



Technical Manual

Technical changes and
errors reserved

Version 26.8.2019

RLL Threaded Lifting Loops

According to Eurocodes, EU Machinery directive
2006/42/EC and VDI/BV-BS 6205
CE Approved



2017
R-Group Finland OY


 asiakastieto.fi

Table of Contents

1. DESCRIPTION OF THE SYSTEM	3
1.1 Manufacturing markings	3
1.2 Quality control	3
2. LIFTING LOOPS	4
2.1 RLL lifting loop	4
3. SAFE WORKING LOADS	5
3.1 Design concept	5
3.2 Safe working loads	6
4. USE	7
4.1 Allowed lifting angles and types	7
4.2 Installation	8
4.3 Lifting device minimum diameter	9
4.4 Inspection and service life	10
4.4.1 Required inspections and documentation	10
4.4.2 Inspection before use	11
4.4.3 Damage leading to immediate rejection	12

1. DESCRIPTION OF THE SYSTEM

RLL threaded lifting loops manufactured by R-Group Finland Oy are lifting loops consisting of wire rope loops and threaded end part. RLL threaded lifting loops can be used for lifting angles up to 45 degrees.

RLL lifting loops are designed and manufactured in accordance with EU Machinery Directive 2006/42/EC and VDI/BV-BS 6205. Lifting loops meet the requirements for safe lifting and handling of concrete elements.

1.1 Manufacturing markings

RLL lifting loops are marked with R-Steel logo, type and load class of lifting insert and CE-marking.

Products are delivered [in cardboard boxes] on a truck palette. Product package is equipped with an R-Steel Pallet Label, which contains the following information: product type, product name, quantity, ISO9001 and ISO14001 quality and environment system markings, and CE marking.

1.2 Quality control

Quality control of the inserts is done according to to quality and environment system of the R-Group Finland Oy.

