

Nord-Lock

Unsurpassed safety



Simplest assembly,
maximum safety against loosening,
tried and trusted worldwide.

NORD-LOCK

Wedge security for maximum requirements

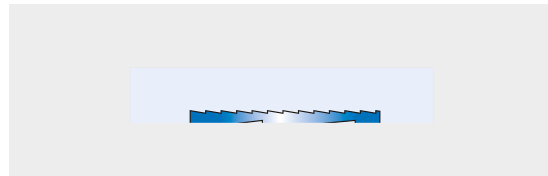
Unsurpassed safety

The Nord-Lock paired lock washers are a purely mechanical machine element which secures via a locking principle instead of via friction and is thereby superior to conventional screw security methods. Nord-Lock provides reliable screw security of this kind even under conditions of extreme vibration or dynamic stress. Because of the extreme hardness of the washers it is possible to utilize the washer with a screw in a property class up to 12.9.

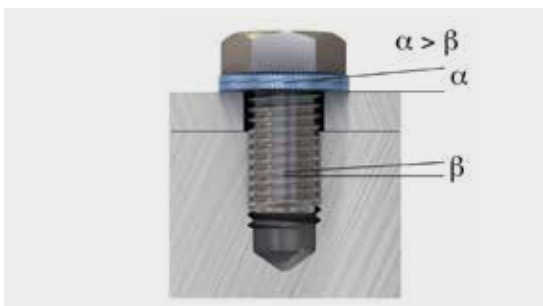
The principle

The wedge-shaped lock washers have wedge surfaces on the inside and radial ribs on the outside. The shape of the wedge is selected so that the angle of the wedge surfaces is always greater than the thread angle. When the screw or the nut is being tightened the radial ribs of the Nord-Lock lock washers embed themselves in a blocking fashion into the mating surface. The paired washers are firmly embedded in their position and movement is now only possible between the wedge surfaces.

Event the smallest turn of the screw during vibration causes an increase in the pre-load force due to the wedge effect - the screw locks itself.

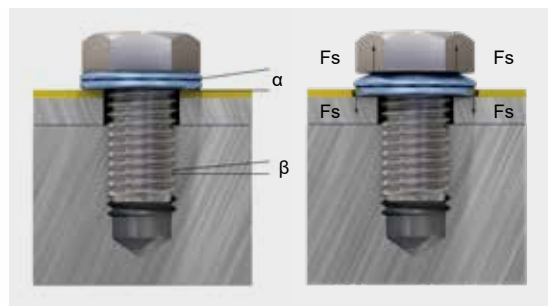


Original



The shape of the wedge surfaces is selected such that the angle « α » is always larger than the thread pitch « β ». The pre-assembled washers are installed in pairs, cam face to cam face

X-series

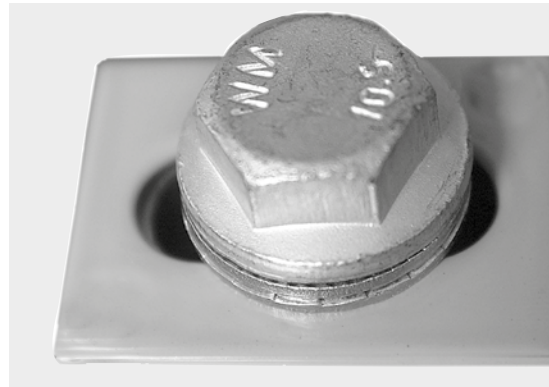


Nord-Lock X-series washers combine Nord-Lock wedge-locking technology with a spring effect. The wedge effect prevents bolt loosening caused by vibration and dynamic loads. The spring effect (F_s) counteracts the slacking movement of the bolt, preventing loss of preload in the joint.

Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

For slotted holes or on soft material, use a flanged nut/bolt in combination with Nord-Lock «sp and spss» (enlarged outer diameter) washers.

This combination will provide the most positive locking effect, while covering as much of the mating surfaces as possible.



Remarks:

All Nord-Lock washers comply with ELV-RoHS and REACH regulations. Nord-Lock washers are available in special steel alloys for highly corrosive or acid environments as well as for high temperature resistance. (254SMO, Alloy 718, Alloy C-276).



