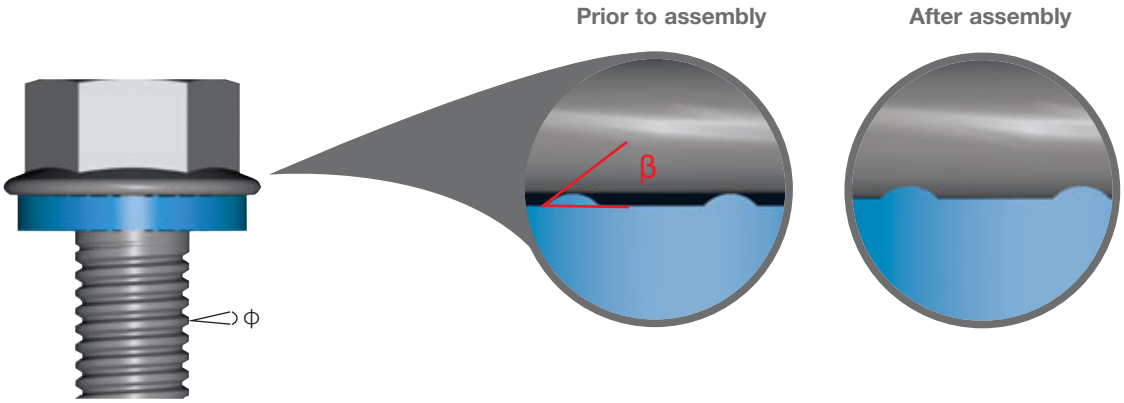
RIPP LOCK® screw lock

Efficient and secure

BÖLLHOFF

The system

RIPP LOCK® lock washers have radial ribs on both sides.
The contact angle at the foot of the ribs is obvious larger than the gradient angle of the metric thread.



The following must apply
for locking: $\beta > \Phi$

■ Screw
■ Washer

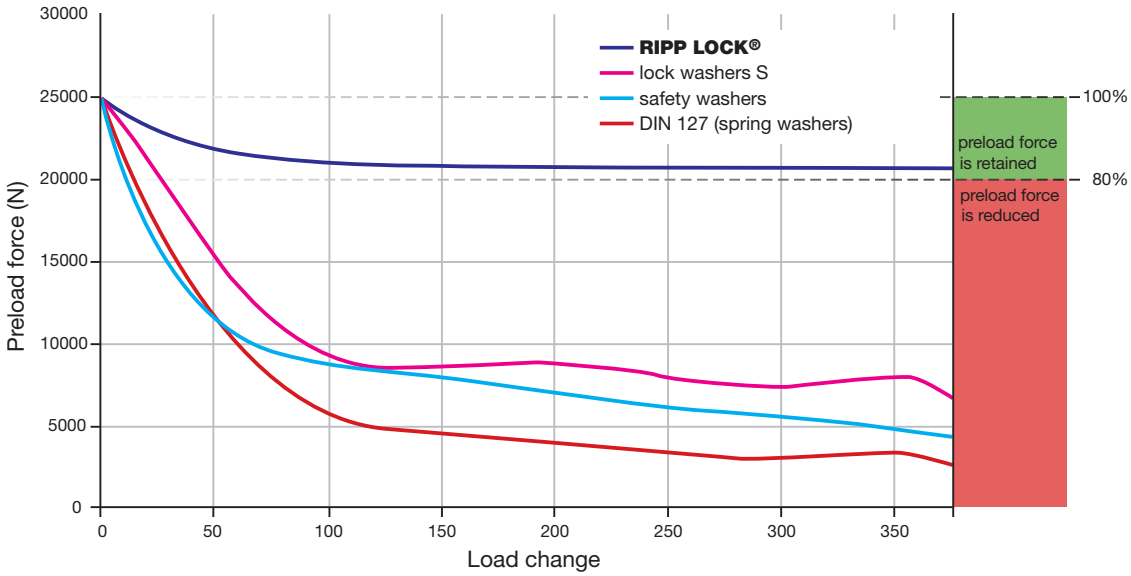
Working-principle

Because of the preload force the ribs of the RIPP LOCK® washers are embossed into the counter surface during assembly.
The resulting form lock prevents self-loosening of the connection reliably, even under extreme vibrations or high dynamic stresses.
Due to their high hardness the washers can be used with screws of all property classes up to 12.9.

