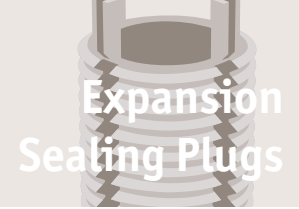


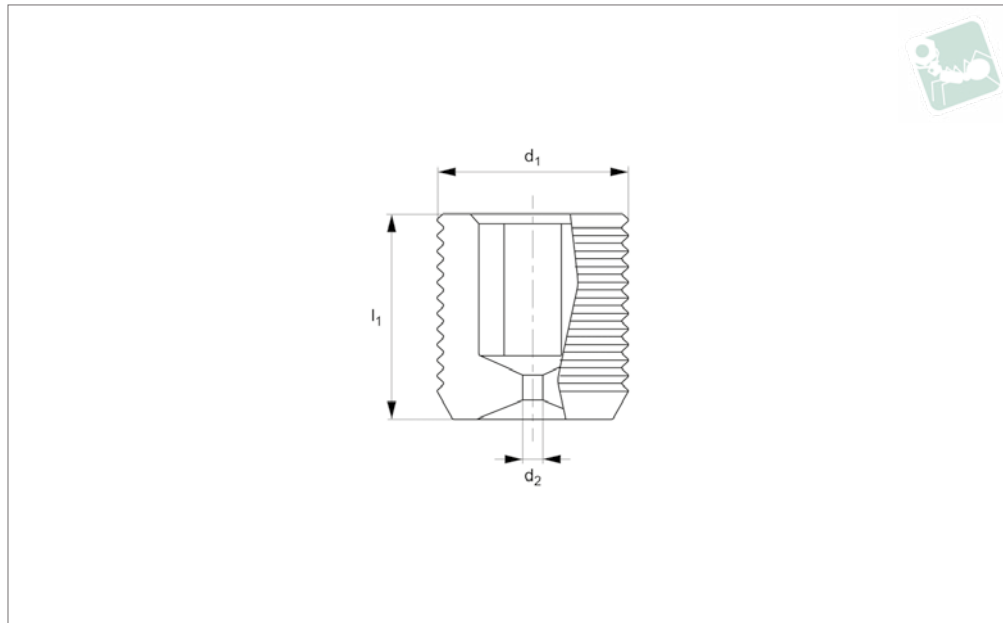


# Metric Threaded Restrictors

## Stainless Steel



Expansion  
Sealing Plugs



**SE0530**

EXPANSION SEALING PLUGS

### Material

A2 stainless steel

### Technical Notes

For restricting flow.

Select size required then add -xxx which indicated reduced hole diameter ( $d_2$ ), eg SE0530.080-0150 A2 indicated a 8mm bore size with a 0.38 orifice.

