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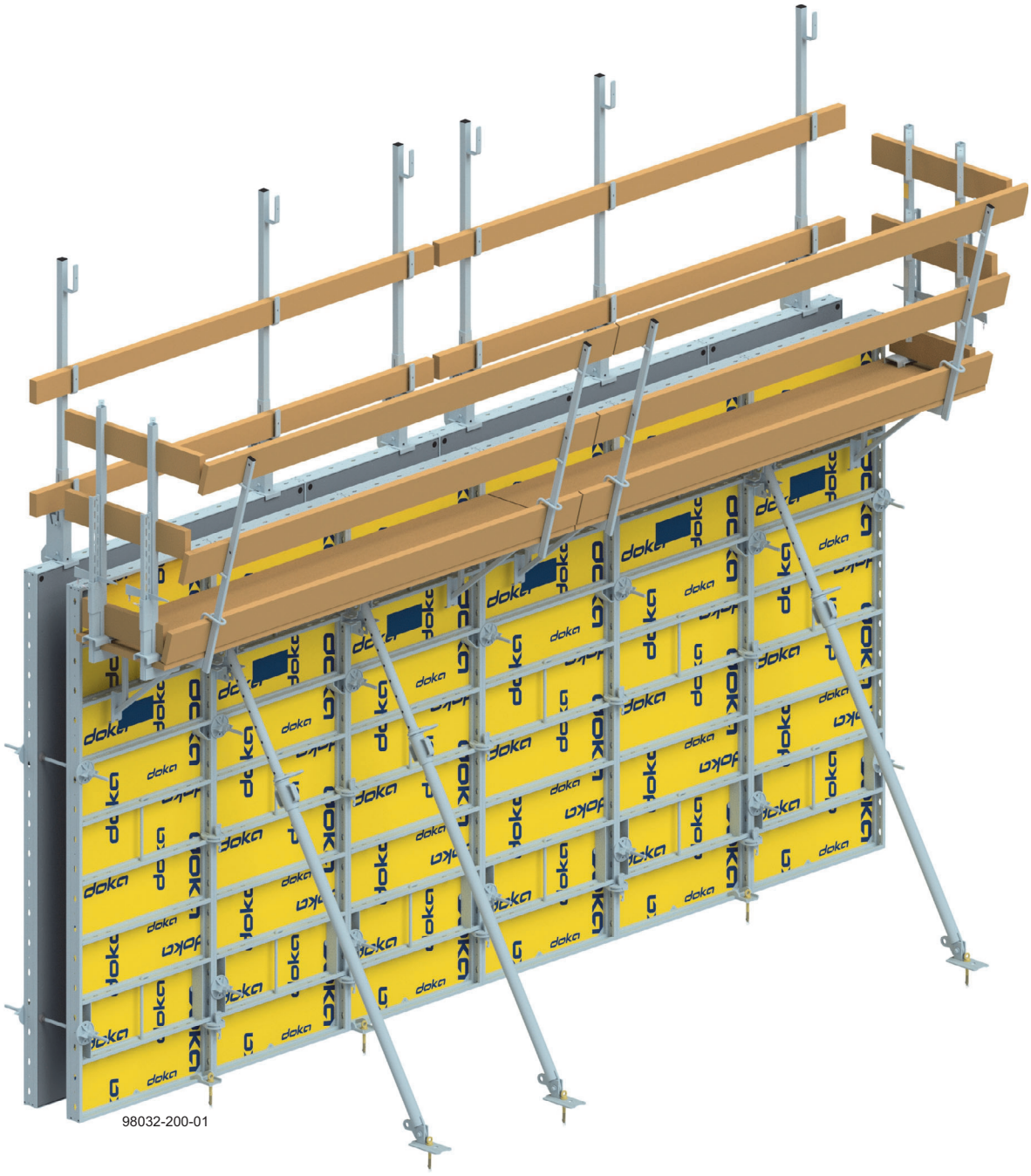
en-US

Formwork & Scaffolding.
We make it work.

Framed formwork Frami S Xlife

User Information

Instructions for assembly and use



98032-200-01

Contents

Introduction

Basic safety warnings

User target groups

- This booklet is aimed at all persons who will be working with the Doka product or system that it describes. It contains information on the standard design for setting up this system, and on correct, compliant utilization of the system.
- All persons working with the product described herein must be familiar with the contents of this booklet and with all the safety instructions it contains.
- Persons who are incapable of reading and understanding this booklet, or who can do so only with difficulty, must be instructed and trained by the customer.
- The customer is to insure that the information materials provided by Doka (e.g. User Information booklets, Method Statements, Operating Instruction manuals, plans etc.) are up to date and available to all users, and that users have been made aware of them and have easy access to them at the usage location.
- In the relevant technical documentation and formwork utilization plans, Doka shows the workplace safety precautions that are necessary in order to use the Doka products safely in the usage situations shown.
  In all cases, users must ensure compliance with the national applicable laws, standards and rules throughout the entire project and to take appropriate additional or alternative workplace safety precautions where necessary.

Hazard assessment

- The customer is responsible for drawing up, documenting, implementing and continually updating a hazard assessment at every job-site.
  This booklet serves as the basis for the site-specific hazard assessment, and for the instructions given to users on how to prepare and utilize the system. It does not substitute for these, however.

Remarks on this booklet

- This document can be used as general Instructions for Assembly and Use (Method Statement) or be incorporated into site-specific Instructions for Assembly and Use (Method Statement).
- **The graphics, animations and videos in this document or app sometimes depict partially assembled assemblies and may require additional safety equipment and/or measures to comply with safety regulations.**
  The customer must ensure all applicable regulations are complied with, even if they are not shown or implied in the graphics, animations and videos provided.
- **Individual sections contain further safety instructions and/or special warnings as applicable.**

Planning

- Provide safe workplaces for those using the formwork (e.g. for when it is being erected/dismantled, modified or repositioned etc). It must be possible to get to and from these workplaces via safe access routes!
- **If you are considering any deviation from the details and instructions given in this booklet, or any application which goes beyond those described in the booklet, then revised static calculations must be produced for checking, as well as supplementary assembly instructions.**

Regulations; occupational health & safety

- All laws, Standards, industrial safety regulations and other safety rules applying to the application and utilization of our products in the country and/or region in which you are operating must be observed at all times.
- If a person or object falls against, or into, the sideguard component and/or any of its accessories, the component affected may only continue in use after it has been inspected and passed by an expert.

Rules applying during all phases of the assignment:

- The customer shall ensure that this product is erected and dismantled, repositioned and generally used for its intended purpose in accordance with the applicable laws, standards and rules, under the direction and supervision of suitably skilled persons. These persons' mental and physical capacity shall not in any way be impaired by alcohol, medicines or drugs.
- Doka products are technical working appliances which are intended for industrial / commercial use only, always in accordance with the respective Doka User Information booklets or other technical documentation authored by Doka.
- The stability and load-bearing capacity of all components and units must be ensured during all phases of the construction work!
- Do not step on or apply strain to cantilevers, closures, etc. until suitable measures to ensure their stability have been correctly implemented (e.g. by tie-backs).
- The functional / technical instructions, safety warnings and loading data shall all be strictly observed and complied with. Non-compliance can cause accidents and severe injury (risk of fatality) and serious damage to property.
- Sources of fire in the vicinity of the formwork are prohibited. Heaters are permissible only when used correctly and situated a correspondingly safe distance from the formwork.
- Customer must give due consideration to any and all effects of the weather on the equipment and regards both its use and storage (e.g. slippery surfaces, risk of slipping, effects of the wind, etc.) and implement appropriate precautionary measures to secure the equipment and surrounding areas and to protect workers.
- All connections must be checked at regular intervals to ensure that they are secure and in full working order.
  In particular threaded connections and wedged connections have to be checked and retightened as necessary in accordance with activity on the jobsite and especially after out-of-the-ordinary occurrences (e.g. after a storm).
- It is strictly prohibited to weld or heat Doka products, particularly parts for anchoring, suspension or connecting, and also cast parts, etc.
  Welding radically changes the micro-structure of the materials of which these components are made. This leads to a drastic reduction in failure load, constituting a serious safety risk.
  It is permissible to cut individual tie rods to length with metal cutting discs (introduction of heat at the end of the rod only), but it is important to ensure that flying sparks do not heat and thus damage other tie rods.
  Welding work can be done only on the articles expressly mentioned in the Doka documents as being suitable for work of this nature.

Assembly

- The equipment/system must be inspected by the customer before use, to ensure that it is in suitable condition. Steps must be taken to rule out the use of components that are damaged, deformed, or weakened due to wear, corrosion or rot (e.g. fungal decay).
- The use of our safety systems and formwork systems in combination with those of other manufacturers could be dangerous, risking injury to health and damage to property, and therefore requires separate verification by the user.
- The equipment/system must be assembled and erected in accordance with the applicable laws, standards and rules by suitably skilled personnel of the customer's, having regard to any and all required safety inspections.
- It is not permitted to modify Doka products; any such modifications constitute a safety risk.

Erecting the formwork

- Doka products and systems must be set up in such a way that all loads acting upon them are safely transferred!

Pouring

- Do not exceed the permitted fresh-concrete pressures. Excessively high pouring rates lead to formwork overload, cause greater deflection and risk causing breakage.

Stripping the formwork

- Do not strip the formwork until the concrete has reached sufficient strength and the person in charge has given the order for the formwork to be stripped!
- When stripping the formwork, never use the crane to break concrete cohesion. Use suitable tools such as timber wedges, special pry-bars or system features such as Framax S bias-cut corners.
- When stripping the formwork, do not endanger the stability of any part of the structure, or of any scaffolding, platforms or formwork that is still in place!

Transporting, stacking and storing

- Observe all country-specific regulations applying to the handling of formwork and scaffolding. For system formwork the Doka slinging means stated in this booklet must be used – this is a mandatory requirement.
  If the type of sling is not specified in this booklet, the customer must use slinging means that are suitable for the application envisaged and that comply with the regulations.
- When lifting, always make sure that the unit to be lifted and its individual parts can absorb the forces that occur.
- Remove loose parts or secure them so that they cannot slip out of position and drop.
- When lifting formwork or formwork accessories with a crane, no persons must be carried along, e.g. on working platforms or in multi-trip packaging.
- All components must be stored safely, following all the special Doka instructions given in the relevant sections of this document!

Maintenance

- Only original Doka components may be used as spare parts. Repairs may only be carried out by the manufacturer or authorized facilities.

Miscellaneous

The weights are averages on the basis of new material. Actual weights can vary due to material tolerances. Weights can also differ on account of dirtying, moisture absorption, etc.

We reserve the right to make alterations in the interests of technical progress.

Symbols

The following symbols are used in this document:

DANGER
This is a notifier drawing attention to an extremely dangerous situation in which non-compliance with this notifier will lead to death or severe, irreversible injury.

WARNING
This is a notifier drawing attention to a dangerous situation in which non-compliance with this notifier can lead to death or severe, irreversible injury.

CAUTION
This is a notifier drawing attention to a dangerous situation in which non-compliance with this notifier can lead to slight, reversible injury.

NOTE
This is a notifier drawing attention to a situation in which non-compliance with this notifier can lead to malfunctions or damage to property.

Instruction
Indicates that actions have to be performed by the user.

Visual inspection
Indicates that actions performed must be checked by means of a visual inspection.

Tip
Draws attention to a useful tip for best-practice usage.

Reference
Cross-references other documents.

Intended use

The Framed formwork Frami S Xlife is a formwork system for forming walls, footings, shafts and columns in a cast-in-place concrete construction. The Framed formwork Frami S Xlife is designed for manual forming and for large-area crane-assisted gang-forming.

Boundary conditions of use:

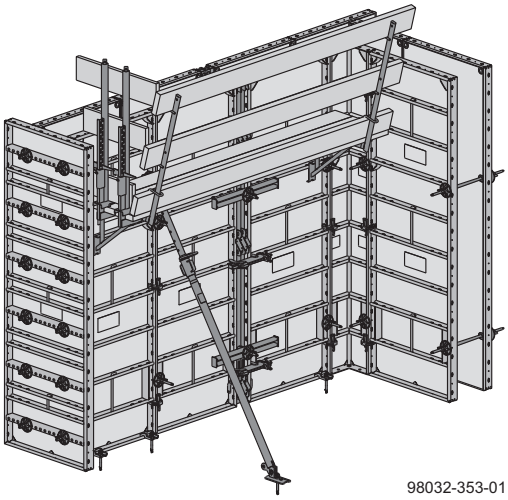
- Max. formwork height: 8.23 m (27'-0")
- Max. wall thickness: 76 cm (30")

Boundary conditions may vary depending on the particular application. Refer to the relevant information in the Doka technical documentation.

Other use or use not in conformity with that stated above is non-intended use and requires the prior written approval of the Doka company!

Areas of use

Wall formwork



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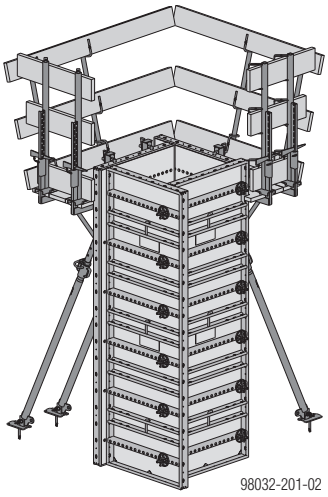
Column formwork



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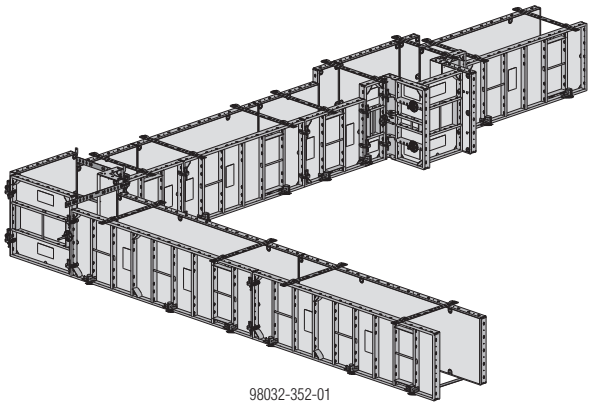
Footing and grade beam formwork



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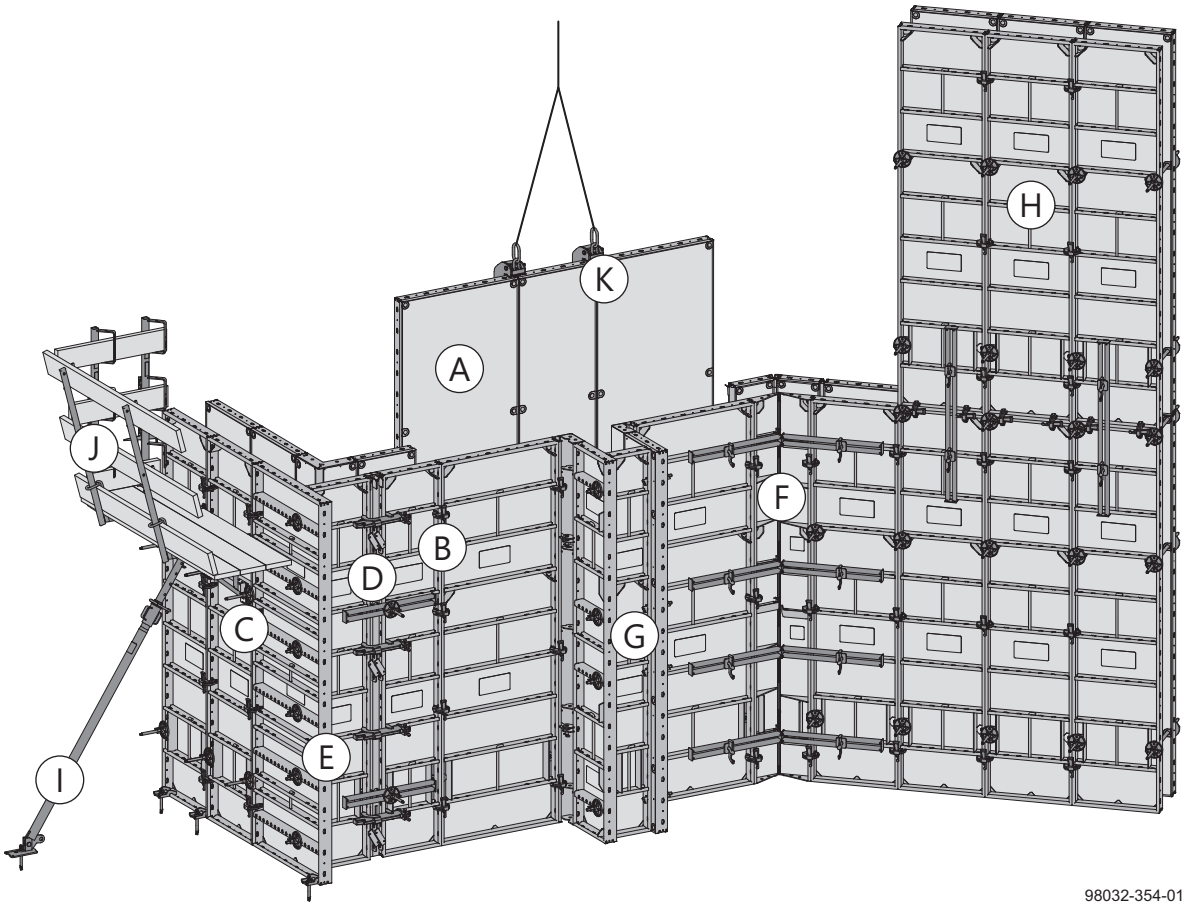
Wall formwork



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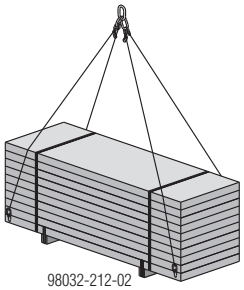
Instructions for assembly and use

Using Frami as a manhandled formwork

The sequence shown here is based on a straight wall. As a rule, formwork set-up should start in a corner, working outward.

Transporting / handling the panels

➤ For offloading panels from a truck, or lifting them a stack at a time on site with Frami transport hooks and Doka 4-part chain 3.20m (see Transporting, stacking and storing).



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Erecting the formwork

➤ Spray the formwork sheet with release agent (see Cleaning and care of your equipment).

WARNING

➤ The Frami panels must be securely braced in every phase of the construction work!

➤ Fix the first panel with a panel strut and two bracing clips (see Plumbing accessories).
This stabilizes the panel so that it cannot fall over.

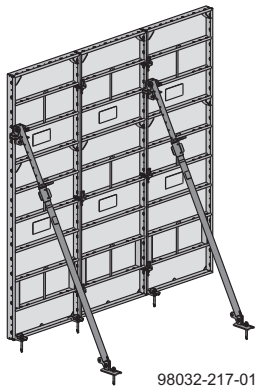
CAUTION

Never use a sledge hammer to align the panels!

This would damage the profiles of the panels.

➤ Use only proper aligning tools (e.g. a special pry-bar) that cannot cause any damage.

➤ Continue lining up panels in this way, clamp them together (see Joining gangs) and fix them with panel struts and bracing clips.



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The gang can now be exactly plumbed and aligned.

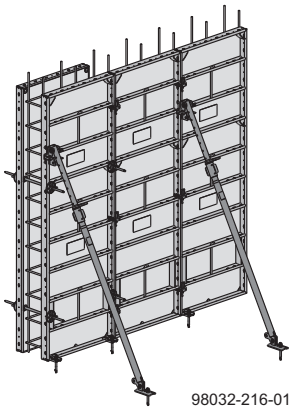
Erecting the opposing formwork

Once the reinforcement has been placed, the formwork can be closed.

➤ Spray the formwork sheet of the opposing formwork with release-agent.

➤ Place the first panel of the opposing formwork.

➤ Insert the form ties (see Form-tie system), so that the opposing formwork is also secured against falling over.



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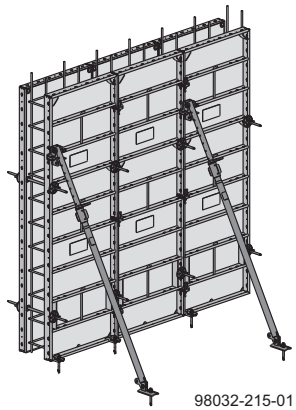
➤ In the same way, carry on lining up panels, clamping them together and fitting form ties.



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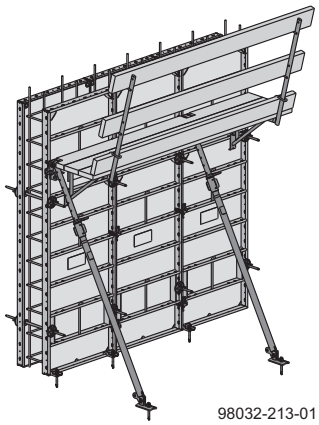
➤ Mount the pouring platform and attach end-of-platform sideguard where necessary (see Pouring-platforms with single brackets).



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Pouring

NOTICE

Do not exceed the maximum permissible rate of placing.

Framed formwork Frami S Xlife:

Permitted fresh-concrete pressure: See Permissible fresh-concrete pressure.

Observe the following **standards**:
ACI 301 Specifications for Structural Concrete
ACI 309 Guide for Consolidation of Concrete
ACI 347 Guide to Formwork for Concrete
SP4 Formwork for Concrete
CAN/CSA S269.3 Concrete Formwork

Follow the directions in the Calculation Guide 'Doka formwork engineering (USA and Canada)' or contact Doka.

➤ Pour the concrete.

➤ Make only moderate use of vibrators, carefully coordinating the times and locations of vibrator use.

Stripping the formwork

NOTICE

➤ Observe the stipulated stripping times.

➤ Remove the pouring platform.

➤ Starting with the unbraced formwork side - strip the panels one at a time and undo the connectors to the adjacent panels.

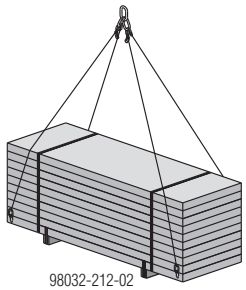
➤ Lift the panel away and clean concrete residue off the formwork sheet (see Cleaning and care of your equipment).

Using Frami as a crane-handled formwork

The sequence shown here is based on a straight wall. As a rule, formwork set-up should start in a corner, working outward.

Transporting / handling the panels

➤ For offloading panels from a truck, or lifting them a stack at a time on site with Frami transport hooks and Doka 4-part chain 3.20m (see Transporting, stacking and storing).



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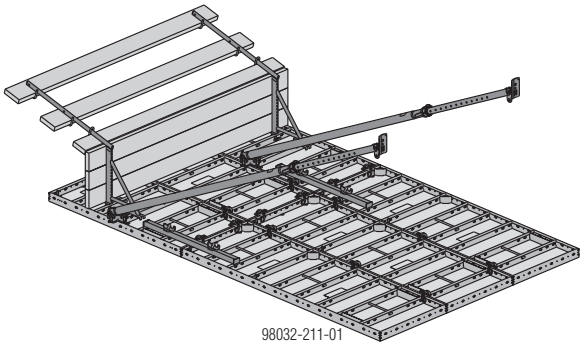
Pre-assembly

➤ Pre-assemble gang-forms face-down on a prepared flat area (see Joining gangs).

➤ Mount the pouring platform and attach end-of-platform sideguard where necessary (see Pouring-platforms with single brackets).

➤ With the gang-form still flat, mount panel struts to it (see Plumbing accessories).



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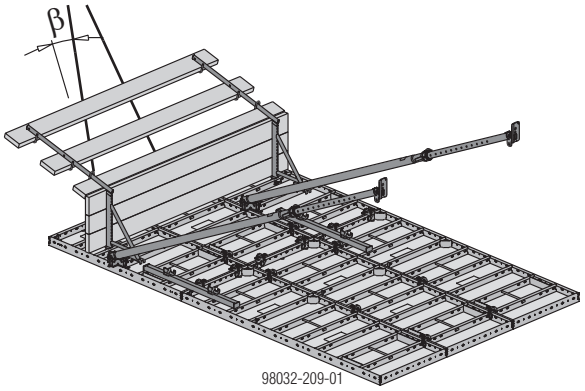
Erecting the formwork

➤ Attach the gang-form to the crane using Frami lifting hooks (see Lifting by crane and 'Frami lifting hooks' operating instructions).

Permitted load-bearing capacity:

- Sling angle β to 30°:
  1100 lbs (500 kg) per Frami lifting hook
  Practical area of formwork that can be lifted using 2 lifting hooks: approx. 270 sq. ft. (25 m²)
- Sling angle β to 7.5°:
  1650 lbs (750 kg) per Frami lifting hook
  Practical area of formwork that can be lifted using 2 lifting hooks: approx. 400 sq. ft. (37.5 m²)

Frami lifting hooks with a 1100 lb (500 kg) rated load-bearing capacity also meet the requirements for a load bearing capacity of 1650 lbs (750 kg) at a sling angle β ≤ 7.5°.



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β ... max. 30°

➤ Pick up the gang-form by crane.

➤ Spray the formwork sheet with release agent (see Cleaning and care of your equipment).

WARNING

➤ Do not allow people to ride on the formwork or platform.

NOTICE

➤ Make sure the tag-lines are long enough to enable the holders to stay outside the danger zone at all times.

➤ Fly the gang-form to its new location.

CAUTION

Never use a sledge hammer to align the panels!

This would damage the profiles of the panels.

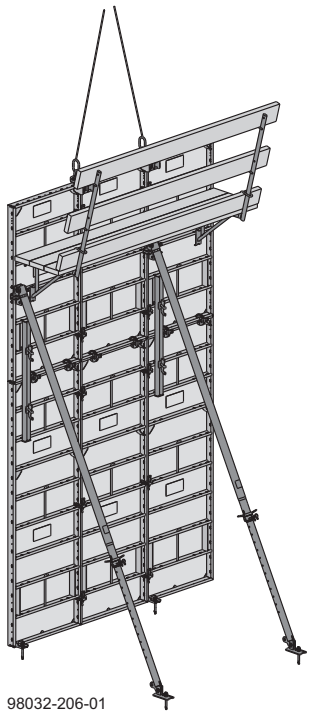
➤ Use only proper aligning tools (e.g. a special pry-bar) that cannot cause any damage.

WARNING

➤ The Frami panels must be securely braced in every phase of the construction work!

➤ Fix the panel struts to the ground (see Plumbing accessories).

➤ Secure the gang-form to the ground with bracing clips.



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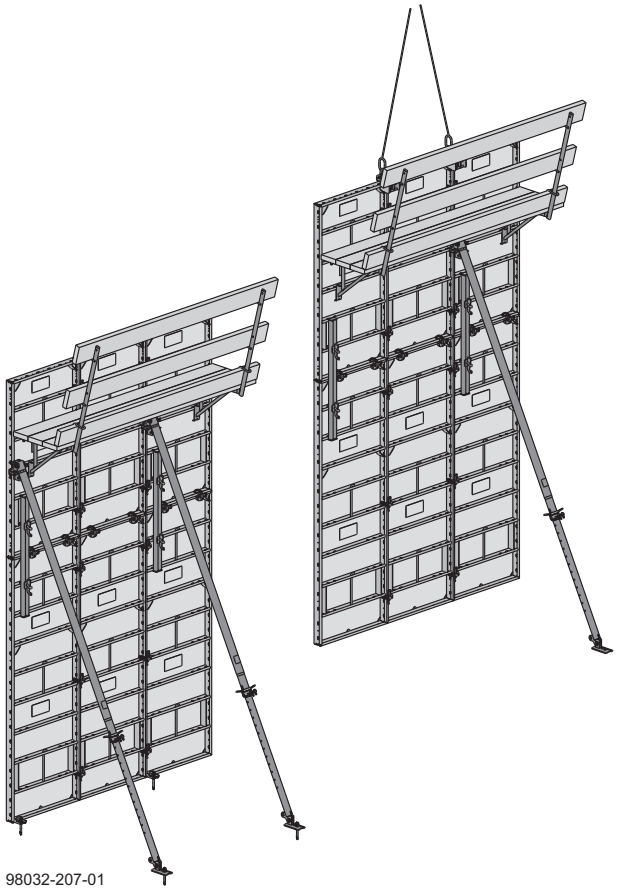
The gang-form is now stable and can be plumbed and aligned exactly, with no need for the crane.

➤ Detach the gang-form from the crane.

➤ Continue lining up gang-forms in this way, clamp them together (see Joining gangs) and fix them with panel struts and bracing clips.



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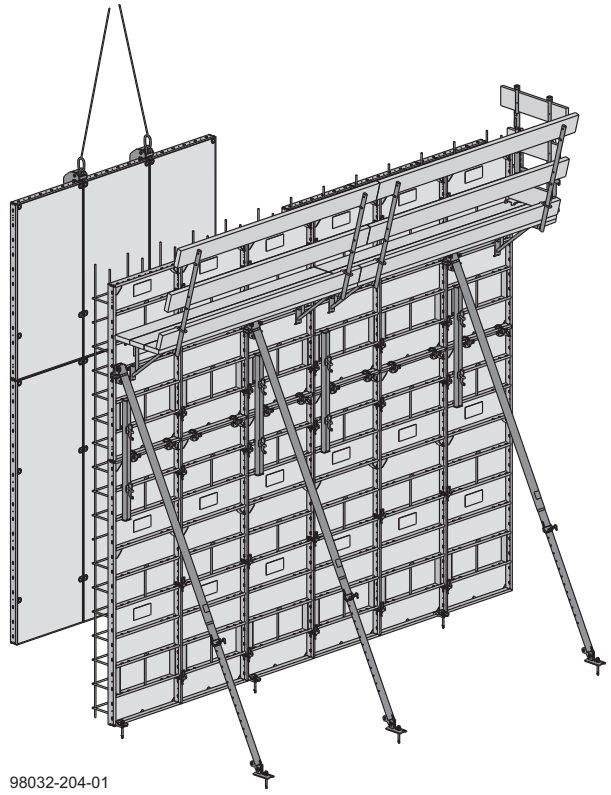
Erecting the opposing formwork

Once the reinforcement has been placed, the formwork can be closed.

➤ Spray the formwork sheet with release agent (see Cleaning and care of your equipment).

➤ Fly the opposing formwork by crane to its next location.



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➤ Insert the form ties (see Form-tie system).

Before disconnecting from the crane:

➤ If there are no panel struts on the opposing formwork, do not disconnect the gang from the crane until a large enough number of form ties have been installed to keep it safely in the upright.

➤ Detach the gang-form from the crane (wherever possible, operate the lifting hook from the opposite pouring platform).

➤ Continue lining up gang-forms in this way, and clamp them together (see Joining gangs).

Pouring

NOTICE

Do not exceed the maximum permissible rate of placing.

Framed formwork Frami S Xlife:

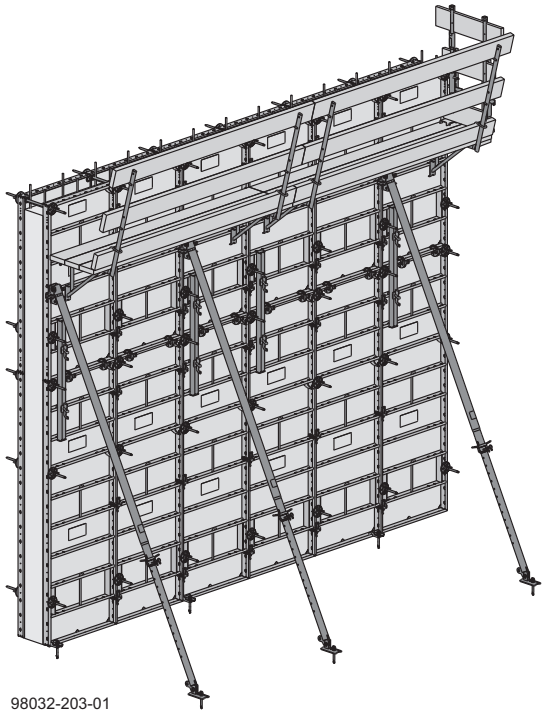
Permitted fresh-concrete pressure: See Permissible fresh-concrete pressure.

Observe the following **standards**:
ACI 301 Specifications for Structural Concrete
ACI 309 Guide for Consolidation of Concrete
ACI 347 Guide to Formwork for Concrete
SP4 Formwork for Concrete
CAN/CSA S269.3 Concrete Formwork

Follow the directions in the Calculation Guide 'Doka formwork engineering (USA and Canada)' or contact Doka.

➤ Pour the concrete.

➤ Make only moderate use of vibrators, carefully coordinating the times and locations of vibrator use.



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Stripping the formwork

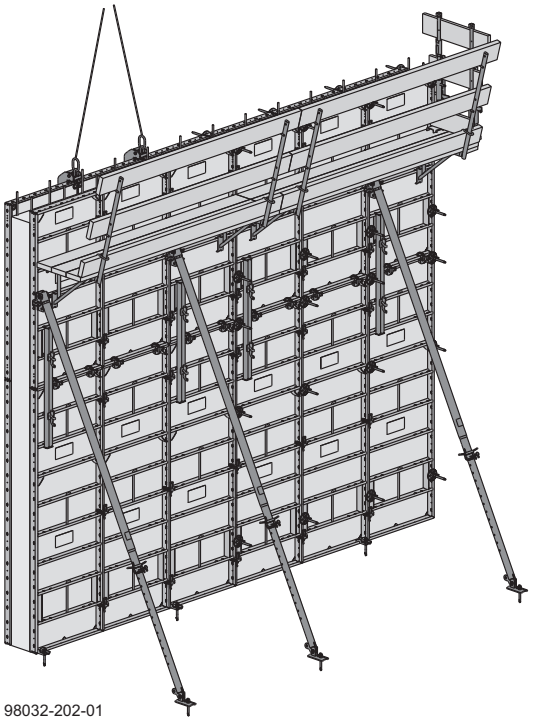
NOTICE

➤ Observe the stipulated stripping times.

➤ Remove any loose items from the formwork and pouring platform, or secure them firmly.

➤ Attach the gang-form of the unbraced formwork side to the crane (wherever possible, operate the lifting hook from the opposite pouring platform).

➤ Take out the form ties and undo the connectors to the adjacent panels.



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To speed up operations when lifting and moving by crane, most of the form ties can be taken out in advance.

Caution!
There must be at least as many form ties left in place as are needed to keep the element safely upright.

WARNING

The formwork tends to adhere to the concrete. When stripping the formwork, do not try to break concrete cohesion using the crane!

Risk of injury and damage to property due to crane overload.

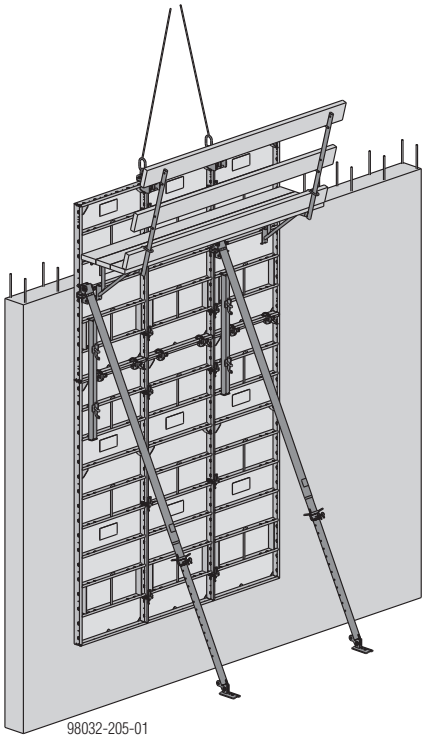
➤ Use suitable tools such as timber wedges or an aligning tool to detach the formwork from the concrete.

➤ Pick up the gang-form and fly it to its next location. Make sure to provide the gang-form with adequate stability if storing it upright prior to its next use (see Plumbing accessories).

Store gang-forms with only one panel strut face down.

➤ Clean concrete residue off the formwork sheet (see Cleaning and care of your equipment).

➤ Where the gang-form has panel struts and a pouring platform attached to it, first attach this gang-form to the crane, and only then detach the floor anchorages of the panel struts.



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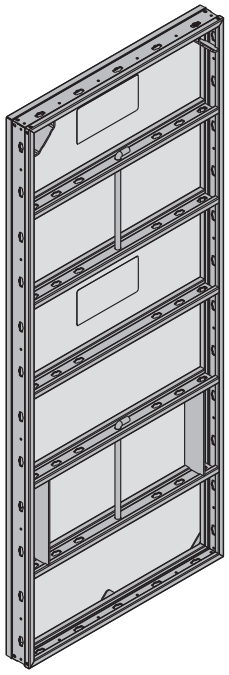
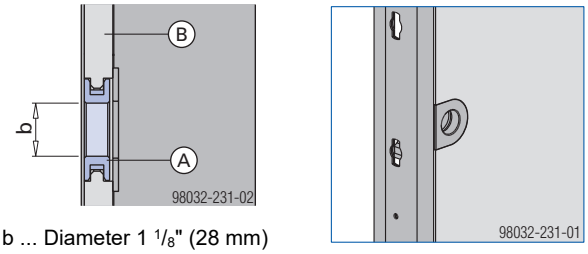
The Frami panel in detail

High load-bearing capacity



Tie-hole



b ... Diameter 1 $^{1}/_{8}$" (28 mm)

A Form-tie protector
B Xlife sheet

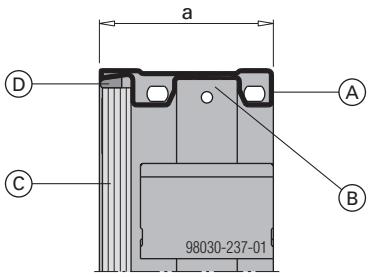
- Xlife sheet protected around the tie-holes by integrated form-tie protectors

Clean concrete surfaces with the innovative Xlife sheet

The Xlife sheet ensures high repeat use, with superb concrete results every time, and reduces the susceptibility to damage.

- High quality concrete finish
- Less touching-up needed
- Less cleaning work – the Xlife sheet can also be cleaned using a high-pressure washer

Dimensionally stable steel hollow-profile frame

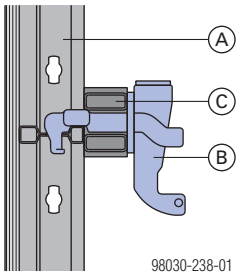


a ... 3 $^{1}/_{2}$" (9.2 cm)

A Frame profile
B Continuous hardware slot for inter-panel connectors
C Formwork sheet
D Silicone sealing strip

- Dimensionally stable hollow profiles
- Hot-dip galvanized for long life
- Strong cross-profiles
- Edge faces are easy to clean - so panels always abut tightly
- All-round hardware slot for fastening clamps at any point required
- Edges of formwork sheet are protected by frame profile
- Cross boreholes for corner configurations and bulkheads

Accessories are easy to fasten in the cross profile



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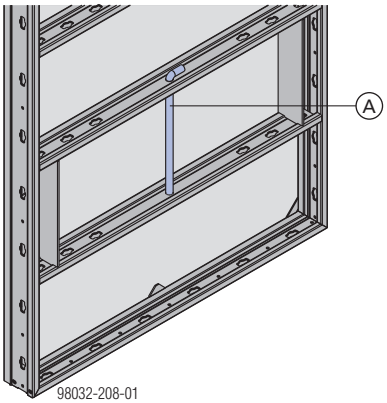
A Frami S Xlife panel
B Frami wedge clamp
C Frami universal waling

Nail-holes

- are integrated in the frame profile to make it easier to attach or nail the panel to the ground or sills
- the nail-holes are located all around the frame, so the panels can be arranged either vertically or horizontally

Safety handles

Note:
Do not get onto and climb up the formwork, or use the safety handles, until the panels have been properly braced.



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A Integral safety handle

- Used to attach safety harnesses.

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WARNING
Do not use the safety handles as slinging points for crane-handling!

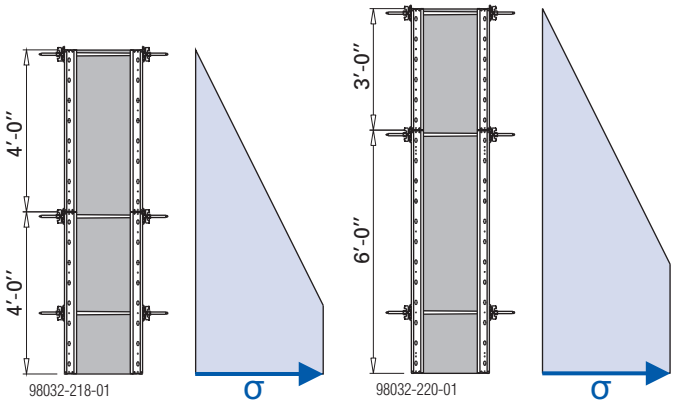
Danger of formwork dropping from crane!

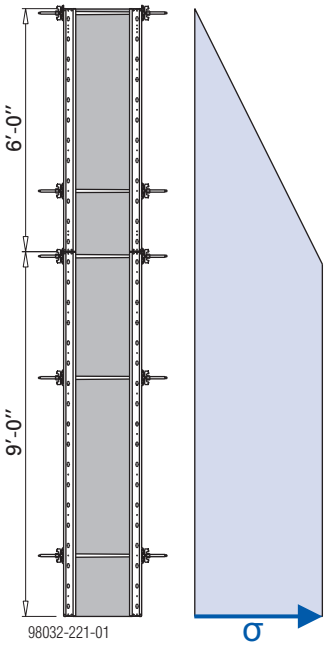
➤ Use only suitable lifting accessories and slinging points. See Lifting by crane and Transporting, stacking and storing.

Permissible fresh-concrete pressure

Vertically stacked formwork

Permitted pressure of fresh concrete, **vertically stacked formwork**:
σ_{hk} = **1000 psf (48 kN/m²)**





Permissible fresh-concrete pressure as a function of the maximum panel width

	Max. width of panel	Permitted fresh-concrete pressure $\sigma_{hk, max}$		
		1000 psf (48 kN/m²)	**1200 psf (58 kN/m²)**	**1500 psf (72 kN/m²)**
Frami S Xlife panel (all panel heights)	8'-0"	✓		
	3'-0"	✓		
	2'-6"	✓	✓	
	2'-0"	✓	✓	✓
	1'-6"	✓	✓	✓
	1'-0"	✓	✓	✓
	6"	✓	✓	✓
Frami S Xlife universal panel (all panel heights)	3'-0"	✓		

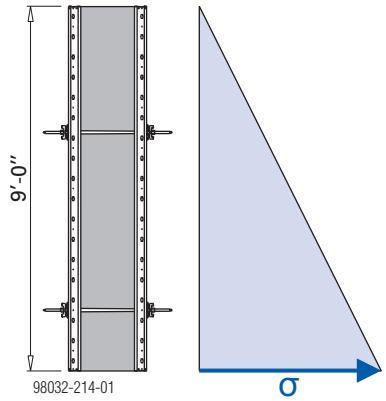
This means that for higher pour-pressures of up to **1200 psf (58 kN/m²)**, it is only allowed to use panels of 2'-6", 2'-0", 1'-6", 1'-0" and 6" in width.
For higher pour-pressures of up to **1500 psf (72 kN/m²)**, it is only allowed to use panels of 2'-0", 1'-6", 1'-0" and 6" in width.

