

Dynarail® FRP Handrail and Ladder Systems



Modular Kits or Custom Fabricated

Corrosion Resistant

Nonconductive

Fire Retardant

High Strength-to-Weight Ratio

Long, Low-Maintenance Life

*Meets OSHA, BOCA & Other
Building Code Requirements*

Fibergrate
Composite Structures

High Performance Composite Solutions



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 BOCA-compliant horizontal and inclined handrail systems with

either two or three rails. Fibergrate also can provide specialty handrail including round tube and picketed railing. 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 offers 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
- Offshore
- Pharmaceutical
- Power
- Pulp & Paper
- Recreation
- Telecommunications
- Transportation
- Water & Wastewater

Features and Benefits of Dynarail®



- **Corrosion Resistance** - the use of premium grade, isophthalic polyester or vinyl ester resin systems and a synthetic surfacing veil maintains structural integrity
- **Slip Resistance** - ladder rungs include heavily serrated flutes for positive, slip-resistant footholds
- **Lightweight Yet Durable** - less than one-half the weight of steel allowing easy installation with no heavy equipment and less manpower required
- **Fire Retardant** - a flame spread rating of 25 or less, when tested in accordance with ASTM E-84; meets the self-extinguishing requirements of ASTM D-635
- **Low Maintenance** - corrosion resistant and requires no scraping, sandblasting or painting
- **UV Protection** - UV inhibitors included in the resin formulation, along with a surfacing veil for optimum protection from the effects of weathering (*An optional UV coating is recommended for installations with intense UV exposure.*)
- **Easily Fabricated** - no need for lifting equipment or expensive tools; can be easily carried by two workers and cut using standard circular or saber saws fitted with abrasive blades
- **Quick and Easy to Install** - components are labeled with computer-generated tags that correspond to installation drawings, ensuring accurate, time-efficient installation
- **Electrically and Thermally Non-Conductive** - providing additional worker safety
- **Electronically Transparent** - does not affect electromagnetic or radio wave frequencies

Dynarail® Resin Systems

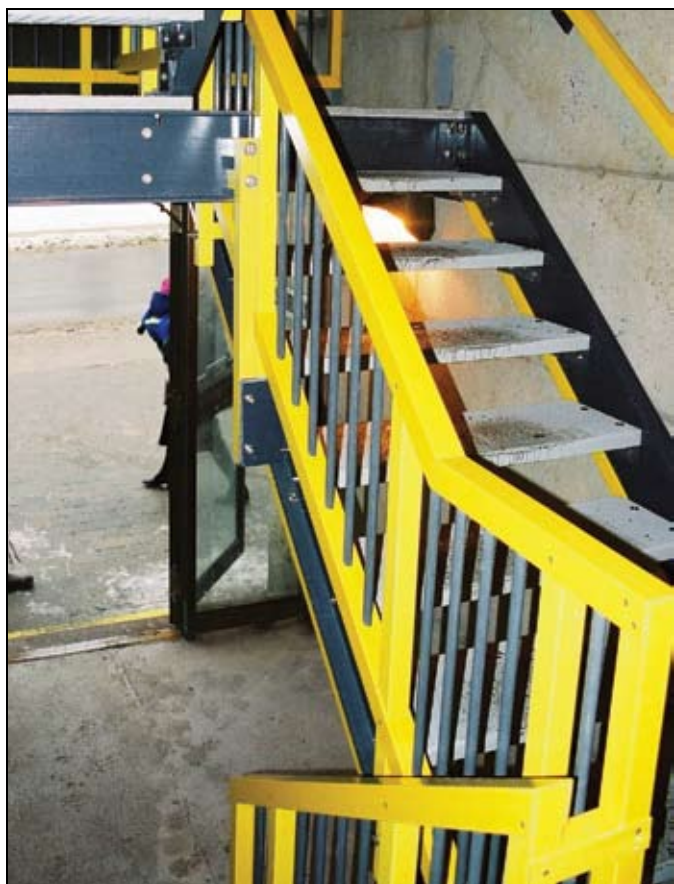
- **ISOFR (HANDRAIL)** - isophthalic polyester resin formulation with a low flame spread rating of 25 or less designed for applications where there is moderate exposure to corrosive elements.
- **VEFR (LADDERS)** - vinyl ester resin system with a flame spread of 25 or less for dependable resistance to 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 prerouted 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

