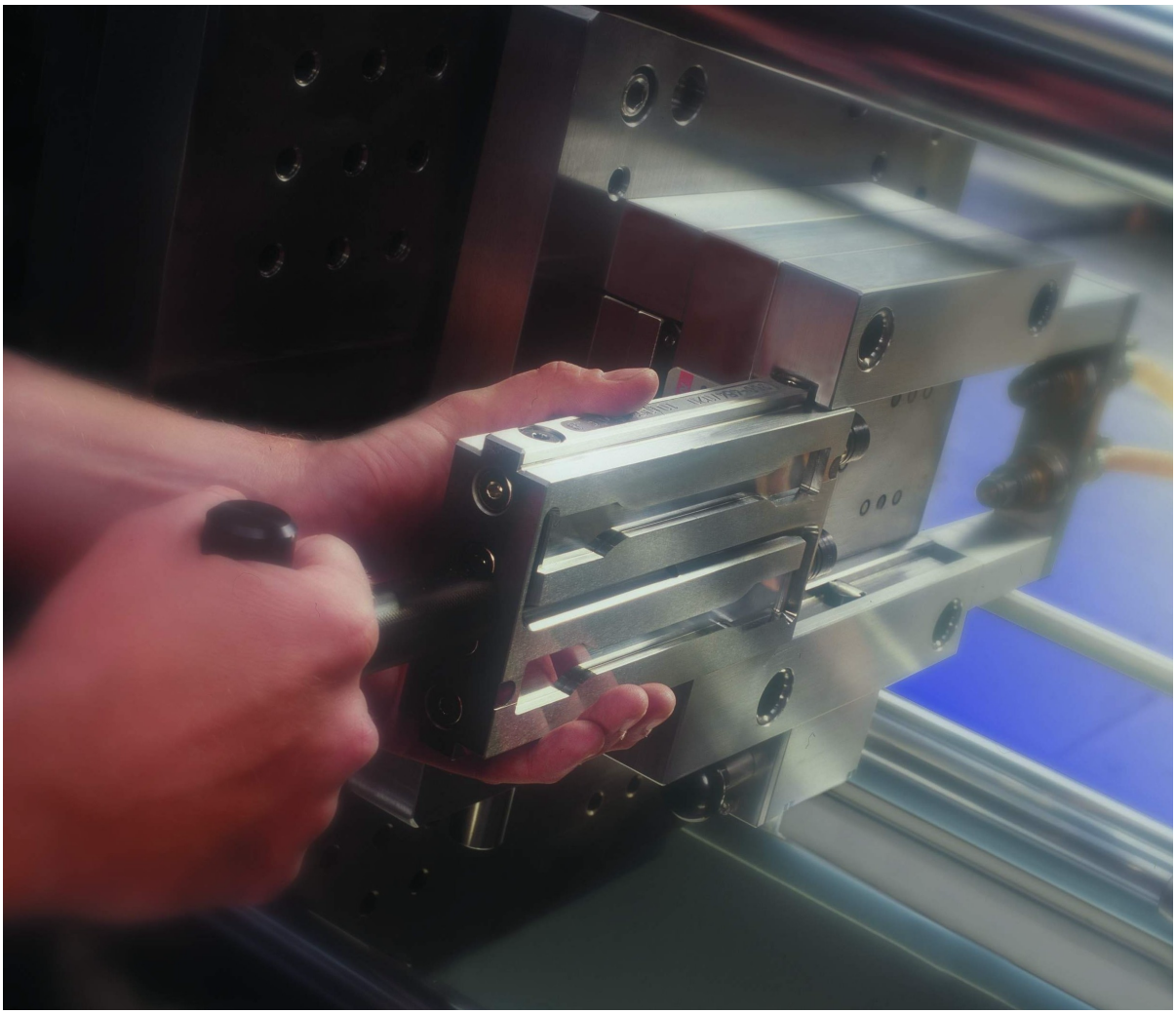
AIM Information Booklet



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PREFACE

This booklet is made to inform you about the AIM Mould System and the relationship between ISO, CAMPUS® and Axxicon Moulds Eindhoven BV.

You will find information on the latest developments in testing polymer properties and the reasons why every laboratory should have an ISO mould, like our AIM Mould System.

At the end the importance of a good and experienced mould maker is explained. A mould maker who is trusted by all main plastic testing laboratories in the world.

Note: This and other information is also available on www.axxicon.com

The information is partly taken out of information from ISO and CAMPUS®, but may contain not updated information or mistakes. Therefore we advise you to check everything with relation to ISO and CAMPUS® yourself.

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CONTENTS

1. HOW IMPORTANT IS ONE WORLD STANDARD?

Developments in determining plastic properties

The plastics industry is a global market, and the competition becomes harder and harder. We tend to export and/or we compete with imported products. So, good and recognisable quality is more important than ever before. Now the important questions are "Do we have the right test results?" and "What do these results mean?"

Plastic properties do not only depend on the size and geometry of the sample, but also on the specimen history. We can change test results by simply changing injection-moulding parameters. Plastic properties also change, influenced by the design of the injection mould (runner length, end- or side-gated, gate size, temperature, surface etc.). However, test standards normally do not mention anything about the production of test specimens.

The International Organisation for Standardisation (ISO) solved this problem. Besides the existing test standards, standards where developed for 'Injection moulding parameters', 'Mould design' and 'Acquisition and presentation of data'. Further they also reduced the amount of different samples. With only 6 ISO samples, including the so-called "Multi-Purpose" specimen you can do most ISO tests.

In addition to the ISO standards, a special material database has been developed. Its name is CAMPUS® (Computer Aided Material Pre-selection by Uniform Standards). This database only contains data from material suppliers, who are affiliated to CAMPUS®. They use the above-mentioned ISO standards for production, testing and presenting plastics. CAMPUS® data are presented on a floppy disk supplied by the material supplier. Special software from MBase enables the integration of data from different suppliers.

These developments are very important for all players in the plastics industry. Raw material suppliers, compounders etc., but also research and development centres, educational institutes, OEM's and moulders can profit from it. Using these ISO standards will lead to 'Rationalisation of procedures and Cost reduction' and 'Better and more consistent product quality'. But moreover you will get worldwide 'Comparable test results' and therefore 'Better access to expanding markets'.

These developments started in Western Europe, and are now spreading all over the world. Not only European companies changed their national standard for ISO, but also the US and Asian industry moves over. Although most American companies use ASTM, the big industries, like the automotive, see the benefits of these ISO standards, and they are now pushing their plastic suppliers to test according ISO. Besides that, standards like ASTM and JIS are being harmonised with ISO.

"The US plastics industry is starting to transition to the use of global testing standards", says Stephen J. Watson, Senior Technical Consultant of DuPont Co. "It is essential to maintain and facilitate growth" (Plastic Engineering; April 1995).

According to Louis T. Dixon, Ford Motor Co., "Manufacturers now marketing only in the US should not be thinking on a short term basis. It is inevitable that at some point in future, they will have to interact with a global manufacturer. That means that the language of commerce must be international and based on uniform and global standards". (Plastic Engineering; April 1995).

The Japanese industry seems to agree with this. The main material suppliers embraced the thought of ISO and CAMPUS®.

Not having international standardised standards may even be a barrier for international trade (S.J. Watson; DuPont Co.). Whether you choose for ISO or not, it seems clear that standardisation of plastics testing is seen as a better route to expanding markets and therefore necessary.

ISO and CAMPUS® establish the uniform standards that grease the wheels of commerce, across a large part of the world.

2. WHY LABORATORIES USE THE AIM MOULD SYSTEM?

2.1 Reasons

In the (recent) past, most companies used their own, or national standards for acquiring plastic material properties. These standards are procedures of 'how to test' and with which sample.

In some laboratories material properties are acquired from samples which are cut from sheet. This however is only interesting if the product for which the plastic will be used, is also a sheet product. If this is not the case, tests on injection moulded parts are recommended.

Very often so-called 'Family-tools' are used. Injection moulds with a lot of different test samples in it, sometimes provided with the possibility to shut-off runners, so only one sample (or a few) could be selected for the injection moulding. In other cases for every sample type another mould is used.

However, current developments in testing thermoplastics, have lead to strict rules concerning the production of test specimens. ISO standards prescribe exactly how an injection mould should be made. Their regulations contain more than only the cavity geometry and 'Family-tools' are no longer allowed.

Therefore Axxicon Moulds Eindhoven BV developed the AIM Mould System.

