VitraPanel Tunnels – Secondary Linings Specification

Specification Statement

The Tunnels Secondary Wall Lining shall consist of VitraPanel EC or VitraPanel Platinum EC supplied by VitraGroup Architectural systems. Each panel shall be pre-sealed on the back, sanded and auto calibrated for surface finish, prior to undercoating and top coating. Undercoat shall be VitraGroup’s proprietary 2-pack undercoat system and top coats shall only be ‘low surface tension’ coatings to maximise the maintenance free cycle; either:

**Vitrathane 644™ for internal tunnel applications** - a specially developed two pack coating system which has good UV resistance and provides a hard surface for scratch resistance. It is a special low surface tension coating to make the panels less sensitive to dirt adherence and easy to clean – (supplied on VitraPanel EC)

**Vitraflon 744™ for external tunnel applications** - an extreme UV resistance coating which has been developed to provide colour and gloss retention for up to 40 years and more. Vitraflon 744 has extremely low surface tension to accommodate easy cleaning of the panels (supplied on VitraPanel Platinum EC)

VitraPanel Secondary wall lining features:

- High Density CFC substrate
- Auto calibrated inline factory processing to ensure industry leading surface finish
- proprietary 2-pack undercoat system, two coats on faces and edges, applied in-line
- Architectural top coat, two coats, applied in-line - custom colour – V644 for internal or V744 for external applications
- Colour coated stainless steel screws for fixing of panels; if required
- Delivery of panels packaged and labelled with protective packaging
- Optional pre-drilling of panels
- Optional secondary framing design

Guaranteed

- Fire resistance
- Cost effective
- Fast to install & easy to replace
- Short response time
- UV resistant
- Easy to clean, low maintenance
- Unlimited colour range
- Graffiti resistance
- Maintain Light reflectivity
- Meets International standards
- Design solutions support
- Impact/ Abrasion resistance
The performance criteria accompanying VitraPanel and recommended as a minimum for the tunnel secondary wall lining application is outlined as follows.

Warranty

A project specific warranty of up to 40 years for internal tunnel linings against defects in materials or manufacturing shall apply, including but not limited to:

- be free from defects in design, materials and workmanship.
- Coating will not peel, crack, blister or otherwise delaminate from its CFC substrate.
- Coating will not change colour so as to give delta E CIE laboratory reading greater that 10 Units from its original colour – as per ASTM D-2244-85
- be new and of the highest quality and standard upon delivery.

Quality Management Systems

Assurance around supply and capability shall be verified by a presence of a documented Quality Management System.

Forms provided upon request will typically include:

- product data sheets
- Work method statements
- Inspection and test plans
- Checklists
- Risk assessments

Performance and Quality

Materials

Panel Materials shall possess the following qualities

Substrate

- High Density Compressed Fibre Cement (CFC)
- Moisture resistant
- durable and non distorting
- non combustible and resistant to flame spread
- stable at 450 degree Celsius over 2 hours
- auto-calibrated for the required level of surface finish
- new and undamaged
Paint Finish

- ‘low surface tension’ whilst maintaining a surface reflectance greater than 60% (20% gloss is recommended)
- Easy to clean
- Graffiti resistant
- Resistant to impact and abrasion
- Solvent resistant to petrol and oils
- Easily mechanically cleanable and resistant to loads applied by cleaning apparatus
- UV protected and weather resistant for outdoor areas
- Available in any colour - custom colours will be required to highlight safety facilities, including identification of entrances to emergency egress passages and breakdown bays
- Must maintain the required reflectivity over the design life

General

- Materials and/or lining systems must have proven performance at other road tunnel locations;
- Incorporate materials that are non-corrodible
- Ensure panels are easily replaceable and demountable

Loadings

The Secondary wall lining panels shall resist the required design load (typically +/- 1 kPa). This load is representative of the load combinations resulting from the below instances

- Traffic gust and vibration
- Cleaning apparatus loads
- Impact and abrasion
- Self weight of panels and frames & installation

Durability

The durability of the materials to be included in the support of the tunnel secondary lining shall provide a Design Life in excess of 50 years.

Acceptance of Secondary Lining System

Acceptance of any particular secondary lining system (panels, frames and fixing method) is subject to a full underground site demonstration by the Supplier.

Production Capacity and Work Load Details

Production capacity will be deemed adequate provided a minimum of 8000m² of tunnel lining can be packaged and supplied per week. The supplier must provide assurance that this minimum can be
maintained during the project schedule (by way of previous projects or production capacity data), as well as providing information that addresses the following criteria;

- Redundancy in production – there must be redundancy in product either by way of a secondary production site or production line
- Storage – there must be adequate storage to stock material in advance. This storage must be undercover and secure. A minimum of 4 weeks’ worth of material will be deemed acceptable
- Process – there must be a clear visible production flow chart showing each step undertaken during the production process. This must include quality processes and checks undertaken in parallel, as required to ensure quality, consistency and traceability.
- Experience – there must be clear evidence of successfully supplying material to projects of similar size and work load
- Response time – on occasions, there must be capability of short turn-around for custom panels

**Delivery and Storage**

Panels shall be supplied packed on pallets, with clear pack identification as per construction program. Adequate space on site shall be provided to ensure pallets protected from the weather prior to installation. Packs must be stored dry.

**Cleaning and Maintenance Procedures**

It is the responsibility of the supplier to provide clear written instructions regarding correct cleaning and maintenance of the lining panels. Preference is for ‘low surface tension coating’ that exhibit excellent self cleaning properties.

**Removal of Graffiti**

Coatings must be Graffiti resistance. The supplier must provide written procedure for the safe removal of Graffiti, ensuring the procedure does not result in loss of colour, gloss of reflectivity

**Making good during defect liability period**

A degree of minor damage and surface scratching can be expected during concurrent works. There must be a clear method supplied for touching up and repairing panels without removal of the panel. Preference will be given to wet-paint air-dried paint systems, or systems that provide equivalent ease and quality of repair.

**Penetrations**

The supplier must provide guidance, by way of documentation and advice, any restrictions regarding the size and location of penetrations within an individual panel.
**Experience**
Suppliers must provide details of their experience on Tunnel projects, including the size (m²), the location, the project period and duration, the client, and the product supplied.

**Sustainability**
The supplier shall highlight any attributes within their product or system relating to sustainability.