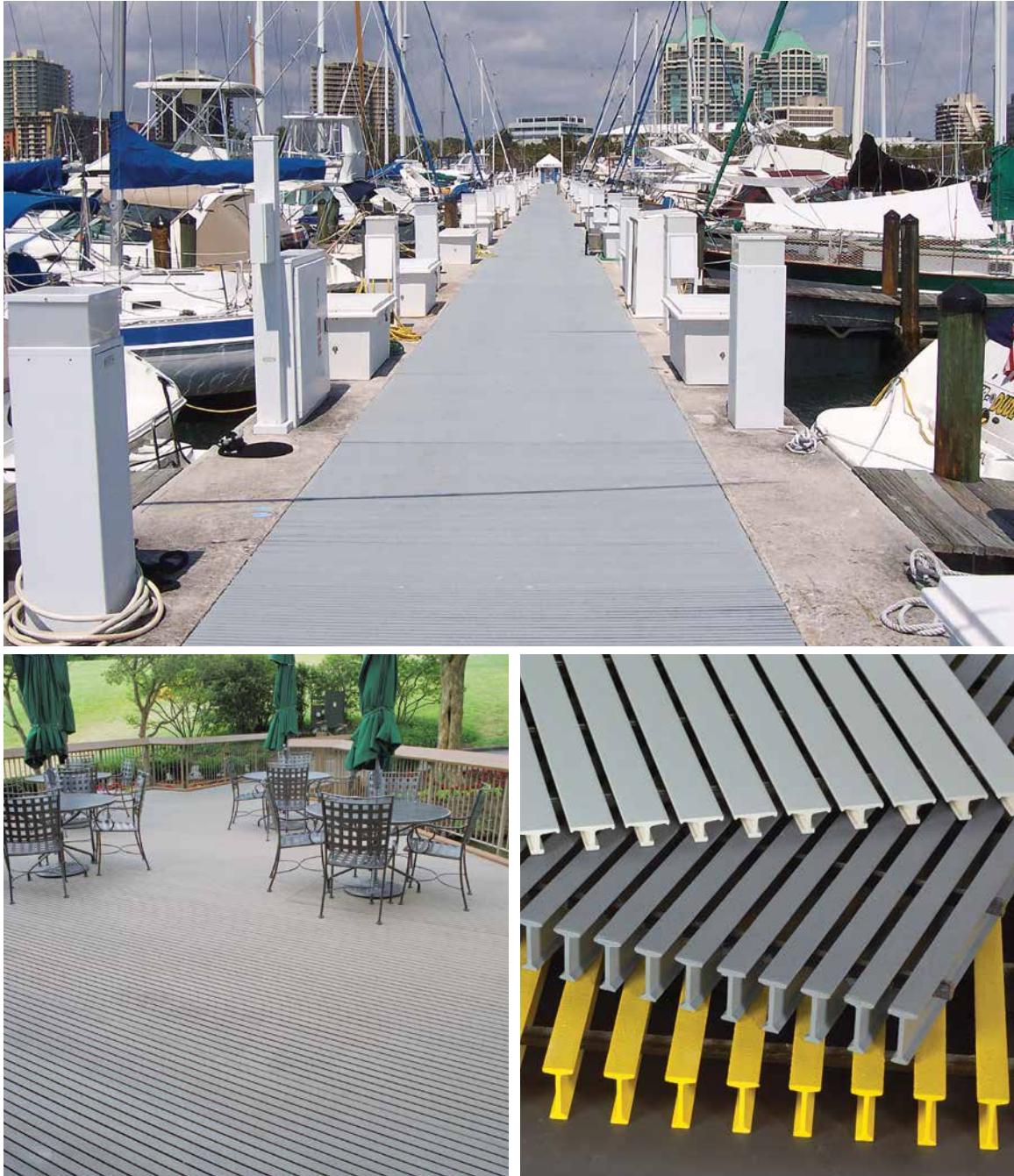


AeroPlastics



FIBERGLASS GRATING

DURA^{DEK}[®] and DURA^{GRID}[®] PULTRUDED GRATING



High Strength Pultruded Fiberglass Grating



Top: DURADEK® and DURAGRID® fiberglass grating provide safe, corrosion resistant walkways and work platforms in a broad range of markets and industries.

Left: Manufactured with unique cross bar construction, DURADEK® and DURAGRID® fiberglass grating can be cut to any size like a solid sheet.