2.2 Advantages of the AIM Mould System

Standardisation
- Designed according ISO
- Testing according ISO and other standards
- Allows low-cost change to ISO
- Obtaining data for CAMPUS®

Time & money
- Faster development
- Greater productivity
- Cost effectiveness
- Lower tooling costs
- Faster set-up
- Convenient storage
- Minimum purging
- Easier maintenance & repair
- Lower material costs
- Increased productivity

Quality
- More rigorous, exact testing
- Quick comparison of plastics
- Consistent product performance
- Higher product quality

Flexibility
- Flexible and safe operation
- Exchange with other plants/customers
- Special specimens according your wish
- Easy, flexible expansion of tools
- Enables intermediate testing
- Instant production change-over
- Maximum versatility
- Short production cycles possible

Construction
- Quick change system
- Changing convenience (side loaded)
- Cooling/heating automatically connected
- Corrosion resistant steel types used
- Pins and bushes for excellent alignment
- Fitting almost every moulding machine

3. WHAT DO ISO & CAMPUS® REQUIRE?

3.1 General

The CAMPUS® database only contains basic data from licensed material suppliers, which testing procedures are fully according to the ISO standards. In order to realise worldwide comparable test-results, ISO has, in addition to the different test procedures, also developed standards for:

- Mould design for sample preparation
- Injection moulding parameters
- Acquisition and presentation of data

Furthermore they designed only 6 test specimens with which all ISO tests can be executed.

3.2 ISO injection moulding machine requirements

For preparation of reproducible and comparable test specimens, only reciprocating screw injection moulding machines, with necessary devices for control and maintenance of conditions shall be used. The ratio of moulding volume (Vm) to screw-stroke volume (Vs) should normally be between 20-80%
The type of screw shall be suitable for the moulding material (length, depth of thread, compression ratio). The screw diameter should be between 18-40 mm. The control system of the machine shall be capable of maintaining the operating conditions within the following ranges:

- Injection time t_I ± 0.1 s
- Hold pressure P_H ± 5 %
- Hold time t_H ± 5 %
- Melt temperature T_M ± 3ºC
- Mould temperature T_c ± 3ºC up to 80 ºC; ± 5 ºC above 80 ºC
- Mass of the moulding « ± 2 %
- Pressure sensor control recommended

The shot volume of the ISO samples 'A', 'B' and 'D2' (see next section) is ± 30 cm^3. The projected area (Ap) varies from 60 cm^2 for the 'A' sample to 150 cm^2 for the 'F' samples. Multiplying these values with the maximum injection moulding pressure in the cavity will result in the required minimum clamping force of the machine.

3.3 ISO mould requirements

An ISO mould is not only a mould that contains cavities of ISO samples with the right specimen geometry. The ISO institute prescribes that it has to be a quick-change system. 'Family-tools', moulds with different sample geometries, are not allowed. Beside specimen geometry, requirements concern e.g. layout, runner and gating dimensions, shot volume, the use of ejector pins, pressure sensors and thermocouples. Also very important is the temperature balance in the mould. Temperature differences between two points on the mould contact / cavity surface should be less than 5º C.

3.4 ISO required specimens

A company, which wants to test according to ISO only, needs 6 different test samples, which however need to be prepared in a special ISO mould with specific requirements. These 6 test samples are:

- ISO 'A' : two (2) tensile bars 170 x 10 x 4 mm with Z-runner lay-out
- ISO 'B' : four (4) bars 80 x 10 x 4 mm with double T-runner lay-out
- ISO 'C' : four (4) short tensile bars 60 x 10 x 3 mm with double T-runner lay-out
- ISO 'D1': two (2) plaques 60 x 60 x 1 mm with double film gating lay-out
- ISO 'D2': two (2) plaques 60 x 60 x 2 mm with double film gating lay-out
- ISO 'F' : two (2) plaques 90 x 80 x 3 mm with double film gating lay-out

3.5 Processing conditions for injection moulding of thermoplastics

Material	MeltT (ºC)	MouldT (ºC)	AIV (mm/s)	CT (s)	HT (s)	TCT (s)	Reference
ABS							
All grades	250	60	200 ± 100				IS 2580 - 2 : 94
Flame retarded	220	60	200 ± 100				
SAN	240	60	200 ± 100				IS 4894 - 2 : 94
ASA	250	60	200 ± 100				IS 6402 - 2 : 94
AEPDS	250	60	200 ± 100				IS 6402 - 2 : 94
ACS	250	60	200 ± 100				IS 6402 - 2 : 94
MABS	245	60	200 ± 100				IS 10366 - 2 : 94
PS	220	45	200 ± 100				IS 1622 - 2 : 94
PS - I							
General purpose	220	45	200 ± 100				IS 2897 - 2 : 94
Flame retarded	210	45	200 ± 100				
PP							
MFR < 1.5 g/10 min	255	40	200 ± 20		40	60	
MFR ≥ 1.5 < 7 g/10 min	230	40	200 ± 20		40	60	IS 1873 - 2 : 97
MFR ≥ 7 g/10 min	200	40	200 ± 20		40	60	
PE	210	40	100 ± 20	35 ± 5		40 ± 5	IS 1872 - 2 : 97
EVOH							
Unfilled, Ethylene							
content > 15 but ≤ 30	220	5	150	45	15	50	
content > 30 but ≤ 45	200	50	150	45	15	50	
content > 45 but ≤ 60	180	50	150	45	15	50	IS 14663 - 2 : 98
Filled (≤ 30), Ethylene							
content > 15 but ≤ 60	230	60	150	35	12	40	
Filled (> 30), Ethylene							
content > 15 but ≤ 60	250	80	150	35	12	40	
PC							
Unreinforced							
MFR > 15 g/10 min	280	80	200 ± 100				
MFR > 10 15 g/10 min	290	80	200 ± 100				
MFR > 5 10 g/10 min	300	80	200 ± 100				IS 7391 - 2 : 95
MFR 5 g/10 min	310	90	200 ± 100				
Glass fibre reinforced	300	110	200 ± 100				
Acetals							
Homopolymer							
MFR ≤ 7 g/10 min	215	90	140 ± 100				
MFR ≥ 7 g/10 min	215	90	300 ± 100				
Homopolymer, impact modified							
MFR ≤ 7 g/10 min	210	60	140 ± 100				FDIS 9988 - 2 : 99
Copolymer							
MFR 4 g/10 min	205	90	140 ± 100				
MFR > 4 g/10 min	205	90	200 ± 100				
Copolymer, impact modified	205	80	200 ± 100				
PA 6							
Unfilled							
VN ≤ 160 mg/l	250	80	200 ± 100		25 ± 5	≤ 50	
VN ≥ 160 mg/l to ≤ 200 mg/l	260	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
VN ≥ 200 mg/l to ≤ 240 mg/l	270	80	200 ± 100		25 ± 5	≤ 50	
Filled, VN ≤ 160 mg/l	290	80	200 ± 100		25 ± 5	≤ 50	
PA 66							
Unfilled, VN ≤ 200 mg/l	290	80	200 ± 100		25 ± 5	≤ 50	
Filled, VN ≤ 200 mg/l							
glass ≥ 10 to ≤ 50%	290	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
glass > 50 to ≤ 70%	300	100	200 ± 100		25 ± 5	≤ 50	

