



# TENTAL / THE CIRCULAR FACADE

# WITH TENTAL, ARCHITECTS CAN NOT ONLY IMAGINE THE WORLD WE ALL WANT, THEY CAN ALSO BUILD IT.

#### MORE POSSIBILITIES

The TENTAL curtain wall was created with a view to offering architects and consultants an extensive range of solutions, giving them as much creative freedom as possible when designing a facade.

TENTAL is a platform, with 50 mm and 60 mm wide aluminium profiles, that allows designing modular curtain walls with large-sized glazing units; seeking the maximum sensation of transparency along with a minimum sightline. Each module can integrate panels weighing up to 850 kg with a surface area up to 12.25 m², depending on the type of glass used. With a complete collection of caps, TENTAL offers a wide range of aesthetic solutions creating a smooth look.

Users can choose from an extensive range of windows, doors and sliding doors compatible with this curtain wall system.

Complying to international standards, TENTAL reaches excellent weather and thermal performances but also high burglar resistance.

#### LESS IMPACT

Using Hydro CIRCAL®, an alloy made with a minimum of 75% recycled end-of-life aluminium (post-consumer scrap), allows tons of scrap that would otherwise become solid waste to be reintroduced into the system. TENTAL's thermal break elements are made from recycled xPET, a material that gives a second life to drink bottles.

Four new patents allow for optimizing materials, simplifying manufacture, and facilitating installation, which is carried out dry, with no glue or sealants used on-site, no packaging and no waste. TENTAL has also been developed with an eco-design mindset to facilitate disassembly and circularity.

TENTAL is under certification to obtain Cradle to Cradle label. The specific characteristics contributes to constructing sustainable buildings that are eligible to be awarded to the main environmental certifications.

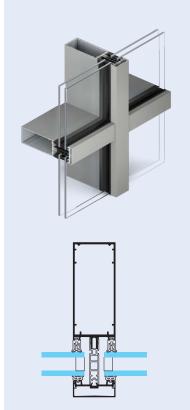
The TENTAL curtain wall is the perfect solution for current needs in terms of design and sustainability in the building industry.

## / THE WIDEST POSSIBLE RANGE OF FACADE SOLUTIONS

### TENTAL FEATURE CAPS

- Sightline: 50 or 60 mm
- Infill: 6 to 62 mm
- Standard or high insulation level
- Mullion drainage
- Facet solution up to +/- 10°
- 90° corner solution
- Anti-burglary: RC2, RC3

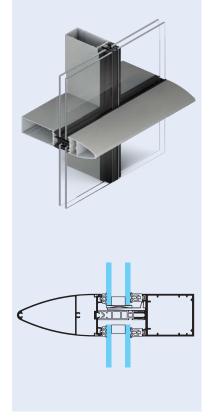




## TENTAL HORIZONTAL LINE

- Sightline: 50 or 60 mm
- Infill: 6 to 62 mm
- Standard insulation level
- Mullion drainage





## TENTAL VERTICAL LINE

- Sightline: 50 or 60 mm
- Infill: from 6 to 62 mm
- Standard insulation level
- Mullion drainage
- Facet solution up to +/- 10°

### TENTAL FLAT CAP

- Sightline: 50 or 60 mm
- Infill: from 6 to 62 mm
- Standard or high insulation level
- Mullion drainage









TENTAL
/ MORE POSSIBILITIES. LESS IMPACT.



### / KEY FEATURES & INNOVATIONS

#### **AESTHETICS AND MODULARITY**

- Available in 50 and 60 mm module
- Multiple exterior aspects:
  - Feature cap aspect
  - Horizontal line aspect
  - Vertical line aspect
  - Flat cap aspect
  - Structural silicone glazed aspect
  - Bead glazed aspect
- Collection of caps that mark the identity of each facade
- A full pallet of exclusive colours
- Facet solution up to +/- 10°
- 90° corner post

#### **EXTERNAL CLADDING**

- The fixing bracket allows elements to be incorporated onto the outside of the facade for enhanced thermal comfort (management of solar gain):
- Envelope cladding: variety of decorative elements

