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**Approval body for construction products and types of construction**

**Bautechnisches Prüfamt**

An institution established by the Federal and Laender Governments

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# European Technical Assessment

# ETA-13/0048 of 10 January 2023

English translation prepared by DIBt - Original version in German language

**General Part**

| | |
|---|---|
| Technical Assessment Body issuing the European Technical Assessment: | Deutsches Institut für Bautechnik |
| Trade name of the construction product | SIKLA Nail Anchor AN N |
| Product family to which the construction product belongs | Fastener for use in concrete for redundant non-structural systems |
| Manufacturer | Sikla Holding GmbH<br>Ägydiplatz 3<br>A-4600 THALHEIM BEI WELS<br>ÖSTERREICH |
| Manufacturing plant | Sikla Herstellwerk 1 |
| This European Technical Assessment contains | 11 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 330747-00-0601, Edition 06/2018 |
| This version replaces | ETA-13/0048 issued on 30 January 2018 |

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## Specific Part

### 1 Technical description of the product

The SIKLA Nail Anchor AN N is a fastener made of galvanized or stainless steel which is placed into a drilled hole and expanded by loading.

The product description is given in Annex A.

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

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastener of at least 50 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 Safety in case of fire (BWR 2)

| Essential characteristic | Performance |
|---|---|
| Reaction to fire | Class A1 |
| Resistance to fire | See Annex C2 |

#### 3.2 Safety in use (BWR 4)

| Essential characteristic | Performance |
|---|---|
| Characteristic resistance for all load directions and modes of failure for simplified design | See Annex B2 and C1 |
| Durability | See Annex B1 |

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

In accordance with European Assessment Document EAD No. 330747-00-0601, the applicable European legal act is: [97/161/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 European Assessment Document

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

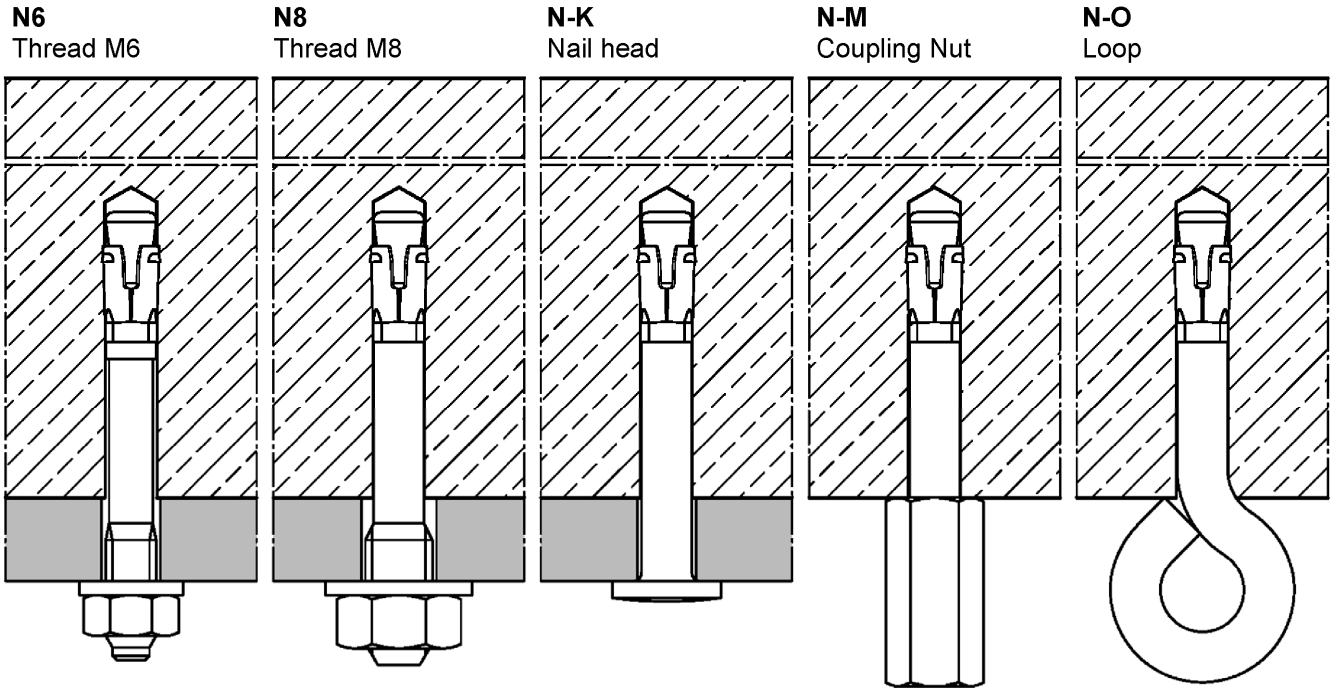
Issued in Berlin on 10 January 2023 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