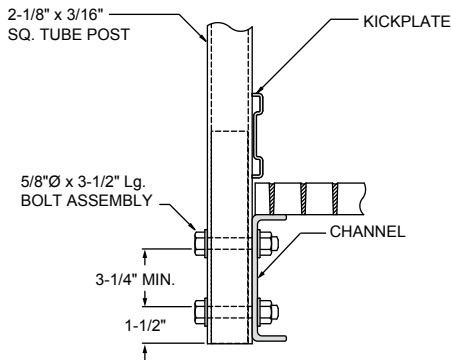
Fibergrate has the capability to turnkey (design, manufacture, fabricate and install) a wide range of handrail projects, from the smallest platform to massive, complex structures; from basic stairways to ADA compliant systems. To meet the requirements presented by such projects, Fibergrate employs a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

Fibergrate can also offer design and engineering, fabrication and installation of specialty solutions including vertical, round tube and picketed handrail, segmented platforms and other special systems.

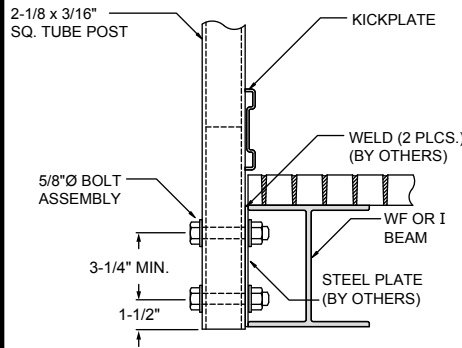
Dynarail® Post Installation Methods

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

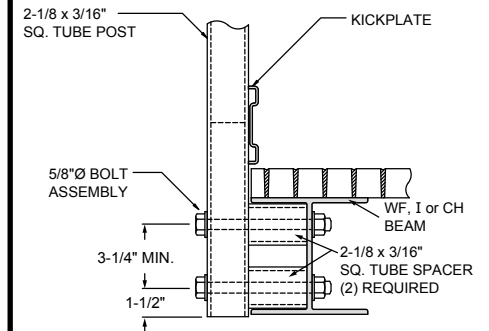
DRAWING A - POST TO FRP OR STEEL CHANNEL



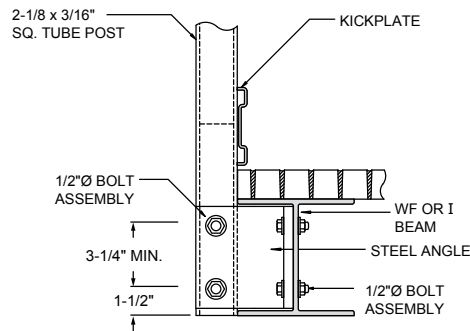
DRAWING B - POST TO STEEL PLATE ON STEEL BEAM



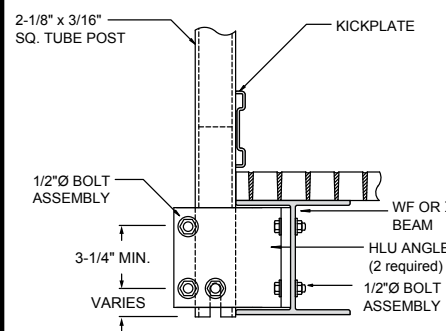
DRAWING C - POST TO FRP OR STEEL BEAM OR CHANNEL WITH FRP SPACERS



