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European Technical Assessment Body  
for construction products



European Technical  
Assessment

ETA-19/0813  
of 5 December 2024

English translation prepared by DIBt - Original version in German language

General Part

|                                                                                                              |  |
|--------------------------------------------------------------------------------------------------------------|--|
| Technical Assessment Body issuing the European Technical Assessment:                                         |  |
| Trade name of the construction product                                                                       |  |
| Product family to which the construction product belongs                                                     |  |
| Manufacturer                                                                                                 |  |
| Manufacturing plant                                                                                          |  |
| This European Technical Assessment contains                                                                  |  |
| This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of |  |
| This version replaces                                                                                        |  |

|                                                                                                  |
|--------------------------------------------------------------------------------------------------|
| Deutsches Institut für Bautechnik                                                                |
| Nord-Lock washers and Nord-Lock X-series washers for non-preloaded structural bolting assemblies |
| Locking washers preventing self-loosening of bolting assemblies                                  |
| Nord-Lock AB<br>Halabacken 180<br>83791 MATTMAR<br>SCHWEDEN                                      |
| Plant 1<br>Plant 2                                                                               |
| 16 pages including 12 annexes which form an integral part of this assessment                     |
| EAD 331565-00-0602                                                                               |
| ETA-19/0813 issued on 9 October 2020                                                             |

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## Specific part

### 1 Technical description of the product

Nord-Lock washers and Nord-Lock X-series washers are self-locking securing washers for non-preloaded structural bolting assemblies according to EN 15048-1:2016-09. Nord-Lock washer and Nord-Lock X-series washers are used in place of regular washers in bolting assemblies. The application is allowed for bolted connections with bolts and nuts (assemblies) as well as underneath nuts – e.g. on threaded rods – and under bolt heads for screw-in connections.

Nord-Lock washers and Nord-Lock X-series washers effectively secure these connections against loosening if subjected to dynamic loads, impact loads or considerable vibration loads.

Nord-Lock washers and Nord-Lock X-series washers consist in each case of two individual washers with serrations 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 component to be connected and another pair of washers is placed between nut and structural component to be connected. The serrations 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 larger than the thread pitch in any case. To ensure the securing effect of the Nord-Lock washers or Nord-Lock X-Series washers the hardness of the structural components shall not be higher than the hardness of the securing washers themselves (see Table A1). Annex A 1 contains examples of Nord-Lock washers and Nord-Lock X-Series washers and a therewith executed connection.

### 2 Specification of the intended use in accordance with the applicable EAD 331565-00-0602

Nord-Lock washers and Nord-Lock X-series washers are intended to be used instead of regular washers for bolting assemblies with property class 4.6 up to including 10.9 (steel) or 70 up to including 80 (stainless steel).

Their dedicated use is for bolting categories A and D according EN 1993-1-8:2010-12.

The securing effect is only guaranteed if requirements for execution according to Annex C 1 to C 2 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 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 to B 8    |
| Hardness of washer       | see Annex A 1 to A 2    |
| Preloading               | No performance assessed |
| Securing effect          | see Annex C 1 to C 2    |

**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 to A 2 |

**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.

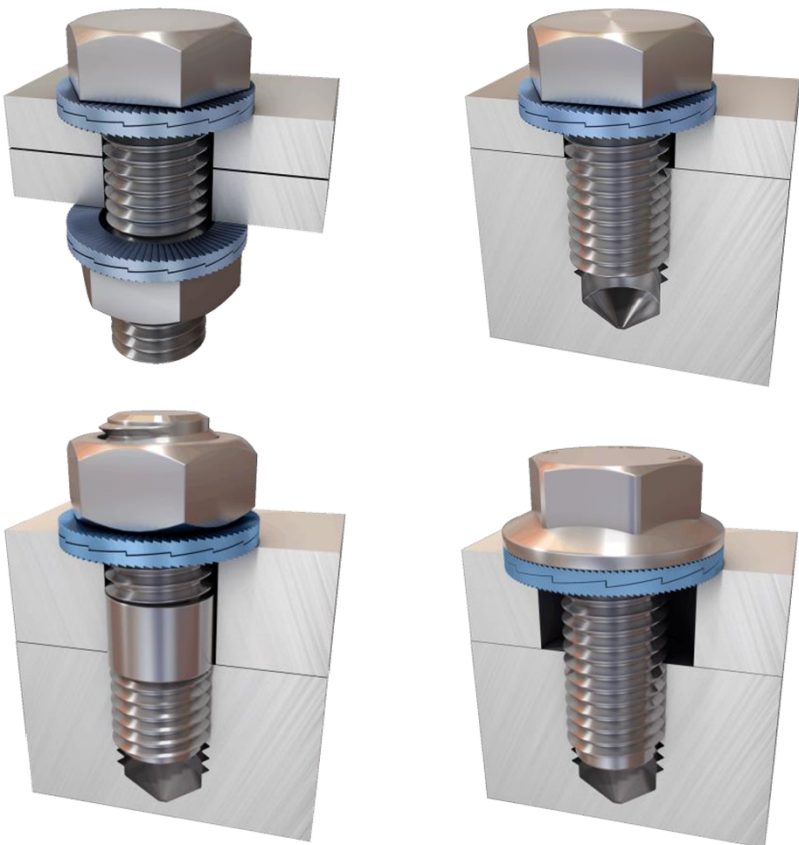
Issued in Berlin on 5 Dezember 2024 by Deutsches Institut für Bautechnik

