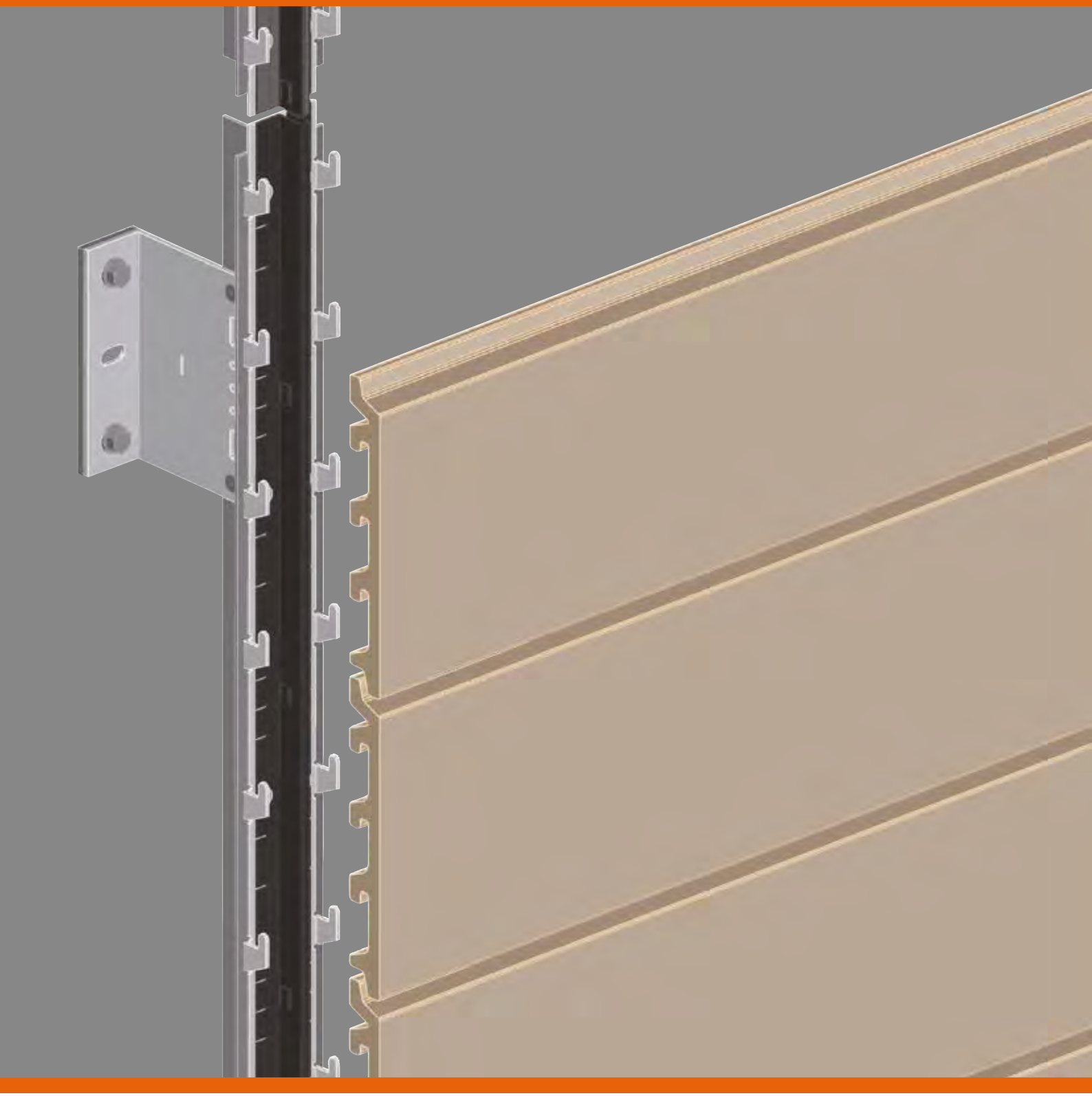
TONALITY
NATURAL FACADES

Fassaadiplaneerija



TONALITY
NATURAL FACADES

Fassaadiplaadid

Sisukord

Riikliku tehnilise tunnustuse uusima versiooni koopia on igal ajal meie veebisaidil www.tonality-facades.de.

Photo: Vesalius residential complex, Leuven, Belgium · Architects: Jasper-Eyers Architects, Brussels, Belgium · Installer: ZND NEDICOM, Asten, Netherlands · Photo: Houben NV, Hasselt, Belgium

TONALITY
NATURAL FACADES

Toodete ülevaade

Fassaadi plaadid

Kõrge kvaliteet, külmakindlus ja vastupidavus on olnud TONALITY fassaadiplaatidele omased omadused juba aastakümneid. Need kvaliteetsed fassaadiplaadid eristuvad silmapaistvalt kõrgekvaliteediliste toorainete, ainulaadsete värvide, pinnaviimistluse, väga atraktiivsete vuukide disaini ja praktilise paigaldussõbraliku tehnoloogiaga. TONALITY fassaadiplaatidest valmistatud ventileeritud vihmavarjuga fassaadiprojektid, olgu need siis uued või renoveeritud, on end tõestanud nii väga töökindlatena kui ka silmapaistvate füüsikaliste omadustega.

TONALITY fassaadiplaadid on sertifitseeritud Saksa Ehitus- ja Keskkonnainstituudi e.V. (IBU - Institut Bauen und Umwelt e.V.), millel on ISO 14025 ja EN 15804 kohase keskkonnatoote deklaratsioon (EPD)

TONALITY pakub ainulaadseid disainivõimalusi üksikute fassaadide jaoks standardformaatidega 150 x 300 mm kuni 400 x 1600 mm ja laia viimistlusvalikuga. TONALITY pakub juba väga laia standardvärvide spektrit BRICK RED, NATUR, NUANCE, NOBLESSE COLOR ja SIENA tootesarjadega, nagu on näidatud lk 58/59.

Soovi korral on saadaval lisavärvid ja pinnad.

Privaatsus- ja päikesekaitse

Lamella, Baguette ja Square Brise Soleil täiendavad TONALITY fassaadiplaatide tootevalikut parimal võimalikul viisil. Valmistatud Brise Soleil elemendid on saadaval paljudes standardmõõtmetes ja kõikides värvides sarjadest NATUR, BRICK RED, NUANCE ja NOBLESSE COLOR, nagu on näidatud lehekülgedel 58/59.
Soovi korral on saadaval täiendavad formaadid, värvid ja kujundid.

Standard lõpetus

smooth | grooved | ühe pilastri riba

Standard formaat

Kõrgus (mm)	Min. laius (mm)	Max. laius (mm)
150	300	900
175	300	900
200	300	1,600
225	350	1,600
250	375	1,600
300	450	1,600
400	600	1,600

KERALIS® Kvaliteet

KERALIS põletusprotsess

KERALIS Quality

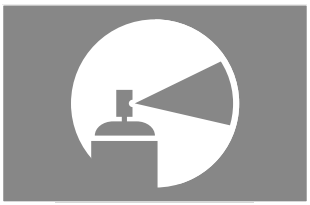
- Uuenduslik tootmisprotsess
- Hoolikalt valmistatud Westerwaldi savid
- Paagutamine 1200°C – kõrgtemperatuuriline põletamine
- Tipptasemel taimetehnoloogia

Sinu kasu

- Pikk eluiga rasketel koormustel
- Täiesti külmakindel
- Madal veeimavus
- Madal saastatus
- Lihtne puhastada

Kõrge tulekindlus

Kaitse keskkonna mõjude eest



Graffiti kaitse

Kõrge survetugevus

Kerge paigaldus

Uuenduslik süsteemitehnoloogia

Madal kaal

Suur värvi valik

Ventileeritavad keraamilised vihmakaitsefassaadid

Ventileeritava vihmavarju fassaadi põhimõte

Tagumine ventilatsiooniga vihmaekraani fassaadi disain on tänu isolatsiooni ja ilmastikukaitsefunktsioonide füüsilisele eraldamisele väga tõhus süsteem. Tänu fassaadi voodri ja soojustuse vahelisele ruumile saab fassaadi voodri taga ringelda õhk ja eemaldada niiskust. Kulutõhususe, ökoloogia ja vastupidavuse seisukohalt on tagaventileeritava vihmakaitsefassaadi tähtsus kasvamas ning seda peetakse juhtivaks süsteemiks uusehitiste ja hoonete renoveerimisel.

Seda süsteemi saab kasutada kõikide hoonetüüpide ja kõrgustega ning see aitab vähendada energiakulusid ning vastab täielikult energiasäästlikele fassaadidele esitatavatele nõuetele. Piisava paksusega isolatsiooni kasutamisega saab tagaventileeritav fassaad saavutada madala energiatarbega ja passiivmaja standardid.

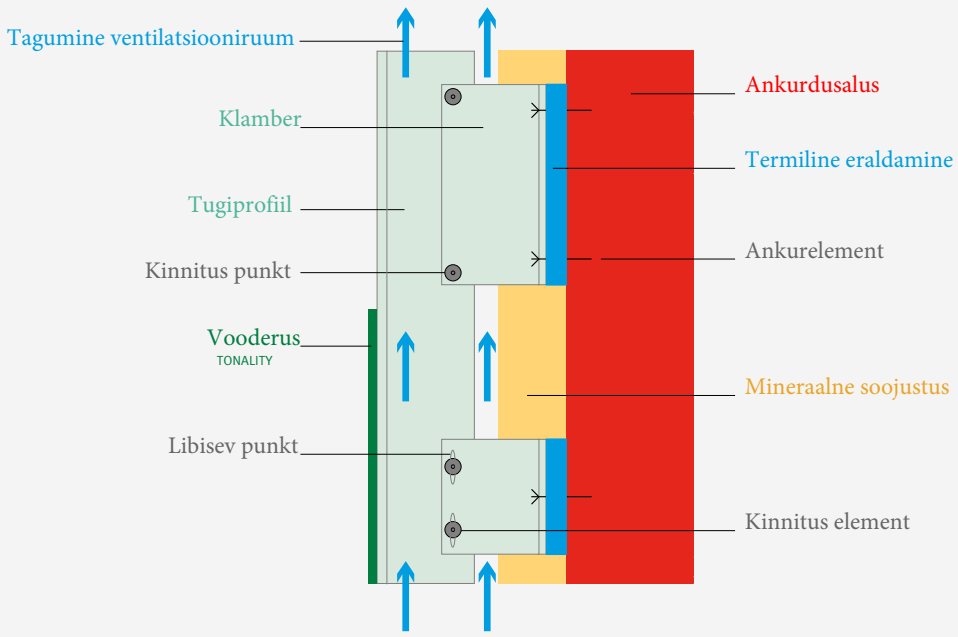


Image: FVHF

Tagantventileeritav vihmakaitsefassaad: soojusisolatsiooni ja ilmastikukaitsematerjalide struktuurse eraldamisega tagavad tagaventileeritavad fassaadisüsteemid tehnilise ja majandusliku kindluse ning suure loomingulise vabaduse.

We are a member of

Fachverband Baustoffe
und Bauteile für vorgehängte
hinterlüftete Fassaden e.V. (FVHF)
www.fvhf.de

TONALITY fassaadisüsteem

TONALITY fassaadisüsteem koosneb tagaküljelt profileeritud fassaadiplaatidest, mis haakuvad seal vertikaalsete alumiiniumist riputusprofiilidega. Plaatide vahelised vertikaalvuugid on tagatud alumiiniumist vuugiprofiilidega. TONALITY fassaadiplaate saab kasutada sise- ja välistingimustes iga hoonetüübi ja kõrgusega. TONALITY fassaadiplaadid sobivad ka õhupealseks (laevoodri) paigaldamiseks.

TONALITY fassaadiplaadid on saanud tehnilised kinnitused Z-10.3-796 22 mm paksuste plaatide jaoks ja Z-10.3-798 plaatide jaoks Plaadi paksus 26 mm.
Fassaadiplaatide maksimaalsed avaused tuulekoormuse suhtes on saadaval konkreetsete riiklike tehniliste lubade alusel.
Olenevalt kasutatavatest riputusprofiilidest eristatakse baasklambrisüsteemi (BAS) ja adaptiivset süsteemi (ADS).

Savi materjal

Savi tähelepanuväärsed omadused on tuntud juba iidsetest aegadest. Savimaterjali erilist plastilisust kasutades valmistatud savikeraamika avastamine pärineb 10 000 – 8000 eKr. Seega on savi üks vanimaid inimkonna kasutatud looduslikke materjale. Savimaterjalid on ilmastikumõjude ja maakoore erosiooni saadused. Neid esineb mandri- ja merealadel. Nende mitmekesisus sõltub füüsikalis-keemilistest tingimustest nende moodustumise ajal, mis moodustab laia omaduste spektri ja seega ka mitmekesised savi kasutusvõimalused. TONAALSUSE jaoks kasutatavad esmaklassilised savid kaevandatakse Westerwaldis. Need kuuluvad maailma parimate savide hulka ja on kuulsad oma erilise puhtuse poolest.

Tootmisprotsess

TONALITY fassaadiplaate toodetakse, kuivatatakse ja põletatakse tipptasemel tootmisrajatistes, kasutades vaakumekstrusiooniprotsessi. Uuendusliku KERALISe protsessi käigus savi tooraine kuivatatakse, jahvatatakse peeneks savipulbriks ja värvitakse läbivalt peente vahekordadega. Seejärel põletatakse tooted temperatuuril üle 1200 °C. Tooraine kõrge kvaliteedi ja kõrge põletustemperatuuri tõttu toimub põletamisel paagutamisprotsess. See annab tiheduse ja sileda pinna.

Kasutusvaldkonnad

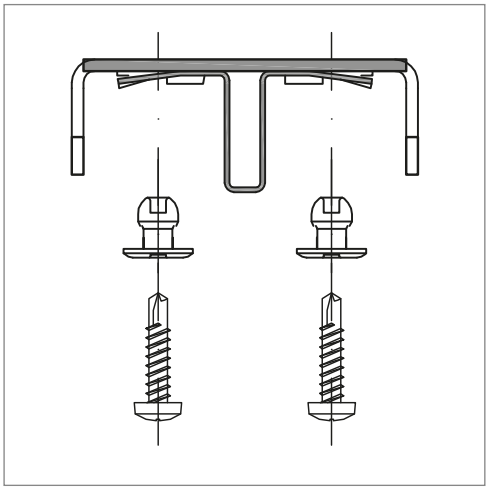
Tagantventileeritavad vihmakaitsefassaadid. TONALITY fassaadiplaate saab kasutada sise- ja välistingimustes igat tüüpi ja kõrgusega hoonetega. TONALITY fassaadisüsteemil on Deutsches Institut für Bautechnik (DIBT) standardile DIN 18516 vastav riiklik tehniline tunnustus nr Z-10.3-798. Privaatsus ja päikesekaitse on võimalik TONALITY tooteid kasutades.

Properties

- mittesüttiv / ehitusmaterjalide klass A1 (EN 13501-1)
- ilmastiku- ja külmakindel
- vett mitteläbilaskev
- lagunemiskindel
- UV-kindel
- põrutuskindel
- püsiv graffiti kaitse sarjades TONALITY NATUR, NUANCE, NOBLESSE COLOR ja SIENA
- mida reguleerib riiklik tehniline tunnustus
- süsteemi väike kaal
- täpne sobivus plaatide ja süsteemi aluskonstruktsiooni vahel
- paigaldus, mida ilmastik ei mõjuta

Klamber siini süsteem (BAS)

BAS süsteem

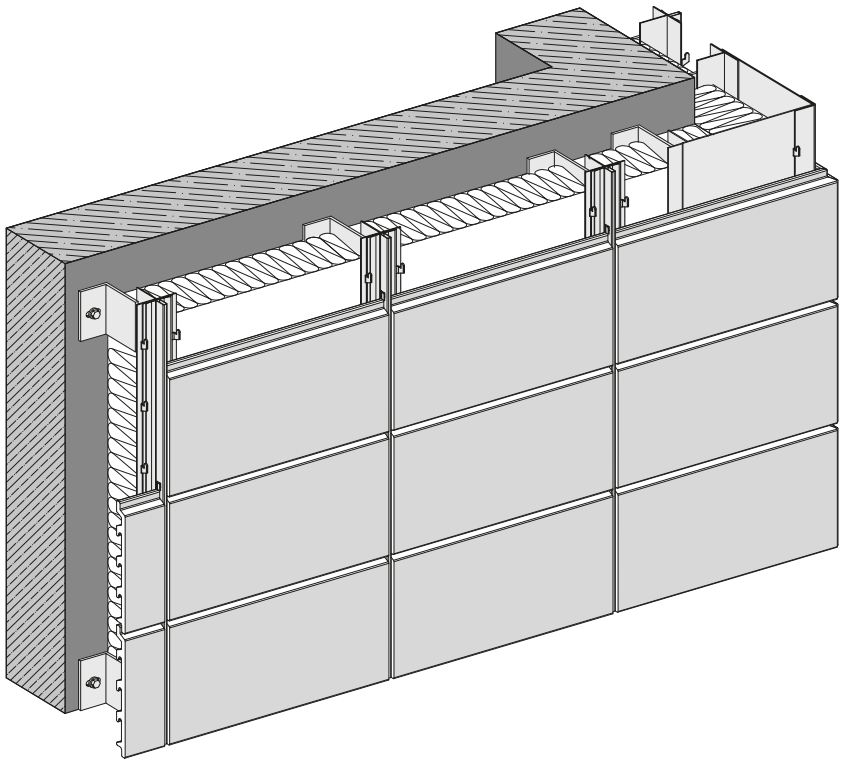


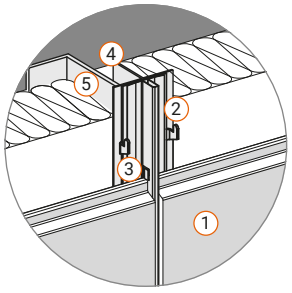
Aluskinnitussiinide süsteemi (BAS) saab kinnitada tavapärase vertikaalse esmase aluskonstruktsiooni külge, mis koosneb seinakonsoolidest ja T-profiilidest. Vuugiprofiilid ja tugiprofiilid on juba tehases omavahel kindlalt ühendatud. TONALITY 90° välisnurgaprofiil on saadaval kaldnurkade jaoks ja TONALITY 30 x 30 mm välisnurkprofiil avatud nurkade jaoks.
Akna- ja uksepiirkondades kinnitamiseks on saadaval paljas- ja sillusprofiilid. Süsteemi komponente täiendab universaalselt kasutatav BAS-Flex hoidik.

Profiili valik	Plaatide koõrgus (mm)	Profiili pikkus (mm)
Erinevad süsteemi alamstruktuuri profiilid ja profiili pikkused, mis põhinevad hoidiku ruudustikust tuleneval konkreetsel plaadi kõrgusel.	150	2,694
	175	2,794
	200	2,794
	225	2,694
	250	2,744
	300	2,694
	400	2,794

BAS süsteem vertikaalsel aluskonstruktsioonil

DWG No. BAS 200-01

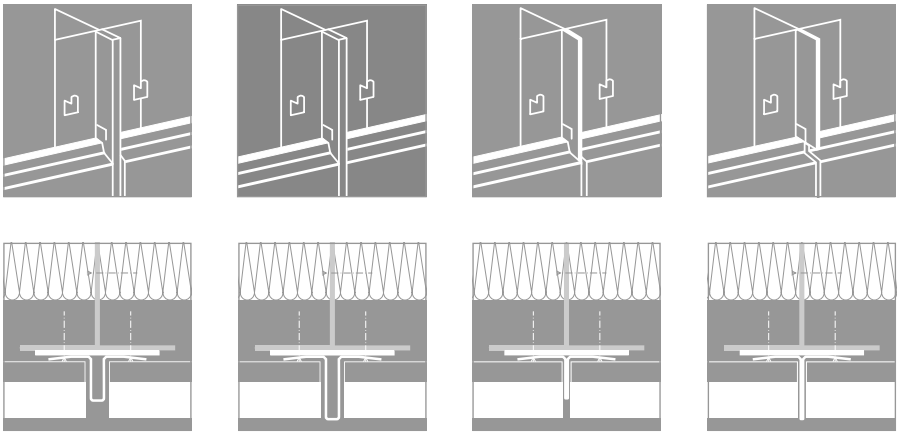




Klamber siini süsteem (BAS)

1 TONALITY fassaadi plaat
2 Klmaber siini suüsteem
3 integreeritud dekonstruktsiooni kaitse
4 Aluskonstruktsioon — alumiinium T_profiil
5 Aluskonstrutsioon — seinaklamber metallist

TONALITY süsteemilahendused pakuvad erinevaid fassaadi kujundus võimalusi koos vuugiprofiilide valikuga. Olgu tegemist suletud 8 mm laiuse vuugi, peaaegu nähtamatu 2 mm laiuse peenvuugi või lahtise vuukiga – süsteemil on lahendus igale disaininõudele. Suletud liitekohti saab teostada nii süvis- kui ka tasapinnalisena.



