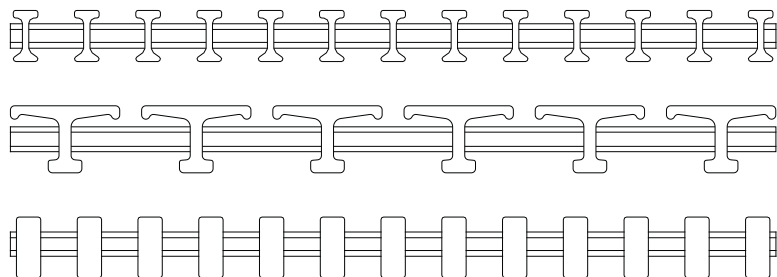
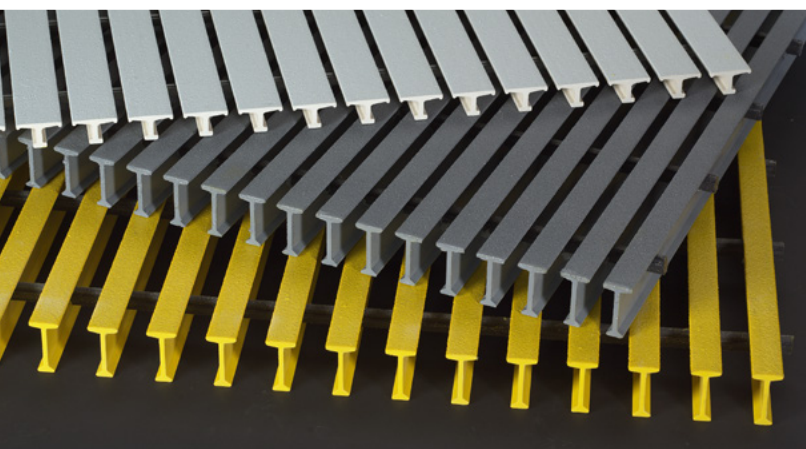


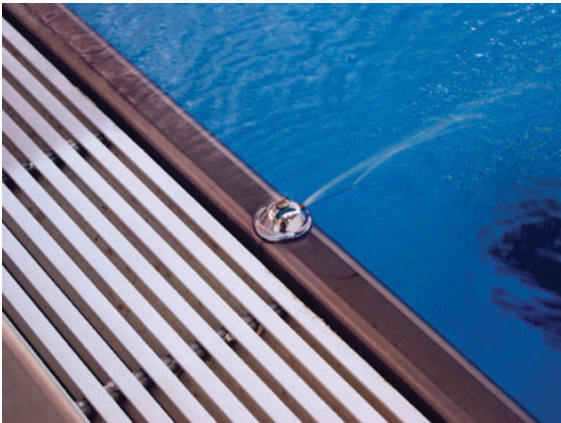


DURAGRID

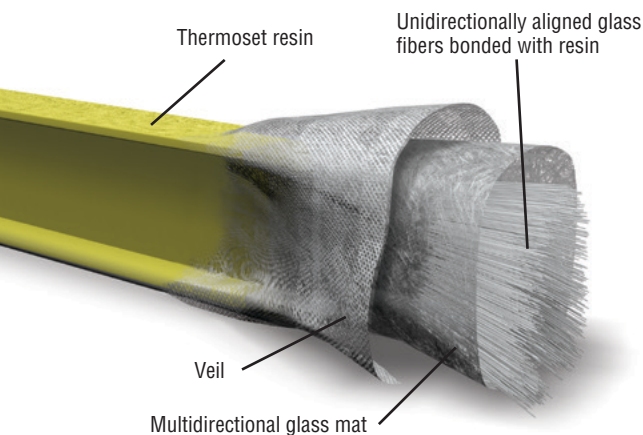
PULTRUDED FIBERGLASS GRATING



HIGH STRENGTH PULTRUDED FIBERGLASS GRATING



Multiple series of DURAGRID® were used for slip-resistant walkways at the Bismarck Aquatic Center in Bismarck, North Dakota.



Three-Piece Cross-Rod Assembly

The 3-piece cross-rod assembly used in 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.

What is DURAGRID®?

DURAGRID® is high strength pultruded bar grating made exclusively in the U.S.A. that can be used like traditional metal grates or fiberglass molded grating while offering the inherent benefits of pultrusion. DURAGRID® is an ideal replacement for steel, aluminum, or molded fiberglass gratings anywhere frequent grating and walkway replacement costs are unacceptable.