Material	MeltT (ºC)	MouldT (ºC)	AIV (mm/s)	CT (s)	HT (s)	TCT (s)	Reference
PA 46							
Unfilled, VN ≤ 260 mg/l	315	120	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
Filled, VN ≤ 260 mg/l,							
glass ≤ 50%	315	120	200 ± 100		25 ± 5	≤ 50	
PA 69							
Unfilled, VN ≤ 200 mg/l	270	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
PA 610							
Unfilled, VN ≤ 200 mg/l	270	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
PA 612							
VN ≤ 150 mg/l,							
glass ≤ 10%	240	80	200 ± 100		25 ± 5	≤ 50	
VN > 150 to ≤ 200 mg/l,							
glass ≤ 10%	250	80	200 ± 100		25 ± 5	≤ 50	
VN > 200 to ≤ 250 mg/l,							
glass ≤ 10%	270	80	200 ± 100		25 ± 5	≤ 50	
VN ≤ 140 mg/l,							
glass ≥ 10 but ≤ 30%	250	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
VN ≤ 140 mg/l,							
glass > 30 but ≤ 50%	260	80	200 ± 100		25 ± 5	≤ 50	
VN > 140 to ≤ 180 mg/l,							
glass ≥ 10 to ≤ 30%	260	80	200 ± 100		25 ± 5	≤ 50	
VN > 140 to ≤ 180 mg/l,							
glass ≥ 30 to ≤ 50%	270	80	200 ± 100		25 ± 5	≤ 50	
PA 11							
Unfilled							
VN ≤ 150 mg/l	210	80	200 ± 100		25 ± 5	≤ 50	
VN > 150 to ≤ 200 mg/l	230	80	200 ± 100		25 ± 5	≤ 50	
VN > 200 to ≤ 240 mg/l	250	80	200 ± 100		25 ± 5	≤ 50	
Filled							
VN ≤ 130 mg/l,							
glass ≥ 10 but ≤ 30%	220	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
glass > 30 but ≤ 50%	230	80	200 ± 100		25 ± 5	≤ 50	
VN > 130 to ≤ 240 mg/l,							
glass ≥ 10 to ≤ 20%	250	80	200 ± 100		25 ± 5	≤ 50	
glass ≥ 20 to ≤ 50%	260	80	200 ± 100		25 ± 5	≤ 50	
PA 12							
Unfilled, Plasticizer > 5%							
VN ≤ 150 mg/l,							
glass ≤ 10%	200	80	200 ± 100		25 ± 5	≤ 50	
VN > 150 to ≤ 200 mg/l,							
glass ≤ 10%	210	80	200 ± 100		25 ± 5	≤ 50	
VN > 200 to ≤ 240 mg/l,							
glass ≤ 10%	220	80	200 ± 100		25 ± 5	≤ 50	
Glass ≤ 10%, Plasticizer ≤ 5%							
VN ≤150 mg/l,							
glass ≤ 10%	200	80	200 ± 100		25 ± 5	≤ 50	
VN > 150 to ≤ 200 mg/l,							
glass ≤ 10%	210	80	200 ± 100		25 ± 5	≤ 50	
VN > 200 to ≤ 240 mg/l,							
glass ≤ 10%	220	80	200 ± 100		25 ± 5	≤ 50	
VN ≤ 140 mg/l,							
glass ≥ 10 but ≤ 30%	250	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
VN ≤ 140 mg/l,							
glass > 30 but ≤ 50%	260	80	200 ± 100		25 ± 5	≤ 50	
VN > 140 to ≤ 180 mg/l,							
glass ≥ 10 to ≤ 30%	260	80	200 ± 100		25 ± 5	≤ 50	
VN > 140 to ≤ 180 mg/l,							
glass ≥ 30 to ≤ 50%	270	80	200 ± 100		25 ± 5	≤ 50	

Material	MeltT (ºC)	MouldT (ºC)	AIV (mm/s)	CT (s)	HT (s)	TCT (s)	Reference
PA MXD-6							
Unfilled							
VN ≤ 130 mg/l	250	130	200 ± 100		25 ± 5	≤ 50	
VN > 130 mg/l but ≤ 160 mg/l	260	130	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
Filled							
VN ≤ 130 mg/l, glass ≥ 20 to ≤ 50%	270	130	200 ± 100		25 ± 5	≤ 50	
VN > 130 to ≤ 160 mg/l, glass ≥ 20 to ≤ 50%	280	130	200 ± 100		25 ± 5	≤ 50	
PA NDT/INDT							
Unfilled, VN ≤ 160 mg/l	280	80	200 ± 100		25 ± 5	≤ 50	
Filled, VN ≤ 120 mg/l, glass ≥ 20% but ≤ 50%	300	80	200 ± 100		25 ± 5	≤ 50	IS 1874 - 2 : 95
PBT							
Unfilled	260	80	200 ± 100		20 ± 5	40 ± 5	
Unfilled, Impact modified and flame retarded	250	80	200 ± 100		20 ± 5	40 ± 5	IS 7792 - 2 : 98
Filled	260	80	200 ± 100		20 ± 5	40 ± 5	
Filled, Impact modified and flame retarded	250	80	200 ± 100		20 ± 5	40 ± 5	
PET							
Unfilled, amorphous	285	20	200 ± 100		20 ± 5	40 ± 5	
Unfilled, semicrystalline	275	135	200 ± 100		20 ± 5	40 ± 5	
Filled	285	135	200 ± 100		20 ± 5	40 ± 5	IS 7792 - 2 : 98
Filled, nucleated	285	110	200 ± 100		20 ± 5	40 ± 5	
Filled, flame retarded	275	135	200 ± 100		20 ± 5	40 ± 5	
Filled, nucleated and flame retarded	275	110	200 ± 100		20 ± 5	40 ± 5	
PCT							
Unfilled, amorphous	300	20	200 ± 100		20 ± 5	40 ± 5	
Unfilled, semicrystalline	300	120	200 ± 100		20 ± 5	40 ± 5	IS 7792 - 2 : 98
Filled	300	120	200 ± 100		20 ± 5	40 ± 5	
PEN							
Unfilled, amorphous	300	20	200 ± 100		20 ± 5	40 ± 5	
PK - EP							
T_m > 205°C to ≤ 215°C, 0 to 50% filled	235	80	200 ± 100		15 ± 5	≤ 35	
T_m > 215°C to ≤ 225°C, 0 to 50% filled	245	80	200 ± 100		15 ± 5	≤ 35	
T_m > 225°C to ≤ 235°C, 0 to 50% filled	255	80	200 ± 100		15 ± 5	≤ 35	FDIS 15526–2 : 99
T_m > 235°C to ≤ 245°C, 0 to 50% filled	265	80	200 ± 100		15 ± 5	≤ 35	
T_m > 245°C to ≤ 255°C, 0 to 50% filled	275	80	200 ± 100		15 ± 5	≤ 35	
PK – E							
T_m > 255°C, 0 to 50% filled	275	80	200 ± 100		15 ± 5	≤ 35	DIS 15526-2 : 98
PMMA							
MFR ≤ 1 g/10 min	270	VST - 40*	200 ± 100	50 ± 5			
MFR > 1 but ≤ 2 g/10 min	260	VST - 40*	200 ± 100	50 ± 5			
MFR > 2 but ≤ 4 g/10 min	250	VST - 40*	200 ± 100	50 ± 5			IS 8257 - 2 : 96
MFR > 8 but ≤ 16 g/10 min	230	VST - 40*	200 ± 100	50 ± 5			
MFR > 16 g/10 min	220	VST - 40*	200 ± 100	50 ± 5			
PPE							
Unfilled							
DTUL @ 1.8 MPa > 200°C	340	120	200 ± 100		20 ± 5	≤ 50	FDIS 15103-2 : 99

Material	MeltT (ºC)	MouldT (ºC)	AIV (mm/s)	CT (s)	HT (s)	TCT (s)	Reference
PPE +PS							
Unfilled							
DTUL @ 1.8 MPa ≤ 90°C	260	60	200 ± 100		20 ± 5	≤ 50	
DTUL @ 1.8 MPa > 200°C	340	120	200 ± 100		20 ± 5	≤ 50	
≤50% filled							
DTUL @ 1.8 MPa > 90°C to ≤ 110°C	240	60	200 ± 100		20 ± 5	≤ 50	
DTUL @ 1.8 MPa > 110°C to ≤ 130°C	280	80	200 ± 100		20 ± 5	≤ 50	
DTUL @ 1.8 MPa > 130°C to ≤ 150°C	290	90	200 ± 100		20 ± 5	≤ 50	FDIS 15103-2 : 99
DTUL @ 1.8 MPa > 150°C to ≤ 160°C	310	120	200 ± 100		20 ± 5	≤ 50	
DTUL @ 1.8 MPa > 160°C to ≤ 170°C	320	120	200 ± 100		20 ± 5	≤ 50	
DTUL @ 1.8 MPa > 170°C to ≤ 200°C	340	120	200 ± 100		20 ± 5	≤ 50	
PPE +PA							
≤50% filled							
DTUL @ 1.8 MPa > 160°C to ≤ 180°C	290	90	200 ± 100		20 ± 5	≤ 50	FDIS 15103-2 : 99
DTUL @ 1.8 MPa > 180°C	300	100	200 ± 100		20 ± 5	≤ 50	
Thermoplastic polyester/polyether elastomers							

MeltT	=	Melt temperature in ºC	DIS	=	Draft International Standard
MouldT	=	Mould surface temperature in ºC	FDIS	=	Final Draft International Standard
AIV	=	Average injection velocity in mm/s	IS	=	International Standard
CT	=	Cooling time in s			
HT	=	Holding time in s			
TCT	=	Total cycle time in s			

3.6 Tests to execute with ISO specimens

ISO A	
- Tensile test	ISO 527-2, type 1A
- Tensile creep test	ISO 899-1
- Hardness, ball indentation	ISO 2039-1
- Comparative tracking index (CTI)	IEC 112
- Linear Expansion	---
ISO B	
- Tensile properties (small properties)	ISO 639
- Flexural test	ISO 178
- Flexural creep test	ISO 6602
- Flexural creep (3 point loading)	ISO 899-2
- Compressive test	ISO 604
- Impact strength - Charpy	ISO 179
- Impact strength - Izod	ISO 180
- Impact strength - Tensile	ISO 8256
- Temperature of deflection under load (HDT)	ISO 75 "flatwise position"
- Vicat softening temperature	ISO 306
- Environmental stress cracking	ISO 4599
- Environmental stress cracking	ISO 4600
- Density	ISO 1183
- Oxygen index	ISO 4589
- Electrolytic corrosion	IEC 426
ISO C	
- Impact strength - tensile	ISO 8256
- Environmental influences like	---
§ liquid chemicals	---
§ heat	---
§ weathering	---
ISO D1	
- Electrical properties	---
- Absorption of water	---
- Dynamic mechanical properties	ISO 6721-2
ISO D2	
- Impact multi-axial (falling dart)	ISO 6603
- Shrinkage	ISO 294-4
- Optical properties	---
- Weathering influences on coloured plastics	ISO 4892-2
- Mechanical anisotropy	---
- Weld lines	---
ISO F	
- Tensile properties	ISO 527-2, type 1BA

4. WHAT DOES THE AIM MOULD SYSTEM LOOK LIKE?

4.1 System

The systems mould base consists of a fixed half and a moving half. The fixed half contains an interchangeable mirror plate and at the moving half you can slide-in different product forming inserts.