#### INSTALLATION AND ASSEMBLY

- 3 glazing installation techniques:
  - Continuous pressure plate
  - Punctual pressure plate
  - Structural glazing
- Patented dry connection method

#### **LARGE DIMENSIONS**

- Large infills up to 12,25 m<sup>2</sup>
- Maximum infill weight: up to 850 kg according to EN 13830,
- Maximum glazing thickness 62 mm

#### **SOFTWARE**

- Available in TechDesign and Tech3D.
- Available BIM models

#### **PERFORMANCES**

#### According to EN

- Air permeability: up to AE 1500 Pa
- Water tightness: up to RE 1500 Pa
- Wind pressure resistance:
  - Service pressure: up to 2000 Pa
  - Security pressure: up to 3000 Pa
- Impact resistance: up to I5/E5

#### **According CWCT**

- Air permeability: up to 950 Pa
- Water tightness:
  - Static: up to 950 Pa
  - Dynamic: up to 300/900pa
- Wind pressure resistance:
  - Service pressure: up to 2400 Pa
  - Security pressure: up to 3600 Pa
- Impact resistance: up to I5/E5
- Burglar resistance: RC2 and RC3
- Thermal performance:
  - Uf: up to 0.52 W/m<sup>2</sup>K
  - Ucw: up to 1.4 W/m $^2$ K (with Ug 1.1 W/  $m^2$ K)

### Acoustic performance:

• Rw (C;Ctr) = 43 (-1; -3) dB

#### INTERIOR AND EXTERIOR OPENINGS

- Compatible with a full range of present and future window, door and sliding systems
- High weather-tightness performances, for openings:
  - Air permeability: up to Class 4
  - Water tightness: up to E1500 Pa
  - Resistance to wind pressure: up to C5
  - Mechanical resistance: up to Class 3

### SUSTAINABLE CIRCULAR FACADE

- Designed for assembly and disassembly
- Components are made of recycled material
- Cradle to Cradle® certified
- Available in Hydro CIRCAL®, aluminium made with a minimum of 75% recycled end-of-life aluminium. This aluminium has one of the lowest CO<sub>2</sub> footprints worldwide: 2.3 kg of CO<sub>2</sub>/kg aluminium.

# TENTAL / MORE INNOVATION

#### **ASSEMBLY**

- Simple and quick to manufacture:
  - Patented dry connection of the internal glazing gaskets
  - Patented dry transom/transom connection
- Developed for an improved and reliable assembly in a controlled workshop environment.

#### **BIG GLASS SURFACES**

- Maximum glass loads (up to 850 kg according to EN 13830 are reached by means of:
  - Dedicated and reinforced transoms.
  - Reinforced "tubular" glass supports.
  - Screwed T-blocks.
  - Heavy load pins between connecting transom and mullion

#### **CIRCULARITY**

- The high thermal insulators are made of recycled drinks bottles
- All aluminium profiles are made of recycled aluminium with a minimum of 75% post-consumer scrap.
- Ecodesign: developed for easy disassembly.



Dry connection of inner gaskets

# TENTAL / MORE DESIGN

#### **COLLECTION OF CAPS**

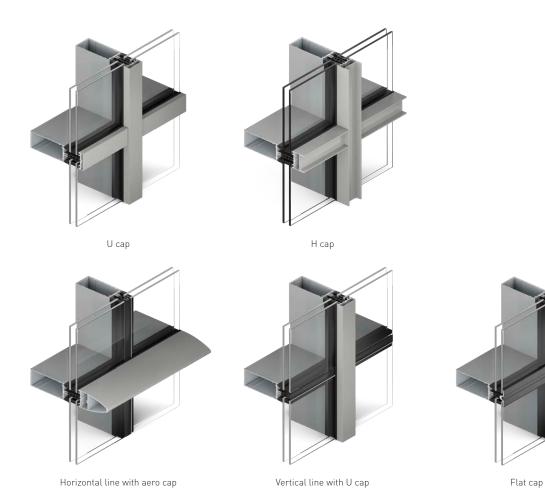
TECHNAL offers a complete collection of caps that marks the identity of each facade. A flat and discrete design (height 4.5 mm) for providing a crystal-clear envelope, an "Aero", "H" shape or "U" shape for accentuating lines. These shapes can also be combined for reinforcing the original character of the building in order to meet the specific requirements of specifiers.

