

## SMOOTH BAR LIFTING LOOPS TECHNICAL MANUAL

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## Lifting Loops

The lifting loops are specially made of flat steel and stainless steel also.

The key benefits and features of Smooth bar lifting loops as below:

- Quick and easy for fixing in walls etc.
- Also available with plain and stainless.
- Easy anchor installation in element using recess former
- It is very economical.

## 1. Introduction

Lifting loops are made of plain steel and stainless steel. EXA, EXB, EXU, EXK lifting loops are mainly used for thin precast elements like walls, columns etc. These are available in various sizes.

EXC lifting loops are designed for lifting and transporting sandwich wall or insulation wall elements. There is no need of any special keys.

Lifting Loops have been designed in accordance with

- EU machinery directive 2006/42/EC
- Betonielementtien nostolenkit ja-ankkurit - 2014
- SFS - EN 13155
- CEN-TR 15728

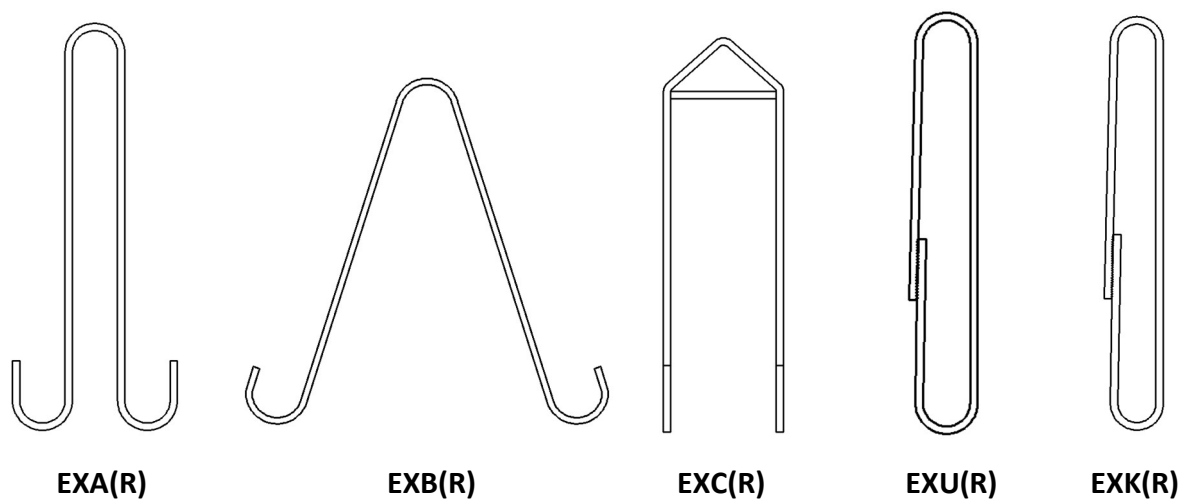


Figure 1. Lifting Loops

## Safety Features

Lifting loop has been tested for a high safety level. The general safety factor given to concrete failure mechanisms is 4.0 against the characteristic (5% fractile) strength of the concrete.

