

European Technical Approval ETA-13/0246

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

Nord-Lock SC Schraubensicherungsscheibe
Nord-Lock SC bolt securing washer

Zulassungsinhaber
Holder of approval

NORD-LOCK GmbH
In der Waage 10
73463 Westhausen
DEUTSCHLAND

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Schraubensicherungsscheibe
Bolt securing washer

Geltungsdauer:
Validity: vom
from
bis
to

28 May 2013
28 May 2018

Herstellwerk
Manufacturing plant

NORD-LOCK International AB
Halabacken 180
83002 Mattmar
SCHWEDEN

Diese Zulassung umfasst
This Approval contains

9 Seiten einschließlich 1 Anhang
9 pages including 1 annex

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, as amended by Article 2 of the law of 8 November 2011⁵;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
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¹ Official Journal of the European Communities L 40, 11 February 1989, p. 12
² Official Journal of the European Communities L 220, 30 August 1993, p. 1
³ Official Journal of the European Union L 284, 31 October 2003, p. 25
⁴ *Bundesgesetzblatt Teil I 1998*, p. 812
⁵ *Bundesgesetzblatt Teil I 2011*, p. 2178
⁶ Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 Definition of the construction product

The Nord-Lock SC securing 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 14399-6:2005 + AC2006.

The Nord-Lock SC securing 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 where one pair of washers is placed between bolt head and structural part to be connected and another pair of washers is placed between nut and structural part to be connected. The radial teeth press into the surfaces during tightening leading to a form fit. Hence in a case of unintentional loosening only the single washers of the pair can turn against each other what will be prevented since the cam angle is greater than the thread pitch in any case. To ensure the securing effect of the NORD-LOCK SC securing 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 securing washers and a therewith executed connection.

1.2 Intended use of the construction product

The Nord-Lock SC securing 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 securing washers are used in structural bolting assemblies of strength class 10.9 according to EN 14399-4:2005 or EN 14399-8:2007 which match k-class K1 according to EN 14399-1:2005, section 4.4.4. NORD-LOCK SC securing washers effectively prevent loosening of the assembly if subjected to impact or significant vibration.

The surface hardness of the structural parts to be connected shall be in the area of the connection lower than 44HRC. If the hardness is higher the washers do not fail but the securing effect is not guaranteed. The securing effect is also not guaranteed for coat thicknesses greater than 200 µm underneath the washers.

The provisions made in this European technical approval are based on an assumed working life of the Nord-Lock SC securing washers of 25 years when installed in the works or as long as the assumed working life of the bolting assembly sufficient protected against corrosion provided. 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.

2 Characteristics of product and methods of verification

2.1 Characteristics of product

The Nord-Lock SC securing washer shall correspond to the drawings given in Annex 1.

The characteristic material values, dimensions and tolerances of the Nord-Lock SC securing washer neither indicated in this section nor in Annex 1 shall correspond to the respective values laid down in the technical documentation⁷ to this European technical approval.

The values of the surface hardness of the washers as well as the torque moments and preload forces of the connections made with the Nord-Lock SC securing washer are given in section 4.2.

The Nord-Lock SC securing washers are considered to satisfy the requirements of performance class A1 of the characteristic reaction to fire.

2.2 Methods of verification

The assessment of the fitness of the Nord-Lock SC securing washer for the intended use in relation to the Essential Requirements ER 1 (Mechanical resistance and stability), ER 2 (Safety in case of fire), ER 3 (Hygiene, health and environment) and additional aspects of durability has been made in accordance with section 3.2 of the Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶.

The assessment of the resistance to fire performance is only relevant to the assembled system (Nord-Lock SC securing washer, bolting assembly, steel structure) which is not part of the European technical approval.

The Nord-Lock SC securing washer are considered to satisfy the requirements of performance class A 1 of the characteristic reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

Concerning Essential Requirements No. 1 (Mechanical resistance and stability) the following applies:

The values of reduced preload force, torque moment etc. given in Table 1 were determined by torque tests.

Concerning Essential Requirement No. 3 (Hygiene, health and environment) the following applies:

The Nord-Lock SC securing washers do not contain dangerous substances or radiation.

Note: In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

⁷

The technical documentation to this European technical approval is deposited at Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure is handed over to the approved bodies.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the Decision 99/92/EC of the European Commission⁸ system 2+ of the attestation of conformity applies.

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

- (a) Tasks for the manufacturer:
 - (1) initial type-testing of the product;
 - (2) factory production control;
 - (3) testing of samples taken at the factory in accordance with a prescribed test plan.
- (b) Tasks for the approved body:
 - (4) certification of factory production control on the basis of:
 - initial inspection of factory and of factory production control;
 - continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with Deutsches Institut für Bautechnik.⁹

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of mechanical connections in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

⁸ Official Journal of the European Communities L 80 of 18.03.1998

⁹ The control plan is a confidential part of the European technical approval and only handed over to the approved bodies involved in the procedure of attestation of conformity. See section 3.2.2.

3.2.2 Tasks for the approved bodies

The approved body shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in written reports.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on the accompanying commercial documents. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the European technical approval,
- the name of the product.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The Nord-Lock SC securing washers are manufactured in accordance with the provisions of the European technical approval using the manufacturing process as laid down in the technical documentation.

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

4.2 Design

4.2.1 General

Nord-Lock SC securing washer completely or partly exposed to external weather or similar conditions are protected sufficiently against corrosion. For the corrosion protection the rules given in EN 1090-2:2008 + A1:2011 and EN 1993-1-3:2006 + AC:2009 are taken into account.

Bolted connections in steel structures with bolting assemblies with NORD-LOCK SC securing washers are designed according to EN 1993-1-8:2005 + AC:2009 as far as no other provisions are made in the following.