2. LIFTING LOOPS

2.1 RLL lifting loop

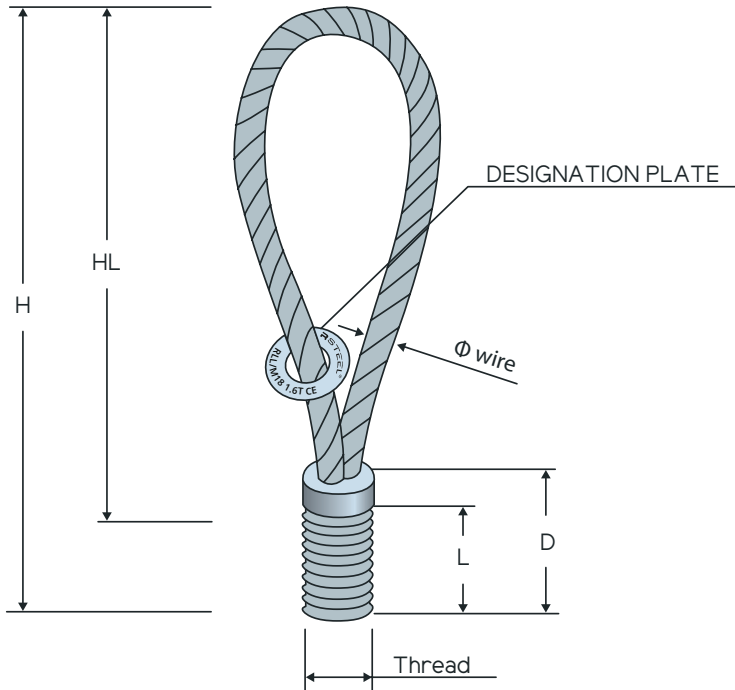


Figure 1. RLL threaded lifting loop

Table 1. RLL threaded lifting loop dimensions

RLL type and load class	Thread	L [mm]	D [mm]	Φwire [mm]	HL [mm]	H [mm]
RLL 0,5-Rd	Rd 12 x 1,75	22	30	6	133	155
RLL 0,8-Rd	Rd 14 x 2,00	25	35	7	130	155
RLL 1,2-Rd	Rd 16 x 2,00	27	38	8	138	165
RLL 1,6-Rd	Rd 18 x 2,50	34	45	9	156	190
RLL 2,0-Rd	Rd 20 x 2,50	35	47	10	180	215
RLL 2,5-Rd	Rd 24 x 3,00	43	57	12	212	255
RLL 4,0-Rd	Rd 30 x 3,50	56	68	16	244	300
RLL 6,3-Rd	Rd 36 x 4,00	67	81	18	293	360
RLL 8,0-Rd	Rd 42 x 4,50	80	95	20	350	430
RLL 12,5-Rd	Rd 52 x 5,00	97	117	26	433	530

RLL type and load class	Thread	L [mm]	D [mm]	Φwire [mm]	HL [mm]	H [mm]
RLL 0,5-M	M12 x 1,75	22	30	6	133	155
RLL 0,8-M	M14 x 2,00	25	35	7	130	155
RLL 1,2-M	M16 x 2,00	27	38	8	138	165
RLL 1,6-M	M18 x 2,50	34	45	9	156	190
RLL 2,0-M	M20 x 2,50	35	47	10	180	215
RLL 2,5-M	M24 x 3,00	43	57	12	212	255
RLL 4,0-M	M30 x 3,50	56	68	16	244	300
RLL 6,3-M	M36 x 4,00	67	81	18	293	360
RLL 8,0-M	M42 x 4,50	80	95	20	350	430
RLL 12,5-M	M52 x 5,00	97	117	26	433	530

Designation plate:

metal plate with the following information

- R-Steel logo and CE mark
- RLL mark / Thread type, thread size and load class
- Product number
- Year of production

Table 2. RLL threaded lifting loop materials

Part	Material
Wire	High strength steel wire (EN 12385-4)
Ferrule	Metal

3. SAFE WORKING LOADS

3.1 Design concept

Safe working loads of RLL threaded lifting loops are determined based on tests according to following standards and instructions:

EN 1990: Basis of structural design
 Machinery directive 2006/42/EC
 VDI/BV-BS 6205

Global safety factor used in determination of safe working loads is

Steel failure of wire loop $\gamma = 4,0$

Dynamic coefficient of 1,3 according to VDI/BV-BS 6205 is assumed.

Safe working loads of lifting inserts in concrete are given in relevant technical manuals.

Safety concept

$E \leq SWL$

Where E = action placed on lifting loop
 SWL = safe working load of lifting loop

3.2 Safe working loads

Safe working loads (SWL) of RLL threaded lifting loops are given in table 3. Safe working loads are valid only for lifting angles $\beta = 0^\circ - 45^\circ$. Transverse shear load is not allowed, see section 4.

Table 3. RLL threaded lifting loop safe working loads

RLL type and load class	Safe working loads (SWL) [kN]
	$\beta = 0^\circ - 45^\circ$
RLL 0,5	5
RLL 0,8	8
RLL 1,2	12
RLL 1,6	16
RLL 2,0	20
RLL 2,5	25
RLL 4,0	40
RLL 6,3	63
RLL 8,0	80
RLL 12,5	125

4. USE

4.1 Allowed lifting angles and types

RLL threaded lifting loops are intended to be used for lifting angles $\beta = 0^\circ - 45^\circ$. Transverse shear load is not allowed. RLL lifting loops are not allowed to be used for tilting of concrete elements. Only tension force is allowed, transverse shear loading is not allowed.

