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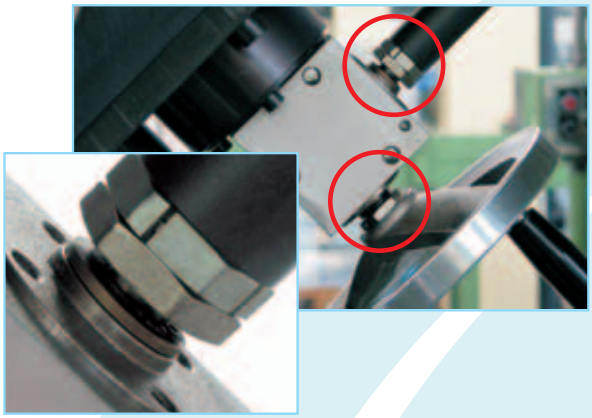
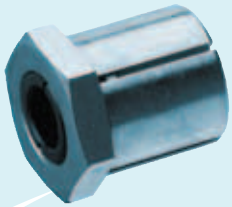
APPLICATIONS

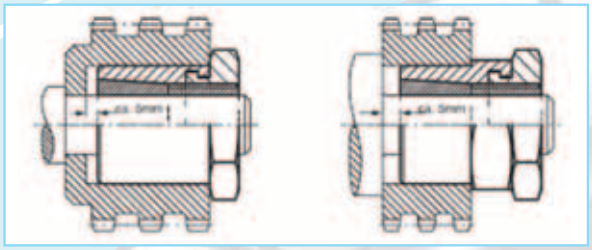
By using tapered shaft hubs, all shaft hub joints of machine elements such as sprocket wheels, gear wheels, belt pulleys, cams, levers etc. can be easily and efficiently established. Tapered shaft hubs are available with or without lock nut.

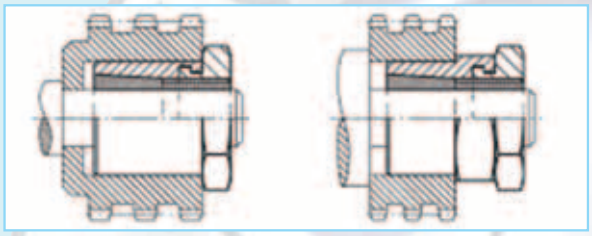


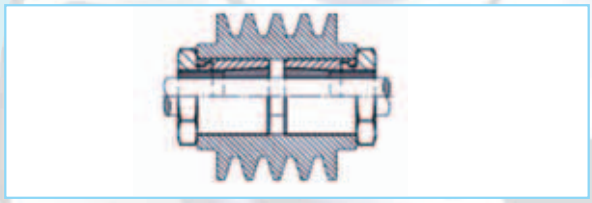
Tapered shaft hub with hexagon nut



Tapered shaft hub with hexagon nut and lock nut







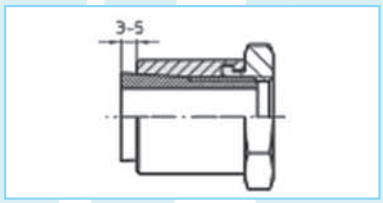
NO AXIAL SHIFT

If, on mounting, the hub sits close to a collar, an axial offset is not possible when tightening the tapered shaft hub. In this case, only 60% of the forces mentioned in the charts can be transmitted.

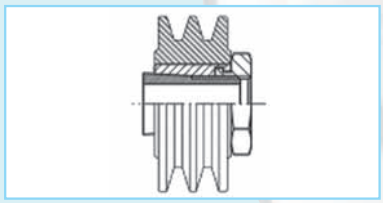
TWO TAPERED SHAFT HUBS IN ONE HUB

When using this method, the tapered shaft hub which is tightened first transmits 100% of the forces mentioned in the charts. When tightening the second tapered shaft hub, an axial offset of the hub is not possible. Therefore, this tapered shaft hub is able to transmit only 60% of the forces.

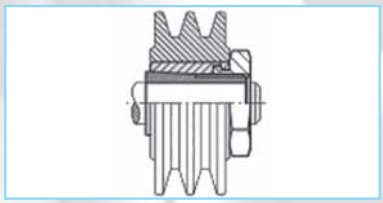
ASSEMBLY



1) The contact surface of the shaft and the hub must be free from oil and dirt.
2) Rotate nut to left until the inner part protrudes approximately 3-5mm over the outer.



3) Install tapered shaft hub in the hub hole.



4) Slightly tighten the nut when located in the desired position. Compensate the axial offset thus produced with a soft-face mallet. Tighten the tapered shaft hub.
Disassembly: Release tapered shaft hub by turning the nut to the left until the inner part protrudes approximately 3-5mm over the outer part.

