

Dynarail® FRP Handrail & Ladder

Products Brochure



High Performance Composite *Solutions*



Low
Install
Cost

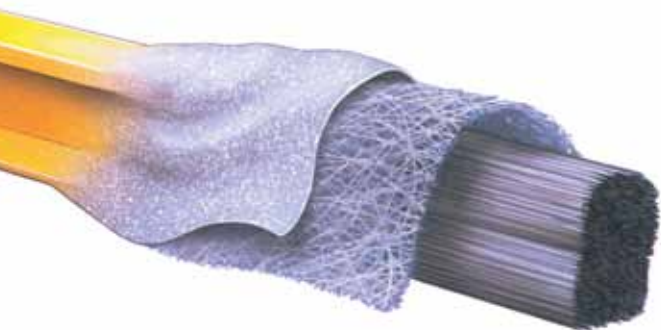
Dynarail® FRP Products



Combining corrosion resistance, long life and a low maintenance design, Dynarail® handrail and ladder systems are superior to conventional metallic systems. These advanced systems are designed and manufactured to be easily installed with no guesswork involved. Components are lightweight and easy to fabricate. Savings on labor and equipment often make the total installed cost of Dynarail comparable to that of steel. Combining its low cost of installation with low maintenance and long life, Dynarail offers a life cycle cost that is significantly lower than that of its counterparts.

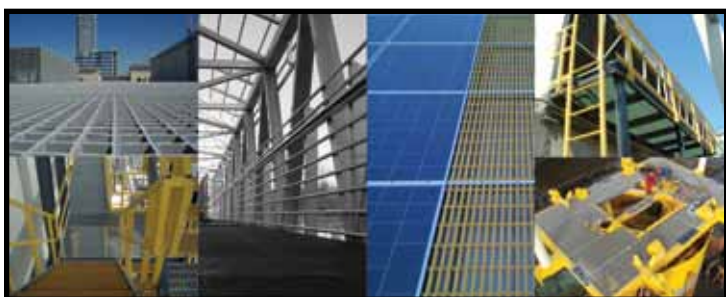


The Dynarail handrail line includes everything needed to install OSHA- and IBC-compliant horizontal and inclined handrail systems with either two or three rails. Fibergrate also can provide specialty picketed handrail systems. The Dynarail ladder line includes ladders, standard walk-thrus and safety cages. Fibergrate's newest ladder product is a retractable walk-thru for applications such as manholes, pits or indoor roof access points where covers are used. Fibergrate's complete line of Dynarail products offer a variety of solutions for most applications.



Dynarail components including the railing, kickplate and ladder rungs, are manufactured using the proven Fibergrate pultrusion process. In this process, continuous fiber rovings and mat as well as a synthetic veil are mechanically drawn through a resin bath and shaped through a series of forming guides, then pulled through a heated die.

Fibergrate Markets



- Architectural
- Bridge & Highway
- Chemical
- Commercial
- Food & Beverage
- Manufacturing
- Metals & Mining
- Microelectronics
- Oil & Gas
- Pharmaceutical
- Power
- Pulp & Paper
- Recreation
- Telecommunications
- Transportation
- Water & Wastewater

Dynarail® Benefits



Corrosion Resistant: Dynarail® fiberglass handrail and ladder products are known for their ability to provide corrosion resistance in the harshest environments and chemical exposures.



Slip Resistant: Ladder rungs include heavily serrated flutes for positive, slip resistant footholds; also ungritted rungs are easy on the hands, while still ensuring safety.



Low Maintenance: The corrosion resistant properties of FRP grating and other products reduce or eliminate the need for sandblasting, scraping and painting. Products are also easily cleaned with a high pressure washer.



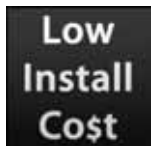
Fire Retardant: Flame spread rating of 25 or less, as tested in accordance with ASTM E-84, and meets the self-extinguishing requirements of ASTM D-635.



Electrically & Thermally Non Conductive: Fiberglass is electrically non conductive for safety and has low thermal conductivity which results in a more comfortable product when physical contact occurs.



Long Service Life: Fiberglass products provide outstanding durability and corrosion resistance in demanding applications, therefore providing improved product life over traditional materials.



Low Install Cost: Due to ease of fabrication and light weight, FRP handrail and ladders eliminate the need for heavy lifting equipment. Components are also labeled with tags that correspond to engineering drawings to ensure time efficient and accurate installation.



UV Protection: UV inhibitors in the resin matrix, along with a synthetic surfacing veil, provides optimum protection from the structural effects of UV weathering. *(An optional UV coating is required for installations with intense UV exposure.)*



NSF® Standard 61-Certified:

Fibergrate is now able to offer NSF Standard 61-Certified Dynarail® FRP handrail and ladder systems. These products complement the complete line of NSF Standard 61-Certified Fibergrate®

molded gratings, Dynaform® fiberglass structural shapes, and Safe-T-Span® pultruded gratings assembled from NSF Standard 61-Certified components. Molded gratings are available in all Fibergrate® molded grating mesh patterns and thicknesses, except Ecograte® and 4' x 12' Micro-Mesh® panels.



Heavy Metal Safe:

The EPA, OSHA and other regulatory agencies created to

protect our lives and our natural resources have increased legislation to control heavy metals such as lead, chrome, cadmium and other metals in all products where exposure is a health threat. Fibergrate Composite Structures Inc. supports this strengthened legislation and has, for more than 20 years, voluntarily tested for heavy metals in our products and minimized or eliminated heavy metals from our products.

