

Technical information

Blind rivet nuts

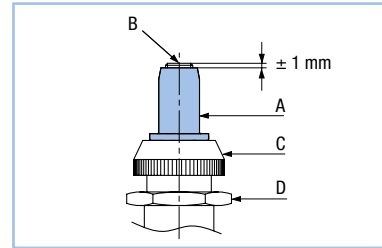
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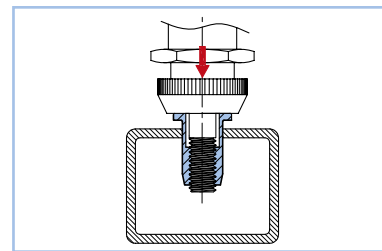
Setting method

Select one of the **Tubtara®** blind rivet nuts out of our product range and a setting tool adequate for the application. Take a test workpiece and drill an appropriate hole.

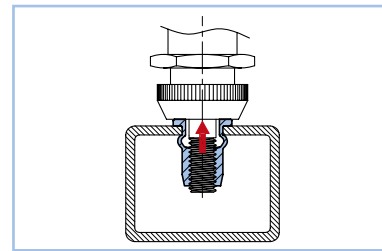
1. Screw the **Tubtara®** blind rivet nut (A) on the mandrel (B) of the setting tool. In the case of the open version, the mandrel should protrude about 1 mm. For closed rivet nuts, continue screwing until you feel resistance. Screw the anvil (C) against the head of the **Tubtara®** and block it with the locking nut (D).



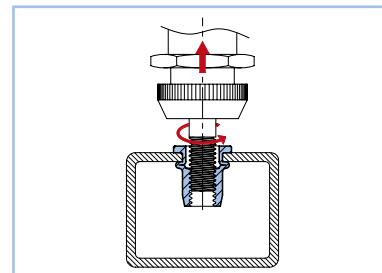
2. Insert the **Tubtara®** blind rivet nut, mounted on the setting tool, into the hole of the workpiece.



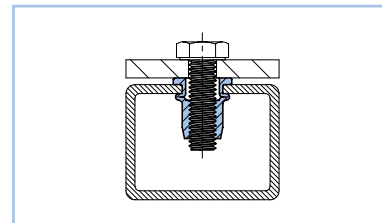
3. Set the **Tubtara®**. The Tubtara's deformation chamber now forms the counter head (bulb) on the underside of the workpiece.



4. Unscrew the mandrel from the **Tubtara®**.



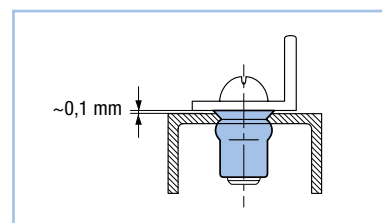
5. The **Tubtara®** blind rivet nut is now set. You can now easily insert your bolt or screw to assemble another component.



Countersunk heads

Are you using a **Tubtara®** blind rivet nut with a countersunk head? Always countersink at 90° so that the head of the installed **Tubtara®** protrudes about 0,1 mm above your workpiece. This ensures direct contact with the assembled component.

Don't have the possibility to countersink?
Use a low profile head



Materials

The **Tubtara®** is available from stock in steel, aluminum and stainless steel 304 & 316.

For critical bearing environments, we can also offer the following solutions to cope with most environmental conditions:

- Superior cold formed stainless steel A5 or A6 quality on demand
- High strength (HS) grades in steel and aluminum on demand
- Several finishing options on stainless steel like Cadmium, ZnNi, Seal Inox®, passivated stainless steel

Available from stock

Material			MNr
Aluminum	AlMg2,5	5052	3.3523
Steel	C8C	QST 34-3	1.0213
Stainless steel A2	304Cu		1.4567
Stainless steel A4	316Cu		1.4578

Material specifications are always subject to modifications.

Available on request

Material			MNr
Stainless steel A5	316Ti		1.4571
Stainless steel A6	904L		1.4539
HS (High Strength) steel	23MnB4		1.5535
HS (High Strength) aluminum	AlMg3,5	5154	

How to choose the right material?

