

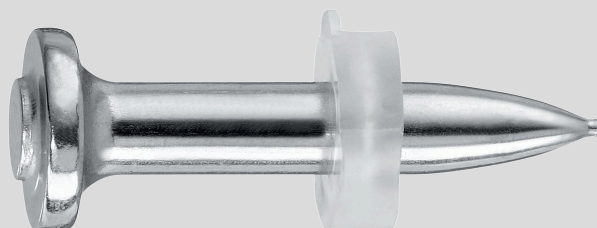


# X-CR

## Stainless steel nails

### Data Sheet

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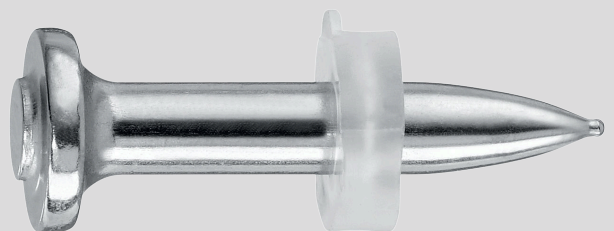


# X-CR

## Stainless steel nails

### Data Sheet

[English](#)

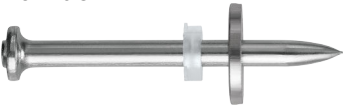


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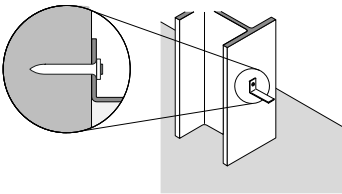
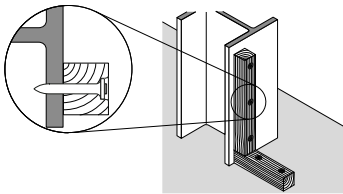
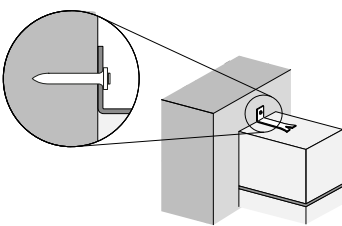
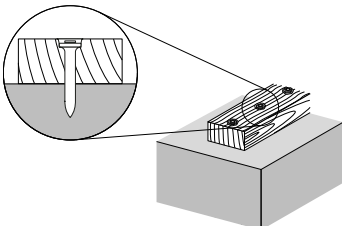
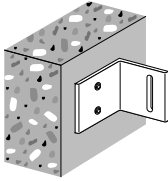
# 1 PRODUCT INFORMATION

## 1.1 Product description

| Designation                                                                                        | Features                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>X-CR P8</p>    | <ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Corrosion-resistant</li> <li>• Nails for fastening to concrete or steel</li> <li>• Engineered for high-quality, reliable fastening</li> <li>• Suitable for universal use</li> <li>• Available in lengths up to 54 mm</li> </ul>                                  |
| <p>X CR P8 S</p>  | <ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• Corrosion-resistant</li> <li>• Nails for fastening to concrete</li> <li>• Engineered for high-quality, more reliable fastening</li> <li>• Suitable for universal use</li> <li>• High pull-over resistance</li> <li>• Available in lengths up to 53 mm</li> </ul> |

# 2 APPLICATION CONDITIONS

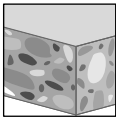
## 2.1 Fastening conditions

|                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |                                                                                       |
| Steel to steel, Aluminum to steel                                                   | Wood to steel                                                                        |                                                                                       |
|  |  |  |
| Steel to concrete                                                                   | Wood to concrete                                                                     | Hilti brackets MFT-FOXV, MFT-FOX VI to concrete                                       |

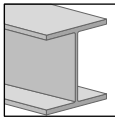


- Fasteners X-CR P8 S15 are specially for fastening rear-ventilated facade consoles.

2.2 Base materials



Concrete



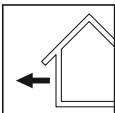
Steel

2.3 Load conditions



Static / quasi-static

## 2.4 Environmental conditions

| Environmental condition                                                                                                                                                                                          | X-CR |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|  <p>Dry indoor</p>                                                                                                              | ■    |
|  <p>Indoor environments with temporary condensation</p>                                                                         | ■    |
|  <p>Outdoor, rural or urban environment with low pollution</p>                                                                  | ■    |
|  <p>1-10km</p> <p>Outdoor, rural or urban environment with moderate concentration of pollutants and/or salt from sea water</p> | ■    |
|  <p>0-1km</p> <p>Coastal areas</p>                                                                                            | ■    |
|  <p>Outdoor, areas with heavy industrial pollution</p>                                                                        | ■    |
|  <p>Close proximity to roadways treated with de-icing salts</p>                                                               | ■    |
|  <p>Special applications, e.g. swimming pool</p>                                                                              | ■    |
|  <p>Special applications, e.g. tunneling</p>                                                                                  | ■    |

- Suitable for corrosion prevention
- Requires expert evaluation

 • For more details, please refer to the [Hilti Corrosion Handbook](#).

## 2.5 Forces of constraints for fastening to steel

| Technical drawing | Description                                              |
|-------------------|----------------------------------------------------------|
|                   | No constraint forces, undisturbed system.                |
|                   | Constraint forces due to primary loading and deflection. |
|                   | Constraint forces due to temperature effect.             |



- When fastening large pieces of steel or aluminium, the possibility of shear loading due to forces of constraint must be taken into account in the fastening design. Allowance must be made for movement or, alternatively, forces of constraint must be taken into account in the design.

## 3 APPROVALS AND CERTIFICATES

| Authority                                                           | Approval/Certificate number                 | Date of issue |
|---------------------------------------------------------------------|---------------------------------------------|---------------|
| American Bureau of Shipping (ABS)                                   | <a href="#">21-2146145-PDA</a>              | 2 Aug 2021    |
| Deutsches Institut für Bautechnik (DIBt)                            | <a href="#">ETA-14/0426</a>                 | 28 Apr 2021   |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/1985 wydanie 1</a> | 2 Dec 2021    |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/2019 wydanie 1</a> | 2 Dec 2021    |
| International Code Council - Evaluation Service (ICC-ES)            | <a href="#">ESR-1663</a>                    | 1 Mar 2023    |
| Lloyd's Register (LR)                                               | <a href="#">LR 2410653TA</a>                | 21 Nov 2023   |
| Romanian Ministry of Regional Development and Public Administration | RO AT 016-01_516-2023                       | 28 Apr 2023   |



- Not all information presented in this product data sheet might be subject to approval/certificate content.
- Information presented in this product data sheet might also be based on Hilti Technical Data.
- Please refer to approval/certificate for further information.

## 4 PRODUCT DATA

### 4.1 Dimensions

| Technical drawing | Fastener           | Shank length        | Head length         | Shank diameter      | Head diameter       | Steel washer size   |
|-------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                   |                    | L <sub>s</sub> [mm] | L <sub>h</sub> [mm] | d <sub>s</sub> [mm] | d <sub>h</sub> [mm] | d <sub>w</sub> [mm] |
|                   | X-CR 16 P8         | 16                  | 2.4                 | 3.7                 | 8                   |                     |
|                   | X-CR 18 P8         | 18                  | 2.4                 | 3.7                 | 8                   |                     |
|                   | X-CR 21 P8         | 21                  | 2.4                 | 3.7                 | 8                   |                     |
|                   | X-CR 24 P8         | 24                  | 2.4                 | 3.7                 | 8                   |                     |
|                   | X-CR 29 P8         | 29                  | 2.4                 | 3.7                 | 8                   |                     |
|                   | X-CR 34 P8         | 34                  | 2.4                 | 3.7                 | 8                   |                     |
|                   | X-CR 39 P8         | 39                  | 2.4                 | 4                   | 8                   |                     |
|                   | X-CR 44 P8         | 44                  | 2.4                 | 4                   | 8                   |                     |
|                   | X-CR 54 P8         | 54                  | 2.4                 | 4                   | 8                   |                     |
|                   | X-CR 39 P8 S12     | 39                  | 2.4                 | 4                   | 8                   | 12                  |
|                   | X-CR 44 P8 S12     | 44                  | 2.4                 | 4                   | 8                   | 12                  |
|                   | X-CR 48 P8 S15     | 48                  | 2.4                 | 4                   | 8                   | 15                  |
|                   | X-CR 52 P8 S15     | 52                  | 2.4                 | 4                   | 8                   | 15                  |
|                   | X-CR-FOX 53 P8 S15 | 53                  | 2.4                 | 4                   | 8                   | 15                  |

### 4.2 Material properties for stainless steel parts

| Fastener                   | Component part | Material        | Steel grade | Standard | Coating thickness   | Hardness | Corrosion resistance class |
|----------------------------|----------------|-----------------|-------------|----------|---------------------|----------|----------------------------|
|                            |                |                 |             |          | t <sub>c</sub> [μm] | [HRC]    |                            |
| X-CR 16 P8 -<br>X-CR 21 P8 | Nail           | Stainless steel | Cr-Ni-steel |          |                     | 51       | CRC IV                     |
| X-CR 24 P8 -<br>X-CR 54 P8 | Nail           | Stainless steel | Cr-Ni-steel |          |                     | 49       | CRC IV                     |
| X-CR P8 S12                | Nail           | Stainless steel | Cr-Ni-steel |          |                     | 49       | CRC IV                     |
| X-CR P8 S15                | Nail           | Stainless steel | Cr-Ni-steel |          | ≥ 5                 | 49       | CRC IV                     |
| X-CR-FOX P8 S15            | Nail           | Stainless steel | Cr-Ni-steel |          | ≥ 5                 | 49       | CRC IV                     |
| X-CR P8 S12                | Steel washer   | Stainless steel | 1.4435      | EN 10088 |                     |          | CRC III                    |
| X-CR P8 S15                | Steel washer   | Stainless steel | 1.4435      | EN 10088 |                     |          | CRC III                    |
| X-CR-FOX P8 S15            | Steel washer   | Stainless steel | 1.4435      | EN 10088 |                     |          | CRC III                    |



- Corrosion resistance class according to EN 1993-1-4.
- Zinc coating on stainless steel nails to improve anchorage in concrete.



### 4.3 Material properties for plastic parts

| Fastener                                                 | Component part | Material          | Color       |
|----------------------------------------------------------|----------------|-------------------|-------------|
| X-CR P8, X-CR P8 S12,<br>X-CR P8 S15,<br>X-CR-FOX P8 S15 | Plastic washer | Polyethylene (PE) | Transparent |

## 5 SYSTEM RECOMMENDATION

### 5.1 Tool recommendation

| Fastening condition                                  | Fastener                                                                  | Tool type                         |
|------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|
| Steel to steel, Aluminum to steel, Steel to concrete | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | DX 6 F8, DX 5 F8, DX 450-FA       |
| Wood to steel, Wood to concrete                      | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | DX 6 F8, DX 5 F8, DX 460 F8, DX 2 |
| Steel to concrete                                    | X-CR 39 P8 S12, X-CR 44 P8 S12                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
|                                                      | X-CR 48 P8 S15, X-CR 52 P8 S15                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
| Hilti brackets MFT-FOXV, MFT-FOX VI to concrete      | X-CR 48 P8 S15, X-CR 52 P8 S15,<br>X-CR-FOX 53 P8 S15                     | DX 6 F8, DX 5 F8, DX 460 F8       |



- For more details, please refer to the chapter Accessories and consumables compatibility in the [Direct Fastening Technology Manual \(DFTM\)](#).
- For more details for fastenings with X-CR 48 P8S15, X-CR 52 P8S15, X-CR-FOX 53 FOX P8S15, please refer to [ETA-14/0426](#).

## 5.2 Cartridge recommendation

| Fastening condition | Base material type                | Tool type                | Cartridge type     | Cartridge color | Tool power level |
|---------------------|-----------------------------------|--------------------------|--------------------|-----------------|------------------|
| Steel to concrete   | Soft concrete,<br>Medium concrete | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanium        | 4 – 8            |
|                     |                                   | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Red             |                  |
|                     | Tough concrete                    | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanium        | 4 – 8            |
|                     |                                   | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Red             |                  |
| Wood to concrete    | Soft concrete,<br>Medium concrete | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanium        | 2 – 8            |
|                     |                                   | DX 5 F8, DX 460 F8, DX 2 | 6.8/11 M10         | Yellow,<br>Red  |                  |

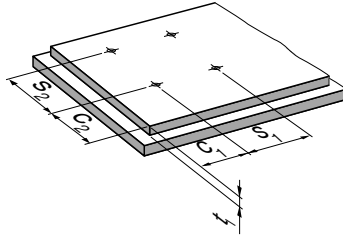
| Fastening condition                  | Base material thickness | Base material tensile strength | Tool type             | Cartridge type     | Cartridge color | Tool power level |
|--------------------------------------|-------------------------|--------------------------------|-----------------------|--------------------|-----------------|------------------|
|                                      | $t_H$ [mm]              | $R_m$ [MPa]                    |                       |                    |                 |                  |
| Steel to steel,<br>Aluminum to steel | > 6 – 8                 | 360 – 630                      | DX 6 F8               | 6.8/11 M10 for DX6 | Titanium        | 6 – 8            |
|                                      | > 6 – 8                 | 360 – 630                      | DX 5 F8               | 6.8/11 M10         | Red             | 3 – 4            |
|                                      | 4 – 6                   | 360 – 630                      | DX 450-FA             | 6.8/11 M10         | Yellow          | 1 – 3            |
|                                      | > 6 – 8                 | 360 – 630                      | DX 450-FA             | 6.8/11 M10         | Red             | 2 – 3            |
|                                      | > 8 – 10                | 360 – 400                      | DX 450-FA             | 6.8/11 M10         | Red             | 2.5 – 3          |
| Wood to steel                        | 5 – 10                  | 360 – 630                      | DX 6 F8               | 6.8/11 M10 for DX6 | Titanium        | 2 – 8            |
|                                      | 5 – 10                  | 360 – 630                      | DX 5 F8,<br>DX 460 F8 | 6.8/11 M10         | Yellow,<br>Red  |                  |



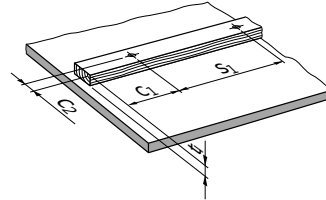
- Tool power level adjustment by setting tests on site.
- Start tool energy selection with recommended tool power level.
- Adjust tool energy according to requirement from chapter quality assurance.

## 6 APPLICATION REQUIREMENTS

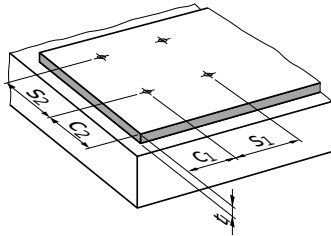
### 6.1 Fastened material properties



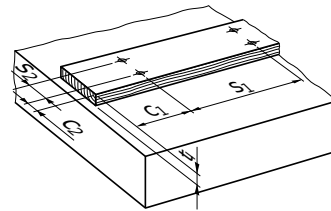
Steel to steel, Aluminium to steel



Wood to steel



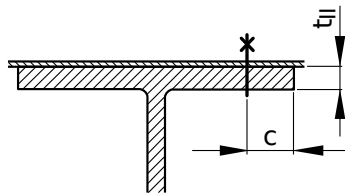
Steel to concrete



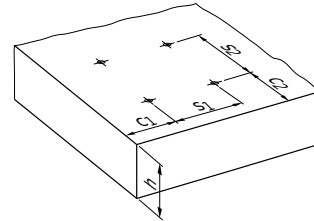
Wood to concrete

| Fastening condition                                        | Fastener                    | Fastened material thickness | Fastened material tensile strength | Edge distance | Edge distance | Fastener spacing distance | Fastener spacing distance |
|------------------------------------------------------------|-----------------------------|-----------------------------|------------------------------------|---------------|---------------|---------------------------|---------------------------|
|                                                            |                             | $t_1$ [mm]                  | $R_m$ [MPa]                        | $c_1$ [mm]    | $c_2$ [mm]    | $s_1$ [mm]                | $s_2$ [mm]                |
| Steel to steel,<br>Steel to concrete                       | X-CR 16 P8 -<br>X-CR 21 P8  | 0.75–8                      | $\geq 370$                         | $\geq 20$     | $\geq 20$     | $\geq 20$                 | $\geq 20$                 |
| Steel to steel,<br>Aluminum to steel,<br>Steel to concrete | X-CR P8 S12,<br>X-CR P8 S15 | $\leq 9$                    |                                    | $\geq 18$     |               |                           |                           |
| Aluminum to steel                                          | X-CR 16 P8 -<br>X-CR 21 P8  | 0.8–2                       | $\geq 210$                         | $\geq 20$     | $\geq 20$     | $\geq 20$                 | $\geq 20$                 |
| Wood to steel,<br>Wood to concrete                         | X-CR 24 P8 -<br>X-CR 54 P8  | 5–25                        |                                    |               |               |                           |                           |

## 6.2 Base material properties



Fastening to steel



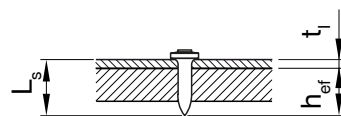
Fastening to concrete

| Base material | Base material thickness | Base material thickness | Edge distance | Edge distance | Fastener spacing distance | Fastener spacing distance |
|---------------|-------------------------|-------------------------|---------------|---------------|---------------------------|---------------------------|
|               | $t_{II}$ [mm]           | $h$ [mm]                | $c_1$ [mm]    | $c_2$ [mm]    | $s_1$ [mm]                | $s_2$ [mm]                |
| Concrete      |                         | $\geq 80$               | $\geq 70$     | $\geq 70$     | $\geq 100$                | $\geq 100$                |
| Steel         | 5 - <7                  |                         | $\geq 25$     |               |                           |                           |
| Steel         | 7 - 10                  |                         | $\geq 10$     |               |                           |                           |

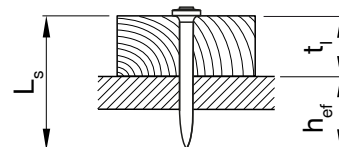


- Base material thickness  $h \geq 80$  mm for shank length diameter  $d_s = 3.7$  mm.
- Base material thickness  $h \geq 90$  mm for shank length diameter  $d_s = 4.0$  mm.
- For more details in relation to base material properties, please refer to the chapter Fastener selection guide in the [Direct Fastening Technology Manual \(DFTM\)](#).

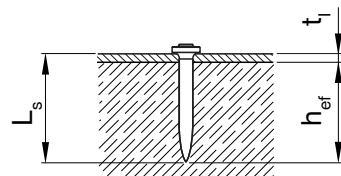
## 6.3 Nail length recommendation



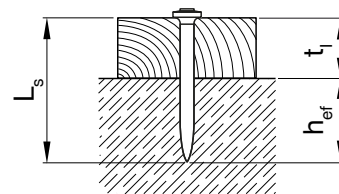
Aluminum to steel, Steel to steel



Wood to steel



Steel to concrete

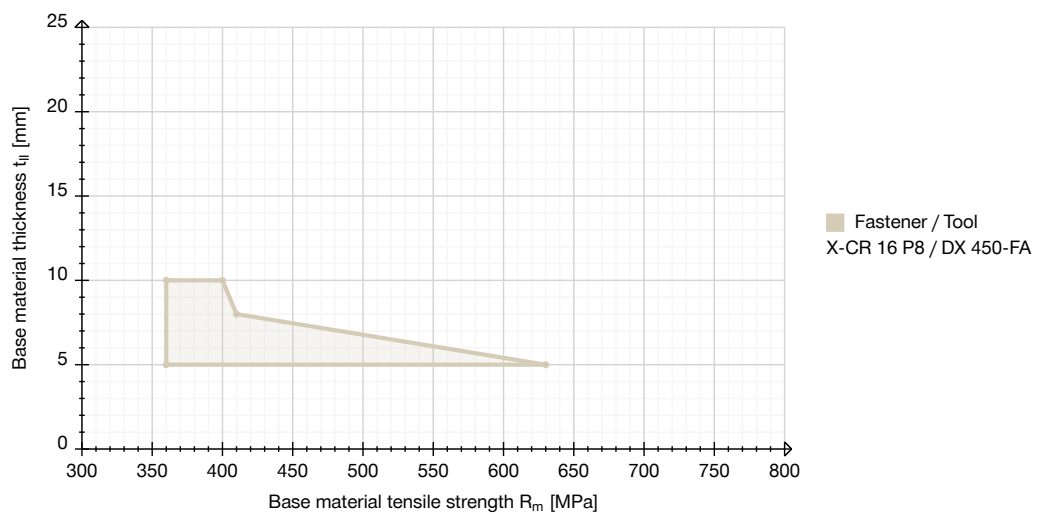


Wood to concrete

| Fastening condition                                      | Fastening characteristics | Shank Length<br>$L_s$ [mm] | Embedment depth<br>$h_{ef}$ [mm] | Fastened material thickness<br>$t_f$ [mm] | Fastener recommendation                                                               |
|----------------------------------------------------------|---------------------------|----------------------------|----------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------|
| Steel to steel                                           | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 9$                         | 0.75–8                                    | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Aluminum to steel                                        | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 9$                         | 0.8–2                                     | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Wood to steel                                            | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 9$                         | 5–45                                      | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 |
| Steel to concrete                                        | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 9$                         | 0.75–8                                    | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
|                                                          | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 27$                        | $\leq 2$                                  | X-CR 39 P8 S12                                                                        |
|                                                          | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 32$                        | 2–7                                       | X-CR 44 P8 S12                                                                        |
|                                                          | Standard fastening        | $L_s \geq h_{ef} + t_f$    | 40–45                            | 5–9                                       | X-CR 52 P8 S15                                                                        |
|                                                          | Standard fastening        | $L_s \geq h_{ef} + t_f$    | 40–45                            | $\leq 5$                                  | X-CR 48 P8 S15                                                                        |
| Wood to concrete                                         | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 27$                        | 5–25                                      | X-CR 34 P8,<br>X-CR 39 P8                                                             |
|                                                          | Standard fastening        | $L_s \geq h_{ef} + t_f$    | $\geq 32$                        | 5–25                                      | X-CR 44 P8,<br>X-CR 54 P8                                                             |
| Hilti brackets<br>MFT-FOXV,<br>MFT-FOX VI to<br>concrete | Standard fastening        | $L_s \geq h_{ef} + t_f$    | 40–45                            | 5–10                                      | X-CR-FOX 53 P8<br>S15                                                                 |

## 6.4 Application range for fastening to steel

### Steel to steel



The marked area represents the admissible field of application.

## 7 PERFORMANCE DATA

### 7.1 Recommended loads under quasi static/static loading

| Fastening condition | Fastener                                                                              | Fastened material thickness | Tension load   | Shear load     |
|---------------------|---------------------------------------------------------------------------------------|-----------------------------|----------------|----------------|
|                     |                                                                                       | $t_f$ [mm]                  | $N_{rec}$ [kN] | $V_{rec}$ [kN] |
| Steel to steel      | X-CR 16 P8                                                                            | 0.75                        | 1              | 1.1            |
|                     | X-CR 16 P8                                                                            | 1                           | 1.2            | 1.4            |
|                     | X-CR 16 P8                                                                            | 1.25                        | 1.5            | 1.7            |
|                     | X-CR 16 P8                                                                            | 2                           | 2.2            | 2              |
|                     | X-CR 16 P8                                                                            | 3–6                         | 1.6            | 2              |
|                     | X-CR 18 P8                                                                            | 6–8                         | 1.6            | 2              |
|                     | X-CR 21 P8                                                                            | 8–11                        | 1.6            | 2              |
| Aluminum to steel   | X-CR 16 P8                                                                            | 0.8                         | 0.4            | 0.4            |
|                     | X-CR 16 P8                                                                            | 1                           | 0.6            | 0.6            |
|                     | X-CR 16 P8                                                                            | 1.2                         | 0.8            | 0.9            |
|                     | X-CR 16 P8                                                                            | 1.5                         | 1.1            | 1.4            |
|                     | X-CR 16 P8                                                                            | 2                           | 1.6            | 1.7            |
| Wood to steel       | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 | 5–25                        | 0.6            | 0.6            |



- Recommended loads  $N_{rec}$  and  $V_{rec}$  are suitable for use in working load design concept with  $\gamma_{global} = 3.0$ .
- For intermediate fastened material thicknesses, use load for smaller thickness.
- Fastened material failure is not being considered.

| Fastening condition                    | Fastener                                       | Embedment depth | Tension load   | Shear load     |
|----------------------------------------|------------------------------------------------|-----------------|----------------|----------------|
|                                        |                                                | $h_{ef}$ [mm]   | $N_{rec}$ [kN] | $V_{rec}$ [kN] |
| Steel to concrete,<br>Wood to concrete | X-CR 24 P8, X-CR 29 P8                         | $\geq 18$       | 0.2            | 0.2            |
|                                        |                                                | $\geq 22$       | 0.3            | 0.3            |
|                                        | X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | $\geq 18$       | 0.2            | 0.2            |
|                                        |                                                | $\geq 22$       | 0.3            | 0.3            |
|                                        |                                                | $\geq 27$       | 0.4            | 0.4            |

| Fastening condition | Fastener                       | Base material state | Tension load   | Shear load     | Bending moment  |
|---------------------|--------------------------------|---------------------|----------------|----------------|-----------------|
|                     |                                |                     | $N_{rec}$ [kN] | $V_{rec}$ [kN] | $M_{rec}$ [kNm] |
| Steel to concrete   | X-CR 39 P8 S12, X-CR 44 P8 S12 | Concrete cracked    | 0.6            | 2              | 5.5             |
|                     | X-CR 48 P8 S15                 | Concrete cracked    | 0.9            | 3              | 5.5             |
|                     | X-CR 39 P8 S12, X-CR 44 P8 S12 | Concrete uncracked  | 2              | 2              | 5.5             |
|                     | X-CR 48 P8 S15                 | Concrete uncracked  | 3              | 3              | 5.5             |



- For more details for fastenings with X-CR 48 P8 S15, X-CR 52 P8 S15, X-CR-FOX 53 FOX P8 S15, please refer to [ETA-14/0426](#).