Dynarail Resin Systems

- **ISOFR (Handrail):** Isophthalic polyester resin formulation with a low flame spread rating of 25 or less designed for applications where there is moderate exposure to corrosive elements.
- **VEFR (Ladders & Handrail):** Vinyl ester resin system with a flame spread of 25 or less for dependable resistance to both acidic and alkaline environments.

Dynarail® FRP Handrail

Dynarail Modular Handrail

Dynarail modular handrail provides the look and performance of a custom rail system in an easily assembled, cost-effective package. Available in easy-to-use kits, the modular kits include step-by-step installation instructions. Dynarail is expertly engineered to use the fewest number of handrail components of any system available facilitating an easier, faster installation with less chance of error. Kits include everything needed for a quality installation requiring only minimal assembly skills, less labor and common hand tools. Posts are pre-routed to accept continuous rails, eliminating the need for extra pieces to connect rails to posts. Utilizing modular kits eliminates time-consuming fabrication and field modification associated with using stock lengths.



Dynarail Unique Handrail Solutions

Fibergrate has the capability to turnkey (design, manufacture, fabricate and install) a wide range of handrail projects, from the smallest platform to massive, complex structures; from basic stairways to ADA compliant systems. To meet the requirements presented by such projects, Fibergrate employs a staff of engineers and technicians highly experienced in computerized design. This design group, well versed in all phases of FRP handrail mounting conditions and special connections, provides the Fibergrate customer with accurate, concise drawings that meet the specifications of the project.

Fibergrate can also offer design, engineering, fabrication, and installation of specialty solutions and picketed handrail, segmented platform handrails and other special systems.

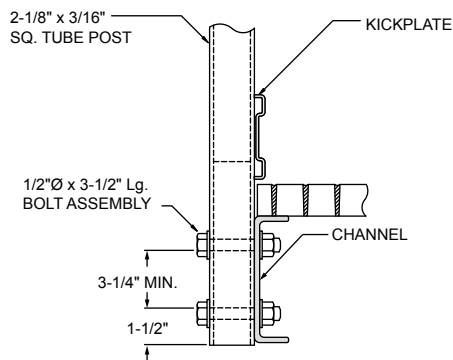


Dynarail® Post Installation Methods

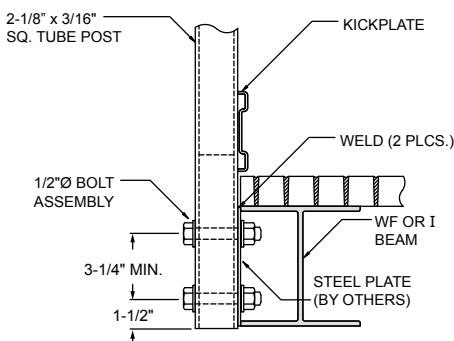
See page 7 for part numbers. For installation conditions not shown, contact Fibergrate.

All details are for posts spaced 6' max on centers to meet a F.O.S. of 2.0 under OSHA and IBC loads, unless noted otherwise.

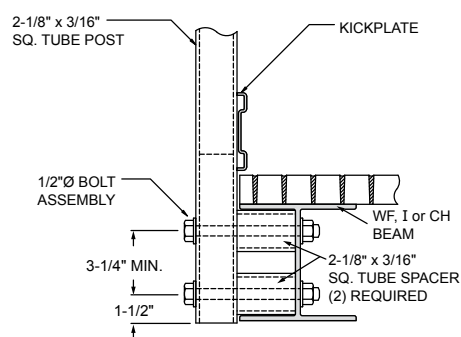
DRAWING A - POST TO FRP OR STEEL CHANNEL



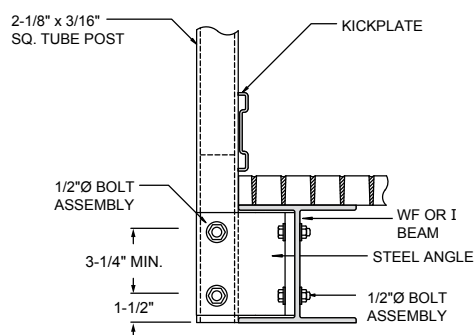
DRAWING B - POST TO STEEL PLATE ON STEEL BEAM



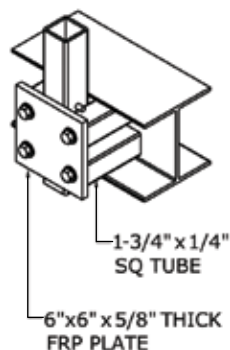
DRAWING C - POST TO FRP OR STEEL BEAM OR CHANNEL WITH FRP SPACERS



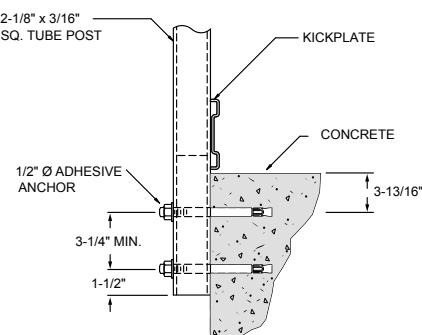
DRAWING D - POST TO STEEL ANGLE ON FRP OR STEEL BEAM



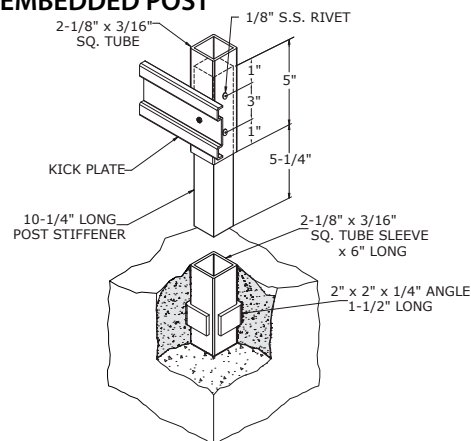
DRAWING E - REMOVABLE POST TO FRP OR STEEL BEAM