Washers in comparison

Property class	Flat washer	Rip-Lock®	Contact washer	Ripped lock washer	Nord-Lock	Nord-Lock X-series
12.9					Steel BN 65212	Steel BN 20750, 20751
10.9	Steel 300HV BN 20368, 20369	Spring steel BN 13291, 13292	Spring steel BN 20192	Spring steel BN 791, 792, 14083	Steel BN 65212	Steel BN 20750, 20751
8.8	Steel 200HV BN 342, 343, 5282	Spring steel BN 13291, 13292	Spring steel BN 20192	Spring steel BN 791, 792, 14083	Steel BN 65212	Steel BN 20750, 20751
Stainless steel	A2 / A4, 140HV BN 6, 670, 671, 1414	A2 BN 2332	Not available	A2 BN 20041	A4 BN 20141	Not available
Suitability for dynamic stress	-	+	++	++	+++	+++

Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

NORD-LOCK

An approved solution

Tested and certified

Nord-Lock washers are produced to the highest specifications and quality standards. They are rigorously tested throughout our production process and they have been approved by independent institutes as well as certification authorities. Nord-Lock washers are laser marked to ensure our customers receive genuine products and allows full traceability for every pair of washers.



SCAN ME

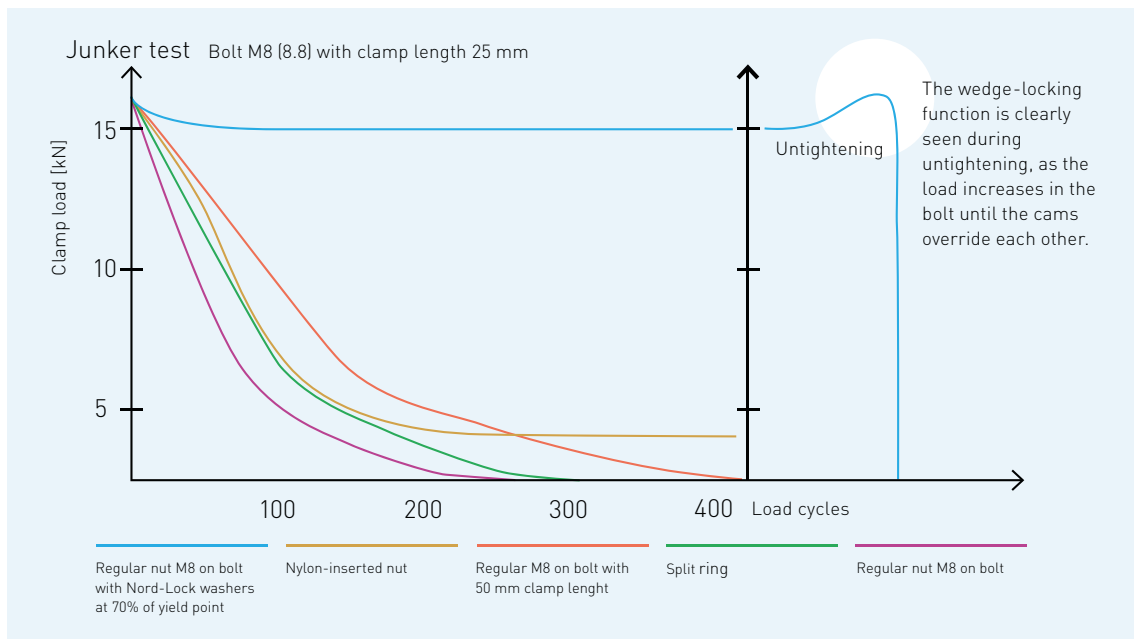


High and consistent preload control

The Junker test is the most severe vibration test for bolted joints. It is used to compare how different locking methods behave under transverse vibrations between two construction parts, while continuously measuring the clamp load. Working load is normally axial, shear load is transversal load. Preload is vital to keep parts together and prevent them from sliding — when lost a bolted joint will fail.

During the Junker test (according to DIN 65151), the graph shows that the clamping load of all solutions drops dramatically apart from the Nord-Lock washers. All other solutions rely on friction, instead of geometry, to secure the bolted joint. Geometry is a more reliable locking method to control preload over time. This prevents costly downtime or potential accidents.

Watch the video! Go to www.youtube.com, search for the Nord-Lock Junker Test.