Choosing the right material and coating for your **Tubtara®** blind rivet nuts is very important for obtaining optimal functionality during the whole life cycle, especially when environmental conditions are unknown or critical. Influences can be chemical (elements dissolved in water), abrasive (sand), heat, friction, contact with other metals, corrosive environments, etc.

The ideal material choice is not always easy and all conditions should be taken into account. We therefore strongly advise to check the following tables and do some tests in the specific application environment in advance.



Materials

Requirements & solutions

	Aluminum	Steel with appropriate coating	Stainless steel A2	Stainless steel A4	Stainless steel A5	Stainless steel A6
Colour distinction		xxx				
Visual identification		xxx				
Weight-saving	xxx		x	x	x	x
Durable	x	x → xxx	xx	xxx	xxx	xxx
Easily recycable	xxx	xxx	xxx	xxx	xxx	xxx
Electrical conductivity	xxx	xx	xx	xx	xx	xx
High/low temperature properties	x	xx	xxx	xxx	xxx	xxx
Non-magnetic	xxx		x	x	x	x
Increased corrosion resistance	xx	o	xxx	xxx	xxx	xxx
Resistant to atmospheric exposure	xx	o	xxx	xxx	xxx	xxx
Resistant to chloride atmospheres		o		xxx	xxx	xxx
Resistant to polluted environments		o		xxx	xxx	xxx
Resistant to harsh environments		o			xxx	xxx
Resistant to process fluids		o			xxx	xxx
Top coating possible		xxx				
Full passivation possible ¹⁾			x	x	x	x


o = possible influence xx = larger influence
 x = small influence xxx = largest influence


¹⁾ all stainless steel by Dejong has undergone a chemical/mechanical cleaning process (natural passivation)

Galvanic couples


A suited material choice is not always easy and all conditions should be taken into account. The table below shows some connection guidelines for corrosion:

Base metal wherein Tubtara is set	Blind rivet nut material		
	Steel zinc plated	Aluminum	Stainless steel 304 & 316
Aluminum			
Steel zinc plated			
Brass, copper	TT®	TT®	
Stainless steel 4xx	TT®	TT®	
Stainless steel 304 & 316	TT®	TT®	

 = base metal and Tubtara® ok

 = base metal corrodes where in contact with Tubtara®

TT® = base metal ok but Tubtara® will corrode

 = corrosion base metal heavily increased by Tubtara®

! We strongly advise to do some tests in the specific application environment.
 Samples are available on request.

Coatings

A suitable coating choice can offer additional characteristics to your **Tubtara®**.

Coating on steel available from stock

Zinktop

- High-quality Cr⁶⁺ & Ni free plating
- Conforms with RoHS, Reach, ELV directives
- 96 h white rust – 480 h red rust
- Coating thickness: 10µ ±2µ

Survey available coating offer



Photo	Coating description	Standard / on request	Salt spray test (h) ISO 9227		Colour / aspect	Corrosion protection	RoHS/Reach compliant	Remarks
			White rust	Red rust				
1	Zinc blue / white Cr ³⁺	REQ	24	72	blue / white	*	yes	Cr ⁶⁺ free
2	Zinc black Cr ³⁺	REQ	48	96	black	*	yes	Cr ⁶⁺ free
3	Zinc yellow Cr ³⁺	REQ	96	240	light yellow	**	yes	Cr ⁶⁺ free
4	Zinktop	ST	96	480	light gray	****	yes	Cr ⁶⁺ and Ni free
5	Zinktop, cobalt free	REQ	96	480	light gray	****	yes	Cr ⁶⁺ , Ni and Co free
6	Ultra 1000	REQ	240	1000	light gray	*****	yes	Cr ⁶⁺ and Ni free
7	ZnNi (Zinc Nickel)	REQ	quality according to customer's specs					
8	Vibraseal®	REQ	x	x	red, green			seals + anti-vibration
9	Gleitmo®	REQ	x	x	-			friction reduction
10	Seal Inox®	REQ	x	x	matt gray	*****		avoids galling
11	Passivation	REQ				*****		only on stainless steel

The Ultra 1000 is more than doubling the resistance to red rust in the salt spray test compared to the standard Zinktop.

