

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-20/0010
of 16 January 2020

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Bolted connections with self-locking Nord-Lock SC-
washers

Product family
to which the construction product belongs

Locking washers preventing self-loosening of bolting
assemblies

Manufacturer

Nord-Lock AB
Halabacken 180
83702 MATTMAR
SCHWEDEN

Manufacturing plant

Werk 1
Werk 2
Plant 1
Plant 2

This European Technical Assessment
contains

7 pages including 3 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 331565-00-0602

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Specific part

1 Technical description of the product

Nord-Lock SC-washers are self-locking securing washers for high-strength structural bolting assemblies for preloading under dynamic loads or vibrations. They have the same inner and outer diameter as the washers according to EN 14399-6:2015.

The Nord-Lock SC-washers consist in each case of two same washers with radial teeth on one side and cam faces on the other side. The pre-assembled washers are installed in pairs, cam face to cam face. One pair of washers is placed between bolt head and structural part and another pair of washers is placed between nut and structural part. The radial teeth press into the surfaces during tightening which is leading to a form lock fixing. Thereby only single washers of a pair can turn against each other. To prevent washers from turning against each other, a greater cam angle than the pitch of the bolt on any case is choosing.

To ensure the securing effect of the Nord-Lock SC-washers the hardness of the structural parts shall not be higher than the hardness of the securing washers themselves (44HRC). Annex 1 contains samples of Nord-Lock SC-washers and a therewith executed connection.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The Nord-Lock SC-washers are intended to be used instead of the specified washers for high-strength structural bolting assemblies M12 to M36 for preloading where the preloading is not used for friction grip but is required for other reasons for execution or as quality insurance measure e. g. for durability. Nord-Lock SC-washers are used in structural bolting assemblies of strength class 10.9 according to EN 14399-4:2015 or EN 14399-8:2018 which match k-class K1 according to EN 14399-1:2015, section 4.5.

The securing and/or preloading effect is only guaranteed if requirements for execution according to Annex C 1 are respected.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the Nord-Lock SC-washers of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Geometry	see annex B 1
Hardness of washers	see annex A 1
Preloading	see annex C 1
Securing effect	see annex C 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

3.3 Durability

Essential characteristic	Performance
Corrosion resistance	see annex A 1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No. 331565-00-0602, the applicable European legal act is: 1998/214/EC.

The system to be applied is: 2+

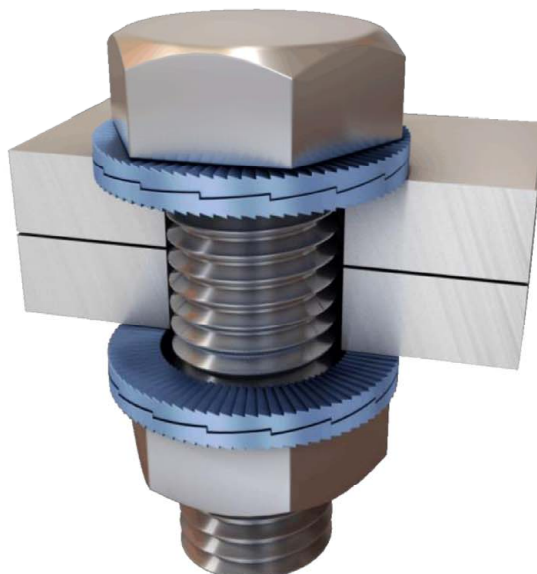
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 16 January 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Böckermann



Schematic diagram of a steel construction connection with a bolting assembly with two Nord-Lock SC-washers

Table A1 Series, available nominal diameter, material, hardness

Series	Nominal diameter	Material	Material number	Hardness
NLSC	M12 to M36	Carbon steel	1.7182	470 – 610 HV1

Corrosion protection

The Nord-Lock SC-washers are supplied with a zinc flake coating with a dry layer thickness of approx. 8 µm and an inorganic cover coating of approx. 2 µm.