DRAWING F - SIDE-MOUNTED POST

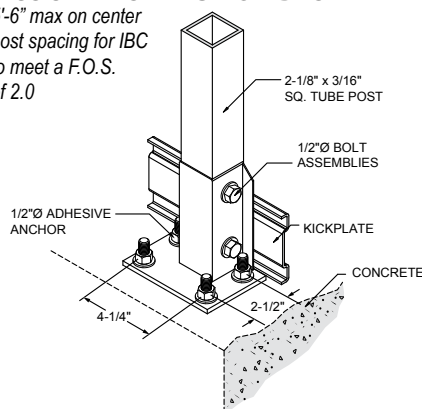


DRAWING G - EMBEDDED POST



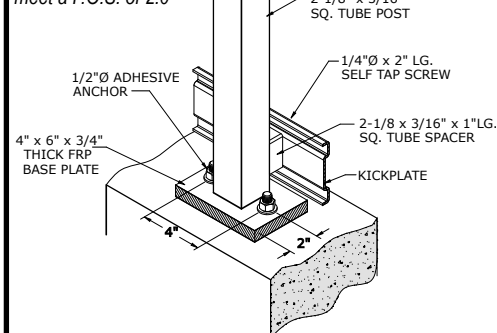
DRAWING H - TOP MOUNT STAINLESS STEEL STANCHION BASE

5'-6" max on center post spacing for IBC to meet a F.O.S. of 2.0



DRAWING I - TOP MOUNT FRP STANCHION BASE

4' max on center post spacing for IBC to meet a F.O.S. of 2.0

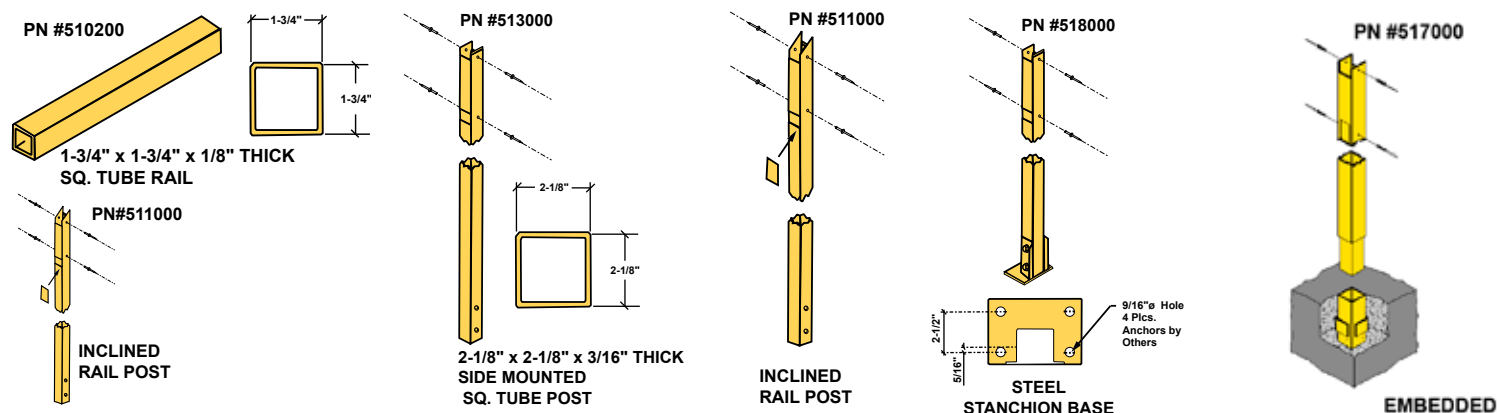
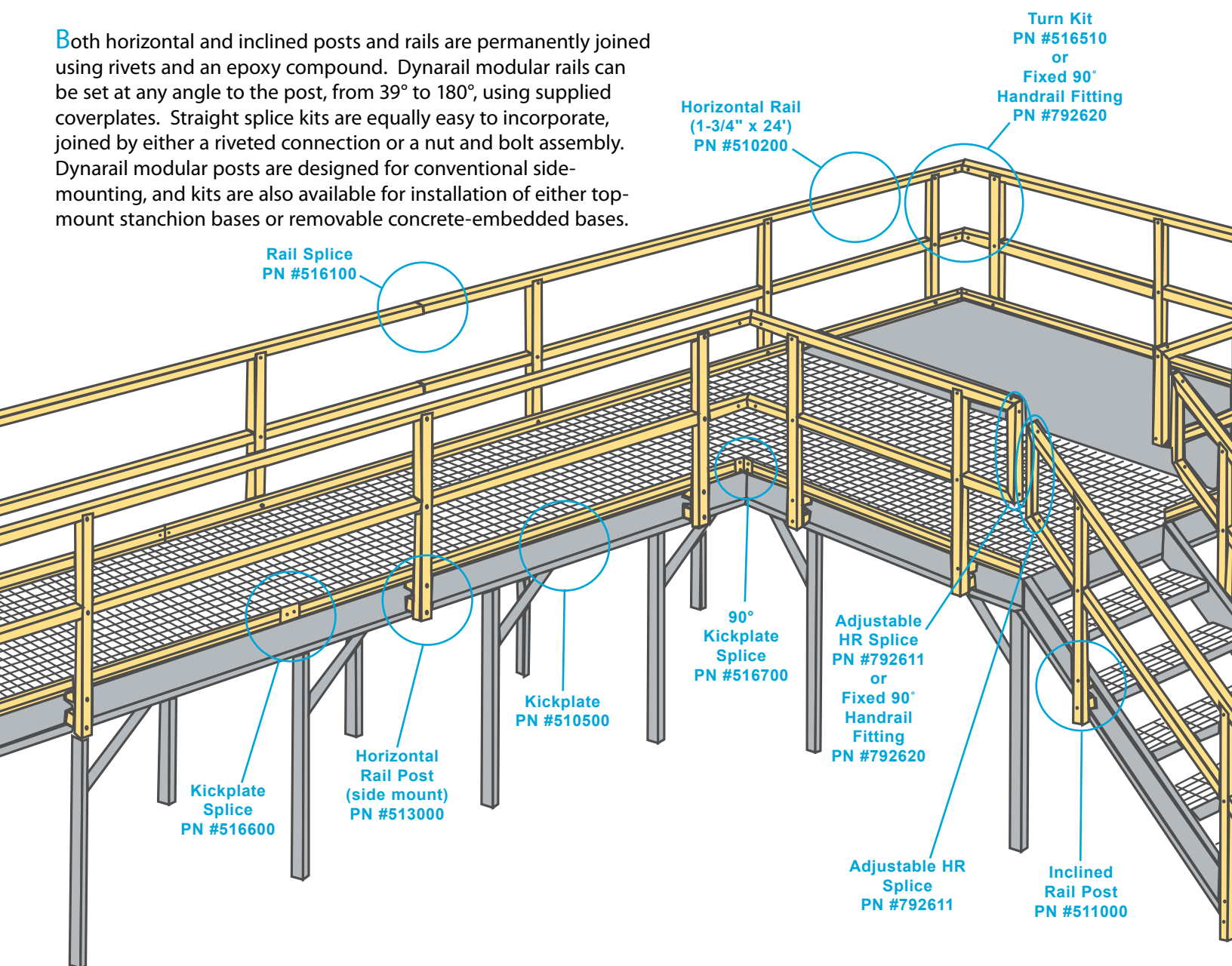