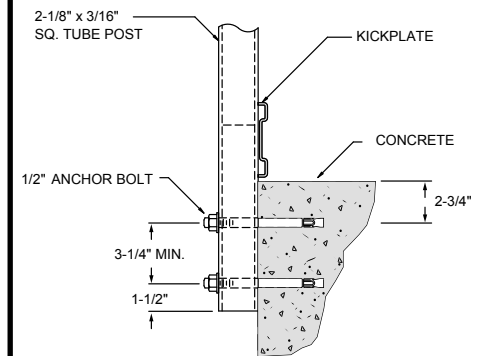
DRAWING D - POST TO STEEL ANGLE ON FRP OR STEEL BEAM



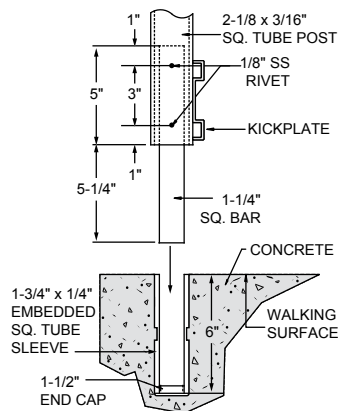
DRAWING E - REMOVABLE POST TO HLU ANGLE ON FRP OR STEEL BEAM



