EcoAs Technical Instruction Manual
Product features

EcoAs is a small-sized, versatile and adaptable formwork system and most suitable for contractors involved in structural and civil engineering projects. EcoAs is particularly economical in areas which are still formed using traditional timber shutters, such as strip footings, bucket and block foundations, light shafts, various beams, landings, drain shafts and the like. The EcoAS panels can be transported and assembled manually.

The system’s tie hole locations are suited to form all kinds of foundations even with joint tapes involved or kickers cast in advance.

A fast and safe panel connection is achieved with just one part – the EA assembly lock. Weighing only 1.5 kg, it can be attached with only one hand at any position on the frame between the cross stiffeners. A solid and safe connection with a perfect alignment is achieved with a few hammer blows.

An improved protection against rust and corrosion is achieved with the annealed powder coating. This prolongs the life span and considerably reduces cleaning efforts.

The proven alkus all-plastic facing made of polypropylene and aluminium offers the advantages of plywood facing such as nailability while avoiding the plywood facing’s disadvantages such as shrinking. The alkus lasts as long as the frame, it is easier to clean and repair than plywood and fully recyclable.

The MEVA multi-function profiles with weld-in Dywidag-threaded nuts facilitate the attachment of all accessory parts, e.g.

- Push-pull props and alignment rails are attached with flange screws.
- Scaffolding brackets are quickly attached with integrated self-locking pins.
- Problem areas can be bridged with Dywidag tie rods of any length. The location of tie holes does not matter.

Material planning with EcoAs is easy to do, there is no need to have many parts on stock and no need to search for various parts.

The maximum admissible fresh concrete pressure of the EcoAs frame formwork system is 50 kN/m². The fresh concrete pressure on plumb-vertical formwork is easy to calculate using the calculator that can be downloaded from www.meva-international.com. Make sure to observe the German Industrial Standard DIN 18218:2010-01 when calculating the pressure.

Abbreviations, measurements, decimal numbers, figures and tables

The abbreviation EA is used for the EcoAs system.

DIN means Deutsche Industrie-Norm (German Industrial Standard). E DIN (E = Entwurf / draft) means that the DIN is in draft status and not yet approved of. Any further abbreviations are explained where they are used the first time.

TÜV means Technischer Überwachungsverein. This is the independent German organisation that tests the safety of technical installations, machinery and motor vehicles. If a product passes the test, it is permitted to carry the GS seal. GS stands for Geprüfte Sicherheit (approved safety).

Measurements: This manual uses the metric system and thus m (for metre), cm (for centimetre) and mm (for millimetre). Dimensions without a measure are in cm.

Decimal numbers: Note that the comma is used in decimal numbers, e.g. 1,5 means 1 and a half.

The page numbers in this manual start with EA. The figures and tables are numbered per page. Depending on its product abbreviation, a cross reference in the text refers to a page, table or figure in this or in another manual.

Updated 6 July 2012
Please observe

This Technical Instruction Manual contains information, instructions and hints describing how to use the MEVA equipment on the construction site in a proper, quick and economic way. Most examples shown are standard applications that will occur in practice most often. For more complicated or special applications not covered in this manual, please contact the MEVA experts for advice. When using our products the federal, state and local codes and regulations must be observed. Many of the details shown do not illustrate the wall formwork system in the ready-to-pour condition as to the aforementioned safety regulations. Please adhere to this manual when applying the equipment described here. Deviations require engineering calculations and analysis to guarantee safety.

Please observe the assembly instructions that your local contractor or employer has created for the site on which the MEVA equipment is used. Such instructions are intended to minimise site-specific risks and must contain the following details:

- The order in which all working steps including assembly and disassembly must be carried out
- The weight of the panels and other system parts
- The type and number of ties and braces as well as the distance between them
- The location, number and dimensions of working scaffolds including working area and protection against falling down
- Pick points for panel transport by crane. With regard to panel transport, please observe this manual. Any deviation will require a static proof.

Important: Generally, only well maintained material may be used. Damaged parts must be replaced. Apply only original MEVA spare parts for replacement.

Attention: Never wax or oil assembly locks.

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The EcoAs panel

Fig. 4.2
The steel frames are made of closed hollow profiles and welded in mitred joints. The profiles are provided with a groove and an edge protection.

Fig. 4.3
Panel connection with the EA assembly lock (see p. EA-7)

Fig. 4.4
Weld-in DW 15 nut for the fast and solid attachment of accessories (see p. EA-12)

Fig. 4.5
Cross stiffeners made of closed and solid steel profile

Fig. 4.6
Tie hole with conical sleeve for the easy attachment of tie rods (see p. EA-9).

Fig. 4.7
Transport hole for the attachment of lifting devices. Allows fast loading and unloading as well as transport of panel stacks near ground level

Fig. 4.1 EcoAs panel 300/100
The EcoAs panel

The EcoAS frame form-work is available with heights 300, 240, 160 and 120 cm (Fig. 5.1).

Fig. 5.1 Height selection
The alkus all-plastic facing

The proven alkus all-plastic facing made of polypropylene and aluminium (Fig. 6.3) offers the advantages of plywood facing such as nailability while avoiding the plywood facing’s disadvantages such as shrinking. The alkus lasts as long as the frame, it is easier to clean and repair than plywood and fully recyclable.

Besides the obvious advantages, such as considerably reduced cleaning effort, minimum consumption of release agent and an excellent concrete finish, alkus offers substantial ecological benefits.

Substituting plastic for wood saves valuable timber resources and puts an end to the highly toxic dioxin which is released in the process of burning plywood that is bonded with phenolic resin.

Used or damaged alkus facing can be recycled into the same product. It is 100 % recyclable, and the manufacturer guarantees reacceptance.

Fig. 6.1 Negative imprint in the concrete when using panels with conventional plywood facing

Fig. 6.2 Smooth and even concrete surface as there is no projecting profile of the panel frame

Fig. 6.3 Layers and material of the alkus all-plastic facing
Panel connection

The fast and efficient connection of the panels is accomplished with the EA assembly lock (Fig. 7.1) no matter if the panels are assembled side by side or on top of each other. The assembly lock can be attached anywhere at the frame between the cross stiffeners and connects the panels solidly. Weighing only 1.5 kg, the assembly lock can easily be attached with only one hand.