Suletud vuugiprofiil süvistatud vuuk 8 mm

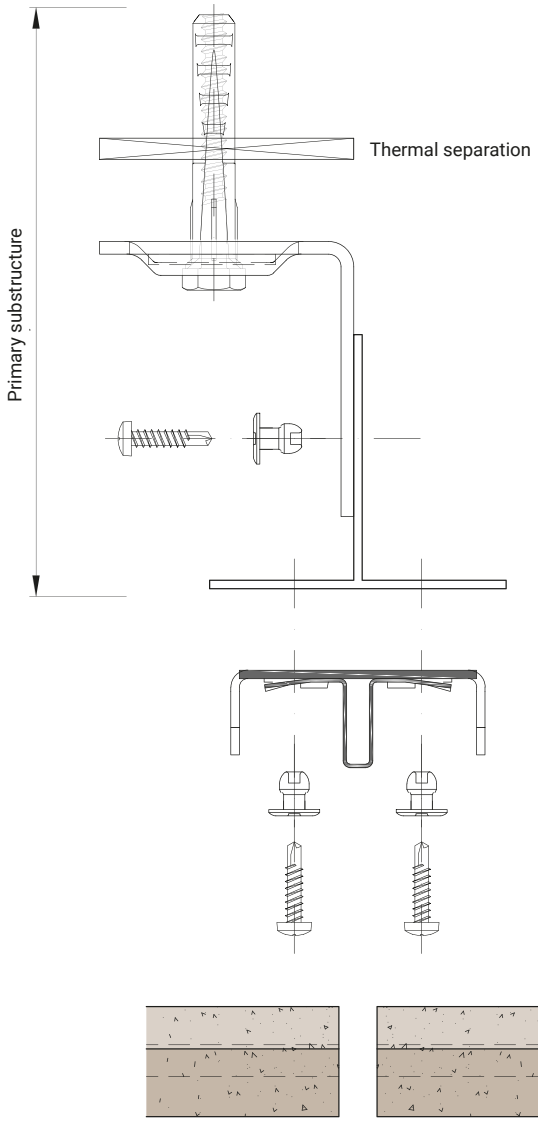
Suletud vuugiprofiili tasandusvuuk 8 mm

Peen liigend suletud süvistatud liitmine 2 mm

Peen liigend suletud loputusliigend 2 mm

Klamber siini süsteem (BAS)

BAS süsteemi projekteerimise ja paigaldamise näide



DWG No. BAS 200-02

Esmane aluskonstruktsioon

Vahekaugus, sulgude tüüp, ankrud, pistikud või puurkruvid, vastavalt spetsiifilise struktuuriarvutusega paigaldaja poolt

Seinakinnitus ja ankur paigaldaja poolt

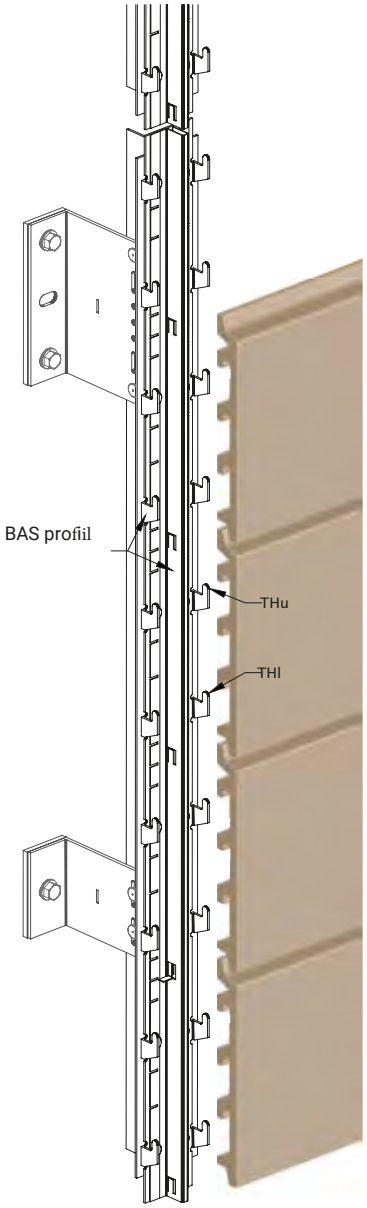
Aluminium T-profiil
paigaldaja poolt

Süsteemi alamstruktuur
BAS süsteem

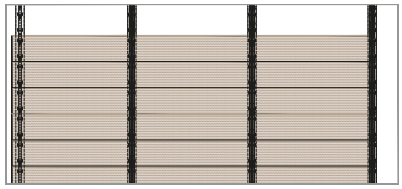
Needi/puurimiskruvi paigaldaja poolt (vastavalt staatilisele insenertööle)

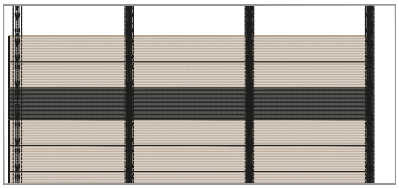
TONALITY Classic 26
Fassaadi paneel

DWG No. BAS 200-04/1



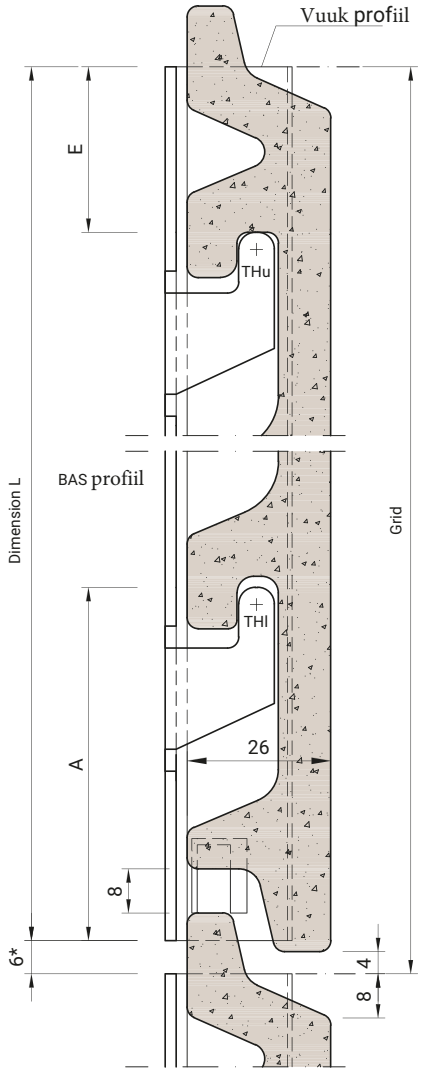
Paigaldus näiteid

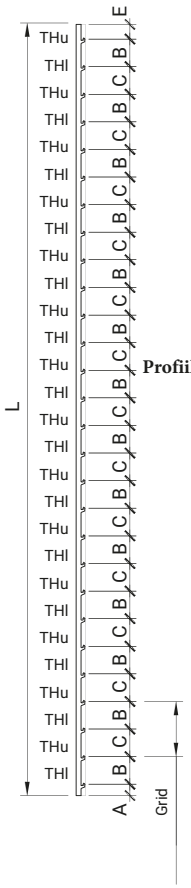




BAS paigaldus

DWG No. BAS 200-05





Profiili pikkus=number ruudustiku vahedest miinus 6 mm

THu: Ülemine plaadi hoidja
THl: Alumine plaadi hoidja

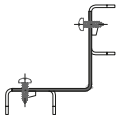
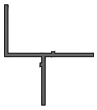
* Plaatide ja profiilide minimaalne põkkvuukide vahekaugus on 6 mm termilise lineaarse paisuvuse tõttu (vt kinnitust)

Võre (mm)	Ruudustiku spetsifikatsioonide arv	Dimension L (mm)	Dimension A (mm)	Dimension B (mm)	Dimension C (mm)	Dimension E (mm)
150	18	2,694	55	75	75	14
175	16	2,794	55	100	75	14
200	14	2,794	64	100	100	30
225	12	2,694	55	150	75	14
250	11	2,744	64	150	100	30
300	9	2,694	114	150	150	30
400	7	2,794	114	200	200	80

Klamber siini süsteem (BAS)

BAS tarneprogramm

Pilt	Tähistused	Material/värv
DWG No. dwg 780 	BAS profiil 20 x 60 x 20 mm Süsteemi sügavus 31 mm Suletud vuuk 8 x 21 mm	aluminium särav; liigendatud profiil RAL 7021 black-grey
DWG No. dwg 781 	BAS profile 20 x 60 x 20 mm Süsteemi sügavus 31 mm Suletud vuuk 8 x 29 mm	aluminium särav, vuugi profiil 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/lintel profile 20 x 100 x 20 mm	aluminium bright
DWG No. dwg 784/785 	BAS closure profile 23 x 40 x 20 mm left or 20 x 40 x 23 mm for right	aluminium bright

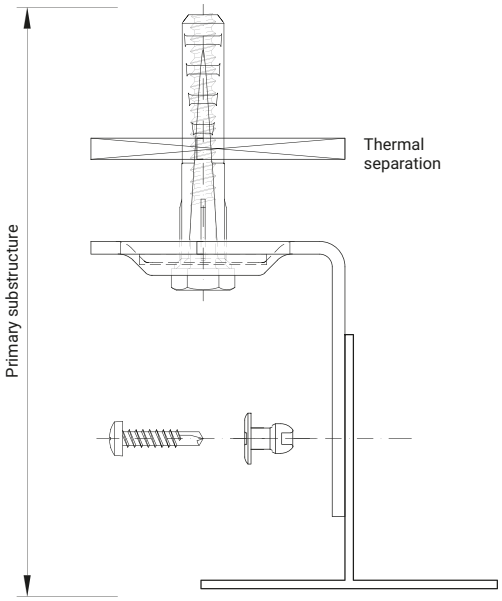
Pilt	Tähistused	Material/värv
DWG No. dwg 724 	90° välisnurk 20 x 66 x 66 x 20 mm	aluminium bright
DWG No. dwg 787 	Välisnurga profiil 90° 20 x 40 x 40 x 20 mm Süsteemi sügavus 31 mm	aluminium bright
DWG No. dwg all-16 	Sealing carrier profile for external corner 27 x 64 mm (usable on both sides)	aluminium 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

Sellel lehel näidatud aluskonstruktsioon sobib 26 mm paksusele plaadile. Analoogne aluskonstruktsioon on saadaval plaadi paksusele 22 mm.
Märkus: Lubatud sildeulatus ja arvutuslikud väärtused (staatiline tehniline tehniline) vt lk 48/49.

BAS-Flex klamber

BAS-Flex süsteemi disain ja paigaldus näited

DWG No. BAS 200-51



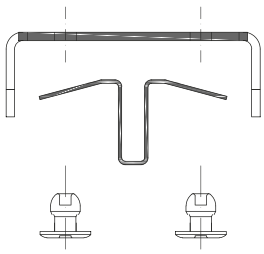
Esmane aluskonstruktsioon

Vahekaugus, sulgude tüüp, ankrud ja tüüblid vastavalt paigaldaja konkreetsetele hoone konstruktsiooniarvutustele

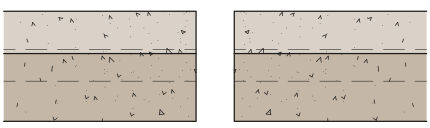
Seinaklamber ja ankur paigaldaja poolt

Aluminium T profile
paigaldaja poolt

System substructure
BAS-Flex holder
with Flex joint profile

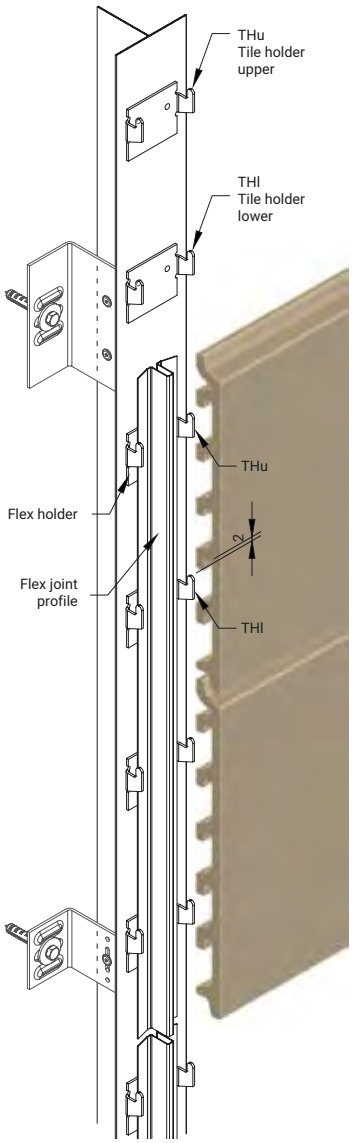


Blind rivet
by installer
(in accordance with structural calculations)

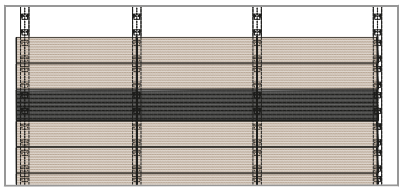


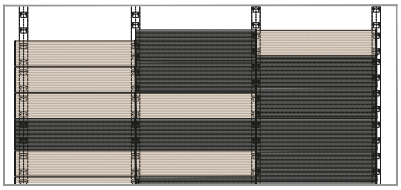
TONALITY Classic 26
Facade tile

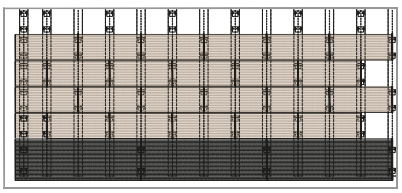
DWG No. BAS 200-50



Installation examples



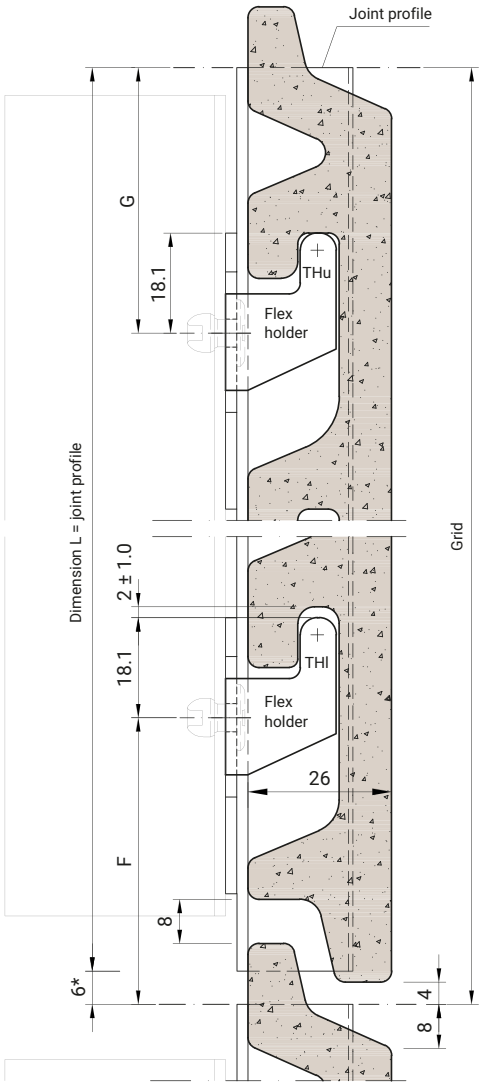


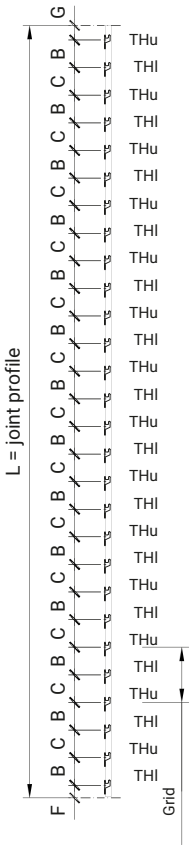


BAS-Flex holder

BAS-Flex installation lay-out

DWG No. BAS 200-52





Joint profile length = number of grid units minus 6 mm

THu: Upper tile holder
THI: Lower tile holder

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

Grid (mm)	Dimension L (mm)	Number of vertical grid spaces	Number of Flex holders	Dimension F (mm)	Dimension B (mm)	Dimension C (mm)	Dimension G (mm)
150	2,794	18.6	37	43	75	75	32
175	2,794	16	32	43	100	75	32
200	2,794	14	28	52	100	100	48
225	2,794	12.4	25	43	150	75	32
250	2,794	11.2	23	52	150	100	48
300	2,794	9.3	19	102	150	150	48
400	2,794	7.0	14	102	200	200	98

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.

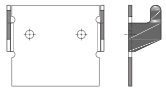
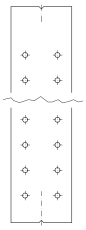
Image	Designation	Material/colour
DWG No. dwg 791 	BAS-Flex holder 20 x 60 x 50 mm System depth 31 mm	Finish bright
DWG No. dwg 792 	BAS-Flex joint profile closed (8 × 21 mm)	Finish coated RAL 7021 black-grey
DWG No. dwg 793 	BAS-Flex joint profile closed (8 × 29 mm) flush	Finish coated RAL 7021 black-grey
DWG No. dwg 795 	BAS-Flex fine joint profile (2 x 21 mm)	Finish coated RAL 7021 black-grey
DWG No. dwg 796 	BAS-Flex fine joint profile (2 x 29 mm) flush	Finish coated RAL 7021 black-grey
DWG No. dwg 794	BAS-Flex spring end strip (45 mm)	Finish bright

Image	Designation	Material/colour
DWG No. dwg all-06 	Sealing carrier profile for external corner 27 x 24 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 	TONALITY spacer for horizontal joint at fitted tile	aluminium bright
DWG No. dwg 798 	BAS-Flex Drilling jig 60 x 1,385 mm	Finish 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.