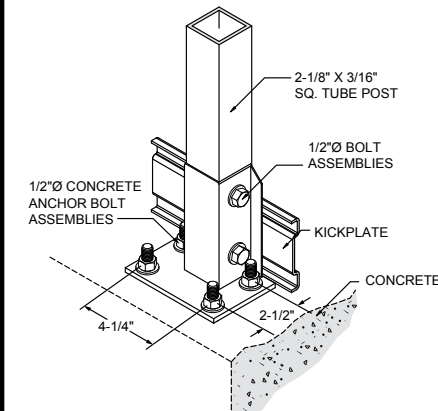
DRAWING F - SIDE-MOUNTED POST



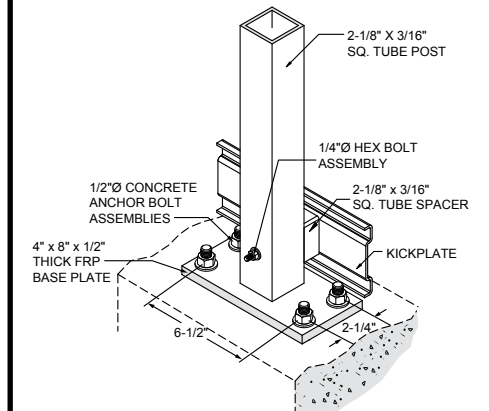
DRAWING G - EMBEDDED POST



DRAWING H - TOP MOUNT STEEL STANCHION BASE



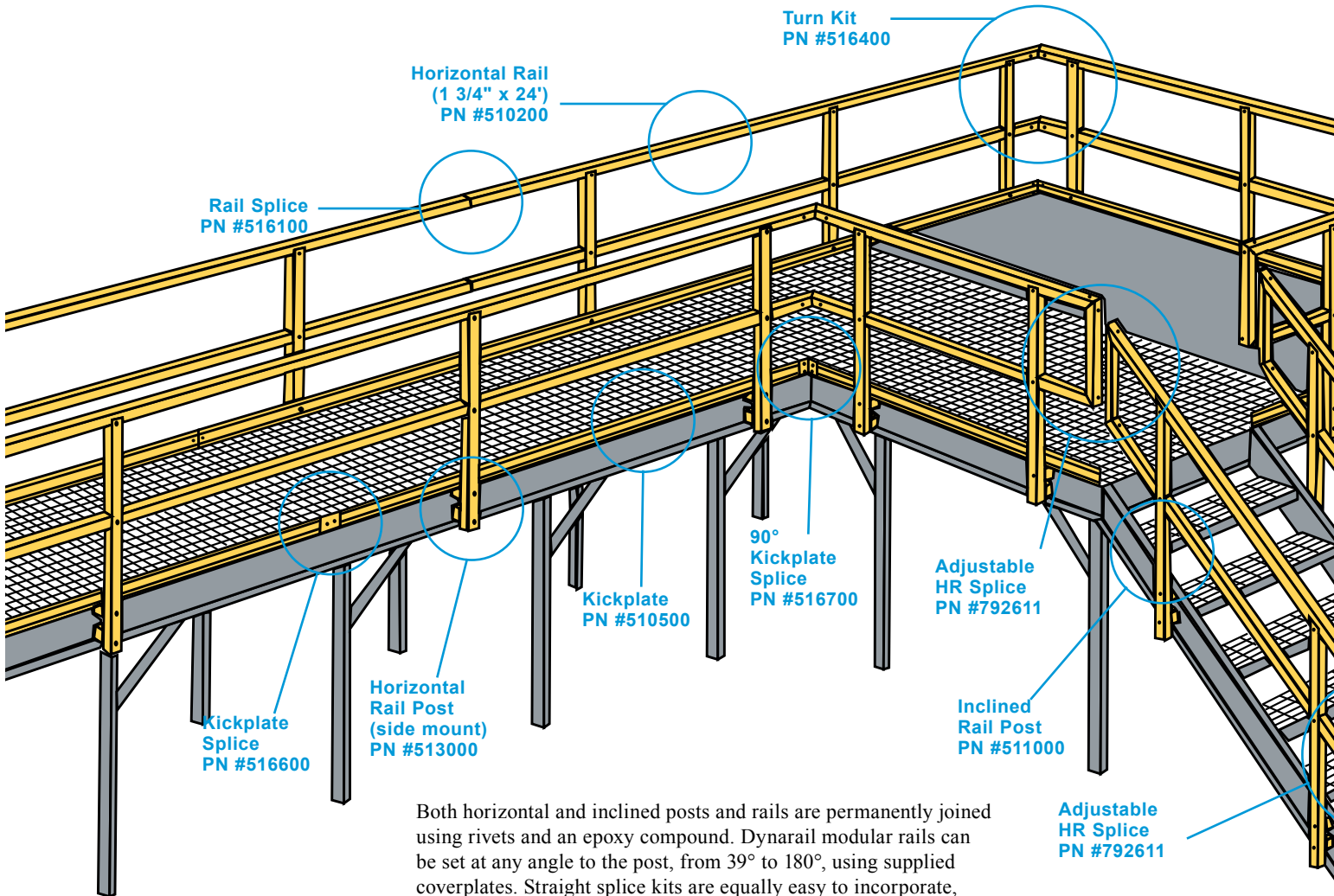
DRAWING I - TOP MOUNT FRP STANCHION BASE