Below you will find a table with approximate figures concerning the different parts of the flexible AIM Mould System:

	L x W x H	Weight
Mould base ("Euromap"):	346 x 296 x 223 mm	90 kg
Mould base ("SPI")	296 x 296 x 223 mm	85 kg
Mirror plate:	196 x 100 x 38 mm	5-6 kg
Productforming insert:	196 x 100 x 38 mm	5-6 kg

Maximum mould temperature for our standard mould bases is 10-140ºC.

4.2 Mounting requirements

The mould base fits most standard moulding machines. The data mentioned below are for the two different standard mould bases (see page 14/30). These standard mould bases can be adjusted for fitting almost every moulding machine.

"Euromap"

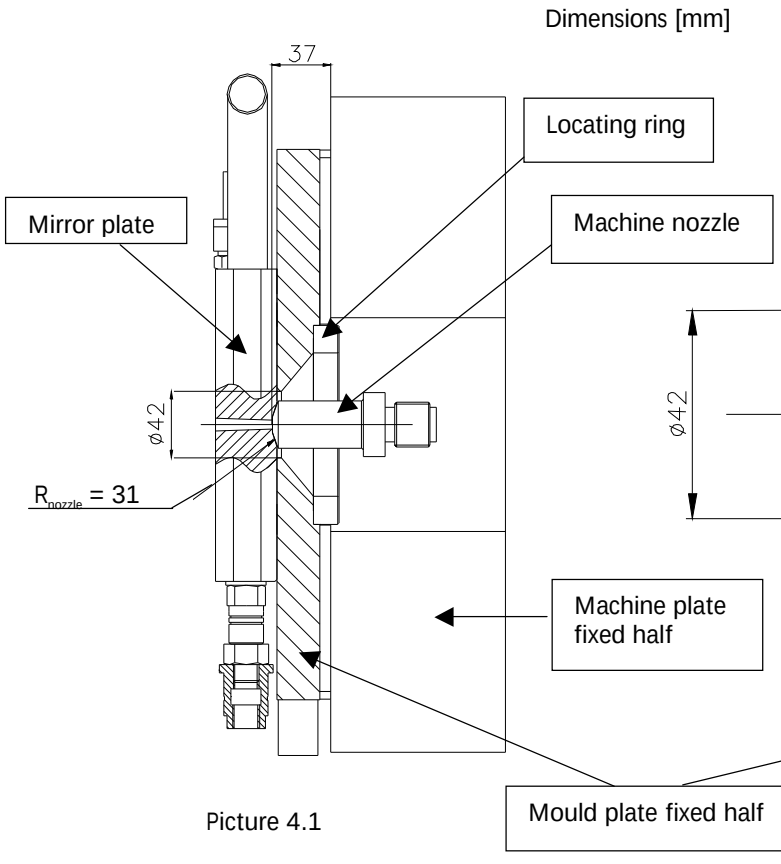
Machine plate dimensions should allow mould plates of:	346 x 296 mm
Machine mounting height should fit:	223 mm
with additional adapter plate:	259 mm
Central ejector pin (when mounted) should fit into machine:	ø35 x 80 mm
Locating ring (fixed half only) diameter is:	ø125 mm
Mounting hole 'Euromap' system for:	M12
- Hole distance horizontally:	140 or 210 mm
- Hole distance vertically:	280 mm
Water / oil tube connection	Female BSP R3/8" and R1/4" (British Standard Pipe)

"SPI"

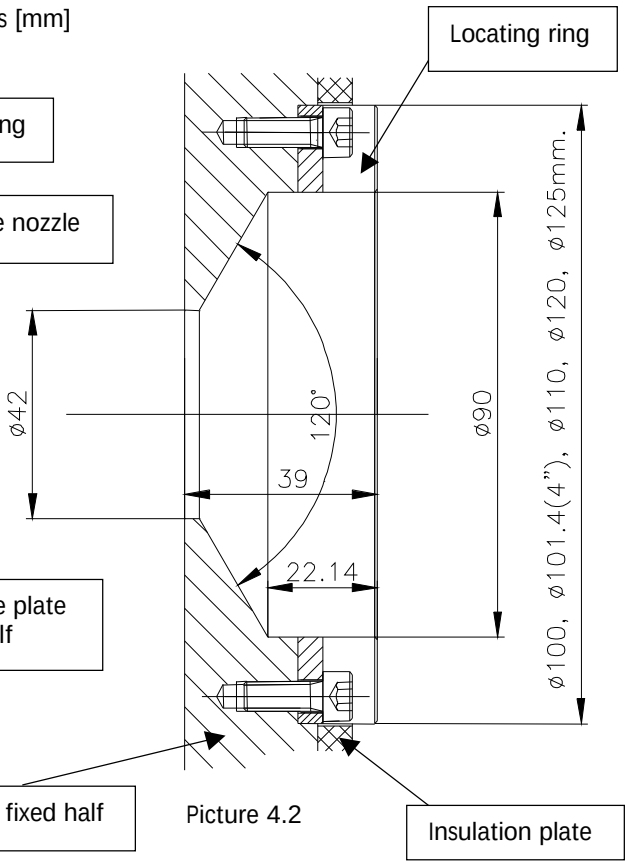
Machine plate dimensions should allow mould plates of:	296 x 296 mm
Machine mounting height should fit:	223 mm
with additional adapter plate:	259 mm
Central ejector pin (when mounted) should fit into machine:	ø35 x 80 mm
Locating ring (fixed half only) diameter is:	ø100, ø101.6 (4"), ø110 or ø120 mm
Mounting hole 'SPI' system for:	M16 (.625")
- Hole distance horizontally:	250 and 254 (10") mm
- Hole distance vertically:	250 and 254 (10") mm
Water / oil tube connection	Female BSP R3/8" and R1/4" (British Standard Pipe)

4.3 Nozzle requirements

The nozzle goes approximately 37 mm into the mould base before it touches the mirror plate (picture 4.1). This means that the nozzle should pass the machine plate for at least 40 mm (e.g. 45 mm). The hole in the mould base is Ø42 mm (picture 4.2) so that the maximum diameter of the nozzle should be less than Ø42 mm (e.g. Ø40 mm). The radius at the back of the mirror plate is R 35 mm. The nozzle radius however, should be smaller e.g. 30-32 mm (picture 4.1). Based on our experience we advise to use a nozzle with a hole diameter of approximately 2/3x sprue diameter. As the sprue diameter is 6 mm (standard), we advise a nozzle hole diameter of 4 mm.



Picture 4.1



Picture 4.2

4.4 Cooling medium

Water with a rust preventing additive can be used as cooling medium. Alternatively following oil-types are recommended:

ARAL	: Farulin U
BP	: BP Transcal LT
ESSO	: Essothermalöl T
MOBIL	: Mobiltherm 603
SHELL	: Thermia Oil B
HOUGHTON	: Transtherm 496

These are high-viscous mineral oils on paraffin base without additives.

