

Technical Manual

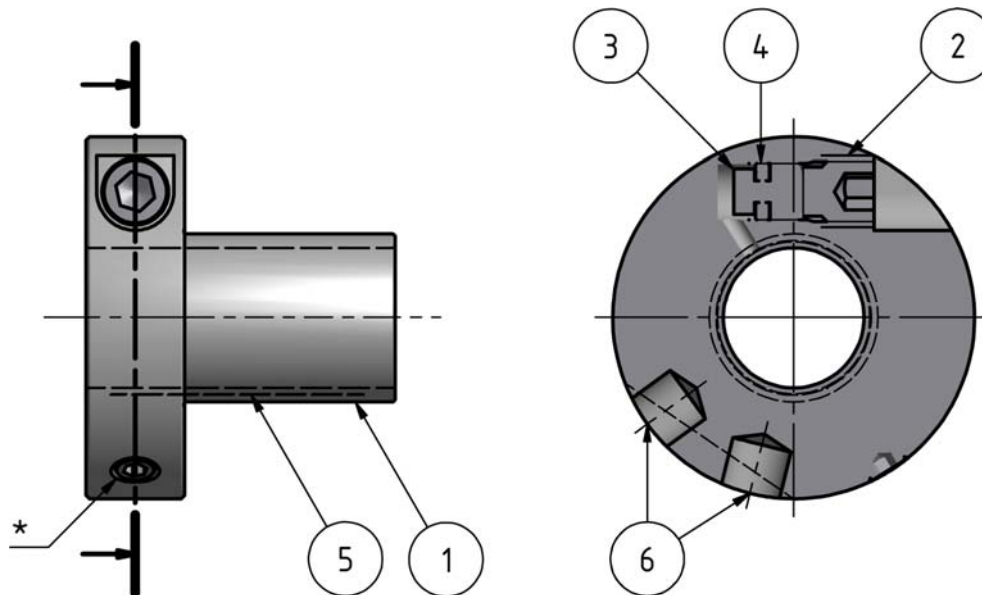
ETP-EXPRESS incl type R Appendix: special version plated with Nickel



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Technical parts description



1.	<p>Double-walled hardened steel sleeve With the same characteristics as for ETP-CLASSIC. ETP-EXPRESS type R is made of stainless steel, Euronorm 1.4057, X19CrNi17 2. * The radial bore in the flange, is used only for filling of pressure medium in our production. NEVER OPEN IT!</p>
2.	<p>Pressure setting screw This is a standard screw. Lubricant Molykote G-n plus. ETP-EXPRESS type R has a stainless steel screw plated for a minimum of friction in the threads. It is available as a spare part from us. Lubricant: Molykote P-1900 food grade paste.</p>
3.	<p>Pressure setting piston Special high precision piston manufactured by us. Not possible to change by the customer. ETP-EXPRESS has to be sent to us for repair.</p>
4.	<p>Special sealing Consisting of a plastic back-up ring and a rubber o-ring Not possible to change by the customer. ETP-EXPRESS has to be sent to us for repair.</p>
5.	<p>Pressure medium A special type of (food approved for type R) grease which is carefully selected to give the correct performance. Not possible to refill by the customer. ETP-EXPRESS has to be sent to us for refilling.</p>
6.	<p>Balance bores, for type R a corda ETP-EXPRESS is design balanced to approx. 75 gmm/kg.</p>

Mounting/dismantling tips

Comments to the instruction which is enclosed with each ETP-EXPRESS:

- All the contact surfaces should be cleaned with a solvent for max. torque capacity.
- A thin oil on the surfaces will reduce the torque capacity slightly, but make the mounting easier.
- Always use a torque wrench to guarantee the best performance.
- When the pressure setting screw is tightened to the recommended tightening torque, the piston has reached the bottom of the bore and any extra tightening does not increase the pressure in the sleeve. **Do not over tighten.**