NORD-LOCK ORIGINAL WASHERS

Wide range and many materials



Nord-Lock original washers are recognized around the world for their ability to secure bolted joints exposed to severe vibration and dynamic loads. The washers increase operational reliability and lower your maintenance costs, while significantly reducing the risks of unplanned production stops, accidents and warranty claims.

Application

- General engineering
- Steel construction
- Agricultural and forestry machines
- Automobile manufacture
- Windpower machines
- Mining
- Rail vehicles
- Traffic management systems

Advantages

- Maximum safety up to and including screw quality 12.9
- Simple assembly and dismantling
- Reliable security against loosening
- Same temperature deployment as the screw
- Re-usable
- Surface-friendly
- Reliable screw locking even under conditions of extreme vibration and dynamic stress

Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

NORD-LOCK X-SERIES WASHERS

One solution for multiple design challenges



Utilizing a unique multifunctional design, Nord-Lock X-series washers secure bolted joints against both spontaneous bolt loosening and slackening. Combining the unrivaled Nord-Lock wedge-effect with an exceptional spring effect, the X-series washers provide the extra level of security you need for applications that operate in extreme conditions.

Application

Nord-Lock X-series washers are the optimum choice when you are facing extreme challenges that require extra layers of protection. Nord-Lock X-series washers keep bolted joints secure when facing multiple challenges, including:

- Material expansion and contraction during thermal cycling
- Settlements due to paint or powder-coating
- Intense vibrations on soft metals, composites and polymers
- Slackening due to multiple clamped parts
- Joints with short clamp length
- Loss of clamp load in gasketed joints

Advantages

- Secures bolted joints against loosening and compensates for loss of preload due to settlement and relaxation
- Reliable locking, even for joints with short clamp length
- Achieves accurate preload with defined and uniform friction
- Available in a wide range of sizes (metric and imperial)
- High corrosion resistance (minimum 1,000 hours in salt spray test according to ISO 9227)
- Withstands environments between -40°C and 150°C
- Designed for bolts of property class 8.8 and 10.9
- Reusable (depending on conditions of use)

Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

NORD-LOCK ORIGINAL WASHERS

Instructions for use

Stud bolts

Assembly takes place without additional flat washers.



Through holes

The usage of two paired wedge lock washers is necessary.



Counter holes

The locking of the nut takes place without gluing in the bolt.



Larger outside diameter for soft surfaces or slot holes

Nord-Lock with increased outside diameter (sp and spss) and flange screw.



No flat washers

Nord-Lock must not be used on top of additional washers.



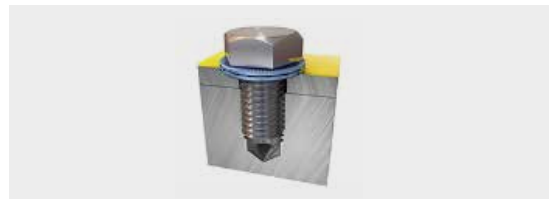
Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions.
Other variants upon request.

NORD-LOCK X-SERIES WASHERS

Instructions for use

Tapped holes

Nord-Lock X-series washers safely lock the bolt against the underlying surface.



Counterbores

The outer diameter of Nord-Lock X-series washers is designed for counterbore holes (i.e., the washers fit under the head of standard bolts).



Through-holes

As for all locking washers, through-holes require two pairs of Nord-Lock X-series washers — one pair for securing the bolt and a second pair for securing the nut.



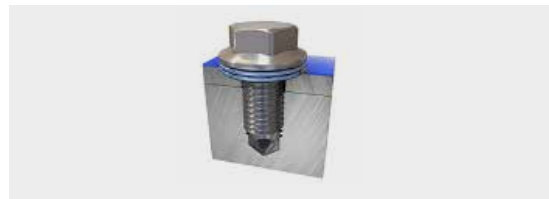
Stud bolts

Nord-Lock X-series washers safely lock the nut on stud bolts and eliminate the need for adhesives.



Applications with large / slotted holes

To optimize the load distribution for applications with large/slotted holes, use a flanged nut/bolt together with Nord-Lock X-series "SP" washers with enlarged outer diameter.