### Important Notes

**Please refer to technical pages for product installation details.**

Order No.	$d_1$	$d_1$ nom.	$d_2$	$l_1$	A/F
SE0530.040-003	M 4x0,7	4	0.30	4	2
SE0530.040-004	M 4x0,7	4	0.38	4	2
SE0530.040-005	M 4x0,7	4	0.51	4	2
SE0530.040-006	M 4x0,7	4	0.61	4	2
SE0530.040-007	M 4x0,7	4	0.71	4	2
SE0530.040-008	M 4x0,7	4	0.81	4	2
SE0530.040-009	M 4x0,7	4	0.89	4	2
SE0530.050-003	M 5x0,8	5	0.30	5	2.5
SE0530.050-004	M 5x0,8	5	0.38	5	2.5
SE0530.050-005	M 5x0,8	5	0.51	5	2.5
SE0530.050-006	M 5x0,8	5	0.61	5	2.5
SE0530.050-007	M 5x0,8	5	0.71	5	2.5
SE0530.050-008	M 5x0,8	5	0.81	5	2.5
SE0530.050-009	M 5x0,8	5	0.89	5	2.5
SE0530.050-010	M 5x0,8	5	1.02	5	2.5
SE0530.050-011	M 5x0,8	5	1.12	5	2.5
SE0530.050-012	M 5x0,8	5	1.22	5	2.5
SE0530.050-013	M 5x0,8	5	1.27	5	2.5
SE0530.050-014	M 5x0,8	5	1.40	5	2.5
SE0530.060-003	M 6x1,0	6	0.30	6	3
SE0530.060-004	M 6x1,0	6	0.38	6	3
SE0530.060-005	M 6x1,0	6	0.51	6	3
SE0530.060-006	M 6x1,0	6	0.61	6	3
SE0530.060-007	M 6x1,0	6	0.71	6	3
SE0530.060-008	M 6x1,0	6	0.81	6	3
SE0530.060-009	M 6x1,0	6	0.89	6	3
SE0530.060-010	M 6x1,0	6	1.02	6	3
SE0530.060-011	M 6x1,0	6	1.12	6	3
SE0530.060-012	M 6x1,0	6	1.22	6	3
SE0530.060-013	M 6x1,0	6	1.27	6	3
SE0530.060-014	M 6x1,0	6	1.40	6	3
SE0530.060-015	M 6x1,0	6	1.50	6	3
SE0530.060-016	M 6x1,0	6	1.60	6	3
SE0530.060-017	M 6x1,0	6	1.70	6	3

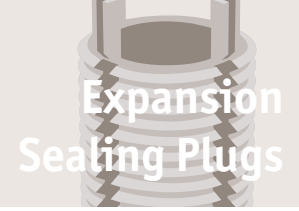


Order No.	d <sub>1</sub>	d <sub>1</sub> nom.	d <sub>2</sub>	l <sub>1</sub>	A/F
SE0530.060-018	M 6x1,0	6	1.80	6	3
SE0530.060-019	M 6x1,0	6	1.91	6	3
SE0530.080-003	M 8x1,25	8	0.30	8	4
SE0530.080-004	M 8x1,25	8	0.38	8	4
SE0530.080-005	M 8x1,25	8	0.51	8	4
SE0530.080-006	M 8x1,25	8	0.61	8	4
SE0530.080-007	M 8x1,25	8	0.71	8	4
SE0530.080-008	M 8x1,25	8	0.81	8	4
SE0530.080-009	M 8x1,25	8	0.89	8	4
SE0530.080-010	M 8x1,25	8	1.02	8	4
SE0530.080-011	M 8x1,25	8	1.12	8	4
SE0530.080-012	M 8x1,25	8	1.22	8	4
SE0530.080-014	M 8x1,25	8	1.40	8	4
SE0530.080-015	M 8x1,25	8	1.50	8	4