Vertical panel connections require three assembly locks for panel height 300 cm, and two assembly locks for panel heights 240, 160 and 120 cm.

If walls are to be poured with architectural concrete of the SB3 type (*), an additional assembly lock is required per panel joint for formwork that is 240 cm high or higher.

(*) The German category SB3 refers to architectural concrete with a high surface quality used for highly decorative building parts, e.g. facades of high-rise buildings or inside walls.

Horizontal panel connections always require two assembly locks.

For the number of assembly locks required for outside corners and columns refer to p. EA-18 und p. EA-34.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA assembly lock</td>
<td>29-205-50</td>
</tr>
</tbody>
</table>
Panel connection

The EA assembly lock is attached between the cross stiffeners anywhere on the panel frame. Its 5-point contact does not only draw the panels together but also aligns them. With only a few hammer blows a safe connection and a perfect alignment are achieved (Fig. 8.1 through 8.4).

Fig. 8.1 and 8.2 show the frame profile of EcoAs panels with single groove while Fig 8.3 and 8.4 show the frame profile of EcoAs panels with double groove.

![Diagram of EA assembly lock](image)

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA assembly lock</td>
<td>29-205-50</td>
</tr>
</tbody>
</table>
Tie holes

The conical anchor sleeve (Fig. 9.1) for the insertion of tie rods DW 15 is welded inside the panel frame.

The formwork can be inclined up to 5 cm per metre or by 3°. Inclined formwork requires articulated flange nuts and must be secured against uplift.

The articulated flange nut can be tightened with a hammer (Fig. 9.2). In order to avoid material damage and for the ease of use, we recommend using a spanner SW 27 when tightening or loosening the articulated flange nut 15/120 (Fig. 9.3).

When connecting panels with different widths, the ties should always be placed through the panel with the larger width (Fig. 9.4).

Always use all tie holes, i.e. all usable tie holes must be used for tying and non usable tie holes be closed with plug D20.

Outside the frame, panels can also be tied with tie claw 23 (Fig. 9.5 und 9.6)

See p. EA-29 for further tying opportunities.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tie rod 15/90</td>
<td>29-900-80</td>
</tr>
<tr>
<td>Flange nut 100</td>
<td>29-900-20</td>
</tr>
<tr>
<td>Articulated flange</td>
<td>29-900-10</td>
</tr>
<tr>
<td>nut 15/120</td>
<td></td>
</tr>
<tr>
<td>Plug D20</td>
<td>29-902-63</td>
</tr>
<tr>
<td>Tie claw 23</td>
<td>29-901-44</td>
</tr>
<tr>
<td>Spanner SW 27</td>
<td>29-800-10</td>
</tr>
</tbody>
</table>
Rate of placing

Rules for placing concrete based on the values shown on this page

- According to DIN 4235, concrete should be placed in layers, the thickness of which can vary from 0.50 to 1.00 m.
- Concrete must not be placed at free fall from heights of 1.50 m or higher.
- When vibrating the concrete, which is done layer by layer, the vibrator must not penetrate more than 0.50 m into the layer below.
- A final vibrating over the overall concrete height is not permitted.
- Since concrete that has been vibrated once cannot be compacted any further, a final vibrating would not provide any advantage but may result in water bubbles (shrinkage cavities) on the concrete surface.

Rate of placing

The maximum admissible rate of placing can be precisely determined according to DIN 18218:2010-01 by using the online calculator available in the download area of www.meva-international.com.

Specific values of tie rods DW 15

<table>
<thead>
<tr>
<th>Tie Rod</th>
<th>d1 (mm)</th>
<th>d2 (mm)</th>
<th>Nominal Cross Section in mm²</th>
<th>Admissible Working Load in kN According to DIN 18216</th>
<th>Tie Rod Elongation in mm/m when using the Admissible Working Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dywidag (DW) Tie Rod</td>
<td>15</td>
<td>17</td>
<td>177</td>
<td>90</td>
<td>2,5</td>
</tr>
</tbody>
</table>

Table 10.1

- **Walls up to 2.40 m**
  Concrete can be poured without considering the pouring rate.

- **Walls higher than 2.40 m**
  The maximum admissible rate of placing can be precisely determined according to DIN 18218:2010-01 by using a calculation programme or by observing the rate of placing shown in Table 10.2. The values in this table can only be used if the end of setting of concrete t_E is known (i.e. the time the concrete needs in order to completely set). The end of concrete setting can be determined by using MEVA’s ultrasonic measuring device USM, with the knead-bag test according to DIN 18218:2010-01 or by asking the concrete supplier.

- **Note**
  Table 10.2 shows the recommended rate of placing that according to DIN 18218:2010-01 is compatible with the fresh concrete pressure and applicable when using tie rod DW 15 together with the articulated flange nut 15/120.

Maximum rate of placing \( v_p \) (depending on the consistency and end of setting of concrete \( t_E \)) in m/h

<table>
<thead>
<tr>
<th>Consistency range</th>
<th>EcoAs (50 kN/m²)</th>
<th>( t_E=5h )</th>
<th>( t_E=7h )</th>
<th>( t_E=10h )</th>
<th>( t_E=15h )</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3</td>
<td>2,29</td>
<td>1,81</td>
<td>1,29</td>
<td>0,73</td>
<td></td>
</tr>
<tr>
<td>F4</td>
<td>1,94</td>
<td>1,30</td>
<td>0,73</td>
<td>0,23</td>
<td></td>
</tr>
<tr>
<td>F5</td>
<td>0,83</td>
<td>0,60</td>
<td>0,42</td>
<td>0,23</td>
<td></td>
</tr>
<tr>
<td>F6</td>
<td>0,66</td>
<td>0,47</td>
<td>0,33</td>
<td>0,22</td>
<td></td>
</tr>
<tr>
<td>SCC</td>
<td>0,76</td>
<td>0,54</td>
<td>0,38</td>
<td>0,25</td>
<td></td>
</tr>
</tbody>
</table>

Table 10.2

* According to DIN 18218:2010-01 (fresh concrete pressure on plumb-vertical formwork)

\( t_E = \) End of setting of concrete

\( v_p = \) Maximum rate of placing
The admissible deflection of formwork parts is defined in DIN 18202 Ebenheitstoleranzen (flatness tolerances), table 3, lines 5 through 7 (Table 11.1). There, the maximum admissible deflection is laid down in relation to the distance between the measuring points. The admissible fresh concrete pressure that is in line with the flatness tolerances as defined in DIN 18202, table 3, line 6 is 50 kN/m² for EcoAs.