Designs where Nord-Lock X-series washers are not recommended:

- Mating surfaces that are not locked in place
- Mating surfaces harder than the washers
- Wooden mating surfaces
- Non-preloaded joints

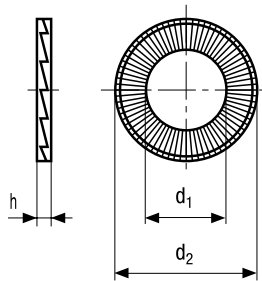


NORD-LOCK

For standard assemblies

Nord-Lock washers **adhered in pairs**

☐ **BN 65212** | Steel through-hardened, zinc flake coated



NORD-LOCK



Standard model



Model with large outside diameter (sp)

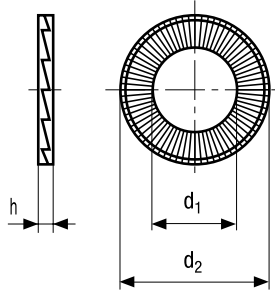
Ø	Description	d ₁	d ₂	h	
M3	NL3	3,4	7	1,8	☐
M3,5	NL3,5	3,9	7,6	1,8	☐
M3,5	NL3,5sp	3,9	9	1,8	☐
M4	NL4	4,4	7,6	1,8	☐
M4	NL4sp	4,4	9	1,8	☐
M5	NL5	5,4	9	1,8	☐
M5	NL5sp	5,4	10,8	1,8	☐
M6	NL6	6,5	10,8	1,8	☐
M6	NL6sp	6,5	13,5	2,5	☐
M8	NL8	8,7	13,5	2,5	☐
M8	NL8sp	8,7	16,6	2,5	☐
M10	NL10	10,7	16,6	2,5	☐
M10	NL10sp	10,7	21	2,5	☐
M11	NL11	11,4	18,5	2,5	☐
M12	NL12	13	19,5	2,5	☐
M12	NL12sp	13	25,4	3,4	☐
M14	NL14	15,2	23	3,4	☐
M14	NL14sp	15,2	30,7	3,4	☐
M16	NL16	17	25,4	3,4	☐
M16	NL16sp	17	30,7	3,4	☐
M18	NL18	19,5	29	3,4	☐
M18	NL18sp	19,5	34,5	3,4	☐
M20	NL20	21,4	30,7	3,4	☐
M20	NL20sp	21,4	39	3,4	☐
M22	NL22	23,4	34,5	3,4	☐
M22	NL22sp	23,4	42	4,6	☐
M24	NL24	25,3	39	3,4	☐
M24	NL24sp	25,3	48,5	4,6	☐
M27	NL27	28,4	42	6,6	☐
M27	NL27sp	28,4	48,5	6,6	☐
M30	NL30	31,4	47	5,8	☐
M30	NL30sp	31,4	58,5	6,6	☐
M33	NL33	34,4	48,5	6,6	☐
M33	NL33sp	34,4	58,5	6,6	☐
M36	NL36	37,4	55	6,6	☐
M36	NL36sp	37,4	63	6,6	☐
M39	NL39	40,4	58,5	6,6	☐
M42	NL42	43,2	63	6,6	☐

Nord-Lock with large outside diameter (sp) for long slots and soft materials. Combination with flange nuts and/or flange screws recommended. The standard assortment is for right-hand-thread

Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

Nord-Lock washers **adhered in pairs**

☑ **BN 65212** | Steel through-hardened, zinc flake coated



NORD-LOCK

\emptyset	Description	d_1	d_2	h	
M45	NL45	46,2	70	7	Supplied on request
M48	NL48	49,6	75	7	
M52	NL52	53,6	80	7	
M56	NL56	59,1	85	7	
M60	NL60	63,1	90	7	
M64	NL64	67,1	95	7	
M68	NL68	71,1	100	9,5	
M72	NL72	75,1	105	9,5	
M76	NL76	79,1	110	9,5	
M80	NL80	83,1	115	9,5	
M85	NL85	88,1	120	9,5	
M90	NL90	92,4	130	9,5	
M95	NL95	97,4	135	9,5	
M100	NL100	103,4	145	9,5	
M105	NL105	108,4	150	9,5	
M110	NL110	113,4	155	9,5	
M115	NL115	118,4	165	9,5	
M120	NL120	123,4	170	9,5	
M125	NL125	128,4	173	9,5	
M130	NL130	133,4	178	9,5	

Nord-Lock with large outside diameter (sp) for long slots and soft materials. Combination with flange nuts and/or flange screws recommended. The standard assortment is for right-hand-thread.

