



Technical Manual

Technical changes and
errors reserved

Version 31.10.2017

RSTEEL[®] **Wire Loop**

Design according to Eurocodes



2017
R-Group Finland OY

asiakastieto.fi

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1. R-STEEL® Wire Loop Description

R-Steel Loops are steel parts installed to concrete before casting. In R-Steel Loop a flexible wire rope is bent to loop and held together by compression sleeve.

R-Steel Loop may be used e.g. to tie concrete wall elements to the building frame with ribbed steel bars installed through the wire rope loop.

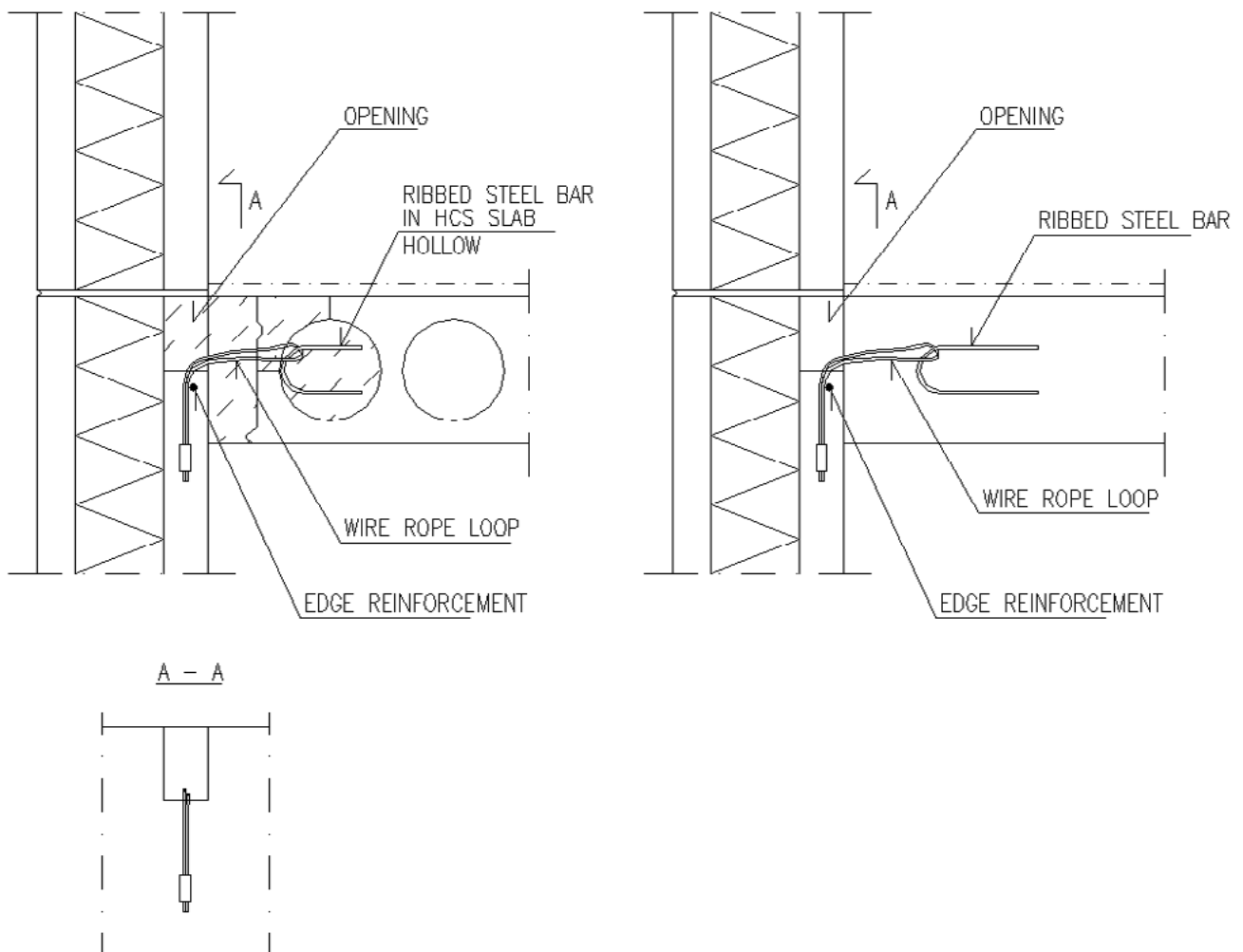


Figure 1. Principles of using R-Steel Loop

2. R-STEEL® Wire Loop Dimensions and Materials

2.1 R-Steel Loop dimensions

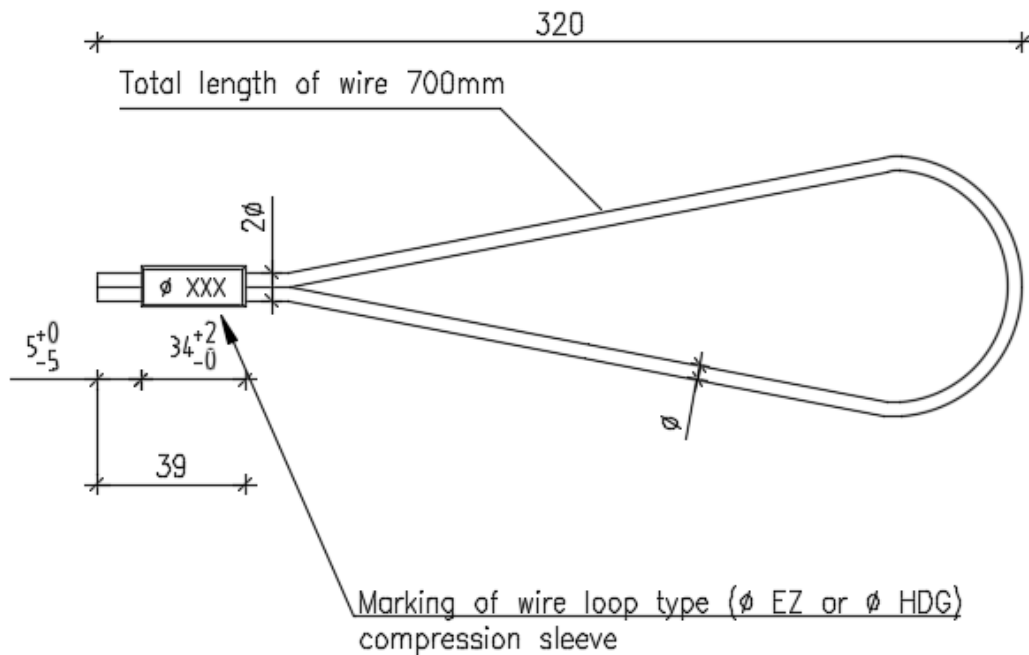


Figure 2. R-Steel Loop dimensions

Table 1. R-Steel Loop wire diameters

R-Steel Loop	Wire diameter ϕ [mm]
R-Steel Loop 5	5
R-Steel Loop 6	6

2.2 R-Steel Loop materials

Table 2. R-Steel Loop materials and standards

Part	Material	Standard
Wire rope	high strength steel wire SE-Zn	SFS-EN 12385
Compression sleeve	1.0046	SFS-EN 10025

2.3 R-Steel Loop surface treatment and ordering code

Table 3. R-Steel Loop surface treatments and ordering codes

R-Steel Loop	R-Steel Loop surface treatment	Ordering code	Marking in compression sleeve
R-Steel Loop 5	Electro zined	R-Steel Loop 5	5 EZ
R-Steel Loop 5	Hot dip galvanized	R-Steel Loop 5 HDG	5 HDG
R-Steel Loop 6	Electro zined	R-Steel Loop 6	6 EZ
R-Steel Loop 6	Hot dip galvanized	R-Steel Loop 6 HDG	6 HDG

3. R-STEEL® Wire Loop Manufacturing

3.1 Manufacturing method

Wire rope is cut to correct length, ends of the wire are inserted through the compression sleeve and the compression sleeve is compressed.

3.2 Manufacturing markings

Product package is equipped with an R-Steel –sticker, which contains the following information: product type, product name, quantity ISO9001 and ISO14001 quality and environment system markings, FI marking and product picture.