The offer of blue and black trivalent coatings, as well as the cobalt free Zinktop, are developed to tackle imminent Reach regulations and can be delivered on demand.

Zinc yellow Cr⁶⁺ plating is no longer standard and has been omitted from this catalogue.

Due to REACH phase out, production of steel yellow hexavalent chromated parts has discontinued completely.

For availability, only until depletion of stock, please contact our customer service.

Coatings

Stainless Steel

All stainless steel Tubtara's have been treated by a special process to obtain a natural passivation layer, improving the corrosion resistance compared to common stainless steel parts in the market.

Optional coatings on stainless steel are
 – Gleitmo® / Seal Inox® / Cadmium / ZnNi
 – Full passivation

Why use a coating?

Requirements & solutions

	Zinktop on steel	Coloured plating on steel	Passivation on stainless steel	Gleitmo®	Vibraseal®	Seal Inox®	Molykote®
Appropriate visual aspects		+					
Colour distinction		+			o	o	
To avoid galling				+		+	+
Reduction of friction				+		+	+
Increase of friction				-		-	-
To avoid galvanic couple	o	o	+		+	+	
Electrical conductivity	+				-	-	-
Anti-vibration function					+		
Increased corrosion resistance	+		+			+	
Seal function					+	+	
UV illumination				+			

- = negative influence

o = possible influence

+ = positive influence

! We strongly advise to do some tests in the specific application environment.
 Samples are available on request.

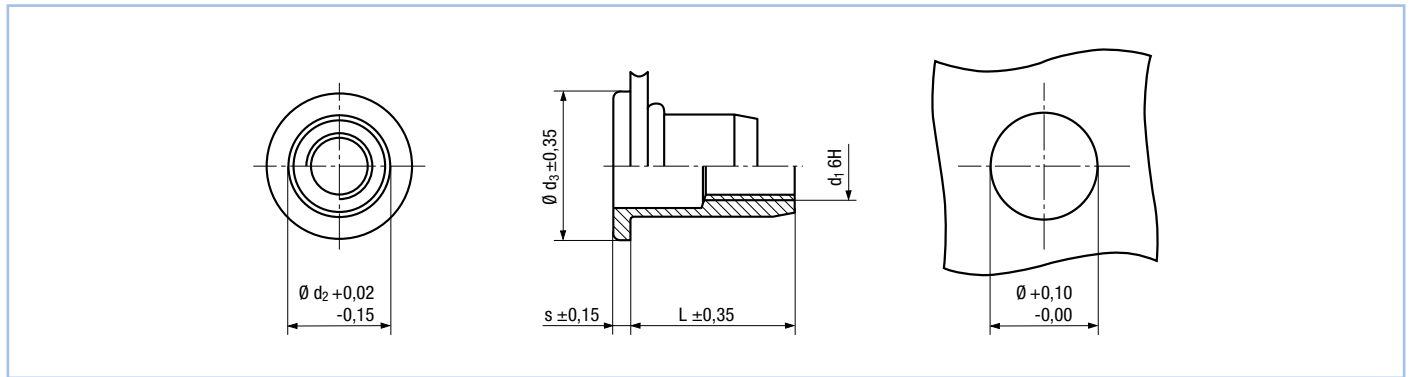


Technical data

General tolerances

	Head form	Dimensions in mm	Dimensions in inches
d ₃ (head diameter)	Flat head Countersunk head Low profile head	±0,35 0 -0,5 -0,15 +0,3	±.014 0 -.020 -.006 +.012
s (head thickness)	Flat head Countersunk head Low profile head	±0,15 0 +0,3 -0,05 +0,3	±.006 0 +.012 -.002 +.012
L (length)	General Stainless steel M10 shank 13 mm	±0,35 ±0,5	±.014 ±.020
d ₁ 6H (metric thread)			
d ₂ (shank size)	General (incl. KN) Splined shank (RS) M10 shank 12,4 mm	-0,02 -0,15 ±0,08 ±0,08	-.001 -.006 ±.003 ±.003

