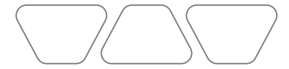


A new standard for stairs

Schlüter®-TREP-V

Working aid





Can stairs be “barrier-free”?

Stair design plays a major role in the safety and accessibility of buildings.

Based on adopting the standard DIN 18040-1 “Construction of accessible buildings - Publicly accessible buildings” as part of technical construction regulations in German state building codes, stairways must have an accessible design for people with physical impairments as well as for blind and visually impaired people.

Even though stairs will of course never be

completely barrier-free, they can be usable and accessible to disabled people with the right design. Important factors include appropriate dimensions, slope and clearly visible step markings as well as slip resistance. A number of regulations specify technical design features of stairways, steps and handrails. The ultimate goal for planning and installing stairways must be to achieve the highest possible level of safety for all user groups.

Recommendation or mandate?

The recommendations of the standard DIN 18040-1 were incorporated in the technical building regulations of all German states in 2019 (now also including NRW) and are mandatory.

In the scope of this roll-out, state-specific adaptations were made, which partially led to major discrepancies in requirements for accessible design. These differences are particularly obvious for stairs.

The administrative template for technical building regulations states the following with reference to DIN 18040-1 (public buildings): “Section 4.3.6 is only applicable to necessary stairs.”

The sample list thus limits the applicability of requirements for accessible stairs to “necessary stairs.”

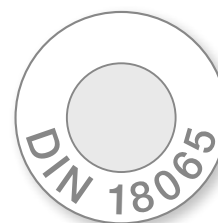
That means the accessibility characteristics according to Section 4.3.6, “Stairs” of DIN 18040-1 exclusively apply to this category of stairs. Construction law distinguishes between necessary stairs, which form part of emergency exit routes according to official regulations (e.g. state building codes) and additional stairs, which may be part of main usage routes. The individual German states have differing requirements for stair design. This can be quite a challenge for designers, particularly since stair systems that are needed for core building access are not necessarily subject to the specifications of DIN 18040-1. On the other hand, these are exactly the stairs that have the most public foot traffic. Given the differing requirements in various German states, we generally recommend the use of TREP-V profiles for all

stair systems used by visitors and building occupants. The aim should be to achieve a uniform norm, including for stairs for which accessibility is not mandatory. This is the only way to meet the needs of all user groups. TREP-V profiles installed in the stairways of residential buildings and single family homes likewise offer enhanced safety.

Additional regulations to be observed

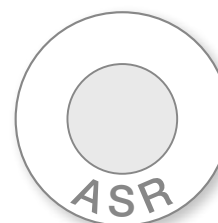
Stair design

DIN 18065 forms the basis for the geometric design of stairways in buildings. This standard does not include any detailed requirements about accessible design. Instead it refers to the corresponding requirements of the applicable state building codes as well as DIN 18040 in conjunction with the technical building regulations in effect in each German state. DIN 18065 also does not contain any details about additional requirements for reference aids or step markings. These must be observed separately.



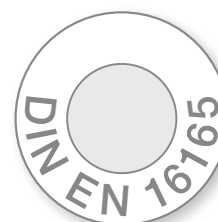
Technical rules for workplaces

Certain buildings (or building areas) not only must comply with accessibility requirements, but also have to meet occupational safety specifications if they are used by employees. A number of German workplace guidelines (e.g. ASR 1.5 Floors, ASR A1.8, Traffic routes, ASR V3a-2, Accessible workplace design) include requirements for stair design.



Slip resistance

DIN 16165, "Determination of slip resistance of pedestrian surfaces" discusses the most important properties of step edges. Slip resistance characteristics determine the surface properties a step marking should have in relation to the adjacent floor covering.