#### 90° ANGLE, THIN ALUMINIUM VIEW

With corner post implementation it allows to make 90° angles with less aluminium seen from inside.

They contribute to the fineness of the structure while supporting the construction of large glazed surfaces.

TENTAL also enables 90° convex angles to be created with edge-to-edge glazing.



# **TENTAL**/ MORE POSSIBILITIES

#### LARGE DIMENSIONS

Based on a 50 or 60 mm module and featuring several patents, TENTAL curtain walling optimizes grids of residential and commercial buildings, new builds or renovations. It offers large glazed surfaces up to 12.25 m² and weighing up to 850 kg.

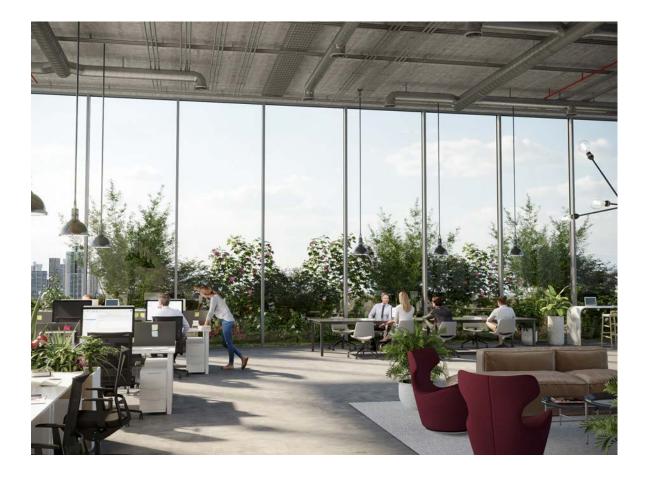
# CHOICE OF ASSEMBLY TECHNOLOGIES

TENTAL gives the opportunity to choose between:

- transom / transom or mullion / transom technology
- continuous pressure plate or punctual pressure plate

#### **VARIETY OF SHAPES**

- Visual consistency between the transoms and mullions to create a continuous line
- Possibility of a continuous or asymmetric grid
- Facade can be facetted +/10°



## / OPENING INTEGRATIONS

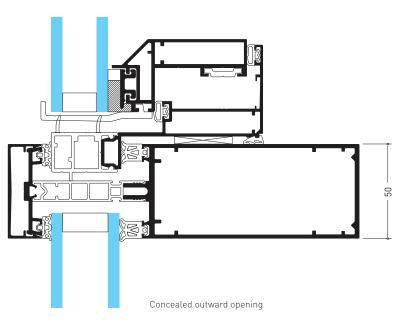
# INWARD AND OUTWARD OPENING WINDOWS

Concealed windows specially designed for TENTAL facade allowing inward openings (side hung, tilt and turn or turn and tilt) or outward openings (top hung or parallel). Innovative solution of fixed frames with thermal barrier created, enabling 2 openings side by side or in alternation with a fix frame.

The concealed opening aspect is made by using SSG technique.

Integration is possible with feature caps, horizontal line, vertical line and flat cap exterior designs.