Example:



Recommended tightening torque values [Nm]

Max. recommended torque to avoid damaging the threaded connection and ensure optimal screw-nut assembly:

	M3	M4	M5	M6	M8	M10	M12
Aluminum	2	2,2	4,5	9,5	17	30	
Steel	2,5	3	5,9	11	25	49	80
Stainless Steel	2,5	3	5,9	11	25	49	80

Recommendations for 8.8 bolts in steel and class A2-70 bolts in stainless steel.

Technical data

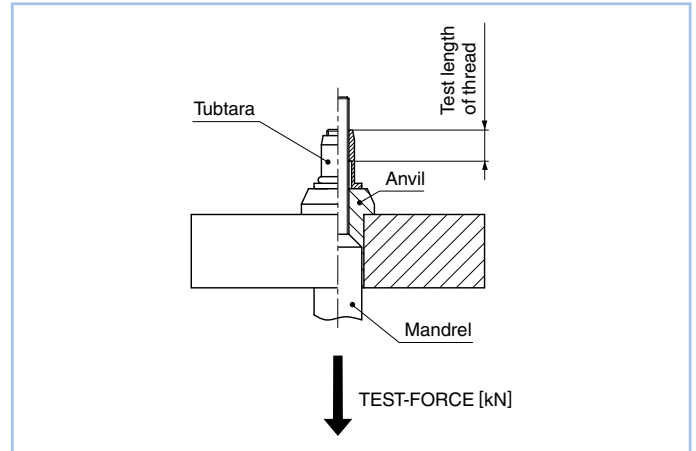
Mechanical properties – How do we test them?

Pull-out (thread strength)

Determines the force [kN] required to destroy (pull out) the threads of the **Tubtara®** blind rivet nut, by pulling a screwed-in mandrel towards the head of the **Tubtara®**.

In many cases the mandrel will break before the threads would fail (see “>” in mechanical values table)

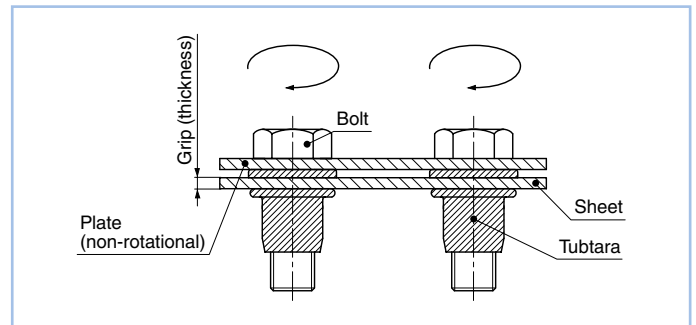
The strength towards the opposite direction is $\pm 1/3$ of the pull out strength.



Maximum Torque

Determines the maximum torque [Nm] that the **Tubtara®** can resist. The Tubtaras are installed in a bolted assembly, using a non-rotational plate.

In most cases the bolt will break before the threads would fail. (see “>” in mechanical values table)

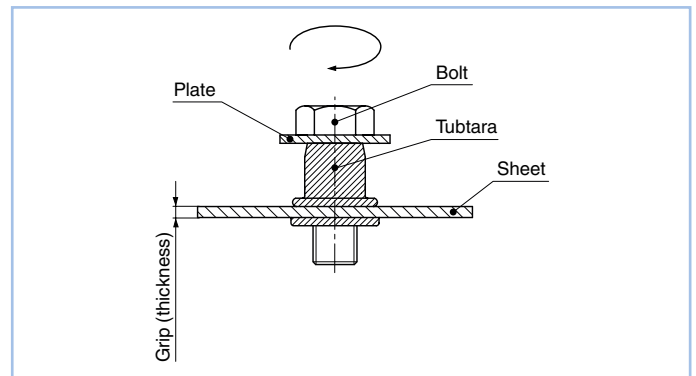


Torque-to-turn (spin out)

Determines at which couple [Nm] the **Tubtara®** starts to rotate (spin) in the parent material in which it is installed. Tested from the blind side with a tightened bolt and a washer.