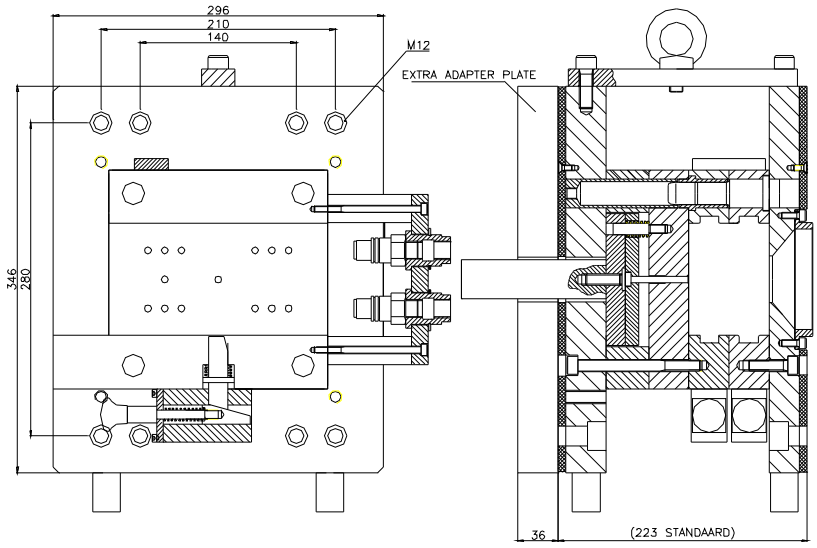
5. WHAT CAN WE OFFER YOU?

5.1 Mould Base

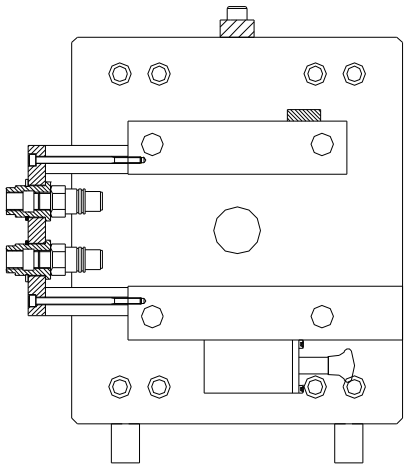
5.1.1 "Euromap" (see also 'mounting requirements' page 12/30)

For normal use (mould temperatures 10-140ºC), with glass fibre insulation plate

Moving half mould base



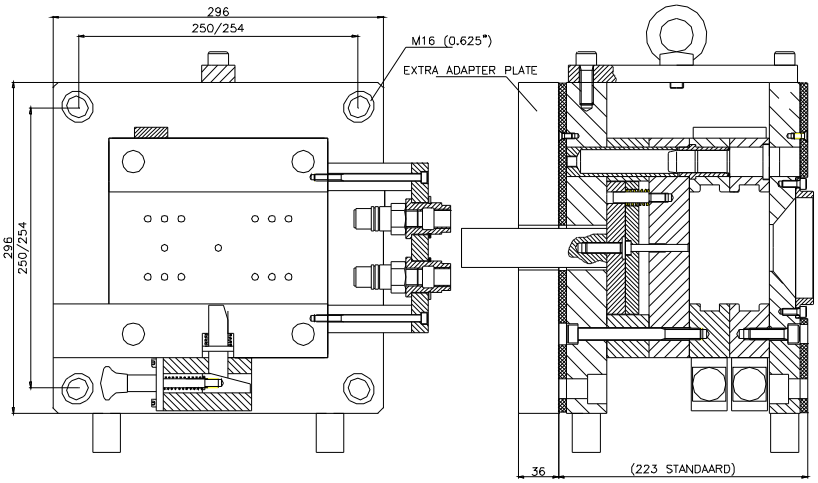
Fixed half mould base



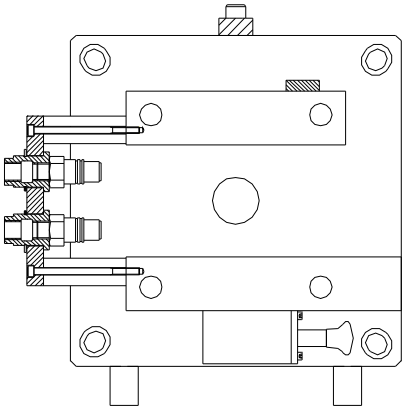
"SPI" (see also 'mounting requirements' page 12/30)

For normal use (mould temperatures 10-140ºC), with glass fibre insulation plate

Moving half mould base



Fixed half mould base



5.1.2 Mould base adjustments (see also page 12/30)

- Adapter plate
  Plate is used to enlarge the "mould-height", when the mould is too small for your injection-moulding machine.

- Locating ring
  In case the standard locating ring does not fit on your injection-moulding machine, a ring with other dimensions can be supplied.

- Hole size
  If your machine does not have holes for bolts M12 or M16 (.625"), we can make them every size.

- Hole pattern
  If your machine plates does not have an identical "Euromap" or "SPI" hole pattern (like indicated above), we can make holes according to another pattern.

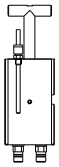
- Pneumatic cylinder
  A pneumatic cylinder can be mounted for pneumatic release/secure of mirror plate and insert instead of the (standard mounted) mechanical locking system.

5.1.3 'Oil heated'
For high mould temperatures (140-200ºC), completely insulated

5.1.4 'Oversized'
For oversized specimen

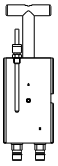
5.2 Mirror plates (fixed half inserts)

5.2.1 AIM Mirror plate



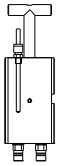
Mirror surface plate, polished N0/N1 (SPI-SPE 1-2) according ISO 1302 equipped with temperature sensor J-type (Fe) with 1 meter cable (K-type and longer cable at request).

5.2.2 AIM Mirror plate “Special”



Mirror surface plate, polished N0/N1 (SPI-SPE 1-2) according ISO 1302 equipped with temperature sensor J-type (Fe) with 1 meter cable (K-type and longer cable at request).
This Mirror plate is “special”, as this is prepared for mounting 1 or 2 pressure sensors with 0.4 meter cable: One pressure sensor position is made above the sprue in the central runner. This is an ISO recommended position for shrinkage measurement on the D2-plaque. The other position is located at the gate side of the tensile bar (AIM Insert ISO A; section 5.3.1). This Mirror plate can also be ordered without pressure sensors mounted (dummy prepared). In this case are dummies mounted and can the pressure sensors be mounted afterwards.

5.2.3 Custom made Mirror plate



Design to be discussed.

5.2.4 Mirror plate adjustments

- Back-side radius
  In case the back-side radius (standard 35 mm; see section 4.3) does not fit your injection-moulding machine nozzle radius, the back-side radius of the mirror plate can be adjusted.

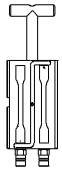
- Temperature sensor K-type
  In case a K-type (CuNi) temperature sensor is required, please inform us.

- Temperature sensor with 2 or 5 meter cable
  Standard temperature sensor has a cable length of 1 meter. In case a longer cable is required, a temperature sensor with 2 or 5 meter can be supplied.

- Pressure sensor 2 or 5 meter extension cable
  Standard pressure sensor has a cable length of 0.4 meter. In case a longer cable is required, a 2 or 5 meter extension cable can be supplied.

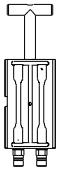
5.3 ISO inserts (moving half)

5.3.1a AIM Insert ISO A



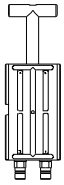
Specimen dimensions according ISO: 170 x 10 x 4 mm
Gating according ISO 294-1 (1996), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.3.1b AIM Insert ISO A Weldline



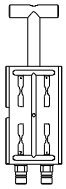
Specimen dimensions according ISO: 170 x 10 x 4 mm
Gating according ISO 294-1 (1996), double T-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.3.2 AIM Insert ISO B



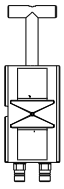
Specimen dimensions according ISO: 80 x 10 x 4 mm
Gating according ISO 294-1 (1996), double T-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.3.3 AIM Insert ISO C



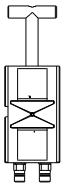
Specimen dimensions according ISO: 60 x 10 x 3 mm
Gating according ISO 294-2 (1996), double T-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.3.4a AIM Insert ISO D1



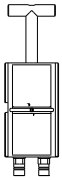
Specimen dimensions according ISO: 60 x 60 x 1 mm
Gating according ISO 294-3 (2002), double film-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N1 (SPI-SPE 1-2); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.3.4b AIM Insert ISO D2



Specimen dimensions according ISO: 60 x 60 x 2 mm
Gating according ISO 294-3 (2002), double film-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N1 (SPI-SPE 1-2); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

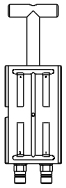
5.3.5 AIM Insert ISO F



Specimen dimensions according ISO: 90 x 80 x 3 mm
Gating according ISO 294-5 (2001), double film-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N1 (SPI-SPE 1-2); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

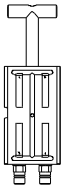
5.4 ASTM inserts (moving half)

5.4.1a AIM Insert ASTM D256 Izod (3.2 mm)