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Head of Section

*beglaubigt:*  
Hahn



Nord-Lock washers NL, NLsp, NLSC, NLss, NLspss, NLss-254, NLspss-254 and Nord-Lock X-series washers NLX und NLXsp



Schematic illustrations of bolted connections with Nord-Lock washers (through-hole connection, blind hole connection, connection with stud bolt, slotted hole connection)

|                                                                                                               |           |
|---------------------------------------------------------------------------------------------------------------|-----------|
| Nord-Lock washers and Nord-Lock X-series washers<br>for non-preloaded structural bolting assemblies           | Annex A 1 |
| Schematic illustrations of Nord-Lock washers and Nord-Lock X-series washers and<br>connections made with them |           |

**Table A1** Series, available nominal diameter, material, hardness, corrosion resistance

| Series              | Nominal diameter | Material          | Material number | Hardness            | CRC <sup>1)</sup> |
|---------------------|------------------|-------------------|-----------------|---------------------|-------------------|
| NL <sup>2)</sup>    | M6 to M48        | low alloyed steel | 1.7182          | > 465 <sup>3)</sup> | ---               |
| NLsp <sup>2)</sup>  | M6 to M36        | low alloyed steel | 1.7182          | > 465 <sup>3)</sup> | ---               |
| NLSC <sup>2)</sup>  | M12 to M36       | low alloyed steel | 1.7182          | > 465 <sup>3)</sup> | ---               |
| NLss                | M6 to M48        | stainless steel   | 1.4404          | > 520 <sup>4)</sup> | III               |
| NLss-254            | M6 to M39        | stainless steel   | 1.4547          | > 600 <sup>4)</sup> | V                 |
| NLspss              | M6 to M30        | stainless steel   | 1.4404          | > 520 <sup>4)</sup> | III               |
| NLspss-254          | M6 to M27        | stainless steel   | 1.4547          | > 600 <sup>4)</sup> | V                 |
| NLX <sup>2)</sup>   | M6 to M24        | low alloyed steel | 1.7225          | > 420 <sup>3)</sup> | ---               |
| NLXsp <sup>2)</sup> | M6 to M24        | low alloyed steel | 1.7225          | > 420 <sup>3)</sup> | ---               |

<sup>1)</sup> Corrosion resistance class according to EN 1993-1-4, table A.3

<sup>2)</sup> This series is supplied with a zinc flake coating with a dry layer thickness of approx. 8 µm and an inorganic top coating of approx. 2 µm. The corrosion protection duration in the neutral salt spray test in accordance with ISO 9227:2023-03 is at least 1,000 hours.

<sup>3)</sup> Through-hardened, HV1

<sup>4)</sup> Surface hardened, HV0.05

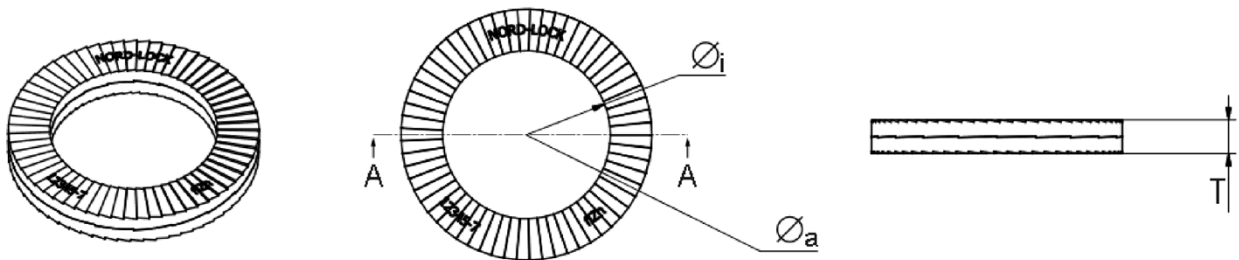
Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Nord-Lock series with classification of the available nominal diameters, materials,  
hardnesses and corrosion protection

