TÜVRheinland CERTIFIED

LEADERGRATE
GRP PRODUCTS

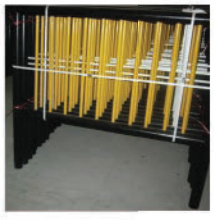
Fabricated by
المستقبل
AL MUSTAQBAL FIBERGLASS IND.

FRP HANDRAIL, LADDER AND FENCING SYSTEMS

LeaderRail

LeaderLadder

LeaderFence



CONTENT

GENERAL INFORMATION

Leadergrate's corrosion resistant fiberglass products are found throughout the world in a variety of applications and industries where safety, low maintenance costs, easy installation, and long service life are essential.

Manufacturing Process

Pultrusion is a continuous molding process using fiber reinforcements with thermosetting resin matrices. Pre-selected reinforcement materials, such as fiberglass roving, mat, woven fabrics are drawn through a resin bath in which all material is thoroughly impregnated with a liquid thermosetting resin. Typical resins include polyester , vinylester and phenolics. The wet out fiber is formed to the desired geometric shape and pulled into a heated steel die. Once inside the die, the resin cure is initiated by controlling elevated temperatures. The laminate solidifies in the exact cavity shape of the die and is continuously pulled by the pultrusion machine.

Corrosion Resistant

Unlike conventional metals, Leadergrate products eliminate the rusting and corrosion problems associated with traditional materials. The corrosion resistance is achieved by the choice of the resin and is enhanced by adding chemical resistant veil to the external surface of the profiles. Additionally, special UV inhibitors included in the formulation provide extra protection from the effects of weathering. The choice of resin is shown in the table on the facing page.

GENERAL INFORMATION

RESIN TYPE	CORROSION	FLAME SPREAD RATING ASTM E84	MAX. OPER. TEMP
Type MP-5 , Phenolic	Used in confined spaces , subways , offshore , oil fields where the fire resistance and low smoke and low toxic fumes is the premium concern	Class 1 , 5 or less	180 °C
Type VEFR-10 , Vinylester	Provides the most chemical resistance in the industry , it is primarily used in petro-chemical ,waste water , mining and plating application where the product is in direct contact with harsh chemical and sewage .	Class 1 10 or less	110 °C
Type VEFR-25 , Vinylester	Provides the most chemical resistance in the industry , it is primarily used in petro-chemical ,waste water , mining and plating application where the product is in direct contact with harsh chemical and sewage .	Class 1 25 or less	110 °C
Type FG-30 Isophtalic	Food Grade corrosion resistance and fire Retardant	Class 1 30 or less	105 °C
Type IFR-10, Isophtalic	Provides intermediate level of chemical resistance where the product is subject to splash and spill contact with harsh chemicals , sea water .	Class 1 10 or less	85 °C
Type IFR-25 , Isophtalic	Provides intermediate level of chemical resistance where the product is subject to splash and spill contact with harsh chemicals , sea water .	Class 1 25 or less	85 °C
Type CFR-25 Orthophtalic	Moderate corrosion resistance and fire retardant for normal application	Class 1 25 or less	60 °C

IMPORTANT FEATURES

1 Easy Installation and Maintenance

There is no need for heavy equipment or expensive tools since Leadergrate handrail and ladder systems are less than half the weight of steel. Lighter weight means lower shipping costs and less manpower for installation. Products can be fabricated or adjusted at site without any need for welding, scraping, sandblasting, painting, pickling or passivation. They are virtually maintenance free.

2 Mechanical resistance

FRP material weight is one third to one half of its steel counterpart. Our handrails and ladders get their strength from a high percentage of glass (55%-70 %) within the laminate, providing durability, high unidirectional strength, and stiffness.

Our Handrail meets the load requirement of OSHA standard, section 1910.23 for concentrated load of 90.6 kgs applied at any point at the top rail or uniform load of 75 kgs/m applied horizontally.

Our ladder meets the load requirement of OSHA standard, section 1910.27 for min design live load of 300 kgs.