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

Why Use DURAGRID®?

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

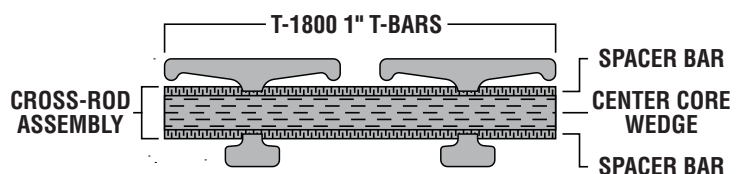
Features

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

Materials of Construction

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 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.



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, generally used for pedestrian applications. It is available in 1", 1-1/2" and 2" depths. The Economy series offers a lighter weight T-shaped bearing bar.

Strongwell's DURAGRID® Heavy Duty (HD) solid bar grating has been designed to handle 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 bearing bar colors are light gray or yellow; the two standard cross rod colors are light gray (polyester) or black (vinyl ester). Other bearing bar colors can be quoted upon request. A small inventory is also maintained of 1" and 1-1/2" "I" and "T" bearing bars in white fire retardant polyester resin.

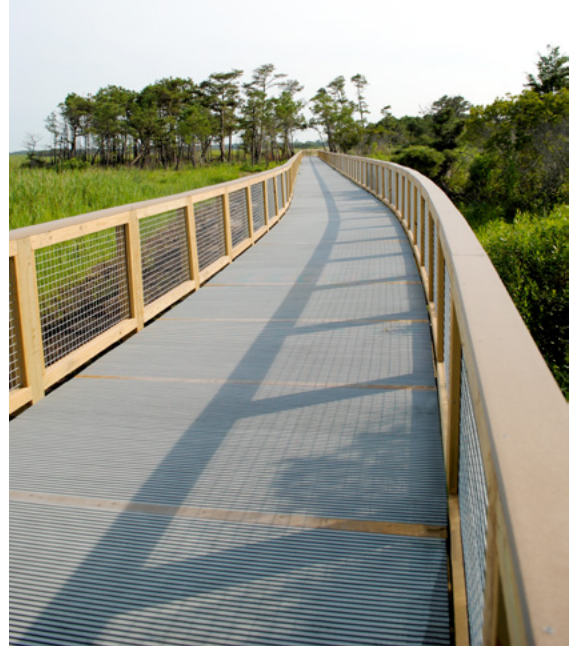
Resin Selection

The standard polyester resin used in DURAGRID® 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.



Almost 5,000 panels of I-4000 1" were used to create a nearly half-mile walking and biking path at Cape Henlopen State Park near Lowes, Delaware.

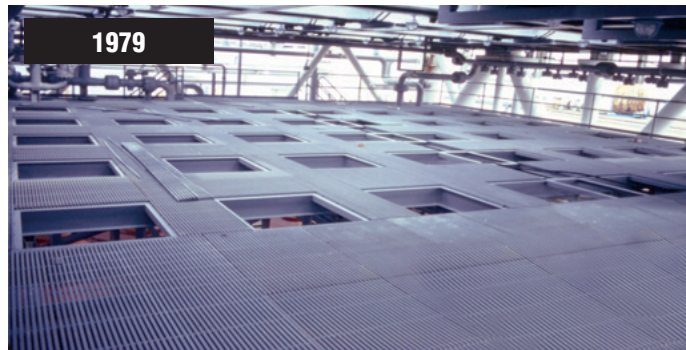


HD-5000 1-1/2" was used at a high-end condominium complex in Miami Beach, Florida to cover drainage channels at parking garage entryways.

APPLICATIONS

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

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



In 1979, I-4000 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 Yohn Rosqui stated, "The grating looks to be in great shape. The surface shows very little wear and tear."



T-1700 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 I-6000 1-1/2" to be the perfect solution.



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 T-1800 using a custom pigmented resin to replace the wooden deck to offer both the aesthetic and structural benefits the club desired.

APPLICATIONS



Chicago Transit maintenance walkways alongside elevated train tracks constitute one of the largest fiberglass grating installations in history. This project used 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. I-6000 1-1/2" was used.



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



Strongwell 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).



