



Chemical thread retention methods

Adhesive, Locking, Sealing

BÖLLHOFF

Chemical thread retention methods

Chemical thread retention methods are nowadays becoming increasingly important when it is a question of securing threaded connections effectively.

Unsecured threaded connections can lose their preload force if subjected to vibrations or dynamic, cyclic loading. This means that components are no longer held together securely, and the threaded connection may fail altogether.

To avoid such failure Böllhoff offers a wide range of chemical thread retention solutions, which are designed to cover different requirements and applications.

The system

Böllhoff also provides an alternative to anaerobic adhesives in the form of precoated chemical thread retention solutions, which may be adhesive, locking or sealing. Precoating has the advantage that the coating no longer has to be applied manually during assembly. This is carried out for a reliable process before the fastener is supplied. In the case of chemical thread retention a distinction is made between adhesive micro-encapsulated and locking polyamide coatings.

Micro-encapsulated precoating (see DIN 267 Part 27):

The pressure and/or shear forces produced as the fastener is tightened cause the micro-capsules to rupture. The adhesive contained in the capsules then combines with a hardener. This is followed by a chemical reaction (polymerisation) and hardening of the adhesive (adhesive bonding), thereby producing the desired locking effect. Bonding the internally and externally threaded components in this manner is a reliable way to prevent self-unscrewing of the threaded connection. The preload force applied here is largely preserved (anti-unscrewing).

Assembly should then be completed promptly after tightening. When the adhesive attains its full effect and when loading of the connection is possible depends on the type of precoating.



Locking thread precoating (see DIN 267 Part 28):

This technique involves applying a polyamide to a section of the thread. The axial clearance between the external and internal threads is filled in by the coating, which results in high surface pressure between the coated thread and the flanks of the uncoated mating thread. This creates the desired locking effect. Polyamide precoating is an anti-loss device and is not aimed at preserving the preload force to greatest possible extent, but rather at preventing the threaded connection falling apart completely. Multiple use is possible here as long as it is remembered that the clamping forces are reduced each time.

The application of a layer of polyamide around the shaft of the fastener (360°) also creates a sealing effect.



Your benefits at a glance

- Integrated system – no change in component geometry
- High clamping and retention effect
- Good reliability compared to many other so-called "retainers" such as circlips, spring washers and wire retainers
- Impossible to forget to fit the retainer due to precoating applied
- Protection of finishes
- Reduction in assembly time
- Matching to specific applications possible
- Incorporation in existing applications.

Technical Information

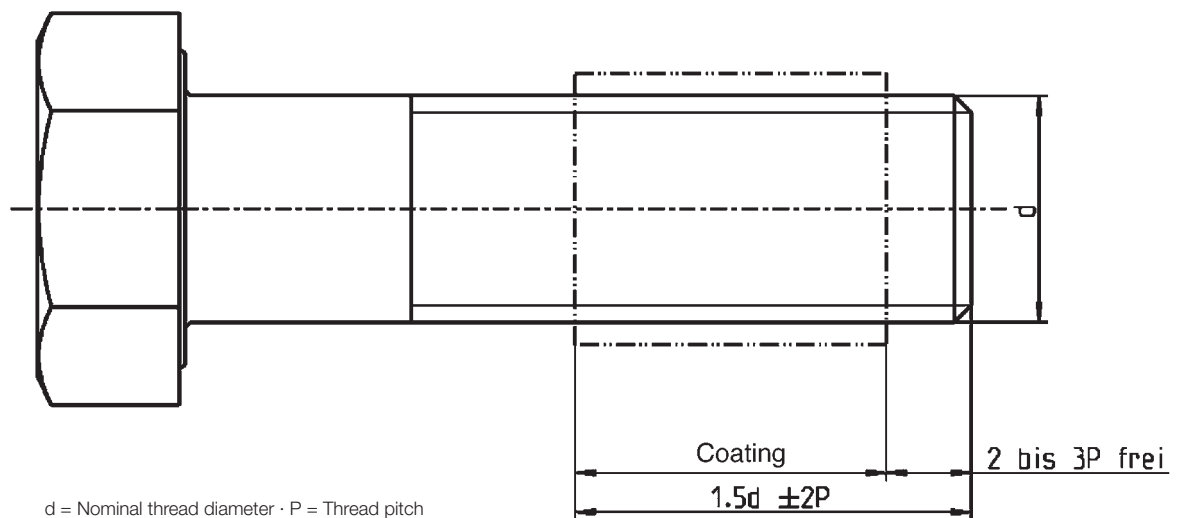
Following you will find a table of chemical thread retentions and their characteristics.

