

## **VARIO VT 20**

The variable Girder Wall Formwork System  
with the proven Girder VT 20



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**Important Notes:**

Without exception, all current safety regulations must be observed in those countries where our products are used.

The photos shown in this brochure feature construction sites in progress. For this reason especially safety and anchor details cannot always be considered as conclusive or final. These are subject to the risk assessment carried out by the contractor.

Safety instructions and load specifications are to be strictly observed at all times. Separate structural calculations are required for any deviations from the standard design data.

The information contained herein is subject to technical changes in the interests of progress. Errors and typographical mistakes reserved.

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# General

## The variable girder wall formwork system

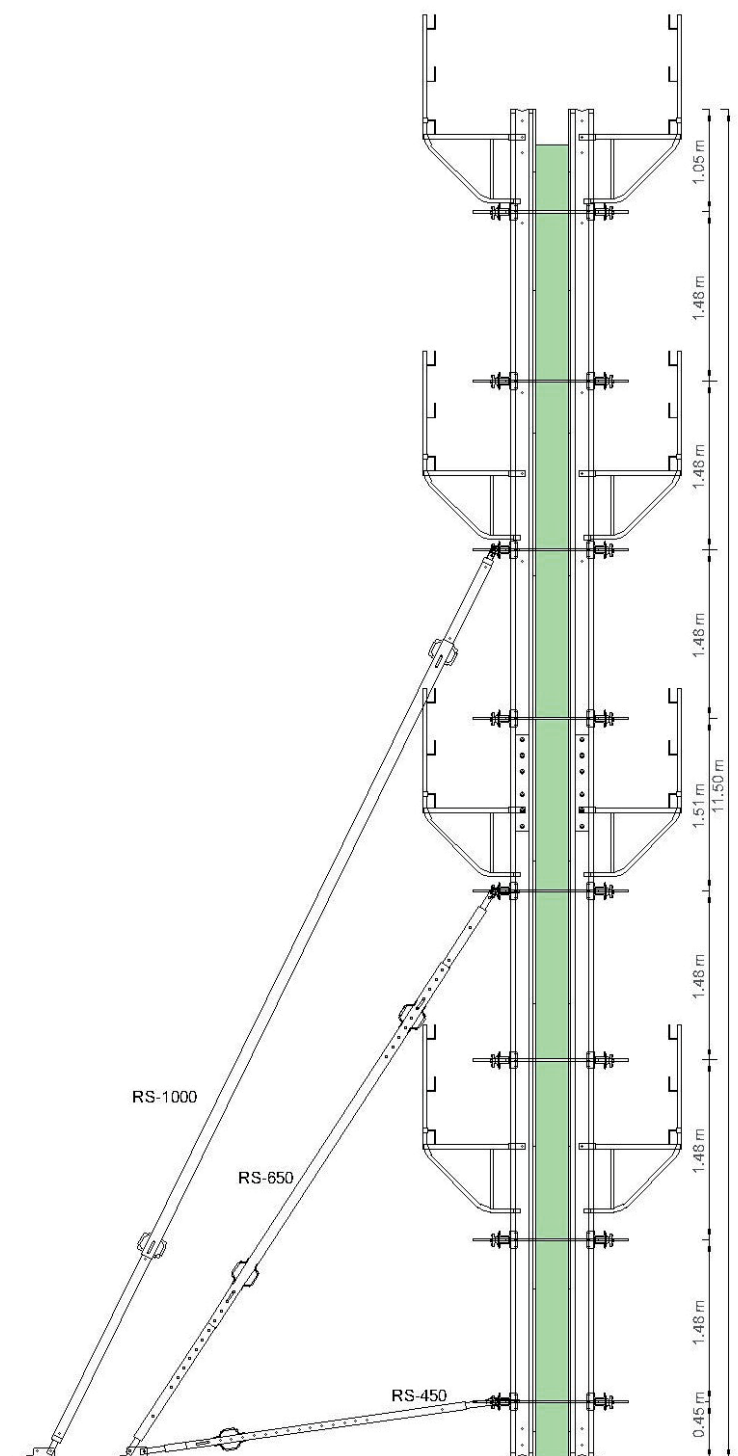
**VARIO VT 20 is the proven girder wall formwork system complete with the continuously adjustable elongated hole couplings.**

Regardless whether it is industrial or residential construction, bridge abutments or retaining walls, every layout and any height up to 11.9 m can be formed with PERI VARIO-VT.

VT 20 girder allow easy adjustment to suit the required height.

Pre-assembled, ready-to-use platforms provide site personnel with a very high level of safety, as well as large time savings particularly with multiple usage.





**The VARIO VT 20 girder wall formwork system offers many advantages. This includes simple planning, minimum on-site material requirements and fast, efficient formwork sequencing.**

Optimally-sized large elements can be assembled specifically for every project. In the process, the following points can always be freely selected:

- type and size of the formlining
- formlining fixings
- panel widths and heights
- position of any height extension or reduction
- girder length and spacing
- waler position, profile and length
- permissible fresh concrete pressure
- tie arrangement (horizontal, vertical)
- type of panel (straight, curved, offset)

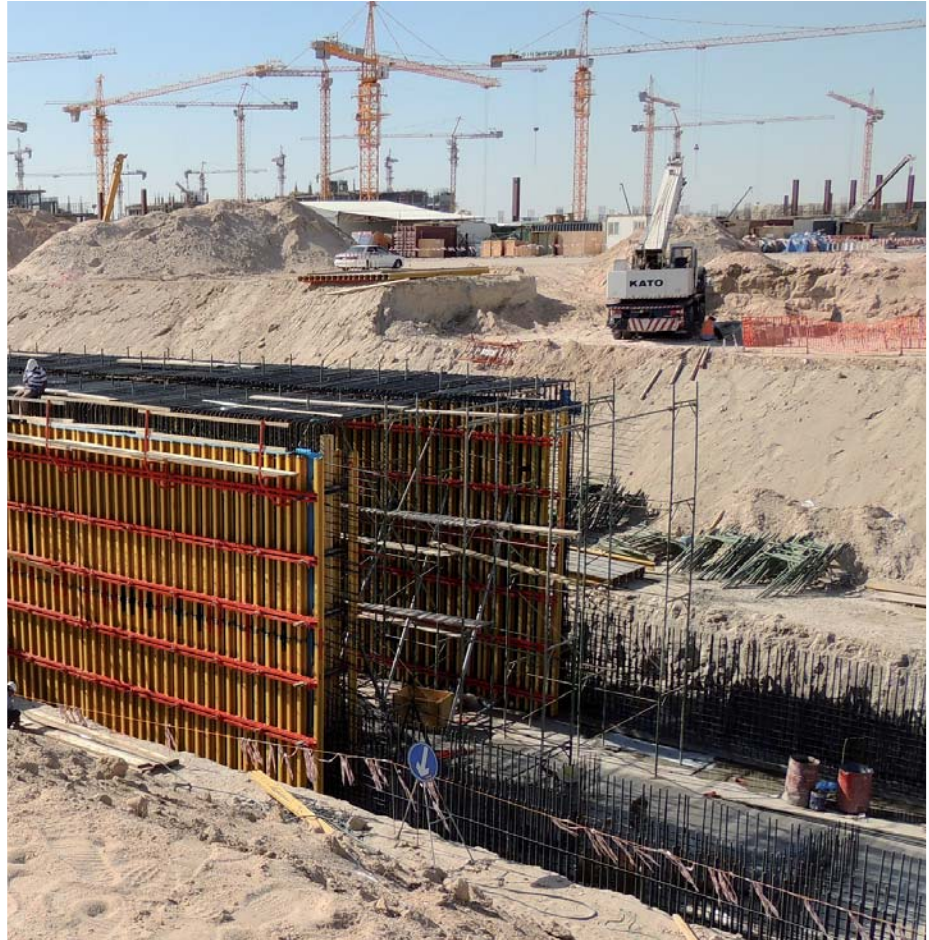


Extended VARIO VT 20 panels being used to shutter administration building.

# General

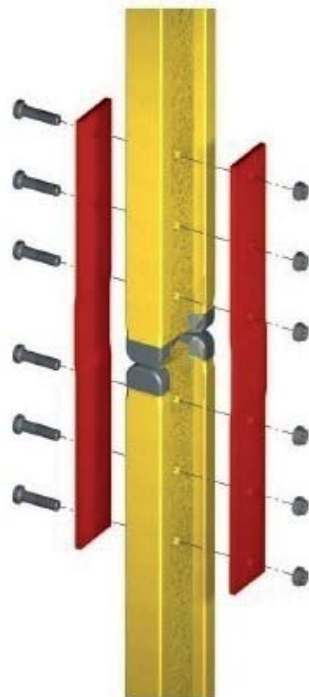
## The variable girder wall formwork system

Cut and cover tunnel constructed using extended VARIO VT formwork.



### The formwork is extended with the VARIO Extension Splice VT 20

Quickly and easily fitted through the existing end holes at the web of VT 20, without having to drill girders. The flexural rigid connection automatically aligns the girders. The splice consist of just two components which are quickly connected using 6 Bolts and nuts M20.

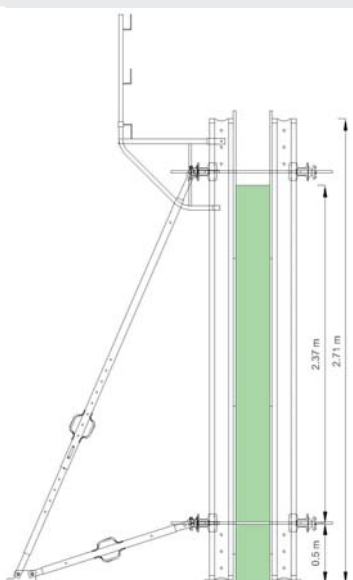


VARIO VT 20 formwork specially adapted to the requirements with defined formlining joint formation and tie point positioning.



CB240 climbing system were combined with VARIO VT20 wall formwork to cast the cores ahead of slab which reduce time and cost for the client.

VARIO panels, with concreting scaffold and push-pull props, are shifted as a complete unit.



Soundproof sealing of the tie points costs 50% less as the top tie point is above the concrete with water spacing of 2.37 m.

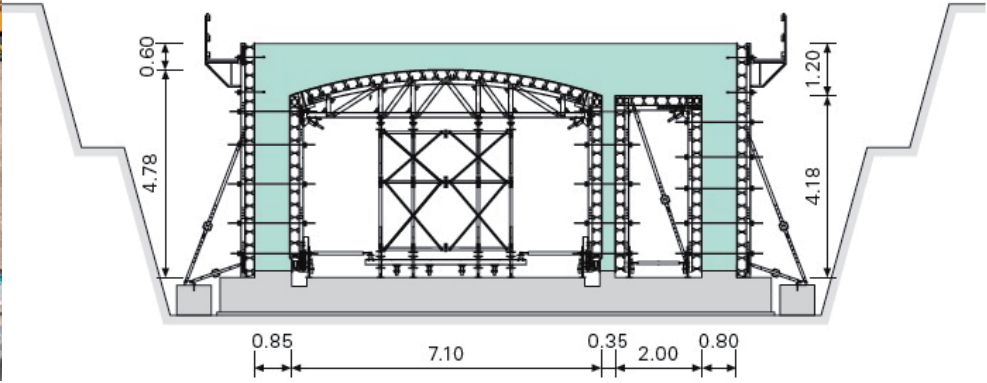


# General

## Complicated geometries with standard system components



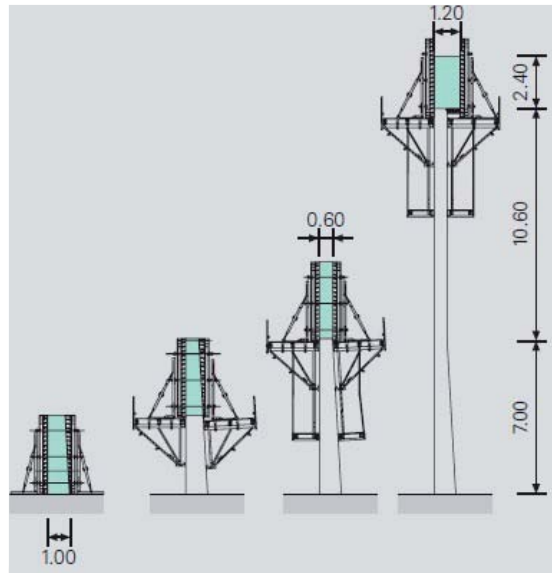
Enabled by PERI tunnel formwork, a rapid four-day cycle per section was achieved at a tunnel construction site near Muscat. Through its cost-effective and flexible design, the side shutter and decking also relied on VARIO VT 20.







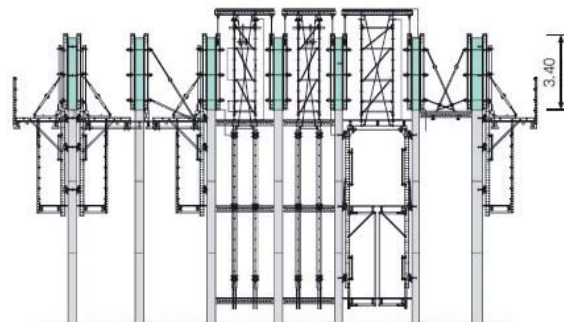
VARIO VT 20 being used to construct a circular tank. Timber on top of VT girders and steel walers produce the circular shape.



Even for this complicated layout, over 90% of the formwork consists of standard system components.



Multi-storey Hotel and Service Apartment with VARIO VT 20 and RCS/VARIO rail climbing formwork systems used for lifting core walls.



# General

## VT 20K Formwork Girder

### Cost-effective and durable



**The PERI VT 20K is the 200 mm solid web girder complete with optimal protection at the girder ends.**

The robust steel cap which surrounds the end of the girder, as well as the concave web end, reliably prevent damage to the girder ends in demanding and tough conditions on the construction site. Here, the natural elasticity of the timber is used to absorb the impact energy if the girder falls to the ground.

Securing of the steel cap was intentionally done in the unstressed area of the web. The highly compressed web board has a high proportion of synthetic resin which ensures high dimensional stability. These improvements in the details, in connection with chords made of high-quality Nordic softwood, greatly extend the service life of the girder.