HD-4000 2-1/2" was used as a trench cover to protect wireless electromagnetic charging devices built into the roadway at the Utah State University Electric Vehicle and Roadway research facility in Logan, Utah.

TECHNICAL DATA

How to Specify DURAGRID®

Fiberglass grating shall be DURAGRID® Series () as manufactured by Strongwell. Grating shall be pultruded and assembled in the U.S.A. Resin shall be fire retardant () meeting the requirements of a Class 1 rating of 25 or less per ASTM E-84 and the self-extinguishing requirements of ASTM D-635. Bearing bar color shall be (). 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 with color correlating with chosen resin system: polyester = light gray, vinyl ester = black.

The cross-roads shall consist of a center core wedge and two 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-roads shall be spaced a maximum of ()" in the panel. The top of the panels (shall) (shall not) be covered with a bonded grit anti-skid surface.

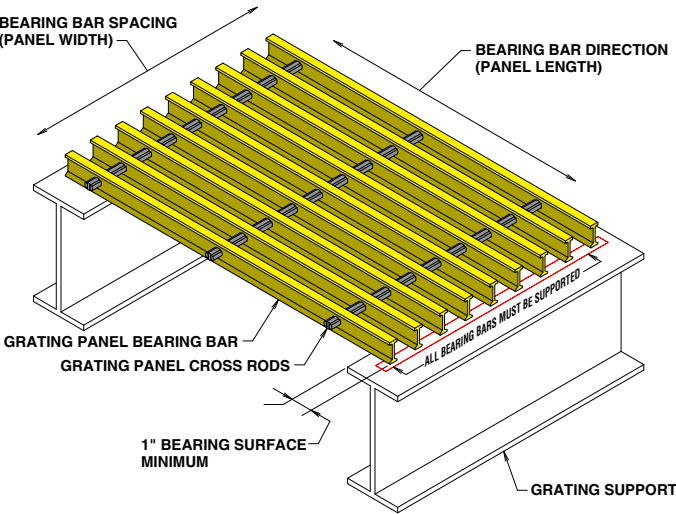
NOTE: If special options are required that are not stated in the above specification, fill in your special requirement in the appropriate section.

How to Order

When ordering DURAGRID®, ensure the bearing bars for installation will be oriented in the correct direction for the application. Bearing bars shall traverse from support to support. Cross-roads are not intended to be applied in the span direction. The adjacent drawing will help specify the width and length of panels.

NOTE: Width is the measurement from end to end of the cross-roads. Length is always the bearing bar length.

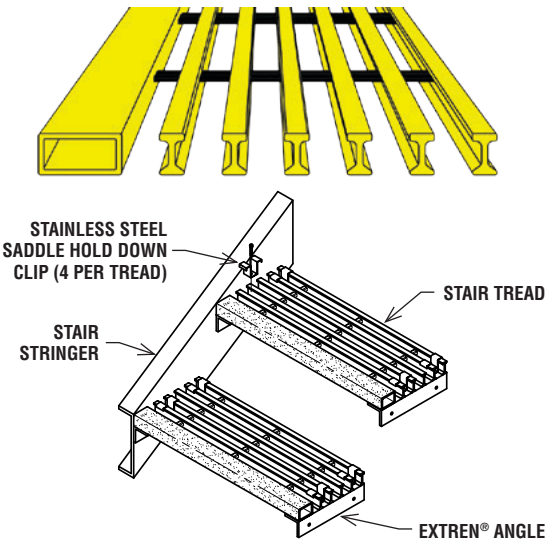
Panel Sizes Are Specified: Width x Length



NOSINGS FOR STAIR TREADS AND LANDINGS

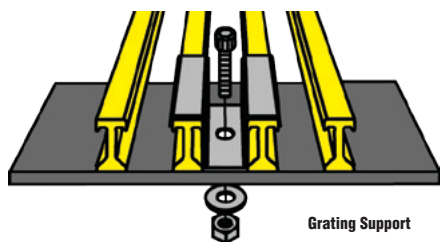
DURAGRID® pultruded stair treads and landings are produced by attaching a 2" deep nosing to the leading edge. This gives added strength and rigidity to the area that takes the most impact and abuse. In addition, the nosing provides more surface area for skid resistance, wear and better visibility. Light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