Features	Adhesive: DIN 267, T 27								
	Products	Precote 30 yellow	Precote 80 red	Precote 83 red	Precote 85 turquoise	3M Scotch Grip 2353 blue	3M Scotch Grip 2510 orange	Polyamide-spot Plasbolt blue/red	Polyamide-spot Plasbolt blue/red
Temperature resistance		-50 till 150 °C	-50 till 170 °C	-50 till 170 °C	-50 till 150 °C	-50 till 90 °C	-50 till 150 °C	-50 till 120 °C	-50 till 120 °C
Resistance bolted	Weak acids pH > 4 at RT	1	1	1	1	1	1	1	1
	Lyes pH > 11 at RT	1	1	1	1	1	1	1	1
	Oils and greases	1	1	1	1	1	1	1	1
	Antifreezes	1	1	1	1	1	1	1	1
	Brake-fluids	1	1	1	1	1	1	1	1
	Solvents	1	1	1	1	1	1	1	1
	Benzines	1	1	1	1	1	1	1	1
	Water	1	1	1	1	1	1	1	1
	DVGW according to DIN 30600 drinking water	no	no	no	no	no	no	no	yes
Breakaway and loosening torque	mid	high	high	high	high	high	high	high	
Reusable	no	no	no	no	no	no	no	5 x	
Dimensional range	M 4 – M 60	M 3 – M 60	M 3 – M 60	M 3 – M 60	M 2 – M 60	M 2 – M 60	M 2 – M 60	M 2 – M 60	
Loosening prevention	yes	yes	yes	yes	yes	yes	yes	no	
Achieves requirement acc. DIN 267, T 27	no	yes	yes	yes	yes	yes	yes	no	
Achieves requirement acc. DIN 267, T 28	no	no	no	no	no	no	no	yes	
Internal thread, free of oil and grease	yes	yes	yes	yes	yes	yes	yes	no	
Processing period after screwing	max. 5 Min.	max. 5 Min.	max. 5 Min.	max. 5 Min.	max. 5 Min.	max. 5 Min.	max. 5 Min.	indefinite	
Minimum temperature f. curing process	- 20 °C	- 20 °C	- 20 °C	- 20 °C	- 20 °C	+ 5 °C	+ 5 °C	n. i.	
Thread-friction-coefficient	0.10 – 0.16	0.25 – 0.30	0.25 – 0.30	0.10 – 0.16	0.10 – 0.16	0.10 – 0.16	0.10 – 0.16	0.10 – 0.15	
Curing time	6 h	6 h	2 h	6 h	24 h	72 h	no	no	

1 = very good · 2 = good · 3 = satisfactory · 4 = unsatisfactory · n. i. = no instructions

Coating according to the rules

Unless otherwise specified the coating has to be applied in the following area and length:



d = Nominal thread diameter · P = Thread pitch

Polyamide- all round Plasbolt blue/red	Locking: DIN 267, T 28			Sealing					
	Clemm-Loc brown	VC 3	Polyamide-spot/ all-round, temperature resistant, orange	Precote 4 white	Precote 5 white	Precote 6 white	Precote 9 redbrown	Scotch Grip 4291	Loctite 5061 pale blue
-50 till 120°C	-50 till 130°C	-50 till 90°C	-50 till 200°C	-50 till 180°C	-50 till 180°C	-50 till 180°C	-50 till 150°C	-50 till 150°C	-50 till 150°C
1	1	3	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1
1	1	4	1	1	1	1	1	1	1
1	1	3	1	1	1	1	1	1	1
1	1	1	1	1-2	1-2	1-2	1-2	1-2	1-2
ja	yes	no	yes	no	no	no	no	no	yes
high	high	low	high	low	low	high	mid	low	low
5 x	5 x	1 x	5 x	1 x	1 x	2 x	2 x	1 x	1 x
M 2 – M 60	M 2 – M 60	M 1 – M 12	M 2 – M 60	M 2 – M 60	M 2 – M 60	M 2 – M 60	M 2 – M 60	M 2 – M 60	M 4 – M 60
no	no	no	no	no	no	no	no	no	no
no	no	no	no	no	no	no	no	no	no
yes	yes	no	yes	no	no	yes	no	no	no
no	no	no	no	no	no	no	no	no	no
indefinite	indefinite	indefinite	indefinite	indefinite	indefinite	indefinite	indefinite	indefinite	indefinite
n. i.	n. i.	n. i.	n. i.	n. i.	n. i.	n. i.	n. i.	n. i.	n. i.
0.10 – 0.15	0.10 – 0.15	0.15 – 0.20	0.10 – 0.15	0.10 – 0.15	0.10 – 0.15	0.20 – 0.30	0.10 – 0.15	0.10 – 0.15	n. i.
no	no	no	no	no	no	no	no	no	no

