Facade tiles

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There is a copy of the latest version of the national technical approval at any time on our website at www.tonality-facades.de.
Facade tiles

High quality, frost resistance and durability have been inherent characteristics of TONALITY facade tiles for decades. These high quality facade tiles distinguish themselves through their outstandingly high quality raw materials combined with their unique colours, range of surface finishes, highly attractive joint designs and practical installation-friendly technology. Ventilated rainscreen facade projects, whether new builds or refurbishments, when constructed from TONALITY facade tiles have proven themselves both to be highly reliable and to possess outstanding physical characteristics.

TONALITY facade tiles are certified by the German Institute Construction and Environment e.V. (IBU - Institut Bauen und Umwelt e.V.) with an environmental product declaration (EPD) in accordance with ISO 14025 and EN 15804.

TONALITY offers unique design opportunities for individual facades with standard formats from 150 x 300 mm up to 400 x 1,600 mm and a wide choice of finishes. TONALITY already offers a very wide spectrum of standard colours with the BRICK RED, NATUR, NUANCE, NOBLESSE COLOR and SIENA product series, as shown on pages 58/59. Additional colours and surfaces are available on request.

Privacy and sun protection

The Lamella, Baguette and Square Brise Soleil complement the TONALITY facade tile product range in the best way possible. The precast Brise Soleil elements are available in numerous standard dimensions and all the colours from the NATUR, BRICK RED, NUANCE and NOBLESSE COLOR series as shown on pages 58/59.

Additional formats, colours and shapes are available on request.

<table>
<thead>
<tr>
<th>Standard finishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>smooth</td>
</tr>
<tr>
<td>grooved</td>
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<tr>
<td>single pilaster strip</td>
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<table>
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<th>Standard formats</th>
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<tbody>
<tr>
<td>Grid height (mm)</td>
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</tbody>
</table>

KERALIS® Quality

KERALIS sinter-firing process

**KERALIS Quality**
- Innovative production process
- Meticulously prepared Westerwald clays
- Sinter firing at 1,200°C – high temperature firing
- Cutting-edge plant technology

**Your benefits**
- Long lifespan under heavy loads
- Completely frost-resistant
- Low water absorption
- Low contamination
- Easy to clean

Privacy and sun protection

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Rear-ventilated ceramic rainscreen facades

Principle of the rear-ventilated rainscreen facade

The rear-ventilated rainscreen facade design is a highly effective system due to the physical separation of insulation and weather protection functions. Due to the space between the facade cladding and the insulation, air can circulate behind the facade cladding and remove any moisture. In terms of cost effectiveness, ecology and durability, the rear-ventilated rainscreen facade is growing in importance and is considered to be the leading system for new build constructions and building renovations.

This system can be used for all building types and heights and helps to reduce energy costs and fully complies with the requirements for energy-saving facades. Through the use of adequate insulation of thicknesses, the rear-ventilated facade can achieve the low-energy and passive house standards.

TONALITY facade system

The TONALITY facade system consists of facade tiles that are profiled on the reverse and which interlock there with vertical aluminium hanger profiles. The vertical joints between the tiles are backed by aluminium joint profiles. TONALITY facade tiles can be used in indoor and outdoor areas with every building type and height. TONALITY facade tiles are also suitable for overhead (ceiling cladding) installation.

TONALITY facade tiles have been awarded technical approvals Z-10.3-796 for the 22 mm tile thickness and Z-10.3-798 for the 26 mm tile thickness. The maximum spans for facade tiles in relation to the wind load can be obtained from the specific national technical approvals.

A distinction is made between the base clinch rail system (BAS) and the adaptive system (ADS), depending on the hanger profiles used. This system can be used for all building types and heights and helps to reduce energy costs and fully complies with the requirements for energy-saving facades. Through the use of adequate insulation of thicknesses, the rear-ventilated facade can achieve the low-energy and passive house standards.

Properties

- non-combustible / building material class A1 (EN 13501-1)
- weather-resistant and frost-resistant
- impermeable to water
- decay-proof
- shock-proof
- permanent graffiti protection in the TONALITY NATUR, NUANCE, NOBLESSE COLOR and SIENA series
- governed by a national technical approval
- low system weight
- exact fit between tile and system substructure
- installation not affected by weather

The clay material

The remarkable properties of clay have been known since ancient times. The discovery of clay ceramics made using the special plasticity of clay material dates from 10,000 - 8,000 BC. Thus, clay is among the oldest natural materials used by mankind. Clay materials are products of weathering and erosion of the earth’s crust. They occur in continental and maritime areas. Their diversity is dependent on the physical-chemical conditions during their formation, which accounts for a wide spectrum of properties and thus the diverse possibilities for using clays. The first-class clays used for TONALITY are excavated in the Westerwald. They are among the world’s finest clays and are famous for their special purity.

Manufacturing process

TONALITY facade tiles are produced, dried and fired in cutting-edge production facilities using the vacuum extrusion process. In the innovative KERALIS process, the raw clay material is dried, ground into a fine clay powder and coloured throughout in finely graduated mix ratios. The products are then fired at over 1,200°C. Due to the high quality of raw materials and high firing temperature, a sintering process occurs during firing. This produces the density and smooth surface.

Areas of application

Rear-ventilated rainscreen facades. TONALITY facade tiles can be used in indoor and outdoor with every type and height of building. The TONALITY facade system has the national technical approval No. Z-10.3-798 in accordance with DIN 18516 from the Deutsches Institut für Bautechnik (DIBT). Privacy and sun protection is possible using TONALITY products.
The base clinch rail system (BAS) can be attached to a conventional vertical primary substructure of wall brackets and T-profiles. Joint profiles and support profiles are already firmly connected to each other in the factory. The TONALITY 90° external corner profile is available for mitred corners and the TONALITY 38 x 30 mm external corner profile for open corners.

Reveal and lintel profiles are available for fixing in window and door areas. The system components are complemented by the universally applicable BAS-Flex holder.