Note! For type R: the screw should only be tightened to the correct tightening torque stated in our catalogue. If the screw is over tightened the screw might get damaged. We therefore recommend the use of a torque wrench. **Do not over tighten.**

- The pressure setting screw, only, is available as a spare part from us. If anything else is damaged and needs to be changed, ETP-EXPRESS has to be sent to us for repair.
- If the piston reaches the bottom (sudden rise in the tightening torque without moving the screw) long before recommended tightening torque is reached, the following could be the reasons:

Too wide tolerance on the shaft or in the bore of the hub
Too thin hub or too weak material in the hub or hollow shaft
Something wrong with ETP-EXPRESS itself

- If mounting is going to be done frequently, put some grease on the threads of the screw regularly for less wear of the threads.

One of the qualities with the ETP connections are their ability to be mounted quickly and repeatedly with maintained performance and precision.

There is however a limit when the screw will be worn and has to be changed. If the threads are cleaned and regularly lubricated the lifetime of the screws can be substantially prolonged.

For the **R types** it is very important that the screws are well lubricated both for proper function and full lifetime capabilities.

When used in food processing applications or similar we recommend the lubricants **OKS 260, Molykote D or Molykote P-1900 food grade paste.**

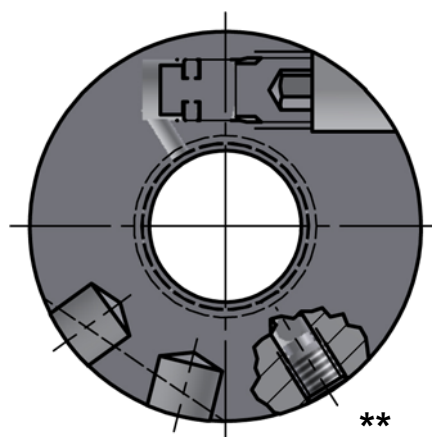
For non stainless ETP-EXPRESS **Molykote G-n plus** can be used.

- There is no risk that the screw loosens by itself because of vibrations, as the hydraulic pressure constantly acts on the piston.
- For repair or service of ETP-EXPRESS, please send it to us.
- If frequent mounting is done, an allen key with a T-handle is very handy to use.
- It is possible to machine in the flange, see other section, for mounting some other components.
- In order not to damage the allen key grip in the screw, make sure the key is inserted to the bottom before tightening.

Dismantling

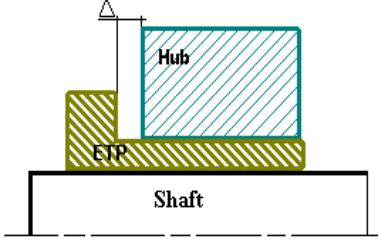
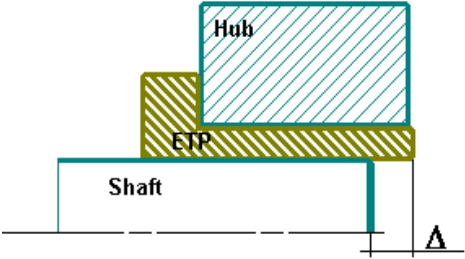
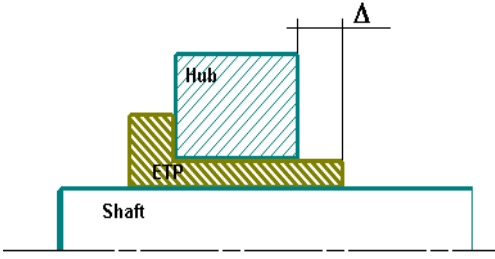
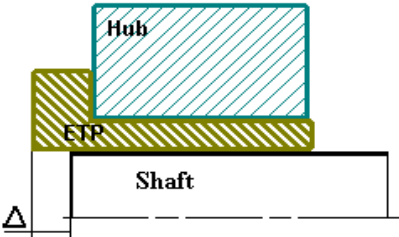
- Just untighten the screw until ETP-EXPRESS loosens its grip on shaft and hub.
- The sleeve should loosen from shaft and hub immediately, when loosening the screw.
- Never dismantle the pressure setting screw or the piston.
- If refilling of grease should be necessary, send the sleeve to us for service.
- If, for some reason ETP-EXPRESS can't be dismantled normally, you can depressurize ETP-EXPRESS by loosening the screw (**) in the radial bore of the flange. Use a 3 mm allen key, first the small pin in the allen grip has to be removed with for example a thin screw driver. Remove the screw and the steel ball that seals the pressure medium channel. Grease will come out and ETP-EXPRESS will loosen.