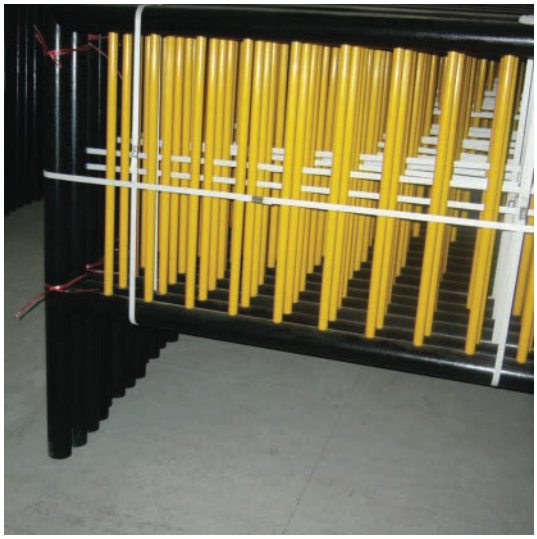
3 UV resistant and Durability

Our products are suitable for 100 % humidity and temp > 55ºC and UV resistant by adding UV inhibitor in the resin and a synthetic veil to the external layer, hence creating a resin rich surface. However, to avoid degradation of the surface after many years, a UV stabilized urethane coating may be applied to the finished product. Our indoor handrail and ladder are unpainted; the Urethane coating is recommended for outdoor application at high temperature 45-55 degrees and for longer service life.

IMPORTANT FEATURES

4 Non Conductive and Fire Retardant

Leadergrate handrails and ladders are electronically and thermally non conductive, and are fire retardant for a safer work environment. Our products meet the self-extinguishing requirements of ASTM-E 84, and have a class 1 flame spread rating of 25 or less. Because our systems are non-metallic, electromagnetic and radio wave frequencies are completely unaffected.



5 A variety of color choices

The standard color is safety Yellow, butany system can be custom ordered to your specific color requirements.

6 Quality Assurance

All Leadergrate handrail and ladder system are manufactured under a strict quality control program. This program coincides with our mission to offer the highest quality products and services and to continue to excel in research and development for new products.

LEADERRAIL
HANDRAIL SYSTEMS

Leadergrate meets your requirements, from small platforms to complex structures, with high-strength, maintenance free handrail that are ideal for any location.
We offer three handrail systems that meet a variety of needs. We have the capability to design, manufacture, and fabricate a custom system.

Areas of Applications for Fiberglass Handrail

- Offshore & marine
- Petro-chemical & refining
- Communications
- Water / Wastewater
- Transportation & transit
- Aerospace
- Automotive
- Mining
- Metal plating
- Food & beverage
- Water parks And Zoos
- Shipping
- Aquariums
- Textile

Engineering

Leadergrate in house engineering and drafting capabilities ensure that custom projects meet custom specifications with quality and accuracy for every phase: Design, fabrication and installation.

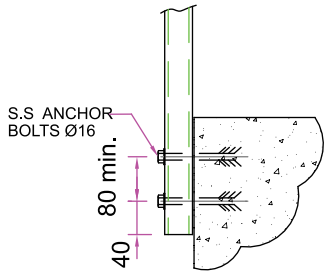
Code Compliant

All LeaderRail Handrail Systems meet or exceed the following specifications and building codes:

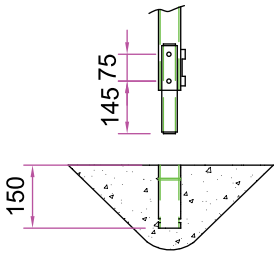
- OSHA, Section 1910.23
- BOCA Basic Building Code, Section 1615.8

TYPICAL DETAILS

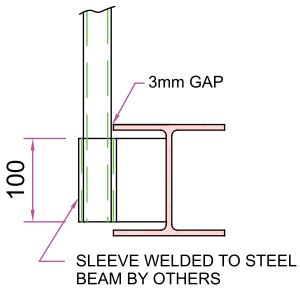
Sketch #1
Post to concrete (side mounting)



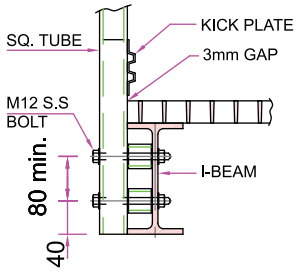
Sketch #2
Post to concrete (embedded)



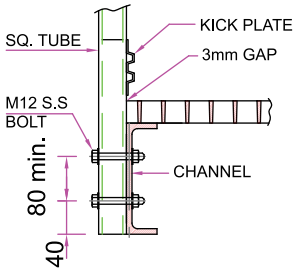
Sketch #3
Removable post (sleeve) on structural steel