# **TENTAL**/ MORE COMFORT

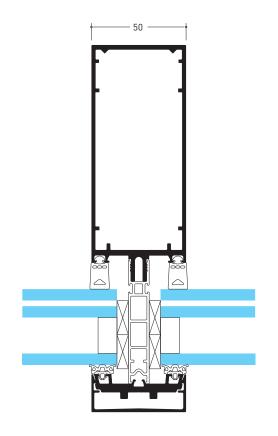
TENTAL offers an elevated level of comfort:

- Compatibility with full range of windows, doors and sliders
- Tested burglary resistance
- Complying to the highest international standards
- Integration of solar control

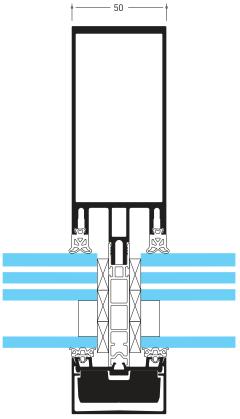
Facade TENTAL grid aspect is burglary resistant according to the EN 1628 -2011, EN1629 - 2011 and EN 1630 -2011 standards.

Ideal for car dealerships, banks, jewellers, luxury brands, police stations, etc.

- Resistance class level 2 with glazing P4A
- Resistance class level 3 with glazing P5A







# TENTAL / MORE COMFORT

#### A SOLUTION TO MEET YOUR NEEDS

TECHNAL has developed fixing brackets which are positioned on the mullion of TENTAL curtain walling and allow for the integration of sun shading blades or a stretched canvas solution whilst maintaining the overall performance - a perfect combination of aesthetics and efficiency. This range enables you to personalise the design and to optimise comfort with a wide choice of solutions: vertical or horizontal sun blinds, fixed or motorised with many possibilities.

#### SUN SHADING: DESIGN AND PROTECTION

The SUNEAL sun shading can be integrated with all aspects of TENTAL curtain walling: grid or vertical trames as well as independent structure. This SUNEAL sun shading allows you to customise the design and optimise comfort with a wide choice of solutions: vertical or horizontal, fixed or moveable, manual or motorised sun shading.

100 mm and 150 mm fixed blades are adaptable and the multitude of available shapes (ogive, rectangular, louvre or perforated sheets) increase the wall cladding options.

Interior comfort is optimised and you can enjoy warmth from the sun in the winter and solar protection in the summer, as well as energy savings by adjusting the amount of natural light entering the rooms.







## **COMMITMENT & SUSTAINABILITY**

TECHNAL demonstrates its strong commitment to the environment in all areas: by using recycled and low-carbon materials, with a product design that is adapted to a circular economy, and produced within a responsible supply chain. In addition, these statements are certified by external organisations to ensure maximum transparency.

#### HYDRO CIRCAL®

We are demonstrating our focus on sustainability by using Hydro CIRCAL® for our system solutions, one of the most sustainable aluminium alloys in our sector. Hydro CIRCAL® is a range of prime quality aluminium made with a minimum of 75% recycled end-of-life aluminium (post-consumer scrap). The production process is verified by an independent third party (DNV-GL), and confirmed by an EPD (Environmental Product Declaration). Hydro CIRCAL® also has one of the smallest  $\rm CO_2$  footprint worldwide: 2.3 kg  $\rm CO_2$  per kilo of aluminium – 4.5 times less than the world global primary average.



#### HYDRO REDUXA®

Hydro REDUXA® is a a low-carbon aluminium, which is made by using renewable energy sources like hydro power. The result is aluminum with a maximum carbon footprint of 4.0 kg  $\rm CO_2$  per kg aluminum, which is one of the world's lowest carbon footprint. Hydro REDUXA® is verified by an independent third party (DNV-GL), covering all carbon emissions from bauxite mining and alumina refining to the production of aluminum in electrolysis and casting. It is also confirmed by an EPD (Environmental Product Declaration).





#### CRADLE TO CRADLE (C2C) CERTIFICATIONS

From its design to the selection of materials and how it is manufactured, the product must offer the level of performance required by the market by reducing, to the greatest extent



possible, environmental impacts such as energy consumption or greenhouse gas emissions. We classify our range under the criteria of the Cradle to Cradle seal, an independent institute that certifies products and processes from a circular economy perspective. We have numerous Cradle to Cradle certified series, including the manufacturing in our plants. In this way, we are able to ensure that the carbon footprint of transporting our products is as low as possible.