What is DURADEK® and DURAGRID®?

DURADEK® and DURAGRID® are high strength pultruded bar type gratings that can be designed and used like traditional metal grates but have the inherent benefits of fiberglass. These problem solving products are ideal replacements for steel or aluminum gratings in corrosive environments or anywhere frequent grating and walkway replacement costs are unacceptable.

DURADEK® is a standard product stocked by distributors nationwide. It is available with individual bearing bars in either 1" or 1-1/2" I-shapes or a 2" T-shape. DURADEK® is a flame retardant product utilizing a polyester or vinyl ester resin. The bearing bars are assembled into 12 panel sizes: 3-, 4-, and 5-foot widths in each of 8-, 10-, 12- and 20-foot lengths. Standard panels are available with cross-rod spacings of 6" or 12" on center.

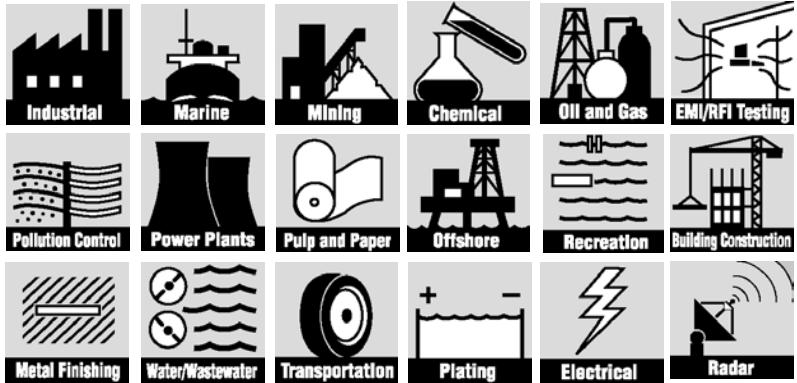
DURAGRID® custom grid or grating systems are designed to accommodate specific applications that cannot effectively be met by a standard fiberglass grating. DURAGRID® offers the customer options such as selection of open space, bar shape, cross-rod placement, custom fabrication, custom resin or color.

Why Use DURADEK® or DURAGRID® Grating?

DURADEK® and DURAGRID® are lightweight, which saves on freight and makes installation easier. The unique cross-bar construction of DURADEK® and DURAGRID® allows the grating panels to be easily cut and modified to fit almost any plant requirement. A full listing of features are shown below.

Features

- Corrosion Resistant
- Structurally Strong
- High Impact and Fatigue Strength
- Lightweight
- Fire Retardant
- Easy to Fabricate and Install
- Low Maintenance
- Low Conductivity
- Resistant to Chipping and Cracking
- Aesthetically Pleasing Appearance
- Skid Resistant
- Rigid
- Low Thermal Conductivity
- Non-Sparking



Materials of Construction

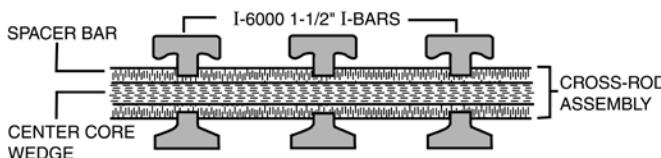
DURADEX® and DURAGRID® fiberglass gratings are a composite of fiberglass reinforcements (fibers and mat) and a thermosetting resin system, produced by the pultrusion process. The pultrusion manufacturing process produces many of the outstanding characteristics of the product.



The bearing bars use both longitudinal (glass roving) and multidirectional (glass mat) reinforcements as well as a synthetic surfacing veil to provide unequalled strength and corrosion resistance. The densely packed core of continuous glass rovings gives the bar strength and stiffness in the longitudinal direction while the continuous glass mat provides strength in the transverse direction and prevents chipping, cracking and lineal fracturing. The synthetic surfacing veil provides a 100% pure resin surface for added corrosion resistance and UV protection.

Three-Piece Cross-Rod Assembly

The 3-piece cross-rod assembly used in DURADEX® and DURAGRID® grating forms a strong, unified panel that can be cut and fabricated like a solid sheet.