TONALITY
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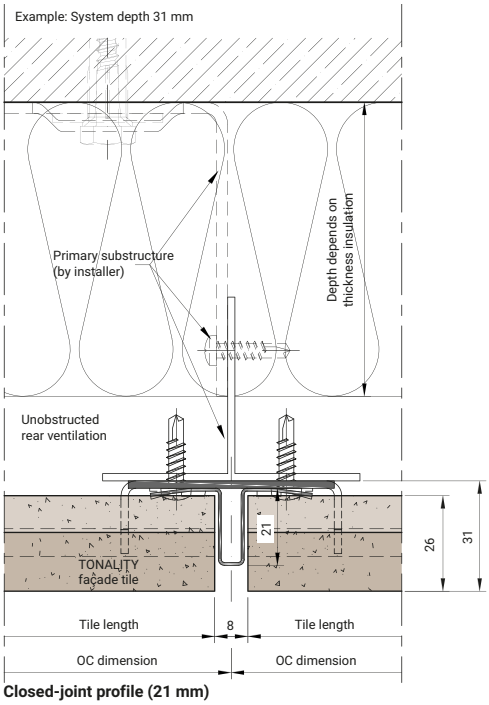
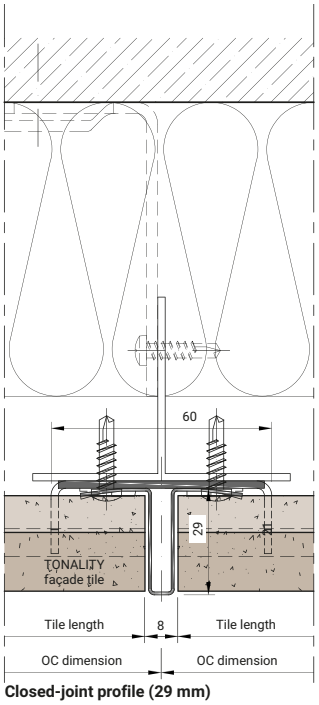
BAS standard details

Representation of joint profiles

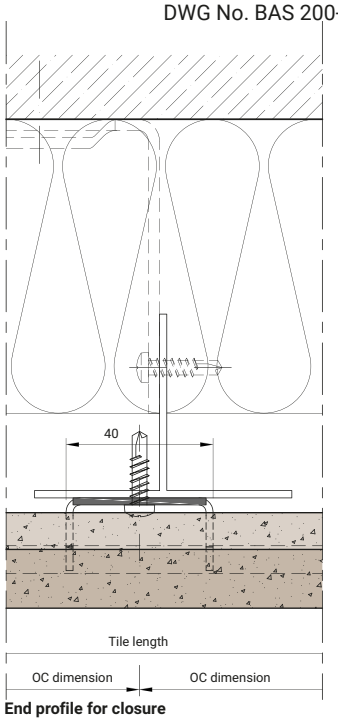
DWG No. BAS 200-07



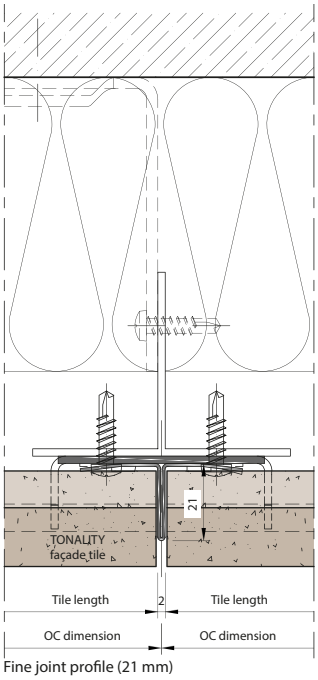
Closed-joint profile (21 mm)



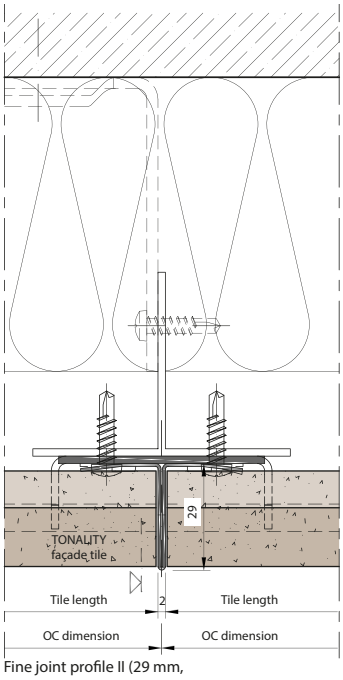
Closed-joint profile (29 mm)



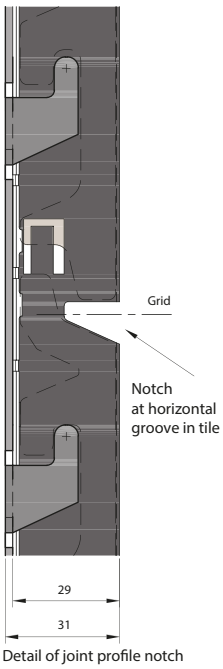
End profile for closure



Fine joint profile (21 mm)



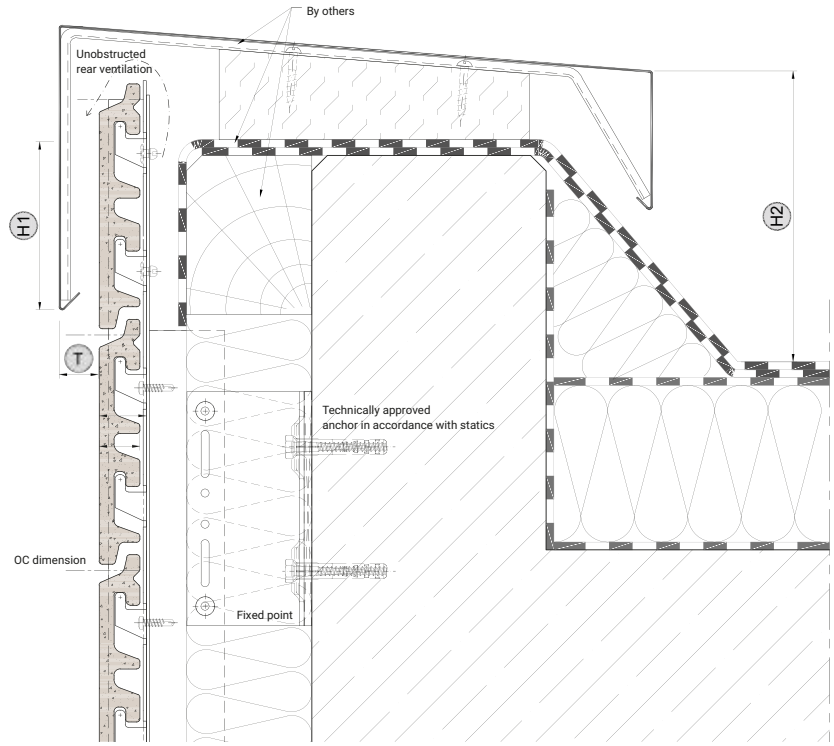
Fine joint profile II (29 mm,
with notches in horizontal joint)



Detail of joint profile notch
at horizontal groove

Vertical section of parapet

DWG No. BAS 100-20



Flat roof guideline requirements

H1 The outer, vertical leg of covers or copings must overlap the upper edge of render or cladding.

Building height:
up to 8 m: min. 50 mm
over 8 to 20 m: min. 80 mm
over 20 m: min. 100 mm

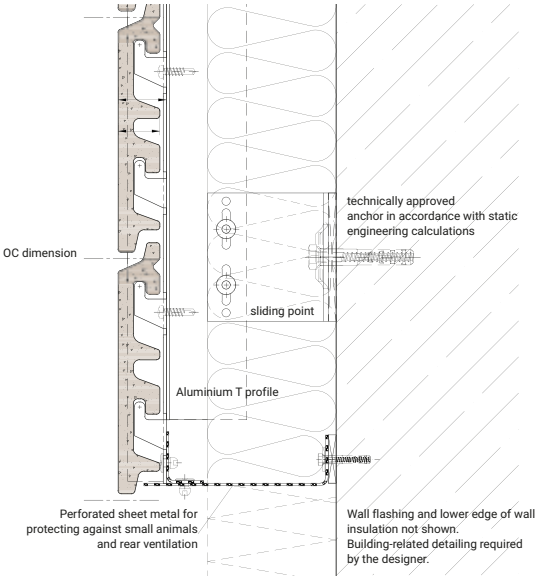
H2 The roof edge closure height must be as follows:
Roof pitches up to 5° approx. 100 mm
Roof pitches > 5° approx. 50 mm
above the covering surface or gravel layer.

Roof edge closures must slope toward the roof.

T The overhang of covers or copings must have a drip edge, at least 20 mm away from the protected building elements.

Vertical section of base

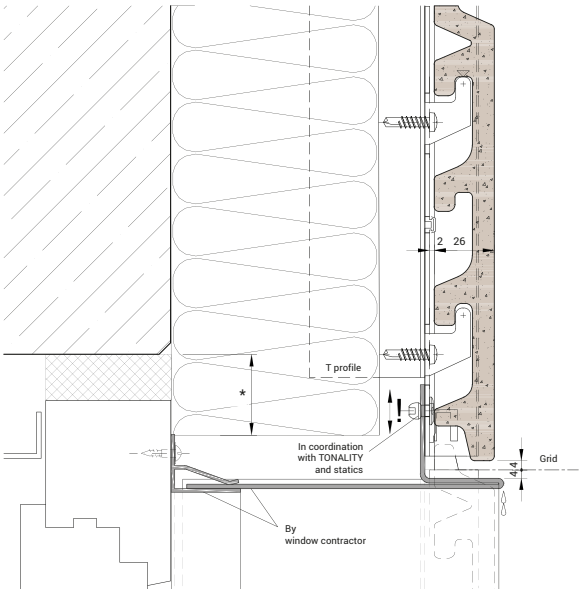
DWG No. BAS 100-21



BAS standard details

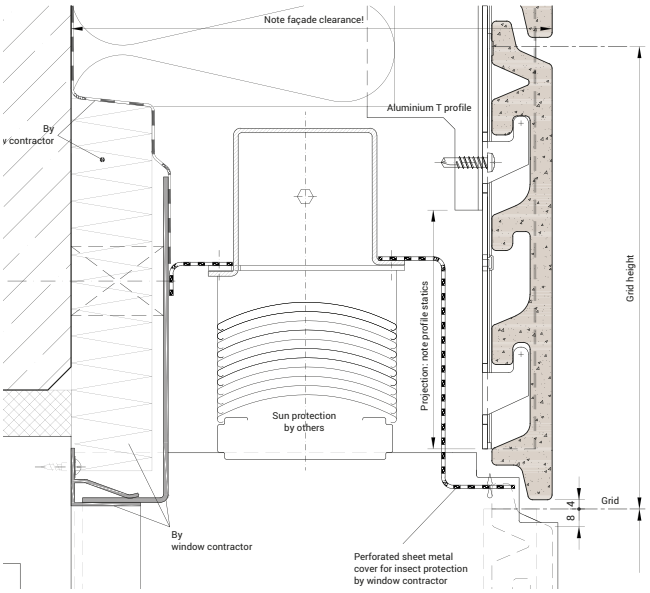
Vertical window sections

DWG No. BAS 200-15



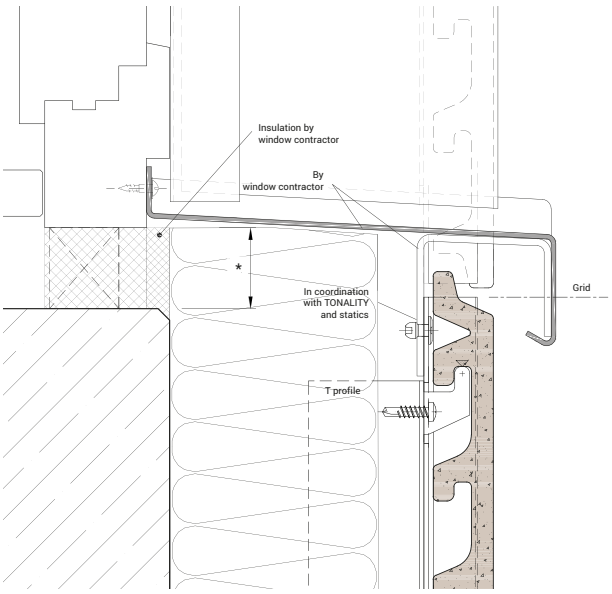
Window lintel with sheet metal cladding
(without sun protection)

DWG No. BAS 200-17



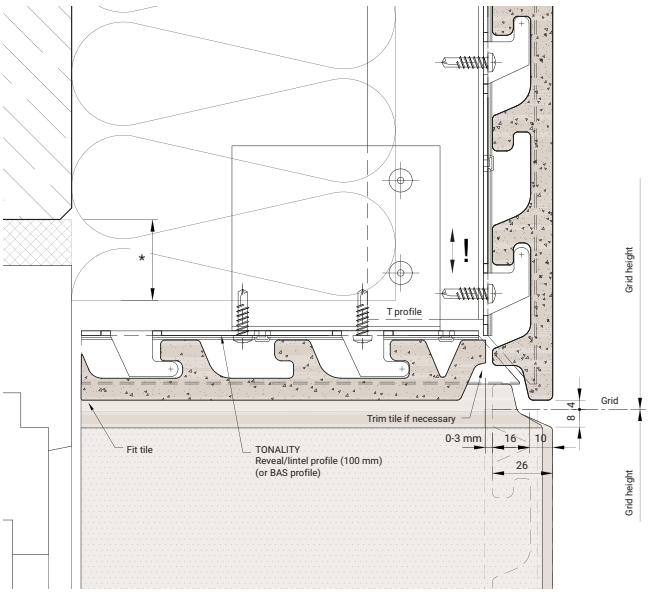
Window lintel with sun protection

DWG No. BAS 200-16



Parapet with window sill connection

DWG No. BAS 200-15.1

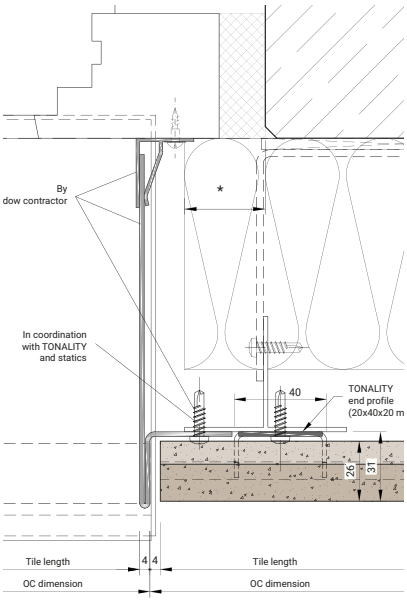


Window lintel with TONALITY cladding (without sun protection)

** Insulation must be implemented in accordance with the current Energy Saving Ordinance (EnEV).*

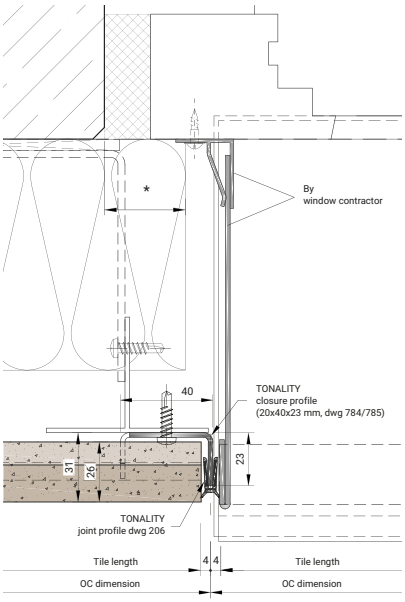
Horizontal window sections

DWG No. BAS 200-14



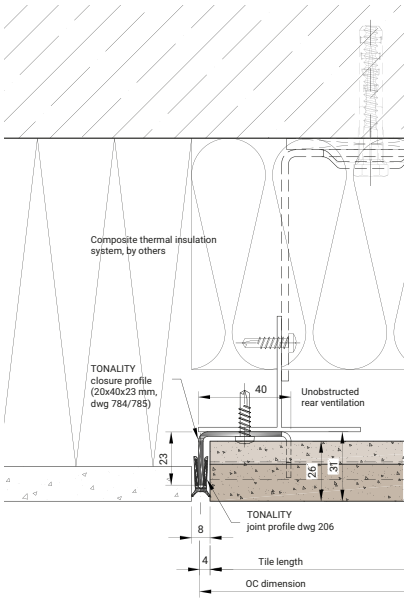
Window reveal with sheet metal cladding

DWG No. BAS 200-14.3



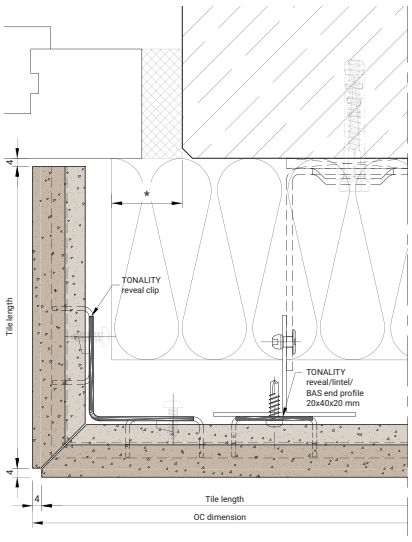
Window reveal with sheet metal cladding and neoprene joint seal

DWG No. BAS 200-30



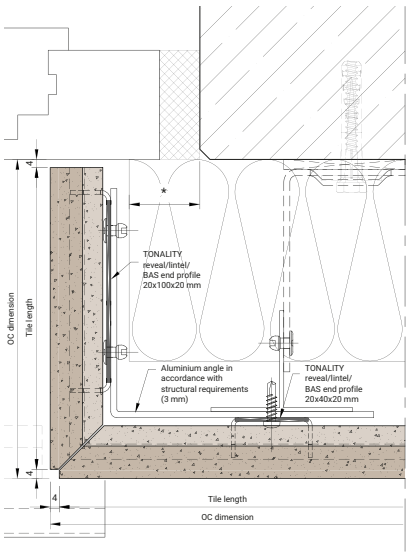
Transition from TONALITY facade (RVCF) to ETICS with neoprene joint seal

DWG No. BAS 200-14.2

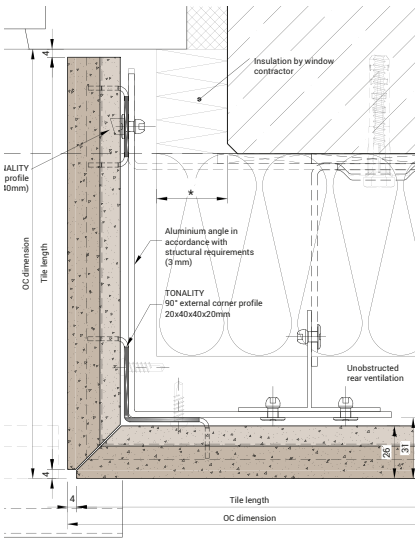


Window reveal with TONALITY (small)

DWG No. BAS 200-14.2



DWG No. BAS 200-14.1



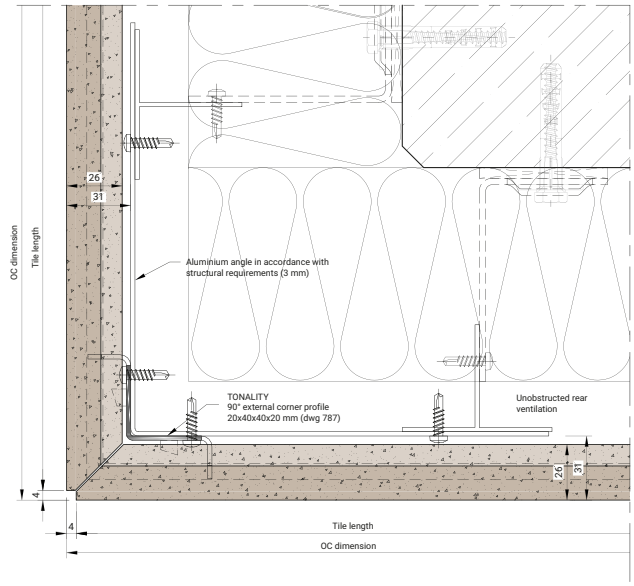
Window reveal with TONALITY (large)

** Insulation must be implemented in accordance with the current Energy Saving Ordinance (EnEV).*

BAS standard details

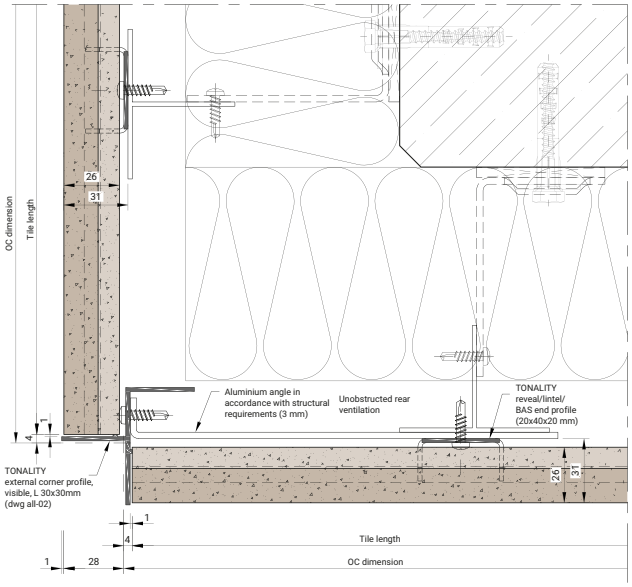
Horizontal sections of external corners

DWG No. BAS 200-09



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.

