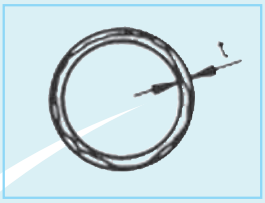
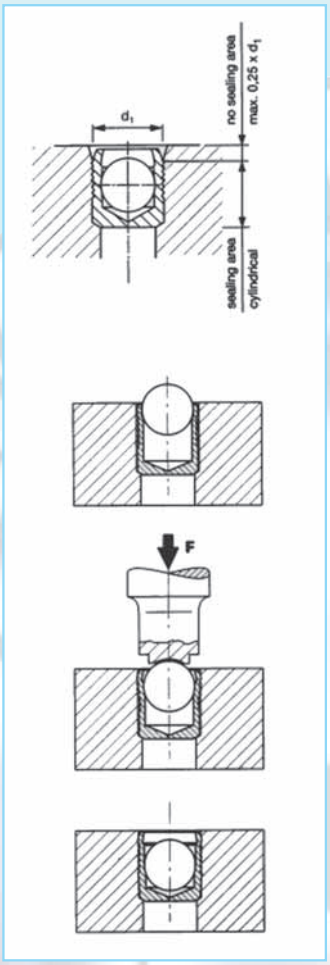
3900-10

COMPONENT REQUIREMENTS

DRILLING HOLES

- Please refer to product tables for counterbore dimensions d2/d3. (Pgs. 387-389)
- Roundness tolerances have to be within t=0,05mm.
- With hard materials the drilling roughness has to be R_Z=10-30µm.
- Drilling tolerance d_1=+0,1mm.
- Longitudinal rifles and spiral grooves have to be avoided as they have a negative influence on the sealing.
- DRILLING HOLES HAVE TO BE KEPT ABSOLUTELY FREE FROM OIL, GREASE AND CHIPS.





ROUNDNESS TOLERANCE

To achieve a secure functioning of the Expander sealing plugs in respect to pressure effectiveness and sealing, a roundness tolerance of t = 0,05mm has to be adhered to.

DRILLING TOLERANCE

The drilling tolerance is +0,1mm.

DRILLING CONCENTRICITY

Within thge active sealing area, the drilling hole has to be cylindrical. The drilling hole entrance may be conical up to 0,25 x d_1 as this zone does not have any primary influence on the sealing function.

GALVANIC CORROSION

An eventual contact corrosion has to be considered.

ASSEMBLY INSTRUCTIONS

MOUNTING PROCEDURE

- The expander Sealing Plug has to be inserted into the counter bore hole with the ball facing out. The upper sleeve edge must not protude the working piece. Please refer to product tables for mounting dimensions.
- When having only a small or no counterbore hole at all the sleeve bottom has to be supported sufficiently.
- Press in the ball by means of a press or setting die until the upper crown is lying underneath the sleeve edge. Please refer to product tables for dimension X and stroke S.

ATTENTION

For the assembly of Expander sealing plugs, please use setting dies 3900.W153 to .W172.

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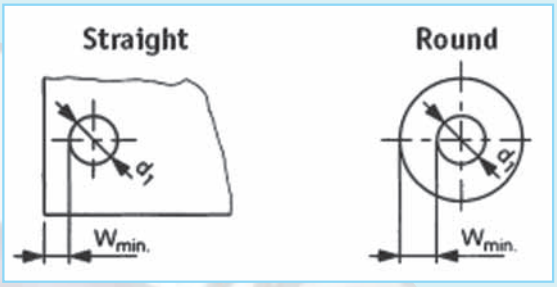
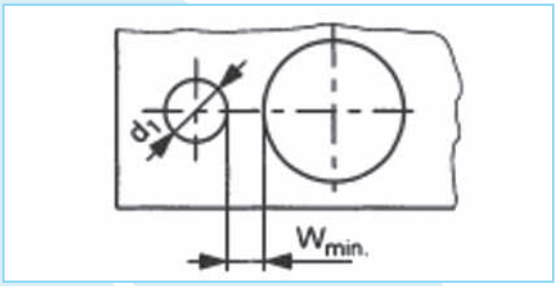
WALL THICKNESS / EDGE DISTANCES:

The Expander Sealing Plug is anchored to the basic material by radial expansion of the sleeve. Depending on the basic materials' characteristics, forces resulting from this type of anchorage as well as the hydralic pressures and temperature loads will necessitate minimum wall thicknesses and edge distances (W min).