This unique system consists of two continuous, pultruded spacer bars and a center core wedge. The spacers are notched at each bearing bar so that the bars are both mechanically locked and chemically bonded to the web of each bearing bar. This separates and affixes bearing bars firmly in position and distributes concentrated loads to adjacent bars. The resulting panel can be easily fabricated with standard carpenters' tools with abrasive cutting edges. Ask for the detailed *Grating Field Fabrication Guide* for further details.

Bar Profiles and Grating Series

A wide variety of bearing bar shapes along with various bearing bar and cross-rod spacings are available depending on the design requirements. Refer to the load/deflection tables in this catalog for selection.

The traditional "I" bar shape provides maximum flexibility in design. It is available in 1", 1-1/4", and 1-1/2" depths.

The "T" bar shape provides a more solid walking surface and prevents catching high heels and other objects between the bars. It is available in 1", 1-1/2" and 2" depths. The Economy series offers a lighter weight bearing bar.

Strongwell's DURAGRID® Heavy Duty (HD) solid bar grating has been designed to take heavy wheel traffic such as forklifts, tow motors and truck traffic. Because of the variety of wheel types and loading, please contact Strongwell's engineering department to determine the series of heavy duty grating to use. It is available in 1", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/4" and 2-1/2" depths.

Strongwell also offers a 1" "R" bar grating, a rectangular bar, in several different series. Visit our website to view the "R" bar information and load tables.

Panel Sizes and Shape

Panels can be made to exact sizes to eliminate waste and fabrication costs in the field. The maximum panel weight is 500 lbs. and the maximum panel size is 60" x 240".

UV Coatings

Bearing bars can be UV coated for added protection and color stability for outdoor applications.

Color

The two standard colors are gray and yellow. Other colors can be quoted upon request. A small inventory is also maintained of 1" and 1-1/2" "I" and "T" bars in white fire retardant polyester resin.

Resin Selection

The standard polyester resin used in DURADEX® is fire retardant and meets the requirements for a Class 1 flame rating of 25 or less per ASTM E-84 and meets the self-extinguishing requirements of ASTM D-635. The resin also contains a UV inhibitor.

DURAGRID® offers a wide selection of resin options including polyester, vinyl ester, phenolic, modar, etc. Other options feature UV inhibitors, various colors and specialized additives.

Surface Texture

Grids can be ordered with or without an anti-skid grit surface. A variety of grit material and textures can be ordered.

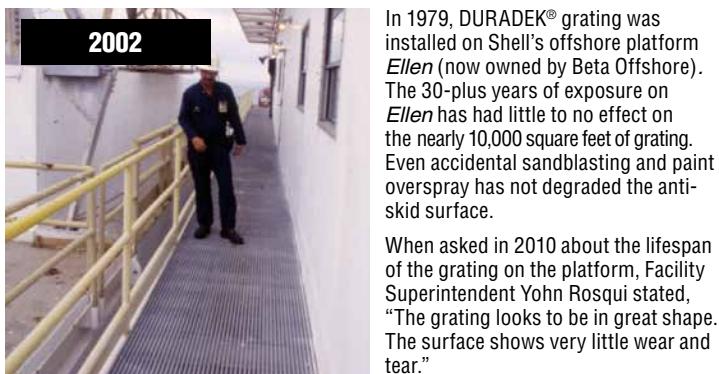
Applications

DURADEX® and DURAGRID® grating systems are designed to accommodate a wide variety of applications, such as:

- General Industry
- Marine/Offshore
- Mining/Processing
- Plating Operations
- Transportation
- Chemical Plants
- Electrical
- Power Plants
- Consumer/Recreation
- Cellular Communications
- Food and Beverage Operations
- Water/Wastewater Treatment
- Agricultural
- Pulp and Paper Plants
- Railroad - AAR Approval
- Fire Equipment



1979



2002

In 1979, DURADEX® grating was installed on Shell's offshore platform *Ellen* (now owned by Beta Offshore). The 30-plus years of exposure on *Ellen* has had little to no effect on the nearly 10,000 square feet of grating. Even accidental sandblasting and paint overspray has not degraded the anti-skid surface.

When asked in 2010 about the lifespan of the grating on the platform, Facility Superintendent John Rosqui stated, "The grating looks to be in great shape. The surface shows very little wear and tear."



2010



DURAGRID® Phenolic grating is used for fire integrity, weight savings and low maintenance and is U.S. Coast Guard approved. Compared to standard steel grating, DURAGRID® Phenolic I-6000 1-1/2" can carry 1.75 times the load of equivalent steel grating. Unlike metal gratings, DURAGRID® Phenolic has memory—returning to its original shape if design loads are exceeded.