### BAS system

The base clinch rail system (BAS) can be attached to a conventional vertical primary substructure of wall brackets and T-profiles. Joint profiles and support profiles are already firmly connected to each other in the factory. The TONALITY 90° external corner profile is available for mitred corners and the TONALITY 38 x 30 mm external corner profile for open corners.

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### BAS system on vertical substructure

<table>
<thead>
<tr>
<th>Profile selection</th>
<th>Tile height (mm)</th>
<th>Profile length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>2,694</td>
<td></td>
</tr>
<tr>
<td>175</td>
<td>2,794</td>
<td></td>
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<td>200</td>
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<tr>
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<td>2,744</td>
<td></td>
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<tr>
<td>300</td>
<td>2,694</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>2,794</td>
<td></td>
</tr>
</tbody>
</table>

Different system substructure profiles and profile lengths based upon the specific tile height resulting from the holder grid.

TONALITY system assemblies offer varied facade design options with a selection of joint profiles. Whether it is a closed 8 mm wide joint, an almost invisible 2 mm wide fine joint, or an open joint, the system has a solution for every design requirement. Closed joints can be implemented in both recessed and flush versions.
Base clinch rail system (BAS)

**BAS system design and installation example**

**BAS installation lay-out**

**Primary substructure**
- Spacing, type of brackets, anchors, plugs or drill screws, in accordance with the specific structural calculations by the installer

**Wall bracket** and anchor by installer

**Aluminium T-profile** by installer

**System substructure**
- BAS system

**Rivet/drill screw** by installer (in accordance with static engineering)

**TONALITY Classic 26** Facade tiles

**Installation examples**

**Profile length = number of grid spaces minus 6 mm**

The minimum butt joint spacing of tiles and profiles is 6 mm due to thermal linear expansivity (see approval).

**Grid (mm) | Number of grid spaces | Dimension L (mm) | Dimension A (mm) | Dimension B (mm) | Dimension C (mm) | Dimension E (mm)**

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
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</table>

* The minimum butt joint spacing of tiles and profiles is 6 mm due to thermal linear expansivity (see approval).
**Base clinch rail system (BAS)**

**BAS delivery programme**

<table>
<thead>
<tr>
<th>Image</th>
<th>Designation</th>
<th>Material/colour</th>
</tr>
</thead>
</table>
| DWG No. dwg 780 | BAS profile 20 x 60 x 20 mm  
System depth 31 mm  
Closed joint 8 x 21 mm            | aluminium bright, joint profile RAL 7021 black-grey |
| DWG No. dwg 781 | BAS profile 20 x 60 x 20 mm  
System depth 31 mm  
Closed joint 8 x 29 mm            | aluminium bright, joint profile RAL 7021 black-grey |
| DWG No. dwg 782 | BAS profile 20 x 60 x 20 mm  
System depth 31 mm  
Closed joint 2 x 21 mm            | aluminium bright, joint profile RAL 7021 black-grey |
| DWG No. dwg 783 | BAS profile 20 x 60 x 20 mm  
System depth 31 mm  
Closed joint 2 x 29 mm            | aluminium bright, joint profile RAL 7021 black-grey |
| DWG No. dwg 789 | BAS end profile 20 x 40 x 23 mm | aluminium bright     |
| DWG No. dwg 723 | BAS reveal/kitel profile 20 x 100 x 20 mm | aluminium bright     |
| DWG No. dwg 784/785 | BAS closure profile 20 x 40 x 20 mm left or  
20 x 40 x 20 mm for right         | aluminium bright     |

<table>
<thead>
<tr>
<th>Image</th>
<th>Designation</th>
<th>Material/colour</th>
</tr>
</thead>
</table>
| DWG No. dwg 724 | Reveal clip  
90° external corner  
20 x 66 x 66 x 20 mm            | aluminium bright     |
| DWG No. dwg 787 | External corner profile 90°  
20 x 40 x 40 x 20 mm  
System depth 31 mm            | aluminium bright     |
| DWG No. dwg all-16 | Sealing carrier profile  
for external corner 27 x 64 mm  
(usable on both sides)            | aluminium bright     |
| DWG No. dwg 206 | Joint profile for corner,  
closure joints and wind barrier | CR neoprene black  |
| DWG No. dwg all-02 | External corner profile  
visible  
30 x 30 mm            | aluminium bright     |
| DWG No. dwg all-16 | Spacer for horizontal joint with cut tile | aluminium bright     |

The substructure shown on this page is suitable for a tile thickness of 26 mm. An analogous substructure is available for a tile thickness of 22 mm. Note: Permitted spans and design calculation values (static engineering) see pages 48/49.

**Base clinch rail system (BAS)**

**BAS-Flex holder**

**BAS-Flex system design and installation example**

| Primary substructure  
Sparking, type of brackets, anchors  
and dowel plugs in accordance with the specific structural calculations for the building by the installer |
| Wall bracket and anchor by installer |
| Aluminium T profile by installer |
| System substructure  
BAS Flex holder  
with flex joint profile |
| Blind rivet by installer  
(in accordance with structural calculations) |
| TONALITY Classic 26  
Facade tile |

Installation examples
BAS-Flex holder

BAS-Flex installation lay-out

<table>
<thead>
<tr>
<th>Grid (mm)</th>
<th>Dimension L (mm)</th>
<th>Number of vertical grid spaces</th>
<th>Number of Flex holders</th>
<th>Dimension F (mm)</th>
<th>Dimension B (mm)</th>
<th>Dimension C (mm)</th>
<th>Dimension D (mm)</th>
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<tr>
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<td>18.6</td>
<td>37</td>
<td>43</td>
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<td>102</td>
<td>200</td>
<td>200</td>
<td>98</td>
</tr>
</tbody>
</table>

The substructure shown on this page is suitable for a tile thickness of 22 mm. An analogous substructure is available for a tile thickness of 22 mm. Note: Permitted spans and design calculation values (static engineering) see pages 46/49.