**Robust steel caps**  
at the end of the girders protect against damages.

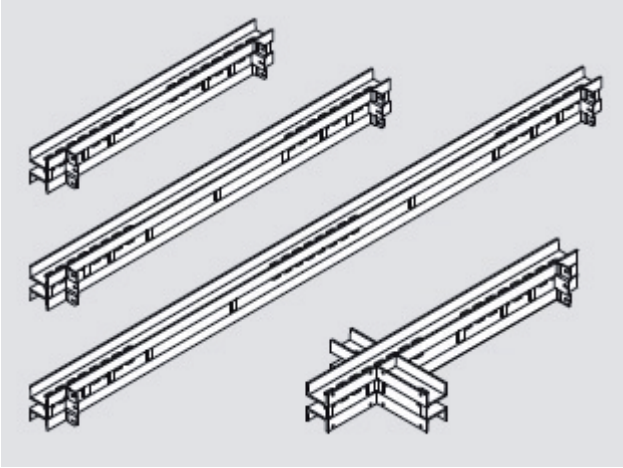
**Note**  
Girder meets the requirement DIN EN 13377 class P20 (declaration of conformity).  
**Technical Data**  
perm. Q = 11.0 kN  
perm. M = 5.0 kN.m  
I<sub>y</sub> = 4181 cm<sup>4</sup>

# General

## The standard system components of a VARIO VT 20 panel

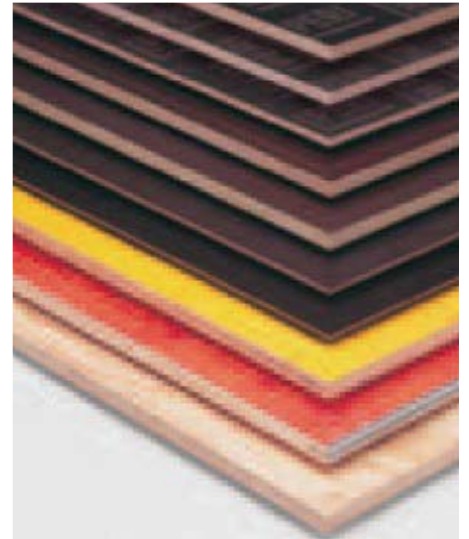
### Steel Waler SRZ/SRU

Available in standard length as well as in any special sizes and forms. Profile cross-sections range from U100 to U140 and others.



### Formling

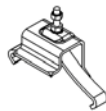
PERI formling sheets come in range of sizes, thickness and grades to ensure that the most appropriate formling is available to meet individual site requirements.



### Connecting Components

#### Hook Strap HB for VT

For connecting the VT20 to SRZ and SRU walers.



#### Hook Strap Uni HBU

For connecting the VT20 to SRZ and SRU Walers from top of the girder.



#### TSS Torx Screw

for assembling the formling



# Standard Applications

## Continuously adjustable panel connections

The rows of slots in the PERI steel walers and couplings allow continuous tightening of panel joints of even roughly erected panels.

### VARIO Coupling VK

With the VARIO coupling, the panels are simultaneously aligned.

The multi-functional VARIO coupling with the wedge:

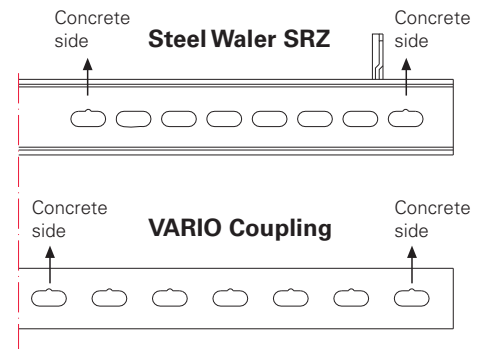
- continuously tightens until joint is grout-tight
- aligns panels
- supports plywood fillers
- extends the width of panels
- fixes stopend formwork
- stabilises internal corners
- is continuously adjustable on both sides

### Important:

PERI steel walers and couplings have notches in the elongated holes. These must always point towards the concrete side. As a result, the tolerances are equal to zero and the panel joints are optimally aligned.

### Standard joint

The continuous adjustment possibility ensures extremely tight panel joints.



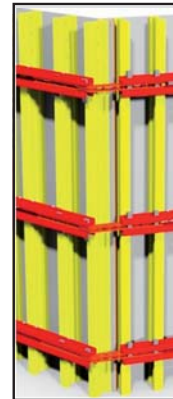
### Filler joint

Any gap up to 1.25 m wide can be filled.



### Oblique joint

Any angle can be shuttered with the articulated coupling.



### Practical tip

Whether a wedge is locking or pulling is evident from its inclination:

Wedge tip points to the element joint

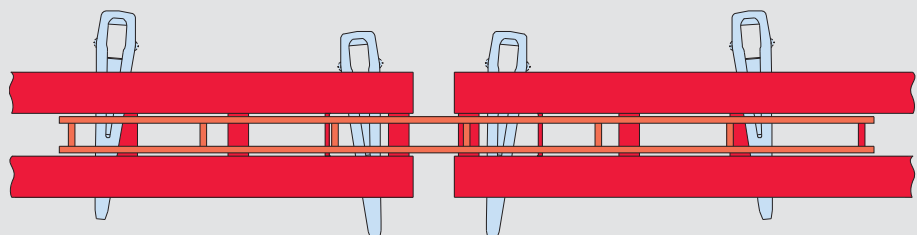
= **wedge pulls**

Wedge tip points away from the element joint

= **wedge pushes**

wedge locking

wedge pulling



**Neat and precise panel joints are always specifically required where special architectural requirements are placed on the concrete surface.**

**VARIO Coupling Concrete Finish VKS**

With the VARIO Coupling VKS and the Alignment Clamp VRS, it is easy and quick to carry out.

The Coupling VKS allows offsets up to 5 mm to be compensated. At the same time, the Coupling VKS can be used as a "standard panel connection".



**Handling**

- Centrally position the Coupling VKS on the element joint in the steel water.
- The smaller side of the trapezoidal-shaped cut-outs points to the concreted side. (Fig. 1)

- Position the Wedge KZ in the same way as with coupling VKZ.
- With element offsets, mount Alignment Clamp VRS on Panel ① positioned to the rear.
- Release pulling wedge on Panel ②.
- Use counter wedge to slightly open the formlining joint on Panel ②. (Fig. 2)

- Loosen pulling and counter wedges on Panel ①.
- Eliminate panel offset by tensioning the Alignment Clamp VRS.
- Release pulling wedge on Panel ②.
- Tightly close joint on Panel ② with counter wedge.
- Counter with pulling wedge on Panel ②. (Fig. 3)

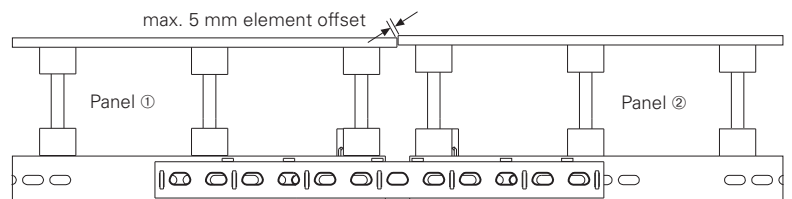


Fig. 1

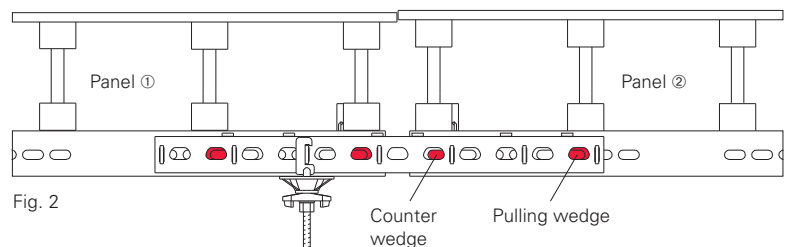


Fig. 2

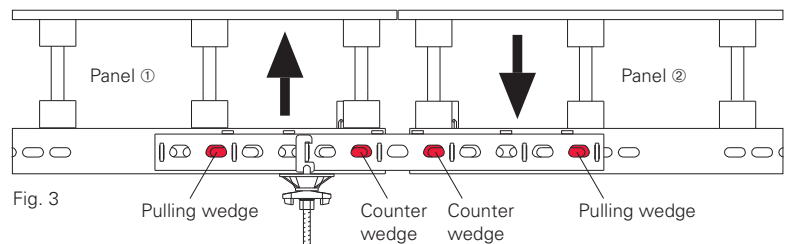


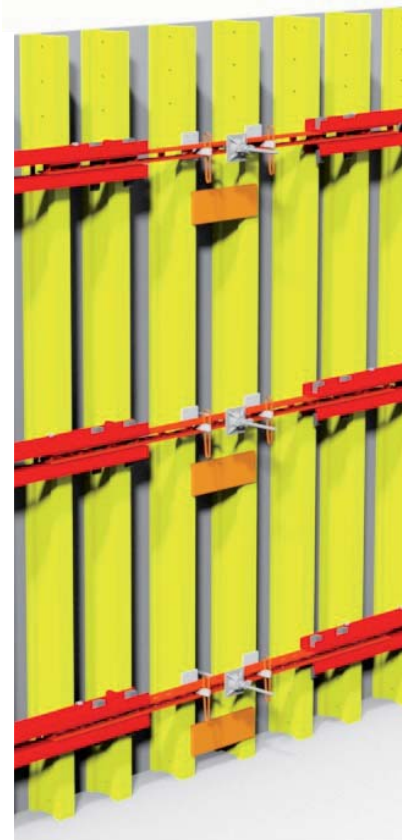
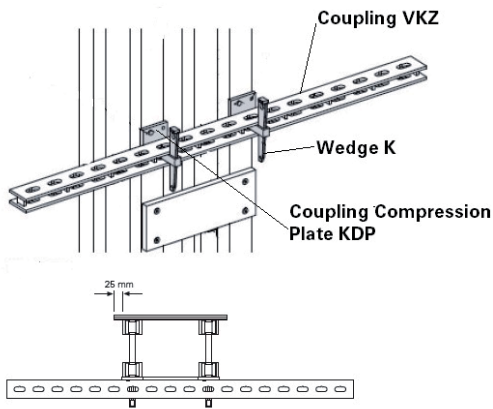
Fig. 3

# Standard Applications

## Fillers, stopend formwork and panel width extensions units

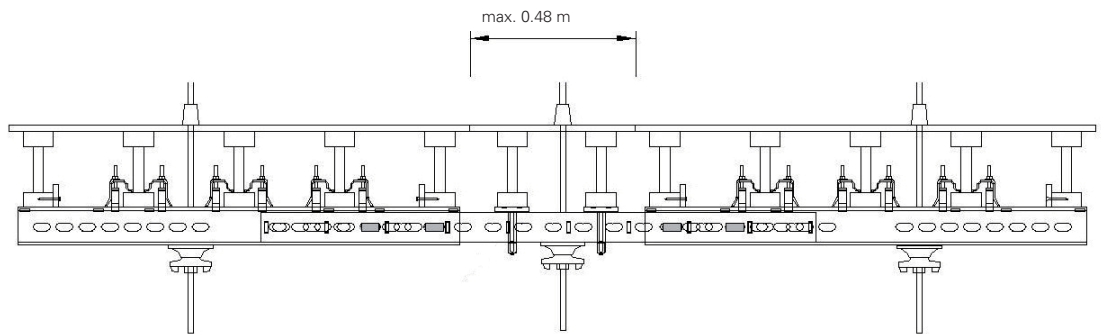
### Infill areas

VARIO VT 20 infill areas are shuttered using the Couplings VKZ 147 and VKZ 211.

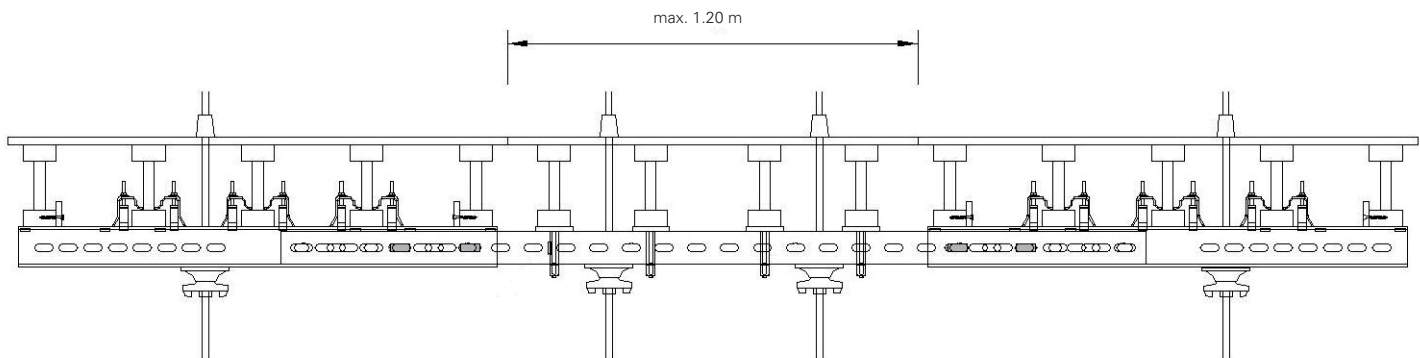


Continuous infill area width with Couplings VKZ.

### Coupling VKZ 147



### Coupling VKZ 211

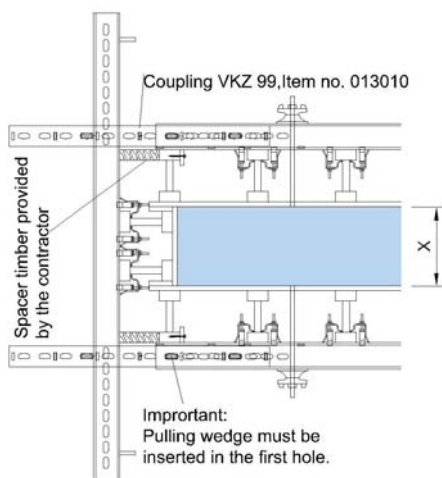


## Stopend Formwork

VARIO offers 2 possibilities for realising stopend formwork: either the Coupling VKZ or Bulkhead Tie is used.