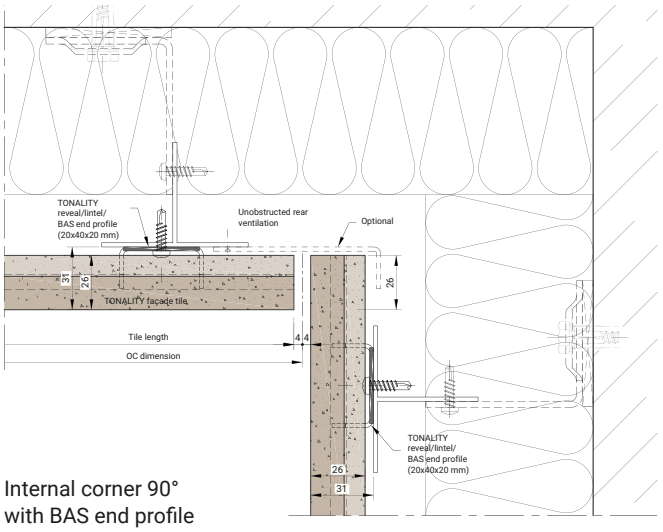
DWG No. BAS 200-10



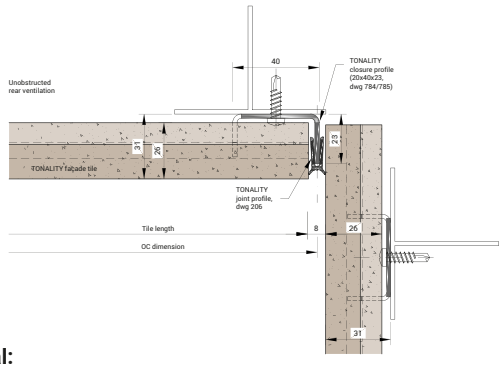
External corner 90° – TONALITY on vertical primary substructure, TONALITY with corner profile – visible external corner profile 30 x 30 mm.

Horizontal sections of internal corners

DWG No. BAS 200-11



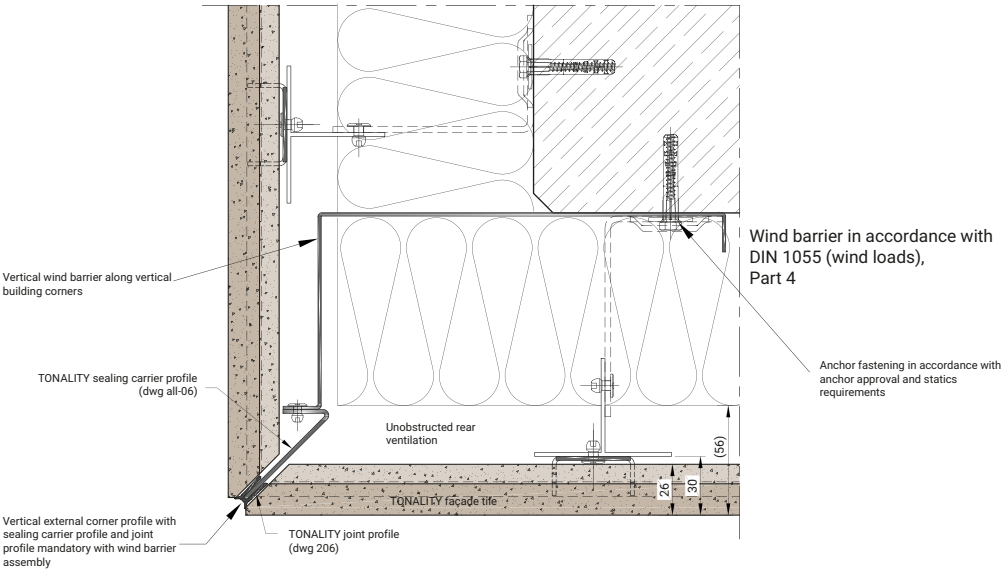
Internal corner 90°
with BAS end profile
All drawings show tiles with a thickness of 26 mm



Optional:
Internal corner 90° with BAS closure and joint profile (neoprene, black)

Horizontal section of external corner with wind barrier

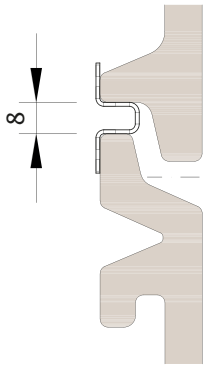
DWG No. BAS 200-08

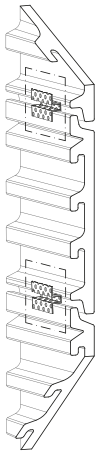


BAS – installation of cut tiles

Cut tiles with spacer

DWG No. dwg all-16



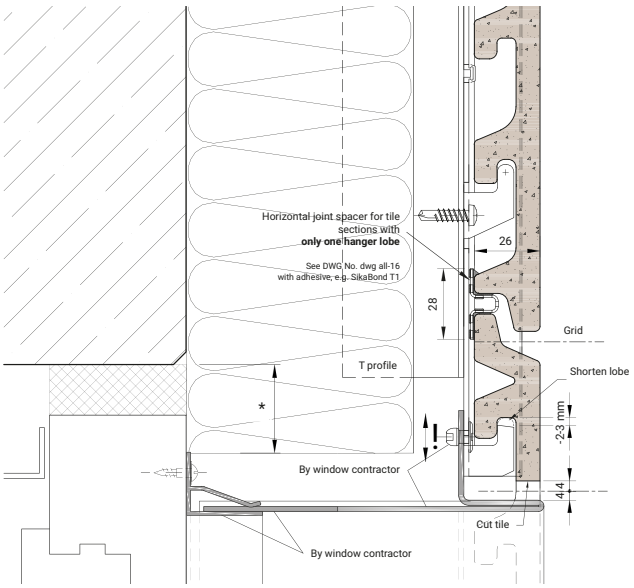


Installation instructions

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

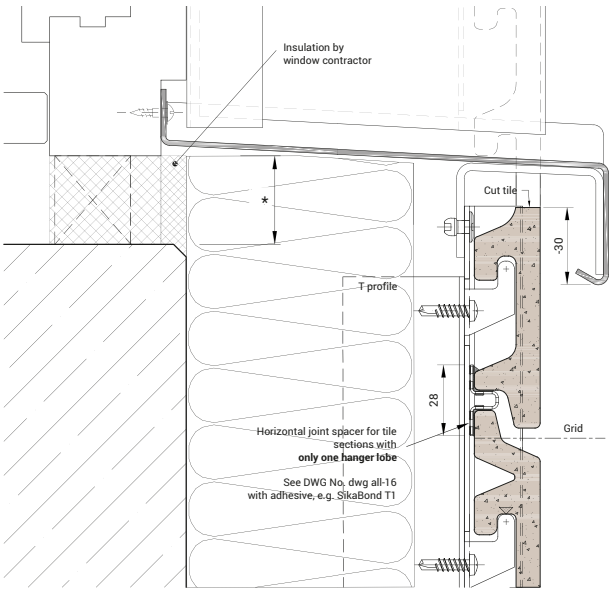
DWG No. BAS 200-15



Detail of cut tile fastening above the window

Installation with spacer – vertical section of window spandrel

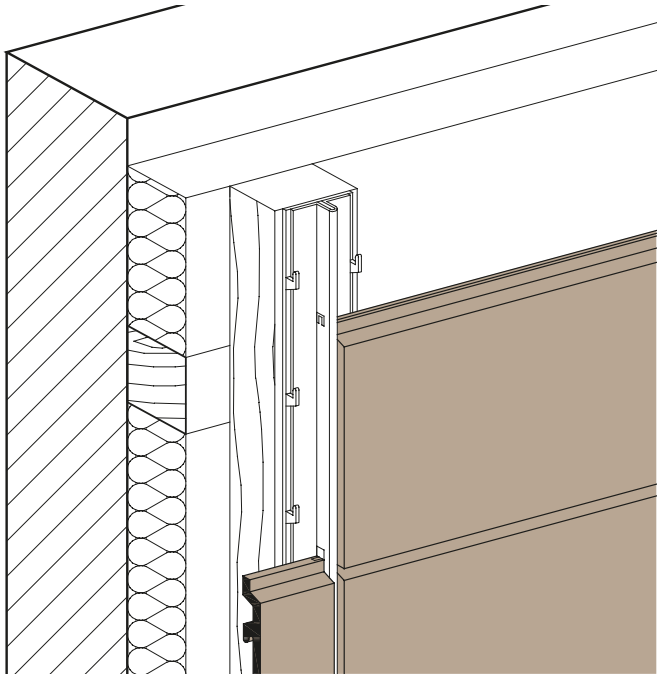
DWG No. BAS 200-16



Detail of cut tile fastening below the window

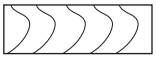
BAS on wooden primary substructure

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

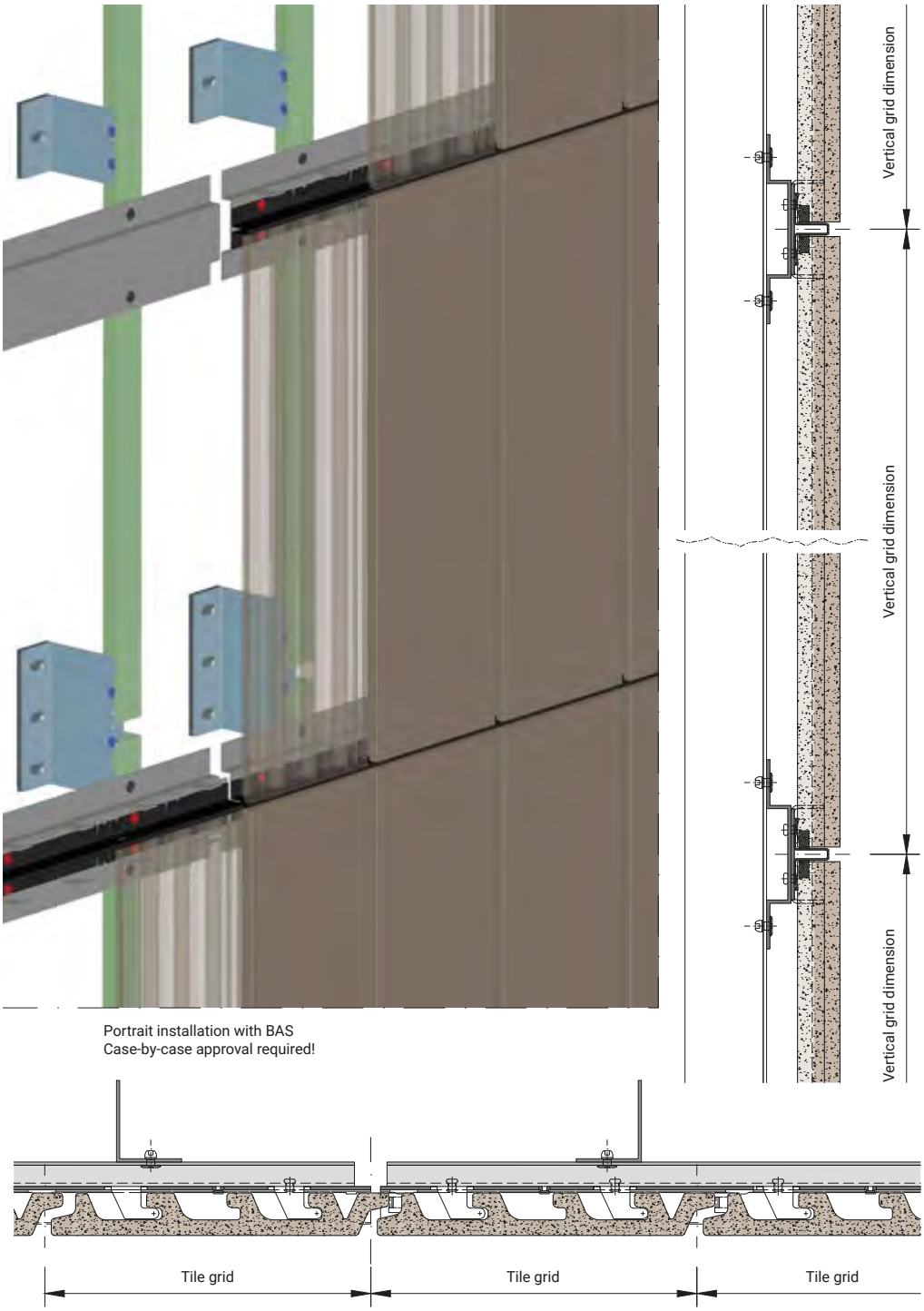
2 BAS profile

3 Wood screw

4 TONALITY facade tile

BAS portrait installation

Portrait installation



Portrait installation with BAS
Case-by-case approval required!

TONALITY
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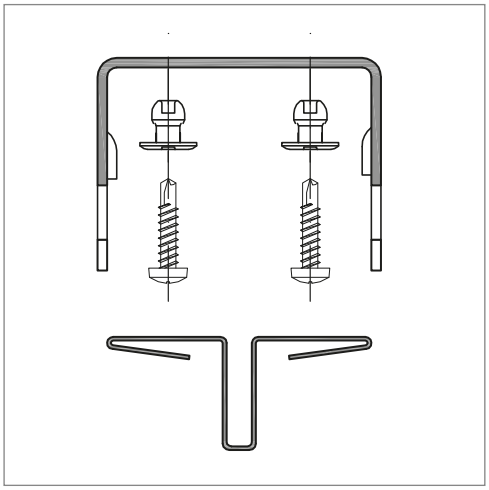
Adaptive system (ADS)

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.

Profile selection	Tile height (mm)	Profile length (mm)
Different system substructure profiles and profile lengths based upon the specific tile height result from the hanger grid.	150	2,694
	175	2,794
	200	2,794
	225	2,694
	250	2,744
	300	2,694
	400	2,794

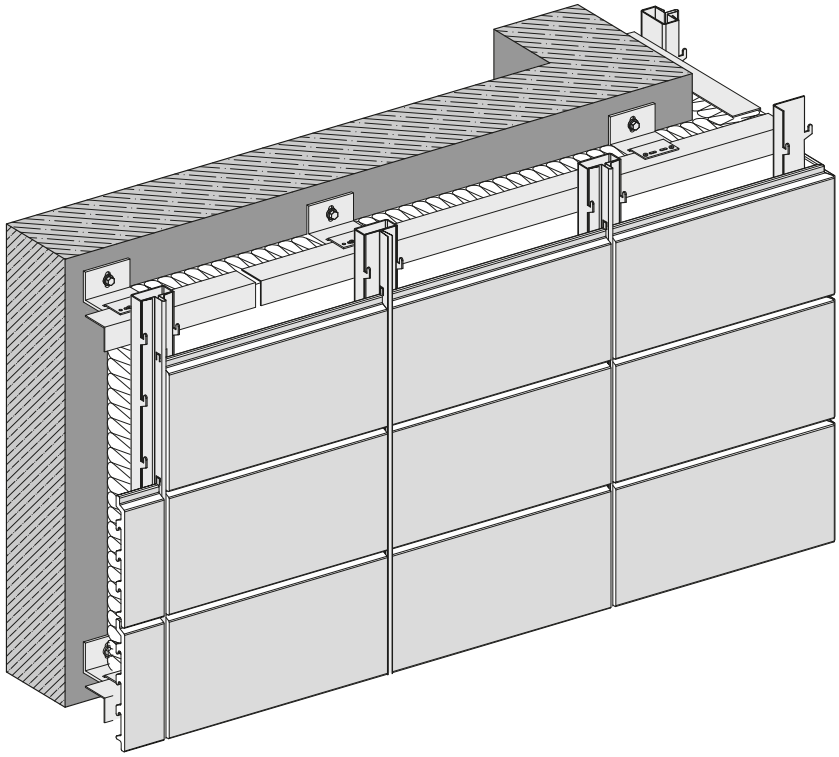
Photo: The Wave, Vejle, Denmark · Architects: Henning Larsen, Copenhagen, Denmark Photo: TONALITY GmbH

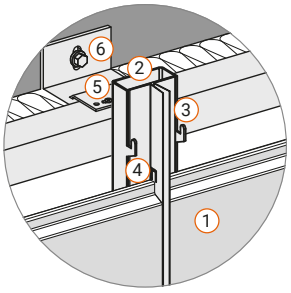
TONALITY
NATURAL FACADES

Adaptive system (ADS)

