

A 3D rendering of various stage construction components, including beams and connectors, in shades of blue and grey, arranged in a dynamic, overlapping fashion.

# The Staging System

acc. DIN EN 13814

Assembly Instruction

Base Construction nivtec-**Alu**

Edition 2015

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**nivtec-flexibel Bühnensysteme GmbH**

[www.nivtec-flexibel.de](http://www.nivtec-flexibel.de)  
[info@nivtec-flexibel.de](mailto:info@nivtec-flexibel.de)

Walter-Freitag-Str. 31  
D-42899 Remscheid

Tel.: +49 (0) 2191/385055  
Tel.: +49 (0) 2191/385088

[www.nivtec.com](http://www.nivtec.com)  
[nivtec@nivtec.com](mailto:nivtec@nivtec.com)

## I. Assembly Instruction nivtec Staging System

This assembly instruction applies for nivtec stages in raster 2 x 1 m. The assembly described in detail below refers to a sample stage size 6 x 4 m. It can be adopted for any other stage size.

It contains step-by-step instructions how to assemble stage platforms to form a safe and stable stage and how to attach additional nivtec system parts such as stairways, rails etc. You will find additional assembly information in text and images in our general catalogue, chapter "building stages with nivtec".

Safe stability is only guaranteed in case of exclusive use of original nivtec parts and if assembly is executed in accordance with nivtec instructions (for example for use of exactly specified Layher parts). All parts used need to be checked before use to ensure their impeccable condition.

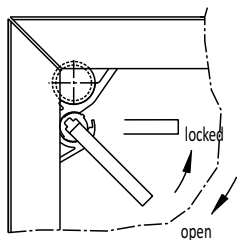
The legs selected should be appropriate for the local ground surface. Depending on the nature of the floor surface it is essential to use floor protectors, especially on slippery or sensible surfaces (concrete, tiles, parquet etc.). Stage constructions may only be set up on stable ground and have to be aligned horizontally. For constructions on rough grounds it is essential to use wooden underpinnings acc. to the standard values listed in DIN EN 13814, item 5.5.4.

For nivtec weight girder stages in raster 2 x 2 m and for nivtec seat galleries detailed part lists and sample drawings are available. We recommend to ask for corresponding information already when planning the base construction. Assembly and attachment of accessories such as rails and stairways have to be executed according to this assembly instruction resp. in accordance with additional information shown in our general catalogue, chapter "building stages with nivtec".

Besides standard stages also specially shaped stages are possible. When planning such stages please contact us in time if due to their individuality the constructions deviate from the general instructions and separate structural calculations are necessary. We will then either authorize your plans or instruct our structural engineers to work out an individual measurement and bracing plan at fair local conditions.

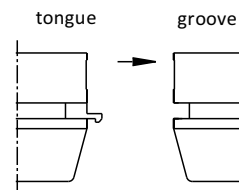
## II. Mounting of legs and platforms acc. to nivtec principle

ill. 1: mounting of legs  
(bottom of platform)



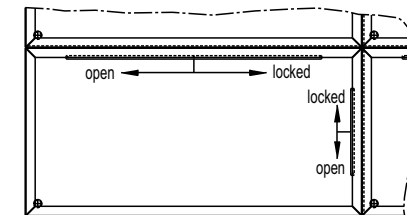
Each nivtec system platform is equipped with 4 leg supports with double eccentric clamping lever. Mounting of leg: Fit the leg into leg support up to the stop and tighten by pulling the clamping lever

ill. 2: connection of platforms



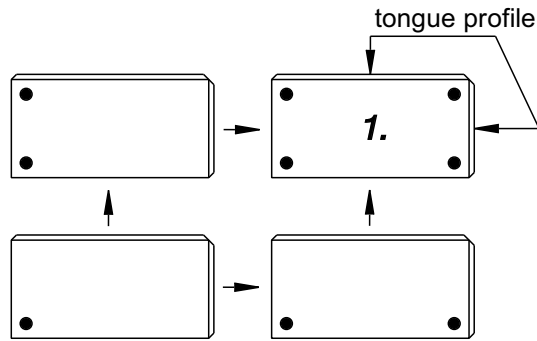
Each nivtec system platform is equipped with 2 tongue profiles and 2 groove profiles. To connect the platforms the tongue profile is hooked into the groove profile. Important: hook tongue into groove profile, not vice versa!

ill. 3: locking of platforms



Each nivtec system platform is equipped with the integrated locking mechanism "Klick-Klack". Immediately after the tongue profile has been hooked into the groove profile move the handle bar into position "locked" and check the stability of the platform connection

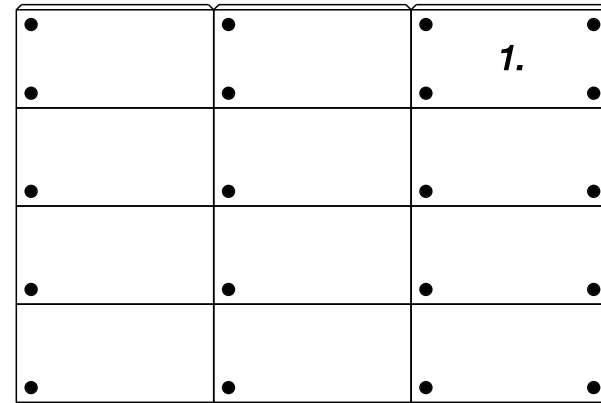
ill. 4: position of platforms



The tongue profiles of all platforms are pointed to the rear and to the right side.

The leg positions as described for a stage 6 x 4 m can be adopted for any other stage size.

ill. 5: sample stage 6 x 4 m



nivtec principle:

position first platform: right back side - 4 legs

platforms right row: 2 legs at the front at the long groove profile (no legs at the back at the tongue profile)

platforms back row: 2 legs at the left side at the short groove profile (no legs at the right side at the short tongue profile)

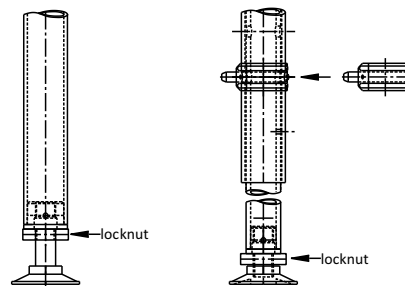
all further platforms: 1 leg at the left front corner of the groove profiles (no further legs necessary).

### III. Height adjustment of stage

There are following possibilities of height adjustment for stages with interchangeable legs:  
(You will find bracing instructions for stage heights from 80 cm from page 7 to page 16.)

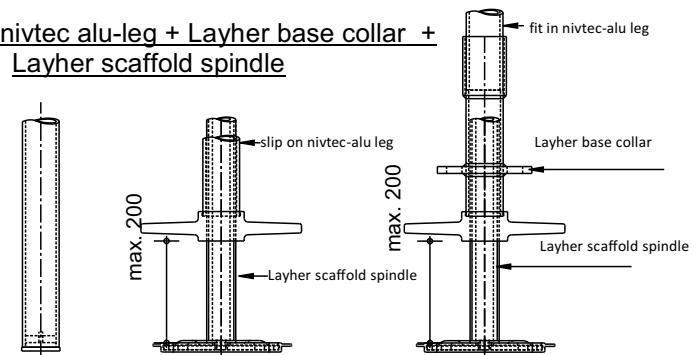
levelling leg with adjusting spindle,  
adjusting capacity +/- 3 cm,  
locknut at legs exceeding 40 cm:  
choose height required ,  
tighten locknut

ill. 6: nivtec levelling leg / extension leg  
with adj. spindle



extension leg, height adjustment  
raster 5cm, adjusting spindle for fine  
adjustment +/- 3 cm, with locknut:  
choose height required - insert  
safety bolt clip - adjust height  
- tighten locknut

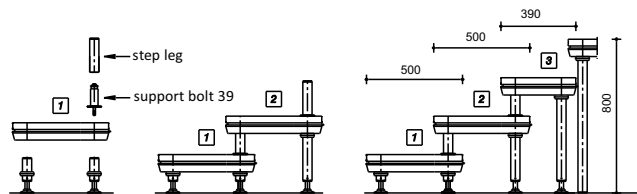
ill. 7: nivtec alu-leg + Layher base collar +  
Layher scaffold spindle



nivtec alu leg with Layher scaffold accessories, max. spindle way 20cm:  
remove leg cork, slip nivtec alu leg on Layher spindle or fit nivtec alu leg into  
Layher base collar, adjust height

## IV. Assembly of nivtec stairway

ill. 8: push-on stairway

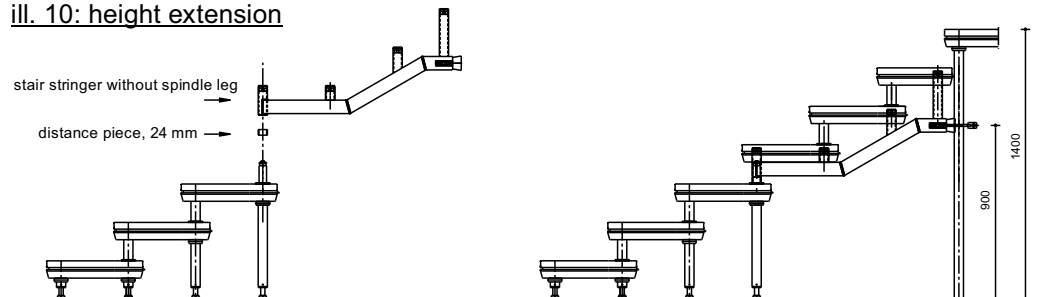


### push on – stairway with standard legs

1. For first step insert 4 legs and mount 2 support bolts  $\varnothing 39$  mm, Art.No. 401 01 0 at the back.
2. For second step insert 2 step legs at the front and 2 legs 40 cm at the back, mount 2 support bolts.  
For further steps use legs 20 cm higher than the previous ones at the back.
3. As last step use platform with depth 39 cm for achieving a uniform tread.
4. Align stairway to stage.
5. Connection of stairway and stage at groove profile:  
1 leg link 110 mm, Art.No. 401 10 0 + 1 special link N-F, Art.No. 402 01 0  
or  
2 special links N-F, Art.No. 402 01 0 (if there is no stage leg)  
connection of stairway and stage at tongue profile:  
2 leg links 110 mm, Art.No. 401 10 0, if necessary add stage leg