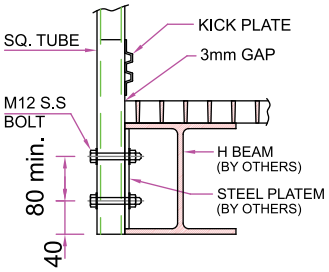
Sketch #4
Post to FRP or Steel I-Beam



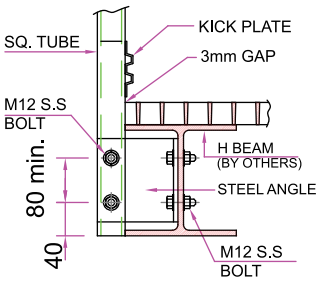
Sketch #5
Post to FRP or Steel Channel



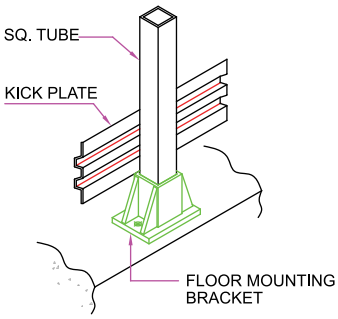
Sketch #6
Post to FRP or Steel H-Beam Parallel plate



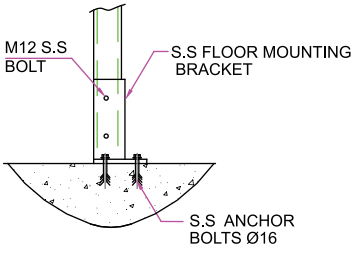
Sketch #7
Post to Steel angle on FRP or Steel H-beam perpendicular plate