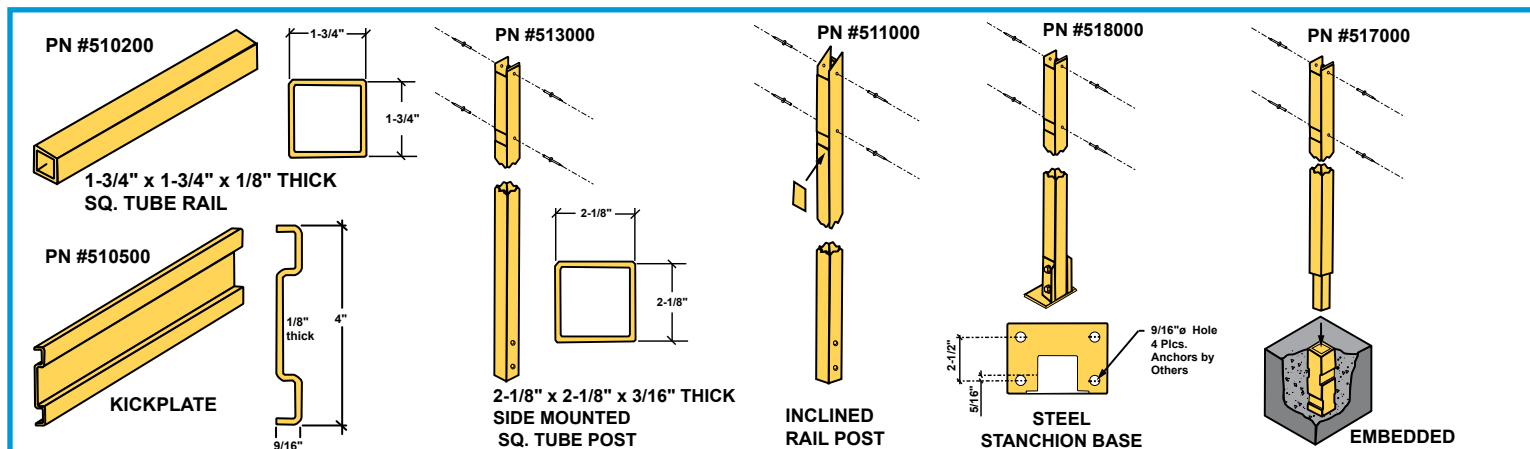
CONCRETE ANCHOR BOLT LOADS

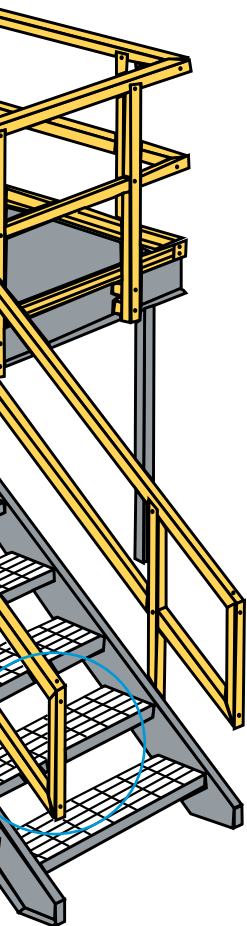
	Drawing F	Drawing H	Drawing I
OSHA (200 lb)	1886 lb	2584 lb	2688 lb
UBC (50 lb/ft)	2829 lb	3876 lb	4032 lb

Modular Dynarail® FRP Handrail Systems

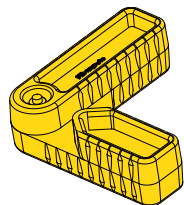


Both horizontal and inclined posts and rails are permanently joined using rivets and an epoxy compound. Dynarail modular rails can be set at any angle to the post, from 39° to 180°, using supplied coverplates. Straight splice kits are equally easy to incorporate, joined by either a riveted connection 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.

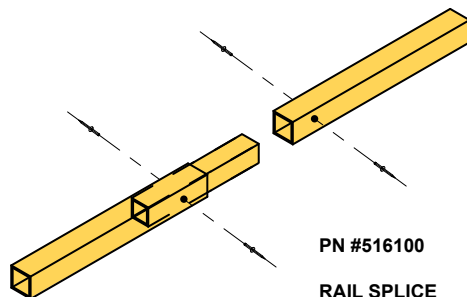




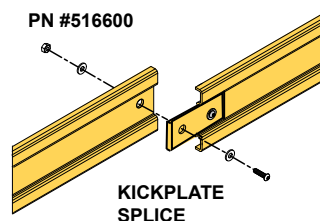
ASSEMBLY PART #		DESCRIPTION
510500	Kickplate	9/16" deep x 4" high x 1/8" thick x 24' long
516600	Kickplate Splice Kit	1 ea. Splice 1-3/4" x 4" x 3/16" 2 ea. 1/4" x 1" x socket round head bolts, nuts and washers.
516700	Kickplate Splice Kit 90°	1 ea. Splice 2-1/8" x 1-1/8" x 3/16" 2 ea. 1/4" x 1" x socket 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 4 ea. Fasteners (Clips and Bands)
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
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
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
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
516400	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		



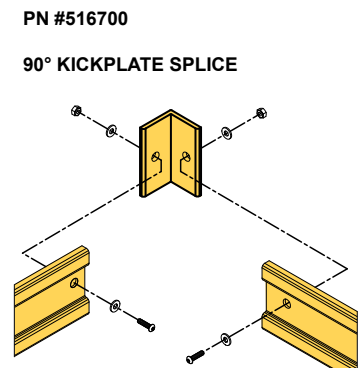
PN #792611
ADJUSTABLE
HANDRAIL
SPLICE



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 vinyl ester yellow Dynaform® pultruded structural shapes. This creates a light-weight ladder system offering long life and low-maintenance service.