Adaptive system (ADS) on horizontal substructure

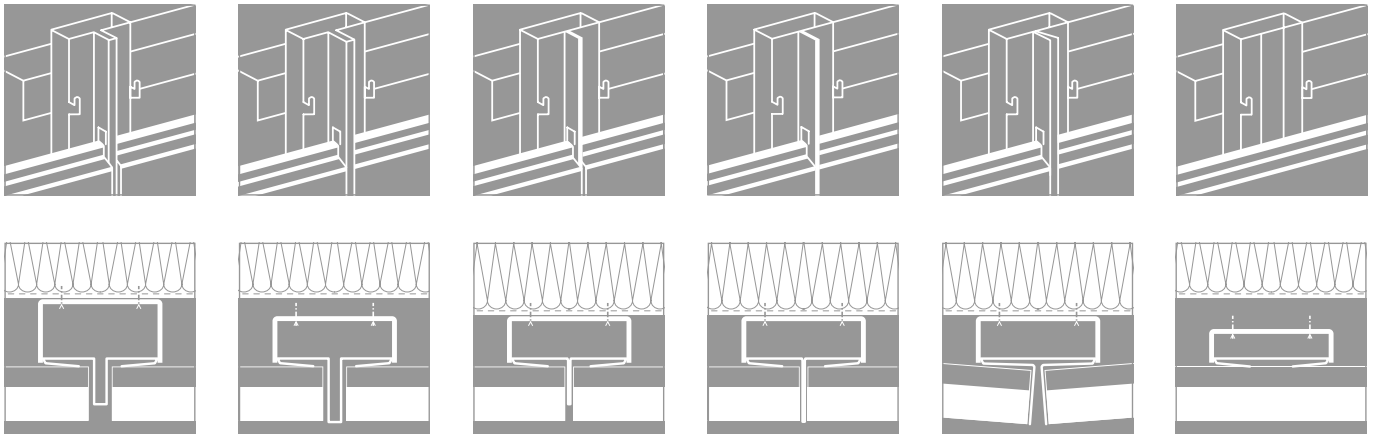
DWG No. ADS 100-01h





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

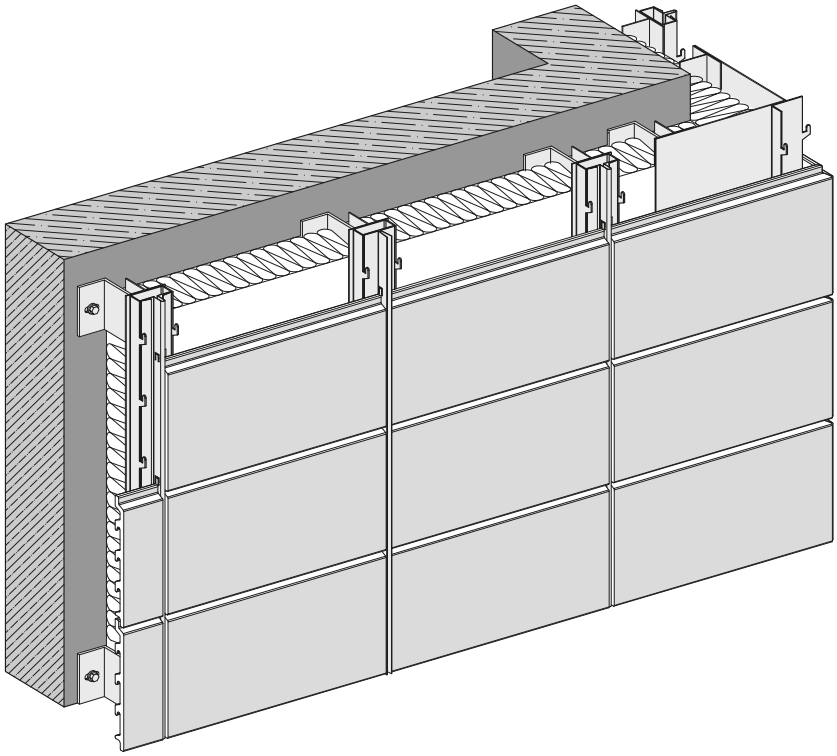
Fine joint closed flush joint 2 mm

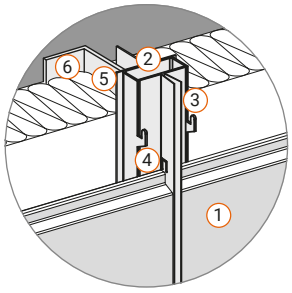
Open joint profile joint 8 mm

End profile for closure No disassembly protection

Adaptive system (ADS) on vertical substructure

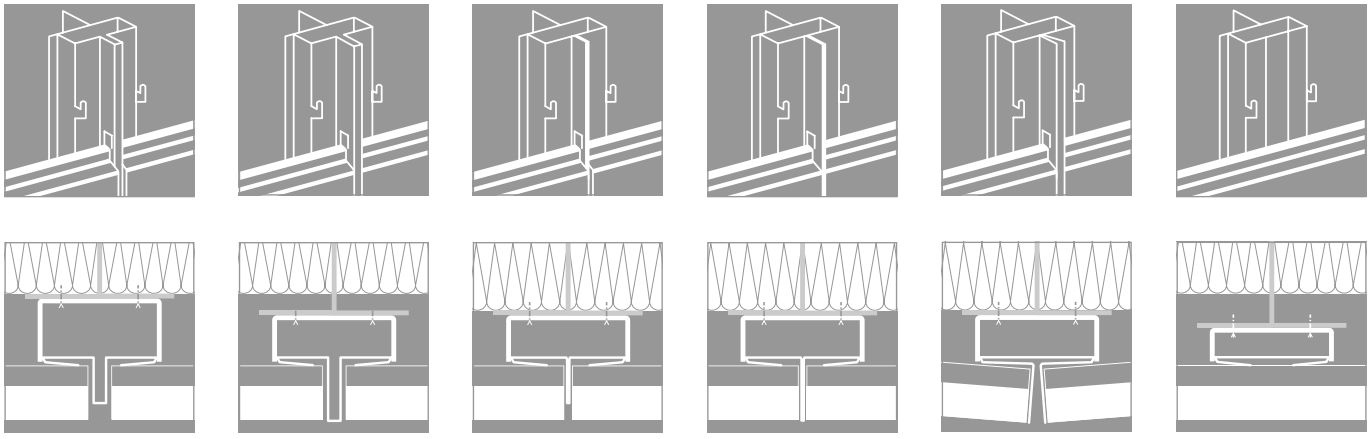
DWG No. ADS 100-01v





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

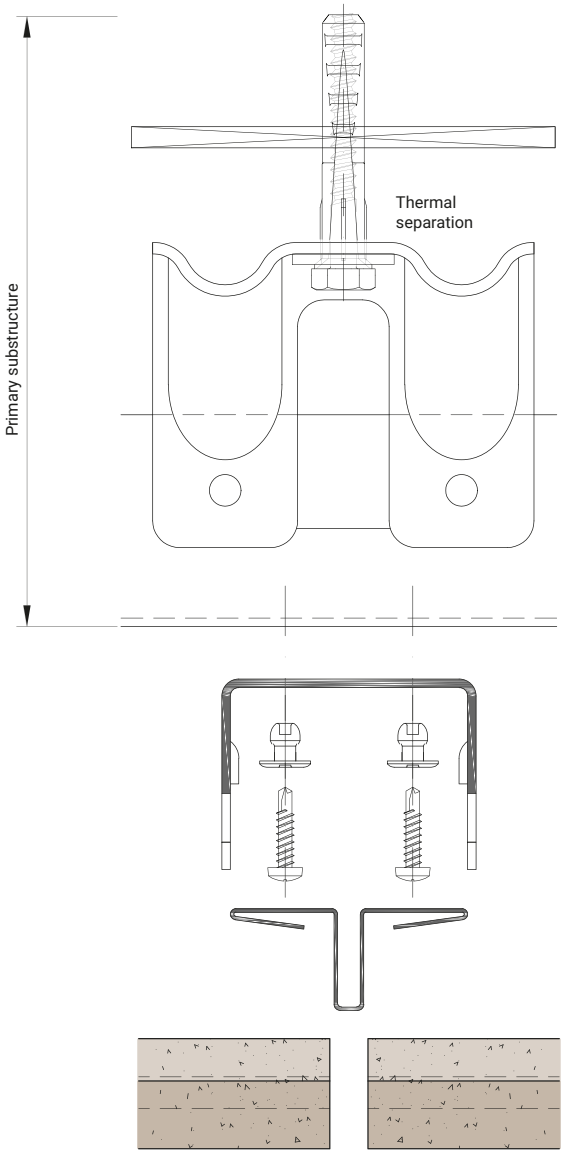
Open joint profile joint 8 mm

End profile for closure No disassembly protection

Adaptive system (ADS)

ADS on horizontal substructure – system design and installation example

DWG No. ADS 100-02h



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

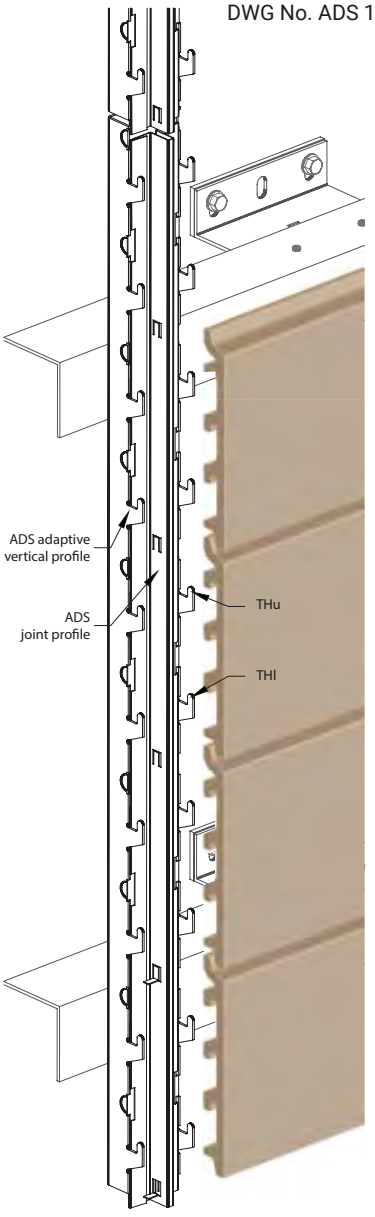
System substructure
TONALITY adaptive vertical profile

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

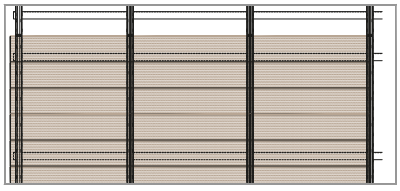
TONALITY
adaptive joint profile

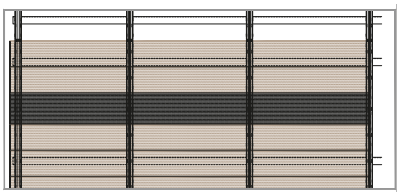
TONALITY
façade tile

DWG No. ADS 100-04/2



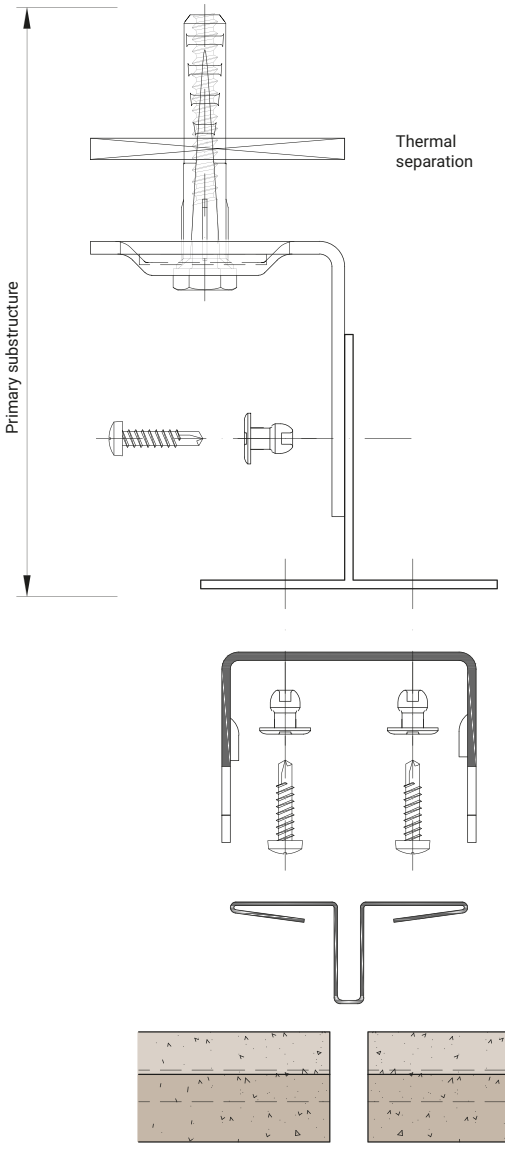
Installation examples





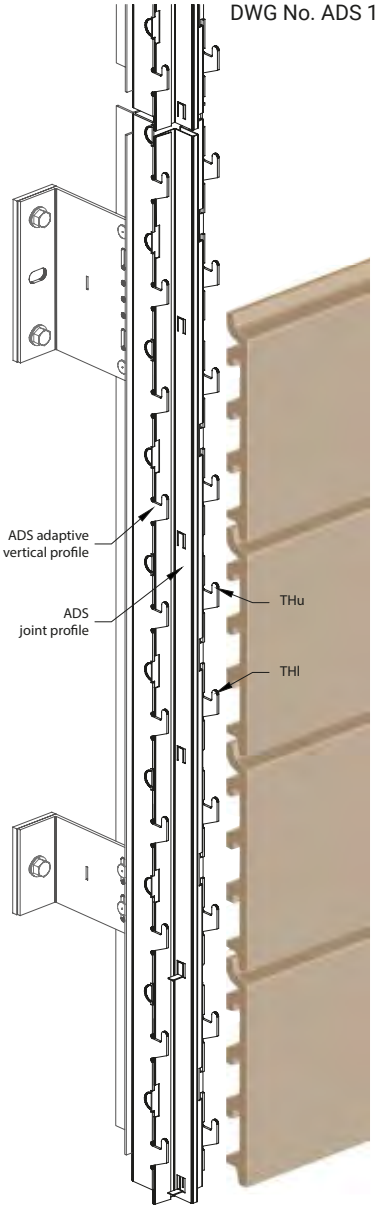
ADS on vertical substructure – system design and installation example

DWG No. ADS 100-02v

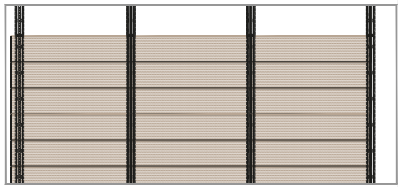


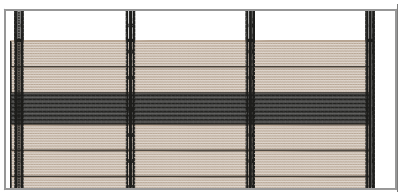
Primary substructure
Spacing, type of brackets, anchors and plugs in accordance with property-specific structural calculations!
by installer

DWG No. ADS 100-04/1



Installation examples

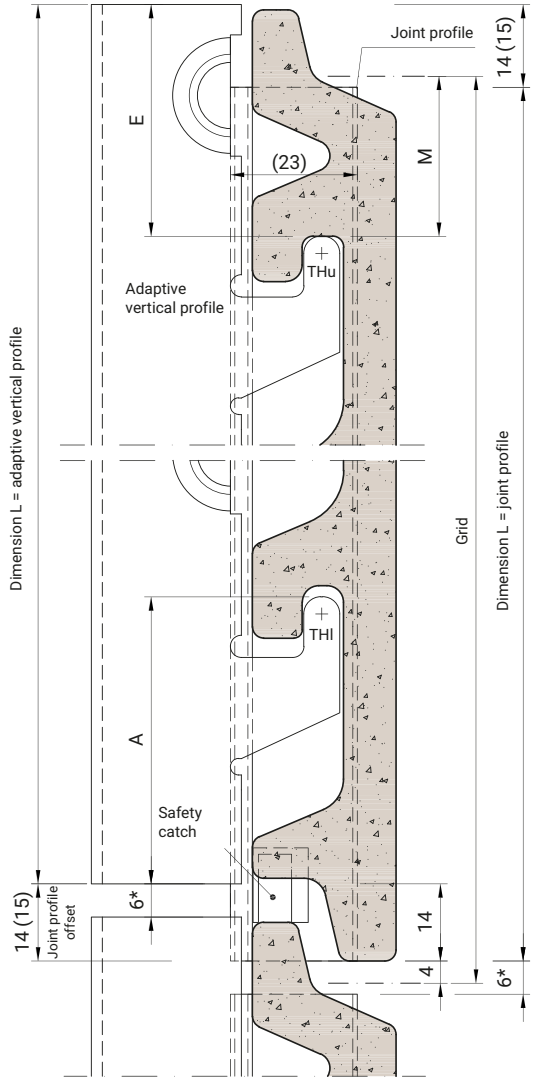


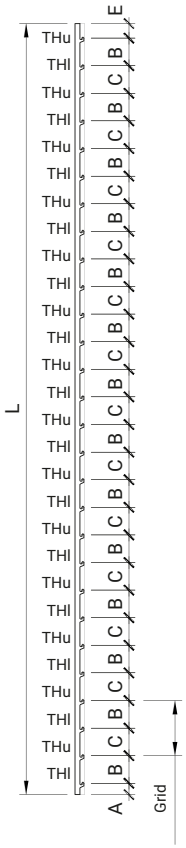


Adaptive system (ADS)

ADS installation lay-out

DWG No. ADS 100-05





Joint profile length = number of grid units minus 6 mm

THu: Upper tile hanger
THl: Lower tile hanger

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

Grid (mm)	Number of grid spaces	Dimension L (mm)	Dimension A (mm)	Dimension B (mm)	Dimension C (mm)	Dimension E (mm)	Dimension M (mm)
150	18	2,694	43	75	75	26	14
175	16	2,794	43	100	75	26	14
200	14	2,794	52	100	100	42	30
225	12	2,694	43	150	75	26	14
250	11	2,744	52	150	100	42	30
300	9	2,694	102	150	150	42	30
400	7	2,794	102	200	200	92	80

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

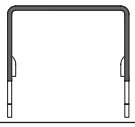
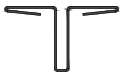
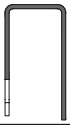
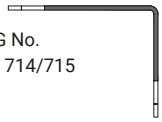
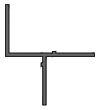
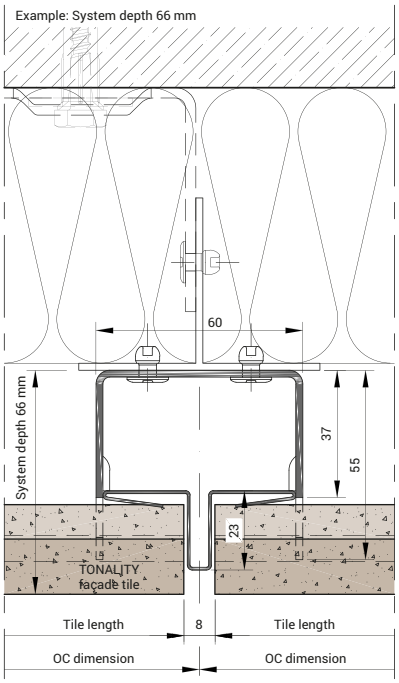
Image	Designation	Material/colour
DWG No. dwg 701 	Adaptive vertical profile 46 35 x 60 x 35 mm for system depth 46 mm	aluminium bright
DWG No. dwg 702 	Adaptive vertical profile 56 45 x 60 x 45 mm for system depth 56 mm	aluminium bright
DWG No. dwg 703 	Adaptive vertical profile 66 55 x 60 x 55 mm for system depth 66 mm	aluminium bright
DWG No. dwg 704 	Closed joint profile (8 mm) 56 x 23 mm for all system depths	aluminium RAL 7021 (black-grey)
DWG No. dwg 706 	Closed joint profile (8 mm) 56 x 30 mm, flush for all system depths	aluminium RAL 7021 (black-grey)
DWG No. dwg 707 	Joint profile fine joint (2 mm) 56 x 23 mm for all system depths	aluminium RAL 7021 (black-grey)
DWG No. dwg 708 	Joint profile fine joint (2 mm) 56 x 30 mm, flush for all system depths	aluminium RAL 7021 (black-grey)
DWG No. dwg 709 	Joint profile (8 mm) open 56 x 32 mm, flush for all system depths	aluminium RAL 7021 (black-grey)
DWG No. dwg all-01	End profile for closure 56 x 5 mm for all system depths	aluminium bright
DWG No. dwg 789 	Reveal/lintel profile narrow, profile width 40 mm for all system depths	aluminium bright
DWG No. dwg 723 	Reveal/lintel profile wide, profile width 100 mm for all system depths	aluminium bright

Image	Designation	Material/colour
DWG No. dwg 716/717 	Closure profile 35 x 30 x 37 mm for right or 37 x 30 x 35 mm for left, for system depth 46 mm	aluminium bright
DWG No. dwg 718/719 	Closure profile 45 x 30 x 47 mm for right or 47 x 30 x 45 mm for left, for system depth 56 mm	aluminium bright
DWG No. dwg 720/721 	Closure profile 55 x 30 x 57 mm for right or 57 x 30 x 55 mm for left, for system depth 66 mm	aluminium bright
DWG No. dwg 710/711 	Vertical profile external corner for system depths 46 mm, 74/35 mm, available in both right and left versions	aluminium bright
DWG No. dwg 712/713 	Vertical profile external corner for system depths 56 mm, 74 x 45 mm, available in both right and left versions	aluminium bright
DWG No. dwg 714/715 	Vertical profile external corner for system depths 66 mm, 74/55 mm, usable on both sides	aluminium bright
DWG No. dwg 207 	Support profile 60 mm (short piece) for all system depths and grids	CR neoprene black
DWG No. dwg all-06 	Sealing carrier profile for external corner (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 30 x 30 mm, visible, for all grids with system depth 56/66 mm	aluminium bright
DWG No. dwg all-16 	Spacer for horizontal joints at fitted tiles	aluminium bright