MAX PULLOUT FORCE ON EACH CONCRETE ANCHOR BOLT

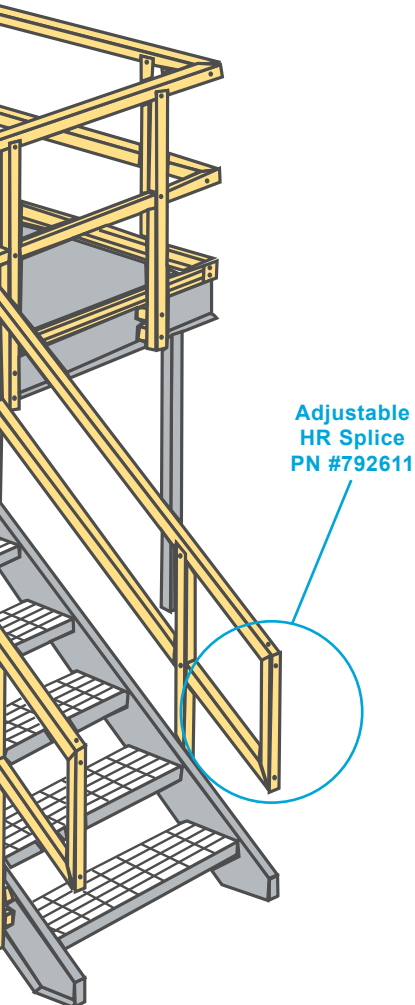
	Drawing F	Drawing H	Drawing I
OSHA (200lb)	2129 lbf	1292 lbf	2100 lbf
IBC (50 lb/ft)	3193 lbf	1777 lbf	2100 lbf

Modular Dynarail® FRP Handrail Systems

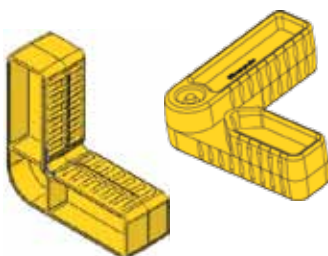
Both horizontal and inclined posts and rails are permanently joined using rivets and an epoxy compound. Dynarail modular rails can be set at any angle to the post, from 39° to 180°, using supplied coverplates. Straight splice kits are equally easy to incorporate, joined by either a riveted connection or a nut and bolt assembly. Dynarail modular posts are designed for conventional side-mounting, and kits are also available for installation of either top-mount stanchion bases or removable concrete-embedded bases.