Products are delivered in cardboard boxes on a truck palette. Cardboard boxes are marked with FI and BY (Concrete Association of Finland) logo and the number of certified product declaration, numbers of the ISO-certificates and the product type and name

3.3 Quality control

Quality control of the inserts is done according to the requirements of the Finnish Code of Building Regulations and the instructions according to quality and environment system of the R-Group Finland Oy (ISO9001 and ISO14001). R-Group Finland Oy has a quality control contract with Inspecta Sertifiointi Oy.

4. R-STEEL® Wire Loop Resistances

4.1 Design principles

Resistances of R-Steel Loops are calculated in ultimate limit state. Design calculations are done according to following codes and regulations:

EN 1992: Eurocode 2: Design of concrete structures

EN 1993: Eurocode 3: Design of steel structures

4.2 R-Steel Loop resistance in element tying

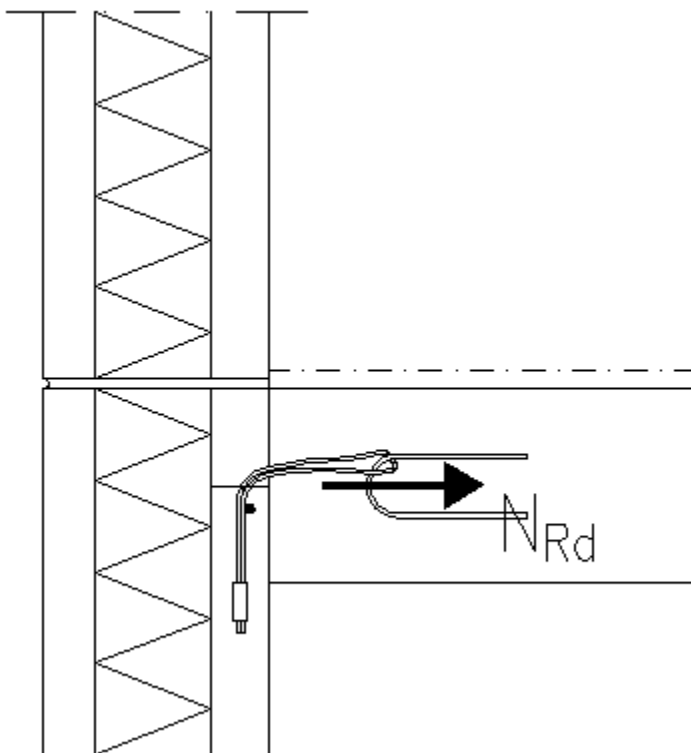


Figure 3. Direction of resistance

Concrete strength \geq C25/30.

Table 4. R-Steel Loop resistances for horizontal force

R-Steel Loop	Resistance in ultimate limit state for horizontal force N_{Rd} [kN]
R-Steel Loop 5	4,8
R-Steel Loop 6	6,1

4.3 R-Steel Loop resistance in lifting

R-Steel Loop can be used for lifting concrete elements according to figure 4. Lifting angle α must be between $0^\circ - 45^\circ$.

Concrete strength at the lifting moment $\geq C15/20$.

Table 5. R-Steel Loop resistances for lifting

R-Steel Loop	Resistance for lifting F_{Rd} [kN]
R-Steel Loop 5	2,9
R-Steel Loop 6	3,6

Lifting device diameter must be ≥ 40 mm.

