

## FUTURAIL LED GRP HANDRAIL SYSTEM

**SWARCO FUTURIT** is one of the world's leading producers of LED-based signalling and lighting technology. Traffic lights, variable message signs and street lights form the portfolio of energy-efficient, sustainable, long-life products for road safety and traffic control.

System integrators and traffic authorities in more than 70 countries trust SWARCO FUTURIT's outstanding quality made in Austria in production, service and personal consultancy. The award-winning company works with quality and environmental management systems according to EN ISO 9001 and 14001. SWARCO FUTURIT is one of the key companies of the international traffic technology corporation SWARCO of Austrian entrepreneur Manfred Swarovski.

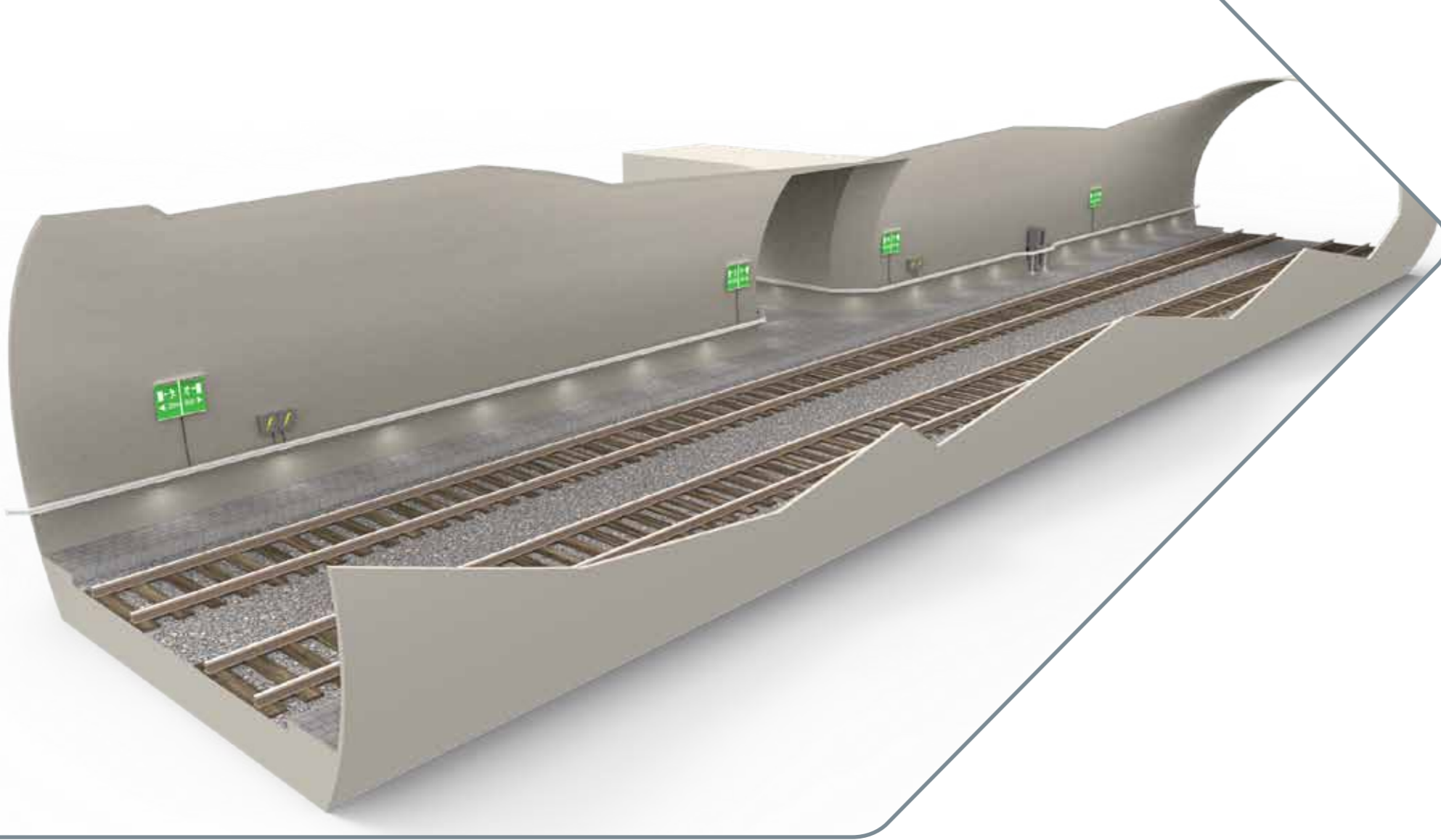
[www.swarcofuturit.com](http://www.swarcofuturit.com)