DISTANCE TO OUTER PROFILE



WALL THICKNESS BETWEEN DRILLED HOLES



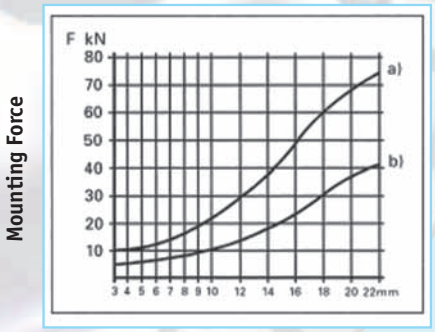
CALCULATION OF MINIMUM WALL THICKNESS AND EDGE DISTANCES (W min)

Diameter of Expander Sealing Plug $d1 \geq 4mm$: $W_{min} = f_{min} \times d_1$
$d1 < 4mm$: $W_{min} = f_{min} \times d_1 + 0,5$

	Description	ETG-100	C 15 Pb	GG-25	GGG-50	AlMgSiPb	AlCu4Mg2	G-AlSi7Mg
Basic Material	Average tensile strength Rm N/mm²	1000	560	250	500	340	480	300
	Min. Breaking elongation A5 / %	6	6	-	7	8	8	4
	Average permanent elongation limit Rp 0,2 N/mm²	865	300	-	320	300	380	250
	Factor f_{min}							
Sleeve from stainless steel		0,6	0,8	1,0	0,8	1,0	0,8	1,0
Sleeve from steel		0,5	0,6	1,0	0,6	1,0	0,6	1,0

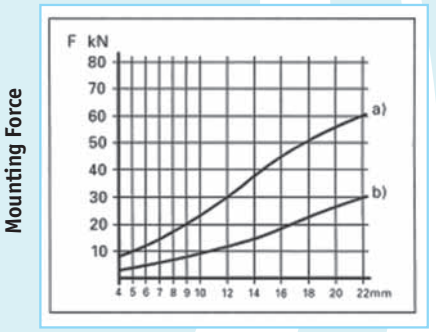
MOUNTING / ASSEMBLY FORCES:

EXPANDER SEALING PLUG No. 3910
SLEEVE FROM STAINLESS STEEL



Diameter of drilling hole d_2
Measured in steel having a tensile strength of $R_m = 1000 N/mm^2$. When using basic materials with lower tensile strengths values are lower.

EXPANDER SEALING PLUG No. 3900
SLEEVE FROM STEEL



Diameter of drilling hole d_2
a) Force at min. drilling tolerance
b) Force at max. drilling tolerance

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ANCHORAGE PRINCIPLE

There is a direct connection between the necessary drilling roughnesses required and both the hardness and the tensile characteristics of the basic material. Depending on the mounting combination of sealing plug and basic material, anchorage can either take place via the rifle profile of the Expander sleeve (Automatic anchorage) or via the surface of the drilling hole.

ATTENTION

Depending on the type of Expander sealing plug and the hardness of the basic material a bore roughness of R_z = 10 - 30µm has to be adhered to.
Requirements to achieve maximum operation reliability

- Drilling tolerance d_1 = + 0,1 mm.
- Consideration of counterbore hole relations.
- Roundness tolerance t = 0,05mm.
- Longitudinal rifles and spiral grooves that may have a negative influence on the sealing effectiveness have to be avoided.
- Drilling holes have to be free from oil and grease.

In cases where an automatic anchorage is not possible when building in the expander sealing plug into a hard basic material a drilling roughness of > R_z = 10-30µm is necessary to achieve the required pressure values. When having roughness > R_z = 30µm, leakages may occur.

ANCHORAGE BY RIFLE PROFILE

(Automatic Anchorage):

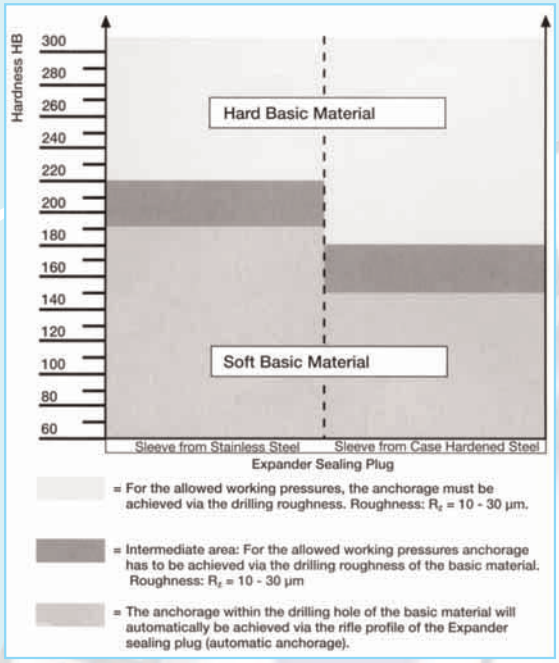
Example: Expander Sealing Plug made from case hardened steel HB = 180, in aluminium alloy HB = 90.

ANCHORAGE BY BORE ROUGHNESS

REQUIRED ROUGHNESS DESIGN:
An ideal bore roughness for the anchor can be achieved by using a twist drill or countersink.

UNDESIRABLE ROUGHNESS DESIGN

Friction will cause a smooth roughness profile that is not desired.



Picture 1 Selection Diagram