Note: Do not try to refill ETP-EXPRESS, send it to us for service.



Design suggestions

ETP-EXPRESS can be allowed to protrude from the hub/shaft according to the following:

ETP-EXPRESS size	Δ mm	
15 / R-15	3	
5/8"	4	
19	4	
3/4"	4	
20 / R-20	5	
22	5	
7/8"	5	
24	5	
25 / R-25	5	
1"	5	
28	5	
1 1/8"	5	
30 / R-30	6	
1 1/4"	6	
32	6	
1 3/8"	6	
35 / R-35	6	
1 7/16"	6	
38	6	
1 1/2"	7	
40 / R-40	7	

42	7
1 3/4"	7
45	7
48	7
1 15/16"	7
50 / R-50	8
2"	8
55	8
60	8
65	8
2 1/2"	8
70	8
80	8
90	8
100	8

Tolerances

Recommended tolerances for ETP-EXPRESS are hub H7.

Shaft h7 for d = 15.

Shaft k6-h7 for d = 19, 22, 24, 28, 32, 38, 42, 48, 55.

Shaft h8 for all other sizes.

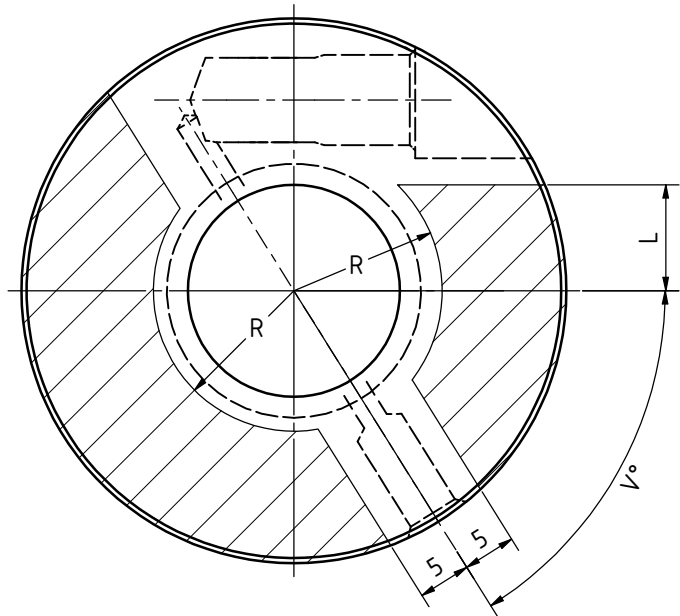
ETP-EXPRESS, recommended tolerances in inch					
	Shaft			Hub	
	from	to		from	to
15	0	-0,0007	15, 5/8"	0	0,0007
5/8"	0	-0,0011	19-25	0	0,0008
19	0,0006	-0,0008	1"-40	0	0,0010
3/4"-20	0	-0,0013	42-65	0	0,0012
22-24	0,0006	-0,0008	70-90	0	0,0014
7/8"	0	-0,0013	100		0,0016
25, 1"	0	-0,0013			
28	0,0006	-0,0008			
1 1/8", 30	0	-0,0013			
1 1/4"		-0,0015			
32	0,0007	-0,0010			
1 3/8" – 1 7/16"	0	-0,0015			
38	0,0007	-0,0010			
1 1/2", 40	0	-0,0015			
42	0,0007	0,0010			
1 3/4", 45	0	-0,0015			
48	0,0007	-0,0010			
1 15/16", 50	0	-0,0015			
2"	0	-0,0018			
55	0,0008	-0,0012			
60-80	0	-0,0018			
90, 100	0	-0,0021			

Recommended tolerances for **ETP-EXPRESS Type R** are, Shaft **h8** and Hub **H7**.