## 2. Product Dimensions

### 2.1. EXA,EXAR Lifting Loop

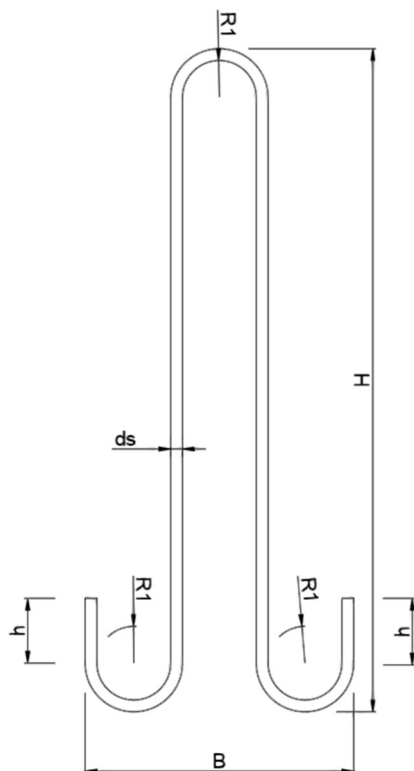


Table 1. EXA,EXAR Lifting Loop dimensions

Lifting loop Diameter	H	B	$\varnothing ds$	h	Bending Radius (R1)
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
6	250	114	6	15	15
8	300	152	8	20	20
10	300	190	10	25	25
12	300	228	12	30	30
14	300	266	14	35	35
16	300	304	16	40	40
20	300	380	20	50	50

2.2. **EXB,EXBR Lifting Loop**

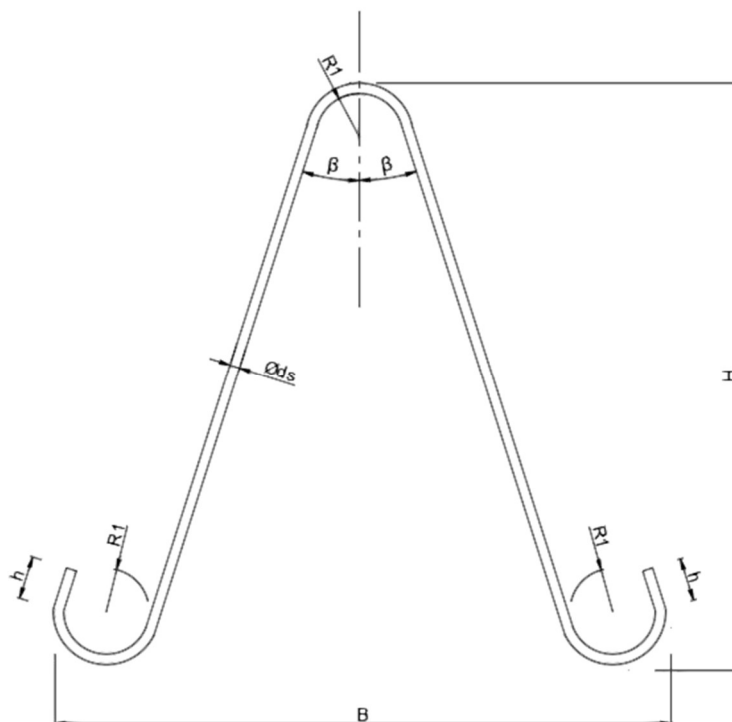


Table 2. EXB,EXBR Lifting Loop dimensions

Lifting loop Diameter [mm]	H [mm]	B [mm]	Øds [mm]	h [mm]	Bending Radius (R1) [mm]
12 S	600	560	12	60	60
12	820	640	12	60	60
16 S	830	750	16	80	80
16	1060	880	16	80	80
20 S	1045	930	20	100	100
20	1380	1085	20	100	100
25 SX	1170	1080	25	125	125
25 S	1370	1180	25	125	125
25	1660	1330	25	125	125
32S	1590	1570	32	160	160
32	2120	1710	32	160	160

