续表 A.3.1

类型	EXPRESS 描述
任务类型枚举 (IfcTaskTypeEnum)	TYPE IfcTaskTypeEnum = ENUMERATION OF (ATTENDANCE, CONSTRUCTION, DEMOLITION, DISMANTLE, DISPOSAL, INSTALLATION, LOGISTIC, MAINTENANCE, MOVE, OPERATION, REMOVAL, RENOVATION, USERDEFINED, NOTDEFINED); END_TYPE
工作日历类型枚举 (IfcWorkCalendar TypeEnum)	TYPE IfcWorkCalendarTypeEnum = ENUMERATION OF (FIRSTSHIFT, SECONDSHIFT, THIRDSHIFT, USERDEFINED, NOTDEFINED); END_TYPE
工作方案类型枚举 (IfcWorkPlan TypeEnum)	TYPE IfcWorkPlanTypeEnum = ENUMERATION OF (ACTUAL, BASELINE, PLANNED, USERDEFINED, NOTDEFINED); END_TYPE
工作计划类型枚举 (IfcWorkSchedule TypeEnum)	TYPE IfcWorkScheduleTypeEnum = ENUMERATION OF (ACTUAL, BASELINE, PLANNED, USERDEFINED, NOTDEFINED); END_TYPE

A.3.2 过程扩展实体的 EXPRESS 描述应符合表 A.3.2 的规定。

表 A.3.2 过程扩展实体的 EXPRESS 描述

实体	EXPRESS 描述
事件 (IfcEvent)	ENTITY IfcEvent SUBTYPE OF IfcProcess; PredefinedType : OPTIONAL IfcEventTypeEnum; EventTriggerType : OPTIONAL IfcEventTriggerTypeEnum; UserDefinedEventTriggerType : OPTIONAL IfcLabel; EventOccurenceTime : OPTIONAL IfcEventTime; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcEvent TypeEnum. USERDEFINED) OR ((PredefinedType = IfcEventTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : NOT(EXISTS(EventTriggerType)) OR (EventTriggerType <> IfcEventTrigger TypeEnum. USERDEFINED) OR ((EventTriggerType = IfcEventTriggerTypeEnum. USERDEFINED) AND EXISTS(UserDefinedEventTriggerType)); END_ENTITY

续表 A.3.2

实体	EXPRESS 描述
事件类型 (IfcEventType)	ENTITY IfcEventType SUBTYPE OF IfcTypeProcess; PredefinedType : IfcEventTypeEnum; EventTriggerType : IfcEventTriggerTypeEnum; UserDefinedEventTriggerType : OPTIONAL IfcLabel; WHERE CorrectPredefinedType : (PredefinedType <> IfcEventTypeEnum. USERDEFINED) OR ((PredefinedType = IfcEventTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcTypeProcess. ProcessType)) ; CorrectEventTriggerType : (EventTriggerType <> IfcEventTriggerTypeEnum. USERDEFINED) OR ((EventTriggerType = IfcEventTriggerTypeEnum. USERDEFINED) AND EXISTS(UserDefinedEvent TriggerType)) ; END_ENTITY
过程 (IfcProcedure)	ENTITY IfcProcedure SUBTYPE OF IfcProcess; PredefinedType : OPTIONAL IfcProcedureTypeEnum; WHERE HasName : EXISTS(SELF\IfcRoot. Name); CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcProcedureType Enum. USERDEFINED) OR ((PredefinedType = IfcProcedureTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY
过程类型 (IfcProcedureType)	ENTITY IfcProcedureType SUBTYPE OF IfcTypeProcess; PredefinedType : IfcProcedureTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcProcedureTypeEnum. USERDEFINED) OR ((Predefined Type = IfcProcedureTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcTypeProcess. ProcessType)); END_ENTITY
顺序关系 (IfcRelSequence)	ENTITY IfcRelSequence SUBTYPE OF IfcRelConnects; RelatingProcess : IfcProcess; RelatedProcess : IfcProcess; TimeLag : OPTIONAL IfcLagTime; SequenceType : OPTIONAL IfcSequenceEnum; UserDefinedSequenceType : OPTIONAL IfcLabel; WHERE AvoidInconsistentSequence : RelatingProcess :<>: RelatedProcess; CorrectSequenceType : (SequenceType <> IfcSequenceEnum. USERDEFINED) OR ((SequenceType = Ifc SequenceEnum. USERDEFINED) AND EXISTS(UserDefinedSequenceType)); END_ENTITY
任务 (IfcTask)	ENTITY IfcTask SUBTYPE OF IfcProcess; Status : OPTIONAL IfcLabel; WorkMethod : OPTIONAL IfcLabel; IsMilestone : BOOLEAN; Priority : OPTIONAL INTEGER; TaskTime : OPTIONAL IfcTaskTime; PredefinedType : OPTIONAL IfcTaskTypeEnum; WHERE HasName : EXISTS(SELF\IfcRoot. Name); CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcTaskTypeEnum. USERDEFINED) OR ((PredefinedType = IfcTaskTypeEnum. USERDEFINED) AND EXISTS(SELF\Ifc Object. ObjectType)); END_ENTITY

续表 A.3.2

实体	EXPRESS 描述
任务类型 (IfcTaskType)	ENTITY IfcTaskType SUBTYPE OF IfcTypeProcess; PredefinedType : IfcTaskTypeEnum; WorkMethod : OPTIONAL IfcLabel; WHERE CorrectPredefinedType : (PredefinedType <> IfcTaskTypeEnum. USERDEFINED) OR ((PredefinedType = IfcTaskTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcTypeProcess. ProcessType)) ; END_ENTITY
工作日历 (IfcWorkCalendar)	ENTITY IfcWorkCalendar SUBTYPE OF IfcControl; WorkingTimes : OPTIONAL SET [1:?] OF IfcWorkTime; ExceptionTimes : OPTIONAL SET [1:?] OF IfcWorkTime; PredefinedType : OPTIONAL IfcWorkCalendarTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcWorkCalendar TypeEnum. USERDEFINED) OR ((PredefinedType = IfcWorkCalendarTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); END_ENTITY
工作控制 (IfcWorkControl)	ENTITY IfcWorkControl ABSTRACT SUPERTYPE OF(ONEOF(IfcWorkPlan, IfcWorkSchedule)) SUBTYPE OF IfcControl; CreationDate : IfcDateTime; Creators : OPTIONAL SET [1:?] OF IfcPerson; Purpose : OPTIONAL IfcLabel; Duration : OPTIONAL IfcDuration; TotalFloat : OPTIONAL IfcDuration; StartTime : IfcDateTime; FinishTime : OPTIONAL IfcDateTime; END_ENTITY
工作方案 (IfcWorkPlan)	ENTITY IfcWorkPlan SUBTYPE OF IfcWorkControl; PredefinedType : OPTIONAL IfcWorkPlanTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcWorkPlanType Enum. USERDEFINED) OR ((PredefinedType = IfcWorkPlanTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY
工作计划 (IfcWorkSchedule)	ENTITY IfcWorkSchedule SUBTYPE OF IfcWorkControl; PredefinedType : OPTIONAL IfcWorkScheduleTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcWorkSchedule TypeEnum. USERDEFINED) OR ((PredefinedType = IfcWorkScheduleTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); END_ENTITY

A.4 产 品 扩 展

A.4.1 产品扩展类型的 EXPRESS 描述应符合表 A.4.1 的规定。

表 A.4.1 产品扩展类型的 EXPRESS 描述

类型	EXPRESS 描述
装配场地 (IfcAssembly PlaceEnum)	TYPE IfcAssemblyPlaceEnum = ENUMERATION OF (SITE, FACTORY, NOTDEFINED); END_TYPE

续表 A.4.1

类型	EXPRESS 描述
元素装配类型（IfcElementAssemblyTypeEnum）	TYPE IfcElementAssemblyTypeEnum = ENUMERATION OF（ ACCESSORY_ASSEMBLY, ARCH, BEAM_GRID, BRACED_FRAME, GIRDER, REINFORCEMENT_UNIT, RIGID_FRAME, SLAB_FIELD, TRUSS, USERDEFINED, NOTDEFINED); END_TYPE
元素组成（IfcElementCompositionEnum）	TYPE IfcElementCompositionEnum = ENUMERATION OF（ COMPLEX, ELEMENT, PARTIAL); END_TYPE
外部空间元素类型（IfcExternalSpatialElementTypeEnum）	TYPE IfcExternalSpatialElementTypeEnum = ENUMERATION OF（ EXTERNAL, EXTERNAL_EARTH, EXTERNAL_WATER, EXTERNAL_FIRE, USERDEFINED, NOTDEFIEND); END_TYPE
地理元素类型（IfcGeographicElementTypeEnum）	TYPE IfcGeographicElementTypeEnum = ENUMERATION OF（ TERRAIN, USERDEFINED, NOTDEFINED); END_TYPE
网格类型(IfcGridTypeEnum)	TYPE IfcGridTypeEnum = ENUMERATION OF（ RECTANGULAR, RADIAL, TRIANGULAR, IRREGULAR, USERDEFINED, NOTDEFINED); END_TYPE
内/外部(IfcInternalOrExternalEnum)	TYPE IfcInternalOrExternalEnum = ENUMERATION OF（ INTERNAL, EXTERNAL, EXTERNAL_EARTH, EXTERNAL_WATER, EXTERNAL_FIRE, NOTDEFINED); END_TYPE
洞口元素（IfcOpeningElementTypeEnum）	TYPE IfcOpeningElementTypeEnum = ENUMERATION OF（ OPENING, RECESS, USERDEFINED, NOTDEFINED); END_TYPE

续表 A.4.1

类型	EXPRESS 描述
实体/虚拟 (IfcPhysicalOr VirtualEnum)	TYPE IfcPhysicalOrVirtualEnum = ENUMERATION OF (PHYSICAL, VIRTUAL, NOTDEFINED); END_TYPE
投影元素类型 (IfcProjectionElement TypeEnum)	TYPE IfcProjectionElementTypeEnum = ENUMERATION OF (USERDEFINED, NOTDEFINED); END_TYPE
空间类型 (IfcSpaceTypeEnum)	TYPE IfcSpaceTypeEnum = ENUMERATION OF (SPACE, PARKING, GFA, INTERNAL, EXTERNAL, USERDEFINED, NOTDEFINED); END_TYPE
空间区域类型 (IfcSpatialZone TypeEnum)	TYPE IfcSpatialZoneTypeEnum = ENUMERATION OF (CONSTRUCTION, FIRESAFETY, LIGHTING, OCCUPANCY, SECURITY, THERMAL, TRANSPORT, VENTILATION, USERDEFINED, NOTDEFINED); END_TYPE
运输元素类型 (IfcTransportElement TypeEnum)	TYPE IfcTransportElementTypeEnum = ENUMERATION OF (ELEVATOR, ESCALATOR, MOVINGWALKWAY, CRANEWAY, LIFTINGGEAR, USERDEFINED, NOTDEFINED); END_TYPE
空间边界选项 (IfcSpaceBoundary Select)	TYPE IfcSpaceBoundarySelect = SELECT (IfcSpace, IfcExternalSpatialElement); END_TYPE

A.4.2 产品扩展实体的 EXPRESS 描述应符合表 A.4.2 的规定。

表 A.4.2 产品扩展实体的 EXPRESS 描述

实体	EXPRESS 描述
注释 (IfcAnnotation)	ENTITY IfcAnnotation SUBTYPE OF IfcProduct; INVERSE ContainedInStructure : SET [0:1] OF IfcRelContainedInSpatialStructure FOR RelatedElements; END_ENTITY
建筑 (IfcBuilding)	ENTITY IfcBuilding SUBTYPE OF IfcSpatialStructureElement; ElevationOfRefHeight : OPTIONAL IfcLengthMeasure; ElevationOfTerrain : OPTIONAL IfcLengthMeasure; BuildingAddress : OPTIONAL IfcPostalAddress; END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
建筑元素 (IfcBuildingElement)	ENTITY IfcBuildingElement ABSTRACT SUPERTYPE OF(ONEOF(IfcBeam, IfcBuildingElementProxy, IfcChimney, IfcColumn, IfcCovering, IfcCurtainWall, IfcDoor, IfcFooting, IfcMember, IfcPile, IfcPlate, IfcRailing, IfcRamp, IfcRampFlight, IfcRoof, IfcShadingDevice, IfcSlab, IfcStair, IfcStairFlight, IfcWall, IfcWindow)) SUBTYPE OF IfcElement; INVERSE HasCoverings : SET OF IfcRelCoversBldgElements FOR RelatingBuildingElement; WHERE MaxOneMaterialAssociation : SIZEOF (QUERY(temp <* SELF\IfcObjectDefinition.HasAssociations | 'IFCPRODUCTEXTENSION.IFCRELASSOCIATESMATERIAL' IN TYPEOF(temp))) <= 1; END_ENTITY
建筑元素类型 (IfcBuilding ElementType)	ENTITY IfcBuildingElementType ABSTRACT SUPERTYPE OF(ONEOF(IfcBeamType, IfcBuildingElementProxyType, IfcChimneyType, IfcColumnType, IfcCoveringType, IfcCurtainWallType, IfcDoorType, IfcFootingType, IfcMemberType, IfcPileType, IfcPlateType, IfcRailingType, IfcRampFlightType, IfcRampType, IfcRoofType, IfcShadingDeviceType, IfcSlabType, IfcStairFlightType, IfcStairType, IfcWallType, IfcWindowType)) SUBTYPE OF IfcElementType; END_ENTITY
建筑楼层 (IfcBuildingStorey)	ENTITY IfcBuildingStorey SUBTYPE OF IfcSpatialStructureElement; Elevation : OPTIONAL IfcLengthMeasure; END_ENTITY
土木工程元素 (IfcCivilElement)	ENTITY IfcCivilElement SUBTYPE OF IfcElement; END_ENTITY
土木工程元素类型 (IfcCivilElementType)	ENTITY IfcCivilElementType SUBTYPE OF IfcElementType; END_ENTITY
分布式元素 (IfcDistribution Element)	ENTITY IfcDistributionElement SUPERTYPE OF(ONEOF(IfcDistributionControlElement, IfcDistributionFlowElement)) SUBTYPE OF IfcElement; INVERSE HasPorts : SET OF IfcRelConnectsPortToElement FOR RelatedElement; END_ENTITY
分布式元素类型 (IfcDistribution ElementType)	ENTITY IfcDistributionElementType SUPERTYPE OF(ONEOF(IfcDistributionControlElementType, IfcDistributionFlowElementType)) SUBTYPE OF IfcElementType; END_ENTITY
元素 (IfcElement)	ENTITY IfcElement ABSTRACT SUPERTYPE OF(ONEOF(IfcBuildingElement, IfcCivilElement, IfcDistributionElement, IfcElementAssembly, IfcElementComponent, IfcFeatureElement, IfcFurnishingElement, IfcGeographicElement, IfcTransportElement, IfcVirtualElement)) SUBTYPE OF IfcProduct; Tag : OPTIONAL IfcIdentifier; INVERSE FillsVoids : SET [0:1] OF IfcRelFillsElement FOR RelatedBuildingElement; ConnectedTo : SET OF IfcRelConnectsElements FOR RelatingElement; IsInterferedByElements : SET OF IfcRelInterferesElements FOR RelatedElement; InterferesElements : SET OF IfcRelInterferesElements FOR RelatingElement; HasProjections : SET OF IfcRelProjectsElement FOR RelatingElement; ReferencedInStructures : SET OF IfcRelReferencedInSpatialStructure FOR RelatedElements; HasOpenings : SET OF IfcRelVoidsElement FOR RelatingBuildingElement; IsConnectionRealization : SET OF IfcRelConnectsWithRealizingElements FOR RealizingElements; ProvidesBoundaries : SET OF IfcRelSpaceBoundary FOR RelatedBuildingElement; ConnectedFrom : SET OF IfcRelConnectsElements FOR RelatedElement; ContainedInStructure : SET [0:1] OF IfcRelContainedInSpatialStructure FOR RelatedElements; END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
元素集合 (IfcElementAssembly)	ENTITY IfcElementAssembly SUBTYPE OF IfcElement; AssemblyPlace : OPTIONAL IfcAssemblyPlaceEnum; PredefinedType : OPTIONAL IfcElementAssemblyTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcElementAssembly TypeEnum. USERDEFINED) OR ((PredefinedType = IfcElementAssemblyTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPRODUCTEXTEN SION. IFCELEMENTASSEMBLYTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
元素集合类型 (IfcElement AssemblyType)	ENTITY IfcElementAssemblyType SUBTYPE OF IfcElementType; PredefinedType : IfcElementAssemblyTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcElementAssemblyTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElementAssemblyTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
元素数量 (IfcElementQuantity)	ENTITY IfcElementQuantity SUBTYPE OF IfcQuantitySet; MethodOfMeasurement : OPTIONAL IfcLabel; Quantities : SET [1:?] OF IfcPhysicalQuantity; WHERE UniqueQuantityNames : IfcUniqueQuantityNames(Quantities); END_ENTITY
元素类型 (IfcElementType)	ENTITY IfcElementType ABSTRACT SUPERTYPE OF(ONEOF(IfcBuildingElementType, IfcCivilElementType, IfcDistributionEle mentType, IfcElementAssemblyType, IfcElementComponentType, IfcFurnishingElementType, IfcGeo graphicElementType, IfcTransportElementType)) SUBTYPE OF IfcTypeProduct; ElementType : OPTIONAL IfcLabel; END_ENTITY
外部空间元素 (IfcExternal SpatialElement)	ENTITY IfcExternalSpatialElement SUBTYPE OF IfcExternalSpatialStructureElement; PredefinedType : OPTIONAL IfcExternalSpatialElementTypeEnum; INVERSE BoundedBy : SET OF IfcRelSpaceBoundary FOR RelatingSpace; END_ENTITY
外部空间结构元素 (IfcExternalSpatial StructureElement)	ENTITY IfcExternalSpatialStructureElement ABSTRACT SUPERTYPE OF(IfcExternalSpatialElement) SUBTYPE OF IfcSpatialElement; END_ENTITY
特征元素(IfcFeature Element)	ENTITY IfcFeatureElement ABSTRACT SUPERTYPE OF(ONEOF(IfcFeatureElementAddition, IfcFeatureElementSubtraction, Ifc SurfaceFeature))SUBTYPE OF IfcElement; END_ENTITY
特征元素增加 (IfcFeatureElement Addition)	ENTITY IfcFeatureElementAddition ABSTRACT SUPERTYPE OF(IfcProjectionElement) SUBTYPE OF IfcFeatureElement; INVERSE ProjectsElements : IfcRelProjectsElement FOR RelatedFeatureElement; END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
特征元素相减 (IfcFeatureElement Subtraction)	ENTITY IfcFeatureElementSubtraction ABSTRACT SUPERTYPE OF(ONEOF(IfcOpeningElement, IfcVoidingFeature)) SUBTYPE OF IfcFeatureElement; INVERSE VoidsElements : IfcRelVoidsElement FOR RelatedOpeningElement; WHERE HasNoSubtraction : SIZEOF(SELF\IfcElement. HasOpenings) = 0; IsNotFilling : SIZEOF(SELF\IfcElement. FillsVoids) = 0; END_ENTITY
家装元素 (IfcFurnishingElement)	ENTITY IfcFurnishingElement SUPERTYPE OF(ONEOF(IfcFurniture, IfcSystemFurnitureElement)) SUBTYPE OF IfcElement; END_ENTITY
家装元素类型 (IfcFurnishing ElementType)	ENTITY IfcFurnishingElementType SUPERTYPE OF(ONEOF(IfcFurnitureType, IfcSystemFurnitureElementType)) SUBTYPE OF IfcElementType; END_ENTITY
地理元素 (IfcGeographicElement)	ENTITY IfcGeographicElement SUBTYPE OF IfcElement; PredefinedType : OPTIONAL IfcGeographicElementTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcGeographicElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcGeographicElementTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPRODUCTEXTENSION. IFCGEOGRAPHICELEMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
地理元素类型 (IfcGeographic ElementType)	ENTITY IfcGeographicElementType SUBTYPE OF IfcElementType; PredefinedType : IfcGeographicElementTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcGeographicElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcGeographicElementTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
网格 (IfcGrid)	ENTITY IfcGrid SUBTYPE OF IfcProduct; UAxes : LIST [1:?] OF UNIQUE IfcGridAxis; VAxes : LIST [1:?] OF UNIQUE IfcGridAxis; WAxes : OPTIONAL LIST [1:?] OF UNIQUE IfcGridAxis; PredefinedType : OPTIONAL IfcGridTypeEnum; INVERSE ContainedInStructure : SET [0:1] OF IfcRelContainedInSpatialStructure FOR RelatedElements; WHERE HasPlacement : EXISTS(SELF\IfcProduct. ObjectPlacement); END_ENTITY
开洞元素 (IfcOpeningElement)	ENTITY IfcOpeningElement SUPERTYPE OF(IfcOpeningStandardCase) SUBTYPE OF IfcFeatureElementSubtraction; PredefinedType : OPTIONAL IfcOpeningElementTypeEnum; INVERSE HasFillings : SET OF IfcRelFillsElement FOR RelatingOpeningElement; END_ENTITY
标准洞口形式 (IfcOpeningStandard Case)	ENTITY IfcOpeningStandardCase SUBTYPE OF IfcOpeningElement; END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
端口 (IfcPort)	ENTITY IfcPort ABSTRACT SUPERTYPE OF(IfcDistributionPort) SUBTYPE OF IfcProduct; INVERSE ContainedIn : SET [0:1] OF IfcRelConnectsPortToElement FOR RelatingPort; ConnectedFrom : SET [0:1] OF IfcRelConnectsPorts FOR RelatedPort; ConnectedTo : SET [0:1] OF IfcRelConnectsPorts FOR RelatingPort; END_ENTITY
投影元素 (IfcProjectionElement)	ENTITY IfcProjectionElement SUBTYPE OF IfcFeatureElementAddition; PredefinedType : OPTIONAL IfcProjectionElementTypeEnum; END_ENTITY
关联材料关系 (IfcRelAssociates Material)	ENTITY IfcRelAssociatesMaterial SUBTYPE OF IfcRelAssociates; RelatingMaterial : IfcMaterialSelect; WHERE NoVoidElement : SIZEOF(QUERY(temp <* SELF\IfcRelAssociates.RelatedObjects | ('IFCPRODUCTEXTENSION.IFCFEATUREELEMENTSUBTRACTION' IN TYPEOF(temp)) OR ('IFCPRODUCTEXTENSION.IFCVIRTUALELEMENT' IN TYPEOF(temp)))) = 0; AllowedElements : SIZEOF(QUERY(temp <* SELF\IfcRelAssociates.RelatedObjects | (SIZEOF(TYPEOF(temp) * ['IFCPRODUCTEXTENSION.IFCELEMENT','IFCPRODUCTEXTENSION.IFCELEMENTTYPE','IFCSHAREDBLDGELEMENTS.IFCWINDOWSTYLE','IFCSHAREDBLDGELEMENTS.IFCDOORSTYLE','IFCSTRUCTURALANALYSISDOMAIN.IFCSTRUCTURALMEMBER','IFCPRODUCTEXTENSION.IFCPORT']) = 0))) = 0; END_ENTITY
连接元素关系 (IfcRelConnects Elements)	ENTITY IfcRelConnectsElements SUPERTYPE OF(ONEOF(IfcRelConnectsPathElements, IfcRelConnectsWithRealizingElements)) SUBTYPE OF IfcRelConnects; ConnectionGeometry : OPTIONAL IfcConnectionGeometry; RelatingElement : IfcElement; RelatedElement : IfcElement; WHERE NoSelfReference : RelatingElement :<>: RelatedElement; END_ENTITY
连接端口关系 (IfcRelConnectsPorts)	ENTITY IfcRelConnectsPorts SUBTYPE OF IfcRelConnects; RelatingPort : IfcPort; RelatedPort : IfcPort; RealizingElement : OPTIONAL IfcElement; WHERE NoSelfReference : RelatingPort :<>: RelatedPort; END_ENTITY
连接端口元素关系 (IfcRelConnects PortToElement)	ENTITY IfcRelConnectsPortToElement SUBTYPE OF IfcRelConnects; RelatingPort : IfcPort; RelatedElement : IfcDistributionElement; END_ENTITY
连接实现元素关系 (IfcRelConnectsWith RealizingElements)	ENTITY IfcRelConnectsWithRealizingElements SUBTYPE OF IfcRelConnectsElements; RealizingElements : SET [1:?] OF IfcElement; ConnectionType : OPTIONAL IfcLabel; END_ENTITY
包含于空间结构关系 (IfcRelContainedIn SpatialStructure)	ENTITY IfcRelContainedInSpatialStructure SUBTYPE OF IfcRelConnects; RelatedElements : SET [1:?] OF IfcProduct; RelatingStructure : IfcSpatialElement; WHERE WR31 : SIZEOF(QUERY(temp <* RelatedElements | 'IFCPRODUCTEXTENSION.IFCSPATIALSTRUCTUREELEMENT' IN TYPEOF(temp))) = 0; END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
填充元素关系 (IfcRelFillsElement)	ENTITY IfcRelFillsElement SUBTYPE OF IfcRelConnects; RelatingOpeningElement : IfcOpeningElement; RelatedBuildingElement : IfcElement; END_ENTITY
干涉元素关系 (IfcRelInterferes Elements)	ENTITY IfcRelInterferesElements SUBTYPE OF IfcRelConnects; RelatingElement : IfcElement; RelatedElement : IfcElement; InterferenceGeometry : OPTIONAL IfcConnectionGeometry; InterferenceType : OPTIONAL IfcIdentifier; ImpliedOrder : LOGICAL; WHERE NotSelfReference : RelatingElement :<>: RelatedElement; END_ENTITY
投影元素关系 (IfcRelProjects Element)	ENTITY IfcRelProjectsElement SUBTYPE OF IfcRelDecomposes; RelatingElement : IfcElement; RelatedFeatureElement : IfcFeatureElementAddition; END_ENTITY
参考空间结构关系 (IfcRelReferencedIn SpatialStructure)	ENTITY IfcRelReferencedInSpatialStructure SUBTYPE OF IfcRelConnects; RelatedElements : SET [1:?] OF IfcProduct; RelatingStructure : IfcSpatialElement; WHERE WR31 : SIZEOF(QUERY(temp <* RelatedElements |'IFCPRODUCTEXTENSION. IFCSPATIALSTRUCTUREELEMENT'IN TYPEOF(temp))) = 0; END_ENTITY
建筑服务关系 (IfcRelServices Buildings)	ENTITY IfcRelServicesBuildings SUBTYPE OF IfcRelConnects; RelatingSystem : IfcSystem; RelatedBuildings : SET [1:?] OF IfcSpatialElement; END_ENTITY
空间边界关系 (IfcRelSpaceBoundary)	ENTITY IfcRelSpaceBoundary SUPERTYPE OF(IfcRelSpaceBoundary1stLevel) SUBTYPE OF IfcRelConnects; RelatingSpace : IfcSpaceBoundarySelect; RelatedBuildingElement : IfcElement; ConnectionGeometry : OPTIONAL IfcConnectionGeometry; PhysicalOrVirtualBoundary : IfcPhysicalOrVirtualEnum; InternalOrExternalBoundary : IfcInternalOrExternalEnum; WHERE CorrectPhysOrVirt : ((PhysicalOrVirtualBoundary = IfcPhysicalOrVirtualEnum. Physical) AND (NOT('IF CPRODUCTEXTENSION. IFCVIRTUALELEMENT ' IN TYPEOF (RelatedBuildingElement)))) OR ((PhysicalOrVirtualBoundary = IfcPhysicalOrVirtualEnum. Virtual) AND (('IFCPRODUCTEXTENSION. IFCVIRTUALELEMENT'IN TYPEOF(RelatedBuildingElement)) OR ('IFCPRODUCTEXTEN SION. IFCOPENINGELEMENT'IN TYPEOF(RelatedBuildingElement)))) OR (PhysicalOrVirtualBoundary = IfcPhysicalOrVirtualEnum. NotDefined); END_ENTITY
第一级空间边界关系 (IfcRelSpace Boundary1stLevel)	ENTITY IfcRelSpaceBoundary1stLevel SUPERTYPE OF(IfcRelSpaceBoundary2ndLevel) SUBTYPE OF IfcRelSpaceBoundary; ParentBoundary : OPTIONAL IfcRelSpaceBoundary1stLevel; INVERSE InnerBoundaries : SET OF IfcRelSpaceBoundary1stLevel FOR ParentBoundary; END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
第二级空间边界关系 (IfcRelSpace Boundary2ndLevel)	ENTITY IfcRelSpaceBoundary2ndLevel SUBTYPE OF IfcRelSpaceBoundary1stLevel; CorrespondingBoundary : OPTIONAL IfcRelSpaceBoundary2ndLevel; INVERSE Corresponds : SET [0:1] OF IfcRelSpaceBoundary2ndLevel FOR CorrespondingBoundary; END_ENTITY
开洞元素关系 (IfcRelVoidsElement)	ENTITY IfcRelVoidsElement SUBTYPE OF IfcRelDecomposes; RelatingBuildingElement : IfcElement; RelatedOpeningElement : IfcFeatureElementSubtraction; END_ENTITY
场地 (IfcSite)	ENTITY IfcSite SUBTYPE OF IfcSpatialStructureElement; RefLatitude : OPTIONAL IfcCompoundPlaneAngleMeasure; RefLongitude : OPTIONAL IfcCompoundPlaneAngleMeasure; RefElevation : OPTIONAL IfcLengthMeasure; LandTitleNumber : OPTIONAL IfcLabel; SiteAddress : OPTIONAL IfcPostalAddress; END_ENTITY
空间 (IfcSpace)	ENTITY IfcSpace SUBTYPE OF IfcSpatialStructureElement; PredefinedType : OPTIONAL IfcSpaceTypeEnum; ElevationWithFlooring : OPTIONAL IfcLengthMeasure; INVERSE HasCoverings : SET OF IfcRelCoversSpaces FOR RelatingSpace; BoundedBy : SET OF IfcRelSpaceBoundary FOR RelatingSpace; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSpace TypeEnum. USERDEFINED) OR ((PredefinedType = IfcSpaceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPRODUCTEXTENSION. IFCSPACETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
空间类型 (IfcSpaceType)	ENTITY IfcSpaceType SUBTYPE OF IfcSpatialStructureElementType; PredefinedType : IfcSpaceTypeEnum; LongName : OPTIONAL IfcLabel; WHERE CorrectPredefinedType : (PredefinedType <> IfcSpaceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSpaceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcSpatialElementType. ElementType)); END_ENTITY
空间元素 (IfcSpatialElement)	ENTITY IfcSpatialElement ABSTRACT SUPERTYPE OF (ONEOF (IfcExternalSpatialStructureElement, IfcSpatialStructureElement, IfcSpatialZone)) SUBTYPE OF IfcProduct; LongName : OPTIONAL IfcLabel; INVERSE ContainsElements : SET OF IfcRelContainedInSpatialStructure FOR RelatingStructure; ServicedBySystems : SET OF IfcRelServicesBuildings FOR RelatedBuildings; ReferencesElements : SET OF IfcRelReferencedInSpatialStructure FOR RelatingStructure; END_ENTITY
空间元素类型 (IfcSpatial ElementType)	ENTITY IfcSpatialElementType ABSTRACT SUPERTYPE OF(ONEOF(IfcSpatialStructureElementType, IfcSpatialZoneType)) SUBTYPE OF IfcTypeProduct; ElementType : OPTIONAL IfcLabel; END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
空间结构元素 (IfcSpatialStructure Element)	ENTITY IfcSpatialStructureElement ABSTRACT SUPERTYPE OF(ONEOF(IfcBuilding, IfcBuildingStorey, IfcSite, IfcSpace)) SUBTYPE OF IfcSpatialElement; CompositionType : OPTIONAL IfcElementCompositionEnum; WHERE WR41 : (HIINDEX(SELF\IfcObjectDefinition. Decomposes) = 1) AND ('IFCKERNEL. IFCRELAGGREGATES' IN TYPEOF(SELF\IfcObjectDefinition. Decomposes[1])) AND (('IFCKER NEL. IFCPROJECT' IN TYPEOF (SELF\IfcObjectDefinition. Decomposes[1]. RelatingObject)) OR ('IF CPRODUCTEXTENSION. IFCSPATIALSTRUCTUREELEMENT' IN TYPEOF (SELF\IfcObjectDefi nition. Decomposes[1]. RelatingObject))); END_ENTITY
空间结构元素类型 (IfcSpatialStructure ElementType)	ENTITY IfcSpatialStructureElementType ABSTRACT SUPERTYPE OF(IfcSpaceType) SUBTYPE OF IfcSpatialElementType; END_ENTITY
空间区域 (IfcSpatialZone)	ENTITY IfcSpatialZone SUBTYPE OF IfcSpatialElement; PredefinedType : OPTIONAL IfcSpatialZoneTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSpatialZone TypeEnum. USERDEFINED) OR ((PredefinedType = IfcSpatialZoneTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPRODUCTEXTENSION. IFCSPATIALZONETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
空间区域类型 (IfcSpatialZoneType)	ENTITY IfcSpatialZoneType SUBTYPE OF IfcSpatialElementType; PredefinedType : IfcSpatialZoneTypeEnum; LongName : OPTIONAL IfcLabel; WHERE CorrectPredefinedType : (PredefinedType <> IfcSpatialZoneTypeEnum. USERDEFINED) OR ((Pre definedType = IfcSpatialZoneTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcSpatialElementType. ElementType)); END_ENTITY
系统 (IfcSystem)	ENTITY IfcSystem SUPERTYPE OF(ONEOF(IfcBuildingSystem, IfcDistributionSystem, IfcStructuralAnalysisModel, Ifc Zone)) SUBTYPE OF IfcGroup; INVERSE ServicesBuildings : SET [0:1] OF IfcRelServicesBuildings FOR RelatingSystem; END_ENTITY
运输元素 (IfcTransportElement)	ENTITY IfcTransportElement SUBTYPE OF IfcElement; PredefinedType : OPTIONAL IfcTransportElementTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcTransportElement TypeEnum. USERDEFINED) OR ((PredefinedType = IfcTransportElementTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPRODUCTEXTENSION. IFCTRANSPORTELEMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
运输元素类型 (IfcTransport ElementType)	ENTITY IfcTransportElementType SUBTYPE OF IfcElementType; PredefinedType : IfcTransportElementTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcTransportElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcTransportElementTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY

续表 A.4.2

实体	EXPRESS 描述
虚拟元素 (IfcVirtualElement)	ENTITY IfcVirtualElement SUBTYPE OF IfcElement; END_ENTITY
区域 (IfcZone)	ENTITY IfcZone SUBTYPE OF IfcSystem; LongName : OPTIONAL IfcLabel; WHERE WR1 : (SIZEOF(SELF\IfcGroup. IsGroupedBy) = 0) OR (SIZEOF (QUERY (temp <* SELF\IfcGroup. IsGroupedBy[1]. RelatedObjects | NOT(('IFCPRODUCTEXTENSION. IFCZONE' IN TYPEOF(temp)) OR ('IFCPRODUCTEXTENSION. IFCSPACE' IN TYPEOF(temp)) OR ('IFCPRODUCTEXTENSION. IFCSPATIALZONE' IN TYPEOF(temp))))) = 0); END_ENTITY

附录 B　共享层数据模式的 EXPRESS 描述

B.1　共享建筑元素

B.1.1　共享建筑元素类型的 EXPRESS 描述应符合表 B.1.1 的规定。

表 B.1.1　共享建筑元素类型的 EXPRESS 描述

类型	EXPRESS 描述
梁类型 (IfcBeamTypeEnum)	TYPE IfcBeamTypeEnum = ENUMERATION OF (BEAM, JOIST, HOLLOWCORE, LINTEL, SPANDREL, T_BEAM, USERDEFINED, NOTDEFINED); END_TYPE
代理元素类型 (IfcBuildingElement ProxyTypeEnum)	TYPE IfcBuildingElementProxyTypeEnum = ENUMERATION OF (COMPLEX, ELEMENT, PARTIAL, PROVISIONFORVOID, USERDEFINED, NOTDEFINED); END_TYPE
建筑系统类型 (IfcBuildingSystem TypeEnum)	TYPE IfcBuildingSystemTypeEnum = ENUMERATION OF (FENESTRATION, FOUNDATION, LOADBEARING, OUTERSHELL, SHADING, TRANSPORT, USERDEFINED, NOTDEFINED); END_TYPE
烟囱类型 (IfcChimneyTypeEnum)	TYPE IfcChimneyTypeEnum = ENUMERATION OF (USERDEFINED, NOTDEFINED); END_TYPE
柱类型 (IfcColumnTypeEnum)	TYPE IfcColumnTypeEnum = ENUMERATION OF (COLUMN, PILASTER, USERDEFINED, NOTDEFINED); END_TYPE
连接类型 (IfcConnection TypeEnum)	TYPE IfcConnectionTypeEnum = ENUMERATION OF (ATPATH, ATSTART, ATEND, NOTDEFINED); END_TYPE

续表 B.1.1

类型	EXPRESS 描述
覆盖物类型（IfcCoveringTypeEnum）	TYPE IfcCoveringTypeEnum = ENUMERATION OF (CEILING, FLOORING, CLADDING, ROOFING, MOLDING, SKIRTINGBOARD, INSULATION, MEMBRANE, SLEEVING, WRAPPING, USERDEFINED, NOTDEFINED); END_TYPE
幕墙类型（IfcCurtainWallTypeEnum）	TYPE IfcCurtainWallTypeEnum = ENUMERATION OF (USERDEFINED, NOTDEFINED); END_TYPE
门类型（IfcDoorTypeEnum）	TYPE IfcDoorTypeEnum = ENUMERATION OF (DOOR, GATE, TRAPDOOR, USERDEFINED, NOTDEFINED); END_TYPE
门开启类型（IfcDoorTypeOperationEnum）	TYPE IfcDoorTypeOperationEnum = ENUMERATION OF (SINGLE_SWING_LEFT, SINGLE_SWING_RIGHT, DOUBLE_DOOR_SINGLE_SWING, DOUBLE_DOOR_SINGLE_SWING_OPPOSITE_LEFT, DOUBLE_DOOR_SINGLE_SWING_OPPOSITE_RIGHT, DOUBLE_SWING_LEFT, DOUBLE_SWING_RIGHT, DOUBLE_DOOR_DOUBLE_SWING, SLIDING_TO_LEFT, SLIDING_TO_RIGHT, DOUBLE_DOOR_SLIDING, FOLDING_TO_LEFT, FOLDING_TO_RIGHT, DOUBLE_DOOR_FOLDING, REVOLVING, ROLLINGUP, SWING_FIXED_LEFT, SWING_FIXED_RIGHT, USERDEFINED, NOTDEFINED); END_TYPE
线性构件类型（IfcMemberTypeEnum）	TYPE IfcMemberTypeEnum = ENUMERATION OF (BRACE, CHORD, COLLAR, MEMBER, MULLION, PLATE, POST, PURLIN, RAFTER, STRINGER, STRUT, STUD, USERDEFINED, NOTDEFINED); END_TYPE

续表 B.1.1

类型	EXPRESS 描述
平板类型 (IfcPlateTypeEnum)	TYPE IfcPlateTypeEnum = ENUMERATION OF (CURTAIN_PANEL, SHEET, USERDEFINED, NOTDEFINED); END_TYPE
扶栏类型 (IfcRailingTypeEnum)	TYPE IfcRailingTypeEnum = ENUMERATION OF (HANDRAIL, GUARDRAIL, BALUSTRADE, USERDEFINED, NOTDEFINED); END_TYPE
坡道段类型 (IfcRampFlight TypeEnum)	TYPE IfcRampFlightTypeEnum = ENUMERATION OF (STRAIGHT, SPIRAL, USERDEFINED, NOTDEFINED); END_TYPE
坡道类型 (IfcRampTypeEnum)	TYPE IfcRampTypeEnum = ENUMERATION OF (STRAIGHT_RUN_RAMP, TWO_STRAIGHT_RUN_RAMP, QUARTER_TURN_RAMP, TWO_QUARTER_TURN_RAMP, HALF_TURN_RAMP, SPIRAL_RAMP, USERDEFINED, NOTDEFINED); END_TYPE
屋顶类型 (IfcRoofTypeEnum)	TYPE IfcRoofTypeEnum = ENUMERATION OF (FLAT_ROOF, SHED_ROOF, GABLE_ROOF, HIP_ROOF, HIPPED_GABLE_ROOF, GAMBREL_ROOF, MANSARD_ROOF, BARREL_ROOF, RAINBOW_ROOF, BUTTERFLY_ROOF, PAVILION_ROOF, DOME_ROOF, FREEFORM, USERDEFINED, NOTDEFINED); END_TYPE
遮阳设施类型 (IfcShadingDevice TypeEnum)	TYPE IfcShadingDeviceTypeEnum = ENUMERATION OF (JALOUSIE, SHUTTER, AWNING, USERDEFINED, NOTDEFINED); END_TYPE

续表 B.1.1

类型	EXPRESS 描述
板类型 (IfcSlabTypeEnum)	TYPE IfcSlabTypeEnum = ENUMERATION OF (FLOOR, ROOF, LANDING, BASESLAB, USERDEFINED, NOTDEFINED); END_TYPE
梯段类型 (IfcStairFlight TypeEnum)	TYPE IfcStairFlightTypeEnum = ENUMERATION OF (STRAIGHT, WINDER, SPIRAL, CURVED, FREEFORM, USERDEFINED, NOTDEFINED); END_TYPE
楼梯类型 (IfcStairTypeEnum)	TYPE IfcStairTypeEnum = ENUMERATION OF (STRAIGHT_RUN_STAIR, TWO_STRAIGHT_RUN_STAIR, QUARTER_WINDING_STAIR, QUARTER_TURN_STAIR, HALF_WINDING_STAIR, HALF_TURN_STAIR, TWO_QUARTER_WINDING_STAIR, TWO_QUARTER_TURN_STAIR, THREE_QUARTER_WINDING_STAIR, THREE_QUARTER_TURN_STAIR, SPIRAL_STAIR, DOUBLE_RETURN_STAIR, CURVED_RUN_STAIR, TWO_CURVED_RUN_STAIR, USERDEFINED, NOTDEFINED); END_TYPE
墙类型 (IfcWallTypeEnum)	TYPE IfcWallTypeEnum = ENUMERATION OF (MOVABLE, PARAPET, PARTITIONING, PLUMBINGWALL, SHEAR, SOLIDWALL, STANDARD, POLYGONAL, ELEMENTEDWALL, USERDEFINED, NOTDEFINED); END_TYPE
窗类型 (IfcWindowType Enum)	TYPE IfcWindowTypeEnum = ENUMERATION OF (WINDOW, SKYLIGHT, LIGHTDOME, USERDEFINED, NOTDEFINED); END_TYPE

续表 B. 1. 1

类型	EXPRESS 描述
窗分隔类型（IfcWindowTypePartitioningEnum）	TYPE IfcWindowTypePartitioningEnum = ENUMERATION OF (SINGLE_PANEL, DOUBLE_PANEL_VERTICAL, DOUBLE_PANEL_HORIZONTAL, TRIPLE_PANEL_VERTICAL, TRIPLE_PANEL_BOTTOM, TRIPLE_PANEL_TOP, TRIPLE_PANEL_LEFT, TRIPLE_PANEL_RIGHT, TRIPLE_PANEL_HORIZONTAL, USERDEFINED, NOTDEFINED); END_TYPE

B. 1. 2 共享建筑元素实体的 EXPRESS 描述应符合表 B. 1. 2 的规定。

表 B. 1. 2 共享建筑元素实体的 EXPRESS 描述

实体	EXPRESS 描述
梁（IfcBeam）	ENTITY IfcBeam SUPERTYPE OF(IfcBeamStandardCase) SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcBeamTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> Ifc BeamTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBeamTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCBEAMTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
标准梁（IfcBeamStandard Case）	ENTITY IfcBeamStandardCase SUBTYPE OF IfcBeam; WHERE HasMaterialProfileSetUsage : SIZEOF (QUERY(temp <* USEDIN(SELF, 'IFCKERNEL. IFCRELASSOCIATES. RELATEDOBJECTS') | ('IFCPRODUCTEXTENSION. IFCRELASSOCIATESMATERIAL' IN TYPEOF(temp)) AND ('IFCMATERIALRE SOURCE. IFCMATERIALPROFILESETUSAGE' IN TYPEOF(temp. RelatingMaterial)))) = 1; END_ENTITY
梁类型（IfcBeamType）	ENTITY IfcBeamType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcBeamTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcBeamTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBeamTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
代理建筑元素（IfcBuildingElement Proxy）	ENTITY IfcBuildingElementProxy SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcBuildingElementProxyTypeEnum; WHERE HasObjectName : EXISTS(SELF\IfcRoot. Name); CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcBuildingElement ProxyTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBuildingElementProxyTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCBUILDIN GELEMENTPROXYTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
代理建筑元素类型 (IfcBuildingElement ProxyType)	ENTITY IfcBuildingElementProxyType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcBuildingElementProxyTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcBuildingElementProxyTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBuildingElementProxy TypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
建筑系统 (IfcBuildingSystem)	ENTITY IfcBuildingSystem SUBTYPE OF IfcSystem; PredefinedType : OPTIONAL IfcBuildingSystemTypeEnum; END_ENTITY
烟囱 (IfcChimney)	ENTITY IfcChimney SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcChimneyTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcChimney TypeEnum. USERDEFINED) OR ((PredefinedType = IfcChimneyTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCCHIMNEYTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
烟囱类型 (IfcChimneyType)	ENTITY IfcChimneyType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcChimneyTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcChimneyTypeEnum. USERDEFINED) OR ((Predefined Type = IfcChimneyTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
柱 (IfcColumn)	ENTITY IfcColumn SUPERTYPE OF(IfcColumnStandardCase) SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcColumnTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcColumn TypeEnum. USERDEFINED) OR ((PredefinedType = IfcColumnTypeEnum. USERDEFINED) AND EX ISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCCOLUMNTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
标准柱 (IfcColumnStandard Case)	ENTITY IfcColumnStandardCase SUBTYPE OF IfcColumn; WHERE HasMaterialProfileSetUsage : SIZEOF (QUERY(temp <* USEDIN(SELF, 'IFCKERNEL. IFCRELASSOCIATES. RELATEDOBJECTS') | ('IFCPRODUCTEXTENSION. IFCRELASSOCIATESMATERIAL' IN TYPEOF(temp)) AND ('IFCMATERIALR ESOURCE. IFCMATERIALPROFILESETUSAGE' IN TYPEOF(temp. RelatingMaterial)))) = 1; END_ENTITY
柱类型 (IfcColumnType)	ENTITY IfcColumnType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcColumnTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcColumnTypeEnum. USERDEFINED) OR ((Predefined Type = IfcColumnTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
覆盖物 (IfcCovering)	ENTITY IfcCovering SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcCoveringTypeEnum; INVERSE CoversSpaces : SET [0:1] OF IfcRelCoversSpaces FOR RelatedCoverings; CoversElements : SET [0:1] OF IfcRelCoversBldgElements FOR RelatedCoverings; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCovering TypeEnum. USERDEFINED) OR ((PredefinedType = IfcCoveringTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELE MENTS. IFCCOVERINGTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
覆盖物类型 (IfcCoveringType)	ENTITY IfcCoveringType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcCoveringTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCoveringTypeEnum. USERDEFINED) OR ((Predefined Type = IfcCoveringTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElcmcntTypc. ElcmcntType)); END_ENTITY
幕墙 (IfcCurtainWall)	ENTITY IfcCurtainWall SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcCurtainWallTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCurtainWallTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCurtainWall TypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGEL EMENTS. IFCCURTAINWALLTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
幕墙类型 (IfcCurtainWallType)	ENTITY IfcCurtainWallType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcCurtainWallTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCurtainWallTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCurtainWallTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
门(IfcDoor)	ENTITY IfcDoor SUPERTYPE OF(IfcDoorStandardCase) SUBTYPE OF IfcBuildingElement; OverallHeight : OPTIONAL IfcPositiveLengthMeasure; OverallWidth : OPTIONAL IfcPositiveLengthMeasure; PredefinedType : OPTIONAL IfcDoorTypeEnum; OperationType : OPTIONAL IfcDoorTypeOperationEnum; UserDefinedOperationType : OPTIONAL IfcLabel; WHERE CorrectStyleAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCDOORTYPE 'IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
标准门 (IfcDoorStandardCase)	ENTITY IfcDoorStandardCase SUBTYPE OF IfcDoor; END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
门类型 (IfcDoorType)	ENTITY IfcDoorType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcDoorTypeEnum; OperationType : IfcDoorTypeOperationEnum; ParameterTakesPrecedence : OPTIONAL BOOLEAN; UserDefinedOperationType : OPTIONAL IfcLabel; WHERE CorrectPredefinedType : (PredefinedType <> IfcDoorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDoorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
线性构件 (IfcMember)	ENTITY IfcMember SUPERTYPE OF(IfcMemberStandardCase) SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcMemberTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcMember TypeEnum. USERDEFINED) OR ((PredefinedType = IfcMemberTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCMEMBERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
标准线性构件 (IfcMemberStandard Case)	ENTITY IfcMemberStandardCase SUBTYPE OF IfcMember; WHERE HasMaterialProfileSetUsage : SIZEOF (QUERY(temp <* USEDIN(SELF,'IFCKERNEL. IFCRELASSOCIATES. RELATEDOBJECTS')	('IFCPRODUCTEXTENSION. IFCRELASSOCIATESMATERIAL' IN TYPEOF(temp)) AND ('IFCMATERIALRESOURCE. IFCMATERIALPROFILESETUSAGE' IN TYPEOF(temp. RelatingMaterial)))) = 1; END_ENTITY
线性构件类型 (IfcMemberType)	ENTITY IfcMemberType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcMemberTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcMemberTypeEnum. USERDEFINED) OR ((Predefined Type = IfcMemberTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
平板 (IfcPlate)	ENTITY IfcPlate SUPERTYPE OF(IfcPlateStandardCase) SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcPlateTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcPlate TypeEnum. USERDEFINED) OR ((PredefinedType = IfcPlateTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCPLATETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
标准平板 (IfcPlateStandardCase)	ENTITY IfcPlateStandardCase SUBTYPE OF IfcPlate; WHERE HasMaterialLayerSetUsage : SIZEOF (QUERY(temp <* USEDIN(SELF,'IFCKERNEL. IFCRELASSOCIATES. RELATEDOBJECTS')	('IFCPRODUCTEXTENSION. IFCRELASSOCIATESMATERIAL' IN TYPEOF(temp)) AND ('IFCMATERIALRESOURCE. IFCMATERIALLAYERSETUSAGE' IN TYPEOF(temp. RelatingMaterial)))) = 1; END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
平板类型 (IfcPlateType)	ENTITY IfcPlateType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcPlateTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcPlateTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPlateTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
扶栏 (IfcRailing)	ENTITY IfcRailing SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcRailingTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcRailing TypeEnum. USERDEFINED) OR ((PredefinedType = IfcRailingTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELE MENTS. IFCRAILINGTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
扶栏类型 (IfcRailingType)	ENTITY IfcRailingType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcRailingTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcRailingTypeEnum. USERDEFINED) OR ((Predefined Type = IfcRailingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
坡道 (IfcRamp)	ENTITY IfcRamp SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcRampTypeEnum; WHERE CorrectShapeDecomposition : (HIINDEX(SELF\IfcObjectDefinition. IsDecomposedBy) = 0) OR ((HIIN DEX(SELF\IfcObjectDefinition. IsDecomposedBy) = 1) AND ((NOT(EXISTS(SELF\IfcProduct. Repres entation))) OR ((EXISTS(SELF\IfcProduct. Representation)) AND (SIZEOF(QUERY(temp <* SELF\ IfcProduct. Representation. Representations | temp. RepresentationIdentifier = 'Body')) = 0)))); CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcRamp TypeEnum. USERDEFINED) OR ((PredefinedType = IfcRampTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCRAMP TYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
坡道段 (IfcRampFlight)	ENTITY IfcRampFlight SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcRampFlightTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcRampFlightType Enum. USERDEFINED) OR ((PredefinedType = IfcRampFlightTypeEnum. USERDEFINED) AND EX-ISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELE MENTS. IFCRAMPFLIGHTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
坡道段类型 (IfcRampFlightType)	ENTITY IfcRampFlightType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcRampFlightTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcRampFlightTypeEnum. USERDEFINED) OR ((PredefinedType = IfcRampFlightTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
坡道类型 (IfcRampType)	ENTITY IfcRampType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcRampTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcRampTypeEnum. USERDEFINED) OR ((PredefinedType = IfcRampTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
路径元素连接关系 (IfcRelConnectsPath Elements)	ENTITY IfcRelConnectsPathElements SUBTYPE OF IfcRelConnectsElements; RelatingPriorities : LIST OF NUMBER; RelatedPriorities : LIST OF NUMBER; RelatedConnectionType : IfcConnectionTypeEnum; RelatingConnectionType : IfcConnectionTypeEnum; WHERE NormalizedRelatingPriorities : (SIZEOF(RelatingPriorities) = 0) OR (SIZEOF (QUERY (temp <* RelatingPriorities | {0.0 <= temp <= 1.0})) = SIZEOF(RelatingPriorities)); NormalizedRelatedPriorities : (SIZEOF(RelatedPriorities) = 0) OR (SIZEOF (QUERY (temp <* RelatedPriorities | {0.0 <= temp <= 1.0})) = SIZEOF(RelatedPriorities)); END_ENTITY
覆盖建筑元素关系 (IfcRelCoversBldg Elements)	ENTITY IfcRelCoversBldgElements SUBTYPE OF IfcRelConnects; RelatingBuildingElement : IfcElement; RelatedCoverings : SET [1:?] OF IfcCovering; END_ENTITY
覆盖空间关系 (IfcRelCoversSpaces)	ENTITY IfcRelCoversSpaces SUBTYPE OF IfcRelConnects; RelatingSpace : IfcSpace; RelatedCoverings : SET [1:?] OF IfcCovering; END_ENTITY
屋顶(IfcRoof)	ENTITY IfcRoof SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcRoofTypeEnum; WHERE CorrectShapeDecomposition : (HIINDEX(SELF\IfcObjectDefinition. IsDecomposedBy) = 0) OR ((HIINDEX (SELF \ IfcObjectDefinition. IsDecomposedBy) = 1) AND ((NOT (EXISTS (SELF \ IfcProduct. Representation))) OR ((EXISTS(SELF\IfcProduct. Representation)) AND (SIZEOF(QUERY(temp <* SELF\IfcProduct. Representation. Representations | temp. RepresentationIdentifier ='Body')) = 0)))); CorrectPredefinedType : NOT (EXISTS (PredefinedType)) OR (PredefinedType <> IfcRoofTypeEnum. USERDEFINED) OR ((PredefinedType = IfcRoofTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCROOFTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
屋顶类型 (IfcRoofType)	ENTITY IfcRoofType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcRoofTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcRoofTypeEnum. USERDEFINED) OR ((PredefinedType = IfcRoofTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
遮阳设施 (IfcShadingDevice)	ENTITY IfcShadingDevice SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcShadingDeviceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcShadingDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcShadingDeviceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCSHADINGDEVICETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
遮阳设施类型 (IfcShadingDeviceType)	ENTITY IfcShadingDeviceType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcShadingDeviceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcShadingDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcShadingDeviceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcElementType. ElementType)); END_ENTITY
板 (IfcSlab)	ENTITY IfcSlab SUPERTYPE OF(ONEOF(IfcSlabElementedCase, IfcSlabStandardCase)) SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcSlabTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSlabTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSlabTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCSLABTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
复合板 (IfcSlabElementedCase)	ENTITY IfcSlabElementedCase SUBTYPE OF IfcSlab; WHERE HasDecomposition : HIINDEX(SELF\IfcObjectDefinition. IsDecomposedBy) > 0; END_ENTITY
标准板 (IfcSlabStandardCase)	ENTITY IfcSlabStandardCase SUBTYPE OF IfcSlab; WHERE HasMaterialLayerSetusage : SIZEOF (QUERY(temp <* USEDIN(SELF,'IFCKERNEL. IFCRELASSOCIATES. RELATEDOBJECTS')	('IFCPRODUCTEXTENSION. IFCRELASSOCIATESMATERIAL' IN TYPEOF(temp)) AND ('IFCMATERIALRE SOURCE. IFCMATERIALLAYERSETUSAGE' IN TYPEOF(temp. RelatingMaterial)))) = 1; END_ENTITY
板类型 (IfcSlabType)	ENTITY IfcSlabType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcSlabTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSlabTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSlabTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
楼梯 (IfcStair)	ENTITY IfcStair SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcStairTypeEnum; WHERE CorrectShapeDecomposition : (HIINDEX(SELF\IfcObjectDefinition. IsDecomposedBy) = 0) OR ((HIINDEX(SELF\IfcObjectDefinition. IsDecomposedBy) = 1) AND ((NOT(EXISTS(SELF\IfcProduct. Representation))) OR ((EXISTS(SELF\IfcProduct. Representation)) AND (SIZEOF(QUERY(temp <* SELF\IfcProduct. Representation. Representations | temp. RepresentationIdentifier ='Body')) = 0)))); CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcStairTypeEnum. USERDEFINED) OR ((PredefinedType = IfcStairTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELEMENTS. IFCSTAIRTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
楼梯段 (IfcStairFlight)	ENTITY IfcStairFlight SUBTYPE OF IfcBuildingElement; NumberOfRiser : OPTIONAL INTEGER; NumberOfTreads : OPTIONAL INTEGER; RiserHeight : OPTIONAL IfcPositiveLengthMeasure; TreadLength : OPTIONAL IfcPositiveLengthMeasure; PredefinedType : OPTIONAL IfcStairFlightTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcStairFlightType Enum. USERDEFINED) OR ((PredefinedType = IfcStairFlightTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELE MENTS. IFCSTAIRFLIGHTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
楼梯段类型 (IfcStairFlightType)	ENTITY IfcStairFlightType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcStairFlightTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcStairFlightTypeEnum. USERDEFINED) OR ((Predefined Type = IfcStairFlightTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
楼梯类型 (IfcStairType)	ENTITY IfcStairType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcStairTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcStairTypeEnum. USERDEFINED) OR ((PredefinedType = IfcStairTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
墙 (IfcWall)	ENTITY IfcWall SUPERTYPE OF(ONEOF(IfcWallElementedCase, IfcWallStandardCase)) SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcWallTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcWall TypeEnum. USERDEFINED) OR ((PredefinedType = IfcWallTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELE MENTS. IFCWALLTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
复合墙 (IfcWallElementedCase)	ENTITY IfcWallElementedCase SUBTYPE OF IfcWall; WHERE HasDecomposition : HIINDEX(SELF\IfcObjectDefinition. IsDecomposedBy) > 0; END_ENTITY
标准墙 (IfcWallStandardCase)	ENTITY IfcWallStandardCase SUBTYPE OF IfcWall; WHERE HasMaterialLayerSetUsage : SIZEOF (QUERY(temp <* USEDIN(SELF,'IFCKERNEL. IFCRELAS SOCIATES. RELATEDOBJECTS') | ('IFCPRODUCTEXTENSION. IFCRELASSOCIATESMATERIAL' IN TYPEOF(temp)) AND ('IFCMATERIALRESOURCE. IFCMATERIALLAYERSETUSAGE' IN TYPEOF (temp. RelatingMaterial)))) = 1; END_ENTITY
墙类型 (IfcWallType)	ENTITY IfcWallType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcWallTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcWallTypeEnum. USERDEFINED) OR ((PredefinedType = IfcWallTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 B.1.2