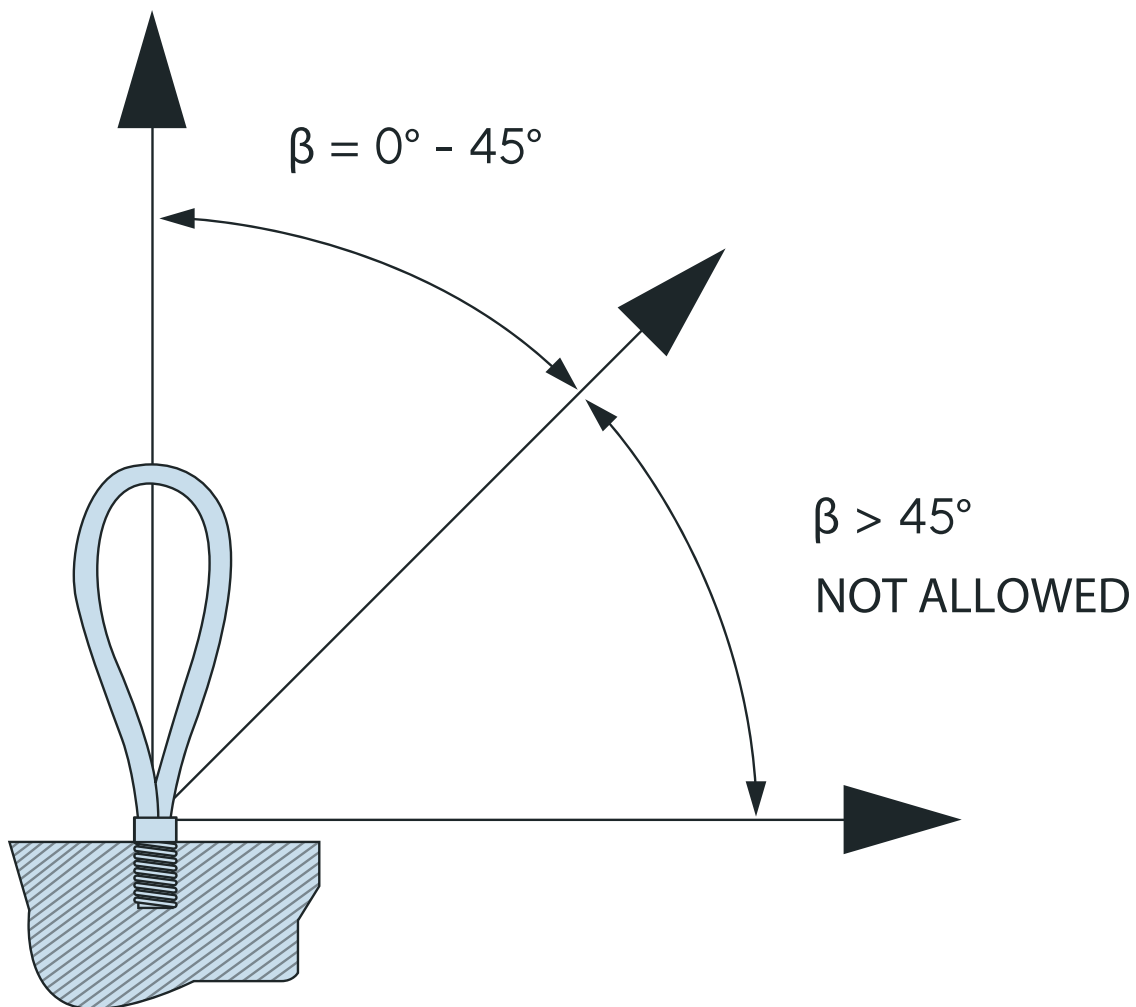


Figure 2. RLL threaded lifting loop allowed lifting angle

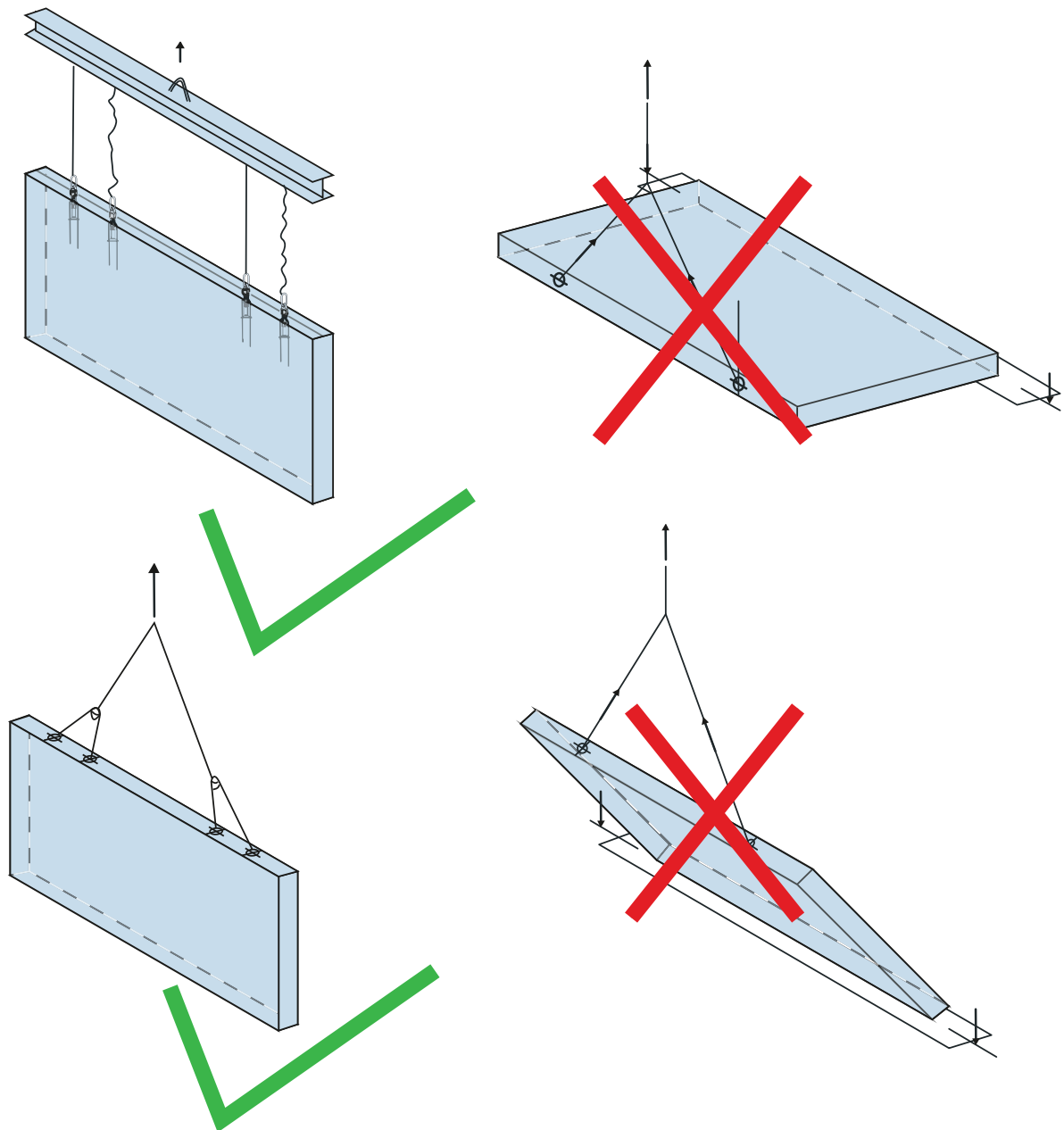


Figure 3. Allowed lifting types

4.2 Installation

RLL threaded lifting loops are intended to be used with R-Steel threaded lifting anchors. Other lifting anchors are not permitted. Load class and load capacity of the threaded lifting anchor must always be verified according to lifting anchor technical manual. Only lifting anchors with corresponding load class may be used with RLL threaded lifting loops.

RLL threaded lifting loop is installed and screwed in to the lifting anchor socket by hand. It is not permitted to use any tools for screwing in and out. Use of tools can damage the RLL lifting loop and result in failure of lifting loop leading to serious injury or death.