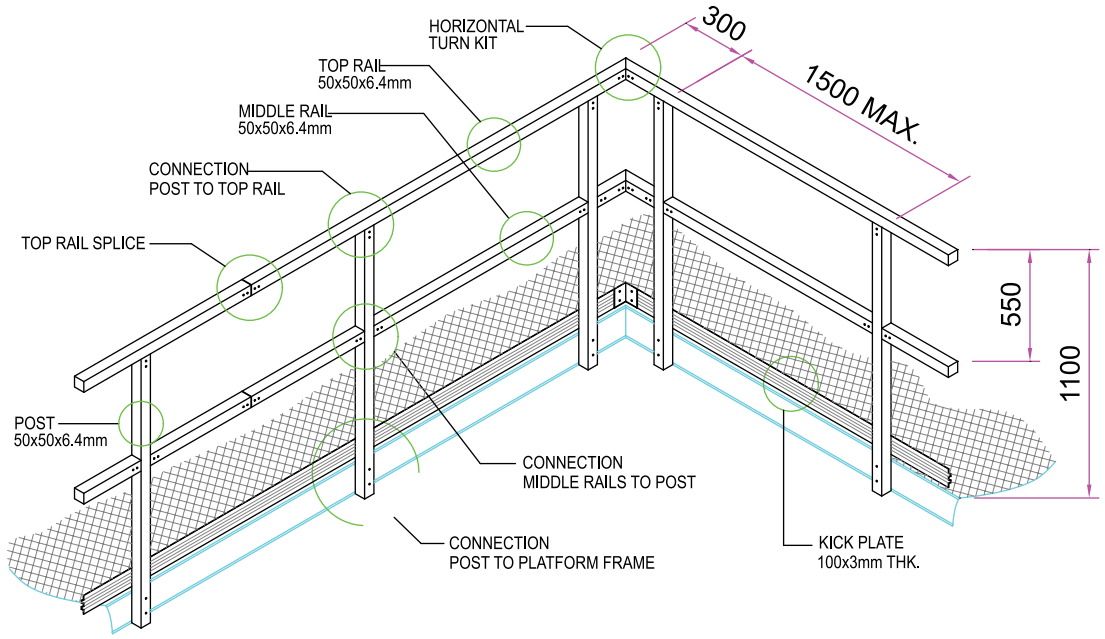
Sketch #8
Top Mount GRP Stanchion base



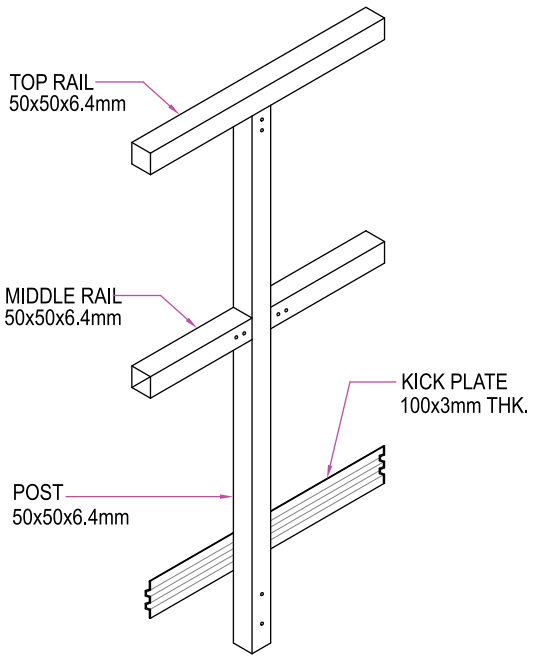
Sketch #9
Top Mount S.S. Stanchion base



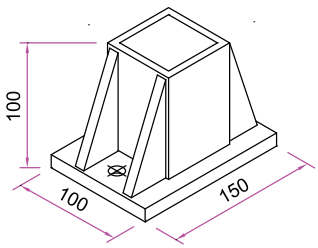
FRP STANDARD HANDRAIL SYSTEM



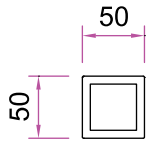
FRP Handrail (ISOMETRIC VIEW)