Strongwell's DURAGRID® T-1700 pultruded grating was used to replace wood planks on a large walkway at Dinner Key Marina in Miami, Florida. The grating allows for easy accessibility to utilities below the walkway and will not rot like the previous wooden walkway.



Copper processing facilities such as the Ammonia Leach/Solvent Extraction/Electrowinning plant for Minera Escondida Limitada in Chile found DURADEX® I-6000 1-1/2" to be the perfect solution.

Applications



Chicago Transit maintenance walkways alongside elevated train tracks constitute one of the largest fiberglass grating installations in history. This project used DURAGRID® T-5000 2" with a custom polyester resin.



Low maintenance fiberglass grating provides trouble free operations for the covers and walkways in the Lakewood, Colorado Wastewater Treatment Plant Headworks. DURADEK® I-6000 1-1/2" was used.



MIII Ruins Park in downtown Minneapolis, Minnesota utilized DURAGRID® T-1800 1" for new pedestrian walkways in the beautiful historical district.



Strongwell DURADEK® I-6000 grating was installed at this School of Business and Information Systems in Hong Kong as air-conditioning platforms when placed horizontally and as louver when placed vertically (as shown here).



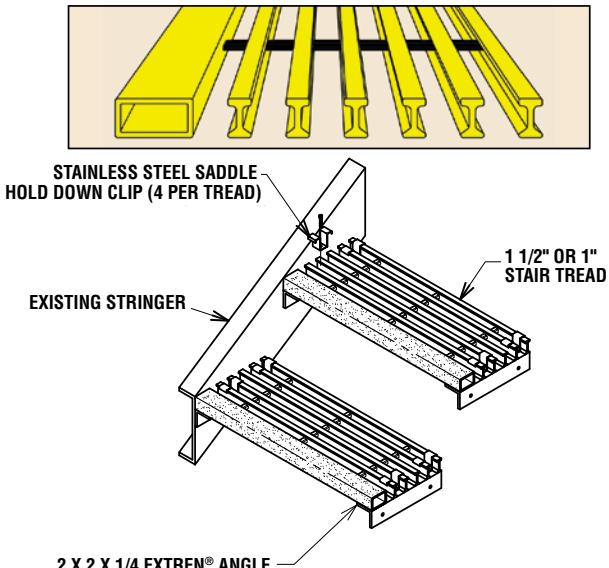
The Muirfield Village Golf Club, designed by Jack Nicklaus, offers an outside patio deck for players to relax and have a snack between nines. After years of constant moisture and the steady pounding of golf shoes, the wood deck had become a safety hazard and required replacement. Strongwell manufactured DURAGRID® T-1800 using a custom pigmented resin to replace the wooden deck to offer both the aesthetic and structural benefits the club was looking for.

Accessories

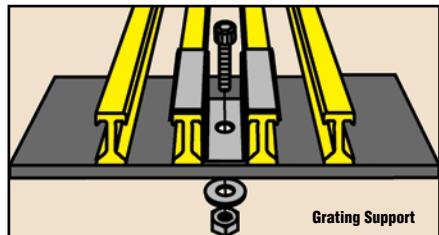
Nosings for Stair Treads and Landings

Stair treads and landings are produced by attaching a 2" deep nosing to the leading edge. This gives added strength and rigidity to the area that takes the most impact and abuse. In addition, the nosing provides more surface area for skid resistance, wear and better visibility. Gray stair treads with yellow nosing are available at additional cost.

MAXIMUM SPAN FOR 300 LBS. AT MIDSPAN			
TREAD WIDTH & COLOR	STAIR TREAD SERIES	1/8" OR LESS DEFLECTION	1/4" OR LESS DEFLECTION
11" Gray or Yellow	I-6000 1"	29"	37"
11" Gray or Yellow	I-6000 1-1/2"	40"	52"
12" Gray or Yellow	T-5000 2"	47"	59"

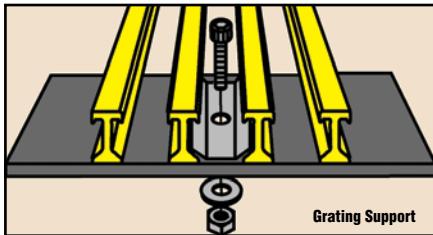


Panel Hold Downs



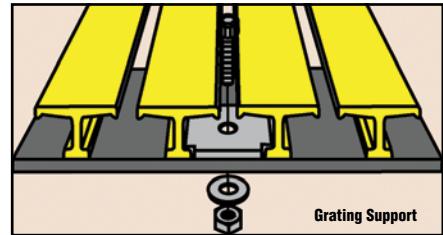
Weldable 316L stainless steel saddle clips are available for all grating series except T-1800 and T-3500.

