

BUILDING  
COMMON GROUND



**Stabox<sup>®</sup>**

Continuity strip



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## Stabox®

### Continuity strip

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# Stabox<sup>®</sup>

Continuity strip



## Stabox® Continuity strip

### Rebend connection for absorption of shear forces

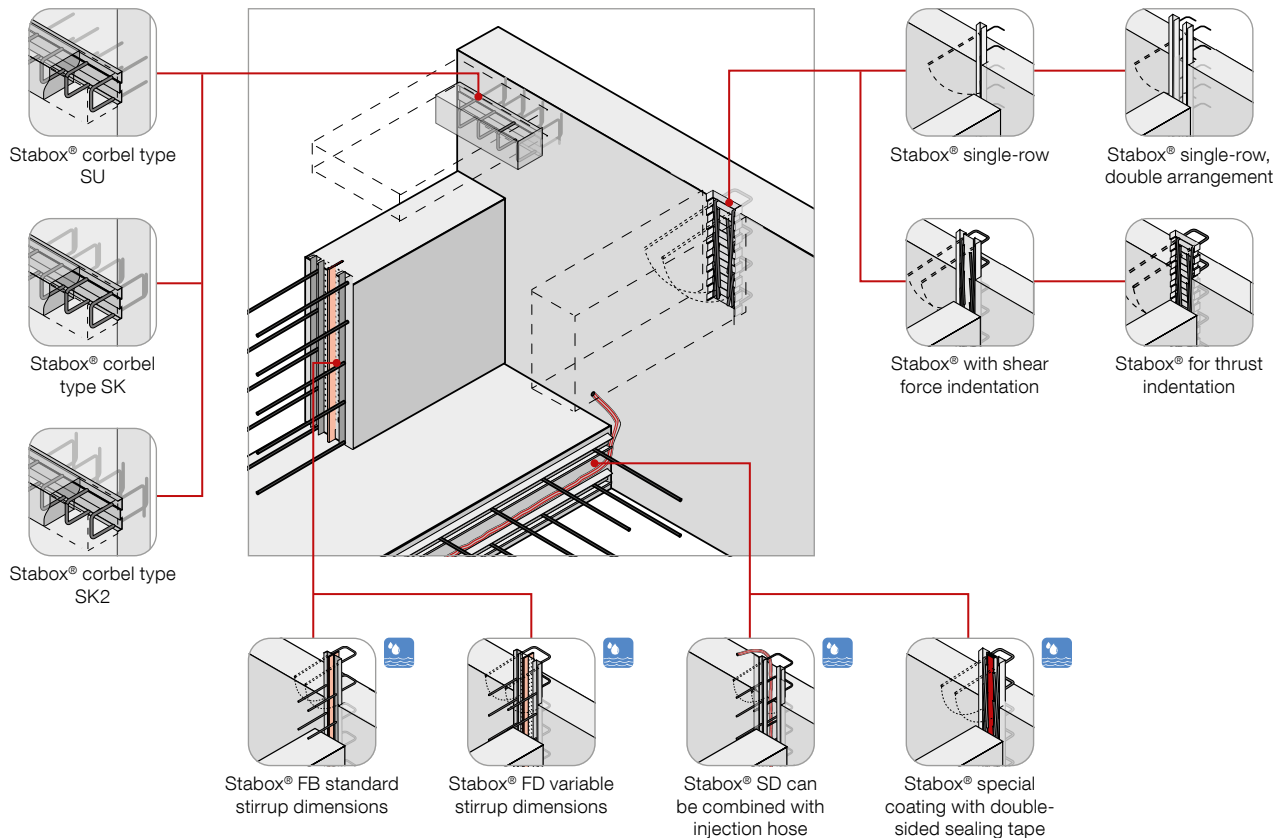
Stabox® reinforcement connections enable the force-locked connection of reinforced concrete components which are produced and concreted in a series of construction phases thanks to rational formwork systems.

Based on the coordinated geometry according to Eurocode and National Annex, Stabox® standard and special connections meet the maximum requirement of an indented joint design.

Continuity Strips are available with bar diameters of 8, 10 and 12 mm. The material input depends on the respective national requirements.

### ★ Advantages

- Simplification of formwork on concrete working joints
- No need to pierce the formwork
- Customised individual Stabox® versions can be produced at short notice

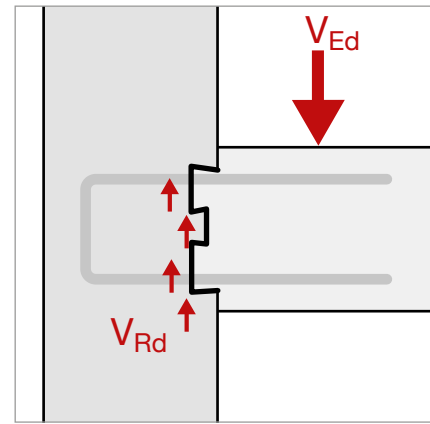


## Load distribution through indented joint

The transverse forces  $V_{Rd}$  that can be absorbed by a concrete working joint essentially depend on three components.

1. Diameter and spacing of the connecting reinforcement
2. Bond characteristics: Steel grade, concrete strength (embedment depth and overlap length)
3. Geometrical use of the concrete load bearing capacity through load distribution – indented joints

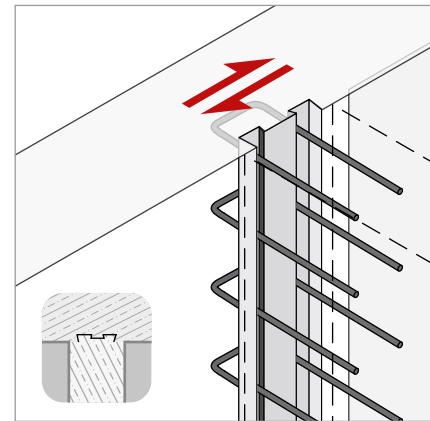
The geometrical requirements for the highest possible category “indented joint” are defined in Eurocode 2, DIN EN 1992-1-1 with NA(D) and the DBV data sheet “Rebending of reinforcing steel and requirements for reinforcement boxes”.



## Indentation transverse to the box

The **Stabox® S** continuity strip fulfils this highest requirement “indented” for all load cases with load  $V_{Ed}$  transverse to the box (LF: c, d, e, f).

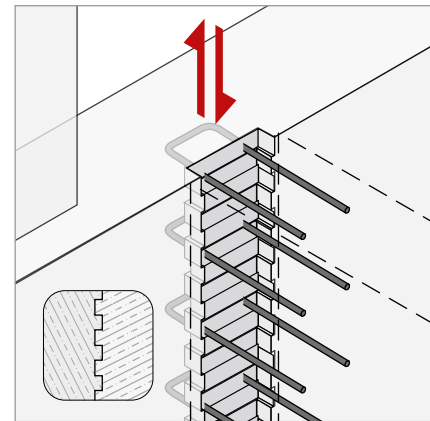
A higher calculatory formulation for the values of roughness [c] and friction [ $\mu$ ] than the surface property “indented” is not possible for the calculation of the absorbable transverse force  $V_{Rd}$ .



## Indentation in the element direction

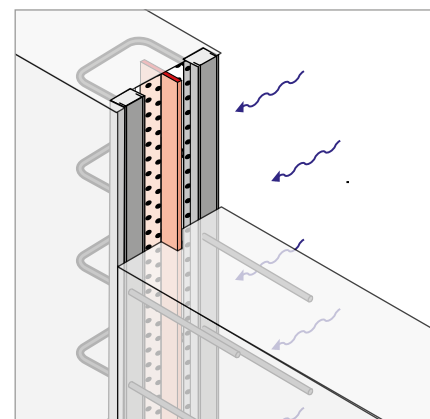
The **Stabox® T** continuity strip fulfils the highest requirement “indented” for all load cases with load  $V_{Ed}$  in the element direction of the box (LF: a, b).

The addition of the Stabox® T reinforcement box to the product range also enables the maximum formulation of the values for roughness [c] and friction [ $\mu$ ] of the surface property “indented” for the calculation of the absorbable shear force  $V_{Rd}$  in the case of shear loads.



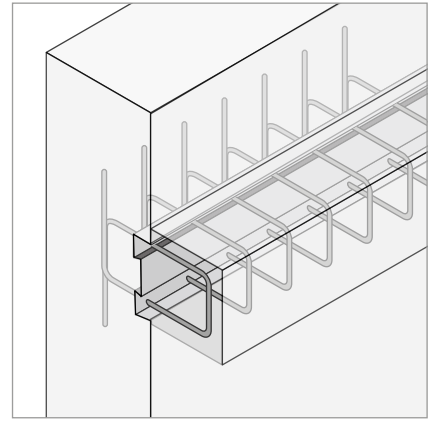
## Watertight working joints for watertight structures

The coated Fradiflex® metal waterstop integrated in the **Stabox® F** continues the floor-wall working joint seal without an interruption. The Fradiflex® metal waterstop can also be used for “pressing water” loads up to a continuously acting hydrostatic pressure of 2 bar (20 m water column).