DIN 18202, Table 3

<table>
<thead>
<tr>
<th>Column</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line</td>
<td>Reference</td>
<td>0,1</td>
<td>1*</td>
<td>4*</td>
<td>10*</td>
<td>15*</td>
</tr>
<tr>
<td>5</td>
<td>Not exposed walls and undersides of slabs</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>Exposed walls and undersides of slabs, e.g. plastered walls, paneling, suspended ceiling</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Like line 6, but with increased requirements</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 11.1

* Interim values can be found in fig. 11.2. Round up found values to full mm.

Tolerances of deflection of walls and undersides of slabs (according to DIN 18202, Table 3)
Attachment of accessories

All panels are provided with multi-function profiles. Dywidag threaded nuts are welded inside the profiles (Fig. 12.1, 12.4 and 12.5). The difference between multi-function profiles and cross stiffeners is that accessories can be attached to the multi-function profile.

Scaffolding brackets are provided with self-locking pins (Fig. 12.2). They are attached to the multi-function profile and can be secured with a flange screw 18.

Alignment rails can be used when lifting large panels gangs with a crane or in order to bridge problem areas or brace panel units in compensation areas. The alignment rails are attached with flange screws to the multi-function profiles.

Formwork can be set plumb by using a push-pull prop that is attached to the panel with a formwork-prop-connector as shown in Fig 12.4.
Wall braces

Push-pull props and brace frames
These wall braces are attached to the multi-function profiles with formwork-prop connectors 18 (Fig. 13.1).

If they are used to align wall formwork, we recommend a max. brace spacing of 4,00 m. For transfer of wind loads a max. spacing of 2,50 m is recommended. For further applications contact our application engineering department.

Please note
- Wall braces and push-pull props must be anchored to the ground by using foot plates and dowels.
- Before anchoring the formwork to the ground, the properties of the ground and the rating of the dowels or nails must be verified according to the federal, state and local codes and regulations. Observe any regulations that apply when working with high walls.
- The formwork height and the length of the push-pull props should be identical. The angle shown in Fig. 13.1 should be max. 60 degrees.

The following table provides a summary of the formwork-prop connectors and their recommended uses:

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
<th>Adjustment range (m)</th>
<th>Adm. pressure (kN)</th>
<th>Adm. tension (kN)</th>
<th>Weight (kg)</th>
<th>Recommended use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brace frame 250 with formwork-prop connector</td>
<td>29-109-20</td>
<td>0,90–1,50</td>
<td>20,0</td>
<td>30,0</td>
<td>8,3</td>
<td>Horizontal alignment of the bottom formwork, brace frame 250, climbing formwork</td>
</tr>
<tr>
<td>Brace frame 250 without connector</td>
<td>29-109-25</td>
<td>1,20–2,20</td>
<td>25,0</td>
<td>40,0</td>
<td>10,5</td>
<td>Folding shaft formwork</td>
</tr>
<tr>
<td>Flange screw 18</td>
<td>29-401-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRL 120</td>
<td>29-108-80</td>
<td>0,90–1,50</td>
<td>20,0</td>
<td>30,0</td>
<td>8,3</td>
<td>Horizontal alignment of the bottom formwork, brace frame 250, climbing formwork</td>
</tr>
<tr>
<td>SRL 170</td>
<td>29-108-90</td>
<td>1,20–2,20</td>
<td>25,0</td>
<td>40,0</td>
<td>10,5</td>
<td>Folding shaft formwork</td>
</tr>
<tr>
<td>R 160</td>
<td>29-109-40</td>
<td>1,35–2,00</td>
<td>25,0</td>
<td>25,0</td>
<td>11,0</td>
<td>Horizontal and vertical alignment</td>
</tr>
<tr>
<td>R 250</td>
<td>29-109-60</td>
<td>1,90–3,20</td>
<td>25,0</td>
<td>30,0</td>
<td>18,5</td>
<td>Upper prop of brace frame 250 for formwork up to 4,05 m</td>
</tr>
<tr>
<td>R 460</td>
<td>29-109-80</td>
<td>3,40–5,20</td>
<td>20,0</td>
<td>30,0</td>
<td>35,8</td>
<td>Wall formwork up to 6,00 m</td>
</tr>
<tr>
<td>R 630</td>
<td>29-109-85</td>
<td>5,10–7,60</td>
<td>9,5</td>
<td>25,0</td>
<td>67,8</td>
<td>Wall formwork up to 9,00 m</td>
</tr>
</tbody>
</table>

Table 13.2
Working scaffolds

Scaffolding bracket
The pluggable scaffolding bracket 90 or 125 (Fig. 14.2) is suspended to the Dywidag-threaded nut of the multi-function profile by turning the scaffold bracket by 45°, then turning it back to vertical position and securing it with a flange screw 18. The planks can be bolted to the brackets. The max. bracket spacing for an admissible load of 150 kg/m² (scaffold group 2) is 2,50 m (in accordance with DIN 4420). The minimum plank thickness is 4,5 cm.

Guard-railing post
It is plugged into the scaffolding bracket (Fig. 14.3 and 14.4)

Lateral protection
If the fall height exceeds 2,00 m, a lateral protection (Fig. 14.5) consisting of handrail, midrail and toe board is required.

When using scaffold tubes as a fall-down protection, guard-railing post 48/120 is installed. This guard-railing post consists of a round pipe (dia. 48 mm) to which scaffold couplers are attached, and of a rectangular adapter which is plugged into the scaffolding bracket (Fig. 14.5).

Note
The minimum cross section of the handrail and midrail is:
- 15 x 3 cm for a post distance of up to 2,00 m
- 20 x 4 cm for a post distance of up to 3,00 m (Fig. 14.1).