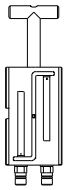
Specimen dimensions according ASTM D256 Izod: 63.5 (2.5”) x 12.7 (0.5”) x 3.2 (0.125”) mm
Gating according ASTM D3641-02 table I (2.1 x 12.7), double T-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.4.1b AIM Insert ASTM D256 Izod (6.4 mm)



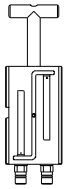
Specimen dimensions according ASTM D256 Izod: 63.5 (2.5”) x 12.7 (0.5”) x 6.4 (0.25”) mm
Gating according ASTM D3641-02 table I (4.3 x 12.7), double T-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.4.2a AIM Insert ASTM D256 Charpy (3.2 mm)



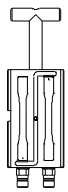
Specimen dimensions according ASTM D256 Charpy: 127 (5”) x 12.7 (0.5”) x 3.2 (0.125”) mm
Gating according ASTM D3641-02 table I (2.1 x 12.7), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.4.2b AIM Insert ASTM D256 Charpy (6.4 mm)



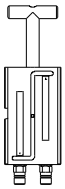
Specimen dimensions according ASTM D256 Charpy: 127 (5”) x 12.7 (0.5”) x 6.4 (0.25”) mm
Gating according ASTM D3641-02 table I (4.3 x 12.7), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.4.3 AIM Insert ASTM D638 type I Tensile (3.2 mm)



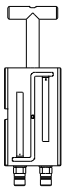
Specimen dimensions according ASTM D638 type I: 165 (6.5") x 13 (0.5") x 3.2 (0.125") mm
Gating according ASTM D3641-02 table I (2.1 x 19 mm), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.4.4a AIM Insert ASTM D648 HDT (3.2 mm)



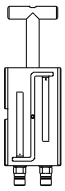
Specimen dimensions according ASTM D648: 127 (5") x 12.7 (0.5") x 3.2 (0.125") mm
Gating according ASTM D3641-02 table I (2.1 x 12.7), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.4.4b AIM Insert ASTM D648 HDT (6.4 mm)



Specimen dimensions according ASTM D648: 127 (5") x 12.7 (0.5") x 6.4 (0.25") mm
Gating according ASTM D3641-02 table I (4.3 x 12.7 mm), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.4.5 AIM Insert ASTM D790 Flexural (3.2 mm)

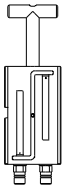


Specimen dimensions according ASTM D790: 127 (5") x 12.7 (0.5") x 3.2 (0.125") mm
Gating according ASTM D3641-02 table I (2.1 x 12.7), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

Note: - The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.
Gating according ASTM D3641-02 table I. Other gating dimensions at request.

5.5 Other inserts (moving half)

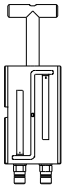
5.5.1a AIM Insert UL94 (1.5 mm)



Specimen dimensions: 125 x 13 x 1.5 mm
Gating according ISO 294-1 (1996), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

Other dimensions (length, width, depth) at request

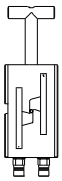
5.5.1b AIM Insert UL94 (3.0 mm)



Specimen dimensions: 125 x 13 x 3.0 mm
Gating according ISO 294-1 (1996), Z-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

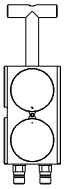
Other dimensions (length, width, depth) at request

5.5.2 AIM Insert UL94 “Special” (0.75 mm)



Specimen dimensions: 125 x 13 x 0.75 mm
Gating according Axxicon design, double film-runner
1 central ejector pin & 2 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 1º

5.5.3 AIM Insert Disc



Specimen dimensions: Ø 85 x 3 mm
Gating and runner according Axxicon design
1 central ejector pin & 0 ejector pins per specimen
Surface polish: standard N1 (SPI-SPE 2); cavity numbers engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 10º

Other dimensions (diameter, depth) at request

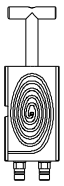
5.5.4a AIM Insert Spiral Flow “Axxicon” (2 mm)

Specimen dimensions: 1150 x 5 x 2 mm
1 central ejector pin & 4 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); length (cm.) engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 10º

Other dimensions (width, depth) at request

Note: Insert can not always run automatically

5.5.4b AIM Insert Spiral Flow “Axxicon” (3 mm)

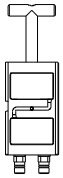


Specimen dimensions: 1150 x 5 x 3 mm
1 central ejector pin & 4 ejector pins per specimen
Surface polish: standard N2 (SPI-SPE 2-3); length (cm.) engraved
Steel: Cr.-steel; HRc: 50-52; Draft: 10º

Other dimensions (width, depth) at request

Note: Insert can not always run automatically

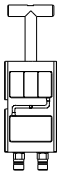
5.5.5 AIM Insert Colour Plaque



Specimen dimensions: 90 x 55 x 2 mm
Gating and runner according Axxicon design
1 central ejector pin & 0 ejector pins per specimen
Surface polish: standard N1 (SPI-SPE 1-2)
Steel: Cr.-steel; HRc: 50-52; Draft: 10º

Other dimensions (length, width, depth) at request

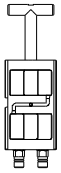
5.5.6 AIM Insert Colour Plaque & Step Chip



Specimen dimensions: 90 x 55 x (2 + 1, 2, 3) mm (3 levels)
Gating and runner according Axxicon design
1 central ejector pin & 0 ejector pins per specimen
Surface polish: standard N1 (SPI-SPE 1-2)
Steel: Cr.-steel; HRc: 50-52; Draft: 10º

Other dimensions (length, width, depth, levels) at request

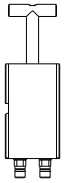
5.5.7 AIM Insert Step Chip



Specimen dimensions: 90 x 55 x (1, 2, 3) mm (3 levels)
Gating and runner according Axxicon design
1 central ejector pin & 0 ejector pins per specimen
Surface polish: standard N1 (SPI-SPE 1-2)
Steel: Cr.-steel; HRc: 50-52; Draft: 10º

Other dimensions (length, width, depth, levels) at request

5.6 Special inserts (moving half)



Design to be discussed

5.7 Options

5.7.1 Insert and mirror plate coating

For inserts and mirror plates as extra protection against abrasive and/or corrosive materials (TiN and MCP).
Please note that the MCP coating can influence the gloss of the surface of the product samples. This can be disadvantageous for optical or transparency tests, but not for mechanical tests.

5.7.2 Grains / textures

For colour plaques or step chips (visual checking).

5.7.3 Chain hole

Enables hanging of samples, or to keep samples together with a chain (colour plaques and step chips).

5.7.4 Logo (easy/difficult-on/in)

In or on samples (colour plaques and step chips).

5.7.5 Notches

Possible, but standards do advise to machine them after moulding.

5.8 Service

5.8.1 Included services

- Design and Manufacturing
  This offer contains design and manufacturing of the mould(s) and or insert(s).
- Quality Assurance
  All articles manufactured by Axxicon Moulds Eindhoven BV are complying with the Quality Assurance system of Axxicon Moulds Eindhoven BV. The by Axxicon Moulds Eindhoven BV handled Quality Assurance system and its execution, apply to NEN-EN-ISO 9001 (2000) and is certified by Lloyd's Register Quality Assurance.
- Internal testing
  All AIM parts will be tested (with a material selected by Axxicon) and made ready for shipment in our "Mould Test Centre" in Eindhoven, the Netherlands.
- Standard delivery terms
  In this case Axxicon Moulds Eindhoven BV will deliver the goods ex works, Axxicon Moulds Eindhoven BV, Eindhoven, the Netherlands.
- Manual & Gloves
  For installation and maintenance purposes we provide you with a manual. Assembly drawings of the mould base and different insert options are included. For mirror plate and insert exchanging purposes we provide you with heat protecting gloves.

5.8.2 Extra services

- Testing with customer
  On request we can arrange an injection moulding test for the mould base(s) and / or the insert(s) at our Mould Test Centre (Eindhoven, the Netherlands) which can be attended by the customer. If you wish so, please confirm at written order.

- Delivery Alternative
  On request we can arrange Delivery Alternative (F.O.B., D.D.U., D.D.P., C.I.F. etc). If you wish so, please confirm at written order.

- Installation and Training
  Axxicon Moulds Eindhoven BV can provide Installation including Training of your personnel. Training may vary from injection moulding to maintenance of the mould. Installation and Training normally takes about 4 - 6 hours. In case it takes more time, the extra hours will be invoiced afterwards. If our company does installation of the mould the warranty terms will be extended with 3 extra months.

- Moulding Simulation
  On request we can provide you with a (simple) moulding simulation.