BAS-Flex delivery programme

The BAS-Flex holder serves as a supplement to the BAS system components. It facilitates easy implementation of mixed grids and height offsets, and can be used universally with all grids and tile heights.

<table>
<thead>
<tr>
<th>Image</th>
<th>Designation</th>
<th>Material/colour</th>
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</thead>
<tbody>
<tr>
<td>DWG No. dwg 791</td>
<td>BAS-Flex holder 30 x 60 x 50 mm System depth 31 mm</td>
<td>Finish bright</td>
</tr>
<tr>
<td>DWG No. dwg 792</td>
<td>BAS-Flex joint profile closed (8 x 21 mm)</td>
<td>Finish coated RAL 7021 black-grey</td>
</tr>
<tr>
<td>DWG No. dwg 793</td>
<td>BAS-Flex joint profile closed (8 x 29 mm)</td>
<td>Finish coated RAL 7021 black-grey</td>
</tr>
<tr>
<td>DWG No. dwg 794</td>
<td>BAS-Flex fine joint profile (2 x 21 mm)</td>
<td>Finish coated RAL 7021 black-grey</td>
</tr>
<tr>
<td>DWG No. dwg 795</td>
<td>BAS-Flex fine joint profile (2 x 29 mm)</td>
<td>Finish coated RAL 7021 black-grey</td>
</tr>
<tr>
<td>DWG No. dwg 796</td>
<td>BAS-Flex spring end strip (45 mm)</td>
<td>Finish bright</td>
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</thead>
<tbody>
<tr>
<td>DWG No. dwg 791</td>
<td>Sealing carrier profile for external corner 23 x 24 mm (usable on both sides)</td>
<td>aluminium coated</td>
</tr>
<tr>
<td>DWG No. dwg 206</td>
<td>Joint profile for corner, closure joints and wind barrier</td>
<td>CR recoat nurse</td>
</tr>
<tr>
<td>DWG No. dwg 792</td>
<td>External corner profile visible 30 x 30 mm</td>
<td>aluminium coated</td>
</tr>
<tr>
<td>DWG No. dwg all-02</td>
<td>TONALITY spacer for horizontal joint at fitted tile</td>
<td>aluminium coated</td>
</tr>
<tr>
<td>DWG No. dwg all-16</td>
<td>BAS-Flex drilling jig 60 x 1.285 mm</td>
<td>Finish bright</td>
</tr>
</tbody>
</table>
BAS standard details

Vertical window sections
- DWG No. BAS 200-15
- DWG No. BAS 200-17
- DWG No. BAS 200-16
- DWG No. BAS 200-15.1
- Window lintel with sheet metal cladding (without sun protection)
- Window lintel with TONALITY cladding (without sun protection)
- Parapet with window sill connection

Horizontal window sections
- DWG No. BAS 200-14
- DWG No. BAS 200-14.3
- DWG No. BAS 200-30
- DWG No. BAS 200-14.2
- DWG No. BAS 200-14.2
- DWG No. BAS 200-14.1
- Window reveal with sheet metal cladding
- Window reveal with sheet metal cladding and neoprene joint seal
- Transition from TONALITY facade (RVCF) to ETICS with neoprene joint seal

Additional notes:
- Insulation must be implemented in accordance with the current Energy Saving Ordinance (EnEV).
- By window contractor
- In coordination with TONALITY and statics
- Sun protection by others
- Note façade clearance!
External corner 90° – TONALITY on vertical primary substructure, mitred TONALITY – external corner profile 90° 20 x 40 x 40 x 20 mm. The edges of mitre cuts must always be provided with a 4 mm chamfer. For example, the external corner profile can be attached to an aluminium sheet.

Optional:
Internal corner 90° with BAS closure and joint profile (neoprene, black)
**BAS – installation of cut tiles**

**Cut tiles with spacer**

![Cut tiles with spacer](image)

**Installation Instructions**

1. Mark the cut tile.
2. Cut with wet saw and recommended cutting blade.
3. Place cut tile face down on a flat substrate.
4. Set up the required tile spacing using a system substructure profile with hangers spaced in accordance with grid.
5. Place the spacers in position (two pieces per cut tile).
6. Fill the resulting joint with spacer adhesive, spread smoothly and evenly and allow to set.
7. Hang the facade tile with scheduled cutting mark on the system substructure profile.

**Installation with spacer – vertical section of window lintel**

![Installation with spacer – vertical section of window lintel](image)

**Installation with spacer – vertical section of window spandrel**

![Installation with spacer – vertical section of window spandrel](image)
BAS on wooden primary substructure

The details must be adapted to the material of the specific substructure selected.

**BAS system design**

1. Wood primary substructure
2. BAS profile
3. Wood screw
4. TONALITY facade tile

**Portrait installation**

Portrait installation with BAS
Case-by-case approval required!
Adaptive system (ADS)

**ADS on horizontal or vertical metal substructure**

TONALITY adaptive vertical profiles accept joint profiles with closed, fine or open joints or end profiles without joints. Left and right-hand external corner profiles are available for mitred corners with 3 system depths: 46, 56 and 66 mm. The TONALITY 30 x 30 mm external corner profile is used for open corners with profiles of 56 and 66 mm system depth. The TONALITY support profile prevents noise being generated in the hanger bracket.

Reveal and lintel profiles are available for fixing in window and door areas. TONALITY gable clips are used with special adhesive to attach tiles cut at an angle.