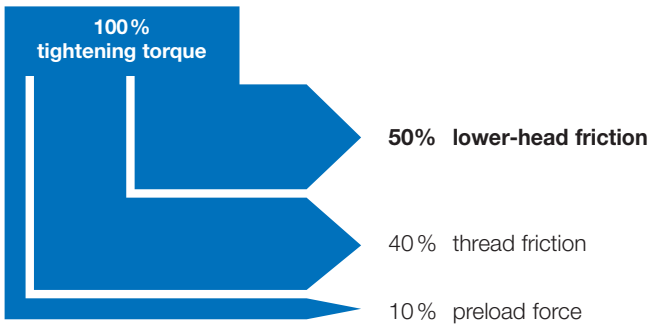
Benefits

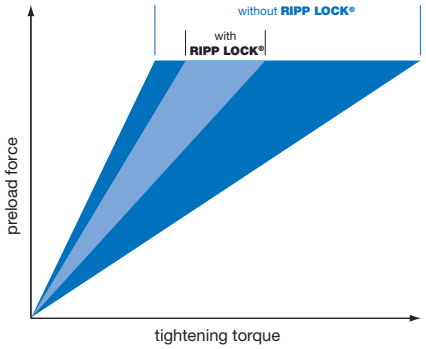
Excellent locking against self-unscrewing – even under high dynamic stress

Junkers vibration test according to DIN 65151
Screw M 10 (8.8) galvanically zinc coated



Very low fluctuation in preload force at defined tightening torque

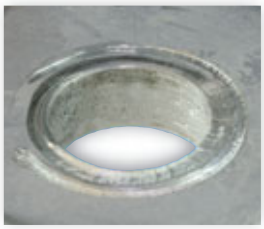




Gentle to contact surface – even to coated or powder coated surfaces


RIPP LOCK®
(painted surfaces)


RIPP LOCK®
(aluminium)


DIN 127
(aluminium)

Benefits

- **Perfectly suitable also for slotted-hole applications**

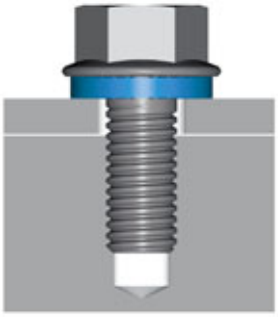
- **Universal use – outside diameter = DIN 125 / ISO 7089**

- **Smaller external diameter for joints with counterbored pan head**

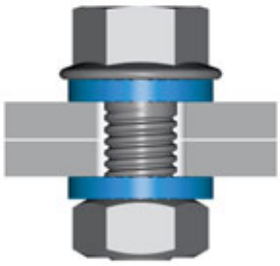
Further benefits

- Easy assembly and removal – multiple reuse
- Economic benefits due to reduction and standardisation of assortment
- Small space requirements
- Not affected by contact with lubricants or greases
- Perfectly suitable for low-strength metals (aluminium, copper, aluminium and magnesium casting alloys, etc.)
- Suitable for all property classes up to 12.9
- Particularly suitable for sensitive surfaces such as zinc coated, chromium-plated, coated or powder coated surfaces
- Immediate effect – no curing
- Same temperature range as high-tensile screws
- Longevity – no ageing, no embrittling or weathering
- Almost no mechanical abrasion – no chip formation
- Retrofitting into almost every construction
- Effective in adjustable fastenings of components (e. g. prestressing of belt drive)
- Very small relaxation
- CAD data available on request
- The RIPP LOCK® defines friction values of most diverse materials and surfaces

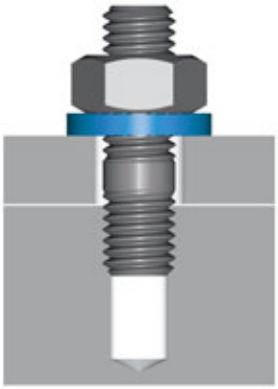
Possible applications



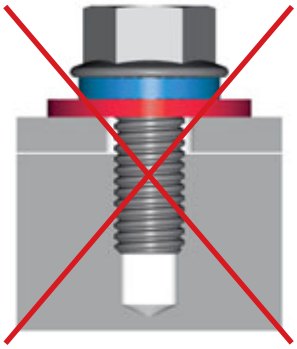
RIPP LOCK® screw fastening in tapped holes