Note:

All other Frami accessories can be subjected to increased pour pressures of up to 1500 psf (72 kN/m²) (only when the approved Frami S panels are used as per the above table).

Not vertically stacked formwork

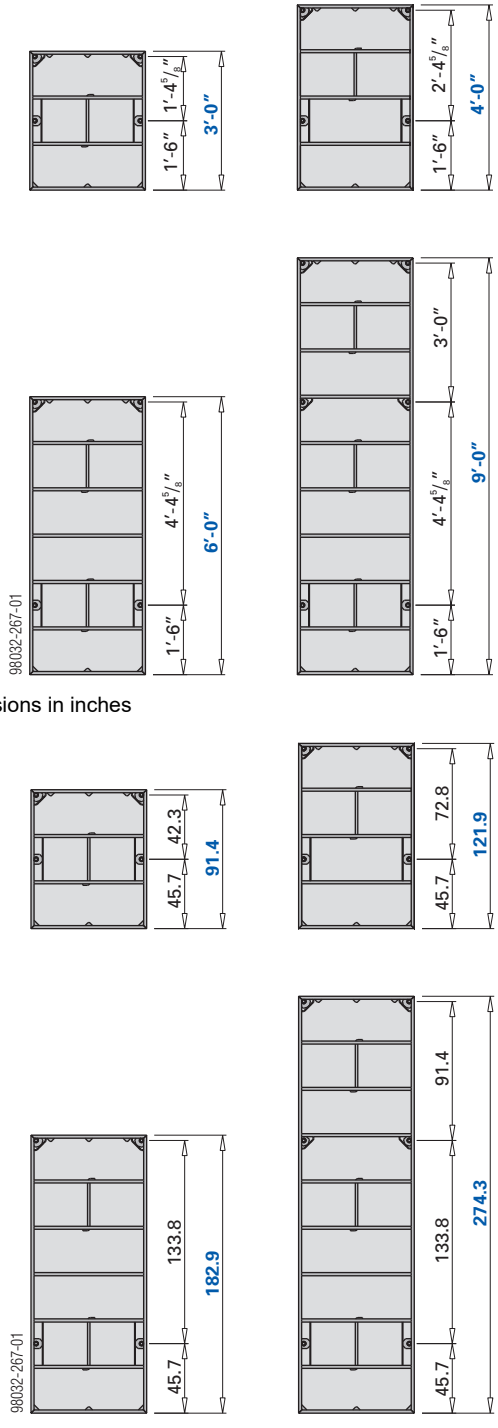
Frami S Xlife panels of height 9'-0" are hydrostatically loadable up to a pour height of 9'-0" (2.74 m).
$\sigma_{hk, max, hydr}$ = **1430 psf (68.5 kN/m²)**



System grid

Frami S Xlife panels

Heights of panels

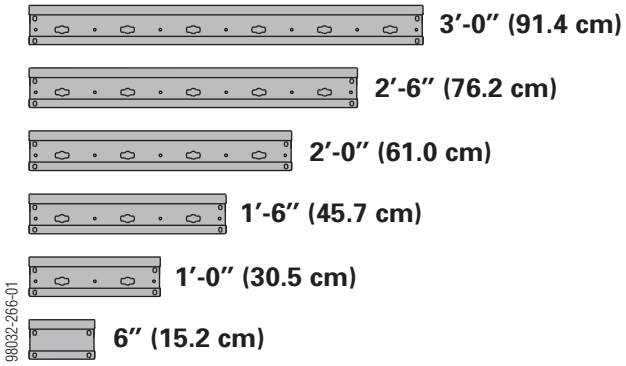


Dimensions in inches

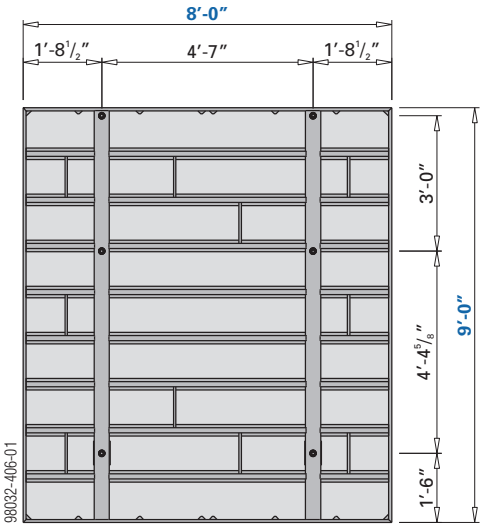
Dimensions in cm

For pour heights of up to 9'-0" (2.74 m) only **2 form ties are needed in the vertical**.

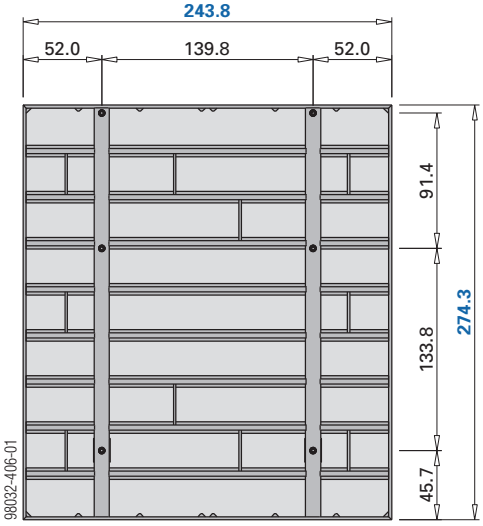
Widths of panels



Panel 8'-0"x9'-0"



Dimensions in inches



Dimensions in cm

Consult your Doka technician for more information on the use of this panel.

For pour heights of up to 9'-0" (2.74 m) only **2 form ties are needed in the vertical**.

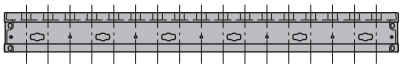
Frami Xlife universal panels

The **3’-0" wide** panels are also available as **Universal panels** with heights of 2’-0", 3’-0", 4’-0", 6’-0" and 9’-0".

The special hole pattern makes these panels particularly suitable for efficient forming of:

- corners
- wall junctions
- bulkheads
- columns

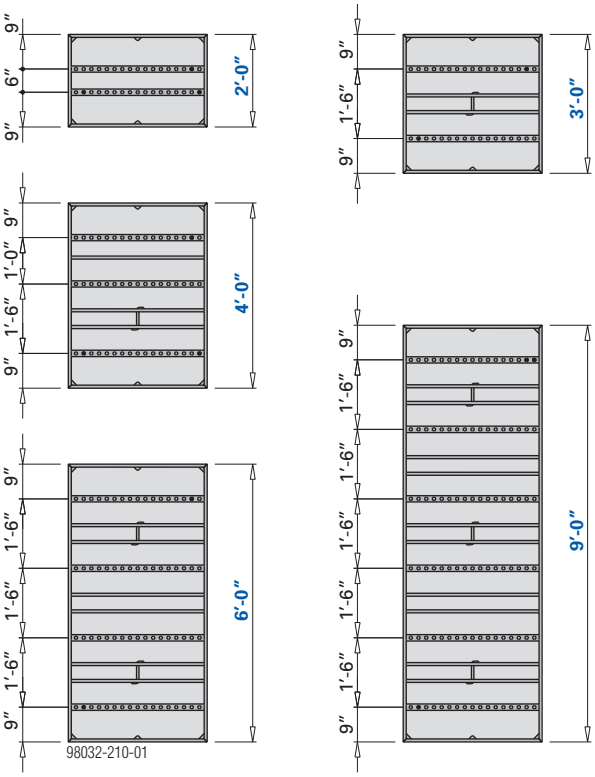
Panel width



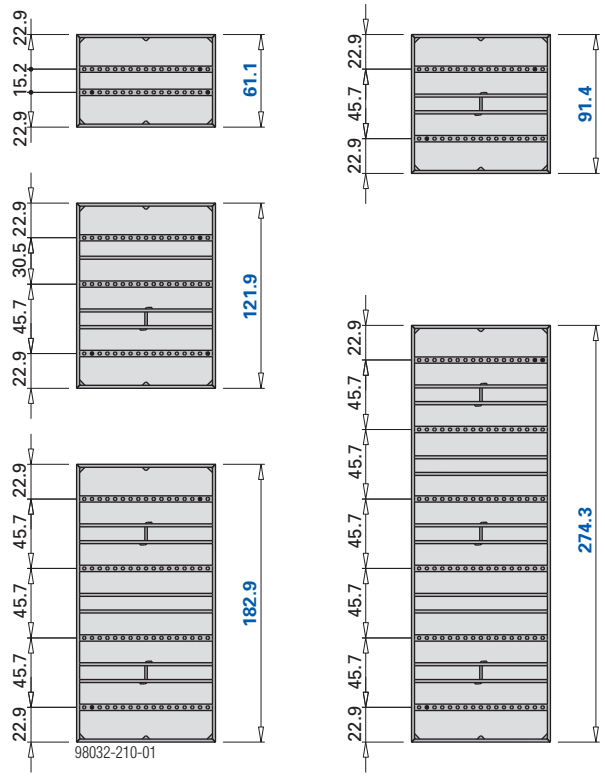
3’-0” (91.4 cm)

98032-266-02

Heights of panels



Dimensions in inch

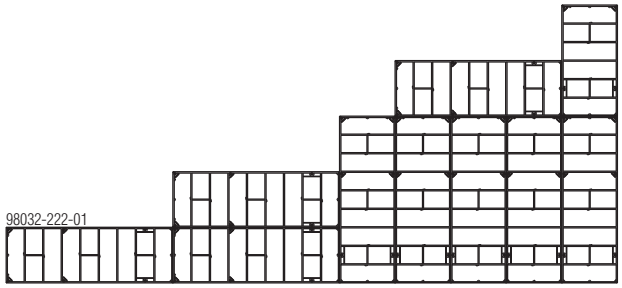


Dimensions in cm

Adaptability

Possible combinations

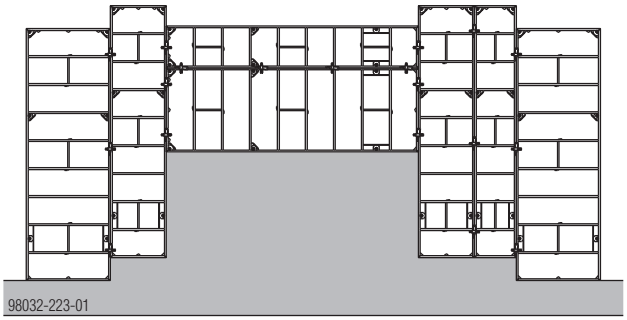
The perfect panel size-grid gives you innumerable possible combinations, in both width and height. You can use the panels either **vertical** or **horizontal**, and the **6" (15 cm) increment-grid** gives you optimum adaptability of the formwork to the dimensions of the structure, at all times.



Schematic representation

Infinite height offset

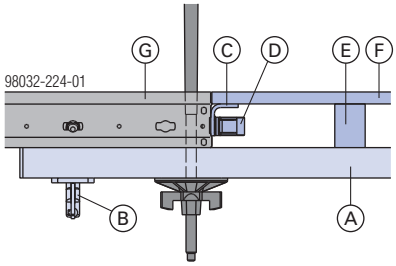
The continuous hardware slot around the inside of the Frami panels enables the clamps to be fastened anywhere on the frame. This allows any adjacent panels to be **staggered** to **any height required**, i.e. without being confined to any fixed grid. This means that the formwork can easily be accommodated to e.g. steps, slopes and uneven ground, with no extra work.



Schematic representation

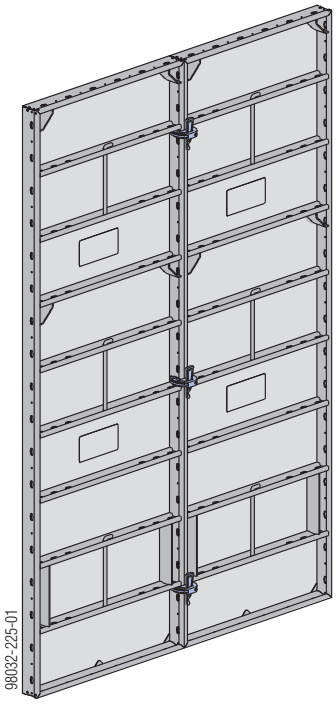
Continue forming with job-built fillers

The framed formwork Frami also gives you easy connections when you need to 'make up' with job-built timber formwork. The Frami universal waling and filler angle make it easy for you to join the panels to dimensional lumber and plywood.



A	Frami universal waling
B	Frami wedge clamp
C	Frami S filler angle 3/4"
D	Frami clip
E	Dimensional lumber
F	Formwork sheeting
G	Frami S Xlife panel

Joining gangs



Attributes of the gang connectors:

- provide self-aligning, crane-handling-safe connections between the gangs
- no losable small parts
- dirt-resistant and hard-wearing for site use
- easy to fix, with a formwork hammer

NOTICE

- Use a formwork hammer weighing max. 32 oz. (800 g).
- Do not oil or grease wedge-clamped joints.

Upright panels:

Panel height	N° of clamps
3'-0"	2
4'-0"	2
6'-0"	2
9'-0"	3

Horizontal panels:

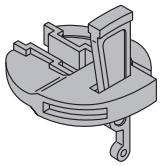
Panel width	N° of clamps
6"	1
1'-0"	1
1'-6"	1
2'-0"	2
2'-6"	2
3'-0"	2

Note:

- For details regarding extra inter-panel connections for outside corners and bulkheads (for increased tensile loads): see Inter-panel connections for increased tensile loads.
- For details on the position of the connector components needed for vertical stacking, see Vertical stacking of panels.

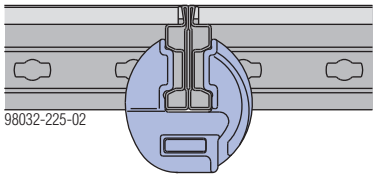
Simple inter-panel connections

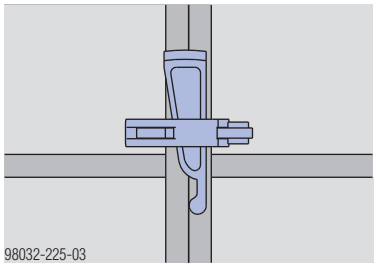
with the Frami clamp



Frami clamp:
Permitted tensile force: 2.245 kip (10.0 kN)
Permitted shear force: 1.12 kip (5.0 kN)
Permitted moment: 0.15 kip-ft (0.20 kNm)

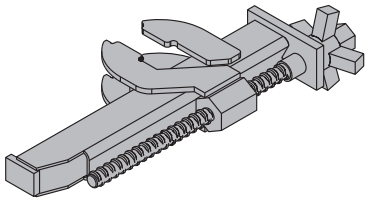
The continuous hardware slot running around the inside of the frame profile means that panels can be fastened together anywhere on the frame. This allows adjacent panels to be staggered in height, infinitely.





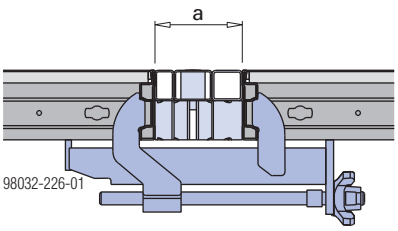
Self-aligning inter-panel connections and fillers

with the Frami adjustable clamp

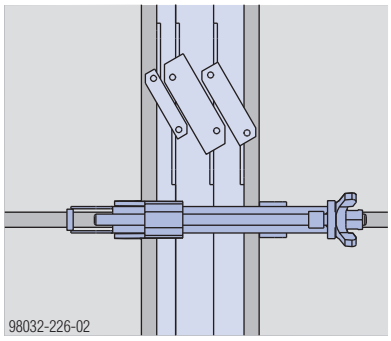


Frami adjustable clamp:
Permitted tensile force: 1.685 kip (7.5 kN)

Filler gaps can be closed easily and economically with Frami S steel fillers. With the Frami adjustable clamp, the panels are joined so that they are resistant to tensile forces, and are aligned at the same time. The adjustable clamp is placed directly over the cross profile.

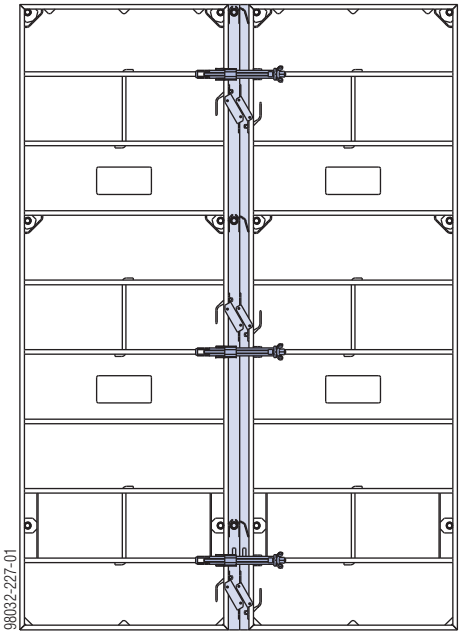


a ... max. 6" (15 cm)

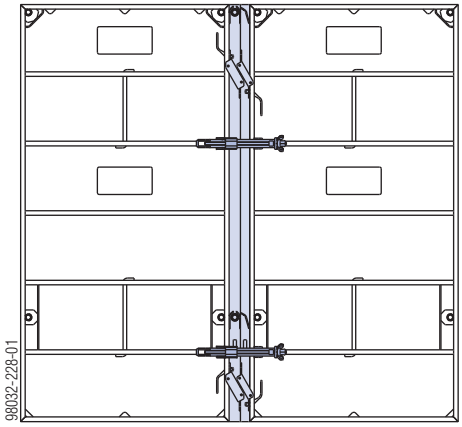


In cases where the Frami adjustable clamp would collide with steel fillers, universal walings, etc., it must be located next to the cross profile (instead of directly over it).

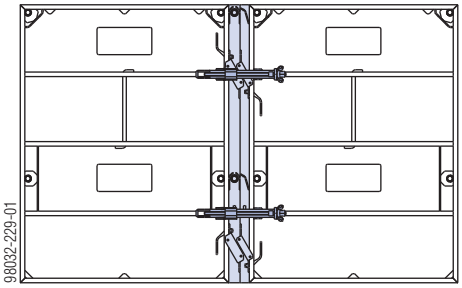
Formwork height: 9’-0" (2.74 m)



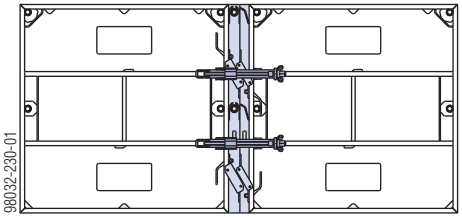
Formwork height: 6’-0" (1.82 m)



Formwork height: 4’-0" (1.22 m)

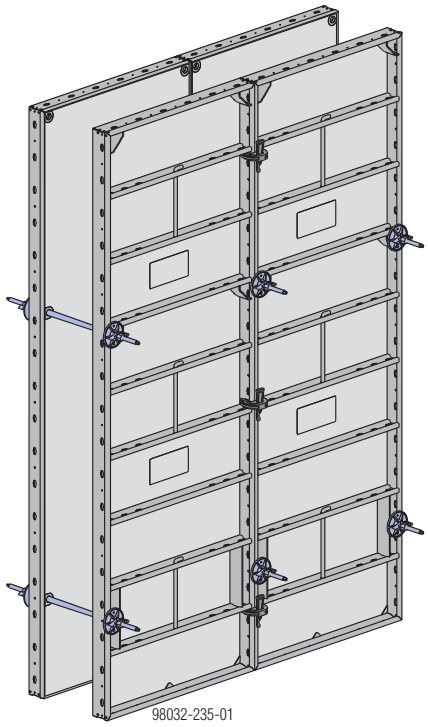


Formwork height: 3’-0" (0.91 m)



Form-tie system

Tying the Frami panels



Tying Frami S Xlife panels 9’-0":

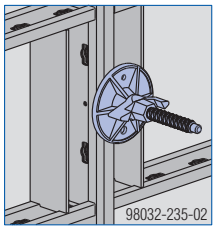
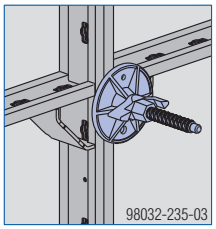
Up to a **pour height** of **9'-0"(2.74 m)** (no vertically stacked panels), **only 2 form ties** are required in the vertical.

The basic rule is as follows:

Place a form tie in every form-tie hole that is not covered by a flat washer (e.g. at a panel joint, only tie one of the two adjoining panels).

Always tie in the bigger (wider) of the two panels.

For exceptions, see Length adjustment using fillers and Vertical stacking of panels.

in the panel	when panels are vertically stacked
	

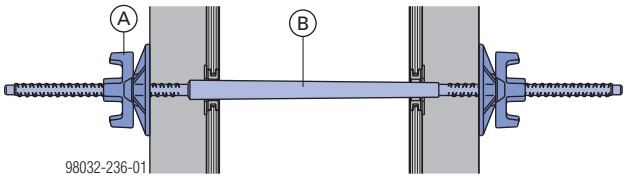
WARNING
Sensitive rod steel!
- ➤ Never weld or heat tie-rods.
- ➤ Tie rods that are damaged or have been weakened by corrosion or wear must be withdrawn from use.

Note:
Close off unneeded tie-holes with Frami S frame-hole plugs.

Note:
Doka also offers economical solutions for creating watertight wall-ties.

For more information, see the User Information booklet 'Doka form-ties for special requirements'.

Taper-tie system 3/4" to 1"



A Super plate 15.0
B Taper tie 3/4"-1" & 15.0mm ends

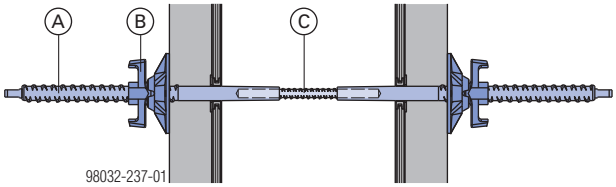
Four different taper tie types are available for forming wall thicknesses in the 6" to 30" (15.2 to 76.2 cm) range.

Wall thickness		Tie-rod length
6" to 12"	(15.2 to 30.5 cm)	32"
12" to 18"	(30.5 to 45.7 cm)	38"
18" to 24"	(45.7 to 61.0 cm)	44"
24" to 30"	(61.0 to 76.2 cm)	52"

Note:
Always loosen the Super plate on the thinner end of the taper tie first.

Taper tie 3/4"-1" & 15.0mm ends:
Permitted load-bearing capacity allowing a 2 : 1 factor of safety against failure:
18000 lbs (80 kN)

She-bolt system 15.0 (5/8")



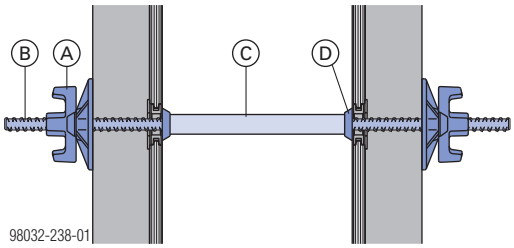
A	Frami S she-bolt 15.0mm x 16" (or Frami S she-bolt 15.0mm 24" for special applications)
B	Super plate 15.0
C	Euro rod 5/8" or Tie rod 15.0mm Length= Wall thickness – 4" (10 cm)

She-bolt 15.0 (5/8" system):

Permitted load-bearing capacity allowing a 2 : 1 factor of safety against failure:
18000 lbs (80 kN)

Tie-rod system 15.0 (5/8")

The Tie rod system 15.0 makes it possible to tie panels in narrow or confined spaces. For areas of application, see Acute and obtuse-angled corners.



A	Super plate 15.0
B	Tie rod 15.0mm
C	Plastic tube 22mm
D	Universal cone 22/10mm

Note:

The Plastic tubes 22mm left behind in the concrete are sealed off with **Plugs 22mm**.

Tie-rod wrench 15.0/20.0

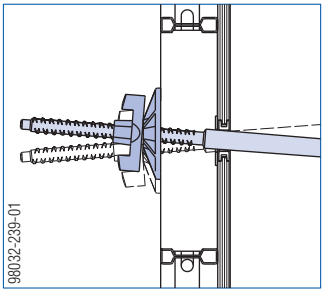
For turning and holding the tie rods.

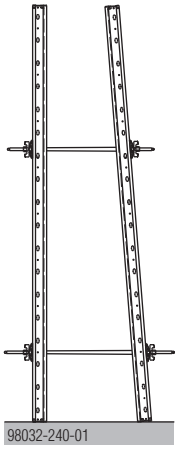
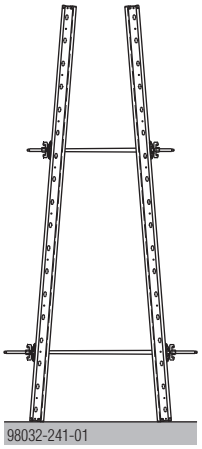
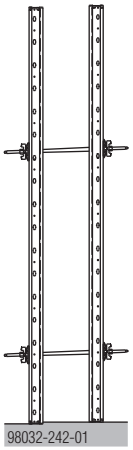
Tie rod 15.0mm:

Permitted load-bearing capacity allowing a 2 : 1 factor of safety against failure:
22000 lbs (98 kN)

Sloping ties on height-mismatched panels

Thanks to the special shape of the Super-plate, the panels can be inclined on one or both sides, and/or height-mismatched.



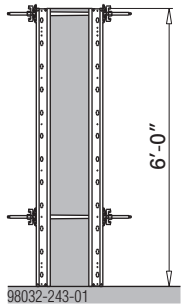
Inclined on one side	Inclined on both sides	Height mismatch
max. 4°	max. 2 x 4°	**Form-tie system 15.0**: max. 1/2" per 6" wall thickness (1.2 cm per 15 cm) **Taper tie 3/4" to 1" & 5/8" [15.0] ends**: max. 1/4" per 6" wall thickness (0.6 cm per 15 cm)
		
98032-240-01	98032-241-01	98032-242-01

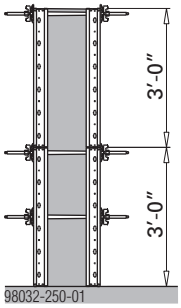
Note:

Secure inclined panels against uplift.

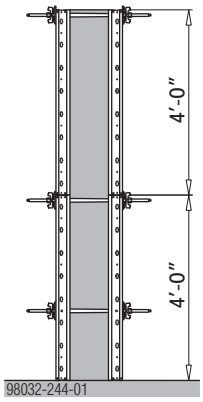
Form-tie situations

Pour height
up to 6'-0" (1.82 m)

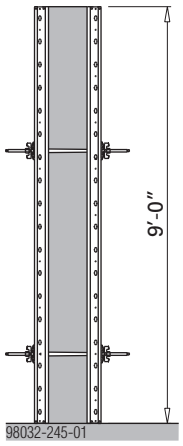




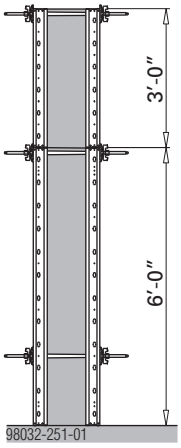
Pour height
up to 8'-0" (2.44 m)



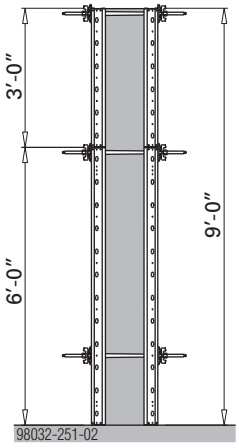
Pour height
up to 9'-0" (2.74 m)



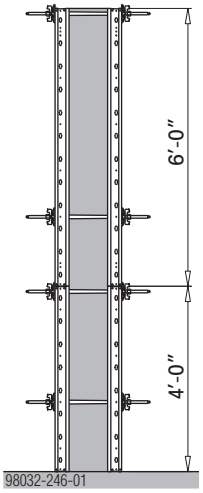
(stacked vertically
or horizontally)



Stack max. 3'-0" on top of one 6'-0" high basic panel!

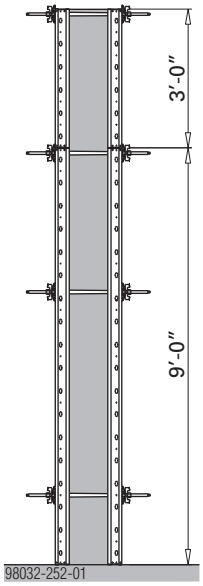


Pour height
up to 10'-0" (3.05 m)



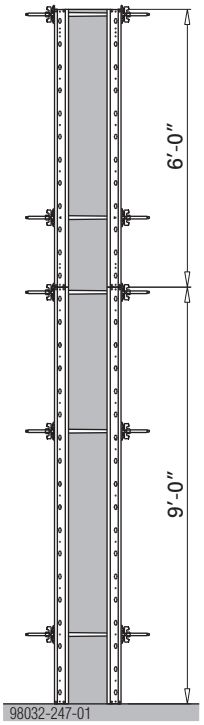
Pour height
up to 12'-0" (3.66 m)

(stacked vertically
or horizontally)



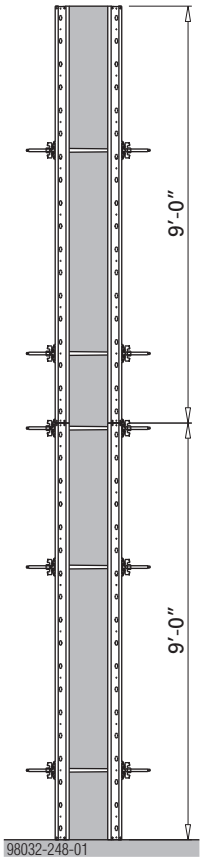
Pour height
up to 15'-0" (4.57 m)

(stacked vertically)



Pour height
up to 18'-0" (5.48 m)

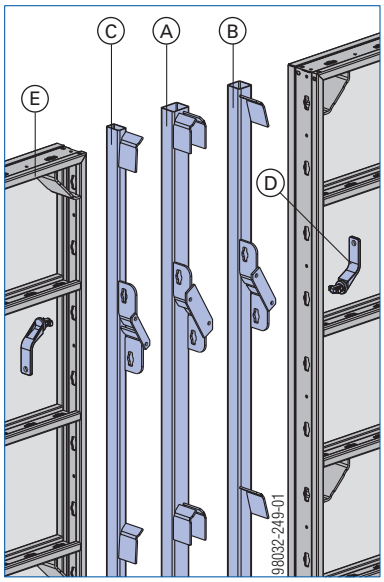
(stacked vertically)



Length adjustment using fillers

with steel fillers and adjustable clamps

By combining the steel filler widths of 1", 1 $^1/_2$", and 2" in various ways, the closures can be made in $^1/_2$" (13 mm) increments.

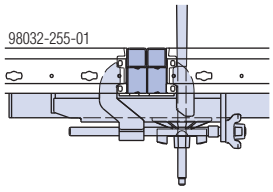
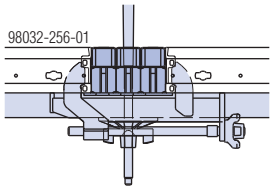


A	Frami S steel filler 2" (with through-tie facility)
B	Frami S steel filler 1 $^1/_2$"
C	Frami S steel filler 1"
D	Frami clip
E	Frami S Xlife panel

In order to get a firm link between the filler and the panels, fix the steel fillers in place with Frami clips **(D)** .

Note:

Form ties can be placed through the 2" (5 cm) wide Frami S steel filler. The steel filler through which the tie is being placed must be fitted in a central position.

Up to **3"** (7.6 cm) filler	Up to **6"** (15 cm) filler
Place form ties in panel, with universal waling	Place form ties in filler, with universal waling
	

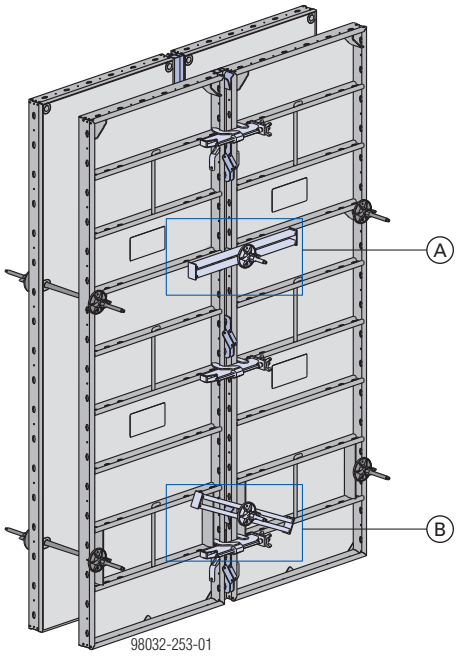
We also offer several other solutions for filler widths of 2" (5 cm), 3" (7.6 cm), and 6" (15 cm).

Note:

Close off unneeded tie-holes with **Frami plugs**.

Frami universal waling

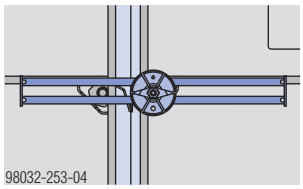
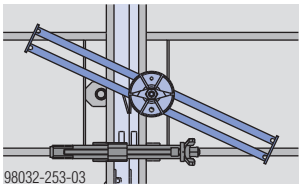
Permitted moment: 0.96 kip-ft (1.3 kNm)



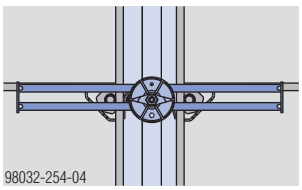
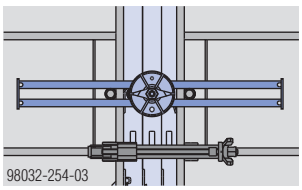
Note:

Where form ties are inserted through the panel frames, the Universal waling must rest on the cross profile.

Tying through the panel

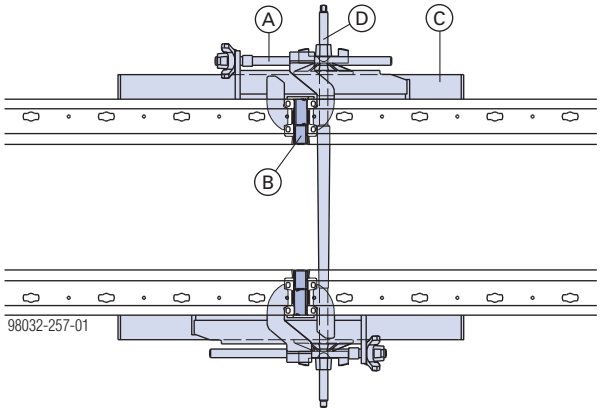
(A) Universal waling in the horizontal (over the cross profile)	**(B)** Universal waling at an angle (so that it rests on the cross profile)
	

Tying through the filler

Universal waling in the horizontal	
	

Filler width 1" (2.5 cm)

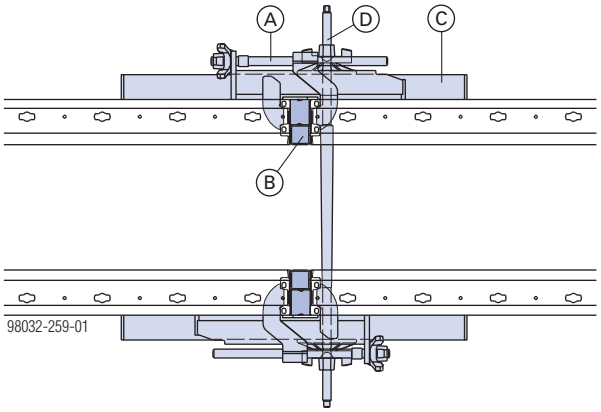
Place form-ties in panel, with universal waling



1 Frami S steel filler 1"

Filler width 1 $^1/_2$" (3.8 cm)

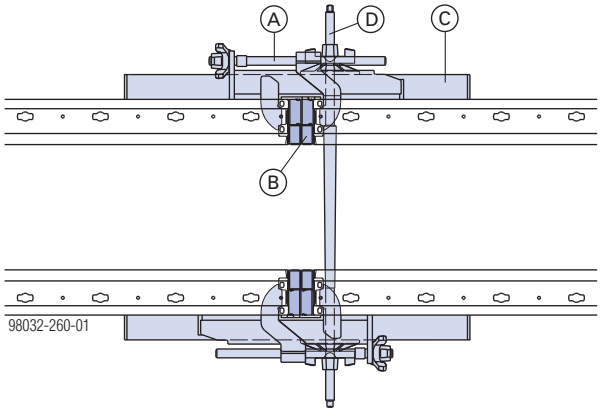
Place form-ties in panel, with universal waling



1 Frami S steel filler 1$^1/_2$"

Filler width 2" (5.1 cm)

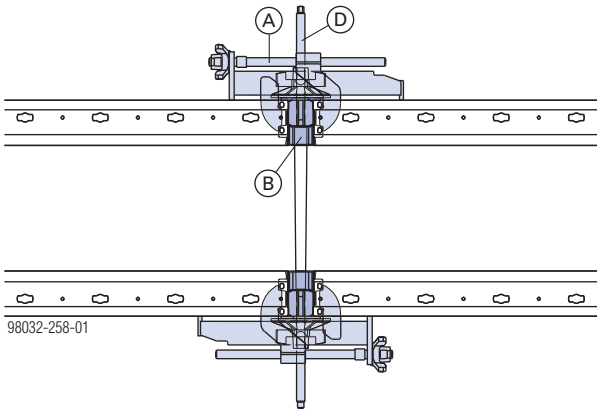
Place form-ties in panel, with universal waling



2 Frami S steel fillers 1"

Filler width 2" (5.1 cm)

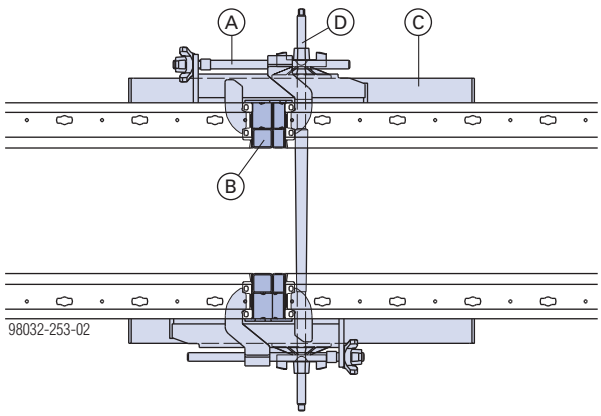
Place form-ties in filler, without universal waling.



