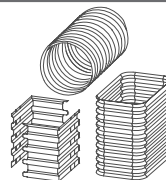


# 2

## 2.1. NON-RECOVERABLE FORMWORK

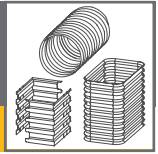
casings, L-shaped box and tubes for cut outs



### FORMWORK FOR CUT OUTS



**ROBUSTA**  
GAUKEL



## Your benefits at a glance:

- Casings with wave and trapezoid profiling
- Non-recoverable formwork for economically creating recesses for sleeve and block foundations – supplied ready to install
- With a trapezoid profile  $t = 2 \text{ cm}$  for the safe static transmission of punching shear forces by means of a shear interlocking system with block foundations
- With a corrugated profile for joints with sleeve foundations
- Dimensions from  $200 \times 200 \text{ mm}$  up to  $1,500 \times 1,500 \text{ mm}$  side lengths; all measurements in between are manufactured to order
- Can be supplied with a spot-welded sheet metal base
- Space-saving and inexpensive to transport as the sleeve is foldable
- Special versions for anchor bars etc. on request
- Also suitable as a large floor opening (F90 standard)

The non-recoverable **ROBUSTA-casings** to produce cut outs have proved themselves time and again.

Usable to anchor prefab columns made of concrete or steel supports in the base plate or in the foundation. For the different kind of foundations we offer the non-recoverable casings in 2 kinds of profiling.

### Trapezoidal casing for block foundations

With modern block foundations the non-recoverable casing will already be built into the foundation to produce a cavity.

The vertical loads of the columns have to be supported by friction and shear-serration. In this case a trapezoidal profiling of the cut out casing is best suitable.

The profiling of the trapezoidal sheet meets the recommendations of Mehlhorn and Basler/Witta.

The bearing of the loads with trapezoidal profiling for a safe static transmission of the vertical loads because of shear-serration.

A conical construction of the casing is not necessary.

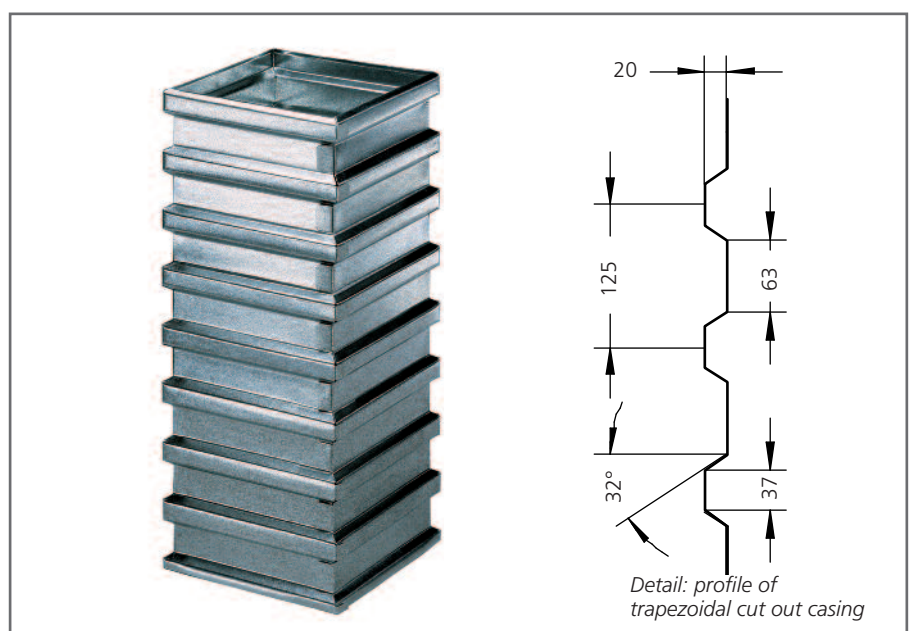
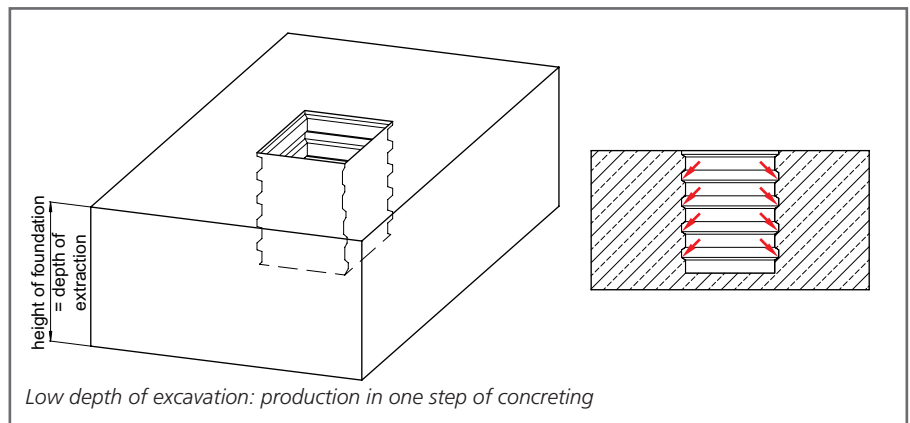
The trapezoidal profile satisfies highest demands of the joint-serration according to DIN1045-1 (July 2001), that means after determining the surface finish the coefficient of roughness may be selected of  $\beta_{ct} = 2.4$  and  $m = 1.0$ .