*beglaubigt*:
Baderschneider

## SIKLA Nail Anchor AN N

### Installation condition and fastener versions

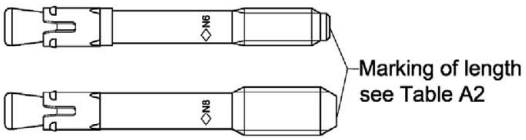
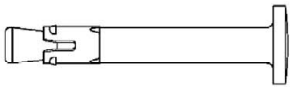
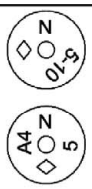
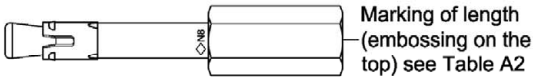
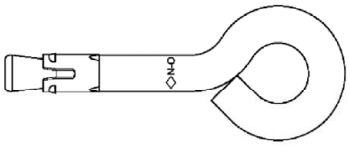



### Table A1: Materials

| Designation | Steel zinc plated | Stainless steel CRC III | High corrosion resistant steel CRC V |
|---|---|---|---|
| Conical bolt | Steel, galvanized ≥ 5 µm, fracture elongation $A_5$ ≥ 8% | Stainless steel, coated fracture elongation $A_5$ ≥ 8% | High corrosion resistant steel, coated fracture elongation $A_5$ ≥ 8% |
| Expansion sleeve | Stainless steel | Stainless steel | Stainless steel |
| Washer | Steel, galvanized ≥ 5 µm | Stainless steel | High corrosion resistant steel |
| Hexagon nut | | | |
| Coupling nut | Steel galvanized ≥ 5 µm | Stainless steel | High corrosion resistant steel |

| | |
|---|---|
| **SIKLA Nail Anchor AN N** | **Annex A1** |
| **Product description**<br>Installation conditions and fastener versions / Materials | |

## Marking

| Version | | Marking (examples) | Explanation |
|---|---|---|---|
| **N6**<br>Thread M6<br><br>**N8** [1)]<br>Thread M8 |  | ◇ N6 5/10<br>◇ N6 5 A4<br><br>◇ N8 5/10<br>◇ N8 5 A4 | ◇ manufacturer identification<br><br>N6 / N8 fastener identity with thread size M6 or M8<br><br>5 max. thickness of fixture for $h_{ef}$ = 30 mm<br>10 max. thickness of fixture for $h_{ef}$ = 25 mm<br><br><u>additional markings:</u><br><br>A4 stainless steel<br>HCR high corrosion resistant steel<br><br>-O fastener version: Loop |
| **N-K** [1)]<br>Nail head |  |  | |
| **N-M** [1)]<br>Coupling Nut<br>M8/M10<br>M8/M12 |  | ◇ N8 5/10<br>◇ N8 5 A4 | |
| **N-O**<br>Loop |  | ◇ N-O | |

[1)] optional with torsion protection

## Table A2: Length identification

| Fastener identifier | Marking | | Thickness of fixture | |
|---|---|---|---|---|
| | all materials | steel, zinc plated | at $h_{ef}$ = 30 mm | at $h_{ef}$ = 25 mm[1)] |
| A | 0 / 5 | | 0 | 5 |
| B | 5 / 10 | | 5 | 10 |
| C | 10 / 15 | | 10 | 15 |
| D | 15 / 20 | | 15 | 20 |
| E | 20 / 25 | | 20 | 25 |
| F | 25 / 30 | | 25 | 30 |
| G | 30 / 35 | | 30 | 35 |
| H | 35 / 40 | | 35 | 40 |
| I | 40 / 45 | | 40 | 45 |
| J | 45 / 50 | | 45 | 50 |
| K | 50 / 55 | | 50 | 55 |
| L | 55 / 60 | | 55 | 60 |
| M | 60 / 65 | | 60 | 65 |