ETP-EXPRESS Type R, recommended tolerances in inch					
	Shaft			Hub	
	from	to		from	to
R15	0	-0,0007	R15	0	0,0007
R 5/8"	0	-0,0011	R 19 – R 25	0	0,0008
R 3/4"-R30	0	-0,0013	R 1" – R40	0	0,0010
R 1 1/4"-R50	0	-0,0015	R 1 3/4" – R60	0	0,0012
R 2"- R 80	0	-0,0018	R 70, R 80	0	0,0021

Machining in the flange

In the drawings below, (see next pages, S-5745 and S-5746), you can see where it is possible to machine in the flange, without getting in contact with the grease channels. When doing this the axial runout of the flange might change slightly because the “stress picture” in the flange will be changed.



ETP-EXPRESS							
	15	5/8"	16	19	3/4"	20	22
R	11	12	12	13	13	14	15
V°	52°	53°	53°	57°	57°	58°	55°
L	7	8	8	9	9	10	11


ETP-EXPRESS							
	7/8"	24	25	1"	28	1 1/8"	30
R	15	16	17	17	18	19	19
V°	55°	57°	58°	58°	57°	57°	58°
L	11	12	13	13	15	15	16

ETP-EXPRESS							
	1 1/4"	32	1 3/8"	35	1 7/16"	38	1 1/2"
R	21	21	22	22	23	24	24
V°	56°	56°	54°	54°	55°	59°	59°
L	17	17	18	18	19	20	20

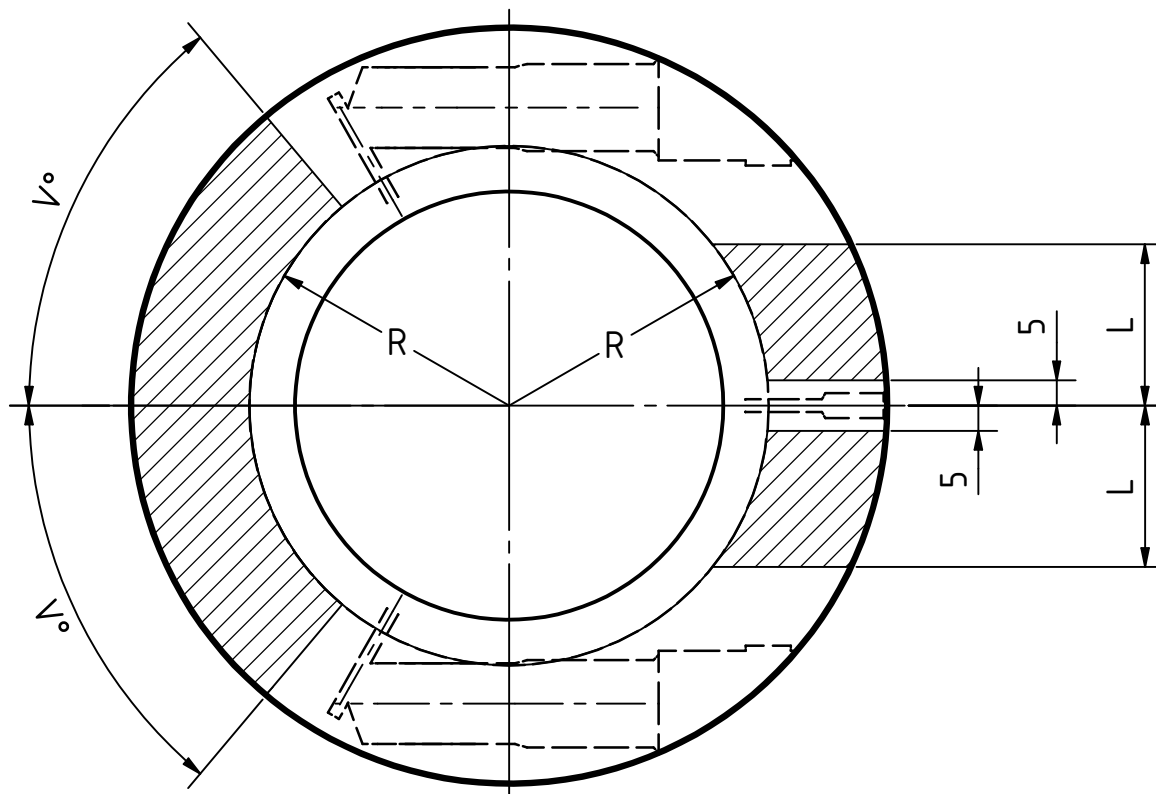
ETP-EXPRESS							
	40	42	1 3/4"	45	48	1 15/16	50
R	25	26	28	28	30	30	30
V°	60°	61°	60°	60°	61°	62°	62°
L	21	22	24	24	26	27	27