实体	EXPRESS 描述
窗 (IfcWindow)	ENTITY IfcWindow SUPERTYPE OF(IfcWindowStandardCase) SUBTYPE OF IfcBuildingElement; OverallHeight : OPTIONAL IfcPositiveLengthMeasure; OverallWidth : OPTIONAL IfcPositiveLengthMeasure; PredefinedType : OPTIONAL IfcWindowTypeEnum; PartitioningType : OPTIONAL IfcWindowTypePartitioningEnum; UserDefinedPartitioningType : OPTIONAL IfcLabel; WHERE CorrectStyleAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGELE MENTS. IFCWINDOWTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
标准窗 (IfcWindowStandard Case)	ENTITY IfcWindowStandardCase SUBTYPE OF IfcWindow; END_ENTITY
窗类型 (IfcWindowType)	ENTITY IfcWindowType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcWindowTypeEnum; PartitioningType : IfcWindowTypePartitioningEnum; ParameterTakesPrecedence : OPTIONAL BOOLEAN; UserDefinedPartitioningType : OPTIONAL IfcLabel; WHERE CorrectPredefinedType : (PredefinedType <> IfcWindowTypeEnum. USERDEFINED) OR ((Predefined Type = IfcWindowTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

B.2 共享建筑服务元素

B.2.1 共享建筑服务元素类型的 EXPRESS 描述应符合表 B.2.1 的规定。

表 B.2.1 共享建筑服务元素类型的 EXPRESS 描述

类型	EXPRESS 描述
分配室类型枚举 (IfcDistribution ChamberElement TypeEnum)	TYPE IfcDistributionChamberElementTypeEnum = ENUMERATION OF (FORMEDDUCT, INSPECTIONCHAMBER, INSPECTIONPIT, MANHOLE, METERCHAMBER, SUMP, TRENCH, VALVECHAMBER, USERDEFINED, NOTDEFINED); END_TYPE
分配端口类型枚举 (IfcDistributionPort TypeEnum)	TYPE IfcDistributionPortTypeEnum = ENUMERATION OF (CABLE, CABLECARRIER, DUCT, PIPE, USERDEFINED, NOTDEFINED); END_TYPE

续表 B.2.1

类型	EXPRESS 描述
分配系统枚举（IfcDistributionSystemEnum）	TYPE IfcDistributionSystemEnum = ENUMERATION OF (AIRCONDITIONING, AUDIOVISUAL, CHEMICAL, CHILLEDWATER, COMMUNICATION, COMPRESSEDAIR, CONDENSERWATER, CONTROL, CONVEYING, DATA, DISPOSAL, DOMESTICCOLDWATER, DOMESTICHOTWATER, DRAINAGE, EARTHING, ELECTRICAL, ELECTROACOUSTIC, EXHAUST, FIREPROTECTION, FUEL, GAS, HAZARDOUS, HEATING, LIGHTING, LIGHTNINGPROTECTION, MUNICIPALSOLIDWASTE, OIL, OPERATIONAL, POWERGENERATION, RAINWATER, REFRIGERATION, SECURITY, SEWAGE, SIGNAL, STORMWATER, TELEPHONE, TV, VACUUM, VENT, VENTILATION, WASTEWATER, WATERSUPPLY, USERDEFINED, NOTDEFINED); END_TYPE
流向枚举（IfcFlowDirectionEnum）	TYPE IfcFlowDirectionEnum = ENUMERATION OF (SOURCE, SINK, SOURCEANDSINK, NOTDEFINED); END_TYPE

B.2.2 共享建筑服务元素实体的 EXPRESS 描述应符合表 B.2.2 的规定。

表 B. 2. 2　共享建筑服务元素实体的 EXPRESS 描述

实体	EXPRESS 描述
分配室 (IfcDistribution ChamberElement)	ENTITY IfcDistributionChamberElement SUBTYPE OF IfcDistributionFlowElement; PredefinedType : OPTIONAL IfcDistributionChamberElementTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcDistributionChamberElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDistributionChamberElementTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDBLDGSERVICEELEMENTS. IFCDISTRIBUTIONCHAMBERELEMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
分配室类型 (IfcDistribution Chamber ElementType)	ENTITY IfcDistributionChamberElementType SUBTYPE OF IfcDistributionFlowElementType; PredefinedType : IfcDistributionChamberElementTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcDistributionChamberElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDistributionChamberElementTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
分配电路 (IfcDistributionCircuit)	ENTITY IfcDistributionCircuit SUBTYPE OF IfcDistributionSystem; END_ENTITY
分配控制元素 (IfcDistribution ControlElement)	ENTITY IfcDistributionControlElement SUPERTYPE OF(ONEOF(IfcActuator, IfcAlarm, IfcController, IfcFlowInstrument, IfcProtectiveDeviceTrippingUnit, IfcSensor, IfcUnitaryControlElement)) SUBTYPE OF IfcDistributionElement; INVERSE AssignedToFlowElement : SET [0:1] OF IfcRelFlowControlElements FOR RelatedControlElements; END_ENTITY
分配控制元素类型 (IfcDistributionControl ElementType)	ENTITY IfcDistributionControlElementType ABSTRACT SUPERTYPE OF(ONEOF(IfcActuatorType, IfcAlarmType, IfcControllerType, IfcFlowInstrumentType, IfcProtectiveDeviceTrippingUnitType, IfcSensorType, IfcUnitaryControlElementType)) SUBTYPE OF IfcDistributionElementType; END_ENTITY
流动分配元素 (IfcDistribution FlowElement)	ENTITY IfcDistributionFlowElement SUPERTYPE OF(ONEOF(IfcDistributionChamberElement, IfcEnergyConversionDevice, IfcFlowController, IfcFlowFitting, IfcFlowMovingDevice, IfcFlowSegment, IfcFlowStorageDevice, IfcFlowTerminal, IfcFlowTreatmentDevice)) SUBTYPE OF IfcDistributionElement; INVERSE HasControlElements : SET [0:1] OF IfcRelFlowControlElements FOR RelatingFlowElement; END_ENTITY
流动分配元素类型 (IfcDistributionFlow ElementType)	ENTITY IfcDistributionFlowElementType ABSTRACT SUPERTYPE OF(ONEOF(IfcDistributionChamberElementType, IfcEnergyConversionDeviceType, IfcFlowControllerType, IfcFlowFittingType, IfcFlowMovingDeviceType, IfcFlowSegmentType, IfcFlowStorageDeviceType, IfcFlowTerminalType, IfcFlowTreatmentDeviceType)) SUBTYPE OF IfcDistributionElementType; END_ENTITY

续表 B.2.2

实体	EXPRESS 描述
分配端口 (IfcDistributionPort)	ENTITY IfcDistributionPort SUBTYPE OF IfcPort; FlowDirection : OPTIONAL IfcFlowDirectionEnum; PredefinedType : OPTIONAL IfcDistributionPortTypeEnum; SystemType : OPTIONAL IfcDistributionSystemEnum; END_ENTITY
分配系统 (IfcDistributionSystem)	ENTITY IfcDistributionSystem SUPERTYPE OF(IfcDistributionCircuit) SUBTYPE OF IfcSystem; LongName : OPTIONAL IfcLabel; PredefinedType : OPTIONAL IfcDistributionSystemEnum; END_ENTITY
能源转换装置 (IfcEnergyConversion Device)	ENTITY IfcEnergyConversionDevice SUPERTYPE OF(ONEOF(IfcAirToAirHeatRecovery, IfcBoiler, IfcBurner, IfcChiller, IfcCoil, IfcCondenser, IfcCooledBeam, IfcCoolingTower, IfcElectricGenerator, IfcElectricMotor, IfcEngine, IfcEvaporativeCooler, IfcEvaporator, IfcHeatExchanger, IfcHumidifier, IfcMotorConnection, IfcSolarDevice, IfcTransformer, IfcTubeBundle, IfcUnitaryEquipment)) SUBTYPE OF IfcDistributionFlowElement; END_ENTITY
能源转换装置类型 (IfcEnergyConversion DeviceType)	ENTITY IfcEnergyConversionDeviceType ABSTRACT SUPERTYPE OF(ONEOF(IfcAirToAirHeatRecoveryType, IfcBoilerType, IfcBurnerType, IfcChillerType, IfcCoilType, IfcCondenserType, IfcCooledBeamType, IfcCoolingTowerType, IfcElectric GeneratorType, IfcElectricMotorType, IfcEngineType, IfcEvaporativeCoolerType, IfcEvaporatorType, IfcHeatExchangerType, IfcHumidifierType, IfcMotorConnectionType, IfcSolarDeviceType, IfcTransformer Type, IfcTubeBundleType, IfcUnitaryEquipmentType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY; Link to EXPRESS-G diagram EXPRESS-G dia
流量控制器 (IfcFlowController)	ENTITY IfcFlowController SUPERTYPE OF(ONEOF(IfcAirTerminalBox, IfcDamper, IfcElectricDistributionBoard, IfcElectric TimeControl, IfcFlowMeter, IfcProtectiveDevice, IfcSwitchingDevice, IfcValve)) SUBTYPE OF IfcDistributionFlowElement; END_ENTITY
流量控制器类型 (IfcFlowController Type)	ENTITY IfcFlowControllerType ABSTRACT SUPERTYPE OF(ONEOF(IfcAirTerminalBoxType, IfcDamperType, IfcElectricDistribution BoardType, IfcElectricTimeControlType, IfcFlowMeterType, IfcProtectiveDeviceType, IfcSwitchingDevice Type, IfcValveType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY
流量配件 (IfcFlowFitting)	ENTITY IfcFlowFitting SUPERTYPE OF(ONEOF(IfcCableCarrierFitting, IfcCableFitting, IfcDuctFitting, IfcJunctionBox, Ifc PipeFitting))SUBTYPE OF IfcDistributionFlowElement; END_ENTITY
流量配件类型 (IfcFlowFittingType)	ENTITY IfcFlowFittingType ABSTRACT SUPERTYPE OF(ONEOF(IfcCableCarrierFittingType, IfcCableFittingType, IfcDuctFitting Type, IfcJunctionBoxType, IfcPipeFittingType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY
流体传输装置 (IfcFlowMovingDevice)	ENTITY IfcFlowMovingDevice SUPERTYPE OF(ONEOF(IfcCompressor, IfcFan, IfcPump)) SUBTYPE OF IfcDistributionFlowElement; END_ENTITY

续表 B.2.2

实体	EXPRESS 描述
流体传输装置类型（IfcFlowMovingDeviceType）	ENTITY IfcFlowMovingDeviceType ABSTRACT SUPERTYPE OF(ONEOF(IfcCompressorType, IfcFanType, IfcPumpType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY
流体管段（IfcFlowSegment）	ENTITY IfcFlowSegment SUPERTYPE OF(ONEOF(IfcCableCarrierSegment, IfcCableSegment, IfcDuctSegment, IfcPipeSegment)) SUBTYPE OF IfcDistributionFlowElement; END_ENTITY
流体管段类型（IfcFlowSegmentType）	ENTITY IfcFlowSegmentType ABSTRACT SUPERTYPE OF(ONEOF(IfcCableCarrierSegmentType, IfcCableSegmentType, IfcDuctSegmentType, IfcPipeSegmentType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY
流体储存装置（IfcFlowStorageDevice）	ENTITY IfcFlowStorageDevice SUPERTYPE OF(ONEOF(IfcElectricFlowStorageDevice, IfcTank)) SUBTYPE OF IfcDistributionFlowElement; END_ENTITY
流体储存装置类型（IfcFlowStorageDeviceType）	ENTITY IfcFlowStorageDeviceType ABSTRACT SUPERTYPE OF(ONEOF(IfcElectricFlowStorageDeviceType, IfcTankType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY
流体末端设备（IfcFlowTerminal）	ENTITY IfcFlowTerminal SUPERTYPE OF(ONEOF(IfcAirTerminal, IfcAudioVisualAppliance, IfcCommunicationsAppliance, IfcElectricAppliance, IfcFireSuppressionTerminal, IfcLamp, IfcLightFixture, IfcMedicalDevice, IfcOutlet, IfcSanitaryTerminal, IfcSpaceHeater, IfcStackTerminal, IfcWasteTerminal)) SUBTYPE OF IfcDistributionFlowElement; END_ENTITY
流体末端设备类型（IfcFlowTerminalType）	ENTITY IfcFlowTerminalType ABSTRACT SUPERTYPE OF(ONEOF(IfcAirTerminalType, IfcAudioVisualApplianceType, IfcCommunicationsApplianceType, IfcElectricApplianceType, IfcFireSuppressionTerminalType, IfcLampType, IfcLightFixtureType, IfcMedicalDeviceType, IfcOutletType, IfcSanitaryTerminalType, IfcSpaceHeaterType, IfcStackTerminalType, IfcWasteTerminalType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY
流体处理设备（IfcFlowTreatmentDevice）	ENTITY IfcFlowTreatmentDevice SUPERTYPE OF(ONEOF(IfcDuctSilencer, IfcFilter, IfcInterceptor)) SUBTYPE OF IfcDistributionFlowElement; END_ENTITY
流体处理设备类型（IfcFlowTreatmentDeviceType）	ENTITY IfcFlowTreatmentDeviceType ABSTRACT SUPERTYPE OF(ONEOF(IfcDuctSilencerType, IfcFilterType, IfcInterceptorType)) SUBTYPE OF IfcDistributionFlowElementType; END_ENTITY
流体控制设备关系（IfcRelFlowControlElements）	ENTITY IfcRelFlowControlElements SUBTYPE OF IfcRelConnects; RelatedControlElements : SET [1:?] OF IfcDistributionControlElement; RelatingFlowElement : IfcDistributionFlowElement; END_ENTITY

B.3 共享部件元素

B.3.1 共享部件元素类型的 EXPRESS 描述应符合表 B.3.1 的规定。

表 B. 3. 1　共享部件元素类型的 EXPRESS 描述

类型	EXPRESS 描述
建筑元素部件类型（IfcBuildingElementPartTypeEnum）	TYPE IfcBuildingElementPartTypeEnum = ENUMERATION OF (INSULATION, PRECASTPANEL, USERDEFINED, NOTDEFINED); END_TYPE
离散附件类型（IfcDiscreteAccessoryTypeEnum）	TYPE IfcDiscreteAccessoryTypeEnum = ENUMERATION OF (ANCHORPLATE, BRACKET, SHOE, USERDEFINED, NOTDEFINED); END_TYPE
紧固件类型（IfcFastenerTypeEnum）	TYPE IfcFastenerTypeEnum = ENUMERATION OF (GLUE, MORTAR, WELD, USERDEFINED, NOTDEFINED); END_TYPE
机械紧固件类型（IfcMechanicalFastenerTypeEnum）	TYPE IfcMechanicalFastenerTypeEnum = ENUMERATION OF (ANCHORBOLT, BOLT, DOWEL, NAIL, NAILPLATE, RIVET, SCREW, SHEARCONNECTOR, STAPLE, STUDSHEARCONNECTOR, USERDEFINED, NOTDEFINED); END_TYPE

B. 3. 2　共享部件元素实体的 EXPRESS 描述应符合表 B. 3. 2 的规定。

表 B. 3. 2　共享部件元素实体的 EXPRESS 描述

实体	EXPRESS 描述
建筑元素部件（IfcBuildingElementPart）	ENTITY IfcBuildingElementPart SUBTYPE OF IfcElementComponent; PredefinedType : OPTIONAL IfcBuildingElementPartTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcBuildingElementPartTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBuildingElementPartTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDCOMPONENTELEMENTS. IFCBUILDINGELEMENTPARTTYPE ' IN TYPEOF (SELF \ IfcObject. IsTypedBy [1]. RelatingType)); END_ENTITY
建筑元素部件类型（IfcBuildingElementPartType）	ENTITY IfcBuildingElementPartType SUBTYPE OF IfcElementComponentType; PredefinedType : IfcBuildingElementPartTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcBuildingElementPartTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBuildingElementPartTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 B.3.2

实体	EXPRESS 描述
离散附件 (IfcDiscreteAccessory)	ENTITY IfcDiscreteAccessory SUBTYPE OF IfcElementComponent; PredefinedType : OPTIONAL IfcDiscreteAccessoryTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcDiscreteAccessoryTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDiscreteAccessoryTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDCOMPONENTELEMENTS. IFCDISCRETEACCESSORYTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
离散附件类型 (IfcDiscrete AccessoryType)	ENTITY IfcDiscreteAccessoryType SUBTYPE OF IfcElementComponentType; PredefinedType : IfcDiscreteAccessoryTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcDiscreteAccessoryTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDiscreteAccessoryTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
元素构件 (IfcElementComponent)	ENTITY IfcElementComponent ABSTRACT SUPERTYPE OF(ONEOF(IfcBuildingElementPart, IfcDiscreteAccessory, IfcFastener, IfcMechanicalFastener, IfcReinforcingElement, IfcVibrationIsolator)) SUBTYPE OF IfcElement; END_ENTITY
元素构件类型 (IfcElementComponentType)	ENTITY IfcElementComponentType ABSTRACT SUPERTYPE OF(ONEOF(IfcBuildingElementPartType, IfcDiscreteAccessoryType, IfcFastenerType, IfcMechanicalFastenerType, IfcReinforcingElementType, IfcVibrationIsolatorType)) SUBTYPE OF IfcElementType; END_ENTITY
紧固件 (IfcFastener)	ENTITY IfcFastener SUBTYPE OF IfcElementComponent; PredefinedType : OPTIONAL IfcFastenerTypeEnum; WHERE CorrectPredefinedType : NOT (EXISTS (PredefinedType)) OR (PredefinedType <> IfcFastenerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFastenerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDCOMPONENTELEMENTS. IFCFASTENERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
紧固件类型 (IfcFastenerType)	ENTITY IfcFastenerType SUBTYPE OF IfcElementComponentType; PredefinedType : IfcFastenerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFastenerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFastenerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
机械紧固件 (IfcMechanical Fastener)	ENTITY IfcMechanicalFastener SUBTYPE OF IfcElementComponent; NominalDiameter : OPTIONAL IfcPositiveLengthMeasure; NominalLength : OPTIONAL IfcPositiveLengthMeasure; PredefinedType : OPTIONAL IfcMechanicalFastenerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcMechanicalFastenerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcMechanicalFastenerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDCOMPONENTELEMENTS. IFCMECHANICALFASTENERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 B.3.2

实体	EXPRESS 描述
机械紧固件类型（IfcMechanicalFastenerType）	ENTITY IfcMechanicalFastenerType SUBTYPE OF IfcElementComponentType; PredefinedType : IfcMechanicalFastenerTypeEnum; NominalDiameter : OPTIONAL IfcPositiveLengthMeasure; NominalLength : OPTIONAL IfcPositiveLengthMeasure; WHERE CorrectPredefinedType : (PredefinedType <> IfcMechanicalFastenerTypeEnum.USERDEFINED) OR ((PredefinedType = IfcMechanicalFastenerTypeEnum.USERDEFINED) AND EXISTS(SELF\IfcElementType.ElementType)); END_ENTITY

B.4 共享设施元素

B.4.1 共享设施元素类型的 EXPRESS 描述应符合表 B.4.1 的规定。

表 B.4.1 共享设施元素类型的 EXPRESS 描述

类型	EXPRESS 描述
家具类型（IfcFurnitureTypeEnum）	TYPE IfcFurnitureTypeEnum = ENUMERATION OF (CHAIR, TABLE, DESK, BED, FILECABINET, SHELF, SOFA, USERDEFINED, NOTDEFINED); END_TYPE
库存类型（IfcInventoryTypeEnum）	TYPE IfcInventoryTypeEnum = ENUMERATION OF (ASSETINVENTORY, SPACEINVENTORY, FURNITUREINVENTORY, USERDEFINED, NOTDEFINED); END_TYPE
成员类型（IfcOccupantTypeEnum）	TYPE IfcOccupantTypeEnum = ENUMERATION OF (ASSIGNEE, ASSIGNOR, LESSEE, LESSOR, LETTINGAGENT, OWNER, TENANT, USERDEFINED, NOTDEFINED); END_TYPE
系统家具元素类型（IfcSystemFurnitureElementTypeEnum）	TYPE IfcSystemFurnitureElementTypeEnum = ENUMERATION OF (PANEL, WORKSURFACE, USERDEFINED, NOTDEFINED); END_TYPE

B.4.2 共享设施元素实体的 EXPRESS 描述应符合表 B.4.2 的规定。

表 B. 4. 2　共享设施元素实体的 EXPRESS 描述

实体	EXPRESS 描述
资产 (IfcAsset)	ENTITY IfcAsset SUBTYPE OF IfcGroup; Identification : OPTIONAL IfcIdentifier; OriginalValue : OPTIONAL IfcCostValue; CurrentValue : OPTIONAL IfcCostValue; TotalReplacementCost : OPTIONAL IfcCostValue; Owner : OPTIONAL IfcActorSelect; User : OPTIONAL IfcActorSelect; ResponsiblePerson : OPTIONAL IfcPerson; IncorporationDate : OPTIONAL IfcDate; DepreciatedValue : OPTIONAL IfcCostValue; END_ENTITY
家具 (IfcFurniture)	ENTITY IfcFurniture SUBTYPE OF IfcFurnishingElement; PredefinedType : OPTIONAL IfcFurnitureTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcFurnitureTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFurnitureTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDFACILITIESELE MENTS. IFCFURNITURETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
家具元素类型 (IfcFurnitureType)	ENTITY IfcFurnitureType SUBTYPE OF IfcFurnishingElementType; AssemblyPlace : IfcAssemblyPlaceEnum; PredefinedType : OPTIONAL IfcFurnitureTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFurnitureTypeEnum. USERDEFINED) OR ((Predefined Type = IfcFurnitureTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
库存 (IfcInventory)	ENTITY IfcInventory SUBTYPE OF IfcGroup; PredefinedType : OPTIONAL IfcInventoryTypeEnum; Jurisdiction : OPTIONAL IfcActorSelect; ResponsiblePersons : OPTIONAL SET [1:?] OF IfcPerson; LastUpdateDate : OPTIONAL IfcDate; CurrentValue : OPTIONAL IfcCostValue; OriginalValue : OPTIONAL IfcCostValue; END_ENTITY
居住者 (IfcOccupant)	ENTITY IfcOccupant SUBTYPE OF IfcActor; PredefinedType : OPTIONAL IfcOccupantTypeEnum; WHERE WR31 : NOT(PredefinedType = IfcOccupantTypeEnum. USERDEFINED) OR EXISTS(SELF\ IfcObject. ObjectType); END_ENTITY
系统家具元素 (IfcSystemFurniture Element)	ENTITY IfcSystemFurnitureElement SUBTYPE OF IfcFurnishingElement; PredefinedType : OPTIONAL IfcSystemFurnitureElementTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSystemFurnitu reElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSystemFurnitureElement TypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSHAREDFACILITIESELE MENTS. IFCSYSTEMFURNITUREELEMENTTYPE ' IN TYPEOF (SELF \ IfcObject. IsTypedBy [1] . RelatingType)); END_ENTITY

续表 B.4.2

实体	EXPRESS 描述
系统家具元素类型（IfcSystemFurnitureElementType）	ENTITY IfcSystemFurnitureElementType SUBTYPE OF IfcFurnishingElementType; PredefinedType : OPTIONAL IfcSystemFurnitureElementTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSystemFurnitureElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSystemFurnitureElementTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

B.5 共享管理元素

B.5.1 共享管理元素类型的 EXPRESS 描述应符合表 B.5.1 的规定。

表 B.5.1 共享管理元素类型的 EXPRESS 描述

类型	EXPRESS 描述
操作请求类型（IfcActionRequestTypeEnum）	TYPE IfcActionRequestTypeEnum = ENUMERATION OF (EMAIL, FAX, PHONE, POST, VERBAL, USERDEFINED, NOTDEFINED); END_TYPE
成本项目类型（IfcCostItemTypeEnum）	TYPE IfcCostItemTypeEnum = ENUMERATION OF (USERDEFINED, NOTDEFINED); END_TYPE
成本计划类型（IfcCostScheduleTypeEnum）	TYPE IfcCostScheduleTypeEnum = ENUMERATION OF (BUDGET, COSTPLAN, ESTIMATE, TENDER, PRICEDBILLOFQUANTITIES, UNPRICEDBILLOFQUANTITIES, SCHEDULEOFRATES, USERDEFINED, NOTDEFINED); END_TYPE
许可类型（IfcPermitTypeEnum）	TYPE IfcPermitTypeEnum = ENUMERATION OF (ACCESS, BUILDING, WORK, USERDEFINED, NOTDEFINED); END_TYPE

B.5.2 共享管理元素实体的 EXPRESS 描述应符合表 B.5.2 的规定。

表 B.5.2 共享管理元素实体的 EXPRESS 描述

实体	EXPRESS 描述
操作请求（IfcActionRequest）	ENTITY IfcActionRequest SUBTYPE OF IfcControl; PredefinedType : OPTIONAL IfcActionRequestTypeEnum; Status : OPTIONAL IfcLabel; LongDescription : OPTIONAL IfcText; END_ENTITY
成本项目（IfcCostItem）	ENTITY IfcCostItem SUBTYPE OF IfcControl; PredefinedType : OPTIONAL IfcCostItemTypeEnum; CostValues : OPTIONAL LIST [1:?] OF IfcCostValue; CostQuantities : OPTIONAL LIST [1:?] OF IfcPhysicalQuantity; END_ENTITY
成本计划（IfcCostSchedule）	ENTITY IfcCostSchedule SUBTYPE OF IfcControl; PredefinedType : OPTIONAL IfcCostScheduleTypeEnum; Status : OPTIONAL IfcLabel; SubmittedOn : OPTIONAL IfcDateTime; UpdateDate : OPTIONAL IfcDateTime; END_ENTITY

续表 B.5.2

实体	EXPRESS 描述
许可 （IfcPermit）	ENTITY IfcPermit SUBTYPE OF IfcControl; PredefinedType : OPTIONAL IfcPermitTypeEnum; Status : OPTIONAL IfcLabel; LongDescription : OPTIONAL IfcText; END_ENTITY
项目订单 （IfcProjectOrder）	ENTITY IfcProjectOrder SUBTYPE OF IfcControl; PredefinedType : OPTIONAL IfcProjectOrderTypeEnum; Status : OPTIONAL IfcLabel; LongDescription : OPTIONAL IfcText; END_ENTITY

附录 C　专业领域层数据模式的 EXPRESS 描述

C.1　建 筑 专 业 应 用

C.1.1　建筑专业类型的 EXPRESS 描述应符合表 C.1.1 的规定。

表 C.1.1　建筑专业类型的 EXPRESS 描述

类型	EXPRESS 描述
门开启方式（IfcDoorPanelOperationEnum）	TYPE IfcDoorPanelOperationEnum = ENUMERATION OF (SWINGING, DOUBLE_ACTING, SLIDING, FOLDING, REVOLVING, ROLLINGUP, FIXEDPANEL, USERDEFINED, NOTDEFINED); END_TYPE
门板位置（IfcDoorPanelPositionEnum）	TYPE IfcDoorPanelPositionEnum = ENUMERATION OF (LEFT, MIDDLE, RIGHT, NOTDEFINED); END_TYPE
门主要材料（IfcDoorStyleConstructionEnum）	TYPE IfcDoorStyleConstructionEnum = ENUMERATION OF (ALUMINIUM, HIGH_GRADE_STEEL, STEEL, WOOD, ALUMINIUM_WOOD, ALUMINIUM_PLASTIC, PLASTIC, USERDEFINED, NOTDEFINED); END_TYPE
门类型（IfcDoorStyleOperationEnum）	TYPE IfcDoorStyleOperationEnum = ENUMERATION OF (SINGLE_SWING_LEFT, SINGLE_SWING_RIGHT, DOUBLE_DOOR_SINGLE_SWING, DOUBLE_DOOR_SINGLE_SWING_OPPOSITE_LEFT, DOUBLE_DOOR_SINGLE_SWING_OPPOSITE_RIGHT, DOUBLE_SWING_LEFT, DOUBLE_SWING_RIGHT, DOUBLE_DOOR_DOUBLE_SWING, SLIDING_TO_LEFT, SLIDING_TO_RIGHT, DOUBLE_DOOR_SLIDING, FOLDING_TO_LEFT, FOLDING_TO_RIGHT, DOUBLE_DOOR_FOLDING, REVOLVING, ROLLINGUP, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.1.1

类型	EXPRESS 描述
渗透性覆盖物类型（IfcPermeableCoveringOperationEnum）	TYPE IfcPermeableCoveringOperationEnum = ENUMERATION OF (GRILL, LOUVER, SCREEN, USERDEFINED, NOTDEFINED); END_TYPE
窗开启方式（IfcWindowPanelOperationEnum）	TYPE IfcWindowPanelOperationEnum = ENUMERATION OF (SIDEHUNGRIGHTHAND, SIDEHUNGLEFTHAND, TILTANDTURNRIGHTHAND, TILTANDTURNLEFTHAND, TOPHUNG, BOTTOMHUNG, PIVOTHORIZONTAL, PIVOTVERTICAL, SLIDINGHORIZONTAL, SLIDINGVERTICAL, REMOVABLECASEMENT, FIXEDCASEMENT, OTHEROPERATION, NOTDEFINED); END_TYPE
窗扇位置（IfcWindowPanelPositionEnum）	TYPE IfcWindowPanelPositionEnum = ENUMERATION OF (LEFT, MIDDLE, RIGHT, BOTTOM, TOP, NOTDEFINED); END_TYPE
窗主要材料（IfcWindowStyleConstructionEnum）	TYPE IfcWindowStyleConstructionEnum = ENUMERATION OF (ALUMINIUM, HIGH_GRADE_STEEL, STEEL, WOOD, ALUMINIUM_WOOD, PLASTIC, OTHER_CONSTRUCTION, NOTDEFINED); END_TYPE
窗类型（IfcWindowStyleOperationEnum）	TYPE IfcWindowStyleOperationEnum = ENUMERATION OF (SINGLE_PANEL, DOUBLE_PANEL_VERTICAL, DOUBLE_PANEL_HORIZONTAL, TRIPLE_PANEL_VERTICAL, TRIPLE_PANEL_BOTTOM, TRIPLE_PANEL_TOP, TRIPLE_PANEL_LEFT, TRIPLE_PANEL_RIGHT, TRIPLE_PANEL_HORIZONTAL, USERDEFINED, NOTDEFINED); END_TYPE

C.1.2 建筑专业实体的 EXPRESS 描述应符合表 C.1.2 的规定。

表 C. 1. 2　建筑专业实体的 EXPRESS 描述

实体	EXPRESS 描述
门框属性 (IfcDoorLining Properties)	ENTITY IfcDoorLiningProperties SUBTYPE OF IfcPreDefinedPropertySet; LiningDepth : OPTIONAL IfcPositiveLengthMeasure; LiningThickness : OPTIONAL IfcNonNegativeLengthMeasure; ThresholdDepth : OPTIONAL IfcPositiveLengthMeasure; ThresholdThickness : OPTIONAL IfcNonNegativeLengthMeasure; TransomThickness : OPTIONAL IfcNonNegativeLengthMeasure; TransomOffset : OPTIONAL IfcLengthMeasure; LiningOffset : OPTIONAL IfcLengthMeasure; ThresholdOffset : OPTIONAL IfcLengthMeasure; CasingThickness : OPTIONAL IfcPositiveLengthMeasure; CasingDepth : OPTIONAL IfcPositiveLengthMeasure; ShapeAspectStyle : OPTIONAL IfcShapeAspect; LiningToPanelOffsetX : OPTIONAL IfcLengthMeasure; LiningToPanelOffsetY : OPTIONAL IfcLengthMeasure; WHERE WR31 : NOT(EXISTS(LiningDepth) AND NOT(EXISTS(LiningThickness))); WR32 : NOT(EXISTS(ThresholdDepth) AND NOT(EXISTS(ThresholdThickness))); WR33 : (EXISTS(TransomOffset) AND EXISTS(TransomThickness)) XOR (NOT(EXISTS(TransomOffset)) AND NOT(EXISTS(TransomThickness))); WR34 : (EXISTS(CasingDepth) AND EXISTS(CasingThickness)) XOR (NOT(EXISTS(CasingDepth)) AND NOT(EXISTS(CasingThickness))); WR35 : (EXISTS(SELF\IfcPropertySetDefinition. DefinesType[1])) AND (('IFCSHAREDBLDGELEMENTS. IFCDOORTYPE' IN TYPEOF(SELF\IfcPropertySetDefinition. DefinesType[1])) OR ('IFCARCHITECTUREDOMAIN. IFCDOORSTYLE' IN TYPEOF(SELF\IfcPropertySetDefinition. DefinesType[1]))); END_ENTITY
门板属性 (IfcDoorPanel Properties)	ENTITY IfcDoorPanelProperties SUBTYPE OF IfcPreDefinedPropertySet; PanelDepth : OPTIONAL IfcPositiveLengthMeasure; PanelOperation : IfcDoorPanelOperationEnum; PanelWidth : OPTIONAL IfcNormalisedRatioMeasure; PanelPosition : IfcDoorPanelPositionEnum; ShapeAspectStyle : OPTIONAL IfcShapeAspect; WHERE ApplicableToType : (EXISTS(SELF\IfcPropertySetDefinition. DefinesType[1])) AND (('IFCSHAREDBLDGELEMENTS. IFCDOORTYPE' IN TYPEOF(SELF\IfcPropertySetDefinition. DefinesType[1])) OR ('IFCARCHITECTUREDOMAIN. IFCDOORSTYLE' IN TYPEOF(SELF\IfcPropertySetDefinition. DefinesType[1]))); END_ENTITY
门类型 (IfcDoorStyle)	ENTITY IfcDoorStyle SUBTYPE OF IfcTypeProduct; OperationType : IfcDoorStyleOperationEnum; ConstructionType : IfcDoorStyleConstructionEnum; ParameterTakesPrecedence : BOOLEAN; Sizeable : BOOLEAN; END_ENTITY
渗透性覆盖物属性 (IfcPermeableCovering Properties)	ENTITY IfcPermeableCoveringProperties SUBTYPE OF IfcPreDefinedPropertySet; OperationType : IfcPermeableCoveringOperationEnum; PanelPosition : IfcWindowPanelPositionEnum; FrameDepth : OPTIONAL IfcPositiveLengthMeasure; FrameThickness : OPTIONAL IfcPositiveLengthMeasure; ShapeAspectStyle : OPTIONAL IfcShapeAspect; END_ENTITY

续表 C.1.2

实体	EXPRESS 描述
窗框属性 (IfcWindowLining Properties)	ENTITY IfcWindowLiningProperties SUBTYPE OF IfcPreDefinedPropertySet; LiningDepth : OPTIONAL IfcPositiveLengthMeasure; LiningThickness : OPTIONAL IfcNonNegativeLengthMeasure; TransomThickness : OPTIONAL IfcNonNegativeLengthMeasure; MullionThickness : OPTIONAL IfcNonNegativeLengthMeasure; FirstTransomOffset : OPTIONAL IfcNormalisedRatioMeasure; SecondTransomOffset : OPTIONAL IfcNormalisedRatioMeasure; FirstMullionOffset : OPTIONAL IfcNormalisedRatioMeasure; SecondMullionOffset : OPTIONAL IfcNormalisedRatioMeasure; ShapeAspectStyle : OPTIONAL IfcShapeAspect; LiningOffset : OPTIONAL IfcLengthMeasure; LiningToPanelOffsetX : OPTIONAL IfcLengthMeasure; LiningToPanelOffsetY : OPTIONAL IfcLengthMeasure; WHERE WR31 : NOT(EXISTS(LiningDepth) AND NOT(EXISTS(LiningThickness))); WR32 : NOT(NOT(EXISTS(FirstTransomOffset)) AND EXISTS(SecondTransomOffset)); WR33 : NOT(NOT(EXISTS(FirstMullionOffset)) AND EXISTS(SecondMullionOffset)); WR34 : (EXISTS(SELF\IfcPropertySetDefinition. DefinesType[1])) AND (('IFCSHAREDBLDGEL EMENTS. IFCWINDOWTYPE' IN TYPEOF(SELF\IfcPropertySetDefinition. DefinesType[1])) OR ('I FCARCHITECTUREDOMAIN. IFCWINDOWSTYLE' IN TYPEOF(SELF\IfcPropertySetDefinition. DefinesType[1]))); END_ENTITY
窗扇属性 (IfcWindowPanel Properties)	ENTITY IfcWindowPanelProperties SUBTYPE OF IfcPreDefinedPropertySet; OperationType : IfcWindowPanelOperationEnum; PanelPosition : IfcWindowPanelPositionEnum; FrameDepth : OPTIONAL IfcPositiveLengthMeasure; FrameThickness : OPTIONAL IfcPositiveLengthMeasure; ShapeAspectStyle : OPTIONAL IfcShapeAspect; WHERE ApplicableToType : (EXISTS(SELF\IfcPropertySetDefinition. DefinesType[1])) AND (('IFCSHARED BLDGELEMENTS. IFCWINDOWTYPE' IN TYPEOF (SELF \ IfcPropertySetDefinition. DefinesType[1])) OR ('IFCARCHITECTUREDOMAIN. IFCWINDOWSTYLE' IN TYPEOF(SELF\IfcPropertySetDefini tion. DefinesType[1]))); END_ENTITY
窗类型 (IfcWindowStyle)	ENTITY IfcWindowStyle SUBTYPE OF IfcTypeProduct; ConstructionType : IfcWindowStyleConstructionEnum; OperationType : IfcWindowStyleOperationEnum; ParameterTakesPrecedence : BOOLEAN; Sizeable : BOOLEAN; END_ENTITY

C.2 结构专业应用

C.2.1 结构专业类型的 EXPRESS 描述应符合表 C.2.1 的规定。

表 C.2.1 结构专业类型的 EXPRESS 描述

类型	EXPRESS 描述
基础类型 (IfcFooting TypeEnum)	TYPE IfcFootingTypeEnum = ENUMERATION OF (CAISSON_FOUNDATION, FOOTING_BEAM, PAD_FOOTING, PILE_CAP, STRIP_FOOTING, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.2.1

类型	EXPRESS 描述
桩施工类型（IfcPileConstructionEnum）	TYPE IfcPileConstructionEnum = ENUMERATION OF (CAST_IN_PLACE, COMPOSITE, PRECAST_CONCRETE, PREFAB_STEEL, USERDEFINED, NOTDEFINED); END_TYPE
桩类型（IfcPileTypeEnum）	TYPE IfcPileTypeEnum = ENUMERATION OF (BORED, DRIVEN, JETGROUTING, COHESION, FRICTION, SUPPORT, USERDEFINED, NOTDEFINED); END_TYPE
钢筋类型（IfcReinforcingBarTypeEnum）	TYPE IfcReinforcingBarTypeEnum = ENUMERATION OF (ANCHORING, EDGE, LIGATURE, MAIN, PUNCHING, RING, SHEAR, STUD, USERDEFINED, NOTDEFINED); END_TYPE
钢筋网片类型（IfcReinforcingMeshTypeEnum）	TYPE IfcReinforcingMeshTypeEnum = ENUMERATION OF (USERDEFINED, NOTDEFINED); END_TYPE
表面特征类型（IfcSurfaceFeatureTypeEnum）	TYPE IfcSurfaceFeatureTypeEnum = ENUMERATION OF (MARK, TAG, TREATMENT, USERDEFINED, NOTDEFINED); END_TYPE
预应力锚具类型（IfcTendonAnchorTypeEnum）	TYPE IfcTendonAnchorTypeEnum = ENUMERATION OF (COUPLER, FIXED_END, TENSIONING_END, USERDEFINED, NOTDEFINED); END_TYPE
预应力筋产品类型（IfcTendonTypeEnum）	TYPE IfcTendonTypeEnum = ENUMERATION OF (BAR, COATED, STRAND, WIRE, USERDEFINED, NOTDEFINED); END_TYPE

续表 C. 2. 1

类型	EXPRESS 描述
切削类型 (IfcVoidingFeature TypeEnum)	TYPE IfcVoidingFeatureTypeEnum = ENUMERATION OF (CUTOUT, NOTCH, HOLE, MITER, CHAMFER, EDGE, USERDEFINED, NOTDEFINED); END_TYPE
钢筋形状参数 (IfcBending ParameterSelect)	TYPE IfcBendingParameterSelect = SELECT (IfcLengthMeasure, IfcPlaneAngleMeasure); END_TYPE

C. 2. 2 结构专业实体的 EXPRESS 描述应符合表 C. 2. 2 的规定。

表 C. 2. 2 结构专业实体的 EXPRESS 描述

实体	EXPRESS 描述
基础 (IfcFooting)	ENTITY IfcFooting SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcFootingTypeEnum; WHERE CorrectPredefinedType : NOT EXISTS(PredefinedType) OR (PredefinedType <> IfcFooting TypeEnum. USERDEFINED) OR ((PredefinedType = IfcFootingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSTRUCTURALELEMENTSDOMAIN. IFCFOOTINGTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)) ; END_ENTITY
基础类型 (IfcFootingType)	ENTITY IfcFootingType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcFootingTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFootingTypeEnum. USERDEFINED) OR ((Predefined Type = IfcFootingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
桩基础 (IfcPile)	ENTITY IfcPile SUBTYPE OF IfcBuildingElement; PredefinedType : OPTIONAL IfcPileTypeEnum; ConstructionType : OPTIONAL IfcPileConstructionEnum; WHERE CorrectPredefinedType : NOT EXISTS(PredefinedType) OR (PredefinedType <> IfcPile TypeEnum. USERDEFINED) OR ((PredefinedType = IfcPileTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSTRUCTURALELEMENTS DOMAIN. IFCPILETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
桩基础类型 (IfcPileType)	ENTITY IfcPileType SUBTYPE OF IfcBuildingElementType; PredefinedType : IfcPileTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcPileTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPileTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.2.2

实体	EXPRESS 描述
钢筋属性集 (IfcReinforcement DefinitionProperties)	ENTITY IfcReinforcementDefinitionProperties SUBTYPE OF IfcPreDefinedPropertySet; DefinitionType : OPTIONAL IfcLabel; ReinforcementSectionDefinitions : LIST [1:?] OF IfcSectionReinforcementProperties; END_ENTITY
钢筋 (IfcReinforcingBar)	ENTITY IfcReinforcingBar SUBTYPE OF IfcReinforcingElement; NominalDiameter : OPTIONAL IfcPositiveLengthMeasure; CrossSectionArea : OPTIONAL IfcAreaMeasure; BarLength : OPTIONAL IfcPositiveLengthMeasure; PredefinedType : OPTIONAL IfcReinforcingBarTypeEnum; BarSurface : OPTIONAL IfcReinforcingBarSurfaceEnum; WHERE CorrectPredefinedType : NOT EXISTS(PredefinedType) OR (PredefinedType <> IfcReinforcingBar TypeEnum. USERDEFINED) OR ((PredefinedType = IfcReinforcingBarTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)) ; CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSTRUCTURALELEMENTS DOMAIN. IFCREINFORCINGBARTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
钢筋类型 (IfcReinforcingBarType)	ENTITY IfcReinforcingBarType SUBTYPE OF IfcReinforcingElementType; PredefinedType : IfcReinforcingBarTypeEnum; NominalDiameter : OPTIONAL IfcPositiveLengthMeasure; CrossSectionArea : OPTIONAL IfcAreaMeasure; BarLength : OPTIONAL IfcPositiveLengthMeasure; BarSurface : OPTIONAL IfcReinforcingBarSurfaceEnum; BendingShapeCode : OPTIONAL IfcLabel; BendingParameters : OPTIONAL LIST [1:?] OF IfcBendingParameterSelect; WHERE CorrectPredefinedType : (PredefinedType <> IfcReinforcingBarTypeEnum. USERDEFINED) OR ((PredefinedType = IfcReinforcingBarTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); BendingShapeCodeProvided : NOT EXISTS(BendingParameters) OR EXISTS(BendingShapeCode); END_ENTITY
钢筋元素 (IfcReinforcing Element)	ENTITY IfcReinforcingElement ABSTRACT SUPERTYPE OF(ONEOF(IfcReinforcingBar, IfcReinforcingMesh, IfcTendon, IfcTendon Anchor))SUBTYPE OF IfcElementComponent; SteelGrade : OPTIONAL IfcLabel; END_ENTITY
钢筋元素类型 (IfcReinforcing ElementType)	ENTITY IfcReinforcingElementType ABSTRACT SUPERTYPE OF(ONEOF(IfcReinforcingBarType, IfcReinforcingMeshType, IfcTendon AnchorType, IfcTendonType)) SUBTYPE OF IfcElementComponentType; END_ENTITY
钢筋网片 (IfcReinforcingMesh)	ENTITY IfcReinforcingMesh SUBTYPE OF IfcReinforcingElement; MeshLength : OPTIONAL IfcPositiveLengthMeasure; MeshWidth : OPTIONAL IfcPositiveLengthMeasure; LongitudinalBarNominalDiameter : OPTIONAL IfcPositiveLengthMeasure; TransverseBarNominalDiameter : OPTIONAL IfcPositiveLengthMeasure; LongitudinalBarCrossSectionArea : OPTIONAL IfcAreaMeasure; TransverseBarCrossSectionArea : OPTIONAL IfcAreaMeasure; LongitudinalBarSpacing : OPTIONAL IfcPositiveLengthMeasure; TransverseBarSpacing : OPTIONAL IfcPositiveLengthMeasure; PredefinedType : OPTIONAL IfcReinforcingMeshTypeEnum; WHERE CorrectPredefinedType : NOT EXISTS(PredefinedType) OR (PredefinedType <> IfcReinforcingMesh TypeEnum. USERDEFINED) OR ((PredefinedType = IfcReinforcingMeshTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSTRUCTURALELEMENTS DOMAIN. IFCREINFORCINGMESHTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)) ; END_ENTITY

续表 C.2.2

实体	EXPRESS 描述
钢筋网片类型 (IfcReinforcing MeshType)	ENTITY IfcReinforcingMeshType SUBTYPE OF IfcReinforcingElementType; PredefinedType : IfcReinforcingMeshTypeEnum; MeshLength : OPTIONAL IfcPositiveLengthMeasure; MeshWidth : OPTIONAL IfcPositiveLengthMeasure; LongitudinalBarNominalDiameter : OPTIONAL IfcPositiveLengthMeasure; TransverseBarNominalDiameter : OPTIONAL IfcPositiveLengthMeasure; LongitudinalBarCrossSectionArea : OPTIONAL IfcAreaMeasure; TransverseBarCrossSectionArea : OPTIONAL IfcAreaMeasure; LongitudinalBarSpacing : OPTIONAL IfcPositiveLengthMeasure; TransverseBarSpacing : OPTIONAL IfcPositiveLengthMeasure; BendingShapeCode : OPTIONAL IfcLabel; BendingParameters : OPTIONAL LIST [1:?] OF IfcBendingParameterSelect; WHERE CorrectPredefinedType : (PredefinedType <> IfcReinforcingMeshTypeEnum. USERDEFINED) OR ((PredefinedType = IfcReinforcingMeshTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); BendingShapeCodeProvided : NOT EXISTS(BendingParameters) OR EXISTS(BendingShapeCode); END_ENTITY
构件表面修饰特征 (IfcSurfaceFeature)	ENTITY IfcSurfaceFeature SUBTYPE OF IfcFeatureElement; PredefinedType : OPTIONAL IfcSurfaceFeatureTypeEnum; WHERE HasObjectType : NOT EXISTS(PredefinedType) OR (PredefinedType <> IfcSurface FeatureTypeEnum. USERDEFINED) OR EXISTS(SELF\IfcObject. ObjectType); END_ENTITY
预应力筋 (IfcTendon)	ENTITY IfcTendon SUBTYPE OF IfcReinforcingElement; PredefinedType : OPTIONAL IfcTendonTypeEnum; NominalDiameter : OPTIONAL IfcPositiveLengthMeasure; CrossSectionArea : OPTIONAL IfcAreaMeasure; TensionForce : OPTIONAL IfcForceMeasure; PreStress : OPTIONAL IfcPressureMeasure; FrictionCoefficient : OPTIONAL IfcNormalisedRatioMeasure; AnchorageSlip : OPTIONAL IfcPositiveLengthMeasure; MinCurvatureRadius : OPTIONAL IfcPositiveLengthMeasure; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcTendon TypeEnum. USERDEFINED) OR ((PredefinedType = IfcTendonTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSTRUCTURALELEMENTS DOMAIN. IFCTENDONTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)) ; END_ENTITY
预应力锚具 (IfcTendonAnchor)	ENTITY IfcTendonAnchor SUBTYPE OF IfcReinforcingElement; PredefinedType : OPTIONAL IfcTendonAnchorTypeEnum; WHERE CorrectPredefinedType : NOT (EXISTS (PredefinedType)) OR (PredefinedType <> IfcTendonAnchor-TypeEnum. USERDEFINED) OR ((PredefinedType = IfcTendonAnchorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCSTRUCTURALELEMENTS DOMAIN. IFCTENDONANCHORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
预应力锚具类型 (IfcTendon AnchorType)	ENTITY IfcTendonAnchorType SUBTYPE OF IfcReinforcingElementType; PredefinedType : IfcTendonAnchorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcTendonAnchorTypeEnum. USERDEFINED) OR ((Predefinedtype = IfcTendonAnchorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY

续表 C.2.2

实体	EXPRESS 描述
预应力筋类型 (IfcTendonType)	ENTITY IfcTendonType SUBTYPE OF IfcReinforcingElementType; PredefinedType : IfcTendonTypeEnum; NominalDiameter : OPTIONAL IfcPositiveLengthMeasure; CrossSectionArea : OPTIONAL IfcAreaMeasure; SheethDiameter : OPTIONAL IfcPositiveLengthMeasure; WHERE CorrectPredefinedType : (PredefinedType <> IfcTendonTypeEnum. USERDEFINED) OR ((Predefined Type = IfcTendonTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
切削特征 (IfcVoidingFeature)	ENTITY IfcVoidingFeature SUBTYPE OF IfcFeatureElementSubtraction; PredefinedType : OPTIONAL IfcVoidingFeatureTypeEnum; WHERE HasObjectType : NOT EXISTS(PredefinedType) OR (PredefinedType <> IfcVoidingFeatureTypeEnum. USERDEFINED) OR EXISTS(SELF\IfcObject. ObjectType); END_ENTITY

C.3 结构分析应用

C.3.1 结构分析类型的 EXPRESS 描述应符合表 C.3.1 的规定。

表 C.3.1 结构分析类型的 EXPRESS 描述

类型	EXPRESS 描述
作用来源类型 (IfcActionSource TypeEnum)	TYPE IfcActionSourceTypeEnum = ENUMERATION OF (DEAD_LOAD_G, COMPLETION_G1, LIVE_LOAD_Q, SNOW_S, WIND_W, PRESTRESSING_P, SETTLEMENT_U, TEMPERATURE_T, EARTHQUAKE_E, FIRE, IMPULSE, IMPACT, TRANSPORT, ERECTION, PROPPING, SYSTEM_IMPERFECTION, SHRINKAGE, CREEP, LACK_OF_FIT, BUOYANCY, ICE, CURRENT, WAVE, RAIN, BRAKES, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.3.1

类型	EXPRESS 描述
作用类型 (IfcActionTypeEnum)	TYPE IfcActionTypeEnum = ENUMERATION OF (PERMANENT_G, VARIABLE_Q, EXTRAORDINARY_A, USERDEFINED, NOTDEFINED); END_TYPE
分析模型类型 (IfcAnalysisModel TypeEnum)	TYPE IfcAnalysisModelTypeEnum = ENUMERATION OF (IN_PLANE_LOADING_2D, OUT_PLANE_LOADING_2D, LOADING_3D, USERDEFINED, NOTDEFINED); END_TYPE
结构分析理论类型 (IfcAnalysisTheory TypeEnum)	TYPE IfcAnalysisTheoryTypeEnum = ENUMERATION OF (FIRST_ORDER_THEORY, SECOND_ORDER_THEORY, THIRD_ORDER_THEORY, FULL_NONLINEAR_THEORY, USERDEFINED, NOTDEFINED); END_TYPE
荷载组类型 (IfcLoadGroup TypeEnum)	TYPE IfcLoadGroupTypeEnum = ENUMERATION OF (LOAD_GROUP, LOAD_CASE, LOAD_COMBINATION, USERDEFINED, NOTDEFINED); END_TYPE
投影长度类型 (IfcProjectedOr TrueLengthEnum)	TYPE IfcProjectedOrTrueLengthEnum = ENUMERATION OF (PROJECTED_LENGTH, TRUE_LENGTH); END_TYPE
结构曲线作用类型 (IfcStructuralCurve ActivityTypeEnum)	TYPE IfcStructuralCurveActivityTypeEnum = ENUMERATION OF (CONST, LINEAR, POLYGONAL, EQUIDISTANT, SINUS, PARABOLA, DISCRETE, USERDEFINED, NOTDEFINED); END_TYPE
线性结构构件类型 (IfcStructuralCurve MemberTypeEnum)	TYPE IfcStructuralCurveMemberTypeEnum = ENUMERATION OF (RIGID_JOINED_MEMBER, PIN_JOINED_MEMBER, CABLE, TENSION_MEMBER, COMPRESSION_MEMBER, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.3.1

类型	EXPRESS 描述
结构面作用类型（IfcStructuralSurfaceActivityTypeEnum）	TYPE IfcStructuralSurfaceActivityTypeEnum = ENUMERATION OF (CONST, BILINEAR, DISCRETE, ISOCONTOUR, USERDEFINED, NOTDEFINED); END_TYPE
结构面构件类型（IfcStructuralSurfaceMemberTypeEnum）	TYPE IfcStructuralSurfaceMemberTypeEnum = ENUMERATION OF (BENDING_ELEMENT, MEMBRANE_ELEMENT, SHELL, USERDEFINED, NOTDEFINED); END_TYPE
结构行为指定（IfcStructuralActivityAssignmentSelect）	TYPE IfcStructuralActivityAssignmentSelect = SELECT (IfcStructuralItem, IfcElement); END_TYPE

C.3.2 结构分析实体的 EXPRESS 描述应符合表 C.3.2 的规定。

表 C.3.2 结构分析实体的 EXPRESS 描述

实体	EXPRESS 描述
结构行为与结构间的关系（IfcRelConnectsStructuralActivity）	ENTITY IfcRelConnectsStructuralActivity SUBTYPE OF IfcRelConnects; RelatingElement : IfcStructuralActivityAssignmentSelect; RelatedStructuralActivity : IfcStructuralActivity; END_ENTITY
结构连接构件（IfcRelConnectsStructuralMember）	ENTITY IfcRelConnectsStructuralMember SUPERTYPE OF(IfcRelConnectsWithEccentricity) SUBTYPE OF IfcRelConnects; RelatingStructuralMember : IfcStructuralMember; RelatedStructuralConnection : IfcStructuralConnection; AppliedCondition : OPTIONAL IfcBoundaryCondition; AdditionalConditions : OPTIONAL IfcStructuralConnectionCondition; SupportedLength : OPTIONAL IfcLengthMeasure; ConditionCoordinateSystem : OPTIONAL IfcAxis2Placement3D; END_ENTITY
偏心连接关系（IfcRelConnectsWithEccentricity）	ENTITY IfcRelConnectsWithEccentricity SUBTYPE OF IfcRelConnectsStructuralMember; ConnectionConstraint : IfcConnectionGeometry; END_ENTITY
结构作用（IfcStructuralAction）	ENTITY IfcStructuralAction ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralCurveAction, IfcStructuralPointAction, IfcStructuralSurfaceAction)) SUBTYPE OF IfcStructuralActivity; DestabilizingLoad : OPTIONAL BOOLEAN; END_ENTITY
结构行为（IfcStructuralActivity）	ENTITY IfcStructuralActivity ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralAction, IfcStructuralReaction)) SUBTYPE OF IfcProduct; AppliedLoad : IfcStructuralLoad; GlobalOrLocal : IfcGlobalOrLocalEnum; INVERSE AssignedToStructuralItem : SET [0:1] OF IfcRelConnectsStructuralActivity FOR RelatedStructuralActivity; END_ENTITY

续表 C.3.2

实体	EXPRESS 描述
结构分析模型 (IfcStructural AnalysisModel)	ENTITY IfcStructuralAnalysisModel SUBTYPE OF IfcSystem; PredefinedType : IfcAnalysisModelTypeEnum; OrientationOf2DPlane : OPTIONAL IfcAxis2Placement3D; LoadedBy : OPTIONAL SET [1:?] OF IfcStructuralLoadGroup; HasResults : OPTIONAL SET [1:?] OF IfcStructuralResultGroup; SharedPlacement : OPTIONAL IfcObjectPlacement; WHERE HasObjectType : (PredefinedType <> IfcAnalysisModelTypeEnum. USERDEFINED) OR EXISTS(SELF\IfcObject. ObjectType); END_ENTITY
结构连接 (IfcStructural Connection)	ENTITY IfcStructuralConnection ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralCurveConnection, IfcStructuralPointConnection, IfcStructuralSurfaceConnection)) SUBTYPE OF IfcStructuralItem; AppliedCondition : OPTIONAL IfcBoundaryCondition; INVERSE ConnectsStructuralMembers : SET [1:?] OF IfcRelConnectsStructuralMember FOR RelatedStructuralConnection; END_ENTITY
结构曲线作用 (IfcStructural CurveAction)	ENTITY IfcStructuralCurveAction SUPERTYPE OF(IfcStructuralLinearAction) SUBTYPE OF IfcStructuralAction; ProjectedOrTrue : OPTIONAL IfcProjectedOrTrueLengthEnum; PredefinedType : IfcStructuralCurveActivityTypeEnum; WHERE ProjectedIsGlobal : (NOT EXISTS(ProjectedOrTrue)) OR ((ProjectedOrTrue <> PROJECTED_LENGTH) OR (SELF\IfcStructuralActivity. GlobalOrLocal = GLOBAL_COORDS)); HasObjectType : (PredefinedType <> IfcStructuralCurveActivityTypeEnum. USERDEFINED) OR EXISTS(SELF\IfcObject. ObjectType); SuitablePredefinedType : PredefinedType <> IfcStructuralCurveActivityTypeEnum. EQUIDISTANT; END_ENTITY
结构曲线连接 (IfcStructuralCurve Connection)	ENTITY IfcStructuralCurveConnection SUBTYPE OF IfcStructuralConnection; Axis : IfcDirection; END_ENTITY
线性结构构件 (IfcStructural CurveMember)	ENTITY IfcStructuralCurveMember SUPERTYPE OF(IfcStructuralCurveMemberVarying) SUBTYPE OF IfcStructuralMember; PredefinedType : IfcStructuralCurveMemberTypeEnum; Axis : IfcDirection; WHERE HasObjectType : (PredefinedType <> IfcStructuralCurveMemberTypeEnum. USERDEFINED) OR EXISTS(SELF\IfcObject. ObjectType); END_ENTITY
变截面线性结构构件 (IfcStructuralCurve MemberVarying)	ENTITY IfcStructuralCurveMemberVarying SUBTYPE OF IfcStructuralCurveMember; END_ENTITY
结构曲线作用的响应 (IfcStructural CurveReaction)	ENTITY IfcStructuralCurveReaction SUBTYPE OF IfcStructuralReaction; PredefinedType : IfcStructuralCurveActivityTypeEnum; WHERE HasObjectType : (PredefinedType <> IfcStructuralCurveActivityTypeEnum. USERDEFINED) OR EXISTS(SELF\IfcObject. ObjectType); SuitablePredefinedType : (PredefinedType <> IfcStructuralCurveActivityTypeEnum. SINUS) AND (PredefinedType <> IfcStructuralCurveActivityTypeEnum. PARABOLA); END_ENTITY