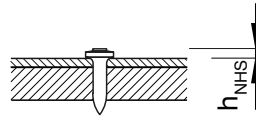
## 8 SPECIFICATION FOR INSTALLATION

### 8.1 Installation characteristics

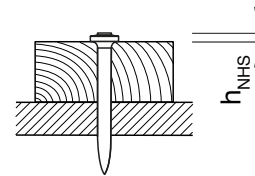
| Fastener                       | Installation method                                  | Fastened material | Fastened material thickness<br>$t_f$ [mm] | Base material | Base material concrete class | Drill bit |
|--------------------------------|------------------------------------------------------|-------------------|-------------------------------------------|---------------|------------------------------|-----------|
| X-CR 16 P8                     | Pre-drilling fastened material                       | Steel             | 3–6                                       |               |                              |           |
| X-CR 18 P8                     | Pre-drilling fastened material                       | Steel             | 6–8                                       |               |                              |           |
| X-CR 18 P8                     | Pre-drilling fastened material                       | Steel             | 8–11                                      |               |                              |           |
| X-CR 39 P8 S12, X-CR 44 P8 S12 | Pre-drilling base material                           |                   |                                           | Concrete      | C20/25 - C45/55              | TX-C-5/18 |
| X-CR 48 P8 S15, X-CR 52 P8 S15 | Pre-drilling base material                           |                   |                                           | Concrete      | C20/25 - C45/55              | TX-C-5/23 |
| X-CR 48 P8 S15                 | Pre-drilling base material through fastened material | Steel             | ≤2                                        | Concrete      | C20/25 - C50/60              | TX-C-5/23 |

## 9 QUALITY ASSURANCE

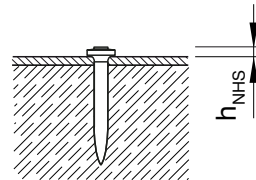
### 9.1 Fastening inspection



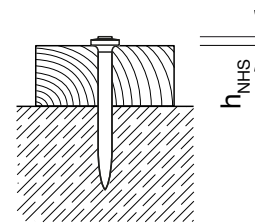
Steel to steel, Aluminum to steel



Wood to steel



Steel to concrete



Wood to concrete

| Fastening condition                                  | Fastener                                                                  | Fastener standoff<br>$h_{NHS}$ [mm] |
|------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------|
| Steel to steel, Aluminum to steel, Steel to concrete | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | 3 – 4.5                             |
| Wood to steel, Wood to concrete                      | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | 3 – 4.5                             |
| Steel to concrete                                    | X-CR 39 P8 S12, X-CR 44 P8 S12                                            | $\leq 5$                            |
| Steel to concrete                                    | X-CR 48 P8 S15, X-CR 52 P8 S15                                            | $\leq 5$                            |



- Visible setting failures must be replaced with a new fastener, not in the same hole.
- These are abbreviated instructions which may vary by application.
- Always review/ follow the instructions accompanying the product.



## 10 ORDERING INFORMATION

### 10.1 Item number and description

| Designation        | Item number    | Description                                |
|--------------------|----------------|--------------------------------------------|
| X-CR 39 P8 S12     | 247354, 298861 | X-CR P8 S Steel/concrete nails with washer |
| X-CR 44 P8 S12     | 247355, 298862 |                                            |
| X-CR 48 P8 S15     | 258121         |                                            |
| X-CR 52 P8 S15     | 2052687        |                                            |
| X-CR-FOX 53 P8 S15 | 2305190        |                                            |
| X-CR 16 P8         | 247356         | X-CR P8 Stainless steel nails              |
| X-CR 18 P8         | 247357         |                                            |
| X-CR 21 P8         | 247358         |                                            |
| X-CR 24 P8         | 247359         |                                            |
| X-CR 29 P8         | 247360         |                                            |
| X-CR 34 P8         | 247361         |                                            |
| X-CR 39 P8         | 247362         |                                            |
| X-CR 44 P8         | 247363         |                                            |
| X-CR 54 P8         | 247429         | X-CR S12 Stainless steel nails with washer |
| X-CR 16 S12        | 298855         |                                            |
| X-CR 18 S12        | 298856         |                                            |
| X-CR 21 S12        | 298857         |                                            |
| X-CR 24 S12        | 298858         |                                            |
| X-CR 29 S12        | 298859         |                                            |
| X-CR 34 S12        | 298860         |                                            |



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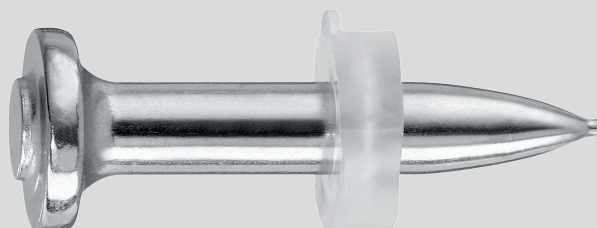


# X-CR

**Edelstahlnägel**

Datenblatt

[Deutsch](#)



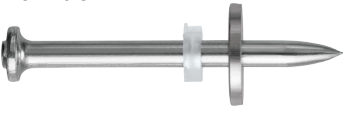
10.01.2025

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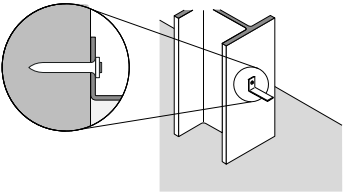
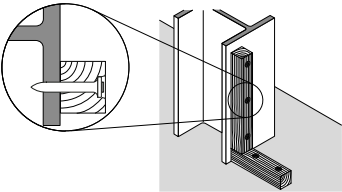
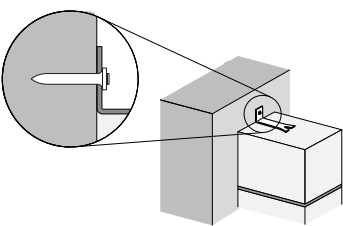
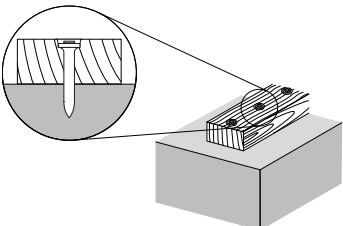
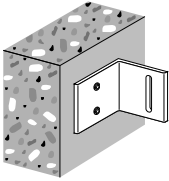
# 1 PRODUKTINFORMATIONEN

## 1.1 Produktbeschreibung

| Bezeichnung                                                                                        | Besondere Eigenschaften                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>X-CR P8</p>    | <ul style="list-style-type: none"> <li>• Nichtrostender Stahl</li> <li>• Korrosionsbeständig</li> <li>• Nägel zur Befestigung auf Stahl oder Beton</li> <li>• Entwickelt für hochwertige und sichere Befestigungen</li> <li>• Universeller Einsatzbereich</li> <li>• In verschiedenen Längen bis 54 mm erhältlich</li> </ul>                          |
| <p>X CR P8 S</p>  | <ul style="list-style-type: none"> <li>• Nichtrostender Stahl</li> <li>• Korrosionsbeständig</li> <li>• Nägel zur Befestigung auf Beton</li> <li>• Entwickelt für hochwertige und sichere Befestigungen</li> <li>• Universeller Einsatzbereich</li> <li>• Hoher Überzugswiderstand</li> <li>• In verschiedenen Längen bis 52 mm erhältlich</li> </ul> |

# 2 ANWENDUNGSBEDINGUNGEN

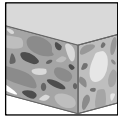
## 2.1 Befestigungsbedingungen

|                                                                                     |  |                                                                                       |  |
|-------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
|  |  |   |  |
| Stahl auf Stahl, Aluminium zu Stahl                                                 |  | Holz auf Stahl                                                                        |  |
|  |  |   |  |
| Stahl auf Beton                                                                     |  | Holz auf Beton                                                                        |  |
|                                                                                     |  |  |  |
|                                                                                     |  | Hilti Halterungen MFT-FOXV, MFT-FOX VI an Beton                                       |  |

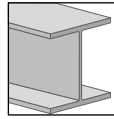


- Die X-CR P8 S15 Befestigungselemente sind speziell für die Befestigung von hinterlüfteten Fassadenkonsolen.

## 2.2 Untergrundmaterial



Beton



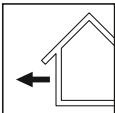
Stahl

## 2.3 Lastbedingungen



Statisch/quasi-statisch

## 2.4 Umgebungsbedingungen

| Umweltbedingungen                                                                                                                                                                                               | X-CR |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <br>Trockene Innenräume                                                                                                        | ■    |
| <br>Innenbereiche mit temporärer Kondensation                                                                                  | ■    |
| <br>Außenbereich, ländliche oder städtische Umgebung mit geringer Umweltverschmutzung                                          | ■    |
| <br>Im Freien, in ländlicher oder städtischer Umgebung mit mäßiger Schadstoffkonzentration und/oder Salzen aus dem Meerwasser | ■    |
| <br>Küstengebiete                                                                                                            | ■    |
| <br>Außenbereich mit hoher industrieller Schadstoffkonzentration                                                             | ■    |
| <br>Nähe zu mit Streusalz behandelten Straßen                                                                                | ■    |
| <br>Spezielle Anwendungen, z.B. Schwimmbad                                                                                   | ■    |
| <br>Spezielle Anwendungen, z. B. Tunnelbau                                                                                   | ■    |

- Geeignet für den Korrosionsschutz
- Erfordert eine fachkundige Beurteilung



• Weitere Einzelheiten entnehmen Sie bitte dem [Hilti Korrosionshandbuch](#).

## 2.5 Zwangskräfte für die Befestigung auf Stahl

| Technische Zeichnung | Beschreibung                                                |
|----------------------|-------------------------------------------------------------|
|                      | Keine Zwangskräfte, ungestörtes System.                     |
|                      | Zwangskräfte aufgrund von Primärbelastung und Durchbiegung. |
|                      | Zwangskräfte aufgrund von Temperatureinwirkung.             |



- Bei der Befestigung großer Stahl- oder Aluminiumteile muss die Möglichkeit einer Scherbelastung durch Zwangskräfte bei der Konstruktion der Befestigung berücksichtigt werden. Es muss Spielraum für Bewegung eingeplant werden. Alternativ sind Zwangskräfte bei der Konstruktion zu berücksichtigen.

## 3 ZULASSUNGEN UND ZERTIFIZIERUNGEN

| Behörde                                                             | Zulassungs-/Bescheinigungsnummer            | Ausgabedatum |
|---------------------------------------------------------------------|---------------------------------------------|--------------|
| American Bureau of Shipping (ABS)                                   | <a href="#">21-2146145-PDA</a>              | 02.08.2021   |
| Deutsches Institut für Bautechnik (DIBt)                            | <a href="#">ETA-14/0426</a>                 | 28.04.2021   |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/1985 wydanie 1</a> | 02.12.2021   |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/2019 wydanie 1</a> | 02.12.2021   |
| International Code Council - Evaluation Service (ICC-ES)            | <a href="#">ESR-1663</a>                    | 01.03.2023   |
| Lloyd's Register (LR)                                               | <a href="#">LR 2410653TA</a>                | 21.11.2023   |
| Romanian Ministry of Regional Development and Public Administration | RO AT 016-01_516-2023                       | 28.04.2023   |



- Nicht alle in diesem Produktdatenblatt enthaltenen Informationen können Gegenstand von Zulassungen/Zertifikaten sein.
- Die in diesem Produktdatenblatt enthaltenen Informationen können auch auf den technischen Daten von Hilti beruhen.
- Weitere Informationen entnehmen Sie bitte der Zulassung/Bescheinigung.



## 4 PRODUKTDATEN

### 4.1 Abmessungen

| Technische Zeichnung | Befestigungselement | Schaftlänge<br>$L_s$ [mm] | Kopflänge<br>$L_h$ [mm] | Schaftdurchmesser<br>$d_s$ [mm] | Kopfdurchmesser<br>$d_h$ [mm] | Stahl-Unterlegscheibe<br>Größe<br>$d_w$ [mm] |
|----------------------|---------------------|---------------------------|-------------------------|---------------------------------|-------------------------------|----------------------------------------------|
|                      | X-CR 16 P8          | 16                        | 2,4                     | 3,7                             | 8                             |                                              |
|                      | X-CR 18 P8          | 18                        | 2,4                     | 3,7                             | 8                             |                                              |
|                      | X-CR 21 P8          | 21                        | 2,4                     | 3,7                             | 8                             |                                              |
|                      | X-CR 24 P8          | 24                        | 2,4                     | 3,7                             | 8                             |                                              |
|                      | X-CR 29 P8          | 29                        | 2,4                     | 3,7                             | 8                             |                                              |
|                      | X-CR 34 P8          | 34                        | 2,4                     | 3,7                             | 8                             |                                              |
|                      | X-CR 39 P8          | 39                        | 2,4                     | 4                               | 8                             |                                              |
|                      | X-CR 44 P8          | 44                        | 2,4                     | 4                               | 8                             |                                              |
|                      | X-CR 54 P8          | 54                        | 2,4                     | 4                               | 8                             |                                              |
|                      | X-CR 39 P8 S12      | 39                        | 2,4                     | 4                               | 8                             | 12                                           |
|                      | X-CR 44 P8 S12      | 44                        | 2,4                     | 4                               | 8                             | 12                                           |
|                      | X-CR 48 P8 S15      | 48                        | 2,4                     | 4                               | 8                             | 15                                           |
|                      | X-CR 52 P8 S15      | 52                        | 2,4                     | 4                               | 8                             | 15                                           |
|                      | X-CR-FOX 53 P8 S15  | 53                        | 2,4                     | 4                               | 8                             | 15                                           |

### 4.2 Materialspezifikation und Materialeigenschaften für Teile aus Edelstahl

| Befestigungselement        | Bauteil               | Material  | Stahlgüte   | Standard | Beschichtungsdicke<br>$t_c$ [µm] | Härte<br>[HRC] | Korrosionsbeständigkeitsklasse |
|----------------------------|-----------------------|-----------|-------------|----------|----------------------------------|----------------|--------------------------------|
| X-CR 16 P8 -<br>X-CR 21 P8 | Nagel                 | Edelstahl | Cr-Ni-Stahl |          |                                  | 51             | CRC IV                         |
| X-CR 24 P8 -<br>X-CR 54 P8 | Nagel                 | Edelstahl | Cr-Ni-Stahl |          |                                  | 49             | CRC IV                         |
| X-CR P8 S12                | Nagel                 | Edelstahl | Cr-Ni-Stahl |          |                                  | 49             | CRC IV                         |
| X-CR P8 S15                | Nagel                 | Edelstahl | Cr-Ni-Stahl |          | ≥ 5                              | 49             | CRC IV                         |
| X-CR-FOX P8 S15            | Nagel                 | Edelstahl | Cr-Ni-Stahl |          | ≥ 5                              | 49             | CRC IV                         |
| X-CR P8 S12                | Stahl-Unterlegscheibe | Edelstahl | 1.4435      | EN 10088 |                                  |                | CRC III                        |
| X-CR P8 S15                | Stahl-Unterlegscheibe | Edelstahl | 1.4435      | EN 10088 |                                  |                | CRC III                        |
| X-CR-FOX P8 S15            | Stahl-Unterlegscheibe | Edelstahl | 1.4435      | EN 10088 |                                  |                | CRC III                        |



- Korrosionsbeständigkeitsklasse nach EN 1993-1-4.
- Verzinkung von Edelstahlnägeln zur besseren Verankerung im Beton.

## 4.3 Materialeigenschaften für Kunststoffteile

| Befestigungselement                                      | Bauteil                    | Material         | Farbe       |
|----------------------------------------------------------|----------------------------|------------------|-------------|
| X-CR P8, X-CR P8 S12,<br>X-CR P8 S15,<br>X-CR-FOX P8 S15 | Kunststoff-Unterlegscheibe | Polyethylen (PE) | Transparent |

# 5 SYSTEMEMPFEHLUNG

## 5.1 Geräteempfehlung

| Befestigungsbedingung                                | Befestigungselement                                                       | Gerätetyp                                                  |
|------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------|
| Stahl auf Stahl, Aluminium zu Stahl, Stahl auf Beton | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | DX 6 F8, DX 5 F8, DX 450-FA                                |
| Holz auf Stahl, Holz auf Beton                       | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | DX 6 F8, DX 5 F8, DX 460 F8, DX 2                          |
| Stahl auf Beton                                      | X-CR 39 P8 S12, X-CR 44 P8 S12<br>X-CR 48 P8 S15, X-CR 52 P8 S15          | DX 6 F8, DX 5 F8, DX 460 F8<br>DX 6 F8, DX 5 F8, DX 460 F8 |
| Hilti Halterungen MFT-FOXV, MFT-FOX VI an Beton      | X-CR 48 P8 S15, X-CR 52 P8 S15,<br>X-CR-FOX 53 P8 S15                     | DX 6 F8, DX 5 F8, DX 460 F8                                |



- Für weitere Einzelheiten wird auf das Kapitel „Kompatibilität von Zubehör und Verbrauchsmaterialien“ im [Handbuch der Direktbefestigungstechnik \(DFTM\)](#) verwiesen.
- Weitere Einzelheiten zu Befestigungen mit X-CR 48 P8S15, X-CR 52 P8S15, X-CR-FOX 53 FOX P8S15 finden Sie unter [ETA-14/0426](#).

## 5.2 Kartuschenempfehlung

| Befestigungsbe-<br>dingung | Untergrundmateri-<br>al              | Gerätetyp                   | Kartuschentyp      | Kartu-<br>schen-<br>farbe | Werkzeugleis-<br>tungsstufe |
|----------------------------|--------------------------------------|-----------------------------|--------------------|---------------------------|-----------------------------|
| Stahl auf Beton            | Harter Beton                         | DX 6 F8                     | 6.8/11 M10 for DX6 | Titan                     | 4 – 8                       |
|                            |                                      | DX 5 F8, DX 460 F8          | 6.8/11 M10         | Rot                       |                             |
|                            | Weicher Beton,<br>Mittelfester Beton | DX 6 F8                     | 6.8/11 M10 for DX6 | Titan                     | 4 – 8                       |
|                            |                                      | DX 5 F8, DX 460 F8          | 6.8/11 M10         | Rot                       |                             |
| Holz auf Beton             |                                      | DX 6 F8                     | 6.8/11 M10 for DX6 | Titan                     | 2 – 8                       |
|                            |                                      | DX 5 F8, DX 460 F8,<br>DX 2 | 6.8/11 M10         | Gelb,<br>Rot              |                             |

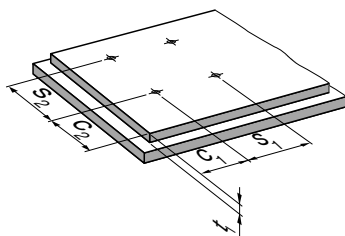
| Befestigungs-<br>bedingung                | Untergrund-<br>materialdicke | Zugfestig-<br>keitsbereich<br>für Material | Gerätetyp             | Kartuschentyp      | Kartu-<br>schen-<br>farbe | Werkzeugleis-<br>tungsstufe |
|-------------------------------------------|------------------------------|--------------------------------------------|-----------------------|--------------------|---------------------------|-----------------------------|
|                                           | $t_H$ [mm]                   | $R_m$ [MPa]                                |                       |                    |                           |                             |
| Stahl auf Stahl,<br>Aluminium zu<br>Stahl | > 6 – 8                      | 360 – 630                                  | DX 6 F8               | 6.8/11 M10 for DX6 | Titan                     | 6 – 8                       |
|                                           | > 6 – 8                      | 360 – 630                                  | DX 5 F8               | 6.8/11 M10         | Rot                       | 3 – 4                       |
|                                           | 4 – 6                        | 360 – 630                                  | DX 450-FA             | 6.8/11 M10         | Gelb                      | 1 – 3                       |
|                                           | > 6 – 8                      | 360 – 630                                  | DX 450-FA             | 6.8/11 M10         | Rot                       | 2 – 3                       |
|                                           | > 8 – 10                     | 360 – 400                                  | DX 450-FA             | 6.8/11 M10         | Rot                       | 2,5 – 3                     |
| Holz auf Stahl                            | 5 – 10                       | 360 – 630                                  | DX 6 F8               | 6.8/11 M10 for DX6 | Titan                     | 2 – 8                       |
|                                           | 5 – 10                       | 360 – 630                                  | DX 5 F8,<br>DX 460 F8 | 6.8/11 M10         | Gelb,<br>Rot              |                             |



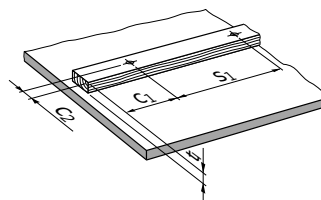
- Leistungseinstellung durch Setzversuche auf der Baustelle.
- Energieauswahl mit der empfohlenen Geräteeinstellung beginnen.
- Stellen Sie die Werkzeugenergie entsprechend den Anforderungen aus dem Kapitel Qualitätssicherung ein.

## 6 ANWENDUNGSANFORDERUNGEN

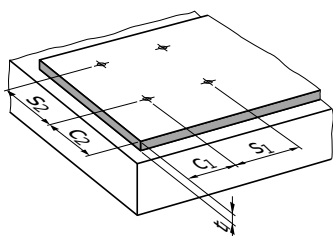
### 6.1 Eigenschaften des befestigten Materials



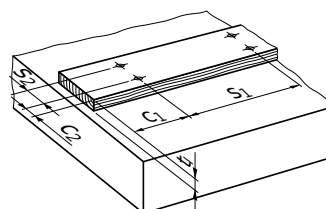
Stahl auf Stahl, Aluminium auf Stahl



Holz auf Stahl



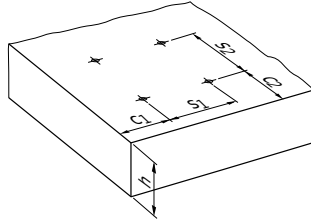
Stahl auf Beton



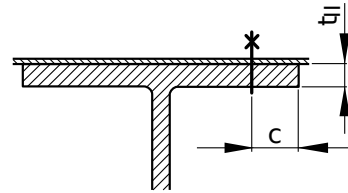
Holz auf Beton

| Befestigungsbedingung                                      | Befestigungselement         | Stärke des befestigten Materials | Zugfestigkeit des Befestigungsmaterials | Randabstand | Randabstand | Abstände zwischen Befestigungselementen | Abstände zwischen Befestigungselementen |
|------------------------------------------------------------|-----------------------------|----------------------------------|-----------------------------------------|-------------|-------------|-----------------------------------------|-----------------------------------------|
|                                                            |                             | $t_f$ [mm]                       | $R_m$ [MPa]                             | $c_1$ [mm]  | $c_2$ [mm]  | $s_1$ [mm]                              | $s_2$ [mm]                              |
| Stahl auf Stahl,<br>Stahl auf Beton                        | X-CR 16 P8 -<br>X-CR 21 P8  | 0,75 – 8                         | $\geq 370$                              | $\geq 20$   | $\geq 20$   | $\geq 20$                               | $\geq 20$                               |
| Stahl auf Stahl,<br>Aluminium zu Stahl,<br>Stahl auf Beton | X-CR P8 S12,<br>X-CR P8 S15 | $\leq 9$                         |                                         | $\geq 18$   |             |                                         |                                         |
| Aluminium zu Stahl                                         | X-CR 16 P8 -<br>X-CR 21 P8  | 0,8 – 2                          | $\geq 210$                              | $\geq 20$   | $\geq 20$   | $\geq 20$                               | $\geq 20$                               |
| Holz auf Stahl,<br>Holz auf Beton                          | X-CR 24 P8 -<br>X-CR 54 P8  | 5 – 25                           |                                         |             |             |                                         |                                         |

## 6.2 Eigenschaften des Untergrundmaterials



Befestigung an Beton



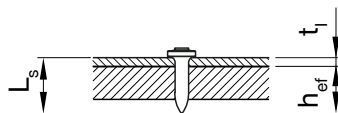
Befestigung auf Stahl

| Untergrund-<br>material | Untergrund-<br>materialdicke | Dicke des<br>Untergrund-<br>materials | Randabstand | Randabstand | Abstände<br>zwischen<br>Befestigungs-<br>elementen | Abstände<br>zwischen<br>Befestigungs-<br>elementen |
|-------------------------|------------------------------|---------------------------------------|-------------|-------------|----------------------------------------------------|----------------------------------------------------|
|                         | $t_l$ [mm]                   | $h$ [mm]                              | $c_1$ [mm]  | $c_2$ [mm]  | $s_1$ [mm]                                         | $s_2$ [mm]                                         |
| Beton                   |                              | $\geq 80$                             | $\geq 70$   | $\geq 70$   | $\geq 100$                                         | $\geq 100$                                         |
| Stahl                   | 5 - <7                       |                                       | $\geq 25$   |             |                                                    |                                                    |
| Stahl                   | 7 - 10                       |                                       | $\geq 10$   |             |                                                    |                                                    |

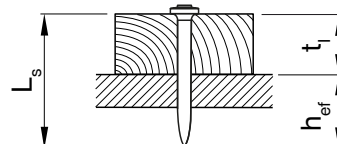


- Untergrundmaterialdicke  $h \geq 80$  mm bei Schaftlänge mit Durchmesser  $d_s = 3,7$  mm.
- Untergrundmaterialdicke  $h \geq 90$  mm bei Schaftlänge mit Durchmesser  $d_s = 4,0$  mm.
- Weitere Einzelheiten zu den Eigenschaften von Untergrundmaterial finden Sie im Kapitel „Auswahl des Befestigungselements“ im [Handbuch der Direktbefestigungstechnik \(DFTM\)](#).