ETP-EXPRESS							
	2"	55	60	2 1/2"	65	70	75
R	34	34	37	39	40	43	46
V°	60°	60°	56°	58°	58°	56°	58°
L	29	29	32	35	35	38	40


ETP-EXPRESS		
	3"	80
R	47	49
V°	59°	59°
L	41	43

Designed by CJ	Initial approved by CJ	Latest rev appr. by	Prod. checked by	Status Approved	Scale	Where tolerance not mentioned
					Date 2014-04-28	SS2768 MEDEL
Title ETP-EXPRESS Dimensions <=80 Allowed machining in flange.					S-5745	
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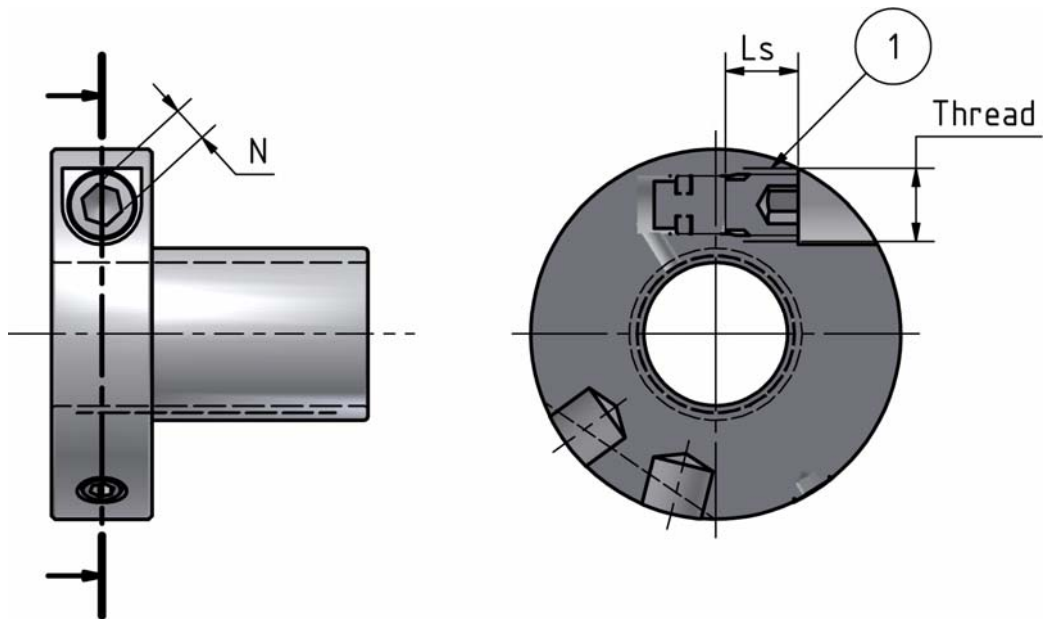
ETP-EXPRESS				
	85	90	95	100
L	32	34	37	40
V°	50°	55°	55°	58°
R	52	55	58	61

Designed by CJ	Initial approved by CJ	Latest rev appr. by	Prod. checked by	Status Approved	Scale	Where tolerance not mentioned
 ETP Transmission AB					Date 2014-04-24	SS2768 MEDEL
					S-5746	
ETP-EXPRESS Dimensions >80 Allowed machining in flange.						