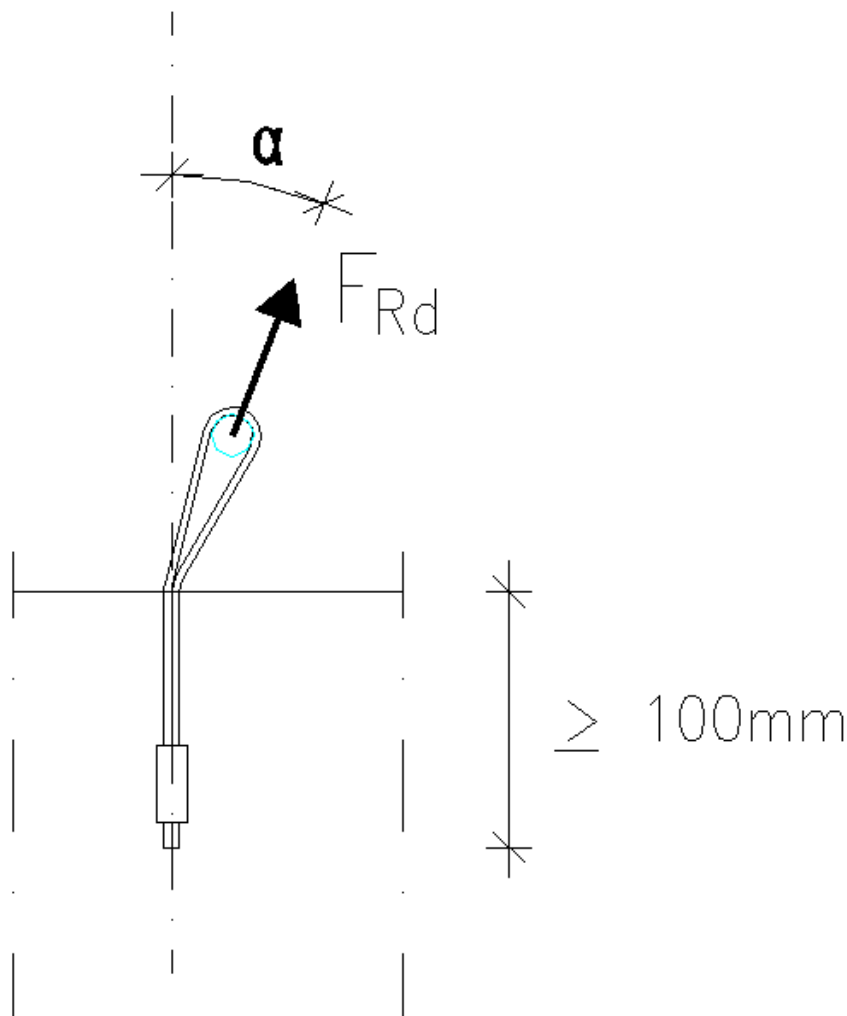


Figure 4. R-Steel Loop in lifting

E.g. Element weight 4 kN is designed to be lifted with R-Steel Loops. Lifting angle $\alpha = 0^\circ - 45^\circ$. Required number of R-Steel Loops is $\frac{4\text{kN}}{1,9\text{kN/pc}} = 2,1\text{pcs} \rightarrow 3\text{pcs}$.

5. R-STEEL® Wire Loop Application

5.1 Limitation for application

R-Steel Loops are designed for concrete $\geq C25/30$ ($\geq C15/20$ in lifting). R-Steel Loops are designed for static loads. Calculations for dynamic loads must be done separately.

R-Steel Loops cannot be welded.

Lifting angle α must be between $0^\circ - 45^\circ$ as in figure 4. R-Steel Loop cannot be used for greater lifting angles.