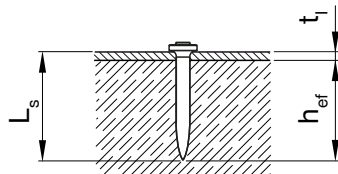
## 6.3 Empfehlung zur Länge von Nägeln



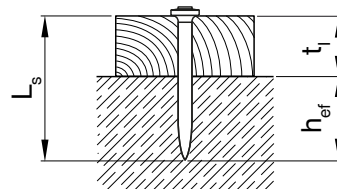
Aluminium zu Stahl, Stahl auf Stahl



Holz auf Stahl



Stahl auf Beton

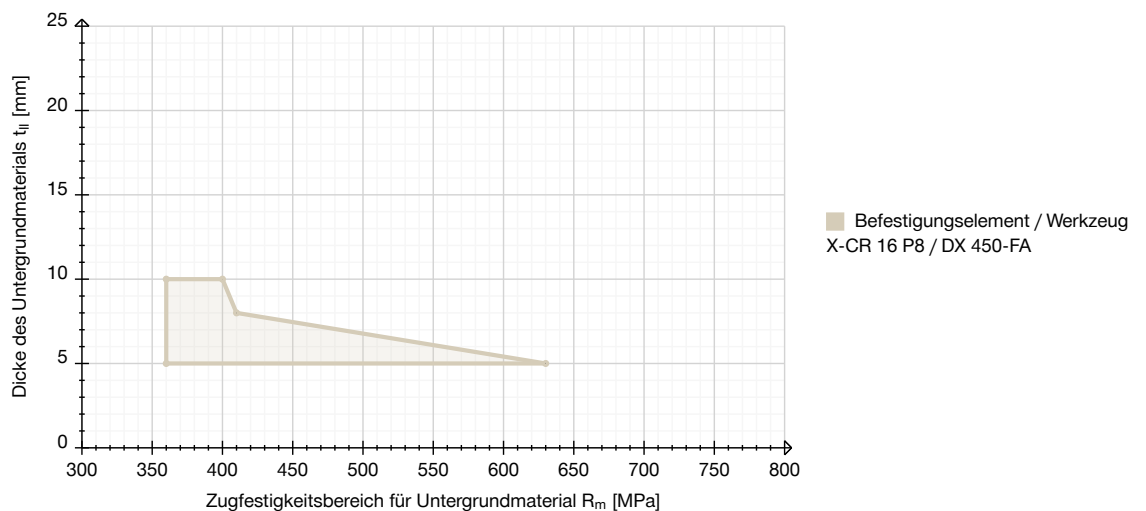


Holz auf Beton

| Befestigungsbe-<br>dingung                               | Befestigungs-<br>merkmale | Schaftlänge             | Verankerungstie-<br>fe | Stärke des<br>befestigten<br>Materials | Empfehlung des<br>Befestigungsele-<br>ments                                           |
|----------------------------------------------------------|---------------------------|-------------------------|------------------------|----------------------------------------|---------------------------------------------------------------------------------------|
|                                                          |                           | $L_s$ [mm]              | $h_{ef}$ [mm]          | $t_l$ [mm]                             |                                                                                       |
| Stahl auf Stahl                                          | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 9$               | 0,75–8                                 | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Aluminium zu Stahl                                       | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 9$               | 0,8–2                                  | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Holz auf Stahl                                           | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 9$               | 5–45                                   | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 |
| Stahl auf Beton                                          | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 9$               | 0,75–8                                 | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
|                                                          | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 27$              | $\leq 2$                               | X-CR 39 P8 S12                                                                        |
|                                                          | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 32$              | 2–7                                    | X-CR 44 P8 S12                                                                        |
|                                                          | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | 40–45                  | $\leq 5$                               | X-CR 48 P8 S15                                                                        |
|                                                          | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | 40–45                  | 5–9                                    | X-CR 52 P8 S15                                                                        |
| Holz auf Beton                                           | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 27$              | 5–25                                   | X-CR 34 P8,<br>X-CR 39 P8                                                             |
|                                                          | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | $\geq 32$              | 5–25                                   | X-CR 44 P8,<br>X-CR 54 P8                                                             |
| Hilti Halterungen<br>MFT-FOXV,<br>MFT-FOX VI an<br>Beton | Standardbefesti-<br>gung  | $L_s \geq h_{ef} + t_l$ | 40–45                  | 5–10                                   | X-CR-FOX 53 P8<br>S15                                                                 |

## 6.4 Anwendungsbereich für die Befestigung auf Stahl

### Stahl auf Stahl



• Der markierte Bereich stellt den zulässigen Anwendungsbereich dar.

## 7 LEISTUNGSDATEN

### 7.1 Empfohlene Lasten unter quasi-statischer/statischer Belastung

| Befestigungsbedingung | Befestigungselement                                                                   | Stärke des befestigten Materials | Zuglast        | Querkraft      |
|-----------------------|---------------------------------------------------------------------------------------|----------------------------------|----------------|----------------|
|                       |                                                                                       | $t_f$ [mm]                       | $N_{rec}$ [kN] | $V_{rec}$ [kN] |
| Stahl auf Stahl       | X-CR 16 P8                                                                            | 0,75                             | 1              | 1,1            |
|                       | X-CR 16 P8                                                                            | 1                                | 1,2            | 1,4            |
|                       | X-CR 16 P8                                                                            | 1,25                             | 1,5            | 1,7            |
|                       | X-CR 16 P8                                                                            | 2                                | 2,2            | 2              |
|                       | X-CR 16 P8                                                                            | 3–6                              | 1,6            | 2              |
|                       | X-CR 18 P8                                                                            | 6–8                              | 1,6            | 2              |
|                       | X-CR 21 P8                                                                            | 8–11                             | 1,6            | 2              |
| Aluminium zu Stahl    | X-CR 16 P8                                                                            | 0,8                              | 0,4            | 0,4            |
|                       | X-CR 16 P8                                                                            | 1                                | 0,6            | 0,6            |
|                       | X-CR 16 P8                                                                            | 1,2                              | 0,8            | 0,9            |
|                       | X-CR 16 P8                                                                            | 1,5                              | 1,1            | 1,4            |
|                       | X-CR 16 P8                                                                            | 2                                | 1,6            | 1,7            |
| Holz auf Stahl        | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 | 5–25                             | 0,6            | 0,6            |



- Die empfohlenen Lasten  $N_{rec}$  und  $V_{rec}$  eignen sich für die Anwendung im Bemessungskonzept für Arbeitslasten mit  $\gamma_{global} = 3,0$ .
- Bei mittleren Dicken des Befestigungsmaterials die Last für die nächstkleinere Dicke verwenden.
- Das Versagen von befestigtem Material wird nicht berücksichtigt.

| Befestigungsbedingung           | Befestigungselement                            | Verankerungstiefe | Zuglast        | Querkraft      |
|---------------------------------|------------------------------------------------|-------------------|----------------|----------------|
|                                 |                                                | $h_{ef}$ [mm]     | $N_{rec}$ [kN] | $V_{rec}$ [kN] |
| Holz auf Beton, Stahl auf Beton | X-CR 24 P8, X-CR 29 P8                         | $\geq 18$         | 0,2            | 0,2            |
|                                 |                                                | $\geq 22$         | 0,3            | 0,3            |
|                                 | X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | $\geq 18$         | 0,2            | 0,2            |
|                                 |                                                | $\geq 22$         | 0,3            | 0,3            |
|                                 |                                                | $\geq 27$         | 0,4            | 0,4            |

| Befestigungsbedingung | Befestigungselement            | Zustand des Untergrundmaterials | Zuglast        | Querkraft      | Biegemoment     |
|-----------------------|--------------------------------|---------------------------------|----------------|----------------|-----------------|
|                       |                                |                                 | $N_{rec}$ [kN] | $V_{rec}$ [kN] | $M_{rec}$ [kNm] |
| Stahl auf Beton       | X-CR 39 P8 S12, X-CR 44 P8 S12 | Beton gerissen                  | 0,6            | 2              | 5,5             |
|                       | X-CR 48 P8 S15                 | Beton gerissen                  | 0,9            | 3              | 5,5             |
|                       | X-CR 39 P8 S12, X-CR 44 P8 S12 | Beton ungerissen                | 2              | 2              | 5,5             |
|                       | X-CR 48 P8 S15                 | Beton ungerissen                | 3              | 3              | 5,5             |



- Weitere Einzelheiten zu Befestigungen mit X-CR 48 P8 S15, X-CR 52 P8 S15, X-CR-FOX 53 FOX P8 S15 finden Sie unter [ETA-14/0426](#).

## 8 MONTAGEVORSCHRIFT

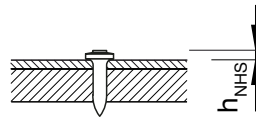
### 8.1 Installationsmerkmale

| Befestigungs-<br>element             | Installations-<br>methode                                                 | Befestigtes<br>Material | Stärke des<br>befestigten<br>Materials<br><br>$t_f$ [mm] | Untergrund-<br>material | Untergrund-<br>material<br>Betonklasse | Bohrer    |
|--------------------------------------|---------------------------------------------------------------------------|-------------------------|----------------------------------------------------------|-------------------------|----------------------------------------|-----------|
| X-CR 16 P8                           | Vorbohren von<br>befestigtem<br>Material                                  | Stahl                   | 3–6                                                      |                         |                                        |           |
| X-CR 18 P8                           | Vorbohren von<br>befestigtem<br>Material                                  | Stahl                   | 6–8                                                      |                         |                                        |           |
| X-CR 18 P8                           | Vorbohren von<br>befestigtem<br>Material                                  | Stahl                   | 8–11                                                     |                         |                                        |           |
| X-CR 39 P8<br>S12, X-CR 44<br>P8 S12 | Vorbohren von<br>Untergrundma-<br>terial                                  |                         |                                                          | Beton                   | C20/25 -<br>C45/55                     | TX-C-5/18 |
| X-CR 48 P8<br>S15, X-CR 52<br>P8 S15 | Vorbohren von<br>Untergrundma-<br>terial                                  |                         |                                                          | Beton                   | C20/25 -<br>C45/55                     | TX-C-5/23 |
| X-CR 48 P8<br>S15                    | Vorbohren von<br>Untergrundma-<br>terial durch<br>befestigtes<br>Material | Stahl                   | ≤2                                                       | Beton                   | C20/25 -<br>C50/60                     | TX-C-5/23 |

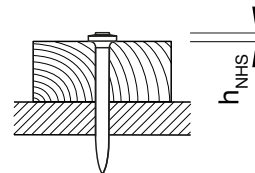


## 9 QUALITÄTSSICHERUNG

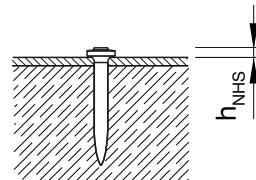
### 9.1 Befestigungskontrolle



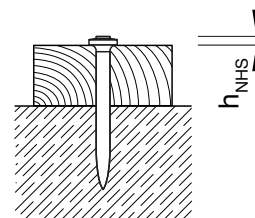
Stahl auf Stahl, Aluminium zu Stahl



Holz auf Stahl



Stahl auf Beton



Holz auf Beton

| Befestigungsbedingung                                | Befestigungselement                                                    | Bolzenvorstand<br>$h_{NHS}$ [mm] |
|------------------------------------------------------|------------------------------------------------------------------------|----------------------------------|
| Stahl auf Stahl, Aluminium zu Stahl, Stahl auf Beton | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                     | 3–4,5                            |
| Holz auf Stahl, Holz auf Beton                       | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | 3–4,5                            |
| Stahl auf Beton                                      | X-CR 39 P8 S12, X-CR 44 P8 S12                                         | ≤5                               |
| Stahl auf Beton                                      | X-CR 48 P8 S15, X-CR 52 P8 S15                                         | ≤5                               |



- Sichtbare Montagefehler sind durch ein neues Befestigungselement zu ersetzen.
- Dies ist eine gekürzte Fassung der Bedienungsanleitung. Der Wortlaut kann je nach Anwendung unterschiedlich sein.
- Beachten Sie immer die dem Produkt beiliegenden Anweisungen.

## 10 BESTELLINFORMATIONEN

### 10.1 Artikelnummer und Beschreibung

| Bezeichnung        | Artikelnummer  | Beschreibung                                        |
|--------------------|----------------|-----------------------------------------------------|
| X-CR 16 P8         | 247356         | X-CR P8 Edelstahl-Nägel                             |
| X-CR 18 P8         | 247357         |                                                     |
| X-CR 21 P8         | 247358         |                                                     |
| X-CR 24 P8         | 247359         |                                                     |
| X-CR 29 P8         | 247360         |                                                     |
| X-CR 34 P8         | 247361         |                                                     |
| X-CR 39 P8         | 247362         |                                                     |
| X-CR 44 P8         | 247363         |                                                     |
| X-CR 54 P8         | 247429         |                                                     |
| X-CR 39 P8 S12     | 247354, 298861 | X-CR P8 S Nägel für Stahl/Beton mit Unterlegscheibe |
| X-CR 44 P8 S12     | 247355, 298862 |                                                     |
| X-CR 48 P8 S15     | 258121         |                                                     |
| X-CR 52 P8 S15     | 2052687        |                                                     |
| X-CR-FOX 53 P8 S15 | 2305190        |                                                     |
| X-CR 16 S12        | 298855         | X-CR S12 Stainless steel nails with washer          |
| X-CR 18 S12        | 298856         |                                                     |
| X-CR 21 S12        | 298857         |                                                     |
| X-CR 24 S12        | 298858         |                                                     |
| X-CR 29 S12        | 298859         |                                                     |
| X-CR 34 S12        | 298860         |                                                     |



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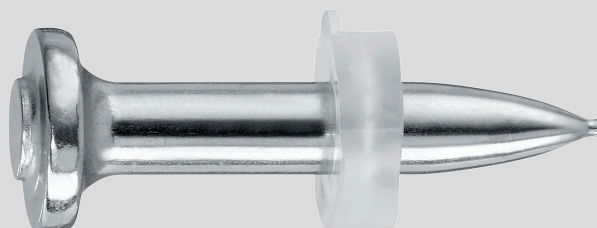


# X-CR

**Clavos de acero inoxidable**

Hoja de datos

[Español](#)

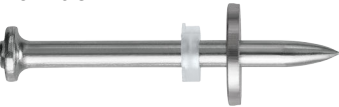


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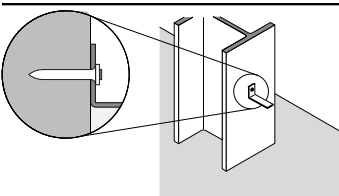
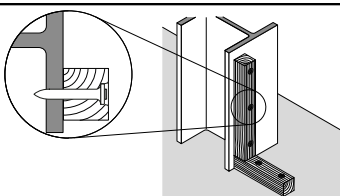
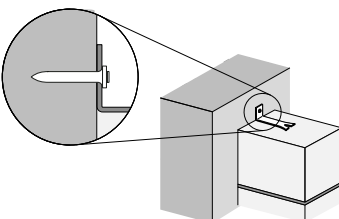
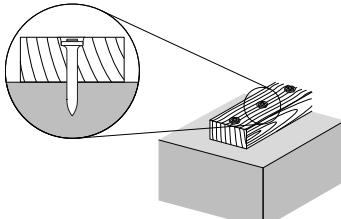
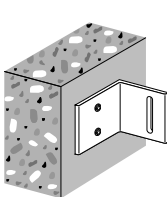
# 1. INFORMACIÓN DEL PRODUCTO

## 1.1. Descripción del producto

| Designación                                                                                            | Características                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>X-CR P8</div>    | <ul style="list-style-type: none"><li>• Acero inoxidable</li><li>• Resistente a la corrosión</li><li>• Clavos para fijaciones sobre hormigón o acero</li><li>• Alta calidad de fijación</li><li>• Uso universal</li><li>• Disponible en longitudes de hasta 54 mm</li></ul>                                                                                        |
| <div>X CR P8 S</div>  | <ul style="list-style-type: none"><li>• Acero inoxidable</li><li>• Resistente a la corrosión</li><li>• Clavos para fijaciones sobre hormigón</li><li>• Diseño que ofrece alta calidad y fiabilidad en las fijaciones</li><li>• Uso universal</li><li>• Elevada resistencia a la tracción hacia un lado</li><li>• Disponible en longitudes de hasta 52 mm</li></ul> |

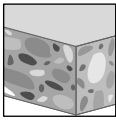
# 2. CONDICIONES DE APLICACIÓN

## 2.1. Condiciones de fijación

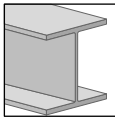
|                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |                                                                                       |
| De acero a acero, Aluminio a acero                                                  | Madera a acero                                                                       |                                                                                       |
|  |  |  |
| Acero a hormigón                                                                    | Madera a hormigón                                                                    | Soportes de Hilti MFT-FOXV, MFT-FOX VI para hormigón                                  |

 Las fijaciones X-CR P8 S15 están especialmente diseñadas para la fijación de consolas de fachadas con ventilación trasera.

2.2. Materiales base



Hormigón



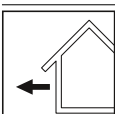
Acero

2.3. Condiciones de carga



Estática y cuasiestática

### 2.4. Condiciones ambientales

| Condiciones ambientales                                                                                                                                                                            | X-CR |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|  <p>Interior seco</p>                                                                                             | ■    |
|  <p>Interiores con condensación temporal</p>                                                                      | ■    |
|  <p>Exteriores, entornos rurales o urbanos con poca contaminación</p>                                             | ■    |
|  <p>Entorno exterior, rural o urbano con una concentración moderada de contaminantes y/o sal del agua marina</p> | ■    |
|  <p>Zonas de costa</p>                                                                                          | ■    |
|  <p>Exterior, zonas con mucha contaminación industrial</p>                                                      | ■    |
|  <p>Proximidad a calzadas tratadas con sales de deshielo</p>                                                    | ■    |
|  <p>Aplicaciones especiales, p. ej., piscinas</p>                                                               | ■    |
|  <p>Aplicaciones especiales, p. ej., tunelización</p>                                                           | ■    |

- Apto para la prevención de la corrosión
  - Requiere evaluación de un experto
-  Para obtener más información, consulte [Manual de corrosión de Hilti](#).



## 2.5. Fuerzas de restricciones para la fijación a acero

| Dibujo técnico | Descripción                                                          |
|----------------|----------------------------------------------------------------------|
|                | Sin fuerzas de restricción, sistema no perturbado.                   |
|                | Fuerzas de limitación debidas a la carga principal y a la deflexión. |
|                | Fuerzas de restricción debidas al efecto de la temperatura.          |



- Al fijar piezas grandes de acero o aluminio, en el diseño de la fijación se debe tener en cuenta la posibilidad de carga cortante debido a fuerzas de limitación. Se debe tener en cuenta el movimiento o, alternatively, se deben tener en cuenta las fuerzas de limitación en el diseño.

## 3. HOMOLOGACIONES Y CERTIFICADOS

| Autoridad                                                           | Número de homologación/certificado          | Fecha de emisión |
|---------------------------------------------------------------------|---------------------------------------------|------------------|
| American Bureau of Shipping (ABS)                                   | <a href="#">21-2146145-PDA</a>              | 2 ago. 2021      |
| Deutsches Institut für Bautechnik (DIBt)                            | <a href="#">ETA-14/0426</a>                 | 28 abr. 2021     |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/1985 wydanie 1</a> | 2 dic. 2021      |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/2019 wydanie 1</a> | 2 dic. 2021      |
| International Code Council - Evaluation Service (ICC-ES)            | <a href="#">ESR-1663</a>                    | 1 mar. 2023      |
| Lloyd's Register (LR)                                               | <a href="#">LR 2410653TA</a>                | 21 nov. 2023     |
| Romanian Ministry of Regional Development and Public Administration | RO AT 016-01_516-2023                       | 28 abr. 2023     |



- Es posible que no toda la información que se proporciona en esta hoja de datos del producto esté sujeta al contenido del certificado u homologación.
- La información que se presenta en esta hoja de datos del producto también puede basarse en los datos técnicos de Hilti.
- Para obtener más información, consulte el certificado o la homologación.

## 4. DATOS DEL PRODUCTO

### 4.1. Dimensiones

| Dibujo técnico | Fijación           | Longitud del vástago | Longitud de cabeza | Diámetro de vástago | Diámetro de la cabeza | Tamaño de arandela de acero |
|----------------|--------------------|----------------------|--------------------|---------------------|-----------------------|-----------------------------|
|                |                    | $L_s$ [mm]           | $L_h$ [mm]         | $d_s$ [mm]          | $d_h$ [mm]            | $d_w$ [mm]                  |
|                | X-CR 16 P8         | 16                   | 2,4                | 3,7                 | 8                     |                             |
|                | X-CR 18 P8         | 18                   | 2,4                | 3,7                 | 8                     |                             |
|                | X-CR 21 P8         | 21                   | 2,4                | 3,7                 | 8                     |                             |
|                | X-CR 24 P8         | 24                   | 2,4                | 3,7                 | 8                     |                             |
|                | X-CR 29 P8         | 29                   | 2,4                | 3,7                 | 8                     |                             |
|                | X-CR 34 P8         | 34                   | 2,4                | 3,7                 | 8                     |                             |
|                | X-CR 39 P8         | 39                   | 2,4                | 4                   | 8                     |                             |
|                | X-CR 44 P8         | 44                   | 2,4                | 4                   | 8                     |                             |
|                | X-CR 54 P8         | 54                   | 2,4                | 4                   | 8                     |                             |
|                | X-CR 39 P8 S12     | 39                   | 2,4                | 4                   | 8                     | 12                          |
|                | X-CR 44 P8 S12     | 44                   | 2,4                | 4                   | 8                     | 12                          |
|                | X-CR 48 P8 S15     | 48                   | 2,4                | 4                   | 8                     | 15                          |
|                | X-CR 52 P8 S15     | 52                   | 2,4                | 4                   | 8                     | 15                          |
|                | X-CR-FOX 53 P8 S15 | 53                   | 2,4                | 4                   | 8                     | 15                          |

### 4.2. Propiedades del material para piezas de acero inoxidable

| Fijación                   | Pieza de componente | Material         | Clasificación de acero | Estándar | Espesor del revestimiento | Dureza | Clase de resistencia a la corrosión |
|----------------------------|---------------------|------------------|------------------------|----------|---------------------------|--------|-------------------------------------|
|                            |                     |                  |                        |          | $t_c$ [μm]                | [HRC]  |                                     |
| X-CR P8 S12                | Arandela de acero   | Acero inoxidable | 1.4435                 | EN 10088 |                           |        | CRC III                             |
| X-CR P8 S15                | Arandela de acero   | Acero inoxidable | 1.4435                 | EN 10088 |                           |        | CRC III                             |
| X-CR-FOX P8 S15            | Arandela de acero   | Acero inoxidable | 1.4435                 | EN 10088 |                           |        | CRC III                             |
| X-CR 16 P8 -<br>X-CR 21 P8 | Clavo               | Acero inoxidable | Acero Cr-Ni            |          |                           | 51     | CRC IV                              |
| X-CR 24 P8 -<br>X-CR 54 P8 | Clavo               | Acero inoxidable | Acero Cr-Ni            |          |                           | 49     | CRC IV                              |
| X-CR P8 S12                | Clavo               | Acero inoxidable | Acero Cr-Ni            |          |                           | 49     | CRC IV                              |
| X-CR P8 S15                | Clavo               | Acero inoxidable | Acero Cr-Ni            |          | ≥5                        | 49     | CRC IV                              |
| X-CR-FOX P8 S15            | Clavo               | Acero inoxidable | Acero Cr-Ni            |          | ≥5                        | 49     | CRC IV                              |



- Clase de resistencia a la corrosión conforme a la norma EN 1993-1-4
- Recubrimiento de zinc en clavos de acero inoxidable para mejorar el anclaje en hormigón.