1 Frami S steel filler 2"

Filler width 2 $^1/_2$" (6.4 cm)

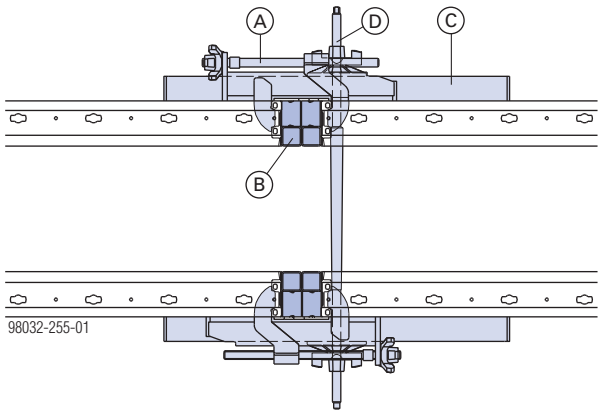
Place form-ties in panel, with universal waling



1 Frami S steel filler 1"
1 Frami S steel filler 1$^1/_2$"

Filler width 3" (7.6 cm)

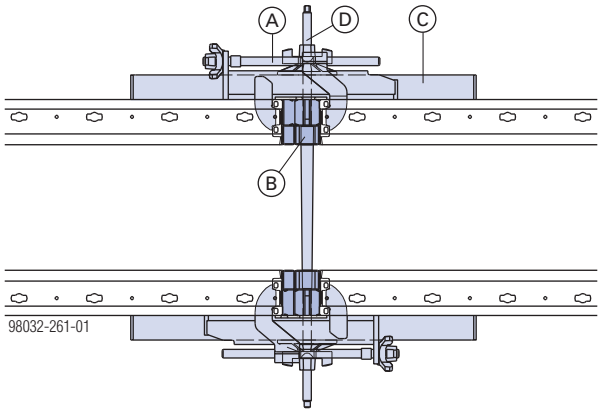
Place form-ties in panel, with universal waling



2 Frami S steel fillers 1$^1/_2$"

Filler width 3" (7.6 cm)

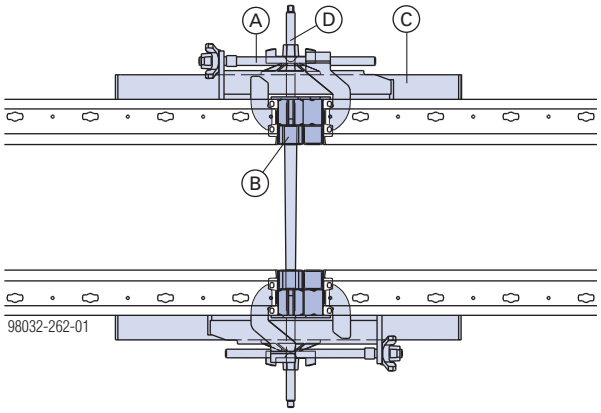
Place form-ties in filler, with universal waling



1 Frami S steel filler 1"
1 Frami S steel filler 2"

Filler width 3 1/2" (8.9 cm)

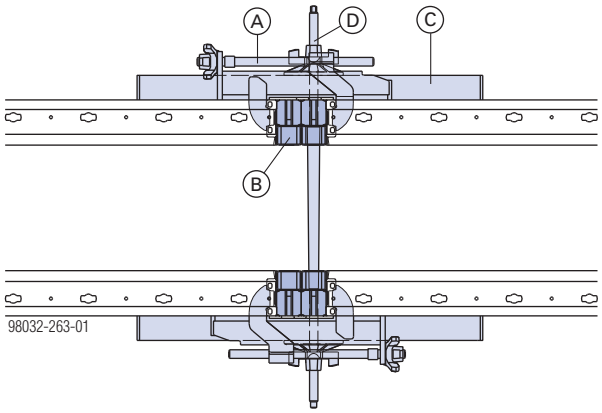
Place form-ties in filler, with universal waling



1 Frami S steel filler 1 1/2"
1 Frami S steel filler 2"

Filler width 4" (10.2 cm)

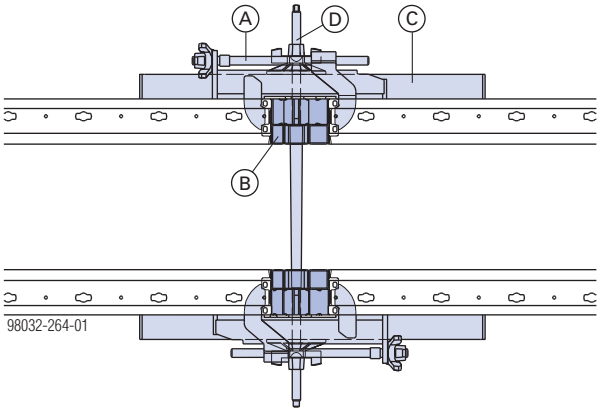
Place form-ties in filler, with universal waling



2 Frami S steel fillers 2"

Filler width 4 1/2" (11.4 cm)

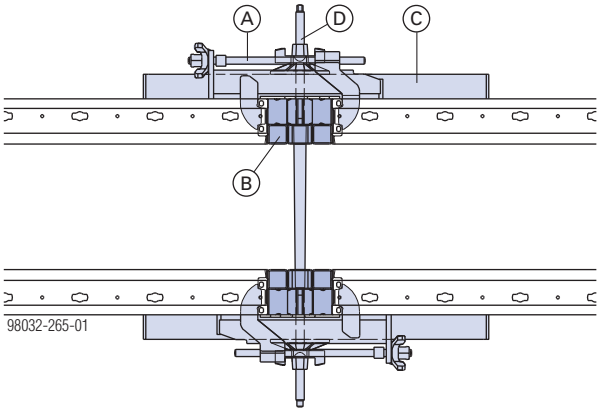
Place form-ties in filler, with universal waling



1 Frami S steel filler 1"
1 Frami S steel filler 1 1/2"
1 Frami S steel filler 2"

Filler width 5" (12.7 cm)

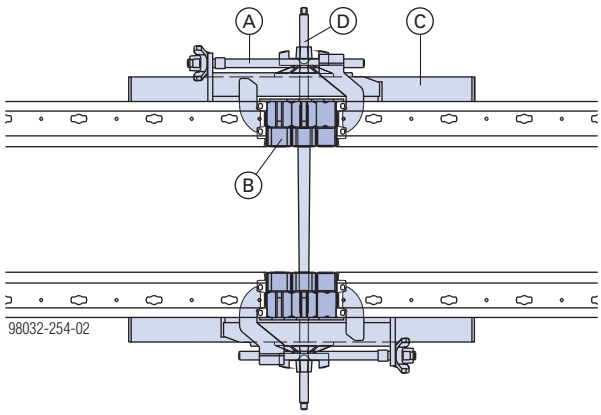
Place form-ties in filler, with universal waling



2 Frami S steel fillers 1 1/2"
1 Frami S steel filler 2"

Filler width 5 1/2" (14 cm)

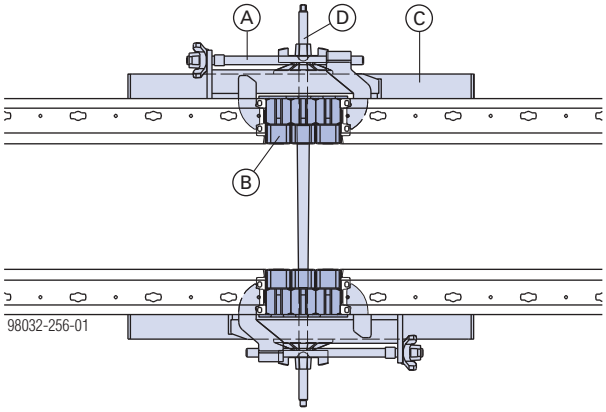
Place form-ties in filler, with universal waling



1 Frami S steel filler 1 1/2"
2 Frami S steel fillers 2"

Filler width: 6" (15.2 cm)

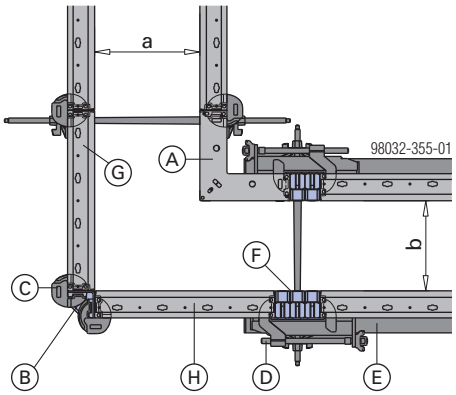
Place form-ties in filler, with universal waling



3 Frami S steel fillers 2"

A	Frami adjustable clamp
B	Frami S steel filler
C	Frami universal waling
D	Form-tie

A combination of three Frami S steel fillers 2" is used if it is necessary to tie through a 6" (15 cm) filler.

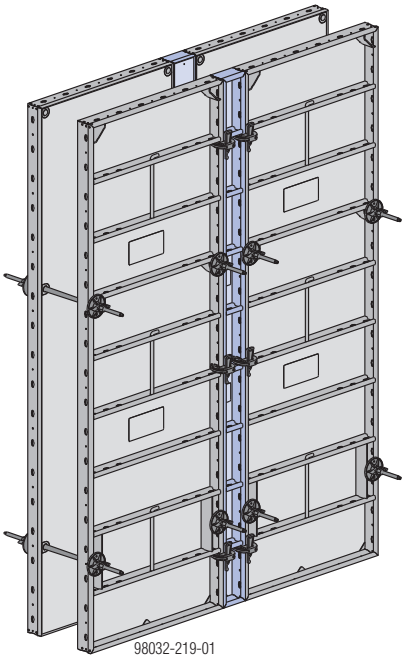


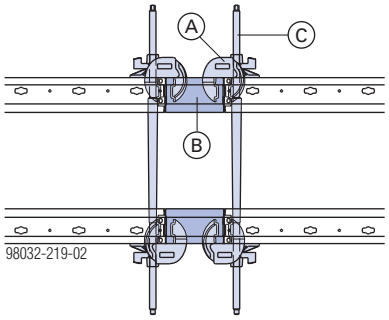
a ... 14" (35.5 cm)
b ... 12" (30.5 cm)

A	Frami S Xlife inside corner
B	Frami S outside corner
C	Frami clamp
D	Frami adjustable clamp
E	Frami universal waling
F	Frami S steel filler
G	Frami S Xlife panel 2'-0"
H	Frami S Xlife panel 2'-0"

with Frami S Xlife panel 6"

Filler width: 6" (15.2 cm)





A	Frami clamp
B	Frami S Xlife panel 6"x9'-0"
C	Tie-rod

using filler angles and plywood

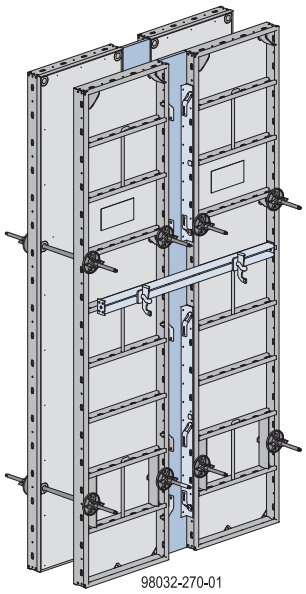
Required numbers of Frami clips:

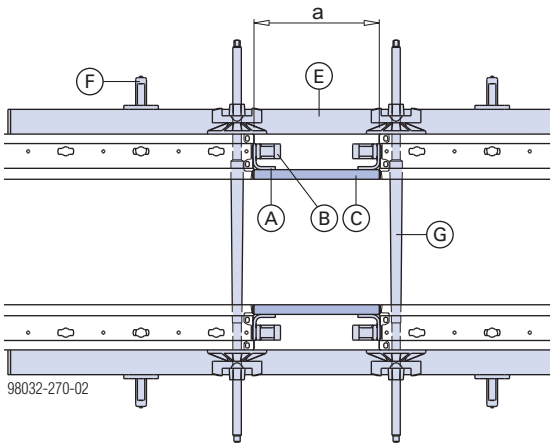
Frami S filler angle 3/4"	N° of units
3'-0"	2
4'-0"	2
6'-0"	3

NOTICE

Where tensile loads occur (on corners and bulkheads), suitable tension anchoring must be provided.

Filler width: 4" - 10" (10.2 - 25.4 cm)

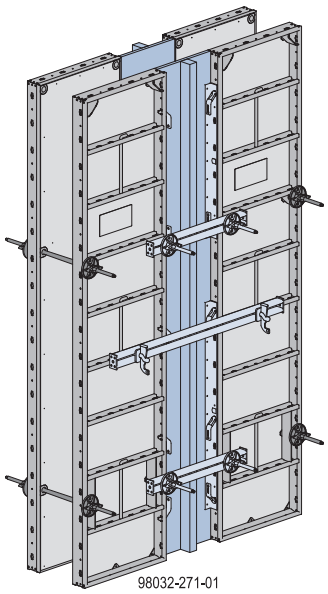


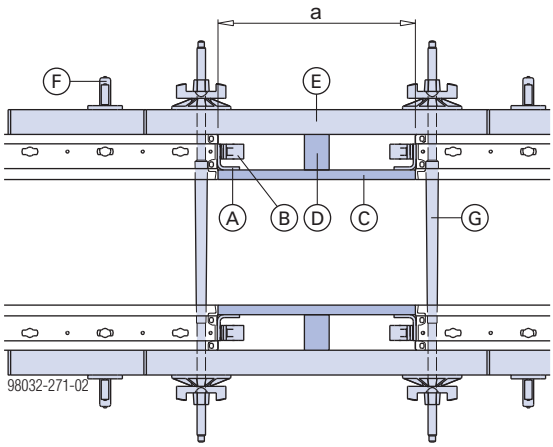


a ... 4" to 10" (10.2 to 25.4 cm)

A	Frami S filler angle
B	Frami clip
C	Plywood $^3/_4$"
E	Frami universal waling 1.25 m
F	Frami wedge clamp
G	Form-tie

Filler width: > 10" - 20" (> 25.4 - 50.8 cm)





a ... > 10" to 20" (> 25.4 to 50.8 cm)

A	Frami S filler angle
B	Frami clip
C	Plywood $^3/_4$"
D	Dimensional lumber 2 $^3/_4$"
E	Frami universal waling 0.70m and 1.25m
F	Frami wedge clamp
G	Form-tie

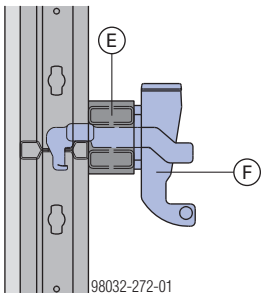
Possible ways of attaching Universal walings:

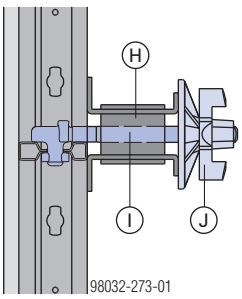
For accessories with an **overall height of 2" (5 cm)** (Frami universal waling **(E)**):

- Frami wedge clamps **(F)**

For accessories with an **overall height of 2" to 4" (5 cm to 10 cm)** (e.g. Framax S universal waling **(H)**):

- Frami universal fixing bolt **(I)** + Super-plate **(J)**

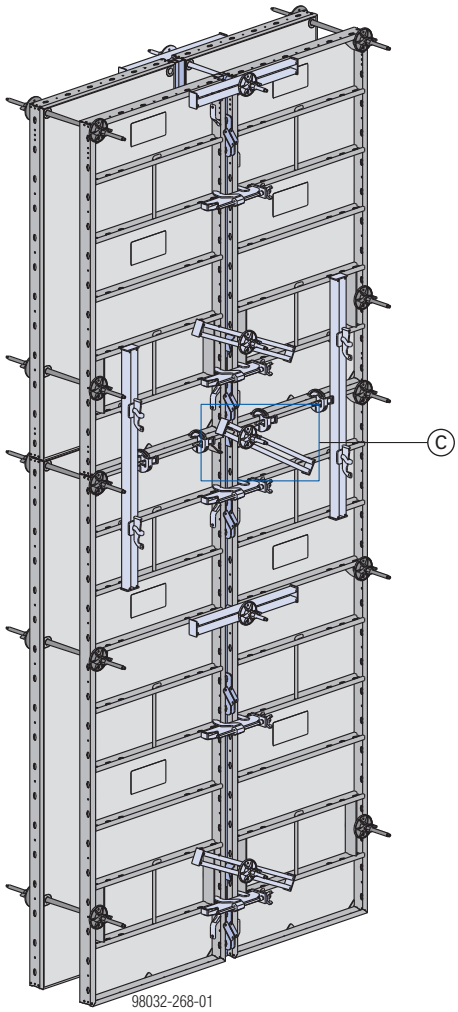




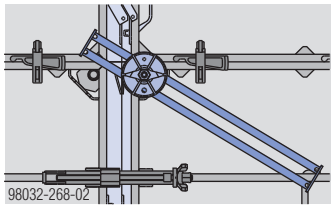
Vertical stacking with fillers

Due to the space constraints encountered here, the Universal waling is generally positioned on the panel joint at an angle.

Formwork height: 15’-0" (4.57 m)

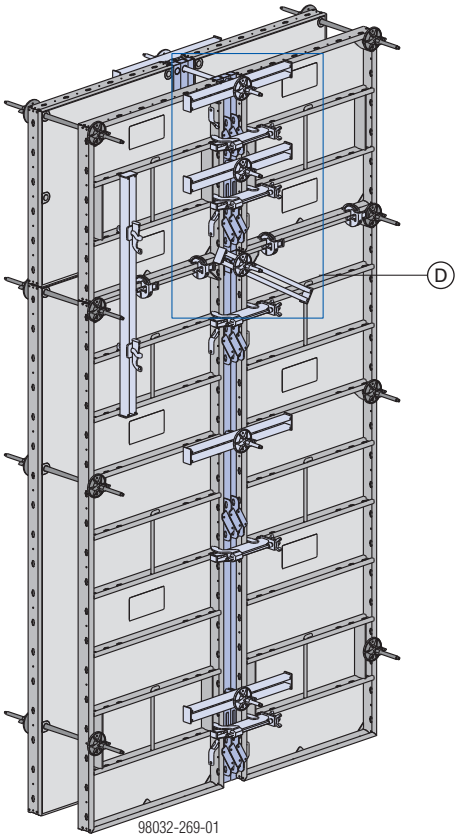


Tying at the panel joint (in the panel)

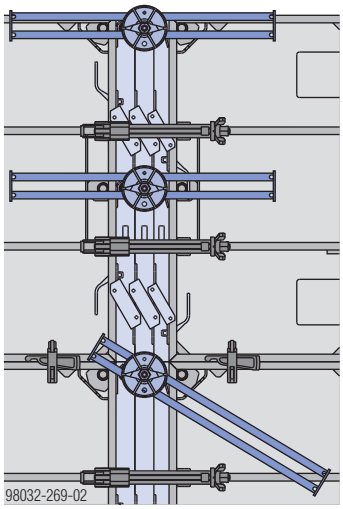


C Universal waling at an angle

Formwork height: 12’-0" (3.66 m)



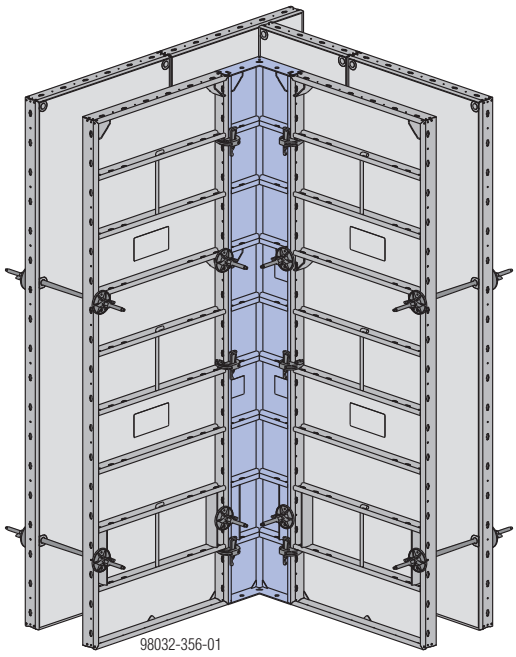
Tying at the panel joint (in the filler)

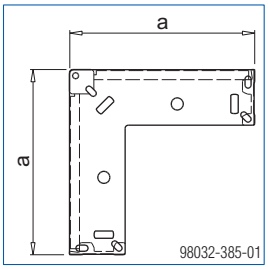


D Universal waling at an angle

90 degree corners

The corner solutions are based on the strong, torsionally rigid **Frami S Xlife inside corner.**





a ... 12" (30.5 cm)

There are **2 ways** to form right-angled **outside corners**:

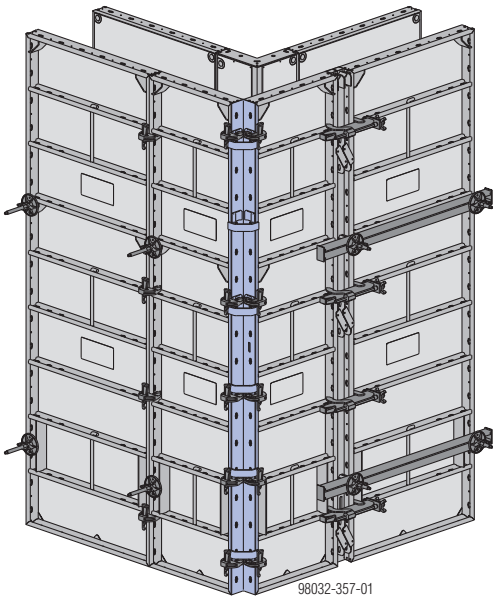
- with a Frami S Xlife universal panel
- with a Frami outside corner

Note:

For details regarding extra inter-panel connections for outside corners (for increased tensile loads): see Inter-panel connections for increased tensile loads.

with a Frami outside corner

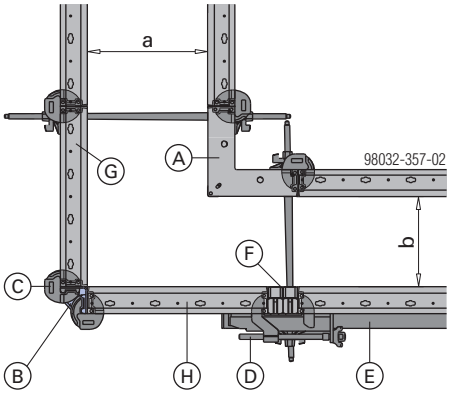
The Frami outside corner is an easy and problem-free way of forming corners in narrow trench situations or where large wall thicknesses are called for.



Required numbers of Frami clamps and Frami clip:

	Up to a wall thickness of		
	16" (41 cm)	24" (61 cm)	30" (76 cm)
Outside corner 3'-0"	4	4	4
Outside corner 4'-0"	6	6	6
Outside corner 6'-0"	6	8	8 + 4[1)]
Outside corner 9'-0"	10	12	12 + 4[1)]

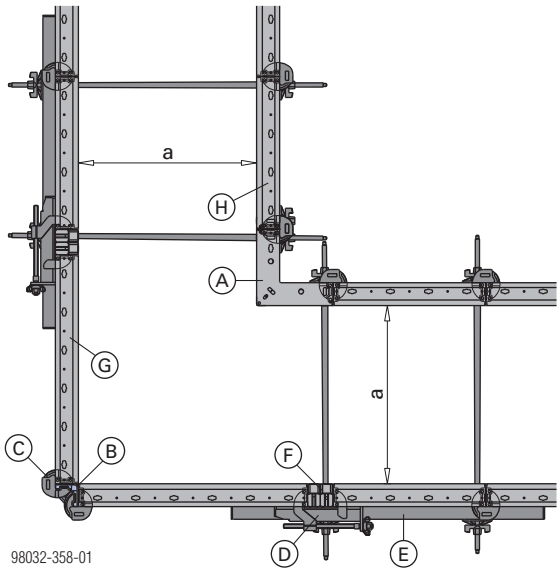
[1)] Number of Frami clips



a ... 16" (40.6 cm)
b ... 12" (30.5 cm)

A	Frami S Xlife inside corner
B	Frami S outside corner
C	Frami clamp
D	Frami adjustable clamp
E	Frami universal waling
F	Frami S steel filler
G	Frami S Xlife panel 2'-0"
H	Frami S Xlife panel 2'-0"

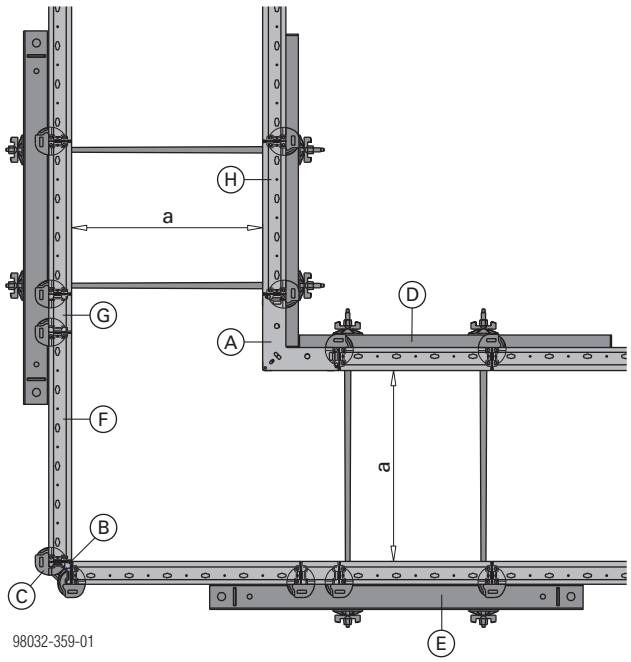
Example with a wall thickness of 28" (71 cm)



a ... 28" (71 cm)

A	Frami S Xlife inside corner
B	Frami S outside corner
C	Frami clamp + Frami clip
D	Frami adjustable clamp
E	Frami universal waling
F	Frami S steel filler
G	Frami S Xlife panel 3’-0"
H	Frami S Xlife panel (max. 2’-0")

Example with a wall thickness of 30" (76 cm)

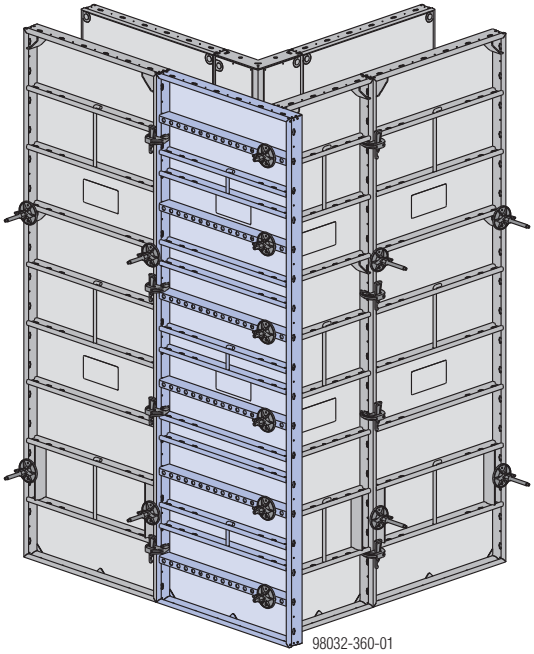


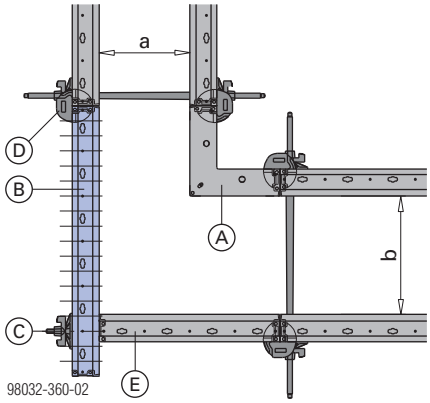
a ... 30" (76 cm)

A	Frami S Xlife inside corner
B	Frami S outside corner
C	Frami clamp + Frami clip
D	Frami universal waling
E	Framax S universal waling
F	Frami S Xlife panel 3’-0"
G	Frami S Xlife panel 6"
H	Frami S Xlife panel (max. 2’-0")

with a Frami S Xlife universal panel

When a universal panel is used, a wall-thickness grid with 2" (5.1 cm) increments is available.





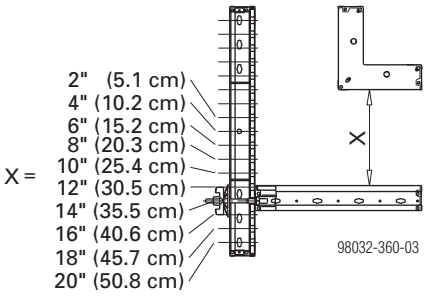
a ... 12" (30.5 cm)
b ... 16" (40.6 cm)

A	Frami S Xlife inside corner
B	Frami S Xlife universal panel
C	Frami universal fixing bolt + Super plate 15.0
D	Frami clamp
E	Frami S Xlife panel 2'-0"

Note:
Close off unneeded grid holes in the form-facing of the universal panels with **Frami plugs**.

Note:
When steel fillers are used, it is also possible to handle wall thicknesses of up to 24" (61 cm).

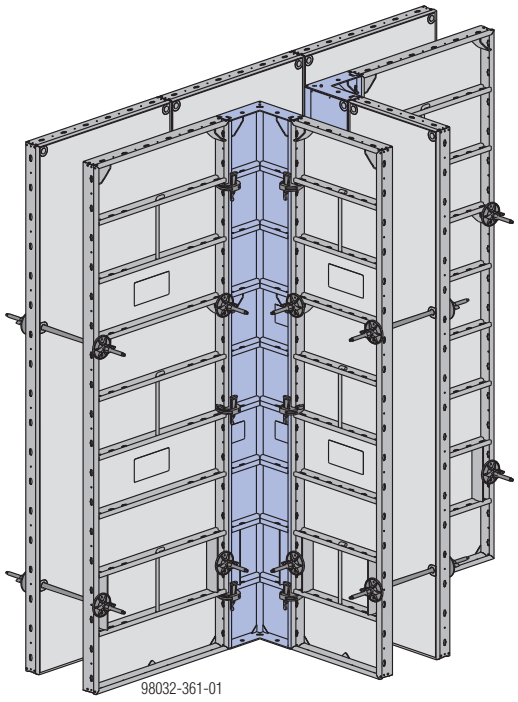
Achievable wall thicknesses in 2" (5.1 cm) grid:



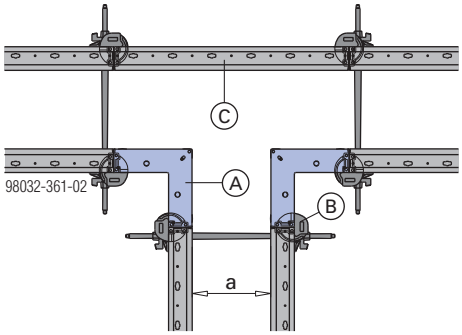
Required numbers of Frami universal fixing bolts + Super plates 15.0:

Universal panel 3'-0"x3'-0"	2
Universal panel 3'-0"x4'-0"	3
Universal panel 3'-0"x6'-0"	4
Universal panel 3'-0"x9'-0"	6

T-junction with Frami inside corner



Wall thicknesses up to 20" (50.8 cm)

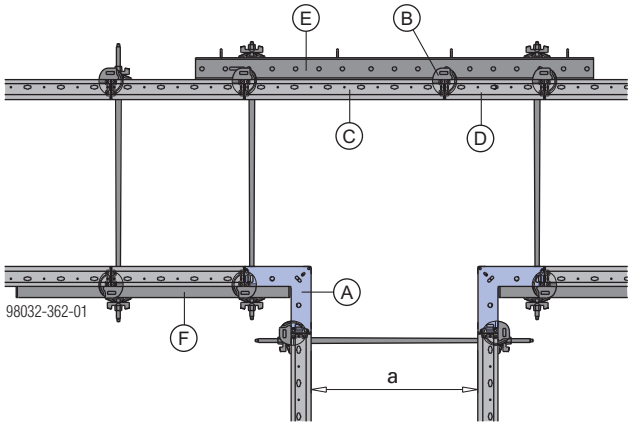


a ... 12" (30.5 cm)

A	Frami S Xlife inside corner
B	Frami clamp
C	Frami S Xlife panel 3'-0"

Where 4" steel fillers are used on both sides, wall thicknesses of up to 20" (50.8 cm) can be formed.

Wall thicknesses up to 30" (76.2 cm)



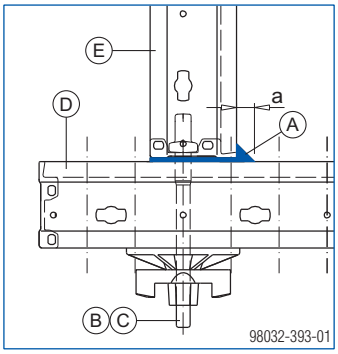
a ... 30" (76.2 cm)

A	Frami S Xlife inside corner
B	Frami clamp
C	Frami S Xlife panel 3'-0"
D	Frami S Xlife panel 1'-6"
E	Multi-purpose waling WS10 Top50 6'-0"
F	Frami universal waling

Chamfer edges

with Frami frontal triangular ledge

The Frami frontal triangular ledge can be pushed over the end face of the panel (no nails needed). For forming outside corners, it is used with the universal panel (integrated slot grid for universal fixing bolts). It is also possible to form edges using the triangular chamfer, of course.

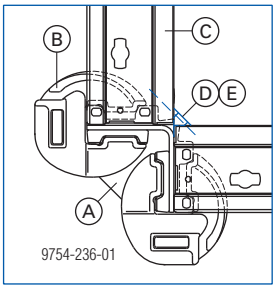


a ... 3/4" (20 mm)

A	Frami S frontal triangular ledge 3/4" or triangular chamfer
B	Frami universal fixing bolt
C	Super-plate 15.0
D	Frami S Xlife universal panel
E	Frami S Xlife panel

with triangular chamfer

Where outside corners are formed using the Frami outside corner, the Frami clamps used for the interconnection mean that the triangular chamfer has to be used here.

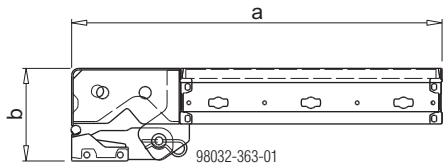


A	Frami S outside corner
B	Frami clamp
C	Frami S Xlife panel
D	Triangular chamfer
E	Wire nail

Triangular chamfers can also be used on corners formed using the Universal panel.

Pilasters

Pilasters can be formed quickly using the Frami S Xlife pilaster panels.

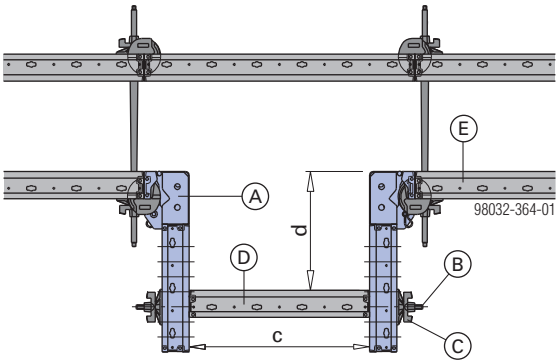


a ... 24" (61 cm)
b ... 6" (15.2 cm)

The Frami S Xlife pilaster panel permits pilaster depths of up to 20" (51 cm), in 2" (5.1 cm) increments, and of up to 24" (61 cm) when outside corners are used.

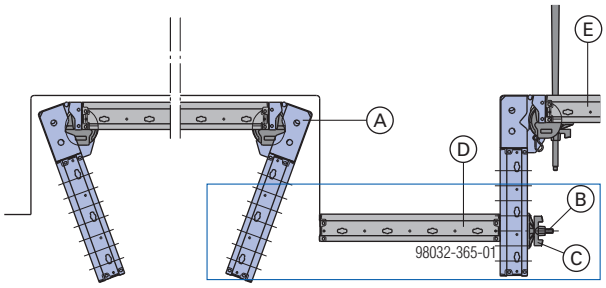
2 positions / functions:

- bolted in place at right-angles –> for pouring



c ... max. 24" (61 cm)
d ... 8" - 20" (20.3 - 51 cm)

- folded closed –> for stripping and resetting the formwork



A	Frami S Xlife pilaster panel
B	Frami universal fixing bolt 5-12cm
C	Super-plate 15.0
D	Frami S Xlife panel
E	Frami S Xlife panel > 6" (without filler)

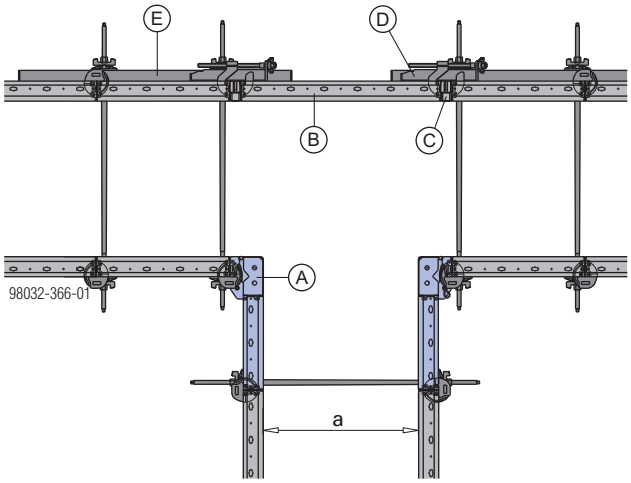
Required number of connectors per pilaster:

Panel height	Universal fixing bolts + Super-plates 15.0
3'-0"	4
4'-0"	4
6'-0"	6
9'-0"	8

To ensure that the formwork can be lifted safely, bolt the Frami S Xlife pilaster panel in the 'folded closed' position.

T-junction with Frami S Xlife pilaster panel

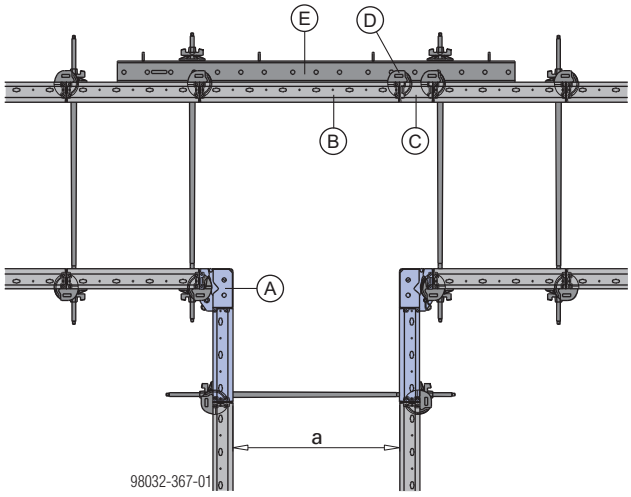
Wall thicknesses from 26" to 28" (66 to 71 cm)



a ... 26" to 28" (66 to 71 cm)

A	Frami S Xlife pilaster panel
B	Frami S Xlife panel 3'-0"
C	Frami S steel filler
D	Frami adjustable clamp
E	Frami universal waling

Wall thicknesses up to 30" (76.2 cm)



a ... 30" (76.2 cm)

A	Frami S Xlife pilaster panel
B	Frami S Xlife panel 3'-0"
C	Frami S Xlife panel 6"
D	Frami clamp
E	Multi-purpose waling WS10 Top50 6'-0"

Shaft formwork

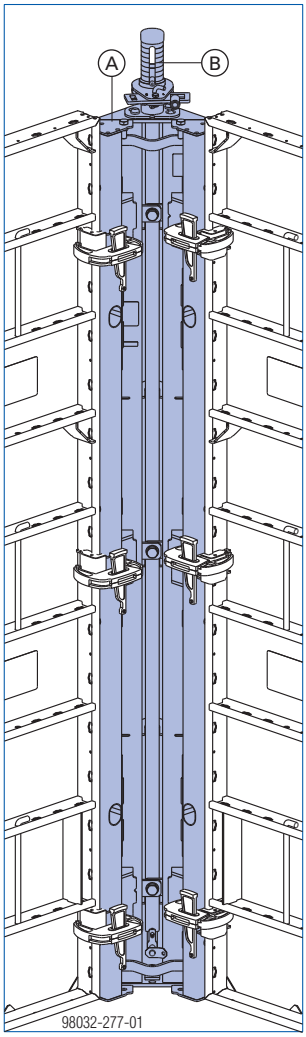
Shaft formwork with Bias-cut corner I

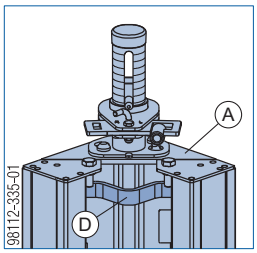
The **Framax bias-cut corner I** is used to form right-angled inside corners in the shaft.

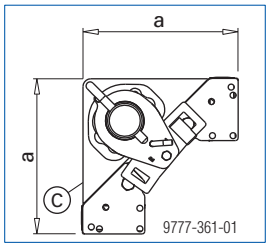
With it, the entire shaft formwork unit is detached from the wall in one piece and then repositioned by crane.

Product features:

- No negative impression in the concrete.
- Formwork set-up and stripping function integrated in the inside corner (no need for crane – uses stripping spindles).
- Entire shaft formwork unit is lifted and reset in one piece (with lifting hooks and 4-part lifting chain).







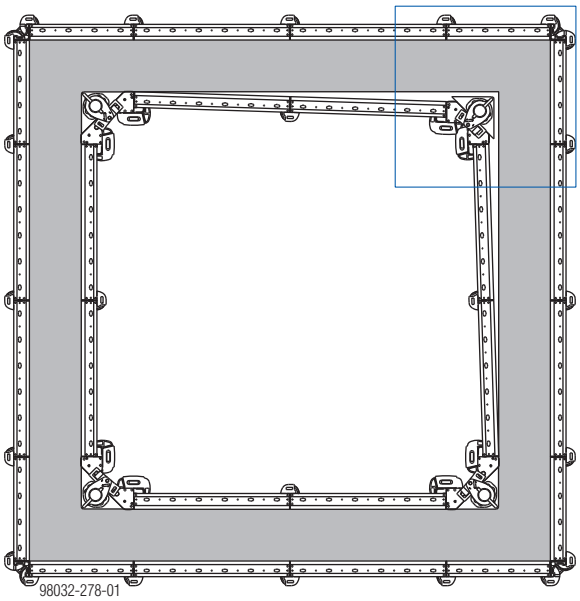
a ... 12" (30 cm)

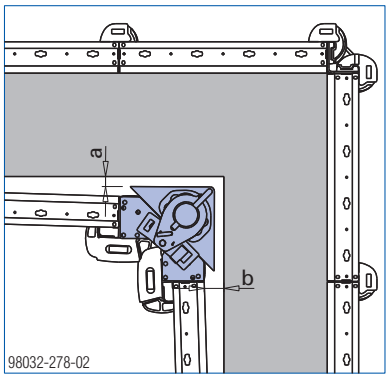
A	Framax S bias cut corner I
B	Framax stripping spindle I with ratchet
C	Steel form-facing
D	Attachment point (only for repositioning **individual** bias-cut corners!)

Position of fillers (fitting timbers) in the inside shaft formwork:

- whenever possible, not directly next to the bias-cut corners

Stripping play:



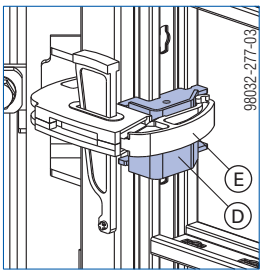


a ... 1 $^{1}/_{8}$" (30 mm)
b ... 2 $^{1}/_{4}$" (60 mm)

Joining gangs

The Framax bias-cut corner I is joined onto the Frami Xlife panels by means of **Framax quick-acting clamps RU**.

The **difference in thickness between the profiles** is bridged here by the **Frami profile adapter**.



D Frami profile adapter for Bias-cut corner I

E Framax quick-acting clamp RU

Number of Framax quick-acting clamps RU needed:

Height of Bias-cut corner I	Panel height	Number of clamps
1.35 m	3'-0"	4
1.35 m	4'-0"	4
2.70 m	6'-0"	6
2.70 m	9'-0"	6

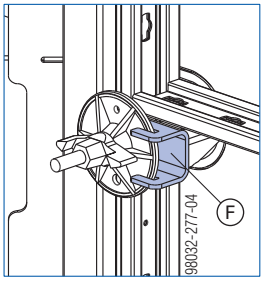
NOTICE

In order to obtain the full available stripping-play, make sure that the Framax quick-acting clamps RU are mounted at staggered heights (i.e. not opposite one another).

Tying the panels

When tying the shaft formwork, the **tie-hole positions of the Frami Xlife panels** should be used.

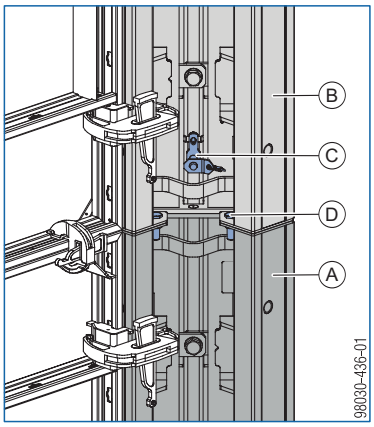
The **difference in thickness between the profiles** is bridged here by the **Frami tie-adapter**.



F Frami tie-adapter for Bias-cut corner I

Vertical stacking of Framax bias-cut corners I

- ➤ Connect lower bias-cut corner with standard panel.
- ➤ Pull the coupling bolt out of the upper bias-cut corner.
- ➤ Remove the two hex bolts from the lower bias-cut corner.
- ➤ Align and thread the upper bias-cut corner onto the lower bias-cut corner.
- ➤ Push the coupling bolt back in.
- ➤ Screw together the bias-cut corners with the just removed two hex bolts and nuts.
- ➤ Add a standard panel on top and connect to the bias-cut corner.