RLL threaded lifting loops are to be screwed in gently by hand, without using force. Dirty threads in lifting anchor and/or lifting loop must be cleaned and, if necessary, lubricated before use. Dirty threads may reduce the screw-in depth, which reduces the load-carrying capacity significantly and may lead to serious injury or death.

RLL threaded lifting loops must always be fully screwed in. Minimum screw-in depths are given in table 4.

Table 4. RLL lifting loop minimum screw-in depth

RLL type and load class	Rd thread	M thread	Minimum screw-in depth [mm]
RLL 0,5	Rd 12 x 1,75	M12 x 1,75	22
RLL 0,8	Rd 14 x 2,00	M14 x 2,00	25
RLL 1,2	Rd 16 x 2,00	M16 x 2,00	27
RLL 1,6	Rd 18 x 2,50	M18 x 2,50	34
RLL 2,0	Rd 20 x 2,50	M20 x 2,50	35
RLL 2,5	Rd 24 x 3,00	M24 x 3,00	43
RLL 4,0	Rd 30 x 3,50	M30 x 3,50	56
RLL 6,3	Rd 36 x 4,00	M36 x 4,00	67
RLL 8,0	Rd 42 x 4,50	M42 x 4,50	80
RLL 12,5	Rd 52 x 5,00	M52 x 5,00	97

4.3 Lifting device minimum diameter

Lifting hook or lifting device used with RLL threaded lifting loops must have a minimum diameter for the deflection of the RLL lifting loop wire. If the lifting hook or lifting device diameter is too small RLL lifting loop wire may fail at small loads, leading to injury or death. Diameter of the lifting hook or lifting device must be at least 3 x wire diameter for wire diameter < 20 mm and at least 5 x wire diameter for wire diameter ≥ 20 mm. Minimum diameters are given in table 5.

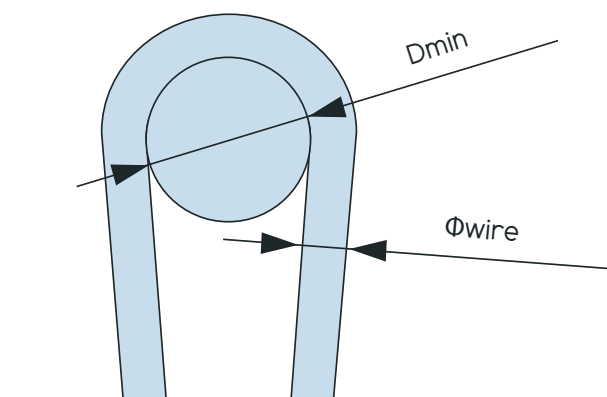


Figure 4. Minimum lifting device diameter for the wire deflection

Table 5. RLL lifting loop minimum diameter of lifting device

RLL type and load class	Rd thread	M thread	Minimum lifting device diameter Dmin [mm]
RLL 0,5	Rd 12 x 1,75	M12 x 1,75	18
RLL 0,8	Rd 14 x 2,00	M14 x 2,00	21
RLL 1,2	Rd 16 x 2,00	M16 x 2,00	24
RLL 1,6	Rd 18 x 2,50	M18 x 2,50	27
RLL 2,0	Rd 20 x 2,50	M20 x 2,50	30
RLL 2,5	Rd 24 x 3,00	M24 x 3,00	36
RLL 4,0	Rd 30 x 3,50	M30 x 3,50	48
RLL 6,3	Rd 36 x 4,00	M36 x 4,00	54
RLL 8,0	Rd 42 x 4,50	M42 x 4,50	100
RLL 12,5	Rd 52 x 5,00	M52 x 5,00	130

4.4 Inspection and service life

4.4.1 Required inspections and documentation

RLL threaded lifting loops must always be examined for damage and wear before use. Initial inspection must be carried out before first use and at least once a year. RLL lifting loops must always be inspected for wear and tear before every use. Inspection must be done by competent personnel. Parts must be clean and pure during inspections. Inspection register must be kept on the worksite and all inspections logged. Inspection register must be kept for every individual lifting loop for the whole service life of the lifting loop. Use of RLL lifting loops which are at the end of their service life can result in failure.