#### **ENVIRONMENTAL PRODUCT DECLARATION**

An Environmental Product Declaration (EPD) is an independently third party-verified document that communicates precise, transparent and comparable information about the life-cycle environmental impacts of a product. But it is not only limited to products, such as a window, but can also be applied to materials (an aluminium billet), assembly parts of products or even for services (like maintenance). This document is used for many different applications, e.g. public procurement or areen building rating

green building rating schemes (i.e. BREEAM, LEED, DNGB).

#### ALUMINIUM STEWARD INITIATIVE (ASI)

ASI is a multi-stakeholder, non-profit, standards-setting and certification organisation. It is the most internationally recognised standard, which addresses the environmental, social and governance (ESG) aspects of the entire aluminium value chain. The assessment is based around the sustainable production of aluminium, from bauxite or mining to the production of semi-fabricated products, taking into account the recycling of pre- and post-consumer scrap. Hydro was one of the first companies, that received this recognition, in accordance with its commitment to a more sustainable future.







# **TENTAL**/ FEATURE CAPS



#### FLAT OR FACETED FACADES

Glazing available from 6 mm to 62 mm for flat or faceted curtain wall up to +/- 10°.

# OPTIMISED DISTRIBUTION OF LOADS

To prevent unacceptable deflection of the transoms and to allow the use of heavy

and large glazing infills (up to 850 kg), a connector, an

anti-rotation spigot and

heavy load pins are used.

The projecting top-hung, parallel, tilt-turn or emergency access opening vents provide natural ventilation whilst maintaining the aesthetic lines whatever the appearance of the external facade.

**CONCEALED OPENING** 

**WINDOWS** 

# COMMON STRUCTURE FOR 50 AND 60 MODULE PROFILES

Range of profile depths to meet the needs of each project.

## ENHANCED THERMAL AND ACOUSTIC PERFORMANCE

Enhanced thermal performance is reached by means of xPET insulators.

Enhanced acoustic and thermal performances with glazing up to 62 mm.

#### **DRY GLAZING**

Patented dry connection of the internal glazing gaskets Patented dry transom/ transom connection

#### **DESIGN**

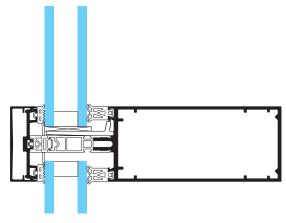
Choice of aluminium caps to highlight the external design of the facade.

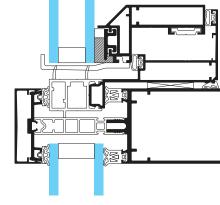
#### CHOICE OF GASKETS

Available as large vulcanised frames or linear pieces depending on project requirements.

#### **INFILLS**

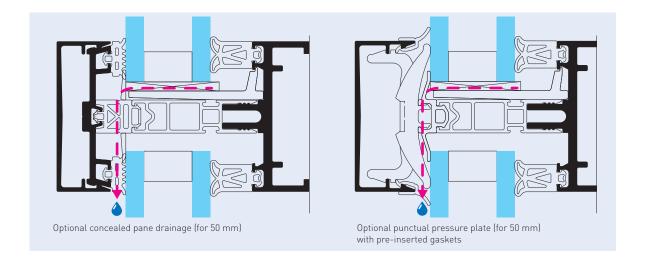
The infills are held in place with a continuous aluminium pressure plate or a specific punctual polyamide pressure plate for 50 mm.





Concealed drainage (for 50 mm)

Concealed outward opening (for 50 mm and 60 mm)



#### CONSTRUCTION

- Simplified manufacturing. The mullions and transoms are optionally straight cut and assembled using a combination of cast spigots face fixed and concealed anti-rotation spigots for ease of manufacture.
- Faceted facades. For facets up to ±10°, standard connectors may be used.
- Special option. The transom assembly block options offers an alternative to anti-rotation spigots in order to meet requirements of design or the project in general.