Annex A 2

**Table B1** Main dimensions of Nord-Lock washers NL

| Product name | Nominal diameter |        | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|--------------|------------------|--------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NL6          | M6               | —      | 6,5                     | 10,8                    | 1,8       | 28              | 10        |
| NL 1/4"      | —                | 1/4"   | 7,2                     | 11,5                    | 2,5       | 28              | 10        |
| NL8          | M8               | 5/16"  | 8,7                     | 13,5                    | 2,5       | 33              | 10        |
| NL 3/8"      | —                | 3/8"   | 10,3                    | 16,6                    | 2,5       | 40              | 12        |
| NL10         | M10              | —      | 10,7                    | 16,6                    | 2,5       | 40              | 12        |
| NL11         | M11              | 7/16"  | 11,4                    | 18,5                    | 2,5       | 47              | 12        |
| NL12         | M12              | —      | 13,0                    | 19,5                    | 2,5       | 47              | 16        |
| NL 1/2"      | —                | 1/2"   | 13,5                    | 19,5                    | 2,5       | 47              | 16        |
| NL14         | M14              | 9/16"  | 15,2                    | 23,0                    | 3,4       | 61              | 20        |
| NL16         | M16              | 5/8"   | 17,0                    | 25,4                    | 3,4       | 61              | 20        |
| NL18         | M18              | —      | 19,5                    | 29,0                    | 3,4       | 75              | 24        |
| NL 3/4"      | —                | 3/4"   | 20,0                    | 30,7                    | 3,4       | 75              | 24        |
| NL20         | M20              | —      | 21,4                    | 30,7                    | 3,4       | 75              | 24        |
| NL22         | M22              | 7/8"   | 23,4                    | 34,5                    | 3,4       | 96              | 24        |
| NL24         | M24              | —      | 25,3                    | 39,0                    | 3,4       | 96              | 24        |
| NL1"         | —                | 1"     | 27,9                    | 39,0                    | 3,4       | 96              | 24        |
| NL27         | M27              | —      | 28,4                    | 42,0                    | 5,8       | 120             | 28        |
| NL30         | M30              | 1 1/8" | 31,4                    | 47,0                    | 5,8       | 120             | 28        |
| NL33         | M33              | 1 1/4" | 34,4                    | 48,5                    | 5,8       | 120             | 28        |
| NL36         | M36              | 1 3/8" | 37,4                    | 55,0                    | 5,8       | 140             | 28        |
| NL39         | M39              | 1 1/2" | 40,4                    | 58,5                    | 5,8       | 140             | 28        |
| NL42         | M42              | —      | 43,2                    | 63,0                    | 5,8       | 140             | 28        |
| NL45         | M45              | 1 3/4" | 46,2                    | 70,0                    | 7,0       | 168             | 28        |
| NL48         | M48              | —      | 49,6                    | 75,0                    | 7,0       | 168             | 28        |



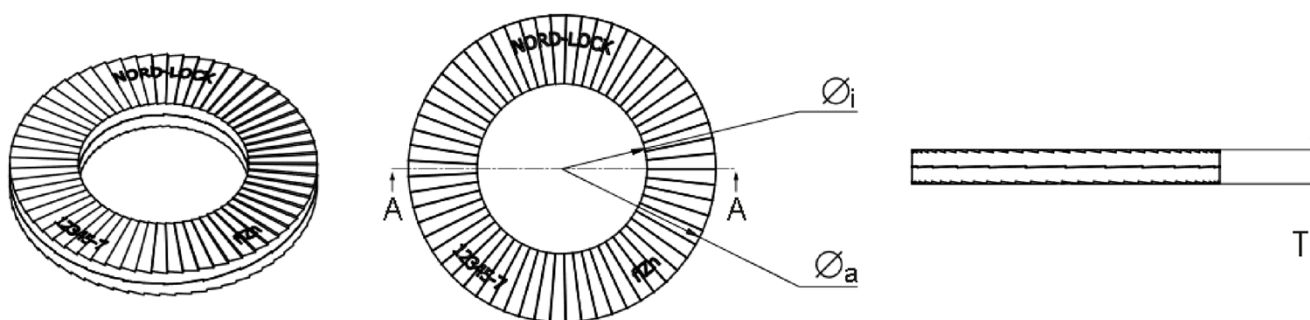
Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Main dimensions of Nord-Lock washers NL

Annex B 1

**Table B2** Main dimensions of Nord-Lock washers NLsp

| Product name | Nominal diameter |        | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|--------------|------------------|--------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NL6sp        | M6               | –      | 6,5                     | 13,5                    | 2,5       | 28              | 10        |
| NL1/4"sp     | –                | 1/4"   | 7,2                     | 13,5                    | 2,5       | 28              | 10        |
| NL8sp        | M8               | 5/16"  | 8,7                     | 16,6                    | 2,5       | 33              | 10        |
| NL3/8"sp     | –                | 3/8"   | 10,3                    | 21,0                    | 2,5       | 40              | 12        |
| NL10sp       | M10              | –      | 10,7                    | 21,0                    | 2,5       | 40              | 12        |
| NL12sp       | M12              | –      | 13,0                    | 25,4                    | 3,4       | 47              | 20        |
| NL1/2"sp     | –                | 1/2"   | 13,5                    | 25,4                    | 3,4       | 47              | 20        |
| NL14sp       | M14              | 9/16"  | 15,2                    | 30,7                    | 3,4       | 61              | 24        |
| NL16sp       | M16              | 5/8"   | 17,0                    | 30,7                    | 3,4       | 61              | 24        |
| NL18sp       | M18              | –      | 19,5                    | 34,5                    | 3,4       | 84              | 24        |
| NL3/4"sp     | –                | 3/4"   | 20,0                    | 39,0                    | 3,4       | 96              | 24        |
| NL20sp       | M20              | –      | 21,4                    | 39,0                    | 3,4       | 96              | 24        |
| NL22sp       | M22              | 7/8"   | 23,4                    | 42,0                    | 4,6       | 120             | 24        |
| NL24sp       | M24              | –      | 25,3                    | 48,5                    | 4,6       | 120             | 24        |
| NL1"sp       | –                | 1"     | 27,9                    | 48,5                    | 4,6       | 120             | 24        |
| NL27sp       | M27              | –      | 28,4                    | 48,5                    | 5,8       | 120             | 28        |
| NL30sp       | M30              | 1 1/8" | 31,4                    | 55,0                    | 5,8       | 120             | 28        |
| NL33sp       | M33              | 1 1/4" | 34,4                    | 58,5                    | 5,8       | 120             | 28        |
| NL36sp       | M36              | 1 3/8" | 37,4                    | 63,0                    | 5,8       | 140             | 28        |