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scaffolding bracket</td>
<td></td>
</tr>
<tr>
<td>90................................</td>
<td>29-106-00</td>
</tr>
<tr>
<td>125............................</td>
<td>29-106-50</td>
</tr>
<tr>
<td>Guard-railing post</td>
<td></td>
</tr>
<tr>
<td>100............................</td>
<td>29-106-75</td>
</tr>
<tr>
<td>140............................</td>
<td>29-106-85</td>
</tr>
<tr>
<td>UK.............................</td>
<td>29-106-80</td>
</tr>
<tr>
<td>Side railing 90/100</td>
<td>29-108-20</td>
</tr>
<tr>
<td>125/100......................</td>
<td>29-108-30</td>
</tr>
<tr>
<td>Swivel-joint coupler</td>
<td></td>
</tr>
<tr>
<td>48/48........................</td>
<td>29-412-52</td>
</tr>
<tr>
<td>Scaffold tube</td>
<td></td>
</tr>
<tr>
<td>48/200........................</td>
<td>29-412-23</td>
</tr>
<tr>
<td>48/300........................</td>
<td>29-412-26</td>
</tr>
<tr>
<td>48/400........................</td>
<td>29-412-27</td>
</tr>
</tbody>
</table>

Fig. 14.1

Fig. 14.2 Scaffolding bracket 90 or 125

Fig. 14.3 Guard-railing post 100 or 140

Fig. 14.4 Guard-railing post 48/120 UK

Fig. 14.5 Lateral protection
A fall-down protection must also be installed opposite the working scaffold for heights from 2 m onwards.

The support 800 for guard-railing posts (Fig. 15.1) is used to install the opposite fall-down protection in combination with any MEVA wall formwork.

The support is suspended over the frame profile of the wall formwork panel and secured with a flange screw 18 (Fig. 15.2).

The MEVA guard-railing posts 100, 140 and 48/120 UK as well as square guard-railing posts sized 40 by 40 mm can be connected to the support. The guard-railing posts are automatically tilted by 15° (Fig. 15.2) to make more room for concrete buckets.

The toe board is attached to the clamp in the front. Boards sized 150 by 30 mm are used as midrails and handrails.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support 800 for guard-railing post</td>
<td>29-108-50</td>
</tr>
<tr>
<td>Guard-railing post 100</td>
<td>29-106-75</td>
</tr>
<tr>
<td>140</td>
<td>29-106-85</td>
</tr>
<tr>
<td>48/120 UK</td>
<td>29-106-80</td>
</tr>
<tr>
<td>Flange screw 18</td>
<td>29-401-10</td>
</tr>
</tbody>
</table>

Guard-railing posts are connected as follows:
MEVA guard-railing post 100, 140 or 48/120 UK
Square guard-railing post 40 by 40 mm
Crane hook

The admissible load of an EA/ML crane hook (Fig. 16.1) is 600 kg.

**Handling**
1. Open the safety lever as far as possible.
2. Push the crane hook over the panel profile until the claw engages completely in the groove.
3. Let go of the safety lever and it will go back to its start position and lock the crane hook. Check that the crane hook is locked before using the crane hook.

**Important handling notes**
- When moving panels, make sure to always use 2 crane hooks, also when moving single panels (Fig. 16.3 and 16.4).
- When moving horizontal panels, the crane hooks must always be attached at the cross stiffeners (Fig. 16.3).
- When moving panel gangs, make sure each crane hook is attached at a panel joint (Fig. 16.5). This avoids displacement of the crane hooks.

**When to replace the crane hook**
If the reference dimension exceeds 24 mm, the crane hook must be replaced immediately. The crane hook must also be displaced if only one side of the hook exceeds the reference dimension (Fig. 16.2).

**Safety check**
Always check the crane hook before using it. Do not overload the crane hook. Overloading causes damage. A damaged crane hook is not capable of full load and its safe use can no longer be guaranteed.

**Safety regulations**
When using our products, the federal, state and local codes and regulations must be observed. Also observe the operating instructions delivered with the crane hook.

### EA/ML crane hook

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA/ML crane hook</td>
<td>29-103-95</td>
</tr>
</tbody>
</table>

Fig. 16.1

Reference dimension: 24 mm

Max. 60°

Fig. 16.2

Max. 60°

Fig. 16.3

Max. 60°

Fig. 16.4

Fig. 16.5
Inside corner 90°

The EcoAs inside corner is equipped with the alkus all-plastic facing. Like standard panels, the inside corner is connected with EA assembly locks (Fig. 17.1 and page EA-7).

Each corner side is 25 cm long (Fig. 17.2).

Gaps on the inside of the corner can be bridged using a filler or timber (Fig. 17.3 and 17.4). The filler (Fig. 17.4) is 5 cm wide. The connection is achieved with Uni-assembly locks and an AS alignment rail must be attached at each tie hole level for stabilisation (Fig. 17.3).

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA inside corner</td>
<td>21-724-10</td>
</tr>
<tr>
<td>AL 300/25 Alu</td>
<td>21-724-20</td>
</tr>
<tr>
<td>AL 240/25 Alu</td>
<td>21-724-30</td>
</tr>
<tr>
<td>AL 120/25 Alu</td>
<td>21-724-40</td>
</tr>
<tr>
<td>Uni-assembly lock</td>
<td>29-400-85</td>
</tr>
<tr>
<td>22</td>
<td>29-400-90</td>
</tr>
<tr>
<td>Filler</td>
<td>21-726-00</td>
</tr>
<tr>
<td>240/5</td>
<td>21-726-10</td>
</tr>
<tr>
<td>120/5</td>
<td>21-726-10</td>
</tr>
</tbody>
</table>
The EA outside corner has a 5 cm wide facing on both sides and an integrated chamfer strip (Fig. 18.1). It is made of aluminium with annealed plastic coating. Together with EA panels and EA assembly locks, the EA outside corner provides a solid solution for 90° outside corners. (Fig. 18.2 and 18.3).

The number of the required assembly locks depends on the height of the outside corner, see Fig. 18.3 and positions a through c.

**Corner height 300 cm**
The connection between outside corner and adjacent panel requires 4 assembly locks per height (a). Four assembly locks are required at the panel joint between 1st and 2nd panel (b) and 3 assembly locks at all other panel joints (c).