续表 C.3.2

实体	EXPRESS 描述
结构项目 (IfcStructuralItem)	ENTITY IfcStructuralItem ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralConnection, IfcStructuralMember)) SUBTYPE OF IfcProduct; INVERSE AssignedStructuralActivity : SET OF IfcRelConnectsStructuralActivity FOR RelatingElement; END_ENTITY
结构线性作用 (IfcStructuralLinear Action)	ENTITY IfcStructuralLinearAction SUBTYPE OF IfcStructuralCurveAction; WHERE SuitableLoadType : SIZEOF(['IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADLINEAR FORCE', 'IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADTEMPERATURE'] * TYPEOF(SELF\IfcStructuralActivity. AppliedLoad)) = 1; ConstPredefinedType : SELF\IfcStructuralCurveAction. PredefinedType = IfcStructuralCurveActivity TypeEnum. CONST; END_ENTITY
结构荷载工况 (IfcStructural LoadCase)	ENTITY IfcStructuralLoadCase SUBTYPE OF IfcStructuralLoadGroup; SelfWeightCoefficients : OPTIONAL LIST [3:3] OF IfcRatioMeasure; WHERE IsLoadCasePredefinedType : SELF\IfcStructuralLoadGroup. PredefinedType = IfcLoadGroupType Enum. LOAD_CASE; END_ENTITY
结构荷载组 (IfcStructuralLoad Group)	ENTITY IfcStructuralLoadGroup SUPERTYPE OF(IfcStructuralLoadCase) SUBTYPE OF IfcGroup; PredefinedType : IfcLoadGroupTypeEnum; ActionType : IfcActionTypeEnum; ActionSource : IfcActionSourceTypeEnum; Coefficient : OPTIONAL IfcRatioMeasure; Purpose : OPTIONAL IfcLabel; INVERSE SourceOfResultGroup : SET [0:1] OF IfcStructuralResultGroup FOR ResultForLoadGroup; LoadGroupFor : SET OF IfcStructuralAnalysisModel FOR LoadedBy; WHERE HasObjectType : ((PredefinedType <> IfcLoadGroupTypeEnum. USERDEFINED) AND (ActionType <> IfcActionTypeEnum. USERDEFINED) AND (ActionSource <> IfcActionSource TypeEnum. USERDEFINED)) OR EXISTS(SELF\IfcObject. ObjectType); END_ENTITY
结构构件 (IfcStructural Member)	ENTITY IfcStructuralMember ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralCurveMember, IfcStructuralSurfaceMember)) SUBTYPE OF IfcStructuralItem; INVERSE ConnectedBy : SET OF IfcRelConnectsStructuralMember FOR RelatingStructuralMember; END_ENTITY
结构的平面作用 (IfcStructural PlanarAction)	ENTITY IfcStructuralPlanarAction SUBTYPE OF IfcStructuralSurfaceAction; WHERE SuitableLoadType : SIZEOF(['IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADPL ANARFORCE', 'IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADTEMPERATURE'] * TYPEOF(SELF\IfcStructuralActivity. AppliedLoad)) = 1; ConstPredefinedType : SELF\IfcStructuralSurfaceAction. PredefinedType = IfcStructuralSurfaceActivity TypeEnum. CONST; END_ENTITY

续表 C.3.2

实体	EXPRESS 描述
结构的点作用 (IfcStructural PointAction)	ENTITY IfcStructuralPointAction SUBTYPE OF IfcStructuralAction; WHERE SuitableLoadType : SIZEOF(['IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADSINGLE FORCE','IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADSINGLEDISPLACEMENT'] * TYPEOF(SELF\IfcStructuralActivity. AppliedLoad)) = 1; END_ENTITY
结构的点连接 (IfcStructuralPoint Connection)	ENTITY IfcStructuralPointConnection SUBTYPE OF IfcStructuralConnection; ConditionCoordinateSystem : OPTIONAL IfcAxis2Placement3D; END_ENTITY
结构点作用的响应 (IfcStructuralPoint Reaction)	ENTITY IfcStructuralPointReaction SUBTYPE OF IfcStructuralReaction; WHERE SuitableLoadType : SIZEOF(['IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADSINGL EFORCE', 'IFCSTRUCTURALLOADRESOURCE. IFCSTRUCTURALLOADSINGLEDISPLACEMENT'] * TYPEOF(SELF\IfcStructuralActivity. AppliedLoad)) = 1; END_ENTITY
结构响应 (IfcStructural Reaction)	ENTITY IfcStructuralReaction ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralCurveReaction, IfcStructuralPointReaction, IfcStruc turalSurfaceReaction)) SUBTYPE OF IfcStructuralActivity; END_ENTITY
结构结果分组 (IfcStructural ResultGroup)	ENTITY IfcStructuralResultGroup SUBTYPE OF IfcGroup; TheoryType : IfcAnalysisTheoryTypeEnum; ResultForLoadGroup : OPTIONAL IfcStructuralLoadGroup; IsLinear : BOOLEAN; INVERSE ResultGroupFor : SET [0:1] OF IfcStructuralAnalysisModel FOR HasResults; WHERE HasObjectType : (TheoryType <> IfcAnalysisTheoryTypeEnum. USERDEFINED) OR EXISTS(SELF\ IfcObject. ObjectType); END_ENTITY
结构的面作用 (IfcStructural SurfaceAction)	ENTITY IfcStructuralSurfaceAction SUPERTYPE OF(IfcStructuralPlanarAction) SUBTYPE OF IfcStructuralAction; ProjectedOrTrue : OPTIONAL IfcProjectedOrTrueLengthEnum; PredefinedType : IfcStructuralSurfaceActivityTypeEnum; WHERE ProjectedIsGlobal : (NOT EXISTS(ProjectedOrTrue)) OR ((ProjectedOrTrue <> PROJECTED_ LENGTH) OR (SELF\IfcStructuralActivity. GlobalOrLocal = GLOBAL_COORDS)); HasObjectType : (PredefinedType <> IfcStructuralSurfaceActivityTypeEnum. USERDEFINED) OR EX ISTS(SELF\IfcObject. ObjectType); END_ENTITY
结构的面连接 (IfcStructuralSurface Connection)	ENTITY IfcStructuralSurfaceConnection SUBTYPE OF IfcStructuralConnection; END_ENTITY
结构的面构件 (IfcStructural SurfaceMember)	ENTITY IfcStructuralSurfaceMember SUPERTYPE OF(IfcStructuralSurfaceMemberVarying) SUBTYPE OF IfcStructuralMember; PredefinedType : IfcStructuralSurfaceMemberTypeEnum; Thickness : OPTIONAL IfcPositiveLengthMeasure; WHERE HasObjectType : (PredefinedType <> IfcStructuralSurfaceMemberTypeEnum. USERDEFINED) OR EXISTS(SELF\IfcObject. ObjectType); END_ENTITY

续表 C.3.2

实体	EXPRESS 描述
变厚度面构件（IfcStructuralSurfaceMemberVarying）	ENTITY IfcStructuralSurfaceMemberVarying SUBTYPE OF IfcStructuralSurfaceMember; END_ENTITY
结构面作用的响应（IfcStructuralSurfaceReaction）	ENTITY IfcStructuralSurfaceReaction SUBTYPE OF IfcStructuralReaction; PredefinedType : IfcStructuralSurfaceActivityTypeEnum; WHERE HasPredefinedType : (PredefinedType <> IfcStructuralSurfaceActivityTypeEnum.USERDEFINED) OR EXISTS(SELF\IfcObject.ObjectType); END_ENTITY

C.4 管道与消防应用

C.4.1 管道与消防类型的 EXPRESS 描述应符合表 C.4.1 的规定。

表 C.4.1 管道与消防类型的 EXPRESS 描述

类型	EXPRESS 描述
灭火末端设备类型枚举（IfcFireSuppressionTerminalTypeEnum）	TYPE IfcFireSuppressionTerminalTypeEnum = ENUMERATION OF (BREECHINGINLET, FIREHYDRANT, HOSEREEL, SPRINKLER, SPRINKLERDEFLECTOR, USERDEFINED, NOTDEFINED); END_TYPE
污水隔离设备类型枚举（IfcInterceptorTypeEnum）	TYPE IfcInterceptorTypeEnum = ENUMERATION OF (CYCLONIC, GREASE, OIL, PETROL, USERDEFINED, NOTDEFINED); END_TYPE
卫生器具类型枚举（IfcSanitaryTerminalTypeEnum）	TYPE IfcSanitaryTerminalTypeEnum = ENUMERATION OF (BATH, BIDET, CISTERN, SHOWER, SINK, SANITARYFOUNTAIN, TOILETPAN, URINAL, WASHHANDBASIN, WCSEAT, USERDEFINED, NOTDEFINED); END_TYPE
立管末端设备类型枚举（IfcStackTerminalTypeEnum）	TYPE IfcStackTerminalTypeEnum = ENUMERATION OF (BIRDCAGE, COWL, RAINWATERHOPPER, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.4.1

类型	EXPRESS 描述
排水末端设备类型枚举（IfcWasteTerminalTypeEnum）	TYPE IfcWasteTerminalTypeEnum = ENUMERATION OF (FLOORTRAP, FLOORWASTE, GULLYSUMP, GULLYTRAP, ROOFDRAIN, WASTEDISPOSALUNIT, WASTETRAP, USERDEFINED, NOTDEFINED); END_TYPE

C.4.2 管道与消防实体的 EXPRESS 描述应符合表 C.4.2 的规定。

表 C.4.2 管道与消防实体的 EXPRESS 描述

实体	EXPRESS 描述
灭火末端设备（IfcFireSuppressionTerminal）	ENTITY IfcFireSuppressionTerminal SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcFireSuppressionTerminalTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcFireSuppressionTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFireSuppressionTerminalTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPLUMBINGFIREPROTECTIONDOMAIN. IFCFIRESUPPRESSIONTERMINALTYPE ' IN TYPEOF (SELF \ IfcObject. IsTypedBy [1] . RelatingType)); END_ENTITY
灭火末端设备类型（IfcFireSuppressionTerminalType）	ENTITY IfcFireSuppressionTerminalType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcFireSuppressionTerminalTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFireSuppressionTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFireSuppressionTerminalTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
污水隔离设备（IfcInterceptor）	ENTITY IfcInterceptor SUBTYPE OF IfcFlowTreatmentDevice; PredefinedType : OPTIONAL IfcInterceptorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcInterceptorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcInterceptorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPLUMBINGFIREPROTECTIONDOMAIN. IFCINTERCEPTORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
污水隔离设备类型（IfcInterceptorType）	ENTITY IfcInterceptorType SUBTYPE OF IfcFlowTreatmentDeviceType; PredefinedType : IfcInterceptorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcInterceptorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcInterceptorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType));END_ENTITY

续表 C.4.2

实体	EXPRESS 描述
卫生器具 (IfcSanitaryTerminal)	ENTITY IfcSanitaryTerminal SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcSanitaryTerminalTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSanitaryTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSanitaryTerminalTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPLUMBINGFIREPROTECTIONDOMAIN. IFCSANITARYTERMINALTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
卫生器具类型 (IfcSanitary TerminalType)	ENTITY IfcSanitaryTerminalType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcSanitaryTerminalTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSanitaryTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSanitaryTerminalTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
立管末端设备 (IfcStackTerminal)	ENTITY IfcStackTerminal SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcStackTerminalTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcStackTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcStackTerminalTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPLUMBINGFIREPROTECTIONDOMAIN. IFCSTACKTERMINALTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
立管末端设备类型 (IfcStackTerminalType)	ENTITY IfcStackTerminalType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcStackTerminalTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcStackTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcStackTerminalTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
排水末端设备 (IfcWasteTerminal)	ENTITY IfcWasteTerminal SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcWasteTerminalTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcWasteTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcWasteTerminalTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCPLUMBINGFIREPROTECTIONDOMAIN. IFCWASTETERMINALTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
排水末端设备类型 (IfcWasteTerminal Type)	ENTITY IfcWasteTerminalType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcWasteTerminalTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcWasteTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcWasteTerminalTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

C.5 暖通空调应用

C.5.1 暖通空调类型的 EXPRESS 描述应符合表 C.5.1 的规定。

表 C.5.1 暖通空调类型的 EXPRESS 描述

类型	EXPRESS 描述
送风末端设备类型（IfcAirTerminalBoxTypeEnum）	TYPE IfcAirTerminalBoxTypeEnum = ENUMERATION OF (CONSTANTFLOW, VARIABLEFLOWPRESSUREDEPENDANT, VARIABLEFLOWPRESSUREINDEPENDANT, USERDEFINED, NOTDEFINED); END_TYPE
空调出风口类型（IfcAirTerminalTypeEnum）	TYPE IfcAirTerminalTypeEnum = ENUMERATION OF (DIFFUSER, GRILLE, LOUVRE, REGISTER, USERDEFINED, NOTDEFINED); END_TYPE
空气-空气热能回收设备类型（IfcAirToAirHeatRecoveryTypeEnum）	TYPE IfcAirToAirHeatRecoveryTypeEnum = ENUMERATION OF (FIXEDPLATECOUNTERFLOWEXCHANGER, FIXEDPLATECROSSFLOWEXCHANGER, FIXEDPLATEPARALLELFLOWEXCHANGER, ROTARYWHEEL, RUNAROUNDCOILLOOP, HEATPIPE, TWINTOWERENTHALPYRECOVERYLOOPS, THERMOSIPHONSEALEDTUBEHEATEXCHANGERS, THERMOSIPHONCOILTYPEHEATEXCHANGERS, USERDEFINED, NOTDEFINED); END_TYPE
锅炉类型（IfcBoilerTypeEnum）	TYPE IfcBoilerTypeEnum = ENUMERATION OF (WATER, STEAM, USERDEFINED, NOTDEFINED); END_TYPE
燃烧器类型（IfcBurnerTypeEnum）	TYPE IfcBurnerTypeEnum = ENUMERATION OF (USERDEFINED, NOTDEFINED); END_TYPE
冷水机组类型（IfcChillerTypeEnum）	TYPE IfcChillerTypeEnum = ENUMERATION OF (AIRCOOLED, WATERCOOLED, HEATRECOVERY, USERDEFINED, NOTDEFINED); END_TYPE
盘管类型（IfcCoilTypeEnum）	TYPE IfcCoilTypeEnum = ENUMERATION OF (DXCOOLINGCOIL, ELECTRICHEATINGCOIL, GASHEATINGCOIL, HYDRONICCOIL, STEAMHEATINGCOIL, WATERCOOLINGCOIL, WATERHEATINGCOIL, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.5.1

类型	EXPRESS 描述
压缩机类型（IfcCompressorTypeEnum）	TYPE IfcCompressorTypeEnum = ENUMERATION OF (DYNAMIC, RECIPROCATING, ROTARY, SCROLL, TROCHOIDAL, SINGLESTAGE, BOOSTER, OPENTYPE, HERMETIC, SEMIHERMETIC, WELDEDSHELLHERMETIC, ROLLINGPISTON, ROTARYVANE, SINGLESCREW, TWINSCREW, USERDEFINED, NOTDEFINED); END_TYPE
冷凝器类型（IfcCondenserTypeEnum）	TYPE IfcCondenserTypeEnum = ENUMERATION OF (AIRCOOLED, EVAPORATIVECOOLED, WATERCOOLED, WATERCOOLEDBRAZEDPLATE, WATERCOOLEDSHELLCOIL, WATERCOOLEDSHELLTUBE, WATERCOOLEDTUBEINTUBE, USERDEFINED, NOTDEFINED); END_TYPE
冷梁类型（IfcCooledBeamTypeEnum）	TYPE IfcCooledBeamTypeEnum = ENUMERATION OF (ACTIVE, PASSIVE, USERDEFINED, NOTDEFINED); END_TYPE
冷却塔类型（IfcCoolingTowerTypeEnum）	TYPE IfcCoolingTowerTypeEnum = ENUMERATION OF (NATURALDRAFT, MECHANICALINDUCEDDRAFT, MECHANICALFORCEDDRAFT, USERDEFINED, NOTDEFINED); END_TYPE
风阀类型（IfcDamperTypeEnum）	TYPE IfcDamperTypeEnum = ENUMERATION OF (BACKDRAFTDAMPER, BALANCINGDAMPER, BLASTDAMPER, CONTROLDAMPER, FIREDAMPER, FIRESMOKEDAMPER, FUMEHOODEXHAUST, GRAVITYDAMPER, GRAVITYRELIEFDAMPER, RELIEFDAMPER, SMOKEDAMPER, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.5.1

类型	EXPRESS 描述
风管配件类型（IfcDuctFittingTypeEnum）	TYPE IfcDuctFittingTypeEnum = ENUMERATION OF (BEND, CONNECTOR, ENTRY, EXIT, JUNCTION, OBSTRUCTION, TRANSITION, USERDEFINED, NOTDEFINED); END_TYPE
风管段类型（IfcDuctSegmentTypeEnum）	TYPE IfcDuctSegmentTypeEnum = ENUMERATION OF (RIGIDSEGMENT, FLEXIBLESEGMENT, USERDEFINED, NOTDEFINED); END_TYPE
风管消声器类型（IfcDuctSilencerTypeEnum）	TYPE IfcDuctSilencerTypeEnum = ENUMERATION OF (FLATOVAL, RECTANGULAR, ROUND, USERDEFINED, NOTDEFINED); END_TYPE
发动机类型（IfcEngineTypeEnum）	TYPE IfcEngineTypeEnum = ENUMERATION OF (EXTERNALCOMBUSTION, INTERNALCOMBUSTION, USERDEFINED, NOTDEFINED); END_TYPE
蒸发冷却器类型（IfcEvaporativeCoolerTypeEnum）	TYPE IfcEvaporativeCoolerTypeEnum = ENUMERATION OF (DIRECTEVAPORATIVERANDOMMEDIAAIRCOOLER, DIRECTEVAPORATIVERIGIDMEDIAAIRCOOLER, DIRECTEVAPORATIVESLINGERSPACKAGEDAIRCOOLER, DIRECTEVAPORATIVEPACKAGEDROTARYAIRCOOLER, DIRECTEVAPORATIVEAIRWASHER, INDIRECTEVAPORATIVEPACKAGEAIRCOOLER, INDIRECTEVAPORATIVEWETCOIL, INDIRECTEVAPORATIVECOOLINGTOWERORCOILCOOLER, INDIRECTDIRECTCOMBINATION, USERDEFINED, NOTDEFINED); END_TYPE
蒸发器类型（IfcEvaporatorTypeEnum）	TYPE IfcEvaporatorTypeEnum = ENUMERATION OF (DIRECTEXPANSION, DIRECTEXPANSIONSHELLANDTUBE, DIRECTEXPANSIONTUBEINTUBE, DIRECTEXPANSIONBRAZEDPLATE, FLOODEDSHELLANDTUBE, SHELLANDCOIL, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.5.1

类型	EXPRESS 描述
风机类型 (IfcFanTypeEnum)	TYPE IfcFanTypeEnum = ENUMERATION OF (CENTRIFUGALFORWARDCURVED, CENTRIFUGALRADIAL, CENTRIFUGALBACKWARDINCLINEDCURVED, CENTRIFUGALAIRFOIL, TUBEAXIAL, VANEAXIAL, PROPELLORAXIAL, USERDEFINED, NOTDEFINED); END_TYPE
过滤器类型 (IfcFilterTypeEnum)	TYPE IfcFilterTypeEnum = ENUMERATION OF (AIRPARTICLEFILTER, COMPRESSEDAIRFILTER, ODORFILTER, OILFILTER, STRAINER, WATERFILTER, USERDEFINED, NOTDEFINED); END_TYPE
流量计类型 (IfcFlowMeter TypeEnum)	TYPE IfcFlowMeterTypeEnum = ENUMERATION OF (ENERGYMETER, GASMETER, OILMETER, WATERMETER, USERDEFINED, NOTDEFINED); END_TYPE
换热器类型 (IfcHeatExchanger TypeEnum)	TYPE IfcHeatExchangerTypeEnum = ENUMERATION OF (PLATE, SHELLANDTUBE, USERDEFINED, NOTDEFINED); END_TYPE
加湿器类型 (IfcHumidifier TypeEnum)	TYPE IfcHumidifierTypeEnum = ENUMERATION OF (STEAMINJECTION, ADIABATICAIRWASHER, ADIABATICPAN, ADIABATICWETTEDELEMENT, ADIABATICATOMIZING, ADIABATICULTRASONIC, ADIABATICRIGIDMEDIA, ADIABATICCOMPRESSEDAIRNOZZLE, ASSISTEDELECTRIC, ASSISTEDNATURALGAS, ASSISTEDPROPANE, ASSISTEDBUTANE, ASSISTEDSTEAM, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.5.1

类型	EXPRESS 描述
医用设备类型（IfcMedicalDeviceTypeEnum）	TYPE IfcMedicalDeviceTypeEnum = ENUMERATION OF (AIRSTATION, FEEDAIRUNIT, OXYGENGENERATOR, OXYGENPLANT, VACUUMSTATION, USERDEFINED, NOTDEFINED); END_TYPE
管道配件类型（IfcPipeFittingTypeEnum）	TYPE IfcPipeFittingTypeEnum = ENUMERATION OF (BEND, CONNECTOR, ENTRY, EXIT, JUNCTION, OBSTRUCTION, TRANSITION, USERDEFINED, NOTDEFINED); END_TYPE
水管段类型（IfcPipeSegmentTypeEnum）	TYPE IfcPipeSegmentTypeEnum = ENUMERATION OF (CULVERT, FLEXIBLESEGMENT, RIGIDSEGMENT, GUTTER, SPOOL, USERDEFINED, NOTDEFINED); END_TYPE
泵类型（IfcPumpTypeEnum）	TYPE IfcPumpTypeEnum = ENUMERATION OF (CIRCULATOR, ENDSUCTION, SPLITCASE, SUBMERSIBLEPUMP, SUMPPUMP, VERTICALINLINE, VERTICALTURBINE, USERDEFINED, NOTDEFINED); END_TYPE
房间加热器类型（IfcSpaceHeaterTypeEnum）	TYPE IfcSpaceHeaterTypeEnum = ENUMERATION OF (CONVECTOR, RADIATOR, USERDEFINED, NOTDEFINED); END_TYPE
水箱类型（IfcTankTypeEnum）	TYPE IfcTankTypeEnum = ENUMERATION OF (BASIN, BREAKPRESSURE, EXPANSION, FEEDANDEXPANSION, PRESSUREVESSEL, STORAGE, VESSEL, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.5.1

类型	EXPRESS 描述
管束类型 (IfcTubeBundle TypeEnum)	TYPE IfcTubeBundleTypeEnum = ENUMERATION OF (FINNED, USERDEFINED, NOTDEFINED); END_TYPE
一体式设备类型 (IfcUnitaryEquipment TypeEnum)	TYPE IfcUnitaryEquipmentTypeEnum = ENUMERATION OF (AIRHANDLER, AIRCONDITIONINGUNIT, DEHUMIDIFIER, SPLITSYSTEM, ROOFTOPUNIT, USERDEFINED, NOTDEFINED); END_TYPE
阀门类型 (IfcValveTypeEnum)	TYPE IfcValveTypeEnum = ENUMERATION OF (AIRRELEASE, ANTIVACUUM, CHANGEOVER, CHECK, COMMISSIONING, DIVERTING, DRAWOFFCOCK, DOUBLECHECK, DOUBLEREGULATING, FAUCET, FLUSHING, GASCOCK, GASTAP, ISOLATING, MIXING, PRESSUREREDUCING, PRESSURERELIEF, REGULATING, SAFETYCUTOFF, STEAMTRAP, STOPCOCK, USERDEFINED, NOTDEFINED); END_TYPE
隔振器类型 (IfcVibrationIsolator TypeEnum)	TYPE IfcVibrationIsolatorTypeEnum = ENUMERATION OF (COMPRESSION, SPRING, USERDEFINED, NOTDEFINED); END_TYPE

C.5.2 暖通空调实体的 EXPRESS 描述应符合表 C.5.2 的规定。

表 C.5.2 暖通空调实体的 EXPRESS 描述

实体	EXPRESS 描述
风道末端设备 (IfcAirTerminal)	ENTITY IfcAirTerminal SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcAirTerminalTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcAirTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcAirTerminalTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCAIRTERMINALTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
送风末端设备 (IfcAirTerminalBox)	ENTITY IfcAirTerminalBox SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcAirTerminalBoxTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcAirTerminalBox TypeEnum. USERDEFINED) OR ((PredefinedType = IfcAirTerminalBoxTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCAIRTERMINALBOXTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
送风末端设备类型 (IfcAirTerminal BoxType)	ENTITY IfcAirTerminalBoxType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcAirTerminalBoxTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcAirTerminalBoxTypeEnum. USERDEFINED) OR ((PredefinedType = IfcAirTerminalBoxTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
空调出风口类型 (IfcAirTerminalType)	ENTITY IfcAirTerminalType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcAirTerminalTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcAirTerminalTypeEnum. USERDEFINED) OR ((PredefinedType = IfcAirTerminalTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
空气-空气能量 回收设备 (IfcAirToAirHeat Recovery)	ENTITY IfcAirToAirHeatRecovery SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcAirToAirHeatRecoveryTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcAirToAirHeat RecoveryTypeEnum. USERDEFINED) OR ((PredefinedType = IfcAirToAirHeatRecovery TypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCAIRTOAIRHEATRECOVERYTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
空气-空气能量 回收设备类型 (IfcAirToAirHeat RecoveryType)	ENTITY IfcAirToAirHeatRecoveryType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcAirToAirHeatRecoveryTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcAirToAirHeatRecoveryTypeEnum. USERDEFINED) OR ((PredefinedType = IfcAirToAirHeatRecoveryTypeEnum. USERDEFINED) AND EXISTS(SELF\Ifc ElementType. ElementType)); END_ENTITY
锅炉 (IfcBoiler)	ENTITY IfcBoiler SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcBoilerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcBoiler TypeEnum. USERDEFINED) OR ((PredefinedType = IfcBoilerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCBOILERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
锅炉类型 (IfcBoilerType)	ENTITY IfcBoilerType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcBoilerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcBoilerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBoilerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
燃烧器 (IfcBurner)	ENTITY IfcBurner SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcBurnerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcBurnerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBurnerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCBURNERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
燃烧器类型 (IfcBurnerType)	ENTITY IfcBurnerType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcBurnerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcBurnerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcBurnerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
冷水机 (IfcChiller)	ENTITY IfcChiller SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcChillerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcChillerType Enum. USERDEFINED) OR ((PredefinedType = IfcChillerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCCHILLERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
冷水机类型 (IfcChillerType)	ENTITY IfcChillerType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcChillerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcChillerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcChillerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
盘管 (IfcCoil)	ENTITY IfcCoil SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcCoilTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCoilType Enum. USERDEFINED) OR ((PredefinedType = IfcCoilTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCCOILTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
盘管类型 (IfcCoilType)	ENTITY IfcCoilType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcCoilTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCoilTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCoilTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
压缩机 (IfcCompressor)	ENTITY IfcCompressor SUBTYPE OF IfcFlowMovingDevice; PredefinedType : OPTIONAL IfcCompressorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCompressorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCompressorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCCOMPRESSORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
压缩机类型 (IfcCompressorType)	ENTITY IfcCompressorType SUBTYPE OF IfcFlowMovingDeviceType; PredefinedType : IfcCompressorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCompressorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCompressorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
冷凝器 (IfcCondenser)	ENTITY IfcCondenser SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcCondenserTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCondenserType Enum. USERDEFINED) OR ((PredefinedType = IfcCondenserTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCCONDENSERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
冷凝器类型 (IfcCondenserType)	ENTITY IfcCondenserType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcCondenserTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCondenserTypeEnum. USERDEFINED) OR ((Predefined Type = IfcCondenserTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
冷梁 (IfcCooledBeam)	ENTITY IfcCooledBeam SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcCooledBeamTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCooledBeamTypeEn um. USERDEFINED) OR ((PredefinedType = IfcCooledBeamTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCCOOLEDBEAMTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
冷梁类型 (IfcCooledBeamType)	ENTITY IfcCooledBeamType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcCooledBeamTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCooledBeamTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCooledBeamTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
冷却塔 (IfcCoolingTower)	ENTITY IfcCoolingTower SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcCoolingTowerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCoolingTower TypeEnum. USERDEFINED) OR ((PredefinedType = IfcCoolingTowerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCCOOLINGTOWER TYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
冷却塔类型 (IfcCooling TowerType)	ENTITY IfcCoolingTowerType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcCoolingTowerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCoolingTowerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCoolingTowerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
风阀 (IfcDamper)	ENTITY IfcDamper SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcDamperTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcDamperType Enum. USERDEFINED) OR ((PredefinedType = IfcDamperTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCDAMPERTYPE' IN TY PEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
风阀类型 (IfcDamperType)	ENTITY IfcDamperType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcDamperTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcDamperTypeEnum. USERDEFINED) OR ((Predefined Type = IfcDamperTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
风管配件 (IfcDuctFitting)	ENTITY IfcDuctFitting SUBTYPE OF IfcFlowFitting; PredefinedType : OPTIONAL IfcDuctFittingTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcDuctFittingType Enum. USERDEFINED) OR ((PredefinedType = IfcDuctFittingTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCDUCTFITTINGTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
风管配件类型 (IfcDuctFittingType)	ENTITY IfcDuctFittingType SUBTYPE OF IfcFlowFittingType; PredefinedType : IfcDuctFittingTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcDuctFittingTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDuctFittingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
风管段 (IfcDuctSegment)	ENTITY IfcDuctSegment SUBTYPE OF IfcFlowSegment; PredefinedType : OPTIONAL IfcDuctSegmentTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcDuctSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDuctSegmentTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCDUCTSEGMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
风管段类型 (IfcDuctSegmentType)	ENTITY IfcDuctSegmentType SUBTYPE OF IfcFlowSegmentType; PredefinedType : IfcDuctSegmentTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcDuctSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDuctSegmentTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
风管消声器 (IfcDuctSilencer)	ENTITY IfcDuctSilencer SUBTYPE OF IfcFlowTreatmentDevice; PredefinedType : OPTIONAL IfcDuctSilencerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcDuctSilencerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDuctSilencerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCDUCTSILENCERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
风管消声器类型 (IfcDuctSilencerType)	ENTITY IfcDuctSilencerType SUBTYPE OF IfcFlowTreatmentDeviceType; PredefinedType : IfcDuctSilencerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcDuctSilencerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcDuctSilencerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
发动机 (IfcEngine)	ENTITY IfcEngine SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcEngineTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcEngineTypeEnum. USERDEFINED) OR ((PredefinedType = IfcEngineTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCENGINETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
发动机类型 (IfcEngineType)	ENTITY IfcEngineType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcEngineTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcEngineTypeEnum. USERDEFINED) OR ((PredefinedType = IfcEngineTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
蒸发冷却器 (IfcEvaporative Cooler)	ENTITY IfcEvaporativeCooler SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcEvaporativeCoolerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcEvaporativeCooler TypeEnum. USERDEFINED) OR ((PredefinedType = IfcEvaporativeCoolerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCEVAPORATIVECOOLERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
蒸发冷却器类型 (IfcEvaporative CoolerType)	ENTITY IfcEvaporativeCoolerType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcEvaporativeCoolerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcEvaporativeCoolerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcEvaporativeCoolerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
蒸发器 (IfcEvaporator)	ENTITY IfcEvaporator SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcEvaporatorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcEvaporatorTypeE-num. USERDEFINED) OR ((PredefinedType = IfcEvaporatorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCEVAPORATORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
蒸发器类型 (IfcEvaporatorType)	ENTITY IfcEvaporatorType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcEvaporatorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcEvaporatorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcEvaporatorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
风机 (IfcFan)	ENTITY IfcFan SUBTYPE OF IfcFlowMovingDevice; PredefinedType : OPTIONAL IfcFanTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcFan TypeEnum. USERDEFINED) OR ((PredefinedType = IfcFanTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCFANTYPE' IN TYPEOF (SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
风机类型 (IfcFanType)	ENTITY IfcFanType SUBTYPE OF IfcFlowMovingDeviceType; PredefinedType : IfcFanTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFanTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFanTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
过滤器 (IfcFilter)	ENTITY IfcFilter SUBTYPE OF IfcFlowTreatmentDevice; PredefinedType : OPTIONAL IfcFilterTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcFilter TypeEnum. USERDEFINED) OR ((PredefinedType = IfcFilterTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCFILTERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
过滤器类型 (IfcFilterType)	ENTITY IfcFilterType SUBTYPE OF IfcFlowTreatmentDeviceType; PredefinedType : IfcFilterTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFilterTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFilterTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
流量计 (IfcFlowMeter)	ENTITY IfcFlowMeter SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcFlowMeterTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcFlowMeterType Enum. USERDEFINED) OR ((PredefinedType = IfcFlowMeterTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCFLOWMETERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
流量计类型 (IfcFlowMeterType)	ENTITY IfcFlowMeterType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcFlowMeterTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFlowMeterTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFlowMeterTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
换热器 (IfcHeatExchanger)	ENTITY IfcHeatExchanger SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcHeatExchangerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcHeatExchanger TypeEnum. USERDEFINED) OR ((PredefinedType = IfcHeatExchangerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCHEATEXCHANGERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
换热器类型 (IfcHeatExchanger Type)	ENTITY IfcHeatExchangerType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcHeatExchangerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcHeatExchangerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcHeatExchangerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
加湿器 (IfcHumidifier)	ENTITY IfcHumidifier SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcHumidifierTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcHumidifierTypeEnum. USERDEFINED) OR ((PredefinedType = IfcHumidifierTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCHUMIDIFIERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
加湿器类型 (IfcHumidifierType)	ENTITY IfcHumidifierType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcHumidifierTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcHumidifierTypeEnum. USERDEFINED) OR ((PredefinedType = IfcHumidifierTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
医用设备 (IfcMedicalDevice)	ENTITY IfcMedicalDevice SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcMedicalDeviceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcMedicalDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcMedicalDeviceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCMEDICALDEVICETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
医用设备类型 (IfcMedicalDeviceType)	ENTITY IfcMedicalDeviceType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcMedicalDeviceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcMedicalDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcMedicalDeviceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
水管配件 (IfcPipeFitting)	ENTITY IfcPipeFitting SUBTYPE OF IfcFlowFitting; PredefinedType : OPTIONAL IfcPipeFittingTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcPipeFittingTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPipeFittingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCPIPEFITTINGTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
水管配件类型 (IfcPipeFittingType)	ENTITY IfcPipeFittingType SUBTYPE OF IfcFlowFittingType; PredefinedType : IfcPipeFittingTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcPipeFittingTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPipeFittingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
水管段 (IfcPipeSegment)	ENTITY IfcPipeSegment SUBTYPE OF IfcFlowSegment; PredefinedType : OPTIONAL IfcPipeSegmentTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcPipeSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPipeSegmentTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCPIPESEGMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
水管段类型 (IfcPipeSegmentType)	ENTITY IfcPipeSegmentType SUBTYPE OF IfcFlowSegmentType; PredefinedType : IfcPipeSegmentTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcPipeSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPipeSegmentTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
泵 (IfcPump)	ENTITY IfcPump SUBTYPE OF IfcFlowMovingDevice; PredefinedType : OPTIONAL IfcPumpTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcPumpTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPumpTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCPUMPTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
泵类型 (IfcPumpType)	ENTITY IfcPumpType SUBTYPE OF IfcFlowMovingDeviceType; PredefinedType : IfcPumpTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcPumpTypeEnum. USERDEFINED) OR ((PredefinedType = IfcPumpTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
房间加热器 (IfcSpaceHeater)	ENTITY IfcSpaceHeater SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcSpaceHeaterTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSpaceHeaterTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSpaceHeaterTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCSPACEHEATERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
房间加热器类型 (IfcSpaceHeaterType)	ENTITY IfcSpaceHeaterType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcSpaceHeaterTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSpaceHeaterTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSpaceHeaterTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
水箱 (IfcTank)	ENTITY IfcTank SUBTYPE OF IfcFlowStorageDevice; PredefinedType : OPTIONAL IfcTankTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcTank TypeEnum. USERDEFINED) OR ((PredefinedType = IfcTankTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCTANKTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
水箱类型 (IfcTankType)	ENTITY IfcTankType SUBTYPE OF IfcFlowStorageDeviceType; PredefinedType : IfcTankTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcTankTypeEnum. USERDEFINED) OR ((PredefinedType = IfcTankTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
管束 (IfcTubeBundle)	ENTITY IfcTubeBundle SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcTubeBundleTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcTubeBundleType Enum. USERDEFINED) OR ((PredefinedType = IfcTubeBundleTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCTUBEBUNDLETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
管束类型 (IfcTubeBundleType)	ENTITY IfcTubeBundleType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcTubeBundleTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcTubeBundleTypeEnum. USERDEFINED) OR ((Pred efinedType = IfcTubeBundleTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
一体式设备 (IfcUnitaryEquipment)	ENTITY IfcUnitaryEquipment SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcUnitaryEquipmentTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcUnitaryEquipment TypeEnum. USERDEFINED) OR ((PredefinedType = IfcUnitaryEquipmentTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCUNITARYEQUIPMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
一体式设备类型 (IfcUnitaryEquipment Type)	ENTITY IfcUnitaryEquipmentType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcUnitaryEquipmentTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcUnitaryEquipmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcUnitaryEquipmentTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY

续表 C.5.2

实体	EXPRESS 描述
阀门 (IfcValve)	ENTITY IfcValve SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcValveTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcValve TypeEnum. USERDEFINED) OR ((PredefinedType = IfcValveTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCVALVETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
阀门类型 (IfcValveType)	ENTITY IfcValveType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcValveTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcValveTypeEnum. USERDEFINED) OR ((PredefinedType = IfcValveTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
隔振器 (IfcVibrationIsolator)	ENTITY IfcVibrationIsolator SUBTYPE OF IfcElementComponent; PredefinedType : OPTIONAL IfcVibrationIsolatorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcVibrationIsola torTypeEnum. USERDEFINED) OR ((PredefinedType = IfcVibrationIsolatorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCHVACDOMAIN. IFCVIBRATIONISOLATORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
隔振器类型 (IfcVibrationIsolator Type)	ENTITY IfcVibrationIsolatorType SUBTYPE OF IfcElementComponentType; PredefinedType : IfcVibrationIsolatorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcVibrationIsolatorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcVibrationIsolatorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY

C.6 电气专业应用

C.6.1 电气专业类型的 EXPRESS 描述应符合表 C.6.1 的规定。

表 C.6.1 电气专业类型的 EXPRESS 描述

类型	EXPRESS 描述
视听设备类型枚举 (IfcAudioVisual Appliance TypeEnum)	TYPE IfcAudioVisualApplianceTypeEnum = ENUMERATION OF (AMPLIFIER, CAMERA, DISPLAY, MICROPHONE, PLAYER, PROJECTOR, RECEIVER, SPEAKER, SWITCHER, TELEPHONE, TUNER, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.6.1

类型	EXPRESS 描述
电缆支架配件类型枚举（IfcCableCarrierFittingTypeEnum）	TYPE IfcCableCarrierFittingTypeEnum = ENUMERATION OF (BEND, CROSS, REDUCER, TEE, USERDEFINED, NOTDEFINED); END_TYPE
电缆支架段类型枚举（IfcCableCarrierSegmentTypeEnum）	TYPE IfcCableCarrierSegmentTypeEnum = ENUMERATION OF (CABLELADDERSEGMENT, CABLETRAYSEGMENT, CABLETRUNKINGSEGMENT, CONDUITSEGMENT, USERDEFINED, NOTDEFINED); END_TYPE
电缆配件类型枚举（IfcCableFittingTypeEnum）	TYPE IfcCableFittingTypeEnum = ENUMERATION OF (CONNECTOR, ENTRY, EXIT, JUNCTION, TRANSITION, USERDEFINED, NOTDEFINED); END_TYPE
电缆段类型枚举（IfcCableSegmentTypeEnum）	TYPE IfcCableSegmentTypeEnum = ENUMERATION OF (BUSBARSEGMENT, CABLESEGMENT, CONDUCTORSEGMENT, CORESEGMENT, USERDEFINED, NOTDEFINED); END_TYPE
通信设备类型枚举（IfcCommunicationsApplianceTypeEnum）	TYPE IfcCommunicationsApplianceTypeEnum = ENUMERATION OF (ANTENNA, COMPUTER, FAX, GATEWAY, MODEM, NETWORKAPPLIANCE, NETWORKBRIDGE, NETWORKHUB, PRINTER, REPEATER, ROUTER, SCANNER, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.6.1

类型	EXPRESS 描述
电器类型枚举（IfcElectricApplianceTypeEnum）	TYPE IfcElectricApplianceTypeEnum = ENUMERATION OF (DISHWASHER, ELECTRICCOOKER, FREESTANDINGELECTRICHEATER, FREESTANDINGFAN, FREESTANDINGWATERHEATER, FREESTANDINGWATERCOOLER, FREEZER, FRIDGE_FREEZER, HANDDRYER, KITCHENMACHINE, MICROWAVE, PHOTOCOPIER, REFRIGERATOR, TUMBLEDRYER, VENDINGMACHINE, WASHINGMACHINE, USERDEFINED, NOTDEFINED); END_TYPE
配电板类型枚举（IfcElectricDistributionBoardTypeEnum）	TYPE IfcElectricDistributionBoardTypeEnum = ENUMERATION OF (CONSUMERUNIT, DISTRIBUTIONBOARD, MOTORCONTROLCENTRE, SWITCHBOARD, USERDEFINED, NOTDEFINED); END_TYPE
电力存储设备类型（IfcElectricFlowStorageDeviceTypeEnum）	TYPE IfcElectricFlowStorageDeviceTypeEnum = ENUMERATION OF (BATTERY, CAPACITORBANK, HARMONICFILTER, INDUCTORBANK, UPS, USERDEFINED, NOTDEFINED); END_TYPE
发电机类型（IfcElectricGeneratorTypeEnum）	TYPE IfcElectricGeneratorTypeEnum = ENUMERATION OF (CHP, ENGINEGENERATOR, STANDALONE, USERDEFINED, NOTDEFINED); END_TYPE
电动机类型（IfcElectricMotorTypeEnum）	TYPE IfcElectricMotorTypeEnum = ENUMERATION OF (DC, INDUCTION, POLYPHASE, RELUCTANCESYNCHRONOUS, SYNCHRONOUS, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.6.1

类型	EXPRESS 描述
电气时间控制器类型（IfcElectricTimeControlTypeEnum）	TYPE IfcElectricTimeControlTypeEnum = ENUMERATION OF (TIMECLOCK, TIMEDELAY, RELAY, USERDEFINED, NOTDEFINED); END_TYPE
接线盒类型（IfcJunctionBoxTypeEnum）	TYPE IfcJunctionBoxTypeEnum = ENUMERATION OF (DATA, POWER, USERDEFINED, NOTDEFINED); END_TYPE
光源类型（IfcLampTypeEnum）	TYPE IfcLampTypeEnum = ENUMERATION OF (COMPACTFLUORESCENT, FLUORESCENT, HALOGEN, HIGHPRESSUREMERCURY, HIGHPRESSURESODIUM, LED, METALHALIDE, OLED, TUNGSTENFILAMENT, USERDEFINED, NOTDEFINED); END_TYPE
灯具类型（IfcLightFixtureTypeEnum）	TYPE IfcLightFixtureTypeEnum = ENUMERATION OF (POINTSOURCE, DIRECTIONSOURCE, SECURITYLIGHTING, USERDEFINED, NOTDEFINED); END_TYPE
电机连接类型（IfcMotorConnectionTypeEnum）	TYPE IfcMotorConnectionTypeEnum = ENUMERATION OF (BELTDRIVE, COUPLING, DIRECTDRIVE, USERDEFINED, NOTDEFINED); END_TYPE
插座类型（IfcOutletTypeEnum）	TYPE IfcOutletTypeEnum = ENUMERATION OF (AUDIOVISUALOUTLET, COMMUNICATIONSOUTLET, POWEROUTLET, DATAOUTLET, TELEPHONEOUTLET, USERDEFINED, NOTDEFINED); END_TYPE
保护装置跳闸单元类型（IfcProtectiveDeviceTrippingUnitTypeEnum）	TYPE IfcProtectiveDeviceTrippingUnitTypeEnum = ENUMERATION OF (ELECTRONIC, ELECTROMAGNETIC, RESIDUALCURRENT, THERMAL, USERDEFINED, NOTDEFINED); END_TYPE

续表 C.6.1

类型	EXPRESS 描述
保护装置类型（IfcProtectiveDeviceTypeEnum）	TYPE IfcProtectiveDeviceTypeEnum = ENUMERATION OF (CIRCUITBREAKER, EARTHLEAKAGECIRCUITBREAKER, EARTHINGSWITCH, FUSEDISCONNECTOR, RESIDUALCURRENTCIRCUITBREAKER, RESIDUALCURRENTSWITCH, VARISTOR, USERDEFINED, NOTDEFINED); END_TYPE
太阳能设备类型（IfcSolarDeviceTypeEnum）	TYPE IfcSolarDeviceTypeEnum = ENUMERATION OF (SOLARCOLLECTOR, SOLARPANEL, USERDEFINED, NOTDEFINED); END_TYPE
开关类型（IfcSwitchingDeviceTypeEnum）	TYPE IfcSwitchingDeviceTypeEnum = ENUMERATION OF (CONTACTOR, DIMMERSWITCH, EMERGENCYSTOP, KEYPAD, MOMENTARYSWITCH, SELECTORSWITCH, STARTER, SWITCHIDISCONNECTOR, TOGGLESWITCH, USERDEFINED, NOTDEFINED); END_TYPE
变压器类型（IfcTransformerTypeEnum）	TYPE IfcTransformerTypeEnum = ENUMERATION OF (CURRENT, FREQUENCY, INVERTER, RECTIFIER, VOLTAGE, USERDEFINED, NOTDEFINED); END_TYPE

C.6.2 电气专业实体的 EXPRESS 描述应符合表 C.6.2 的规定。

表 C.6.2 电气专业实体的 EXPRESS 描述

实体	EXPRESS 描述
视听设备（IfcAudioVisualAppliance）	ENTITY IfcAudioVisualAppliance SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcAudioVisualApplianceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcAudioVisualApplianceTypeEnum.USERDEFINED) OR ((PredefinedType = IfcAudioVisualApplianceTypeEnum.USERDEFINED) AND EXISTS (SELF\IfcObject.ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCAUDIOVISUALAPPLIANCETYPE' IN TYPEOF(SELF\IfcObject.IsTypedBy[1].RelatingType)); END_ENTITY

续表 C.6.2

实体	EXPRESS 描述
视听设备类型 (IfcAudioVisual ApplianceType)	ENTITY IfcAudioVisualApplianceType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcAudioVisualApplianceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcAudioVisualApplianceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcAudioVisualApplianceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
电缆支架配件 (IfcCableCarrierFitting)	ENTITY IfcCableCarrierFitting SUBTYPE OF IfcFlowFitting; PredefinedType : OPTIONAL IfcCableCarrierFittingTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCableCarrierFittingTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableCarrierFittingTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCCABLECARRIERFITTINGTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
电缆支架配件类型 (IfcCableCarrier FittingType)	ENTITY IfcCableCarrierFittingType SUBTYPE OF IfcFlowFittingType; PredefinedType : IfcCableCarrierFittingTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCableCarrierFittingTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableCarrierFittingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
电缆支架段 (IfcCableCarrier Segment)	ENTITY IfcCableCarrierSegment SUBTYPE OF IfcFlowSegment; PredefinedType : OPTIONAL IfcCableCarrierSegmentTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCableCarrierSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableCarrierSegmentTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCCABLECARRIERSEGMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
电缆支架段类型 (IfcCableCarrier SegmentType)	ENTITY IfcCableCarrierSegmentType SUBTYPE OF IfcFlowSegmentType; PredefinedType : IfcCableCarrierSegmentTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCableCarrierSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableCarrierSegmentTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
电缆配件 (IfcCableFitting)	ENTITY IfcCableFitting SUBTYPE OF IfcFlowFitting; PredefinedType : OPTIONAL IfcCableFittingTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCableFittingTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableFittingTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCCABLEFITTINGTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 C.6.2

实体	EXPRESS 描述
电缆配件类型 (IfcCableFittingType)	ENTITY IfcCableFittingType SUBTYPE OF IfcFlowFittingType; PredefinedType : IfcCableFittingTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCableFittingTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableFittingTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
电缆段 (IfcCableSegment)	ENTITY IfcCableSegment SUBTYPE OF IfcFlowSegment; PredefinedType : OPTIONAL IfcCableSegmentTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCableSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableSegmentTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCCABLESEGMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
电缆段类型 (IfcCableSegmentType)	ENTITY IfcCableSegmentType SUBTYPE OF IfcFlowSegmentType; PredefinedType : IfcCableSegmentTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCableSegmentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCableSegmentTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
通信设备 (IfcCommunicationsAppliance)	ENTITY IfcCommunicationsAppliance SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcCommunicationsApplianceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCommunicationsApplianceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCommunicationsApplianceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCCOMMUNICATIONSAPPLIANCETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
通信设备类型 (IfcCommunicationsApplianceType)	ENTITY IfcCommunicationsApplianceType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcCommunicationsApplianceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCommunicationsApplianceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCommunicationsApplianceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
电气设备 (IfcElectricAppliance)	ENTITY IfcElectricAppliance SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcElectricApplianceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcElectricApplianceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricApplianceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCELECTRICAPPLIANCETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 C.6.2

实体	EXPRESS 描述
电气设备类型 (IfcElectricAppliance Type)	ENTITY IfcElectricApplianceType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcElectricApplianceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcElectricApplianceTypeEnum. USERDEFINED) OR ((Predefined Type = IfcElectricApplianceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
配电板 (IfcElectricDistribution Board)	ENTITY IfcElectricDistributionBoard SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcElectricDistributionBoardTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcElectricDistribution BoardTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricDistribution BoardTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCELECTRICDISTRIBUTIONBOARDTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. Relating Type)); END_ENTITY
配电板类型 (IfcElectricDistribution BoardType)	ENTITY IfcElectricDistributionBoardType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcElectricDistributionBoardTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcElectricDistributionBoardTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricDistributionBoardTypeEnum. USERDEFINED) AND EXISTS(SELF\Ifc ElementType. ElementType)); END_ENTITY
电力存储装置 (IfcElectricFlow StorageDevice)	ENTITY IfcElectricFlowStorageDevice SUBTYPE OF IfcFlowStorageDevice; PredefinedType : OPTIONAL IfcElectricFlowStorageDeviceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcElectricFlowStor ageDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricFlowStorageDevice TypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCELECTRICFLOWSTORAGEDEVICETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. Relating Type)); END_ENTITY
电力存储装置类型 (IfcElectricFlowStorage DeviceType)	ENTITY IfcElectricFlowStorageDeviceType SUBTYPE OF IfcFlowStorageDeviceType; PredefinedType : IfcElectricFlowStorageDeviceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcElectricFlowStorageDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricFlowStorageDeviceTypeEnum. USERDEFINED) AND EXISTS(SELF\ IfcElementType. ElementType)); END_ENTITY
发电机 (IfcElectricGenerator)	ENTITY IfcElectricGenerator SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcElectricGeneratorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcElectricGenera torTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricGeneratorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCELECTRICGENERATORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 C.6.2

实体	EXPRESS 描述
发电机类型 (IfcElectricGeneratorType)	ENTITY IfcElectricGeneratorType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcElectricGeneratorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcElectricGeneratorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricGeneratorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
电动马达 (IfcElectricMotor)	ENTITY IfcElectricMotor SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcElectricMotorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcElectricMotorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricMotorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCELECTRICMOTORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
电气时间控制器 (IfcElectricTimeControl)	ENTITY IfcElectricTimeControl SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcElectricTimeControlTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcElectricTimeControlTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricTimeControlTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCELECTRICTIMECONTROLTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
电气时间控制器类型 (IfcElectricTimeControlType)	ENTITY IfcElectricTimeControlType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcElectricTimeControlTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcElectricTimeControlTypeEnum. USERDEFINED) OR ((PredefinedType = IfcElectricTimeControlTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
接线盒 (IfcJunctionBox)	ENTITY IfcJunctionBox SUBTYPE OF IfcFlowFitting; PredefinedType : OPTIONAL IfcJunctionBoxTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcJunctionBoxTypeEnum. USERDEFINED) OR ((PredefinedType = IfcJunctionBoxTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCJUNCTIONBOXTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
接线盒类型 (IfcJunctionBoxType)	ENTITY IfcJunctionBoxType SUBTYPE OF IfcFlowFittingType; PredefinedType : IfcJunctionBoxTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcJunctionBoxTypeEnum. USERDEFINED) OR ((PredefinedType = IfcJunctionBoxTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY

续表 C.6.2

实体	EXPRESS 描述
光源 (IfcLamp)	ENTITY IfcLamp SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcLampTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcLampTypeEnum.USERDEFINED) OR ((PredefinedType = IfcLampTypeEnum.USERDEFINED) AND EXISTS (SELF\IfcObject.ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCLAMPTYPE' IN TYPEOF(SELF\IfcObject.IsTypedBy[1].RelatingType)); END_ENTITY
光源类型 (IfcLampType)	ENTITY IfcLampType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcLampTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcLampTypeEnum.USERDEFINED) OR ((PredefinedType = IfcLampTypeEnum.USERDEFINED) AND EXISTS(SELF\IfcElementType.ElementType)); END_ENTITY
灯具 (IfcLightFixture)	ENTITY IfcLightFixture SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcLightFixtureTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcLightFixtureTypeEnum.USERDEFINED) OR ((PredefinedType = IfcLightFixtureTypeEnum.USERDEFINED) AND EXISTS (SELF\IfcObject.ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCLIGHTFIXTURETYPE' IN TYPEOF(SELF\IfcObject.IsTypedBy[1].RelatingType)); END_ENTITY
灯具类型 (IfcLightFixtureType)	ENTITY IfcLightFixtureType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcLightFixtureTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcLightFixtureTypeEnum.USERDEFINED) OR ((PredefinedType = IfcLightFixtureTypeEnum.USERDEFINED) AND EXISTS(SELF\IfcElementType.ElementType)); END_ENTITY
电机连接 (IfcMotorConnection)	ENTITY IfcMotorConnection SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcMotorConnectionTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcMotorConnectionTypeEnum.USERDEFINED) OR ((PredefinedType = IfcMotorConnectionTypeEnum.USERDEFINED) AND EXISTS (SELF\IfcObject.ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCMOTORCONNECTIONTYPE' IN TYPEOF(SELF\IfcObject.IsTypedBy[1].RelatingType)); END_ENTITY
电机连接类型 (IfcMotorConnectionType)	ENTITY IfcMotorConnectionType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcMotorConnectionTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcMotorConnectionTypeEnum.USERDEFINED) OR ((PredefinedType = IfcMotorConnectionTypeEnum.USERDEFINED) AND EXISTS(SELF\IfcElementType.ElementType)); END_ENTITY

续表 C.6.2

实体	EXPRESS 描述
插座 (IfcOutlet)	ENTITY IfcOutlet SUBTYPE OF IfcFlowTerminal; PredefinedType : OPTIONAL IfcOutletTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcOutletTypeEnum.USERDEFINED) OR ((PredefinedType = IfcOutletTypeEnum.USERDEFINED) AND EXISTS (SELF\IfcObject.ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCOUTLETTYPE' IN TYPEOF(SELF\IfcObject.IsTypedBy[1].RelatingType)); END_ENTITY
插座类型 (IfcOutletType)	ENTITY IfcOutletType SUBTYPE OF IfcFlowTerminalType; PredefinedType : IfcOutletTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcOutletTypeEnum.USERDEFINED) OR ((PredefinedType = IfcOutletTypeEnum.USERDEFINED) AND EXISTS(SELF\IfcElementType.ElementType)); END_ENTITY
保护装置 (IfcProtectiveDevice)	ENTITY IfcProtectiveDevice SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcProtectiveDeviceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcProtectiveDeviceTypeEnum.USERDEFINED) OR ((PredefinedType = IfcProtectiveDeviceTypeEnum.USERDEFINED) AND EXISTS (SELF\IfcObject.ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCPROTECTIVEDEVICETYPE' IN TYPEOF(SELF\IfcObject.IsTypedBy[1].RelatingType)); END_ENTITY
保护装置跳闸单元 (IfcProtectiveDeviceTrippingUnit)	ENTITY IfcProtectiveDeviceTrippingUnit SUBTYPE OF IfcDistributionControlElement; PredefinedType : OPTIONAL IfcProtectiveDeviceTrippingUnitTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcProtectiveDeviceTrippingUnitTypeEnum.USERDEFINED) OR ((PredefinedType = IfcProtectiveDeviceTrippingUnitTypeEnum.USERDEFINED) AND EXISTS (SELF\IfcObject.ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN.IFCPROTECTIVEDEVICETRIPPINGUNITTYPE' IN TYPEOF(SELF\IfcObject.IsTypedBy[1].RelatingType)); END_ENTITY
跳闸式保护 装置类型 (IfcProtectiveDeviceTrippingUnitType)	ENTITY IfcProtectiveDeviceTrippingUnitType SUBTYPE OF IfcDistributionControlElementType; PredefinedType : IfcProtectiveDeviceTrippingUnitTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcProtectiveDeviceTrippingUnitTypeEnum.USERDEFINED) OR ((PredefinedType = IfcProtectiveDeviceTrippingUnitTypeEnum.USERDEFINED) AND EXISTS(SELF\IfcElementType.ElementType)); END_ENTITY
保护装置类型 (IfcProtectiveDeviceType)	ENTITY IfcProtectiveDeviceType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcProtectiveDeviceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcProtectiveDeviceTypeEnum.USERDEFINED) OR ((PredefinedType = IfcProtectiveDeviceTypeEnum.USERDEFINED) AND EXISTS(SELF\IfcElementType.ElementType)); END_ENTITY