A Lower bias-cut corner I

B Upper bias-cut corner I

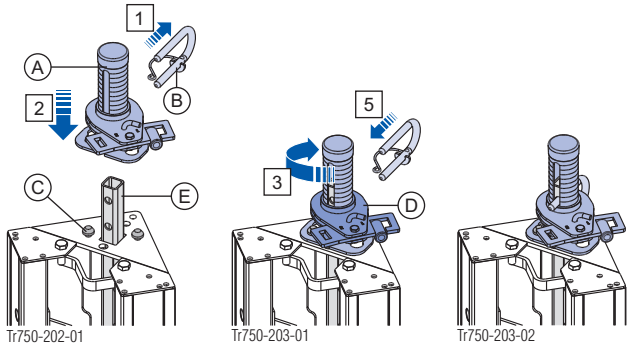
C Coupling bolt

D Hexagon bolt ISO 4019 M16x45 8.8 galv. +
Hexagon nut ISO 4032 M16 8 galv.

Video:
https://player.vimeo.com/video/256373947

Mounting the Framax stripping spindle I

1) Pull out the U-bolt from the stripping spindle.
2) Place the stripping spindle on the centering stud of the bias-cut corner.
3) Twist the stripping spindle clockwise until fully engaged.
4) Position the ratchet between the holes in the push-rod.
5) Fix the stripping spindle with the U-bolt.



A	Framax stripping spindle I with ratchet
B	U-bolt
C	Centering stud of bias-cut corner
D	Ratchet
E	Push-rod

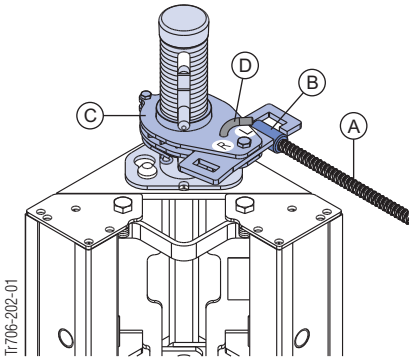
Animation: https://player.vimeo.com/video/256374622

Operating the Framax stripping spindle I with ratchet

➤ Screw a Tie-rod 15.0mm into the Weldable coupler 15.0 of the ratchet.

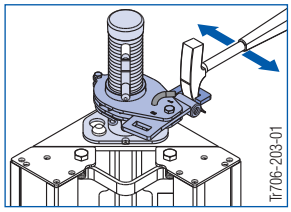
➤ **Setting up**:
- shift the change-over lever into the '**L**' position
- turn the ratchet **clockwise**.

➤ **Stripping**:
- shift the change-over lever into the '**R**' position
- turn the ratchet **anti-clockwise**.



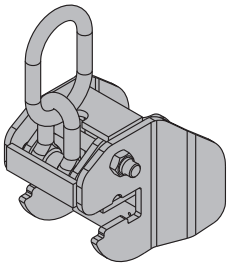
A	Tie-rod 15.0mm
B	Weldable coupler 15.0
C	Ratchet
D	Change-over lever

You can also use a **formwork hammer** to operate the ratchet, instead of a Tie-rod 15.0mm.

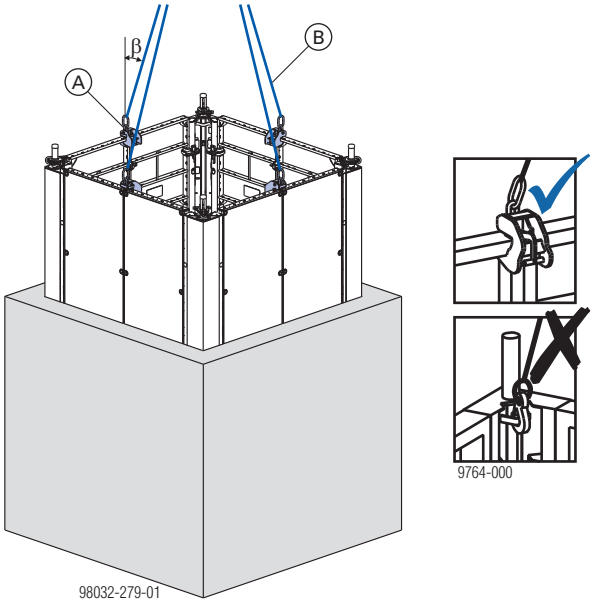


Lifting by crane

Frami lifting hook



Follow the additional directions in the Operating Instructions!



β ... max. 15°

A Frami lifting hook

B 4-part lifting chain

The attachment point on the Bias-cut corner I must not be used for lifting the shaft formwork.

➤ The shaft formwork may only be reset **using lifting hooks**.

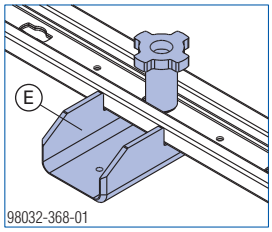
Permitted weight of the shaft formwork:
2000 kg (4400 lbs) with 4 Frami lifting hooks

Use a lifting beam for repositioning large gangforms.

Doka shaft platform

With its telescopic shaft beams, this platform can accommodate any dimension of structure. The inside formwork can be 'parked' on the platform and repositioned together with the platform.

The Frami panel shoe provides increased stability on shaft platforms.

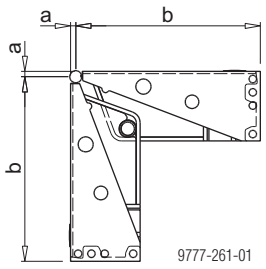


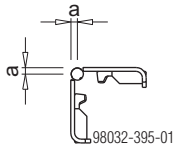
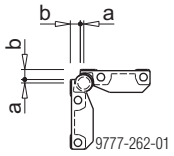
E Frami panel shoe

Follow the directions in the 'Shaft platform' User Information booklet.

Acute and obtuse-angled corners

Frami also offers hinged corners as the perfect solution for acute and obtuse-angled corners.

Hinged corner I

a ... 1/4" (0.7 cm) b ... 9 5/8" (24.3 cm)

Hinged outside corner A (galvanized)	Hinged outside corner A (powder-coated)
	
a ... 3/8" (0.85 cm)	a ... 1/8" (0.46 cm) b ... 1/2" (1.3 cm)

Note:
The Hinged outside corner A (galvanized) cannot be combined with the Hinged outside corner A (powder-coated).

N° of universal walings in the outside and inside corners:

Panel height	N° of universal walings
3'-0"	4
4'-0"	4
6'-0"	4
9'-0"	8

Position of the universal walings:
In every support level of the Hinged inside corner I.

Note:
For angles of less than 120°, no universal walings are needed in inside corners.

NOTICE
If fillers have been installed, fit extra universal walings as shown in Length adjustment using fillers.

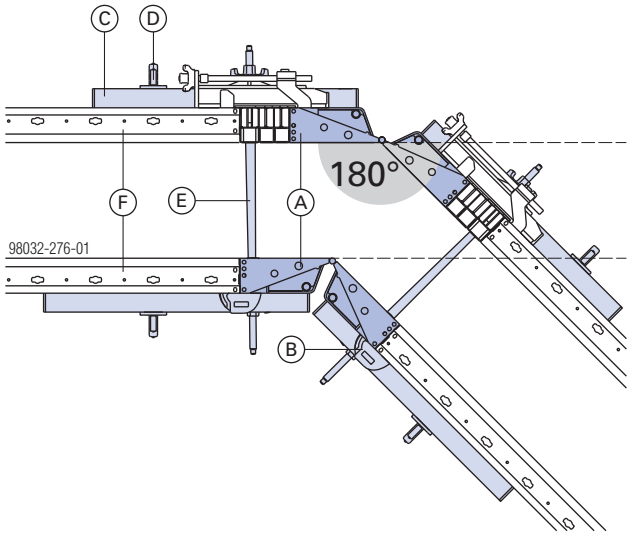
Number of Frami clamps needed in the whole hinged outside corner (i.e. for both sides):

Panel height	Width of panel next to hinged outside corner	
	up to 2'-0"	up to 3'-0"
3'-0"	4	4
4'-0"	4	6
6'-0"	6	8
9'-0"	8	12

NOTICE
For details regarding extra inter-panel connections for outside corners (for increased tensile loads): see Inter-panel connections for increased tensile loads.

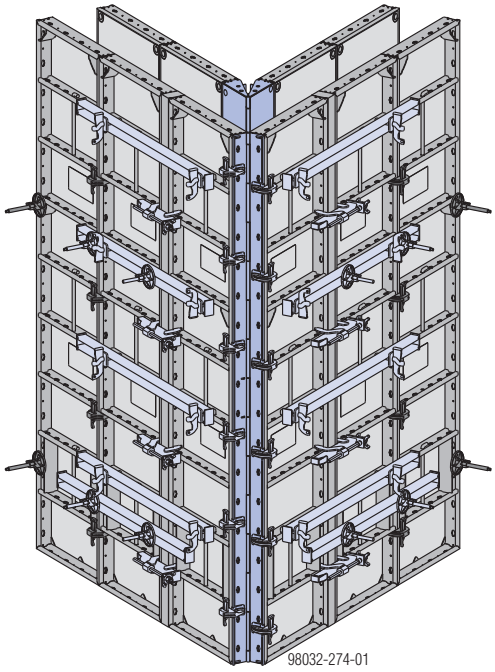
Note:
Acute-angled (pointed) corners are tied using the Tie rod system 15.0 (5/8"ø). This makes it possible to form angles down to 60°.

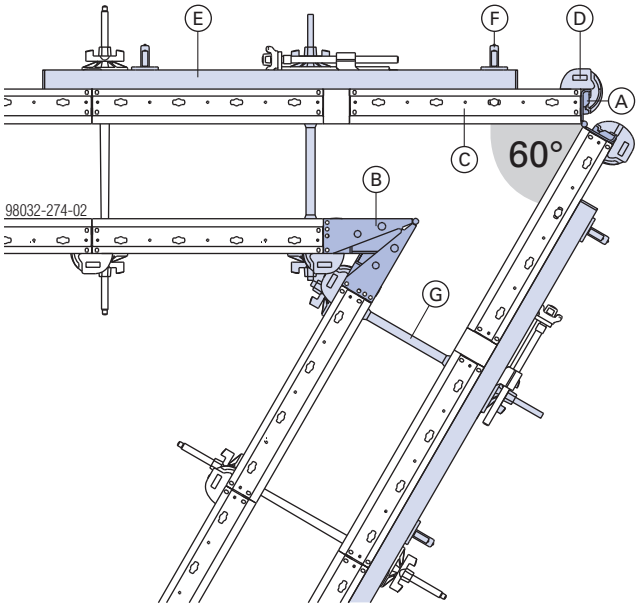
135° - 180° angles, with hinged inside corner I only



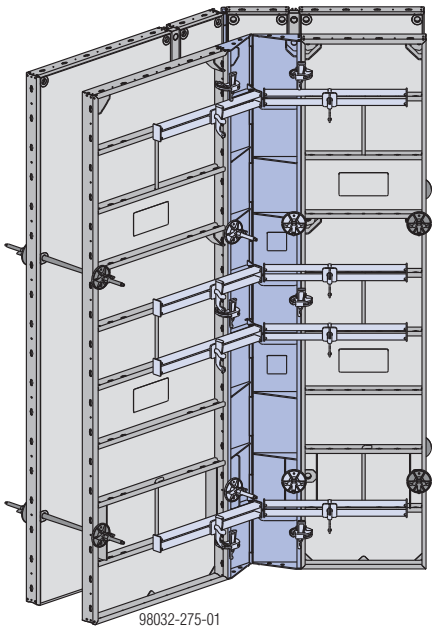
A	Frami S hinged inside corner I
B	Frami clamp
C	Frami universal waling
D	Frami wedge clamp
E	Form-tie
F	Frami S Xlife panel

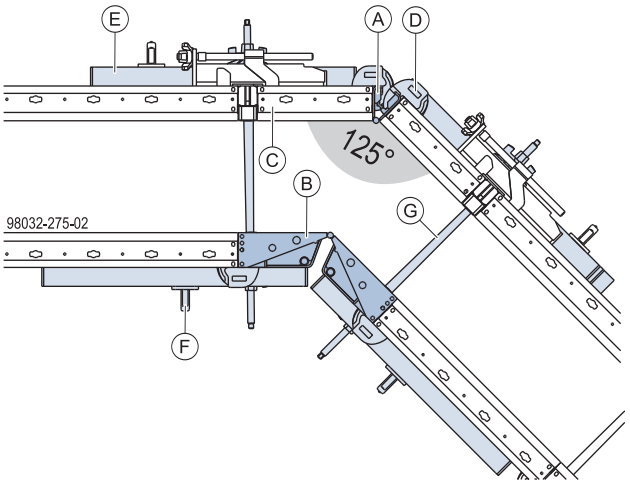
60° - 125° (140°) angles, with hinged corners I + A





A	Frami S hinged outside corner A
B	Frami S hinged inside corner I
C	Frami S Xlife panel
D	Frami clamp
E	Frami universal waling 1.25m
F	Frami wedge clamp
G	Form tie





A	Frami S hinged outside corner A
B	Frami S hinged inside corner I
C	Frami S Xlife panel
D	Frami clamp
E	Frami universal waling
F	Frami wedge clamp
G	Form tie

A 140° angle is also possible if using Frami clips instead of Frami clamps in the outside corner.

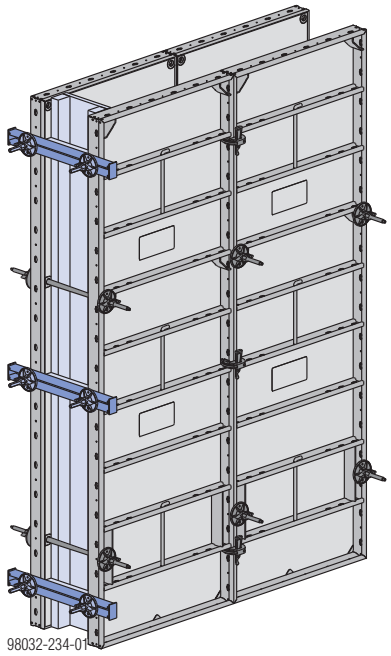
Bulkhead formwork

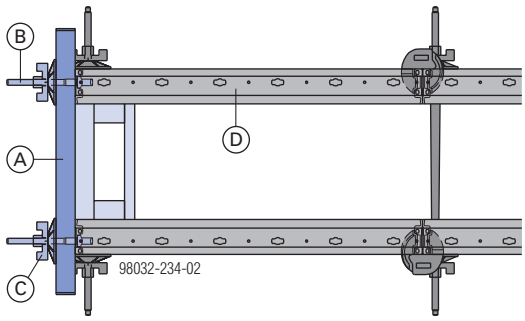
There are **4 possible ways** of forming **bulkheads**:

- with Universal walings
- with stop-end waler ties
- with an Xlife universal panel and an outside corner
- with an Xlife panel and an outside corner

with Universal walings

The Universal waling makes it possible to form bulkheads continuously across any thickness of wall. The Universal walings are mounted using Universal fixing bolts 5-12cm and Super plates 15.0.





A	Frami universal waling or Framax S universal waling
B	Universal fixing bolt 5-12cm
C	Super plate 15.0
D	Frami S Xlife panel > 6"
E	Form tie

Frami universal fixing bolt:

Permitted tensile load:

2.92 kip (13.0 kN) when used in the Xlife panel

3.51 kip (15.6 kN), when used in the Xlife universal panel

Frami universal waling:

Permitted moment: 0.96 kip-ft (1.3 kNm)

Framax S universal waling:

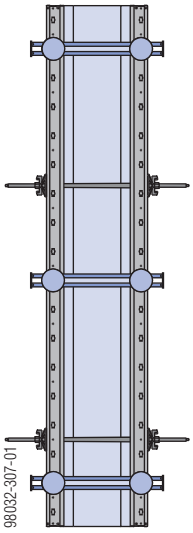
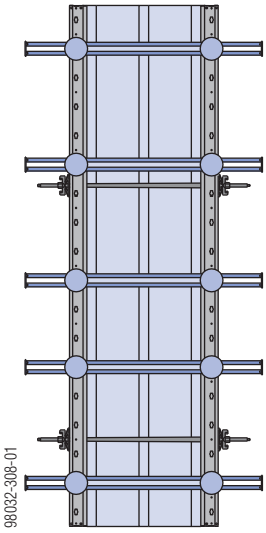
Permitted moment: 3.85 kip-ft (5.2 kNm)

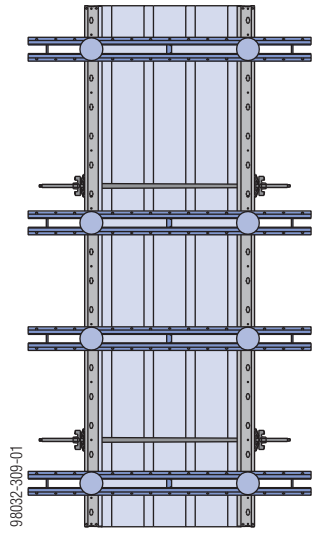
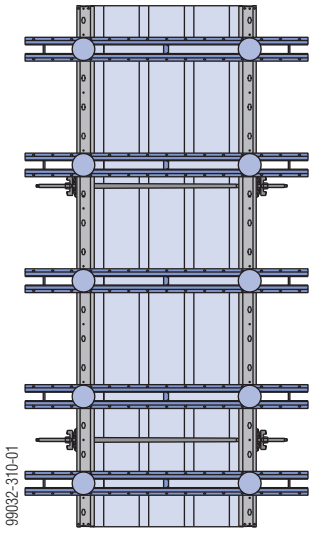
Note:

For details regarding extra inter-panel connections for bulkheads (for increased tensile loads): see Inter-panel connections for increased tensile loads.

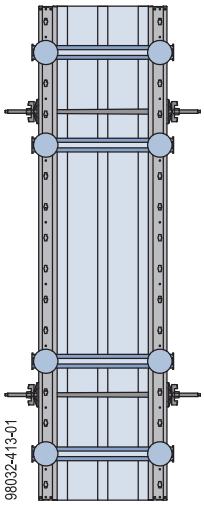
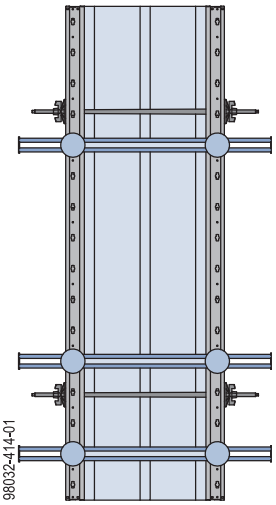
Position of the universal walings

Panel height 9'-0" (2.74 m)

Up to wall thickness **16" (40 cm)**	Up to wall thickness **24" (61 cm)**
3 Frami universal walings	5 Frami universal walings
	

Up to wall thickness **28" (71 cm)**	Up to wall thickness **30" (76 cm)**
4 Framax S universal walings	5 Framax S universal walings
	

Panel height 8'-0" (2.44 m) for horizontally positioned panel 8'-0"x9'-0"

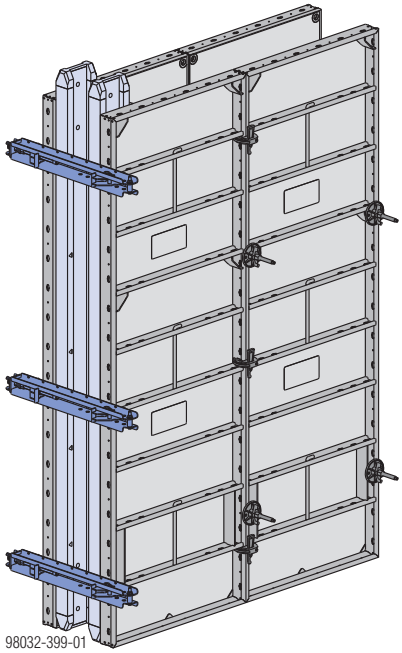
▪ Up to wall thickness **20" (51 cm)** ▪ $\sigma_{hk,\,max}$ = **1000 psf (48 kN/m²)**	▪ Up to wall thickness **24" (61 cm)** ▪ $\sigma_{hk,\,max,\,hydr}$ = **1430 psf (68.5 kN/m²)**
4 Frami universal walings	3 Frami universal walings
	

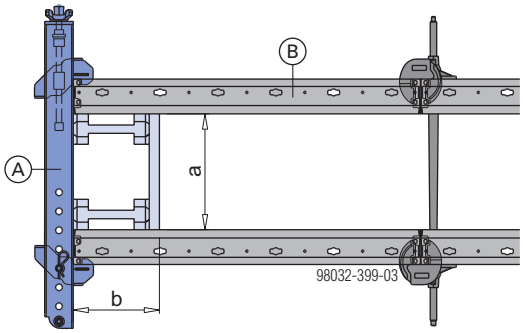
Frami universal fixing bolt:

Permitted tensile load: 2.245 kip (10.0 kN), when used in the 8'-0"x9'-0" panel.

with stop-end waler ties

The Frami stop-end waler tie 15-45cm lets you form bulkheads steplessly, from wall thicknesses of 6" (15 cm) to 18" (45 cm).





a ... 6" (15 cm) to 18" (45 cm)
b ... ≥ 8" (20 cm)

A Frami stop-end waler tie 15-45cm

B Frami S Xlife panel

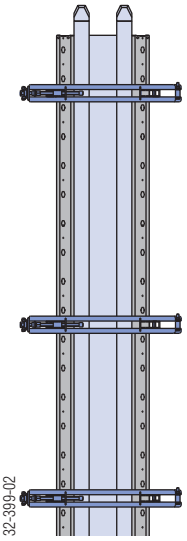
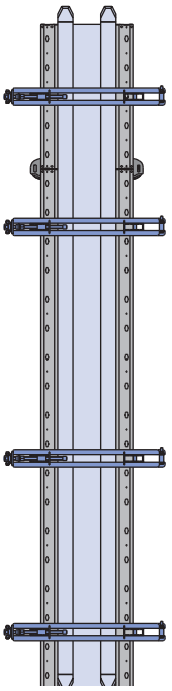
Required numbers of Frami stop-end waler ties 15-45cm:

Panel height (upright panels)	Frami stop-end waler tie 15-45cm
3'-0"	1*)
4'-0"	2
6'-0"	2
9'-0"	3

Panel width (horizontal panels)	Frami stop-end waler tie 15-45cm
6" to 2'-6"	1*)
3'-0"	2

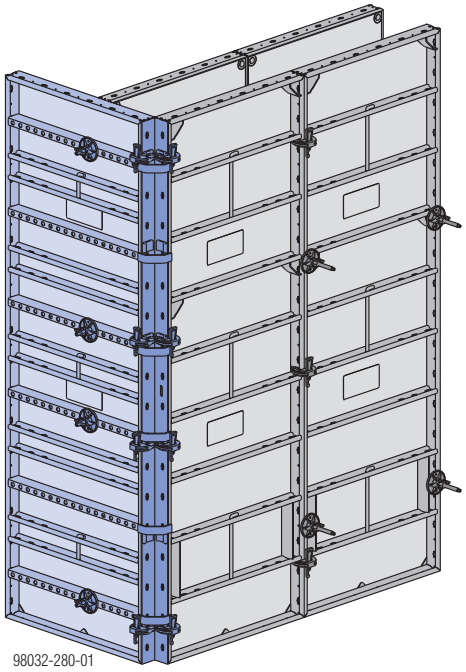
*) On single panels not forming part of a gang (e.g. when being used as footing and grade-beam formwork), at least 2 stop-end waler ties must be used.

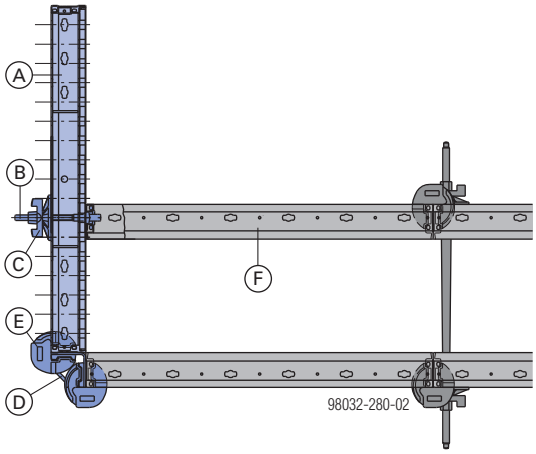
Positioning the stop-end waler ties:

Example for formwork height 9'-0" (2.74 m)	Example for formwork height 11'-6" (3.50 m)
	

with an Xlife universal panel and an outside corner

The continuous hole grid on the Universal panels makes it possible to form bulkheads in 2" (5.1 cm) increments.





A Frami S Xlife universal panel
B Frami universal fixing bolt 5-12cm
C Super-plate 15.0
D Frami S outside corner
E Frami clamp
F Frami S Xlife panel

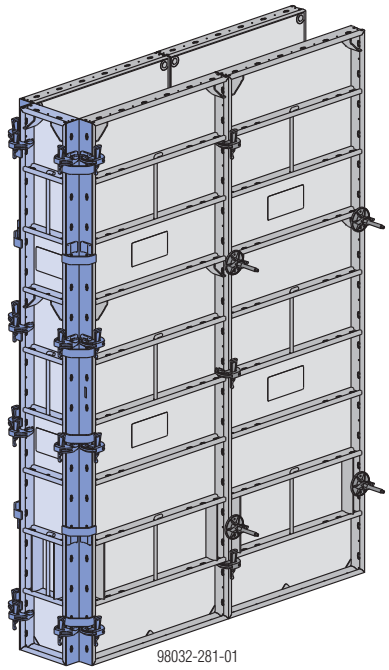
Required numbers of connectors:

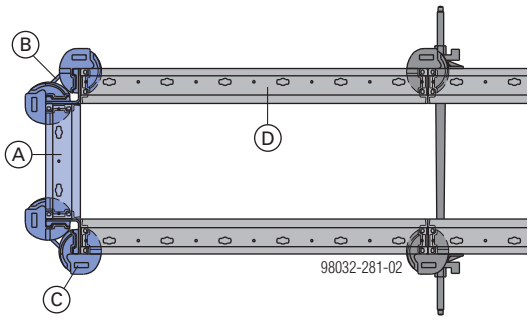
Panel height	Universal fixing bolt + Super-plate	Frami clamp
3'-0"	2	4
4'-0"	2	4
6'-0"	3	6
9'-0"	4	8

The values given here apply up to a wall thickness of 24" (61 cm).

with an Xlife panel and an outside corner

For walls whose thickness corresponds exactly to the panel width.





A Frami S Xlife panel
B Frami S outside corner
C Frami clamp

Required numbers of Frami clamps per bulkhead:

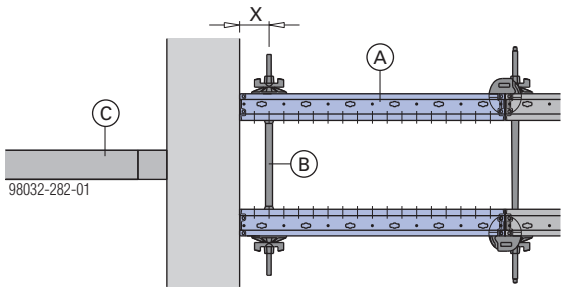
Panel height	Frami clamp
3'-0"	8
4'-0"	8
6'-0"	12
9'-0"	16

The values given here apply up to a wall thickness of 24" (61 cm).

Wall junctions

Right-angled connections

with an Xlife universal panel:

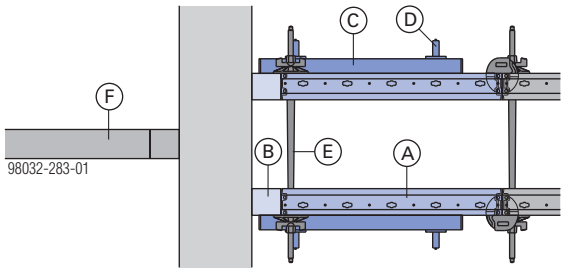


A Frami S Xlife universal panel
B Tie-rod 15.0mm
C In-place timber brace

Number of form-ties:

Form-tie position **X**	Xlife universal panel			
	3'-0"	4'-0"	6'-0"	9'-0"
Up to 6" (15 cm)	2	2	3	4
Up to max. 10" (25 cm)	2	2	4	6

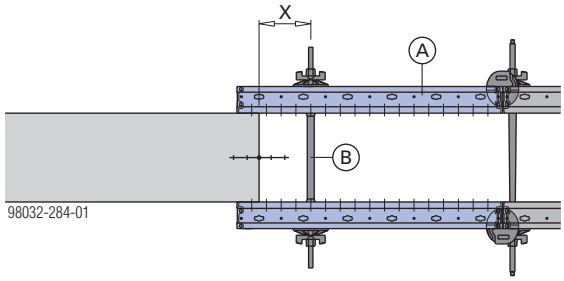
with Xlife panel and dimensional lumber:



A Frami S Xlife panel
B Dimensional lumber, max. 4" (10 cm)
C Universal waling – not needed if the squared timber is less than 2" (5 cm) wide
D Frami wedge clamp
E Form-tie
F In-place timber brace

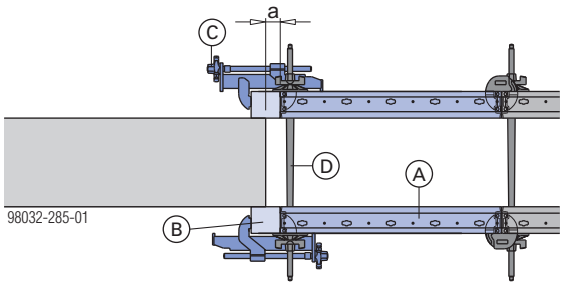
In-line connections

with an Xlife universal panel:



A Frami S Xlife universal panel
B Tie-rod 15.0mm

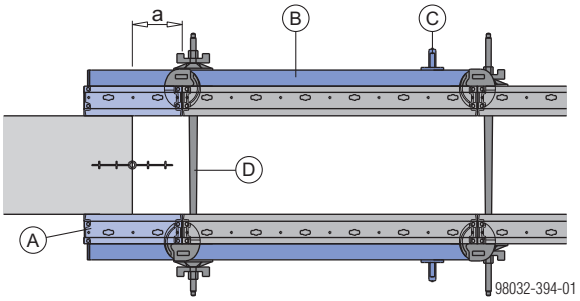
with Xlife panel and dimensional lumber:



a ... max. 2" (5 cm)

A Frami S Xlife panel
B Dimensional lumber
C Adjustable clamp
D Form-tie

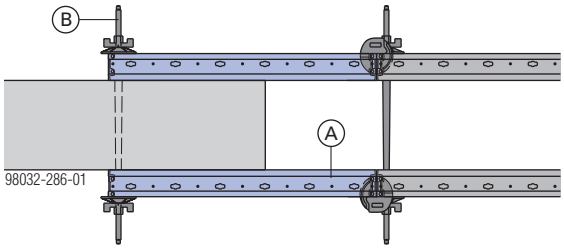
with Xlife panel 1'-0":



a ... max. 8" (20 cm)

A Frami S Xlife panel 1'-0"
B Frami universal waling 1.25m
C Frami wedge clamp
D Form-tie

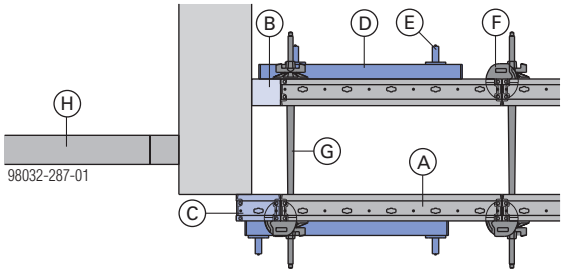
with an Xlife panel from the previous casting section:



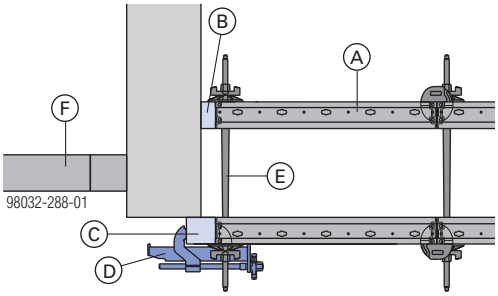
A Frami S Xlife panel
B Form-tie

Corner connections

with Xlife panel and dimensional lumber:



A Frami S Xlife panel
B Dimensional lumber, max. 4" (10 cm)
C Frami S Xlife panel 6"
D Universal walings – not needed if the squared timber is less than 2" (5 cm) wide
E Frami wedge clamp
F Frami clamp
G Form-tie
H In-place timber brace



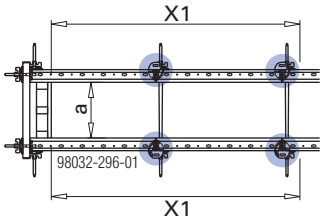
A Frami S Xlife panel
B Dimensional lumber, max. 2" (5 cm)
C Dimensional lumber
D Adjustable clamp
E Form-tie
F In-place timber brace

Inter-panel connections for increased tensile loads

As a basic rule, only **3 clamps are needed per 9’-0" panel height**, and **2 clamps per 6’-0", 4’-0" and 3’-0" panel height**, as tension links between the panels. However, where **increased tensile loads** need to be sustained near outside corners and stop-ends, **extra clamps are needed**.

Near bulkheads

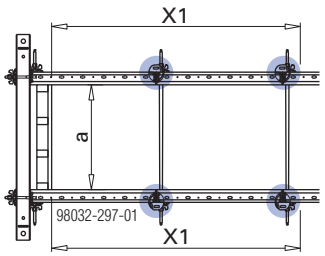
for wall thicknesses from 16" to 24" (40 to 61 cm)



a ... 16" to 24" (40 to 61 cm)

Panel height	Number of clamps In zone **"X1"** (panel joints **within 6’-0" (1.8 m)** of a bulkhead)
9’-0"	3 **+ 1**
6’-0"	2 **+ 1**
4’-0"	2
3’-0"	2

for wall thicknesses of over 24" and up to 30" (61 cm and up to 76 cm)

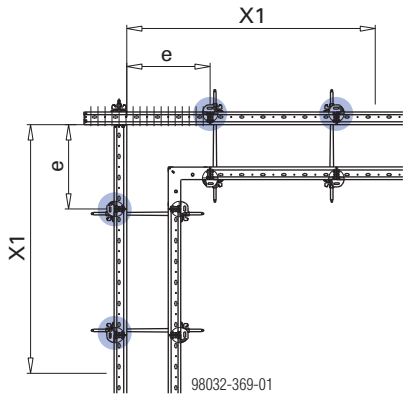


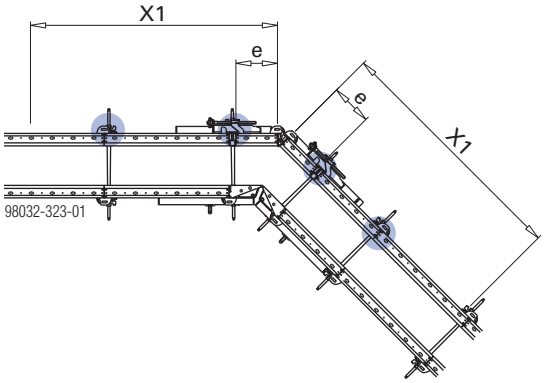
a ... up to 30" (76 cm)

Panel height	Number of clamps In zone **'X1'** (panel joints **up to 6’-0" (1.8 m)** away from a bulk-head)
9’-0"	3 **+ 2**
6’-0"	2 **+ 1**
4’-0"	2
3’-0"	2

Near outside corners

for panel widths up to 2’-0"

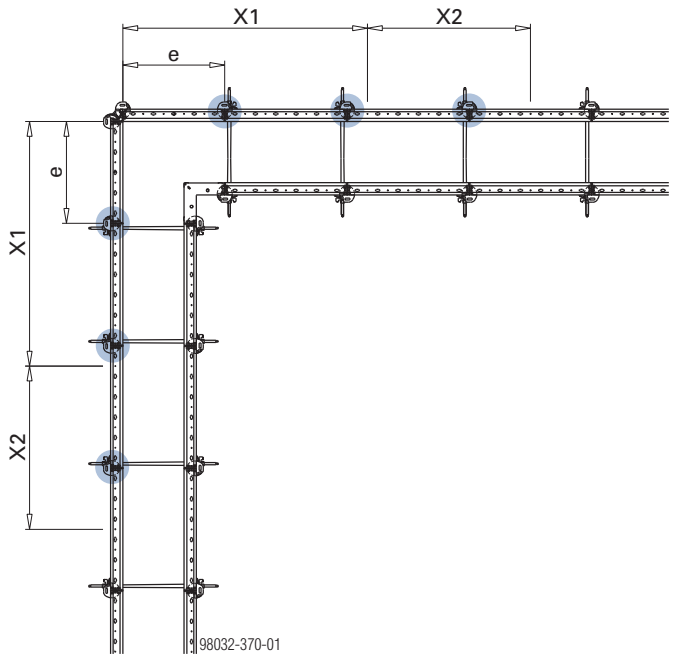


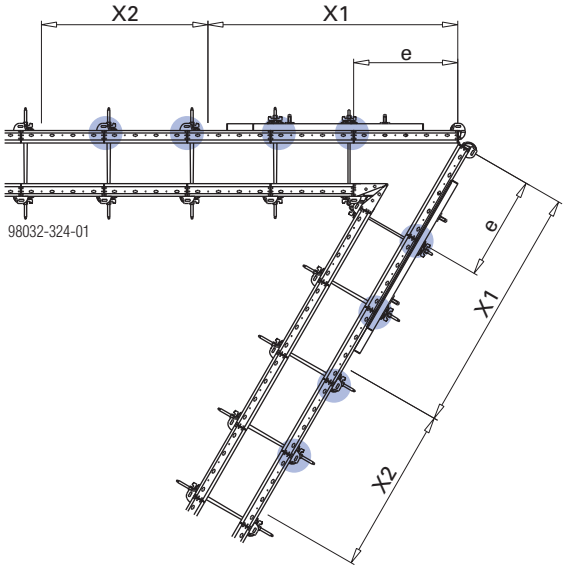


e ... up to 2’-0" (panel width)

Panel height	Number of clamps In zone **'X1'** (panel joints **within 6’-0" (1.8 m)** of an outside corner)
9’-0"	3 **+ 1**
6’-0"	2 **+ 1**
4’-0"	2
3’-0"	2

for panel widths over 2’-0" and up to 3’-0"

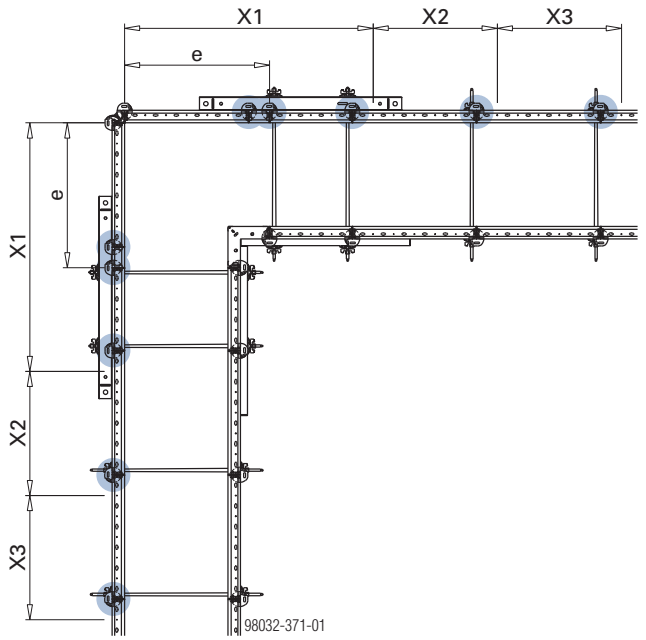




e ... > 2'-0" up to 3'-0" (panel width)

Panel height	Number of clamps	
	In **zone 'X1'** (panel joints **up to 6’-0" (1.8 m)** from an outside corner)	In **zone 'X2'** (panel joints **6’-0" to 10’-0" (1.8 to 3.0 m)** from an outside corner)
9'-0"	3 **+ 3**	3 **+ 1**
6'-0"	2 **+ 2**	2 **+ 1**
4’-0"	2 **+ 1**	2
3'-0"	2	2

for panel widths of over 3’-0" and up to 3’-6"



e ... > 3’-0" up to 3’-6" (panel width)

Panel height	N° of clamps		
	In **zone 'X1'** (panel joints **up to 6’-0" (1.8 m)** from an outside corner)	In **zone 'X2'** (panel joints **6’-0" to 9’-0" (1.8 to 2.74 m)** from an outside corner)	In **zone 'X3'** (panel joints **9’-0" to 12’-0" (2.74 to 3.65 m)** from an outside corner)
9'-0"	3 **+ 3**	3 **+ 2**	3 **+ 1**
6'-0"	2 **+ 2**	2 **+ 1**	2 **+ 1**
4'-0"	2 **+ 1**	2	2
3'-0"	2	2	2

Vertical stacking of panels

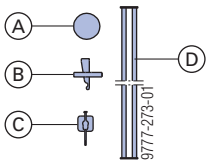
Positions of the interconnecting and form-tie components and accessories needed for:

- Lifting and setting down
- Crane-handling
- Pouring platform
- Pouring

Note:
Follow the directions under Form-tie system.

Frami clamp:
Permitted tensile force: 2.245 kip (10.0 kN)
Permitted shear force: 1.12 kip (5.0 kN)
Permitted moment: 0.15 kip-ft (0.20 kNm)

Frami universal waling:
Permitted moment: 0.96 kip-ft (1.3 kNm)

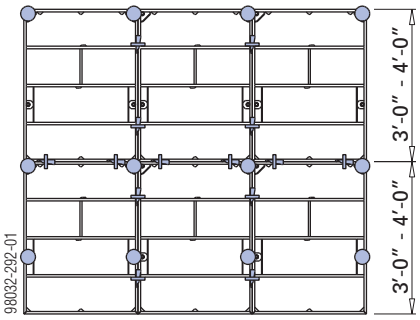


A	Tie rod + Super plate 15.0
B	Frami clamp
C	Frami wedge clamp
D	Frami universal waling 1.25m

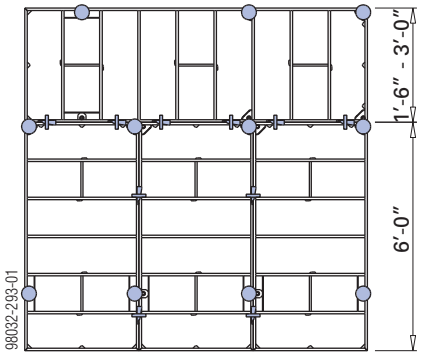
NOTICE
Do not oil or grease wedge-clamped joints.

