

ISO 10303-207:1999-10 (E)

Industrial automation systems and integration - Product data representation and exchange - Part 207: Application protocol: Sheet metal die planning and design

Contents		Page
1	Scope	1
2	Normative references	5
3	Definitions	7
3.1	Terms defined in ISO 8601	7
3.2	Terms defined in ISO 10303-1	7
3.3	Terms defined in ISO 10303-31	9
3.4	Terms defined in ISO 10303-42	9
3.5	Terms defined in ISO 10303-43	10
3.6	Terms defined in ISO 10303-44	10
3.7	Terms defined in ISO 10303-202	11
3.8	Other definitions	11
3.8.1	cam	11
3.8.2	contractor	11
3.8.3	die	11
3.8.4	die face	11
3.8.5	die set	11
3.8.6	die structure	12
3.8.7	feature	12
3.8.8	feature property	12
3.8.9	hard aid	12
3.8.10	in-process	12
3.8.11	mating die	12
3.8.12	part process plan	12
3.8.13	sheet metal	12
3.8.14	sheet metal part	12
3.8.15	sheet metal part process plan	12
3.8.16	stamping press	13
3.8.17	supplier	13
3.9	Abbreviations	13
4	Information requirements	14
4.1	Units of functionality	14
4.1.1	feature	15
4.1.2	item	15
4.1.3	item_definition	16
4.1.4	item_definition_relationship	16
4.1.5	item_version	17
4.1.6	part_process_plan	17
4.1.7	product	17
4.1.8	representation_element	18
4.1.9	shape_definition	19
4.1.10	shape_definition_relationship	19
4.1.11	tolerance	19
4.1.12	work_order	20

4.1.13	work_request	20
4.2	Application objects	20
4.3	Application assertions	59
5	Application interpreted model	67
5.1	Mapping table	67
5.2	AIM EXPRESS short listing	158
6	Conformance requirements	235
6.1	Conformance class membership	237

Annexes

A	AIM EXPRESS expanded listing	258
B	AIM short names	352
C	Implementation method-specific requirements	368
D	Protocol Implementation Conformance Statement (PICS) proforma	369
E	Information object registration	371
E.1	Document identification	371
E.2	Schema identification	371
F	Application interpreted constructs	372
G	Application activity model	443
G.1	Application activity model definitions and abbreviations	443
G.2	Application activity model diagrams	454
H	Application reference model	460
J	AIM EXPRESS-G	469
K	Computer interpretable listing	512
L	Technical discussions	513
L.1	Technical discussion on dies	513
L.2	Technical discussion on presses	515
M	Cross reference for AIM diagrams	517
N	Bibliography	526
Index	527

Figures

Figure 1 - Typical sheet metal die set	xiv
Figure 2 - Data planning model	xv
Figure G.1 - AAM IDEF0 diagram 1 of 5: A-0 Prepare for sheet metal production	455
Figure G.2 - AAM IDEF0 diagram 2 of 5: A0 Prepare for sheet metal production	456
Figure G.3 - AAM IDEF0 diagram 3 of 5: A2 Engineer die	457

Figure G.4 - AAM IDEF0 diagram 4 of 5: A22 Conceptualize part manufacture and die function	458
Figure G.5 - AAM IDEF0 diagram 5 of 5: A23 Design die	459
Figure H.1 - ARM IDEF1X diagram 1 of 8	461
Figure H.2 - ARM IDEF1X diagram 2 of 8	462
Figure H.3 - ARM IDEF1X diagram 3 of 8	463
Figure H.4 - ARM IDEF1X diagram 4 of 8	464
Figure H.5 - ARM IDEF1X diagram 5 of 8	465
Figure H.6 - ARM IDEF1X diagram 6 of 8	466
Figure H.7 - ARM IDEF1X diagram 7 of 8	467
Figure H.8 - ARM IDEF1X diagram 8 of 8	468
Figure J.1 - Application context - AIM EXPRESS-G diagram 1 of 42	470
Figure J.2 - Product definition (1 of 2) - AIM EXPRESS-G diagram 2 of 42	471
Figure J.3 - Product definition (2 of 2) - AIM EXPRESS-G diagram 3 of 42	472
Figure J.4 - Product property definition - AIM EXPRESS-G diagram 4 of 42	473
Figure J.5 - Product property representation - AIM EXPRESS-G diagram 5 of 42	474
Figure J.6 - Document management - AIM EXPRESS-G diagram 6 of 42	475
Figure J.7 - Action management - AIM EXPRESS-G diagram 7 of 42	476
Figure J.8 - Action and method definition - AIM EXPRESS-G diagram 8 of 42	477
Figure J.9 - Approval - AIM EXPRESS-G diagram 9 of 42	478
Figure J.10 - Contract management - EXPRESS-G diagram 10 of 42	479
Figure J.11 - Security classification management - AIM EXPRESS-G diagram 11 of 42	480
Figure J.12 - Person organization management (1 of 2) - AIM EXPRESS-G diagram 12 of 42	481
Figure J.13 - Person organization management (2 of 2) - AIM EXPRESS-G diagram 13 of 42	482
Figure J.14 - Date time management - AIM EXPRESS-G diagram 14 of 42	483
Figure J.15 - Measure - AIM EXPRESS-G diagram 15 of 42	484
Figure J.16 - Representation - AIM EXPRESS-G diagram 16 of 42	485
Figure J.17 -Product structure - AIM EXPRESS-G diagram 17 of 24	486
Figure J.18 - Product concept - AIM EXPRESS-G diagram 18 of 42	487
Figure J.19 - Configuration management and effectivity - AIM EXPRESS-G diagram 19 of 42	488
Figure J.20 - Qualified measure and material property definition - AIM EXPRESS-G diagram 20 of 42.489	
Figure J.21 - Shape dimension - AIM EXPRESS-G diagram 21 of 42	490