| Ausführung identifier | Marking | | Thickness of fixture | |
|---|---|---|---|---|
| | all materials | steel, zinc plated | at $h_{ef}$ = 30 mm | at $h_{ef}$ = 25 mm[1)] |
| N | 65 / 70 | | 65 | 70 |
| O | 70 / 75 | | 70 | 75 |
| P | 75 / 80 | | 75 | 80 |
| Q | 80 / 85 | | 80 | 85 |
| R | 85 / 90 | | 85 | 90 |
| S | 90 / 95 | | 90 | 95 |
| T | 95 / 100 | | 95 | 100 |
| U | 100 / 105 | | 100 | 105 |
| V | 105 / 110 | | 105 | 110 |
| W | 110 / 115 | | 110 | 115 |
| X | 115 / 120 | | 115 | 120 |
| Y | 120 / 125 | | 120 | 125 |
| Z | 125 / 130 | | 125 | 130 |

[1)] for internal use only

**SIKLA Nail Anchor AN N**

**Product description**
Marking / Length identification

**Annex A2**

## Specifications of intended use

| **Nail Anchor AN N** | **N6** Thread M6 | **N8** Thread M6 | **N-K** Nail head | **N-M** Coupling nut | **N-O** Loop |
|---|---|---|---|---|---|
| Static or quasi-static action | ✓ | | | | |
| Fire exposure | R30 / R60 / R90 / R120 | | | | |
| Cracked or uncracked concrete | ✓ | | | | |
| Strength classes C12/15 to C50/60 according to EN 206:2013 + A1:2016 | ✓ | | | | |
| Compacted, reinforced or unreinforced normal weight concrete, without fibres according to EN 206:2013 + A1:2016 | ✓ | | | | |

| **Use conditions (environmental conditions):** | **Effective anchorage depth** |
|---|---|
| • Structures subject to dry internal conditions (zinc plated steel, stainless steel or high corrosion resistant steel) | $h_{ef}$ ≥ 30mm and $h_{ef,red}$ ≥ 25mm |
| • Structures subject to permanently damp internal conditions, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel) | $h_{ef}$ ≥ 30mm and $h_{ef,red}$ ≥ 25mm |
| • Structures subject to external atmospheric exposure including industrial and marine environment, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel) | $h_{ef}$ ≥ 30mm |
| • Structures subject to external atmospheric exposure and to permanently damp internal conditions, if other particular aggressive conditions exist (high corrosion resistant steel) | $h_{ef}$ ≥ 30mm |

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used.)

**Design:**

- Fastenings are designed under the responsibility of an engineer experienced in fastenings and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be fastened. The position of the fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.).
- Design of fastenings according to EN 1992-4:2018, simplified design method C
- Fasteners are only to be used for redundant non-structural systems.

**Installation:**

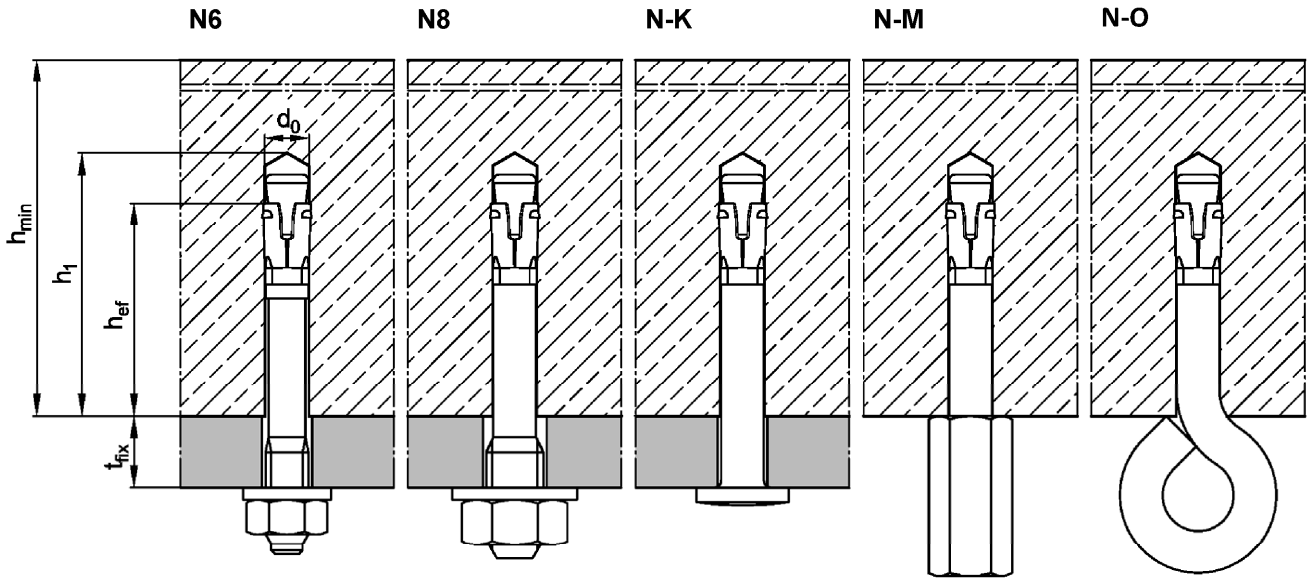
- Drill hole by hammer drilling or vacuum drilling.
- Installation only as supplied by the manufacturer, without replacement of individual parts.
- Fastener installation such that the effective setting depth is complied with. This compliance is ensured, if the admissible thickness of fixture is kept or the loop of Nail Anchor N-O rests on the concrete surface.