### 4.3. Propiedades del material para piezas de plástico

| Fijación                                                 | Pieza de componente  | Material         | Color        |
|----------------------------------------------------------|----------------------|------------------|--------------|
| X-CR P8, X-CR P8 S12,<br>X-CR P8 S15,<br>X-CR-FOX P8 S15 | Arandela de plástico | Polietileno (PE) | Transparente |

## 5. RECOMENDACIÓN DEL SISTEMA

### 5.1. Recomendación de herramienta

| Condición de fijación                                | Fijación                                                                  | Tipo de herramienta               |
|------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|
| De acero a acero, Aluminio a acero, Acero a hormigón | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | DX 6 F8, DX 5 F8, DX 450-FA       |
| Madera a acero, Madera a hormigón                    | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | DX 6 F8, DX 5 F8, DX 460 F8, DX 2 |
| Acero a hormigón                                     | X-CR 39 P8 S12, X-CR 44 P8 S12                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
|                                                      | X-CR 48 P8 S15, X-CR 52 P8 S15                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
| Soportes de Hilti MFT-FOXV, MFT-FOX VI para hormigón | X-CR 48 P8 S15, X-CR 52 P8 S15,<br>X-CR-FOX 53 P8 S15                     | DX 6 F8, DX 5 F8, DX 460 F8       |



- Para obtener más detalles, consulte el capítulo sobre la compatibilidad de accesorios y consumibles en el [Manual de tecnología de fijación directa \(DFTM\)](#).
- Para obtener más información sobre las fijaciones con X-CR 48 P8S15, X-CR 52 P8S15, X-CR-FOX 53 FOX P8S15, consulte [ETA-14/0426](#).

## 5.2. Recomendación de cartucho

| Condición de fijación | Tipo de material base           | Tipo de herramienta      | Tipo de cartucho   | Color del cartucho | Nivel de potencia de la herramienta |
|-----------------------|---------------------------------|--------------------------|--------------------|--------------------|-------------------------------------|
| Acero a hormigón      | Hormigón blando, Hormigón medio | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanio            | 4 – 8                               |
|                       |                                 | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Rojo               |                                     |
|                       | Hormigón duro                   | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanio            | 4 – 8                               |
|                       |                                 | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Rojo               |                                     |
| Madera a hormigón     | Hormigón blando, Hormigón medio | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanio            | 2 – 8                               |
|                       |                                 | DX 5 F8, DX 460 F8, DX 2 | 6.8/11 M10         | Amarillo, Rojo     |                                     |

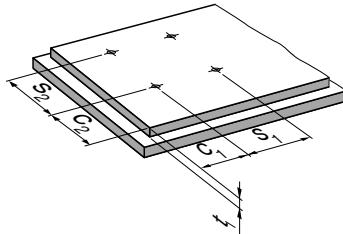
| Condición de fijación              | Espesor del material base<br>$t_b$ [mm] | Material base resistencia a tracción<br>$R_m$ [MPa] | Tipo de herramienta | Tipo de cartucho   | Color del cartucho | Nivel de potencia de la herramienta |
|------------------------------------|-----------------------------------------|-----------------------------------------------------|---------------------|--------------------|--------------------|-------------------------------------|
| De acero a acero, Aluminio a acero | > 6 – 8                                 | 360 – 630                                           | DX 6 F8             | 6.8/11 M10 for DX6 | Titanio            | 6 – 8                               |
|                                    | > 6 – 8                                 | 360 – 630                                           | DX 5 F8             | 6.8/11 M10         | Rojo               | 3 – 4                               |
|                                    | 4 – 6                                   | 360 – 630                                           | DX 450-FA           | 6.8/11 M10         | Amarillo           | 1 – 3                               |
|                                    | > 6 – 8                                 | 360 – 630                                           | DX 450-FA           | 6.8/11 M10         | Rojo               | 2 – 3                               |
|                                    | > 8 – 10                                | 360 – 400                                           | DX 450-FA           | 6.8/11 M10         | Rojo               | 2,5 – 3                             |
| Madera a acero                     | 5 – 10                                  | 360 – 630                                           | DX 6 F8             | 6.8/11 M10 for DX6 | Titanio            | 2 – 8                               |
|                                    | 5 – 10                                  | 360 – 630                                           | DX 5 F8, DX 460 F8  | 6.8/11 M10         | Amarillo, Rojo     |                                     |



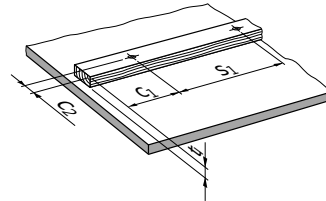
- Ajuste del nivel de potencia de la herramienta mediante la realización de ensayos in situ.
- Selección de energía de inicio de la herramienta con el nivel de potencia recomendado.
- Ajuste la energía de la herramienta según los requisitos del capítulo de garantía de calidad.

## 6. REQUISITOS DE APLICACIÓN

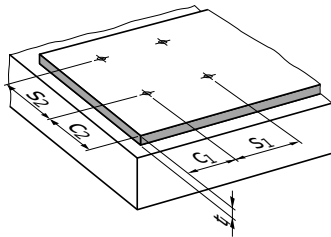
### 6.1. Propiedades del material de fijación



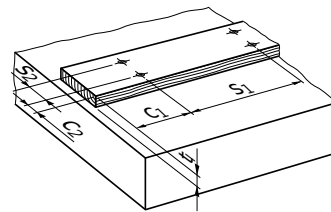
Acero a acero, aluminio a acero



Madera a acero



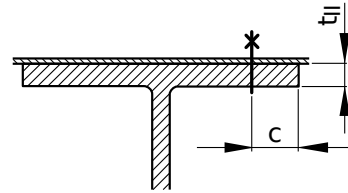
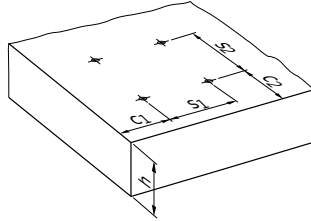
Acero a hormigón



Madera a hormigón

| Condición de fijación                                      | Fijación                    | Espesor del material fijado | Resistencia a tracción del material fijado | Distancia al borde | Distancia al borde | Distancia de separación de la fijación | Distancia de separación de la fijación |
|------------------------------------------------------------|-----------------------------|-----------------------------|--------------------------------------------|--------------------|--------------------|----------------------------------------|----------------------------------------|
|                                                            |                             | $t_1$ [mm]                  | $R_m$ [MPa]                                | $c_1$ [mm]         | $c_2$ [mm]         | $s_1$ [mm]                             | $s_2$ [mm]                             |
| De acero a acero,<br>Acero a hormigón                      | X-CR 16 P8 -<br>X-CR 21 P8  | 0,75 – 8                    | $\geq 370$                                 | $\geq 20$          | $\geq 20$          | $\geq 20$                              | $\geq 20$                              |
| De acero a acero,<br>Aluminio a acero,<br>Acero a hormigón | X-CR P8 S12,<br>X-CR P8 S15 | $\leq 9$                    |                                            | $\geq 18$          |                    |                                        |                                        |
| Aluminio a acero                                           | X-CR 16 P8 -<br>X-CR 21 P8  | 0,8 – 2                     | $\geq 210$                                 | $\geq 20$          | $\geq 20$          | $\geq 20$                              | $\geq 20$                              |
| Madera a acero,<br>Madera a hormigón                       | X-CR 24 P8 -<br>X-CR 54 P8  | 5 – 25                      |                                            |                    |                    |                                        |                                        |

## 6.2. Propiedades del material base



Fijación a hormigón

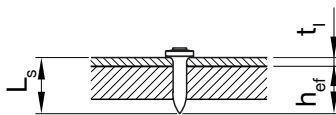
Fijación a acero

| Material base | Espesor del material base | Espesor del material base | Distancia al borde | Distancia al borde | Distancia de separación de la fijación | Distancia de separación de la fijación |
|---------------|---------------------------|---------------------------|--------------------|--------------------|----------------------------------------|----------------------------------------|
|               | $t_{II}$ [mm]             | $h$ [mm]                  | $c_1$ [mm]         | $c_2$ [mm]         | $s_1$ [mm]                             | $s_2$ [mm]                             |
| Hormigón      |                           | $\geq 80$                 | $\geq 70$          | $\geq 70$          | $\geq 100$                             | $\geq 100$                             |
| Acero         | 5 - <7                    |                           | $\geq 25$          |                    |                                        |                                        |
| Acero         | 7 - 10                    |                           | $\geq 10$          |                    |                                        |                                        |

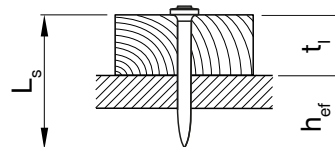


- Espesor del material base  $h \geq 80$  mm para diámetro de la longitud del vástago  $d_s = 3,7$  mm.
- Espesor del material base  $h \geq 90$  mm para diámetro de longitud de vástago  $d_s = 4,0$  mm.
- Para obtener más información sobre las propiedades del material base, consulte el capítulo de guía de selección de fijaciones del [Manual técnico de fijación directa \(DFTM\)](#).

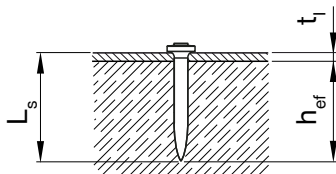
## 6.3. Recomendación de longitud de clavo



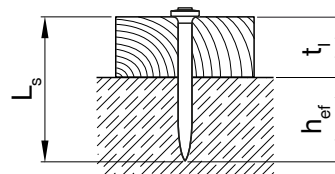
Aluminio a acero, De acero a acero



Madera a acero



Acero a hormigón

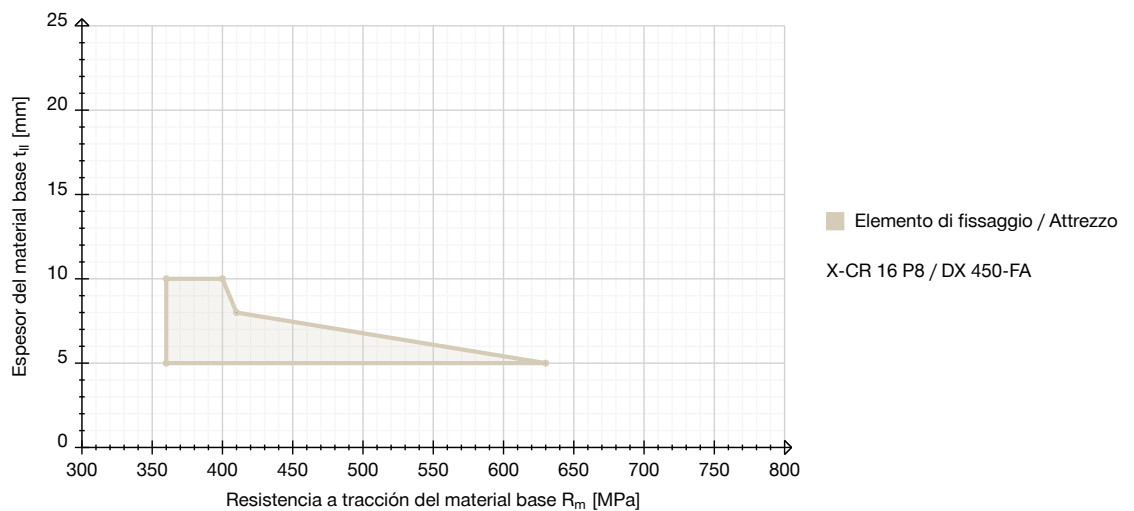


Madera a hormigón

| Condición de fijación                                | Características de fijación | Longitud del vástago<br>$L_s$ [mm] | Profundidad de empotramiento<br>$h_{ef}$ [mm] | Espesor del material fijado<br>$t_l$ [mm] | Recomendación de fijación                                                             |
|------------------------------------------------------|-----------------------------|------------------------------------|-----------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------|
| De acero a acero                                     | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 9$                                      | 0,75–8                                    | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Aluminio a acero                                     | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 9$                                      | 0,8–2                                     | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Madera a acero                                       | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 9$                                      | 5–45                                      | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 |
| Acero a hormigón                                     | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 9$                                      | 0,75–8                                    | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
|                                                      | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 27$                                     | $\leq 2$                                  | X-CR 39 P8 S12                                                                        |
|                                                      | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 32$                                     | 2–7                                       | X-CR 44 P8 S12                                                                        |
|                                                      | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | 40–45                                         | $\leq 5$                                  | X-CR 48 P8 S15                                                                        |
|                                                      | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | 40–45                                         | 5–9                                       | X-CR 52 P8 S15                                                                        |
| Madera a hormigón                                    | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 27$                                     | 5–25                                      | X-CR 34 P8,<br>X-CR 39 P8                                                             |
|                                                      | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | $\geq 32$                                     | 5–25                                      | X-CR 44 P8,<br>X-CR 54 P8                                                             |
| Soportes de Hilti MFT-FOXV, MFT-FOX VI para hormigón | Fijación estándar           | $L_s \geq h_{ef} + t_l$            | 40–45                                         | 5–10                                      | X-CR-FOX 53 P8 S15                                                                    |

## 6.4. Rango de aplicación para fijación a acero

### De acero a acero



**i** • El área marcada representa el campo admisible de aplicación.

## 7. DATOS DE RENDIMIENTO

### 7.1. Cargas recomendadas con carga estática/cuasiestática

| Condición de fijación | Fijación                                                                              | Esesor del material fijado | Carga de tensión | Carga cortante |
|-----------------------|---------------------------------------------------------------------------------------|----------------------------|------------------|----------------|
|                       |                                                                                       | $t_f$ [mm]                 | $N_{rec}$ [kN]   | $V_{rec}$ [kN] |
| De acero a acero      | X-CR 16 P8                                                                            | 0,75                       | 1                | 1,1            |
|                       | X-CR 16 P8                                                                            | 1                          | 1,2              | 1,4            |
|                       | X-CR 16 P8                                                                            | 1,25                       | 1,5              | 1,7            |
|                       | X-CR 16 P8                                                                            | 2                          | 2,2              | 2              |
|                       | X-CR 16 P8                                                                            | 3–6                        | 1,6              | 2              |
|                       | X-CR 18 P8                                                                            | 6–8                        | 1,6              | 2              |
|                       | X-CR 21 P8                                                                            | 8–11                       | 1,6              | 2              |
| Aluminio a acero      | X-CR 16 P8                                                                            | 0,8                        | 0,4              | 0,4            |
|                       | X-CR 16 P8                                                                            | 1                          | 0,6              | 0,6            |
|                       | X-CR 16 P8                                                                            | 1,2                        | 0,8              | 0,9            |
|                       | X-CR 16 P8                                                                            | 1,5                        | 1,1              | 1,4            |
|                       | X-CR 16 P8                                                                            | 2                          | 1,6              | 1,7            |
| Madera a acero        | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 | 5–25                       | 0,6              | 0,6            |



- Las cargas recomendadas  $N_{rec}$  y  $V_{rec}$  son aptas para su uso en un concepto de diseño de cargas de trabajo con  $\gamma_{global} = 3,0$ .
- Para grosores de materiales intermedios fijados, utilice carga para materiales con menor grosor.
- No se tiene en cuenta el fallo del material fijado.

| Condición de fijación                  | Fijación                                       | Profundi-<br>dad de<br>empotra-<br>miento | Carga de<br>tensión | Carga<br>cortante |
|----------------------------------------|------------------------------------------------|-------------------------------------------|---------------------|-------------------|
|                                        |                                                | $h_{ef}$ [mm]                             | $N_{rec}$ [kN]      | $V_{rec}$ [kN]    |
| Acero a hormigón,<br>Madera a hormigón | X-CR 24 P8, X-CR 29 P8                         | $\geq 18$                                 | 0,2                 | 0,2               |
|                                        |                                                | $\geq 22$                                 | 0,3                 | 0,3               |
|                                        | X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | $\geq 18$                                 | 0,2                 | 0,2               |
|                                        |                                                | $\geq 22$                                 | 0,3                 | 0,3               |
|                                        |                                                | $\geq 27$                                 | 0,4                 | 0,4               |

| Condición de fijación | Fijación                       | Estado del material base | Carga de<br>tensión | Carga<br>cortante | Momento flector |
|-----------------------|--------------------------------|--------------------------|---------------------|-------------------|-----------------|
|                       |                                |                          | $N_{rec}$ [kN]      | $V_{rec}$ [kN]    | $M_{rec}$ [kNm] |
| Acero a hormigón      | X-CR 39 P8 S12, X-CR 44 P8 S12 | Hormigón fisurado        | 0,6                 | 2                 | 5,5             |
|                       | X-CR 48 P8 S15                 | Hormigón fisurado        | 0,9                 | 3                 | 5,5             |
|                       | X-CR 39 P8 S12, X-CR 44 P8 S12 | Hormigón no fisurado     | 2                   | 2                 | 5,5             |
|                       | X-CR 48 P8 S15                 | Hormigón no fisurado     | 3                   | 3                 | 5,5             |



- Para obtener más información sobre las fijaciones con X-CR 48 P8 S15, X-CR 52 P8 S15, X-CR-FOX 53 FOX P8 S15, consulte [ETA-14/0426](#).



## 8. ESPECIFICACIÓN PARA LA INSTALACIÓN

### 8.1. Características de instalación

| Fijación                             | Método de instalación                                            | Material de fijación | Espesor del material fijado<br><br>$t_f$ [mm] | Material base | Clase de hormigón, material base | Broca     |
|--------------------------------------|------------------------------------------------------------------|----------------------|-----------------------------------------------|---------------|----------------------------------|-----------|
| X-CR 16 P8                           | Taladrado previo del material fijado                             | Acero                | 3–6                                           |               |                                  |           |
| X-CR 18 P8                           | Taladrado previo del material fijado                             | Acero                | 6–8                                           |               |                                  |           |
| X-CR 18 P8                           | Taladrado previo del material fijado                             | Acero                | 8–11                                          |               |                                  |           |
| X-CR 39 P8<br>S12, X-CR 44<br>P8 S12 | Taladrado previo de material base                                |                      |                                               | Hormigón      | C20/25 -<br>C45/55               | TX-C-5/18 |
| X-CR 48 P8<br>S15, X-CR 52<br>P8 S15 | Taladrado previo de material base                                |                      |                                               | Hormigón      | C20/25 -<br>C45/55               | TX-C-5/23 |
| X-CR 48 P8<br>S15                    | Taladrado previo del material base (a través de material fijado) | Acero                | ≤2                                            | Hormigón      | C20/25 -<br>C50/60               | TX-C-5/23 |

9. CONTROL DE CALIDAD

9.1. Inspección de fijación

| De acero a acero, Aluminio a acero                   |                                                                        | Madera a acero                                     |  |
|------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------|--|
|                                                      |                                                                        |                                                    |  |
| Acero a hormigón                                     |                                                                        | Madera a hormigón                                  |  |
| Condición de fijación                                | Fijación                                                               | Fijación con distanciador<br>h <sub>NHS</sub> [mm] |  |
| De acero a acero, Aluminio a acero, Acero a hormigón | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                     | 3 – 4,5                                            |  |
| Madera a acero, Madera a hormigón                    | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | 3 – 4,5                                            |  |
| Acero a hormigón                                     | X-CR 39 P8 S12, X-CR 44 P8 S12                                         | ≤ 5                                                |  |
| Acero a hormigón                                     | X-CR 48 P8 S15, X-CR 52 P8 S15                                         | ≤ 5                                                |  |

- 
- Los fallos de colocación visibles deben sustituirse por nuevas fijaciones, sin utilizar el mismo orificio.
  - Estas instrucciones se encuentran abreviadas y pueden variar según la aplicación.
  - Revise y siga siempre las instrucciones que acompañan al producto.

## 10. INFORMACIÓN DEL PEDIDO

### 10.1. Número y descripción del artículo

| Designación        | Número de elemento | Descripción                                       |
|--------------------|--------------------|---------------------------------------------------|
| X-CR 16 P8         | 247356             | Clavos de acero inoxidable X-CR P8                |
| X-CR 18 P8         | 247357             |                                                   |
| X-CR 21 P8         | 247358             |                                                   |
| X-CR 24 P8         | 247359             |                                                   |
| X-CR 29 P8         | 247360             |                                                   |
| X-CR 34 P8         | 247361             |                                                   |
| X-CR 39 P8         | 247362             |                                                   |
| X-CR 44 P8         | 247363             |                                                   |
| X-CR 54 P8         | 247429             |                                                   |
| X-CR 16 S12        | 298855             | Clavos de acero inoxidable X-CR S12 con arandela  |
| X-CR 18 S12        | 298856             |                                                   |
| X-CR 21 S12        | 298857             |                                                   |
| X-CR 24 S12        | 298858             |                                                   |
| X-CR 29 S12        | 298859             |                                                   |
| X-CR 34 S12        | 298860             |                                                   |
| X-CR 39 P8 S12     | 247354, 298861     | Clavos para hormigón/acero X-CR P8 S con arandela |
| X-CR 44 P8 S12     | 247355, 298862     |                                                   |
| X-CR 48 P8 S15     | 258121             |                                                   |
| X-CR 52 P8 S15     | 2052687            |                                                   |
| X-CR-FOX 53 P8 S15 | 2305190            |                                                   |



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[www.hilti.group](https://www.hilti.group)

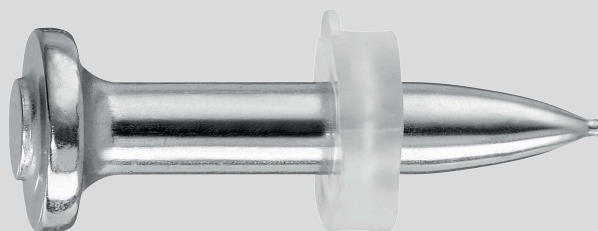


# X-CR

**Clous en acier inoxydable**

Fiche technique

[Français](#)

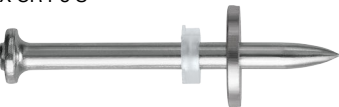


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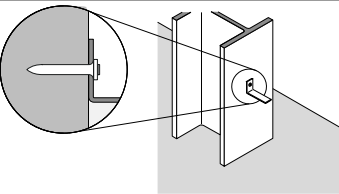
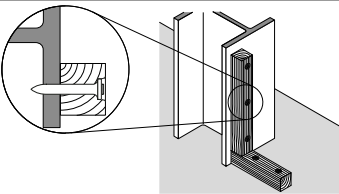
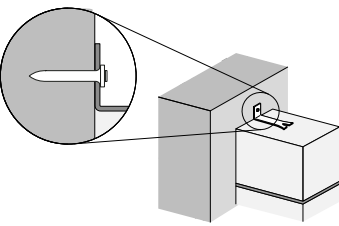
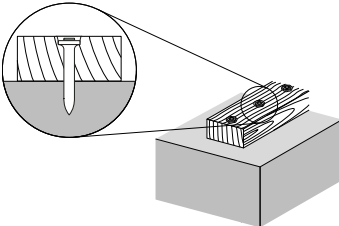
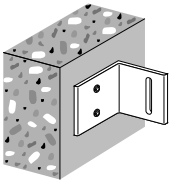
# 1 INFORMATIONS SUR LE PRODUIT

## 1.1 Description du produit

| Désignation                                                                                        | Caractéristiques                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>X-CR P8</p>    | <ul style="list-style-type: none"> <li>• Acier inoxydable</li> <li>• Résistant à la corrosion</li> <li>• Clous de fixation sur béton ou acier</li> <li>• Fixation haute qualité</li> <li>• Usage universel</li> <li>• Disponibles en différentes longueurs jusqu'à 54 mm</li> </ul>                                                             |
| <p>X CR P8 S</p>  | <ul style="list-style-type: none"> <li>• Acier inoxydable</li> <li>• Résistant à la corrosion</li> <li>• Clous de fixation sur béton</li> <li>• Conçu pour une fixation fiable de haute qualité</li> <li>• Usage universel</li> <li>• Résistance à l'arrachement élevée</li> <li>• Disponible en différentes longueurs jusqu'à 52 mm</li> </ul> |

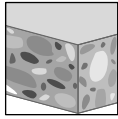
# 2 CONDITIONS D'APPLICATION

## 2.1 Conditions de fixation

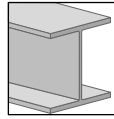
|                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |                                                                                      |   |
| Acier sur acier, Aluminium sur acier                                                |                                                                                      | Bois sur acier                                                                        |
|  |  |  |
| Acier sur béton                                                                     | Bois sur béton                                                                       | Pattes-équerres MFT-FOXV, MFT-FOX VI<br>Hilti sur béton                               |

 • Les fixations X-CR P8 S15 sont spécialement pour la fixation de consoles de façade ventilées arrière.