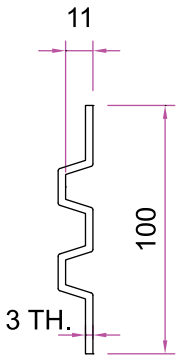
TYPICAL DETAIL



FLOOR MOUNTING BRACKET

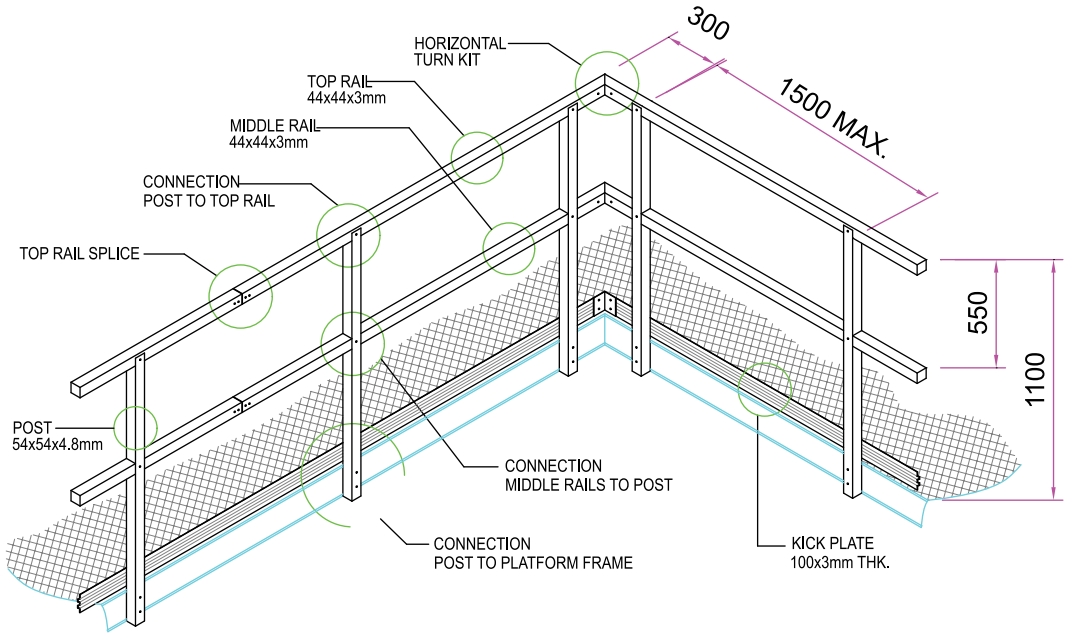


HANDRAIL POST
TOP & MIDDLE RAILS

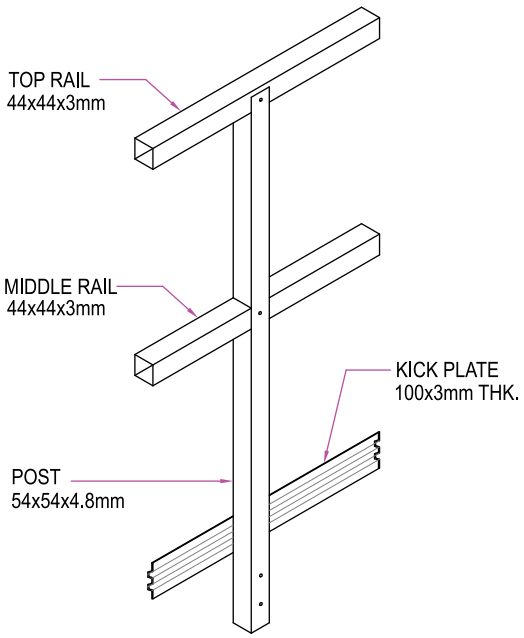


KICK PLATE

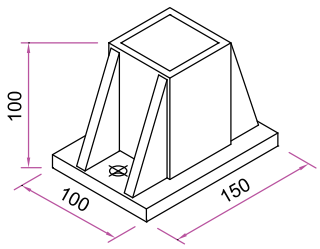
FRP ALTERNATIVE HANDRAIL SYSTEM



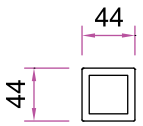
FRP Handrail (ISOMETRIC VIEW)



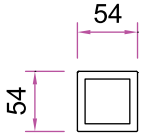
TYPICAL DETAIL



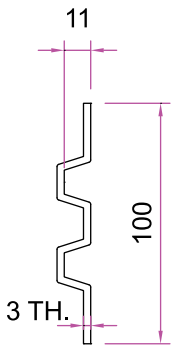
FLOOR MOUNTING BRACKET



TOP & MIDDLE RAILS



HANDRAIL POST



KICK PLATE

LEADERLADDER
SAFETY LADDER SYSTEMS

Designed for easy installation and fabrication, LeaderLadder meets or exceeds OSHA requirements with durable construction and corrosion-resistant materials.

Advantages

LeaderLadder Systems are one-third the weight of steel and require less maintenance and upkeep. That's because they're manufactured with the optimal combination of fiberglass rovings and isophtalic polyester or vinylester resins, ensuring a long, corrosion-free life.

Leadergrate has engineered two basic ladder systems. Our standard Fiberglass ladder offers the necessary rigidity and safety when structural stand-off supports are capable of being provided at regular and close intervals. However, in some cases, stand off supports cannot be provided at regular intervals, thus requiring the ladder to span much longer distances. In order to comply with OSHA standards for ladder safety and design, leadergrate offers stiffened ladder to meet these needs. All our ladders are designed for ease fabrication and installation, while offering the maximum corrosion resistance.