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



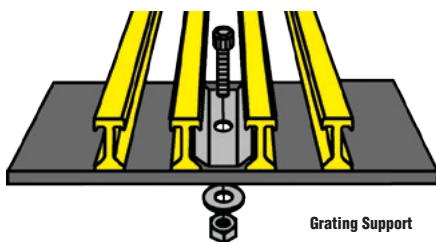
ACCESSORIES

Panel Hold Downs



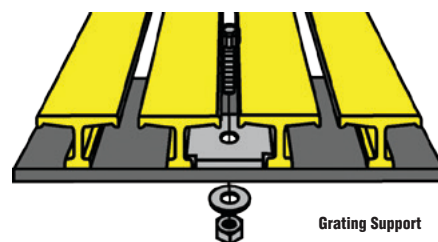
Weldable 316L stainless steel saddle clips are available for all DURAGRID® grating series.

*Bolts are priced separately from the saddle clips.



Weldable 316L stainless steel insert clips are available for all DURAGRID® grating series.

*Bolts are priced separately from the hold-down.

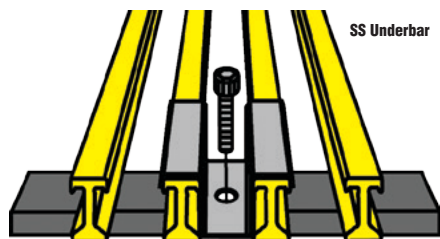


Weldable 316L stainless steel insert clips are available for series T-1800 and T-3500 only.

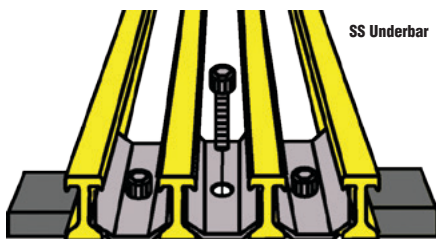
*Bolts are priced separately from the hold-down. (All bolts are 1/4-20 x 1-1/4", cap head, 316L stainless steel.)

Panel Connectors

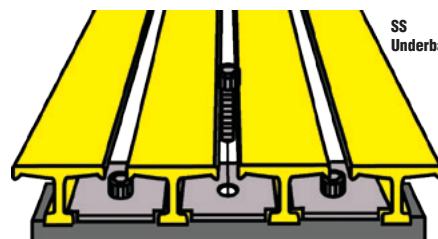
Panel Connectors are generally only used at midspan to assist in transferring load from section to section.



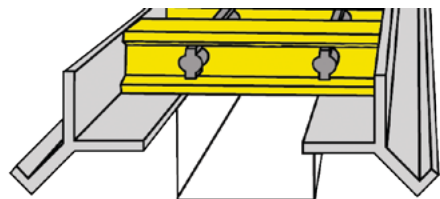
316L stainless steel saddle clips are available as panel connectors for all DURAGRID® grating series.



Insert clip hold-downs are available for all DURAGRID® grating series.



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 DURAGRID® products. Corrosion resistant Fiberglass Curb Angles are available for 1", 1-1/2" and 2" grating panel thicknesses in gray fire retardant vinyl ester.

USING THE LOAD/DEFLECTION TABLES

Series Designation

The series designation indicates the bar size and shape and the percent of open area. For example: T-3500 1-1/2" means 1-1/2" T-bar spaced to give a 35% open area.

Load Table Data

The following pages are a quick reference for various grating options based on pedestrian loads and maximum spans to have 0.25" maximum deflection.

STATISTICAL REPORTING METHODS

Minimum Value

A value that is a specified distance from the average. The most common specified distance is three standard deviations.

Characteristic Value

As defined by ASTM D7290, a value that is normally between two and three standard deviations from the average.

Average Value

The sum of a list of values divided by the number of values in the list, without consideration for standard deviations.

Typical Value

No definition. Not recommended for use by Professional Engineers. Can be any value the manufacturer chooses.

NOTE: Strongwell recommends the use of minimum or characteristic values for design calculations.

* For full load tables, visit <http://www.strongwell.com/gratingloadtables> . For special conditions or additional information, contact us.

DURAGRID® I-BAR PULTRUDED GRATING

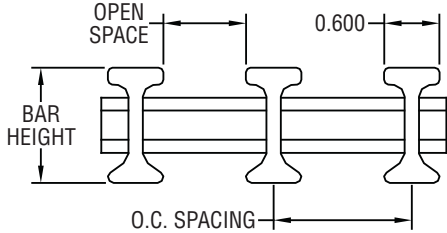
¹ 100 psf load, simple span (dimensions shown), 0.25" deflection.

