

ISO 10303-223:2008-04 (E)

Industrial automation systems and integration_ - Product data representation and exchange_ - Part_223: Application protocol: Exchange of design and manufacturing product information for cast parts

Contents	Page
1 Scope.....	1
2 Normative references.....	3
3 Terms, definitions and abbreviated terms.....	5
3.1 Terms defined in ISO 1101.....	5
3.2 Terms defined in ISO 5459.....	5
3.3 Terms defined in ISO 8062-1.....	5
3.4 Terms defined in ISO 10303-1.....	5
3.5 Terms defined in ISO 10303-31.....	6
3.6 Terms defined in ISO 10303-42.....	6
3.7 Other terms and definitions.....	6
3.8 Abbreviated items.....	9
4 Information requirements.....	9
4.1 Units of functionality.....	10
4.1.1 Casting features.....	11
4.1.2 Casting_prerequisites.....	13
4.1.3 Design_exception.....	14
4.1.4 Die_mould_features.....	14
4.1.5 Investment_casting_features.....	15
4.1.6 Library_reference.....	16
4.1.7 Manufacturing_casting_resources.....	16
4.1.8 manufacturing_feature.....	18
4.1.9 Manufacturing_part_properties.....	18
4.1.10 Manufacturing_process_requirement_documents.....	19
4.1.11 Manufacturing_process_control_documentation.....	21
4.1.12 Measurement_limitations.....	21
4.1.13 Part_administration_data.....	23
4.1.14 Part_model.....	24
4.1.15 Process_activities.....	24
4.1.16 Process_plan.....	26
4.1.17 Quality_control.....	26
4.1.18 Requisitions.....	27
4.1.19 Shape_representation_for_casting_and_machining.....	28
4.1.20 Simulation.....	29
4.2 Application objects.....	30
4.3 Application assertions.....	295
5 Application interpreted model.....	379
5.1 Mapping specification.....	379
5.1.1 Casting features UoF.....	381
5.1.2 Casting_prerequisites UoF.....	560
5.1.3 Design_exception UoF.....	606
5.1.4 Die_mould_features UoF.....	611
5.1.5 Investment_casting_features UoF.....	678
5.1.6 Library_reference UoF.....	698
5.1.7 Manufacturing_casting_resources UoF.....	706
5.1.8 Manufacturing_part_properties UoF.....	729
5.1.9 Manufacturing_process_requirement_documents UoF.....	753
5.1.10 Measurement_limitations UoF.....	777
5.1.11 Manufacturing_feature UoF.....	814

5.1.12 Manufacturing_process_control_documentation UoF	823
5.1.13 Part_administration_data UoF.....	842
5.1.14 Part_model UoF	847
5.1.15 Process_activities UoF	863
5.1.16 Process_plan UoF.....	914
5.1.17 Quality control UoF	925
5.1.18 Requisitions UoF.....	954
5.1.19 Shape_representation_for_castings UoF	957
5.1.20 Simulation UoF	973
5.2 AIM EXPRESS short listing	998
6 Conformance requirements	1361
Annex A (normative) AIM EXPRESS expanded listing	1397
Annex B (normative) AIM short names	1780
Annex C (normative) Implementation method specific requirements	1801
Annex D (normative) Protocol Implementation Conformance Statement (proforma)	1802
Annex E (normative) Information object registration.....	1804
Annex F (informative) Application activity model.....	1805
Annex G (informative) Application reference model	1848
Annex H (informative) AIM EXPRESS-G.....	1902
Annex I (informative) Computer interpretable listings.....	1946
Annex J (informative) Application protocol usage guide	1947
Bibliography	2237
Index	2239

Figures

Figure 1 — ISO 10303 manufacturing suite of standards.....	xi
Figure 2 — Data planning model.....	xii
Figure 3 — Angular_dimension_tolerance.....	37
Figure 4 — Angular_size_dimension_tolerance.....	38
Figure 5 — Chaplet and Chaplet_pad.....	53
Figure 6 — Choke connection in a Gating_system	57
Figure 7 — Compound_feature	61
Figure 8 — Core and Core_print	66
Figure 9 — Curved_dimension_tolerance	75
Figure 10 — Diameter_dimension_tolerance	88
Figure 11 — Distance_along_curve_tolerance.....	98
Figure 12 — Filter connection in a Gating_system	124

