



International Standard Tool (IST)
THE INSERT TOOL

Production of standard specimen

The IST Specimen Tool by wf plastic GmbH enables you to produce standard test specimens and special test specimen geometries made of thermoplastics by injection molding.

Using the IST injection mold (Made in Germany), standard test specimens can be injection molded for mechanical material tests (e.g. tensile tests, impact tests) and sample parts (e.g. plates, stepped plates, surface patterns). Furthermore, it is possible to carry out rheological investigations for the determination of flow paths and pressure losses using special additional tool inserts, as well as to determine tensile strengths or to examine the design of film hinges.

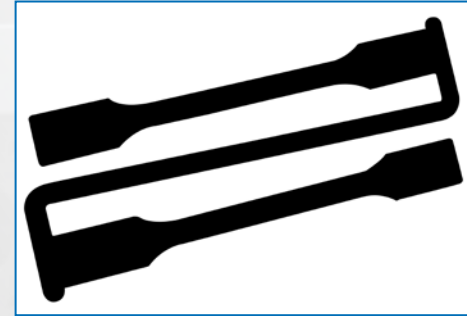
The tool consists of the master tool and the exchangeable inserts for the nozzle and the closing side.

IST-test specimen technology and advantages

- Fast and reliable delivery
- on-site service, commissioning and training
- tool standard temperatures up to 140 ° C and up to 240 ° C as option
- standardized manufacturing of test specimen
- large selection of interchangeable inserts, for diverse test requirements
- fast change of the interchangeable tool inserts
- various surface coatings and materials also for plastic materials with abrasive and corrosive behavior

TOOL DIMENSIONS

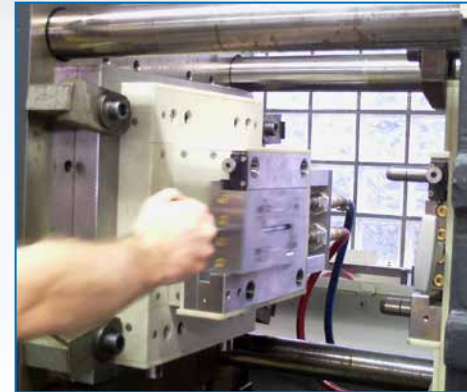
	height [mm]	width [mm]	depth [mm]	weight [Kg]
master tool	346	296	230	91
mirror plate	196	100	38.5	5 – 6.5
interchangeable inserts	196	100	385	5 – 6.5



DIN EN ISO 3167



Examples of interchangeable inserts



Mastertool with inserts

MASTER TOOL

The master tool is for the mounting of the interchangeable inserts. The tool inserts are replaced without timedelay. No screws or temperature control hoses have to be disconnected. The change of the inserts lasts only seconds.



Master tool with interchangeable insert and mirror plate

FIXED MOULD HALF SIDE INSERT (MIRROR PLATE)

The fixed mould half side inserts is - as in most cases of the specimen tools – a mirror plate. The fixed mould half side insert can be delivered optional with pressure or temperature sensors.



mirror plate

MOVING MOULD HALF SIDE INSERT

Usually the cavity is placed in the fixed mould half insert. The ejectors are connected directly to the ejection mechanism of the injection molding machine. The specimens are produced and just fall down or they can be taken out by a robot system.



moving mould half side inserts

Technical requirements for the injection moulding machine according to Euromap

SPECIFICATION OF THE INJECTION MOULDING MACHINE

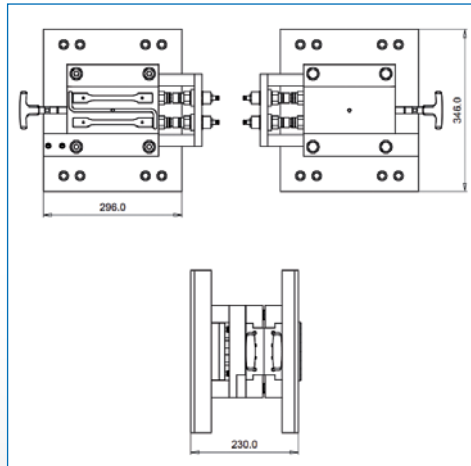
The tool is compatible with most common injection moulding machines. The following data refers to a standard version. The standard version can be adapted to any size dependent injection molding machine at an additional price.