## 2.2 Matériaux supports

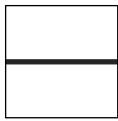


Béton



Acier

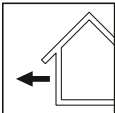
## 2.3 Conditions de charge



Statique/quasi statique



## 2.4 Conditions environnementales

| Conditions environnementales                                                                                                                                                                         | X-CR |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|  <p>Milieu intérieur sec</p>                                                                                        | ■    |
|  <p>Environnements intérieurs avec condensation temporaire</p>                                                      | ■    |
|  <p>Environnement extérieur, rural ou urbain avec faible pollution</p>                                              | ■    |
|  <p>Environnement extérieur, rural ou urbain avec concentration modérée de polluants et/ou de sel d'eau de mer</p> | ■    |
|  <p>Zones côtières</p>                                                                                            | ■    |
|  <p>Milieu extérieur avec forte pollution industrielle</p>                                                        | ■    |
|  <p>Étroite proximité avec des voies de circulation traitées avec des sels de dégivrage</p>                       | ■    |
|  <p>Applications spéciales, p. ex. piscine</p>                                                                    | ■    |
|  <p>Applications spéciales, p. ex. tunnelage</p>                                                                  | ■    |

- Convient à la prévention de la corrosion
- Nécessite une évaluation d'expert

 • Pour de plus amples informations, veuillez vous reporter à [manuel sur la corrosion Hilti](#).

## 2.5 Forces de contrainte pour la fixation sur acier

| Dessin technique | Description                                              |
|------------------|----------------------------------------------------------|
|                  | Aucune force de contrainte, système non perturbé.        |
|                  | Contraintes dues à la charge primaire et à la déflexion. |
|                  | Contraintes dues à l'effet de température.               |



- Lors de la fixation de grandes pièces d'acier ou d'aluminium, la possibilité d'une charge de cisaillement due à des forces de contrainte doit être prise en compte dans le dimensionnement de la fixation. Il faut tenir compte des mouvements ou des forces de contrainte dans le dimensionnement.

## 3 HOMOLOGATIONS ET CERTIFICATS

| Autorité                                                            | N° d'homologation/de certificat             | Date d'émission |
|---------------------------------------------------------------------|---------------------------------------------|-----------------|
| American Bureau of Shipping (ABS)                                   | <a href="#">21-2146145-PDA</a>              | 2 août 2021     |
| Deutsches Institut für Bautechnik (DIBt)                            | <a href="#">ETA-14/0426</a>                 | 28 avr. 2021    |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/1985 wydanie 1</a> | 2 déc. 2021     |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/2019 wydanie 1</a> | 2 déc. 2021     |
| International Code Council - Evaluation Service (ICC-ES)            | <a href="#">ESR-1663</a>                    | 1 mars 2023     |
| Lloyd's Register (LR)                                               | <a href="#">LR 2410653TA</a>                | 21 nov. 2023    |
| Romanian Ministry of Regional Development and Public Administration | RO AT 016-01_516-2023                       | 28 avr. 2023    |



- Les informations présentées dans cette fiche produit ne font pas forcément toutes l'objet d'une homologation ou d'un certificat.
- Les informations présentées dans cette fiche technique peuvent également être basées sur les données techniques Hilti.
- Veuillez vous reporter à l'homologation/au certificat pour obtenir de plus amples informations.

## 4 DONNÉES PRODUIT

### 4.1 Dimensions

| Dessin technique | Fixation           | Lon-<br>gueur de<br>la tige | Lon-<br>gueur de<br>tête | Diamètre<br>de la tige | Diamètre<br>de tête | Taille de<br>la<br>rondelle<br>en acier |
|------------------|--------------------|-----------------------------|--------------------------|------------------------|---------------------|-----------------------------------------|
|                  |                    | L <sub>s</sub> [mm]         | L <sub>h</sub> [mm]      | d <sub>s</sub> [mm]    | d <sub>h</sub> [mm] | d <sub>w</sub> [mm]                     |
|                  | X-CR 16 P8         | 16                          | 2,4                      | 3,7                    | 8                   |                                         |
|                  | X-CR 18 P8         | 18                          | 2,4                      | 3,7                    | 8                   |                                         |
|                  | X-CR 21 P8         | 21                          | 2,4                      | 3,7                    | 8                   |                                         |
|                  | X-CR 24 P8         | 24                          | 2,4                      | 3,7                    | 8                   |                                         |
|                  | X-CR 29 P8         | 29                          | 2,4                      | 3,7                    | 8                   |                                         |
|                  | X-CR 34 P8         | 34                          | 2,4                      | 3,7                    | 8                   |                                         |
|                  | X-CR 39 P8         | 39                          | 2,4                      | 4                      | 8                   |                                         |
|                  | X-CR 44 P8         | 44                          | 2,4                      | 4                      | 8                   |                                         |
|                  | X-CR 54 P8         | 54                          | 2,4                      | 4                      | 8                   |                                         |
|                  | X-CR 39 P8 S12     | 39                          | 2,4                      | 4                      | 8                   | 12                                      |
|                  | X-CR 44 P8 S12     | 44                          | 2,4                      | 4                      | 8                   | 12                                      |
|                  | X-CR 48 P8 S15     | 48                          | 2,4                      | 4                      | 8                   | 15                                      |
|                  | X-CR 52 P8 S15     | 52                          | 2,4                      | 4                      | 8                   | 15                                      |
|                  | X-CR-FOX 53 P8 S15 | 53                          | 2,4                      | 4                      | 8                   | 15                                      |

### 4.2 Propriétés du matériau pour pièces en acier inoxydable

| Fixation                   | Pièce de<br>composant | Matériau            | Classe<br>d'acier | Standard | Épaisseur<br>du<br>revêtement | Dureté | Classe de<br>résistance<br>à la<br>corrosion |
|----------------------------|-----------------------|---------------------|-------------------|----------|-------------------------------|--------|----------------------------------------------|
|                            |                       |                     |                   |          | t <sub>c</sub> [µm]           | [HRC]  |                                              |
| X-CR 16 P8 -<br>X-CR 21 P8 | Clou                  | Acier<br>inoxydable | Acier Cr-Ni       |          |                               | 51     | CRC IV                                       |
| X-CR 24 P8 -<br>X-CR 54 P8 | Clou                  | Acier<br>inoxydable | Acier Cr-Ni       |          |                               | 49     | CRC IV                                       |
| X-CR P8 S12                | Clou                  | Acier<br>inoxydable | Acier Cr-Ni       |          |                               | 49     | CRC IV                                       |
| X-CR P8 S15                | Clou                  | Acier<br>inoxydable | Acier Cr-Ni       |          | ≥ 5                           | 49     | CRC IV                                       |
| X-CR-FOX P8 S15            | Clou                  | Acier<br>inoxydable | Acier Cr-Ni       |          | ≥ 5                           | 49     | CRC IV                                       |
| X-CR P8 S12                | Rondelle en<br>acier  | Acier<br>inoxydable | 1.4435            | EN 10088 |                               |        | CRC III                                      |
| X-CR P8 S15                | Rondelle en<br>acier  | Acier<br>inoxydable | 1.4435            | EN 10088 |                               |        | CRC III                                      |
| X-CR-FOX P8 S15            | Rondelle en<br>acier  | Acier<br>inoxydable | 1.4435            | EN 10088 |                               |        | CRC III                                      |



- Classe de résistance à la corrosion selon EN 1993-1-4.
- Revêtement de zinc sur clous en acier inoxydable pour améliorer l'ancrage dans le béton.

### 4.3 Propriétés du matériau pour pièces plastiques

| Fixation                                                 | Pièce de composant    | Matériau          | Couleur     |
|----------------------------------------------------------|-----------------------|-------------------|-------------|
| X-CR P8, X-CR P8 S12,<br>X-CR P8 S15,<br>X-CR-FOX P8 S15 | Rondelle en plastique | Polyéthylène (PE) | Transparent |

## 5 RECOMMANDATION SYSTÈME

### 5.1 Recommandation sur l'outil

| Conditions de fixation                                  | Fixation                                                                  | Type d'outil                      |
|---------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|
| Acier sur acier, Aluminium sur acier, Acier sur béton   | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | DX 6 F8, DX 5 F8, DX 450-FA       |
| Bois sur acier, Bois sur béton                          | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | DX 6 F8, DX 5 F8, DX 460 F8, DX 2 |
| Acier sur béton                                         | X-CR 39 P8 S12, X-CR 44 P8 S12                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
|                                                         | X-CR 48 P8 S15, X-CR 52 P8 S15                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
| Pattes-équerres MFT-FOXV, MFT-FOX VI<br>Hilti sur béton | X-CR 48 P8 S15, X-CR 52 P8 S15,<br>X-CR-FOX 53 P8 S15                     | DX 6 F8, DX 5 F8, DX 460 F8       |



- Pour plus de détails, veuillez vous reporter au chapitre sur la compatibilité des accessoires et des consommables dans le [Guide sur la technologie de clouage \(DFTM\)](#).
- Pour plus de détails sur les fixations avec X-CR 48 P8S15, X-CR 52 P8S15, X-CR-FOX 53 FOX P8S15, veuillez vous reporter à [ETA-14/0426](#).

## 5.2 Recommandation de cartouche

| Conditions de fixation | Type de matériau support | Type d'outil             | Type de cartouche  | Couleur de la car-touche | Niveau de puissance de l'outil |
|------------------------|--------------------------|--------------------------|--------------------|--------------------------|--------------------------------|
| Acier sur béton        | Béton dur                | DX 6 F8                  | 6.8/11 M10 for DX6 | Titane                   | 4 – 8                          |
|                        |                          | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Rouge                    |                                |
|                        | Béton léger, Béton moyen | DX 6 F8                  | 6.8/11 M10 for DX6 | Titane                   | 4 – 8                          |
|                        |                          | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Rouge                    |                                |
| Bois sur béton         |                          | DX 6 F8                  | 6.8/11 M10 for DX6 | Titane                   | 2 – 8                          |
|                        |                          | DX 5 F8, DX 460 F8, DX 2 | 6.8/11 M10         | Jaune, Rouge             |                                |

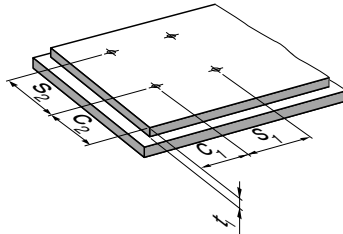
| Conditions de fixation               | Épaisseur du matériau support | Plage de résistances à la traction du matériau | Type d'outil       | Type de cartouche  | Couleur de la car-touche | Niveau de puissance de l'outil |
|--------------------------------------|-------------------------------|------------------------------------------------|--------------------|--------------------|--------------------------|--------------------------------|
|                                      | t <sub>li</sub> [mm]          | R <sub>m</sub> [MPa]                           |                    |                    |                          |                                |
| Acier sur acier, Aluminium sur acier | > 6 – 8                       | 360 – 630                                      | DX 6 F8            | 6.8/11 M10 for DX6 | Titane                   | 6 – 8                          |
|                                      | > 6 – 8                       | 360 – 630                                      | DX 5 F8            | 6.8/11 M10         | Rouge                    | 3 – 4                          |
|                                      | 4 – 6                         | 360 – 630                                      | DX 450-FA          | 6.8/11 M10         | Jaune                    | 1 – 3                          |
|                                      | > 6 – 8                       | 360 – 630                                      | DX 450-FA          | 6.8/11 M10         | Rouge                    | 2 – 3                          |
|                                      | > 8 – 10                      | 360 – 400                                      | DX 450-FA          | 6.8/11 M10         | Rouge                    | 2,5 – 3                        |
| Bois sur acier                       | 5 – 10                        | 360 – 630                                      | DX 6 F8            | 6.8/11 M10 for DX6 | Titane                   | 2 – 8                          |
|                                      | 5 – 10                        | 360 – 630                                      | DX 5 F8, DX 460 F8 | 6.8/11 M10         | Jaune, Rouge             |                                |



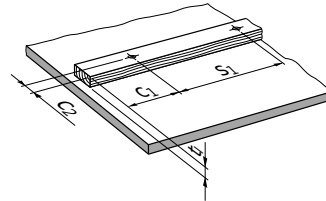
- Réglage du niveau de puissance des outils lors d'essais sur le chantier.
- Commencez la sélection de l'énergie de l'outil avec le niveau de puissance recommandé.
- Ajustez l'énergie de l'outil selon les exigences du chapitre d'assurance qualité.

## 6 EXIGENCES EN MATIÈRE D'APPLICATION

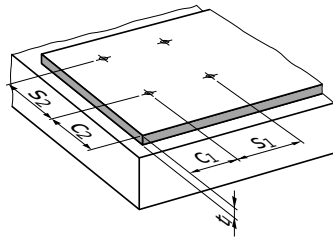
### 6.1 Propriétés du matériau fixé



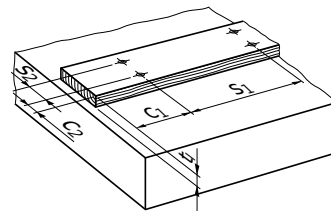
Acier sur acier, aluminium sur acier



Bois sur acier



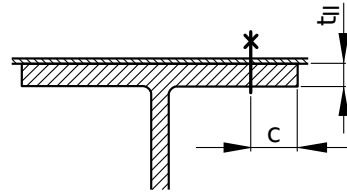
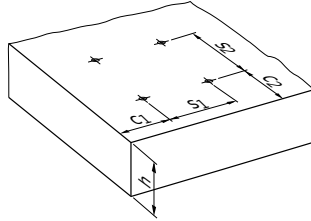
Acier sur béton



Bois sur béton

| Conditions de fixation                                      | Fixation                    | Épaisseur du matériau fixé<br>$t_f$ [mm] | Résistance à la traction du matériau fixé<br>$R_m$ [MPa] | Distance au bord<br>$c_1$ [mm] | Distance au bord<br>$c_2$ [mm] | Distance d'écartement entre les fixations<br>$s_1$ [mm] | Distance d'écartement entre les fixations<br>$s_2$ [mm] |
|-------------------------------------------------------------|-----------------------------|------------------------------------------|----------------------------------------------------------|--------------------------------|--------------------------------|---------------------------------------------------------|---------------------------------------------------------|
| Acier sur acier,<br>Acier sur béton                         | X-CR 16 P8 -<br>X-CR 21 P8  | 0,75 – 8                                 | $\geq 370$                                               | $\geq 20$                      | $\geq 20$                      | $\geq 20$                                               | $\geq 20$                                               |
| Acier sur acier,<br>Aluminium sur acier,<br>Acier sur béton | X-CR P8 S12,<br>X-CR P8 S15 | $\leq 9$                                 |                                                          | $\geq 18$                      |                                |                                                         |                                                         |
| Aluminium sur acier                                         | X-CR 16 P8 -<br>X-CR 21 P8  | 0,8 – 2                                  | $\geq 210$                                               | $\geq 20$                      | $\geq 20$                      | $\geq 20$                                               | $\geq 20$                                               |
| Bois sur acier,<br>Bois sur béton                           | X-CR 24 P8 -<br>X-CR 54 P8  | 5 – 25                                   |                                                          |                                |                                |                                                         |                                                         |

## 6.2 Propriétés du matériau support



Fixation au béton

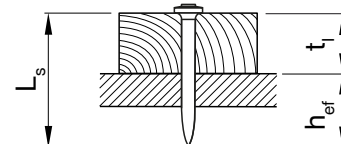
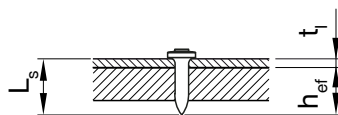
Fixation sur acier

| Matériau support | Épaisseur du matériau support | Épaisseur du matériau support | Distance au bord | Distance au bord | Distance d'écartement entre les fixations | Distance d'écartement entre les fixations |
|------------------|-------------------------------|-------------------------------|------------------|------------------|-------------------------------------------|-------------------------------------------|
|                  | $t_{II}$ [mm]                 | $h$ [mm]                      | $c_1$ [mm]       | $c_2$ [mm]       | $s_1$ [mm]                                | $s_2$ [mm]                                |
| Béton            |                               | $\geq 80$                     | $\geq 70$        | $\geq 70$        | $\geq 100$                                | $\geq 100$                                |
| Acier            | 5 - <7                        |                               | $\geq 25$        |                  |                                           |                                           |
| Acier            | 7 - 10                        |                               | $\geq 10$        |                  |                                           |                                           |



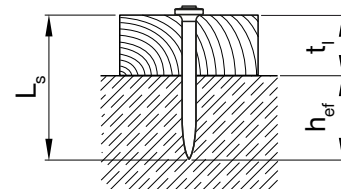
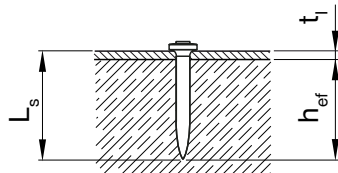
- Épaisseur du matériau support  $h \geq 80$  mm pour diamètre de tige  $d_s = 3,7$  mm.
- Épaisseur du matériau support  $h \geq 90$  mm pour diamètre de tige  $d_s = 4,0$  mm.
- Pour de plus amples informations concernant les propriétés du matériau support, veuillez vous reporter au chapitre Guide de sélection des fixations dans le [Guide sur la technologie de clouage \(DFTM\)](#).

## 6.3 Longueur de clou recommandée



Acier sur acier, Aluminium sur acier

Bois sur acier



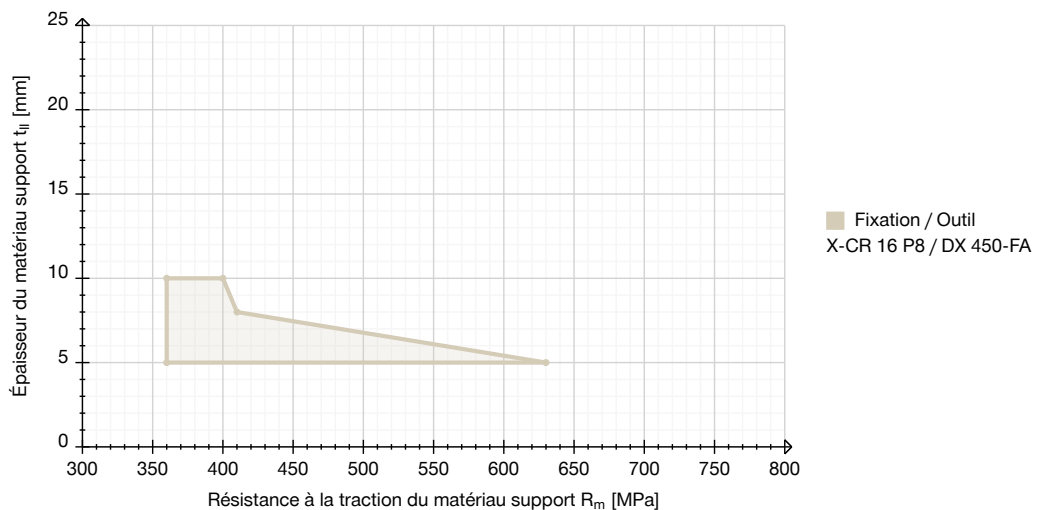
Acier sur béton

Bois sur béton

| Conditions de fixation                                        | Caractéristiques de fixation | Longueur de tige        | Profondeur d'implantation | Épaisseur du matériau fixé | Recommandation de fixation                                                            |
|---------------------------------------------------------------|------------------------------|-------------------------|---------------------------|----------------------------|---------------------------------------------------------------------------------------|
|                                                               |                              | $L_s$ [mm]              | $h_{ef}$ [mm]             | $t_f$ [mm]                 |                                                                                       |
| Acier sur acier                                               | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 9$                  | 0,75 – 8                   | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Aluminium sur acier                                           | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 9$                  | 0,8 – 2                    | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Bois sur acier                                                | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 9$                  | 5 – 45                     | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 |
| Acier sur béton                                               | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 9$                  | 0,75 – 8                   | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
|                                                               | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 27$                 | $\leq 2$                   | X-CR 39 P8 S12                                                                        |
|                                                               | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 32$                 | 2 – 7                      | X-CR 44 P8 S12                                                                        |
|                                                               | Fixation standard            | $L_s \geq h_{ef} + t_f$ | 40 – 45                   | $\leq 5$                   | X-CR 48 P8 S15                                                                        |
|                                                               | Fixation standard            | $L_s \geq h_{ef} + t_f$ | 40 – 45                   | 5 – 9                      | X-CR 52 P8 S15                                                                        |
| Bois sur béton                                                | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 27$                 | 5 – 25                     | X-CR 34 P8,<br>X-CR 39 P8                                                             |
|                                                               | Fixation standard            | $L_s \geq h_{ef} + t_f$ | $\geq 32$                 | 5 – 25                     | X-CR 44 P8,<br>X-CR 54 P8                                                             |
| Pattes-équerres<br>MFT-FOXV,<br>MFT-FOX VI Hilti<br>sur béton | Fixation standard            | $L_s \geq h_{ef} + t_f$ | 40 – 45                   | 5 – 10                     | X-CR-FOX 53 P8<br>S15                                                                 |

## 6.4 Plage d'applications pour la fixation sur acier

### Acier sur acier



• La zone marquée représente le champ d'application autorisé.



## 7 DONNÉES DE PERFORMANCE

### 7.1 Charges recommandées sous les charges quasi statiques/statiques

| Conditions de fixation | Fixation                                                                              | Épaisseur du matériau fixé | Charge de traction | Charge de cisaillement |
|------------------------|---------------------------------------------------------------------------------------|----------------------------|--------------------|------------------------|
|                        |                                                                                       | $t_f$ [mm]                 | $N_{rec}$ [kN]     | $V_{rec}$ [kN]         |
| Acier sur acier        | X-CR 16 P8                                                                            | 0,75                       | 1                  | 1,1                    |
|                        | X-CR 16 P8                                                                            | 1                          | 1,2                | 1,4                    |
|                        | X-CR 16 P8                                                                            | 1,25                       | 1,5                | 1,7                    |
|                        | X-CR 16 P8                                                                            | 2                          | 2,2                | 2                      |
|                        | X-CR 16 P8                                                                            | 3–6                        | 1,6                | 2                      |
|                        | X-CR 18 P8                                                                            | 6–8                        | 1,6                | 2                      |
|                        | X-CR 21 P8                                                                            | 8–11                       | 1,6                | 2                      |
| Aluminium sur acier    | X-CR 16 P8                                                                            | 0,8                        | 0,4                | 0,4                    |
|                        | X-CR 16 P8                                                                            | 1                          | 0,6                | 0,6                    |
|                        | X-CR 16 P8                                                                            | 1,2                        | 0,8                | 0,9                    |
|                        | X-CR 16 P8                                                                            | 1,5                        | 1,1                | 1,4                    |
|                        | X-CR 16 P8                                                                            | 2                          | 1,6                | 1,7                    |
| Bois sur acier         | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 | 5–25                       | 0,6                | 0,6                    |



- Les charges recommandées  $N_{rec}$  et  $V_{rec}$  peuvent être utilisées dans le concept de calcul de charge utile avec  $\gamma_{global} = 3,0$ .
- Concernant les épaisseurs de matériau fixé intermédiaires, utiliser la charge pour l'épaisseur inférieure.
- La défaillance du matériau fixé n'est pas prise en compte.

| Conditions de fixation             | Fixation                                       | Profon-<br>deur<br>d'implan-<br>tation | Charge de<br>traction | Charge de<br>cisaille-<br>ment |
|------------------------------------|------------------------------------------------|----------------------------------------|-----------------------|--------------------------------|
|                                    |                                                | $h_{ef}$ [mm]                          | $N_{rec}$ [kN]        | $V_{rec}$ [kN]                 |
| Acier sur béton, Bois<br>sur béton | X-CR 24 P8, X-CR 29 P8                         | $\geq 18$                              | 0,2                   | 0,2                            |
|                                    |                                                | $\geq 22$                              | 0,3                   | 0,3                            |
|                                    | X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | $\geq 18$                              | 0,2                   | 0,2                            |
|                                    |                                                | $\geq 22$                              | 0,3                   | 0,3                            |
|                                    |                                                | $\geq 27$                              | 0,4                   | 0,4                            |

| Conditions de<br>fixation | Fixation                          | État du matériau<br>support | Charge de<br>traction | Charge de<br>cisaille-<br>ment | Moment de flexion |
|---------------------------|-----------------------------------|-----------------------------|-----------------------|--------------------------------|-------------------|
|                           |                                   |                             | $N_{rec}$ [kN]        | $V_{rec}$ [kN]                 | $M_{rec}$ [kNm]   |
| Acier sur béton           | X-CR 39 P8 S12, X-CR<br>44 P8 S12 | Béton fissuré               | 0,6                   | 2                              | 5,5               |
|                           | X-CR 48 P8 S15                    | Béton fissuré               | 0,9                   | 3                              | 5,5               |
|                           | X-CR 39 P8 S12, X-CR<br>44 P8 S12 | Béton non fissuré           | 2                     | 2                              | 5,5               |
|                           | X-CR 48 P8 S15                    | Béton non fissuré           | 3                     | 3                              | 5,5               |



- Pour plus de détails sur les fixations avec X-CR 48 P8 S15, X-CR 52 P8 S15, X-CR-FOX 53 FOX P8 S15, veuillez vous reporter à [ETA-14/0426](#).