Figure J.22 - Shape tolerance and shape aspect definition - AIM EXPRESS-G diagram 22 of 42	491
Figure J.23 - Process property representation - AIM EXPRESS-G diagram 23 of 42	492
Figure J.24 - Process property - AIM EXPRESS-G diagram 24 of 42	493
Figure J.25 - Geometry representation - AIM EXPRESS-G diagram 25 of 42	494
Figure J.26 - Geometry placement and transformation - AIM EXPRESS-G diagram 26 of 42	495
Figure J.27 - Geometry points - AIM EXPRESS-G diagram 27 of 42	496
Figure J.28 - Geometry curves - AIM EXPRESS-G diagram 28 of 42	497
Figure J.29 - Geometry surfaces - AIM EXPRESS-G diagram 29 of 42	498
Figure J.30 - Geometry conics - AIM EXPRESS-G diagram 30 of 42	499
Figure J.31 - Geometry surface curves - AIM EXPRESS-G diagram 31 of 42	500
Figure J.32 - Geometry bounded curves - AIM EXPRESS-G diagram 32 of 42	501
Figure J.33 - Geometry b-spline curves - AIM EXPRESS-G diagram 33 of 42	502
Figure J.34 - Geometry elementary surfaces - AIM EXPRESS-G diagram 34 of 42	503
Figure J.35 - Geometry bounded surfaces - AIM EXPRESS-G diagram 35 of 42	504
Figure J.36 - Geometry b-spline surfaces - AIM EXPRESS-G diagram 36 of 42	505
Figure J.37 - Topology representation - AIM EXPRESS-G diagram 37 of 42	506
Figure J.38 - Topology (1 of 2) - AIM EXPRESS-G diagram 38 of 42	507
Figure J.39 - Topology (2 of 2) - AIM EXPRESS-G diagram 39 of 42	508
Figure J.40 - Geometric solid models - AIM EXPRESS-G diagram 40 of 42	509
Figure J.41 - Geometric CSG solids - AIM EXPRESS-G diagram 41 of 42	510
Figure J.42 - Geometric external shapes - AIM EXPRESS-G diagram 42 of 42	511
Figure L.1 - Cross-section of three-part die set	514
Figure L.2 - Illustration of how a cam may convert downward force into lateral force	515

Tables

Table 1 - Mapping table for feature UoF	69
Table 2 - Mapping table for item UoF	72
Table 3 - Mapping table for item_definition UoF	75
Table 4 - Mapping table for item_definition_relationship UoF	89
Table 5 - Mapping table for item_version UoF	92
Table 6 - Mapping Table for part_process_plan UoF	95

Table 7 - Mapping table for product UoF	114
Table 8 - Mapping table for representation_element UoF	116
Table 9 - Mapping table for shape_definition UoF	122
Table 10 - Mapping table for shape_definition_relationship UoF	127
Table 11 - Mapping table for tolerance UoF	128
Table 12 - Mapping table for work_order UoF	132
Table 13 - Mapping table for work_order_request UoF	155
Table 14 - Conformance options	236
Table 15 - Conformance class membership	237
Table B.1 - AIM short names of entities	352