SE0530.080-016	M 8x1,25	8	1.60	8	4
SE0530.080-017	M 8x1,25	8	1.70	8	4
SE0530.080-018	M 8x1,25	8	1.80	8	4
SE0530.080-019	M 8x1,25	8	1.91	8	4
SE0530.080-020	M 8x1,25	8	1.98	8	4
SE0530.080-021	M 8x1,25	8	2.08	8	4
SE0530.080-022	M 8x1,25	8	2.16	8	4
SE0530.080-023	M 8x1,25	8	2.29	8	4
SE0530.080-024	M 8x1,25	8	2.41	8	4
SE0530.080-025	M 8x1,25	8	2.54	8	4
SE0530.080-026	M 8x1,25	8	2.59	8	4
SE0530.080-027	M 8x1,25	8	2.69	8	4
SE0530.080-028	M 8x1,25	8	2.79	8	4
SE0530.080-029	M 8x1,25	8	2.92	8	4
SE0530.100-003	M10x1,5	10	0.30	10	5
SE0530.100-004	M10x1,5	10	0.38	10	5
SE0530.100-005	M10x1,5	10	0.51	10	5
SE0530.100-006	M10x1,5	10	0.61	10	5
SE0530.100-007	M10x1,5	10	0.71	10	5
SE0530.100-008	M10x1,5	10	0.81	10	5
SE0530.100-009	M10x1,5	10	0.89	10	5
SE0530.100-010	M10x1,5	10	1.02	10	5
SE0530.100-011	M10x1,5	10	1.12	10	5
SE0530.100-012	M10x1,5	10	1.22	10	5
SE0530.100-013	M10x1,5	10	1.27	10	5
SE0530.100-014	M10x1,5	10	1.40	10	5
SE0530.100-015	M10x1,5	10	1.50	10	5
SE0530.100-016	M10x1,5	10	1.60	10	5
SE0530.100-017	M10x1,5	10	1.70	10	5
SE0530.100-018	M10x1,5	10	1.80	10	5
SE0530.100-019	M10x1,5	10	1.91	10	5
SE0530.100-020	M10x1,5	10	1.98	10	5
SE0530.100-021	M10x1,5	10	2.08	10	5
SE0530.100-022	M10x1,5	10	2.16	10	5
SE0530.100-023	M10x1,5	10	2.29	10	5
SE0530.100-024	M10x1,5	10	2.41	10	5
SE0530.100-025	M10x1,5	10	2.54	10	5
SE0530.100-026	M10x1,5	10	2.59	10	5
SE0530.100-027	M10x1,5	10	2.69	10	5
SE0530.100-028	M10x1,5	10	2.79	10	5
SE0530.100-029	M10x1,5	10	2.92	10	5
SE0530.100-030	M10x1,5	10	3.00	10	5
SE0530.100-031	M10x1,5	10	3.10	10	5
SE0530.100-032	M10x1,5	10	3.18	10	5
SE0530.100-033	M10x1,5	10	3.30	10	5
SE0530.100-034	M10x1,5	10	3.43	10	5
SE0530.100-035	M10x1,5	10	3.51	10	5
SE0530.100-036	M10x1,5	10	3.58	10	5
SE0530.100-037	M10x1,5	10	3.68	10	5
SE0530.100-038	M10x1,5	10	3.81	10	5
SE0530.100-039	M10x1,5	10	3.91	10	5
SE0530.120-003	M12x1,75	12	0.30	12	6
SE0530.120-004	M12x1,75	12	0.38	12	6
SE0530.120-005	M12x1,75	12	0.51	12	6