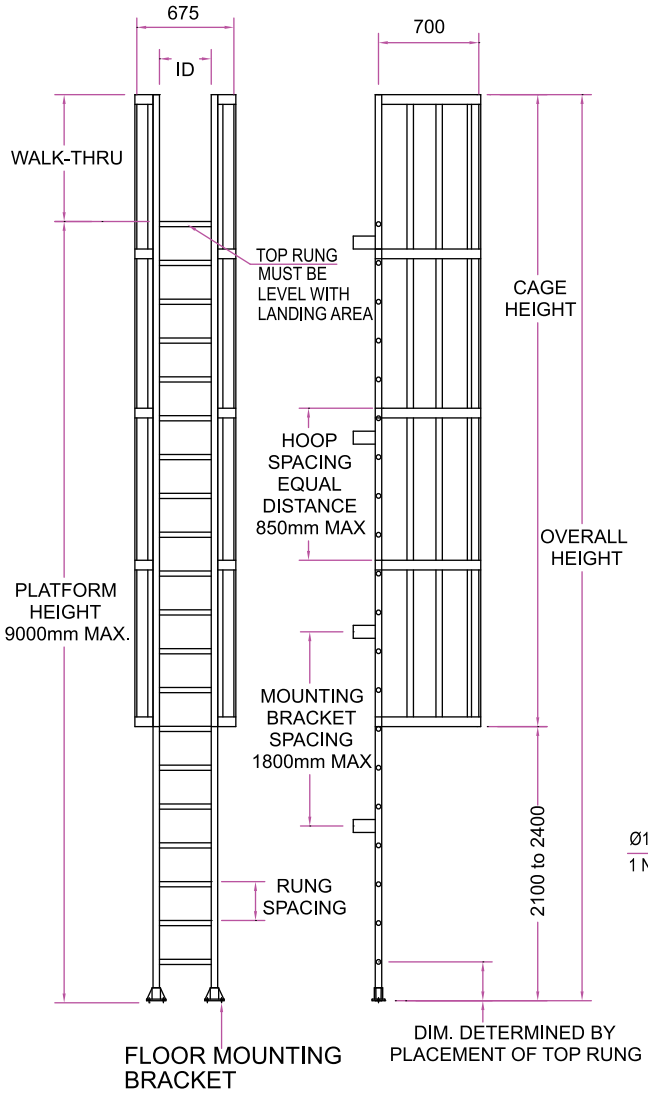
LEADERLADDER
SAFETY LADDER SYSTEMS

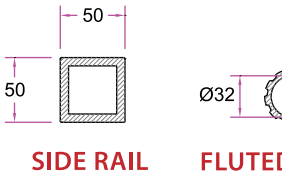
Design / Standard

LeaderLadder meets the following minimum requirement of OSHA code, section 1910.27:

- Minimum design live load shall be a single concentrated load of 300 kgs.
- Distance between rungs shall not exceed 300 mm.
- Minimum distance between side rails shall be minimum 400 mm.
- The safety cage is required on ladders of more than 6 m to a maximum unbroken length of 9 m.
- The safety cage to extend minimum of 1050 mm above top of lading.
- The safety cage to begin minimum 2100 mm to maximum 2400 mm above base of ladder (floor).
- The safety cage shall not extend less than 675 mm nor more than 700 mm from the centerline of the rungs of the ladder. Cage shall not be less than 675 mm in width.
- The distance between hoop cages shall be maximum 850 mm.
- The wall mounting brackets shall be spaces at maximum 1800 mm.
- Vertical bars shall be located at a maximum spacing of 40 degrees around circumference of the cage; this will give a maximum spacing of approximately 238 mm center to center.
- In certain location, where safety is a major concern, our safety cage shall have a fiberglass net manufactured by pultrusion process instead of vertical bars, average thickness 3 mm fixes on the GRP cage hoops, to provide extra safety for technicians.

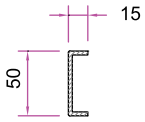
FRP SAFETY LADDER



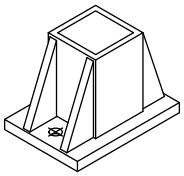


SIDE RAIL

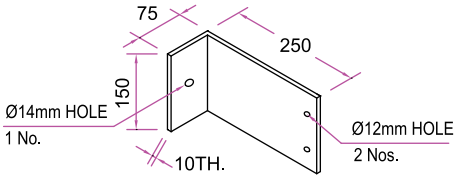
FLUTED TUBE (Rung)



C-CHANNEL (Vertical bar)

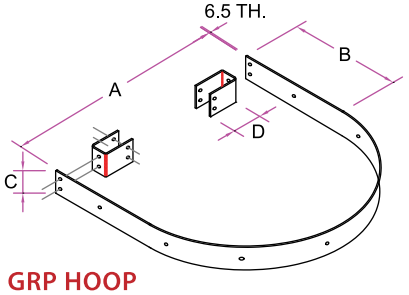


FLOOR MOUNTING BRACKET



WALL MOUNTING BRACKET

Ladder Height (in mm) for RS25	Wall Mounting Bracket Qty. Required	Ladder Height (in mm) for RS30	Wall Mounting Bracket Qty. Required
1800 - 3600	2 Sets	1500 - 3000	2 Sets
3750 - 5400	3 Sets	3125 - 4500	3 Sets
5550 - 7200	4 Sets	4625 - 6000	4 Sets
7350 - 9000	5 Sets	6125 - 7500	5 Sets
9150 - 10800	6 Sets	7625 - 9000	6 Sets



GRP HOOP

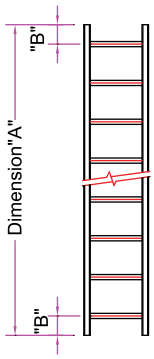
HOOP KIT Ladder Width	A	B	C	D	CODE
400	675	437	75	137	HK40
450	675	437	75	112	HK45
500	675	437	75	87	HK50

GRP LADDERS

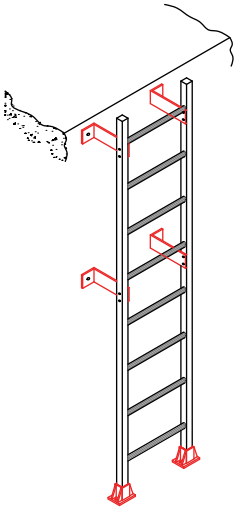
LADDER WIDTH	400	450	500
CODE	LW40	LW45	LW50