**Corner height 240 cm**
The connection between outside corner and adjacent panel requires 4 assembly locks per height (a). Three assembly locks are required at the panel joint between 1st and 2nd panel (b) and 2 assembly locks at all other panel joints (c).

**Corner height 160 cm**
The connection between outside corner and adjacent panel requires 3 assembly locks per height (a). Two assembly locks are required for all other panel joints (b, c).

**Corner height 120 cm**
The connection between outside corner and adjacent panel (a) as well as all other panel joints require 2 assembly locks per height (b, c).
Hinged corners

Acute and obtuse angled corners are formed using hinged inside corners and hinged outside corners.

The outside corner requires alignment rails to be attached to the multi-function profiles with flange screws (Fig. 19.1 and 19.2).

If the inside angle is larger than 100°, a wooden blocking and alignment rails must be used on the inside (Fig. 19.1).

Timber fillers and Uni-assembly locks 22 are used for length compensation.

Side length
- Outside corner 7,5 cm
- Inside corner 30 cm

Adjustment range
60° to 180°

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA hinged corner</td>
<td>21-726-40</td>
</tr>
<tr>
<td>inside 120/30</td>
<td></td>
</tr>
<tr>
<td>inside 240/30</td>
<td>21-726-30</td>
</tr>
<tr>
<td>outside 120</td>
<td>21-726-60</td>
</tr>
<tr>
<td>outside 240</td>
<td>21-726-50</td>
</tr>
<tr>
<td>Uni-assembly lock 22</td>
<td>29-400-85</td>
</tr>
<tr>
<td>Timber filler</td>
<td></td>
</tr>
<tr>
<td>Alignment rails with</td>
<td></td>
</tr>
<tr>
<td>bolt M18x100</td>
<td></td>
</tr>
<tr>
<td>Hinged outside corner</td>
<td></td>
</tr>
<tr>
<td>Uni-assembly lock 22</td>
<td>29-400-90</td>
</tr>
<tr>
<td>Alignment rails with</td>
<td></td>
</tr>
<tr>
<td>bolt M18x100</td>
<td></td>
</tr>
<tr>
<td>Hinged inside corner</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 19.1

Min. 60°

Fig. 19.2
Hinged corners

We recommend attaching the alignment rail with flange screws before installing the tie rods (Fig. 20.1).

The required timber fillers depend on the wall thickness, inside angle and panel width. See Table 20.2.

\[
y = \text{panel width E1 plus required timber filler}
\]

Wall thickness (WT) in cm | Inside angle α | y in cm | Required timber filler
---|---|---|---
| 70° - 75° | 75° - 85° | 85° - 96° | 96° - 110° | 110° - 146° | 146° - 168° | 168° - 180° |
| 24 | 55 | 50 | 45 | 40 | 30 | 25 | Job-built compensation 25,0 - 22,5 |
| | | | | | | | 1,8 - 0 |
| | | | | | | | 5,0 - 0 |
| | | | | | | | 5,0 - 0 |
| | | | | | | | 5,0 - 0 |
| | | | | | | | 10,0 - 0 |
| | | | | | | | 5,0 - 0 |

Table 20.2

Equation to calculate width \( y = \frac{WS}{\tan \alpha/2} + 22,5 \text{ [cm]} \)
Length compensation

Timber filler
Gaps up to 17 cm can be formed on site by using timber fillers and Uni-assembly locks 22. Compensation areas are reinforced with alignment rails (Fig. 21.1 and 21.2).

Compensation plate
It is used for compensations from 6 to 20 cm and attached to the panel with 2 EA assembly locks. Alignment rails must be used for bridging and reinforcement (Fig. 21.3 through 21.5)
**Fig. 22.1** through 22.5 show a T-wall connection using 2 inside corners.

Different wall widths can be compensated as follows:
- Widths from 6 to 20 cm with the EA compensation plate and EA assembly lock (Fig. 22.4)
- Widths up to 17 cm with timber filler and Uni-assembly lock 22 (Fig. 22.5)

**Description** | **Ref. No.**
--- | ---
EA inside corner | 21-724-10
AL 300/25 Alu | 21-724-20
AL 240/25 Alu | 21-724-30
AL 160/25 Alu | 21-724-40
AL 120/25 Alu | 21-724-40
Uni-assembly lock 22 | 29-400-85
28 | 29-400-90
EA compensation plate 120/20 | 21-726-20

*Admissible span depends on alignment rail (see p. EA-26)*
Connection to existing walls

Fig. 23.1 through 23.7 show some options for connecting formwork to an existing wall. Depending on the wall layout and conditions on the construction site, the most suitable solution may vary from site to site.

Make sure the formwork is tightly attached to the existing wall to avoid a leakage of the fresh concrete and a patchy concrete surface.

For connections to an existing wall or for the next cycle using the multi-purpose panel see Fig. 23.6 and 23.7 and refer to p. EA-35.
Stop ends

Stop ends can be formed as follows:

- either with a stop end fixture (Fig. 24.1 and 24.2)
- or with outside corners and standard panels (Fig. 24.3 and 24.4).

Two stop end fixtures with different lengths are available:

- stop end fixture 23/40 for walls widths up to 35 cm
- stop end bracket 2,5’-60/23 for wall widths up to 75 cm

One brace is required per tie hole level.

When forming stop ends with outside corners and standard panels, panels that are wider than 50 cm require an additional bracing (Fig. 24.3 and 24.4). One brace is required per tie hole level.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop end fixture</td>
<td>29-105-45</td>
</tr>
<tr>
<td>Stop end bracket 2,5’-60/23</td>
<td>29-105-60</td>
</tr>
<tr>
<td>EA outside corner 120 Alu</td>
<td>21-725-95</td>
</tr>
<tr>
<td>EA outside corner 160 Alu</td>
<td>21-725-90</td>
</tr>
<tr>
<td>EA outside corner 240 Alu</td>
<td>21-725-85</td>
</tr>
<tr>
<td>EA outside corner 300 Alu</td>
<td>21-725-87</td>
</tr>
</tbody>
</table>
Wall offsets up to 8 cm are formed by moving back the corresponding panel (Fig. 25.1 and 25.4). For offsets of 8 or more centimetres, inside corners should be used (Fig. 25.2, 25.3, 25.5 and 25.6).