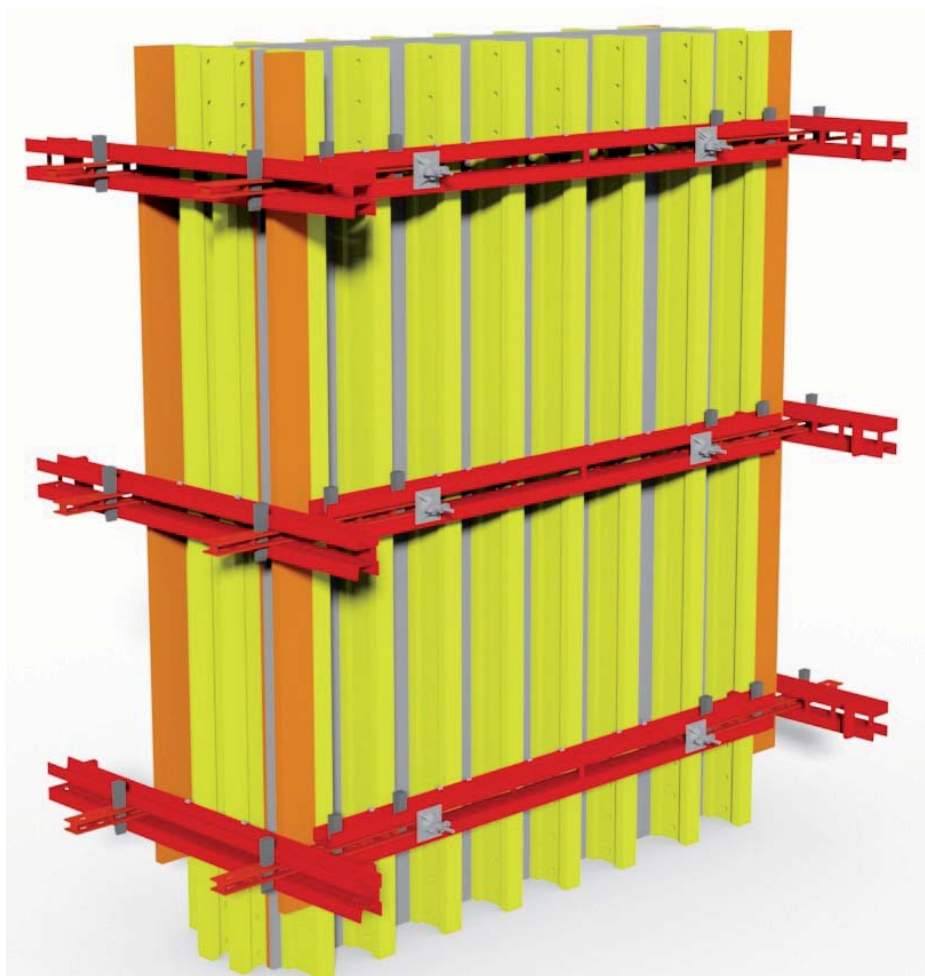
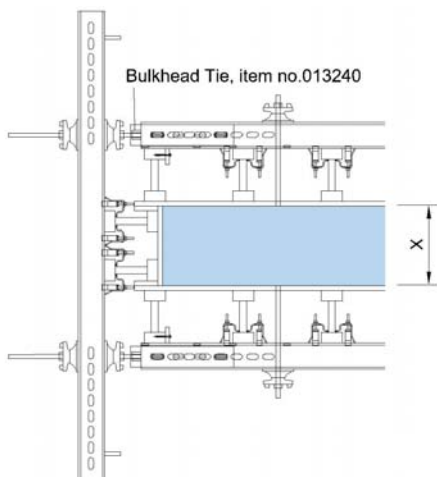
### Coupling VKZ

perm. tension force 50 kN.



### Bulkhead Tie

perm. tension force 30 kN.



Complete stopend formwork with coupling VKZ.

# Standard Applications

## External corners, internal corners

Depending on the application, external and internal corners can be formed in various alternative ways.

- With VARIO Corner Panels
- With Cross Walers & Shaft Corners
- With Special Walers

### VARIO Corner Panel

With this solution, especially for thin walls and low utilisation, the fillers consist of standard components.



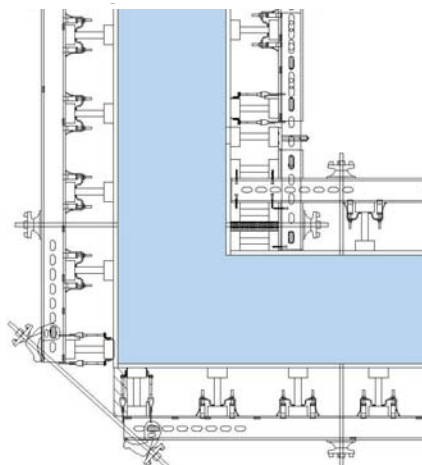
### External Corner

Ensure that it is tightened when the correct angle is achieved. The continuous adjustment possibility facilitates this process.

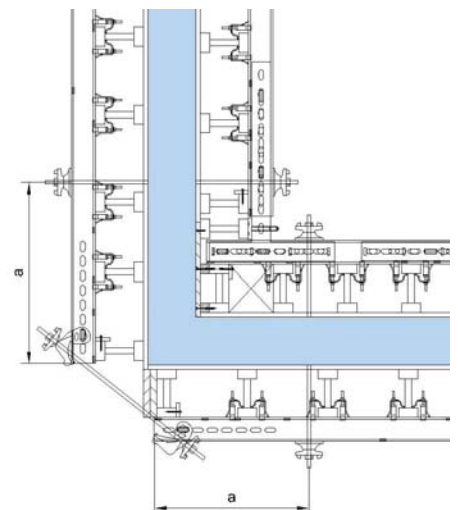


### Details of the VARIO Internal Corner

VSRZ waler used for Internal corner



TKZ waler used for Internal corner





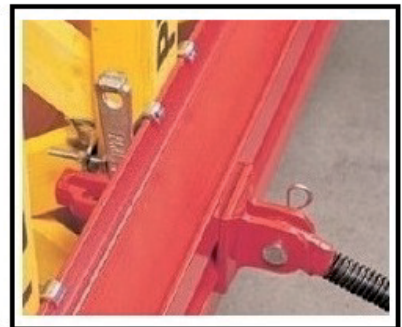
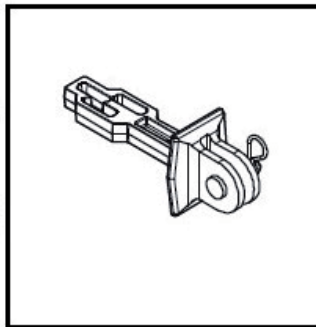
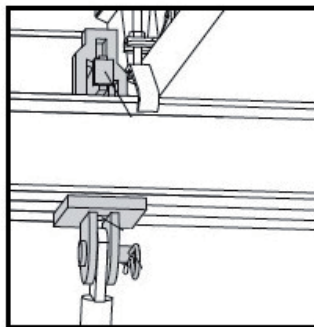
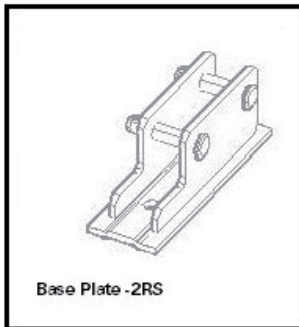
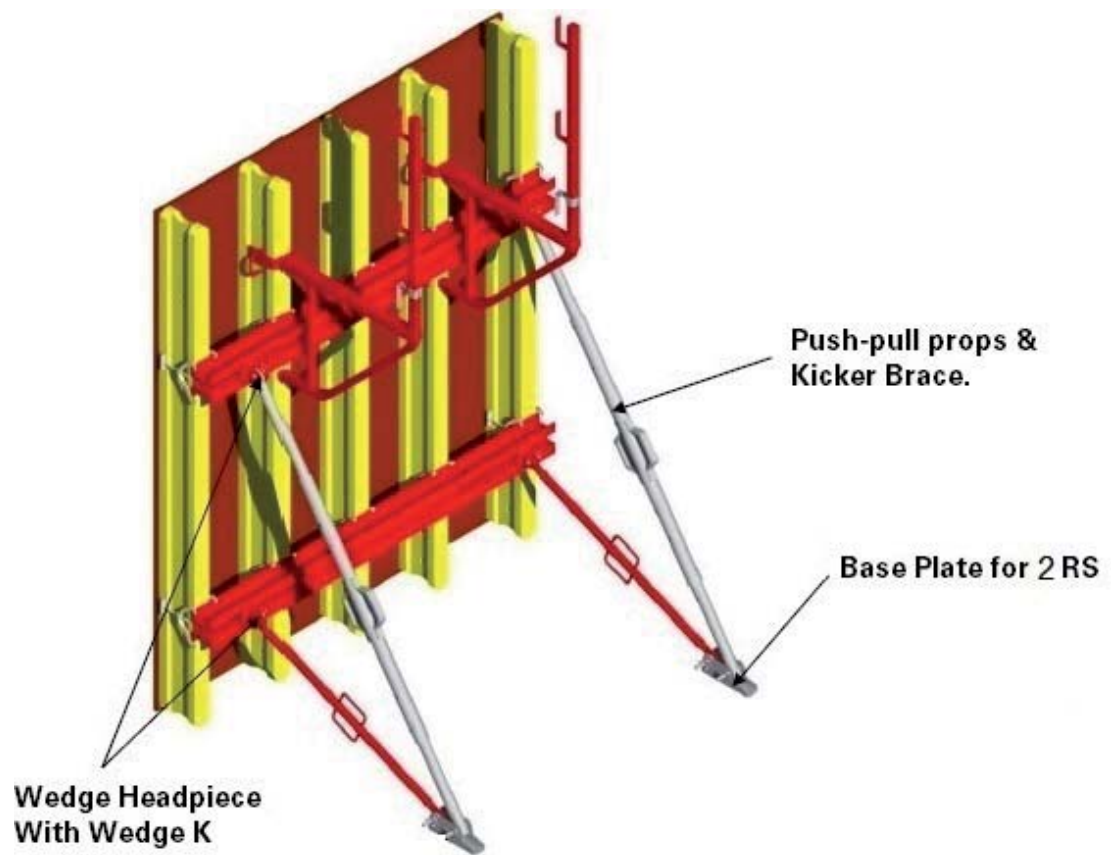
# Standard Applications

## Push-pull prop connector, crane lifting units

### Push-Pull Prop Connector

Connecting the push-props and kickers to the VARIO panel is carried out using Wedge Headpiece. Fixing to the slab takes place using Base Plates and PERI Anchor Bolts 14/20 x 130.

**The first panel must always be secured with 2 push-pull props.**



Connecting to Steel Waler SRZ with the Wedge Headpiece, Item no. 028060 and Wedge K, Item no. 024250.

## Crane Lifting Unit

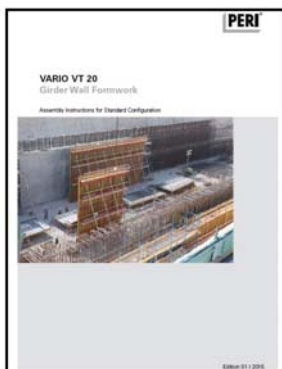
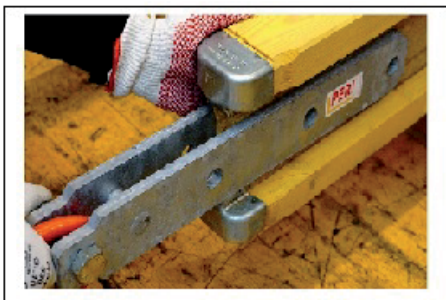
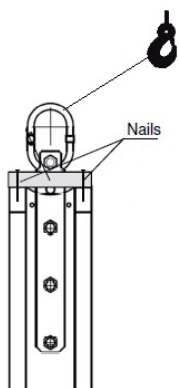
**PERI VARIO**  
for lifting panels with the crane.

### Crane Splice - VT 20

as easily assembled and dismantled lifting unit.

#### Important:

In general, two crane lifting units are used per moving unit. The Instructions for Use contain important information and must be followed at all times.



Assembly Instructions for Standard configuration for Vario VT 20.

### Crane Splice- VT 20

Permissible load-bearing capacity to be referred in the instruction of use manual.

# Standard Applications

## Working and Concreting Scaffold

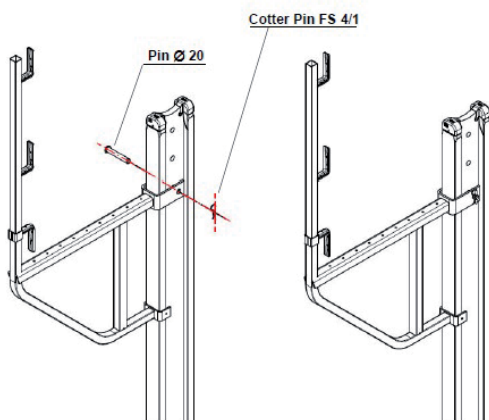
### Scaffold Bracket GB 80-VT

The Scaffold Bracket GB 80 is used for the assembly of an 80 cm wide working scaffold. Scaffold components supplied by the contractor must comply with local valid safety regulations (for Germany DIN 4420). Timber components must conform at least to S10 or MS10 classification according to DIN 4074 as well as being clearly marked (BGR 169). Cross-section of guardrail boards: 3 cm x 15 cm. Secure planking and guardrails with nails or screws.



A correctly assembled concreting platform complete.

PERI Scaffold Bracket GB 80-VT  
perm. working load 1.5 kN/m<sup>2</sup>,  
max. width of influence 1.25 m.



Several working platform levels are required at great heights.

# Standard Applications

## Panel extensions

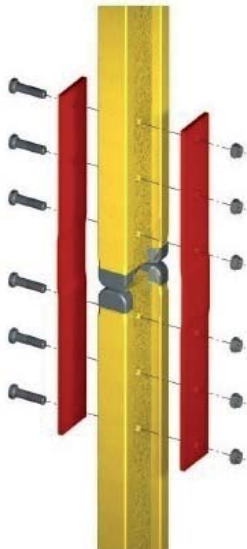
### Heights up to 8.00 m

The standard method of extension is to use the VARIO Extension Splice VT 20.