Figure 13 — Flask	127
Figure 14 — Location_dimension_tolerance.....	155
Figure 15 — Pattern_plate.....	200
Figure 16 — Production_core_box with Core.....	217
Figure 17 — Radial_dimension_tolerance	239
Figure 18 — Riser conection to Gating_system	250
Figure 19 — Sprue conection to Gating_system	277
Figure 20 — Well and associated Gating_system	294
Figure F.1 — IDEF0 basic notation.....	1805
Figure F.2 — A-0 Exchange of design and manufacturing product information for cast parts.....	1827
Figure F.3 — A0 Cast a part.....	1828
Figure F.4 — A1 Sand cast a part.....	1829
Figure F.5 — A11 Design sand mould and plan process.....	1830
Figure F.6 — A111 Design sand mould	1831
Figure F.7 — A12 Build sand mould.....	1832
Figure F.8 — A13 Build pattern and rigging assembly	1833
Figure F.9 — A131 Make sand mould	1834
Figure F.10 — A15 Pour cool and shakeout.....	1835
Figure F.11 — A2 Die cast a part	1836
Figure F.12 — A12 Design die and plan die casting process	1837
Figure F.13 — A22 Build die	1838
Figure F.14 — A22 Build die	1839
Figure F.15 — A23 Melt, pour, cool and extract.....	1840
Figure F.16 — A3 Investment cast a part	1841
Figure F.17 — A31 Design investment pattern assembly and plan process.....	1842
Figure F.18 — A311 Design investment mould	1843
Figure F.19 — A32 Build wax or foam pattern.....	1844
Figure F.20 — A33 Invest pattern	1845
Figure F.21 — A34 Melt, pour, cool and Knockout.....	1846
Figure F.22 — A4 Finish and inspect	1847
Figure G.1 — ARM diagram (1 of 53).....	1849
Figure G.2 — ARM diagram (2 of 53).....	1850
Figure G.3 — ARM diagram (3 of 53).....	1851
Figure G.4 — ARM diagram (4 of 53).....	1852
Figure G.5 — ARM diagram (5 of 53).....	1853
Figure G.6 — ARM diagram (6 of 53).....	1854
Figure G.7 — ARM diagram (7 of 53).....	1855
Figure G.8 — ARM diagram (8 of 53).....	1856
Figure G.9 — ARM diagram (9 of 53).....	1857
Figure G.10 — ARM diagram (10 of 53).....	1858
Figure G.11 — ARM diagram (11 of 53).....	1859
Figure G.12 — ARM diagram (12 of 53).....	1860
Figure G.13 — ARM diagram (13 of 53).....	1861
Figure G.14 — ARM diagram (14 of 53).....	1862
Figure G.15 — ARM diagram (15 of 53).....	1863
Figure G.16 — ARM diagram (16 of 53).....	1864
Figure G.17 — ARM diagram (17 of 53).....	1865
Figure G.18 — ARM diagram (18 of 53).....	1866
Figure G.19 — ARM diagram (19 of 53).....	1867
Figure G.20 — ARM diagram (20 of 53).....	1868