The trapezoidal cut out casings are made of galvanized trapezoidal sheet.

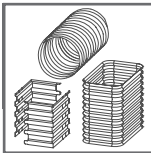
The metal shuttering is punched out and mounted on site at the breaks.

The special forming of the punch outs guarantees, that the cutting edges are pressed against each other when mounting.

That means a higher accuracy to size and a dependable sealing against grout in the corners.







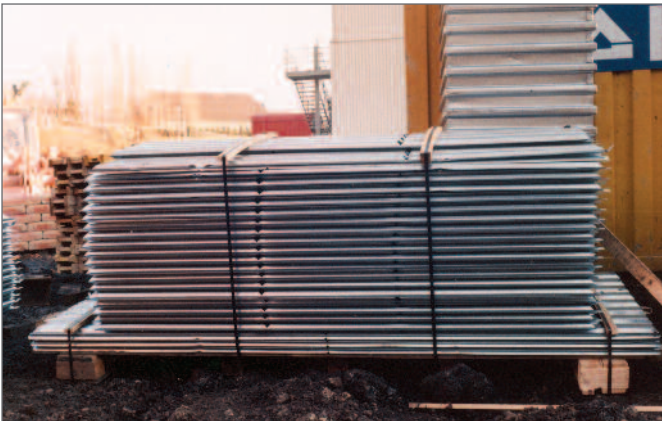
Trapezoid casing  
as foldable casing

Because of a special punching technique the delivery as foldable cut out casings in folded out tabular form is possible. With this possibility we are offering an interesting and economical solution.

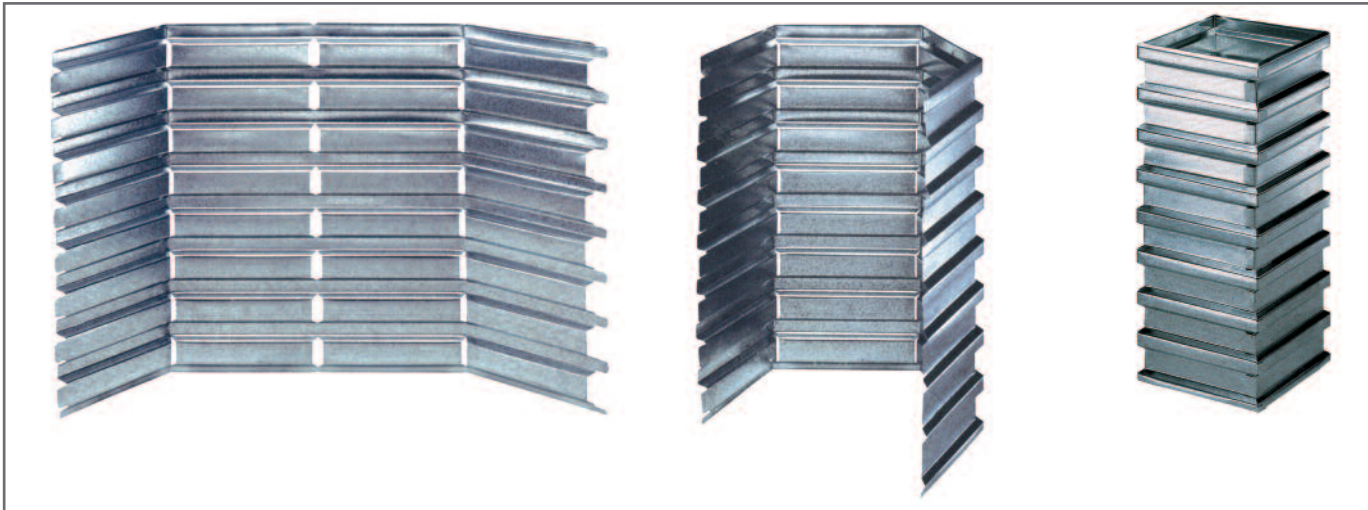
Because of the extreme reduction of the transport volume you will save transport- and storing costs.

Unwinded metal sheets are easily and quickly folded on the building site, and closed at the open corner by bending the overstanding metal plates.

At a side length of more than 600 mm a stiffening is necessary.

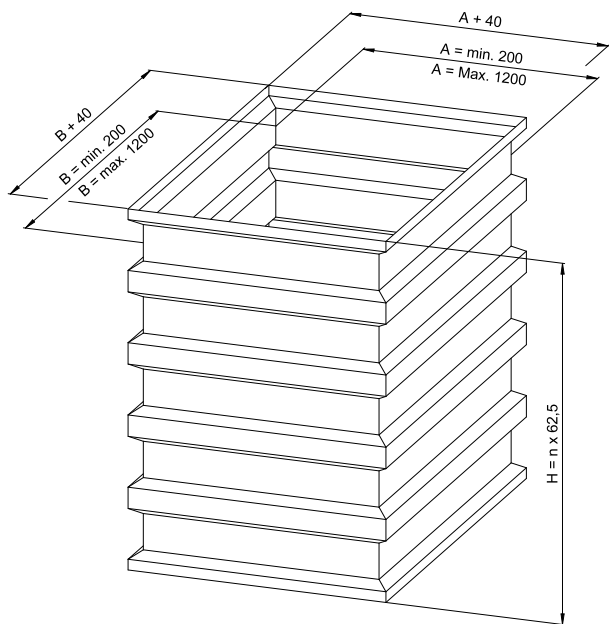


Space saving transport in unfolded condition



Mounting – fast and true to size

TECHNICAL DATA:



**Internal cut out casing** with trapezoid profile, mounted ready to install, stiffened if necessary, with spotwelded base sheet on request

Standard dimensions length of side 200 – 1200 mm*	Item No.
according to statement – as foldable casing	212000
according to statement – mounted	212010

\* bigger dimensions available on request

**Important when ordering:**  
Please advise the clear internal measurements in millimeters.

**Important when planning the surrounding stirrup reinforcement:**

The external measurements are 40 mm more than the internal measurements.

**Important when installing:**  
You have to ensure a careful grouting of the joint between casing wall and prefab part with non shrinking grouting material.

Casing with wave  
profiling  
for sleeve foundation

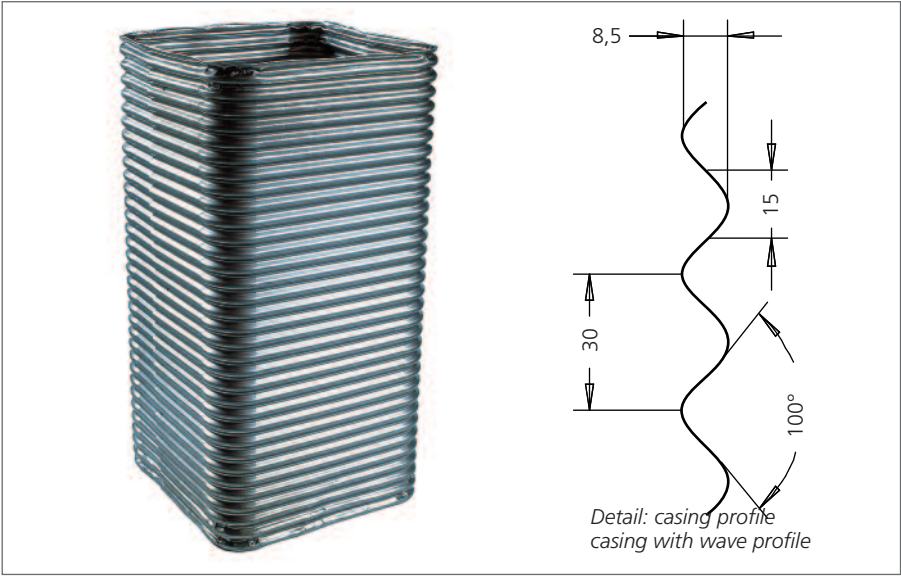
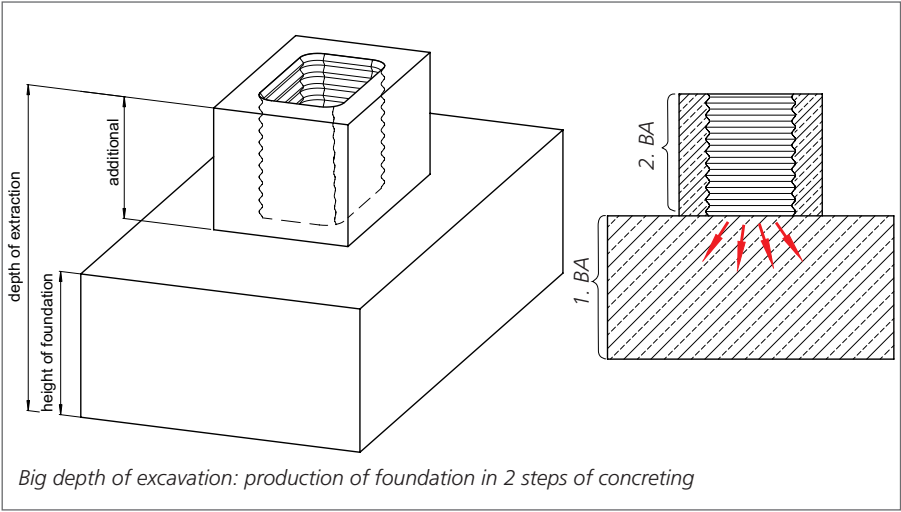
At this type of foundation the foundation block is concreted in a second pouring step.

The profile does not serve as a shearing force transmission but only for the production of a "rough joint".

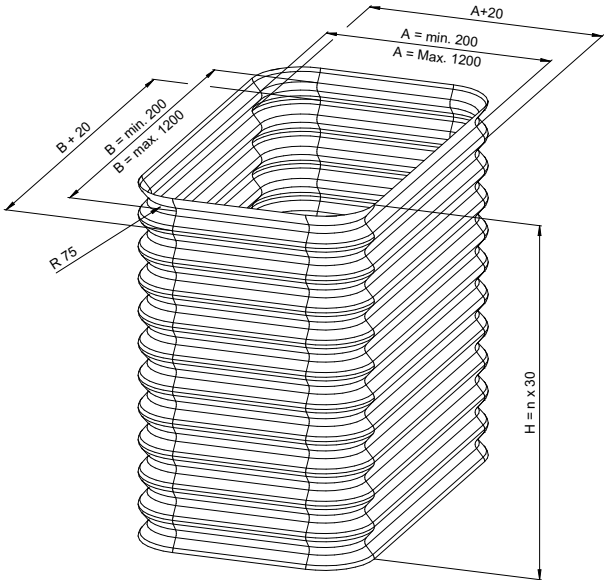
That means, that the entire vertical load of the column will be transmitted into the foundation block by soil pressure at the column base.