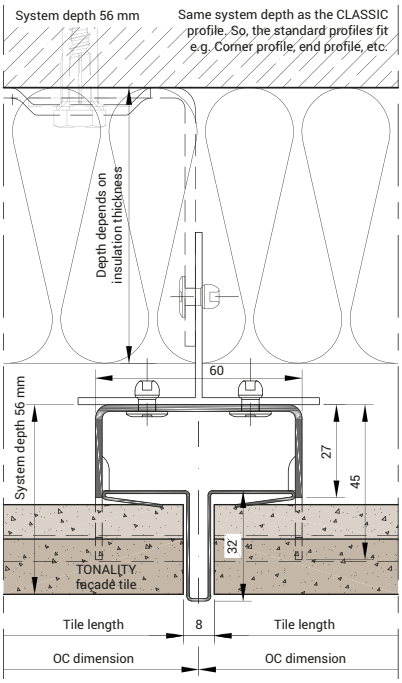
ADS standard details

View of joint profiles on vertical substructure

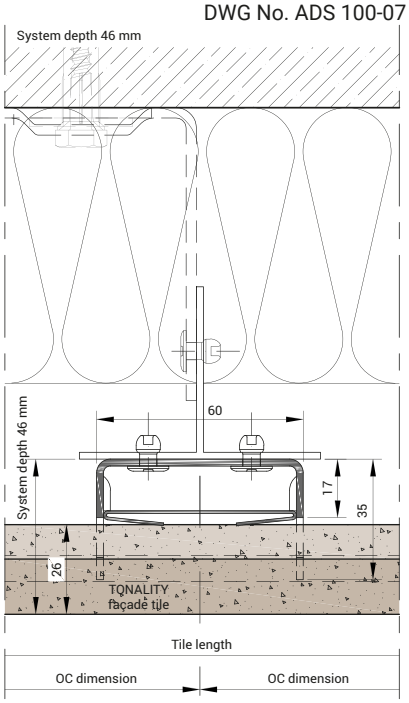
DWG No. ADS 100-07



Closed-joint profile (23 mm)

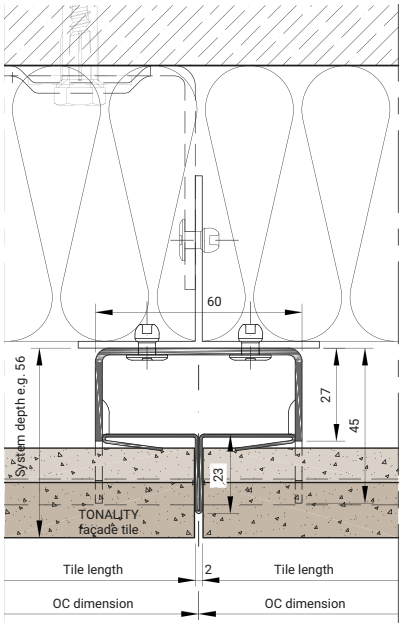


Closed-joint profile (32 mm)

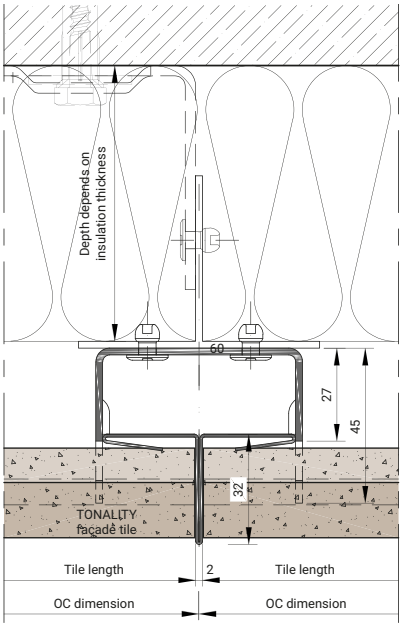


End profile for closure

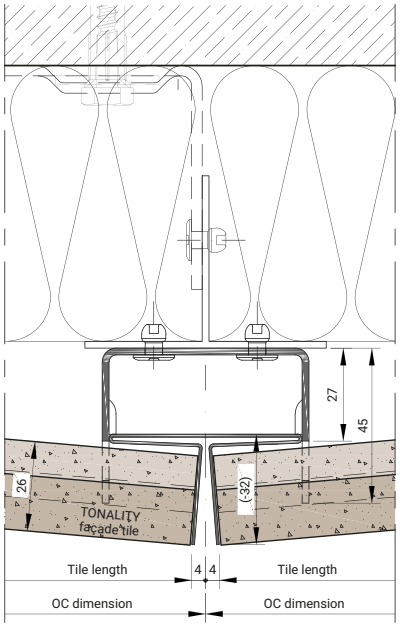
DWG No. ADS 100-08



Fine joint profile (23 mm)



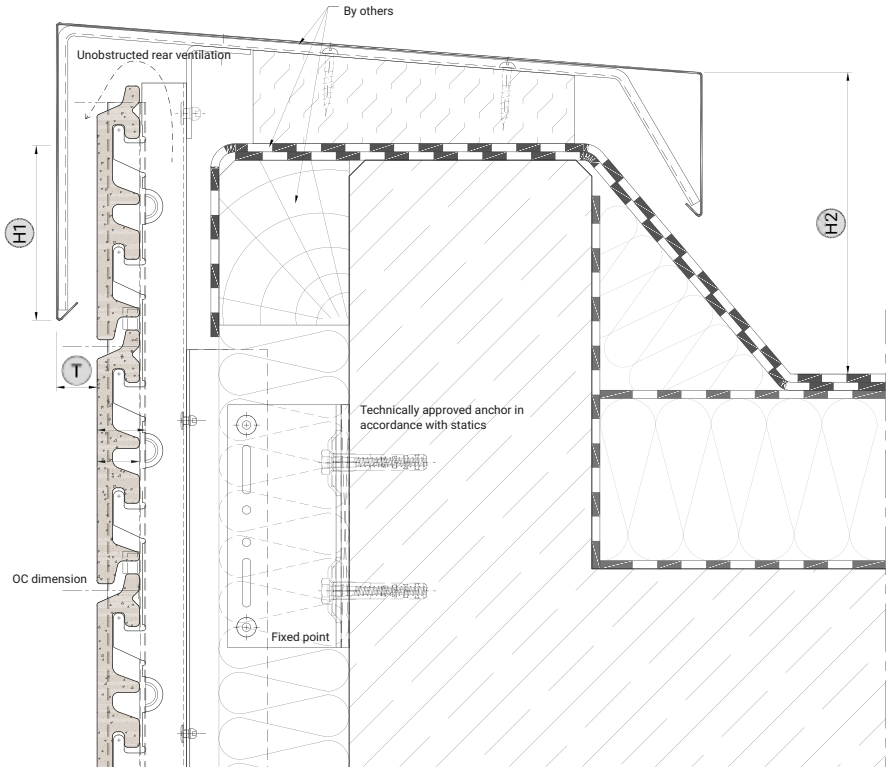
Fine joint profile II
(32 mm with notches in horizontal joint)



Open joint profile (30 mm)
Due to production tolerances, it is possible that the open profile will not end precisely at the tile surface.

Vertical section of parapet

DWG No. ADS 100-20



Flat roof guideline requirements

H1 The outer, vertical leg of covers or copings must overlap the upper edge of render or cladding.

Building height:
up to 8 m: min. 50 mm
over 8 to 20 m: min. 80 mm
over 20 m: min. 100 mm

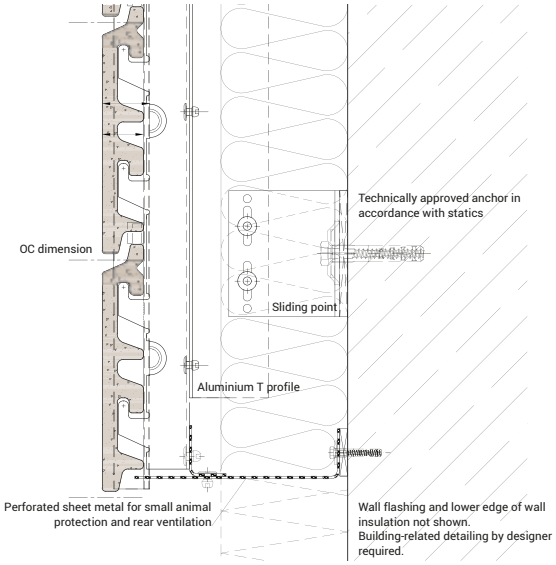
H2 The roof edge closure height must be as follows:
Roof pitches up to 5° approx. 100 mm
Roof pitches > 5° approx. 50 mm
above the covering surface or gravel layer.

Roof edge closures must slope toward the roof.

T The overhang of covers or copings must have a drip edge, at least 20 mm away from the protected building elements.

Vertical section of base

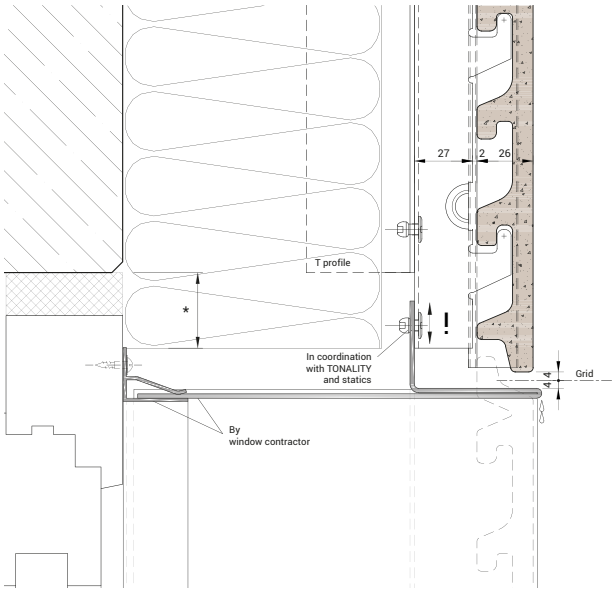
DWG No. ADS 100-21



ADS standard details

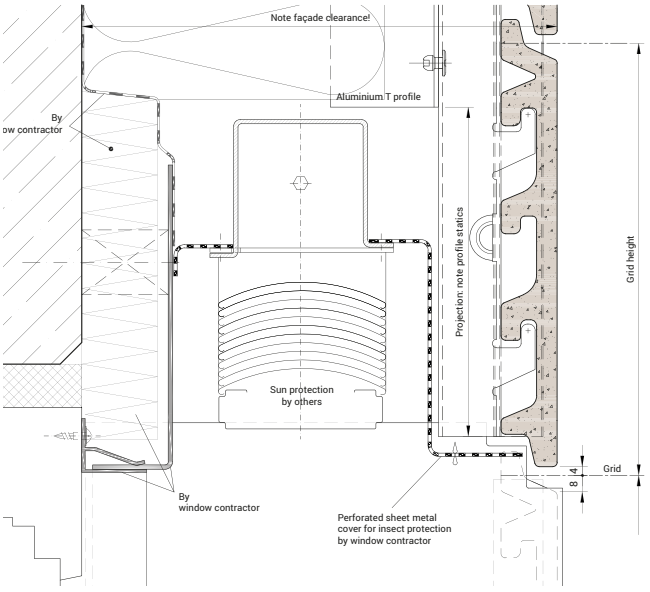
Vertical sections of windows

DWG No. ADS 100-15



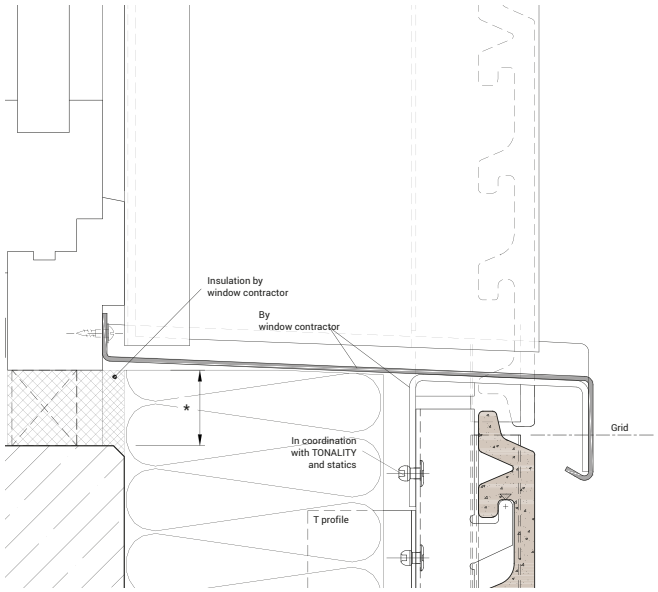
Window lintel with sheet metal cladding (without sun protection)

DWG No. ADS 100-17



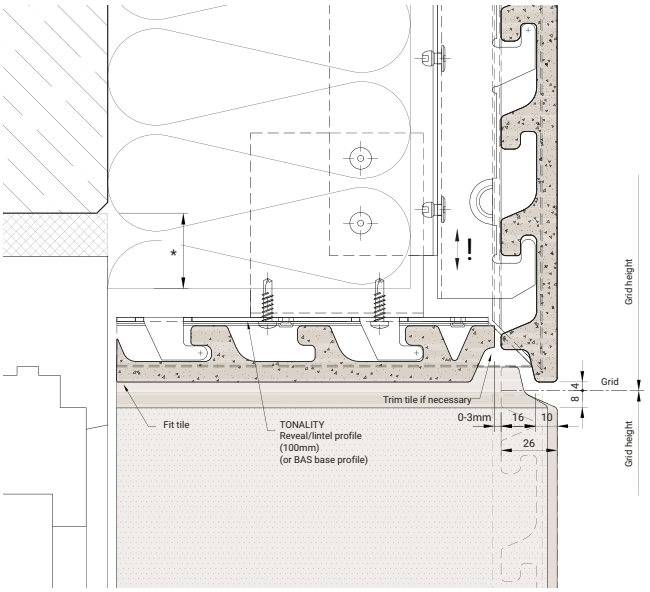
Window lintel with sun protection

DWG No. ADS 100-16



Parapet with window sill connection

DWG No. ADS 100-15.1

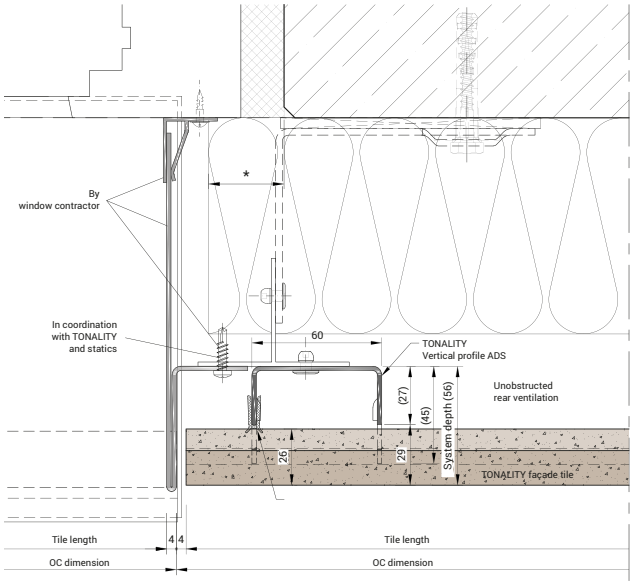


Window lintel with TONALITY cladding (without sun protection)

** Insulation must be implemented in accordance with the current Energy Saving Ordinance (EnEV).*

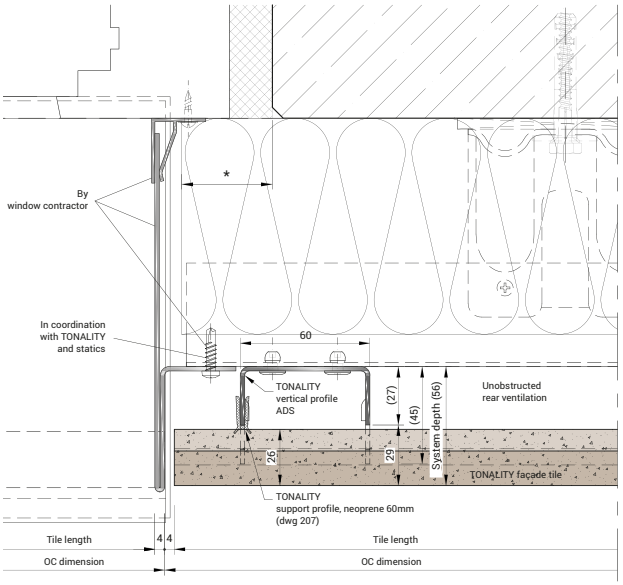
Horizontal sections of windows

DWG No. ADS 100-14



Window reveal with sheet metal cladding on vertical primary substructure

DWG No. ADS 100-18



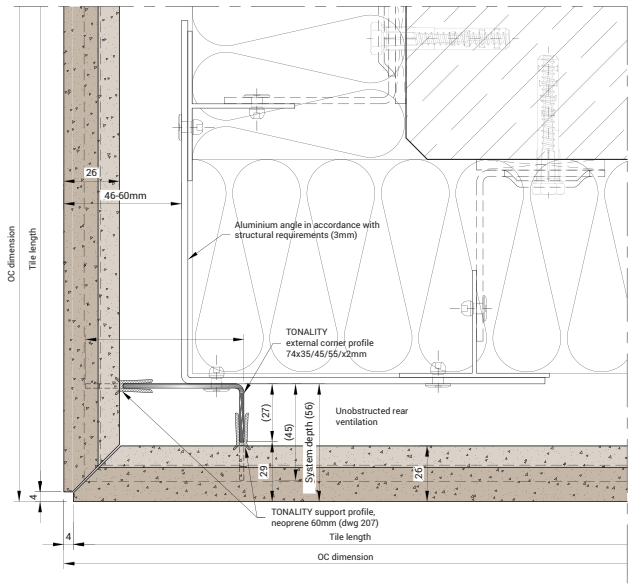
Window reveal with sheet metal cladding on horizontal primary substructure

** Insulation must be implemented in accordance with the current Energy Saving Ordinance (EnEV).*

ADS standard details

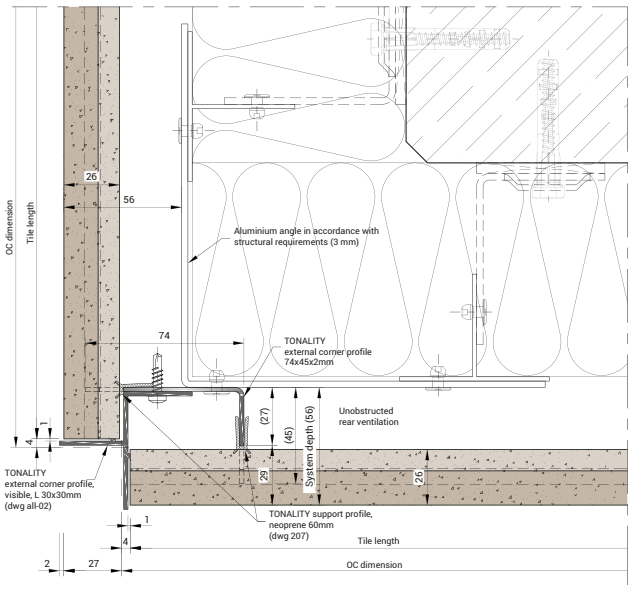
Horizontal sections of external corners

DWG No. ADS 100-09



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.