2.3. EXC Lifting Loop

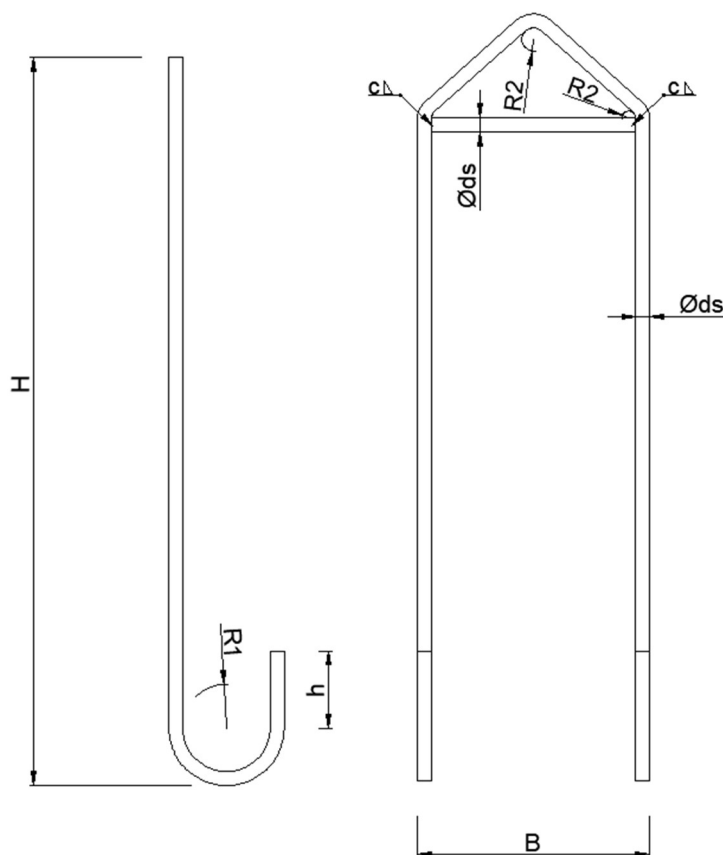


Table 3. EXC Lifting Loop dimensions

Lifting loop Diameter [mm]	H [mm]	B [mm]	Øds [mm]	h [mm]	Bending Radius (R1) [mm]	Bending Radius (R2) [mm]
12	800	229	12	60	60	24
16 S	810	237	16	80	80	32
16	1050	237	16	80	80	32
20 S	1040	245	20	100	100	40
20	1390	245	20	100	100	40
25 SX	1175	255	25	125	125	50
25 S	1375	255	25	125	125	50
25	1675	255	25	125	125	50
32S	1600	269	32	160	160	64
32	2050	269	32	160	160	64

2.4. EXCR Lifting Loop

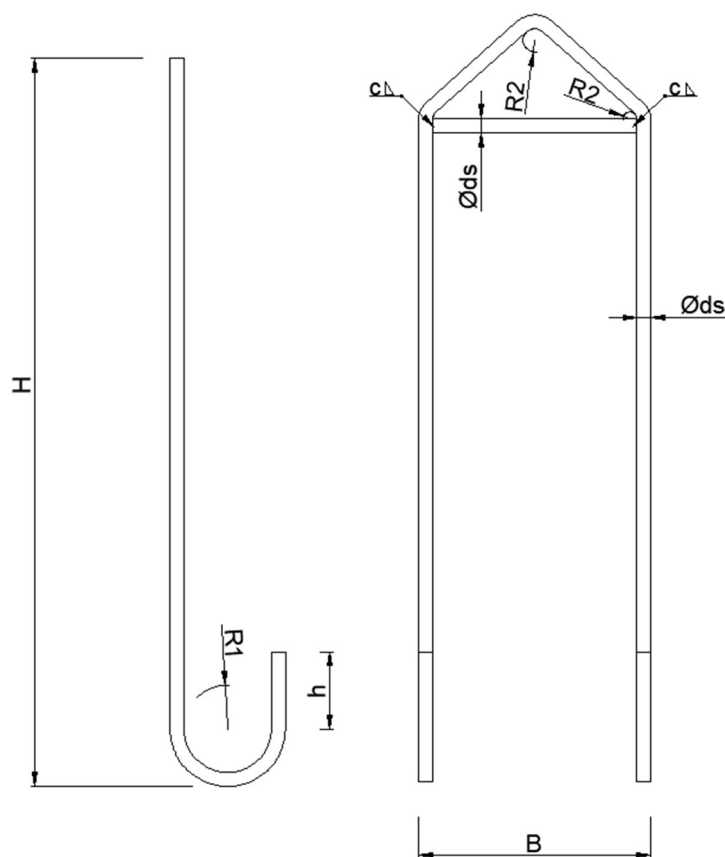


Table 4. EXCR Lifting Loop dimensions

Lifting loop Diameter [mm]	H [mm]	B [mm]	$\varnothing ds$ [mm]	h [mm]	Bending Radius (R1) [mm]	Bending Radius (R2) [mm]
12	800	229	12	60	60	24
16 S	810	237	16	80	80	32
20 S	1040	245	20	100	100	40
25 SX	1175	255	25	125	125	50