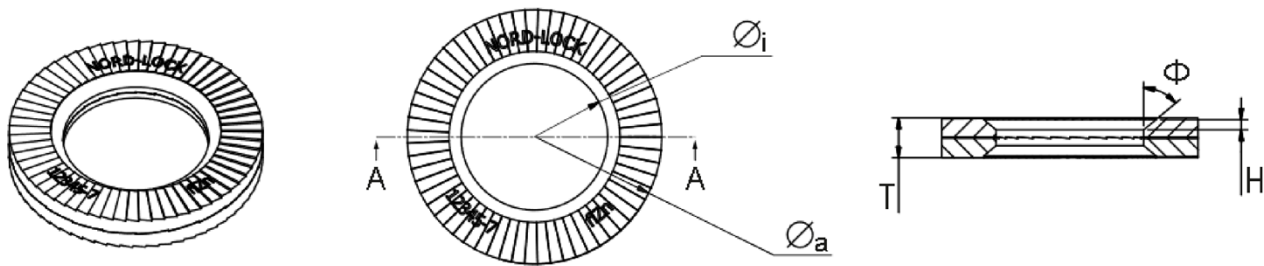
Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Main dimensions of Nord-Lock washers NLsp

Annex B 2

Table B3 Main dimensions of Nord-Lock washers NLSC

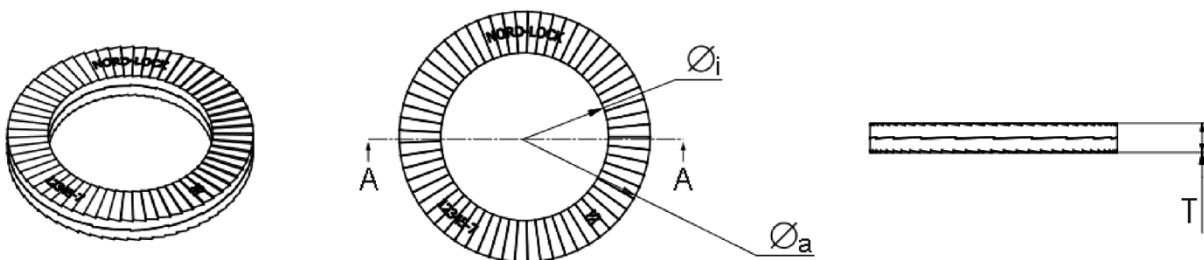
| Product name | Nominal diameter |      | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|--------------|------------------|------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NL12SC       | M12              | 13,1 | 23,7                    | 4,6                     | 1,2       | 50              | 47        |
| NL16SC       | M16              | 17,1 | 29,7                    | 4,6                     | 1,2       | 50              | 61        |
| NL20SC       | M20              | 21,4 | 36,7                    | 4,6                     | 1,5       | 50              | 96        |
| NL22SC       | M22              | 23,4 | 38,7                    | 4,6                     | 1,5       | 50              | 120       |
| NL24SC       | M24              | 25,3 | 43,7                    | 4,6                     | 1,5       | 50              | 120       |
| NL27SC       | M27              | 28,4 | 49,5                    | 5,8                     | 1,8       | 52,5            | 120       |
| NL30SC       | M30              | 31,4 | 55,4                    | 5,8                     | 1,8       | 52,5            | 120       |
| NL36SC       | M36              | 37,4 | 65,4                    | 6                       | 1,6       | 60              | 140       |



|                                                                                                     |           |
|-----------------------------------------------------------------------------------------------------|-----------|
| Nord-Lock washers and Nord-Lock X-series washers<br>for non-preloaded structural bolting assemblies | Annex B 3 |
| Main dimensions of Nord-Lock washers NLSC                                                           |           |