<table>
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<tr>
<th>Profile selection</th>
<th>Tile height (mm)</th>
<th>Profile length (mm)</th>
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</thead>
<tbody>
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<td></td>
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<td>200</td>
<td>2,794</td>
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<td></td>
<td>225</td>
<td>2,694</td>
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<tr>
<td></td>
<td>250</td>
<td>2,744</td>
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<tr>
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<td>300</td>
<td>2,694</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>2,794</td>
</tr>
</tbody>
</table>
Adaptive system (ADS)

Adaptive system (ADS) on horizontal substructure

Adaptive system (ADS) on vertical substructure

Adaptive system ADS
1 TONALITY facade tile
2 TONALITY Adaptive vertical profile metal (= system substructure)
3 TONALITY Adaptive metal joint profile
4 TONALITY integrated deconstruction protection
5 Primary substructure aluminium T-profile (by installer)
6 Primary substructure metal wall bracket (by installer)

Closed joint profile recessed joint 8 mm
Closed joint profile flush joint 8 mm
Fine joint closed recessed joint 2 mm
Fine joint closed flush joint 2 mm
Open joint profile joint 8 mm
End profile for closure No disassembly protection

Closed joint profile recessed joint 8 mm
Closed joint profile flush joint 8 mm
Fine joint closed recessed joint 2 mm
Fine joint closed flush joint 2 mm
Open joint profile joint 8 mm
End profile for closure No disassembly protection
Adaptive system (ADS)

**ADS on horizontal substructure – system design and installation example**

Primary substructure: Spacing, type of brackets, anchors and dowel plugs in accordance with property-specific structural calculations by installer

Wall bracket and anchor by installer

Aluminium T profile by installer

System substructure: TONALITY adaptive vertical profile

Rivet/drill screw by installer (in accordance with statics calculation)

TONALITY adaptive joint profile

Installation examples

**ADS on vertical substructure – system design and installation example**

Primary substructure: Spacing, type of brackets, anchors and plugs in accordance with property-specific structural calculations by installer

Wall bracket and anchor by installer

Aluminium T profile by installer

System substructure: TONALITY adaptive vertical profile

Rivet/drill screw by installer (in accordance with statics calculation)

TONALITY adaptive joint profile

Installation examples
The substructure shown on this page is suitable for a tile thickness of 26 mm. An analogous substructure for a tile thickness of 22 mm is available. Note: Permitted spans and calculation values (static engineering) see pages 48/49.

### ADS delivery programme

<table>
<thead>
<tr>
<th>Image</th>
<th>Designation</th>
<th>Material/colour</th>
</tr>
</thead>
<tbody>
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<td>DWG No. dwg 701</td>
<td>Adaptive vertical profile 46</td>
<td>aluminium bright</td>
</tr>
<tr>
<td>DWG No. dwg 702</td>
<td>Adaptive vertical profile 56</td>
<td>aluminium bright</td>
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<tr>
<td>DWG No. dwg 703</td>
<td>Adaptive vertical profile 66</td>
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<tr>
<td>DWG No. dwg 704</td>
<td>Closed joint profile (8 mm) 56 x 23 mm</td>
<td>aluminium RAL 7021 (black-grey)</td>
</tr>
<tr>
<td>DWG No. dwg 705</td>
<td>Joint profile fine joint (2 mm) 56 x 23 mm</td>
<td>aluminium RAL 7021 (black-grey)</td>
</tr>
<tr>
<td>DWG No. dwg 706</td>
<td>Joint profile fine joint (8 mm) 56 x 30 mm</td>
<td>aluminium RAL 7021 (black-grey)</td>
</tr>
<tr>
<td>DWG No. dwg 707</td>
<td>Joint profile fine joint (8 mm) 56 x 30 mm, flush</td>
<td>aluminium RAL 7021 (black-grey)</td>
</tr>
<tr>
<td>DWG No. dwg 708</td>
<td>Joint profile fine joint (2 mm) 56 x 30 mm, flush</td>
<td>aluminium RAL 7021 (black-grey)</td>
</tr>
<tr>
<td>DWG No. dwg 709</td>
<td>Joint profile fine joint (8 mm) open 56 x 32 mm, flush</td>
<td>aluminium RAL 7021 (black-grey)</td>
</tr>
<tr>
<td>DWG No. dwg all-01</td>
<td>End profile for closure 56 x 5 mm</td>
<td>aluminium bright</td>
</tr>
<tr>
<td>DWG No. dwg 710</td>
<td>Reveal joint profile narrow, profile width 45 mm</td>
<td>aluminium bright</td>
</tr>
<tr>
<td>DWG No. dwg 711</td>
<td>Reveal joint profile wide, profile width 100 mm</td>
<td>aluminium bright</td>
</tr>
<tr>
<td>DWG No. dwg 712</td>
<td>Support profile 60 mm (short piece) for all system depths and grids</td>
<td>CR neoprene black</td>
</tr>
<tr>
<td>DWG No. dwg 713</td>
<td>Sealing carrier profile for external corner (usable on both sides)</td>
<td>aluminium bright</td>
</tr>
<tr>
<td>DWG No. dwg 714</td>
<td>External corner profile for all system depths and grids</td>
<td>CR neoprene black</td>
</tr>
<tr>
<td>DWG No. dwg 715</td>
<td>Joint profile for corner, closure joints and wind barrier</td>
<td>aluminium bright</td>
</tr>
<tr>
<td>DWG No. dwg 716</td>
<td>External corner profile 30 x 30 mm, available for all grids with system depth 56/66 mm</td>
<td>aluminium bright</td>
</tr>
<tr>
<td>DWG No. dwg 717</td>
<td>Spacer for horizontal joints at fitted tiles</td>
<td>aluminium bright</td>
</tr>
</tbody>
</table>
**ADS standard details**

**View of joint profiles on vertical substructure**

- Closed joint profile (23 mm)
- Closed joint profile (32 mm)
- Open joint profile (32 mm)
- Open joint profile (23 mm)

**Vertical section of parapet**

**Vertical section of base**

**DWG No. ADS 100-07**

**DWG No. ADS 100-08**

**DWG No. ADS 100-09**

**DWG No. ADS 100-20**

**DWG No. ADS 100-21**

Further technical details and specifications can be found in the ADS standard details section.
Vertical sections of windows