In an assembly, required torque-to-turn force will be higher, due to increased clamping pressure and friction resistance after tightening the assembled bolt.

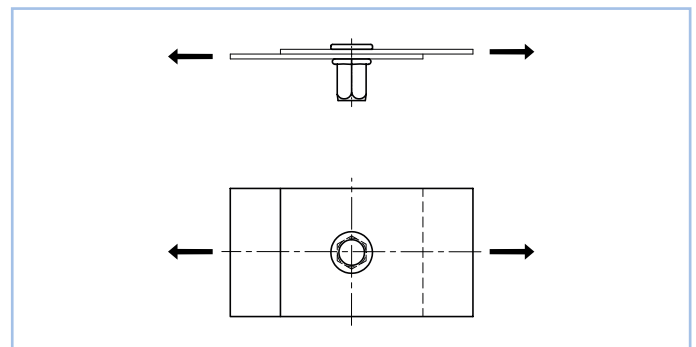
In some cases the bolt will break before the threads would fail. (see “>” in mechanical values table)



Shear test

Tests the strength [kN] of an installed **Tubtara®** (without assembled bolt) towards shearing. In many cases the **Tubtara®** will be pulled out of the plate without shearing, or shear in the middle between the 2 plates.

Plate material, hardness and how holes are formed (drilled, punched or laser cut) will influence test results.



Technical data

Mechanical properties

The tables below show some indicative standard values for Tubtara's with round or hexagonal shank and flat head in first grip for middle sheet thickness within range.

Mechanical reference values

Product	Material	Pull-out [kN]	Max. torque [Nm]	Torque-to-turn [Nm]	Shear test [kN]
Round shank					
M3 UPO 20	Steel C8C	> 5,8	> 2	1,8	1,9
	Alu 5052	> 3,1	1,9	0,8	0,6
	SS 304Cu	–	–	–	–
M4 UPO 30	Steel C8C	> 10,8	> 7,5	2,7	2,6
	Alu 5052	> 4,5	4,9	1,4	1,1
M4 UPO 20	SS 304Cu	> 11	7,1	2,6	3,5
M5 UPO 30	Steel C8C	> 12	> 10	4,7	3,5
	Alu 5052	> 5,2	4,9	1,5	1,6
	SS 304Cu	> 14,5	> 16	3	4,8
M6 UPO 30	Steel C8C	> 21	> 19	7	5
	Alu 5052	> 10,5	16	3,2	2,4
	SS 304Cu	> 27	> 22	6,8	7,3
M8 UPO 30	Steel C8C	> 33	> 50	13	6
	Alu 5052	> 15	33	5,3	2,9
	SS 304Cu	> 40	> 70	9	9
M10 UPO 35	Steel C8C	> 40	> 70	15	8
	Alu 5052	> 20	39,5	7	3,7
	SS 304Cu	> 43	> 70	8	8,5
M10 SPO 35	Steel C8C	> 40	> 70	15	8
	Alu 5052	–	–	–	–
	SS 304Cu	> 43	> 70	13	8,4
M12 UPO 40	Steel C8C	> 63	> 120	32	11,5
	Alu 5052	–	–	–	–
	SS 304Cu	> 70	> 130	25	14
Hexagonal shank					
M4 HUPO 20	Steel C8C	> 8,8	> 7,5	> 5,5	2,6
	SS 304Cu	> 10,8	> 7,1	6	3,7
M5 HUPO 30	Steel C8C	> 12	12	> 6,5	3,6
	SS 304Cu	> 15,5	15	> 9	4,8
M6 HUPO 30	Steel C8C	23	> 24,5	> 21	5,1
	SS 304Cu	24,5	> 23	> 22	7,2
M8 HUPO 30	Steel C8C	32,8	> 50	> 30	6,6
	SS 304Cu	39	> 64	32	9,4
M10 HSPO 35	Steel C8C	> 40	> 70	50	7,9
	SS 304Cu	> 43	> 70	> 50	10,2
M12 HUPO 40	Steel C8C	> 63	> 120	68	12,5
	SS 304Cu	> 70	> 130	> 70	14,6