For the producing of the foundation in two steps we recommend to order the casing without base approx. 3 – 5 cm longer, the standing out will be pressed into the green concrete of the first pouring-step.

After the setting the casing is fixed with no possibility to shift and it cannot slip or lift anymore when continuing with concreting.



TECHNICAL DATA:



Internal cut out casing with wave profiling, steel, mounted ready to install, stiffened if necessary, with spotwelded base sheet on request

Standard dimensions length of side 200 – 1200 mm*	Item No.
according to statement	211000

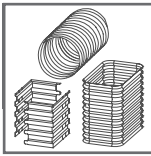
\* bigger dimensions available on request

**Important when ordering:**  
Please advise the clear internal measurements in millimeters.

**Important when planning the surrounding stirrup reinforcement:**  
The external measurements are 20 mm more than the internal measurements.

**Important when installing:**  
You have to ensure a careful grouting of the joint between casing wall and prefab part with non shrinking grouting material.

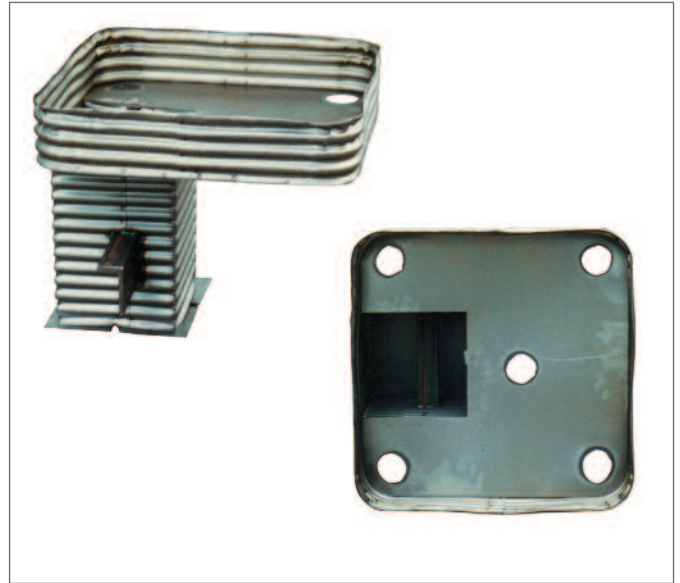




### Special casings for cut outs – examples



*Casing ready to mount with lateral filling chute and traversing steel girder*



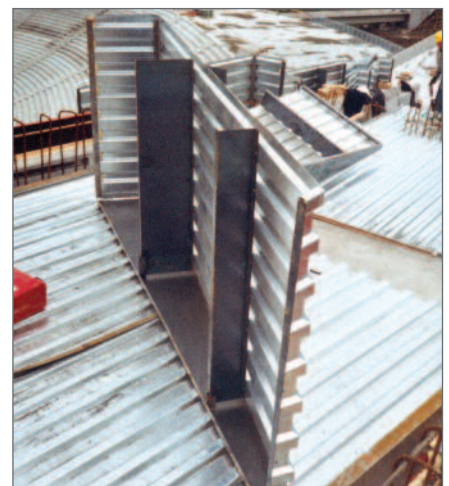
*Special casing with cut out for base deepening for machine foundations*



*Various special casings*



*Special casings to produce cavities in the slab, especially adapted variations for different slab inclinations*





## Your benefits at a glance:

- Non-recoverable formwork for creating floor openings economically
- Can be mounted and fixed to the formwork in less than a minute!
- No troublesome measuring and cutting wooden shuttering panels
- Galvanised sheet metal; the formwork box remains in the concrete; no formwork stripping necessary!
- No wood waste any more; no more expensive disposal!
- The trapezoidal profile guarantees secure bonding with the mortar – no need for time-consuming reinforcement connections!
- Space-saving transport and storage thanks to L brackets set into each other
- Special versions for specific individual dimensions can be delivered rapidly
- Fire safety assessment for F90 available

The **ROBUSTA – L-shaped formwork box** optimizes the production of floor openings. A faster run of working process is possible because of the flexible use of different basic measurements. The effort of time for producing **one wooden casing** with measuring, cutting, nailing, installing and encasing will total approx. **15 to 20 minutes**.

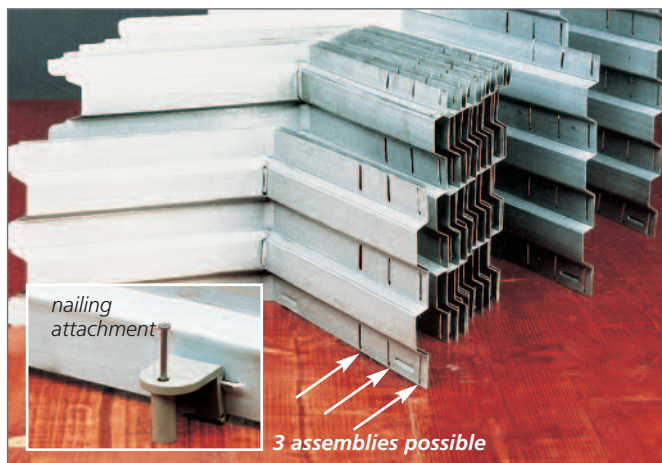
This effort will be reduced with the L-shaped formwork box to **less than 1 minute** regardless of the size of the casing.