5.1.1 Minimum center and edge distances

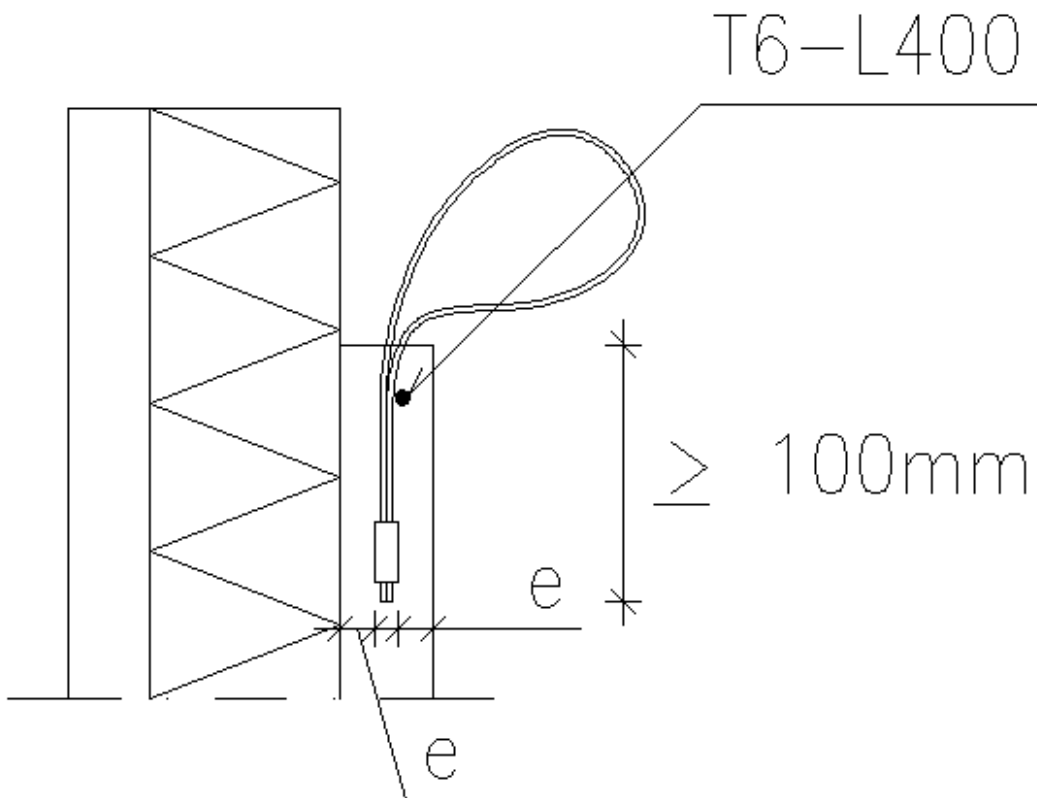


Figure 5. Minimum edge distance and minimum insertion of R-Steel Loop

Minimum edge distance from sleeve (e in figure 5) is 15 mm.

5.1.2 Reinforcement

Anchoring reinforcement according to figure 6 must be installed through the R-Steel Loop and it must be anchored to the cast in situ concrete. Reinforcement material B500B.

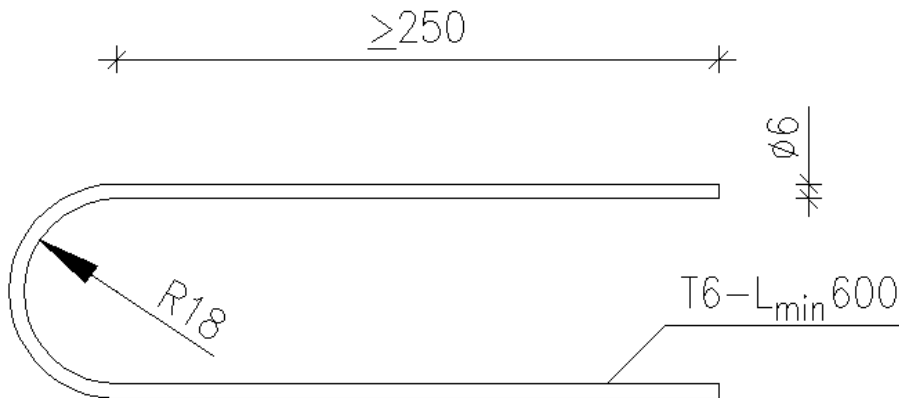


Figure 6. Anchoring reinforcement

6. Installation

R-Steel Loop and anchoring reinforcement must be securely attached and must not move during casting. R-Steel Loop may not be vibrated during casting.

7. Supervision of Installation

7 SUPERVISION OF INSTALLATION

Check list before casting:

- R-Steel Loop is in good condition
- R-Steel Loop is according to designs and in the right place
- R-Steel Loop is attached firmly
- the required additional reinforcement is assembled

During the casting:

- R-Steel Loop stays in the right place
- concrete is thoroughly vibrated around the R-Steel Loop

After the casting:

- the situation of the R-Steel Loop is according to design

About R-Group

R-Group is a leading provider of steel connections for precast and cast-in- situ construction around the globe.

With over three decades of our participation in huge projects, we don't compromise on quality or customer satisfaction and we create connections for a lifetime.

Our customer-oriented service, excellent and reliable network of suppliers plus our extensive product portfolio ensure that we are able to offer professional and flexible solutions for any kind of projects.




In our operations we comply with the ISO 9001 and 14001 standards

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