续表 C.6.2

实体	EXPRESS 描述
太阳能装置 (IfcSolarDevice)	ENTITY IfcSolarDevice SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcSolarDeviceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSolarDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSolarDeviceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCSOLARDEVICETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
太阳能装置类型 (IfcSolarDeviceType)	ENTITY IfcSolarDeviceType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcSolarDeviceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSolarDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSolarDeviceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY
开关装置 (IfcSwitchingDevice)	ENTITY IfcSwitchingDevice SUBTYPE OF IfcFlowController; PredefinedType : OPTIONAL IfcSwitchingDeviceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSwitchingDevice TypeEnum. USERDEFINED) OR ((PredefinedType = IfcSwitchingDeviceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCSWITCHINGDEVICETYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
开关装置类型 (IfcSwitching DeviceType)	ENTITY IfcSwitchingDeviceType SUBTYPE OF IfcFlowControllerType; PredefinedType : IfcSwitchingDeviceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSwitchingDeviceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSwitchingDeviceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcElementType. ElementType)); END_ENTITY
变压器 (IfcTransformer)	ENTITY IfcTransformer SUBTYPE OF IfcEnergyConversionDevice; PredefinedType : OPTIONAL IfcTransformerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcTransformerType Enum. USERDEFINED) OR ((PredefinedType = IfcTransformerTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCELECTRICALDOMAIN. IFCTRANFORMERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
变压器类型 (IfcTransformerType)	ENTITY IfcTransformerType SUBTYPE OF IfcEnergyConversionDeviceType; PredefinedType : IfcTransformerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcTransformerTypeEnum. USERDEFINED) OR ((Pre definedType = IfcTransformerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElement Type. ElementType)); END_ENTITY

C.7　建筑智能控制应用

C.7.1　建筑智能控制类型的 EXPRESS 描述应符合表 C.7.1 的规定。

表 C.7.1　建筑智能控制类型的 EXPRESS 描述

类型	EXPRESS 描述
执行器类型枚举（IfcActuatorTypeEnum）	TYPE IfcActuatorTypeEnum = ENUMERATION OF (ELECTRICACTUATOR, HANDOPERATEDACTUATOR, HYDRAULICACTUATOR, PNEUMATICACTUATOR, THERMOSTATICACTUATOR, USERDEFINED, NOTDEFINED); END_TYPE
报警器类型枚举（IfcAlarmTypeEnum）	TYPE IfcAlarmTypeEnum = ENUMERATION OF (BELL, BREAKGLASSBUTTON, LIGHT, MANUALPULLBOX, SIREN, WHISTLE, USERDEFINED, NOTDEFINED); END_TYPE
控制器类型枚举（IfcControllerTypeEnum）	TYPE IfcControllerTypeEnum = ENUMERATION OF (FLOATING, PROGRAMMABLE, PROPORTIONAL, MULTIPOSITION, TWOPOSITION, USERDEFINED, NOTDEFINED); END_TYPE
流量传感器类型枚举（IfcFlowInstrumentTypeEnum）	TYPE IfcFlowInstrumentTypeEnum = ENUMERATION OF (PRESSUREGAUGE, THERMOMETER, AMMETER, FREQUENCYMETER, POWERFACTORMETER, PHASEANGLEMETER, VOLTMETER_PEAK, VOLTMETER_RMS, USERDEFINED, NOTDEFINED); END_TYPE
传感器类型枚举（IfcSensorTypeEnum）	TYPE IfcSensorTypeEnum = ENUMERATION OF (CONDUCTANCESENSOR, CONTACTSENSOR, FIRESENSOR, FLOWSENSOR, GASSENSOR, HEATSENSOR, HUMIDITYSENSOR, IONCONCENTRATIONSENSOR, LEVELSENSOR, LIGHTSENSOR, MOISTURESENSOR,

续表 C.7.1

类型	EXPRESS 描述
传感器类型枚举 (IfcSensorTypeEnum)	MOVEMENTSENSOR, PHSENSOR, PRESSURESENSOR, RADIATIONSENSOR, RADIOACTIVITYSENSOR, SMOKESENSOR, SOUNDSENSOR, TEMPERATURESENSOR, WINDSENSOR, USERDEFINED, NOTDEFINED); END_TYPE
同一控制元件 类型枚举 (IfcUnitaryControl ElementTypeEnum)	TYPE IfcUnitaryControlElementTypeEnum = ENUMERATION OF (ALARMPANEL, CONTROLPANEL, GASDETECTIONPANEL, INDICATORPANEL, MIMICPANEL, HUMIDISTAT, THERMOSTAT, WEATHERSTATION, USERDEFINED, NOTDEFINED); END_TYPE

C.7.2 建筑智能控制实体的 EXPRESS 描述应符合表 C.7.2 的规定。

表 C.7.2 建筑智能控制实体的 EXPRESS 描述

实体	EXPRESS 描述
执行器 (IfcActuator)	ENTITY IfcActuator SUBTYPE OF IfcDistributionControlElement; PredefinedType : OPTIONAL IfcActuatorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcActuatorType Enum. USERDEFINED) OR ((PredefinedType = IfcActuatorTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCBUILDINGCONTROLSDOMAIN. IFCACTUATORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
执行器类型 (IfcActuatorType)	ENTITY IfcActuatorType SUBTYPE OF IfcDistributionControlElementType; PredefinedType : IfcActuatorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcActuatorTypeEnum. USERDEFINED) OR ((Predefined Type = IfcActuatorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
报警器 (IfcAlarm)	ENTITY IfcAlarm SUBTYPE OF IfcDistributionControlElement; PredefinedType : OPTIONAL IfcAlarmTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcAlarm TypeEnum. USERDEFINED) OR ((PredefinedType = IfcAlarmTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCBUILDINGCONTROLSDOMA IN. IFCALARMTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 C.7.2

实体	EXPRESS 描述
报警器类型 (IfcAlarmType)	ENTITY IfcAlarmType SUBTYPE OF IfcDistributionControlElementType; PredefinedType : IfcAlarmTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcAlarmTypeEnum. USERDEFINED) OR ((PredefinedType = IfcAlarmTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
控制器 (IfcController)	ENTITY IfcController SUBTYPE OF IfcDistributionControlElement; PredefinedType : OPTIONAL IfcControllerTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcControllerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcControllerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCBUILDINGCONTROLSDOMAIN.IFCCONTROLLERTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
控制器类型 (IfcControllerType)	ENTITY IfcControllerType SUBTYPE OF IfcDistributionControlElementType; PredefinedType : IfcControllerTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcControllerTypeEnum. USERDEFINED) OR ((PredefinedType = IfcControllerTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
流量传感器 (IfcFlowInstrument)	ENTITY IfcFlowInstrument SUBTYPE OF IfcDistributionControlElement; PredefinedType : OPTIONAL IfcFlowInstrumentTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcFlowInstrumentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFlowInstrumentTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCBUILDINGCONTROLSDOMAIN.IFCFLOWINSTRUMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
流量传感器类型 (IfcFlowInstrumentType)	ENTITY IfcFlowInstrumentType SUBTYPE OF IfcDistributionControlElementType; PredefinedType : IfcFlowInstrumentTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcFlowInstrumentTypeEnum. USERDEFINED) OR ((PredefinedType = IfcFlowInstrumentTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
传感器 (IfcSensor)	ENTITY IfcSensor SUBTYPE OF IfcDistributionControlElement; PredefinedType : OPTIONAL IfcSensorTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSensorTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSensorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCBUILDINGCONTROLSDOMAIN. IFCSENSORTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY

续表 C.7.2

实体	EXPRESS 描述
传感器类型 (IfcSensorType)	ENTITY IfcSensorType SUBTYPE OF IfcDistributionControlElementType; PredefinedType : IfcSensorTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSensorTypeEnum. USERDEFINED) OR ((Predefined Type = IfcSensorTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcElementType. ElementType)); END_ENTITY
同一控制元件 (IfcUnitaryControl Element)	ENTITY IfcUnitaryControlElement SUBTYPE OF IfcDistributionControlElement; PredefinedType : OPTIONAL IfcUnitaryControlElementTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcUnitaryControl ElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcUnitaryControlElement TypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); CorrectTypeAssigned : (SIZEOF(IsTypedBy) = 0) OR ('IFCBUILDINGCONTROLSDOMAIN. IFCUNITARYCONTROLELEMENTTYPE' IN TYPEOF(SELF\IfcObject. IsTypedBy[1]. RelatingType)); END_ENTITY
同一控制元件类型 (IfcUnitaryControl ElementType)	ENTITY IfcUnitaryControlElementType SUBTYPE OF IfcDistributionControlElementType; PredefinedType : IfcUnitaryControlElementTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcUnitaryControlElementTypeEnum. USERDEFINED) OR ((PredefinedType = IfcUnitaryControlElementTypeEnum. USERDEFINED) AND EXISTS(SELF\Ifc ElementType. ElementType)); END_ENTITY

C.8 施 工 管 理 应 用

C.8.1 施工管理类型的 EXPRESS 描述应符合表 C.8.1 的规定。

表 C.8.1 施工管理类型的 EXPRESS 描述

类型	EXPRESS 描述
建筑施工设备 资源类型 (IfcConstruction EquipmentResource TypeEnum)	TYPE IfcConstructionEquipmentResourceTypeEnum = ENUMERATION OF (DEMOLISHING, EARTHMOVING, ERECTING, HEATING, LIGHTING, PAVING, PUMPING, TRANSPORTING, USERDEFINED, NOTDEFINED); END_TYPE
建筑施工材料 资源类型 (IfcConstruction MaterialResource TypeEnum)	TYPE IfcConstructionMaterialResourceTypeEnum = ENUMERATION OF (AGGREGATES, CONCRETE, DRYWALL, FUEL, GYPSUM, MASONRY, METAL, PLASTIC, WOOD, NOTDEFINED, USERDEFINED); END_TYPE

续表 C.8.1

类型	EXPRESS 描述
建筑施工产品资源类型（IfcConstructionProductResourceTypeEnum）	TYPE IfcConstructionProductResourceTypeEnum = ENUMERATION OF (ASSEMBLY, FORMWORK, USERDEFINED, NOTDEFINED); END_TYPE
团队资源类型（IfcCrewResourceTypeEnum）	TYPE IfcCrewResourceTypeEnum = ENUMERATION OF (OFFICE, SITE, USERDEFINED, NOTDEFINED); END_TYPE
技术人员资源类型（IfcLaborResourceTypeEnum）	TYPE IfcLaborResourceTypeEnum = ENUMERATION OF (ADMINISTRATION, CARPENTRY, CLEANING, CONCRETE, DRYWALL, ELECTRIC, FINISHING, FLOORING, GENERAL, HVAC, LANDSCAPING, MASONRY, PAINTING, PAVING, PLUMBING, ROOFING, SITEGRADING, STEELWORK, SURVEYING, USERDEFINED, NOTDEFINED); END_TYPE
分包资源类型（IfcSubContractResourceTypeEnum）	TYPE IfcSubContractResourceTypeEnum = ENUMERATION OF (PURCHASE, WORK, USERDEFINED, NOTDEFINED); END_TYPE

C.8.2 施工管理实体的 EXPRESS 描述应符合表 C.8.2 的规定。

表 C.8.2 施工管理实体的 EXPRESS 描述

实体	EXPRESS 描述
建筑施工设备资源（IfcConstructionEquipmentResource）	ENTITY IfcConstructionEquipmentResource SUBTYPE OF IfcConstructionResource; PredefinedType : OPTIONAL IfcConstructionEquipmentResourceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcConstructionEquipmentResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcConstructionEquipmentResourceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY

续表 C.8.2

实体	EXPRESS 描述
建筑施工设备资源类型（IfcConstructionEquipmentResourceType）	ENTITY IfcConstructionEquipmentResourceType SUBTYPE OF IfcConstructionResourceType; PredefinedType : IfcConstructionEquipmentResourceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcConstructionEquipmentResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcConstructionEquipmentResourceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcTypeResource. ResourceType)); END_ENTITY
建筑施工材料资源（IfcConstructionMaterialResource）	ENTITY IfcConstructionMaterialResource SUBTYPE OF IfcConstructionRcsourcc; PredefinedType : OPTIONAL IfcConstructionMaterialResourceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcConstructionMaterialResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcConstructionMaterialResourceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY
建筑施工材料资源类型（IfcConstructionMaterialResourceType）	ENTITY IfcConstructionMaterialResourceType SUBTYPE OF IfcConstructionResourceType; PredefinedType : IfcConstructionMaterialResourceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcConstructionMaterialResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcConstructionMaterialResourceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcTypeResource. ResourceType)); END_ENTITY
建筑施工产品资源（IfcConstructionProductResource）	ENTITY IfcConstructionProductResource SUBTYPE OF IfcConstructionResource; PredefinedType : OPTIONAL IfcConstructionProductResourceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcConstructionProductResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcConstructionProductResourceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY
建筑施工产品资源类型（IfcConstructionProductResourceType）	ENTITY IfcConstructionProductResourceType SUBTYPE OF IfcConstructionResourceType; PredefinedType : IfcConstructionProductResourceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcConstructionProductResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcConstructionProductResourceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcTypeResource. ResourceType)); END_ENTITY
建筑施工资源（IfcConstructionResource）	ENTITY IfcConstructionResource ABSTRACT SUPERTYPE OF(ONEOF(IfcConstructionEquipmentResource, IfcConstructionMaterialResource, IfcConstructionProductResource, IfcCrewResource, IfcLaborResource, IfcSubContractResource)) SUBTYPE OF IfcResource; Usage : OPTIONAL IfcResourceTime; BaseCosts : OPTIONAL LIST [1:?] OF IfcAppliedValue; BaseQuantity : OPTIONAL IfcPhysicalQuantity; END_ENTITY
建筑施工资源类型（IfcConstructionResourceType）	ENTITY IfcConstructionResourceType ABSTRACT SUPERTYPE OF(ONEOF(IfcConstructionEquipmentResourceType, IfcConstructionMaterialResourceType, IfcConstructionProductResourceType, IfcCrewResourceType, IfcLaborResourceType, IfcSubContractResourceType)) SUBTYPE OF IfcTypeResource; BaseCosts : OPTIONAL LIST [1:?] OF IfcAppliedValue; BaseQuantity : OPTIONAL IfcPhysicalQuantity; END_ENTITY

续表 C.8.2

实体	EXPRESS 描述
团队资源 (IfcCrewResource)	ENTITY IfcCrewResource SUBTYPE OF IfcConstructionResource; PredefinedType : OPTIONAL IfcCrewResourceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcCrewResource TypeEnum. USERDEFINED) OR ((PredefinedType = IfcCrewResourceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY
团队资源类型 (IfcCrewResource Type)	ENTITY IfcCrewResourceType SUBTYPE OF IfcConstructionResourceType; PredefinedType : IfcCrewResourceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcCrewResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcCrewResourceTypeEnum. USERDEFINED) AND EXISTS(SELF\Ifc TypeResource. ResourceType)); END_ENTITY
技术人员资源 (IfcLaborResource)	ENTITY IfcLaborResource SUBTYPE OF IfcConstructionResource; PredefinedType : OPTIONAL IfcLaborResourceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcLaborResource TypeEnum. USERDEFINED) OR ((PredefinedType = IfcLaborResourceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY
技术人员资源类型 (IfcLaborResource Type)	ENTITY IfcLaborResourceType SUBTYPE OF IfcConstructionResourceType; PredefinedType : IfcLaborResourceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcLaborResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcLaborResourceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcType Resource. ResourceType)); END_ENTITY
分包资源 (IfcSubContract Resource)	ENTITY IfcSubContractResource SUBTYPE OF IfcConstructionResource; PredefinedType : OPTIONAL IfcSubContractResourceTypeEnum; WHERE CorrectPredefinedType : NOT(EXISTS(PredefinedType)) OR (PredefinedType <> IfcSubContract ResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSubContract ResourceTypeEnum. USERDEFINED) AND EXISTS (SELF\IfcObject. ObjectType)); END_ENTITY
分包资源类型 (IfcSubContract ResourceType)	ENTITY IfcSubContractResourceType SUBTYPE OF IfcConstructionResourceType; PredefinedType : IfcSubContractResourceTypeEnum; WHERE CorrectPredefinedType : (PredefinedType <> IfcSubContractResourceTypeEnum. USERDEFINED) OR ((PredefinedType = IfcSubContractResourceTypeEnum. USERDEFINED) AND EXISTS(SELF\IfcTypeRes ource. ResourceType)); END_ENTITY

附录 D　资源层数据模式的 EXPRESS 描述

D.1　参 与 者 资 源

D.1.1　参与者资源类型的 EXPRESS 描述应符合表 D.1.1 的规定。

表 D.1.1　参与者资源类型的 EXPRESS 描述

类型	EXPRESS 描述
地址类型枚举 (IfcAddressTypeEnum)	TYPE IfcAddressTypeEnum = ENUMERATION OF (OFFICE, SITE, HOME, DISTRIBUTIONPOINT, USERDEFINED); END_TYPE
角色枚举 (IfcRoleEnum)	TYPE IfcRoleEnum = ENUMERATION OF (SUPPLIER, MANUFACTURER, CONTRACTOR, SUBCONTRACTOR, ARCHITECT, STRUCTURALENGINEER, COSTENGINEER, CLIENT, BUILDINGOWNER, BUILDINGOPERATOR, MECHANICALENGINEER, ELECTRICALENGINEER, PROJECTMANAGER, FACILITIESMANAGER, CIVILENGINEER, COMMISSIONINGENGINEER, ENGINEER, OWNER, CONSULTANT, CONSTRUCTIONMANAGER, FIELDCONSTRUCTIONMANAGER, RESELLER, USERDEFINED); END_TYPE
参与者选择 (IfcActorSelect)	TYPE IfcActorSelect = SELECT (IfcOrganization, IfcPerson, IfcPersonAndOrganization); END_TYPE

D. 1. 2 参与者资源实体的 EXPRESS 描述应符合表 D. 1. 2 的规定。

表 D. 1. 2 参与者资源实体的 EXPRESS 描述

实体	EXPRESS 描述
参与者角色 (IfcActorRole)	ENTITY IfcActorRole; Role: IfcRoleEnum; UserDefinedRole: OPTIONAL IfcLabel; Description: OPTIONAL IfcText; WHERE WR1: (Role <> IfcRoleEnum. USERDEFINED) OR ((Role = IfcRoleEnum. USERDEFINED) AND EXISTS(SELF. UserDefinedRole)); END_ENTITY
组织 (IfcOrganization)	ENTITY IfcOrganization; Identification: OPTIONAL IfcIdentifier; Name: IfcLabel; Description: OPTIONAL IfcText; Roles: OPTIONAL LIST [1:?] OF IfcActorRole; Addresses: OPTIONAL LIST [1:?] OF IfcAddress; INVERSE IsRelatedBy: SET OF IfcOrganizationRelationship FOR RelatedOrganizations; Relates: SET OF IfcOrganizationRelationship FOR RelatingOrganization; Engages: SET OF IfcPersonAndOrganization FOR TheOrganization; END_ENTITY
组织关系 (IfcOrganization Relationship)	ENTITY IfcOrganizationRelationship; Name: IfcLabel; Description: OPTIONAL IfcText; RelatingOrganization: IfcOrganization; RelatedOrganizations: SET [1:?] OF IfcOrganization; END_ENTITY
人员 (IfcPerson)	ENTITY IfcPerson; Identification: OPTIONAL IfcIdentifier; FamilyName: OPTIONAL IfcLabel; GivenName: OPTIONAL IfcLabel; MiddleNames: OPTIONAL LIST [1:?] OF IfcLabel; PrefixTitles: OPTIONAL LIST [1:?] OF IfcLabel; SuffixTitles: OPTIONAL LIST [1:?] OF IfcLabel; Roles: OPTIONAL LIST [1:?] OF IfcActorRole; Addresses: OPTIONAL LIST [1:?] OF IfcAddress; INVERSE EngagedIn: SET OF IfcPersonAndOrganization FOR ThePerson; WHERE IdentifiablePerson:EXISTS(Identification) OR EXISTS(FamilyName) OR EXISTS(GivenName); ValidSetOfNames:NOT EXISTS(MiddleNames) OR EXISTS(FamilyName) OR EXISTS(GivenName); END_ENTITY
组织人员 (IfcPersonAnd Organization)	ENTITY IfcPersonAndOrganization; ThePerson: IfcPerson; TheOrganization: IfcOrganization; Roles: OPTIONAL LIST [1:?] OF IfcActorRole; END_ENTITY
地址 (IfcAddress)	ENTITY IfcAddress ABSTRACT SUPERTYPE OF (ONEOF(IfcPostalAddress, IfcTelecomAddress)); Purpose: OPTIONAL IfcAddressTypeEnum; Description: OPTIONAL IfcText; UserDefinedPurpose: OPTIONAL IfcLabel; INVERSE OfPerson: SET OF IfcPerson FOR Addresses; OfOrganization: SET OF IfcOrganization FOR Addresses; WHERE WR1 : (NOT(EXISTS(Purpose))) OR ((Purpose <> IfcAddressTypeEnum. USERDEFINED) OR ((Purpose = IfcAddressTypeEnum. USERDEFINED) AND EXISTS(SELF. UserDefinedPurpose))); END_ENTITY

续表 D.1.2

实体	EXPRESS 描述
邮政地址 (IfcPostalAddress)	ENTITY IfcPostalAddress SUBTYPE OF(IfcAddress); InternalLocation: OPTIONAL IfcLabel; AddressLines: OPTIONAL LIST [1:?] OF IfcLabel; PostalBox: OPTIONAL IfcLabel; Town: OPTIONAL IfcLabel; Region: OPTIONAL IfcLabel; PostalCode: OPTIONAL IfcLabel; Country: OPTIONAL IfcLabel; WHERE WR1 : EXISTS (InternalLocation) OR EXISTS (AddressLines) OR EXISTS (PostalBox) OR EXISTS (PostalCode) OR EXISTS (Town) OR EXISTS (Region) OR EXISTS (Country); END_ENTITY
电信地址 (IfcTelecomAddress)	ENTITY IfcTelecomAddress SUBTYPE OF(IfcAddress); TelephoneNumbers: OPTIONAL LIST [1:?] OF IfcLabel; FacsimileNumbers: OPTIONAL LIST [1:?] OF IfcLabel; PagerNumber: OPTIONAL IfcLabel; ElectronicMailAddresses: OPTIONAL LIST [1:?] OF IfcLabel; WWWHomePageURL: OPTIONAL IfcURIReference; MessagingIDs:OPTIONAL LIST [1:?] OF IfcURIReference; WHERE MinimumDataProvided: EXISTS (TelephoneNumbers) OR EXISTS (PagerNumber) OR EXISTS (FacsimileNumbers) OR EXISTS (ElectronicMailAddresses) OR EXISTS (WWWHomePageURL) OR EXISTS (MessagingIDs); END_ENTITY

D.2 审 批 资 源

D.2.1 审批资源实体的 EXPRESS 描述应符合表 D.2.1 的规定。

表 D.2.1 审批资源实体的 EXPRESS 描述

实体	EXPRESS 描述
审批 (IfcApproval)	ENTITY IfcApproval; Identifier:OPTIONAL IfcIdentifier; Name:OPTIONAL IfcLabel; Description:OPTIONAL IfcText; TimeOfApproval:OPTIONAL IfcDateTime; Status:OPTIONAL IfcLabel; Level:OPTIONAL IfcLabel; Qualifier:OPTIONAL IfcText; RequestingApproval:OPTIONAL IfcActorSelect; GivingApproval:OPTIONAL IfcActorSelect; INVERSE HasExternalReferences:SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; ApprovedObjects:SET OF IfcRelAssociatesApproval FOR RelatingApproval; ApprovedResources:SET OF IfcResourceApprovalRelationship FOR RelatingApproval; IsRelatedWith:SET OF IfcApprovalRelationship FOR RelatedApprovals; Relates:SET OF IfcApprovalRelationship FOR RelatingApproval; WHERE HasIdentifierOrName:EXISTS (Identifier) OR EXISTS (Name); END_ENTITY

续表 D.2.1

实体	EXPRESS 描述
审批关联 (IfcApproval Relationship)	ENTITY IfcApprovalRelationship SUBTYPE OF IfcResourceLevelRelationship; RelatingApproval:IfcApproval; RelatedApprovals:SET [1:?] OF IfcApproval; END_ENTITY
审批关联资源 (IfcResourceApproval Relationship)	ENTITY IfcResourceApprovalRelationship SUBTYPE OF IfcResourceLevelRelationship; RelatedResourceObjects:SET [1:?] OF IfcResourceObjectSelect; RelatingApproval:IfcApproval; END_ENTITY

D.3 约 束 资 源

D.3.1 约束资源类型的 EXPRESS 描述应符合表 D.3.1 的规定。

表 D.3.1 约束资源类型的 EXPRESS 描述

类型	EXPRESS 描述
基准枚举 (IfcBenchmark Enum)	TYPE IfcBenchmarkEnum = ENUMERATION OF (GREATERTHAN, GREATERTHANOREQUALTO, LESSTHAN, LESSTHANOREQUALTO, EQUALTO, NOTEQUALTO, INCLUDES, NOTINCLUDES, INCLUDEDIN, NOTINCLUDEDIN); END_TYPE
约束枚举 (IfcConstraintEnum)	TYPE IfcConstraintEnum = ENUMERATION OF (HARD, SOFT, ADVISORY, USERDEFINED, NOTDEFINED); END_TYPE
逻辑运算符枚举 (IfcLogicalOperator Enum)	TYPE IfcLogicalOperatorEnum = ENUMERATION OF (LOGICALAND, LOGICALOR, LOGICALXOR, LOGICALNOTAND, LOGICALNOTOR); END_TYPE
目标枚举 (IfcObjectiveEnum)	TYPE IfcObjectiveEnum = ENUMERATION OF (CODECOMPLIANCE, CODEWAIVER, DESIGNINTENT, EXTERNAL, HEALTHANDSAFETY, MERGECONFLICT, MODELVIEW, PARAMETER, REQUIREMENT, SPECIFICATION, TRIGGERCONDITION, USERDEFINED, NOTDEFINED); END_TYPE

续表 D.3.1

类型	EXPRESS 描述
度量值选择 (IfcMetricValue Select)	TYPE IfcMetricValueSelect = SELECT (IfcMeasureWithUnit, IfcTable, IfcTimeSeries, IfcAppliedValue, IfcValue, IfcReference); END_TYPE

D.3.2 约束资源实体的 EXPRESS 描述应符合表 D.3.2 的规定。

表 D.3.2 约束资源实体的 EXPRESS 描述

实体	EXPRESS 描述
约束 (IfcConstraint)	ENTITY IfcConstraint ABSTRACT SUPERTYPE OF(ONEOF(IfcMetric, IfcObjective)); Name:IfcLabel; Description:OPTIONAL IfcText; ConstraintGrade:IfcConstraintEnum; ConstraintSource:OPTIONAL IfcLabel; CreatingActor:OPTIONAL IfcActorSelect; CreationTime:OPTIONAL IfcDateTime; UserDefinedGrade:OPTIONAL IfcLabel; INVERSE HasExternalReferences:SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; PropertiesForConstraint:SET OF IfcResourceConstraintRelationship FOR RelatingConstraint; WHERE WR11:(ConstraintGrade <> IfcConstraintEnum.USERDEFINED) OR ((ConstraintGrade = IfcConstraintEnum.USERDEFINED) AND EXISTS(SELF\IfcConstraint.UserDefinedGrade)); END_ENTITY
度量 (IfcMetric)	ENTITY IfcMetric SUBTYPE OF IfcConstraint; Benchmark:IfcBenchmarkEnum; ValueSource:OPTIONAL IfcLabel; DataValue:IfcMetricValueSelect; ReferencePath:OPTIONAL IfcReference; END_ENTITY
目标 (IfcObjective)	ENTITY IfcObjective SUBTYPE OF IfcConstraint; BenchmarkValues:OPTIONAL LIST [1:?] OF IfcConstraint; LogicalAggregator:OPTIONAL IfcLogicalOperatorEnum; ObjectiveQualifier:IfcObjectiveEnum; UserDefinedQualifier:OPTIONAL IfcLabel; WHERE WR21:(ObjectiveQualifier <> IfcObjectiveEnum.USERDEFINED) OR ((ObjectiveQualifier = IfcObjectiveEnum.USERDEFINED) AND EXISTS(SELF\IfcObjective.UserDefinedQualifier)); END_ENTITY
引用 (IfcReference)	ENTITY IfcReference; TypeIdentifier:OPTIONAL IfcIdentifier; AttributeIdentifier:OPTIONAL IfcIdentifier; InstanceName:OPTIONAL IfcLabel; ListPositions:OPTIONAL LIST [1:?] OF INTEGER; InnerReference:OPTIONAL IfcReference; END_ENTITY
约束关联资源 (IfcResourceConstraint Relationship)	ENTITY IfcResourceConstraintRelationship SUBTYPE OF IfcResourceLevelRelationship; RelatingConstraint:IfcConstraint; RelatedResourceObjects:SET [1:?] OF IfcResourceObjectSelect; END_ENTITY

D.4 成 本 资 源

D.4.1 成本资源类型的 EXPRESS 描述应按表 D.4.1 的规定采用。

表 D.4.1 成本资源类型的 EXPRESS 描述

类型	EXPRESS 描述
算术运算符枚举（IfcArithmeticOperatorEnum）	TYPE IfcArithmeticOperatorEnum = ENUMERATION OF (ADD, DIVIDE, MULTIPLY, SUBTRACT); END_TYPE
应用价值选择（IfcAppliedValueSelect）	TYPE IfcAppliedValueSelect = SELECT (IfcMeasureWithUnit, IfcValue, IfcReference); END_TYPE

D.4.2 成本资源实体的 EXPRESS 描述应按表 D.4.2 的规定采用。

表 D.4.2 成本资源实体的 EXPRESS 描述

实体	EXPRESS 描述
应用值（IfcAppliedValue）	ENTITY IfcAppliedValue SUPERTYPE OF(IfcCostValue); Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; AppliedValue : OPTIONAL IfcAppliedValueSelect; UnitBasis : OPTIONAL IfcMeasureWithUnit; ApplicableDate : OPTIONAL IfcDate; FixedUntilDate : OPTIONAL IfcDate; Category : OPTIONAL IfcLabel; Condition : OPTIONAL IfcLabel; ArithmeticOperator : OPTIONAL IfcArithmeticOperatorEnum; Components : OPTIONAL LIST [1:?] OF IfcAppliedValue; INVERSE HasExternalReference : SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; END_ENTITY
成本值（IfcCostValue）	ENTITY IfcCostValue SUBTYPE OF IfcAppliedValue; END_ENTITY
货币关系（IfcCurrencyRelationship）	ENTITY IfcCurrencyRelationship SUBTYPE OF IfcResourceLevelRelationship; RelatingMonetaryUnit : IfcMonetaryUnit; RelatedMonetaryUnit : IfcMonetaryUnit; ExchangeRate : IfcPositiveRatioMeasure; RateDateTime : OPTIONAL IfcDateTime; RateSource : OPTIONAL IfcLibraryInformation; END_ENTITY

D.5 日 期 时 间 资 源

D.5.1 日期时间资源类型的 EXPRESS 描述应按表 D.5.1 的规定采用。

表 D.5.1　日期时间资源类型的 EXPRESS 描述

类型	EXPRESS 描述
日期 (IfcDate)	TYPE IfcDate = STRING; END_TYPE
日期时间 (IfcDateTime)	TYPE IfcDateTime = STRING; END_TYPE
月中日序数 (IfcDayInMonth Number)	TYPE IfcDayInMonthNumber = INTEGER; WHERE ValidRange : {1 <= SELF <= 31} END_TYPE
周中日序数 (IfcDayInWeekNumber)	TYPE IfcDayInWeekNumber = INTEGER; WHERE ValidRange : {1 <= SELF <= 7} END_TYPE
持续时间 (IfcDuration)	TYPE IfcDuration = STRING; END_TYPE
年中月序数 (IfcMonthIn YearNumber)	TYPE IfcMonthInYearNumber = INTEGER; WHERE ValidRange : {1 <= SELF <= 12} END_TYPE
时间 (IfcTime)	TYPE IfcTime = STRING; END_TYPE
时间戳 (IfcTimeStamp)	TYPE IfcTimeStamp = INTEGER; END_TYPE
数据源枚举 (IfcDataOriginEnum)	TYPE IfcDataOriginEnum = ENUMERATION OF (MEASURED, PREDICTED, SIMULATED, USERDEFINED, NOTDEFINED); END_TYPE
循环类型枚举 (IfcRecurrence TypeEnum)	TYPE IfcRecurrenceTypeEnum = ENUMERATION OF (DAILY, WEEKLY, MONTHLY_BY_DAY_OF_MONTH, MONTHLY_BY_POSITION, BY_DAY_COUNT, BY_WEEKDAY_COUNT, YEARLY_BY_DAY_OF_MONTH, YEARLY_BY_POSITION); END_TYPE
任务期限枚举 (IfcTaskDuration Enum)	TYPE IfcTaskDurationEnum = ENUMERATION OF (ELAPSEDTIME, WORKTIME, NOTDEFINED); END_TYPE
时间序列类型枚举 (IfcTimeSeriesData TypeEnum)	TYPE IfcTimeSeriesDataTypeEnum = ENUMERATION OF (CONTINUOUS, DISCRETE, DISCRETEBINARY, PIECEWISEBINARY, PIECEWISECONSTANT, PIECEWISECONTINUOUS, NOTDEFINED); END_TYPE

续表 D.5.1

类型	EXPRESS 描述
时间比例选择 (IfcTimeOrRatio Select)	TYPE IfcTimeOrRatioSelect = SELECT (IfcRatioMeasure, IfcDuration); END_TYPE

D.5.2 日期时间资源实体的 EXPRESS 描述应按表 D.5.2 的规定采用。

表 D.5.2 日期时间资源实体的 EXPRESS 描述

实体	EXPRESS 描述
事件时间 (IfcEventTime)	ENTITY IfcEventTime SUBTYPE OF IfcSchedulingTime; ActualDate : OPTIONAL IfcDateTime; EarlyDate : OPTIONAL IfcDateTime; LateDate : OPTIONAL IfcDateTime; ScheduleDate : OPTIONAL IfcDateTime; END_ENTITY
不规则时间序列 (IfcIrregularTime Series)	ENTITY IfcIrregularTimeSeries SUBTYPE OF IfcTimeSeries; Values : LIST [1:?] OF IfcIrregularTimeSeriesValue; END_ENTITY
时延 (IfcLagTime)	ENTITY IfcLagTime SUBTYPE OF IfcSchedulingTime; LagValue : IfcTimeOrRatioSelect; DurationType : IfcTaskDurationEnum; END_ENTITY
循环模式 (IfcRecurrencePattern)	ENTITY IfcRecurrencePattern; RecurrenceType : IfcRecurrenceTypeEnum; DayComponent : OPTIONAL SET [1:?] OF IfcDayInMonthNumber; WeekdayComponent : OPTIONAL SET [1:?] OF IfcDayInWeekNumber; MonthComponent : OPTIONAL SET [1:?] OF IfcMonthInYearNumber; Position : OPTIONAL IfcInteger; Interval : OPTIONAL IfcInteger; Occurrences : OPTIONAL IfcInteger; TimePeriods : OPTIONAL LIST [1:?] OF IfcTimePeriod; END_ENTITY
规则时间序列 (IfcRegularTimeSeries)	ENTITY IfcRegularTimeSeries SUBTYPE OF IfcTimeSeries; TimeStep : IfcTimeMeasure; Values : LIST [1:?] OF IfcTimeSeriesValue; END_ENTITY
资源时间 (IfcResourceTime)	ENTITY IfcResourceTime SUBTYPE OF IfcSchedulingTime; ScheduleWork : OPTIONAL IfcDuration; ScheduleUsage : OPTIONAL IfcPositiveRatioMeasure; ScheduleStart : OPTIONAL IfcDateTime; ScheduleFinish : OPTIONAL IfcDateTime; ScheduleContour : OPTIONAL IfcLabel; LevelingDelay : OPTIONAL IfcDuration; IsOverAllocated : OPTIONAL BOOLEAN; StatusTime : OPTIONAL IfcDateTime; ActualWork : OPTIONAL IfcDuration; ActualUsage : OPTIONAL IfcPositiveRatioMeasure; ActualStart : OPTIONAL IfcDateTime; ActualFinish : OPTIONAL IfcDateTime; RemainingWork : OPTIONAL IfcDuration; RemainingUsage : OPTIONAL IfcPositiveRatioMeasure; Completion : OPTIONAL IfcPositiveRatioMeasure; END_ENTITY

续表 D.5.2

实体	EXPRESS 描述
计划时间 (IfcSchedulingTime)	ENTITY IfcSchedulingTime ABSTRACT SUPERTYPE OF(ONEOF(IfcEventTime, IfcLagTime, IfcResourceTime, IfcTaskTime, IfcWorkTime)); Name : OPTIONAL IfcLabel; DataOrigin : OPTIONAL IfcDataOriginEnum; UserDefinedDataOrigin : OPTIONAL IfcLabel; END_ENTITY
任务时间 (IfcTaskTime)	ENTITY IfcTaskTime SUPERTYPE OF(IfcTaskTimeRecurring) SUBTYPE OF IfcSchedulingTime; DurationType : OPTIONAL IfcTaskDurationEnum; ScheduleDuration : OPTIONAL IfcDuration; ScheduleStart : OPTIONAL IfcDateTime; ScheduleFinish : OPTIONAL IfcDateTime; EarlyStart : OPTIONAL IfcDateTime; EarlyFinish : OPTIONAL IfcDateTime; LateStart : OPTIONAL IfcDateTime; LateFinish : OPTIONAL IfcDateTime; FreeFloat : OPTIONAL IfcDuration; TotalFloat : OPTIONAL IfcDuration; IsCritical : OPTIONAL BOOLEAN; StatusTime : OPTIONAL IfcDateTime; ActualDuration : OPTIONAL IfcDuration; ActualStart : OPTIONAL IfcDateTime; ActualFinish : OPTIONAL IfcDateTime; RemainingTime : OPTIONAL IfcDuration; Completion : OPTIONAL IfcPositiveRatioMeasure; END_ENTITY
任务时间循环 (IfcTaskTime Recurring)	ENTITY IfcTaskTimeRecurring SUBTYPE OF IfcTaskTime; Recurrance : IfcRecurrencePattern; END_ENTITY
时间周期 (IfcTimePeriod)	ENTITY IfcTimePeriod; StartTime : IfcTime; EndTime : IfcTime; END_ENTITY
时间序列 (IfcTimeSeries)	ENTITY IfcTimeSeries ABSTRACT SUPERTYPE OF(ONEOF(IfcIrregularTimeSeries, IfcRegularTimeSeries)); Name : IfcLabel; Description : OPTIONAL IfcText; StartTime : IfcDateTime; EndTime : IfcDateTime; TimeSeriesDataType : IfcTimeSeriesDataTypeEnum; DataOrigin : IfcDataOriginEnum; UserDefinedDataOrigin : OPTIONAL IfcLabel; Unit : OPTIONAL IfcUnit; INVERSE HasExternalReference : SET [1:?] OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; END_ENTITY
时间序列值 (IfcTimeSeriesValue)	ENTITY IfcTimeSeriesValue; ListValues : LIST [1:?] OF IfcValue; END_ENTITY
工作时间 (IfcWorkTime)	ENTITY IfcWorkTime SUBTYPE OF IfcSchedulingTime; RecurrencePattern : OPTIONAL IfcRecurrencePattern; Start : OPTIONAL IfcDate; Finish : OPTIONAL IfcDate; END_ENTITY

D.6 外部引用资源

D.6.1 外部引用资源类型的 EXPRESS 描述应按表 D.6.1 的规定采用。

表 D.6.1 外部引用资源类型的 EXPRESS 描述

类型	EXPRESS 描述
语言标识 (IfcLanguageId)	TYPE IfcLanguageId = IfcIdentifier; END_TYPE
统一资源标识符引用 (IfcURIReference)	TYPE IfcURIReference = STRING; END_TYPE
文档机密类型枚举 (IfcDocumentConfidentialityEnum)	TYPE IfcDocumentConfidentialityEnum = ENUMERATION OF (PUBLIC, RESTRICTED, CONFIDENTIAL, PERSONAL, USERDEFINED, NOTDEFINED); END_TYPE
文档状态枚举 (IfcDocumentStatusEnum)	TYPE IfcDocumentStatusEnum = ENUMERATION OF (DRAFT, FINALDRAFT, FINAL, REVISION, NOTDEFINED); END_TYPE
分类引用选择 (IfcClassificationReferenceSelect)	TYPE IfcClassificationReferenceSelect = SELECT (IfcClassificationReference, IfcClassification); END_TYPE
分类选择 (IfcClassificationSelect)	TYPE IfcClassificationSelect = SELECT (IfcClassification, IfcClassificationReference); END_TYPE
文档选择 (IfcDocumentSelect)	TYPE IfcDocumentSelect = SELECT (IfcDocumentReference, IfcDocumentInformation); END_TYPE
库选择 (IfcLibrarySelect)	TYPE IfcLibrarySelect = SELECT (IfcLibraryReference, IfcLibraryInformation); END_TYPE
资源对象选择 (IfcResourceObjectSelect)	TYPE IfcResourceObjectSelect = SELECT (IfcPropertyAbstraction, IfcPhysicalQuantity, IfcAppliedValue, IfcContextDependentUnit, IfcConversionBasedUnit, IfcProfileDef, IfcActorRole, IfcApproval, IfcConstraint, IfcTimeSeries, IfcMaterialDefinition, IfcPerson, IfcPersonAndOrganization, IfcOrganization, IfcExternalReference, IfcExternalInformation); END_TYPE

D. 6. 2 外部引用资源实体的 EXPRESS 描述应按表 D. 6. 2 的规定采用。

表 D. 6. 2 外部引用资源实体的 EXPRESS 描述

实体	EXPRESS 描述
分类 (IfcClassification)	ENTITY IfcClassification SUBTYPE OF IfcExternalInformation; Source : OPTIONAL IfcLabel; Edition : OPTIONAL IfcLabel; EditionDate : OPTIONAL IfcDate; Name : IfcLabel; Description : OPTIONAL IfcText; Location : OPTIONAL IfcURIReference; ReferenceTokens : OPTIONAL LIST [1:?] OF IfcIdentifier; INVERSE ClassificationForObjects : SET OF IfcRelAssociatesClassification FOR RelatingClassification; HasReferences : SET OF IfcClassificationReference FOR ReferencedSource; END_ENTITY
分类引用 (IfcClassification Reference)	ENTITY IfcClassificationReference SUBTYPE OF IfcExternalReference; ReferencedSource : OPTIONAL IfcClassificationReferenceSelect; Description : OPTIONAL IfcText; Sort : OPTIONAL IfcIdentifier; INVERSE ClassificationRefForObjects : SET [0:?] OF IfcRelAssociatesClassification FOR RelatingClassification; HasReferences : SET [0:?] OF IfcClassificationReference FOR ReferencedSource; END_ENTITY
文档信息 (IfcDocumentInformation)	ENTITY IfcDocumentInformation SUBTYPE OF IfcExternalInformation; Identification : IfcIdentifier; Name : IfcLabel; Description : OPTIONAL IfcText; Location : OPTIONAL IfcURIReference; Purpose : OPTIONAL IfcText; IntendedUse : OPTIONAL IfcText; Scope : OPTIONAL IfcText; Revision : OPTIONAL IfcLabel; DocumentOwner : OPTIONAL IfcActorSelect; Editors : OPTIONAL SET [1:?] OF IfcActorSelect; CreationTime : OPTIONAL IfcDateTime; LastRevisionTime : OPTIONAL IfcDateTime; ElectronicFormat : OPTIONAL IfcIdentifier; ValidFrom : OPTIONAL IfcDate; ValidUntil : OPTIONAL IfcDate; Confidentiality : OPTIONAL IfcDocumentConfidentialityEnum; Status : OPTIONAL IfcDocumentStatusEnum; INVERSE DocumentInfoForObjects : SET OF IfcRelAssociatesDocument FOR RelatingDocument; HasDocumentReferences : SET OF IfcDocumentReference FOR ReferencedDocument; IsPointedTo : SET OF IfcDocumentInformationRelationship FOR RelatedDocuments; IsPointer : SET [0:1] OF IfcDocumentInformationRelationship FOR RelatingDocument; END_ENTITY
文档信息关系 (IfcDocumentInformationRelationship)	ENTITY IfcDocumentInformationRelationship SUBTYPE OF IfcResourceLevelRelationship; RelatingDocument : IfcDocumentInformation; RelatedDocuments : SET [1:?] OF IfcDocumentInformation; RelationshipType : OPTIONAL IfcLabel; END_ENTITY

续表 D.6.2

实体	EXPRESS 描述
文档引用 (IfcDocument Reference)	ENTITY IfcDocumentReference SUBTYPE OF IfcExternalReference; Description:OPTIONAL IfcText; ReferencedDocument:OPTIONAL IfcDocumentInformation; INVERSE DocumentRefForObjects:SET OF IfcRelAssociatesDocument FOR RelatingDocument; WHERE WR1:EXISTS(Name) XOR EXISTS(ReferencedDocument); END_ENTITY
外部信息 (IfcExternalIn formation)	ENTITY IfcExternalInformation ABSTRACT SUPERTYPE OF(ONEOF(IfcClassification, IfcDocumentInformation, IfcLibraryInform ation)); END_ENTITY
外部引用 (IfcExternalReference)	ENTITY IfcExternalReference ABSTRACT SUPERTYPE OF(ONEOF(IfcClassificationReference, IfcDocumentReference, IfcExternally DefinedHatchStyle, IfcExternallyDefinedSurfaceStyle, IfcExternallyDefinedTextFont, IfcLibraryRefer ence)); Location : OPTIONAL IfcURIReference; Identification : OPTIONAL IfcIdentifier; Name : OPTIONAL IfcLabel; INVERSE ExternalReferenceForResources : SET [0:?] OF IfcExternalReferenceRelationship FOR RelatingReference; WHERE WR1 : EXISTS(Identification) OR EXISTS(Location) OR EXISTS(Name); END_ENTITY
外部引用关系 (IfcExternalReference Relationship)	ENTITY IfcExternalReferenceRelationship SUBTYPE OF IfcResourceLevelRelationship; RelatingReference : IfcExternalReference; RelatedResourceObjects : SET [1:?] OF IfcResourceObjectSelect; END_ENTITY
库信息 (IfcLibraryInformation)	ENTITY IfcLibraryInformation SUBTYPE OF IfcExternalInformation; Name : IfcLabel; Version : OPTIONAL IfcLabel; Publisher : OPTIONAL IfcActorSelect; VersionDate : OPTIONAL IfcDateTime; Location : OPTIONAL IfcURIReference; Description : OPTIONAL IfcText; INVERSE LibraryInfoForObjects : SET [0:?] OF IfcRelAssociatesLibrary FOR RelatingLibrary; HasLibraryReferences : SET OF IfcLibraryReference FOR ReferencedLibrary; END_ENTITY
库引用 (IfcLibraryReference)	ENTITY IfcLibraryReference SUBTYPE OF IfcExternalReference; Description : OPTIONAL IfcText; Language : OPTIONAL IfcLanguageId; ReferencedLibrary : OPTIONAL IfcLibraryInformation; INVERSE LibraryRefForObjects : SET [0:?] OF IfcRelAssociatesLibrary FOR RelatingLibrary; END_ENTITY
资源层关系 (IfcResourceLevel Relationship)	ENTITY IfcResourceLevelRelationship ABSTRACT SUPERTYPE OF(ONEOF(IfcApprovalRelationship, IfcCurrencyRelationship, IfcDocumentIn formationRelationship, IfcExternalReferenceRelationship, IfcMaterialRelationship, IfcOrganizationRelation ship, IfcPropertyDependencyRelationship, IfcResourceApprovalRelationship, IfcResourceConstraintRelation ship)); Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; END_ENTITY

D.7 几何约束资源

D.7.1 几何约束资源类型的 EXPRESS 描述应按表 D.7.1 的规定采用。

表 D.7.1 几何约束资源类型的 EXPRESS 描述

类型	EXPRESS 描述
边曲线 (IfcCurveOr EdgeCurve)	TYPE IfcCurveOrEdgeCurve = SELECT (IfcBoundedCurve, IfcEdgeCurve); END_TYPE
栅格坐标方向选择 (IfcGridPlacement DirectionSelect)	TYPE IfcGridPlacementDirectionSelect = SELECT (IfcVirtualGridIntersection, IfcDirection); END_TYPE
点或顶点 (IfcPointOr VertexPoint)	TYPE IfcPointOrVertexPoint = SELECT (IfcPoint, IfcVertexPoint); END_TYPE
实体或壳 (IfcSolidOrShell)	TYPE IfcSolidOrShell = SELECT (IfcSolidModel, IfcClosedShell); END_TYPE
表面或面 (IfcSurfaceOr FaceSurface)	TYPE IfcSurfaceOrFaceSurface = SELECT (IfcSurface, IfcFaceSurface, IfcFaceBasedSurfaceModel); END_TYPE

D.7.2 几何约束资源实体的 EXPRESS 描述应按表 D.7.2 的规定采用。

表 D.7.2 几何约束资源实体的 EXPRESS 描述

类型	EXPRESS 描述
连接几何曲线 (IfcConnection CurveGeometry)	ENTITY IfcConnectionCurveGeometry SUBTYPE OF IfcConnectionGeometry; CurveOnRelatingElement : IfcCurveOrEdgeCurve; CurveOnRelatedElement : OPTIONAL IfcCurveOrEdgeCurve; END_ENTITY
连接几何 (IfcConnection Geometry)	ENTITY IfcConnectionGeometry ABSTRACT SUPERTYPE OF(ONEOF(IfcConnectionCurveGeometry, IfcConnectionPointGeometry, IfcConnectionSurfaceGeometry, IfcConnectionVolumeGeometry)); END_ENTITY
连接点偏心 (IfcConnection PointEccentricity)	ENTITY IfcConnectionPointEccentricity SUBTYPE OF IfcConnectionPointGeometry; EccentricityInX : OPTIONAL IfcLengthMeasure; EccentricityInY : OPTIONAL IfcLengthMeasure; EccentricityInZ : OPTIONAL IfcLengthMeasure; END_ENTITY
连接点几何 (IfcConnection PointGeometry)	ENTITY IfcConnectionPointGeometry SUPERTYPE OF(IfcConnectionPointEccentricity) SUBTYPE OF IfcConnectionGeometry; PointOnRelatingElement : IfcPointOrVertexPoint; PointOnRelatedElement : OPTIONAL IfcPointOrVertexPoint; END_ENTITY

续表 D.7.2

类型	EXPRESS 描述
连接表面几何 (IfcConnection SurfaceGeometry)	ENTITY IfcConnectionSurfaceGeometry SUBTYPE OF IfcConnectionGeometry; SurfaceOnRelatingElement : IfcSurfaceOrFaceSurface; SurfaceOnRelatedElement : OPTIONAL IfcSurfaceOrFaceSurface; END_ENTITY
连接体积几何 (IfcConnection VolumeGeometry)	ENTITY IfcConnectionVolumeGeometry SUBTYPE OF IfcConnectionGeometry; VolumeOnRelatingElement : IfcSolidOrShell; VolumeOnRelatedElement : OPTIONAL IfcSolidOrShell; END_ENTITY
栅格轴 (IfcGridAxis)	ENTITY IfcGridAxis; AxisTag : OPTIONAL IfcLabel; AxisCurve : IfcCurve; SameSense : IfcBoolean; INVERSE PartOfW : SET [0:1] OF IfcGrid FOR WAxes; PartOfV : SET [0:1] OF IfcGrid FOR VAxes; PartOfU : SET [0:1] OF IfcGrid FOR UAxes; HasIntersections : SET OF IfcVirtualGridIntersection FOR IntersectingAxes; WHERE WR1 : AxisCurve.Dim = 2; WR2 : (SIZEOF(PartOfU) = 1) XOR (SIZEOF(PartOfV) = 1) XOR (SIZEOF(PartOfW) = 1); END_ENTITY
栅格坐标系 (IfcGridPlacement)	ENTITY IfcGridPlacement SUBTYPE OF IfcObjectPlacement; PlacementLocation : IfcVirtualGridIntersection; PlacementRefDirection : OPTIONAL IfcGridPlacementDirectionSelect; END_ENTITY
局部坐标系 (IfcLocalPlacement)	ENTITY IfcLocalPlacement SUBTYPE OF IfcObjectPlacement; PlacementRelTo : OPTIONAL IfcObjectPlacement; RelativePlacement : IfcAxis2Placement; WHERE WR21 : IfcCorrectLocalPlacement(RelativePlacement, PlacementRelTo); END_ENTITY
对象坐标系 (IfcObjectPlacement)	ENTITY IfcObjectPlacement ABSTRACT SUPERTYPE OF(ONEOF(IfcGridPlacement, IfcLocalPlacement)); INVERSE PlacesObject : SET [0:?] OF IfcProduct FOR ObjectPlacement; ReferencedByPlacements : SET OF IfcLocalPlacement FOR PlacementRelTo; END_ENTITY
虚栅格交点 (IfcVirtual GridIntersection)	ENTITY IfcVirtualGridIntersection; IntersectingAxes : LIST [2:2] OF UNIQUE IfcGridAxis; OffsetDistances : LIST [2:3] OF IfcLengthMeasure; END_ENTITY

D.7.3 几何约束资源应采用正确局部坐标系(IfcCorrectLocalPlacement)函数,函数的 EXPRESS 描述应符合下列规定:

```
FUNCTION IfcCorrectLocalPlacement
  (AxisPlacement:IfcAxis2Placement;
   RelPlacement : IfcObjectPlacement):LOGICAL;
  IF (EXISTS(RelPlacement)) THEN
```

```
    IF ('IFCGEOMETRICCONSTRAINTRESOURCE.IFCGRIDPLACEMENT' IN TYPEOF(RelPlacement)) THEN
      RETURN(?);
    END_IF;
    IF ('IFCGEOMETRICCONSTRAINTRESOURCE.IFCLOCALPLACEMENT' IN TYPEOF(RelPlacement)) THEN
      IF ('IFCGEOMETRYRESOURCE.IFCAXIS2PLACEMENT2D' IN TYPEOF(AxisPlacement)) THEN
        RETURN(TRUE);
      END_IF;
      IF ('IFCGEOMETRYRESOURCE.IFCAXIS2PLACEMENT3D' IN TYPEOF(AxisPlacement)) THEN
        IF (RelPlacement\IfcLocalPlacement.RelativePlacement.Dim = 3) THEN
          RETURN(TRUE);
        ELSE
          RETURN(FALSE);
        END_IF;
      END_IF;
    END_IF;
  ELSE
    RETURN(TRUE);
  END_IF;
  RETURN(?);
END_FUNCTION
```

D.8 几何模型资源

D.8.1 几何模型资源类型的 EXPRESS 描述应按表 D.8.1 的规定采用。

表 D.8.1 几何模型资源类型的 EXPRESS 描述

类型	EXPRESS 描述
布尔运算符 (IfcBoolean Operator)	TYPE IfcBooleanOperator = ENUMERATION OF (UNION, INTERSECTION, DIFFERENCE); END_TYPE
布尔运算项 (IfcBooleanOperand)	TYPE IfcBooleanOperand = SELECT (IfcSolidModel, IfcHalfSpaceSolid, IfcBooleanResult, IfcCsgPrimitive3D); END_TYPE
CSG 选择 (IfcCsgSelect)	TYPE IfcCsgSelect = SELECT (IfcBooleanResult, IfcCsgPrimitive3D); END_TYPE
几何集选择 (IfcGeometric SetSelect)	TYPE IfcGeometricSetSelect = SELECT (IfcPoint, IfcCurve, IfcSurface); END_TYPE

D. 8. 2 几何模型资源实体的 EXPRESS 描述应按表 D. 8. 2 的规定采用。

表 D. 8. 2 几何模型资源实体的 EXPRESS 描述

实体	EXPRESS 描述
高级边界表达 (IfcAdvancedBrep)	ENTITY IfcAdvancedBrep SUPERTYPE OF(IfcAdvancedBrepWithVoids) SUBTYPE OF IfcManifoldSolidBrep; WHERE HasAdvancedFaces : SIZEOF(QUERY(Afs <* SELF\IfcManifoldSolidBrep. Outer. CfsFaces | (NOT ('IFCTOPOLOGYRESOURCE. IFCADVANCEDFACE' IN TYPEOF(Afs))))) = 0; END_ENTITY
带孔洞高级边界表达 (IfcAdvancedBrep WithVoids)	ENTITY IfcAdvancedBrepWithVoids SUBTYPE OF IfcAdvancedBrep; Voids : SET [1:?] OF IfcClosedShell; WHERE VoidsHaveAdvancedFaces : SIZEOF (QUERY (Vsh <* Voids | SIZEOF (QUERY (Afs <* Vsh. CfsFaces | (NOT ('IFCTOPOLOGYRESOURCE. IFCADVANCEDFACE' IN TYPEOF(Afs))))) = 0)) = 0; END_ENTITY
块 (IfcBlock)	ENTITY IfcBlock SUBTYPE OF IfcCsgPrimitive3D; XLength : IfcPositiveLengthMeasure; YLength : IfcPositiveLengthMeasure; ZLength : IfcPositiveLengthMeasure; END_ENTITY
布尔剪辑结果 (IfcBoolean ClippingResult)	ENTITY IfcBooleanClippingResult SUBTYPE OF IfcBooleanResult; WHERE FirstOperandType : ('IFCGEOMETRICMODELRESOURCE. IFCSWEPTAREASOLID' IN TYPEOF(FirstOperand)) OR ('IFCGEOMETRICMODELRESOURCE. IFCSWEPTDISCSOLID' IN TYPEOF(FirstOperand)) OR ('IFCGEOMETRICMODELRESOURCE. IFCBOOLEANCLIPPINGRESULT' IN TYPEOF(FirstOperand)); SecondOperandType : ('IFCGEOMETRICMODELRESOURCE. IFCHALFSPACESOLID' IN TYPEOF(SecondOperand)); OperatorType : Operator = DIFFERENCE; END_ENTITY
布尔结果 (IfcBooleanResult)	ENTITY IfcBooleanResult SUPERTYPE OF(IfcBooleanClippingResult) SUBTYPE OF IfcGeometricRepresentationItem; Operator : IfcBooleanOperator; FirstOperand : IfcBooleanOperand; SecondOperand : IfcBooleanOperand; DERIVE Dim : IfcDimensionCount := FirstOperand. Dim; WHERE SameDim : FirstOperand. Dim = SecondOperand. Dim; END_ENTITY
包围盒 (IfcBoundingBox)	ENTITY IfcBoundingBox SUBTYPE OF IfcGeometricRepresentationItem; Corner : IfcCartesianPoint; XDim : IfcPositiveLengthMeasure; YDim : IfcPositiveLengthMeasure; ZDim : IfcPositiveLengthMeasure; DERIVE Dim : IfcDimensionCount := 3; END_ENTITY