#### **PERFORMANCE**

- Advanced thermal performance. The thermal insulation of the standard TENTAL feature capped solution is obtained via an ABS thermal insulator between the pressure plates and the mullion and transom structure. This principle ensures optimal thermal performance and meets or exceeds building regulations' requirements. Optional xPET insulators can be applied to reach the highest thermal performances.
- Thermal insulation with glazing
   U<sub>a</sub> = 1.1 W/m<sup>2</sup>K, TENTAL 50
  - Fixed curtain wall (transom-transom) with 80% glazing (24 mm insulating panel,  $U_p = 1.2 \text{ W/m}^2\text{K}$ .
  - Fixed curtain wall (mullion-transom) with 50% glazing [80 mm insulating panel,  $U_p = 0.37$ ]  $U_{cw} = 1.0 \text{ W/m}^2\text{K}$ .
- Air, water and wind resistance in accordance with European standards.

### / HORIZONTAL LINE - VERTICAL LINE



#### **FLAT OR FACETED FACADES**

Glazing available from 6 mm to 62 mm for flat or faceted curtain wall up to +/- 10°.

## OPTIMISED DISTRIBUTION OF LOADS

To prevent unacceptable deflection of the transoms and to allow the use of heavy and large glazing infills (up to 850 kg), a connector, an anti-rotation spigot and heavy load pins are used.

### INFILLS

The infills are held in place with a continuous aluminium pressure plate or a specific punctual polyamide pressure plate for 50 mm

## CONCEALED OPENING WINDOWS

The projecting top-hung, parallel, tilt-turn or emergency access opening vents provide natural ventilation whilst maintaining the aesthetic lines whatever the appearance of the external facade.

# COMMON STRUCTURE FOR 50 AND 60 MODULE PROFILES

Range of profile depths to meet the needs of each project.

## ENHANCED THERMAL AND ACOUSTIC PERFORMANCE

Enhanced thermal performance is reached by means of xPET insulators on the horizontal or vertical line.

Enhanced acoustic and thermal performances with glazing up to 62 mm.

#### DESIGN

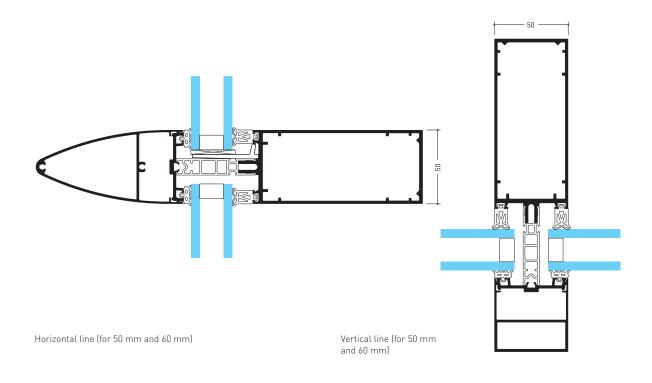
Choice of aluminium caps to highlight the external design of the facade.

## CHOICE OF GASKETS

Available as large vulcanised frames or linear pieces depending on project requirements.