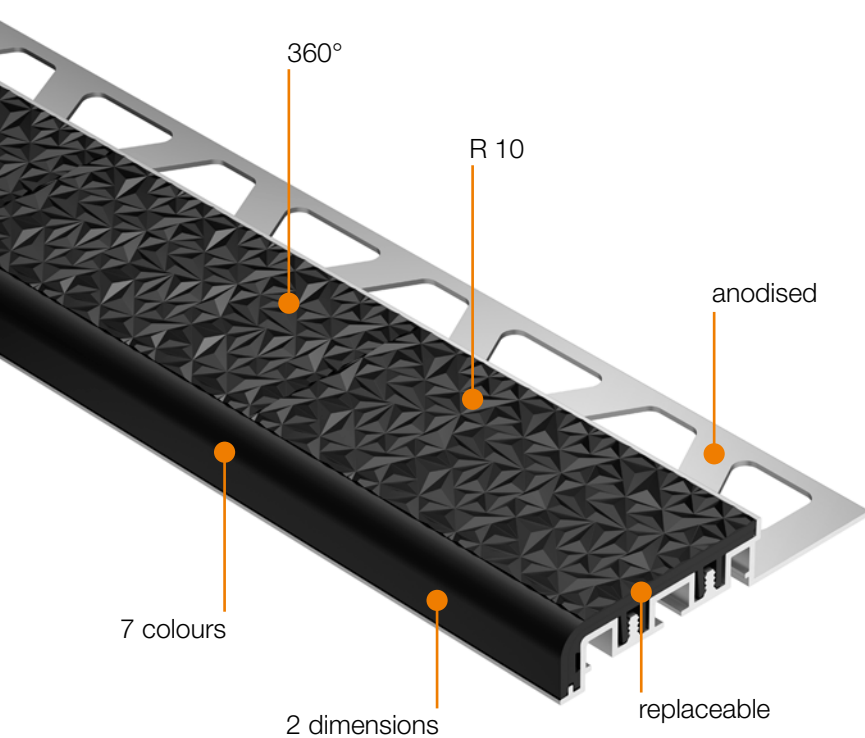
Reference aids

Stairs and individual steps must include reference aids for visually impaired people in the form of step markings that form a visual contrast to the adjoining covering. DIN 32975, "Designing visual information in the public area for accessible use" provides instructions for creating optimum contrast to adjoining materials.





Schlüter®-TREP-V: beautifully safe



The TREP-V profile range incorporates the current insights and recommendations of the above-listed regulations to help create maximum user safety for stairways. The innovative tread surface with its modern design makes a key contribution to harmonious appearance and offers optimum support for the safe use of stairs.

Our TREP-V stair nosing profile can be used in combination with tiles in various thicknesses that are installed with proven methods. The anchoring leg of the profile is fully embedded in the floor covering in such a way that the profile is flush with tiles in various thicknesses.

Slip resistance

The reversible slip-resistant plastic insert of the profile is a special feature. The patented surface structure not only looks modern, but also ensures slip resistance in all directions. The slip resistance properties of TREP-V inserts were tested according to

DIN EN 16165 and classified as R10. That means the profiles are suitable for use in interior spaces. As the slip resistance classes of adjoining materials may vary by max. one class according to regulation 108-003 of the German Statutory Accident Insurance

(DGUV), TREP-V can be combined with coverings of class R9 to R11. In addition, the special haptic surface structure is dirt-repellent and the profile is easy to clean.

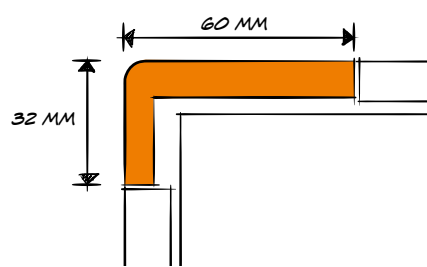
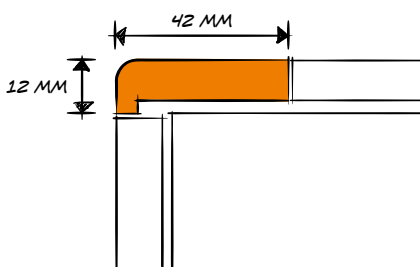
The choice is yours!