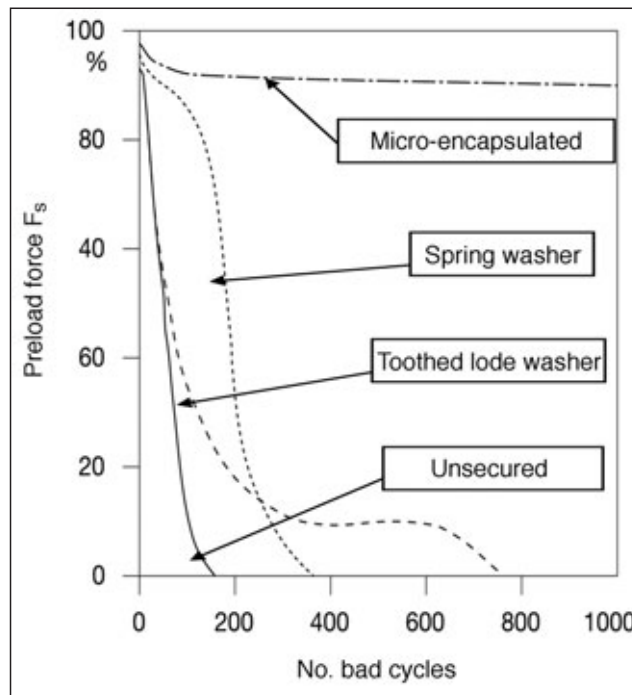


Technical Information

Torques

Thread	Adhesive coating DIN 267-27								Screwing-torque M_{IN} max. Nm	Locking coating after DIN 267-28					
	Reference-Tighteningtorque M_A Nm				$M_{LB} \geq 0.9 \cdot M_A$					Reference-Tighteningtorque M_A Nm		Locking-torque			
	5.6	5.8	8.8	10.9 12.9	5.6	5.8	8.8	10.9 12.9		5.6	5.8 8.8 10.9 12.9	1. Screw-out M_{Cut} in Nm min.	5. Screw-out M_{Cut} in Nm min.		
M 3	0.6		1.2		0.54		1.1		0.43	0.6		1.2		0.1	0.08
M 4	1.3		2.8		1.2		2.5		0.9	1.3		2.8		0.12	0.1
M 5	2.6		5.5		2.3		5		1.6	2.6		5.5		0.18	0.15
M 6	4.5		9.5		4.1		8.6		3	4.5		9.5		0.35	0.23
M 8	11		23		9.9		20.7		6	11		23		0.85	0.45
M 10	22		46		19.8		41.4		10.5	22		46		1.5	0.75
M 12	38		79		34.2		71.1		15.5	38		79		2.3	1.6
M 14	60		125		54		112.5		24	60		125		3.3	2.3
M 16	90		195		81		175.5		32	90		195		4.0	2.8
M 18	128		280		115		252		45	128		280		4.7	3.2
M 20	176		390		158		351		-	-		-		-	-
M 22	240		530		216		477		-	-		-		-	-
M 24	310		670		279		603		-	-		-		-	-
M 27	460		1000		414		900		-	-		-		-	-
M 30	620		1350		558		1215		-	-		-		-	-
M 33	825		1850		742		1665		-	-		-		-	-
M 36	1100		2350		990		2115		-	-		-		-	-
M 39	1400		3000		1260		2700		-	-		-		-	-

Fastener refention methods under dynamic lateral load



Junkers vibration test acc. to DIN 65151

We advise our customers about the best technical and most cost-effective solution and then implement their specific requirements. Standard coatings are Plas-Bolt, Precote and Scotchgrip.

Additional chemical thread retention solutions and sealing available at any time on request.

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