All wall offsets require alignment rails (Fig. 25.1 through 25.2).

Job-built tie rods in different lengths can be used to align and bridge different kinds of problem areas such as pilasters, wall offsets and projecting parts. This can be done at any multi-function profile without considering existing tie holes.

Wall offset

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA inside corner</td>
<td>21-724-10</td>
</tr>
<tr>
<td>AL 300/25 Alu</td>
<td>21-724-20</td>
</tr>
<tr>
<td>AL 240/25 Alu</td>
<td>21-724-30</td>
</tr>
<tr>
<td>AL 160/25 Alu</td>
<td>21-724-40</td>
</tr>
<tr>
<td>Uni-assembly lock 22</td>
<td>29-400-85</td>
</tr>
</tbody>
</table>

Fig. 25.1

Fig. 25.2

Fig. 25.3

Fig. 25.4

Fig. 25.5

Fig. 25.6
Pilasters are fast formed with inside corners, standard panels and, where necessary, wooden blockings. Alignment rails must be used for reinforcement and statical reasons (Fig. 26.1 through 26.3).
Differences in height

Being independent of a grid, the panels can easily be connected without further accessories. Vertical, horizontal and even inclined panels can all be safely connected with EA assembly locks, even with differences in height (Fig. 27.1).

Job-built fillers are made with a board and a facing cut to size and, where necessary, a square timber. The EA assembly lock is used for connection.

Alignment rails may be required for load transfer in the compensation area (Fig. 27.1, Fig. 27.2 and p. EA-29).
Due to the central position of the tie holes in the 80 cm wide panels when horizontally used (except panels with height 300 cm), EcoAs is particularly suited for job-built solutions to form complicated foundations even when joint tapes or kickers involved (Fig. 28.1 through 28.3). When combined with 120 cm inside corners, the 80 cm panels are horizontally used.

The use of foundation tapes and tensioners for foundation tapes (Fig. 28.4 through 28.6) eliminates the time-consuming job of installing bottom ties. The tensioner for foundation tape is attached to the formwork with a wedge.

The upper tie in the concrete can be replaced as follows:
- by a push-pull strut.
- by tie claws 23.

Two tie claws 23, one DW tie rod 15 and two flange nuts 100 are required per tie (Fig. 28.8). We recommend using an anchor sleeve as a spacer between the opposite panels and in order to protect the tie from dirt.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push-pull strut</td>
<td>29-105-70</td>
</tr>
<tr>
<td>Tie claw 23</td>
<td>29-901-44</td>
</tr>
<tr>
<td>Flange nut 100</td>
<td>29-900-20</td>
</tr>
<tr>
<td>Foundation tape</td>
<td>29-307-50</td>
</tr>
<tr>
<td>Tensioner EA for foundation tape</td>
<td>29-307-75</td>
</tr>
<tr>
<td>Trolley for foundation tape</td>
<td>29-307-55</td>
</tr>
</tbody>
</table>

Table 28.7

Max. spacing of tensioner for foundation

<table>
<thead>
<tr>
<th>Pouring height 80 cm</th>
<th>185 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pouring height 100 cm</td>
<td>120 cm</td>
</tr>
<tr>
<td>Pouring height 135 cm</td>
<td>70 cm</td>
</tr>
</tbody>
</table>
Substitution of ties

In certain cases tie rods need not be installed at certain tie holes and their number can be reduced by using alignment rails.

If a horizontal panel 160/80 is placed on top of a vertical panel 160/80 (Fig. 29.1), one tie level can be substituted by using 2 AS alignment rails 125 at multi-function profiles at tie hole level.

Length compensation (Fig. 29.2): When using adequate alignment rails, no tie rods need to be installed through the tie holes of the filler. In order to guarantee an effective alignment with the alignment rail, we recommend placing the alignment rails at multi-function profile level and limit the length of the residual measure to 50% of the length of the alignment rails (Table 29.3 and Fig. 29.4).

If the fresh concrete pressure $P_{\text{max}}$ is 50 kN/m² and if lines 5 and 6 of standard DIN 18202 (tolerances in surface building) are observed, the following residual measures can be bridged using AS alignment rails:

<table>
<thead>
<tr>
<th>Alignment rail</th>
<th>Res. measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS-RS 50</td>
<td>Up to 0,30 m</td>
</tr>
<tr>
<td>AS-RS 125</td>
<td>Up to 0,60 m</td>
</tr>
<tr>
<td>AS-RS 200</td>
<td>Up to 0,70 m</td>
</tr>
</tbody>
</table>

Table 29.3

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS alignment rail</td>
<td></td>
</tr>
<tr>
<td>50, galv.</td>
<td>29-201-73</td>
</tr>
<tr>
<td>125, galv.</td>
<td>29-201-75</td>
</tr>
<tr>
<td>200, galv.</td>
<td>29-201-80</td>
</tr>
</tbody>
</table>
Height extension

Combinations for height extension
All panels can be combined vertically or horizontally and must always be connected with the EA assembly lock. With the standard panels being 120, 160, 240 and 300 cm high, heights in increments of 40 cm can be achieved (Fig. 30.1).

Different heights

Fig. 30.1
Height extension

When extending the height with vertical panels, alignment rails must be used for bracing. Make sure the alignment rails are long enough.

When crane ganging height-extended panels, make sure to place an alignment rail at every other panel (Fig. 31.1 and 31.2).
Height extension

When extending the height with horizontal panels, please observe:

- If the extension exceeds 30 cm, i.e. if the panel on top is wider than 30 cm, make sure to anchor through the tie holes shown in Fig. 32.1.

Horizontal height extension of more than 30 cm

![Diagram showing horizontal height extension of more than 30 cm.]

Fig. 32.1

- An extension up to 30 cm requires tying at the top only when using folding platforms or scaffolding brackets (Fig. 32.2).

Horizontal height extension of up to 30 cm

![Diagram showing horizontal height extension of up to 30 cm.]