2 dimensions, 7 colours

With its two dimensions of 42/12 mm and 60/32 mm as well as a selection of contrasting colours that reflect modern floor covering trends, the TREP-V product range offers attractive options for stair design stairs

that are fully compliant with the applicable regulations. The TREP-V colour assortment creates the necessary contrasts to help visually impaired people recognise adjoining floor coverings. The structure and matte

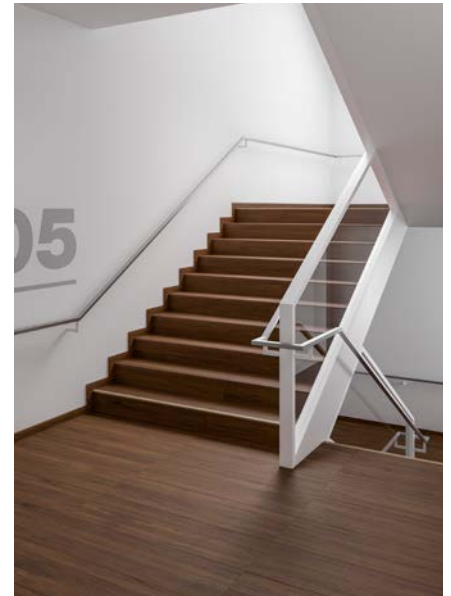
insert surface reduces the reflection of ambient lighting to achieve a full contrast impression. The section below shows an aid for finding the right contrast colour.



- GS** Matte graphite black
- FG** Joint grey
- HG** Light grey
- SG** Stone grey
- SP** Soft peach
- HB** Light beige
- NB** Nut brown



Creating the right contrast



According to the recommendations of DIN 18040, every step of stairways with up to 3 individual steps that start or end in open spaces must be marked (Fig. 1 and 1a). In staircases, the first and last step, and preferably all steps, must be marked (Fig. 2). TREP-V enables you to either create the desired visual contrast or harmonious colour matches for the tile covering.

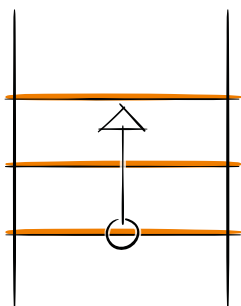


Fig. 1

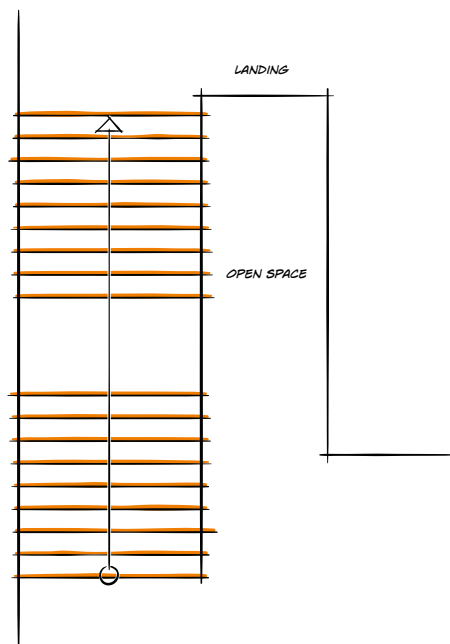


Fig. 1a

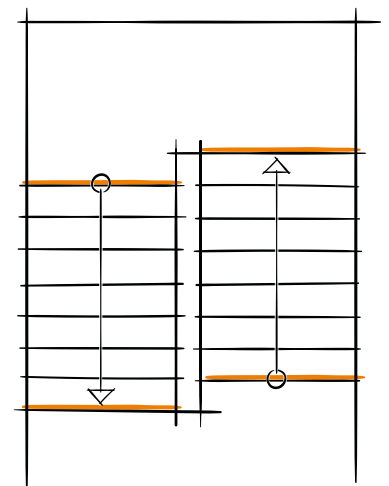


Fig. 2

— : markings required for contrast behaviour

Contrast calculation

According to DIN 32975, visual contrast is determined with the so-called Michelson's equation $K = (L1 - L2) / (L1 + L2)$. Contrast K (according to Michelson) refers to the relative luminance contrast between adjoining fields. The lightness coefficient (HW) is another way to calculate contrast with this equation.