² Weight per square foot is based upon cross rods 6" on center. Deduct 0.186 lbs/ft² for 12" on center.

NOTES:

N/A : Not intended for pedestrian applications.

For full load tables, visit <http://www.strongwell.com/gratingloadtables>

SERIES	ON CENTER SPACING	OPEN SPACE	# BARS PER FOOT OF WIDTH	% OPEN SPACE	BAR HEIGHT	SPAN ¹	WT/FT ²	FIGURE
I-2000	0.750	0.150	16	20%	1.00"	52	4.5	
					1.25"	58	5.0	
					1.50"	67	5.5	
I-3000	0.850	0.250	14.12	30%	1.00"	51	4.0	
					1.25"	56	4.5	
					1.50"	65	4.9	
I-4000	1.000	0.400	12	40%	1.00"	48	3.4	
					1.25"	54	3.9	
					1.50"	62	4.2	
I-4800	1.161	0.561	10.33	48%	1.00"	47	3.0	
					1.50"	60	3.8	
I-5000	1.200	0.600	10	50%	1.00"	46	2.9	
					1.25"	52	3.3	
					1.50"	59	3.6	
I-5500	1.330	0.730	9.02	55%	1.00"	45	2.7	
					1.50"	58	3.2	
I-6000	1.500	0.900	8	60%	1.00"	44	2.4	
					1.25"	49	2.7	
					1.50"	56	3.0	
I-6500	1.710	1.110	7.02	65%	1.00"	42	2.2	
					1.25"	47	2.4	
					1.50"	54	2.7	
I-7000	2.000	1.400	6	70%	1.00"	40	1.9	
					1.25"	45	2.1	
					1.50"	52	2.3	
I-7500	2.400	1.800	5	75%	1.00"	N/A	1.7	
					1.25"	N/A	1.8	
					1.50"	N/A	2.0	
I-8000	3.000	2.400	4	80%	1.00"	N/A	1.4	
					1.25"	N/A	1.5	
					1.50"	N/A	1.7	
I-8300	3.600	3.000	3.33	83%	1.00"	N/A	1.3	
					1.25"	N/A	1.3	
					1.50"	N/A	1.4	
I-8500	4.000	3.400	3	85%	1.00"	N/A	1.2	
					1.25"	N/A	1.2	
					1.50"	N/A	1.3	
I-9000	6.000	5.400	2	90%	1.00"	N/A	0.9	
					1.25"	N/A	1.0	
					1.50"	N/A	1.0	

DURAGRID® T-BAR PULTRUDED GRATING

¹ 100 psf load, simple span (dimensions shown), 0.25" deflection.

² Weight per square foot is based upon cross rods 6" on center. Deduct 0.186 lbs/ft² for 12" on center.

NOTES:

N/A : Not intended for pedestrian applications.

For full load tables, visit <http://www.strongwell.com/gratingloadtables>

SERIES	ON CENTER SPACING	OPEN SPACE	# BARS PER FOOT OF WIDTH	% OPEN SPACE	BAR HEIGHT	SPAN ¹	WT/FT ²	FIGURE
ET-3300	1.500"	0.500"	8	33%	1.00"	39	2.0	
					1.50"	48	2.4	
ET-5000	2.000"	1.000"	6	50%	1.00"	36	1.6	
					1.50"	45	1.9	
ET-7200	2.600"	1.600"	3.33	72%	1.00"	31	0.9	
					1.50"	38	1.1	
ET-8300	6.000"	5.000"	2	83%	1.00"	N/A	0.8	
ET-8800	8.000"	7.000"	1.71	88%	1.00"	N/A	0.7	
T-0000	1.625"	0.000"	7.38	0%	1.00"	44	3.1	
T-1000	1.800"	0.175"	6.67	10%	1.00"	43	2.9	
T-1200	1.850"	0.225"	6.49	12%	1.00"	43	2.8	
T-1800	2.000"	0.375"	6	18%	1.00"	42	2.6	
T-2500	2.120"	0.495"	5.66	25%	1.00"	42	2.5	
T-3000	2.330"	0.705"	5.15	30%	1.00"	41	2.4	
T-3500	2.400"	0.775"	5	35%	1.00"	40	2.3	
T-3800	2.620"	0.995"	4.58	38%	1.00"	39	2.1	
T-0000	1.625"	0.000"	7.38	0%	1.50"	58	3.8	
T-1000	1.800"	0.175"	6.67	10%	1.50"	57	3.5	
T-1200	1.850"	0.225"	6.49	12%	1.50"	56	3.4	
T-1800	2.000"	0.375"	6	18%	1.50"	55	3.2	
T-2500	2.120"	0.495"	5.66	25%	1.50"	54	3.0	
T-3500	2.400"	0.775"	5	35%	1.50"	53	2.7	
T-3800	2.620"	0.995"	4.58	38%	1.50"	52	2.5	
T-0000	1.000"	0.000"	12	0%	2.00"	78	5.7	
T-1700	1.200"	0.200"	10	17%	2.00"	74	4.8	
T-3300	1.500"	0.500"	8	33%	2.00"	70	3.9	
T-5000	2.000"	1.000"	6	50%	2.00"	65	3.1	
T-5800	2.400"	1.400"	5	58%	2.00"	62	2.6	
T-6700	3.000"	2.000"	4	67%	2.00"	58	2.2	