## Special shapes

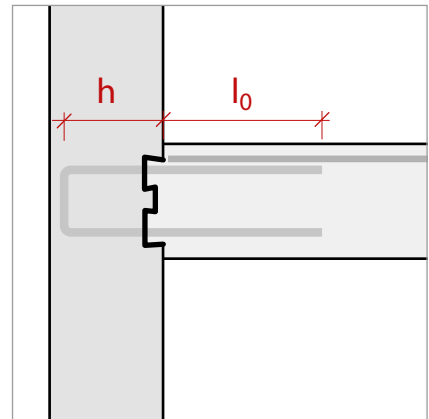
The shapes and dimensions specified in the planning as well as structurally necessary bending shapes of the reinforcement place particular demands on rebendable reinforcement connections. The FRANK Stabox® S and Stabox® T reinforcement boxes offer numerous possibilities for special dimensions and shapes. Formworking is thus significantly reduced in the most diverse applications through the use of the Stabox® reinforcement connections.



## Overlap length

With the standard types of the Stabox® rebend connections, the stirrup dimensions such as stirrup height  $h$  and overlap length  $l_0$  are manufactured in accordance with the Stabox® type static calculation and type test report.

The overlapping joints in the 2<sup>nd</sup> concrete pour are to be executed in such a way that a full joint of the reinforcement of the rebend connection is formed. To do this, the bars used as the reinforcement in the 2<sup>nd</sup> concrete pour must have at least the same diameter as those in the Stabox® rebend connection and are to be taken directly up to the concreting pour joint. The overlap length of the rebend connections in the 2<sup>nd</sup> concrete pour depends on the respective reinforcing steel diameter.



## Type static calculation and type test report

The Stabox® continuity strip defines the current state of the art.

The further processing of the reinforcing steel insert B500B in the factory according to DIN 488 with guaranteed rebending capability is checked by both in-house and external supervision and confirmed by the U mark.

The manufacture and dimensioning are based on the current standard DIN EN 1992-1-1 with NA(D), Eurocode 2, the additional regulations from the DBV data sheet "Rebending of reinforcing steels and requirements for reinforcement boxes" as well as the test report, the type static calculation and type test report of the LBV, August 2013.



## Stabox® S transverse indentation

### standard single and double row

The main use of reinforcement boxes in construction requires a defined shear force transmission in most cases.

The prefabricated Stabox® standard reinforcement connection with roughened surface guarantees intensive anchoring with the concrete and meets the highest shear force requirements for an indented construction joint.

- KOMO® product certificate
- Approval for Poland
- Product certificate for the Czech Republic



## Stabox® T shear indentation

### special connection for high shear stress

The Stabox® special connection is used for very high shear stress in the joint direction. This shear stress can occur in wall or ceiling slabs, for example, by wind loads in the element direction.

The special trapezoidal form of the reinforcement box meets the highest requirement of an “indented” working joint.

- Stabox® special connector with shear force indentation
- Highest load-bearing capacity thanks to profiled reinforcement box



## Stabox® F joint seal

### with Fradiflex® metal water stop

For water-impermeable concrete structures, the Stabox® reinforcement connection with integrated, double-coated Fradiflex® metal water stop is an ideal solution for sealing working joints with continuous reinforcement.

- Secure sealing of joints - confirmed by an European Technical Assessment (ETA)
- Reduced formwork expenditure - no need to penetrate formwork



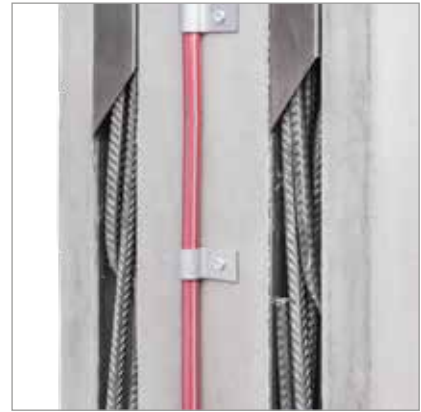


## Stabox® SD custom version

### for variable stirrup widths and combinable with Intec® injection hose system

The Stabox® special SD double-edged reinforcement connection version can be used to seal working joints with continuous reinforcement.

For water-impermeable concrete structures, the special SD version can be combined with the Intec® injection hose system or Cresco® expanding waterstop. The Stabox® special SD version is recommended for stirrup widths greater than 23 cm.



## Stabox® special coating

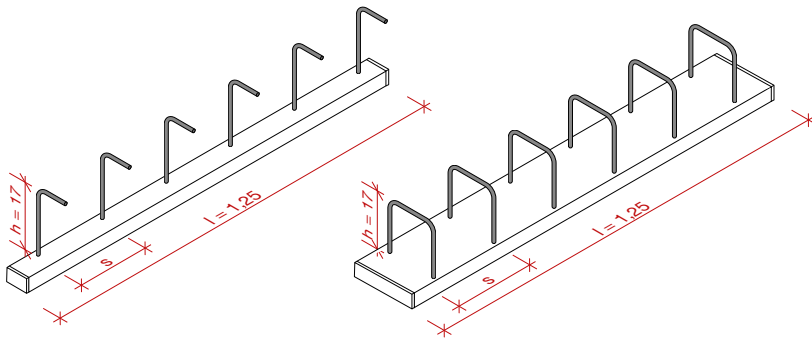
### with sealing tape

The special coating of the Stabox® rebend connection with sealing tape on both sides offers additional security in the working joint seals, e.g. in the floor / wall area.

The special coating applied to both sides in the central box area guarantees optimum bonding between sheet metal and concrete and thus prevents any possible lateral infiltration into either concreting section.



## Dimensions of the standard versions



Possible hook/stirrup spacing s cm	Number of stirrups and hooks with standard element length
10	12
15	8
20	6

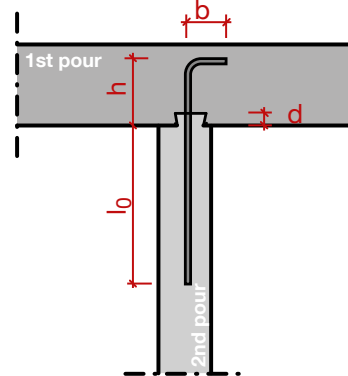
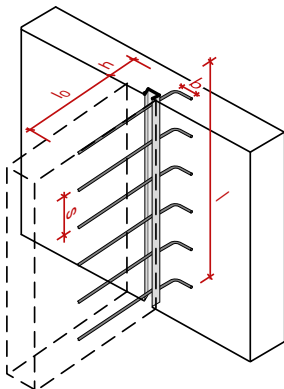
### Standard dimensions

Steel Ø mm	Possible hook/stirrup shape	Possible hook/stirrup spacing s cm	Stirrup height h cm	Overlap length $l_0$ cm	Element length l m
8	L / B	10 / 15 / 20	17	26*	1.25
10	L / B	10 / 15 / 20	17	30	1.25
12	L / B	10 / 15 / 20	17	39	1.25

With the standard types of the Stabox® rebend connections, the stirrup dimensions such as stirrup height h and overlap length  $l_0$  are manufactured in accordance with the Stabox® type static calculation and type test report.

\* Minimum value of the overlap length according to the Stabox® type test is 21 cm.

## Stabox® type L single-row



## Stabox®

Standard versions, single-shear

	Article number	For wall thickness from cm	Type	Steel Ø mm	Hook length $b^{**}$ cm	Steel cross-section $A_s$ cm <sup>2</sup> /m	Stirrup spacing cm	Weight kg/each
	STA05L0810	9	5 L	8	10	5.00	10	3.75
	STA05L0815	9	5 L	8	10	3.35	15	2.88
	STA05L0820	9	5 L	8	10	2.51	20	2.43
	STA07L1010	13	7 L	10	10	7.85	10	5.48
	STA05L1015	9	5 L	10	10	5.24	15	4.31
	STA05L1020	9	5 L	10	10	3.93	20	3.51
	STA09L1210	13	9 L	12	10	11.31	10	8.25
	STA07L1215	11	7 L	12	10	7.54	15	5.81
	STA07L1220	9	7 L	12	10	5.65	20	4.69

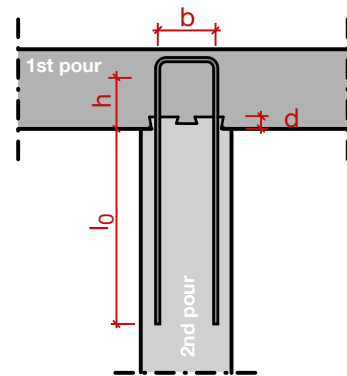
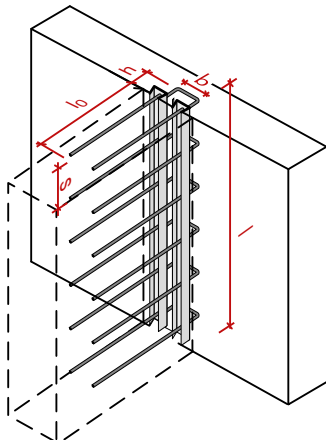
The element thickness "d" lies between 3 and 3.5 cm, depending on the steel Ø and spacing.

Due to manufacturing and installation conditions, the stirrup height may vary by 1 to 2 cm.

The length of the reinforcement box without polystyrene end caps is 1.20 m. Standard short elements and connections for precast plants on enquiry.