2.5. EXU,EXUR Lifting Loop

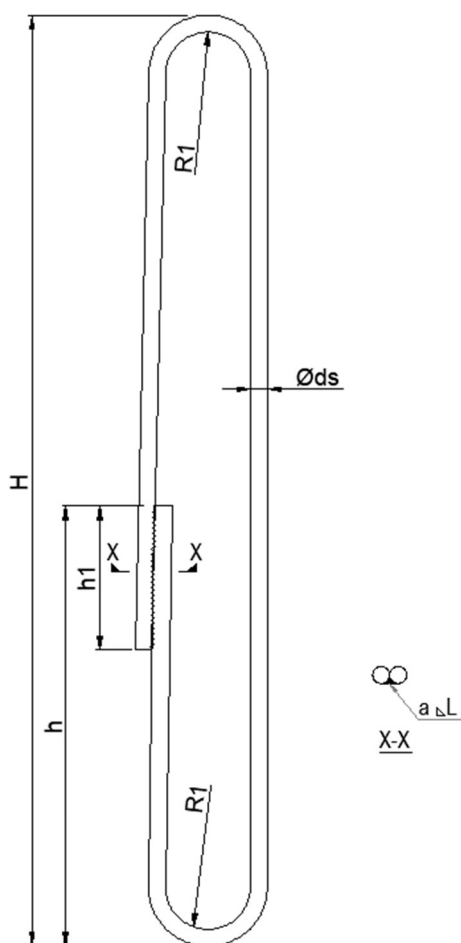


Table 5. EXU,EXUR Lifting Loop dimensions

Lifting loop Diameter	H	Øds	h	h1	a	L	Bending Radius (R1)
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
10	700	10	260	70	4	45	50
12	900	12	312	90	4	60	50
14	1100	14	364	110	5	70	50
16-1	900	16	416	130	5	85	50
16-2	1250	16	416	130	5	85	50
20-1	1100	20	520	170	6	110	50
20-2	1600	20	520	170	6	110	50
25	1800	25	650	260	6	170	50