## V. Extension possibilities for nivtec stairways

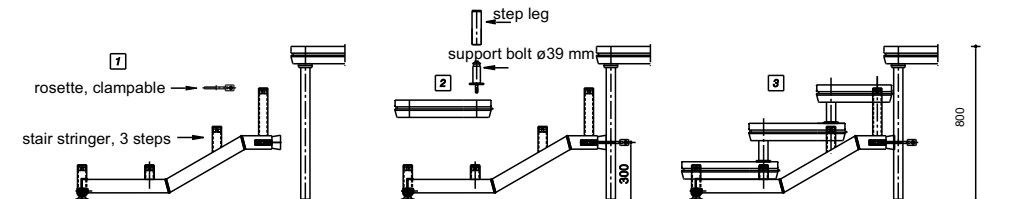
ill. 10: height extension



### height extension

1. Set up stairway with standard legs and platforms of depth 50 cm up to required height – see push-on stairway
2. Mount rosettes at stage legs at mandatory height
3. Roughly align stairway to stage.
4. Remove spindle legs from stringers.
5. Slip distance pieces on support bolts.
6. Slip stringers on support bolts and drive wedge into rosette.
7. Mount steps – see stairway with stair stringers.

ill. 9: stairway with stair stringers



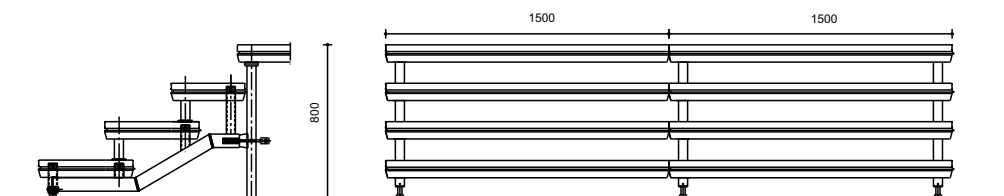
### stairway with stair stringers (3 or 4 steps)

1. Mount rosettes at stage legs, direction: big hole at the front.  
(stringer 3 steps: 300 mm / stringer 4 steps: 500 mm above the floor)
2. Mount stringers loosely at rosettes and adjust height.
3. Put on first step, mount 2 support bolts  $\varnothing 39$  mm Art.No. 401 01 0 at the back, slip on step legs.
4. Put on second step, mount 2 support bolts  $\varnothing 39$  mm Art.No. 401 01 0 at the back, slip on step legs (repeat for next steps)
5. As last step use platform with depth 39 cm for achieving a uniform tread.
6. Fasten clamping levers of all leg supports.
7. Secure rosettes by driving in the wedges

Alternatively stairway may be pre-assembled. Mount rosettes at stage legs, hook in stringers, drive in wedges.

ill. 11: width extension, show stairway

platform width for show stairway: max. 150 cm, reduced load capacity: 5 kN/sqm



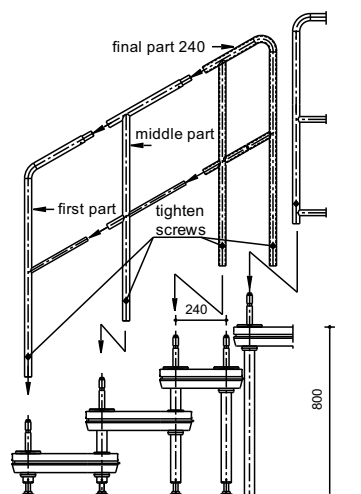
### width extension – show stairway

1. Set up complete stairway with 2 stringers – see stairway with stair stringers
2. Attach third stringer at next stage leg to the left.
3. Hook first extension platform into bottom step and slip on third stringer.
4. Mount following steps accordingly.
5. Fasten clamping levers of all leg supports.
6. Secure third stringer by driving wedge into rosette.

The show stairway may be extended to the left side by use of additional stringers and steps.

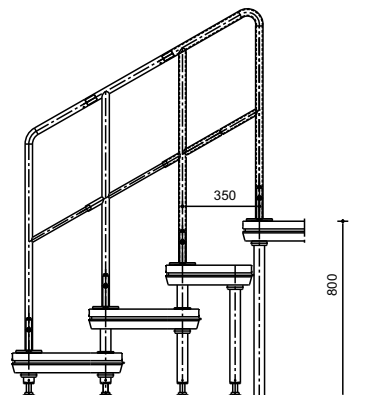
## VI. Attachment of stairway safety rails

ill. 12: stairway rail, push-on stairway  
rail ending on top step

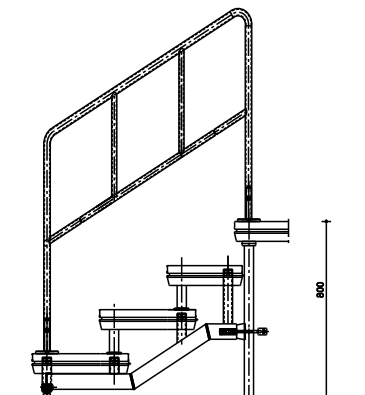


Stairway rail, extendable plug-in system

ill. 13: stairway rail, push-on stairway  
rail ending on stage



ill. 14: stairway rail, fix  
rail ending on stage



Stairway rail, single piece - ending on stage

1. Remove blue plastic caps.
2. Combine first, middle and final parts.  
Depending on number of steps the rail can be extended with middle, double middle or triple middle parts.

### Final parts:

Width 240 mm: ending on top step (for use at stage corners, where stage rails and stairway rails meet).

Width 350 mm: ending on stage (for use at all other positions, enabling use of stage rails in standard raster sizes).

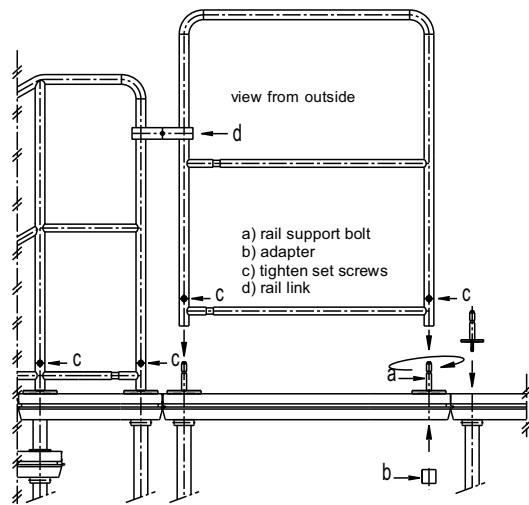
3. Screw in rail support bolts, Art.No. 310 01 0, and tighten them
4. Slip complete rail resp. single piece rail on support bolts.
5. Tighten set screws. The screws have to be at the outside.
- 6a. For connection of stage rail and final part 240 mm use rail link 110 mm, Art.No. 310 11 0, tighten screw.
- 6b. For connection of stage rail and final part 350 mm use rail link 150 mm, Art.No. 310 10 0 or 310 10 5, tighten screw.

When attaching stairways make sure to avoid and close rail gaps.

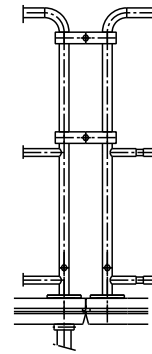
Special rails are available in various widths such as 15 cm, 50 cm, 100 cm, and 150 cm

## VII. Attachment of safety stage rails

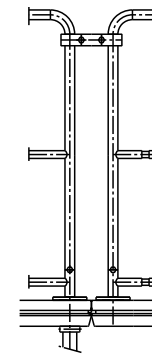
ill. 15: attachment of rails



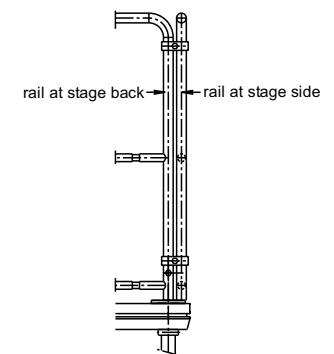
ill. 15e: 2 rail links, 150 mm



ill. 15f: 1 rail link, 150 mm, reinforced



ill. 15g: 2 corner links



Attachment of stage safety rails (ill. 15), height 100 cm, and stage safety rails with vertical bars, height 110 cm, is identical. Start the assembly of the safety rails at the back of the stage. Next the side rails are attached. Make sure that all rails are connected to each other with rail links resp. corner links at the corners.

necessary standard accessories per rail:

2 rail support bolts, Art.No. 310 01 0  
1 adapter, Art.No. 310 20 0  
1 rail link, Art.No. 310 10 0

links for assembly of safety rails 185 cm if lateral load 1 kN/m is required:  
(if rail 185 cm is combined with other rails)