Min. mounting dimensions (height/weight/depth)	
standard	346 x 296 x 230 mm
more installation height	346 x 296 x 257 mm
small clamping plate	346 x 246 x 230 mm
vertical insert	196 x 296 x 230 mm
central ejector	
standard	Ø 35 mm
vertical insert	Ø 18 mm
diameter of locating ring	
standard	Ø 125 mm
vertical insert	Ø 100 mm
tool installation height	
mounting holes according to Euromap system for M12 screws	Ø 13.5 mm
horizontal hole spacing	
vertical hole spacing	280 mm
tool tempering	
	Hasco standard Z 811/9/R ¼"

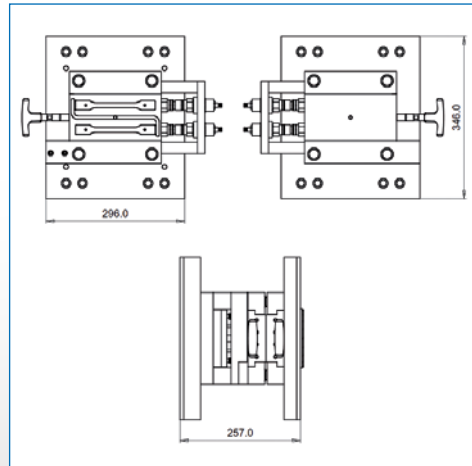
4 master tools in various dimensions. Suitable for all common injection molding machines.

SPECIFICATION OF THE MACHINE FIXED HALF SIDE

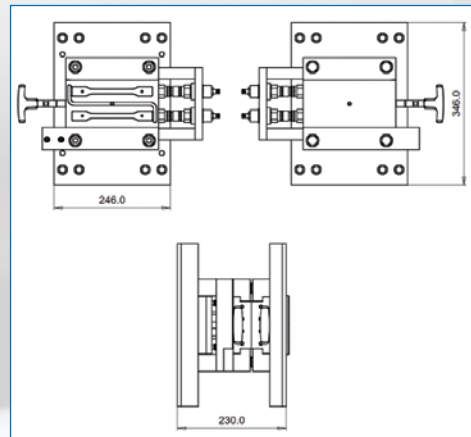
The nozzle dips approx. 37 mm into the tool before the mirror plate is touched. The stroke should therefore be at least 37 mm. The drilling at the base tool is Ø 42 mm, so the max. diameter of the injection nozzle should be less than Ø 42 mm. The injection nozzle is designed as a flat nozzle. This can also be designed differently according customer requirements.



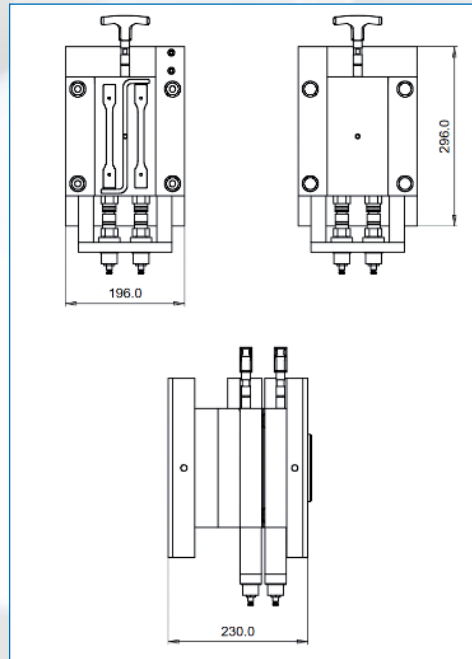
Standard order no. 530.000.0000



Mould high extended order no. 530.000.0073



Mould high small order no. 530.000.0071



Insert vertically order no. 530.000.0072

SPECIFICATION OF THE PLASTICATING UNIT

Example of injection molding type A including sprue injection molding

Test specimen type 1A:

projected area 2,400 mm²
wall thickness 4 mm
volume 9,600 mm³

projected area 3,466 mm²
recommended max. dosing volume of the injection moulding machine in between 25 and 50 cm³

runner
channel length 130 mm
maximum channel width 8.3 mm
projected area 1,066 mm²
channel height 5.5 mm
average channel width 6.3 mm
cross sectional area 34.65 mm²
volume 4,505 mm³

recommended max. injection pressure 1,500 bar

Specimen tool for type 1A DIN EN ISO 527-2

sprue
average diameter Ø 7 mm
length 40 mm
volume 1,540 mm³
total volume 15,645 mm³
moulding volume of ca. 16 cm³

volume gating ca. 6 cm³
volume moulding ca. 10 cm³
volume sprue and moulding ca. 16 cm³
projected area ca. 3,470 mm²
recommended max. dosing volume 25 bis 50 cm³
recommended max. injection pressure > 1,500 bar

Filling pressure [bar]	buoyancy [kN]	plus 20% reserve [kN]	application
400	140	170	easy-flowing injection moulding
800	280	340	poor-flowing thermoplastics
1,200	420	510	all thermoplastics

Usually 400 bar filling pressure (corresponding to 600 to 1.000 bar injection pressure) is sufficient for injection moulding types. Poor flowing thermoplastics, e.g. highly filled plastics or very highly viscous film materials, should have a pressure requirement of 800 bar. For these cases an injection moulding machine with a clamping force of approx. 350 kN should be provided. In very rare cases, the filling pressure requirement can be up to 1.200 bar. An injection moulding machine with a clamping force of 500 kN should be suitable for all thermoplastics.

SPECIFICATION OF THE PLASTICIZING

Double tool for test specimen type 1A

2 x test specimen type 1A :

projected area 4,800 mm²
wall thickness 8 mm
volume 19,200 mm³

runner

channel length 260 mm
maximum channel width 8.2 mm
projected area 2,132 mm²
channel height 5.5 mm
average channel width 6.3 mm
cross sectional area 34.65 mm²
volume 9,009 mm³

spure

average diameter Ø 7 mm
length 40 mm
volume 1,540 mm³
total volume 29,749 mm³
Moulding volume ca. 30 cm³

projected area 6,932 mm²
recommended max. dosing volume of the injection moulding machine in between 45 and 90 cm³
recommended max injection pressure 1,500 bar

Test tool double for Type 1A DIN EN ISO 527-2

Volume sprue ca. 11 cm³
Volume moulding ca. 19 cm³
Volume sprue and moulding ca. 30 cm³
Projected area ca. 6,932 mm²
Recommended max. dosing volume 45 bis 90 cm³
Recommended max. injection pressure > 1,500 bar

Filling pressure [bar]	buoyancy [kN]	plus 20% reserve [kN]	application
400	280	340	easy-flowing injection molding
800	560	672	poor-flowing thermoplastics
1,200	840	1,020	all thermoplastics

Usually 400 bar filling pressure (corresponding to 600 to 1.000 bar injection pressure) is sufficient for injection molding types. Poorflowing thermoplastics, e.g. highly filled plastics or very highly viscous film materials, should have a filling pressure requirement of 800 bar. For these cases an injection moulding machine with a clamping force of approx. 600 kN should be provided. In very rare cases, the filling pressure requirement can be up to 1.200 bar. An injection moulding machine with a clamping force of 1.000 kN should be suitable for all thermoplastics.

Notes

NOTE 1

Filling pressure: The pressure required to fill the sprue and cavity. The filling pressure reacts on the projected area. Injection pressure: The specific pressure on the spraying unit. Due to pressure losses at the area of the machine nozzle and the sprue bushing, an injection pressure which is increased by a factor of 1.3 to 2.5 is required to reach the filling pressure.

NOTE 2

Other test specimens, in particular thin-walled pattern plates or flow spirals, may need significantly higher injection pressures, locking forces or metering volumes.

NOTE 3

These are all guidelines. Special solution, e.g. only one test specimen type and one material, have to be calculated separately.