Note:
When panels are vertically stacked, the arrows point upward.

Formwork height:
6’-0" to 8’-0" (183 to 244 cm)

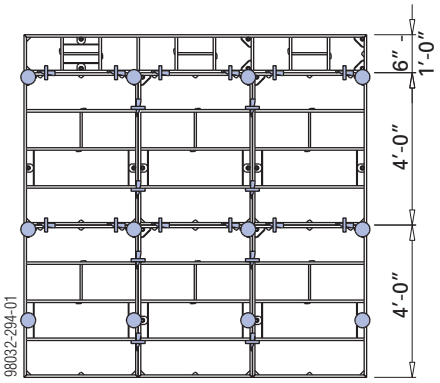


Formwork height:
7’-6" to 9’-0" (228 to 274 cm)

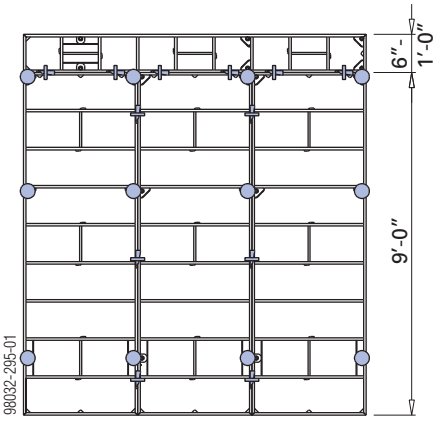


NOTICE
Stack max. 3’-0" on top of one 6’-0" high basic panel!

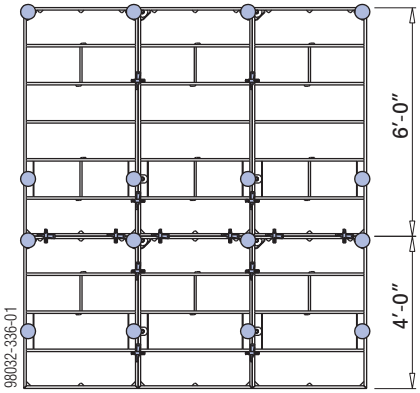
Formwork height:
8’-6" and 9’-0" (259 and 274 cm)



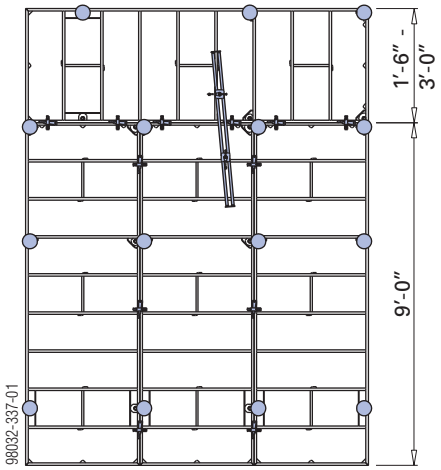
Formwork height:
9’-6" and 10’-0" (289 and 305 cm)



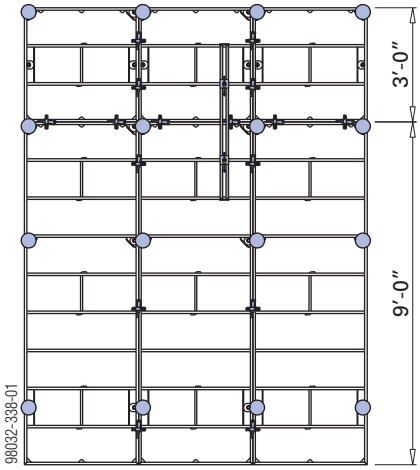
Formwork height: 10’-0" (305 cm)



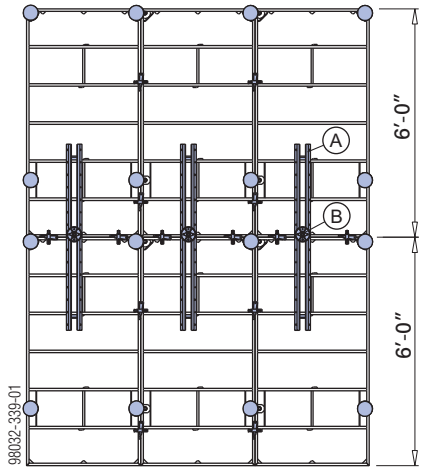
Formwork height: 10’-6" to 12’-0" (320 to 365 cm)



Formwork height: 12’-0" (365 cm)



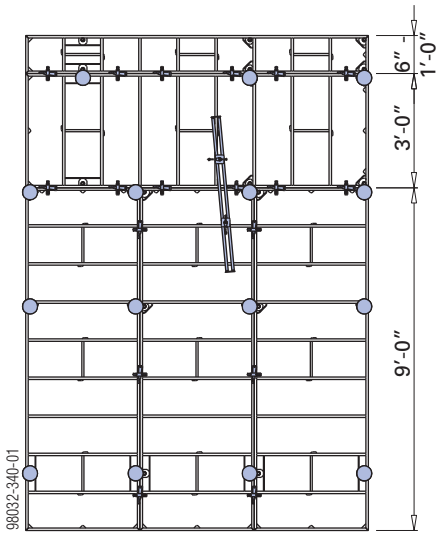
Formwork height: 12’-0" (365 cm)



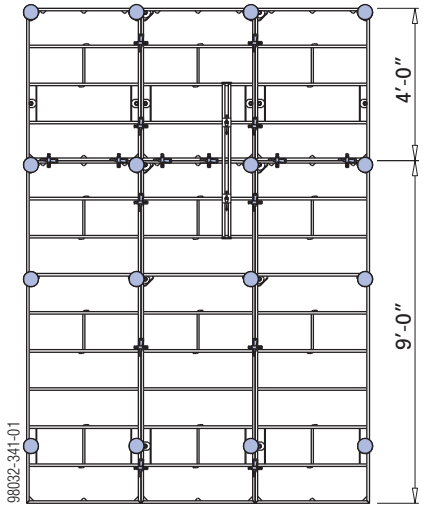
A Framax S universal waling 1.50m

B Frami profile connector 5-18cm + Super plate 15.0

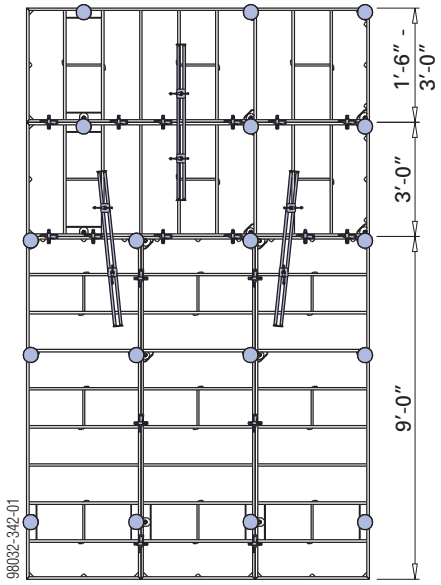
Formwork height: 12’-6" and 13’-0" (381 and 396 cm)



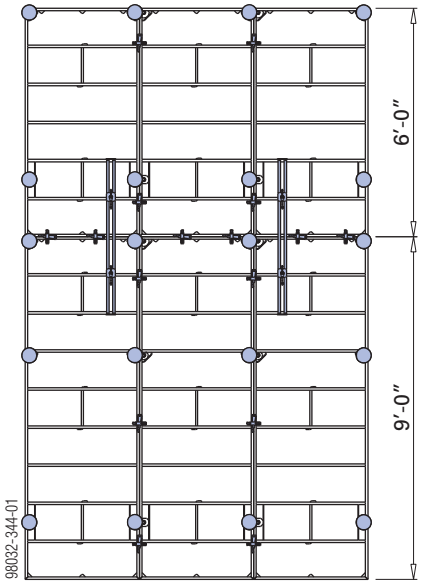
Formwork height: 13’-0" (396 cm)



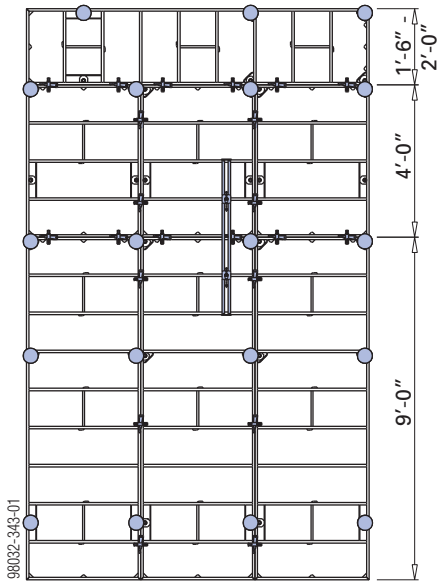
Formwork height:
13’-6" to 15’-0" (411 to 457 cm)



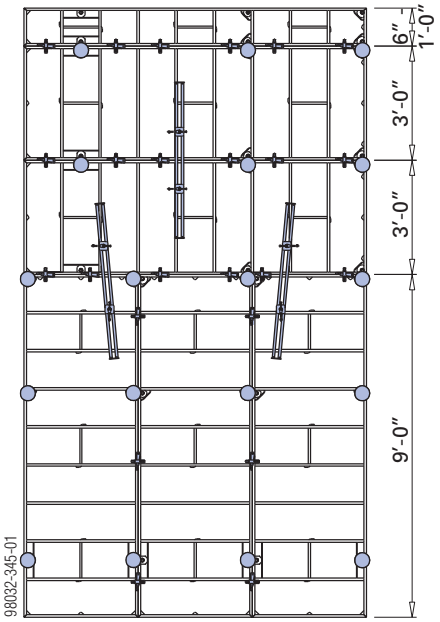
Formwork height:
15’-0" (457 cm)



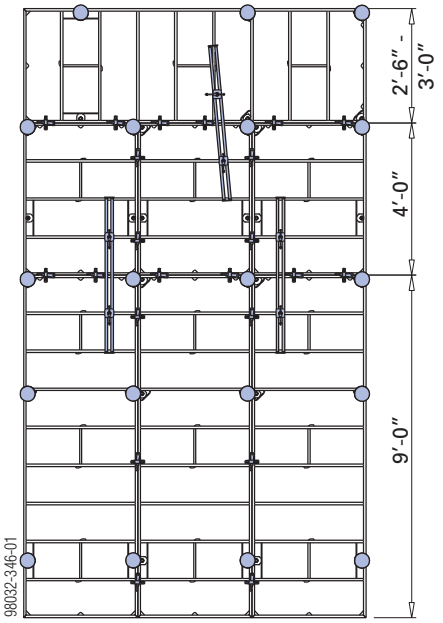
Formwork height:
14’-6" and 15’-0" (442 and 457 cm)



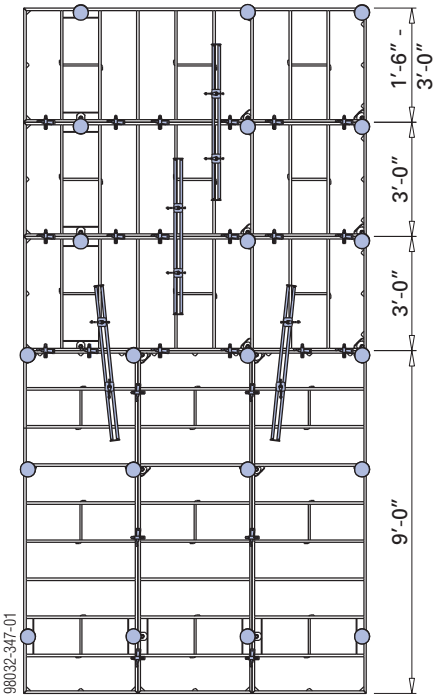
Formwork height:
15’-6" and 16’-0" (472 and 487 cm)



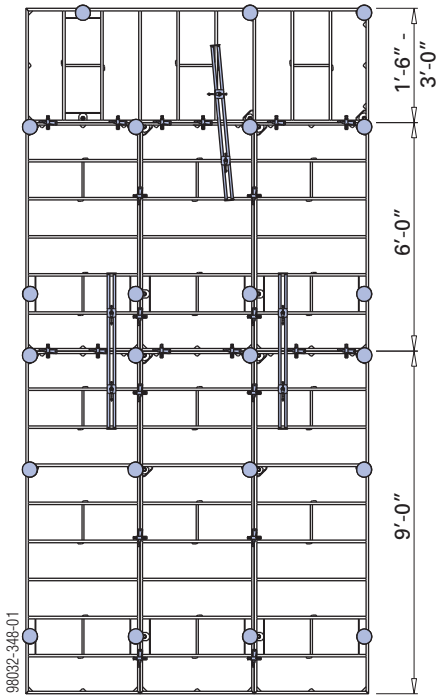
Formwork height:
15’-6" and 16’-0" (472 and 487 cm)



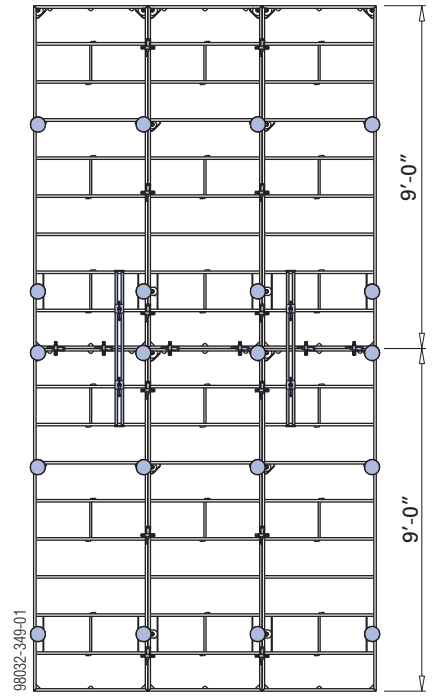
Formwork height:
16’-6" to 18’-0" (503 to 548 cm)



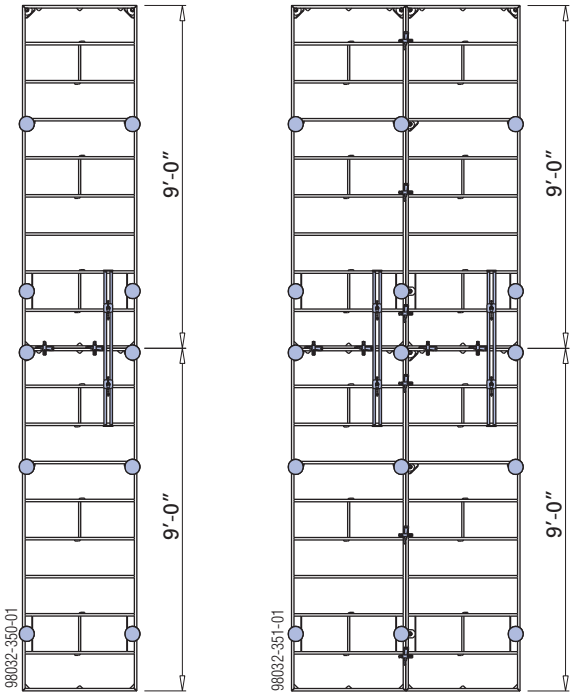
Formwork height:
16’-6" to 18’-0" (503 to 548 cm)



Formwork height:
18’-0" (548 cm)



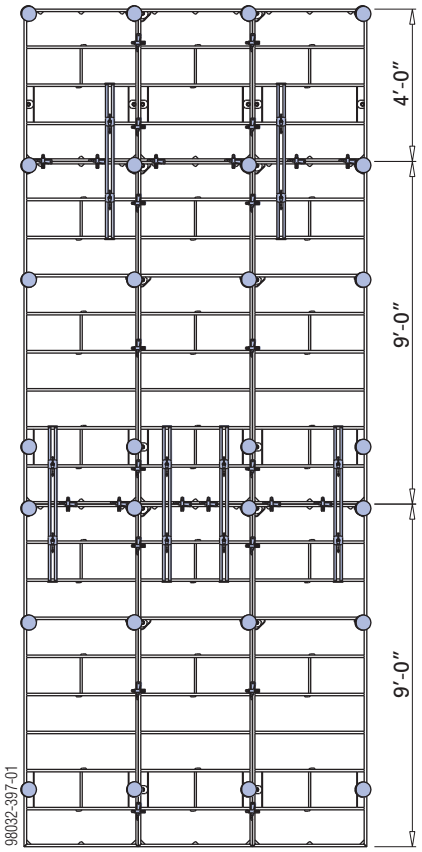
Note:
When adding narrow gangs, observe the following rules for vertical stacking of panels:



Other combinations require correspondingly more connector components.

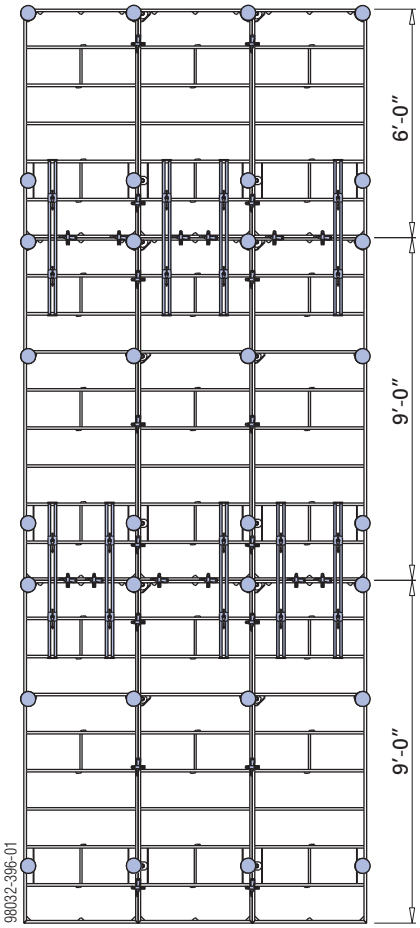
The illustrations given here show the most economical solutions for each formwork height.

Formwork height:
22-'0" (670 cm)

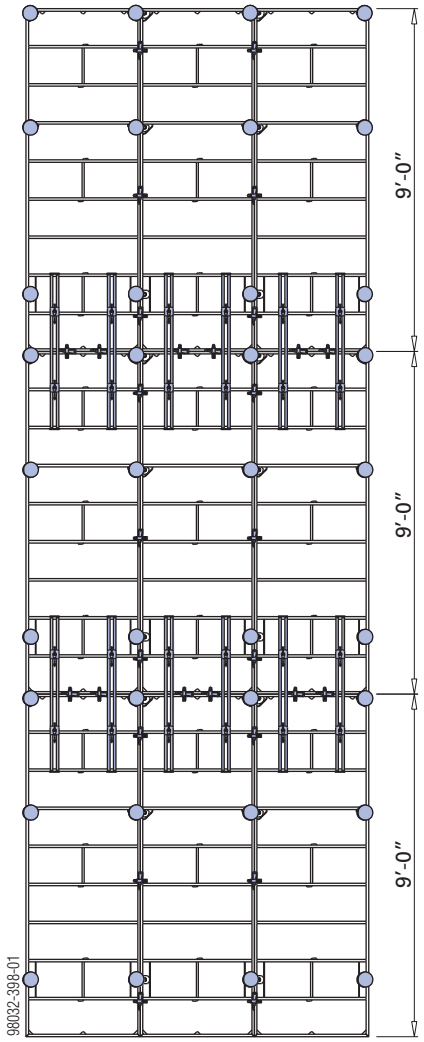


Note:
The accessories shown here must also be used for a formwork height of 21'-0" (640 cm)

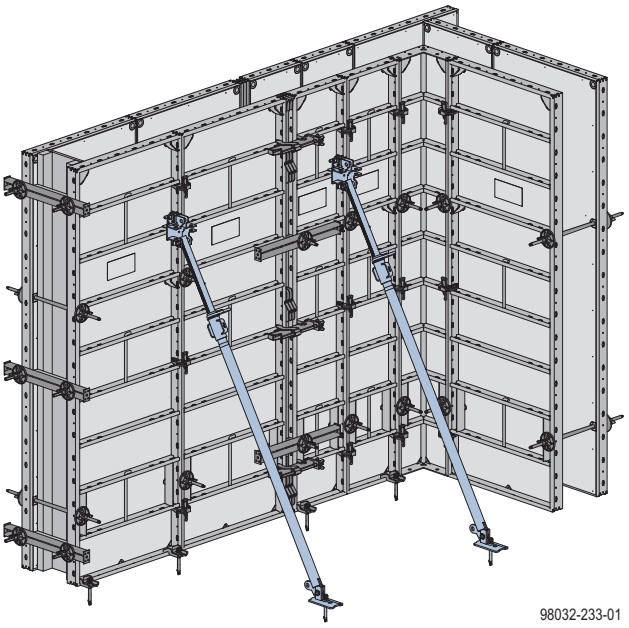
Formwork height:
24’-0" (731 cm)



Formwork height:
27’-0" (823 cm)



Plumbing accessories



Plumbing accessories brace the formwork against wind loads and make it easier to plumb and align.

WARNING

Risk of the formwork tipping over!

- ➤ Formwork panels must be held stable **in every phase** of construction work!
- ➤ Comply with all applicable safety regulations!
- ➤ If **high wind speeds** are likely, when work is done for the day, and before prolonged work breaks, always take extra precautions to secure the formwork in place.
  Suitable measures:
  - set up the opposing formwork
  - place the formwork against a wall
  - secure the framework to the ground (e.g. using Frami bracing clips)
- ➤ The safety pin is only used to roughly adjust the plumbing accessories (struts and pipe-braces) and must not be removed or detached while under load.

For more information (wind loads etc.) see the section headed 'Vertical and horizontal loads' in the 'Doka formwork engineering' Calculation Guide.

The rule-of-thumb here is:

The length of the struts or pipe-braces should be the same as the height of the panel to be supported.

Note:

Every gang-form must be supported by **at least 2 plumbing accessories**.

Max. influence widths of the struts or pipe-braces:

Formwork height	**Plumbing strut/ strut / Pipe brace**	Max. influence width assuming wind pressure of	
		10 psf (0.48 kN/m²)	**15 psf** (0.72 kN/m²)
6'-0" (1.83 m)	**260**	9'-0" (2.75 m)	6'-0" (1.83 m)
9'-0" (2.75 m)	**260**	9'-0" (2.75 m)	6'-0" (1.83 m)
12'-0" (3.66 m)	**340**	12'-0" (3.65 m)	9'-0" (2.75 m)
15'-0" (4.57 m)	**540** [1]	15'-0" (4.55 m)	10'-0" (3.05 m)
18'-0" (5.48 m)	**540** [1]	10'-6" (3.20 m)	6'-9" (2.05 m)
21'-0" (6.40 m)	**340** +	12'-0" (3.65 m)	9'-0" (2.75 m)
	22'-0"-40'-0" [2]	12'-0" (3.65 m)	9'-0" (2.75 m)
22'-0" (6.70 m)	**340** +	12'-0" (3.65 m)	9'-0" (2.75 m)
	22'-0"-40'-0" [2]	12'-0" (3.65 m)	9'-0" (2.75 m)
24'-0" (7.31 m)	**340** +	10'-6" (3.20 m)	6'-9" (2.05 m)
	22'-0"-40'-0" [2]	12'-0" (3.65 m)	9'-0" (2.75 m)
27'-0" (8.23 m)	**540** [1] +	12'-0" (3.65 m)	9'-0" (2.75 m)
	22'-0"-40'-0" [2]	12'-0" (3.65 m)	9'-0" (2.75 m)
Max. anchoring load: **3 kip (13.5 kN)**			

[1] or pipe brace 12'-0"-21'-0"
[2] or Eurex 60 550

Values apply to all panel struts in conjunction with the **Frami S prop head** or the **Frami S connection profile**.

These values apply up to wind pressures of 10 psf (0.48 kN/m²) or 15 psf (0.72 kN/m²) respectively. The greater wind loads encountered at exposed formwork-ends must be constructionally sustained by additional plumbing accessories (e.g. struts or pipe-braces).
The number of struts must be determined separately for:
- wind pressure above 15 psf (0.72 kN/m²)
- formwork higher than 27'-0" (8.23 m)

Sample calculation:

- Formwork height: 27'-0" (8.23 m)
- Width of gang-form: 21'-0" (6.40 m)
- Wind pressure: 10 psf (0.48 kN/m²)

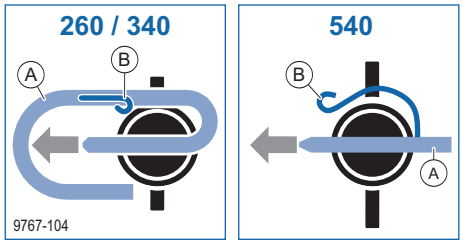
Result:

- 2 Struts 540
  (or 2 pipe braces 12'-0"-21'-0")
  and
- 2 pipe braces 22'-0"-40'-0"
  (or 2 Eurex 60 550)

Pre-assembly

➤ Install heads on the plumbing accessory.
➤ Fix the plumbing accessory to the formwork and to the ground (see connection options below for details).
➤ Precision adjustment of the plumbing strut with adjusting nut.

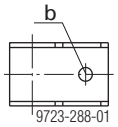
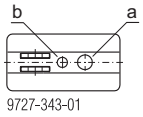
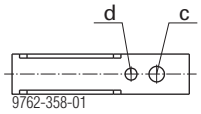
- The safety pin **(A)** must be fully inserted into the plumbing accessory and secured in this position by the locking spring **(B)** .
- The function of the locking spring **(B)** must be ensured.



Fixing to the floor

➤ Anchor the plumbing accessories in such a way as to resist tensile and compressive forces!

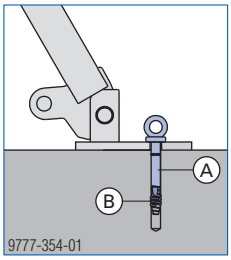
Boreholes in the footplates

Plumbing strut 260	Struts 340 / 540	Pipe brace (pipe brace shoe)
		

a ... 1" diam. (26 mm)
b ... $^{11}/_{16}$" diam. (18 mm) (suitable for Doka express anchor)
c ... 1 $^{1}/_{16}$" diam. (27 mm)
d ... $^{13}/_{16}$" diam. (20 mm) (suitable for Doka express anchor)

Anchoring the footplate

The **Doka express anchor** can be re-used many times over.



A Doka express anchor 16x125mm
B Doka coil 16mm

Doka express anchor 16x125mm:
Concrete strength class: min. C20/25
cylinder compressive strength of the concrete while under load: $f_{ck,cylinder,current}$ = min. 3000 psi (20 N/mm²) (corresp. to B25)

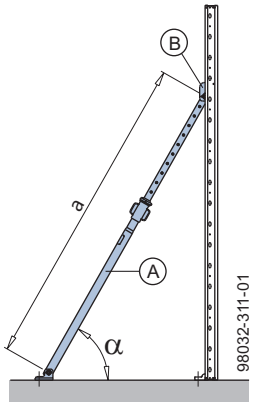
Follow the directions in the 'Doka express anchor 16x125mm' User Information booklet!

Required safe working load of alternative anchors:
- $R_d \geq 4.5$ kip (20.3 kN)
- $R_k \geq 3.0$ kip (13.5 kN)

Follow the manufacturers' applicable fitting instructions.

➤ Use nail-holes to secure the panels to the ground or the plumbing board.

Plumbing strut 260



a ... min. 4'-9" - max. 8'-6" (min. 147 - max. 257 cm)
α ... approx. 60°

A Plumbing strut 260 IB
B Strut head EB

Max. influence widths of Plumbing strut 260:

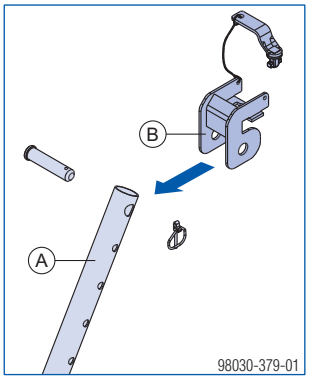
Formwork height	Max. influence width assuming wind pressure of	
	10 psf (0.48 kN/m²)	**15 psf** (0.72 kN/m²)
6'-0" (1.83 m)	7'-6" (2.30 m)	5'-0" (1.50 m)
9'-0" (2.75 m)	5'-0" (1.50 m)	3'-6" (1.05 m)
Max. anchoring load: **1 kip (4.5 kN)**		

The values given here apply to Plumbing struts 260 **with a Strut head EB**.

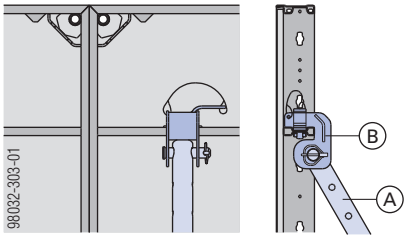
These values apply up to wind-pressures of 10 psf (0.48 kN/m²) or 15 psf (0.72 kN/m²) respectively. The greater wind loads encountered at exposed formwork-ends must be constructionally sustained by additional plumbing accessories (e.g. struts or pipe-braces).

Fixing the struts to the formwork

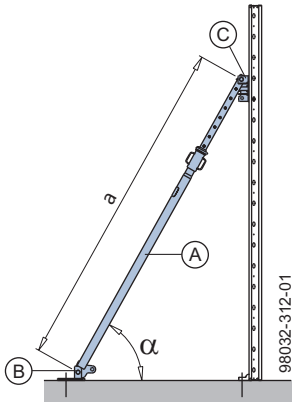
➤ Fit the Strut head onto the Plumbing strut.



➤ Pin the Strut head into the holes in the **cross profiles (frame profiles)**.



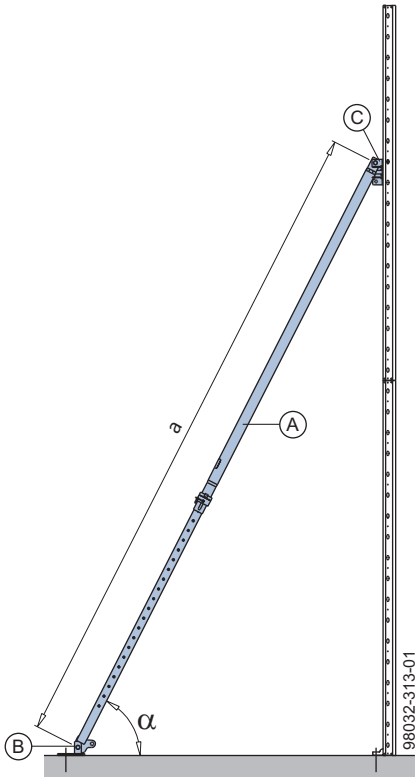
Strut 340



a ... min. 6'-4" - max. 11'-2" (min. 191 - max. 342 cm)
α ... approx. 60°

A Plumbing strut 340 IB EF
B Prop shoe EB
C Frami S bracing head EB or Frami S connection profile EB

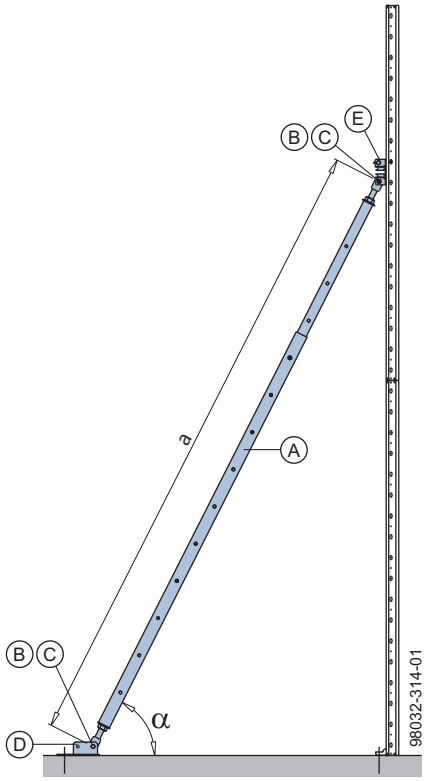
Strut 540



a ... min. 10’-2" - max. 18’-0" (min. 310 - max. 549 cm)
α ... approx. 60°

A	Plumbing strut 540 IB EF
B	Prop shoe EB
C	Frami S bracing head EB or Frami S connection profile EB

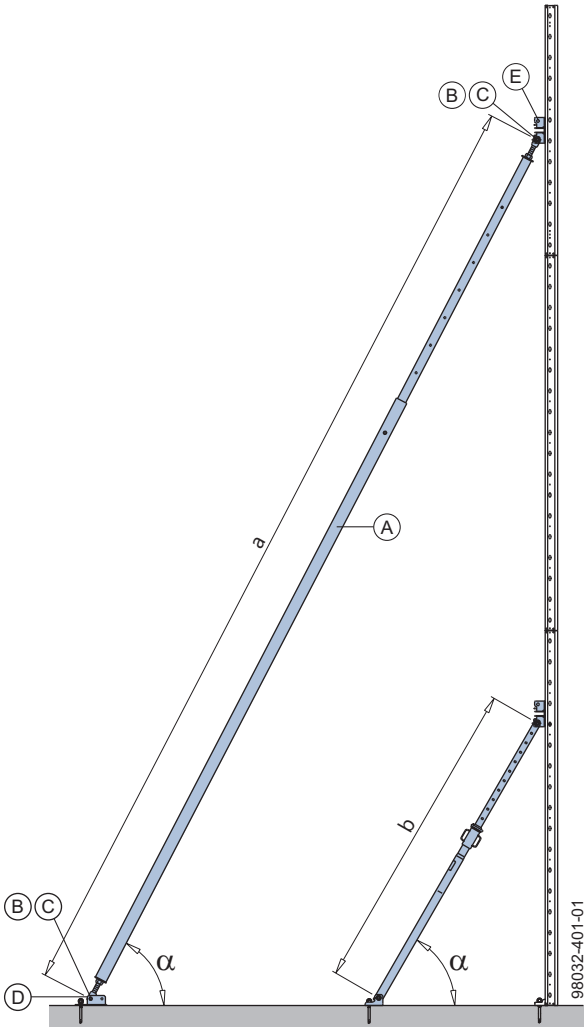
Pipe brace 12’-0"-21’-0"



a ... min. 12’-0" - max. 21’-0" (min. 366 - max. 640 cm)
α ... approx. 60°

A	Pipe brace 12’-0"-21’-0"
B	Speed bolt 3/4"x4"
C	Speed nut 3/4"
D	Pipe brace shoe
E	Frami S bracing head EB or Frami S connection profile EB

Pipe brace 22’-0"-40’-0"



a ... min. 22’-0" - max. 40’-0" (min. 670 - max. 1219 cm)
b ... min. 6’-4" - max. 11’-2" (min. 191 - max. 342 cm)
α ... approx. 60°

A	Pipe brace 22’-0"-40’-0"
B	Speed bolt 3/4"x4"
C	Speed nut 3/4"
D	Pipe brace shoe
E	Frami S bracing head EB or Frami S connection profile EB

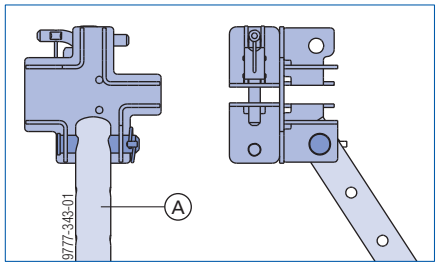
Fixing the struts to the formwork

with Frami S bracing head

The Frami S bracing head allows bracing to be attached to the frame profile.

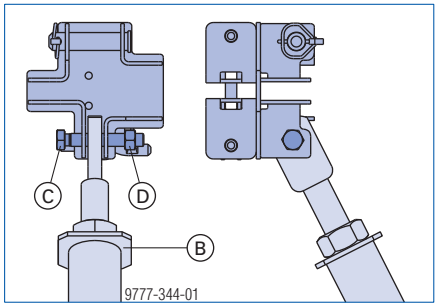
Fixing the Frami S bracing head to Struts 340 / 540 (A)

➤ Attach the Frami S bracing head to the strut with the included bolt and spring cotter.



Fixing the Frami S bracing head to the Pipe brace (B)

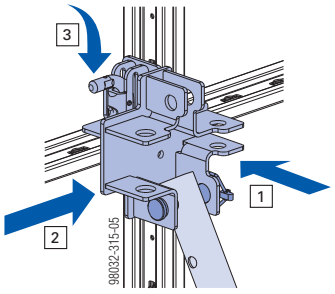
➤ Attach the Frami S bracing head to the pipe brace using a speed bolt and speed nut.



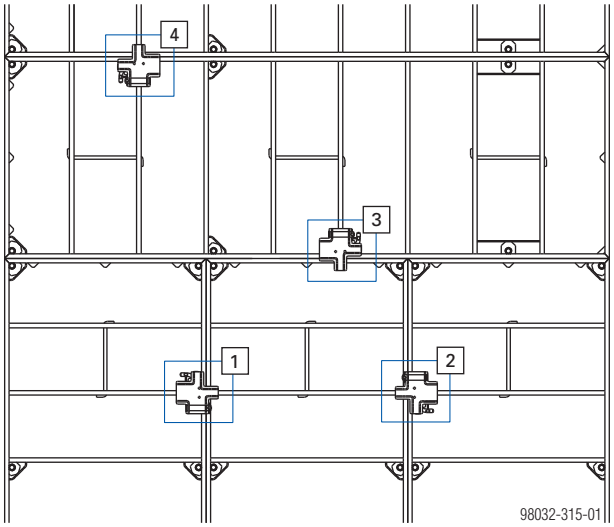
A	Strut 340 / 540
B	Pipe brace 12’-0"-21’-0"
C	Speed bolt 3/4"x4"
D	Speed nut 3/4"

Attaching the Frami S bracing head to the frame profile

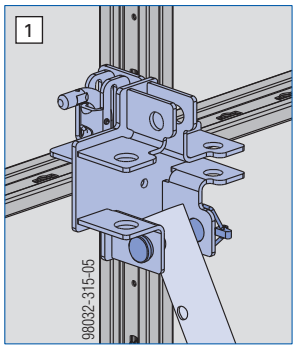
1) Place the bracing head onto an empty cross profile.
2) Slide the bracing head until it is flush with the frame profile.
   The stud-pins will slide into the cross boreholes of the frame profiles.
3) Push the U-bolt to secure the head in place.

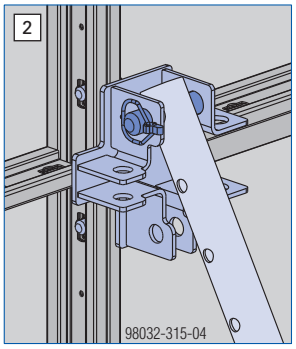


Possible connection points on vertically and horizontally placed panels

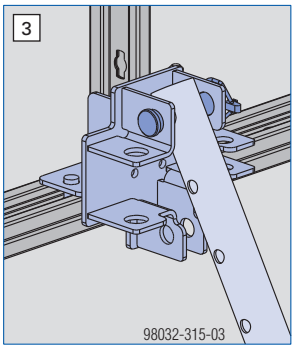


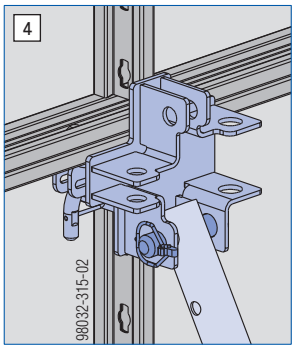
On a vertically placed panel





On a horizontally placed panel





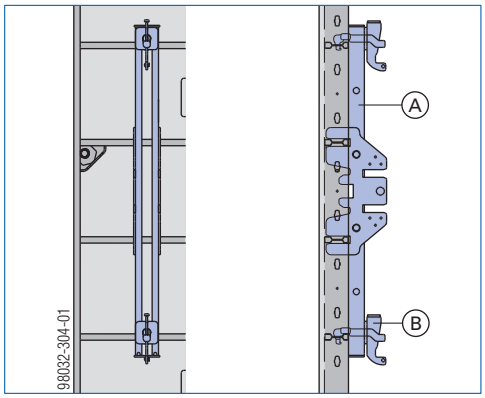
with Frami S connection profile

This connection method is used on column formwork, circular formwork and wherever it is not possible to attach the Frami S bracing head to the frame profile.

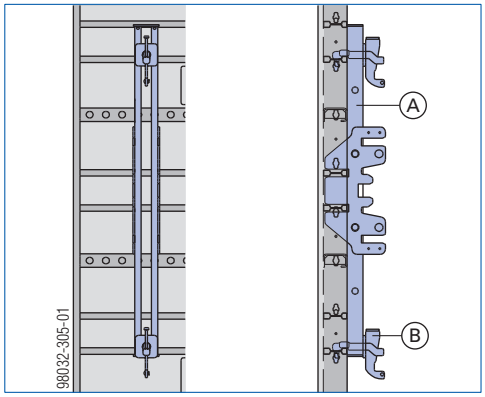
The Connection profile is suitable for use on standard Xlife panels and Xlife universal panels.

➤ Use Frami wedge clamps to fasten the Frami S connection profile in the cross boreholes of the **cross-profiles or frame profiles**.

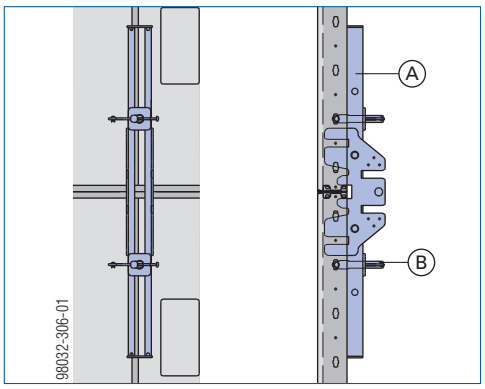
On standard Xlife panels



On Xlife universal panels



On the panel joint (stacked horizontally)



A Frami S connection profile EB

B Frami wedge clamp

Attaching the struts to the Frami S connection profile

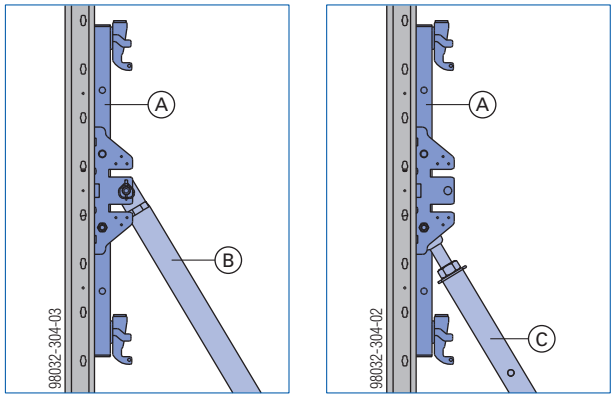
The connection profile has connection points for the Pipe brace and for the Struts 340 / 540.