RUNG SPACING	250	300
CODE	RS25	RS30
"B" (in mm)	125	150

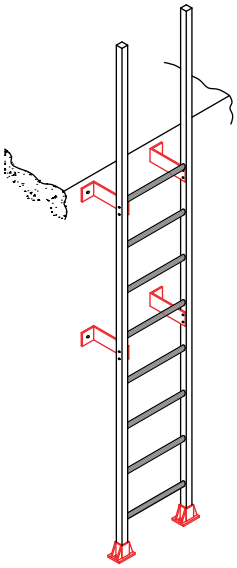
LADDERS	Height	Code	Height	Code
"A" (in mm)	1500	LH15	1800	LH18
	2000	LH20	2400	LH24
	2500	LH25	3000	LH30
	3000	LH30	3600	LH36
	3500	LH35	4200	LH42
	4000	LH40	4800	LH48
	4500	LH45	5400	LH54
	5000	LH50	6000	LH60
	5500	LH55	6600	LH66
	6000	LH60	7200	LH72
	6500	LH65	7800	LH78
	7000	LH70	8200	LH82



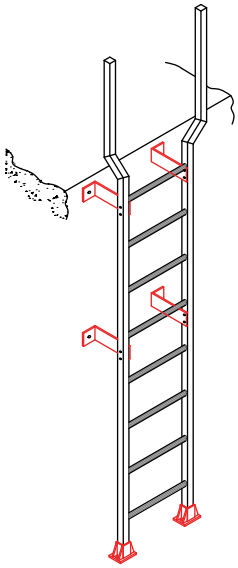
ASSEMBLY & MOUNTING DETAILS



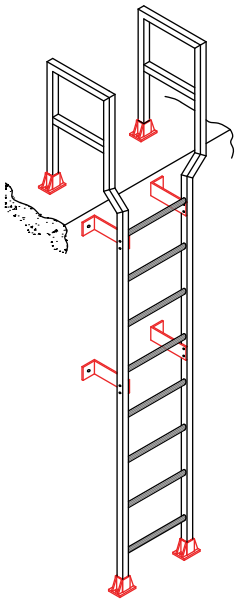
Ladder 400mm



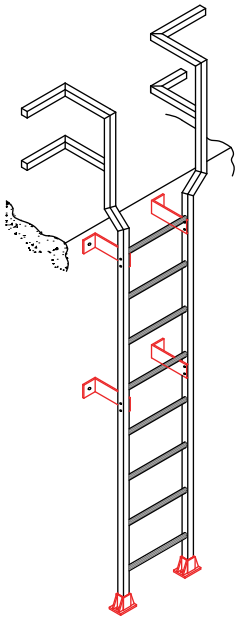
Ladder with 450/500mm Walk-thru



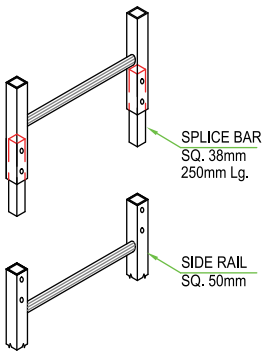
Ladder with 575mm Walk-thru



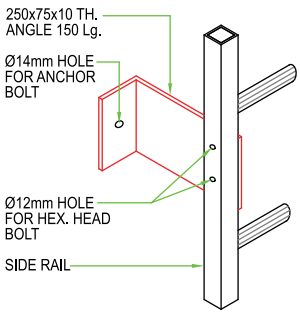
Ladder with Walk-thru and Handrail Connections to floor



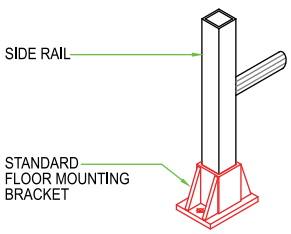
Ladder with Walk-thru and Handrail Connections



Ladder Splice Kit



Standard Wall Mount Kit



Floor Mount Kit

LEADERFENCE

LEADER FENCING SYSTEMS

LeaderFence is particularly used in the area where electric insulation and corrosion resistance are necessary.

Our products are used inside and outside plants and electric plants to circumscribe voltage devices. Besides being insulating, electro-magnetically transparent and non-conductive, our fencing panels are maintenance free, and do not need grounding or painting.
Our fencing are used in Electric power plants, geothermal plants, transformers, railway substations, railway tunnel recesses and others.