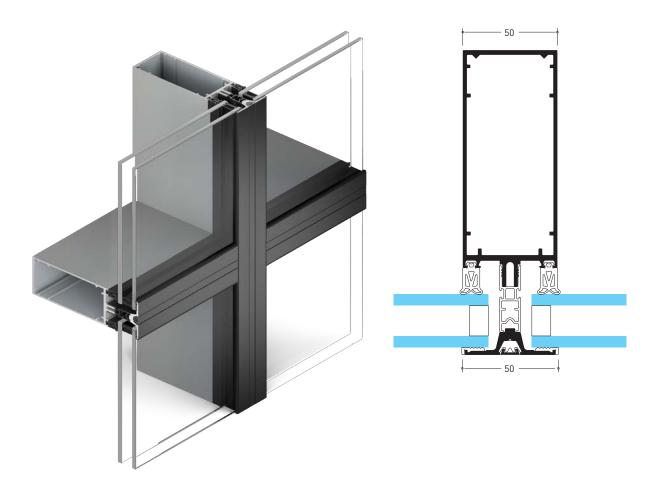
Vertical Line





# TENTAL / FLAT CAP





#### **FEATURES**

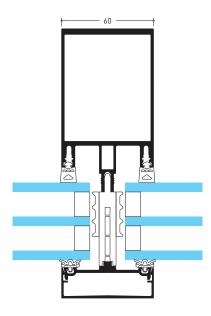
- For 50 mm and 60 mm module
- Black anodized flat pressure plate of 4.5 mm depth
- Infill up to 62 mm
- Maximum weight: 850 kg by glazing panel
- Possibility to realize an all-glass facade with horizontal or vertical line

### PERFORMANCES

- Advanced thermal performance. The thermal insulation of the standard TENTAL feature capped solution is obtained via an ABS thermal insulator between the pressure plates and the mullion and transom structure. This principle ensures optimal thermal performance and meets or exceeds building regulations' requirements. Optional xPET insulators can be applied to reach the highest thermal performances.
- Air, water and wind resistance in accordance with European standards.



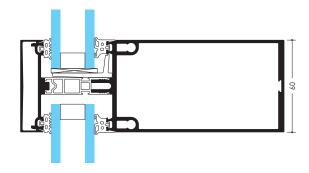




High insulation level (for 50 mm and 60 mm)

#### LARGE DIMENSION GLAZING

TENTAL 60 is an option that uses 60 mm module mullions and transoms to increase the dimensions of the glazing and thus maximizing natural light.



Standard insulation level (for 50 mm and 60 mm)

#### CONSTRUCTION

- Simplified manufacturing. The transoms are are notched and overlapped on to the mullions.
- Faceted facades. For facets up to ±10°.
- Special option. The transom assembly block options offers an alternative to anti-rotation spigots in order to meet requirements of design or the project in general.

#### **PERFORMANCE**

- Advanced thermal performance. The thermal insulation of the standard TENTAL feature capped solution is obtained via an ABS thermal insulator between the pressure plates and the mullion and transom structure. This principle ensures optimal thermal performance and meets or exceeds building regulations' requirements. Optional xPET insulators can be applied to reach the highest thermal performances.
- Thermal insulation with glazing
   Air, water and wind resistance in accordance
   with European standards.



## / WEATHER AND RESISTANCE PERFORMANCES

The curtain wall system has been tested in accordance with the requirements of the European standard EN 13830. Further information is available upon request.

TENTAL 50   WEATHER PERFORMANCES (A.E.V.)								
	Air permeability	Resistance to wind pressure						
EN13830	AE 1500 Pa	up to RE 1500 Pa	Service 2000 Pa Security 3000 Pa					
CWCT	950 pa	Static 900pa Dynamic 300/900pa	Service 2400 Pa Security 3600 Pa					
Concealed inward opening	Class 4	RE 1500 Pa	Class C5					
Concealed outward opening	Class 4	RE 1500 Pa	Class C5					

TENTAL 60   WEATHER PERFORMANCES (A.E.V.)								
	Air permeability	Water tightness	Resistance to wind pressure					
EN13830	AE 1200 Pa	up to RE 1500 Pa	Service 2000 Pa Security 3000 Pa					
CWCT	950 pa	Static 900pa Dynamic 300/900pa	Service 2400 Pa Security 3600 Pa					
Concealed inward opening	Class 4	RE 1500 Pa	Class C5					
Concealed outward opening	Class 4	RE 1500 Pa	Class C5					

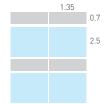
TENTAL 50 & TENTAL 60   RESISTANCE PERFORMANCES								
Burglary resistance Impact resistance mullion - transom								
TENTAL 50		15 / E5						
TENTAL 60	RC1N, RC2N, RC2, RC3	15 / E5						

## / THERMAL PERFORMANCES

The precise performance depends on a combination of the size of the frames, the thickness of the glass, the type of infill and the options chosen. The values below are provided for indicative purposes only. Further information is available upon request.