Fig. 32.2
Crane-ganging

When lifting and transporting large panel gangs with a crane, the crane hooks are attached at the panel joints to prevent them from shifting (Fig. 33.1).

Example (Fig. 33.1): The panel gang sized 6 by 4 m and consisting of 8 EcoAs panels 300/100 weighs 876 kg including accessories (2 AS alignment rails 125 and 26 EA assembly locks).

Transport angles
When using transport angles (Fig. 33.2), panels stacks need not be placed on square timbers, which saves room, and panel stacks can also be moved when they are not complete. Simply attach 4-rope crane slings directly over the top panel of the stack. Never use 2-rope crane slings! Five to 12 EcoAs panels can be moved when using transport angles. The maximum load capacity per angle is 10 kN.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport angle 10 foldable</td>
<td>29-305-10</td>
</tr>
<tr>
<td>rigid</td>
<td>29-305-15</td>
</tr>
</tbody>
</table>

Important
Note that each transport unit always requires a minimum 2 crane hooks. No transport unit must exceed the weight of 1200 kg when using 2 crane hooks (each with a load capacity of 600 kg).
Column formwork

Foundations with a maximum side length of 90 cm (Fig. 34.2) and a maximum height of 120 cm can be formed using 2 assembly locks per height (Fig. 34.1).

Columns with a maximum side length of 60 cm (Fig. 34.4) and a maximum pouring height of 300 cm (Fig. 34.4) can be formed using outside corners and standard panels.

Columns with larger cross sections and/or heights require more assembly locks and additional strengthening collars due to their increased fresh concrete pressure (Fig. 34.3 and Table 34.5).

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA outside corner</td>
<td></td>
</tr>
<tr>
<td>300 Alu</td>
<td>21-725-75</td>
</tr>
<tr>
<td>240 Alu</td>
<td>21-725-85</td>
</tr>
<tr>
<td>160 Alu</td>
<td>21-725-90</td>
</tr>
<tr>
<td>120 Alu</td>
<td>21-725-95</td>
</tr>
</tbody>
</table>

Table 34.5

<table>
<thead>
<tr>
<th>EcoAs-column formwork</th>
<th>EA assembly locks plus str. collars</th>
</tr>
</thead>
<tbody>
<tr>
<td>h = 1,20 m</td>
<td>2</td>
</tr>
<tr>
<td>h = 1,60 m</td>
<td>3</td>
</tr>
<tr>
<td>h = 2,40 m</td>
<td>6</td>
</tr>
<tr>
<td>h = 3,00 m</td>
<td>8</td>
</tr>
<tr>
<td>h = 3,60 m</td>
<td>8 + 1 str. collar</td>
</tr>
<tr>
<td>h = 4,00 m</td>
<td>9 + 1 str. collar</td>
</tr>
<tr>
<td>h = 4,80 m</td>
<td>12 + 2 str. collars</td>
</tr>
<tr>
<td>h = 6,00 m</td>
<td>16 + 4 str. collars</td>
</tr>
</tbody>
</table>
Multi-purpose panel

The multi-purpose panels are particularly suited to form pilasters, stop ends, connections to existing walls, 90° corners and wall offsets (Fig. 35.1 through 35.3).

The multi-purpose panels are provided with perforated profiles (see p. EA-36) to attach tie rods, stop end fixtures and flange nuts.

**Attention**
The stop end fixture must not be inserted into the outermost tie hole because it has to fully rest on the panel. The stop end fixture is applied with flange nut 100 (Fig. 35.3).

If applied with a hinged corner, there is no need for an additional alignment rail or strengthening collar on the outside if distance X is less than L/2 (Fig. 35.4).

The perforated profiles are punched every 2.5 cm (Fig. EA-36.4) and thus allow the multi-purpose panel to be used for many applications. When, for example, pouring against an existing wall or pouring the next cycle, tying can be done very close at the existing wall, which prevents the concrete from bleeding (Fig. 35.2).

**Obtuse angled corner**
If the height of the wall to be poured is less than 120 cm, no special accessories are required.

If the height of the wall to be poured exceeds 120 cm, the formwork must be secured with tensioning chains against lateral shifting to the outside.

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA multi-purpose panel</td>
<td>21-720-50</td>
</tr>
<tr>
<td>Stop end fixture</td>
<td>29-402-85</td>
</tr>
</tbody>
</table>

Fig. 35.1

Fig. 35.2

Fig. 35.3

Fig. 35.4
Corner solutions with multi-purpose panels

Figures 36.1 and 36.2 show corner solutions with multi-purpose panels for wall thicknesses of 25 cm, 30 cm and 35 cm.

The perforated profile of the panel is punched every 2.5 cm (Fig. 36.4). This allows an accurate forming of all the typical dimensions found with stop ends, pilasters, 90° angles and wall offsets.

Attention
The stop end fixture must not be inserted into the outermost tie hole because it has to fully rest on the panel. The stop end fixture is applied with flange nut 100 (Fig. 36.3 and 36.4).

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop end fixture</td>
<td>23/40 yellow</td>
</tr>
<tr>
<td>Flange nut 100</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 36.3

Fig. 36.4
Formwork assembly and stripping

Important!
When assembling and stripping formwork, strictly observe the local accident prevention rules and all other applicable federal, state and local regulations.

Attention
Formwork with a height of 2 or more metres requires a fall-down protection to be installed on both sides of the formwork.

Planning
If you want to benefit fully from the efficient and economical use that the EcoAs formwork offers, we recommend you first plan and prepare its use. Start planning by determining the optimum formwork quantity to be held in stock (such quantity is usually based on the amount of formwork required for a one day’s work). When determining the quantity, consider this:
- the formwork weight
- the time required for formwork assembly and stripping
- transport of gangs from one pour to the next considerably reduces forming time
- capacity of the lifting devices
- a logical cycle plan that takes corner configurations, reinforcements etc. into account

Once all these aspects have been considered, the quantities of formwork items can be specified.

Ground
The ground on which the formwork is going to be placed should be clean, even and capable of bearing the expected load because this will help reduce the time required for the assembly and stripping.

Panel transport
When unloading panels or moving panel stacks make sure to use appropriate transport devices that can bear the load.