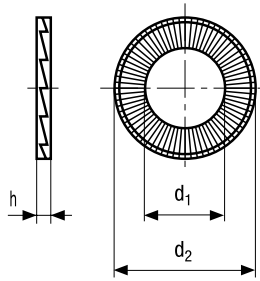
Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

NORD-LOCK

For corrosion-resistant assemblies

Nord-Lock washers **adhered in pairs**

● **BN 20141** | Stainless steel



NORD-LOCK



Standard model (ss)



Model with large outside diameter (spss)

Ø	Description	d ₁	d ₂	h	
M3	NL3ss	3,4	7	2,2	●
M3,5	NL3,5ss	3,9	7,6	2,2	●
M3,5	NL3,5spss	3,9	9	2,2	●
M4	NL4ss	4,4	7,6	2,2	●
M4	NL4spss	4,4	9	2,2	●
M5	NL5ss	5,4	9	2,2	●
M5	NL5spss	5,4	10,8	2,2	●
M6	NL6ss	6,5	10,8	2,2	●
M6	NL6spss	6,5	13,5	2,2	●
M8	NL8ss	8,7	13,5	2,2	●
M8	NL8spss	8,7	16,6	2,2	●
M10	NL10ss	10,7	16,6	2,2	●
M10	NL10spss	10,7	21	2,2	●
M11	NL11ss	11,4	18,5	2,2	●
M12	NL12ss	13	19,5	3,2	●
M12	NL12spss	13	25,4	3,2	●
M14	NL14ss	15,2	23	3,2	●
M14	NL14spss	15,2	30,7	3,2	●
M16	NL16ss	17	25,4	3,2	●
M16	NL16spss	17	30,7	3,2	●
M18	NL18ss	19,5	29	3,2	●
M18	NL18spss	19,5	34,5	3,2	●
M20	NL20ss	21,4	30,7	3,2	●
M20	NL20spss	21,4	39	3,2	●
M22	NL22ss	23,4	34,5	3,2	●
M22	NL22spss	23,4	42	3,2	●
M24	NL24ss	25,3	39	3,2	●
M24	NL24spss	25,3	48,5	3,2	●
M27	NL27ss	28,4	42	6,8	●
M27	NL27spss	28,4	48,5	6,8	●
M30	NL30ss	31,4	47	6,8	●
M30	NL30spss	31,4	58,5	6,8	●
M33	NL33ss	34,4	48,5	6,8	●
M36	NL36ss	37,4	55	6,8	●
M39	NL39ss	40,4	58,5	6,8	●
M42	NL42ss	43,2	63	6,8	●
M45	NL45ss	46,2	70	6,8	Supplied on request
M48	NL48ss	49,6	75	6,8	
M52	NL52ss	53,6	80	9	
M56	NL56ss	59,1	85	9	
M60	NL60ss	63,1	90	9	
M64	NL64ss	67,1	95	9	
M68	NL68ss	71,1	100	9	
M72	NL72ss	75,1	105	9	
M76	NL76ss	79,1	110	9	
M80	NL80ss	83,1	115	9	

Nord-Lock with large outside diameter (spss) for long slots and soft materials. Combination with flange nuts and/or flange screws recommended.

The standard assortment is for right-hand-thread.

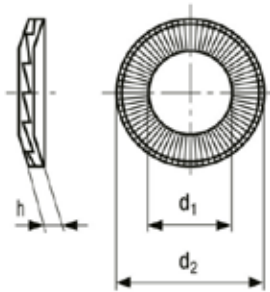
Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

X-SERIES WASHERS

Extra level of security for applications that operate in extreme conditions

Nord-Lock wedge lock washers X-series **adhered in pairs**

☑ **BN 20750** | Steel through-hardened, zinc flake coated



Ø	Description	d ₁	d ₂	h	
M6	NLX6	6,3	10,8	1,77	☑
M8	NLX8	8,4	13,5	2,29	☑
M10	NLX10	10,5	16,6	2,95	☑
M11	NLX11	11,5	18,5	3,24	☑
M12	NLX12	12,5	19,5	3,5	☑
M14	NLX14	14,6	23	4,03	☑
M16	NLX16	16,6	25,4	4,74	☑
M18	NLX18	18,7	29	5,36	☑
M20	NLX20	20,7	30,7	6,01	☑

NORD-LOCK



Standard model

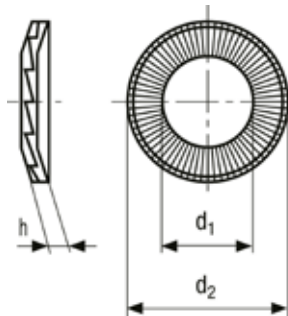
Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions.
Other variants upon request.