The lightness coefficients of the profile inserts were established with measuring technology in a laboratory. These values may vary due to local ambient influences (metamerism) and the natural wear and usage of the insert. Colour variations in adjoining floor tiles that occur within a series can also complicate the contrast calculation. We therefore recommend sampling our stair nosing profiles with the adjoining materials to determine the optimum contrast.

$$K = (HW1 - HW2) : (HW1 + HW2)$$

Visual information is determined by perceived brightness, not by a specific colour. Official guidelines therefore specify a contrast value of $K \geq 0.4$ between step markings and the floor covering.



Fig. 3

Sample calculation 1

Stairway design:

first and last step edge with visual contrast; remaining steps in a colour that matches the tiles (see Fig. 3)

Tile: Ivory 2754UL10 (Villeroy & Boch)

Colour code: UL10, RAL similar to 080 80 10

(data supplied by Villeroy & Boch)

=> HW1 = 59.08

TREP-V insert colour graphite black

GS => RAL 9011 => HW2: 5.1

Sample calculation with Michelson equation:

$$K = (HW1 - HW2) / (HW1 + HW2)$$

$$K = (59.08 - 5.1) / (59.08 + 5.1)$$

$$K = (53.98) / (64.18)$$

$$K = 0.84$$

Result:

The contrast value K 0.8 is \geq K 0.4.

The contrast value is sufficiently high.

Additional contrast options of the profile insert with ivory tile (marked in green)

Profile insert / colour	HW2 profile insert	HW1 ivory tile	Contrast*
GS Matte graphite black	5.1	59.08	-0.84
FG Joint grey	18.0	59.08	-0.53
HG Light grey	63.7	59.08	0.04
SG Stone grey	37.7	59.08	-0.22
SP Soft peach	69.5	59.08	0.08
HB Light beige	28.2	59.08	-0.35
NB Nut brown	14.2	59.08	-0.61

* for contrasting step marking, determined according to the Michelson equation $K \geq 0.4$



Overview of profile inserts

Our reference list gives you a quick overview of the most suitable profile insert colours. The recommended lightness coefficients for your tiles simplify the selection.

Colour selection for contrasting profile inserts based on the lightness coefficient (HW) of the tile covering

Profile insert/colour	HW2 profile insert	Suitable for tiles with HW*
GS Matte graphite black	5.1	> 16
FG Joint grey	18.0	> 54
HG Light grey	63.7	< 21
SG Stone grey	37.7	< 12
SP Soft peach	69.5	< 23
HB Light beige	28.2	> 85 or < 9
NB Nut brown	14.2	> 43

* for contrasting step marking

Schlüter colour designation	RAL colour*
GS Matte graphite black	RAL 9011
FG Joint grey	RAL 0004000
HG Light grey	RAL 7035
SG Stone grey	RAL 0606005
SP Soft peach	RAL 0758510
HB Light beige	RAL 1019
NB Nut brown	RAL 8007

* RAL colour specifications are approximate.

The print does not allow reproductions of the original colours.



Tip:

If no lightness coefficient data are available for the flooring material, use a colour card for matching. You can then use the respective colour code to ask the manufacturer about the corresponding lightness coefficient.

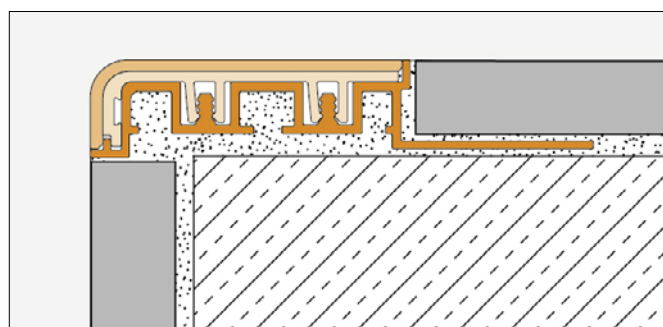
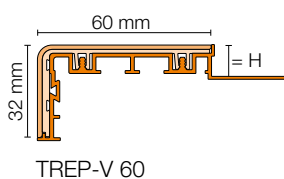
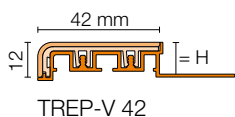
The RAL colour system was used as an example for calculation. The HW values corresponding to RAL colours are available for downloading.
www.RAL.de





Profile geometry

Depending on local regulations, the dimensions of the required marking for step edges may vary. According to DIN 18040-1/-2, the contrasting marking on should have a width of 40-50 mm on stair steps and a width of 10-20 mm on the riser, in each case measured from the front or top edge of the step. Our insert 42/12 mm meets these requirements for a contrasting zone of DIN 18040-1/-2. The dimension 60/32 mm offers the option to comply with further requirements beyond the standards.