续表 D.8.2

实体	EXPRESS 描述
半空间包围盒 (IfcBoxedHalfSpace)	ENTITY IfcBoxedHalfSpace SUBTYPE OF IfcHalfSpaceSolid; Enclosure : IfcBoundingBox; END_ENTITY
笛卡尔点列 (IfcCartesianPointList)	ENTITY IfcCartesianPointList ABSTRACT SUPERTYPE OF(IfcCartesianPointList3D) SUBTYPE OF IfcGeometricRepresentationItem; END_ENTITY
三维笛卡尔点列 (IfcCartesian PointList3D)	ENTITY IfcCartesianPointList3D SUBTYPE OF IfcCartesianPointList; CoordList : LIST [1:?] OF LIST [3:3] OF IfcLengthMeasure; END_ENTITY
三维 CSG 体素 (IfcCsgPrimitive3D)	ENTITY IfcCsgPrimitive3D ABSTRACT SUPERTYPE OF(ONEOF(IfcBlock, IfcRectangularPyramid, IfcRightCircularCone, IfcRight CircularCylinder, IfcSphere)) SUBTYPE OF IfcGeometricRepresentationItem; Position : IfcAxis2Placement3D; DERIVE Dim : IfcDimensionCount := 3; END_ENTITY
CSG 立体 (IfcCsgSolid)	ENTITY IfcCsgSolid SUBTYPE OF IfcSolidModel; TreeRootEXPRESSion : IfcCsgSelect; END_ENTITY
拉伸体 (IfcExtrudedAreaSolid)	ENTITY IfcExtrudedAreaSolid SUPERTYPE OF(IfcExtrudedAreaSolidTapered) SUBTYPE OF IfcSweptAreaSolid; ExtrudedDirection : IfcDirection; Depth : IfcPositiveLengthMeasure; WHERE ValidExtrusionDirection : IfcDotProduct(IfcRepresentationItem() || IfcGeometricRepresentationItem() || IfcDirection([0.0,0.0,1.0]), SELF.ExtrudedDirection) <> 0.0; END_ENTITY
拉伸锥 (IfcExtrudedArea SolidTapered)	ENTITY IfcExtrudedAreaSolidTapered SUBTYPE OF IfcExtrudedAreaSolid; EndSweptArea : IfcProfileDef; WHERE CorrectProfileAssignment : IfcTaperedSweptAreaProfiles(SELF\IfcSweptAreaSolid.SweptArea, SELF.End SweptArea); END_ENTITY
基于面的表面模型 (IfcFaceBased SurfaceModel)	ENTITY IfcFaceBasedSurfaceModel SUBTYPE OF IfcGeometricRepresentationItem; FbsmFaces : SET [1:?] OF IfcConnectedFaceSet; DERIVE Dim : IfcDimensionCount := 3; END_ENTITY
小面片 Brep (IfcFacetedBrep)	ENTITY IfcFacetedBrep SUPERTYPE OF(IfcFacetedBrepWithVoids) SUBTYPE OF IfcManifoldSolidBrep; END_ENTITY
小面片空洞 Brep (IfcFacetedBrep WithVoids)	ENTITY IfcFacetedBrepWithVoids SUBTYPE OF IfcFacetedBrep; Voids : SET [1:?] OF IfcClosedShell; END_ENTITY

续表 D.8.2

实体	EXPRESS 描述
固定参考方向扫掠体（IfcFixedReferenceSweptAreaSolid）	ENTITY IfcFixedReferenceSweptAreaSolid SUBTYPE OF IfcSweptAreaSolid; Directrix : IfcCurve; StartParam : OPTIONAL IfcParameterValue; EndParam : OPTIONAL IfcParameterValue; FixedReference : IfcDirection; WHERE DirectrixBounded : (EXISTS(StartParam) AND EXISTS(EndParam)) OR (SIZEOF(['IFCGEOMETRYRESOURCE.IFCCONIC','IFCGEOMETRYRESOURCE.IFCBOUNDEDCURVE'] * TYPEOF(Directrix)) = 1); END_ENTITY
几何曲线集（IfcGeometricCurveSet）	ENTITY IfcGeometricCurveSet SUBTYPE OF IfcGeometricSet; WHERE NoSurfaces : SIZEOF(QUERY(Temp <* SELF\IfcGeometricSet.Elements	'IFCGEOMETRYRESOURCE.IFCSURFACE' IN TYPEOF(Temp))) = 0; END_ENTITY
几何集（IfcGeometricSet）	ENTITY IfcGeometricSet SUPERTYPE OF(IfcGeometricCurveSet) SUBTYPE OF IfcGeometricRepresentationItem; Elements : SET [1:?] OF IfcGeometricSetSelect; DERIVE Dim : IfcDimensionCount :=: Elements[1].Dim; WHERE ConsistentDim:SIZEOF(QUERY(Temp <* Elements | Temp.Dim <> Elements[1].Dim)) = 0; END_ENTITY
半空间立体（IfcHalfSpaceSolid）	ENTITY IfcHalfSpaceSolid SUPERTYPE OF(ONEOF(IfcBoxedHalfSpace, IfcPolygonalBoundedHalfSpace)) SUBTYPE OF IfcGeometricRepresentationItem; BaseSurface : IfcSurface; AgreementFlag : BOOLEAN; DERIVE Dim : IfcDimensionCount :=: 3; END_ENTITY
流形立体 Brep（IfcManifoldSolidBrep）	ENTITY IfcManifoldSolidBrep ABSTRACT SUPERTYPE OF(ONEOF(IfcAdvancedBrep, IfcFacetedBrep)) SUBTYPE OF IfcSolidModel; Outer : IfcClosedShell; END_ENTITY
多边有界半空间（IfcPolygonalBoundedHalfSpace）	ENTITY IfcPolygonalBoundedHalfSpace SUBTYPE OF IfcHalfSpaceSolid; Position : IfcAxis2Placement3D; PolygonalBoundary : IfcBoundedCurve; WHERE BoundaryDim : PolygonalBoundary.Dim = 2; BoundaryType : SIZEOF(TYPEOF(PolygonalBoundary) * ['IFCGEOMETRYRESOURCE.IFCPOLYLINE','IFCGEOMETRYRESOURCE.IFCCOMPOSITECURVE']) = 1; END_ENTITY
四棱锥（IfcRectangularPyramid）	ENTITY IfcRectangularPyramid SUBTYPE OF IfcCsgPrimitive3D; XLength : IfcPositiveLengthMeasure; YLength : IfcPositiveLengthMeasure; Height : IfcPositiveLengthMeasure; END_ENTITY

续表 D.8.2

实体	EXPRESS 描述
旋转体 (IfcRevolved AreaSolid)	ENTITY IfcRevolvedAreaSolid SUPERTYPE OF(IfcRevolvedAreaSolidTapered) SUBTYPE OF IfcSweptAreaSolid; Axis : IfcAxis1Placement; Angle : IfcPlaneAngleMeasure; DERIVE AxisLine : IfcLine := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcCurve() || IfcLine(Axis. Location, IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Axis. Z, 1.0)); WHERE AxisStartInXY : Axis. Location. Coordinates[3] = 0.0; AxisDirectionInXY : Axis. Z. DirectionRatios[3] = 0.0; END_ENTITY
锥形旋转区域 (IfcRevolvedArea SolidTapered)	ENTITY IfcRevolvedAreaSolidTapered SUBTYPE OF IfcRevolvedAreaSolid; EndSweptArea : IfcProfileDef; WHERE CorrectProfileAssignment : IfcTaperedSweptAreaProfiles(SELF\IfcSweptAreaSolid. SweptArea, SELF. EndSweptArea); END_ENTITY
正圆锥 (IfcRight CircularCone)	ENTITY IfcRightCircularCone SUBTYPE OF IfcCsgPrimitive3D; Height : IfcPositiveLengthMeasure; BottomRadius : IfcPositiveLengthMeasure; END_ENTITY
正圆柱 (IfcRightCircular Cylinder)	ENTITY IfcRightCircularCylinder SUBTYPE OF IfcCsgPrimitive3D; Height : IfcPositiveLengthMeasure; Radius : IfcPositiveLengthMeasure; END_ENTITY
切片脊柱 (IfcSectionedSpine)	ENTITY IfcSectionedSpine SUBTYPE OF IfcGeometricRepresentationItem; SpineCurve : IfcCompositeCurve; CrossSections : LIST [2:?] OF IfcProfileDef; CrossSectionPositions : LIST [2:?] OF IfcAxis2Placement3D; DERIVE Dim : IfcDimensionCount := 3; WHERE CorrespondingSectionPositions : SIZEOF(CrossSections) = SIZEOF(CrossSectionPositions); ConsistentProfileTypes : SIZEOF(QUERY(temp <* CrossSections | CrossSections[1]. ProfileType <> temp. ProfileType)) = 0; SpineCurveDim : SpineCurve. Dim = 3; END_ENTITY
基于壳的表面模型 (IfcShellBased SurfaceModel)	ENTITY IfcShellBasedSurfaceModel SUBTYPE OF IfcGeometricRepresentationItem; SbsmBoundary : SET [1:?] OF IfcShell; DERIVE Dim : IfcDimensionCount := 3; END_ENTITY
立体模型 (IfcSolidModel)	ENTITY IfcSolidModel ABSTRACT SUPERTYPE OF(ONEOF(IfcCsgSolid, IfcManifoldSolidBrep, IfcSweptAreaSolid, IfcSweptDiskSolid)) SUBTYPE OF IfcGeometricRepresentationItem; DERIVE Dim : IfcDimensionCount := 3; END_ENTITY

续表 D.8.2

实体	EXPRESS 描述
球 (IfcSphere)	ENTITY IfcSphere SUBTYPE OF IfcCsgPrimitive3D; Radius : IfcPositiveLengthMeasure; END_ENTITY
面线扫掠体 (IfcSurfaceCurve SweptAreaSolid)	ENTITY IfcSurfaceCurveSweptAreaSolid SUBTYPE OF IfcSweptAreaSolid; Directrix : IfcCurve; StartParam : OPTIONAL IfcParameterValue; EndParam : OPTIONAL IfcParameterValue; ReferenceSurface : IfcSurface; WHERE DirectrixBounded : (EXISTS(StartParam) AND EXISTS(EndParam)) OR (SIZEOF(['IFCGEOMETRYRESOURCE.IFCCONIC','IFCGEOMETRYRESOURCE.IFCBOUNDEDCURVE'] * TYPEOF(Directrix)) = 1); END_ENTITY
扫掠面 (IfcSweptAreaSolid)	ENTITY IfcSweptAreaSolid ABSTRACT SUPERTYPE OF(ONEOF(IfcExtrudedAreaSolid, IfcFixedReferenceSweptAreaSolid, IfcRevolvedAreaSolid, IfcSurfaceCurveSweptAreaSolid)) SUBTYPE OF IfcSolidModel; SweptArea : IfcProfileDef; Position : OPTIONAL IfcAxis2Placement3D; WHERE SweptAreaType : SweptArea.ProfileType = IfcProfileTypeEnum.Area; END_ENTITY
扫掠圆盘体 (IfcSweptDiskSolid)	ENTITY IfcSweptDiskSolid SUPERTYPE OF(IfcSweptDiskSolidPolygonal) SUBTYPE OF IfcSolidModel; Directrix : IfcCurve; Radius : IfcPositiveLengthMeasure; InnerRadius : OPTIONAL IfcPositiveLengthMeasure; StartParam : OPTIONAL IfcParameterValue; EndParam : OPTIONAL IfcParameterValue; WHERE DirectrixDim : Directrix.Dim = 3; InnerRadiusSize : (NOT EXISTS(InnerRadius)) OR (Radius > InnerRadius); DirectrixBounded : (EXISTS(StartParam) AND EXISTS(EndParam)) OR (SIZEOF(['IFCGEOMETRYRESOURCE.IFCCONIC','IFCGEOMETRYRESOURCE.IFCBOUNDEDCURVE'] * TYPEOF(Directrix)) = 1); END_ENTITY
多边形扫掠圆盘体 (IfcSweptDiskSolid Polygonal)	ENTITY IfcSweptDiskSolidPolygonal SUBTYPE OF IfcSweptDiskSolid; FilletRadius : OPTIONAL IfcPositiveLengthMeasure; WHERE CorrectRadii : NOT(EXISTS(FilletRadius)) OR (FilletRadius >= SELF\IfcSweptDiskSolid.Radius); DirectrixIsPolyline : 'IFCGEOMETRYRESOURCE.IFCPOLYLINE' IN TYPEOF(SELF\IfcSweptDiskSolid.Directrix); END_ENTITY
细分面集合 (IfcTessellated FaceSet)	ENTITY IfcTessellatedFaceSet ABSTRACT SUPERTYPE OF(IfcTriangulatedFaceSet) SUBTYPE OF IfcTessellatedItem; Coordinates : IfcCartesianPointList3D; Normals : OPTIONAL LIST [1:?] OF LIST [3:3] OF IfcParameterValue; Closed : OPTIONAL BOOLEAN; INVERSE HasColours : SET [0:1] OF IfcIndexedColourMap FOR MappedTo; HasTextures : SET [0:?] OF IfcIndexedTextureMap FOR MappedTo; END_ENTITY

续表 D.8.2

实体	EXPRESS 描述
细分项 (IfcTessellatedItem)	ENTITY IfcTessellatedItem ABSTRACT SUPERTYPE OF(IfcTessellatedFaceSet) SUBTYPE OF IfcGeometricRepresentationItem; END_ENTITY
细分三角面集合 (IfcTriangulated FaceSet)	ENTITY IfcTriangulatedFaceSet SUBTYPE OF IfcTessellatedFaceSet; CoordIndex : LIST [1:?] OF LIST [3:3] OF INTEGER; NormalIndex : OPTIONAL LIST [1:?] OF LIST [3:3] OF INTEGER; DERIVE NumberOfTriangles : INTEGER := SIZEOF(CoordIndex); END_ENTITY

D.8.3 几何模型资源函数的 EXPRESS 描述应按表 D.8.3 的规定采用。

表 D.8.3 几何模型资源函数的 EXPRESS 描述

函数	EXPRESS 描述

点乘函数
(IfcDotProduct)
	FUNCTION IfcDotProduct
	(Arg1, Arg2 : IfcDirection)
	: REAL;
	LOCAL
	Scalar : REAL;
	Vec1, Vec2 : IfcDirection;
	Ndim : INTEGER;
	END_LOCAL;
	IF NOT EXISTS (Arg1) OR NOT EXISTS (Arg2) THEN
	Scalar := ?;
	ELSE
	IF (Arg1.Dim <> Arg2.Dim) THEN
	Scalar := ?;
	ELSE
	BEGIN
	Vec1 := IfcNormalise(Arg1);
	Vec2 := IfcNormalise(Arg2);
	Ndim := Arg1.Dim;
	Scalar := 0.0;
	REPEAT i := 1 TO Ndim;
	Scalar := Scalar + Vec1.DirectionRatios[i] * Vec2.DirectionRatios[i];
	END_REPEAT;
	END;
	END_IF;
	END_IF;
	RETURN (Scalar);
	END_FUNCTION

锥形扫掠面截面检查函数
(IfcTaperedSwept AreaProfiles)
	FUNCTION IfcTaperedSweptAreaProfiles
	(StartArea, EndArea : IfcProfileDef)
	: LOGICAL;
	LOCAL
	Result : LOGICAL := FALSE;
	END_LOCAL;
	IF ('IFCPROFILERESOURCE.IFCPARAMETERIZEDPROFILEDEF' IN TYPEOF(StartArea)) THEN
	IF ('IFCPROFILERESOURCE.IFCDERIVEDPROFILEDEF' IN TYPEOF(EndArea)) THEN
	Result := (StartArea := : EndArea\IfcDerivedProfileDef.ParentProfile);
	ELSE
	Result := (TYPEOF(StartArea) = TYPEOF(EndArea));
	END_IF;
	ELSE
	IF ('IFCPROFILERESOURCE.IFCDERIVEDPROFILEDEF' IN TYPEOF(EndArea)) THEN
	Result := (StartArea := : EndArea\IfcDerivedProfileDef.ParentProfile);
	ELSE
	Result := FALSE;
	END_IF;
	END_IF;
	RETURN(Result);
	END_FUNCTION

续表 D.8.3

函数	EXPRESS 描述

矢量和函数
(IfcVectorSum)
	FUNCTION IfcVectorSum
	(Arg1, Arg2 : IfcVectorOrDirection)
	: IfcVector;
	LOCAL
	Result : IfcVector;
	Res, Vec1, Vec2 : IfcDirection;
	Mag, Mag1, Mag2 : REAL;
	Ndim : INTEGER;
	END_LOCAL;
	IF ((NOT EXISTS (Arg1)) OR (NOT EXISTS (Arg2))) OR (Arg1. Dim <> Arg2. Dim) THEN
	RETURN (?);
	ELSE
	BEGIN
	IF'IFCGEOMETRYRESOURCE. IFCVECTOR'IN TYPEOF(Arg1) THEN
	Mag1 := Arg1\IfcVector. Magnitude;
	Vec1 := Arg1\IfcVector. Orientation;
	ELSE
	Mag1 := 1.0;
	Vec1 := Arg1;
	END_IF;
	IF'IFCGEOMETRYRESOURCE. IFCVECTOR'IN TYPEOF(Arg2) THEN
	Mag2 := Arg2\IfcVector. Magnitude;
	Vec2 := Arg2\IfcVector. Orientation;
	ELSE
	Mag2 := 1.0;
	Vec2 := Arg2;
	END_IF;
	Vec1 := IfcNormalise (Vec1);
	Vec2 := IfcNormalise (Vec2);
	Ndim := SIZEOF(Vec1. DirectionRatios);
	Mag := 0.0;
	Res := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection ([0.0: Ndim]);
	REPEAT i := 1 TO Ndim;
	Res. DirectionRatios[i] := Mag1 * Vec1. DirectionRatios[i] + Mag2 * Vec2. DirectionRatios[i];
	Mag := Mag + (Res. DirectionRatios[i] * Res. DirectionRatios[i]);
	END_REPEAT;
	IF (Mag > 0.0) THEN
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Res, SQRT(Mag));
	ELSE
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Vec1, 0.0);
	END_IF;
	END;
	END_IF;
	RETURN (Result);
	END_FUNCTION

D.9 几 何 资 源

D.9.1 几何资源类型的 EXPRESS 描述应按表 D.9.1 的规定采用。

表 D.9.1 几何资源类型的 EXPRESS 描述

类型	EXPRESS 描述
维数 (IfcDimensionCount)	TYPE IfcDimensionCount = INTEGER; WHERE WR1 : { 0 < SELF <= 3 }; END_TYPE

续表 D.9.1

类型	EXPRESS 描述
B样条曲线样式枚举 (IfcBSplineCurveForm)	TYPE IfcBSplineCurveForm = ENUMERATION OF (POLYLINE_FORM, CIRCULAR_ARC, ELLIPTIC_ARC, PARABOLIC_ARC, HYPERBOLIC_ARC, UNSPECIFIED); END_TYPE
B样条曲面样式枚举 (IfcBSplineSurface Form)	TYPE IfcBSplineSurfaceForm = ENUMERATION OF (PLANE_SURF, CYLINDRICAL_SURF, CONICAL_SURF, SPHERICAL_SURF, TOROIDAL_SURF, SURF_OF_REVOLUTION, RULED_SURF, GENERALISED_CONE, QUADRIC_SURF, SURF_OF_LINEAR_EXTRUSION, UNSPECIFIED); END_TYPE
节点向量类型枚举 (IfcKnotType)	TYPE IfcKnotType = ENUMERATION OF (UNIFORM_KNOTS, QUASI_UNIFORM_KNOTS, PIECEWISE_BEZIER_KNOTS, UNSPECIFIED); END_TYPE
过渡代码枚举 (IfcTransitionCode)	TYPE IfcTransitionCode = ENUMERATION OF (DISCONTINUOUS, CONTINUOUS, CONTSAMEGRADIENT, CONTSAMEGRADIENTSAMECURVATURE); END_TYPE
裁剪优先权枚举 (IfcTrimming Preference)	TYPE IfcTrimmingPreference = ENUMERATION OF (CARTESIAN, PARAMETER, UNSPECIFIED); END_TYPE
轴2方位 (IfcAxis2Placement)	TYPE IfcAxis2Placement = SELECT (IfcAxis2Placement2D, IfcAxis2Placement3D); END_TYPE
面上曲线 (IfcCurveOnSurface)	TYPE IfcCurveOnSurface = SELECT (IfcCompositeCurveOnSurface, IfcPcurve); END_TYPE
裁剪选择 (IfcTrimmingSelect)	TYPE IfcTrimmingSelect = SELECT (IfcCartesianPoint, IfcParameterValue); END_TYPE
矢量或方向 (IfcVectorOr Direction)	TYPE IfcVectorOrDirection = SELECT (IfcDirection, IfcVector); END_TYPE

D. 9. 2 几何资源实体的 EXPRESS 描述应按表 D. 9. 2 的规定采用。

表 D. 9. 2 几何资源实体的 EXPRESS 描述

实体	EXPRESS 描述
轴 1 方位 (IfcAxis1Placement)	ENTITY IfcAxis1Placement SUBTYPE OF IfcPlacement; Axis : OPTIONAL IfcDirection; DERIVE Z : IfcDirection := NVL (IfcNormalise(Axis), IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0,0.0,1.0])); WHERE AxisIs3D : (NOT (EXISTS (Axis))) OR (Axis. Dim = 3); LocationIs3D : SELF\IfcPlacement. Location. Dim = 3; END_ENTITY
二维轴 2 方位 (IfcAxis2Placement2D)	ENTITY IfcAxis2Placement2D SUBTYPE OF IfcPlacement; RefDirection : OPTIONAL IfcDirection; DERIVE P : LIST [2:2] OF IfcDirection := IfcBuild2Axes(RefDirection); WHERE RefDirIs2D : (NOT (EXISTS (RefDirection))) OR (RefDirection. Dim = 2); LocationIs2D : SELF\IfcPlacement. Location. Dim = 2; END_ENTITY
三维轴 2 方位 (IfcAxis2Placement3D)	ENTITY IfcAxis2Placement3D SUBTYPE OF IfcPlacement; Axis : OPTIONAL IfcDirection; RefDirection : OPTIONAL IfcDirection; DERIVE P : LIST [3:3] OF IfcDirection := IfcBuildAxes(Axis, RefDirection); WHERE LocationIs3D : SELF\IfcPlacement. Location. Dim = 3; AxisIs3D : (NOT (EXISTS (Axis))) OR (Axis. Dim = 3); RefDirIs3D : (NOT (EXISTS (RefDirection))) OR (RefDirection. Dim = 3); AxisToRefDirPosition : (NOT (EXISTS (Axis))) OR (NOT (EXISTS (RefDirection))) OR (IfcCrossProduct(Axis,RefDirection). Magnitude > 0.0); AxisAndRefDirProvision : NOT ((EXISTS (Axis)) XOR (EXISTS (RefDirection))); END_ENTITY
边界曲线 (IfcBoundaryCurve)	ENTITY IfcBoundaryCurve SUPERTYPE OF(IfcOuterBoundaryCurve) SUBTYPE OF IfcCompositeCurveOnSurface; WHERE IsClosed : SELF\IfcCompositeCurve. ClosedCurve; END_ENTITY
有界曲线 (IfcBoundedCurve)	ENTITY IfcBoundedCurve ABSTRACT SUPERTYPE OF(ONEOF(IfcBSplineCurve, IfcCompositeCurve, IfcPolyline, IfcTrimmed Curve)) SUBTYPE OF IfcCurve; END_ENTITY
有界曲面 (IfcBoundedSurface)	ENTITY IfeBoundedSurface ABSTRACT SUPERTYPE OF (ONEOF (IfcBSplinesurface,IfcCurveBoundedplane, IfcCurve BoundedSurface, IfcRectangularTrimmedSurface)) SUBTYPE OF Ifcsurface; END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
B样条曲线 (IfcBSplineCurve)	ENTITY IfcBSplineCurve ABSTRACT SUPERTYPE OF(IfcBSplineCurveWithKnots) SUBTYPE OF IfcBoundedCurve; Degree : INTEGER; ControlPointsList : LIST [2:?] OF IfcCartesianPoint; CurveForm : IfcBSplineCurveForm; ClosedCurve : LOGICAL; SelfIntersect : LOGICAL; DERIVE UpperIndexOnControlPoints : INTEGER := (SIZEOF(ControlPointsList) − 1); ControlPoints : ARRAY [0:UpperIndexOnControlPoints] OF IfcCartesianPoint := IfcListToArray(Control PointsList,0,UpperIndexOnControlPoints); WHERE SameDim : SIZEOF(QUERY(Temp <* ControlPointsList | Temp.Dim <> ControlPointsList[1].Dim)) = 0; END_ENTITY
节点向量B样条曲线 (IfcBSplineCurve WithKnots)	ENTITY IfcBSplineCurveWithKnots SUPERTYPE OF(IfcRationalBSplineCurveWithKnots) SUBTYPE OF IfcBSplineCurve; KnotMultiplicities : LIST [2:?] OF INTEGER; Knots : LIST [2:?] OF IfcParameterValue; KnotSpec : IfcKnotType; DERIVE UpperIndexOnKnots : INTEGER := SIZEOF(Knots); WHERE ConsistentBSpline : IfcConstraintsParamBSpline(Degree, UpperIndexOnKnots, UpperIndexOnControl Points, KnotMultiplicities, Knots); CorrespondingKnotLists : SIZEOF(KnotMultiplicities) = UpperIndexOnKnots; END_ENTITY
B样条曲面 (IfcBSplineSurface)	ENTITY IfcBSplineSurface ABSTRACT SUPERTYPE OF(IfcBSplineSurfaceWithKnots) SUBTYPE OF IfcBoundedSurface; UDegree : INTEGER; VDegree : INTEGER; ControlPointsList : LIST [2:?] OF LIST [2:?] OF IfcCartesianPoint; SurfaceForm : IfcBSplineSurfaceForm; UClosed : LOGICAL; VClosed : LOGICAL; SelfIntersect : LOGICAL; DERIVE UUpper : INTEGER := SIZEOF(ControlPointsList) − 1; VUpper : INTEGER := SIZEOF(ControlPointsList[1]) − 1; ControlPoints : ARRAY [0:UUpper] OF ARRAY [0:VUpper] OF IfcCartesianPoint := IfcMakeArray OfArray(ControlPointsList, 0,UUpper,0,VUpper); END_ENTITY
节点向量B样条曲面 (IfcBSplineSurface WithKnots)	ENTITY IfcBSplineSurfaceWithKnots SUPERTYPE OF(IfcRationalBSplineSurfaceWithKnots) SUBTYPE OF IfcBSplineSurface; UMultiplicities : LIST [2:?] OF INTEGER; VMultiplicities : LIST [2:?] OF INTEGER; UKnots : LIST [2:?] OF IfcParameterValue; VKnots : LIST [2:?] OF IfcParameterValue; KnotSpec : IfcKnotType; DERIVE KnotVUpper : INTEGER := SIZEOF(VKnots); KnotUUpper : INTEGER := SIZEOF(UKnots); WHERE UDirectionConstraints : IfcConstraintsParamBSpline (SELF \ IfcBSplineSurface.UDegree, KnotUUpper, SELF\IfcBSplineSurface.UUpper, UMultiplicities, UKnots); VDirectionConstraints : IfcConstraintsParamBSpline (SELF \ IfcBSplineSurface.VDegree, KnotVUpper, SELF\IfcBSplineSurface.VUpper, VMultiplicities, VKnots); CorrespondingULists : SIZEOF(UMultiplicities) = KnotUUpper; CorrespondingVLists : SIZEOF(VMultiplicities) = KnotVUpper; END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
笛卡尔点 (IfcCartesianPoint)	ENTITY IfcCartesianPoint SUBTYPE OF IfcPoint; Coordinates : LIST [1:3] OF IfcLengthMeasure; DERIVE Dim : IfcDimensionCount := HIINDEX(Coordinates); WHERE CP2Dor3D : HIINDEX(Coordinates) >= 2; END_ENTITY
笛卡尔变换运算符 (IfcCartesianTransformationOperator)	ENTITY IfcCartesianTransformationOperator ABSTRACT SUPERTYPE OF(ONEOF(IfcCartesianTransformationOperator2D, IfcCartesianTransformationOperator3D)) SUBTYPE OF IfcGeometricRepresentationItem; Axis1 : OPTIONAL IfcDirection; Axis2 : OPTIONAL IfcDirection; LocalOrigin : IfcCartesianPoint; Scale : OPTIONAL REAL; DERIVE Scl : REAL := NVL(Scale, 1.0); Dim : IfcDimensionCount := LocalOrigin.Dim; WHERE ScaleGreaterZero : Scl > 0.0; END_ENTITY
二维笛卡尔变换运算符 (IfcCartesianTransformationOperator2D)	ENTITY IfcCartesianTransformationOperator2D SUPERTYPE OF(IfcCartesianTransformationOperator2DnonUniform) SUBTYPE OF IfcCartesianTransformationOperator; DERIVE U : LIST [2:2] OF IfcDirection := IfcBaseAxis(2, SELF\IfcCartesianTransformationOperator.Axis1, SELF\IfcCartesianTransformationOperator.Axis2,?); WHERE DimEqual2 : SELF\IfcCartesianTransformationOperator.Dim = 2; Axis1Is2D : NOT(EXISTS(SELF\IfcCartesianTransformationOperator.Axis1)) OR (SELF\IfcCartesianTransformationOperator.Axis1.Dim = 2); Axis2Is2D : NOT(EXISTS(SELF\IfcCartesianTransformationOperator.Axis2)) OR (SELF\IfcCartesianTransformationOperator.Axis2.Dim = 2); END_ENTITY
二维笛卡尔非均匀比例变换运算符 (IfcCartesianTransformationOperator2DnonUniform)	ENTITY IfcCartesianTransformationOperator2DnonUniform SUBTYPE OF IfcCartesianTransformationOperator2D; Scale2 : OPTIONAL REAL; DERIVE Scl2 : REAL := NVL(Scale2, SELF\IfcCartesianTransformationOperator.Scl); WHERE Scale2GreaterZero : Scl2 > 0.0; END_ENTITY
三维笛卡尔变换运算符 (IfcCartesianTransformationOperator3D)	ENTITY IfcCartesianTransformationOperator3D SUPERTYPE OF(IfcCartesianTransformationOperator3DnonUniform) SUBTYPE OF IfcCartesianTransformationOperator; Axis3 : OPTIONAL IfcDirection; DERIVE U : LIST [3:3] OF IfcDirection := IfcBaseAxis(3, SELF\IfcCartesianTransformationOperator.Axis1, SELF\IfcCartesianTransformationOperator.Axis2,Axis3); WHERE DimIs3D : SELF\IfcCartesianTransformationOperator.Dim = 3; Axis1Is3D : NOT(EXISTS(SELF\IfcCartesianTransformationOperator.Axis1)) OR (SELF\IfcCartesianTransformationOperator.Axis1.Dim = 3); Axis2Is3D : NOT(EXISTS(SELF\IfcCartesianTransformationOperator.Axis2)) OR (SELF\IfcCartesianTransformationOperator.Axis2.Dim = 3); Axis3Is3D : NOT(EXISTS(Axis3)) OR (Axis3.Dim = 3); END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
三维笛卡尔非均匀比例变换运算符（IfcCartesianTransformationOperator3DnonUniform）	ENTITY IfcCartesianTransformationOperator3DnonUniform SUBTYPE OF IfcCartesianTransformationOperator3D; Scale2 : OPTIONAL REAL; Scale3 : OPTIONAL REAL; DERIVE Scl2 : REAL := NVL(Scale2, SELF\IfcCartesianTransformationOperator.Scl); Scl3 : REAL := NVL(Scale3, SELF\IfcCartesianTransformationOperator.Scl); WHERE Scale2GreaterZero : Scl2 > 0.0; Scale3GreaterZero : Scl3 > 0.0; END_ENTITY
圆（IfcCircle）	ENTITY IfcCircle SUBTYPE OF IfcConic; Radius : IfcPositiveLengthMeasure; END_ENTITY
复合曲线（IfcCompositeCurve）	ENTITY IfcCompositeCurve SUPERTYPE OF(IfcCompositeCurveOnSurface) SUBTYPE OF IfcBoundedCurve; Segments : LIST [1:?] OF IfcCompositeCurveSegment; SelfIntersect : LOGICAL; DERIVE NSegments : INTEGER := SIZEOF(Segments); ClosedCurve : LOGICAL := Segments[NSegments].Transition <> Discontinuous; WHERE CurveContinuous : ((NOT ClosedCurve) AND (SIZEOF(QUERY(Temp <* Segments | Temp.Transition = Discontinuous)) = 1)) OR ((ClosedCurve) AND (SIZEOF(QUERY(Temp <* Segments | Temp.Transition = Discontinuous)) = 0)); SameDim : SIZEOF(QUERY(Temp <* Segments | Temp.Dim <> Segments[1].Dim)) = 0; END_ENTITY
面上复合曲线（IfcCompositeCurveOnSurface）	ENTITY IfcCompositeCurveOnSurface SUPERTYPE OF(IfcBoundaryCurve) SUBTYPE OF IfcCompositeCurve; DERIVE BasisSurface : SET [0:1] OF IfcSurface := IfcGetBasisSurface(SELF); WHERE SameSurface : SIZEOF(BasisSurface) > 0; END_ENTITY
复合曲线段（IfcCompositeCurveSegment）	ENTITY IfcCompositeCurveSegment SUPERTYPE OF(IfcReparametrisedCompositeCurveSegment) SUBTYPE OF IfcGeometricRepresentationItem; Transition : IfcTransitionCode; SameSense : BOOLEAN; ParentCurve : IfcCurve; INVERSE UsingCurves : SET [1:?] OF IfcCompositeCurve FOR Segments; DERIVE Dim : IfcDimensionCount := ParentCurve.Dim; WHERE ParentIsBoundedCurve : ('IFCGEOMETRYRESOURCE.IFCBOUNDEDCURVE' IN TYPEOF(ParentCurve)); END_ENTITY
圆锥曲线（IfcConic）	ENTITY IfcConic ABSTRACT SUPERTYPE OF(ONEOF(IfcCircle, IfcEllipse)) SUBTYPE OF IfcCurve; Position : IfcAxis2Placement; END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
曲线 (IfcCurve)	ENTITY IfcCurve ABSTRACT SUPERTYPE OF(ONEOF(IfcBoundedCurve, IfcConic, IfcLine, IfcOffsetCurve2D, IfcOffsetCurve3D, IfcPcurve)) SUBTYPE OF IfcGeometricRepresentationItem; DERIVE Dim : IfcDimensionCount := IfcCurveDim(SELF); END_ENTITY
曲边有界平面 (IfcCurveBoundedPlane)	ENTITY IfcCurveBoundedPlane SUBTYPE OF IfcBoundedSurface; BasisSurface : IfcPlane; OuterBoundary : IfcCurve; InnerBoundaries : SET OF IfcCurve; END_ENTITY
曲边有界曲面 (IfcCurveBoundedSurface)	ENTITY IfcCurveBoundedSurface SUBTYPE OF IfcBoundedSurface; BasisSurface : IfcSurface; Boundaries : SET [1:?] OF IfcBoundaryCurve; ImplicitOuter : BOOLEAN; END_ENTITY
圆柱面 (0IfcCylindricalSurface)	ENTITY IfcCylindricalSurface SUBTYPE OF IfcElementarySurface; Radius : IfcPositiveLengthMeasure; END_ENTITY
方向 (IfcDirection)	ENTITY IfcDirection SUBTYPE OF IfcGeometricRepresentationItem; DirectionRatios : LIST [2:3] OF REAL; DERIVE Dim : IfcDimensionCount := HIINDEX(DirectionRatios); WHERE MagnitudeGreaterZero : SIZEOF(QUERY(Tmp <* DirectionRatios | Tmp <> 0.0)) > 0; END_ENTITY
基本曲面 (IfcElementarySurface)	ENTITY IfcElementarySurface ABSTRACT SUPERTYPE OF(ONEOF(IfcCylindricalSurface, IfcPlane)) SUBTYPE OF IfcSurface; Position : IfcAxis2Placement3D; END_ENTITY
椭圆 (IfcEllipse)	ENTITY IfcEllipse SUBTYPE OF IfcConic; SemiAxis1 : IfcPositiveLengthMeasure; SemiAxis2 : IfcPositiveLengthMeasure; END_ENTITY
几何表达项 (IfcGeometricRepresentationItem)	ENTITY IfcGeometricRepresentationItem ABSTRACT SUPERTYPE OF(ONEOF(IfcAnnotationFillArea, IfcBooleanResult, IfcBoundingBox, IfcCartesianPointList, IfcCartesianTransformationOperator, IfcCompositeCurveSegment, IfcCsgPrimitive3D, IfcCurve, IfcDirection, IfcFaceBasedSurfaceModel, IfcFillAreaStyleHatching, IfcFillAreaStyleTiles, IfcGeometricSet, IfcHalfSpaceSolid, IfcLightSource, IfcPlacement, IfcPlanarExtent, IfcPoint, IfcSectionedSpine, IfcShellBasedSurfaceModel, IfcSolidModel, IfcSurface, IfcTessellatedItem, IfcTextLiteral, IfcVector)) SUBTYPE OF IfcRepresentationItem; END_ENTITY
直线 (IfcLine)	ENTITY IfcLine SUBTYPE OF IfcCurve; Pnt : IfcCartesianPoint; Dir : IfcVector; WHERE SameDim : Dir.Dim = Pnt.Dim; END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
映射项 (IfcMappedItem)	ENTITY IfcMappedItem SUBTYPE OF IfcRepresentationItem; MappingSource : IfcRepresentationMap; MappingTarget : IfcCartesianTransformationOperator; END_ENTITY
二维偏置曲线 (IfcOffsetCurve2D)	ENTITY IfcOffsetCurve2D SUBTYPE OF IfcCurve; BasisCurve : IfcCurve; Distance : IfcLengthMeasure; SelfIntersect : LOGICAL; WHERE DimIs2D : BasisCurve.Dim = 2; END_ENTITY
三维偏置曲线 IfcOffsetCurve3D	ENTITY IfcOffsetCurve3D SUBTYPE OF IfcCurve; BasisCurve : IfcCurve; Distance : IfcLengthMeasure; SelfIntersect : LOGICAL; RefDirection : IfcDirection; WHERE DimIs3D : BasisCurve.Dim = 3; END_ENTITY
外边界曲线 (IfcOuterBoundary Curve)	ENTITY IfcOuterBoundaryCurve SUBTYPE OF IfcBoundaryCurve; END_ENTITY
P 曲线 (IfcPcurve)	ENTITY IfcPcurve SUBTYPE OF IfcCurve; BasisSurface : IfcSurface; ReferenceCurve : IfcCurve; WHERE DimIs2D : ReferenceCurve.Dim = 2; END_ENTITY
方位 (IfcPlacement)	ENTITY IfcPlacement ABSTRACT SUPERTYPE OF(ONEOF(IfcAxis1Placement, IfcAxis2Placement2D, IfcAxis2Placement3D)) SUBTYPE OF IfcGeometricRepresentationItem; Location : IfcCartesianPoint; DERIVE Dim : IfcDimensionCount :=Location.Dim; END_ENTITY
平面 (IfcPlane)	ENTITY IfcPlane SUBTYPE OF IfcElementarySurface; END_ENTITY
点 (IfcPoint)	ENTITY IfcPoint ABSTRACT SUPERTYPE OF(ONEOF(IfcCartesianPoint, IfcPointOnCurve, IfcPointOnSurface)) SUBTYPE OF IfcGeometricRepresentationItem; END_ENTITY
曲线上点 (IfcPointOnCurve)	ENTITY IfcPointOnCurve SUBTYPE OF IfcPoint; BasisCurve : IfcCurve; PointParameter : IfcParameterValue; DERIVE Dim : IfcDimensionCount :=BasisCurve.Dim; END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
曲面上点 (IfcPointOnSurface)	ENTITY IfcPointOnSurface SUBTYPE OF IfcPoint; BasisSurface : IfcSurface; PointParameterU : IfcParameterValue; PointParameterV : IfcParameterValue; DERIVE Dim : IfcDimensionCount := BasisSurface.Dim; END_ENTITY
折线 (IfcPolyline)	ENTITY IfcPolyline SUBTYPE OF IfcBoundedCurve; Points : LIST [2:?] OF IfcCartesianPoint; WHERE SameDim : SIZEOF(QUERY(Temp <* Points | Temp.Dim <> Points[1].Dim)) = 0; END_ENTITY
节点向量有理 B样条曲线 (IfcRationalBSpline CurveWithKnots)	ENTITY IfcRationalBSplineCurveWithKnots SUBTYPE OF IfcBSplineCurveWithKnots; WeightsData : LIST [2:?] OF REAL; DERIVE Weights : ARRAY [0:UpperIndexOnControlPoints] OF REAL := IfcListToArray(WeightsData,0,SELF\IfcBSplineCurve.UpperIndexOnControlPoints); WHERE SameNumOfWeightsAndPoints : SIZEOF(WeightsData) = SIZEOF(SELF\IfcBSplineCurve.ControlPointsList); WeightsGreaterZero : IfcCurveWeightsPositive(SELF); END_ENTITY
节点向量有理 B样条曲面 (IfcRationalBSpline SurfaceWithKnots)	ENTITY IfcRationalBSplineSurfaceWithKnots SUBTYPE OF IfcBSplineSurfaceWithKnots; WeightsData : LIST [2:?] OF LIST [2:?] OF REAL; DERIVE Weights : ARRAY [0:UUpper] OF ARRAY [0:VUpper] OF REAL := IfcMakeArrayOfArray(WeightsData,0,UUpper,0,VUpper); WHERE CorrespondingWeightsDataLists : (SIZEOF(WeightsData) = SIZEOF(SELF\IfcBSplineSurface.ControlPointsList)) AND (SIZEOF(WeightsData[1]) = SIZEOF(SELF\IfcBSplineSurface.ControlPointsList[1])); WeightValuesGreaterZero : IfcSurfaceWeightsPositive(SELF); END_ENTITY
矩形裁剪曲面 (IfcRectangular TrimmedSurface)	ENTITY IfcRectangularTrimmedSurface SUBTYPE OF IfcBoundedSurface; BasisSurface : IfcSurface; U1 : IfcParameterValue; V1 : IfcParameterValue; U2 : IfcParameterValue; V2 : IfcParameterValue; Usense : BOOLEAN; Vsense : BOOLEAN; WHERE U1AndU2Different : U1 <> U2; V1AndV2Different : V1 <> V2; UsenseCompatible : (('IFCGEOMETRYRESOURCE.IFCELEMENTARYSURFACE' IN TYPEOF(BasisSurface)) AND (NOT ('IFCGEOMETRYRESOURCE.IFCPLANE' IN TYPEOF(BasisSurface)))) OR ('IFCGEOMETRYRESOURCE.IFCSURFACEOFREVOLUTION' IN TYPEOF(BasisSurface)) OR (Usense = (U2 > U1)); VsenseCompatible : Vsense = (V2 > V1); END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
重参数化复合曲线段 (IfcReparametrised CompositeCurve Segment)	ENTITY IfcReparametrisedCompositeCurveSegment SUBTYPE OF IfcCompositeCurveSegment; ParamLength : IfcParameterValue; WHERE PositiveLengthParameter : ParamLength > 0.0; END_ENTITY
表达项 (IfcRepresentationItem)	ENTITY IfcRepresentationItem ABSTRACT SUPERTYPE OF(ONEOF(IfcGeometricRepresentationItem, IfcMappedItem, IfcStyledItem, IfcTopologicalRepresentationItem)); INVERSE LayerAssignment : SET [0:1] OF IfcPresentationLayerAssignment FOR AssignedItems; StyledByItem : SET [0:1] OF IfcStyledItem FOR Item; END_ENTITY
表达映射 (IfcRepresentationMap)	ENTITY IfcRepresentationMap; MappingOrigin : IfcAxis2Placement; MappedRepresentation : IfcRepresentation; INVERSE HasShapeAspects : SET [0:?] OF IfcShapeAspect FOR PartOfProductDefinitionShape; MapUsage : SET OF IfcMappedItem FOR MappingSource; WHERE ApplicableMappedRepr :'IFCREPRESENTATIONRESOURCE.IFCSHAPEMODEL' IN TYPEOF(MappedRepresentation); END_ENTITY
曲面 (IfcSurface)	ENTITY IfcSurface ABSTRACT SUPERTYPE OF(ONEOF(IfcBoundedSurface, IfcElementarySurface, IfcSweptSurface)) SUBTYPE OF IfcGeometricRepresentationItem; DERIVE Dim : IfcDimensionCount := 3; END_ENTITY
线性拉伸面 (IfcSurfaceOfLinearExtrusion)	ENTITY IfcSurfaceOfLinearExtrusion SUBTYPE OF IfcSweptSurface; ExtrudedDirection : IfcDirection; Depth : IfcLengthMeasure; DERIVE ExtrusionAxis : IfcVector := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(ExtrudedDirection, Depth); WHERE DepthGreaterZero : Depth > 0.; END_ENTITY
旋转曲面 (IfcSurfaceOfRevolution)	ENTITY IfcSurfaceOfRevolution SUBTYPE OF IfcSweptSurface; AxisPosition : IfcAxis1Placement; DERIVE AxisLine : IfcLine := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcCurve() || IfcLine(AxisPosition.Location, IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(AxisPosition.Z,1.0)); END_ENTITY
扫掠曲面 (IfcSweptSurface)	ENTITY IfcSweptSurface ABSTRACT SUPERTYPE OF(ONEOF(IfcSurfaceOfLinearExtrusion, IfcSurfaceOfRevolution)) SUBTYPE OF IfcSurface; SweptCurve : IfcProfileDef; Position : OPTIONAL IfcAxis2Placement3D; WHERE SweptCurveType : SweptCurve.ProfileType = IfcProfileTypeEnum.Curve; END_ENTITY

续表 D.9.2

实体	EXPRESS 描述
裁剪曲线 (IfcTrimmedCurve)	ENTITY IfcTrimmedCurve SUBTYPE OF IfcBoundedCurve; BasisCurve : IfcCurve; Trim1 : SET [1:2] OF IfcTrimmingSelect; Trim2 : SET [1:2] OF IfcTrimmingSelect; SenseAgreement : BOOLEAN; MasterRepresentation : IfcTrimmingPreference; WHERE Trim1ValuesConsistent : (HIINDEX(Trim1) = 1) OR (TYPEOF(Trim1[1]) <> TYPEOF(Trim1[2])); Trim2ValuesConsistent : (HIINDEX(Trim2) = 1) OR (TYPEOF(Trim2[1]) <> TYPEOF(Trim2[2])); NoTrimOfBoundedCurves : NOT('IFCGEOMETRYRESOURCE.IFCBOUNDEDCURVE' IN TYPEOF (BasisCurve)); END_ENTITY
矢量 (IfcVector)	ENTITY IfcVector SUBTYPE OF IfcGeometricRepresentationItem; Orientation : IfcDirection; Magnitude : IfcLengthMeasure; DERIVE Dim : IfcDimensionCount := Orientation.Dim; WHERE MagGreaterOrEqualZero : Magnitude >= 0.0; END_ENTITY

D.9.3 几何资源函数的 EXPRESS 描述应按表 D.9.3 的规定采用。

表 D.9.3 几何资源函数的 EXPRESS 描述

函数	EXPRESS 描述

基轴
(IfcBaseAxis)
	FUNCTION IfcBaseAxis
	(Dim : INTEGER;
	Axis1, Axis2, Axis3 : IfcDirection)
	: LIST [2:3] OF IfcDirection;
	LOCAL
	U : LIST [2:3] OF IfcDirection;
	Factor : REAL;
	D1, D2 : IfcDirection;
	END_LOCAL;
	IF (Dim = 3) THEN
	D1 := NVL(IfcNormalise(Axis3), IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0,0.0,1.0]));
	D2 := IfcFirstProjAxis(D1, Axis1);
	U := [D2, IfcSecondProjAxis(D1, D2, Axis2), D1];
	ELSE
	IF EXISTS(Axis1) THEN
	D1 := IfcNormalise(Axis1);
	U := [D1, IfcOrthogonalComplement(D1)];
	IF EXISTS(Axis2) THEN
	Factor := IfcDotProduct(Axis2, U[2]);
	IF (Factor < 0.0) THEN
	U[2].DirectionRatios[1] := -U[2].DirectionRatios[1];
	U[2].DirectionRatios[2] := -U[2].DirectionRatios[2];
	END_IF;
	END_IF;
	ELSE
	IF EXISTS(Axis2) THEN
	D1 := IfcNormalise(Axis2);
	U := [IfcOrthogonalComplement(D1), D1];
	U[1].DirectionRatios[1] := -U[1].DirectionRatios[1];
	U[1].DirectionRatios[2] := -U[1].DirectionRatios[2];
	ELSE
	U := [IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([1.0, 0.0]),
	IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0, 1.0])];
	END_IF;
	END_IF;
	END_IF;
	RETURN(U);
	END_FUNCTION

续表 D.9.3

函数	EXPRESS 描述
二轴构建 (IfcBuild2Axes)	FUNCTION IfcBuild2Axes (RefDirection : IfcDirection) : LIST [2:2] OF IfcDirection; LOCAL D : IfcDirection := NVL(IfcNormalise(RefDirection), IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([1.0,0.0])); END_LOCAL; RETURN([D, IfcOrthogonalComplement(D)]); END_FUNCTION
轴构建 (IfcBuildAxes)	FUNCTION IfcBuildAxes (Axis, RefDirection : IfcDirection) : LIST [3:3] OF IfcDirection; LOCAL D1, D2 : IfcDirection; END_LOCAL; D1 := NVL(IfcNormalise(Axis), IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0,0.0,1.0])); D2 := IfcFirstProjAxis(D1, RefDirection); RETURN ([D2, IfcNormalise(IfcCrossProduct(D1,D2))\IfcVector.Orientation, D1]); END_FUNCTION

B样条约束参数
(IfcConstraints
ParamBSpline)
	FUNCTION IfcConstraintsParamBSpline
	(Degree, UpKnots, UpCp : INTEGER;
	KnotMult : LIST OF INTEGER;
	Knots : LIST OF IfcParameterValue)
	: BOOLEAN;
	LOCAL
	Result : BOOLEAN := TRUE;
	K, Sum : INTEGER;
	END_LOCAL;
	(* Find sum of knot multiplicities *)
	Sum := KnotMult[1];
	REPEAT i := 2 TO UpKnots;
	Sum := Sum + KnotMult[i];
	END_REPEAT;
	(* Check limits holding for all B-spline parametrisations *)
	IF (Degree < 1) OR (UpKnots < 2) OR (UpCp < Degree) OR
	(Sum <> (Degree + UpCp + 2)) THEN
	Result := FALSE;
	RETURN(Result);
	END_IF;
	K := KnotMult[1];
	IF (K < 1) OR (K > Degree + 1) THEN
	Result := FALSE;
	RETURN(Result);
	END_IF;
	
	REPEAT i := 2 TO UpKnots;
	IF (KnotMult[i] < 1) OR (Knots[i] <= Knots[i-1]) THEN
	Result := FALSE;
	RETURN(Result);
	END_IF;
	K := KnotMult[i];
	IF (i < UpKnots) AND (K > Degree) THEN
	Result := FALSE;
	RETURN(Result);
	END_IF;
	IF (i = UpKnots) AND (K > Degree + 1) THEN
	Result := FALSE;
	RETURN(Result);
	END_IF;
	END_REPEAT;
	RETURN(result);
	END_FUNCTION

续表 D.9.3

函数	EXPRESS 描述

叉积
(IfcCrossProduct)
	FUNCTION IfcCrossProduct
	(Arg1, Arg2 : IfcDirection)
	: IfcVector;
	LOCAL
	Mag : REAL;
	Res : IfcDirection;
	V1,V2 : LIST[3:3] OF REAL;
	Result : IfcVector;
	END_LOCAL;
	
	IF (NOT EXISTS (Arg1) OR (Arg1.Dim = 2)) OR (NOT EXISTS (Arg2) OR (Arg2.Dim = 2)) THEN
	RETURN(?);
	ELSE
	BEGIN
	V1 := IfcNormalise(Arg1)\IfcDirection.DirectionRatios;
	V2 := IfcNormalise(Arg2)\IfcDirection.DirectionRatios;
	Res := IfcRepresentationItem() || IfcGeometricRepresentationItem ()
	|| IfcDirection([(V1[2] * V2[3] - V1[3] * V2[2]), (V1[3] * V2[1] - V1[1] * V2[3]), (V1[1] * V2[2] - V1[2] * V2[1])]);
	Mag := 0.0;
	REPEAT i := 1 TO 3;
	Mag := Mag + Res.DirectionRatios[i] * Res.DirectionRatios[i];
	END_REPEAT;
	IF (Mag > 0.0) THEN
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Res, SQRT(Mag));
	ELSE
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Arg1, 0.0);
	END_IF;
	RETURN(Result);
	END;
	END_IF;
	END_FUNCTION

曲线维数
(IfcCurveDim)
	FUNCTION IfcCurveDim
	(Curve : IfcCurve)
	: IfcDimensionCount;
	
	IF ('IFCGEOMETRYRESOURCE.IFCLINE' IN TYPEOF(Curve))
	THEN RETURN(Curve\IfcLine.Pnt.Dim);
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCCONIC' IN TYPEOF(Curve))
	THEN RETURN(Curve\IfcConic.Position.Dim);
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCPOLYLINE' IN TYPEOF(Curve))
	THEN RETURN(Curve\IfcPolyline.Points[1].Dim);
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCTRIMMEDCURVE' IN TYPEOF(Curve))
	THEN RETURN(IfcCurveDim(Curve\IfcTrimmedCurve.BasisCurve));
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCCOMPOSITECURVE' IN TYPEOF(Curve))
	THEN RETURN(Curve\IfcCompositeCurve.Segments[1].Dim);
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCBSPLINECURVE' IN TYPEOF(Curve))
	THEN RETURN(Curve\IfcBSplineCurve.ControlPointsList[1].Dim);
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCOFFSETCURVE2D' IN TYPEOF(Curve))
	THEN RETURN(2);
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCOFFSETCURVE3D' IN TYPEOF(Curve))
	THEN RETURN(3);
	END_IF;
	IF ('IFCGEOMETRYRESOURCE.IFCPCURVE' IN TYPEOF(Curve))
	THEN RETURN(3);
	END_IF;
	RETURN (?);
	END_FUNCTION

续表 D.9.3

函数	EXPRESS 描述
曲线正权值 (IfcCurveWeights Positive)	FUNCTION IfcCurveWeightsPositive (B: IfcRationalBSplineCurveWithKnots) : BOOLEAN; LOCAL Result : BOOLEAN := TRUE; END_LOCAL; REPEAT i := 0 TO B.UpperIndexOnControlPoints; IF B.Weights[i] <= 0.0 THEN Result := FALSE; RETURN(Result); END_IF; END_REPEAT; RETURN(Result); END_FUNCTION

点积
(IfcDotProduct)
	FUNCTION IfcDotProduct
	(Arg1, Arg2 : IfcDirection)
	: REAL;
	LOCAL
	Scalar : REAL;
	Vec1, Vec2 : IfcDirection;
	Ndim : INTEGER;
	END_LOCAL;
	
	IF NOT EXISTS (Arg1) OR NOT EXISTS (Arg2) THEN
	Scalar := ?;
	ELSE
	IF (Arg1.Dim <> Arg2.Dim) THEN
	Scalar := ?;
	ELSE
	BEGIN
	Vec1 := IfcNormalise(Arg1);
	Vec2 := IfcNormalise(Arg2);
	Ndim := Arg1.Dim;
	Scalar := 0.0;
	REPEAT i := 1 TO Ndim;
	Scalar := Scalar + Vec1.DirectionRatios[i] * Vec2.DirectionRatios[i];
	END_REPEAT;
	END;
	END_IF;
	END_IF;
	RETURN (Scalar);
	END_FUNCTION

第一投影轴
(IfcFirstProjAxis)
	FUNCTION IfcFirstProjAxis
	(ZAxis, Arg : IfcDirection) : IfcDirection;
	LOCAL
	XAxis : IfcDirection;
	V : IfcDirection;
	Z : IfcDirection;
	XVec : IfcVector;
	END_LOCAL;
	
	IF (NOT EXISTS(ZAxis)) THEN
	RETURN (?) ;
	ELSE
	Z := IfcNormalise(ZAxis);
	IF NOT EXISTS(Arg) THEN
	IF (Z.DirectionRatios <> [1.0,0.0,0.0]) THEN

续表 D.9.3

函数	EXPRESS 描述

第一投影轴
(IfcFirstProjAxis)
	V := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([1.0,0.0,0.0]);
	ELSE
	V := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0,1.0,0.0]);
	END_IF;
	ELSE
	IF (Arg.Dim <> 3) THEN
	RETURN (?) ;
	END_IF;
	IF ((IfcCrossProduct(Arg,Z).Magnitude) = 0.0) THEN
	RETURN (?);
	ELSE
	V := IfcNormalise(Arg);
	END_IF;
	END_IF;
	XVec := IfcScalarTimesVector(IfcDotProduct(V, Z), Z);
	XAxis := IfcVectorDifference(V, XVec).Orientation;
	XAxis := IfcNormalise(XAxis);
	END_IF;
	RETURN(XAxis);
	END_FUNCTION

取基曲面
(IfcGetBasisSurface)
	FUNCTION IfcGetBasisSurface
	(C : IfcCurveOnSurface) : SET[0:2] OF IfcSurface;
	
	LOCAL
	Surfs : SET[0:2] OF IfcSurface;
	N : INTEGER;
	END_LOCAL;
	
	Surfs := [];
	IF'IFCGEOMETRYRESOURCE.IFCPCURVE'IN TYPEOF (C) THEN
	Surfs := [C\IfcPCurve.BasisSurface];
	ELSE
	IF'IFCGEOMETRYRESOURCE.IFCCOMPOSITECURVEONSURFACE'IN TYPEOF (C) THEN
	
	(* For an IfcCompositeCurveOnSurface the BasisSurface is the intersection
	of the BasisSurface of all the segments *)
	
	N := SIZEOF(C\IfcCompositeCurve.Segments);
	Surfs := IfcGetBasisSurface(C\IfcCompositeCurve.Segments[1].ParentCurve);
	
	IF N > 1 THEN
	REPEAT i := 2 TO N;
	Surfs := Surfs * IfcGetBasisSurface(C\IfcCompositeCurve.Segments[1].ParentCurve);
	END_REPEAT;
	END_IF;
	END_IF;
	END_IF;
	RETURN(Surfs);
	END_FUNCTION

列表到数组
(IfcListToArray)
	FUNCTION IfcListToArray
	(Lis : LIST [0:?] OF GENERIC : T;
	Low,U : INTEGER) : ARRAY OF GENERIC : T;
	LOCAL
	N : INTEGER;
	Res : ARRAY [Low:U] OF GENERIC : T;
	END_LOCAL;
	
	N := SIZEOF(Lis);
	IF (N <> (U−Low +1)) THEN
	RETURN(?);
	ELSE
	Res := [Lis[1] : N];
	REPEAT i := 2 TO N;
	Res[Low+i−1] := Lis[i];
	END_REPEAT;
	RETURN(Res);
	END_IF;
	END_FUNCTION

续表 D.9.3

函数	EXPRESS 描述

生成数组的数组
(IfcMakeArray
OfArray)
	FUNCTION IfcMakeArrayOfArray
	(Lis : LIST[1:?] OF LIST [1:?] OF GENERIC : T;
	Low1, U1, Low2, U2 : INTEGER):
	ARRAY [Low1:U1] OF ARRAY [Low2:U2] OF GENERIC : T;
	
	LOCAL
	Res : ARRAY[Low1:U1] OF ARRAY [Low2:U2] OF GENERIC : T;
	END_LOCAL;
	
	(* Check input dimensions for consistency *)
	IF (U1−Low1+1) <> SIZEOF(Lis) THEN
	RETURN (?);
	END_IF;
	IF (U2 − Low2 + 1) <> SIZEOF(Lis[1]) THEN
	RETURN (?) ;
	END_IF;
	