*Bolts are priced separately from the saddle clips.



Weldable 316L stainless steel insert clips are available for all grating series except T-1800 and T-3500.

*Bolts are priced separately from the hold-down.

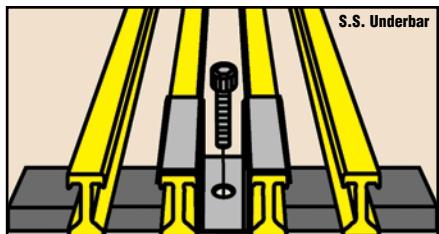


Weldable 316L stainless steel insert clips are available for series T-1800 and T-3500 only.

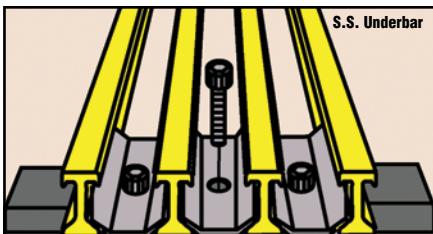
*Bolts are priced separately from the hold-down.
(All bolts are 1/4-20 x 1-1/4", cap head, 316L stainless steel.)

Panel Connectors

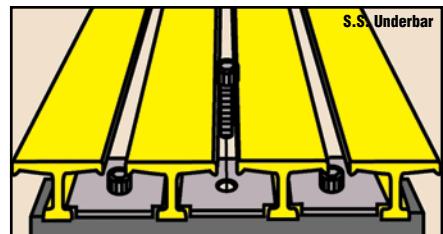
Panel Connectors are generally only used at midspan to assist in transferring load from section to section.



316L stainless steel saddle clips are available as panel connectors for "I" and "HD" bar grating and T-bar grating except T-1800 and T-3500.



Insert clip hold-downs are available for I-bar grating and T-bar grating except for T-1800 and T-3500.

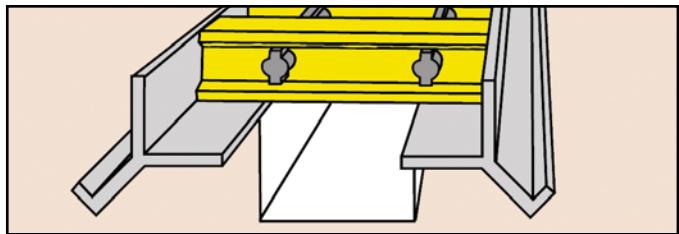


Insert clip hold-downs are available for T-1800 and T-3500 grating.

(All bolts are 1/4-20 x 1-1/4", cap head, 316L stainless steel.)

Curb Angle

Fiberglass Curb Angle provides a strong, firm base for bearing bars and is pultruded from the same material and in the same manner as other DURADEX® and DURAGRID® products. Corrosion resistant Fiberglass Curb Angles are available in four sizes in gray fire retardant vinyl ester.



Using The Load/Deflection Tables

Typical Bearing Bar Spacings

Strongwell manufactures virtually any non-standard and non-stocked custom grid and grating. However, the following load tables are for the most popular bearing bar configurations. The physical properties are shown for the section.

To determine loading or physical properties for other bar spacings, use the multiplier shown on the tables.

Series Designation

The series designation indicates the bar size and shape and the percent of open area. For example: T-1800 1" means 1" T-bar spaced to give an 18% open area.

Cross Rod Spacings

Cross rod spacings must be 2", 4", 6", 8", 10", etc. Our standard spacings are 6" and 12" on center.

Load Table Values

All tables show typical values.