Figure G.21 — ARM diagram (21 of 53)	1869
Figure G.22 — ARM diagram (22 of 53)	1870
Figure G.23 — ARM diagram (23 of 53)	1871
Figure G.24 — ARM diagram (24 of 53)	1872
Figure G.25 — ARM diagram (25 of 53)	1873
Figure G.26 — ARM diagram (26 of 53)	1874
Figure G.27 — ARM diagram (27 of 53)	1875
Figure G.28 — ARM diagram (28 of 53)	1876
Figure G.29 — ARM diagram (29 of 53)	1877
Figure G.30 — ARM diagram (30 of 53)	1878
Figure G.31 — ARM diagram (31 of 53)	1879
Figure G.32 — ARM diagram (32 of 53)	1880
Figure G.33 — ARM diagram (33 of 53)	1881
Figure G.34 — ARM diagram (34 of 53)	1882
Figure G.35 — ARM diagram (35 of 53)	1883
Figure G.36 — ARM diagram (36 of 53)	1884
Figure G.37 — ARM diagram (37 of 53)	1885
Figure G.38 — ARM diagram (38 of 53)	1886
Figure G.39 — ARM diagram (39 of 53)	1887
Figure G.40 — ARM diagram (40 of 53)	1888
Figure G.41 — ARM diagram (41 of 53)	1889
Figure G.42 — ARM diagram (42 of 53)	1890
Figure G.43 — ARM diagram (43 of 53)	1891
Figure G.44 — ARM diagram (44 of 53)	1892
Figure G.45 — ARM diagram (45 of 53)	1893
Figure G.46 — ARM diagram (46 of 53)	1894
Figure G.47 — ARM diagram (47 of 53)	1895
Figure G.48 — ARM diagram (48 of 53)	1896
Figure G.49 — ARM diagram (49 of 53)	1897
Figure G.50 — ARM diagram (50 of 53)	1898
Figure G.51 — ARM diagram (51 of 53)	1899
Figure G.52 — ARM diagram (52 of 53)	1900
Figure G.53 — ARM diagram (53 of 53)	1901
Figure H.1 — AIM EXPRESS-G diagram application_context	1903
Figure H.2 — AIM EXPRESS-G diagram product	1904
Figure H.3 — AIM EXPRESS-G diagram product_definition	1905
Figure H.4 — AIM EXPRESS-G diagram effectivity	1906
Figure H.5 — AIM EXPRESS-G diagram property_definition	1907
Figure H.6 — AIM EXPRESS-G diagram property_definition_representation	1908
Figure H.7 — AIM EXPRESS-G diagram characterized_object	1909
Figure H.8 — AIM EXPRESS-G diagram casting_feature_definition	1910
Figure H.9 — AIM EXPRESS-G diagram shape_aspect	1911
Figure H.10 — AIM EXPRESS-G diagram representation	1912
Figure H.11 — AIM EXPRESS-G diagram shape_representation	1913
Figure H.12 — AIM EXPRESS-G diagram representation_item	1914
Figure H.13 — AIM EXPRESS-G diagram point	1915
Figure H.14 — AIM EXPRESS-G diagram placement	1916
Figure H.15 — AIM EXPRESS-G diagram curve	1917
Figure H.16 — AIM EXPRESS-G diagram bounded_curve	1918
Figure H.17 — AIM EXPRESS-G diagram b-spline_curve	1919

Figure H.18 — AIM EXPRESS-G diagram surface.....	1920
Figure H.19 — AIM EXPRESS-G diagram bounded_surface.....	1921
Figure H.20 — AIM EXPRESS-G diagram topology.....	1922
Figure H.21 — AIM EXPRESS-G diagram shell and face_bound.....	1923
Figure H.22 — AIM EXPRESS-G diagram geometric_tolerance.....	1924
Figure H.23 — AIM EXPRESS-G diagram datum.....	1925
Figure H.24 — AIM EXPRESS-G diagram dimensional tolerance.....	1926
Figure H.25 — AIM EXPRESS-G diagram action.....	1927
Figure H.26 — AIM EXPRESS-G diagram action_method.....	1928
Figure H.27 — AIM EXPRESS-G diagram action_method_relationship.....	1929
Figure H.28 — AIM EXPRESS-G diagram action_property.....	1930
Figure H.29 — AIM EXPRESS-G diagram action_directive.....	1931
Figure H.30 — AIM EXPRESS-G diagram resource_property.....	1932
Figure H.31 — AIM EXPRESS-G diagram action_resource.....	1933
Figure H.32 — AIM EXPRESS-G diagram document.....	1934
Figure H.33 — AIM EXPRESS-G diagram group.....	1935
Figure H.34 — AIM EXPRESS-G diagram externally_defined_item.....	1936
Figure H.35 — AIM EXPRESS-G diagram approval.....	1937
Figure H.36 — AIM EXPRESS-G diagram date.....	1938
Figure H.37 — AIM EXPRESS-G diagram applied assignments.....	1939
Figure H.38 — AIM EXPRESS-G diagram address.....	1940
Figure H.39 — AIM EXPRESS-G diagram unit.....	1941
Figure H.40 — AIM EXPRESS-G diagram measure_with_unit.....	1942
Figure H.41 — AIM EXPRESS-G diagram id and description attribute.....	1943
Figure H.42 — AIM EXPRESS-G diagram name and role attribute.....	1944
Figure H.43 — AIM EXPRESS-G diagram text, label and identifier.....	1945
Figure J.1 — Manufacturing suite test case test part drawing.....	2055
Figure J.2 — Manufacturing suite test case part.....	2056

Tables

Table 1 — Conformance class UoFs.....	1362
Table 2 — Conformance class elements.....	1375
Table B.1— AIM short names of entities.....	1780