

Tunnel gate inserts



Dimensioning tunnel gate inserts:

For dimensioning the tunnel gate inserts two parameters are important.

1. What is the viscosity of the used material?
2. What is the shot-weight?

Viscosity:

Visc 1: low viscosity (free flowing)

PP	Polypropylene
PE	Polyethylene
PS	Polystyrene
SB	Styrene-Butadiene-Copolymer

Visc 2: medium viscosity

ABS	Acrylonitrile-Butadiene-Styrene
PBT	Polybutylene-Terephthalate
POM	Polyoxymethylene
TPE	Thermoplastic Elastomer
PA	Polyamide
PET	Polyethylene-Terephthalate
PMMA	Polymethylmethacrylate
SAN	Styrene-Acrylonitrile

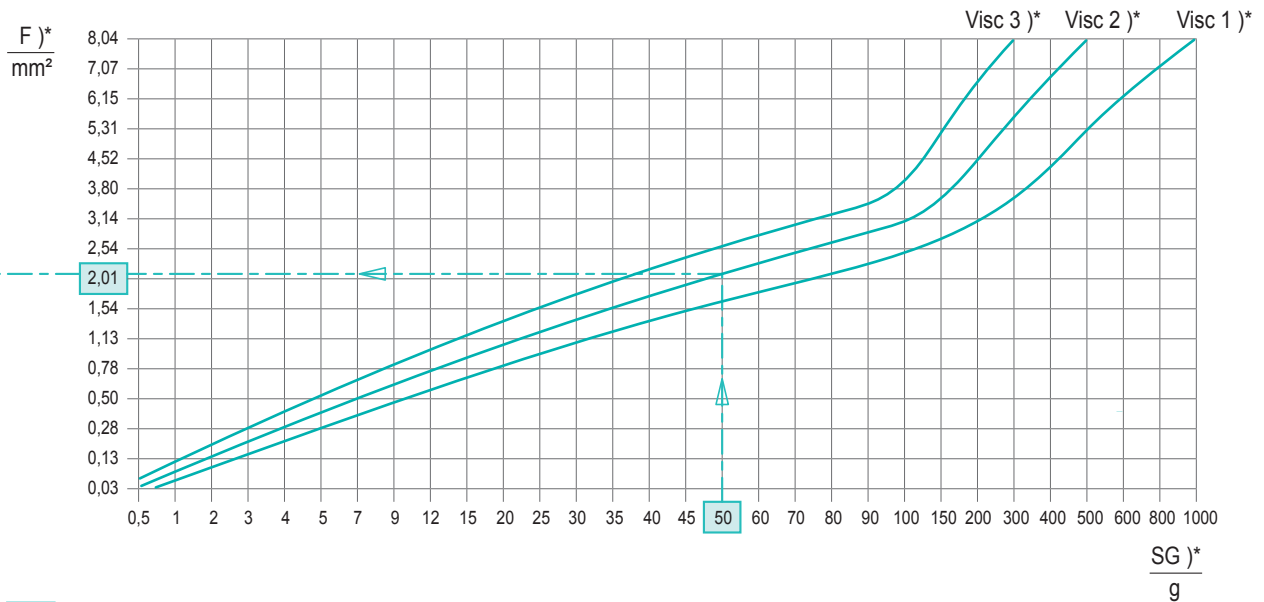
Visc 3: high viscosity (slow flowing)

PC	Polycarbonate
PVC	Polyvinyl-Chloride
PES	Polysulfone
PPO	Polyphenylene-Oxide
PPS	Polyphenylene-Sulfide

Gate surface:

With the two parameters, you can now specify the required gate surface, according to the table below.

Example: Based on a shot-weight of 50g, the material PA (Visc 2), we get a gate surface of 2.01 mm².



Example for 50g PA

Caution: When using filled plastics (glass fibres, carbon fibres etc.) you should **increase** the determined gate surface by ~ 45%!

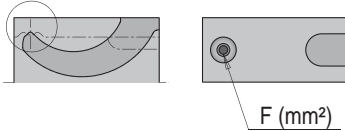
The recommended shot-weights and gate-diameters are only guide values. Please also take into account individual parameters such as part geometry, mould design, type of plastic and fillers.