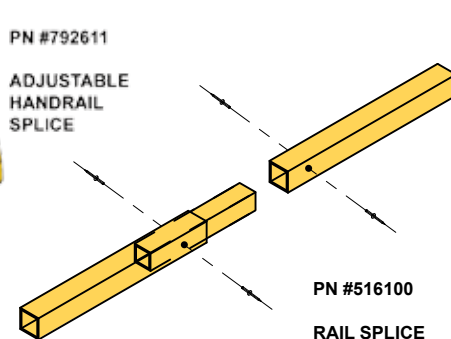
Modular Dynarail® FRP Handrail Systems



ASSEMBLY PART #	DESCRIPTION	
510500	Kickplate	9/16" deep x 4" high x 1/8" thick x 24' long
516600	Kickplate Splice Kit	1 ea. Splice 1-3/4" x 4" x 3/16" 2 ea. 1/4" x 1" x socket round head bolts, nuts and washers.
516700	Kickplate Splice Kit 90°	1 ea. Splice 2-1/8" x 1-1/8" x 3/16" 2 ea. 1/4" x 1" x socket round head bolts, nuts and washers.
511000	Post Kit (Inclined Rail)	1 ea. Post 2-1/8" x 3/16" x 45" high sq. tube 4 ea. Cover Plates 2-1/8" x 3-1/4" 4 ea. Rivets 18-8 SS
513000	Post Kit (Horizontal Rail) Side Mount	1 ea. Post 2-1/8" x 3/16" x 50-1/4" high sq. tube (undrilled) 4 ea. Rivets 1/8" x 3/8" 18-8 SS 1 ea. 1" Hex Washer Head Mach Screw
517000	Post Kit (Horizontal Rail) Removable Concrete Embedded	1 ea. Post 2-1/8" x 3/16" x 46-3/4" high 1 ea. 1-3/4" sq. bar extension 5" long 1 ea. Sleeve 2-1/8" x 3/16" x 6" sq. tube (ships loose) 4 ea. Rivets 18-8 SS 1 ea. 1" Hex Washer Head Mach Screw
518000	Post Kit (Horizontal Rail) Top Mount (SS Base)	1 ea. Post 2-1/8" x 3/16" x 40-1/4" high 1 ea. Stanchion Base 316 SS 2 ea. Bolts 1/2" x 3" and nuts 316 SS 4 ea. Rivets 18-8 SS 1 ea. 1" Hex Washer Head Mach Screw
518200	Post Kit (Horizontal Rail) Top Mount (FRP Base)	1 ea. Post 2-1/8" x 3/16" x 40-1/4" high 1 ea. Stanchion Base FRP 1 ea 2-1/8" x 3/16" Sq. Tube Kickplate Spacer 1 ea. 1/4" Hex Bolt Assembly 4 ea. Rivets 18-8 SS
510200	Rail	1-3/4" x 1/8" x 24' long sq. tube
792611	Adjustable HR Splice	1 ea. Adjustable from 39° to 180°
516100	Rail Splice Kit	1 ea. Splice 1-1/2" sq. tube 4 ea. Rivets 18-8 SS
516510	Turn Kit	2 ea. Adjustable HR Splices 8 ea. Rivets 18-8 SS
510100	Spacer Material	21' of 2-1/8" x 3/16" yellow sq. tube
Bonding material should be ordered with each shipment of handrail material. Order 1 kit (# 549100) for every 15 posts		
SI Conversions: inch = 25.4 mm 1 foot = .305 m 1 mm = .0394 inches 1 meter = 3.28 feet		

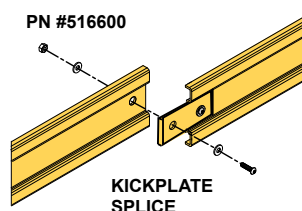


PN #792620
FIXED 90°
HANDRAIL FITTING

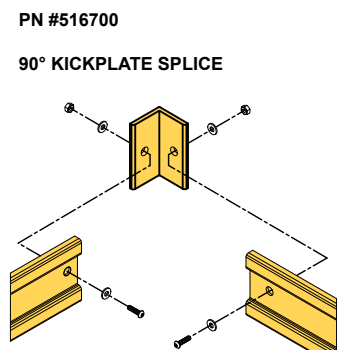


PN #792611
ADJUSTABLE
HANDRAIL
SPLICE

PN #516100
RAIL SPLICE



PN #516600
KICKPLATE
SPLICE



PN #516700
90° KICKPLATE SPLICE

Dynarail® FRP Safety Ladders

Advantages

The innovative Dynarail® fiberglass reinforced plastic (FRP) safety ladder and cage system meets or exceeds OSHA requirements. Dynarail cage components are shipped in compact kit form - not large, bulky units prone to damage. The safety cage is ready for field assembly with predrilled hoops for fast and easy attachment to the ladder and vertical safety bars.

Ladders are stocked in standard heights of 8', 10', 12', 14', 16', 18', 20' and 24' and are available in taller heights using splice kits. Ladders may be ordered with or without safety cage kits.



Safety First

Safety features are built in from the ground up. Special clip angles have been developed to securely anchor the ladder. Intermediate stand-off brackets laterally stabilize the ladder to the supporting structure on 6' centers. Ladder rungs include heavily serrated flutes for slip resistant footholds.

Durable FRP Construction

Standard Dynarail ladders and cages are manufactured with ISOFR yellow Dynaform® pultruded structural shapes. This creates a lightweight ladder system offering long life and low maintenance service.

Custom Solutions

In addition to Dynarail standard ladder cage configurations, special details can be custom fabricated. These include single or double side dismounts to platforms, special stand-off distances, self-supporting returns and handrail connections for additional worker safety.



Technical Information

OSHA Requirements for Ladders & Ladder Systems

From the Code of Federal Regulations dated July 1, 1995, Title 29, Labor, 1910.27

Installer is responsible for referring to most current OSHA Code for complete information.