RLL lifting loops may not be modified in any way. No repair work or welding of any sort can be done on RLL lifting loops. Damaged lifting loops must be immediately made unusable and discarded.

4.4.2 Inspection before use

Check before every use:

- RLL lifting loop designation plate is legible and in good condition
- Wires are in good condition (check especially the loop top where the wire is in contact with lifting hook)
- Clamps are free of cracks
- Thread is OK and free of cracks
- There is no settling at the lifting loop bottom (bottom of the steel ferrule must be flat)

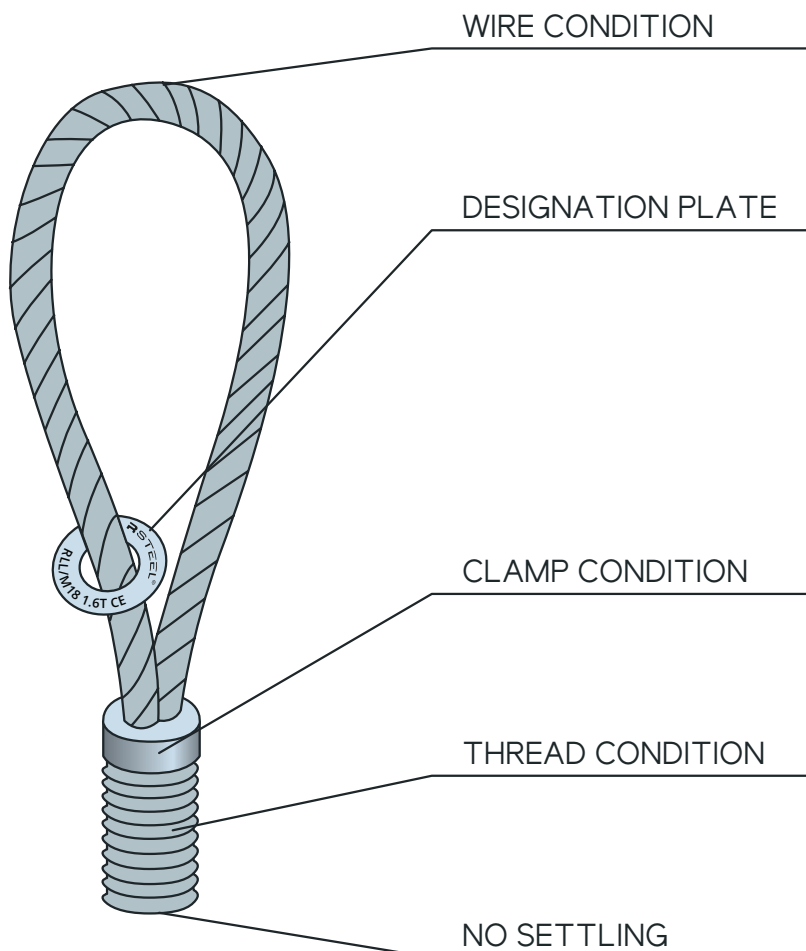


Figure 5. Check before every use

4.4.3 Damage leading to immediate rejection

RLL threaded lifting loops may no longer be used if any of the following types of damage is observed:

- Breakage or visible damage to 4 randomly distributed individual outer wires over a wire rope length of 3 x the wire rope diameter or the entire wire rope
- RLL lifting loop designation plate is illegible or missing
- Bends, twists or kinks in the wire rope
- Deformation or damage of the wire rope
- Crushing of the wire rope
- Heavy wear in any part of the lifting loop
- Corrosion pits or large corroded areas
- Connection between wire rope and ferrule loosened or detached
- Cracks or deformation in the thread
- Damage in the threaded part
- Bends in the threaded part
- Signs of welding or modification of lifting loop
- Settling at the lifting loop bottom

RLL lifting loops rejected in inspection must be immediately made unusable and discarded.

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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