| **SIKLA Nail Anchor AN N** | **Annex B1** |
|---|---|
| **Intended Use**<br>Specifications | |

## Table B1: Installation parameters

| Fastener type | | | N6 N-K N-O | N8 N-M | N6 N-K N-O | N8 N-M |
|---|---|---|---|---|---|---|
| Effective anchorage depth | $h_{ef} \geq$ | [mm] | **25**[1)] | | **30** | |
| Nominal drill hole diameter | $d_0$ | [mm] | 6 | | 6 | |
| Cutting diameter to drill bit | $d_{cut} \leq$ | [mm] | 6,40 | | 6,40 | |
| Depth of drill hole | $h_1 \geq$ | [mm] | 35 | | 40 | |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 7 | 9 | 7 | 9 |
| Maximum tightening torque **(N 6 and N 8)** | $T_{inst} \leq$ | [Nm] | 4 | | 4 | |
| Minimum member thickness | $h_{min}$ | [mm] | 80 | | 80 | |

[1)] Internal use only

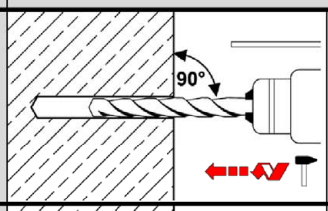
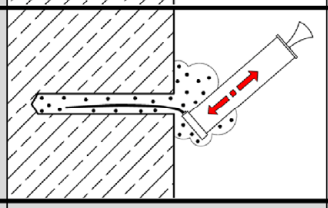
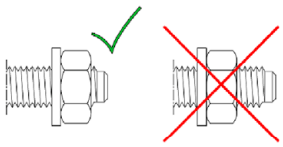
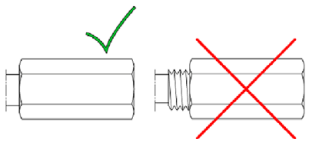
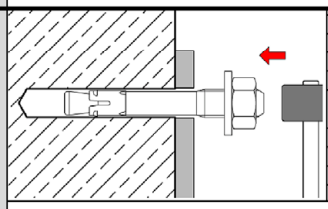
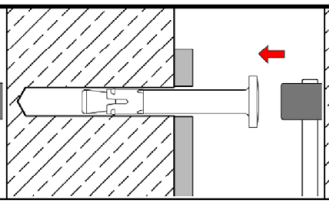
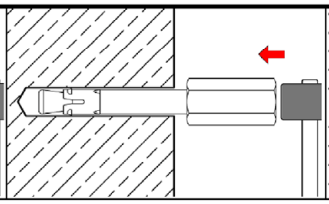
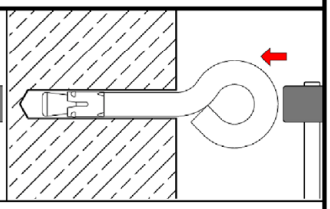
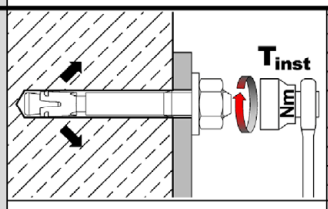
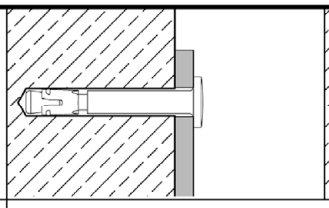
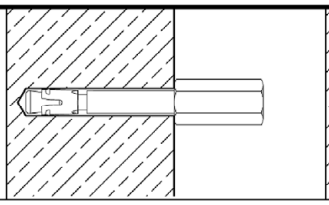
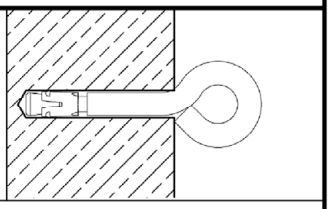