MESH	DIMENSIONS OF PANEL (MM)	VERTICAL SUPPORT	DISTANCE BETWEEN VERTICAL SUPPORT
Type 1 Mesh mm 38x38 Thickness 13 mm	1220x2440 915x3050	Square profile 54x54x4.8 mm	1274 969
Type 2 Mesh mm 50x50 Thickness 13 mm	1220x2440 915x3050	Square profile 54x54x4.8 mm	1274 969
Type 3 Mesh mm 40x40 Thickness 25 mm	1007x3007	Square profile 54x54x4.8 mm	1061
Type 4 Mesh mm 100x25 Thickness 25 mm	1220x2440 915x3050	Square profile 54x54x4.8 mm	1274 969
Type 5 Mesh mm 33x33 Thickness 3 mm	2500x2000	Square profile 54x54x4.8 mm Horizontal profile 82x29x4x2.5 mm	2554
Type 6 Mesh mm 33x66 Thickness 3 mm	2500x2000	Square profile 54x54x4.8 mm Horizontal profile 82x29x4x2.5 mm	2554

MARKET APPLICATIONS

Leadergrate's products and services have been successfully used in various applications in many different industries. Wherever there is value placed on safety, eliminating maintenance expenditures, ease installation, and long service life, leadergrate should be consulted.

The following are industries and locations where our products are used :

- Offshore drilling & production facilities as wellhead access platforms around the wells and vessels, stair towers, grating systems, electrical cable trays and mudmats.
- Petrochemical Plants and refineries as walkways, catwalks around vessels and equipment, stair towers, and trench grating.
- Industrial & municipal wastewater facilities as walkways, catwalks, in and around clarifiers, settling basins, and platforms used as storage areas.
- Metal plating and mining facilities as platforms in the processing areas, catwalks, stair towers and storage areas.
- Commercial warehouse as additional storage areas and mezzanines.
- Beverage & food processing plants as grating systems and platforms in and around the wash-down areas, access platforms and storage areas.
- Water park & swimming pools as trench grating in and pools, structural systems for the flowing streams.
- Cooling tower industry as access walkways and towers, de-misters.
- Power plant & desalination plants as platforms, grating systems around chemical dosing plants, sea water tank, fencing etc...
- Aquarium, Zoos & Abattoirs as standing platforms for animals, fencing, cages.
- Service underground tunnels & metro as walking platforms for technicians.
- Residential Building as fencing, false ceiling, raised floor, external cladding.
- Marina as pontoons, ramps, jetties, access bridges, walkways, boat docks, bridge decks.
- Ships as storage area for fish, walkways, platforms.

MARKET APPLICATIONS

FRP HANDRAIL

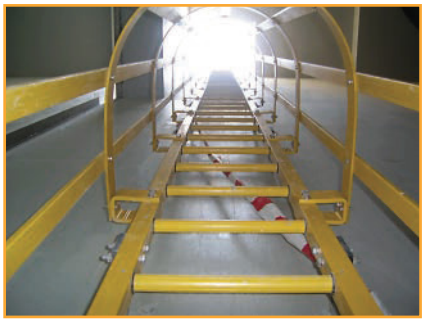
FRP SQUARE HANDRAIL

FRP ROUND HANDRAIL

FRP LADDERS

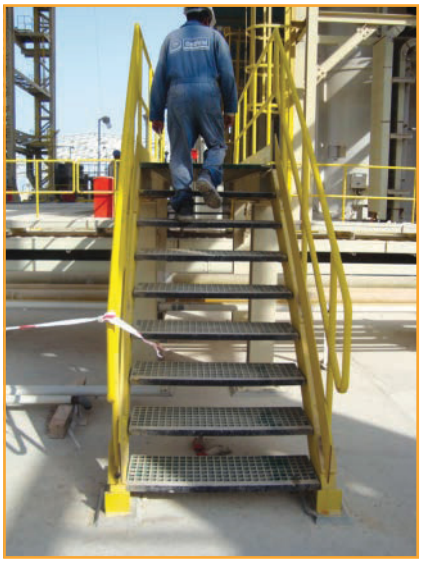
FRP TOP WALKTHROUGH

FRP FENCING



FRP SAFETY CAGE

MARKET APPLICATIONS



FRP STAIRCASE

FRP DOOR

FRP STAIRCASE

FRP LADDER WITH SAFETY CAGE

FRP LADDER ON PLATFORM

LEADERGRATE
GRP PRODUCTS

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