	(* Initialise Res with values from Lis[1] *)
	Res :=[IfcListToArray(Lis[1], Low2, U2) : (U1−Low1 + 1)];
	REPEAT i := 2 TO HIINDEX(Lis);
	IF (U2−Low2+1) <> SIZEOF(Lis[i]) THEN
	RETURN (?);
	END_IF;
	Res[Low1+i−1] := IfcListToArray(Lis[i], Low2, U2);
	END_REPEAT;
	RETURN (Res);
	END_FUNCTION

正则化
(IfcNormalise)
	FUNCTION IfcNormalise
	(Arg : IfcVectorOrDirection)
	: IfcVectorOrDirection;
	LOCAL
	Ndim : INTEGER;
	V : IfcDirection
	:= IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([1.,0.]);
	Vec : IfcVector
	:= IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector (
	IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([1.,0.]), 1.);
	Mag : REAL;
	Result : IfcVectorOrDirection
	:= V;
	END_LOCAL;
	
	IF NOT EXISTS (Arg) THEN
	RETURN (?);
	ELSE
	IF'IFCGEOMETRYRESOURCE. IFCVECTOR' IN TYPEOF(Arg) THEN
	BEGIN
	Ndim := Arg\IfcVector. Dim;
	V. DirectionRatios := Arg\IfcVector. Orientation. DirectionRatios;
	Vec. Magnitude := Arg\IfcVector. Magnitude;
	Vec. Orientation := V;
	IF Arg\IfcVector. Magnitude = 0.0 THEN
	RETURN(?);
	ELSE
	Vec. Magnitude := 1.0;
	END_IF;
	END;
	ELSE
	BEGIN
	Ndim := Arg\IfcDirection. Dim;

续表 D.9.3

函数	EXPRESS 描述

正则化
(IfcNormalise)
	V. DirectionRatios := Arg\IfcDirection. DirectionRatios;
	END;
	END_IF;
	
	Mag := 0.0;
	REPEAT i := 1 TO Ndim;
	Mag := Mag + V. DirectionRatios[i] * V. DirectionRatios[i];
	END_REPEAT;
	IF Mag > 0.0 THEN
	Mag := SQRT(Mag);
	REPEAT i := 1 TO Ndim;
	V. DirectionRatios[i] := V. DirectionRatios[i]/Mag;
	END_REPEAT;
	IF'IFCGEOMETRYRESOURCE. IFCVECTOR'IN TYPEOF(arg) THEN
	Vec. Orientation := V;
	Result := Vec;
	ELSE
	Result := V;
	END_IF;
	ELSE
	RETURN(?);
	END_IF;
	END_IF;
	RETURN (Result);
	END_FUNCTION

正交补
(IfcOrthogonal Complement)
	FUNCTION IfcOrthogonalComplement
	(Vec : IfcDirection)
	: IfcDirection;
	LOCAL
	Result : IfcDirection ;
	END_LOCAL;
	IF NOT EXISTS (Vec) OR (Vec. Dim <> 2) THEN
	RETURN(?);
	ELSE
	Result := IfcRepresentationItem ( ) || IfcGeometricRepresentationItem ( ) || IfcDirection ([-Vec. DirectionRatios[2], Vec. DirectionRatios[1]]);
	RETURN(Result);
	END_IF;
	END_FUNCTION

同轴 2 方位类型 (IfcSameAxis2 Placement)	FUNCTION IfcSameAxis2Placement (ap1, ap2 : IfcAxis2Placement; Epsilon : REAL) : LOGICAL ; RETURN (IfcSameDirection(ap1. P[1],ap2. P[1],Epsilon) AND IfcSameDirection(ap1. P[2],ap2. P[2],Epsilon) AND IfcSameCartesianPoint(ap1. Location,ap1. Location,Epsilon)); END_FUNCTION

同笛卡尔点
(IfcSameCartesian Point)
	FUNCTION IfcSameCartesianPoint
	(cp1, cp2 : IfcCartesianPoint; Epsilon : REAL)
	: LOGICAL;
	
	LOCAL
	cp1x : REAL := cp1. Coordinates[1];
	cp1y : REAL := cp1. Coordinates[2];
	cp1z : REAL := 0;
	cp2x : REAL := cp2. Coordinates[1];
	cp2y : REAL := cp2. Coordinates[2];
	cp2z : REAL := 0;

续表 D.9.3

函数	EXPRESS 描述

同笛卡尔点
(IfcSameCartesian Point)
	END_LOCAL;
	
	IF (SIZEOF(cp1.Coordinates) > 2) THEN
	cp1z := cp1.Coordinates[3];
	END_IF;
	
	IF (SIZEOF(cp2.Coordinates) > 2) THEN
	cp2z := cp2.Coordinates[3];
	END_IF;
	
	RETURN (IfcSameValue(cp1x,cp2x,Epsilon) AND
	IfcSameValue(cp1y,cp2y,Epsilon) AND
	IfcSameValue(cp1z,cp2z,Epsilon));
	END_FUNCTION

同方向
(IfcSameDirection)
	FUNCTION IfcSameDirection
	(dir1, dir2 : IfcDirection; Epsilon : REAL)
	: LOGICAL;
	LOCAL
	dir1x : REAL := dir1.DirectionRatios[1];
	dir1y : REAL := dir1.DirectionRatios[2];
	dir1z : REAL := 0;
	dir2x : REAL := dir2.DirectionRatios[1];
	dir2y : REAL := dir2.DirectionRatios[2];
	dir2z : REAL := 0;
	END_LOCAL;
	
	IF (SIZEOF(dir1.DirectionRatios) > 2) THEN
	dir1z := dir1.DirectionRatios[3];
	END_IF;
	
	IF (SIZEOF(dir2.DirectionRatios) > 2) THEN
	dir2z := dir2.DirectionRatios[3];
	END_IF;
	
	RETURN (IfcSameValue(dir1x,dir2x,Epsilon) AND
	IfcSameValue(dir1y,dir2y,Epsilon) AND
	IfcSameValue(dir1z,dir2z,Epsilon));
	
	END_FUNCTION

等值 (IfcSameValue)	FUNCTION IfcSameValue (Value1, Value2 : REAL; Epsilon : REAL) : LOGICAL; LOCAL ValidEps : REAL; DefaultEps : REAL := 0.000001; END_LOCAL; ValidEps := NVL(Epsilon, DefaultEps); RETURN ((Value1 + ValidEps > Value2) AND (Value1 < Value2 + ValidEps)); END_FUNCTION
标量乘矢量 (IfcScalarTimesVector)	FUNCTION IfcScalarTimesVector (Scalar : REAL; Vec : IfcVectorOrDirection) : IfcVector; LOCAL V : IfcDirection; Mag : REAL; Result : IfcVector; END_LOCAL; IF NOT EXISTS (Scalar) OR NOT EXISTS (Vec) THEN

续表 D.9.3

函数	EXPRESS 描述

标量乘矢量
(IfcScalarTimesVector)
	RETURN (?) ;
	ELSE
	IF 'IFCGEOMETRYRESOURCE. IFCVECTOR' IN TYPEOF (Vec) THEN
	V := Vec\IfcVector. Orientation;
	Mag := Scalar * Vec\IfcVector. Magnitude;
	ELSE
	V := Vec;
	Mag := Scalar;
	END_IF;
	IF (Mag < 0.0) THEN
	REPEAT i := 1 TO SIZEOF(V. DirectionRatios);
	V. DirectionRatios[i] := -V. DirectionRatios[i];
	END_REPEAT;
	Mag := -Mag;
	END_IF;
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(IfcNormalise (V), Mag);
	END_IF;
	RETURN (Result);
	END_FUNCTION

第二投影轴
(IfcSecondProjAxis)
	FUNCTION IfcSecondProjAxis
	(ZAxis, XAxis, Arg: IfcDirection)
	: IfcDirection;
	LOCAL
	YAxis : IfcVector;
	V : IfcDirection;
	Temp : IfcVector;
	END_LOCAL;
	
	IF NOT EXISTS(Arg) THEN
	V := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0,1.0,0.0]);
	ELSE
	V := Arg;
	END_IF;
	Temp := IfcScalarTimesVector(IfcDotProduct(V, ZAxis), ZAxis);
	YAxis := IfcVectorDifference(V, Temp);
	Temp := IfcScalarTimesVector(IfcDotProduct(V, XAxis), XAxis);
	YAxis := IfcVectorDifference(YAxis, Temp);
	YAxis := IfcNormalise(YAxis);
	RETURN(YAxis. Orientation);
	END_FUNCTION

曲面正权值 (IfcSurfaceWeights Positive)	FUNCTION IfcSurfaceWeightsPositive (B: IfcRationalBSplineSurfaceWithKnots) : BOOLEAN; LOCAL Result : BOOLEAN := TRUE; END_LOCAL; REPEAT i := 0 TO B\IfcBSplineSurface. UUpper; REPEAT j := 0 TO B\IfcBSplineSurface. VUpper; IF (B. Weights[i][j] <= 0.0) THEN Result := FALSE; RETURN(Result); END_IF; END_REPEAT; END_REPEAT; RETURN(Result); END_FUNCTION

续表 D.9.3

函数	EXPRESS 描述

矢量差
(IfcVectorDifference)
	FUNCTION IfcVectorDifference
	(Arg1, Arg2 : IfcVectorOrDirection)
	: IfcVector;
	LOCAL
	Result : IfcVector;
	Res, Vec1, Vec2 : IfcDirection;
	Mag, Mag1, Mag2 : REAL;
	Ndim : INTEGER;
	END_LOCAL;
	
	IF ((NOT EXISTS (Arg1)) OR (NOT EXISTS (Arg2))) OR (Arg1.Dim <> Arg2.Dim) THEN
	RETURN (?);
	ELSE
	BEGIN
	IF'IFCGEOMETRYRESOURCE.IFCVECTOR' IN TYPEOF(Arg1) THEN
	Mag1 := Arg1\IfcVector.Magnitude;
	Vec1 := Arg1\IfcVector.Orientation;
	ELSE
	Mag1 := 1.0;
	Vec1 := Arg1;
	END_IF;
	IF'IFCGEOMETRYRESOURCE.IFCVECTOR' IN TYPEOF(Arg2) THEN
	Mag2 := Arg2\IfcVector.Magnitude;
	Vec2 := Arg2\IfcVector.Orientation;
	ELSE
	Mag2 := 1.0;
	Vec2 := Arg2;
	END_IF;
	Vec1 := IfcNormalise (Vec1);
	Vec2 := IfcNormalise (Vec2);
	Ndim := SIZEOF(Vec1.DirectionRatios);
	Mag := 0.0;
	Res := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0:Ndim]);
	
	REPEAT i := 1 TO Ndim;
	Res.DirectionRatios[i] := Mag1 * Vec1.DirectionRatios[i] - Mag2 * Vec2.DirectionRatios[i];
	Mag := Mag + (Res.DirectionRatios[i] * Res.DirectionRatios[i]);
	END_REPEAT;
	
	IF (Mag > 0.0) THEN
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Res, SQRT(Mag));
	ELSE
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Vec1, 0.0);
	END_IF;
	END;
	END_IF;
	RETURN (Result);
	END_FUNCTION

矢量和 (IfcVectorSum)	FUNCTION IfcVectorSum (Arg1, Arg2 : IfcVectorOrDirection) : IfcVector; LOCAL Result : IfcVector; Res, Vec1, Vec2 : IfcDirection; Mag, Mag1, Mag2 : REAL; Ndim : INTEGER; END_LOCAL; IF ((NOT EXISTS (Arg1)) OR (NOT EXISTS (Arg2))) OR (Arg1.Dim <> Arg2.Dim) THEN

续表 D.9.3

函数	EXPRESS 描述

矢量和
(IfcVectorSum)
	RETURN (?) ;
	ELSE
	BEGIN
	IF'IFCGEOMETRYRESOURCE. IFCVECTOR'IN TYPEOF(Arg1) THEN
	Mag1 := Arg1\IfcVector. Magnitude;
	Vec1 := Arg1\IfcVector. Orientation;
	ELSE
	Mag1 := 1.0;
	Vec1 := Arg1;
	END_IF;
	IF'IFCGEOMETRYRESOURCE. IFCVECTOR'IN TYPEOF(Arg2) THEN
	Mag2 := Arg2\IfcVector. Magnitude;
	Vec2 := Arg2\IfcVector. Orientation;
	ELSE
	Mag2 := 1.0;
	Vec2 := Arg2;
	END_IF;
	Vec1 := IfcNormalise (Vec1);
	Vec2 := IfcNormalise (Vec2);
	Ndim := SIZEOF(Vec1. DirectionRatios);
	Mag := 0.0;
	Res := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.0:Ndim]);
	
	REPEAT i := 1 TO Ndim;
	Res. DirectionRatios[i] := Mag1 * Vec1. DirectionRatios[i] + Mag2 * Vec2. DirectionRatios[i];
	Mag := Mag + (Res. DirectionRatios[i] * Res. DirectionRatios[i]);
	END_REPEAT;
	
	IF (Mag > 0.0) THEN
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Res, SQRT(Mag));
	ELSE
	Result := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcVector(Vec1, 0.0);
	END_IF;
	END;
	END_IF;
	RETURN (Result);
	END_FUNCTION

D.10 材 料 资 源

D.10.1 材料资源类型的 EXPRESS 描述应按表 D.10.1 的规定采用。

表 D.10.1 材料资源类型的 EXPRESS 描述

类型	EXPRESS 描述
基点参考 (IfcCardinalPoint Reference)	TYPE IfcCardinalPointReference = INTEGER; WHERE GreaterThanZero : SELF > 0 END_TYPE
方向指向枚举 (IfcDirectionSense Enum)	TYPE IfcDirectionSenseEnum = ENUMERATION OF (POSITIVE, NEGATIVE); END_TYPE
层集方向枚举 (IfcLayerSetDirection Enum)	TYPE IfcLayerSetDirectionEnum = ENUMERATION OF (AXIS1, AXIS2, AXIS3); END_TYPE

续表 D.10.1

类型	EXPRESS 描述
材料选择 (IfcMaterialSelect)	TYPE IfcMaterialSelect = SELECT (IfcMaterialUsageDefinition, IfcMaterialDefinition, IfcMaterialList); END_TYPE

D.10.2 材料资源实体的 EXPRESS 描述应按表 D.10.2 的规定采用。

表 D.10.2 材料资源实体的 EXPRESS 描述

实体	EXPRESS 描述
材料 (IfcMaterial)	ENTITY IfcMaterial SUBTYPE OF IfcMaterialDefinition; Name : IfcLabel; Description : OPTIONAL IfcText; Category : OPTIONAL IfcLabel; INVERSE HasRepresentation : SET [0:1] OF IfcMaterialDefinitionRepresentation FOR RepresentedMaterial; IsRelatedWith : SET OF IfcMaterialRelationship FOR RelatedMaterials; RelatesTo : SET [0:1] OF IfcMaterialRelationship FOR RelatingMaterial; END_ENTITY
材料分类关系 (IfcMaterial Classification Relationship)	ENTITY IfcMaterialClassificationRelationship; MaterialClassifications : SET [1:?] OF IfcClassificationSelect; ClassifiedMaterial : IfcMaterial; END_ENTITY
材料成分 (IfcMaterial Constituent)	ENTITY IfcMaterialConstituent SUBTYPE OF IfcMaterialDefinition; Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; Material : IfcMaterial; Fraction : OPTIONAL IfcNormalisedRatioMeasure; Category : OPTIONAL IfcLabel; INVERSE ToMaterialConstituentSet : IfcMaterialConstituentSet FOR MaterialConstituents; END_ENTITY
材料成分集 (IfcMaterial ConstituentSet)	ENTITY IfcMaterialConstituentSet SUBTYPE OF IfcMaterialDefinition; Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; MaterialConstituents : OPTIONAL SET [1:?] OF IfcMatcrialConstituent; END_ENTITY
材料定义 (IfcMaterialDefinition)	ENTITY IfcMaterialDefinition ABSTRACT SUPERTYPE OF(ONEOF(IfcMaterial, IfcMaterialConstituent, IfcMaterialConstituentSet, IfcMaterialLayer, IfcMaterialLayerSet, IfcMaterialProfile, IfcMaterialProfileSet)); INVERSE AssociatedTo : SET [0:?] OF IfcRelAssociatesMaterial FOR RelatingMaterial; HasExternalReferences : SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; HasProperties : SET OF IfcMaterialProperties FOR Material; END_ENTITY
材料层 (IfcMaterialLayer)	ENTITY IfcMaterialLayer SUPERTYPE OF(IfcMaterialLayerWithOffsets) SUBTYPE OF IfcMaterialDefinition; Material : OPTIONAL IfcMaterial; LayerThickness : IfcNonNegativeLengthMeasure; IsVentilated : OPTIONAL IfcLogical; Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; Category : OPTIONAL IfcLabel; Priority : OPTIONAL IfcNormalisedRatioMeasure; INVERSE ToMaterialLayerSet : IfcMaterialLayerSet FOR MaterialLayers; END_ENTITY

续表 D.10.2

实体	EXPRESS 描述
材料层集 (IfcMaterialLayerSet)	ENTITY IfcMaterialLayerSet SUBTYPE OF IfcMaterialDefinition; MaterialLayers : LIST [1:?] OF IfcMaterialLayer; LayerSetName : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; DERIVE TotalThickness : IfcLengthMeasure := IfcMlsTotalThickness(SELF); END_ENTITY
材料层集用法 (IfcMaterialLayer SetUsage)	ENTITY IfcMaterialLayerSetUsage SUBTYPE OF IfcMaterialUsageDefinition; ForLayerSet : IfcMaterialLayerSet; LayerSetDirection : IfcLayerSetDirectionEnum; DirectionSense : IfcDirectionSenseEnum; OffsetFromReferenceLine : IfcLengthMeasure; ReferenceExtent : OPTIONAL IfcPositiveLengthMeasure; END_ENTITY
偏置材料层集 (IfcMaterialLayer WithOffsets)	ENTITY IfcMaterialLayerWithOffsets SUBTYPE OF IfcMaterialLayer; OffsetDirection : IfcLayerSetDirectionEnum; OffsetValues : ARRAY [1:2] OF IfcLengthMeasure; END_ENTITY
材料列表 (IfcMaterialList)	ENTITY IfcMaterialList; Materials : LIST [1:?] OF IfcMaterial; END_ENTITY
材料截面 (IfcMaterialProfile)	ENTITY IfcMaterialProfile SUPERTYPE OF(IfcMaterialProfileWithOffsets) SUBTYPE OF IfcMaterialDefinition; Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; Material : OPTIONAL IfcMaterial; Profile : IfcProfileDef; Priority : OPTIONAL IfcNormalisedRatioMeasure; Category : OPTIONAL IfcLabel; INVERSE ToMaterialProfileSet : IfcMaterialProfileSet FOR MaterialProfiles; END_ENTITY
材料截面集 (IfcMaterialProfileSet)	ENTITY IfcMaterialProfileSet SUBTYPE OF IfcMaterialDefinition; Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; MaterialProfiles : LIST [1:?] OF IfcMaterialProfile; CompositeProfile : OPTIONAL IfcCompositeProfileDef; END_ENTITY
材料截面集用法 (IfcMaterialProfile SetUsage)	ENTITY IfcMaterialProfileSetUsage SUPERTYPE OF(IfcMaterialProfileSetUsageTapering) SUBTYPE OF IfcMaterialUsageDefinition; ForProfileSet : IfcMaterialProfileSet; CardinalPoint : OPTIONAL IfcCardinalPointReference; ReferenceExtent : OPTIONAL IfcPositiveLengthMeasure; END_ENTITY
锥形材料截面 层集用法 (IfcMaterialProfile SetUsageTapering)	ENTITY IfcMaterialProfileSetUsageTapering SUBTYPE OF IfcMaterialProfileSetUsage; ForProfileEndSet : IfcMaterialProfileSet; CardinalEndPoint : OPTIONAL IfcCardinalPointReference; END_ENTITY

续表 D.10.2

实体	EXPRESS 描述
偏置材料截面（IfcMaterialProfileWithOffsets）	ENTITY IfcMaterialProfileWithOffsets SUBTYPE OF IfcMaterialProfile; OffsetValues : ARRAY [1:2] OF IfcLengthMeasure; END_ENTITY
材料属性（IfcMaterialProperties）	ENTITY IfcMaterialProperties SUBTYPE OF IfcExtendedProperties; Material : IfcMaterialDefinition; END_ENTITY
材料关系（IfcMaterialRelationship）	ENTITY IfcMaterialRelationship SUBTYPE OF IfcResourceLevelRelationship; RelatingMaterial : IfcMaterial; RelatedMaterials : SET [1:?] OF IfcMaterial; EXPRESSion : OPTIONAL IfcLabel; END_ENTITY
材料用法定义（IfcMaterialUsageDefinition）	ENTITY IfcMaterialUsageDefinition ABSTRACT SUPERTYPE OF(ONEOF(IfcMaterialLayerSetUsage, IfcMaterialProfileSetUsage)); INVERSE AssociatedTo : SET [1:?] OF IfcRelAssociatesMaterial FOR RelatingMaterial; END_ENTITY

D.10.3 材料资源应采用层集总厚度函数，函数的 EXPRESS 描述应符合下列规定：

```
FUNCTION IfcMlsTotalThickness
(LayerSet : IfcMaterialLayerSet) : IfcLengthMeasure;
  LOCAL
    Max : IfcLengthMeasure := LayerSet.MaterialLayers[1].LayerThickness;
  END_LOCAL;
  IF SIZEOF(LayerSet.MaterialLayers) > 1 THEN
    REPEAT i := 2 TO HIINDEX(LayerSet.MaterialLayers);
      Max := Max + LayerSet.MaterialLayers[i].LayerThickness;
    END_REPEAT;
  END_IF;
  RETURN (Max);
END_FUNCTION
```

D.11 度 量 资 源

D.11.1 度量资源类型的 EXPRESS 描述应按表 D.11.1 的规定采用。

表 D.11.1 度量资源类型的 EXPRESS 描述

类型	EXPRESS 描述
放射性剂量度量（IfcAbsorbedDoseMeasure）	TYPE IfcAbsorbedDoseMeasure = REAL; END_TYPE
加速度度量（IfcAccelerationMeasure）	TYPE IfcAccelerationMeasure = REAL; END_TYPE
物质量度量（IfcAmountOfSubstanceMeasure）	TYPE IfcAmountOfSubstanceMeasure = REAL; END_TYPE

续表 D.11.1

类型	EXPRESS 描述
角速度度量（IfcAngularVelocityMeasure）	TYPE IfcAngularVelocityMeasure = REAL; END_TYPE
二维密度度量（IfcAreaDensityMeasure）	TYPE IfcAreaDensityMeasure = REAL; END_TYPE
面积度量（IfcAreaMeasure）	TYPE IfcAreaMeasure = REAL; END_TYPE
布尔（IfcBoolean）	TYPE IfcBoolean = BOOLEAN; END_TYPE
复数（IfcComplexNumber）	TYPE IfcComplexNumber = ARRAY [1:2] OF REAL; END_TYPE
合成平面角度度量（IfcCompoundPlaneAngleMeasure）	TYPE IfcCompoundPlaneAngleMeasure = LIST [3:4] OF INTEGER; WHERE MinutesInRange : ABS(SELF[2]) < 60 SecondsInRange : ABS(SELF[3]) < 60 MicrosecondsInRange : (SIZEOF(SELF) = 3) OR (ABS(SELF[4]) < 1000000) ConsistentSign : ((SELF[1] >= 0) AND (SELF[2] >= 0) AND (SELF[3] >= 0) AND ((SIZEOF(SELF) = 3) OR (SELF[4] >= 0))) OR ((SELF[1] <= 0) AND (SELF[2] <= 0) AND (SELF[3] <= 0) AND ((SIZEOF(SELF) = 3) OR (SELF[4] <= 0))) END_TYPE
环境相关度量（IfcContextDependentMeasure）	TYPE IfcContextDependentMeasure = REAL; END_TYPE
计数度量（IfcCountMeasure）	TYPE IfcCountMeasure = NUMBER; END_TYPE
曲率度量（IfcCurvatureMeasure）	TYPE IfcCurvatureMeasure = REAL; END_TYPE
描述度量（IfcDescriptiveMeasure）	TYPE IfcDescriptiveMeasure = STRING; END_TYPE
剂量等价物度量（IfcDoseEquivalentMeasure）	TYPE IfcDoseEquivalentMeasure = REAL; END_TYPE
动力黏性度量（IfcDynamicViscosityMeasure）	TYPE IfcDynamicViscosityMeasure = REAL; END_TYPE
电容度量（IfcElectricCapacitanceMeasure）	TYPE IfcElectricCapacitanceMeasure = REAL; END_TYPE
电荷度量（IfcElectricChargeMeasure）	TYPE IfcElectricChargeMeasure = REAL; END_TYPE
电导率度量（IfcElectricConductanceMeasure）	TYPE IfcElectricConductance Measure = REAL; END_TYPE
电流度量（IfcElectricCurrentMeasure）	TYPE IfcElectricCurrentMeasure = REAL; END_TYPE
电阻度量（IfcElectricResistanceMeasure）	TYPE IfcElectricResistanceMeasure = REAL; END_TYPE
电压度量（IfcElectricVoltageMeasure）	TYPE IfcElectricVoltageMeasure = REAL; END_TYPE

续表 D.11.1

类型	EXPRESS 描述
能量度量 (IfcEnergyMeasure)	TYPE IfcEnergyMeasure = REAL; END_TYPE
力度量 (IfcForceMeasure)	TYPE IfcForceMeasure = REAL; END_TYPE
频率度量 (IfcFrequency Measure)	TYPE IfcFrequencyMeasure = REAL; END_TYPE
热流量密度度量 (IfcHeatFluxDensity Measure)	TYPE IfcHeatFluxDensityMeasure = REAL; END_TYPE
热值度量 (IfcHeatingValue Measure)	TYPE IfcHeatingValueMeasure = REAL; WHERE WR1 : SELF > 0 END_TYPE
标识符 (IfcIdentifier)	TYPE IfcIdentifier = STRING (255); END_TYPE
照明度量 (IfcIlluminance Measure)	TYPE IfcIlluminanceMeasure = REAL; END_TYPE
热感应系数度量 (IfcInductance Measure)	TYPE IfcInductanceMeasure = REAL; END_TYPE
整数 (IfcInteger)	TYPE IfcInteger = INTEGER; END_TYPE
整数速率度量 (IfcIntegerCount RateMeasure)	TYPE IfcIntegerCountRateMeasure = INTEGER; END_TYPE
离子浓度度量 (IfcIonConcentration Measure)	TYPE IfcIonConcentrationMeasure = REAL; END_TYPE
等温湿度度量 (IfcIsothermalMoisture CapacityMeasure)	TYPE IfcIsothermalMoistureCapacityMeasure = REAL; END_TYPE
运动黏性度量 (IfcKinematicViscosity Measure)	TYPE IfcKinematicViscosityMeasure = REAL; END_TYPE
标签 (IfcLabel)	TYPE IfcLabel = STRING (255); END_TYPE
长度度量 (IfcLengthMeasure)	TYPE IfcLengthMeasure = REAL; END_TYPE
线荷载度量 (IfcLinearForce Measure)	TYPE IfcLinearForceMeasure = REAL; END_TYPE
线性力矩度量 (IfcLinearMoment Measure)	TYPE IfcLinearMomentMeasure = REAL; END_TYPE
线刚度度量 (IfcLinearStiffness Measure)	TYPE IfcLinearStiffnessMeasure = REAL; END_TYPE
直线速度度量 (IfcLinearVelocity Measure)	TYPE IfcLinearVelocityMeasure = REAL; END_TYPE
逻辑 (IfcLogical)	TYPE IfcLogical = LOGICAL; END_TYPE

续表 D.11.1

类型	EXPRESS 描述
光通量度量（IfcLuminousFlux Measure）	TYPE IfcLuminousFluxMeasure = REAL; END_TYPE
光强分布度量（IfcLuminousIntensity DistributionMeasure）	TYPE IfcLuminousIntensityDistributionMeasure = REAL; END_TYPE
光强度量（IfcLuminousIntensity Measure）	TYPE IfcLuminousIntensityMeasure = REAL; END_TYPE
磁感应强度度量（IfcMagneticFlux DensityMeasure）	TYPE IfcMagneticFluxDensityMeasure = REAL; END_TYPE
磁通量度量（IfcMagneticFlux Measure）	TYPE IfcMagneticFluxMeasure = REAL; END_TYPE
密度度量（IfcMassDensity Measure）	TYPE IfcMassDensityMeasure = REAL; END_TYPE
流速度量（IfcMassFlow RateMeasure）	TYPE IfcMassFlowRateMeasure = REAL; END_TYPE
质量度量（IfcMassMeasure）	TYPE IfcMassMeasure = REAL; END_TYPE
单位长度质量度量（IfcMassPerLength Measure）	TYPE IfcMassPerLengthMeasure = REAL; END_TYPE
弹性模量度量（IfcModulusOf ElasticityMeasure）	TYPE IfcModulusOfElasticityMeasure = REAL; END_TYPE
地基反应线性模量度量（IfcModulusOfLinear SubgradeReaction Measure）	TYPE IfcModulusOfLinearSubgradeReactionMeasure = REAL; END_TYPE
地基反应转动模量度量（IfcModulusOf Rotational SubgradeReaction Measure）	TYPE IfcModulusOfRotationalSubgradeReactionMeasure = REAL; END_TYPE
地基反力系数度量（IfcModulusOfSubgrade ReactionMeasure）	TYPE IfcModulusOfSubgradeReactionMeasure = REAL; END_TYPE
潮湿扩散率度量（IfcModulusOfSubgrade ReactionMeasure）	TYPE IfcMoistureDiffusivityMeasure = REAL; END_TYPE
分子重量度量（IfcMolecular WeightMeasure）	TYPE IfcMolecularWeightMeasure = REAL; END_TYPE
惯性矩度量（IfcMoment OfInertiaMeasure）	TYPE IfcMomentOfInertiaMeasure = REAL; END_TYPE
货币值度量（IfcMonetary Mcasurc）	TYPE IfcMonetaryMeasure = REAL; END_TYPE

续表 D.11.1

类型	EXPRESS 描述
非负长度度量 (IfcNonNegative LengthMeasure)	TYPE IfcNonNegativeLengthMeasure = IfcLengthMeasure; WHERE NotNegative : SELF >= 0 END_TYPE
正则比例度量 (IfcNormalised RatioMeasure)	TYPE IfcNormalisedRatioMeasure = IfcRatioMeasure; WHERE WR1 : {0.0 <= SELF <= 1.0} END_TYPE
数字度量 (IfcNumeric Measure)	TYPE IfcNumericMeasure = NUMBER; END_TYPE
参数值 (IfcParameterValue)	TYPE IfcParameterValue = REAL; END_TYPE
pH 值度量 (IfcPHMeasure)	TYPE IfcPHMeasure = REAL; WHERE WR21 : {0.0 <= SELF <= 14.0} END_TYPE
面荷载度量 (IfcPlanarForce Measure)	TYPE IfcPlanarForceMeasure = REAL; END_TYPE
平面角度度量 (IfcPlaneAngle Measure)	TYPE IfcPlaneAngleMeasure = REAL; END_TYPE
正长度度量 (IfcPositiveLength Measure)	TYPE IfcPositiveLengthMeasure = IfcLengthMeasure; WHERE WR1 : SELF > 0 END_TYPE
正平面角度度量 (IfcPositivePlane AngleMeasure)	TYPE IfcPositivePlaneAngleMeasure = IfcPlaneAngleMeasure; WHERE WR1 : SELF > 0 END_TYPE
正比例度量 (IfcPositiveRatio Measure)	TYPE IfcPositiveRatioMeasure = IfcRatioMeasure; WHERE WR1 : SELF > 0 END_TYPE
功率度量 (IfcPowerMeasure)	TYPE IfcPowerMeasure = REAL; END_TYPE
压强度量 (IfcPressure Measure)	TYPE IfcPressureMeasure = REAL; END_TYPE
反射性强度度量 (IfcRadioActivity Measure)	TYPE IfcRadioActivityMeasure = REAL; END_TYPE
比例度量 (IfcRatioMeasure)	TYPE IfcRatioMeasure = REAL; END_TYPE
实数 (IfcReal)	TYPE IfcReal = REAL; END_TYPE
转动频率度量 (IfcRotationalFrequency Measure)	TYPE IfcRotationalFrequencyMeasure = REAL; END_TYPE
转动质量度量 (IfcRotational MassMeasure)	TYPE IfcRotationalMassMeasure = REAL; END_TYPE
转动刚度度量 (IfcRotationalStiffness Measure)	TYPE IfcRotationalStiffnessMeasure = REAL; END_TYPE

续表 D.11.1

类型	EXPRESS 描述
截面积分度量（IfcSectionalAreaIntegralMeasure）	TYPE IfcSectionalAreaIntegralMeasure = REAL; END_TYPE
截面模量度量（IfcSectionModulusMeasure）	TYPE IfcSectionModulusMeasure = REAL; END_TYPE
剪切模量度量（IfcShearModulusMeasure）	TYPE IfcShearModulusMeasure = REAL; END_TYPE
立体角度度量（IfcSolidAngleMeasure）	TYPE IfcSolidAngleMeasure = REAL; END_TYPE
声功率级度量（IfcSoundPowerLevelMeasure）	TYPE IfcSoundPowerLevelMeasure = REAL; END_TYPE
声功率度量（IfcSoundPowerMeasure）	TYPE IfcSoundPowerMeasure = REAL; END_TYPE
声压级度量（IfcSoundPressureLevelMeasure）	TYPE IfcSoundPressureLevelMeasure = REAL; END_TYPE
声压度量（IfcSoundPressureMeasure）	TYPE IfcSoundPressureMeasure = REAL; END_TYPE
比热度量（IfcSpecificHeatCapacityMeasure）	TYPE IfcSpecificHeatCapacityMeasure = REAL; END_TYPE
温度梯度度量（IfcTemperatureGradientMeasure）	TYPE IfcTemperatureGradientMeasure = REAL; END_TYPE
温度变化率度量（IfcTemperatureRateOfChangeMeasure）	TYPE IfcTemperatureRateOfChangeMeasure = REAL; END_TYPE
文本（IfcText）	TYPE IfcText = STRING; END_TYPE
热吸收度量（IfcThermalAdmittanceMeasure）	TYPE IfcThermalAdmittanceMeasure = REAL; END_TYPE
导热性度量（IfcThermalConductivityMeasure）	TYPE IfcThermalConductivityMeasure = REAL; END_TYPE
热胀系数度量（IfcThermalExpansionCoefficientMeasure）	TYPE IfcThermalExpansionCoefficientMeasure = REAL; END_TYPE
热阻度量（IfcThermalResistanceMeasure）	TYPE IfcThermalResistanceMeasure = REAL; END_TYPE
热传导度量（IfcThermalTransmittanceMeasure）	TYPE IfcThermalTransmittanceMeasure = REAL; END_TYPE
热力学温度度量（IfcThermodynamicTemperatureMeasure）	TYPE IfcThermodynamicTemperatureMeasure = REAL; END_TYPE
时间度量（IfcTimeMeasure）	TYPE IfcTimeMeasure = REAL; END_TYPE

续表 D.11.1

类型	EXPRESS 描述
扭矩度量（IfcTorqueMeasure）	TYPE IfcTorqueMeasure = REAL; END_TYPE
蒸汽渗透度量（IfcVaporPermeabilityMeasure）	TYPE IfcVaporPermeabilityMeasure = REAL; END_TYPE
体积度量（IfcVolumeMeasure）	TYPE IfcVolumeMeasure = REAL; END_TYPE
体积流速度量（IfcVolumetricFlowRateMeasure）	TYPE IfcVolumetricFlowRateMeasure = REAL; END_TYPE
恒定翘曲度量（IfcWarpingConstantMeasure）	TYPE IfcWarpingConstantMeasure = REAL; END_TYPE
扭曲力矩度量（IfcWarpingMomentMeasure）	TYPE IfcWarpingMomentMeasure = REAL; END_TYPE
导出单位枚举（IfcDerivedUnitEnum）	TYPE IfcDerivedUnitEnum = ENUMERATION OF (ANGULARVELOCITYUNIT, AREADENSITYUNIT, COMPOUNDPLANEANGLEUNIT, DYNAMICVISCOSITYUNIT, HEATFLUXDENSITYUNIT, INTEGERCOUNTRATEUNIT, ISOTHERMALMOISTURECAPACITYUNIT, KINEMATICVISCOSITYUNIT, LINEARVELOCITYUNIT, MASSDENSITYUNIT, MASSFLOWRATEUNIT, MOISTUREDIFFUSIVITYUNIT, MOLECULARWEIGHTUNIT, SPECIFICHEATCAPACITYUNIT, THERMALADMITTANCEUNIT, THERMALCONDUCTANCEUNIT, THERMALRESISTANCEUNIT, THERMALTRANSMITTANCEUNIT, VAPORPERMEABILITYUNIT, VOLUMETRICFLOWRATEUNIT, ROTATIONALFREQUENCYUNIT, TORQUEUNIT, MOMENTOFINERTIAUNIT, LINEARMOMENTUNIT, LINEARFORCEUNIT, PLANARFORCEUNIT, MODULUSOFELASTICITYUNIT, SHEARMODULUSUNIT, LINEARSTIFFNESSUNIT, ROTATIONALSTIFFNESSUNIT, MODULUSOFSUBGRADEREACTIONUNIT, ACCELERATIONUNIT, CURVATUREUNIT, HEATINGVALUEUNIT, IONCONCENTRATIONUNIT, LUMINOUSINTENSITYDISTRIBUTIONUNIT, MASSPERLENGTHUNIT, MODULUSOFLINEARSUBGRADEREACTIONUNIT, MODULUSOFROTATIONALSUBGRADEREACTIONUNIT, PHUNIT, ROTATIONALMASSUNIT, SECTIONAREAINTEGRALUNIT,

续表 D.11.1

类型	EXPRESS 描述
导出单位枚举 (IfcDerivedUnit Enum)	SECTIONMODULUSUNIT, SOUNDPOWERLEVELUNIT, SOUNDPOWERUNIT, SOUNDPRESSURELEVELUNIT, SOUNDPRESSUREUNIT, TEMPERATUREGRADIENTUNIT, TEMPERATURERATEOFCHANGEUNIT, THERMALEXPANSIONCOEFFICIENTUNIT, WARPINGCONSTANTUNIT, WARPINGMOMENTUNIT, USERDEFINED); END_TYPE
SI 前缀 (IfcSIPrefix)	TYPE IfcSIPrefix = ENUMERATION OF (EXA, PETA, TERA, GIGA, MEGA, KILO, HECTO, DECA, DECI, CENTI, MILLI, MICRO, NANO, PICO, FEMTO, ATTO); END_TYPE
国际单位制单位名称 (IfcSIUnitName)	TYPE IfcSIUnitName = ENUMERATION OF (AMPERE, BECQUEREL, CANDELA, COULOMB, CUBIC_METRE, DEGREE_CELSIUS, FARAD, GRAM, GRAY, HENRY, HERTZ, JOULE, KELVIN, LUMEN, LUX, METRE, MOLE, NEWTON, OHM, PASCAL, RADIAN, SECOND, SIEMENS, SIEVERT, SQUARE_METRE, STERADIAN, TESLA, VOLT, WATT, WEBER); END_TYPE

续表 D.11.1

类型	EXPRESS 描述
单位枚举 (IfcUnitEnum)	TYPE IfcUnitEnum = ENUMERATION OF (ABSORBEDDOSEUNIT, AMOUNTOFSUBSTANCEUNIT, AREAUNIT, DOSEEQUIVALENTUNIT, ELECTRICCAPACITANCEUNIT, ELECTRICCHARGEUNIT, ELECTRICCONDUCTANCEUNIT, ELECTRICCURRENTUNIT, ELECTRICRESISTANCEUNIT, ELECTRICVOLTAGEUNIT, ENERGYUNIT, FORCEUNIT, FREQUENCYUNIT, ILLUMINANCEUNIT, INDUCTANCEUNIT, LENGTHUNIT, LUMINOUSFLUXUNIT, LUMINOUSINTENSITYUNIT, MAGNETICFLUXDENSITYUNIT, MAGNETICFLUXUNIT, MASSUNIT, PLANEANGLEUNIT, POWERUNIT, PRESSUREUNIT, RADIOACTIVITYUNIT, SOLIDANGLEUNIT, THERMODYNAMICTEMPERATUREUNIT, TIMEUNIT, VOLUMEUNIT, USERDEFINED); END_TYPE
导出度量值选择 (IfcDerivedMeasure Value)	TYPE IfcDerivedMeasureValue = SELECT (IfcVolumetricFlowRateMeasure, IfcThermalTransmittanceMeasure, IfcThermalResistanceMeasure, IfcThermalAdmittanceMeasure, IfcPressureMeasure, IfcPowerMeasure, IfcMassFlowRateMeasure, IfcMassDensityMeasure, IfcLinearVelocityMeasure, IfcKinematicViscosityMeasure, IfcIntegerCountRateMeasure, IfcHeatFluxDensityMeasure, IfcFrequencyMeasure, IfcEnergyMeasure, IfcElectricVoltageMeasure, IfcDynamicViscosityMeasure, IfcCompoundPlaneAngleMeasure, IfcAngularVelocityMeasure, IfcThermalConductivityMeasure, IfcMolecularWeightMeasure, IfcVaporPermeabilityMeasure, IfcMoistureDiffusivityMeasure, IfcIsothermalMoistureCapacityMeasure, IfcSpecificHeatCapacityMeasure, IfcMonetaryMeasure, IfcMagneticFluxDensityMeasure,

续表 D.11.1

类型	EXPRESS 描述
导出度量值选择（IfcDerivedMeasureValue）	IfcMagneticFluxMeasure， IfcLuminousFluxMeasure， IfcForceMeasure， IfcInductanceMeasure， IfcIlluminanceMeasure， IfcElectricResistanceMeasure， IfcElectricConductanceMeasure， IfcElectricChargeMeasure， IfcDoseEquivalentMeasure， IfcElectricCapacitanceMeasure， IfcAbsorbedDoseMeasure， IfcRadioActivityMeasure， IfcRotationalFrequencyMeasure， IfcTorqueMeasure， IfcAccelerationMeasure， IfcLinearForceMeasure， IfcLinearStiffnessMeasure， IfcModulusOfSubgradeReactionMeasure， IfcModulusOfElasticityMeasure， IfcMomentOfInertiaMeasure， IfcPlanarForceMeasure， IfcRotationalStiffnessMeasure， IfcShearModulusMeasure， IfcLinearMomentMeasure， IfcLuminousIntensityDistributionMeasure， IfcCurvatureMeasure， IfcMassPerLengthMeasure， IfcModulusOfLinearSubgradeReactionMeasure， IfcModulusOfRotationalSubgradeReactionMeasure， IfcRotationalMassMeasure， IfcSectionalAreaIntegralMeasure， IfcSectionModulusMeasure， IfcTemperatureGradientMeasure， IfcThermalExpansionCoefficientMeasure， IfcWarpingConstantMeasure， IfcWarpingMomentMeasure， IfcSoundPowerMeasure， IfcSoundPressureMeasure， IfcHeatingValueMeasure， IfcPHMeasure， IfcIonConcentrationMeasure， IfcTemperatureRateOfChangeMeasure， IfcAreaDensityMeasure， IfcSoundPowerLevelMeasure， IfcSoundPressureLevelMeasure）； END_TYPE
度量值选择（IfcMeasureValue）	TYPE IfcMeasureValue = SELECT（ IfcVolumeMeasure， IfcTimeMeasure， IfcThermodynamicTemperatureMeasure， IfcSolidAngleMeasure， IfcPositiveRatioMeasure， IfcRatioMeasure， IfcPositivePlaneAngleMeasure， IfcPlaneAngleMeasure， IfcParameterValue， IfcNumericMeasure， IfcMassMeasure， IfcPositiveLengthMeasure， IfcLengthMeasure， IfcElectricCurrentMeasure， IfcDescriptiveMeasure，

续表 D.11.1

类型	EXPRESS 描述
度量值选择 (IfcMeasureValue)	IfcCountMeasure, IfcContextDependentMeasure, IfcAreaMeasure, IfcAmountOfSubstanceMeasure, IfcLuminousIntensityMeasure, IfcNormalisedRatioMeasure, IfcComplexNumber, IfcNonNegativeLengthMeasure); END_TYPE
简单值选择 (IfcSimpleValue)	TYPE IfcSimpleValue = SELECT (IfcInteger, IfcReal, IfcBoolean, IfcIdentifier, IfcText, IfcLabel, IfcLogical, IfcDateTime, IfcDate, IfcTime, IfcDuration, IfcTimeStamp); END_TYPE
单位量单位选择 (IfcUnit)	TYPE IfcUnit = SELECT (IfcDerivedUnit, IfcNamedUnit, IfcMonetaryUnit); END_TYPE
值选择 (IfcValue)	TYPE IfcValue = SELECT (IfcMeasureValue, IfcSimpleValue, IfcDerivedMeasureValue); END_TYPE

D.11.2 度量资源实体的 EXPRESS 描述应按表 D.11.2 的规定采用。

表 D.11.2 度量资源实体的 EXPRESS 描述

实体	EXPRESS 描述
环境相关单位 (IfcContextDependentUnit)	ENTITY IfcContextDependentUnit SUBTYPE OF IfcNamedUnit; Name : IfcLabel; INVERSE HasExternalReference : SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; END_ENTITY
基本转换单位 (IfcConversionBasedUnit)	ENTITY IfcConversionBasedUnit SUPERTYPE OF(IfcConversionBasedUnitWithOffset) SUBTYPE OF IfcNamedUnit; Name : IfcLabel; ConversionFactor : IfcMeasureWithUnit; INVERSE HasExternalReference : SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; END_ENTITY
基本偏移转换单位 (IfcConversionBasedUnitWithOffset)	ENTITY IfcConversionBasedUnitWithOffset SUBTYPE OF IfcConversionBasedUnit; ConversionOffset : IfcReal; END_ENTITY

续表 D.11.2

实体	EXPRESS 描述
导出单位 (IfcDerivedUnit)	ENTITY IfcDerivedUnit; Elements : SET [1:?] OF IfcDerivedUnitElement; UnitType : IfcDerivedUnitEnum; UserDefinedType : OPTIONAL IfcLabel; DERIVE Dimensions : IfcDimensionalExponents := IfcDeriveDimensionalExponents(Elements); WHERE WR1 : (SIZEOF (Elements) > 1) OR ((SIZEOF (Elements) = 1) AND (Elements[1]. Exponent <> 1)); WR2 : (UnitType <> IfcDerivedUnitEnum. USERDEFINED) OR ((UnitType = IfcDerivedUnitEnum. USERDEFINED) AND (EXISTS(SELF. UserDefinedType))); END_ENTITY
导出单位元素 (IfcDerivedUnit Element)	ENTITY IfcDerivedUnitElement; Unit : IfcNamedUnit; Exponent : INTEGER; END_ENTITY
量纲指数 (IfcDimensional Exponents)	ENTITY IfcDimensionalExponents; LengthExponent : INTEGER; MassExponent : INTEGER; TimeExponent : INTEGER; ElectricCurrentExponent : INTEGER; ThermodynamicTemperatureExponent : INTEGER; AmountOfSubstanceExponent : INTEGER; LuminousIntensityExponent : INTEGER; END_ENTITY
带单位度量 (IfcMeasure WithUnit)	ENTITY IfcMeasureWithUnit; ValueComponent : IfcValue; UnitComponent : IfcUnit; END_ENTITY
货币单位 (IfcMonetaryUnit)	ENTITY IfcMonetaryUnit; Currency : IfcLabel; END_ENTITY
命名单位 (IfcNamedUnit)	ENTITY IfcNamedUnit ABSTRACT SUPERTYPE OF(ONEOF(IfcContextDependentUnit, IfcConversionBasedUnit, IfcSIUnit)); Dimensions : IfcDimensionalExponents; UnitType : IfcUnitEnum; WHERE WR1 : IfcCorrectDimensions (SELF. UnitType, SELF. Dimensions); END_ENTITY
国际单位制单位 (IfcSIUnit)	ENTITY IfcSIUnit SUBTYPE OF IfcNamedUnit; Prefix : OPTIONAL IfcSIPrefix; Name : IfcSIUnitName; DERIVE SELF\IfcNamedUnit. Dimensions : IfcDimensionalExponents := IfcDimensionsForSiUnit (SELF. Name); END_ENTITY
指定单位 (IfcSIUnitAssignment)	ENTITY IfcUnitAssignment; Units : SET [1:?] OF IfcUnit; WHERE WR01 : IfcCorrectUnitAssignment(Units); END_ENTITY

D.11.3 度量资源函数的 EXPRESS 描述应按表 D.11.3 的规定采用。

表 D.11.3　度量资源函数的 EXPRESS 描述

函数	EXPRESS 描述
正确量纲 (IfcCorrect Dimensions)	FUNCTION IfcCorrectDimensions (m　: IfcUnitEnum; Dim : IfcDimensionalExponents) : LOGICAL; CASE m OF LENGTHUNIT : IF Dim = (IfcDimensionalExponents (1, 0, 0, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; MASSUNIT : IF Dim = (IfcDimensionalExponents (0, 1, 0, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; TIMEUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 1, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ELECTRICCURRENTUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 0, 1, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; THERMODYNAMICTEMPERATUREUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 0, 0, 1, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; AMOUNTOFSUBSTANCEUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 0, 0, 0, 1, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; LUMINOUSINTENSITYUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 1)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; PLANEANGLEUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; SOLIDANGLEUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; AREAUNIT : IF Dim = (IfcDimensionalExponents (2, 0, 0, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; VOLUMEUNIT : IF Dim = (IfcDimensionalExponents (3, 0, 0, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ABSORBEDDOSEUNIT : IF Dim = (IfcDimensionalExponents (2, 0, −2, 0, 0, 0, 0))

续表 D.11.3

函数	EXPRESS 描述
正确量纲 (IfcCorrect Dimensions)	THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; RADIOACTIVITYUNIT : IF Dim = (IfcDimensionalExponents (0, 0, −1, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ELECTRICCAPACITANCEUNIT : IF Dim = (IfcDimensionalExponents (−2, −1, 4, 2, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; DOSEEQUIVALENTUNIT : IF Dim = (IfcDimensionalExponents (2, 0, −2, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ELECTRICCHARGEUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 1, 1, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ELECTRICCONDUCTANCEUNIT : IF Dim = (IfcDimensionalExponents (−2, −1, 3, 2, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ELECTRICVOLTAGEUNIT : IF Dim = (IfcDimensionalExponents (2, 1, −3, −1, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ELECTRICRESISTANCEUNIT : IF Dim = (IfcDimensionalExponents (2, 1, −3, −2, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ENERGYUNIT : IF Dim = (IfcDimensionalExponents (2, 1, −2, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; FORCEUNIT : IF Dim = (IfcDimensionalExponents (1, 1, −2, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; FREQUENCYUNIT : IF Dim = (IfcDimensionalExponents (0, 0, −1, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; INDUCTANCEUNIT : IF Dim = (IfcDimensionalExponents (2, 1, −2, −2, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; ILLUMINANCEUNIT : IF Dim = (IfcDimensionalExponents (−2, 0, 0, 0, 0, 0, 1)) THEN RETURN(TRUE);

续表 D.11.3

函数	EXPRESS 描述
正确量纲 (IfcCorrect Dimensions)	ELSE RETURN(FALSE); END_IF; LUMINOUSFLUXUNIT : IF Dim = (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 1)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; MAGNETICFLUXUNIT : IF Dim = (IfcDimensionalExponents (2, 1, −2, −1, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; MAGNETICFLUXDENSITYUNIT : IF Dim = (IfcDimensionalExponents (0, 1, −2, −1, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; POWERUNIT : IF Dim = (IfcDimensionalExponents (2, 1, −3, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; PRESSUREUNIT : IF Dim = (IfcDimensionalExponents (−1, 1, −2, 0, 0, 0, 0)) THEN RETURN(TRUE); ELSE RETURN(FALSE); END_IF; OTHERWISE : RETURN (UNKNOWN); END_CASE; END_FUNCTION
正确指定单位 (IfcCorrectUnit Assignment)	FUNCTION IfcCorrectUnitAssignment (Units : SET [1:?] OF IfcUnit) : LOGICAL; LOCAL NamedUnitNumber : INTEGER := 0; DerivedUnitNumber : INTEGER := 0; MonetaryUnitNumber : INTEGER := 0; NamedUnitNames : SET OF IfcUnitEnum := []; DerivedUnitNames : SET OF IfcDerivedUnitEnum := []; END_LOCAL; NamedUnitNumber := SIZEOF(QUERY(temp <* Units	('IFCMEASURERESOURCE.IFCNAMEDUNIT' IN TYPEOF(temp)) AND NOT(temp\IfcNamedUnit.UnitType = IfcUnitEnum.USERDEFINED))); DerivedUnitNumber := SIZEOF(QUERY(temp <* Units	('IFCMEASURERESOURCE.IFCDERIVEDUNIT' IN TYPEOF(temp)) AND NOT(temp\IfcDerivedUnit.UnitType = IfcDerivedUnitEnum.USERDEFINED))); MonetaryUnitNumber := SIZEOF(QUERY(temp <* Units	'IFCMEASURERESOURCE.IFCMONETARYUNIT' IN TYPEOF(temp))); REPEAT i := 1 TO SIZEOF(Units); IF (('IFCMEASURERESOURCE.IFCNAMEDUNIT' IN TYPEOF(Units[i])) AND NOT(Units[i]\IfcNamedUnit.UnitType = IfcUnitEnum.USERDEFINED)) THEN

续表 D.11.3

函数	EXPRESS 描述
正确指定单位 (IfcCorrectUnit Assignment)	NamedUnitNames :≔ NamedUnitNames + Units[i]\IfcNamedUnit.UnitType; END_IF; IF (('IFCMEASURERESOURCE.IFCDERIVEDUNIT' IN TYPEOF(Units[i])) AND NOT(Units[i]\IfcDerivedUnit.UnitType = IfcDerivedUnitEnum.USERDEFINED)) THEN DerivedUnitNames :≔ DerivedUnitNames + Units[i]\IfcDerivedUnit.UnitType; END_IF; END_REPEAT; RETURN((SIZEOF(NamedUnitNames) = NamedUnitNumber) AND (SIZEOF(DerivedUnitNames) = DerivedUnitNumber) AND (MonetaryUnitNumber <= 1)); END_FUNCTION
导出量纲指数 (IfcDeriveDimensional Exponents)	FUNCTION IfcDeriveDimensionalExponents (UnitElements : SET [1:?] Of IfcDerivedUnitElement) : IfcDimensionalExponents; LOCAL Result : IfcDimensionalExponents :≔ IfcDimensionalExponents(0, 0, 0, 0, 0, 0, 0); END_LOCAL; REPEAT i :≔ LOINDEX(UnitElements) TO HIINDEX(UnitElements); Result.LengthExponent :≔ Result.LengthExponent + (UnitElements[i].Exponent * UnitElements[i].Unit.Dimensions.LengthExponent); Result.MassExponent :≔ Result.MassExponent + (UnitElements[i].Exponent * UnitElements[i].Unit.Dimensions.MassExponent); Result.TimeExponent :≔ Result.TimeExponent + (UnitElements[i].Exponent * UnitElements[i].Unit.Dimensions.TimeExponent); Result.ElectricCurrentExponent :≔ Result.ElectricCurrentExponent + (UnitElements[i].Exponent * UnitElements[i].Unit.Dimensions.ElectricCurrentExponent); Result.ThermodynamicTemperatureExponent :≔ Result.ThermodynamicTemperatureExponent + (UnitElements[i].Exponent * UnitElements[i].Unit.Dimensions.ThermodynamicTemperatureExponent); Result.AmountOfSubstanceExponent :≔ Result.AmountOfSubstanceExponent + (UnitElements[i].Exponent * UnitElements[i].Unit.Dimensions.AmountOfSubstanceExponent); Result.LuminousIntensityExponent :≔ Result.LuminousIntensityExponent + (UnitElements[i].Exponent * UnitElements[i].Unit.Dimensions.LuminousIntensityExponent); END_REPEAT; RETURN (Result); END_FUNCTION
国际标准单位 量纲 (IfcDimensions ForSiUnit)	FUNCTION IfcDimensionsForSiUnit (n : IfcSiUnitName) : IfcDimensionalExponents; CASE n OF METRE : RETURN (IfcDimensionalExponents (1, 0, 0, 0, 0, 0, 0)); SQUARE_METRE : RETURN (IfcDimensionalExponents (2, 0, 0, 0, 0, 0, 0)); CUBIC_METRE : RETURN (IfcDimensionalExponents (3, 0, 0, 0, 0, 0, 0)); GRAM : RETURN (IfcDimensionalExponents (0, 1, 0, 0, 0, 0, 0)); SECOND : RETURN (IfcDimensionalExponents (0, 0, 1, 0, 0, 0, 0)); AMPERE : RETURN (IfcDimensionalExponents

续表 D.11.3

函数	EXPRESS 描述
国际标准单位量纲（IfcDimensionsForSiUnit）	(0, 0, 0, 1, 0, 0, 0)); KELVIN : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 1, 0, 0)); MOLE : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 0, 1, 0)); CANDELA : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 1)); RADIAN : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 0)); STERADIAN : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 0)); HERTZ : RETURN (IfcDimensionalExponents (0, 0, −1, 0, 0, 0, 0)); NEWTON : RETURN (IfcDimensionalExponents (1, 1, −2, 0, 0, 0, 0)); PASCAL : RETURN (IfcDimensionalExponents (−1, 1, −2, 0, 0, 0, 0)); JOULE : RETURN (IfcDimensionalExponents (2, 1, −2, 0, 0, 0, 0)); WATT : RETURN (IfcDimensionalExponents (2, 1, −3, 0, 0, 0, 0)); COULOMB : RETURN (IfcDimensionalExponents (0, 0, 1, 1, 0, 0, 0)); VOLT : RETURN (IfcDimensionalExponents (2, 1, −3, −1, 0, 0, 0)); FARAD : RETURN (IfcDimensionalExponents (−2, −1, 4, 2, 0, 0, 0)); OHM : RETURN (IfcDimensionalExponents (2, 1, −3, −2, 0, 0, 0)); SIEMENS : RETURN (IfcDimensionalExponents (−2, −1, 3, 2, 0, 0, 0)); WEBER : RETURN (IfcDimensionalExponents (2, 1, −2, −1, 0, 0, 0)); TESLA : RETURN (IfcDimensionalExponents (0, 1, −2, −1, 0, 0, 0)); HENRY : RETURN (IfcDimensionalExponents (2, 1, −2, −2, 0, 0, 0)); DEGREE_CELSIUS : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 1, 0, 0)); LUMEN : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 1)); LUX : RETURN (IfcDimensionalExponents (−2, 0, 0, 0, 0, 0, 1)); BECQUEREL : RETURN (IfcDimensionalExponents (0, 0, −1, 0, 0, 0, 0)); GRAY : RETURN (IfcDimensionalExponents (2, 0, −2, 0, 0, 0, 0)); SIEVERT : RETURN (IfcDimensionalExponents (2, 0, −2, 0, 0, 0, 0)); OTHERWISE : RETURN (IfcDimensionalExponents (0, 0, 0, 0, 0, 0, 0)); END_CASE; END_FUNCTION