\*\*bHook = 10 cm (bmin Ø 8 ≥ 6.4 cm; Ø 10 ≥ 8 cm; Ø 12 ≥ 9.6 cm)

## Stabox® S Type B



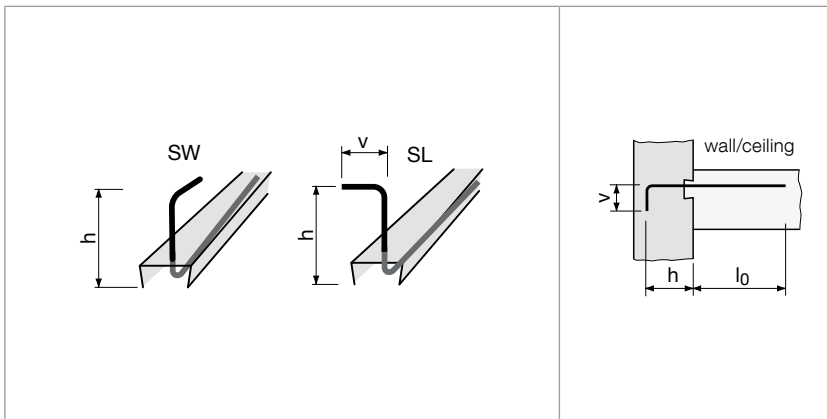
## Stabox® S

Standard versions, double-shear, "indented" box profile for the calculation of the transverse force capacity  $V_{Rd}$

	Article number	For wall thickness from cm	Type	Steel Ø mm	Stirrup width b cm	Steel cross-section $A_s$ cm <sup>2</sup> /m	Stirrup spacing cm	Weight kg/each
	STA09B0815	13	9 B	8	7	3.35	15	4.68
	STA09B1015	13	9 B	10	7	5.24	15	6.78
	STA12B0815	16-18	12 B	8	10	3.35	15	5.12
	STA12B0820	16-18	12 B	8	10	2.51	20	4.35
	STA12B1015	16-18	12 B	10	10	5.24	15	7.18
	STA12B1020	16-18	12 B	10	10	3.93	20	5.80
	STA12B1215	16-18	12 B	12	10	7.54	15	10.89
	STA12B1220	16-18	12 B	12	10	5.65	20	8.58
	STA15B0815	18-20	15 B	8	12	3.35	15	5.16
	STA15B0820	18-20	15 B	8	12	2.51	20	4.37
	STA15B1015	18-20	15 B	10	12	5.24	15	7.70
	STA15B1020	18-20	15 B	10	12	3.93	20	6.27
	STA15B1215	18-20	15 B	12	12	7.54	15	11.55
	STA15B1220	18-20	15 B	12	12	5.65	20	7.08
	STA19B0815	23-26	19 B	8	17	3.35	15	5.34
	STA19B1010	23-26	19 B	10	17	7.85	10	10.82
	STA19B1015	23-26	19 B	10	17	5.24	15	7.89
	STA19B1020	23-26	19 B	10	17	3.93	20	6.42
	STA19B1210	23-26	19 B	12	17	11.31	10	17.48
	STA19B1215	23-26	19 B	12	17	7.54	15	12.52
	STA22B0815	26-29	22 B	8	20	3.35	15	6.21
	STA22B1010	26-29	22 B	10	20	7.85	10	12.03
	STA22B1015	26-29	22 B	10	20	5.24	15	8.89
	STA22B1210	26-29	22 B	12	20	11.31	10	18.02
	STA22B1215	26-29	22 B	12	20	7.54	15	12.95
	STA22B1220	26-29	22 B	12	20	5.65	20	10.41
	STA25B1010	29	25 B	10	23	7.85	10	12.54
	STA25B1015	29	25 B	10	23	5.24	15	9.32
	STA25B1210	29	25 B	12	23	11.31	10	18.72
	STA25B1215	29	25 B	12	23	7.54	15	13.54
	STA25B1220	29	25 B	12	23	5.65	20	10.85

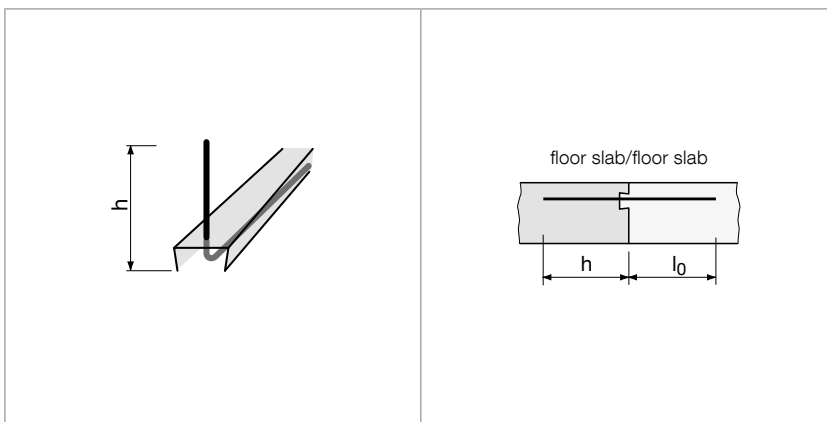
The element thickness "d" lies between 3 and 5 cm, depending on the steel Ø and spacing.  
 Due to manufacturing and installation conditions, the stirrup height may vary by 1 to 2 cm.  
 The length of the reinforcement box without polystyrene end caps is 1.20 m.

## Stabox® custom manufacturing



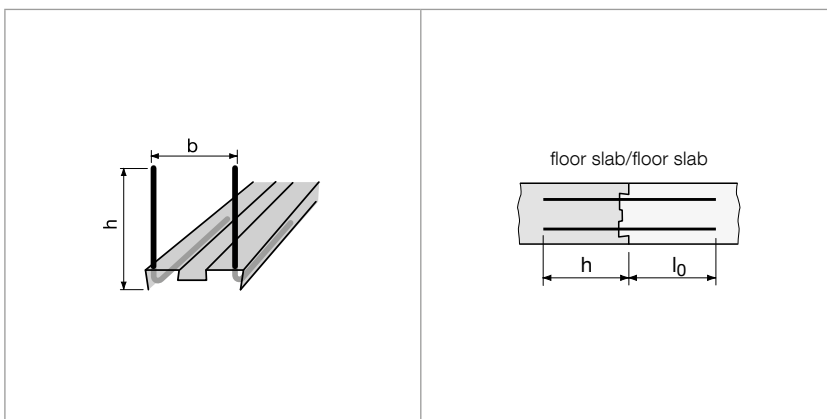
### SW / SL

Single-row reinforcement box  
e.g. wall/ceiling connection



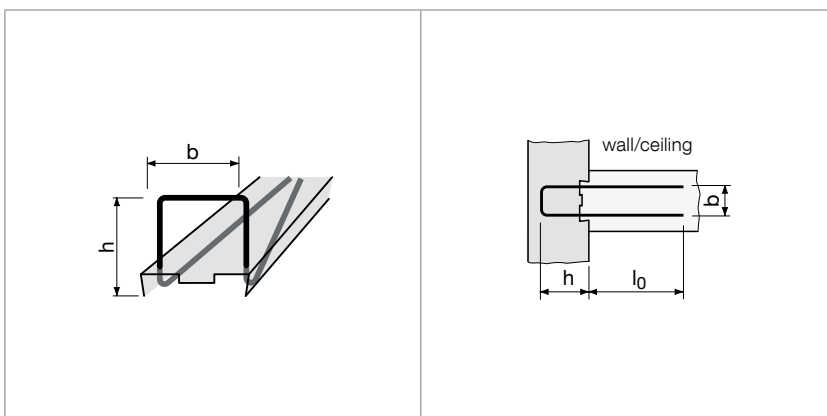
### SG

Single-row reinforcement box e.g. for  
the connection of floor slabs.



### S2G

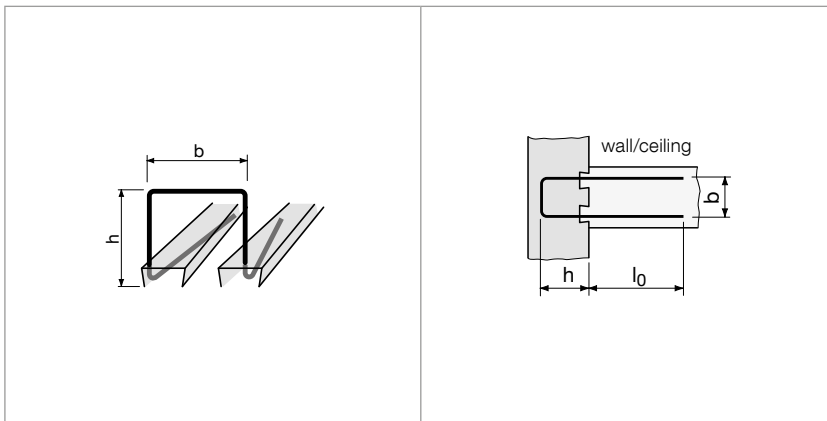
Double-section reinforcement con-  
nection e.g. for the connection of floor  
slabs with indentation transverse to the  
box.