**Table B4** Main dimensions of Nord-Lock washers NLss

| Product name | Nominal diameter |        | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|--------------|------------------|--------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NL6ss        | M6               | —      | 6,5                     | 10,8                    | 2,2       | 20              | 10        |
| NL 1/4"ss    | —                | 1/4"   | 7,2                     | 11,5                    | 2,2       | 20              | 10        |
| NL6ss        | M6               | —      | 6,5                     | 10,8                    | 2,2       | 20              | 10        |
| NL 1/4"ss    | —                | 1/4"   | 7,2                     | 11,5                    | 2,2       | 20              | 10        |
| NL8ss        | M8               | 5/16"  | 8,7                     | 13,5                    | 2,0       | 33              | 10        |
| NL3/8"ss     | —                | 3/8"   | 10,3                    | 16,6                    | 2,0       | 40              | 12        |
| NL10ss       | M10              | —      | 10,7                    | 16,6                    | 2,0       | 40              | 12        |
| NL11ss       | M11              | 7/16"  | 11,4                    | 18,5                    | 2,2       | 47              | 12        |
| NL12ss       | M12              | —      | 13,0                    | 19,5                    | 2,0       | 47              | 16        |
| NL 1/2"ss    | —                | 1/2"   | 13,5                    | 19,5                    | 2,0       | 47              | 16        |
| NL14ss       | M14              | 9/16"  | 15,2                    | 23,0                    | 3,0       | 61              | 20        |
| NL16ss       | M16              | 5/8"   | 17,0                    | 25,4                    | 3,0       | 61              | 20        |
| NL18ss       | M18              | —      | 19,5                    | 29,0                    | 3,2       | 75              | 24        |
| NL3/4"ss     | —                | 3/4"   | 20,0                    | 30,7                    | 3,2       | 75              | 24        |
| NL20ss       | M20              | —      | 21,4                    | 30,7                    | 3,0       | 75              | 24        |
| NL22ss       | M22              | 7/8"   | 23,4                    | 34,5                    | 3,2       | 96              | 24        |
| NL24ss       | M24              | —      | 25,3                    | 39,0                    | 3,2       | 96              | 24        |
| NL1"ss       | —                | 1"     | 27,9                    | 39,0                    | 3,2       | 96              | 24        |
| NL27ss       | M27              | —      | 28,4                    | 42,0                    | 6,8       | 120             | 28        |
| NL30ss       | M30              | 1 1/8" | 31,4                    | 47,0                    | 6,8       | 120             | 28        |
| NL33ss       | M33              | 1 1/4" | 34,4                    | 48,5                    | 6,8       | 120             | 28        |
| NL36ss       | M36              | 1 3/8" | 37,4                    | 55,0                    | 6,8       | 140             | 28        |
| NL39ss       | M39              | 1 1/2" | 40,4                    | 58,5                    | 6,8       | 140             | 28        |
| NL42ss       | M42              | —      | 43,2                    | 63,0                    | 6,8       | 140             | 28        |



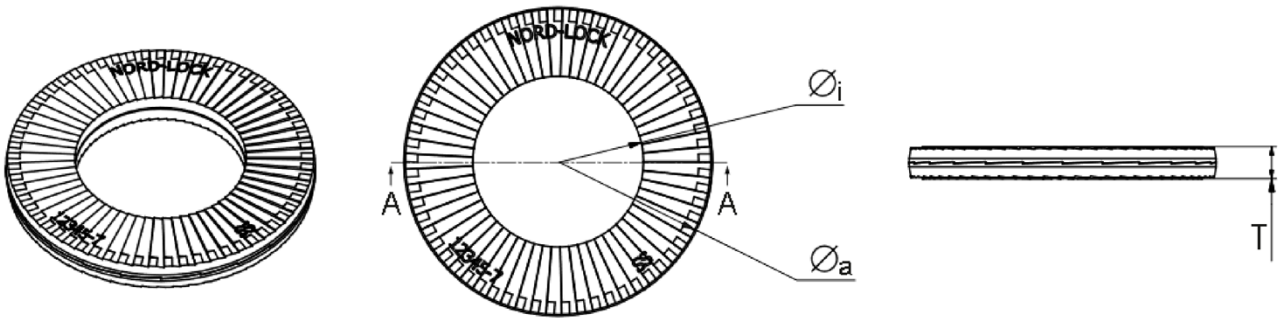
Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Main dimensions of Nord-Lock washers NLss

Annex B 4

**Table B5** Main dimensions of Nord-Lock washers NLspss

| Product name | Nominal diameter |        | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|--------------|------------------|--------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NL6spss      | M6               | –      | 6,5                     | 13,5                    | 2,0       | 20              | 10        |
| NL1/4"spss   | –                | 1/4"   | 7,2                     | 13,5                    | 2,2       | 20              | 10        |
| NL8spss      | M8               | 5/16"  | 8,7                     | 16,6                    | 2,15      | 33              | 10        |
| NL3/8"spss   | –                | 3/8"   | 10,3                    | 21,0                    | 2,0       | 40              | 12        |
| NL10spss     | M10              | –      | 10,7                    | 21,0                    | 2,0       | 40              | 12        |
| NL12spss     | M12              | –      | 13,0                    | 25,4                    | 3,0       | 47              | 20        |
| NL1/2"spss   | –                | 1/2"   | 13,5                    | 25,4                    | 3,2       | 47              | 20        |
| NL14spss     | M14              | 9/16"  | 15,2                    | 30,7                    | 3,2       | 61              | 24        |
| NL16spss     | M16              | 5/8"   | 17,0                    | 30,7                    | 3,2       | 61              | 24        |
| NL18spss     | M18              | –      | 19,5                    | 34,5                    | 3,2       | 84              | 24        |
| NL3/4"spss   | –                | 3/4"   | 20,0                    | 39,0                    | 3,2       | 96              | 24        |
| NL20spss     | M20              | –      | 21,4                    | 39,0                    | 3,2       | 96              | 24        |
| NL22spss     | M22              | 7/8"   | 23,4                    | 42,0                    | 3,2       | 120             | 24        |
| NL24spss     | M24              | –      | 25,3                    | 48,5                    | 4,5       | 96              | 24        |
| NL1"spss     | –                | 1"     | 27,9                    | 48,5                    | 3,2       | 120             | 24        |
| NL27spss     | M27              | –      | 28,4                    | 48,5                    | 6,8       | 120             | 28        |
| NL30spss     | M30              | 1 1/8" | 31,4                    | 58,5                    | 6,8       | 120             | 28        |