- DWG No. ADS 100-15: Window lintel with sheet metal cladding (without sun protection)
- DWG No. ADS 100-17: Window lintel with sheet metal cladding (without sun protection)
- DWG No. ADS 100-16: Window lintel with TONALITY cladding (without sun protection)
- DWG No. ADS 100-15.1: Parapet with window sill connection

Horizontal sections of windows

- DWG No. ADS 100-14: Window reveal with sheet metal cladding on vertical primary substructure
- DWG No. ADS 100-18: Window reveal with sheet metal cladding on horizontal primary substructure

* Insulation must be implemented in accordance with the current Energy Saving Ordinance (EnEV).
**Horizontal sections of external corners**

External corner 90° – **TONALITY** on vertical primary substructure, mitred **TONALITY** – external corner profile 90° 74 x 45 x 2 mm. The edges of mitre cuts must always be provided with a 4 mm chamfer. The external corner profile can be attached to an aluminium sheet.

**Horizontal sections of internal corners**

Internal corner 90° with **ADS** end profile

**Horizontal section of external corner with wind barrier**

Wind barrier in accordance with DIN 1055 (wind loads) Part 4

**Curved walls**

Large radii can also be built using the BAS system design.
**ADS – installation of cut tiles**

**Cut tiles with spacer**

**Installation instructions**

1. Mark the cut tile.
2. Cut with wet saw and recommended cutting blade.
3. Place cut tile face down on a flat substrate.
4. Set up the required tile spacing using a system substructure profile with hangers spaced in accordance with grid.
5. Place the spacers in position (two pieces per cut tile).
6. Fill the resulting joint with spacer adhesive, spread smoothly and evenly and allow to set.
7. Hang the facade tile with scheduled cutting mark on the system substructure profile.

**Installation with spacer – vertical section of window lintel**

Detail of fitted tile fastening above the window

**Installation with spacer – vertical section of window spandrel**

Detail of fitted tile fastening below the window
ADS on wooden primary substructure

TONALITY ADS on wooden primary substructure

The details must be adapted to the material of the specific substructure selected.

**ADS system design**

1. Wood primary substructure
2. ADS TONALITY adaptive vertical profile
3. Wood screw
4. TONALITY adaptive joint profile
5. TONALITY facade tile

**TONALITY ADS on wooden primary substructure – Vertical section**

- Wood frame construction (not in TONALITY scope)
- Vertical section
- Horizontal section
- Fastening in coordination with statics (stainless steel)
- Unobstructed rear ventilation
- Depending on statics and system depth (–125-250)
- Centre-to-centre grid length
- Centre-to-centre grid height
- Grid height
- Centre-to-centre grid length

**ADS system design**

1. Wood primary substructure
2. ADS TONALITY adaptive vertical profile
3. Wood screw
4. TONALITY adaptive joint profile
5. TONALITY facade tile
Adaptive systems

**TONALITY Adaptive system T-Line**

A classic brick wall appearance can be created using a TONALITY T-Line system. It is suitable for all tile types and sizes. As an adaptive system, T-Line can be installed on vertical and horizontal substructures.

The TONALITY Adaptive system T-Line consists of type A and type B profiles that are attached alternately to the primary substructure which are attached in a staggered lay-out. Type A and type B joint profiles are available as a closed joint (8 mm).

**TONALITY adaptive system Siding**

The TONALITY Siding system substructure is ideally suited for the design of a TONALITY tile facade with the appearance of weatherboard ("shiplap" effect). All tile types and sizes can be used for this TONALITY system substructure. The sloping position and overlapping of TONALITY tiles is achieved by the shape of TONALITY Siding system substructure profiles.

The continuous vertical joints can be designed with a closed 8 mm joint or a fine 2 mm joint, either flush with the tile face or recessed.
ADS portrait installation

Portrait installation with ADS
Case-by-case approval required

Photo: DAHL office, Viborg, Denmark · Architects: Spacefab ARCHITECTS, Copenhagen, Denmark · Photo: Ivarsson, Rødekro, Denmark
The wind loads specified in the following tables are the design values of resistance for building components to wind loading. Linear interpolations may be made between two adjacent table values. The values apply to tiles with a thickness of 26 mm.

Negative wind load pressure* (kN/m²) | -0.75 | -1.20 | -1.50 | -2.25 | -3.00 | -3.75 | -4.50
--- | --- | --- | --- | --- | --- | --- | ---
Maximum spans (m) | 1.20 | 1.20 | 1.20 | 1.16 | 0.87 | 0.69 | 0.58

| Tile 200 | 1.60 | 1.60 | 1.20 | 0.80 | 0.60 | 0.48 | 0.40
| a) | 1.60 | 0.80 | 0.60 | 0.55 | 0.48 | 0.40 | 0.34
| b) | 1.60 | 1.02 | 0.86 | 0.68 | 0.51 | 0.41 | 0.34
| Tile 225 | 1.60 | 1.60 | 1.60 | 1.35 | 1.11 | 0.89 | 0.74
| a) | 1.60 | 1.60 | 1.60 | 1.35 | 1.11 | 0.89 | 0.74
| b) | 1.60 | 1.36 | 1.02 | 0.68 | 0.51 | 0.41 | 0.34
| Tile 250 | 1.60 | 1.60 | 1.35 | 1.11 | 0.89 | 0.74 | 0.60
| a) | 1.60 | 1.60 | 1.60 | 1.35 | 1.11 | 0.89 | 0.74
| b) | 1.60 | 1.36 | 1.02 | 0.68 | 0.51 | 0.41 | 0.34
| Tile 300 | 1.60 | 1.60 | 1.00 | 0.76 | 0.63 | 0.51 | 0.43
| a) | 1.60 | 1.60 | 1.00 | 0.76 | 0.63 | 0.51 | 0.43
| b) | 1.60 | 1.30 | 0.92 | 0.64 | 0.41 | 0.28 | 0.21
| Tile 400 | 1.60 | 1.60 | 0.85 | 0.64 | 0.51 | 0.43 | 0.36
| a) | 1.60 | 1.60 | 0.85 | 0.64 | 0.51 | 0.43 | 0.36
| b) | 1.60 | 1.40 | 0.92 | 0.64 | 0.41 | 0.28 | 0.21

* The partial stability coefficient γ_M has already been taken into consideration.