2.6. EXK,EXKR Lifting Loop

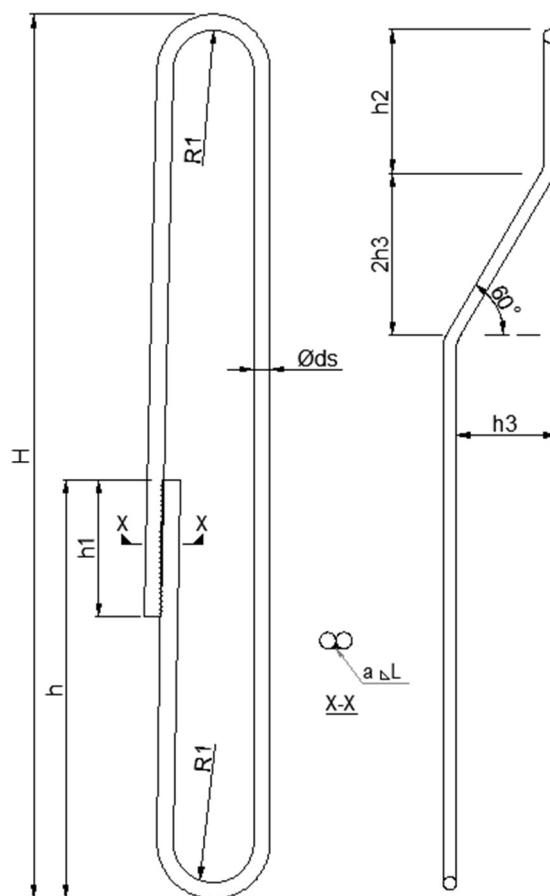


Table 6. EXK,EXKR Lifting Loop dimensions

Lifting loop Diameter [mm]	H [mm]	Øds [mm]	h [mm]	h1 [mm]	a [mm]	L [mm]	Bending Radius (R1) [mm]	h2 [mm]	h3 [mm]
10	700	10	260	70	4	45	50	110	90
12	900	12	312	90	4	60	50	132	90
14	1100	14	364	110	5	70	50	154	90
16-1	900	16	416	170	6	145	50	176	180
16-2	1250	16	416	170	6	145	50	176	180
20-1	1100	20	520	240	7	200	50	220	180
20-2	1600	20	520	240	7	200	50	220	180
25	1800	25	650	260	6	170	50	275	90

## 2.7. Materials

Table 7. Lifting Loops are available in following materials.

<b>Lifting</b>	<b>Material</b>	<b>Material Type</b>	<b>Standard</b>
EXA, EXB, EXC, EXU, EXK	S235J2 + N	Plain Steel	EN 10025
EXAR, EXBR, EXCR, EXUR, EXKR	1.4301	Stainless Steel	EN 10088

### 3. Allowable Loads

Lifting Loops have been designed in accordance with EU machinery directive 2006/42/EC and SFS-EN 13155. Capacity has been calculated for concrete grade C12/15.

Global safety factor considered for steel failure - 4.1

Global safety factor considered for concrete failure - 3.1

#### 3.1. EXA,EXAR Lifting Loop

Table 8. EXA,EXAR Lifting Capacity

Lifting loop Diameter [mm]	N <sub>Rd</sub> , [kN]	
	0°	30°
6	2.82	2.45
8	5.02	4.35
10	6.69	5.79
12	8.53	7.39
14	10.53	9.12
16	12.70	11.00
20	17.53	15.19

#### 3.2. EXB Lifting Loop

Table 9. EXB Lifting Loop capacity

Lifting loop Diameter [mm]	N <sub>Rd</sub> , [kN]	
	0°	30°
12 S	14.06	12.18
12	19.67	17.03
16 S	28.57	24.74
16	34.97	30.28
20 S	47.30	40.96
20	54.64	47.32
25 SX	68.93	59.69
25 S	80.46	69.68
25	85.37	73.93
32S	123.89	107.29
32	139.87	121.13

### 3.3. EXBR Lifting Loop

Table 10. EXBR Lifting Loop capacity

Lifting loop Diameter [mm]	N <sub>Rd</sub> , [kN]	
	0°	30°
12 S	14.06	12.18
12	20.16	17.46
16 S	28.57	24.74
16	37.06	32.10
20 S	47.30	40.96
20	62.76	54.35
25 SX	68.93	59.69
25 S	80.46	69.68
25	97.19	84.17
32S	123.89	107.29
32	163.02	141.18

### 3.4. EXC Lifting Loop

Table 11. EXC Lifting Loop capacity

Lifting loop Diameter [mm]	N <sub>Rd</sub> , [kN]	
	0°	30°
12	19.67	17.03
16 S	30.27	26.22
16	34.97	30.28
20 S	48.45	41.96
20	54.64	47.32
25 SX	71.24	61.69
25 S	82.77	71.68
25	85.37	73.93
32S	127.73	110.62
32	139.87	121.13

### 3.5. EXCR Lifting Loop

Table 12. EXCR Lifting Loop capacity

Lifting loop Diameter [mm]	N <sub>Rd</sub> , [kN]	
	0°	30°
12	22.15	19.18
16	30.27	26.22
20	48.45	41.96
25	71.24	61.69

### 3.6. EXU,EXUR,EXK,EXKR Lifting Loop

Table 13. EXU,EXUR,EXK,EXKR Lifting Loop capacity with minimum reinforcement in concrete (N<sub>Rd</sub>,kN)