Advantages

In addition to Dynarail's 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 AND 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.

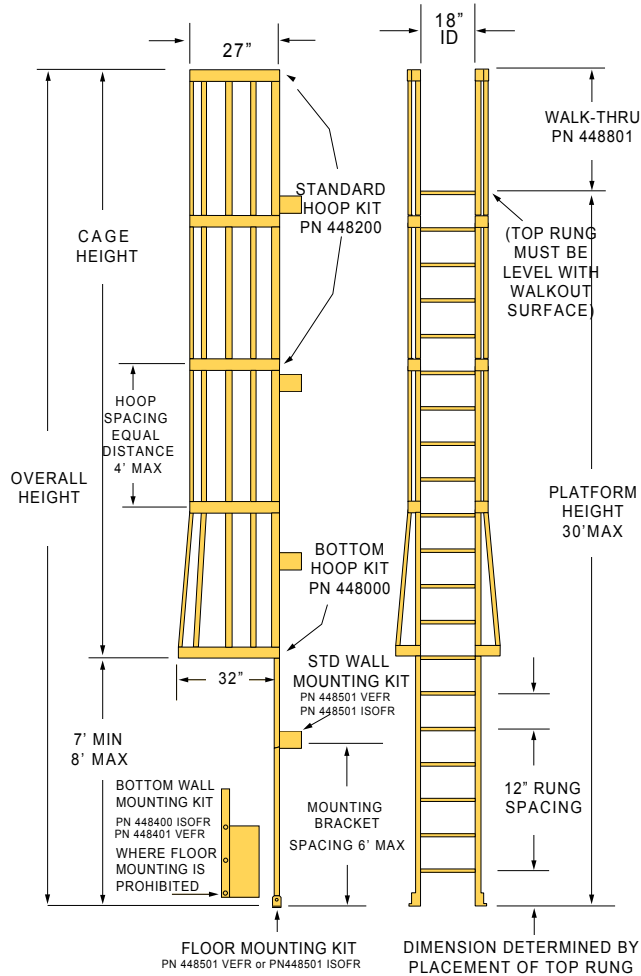
CAGE:

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 Requirements

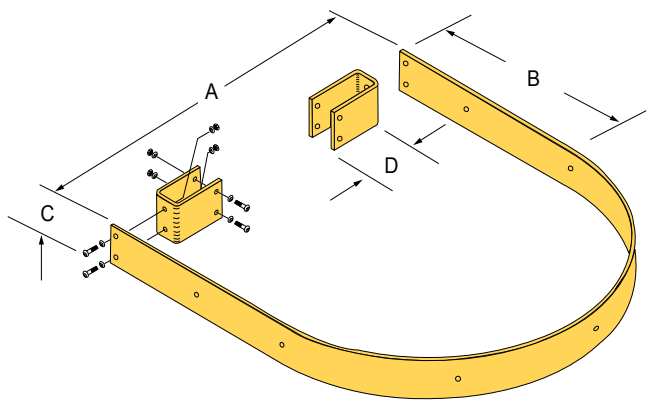
Cage Assembly Components

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 ISOFR - DK GRAY VEFR - BEIGE	Bottom Wall Mount Kits PN 448400 ISOFR PN 448401 VEFR	Wall Mount Kits Required 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



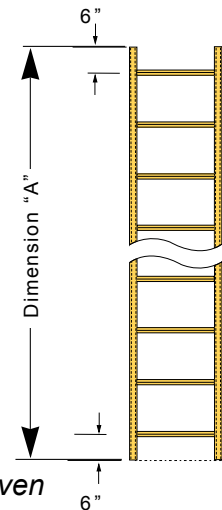
Hoop Kit	PART NUMBER	A	B	C	D
Bottom	448000	35"	16"	3"	8.5"
Standard	448200	27"	16"	3"	4.5"