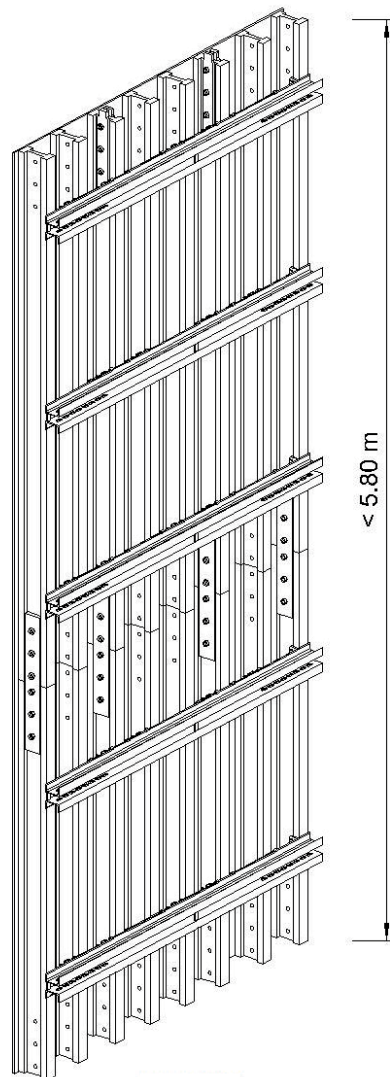
The flexurally stiff connection also automatically aligns the panels. The splice consists of only two components and is connected in no time with 6 Bolts M20x80 & 6 Nuts M20-8-VZ.

#### Static values for the Extension Splice VT 20

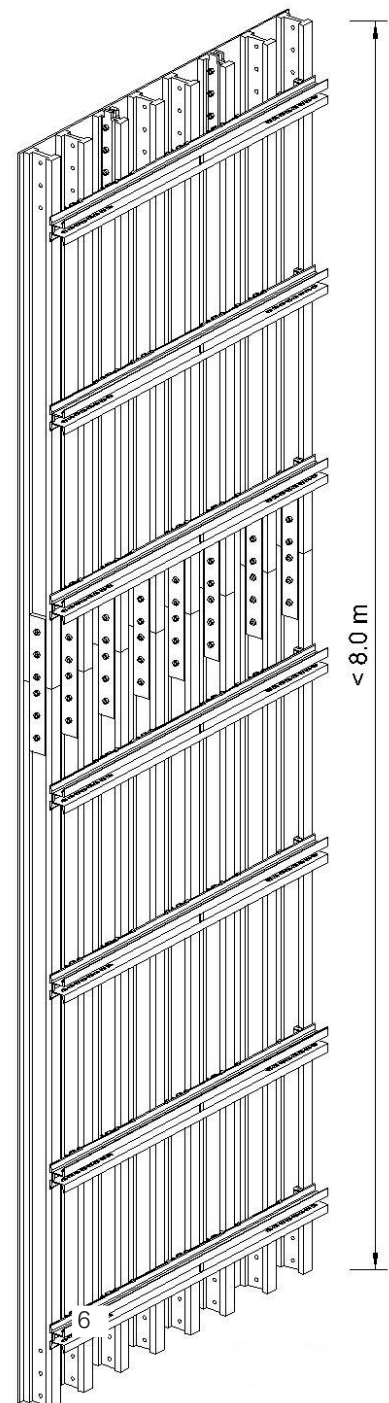
$M_{perm.} = 1.3 \text{ kNm}$   
 $Q_{perm.} = 0 \text{ kN}$   
 or  
 $M_{perm.} = 0 \text{ kNm}$   
 $Q_{perm.} = 4.6 \text{ kN}$



**Extensions up to 5.80 m**  
4 x Extension Splices VT 20 for a 2.50 m element width.



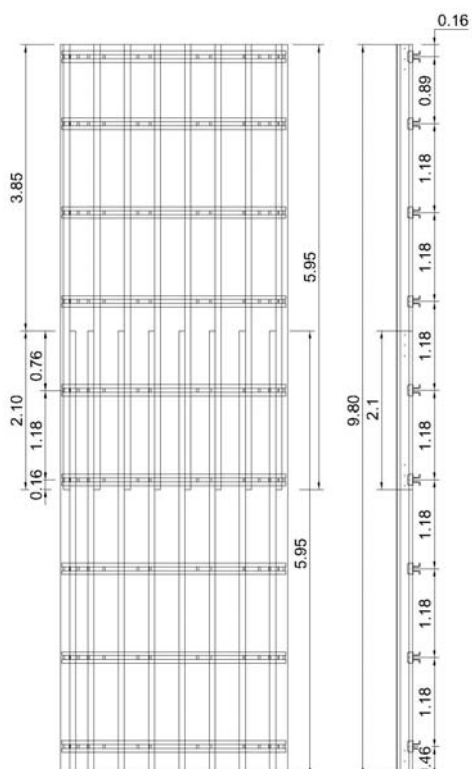
**Extensions up to 8.00 m**  
8 x Extension Splices VT 20 for a 2.50m element width.



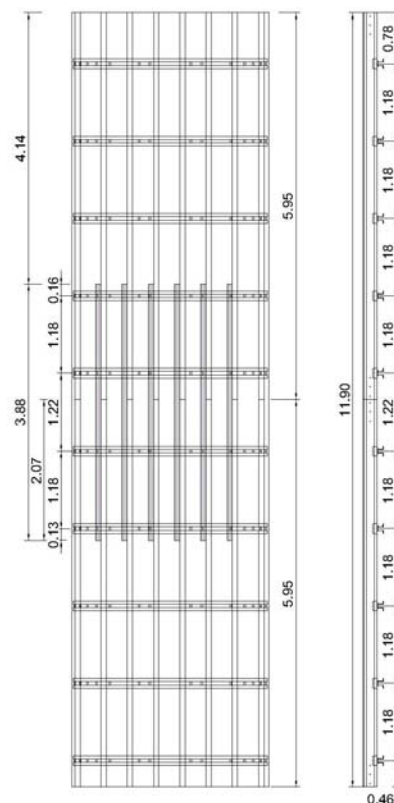


8.00 m high Metro station walls extended with extension splice for VT.

**Heights up to 9.80 m**  
with overlapping girders.



**Heights up to 11.90 m**  
with additional girders.



For more information on extensions,  
see PERI Design Tables  
or VARIO VT 20 assembly instructions.8

# Special Applications

## Architectural concrete | Perfect concrete surfaces with VARIO

Achieving a first-class architectural concrete finish is primarily a question of selecting the most suitable formwork and formlining. Other factors such as the accuracy of the formwork assembly, shuttering work, concrete release agent, concrete and its placing all significantly influence the result. Through the free choice of girder lengths and spacings, tie positions and formlining, the VARIO VT 20 girder wall formwork offers the highest possible degree of flexibility for the realisation of architectural concrete structures.



Attractive looking concrete finish with rough vertical board finish.

43.50 m high tower with architectural concrete with a board finish for an industrial plant.



Exemplary fairfaced concrete with rough horizontal board finish.



Perfect architectural concrete finish with horizontal and vertical panicular pattern.

# Special Applications

## Architectural concrete | Perfect concrete surfaces with VARIO

Due to the freely configurable waler and tie spacings, numerous possibilities for realising neat joint and tie arrangements can be executed.

An orderly pattern of ties spaced at 0.75 x 1.18 m and smooth, architectural concrete are the result





The rough surface finish ensures that the massive tunnel portals blend into the volcanic rock landscape. The unusual washboard structure was created by using extra battens on the formlining.

Portal of a tunnel structure shuttered as shown with VARIO VT 20 on KGF 240 climbing scaffold.



**High-quality architectural concrete with vertical board finish.**

The panels were pre-assembled at PERI's Weissenhorn factory.



The BAB 4 motorway bridge over the Triebischbach valley was constructed with 49 m high circular piers featuring trumpet-shaped pier heads.

# Special Applications

## Tower construction / VARIO on climbing scaffold and working platforms

Further information:  
Climbing Scaffold CB,  
ACS product brochure.

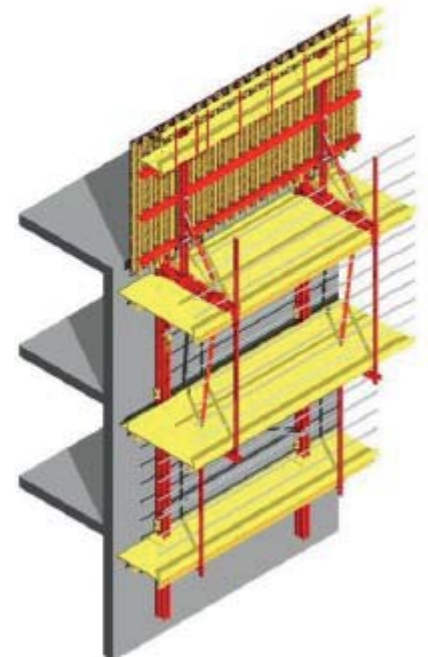


### Type-tested safety with ACS and CB 240 systems.

The CB 240 carriages with high safety allow formwork to be moved 0.75 m on a platform without a crane. The formwork is moved together with the scaffold vertically in one crane lift. This saves time.

The ACS system with a strongback and formwork carriage on brackets. Formwork platform and scaffolding with suspended movable formwork on adjustable bracket.

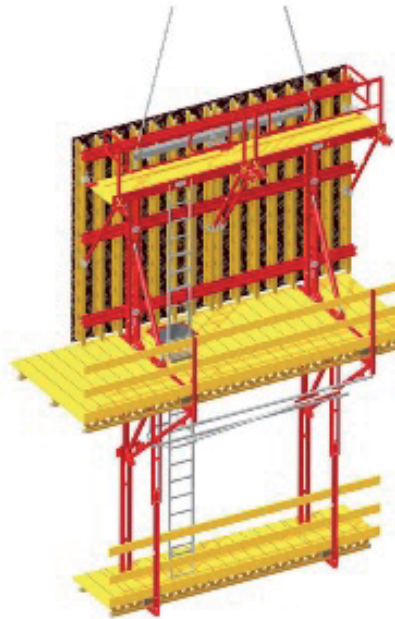
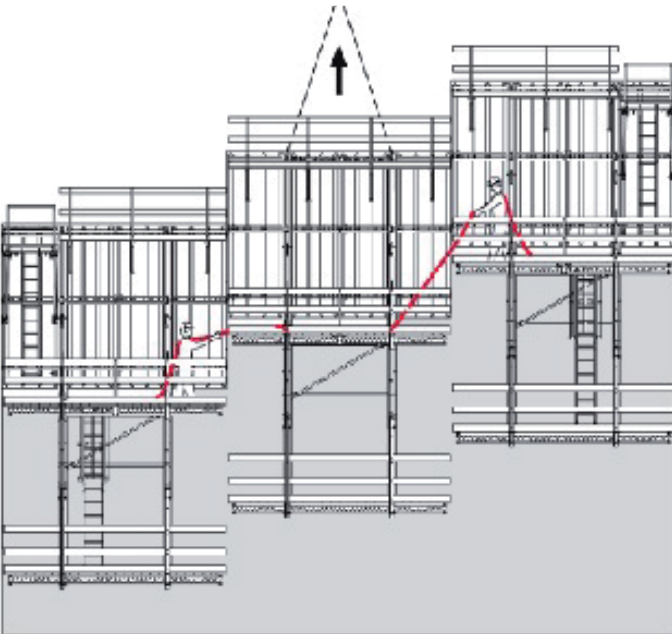
The platform lining can be pre-assembled and can be used immediately when moving from one site to the next. This results in considerable assembly time savings.





CB climbing saves time with cores climbing ahead of the slabs.

**Climbing Sequence C240**



# Special Applications

## Water-retaining structures | Circular structures with VARIO

### VARIO VT 20– for shuttering circular structures

The VARIO articulated couplings connect the straight steel walers in a polygonal arrangement. It can be moved continuously to the right or to the left via the wedges. This results in a flush and neat panel joint.

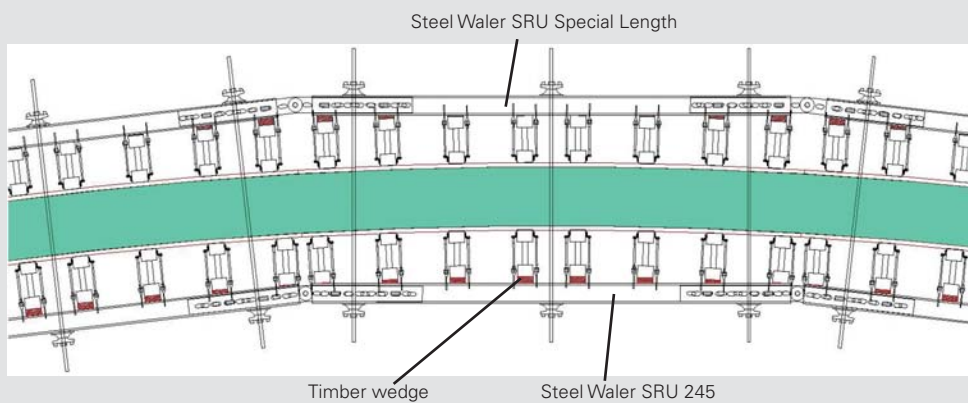
**In general, two design versions is standard.**



Silo, h = 20 m, Ø = 47 m for 3 storage tank for ethylene, India. Shuttered with circular VARIO VT20 girder formwork on CB 240 climbing system.



More information on PERI circular formwork: RUNDLEX and GRV product brochures.



**Version 1**

Spacer timber inserted between VT 20 girders and SRU steel walers.

The haunched transition to the ground slab was pre-assembled with the VARIO wall formwork panels to form a single unit for lifting.



**Version 2**

Segment profile timbers between the formlining and girders.



7.50 m high circular formwork with segment profile timbers on the VT 24 girders.

# Special Applications

## Single-sided walls | With VARIO and Brace Frame SB

For concreting against rock faces, existing walls or sheet piling, VARIO VT 20 with SB Brace Frames is used.

### PERI brace frames

allow single-sided concreting up to a max. height of 8.75 m (see PERI Design Tables).

### PERI Brace Frames SB-A0, A, B, C

are sized for loading on a lorry or in a container.

### PERI brace frames

can be connected to all PERI wall formwork systems with standard system components.



A Max. concreting height of 8.75 m, can be achieved using Brace Frame SB-A0, A, B and C with VARIO VT 20 wall formwork.

### The PERI V-Tie Holder

For easy and accurate installation of anchors when using brace frames.

**The V-Tie Holder and the Leading Anchor Coupler allow accurate assembly of the Tension Anchor under 45°.**



Anchor system is easily fixed to the reinforcement with wire and pliers.