### SWARCO | FIRST IN TRAFFIC SOLUTIONS.

**SWARCO** is a growing international group providing the complete range of products, systems, services and solutions for road safety and intelligent traffic management. With almost five decades of experience in the industry, the corporation supports the growing mobility needs of society with turnkey systems and solutions in road marking, urban and interurban traffic control, parking, public transport, infomobility and street lighting. Cooperative systems, V2I communication, electromobility, and integrated software solutions for the Smart City are latest, future-oriented fields in the group's portfolio.

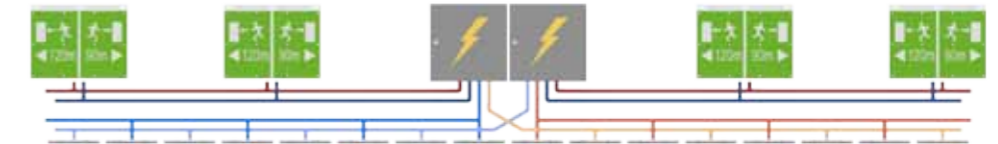
[www.swarco.com](http://www.swarco.com)





## SYSTEM OVERVIEW

The system consists of the handrail with LED modules, a wall mounting, a redundant energy supply and the LED-lit escape route signs.



The entire installation and cabling complies with the mechanical and electrical requirements and the fire protection regulations according to EN 13501.

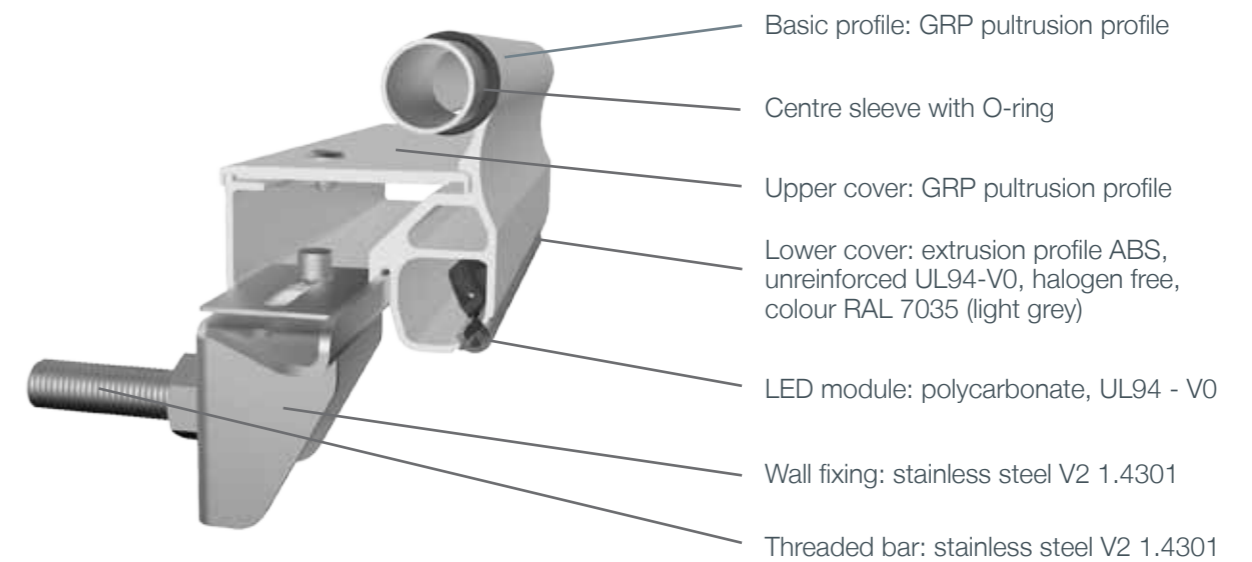
# SAFETY CONCEPT FOR RAILWAY TUNNELS

## FUTURAIL FOR BETTER ORIENTATION IN CASE OF EMERGENCY

FUTURAIL is a system solution which safely guides people out of a railway tunnel in case of emergency. The LED system is used as emergency lighting and escape route marker in railway tunnels. It complies with the demanding technical specifications for the interoperability regarding „safety in railway tunnels“ (TSI).