1. (a)(1)(i) 200 lb concentrated load (minimum at center of rung)
2. (b)(1)(ii&iii) Distance between rungs maximum 12", minimum clear width between siderails of 16"
3. (c)(4) Distance from the centerline of rungs to wall in back of ladder shall be not less than 7"
4. (d)(1)(ii) Cage required on ladders of more than 20' to a maximum unbroken length of 30'
5. (d)(1)(iii) Cage to extend minimum of 42" above top of landing
6. (d)(1)(iv) Cage shall begin minimum 7' to maximum 8' above base of ladder (floor)
7. (d)(1)(v) Cage shall not be less than 27" in width
8. (d)(1)(v) Cage hoop vertical bars shall be located at a maximum spacing of 40° around the circumference of the cage

Technical Data

(Except where noted, all materials are yellow vinyl ester, fire retardant (VEFR))

LADDER:

Maximum length without splice	24'-0"	Outside Diameter of rung	1-1/4"
Maximum ladder length with cage	33'-6"	Inside Diameter of rung	7/8"
Clear inside width (inside rail to rail)	18"	Rail - outside width	1-3/4"
Outside width (outside rail to rail)	21-1/2"	Rail - wall thickness	1/4"
Rung Spacing (center to center)	12"	Weight per foot (approximately)	2.7 lbs.

CAGE:

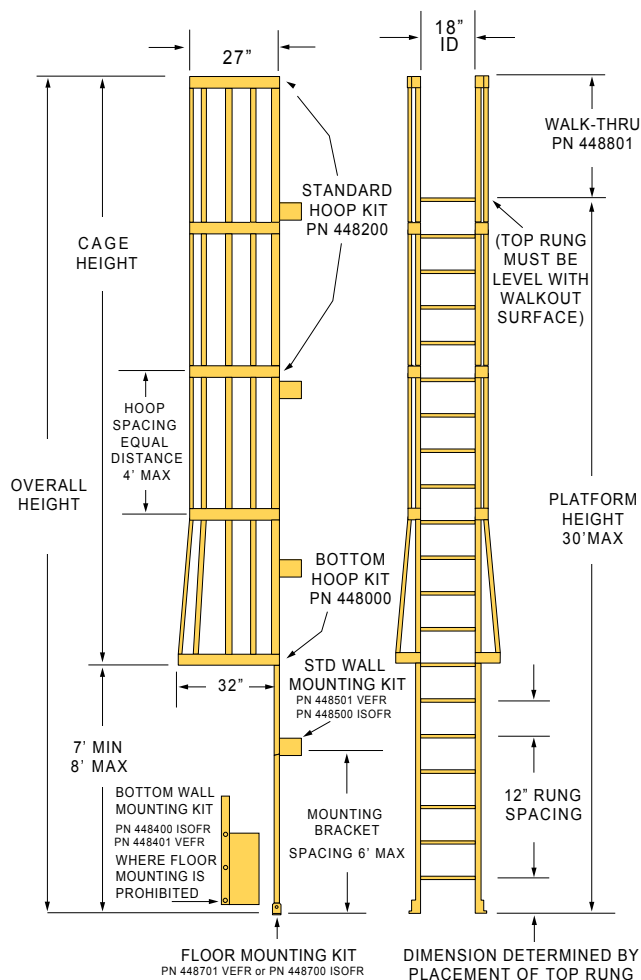
Product	Description
Standard Hoop Kit (PN 448200)	27" from center line of ladder rung to inside of hoop 3" wide x 1/4" thick hand layup Predrilled holes (<i>with necessary bolt assemblies</i>)
Bottom Hoop Kit (PN 448000)	31" from center line of ladder rung to inside of hoop 3" wide x 1/4" thick hand layup Predrilled holes (<i>with necessary bolt assemblies</i>)
Hoop Brackets (Included with hoop kits)	1/4" thick, "U" shaped hand layup Predrilled holes (<i>with necessary bolt assemblies</i>)
Vertical I-Bars (PN 446211 - 10 ft; PN 446210 - 20 ft)	I-Bar, 1-1/2" deep x 5/8" flange x 1/8" thick
Bottom Wall Mount Bracket Kit* (PN 448400 ISOFR Dk Gray, PN 448401 VEFR Beige) <i>Required when ladder cannot be floor mounted</i>	3" x 7-7/8" x 3/8" angle, 18" long Two per set (<i>with necessary bolt assemblies</i>)
Wall Mount Bracket Kit* (PN 448500 ISOFR Dk Gray, PN 448501 VEFR Beige)	3" x 7-7/8" x 3/8" angle, 6" long 7" from wall to center of rung Two per set (<i>with necessary bolt assemblies</i>)
Floor Mount Clip Kit* (PN 448700 ISOFR Dk Gray, PN 448701 VEFR Beige)	4" x 4" x 3/8" angle, 2-3/4" long Two per set (<i>with necessary bolt assemblies</i>)

***NOTE:** Wall mount brackets and floor mount clips are predrilled with 9/16" diameter holes for 1/2" diameter anchor bolts only. **Anchor bolts not included.**