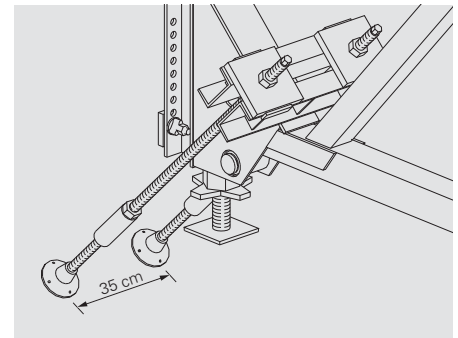
The advantages of the anchoring system with the Leading Anchor Coupler and V-Tie Holder are:

- less on-site material requirements
- no need to cut the tie rods to size
- tie rods are recoverable



The Leading Anchor Coupler is removed using the Single-Ended Spanner SW 70.

**The tension forces arising at the brace frame's anchor point determine the choice of anchor system.**



**Example: DW 20 anchor system**  
Perm. tension force according to DIN 18216  $2 \times 150 \text{ kN} = 300 \text{ kN}$ .

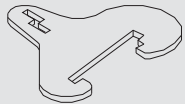

**When using PERI brace frames, the following must be taken into consideration:**

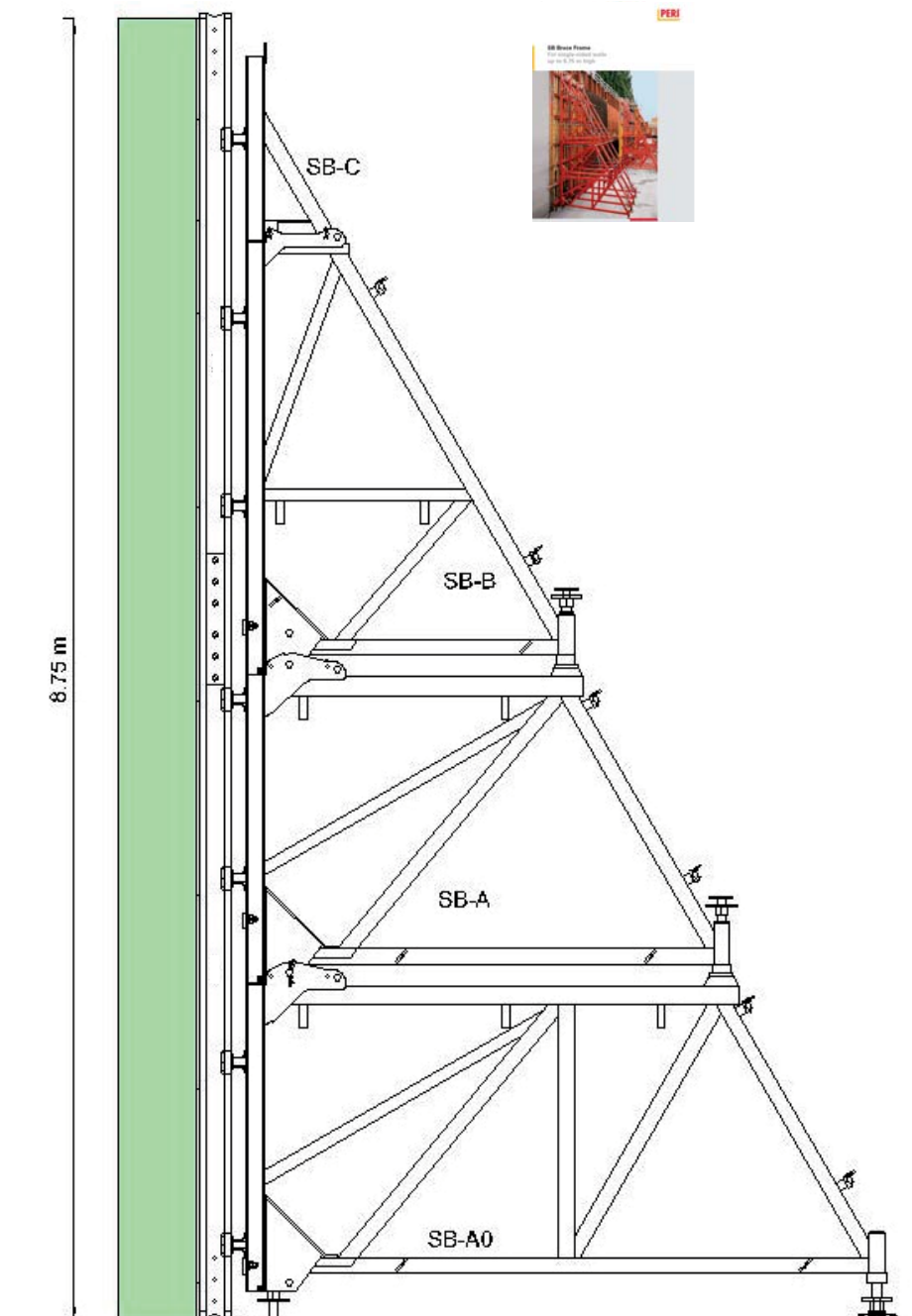
1. The structural members (e.g. foundations or ground slabs) must be able to carry the tension and compression forces arising. Check the design of the members and position of the anchors when planning.
2. The "other side" of the single-sided formwork (existing walls, planking, rocks etc.) must obviously be able to withstand the fresh concrete pressure acting upon it.
3. DW tie rods installed for anchoring purposes must not be welded or bent. We recommend the use of PERI V-Tie Holders.

Instructions and information regarding the use: PERI Brace Frame SB product brochure.



**The following connecting parts are required for connecting VARIO GT 24 to Brace Frames SB-A0, A, B and C:**

<p><b>Waler Connector</b> SB-A, B, C Item no.: 025760</p> 	<p><b>Wedge K, galv.</b> Item no.: 024250</p> 
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**Example:**  
Vario VT 20, h= 8.75 m

# VARIO VT 20

## Girder VT 20



Panel Height = 2.50 m  
Girder VT 20, l = 2.45 m

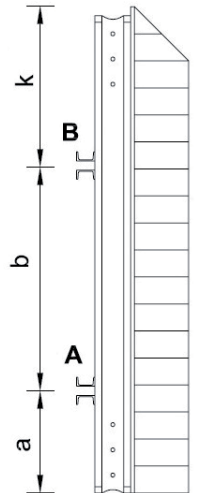
Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45 b = 1.20 k = 0.90	30	0.69	0.10	0.43	32	25		
	40	0.53	0.19	0.40	42	26		
	50	0.45	0.19	0.29	49	26		
	60	0.42	0.35	0.20	53	25		
	70							
	80							

Panel Height = 2.70 m  
Girder VT 20, l = 2.65 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45 b = 1.35 k = 0.90	30	0.65	0.55	0.83	34	29		
	40	0.49	0.82	0.83	45	31		
	50	0.41	0.69	0.69	54	31		
	60	0.38	0.48	0.55	59	31		
	70							
	80							

Panel Height = 3.00 m  
Girder VT 20, l = 2.90 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45 b = 1.60 k = 0.95	30	0.59	2.07	1.90	37	35		
	40	0.44	2.47	1.93	50	38		
	50	0.37	2.39	1.81	60	40		
	60	0.32	2.00	1.52	69	39		
	70	0.30	1.72	1.33	73	39		
	80							



Panel Height = 3.70 m, Pouring Height = 3.60 m  
Girder VT 20, l = 3.60 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45 b = 1.78 k = 1.37	30	0.41	3.82	1.10	36	54		
	40	0.36	1.20	1.81	50	62		
	50	0.33	1.52	2.31	63	67		
	60	0.30	1.59	2.43	75	69		
	70	0.26	1.36	2.15	85	69		
	80	0.24	1.11	1.91	91	69		

$f_k$  = cantilever deflection  
 $f_F$  = span deflection



# VARIO VT 20

## Girder VT 20



Panel Height = 3.40 m  
Girder VT 20, l = 3.30 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45	30	0.56	0.45	0.34	31	39	15	
b = 1.20	40	0.46	0.34	0.26	41	49	14	
c = 1.20	50	0.41	0.25	0.33	52	54	14	
k = 0.55	60	0.35	0.18	0.33	62	56	14	
	70	0.31	0.17	0.28	70	56	14	
	80	0.30	0.28	0.23	75	55	14	

Panel Height = 3.70 m  
Girder VT 20, l = 3.60 m

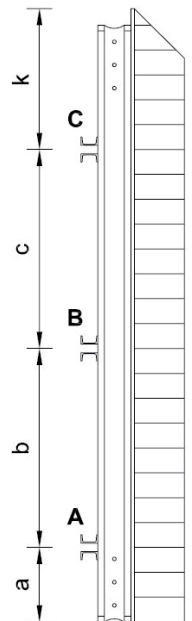
Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45	30	0.58	0.16	0.23	31	38	24	
b = 1.20	40	0.44	0.10	0.24	41	50	25	
c = 1.20	50	0.38	0.08	0.30	52	58	25	
k = 0.85	60	0.32	0.15	0.36	68	69	27	
	70	0.30	0.15	0.33	72	64	24	
	80	0.28	0.17	0.29	80	64	24	

Panel Height = 4.00 m  
Girder VT 20, l = 3.90 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45	30	0.59	2.12	0.49	32	37	32	
b = 1.30	40	0.44	1.36	0.46	43	51	34	
c = 1.20	50	0.36	1.14	0.49	54	62	34	
k = 1.05	60	0.32	1.13	0.55	65	70	33	
	70	0.30	1.10	0.59	76	74	33	
	80	0.27	1.00	0.54	85	74	33	

Panel Height = 4,60 m, Pouring Height = 4,50 m  
Girder VT 20, l = 4.50 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a = 0.45	30	0.51	4.20	0.35	32	41	44	
b = 1.30	40	0.39	2.38	0.44	42	57	49	
c = 1.50	50	0.31	1.53	0.48	52	72	51	
k = 1.25	60	0.27	1.30	0.42	63	84	51	
	70	0.24	1.26	0.38	74	92	51	
	80	0.23	1.31	0.44	85	97	50	



$f_k$  = cantilever deflection  
 $f_F$  = span deflection

# VARIO VT 20

## Girder VT 20



Panel Height = 4.60 m  
Girder VT 20, l = 4.50 m

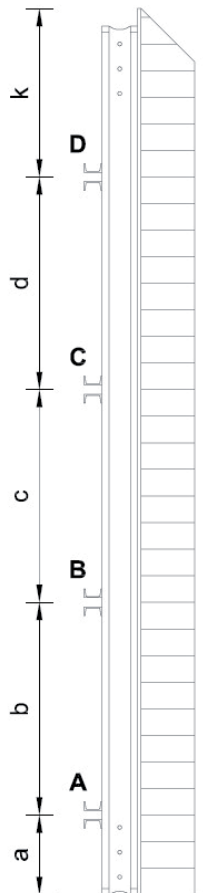
Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a= 0.45	30	0.58	0.49	0.37	31	36	38	15
b = 1.20	40	0.45	0.36	0.27	41	49	47	15
c = 1.30	50	0.36	0.24	0.22	51	62	53	14
d = 1.05	60	0.30	0.19	0.25	62	74	54	14
k = 0.55	70	0.26	0.16	0.28	72	84	54	14
	80	0.25	0.17	0.33	83	90	53	14

Panel Height = 5.00 m  
Girder VT 20, l = 4.90 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a= 0.45	30	0.60	0.84	0.26	31	37	36	29
b = 1.20	40	0.45	0.45	0.26	41	49	48	30
c = 1.20	50	0.36	0.38	0.25	51	62	57	30
d = 1.20	60	0.29	0.04	0.02	62	75	62	29
k = 0.95	70	0.25	0.34	0.24	72	87	64	29
	80	0.23	0.31	0.27	83	96	64	29

Panel Height = 6.00 m  
Girder VT 20, l = 5.90 m

Waler Spacing [m]	Fresh Concrete Pressure $\sigma_{hk}$ [kN/m <sup>2</sup> ]	Girder Spacing $a_{perm.}$ [m]	Deflection [mm]		Waler Load [kN/m]			
			$f_k$	$f_F$	A	B	C	D
a= 0.45	30	0.45	0.39	0.72	34	48	48	32
b = 1.50	40	0.34	0.70	0.74	45	64	65	33
c = 1.55	50	0.27	0.64	0.64	56	80	79	35
d = 1.55	60	0.23	0.47	0.63	67	97	89	35
k = 0.95	70	0.19	0.30	0.60	78	114	95	34
	80	0.17	0.31	0.61	90	131	98	34



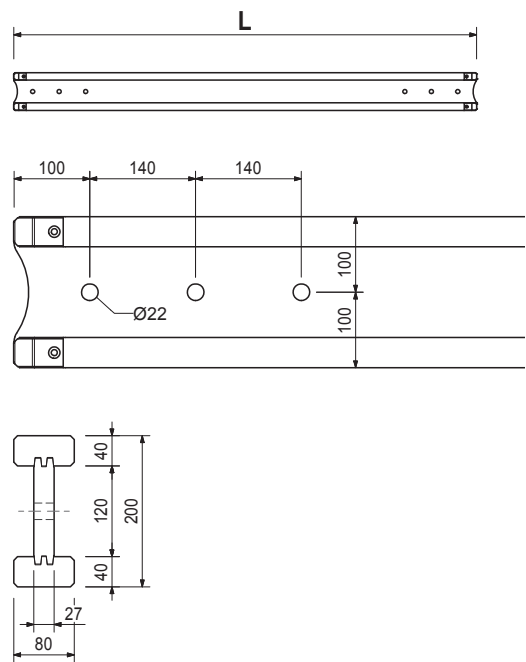
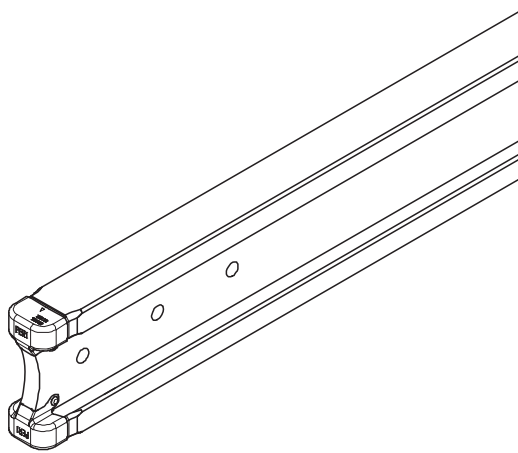
$f_k$  = cantilever deflection  
 $f_F$  = span deflection