D [mm]	Grade	Wall Thickness,[mm]																	
		100		120		140		160		180		200		220		240		260	
		0°	30°	0°	30°	0°	30°	0°	30°	0°	30°	0°	30°	0°	30°	0°	30°	0°	30°
10	C12	14.4	12.5	16.1	14	16.1	14	16.1	14	16.1	14	16.1	14	16.1	14	16.1	14	16.1	14
	C15	16.1	14	18.7	16.2	18.7	16.2	18.7	16.2	18.7	16.2	18.7	16.2	18.7	16.2	18.7	16.2	18.7	16.2
12	C12	17.8	15.4	21.4	18.5	24.9	21.6	25.5	22	25.5	22	25.5	22	25.5	22	25.5	22	25.5	22
	C15	19.9	17.3	23.9	20.7	27.9	24.1	27.9	24.1	27.9	24.1	27.9	24.1	27.9	24.1	27.9	24.1	27.9	24.1
14	C12	21.1	18.3	25.3	21.9	29.6	25.6	33.8	29.2	36.8	31.9	36.8	31.9	36.8	31.9	36.8	31.9	36.8	31.9
	C15	23.6	20.4	28.3	24.5	33	28.6	37.8	32.7	37.9	32.8	37.9	32.8	37.9	32.8	37.9	32.8	37.9	32.8
16-1	C12	17.8	15.4	21.4	18.5	24.9	21.6	28.5	24.7	32.1	27.8	35.4	30.7	35.4	30.7	35.4	30.7	35.4	30.7
	C15	19.9	17.3	23.9	20.7	27.9	24.2	31.9	27.6	35.9	31.1	39.8	34.5	41.1	35.6	41.1	35.6	41.1	35.6
16-2	C12	23.5	20.4	28.2	24.4	32.9	28.5	37.6	32.6	42.3	36.7	47.0	40.7	48.3	41.8	48.3	41.8	48.3	41.8
	C15	26.3	22.8	31.6	27.3	36.8	31.9	42.1	36.4	47.3	41.0	49.5	42.9	49.5	42.9	49.5	42.9	49.5	42.9
20-1	C12	21.1	18.3	25.3	21.9	29.6	25.6	33.8	29.2	38.0	32.9	42.2	36.6	46.4	40.2	50.7	43.9	54.9	47.5
	C15	23.6	20.4	28.3	24.5	33.0	28.6	37.8	32.7	42.5	36.8	47.2	40.9	51.9	45.0	56.6	49.1	61.4	53.1
20-2	C12	29.0	25.1	34.8	30.1	40.6	35.2	46.4	40.2	52.2	45.2	58.0	50.2	63.8	55.3	69.6	60.3	75.4	65.3
	C15	32.4	28.1	38.9	33.7	45.4	39.3	51.9	44.9	58.4	50.6	64.9	56.2	71.4	61.8	77.4	67.0	77.4	67.0
25	C12	32.1	27.8	38.5	33.3	44.9	38.9	51.3	44.4	57.7	50	64.2	55.6	70.6	61.1	77	66.7	83.4	72.2
	C15	35.9	31.1	43	37.3	50.2	43.5	57.4	49.7	64.6	55.9	71.7	62.1	78.9	68.3	86.1	74.5	93.2	80.8

3.11. **Concrete cover and thickness**

*Table 14. EXA, EXB, EXC Lifting Loops*

Diameter, [mm]	Min. concrete cover, [mm]	Min. concrete thickness, [mm]
6	20	45
8	30	60
10	35	75
12	40	90
14	45	105
16	55	120
20	65	150
25	80	185
32	105	240

*Table 15. EXU, EXK Lifting Loops*

Diameter, [mm]	Min. concrete cover, [mm]	Min. concrete thickness, [mm]
6	30	60
8	40	80
10	45	100
12	55	120
14	65	140
16	75	160
16	75	160
20	90	200
20	90	200
25	115	250
32	145	320