### SB

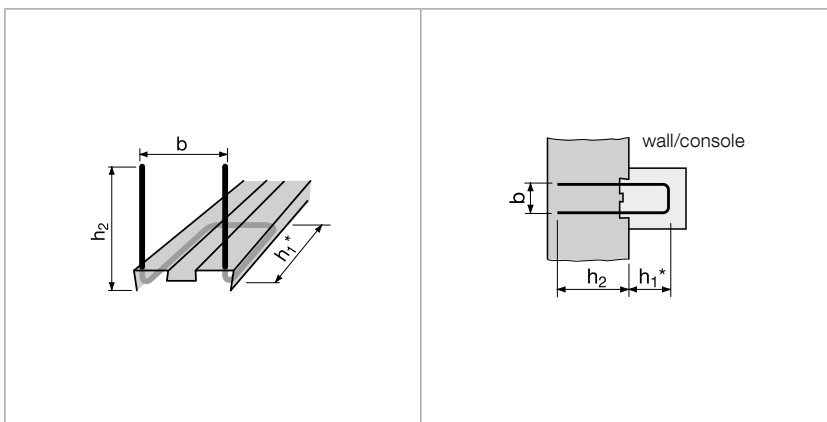
Double-section reinforcement connec-  
tion with 'indented' box profile for the  
absorbance of transverse forces.

## Stabox® custom manufacturing



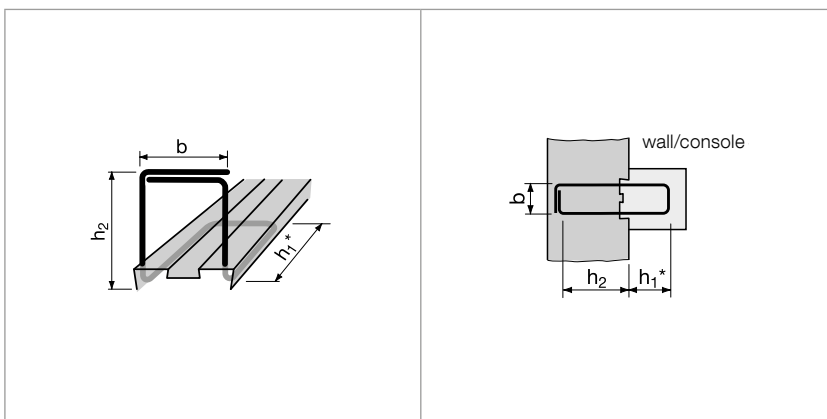
### SD

Double-section reinforcement connection in two separate boxes, combinable with Intec® injection hose or Cresco® expanding waterstop.



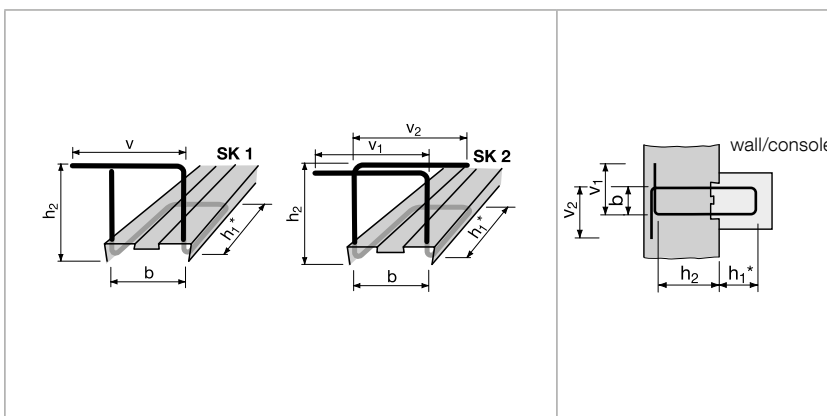
### SU

Double-section reinforcement connection as corbel connection according to the individual dimensions of the corbel. Anchoring with straight bars in the first building section.



### SK

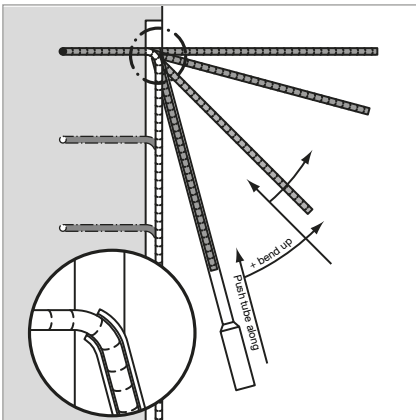
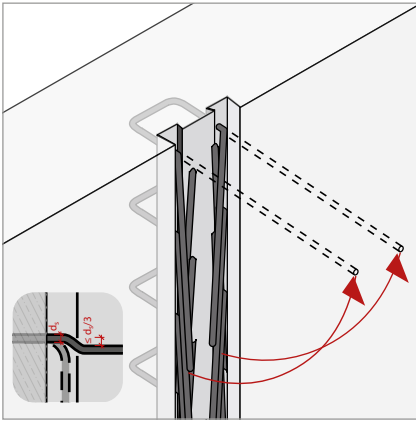
Double-row corbel connection. Anchoring with angled bars in the first building section.



### SK1 und SK2

Double-row console connection with extension of the angled bars in the first building section according to individual requirements.

\* In case of corbel types, dimension  $h_1$  may vary by 1 to 2 cm due to manufacturing and installation conditions.



## Rebending and rebending tool

The bending and rebending of reinforcing steel changes the material properties in the deformation area affected. The influence on the static and dynamic strengths must be taken into account in the dimensioning. All requirements in accordance with specified current rules are taken into account in the Stabox® support structure tables.

In order to minimise the negative effects on the material properties, the instructions for use and rebending must be observed on site. Please use a suitable rebending tool in each case for the rebending of the bars (see table).

- Slightly raise the steel insert and bend it out to an angle of 20° at the most.
- Using the rebending tool, bend the structural steel step by step until it is straight. When doing this, push the rebending tool further forward as shown in the diagram.
- According to the DBV data sheet, the offset dimension should be  $\leq d_s/3$ .
- Steel should not be rebent at temperatures below -5 °C.
- Multiple bending and rebending is not permissible.

### Rebending tool

Article number	Ø mm	Colour
STARBW08	8	yellow
STARBW10	10	green
STARBW12	12	red

## Volume of reinforcement boxes

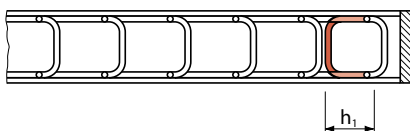
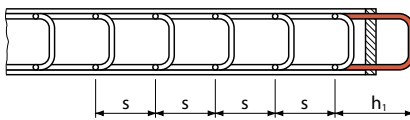
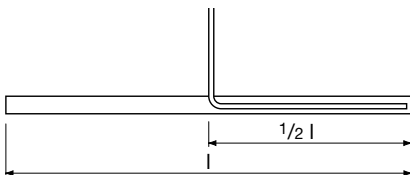
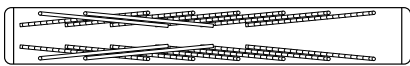
In all standard types of Stabox® the reinforcement box is closed. The overlap dimension  $l_0$  is accommodated in the box in opposite directions depending on space requirements.

The capacity of the reinforcement box is limited in relation to the box width, steel diameter, stirrup spacing and overlap length.

The possible  $l_0$  in a closed box is maximally one half of the box length.

In the case of corbel connections the reinforcement box is open on one side and all stirrups point in one direction.

If a closed box is required (customer request), one or two end stirrups are shortened. The length  $h_1$  of the end stirrup is shorter than the stirrup spacing  $s$ .



## Different load cases according to EC 2

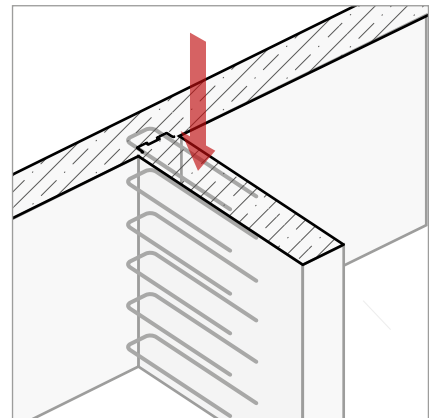
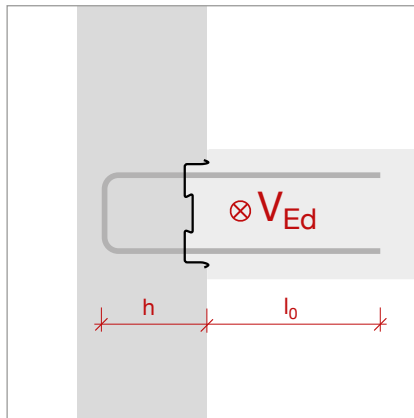
Depending on structural conditions the loads must be calculated differently.

### Load case a, b with Stabox® S

e.g. wall connection

Shear force capacity parallel to the joint with standard reinforcement connection (smooth).