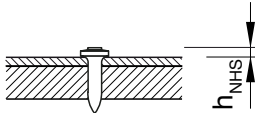
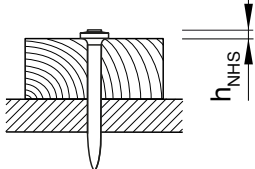
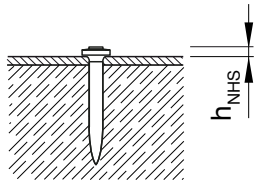
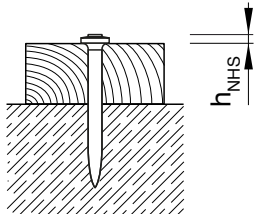
## 8 SPÉCIFICATION POUR L'INSTALLATION

### 8.1 Caractéristiques de pose

| Fixation                             | Méthode de pose                                            | Matériau fixé | Épaisseur du matériau fixé<br>$t_f$ [mm] | Matériau support | Classe de matériau support béton | Mèche     |
|--------------------------------------|------------------------------------------------------------|---------------|------------------------------------------|------------------|----------------------------------|-----------|
| X-CR 16 P8                           | Pré-perçage du matériau fixé                               | Acier         | 3 – 6                                    |                  |                                  |           |
| X-CR 18 P8                           | Pré-perçage du matériau fixé                               | Acier         | 6 – 8                                    |                  |                                  |           |
| X-CR 18 P8                           | Pré-perçage du matériau fixé                               | Acier         | 8 – 11                                   |                  |                                  |           |
| X-CR 39 P8<br>S12, X-CR 44<br>P8 S12 | Pré-perçage du matériau support                            |               |                                          | Béton            | C20/25 -<br>C45/55               | TX-C-5/18 |
| X-CR 48 P8<br>S15, X-CR 52<br>P8 S15 | Pré-perçage du matériau support                            |               |                                          | Béton            | C20/25 -<br>C45/55               | TX-C-5/23 |
| X-CR 48 P8<br>S15                    | Pré-perçage du matériau support à travers le matériau fixé | Acier         | ≤ 2                                      | Béton            | C20/25 -<br>C50/60               | TX-C-5/23 |

# 9 ASSURANCE QUALITÉ

## 9.1 Contrôle de la fixation

|                                                                                   |  |                                                                                     |  |
|-----------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|--|
|  |  |  |  |
| Acier sur acier, Aluminium sur acier                                              |  | Bois sur acier                                                                      |  |
|  |  |  |  |
| Acier sur béton                                                                   |  | Bois sur béton                                                                      |  |

| Conditions de fixation                                | Fixation                                                               | Implantation de la fixation<br>$h_{NHS}$ [mm] |
|-------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------|
| Acier sur acier, Aluminium sur acier, Acier sur béton | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                     | 3 – 4,5                                       |
| Bois sur acier, Bois sur béton                        | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | 3 – 4,5                                       |
| Acier sur béton                                       | X-CR 39 P8 S12, X-CR 44 P8 S12                                         | $\leq 5$                                      |
| Acier sur béton                                       | X-CR 48 P8 S15, X-CR 52 P8 S15                                         | $\leq 5$                                      |

- i**
- Les erreurs de pose visibles doivent être corrigées en réalisant une nouvelle fixation, avec un nouveau trou.
  - Ces instructions abrégées peuvent varier selon l'application.
  - Toujours consulter / suivre les instructions qui accompagnent le produit.

## 10 INFORMATIONS DE COMMANDE

### 10.1 Numéro d'article et description

| Désignation        | Code article   | Description                                   |
|--------------------|----------------|-----------------------------------------------|
| X-CR 16 P8         | 247356         | Clous X-CR P8 acier inoxydable                |
| X-CR 18 P8         | 247357         |                                               |
| X-CR 21 P8         | 247358         |                                               |
| X-CR 24 P8         | 247359         |                                               |
| X-CR 29 P8         | 247360         |                                               |
| X-CR 34 P8         | 247361         |                                               |
| X-CR 39 P8         | 247362         |                                               |
| X-CR 44 P8         | 247363         |                                               |
| X-CR 54 P8         | 247429         |                                               |
| X-CR 39 P8 S12     | 247354, 298861 | Clous X-CR P8 S béton / acier avec rondelle   |
| X-CR 44 P8 S12     | 247355, 298862 |                                               |
| X-CR 48 P8 S15     | 258121         |                                               |
| X-CR 52 P8 S15     | 2052687        |                                               |
| X-CR-FOX 53 P8 S15 | 2305190        | Clous X-CR S12 acier inoxydable avec rondelle |
| X-CR 16 S12        | 298855         |                                               |
| X-CR 18 S12        | 298856         |                                               |
| X-CR 21 S12        | 298857         |                                               |
| X-CR 24 S12        | 298858         |                                               |
| X-CR 29 S12        | 298859         |                                               |
| X-CR 34 S12        | 298860         |                                               |



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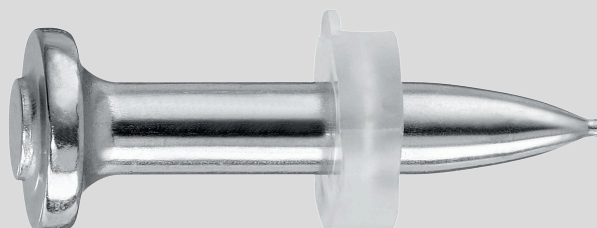


# X-CR

**Chiodi per acciaio inox**

Scheda tecnica

[Italiano](#)

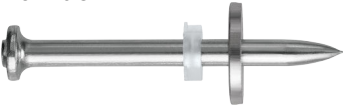


## INDICE

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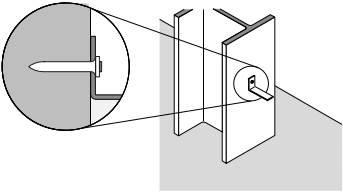
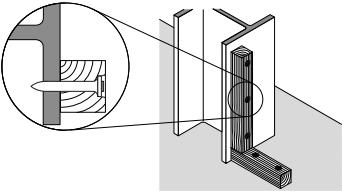
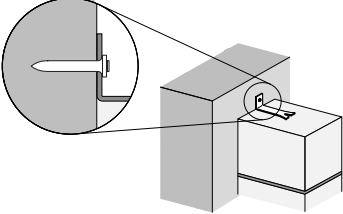
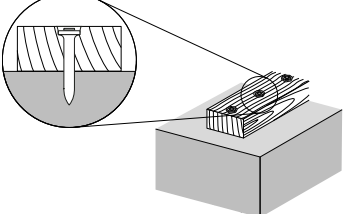
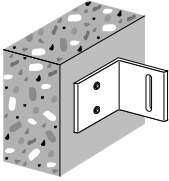
## 1 INFORMAZIONI SUL PRODOTTO

### 1.1 Descrizione del prodotto

| Denominazione                                                                                      | Vantaggi                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>X-CR P8</p>    | <ul style="list-style-type: none"> <li>• Acciaio inox</li> <li>• Resistente alla corrosione</li> <li>• Chiodi per fissaggio su calcestruzzo o acciaio</li> <li>• Alta qualità di fissaggio</li> <li>• Adatto per un utilizzo universale</li> <li>• Disponibile in lunghezze fino a 54 mm</li> </ul>                                                               |
| <p>X CR P8 S</p>  | <ul style="list-style-type: none"> <li>• Acciaio inox</li> <li>• Resistente alla corrosione</li> <li>• Chiodi per fissaggio su calcestruzzo</li> <li>• Progettato per un fissaggio affidabile e di alta qualità</li> <li>• Adatto per un utilizzo universale</li> <li>• Alta resistenza alla trazione</li> <li>• Disponibile in lunghezze fino a 52 mm</li> </ul> |

## 2 CONDIZIONI DI APPLICAZIONE

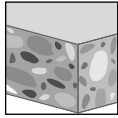
### 2.1 Condizioni di fissaggio

|                                                                                     |  |                                                                                       |  |
|-------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
|  |  |   |  |
| Acciaio su acciaio, Alluminio su acciaio                                            |  | Legno ad acciaio                                                                      |  |
|  |  |   |  |
| Acciaio su calcestruzzo                                                             |  | Legno su calcestruzzo                                                                 |  |
|                                                                                     |  |  |  |
|                                                                                     |  | Staffe Hilti MFT-FOXV, MFT-FOX VI su calcestruzzo                                     |  |

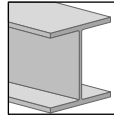
 • I sistemi di fissazione X-CR P8 S15 sono appositamente per il fissamento di console per facciata ventilata posteriore.



## 2.2 Materiali di base

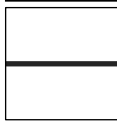


Calcestruzzo



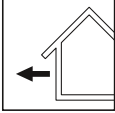
Acciaio

## 2.3 Condizioni di carico



Statico/quasi statico

2.4 Condizioni ambientali

| Condizioni ambientali                                                                                                                                                                                     | X-CR |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| <br>Interni asciutti                                                                                                     | ■    |
| <br>Ambienti interni con condensa temporanea                                                                             | ■    |
| <br>Ambiente esterno, rurale o urbano con basso inquinamento                                                             | ■    |
| <br>Ambiente esterno, rurale o urbano con moderata concentrazione di inquinanti e/o sale proveniente dall'acqua di mare | ■    |
| <br>Aree costiere                                                                                                      | ■    |
| <br>Esterno, aree con elevato inquinamento industriale                                                                 | ■    |
| <br>In prossimità di carreggiate trattate con sali disgelanti                                                          | ■    |
| <br>Applicazioni speciali, per es. piscina                                                                             | ■    |
| <br>Applicazioni speciali, per es. tunnel                                                                              | ■    |

- Adatto per prevenire la corrosione
- Richiede la valutazione di un esperto

 • Per maggiori dettagli, fare riferimento a [Hilti Corrosion Handbook](#) (Manuale sulla corrosione Hilti).

## 2.5 Forze di vincolo per il fissaggio su acciaio

| Disegno tecnico | Descrizione                                                       |
|-----------------|-------------------------------------------------------------------|
|                 | Nessuna forza di vincolo, sistema non sottoposto a forze esterne. |
|                 | Forze di vincolo dovute al carico primario e alla deflessione     |
|                 | Forze vincolanti per effetto della temperatura.                   |

- i**
- Quando si effettua il fissaggio di grandi elementi in acciaio o alluminio, a causa delle forze di vincolo esistenti, nella relativa progettazione deve essere considerato un possibile di carico di taglio. Deve essere impostata una tolleranza per i movimenti o, in alternativa, nella progettazione devono essere prese in considerazione le forze di vincolo.

## 3 OMOLOGAZIONI E CERTIFICAZIONI

| Autorità                                                            | N. omologazione/certificazione              | Data di emissione |
|---------------------------------------------------------------------|---------------------------------------------|-------------------|
| American Bureau of Shipping (ABS)                                   | <a href="#">21-2146145-PDA</a>              | 02 ago 2021       |
| Deutsches Institut für Bautechnik (DIBt)                            | <a href="#">ETA-14/0426</a>                 | 28 apr 2021       |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/1985 wydanie 1</a> | 02 dic 2021       |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/2019 wydanie 1</a> | 02 dic 2021       |
| International Code Council - Evaluation Service (ICC-ES)            | <a href="#">ESR-1663</a>                    | 01 mar 2023       |
| Lloyd's Register (LR)                                               | <a href="#">LR 2410653TA</a>                | 21 nov 2023       |
| Romanian Ministry of Regional Development and Public Administration | RO AT 016-01_516-2023                       | 28 apr 2023       |

- i**
- Non tutte le informazioni presentate in questa scheda tecnica del prodotto possono essere soggette a omologazione/certificazione.
  - Le informazioni contenute in questa scheda tecnica possono anche essere basate sui dati tecnici Hilti.
  - Per ulteriori informazioni fare riferimento all'omologazione/certificazione corrispondente.

## 4 DATI DEL PRODOTTO

### 4.1 Dimensioni

| Disegno tecnico | Elemento di fissaggio | Lun-<br>ghezza<br>gambo | Lun-<br>ghezza<br>testa | Diame-<br>tro<br>gambo | Diame-<br>tro testa | Misura<br>della<br>rondella<br>in<br>acciaio |
|-----------------|-----------------------|-------------------------|-------------------------|------------------------|---------------------|----------------------------------------------|
|                 |                       | $L_s$ [mm]              | $L_h$ [mm]              | $d_s$ [mm]             | $d_h$ [mm]          | $d_w$ [mm]                                   |
|                 | X-CR 16 P8            | 16                      | 2,4                     | 3,7                    | 8                   |                                              |
|                 | X-CR 18 P8            | 18                      | 2,4                     | 3,7                    | 8                   |                                              |
|                 | X-CR 21 P8            | 21                      | 2,4                     | 3,7                    | 8                   |                                              |
|                 | X-CR 24 P8            | 24                      | 2,4                     | 3,7                    | 8                   |                                              |
|                 | X-CR 29 P8            | 29                      | 2,4                     | 3,7                    | 8                   |                                              |
|                 | X-CR 34 P8            | 34                      | 2,4                     | 3,7                    | 8                   |                                              |
|                 | X-CR 39 P8            | 39                      | 2,4                     | 4                      | 8                   |                                              |
|                 | X-CR 44 P8            | 44                      | 2,4                     | 4                      | 8                   |                                              |
|                 | X-CR 54 P8            | 54                      | 2,4                     | 4                      | 8                   |                                              |
|                 | X-CR 39 P8 S12        | 39                      | 2,4                     | 4                      | 8                   | 12                                           |
|                 | X-CR 44 P8 S12        | 44                      | 2,4                     | 4                      | 8                   | 12                                           |
|                 | X-CR 48 P8 S15        | 48                      | 2,4                     | 4                      | 8                   | 15                                           |
|                 | X-CR 52 P8 S15        | 52                      | 2,4                     | 4                      | 8                   | 15                                           |
|                 | X-CR-FOX 53 P8 S15    | 53                      | 2,4                     | 4                      | 8                   | 15                                           |

### 4.2 Proprietà dei materiali per parti in acciaio inossidabile

| Elemento di fissaggio      | Parte del componente | Materiale            | Grado acciaio | Norma    | Spessore di rivestimento | Durezza | Classe di resistenza alla corrosione |
|----------------------------|----------------------|----------------------|---------------|----------|--------------------------|---------|--------------------------------------|
|                            |                      |                      |               |          | $t_c$ [μm]               | [HRC]   |                                      |
| X-CR 16 P8 -<br>X-CR 21 P8 | Chiodo               | Acciaio inossidabile | Acciaio Cr-Ni |          |                          | 51      | CRC IV                               |
| X-CR 24 P8 -<br>X-CR 54 P8 | Chiodo               | Acciaio inossidabile | Acciaio Cr-Ni |          |                          | 49      | CRC IV                               |
| X-CR P8 S12                | Chiodo               | Acciaio inossidabile | Acciaio Cr-Ni |          |                          | 49      | CRC IV                               |
| X-CR P8 S15                | Chiodo               | Acciaio inossidabile | Acciaio Cr-Ni |          | ≥ 5                      | 49      | CRC IV                               |
| X-CR-FOX P8 S15            | Chiodo               | Acciaio inossidabile | Acciaio Cr-Ni |          | ≥ 5                      | 49      | CRC IV                               |
| X-CR P8 S12                | Rondella in acciaio  | Acciaio inossidabile | 1.4435        | EN 10088 |                          |         | CRC III                              |
| X-CR P8 S15                | Rondella in acciaio  | Acciaio inossidabile | 1.4435        | EN 10088 |                          |         | CRC III                              |
| X-CR-FOX P8 S15            | Rondella in acciaio  | Acciaio inossidabile | 1.4435        | EN 10088 |                          |         | CRC III                              |



- Classe di resistenza alla corrosione secondo EN 1993-1-4.
- Rivestimento di zinco su chiodi in acciaio inox per migliorare l'ancoraggio nel calcestruzzo.

### 4.3 Proprietà dei materiali per parti in plastica

| Elemento di fissaggio                                    | Parte del componente | Materiale        | Colore      |
|----------------------------------------------------------|----------------------|------------------|-------------|
| X-CR P8, X-CR P8 S12,<br>X-CR P8 S15,<br>X-CR-FOX P8 S15 | Rondella in plastica | Polietilene (PE) | Trasparente |

## 5 RACCOMANDAZIONI SUL SISTEMA

### 5.1 Raccomandazioni per l'attrezzo

| Condizione di fissaggio                                              | Elemento di fissaggio                                                     | Tipo di attrezzo                  |
|----------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|
| Acciaio su acciaio, Alluminio su acciaio,<br>Acciaio su calcestruzzo | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | DX 6 F8, DX 5 F8, DX 450-FA       |
| Legno ad acciaio, Legno su calcestruzzo                              | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | DX 6 F8, DX 5 F8, DX 460 F8, DX 2 |
| Acciaio su calcestruzzo                                              | X-CR 39 P8 S12, X-CR 44 P8 S12                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
|                                                                      | X-CR 48 P8 S15, X-CR 52 P8 S15                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
| Staffe Hilti MFT-FOXV, MFT-FOX VI su<br>calcestruzzo                 | X-CR 48 P8 S15, X-CR 52 P8 S15,<br>X-CR-FOX 53 P8 S15                     | DX 6 F8, DX 5 F8, DX 460 F8       |



- Per maggiori dettagli, fare riferimento al capitolo Compatibilità di accessori e materiali di consumo all'indirizzo [Direct Fastening Technology Manual \(DFTM\)](#) (Manuale del fissaggio diretto).
- Per maggiori dettagli sui fissaggi con X-CR 48 P8S15, X-CR 52 P8S15, X-CR-FOX 53 FOX P8S15, consultare [ETA-14/0426](#).

## 5.2 Raccomandazioni per la cartuccia

| Condizione di fissaggio | Tipo di materiale base              | Tipo di attrezzo         | Tipo propulsore    | Colore della cartuccia | Livello di potenza dell'utensile |
|-------------------------|-------------------------------------|--------------------------|--------------------|------------------------|----------------------------------|
| Acciaio su calcestruzzo | Calcestruzzo duro                   | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanio                | 4 – 8                            |
|                         |                                     | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Rosso                  |                                  |
|                         | Cemento morbido, Calcestruzzo medio | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanio                | 4 – 8                            |
|                         |                                     | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Rosso                  |                                  |
| Legno su calcestruzzo   |                                     | DX 6 F8                  | 6.8/11 M10 for DX6 | Titanio                | 2 – 8                            |
|                         |                                     | DX 5 F8, DX 460 F8, DX 2 | 6.8/11 M10         | Giallo, Rosso          |                                  |

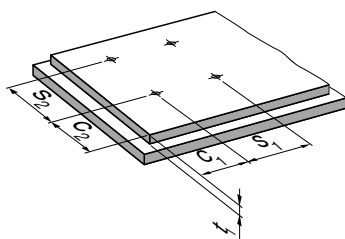
| Condizione di fissaggio                  | Spessore del materiale di base | Resistenza alla trazione del materiale di base | Tipo di attrezzo   | Tipo propulsore    | Colore della cartuccia | Livello di potenza dell'utensile |
|------------------------------------------|--------------------------------|------------------------------------------------|--------------------|--------------------|------------------------|----------------------------------|
|                                          | t <sub>II</sub> [mm]           | R <sub>m</sub> [MPa]                           |                    |                    |                        |                                  |
| Acciaio su acciaio, Alluminio su acciaio | > 6 – 8                        | 360 – 630                                      | DX 6 F8            | 6.8/11 M10 for DX6 | Titanio                | 6 – 8                            |
|                                          | > 6 – 8                        | 360 – 630                                      | DX 5 F8            | 6.8/11 M10         | Rosso                  | 3 – 4                            |
|                                          | 4 – 6                          | 360 – 630                                      | DX 450-FA          | 6.8/11 M10         | Giallo                 | 1 – 3                            |
|                                          | > 6 – 8                        | 360 – 630                                      | DX 450-FA          | 6.8/11 M10         | Rosso                  | 2 – 3                            |
|                                          | > 8 – 10                       | 360 – 400                                      | DX 450-FA          | 6.8/11 M10         | Rosso                  | 2,5 – 3                          |
| Legno ad acciaio                         | 5 – 10                         | 360 – 630                                      | DX 6 F8            | 6.8/11 M10 for DX6 | Titanio                | 2 – 8                            |
|                                          | 5 – 10                         | 360 – 630                                      | DX 5 F8, DX 460 F8 | 6.8/11 M10         | Giallo, Rosso          |                                  |



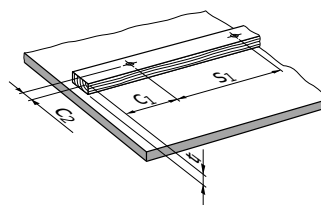
- Regolazione del livello di potenza dell'attrezzo mediante impostazione di test in situ.
- Avviare la selezione dell'energia dell'attrezzo con il relativo livello di potenza consigliato.
- Regolazione dell'energia dell'attrezzo in base ai requisiti del capitolo Assicurazione qualità.

## 6 REQUISITI DI APPLICAZIONE

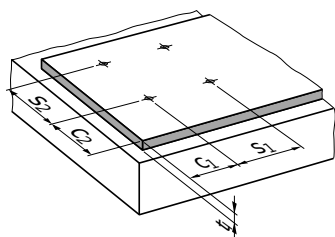
### 6.1 Caratteristiche del materiale fissato



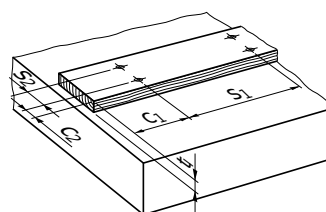
Acciaio su acciaio, alluminio su acciaio



Legno ad acciaio



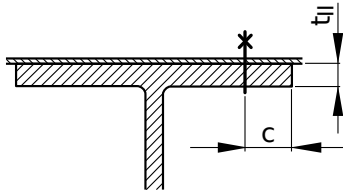
Acciaio su calcestruzzo



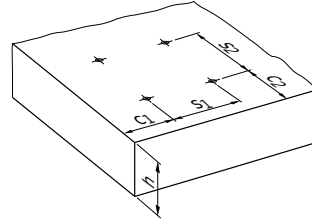
Legno su calcestruzzo

| Condizione di fissaggio                                                 | Elemento di fissaggio       | Spessore materiale fissato<br>$t_f$ [mm] | Resistenza a trazione del materiale fissato<br>$R_m$ [MPa] | Distanza dal bordo<br>$c_1$ [mm] | Distanza dal bordo<br>$c_2$ [mm] | Distanza dall'elemento di fissaggio<br>$s_1$ [mm] | Distanza dall'elemento di fissaggio<br>$s_2$ [mm] |
|-------------------------------------------------------------------------|-----------------------------|------------------------------------------|------------------------------------------------------------|----------------------------------|----------------------------------|---------------------------------------------------|---------------------------------------------------|
| Acciaio su acciaio,<br>Acciaio su calcestruzzo                          | X-CR 16 P8 -<br>X-CR 21 P8  | 0,75–8                                   | $\geq 370$                                                 | $\geq 20$                        | $\geq 20$                        | $\geq 20$                                         | $\geq 20$                                         |
| Acciaio su acciaio,<br>Alluminio su acciaio,<br>Acciaio su calcestruzzo | X-CR P8 S12,<br>X-CR P8 S15 | $\leq 9$                                 |                                                            | $\geq 18$                        |                                  |                                                   |                                                   |
| Alluminio su acciaio                                                    | X-CR 16 P8 -<br>X-CR 21 P8  | 0,8–2                                    | $\geq 210$                                                 | $\geq 20$                        | $\geq 20$                        | $\geq 20$                                         | $\geq 20$                                         |
| Legno ad acciaio,<br>Legno su calcestruzzo                              | X-CR 24 P8 -<br>X-CR 54 P8  | 5–25                                     |                                                            |                                  |                                  |                                                   |                                                   |

## 6.2 Proprietà del materiale di base



Fissaggio su acciaio



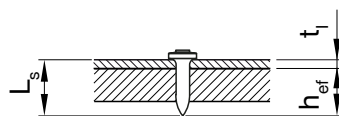
Fissaggio su calcestruzzo

| Materiale di base | Spessore del materiale di base<br>$t_{II}$ [mm] | Spessore materiale di base<br>$h$ [mm] | Distanza dal bordo<br>$c_1$ [mm] | Distanza dal bordo<br>$c_2$ [mm] | Distanza dall'elemento di fissaggio<br>$s_1$ [mm] | Distanza dall'elemento di fissaggio<br>$s_2$ [mm] |
|-------------------|-------------------------------------------------|----------------------------------------|----------------------------------|----------------------------------|---------------------------------------------------|---------------------------------------------------|
| Calcestruzzo      |                                                 | $\geq 80$                              | $\geq 70$                        | $\geq 70$                        | $\geq 100$                                        | $\geq 100$                                        |
| Acciaio           | 5 - <7                                          |                                        | $\geq 25$                        |                                  |                                                   |                                                   |
| Acciaio           | 7 - 10                                          |                                        | $\geq 10$                        |                                  |                                                   |                                                   |

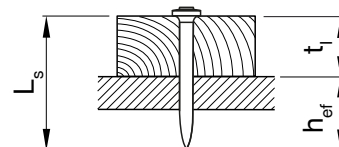


- Spessore del materiale di base  $h \geq 80$  mm per diametro del gambo  $d_s = 3,7$  mm
- Spessore del materiale di base  $h \geq 90$  mm per diametro gambo  $d_s = 4,0$  mm.
- Per maggiori dettagli sulle proprietà del materiale di base, consultare il capitolo Guida alla scelta degli elementi di fissaggio all'indirizzo [Direct Fastening Technology Manual \(DFTM\)](#) (Manuale di tecnologia del fissaggio diretto).