X-SERIES WASHERS

Extra level of security for applications that operate in extreme conditions

Nord-Lock wedge lock washers X-series **adhered in pairs**

☒ **BN 20751** | Steel through-hardened, zinc flake coated



Ø	Description	d ₁	d ₂	h	
M6	NLX6sp	6,3	13,5	1,77	☒
M8	NLX8sp	8,4	16,6	2,29	☒
M10	NLX10sp	10,5	21	2,95	☒
M12	NLX12sp	12,5	25,4	3,5	☒
M14	NLX14sp	14,6	29	4,03	☒
M16	NLX16sp	16,6	30,7	4,74	☒
M18	NLX18sp	18,7	34,5	5,36	☒
M20	NLX20sp	20,7	39	6,01	☒

NORD-LOCK

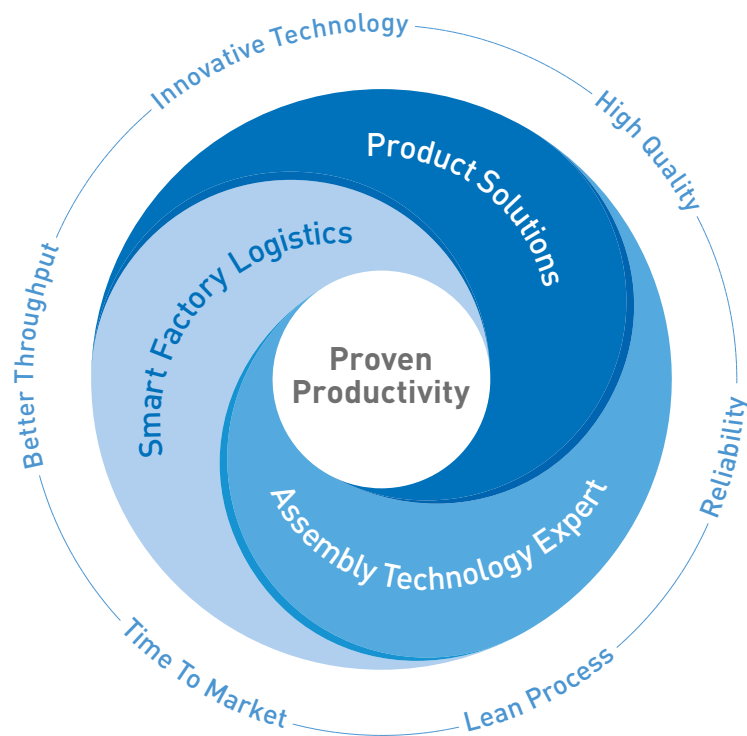


Model with large outside diameter (sp)

Subject to change without notice. Please refer to your local Bossard E-Shop for the current assortment and dimensions. Other variants upon request.

PROVEN PRODUCTIVITY – A PROMISE TO OUR CUSTOMERS

The strategy for success



From years of cooperation with our customers we know what achieves proven and sustainable impact. We have identified what it takes to strengthen the competitiveness of our customers. Therefore we support our customers in three strategic core areas.

Firstly, when finding optimal **Product Solutions**, that is in the evaluation and use of the best fastening part for the particular function intended in our customers' products.

Second, our **Assembly Technology Expert** services deliver the smartest solutions for all possible fastening challenges. Our services cover from the moment our customers developing a new product, to

assembly process optimization as well as fastening technology education for our customers' employees.

And thirdly, optimising our clients' productions in a smart and lean way with **Smart Factory Logistics**, our methodology, with intelligent logistics systems and tailor-made solutions.

Understood as a promise to our customers, "Proven Productivity" contains two elements: Firstly, that it demonstrably works. And secondly, that it sustainably and measurably improves the productivity and competitiveness of our customers.

And this for us is a philosophy which motivates us every day to always be one step ahead.

www.bossard.com