# Metric Threaded Restrictors

## Stainless Steel



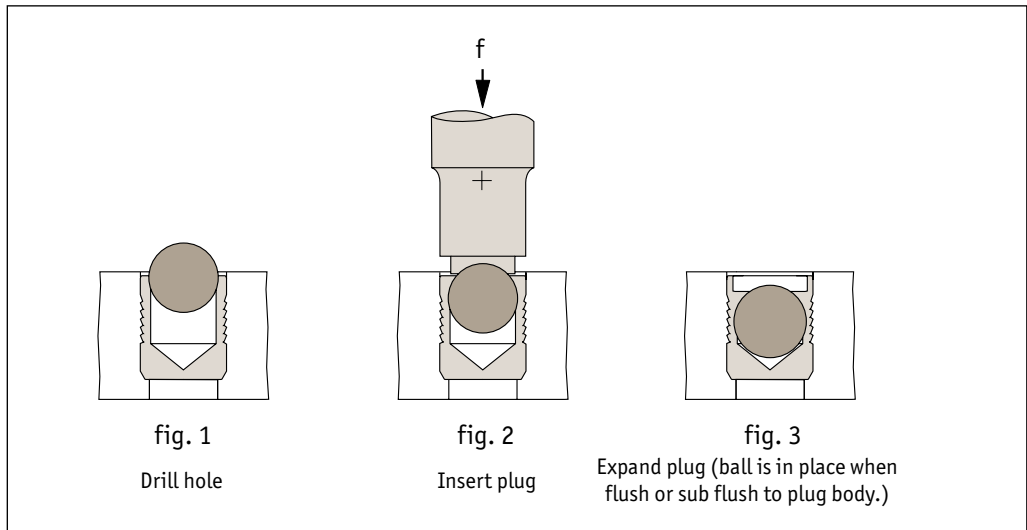
Order No.	d <sub>1</sub>	d <sub>1</sub> nom.	d <sub>2</sub>	l <sub>1</sub>	A/F
SE0530.120-006	M12x1,75	12	0.61	12	6
SE0530.120-007	M12x1,75	12	0.71	12	6
SE0530.120-008	M12x1,75	12	0.81	12	6
SE0530.120-009	M12x1,75	12	0.89	12	6
SE0530.120-010	M12x1,75	12	1.02	12	6
SE0530.120-011	M12x1,75	12	1.12	12	6
SE0530.120-012	M12x1,75	12	1.22	12	6
SE0530.120-013	M12x1,75	12	1.27	12	6
SE0530.120-014	M12x1,75	12	1.40	12	6
SE0530.120-015	M12x1,75	12	1.50	12	6
SE0530.120-016	M12x1,75	12	1.60	12	6
SE0530.120-017	M12x1,75	12	1.70	12	6
SE0530.120-018	M12x1,75	12	1.80	12	6
SE0530.120-019	M12x1,75	12	1.91	12	6
SE0530.120-020	M12x1,75	12	1.98	12	6
SE0530.120-021	M12x1,75	12	2.08	12	6
SE0530.120-022	M12x1,75	12	2.16	12	6
SE0530.120-023	M12x1,75	12	2.29	12	6
SE0530.120-024	M12x1,75	12	2.41	12	6
SE0530.120-025	M12x1,75	12	2.54	12	6
SE0530.120-026	M12x1,75	12	2.59	12	6
SE0530.120-027	M12x1,75	12	2.69	12	6
SE0530.120-028	M12x1,75	12	2.79	12	6
SE0530.120-029	M12x1,75	12	2.92	12	6
SE0530.120-030	M12x1,75	12	3.00	12	6
SE0530.120-031	M12x1,75	12	3.10	12	6
SE0530.120-032	M12x1,75	12	3.18	12	6
SE0530.120-033	M12x1,75	12	3.30	12	6
SE0530.120-034	M12x1,75	12	3.43	12	6
SE0530.120-035	M12x1,75	12	3.51	12	6
SE0530.120-036	M12x1,75	12	3.58	12	6
SE0530.120-037	M12x1,75	12	3.68	12	6
SE0530.120-038	M12x1,75	12	3.81	12	6
SE0530.120-039	M12x1,75	12	3.91	12	6
SE0530.120-040	M12x1,75	12	4.01	12	6
SE0530.120-041	M12x1,75	12	4.11	12	6
SE0530.120-042	M12x1,75	12	4.19	12	6
SE0530.120-043	M12x1,75	12	4.32	12	6
SE0530.120-044	M12x1,75	12	4.42	12	6
SE0530.120-045	M12x1,75	12	4.50	12	6
SE0530.120-046	M12x1,75	12	4.60	12	6
SE0530.120-047	M12x1,75	12	4.70	12	6
SE0530.120-048	M12x1,75	12	4.83	12	6
SE0530.120-049	M12x1,75	12	4.90	12	6
SE0530.120-050	M12x1,75	12	4.95	12	6



Hydraulic and pneumatic components and systems are often cross-drilled to provide the correct channels for air and gas. Some of these channels have to be drilled from the outside and later need to be closed off (plugged).

The expansion sealing plugs are inserted into a drilled hole and the expander ball is driven into the plug sleeve. The independent grooved sealing rings on the plug ball are driven into the housing material to permanently plug and seal the hole. The ball is retained in place.

No need for tapping or reaming, no machining of O ring grooves or the use of tapes or sealants. To seal a hole, follow this procedure:



**Applications**

Some of the typical applications for our sealing screws include:

- |             |            |
|-------------|------------|
| Pneumatics  | Aerospace  |
| Hydraulics  | Valves     |
| Fluid Power | Regulators |
| Automation  | Cylinders  |
| Industrial  |            |

Sealing Plugs from Automation Components



“Standard” Expansion sealing plugs - push the ball which expands the sleeve and seals the channel.