The steps required for the assembly
For ergonomic reasons, the outside formwork is usually assembled and placed first. Start the assembly in a corner or at a determined point and perform the following steps:

Step 1 – Place and brace the outside formwork.

Step 2 – Define and mark the pouring height, build in the reinforcements and blockouts.

Step 3 – Place the inside formwork, tie the outside and inside formwork and close the formwork.

Refer to the following pages for a detailed description of these steps including the working platform and formwork stripping.

Fig. 37.1 Double-sided formwork
Formwork assembly and stripping

Step 1 – Place and brace the outside formwork

The following description is based on an even wall. Before starting, keep in mind:
- When preassembling large panel units on an even surface, attach the wall braces and the scaffolding brackets as well, i.e. before executing step 1.
- Walls of less than 6 m require a filler for easy stripping (Fig. 38.3) as otherwise the formwork may wedge when stripping and stick to the concrete.

1. Spray the facing with the release agent MevaTrenn FT8.

2. Place the first panel and immediately attach it with two brace frames to the ground to prevent it from falling over (Fig. 38.1). Attach the foot plate firmly to the ground, with two soil nails when attached directly to the soil or with two heavy-duty dowels when attached to a concrete foundation.

After placing panels, always reinforce them immediately with push-pull props or brace frames so they withstand tensile force and pressure and are protected against displacement and wind. The push-pull prop spacing depends on the application.

If the scaffolding bracket was not preassembled before step 1, you can now assemble the working platform and attach it.

3. String further panels together, connect them with EA assembly locks and brace them.

The panels are usually connected with 2 or 3 assembly locks (see p. EA-7). For outside corner configurations see p. EA-18.

Step 2 – Pouring height, reinforcements and blockouts

Following step 1, the pouring height is defined and marked, the reinforcements and blockouts, if required, are installed.

Step 3 – Place the inside formwork and tie the outside and inside formwork

The inside formwork is placed after the outside formwork. Then the inside and outside formwork are tied firmly with tie rods and articulated flange nuts.
Formwork assembly and stripping

Working scaffold
The plug-in scaffolding bracket is the basis for the working scaffold (Fig. 39.1). The bracket spacing (max. 250 cm) depends on the planking (taking into consideration DIN 4420, Part 1, Table 8, for a load of 150 kg/m² (platform group 2)).

The planking and scaffolding bracket can be firmly connected. Do not place any planks before having secured the formwork with push-pull props or before having tied the inside with the outside formwork.

Do not forget to attach a side railing to the working scaffold if such a protection is required.

Pouring concrete
Once you have placed, attached and closed the formwork, you can start pouring concrete. When doing so, observe the admissible rate of placing which also depends on the temperature and type of cement used (see p. EA-10).
Formwork assembly and stripping

**Stripping**

Do not start stripping before the concrete has set to the point where it cannot deform anymore. It is best to start stripping at the stop ends or at a corner. Walls of less than 6 m require a filler for easy stripping at the inside formwork (Fig. EA-38.3) as otherwise the formwork may wedge and stick to the concrete. Start stripping with the inside formwork. Stripping of both the outside and inside formwork is done as follows:

1. Remove the working scaffold.
2. Remove the articulated flange nuts and tie rods section by section. Make sure the unbraced formwork is immediately secured against falling over or strip it immediately.
3. Loosen the formwork panels or large panel units by removing the assembly locks at the panel joints and remove them manually or with a crane. Before removing them with a crane, make sure the formwork is detached from the concrete.
4. Clean the facing and remove any concrete. Before the next use, spray the facing with the release agent MevaTrenn FT8 (for the alkus facing). Observe the operating instructions for the alkus facing. Note that the release agent must not be stored in galvanized containers.

**Please note**

When stripping manually, detach and disassemble the working scaffold and brace frames before stripping the panels.

When transporting large panel units with a crane, the working scaffold and wall braces are not detached from the panel units. While in vertical position, all components are cleaned and sprayed before being transported together to the next place of use (see p. EA-33).

If there is no further use for the panel units, the working scaffold and wall braces are detached and disassembled in horizontal position, cleaned and stacked for transport.
Transport

Make sure that all material is secured properly.

**Recommendation**
Use one load/cargo strap per 1 metre of cargo. That means for a fully loaded truck with a trailer length of 13,60 m, 14 load or cargo straps would be required.

EcoAs panels require 2 or 3 straps. Due to their low weight, EA corners require only 2 straps (Fig. 41.1).

When moving panel stacks make sure that panels are secured against shifting. MEVA secures EcoAs panels with the black AS/ST safety bolt (Fig. 41.2) These plugs should also be used by the job-site when returning material.

**Safety regulations**
When using or transporting our products, the federal, state, and local codes and regulations must be observed.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ref. No.</th>
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<tbody>
<tr>
<td>Safety bolt</td>
<td>AS/ST black</td>
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</table>
Service

Cleaning
The formwork is cleaned professionally upon return. Cleaning is done using industrial equipment with assembly lines.

Regeneration
The regeneration is carried out as follows: The frames are checked and, if necessary, repaired, painted and provided with a new facing.

As long as the formwork equipment is up-to-date, a regeneration will always be a more economical solution than purchasing new formwork.

Please note that the cleaning and regeneration service is not available in all countries in which MEVA does business.

Rentals
With much equipment on stock, we offer our customers the option of renting supplementary material during peak times. We also give prospective customers the chance to test MEVA formwork so they can see its benefits for themselves in actual use.

RentalPlus
Since MEVA started the flat rate for cleaning and repair of rented formwork systems, more and more contractors experience the outstanding advantages. Ask our representatives about the details!

Static calculations
Generally, this is only necessary for applications like single-sided formwork where the anchor parts are embedded in the foundation or the base slab. If requested, we can perform static calculations for such applications at an additional charge.

Formwork seminars
To make sure that all our products are used properly and efficiently, we offer formwork seminars. They provide our customers a good opportunity to keep themselves up-to-date and to benefit from the know-how of our engineers.

Formwork drawings
Of course, all offices in our technical department have CAD facilities. You get expert, clearly represented plans and work cycle drawings.

Special solutions
We can help with special parts, custom-designed for your project, as a supplement to our formwork systems.

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