4.2.2 Specific

Connections with bolting assemblies with Nord-Lock SC securing washers are designed where friction grip is not relevant for load transfer. The reduced preload forces according to Table 1 are taken into account.

Table 1: Reduced preload forces and required torque moments to achieve

Designation	Nominal diameter	Reduced preload force $F_{p,C,NL}$ [kN]	Modified torque method	Modified combined method
			torque moment $M_{A,NL}$ [Nm]	pre-torque moment $M_{A,MKV,NL}$ [Nm]
NL12SC	M12	45	130	100
NL16SC	M16	90	330	250
NL20SC	M20	145	660	490
NL22SC	M22	170	850	640
NL24SC	M24	200	1100	825
NL27SC	M27	260	1600	1220
NL30SC	M30	315	2150	1650
NL36SC	M36	460	3750	2800

4.3 Installation

4.3.1 General

Bolted connections in steel structure with bolting assemblies with NORD-LOCK SC securing washers are executed according to EN 1090-2:2008 + A1:2011 as far as no other provisions are made in the following.

4.3.2 Specific

The installation of the NORD-LOCK SC securing washers is only carried out according to the provisions of the manufacturer with the appropriate tools. The manufacturer hands over the assembly instruction to the executing company.

Connections with NORD-LOCK SC securing washers are only executed by companies with the necessary experience unless the instruction of the assembly personnel is arranged by specialists experienced in this field.

The bolting assemblies match k-class K1 according to EN 14399-1:2005, section 4.4.4.

The total coat thickness of metallic coats and / or organic coats does not exceed 200µm in the area of the NORD-LOCK SC securing washers.

The structural parts to be connected have direct contact. The bolt axis is rectangular to the surface of the structural part. Possible inclination is adequately adjusted by wedge washers.

One securing washer in each case is generally placed underneath the bolt head and underneath the nut. A combination with other washers except turn save wedge washers is not allowed. It is considered that every securing washer consists of two single washers glued together. Securing washer are not used if the single washers have separated before installation.

Deviating from EN 1993-1-8:2005 + AC:2009 and EN 1090-2:2008+A1:2011 the torque moments according to Table 1 is used.

For the required angle of further rotation ϑ_{MKV} for the modified combined method the values in Table 2 apply.

Table 2: Required angle of further rotation ϑ_{MKV} for the modified combined method

Total nominal thickness "t" of parts to be connected (including all packs and washers) d = bolt diameter	Further rotation to be applied, during the second step of tightening	
	ϑ_{MKV} [Degrees]	Part turn
$t < 2 d$	45°	1/8
$2 d \leq t < 6 d$	60°	1/6
$6 d \leq t \leq 10 d$	90°	1/4
$10 d < t$	no recommendation	

5 Indications to the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1, 2, 4.2 and 4.3 (including Annex 1 if referred to) is given to those who are concerned. This information may be given by reproduction of the respective parts of the European technical approval.

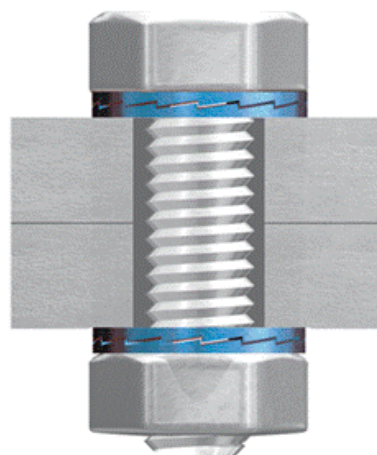
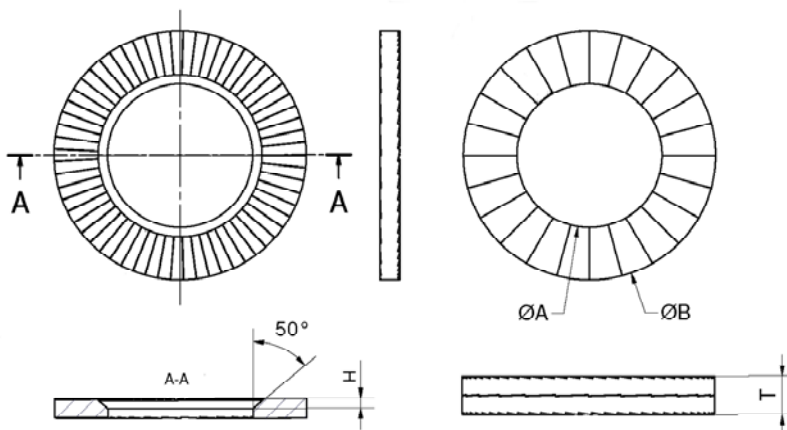
In addition all installation data (e. g. reduced preload force, torque moment) shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

Uwe Bender
Head of Department

beglaubigt:
Ulbrich

Table 1 Main dimensions of the Nord-Lock SC bolt securing washers

Size	Outside ØB [mm]	Inside ØA [mm]	Thickness T [mm]	Chamfer H [mm]
M12	23.7	13.1	4.6	1.2
M16	29.7	17.1	4.6	1.2
M20	36.7	21.4	4.6	1.6
M22	38.7	23.4	4.6	1.6
M24	43.7	25.3	4.6	1.6
M27	49.5	28.4	5.8	1.8
M30	55.4	31.4	5.8	1.8
M36	65.4	37.4	6.0	1.6



Schematic illustration of a connection with Nord-Lock SC bolt securing washers

Nord-Lock SC bolt securing washer

Main dimensions of the bolt securing washers
Schematic illustration of a connection with bolt securing washers

Annex 1