The assembling of the 2 L-angles and the bending of the sheet ends takes only 20 seconds. Another 20 to 25 seconds will be needed to insert the nailing attachment and nail to the wooden casing.

### No more working steps necessary!

With previous appropriate discussion with the architect or planner the measurements of the floor openings can be planned accordingly, so all floor openings can be produced economically with 1 or 2 basic types.

In that way a storage on site or on a stockyard will be economical.



Standard sizes, type 1 for example



assembled to  
200 x 150 mm

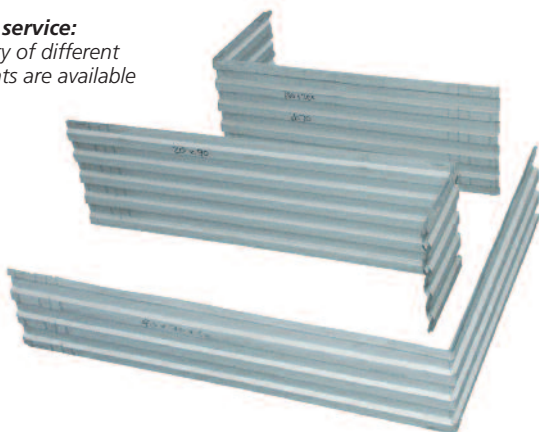


assembled to  
200 x 200 mm

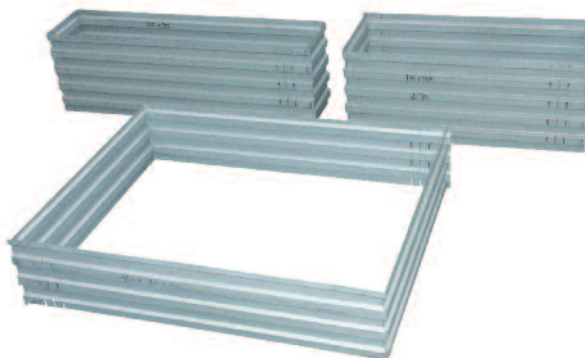


assembled to  
200 x 250 mm

**Our special service:**  
a wide variety of different  
measurements are available  
on request



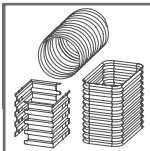
state of delivery: both L-angles stuck one to the other



mounted together and ready for use







# NON-RECOVERABLE FORMWORK

## L-SHAPED FORMWORK BOX

2

### Easy installation and mounting in less than 45 seconds:

on filigree slabs:

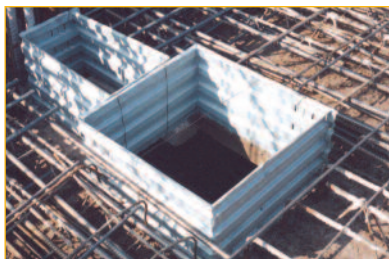


The angles are delivered in single parts and are ready to use in no time at all.



20 seconds

on wooden slabs:



On element slabs the casings will be fixed with wire to the reinforcement.



The casing will be nailed directly to the wooden casing with nailing attachments.



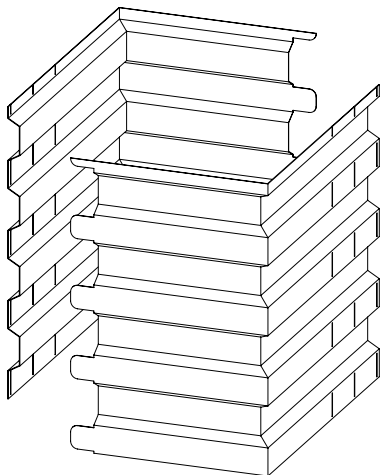
45 seconds



An inconvenient striking is not necessary.



### TECHNICAL DATA:



### L-shaped formwork box, standard sizes

Type	dimensions B x L [mm]	Weight [kg/H = 200 mm]	Item No. [H=200 mm]
1	20 x 25	0.90	215010
2	25 x 35	1.10	215020
3	30 x 40	1.30	215030
4	acc. to statement		215000
Accessory: nailing attachment			215099

Variations for assembling in mm:

**Type 1:** 200 x 200 / 200 x 150

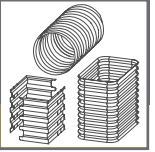
**Type 2:** 250 x 300 / 250 x 250

**Type 3:** 300 x 350 / 300 x 300

All L-shaped formwork boxes are available for ceiling thickness 13, 15, 18, 20, 26 and 30 cm.