1 rail link 150 mm, reinforced, Art.No. 310 10 5 (ill. 15f)  
or  
2 rails links 150 mm, Art.No. 310 10 0 (ill. 15e)

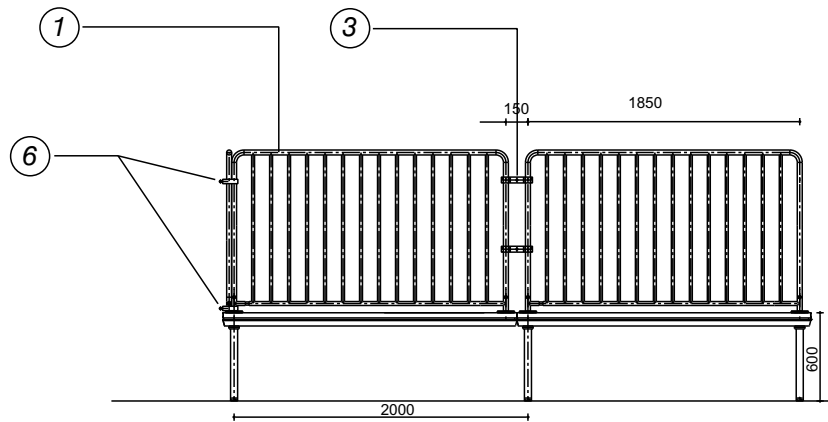
accessory for assembly of safety rails 185 cm if lateral load 1 kN/m is required:  
(if rail 185 cm is set up individually)

2 rail support bolts, reinforced, Art.No. 310 01 5

1. Remove blue caps at top of platform.
2. Screw in rail support bolts  $\varnothing 26$  mm, Art.No. 310 01 0 (ill. 15a) and tighten them with ratchet spanner, SW 19.
3. At places without a leg underneath insert nivtec thread adapter, Art.No. 310 20 0 (ill.15b).
4. Slip rails on support bolts.
5. Tighten screws at the bottom of the rails (ill. 15c).
6. As connection of the rails use rail links Art.No. 310 10 0 or Art.No. 310 10 5 at the top of the rails (ill. 15e / 15f).
7. Connection at corners (ill. 15g): Place the first side rail beside the already mounted rail at the back of the stage. At the front slip the rail on a rail support bolt. Use 2 corner links, Art.No. 310 21 0, per corner. Place metal clamps around both rail posts, fit set screw between the posts and tighten the screw.

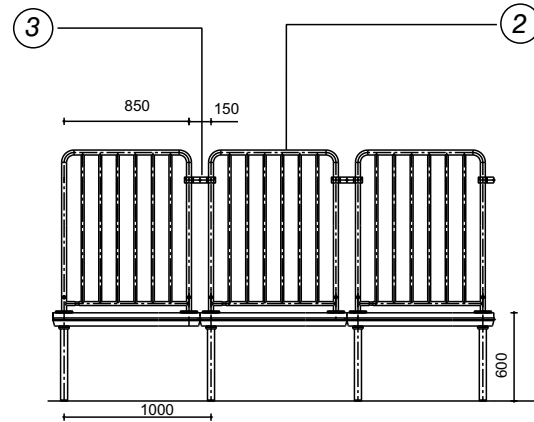
## VIII. Safety rails with vertical bars – examples:

ill. 16: rails at the back of a stage and a gallery



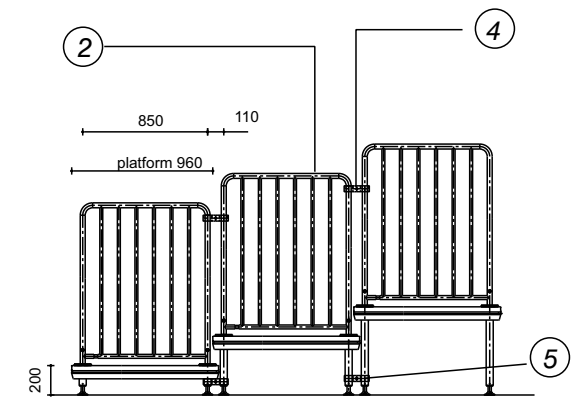
- 1: safety rail with vertical bars, 185 cm, Art.No. 303 03 0
- 3: rail link, 150 mm, Art.No. 310 10 0
- 6: corner link, Art.No. 310 21 0

ill. 17: rails at the side of a stage



- 2: safety rail with vertical bars, 85 cm, Art.No. 303 02 0
- 3: rail link, 150 mm, Art.No. 310 10 0
- 4: rail link, 110 mm, Art.No. 310 11 0
- 5: leg link, 110 mm, Art.No. 401 10 0

ill. 18: rails at the side of a gallery



Attachment of stage safety rails with vertical bars, height 110 cm, and stage safety rails, height 100 cm, is identical.

The drawings above show examples of stages / galleries equipped with safety rails with vertical bars.

Contrary to the method shown in illustration 17 with a rail 85 cm per platform you may also use a rail 185 cm covering two platforms.

If lateral load 1 kN/m is required for rails 185 cm instructions as per chapter VII are to be respected.

## IX. Bracing Guidelines nivtec-Alu

- **Aluminium base construction** for adjustable stage heights up to 180 cm due to combination of **nivtec alu legs** in standard sizes up to 180 cm with new removable and breakproof leg corks and **Layher accessories** such as spindles, base collars and rosettes as well as standardized alu bracing elements.
- Assembly only according to nivtec bracing guidelines and part lists.
- For stage heights exceeding 140 cm additional horizontal bracing is mandatory.

bracing guideline for alu base constructions from 80 cm up to 180 cm	max. stage height	alu diagonal brace bay height	rosettes * with thread	alu horizontal brace
nivtec alu leg 60 cm	60 cm			
nivtec alu leg 60 cm + Layher spindle 60	80 cm	0,475 m	1 + 1*	
nivtec alu leg 60 cm + Layher spindle 60 + base collar	100 cm	0,475 m	1	
nivtec alu leg 80 cm	80 cm	0,475 m	2	
nivtec alu leg 80 cm + Layher spindle 80	100 cm	0,475 m	2	
nivtec alu leg 80 cm + Layher spindle 80 + base collar	120 cm	0,675 m	1	
nivtec alu leg 100 cm	100 cm	0,675 m	2	
nivtec alu leg 100 cm + Layher spindle 80	120 cm	0,675 m	2	
nivtec alu leg 100 cm + Layher spindle 80 + base collar	140 cm	0,875 m	1	
nivtec alu leg 120 cm	120 cm	0,875 m	2	
nivtec alu leg 120 cm + Layher spindle 80	140 cm	0,875 m	2	
nivtec alu leg 120 cm + Layher spindle 80 + base collar	160 cm	1,075 m	1	x
nivtec alu leg 140 cm	140 cm	1,075 m	2	
nivtec alu leg 140 cm + Layher spindle 80	160 cm	1,075 m	2	x
nivtec alu leg 140 cm + Layher spindle 80 + base collar	180 cm	1,275 m	1	x
nivtec alu leg 160 cm	160 cm	1,275 m	2	x
nivtec alu leg 160 cm + Layher spindle 80	180 cm	1,275 m	2	x
nivtec alu leg 180 cm	180 cm	1,475 m	2	x

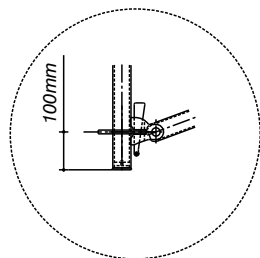
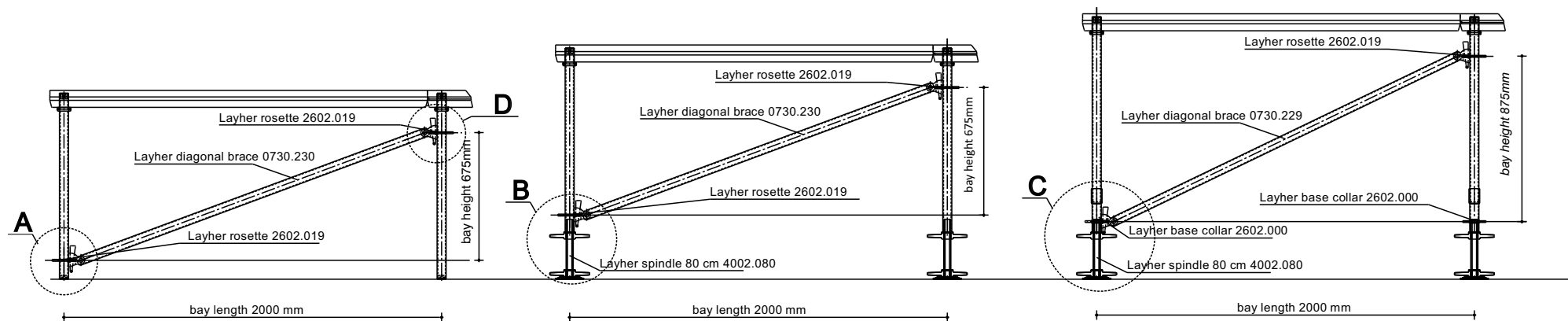


Example: nivtec alu leg 100 cm – attachment of alu diagonal braces acc. to version 1 (wedge head/wedge head):

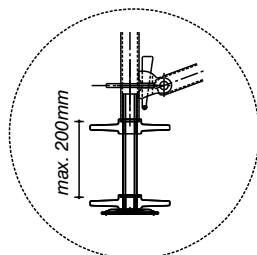
ill. 19: stage height 100 cm

ill. 20: stage height 120 cm

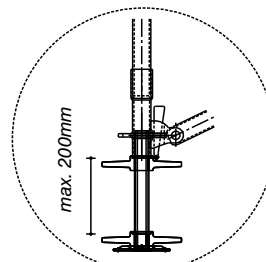
ill. 21: stage height 140 cm



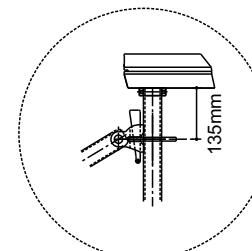
ill. 22: detail A



ill. 23: detail B



ill. 24: detail C



ill. 25: detail D

At standard alu legs and alu levelling legs width adj. spindle mount rosettes Art.No. 2602.019 acc. to detail A (bottom) and detail D (top). Attach alu diagonal braces, size of braces acc. to bracing guideline chart, and drive in wedges.