Through screw joints with two RIPP LOCK® washers



With RIPP LOCK®, adhesion of studs is not required anymore

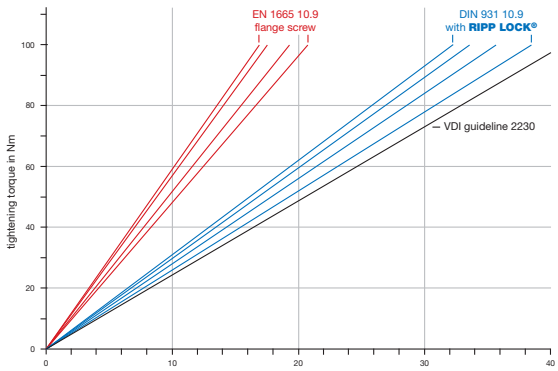


RIPP LOCK® shall not be used on loose plain washers

Tightening torques

To minimise creep and relaxation, screws with a large head support are used in many applications. However, particularly for light metals, friction values often are so high that the desired preload forces are not achieved (see red lines in diagram). With the use of RIPP LOCK® lock washers which only allow a relative movement between screw head and washer, defined friction values and thus defined clamping forces are always achieved – even for most diverse materials and surfaces (see blue lines in diagram).

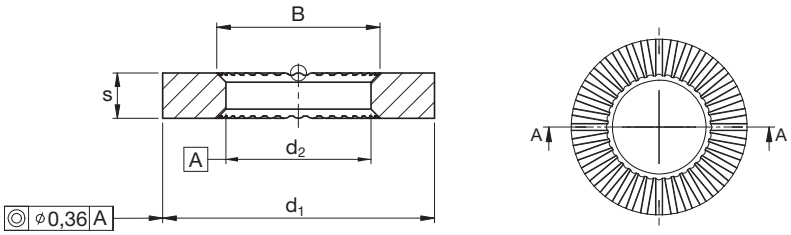
Tested on aluminum



Tightening torques determined in accordance with VDI guideline 2230 (Association of German Engineers – VDI) can thus be applied to almost all other applications.

SCHATZ® ADVANCED QUALITY

Technical information



Material **Steel**
Hardness 400 – 500 HV
Surface Zinc flake 480 h

Size (nominal dimension)	Diameter of hole d_2 min.	Outside diameter d_1 max.	Thickness s nominal dimension	B max.	Order No.
4	4.3	9	2.0	5.0	53065STZL4
5	5.3	10	2.0	6.0	53065STZL5
6	6.4	12	2.0	8.0	53065STZL6
8	8.4	16	2.5	10.0	53065STZL8
10	10.5	20	2.5	12.1	53065STZL10
12	12.5	24	3.0	14.1	53065STZL12
14	14.5	28	3.0	16.1	53065STZL14
16	16.5	30	4.0	18.1	53065STZL16
20	20.5	37	4.0	22.1	53065STZL20
24	24.5	44	5.0	26.1	53065STZL24
27	27.5	50	5.0	29.1	53065STZL27
30	30.5	56	5.0	32.1	53065STZL30

Smaller external diameter

Size (nominal dimension)	Diameter of hole d_2 min.	Outside diameter d_1 max.	Thickness s nominal dimension	B max.	Order No.
6	6.4	11	2.0	8.0	53065STSZL6
8	8.4	15	2.5	10.0	53065STSZL8
10	10.5	18	2.5	12.1	53065STSZL10
12	12.5	20	3.0	14.1	53065STSZL12

Material **Stainless Steel 1.4404 Surface hardened***
Hardness ≥ 800 HV

Size (nominal dimension)	Diameter of hole d_2 min.	Outside diameter d_1 max.	Thickness s nominal dimension	B max.	Order No.
4	4.3	9	2.0	5.0	53065A44
5	5.3	10	2.0	6.0	53065A45
6	6.4	12	2.0	8.0	53065A46
8	8.4	16	2.5	10.0	53065A48
10	10.5	20	2.5	12.1	53065A410
12	12.5	24	3.0	14.1	53065A412
16	16.5	30	4.0	18.1	53065A416

All RIPP LOCK® lock washers comply with ELV, RoHS and WEEE directives and are thus Cr(VI)-free.