# VARIO VT 20 Girder Wall Formwork



Item no. Weight kg

Item no.	Weight kg	Girders VT 20K with Steel Cap	L
074990	8,560	Girder VT 20K L = 1.45 m	1445
074905	12,700	Girder VT 20K L = 2.15 m	2150
074910	14,460	Girder VT 20K L = 2.45 m	2450
074890	15,640	Girder VT 20K L = 2.65 m	2650
074920	17,110	Girder VT 20K L = 2.90 m	2900
074930	19,470	Girder VT 20K L = 3.30 m	3290
074940	21,240	Girder VT 20K L = 3.60 m	3590
074950	23,010	Girder VT 20K L = 3.90 m	3890
074960	26,550	Girder VT 20K L = 4.50 m	4490
074970	28,910	Girder VT 20K L = 4.90 m	4900
074980	34,810	Girder VT 20K L = 5.90 m	5900



Item no.	Weight kg	Girders VT 20 without Steel Cap	L
073710	8,560	Girder VT 20 L = 1.45 m	1445
073720	12,700	Girder VT 20 L = 2.15 m	2150
073730	14,460	Girder VT 20 L = 2.45 m	2450
073740	15,640	Girder VT 20 L = 2.65 m	2650
073750	17,110	Girder VT 20 L = 2.90 m	2900
073760	19,470	Girder VT 20 L = 3.30 m	3290
073770	21,240	Girder VT 20 L = 3.60 m	3590
073780	23,010	Girder VT 20 L = 3.90 m	3890
073790	26,550	Girder VT 20 L = 4.50 m	4490
073800	28,910	Girder VT 20 L = 4.90 m	4900
073810	34,810	Girder VT 20 L = 5.90 m	5900

Item no.	Weight kg		L
010600	19,800	<b>Steel Waler SRZ U-100 (Metric Length)</b>	950
010030	25,100	<b>Steel Waler SRZ U-100 l = 0.95 m</b>	1200
010610	30,400	<b>Steel Waler SRZ U-100 l = 1.20 m</b>	1450
010060	38,300	<b>Steel Waler SRZ U-100 l = 1.825 m</b>	1825
010070	40,900	<b>Steel Waler SRZ U-100 l = 1.95 m</b>	1950
010050	51,600	<b>Steel Waler SRZ U-100 l = 2.45 m</b>	2450
010120	61,500	<b>Steel Waler SRZ U-100 l = 2.95 m</b>	2950

Steel waler for VARIO VT 20 panels and special applications.

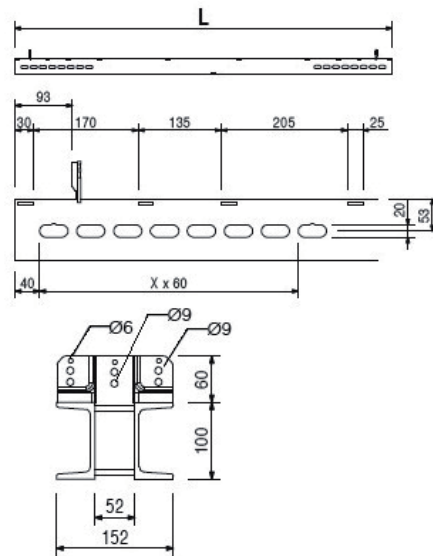
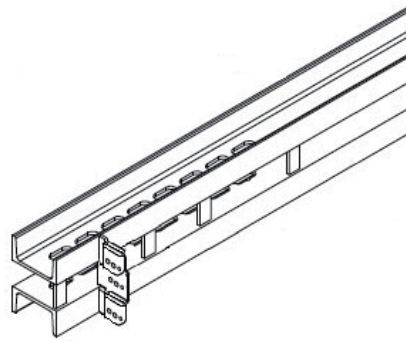
**Note**

Special lengths and other profile sizes on request.

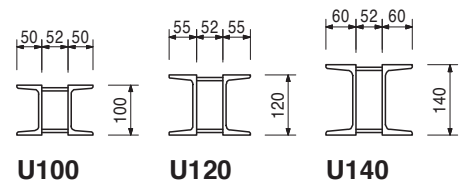
**Technical Data**

Wy = 82.4 cm<sup>3</sup>, ly = 412 cm<sup>4</sup>

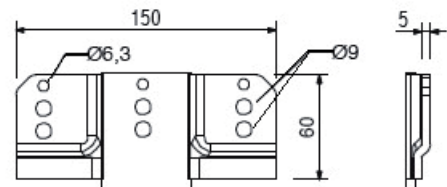
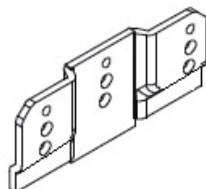
		Steel Waler SRZ U-100 (Imperial Length)	L
010360	25,900	Steel Waler SRZ U-100 l = 1.17 m	1170
010610	30,400	Steel Waler SRZ U-100 l = 1.45 m	1450
010110	38,100	Steel Waler SRZ U-100 l = 1.78 m	1780
010370	50,200	Steel Waler SRZ U-100 l = 2.39 m	2390
010380	75,900	Steel Waler SRZ U-100 l = 3.61 m	3610
010390	102.00	Steel Waler SRZ U-100 l = 4.83 m	4830



010080	22,000	<b>Steel Waler SRZ Spec. Length</b>	<b>Technical Data</b>
010150	28,000	<b>Steel Waler SRZ U-100 Spec. Length</b>	Wy = 82.4 cm <sup>3</sup> , ly = 412 cm <sup>4</sup>
010090	33,000	<b>Steel Waler SRZ U-120 Spec. Length</b>	Wy = 121.4 cm <sup>3</sup> , ly = 728 cm <sup>4</sup>
010350	0,000	<b>Steel Waler SRZ U-140 Spec. Length</b>	Wy = 172.8 cm <sup>3</sup> , ly = 1210 cm <sup>4</sup>
		<b>Additional Row of SRZ Slots</b>	



710001	0,376	<b>End Plate SRZ</b>
		For Steel waler SRZ with special lengths.



# VARIO VT 20 Girder Wall Formwork

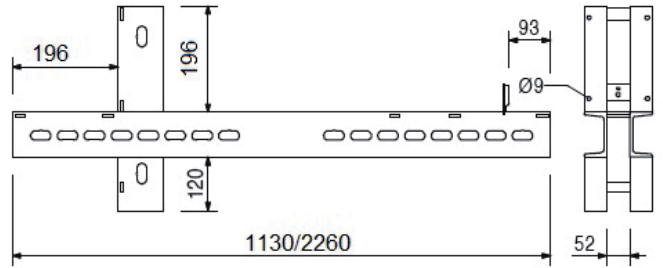
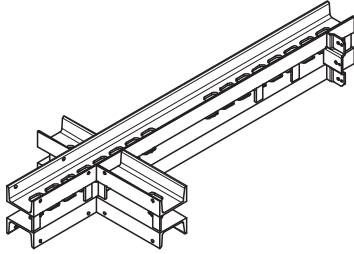


Item no. Weight kg

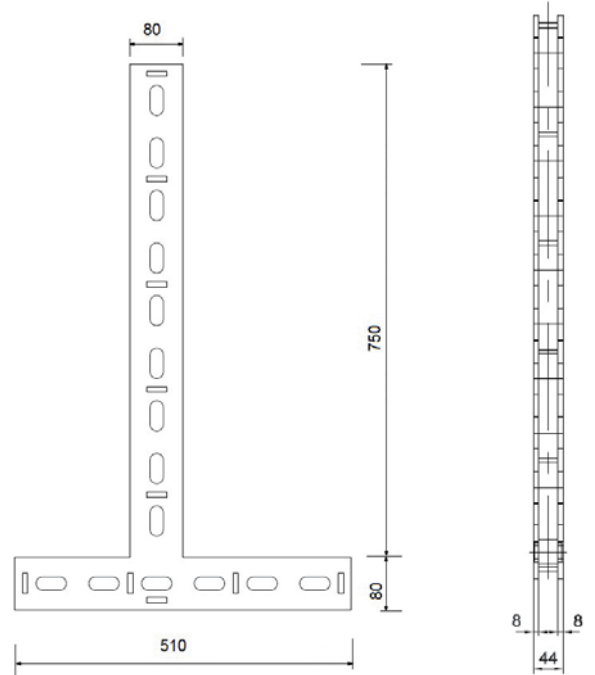
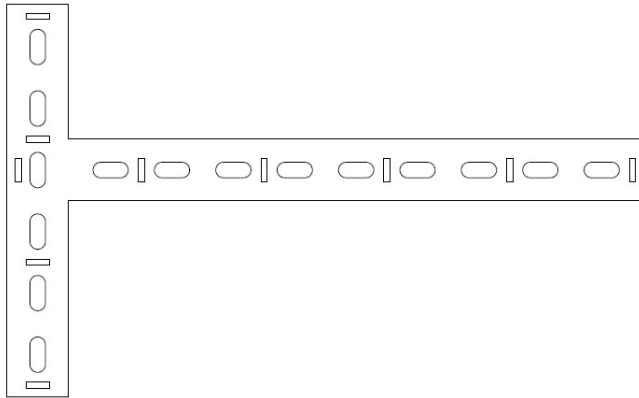
821901	31,500	Steel Waler VSRZ for VT 20 Steel Waler VSRZ-20 U-100 I = 1.13 Steel Waler for VARIO VT 20 corner panels and special applications.
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**Note**  
Special lengths and other profile sizes on request.

**Technical Data**  
Wy = 82.4 cm<sup>3</sup>, ly = 412 cm<sup>4</sup>



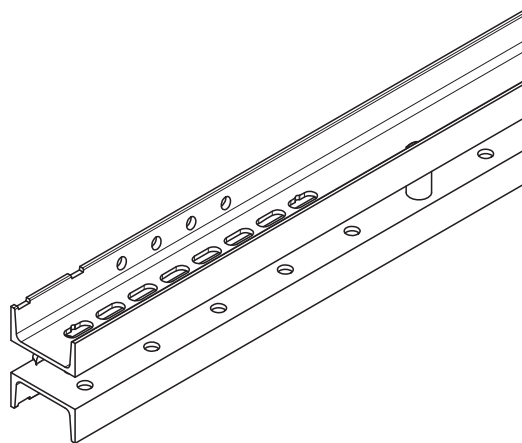
828367	11,500	T Coupling TKZ For continuously variable tight (tension and compression) connection of SRZ and SRU steel waler on internal corner.
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Item no. Weight kg

Item no.	Weight kg	Steel Walers Universal SRU
103868	18,100	Steel Waler Universal SRU U120, l = 0.72 m
103871	24,200	Steel Waler Universal SRU U120, l = 0.97 m
103874	30,900	Steel Waler Universal SRU U120, l = 1.22 m
103877	38,100	Steel Waler Universal SRU U120, l = 1.47 m
103886	44,700	Steel Waler Universal SRU U120, l = 1.72 m
103889	52,000	Steel Waler Universal SRU U120, l = 1.97 m
103898	58,600	Steel Waler Universal SRU U120, l = 2.22 m
103892	65,600	Steel Waler Universal SRU U120, l = 2.47 m
103929	72,000	Steel Waler Universal SRU U120, l = 2.72 m
103903	81,000	Steel Waler Universal SRU U120, l = 2.97 m
103906	92,600	Steel Waler Universal SRU U120, l = 3.47 m
103915	106,000	Steel Waler Universal SRU U120, l = 3.97 m
103918	119,000	Steel Waler Universal SRU U120, l = 4.47 m
103922	135,000	Steel Waler Universal SRU U120, l = 4.97 m
103925	146,000	Steel Waler Universal SRU U120, l = 5.47 m
103928	159,000	Steel Waler Universal SRU U120, l = 5.97 m

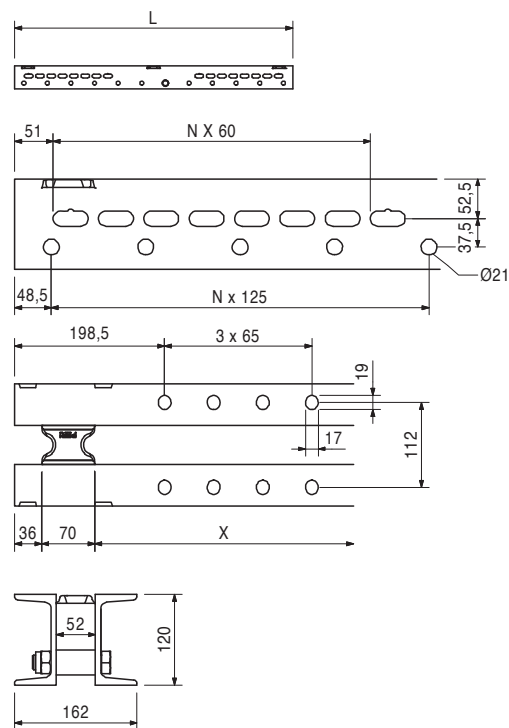
Universal steel waler profile U120 used as waling for girder wall formwork and for diverse special applications. With adjustable spacers.



L
722
972
1222
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5472
5972

**Note**  
Permissible load: see PERI Design Tables.

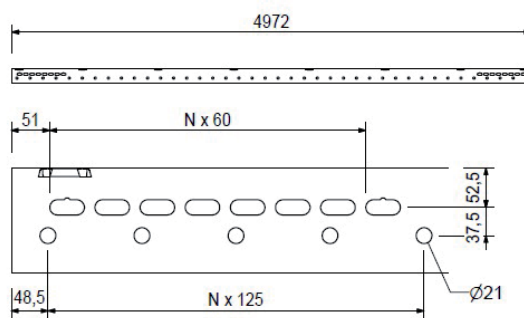
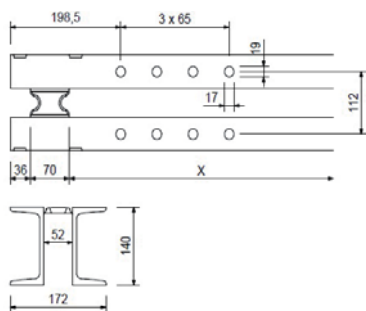
**Technical Data**  
U120:  $W_y = 121.4 \text{ cm}^3$ ,  $I_y = 728 \text{ cm}^4$ .