When using Layher spindles (max. spindle way 20 cm – detail B) with the same leg you achieve a stage height of max. + 20 cm. Remove leg cork/load distributor and slip alu leg on spindle.

Mount alu diagonal braces as described above. Sizes of diagonal braces are identical for both set ups.

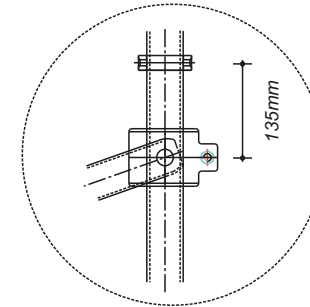
When using base collar and Layher spindle (max. spindle way 20 cm – detail C) with the same leg you achieve a stage height of max. + 40 cm. Remove leg cork/load distributor and set alu leg on base collar. At the bottom attach alu diagonal brace at the rosette of the base collar. At the top attach alu diagonal brace at the clampable rosette (detail D). Make sure to use size of alu diagonal brace mentioned in the bracing guideline chart.

### Attachment of alu diagonal braces acc. to version 2 (wedge head/semi coupler):

At the bottom alu diagonal braces are mounted as in version 1 with wedge head. At the top the diagonal brace is attached with a semi coupler mounted at one end of the diagonal brace (detail E). Place semi coupler at the leg, tighten screw with specified torque 50 Nm.

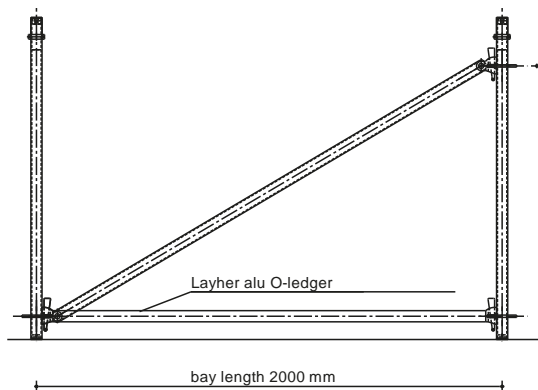
Depending on size and shape of stage it is technically inevitable that two diagonals meet at the top. Here it's mandatory for both diagonals to use braces as per version 1 (wedge head/wedge head with rosette).

ill. 26: detail E

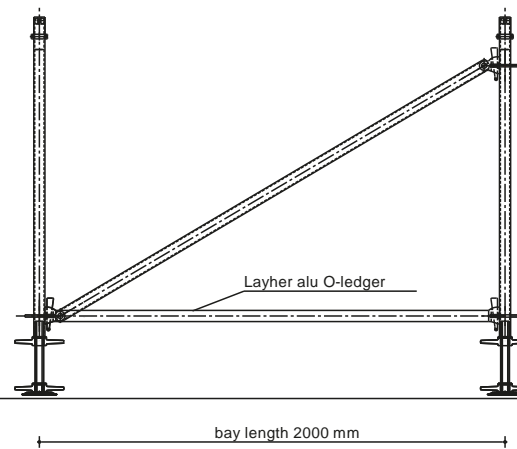


For stage heights exceeding 140 cm additional alu horizontal braces acc. to bracing guideline chart are mandatory.

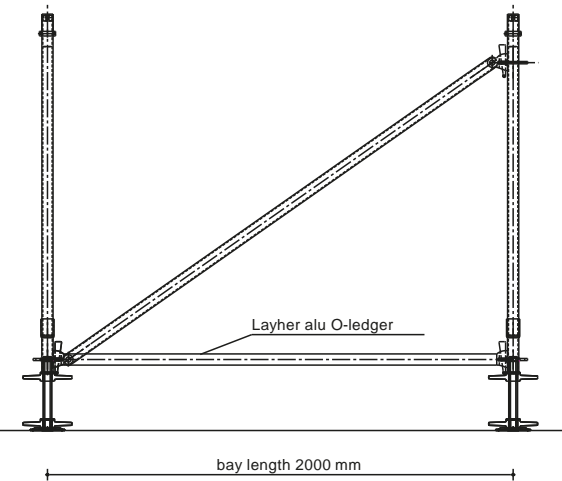
ill. 27: stage height >140 cm



ill. 28: stage height >140 cm



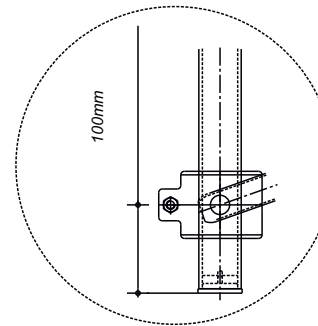
ill. 29: stage height >140 cm



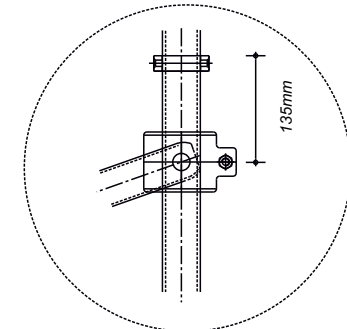
Horizontal braces = Layher alu O-Ledger (wedge head/wedge head) are mandatory in all rows and axis. Attach ledger, drive in wedges. Lengths of ledgers are defined by distance between the stage legs / bay lengths. Usually the distance between the legs is 200 cm resp. 100 cm. Please consider special distance of 185 cm in first row of platforms at the right side resp. 85 cm in the back row of platforms.

### Attachment of alu diagonal braces acc. to version 3 (semi coupler/semi coupler):

This version is applicable for stage heights from 80 cm to 140 cm built with standard alu legs, alu levelling legs with adj. spindle and alu legs on Layher spindle. The diagonal brace is attached to the stage legs with semi couplers mounted at both ends of the diagonal brace (detail F and G). Tighten screws with specified torque 50 Nm.



ill. 30: detail F



ill. 31: detail G

### Attachment of alu diagonal braces acc. to version 4 (alu tube / swivel coupler):

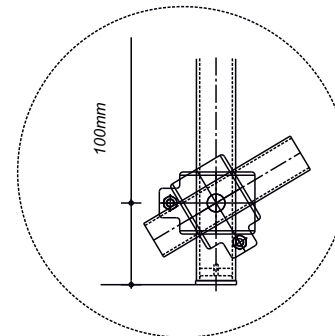
nivtec alu tube 48,3 x 4,0 mm – material: EN AW-6005 A T6

This version is applicable for stage heights from 80 cm to 140 cm built with standard alu legs, alu levelling legs with adj. spindle, alu legs on Layher spindle as well as extension legs.

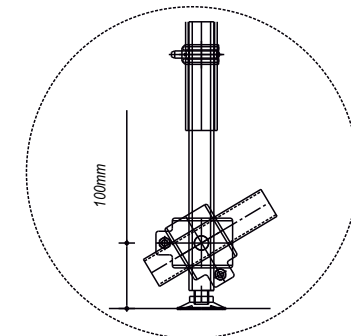
Diagonal alu tube braces are attached to stage legs with Layher swivel couplers both at the top and at the bottom (detail H). At the inner tube at the bottom of extension legs Altrad/Plettac reduction swivel couplers are required (detail I). Exception: extension leg 80 – 140 cm in position Zero requires Layher swivel coupler at the outside tube. For alu leg 60 cm on Layher spindle 60 use Altrad/Plettac reduction swivel coupler at the spindle tube in case of stage height 80 cm.