- Bolts class 8.8 were used
- >: Value will be higher, but test could not be completed due to breakage of bolt or min. value is used as reference
- Steel plate (HRB 55) was used to set the Tubtara® (approximately middle of grip range)

Technical data

Geometrical reference values (open end parts)

Product	Material	Setting force [kN]	Stroke [mm]	Size bulb forming [mm]	Length under plate [mm]
Round shank					
M3 UPO 20	Steel C8C	4	2,6	6,6–6,7	5,9–6,1
	Alu 5052	2,3	1,9	6–6,1	6,7–6,6
	SS 304Cu	–	–	–	–
M4 UPO 30	Steel C8C	4,5	2,8	7,8–7,9	6,7–6,8
	Alu 5052	2,2	2,7	7,7–7,8	6,8–7
M4 UPO 20	SS 304Cu	6	2,4	7,3–7,4	7,6–7,8
M5 UPO 30	Steel C8C	6,5	3,8	9,4–9,5	7,3–7,4
	Alu 5052	3,4	3,6	9,3–9,4	7,3–7,4
	SS 304Cu	8	3,5	8,9–9,2	7,3–7,5
M6 UPO 30	Steel C8C	9,5	4	11,6–11,8	9,3–9,6
	Alu 5052	4,9	3,3	11,2–11,3	10–10,2
	SS 304Cu	13	4	11,3–11,6	9,6–10
M8 UPO 30	Steel C8C	12	4	13,6–13,8	10,9–11,2
	Alu 5052	5,5	3,8	13,6–13,8	11,1–11,3
	SS 304Cu	15,4	4,2	13,6–13,7	11,3–11,6
M10 UPO 35	Steel C8C	14,5	4,4	15,7–15,8	14,4–14,5
	Alu 5052	8	4,7	15,6–15,9	14,1–14,4
	SS 304Cu	15,5	4	14,8–15	13,6–14
M10 SPO 35	Steel C8C	15,5	4,5	16,1–16,3	15,5–15,7
	Alu 5052	–	–	–	–
	SS 304Cu	23,5	4,6	15,9–16,1	16,6–16,9
M12 UPO 40	Steel C8C	20,5	6,5	20,8–21	17,5–18
	Alu 5052	–	–	–	–
	SS 304Cu	30	7	20,5–21,5	17–17,5
Hexagonal shank					
M4 HUPO 20	Steel C8C	5,5	2,8	7,6–8,3	6,1–6,4
	SS 304Cu	5,3	2,5	7,5–7,9	7,5–7,9
M5 HUPO 30	Steel C8C	6,1	4	9,8–10,4	7,8–8,2
	SS 304Cu	7,2	3,3	9,1–9,5	7,1–7,3
M6 HUPO 30	Steel C8C	11,5	3,6	11,4–12,5	9,7–10,1
	SS 304Cu	10	4,3	11,9–12,3	9–9,3
M8 HUPO 30	Steel C8C	14	4,6	14,3–15,4	10,7–11,1
	SS 304Cu	14	4,5	14–14,5	10,7–11,1
M10 HSPO 35	Steel C8C	18	5,5	17,5–18,6	14,4–14,7
	SS 304Cu	19	6	17–17,6	16–16,7
M12 HUPO 40	Steel C8C	21	6,6	20,7–21,6	15–16,1
	SS 304Cu	25	7	21–22	17–17,5

Length under plate of open end parts: values obtained after setting.