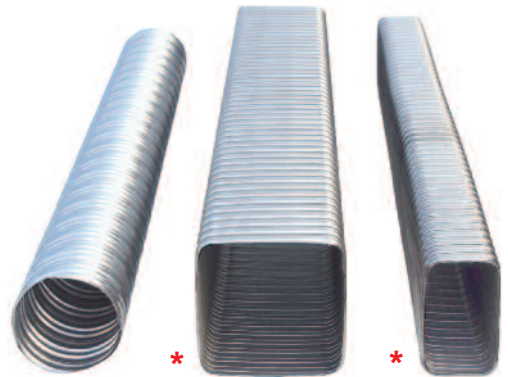
Please advise on your order!





## Your benefits at a glance:

- Non-recoverable formwork for inexpensively creating recesses and openings for supply lines in beams and floors
- Standard dimensions of the round tubes: Ø 40 mm up to 1,000 mm; quadratic tubing 58 x 58 mm up to 200 x 200 mm
- Supply length 5 m (stock length) and in specific lengths according to customer request sawed ready to install – also with angled cuts if needed
- Any transportable length available on request
- Round tubes with profiles both on the inside and out, giving a perfect shearing bond and great mechanical strength against concrete pressure
- Low weight and easy handling
- Fasteners for steel and wooden formwork can be supplied
- Also for mast foundations and anchoring machines (excluding quadratic and square tubes)



### Round tubes for cut outs

Because the tubes are delivered ready for installation, the costs for the formwork will be reduced enormously on site. Encasing with a lot of effort and the disposal of wooden remains is not necessary.

The tubes are produced of profiled band steel. The tubes up to Ø 80 mm are produced longitudinal welded, all bigger diameters as winding cable tube.

Hot galvanized tubes are available if there is danger of rusting. The tubes will be galvanized after sawing, so that also the cutting edges are protected!

Internal and external sockets for coupling are available to couple tubes on site, by that the profiling can be used as a screw thread.



### Rectangle and quadratic tubes for cut outs

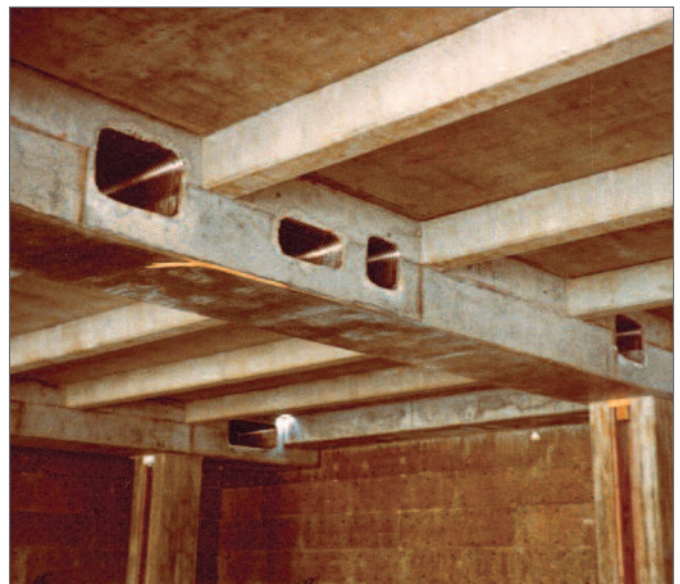
Type of production as profiled band steel. Hot galvanized tubes are available if there is danger of rusting.

The tubes will be galvanized after sawing, so that the also cutting edges are protected!

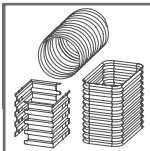
#### Attention\*:

These tubes are not profiled on the inside. This means a shearing bond as with round tubes between grout and surrounding concrete is not possible!

Therefore these kind of tubes are not suitable for anchoring traction loads.





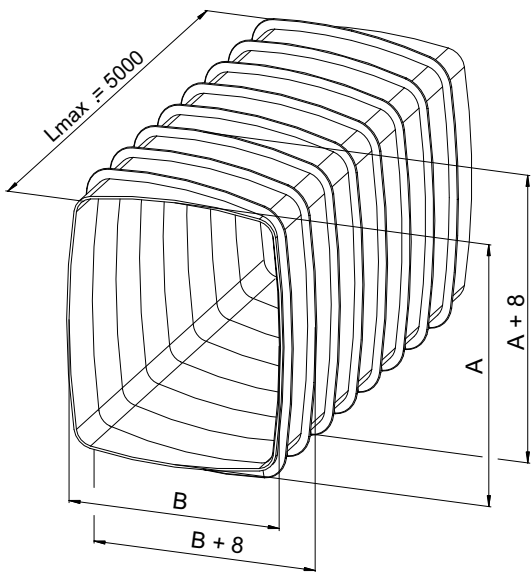
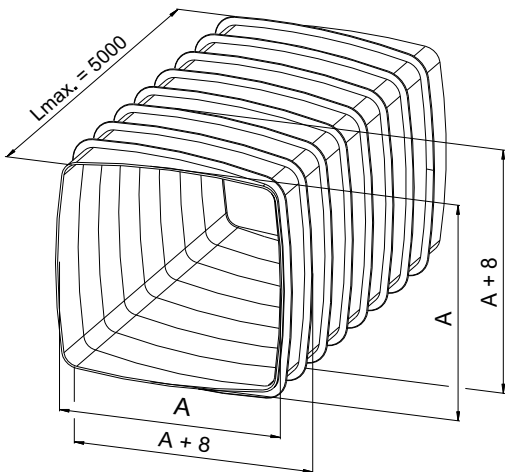
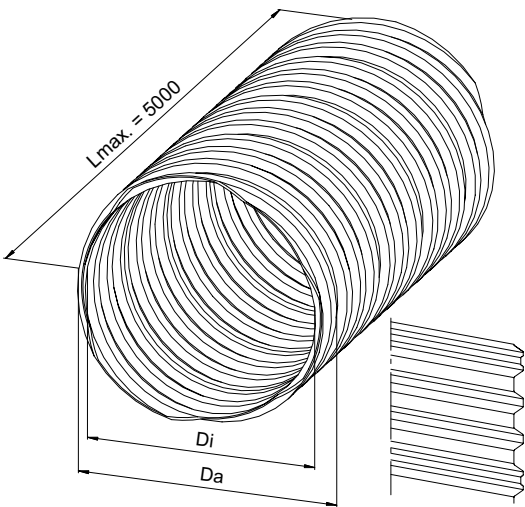