NOTE 4

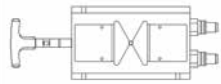
In the case of rather poorflowing types (film formulations), an injection pressure of up to about 1200 bar is required. A part of this is consumed in the machine nozzle and the sprue bush, so that roughly 500 to 800 bar may arrive as filling pressure in the molded part.

Standards:

EN ISO 294	Injection moulding of test specimens from thermoplastics
EN ISO 294- part 1	General principles of multipurpose specimens and rods
EN ISO 178	Determination of bending properties
EN ISO 527 2	Determination of tensile properties
DIN 53504	Testing of rubber and elastomers - Determination of tensile strength, tear strength and stress values in the tensile test

International Standard Tool insert DIN 10724 type D2 (double-film-gating)

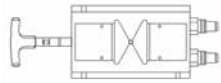
order no. 530.000.0044



dimension	60 x 60 x 2 mm
standard	production according ISO 294-3 specimen dimension DIN 10724 type D2
gating	double-film-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRC: 50-52, draft: 1°

International Standard Tool insert DIN 10724 type D3 (double-film-gating)

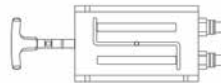
order no. 530.000.0069



dimension	60 x 60 x 3 mm
standard	production according ISO 294-3 specimen dimension DIN 10724 type D3
gating	double-film-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRC: 50-52, draft: 1°

International Standard Tool insert UL94 0.75mm (Z-gating)

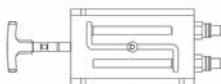
order no. 530.000.0034



dimension	125 x 13 x 0.75 mm
standard	production according ISO 294-1 specimen dimension UL 94
gating	Z-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRC: 50-52, draft: 1°

International Standard Tool insert UL94 1.5mm (Z-gating)

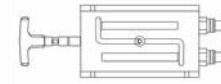
order no. 530.000.0036



dimension	125 x 13 x 1.5 mm
standard	production according ISO 294-1 specimen dimension UL 94
gating	Z-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRC: 50-52, draft: 1°

International Standard Tool insert UL94 3.0mm (Z-gating)

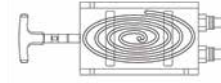
order no. 530.000.0037



dimension	125 x 13 x 3.0 mm
standard	production according ISO 294-1 specimen dimension UL 94
gating	Z-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRC: 50-52, draft: 1°

International Standard Tool insert spiral flow 2mm

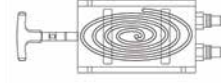
order no. 530.000.0045



dimension	1150 x 5 x 2.0 mm
standard	spiral flow
gating	center
ejector	1 central-pin and 4 ejector-pins each cavity
surface polishing	dash polished
lay-out	steel: Cr-steel, HRC: 50-52

International Standard Tool insert spiral flow 3mm

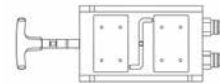
order no. 530.000.0046



dimension	1150 x 5 x 3.0 mm
standard	spiral flow
gating	center
ejector	1 central-pin and 4 ejector-pins each cavity
surface polishing	dash polished
lay-out	steel: Cr-steel, HRC: 50-52

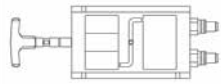
International Standard Tool insert colour plaque 2mm

order no. 530.000.0047



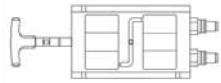
dimension	90 x 55 x 2.0 mm
standard	wf plastic standard
gating	wf plastic standard
ejector	1 central ejector-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	Cr-steel, HRC: 50-52, draft: 10°

International Standard Tool insert colour plaque and step chip 2mm+1;2;3mm **order no.** 530.000.0048



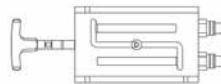
dimension	90 x 55 x 2.0 mm + 1; 2; 3 mm
standard	wf plastic standard
gating	wf plastic standard
ejector	1 central ejector-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	Cr-steel, HRc: 50-52, draft: 10°

International Standard Tool insert colour plaque and step chip 1;2;3mm **order no.** 530.000.0049



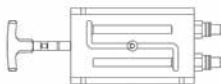
dimension	90 x 55 x 1; 2; 3 mm
standard	wf plastic standard
gating	wf plastic standard
ejector	1 central ejector-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	Cr-steel, HRc: 50-52, draft: 10°