Length of diagonal alu tube brace for legs from 80 cm up to 100 cm: 225 cm

Length of diagonal alu tube brace for legs from 100 cm up to 140 cm: 240 cm



ill. 32: detail H  
swivel coupler 48,3 mm

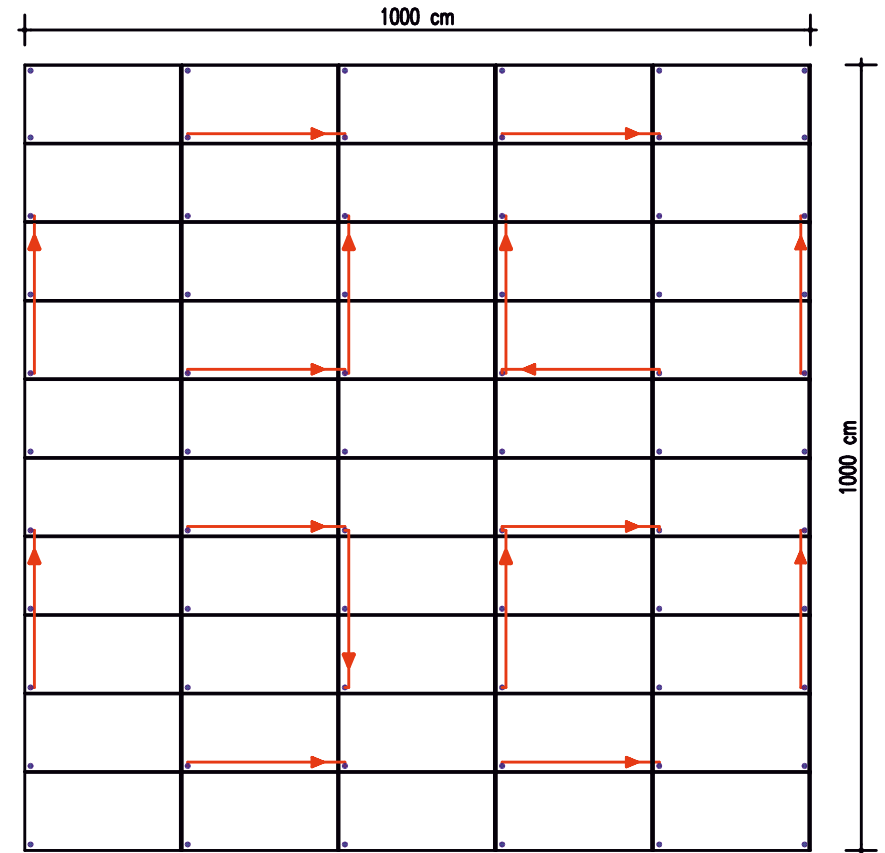
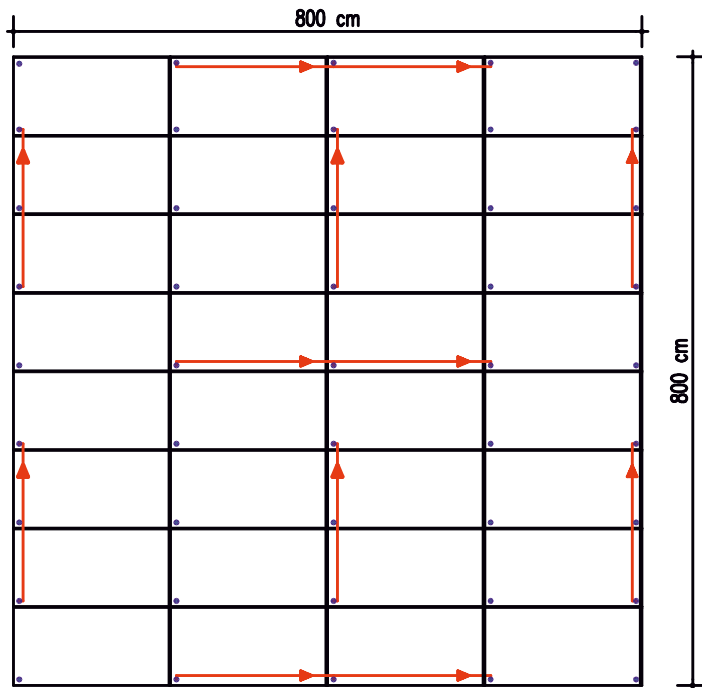
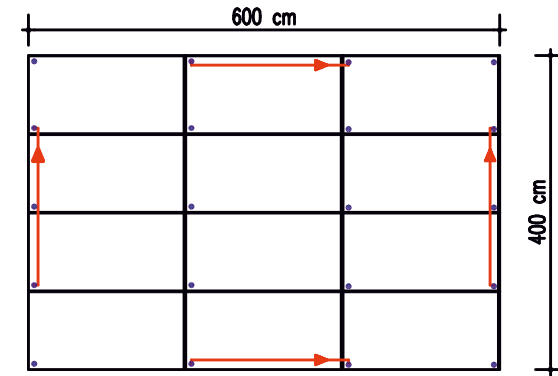
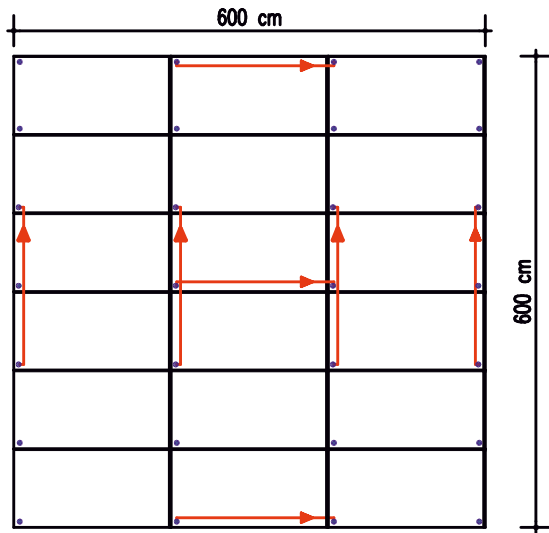


ill. 33: detail I  
reduction swivel coupler 48,3 / 38 mm

Attach swivel couplers at stage legs, mount diagonal alu tube braces, tighten screws with specified torque of 50 Nm.

For information regarding position and direction of bracing elements please see bracing plans for respective stage height and size – sample plans attached.

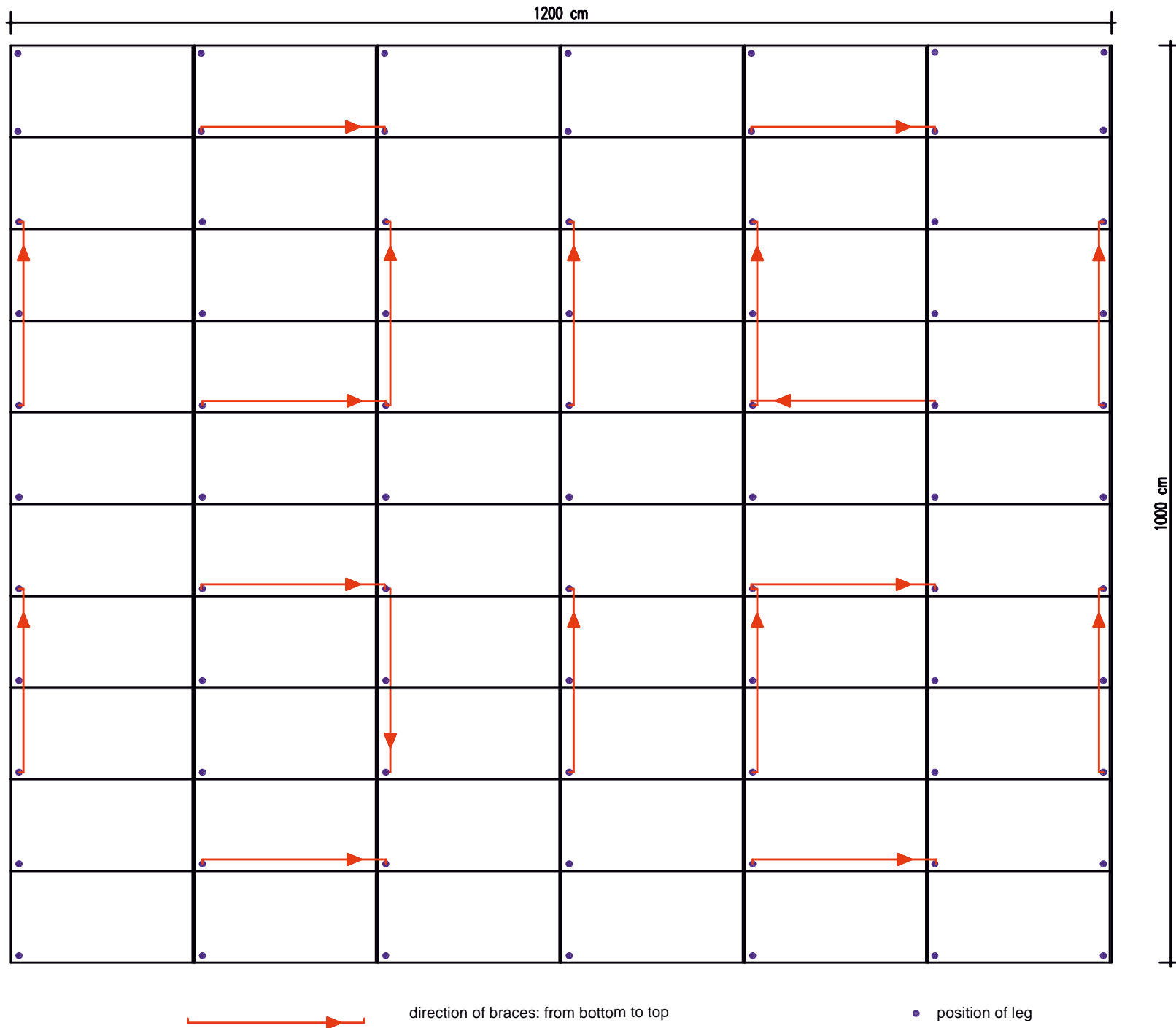
Stage constructions with extreme differences in relation of width and depth or size and height are to be considered separately. The same applies for stages for dance events or for stages for which extraordinary load situations are to be expected. Depending on the features of the event individual measuring and bracing concepts may be necessary. Please consider these facts when planning your projects and contact us in time. Plans for various sizes are available upon request.