Technical data

To obtain the length under the plate after setting of **closed end parts**, you can add the following sizes to the above-mentioned:

Steel and aluminum

[mm]

M3	3,5
M4	4,5
M5	6
M6	7
M8	8
M10	10
M12	10

In some cases the real length will be shorter. All dimensions can be checked on the technical data sheets in our catalogue.

Stainless steel

[mm]

M4	4,5
M5	6
M6	7
M8	8
M10	7
M12	10

In practice, variations may result from differing setting and environmental conditions. The values mentioned can be used as a reference and optimised by using additional features. We strongly advise customers to perform their own tests in the correct material thickness and specific application.

Technical data

Grip range influences

The following values can be used as a guidance for other versions:

Type	Grip [mm]	Aluminum			Steel			Stainless steel 304 + 316		
		Setting Force [N]	Stroke [mm]	Pullout [N]	Setting Force [N]	Stroke [mm]	Pullout [N]	Setting Force [N]	Stroke [mm]	Pullout [N]
M3 UPO 20	1	2000	2	3750	4000	2,5	> 5000			
	2	2600	1,5	3280	4750	2	> 5000			
M3 UPO 30	2	1850	1,5	3900	3700	2,5	> 5000			
	3	2050	1	3968	4750	2	> 5000			
M4 UPO 20	1							4900	2	> 9000
	2							5500	1,5	> 9000
M4 UPO 30	1	2100	3	5170	4300	2,5	> 8000			
	3	2430	1	4330	5650	1,5	> 8000			
M4 UPO 35	2							5500	2,6	> 9000
	3,5							6000	1,7	> 9000
M4 UPO 45	3	2050	2,8	4838	4200	2,5	> 8000			
	4,5	2875	1,5	4421	5000	1,5	> 8000			
M5 UPO 30	1	3050	3,5	5500	6150	3,5	12240	7500	3	> 15000
	3	3650	2	5000	7200	2,5	9600	8500	1,7	> 15000
M5 UPO 50	3							7500	4	> 15000
	5							8500	2	> 15000
M5 UPO 55	3	3000	3,5	6450	5750	4	11800			
	5,5	4300	1,5	5525	9650	2	10300			
M6 UPO 30	1	4500	3	11000	9400	4	21200	11850	4	> 24000
	3	5750	2	10000	12000	3	18500	14460	3	> 24000
M6 UPO 50	3							13500	4,5	> 24000
	5							15000	2,8	> 24000
M6 UPO 55	3	4500	3,5	11000	9000	3,5	22700			
	5,5	6100	1,8	10000	11000	2	19700			
M6 UPO 80	5,5	4950	4,7	9160	8700	4	19900			
	8	5400	2	8200	11750	2,5	17200			
M8 UPO 30	1	5000	3	14900	11500	4	30400	14500	4,2	> 41000
	3	6600	2	14000	13750	2,5	26100	18000	2,8	> 41000
M8 UPO 55	3	5400	4	15500	11500	4	32500	14500	5,5	> 41000
	5,5	7400	2	11200	15500	2,5	31900	18500	3	> 41000
M8 UPO 80	5,5	5900	4	16100	10700	4	32400			
	8	7850	2	13600	14700	2,5	26500			
M10 UPO 30	1							14500	3,5	> 45000
	3							18500	2,5	> 45000
M10 UPO 35	1	6750	4	22100	13600	4,5	39600			
	3,5	9000	2,5	17700	17000	2,5	32400			
M10 UPO 50	3							14500	3,5	> 39500
	5							18500	2,5	> 37000
M10 UPO 60	3,5	9000	5	25250	14900	4	42300			
	6	13000	3	23000	17900	2,5	31700			
M10 SPO 35	1				13500	4,5	40500	19500	4,5	> 45000
	3,5				16100	2,5	36100	26500	3,5	> 45000
M10 SPO 60	3,5				15900	5,5	48000	21000	5,5	> 45000
	6				20400	3	37500	25000	3,5	> 45000
M12 UPO 40	1				19500	5,5	> 50000	26000	8	> 75000
	4				25000	4	> 50000	34000	5	> 70000
M12 UPO 70	4				19500	5,5	> 50000	28000	8	> 75000
	7				25000	4	> 50000	37000	5	> 70000

Setting force or upset load: Force (in Newton) necessary to deform the Tubtara® referred to in an adequate way.