# NON-RECOVERABLE FORMWORK

## RECESS TUBES FOR CUT-OUTS

2

### TECHNICAL DATA:



### tubes for cut outs

round, normal steel

Internal-Ø [mm]	External-Ø [mm]	Weight [kg/m]	Item No.
40	46	0.26	220400
50	56	0.35	220500
60	67	0.40	220600
65	72	0.48	220650
70	77	0.58	220700
80	87	0.67	220800
100	108	0.86	221000
125	133	1.12	221250
150	158	1.28	221500
200	210	1.70	222000
250	260	2.25	222500
300	310	2.68	223000
350	360	3.12	223500
400	410	3.55	224000
480	500	6.22	225000
580	600	7.50	226000
680	700	11.60	227000
780	800	12.60	228000
880	900	14.18	229000
980	1000	15.80	229800

quadratic\*, normal steel

Nominal width [mm]	ext. measurements [mm]	Weight [kg/m]	Item No.
58 x 58	66 x 66	0.75	230580
70 x 70	78 x 78	0.88	230700
82 x 82	90 x 90	1.01	230820
100 x 100	108 x 108	1.15	231000
130 x 130	138 x 138	1.65	231300
140 x 140	148 x 148	1.70	231400
190 x 190	198 x 198	2.35	231900
200 x 200	208 x 208	2.45	232000

rectangle\*, normal steel

Nominal width [mm]	Ext. measurements [mm]	Weight [kg/m]	Item No.
57 x 28	65 x 36	0.53	240570
70 x 50	78 x 58	0.74	240700
77 x 42	85 x 50	0.86	240770
90 x 60	98 x 68	0.86	240900
100 x 80	108 x 88	1.05	241000
105 x 50	113 x 58	0.97	241050
120 x 70	128 x 78	1.18	241200
130 x 70	138 x 78	1.58	241300
140 x 80	148 x 88	1.38	241400
160 x 80	168 x 88	1.50	241680
160 x 100	168 x 108	1.65	241600
170 x 70	178 x 78	1.65	241700
175 x 55	183 x 63	1.73	241750
230 x 76	238 x 84	1.94	242300

\* These tubes are not profiled on the inside. This means a shearing bond as with round tubes between grout and surrounding concrete is not possible! Therefore these kind of tubes are not suitable for anchoring traction loads.



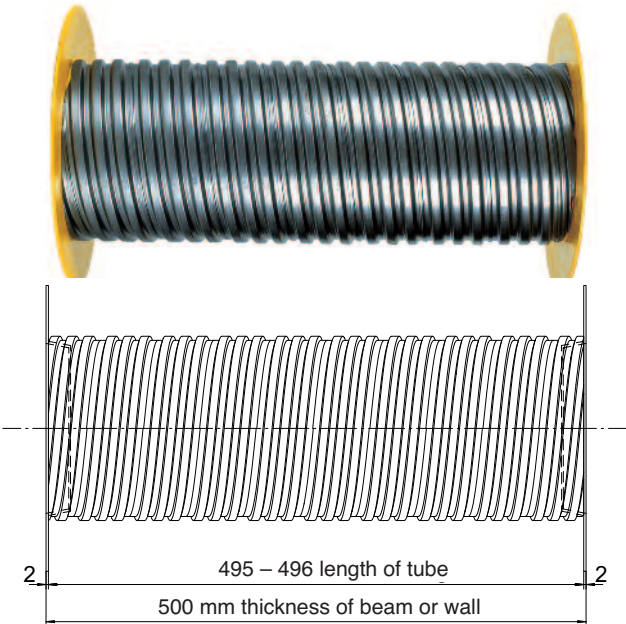
Fastener to wooden or steel foundations *(steel covers available on request)*

### Plastic cover with flange

For nailing to wooden casings and to close the tube ends, reusable.

The tube is protected stirdy against uplift and moving in walls und beams by fixation on both ends.