International Standard Tool insert ASTM D6110 127x12.7x3.2mm **order no.** 530.000.0058



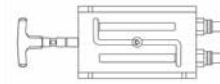
dimension	127 (5") x 12.7 (0.5") x 3.2 (0.125") mm
standard	production according ISO 294-1 specimen dimension ASTM D6110
gating	Z-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRc: 50-52, draft: 1°

International Standard Tool insert ASTM D6110 127x12.7x6.4mm **order no.** 530.000.0059



dimension	127 (5") x 12.7 (0.5") x 6.4 (0.25") mm
standard	production according ISO 294-1 specimen dimension ASTM D6110
gating	Z-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRc: 50-52, draft: 1°

International Standard Tool insert ASTM D638 type 1 tensile 165x12.7x3.2mm **order no.** 530.000.0063



dimension	165 (6.5") x 12.7 (0.5") x 3.2 (0.125") mm shoulder length 19mm
standard	production according ISO 294-1 specimen dimension ASTM D638
gating	Z-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRc: 50-52, draft: 1°

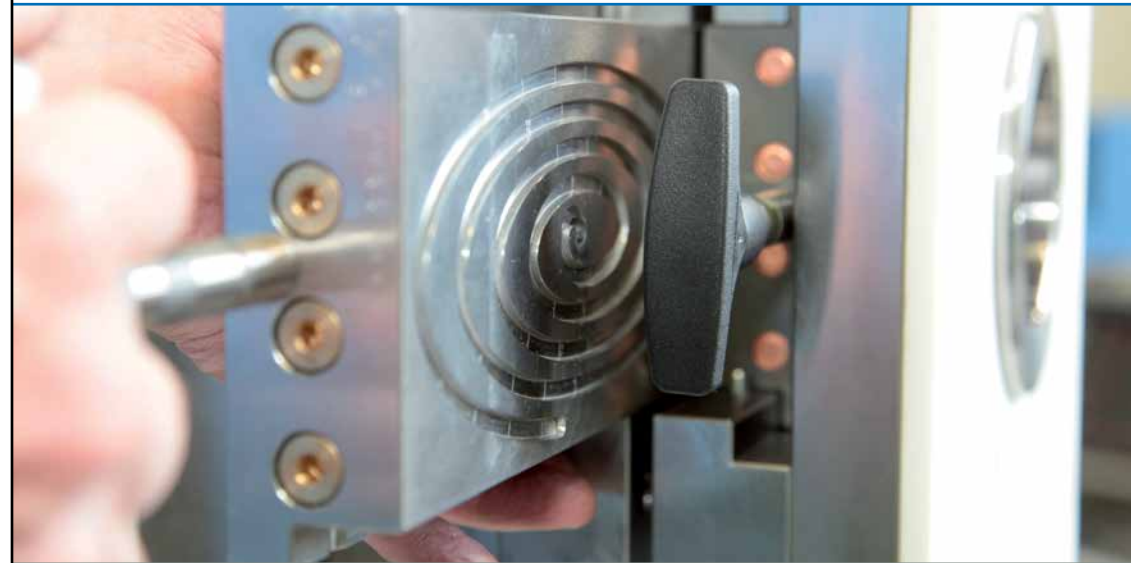
International Standard Tool insert ASTM D256 63.5x12.7x3.2mm **order no.** 530.000.0065



dimension	63.5 (2.5") x 12.7 (0.5") x 3.2 (0.125") mm shoulder length 19mm
standard	production according ISO 294-1 specimen dimension ASTM D256
gating	double-T-gating
ejector	1 central-pin and 2 ejector-pins each cavity
surface polishing	dash polished
lay-out	cavity numbers engraved steel: Cr-steel, HRc: 50-52, draft: 1°

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wf plastic GmbH
Heydastr. 16
D-58093 Hagen
Germany

✉ info@wf-plastic.de
☎ +49 2331 35204 00
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f facebook.com/wf.plastic.gmbh

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International Standard Tool (IST)
THE INSERT TOOL