*The production and hardening process can have an influence on the corrosion behavior.

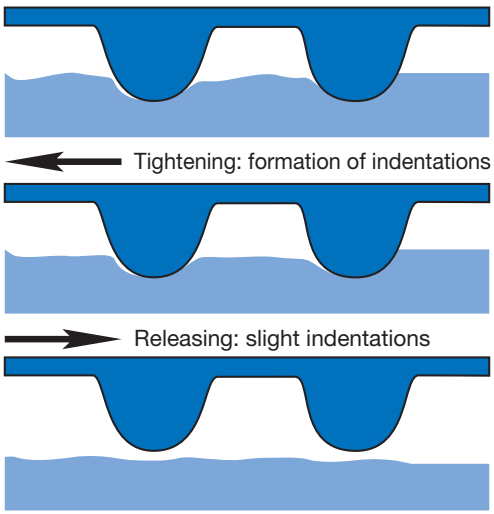
RIPP LOCK® lock screws and nuts

Special advantages

- Reliable fastening connections, no additional elements required
- Increased contact area makes washers and spring washers unnecessary
- Rounded locking ribs enable corrosion protection to be largely maintained at the fastening points, since the fastening does not damage the surface
- Reduced setting values for the screws because of cold working of the clamped materials
- Good tightening characteristics, excellent reusability

Because the ribs do not dig into the surface in the release direction, the fastening is gentle to sensitive surfaces.
The damage to the surface around the contact area is minimal.

The diagram shows the principle of operation of these self-locking screws and nuts.



After release:
slightly indented surface

Design instructions

RIPP LOCK® self-locking screws and nuts are available as:

- Hexagon socket self-locking screws, property class 100
- Hexagon head self-locking screws, property class 100
- Hexagon head self-locking nuts, property class 10

For self-locking screws with hexagon socket heads, the head heights and hexagon sizes are identical to those for DIN 912 screws. To achieve a greater contact area the head diameter is slightly increased. This results in a reduced surface pressure.

Property classes

- Self-locking screws 100 = 1,040 N/mm²
- Self-locking nuts 10: for screws up to property class 10.9 and screw class 100
- Property classes 12.9 and 12 available on request

Hardness

- Hardness at the edge amounts 400 – 500 HV

Mechanical features of the **RIPP LOCK®** locking screws and locking nuts

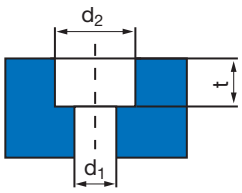
Tightening torque M_A (Nm) and achieving preload force F_M (kN) for RIPP LOCK® locking screws and locking nuts when using 90 % of the yield strength $R_{p0,2}$.

Strength class	Counterpart material	M 5	M 6	M 8	M 10	M 12	M 16
Strength class screws 100 nuts 10	Steel R_m = < 800 N/mm²	11	19	42	85	130	330
	Steel R_m = > 800 N/mm²	10	18	37	80	120	300
	Gray cast iron	9	16	35	75	115	300
	Indications for achievable preload forces have to be checked in practice	Preload force F_M (kN)					
		9.0	12.6	23.2	37.0	54.0	102.0