“Pull” Expansion sealing plugs. Pulling on the mandrel expands the sleeve, sealing the channel. At a predetermined force the mandrel breaks off.

### Hole Preparation

Refer to the data sheet for the correct hole size to drill for the counterbored and drilled hole size and tolerance. Hole concentricity must be held within 0,05mm.

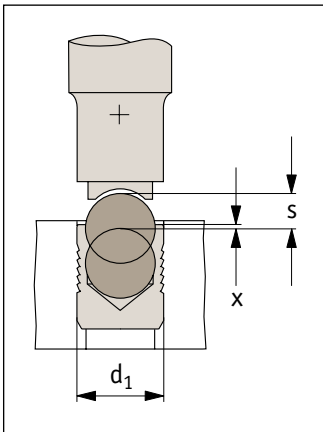
Bore roughness must be between Rz (RMS) 10-30µ (especially for hard materials).

Avoid spiral or longitudinal grooves as these may affect plug performance. Ensure the holes are clean and dirt free.

### Installation

Insert the plug into the counterbored hole with the ball facing outwards, seated against the counterbore shoulder.

Press the ball into the sleeve so that the top of the ball is slightly below the top of the sleeve (note approximate values for x and s in table below):



$d_1$	3	4	5	6	7	8	9	10	12	14	16	18	20	22
Stroke - s	1.2	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.5	6.35	7.0	8.0	9.0	10.0
Top of ball relative to top of sleeve - x ±0.2	0.4	0.2	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.6	0.6	0.8	0.8

Use the correct installation tool for each plug size. The plugs can be installed using a hammer and the installation tool. An air hammer with the correct air hammer installation tool can also be used.

### Minimum wall thickness and distance from an edge

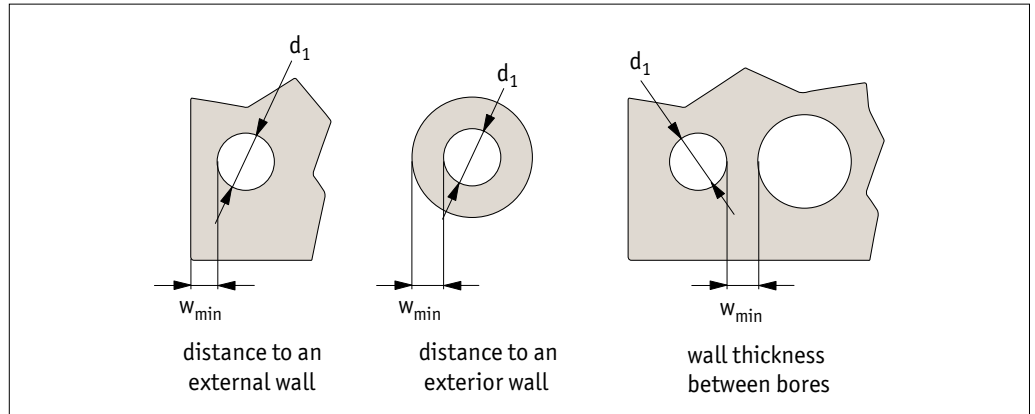
The radial expansion of the plug causes the housing material around the plug to deform plastically. Therefore a proper minimum wall thickness or distance from an edge is necessary to optimise the strength of the mechanical connection. The operating hydraulic pressure, thermal cycling, plug type and characteristics of the base metal also need to be considered – please consult our technical department.

$d_1 \geq 4\text{mm}$

$w_{\min} = f_{\min} \times d_1$

$d_1 < 4\text{mm}$

$w_{\min} = (f_{\min} \times d_1) + 0.5\text{mm}$



The guidelines for minimum wall thickness or distance from and edge ( $W_{\min}$ ) are shown below – these minimum values produce only a very slight deformation on the exterior profile (less than 20 microns).