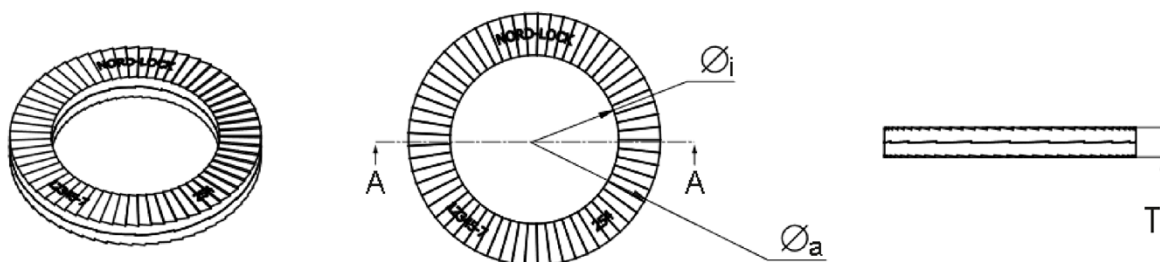
Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Main dimensions of Nord-Lock washers NLspss

Annex B 5

**Table B6** Main dimensions of Nord-Lock washers NLss-254

| Product name  | Nominal diameter |        | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|---------------|------------------|--------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NL6ss-254     | M6               | —      | 6,5                     | 10,8                    | 2,2       | 20              | 10        |
| NL 1/4"ss-254 | —                | 1/4"   | 7,2                     | 11,5                    | 2,2       | 20              | 10        |
| NL8ss-254     | M8               | 5/16"  | 8,7                     | 13,5                    | 2,0       | 33              | 10        |
| NL3/8"ss-254  | —                | 3/8"   | 10,3                    | 16,6                    | 2,0       | 40              | 12        |
| NL10ss-254    | M10              | —      | 10,7                    | 16,6                    | 2,0       | 40              | 12        |
| NL11ss-254    | M11              | 7/16"  | 11,4                    | 18,5                    | 2,2       | 47              | 12        |
| NL12ss-254    | M12              | —      | 13,0                    | 19,5                    | 2,0       | 47              | 16        |
| NL 1/2"ss-254 | —                | 1/2"   | 13,5                    | 19,5                    | 2,0       | 47              | 16        |
| NL14ss-254    | M14              | 9/16"  | 15,2                    | 23,0                    | 3,0       | 61              | 20        |
| NL16ss-254    | M16              | 5/8"   | 17,0                    | 25,4                    | 3,0       | 61              | 20        |
| NL18ss-254    | M18              | —      | 19,5                    | 29,0                    | 3,2       | 75              | 24        |
| NL3/4"ss-254  | —                | 3/4"   | 20,0                    | 30,7                    | 3,2       | 75              | 24        |
| NL20ss-254    | M20              | —      | 21,4                    | 30,7                    | 3,0       | 75              | 24        |
| NL22ss-254    | M22              | 7/8"   | 23,4                    | 34,5                    | 3,2       | 96              | 24        |
| NL24ss-254    | M24              | —      | 25,3                    | 39,0                    | 3,2       | 96              | 24        |
| NL1"ss-254    | —                | 1"     | 27,9                    | 39,0                    | 3,2       | 96              | 24        |
| NL27ss-254    | M27              | —      | 28,4                    | 42,0                    | 5,8       | 120             | 28        |
| NL30ss-254    | M30              | 1 1/8" | 31,4                    | 47,0                    | 5,8       | 120             | 28        |
| NL33ss-254    | M33              | 1 1/4" | 34,4                    | 48,5                    | 5,8       | 120             | 28        |
| NL36ss-254    | M36              | 1 3/8" | 37,4                    | 55,0                    | 5,8       | 140             | 28        |
| NL39ss-254    | M39              | 1 1/2" | 40,4                    | 58,5                    | 5,8       | 140             | 28        |



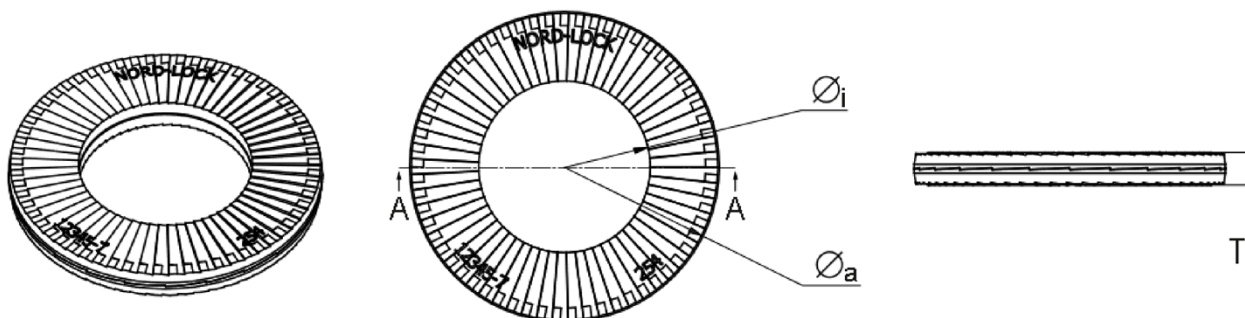
Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Main dimensions of Nord-Lock washers NLss-254