Dynarail® FRP Safety Ladders

Dynarail® Ladder System Data

Component Selection Guide



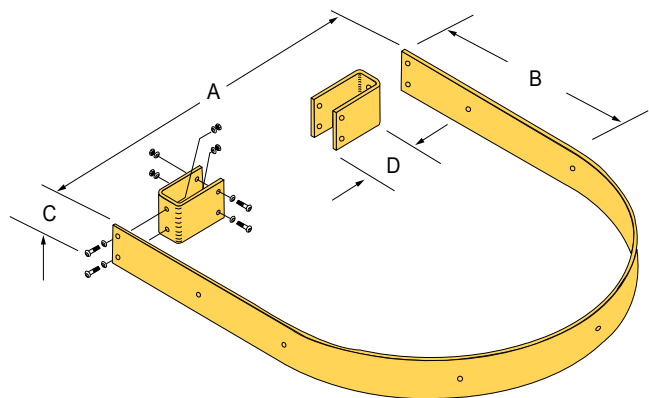
Cage Assembly Components

Cage Height	Hoops Required		Vertical I-Bars Required	
	Standard Hoop Kit PN 448200	Bottom Hoop Kit PN 448000	10' Vertical I-Bar PN 446211	20' Vertical I-Bar PN 446210
3' 0"	1	1	3	0
3' 6" to 4' 0"	1	1	1	1
4' 7-1/2"	1	1	4	0
4' 7-1/2" to 5' 3"	2	1	4	0
5' 6"	2	1	4	0
6' 0" to 6' 6"	2	1	0	2
7' 0"	2	1	2	2
7' 6"	2	1	0	3
8' 0" to 8' 10-1/4"	2	1	7	0
8' 10-1/4" to 10' 0"	3	1	7	0
10' 6" to 13' 1"	3	1	0	5
13' 1"	4	1	0	5
13' 6" to 14'	4	1	3	4
14' 6" to 17' 3-3/4"	4	1	0	7
17' 3-3/4" to 20' 0"	5	1	0	7
20' 0"	5	1	0	7
20' 6" to 21' 7/12"	5	1	1	8
21' 7/12" to 22' 6"	6	1	1	8
23' 0" to 24' 0"	6	1	4	7
24' 6" to 25' 10-1/2"	6	1	1	10
25' 10-1/2" to 26' 6"	7	1	1	10

Ladder Mounting Accessories

Ladder Height	Floor Mount Kits Required	Bottom Wall Mount Kits	Wall Mount Kits Required
ISOFR-DK GRAY VEFR - BEIGE	PN 448700 ISOFR PN 448701 VEFR	PN 448400 ISOFR PN 448401 VEFR	PN 448500 ISOFR PN 448501 VEFR
0" to 6"	1	1	1
6' 6" to 12' 0"	1	1	2
12' 6" to 18' 0"	1	1	3
18' 6" to 24' 0"	1	1	4
24' 6" to 30' 0"	1	1	5
30' 6" to 36' 0"	1	1	6

Dynarail® Hoop Data



Hoop Kit	PART NUMBER	A	B	C	D
Bottom	448000	35"	16"	3"	8.5"
Standard	448200	27"	16"	3"	4.5"

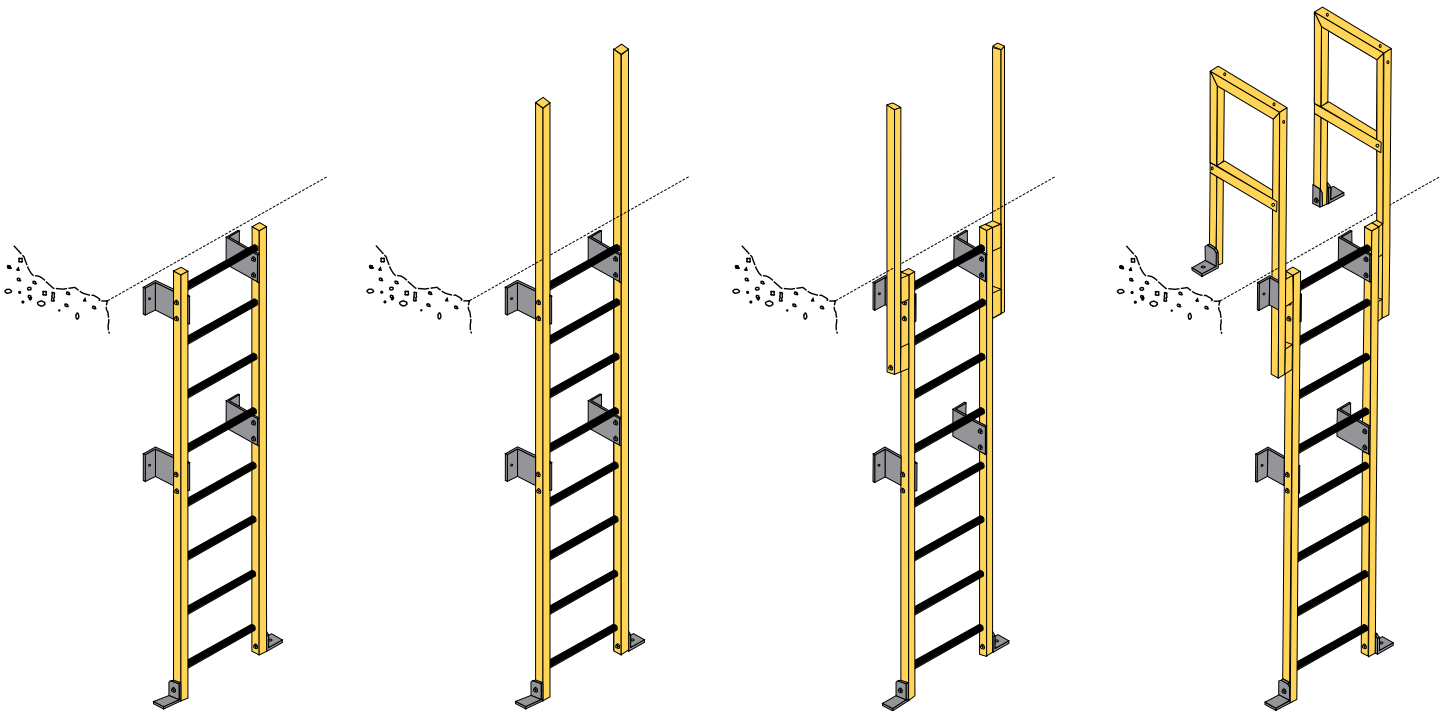
Ladder and Accessories

Ladders ("A" dimension = stock length)	
Length*	Part Number
8'	444508
10'	444510
12'	444512
14'	444514
16'	444516
18'	444518
20'	444520
24'	444524
Accessories	
Description	Part Number
Ladder Rail Splice Kit	448600
18" Wide Walk-thru Kit	448801
24" Wide Walk-thru Kit	448901