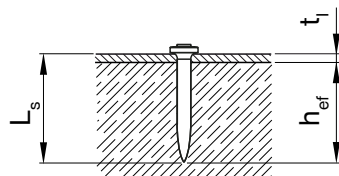
## 6.3 Lunghezza del chiodo consigliata



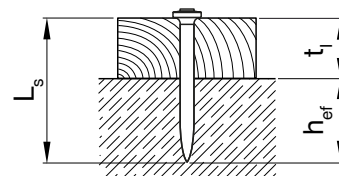
Acciaio su acciaio, Alluminio su acciaio



Legno ad acciaio



Acciaio su calcestruzzo



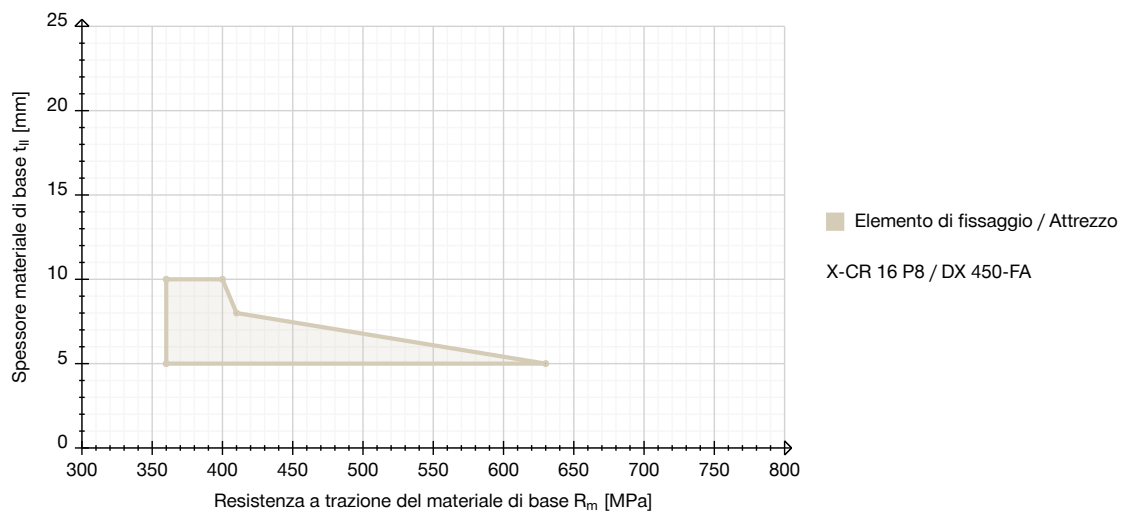
Legno su calcestruzzo



| Condizione di fissaggio                           | Caratteristiche di fissaggio | Lunghezza gambo<br>$L_s$ [mm] | Profondità di posa<br>$h_{ef}$ [mm] | Spessore materiale fissato<br>$t_l$ [mm] | Raccomandazioni sull'elemento di fissaggio                                            |
|---------------------------------------------------|------------------------------|-------------------------------|-------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------|
| Acciaio su acciaio                                | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 9$                            | 0,75–8                                   | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Alluminio su acciaio                              | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 9$                            | 0,8–2                                    | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Legno ad acciaio                                  | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 9$                            | 5–45                                     | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 |
| Acciaio su calcestruzzo                           | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 9$                            | 0,75–8                                   | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
|                                                   | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 27$                           | $\leq 2$                                 | X-CR 39 P8 S12                                                                        |
|                                                   | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 32$                           | 2–7                                      | X-CR 44 P8 S12                                                                        |
|                                                   | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | 40–45                               | $\leq 5$                                 | X-CR 48 P8 S15                                                                        |
|                                                   | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | 40–45                               | 5–9                                      | X-CR 52 P8 S15                                                                        |
| Legno su calcestruzzo                             | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 27$                           | 5–25                                     | X-CR 34 P8,<br>X-CR 39 P8                                                             |
|                                                   | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | $\geq 32$                           | 5–25                                     | X-CR 44 P8,<br>X-CR 54 P8                                                             |
| Staffe Hilti MFT-FOXV, MFT-FOX VI su calcestruzzo | Fissazione standard          | $L_s \geq h_{ef} + t_l$       | 40–45                               | 5–10                                     | X-CR-FOX 53 P8 S15                                                                    |

## 6.4 Gamma di applicazioni per fissaggio su acciaio

### Acciaio su acciaio



• L'area marcata indica il campo applicativo ammesso.

## 7 DATI SULLE PRESTAZIONI

### 7.1 Carichi raccomandati in caso carico statico/quasi statico

| Condizione di fissaggio | Elemento di fissaggio                                                                 | Spessore materiale fissato | Carico a trazione | Carico di taglio |
|-------------------------|---------------------------------------------------------------------------------------|----------------------------|-------------------|------------------|
|                         |                                                                                       | $t_f$ [mm]                 | $N_{rec}$ [kN]    | $V_{rec}$ [kN]   |
| Acciaio su acciaio      | X-CR 16 P8                                                                            | 0,75                       | 1                 | 1,1              |
|                         | X-CR 16 P8                                                                            | 1                          | 1,2               | 1,4              |
|                         | X-CR 16 P8                                                                            | 1,25                       | 1,5               | 1,7              |
|                         | X-CR 16 P8                                                                            | 2                          | 2,2               | 2                |
|                         | X-CR 16 P8                                                                            | 3-6                        | 1,6               | 2                |
|                         | X-CR 18 P8                                                                            | 6-8                        | 1,6               | 2                |
|                         | X-CR 21 P8                                                                            | 8-11                       | 1,6               | 2                |
| Alluminio su acciaio    | X-CR 16 P8                                                                            | 0,8                        | 0,4               | 0,4              |
|                         | X-CR 16 P8                                                                            | 1                          | 0,6               | 0,6              |
|                         | X-CR 16 P8                                                                            | 1,2                        | 0,8               | 0,9              |
|                         | X-CR 16 P8                                                                            | 1,5                        | 1,1               | 1,4              |
|                         | X-CR 16 P8                                                                            | 2                          | 1,6               | 1,7              |
| Legno ad acciaio        | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 | 5-25                       | 0,6               | 0,6              |

- i**
- I carichi raccomandati  $N_{rec}$  e  $V_{rec}$  sono adatti per l'uso nel piano di progettazione del carico di lavoro con  $\gamma_{global} = 3,0$ .
  - Per spessori intermedi di materiale fissato, usare il carico per uno spessore minore.
  - Il cedimento del materiale fissato non viene preso in considerazione.

| Condizione di fissaggio                        | Elemento di fissaggio                          | Profondità di posa | Carico a trazione | Carico di taglio |
|------------------------------------------------|------------------------------------------------|--------------------|-------------------|------------------|
|                                                |                                                | $h_{ef}$ [mm]      | $N_{rec}$ [kN]    | $V_{rec}$ [kN]   |
| Acciaio su calcestruzzo, Legno su calcestruzzo | X-CR 24 P8, X-CR 29 P8                         | $\geq 18$          | 0,2               | 0,2              |
|                                                |                                                | $\geq 22$          | 0,3               | 0,3              |
|                                                | X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | $\geq 18$          | 0,2               | 0,2              |
|                                                |                                                | $\geq 22$          | 0,3               | 0,3              |
|                                                |                                                | $\geq 27$          | 0,4               | 0,4              |

| Condizione di fissaggio | Elemento di fissaggio          | Stato del materiale di base | Carico a trazione | Carico di taglio | Momento di flessione |
|-------------------------|--------------------------------|-----------------------------|-------------------|------------------|----------------------|
|                         |                                |                             | $N_{rec}$ [kN]    | $V_{rec}$ [kN]   | $M_{rec}$ [kNm]      |
| Acciaio su calcestruzzo | X-CR 39 P8 S12, X-CR 44 P8 S12 | Calcestruzzo fessurato      | 0,6               | 2                | 5,5                  |
|                         | X-CR 48 P8 S15                 | Calcestruzzo fessurato      | 0,9               | 3                | 5,5                  |
|                         | X-CR 39 P8 S12, X-CR 44 P8 S12 | Calcestruzzo non fessurato  | 2                 | 2                | 5,5                  |
|                         | X-CR 48 P8 S15                 | Calcestruzzo non fessurato  | 3                 | 3                | 5,5                  |

- i**
- Per maggiori dettagli sui fissaggi con X-CR 48 P8 S15, X-CR 52 P8 S15, X-CR-FOX 53 FOX P8 S15, consultare [ETA-14/0426](#).

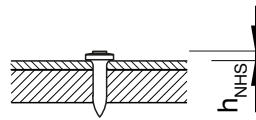
## 8 SPECIFICHE DI INSTALLAZIONE

### 8.1 Caratteristiche di installazione

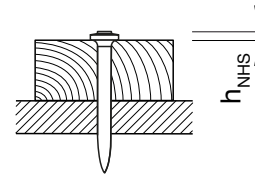
| Elemento di fissaggio                | Metodo di installazione                                        | Materiale fissato | Spessore materiale fissato<br>$t_f$ [mm] | Materiale di base | Materiale di base, classe di calcestruzzo | Punta     |
|--------------------------------------|----------------------------------------------------------------|-------------------|------------------------------------------|-------------------|-------------------------------------------|-----------|
| X-CR 16 P8                           | Pre-foratura di materiale fissato                              | Acciaio           | 3–6                                      |                   |                                           |           |
| X-CR 18 P8                           | Pre-foratura di materiale fissato                              | Acciaio           | 6–8                                      |                   |                                           |           |
| X-CR 18 P8                           | Pre-foratura di materiale fissato                              | Acciaio           | 8–11                                     |                   |                                           |           |
| X-CR 39 P8<br>S12, X-CR 44<br>P8 S12 | Materiale di base di pre-foratura                              |                   |                                          | Calcestruzzo      | C20/25 - C45/55                           | TX-C-5/18 |
| X-CR 48 P8<br>S15, X-CR 52<br>P8 S15 | Materiale di base di pre-foratura                              |                   |                                          | Calcestruzzo      | C20/25 - C45/55                           | TX-C-5/23 |
| X-CR 48 P8<br>S15                    | Pre-foratura di materiale di base attraverso materiale fissato | Acciaio           | ≤2                                       | Calcestruzzo      | C20/25 - C50/60                           | TX-C-5/23 |

## 9 ASSICURAZIONE QUALITÀ

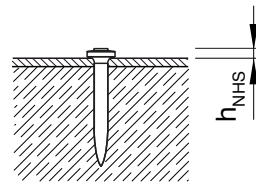
### 9.1 Ispezione fissaggio



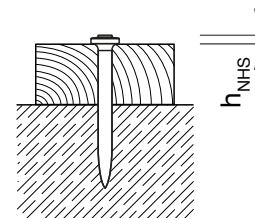
Acciaio su acciaio, Alluminio su acciaio



Legno ad acciaio



Acciaio su calcestruzzo



Legno su calcestruzzo

| Condizione di fissaggio                                              | Elemento di fissaggio                                                     | Distanziatore chiodo<br>$h_{NHS}$ [mm] |
|----------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------|
| Acciaio su acciaio, Alluminio su acciaio,<br>Acciaio su calcestruzzo | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | 3 – 4,5                                |
| Legno ad acciaio, Legno su calcestruzzo                              | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | 3 – 4,5                                |
| Acciaio su calcestruzzo                                              | X-CR 39 P8 S12, X-CR 44 P8 S12                                            | $\leq 5$                               |
| Acciaio su calcestruzzo                                              | X-CR 48 P8 S15, X-CR 52 P8 S15                                            | $\leq 5$                               |



- Gli errori di impostazione evidenti devono essere corretti sostituendo l'elemento di fissaggio, realizzando un nuovo foro.
- Di seguito sono riportate istruzioni brevi che possono variare a seconda dell'applicazione.
- Consultare/seguire sempre le istruzioni allegate al prodotto.

## 10 INFORMAZIONI PER L'ORDINE

### 10.1 Numero articolo e descrizione

| Denominazione      | Codice articolo | Descrizione                                            |
|--------------------|-----------------|--------------------------------------------------------|
| X-CR 16 P8         | 247356          | Chiodi per acciaio inox X-CR P8                        |
| X-CR 18 P8         | 247357          |                                                        |
| X-CR 21 P8         | 247358          |                                                        |
| X-CR 24 P8         | 247359          |                                                        |
| X-CR 29 P8         | 247360          |                                                        |
| X-CR 34 P8         | 247361          |                                                        |
| X-CR 39 P8         | 247362          |                                                        |
| X-CR 44 P8         | 247363          |                                                        |
| X-CR 54 P8         | 247429          |                                                        |
| X-CR 39 P8 S12     | 247354, 298861  | Chiodi per acciaio/calcestruzzo X-CR P8 S con rondella |
| X-CR 44 P8 S12     | 247355, 298862  |                                                        |
| X-CR 48 P8 S15     | 258121          |                                                        |
| X-CR 52 P8 S15     | 2052687         |                                                        |
| X-CR-FOX 53 P8 S15 | 2305190         |                                                        |
| X-CR 16 S12        | 298855          | X-CR S12 Stainless steel nails with washer             |
| X-CR 18 S12        | 298856          |                                                        |
| X-CR 21 S12        | 298857          |                                                        |
| X-CR 24 S12        | 298858          |                                                        |
| X-CR 29 S12        | 298859          |                                                        |
| X-CR 34 S12        | 298860          |                                                        |



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[www.hilti.group](https://www.hilti.group)

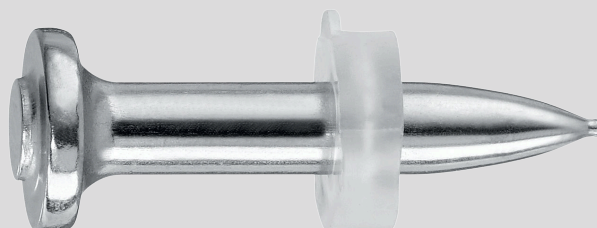


# X-CR

**Gwoździe ze stali nierdzewnej**

Karta danych

[Polski](#)



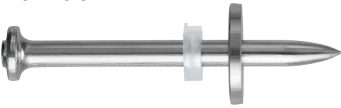
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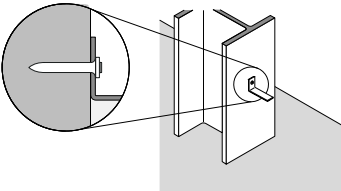
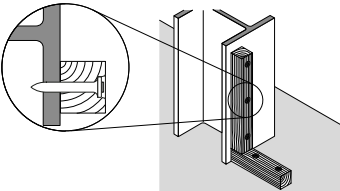
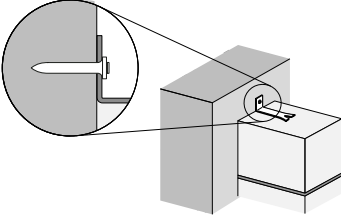
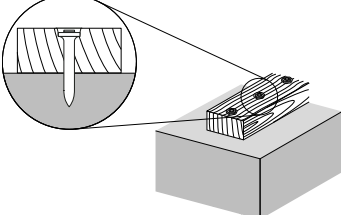
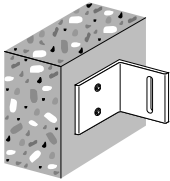
# 1 INFORMACJE O PRODUKCIE

## 1.1 Opis produktu

| Oznaczenie                                                                                     | Cechy                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X-CR P8<br>   | <ul style="list-style-type: none"> <li>• Stal nierdzewna</li> <li>• Odporne na korozję</li> <li>• Gwoździe do zamocowań do stali lub betonu</li> <li>• Wysoka jakość mocowania</li> <li>• Odpowiednie do zastosowań uniwersalnych</li> <li>• Dostępne różne długości do 54 mm</li> </ul>                                                            |
| X CR P8 S<br> | <ul style="list-style-type: none"> <li>• Stal nierdzewna</li> <li>• Odporne na korozję</li> <li>• Gwoździe do zamocowań do betonu</li> <li>• Zapewnia wysoką jakość i niezawodność mocowania</li> <li>• Odpowiednie do zastosowań uniwersalnych</li> <li>• Duża wytrzymałość na przeciąganie</li> <li>• Dostępne różne długości do 52 mm</li> </ul> |

# 2 WARUNKI ZASTOSOWANIA

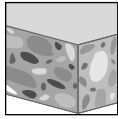
## 2.1 Warunki mocowania

|                                                                                     |  |                                                                                       |  |
|-------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|
|  |  |   |  |
| Stal do stali, Aluminium do stali                                                   |  | Drewno do stali                                                                       |  |
|  |  |   |  |
| Stal do betonu                                                                      |  | Drewno do betonu                                                                      |  |
|                                                                                     |  |  |  |
|                                                                                     |  | Wsporniki Hilti MFT-FOXV, MFT-FOX VI do betonu                                        |  |

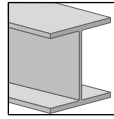


- Elementy mocujące X-CR P8 S15 są przeznaczone specjalnie do mocowania konsol fasad wentylowanych.

## 2.2 Materiały podłoża



Beton



Stal

## 2.3 Warunki obciążenia



Statyczny/kwazistatyczny

## 2.4 Warunki środowiskowe

| Warunki otoczenia                                                                                                                                                                                           | X-CR |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|  <p>Suche, wewnątrz</p>                                                                                                    | ■    |
|  <p>Środowiska wewnętrzne przy czasowej kondensacji wody</p>                                                               | ■    |
|  <p>Na zewnątrz, w środowisku wiejskim lub miejskim o małym poziomie zanieczyszczeń</p>                                    | ■    |
|  <p>Na zewnątrz, w środowisku wiejskim lub miejskim o umiarkowanym stężeniu zanieczyszczeń i/lub soli z wody morskiej</p> | ■    |
|  <p>Obszary przybrzeżne</p>                                                                                              | ■    |
|  <p>Na zewnątrz, obszary o dużym stężeniu zanieczyszczeń przemysłowych</p>                                               | ■    |
|  <p>Bliskość dróg, na których stosowane są sole odładzające</p>                                                          | ■    |
|  <p>Zastosowania specjalne, np. basen</p>                                                                                | ■    |
|  <p>Zastosowania specjalne, np. drążenie tuneli</p>                                                                      | ■    |

- Nadaje się do zapobiegania korozji
- Wymaga oceny eksperta



• Aby uzyskać więcej informacji, zapoznaj się z informacjami na stronie [Hilti Corrosion Handbook](#).

## 2.5 Siły ograniczające dla mocowań do stali

| Rysunek techniczny | Opis                                                       |
|--------------------|------------------------------------------------------------|
|                    | Brak sił ograniczających, niezakłócony system.             |
|                    | Siły ograniczeń z powodu pierwotnego obciążenia i ugięcia. |
|                    | Siły ograniczeń wynikające z wpływu temperatury.           |



- Przy mocowaniu dużych elementów ze stali lub aluminium, przy projektowaniu zamocowania trzeba uwzględnić możliwość obciążenia ścinającego z powodu sił ograniczających. Przy projektowaniu trzeba uwzględnić ruchy lub, alternatywnie, siły ograniczające.

## 3 APROBATY I CERTYFIKATY

| Instytucja nadzorująca                                              | Aprobata/numer certyfikatu                  | Data wystawienia |
|---------------------------------------------------------------------|---------------------------------------------|------------------|
| American Bureau of Shipping (ABS)                                   | <a href="#">21-2146145-PDA</a>              | 02.08.2021       |
| Deutsches Institut für Bautechnik (DIBt)                            | <a href="#">ETA-14/0426</a>                 | 28.04.2021       |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/1985 wydanie 1</a> | 02.12.2021       |
| Instytut Techniki Budowlanej (Poland) (ITB)                         | <a href="#">ITB-KOT-2021/2019 wydanie 1</a> | 02.12.2021       |
| International Code Council - Evaluation Service (ICC-ES)            | <a href="#">ESR-1663</a>                    | 01.03.2023       |
| Lloyd's Register (LR)                                               | <a href="#">LR 2410653TA</a>                | 21.11.2023       |
| Romanian Ministry of Regional Development and Public Administration | RO AT 016-01_516-2023                       | 28.04.2023       |



- Nie wszystkie informacje przedstawione w niniejszej karcie produktu mogą podlegać zatwierdzeniu/certyfikacji.
- Informacje przedstawione w niniejszej karcie produktu mogą być też oparte na danych technicznych Hilti.
- Więcej informacji można znaleźć w zatwierdzeniu/certyfikacie.

## 4 DANE PRODUKTU

### 4.1 Wymiary

| Rysunek techniczny | Elementy mocujące  | Długość trzpienia   | Długość głowicy     | Średnica trzpienia  | Średnica głowicy    | Rozmiar podkładki stalowej |
|--------------------|--------------------|---------------------|---------------------|---------------------|---------------------|----------------------------|
|                    |                    | L <sub>s</sub> [mm] | L <sub>h</sub> [mm] | d <sub>s</sub> [mm] | d <sub>h</sub> [mm] | d <sub>w</sub> [mm]        |
|                    | X-CR 16 P8         | 16                  | 2,4                 | 3,7                 | 8                   |                            |
|                    | X-CR 18 P8         | 18                  | 2,4                 | 3,7                 | 8                   |                            |
|                    | X-CR 21 P8         | 21                  | 2,4                 | 3,7                 | 8                   |                            |
|                    | X-CR 24 P8         | 24                  | 2,4                 | 3,7                 | 8                   |                            |
|                    | X-CR 29 P8         | 29                  | 2,4                 | 3,7                 | 8                   |                            |
|                    | X-CR 34 P8         | 34                  | 2,4                 | 3,7                 | 8                   |                            |
|                    | X-CR 39 P8         | 39                  | 2,4                 | 4                   | 8                   |                            |
|                    | X-CR 44 P8         | 44                  | 2,4                 | 4                   | 8                   |                            |
|                    | X-CR 54 P8         | 54                  | 2,4                 | 4                   | 8                   |                            |
|                    | X-CR 39 P8 S12     | 39                  | 2,4                 | 4                   | 8                   | 12                         |
|                    | X-CR 44 P8 S12     | 44                  | 2,4                 | 4                   | 8                   | 12                         |
|                    | X-CR 48 P8 S15     | 48                  | 2,4                 | 4                   | 8                   | 15                         |
|                    | X-CR 52 P8 S15     | 52                  | 2,4                 | 4                   | 8                   | 15                         |
|                    | X-CR-FOX 53 P8 S15 | 53                  | 2,4                 | 4                   | 8                   | 15                         |

### 4.2 Właściwości materiałowe części ze stali nierdzewnej

| Elementy mocujące          | Część składowa    | Materiał        | Klasa stali | Standardowe | Grubość powłoki     | Twardość | Klasa odporności na korozję |
|----------------------------|-------------------|-----------------|-------------|-------------|---------------------|----------|-----------------------------|
|                            |                   |                 |             |             | t <sub>c</sub> [μm] | [HRC]    |                             |
| X-CR 16 P8 -<br>X-CR 21 P8 | Gwóźdź            | Stal nierdzewna | Stal cr-Ni  |             |                     | 51       | CRC IV                      |
| X-CR 24 P8 -<br>X-CR 54 P8 | Gwóźdź            | Stal nierdzewna | Stal cr-Ni  |             |                     | 49       | CRC IV                      |
| X-CR P8 S12                | Gwóźdź            | Stal nierdzewna | Stal cr-Ni  |             |                     | 49       | CRC IV                      |
| X-CR P8 S15                | Gwóźdź            | Stal nierdzewna | Stal cr-Ni  |             | ≥ 5                 | 49       | CRC IV                      |
| X-CR-FOX P8 S15            | Gwóźdź            | Stal nierdzewna | Stal cr-Ni  |             | ≥ 5                 | 49       | CRC IV                      |
| X-CR P8 S12                | Podkładka stalowa | Stal nierdzewna | 1.4435      | EN 10088    |                     |          | CRC III                     |
| X-CR P8 S15                | Podkładka stalowa | Stal nierdzewna | 1.4435      | EN 10088    |                     |          | CRC III                     |
| X-CR-FOX P8 S15            | Podkładka stalowa | Stal nierdzewna | 1.4435      | EN 10088    |                     |          | CRC III                     |



- Klasa odporności na korozję zgodnie z normą EN 1993-1-4.
- Powłoka cynkowa na gwóźdźach ze stali nierdzewnej, aby zapewnić lepsze zakotwienie w betonie.