Max. bearing spans of cladding tiles for design values of building components under negative wind load pressure for the 'ADS' and 'BAS-Flex' systems

Max. bearing spans of cladding tiles for design values of building components under positive wind load pressure

Max. bearing spans of cladding tiles for design values of building components under negative wind load pressure for the 'BAS' system with rivet connection

Max. bearing spans of cladding tiles for design values of building components under negative wind load pressure for the 'BAS' system with screw connection

Max. bearing spans of cladding tiles for design values of building components under positive wind load pressure for the 'ADS', 'BAS' and 'BAS-Flex' systems
Privacy and sun protection systems

Lamella, Baguette and Square Brise Soleil

The Lamella, Baguette and Square Brise Soleil optimally complement the TONALITY facade tile product range. Integration of Brise Soleil early in the design process provides scope for creative facade design concepts. You can choose just to match the clay tile facade or alternatively to use the Brise Soleil as decorative elements in their own right either individually or in combination with metal, ceramic, glass and rendered facades. The precast elements Brise Soleil are available in numerous standard dimensions and all colours from the NATUR, BRICK RED, NUANCE and NOBLESSE COLOR series as shown on page 58/59. Whether used inside or outside the building, or in either vertical or horizontal format these Brise Soleil help designers to create truly unique buildings.

The TONALITY sight and sun protection elements are available in standard dimensions from 300 to 1,600 mm.

Please contact our technical support team for fixing options for privacy and sun protection systems.

Sustainable building with TONALITY facade tiles

The data includes raw material extraction and energy supply, raw material transport and product manufacturing, including packaging and its disposal.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units per m²</th>
<th>TONALITY value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total non-renewable primary energy</td>
<td>megajoules</td>
<td>651</td>
</tr>
<tr>
<td>Total renewable primary energy</td>
<td>megajoules</td>
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</tr>
<tr>
<td>Global warming potential</td>
<td>kg CO₂ equivalent</td>
<td>43.1</td>
</tr>
<tr>
<td>Depletion of stratospheric ozone layer potential</td>
<td>kg CFC11 equivalent</td>
<td>6.32E-9</td>
</tr>
<tr>
<td>Summer smog potential</td>
<td>kg NO₂ equivalent</td>
<td>1.12E-1</td>
</tr>
<tr>
<td>Acidification of soil and water potential</td>
<td>kg (PO₄)³⁺ equivalent</td>
<td>8.83E-2</td>
</tr>
<tr>
<td>Nutrient input/eutrophication potential</td>
<td>kg ethylene equivalent</td>
<td>9.04E-3</td>
</tr>
</tbody>
</table>

Explanation of measured quantities:

Total non-renewable primary energy: Effect: Non-renewable primary energy as a measure of fossil fuel energy sources (oil, natural gas, coal, lignite and uranium) and weighted in line with the scarcity.

Total renewable primary energy: Effect: Renewable primary energy as the measure of the use of renewable energy (wind power, hydro power, biomass, solar energy).

Global warming potential: Global Warming Potential (GWP) > global warming; Effect: Increased warming of the troposphere due to anthropogenic greenhouse gases such as burning fossil fuels.

Depletion of stratospheric ozone layer potential: Depletion Potential (ODP) > ozone layer destruction; Effect: Reduction of ozone concentration in the stratosphere due to emissions such as chlorofluorocarbons (CFCs).

Summer smog potential/photochemical ozone: Creation Potential = summer smog; Effect: Development of ozone near the ground the influence of sunlight due to photochemical reaction of nitrogen oxides with hydrocarbons and volatile organic substances.

Acidification of soil and water potential: Acidification Potential (AP) = acid rain; Effect: Reduction of rainwater pH due to leaching of acid forming gases such as sulphur dioxide (SO₂) and nitrogen oxide (NOx).

Nutrient input/eutrophication potential: (EIP) > over-fertilisation; Effect: Excessive content of nutrients in water table and in rural areas due to substances such as phosphorus and nitrogen from agriculture, combustion processes and waste water.
Building physics requirements (air intake, ventilation and rear ventilation)

The interaction of the outer wall with the external wall cladding must take the assessment of thermal insulation, soundproofing, water vapour control and fire protection into account. As a rule, rear ventilated cladding is required to reliably discharge moisture from the building, to drain off any possible penetrating precipitation, for capillary separation of cladding from the insulation or surface of the outer wall and for discharging any condensation inside the cladding.

Structural requirements

The cladding facade must be free from stress forces once installed. Deformation stress loads must not damage the cladding or substructure at connecting or fixing points. Similar or identical movements must be possible in the substructure and cladding in the region of expansion joints in the structure. This also applies by analogy for movement joints in the substructure. Anchor points must be provided for scaffolding. During installation, the insulation must be fixed permanently in place, forming a seamless barrier with stable dimensions, also taking any possible moisture ingress into consideration due to the weather conditions. Wooden and wood-based materials must be protected in accordance with DIN 68800-1, 2, 3 and 5.

Stability

The stability of the facade cladding must be proven and demonstrated. TONALITY facade tiles may only be used as a cladding facade if a national technical approval of European technical approval evaluation has been issued for the facade tiles for this field of use or an “approval for an individual case” is available from the building’s owner or the appropriate authority responsible for the specific individual case of implementation. The verification of stability in accordance with national or state building regulations must be provided by the building’s owner or his approved agent.