D.12 展示外观资源

D.12.1 展示外观资源类型的 EXPRESS 描述应按表 D.12.1 的规定采用。

表 D.12.1 展示外观资源类型的 EXPRESS 描述

类型	EXPRESS 描述
字体样式 (IfcFontStyle)	TYPE IfcFontStyle = STRING; WHERE WR1 : SELF IN ['normal','italic','oblique']; END_TYPE
字体转化 (IfcFontVariant)	TYPE IfcFontVariant = STRING; WHERE WR1 : SELF IN ['normal','small-caps']; END_TYPE
字体粗细 (IfcFontWeight)	TYPE IfcFontWeight = STRING; WHERE WR1 : SELF IN ['normal','small-caps','100','200','300','400','500','600','700','800','900']; END_TYPE
可表示文本 (IfcPresentableText)	TYPE IfcPresentableText = STRING; END_TYPE
反射指数 (IfcSpecularExponent)	TYPE IfcSpecularExponent = REAL; END_TYPE
反射粗糙度 (IfcSpecular Roughness)	TYPE IfcSpecularRoughness = REAL; WHERE WR1 : {0.0 <= SELF <= 1.0}; END_TYPE
文本对齐 (IfcTextAlignment)	TYPE IfcTextAlignment = STRING; WHERE WR1 : SELF IN ['left','right','center','justify']; END_TYPE
文本修饰 (IfcTextDecoration)	TYPE IfcTextDecoration = STRING; WHERE WR1 : SELF IN ['none','underline','overline','line-through','blink']; END_TYPE
文本字体名称 (IfcTextFontName)	TYPE IfcTextFontName = STRING; END_TYPE
文本转换 (IfcText Transformation)	TYPE IfcTextTransformation = STRING; WHERE WR1 : SELF IN ['capitalize','uppercase','lowercase','none']; END_TYPE
空样式 (IfcNullStyle)	TYPE IfcNullStyle = ENUMERATION OF (NULL); END_TYPE
反射模型枚举 (IfcReflectance MethodEnum)	TYPE IfcReflectanceMethodEnum = ENUMERATION OF (BLINN, FLAT, GLASS, MATT, METAL, MIRROR, PHONG, PLASTIC, STRAUSS, NOTDEFINED); END_TYPE

续表 D.12.1

类型	EXPRESS 描述
侧表面 (IfcSurfaceSide)	TYPE IfcSurfaceSide = ENUMERATION OF (POSITIVE, NEGATIVE, BOTH); END_TYPE
颜色选择 (IfcColour)	TYPE IfcColour = SELECT (IfcColourSpecification, IfcPreDefinedColour); END_TYPE
颜色或因子选择 (IfcColourOrFactor)	TYPE IfcColourOrFactor = SELECT (IfcNormalisedRatioMeasure, IfcColourRgb); END_TYPE
曲线字体或比例化曲线字体选择 (IfcCurveFont OrScaledCurve FontSelect)	TYPE IfcCurveFontOrScaledCurveFontSelect = SELECT (IfcCurveStyleFontSelect, IfcCurveStyleFontAndScaling); END_TYPE
曲线样式字体选择 (IfcCurveStyle FontSelect)	TYPE IfcCurveStyleFontSelect = SELECT (IfcPreDefinedCurveFont, IfcCurveStyleFont); END_TYPE
填充样式选择 (IfcFillStyleSelect)	TYPE IfcFillStyleSelect = SELECT (IfcFillAreaStyleHatching, IfcFillAreaStyleTiles, IfcExternallyDefinedHatchStyle, IfcColour); END_TYPE
影线距离选择 (IfcHatchLine DistanceSelect)	TYPE IfcHatchLineDistanceSelect = SELECT (IfcPositiveLengthMeasure, IfcVector); END_TYPE
表达样式选择 (IfcPresentation StyleSelect)	TYPE IfcPresentationStyleSelect = SELECT (IfcNullStyle, IfcCurveStyle, IfcFillAreaStyle, IfcTextStyle, IfcSurfaceStyle); END_TYPE
尺寸选择 (IfcSizeSelect)	TYPE IfcSizeSelect = SELECT (IfcRatioMeasure, IfcLengthMeasure, IfcDescriptiveMeasure, IfcPositiveLengthMeasure, IfcNormalisedRatioMeasure, IfcPositiveRatioMeasure); END_TYPE
反射高光选择 (IfcSpecular HighlightSelect)	TYPE IfcSpecularHighlightSelect = SELECT (IfcSpecularExponent, IfcSpecularRoughness); END_TYPE
样式分配选择 (IfcStyleAssignment Select)	TYPE IfcStyleAssignmentSelect = SELECT (IfcPresentationStyleAssignment, IfcPresentationStyle); END_TYPE

续表 D. 12. 1

类型	EXPRESS 描述
表面样式元素选择（IfcSurfaceStyle ElementSelect）	TYPE IfcSurfaceStyleElementSelect = SELECT (IfcSurfaceStyleShading, IfcSurfaceStyleLighting, IfcSurfaceStyleWithTextures, IfcExternallyDefinedSurfaceStyle, IfcSurfaceStyleRefraction); END_TYPE
文本字体选择（IfcTextFontSelect）	TYPE IfcTextFontSelect = SELECT (IfcPreDefinedTextFont, IfcExternallyDefinedTextFont); END_TYPE

D. 12. 2 展示外观资源实体的 EXPRESS 描述应按表 D. 12. 2 的规定采用。

表 D. 12. 2 展示外观资源实体的 EXPRESS 描述

实体	EXPRESS 描述
二进制大对象纹理（IfcBlobTexture）	ENTITY IfcBlobTexture SUBTYPE OF IfcSurfaceTexture; RasterFormat : IfcIdentifier; RasterCode : BINARY; WHERE SupportedRasterFormat : SELF. RasterFormat IN ['BMP','JPG','GIF','PNG']; RasterCodeByteStream : BLENGTH(RasterCode) MOD 8 = 0; END_ENTITY
红绿蓝颜色（IfcColourRgb）	ENTITY IfcColourRgb SUBTYPE OF IfcColourSpecification; Red : IfcNormalisedRatioMeasure; Green : IfcNormalisedRatioMeasure; Blue : IfcNormalisedRatioMeasure; END_ENTITY
红绿蓝颜色列表（IfcColourRgbList）	ENTITY IfcColourRgbList SUBTYPE OF IfcPresentationItem; ColourList : LIST [1:?] OF LIST [3:3] OF IfcNormalisedRatioMeasure; END_ENTITY
颜色分量（IfcColour Specification）	ENTITY IfcColourSpecification ABSTRACT SUPERTYPE OF(IfcColourRgb) SUBTYPE OF IfcPresentationItem; Name : OPTIONAL IfcLabel; END_ENTITY
曲线样式（IfcCurveStyle）	ENTITY IfcCurveStyle SUBTYPE OF IfcPresentationStyle; CurveFont : OPTIONAL IfcCurveFontOrScaledCurveFontSelect; CurveWidth : OPTIONAL IfcSizeSelect; CurveColour : OPTIONAL IfcColour; ModelOrDraughting : OPTIONAL BOOLEAN; WHERE MeasureOfWidth : (NOT(EXISTS(CurveWidth))) OR('IFCMEASURERESOURCE. IFCPOSITIVELENGTHMEASURE' IN TYPEOF(CurveWidth)) OR (('IFCMEASURERESOURCE. IFCDESCRIPTIVEMEASURE' IN TYPEOF(CurveWidth)) AND (CurveWidth ='by layer')); IdentifiableCurveStyle : EXISTS(CurveFont) OR EXISTS(CurveWidth) OR EXISTS(CurveColour); END_ENTITY
曲线样式字体（IfcCurveStyleFont）	ENTITY IfcCurveStyleFont SUBTYPE OF IfcPresentationItem; Name : OPTIONAL IfcLabel; PatternList : LIST [1:?] OF IfcCurveStyleFontPattern; END_ENTITY

续表 D.12.2

实体	EXPRESS 描述
曲线样式字体比例（IfcCurveStyleFontAndScaling）	ENTITY IfcCurveStyleFontAndScaling SUBTYPE OF IfcPresentationItem; Name : OPTIONAL IfcLabel; CurveFont : IfcCurveStyleFontSelect; CurveFontScaling : IfcPositiveRatioMeasure; END_ENTITY
曲线样式字体模板（IfcCurveStyleFontPattern）	ENTITY IfcCurveStyleFontPattern SUBTYPE OF IfcPresentationItem; VisibleSegmentLength : IfcLengthMeasure; InvisibleSegmentLength : IfcPositiveLengthMeasure; WHERE VisibleLengthGreaterEqualZero : VisibleSegmentLength >= 0.; END_ENTITY
制图预定义颜色（IfcDraughtingPreDefinedColour）	ENTITY IfcDraughtingPreDefinedColour SUBTYPE OF IfcPreDefinedColour; WHERE PreDefinedColourNames : SELF\IfcPreDefinedItem.Name IN ['black','red','green','blue','yellow','magenta','cyan','white','by layer']; END_ENTITY
制图预定义曲线字体（IfcDraughtingPreDefinedCurveFont）	ENTITY IfcDraughtingPreDefinedCurveFont SUBTYPE OF IfcPreDefinedCurveFont; WHERE PreDefinedCurveFontNames : SELF\IfcPredefinedItem.Name IN ['continuous','chain','chain double dash','dashed','dotted','by layer']; END_ENTITY
外部定义填充样式（IfcExternallyDefinedHatchStyle）	ENTITY IfcExternallyDefinedHatchStyle SUBTYPE OF IfcExternalReference; END_ENTITY
外部定义表面样式（IfcExternallyDefinedSurfaceStyle）	ENTITY IfcExternallyDefinedSurfaceStyle SUBTYPE OF IfcExternalReference; END_ENTITY
外部定义文本字体（IfcExternallyDefinedTextFont）	ENTITY IfcExternallyDefinedTextFont SUBTYPE OF IfcExternalReference; END_ENTITY
填充区域样式（IfcFillAreaStyle）	ENTITY IfcFillAreaStyle SUBTYPE OF IfcPresentationStyle; FillStyles : SET [1:?] OF IfcFillStyleSelect; ModelorDraughting : OPTIONAL BOOLEAN; WHERE MaxOneColour : SIZEOF(QUERY(Style <* SELF.FillStyles	'IFCPRESENTATIONAPPEARANCERESOURCE.IFCCOLOUR' IN TYPEOF(Style))) <= 1; MaxOneExtHatchStyle : SIZEOF(QUERY(Style <* SELF.FillStyles	'IFCPRESENTATIONAPPEARANCERESOURCE.IFCEXTERNALLYDEFINEDHATCHSTYLE' IN TYPEOF(Style))) <= 1; ConsistentHatchStyleDef : IfcCorrectFillAreaStyle(SELF.FillStyles); END_ENTITY
填充区域样式阴影（IfcFillAreaStyleHatching）	ENTITY IfcFillAreaStyleHatching SUBTYPE OF IfcGeometricRepresentationItem; HatchLineAppearance : IfcCurveStyle; StartOfNextHatchLine : IfcHatchLineDistanceSelect; PointOfReferenceHatchLine : OPTIONAL IfcCartesianPoint; PatternStart : OPTIONAL IfcCartesianPoint; HatchLineAngle : IfcPlaneAngleMeasure; WHERE PatternStart2D : NOT(EXISTS(PatternStart)) OR (PatternStart.Dim = 2); RefHatchLine2D : NOT(EXISTS(PointOfReferenceHatchLine)) OR (PointOfReferenceHatchLine.Dim = 2); END_ENTITY

续表 D.12.2

实体	EXPRESS 描述
填充区拼贴式样 (IfcFillAreaStyleTiles)	ENTITY IfcFillAreaStyleTiles SUBTYPE OF IfcGeometricRepresentationItem; TilingPattern : LIST [2:2] OF IfcVector; Tiles : SET [1:?] OF IfcStyledItem; TilingScale : IfcPositiveRatioMeasure; END_ENTITY
图像纹理 (IfcImageTexture)	ENTITY IfcImageTexture SUBTYPE OF IfcSurfaceTexture; URLReference : IfcURIReference; END_ENTITY
颜色映射索引 (IfcIndexedColour Map)	ENTITY IfcIndexedColourMap SUBTYPE OF IfcPresentationItem; MappedTo : IfcTessellatedFaceSet; Overrides : OPTIONAL IfcSurfaceStyleShading; Colours : IfcColourRgbList; ColourIndex : LIST [1:?] OF INTEGER; END_ENTITY
纹理映射索引 (IfcIndexedTexture Map)	ENTITY IfcIndexedTextureMap ABSTRACT SUPERTYPE OF(IfcIndexedTriangleTextureMap) SUBTYPE OF IfcTextureCoordinate; MappedTo : IfcTessellatedFaceSet; TexCoords : IfcTextureVertexList; END_ENTITY
三角纹理映射索引 (IfcIndexedTriangle TextureMap)	ENTITY IfcIndexedTriangleTextureMap SUBTYPE OF IfcIndexedTextureMap; TexCoordIndex : OPTIONAL LIST [1:?] OF LIST [3:3] OF INTEGER; END_ENTITY
像素纹理 (IfcPixelTexture)	ENTITY IfcPixelTexture SUBTYPE OF IfcSurfaceTexture; Width : IfcInteger; Height : IfcInteger; ColourComponents : IfcInteger; Pixel : LIST [1:?] OF BINARY (32); WHERE MinPixelInS : Width >= 1; MinPixelInT : Height >= 1; NumberOfColours : {1 <= ColourComponents <= 4}; SizeOfPixelList : SIZEOF(Pixel) = (Width * Height); PixelAsByteAndSameLength : SIZEOF(QUERY(temp<* Pixel | (BLENGTH(temp) MOD 8 = 0) AND (BLENGTH(temp) = BLENGTH(Pixel[1])))) = SIZEOF(Pixel); END_ENTITY
预定义颜色 (IfcPreDefinedColour)	ENTITY IfcPreDefinedColour ABSTRACT SUPERTYPE OF(IfcDraughtingPreDefinedColour) SUBTYPE OF IfcPreDefinedItem; END_ENTITY
预定义曲线字体 (IfcPreDefinedCurve Font)	ENTITY IfcPreDefinedCurveFont ABSTRACT SUPERTYPE OF(IfcDraughtingPreDefinedCurveFont) SUBTYPE OF IfcPreDefinedItem; END_ENTITY
预定义项 (IfcPreDefinedItem)	ENTITY IfcPreDefinedItem ABSTRACT SUPERTYPE OF(ONEOF(IfcPreDefinedColour, IfcPreDefinedCurveFont, IfcPreDefinedTextFont)) SUBTYPE OF IfcPresentationItem; Name : IfcLabel; END_ENTITY

续表 D.12.2

实体	EXPRESS 描述
预定义文本字体 (IfcPreDefinedTextFont)	ENTITY IfcPreDefinedTextFont ABSTRACT SUPERTYPE OF(IfcTextStyleFontModel) SUBTYPE OF IfcPreDefinedItem; END_ENTITY
表达样式 (IfcPresentationStyle)	ENTITY IfcPresentationStyle ABSTRACT SUPERTYPE OF(ONEOF(IfcCurveStyle, IfcFillAreaStyle, IfcSurfaceStyle, IfcTextStyle)); Name : OPTIONAL IfcLabel; END_ENTITY
表达样式分配 (IfcPresentationStyleAssignment)	ENTITY IfcPresentationStyleAssignment; Styles : SET [1:?] OF IfcPresentationStyleSelect; END_ENTITY
样式项 (IfcStyledItem)	ENTITY IfcStyledItem SUBTYPE OF IfcRepresentationItem; Item : OPTIONAL IfcRepresentationItem; Styles : SET [1:?] OF IfcStyleAssignmentSelect; Name : OPTIONAL IfcLabel; WHERE ApplicableItem : NOT('IFCPRESENTATIONAPPEARANCERESOURCE.IFCSTYLEDITEM' IN TYPEOF(Item)); END_ENTITY
表面样式 (IfcSurfaceStyle)	ENTITY IfcSurfaceStyle SUBTYPE OF IfcPresentationStyle; Side : IfcSurfaceSide; Styles : SET [1:5] OF IfcSurfaceStyleElementSelect; WHERE MaxOneShading : SIZEOF(QUERY(Style <* SELF.Styles | 'IFCPRESENTATIONAPPEARANCERESOURCE.IFCSURFACESTYLESHADING' IN TYPEOF(Style))) <= 1; MaxOneLighting : SIZEOF(QUERY(Style <* SELF.Styles | 'IFCPRESENTATIONAPPEARANCERESOURCE.IFCSURFACESTYLELIGHTING' IN TYPEOF(Style))) <= 1; MaxOneRefraction : SIZEOF(QUERY(Style <* SELF.Styles | 'IFCPRESENTATIONAPPEARANCERESOURCE.IFCSURFACESTYLEREFRACTION' IN TYPEOF(Style))) <= 1; MaxOneTextures : SIZEOF(QUERY(Style <* SELF.Styles | 'IFCPRESENTATIONAPPEARANCERESOURCE.IFCSURFACESTYLEWITHTEXTURES' IN TYPEOF(Style))) <= 1; MaxOneExtDefined : SIZEOF(QUERY(Style <* SELF.Styles | 'IFCPRESENTATIONAPPEARANCERESOURCE.IFCEXTERNALLYDEFINEDSURFACESTYLE' IN TYPEOF(Style))) <= 1; END_ENTITY
表面光照样式 (IfcSurfaceStyleLighting)	ENTITY IfcSurfaceStyleLighting SUBTYPE OF IfcPresentationItem; DiffuseTransmissionColour : IfcColourRgb; DiffuseReflectionColour : IfcColourRgb; TransmissionColour : IfcColourRgb; ReflectanceColour : IfcColourRgb; END_ENTITY
表面折射样式 (IfcSurfaceStyleRefraction)	ENTITY IfcSurfaceStyleRefraction SUBTYPE OF IfcPresentationItem; RefractionIndex : OPTIONAL IfcReal; DispersionFactor : OPTIONAL IfcReal; END_ENTITY
表面渲染样式 (IfcSurfaceStyleRendering)	ENTITY IfcSurfaceStyleRendering SUBTYPE OF IfcSurfaceStyleShading; Transparency : OPTIONAL IfcNormalisedRatioMeasure; DiffuseColour : OPTIONAL IfcColourOrFactor; TransmissionColour : OPTIONAL IfcColourOrFactor; DiffuseTransmissionColour : OPTIONAL IfcColourOrFactor; ReflectionColour : OPTIONAL IfcColourOrFactor; SpecularColour : OPTIONAL IfcColourOrFactor; SpecularHighlight : OPTIONAL IfcSpecularHighlightSelect; ReflectanceMethod : IfcReflectanceMethodEnum; END_ENTITY

续表 D.12.2

实体	EXPRESS 描述
表面明暗样式（IfcSurfaceStyleShading）	ENTITY IfcSurfaceStyleShading SUPERTYPE OF(IfcSurfaceStyleRendering) SUBTYPE OF IfcPresentationItem; SurfaceColour : IfcColourRgb; END_ENTITY
表面纹理样式（IfcSurfaceStyleWithTextures）	ENTITY IfcSurfaceStyleWithTextures SUBTYPE OF IfcPresentationItem; Textures : LIST [1:?] OF IfcSurfaceTexture; END_ENTITY
表面纹理（IfcSurfaceTexture）	ENTITY IfcSurfaceTexture ABSTRACT SUPERTYPE OF(ONEOF(IfcBlobTexture, IfcImageTexture, IfcPixelTexture)) SUBTYPE OF IfcPresentationItem; RepeatS : BOOLEAN; RepeatT : BOOLEAN; Mode : OPTIONAL IfcIdentifier; TextureTransform : OPTIONAL IfcCartesianTransformationOperator2D; Parameter : OPTIONAL LIST [1:?] OF IfcIdentifier; INVERSE IsMappedBy : SET [0:?] OF IfcTextureCoordinate FOR Maps; UsedInStyles : SET [0:?] OF IfcSurfaceStyleWithTextures FOR Textures; END_ENTITY
文本样式（IfcTextStyle）	ENTITY IfcTextStyle SUBTYPE OF IfcPresentationStyle; TextCharacterAppearance : OPTIONAL IfcTextStyleForDefinedFont; TextStyle : OPTIONAL IfcTextStyleTextModel; TextFontStyle : IfcTextFontSelect; ModelOrDraughting : OPTIONAL BOOLEAN; END_ENTITY
文本样式字体模型（IfcTextStyleFontModel）	ENTITY IfcTextStyleFontModel SUBTYPE OF IfcPreDefinedTextFont; FontFamily : LIST [1:?] OF IfcTextFontName; FontStyle : OPTIONAL IfcFontStyle; FontVariant : OPTIONAL IfcFontVariant; FontWeight : OPTIONAL IfcFontWeight; FontSize : IfcSizeSelect; WHERE MeasureOfFontSize :('IFCMEASURERESOURCE. IFCLENGTHMEASURE'IN TYPEOF(SELF. FontSize)) AND (SELF. FontSize > 0.); END_ENTITY
定义字体文本样式（IfcTextStyleForDefinedFont）	ENTITY IfcTextStyleForDefinedFont SUBTYPE OF IfcPresentationItem; Colour : IfcColour; BackgroundColour : OPTIONAL IfcColour; END_ENTITY
文本样式文本模型（IfcTextStyleTextModel）	ENTITY IfcTextStyleTextModel SUBTYPE OF IfcPresentationItem; TextIndent : OPTIONAL IfcSizeSelect; TextAlign : OPTIONAL IfcTextAlignment; TextDecoration : OPTIONAL IfcTextDecoration; LetterSpacing : OPTIONAL IfcSizeSelect; WordSpacing : OPTIONAL IfcSizeSelect; TextTransform : OPTIONAL IfcTextTransformation; LineHeight : OPTIONAL IfcSizeSelect; END_ENTITY
纹理坐标（IfcTextureCoordinate）	ENTITY IfcTextureCoordinate ABSTRACT SUPERTYPE OF(ONEOF(IfcIndexedTextureMap, IfcTextureCoordinateGenerator, IfcTextureMap)) SUBTYPE OF IfcPresentationItem; Maps : LIST [1:?] OF IfcSurfaceTexture; END_ENTITY

续表 D.12.2

实体	EXPRESS 描述
纹理坐标生成器（IfcTextureCoordinateGenerator）	ENTITY IfcTextureCoordinateGenerator SUBTYPE OF IfcTextureCoordinate; Mode : IfcLabel; Parameter : OPTIONAL LIST [1:?] OF IfcReal; END_ENTITY
纹理映射（IfcTextureMap）	ENTITY IfcTextureMap SUBTYPE OF IfcTextureCoordinate; Vertices : LIST [3:?] OF IfcTextureVertex; MappedTo : IfcFace; END_ENTITY
纹理顶点（IfcTextureVertex）	ENTITY IfcTextureVertex SUBTYPE OF IfcPresentationItem; Coordinates : LIST [2:2] OF IfcParameterValue; END_ENTITY
纹理顶点列表（IfcTextureVertexList）	ENTITY IfcTextureVertexList SUBTYPE OF IfcPresentationItem; TexCoordsList : LIST [1:?] OF LIST [2:2] OF IfcParameterValue; END_ENTITY

D.12.3 展示外观资源应采用正确填充样式（IfcCorrectFillAreaStyle）函数，函数的 EXPRESS 描述应符合下列规定：

```
FUNCTION IfcCorrectFillAreaStyle
  (Styles : SET[1:?] OF IfcFillStyleSelect)
  :LOGICAL;
LOCAL
   Hatching : INTEGER := 0;
   Tiles    : INTEGER := 0;
   Colour   : INTEGER := 0;
   External : INTEGER := 0;
END_LOCAL;
External := SIZEOF(QUERY(Style <* Styles |
  'IFCPRESENTATIONAPPEARANCERESOURCE.IFCEXTERNALLYDEFINEDHATCH
STYLE' IN
    TYPEOF(Style)));
Hatching  := SIZEOF(QUERY(Style <* Styles |
  'IFCPRESENTATIONAPPEARANCERESOURCE.IFCFILLAREASTYLEHATCHING' IN
    TYPEOF(Style)));
Tiles     := SIZEOF(QUERY(Style <* Styles |
  'IFCPRESENTATIONAPPEARANCERESOURCE.IFCFILLAREASTYLETILES' IN
    TYPEOF(Style)));
Colour    := SIZEOF(QUERY(Style <* Styles |
  'IFCPRESENTATIONAPPEARANCERESOURCE.IFCCOLOUR' IN
    TYPEOF(Style)));
IF (External > 1) THEN
  RETURN (FALSE);
END_IF;
IF ((External = 1) AND ((Hatching > 0) OR (Tiles > 0) OR (Colour > 0))) THEN
  RETURN (FALSE);
END_IF;
IF (Colour > 1) THEN
```

```
    RETURN (FALSE);
  END_IF;
  IF ((Hatching > 0) AND (Tiles >0)) THEN
    RETURN (FALSE);
  END_IF;
  RETURN(TRUE);
  END_FUNCTION
```

D.13 展示定义资源

D.13.1 展示定义资源类型的 EXPRESS 描述应按表 D.13.1 的规定采用。

表 D.13.1 展示定义资源类型的 EXPRESS 描述

类型	EXPRESS 描述
框对齐 (IfcBoxAlignment)	TYPE IfcBoxAlignment = IfcLabel; WHERE WR1 : SELF IN ['top-left','top-middle','top-right','middle-left','center','middle-right','bottom-left','bottommiddle','bottom-right']; END_TYPE
文本路径枚举 (IfcTextPath)	TYPE IfcTextPath = ENUMERATION OF (LEFT, RIGHT, UP, DOWN); END_TYPE

D.13.2 展示定义资源实体的 EXPRESS 描述应按表 D.13.2 的规定采用。

表 D.13.2 展示定义资源实体的 EXPRESS 描述

实体	EXPRESS 描述
填充区域注释 (IfcAnnotation FillArea)	ENTITY IfcAnnotationFillArea SUBTYPE OF IfcGeometricRepresentationItem; OuterBoundary : IfcCurve; InnerBoundaries : OPTIONAL SET [1:?] OF IfcCurve; END_ENTITY
平面框 (IfcPlanarBox)	ENTITY IfcPlanarBox SUBTYPE OF IfcPlanarExtent; Placement : IfcAxis2Placement; END_ENTITY
平面范围 (IfcPlanarExtent)	ENTITY IfcPlanarExtent SUPERTYPE OF(IfcPlanarBox) SUBTYPE OF IfcGeometricRepresentationItem; SizeInX : IfcLengthMeasure; SizeInY : IfcLengthMeasure; END_ENTITY
表达项 (IfcPresentationItem)	ENTITY IfcPresentationItem ABSTRACT SUPERTYPE OF(ONEOF(IfcColourRgbList, IfcColourSpecification, IfcCurveStyleFont, IfcCurveStyleFontAndScaling, IfcCurveStyleFontPattern, IfcIndexedColourMap, IfcPreDefinedItem, IfcSurfaceStyleLighting, IfcSurfaceStyleRefraction, IfcSurfaceStyleShading, IfcSurfaceStyleWithTextures, IfcSurfaceTexture, IfcTextStyleForDefinedFont, IfcTextStyleTextModel, IfcTextureCoordinate, IfcTextureVertex, IfcTextureVertexList)); END_ENTITY

续表 D.13.2

实体	EXPRESS 描述
文本文字 (IfcTextLiteral)	ENTITY IfcTextLiteral SUPERTYPE OF(IfcTextLiteralWithExtent) SUBTYPE OF IfcGeometricRepresentationItem; Literal : IfcPresentableText; Placement : IfcAxis2Placement; Path : IfcTextPath; END_ENTITY
带范围文本文字 (IfcTextLiteralWith Extent)	ENTITY IfcTextLiteralWithExtent SUBTYPE OF IfcTextLiteral; Extent : IfcPlanarExtent; BoxAlignment : IfcBoxAlignment; WHERE WR31 : NOT('IFCPRESENTATIONDEFINITIONRESOURCE. IFCPLANARBOX' IN TYPEOF(Extent)); END_ENTITY

D.14 展示组织资源

D.14.1 展示组织资源类型的 EXPRESS 描述应按表 D.14.1 的规定采用。

表 D.14.1 展示组织资源类型的 EXPRESS 描述

类型	EXPRESS 描述
光分布曲线枚举 (IfcLightDistribution CurveEnum)	TYPE IfcLightDistributionCurveEnum = ENUMERATION OF (TYPE_A, TYPE_B, TYPE_C, NOTDEFINED); END_TYPE
发光源枚举 (IfcLightEmission SourceEnum)	TYPE IfcLightEmissionSourceEnum = ENUMERATION OF (COMPACTFLUORESCENT, FLUORESCENT, HIGHPRESSUREMERCURY, HIGHPRESSURESODIUM, LIGHTEMITTINGDIODE, LOWPRESSURESODIUM, LOWVOLTAGEHALOGEN, MAINVOLTAGEHALOGEN, METALHALIDE, TUNGSTENFILAMENT, NOTDEFINED); END_TYPE
分层项选择 (IfcLayeredItem)	TYPE IfcLayeredItem = SELECT (IfcRepresentationItem, IfcRepresentation); END_TYPE
光分布数据资源选择 (IfcLightDistribution DataSourceSelect)	TYPE IfcLightDistributionDataSourceSelect = SELECT (IfcExternalReference, IfcLightIntensityDistribution); END_TYPE

D.14.2 展示组织资源实体的 EXPRESS 描述应按表 D.14.2 的规定采用。

表 D. 14. 2　展示组织资源实体的 EXPRESS 描述

实体	EXPRESS 描述
光分布数据 (IfcLightDistribution Data)	ENTITY IfcLightDistributionData; MainPlaneAngle : IfcPlaneAngleMeasure; SecondaryPlaneAngle : LIST [1:?] OF IfcPlaneAngleMeasure; LuminousIntensity : LIST [1:?] OF IfcLuminousIntensityDistributionMeasure; END_ENTITY
光强分布 (IfcLightIntensity Distribution)	ENTITY IfcLightIntensityDistribution; LightDistributionCurve : IfcLightDistributionCurveEnum; DistributionData : LIST [1:?] OF IfcLightDistributionData; END_ENTITY
光源 (IfcLightSource)	ENTITY IfcLightSource ABSTRACT SUPERTYPE OF(ONEOF(IfcLightSourceAmbient, IfcLightSourceDirectional, IfcLightSource Goniometric, IfcLightSourcePositional)) SUBTYPE OF IfcGeometricRepresentationItem; Name : OPTIONAL IfcLabel; LightColour : IfcColourRgb; AmbientIntensity : OPTIONAL IfcNormalisedRatioMeasure; Intensity : OPTIONAL IfcNormalisedRatioMeasure; END_ENTITY
环境光源 (IfcLightSource Ambient)	ENTITY IfcLightSourceAmbient SUBTYPE OF IfcLightSource; END_ENTITY
光源方向 (IfcLightSource Directional)	NTITY IfcLightSourceDirectional SUBTYPE OF IfcLightSource; Orientation : IfcDirection; END_ENTITY
光源几何 (IfcLightSource Goniometric)	ENTITY IfcLightSourceGoniometric SUBTYPE OF IfcLightSource; Position : IfcAxis2Placement3D; ColourAppearance : OPTIONAL IfcColourRgb; ColourTemperature : IfcThermodynamicTemperatureMeasure; LuminousFlux : IfcLuminousFluxMeasure; LightEmissionSource : IfcLightEmissionSourceEnum; LightDistributionDataSource : IfcLightDistributionDataSourceSelect; END_ENTITY
光源位置 (IfcLightSource Positional)	ENTITY IfcLightSourcePositional SUPERTYPE OF(IfcLightSourceSpot) SUBTYPE OF IfcLightSource; Position : IfcCartesianPoint; Radius : IfcPositiveLengthMeasure; ConstantAttenuation : IfcReal; DistanceAttenuation : IfcReal; QuadricAttenuation : IfcReal; END_ENTITY
光源点 (IfcLightSource Spot)	ENTITY IfcLightSourceSpot SUBTYPE OF IfcLightSourcePositional; Orientation : IfcDirection; ConcentrationExponent : OPTIONAL IfcReal; SpreadAngle : IfcPositivePlaneAngleMeasure; BeamWidthAngle : IfcPositivePlaneAngleMeasure; END_ENTITY

续表 D.14.2

类型	EXPRESS 描述
展示层分配 (IfcPresentationLayer Assignment)	ENTITY IfcPresentationLayerAssignment SUPERTYPE OF(IfcPresentationLayerWithStyle); Name : IfcLabel; Description : OPTIONAL IfcText; AssignedItems : SET [1:?] OF IfcLayeredItem; Identifier : OPTIONAL IfcIdentifier; WHERE ApplicableItems : SIZEOF(QUERY(temp <* AssignedItems | (SIZEOF(TYPEOF(temp) * ['IFCREPR ESENTATIONRESOURCE. IFCSHAPEREPRESENTATION','IFCGEOMETRYRESOURCE. IFCGEOME TRICREPRESENTATIONITEM','IFCGEOMETRYRESOURCE. IFCMAPPEDITEM']) = 1))) = SIZEOF (AssignedItems); END_ENTITY
带样式展示层 (IfcPresentationLayer WithStyle)	ENTITY IfcPresentationLayerWithStyle SUBTYPE OF IfcPresentationLayerAssignment; LayerOn : LOGICAL; LayerFrozen : LOGICAL; LayerBlocked : LOGICAL; LayerStyles : SET OF IfcPresentationStyle; WHERE ApplicableOnlyToItems : SIZEOF(QUERY(temp <* AssignedItems | (SIZEOF(TYPEOF(temp) * ['IF CGEOMETRYRESOURCE. IFCGEOMETRICREPRESENTATIONITEM','IFCGEOMETRYRESOURCE. I FCMAPPEDITEM']) = 1))) = SIZEOF(AssignedItems); END_ENTITY

D.15 截 面 资 源

D.15.1 截面资源类型的 EXPRESS 描述应按表 D.15.1 的规定采用。

表 D.15.1 截面资源类型的 EXPRESS 描述

类型	EXPRESS 描述
截面类型枚举 (IfcProfileTypeEnum)	TYPE IfcProfileTypeEnum = ENUMERATION OF (CURVE, AREA); END_TYPE
钢筋角色枚举 (IfcReinforcingBar RoleEnum)	TYPE IfcReinforcingBarRoleEnum = ENUMERATION OF (MAIN, SHEAR, LIGATURE, STUD, PUNCHING, EDGE, RING, ANCHORING, USERDEFINED, NOTDEFINED); END_TYPE
钢筋表面枚举 (IfcReinforcingBar SurfaceEnum)	TYPE IfcReinforcingBarSurfaceEnum = ENUMERATION OF (PLAIN, TEXTURED); END_TYPE
截面类型枚举 (IfcSectionTypeEnum)	TYPE IfcSectionTypeEnum = ENUMERATION OF (UNIFORM, TAPERED); END_TYPE

D.15.2 截面资源实体的 EXPRESS 描述应按表 D.15.2 的规定采用。

表 D. 15. 2　截面资源实体的 EXPRESS 描述

实体	EXPRESS 描述
任意封闭截面定义（IfcArbitraryClosedProfileDef）	ENTITY IfcArbitraryClosedProfileDef SUPERTYPE OF(IfcArbitraryProfileDefWithVoids) SUBTYPE OF IfcProfileDef; OuterCurve : IfcCurve; WHERE WR1 : OuterCurve. Dim = 2; WR2 : NOT('IFCGEOMETRYRESOURCE. IFCLINE' IN TYPEOF(OuterCurve)); WR3 : NOT('IFCGEOMETRYRESOURCE. IFCOFFSETCURVE2D' IN TYPEOF(OuterCurve)); END_ENTITY
任意开放截面定义（IfcArbitraryOpenProfileDef）	ENTITY IfcArbitraryOpenProfileDef SUPERTYPE OF(IfcCenterLineProfileDef) SUBTYPE OF IfcProfileDef; Curve : IfcBoundedCurve; WHERE WR11 :('IFCPROFILERESOURCE. IFCCENTERLINEPROFILEDEF' IN TYPEOF(SELF)) OR (SELF\IfcProfileDef. ProfileType = IfcProfileTypeEnum. CURVE); WR12 : Curve. Dim = 2; END_ENTITY
任意带洞截面定义（IfcArbitraryProfileDefWithVoids）	ENTITY IfcArbitraryProfileDefWithVoids SUBTYPE OF IfcArbitraryClosedProfileDef; InnerCurves : SET [1:?] OF IfcCurve; WHERE WR1 : SELF\IfcProfileDef. ProfileType = AREA; WR2 : SIZEOF(QUERY(temp <* InnerCurves | temp. Dim <> 2)) = 0; WR3 : SIZEOF(QUERY(temp <* InnerCurves | 'IFCGEOMETRYRESOURCE. IFCLINE' IN TYPEOF(temp))) = 0; END_ENTITY
非对称工形截面定义（IfcAsymmetricIShapeProfileDef）	ENTITY IfcAsymmetricIShapeProfileDef SUBTYPE OF IfcParameterizedProfileDef; BottomFlangeWidth : IfcPositiveLengthMeasure; OverallDepth : IfcPositiveLengthMeasure; WebThickness : IfcPositiveLengthMeasure; BottomFlangeThickness : IfcPositiveLengthMeasure; BottomFlangeFilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; TopFlangeWidth : IfcPositiveLengthMeasure; TopFlangeThickness : OPTIONAL IfcPositiveLengthMeasure; TopFlangeFilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; BottomFlangeEdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; BottomFlangeSlope : OPTIONAL IfcPlaneAngleMeasure; TopFlangeEdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; TopFlangeSlope : OPTIONAL IfcPlaneAngleMeasure; WHERE ValidFlangeThickness : NOT(EXISTS(TopFlangeThickness)) OR ((BottomFlangeThickness + TopFlangeThickness) < OverallDepth); ValidWebThickness : (WebThickness < BottomFlangeWidth) AND (WebThickness < TopFlangeWidth); ValidBottomFilletRadius : (NOT(EXISTS(BottomFlangeFilletRadius))) OR (BottomFlangeFilletRadius <= (BottomFlangeWidth - WebThickness)/2.); ValidTopFilletRadius : (NOT(EXISTS(TopFlangeFilletRadius))) OR (TopFlangeFilletRadius <= (TopFlangeWidth - WebThickness)/2.); END_ENTITY
中心线截面定义（IfcCenterLineProfileDef）	ENTITY IfcCenterLineProfileDef SUBTYPE OF IfcArbitraryOpenProfileDef; Thickness : IfcPositiveLengthMeasure; END_ENTITY
中空圆形截面定义（IfcCircleHollowProfileDef）	ENTITY IfcCircleHollowProfileDef SUBTYPE OF IfcCircleProfileDef; WallThickness : IfcPositiveLengthMeasure; WHERE WR1 : WallThickness < SELF\IfcCircleProfileDef. Radius; END_ENTITY

续表 D.15.2

实体	EXPRESS 描述
圆截面定义 (IfcCircleProfileDef)	ENTITY IfcCircleProfileDef SUPERTYPE OF(IfcCircleHollowProfileDef) SUBTYPE OF IfcParameterizedProfileDef; Radius : IfcPositiveLengthMeasure; END_ENTITY
组合截面定义 (IfcComposite ProfileDef)	ENTITY IfcCompositeProfileDef SUBTYPE OF IfcProfileDef; Profiles : SET [2:?] OF IfcProfileDef; Label : OPTIONAL IfcLabel; WHERE InvariantProfileType : SIZEOF (QUERY (temp < * Profiles | temp. ProfileType <> Profiles [1] . ProfileType)) = 0; NoRecursion : SIZEOF(QUERY(temp <* Profiles |'IFCPROFILER ESOURCE. IFCCOMPOSITEPROFILEDEF' IN TYPEOF(temp))) = 0; END_ENTITY
C 形截面定义 (IfcCShapeProfileDef)	ENTITY IfcCShapeProfileDef SUBTYPE OF IfcParameterizedProfileDef; Depth : IfcPositiveLengthMeasure; Width : IfcPositiveLengthMeasure; WallThickness : IfcPositiveLengthMeasure; Girth : IfcPositiveLengthMeasure; InternalFilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; WHERE ValidGirth : Girth < (Depth / 2.); ValidInternalFilletRadius : NOT(EXISTS(InternalFilletRadius)) OR ((InternalFilletRadius <= Width/2- WallThickness) AND (InternalFilletRadius <= Depth/2 - WallThickness)); ValidWallThickness : (WallThickness < Width/2.) AND (WallThickness < Depth/2.); END_ENTITY
导出截面定义 (IfcDerivedProfileDef)	ENTITY IfcDerivedProfileDef SUPERTYPE OF(IfcMirroredProfileDef) SUBTYPE OF IfcProfileDef; ParentProfile : IfcProfileDef; Operator : IfcCartesianTransformationOperator2D; Label : OPTIONAL IfcLabel; WHERE InvariantProfileType:SELF\IfcProfileDef. ProfileType = ParentProfile. ProfileType; END_ENTITY
椭圆截面定义 (IfcEllipseProfileDef)	ENTITY IfcEllipseProfileDef SUBTYPE OF IfcParameterizedProfileDef; SemiAxis1 : IfcPositiveLengthMeasure; SemiAxis2 : IfcPositiveLengthMeasure; END_ENTITY
工形截面定义 (IfcIShapeProfileDef)	ENTITY IfcIShapeProfileDef SUBTYPE OF IfcParameterizedProfileDef; OverallWidth : IfcPositiveLengthMeasure; OverallDepth : IfcPositiveLengthMeasure; WebThickness : IfcPositiveLengthMeasure; FlangeThickness : IfcPositiveLengthMeasure; FilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; FlangeEdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; FlangeSlope : OPTIONAL IfcPlaneAngleMeasure; WHERE ValidFlangeThickness : (2 * FlangeThickness) < OverallDepth; ValidWebThickness : WebThickness < OverallWidth; ValidFilletRadius : NOT(EXISTS(FilletRadius)) OR ((FilletRadius <= (OverallWidth - WebThickness)/ 2.) AND (FilletRadius <= (OverallDepth - (2 * FlangeThickness))/2.)); END_ENTITY

续表 D.15.2

实体	EXPRESS 描述
L 形截面定义 (IfcLShapeProfileDef)	ENTITY IfcLShapeProfileDef SUBTYPE OF IfcParameterizedProfileDef; Depth : IfcPositiveLengthMeasure; Width : OPTIONAL IfcPositiveLengthMeasure; Thickness : IfcPositiveLengthMeasure; FilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; EdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; LegSlope : OPTIONAL IfcPlaneAngleMeasure; WHERE ValidThickness : (Thickness < Depth) AND (NOT(EXISTS(Width)) OR (Thickness < Width)); END_ENTITY
镜像截面定义 (IfcMirroredProfile Def)	ENTITY IfcMirroredProfileDef SUBTYPE OF IfcDerivedProfileDef; DERIVE SELF\IfcDerivedProfileDef. Operator : IfcCartesianTransformationOperator2D := IfcRepresentationItem() | | IfcGeometricRepresentationItem() || IfcCartesianTransformationOperator(- Axis1 IfcRepresentationItem () || IfcGeometricRepresentationItem() || IfcDirection([-1. , 0.]), - Axis2 IfcRepresentationItem() || Ifc GeometricRepresentationItem() || IfcDirection([0. , 1.]), - LocalOrigin IfcRepresentationItem() || IfcGe ometricRepresentationItem() || IfcPoint() || IfcCartesianPoint([0. , 0.]), - Scale 1.) || IfcCartesianTran sformationOperator2D(); END_ENTITY
参数化截面定义 (IfcParameterized ProfileDef)	ENTITY IfcParameterizedProfileDef ABSTRACT SUPERTYPE OF(ONEOF(IfcAsymmetricIShapeProfileDef, IfcCShapeProfileDef, IfcCircleProf ileDef, IfcEllipseProfileDef, IfcIShapeProfileDef, IfcLShapeProfileDef, IfcRectangleProfileDef, IfcTShapePro fileDef, IfcTrapeziumProfileDef, IfcUShapeProfileDef, IfcZShapeProfileDef)) SUBTYPE OF IfcProfileDef; Position : OPTIONAL IfcAxis2Placement2D; END_ENTITY
截面定义 (IfcProfileDef)	ENTITY IfcProfileDef SUPERTYPE OF(ONEOF(IfcArbitraryClosedProfileDef,IfcArbitraryOpenProfileDef,IfcCompositeProfileDef, IfcDerivedProfileDef, IfcParameterizedProfileDef)); ProfileType : IfcProfileTypeEnum; ProfileName : OPTIONAL IfcLabel; INVERSE HasExternalReference : SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; HasProperties : SET OF IfcProfileProperties FOR ProfileDefinition; END_ENTITY
截面属性 (IfcProfileProperties)	ENTITY IfcProfileProperties SUBTYPE OF IfcExtendedProperties; ProfileDefinition : IfcProfileDef; END_ENTITY
中空矩形截面 定义 (IfcRectangleHollow ProfileDef)	ENTITY IfcRectangleHollowProfileDef SUBTYPE OF IfcRectangleProfileDef; WallThickness : IfcPositiveLengthMeasure; InnerFilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; OuterFilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; WHERE ValidWallThickness : (WallThickness < (SELF\IfcRectangleProfileDef. XDim/2.)) AND (WallThickness < (SELF\IfcRectangleProfileDef. YDim/2.)); ValidInnerRadius : NOT(EXISTS(InnerFilletRadius)) OR ((InnerFilletRadius <= (SELF\IfcRectanglePro fileDef. XDim/2 - WallThickness)) AND (InnerFilletRadius <= (SELF\IfcRectangleProfileDef. YDim/2 -W allThickness))); ValidOuterRadius : NOT(EXISTS(OuterFilletRadius)) OR ((OuterFilletRadius <= (SELF\IfcRectangleP rofileDef. XDim/2.)) AND (OuterFilletRadius <= (SELF\IfcRectangleProfileDef. YDim/2.))); END_ENTITY

续表 D.15.2

实体	EXPRESS 描述
矩形截面定义（IfcRectangleProfileDef）	ENTITY IfcRectangleProfileDef SUPERTYPE OF(ONEOF(IfcRectangleHollowProfileDef, IfcRoundedRectangleProfileDef)) SUBTYPE OF IfcParameterizedProfileDef; XDim : IfcPositiveLengthMeasure; YDim : IfcPositiveLengthMeasure; END_ENTITY
钢筋属性（IfcReinforcementBarProperties）	ENTITY IfcReinforcementBarProperties SUBTYPE OF IfcPreDefinedProperties; TotalCrossSectionArea : IfcAreaMeasure; SteelGrade : IfcLabel; BarSurface : OPTIONAL IfcReinforcingBarSurfaccEnum; EffectiveDepth : OPTIONAL IfcLengthMeasure; NominalBarDiameter : OPTIONAL IfcPositiveLengthMeasure; BarCount : OPTIONAL IfcCountMeasure; END_ENTITY
圆角矩形截面定义（IfcRoundedRectangleProfileDef）	ENTITY IfcRoundedRectangleProfileDef SUBTYPE OF IfcRectangleProfileDef; RoundingRadius : IfcPositiveLengthMeasure; WHERE ValidRadius : ((RoundingRadius <= (SELF\IfcRectangleProfileDef. XDim/2.)) AND (RoundingRadius <= (SELF\IfcRectangleProfileDef. YDim/2.))); END_ENTITY
横截面属性（IfcSectionProperties）	ENTITY IfcSectionProperties SUBTYPE OF IfcPreDefinedProperties; SectionType : IfcSectionTypeEnum; StartProfile : IfcProfileDef; EndProfile : OPTIONAL IfcProfileDef; END_ENTITY
横截面钢筋属性（IfcSectionReinforcementProperties）	ENTITY IfcSectionReinforcementProperties SUBTYPE OF IfcPreDefinedProperties; LongitudinalStartPosition : IfcLengthMeasure; LongitudinalEndPosition : IfcLengthMeasure; TransversePosition : OPTIONAL IfcLengthMeasure; ReinforcementRole : IfcReinforcingBarRoleEnum; SectionDefinition : IfcSectionProperties; CrossSectionReinforcementDefinitions : SET [1:?] OF IfcReinforcementBarProperties; END_ENTITY
梯形截面定义（IfcTrapeziumProfileDef）	ENTITY IfcTrapeziumProfileDef SUBTYPE OF IfcParameterizedProfileDef; BottomXDim : IfcPositiveLengthMeasure; TopXDim : IfcPositiveLengthMeasure; YDim : IfcPositiveLengthMeasure; TopXOffset : IfcLengthMeasure; END_ENTITY
T 形截面定义（IfcTShapeProfileDef）	ENTITY IfcTShapeProfileDef SUBTYPE OF IfcParameterizedProfileDef; Depth : IfcPositiveLengthMeasure; FlangeWidth : IfcPositiveLengthMeasure; WebThickness : IfcPositiveLengthMeasure; FlangeThickness : IfcPositiveLengthMeasure; FilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; FlangeEdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; WebEdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; WebSlope : OPTIONAL IfcPlaneAngleMeasure; FlangeSlope : OPTIONAL IfcPlaneAngleMeasure; WHERE ValidFlangeThickness : FlangeThickness < Depth; ValidWebThickness : WebThickness < FlangeWidth; END_ENTITY

续表 D.15.2

实体	EXPRESS 描述
U形截面定义 (IfcUShape ProfileDef)	ENTITY IfcUShapeProfileDef SUBTYPE OF IfcParameterizedProfileDef; Depth : IfcPositiveLengthMeasure; FlangeWidth : IfcPositiveLengthMeasure; WebThickness : IfcPositiveLengthMeasure; FlangeThickness : IfcPositiveLengthMeasure; FilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; EdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; FlangeSlope : OPTIONAL IfcPlaneAngleMeasure; WHERE ValidFlangeThickness : FlangeThickness < (Depth / 2.); ValidWebThickness : WebThickness < FlangeWidth; END_ENTITY
Z形截面定义 (IfcZShapeProfile Def)	ENTITY IfcZShapeProfileDef SUBTYPE OF IfcParameterizedProfileDef; Depth : IfcPositiveLengthMeasure; FlangeWidth : IfcPositiveLengthMeasure; WebThickness : IfcPositiveLengthMeasure; FlangeThickness : IfcPositiveLengthMeasure; FilletRadius : OPTIONAL IfcNonNegativeLengthMeasure; EdgeRadius : OPTIONAL IfcNonNegativeLengthMeasure; WHERE ValidFlangeThickness : FlangeThickness < (Depth / 2.); END_ENTITY

D.16 属 性 资 源

D.16.1 属性资源类型的 EXPRESS 描述应按表 D.16.1 的规定采用。

表 D.16.1 属性资源类型的 EXPRESS 描述

类型	EXPRESS 描述
插值曲线枚举 (IfcCurveInterpolation Enum)	TYPE IfcCurveInterpolationEnum = ENUMERATION OF (LINEAR, LOG_LINEAR, LOG_LOG, NOTDEFINED); END_TYPE
对象引用选择 (IfcObjectReference Select)	TYPE IfcObjectReferenceSelect = SELECT (IfcMaterialDefinition, IfcPerson, IfcOrganization, IfcPersonAndOrganization, IfcExternalReference, IfcTimeSeries, IfcAddress, IfcAppliedValue, IfcTable); END_TYPE

D.16.2 属性资源实体的 EXPRESS 描述应按表 D.16.2 的规定采用。

表 D.16.2 属性资源实体的 EXPRESS 描述

实体	EXPRESS 描述
复杂属性 (IfcComplex Property)	ENTITY IfcComplexProperty SUBTYPE OF IfcProperty; UsageName : IfcIdentifier; HasProperties : SET [1:?] OF IfcProperty; WHERE WR21 : SIZEOF(QUERY(temp <* HasProperties | SELF :=: temp)) = 0; WR22 : IfcUniquePropertyName(HasProperties); END_ENTITY

续表 D.16.2

实体	EXPRESS 描述
扩展属性(IfcExtendedProperties)	ENTITY IfcExtendedProperties ABSTRACT SUPERTYPE OF(ONEOF(IfcMaterialProperties, IfcProfileProperties)) SUBTYPE OF IfcPropertyAbstraction; Name : OPTIONAL IfcIdentifier; Description : OPTIONAL IfcText; Properties : SET [1:?] OF IfcProperty; END_ENTITY
预定义属性(IfcPreDefinedProperties)	ENTITY IfcPreDefinedProperties ABSTRACT SUPERTYPE OF(ONEOF(IfcReinforcementBarProperties, IfcSectionProperties, IfcSectionReinforcementProperties)) SUBTYPE OF IfcPropertyAbstraction; END_ENTITY
属性(IfcProperty)	ENTITY IfcProperty ABSTRACT SUPERTYPE OF(ONEOF(IfcComplexProperty, IfcSimpleProperty)) SUBTYPE OF IfcPropertyAbstraction; Name : IfcIdentifier; Description : OPTIONAL IfcText; INVERSE PartOfPset : SET OF IfcPropertySet FOR HasProperties; PropertyForDependance : SET OF IfcPropertyDependencyRelationship FOR DependingProperty; PropertyDependsOn : SET OF IfcPropertyDependencyRelationship FOR DependantProperty; PartOfComplex : SET OF IfcComplexProperty FOR HasProperties; END_ENTITY
抽象属性(IfcPropertyAbstraction)	ENTITY IfcPropertyAbstraction ABSTRACT SUPERTYPE OF(ONEOF(IfcExtendedProperties, IfcPreDefinedProperties, IfcProperty, IfcPropertyEnumeration)); INVERSE HasExternalReferences : SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; END_ENTITY
有界值属性(IfcPropertyBoundedValue)	ENTITY IfcPropertyBoundedValue SUBTYPE OF IfcSimpleProperty; UpperBoundValue : OPTIONAL IfcValue; LowerBoundValue : OPTIONAL IfcValue; Unit : OPTIONAL IfcUnit; SetPointValue : OPTIONAL IfcValue; WHERE SameUnitUpperLower : NOT(EXISTS(UpperBoundValue)) OR NOT(EXISTS(LowerBoundValue)) OR (TYPEOF(UpperBoundValue) = TYPEOF(LowerBoundValue)); SameUnitUpperSet : NOT(EXISTS(UpperBoundValue)) OR NOT(EXISTS(SetPointValue)) OR (TYPEOF(UpperBoundValue) = TYPEOF(SetPointValue)); SameUnitLowerSet : NOT(EXISTS(LowerBoundValue)) OR NOT(EXISTS(SetPointValue)) OR (TYPEOF(LowerBoundValue) = TYPEOF(SetPointValue)); END_ENTITY
关系依赖属性(IfcPropertyDependencyRelationship)	ENTITY IfcPropertyDependencyRelationship SUBTYPE OF IfcResourceLevelRelationship; DependingProperty : IfcProperty; DependantProperty : IfcProperty; EXPRESSion : OPTIONAL IfcText; WHERE NoSelfReference : DependingProperty :<>: DependantProperty; END_ENTITY
枚举属性值(IfcPropertyEnumeratedValue)	ENTITY IfcPropertyEnumeratedValue SUBTYPE OF IfcSimpleProperty; EnumerationValues : OPTIONAL LIST [1:?] OF IfcValue; EnumerationReference : OPTIONAL IfcPropertyEnumeration; WHERE WR21 : NOT(EXISTS(EnumerationReference)) OR NOT(EXISTS(EnumerationValues)) OR (SIZEOF(QUERY(temp <* EnumerationValues | temp IN EnumerationReference.EnumerationValues)) = SIZEOF(EnumerationValues)); END_ENTITY

续表 D.16.2

实体	EXPRESS 描述
属性枚举 (IfcProperty Enumeration)	ENTITY IfcPropertyEnumeration SUBTYPE OF IfcPropertyAbstraction; Name : IfcLabel; EnumerationValues : LIST [1:?] OF UNIQUE IfcValue; Unit : OPTIONAL IfcUnit; UNIQUE UR1 : Name; WHERE WR01 : SIZEOF(QUERY(temp <* SELF. EnumerationValues | NOT(TYPEOF(SELF. EnumerationValues[1]) = TYPEOF(temp)))) = 0; END_ENTITY
属性列表值 (IfcPropertyList Value)	ENTITY IfcPropertyListValue SUBTYPE OF IfcSimpleProperty; ListValues : OPTIONAL LIST [1:?] OF IfcValue; Unit : OPTIONAL IfcUnit; WHERE WR31 : SIZEOF(QUERY(temp <* SELF. ListValues | NOT(TYPEOF(SELF. ListValues[1]) = TYPEOF(temp)))) = 0; END_ENTITY
引用值属性 (IfcPropertyReference Value)	ENTITY IfcPropertyReferenceValue SUBTYPE OF IfcSimpleProperty; UsageName : OPTIONAL IfcText; PropertyReference : OPTIONAL IfcObjectReferenceSelect; END_ENTITY
单值属性 (IfcPropertySingle Value)	ENTITY IfcPropertySingleValue SUBTYPE OF IfcSimpleProperty; NominalValue : OPTIONAL IfcValue; Unit : OPTIONAL IfcUnit; END_ENTITY
表值属性 (IfcPropertyTable Value)	ENTITY IfcPropertyTableValue SUBTYPE OF IfcSimpleProperty; DefiningValues : OPTIONAL LIST [1:?] OF UNIQUE IfcValue; DefinedValues : OPTIONAL LIST [1:?] OF IfcValue; EXPRESSion : OPTIONAL IfcText; DefiningUnit : OPTIONAL IfcUnit; DefinedUnit : OPTIONAL IfcUnit; CurveInterpolation : OPTIONAL IfcCurveInterpolationEnum; WHERE WR21 : (NOT(EXISTS(DefiningValues)) AND NOT(EXISTS(DefinedValues))) OR (SIZEOF(DefiningValues) = SIZEOF(DefinedValues)); WR22 : NOT(EXISTS(DefiningValues)) OR (SIZEOF(QUERY(temp <* SELF. DefiningValues | TYPEOF(temp) <> TYPEOF(SELF. DefiningValues[1]))) = 0); WR23 : NOT(EXISTS(DefinedValues)) OR (SIZEOF(QUERY(temp <* SELF. DefinedValues | TYPEOF(temp) <> TYPEOF(SELF. DefinedValues[1]))) = 0); END_ENTITY
简单属性 (IfcSimpleProperty)	ENTITY IfcSimpleProperty ABSTRACT SUPERTYPE OF(ONEOF(IfcPropertyBoundedValue, IfcPropertyEnumeratedValue, IfcPropertyListValue, IfcPropertyReferenceValue, IfcPropertySingleValue, IfcPropertyTableValue)) SUBTYPE OF IfcProperty; END_ENTITY

D.16.3 属性资源应采用属性名称唯一性函数，函数的 EXPRESS 描述应符合下列规定：

```
FUNCTION IfcUniquePropertyName
    (Properties : SET [1:?] OF IfcProperty)
    :BOOLEAN; LOCAL tmp : GENERIC; END_LOCAL; RETURN(tmp);
END_FUNCTION
```