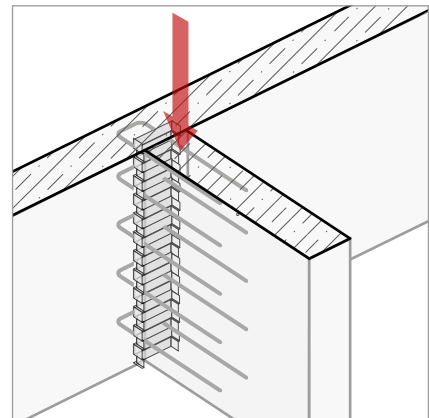
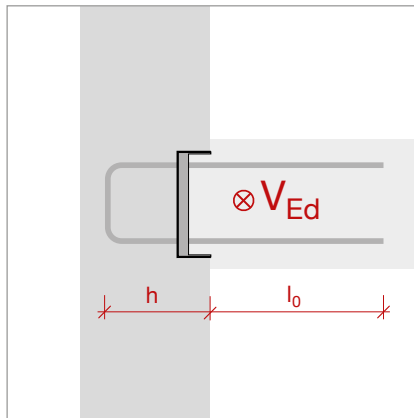
See table on page 18.



### Load case a, b with Stabox® T

e.g. wall connection

Shear force capacity parallel to the joint with Stabox® T indented – see table on page 19.

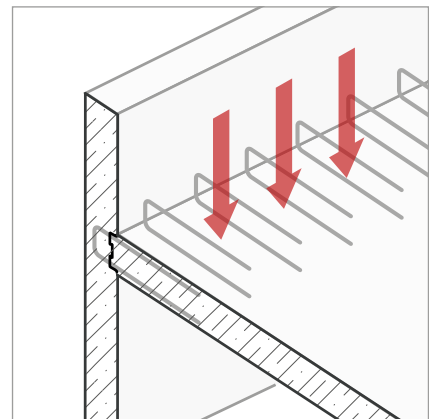
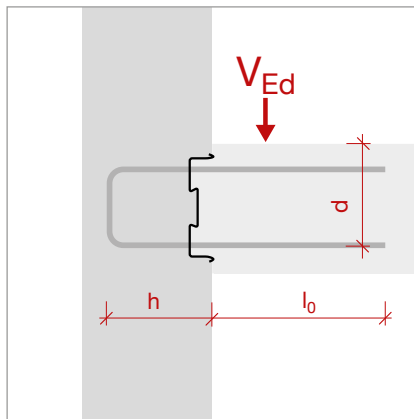


### Load case c with Stabox® S

e.g. wall/ceiling connection

Transverse force capacity transverse to the joint (indented) with and without transverse force reinforcement in the ceiling.

See tables on pages 20/21.



### Load case e with Stabox® S

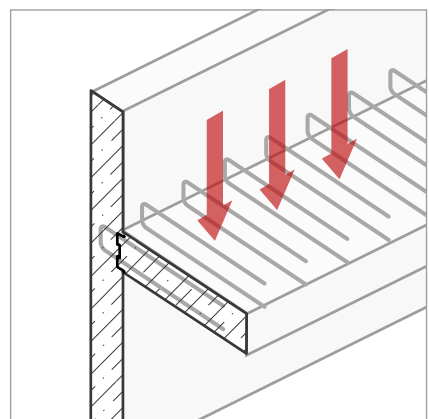
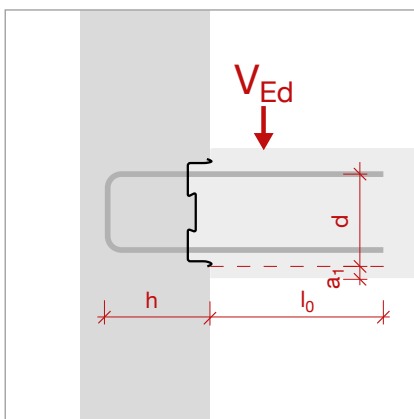
e.g. cantilever slab connection

Transverse force capacity transverse to the joint (indented) with and without transverse force reinforcement in the ceiling.

See tables on pages 22/23

Special corbel.

See table on page 24.

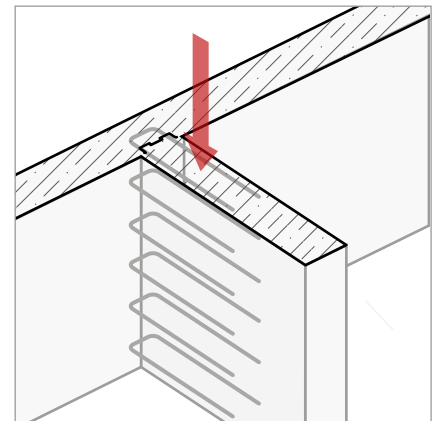
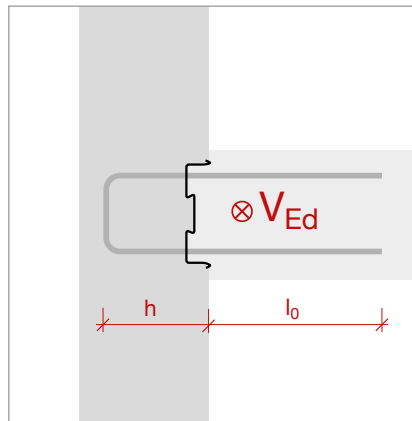


## Stabox® S

Standard type

Standard box shape, stirrup type B

e.g. wall connection



### Case a (smooth)

Shear force parallel to the concreting joint with smooth box

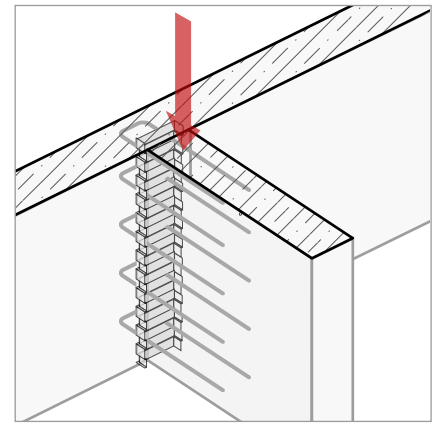
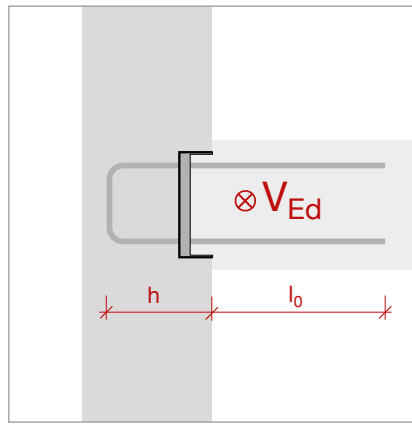
Type	STA 9 B	STA 12 B	STA 15 B	STA 19 B	STA 22 B	STA 25 B
<b>C20/25</b>						
<b>Shear force <math>V_{Rd}</math> [kN/m]</b>						
∅ 8 / 20	99.5	104.6	108.1	116.7	121.8	127.0
∅ 8 / 15	102.0	132.6	136.1	144.7	149.8	155.0
∅ 8 / 10	102.0	136.0	158.7	200.7	205.8	211.0
∅ 10 / 20		125.6	129.1	137.7	142.8	148.0
∅ 10 / 15		136.0	158.7	172.7	177.8	183.0
∅ 10 / 10		136.0	158.7	215.3	247.8	253.0
∅ 12 / 20		136.0	141.1	149.7	154.8	160.0
∅ 12 / 15		136.0	158.7	188.7	193.8	199.0
∅ 12 / 10		136.0	158.7	215.3	249.3	277.0
<b>C25/30</b>						
∅ 8 / 20	115.4	121.4	125.4	135.4	141.4	147.3
∅ 8 / 15	127.5	153.9	157.9	167.9	173.8	179.8
∅ 8 / 10	127.5	170.0	198.3	232.8	238.8	244.8
∅ 10 / 20		145.8	149.8	159.7	165.7	171.7
∅ 10 / 15		170.0	190.4	200.4	206.3	212.3
∅ 10 / 10		170.0	198.3	269.2	287.6	293.6
∅ 12 / 20		159.7	163.7	173.7	179.7	185.6
∅ 12 / 15		170.0	198.3	218.9	224.9	230.9
∅ 12 / 10		170.0	198.3	269.2	311.7	321.4
<b>C30/37</b>						
∅ 8 / 20	130.3	137.1	141.6	152.9	159.6	166.4
∅ 8 / 15	153.0	173.8	178.3	189.6	196.3	203.1
∅ 8 / 10	153.0	204.0	238.0	262.9	269.7	276.5
∅ 10 / 20		164.6	169.1	180.4	187.1	193.9
∅ 10 / 15		204.0	215.0	226.2	233.0	239.8
∅ 10 / 10		204.0	238.0	318.0	324.7	331.5
∅ 12 / 20		180.3	184.8	196.1	202.9	209.6
∅ 12 / 15		204.0	236.0	247.2	254.0	260.7
∅ 12 / 10		204.0	238.0	323.0	356.2	362.9

Values for greater wall widths and deviating overlap lengths  $l_0$  on enquiry  
 Standard stirrup height  $h = 17$  cm  
 Standard overlap length  $l_0$ : ∅ 8 = 26, ∅ 10 = 30, ∅ 12 = 39 cm