Assumed Loads, design values, setting out

All parts of the facade cladding must be designed taking the safety factors or permitted stress forces of the appropriate standards or national technical approvals into account. DIN 18516-1 must be taken into consideration when calculating internal forces. Design values for TONALITY facade tiles must be taken from the respective approval. The permitted forces for fastening elements must be taken from the national technical approvals or test certificates. The load-bearing capacity of fastenings and connections not governed in standards or technical approvals, the national application document must be demonstrated and proven for all components of the cladding facade. Reduced wind loads may be assessed for the facade tiles for buildings with rear-ventilated rainscreen facades if the external wall cladding qualifies as permeable to wind. The substructure system must not carry any additional loads such as components for advertising or window systems. In verifying the stability, at least an additional 20 mm must be added to the design separation assessed between outer wall and cladding to take deviations in the dimensions of the outer wall into account. Deviations to this are permitted, if only small dimensional deviations have been determined on-site.

Viscosity

Moisture penetration through vertical wooden load-bearing battens is prevented by using a system relevant substructure. Harmful effects, e.g. between different building materials – even without direct contact, especially in the direction of the flow of water – must be excluded by structural measures and by selecting suitable building materials.

Requirements for installation

The geometric assumptions of static engineering calculations and implementation plans must be complied with during installation.

The cladding facade should be situated at a distance of at least 20 mm from the thermal insulation or the surface of the outer wall. The distance may be reduced locally to 5 mm by the substructure or irregularities in the wall, for example. To ensure long-term, reliable functioning of the cladding facade, air intake and ventilation openings must be designed with cross-sections of at least 50 cm² per 1 m length of wall.

Verification of suitability

TONALITY facade tiles 26 mm thick may be used as non-combustible building materials in accordance with national technical approval Z-10.3-798, or 22 mm thick TONALITY facade tiles in accordance with national technical approval Z-10.3-796 within the meaning of DIN 18516-1.

Fire protection

Rear-ventilated rainscreen facades are traditionally amongst the safest external wall cladding assemblies. The contemporary fire protection requirements for rear-ventilated rainscreen facades can be obtained from specific state or national building regulations. Building authority requirements for fire behaviour are based on the building’s height and use.

Protection against condensation

Protection against condensation is a major pre-condition for thermal insulation functioning in external walls. Formation of condensation and subsequent formation of mould on the inside of the outer wall can be prevented by using rear-ventilated rainscreen facades. These permit problem-free, physically correct external wall constructions with decreasing resistance to vapour diffusion in the layers toward the exterior. Moisture in the building and from inside the building is removed via the rear ventilation gap, without the formation of condensation on the inside of the external wall. The improved drying behaviour of outer walls with rear-ventilated rainscreen facades contributes to a healthy indoor climate and benefits the energy balance, because otherwise increased humidity could only be removed by increased window ventilation. Verification opportunities for protecting against condensation forming are listed in DIN 4108-3.

Insulation

Only standardized or technically approved, type WAB (external thermal insulation for use beneath cladding) may be used in accordance with DIN 4108-1:2008-06 for thermal insulation in rear-ventilated rainscreen facades. Fleece-backed mineral fibre insulation in accordance with DIN 4108-10:2008-06 for thermal insulation in rear-ventilated rainscreen facades. Fleece-backed mineral fibre insulation in accordance with DIN 4108-10.22 mm thick TONALITY facade tiles in accordance with national technical approval Z-10.3-798, or 22 mm thick TONALITY facade tiles in accordance with national technical approval Z-10.3-796. According to the national technical approval, the TONALITY facade system is non-combustible, as long as any thermal insulation present consists of non-combustible mineral fibre thermal insulation. Therefore, TONALITY facade tiles in the form of a rear-ventilated rainscreen facade can be used for every type and height of building.

Weather protection

Rear-ventilated rainscreen facades ensure lasting protection for buildings from atmospheric precipitation. They are allocated to the highest requirements group III – heavy driving rain loads – of DIN 4108-3. This shows rear-ventilated rainscreen facades are especially resistant to driving rain. Even in areas with high annual precipitation and windy locations, rear-ventilated rainscreen facades prevent water penetration into the building without impairing the expulsion of moisture from inside the building. The consistent separation of the cladding facade from the structure of the building and insulation protects the building from the effects of weather. Both cooling down and heat losses in winter as well as heating up in summer are avoided. Stable, comfortable climates are achieved in the rooms inside. Structural components are protected against high temperature loads, which has a very positive impact on their working life.
Design basics

Substructure installation – primary substructure wall brackets

The wall brackets must be fitted at vertical axis separations and in the horizontal grid in accordance with static engineering calculations. Attention must be paid to ensure a precisely perpendicular alignment.

The system manufacturer's processing instructions for the primary substructure and anchors must be strictly adhered to during the installation of wall brackets. All brackets must be thermally insulated from the outer shell of the building using suitable underlays in accordance with DIN 18516. Care must be given to use technically approved anchoring elements in accordance with static engineering requirements. We recommend the dowel manufacturer completes a sufficient number of pull-out tests prior to starting installation work.

Substructure installation – primary substructure vertical T-profile

The vertical T-profiles must be adjusted to the facade alignment at the appropriate height on wall brackets and screwed or riveted in place in accordance with manufacturer's specifications.

Appropriate butt joints must be formed and both fixed and sliding point connections to absorb linear thermal expansion of the profiles must be built in during installation of the vertical T-profiles. During implementation, ensure that the primary substructure and the TONALITY profile can expand uniformly and free from stress.

Substructure installation – primary substructure horizontal L-profile – only applies to ADS

The horizontal L-profiles must be adjusted to the facade alignment at the appropriate height on wall brackets and screwed or riveted in place in accordance with manufacturer's specifications.

Appropriate butt joint formation and both fixed and sliding point connections to absorb linear thermal expansion of profiles must be built in during installation of the vertical T-profiles. During implementation, ensure that the primary substructure and the TONALITY profile can expand uniformly and free from stress.