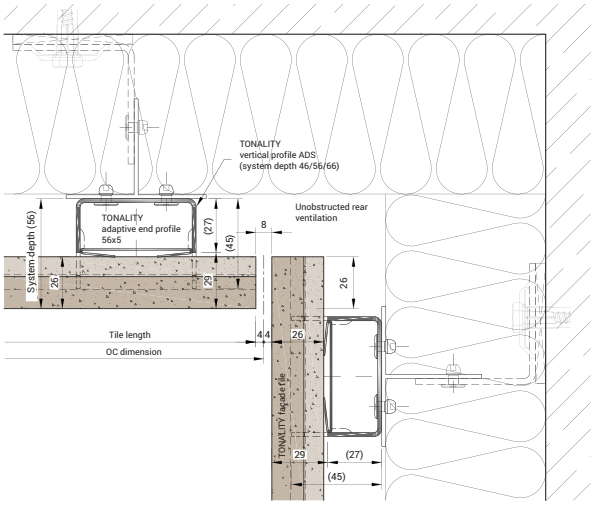
DWG No. ADS 100-10



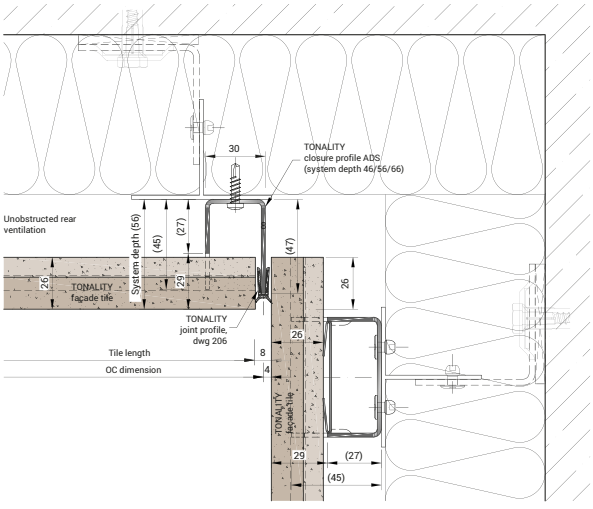
External corner 90° – TONALITY on vertical primary substructure, TONALITY with corner profile – visible external corner profile. The visible external corner profile is attached to the external corner profile 74 x 45 x 2 mm.

Horizontal sections of internal corners

DWG No. ADS 100-11



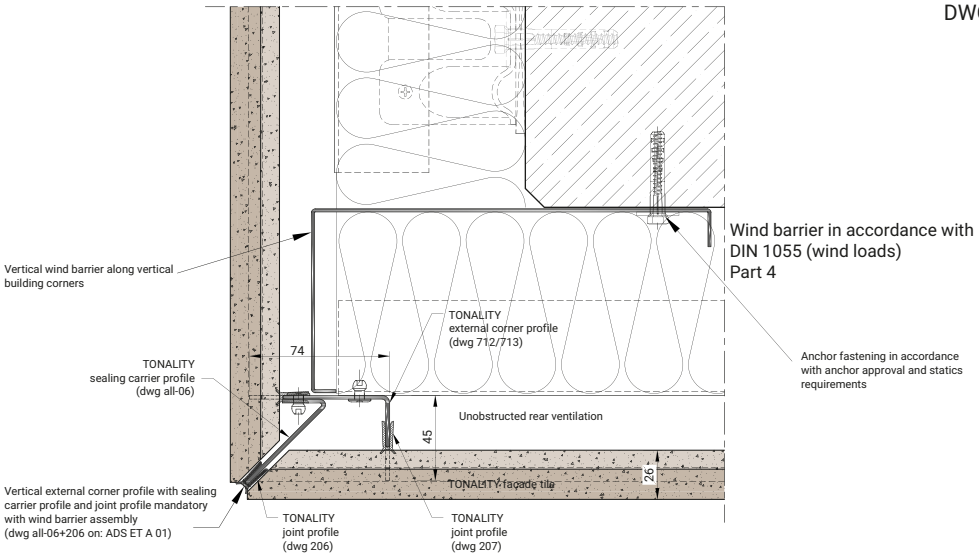
Internal corner 90° with ADS end profile



optional: Internal corner 90° with ADS closure and joint profile

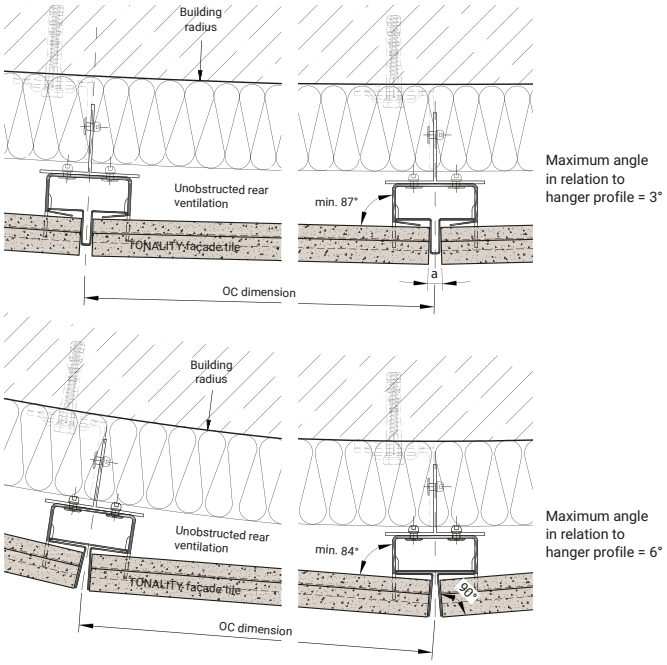
Horizontal section of external corner with wind barrier

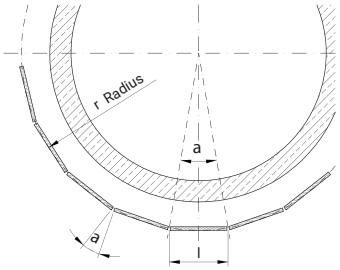
DWG No. ADS 100-22



Curved walls

DWG No. ADS 100-23





Formula: sin $\frac{l}{r} = a$

l = Length/OC dimension
r = external radius of façade
a = Angle between tiles

Example:

l = OC dimension 450 mm
r = 5,150 mm
sin = 450 : 5,150 = 5.01°
a = 5.01°

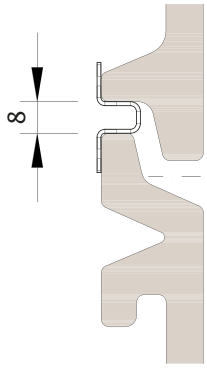
up to 6° = closed joint profile
6° to 12° = open joint profile

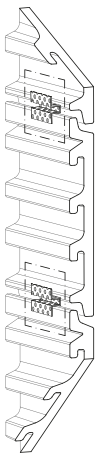
Large radii can also be built using the BAS system design.

ADS – installation of cut tiles

Cut tiles with spacer

DWG No. dwg all-16

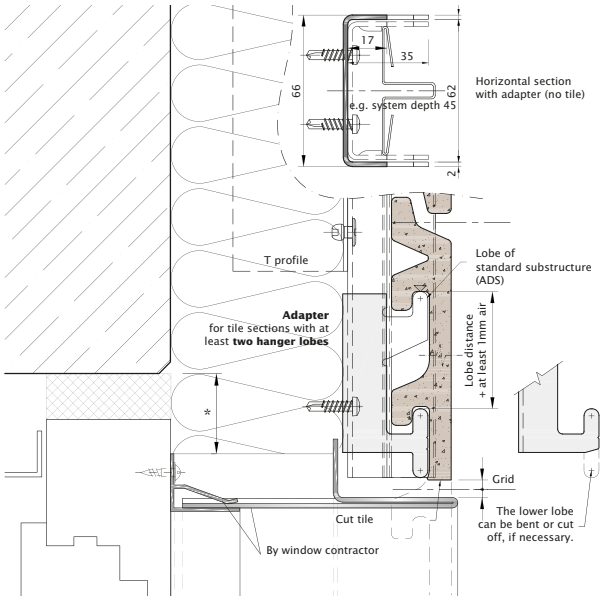




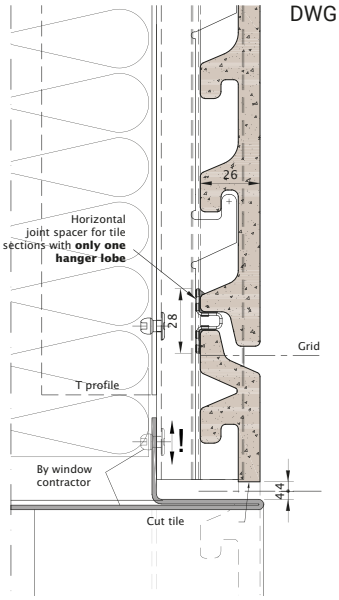
Installation instructions

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



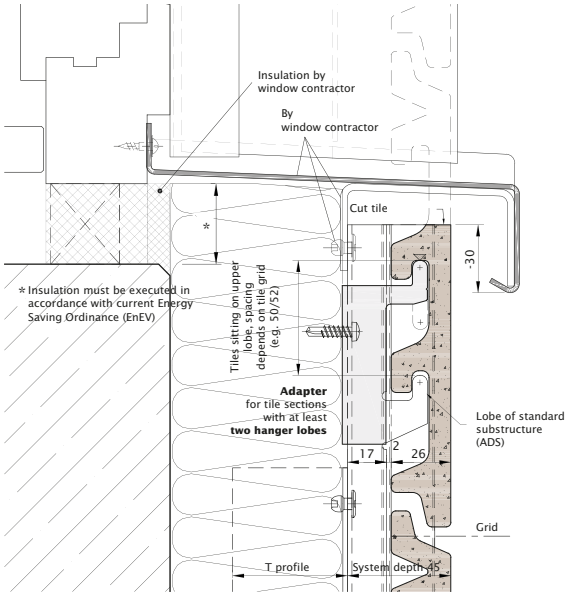
DWG No. ADS 100-28

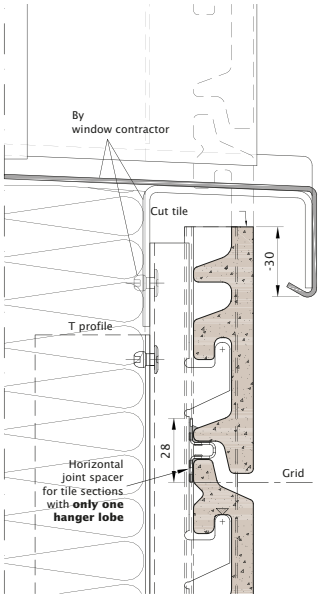


Detail of fitted tile fastening above the window

Installation with spacer – vertical section of window spandrel

DWG No. ADS 100-29

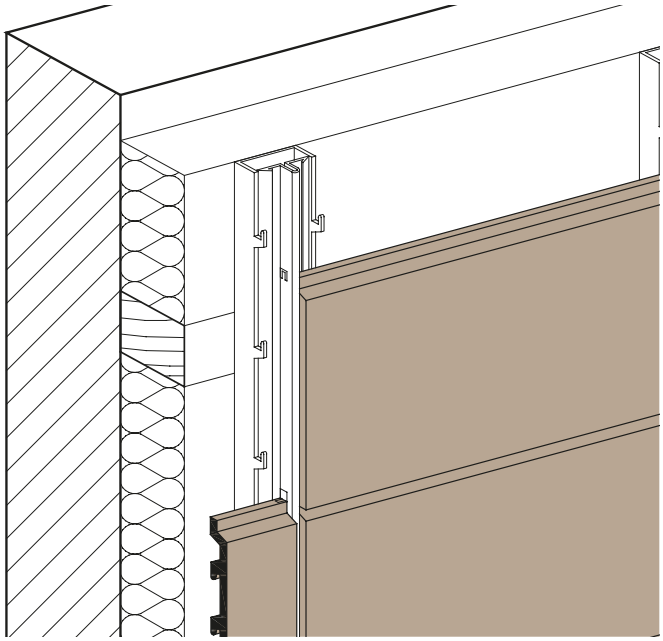




Detail of fitted tile fastening below the window

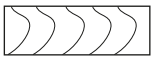
ADS on wooden primary substructure

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

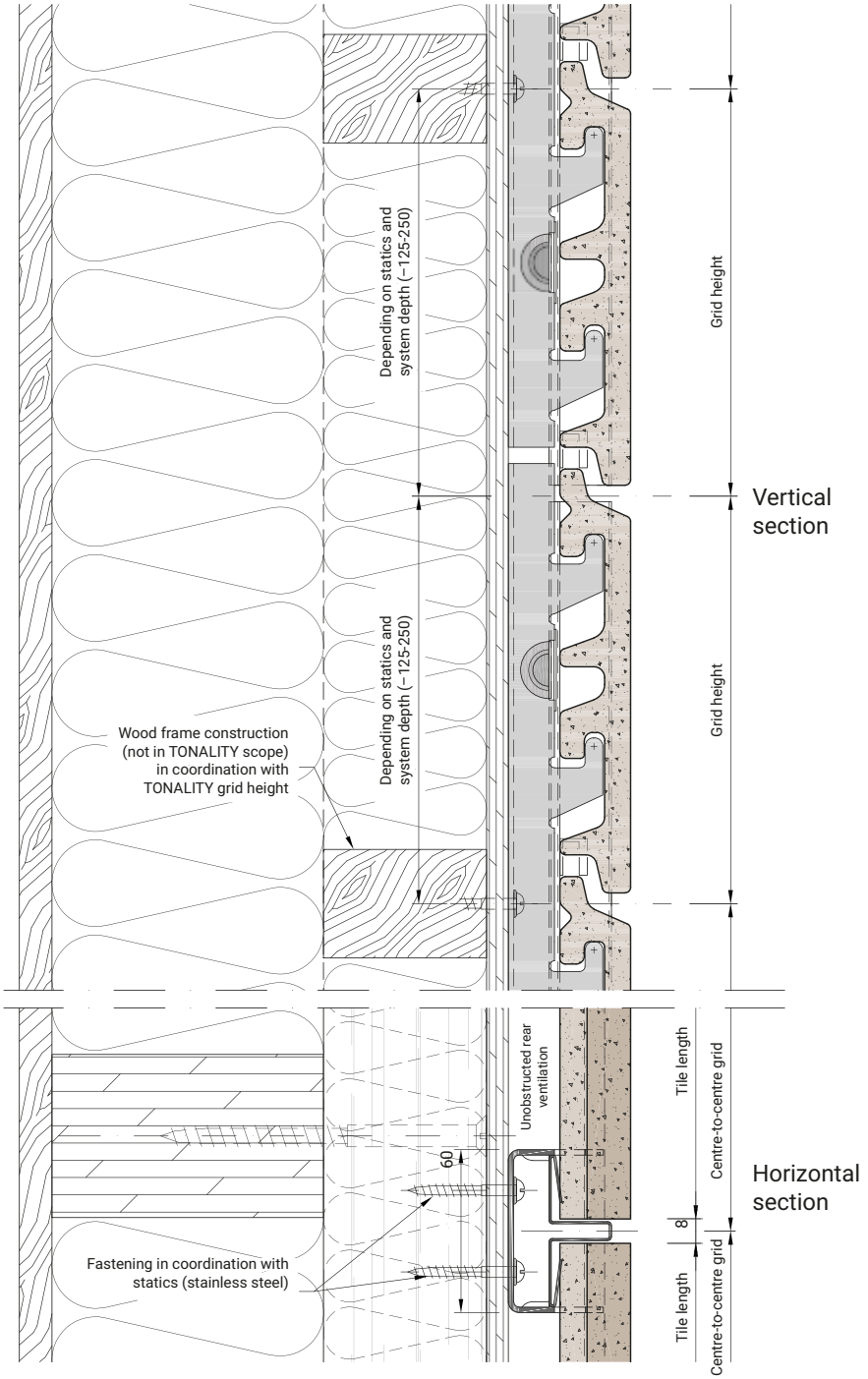
3 Wood screw

4 TONALITY adaptive joint profile

5 Tonality facade tile

TONALITY ADS on wooden primary substructure – Vertical section

DWG No. ADS 100-19



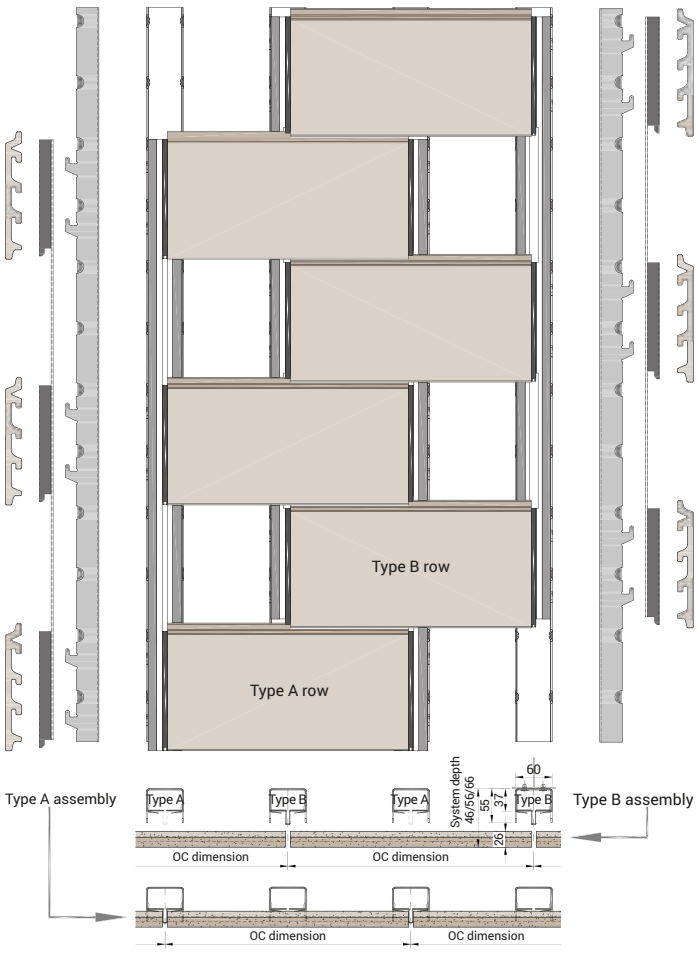
Adaptive systems

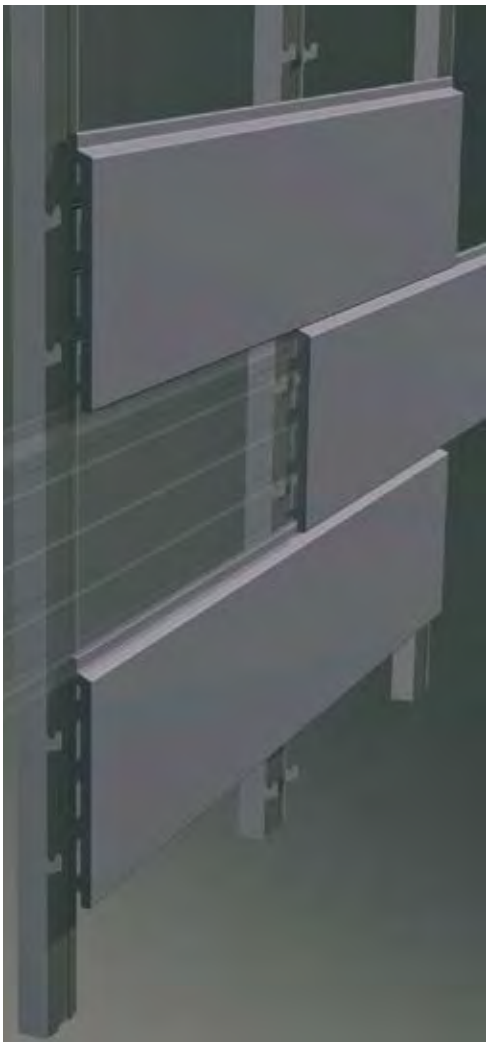
TONALITY Adaptive system T-Line

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).