DURAGRID® HD PULTRUDED GRATING

¹ 100 psf load, simple span (dimensions shown), 0.25" deflection.

² Weight per square foot is based upon cross rods 6" on center. Deduct 0.186 lbs/ft² for 12" on center.

NOTES:

HD Grating is generally suitable for long spans or heavy wheel loads.

For full load tables, visit <http://www.strongwell.com/gratingloadtables>

SERIES	ON CENTER SPACING	OPEN SPACE	# BARS PER FOOT OF WIDTH	% OPEN SPACE	BAR HEIGHT	SPAN ¹	WT/FT ²	FIGURE
HD-3000	0.850"	0.250"	14	30%	1.00"	56	7.8	
					1.25"	66	9.5	
					1.50"	75	11.3	
					1.75"	85	13.0	
					2.00"	93	16.1	
					2.25"	102	17.1	
					2.50"	110	18.2	
HD-4000	1.000"	0.400"	12	40%	1.00"	54	7.0	
					1.25"	63	8.5	
					1.50"	72	10.1	
					1.75"	82	11.6	
					2.00"	89	14.4	
					2.25"	98	14.7	
					2.50"	105	16.3	
HD-5000	1.200"	0.600"	10	50%	1.00"	51	5.9	
					1.25"	61	7.2	
					1.50"	68	8.5	
					1.75"	78	9.8	
					2.00"	85	11.1	
					2.25"	94	12.4	
					2.50"	101	13.7	
HD-6000	1.500"	0.900"	8	60%	1.00"	48	4.9	
					1.25"	57	5.9	
					1.50"	65	7.0	
					1.75"	73	8.0	
					2.00"	80	9.0	
					2.25"	89	10.1	
					2.50"	95	11.1	

DURAGRID® R-BAR PULTRUDED GRATING

¹ 100 psf load, simple span (dimensions shown), 0.25" deflection.

² Weight per square foot is based upon cross rods 6" on center. Deduct 0.186 lbs/ft² for 12" on center.

NOTES:

N/A : Not intended for pedestrian applications.

For full load tables, visit <http://www.strongwell.com/gratingloadtables>

SERIES	ON CENTER SPACING	OPEN SPACE	# BARS PER FOOT OF WIDTH	% OPEN SPACE	BAR HEIGHT	SPAN ¹	WT/FT ²	FIGURE
R-6200	0.813"	0.500"	14.77	62%	1.00"	46	4.5	<p>The diagram illustrates the cross-section of the grating. It shows three vertical bars with horizontal cross rods. The vertical distance between the top of one bar and the top of the next is labeled 'OPEN SPACE'. The height of a single bar is labeled 'BAR HEIGHT'. The horizontal distance between the centerlines of two adjacent bars is labeled 'O.C. SPACING'. A dimension line indicates the width of the bars is 0.3125 inches.</p>
R-7300	1.188"	0.875"	10.1	73%	1.00"	42	3.2	
R-8300	1.875"	1.563"	6.4	83%	1.00"	37	2.2	
R-9000	3.000"	2.688"	4	90%	1.00"	N/A	1.4	
R-9500	6.000"	5.688"	2	95%	1.00"	N/A	0.7	
R-9700	11.875"	11.563"	1	97%	1.00"	N/A	0.4	



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