Thermal installation

The thickness of thermal insulation and type of insulation are determined by the Energy Saving Ordinance or client specifications. Generally, the installation must be installed on wall surfaces which have been sanitized in compliance with manufacturer's guidelines.

Using perimeter insulation is recommended for the base area. Care must be taken that the insulation panels are pressed firmly together in the butt joints. All window, door and building joints must be checked for proper seals and, if applicable, visible defects must be reported to Project Management before proceeding with work.

Fixed point – sliding point

To ensure stress-free working of the aluminium substructure, it is absolutely essential to give formation of fixed and sliding points consideration during the installation of the primary substructure. For sliding points, the fastener (rivet, screw) is set in a slot; fixed points are formed by precisely fixing a fastener into a corresponding round hole.

Ceiling cladding / overhead installation

According to the national technical approval, TONALITY facade tiles can also be used as ceiling cladding (overhead installation), when used with the base clinch rail system (BAS) and adaptive system (ADS). This requires mechanical protection against facade tile slippage from hanger profiles. This can be carried out for example, by optionally using the anti-lift retaining clip already integrated in the joint profile.
Base clinch rail system (BAS)

TONALITY BAS profiles must be screwed to T-aluminium 70 x 50 x 2 mm support profiles made of EN AW 6060 aluminium alloy in accordance with DIN EN 755-2, material corresponding to T66, in accordance with the national technical approval, at a spacing equal to or twice the nominal tile height. The proof of stability for the support profile must be verified by static engineering for the specific construction project. The connection between base clinch rail system and support profile on the reverse must be provided using drill screws profile must be verified by static engineering for the specific construction. Two screws must be set symmetrically at each connection point. Butt joints of profiles must be at least 6 mm. Butt joints in the system substructure must not be separated. Alternatively, aluminium/stainless steel rivets – K9.5 can be used according to the national technical approval.

ADS – adaptive system

Installation of vertical profile

TONALITY vertical profiles must be screwed or riveted to the previously installed substructure in accordance with the construction's static engineering requirements. The separation between connections and the type of connection must be implemented in accordance with the construction's static requirements. Technically approved connecting elements must be used in all cases. As already described for the substructure, appropriate butt joint formation for absorbing thermal linear expansion of profiles must be built in whilst installing the profiles. Make sure that butt joint formation required in the primary substructure (T-profile) and the TONALITY ADS hanger profile are implemented in the same vertical grid. When arranging several hanger profiles above one another, the length of the hanger profiles and the distance between fixed points of two consecutive hanger profiles must not exceed 150 mm maximum, in order to avoid an apparent visual misalignment of the cladding in the region of the butt joint due to hanger profiles curving outwards.

Joint profile installation

To secure joint profiles, they are clamped onto the vertical profile, setting the edges on beads in the vertical profile. As a rule, they are prevented from falling out by inserting the tiles. At the same time, the tiles are pressed against the vertical profile by the joint profile in order to avoid noise being generated on the tile under wind loading. When inserting the joint profile, attention must be paid to the height constraints of the system profile and the joint profiles must be inserted in such a way that achieves the required clamping effect for the tiles. With ceiling cladding, it is advisable for the joint profile to be screwed to the vertical profile to ensure that any horizontal displacement of the joint profile and installed tiles is prevented. The joint profile must not span the 6 mm vertical profile butt joint beyond the grid.

Cutting residues must be removed from the tiles after cutting tiles on site. This can be done using a supply of ample clean water. Only dry tiles using a dry microfiber cloth (e.g. from Vileda). It is important here that the tile and cloth are dry, so no residue remains on the tile. However, if concrete or mortar residues remain on the tile, this can be removed using a cement residue remover.

 albeit daily use, it is always advisable to use water-based cleaning products. Certain products, such as those containing strong surfactants, can damage the tiles, so it is better to use products recommended by the manufacturer.

Dahm D2 ceramic and stone cutting machine Item No. 30023

Dahm DNS 1 diamond cutting blade Item No. 50152

Cutting fine dust from tiles

Cutting residues must be removed from the tiles after cutting tiles on site. This can be done using a supply of ample clean water. Only dry tiles using a dry microfiber cloth (e.g. from Vileda). It is important here that the tile and cloth are dry, so no residue remains on the tile. However, if concrete or mortar residues remain on the tile, this can be removed using a cement residue remover.

Tiles with graffiti protection – cleaning contamination from tiles

Tiles in the TONALITY NATUR, NUANCE, SIENA and NOBLESSE COLOR product series have durable, effective graffiti protection. This is directly fired in during the KERALIS process. The protective effect is present from day one, and so also during construction phase. Unlike conventional systems, no refreshing or renewal of the protection is required. TONALITY graffiti protection lasts for the entire life of the product.

With conventional systems, graffiti protection must be applied retroactively. It usually involves a wax-like coating that alters the gloss level of the tiles and often leads to spots forming. The coating also loses its effectiveness after approx. 3 years and must be reapplied. TONALITY graffiti protection does not need to be renewed. Should contamination occur through graffiti, it can be "wiped off". We recommend a mild solution of alcohol for this, or a graffiti remover such as P3 Scribes 400 from the company Henkel.
Integrated graffiti protection is available for all colours of the TONALITY NATUR, NUANCE, SIENA and NOBLESSE COLOR series. Further colours and finishes on request.

TONALITY NATUR

70017 Tuscania 70022 Beige 70024 Cream light 70015 Pearl grey

70010 Flint grey 70021 Umbra grey

TONALITY NUANCE

70020 Brick red (finished surface) 70006 Dark red 70011 Copper red 70009 Bright red

70016 Sand 70004 Cream 70018 White matt 70022 White glossy

70007 Eggshell 70013 Light grey 70008 Bright grey 70014 Middle grey

70005 Dark grey 70001 Anthracite 70025 Black matt 70023 Black glossy

TONALITY SIENA

70100 Anthracite 70102 Red 70103 Beige 70101 White

TONALITY BRICK RED

70019 Brick red (natural)
Quality made in Germany