Load Data

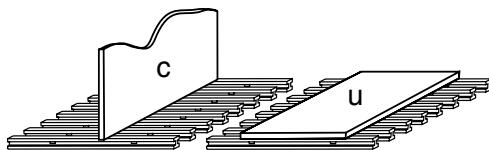
Deflection and safe load data were calculated by the Strongwell Test Lab. All tables show typical values.

c is Concentrated Load LBS/FT of width

Δc is Deflection under Concentrated Load

u is Uniform Load LBS/FT²

Δu is Deflection under Uniform Load



The modulus of elasticity will vary with span length due to the non-homogeneous make-up of composite material.

DURADEK® High Strength Fiberglass Grating

The following load tables are for standard DURADEK® fiberglass grating panels stocked by distributors: DURADEK® I-6000 1", I-6000 1-1/2", and T-5000 2". Standard panels come with cross-rod spacings of 6" or optional 12" on center.

DURADEK® I-6000 1" Bearing Bars Spaced 1-1/2" On Center

A = 2.496 IN²/FT OF WIDTH S = 0.656 IN³/FT OF WIDTH I = 0.328 IN⁴/FT OF WIDTH
60% OPEN AREA APPROX. WT. = 2.4 LBS/SQ FT

SPAN INCHES		LOAD												SAFE LOAD 2:1	SAFETY FACTOR	DEFLECTION	E x 10 ⁶ PSI	
		50	100	150	200	250	300	400	500	750	1000	2000	3000	4000	5000			
12	Δu	0.001	0.002	0.003	0.004	0.005	0.005	0.007	0.009	0.014	0.018	0.036	0.054	0.073	0.091	10401	0.189	3.78
	Δc	0.001	0.003	0.004	0.006	0.007	0.009	0.012	0.015	0.022	0.029	0.058	0.087	0.116	0.145	5200	0.151	
18	Δu	0.004	0.008	0.013	0.017	0.021	0.025	0.033	0.042	0.063	0.084	0.167	0.251	0.335	0.418	4954	0.415	4.15
	Δc	0.004	0.009	0.013	0.018	0.022	0.027	0.036	0.045	0.067	0.089	0.179	0.268	0.357	0.446	3716	0.332	
24	Δu	0.012	0.025	0.037	0.050	0.062	0.075	0.100	0.124	0.187	0.249	0.498				2900	0.722	4.41
	Δc	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.149	0.199	0.398	0.597			2900	0.577	
30	Δu	0.029	0.058	0.087	0.116	0.145	0.174	0.231	0.289	0.434	0.579					1856	1.074	4.63
	Δc	0.019	0.037	0.056	0.074	0.093	0.111	0.148	0.185	0.278	0.370					2320	0.859	
36	Δu	0.058	0.115	0.173	0.230	0.288	0.345	0.460	0.575							1289	1.483	4.83
	Δc	0.031	0.061	0.092	0.123	0.153	0.184	0.245	0.307	0.460	0.614					1933	1.186	
42	Δu	0.105	0.211	0.316	0.422	0.527	0.633									943	1.989	4.88
	Δc	0.048	0.096	0.145	0.193	0.241	0.289	0.386	0.482							1649	1.591	
48	Δu	0.176	0.353	0.529	0.705											719	2.534	4.98
	Δc	0.071	0.141	0.212	0.282	0.353	0.423	0.564								1437	2.027	
54	Δu	0.281	0.563													566	3.184	5.00
	Δc	0.100	0.200	0.300	0.400	0.500	0.600									1274	2.548	

NOTE: When a 100 pounds per square foot uniform load is placed upon a 43" simple span, it will produce a deflection of 1/4" at midspan.

Specifications

How to Specify DURADEX® and DURAGRID®

Fiberglass grating shall be (select one):

DURADEX® Series (I-6000 1") (I-6000 1-1/2") (T-5000 2") as manufactured by Strongwell–Chatfield Division, Chatfield, Minnesota.

DURAGRID® as manufactured by Strongwell–Chatfield Division, Chatfield, Minnesota. Grating panels shall be made of (1") (1-1/4") (1-1/2") (2") deep pultruded (T) (I) bars.

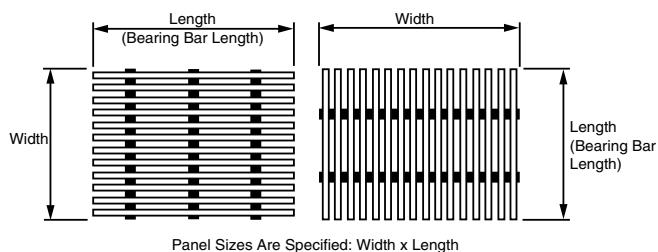
DURAGRID® Heavy Duty as manufactured by Strongwell–Chatfield Division, Chatfield, Minnesota. Grating panels shall be made of (1") (1-1/4") (1-1/2") (1-3/4") (2") (2-1/4") (2-1/2") deep pultruded (HD) bars.