Counterbore dimensions

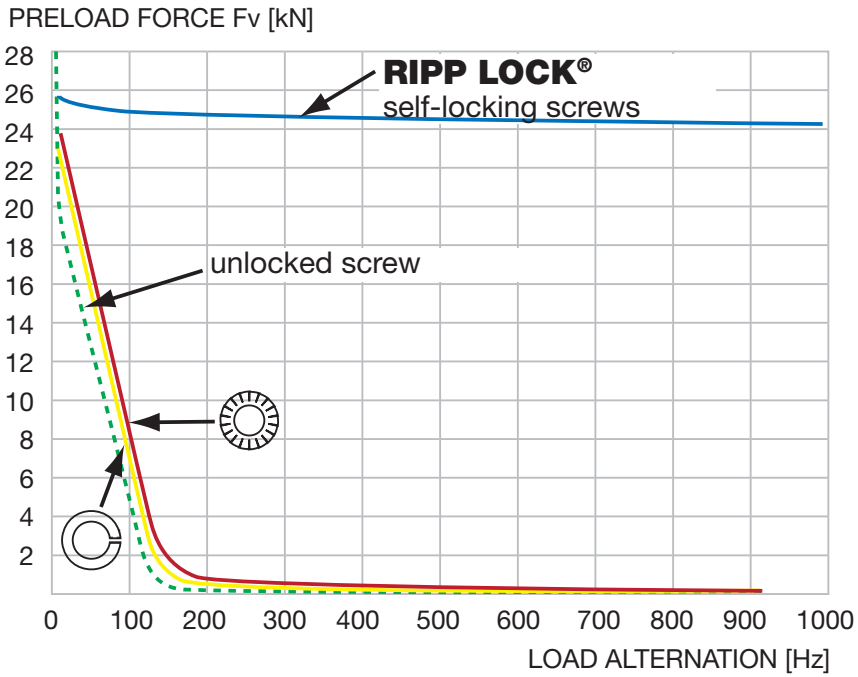
The counterbore dimensions for fitting these screws are set out in DIN 74, part 2.

Threads	M 5	M 6	M 8	M 10	M 12	M 16
d_1 Through hole average size (m) [1]	5.5	6.6	9.0	11.0	13.5	17.5
d_2 Counterbore diameter [2]	12.5	14.5	19.0	21.5	24.5	33.0
t Counterbore depth [2]	5.7	6.8	9.0	11.0	13.0	16.0

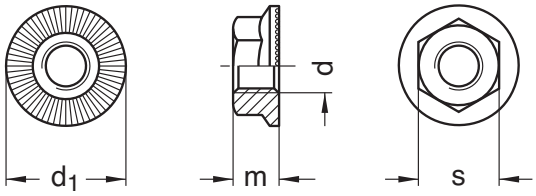


[1] Through hole average size to DIN ISO 273
[2] to DIN 74, part 2

The diagram below shows the fastening behaviour of screws in a shake test.
The dashed line shows the behaviour of an unlocked screw, the continuous lines the behaviour of screws with spring washers to DIN 127 and serrated lock washers to DIN 6798.
The blue line indicates the behaviour of a screw with locking teeth or locking ribs.
(see also page 3 – Junkers vibration test of RIPP LOCK® washers)



Technical information



RIPP LOCK® locknuts, strength class 10

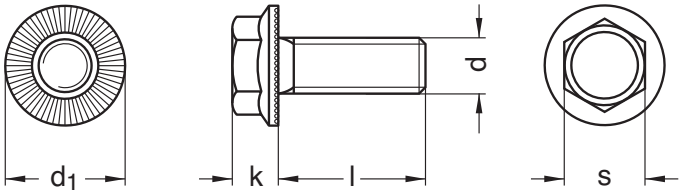
d	d_1	s	m	Order No.
M 5	11.20	8	4.3	W1931005
M 6	14.25	10	5.5	W1931006
M 8	18.20	13	7.0	W1931008
M 10	21.00	15	8.5	W19310010
M 12	24.00	17	10.0	W19310012
M 16	31.00	22	14.0	W19310016

RIPP LOCK® locknuts, strength class 10, zinc plated

d	d_1	s	m	Order No.
M 5	11.20	8	4.3	W193100VZ5
M 6	14.25	10	5.5	W193100VZ6
M 8	18.20	13	7.0	W193100VZ8
M 10	21.00	15	8.5	W193100VZ10
M 12	24.00	17	10.0	W193100VZ12
M 16	31.00	22	14.0	W193100VZ16

All RIPP LOCK® lock nuts comply with ELV, RoHs and WEEE directives and are thus Cr(VI)-free. Further surfaces and dimensions on request.