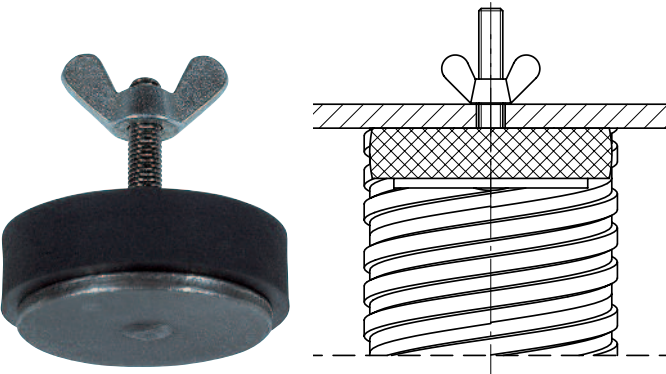
**Important when ordering cut tubes:**  
The thickness of flange "T" of the closing cover must be deducted of the total length!



### Rubber spanner

Preferably to fix the tube to steel formwork. Therefore a boring has to be made in the casing. The thread core will be inserted through the side which has contact to the concrete.

By tightening the wingnut the rubber will be squeezed and is clamped safely inside the tube, also when using outisde vibrators.



### Plastic closing cover without flange

To close the tube ends, reusable.

If the covering on top should be stable we recommend the use of steel closing cover.

**Important when determining the installing parts on the tube:**  
The closing cover Type B will extend into the tube with the measurement "H".



Fixing to reinforcement

### Vertical positioner ST

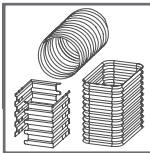
For safe fixing of all kind of tubes to reinforcement meshes we deliver on request bent wire bows adapted to almost all lengths and diameters.



### Vertical positioner ST for cut out tubes

Sizes round/rectangle	Item No.
on request	101400



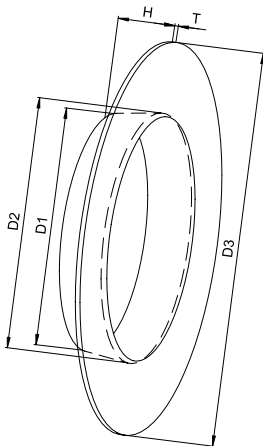


# NON-RECOVERABLE FORMWORK

# 2

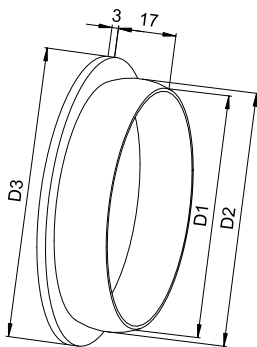
## ROUND CUT-OUT TUBES: FIXING

### TECHNICAL DATA:



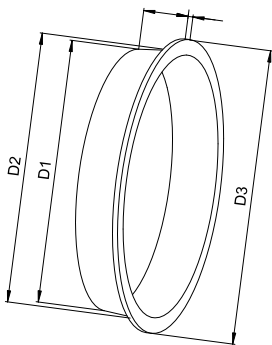
#### Plastic closing cover yellow, with flange

Dn [mm]	D1 [mm]	D2 [mm]	D3 [mm]	H [mm]	T [mm]	G [kg/100 units]	Item No.
40	39	41	88	15	1.20	0.80	229404
50	49	52.5	102	15	1.20	1.30	229405
60	59	60.5	130	30	2.00	1.50	229406
65	63	68	121	20	2.00	1.90	229465
70	67	73	129	19	1.50	2.00	229407
80	77	82	138	20	1.75	2.50	229408
100	97	103	162	20	1.50	3.65	229410
125	122	128	205	20	2.00	6.50	229412
150	147	153	245	19	2.00	10.20	229415
200	199	203	300	18	2.00	16.80	229420
250	249	253	395	19	2.20	29.80	229425
310	308	312	373	22	2.20	25.70	229431
350	343	338	435	22	2.50	35.40	229435
400	398	408	490	30	2.50	50.00	229440



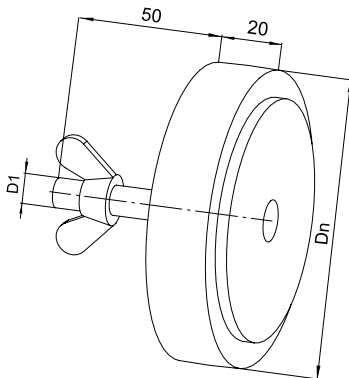
#### Plastic closing cover even surface, without flange

Dn [mm]	D1 [mm]	D2 [mm]	D3 [mm]	G [kg/100 units]	Item No.
50	49	50.5	59	1.10	229305
60	56	59.5	74	1.75	229306
70	67	71.0	78	1.90	229307
80	80	82.0	94	2.60	229308



#### Plastic closing cover recessed surface, without flange

Dn [mm]	D1 [mm]	D2 [mm]	D3 [mm]	H [mm]	G [kg/100 units]	Item No.
40	39	41	44	14	0.74	229304
100	99	101	110	17	2.40	229310
125	124	128	135	23	2.70	229312
150	148	151	160	33	4.00	229315
200	199	201	208	23	8.80	229320
250	249	251	266	22	16.90	229325
300	299	302	313	23	23.00	229330
310	308	311	324	22	22.70	229331



#### Rubber spanner for fixing the round tubes for cut outs to steel formwork

Dn [mm]	D1 [mm]	G [kg/100 units]	Item No.
40	M 8	9.60	229940
50	M 8	12.20	229950
60	M 8	15.90	229960
65	M 8	17.40	229965
70	M 8	24.10	229970
80	M 10	33.40	229980
100	M 10	44.60	229910



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