Tel: 01483 286677 Fax: 01483 286678 Email: info@wixroyd.com Web: www.wixroyd.com

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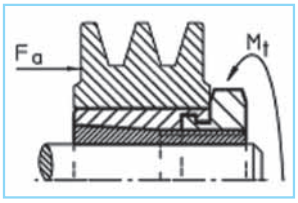
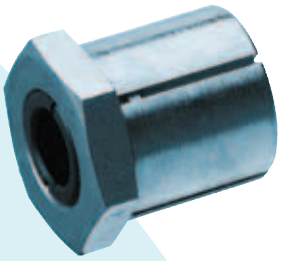
SIMULTANEOUS EXPOSURE TO DIFFERENT FORCES



If torque (M_t) and axial forces (F_a) are transmitted simultaneously, a resultant total torque (M_r) is obtained which must be less than or equal to the maximum torque (M_{max}) indicated in the charts. ($M_r \leq M_{max}$).

$$M_r = \sqrt{M_t^2 + (F_a \times 2 \times \frac{d_1}{1000})^2 \times \nu} \text{ [Nm]}$$

(M_r) = Resultant total torque
(M_t) = Torque
F_a = Axial force
d_1 = Shaft diameter
ν = Safety factor



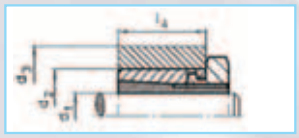
EXAMPLE:

Shaft hub 3842.W125
M_t = 150 Nm
F_a = 5kN
d_1 = 25mm
ν = 2

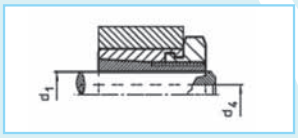
$$Mr = \sqrt{150^2 Nm^2 + (5000_N \times \frac{25mm}{2 \times 1000mm/m})^2 \times 2} = 325Nm$$

A maximum torque (^{M}max) of 520 Nm is transmitted by the tapered shaft hub 3842.W125. The forces can be transmitted because M_r (325 Nm) is less than M_{max}.

OUTSIDE DIAMETER OF HUB AND INSIDE DIAMETER TO HOLLOW SHAFT



When fitting tapered shaft hubs, the outside diameter of the hub and the inside diameter of the hollow shaft have to be considered.



SMALLEST POSSIBLE OUTSIDE DIAMETER OF HUB

$$d_3 \geq d_2 \times \sqrt{\frac{R_e + P_N \times C_N}{R_e - P_N \times C_N}} \text{ [mm]}$$

d_1 = Shaft diameter
d_2 = Hub hole
d_3 = Outside diameter of hub
d_4 = Inside diameter of hollow shaft
R_e = Apparent yielding point
$R_p0{,}2$, $R_p0{,}1$ = Permanent elongation limit

LARGEST POSSIBLE INSIDE DIAMETER OF HOLLOW SHAFT

$$d_4 \leq d_1 \times \sqrt{\frac{R_e - 2P_W}{R_e\ (R_p)}} \text{ [mm]}$$

P_N = Surface pressure hub
P_W = Surface pressure shaft
C_N = Factor [is "1", if the hub length is ≥ the fitting length of the tapered shaft hub (LN ≥ L2)]

EXAMPLE

Tapered shaft hub 3840.W025, hub material GG25;
$R_{P0},1 = 165\ ^N/mm^2$
$C_N = 1$

$$d_3 \geq 42mm \times \sqrt{\frac{165^N/mm^2 - 103^N/mm^2 \times 1}{165^N/mm^2 - 103^N/mm^2 \times 1}} \geq 87{,}4\ mm$$

Tapered shaft hub 3840.W025, hub material CK45;
$R_e = 380\ ^N/mm^2$
$C_N = 1$

$$d_4 \leq 25mm \times \sqrt{\frac{380N/mm^2 - 2 \times 174^N/mm^2}{380^N/mm^2}} \leq 7.2\ mm$$

MATERIAL CHART

Diameter	Material									
	St 37-2 Ust 37-2	St 50-2	Ck 35	Ck 45	9 SMn 28 9SMn 28Pb 28	GG 15	GG 20	GG 25	GGG-40	AlMg 3 F 25
	Minimum strength values in $^N/mm^2$									
	Re	Re	Re	Re	Re	Rp 0,1	Rp 0,1	Rp 0,1	Rp 0,2	Re
16 < d1 ≤ 40	225	285	320	380	375	90	130	165	250	180
40 < d1 ≤ 100	205	265	260	300	245	90	130	165	250	180