Annex B 6

**Table B7** Main dimensions of Nord-Lock washers NLspss

| Product name    | Nominal diameter |       | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|-----------------|------------------|-------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NL6spss-254     | M6               | –     | 6,5                     | 13,5                    | 2,2       | 20              | 10        |
| NL 1/4"spss-254 | –                | 1/4"  | 7,2                     | 13,5                    | 2,2       | 20              | 10        |
| NL8spss-254     | M8               | 5/16" | 8,7                     | 16,6                    | 2,2       | 33              | 10        |
| NL 3/8"spss-254 | –                | 3/8"  | 10,3                    | 21,0                    | 2,2       | 40              | 12        |
| NL10spss-254    | M10              | –     | 10,7                    | 21,0                    | 2,2       | 40              | 12        |
| NL12spss-254    | M12              | –     | 13,0                    | 25,4                    | 3,2       | 47              | 20        |
| NL 1/2"spss-254 | –                | 1/2"  | 13,5                    | 25,4                    | 3,2       | 47              | 20        |
| NL14spss-254    | M14              | 9/16" | 15,2                    | 30,7                    | 3,2       | 61              | 24        |
| NL16spss-254    | M16              | 5/8"  | 17,0                    | 30,7                    | 3,2       | 61              | 24        |
| NL18spss-254    | M18              | –     | 19,5                    | 34,5                    | 3,2       | 84              | 24        |
| NL 3/4"spss-254 | –                | 3/4"  | 20,0                    | 39,0                    | 3,2       | 96              | 24        |
| NL20spss-254    | M20              | –     | 21,4                    | 39,0                    | 3,2       | 96              | 24        |
| NL22spss-254    | M22              | 7/8"  | 23,4                    | 42,0                    | 3,2       | 120             | 24        |
| NL24spss-254    | M24              | –     | 25,3                    | 48,5                    | 4,5       | 96              | 24        |
| NL1"spss-254    | –                | 1"    | 27,9                    | 48,5                    | 3,2       | 120             | 24        |
| NL27spss-254    | M27              | –     | 28,4                    | 48,5                    | 5,8       | 120             | 28        |



Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Main dimensions of Nord-Lock washers NLspss-254

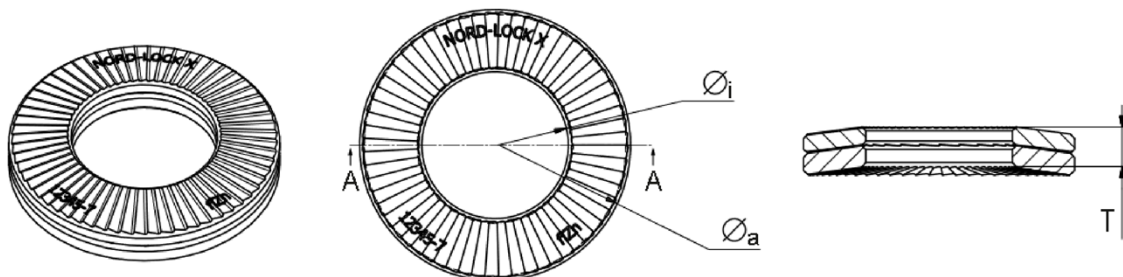
Annex B 7

**Table B8** Main dimensions of Nord-Lock X-series washers NLX

| Product name | Nominal diameter |       | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|--------------|------------------|-------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NLX6         | M6               | —     | 6,3                     | 10,8                    | 1,6       | 40              | 12        |
| NLX8         | M8               | 5/16" | 8,4                     | 13,5                    | 2,2       | 47              | 12        |
| NLX3/8"      | —                | 3/8"  | 10,0                    | 16,6                    | 2,6       | 47              | 16        |
| NLX10        | M10              | —     | 10,5                    | 16,6                    | 2,8       | 47              | 16        |
| NLX12        | M12              | —     | 12,5                    | 19,5                    | 3,4       | 61              | 20        |
| NLX1/2"      | —                | 1/2"  | 13,2                    | 19,5                    | 3,5       | 61              | 20        |
| NLX14        | M14              | 9/16" | 14,6                    | 23,0                    | 3,9       | 61              | 20        |
| NLX16        | M16              | 5/8"  | 16,6                    | 25,4                    | 4,6       | 61              | 24        |
| NLX3/4"      | —                | 3/4"  | 19,5                    | 30,7                    | 5,5       | 61              | 24        |
| NLX20        | M20              | —     | 20,7                    | 30,7                    | 5,9       | 61              | 24        |
| NLX24        | M24              | —     | 24,8                    | 39,0                    | 7,0       | 75              | 28        |

**Table B9** Main dimensions of Nord-Lock X-series washers NLXsp

| Product name | Nominal diameter |       | $\varnothing_i$<br>[mm] | $\varnothing_a$<br>[mm] | T<br>[mm] | Serration count | Cam count |
|--------------|------------------|-------|-------------------------|-------------------------|-----------|-----------------|-----------|
| NLX6sp       | M6               | —     | 6,3                     | 13,5                    | 2,0       | 40              | 12        |
| NLX8sp       | M8               | 5/16" | 8,4                     | 16,6                    | 2,2       | 47              | 12        |
| NLX10sp      | M10              | —     | 10,5                    | 21,0                    | 3,3       | 47              | 16        |
| NLX12sp      | M12              | —     | 12,5                    | 25,4                    | 4,0       | 61              | 20        |
| NLX16sp      | M16              | 5/8"  | 16,6                    | 30,7                    | 4,6       | 61              | 24        |
| NLX20sp      | M20              | —     | 27,0                    | 39,0                    | 6,1       | 61              | 24        |
| NLX24sp      | M24              | —     | 24,8                    | 47,0                    | 7,0       | 75              | 28        |



Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Main dimensions of Nord-Lock X-Series washers NLX and NLXsp

Annex B 8

In order to achieve the securing effect of the Nord-Lock washers or Nord-Lock X-series washers in the bolted connections, the tightening torques according to Table C1 shall be used.