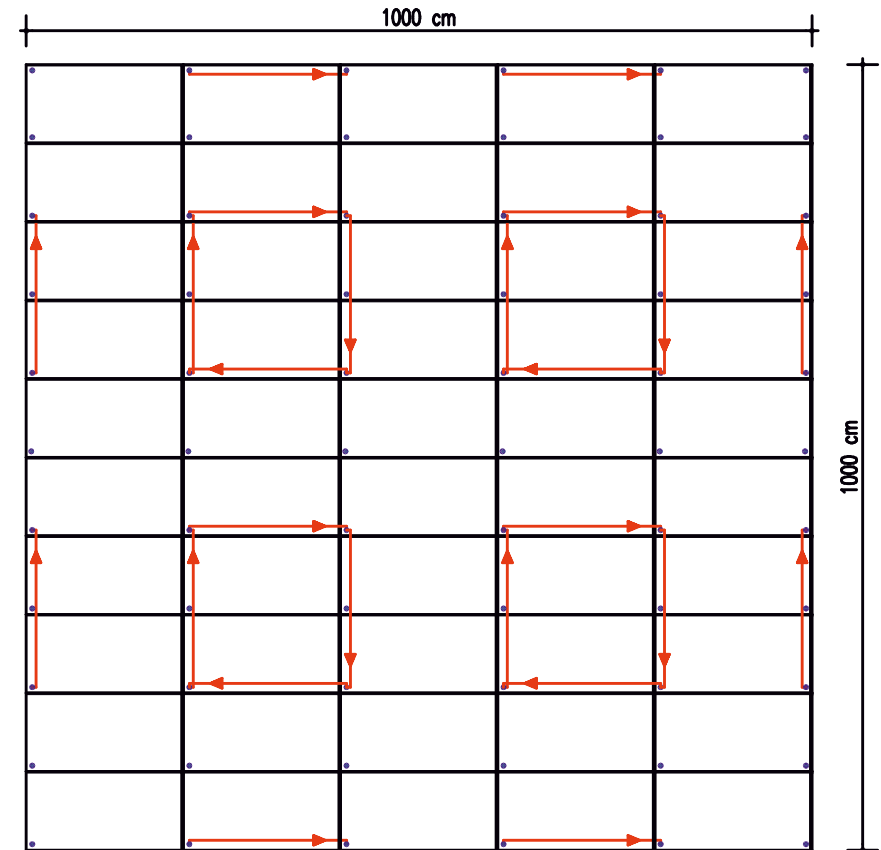
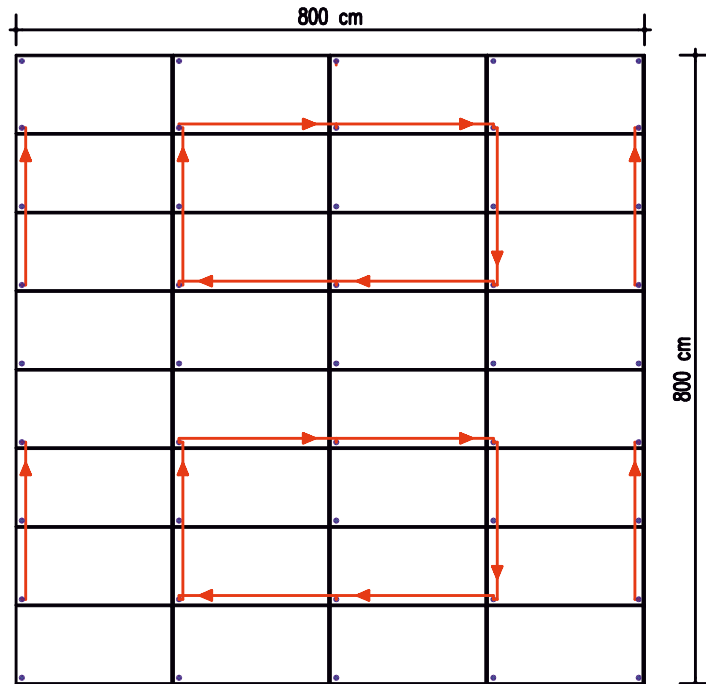
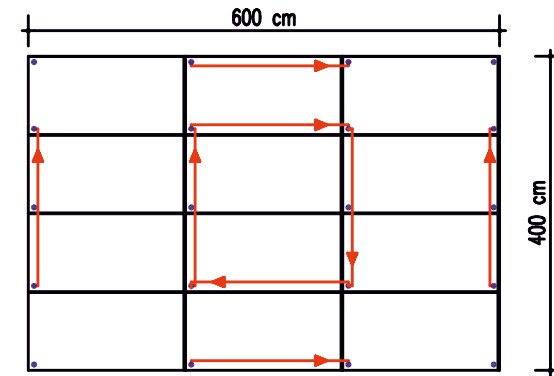
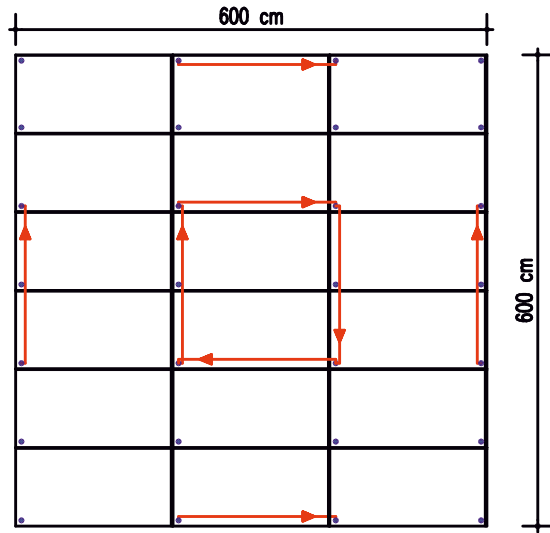



direction of braces: from bottom to top

• position of leg

ill. 35: sample plans for diagonal braces, stage height 80 cm

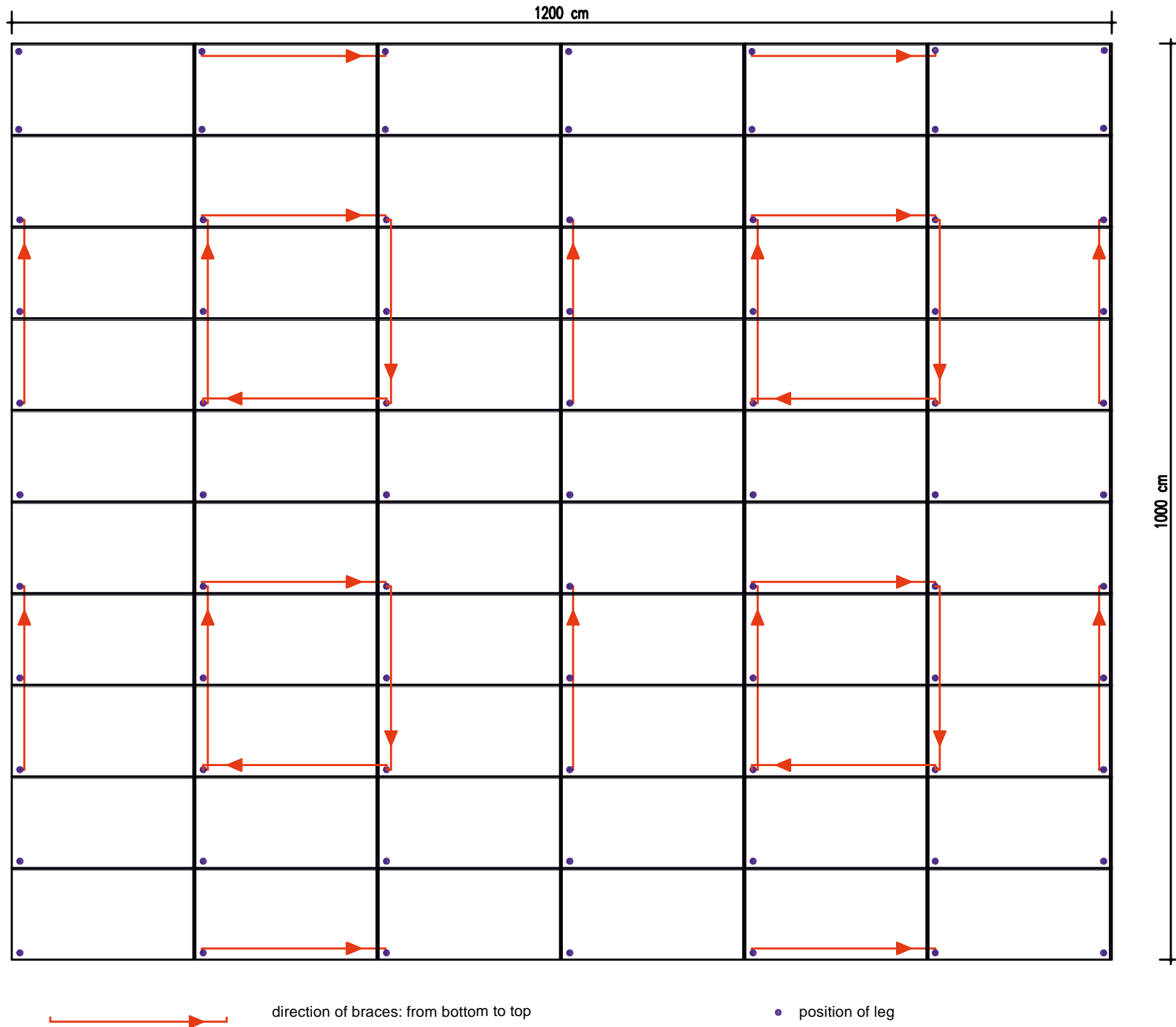


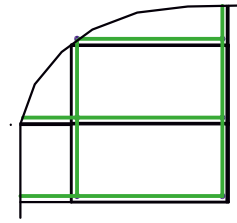
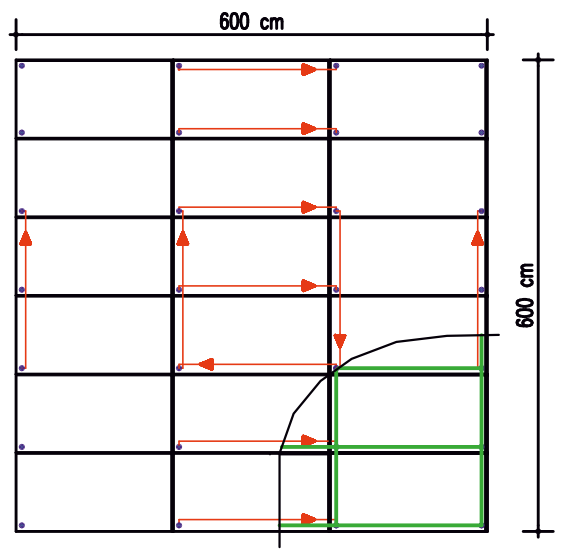