Modern LED technologies ensure a uniform and stable illumination over the entire life cycle. The basic profile is produced in a pultrusion process from glass fibre reinforced plastic and resists to the enormous mechanical forces exerted by trains passing at speeds of up to 250 km/h.

## CROSS SECTION OF HANDRAIL

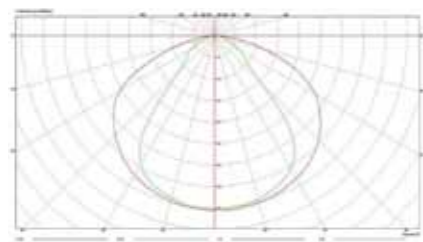


# LED MODULE

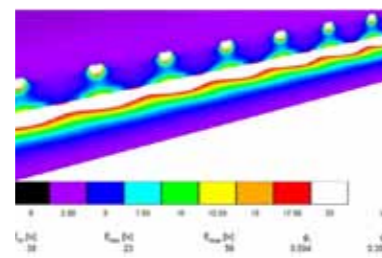
- highly efficient mid-power LEDs
- easy to install
- easy and quick to replace
- patented fixing mechanism
- vandalism-proof



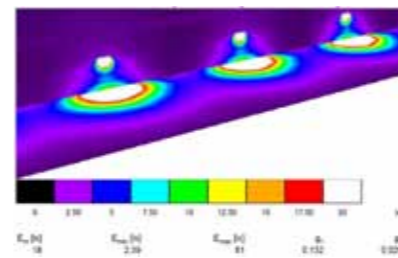
## LIGHT DISTRIBUTION



Light distribution curve



Light dot gap 2.7 m  
Normal operation



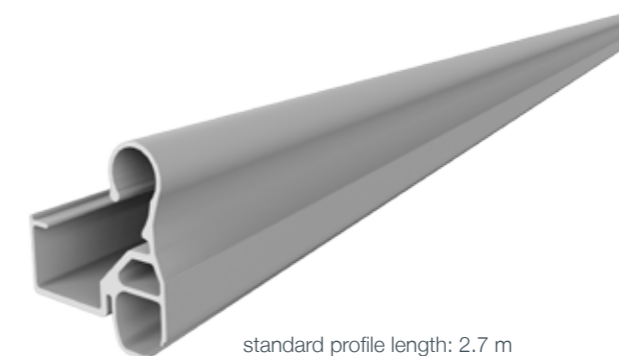
Light dot gap 5.4 m  
In case of failure of one string

TECHNICAL DETAILS	
Housing	polycarbonate, UL94 - V0
LEDs	12 NICHIA mid-power LEDs on FR4 printed circuit board
Colour temperature	2,900K, 4,000 K, 5,000 K, 6,300 K, ± 100 K
Ambient temperature	-40°C to + 50°C
Operating voltage	19 - 27 V DC
Charging rate	120 mA per modul (= 2.9 W at 24 V DC)
Dimming	PWM
Nominal luminous flux	280 lm (120 mA) $T_A=25^\circ\text{C}$
Ingress	IP 67 acc. to EN 60598
Weight	85 g
Dimensions	270 mm x 19 mm x 33 mm

## BASIC PROFILE

Advantages of GRP pultrusion profile:

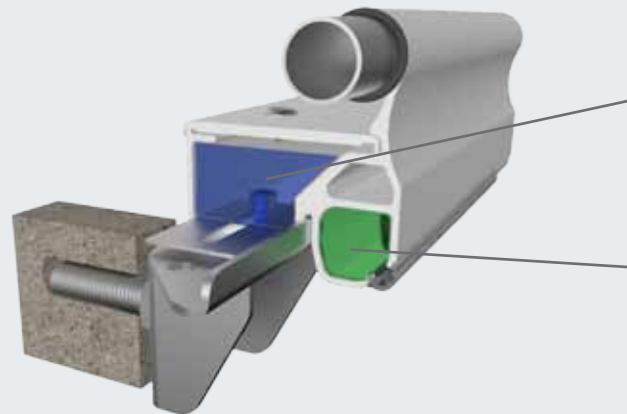
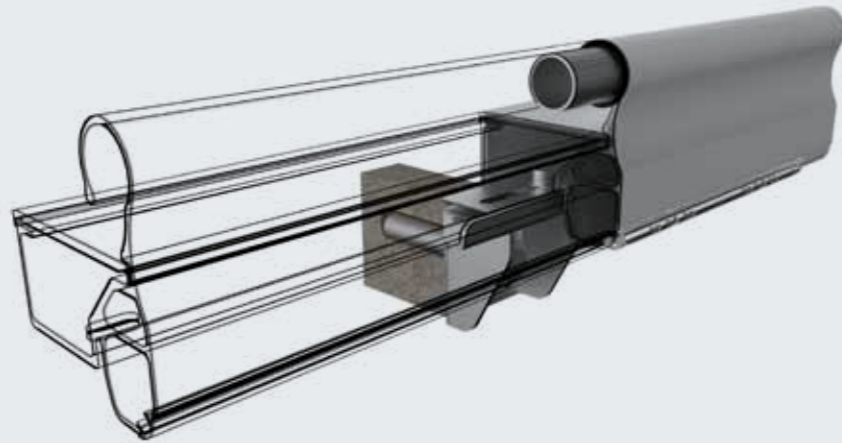
- very high resistance to mechanical stress (pull, compression, transverse load)
- very little thermal expansion of ± 3 mm
- compliant with fire protection class EN 13501 (class B-s1, d0, UL94-V0)
- halogen free and UV resistant
- no twists
- available in RAL 7035 (light grey) and RAL 1023 (traffic yellow)
- easy to tool (cutting to length and drilling)



standard profile length: 2.7 m

# INSTALLATION

quick to install thanks to simple connector and screw system



Easily accessible cable duct for quick wiring of pre-installed LED modules, maintenance works and additional external wiring

primary cable duct for LED modules

Example of wall mounting

# DEVIATION



Example of combined installation with wall mounting and pedestals

- adjustable to individual tunnel layout
- possible at different mitre bends and angles

# SYSTEM COMPONENTS



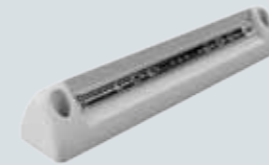
## POWER SUPPLY

- cabinet made of steel or plastic
- double power supply
- incl. inrush current limiters and connecting terminals



## ESCAPE ROUTE SIGN

- LED-lit with fluorescent pictogram
- sheeting or print (SWARCO fluorescent print)



## WALL MODULE

- made of ASA polycarbonate
- for additional illumination (e.g. signs)
- UL94-V0
- dimensions: 350 x 65 x 57 mm

Supplementary components such as emergency exit illumination, signalisation or markings can be offered for specific projects.

# CERTIFICATION

Test type	Norm parameters	Date Test institute Protocol no.
Line load	70 kN/m vertical 150 kN/m horizontal Test acc. to norm: UNI 10807 und EN 14019	31.03.2016 - Istituto Giordano Nr. 332659
Vibration test	10800 vibration cycles simulating the aging process of the handrail profile	31.03.2016 - Istituto Giordano Nr. 332659
Fire resistance	Material test on fire resistance with classification Test acc. to norm: EN 13501-1:2009 UNI EN ISO 11925-2:2005 UNI EN 13238:2010, UNI EN 13328:2014	21.03.2016 - Istituto Giordano Nr. 332289 Nr. 332290 Nr. 332291
UV test	Arizona Sun Test - 30 MJ/m <sup>2</sup> UNI EN ISO 4892-2:2013, UNI 8941-3:1987	09.03.2016 - Istituto Giordano Nr. 332001
EMC test	Test acc. to norm: EN 61000-6-2, EN 61000-6-3 und EN 50293	08.01.2015 - TÜV Wien Nr. M/EMV-15/101
IP test	Test on IP67 acc. to norm: CEI EN 60529:1997 + A1:2000 + A2:2014	15.03.2016 - Istituto Giordano Nr. 332101
Norms	ISO 3864-1 / ISO 3926 / IEC 50171 / EN 1838 / IEC 60754-1/2 / IEC 61034 / IEC 60304 / IEC 60332 / EC 50267-2-1 / IEC 50268-2 / IEC EN 60204-1	