**SIKLA Nail Anchor AN N**

**Intended Use**
Installation parameters

**Annex B2**

## Installation instructions

| | All fastener types | | | |
|---|---|---|---|---|
| 1 |   | Drill hole perpendicular to the concrete surface by hammer drilling or vacuum drilling. | | |
| 2 |  | Blow out dust. Alternatively, vacuum clean down to the bottom of the hole. | | |
| | **N6 / N8**<br>Thread M6 / M8 | **N-K**<br>Nail head | **N-M**<br>Coupling nut | **N-O**<br>Loop |
| 3 |  | - |  | - |
| | Check position of nut. | | | |
| 4 |  |  |  |  |
| | Drive in fastener. | | | |
| 5 |   |  |  |  |
| | Apply installation torque $T_{inst} \leq 4$ Nm. | Installation condition | | |

## Table C1: Characteristic resistance for a fixing point [1], all directions, design method C

| **Fastener type** | | | **N6** | **N8 N-K N-M** | **N-O** | **N6** | **N8 N-K N-M** | **N-O** |
|---|---|---|---|---|---|---|---|---|
| **Effective anchorage depth** | $h_{ef}$ | **[mm]** | **25** | | | **30** | | |
| **Optimized for maximum load** | | | | | | | | |
| Characteristic resistance **C12/15** | $F_{Rk}$ | [kN] | 3,0 | 3,0 | 1,5 | 4,0 | 4,0 | 1,5 |
| Characteristic resistance **C20/25** to **C50/60** | $F_{Rk}$ | [kN] | 4,5 | 4,5 | 1,5 | 5,9 | 5,9 | 1,5 |
| Respective spacing between fixing points [1) 2)] | $s_{cr}$ | [mm] | 100 | | | | | |
| | for $c_{cr} \geq$ | [mm] | 200 | | | | | |
| Respective edge distance [2)] | $c_{cr}$ | [mm] | 100 | | | | | |
| | for $s_{cr} \geq$ | [mm] | 200 | | | | | |
| Partial factor | $\gamma_M$ | - | 1,5 | | | | | |
| **Optimized for minimum edge distance** | | | | | | | | |
| Characteristic resistance **C12/15** | $F_{Rk}$ | [kN] | 1,5 | 1,5 | 1,5 | 2,0 | 2,0 | 1,5 |
| Characteristic resistance **C20/25** to **C50/60** | $F_{Rk}$ | [kN] | 2,0 | 2,0 | 1,5 | 2,5 | 2,5 | 1,5 |
| Respective spacing between fixing points [1) 2)] | $c_{cr}$ | [mm] | 50 | | | | | |
| | for $s_{cr} \geq$ | [mm] | 100 | | | | | |
| Partial factor | $\gamma_M$ | - | 1,5 | | | | | |
| **Shear load with lever arm** | | | | | | | | |
| Characteristic bending resistance, **steel, zinc plated** | $M^0_{Rk,s}$ | [Nm] | 9,2 | 12,7 | [3)] | 9,2 | 12,7 | [3)] |
| Characteristic bending resistance, **stainless steel A4 / HCR** | $M^0_{Rk,s}$ | [Nm] | 9,2 | 13,5 | [3)] | 9,2 | 13,5 | [3)] |
| Partial factor | $\gamma_{Ms}$ | - | 1,25 | | | | | |

[1)] A fixing point is defined as:
- Single fastener
- Fastener group with a minimum spacing s of 50 mm ≤ s < $s_{cr}$

If the spacing in a fixing point is greater than or equal to the respective spacing in this table, the characteristic resistances apply to every single fastener.