- Measuring Report (Roughness)
  On request we can provide you with a measuring report with the roughness of the cavity surfaces from the mirror plates and/or inserts (sections 5.2 till 5.5).

5.9 Accessories

5.9.1 AIM Maintenance kit + spare-parts:

- 1x set hex keys
- 1x set spanners
- 1x spray-can cleaning fluid "Quickleen" (Mavon)
- 1x spray-can preservative "Erol" (anti-corrosion)
- 1x tube grease type "Z 260/1"
- 2x box cleaning material "Kimberley Clark"
- 1x tube "Loctite 572 pipe sealant"
- 6x quick-coupling "female" (mirror plate/insert)
- 4x quick-coupling "male" (mould base)
- 10x seal ring (mould base/mirror plate/insert)
- 2x handle (mirror plate/insert)
- 8x plug (mirror plate/insert)
- 1x ejector pin central Ø6 mm (insert)
- 4x ejector pin Ø4 mm (insert)
- 2x ejector pin Ø6 mm (mould base)
- 20x spring small (mould base/insert)
- 4x spring small ejector plate (mould base)

AIM Maintenance kit + spare-parts

5.9.2 Spare-parts

For maintenance purpose we can supply several spare-part packages.

6. WHAT DO WE RECOMMEND?

6.1 General

This recommendation assumes normal circumstances, without specific adjustments for high temperatures, abrasive materials etc.

6.2 ISO testing

ISO has defined six (6) specimens with which you can do most ISO tests. A pressure sensor is required in case of shrinkage measurement (specified ISO location) on the 'D2' specimen. In other cases pressure sensors are recommended at least one (1) at the specified ISO location.

Therefore we recommend as follows:

- 1x AIM 'standard' mould base
- 1x AIM 'dummy prepared' mirror plate
- 1x AIM Insert ISO 'A' ; two (2) tensile bar cavities 170 x 10 x 4 mm with Z-runner layout
- 1x AIM Insert ISO 'B' ; four (4) bar cavities 80 x 10 x 4 mm with double T-runner layout
- 1x AIM Insert ISO 'D2'; two (2) plaque cavities 60 x 60 x 2 mm with double film-runner layout

Optional:

- 1 or 2 pressure sensors to be mounted in 'dummy prepared' mirror plate
- 1 x AIM 'standard' mirror plate (no sign of 'dummy' or pressure sensor on sample)
- 1 x AIM Insert ISO 'C': four (4) tensile bar cavities 60 x 10 x 3 mm with double T-runner layout
- 1 x AIM Insert ISO 'D1': two (2) plaque cavities 60 x 60 x 1 mm with double film-runner layout
- 1 x AIM Insert ISO 'F': two (2) plaque cavities 90 x 80 x 3 mm with double film-runner lay-out

6.3 Other specimen

Although the AIM Mould System was designed according to ISO mould making standards, we also supply inserts with specimen according other standards, like e.g.: DIN, ASTM, BS, JIS etc.

Because these standards normally only prescribe the specimen geometry, these inserts will, in principle, be designed with the same runner and gate regulations as for the ISO inserts. This also means only identical cavities and thicknesses. In addition to that we design cavities with +1% shrinkage, which normally fits within the specimen tolerance for most materials.

For budgetary reasons, you might want to have different thicknesses in one (1) insert, like e.g. bars for UL94 with thickness 1.6 and 3.2 mm. This however causes a not balanced material flow like in 'family moulds'.

For offering such inserts we need additional information about:

- Test properties - Standard -> Name, number, sample type; e.g. ASTM D 638, Type V.

In case you want moulded notches (standards advise not to, they advise to machine them after injection moulding), we need the design of the notch because it can make a lot of difference in price. A design is also required in case of step chips, logo's (in or on the specimen) and the use of holes.

7. WHY THE AIM MOULD SYSTEM?

7.1 Benefits

Although the mould has preliminary been designed for producing ISO test specimen, it is also often used for making specimen, according to ASTM or other standards (JIS, DIN, BS, NEN etc.).

The use of product forming inserts, which can be exchanged in less than 20 seconds, enables you to do tests according to different standards, or to move from e.g. ASTM to ISO slowly not investing too much at once.

ISO does not allow "family-moulds" (moulds with different cavities) which means that every product forming insert normally will have 2 or 4 cavities, but all with the same size and geometry. This results in a better and more balanced flow of plastics and therefore in more consistent testing data.

Equally important is the correctness of the mould. As stated before, making a mould for test samples is more than only making the correct size and geometry of the cavity. But which traditional mould maker guarantees you that everything else is also correct?

The AIM Mould System results, under "exact testing" requirements, in optimal productivity because the moulded samples will automatically be ejected by the special designed ejector system and because mould exchange times almost disappear.

Developing new materials sometimes require intermediate tests and therefore a great flexibility of the mould. AIM Mould System enables you to quickly produce only a few test specimens for this purpose.

The use of thermocouples in every mirror plate and the possibility to mount a pressure transducer enables you to have a better control of the production conditions, which also results in better specimens.

Money is earned i.e. costs are saved by the short production- and exchange-times and the systems flexibility.

The AIM mould system is a standard one, which is used by a lot of international companies. Being standard means that the inserts you use are interchangeable with the inserts all over the world. The inserts can be temporary used at other plants of your company or even at your customers (with the same mould base).

Taking the above mentioned into account, all our customers (Raw Material Suppliers, Compounders, Research Institutes, Universities and OEMs from all over the world) find this an acceptable cost for all the benefits (conformity with ISO, flexibility, production capacity, etc.) they invest in.

8. SATISFIED “AIM-USERS” ALL OVER THE WORLD. AMONG THEM:

A
A. Schulman
ACLO Compounders
Act Research
Adolf-Kolping-Schule
Advanced Elastomer Systems
Aimplas
Akita Prefectural Ind. Tech. Center
AKZO
Albemarle
Albis Corporation
Alcan Chemicals
Ampacet
Armines (École des Mines)
Asahi Optical Corporation
Asahi Thermofil
Auto Network (Sumitomo Wiring)

B
Bakelite AG
Basell
Basell SDK Sunrise
BASF
Bayer MaterialScience
Becker Group Europe
Berstorff
B.M. S.A. Sociedad Unipersonal
Borealis
Boston Scientific Corporation
BP Chemicals
Brüggeman Chemical
BP Amoco Chemicals
BTicino

C
C2P Germany
Cabot Plastics
Capelle Pigments
Certech
Chevron Phillips Chemicals
China Petrochemical
Chisso Petrochemical Corporation
Ciba Specialty Chemicals
Clariant
Crompton Vinyl Additives

D
DAF Trucks
Daicel Polymers
Degussa
Denso Corporation
Diethelm
DOW Chemical
DSM Engineering Plastics
DuPont
DuPont Dow Elastomers L.L.C.
DuPont Toray
Dynasol Elastomeros

E
Eastman Chemical
Ecole des Mines de Douai
Eldra Kunststoff technik
Engineering Compounding Plastics
Enichem
Ensiacet
EP Compounding
Essilor
ETA
European Owens Corning
ExxonMobil Chemical Company

F
Fachhochschule Pforzheim, Reutlingen
Fachhochschule für Kunststofftechnik
Faurecia
Ferromatic Millacron
Formosa Plastics Corporation
Fraunhofer Institut
Frisetta Polymer

G
GE Plastics
Gebroeders Cappelle
Gemü
Gentex Optics
Georg Menshen
Gessmann
Gharda Chemicals
Grand Polymer Corporation
Great Lakes Chemical
Grossfillex
Hydro Polymers

H
Heraplast
Hitachi Chemical
Hoffmann & Voss Industriekunststoffe
Huntsman Polyurethanes
Honeywell International
Hydro Polymers

I
ICI
Idemitsu Petrochemical
Inno-Comp
Innova
Institut für Polymerforschung
Institute Université Technique
ISPA
Isuzu Motors

J
Japan Polychem Corporation
Japan Polyolefine
Japan Polypropylen Corporation
JBP
J&A Plastics
JGP Perrite
Johnson Controls

K
Kennan Industrial Research Institute
Koito Manufacturing
Kunststoff-Institut Lüdenscheid
Kunststoffwerke Leinefeld

L
Laboratoire National D’Essais (LNE)
Laboratorio di Impresa
Lanzhou Petrochem
Lehmann & Voss
Lenor Plastics Service
Leuna-Miramid
LG-DOW Chemical
Lindauer Dornier
LNP Engineering Plastics
London Metropolitan University
Luzenac