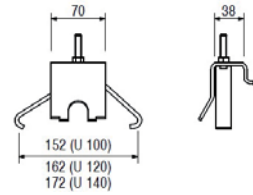
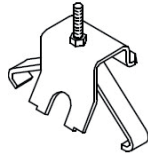
103943 157,000

Steel Waler Universal SRU U140, l = 4.97 m  
Universal steel waler profile U140 used as waling for girder wall formwork and for diverse special applications. With adjustable spacers.

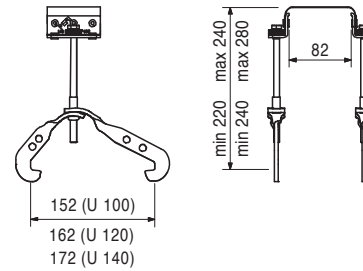
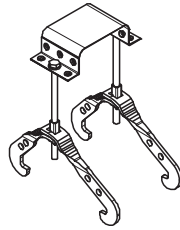
**Note**  
Permissible load: see PERI Design Tables.  
**Technical Data**  
U140:  $W_y = 172.8 \text{ cm}^3$ ,  $I_y = 1210 \text{ cm}^4$



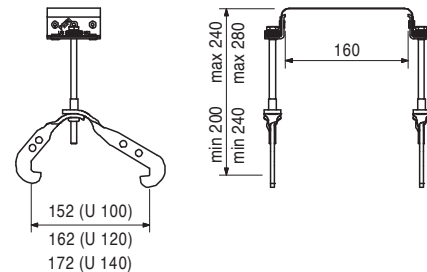
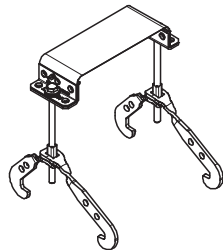
Item no.	Weight kg		
024880	0,520	Hook Strap HB for VT. For fixing VT 20 Girders to the Steel Waler SRZ or SRU, Profiles U100 – U140.	<b>Note</b> The girders can be mounted at right-angles or diagonally to the steel walers.



104931	0,865	<b>Hook Straps Uni HBU</b>	<b>Note</b> The girders can be mounted at right-angles or diagonally to the steel walers and also outside of the nodes.
103845	0,893	<b>Hook Strap Uni HBU 20-24</b>	
		<b>Hook Strap Uni HBU 24-28</b>	



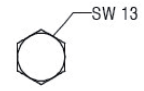
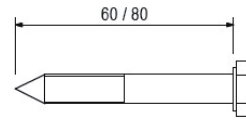
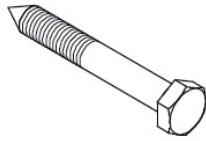
104930	0,887	<b>Hook Straps Uni Double HBUD</b>	<b>Note</b> The girders can be mounted at right-angles or diagonally to the steel walers and also outside of the nodes.
104096	0,912	<b>Hook Strap Uni Double HBUD 20-24</b>	
		<b>Hook Strap Uni Double HBUD 24-28</b>	



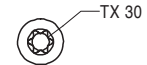
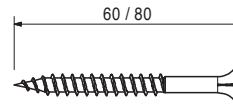
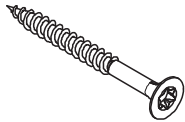
071219	0,000	<b>Accessories Hook Straps HBU, HBUD</b>
104929	0,050	<b>Screw Change HBU, HBUD</b>
107185	0,060	<b>Bolt ISO 4014 M8 x 150-8.8, galv.</b>
103518	0,060	<b>Bolt ISO 4014 M8 x 180-8.8, galv.</b>
103844	0,013	<b>Sleeve HBU/HBUD, galv.</b>

Item no. Weight kg

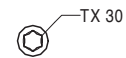
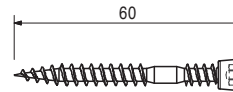
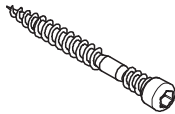
024270	0,023	Lag Screws DIN 571, galv.
024260	0,027	Lag Screw DIN 571 8 x 60, galv.
		Lag Screw DIN 571 8 x 80, galv.



024470	0,008	<b>TSS-Torx, galv.</b>
024690	0,008	<b>TSS-Torx 6 x 60, galv.</b>
		<b>TSS-Torx 6 x 80, galv.</b>
For Torx Blade TX 30. Self-drilling.		



110272	0,006	<b>TSS-Torx 6 x 60, ZKS, galv.</b>
For Torx Blade TX 30. Self-drilling.		





Item no.	Weight kg		
128013	2,100	Cordless Combi Drill ABS 18 Universal power screwdriver with continuous electronic speed control and clockwise/anti-clockwise rotation. Including 2 batteries and a battery charger in case.	Note Follow Instructions for Use!
			
Accessories			
072220	0,400	Bit Holder for SCU 7-9	
072140	0,005	Bit Point TX 30	
128016	0,760	Replacement Battery Li-Ion 18V	

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072220	0,400	Accessories Cordless Combi Drill ABS 18 Bit Holder for SCU 7-9	
072140	0,005	Bit Point TX 30	

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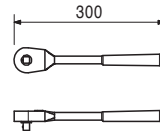
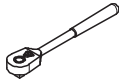
128011	1,800	Cordless Impact Screwdriver ASCD 18-W2 Light weight electric power wrench for momentfree working, with clockwise/anti-clockwise rotation and 1/2 square drive. Including 2 batteries and a battery charger in case.	Note Follow Instructions for Use!
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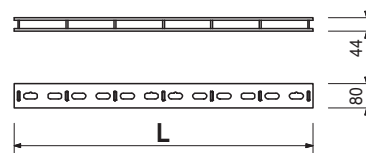
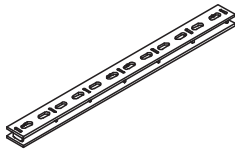
Item no.	Weight kg		
128016	0,760	Replacement Battery Li-Ion 18V For use with Cordless Combi Drill ABS 18 and Cordless Impact Screwdriver ASCD 18-W2.	Note Follow Instructions for Use! Technical Data Capacity 4 Ah.



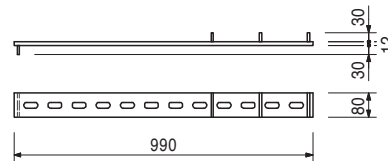
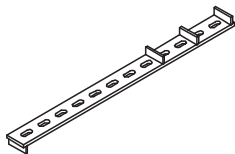
072180	0,560	<b>Ratchet Wrench 1/2"</b>	
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		<b>Couplings VKZ</b>	
013010	9,000	<b>Coupling VKZ 99</b>	
013020	13,300	<b>Coupling VKZ 147</b>	
013030	19,100	<b>Coupling VKZ 211</b>	
013080	9,000	<b>Coupling VKZ Spec. Length</b>	
		For connection of SRZ and SRU steel walers.	



101395	7,110	<b>Offset Coupling VVKZ 3/99</b>	
		For connecting extended and non-extended VARIO elements above the extension.	

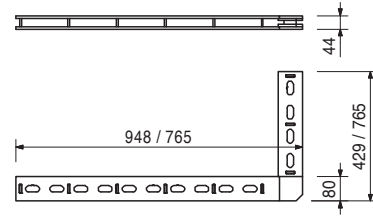
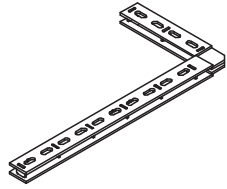


# VARIO VT 20 Girder Wall Formwork

Item no.	Weight kg
013140	11,900
013130	13,300
013180	9,000

**Corner Couplings EKZ**  
**Corner Coupling EKZ 95/43**  
**Corner Coupling EKZ 76/76**  
**Corner Coupling EKZ Spec. Length**

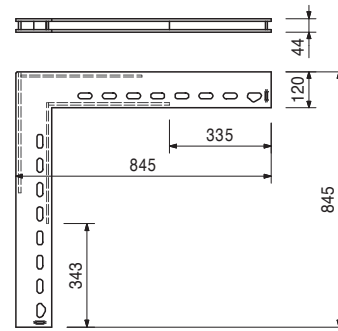
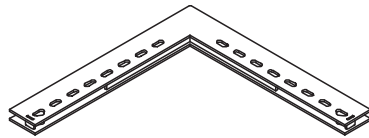
For continuously variable tight (tension and compression) connection of SRZ and SRU steel walers.



103850	24,700
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**Outside Corner Coupling AKZ 85/85**

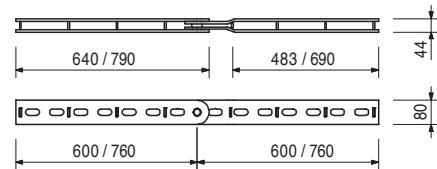
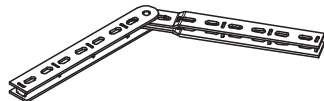
For providing tensile and compression-proof connections of Steel Walers SRZ and SRU on external corners.



013220	11,500
013210	14,400
013230	9,000

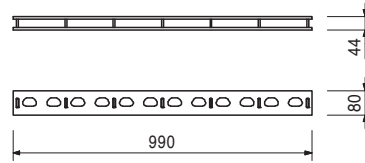
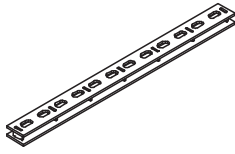
**Articulated Couplings GKZ**  
**Articulated Coupling GKZ 60/60**  
**Articulated Coupling GKZ 76/76**  
**Articulated Coupling GKZ Spec. Length**

For continuously variable tight (tension and compression) connection of SRZ and SRU steel walers with oblique angles more than 48°.



Item no.	Weight kg
102825	8,700

**VARIO Coupling Concrete Finish VKS 99**  
 For connecting VARIO VT20 panels. Allows compensation of up to max. 5 mm panel offsets.

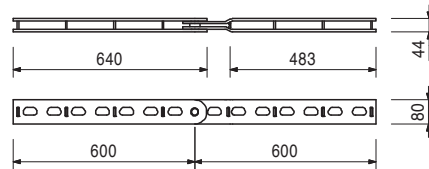
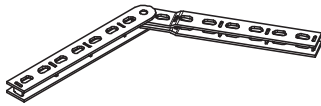


102945	2,070
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Accessories  
**VARIO Alignment Clamp VRS**

103054	11,300
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**Articulated Coupling GKS 60/60 S**  
 For connecting VARIO VT20 panels. Allows compensation of up to max. 5 mm panel offsets.



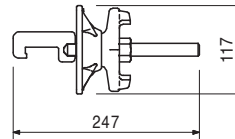
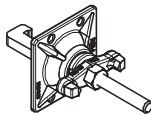
102945	2,070
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Accessories  
**VARIO Alignment Clamp VRS**

102945	2,070
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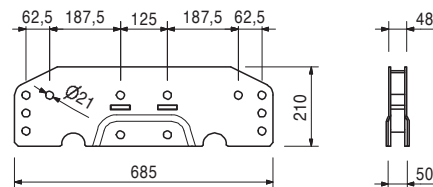
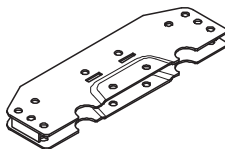
**VARIO Alignment Clamp VRS**  
 In connection with Coupling VKS 99 or Articulated Coupling GKS 60/60. For compensating maximum 5 mm element offset.

**Complete with**  
 1 pc. 030370 Wingnut Pivot Plate DW 15, galv.



103737	10,800
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**Universal Coupling UK 70**  
 For a rigid connection of Steel waler SRU and for connecting Heavy-Duty Spindles SLS.

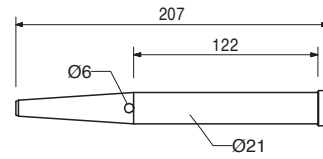
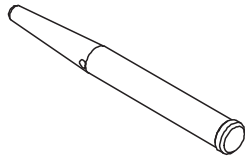


104031	0,462
018060	0,030

Accessories  
**Fitting Pin Ø 21 x 120**  
**Cotter Pin 4/1, galv.**

Item no.	Weight kg
104031	0,462

**Fitting Pin Ø 21 x 120**  
For different connections.



018060	0,030
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Accessories  
**Cotter Pin 4/1, galv.**

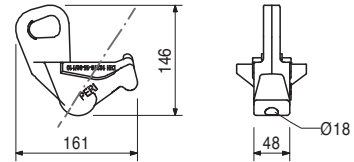
018060	0,030
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**Cotter Pin 4/1, galv.**



024210	2,180
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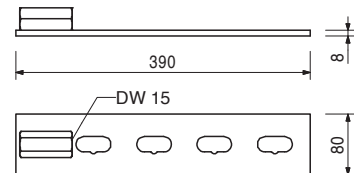
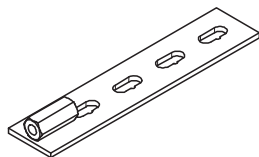
**Tie Yoke SKZ**  
For tensioning on external corners with Steel Waler SRZ, SRU, U100 - U140 and VARIO couplings.



013240	2,100
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**Stopend Tie**  
For assembling stopend formwork with VARIO VT 20.

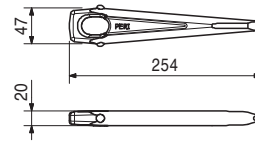
**Technical Data**  
Permissible tension force 30.0 kN.



Item no.	Weight kg
024240	0,805

**Wedge KZ, galv.**

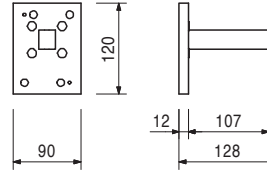
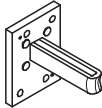
For connecting panels with VARIO Couplings or Tie Yoke SKZ.



024220	1,230
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**Coupling Compression Plate KDP**

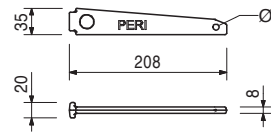
For mounting girders to VARIO Couplings in infill areas.



024250	0,331
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**Wedge K, galv.**

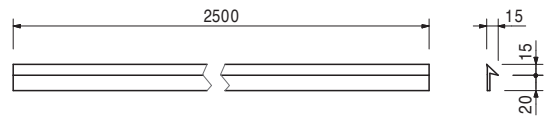
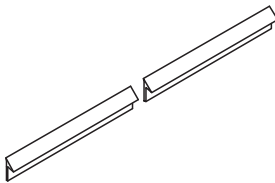
For Coupling Compression Plate KDP, Wedge Head Piece SRZ/SRU and Waler Connector SB-A, B, C.



031200	0,470
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**Chamfer Strip with Flange l = 2.50 m**

Plastic chamfer strip.