The bearing bars shall be spaced at _____ inches on center. Resin shall be fire retardant (polyester) (vinyl ester) meeting the requirements of a Class 1 rating of 25 or less per ASTM E-84 and meets the self-extinguishing requirements of ASTM D-635. Color shall be (gray) (yellow). Resin shall be UV inhibited and the composite shall include a veil on all exposed surfaces. Panels shall be assembled into the sizes ordered using a 3-piece pultruded cross-rod system.

The cross-rods shall consist of a center core wedge and 2 spacer bars that are notched at each bearing bar so that each bearing bar is both mechanically locked and chemically bonded to the web of each bearing bar. The spacer bars shall be continually bonded to the center core wedge. The cross-rods shall be spaced a maximum of (6") (12") in the panel. The top of the panels (shall) (shall not) be covered with a bonded grit anti-skid surface.

NOTE: If special options are required that are not stated in the above specification, fill in your special requirement in the appropriate section.

How to Order



When ordering DURADEX® or DURAGRID®, make sure the bearing bars in the panel are oriented in the correct direction for the application. Bearing bars should traverse from support to support. Cross-rods are not intended to be applied in the span direction. The adjacent drawing will help you specify the width and length of panels. NOTE: Width is the measurement from end to end of the cross-rods. Length is always the bearing bar length.

Options

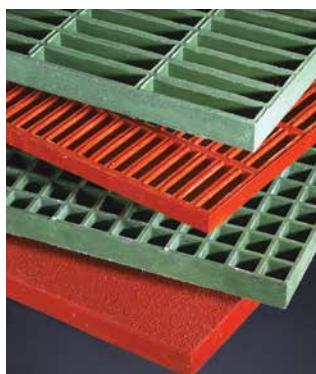
Strongwell offers a broad range of fiberglass decking and flooring materials. A brief description of the other available flooring products in the Strongwell industrial product line is shown here. Full-color brochures are available for each individual product.



SAFPLANK®, a system of interlocking planks, provides easy installation and superior corrosion resistance for applications requiring a solid deck or floor.



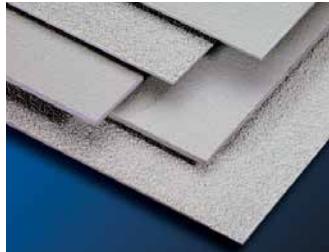
SAFDECK® is a high strength, one-piece, overlapping panel system. Low in conductivity and nonsparking, **SAFDECK®** provides safe walkways in numerous applications.



DURAGRATE® molded grating has a concave profile on the upper surface for skid resistance. Grit tops are optional.



COMPOSOLITE® building panels are suitable for major load bearing structural applications and are particularly well-suited to outdoor use and corrosive environments.



SAFPLATE®, a solid anti-skid flooring, helps reduce worker slips and falls in both wet and dry applications.



Alro Plastics

Your Source for Engineering Plastics

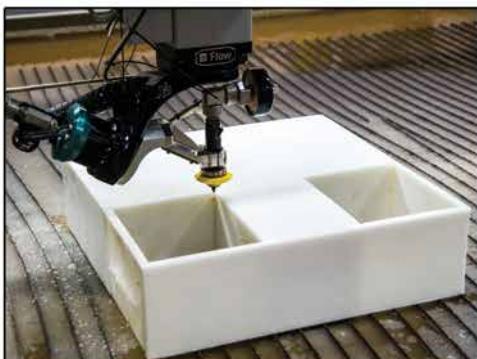
5-Axis Waterjet Cutting

Alro Plastics now offers 5-Axis Waterjet Cutting. This machine uses a high-pressure jet of water and an abrasive substance to cut through our plastic materials. The Waterjet is capable of cutting intricate parts to print that are not possible on other machining equipment.