## Stabox® T

Trapezoidal box shape,  
stirrup type B  
e.g. wall connection



### Case a (indented)

Shear force parallel to the concreting joint with indented box

Type	STATB 12 B	STATB 16 B	STATB 19 B	STATB 22 B
<b>C20/25</b>				
<b>Shear force <math>V_{Rd}</math> [kN/m]</b>				
ø 8 / 20	177.6	194.8	207.7	220.6
ø 8 / 15	219.6	236.8	249.7	262.6
ø 8 / 10	303.6	320.8	333.7	346.5
ø 10 / 20	209.1	226.3	239.2	252.1
ø 10 / 15	261.6	278.8	291.7	304.6
ø 10 / 10	366.6	383.8	396.7	409.5
ø 12 / 20	277.1	244.3	257.2	270.1
ø 12 / 15	285.6	302.8	315.7	328.5
ø 12 / 10	402.6	419.8	432.7	445.5
<b>C25/30</b>				
ø 8 / 20	206.1	226.0	241.0	255.9
ø 8 / 15	254.8	274.7	289.7	304.7
ø 8 / 10	352.3	372.2	387.2	402.1
ø 10 / 20	242.6	262.6	277.5	292.5
ø 10 / 15	303.5	323.5	338.4	353.4
ø 10 / 10	425.4	445.3	460.3	475.2
ø 12 / 20	263.5	283.4	298.4	313.4
ø 12 / 15	331.4	351.3	366.3	381.2
ø 12 / 10	467.1	487.1	502.0	517.0
<b>C30/37</b>				
ø 8 / 20	232.7	255.2	272.1	289.0
ø 8 / 15	287.7	310.2	327.1	344.0
ø 8 / 10	397.8	420.3	437.2	454.1
ø 10 / 20	274.0	296.5	313.4	330.3
ø 10 / 15	342.8	365.3	382.2	399.1
ø 10 / 10	480.3	502.9	519.8	536.7
ø 12 / 20	297.5	320.1	337.0	353.9
ø 12 / 15	374.2	396.7	413.6	430.5
ø 12 / 10	527.5	550.0	566.9	583.8

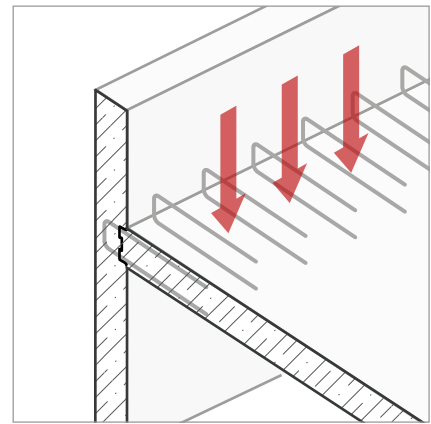
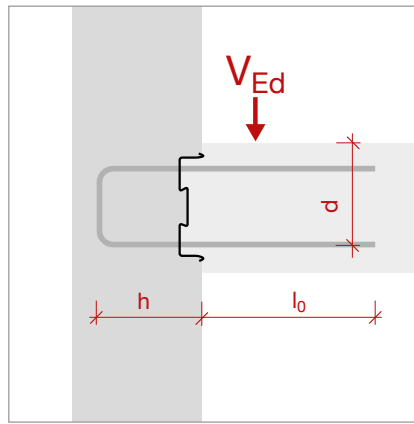
Values for greater wall widths and deviating overlap lengths  $l_0$  on enquiry  
Standard stirrup height  $h = 17$  cm  
Standard overlap length  $l_0$ : ø 8 = 26, ø 10 = 30, ø 12 = 39 cm

## Stabox® S

Standard type

Standard box shape, stirrup type B

e.g. wall/ceiling connection without transverse force reinforcement



### Case c (indented)

Shear force perpendicular to the concreting joint with indented box (without transverse force reinforcement)

stat. useful height d	120 mm	150 mm	170 mm	190 mm	210 mm	230 mm	250 mm
<b>C20/25</b>							
	<b>Shear force <math>V_{Rd}</math> [kN/m]</b>						
∅ 8 / 20	53.1	66.4	75.3	78.7	78.7	78.7	78.7
∅ 8 / 15	53.1	66.4	75.3	84.1	91.3	96.7	102.0
∅ 8 / 10	53.1	66.4	75.3	84.1	91.3	96.7	102.0
∅ 10 / 20	53.1	66.4	75.3	84.1	91.3	96.7	102.0
∅ 10 / 15	53.1	66.4	75.3	84.1	91.3	96.7	102.0
∅ 10 / 10	56.6	66.4	75.3	84.1	91.3	96.7	102.0
∅ 12 / 20	53.1	66.4	75.3	84.1	91.3	96.7	102.0
∅ 12 / 15	55.8	66.4	75.3	84.1	91.3	96.7	102.0
∅ 12 / 10	63.9	74.1	80.6	86.8	91.6	96.7	102.0
<b>C25/30</b>							
∅ 8 / 20	59.4	74.2	78.7	78.7	78.7	78.7	78.7
∅ 8 / 15	59.4	74.2	84.1	94.0	102.1	104.9	104.9
∅ 8 / 10	59.4	74.2	84.1	94.0	102.1	108.1	114.1
∅ 10 / 20	59.4	74.2	84.1	94.0	102.1	108.1	114.1
∅ 10 / 15	59.4	74.2	84.1	94.0	102.1	108.1	114.1
∅ 10 / 10	60.9	74.2	84.1	94.0	102.1	108.1	114.1
∅ 12 / 20	59.4	74.2	84.1	94.0	102.1	108.1	114.1
∅ 12 / 15	60.1	74.2	84.1	94.0	102.1	108.1	114.1
∅ 12 / 10	68.8	79.8	86.8	94.0	102.1	108.1	114.1
<b>C30/37</b>							
∅ 8 / 20	65.1	78.7	78.7	78.7	78.7	78.7	78.7
∅ 8 / 15	65.1	81.3	92.2	103.0	104.9	104.9	104.9
∅ 8 / 10	65.1	81.3	92.2	103.0	111.8	118.5	125.0
∅ 10 / 20	65.1	81.3	92.2	103.0	111.8	118.5	122.9
∅ 10 / 15	65.1	81.3	92.2	103.0	111.8	118.5	125.0
∅ 10 / 10	65.1	81.3	92.2	103.0	111.8	118.5	125.0
∅ 12 / 20	65.1	81.3	92.2	103.0	111.8	118.5	125.0
∅ 12 / 15	65.1	81.3	92.2	103.0	111.8	118.5	125.0
∅ 12 / 10	73.1	84.8	92.2	103.0	111.8	118.5	125.0

Values for further dimensions or special stirrups on enquiry

Standard stirrup height  $h = 17$  cm

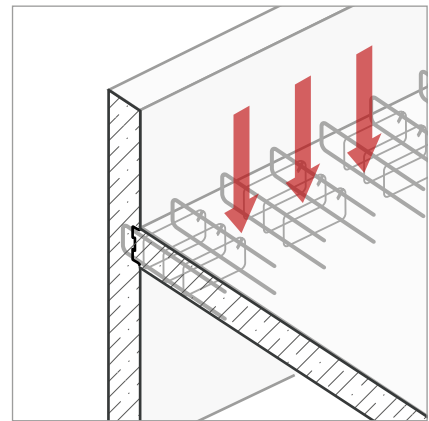
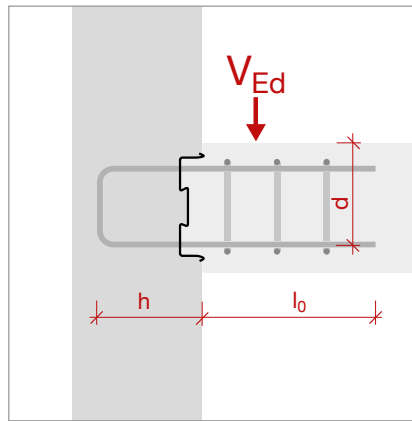
Standard overlap length  $l_0$ : ∅ 8 = 26, ∅ 10 = 30, ∅ 12 = 39 cm

## Stabox® S

Standard type

Standard box shape, stirrup type B

e.g. wall/ceiling connection with transverse force reinforcement



## Case c (indented)

Shear force perpendicular to the concreting joint with indented box (with transverse force reinforcement)