M
Macroplast
Matsushita Electric Works
Millenium Inorganic Chemicals
Mitsubishi Chemical Corporation
Mitsubishi Engineering Plastics
Mitsubishi Gas Chemical
Mitsubishi Motor Corporation
Miyama Kasei Corporation
Monsanto
Montell SDK Sunrise
Multibase

N
Nanhai
Nektar Therapeutics
Netafim
Nippon Unicar Company Limited
Nissan Motor Corporation
Nord Color
NOVA Chemicals
Novo Nordisk
Noyvallesina Engineering
Nylon Corporation (Nyltech)

O
OPP Petroquímica
Otsuka Chemical

P
Pacific Industrial Corporation
PalPlast
Peguform
Petrobas Energia
PetroChina
Petronas Research & Scientific
Petroquimica Cuyo
Peugeot Citroen
Polymer Chemie
Philips
Plastoplan
Polyamid 2000
PolyOne
P.P.G. Industries
Premix
PTS Compound Produktions

R
RadiciNovacips
Raychem
Reliance Industries
Rehau
Repol
Rhodia Polyamide & Recherches
Rio Polimeros

S
SABIC
Saier
Sanyo IK Color
SC Concern - Stirol
Schwan Stabilo
Secco
SG Magnets
SGL Technik
Shigeru
Singapore Polytechnic
Sinopec
Spohn
SOLA Optical
Solvay Advanced Polymers
Suiryo Plastics
Sumika Chemical Analysis Services
Sumitomo Chemical Corporation
SunAromer Corporation
Supreme Petrochem
Suzuki Motor Corporation
Syarikat Daya Usaha

T
Talc de Luzenac
Takagi Seiko
Taylor Made Adidas Golf
TechnoPolymer Corporation
TecoPolimer
Tekno Polimer
Ter Hell Plastic
Thai Polyacetal
Tiszai Vegyi Kombinát
Thai Polycarbonate
The Polyolefin Company
TNO Plastics & Rubber Institute
Tokai Rika Denki
Tokuyama Corporation
Toray Industries
Total Petrochemicals
Toyoda Gosei Corporation
Toyota Motor Corporation
Toyota Tsusho Corporation
Tsubakuro Chemical

U
UBE Industries
Ueno Fine Chemicals
Unitika Corporation
University of Bayreuth, Eindhoven,
Groningen, Hamburg, Strasbourg, Twente

V
Victor International Plastics
Victorinox
VTT Chemical Technology
Vygon

W
Witcom Engineering Plastics

Y
Yanshan Petrochem
Yazaki Parts
YKK Corporation

Z
Zeon Corporation
ZF Boge Elastmetall

Countries where we delivered the AIM Mould System to:

Argentina
Australia
Belgium
Brazil
Canada
China
Denmark
Finland
France
Germany
Great Britain
Hong Kong
Hungary
India
Indonesia
Israel
Italy
Japan
Korea
Malaysia
Mexico
The Netherlands
Norway
Philippines
Scotland
Singapore
Spain
Sweden
Switzerland
Thailand
Turkey
Ukraïne
USA
Vietnam

9. WHAT MEANS AXXICON MOULDS EINDHOVEN BV TO ME?

9.1 Advantage of a multi-national company

Axxicon Moulds Eindhoven BV is a part of Axxicon Mould Technology. Axxicon Mould Technology consists of two production facilities in The Netherlands and sales offices in Hong Kong and Los Angeles. With over 55 years of experience and 80 employees, Axxicon Moulds Eindhoven BV has a leading position in the worlds mould making industry.

Opposite to most other mould makers, we are very market orientated. Our strategy is focus and specialisation. We do not only make customer specified moulds, but also Axxicon standardised moulds from which our customers benefit in terms of reliability, quality and highly improved value for money. One of our major examples is the mould for Optical Discs. Worldwide almost 1 of every 2 Optical Discs is made in an Axxicon Optical Disc mould. Other important industries in our focus are “High-end disposables” and “High-grade medical devices”.

9.2 Benefits for R&D, QC and QA departments or other laboratories

As a mould maker we strive to be good in everything, but one thing is for sure: besides over 55 years of mould making experience and over 15 years experience in the testing branch, we are your partner and advise you correctly.

Standardised specimens not only have the right geometry. Also the production method and conditions are very important and therefore the way cavities are gated, how many cavities are allowed and how they are laid out.

How many mould makers know anything about internationally accepted testing standards and their effect on mould making? How many mould makers would advise you not to use so called 'family moulds'. Their time for studying the different standards would already cause a lot of engineering costs, where we offer a standardised mould 'off the shelf'.

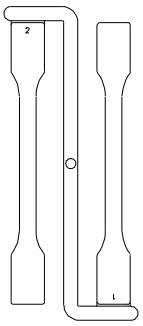
But we do not only sell moulds. We do more. On request, we can provide "Door To Door" delivery, installation & training, a maintenance kit and spare-parts. Installation is also beneficial to the warranty terms and in Europe it might mean that you do not have extra delivery costs, because in that case, our engineer can take the mould with him.

9.3 Guarantees and after sales

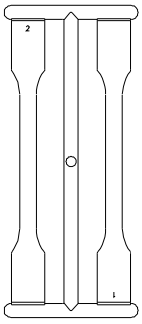
We, at Axxicon Moulds Eindhoven BV, specialise in quality equipment. Everything we provide is built to last and the AIM Mould System is no exception. If, although it is unlikely to happen (see also section 5.8.1. about Quality Assurance and internal testing), a problem should occur, we will promptly and adequately react on your service requirement.

Our Customer Service Department will accurately answer questions about delivery. Technical questions about the mould, but, equally important to you, also about the moulding process will be handled by our Service Department.

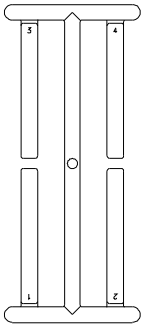
10. SAMPLE OVERVIEW



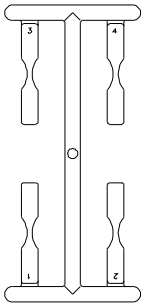
ISO A



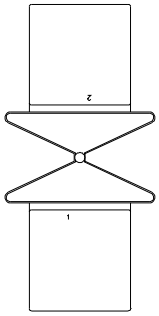
ISO A Weldline



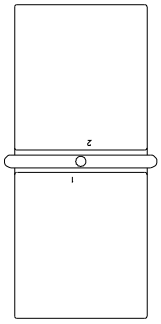
ISO B



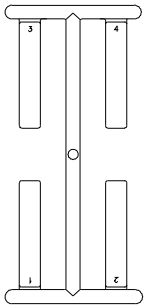
ISO C



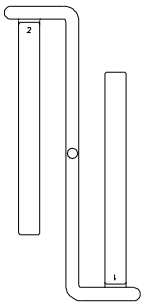
ISO D



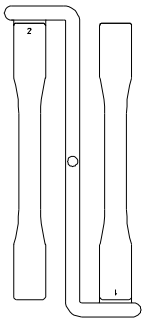
ISO F



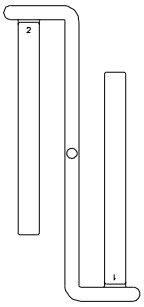
ASTM D256
Izod



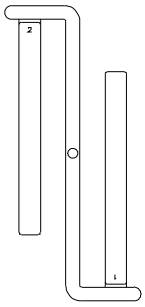
ASTM D256
Charpy



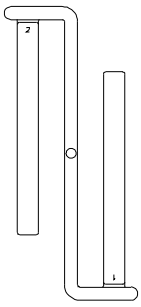
ASTM D638 type I
Tensile



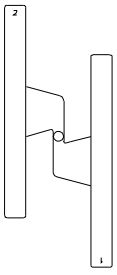
ASTM D648
HDT



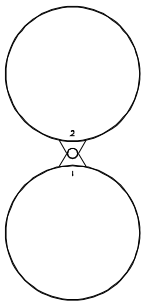
ASTM D790
Flexural



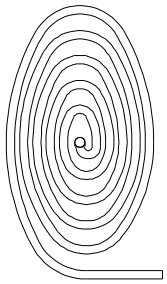
UL94

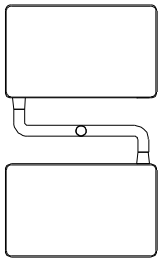


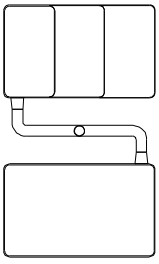
UL94
"Special"

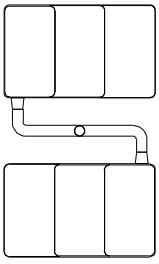


Disc


Spiral Flow
"Axxicon"


Colour Plaque


Colour Plaque & Step Chip


Step Chip