 direction of braces: from bottom to top

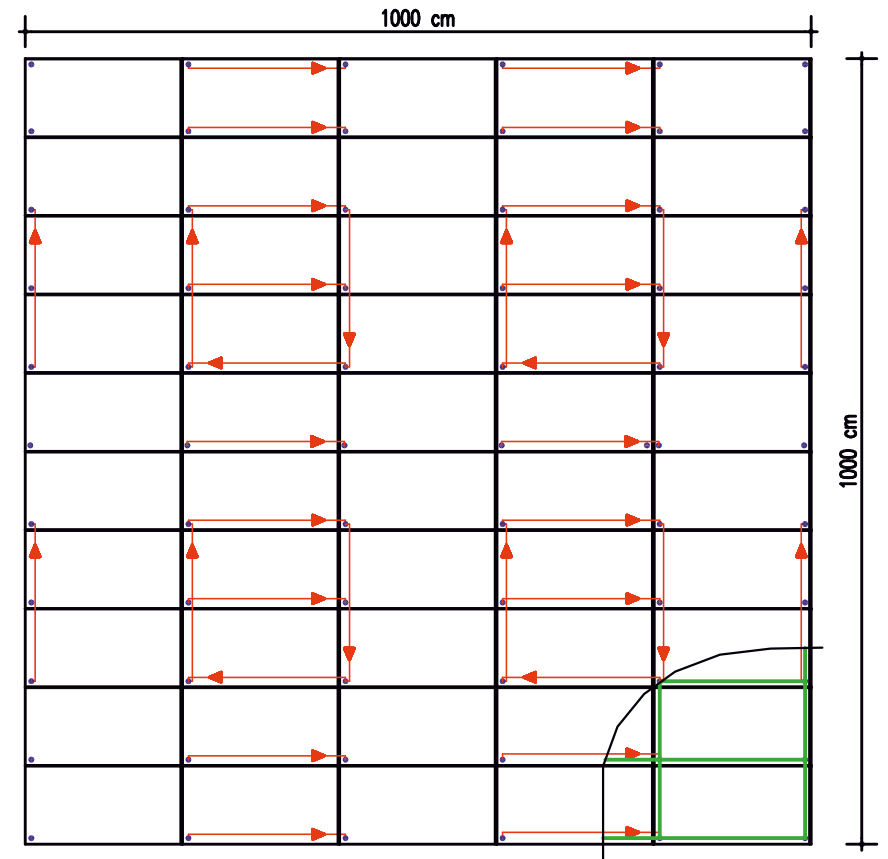
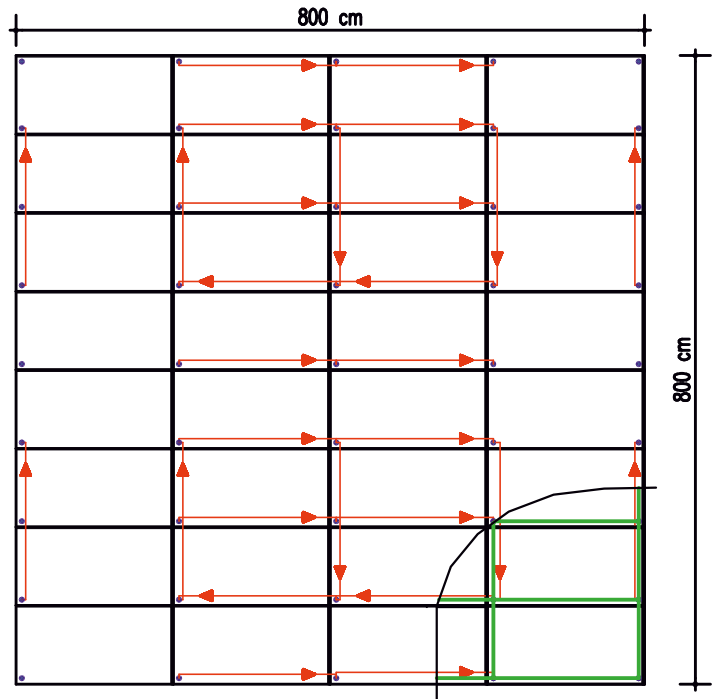
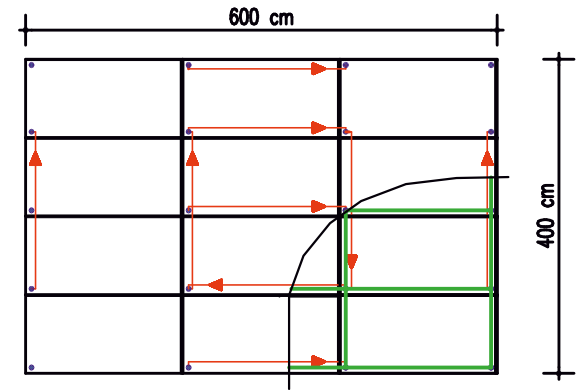
 position of leg

ill. 37: sample plans for diagonal braces, stage heights >80 cm - 140 cm





horizontal braces mandatory in all rows and axis



direction of braces: from bottom to top



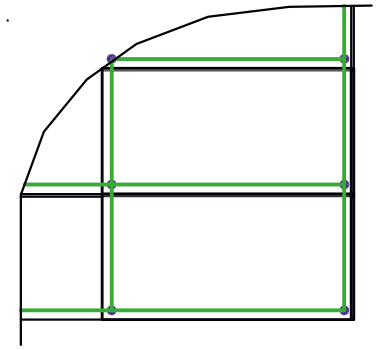
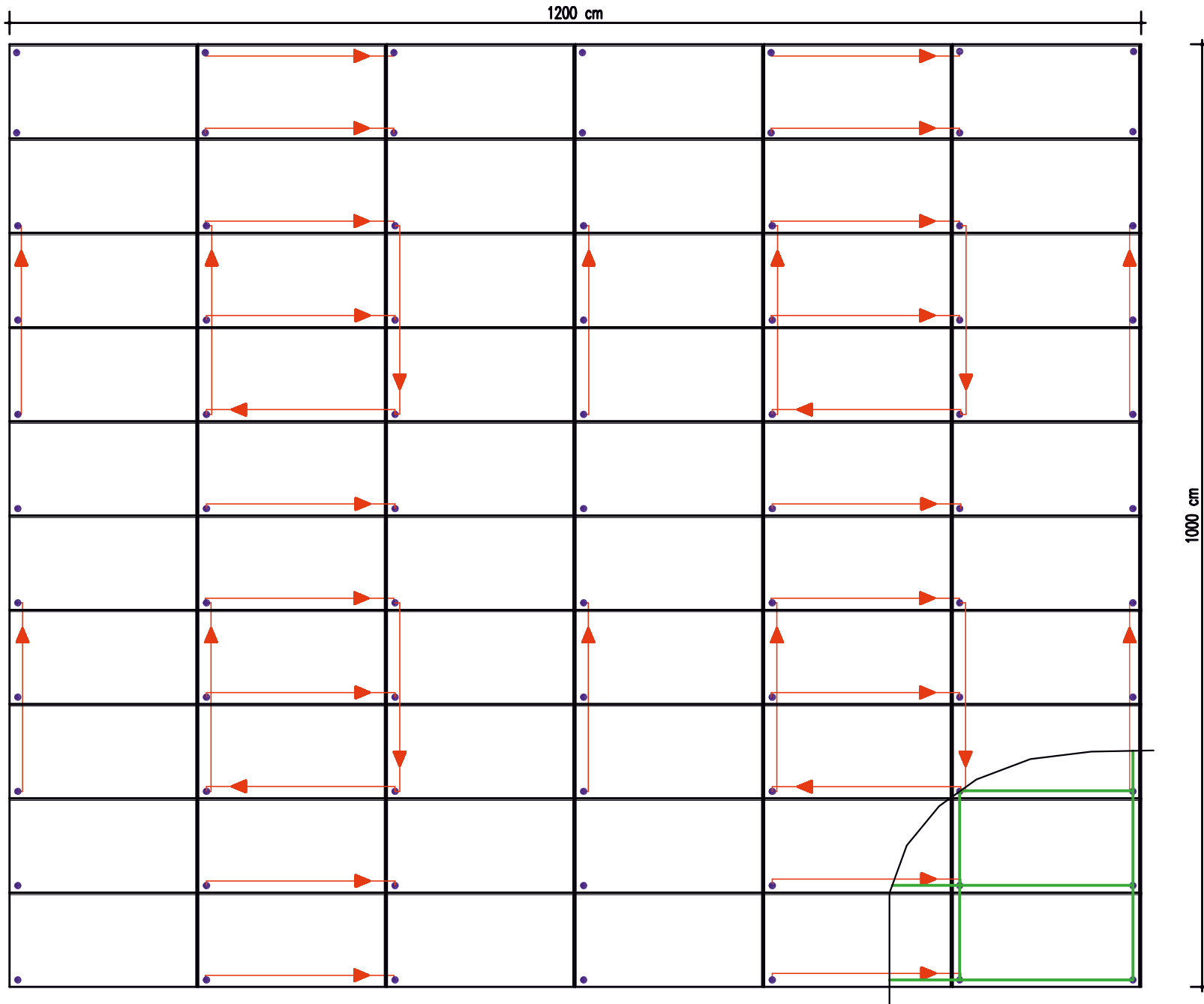
position of leg