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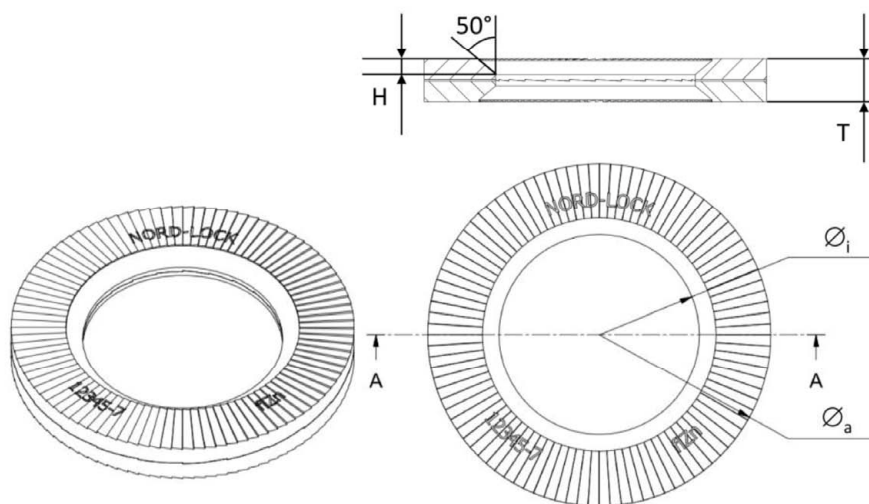
Bolted connections with self-locking Nord-Lock SC-washers

Schematic diagram of a bolted connection with Nord-Lock SC-washers, available nominal diameters, material, hardness and corrosion protection of Nord-Lock SC-washers

Annex A 1

Table B1 Main dimensions of Nord-Lock SC-washers

NLSC	Nominal diameters of assemblies	\varnothing_i [mm]	\varnothing_a [mm]	T [mm]	H [mm]
NL12SC	M12	13.1	23.7	4.6	1.2
NL16SC	M16	17.1	29.7	4.6	1.2
NL20SC	M20	21.4	36.7	4.6	1.6
NL22SC	M22	23.4	38.7	4.6	1.6
NL24SC	M24	25.3	43.7	4.6	1.6
NL27SC	M27	28.4	49.5	5.8	1.8
NL30SC	M30	31.4	55.4	5.8	1.8
NL36SC	M36	37.4	65.4	6.0	1.6



Bolted connections with self-locking Nord-Lock SC-washers

Main dimensions of Nord-Lock SC-washers

Annex B 1

For bolted connections with Nord-Lock SC-washers, the reduced preload forces according to Table C1 apply in deviation from the specifications in DIN EN 1993-1-8:2010-12.

If preload forces are not to be taken into account for the dimensioning of bolted connections with Nord-Lock SC-washers, the tightening torques specified in Table C2 may be applied to achieve a securing effect.

The components to be connected shall lie directly on top of each other. Any gaps between the components shall be closed after tightening the screws. The screw axis shall be perpendicular to the component surface. Any inclinations shall be compensated by suitable wedge washers.

Always arrange one Nord-Lock SC-washer under the bolt head and one under the nut. A combination with other washers, other than non-rotating wedge washers, is not permitted. Please note that each Nord-Lock SC-washer consists of two individual washers glued together. Nord-Lock SC-washers, which have already separated before assembly, shall no longer be used.

Table C1 Torque moments for achieving the reduced preload force for bolting assemblies according EN 14399-4 and EN 14399-8

Designation	Nominal diameter	Reduced preload force $F_{p,C,SC}$ [kN]	Modified torque method	Modified combined method
			Torque moment $M_{A,SC}$ [Nm]	Pre-torque moment $M_{A,MKV,SC}$ [Nm]
NL12SC	M12	45	130	100
NL16SC	M16	90	330	250
NL20SC	M20	145	660	490
NL22SC	M22	170	850	640
NL24SC	M24	200	1,100	825
NL27SC	M27	260	1,600	1,220
NL30SC	M30	315	2,150	1,650
NL36SC	M36	460	3,750	2,800

Tabelle C2 Torque moments for achieving the securing effect for bolting assemblies according to EN 14399-4 and EN 14399-8 ¹⁾

Designation	Nominal diameter	Modified torque method
		Torque moment $M_{A,SC}$ [Nm]
NL12SC	M12	80
NL16SC	M16	200
NL20SC	M20	360
NL22SC	M22	520
NL24SC	M24	640
NL27SC	M27	1,000
NL30SC	M30	1,320
NL36SC	M36	2,240

¹⁾ applies only to bolted connections with Nord-Lock SC-washers, where preload forces are not taken into account for the dimensioning

Bolted connections with self-locking Nord-Lock SC-washers

Torque moments in Nm for achieving the securing effect for Nord-Lock SC-washers

Annex C 1