TENTAL - U <sub>f</sub> (W/m <sup>2</sup> K)						
$U_{_{\rm f}}$ (W/m $^2$ K)	transom /	transom	mullion / transom			
O <sub>f</sub> (VV/111-YK)	standard insulation	high insulation	standard insulation	high insulation		
TENTAL 50	1.20 - 1.79	0.55 - 1.01	1.15 - 2.02	0.53 - 1.18		
TENTAL 60	-	-	1.09 - 2.05	0.52 - 1.42		

TENTAL 50 - U <sub>cw</sub> (W/m <sup>2</sup> K)										
	Triple glazing (36 mm)				Double glazing (24 mm)					
U <sub>g</sub> (W/m²K)	0.5 + Swisspacer Ultimate	0.5	0.7	0.9	1.0 + Swisspacer Ultimate	1.1	1.3	1.5	1.7	1.9
Feature caps transom/transom	0.73	0.86	1.0	1.1	1.2	1.4	1.5	1.7	1.8	2.0
Features caps mullion/transom	0.73	0.88	1.0	1.1	1.2	1.4	1.6	1.7	1.9	2.0

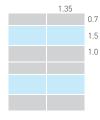


Each section (100% glazed looking from inside to outside): glazed section + opaque spandrel panel + 2 frames

W 1.35 m x H (0.7 m spandrel+ 2.5 m glazing)

24 mm spandrel in combination with double glazing: U<sub>p</sub> 1.2 W/m²K 36 mm spandrel in combination with triple glazing: U<sub>p</sub> 0.79 W/m²K

TENTAL 50 - U <sub>cw</sub> (W/m <sup>2</sup> K)										
	Triple glazing (36 mm)				Double glazing (24 mm)					
U <sub>g</sub> (W/m²K)	0.5 + Swisspacer Ultimate	0.5	0.7	0.9	1.0 + Swisspacer Ultimate	1.1	1.3	1.5	1.7	1.9
Feature caps transom/transom	0.87	1.0	1.1	1.1	1.3	1.5	1.5	1.6	1.7	1.8
Features caps mullion/transom	0.88	1.0	1.1	1.2	1.4	1.5	1.6	1.7	1.7	1.8



Each section (60% glazed looking from inside to outside): glazed section + 2 opaque spandrel panels + 3 frames per level.

W 1.35 m x H (0.7 m spandrel + 1.5 m glazing + 1 m spandrel)
24 mm spandrel in combination with double glazing: U<sub>p</sub> 1.2 W/m²K
36 mm spandrel in combination with triple glazing: U<sub>p</sub> 0.79 W/m²K



## MATERIALS AND FINISHES

For all TECHNAL systems only the best materials and parts are used to ensure long-term performance and to minimise maintenance and environmental impact.

- Fittings are cast from EN 12844 compliant Zamak 5.
- All seals are EPDM or TPE (Thermoplastic elastomer).
- Thermal breaks are extruded from ABS or xPET.
- Screws are made from stainless steel.

#### **FINISHES AND COLOURS**

A wide range of finishes and colours is available to meet individual project requirements, enhancing existing buildings and offering architects and designers greater design freedom:

- Natural anodised in accordance with "QUALANOD" instructions.
- Polyester coating finishes in a wide range of colours in accordance with "QUALICOAT" and "QUALIMARINE" instructions.
- TENTAL is also available in lacquered finishes with the colour range EXCLUSIVE for a stylish and contemporary look.

#### **PROFILES**

TENTAL is made from Hydro CIRCAL®, recycled low carbon aluminium. That means it's prime quality aluminium made with a minimum of 75% recycled end-of-life aluminium (nost-consum).



- aluminium (post-consumer scrap). Hydro CIRCAL® has one of the smallest  $\mathrm{CO}_2$  footprint worldwide: 2.3 kg of  $\mathrm{CO}_2$  per kilo of aluminium.
- The aluminium profiles are extruded from alloy EN AW 6060 Building complying to EN 12020, EN 573-3, EN 515 and EN 775-1 to 9.



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