horizontal braces in all rows and axis



ill. 39: sample plans for diagonal braces, stage heights >140 cm - 180 cm



horizontal braces mandatory in all rows and axis

1000 cm



direction of braces: from bottom to top

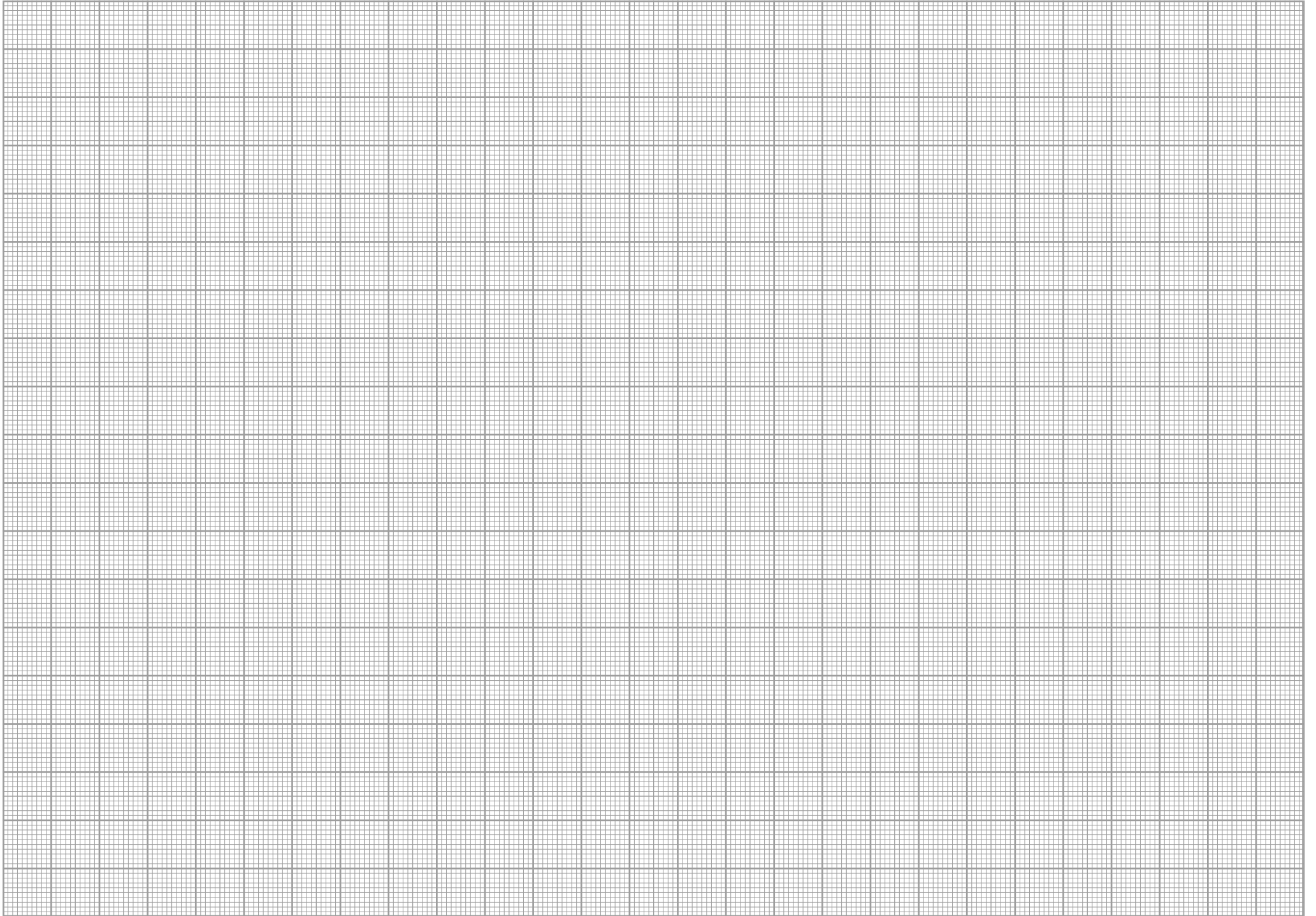


position of leg

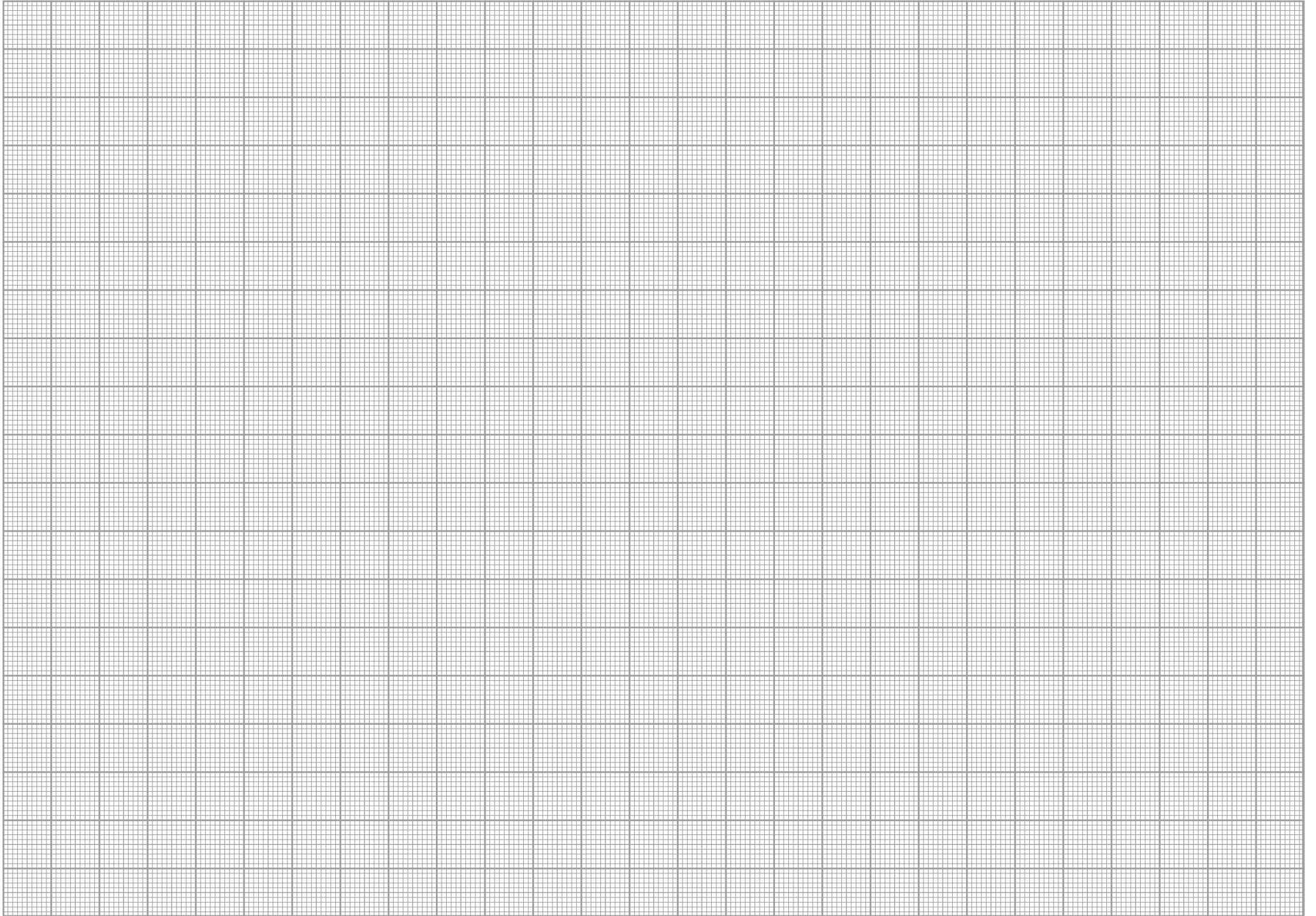


horizontal braces in all rows and axis

# Notes



# Notes





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**nivtec-flexibel Bühnensysteme GmbH**

Walter-Freitag-Str. 31  
D-42899 Remscheid

Tel.: +49 (0) 2191/385055  
Tel.: +49 (0) 2191/385088

[www.nivtec-flexibel.de](http://www.nivtec-flexibel.de)  
[info@nivtec-flexibel.de](mailto:info@nivtec-flexibel.de)

[www.nivtec.com](http://www.nivtec.com)  
[nivtec@nivtec.com](mailto:nivtec@nivtec.com)