➤ Guide the Pipe brace to the appropriate connection point and fix it on with a speed bolt and a speed nut.

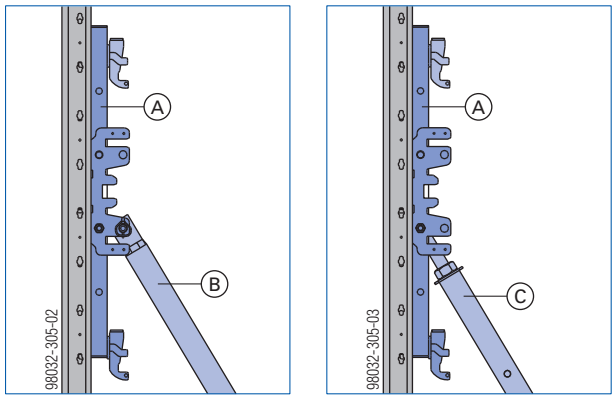
➤ If using Struts 340 / 540, attach the Frami S connection profile with a bolt and a spring cotter.

Strut 340 / 540	Pipe brace

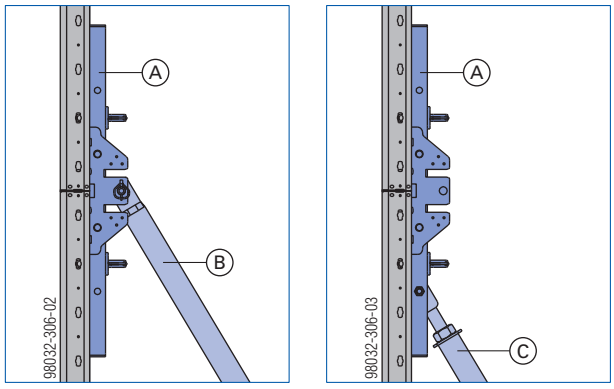
On standard Xlife panels



On Xlife universal panels



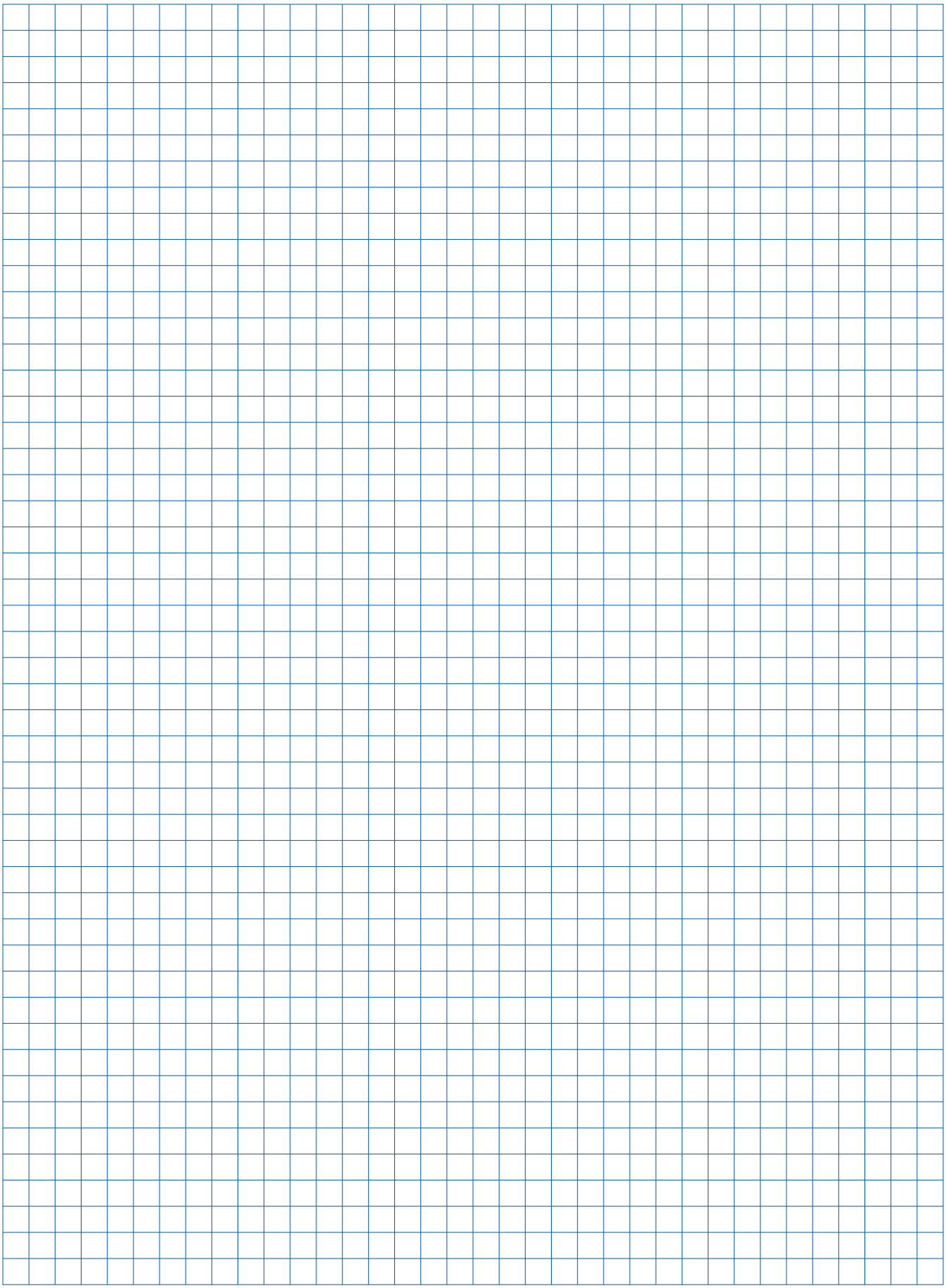
On the panel joint (stacked horizontally)



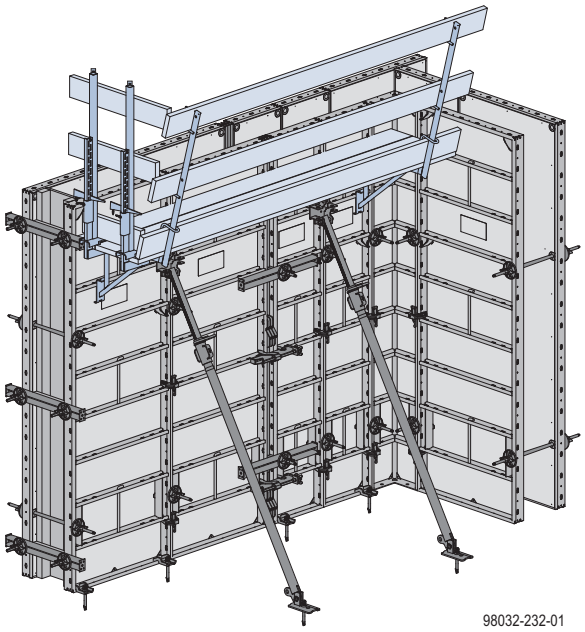
A Frami S connection profile EB

B Strut 340 / 540

C Pipe brace 12’-0"-21’-0" or 22’-0"-40’-0"



Pouring-platforms with single brackets



The Frami brackets 60 enable you to assemble pouring platforms that can easily be mounted by hand.

Preconditions for use:

- Only fix the pouring platform onto formwork constructions that are sufficiently stable to transfer the expected loads.
- Also brace the formwork in a windproof manner when erecting it and when it is temporarily 'parked' in the standing position.
- Ensure that the formwork gang has sufficient stiffness.
- Observe all applicable safety rules.

Frami bracket 60

The Frami bracket 60 is a 'use-anywhere' bracket for making pouring platforms
(platform width 2'-0" (60 cm)).

Note:
The scaffold planks and guardrail planks shall meet or exceed any local, state, provincial or national regulations.

Plank thicknesses for support centers of up to 6'-6" (2.00 m):

- 2 OSHA scaffold planks 2x10 (nominal) or 2x9 (rough). Additional woodstrip of similar quality to close the gap in between the 2 planks
- Guardrail, nominal 2x4 1500psi (stress grade) construction grade lumber
- Midrail and toe-board, nominal 1x6 1500psi (stress grade) construction grade lumber

Fastening the scaffold planks:
with 3 carriage bolts $^{3}/_{8}$-16 x 4 $^{3}/_{4}$ (cup square screws M 10x120) per bracket (not included with product).

Fastening the guardrail planks: Use nails

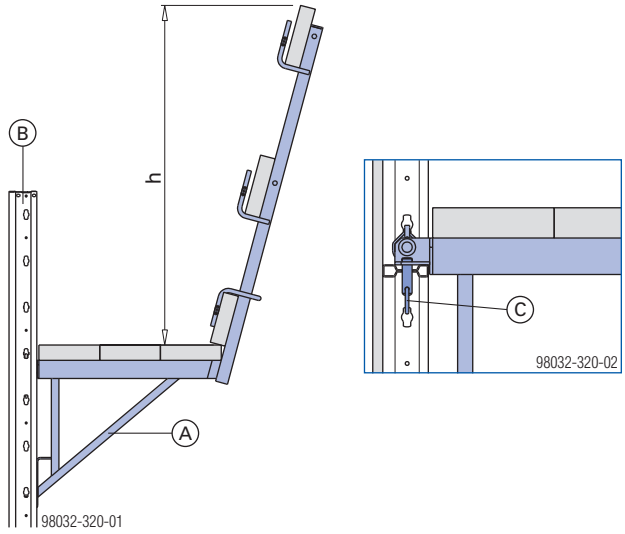
Permitted service load: 25 psf (120 kg/m²)
Max. influence width: 6'-0" (1.80 m)
Complies with the following Standards:

- OSHA 1926, Subpart L
- CAN/CSA S269.2 - 'Access Scaffolding for Construction Purposes' (light-duty scaffolds)

NOTICE
The brackets must be secured against accidental lift-out

NOTICE
Multi-panel gangs without an opposing formwork and with pouring platforms must be fixed on the ground so as to prevent slippage.

On upright panel (fixed in the cross profile)

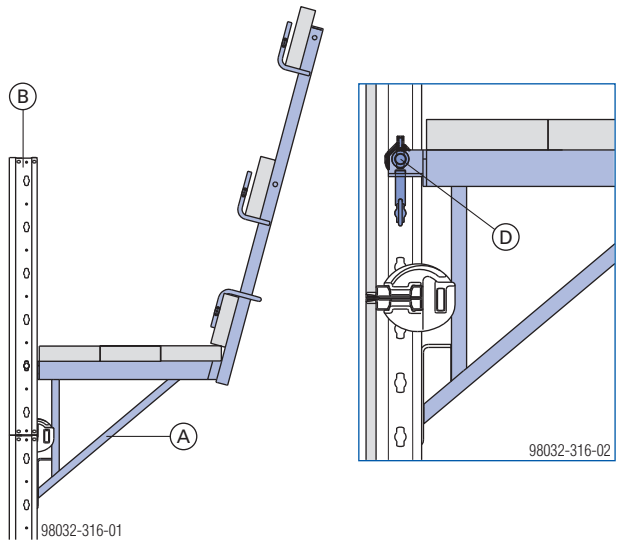


h ... 3'-7" (110 cm)

A	Frami bracket 60
B	Upright panel
C	Spring cotter (anti-liftout guard)

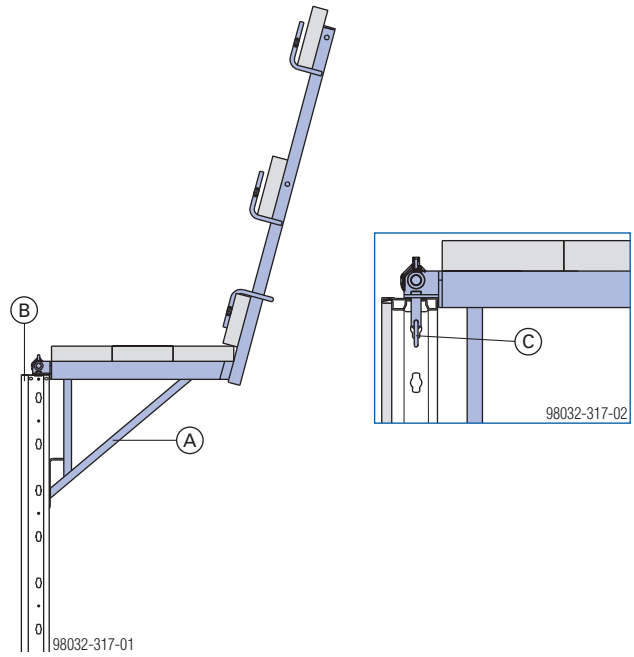
Note:
DO NOT secure the bracket into the circular hole in the middle of the cross profile.

On horizontal panel (fixed in the cross profile)



A Frami bracket 60
B Horizontal panel
D Fastening bolt with linchpin (anti-liftout guard)

On upright or horizontal panel (fixed in the frame profile)



A Frami bracket 60
B Horizontal panel
C Spring cotter (anti-liftout guard)

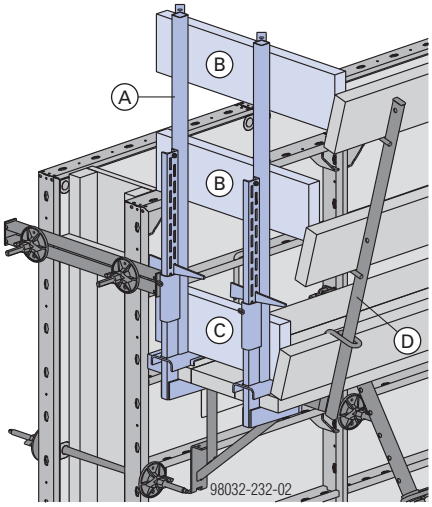
When the platform is fixed in the frame profile, the formwork does not provide any fall protection.

➤ For this reason, mount a counter railing on the opposing formwork.

Sideguards on exposed platform-ends

On pouring platforms that do not completely encircle the structure, suitable sideguards must be placed across exposed end-of-platform zones.

Handrail clamp S



A Handrail clamp S
B Guardrail plank min. 2x4 (1 1/2" x 3 1/2" (4 x 9 cm)), site-provided
C Guardrail plank min. 2x6 (1 1/2" x 5 1/2" (4 x 14 cm)), site-provided
D Frami bracket 60

Note:
The walkway boards and guardrail planks shall meet or exceed any local, state, provincial or national regulations.

The sideguard consists of:

- 2 Handrail clamps S
- 2 guardrail planks min. 1 1/2" x 3 1/2" (4 x 9 cm), site-provided
- 1 guardrail plank min. 1 1/2" x 5 1/2" (4 x 14 cm), site-provided

How to mount:

➤ Fasten the handrail clamps to the walkway boards of the pouring paltform, using the wedge (clamping range 1" - 1'-5" (2 to 43 cm)).

➤ Secure the guardrail planks to the loops on the handrail clamps with one d10 (28x65) nail per loop.

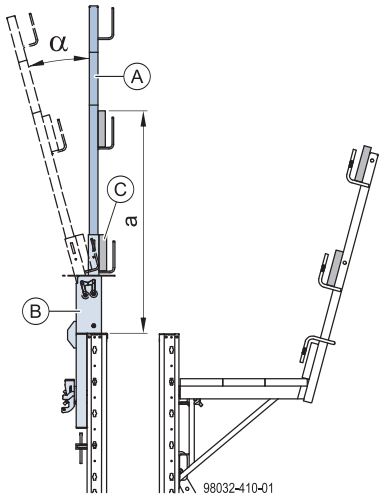
Follow the directions in the User Information booklet 'Handrail clamp S'!

Opposing guard-rail

If working platforms are only mounted on one side of the formwork, then guard rails must be mounted on the opposing formwork.

Note:
Comply with all national regulations that apply to guard-rail planks.

Xsafe edge protection XP



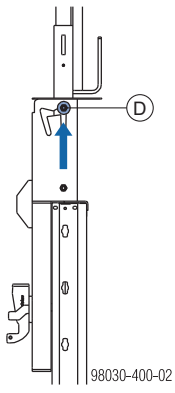
α ...15°
a ... 3'-4" (103 cm)

A Handrail post XP 1.20m
B Frami adapter XP
C Handrail board (min. 1 $^1/_2$ x 3 $^1/_2$" (4 x 9 cm))

NOTICE
DO NOT mount any handrail boards on the upper handrail bracket!

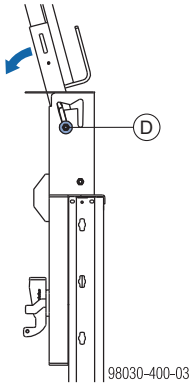
If necessary (e.g. for more space when pouring), the railing can be pivoted outward 15°.

➤ Press the locking screw upward on the XP adapters until the spring snaps in place (watch for overlapping of the handrail boards).



D Locking screw

➤ Pivot railing outward.



D Locking screw

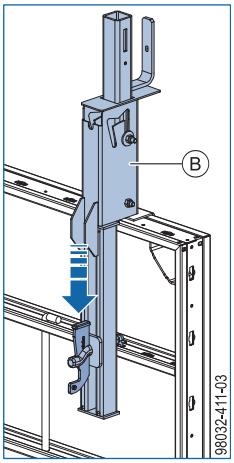
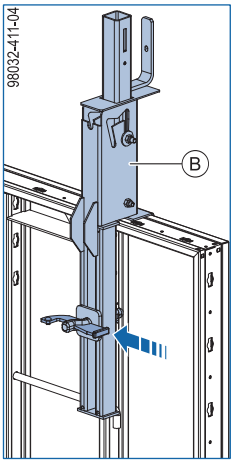
Locking screw drops down automatically and secures the swivel unit.

Visually inspect the position of the locking screw.

Assembly

The counter railing can be installed on vertical gang-forms as well as on gang-forms positioned horizontally on the ground.

➤ Attach Frami adapter XP to Frami S Xlife panel and secure with wedge.

Vertical panel:	Horizontal panel: *):
	

*) Installation on a horizontal **Frami S Xlife panel 8'-0"x9'-0"** is not possible.

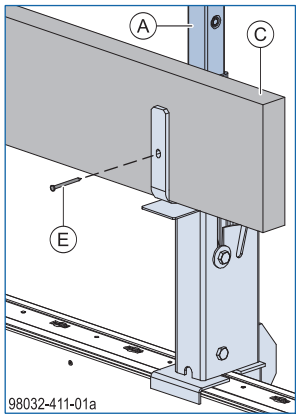
B Frami adapter XP

Make sure that it is seated correctly and is fully supported.

➤ Push the handrail posts XP into the post-holding fixtures of the Frami adapter until the locking mechanism engages.

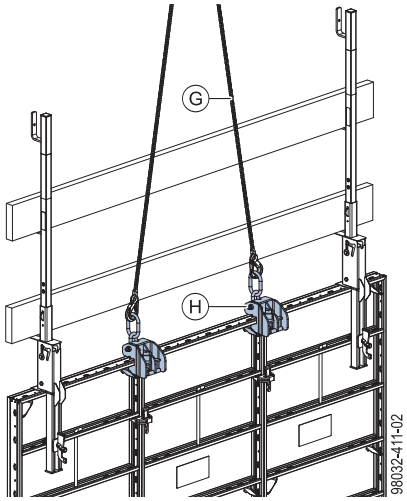
➤ Hook the handrail boards into place.

➤ Use nails to secure the handrail boards to the handrail posts XP.



A Handrail post XP 1.20m
C Handrail board
E Nail d10 (28x65)

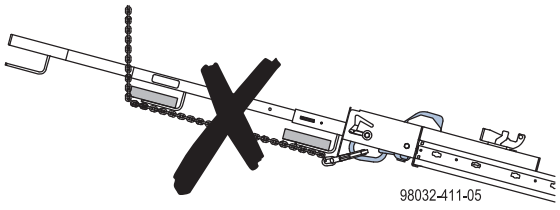
Lifting by crane



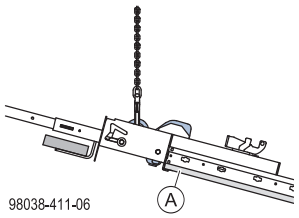
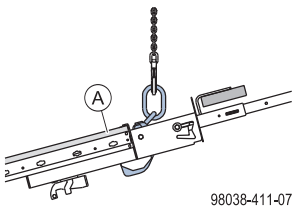
G Doka 4-part chain
H Frami lifting hook

In the case of gang-forms with counter railings from the Xsafe edge protection XP, pay attention to the following:

- When lifting or repositioning, the railing must remain vertical.
- Elastic deformation of the railing can occur, since the 4-part chain rests against the handrail boards while repositioning.
- DO NOT move the 4-part chain above the handrail board while lifting, moving or repositioning.

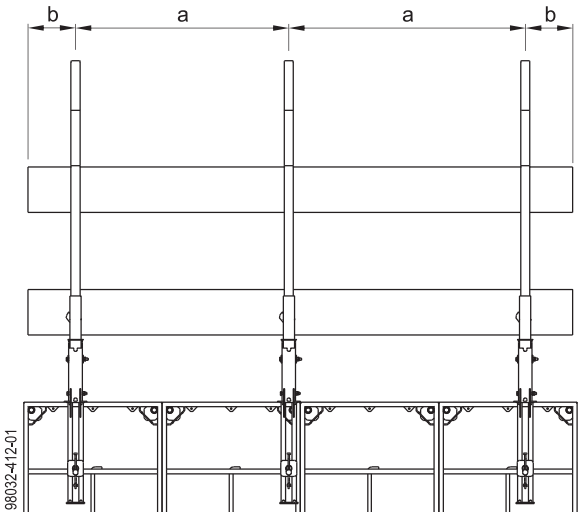


Make sure that the 4-part chain is positioned correctly:

▪ Set down with the sheeting side down. ▪ Lift up from this position	
▪ Set down with the sheeting side up (e.g. to clean the plywood) ▪ Lift from the cleaning position ▪ Move the upright gang-form	

A Sheeting side

Structural design

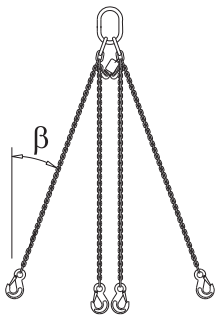


a ... max. span 4'-11" (150 cm)
b ... max. cantilever 1'-7" (50 cm)

Lifting by crane

Safe crane-handling of Frami is made possible by the Doka 4-part chain 3.20m and the Frami lifting hook. The lifting hook locks automatically after being hung into place.

Doka 4-part chain 3.20m

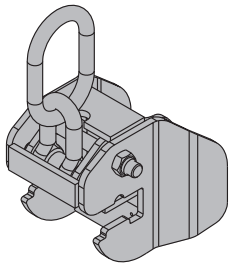


➤ Attach the Doka 4-part chain 3.20m to the Frami lifting hooks.
➤ Hang the remaining chain-lengths back in place.

Perm. load-bearing capacity (as 2-part chain):
Up to spread-angle β of 30°: 5,200 lbs (2,400 kg).

Follow the directions in the Operating Instructions!

Frami lifting hook



Permitted working load limit:

- Sling angle β to 30°:
  1100 lbs (500 kg) per Frami lifting hook
  Practical area of formwork that can be lifted using 2 lifting hooks: approx. 270 sq. ft. (25 m²)
- Sling angle β to 7.5°:
  1650 lbs (750 kg) per Frami lifting hook
  Practical area of formwork that can be lifted using 2 lifting hooks: approx. 400 sq. ft. (37.5 m²)

Frami lifting hooks with a 1100 lbs (500 kg) rated working load limit also meet the requirements for a working load limit of 1650 lbs (750 kg) at a sling angle β ≤ 7.5°.

Follow the directions in the Operating Instructions!

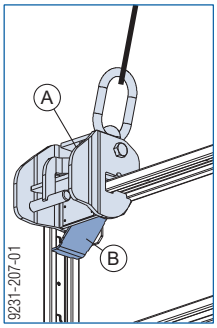
Securing the lifting hooks against slipping sideways

NOTICE

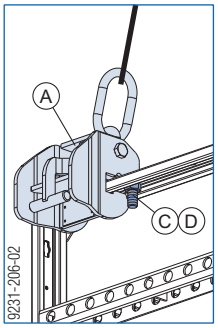
Position the lifting hooks so that they cannot slip sideways.

- over **inter-panel joints**
- over **cross profiles** (single panels incorporated in the horizontal)
- in **corner-tie pockets** (e.g. gangs with only two panels joined together longside vertically)
- or **secure with bolts**

Frami S Xlife panel



Frami S Xlife universal panel



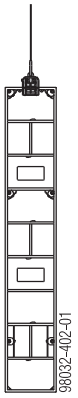
A	Frami lifting hook
B	Corner-tie pocket
C	Hexagon bolt DIN 933 M18x50 8.8 galv.
D	Hexagon nut DIN 934 M18 8 galv.

Position of the lifting hooks

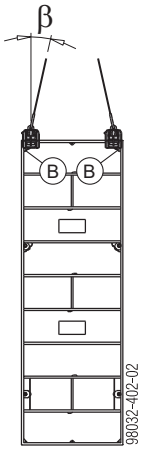
Note:
The positions of the lifting hooks as shown here also apply for gangs incorporating vertically stacked panels.

Single panel:

Panel width of up to 2'-0"

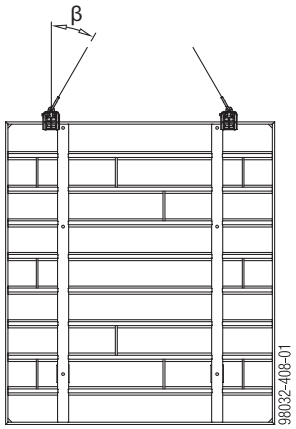


Panel width of over 2'-0"



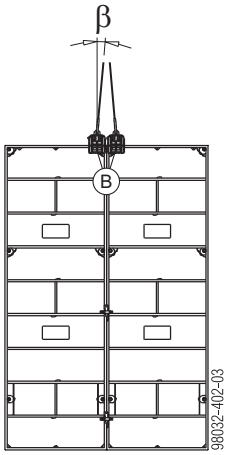
B Corner-tie pocket

Panel 8'-0"x9'-0"

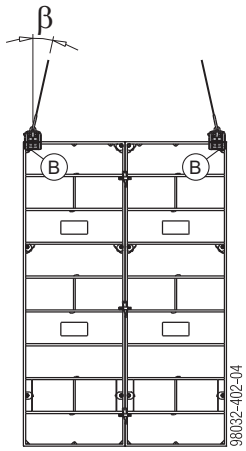


Gang-form - Two panels longside vertical:

Variant 1:

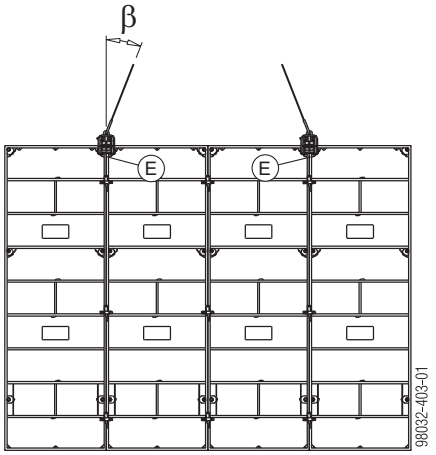


Variant 2:



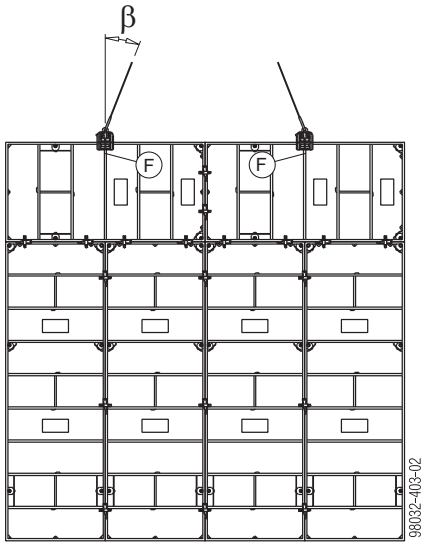
B Corner-tie pocket

Gang-form - Three (or more) panels longside vertical:



E Panel joint

Gang-form - Panel longside horizontal (vertically stacked):



F Cross profile

Transporting, stacking and storing

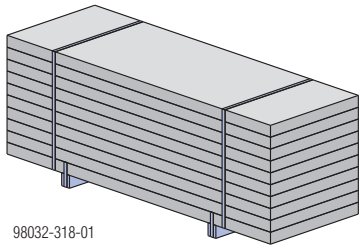
Bundling the panels

1) Place sleepers (W x H approx. 4" x 4" (10 x 10 cm)) under the cross profile.
2) Strap the sleepers (hardwood blocking) and the bottom panel together with metal banding.

CAUTION

➤ Stack max. 10 panels on top of one another (results in a stack height, incl. sleepers, of approx. 3'-4" (100 cm)).

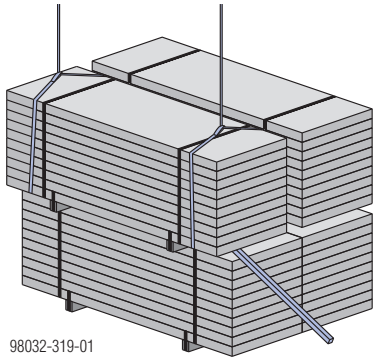
3) Strap the whole stack together tightly with metal banding.



Transporting the panels

Dokamatic lifting strap 13.00m

The Lifting strap 13.00m is a practical tool for **offloading and loading trucks**, and for **lifting and setting down** stacks of panels.



With closely stacked bundels of panels:

➤ lever up the bundle (e.g. with a piece of dimensional lumber **(D)**), to make a space for threading in the lifting equipment.
Caution!
When doing this, always make sure that the bundle of panels remains stable!

WARNING

➤ The Lifting straps 13.00 m may only be used as shown here if there is no risk of the straps sliding towards one another, or of the load being displaced.

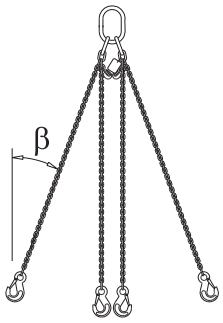
Perm. load:
4,400 lbs (2,000 kg) / Dokamatic lifting strap 13.00m

Follow the directions in the Operating Instructions!

Doka 4-part chain 3.20m

The Doka 4-part chain 3.20m is a multi-functional slinging means:

- used with the integrated **eye-hooks** for hoisting formwork, platforms and multi-trip packaging containers
- used in conjunction with **Frami transport hook** for hoisting stacks of panels and individual panels



The Doka 4-part chain 3.20m can be adjusted to the center-of-gravity position by shortening the lengths of the individual chains.

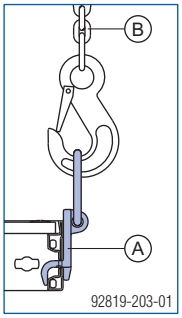
Perm. load:

	Spread-angle β			
	0°	0°-30°	30°-45°	45°-60°
Using 1 chain	3,000 lbs (1,400 kg)	-	-	-
Using 2 chains	-	5,200 lbs (2,400 kg)	4,400 lbs (2,000 kg)	3,000 lbs (1,400 kg)
Using all 4 chains	-	7,900 lbs (3,600 kg)	6,600 lbs (3,000 kg)	4,600 lbs (2,120 kg)

Follow the directions in the Operating Instructions!

Frami transport hook with Doka 4-part chain 3.20m

Close-up of Frami transport hook



A Frami transport hook
B Doka 4-part chain 3.20m
C Stacking tape
D Strapping tape

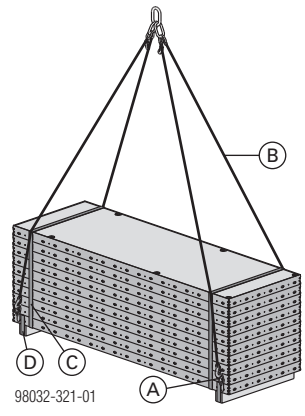
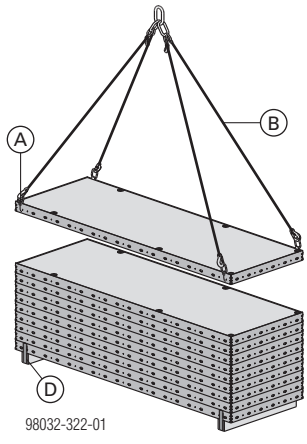
Permitted working load limit:
1000 lbs (450 kg) per Frami transport hook

Frami transport hooks manufactured until 2015, with a rated working load limit of 550 lbs (250 kg), are also capable of carrying 1000 lbs (450 kg).

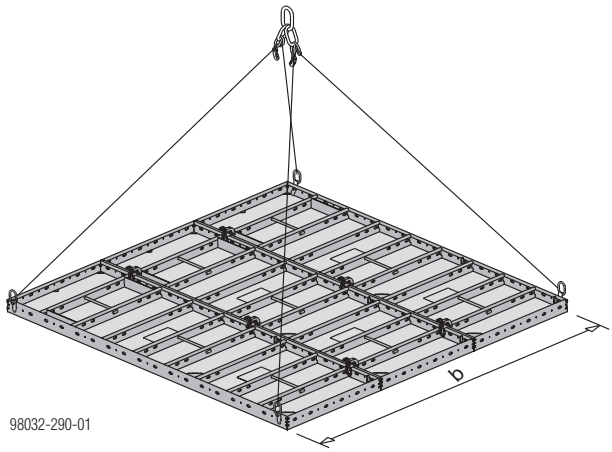
Follow the directions in the Operating Instructions!

The Frami transport hook plus Doka 4-part chain 3.20m are used for:

- Hoisting bundled stacks of panels
- Lifting panels off the stack
- Handling horizontal (flat) multi-panel gangs

Hoisting bundled stacks of panels	Lifting panels off the stack
	

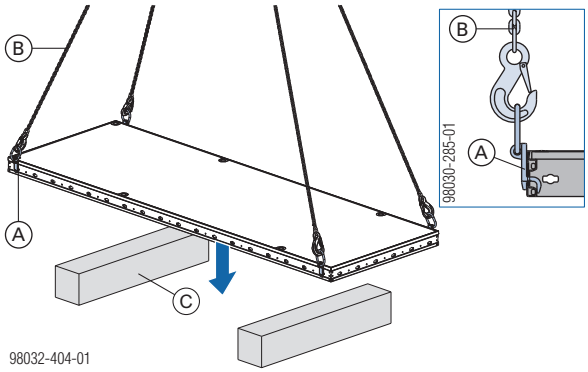
Handling horizontal (flat) multi-panel gangs



Dimension 'b' (Width of gang-form)	Max. number of panels across the width of the gang-form
up to 6'-0"	no restriction
more than 6'-0"	**max. 3 panels**

Lifting panels upright / turning panels over

➤ Use **Frami transport hooks** to lay the framed panel flat on squared timbers 8" x 8" (20 x 20 cm).



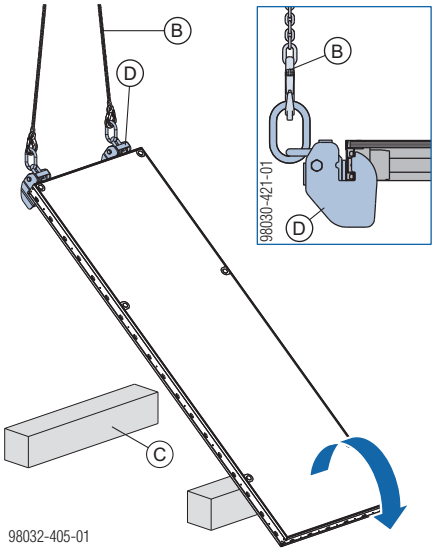
A	Frami transport hook
B	Doka 4-part chain 3.20m
C	Squared timber 8" x 8" (20 x 20 cm)

WARNING

Using Frami transport hooks to lift framed panels upright or turn them over is prohibited!

➤ Use Frami lifting hooks!

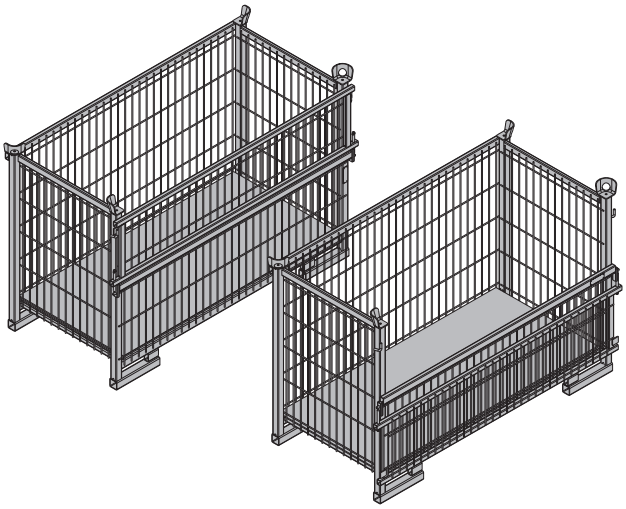
➤ Position the Frami lifting hooks. Lift the framed panel upright with **Frami lifting hooks** and, if applicable, lay it flat with the sheeting side down.



B	Doka 4-part chain 3.20m
C	Squared timber 8" x 8" (20 x 20 cm)
D	Frami lifting hook

Follow the directions in the Operating Instructions!

Doka skeleton transport box 1.70x0.80m



Storage and transport devices for small items.

To make the Doka skeleton transport box easier to load and unload, one of its sidewalls can be opened.

Permitted load-bearing capacity: 700 kg (1540 lbs)
Permitted imposed stacking load: 3150 kg (6950 lbs)

Using Doka skeleton transport boxes 1.70x0.80m as storage units

Max. n° of units on top of one another

Outdoors (on the site) Floor gradient up to 3 %	Indoors Floor gradient up to 1 %
2	5
It is not allowed to stack empty pallets on top of one another!	

NOTICE

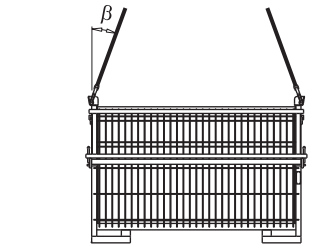
Stacked multi-trip boxes or pallets must have the heaviest boxes at the bottom and the lightest at the top.

Using Doka skeleton transport boxes 1.70x0.80m as transport devices

Lifting by crane

NOTICE

- Multi-trip packaging items may only be lifted one at a time.
- Only lift the boxes when their sidewalls are closed!
- Use a suitable lifting tackle.
  - e.g. Doka 4-part chain 3.20m
  - Do not exceed the safe working load limit of the lifting tackle
- Sling angle β max. 30°!



9234-203-01

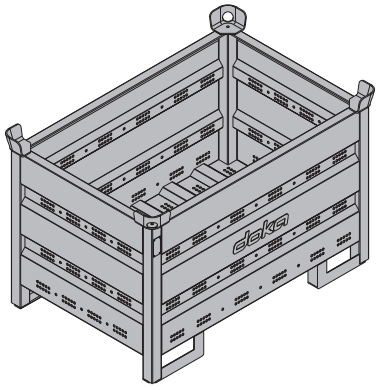
Shifting boxes with the forklift or pallet stacking truck

The forks can be inserted under either the broadside or the narrowside of the containers.

Doka multi-trip transport box

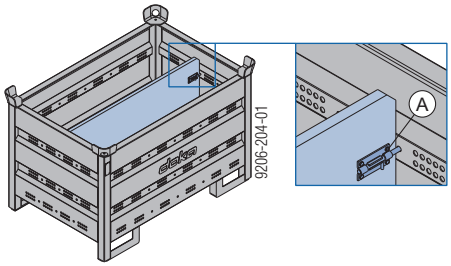
Storage and transport device for small items.

Doka multi-trip transport box 1.20x0.80m



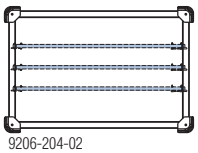
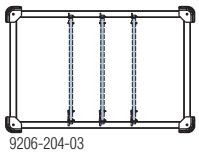
Permitted load-bearing capacity: 1500 kg (3300 lbs)
Permitted imposed stacking load: 7850 kg (17300 lbs)

Different items in the Doka multi-trip transport box can be kept separate with the **Multi-trip transport box partitions 1.20m or 0.80m**.

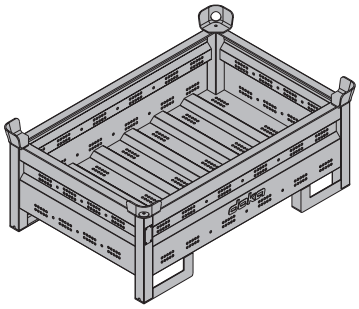


A Slide-bolt for fixing the partition

Possible ways of dividing the box

Multi-trip transport box partition	in the longitudinal direction	in the transverse direction
1.20m	max. 3 partitions	-
0.80m	-	max. 3 partitions
	 9206-204-02	 9206-204-03

Doka multi-trip transport box 1.20x0.80mx0.41m



Permitted load-bearing capacity: 750 kg (1650 lbs)
Permitted imposed stacking load: 7200 kg (15870 lbs)

Using Doka multi-trip transport boxes as storage units

Max. n° of units on top of one another

Outdoors (on the site) Floor gradient up to 3 %		**Indoors** Floor gradient up to 1 %	
Doka multi-trip transport box		Doka multi-trip transport box	
1.20x0.80m	1.20x0.80x0.41m	1.20x0.80m	1.20x0.80x0.41m
3	5	6	10
It is not allowed to stack empty pallets on top of one another!			

NOTICE

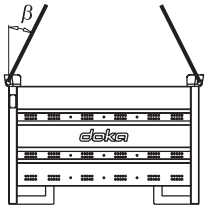
Stacked multi-trip boxes or pallets must have the heaviest boxes at the bottom and the lightest at the top.

