

ISO 10303-204:2002-08 (E)

Industrial automation systems and integration - Product data representation and exchange - Part 204: Application protocol: Mechanical design using boundary representation

Contents		Page
1	Scope	1
2	Normative references	3
3	Terms, definitions, and abbreviations	5
3.4	Other definitions	7
3.5	Abbreviations	8
4	Information requirements	9
4.1	Units of functionality	11
4.1.1	faceted_B-rep	12
4.1.2	elementary_B-rep	13
4.1.3	advanced_B-rep	14
4.1.4	name_preservation	16
4.1.5	product_structure	16
4.1.6	visual_presentation_for_B-rep	17
4.2	Application objects	18
4.3	Application assertions	34
5	Application interpreted model	38
5.1	Mapping table	38
5.2	AIM EXPRESS short listing	67
6	Conformance requirements	93
6.1	Conformance class 1: B-rep level 1 (CC1)	94
6.2	Conformance class 2: B-rep level 2 (CC2)	94
6.3	Conformance class 3: B-rep level 3 (CC3)	95
Annex A (normative) AIM EXPRESS expanded listing		97
A.1	AIM EXPRESS listing	97
Annex B (normative) AIM short names		185
Annex C (normative) Implementation method specific requirements		192
Annex D (normative) PICS (Protocol Implementation Conformance Statement) proforma		193
Annex E (normative) Information object registration		195
E.1	Document identification	195
E.2	Schema identification	195
Annex F (informative) Application Activity Model (AAM)		196
F.1	AAM definitions	196
F.2	Description of AAM scenario	200
F.3	Mechanical design requirements for model contents and completeness	203
F.4	AAM diagrams	206

Annex G (informative) Application reference model diagrams	211
Annex H (informative) AIM EXPRESS-G	224
Annex J (informative) Computer interpretable listing	243
Annex K (informative) Technical discussions	244
K.1 Geometric shape description alternatives	244
K.2 Known issues	244
Bibliography	246
Index	247
Figures engineering applications	ix
Figure 2 Data planning model	x
Figure 3 Relationships between geometric AICs	40
Figure F.1 Conceptual structure of mechanical design product	205
Figure F.2 Industrial manufacturing of mechanical products (node A0)	207
Figure F.3 Industrial manufacturing of mechanical products (node A0 expanded)	208
Figure F.4 Conceptual design (node A3)	209
Figure F.5 Design and evaluation (Node A4)	210
Figure G.1 ARM diagram (1 of 12)	212
Figure G.2 ARM diagram (2 of 12)	213
Figure G.3 ARM diagram (3 of 12)	214
Figure G.4 ARM diagram (4 of 12)	215
Figure G.5 ARM diagram (5 of 12) shell in faceted B-rep	216
Figure G.6 ARM diagram (6 of 12) shell in elementary or advanced_B-rep	217
Figure G.7 ARM diagram (7 of 12) surface in advanced B-rep	218
Figure G.8 ARM diagram (8 of 12) surface in elementary B-rep	219
Figure G.9 ARM diagram (9 of 12) curve in advanced_B-rep	220
Figure G.10 ARM diagram (10 of 12) curve in elementary_B-rep	221
Figure G.11 ARM diagram (11 of 12)	222
Figure G.12 ARM diagram (12 of 12) conventions used in NIAM diagrams	223
Figure H.1 AIM EXPRESS-G diagram advanced B-rep	225
Figure H.2 AIM EXPRESS-G diagram advanced_face	226
Figure H.3 AIM EXPRESS-G diagram surfaces	227

Figure H.4 AIM EXPRESS-G diagram curves	228
Figure H.5 AIM EXPRESS-G diagram elementary_surface	229
Figure H.6 AIM EXPRESS-G diagram b_spline_curve	230
Figure H.7 AIM EXPRESS-G diagram b_spline_surface	231
Figure H.8 AIM EXPRESS-G diagram surface curves	232
Figure H.9 AIM EXPRESS-G diagram elementary B-rep	233
Figure H.10 AIM EXPRESS-G diagram face and curve in elementary B-rep	234
Figure H.11 AIM EXPRESS-G diagram faceted B-rep	235
Figure H.12 AIM EXPRESS-G diagram product structure	236
Figure H.13 AIM EXPRESS-G diagram product structure continued	237
Figure H.14 AIM EXPRESS-G diagram visual presentation	238
Figure H.15 AIM EXPRESS-G diagram camera model and projection	239
Figure H.16 AIM EXPRESS-G diagram point and curve styles	240
Figure H.17 AIM EXPRESS-G diagram surface styles	241
Figure H.18 AIM EXPRESS-G diagram visual presentation concluded	242
Tables Table 1 Use of units of functionality within functional levels	18
Table 2 Mapping table for advanced_B-rep UoF	41
Table 3 Mapping table for elementary_B-Rep UoF	48
Table 4 Mapping table for faceted_B-Rep UoF	52
Table 5 Mapping table for name_preservation UoF	54
Table 6 Mapping table for product_structure UoF	55
Table 7 Mapping table for visual_presentation_for_B-rep UoF	59
Table 8 Units of functionality within conformance classes	94
Table 9 AIM entities within conformance classes	96
Table B.1 AIM short names of entities	185