D.17 数 量 资 源

D.17.1 数量资源实体的 EXPRESS 描述应按表 D.17.1 的规定采用。

表 D.17.1 数量资源实体的 EXPRESS 描述

实体	EXPRESS 描述
复杂物理量 (IfcPhysicalComplex Quantity)	ENTITY IfcPhysicalComplexQuantity SUBTYPE OF IfcPhysicalQuantity; HasQuantities : SET [1:?] OF IfcPhysicalQuantity; Discrimination : IfcLabel; Quality : OPTIONAL IfcLabel; Usage : OPTIONAL IfcLabel; WHERE NoSelfReference : SIZEOF(QUERY(temp <* HasQuantities | SELF :=: temp)) = 0; UniqueQuantityNames : IfcUniqueQuantityNames(HasQuantities); END_ENTITY
物理量 (IfcPhysicalQuantity)	ENTITY IfcPhysicalQuantity ABSTRACT SUPERTYPE OF(ONEOF(IfcPhysicalComplexQuantity, IfcPhysicalSimpleQuantity)); Name : IfcLabel; Description : OPTIONAL IfcText; INVERSE HasExternalReferences : SET OF IfcExternalReferenceRelationship FOR RelatedResourceObjects; PartOfComplex : SET [0:1] OF IfcPhysicalComplexQuantity FOR HasQuantities; END_ENTITY
简单物理量 (IfcPhysicalSimple Quantity)	ENTITY IfcPhysicalSimpleQuantity ABSTRACT SUPERTYPE OF(ONEOF(IfcQuantityArea, IfcQuantityCount, IfcQuantityLength, IfcQuantityTime, IfcQuantityVolume, IfcQuantityWeight)) SUBTYPE OF IfcPhysicalQuantity; Unit : OPTIONAL IfcNamedUnit; END_ENTITY
面积数量 (IfcQuantityArea)	ENTITY IfcQuantityArea SUBTYPE OF IfcPhysicalSimpleQuantity; AreaValue : IfcAreaMeasure; Formula : OPTIONAL IfcLabel; WHERE WR21 : NOT(EXISTS(SELF\IfcPhysicalSimpleQuantity.Unit)) OR (SELF\IfcPhysicalSimpleQuantity.Unit.UnitType = IfcUnitEnum.AREAUNIT); WR22 : AreaValue >= 0.; END_ENTITY
计数 (IfcQuantityCount)	ENTITY IfcQuantityCount SUBTYPE OF IfcPhysicalSimpleQuantity; CountValue : IfcCountMeasure; Formula : OPTIONAL IfcLabel; WHERE WR21 : CountValue >= 0.; END_ENTITY
长度数量 (IfcQuantityLength)	ENTITY IfcQuantityLength SUBTYPE OF IfcPhysicalSimpleQuantity; LengthValue : IfcLengthMeasure; Formula : OPTIONAL IfcLabel; WHERE WR21 : NOT(EXISTS(SELF\IfcPhysicalSimpleQuantity.Unit)) OR (SELF\IfcPhysicalSimpleQuantity.Unit.UnitType = IfcUnitEnum.LENGTHUNIT); WR22 : LengthValue >= 0.; END_ENTITY

续表 D.17.1

实体	EXPRESS 描述
时间数量 (IfcQuantityTime)	ENTITY IfcQuantityTime SUBTYPE OF IfcPhysicalSimpleQuantity; TimeValue : IfcTimeMeasure; Formula : OPTIONAL IfcLabel; WHERE WR21 : NOT(EXISTS(SELF\IfcPhysicalSimpleQuantity. Unit)) OR (SELF\IfcPhysicalSimpleQuantity. Unit. UnitType = IfcUnitEnum. TIMEUNIT); WR22 : TimeValue >= 0. ; END_ENTITY
体积数量 (IfcQuantityVolume)	ENTITY IfcQuantityVolume SUBTYPE OF IfcPhysicalSimpleQuantity; VolumeValue : IfcVolumeMeasure; Formula : OPTIONAL IfcLabel; WHERE WR21 : NOT(EXISTS(SELF\IfcPhysicalSimpleQuantity. Unit)) OR (SELF\IfcPhysicalSimpleQuantity. Unit. UnitType = IfcUnitEnum. VOLUMEUNIT); WR22 : VolumeValue >= 0. ; END_ENTITY
重量数量 (IfcQuantityWeight)	ENTITY IfcQuantityWeight SUBTYPE OF IfcPhysicalSimpleQuantity; WeightValue : IfcMassMeasure; Formula : OPTIONAL IfcLabel; WHERE WR21 : NOT(EXISTS(SELF\IfcPhysicalSimpleQuantity. Unit)) OR (SELF\IfcPhysicalSimpleQuantity. Unit. UnitType = IfcUnitEnum. MASSUNIT); WR22 : WeightValue >= 0. ; END_ENTITY

D.17.2 数量资源应采用数量名称唯一性函数，函数的 EXPRESS 描述应符合下列规定：

```
FUNCTION IfcUniqueQuantityNames
    (Properties : SET [1:?] OF IfcPhysicalQuantity)
    : LOGICAL; LOCAL tmp : GENERIC; END_LOCAL; RETURN (tmp);
END_FUNCTION
```

D.18 表 达 资 源

D.18.1 表达资源类型的 EXPRESS 描述应按表 D.18.1 的规定采用。

表 D.18.1 表达资源类型的 EXPRESS 描述

类型	EXPRESS 描述
几何投影枚举 (IfcGeometric ProjectionEnum)	TYPE IfcGeometricProjectionEnum = ENUMERATION OF (GRAPH_VIEW, SKETCH_VIEW, MODEL_VIEW, PLAN_VIEW, REFLECTED_PLAN_VIEW, SECTION_VIEW, ELEVATION_VIEW, USERDEFINED, NOTDEFINED); END_TYPE

续表 D.18.1

类型	EXPRESS 描述
全局局部枚举（IfcGlobalOrLocalEnum）	TYPE IfcGlobalOrLocalEnum = ENUMERATION OF (GLOBAL_COORDS, LOCAL_COORDS); END_TYPE
坐标系引用选择（IfcCoordinateReferenceSystemSelect）	TYPE IfcCoordinateReferenceSystemSelect = SELECT (IfcCoordinateReferenceSystem, IfcGeometricRepresentationContext); END_TYPE
产品表达选择（IfcProductRepresentationSelect）	TYPE IfcProductRepresentationSelect = SELECT (IfcProductDefinitionShape, IfcRepresentationMap); END_TYPE

D.18.2 表达资源实体的 EXPRESS 描述应按表 D.18.2 的规定采用。

表 D.18.2 表达资源实体的 EXPRESS 描述

实体	EXPRESS 描述
坐标系转换（IfcCoordinateOperation）	ENTITY IfcCoordinateOperation ABSTRACT SUPERTYPE OF(IfcMapConversion); SourceCRS : IfcCoordinateReferenceSystemSelect; TargetCRS : IfcCoordinateReferenceSystem; END_ENTITY
引用坐标系（IfcCoordinateReferenceSystem）	ENTITY IfcCoordinateReferenceSystem ABSTRACT SUPERTYPE OF(IfcProjectedCRS); Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; GeodeticDatum : IfcIdentifier; VerticalDatum : OPTIONAL IfcIdentifier; END_ENTITY
几何表达相关环境（IfcGeometricRepresentationContext）	ENTITY IfcGeometricRepresentationContext SUPERTYPE OF(IfcGeometricRepresentationSubContext) SUBTYPE OF IfcRepresentationContext; CoordinateSpaceDimension : IfcDimensionCount; Precision : OPTIONAL REAL; WorldCoordinateSystem : IfcAxis2Placement; TrueNorth : OPTIONAL IfcDirection; INVERSE HasSubContexts : SET OF IfcGeometricRepresentationSubContext FOR ParentContext; WHERE WR11 : NOT(EXISTS(TrueNorth)) OR (HIINDEX(TrueNorth.DirectionRatios) = 2); END_ENTITY
几何表达相关子环境（IfcGeometricRepresentationSubContext）	ENTITY IfcGeometricRepresentationSubContext SUBTYPE OF IfcGeometricRepresentationContext; ParentContext : IfcGeometricRepresentationContext; TargetScale : OPTIONAL IfcPositiveRatioMeasure; TargetView : IfcGeometricProjectionEnum; UserDefinedTargetView : OPTIONAL IfcLabel; DERIVE SELF\IfcGeometricRepresentationContext.WorldCoordinateSystem : IfcAxis2Placement := ParentContext.WorldCoordinateSystem; SELF\IfcGeometricRepresentationContext.CoordinateSpaceDimension : IfcDimensionCount := ParentContext.CoordinateSpaceDimension; SELF\IfcGeometricRepresentationContext.TrueNorth : IfcDirection := NVL(ParentContext.TrueNorth, IfcConvertDirectionInto2D (SELF\IfcGeometricRepresentationContext.WorldCoordinateSystem.P[2])); SELF\IfcGeometricRepresentationContext.Precision : REAL := NVL(ParentContext.Precision,1.E-5); WHERE WR31 : NOT('IFCREPRESENTATIONRESOURCE.IFCGEOMETRICREPRESENTATIONSUBCONTEXT'IN TYPEOF(ParentContext)); WR32 : (TargetView <> IfcGeometricProjectionEnum.USERDEFINED) OR ((TargetView = IfcGeometricProjectionEnum.USERDEFINED) AND EXISTS(UserDefinedTargetView)); END_ENTITY

续表 D.18.2

实体	EXPRESS 描述
映射(地图)转换 (IfcMapConversion)	ENTITY IfcMapConversion SUBTYPE OF IfcCoordinateOperation; Eastings : IfcLengthMeasure; Northings : IfcLengthMeasure; OrthogonalHeight : IfcLengthMeasure; XAxisAbscissa : OPTIONAL IfcReal; XAxisOrdinate : OPTIONAL IfcReal; Scale : OPTIONAL IfcReal; END_ENTITY
材料定义表达 (IfcMaterialDefinition Representation)	ENTITY IfcMaterialDefinitionRepresentation SUBTYPE OF IfcProductRepresentation; RepresentedMaterial : IfcMaterial; WHERE OnlyStyledRepresentations : SIZEOF(QUERY(temp <* Representations | (NOT('IFCREPRESENTATIONRESOURCE.IFCSTYLEDREPRESENTATION' IN TYPEOF(temp))))) = 0; END_ENTITY
产品定义形状 (IfcProductDefinition Shape)	ENTITY IfcProductDefinitionShape SUBTYPE OF IfcProductRepresentation; INVERSE ShapeOfProduct : SET [1:?] OF IfcProduct FOR Representation; HasShapeAspects : SET OF IfcShapeAspect FOR PartOfProductDefinitionShape; WHERE OnlyShapeModel : SIZEOF(QUERY(temp <* Representations | (NOT('IFCREPRESENTATIONRESOURCE.IFCSHAPEMODEL' IN TYPEOF(temp))))) = 0; END_ENTITY
产品表达 (IfcProductRepresentation)	ENTITY IfcProductRepresentation ABSTRACT SUPERTYPE OF(ONEOF(IfcMaterialDefinitionRepresentation, IfcProductDefinitionShape)); Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; Representations : LIST [1:?] OF IfcRepresentation; END_ENTITY
投影坐标系 (IfcProjectedCRS)	ENTITY IfcProjectedCRS SUBTYPE OF IfcCoordinateReferenceSystem; MapProjection : OPTIONAL IfcIdentifier; MapZone : OPTIONAL IfcIdentifier; MapUnit : OPTIONAL IfcNamedUnit; WHERE WR11 : NOT(EXISTS(MapUnit)) OR (MapUnit.UnitType = IfcUnitEnum.LENGTHUNIT); END_ENTITY
表达 (IfcRepresentation)	ENTITY IfcRepresentation ABSTRACT SUPERTYPE OF(ONEOF(IfcShapeModel, IfcStyleModel)); ContextOfItems : IfcRepresentationContext; RepresentationIdentifier : OPTIONAL IfcLabel; RepresentationType : OPTIONAL IfcLabel; Items : SET [1:?] OF IfcRepresentationItem; INVERSE RepresentationMap : SET [0:1] OF IfcRepresentationMap FOR MappedRepresentation; LayerAssignments : SET OF IfcPresentationLayerAssignment FOR AssignedItems; OfProductRepresentation : SET OF IfcProductRepresentation FOR Representations; END_ENTITY
表达环境 (IfcRepresentationContext)	ENTITY IfcRepresentationContext ABSTRACT SUPERTYPE OF(IfcGeometricRepresentationContext); ContextIdentifier : OPTIONAL IfcLabel; ContextType : OPTIONAL IfcLabel; INVERSE RepresentationsInContext : SET OF IfcRepresentation FOR ContextOfItems; END_ENTITY

续表 D.18.2

实体	EXPRESS 描述
形状方面 (IfcShapeAspect)	ENTITY IfcShapeAspect; ShapeRepresentations : LIST [1:?] OF IfcShapeModel; Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; ProductDefinitional : LOGICAL; PartOfProductDefinitionShape : OPTIONAL IfcProductRepresentationSelect; END_ENTITY
形状模型 (IfcShapeModel)	ENTITY IfcShapeModel ABSTRACT SUPERTYPE OF(ONEOF(IfcShapeRepresentation, IfcTopologyRepresentation)) SUBTYPE OF IfcRepresentation; INVERSE OfShapeAspect : SET [0:1] OF IfcShapeAspect FOR ShapeRepresentations; WHERE WR11 : (SIZEOF(SELF\IfcRepresentation.OfProductRepresentation) = 1) XOR (SIZEOF(SELF\IfcRepresentation.RepresentationMap) = 1) XOR (SIZEOF(OfShapeAspect) = 1); END_ENTITY
形状表达(IfcShapeRepresentation)	ENTITY IfcShapeRepresentation SUBTYPE OF IfcShapeModel; WHERE WR21 :'IFCREPRESENTATIONRESOURCE.IFCGEOMETRICREPRESENTATIONCONTEXT' IN TYPEOF(SELF\IfcRepresentation.ContextOfItems); WR22 : SIZEOF(QUERY(temp <* Items |('IFCTOPOLOGYRESOURCE.IFCTOPOLOGICALREPRESENTATIONITEM' IN TYPEOF(temp)) AND (NOT(SIZEOF(['IFCTOPOLOGYRESOURCE.IFCVERTEXPOINT','IFCTOPOLOGYRESOURCE.IFCEDGECURVE','IFCTOPOLOGYRESOURCE.IFCFACESURFACE'] * TYPEOF(temp)) = 1)))) = 0; WR23 : EXISTS(SELF\IfcRepresentation.RepresentationType); WR24 : IfcShapeRepresentationTypes(SELF\IfcRepresentation.RepresentationType, SELF\IfcRepresentation.Items); END_ENTITY
样式表达 (IfcStyledRepresentation)	ENTITY IfcStyledRepresentation SUBTYPE OF IfcStyleModel; WHERE OnlyStyledItems : SIZEOF(QUERY(temp <* SELF\IfcRepresentation.Items	(NOT('IFCPRESENTATIONAPPEARANCERESOURCE.IFCSTYLEDITEM' IN TYPEOF(temp))))) = 0; END_ENTITY
样式模型 (IfcStyleModel)	ENTITY IfcStyleModel ABSTRACT SUPERTYPE OF(IfcStyledRepresentation) SUBTYPE OF IfcRepresentation; END_ENTITY
拓扑表达 (IfcTopologyRepresentation)	ENTITY IfcTopologyRepresentation SUBTYPE OF IfcShapeModel; WHERE WR21 : SIZEOF(QUERY(temp <* SELF\IfcRepresentation.Items	NOT('IFCTOPOLOGYRESOURCE.IFCTOPOLOGICALREPRESENTATIONITEM' IN TYPEOF(temp)))) = 0 ; WR22 : EXISTS(SELF\IfcRepresentation.RepresentationType); WR23 : IfcTopologyRepresentationTypes(SELF\IfcRepresentation.RepresentationType, SELF\IfcRepresentation.Items); END_ENTITY

D.18.3 表达资源函数的 EXPRESS 描述应按表 D.18.3 的规定采用。

表 D.18.3　表达资源函数的 EXPRESS 描述

函数	EXPRESS 描述
转换方向至二维 (IfcConvertDirectionInto2D)	FUNCTION IfcConvertDirectionInto2D (Direction : IfcDirection) : IfcDirection; LOCAL Direction2D : IfcDirection := IfcRepresentationItem() || IfcGeometricRepresentationItem () || IfcDirection([0.,1.]); END_LOCAL; Direction2D.DirectionRatios[1] := Direction.DirectionRatios[1]; Direction2D.DirectionRatios[2] := Direction.DirectionRatios[2]; RETURN (Direction2D); END_FUNCTION
同轴 2 方位 (IfcSameAxis2Placement)	FUNCTION IfcSameAxis2Placement (ap1, ap2 : IfcAxis2Placement; Epsilon : REAL) : LOGICAL ; RETURN (IfcSameDirection(ap1.P[1],ap2.P[1],Epsilon) AND IfcSameDirection(ap1.P[2],ap2.P[2],Epsilon) AND IfcSameCartesianPoint(ap1.Location,ap1.Location,Epsilon)); END_FUNCTION

同笛卡尔点
(IfcSameCartesianPoint)
	FUNCTION IfcSameCartesianPoint
	(cp1, cp2 : IfcCartesianPoint; Epsilon : REAL)
	: LOGICAL;
	LOCAL
	cp1x : REAL := cp1.Coordinates[1];
	cp1y : REAL := cp1.Coordinates[2];
	cp1z : REAL := 0;
	cp2x : REAL := cp2.Coordinates[1];
	cp2y : REAL := cp2.Coordinates[2];
	cp2z : REAL := 0;
	END_LOCAL;
	IF (SIZEOF(cp1.Coordinates) > 2) THEN
	cp1z := cp1.Coordinates[3];
	END_IF;
	IF (SIZEOF(cp2.Coordinates) > 2) THEN
	cp2z := cp2.Coordinates[3];
	END_IF;
	RETURN (IfcSameValue(cp1x,cp2x,Epsilon) AND
	IfcSameValue(cp1y,cp2y,Epsilon) AND
	IfcSameValue(cp1z,cp2z,Epsilon));
	END_FUNCTION

同方向
(IfcSameDirection)
	FUNCTION IfcSameDirection
	(dir1, dir2 : IfcDirection; Epsilon : REAL)
	: LOGICAL;
	LOCAL
	dir1x : REAL := dir1.DirectionRatios[1];
	dir1y : REAL := dir1.DirectionRatios[2];
	dir1z : REAL := 0;
	dir2x : REAL := dir2.DirectionRatios[1];
	dir2y : REAL := dir2.DirectionRatios[2];
	dir2z : REAL := 0;
	END_LOCAL;
	IF (SIZEOF(dir1.DirectionRatios) > 2) THEN
	dir1z := dir1.DirectionRatios[3];
	END_IF;
	IF (SIZEOF(dir2.DirectionRatios) > 2) THEN
	dir2z := dir2.DirectionRatios[3];
	END_IF;
	RETURN (IfcSameValue(dir1x,dir2x,Epsilon) AND
	IfcSameValue(dir1y,dir2y,Epsilon) AND
	IfcSameValue(dir1z,dir2z,Epsilon));
	END_FUNCTION

续表 D.18.3

函数	EXPRESS 描述
同有效精度 (IfcSameValidPrecision)	FUNCTION IfcSameValidPrecision (Epsilon1, Epsilon2 : REAL) : LOGICAL ; LOCAL ValidEps1, ValidEps2 : REAL; DefaultEps : REAL := 0.000001; DerivationOfEps : REAL := 1.001; UpperEps : REAL := 1.0; END_LOCAL; ValidEps1 := NVL(Epsilon1, DefaultEps); ValidEps2 := NVL(Epsilon2, DefaultEps); RETURN ((0.0 < ValidEps1) AND (ValidEps1 <= (DerivationOfEps * ValidEps2)) AND (ValidEps2 <= (DerivationOfEps * ValidEps1)) AND (ValidEps2 < UpperEps)); END_FUNCTION
同值 (IfcSameValue)	FUNCTION IfcSameValue (Value1, Value2 : REAL; Epsilon : REAL) : LOGICAL; LOCAL ValidEps : REAL; DefaultEps : REAL := 0.000001; END_LOCAL; ValidEps := NVL(Epsilon, DefaultEps); RETURN ((Value1 + ValidEps > Value2) AND (Value1 < Value2 + ValidEps)); END_FUNCTION

形状表达类型
(IfcShapeRepresentationTypes)
	FUNCTION IfcShapeRepresentationTypes
	(RepType : IfcLabel; Items : SET OF IfcRepresentationItem) : LOGICAL;
	LOCAL
	Count : INTEGER := 0;
	END_LOCAL;
	CASE RepType OF
	'Point' :
	BEGIN
	Count := SIZEOF(QUERY(temp < * Items |('IFCGEOMETRYRESOURCE. IFCPOINT' IN TYPEOF(temp))));
	END;
	'PointCloud' :
	BEGIN
	Count := SIZEOF(QUERY(temp < * Items |('IFCGEOMETRYRESOURCE. IFCCARTESIANPOINTLIST3D' IN TYPEOF(temp))));
	END;
	'Curve' :
	BEGIN
	Count := SIZEOF(QUERY(temp < * Items |('IFCGEOMETRYRESOURCE. IFCCURVE' IN TYPEOF(temp))));
	END;
	'Curve2D' :
	BEGIN
	Count := SIZEOF(QUERY(temp < * Items |('IFCGEOMETRYRESOURCE. IFCCURVE' IN TYPEOF(temp))
	AND (temp\IfcCurve. Dim = 2)));
	END;
	'Curve3D' :
	BEGIN
	Count := SIZEOF(QUERY(temp < * Items |('IFCGEOMETRYRESOURCE. IFCCURVE' IN TYPEOF(temp))
	AND (temp\IfcCurve. Dim = 3)));
	END;
	'Surface' :
	BEGIN
	Count := SIZEOF(QUERY(temp < * Items |('IFCGEOMETRYRESOURCE. IFCSURFACE' IN TYPEOF(temp)));

续表 D.18.3

函数	EXPRESS 描述

形状表达类型（IfcShapeRepresentationTypes）	END;
	'Surface2D':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRYRESOURCE.IFCSURFACE' IN TYPEOF(temp))
	AND (temp\IfcSurface.Dim = 2)));
	END;
	'Surface3D':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRYRESOURCE.IFCSURFACE' IN TYPEOF(temp))
	AND (temp\IfcSurface.Dim = 3)));
	END;
	'FillArea':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRYRESOURCE.IFCANNOTATIONFILLAREA' IN TYPEOF(temp))));
	END;
	'Text':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRYRESOURCE.IFCTEXTLITERAL' IN TYPEOF(temp))));
	END;
	'AdvancedSurface':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |'IFCGEOMETRYRESOURCE.IFCBSPLINESURFACE' IN TYPEOF(temp)));
	END;
	'Annotation2D':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items
		(
		SIZEOF(TYPEOF(temp) * [
		'IFCGEOMETRYRESOURCE.IFCPOINT',
		'IFCGEOMETRYRESOURCE.IFCCURVE',
		'IFCGEOMETRICMODELRESOURCE.IFCGEOMETRICCURVESET',
		'IFCPRESENTATIONDEFINITIONRESOURCE.IFCANNOTATIONFILLAREA',
		'IFCPRESENTATIONDEFINITIONRESOURCE.IFCTEXTLITERAL']) = 1)
		));
		END;
		'GeometricSet':
		BEGIN
		Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE.IFCGEOMETRICSET' IN TYPEOF(temp))
		OR('IFCGEOMETRYRESOURCE.IFCPOINT' IN TYPEOF(temp))
		OR('IFCGEOMETRYRESOURCE.IFCCURVE' IN TYPEOF(temp))
		OR('IFCGEOMETRYRESOURCE.IFCSURFACE' IN TYPEOF(temp))));
		END;
		'GeometricCurveSet':
		BEGIN
		Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE.IFCGEOMETRICCURVESET' IN TYPEOF(temp))
		OR('IFCGEOMETRICMODELRESOURCE.IFCGEOMETRICSET' IN TYPEOF(temp))
		OR('IFCGEOMETRYRESOURCE.IFCPOINT' IN TYPEOF(temp))
		OR('IFCGEOMETRYRESOURCE.IFCCURVE' IN TYPEOF(temp))));
		REPEAT i:=1 TO HIINDEX(Items);
		IF('IFCGEOMETRYRESOURCE.IFCGEOMETRICSET' IN TYPEOF(Items[i]))
		THEN
		IF (SIZEOF(QUERY(temp <* Items[i]\IfcGeometricSet.Elements |'IFCGEOMETRYRESOURCE.IFCSURFACE' IN TYPEOF(temp))) > 0)

续表 D.18.3

函数	EXPRESS 描述

形状表达类型(IfcShapeRepresentationTypes)	THEN
	Count := Count - 1;
	END_IF;
	END_IF;
	END_REPEAT;
	END;
	'Tessellation':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |'IFCGEOMETRICMODELRESOURCE. IFCTESSELLATEDITEM' IN TYPEOF(temp)));
	END;
	'SurfaceOrSolidModel':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items
		SIZEOF([
		'IFCGEOMETRICMODELRESOURCE. IFCTESSELATEDITEM',
		'IFCGEOMETRICMODELRESOURCE. IFCSHELLBASEDSURFACEMODEL',
		'IFCGEOMETRICMODELRESOURCE. IFCFACEBASEDSURFACEMODEL',
		'IFCGEOMETRICMODELRESOURCE. IFCSOLIDMODEL'] * TYPEOF(temp)) >=1
		));
		END;
		'SurfaceModel':
		BEGIN
		Count := SIZEOF(QUERY(temp <* Items
			SIZEOF([
			'IFCGEOMETRICMODELRESOURCE. IFCTESSELLATEDITEM',
			'IFCGEOMETRICMODELRESOURCE. IFCSHELLBASEDSURFACEMODEL',
			'IFCGEOMETRICMODELRESOURCE. IFCFACEBASEDSURFACEMODEL'] * TYPEOF(temp)) >= 1
			));
			END;
			'SolidModel':
			BEGIN
			Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE. IFCSOLIDMODEL' IN TYPEOF(temp))));
			END;
			'SweptSolid':
			BEGIN
			Count := SIZEOF(QUERY(temp <* Items
				(SIZEOF([
				'IFCGEOMETRICMODELRESOURCE. IFCEXTRUDEDAREASOLID',
				'IFCGEOMETRICMODELRESOURCE. IFCREVOLVEDAREASOLID'] * TYPEOF(temp)) >= 1
				) AND (SIZEOF([
				'IFCGEOMETRICMODELRESOURCE. IFCEXTRUDEDAREASOLIDTAPERED',
				'IFCGEOMETRICMODELRESOURCE. IFCREVOLVEDAREASOLIDTAPERED'] * TYPEOF(temp)) = 0
				)
				));
				END;
				'AdvancedSweptSolid':
				BEGIN
				Count := SIZEOF(QUERY(temp <* Items
					SIZEOF([
					'IFCGEOMETRICMODELRESOURCE. IFCSWEPTAREASOLID',
					'IFCGEOMETRICMODELRESOURCE. IFCSWEPTDISKSOLID'] * TYPEOF(temp)) >= 1
					));
					END;
					'CSG':
					BEGIN
					Count := SIZEOF(QUERY(temp <* Items
						SIZEOF([

续表 D.18.3

函数	EXPRESS 描述

形状表达类型
(IfcShapeRepresentationTypes)
	'IFCGEOMETRICMODELRESOURCE.IFCBOOLEANRESULT',
	'IFCGEOMETRICMODELRESOURCE.IFCCSGPRIMITIVE3D',
	'IFCGEOMETRICMODELRESOURCE.IFCCSGSOLID'] * TYPEOF(temp)) >= 1
	));
	END;
	'Clipping':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE.IFCBOOLEANCLIPPINGRESULT' IN TYPEOF(temp))));
	END;
	'Brep':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE.IFCFACETEDBREP' IN TYPEOF(temp))));
	END;
	'AdvancedBrep':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE.IFCMANIFOLDSOLIDBREP' IN TYPEOF(temp))));
	END;
	'BoundingBox':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE.IFCBOUNDINGBOX' IN TYPEOF(temp))));
	IF (SIZEOF(Items) > 1)
	THEN
	Count := 0;
	END_IF;
	END;
	'SectionedSpine':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRICMODELRESOURCE.IFCSECTIONEDSPINE' IN TYPEOF(temp))));
	END;
	'LightSource':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCPRESENTATIONORGANIZATIONRESOURCE.IFCLIGHTSOURCE' IN TYPEOF(temp))));
	END;
	'MappedRepresentation':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |('IFCGEOMETRYRESOURCE.IFCMAPPEDITEM' IN TYPEOF(temp))));
	END;
	OTHERWISE : RETURN(?);
	END_CASE;
	RETURN (Count = SIZEOF(Items));
	END_FUNCTION

拓扑表达类型 (IfcTopologyRepresentationTypes)	FUNCTION IfcTopologyRepresentationTypes (RepType : IfcLabel; Items : SET OF IfcRepresentationItem) : LOGICAL; LOCAL Count : INTEGER := 0; END_LOCAL; CASE RepType OF 'Vertex': BEGIN

续表 D.18.3

函数	EXPRESS 描述

拓扑表达类型（IfcTopologyRepresentationTypes）	Count := SIZEOF(QUERY(temp <* Items |
	('IFCTOPOLOGYRESOURCE.IFCVERTEX' IN TYPEOF(temp))));
	END;
	'Edge':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |
	('IFCTOPOLOGYRESOURCE.IFCEDGE' IN TYPEOF(temp))));
	END;
	'Path':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |
	('IFCTOPOLOGYRESOURCE.IFCPATH' IN TYPEOF(temp))));
	END;
	'Face':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |
	('IFCTOPOLOGYRESOURCE.IFCFACE' IN TYPEOF(temp))));
	END;
	'Shell':
	BEGIN
	Count := SIZEOF(QUERY(temp <* Items |
	('IFCTOPOLOGYRESOURCE.IFCOPENSHELL' IN TYPEOF(temp))
	OR('IFCTOPOLOGYRESOURCE.IFCCLOSEDSHELL' IN TYPEOF(temp))));
	END;
	'Undefined': RETURN(TRUE);
	OTHERWISE : RETURN(?);
	END_CASE;
	RETURN (Count = SIZEOF(Items));
	END_FUNCTION

D.19 结构荷载资源

D.19.1 结构荷载资源类型的 EXPRESS 描述应按表 D.19.1 的规定采用。

表 D.19.1 结构荷载资源类型的 EXPRESS 描述

类型	EXPRESS 描述
地基反应转动模量选择（IfcModulusOfRotationalSubgradeReactionSelect）	TYPE IfcModulusOfRotationalSubgradeReactionSelect = SELECT (IfcBoolean, IfcModulusOfRotationalSubgradeReactionMeasure); END_TYPE
地基反应模量选择（IfcModulusOfSubgradeReactionSelect）	TYPE IfcModulusOfSubgradeReactionSelect = SELECT (IfcBoolean, IfcModulusOfSubgradeReactionMeasure); END_TYPE
地基反应剪切模量选择（IfcModulusOfTranslationalSubgradeReactionSelect）	TYPE IfcModulusOfTranslationalSubgradeReactionSelect = SELECT (IfcBoolean, IfcModulusOfLinearSubgradeReactionMeasure); END_TYPE
转动刚度选择（IfcRotationalStiffnessSelect）	TYPE IfcRotationalStiffnessSelect = SELECT (IfcBoolean, IfcRotationalStiffnessMeasure); END_TYPE

续表 D. 19. 1

类型	EXPRESS 描述
剪切刚度选择（IfcTranslationalStiffnessSelect）	TYPE IfcTranslationalStiffnessSelect = SELECT (IfcBoolean, IfcLinearStiffnessMeasure); END_TYPE
弯曲刚度选择（IfcWarpingStiffnessSelect）	TYPE IfcWarpingStiffnessSelect = SELECT (IfcBoolean, IfcWarpingMomentMeasure); END_TYPE

D. 19. 2 结构荷载资源实体的 EXPRESS 描述应按表 D. 19. 2 的规定采用。

表 D. 19. 2 结构荷载资源实体的 EXPRESS 描述

实体	EXPRESS 描述
边界条件（IfcBoundaryCondition）	ENTITY IfcBoundaryCondition ABSTRACT SUPERTYPE OF(ONEOF(IfcBoundaryEdgeCondition, IfcBoundaryFaceCondition, IfcBoundaryNodeCondition)); Name : OPTIONAL IfcLabel; END_ENTITY
线边界条件（IfcBoundaryEdgeCondition）	ENTITY IfcBoundaryEdgeCondition SUBTYPE OF IfcBoundaryCondition; TranslationalStiffnessByLengthX : OPTIONAL IfcModulusOfTranslationalSubgradeReactionSelect; TranslationalStiffnessByLengthY : OPTIONAL IfcModulusOfTranslationalSubgradeReactionSelect; TranslationalStiffnessByLengthZ : OPTIONAL IfcModulusOfTranslationalSubgradeReactionSelect; RotationalStiffnessByLengthX : OPTIONAL IfcModulusOfRotationalSubgradeReactionSelect; RotationalStiffnessByLengthY : OPTIONAL IfcModulusOfRotationalSubgradeReactionSelect; RotationalStiffnessByLengthZ : OPTIONAL IfcModulusOfRotationalSubgradeReactionSelect; END_ENTITY
面边界条件（IfcBoundaryFaceCondition）	ENTITY IfcBoundaryFaceCondition SUBTYPE OF IfcBoundaryCondition; TranslationalStiffnessByAreaX : OPTIONAL IfcModulusOfSubgradeReactionSelect; TranslationalStiffnessByAreaY : OPTIONAL IfcModulusOfSubgradeReactionSelect; TranslationalStiffnessByAreaZ : OPTIONAL IfcModulusOfSubgradeReactionSelect; END_ENTITY
点边界条件（IfcBoundaryNodeCondition）	ENTITY IfcBoundaryNodeCondition SUPERTYPE OF(IfcBoundaryNodeConditionWarping) SUBTYPE OF IfcBoundaryCondition; TranslationalStiffnessX : OPTIONAL IfcTranslationalStiffnessSelect; TranslationalStiffnessY : OPTIONAL IfcTranslationalStiffnessSelect; TranslationalStiffnessZ : OPTIONAL IfcTranslationalStiffnessSelect; RotationalStiffnessX : OPTIONAL IfcRotationalStiffnessSelect; RotationalStiffnessY : OPTIONAL IfcRotationalStiffnessSelect; RotationalStiffnessZ : OPTIONAL IfcRotationalStiffnessSelect; END_ENTITY
点边界条件弯曲（IfcBoundaryNodeCondition Warping）	ENTITY IfcBoundaryNodeConditionWarping SUBTYPE OF IfcBoundaryNodeCondition; WarpingStiffness : OPTIONAL IfcWarpingStiffnessSelect; END_ENTITY
失效连接条件（IfcFailureConnectionCondition）	ENTITY IfcFailureConnectionCondition SUBTYPE OF IfcStructuralConnectionCondition; TensionFailureX : OPTIONAL IfcForceMeasure; TensionFailureY : OPTIONAL IfcForceMeasure; TensionFailureZ : OPTIONAL IfcForceMeasure; CompressionFailureX : OPTIONAL IfcForceMeasure; CompressionFailureY : OPTIONAL IfcForceMeasure; CompressionFailureZ : OPTIONAL IfcForceMeasure; END_ENTITY

续表 D.19.2

实体	EXPRESS 描述
滑移连接条件（IfcSlippageConnectionCondition）	ENTITY IfcSlippageConnectionCondition SUBTYPE OF IfcStructuralConnectionCondition; SlippageX : OPTIONAL IfcLengthMeasure; SlippageY : OPTIONAL IfcLengthMeasure; SlippageZ : OPTIONAL IfcLengthMeasure; END_ENTITY
结构连接条件（IfcStructuralConnectionCondition）	ENTITY IfcStructuralConnectionCondition ABSTRACT SUPERTYPE OF(ONEOF(IfcFailureConnectionCondition, IfcSlippageConnectionCondition)); Name : OPTIONAL IfcLabel; END_ENTITY
结构荷载（IfcStructuralLoad）	ENTITY IfcStructuralLoad ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralLoadConfiguration, IfcStructuralLoadOrResult)); Name : OPTIONAL IfcLabel; END_ENTITY
结构荷载配置（IfcStructuralLoadConfiguration）	ENTITY IfcStructuralLoadConfiguration SUBTYPE OF IfcStructuralLoad; Values : LIST [1:?] OF IfcStructuralLoadOrResult; Locations : OPTIONAL LIST [1:?] OF UNIQUE LIST [1:2] OF IfcLengthMeasure; WHERE ValidListSize : NOT EXISTS(Locations) OR (SIZEOF(Locations) = SIZEOF(Values)); END_ENTITY
线性荷载力（IfcStructuralLoadLinearForce）	ENTITY IfcStructuralLoadLinearForce SUBTYPE OF IfcStructuralLoadStatic; LinearForceX : OPTIONAL IfcLinearForceMeasure; LinearForceY : OPTIONAL IfcLinearForceMeasure; LinearForceZ : OPTIONAL IfcLinearForceMeasure; LinearMomentX : OPTIONAL IfcLinearMomentMeasure; LinearMomentY : OPTIONAL IfcLinearMomentMeasure; LinearMomentZ : OPTIONAL IfcLinearMomentMeasure; END_ENTITY
结构荷载或结果（IfcStructuralLoadOrResult）	ENTITY IfcStructuralLoadOrResult ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralLoadStatic, IfcSurfaceReinforcementArea)) SUBTYPE OF IfcStructuralLoad; END_ENTITY
结构平面荷载力（IfcStructuralLoadPlanarForce）	ENTITY IfcStructuralLoadPlanarForce SUBTYPE OF IfcStructuralLoadStatic; PlanarForceX : OPTIONAL IfcPlanarForceMeasure; PlanarForceY : OPTIONAL IfcPlanarForceMeasure; PlanarForceZ : OPTIONAL IfcPlanarForceMeasure; END_ENTITY
结构荷载单一位移（IfcStructuralLoadSingleDisplacement）	ENTITY IfcStructuralLoadSingleDisplacement SUPERTYPE OF(IfcStructuralLoadSingleDisplacementDistortion) SUBTYPE OF IfcStructuralLoadStatic; DisplacementX : OPTIONAL IfcLengthMeasure; DisplacementY : OPTIONAL IfcLengthMeasure; DisplacementZ : OPTIONAL IfcLengthMeasure; RotationalDisplacementRX : OPTIONAL IfcPlaneAngleMeasure; RotationalDisplacementRY : OPTIONAL IfcPlaneAngleMeasure; RotationalDisplacementRZ : OPTIONAL IfcPlaneAngleMeasure; END_ENTITY
结构荷载位移畸变（IfcStructuralLoadSingleDisplacementDistortion）	ENTITY IfcStructuralLoadSingleDisplacementDistortion SUBTYPE OF IfcStructuralLoadSingleDisplacement; Distortion : OPTIONAL IfcCurvatureMeasure; END_ENTITY

续表 D.19.2

实体	EXPRESS 描述
结构荷载单力 (IfcStructuralLoad SingleForce)	ENTITY IfcStructuralLoadSingleForce SUPERTYPE OF(IfcStructuralLoadSingleForceWarping) SUBTYPE OF IfcStructuralLoadStatic; ForceX : OPTIONAL IfcForceMeasure; ForceY : OPTIONAL IfcForceMeasure; ForceZ : OPTIONAL IfcForceMeasure; MomentX : OPTIONAL IfcTorqueMeasure; MomentY : OPTIONAL IfcTorqueMeasure; MomentZ : OPTIONAL IfcTorqueMeasure; END_ENTITY
结构荷载单力翘曲 (IfcStructuralLoad SingleForceWarping)	ENTITY IfcStructuralLoadSingleForceWarping SUBTYPE OF IfcStructuralLoadSingleForce; WarpingMoment : OPTIONAL IfcWarpingMomentMeasure; END_ENTITY
结构静荷载 (IfcStructural LoadStatic)	ENTITY IfcStructuralLoadStatic ABSTRACT SUPERTYPE OF(ONEOF(IfcStructuralLoadLinearForce, IfcStructuralLoadPlanarForce, IfcStructuralLoadSingleDisplacement, IfcStructuralLoadSingleForce, IfcStructuralLoadTemperature)) SUBTYPE OF IfcStructuralLoadOrResult; END_ENTITY
结构温度荷载 (IfcStructuralLoad Temperature)	ENTITY IfcStructuralLoadTemperature SUBTYPE OF IfcStructuralLoadStatic; DeltaTConstant : OPTIONAL IfcThermodynamicTemperatureMeasure; DeltaTY : OPTIONAL IfcThermodynamicTemperatureMeasure; DeltaTZ : OPTIONAL IfcThermodynamicTemperatureMeasure; END_ENTITY
表面增强区 (IfcSurfaceReinfo rcementArea)	ENTITY IfcSurfaceReinforcementArea SUBTYPE OF IfcStructuralLoadOrResult; SurfaceReinforcement1 : OPTIONAL LIST [2:3] OF IfcLengthMeasure; SurfaceReinforcement2 : OPTIONAL LIST [2:3] OF IfcLengthMeasure; ShearReinforcement : OPTIONAL IfcRatioMeasure; WHERE SurfaceAndOrShearAreaSpecified : EXISTS(SurfaceReinforcement1) OR EXISTS(SurfaceReinforcement2) OR EXISTS(ShearReinforcement); NonnegativeArea1 : (NOT EXISTS(SurfaceReinforcement1)) OR ((SurfaceReinforcement1[1] >= 0.) AND (SurfaceReinforcement1[2] >= 0.) AND ((SIZEOF(SurfaceReinforcement1) = 1) OR (SurfaceReinforcement1[1] >= 0.))); NonnegativeArea2 : (NOT EXISTS(SurfaceReinforcement2)) OR ((SurfaceReinforcement2[1] >= 0.) AND (SurfaceReinforcement2[2] >= 0.) AND ((SIZEOF(SurfaceReinforcement2) = 1) OR (SurfaceReinforcement2[1] >= 0.))); NonnegativeArea3 : (NOT EXISTS(ShearReinforcement)) OR (ShearReinforcement >= 0.); END_ENTITY

D.20 拓 扑 资 源

D.20.1 拓扑资源应采用壳类型的 EXPRESS 描述，并应符合下列规定。

```
TYPE IfcShell = SELECT (
  IfcClosedShell,
  IfcOpenShell);
END_TYPE
```

D.20.2 拓扑资源实体的 EXPRESS 描述应按表 D.20.2 的规定采用。

表 D. 20. 2　拓扑资源实体的 EXPRESS 描述

实体	EXPRESS 描述
高级面 (IfcAdvancedFace)	ENTITY IfcAdvancedFace SUBTYPE OF IfcFaceSurface; WHERE ApplicableSurface : SIZEOF (['IFCGEOMETRYRESOURCE. IFCELEMENTARYSURFACE','IFCGEOMETRYRESOURCE. IFCSWEPTSURFACE','IFCGEOMETRYRESOURCE. IFCBSPLINESURFACE'] * TYPEOF(SELF\IfcFaceSurface. FaceSurface)) = 1; RequiresEdgeCurve : SIZEOF(QUERY (ElpFbnds <* QUERY (Bnds <* SELF\IfcFace. Bounds | 'IFCTOPOLOGYRESOURCE. IFCEDGELOOP' IN TYPEOF(Bnds. Bound)) | NOT (SIZEOF (QUERY (Oe <* ElpFbnds. Bound\IfcEdgeLoop. EdgeList | NOT('IFCTOPOLOGYRESOURCE. IFCEDGECURVE' IN TYPEOF(Oe\IfcOrientedEdge. EdgeElement)))) = 0))) = 0; ApplicableEdgeCurves : SIZEOF(QUERY (ElpFbnds <* QUERY (Bnds <* SELF\IfcFace. Bounds | 'IFCTOPOLOGYRESOURCE. IFCEDGELOOF' IN TYPEOF(Bnds. Bound)) | NOT (SIZEOF (QUERY (Oe <* ElpFbnds. Bound\IfcEdgeLoop. EdgeList | NOT (SIZEOF (['IFCGEOMETRYRESOURCE. IFCLINE','IFCGEOMETRYRESOURCE. IFCCONIC','IFCGEOMETRYRESOURCE. IFCPOLYLINE','IFCGEOMETRYRESOURCE. IFCBSPLINECURVE'] * TYPEOF(Oe\IfcOrientedEdge. EdgeElement\IfcEdgeCurve. EdgeGeometry)) = 1))) = 0))) = 0; END_ENTITY
封闭壳 (IfcCloscdShcll)	ENTITY IfcClosedShell SUBTYPE OF IfcConnectedFaceSet; END_ENTITY
连通面集 (IfcConnectedFaceSet)	ENTITY IfcConnectedFaceSet SUPERTYPE OF(ONEOF(IfcClosedShell, IfcOpenShell)) SUBTYPE OF IfcTopologicalRepresentationItem; CfsFaces : SET [1:?] OF IfcFace; END_ENTITY
边(IfcEdge)	ENTITY IfcEdge SUPERTYPE OF(ONEOF(IfcEdgeCurve, IfcOrientedEdge, IfcSubedge)) SUBTYPE OF IfcTopologicalRepresentationItem; EdgeStart : IfcVertex; EdgeEnd : IfcVertex; END_ENTITY
边曲线 (IfcEdgeCurve)	ENTITY IfcEdgeCurve SUBTYPE OF IfcEdge; EdgeGeometry : IfcCurve; SameSense : BOOLEAN; END_ENTITY
边环 (IfcEdgeLoop)	ENTITY IfcEdgeLoop SUBTYPE OF IfcLoop; EdgeList : LIST [1:?] OF IfcOrientedEdge; DERIVE Ne : INTEGER := SIZEOF(EdgeList); WHERE IsClosed : (EdgeList[1]. EdgeStart) := (EdgeList[Ne]. EdgeEnd); IsContinuous : IfcLoopHeadToTail(SELF); END_ENTITY
面(IfcFace)	ENTITY IfcFace SUPERTYPE OF(IfcFaceSurface) SUBTYPE OF IfcTopologicalRepresentationItem; Bounds : SET [1:?] OF IfcFaceBound; INVERSE HasTextureMaps : SET [0:?] OF IfcTextureMap FOR MappedTo; WHERE HasOuterBound : SIZEOF(QUERY(temp <* Bounds | 'IFCTOPOLOGYRESOURCE. IFCFACEOUTERBOUND' IN TYPEOF(temp))) <= 1; END_ENTITY

续表 D.20.2

实体	EXPRESS 描述
面边界 (IfcFaceBound)	ENTITY IfcFaceBound SUPERTYPE OF(IfcFaceOuterBound) SUBTYPE OF IfcTopologicalRepresentationItem; Bound : IfcLoop; Orientation : BOOLEAN; END_ENTITY
面外边界 (IfcFaceOuterBound)	ENTITY IfcFaceOuterBound SUBTYPE OF IfcFaceBound; END_ENTITY
面曲面 (IfcFaceSurface)	ENTITY IfcFaceSurface SUPERTYPE OF(IfcAdvancedFace) SUBTYPE OF IfcFace; FaceSurface : IfcSurface; SameSense : BOOLEAN; END_ENTITY
环(IfcLoop)	ENTITY IfcLoop SUPERTYPE OF(ONEOF(IfcEdgeLoop, IfcPolyLoop, IfcVertexLoop)) SUBTYPE OF IfcTopologicalRepresentationItem; END_ENTITY
开敞壳 (IfcOpenShell)	ENTITY IfcOpenShell SUBTYPE OF IfcConnectedFaceSet; END_ENTITY
有向边 (IfcOrientedEdge)	ENTITY IfcOrientedEdge SUBTYPE OF IfcEdge; EdgeElement : IfcEdge; Orientation : BOOLEAN; DERIVE SELF\IfcEdge.EdgeStart : IfcVertex := IfcBooleanChoose (Orientation, EdgeElement.EdgeStart, EdgeElement.EdgeEnd); SELF\IfcEdge.EdgeEnd : IfcVertex := IfcBooleanChoose (Orientation, EdgeElement.EdgeEnd, EdgeElement.EdgeStart); WHERE EdgeElementNotOriented : NOT('IFCTOPOLOGYRESOURCE.IFCORIENTEDEDGE' IN TYPEOF(EdgeElement)); END_ENTITY
路径(IfcPath)	ENTITY IfcPath SUBTYPE OF IfcTopologicalRepresentationItem; EdgeList : LIST [1:?] OF UNIQUE IfcOrientedEdge; WHERE IsContinuous : IfcPathHeadToTail(SELF); END_ENTITY
多边环(IfcPolyLoop)	ENTITY IfcPolyLoop SUBTYPE OF IfcLoop; Polygon : LIST [3:?] OF UNIQUE IfcCartesianPoint; WHERE AllPointsSameDim : SIZEOF(QUERY(Temp <* Polygon | Temp.Dim <> Polygon[1].Dim)) = 0; END_ENTITY
子边(IfcSubedge)	ENTITY IfcSubedge SUBTYPE OF IfcEdge; ParentEdge : IfcEdge; END_ENTITY
拓扑表达项 (IfcTopologicalRepresentationItem)	ENTITY IfcTopologicalRepresentationItem ABSTRACT SUPERTYPE OF(ONEOF(IfcConnectedFaceSet, IfcEdge, IfcFace, IfcFaceBound, IfcLoop, IfcPath, IfcVertex)) SUBTYPE OF IfcRepresentationItem; END_ENTITY

续表 D.20.2

实体	EXPRESS 描述
顶点(IfcVertex)	ENTITY IfcVertex SUPERTYPE OF(IfcVertexPoint) SUBTYPE OF IfcTopologicalRepresentationItem; END_ENTITY
顶点环 (IfcVertexLoop)	ENTITY IfcVertexLoop SUBTYPE OF IfcLoop; LoopVertex : IfcVertex; END_ENTITY
顶点点 (IfcVertexPoint)	ENTITY IfcVertexPoint SUBTYPE OF IfcVertex; VertexGeometry : IfcPoint; END_ENTITY

D.20.3 拓扑资源函数的 EXPRESS 描述应按表 D.20.3 的规定采用。

表 D.20.3 拓扑资源函数的 EXPRESS 描述

函数	EXPRESS 描述

布尔选择
(IfcBooleanChoose)
	FUNCTION IfcBooleanChoose
	(B : BOOLEAN ;
	Choice1, Choice2 : Generic : Item) : Generic : Item;
	IF B THEN
	RETURN (Choice1);
	ELSE
	RETURN (Choice2);
	END_IF;
	END_FUNCTION

环首尾 (IfcLoopHeadToTail)	FUNCTION IfcLoopHeadToTail (ALoop : IfcEdgeLoop) : LOGICAL; LOCAL N : INTEGER; P : LOGICAL := TRUE; END_LOCAL; N := SIZEOF (ALoop. EdgeList); REPEAT i := 2 TO N; P := P AND (ALoop. EdgeList[i-1]. EdgeEnd :=: ALoop. EdgeList[i]. EdgeStart); END_REPEAT; RETURN (P); END_FUNCTION
路径首尾 (IfcPathHeadToTail)	FUNCTION IfcPathHeadToTail (APath : IfcPath) : LOGICAL; LOCAL N : INTEGER := 0; P : LOGICAL := UNKNOWN; END_LOCAL; N := SIZEOF (APath. EdgeList); REPEAT i := 2 TO N; P := P AND (APath. EdgeList[i-1]. EdgeEnd :=: APath. EdgeList[i]. EdgeStart); END_REPEAT; RETURN (P); END_FUNCTION

D.21 工 具 资 源

D.21.1 工具资源类型的 EXPRESS 描述应按表 D.21.1 的规定采用。

表 D.21.1 工具资源类型的 EXPRESS 描述

类型	EXPRESS 描述
全球唯一标识 (IfcGloballyUniqueId)	TYPE IfcGloballyUniqueId = STRING (22) FIXED; END_TYPE
变更操作枚举 (IfcChangeAction Enum)	TYPE IfcChangeActionEnum = ENUMERATION OF (NOCHANGE, MODIFIED, ADDED, DELETED, NOTDEFINED); END_TYPE
对象状态枚举 (IfcStateEnum)	TYPE IfcStateEnum = ENUMERATION OF (READWRITE, READONLY, LOCKED, READWRITELOCKED, READONLYLOCKED); END_TYPE

D.21.2 工具资源实体的 EXPRESS 描述应按表 D.21.2 的规定采用。

表 D.21.2 工具资源实体的 EXPRESS 描述

实体	EXPRESS 描述
应用程序 (IfcApplication)	ENTITY IfcApplication; ApplicationDeveloper : IfcOrganization; Version : IfcLabel; ApplicationFullName : IfcLabel; ApplicationIdentifier : IfcIdentifier; UNIQUE UR1 : ApplicationIdentifier; UR2 : ApplicationFullName, Version; END_ENTITY
归属历史 (IfcOwnerHistory)	ENTITY IfcOwnerHistory; OwningUser : IfcPersonAndOrganization; OwningApplication : IfcApplication; State : OPTIONAL IfcStateEnum; ChangeAction : OPTIONAL IfcChangeActionEnum; LastModifiedDate : OPTIONAL IfcTimeStamp; LastModifyingUser : OPTIONAL IfcPersonAndOrganization; LastModifyingApplication : OPTIONAL IfcApplication; CreationDate : IfcTimeStamp; WHERE CorrectChangeAction : (EXISTS(LastModifiedDate)) OR (NOT(EXISTS(LastModifiedDate)) AND NOT (EXISTS(ChangeAction))) OR (NOT(EXISTS(LastModifiedDate)) AND EXISTS(ChangeAction) AND ((ChangeAction = IfcChangeActionEnum.NOTDEFINED) OR (ChangeAction = IfcChangeActionEnum.NOCHANGE))); END_ENTITY

续表 D.21.2

实体	EXPRESS 描述
表格(IfcTable)	ENTITY IfcTable; Name : OPTIONAL IfcLabel; Rows : OPTIONAL LIST [1:?] OF IfcTableRow; Columns : OPTIONAL LIST [1:?] OF IfcTableColumn; DERIVE NumberOfCellsInRow : INTEGER := HIINDEX(Rows[1]. RowCells); NumberOfHeadings : INTEGER := SIZEOF(QUERY(Temp <* Rows | Temp. IsHeading)); NumberOfDataRows : INTEGER := SIZEOF(QUERY(Temp <* Rows | NOT(Temp. IsHeading))); WHERE WR1 : SIZEOF(QUERY(Temp <* Rows | HIINDEX(Temp. RowCells) <> HIINDEX(Rows[1]. Row Cells))) = 0; WR2 : { 0 <= NumberOfHeadings <= 1 }; END_ENTITY
表格列 (IfcTableColumn)	ENTITY IfcTableColumn; Identifier : OPTIONAL IfcIdentifier; Name : OPTIONAL IfcLabel; Description : OPTIONAL IfcText; Unit : OPTIONAL IfcUnit; ReferencePath : OPTIONAL IfcReference; END_ENTITY
表格行 (IfcTableRow)	ENTITY IfcTableRow; RowCells : OPTIONAL LIST [1:?] OF IfcValue; IsHeading : OPTIONAL BOOLEAN; INVERSE OfTable : IfcTable FOR Rows; END_ENTITY

附录 E　元数据数据模式

E. 0. 1　元数据的 EXPRESS 数据模式描述应符合下列规定：

```
(*
  BIM file exchange meta-data EXPRESS schema
*)
SCHEMA BIMHeader

TYPE FILEFORMAT = STRING;
  WHERE
  FILE_FORMAT: SELF IN ['XML', 'EXPRESS'];
END_TYPE;

TYPE FILENUMBER = INTEGER;
  WHERE
  BE_POSITVIE: SELF >= 1;
END_TYPE;

TYPE REFERENCENUMBER = INTEGER;
  WHERE
  NONE_NEGATIVE: SELF >= 0;
END_TYPE;

ENTITY HeadInfo;
  Author:STRING;
  Version:STRING;
END_ENTITY ;
ENTITY ModelInfo;
  FileType: FILEFORMAT;
  FileCount: FILENUMBER;
END_ENTITY ;
ENTITY ReferenceInfo;
  TextNumber: REFERENCENUMBER;
  ImageNumber: REFERENCENUMBER;
  AudioNumber: REFERENCENUMBER;
  VideoNumber: REFERENCENUMBER;
  OthersNumber: REFERENCENUMBER;
  TotalRefNumber: REFERENCENUMBER;
END_ENTITY ;
END_SCHEMA
```

E. 0. 2　元数据的 XML 数据模式描述应符合下列规定：

```
<? xml version="1.0" encoding="UTF-8"? >
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
    targetNamespace="http://www.cabr.com.cn/define"
    elementFormDefault="qualified">

<xs:element name="BIMHeader" type=" FileExchangeInfo" abstract="false"/>

<xs:complexType name="FileExchangeInfo">
  <xs:sequence>
    <! -- FileExchange Infomation composed by three parts -->
    <xs:element name="HeadInfo"          type=" HeadInfo"/>
    <xs:element name="ModelInfo"        type=" ModelInfo"/>
    <xs:element name="ReferenceInfo" type=" ReferenceInfo"/>
  </xs:sequence>
</xs:complexType>

<xs:simpleType name="FileFormat">
  <! -- Can only be "XML" or "EXPRESS" -->
  <xs:restriction base="xs:string">
    <xs:enumeration value="XML"/>
    <xs:enumeration value="EXPRESS"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="FileNumber">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="1"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ReferenceNumber">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="0"/>
  </xs:restricition>
</xs:simpleType>

<xs:complexType name="HeadInfo">
  <xs:sequence>
    <! -- Record the head has been extended or not -->
    <xs:element name="Author" type="xs:string"/>
    <xs:element name="Version" type=xs:string"/>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="ModelInfo">
```

```
  <xs:sequence>
    <! -- Record there are how many model files -->
    <xs:element name="FileType" type=" FileFormat"/>
    <xs:element name="FileCount" type=" FileNumber"/>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="ReferenceInfo">
  <xs:sequence>
    <! -- Record how many reference files -->
    <xs:element name="TextNumber" type=" ReferenceNumber"/>
    <xs:element name="ImageNumber" type=" ReferenceNumber"/>
    <xs:element name="AudioNumber" type=" ReferenceNumber"/>
    <xs:element name="VideoNumber" type=" ReferenceNumber"/>
    <xs:element name="OthersNumber" type=" ReferenceNumber"/>
    <xs:element name="TotalRefNumber" type=" ReferenceNumber "/>
  </xs:sequence>
</xs:complexType>

</xs:schema>
```

本标准用词说明

1 为便于在执行本标准条文时区别对待，对于要求严格程度不同的用词说明如下：

1）表示很严格，非这样做不可的：

正面词采用“必须”；反面词采用“严禁”；

2）表示严格，在正常情况下均应这样做的：

正面词采用“应”；反面词采用“不应”或“不得”；

3）表示允许稍有选择，在条件许可时首先应这样做的：

正面词采用“宜”；反面词采用“不宜”；

4）表示有选择，在一定条件下可以这样做的，采用“可”。

2 条文中指明应按其他有关标准执行的写法为：“应符合……的规定”或“应按……执行”。