Tunnel gate inserts



Selection:

The selection is done with the determined gate surface F, from the table.



With contour:

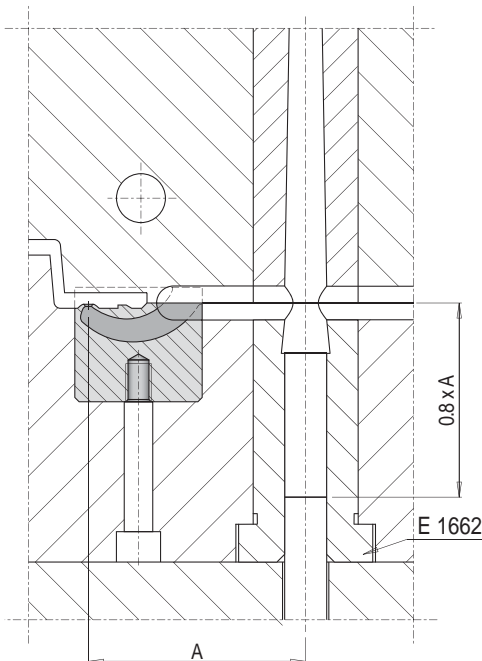
Visk 1)*	Visk 2)*	Visk 3)*	F (mm²)*	E 1680 Nr./No.	E 1685 Nr./No.
- 3 g	- 2 g	- 1 g	0.14	E 1680/ 6/0.6	-
- 5 g	- 4 g	- 3 g	0.14	E 1680/ 8/0.6	E 1685/ 8/0.6
			0.25	E 1680/ 8/0.8	E 1685/ 8/0.8
- 30 g	- 20 g	- 12 g	0.25	E 1680/10/0.8	E 1685/10/0.8
			0.57	E 1680/10/1.2	E 1685/10/1.2
			1.01	E 1680/10/1.6	E 1685/10/1.6
- 50 g	- 35 g	- 25 g	0.57	E 1680/12/1.2	E 1685/12/1.2
			1.01	E 1680/12/1.6	E 1685/12/1.6
			1.57	E 1680/12/2.0	E 1685/12/2.0
-200 g	-120 g	- 75 g	1.01	E 1680/14/1.6	E 1685/14/1.6
			1.57	E 1680/14/2.0	E 1685/14/2.0
			2.26	E 1680/14/2.4	E 1685/14/2.4
			3.08	E 1680/14/2.8	E 1685/14/2.8

Without contour:

F (mm²)*	E 1690 Nr./No.	E 1692 Nr./No.	F (mm²)*	E 1695 Nr./No.
0.13	E 1690/10	E 1690/10	0.13	E 1690/10
0.28			0.53	
0.13	E 1690/15	E 1692/15	0.15	E 1690/15
0.50			0.79	
0.13	E 1690/18	E 1692/18	0.28	E 1690/18
1.13			1.52	
0.13	E 1690/25	E 1692/25	0.28	E 1690/15
2.54			3.40	
2.14	E 1690/30	E 1692/30	1.00	E 1690/30
7.60			8.48	
2.14	E 1690/45	E 1692/45		
7.60				

Dimensioning of distance A:

For a straight shot break and a good demoulding, the distance A and 0.8 x A are very important and must be observed.



E 1680

d1	elastomers TPE, TPU, TPA, etc.	PE, PP, PET, PBT, etc.	ABS, ASA, PC/ABS, HI-PC, PA, POM, SB, etc.	PA + GF, PC, SAN, PS, PMMA, PEI, etc.
6	A	A	A	A
8	9 - 12	12 - 18	15 - 22	18 - 25
10	11 - 14	15 - 22	19 - 27	23 - 30
12	15 - 18	19 - 27	24 - 33	28 - 36
14	18 - 22	22 - 30	27 - 36	32 - 40
14	20 - 25	25 - 33	30 - 37	35 - 43