[2)] Intermediate values can be linearly interpolated

[3)] No performance assessed.

## Table C2: Characteristic resistance for a fixing point [1] under **fire exposure** in concrete C20/25 to C50/60, design method C

| Fire resistance class | | | | Fastener type | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N6 N8 | N-K | N-M[3] | N-O | N6 N8 | N-K | N-M[3] | N-O |
| **Effective anchorage depth** | | $h_{ef}$ | [mm] | **25** | | | | **30** | | | |
| **Load in any direction** | | | | | | | | | | | |
| R 30 | Characteristic resistance, **steel zinc plated** | $F_{Rk,fi}$ | [kN] | 0,6 | 0,6 | 0,6 | 0,2 | 0,9 | 0,9 | 0,8 | [2] |
| R 60 | | | | 0,6 | 0,6 | 0,6 | 0,2 | 0,7 | 0,8 | 0,7 | [2] |
| R 90 | | | | 0,5 | 0,6 | 0,6 | 0,1 | 0,5 | 0,6 | 0,6 | [2] |
| R 120 | | | | 0,4 | 0,5 | 0,5 | 0,1 | 0,4 | 0,5 | 0,6 | [2] |
| R 30 | Characteristic resistance, **stainless steel A4 / HCR** | $F_{Rk,fi}$ | [kN] | 0,6 | 0,6 | 0,6 | 0,2 | 0,9 | 0,9 | 0,8 | 0,2 |
| R 60 | | | | 0,6 | 0,6 | 0,6 | 0,2 | 0,9 | 0,9 | 0,7 | 0,2 |
| R 90 | | | | 0,5 | 0,6 | 0,6 | 0,1 | 0,9 | 0,9 | 0,6 | 0,1 |
| R 120 | | | | 0,4 | 0,5 | 0,5 | 0,1 | 0,7 | 0,7 | 0,6 | 0,1 |
| R 30 - R 120 | Edge distance | $c_{cr,fi}$ | [mm] | 50 | | | | 50 | | | |
| | Spacing | $s_{cr,fi}$ | [mm] | 100 | | | | 100 | | | |
| **Shear load with lever arm** | | | | | | | | | | | |
| R 30 | Characteristic resistance, **steel zinc plated** | $M^0_{Rk,fi}$ | [Nm] | 0,7 | 1,0 | 0,7 | [2] | 0,7 | 1,0 | 0,7 | [2] |
| R 60 | | | | 0,5 | 0,8 | 0,7 | [2] | 0,5 | 0,8 | 0,7 | [2] |
| R 90 | | | | 0,4 | 0,5 | 0,6 | [2] | 0,4 | 0,5 | 0,6 | [2] |
| R 120 | | | | 0,3 | 0,4 | 0,5 | [2] | 0,3 | 0,4 | 0,5 | [2] |
| R 30 | Characteristic resistance, **stainless steel A4 / HCR** | $M^0_{Rk,fi}$ | [Nm] | 1,4 | 2,1 | 0,7 | [2] | 1,4 | 2,1 | 0,7 | [2] |
| R 60 | | | | 1,1 | 1,5 | 0,7 | [2] | 1,1 | 1,5 | 0,7 | [2] |
| R 90 | | | | 0,7 | 1,0 | 0,6 | [2] | 0,7 | 1,0 | 0,6 | [2] |
| R 120 | | | | 0,5 | 0,7 | 0,5 | [2] | 0,5 | 0,7 | 0,5 | [2] |
| **If the fire attack is from more than one side, the edge distance shall be ≥ 300 mm** | | | | | | | | | | | |

[1] A fixing point is defined as:
- Single fastener,
- Fastener group with a minimum spacing s of 50 mm ≤ s < $s_{cr}$

If the spacing in a fixing point is greater than or equal to the respective spacing in this table, the characteristic resistances apply to every single fastener

[2] No performance assessed

[3] Only in connection with threaded rods M8, M10 or M12 minimum strength class 5.8.

**SIKLA Nail Anchor AN N**

**Performances**
Characteristic resistance under fire exposure

**Annex C2**