Ladder and Accessories

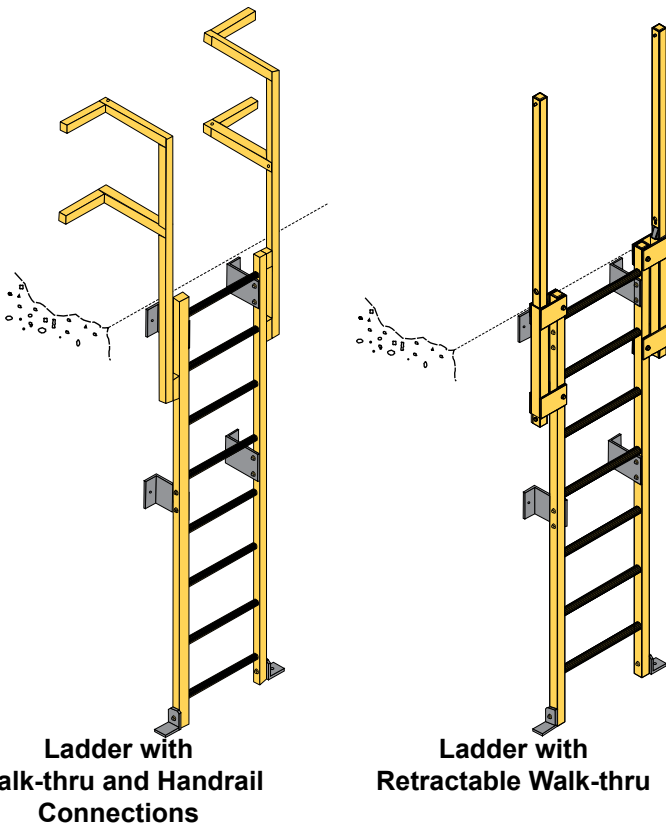
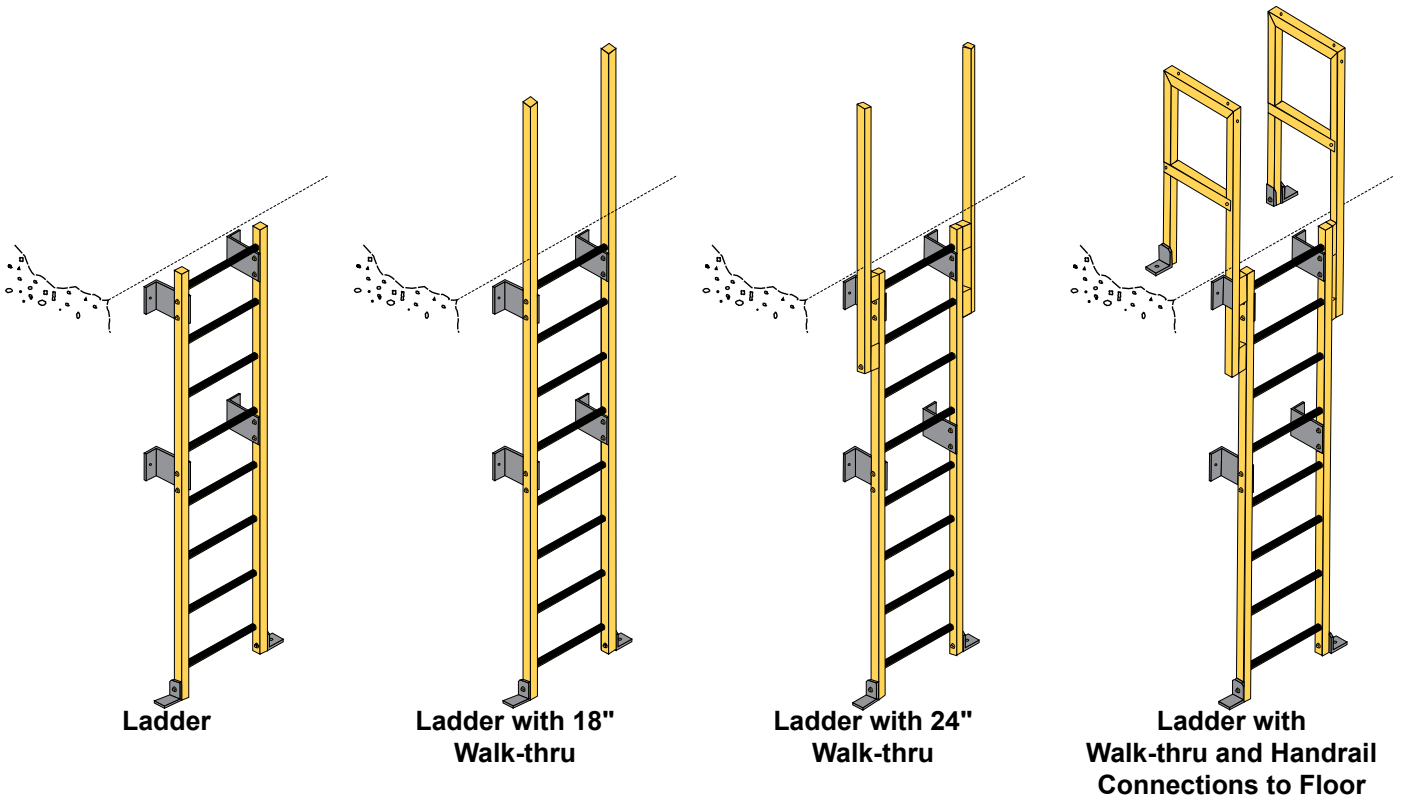
Ladders ("A" dimension = stock length)	
Length*	Part Number
8'	444508
10'	444510
12'	444512
14'	444514
16'	444516
18'	444518
20'	444520
24'	444524
Accessories	
Description	Part Number
Ladder Rail Splice Kit	448600
18" Wide Walk-thru Kit	448801
24" Wide Walk-thru Kit	448901