Using Doka multi-trip transport boxes as transport devices

Lifting by crane

NOTICE

- Multi-trip packaging items may only be lifted one at a time.
- Use a suitable lifting tackle.
  - e.g. Doka 4-part chain 3.20m
  - Do not exceed the safe working load limit of the lifting tackle
- Sling angle β max. 30°!



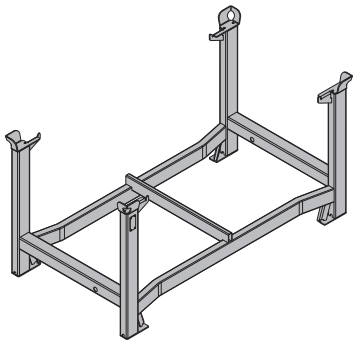
9206-202-01

Shifting boxes with the forklift or pallet stacking truck

The forks can be inserted under either the broadside or the narrowside of the containers.

Doka stacking pallet 1.55x0.85m and 1.20x0.80m

Storage and transport devices for long items.



Permitted load-bearing capacity: 1100 kg (2420 lbs)
Permitted imposed stacking load: 5900 kg (13000 lbs)

Using Doka stacking pallets as storage units

Max. number of units on top of one another

Outdoors (on the site) Floor gradient up to 3%	Indoors Floor gradient up to 1%
2	6
Do not stack empty pallets on top of one another!	

NOTICE

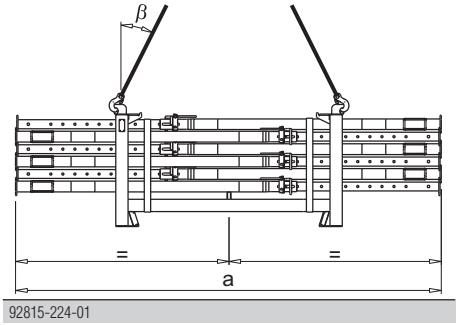
- The heaviest multi-trip boxes or pallets in the stack must be at the bottom and the lightest at the top.
- Do not attach caster wheels to the multi-trip box or pallet at the very bottom of the stack.
- For multi-trip boxes or pallets with caster wheels, use the fixing brake to prevent movement.

Using Doka stacking pallets as transport devices

Lifting by crane

NOTICE

- Multi-trip packaging items may only be lifted one at a time.
- Use suitable lifting chains:
  - e.g. Doka 4-part chain 3.20m
  - Do not exceed the permitted working load limit of the lifting chains.
- Load the items centrically.
- Fasten the load to the stacking pallet so that it cannot slide or tip out (e.g. with strapping tape or lashing strap).
- Sling angle β max. 30°!



	a
Doka stacking pallet 1.55x0.85m	max. 4.5 m
Doka stacking pallet 1.20x0.80m	max. 3.0 m

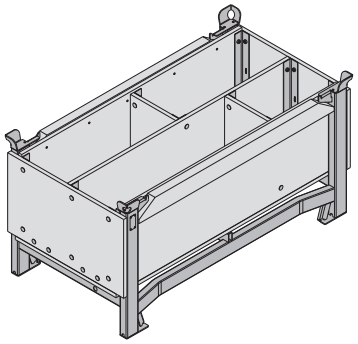
Shifting boxes with the forklift or pallet stacking truck

NOTICE

- Load the items centrically.
- Fasten the load to the stacking pallet so that it cannot slide or tip out (e.g. with strapping tape or lashing strap).

Doka accessory box

Storage and transport devices for small items.



Permitted load-bearing capacity: 1000 kg (2200 lbs)
Permitted imposed stacking load: 5530 kg (12190 lbs)

Using Doka accessory boxes as storage units

Max. n° of units on top of one another

Outdoors (on the site) Floor gradient up to 3%	Indoors Floor gradient up to 1%
3	6
Do not stack empty pallets on top of one another!	

NOTICE

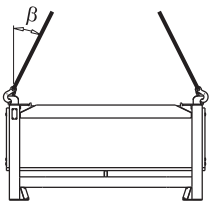
- The heaviest multi-trip boxes or pallets in the stack must be at the bottom and the lightest at the top.
- Do not attach caster wheels to the multi-trip box or pallet at the very bottom of the stack.
- For multi-trip boxes or pallets with caster wheels, use the fixing brake to prevent movement.

Using Doka accessory boxes as transport devices

Lifting by crane

NOTICE

- Multi-trip packaging items may only be lifted one at a time.
- Use a suitable lifting tackle.
  - e.g. Doka 4-part chain 3.20m
  - Do not exceed the safe working load limit of the lifting tackle
- When lifting stacking pallets to which Bolt-on castor sets B have been attached, you must also follow the directions in the ‘Bolt-on castor set B’ User Information booklet!
- Sling angle β max. 30°!



92816-206-01

Shifting boxes with the forklift or pallet stacking truck

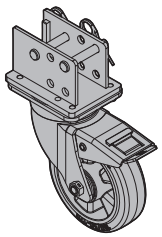
The forks can be inserted under either the broadside or the narrowside of the containers.

Universal caster wheel for transport pallet

Universal caster wheels for transport pallet turn the multi-trip transport box into a fast and maneuverable transport trolley.

- Four casters are required per multi-trip transport box.
- Compatible multi-trip transport box:
  - Doka stacking pallets (all sizes)
  - Doka multi-trip transport box 1.20x0.80m
  - Doka skeleton transport box 1.70x0.80m
  - DokaXdek panel pallets (all sizes)
  - Superdek beam pallet 1.22x1.10m

Refer to the 'Universal Caster Wheel for Transport Pallet' user information.

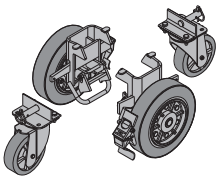


Bolt-on caster set B

The Bolt-on castor set B turns the multi-trip packaging unit into a fast and maneuverable transport trolley.

- Suitable for drive-through access openings > 90 cm.
- Compatible multi-trip transport box:
  - Doka accessory box
  - Doka stacking pallets (all sizes)
  - Protective fence Z pallets

Follow the directions in the 'Bolt-on castor set B' User Information booklet!



Column formwork

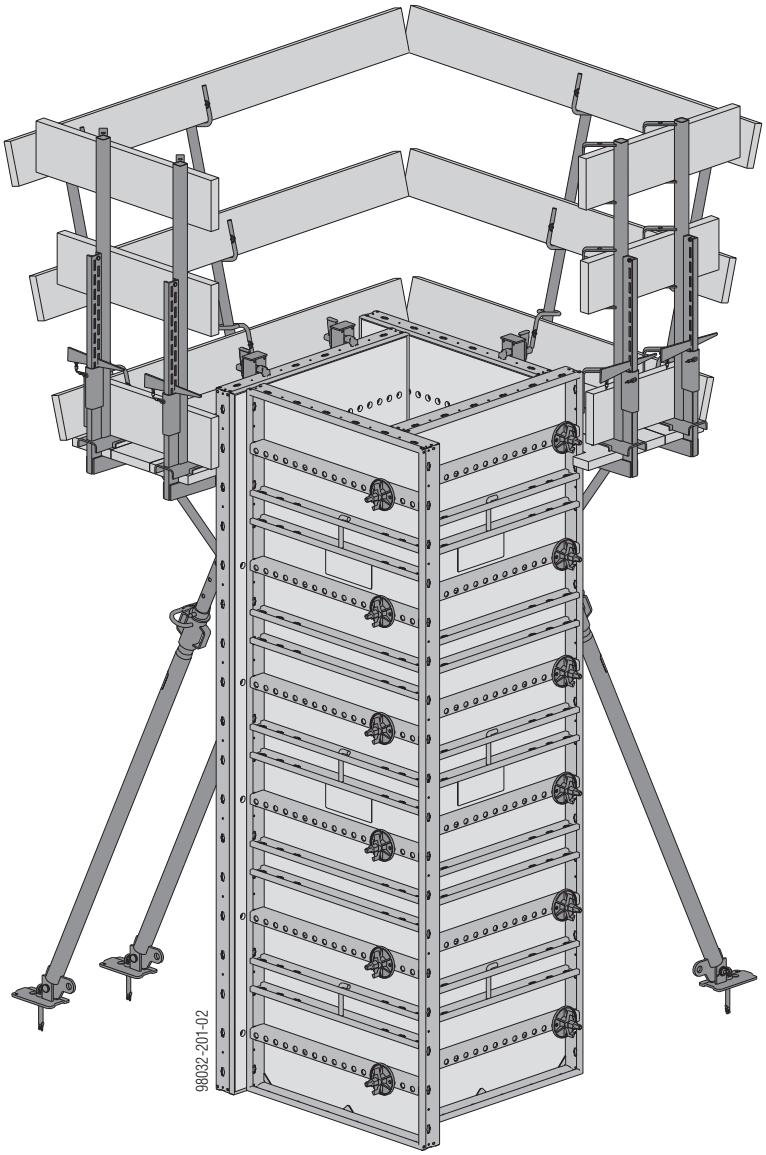
There are several different ways of using Frami framed formwork to make column formworks:

- With **Xlife universal panels**
  - Flexibly adapts to column cross-sections of up to 32" x 32" (81 x 81 cm) in 2" (5.1 cm) increments
- Combination of **Xlife universal panels and Xlife standard panels**
  - Highly economical solution for certain column cross-sections
- With **Xlife panels and outside corners**
  - for dimensions of 6" (15.2 cm), 12" (30.5 cm), 18" (45.7 cm) and 24" (61 cm)

Permitted fresh-concrete pressure: **1650 psf (80 kN/m²)**

NOTICE

Fillers are generally not allowed in the column formwork.



Design of column formwork

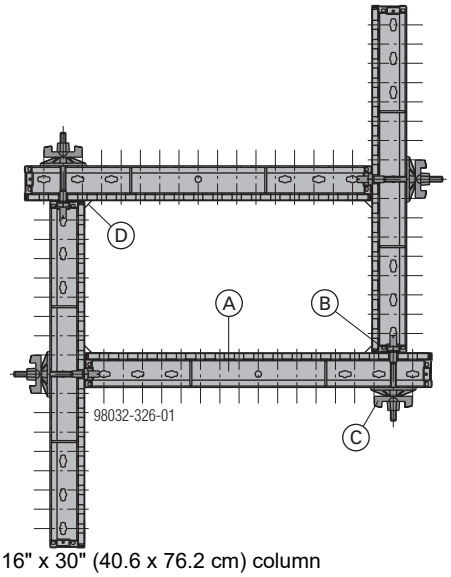
NOTICE

- To achieve exact plumbing & aligning of the column formwork, the best arrangement of the panel struts is as illustrated here.
- Always attach panel struts to free-standing formwork halves to prevent them from falling over.
- To obtain the highest possible dimensional accuracy, the panels must be pushed apart (i.e. towards the outside) while being assembled.

with Xlife universal panels

The practical 2" (5.1 cm) hole-grid is ideal for forming columns. **Cross-sections of up to 32" x 32" (81 x 81 cm).** By combining panels with heights of 9'-0", 6'-0", 4'-0", 3'-0" and 2'-0", an incremental height grid of 1'-0" (30.5 cm) can be achieved.

Possible cross-sections in a 2" (5.1 cm) increment-grid



Example: 16" x 30" (40.6 x 76.2 cm) column

A	Frami S Xlife universal panel
B	Frami universal fixing bolt 5-12cm
C	Super-plate 15.0
D	Frami S frontal triangular ledge 3/4"

Frami universal fixing bolt:

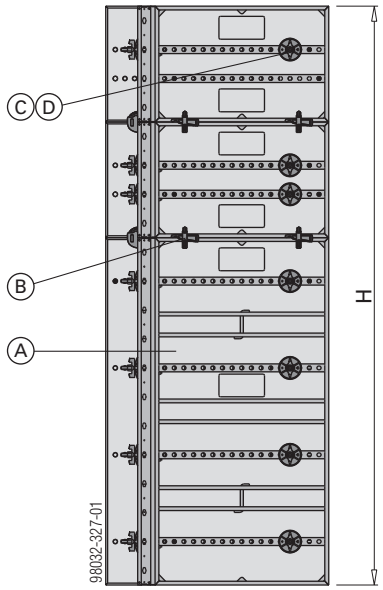
Permitted tensile load:

3.51 kip (15.6 kN), when used in the Xlife universal panel

Note:

Close off unneeded grid holes in the form-facing of the universal panels with **Frami plugs**.

Materials schedule:



Formwork height **(H)**	Xlife universal panels **(A)**					Frami clamps **(B)**	Universal fixing bolts **(C)**	Super-plates 15.0 **(D)**
	9'-0"	6'-0"	4'-0"	3'-0"	2'-0"			
9'-0" (2.74 m)	4						24	24
10'-0" (3.05 m)		4	4			8	28	28
11'-0" (3.35 m)	4				4	8	28	28
12'-0" (3.65 m)	4			4		8	32	32
13'-0" (3.96 m)	4		4			8	36	36
14'-0" (4.26 m)	4			4	4	16	36	36
15'-0" (4.57 m)	4	4				8	40	40
16'-0" (4.87 m)	4		4	4		16	44	44
17'-0" (5.18 m)	4	4			4	16	44	44
18'-0" (5.48 m)	8					8	48	48

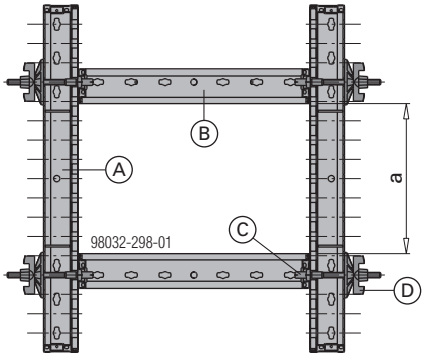
Table gives number of items needed

A 2'-0" high Xlife universal panel as the topmost panel requires only one Universal fixing bolt 5-12cm + Super-plate at each corner of the column.

with Xlife universal panels and Xlife standard panels

Certain cross-sections of column can be formed highly economically by combining Xlife universal panels and standard Xlife panels.

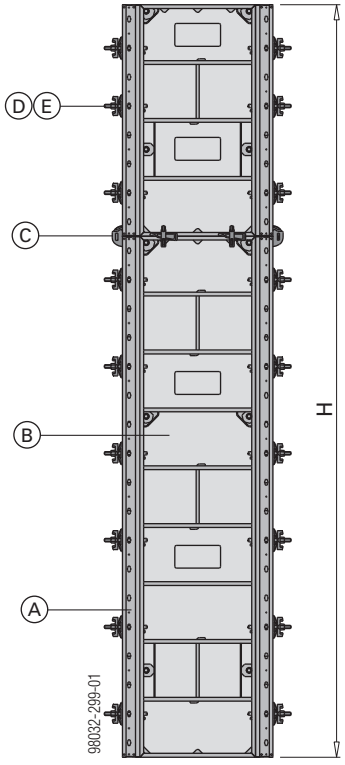
Possible cross-sections:



a ... up to 28" (71 cm), in 2" (5.1 cm) increments
Example: 16" x 24" (40.6 x 61 cm) column

A	Frami S Xlife universal panel
B	Frami S Xlife panel (max. 2'-0")
C	Frami universal fixing bolt 5-12cm
D	Super-plate 15.0

Materials schedule:



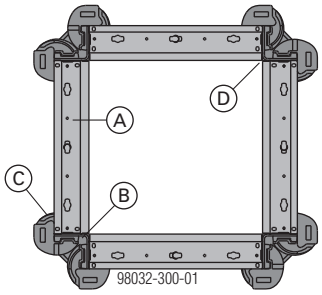
Formwork height **(H)**	Xlife universal panels **(A)**				Xlife panels **(B)**			
	9'-0"	6'-0"	4'-0"	3'-0"	9'-0"	6'-0"	4'-0"	3'-0"
3'-0" (0.91 m)				2				2
4'-0" (1.22 m)			2				2	
6'-0" (1.83 m)		2				2		
7'-0" (2.13 m)			2	2			2	2
8'-0" (2.44 m)			4				4	
9'-0" (2.74 m)	2				2			
10'-0" (3.05 m)		2	2			2	2	
11'-0" (3.35 m)			4	2			4	2
12'-0" (3.65 m)	2			2	2			2
13'-0" (3.96 m)	2		2		2		2	
14'-0" (4.26 m)		2	4			2	4	
15'-0" (4.57 m)	2	2			2	2		
16'-0" (4.87 m)	2		2	2	2		2	2
17'-0" (5.18 m)	2		4		2		4	
18'-0" (5.48 m)	4				4			

Formwork height **(H)**	Frami clamp **(C)**	Frami universal fixing bolt 5-12cm **(D)**	Super-plate 15.0 **(E)**
3'-0" (0.91 m)		8	8
4'-0" (1.22 m)		12	12
6'-0" (1.83 m)		16	16
7'-0" (2.13 m)	8	20	20
8'-0" (2.44 m)	8	24	24
9'-0" (2.74 m)		24	24
10'-0" (3.05 m)	8	28	28
11'-0" (3.35 m)	16	32	32
12'-0" (3.65 m)	8	32	32
13'-0" (3.96 m)	8	36	36
14'-0" (4.26 m)	16	40	40
15'-0" (4.57 m)	8	40	40
16'-0" (4.87 m)	16	44	44
17'-0" (5.18 m)	16	48	48
18'-0" (5.48 m)	8	48	48

Table gives number of items needed

with outside corners and Xlife panels

Column dimensions of **6" (15.2 cm), 12" (30.5 cm), 18" (45.7 cm)** and **24" (61 cm)** can also be formed with **outside corners** and **Xlife panels**.

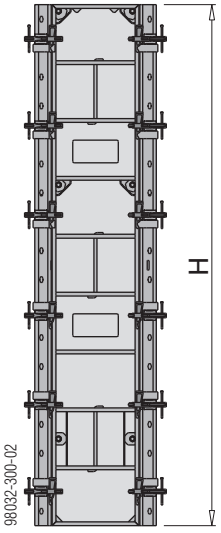


Example: 18" x 18" (45.7 x 45.7 cm) column

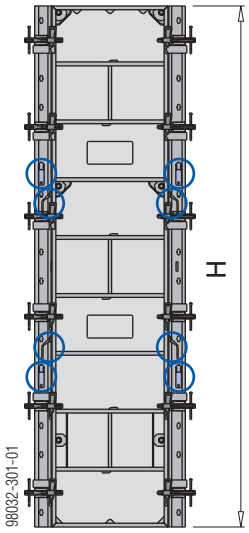
A Frami S Xlife panel (max. 2'-0")
B Frami S outside corner
C Frami clamp
D Frami S frontal triangular ledge 3/4"

Materials schedule:

up to 18" (45.7 cm) 24" (61 cm)



Example: Outside corners 9'-0" with Xlife panel 1'-6"x9'-0"



Example: Outside corners 9'-0" with Xlife panel 2'-0"x9'-0" and extra Frami clips [1)]

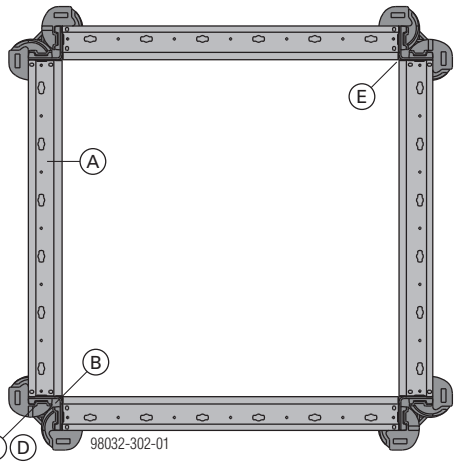
Panel height **(H)**	Xlife panel **(A)**				Outside corners **(B)**				Frami clamp **(C)**	Frami clip [1)]
	9'-0"	6'-0"	4'-0"	3'-0"	9'-0"	6'-0"	4'-0"	3'-0"		
3'-0"				4				4	16	8
4'-0"			4				4		24	8
6'-0"		4				4			32	16
9'-0"	4				4				48	16

Table shows number of items needed

[1)] For the 24" (61 cm) version, Frami clips are also required in the Frami outside corner.

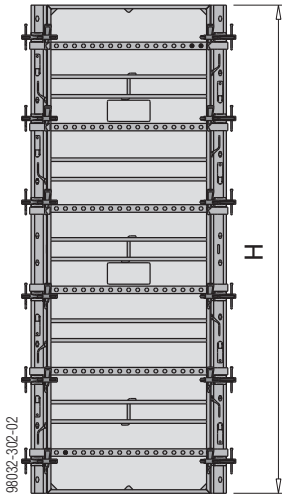
with outside corners and Xlife universal panels

Column dimensions of **36" (91.5 cm)** can also be formed with **outside corners** and **Xlife universal panels**.



A Frami S Xlife universal panel
B Frami S outside corner
C Frami clamp
D Frami clip
E Frami S frontal triangular ledge 3/4"

Materials schedule:



Example: Outside corners 9'-0" with Xlife universal panels 3'-0"x9'-0"

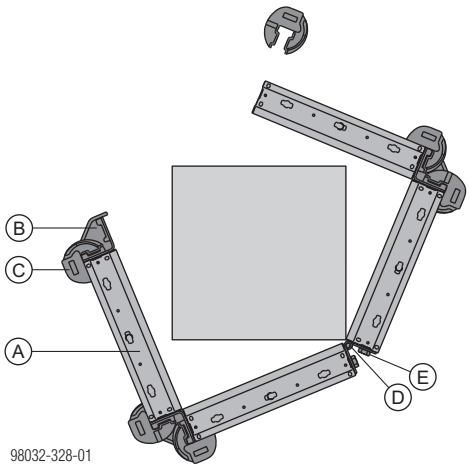
Panel height **(H)**	Xlife universal panels **(A)**				Outside corners **(B)**				Frami clamps **(C)**	Frami clips **(D)**
	9'-0"	6'-0"	4'-0"	3'-0"	9'-0"	6'-0"	4'-0"	3'-0"		
3'-0"				4				4	16	16
4'-0"			4				4		24	16
6'-0"		4				4			32	24
9'-0"	4				4				48	32

Table gives number of items needed

with column hinge and Xlife panels

The Frami S column hinge makes for **easy opening and closing** of the column formwork. This does away with time-consuming assembly and dismantling work.

In conjunction with Xlife panels and outside corners, the column hinges make it possible to form column dimensions of **6" (15.2 cm), 12" (30.5 cm), 18" (45.7 cm)** and **24" (61 cm)**.

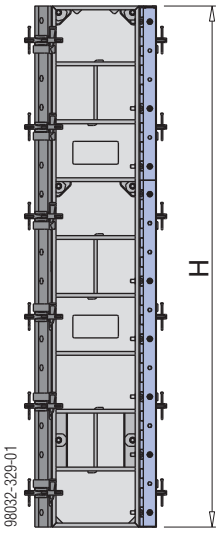


Example: 18" x 18" (45.7 x 45.7 cm) column

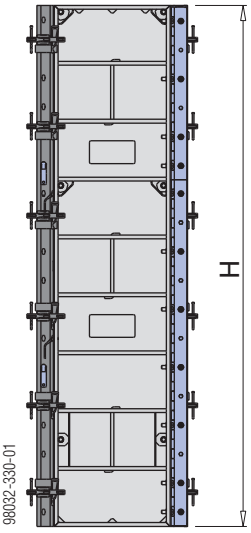
A	Frami S Xlife panel (max. 2'-0")
B	Frami S outside corner
C	Frami clamp
D	Frami S column hinge
E	Hexagon bolt DIN 933 M18x50 8.8 galv.+ Hexagon nut DIN 934 M18 8 galv.

Materials schedule:

Example with Xlife panel 1'-6"x9'-0"



Example with Xlife panel 2'-0"x9'-0"



NOTICE

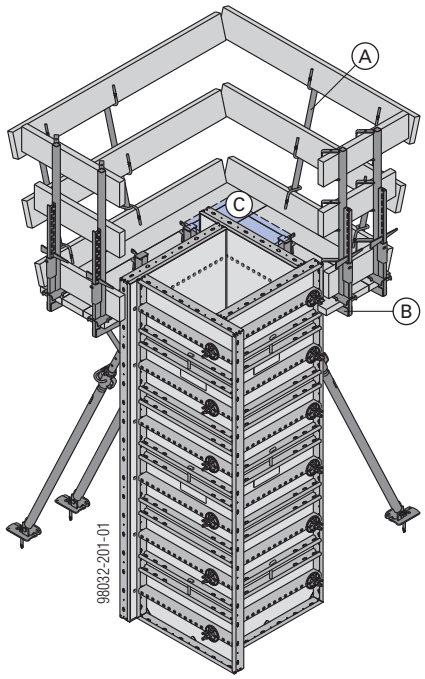
- For 24" (61 cm) wide columns, 4 Frami clips for every 9'-0" (2.74 m) of column height are also required in the Frami outside corner.
- For 24" (61 cm) wide columns, 4 extra screws are also required in the Frami S column hinge for every 9'-0" (2.74 m) of column height.

Panel height **(H)**	Xlife panels **(A)**				Outside corners **(B)**			
	9'-0"	6'-0"	4'-0"	3'-0"	9'-0"	6'-0"	4'-0"	3'-0"
3'-0"				4				3
4'-0"			4				3	
6'-0"		4				3		
9'-0"	4				3			

Panel height **(H)**	Column hinge **(D)**			Hexagon bolt + hexagon nut **(E)**	Frami clamp **(C)**
	6'-0"	4'-0"	3'-0"		
3'-0"			1	6	12
4'-0"		1		8	18
6'-0"	1			12	24
9'-0"	1		1	18	36

Table gives number of items needed

Pouring platform with Frami bracket 60



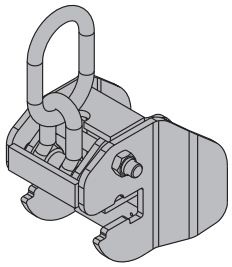
A	Frami bracket 60 (walkway boards and guardrail planks provided at site)
B	Handrail clamp S (guardrail planks provided at site)
C	Board for screwing the floor planking onto

Note:
Where the two floor planking units meet, a board must be screwed onto the underside.

For more information on constructing pouring platforms, see Pouring-platforms with single brackets.

Lifting by crane

Frami lifting hook



Follow the additional directions in the Operating Instructions!

Position of the lifting hooks

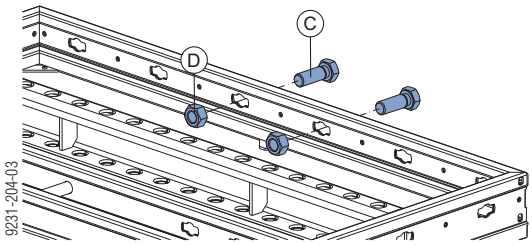
Before repositioning the formwork, take into account the centre-of-gravity position of the formwork half.

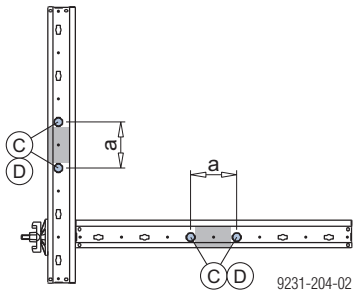
- Choose a suitable position for the lifting hooks.
- Adjust the lifting chain by shortening one of the lengths of chain.

Securing the lifting hooks against slipping sideways

Use bolts to secure the lifting hooks so that they cannot slide from side to side:

1) Insert hexagon bolts M18 into the cross boreholes of the frame profile and secure them with hexagon nuts M18.





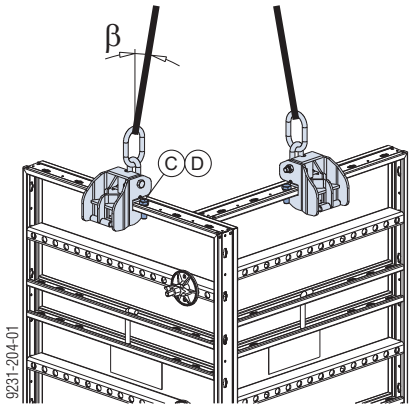
a ... 152 mm (6")

C Hexagon bolt DIN 933 M18x50 8.8 galv.

D Hexagon nut DIN 934 M18 8 galv.

The position of the pairs of bolts depends on the center-of-gravity position.

2) Place the lifting hooks on the frame profile, between the two bolts.



β ... max. 15°

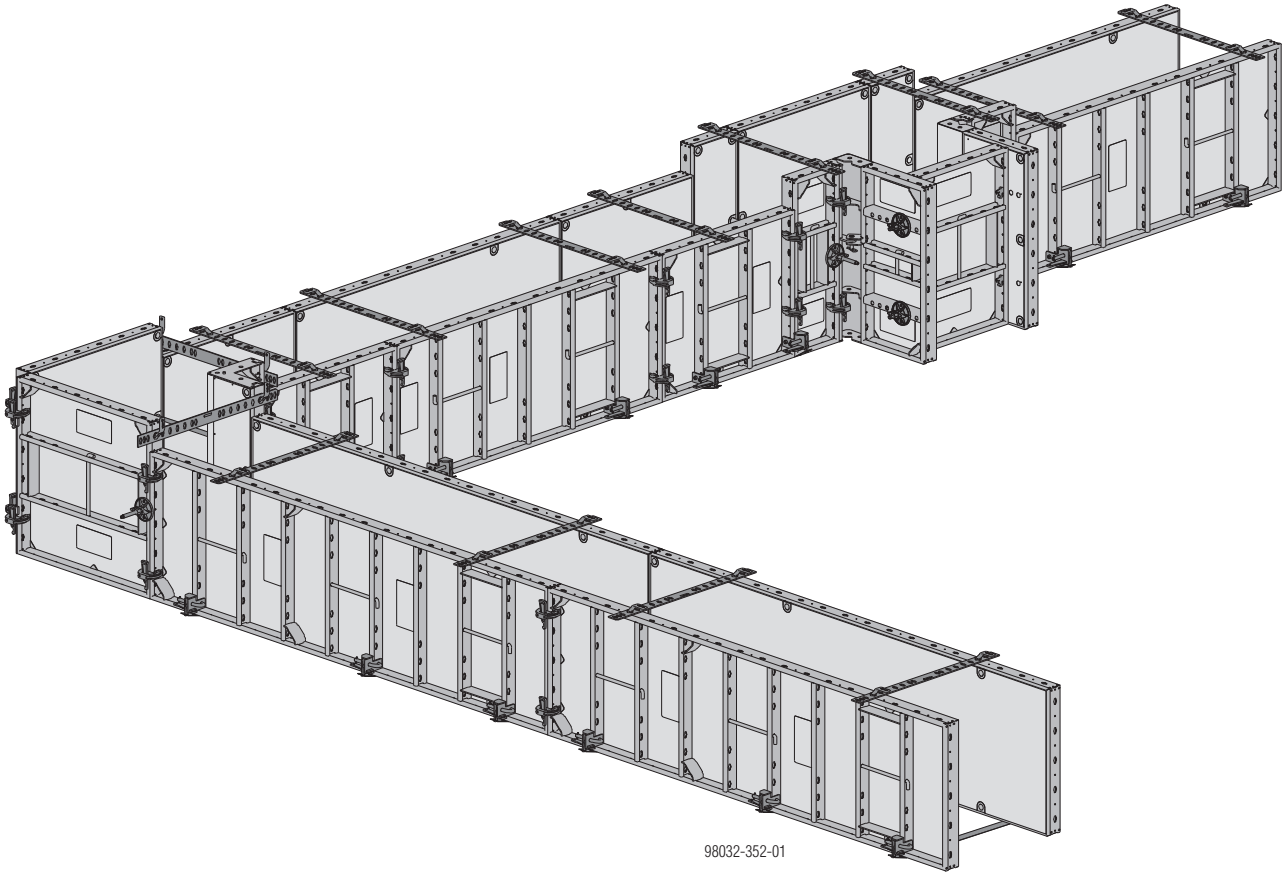
C Hexagon bolt DIN 933 M18x50 8.8 galv.

D Hexagon nut DIN 934 M18 8 galv.

Footing and grade beam formwork

The Frami panels can also be used for footings and grade beams.

This is particularly advantageous where it is intended to continue forming (i.e. the walls) using the same panels. Footings and grade beams can quickly be formed with any of the Frami panels, with the panels either upright or horizontal. Frami clamps, and a blow with the hammer, are all it takes to join the panels. Length adjustments and corners are solved just as simply as in 'normal" walls. A range of practical accessories makes the work very much easier.

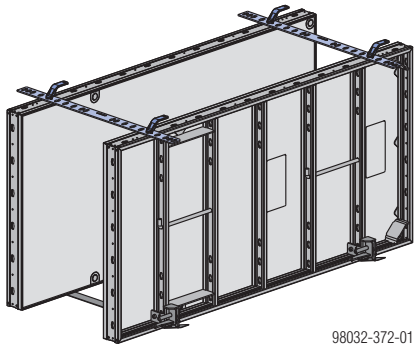


98032-352-01

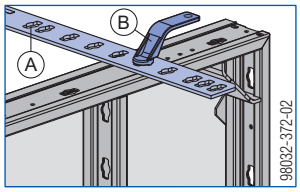
Tying horizontal Xlife panels

Top tie

with Frami S top yokes and Frami clips



- Tie rod is held above panel (not in the concrete)



A Frami S top yoke 4"-32"
B Frami clip

Frami S top yoke 4"-32":
Permitted load-bearing capacity: 1.12 kip (5.0 kN)

Frami clip:
Permitted tensile force: 2.245 kip (10.0 kN)
Permitted shear force: 1.12 kip (5.0 kN)
Permitted moment: 0.15 kip-ft (0.20 kNm)

Number of ties needed:

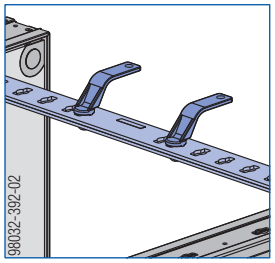
Xlife panel (horizontal)	Number of ties
3'-0"	1 *)
4'-0"	1 *)
6'-0"	2
9'-0"	2

*) Two ties are needed in both the first and last panel.

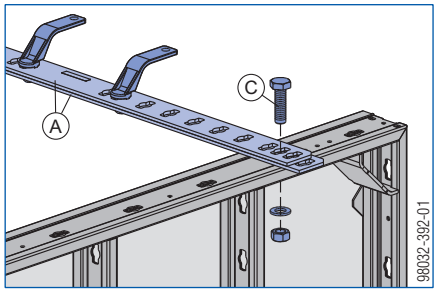
Possible wall thicknesses:

Wall thicknesses	Incre-ments	Number of Frami S top yokes
4"- 32" (10 - 81 cm)	2" (5.1 cm)	1 per tie
33"- 47" (83.5 - 119 cm)	1" (2.5 cm)	2 per tie *)
47 1/2" - 64 1/2" (120.2 - 163.2 cm)	1" (2.5 cm)	2 per tie *)

*) join these top yokes with 2 Frami clips.



Special cases for wall thicknesses of 33" and 34":

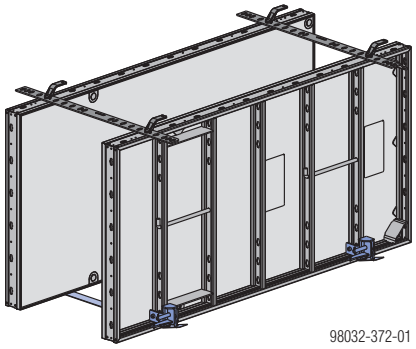


Wall thick-ness	How to fix the top yokes
33"	Bolt to both sides
34"	1 bolt, 1 Frami clip

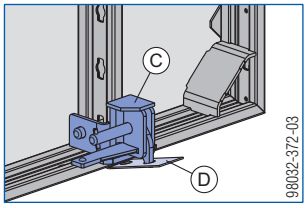
A Frami S top yoke 4"-32"
C Speed bolt 5/8 x 1 3/4" (M16x45)

Bottom tie

with Doka perforated tape and Frami foundation clamps



- Tie is held beneath the panel
- Wall thicknesses: in 2" (5 cm) increments



C Frami foundation clamp

D Doka perforated tape (lost anchoring component)

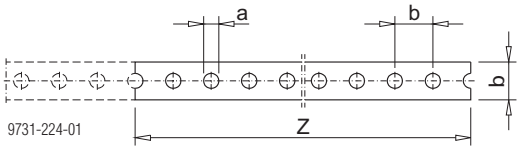
Frami foundation clamp:
Permitted load-bearing capacity: 1.795 kip (8.0 kN)

Required numbers of Doka perforated tapes:

Formwork height	Xlife panel (horizontal)	N° of items Doka perforated	Position
up to 2'-6" (76 cm)	3'-0"	1 *)	Right next to the panel joint (1', 30 cm)
	4'-0"		
	6'-0"	2	
	9'-0"	2	Each 2'-0" (61 cm) from the panel joint
up to 3'-0" (91 cm)	3'-0"	1 *)	Right next to the panel joint (1', 30 cm))
	4'-0"	2	
	6'-0"		
	9'-0"	3	2 pieces of tape right next to the panel joint and 1 tape 4'-0" (122 cm) from the panel joint

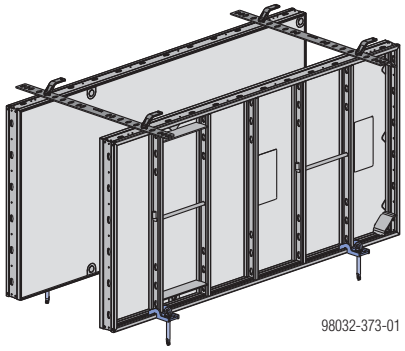
*) Two pieces of Doka perforated tape are needed in the first and in the last panel.

Doka perforated tape 50x2.0 mm 25 m



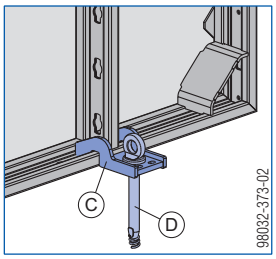
a ... $^{11}/_{16}$" (18 mm)
b ... 2" (5 cm)
Z ... Length of tape cut off roll: Wall thickness + 15 $^{3}/_{4}$" (40 cm)

with Frami bracing clips and Doka Express anchors 16x125mm



- The form tie is not in the concrete

NOTICE
Use Frami bracing clips only on foundation slabs and concrete floor-slabs.



E Frami bracing clip

F Doka express anchor 16x125mm + Doka coil 16mm

Frami bracing clip with express anchor
Concrete strength class: min. C20/25
Permitted load-bearing capacity for cylinder compressive strength $f_{ck,cylinder,current}$ of the cement during loading:
- 1200 psi (8 N/mm²): 3.6 kip (16 kN)
- 2400 psi (16 N/mm²): 4.6 kip (20 kN)

Required concrete thickness: min. 8" (20 cm)
Required distance from edge: min. 6" (15 cm)

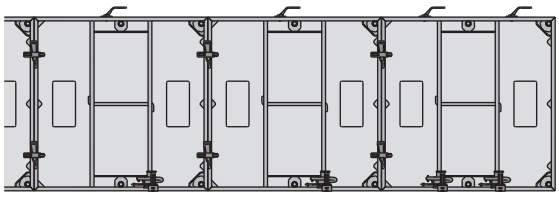
Required numbers of Frami bracing clips:

Cylinder compressive strength $f_{ck,cylinder,current}$ of the foundation plate during loading	Formwork height	Xlife panel (horizontal)	N° of items Frami bracing clip	Position
min. 1200 psi (8 N/mm²)	to 2'-6" (76 cm)	3'-0"	1 *)	Right next to the panel joint
		4'-0"		
		6'-0"	2	
		9'-0"	2	Each 2'-0" (61 cm) from the panel joint
	up to 3'-0" (91 cm)	3'-0"	1 *)	Right next to the panel joint
		4'-0"		
		6'-0"	2	
		9'-0"	3	2 of them each 15 3/4" (40 cm) from the panel joint, 1 of them in the middle
min. 2400 psi (16 N/mm²)	up to 3'-0" (91 cm)	3'-0"	1 *)	Right next to the panel joint
		4'-0"		
		6'-0"	2	Each 2'-0" (61 cm) from the panel joint
		9'-0"		

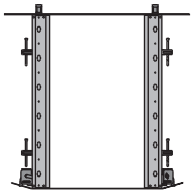
*) Two Frami bracing clips are needed in the first panel, and two in the last panel.

Practical example

Xlife panel 3’-0"x3’-0"

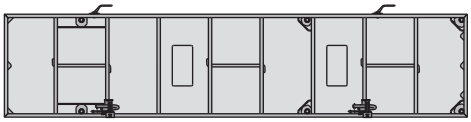


98032-378-01



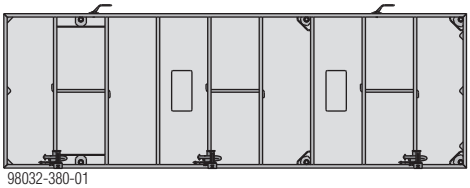
98032-378-02

Xlife panel 2’-0"x9’-0"



98032-379-01

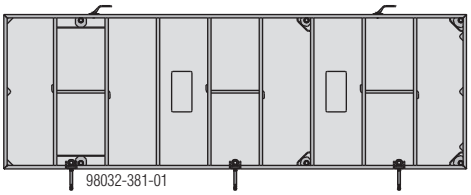
Xlife panel 3’-0"x9’-0"



98032-380-01

with Frami bracing clips and Doka Express anchors 16x125mm

Xlife panel 3’-0"x9’-0"

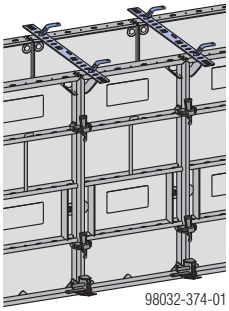


98032-381-01

Tying upright Xlife panels

Top tie

with Frami S top yokes and Frami clips



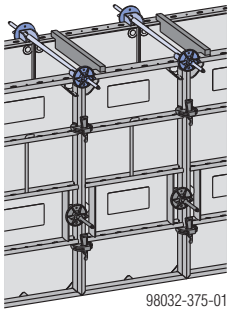
Number of ties needed:

Xlife panel (vertical)	N° of items Ties	Position
3'-0"	1 *)	Right next to the panel joint
4'-0"		

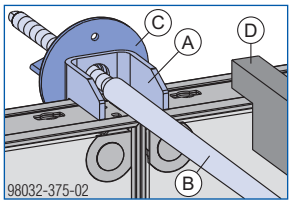
*) Two ties are needed in both the first and last panel.