Technical information



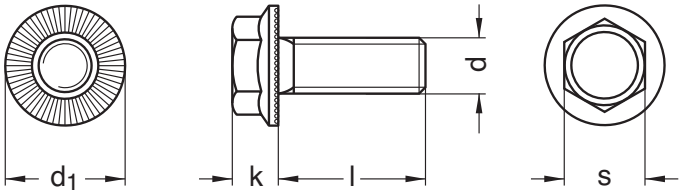
RIPP LOCK® lock screws, strength class 100

d	s	k	d1
M 5	8	4.3	11.2
M 6	10	5.5	14.2
M 8	13	7.0	18.2
M 10	15	8.5	21.0
M 12	17	10.0	24.0
M 16	22	14.0	31.0

d	l	Order No.	d	l	Order No.
M 5	10	W158100510	M 10	22	W1581001022
M 5	12	W158100512	M 10	25	W1581001025
M 5	14	W158100514	M 10	30	W1581001030
M 5	16	W158100516	M 10	35	W1581001035
M 6	10	W158100610	M 10	40	W1581001040
M 6	12	W158100612	M 12	20	W1581001220
M 6	14	W158100614	M 12	25	W1581001225
M 6	16	W158100616	M 12	30	W1581001230
M 6	18	W158100618	M 12	35	W1581001235
M 6	20	W158100620	M 12	40	W1581001240
M 6	25	W158100625	M 12	45	W1581001245
M 6	30	W158100630	M 12	50	W1581001250
M 8	12	W158100812	M 12	55	W1581001255
M 8	14	W158100814	M 16	25	W1581001625
M 8	16	W158100816	M 16	30	W1581001630
M 8	18	W158100818	M 16	35	W1581001635
M 8	20	W158100820	M 16	40	W1581001640
M 8	25	W158100825	M 16	45	W1581001645
M 8	30	W158100830	M 16	50	W1581001650
M 8	35	W158100835	M 16	55	W1581001655
M 8	40	W158100840	M 16	60	W1581001660
M 10	16	W1581001016	M 16	70	W1581001670
M 10	18	W1581001018	M 16	80	W1581001680
M 10	20	W1581001020	M 16	85	W1581001685

All RIPP LOCK® lock screws comply with ELV, RoHs and WEEE directives and are thus Cr(VI)-free. Further surfaces and dimensions on request.

Technical information



RIPP LOCK® lock screws, strength class 100, zinc plated

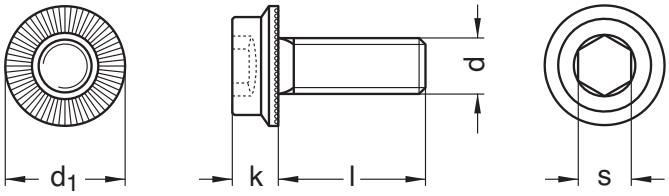
d	s	k	d_1
M 5	8	4.3	11.2
M 6	10	5.5	14.2
M 8	13	7.0	18.2
M 10	15	8.5	21.0
M 12	17	10.0	24.0
M 16	22	14.0	31.0

d	l	Order No.
M 5	10	W158100VZ510
M 5	12	W158100VZ512
M 5	16	W158100VZ516
M 6	10	W158100VZ610
M 6	12	W158100VZ612
M 6	14	W158100VZ614
M 6	16	W158100VZ616
M 6	20	W158100VZ620
M 6	25	W158100VZ625
M 8	12	W158100VZ812
M 8	14	W158100VZ814
M 8	16	W158100VZ816
M 8	20	W158100VZ820
M 8	25	W158100VZ825
M 8	35	W158100VZ835
M 8	40	W158100VZ840
M 10	16	W158100VZ1016
M 10	20	W158100VZ1020
M 10	25	W158100VZ1025

d	l	Order No.
M 10	30	W158100VZ1030
M 10	35	W158100VZ1035
M 12	20	W158100VZ1220
M 12	25	W158100VZ1225
M 12	30	W158100VZ1230
M 12	35	W158100VZ1235
M 12	40	W158100VZ1240
M 12	45	W158100VZ1245
M 12	50	W158100VZ1250
M 16	25	W158100VZ1625
M 16	30	W158100VZ1630
M 16	35	W158100VZ1635
M 16	40	W158100VZ1640
M 16	45	W158100VZ1645
M 16	50	W158100VZ1650
M 16	55	W158100VZ1655
M 16	60	W158100VZ1660
M 16	70	W158100VZ1670

All RIPP LOCK® lock screws comply with ELV, RoHs and WEEE directives and are thus Cr(VI)-free. Further surfaces and dimensions on request.