*Field Cut to size

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



Assembly & Mounting Details



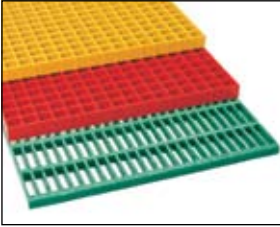
Ladder Splice Kit
PN 448600

Standard Wall Mount Kit
PN 448500 ISOFR DKGRY
PN 448501 VEFR BEIGE

Bottom Wall Mount Kit
PN 448400 ISOFR DKGRY
PN 448401 VEFR BEIGE

Floor Mount Kit
PN 448700 ISOFR DKGRY
PN 448701 VEFR BEIGE

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 more than ten resins including Chemgrate CP-84 and more than twenty grating configurations available in many panel sizes and surfaces.

RIGIDEX® Moltruded® Grating

RIGIDEX Moltruded gratings are the first fiberglass gratings to combine the corrosion resistance of molded grating with the longer span capacity of pultruded grating, all at the low cost of metal gratings.



Safe-T-Span® Pultruded Industrial and Pedestrian Gratings

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

Dynarail® Handrail

Easily assembled from durable prefabricated components or engineered to your specifications, Dynarail handrail meets or exceeds OSHA and strict building code requirements for safety and design.

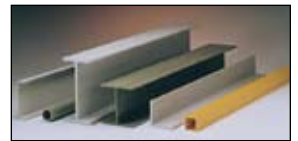


Dynarail® Safety Ladder System

Easily assembled on site, Dynarail safety ladder systems meet or exceed OSHA requirements. Though less costly than prefabricated ladder systems, these safety ladders provide a custom fit to the supporting structure.

Dynaform® Structural Shapes

Fibergrate offers a wide range of pultruded structural components for industrial use, including bars, rods, tubes, beams, channels, leg angles and plates.



Stair Solutions

Fibergrate offers a wide range of slip-resistant products to meet your stair safety needs. These durable products which include treads, tread covers and covered stair treads are a long-term, cost-efficient solution for your facility.

Grating Pedestals

Uniquely designed adjustable single and quad head pedestals for square mesh molded grating are manufactured to provide safe and economical support for elevated flooring.



Fabrication Services

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