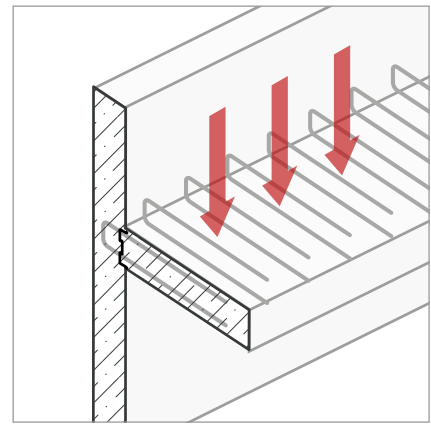
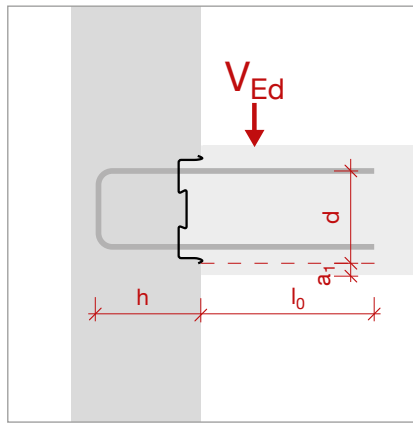
stat. useful height d	120 mm	150 mm	170 mm	190 mm	210 mm	230 mm	250 mm
<b>C20/25</b>							
<b>Shear force <math>V_{Rd}</math> [kN/m]</b>							
ø 8 / 20	87.4	87.4	87.4	87.4	87.4	87.4	87.4
ø 8 / 15	89.3	116.6	116.6	116.6	116.6	116.6	116.6
ø 8 / 10	89.3	127.5	153.0	174.8	174.8	174.8	174.8
ø 10 / 20	89.3	127.5	136.6	136.6	136.6	136.6	136.6
ø 10 / 15	89.3	127.5	153.0	178.5	182.1	182.1	182.1
ø 10 / 10	89.3	127.5	153.0	178.5	204.0	229.5	255.0
ø 12 / 20	89.3	127.5	153.0	178.5	196.7	196.7	196.7
ø 12 / 15	89.3	127.5	153.0	178.5	204.0	229.5	255.0
ø 12 / 10	89.3	127.5	153.0	178.5	204.0	229.5	255.0
<b>C25/30</b>							
ø 8 / 20	87.4	87.4	87.4	87.4	87.4	87.4	87.4
ø 8 / 15	111.6	116.6	116.6	116.6	116.6	116.6	116.6
ø 8 / 10	111.6	159.4	174.8	174.8	174.8	174.8	174.8
ø 10 / 20	111.6	136.6	136.6	136.6	136.6	136.6	136.6
ø 10 / 15	111.6	159.4	182.1	182.1	182.1	182.1	182.1
ø 10 / 10	111.6	159.4	191.3	223.1	255.0	273.2	273.2
ø 12 / 20	111.6	159.4	191.3	196.7	196.7	196.7	196.7
ø 12 / 15	111.6	159.4	191.3	223.1	255.0	262.3	262.3
ø 12 / 10	111.6	159.4	191.3	223.1	255.0	286.9	318.8
<b>C30/37</b>							
ø 8 / 20	87.4	87.4	87.4	87.4	87.4	87.4	87.4
ø 8 / 15	116.6	116.6	116.6	116.6	116.6	116.6	116.6
ø 8 / 10	133.9	174.8	174.8	174.8	174.8	174.8	174.8
ø 10 / 20	133.9	136.6	136.6	136.6	136.6	136.6	136.6
ø 10 / 15	133.9	182.1	182.1	182.1	182.1	182.1	182.1
ø 10 / 10	133.9	191.3	229.5	267.8	273.2	273.2	273.2
ø 12 / 20	133.9	191.3	196.7	196.7	196.7	196.7	196.7
ø 12 / 15	133.9	191.3	229.5	262.3	262.3	262.3	262.3
ø 12 / 10	133.9	191.3	229.5	267.8	306.0	344.3	376.7

Values for further dimensions or special stirrups on enquiry  
 Standard stirrup height  $h = 17$  cm  
 Standard overlap length  $l_0$ : Ø 8 = 26, Ø 10 = 30, Ø 12 = 39 cm

## Stabox® S

Standard box shape, stirrup type B

Cantilever slab connection without transverse force reinforcement



### Case e (indented)

Shear force perpendicular to the concreting joint with indented box (without transverse force reinforcement)

Type	STA 12 B	STA 15 B	STA 19 B	STA 22 B	STA 25 B
<b>C20/25</b>					
<b>Shear force <math>V_{Rd}</math> [kN/m]</b>					
∅ 8 / 20	42.1	52.5	52.5	52.5	52.5
∅ 8 / 15	42.1	55.3	70.0	70.0	70.0
∅ 8 / 10	42.1	55.3	73.0	81.9	89.6
∅ 10 / 20	41.6	54.9	65.6	65.6	65.6
∅ 10 / 15	42.0	54.9	72.6	81.5	87.5
∅ 10 / 10	48.1	57.8	72.6	81.5	89.4
∅ 12 / 20	42.8	54.5	72.2	73.1	73.1
∅ 12 / 15	47.1	56.7	72.2	81.0	89.1
∅ 12 / 10	53.9	64.9	78.3	84.6	90.2
<b>C25/30</b>					
∅ 8 / 20	47.0	60.9	60.9	60.9	60.9
∅ 8 / 15	47.0	61.9	81.2	81.2	81.2
∅ 8 / 10	47.0	61.9	81.7	91.6	100.2
∅ 10 / 20	46.5	61.4	76.2	76.2	76.2
∅ 10 / 15	46.5	61.4	81.2	91.1	99.9
∅ 10 / 10	51.8	62.3	81.2	91.1	99.9
∅ 12 / 20	46.1	60.9	80.7	84.9	84.9
∅ 12 / 15	50.7	61.1	80.7	90.6	99.6
∅ 12 / 10	58.1	69.9	84.4	91.2	99.6
<b>C30/37</b>					
∅ 8 / 20	51.5	67.8	68.8	68.8	68.8
∅ 8 / 15	51.5	67.8	89.5	91.7	91.7
∅ 8 / 10	51.5	67.8	89.5	100.3	109.8
∅ 10 / 20	51.0	67.2	86.0	86.0	86.0
∅ 10 / 15	51.0	67.2	88.9	99.8	109.5
∅ 10 / 10	55.0	67.2	88.9	99.8	109.5
∅ 12 / 20	50.4	66.7	88.4	95.8	95.8
∅ 12 / 15	53.9	66.7	88.4	99.2	109.1
∅ 12 / 10	61.7	74.3	89.7	99.2	109.1

The values listed above are pure transverse force values; proof of the moments must be furnished separately.

Values for further dimensions or special stirrups on enquiry

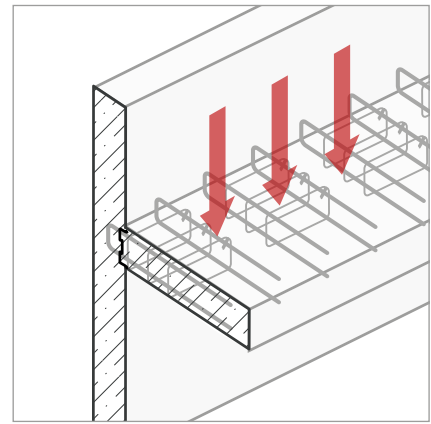
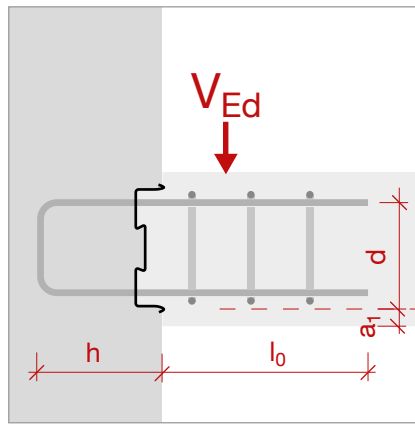
Standard stirrup height  $h = 17$  cm

Standard overlap length  $l_0$ : ∅ 8 = 26, ∅ 10 = 30, ∅ 12 = 39 cm

## Stabox® S

Standard box shape, stirrup type B

Cantilever slab connection with transverse force reinforcement



## Case e (indented)

Shear force perpendicular to the concreting joint with indented box (with transverse force reinforcement)

Type	STA 12 B	STA 15 B	STA 19 B	STA 22 B	STA 25 B
<b>C20/25</b>					
<b>Shear force <math>V_{Rd}</math> [kN/m]</b>					
∅ 8 / 20	57.4	58.3	58.3	58.3	58.3
∅ 8 / 15	57.4	77.8	77.8	77.8	77.8
∅ 8 / 10	57.4	95.6	116.7	116.7	116.7
∅ 10 / 20	56.1	72.9	72.9	72.9	72.9
∅ 10 / 15	56.1	94.4	97.2	97.2	97.2
∅ 10 / 10	56.1	94.4	145.4	145.8	145.8
∅ 12 / 20	54.8	81.2	81.2	81.2	81.2
∅ 12 / 15	54.8	93.1	108.3	108.3	108.3
∅ 12 / 10	54.8	93.1	144.1	162.5	162.5
<b>C25/30</b>					
∅ 8 / 20	67.7	67.7	67.7	67.7	67.7
∅ 8 / 15	71.7	90.3	90.3	90.3	90.3
∅ 8 / 10	71.7	119.5	135.4	135.4	135.4
∅ 10 / 20	70.1	84.6	84.6	84.6	84.6
∅ 10 / 15	70.1	112.8	112.8	112.8	112.8
∅ 10 / 10	70.1	117.9	169.2	169.2	169.2
∅ 12 / 20	68.5	94.3	94.3	94.3	94.3
∅ 12 / 15	68.5	116.3	125.7	125.7	125.7
∅ 12 / 10	68.5	116.3	180.1	188.6	188.6
<b>C30/37</b>					
∅ 8 / 20	76.4	76.4	76.4	76.4	76.4
∅ 8 / 15	86.1	101.9	101.9	101.9	101.9
∅ 8 / 10	86.1	143.4	152.9	152.9	152.9
∅ 10 / 20	84.2	95.5	95.5	95.5	95.5
∅ 10 / 15	84.2	127.4	127.4	127.4	127.4
∅ 10 / 10	84.2	141.5	191.1	191.1	191.1
∅ 12 / 20	82.2	106.5	106.5	106.5	106.5
∅ 12 / 15	82.2	139.6	142.0	142.0	142.0
∅ 12 / 10	82.2	139.6	212.9	212.9	212.9

The values listed above are pure transverse force values; proof of the moments must be furnished separately.