*Field Cut to size

Note: Top rung step-off must be even with upper walking surface

Assembly & Mounting Details

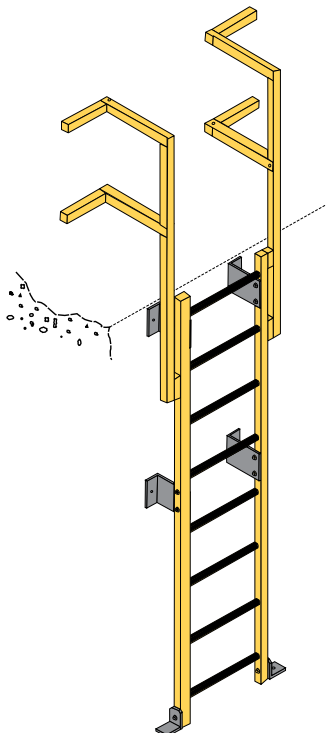


Ladder

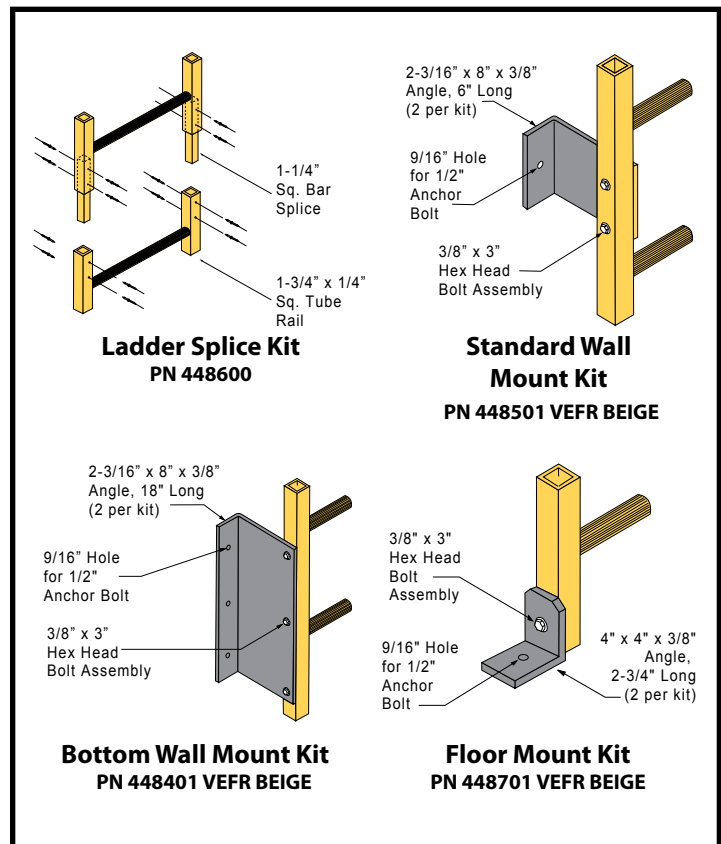
**Ladder with 18"
Walk-thru**

**Ladder with 24"
Walk-thru**

**Ladder with
Walk-thru and Handrail
Connections to Floor**



**Ladder with
Walk-thru and Connections
to Handrail**



Fibergrate Products & Services



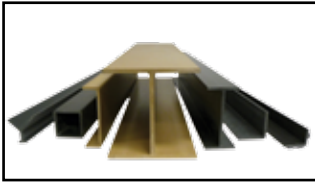
Fibergrate® Molded Grating

Fibergrate® molded gratings are designed to provide the ultimate in reliable performance, even in the most demanding conditions. Fibergrate offers the widest selection in the market with multiple resins and more than twenty grating configurations available in many panel sizes and surfaces.



Safe-T-Span® Pultruded Industrial and Pedestrian Gratings

Combining corrosion resistance, long-life and low maintenance, Safe-T-Span® provides unidirectional strength for industrial and pedestrian pultruded grating applications.



Dynaform® Structural Shapes

Fibergrate offers a wide range of standard Dynaform® pultruded structural profiles for industrial and commercial use, including I-beams, wide flange beams, round and square tubes, bars, rods, channels, leg angles and plate.



Dynarail® Handrail & Safety Ladder Systems

Easily assembled from durable components or engineered and prefabricated to your specifications, Dynarail® handrail and safety ladder systems meet or exceed OSHA and strict building code requirements for safety and design.



Custom Composite Solutions

Combining Fibergrate's design, manufacturing and fabrication services allows Fibergrate to offer custom composite solutions to meet our client's specific requirements. Either through unique pultruded profiles or custom open molding, Fibergrate can help bring your vision to reality.



Design & Fabrication Services

Combining engineering expertise with an understanding of fiberglass applications, Fibergrate provides turnkey design and fabrication of fiberglass structures, including platforms, catwalks, stairways, railings and equipment support structures.



Worldwide Sales & Distribution Network

Whether a customer requires a platform in a mine in South Africa to grating on an oil rig in the North Sea, or walkways in a Wisconsin cheese plant to handrails at a water treatment facility in Brazil; Fibergrate has sales and service locations throughout the world to meet the needs and exceed the expectations of any customer.

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