Upset stroke: Stroke (in mm) that should be set on the setting tool to give the Tubtara® referred to, the adequate deformation.

! The mentioned values are average reference values only. We strongly advise the customer to do his own tests in the proper material thickness and specific application.

Semi-hex parts have a setting force which is 10 to 15 % lower than full hex or round parts but have the same fixation strength.

High strength materials:

- 23MnB4: +20 % higher mechanical strength compared to C8C
- AlMg3,5: +20 % higher mechanical strength compared to AlMg2,5

Technical data

HX Tubtara® with seal under the head

Information about NBR O-Ring & compatibility with other products

Shore hardness	70 – 95	Aromatic hydrocarbons	x	Lye	x
Hydraulic fluids	xxxx	Aliphatic Hydrocarbons	xxx	Chlorinated hydrocarbons	x
Fuel oils	xx	Water under 80 °C	xxx	Ozone & sunlight	x
Organic oils	xxxx	Water over 80 °C	x	Temperature range °C	-30 ... +120
Brake fluid	–	Alcohols	xx	Electrical properties	–
Silicone & grease	xx	Ketone	–	Compression sets	xxx
Gasoline	xxx	Acid (concentrated)	–	Flame resistance	no
Aromatic fluids up to 50 %	xx	Acid (diluted)	x	Kerosene	xxx

Key: xxxx very good → x satisfactory – not suitable. Seals in other materials like Viton or EPDM on request. Store in a dry and dark place (all boxes are marked)

(H)DPX Tubtara® with seal under the head

Information about the non-reactive, peripheral seal, made of flexible organic based material

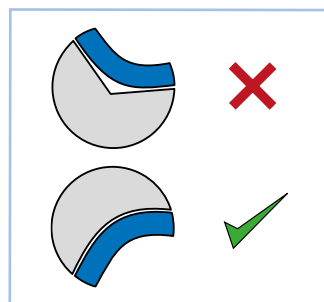
Material	polyurethane	Reusability	yes
Colour	blue	Bead form	concave
Sealing capacity	> 150 bar	Cure method	heat cure
Temperature range	-40 ... +100 °C (150 °C peak)	Waterproof	IP67 ¹⁾
Shore hardness	50 A range	Shelf life	4 years

Compatibility with other products: resistant to many automotive oils, antifreeze and transmission fluids. Store in a dry place (room temperature)

¹⁾ If correctly installed, only guaranteed under Dejong test conditions

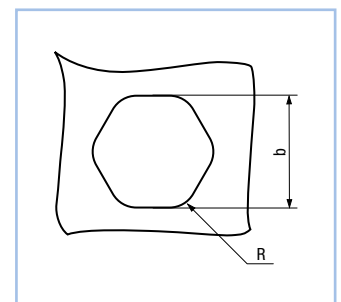
Hole preparation for semi-hex HDKX + Precote® seal

To obtain an IP 67 waterproof assembly with semi-hex (stainless steel) HDKX series, the hexagonal holes need to be formed with a radius:



Radius hexagonal hole

Thread	b ^{+0,1}	R ^{+/-0,05}
M5	7	1,8
M6	9	2,2
M8	11	2,7
M10	13	2,8



Conversion table

Multiply	by	To get	
Millimeter	mm	.03937	Inch
Inch	in	25,4	Millimeter
Kilogram	kg	2,2046	Pound
Pound	lb	0,4536	Kilogram
Newton	N	0,2248	Pound-force
Newton metre	Nm	8,8507	Pound-inch

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