Spare parts

The following parts can be delivered as spare parts.

- Pressure setting screw.



When ordering, please just tell us for which size of ETP-EXPRESS you need the screw.

EXPRESS	Thread	Ls (mm)	N (mm)
15	M10x1,5	10	5
R 15	M10x1,5	10	5
5/8"	M10x1,5	10	5
19	M10x1,5	10	5
3/4"	M10x1,5	10	5
20	M10x1,5	10	5
R 20	M10x1,5	10	5
22	M10x1,5	12	5
7/8"	M10x1,5	12	5
24	M10x1,5	12	5
25	M10x1,5	12	5
R 25	M10x1,5	12	5
1"	M10x1,5	12	5
28	M10x1,5	16	5
1 1/8"	M10x1,5	16	5
30	M10x1,5	16	5
R 30	M10x1,5	16	5
1 1/4"	M10x1,5	18	5

32	M10x1,5	18	5
1 3/8"	M10x1,5	20	5
35	M10x1,5	20	5
R 35	M10x1,5	20	5
1 7/16"	M10x1,5	20	5
38	M16x2	16	5
1 1/2"	M16x2	16	8
40	M16x2	16	8
R 40	M16x2	16	8
42	M16x2	16	8
1 3/4"	M16x2	18	8
45	M16x2	18	8
48	M16x2	18	8
1 15/16"	M16x2	18	8
50	M16x2	18	8
R50	M16x2	18	8
2"	M16x2	25	8
55	M16x2	25	8
60	M16x2	30	8
R 60	M16x2	30	8
65	M16x2	30	8
2 1/2"	M16x2	30	8
70	M20x2,5	35	10
R 70	M20x2,5	35	10
3"	M20x2,5	35	10
80	M20x2,5	35	10
R 80	M20x2,5	35	10
90	M20x2,5	35	10
100	M20x2,5	35	10

FAQ

Can the screw be overtightened?

At and above the recommended tightening torque, the piston have reached the bottom of the cylinder and further tightening of the screw will only press the piston harder on the bottom of the bore. Too high over tightening could cause damage to the screw and piston and also cause excessive wear to the allen key grip in the screw.

Do you need to use a torque wrench?

If the torque going to be transmitted is close to the rated torque in the brochure, we recommend the use of a torque wrench. Also if mounting/dismantling is going to be done frequently, as it prevents over tightening and excessive wear to the screw and the threads

For type R we also recommend the use of a torque wrench.

What is the pressure medium?

For ETP-EXPRESS a special type of grease is used. It has to be of a certain type, which is no so sensitive to temperature changes, easy to seal off but can flow easily in the grease channels.

For ETP-EXPRESS R it is food approved grease both in the sleeve and the lubricant for the screw.

Do the sealing rings need to be replaced?

Normally not but to do this, the piston has to be taken out and the sleeve has to be refilled with grease.

To be sure that it is made correctly you have to send it to us. It is important to fill in the correct amount and avoid dirt and air enclosures.

Appendix, ETP-EXPRESS C (plated with Nickel)

ETP-EXPRESS is also available on request plated with electroless Nickel .

ETP-EXPRESS is chemically coated with Nickel through immersion in a hot bath. The Nickel is deposited on the surfaces of ETP-EXPRESS. The coating used is nickel phosphorus with a phosphorus content of 7 - 10 per cent. The thickness of the coating is > 0,015 mm. Hardness on the surface: 500 HV.