DWG No. T-Line 600-01



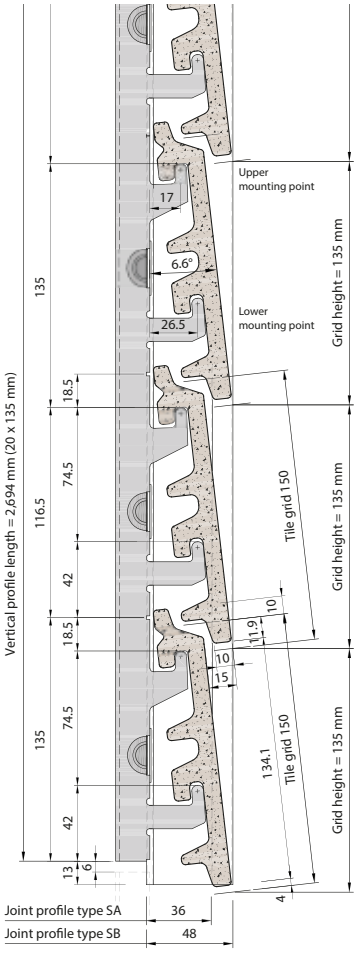


TONALITY adaptive system Siding

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.

DWG No. SID 500-01



DWG No. SID 500-03

Example: SID grid 185mm

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ADS portrait installation

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

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Permitted spans

National technical approval No. Z-10.3-798

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.

In each case, the permissible span is the shorter span from the wind load pressure and wind suction tables. To obtain the maximum permissible bearing spans, the wind loads specified in the table must be compared with the design values of building components to wind loading for the construction project.

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

Positive wind load pressure* (kN/m^2)	+0.75	+1.20	+1.50	+2.25	+3.00	+3.75	+4.50
	Maximum spans (m)						
Tile 150	1.20	1.20	1.20	1.20	1.10	0.98	0.89
Tile 175	1.20	1.20	1.20	1.20	1.10	0.98	0.89
Tile 200	1.60	1.60	1.60	1.28	1.10	0.99	0.90
Tile 225	1.60	1.60	1.60	1.30	1.12	1.00	0.92
Tile 250	1.60	1.60	1.60	1.27	1.10	0.99	0.90
Tile 300	1.60	1.60	1.60	1.26	1.10	0.98	0.89
Tile 400	1.60	1.60	1.60	1.37	1.18	1.06	0.97

* 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

Negative wind load pressure* (kN/m^2)	-0.75	-1.20	-1.50	-2.25	-3.00	-3.75	-4.50
	Maximum spans (m)						
Tile 150	1.20	1.20	1.20	1.20	1.20	1.01	0.84
Tile 175	1.20	1.20	1.20	1.20	1.20	1.20	1.10
Tile 200	1.60	1.60	1.60	1.60	1.35	1.08	0.90
Tile 225	1.60	1.60	1.60	1.35	1.11	0.89	0.74
Tile 250	1.60	1.60	1.60	1.20	0.90	0.72	0.60
Tile 300	1.60	1.60	1.60	1.27	0.95	0.76	0.63
Tile 400	1.60	1.60	1.28	0.85	0.64	0.51	0.43

* 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 'BAS' system with screw connection

Negative wind load pressure* (kN/m^2)	-0.75	-1.20	-1.50	-2.25	-3.00	-3.75	-4.50
	Maximum spans (m)						
Tile 150 a) or b)	1.20	1.20	1.20	1.16	0.87	0.69	0.58
Tile 175 a) or b)	1.20	1.20	1.20	0.97	0.73	0.58	0.49
Tile 200 a) b)	 1.60 1.60	 1.60 1.60	 1.60 1.20	 1.60 0.80	 1.30 0.60	 1.04 0.48	 0.87 0.40
Tile 225 a) b)	 1.60 1.60	 1.60 1.36	 1.60 1.02	 1.35 0.68	 1.11 0.51	 0.89 0.41	 0.74 0.34
Tile 250 a) b)	 1.60 1.60	 1.60 1.10	 1.60 0.83	 1.20 0.55	 0.90 0.41	 0.72 0.33	 0.60 0.28
Tile 300 a)	1.60	1.60	1.60	1.11	0.83	0.67	0.56
Tile 400 a)	1.60	1.60	1.20	0.80	0.60	0.48	0.40

* The partial stability coefficient γ_M has already been taken into consideration. a) Spacing of screw connections = 1x nominal tile height b) Spacing of screw connections = 2x nominal tile height

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

Negative wind load pressure* (kN/m^2)	-0.75	-1.20	-1.50	-2.25	-3.00	-3.75	-4.50
	Maximum spans (m)						
Tile 150 a)	1.20	1.20	1.20	1.20	1.15	0.92	0.77
Tile 175 a)	1.20	1.20	1.20	1.12	0.84	0.67	0.56
Tile 200 a) b)	 1.60 1.60	 1.60 1.60	 1.60 1.29	 1.60 0.86	 1.35 0.65	 1.08 0.52	 0.90 0.43
Tile 225 a) b)	 1.60 1.60	 1.60 1.36	 1.60 1.02	 1.35 0.68	 1.11 0.51	 0.89 0.41	 0.74 0.34
Tile 250 a) b)	 1.60 1.60	 1.60 1.10	 1.60 0.83	 1.20 0.55	 0.90 0.41	 0.72 0.33	 0.60 0.28
Tile 300 a)	1.60	1.60	1.60	1.27	0.95	0.76	0.63
Tile 400 a)	1.60	1.60	1.28	0.85	0.64	0.51	0.43

* The partial stability coefficient γ_M has already been taken into consideration. a) Spacing of rivet connections = 1x nominal tile height b) Spacing of rivet connections = 2x nominal tile height

Privacy and sun protection systems

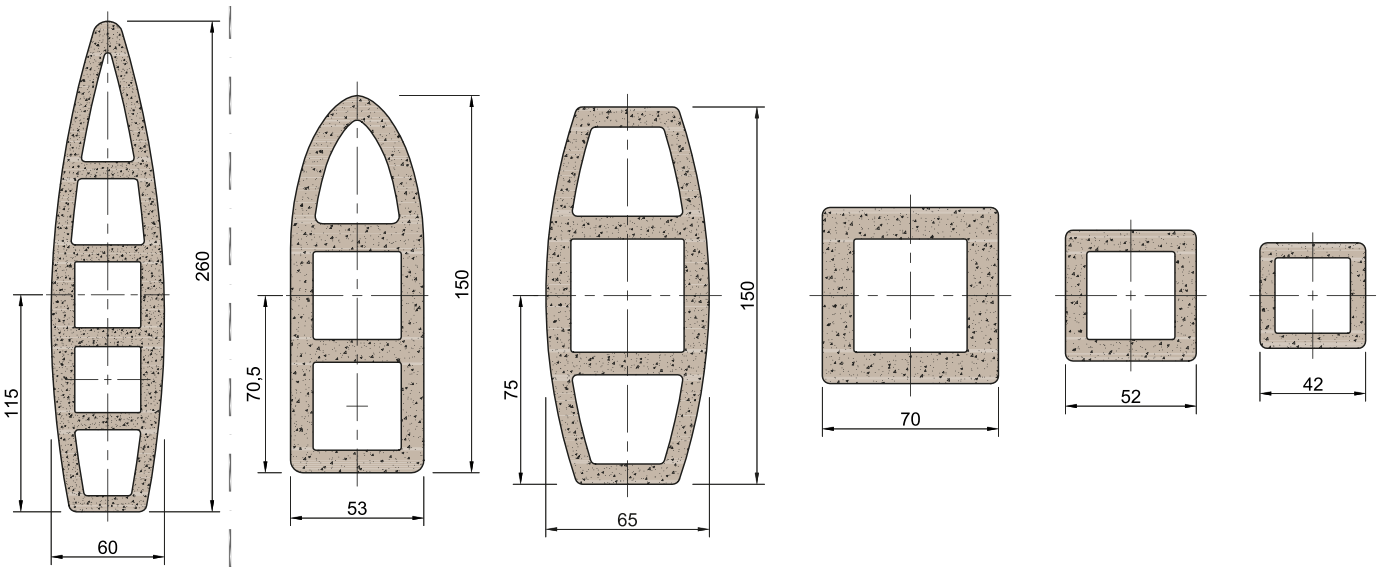
Lamella, Baguette and Square Brise Soleil

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.

Lamella 260 | Lamella 150 | Baguette 150 | Square 70 | Square 50 | Square 40



Environmental declaration

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.

Parameter	Units per m^2	TONALITY value
Total non-renewable primary energy	megajoules	651
Total renewable primary energy	megajoules	59.4
Global warming potential	kg CO_2 equivalent	43.1
Depletion of stratospheric ozone layer potential	kg CFC11 equivalent	6.32E-9
Summer small potential	kg SO2 equivalent	1.12E-1
Acidification of soil and water potential	kg (PO4)3 equivalent	8.83E-2
Nutrient input/eutrophication potential	kg ethylene equivalent	9.04E-3

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 under 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: (EP) > 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.

TONALITY
NATURAL FACADES

Design basics

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-ventilation is required to reliably discharge moisture from the building, to drain off any possible penetrating precipitation, for capillary separation of cladding from the inulation or surface of the outer wall and for discharging any condensation inside the cladding.

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.

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.

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.

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 or 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 supervisory 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.

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 national or state building regulations when attached to metallic substructures for rear ventilated external wall cladding in accordance with 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. 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.

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

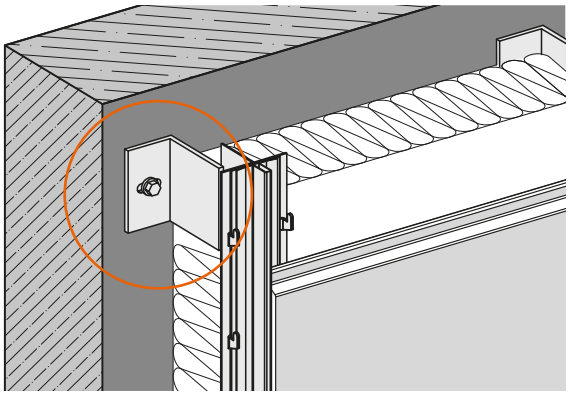
Only standardised or technically approved, type WAB (external thermal insulation for use beneath cladding) may be used in accordance with DIN 4108-10:2008-06 for thermal insulation in rear-ventilated rainscreen facades. Fleece-backed mineral fibre insulation in accordance with DIN EN 13162 is preferable in open-jointed facades. Facade insulation panels must be installed fitting tightly together in formation, between the substrate and insulation layer in accordance with structural standards or manufacturer's specifications. They must be mechanically attached using insulation fasteners (‚fixing pins') and must be tightly connected to adjacent building components. Particularly high requirements are placed on the insulation in the external building envelope of so-called energy Efficient and Passivhaus buildings that are largely designed to function without supplementary heating. Suspended rear-ventilated rainscreen facades make an exemplary contribution to this ambitious overall energy concept for relieving the climate and the environment.

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

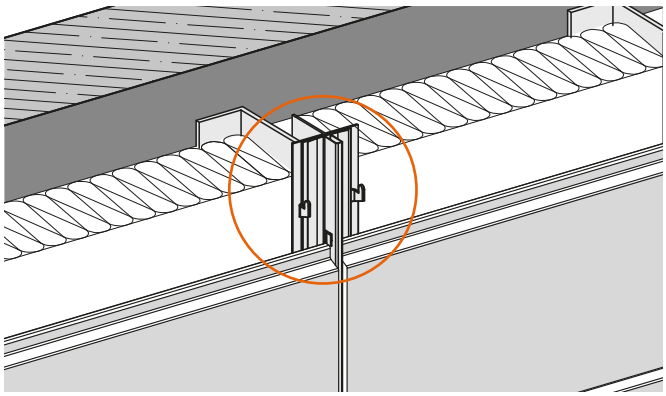
Substructure installation – primary substructure wall brackets



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.

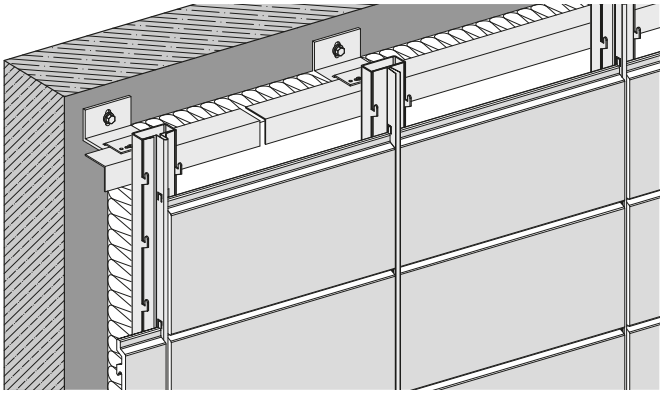
Substructure installation – primary substructure vertical T-profile



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.

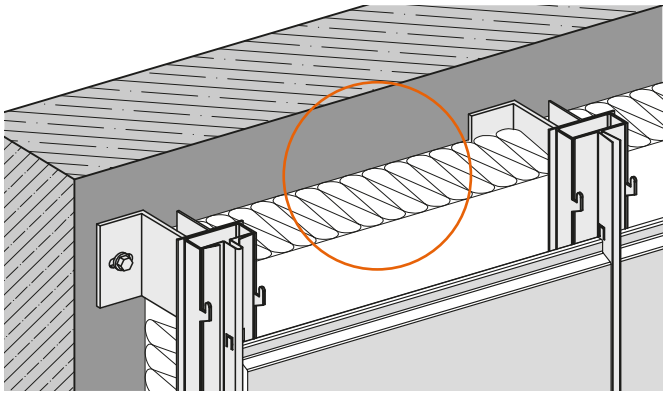
Substructure installation – primary substructure horizontal L-profile – only applies to ADS



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 profiles. During implementation, ensure that the primary substructure and the TONALITY profiles can expand uniformly, free from stress. On thermal linear expansion grounds, we recommend restricting the profile length to a maximum of 3m. Ensure there is a sufficient gap between the profiles to avoid distortion due to linear thermal expansion

Thermal installation

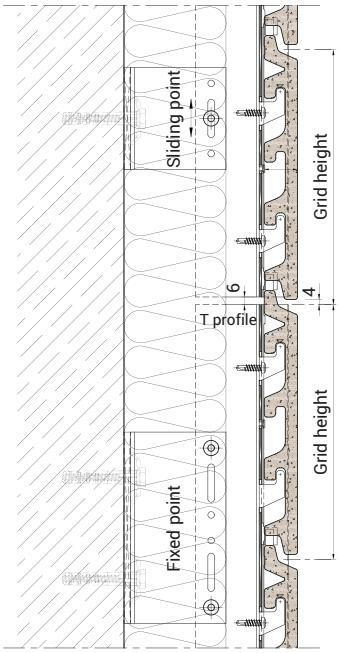


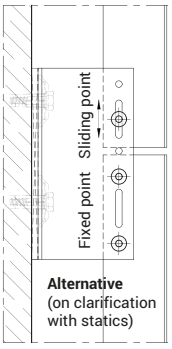
The thickness of thermal insulation and type of insulation are determined by the Energy Saving Ordinance or client specifications. Generally, the installation must be installed on wall surfaces which have been sanitized in compliance with manufacturer's guidelines.

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

DWG No. BAS 200-19





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.

TONALITY
NATURAL FACADES

Design basics

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 JT9-4-4.8x19 or other approved means of fixing, 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 spanned by facade tiles.

Alternatively, aluminium/stainless steel rivets – K9.5 can be used according to the national technical approval.

ADS – adaptive system

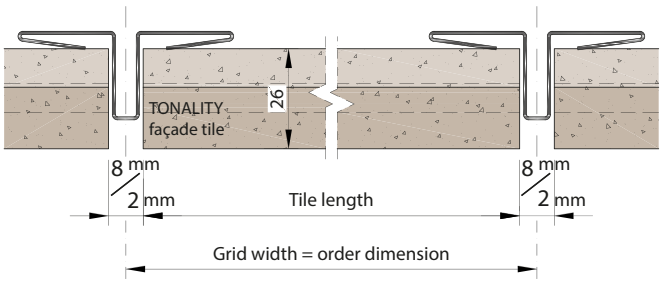
Installation of vertical profile

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 other, the length of the hanger profiles and the distance between fixed points of two consecutive hanger profiles must not exceed 2.80 m. The butt joints of facade tiles and hanger profiles must be at least 6 mm. Corresponding butt joints must be planned when cutting to size on site. Hanger profile butt joints must not be spanned by facade tiles. When installing vertical ADS hanger profiles on a horizontal primary substructure, ADS hanger profile cantilevers 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.

Ordering instructions



Example: Axial dimension = 450 mm; joint width = 8 mm
Cut length = 450 mm – 8.0 mm = 442 mm

The cut length (tile length) is calculated as grid length (axial dimension) minus the joint width selected (standard joint 8 mm or fine joint 2 mm).

- To avoid interruptions during installation due to breakage or waste, we recommend adding an allowance of approx. 5% (5 - 15%, depending on the construction) to the number required.
- When ordering, we recommend consideration of a reasonable number of spare tiles for storage by the owner of the building.
- An unambiguous and binding order can be placed using the electronic order form available from our customer service team.

Disposal of waste

Facade tiles can be disposed of as building and demolition waste under waste code number 17.01.03 (tiles, bricks and ceramics in accordance with the European waste catalogue). By sorting materials, it is possible to direct them to high-quality recycling. The aluminium profiles can be disposed of as a recyclable material or as building and demolition waste under waste code number 17.04.02 (aluminium in accordance with the European waste catalogue).

Storage and transport

Facade tiles and substructure are packed on pallets and wrapped with shrink film and edge protection to protect against damage or contamination. Despite the above appropriate care should be taken when unloading and moving.

Cutting

We recommend wet cutting machines like those used by tile fixers to cut large format and thick porcelain stoneware. The following recommendation is an example for this:

Dahm D2 ceramic and stone cutting machine Item No. 30025

Dahm DNS 1 diamond cutting blade Item No. 50152

Source address:
Karl Dahm & Partner GmbH
Professional tools for tiles and natural stone
Ludwigstrasse 5, 83358 Seebruck, Germany
Telephone +49 (0) 8667-878-0, Fax +49 (0) 8667-878-200
Internet: www.dahm-werkzeug.de

Warning: If longitudinal cuts of more than 1,500 mm must be made, then use an appropriate machine with a longer cutting table.

Cleaning 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 clean tiles should be installed. If there is still fine dust on the tiles in the form of a grey haze following installation, this can be wiped off 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 away”. We recommend a mild solution of alcohol for this, or a graffiti remover such as P3 Scribex 400 from the company Henkel.

TONALITY
NATURAL FACADES

Colour overview

TONALITY NATUR


70017 Toscana


70002 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

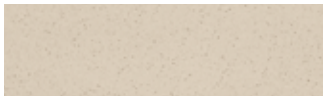

70009 Bright red


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 NOBLESSE COLOR

70355 – BL1
70356 – BL2
70357 – BL3
70358 – BL4
70380 – GR1
70381 – GR2
70382 – GR3
70383 – GR4
70370 – TU1
70371 – TU2
70372 – TU3
70390 – VI1
70391 – VI2
70392 – VI3
70365 – GE1
70366 – GE2
70375 – OK1
70376 – OK2
70350 – CR1
70351 – CR2
70352 – CR3
70360 – OR1
70361 – OR2
70385 – RO1
70386 – RO2
70340 – BR1
70341 – BR2

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 BRICK RED

70019 Brick red (natural)

TONALITY
NATURAL FACADES

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