**Table C1** Tightening torques in Nm to achieve the securing effect of the Nord-Lock washer or Nord-Lock X-series washer

| Nominal diameter <sup>1)</sup>                                                                                   | Bolts and nuts made of steel |      |      |      | Bolts and nuts made of stainless steel |      |
|------------------------------------------------------------------------------------------------------------------|------------------------------|------|------|------|----------------------------------------|------|
|                                                                                                                  | Property class               |      |      |      | Property class                         |      |
|                                                                                                                  | 4.6                          | 5.6  | 8.8  | 10.9 | 70                                     | 80   |
| M6                                                                                                               | 3                            | 3    | 8    | 11   | 5                                      | 7    |
| M8                                                                                                               | 7                            | 9    | 20   | 28   | 14                                     | 18   |
| M10                                                                                                              | 14                           | 18   | 37   | 55   | 27                                     | 35   |
| M12                                                                                                              | 24                           | 30   | 65   | 95   | 47                                     | 60   |
| M14                                                                                                              | 42                           | 45   | 115  | 165  | 70                                     | 100  |
| M16                                                                                                              | 62                           | 75   | 165  | 230  | 115                                    | 150  |
| M18                                                                                                              | 90                           | 100  | 250  | 355  | 150                                    | 210  |
| M20                                                                                                              | 120                          | 150  | 320  | 450  | 220                                    | 290  |
| M22                                                                                                              | 160                          | 200  | 430  | 610  | 295                                    | 410  |
| M24                                                                                                              | 210                          | 260  | 550  | 780  | 390                                    | 510  |
| M27                                                                                                              | 300                          | 360  | 800  | 1100 | 560                                    | 750  |
| M30                                                                                                              | 410                          | 510  | 1100 | 1500 | 750                                    | 1000 |
| M33                                                                                                              | 560                          | 670  | 1400 | 2100 | 1000                                   | 1300 |
| M36                                                                                                              | 720                          | 850  | 1900 | 2700 | 1300                                   | 1700 |
| M39                                                                                                              | 1000                         | 1100 | 2750 | 3900 | 2000                                   | 2700 |
| M42                                                                                                              | 1300                         | 1350 | 3500 | 4800 | 2600                                   | 3500 |
| M45                                                                                                              | 1600                         | 1650 | 4200 | 6000 | 3200                                   | 4200 |
| M48                                                                                                              | 1950                         | 2330 | 5200 | 7400 | 3900                                   | 5200 |
| <sup>1)</sup> The nominal diameters available for the individual series according to Table A1 must be considered |                              |      |      |      |                                        |      |

Deviating from the tightening torques specified in Table C1, lower tightening torques can also be used, provided that a procedural instruction based on EAD 331565-00-06027 is available for the respective individual case to check the securing effect.

Nord-Lock washers and Nord-Lock X-series washers  
for non-preloaded structural bolting assemblies

Execution instructions for bolting assemblies with Nord-Lock washers or  
Nord-Lock X-series washers

Annex C 1

The total layer thickness of metallic coatings and / or organic coatings shall not exceed 300 µm in the area of the Nord-Lock washers or Nord-Lock X-series washers.

The orientation of the Nord-Lock X-series washer (curved side facing towards or away from structural part) has no influence on the securing effect.

The components to be connected must lie directly on top of each other. Any gaps between the components must be closed after the bolts have been tightened. The bolt axis must be at right angles to the component surface. Any inclinations must be compensated for using suitable taper washers.

One Nord-Lock washer or Nord-Lock X-series washer must always be placed on the bolt head side and one on the nut side. Nord-Lock washers or Nord-Lock X-series washers can be combined with the same washer series (see Table A1). The limits of the permissible adjustment of the clamping lengths in accordance with EN 1090-2:2018-09 apply. A combination with other washers, except for non-rotating taper washers, is forbidden.

Note that each Nord-Lock washer or Nord-Lock X-series washer consists of two individual washers glued together. Nord-Lock washers or Nord-Lock X-series washers where this glue has already come loose before assembly shall no longer be used due to possible incorrect assembly.

Nord-Lock washers or Nord-Lock X-series washers may be reused if a procedural instruction based on EAD 331565-00-0602 is available for the respective individual case.

Nord-Lock washers and Nord-Lock X-series washers according to this assessment have been assessed in accordance with the regulations of EAD 331565-00-0602 section 2.2.3 on the securing effect and are maintenance-free.

|                                                                                                       |           |
|-------------------------------------------------------------------------------------------------------|-----------|
| Nord-Lock washers and Nord-Lock X-series washers<br>for non-preloaded structural bolting assemblies   | Annex C 2 |
| Execution instructions for bolting assemblies with Nord-Lock washers or<br>Nord-Lock X-series washers |           |