Through the coating the coefficient of friction is reduced and thus also the transmittable torque.

When ETP-EXPRESS C is used on a steel shaft (not coated) the transmittable torque will be reduced by 25 %. When used on a shaft also coated with Nickel the torque will be reduced by 50 %.

The properties of electroless Nickel are far superior and much more effective than the properties of electrolytic Nickel. Electroless Nickel also give a very even surface layer and does not build up or get reduced in inner or outer corners.

Rate of corrosion

For some well known solutions the rate of corrosion in $\mu\text{m}/\text{year}$ for electroless nickel is approximately:

Solution	$\mu\text{m}/\text{year}$	Solution	$\mu\text{m}/\text{year}$
26% NaCl	0.2	10% acetic acid	25
25% KCl	0	Galacial acid	0.8
31% Na ₂ SO ₄	0.8	5% citric acid	2
27% Al ₂ (SO ₄) ₃	5	10% oxalic acid	3*
10% CH ₃ CO ₂ H	25	Formic acid	13
5% C ₆ H ₈ O ₇	2	Borax	10
10% (CO ₂ H) ₂	3	Vinegar	10
2% NH ₃	28*	Chlorine-wet	10
28% NH ₃	16*	Sodium Bicarbonate	10
27% NH ₄ Cl	8	Beer	2
43% (NH ₄) ₂ SO ₄	3	Milk*	2
H ₂ O	0.1	Fruit and lemon juice	2
80% H ₃ PO ₄	3	Oil vegetable	2
1% FeCl ₃	200	Sodium Hydroxine	2

*) = Will turn black

Beet Sugar liquor	2
Boric acid	2
Calcium Chloride	2
Cane sugar liquor	2
Detergent	2
Oil, Peanut	2
Soap Wash liquor	2
Steam	2
Sugar liquor	2
Water distilled	2

Mounting and design/tips

- Because of the very even surface finish that is achieved with the surface treatment it is important to clean the surfaces on ETP-EXPRESS C and the shaft/hub thoroughly with a solvent before mounting. If this is not done, friction coefficient and thus the transmittable torque will be further reduced.
- ETP-EXPRESS C is interchangeable with the normal ETP-EXPRESS if used on an h8 shaft but the transmittable torque will be lower with ETP-EXPRESS C.
- When mounting on stainless steel or aluminium shafts the transmittable torque will be slightly reduced but it is neglectable.
- The threads of the stainless screw is coated for a low and even friction. Make sure the screw thread is well lubricated, Molykote P-1900, food grade paste before each mounting.
- In some environments the surface will turn black. This is just a chemical reaction and does not affect the corrosion protection.

FAQ

How does electroless Nickel compare to stainless steel?

Electroless Nickel is a corrosion protection and not corrosion free in any environment. How resistant it is totally depends on what type of environment it is exposed to. It is very resistant in the following environments: all types of water, strong caustic solutions, strong and weak acids, organic acids and all types of salt solutions. In these environments it comes close to the protection which stainless steel gives.

Above you find some examples of the rate of corrosion.

Will the layer of Nickel break or get damaged after a few mountings?

No, it will not as the adhesion between Nickel and steel is very strong. Also some part of the Nickel layer goes into the steel material.

Will the layer come loose if the surface is hit against another metal surface?

It depends on how and with what it is hit. The surface is however, very hard and strongly bound to the underlying metal after the treatment. There is no risk that you can peel off the layer. If the blow is hard with a sharp tool, then it could penetrate through the layer and thus expose the steel to the environment.

Is the thickness of the layer even everywhere?

Yes, it is very uniform. This is one of the advantages with electroless Nickel plating that all surfaces get exactly the same thickness. Other methods sometimes give more around the edges and corners and less on the straight surfaces.

Will the screws get fragile when they are plated?

Electroless Nickel plating does not give any hydrogen brittleness nor does it affect the strength or the screws in any other way.