Basics - Design

Clamping length for shrink discs

The clamping length *l* of the shrink disk at the junction l_K (between shaft and hub), should be chosen to be somewhat wider to minimize the stress concentration at this point. An excessively wide connection increases the tendency to fretting corrosion, because the pressure decreases outward. The pressure is distributed approximately at an angle between 15° - 20° through the hub. This is largely dependent on the hub wall thickness and stiffness of the shaft. A good approximation can be made from the following equation:

Clamping length of the contact area: $l_K = 0{,}316\,(d - d_w) + l$

The cylindrical surfaces should be located symmetrically under the shrink disc! With a slightly different clamping length the transmissible torque *M* will not change, because a smaller contact surface results in a higher pressure - also a larger contact surface causes lower pressure.

Tightening torque of the clamping screws

The given tightening torque values in the tables for the screws are based on a friction coefficient $\mu_{ges} = 0{,}1$. In principle, the specified tightening torque M_A can be reduced to M_{Agew} to reduce stresses in the components. This may be necessary for soft materials and bored shafts. The reduction of M_A also reduced the pressure p_N and transmissible torque *M*. The ratio is approximately proportional and can be calculated according to:

$$M_{(new)} = \frac{M_{Agew}}{M_A}\, M \quad \text{also} \quad p_{N\,(new)} = \frac{M_{Agew}}{M_A}\, p_N$$

The tightening torques can not be reduced arbitrary, therefore apply the following limits:

$$M_{Agew} \geq \left| \begin{array}{l} \text{Class } 8.8 : 0{,}85\, M_A \\ \text{Class } 10.9 : 0{,}70\, M_A \\ \text{Class } 12.9 : 0{,}60\, M_A \end{array} \right| \leq M_A$$

A further reduction requires additional screw locks!

Tolerances and surfaces

The values found in the product data based on surface quality and tolerances according to the table below. These values are given as recommendations.

Higher values for the surface roughness reduces the transmissible torque and promote unwanted settling. Larger clearance also reduces the transmissible torque and heightened tensions in the hub.

In the case of significantly different values, please contact us!

Tolerance for the outer diameter hub - f7!

Recommended tolerances and surface roughness				
>	≤	FS_{max} mm	Clearance Hub/Shaft	Rz µm
9	18	0,022	H6/h6	10
18	30	0,026	H6/h6	10
30	50	0,032	H6/h6	10
50	80	0,049	H7/h6	10
80	120	0,057	H7/h6	16
120	150	0,065	H7/h6	16
150	180	0,079	H7/g6	16
180	250	0,090	H7/g6	16
250	315	0,101	H7/g6	16
315	400	0,111	H7/g6	16
400	500	0,123	H7/g6	25
500	630	0,136	H7/g6	25
630	800	0,154	H7/g6	25
800	1000	0,172	H7/g6	25