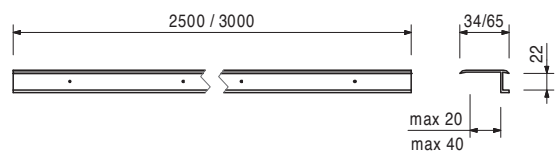
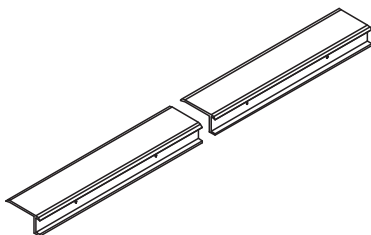
030260	0,500
101706	1,230

**Formwork Joints**

**Formwork Joint 21/20 l = 2.50 m**

**Formwork Joint 21/40 l = 3.00 m**

Plastic profile strip for easier striking of shafts.



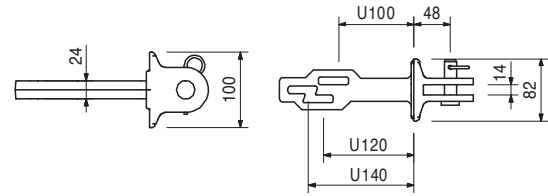
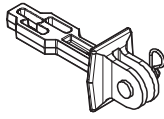
Item no.	Weight kg
028060	1,940

**Wedge Headpiece SRZ/SRU**

For connecting push-pull props and kicker braces to Steel Waler SRZ and SRU Profile U100 – U140.

**Complete with**

- 1 pc. 027170 Bolt Ø 16 x 42, galv.
- 1 pc. 018060 Cotter Pin 4/1, galv.



024250	0,331
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Accessories

**Wedge K, galv.**

823419	10,80
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**Extension Splice VT 20**

For extending VT 20 girders and VARIO VT 20 elements up to max. height of 8.00 m.

**Complete with**

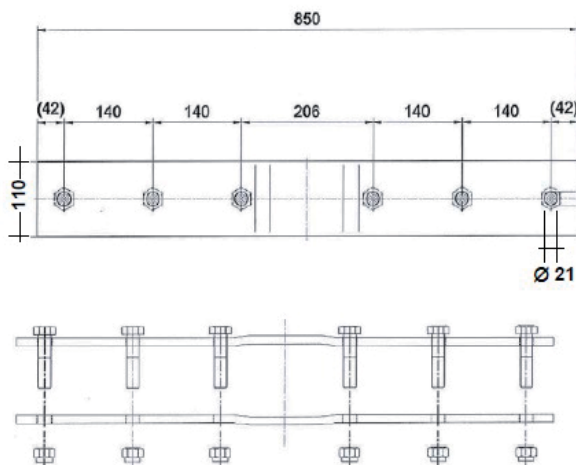
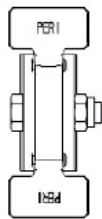
- 2 Plates
- 6 pc. 024900 Bolt M20x80-8.8
- 6 pc. 710334 Nuts M20-8-VZ

**Technical Data**

Refer to permissible load page xx

**Safety Instructions**

All girders of the panel have to be connected and never exceed the permissible loads. Follow Instructions of use at all times.



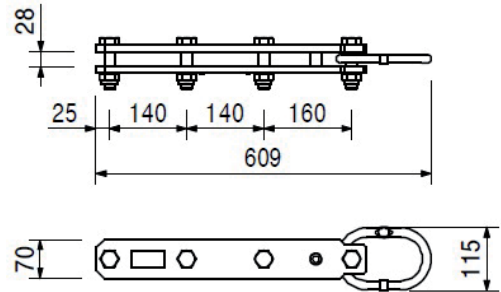
Item no.	Weight kg
113712	8,10

**Crane Splice VT 20**  
 For transporting elements by crane with the VT 20 Girder

**Complete with**  
 3 pc. 024900 Bolt M20x80-8.8  
 3 pc. 710334 Nuts M20-8-VZ

**Technical Data**  
 For Load-carrying capacity, refer to permissible table.

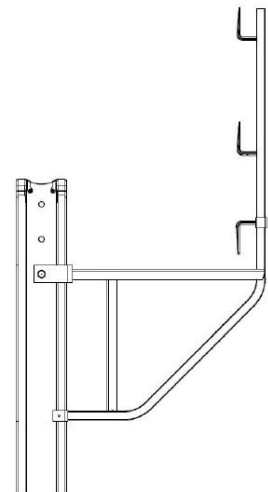
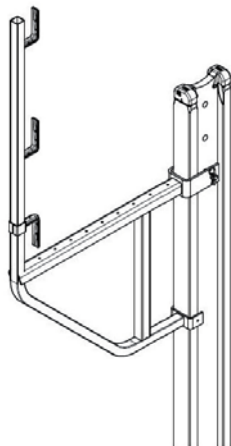
**Safety Instructions**  
 Always use 2 pieces per transportation unit.  
 Follow Instructions of use at all times.



823420	11,20
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**Scaffold Bracket GB 80-VT**  
 For assembly of a working and concreting scaffold with VARIO VT 20

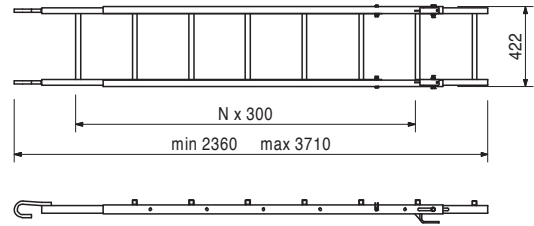
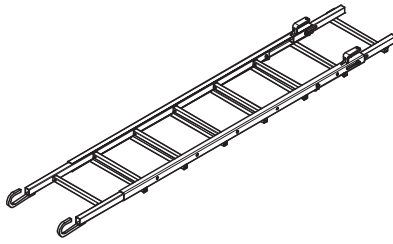
**Technical Data**  
 Permissible load 150 kg/m<sup>2</sup> with a maximum width of influence 1.25 m.





Item no.	Weight kg
107738	24,100

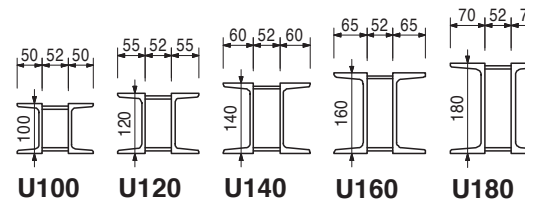
**Ladder 240-360**  
Adjustable from 2.40 m to 3.60 m.



022310	22,000
022320	28,000
022330	33,000
022340	40,000
022350	45,000
022460	0,000

**Tunnel Frame Wales RKR**  
**Tunnel Frame Wale RKR U100**  
**Tunnel Frame Wale RKR U120**  
**Tunnel Frame Wale RKR U140**  
**Tunnel Frame Wale RKR U160**  
**Tunnel Frame Wale RKR U180**  
**Welding Unit for RKR**

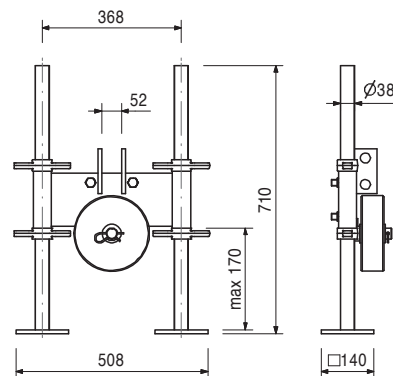
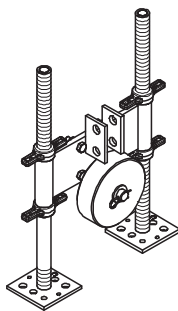
**Note**  
When ordering, please use a copy of the respective version whilst specifying the dimensions. For the wall wales, the VARIO Extension (l= 236 mm) must always be added when determining the total length. Welded joints RKR (1 per wall waler) are to be featured separately.



022380	23,500
022440	20,800

**Double Spindles RKR**  
**Double Spindle with Wheel RKR**  
**Double Spindle without Wheel RKR**

**Complete with**  
 4 pc. 710880 Washer DIN 434 18, galv.  
 1 pc. 710252 Bolt ISO 4017 M16 x 50-8.8, galv.  
 1 pc. 710229 Nut ISO 4032 M16-8, galv.  
**Technical Data**  
 Bearing capacity of Double Spindle 102.5 kN.  
 Bearing capacity of Wheel 6.0 kN.



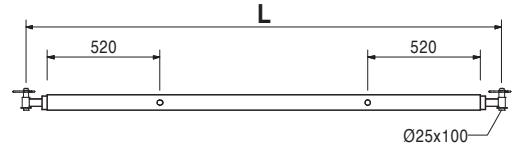
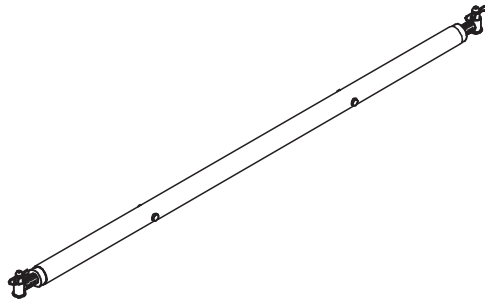
Item no.	Weight kg
022400	12,300

**Adjusting Spindle RKR, compl.**

For aligning RKR culvert frame formwork. Do not use for transferring loads.

**Complete with**

2 pc. 725560 Bolt  $\varnothing$  25 x 100  
2 pc. 018060 Cotter Pin 4/1, galv.



022410	19,600
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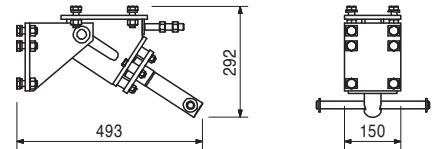
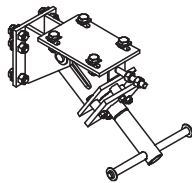
**Corner Spindle RKR**

**Complete with**

10 pc. 710880 Washer DIN 434 18, galv.  
10 pc. 710225 Bolt ISO 4017 M16 x 45-8.8, galv.  
10 pc. 710229 Nut ISO 4032 M16-8, galv.

**Technical Data**

Permissible load 90.0 kN.



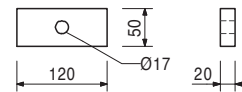
Accessories

701991	0,906
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**Plate FI 50 x 20 x 120, ESP**

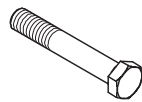
701991	0,906
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**Plate FI 50 x 20 x 120, ESP**

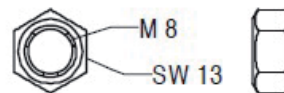


## VARIO VT 20 Girder Wall Formwork

Item no.	Weight kg		L
710284	0,031	<b>Bolts ISO 4014-8.8, galv.</b>	
710285	0,050	<b>Bolt ISO 4014 M8 x 60-8.8, galv.</b>	60
722859	0,066	<b>Bolt ISO 4014 M8 x 100-8.8, galv.</b>	100
104929	0,050	<b>Bolt ISO 4014 M8 x 140-8.8, galv.</b>	140
103518	0,060	<b>Bolt ISO 4014 M8 x 150-8.8, galv.</b>	150
710593	0,062	<b>Bolt ISO 4014 M8 x 190-8.8, galv.</b>	190
710242	0,063	<b>Bolt ISO 4014 M10 x 80-8.8, galv.</b>	80
721817	0,040	<b>Bolt ISO 4014 M10 x 100-8.8, galv.</b>	100
710221	0,067	<b>Bolt ISO 4014 M10 x 50-8.8, galv.</b>	50
720610	0,075	<b>Bolt ISO 4014 M12 x 60-8.8, galv.</b>	60
710220	0,087	<b>Bolt ISO 4014 M12 x 70-8.8, galv.</b>	70
750330	0,100	<b>Bolt ISO 4014 M12 x 80-8.8, galv.</b>	80
710299	0,100	<b>Bolt ISO 4014 M12 x 100-8.8, galv.</b>	100
714093	0,123	<b>Bolt ISO 4014 M16 x 60-8.8, galv.</b>	60
710222	0,139	<b>Bolt ISO 4014 M16 x 70-8.8, galv.</b>	70
721729	0,160	<b>Bolt ISO 4014 M16 x 80-8.8, galv.</b>	80
710219	0,170	<b>Bolt ISO 4014 M16 x 90-8.8, galv.</b>	90
710233	0,184	<b>Bolt ISO 4014 M16 x 100-8.8, galv.</b>	100
105402	0,200	<b>Bolt ISO 4014 M16 x 110-8.8, galv.</b>	110
710232	0,200	<b>Bolt ISO 4014 M16 x 120-8.8, galv.</b>	120
722169	0,210	<b>Bolt ISO 4014 M16 x 130-8.8, galv.</b>	130
780155	0,246	<b>Bolt ISO 4014 M16 x 140-8.8, galv.</b>	140
024900	0,278	<b>Bolt ISO 4014 M16 x 160-8.8, galv.</b>	160
710226	0,255	<b>Bolt ISO 4014 M20 x 80-8.8, galv.</b>	80
024910	0,340	<b>Bolt ISO 4014 M20 x 90-8.8, galv.</b>	90
104477	0,303	<b>Bolt ISO 4014 M20 x 100-8.8, galv.</b>	100
711078	0,300	<b>Bolt ISO 4014 M20 x 120-8.8, galv.</b>	120
781054	0,360	<b>Bolt ISO 4014 M20 x 130-8.8, galv.</b>	130
706462	0,447	<b>Bolt ISO 4014 M20 x 160-8.8, galv.</b>	160
109612	0,545	<b>Bolt ISO 4014 M20 x 200-8.8, galv.</b>	200
113686	0,600	<b>Bolt ISO 4014 M24 x 130-8.8, galv.</b>	130
	0,839	<b>Bolt ISO 4014 M24 x 200-8.8, galv.</b>	200



024090	0,005	<b>Nuts ISO 4032, galv.</b>	
710234	0,010	<b>Nuts ISO 4032 M8-8, galv.</b>	
710330	0,017	<b>Nuts ISO 4032 M10-8, galv.</b>	
710229	0,033	<b>Nuts ISO 4032 M12-8, galv.</b>	
710334	0,064	<b>Nuts ISO 4032 M16-8, galv.</b>	
022250	0,100	<b>Nuts ISO 4032 M20-8, galv.</b>	
		<b>Nuts ISO 4032 M24-8, galv.</b>	





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