Waterjet Highlights:

- Ability to cut up to 10" thick material
- Maximum part size of 78" wd x 157" lg
- 5-Axis capabilities, bevels and 3D cutting
- Ability to cut glass-filled and fiberglass products
- Works great on rubber, urethane, neoprene and foam



Wide thickness range, able to cut down to 1/32" thick and up to 10" thick in a single operation.



5-Axis technology, we are able to produce parts quicker, more accurate bevels and do 3D cutting.



Tough materials, capable of cutting fiberglass, glass-filled, rubber, urethane and foam parts.

Materials	Thickness	Width	Length	Tolerance
All, including glass-filled, G10, rubber, urethane and fiberglass	1/32" thk (min) up to 10" thick (max)	1/2" wide (min) up to 78" wide (max)	1/2" long (min) up to 157" long (max)	+/- .015" (default) <i>* Tolerances vary by material.</i>

** This chart is a guideline only. Tolerance listed is a standard, we can quote alternate tolerances as needed. Tolerances may vary depending on material.*

*** Maximum and Minimum thickness will vary based on material selected, generally speaking the harder the material the thinner we can waterjet cut.*



Alro Plastics

Your Source for Engineering Plastics

Alro Plastics is an industry leader in supplying engineering plastic shapes and parts. We cut and/or ship the same day your order is placed and provide value added processing to meet the most demanding fabrication requirements.

PRODUCTS

ABS	EXTRUSIONS	NYLATRON® GSM	RADEL®
ACETAL	FGI-AM™ GRATING	NYLATRON® NSM	REPROCESSED UHMW
ACETRON® GP	FIBERGLASS	NYLOIL®	RUBBER
ACRYLIC	FILMS	NYLONS	SAFPLATE®
ANTI-MICROBIAL	FLUOROSINT®	NYMETAL™	SAFRAIL™
BALLISTIC PROTECTION	G10 / FR-4	OPTIX®	SANALITE®
BORATED PE	GPO-3	PALIGHT®	SEMITRON®
CAST NYLON	HDPE	PALSUN®	STARBOARD®
CELAZOLE®	HYDEX® 202/301	PBT	SUSTARIN® C
CHEMGRATE®	HYDEX® 4101/4101L	PEEK	TECAFORM® HPV 13
CLEAR PVC	HYDLAR® Z	PET	TECAFORM® UD BLUE
COLORCORE®	HY-PACT® VH	PETG	TECHTRON®
COMPOSOLITE®	IND. LAMINATES	PHENOLIC	TIVAR®
CPVC	KETRON® PEEK	PLEXIGLAS®	TIVAR® 1000
CUTTING BOARD	KOMA ALU®	POLYCARBONATE	TIVAR® 88
DELRIN®	KOMATEX®	POLYETHYLENE	TIVAR® H.O.T.
DELRIN® AF	KYDEX®	POLYPROPYLENE	TOOLING BOARD
DENSETEC®	KYNAR® PVDF	POLYSTONE® M	TORLON®
DURADEK®	LDPE	POLYSULFONE	UHMW-PE
DURAGRATE®	LIFE SCIENCE GRADES	PPS	ULTEM®
DURAGRID®	LubX® C	PRECISION BOARD	URETHANE
DURAPLEX®	MAKROLON®	PROFILES	USDA GRATING
DURASHIELD®	MC® 901/907	PROPYLUX®	VHMW SHEET
DURATREAD®	MEDICAL GRADES	PTFE / TFE	VIVAK®
DURATRON®	MICARTA®	PVC	WALLTUF®
ERTALYTE®	MIRROR	PVC FOAM SHEET	WEARGEHR®
EXTREN®	NORYL® PPO	PVDF	ZELUX®

Many products available in sheet, rod, tube and custom shapes. Call for inquiry.



Alro Plastics

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Livonia, MI 48150
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Toll Free: (800) 877-2576

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Jackson, MI 49204
Local: (517) 787-5500
Fax: (517) 787-6380
Toll Free: (800) 877-2576

GRAND RAPIDS
4150 Broadmoor SE
Grand Rapids, MI 49512
Local: (616) 656-2820
Fax: (616) 656-2828
Toll Free: (888) 877-2576

LOUISVILLE
5620 Shepherdsville Rd
Louisville, KY 40228
Local: (502) 968-9980
Fax: (502) 968-5530
Toll Free: (877) 968-9980

CLEARWATER
10585 47th Street N.
Clearwater, FL 33762
Local: (727) 573-1480
Fax: (727) 573-1632