E 1685

8	11 - 14	15 - 22	19 - 27	23 - 30
10	15 - 18	19 - 27	24 - 33	28 - 36
12	18 - 22	22 - 30	27 - 36	32 - 40
14	20 - 25	25 - 33	30 - 37	35 - 43

E 1690/ E 1692

10	12 - 16	13 - 20	16 - 23	22 - 29
15	16 - 21	18 - 25	21 - 28	27 - 34
18	21 - 26	26 - 34	31 - 39	36 - 45
25	28 - 33	31 - 39	36 - 44	41 - 50
30	33 - 38	38 - 48	43 - 53	48 - 58
45	48 - 53	53 - 63	58 - 68	-

E 1695

10	12 - 16	13 - 20	16 - 23	22 - 29
15	16 - 21	18 - 25	21 - 28	27 - 34
18	21 - 26	26 - 34	31 - 39	36 - 45
25	28 - 33	31 - 39	36 - 44	41 - 50
30	33 - 38	38 - 48	43 - 53	48 - 58

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Measures for a straight shot break:

Heat sink paste:

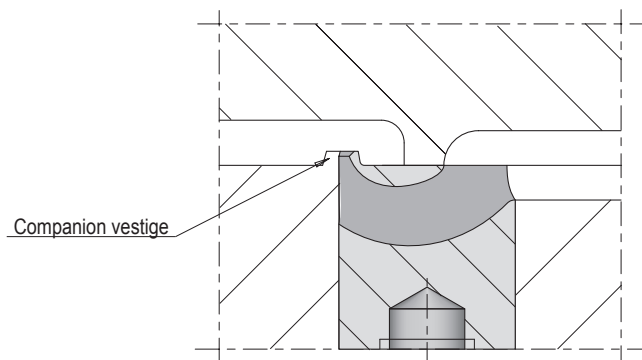
When processing temperature-sensitive materials or plastics susceptible to stringing, it is recommended to use heat sink paste in the lateral clearances of at the tunnel gate insert.

The heat sink paste: - prevents localized heating of the gate insert for moulding processes with short cycle times
- improves heat dissipation
- enhances degating performance (no stringing)

For the following plastics, heat sink paste is recommended: PE, PP, POM, PC, PBT, PEI, PPO,PS

Companion vestige:

To allow very flat parts an optimal shot break of the gate, the application of a companion vestige is recommended. It ensures a shot breaking line which is parallel to the mould parting line. This is particularly recommended with materials prone to stringing.

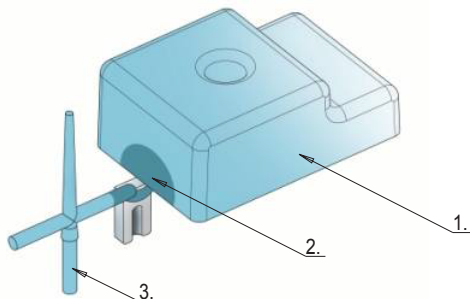


Jetting:

Jetting means, recognizable plastic flow lines on the finished plastic part. Especially for housing parts, which can not be injected against a baffle, jetting may happen. This undesirable effect can be prevented by following measures:

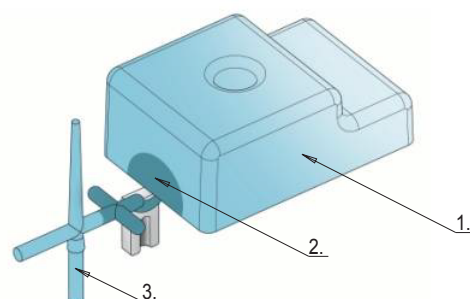
- Increase gate surface
- Use graduated injection profile: fast - slow - fast

Automatically graduated injection



1. High injection speed for filling the cold runner.
2. Low injection speed to ensure optimum frontal (laminar) flow.
3. High injection speed for quick mould filling, followed by holding pressure setting.

Mechanical graduated injection



- Transverse runner reduces the velocity of the flowing front in the gate area while machine parameters remain constant.
- For moulds frequently used on different injection moulding machines.