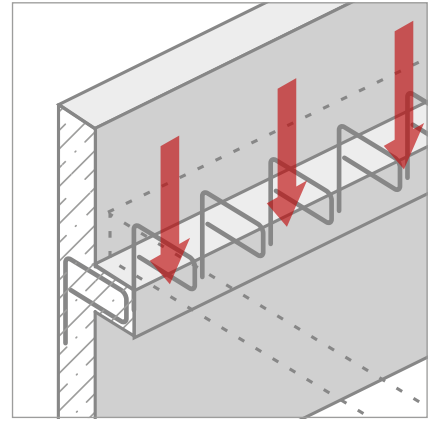
Values for further dimensions or special stirrups on enquiry

Standard stirrup height  $h = 17$  cm

Standard overlap length  $l_0$ : ∅ 8 = 26, ∅ 10 = 30, ∅ 12 = 39 cm

## Stabox® S

Corbel type  
Standard box shape,  
Stirrup type e.g. SK1

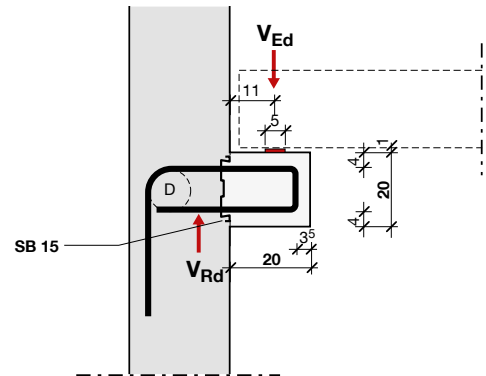


### Case e, special case: corbel

Joint surface indented according to DIN EN 1992-1-1 (Eurocode 2)

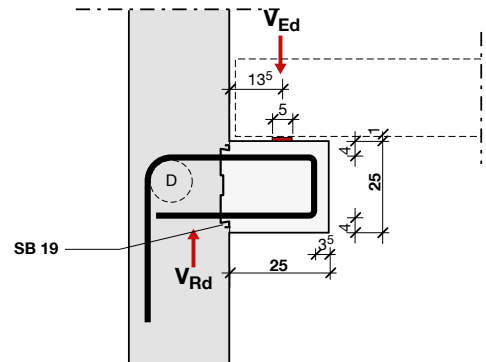
Example SK1 – box 15 h = 20 cm, b = 20 cm

$V_{Rd}$ [kN/m]*	C20/25	C25/30	C30/37
∅ 8 / 20	46.9	50.5	53.6
∅ 8 / 15	51.6	55.6	59.0
∅ 8 / 10	59.0	63.6	67.6
∅ 10 / 20	54.4	58.6	62.3
∅ 10 / 15	59.9	64.5	68.5



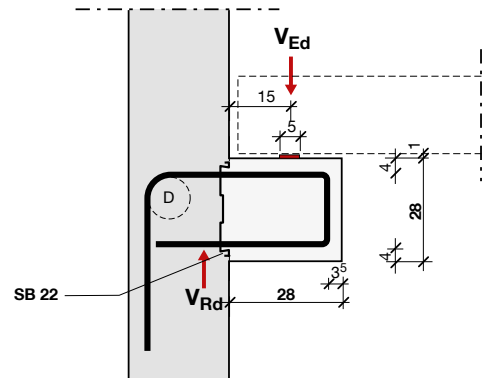
Example SK1 – box 19 h = 25 cm, b = 25 cm

$V_{Rd}$ [kN/m]*	C20/25	C25/30	C30/37
∅ 8 / 20	55.5	59.8	63.5
∅ 8 / 15	61.1	65.8	69.9
∅ 10 / 20	64.4	69.4	73.7
∅ 10 / 15	70.9	76.4	81.1
∅ 12 / 20	72.7	78.3	83.3
∅ 12 / 15	80.1	86.2	91.6



Example SK1 – box 22 h = 28 cm, b = 28 cm

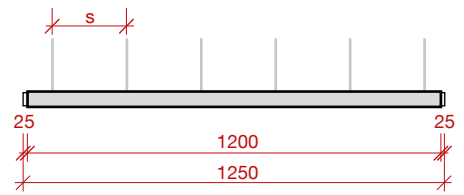
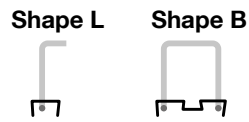
$V_{Rd}$ [kN/m]*	C20/25	C25/30	C30/37
∅ 8 / 20	58.7	63.3	67.2
∅ 8 / 15	64.6	69.6	74.0
∅ 10 / 20	68.2	73.4	78.0
∅ 10 / 15	75.0	80.8	85.9
∅ 12 / 20	77.0	82.9	88.1
∅ 12 / 15	84.7	91.3	97.0



\* $H_{Ed}$  was accounted for with 20% of  $V_{Ed}$ .

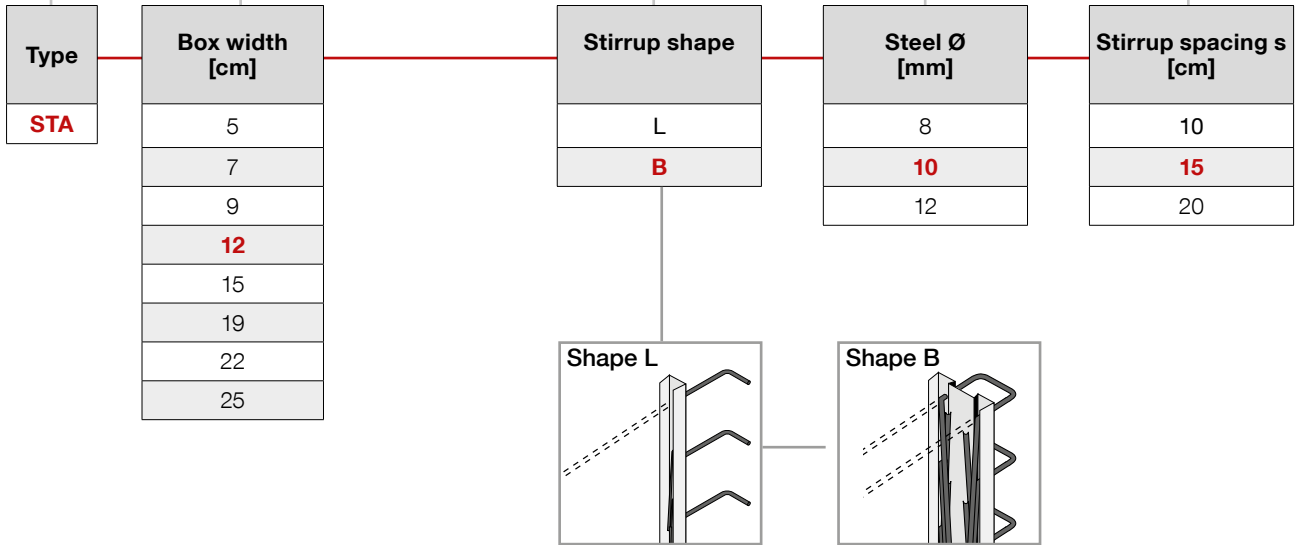
Values for deviating corbel geometries on enquiry

## Order code Stabox® S

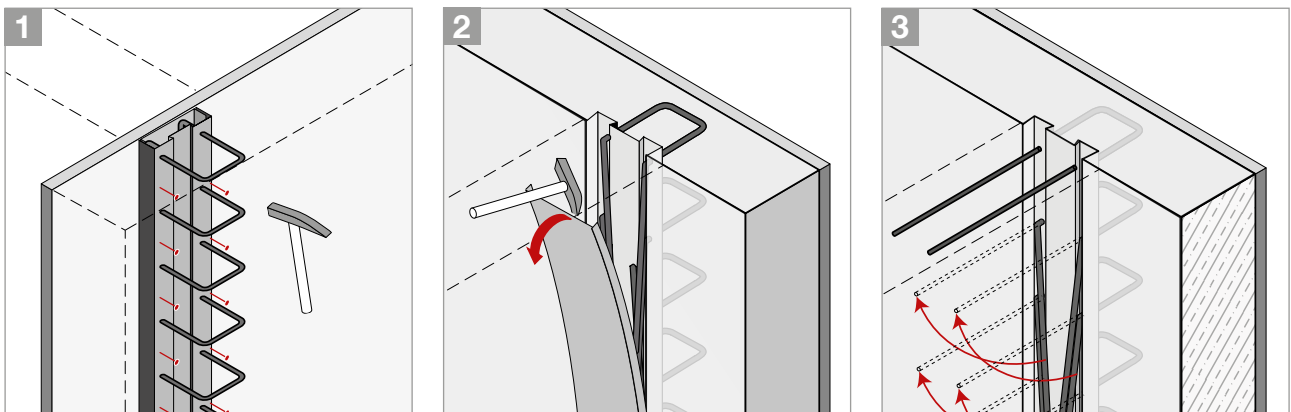


Example: Stabox® S

**STA 12 B 10 15**



## Application



Detailed application guidelines can be found at [www.maxfrank.com](http://www.maxfrank.com).



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