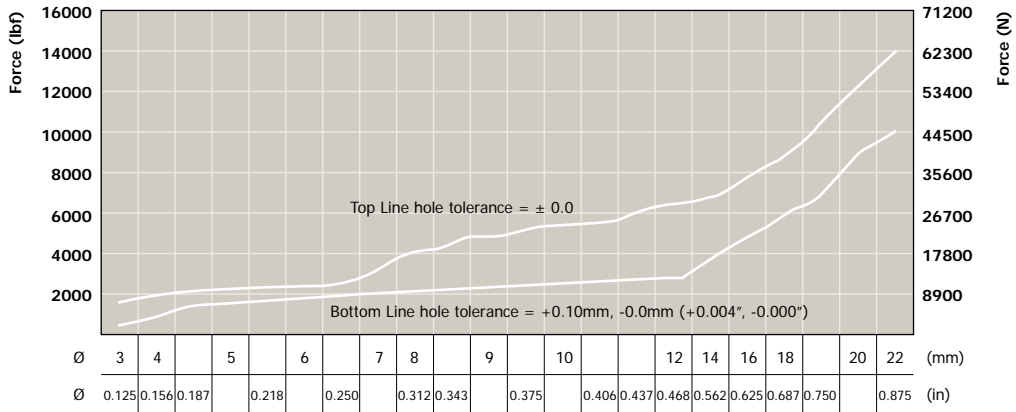
Sealing Plug type	Base Metal						
	Steel (SAE 1144)	Steel (SAE 10L15)	Cast Iron (ASTM A48)	Ductile Iron (ASTM A356)	Aluminium (2024-T4)	Aluminium (6061-T6)	Cast Aluminium (356-T6)
	<b>Factor <math>f_{\min}</math></b>						
Steel body	0.5	0.6	1.0	0.6	0.6	1.0	1.0
Stainless Body	0.6	0.8	1.0	0.8	0.8	1.0	1.0
Pull PLugs	0.5	0.6	1.0	0.6	0.6	1.0	1.0



### Installation Forces Guidelines

The values offered are to be used as a guideline. The base metal chosen for your specific application, the surface treatment, hole size and surface finish all affect the seal performance. Please contact our Technical Department for more information.

#### Installation Forces:



### Pressure Performance Guidelines

	Steel (Case-hardened) Plug Body	
	Ø 3-10	Ø 12-32
Steel (SAE 1144)	350 bar working pressure 1,100 bar proof pressure	380 bar working pressure 900 bar proof pressure
Steel (SAE 10L15)		
Cast Iron (ASTM A48)		
Ductile Iron (ASTM A356)		
Aluminium (2024-T4)	310 bar working pressure 1,000 bar proof pressure	240 bar working pressure 800 bar proof pressure
Aluminium (6061-T6)		
Cast Aluminium (356-T6)		

	Stainless Steel (300 Series) Plug Body	
	Ø 3-10	Ø 12-32
Steel (SAE 1144)	450 bar working pressure 1,300 bar proof pressure	450 bar working pressure 1,100 bar proof pressure
Steel (SAE 10L15)		
Cast Iron (ASTM A48)		
Ductile Iron (ASTM A356)		
Aluminium (2024-T4)	380 bar working pressure 1,200 bar proof pressure	280 bar working pressure 900 bar proof pressure
Aluminium (6061-T6)		
Cast Aluminium (356-T6)		

	Aluminium (2024-T4) Plug Body	
	Ø 3-10	Ø 12-32
Steel (SAE 1144)	450 bar working pressure 1,300 bar proof pressure	350 bar working pressure 1,100 bar proof pressure
Steel (SAE 10L15)		
Cast Iron (ASTM A48)		
Ductile Iron (ASTM A356)		
Aluminium (2024-T4)	380 bar working pressure 1,200 bar proof pressure	280 bar working pressure 900 bar proof pressure
Aluminium (6061-T6)		
Cast Aluminium (356-T6)		