Technical information



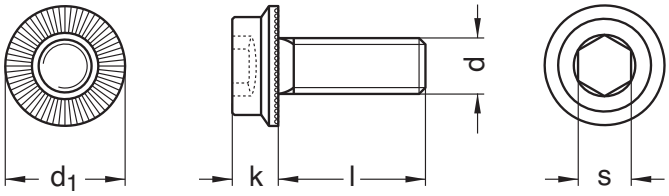
RIPP LOCK® lock screws with hexagon socket, strength class 100

d	s	d_1 max.	k max.
M 5	4	11.0	5
M 6	5	13.5	6
M 8	6	17.0	8
M 10	8	19.5	10
M 12	10	22.5	12

d	l	Order No.	d	l	Order No.
M 5	10	W251100510	M 8	40	W251100840
M 5	12	W251100512	M 10	16	W2511001016
M 5	16	W251100516	M 10	20	W2511001020
M 5	20	W251100520	M 10	25	W2511001025
M 6	10	W251100610	M 10	30	W2511001030
M 6	12	W251100612	M 10	35	W2511001035
M 6	16	W251100616	M 10	40	W2511001040
M 6	20	W251100620	M 12	20	W2511001220
M 6	25	W251100625	M 12	25	W2511001225
M 6	30	W251100630	M 12	30	W2511001230
M 8	12	W251100812	M 12	35	W2511001235
M 8	16	W251100816	M 12	40	W2511001240
M 8	20	W251100820	M 12	45	W2511001245
M 8	25	W251100825	M 12	50	W2511001250
M 8	30	W251100830			

All RIPP LOCK® lock screws comply with ELV, RoHs and WEEE directives and are thus Cr(VI)-free. Further surfaces and dimensions on request.

Technical information



RIPP LOCK® lock screws with hexagon socket, strength class 100, zinc plated

d	s	d_1 max.	k max.
M 5	4	11.0	5
M 6	5	13.5	6
M 8	6	17.0	8
M 10	8	19.5	10
M 12	10	22.5	12

d	l	Order No.	d	l	Order No.
M 5	10	W251100VZ510	M 8	30	W251100VZ830
M 5	12	W251100VZ512	M 8	40	W251100VZ840
M 5	16	W251100VZ516	M 10	20	W251100VZ1020
M 5	20	W251100VZ520	M 10	25	W251100VZ1025
M 6	12	W251100VZ612	M 10	30	W251100VZ1030
M 6	16	W251100VZ616	M 10	35	W251100VZ1035
M 6	20	W251100VZ620	M 10	40	W251100VZ1040
M 6	25	W251100VZ625	M 12	30	W251100VZ1230
M 6	30	W251100VZ630	M 12	35	W251100VZ1235
M 8	16	W251100VZ816	M 12	40	W251100VZ1240
M 8	20	W251100VZ820	M 12	45	W251100VZ1245
M 8	25	W251100VZ825	M 12	50	W251100VZ1250

All RIPP LOCK® lock screws comply with ELV, RoHs and WEEE directives and are thus Cr(VI)-free. Further surfaces and dimensions on request.

RIPP LOCK® lock screws and nuts – Approvals

General technical approval

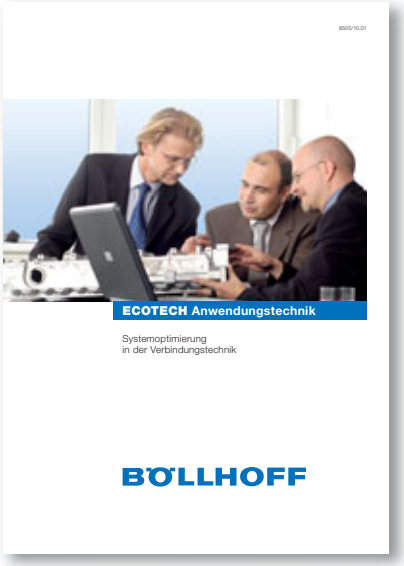
Registration number: Z-14.4-664

Object of approval:
Bolted connection with RIPP LOCK® screw lock washers

The general technical approval verifies the screw-locking performance of the RIPP LOCK® washers in accordance with state building regulation.

RIPP LOCK® washers are tested and approved to secure the bolted connection, suitable even under high dynamic loads and under extreme vibration.

More interesting products for you



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System optimization in the joining technology

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