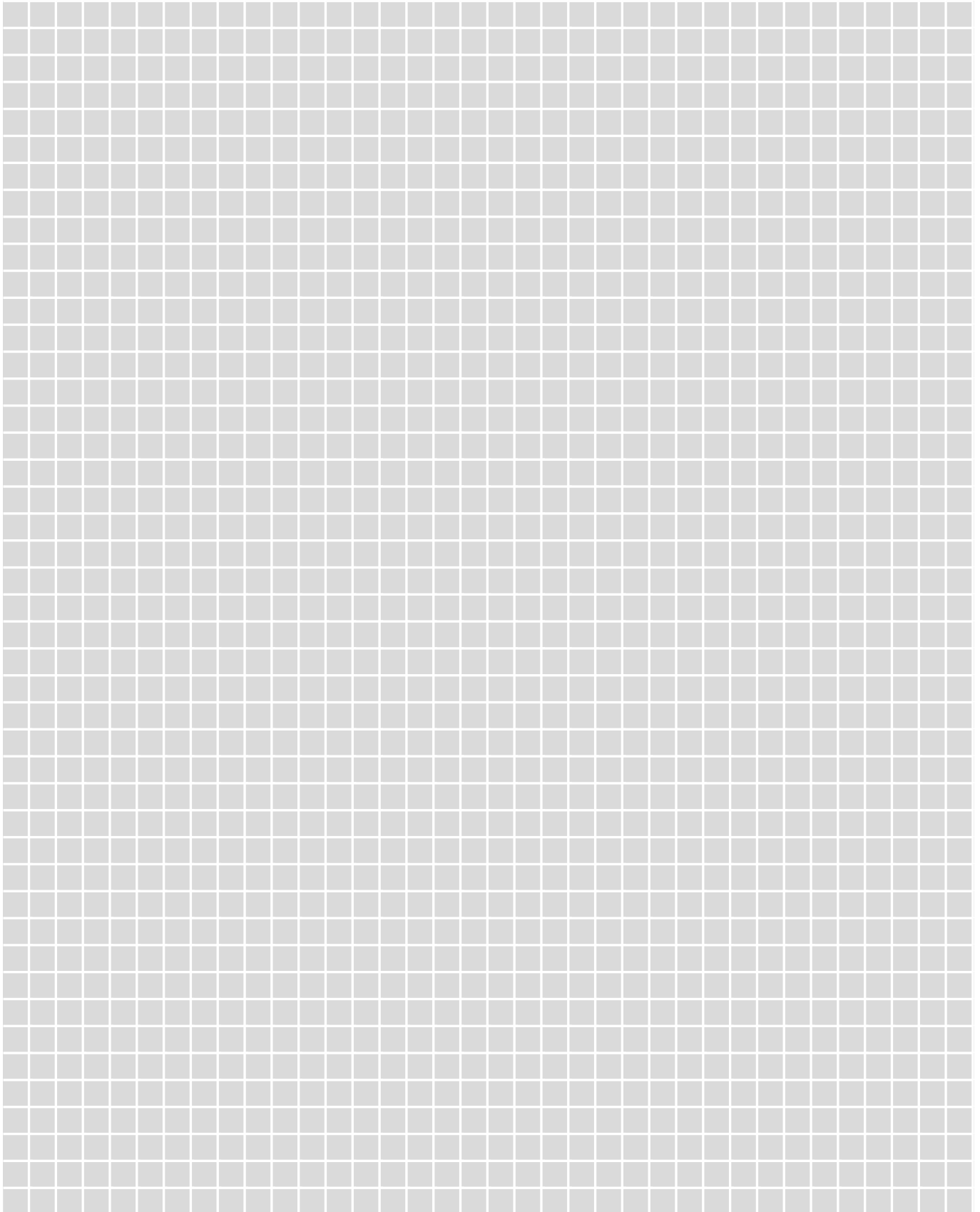
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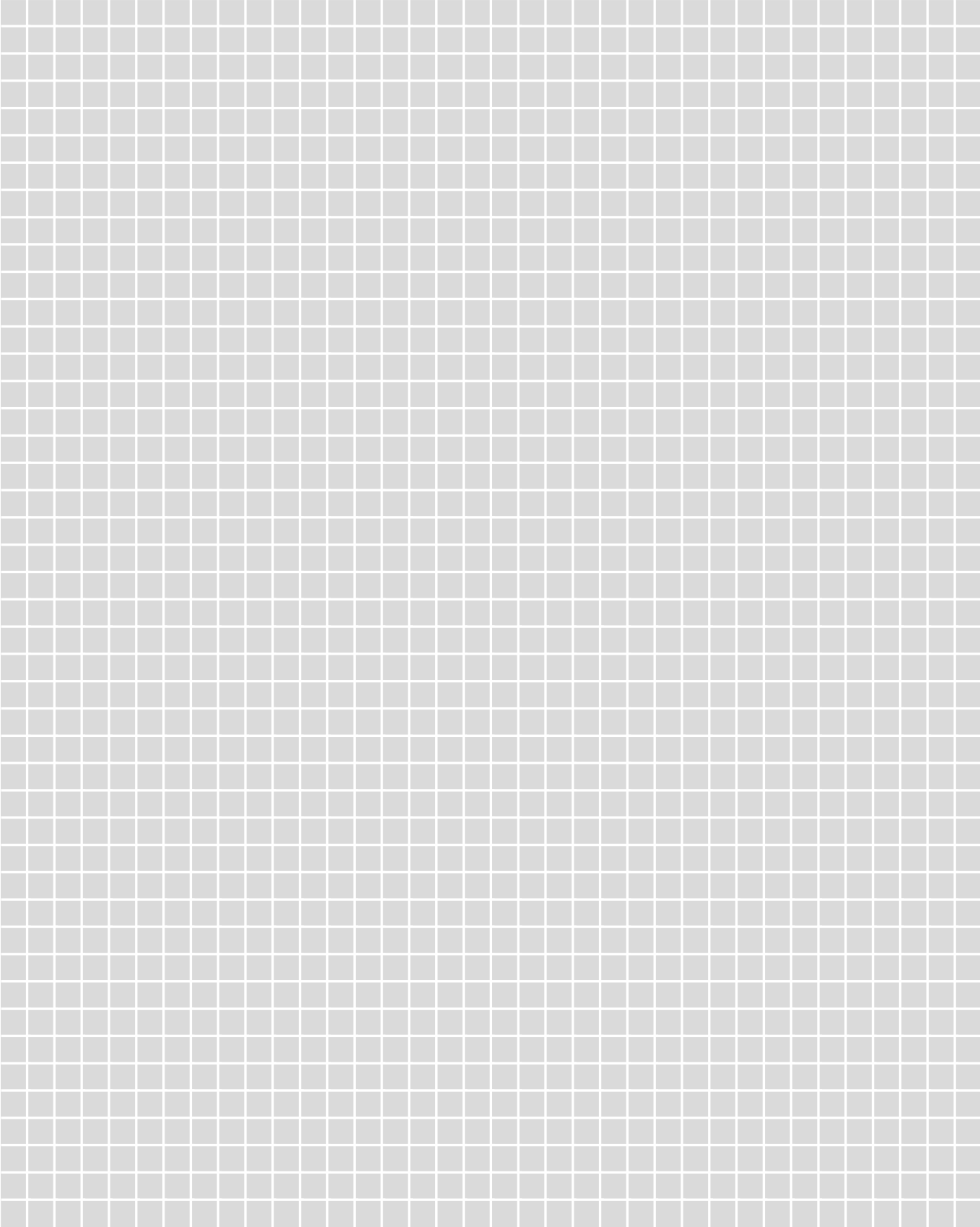
For further information, please refer to the illustrated Schlüter price list in the "Stair nosing profiles" section and our product data sheet 3.6.





Notes:







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