For more information, see Tying horizontal Xlife panels.

with Frami tie-holder bracket and Taper tie 3/4" to 1" & 5/8" [15.0] ends



- Tie-rod is held above panel (not in the concrete)



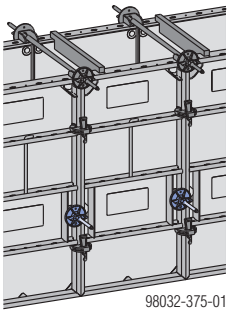
A Frami tie-holder bracket
B Taper tie 3/4" to 1" & 5/8" [15.0] ends
C Super-plate 15.0
D Wooden spacer

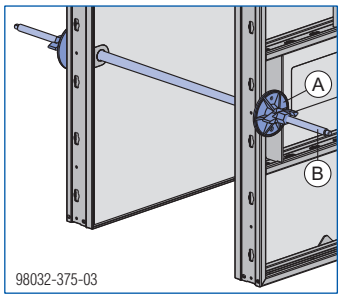
Required numbers of Frami tie-holder brackets:

Xlife panel (upright)	Number and position of Frami tie-holder brackets
3'-0"	Over every panel joint
4'-0"	

Bottom tie

with Taper tie 3/4" to 1" & 5/8" [15.0] ends





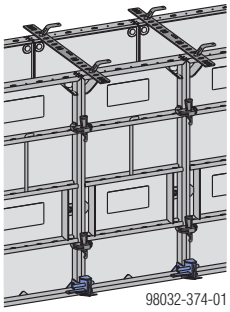
A Super-plate 15.0

B Taper tie 3/4" to 1" & 5/8" [15.0] ends

Required number of form-ties:

Xlife panel (upright)	Number and position of ties
3’-0"	At every panel joint
4’-0"	

with Doka perforated tape and Frami foundation clamps



Max. pour heights:

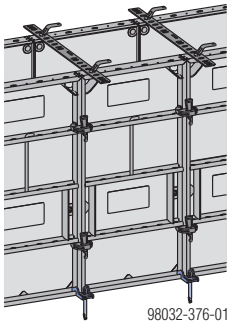
Panel width	Max. pour height
3'-0"	3’-0" (90 cm)
2'-6"	3’-6" (106 cm)
2'-0"	4’-0" (122 cm)

Required numbers of Doka perforated tapes:

Xlife panel (vertical)	Number and position Doka perforated tape
3'-0"	Over every panel joint
4'-0"	

For more information, see Tying horizontal Xlife panels.

with Frami bracing clips and Doka Express anchors 16x125mm



NOTICE

Use Frami bracing clips only on foundation slabs and concrete floor-slabs.

Max. pour heights:

Cylinder compressive strength $f_{ck,cylinder,current}$ of the foundation plate during loading	Panel width	Max. pour height
min. 1200 psi (8 N/mm²)	3'-0"	3'-2" (96 cm)
	2'-6"	3'-6" (106 cm)
	2'-0"	4'-0" (122 cm)
min. 2400 psi (16 N/mm²)	3'-0"	3'-6" (106 cm)
	2'-6"	4'-0" (122 cm)

Required numbers of Frami bracing clips:

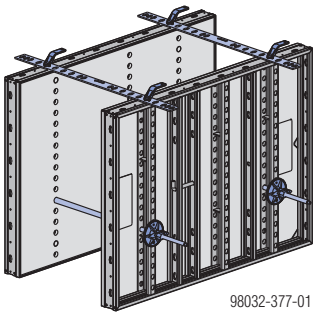
Xlife panel (vertical)	Number and position Frami bracing clip
3'-0"	Over every panel joint
4'-0"	

For more information, see Tying horizontal Xlife panels.

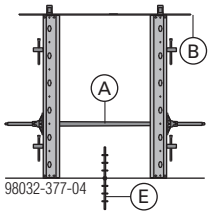
Tying horizontal Xlife universal panels

With Xlife universal panels, it is possible to tie the panels above a joint-sealing tape.

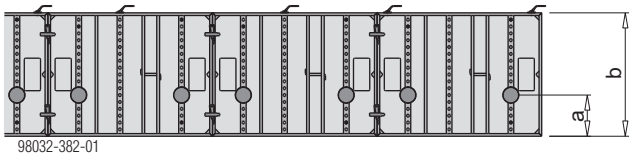
Note:
The max. tying height is 1'-0" (30 cm) – do not place the tie higher than this!



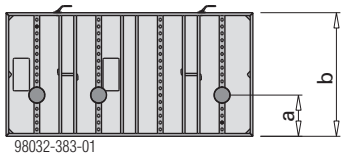
Practical example



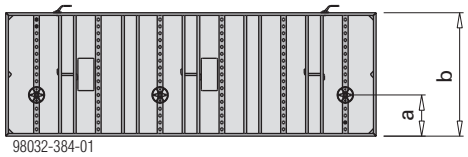
Xlife universal panel 3'-0"x4'-0"



Xlife universal panel 3'-0"x6'-0"



Xlife universal panel 3'-0"x9'-0"

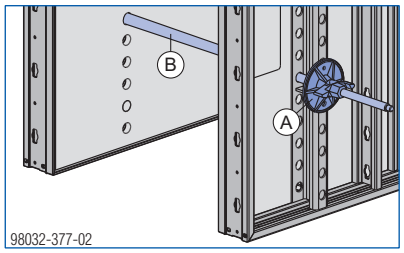


a ... max. tying height = 1'-0" (30 cm)
b ... 3'-0" (91 cm)

A Taper tie 3/4" to 1" & 5/8" [15.0] ends
B Frami S top yoke
E Joint-sealing tape

Tying inside the panel:

with Taper tie 3/4" to 1" & 5/8" [15.0] ends



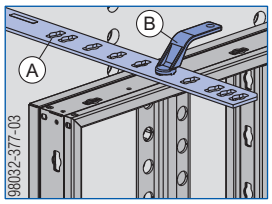
A Super-plate 15.0
B Taper tie 3/4" to 1" & 5/8" [15.0] ends

Required number of form-ties:

Xlife universal panel (horizontal)	Number of ties
3'-0"	2
4'-0"	2
6'-0"	3
9'-0"	3

Pressure bracing at top

with Frami S top yokes and Frami clips



A Frami S top yoke 4"-32"
B Frami clip

Required numbers of pressure braces:

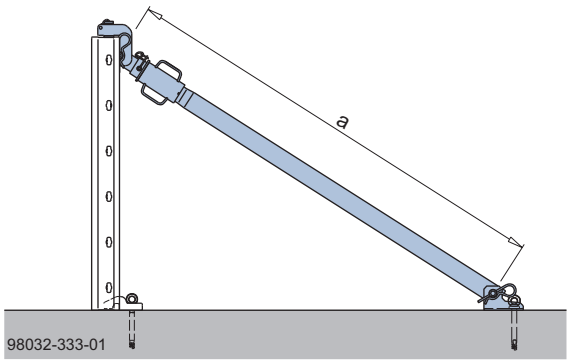
Xlife universal panel (horizontal)	Number of pressure braces
3'-0"	1 *)
4'-0"	1 *)
6'-0"	2
9'-0"	2

*) Two pressure braces are needed in the first panel, and two in the last panel.

Plumbing accessories

The Doka plumbing accessories are the safe, reliable way to set up and plumb the panels of the footing and grade beam formwork.

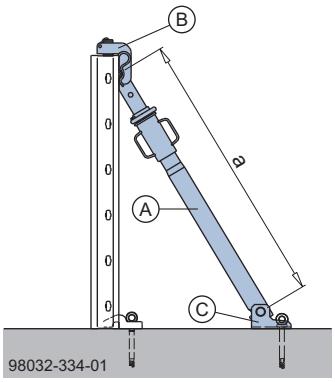
Plumbing the panels with the Plumbing strut 260



a ... min. 4'-9" (147 cm)

For more information, see Plumbing accessories.

Plumbing the panels with the Adjusting strut 120

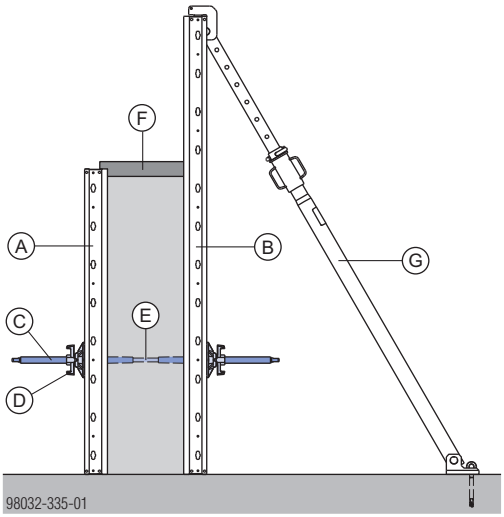


a ... min. 2'-7 $^{1}/_{2}$" - max. 4'-3" (82 - 131 cm)

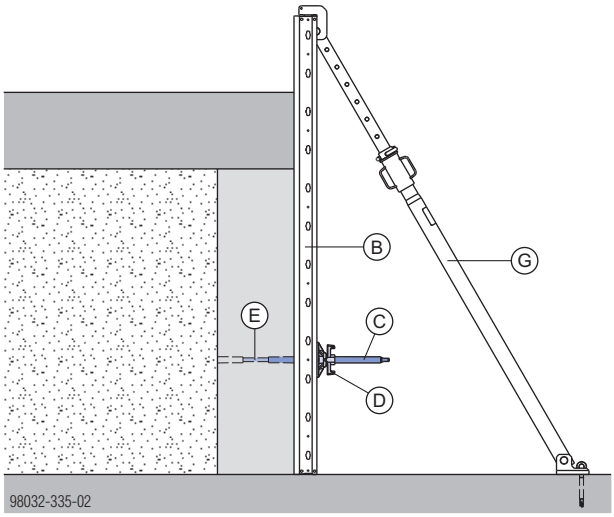
A	Adjusting strut 120 IB
B	Strut head EB
C	Strut shoe EB

Frost walls

1st casting section



2nd casting section



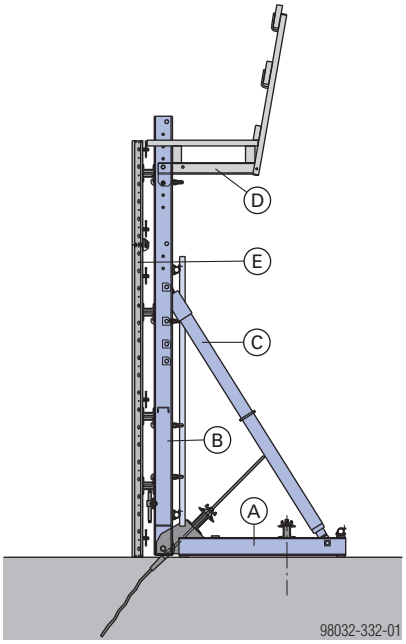
A	Frami S Xlife panel 4'-0"
B	Frami S Xlife panel 6'-0"
C	She-bolt 15.0mm x 16"
D	Super-plate 15.0
E	Euro rod 5/8" or Tie-rod 15.0mm
F	Wooden spacer
G	Plumbing strut 260 IB + Strut head EB

General remarks

Frami combined with . . .

Starting block D22

With the Starting block of the Dam formwork D22, you can also use the Frami panels for single-sided wall formwork.



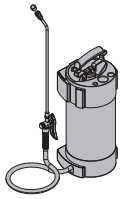
A	Starter-block unit D22
B	Vertical waling D15 3.00m U120
C	Spindle strut D15 3.00m
D	Screw-on access bracket MF75
E	Frami S Xlife panel

Follow the directions in the “Doka dam formwork” User Information!

Cleaning and care of your equipment

Concrete release agent

Doka-Trenn and Doka-OptiX are applied using the Doka sprayer for release agent.



Follow the directions in the 'Doka sprayer for release agent' Operating Instructions and on the containers of release agent.

NOTICE

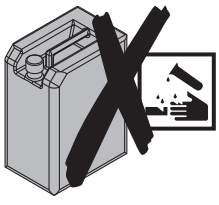
- Before every pour:
  - Apply release agent to the formwork sheet and the end faces **extremely thinly, evenly and in a continuous layer**.
- Make sure there are no drips of release agent running down the formwork sheet.
- Applying too much release agent will spoil the concrete finish.

To determine the right dosage and to make sure that you are using the agent correctly, test it on less important parts of the structure first.

Cleaning

NOTICE

- Immediately after pouring:
  - Remove any blobs of concrete from the back-face of the formwork, using water (without any added sand).
- Immediately after stripping the formwork:
  - Clean the formwork with a high-pressure washer and a concrete scraper.
- Do not use any chemical cleaning agents!

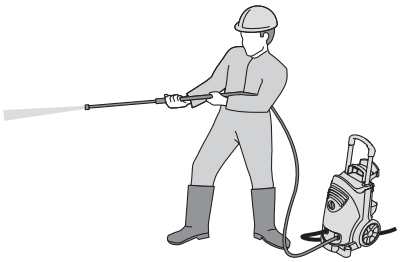


Cleaning high formwork:
Provide a working platform at a suitable cleaning location.

- Wheel-around scaffold DF (working heights of up to 3.50 m)
- Ringlock (working heights of up to 12.00 m)

Cleaning equipment

High-pressure washer

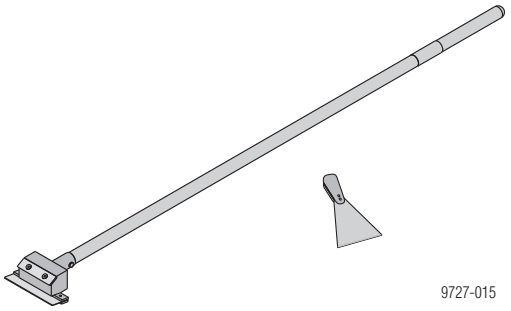


NOTICE

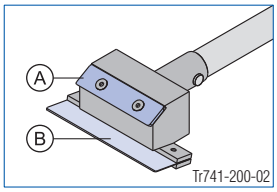
- Appliance pressure rating: 200 to max. 300 bar
- Keep the water-jet the correct distance from the formwork, and move it at the right speed:
  - The higher the pressure, the further away from the formwork you must keep the jet and the faster you must move it across the surface.
- Do not aim the jet at one place for too long.
- Make only moderate use of the jet around the silicone sealing strip:
  - If the pressure is too high, this will damage the silicone sealing strip.
  - Do not aim the jet at one place for too long.

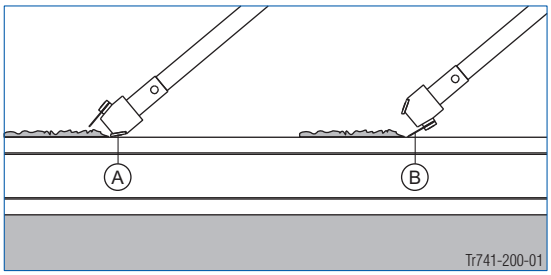
Concrete scraper

For removing concrete remnants, we recommend using a **Double scraper Xlife** and a paint scraper.



Functional description:

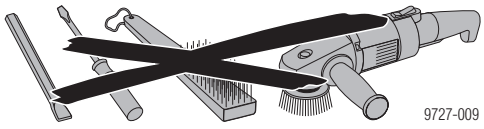




A Blade for dealing with heavy soiling
B Blade for dealing with slight soiling

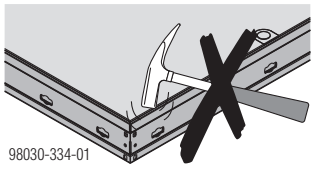
NOTICE

Do not use pointed or sharp objects, wire brushes, abrasive disks or cup brushes.

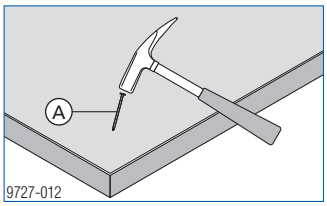


Care

- Never strike the frame profiles with a hammer

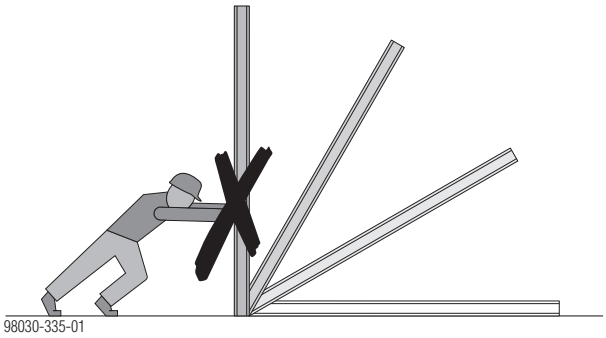


- Do not use nails longer than 60 mm on the formwork.

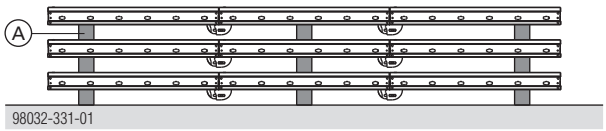


A max. l=60 mm

- Do not throw panels down or allow them to drop.



- Only stack panel gangs on top of one another with timber battens **(A)** between each layer.

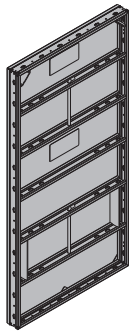


This prevents the formwork sheets from being damaged by the connector components.

	[lbs]	Article #
Frami S Xlife panel 3'-0"x9'-0"	**181.0**	**588801500**
Frami S Xlife panel 2'-6"x9'-0"	**159.0**	**588802500**
Frami S Xlife panel 2'-0"x9'-0"	**145.0**	**588803500**
Frami S Xlife panel 1'-6"x9'-0"	**116.0**	**588804500**
Frami S Xlife panel 1'-0"x9'-0"	**95.5**	**588805500**
Frami S Xlife panel 6"x9'-0"	**63.5**	**588806500**
Frami S Xlife panel 2'-0"x8'-0"	**132.0**	**588897500**
Frami S Xlife panel 3'-0"x6'-0"	**135.0**	**588811500**
Frami S Xlife panel 2'-6"x6'-0"	**109.0**	**588812500**
Frami S Xlife panel 2'-0"x6'-0"	**98.8**	**588813500**
Frami S Xlife panel 1'-6"x6'-0"	**80.2**	**588814500**
Frami S Xlife panel 1'-0"x6'-0"	**65.3**	**588815500**
Frami S Xlife panel 6"x6'-0"	**41.9**	**588816500**
Frami S Xlife panel 3'-0"x4'-0"	**94.8**	**588854500**
Frami S Xlife panel 2'-6"x4'-0"	**75.8**	**588855500**
Frami S Xlife panel 2'-0"x4'-0"	**66.1**	**588856500**
Frami S Xlife panel 1'-6"x4'-0"	**55.1**	**588857500**
Frami S Xlife panel 1'-0"x4'-0"	**46.1**	**588858500**
Frami S Xlife panel 6"x4'-0"	**29.3**	**588859500**
Frami S Xlife panel 3'-0"x3'-0"	**69.4**	**588821500**
Frami S Xlife panel 2'-6"x3'-0"	**61.3**	**588822500**
Frami S Xlife panel 2'-0"x3'-0"	**53.1**	**588823500**
Frami S Xlife panel 1'-6"x3'-0"	**45.2**	**588824500**
Frami S Xlife panel 1'-0"x3'-0"	**37.5**	**588825500**
Frami S Xlife panel 6"x3'-0"	**21.8**	**588826500**

Frami S Xlife-Element

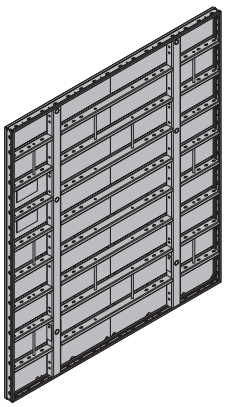
Galvanized



Frami S Xlife panel 8'-0"x9'-0"	**606.0**	**588896500**

Frami S Xlife-Element 8'-0"x9'-0"

Galvanized

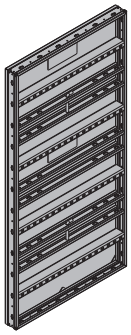


	[lbs]	Article #
Frami S Xlife universal panel 3'-0"x9'-0"	**237.0**	**588807500**
Frami S Xlife universal panel 3'-0"x6'-0"	**162.0**	**588808500**
Frami S Xlife universal panel 3'-0"x4'-0"	**107.0**	**588860500**
Frami S Xlife universal panel 3'-0"x3'-0"	**83.8**	**588809500**
Frami S Xlife universal panel 3'-0"x2'-0"	**56.2**	**588810500**

Frami S Xlife-Uni-Element

Galvanized

Corners marked in blue



Frami S Xlife inside corner 1'-0"x9'-0"	**138.0**	**588817500**
Frami S Xlife inside corner 1'-0"x6'-0"	**94.1**	**588818500**
Frami S Xlife inside corner 1'-0"x4'-0"	**67.2**	**588861500**
Frami S Xlife inside corner 1'-0"x3'-0"	**52.5**	**588819500**

Frami S Xlife-Innenecke

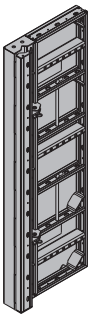
Galvanized

Frami S outside corner 9'-0"	**54.0**	**588827000**
Frami S outside corner 6'-0"	**35.5**	**588828000**
Frami S outside corner 4'-0"	**24.3**	**588862000**
Frami S outside corner 3'-0"	**17.4**	**588829000**

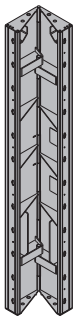
Frami S-Außenecke

Galvanized

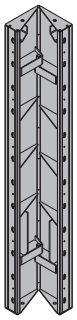
	[lbs]	Article #
Frami S Xlife pilaster panel 9'-0"	**206.0**	**588838500**
Frami S Xlife pilaster panel 6'-0"	**144.0**	**588839500**
Frami S Xlife pilaster panel 4'-0"	**99.6**	**588865500**
Frami S Xlife pilaster panel 3'-0"	**78.9**	**588840500**
Frami S Xlife-Stützenvorlageelement		
Galvanized		
Length: 2' (61 cm)		
Width: 6" (15 cm)		



Frami S hinged inside corner I galv. 9'-0"	**162.0**	**588831500**
Frami S hinged inside corner I galv. 6'-0"	**109.0**	**588832500**
Frami S hinged inside corner I galv. 4'-0"	**76.5**	**588863500**
Frami S hinged inside corner I galv. 3'-0"	**60.4**	**588833500**
Frami S-Scharnierecke I verzinkt		
Galvanized		



Frami S hinged inside corner I 9'-0"	**157.0**	**588831000**
Frami S hinged inside corner I 6'-0"	**104.0**	**588832000**
Frami S hinged inside corner I 4'-0"	**75.0**	**588863000**
Frami S hinged inside corner I 3'-0"	**60.0**	**588833000**
Frami S-Scharnierecke I		
Powder-coated, blue		



Frami S hinged outside corner A galv. 9'-0"	**65.0**	**588894000**
Frami S hinged outside corner A galv. 6'-0"	**43.0**	**588893000**
Frami S hinged outside corner A galv. 4'-0"	**28.9**	**588892000**
Frami S hinged outside corner A galv. 3'-0"	**20.9**	**588891000**
Frami S-Scharnierecke A verzinkt		
Galvanized		

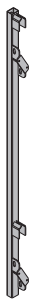
	[lbs]	Article #
Frami S hinged outside corner A 9'-0"	**64.4**	**588834000**
Frami S hinged outside corner A 6'-0"	**42.5**	**588835000**
Frami S hinged outside corner A 4'-0"	**28.7**	**588864000**
Frami S hinged outside corner A 3'-0"	**21.6**	**588836000**
Frami S-Scharnierecke A		
Powder-coated, blue		

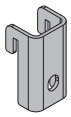
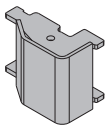
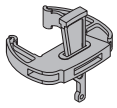
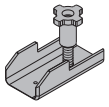
Frami S column hinge 6'-0"	**69.2**	**588881000**
Frami S column hinge 4'-0"	**20.9**	**588882000**
Frami S column hinge 3'-0"	**34.6**	**588883000**
Frami S-Stützengelenk		

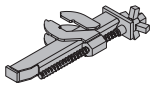
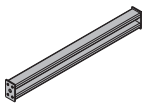
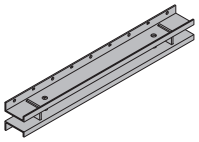
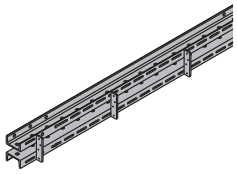
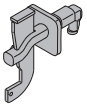
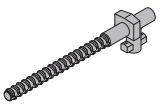
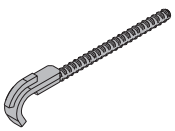
Hexagon bolt DIN 933 M18x50 8.8 galv.	**0.33**	**588879000**
Sechskantschraube DIN 933 M18x50 8.8 verz.		

Hexagon nut DIN 934 M18 8 galv.	**0.11**	**588880000**
Sechskantmutter DIN 934 M18 8 verz.		

Frami S steel filler 2"x9'-0"	**22.5**	**588842000**
Frami S steel filler 1 1/2"x9'-0"	**20.9**	**588843000**
Frami S steel filler 1"x9'-0"	**15.4**	**588844000**
Frami S steel filler 2"x6'-0"	**15.0**	**588845000**
Frami S steel filler 1 1/2"x6'-0"	**13.9**	**588846000**
Frami S steel filler 1"x6'-0"	**9.3**	**588847000**
Frami S steel filler 2"x4'-0"	**11.0**	**588866000**
Frami S steel filler 1 1/2"x4'-0"	**10.4**	**588867000**
Frami S steel filler 1"x4'-0"	**7.5**	**588868000**
Frami S steel filler 2"x3'-0"	**9.7**	**588848000**
Frami S steel filler 1 1/2"x3'-0"	**8.6**	**588849000**
Frami S steel filler 1"x3'-0"	**6.4**	**588850000**
Frami S-Stahlausgleich		
Powder-coated, blue		



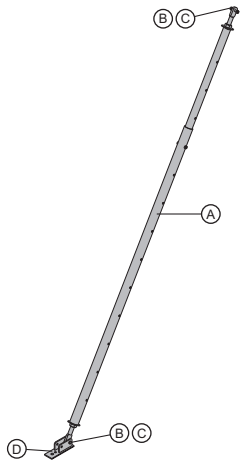
	[lbs]	Article #
Frami S filler angle 3/4" 3'-0"	**16.3**	**588820000**
Frami S filler angle 3/4" 4'-0"	**10.1**	**588886000**
Frami S filler angle 3/4" 6'-0"	**15.4**	**588885000**
Frami S-Schalhautwinkel		
Galvanized		
		
Framax S bias cut corner I 2.70m	**388.0**	**588527000**
Framax S bias cut corner I 1.35m	**207.0**	**588528000**
Framax S Ausschalecke I		
Galvanized, powder-coated		
		
Framax stripping spindle I with ratchet	**12.1**	**588653000**
Framax-Ausschalspindel I mit Ratsche		
Galvanized		
Height: 10" (24,8 cm)		
		
Frami tie-adapter for bias cut corner I	**1.0**	**588492000**
Frami-Ankeradapter für Ausschalecke I		
Galvanized		
Height: 4 1/2" (11 cm)		
		
Frami profile adapter for bias cut corner I	**1.3**	**588491000**
Frami-Profiladapter für Ausschalecke I		
Galvanized		
Height: 3 1/4" (8 cm)		
		
Framax quick acting clamp RU	**6.8**	**588153400**
Framax-Schnellspanner RU		
Galvanized		
Length: 8" (20 cm)		
		
Frami panel shoe	**2.9**	**588490000**
Frami-Elementschuh		
Galvanized		
Length: 6 1/2" (16 cm)		
		

	[lbs]	Article #
Frami clamp	**2.6**	**588433000**
Frami-Spanner		
Galvanized		
Length: 4 1/2" (11 cm)		
		
Frami adjustable clamp	**7.9**	**588436000**
Frami-Ausgleichsspanner		
Galvanized		
Length: 1'-4" (40 cm)		
		
Frami universal waling 0.70m	**8.2**	**588439000**
Frami universal waling 1.25m	**14.1**	**588440000**
Frami-Klemmschiene		
Painted blue		
		
Framax S universal waling 0.90m	**23.6**	**588519000**
Framax S universal waling 1.50m	**39.2**	**588520000**
Framax S Klemmschiene		
Painted blue		
		
Multi-purpose waling WS10 Top50 6'-0"	**82.2**	**581603000**
Mehrzweckriegel WS10 Top50 6'-0"		
Painted blue		
		
Frami wedge clamp	**2.4**	**588441000**
Frami-Klemme		
Galvanized		
Length: 6 1/2" (16 cm)		
		
Frami universal fixing bolt 5-12cm	**0.95**	**588479000**
Frami-Universalverbinder 5-12cm		
Galvanized		
Length: 9" (23 cm)		
		
Frami profile connector 5-18cm	**1.8**	**588493000**
Frami-Profilverbinder 5-18cm		
Galvanized		
Length: 1'-1" (33 cm)		
		

	[lbs]	Article #
Frami stop-end waler tie 15-45cm Frami-Stirnabschalzwinge 15-45cm Galvanized Length: 2'-9" (85 cm)	**19.4**	**588498000**
Frami lifting hook Frami-Umsetzbügel Galvanized Width: 6" (15 cm) Height: 8" (21 cm) Follow the directions in the "Operating Instructions"!	**16.5**	**588438000**
Plumbing strut 260 IB Justierstütze 260 IB Galvanized Length: 4'-10" - 8'-5" (146,8 - 256,7 cm)	**28.2**	**588437500**
Strut head EB Strebenkopf EB Galvanized Width: 3 1/2" (9 cm) Height: 5 1/2" (14 cm)	**3.1**	**588945000**
Adjusting strut 120 IB Justierstrebe 120 IB Galvanized Length: 2'-8" - 4'-3" (81,5 - 130,6 cm)	**16.8**	**588248500**
Strut shoe EB Strebenschuh EB Galvanized Width: 3 1/4" (8 cm) Height: 5" (13 cm)	**2.1**	**588946000**

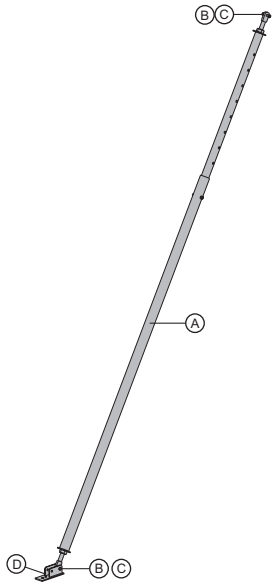
	[lbs]	Article #
Strut 340 Stütze 340 consisting of:		
(A) **Plumbing strut 340 IB EF** Galvanized Length: 6'-3" - 11'-3" (190,8 - 341,8 cm)	**32.8**	**588247500**
(B) **Prop shoe EB** Galvanized Length: 8" (20 cm) Width: 4 1/2" (11 cm) Height: 4" (10 cm)	**4.0**	**588245500**
Galvanized Delivery condition: separate parts		
Strut 540 Stütze 540 consisting of:		
(A) **Plumbing strut 540 IB EF** Galvanized Length: 10'-2" - 18' (310,5 - 549,2 cm)	**63.7**	**588250500**
(B) **Prop shoe EB** Galvanized Length: 8" (20 cm) Width: 4 1/2" (11 cm) Height: 4" (10 cm)	**4.0**	**588245500**
Galvanized Delivery condition: separate parts		

	[lbs]	Article #
Pipe brace 12'-0"-21'-0" Rohrstütze 12'-0"-21'-0" consisting of:		
(A) **Pipe brace 12'-0"-21'-0"**	**160.0**	**585091000**
(B) **Speed bolt 3/4"x4"** 2 pcs.	**0.64**	**585650000**
(C) **Speed nut 3/4"** 2 pcs.	**0.2**	**585652000**
(D) **Pipe brace shoe S** Painted yellow	**6.4**	**585088500**



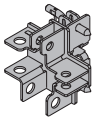
Galvanized
Delivery condition: separate parts

Pipe brace 22'-0"-40'-0" Rohrstütze 22'-0"-40'-0" consisting of:		
(A) **Pipe brace 22'-0"-40'-0"**	**410.0**	**585092000**
(B) **Speed bolt 3/4"x4"** 2 pcs.	**0.64**	**585650000**
(C) **Speed nut 3/4"** 2 pcs.	**0.2**	**585652000**
(D) **Pipe brace shoe S** Painted yellow	**6.4**	**585088500**



Galvanized
Delivery condition: separate parts

Frami S bracing head EB Frami S-Stützenkopf EB	**8.6**	**588853500**



Galvanized
Width: 7 1/2" (19 cm)
Height: 7 1/2" (19 cm)

	[lbs]	Article #
Frami S connection profile EB Frami S-Anschlussprofil EB	**21.2**	**588852500**

Painted blue
Height: 3'-5" (105 cm)

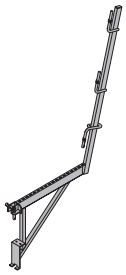
Doka express anchor 16x125mm Doka-Expressanker 16x125mm	**0.68**	**588631000**

Galvanized
Length: 7" (18 cm)

Doka coil 16mm Doka-Coil 16mm	**0.02**	**588633000**

Galvanized
Diameter: 5/8" (1,6 cm)

Frami bracket 60 Frami-Konsole 60	**17.0**	**588442000**

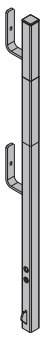


Galvanized
Length: 3'-3" (98 cm)
Height: 5'-2" (157 cm)

Handrail clamp S Schutzgeländerzwinge S	**25.4**	**580470000**

Galvanized
Height: 4' - 5'-7" (123 - 171 cm)

Handrail post XP 1.20m Geländersteher XP 1,20m	**9.0**	**586460000**



Galvanized
Height: 3'-10" (118 cm)

	[lbs]	Article #
Frami adapter XP Frami-Adapter XP Galvanized Height: 3' (91,5 cm)	**22.0**	**586477000**
Frami S frame hole plug Frami S-Ankerstopfen Brown Diameter: 1 1/8" (3 cm)	**0.007**	**588830000**
Frami universal panel plug Frami-Abdeckstopfen Yellow Diameter: 3/4" (2 cm)	**0.007**	**588445000**
Frami tie-holder bracket Frami-Ankerhaltewinkel Galvanized	**1.3**	**588453000**
Frami S top yoke 4"-32" Frami S-Flachanker 4"-32" Galvanized Length: 3'-2" (96 cm)	**4.6**	**588889000**
Frami S top yoke 4"-30" Frami S-Flachanker 4"-30" Galvanized Length: 3'-3" (99 cm)	**4.9**	**588837000**
Frami clip Frami-Stecker Galvanized Width: 1 1/8" (3 cm) Height: 4 1/2" (12 cm)	**0.57**	**588434000**
Frami bracing clip Frami-Bodenhalter Galvanized Length: 5" (12,7 cm) Width: 2 3/4" (6,7 cm)	**1.5**	**588495000**

	[lbs]	Article #
Frami foundation clamp Frami-Fundamentspanner Galvanized Height: 3 1/2" (9 cm)	**3.5**	**588452000**
Doka perforated tape 50x2.0mm 25m Doka-Lochband 50x2,0mm 25m	**37.5**	**588206000**
Frami S frontal triangular ledge 3/4" 9'-0" Frami S-Stirndreikantleiste 3/4"	**3.7**	**588878000**
Doka 4-part chain 3.20m Doka-Vierstrangkette 3,20m Follow the directions in the "Operating Instructions"!	**33.1**	**588620000**
Frami transport hook Frami-Transporthaken Galvanized Length: 7" (17,5 cm) Follow the directions in the "Operating Instructions"!	**1.2**	**588494000**
Dokamatic lifting strap 13.00m Dokamatic-Umsetzgurt 13,00m Green Follow the directions in the "Operating Instructions"!	**23.1**	**586231000**

Taper tie system 3/4" to 1"

Taper tie 3/4"-1"x32" & 15.0mm ends	**3.7**	**585820000**
Taper tie 3/4"-1"x38" & 15.0mm ends	**4.9**	**585821000**
Taper tie 3/4"-1"x44" & 15.0mm ends	**6.0**	**585822000**
Taper tie 3/4"-1"x52" & 15.0mm ends	**7.1**	**585823000**

Kon. Ankerstab 3/4"-1" & 5/8" [15,0] End.

	[lbs]	Article #
Super plate 15.0 Superplatte 15,0 Galvanized Height: 2 1/4" (6 cm) Diameter: 4 1/2" (12 cm) Width-across: 27 mm DIN 18216	**2.2**	**581966000**

She-bolt system 15.0

Frami S she-bolt 15.0mm x 16" **Frami S she-bolt 15.0mm x 24"** Frami S-Ankerkopf 15,0mm	**1.9** **2.6**	**588890000** **588895000**
Super plate 15.0 Superplatte 15,0 Galvanized Height: 2 1/4" (6 cm) Diameter: 4 1/2" (12 cm) Width-across: 27 mm DIN 18216	**2.2**	**581966000**

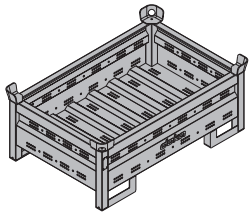
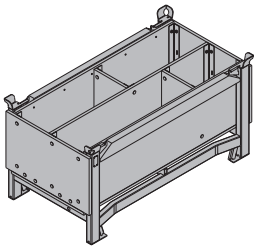
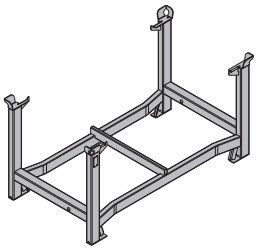
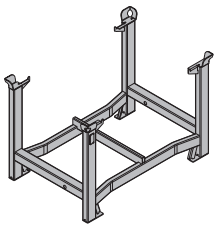
Tie rod system 15.0

Tie rod 15.0mm galvanized 0.50m	**1.6**	**581821000**
Tie rod 15.0mm galvanized 0.75m	**2.4**	**581822000**
Tie rod 15.0mm galvanized 1.00m	**3.1**	**581823000**
Tie rod 15.0mm galvanized 1.25m	**4.0**	**581826000**
Tie rod 15.0mm galvanized 1.50m	**4.9**	**581827000**
Tie rod 15.0mm galvanized 1.75m	**5.5**	**581828000**
Tie rod 15.0mm galvanized 2.00m	**6.4**	**581829000**
Tie rod 15.0mm galvanized 2.50m	**7.9**	**581852000**
Tie rod 15.0mm galvanized .....m	**3.1**	**581824000**
Tie rod 15.0mm non-treated 0.50m	**1.6**	**581870000**
Tie rod 15.0mm non-treated 0.75m	**2.4**	**581871000**
Tie rod 15.0mm non-treated 1.00m	**3.1**	**581874000**
Tie rod 15.0mm non-treated 1.25m	**4.0**	**581886000**
Tie rod 15.0mm non-treated 1.50m	**4.6**	**581876000**
Tie rod 15.0mm non-treated 1.75m	**5.5**	**581887000**
Tie rod 15.0mm non-treated 2.00m	**6.4**	**581875000**
Tie rod 15.0mm non-treated 2.50m	**7.9**	**581877000**
Tie rod 15.0mm non-treated 3.00m	**9.5**	**581878000**
Tie rod 15.0mm non-treated 3.50m	**11.0**	**581888000**
Tie rod 15.0mm non-treated 4.00m	**12.6**	**581879000**
Tie rod 15.0mm non-treated 5.00m	**15.9**	**581880000**
Tie rod 15.0mm non-treated 6.00m	**19.0**	**581881000**
Tie rod 15.0mm non-treated .....m Ankerstab 15,0mm DIN 18216	**3.1**	**581873000**
Super plate 15.0 Superplatte 15,0 Galvanized Height: 2 1/4" (6 cm) Diameter: 4 1/2" (12 cm) Width-across: 27 mm DIN 18216	**2.2**	**581966000**
Wing nut 15.0 Flügelmutter 15,0 Galvanized Length: 4" (10 cm) Height: 2" (5 cm) Width-across: 27 mm DIN 18216	**0.68**	**581961000**

	[lbs]	Article #
Battered washer 12/18 Winkelplatte 12/18 Galvanized Special order only! DIN 18216	**3.3**	**581934000**
Plastic tube 22mm 2.50m Kunststoffrohr 22mm 2,50m PVC Gray Diameter: 1" (2,6 cm)	**0.99**	**581951000**
Universal cone 22/10mm Universal-Konus 22/10mm Gray Diameter: 1 5/8" (4 cm)	**0.011**	**581995000**
Plug 22mm Verschlussstopfen 22mm PE Gray	**0.007**	**581953000**
Protective cap 15.0/20.0 Schutzkappe 15,0/20,0 Yellow Length: 2 1/4" (6 cm) Diameter: 2 3/4" (6,7 cm)	**0.066**	**581858000**
Tie-rod wrench 15.0/20.0 Ankerstabschlüssel 15,0/20,0 Galvanized	**4.0**	**580594000**

Multi-trip packaging

Doka multi-trip transport box 1.20x0.80m Doka-Mehrwegcontainer 1,20x0,80m Galvanized Height: 2'-7" (78 cm)	**154.0**	**583011000**
Multi-trip transport box partition 0.80m **Multi-trip transport box partition 1.20m** Mehrwegcontainer Unterteilung Steel parts galvanized Timber parts varnished yellow	**8.2** **12.1**	**583018000** **583017000**

	[lbs]	Article #
Doka multi-trip transport box 1.20x0.80x0.41m Doka-Mehrwegcontainer 1,20x0,80x0,41m Galvanized 	**93.7**	**583009000**
Doka accessory box Doka-Kleinteilebox Timber parts varnished yellow Steel parts galvanized Length: 5'-1" (154 cm) Width: 2'-9" (83 cm) Height: 2'-6" (77 cm) Special order only! 	**235.0**	**583010000**
Doka skeleton transport box 1.70x0.80m Doka-Gitterbox 1,70x0,80m Galvanized Height: 3'-8" (113 cm) 	**192.0**	**583012000**
Doka stacking pallet 1.55x0.85m Doka-Stapelpalette 1,55x0,85m Galvanized Height: 2'-6" (77 cm) 	**90.4**	**586151000**
Doka stacking pallet 1.20x0.80m Doka-Stapelpalette 1,20x0,80m Galvanized Height: 2'-6" (77 cm) 	**83.8**	**583016000**

[lbs]	Article #

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