### 4.3 Właściwości materiału dla elementów z tworzyw sztucznych

| Elementy mocujące                                        | Część składowa       | Materiał        | Kolor       |
|----------------------------------------------------------|----------------------|-----------------|-------------|
| X-CR P8, X-CR P8 S12,<br>X-CR P8 S15,<br>X-CR-FOX P8 S15 | Podkładka plastikowa | Polietylen (PE) | Przejrzysty |

## 5 ZALECENIE SYSTEMU

### 5.1 Narzędzie polecane

| Warunek mocowania                                 | Elementy mocujące                                                         | Rodzaj urządzenia                 |
|---------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|
| Stal do stali, Aluminium do stali, Stal do betonu | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                        | DX 6 F8, DX 5 F8, DX 450-FA       |
| Drewno do stali, Drewno do betonu                 | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8,<br>X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | DX 6 F8, DX 5 F8, DX 460 F8, DX 2 |
| Stal do betonu                                    | X-CR 39 P8 S12, X-CR 44 P8 S12                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
|                                                   | X-CR 48 P8 S15, X-CR 52 P8 S15                                            | DX 6 F8, DX 5 F8, DX 460 F8       |
| Wsporniki Hilti MFT-FOXV, MFT-FOX VI do betonu    | X-CR 48 P8 S15, X-CR 52 P8 S15,<br>X-CR-FOX 53 P8 S15                     | DX 6 F8, DX 5 F8, DX 460 F8       |



- Szczegółowe informacje zamieszczono w rozdziale Akcesoria i zgodność materiałów eksploatacyjnych w [Podręcznik techniki kotwienia \(DFTM\)](#)
- Szczegółowe informacje na temat mocowania przy użyciu X-CR 48 P8S15, X-CR 52 P8S15, X-CR-FOX 53 FOX P8S15 zamieszczono na stronie [ETA-14/0426](#).

## 5.2 Zalecenie dotycząca naboju

| Warunek mocowania | Rodzaj materiału podłoża                   | Rodzaj urządzenia        | Rodzaj naboju      | Kolor naboju    | Poziom mocy narzędzia |
|-------------------|--------------------------------------------|--------------------------|--------------------|-----------------|-----------------------|
| Stal do betonu    | Beton o wyższym stosunku w/c, Beton średni | DX 6 F8                  | 6.8/11 M10 for DX6 | Tytan           | 4 – 8                 |
|                   |                                            | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Czerwony        |                       |
|                   | Twardy beton                               | DX 6 F8                  | 6.8/11 M10 for DX6 | Tytan           | 4 – 8                 |
|                   |                                            | DX 5 F8, DX 460 F8       | 6.8/11 M10         | Czerwony        |                       |
| Drewno do betonu  | Beton o wyższym stosunku w/c, Beton średni | DX 6 F8                  | 6.8/11 M10 for DX6 | Tytan           | 2 – 8                 |
|                   |                                            | DX 5 F8, DX 460 F8, DX 2 | 6.8/11 M10         | Żółty, Czerwony |                       |

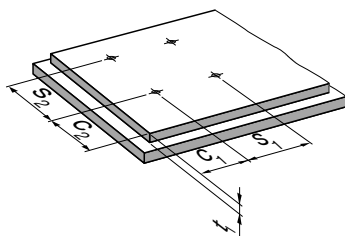
| Warunek mocowania                 | Grubość materiału podłoża<br>$t_{li}$ [mm] | Wytrzymałość na rozciąganie materiału podłoża<br>$R_m$ [MPa] | Rodzaj urządzenia  | Rodzaj naboju      | Kolor naboju    | Poziom mocy narzędzia |
|-----------------------------------|--------------------------------------------|--------------------------------------------------------------|--------------------|--------------------|-----------------|-----------------------|
| Stal do stali, Aluminium do stali | > 6 – 8                                    | 360 – 630                                                    | DX 6 F8            | 6.8/11 M10 for DX6 | Tytan           | 6 – 8                 |
|                                   | > 6 – 8                                    | 360 – 630                                                    | DX 5 F8            | 6.8/11 M10         | Czerwony        | 3 – 4                 |
|                                   | 4 – 6                                      | 360 – 630                                                    | DX 450-FA          | 6.8/11 M10         | Żółty           | 1 – 3                 |
|                                   | > 6 – 8                                    | 360 – 630                                                    | DX 450-FA          | 6.8/11 M10         | Czerwony        | 2 – 3                 |
|                                   | > 8 – 10                                   | 360 – 400                                                    | DX 450-FA          | 6.8/11 M10         | Czerwony        | 2,5 – 3               |
| Drewno do stali                   | 5 – 10                                     | 360 – 630                                                    | DX 6 F8            | 6.8/11 M10 for DX6 | Tytan           | 2 – 8                 |
|                                   | 5 – 10                                     | 360 – 630                                                    | DX 5 F8, DX 460 F8 | 6.8/11 M10         | Żółty, Czerwony |                       |



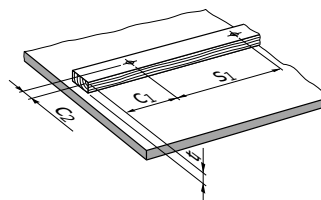
- Regulacja poziomu mocy narzędzia poprzez testy na miejscu.
- Wybór energii narzędzia trzeba rozpocząć od zalecanego poziomu mocy narzędzia.
- Dostosuj energię narzędzia zgodnie z wymaganiami określonymi w rozdziale dotyczącym zapewnienia jakości.

## 6 WYMAGANIA DOTYCZĄCE ZASTOSOWANIA

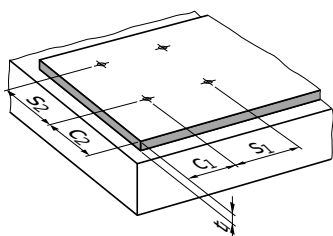
### 6.1 Właściwości zamocowanego materiału



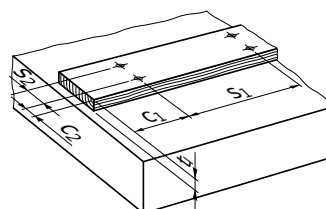
Stal do stali, aluminium do stali



Drewno do stali



Stal do betonu

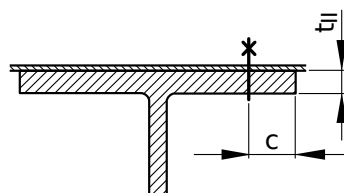
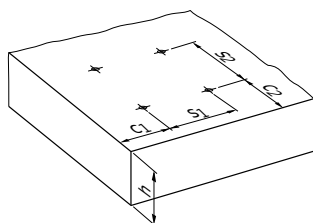


Drewno do betonu

| Warunek mocowania                                       | Elementy mocujące           | Grubość mocowanego materiału | Wytrzymałość na rozciąganie mocowanego materiału | Odległość od krawędzi | Odległość od krawędzi | Odległość między elementami mocującymi | Odległość między elementami mocującymi |
|---------------------------------------------------------|-----------------------------|------------------------------|--------------------------------------------------|-----------------------|-----------------------|----------------------------------------|----------------------------------------|
|                                                         |                             | $t_f$ [mm]                   | $R_m$ [MPa]                                      | $c_1$ [mm]            | $c_2$ [mm]            | $s_1$ [mm]                             | $s_2$ [mm]                             |
| Stal do stali,<br>Stal do betonu                        | X-CR 16 P8 -<br>X-CR 21 P8  | 0,75 – 8                     | $\geq 370$                                       | $\geq 20$             | $\geq 20$             | $\geq 20$                              | $\geq 20$                              |
| Stal do stali,<br>Aluminium do stali,<br>Stal do betonu | X-CR P8 S12,<br>X-CR P8 S15 | $\leq 9$                     |                                                  | $\geq 18$             |                       |                                        |                                        |
| Aluminium do stali                                      | X-CR 16 P8 -<br>X-CR 21 P8  | 0,8 – 2                      | $\geq 210$                                       | $\geq 20$             | $\geq 20$             | $\geq 20$                              | $\geq 20$                              |
| Drewno do stali,<br>Drewno do betonu                    | X-CR 24 P8 -<br>X-CR 54 P8  | 5 – 25                       |                                                  |                       |                       |                                        |                                        |



## 6.2 Właściwości materiału podłoża



Mocowanie do betonu

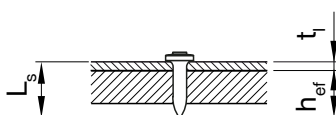
Mocowanie do stali

| Materiał podłoża | Grubość materiału podłoża | Grubość materiału podłoża | Odległość od krawędzi | Odległość od krawędzi | Odległość między elementami mocującymi | Odległość między elementami mocującymi |
|------------------|---------------------------|---------------------------|-----------------------|-----------------------|----------------------------------------|----------------------------------------|
|                  | $t_{II}$ [mm]             | $h$ [mm]                  | $c_1$ [mm]            | $c_2$ [mm]            | $s_1$ [mm]                             | $s_2$ [mm]                             |
| Beton            |                           | $\geq 80$                 | $\geq 70$             | $\geq 70$             | $\geq 100$                             | $\geq 100$                             |
| Stal             | 5 - <7                    |                           | $\geq 25$             |                       |                                        |                                        |
| Stal             | 7 - 10                    |                           | $\geq 10$             |                       |                                        |                                        |

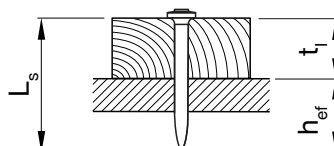


- Grubość materiału podłoża  $h \geq 80$  mm dla średnicy trzpienia  $d_s = 3,7$  mm.
- Grubość materiału podłoża  $h \geq 90$  mm dla średnicy trzpienia  $d_s = 4,0$  mm.
- Więcej informacji na temat właściwości materiału podłoża można znaleźć w rozdziale Przewodnik doboru elementów mocujących w [Podręcznik technologii bezpośredniego mocowania \(DFTM\)](#).

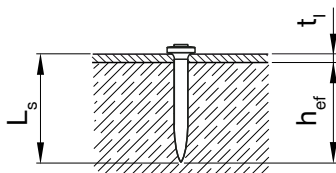
## 6.3 Zalecana długość gwoździ



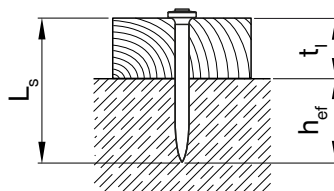
Aluminium do stali, Stal do stali



Drewno do stali



Stal do betonu

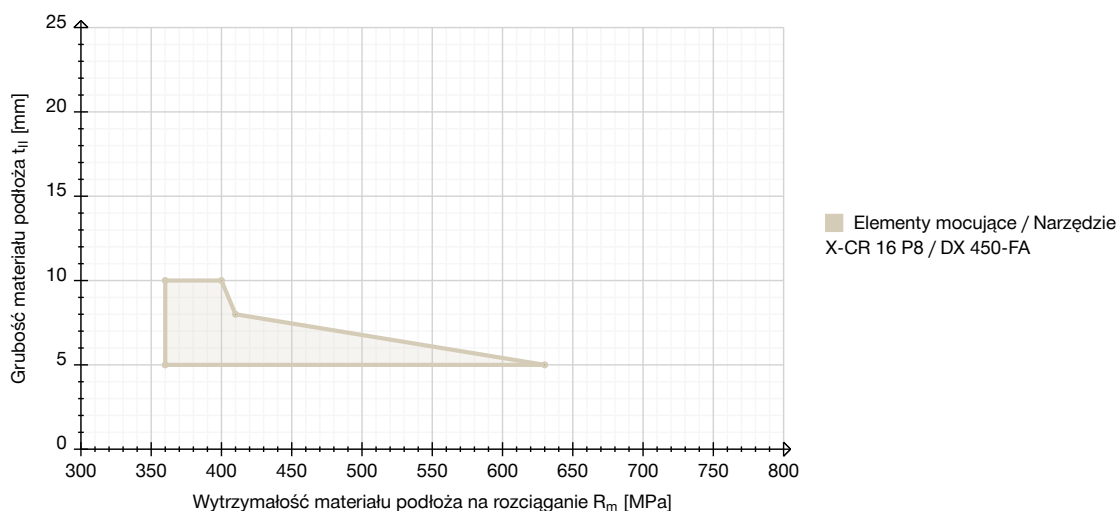


Drewno do betonu

| Warunek mocowania                              | Właściwości mocowania | Długość trzpienia<br>$L_s$ [mm] | Głębokość osadzenia<br>$h_{ef}$ [mm] | Grubość mocowanego materiału<br>$t_l$ [mm] | Zalecenia dotyczące elementów mocujących                                              |
|------------------------------------------------|-----------------------|---------------------------------|--------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------|
| Stal do stali                                  | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 9$                             | 0,75–8                                     | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Aluminium do stali                             | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 9$                             | 0,8–2                                      | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
| Drewno do stali                                | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 9$                             | 5–45                                       | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 |
| Stal do betonu                                 | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 9$                             | 0,75–8                                     | X-CR 16 P8,<br>X-CR 18 P8,<br>X-CR 21 P8                                              |
|                                                | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 27$                            | $\leq 2$                                   | X-CR 39 P8 S12                                                                        |
|                                                | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 32$                            | 2–7                                        | X-CR 44 P8 S12                                                                        |
|                                                | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | 40–45                                | $\leq 5$                                   | X-CR 48 P8 S15                                                                        |
|                                                | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | 40–45                                | 5–9                                        | X-CR 52 P8 S15                                                                        |
| Drewno do betonu                               | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 27$                            | 5–25                                       | X-CR 34 P8,<br>X-CR 39 P8                                                             |
|                                                | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | $\geq 32$                            | 5–25                                       | X-CR 44 P8,<br>X-CR 54 P8                                                             |
| Wsporniki Hilti MFT-FOXV, MFT-FOX VI do betonu | Mocowanie standardowe | $L_s \geq h_{ef} + t_l$         | 40–45                                | 5–10                                       | X-CR-FOX 53 P8 S15                                                                    |

## 6.4 Zakres zastosowań do mocowania do stali

### Stal do stali



**i** • Oznaczony obszar to dopuszczalne pole zastosowania.

## 7 DANE WŁAŚCIWOŚCI

### 7.1 Zalecane obciążenia przy obciążeniu kwazistatycznym/statycznym

| Warunek mocowania  | Elementy mocujące                                                                     | Grubość mocowanego materiału | Obciążenie rozciągające | Obciążenie ścinające |
|--------------------|---------------------------------------------------------------------------------------|------------------------------|-------------------------|----------------------|
|                    |                                                                                       | $t_f$ [mm]                   | $N_{rec}$ [kN]          | $V_{rec}$ [kN]       |
| Stal do stali      | X-CR 16 P8                                                                            | 0,75                         | 1                       | 1,1                  |
|                    | X-CR 16 P8                                                                            | 1                            | 1,2                     | 1,4                  |
|                    | X-CR 16 P8                                                                            | 1,25                         | 1,5                     | 1,7                  |
|                    | X-CR 16 P8                                                                            | 2                            | 2,2                     | 2                    |
|                    | X-CR 16 P8                                                                            | 3–6                          | 1,6                     | 2                    |
|                    | X-CR 18 P8                                                                            | 6–8                          | 1,6                     | 2                    |
|                    | X-CR 21 P8                                                                            | 8–11                         | 1,6                     | 2                    |
| Aluminium do stali | X-CR 16 P8                                                                            | 0,8                          | 0,4                     | 0,4                  |
|                    | X-CR 16 P8                                                                            | 1                            | 0,6                     | 0,6                  |
|                    | X-CR 16 P8                                                                            | 1,2                          | 0,8                     | 0,9                  |
|                    | X-CR 16 P8                                                                            | 1,5                          | 1,1                     | 1,4                  |
|                    | X-CR 16 P8                                                                            | 2                            | 1,6                     | 1,7                  |
| Drewno do stali    | X-CR 24 P8,<br>X-CR 29 P8,<br>X-CR 34 P8,<br>X-CR 39 P8,<br>X-CR 44 P8,<br>X-CR 54 P8 | 5–25                         | 0,6                     | 0,6                  |



- Obciążenia zalecane  $N_{rec}$  i  $V_{rec}$  są odpowiednie do stosowania w koncepcjach projektowych obciążeń roboczych z  $\gamma_{global} = 3,0$ .
- Do pośrednich grubości materiału mocowanych, należy stosować Obciążenie dla mniejszej grubości.
- Bez uwzględnienia uszkodzenia mocowanego materiału.

| Warunek mocowania                | Elementy mocujące                              | Głębokość osadzenia | Obciążenie rozciągające | Obciążenie ścinające |
|----------------------------------|------------------------------------------------|---------------------|-------------------------|----------------------|
|                                  |                                                | $h_{ef}$ [mm]       | $N_{rec}$ [kN]          | $V_{rec}$ [kN]       |
| Drewno do betonu, Stal do betonu | X-CR 24 P8, X-CR 29 P8                         | $\geq 18$           | 0,2                     | 0,2                  |
|                                  |                                                | $\geq 22$           | 0,3                     | 0,3                  |
|                                  | X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | $\geq 18$           | 0,2                     | 0,2                  |
|                                  |                                                | $\geq 22$           | 0,3                     | 0,3                  |
|                                  |                                                | $\geq 27$           | 0,4                     | 0,4                  |

| Warunek mocowania | Elementy mocujące              | Stan materiału podłoża | Obciążenie rozciągające | Obciążenie ścinające | Moment zginający |
|-------------------|--------------------------------|------------------------|-------------------------|----------------------|------------------|
|                   |                                |                        | $N_{rec}$ [kN]          | $V_{rec}$ [kN]       |                  |
| Stal do betonu    | X-CR 39 P8 S12, X-CR 44 P8 S12 | Beton niezarysowany    | 2                       | 2                    | 5,5              |
|                   | X-CR 48 P8 S15                 | Beton niezarysowany    | 3                       | 3                    | 5,5              |
|                   | X-CR 39 P8 S12, X-CR 44 P8 S12 | Beton zarysowany       | 0,6                     | 2                    | 5,5              |
|                   | X-CR 48 P8 S15                 | Beton zarysowany       | 0,9                     | 3                    | 5,5              |



- Szczegółowe informacje na temat mocowania przy użyciu X-CR 48 P8 S15, X-CR 52 P8 S15, X-CR-FOX 53 FOX P8 S15 zamieszczono na stronie [ETA-14/0426](#).

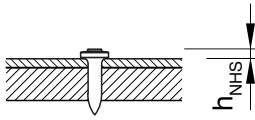
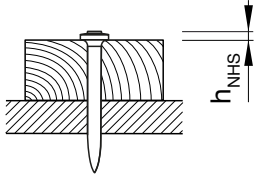
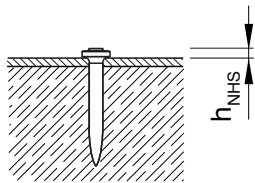
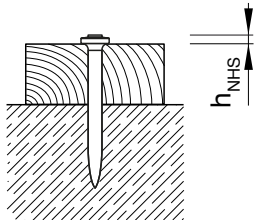
## 8 SPECYFIKACJA MONTAŻU

### 8.1 Charakterystyka montażowa

| Elementy mocujące              | Metoda montażowa                                      | Zamocowany materiał | Grubość mocowanego materiału<br><br>$t_f$ [mm] | Materiał podłoża | Klasa betonu będącego materiałem podłoża | Wiertło   |
|--------------------------------|-------------------------------------------------------|---------------------|------------------------------------------------|------------------|------------------------------------------|-----------|
| X-CR 16 P8                     | Nawiercanie mocowanego materiału                      | Stal                | 3 – 6                                          |                  |                                          |           |
| X-CR 18 P8                     | Nawiercanie mocowanego materiału                      | Stal                | 6 – 8                                          |                  |                                          |           |
| X-CR 18 P8                     | Nawiercanie mocowanego materiału                      | Stal                | 8 – 11                                         |                  |                                          |           |
| X-CR 39 P8 S12, X-CR 44 P8 S12 | Nawiercanie materiału podłoża                         |                     |                                                | Beton            | C20/25 - C45/55                          | TX-C-5/18 |
| X-CR 48 P8 S15, X-CR 52 P8 S15 | Nawiercanie materiału podłoża                         |                     |                                                | Beton            | C20/25 - C45/55                          | TX-C-5/23 |
| X-CR 48 P8 S15                 | Nawiercanie materiału podłoża przez mocowany materiał | Stal                | ≤2                                             | Beton            | C20/25 - C50/60                          | TX-C-5/23 |

## 9 ZAPEWNIANIE JAKOŚCI

### 9.1 Inspekcja mocowania

|  |                                                                        |  |  |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
| Stal do stali, Aluminium do stali                                                 |                                                                        | Drewno do stali                                                                     |  |
|  |                                                                        |  |  |
| Stal do betonu                                                                    |                                                                        | Drewno do betonu                                                                    |  |
| Warunek mocowania                                                                 | Elementy mocujące                                                      | Wystawianie łącznika<br>$h_{NHS}$ [mm]                                              |  |
| Stal do stali, Aluminium do stali, Stal do betonu                                 | X-CR 16 P8, X-CR 18 P8, X-CR 21 P8                                     | 3 – 4,5                                                                             |  |
| Drewno do stali, Drewno do betonu                                                 | X-CR 24 P8, X-CR 29 P8, X-CR 34 P8, X-CR 39 P8, X-CR 44 P8, X-CR 54 P8 | 3 – 4,5                                                                             |  |
| Stal do betonu                                                                    | X-CR 39 P8 S12, X-CR 44 P8 S12                                         | $\leq 5$                                                                            |  |
| Stal do betonu                                                                    | X-CR 48 P8 S15, X-CR 52 P8 S15                                         | $\leq 5$                                                                            |  |



- Widoczne wadliwe zamocowania trzeba zastąpić nowymi elementami mocującymi, nie w tym samym otworze.
- Niniejszy dokument to wersja skrócona instrukcji, mogących różnić się w zależności od zastosowania.
- Należy zawsze przestrzegać instrukcji dołączonych do danego produktu.

## 10 INFORMACJE DOTYCZĄCE ZAMAWIANIA

### 10.1 Nr artykułu i opis

| Oznaczenie         | Nr artykułu    | Opis                                            |
|--------------------|----------------|-------------------------------------------------|
| X-CR 39 P8 S12     | 247354, 298861 | Gwoździe X-CR P8 S do stali/betonu, z podkładką |
| X-CR 44 P8 S12     | 247355, 298862 |                                                 |
| X-CR 48 P8 S15     | 258121         |                                                 |
| X-CR 52 P8 S15     | 2052687        |                                                 |
| X-CR-FOX 53 P8 S15 | 2305190        |                                                 |
| X-CR 16 P8         | 247356         | Gwoździe X-CR P8 ze stali nierdzewnej           |
| X-CR 18 P8         | 247357         |                                                 |
| X-CR 21 P8         | 247358         |                                                 |
| X-CR 24 P8         | 247359         |                                                 |
| X-CR 29 P8         | 247360         |                                                 |
| X-CR 34 P8         | 247361         |                                                 |
| X-CR 39 P8         | 247362         |                                                 |
| X-CR 44 P8         | 247363         | X-CR S12 Stainless steel nails with washer      |
| X-CR 54 P8         | 247429         |                                                 |
| X-CR 16 S12        | 298855         |                                                 |
| X-CR 18 S12        | 298856         |                                                 |
| X-CR 21 S12        | 298857         |                                                 |
| X-CR 24 S12        | 298858         |                                                 |
| X-CR 29 S12        | 298859         |                                                 |
| X-CR 34 S12        | 298860         |                                                 |



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