CONTRARIAN MICRO TEXTURES
by Rigidized® Metals Corporation

Titanium
Technical Data Overview

InvariGrain Titanium

Product Description
InvariGrain is a directional, moderate gloss finish, available in titanium, which is designed for use in architectural applications. It can be applied to wall panels, coping and trim. Since InvariGrain has no coatings to deteriorate, it will last indefinitely with little maintenance.

Grade Selection
Optimal performance of InvariGrain is assured by its highly engineered properties, which appear in Table I. Grade 2 is appropriate for most applications. Other grades may be considered where design parameters such as wind resistance require elevated mechanical properties. It should be noted that grades with higher mechanical properties will be somewhat more difficult to fabricate. For most applications, Grade 1 offers a practical balance between formability and strength. InvariGrain is at home in severe environments, such as seacoast atmospheres subjected to salt water spray.

Table I		Grade 2
CHEMICAL ANALYSIS		
Titanium		99.495% min.
C, Fe, H, N, O		.505% max.
TYPICAL MECHANICAL PROPERTIES		
Yield Strength (psi)		40,000
Elongation in 2 inches		20%
Hardness (HRB)		80
PHYSICAL PROPERTIES		
Density (lb./cu. in.)		.163
Modulus of Elasticity in Tension (x 10^6 lb./sq. in.)		15
Mean Coefficient of Thermal Expansion per °F (x 10^{-6})	32 - 212°F	4.8
	32 - 600°F	5.1
	32 - 1000°F	59.2
Melting Point Range °F		3,000

Pounds Per Piece
Thickness (in.) x Width (in.) x Length (in.) x .163

Available Sizes
Please refer to Table II. Coils and cut lengths up to 288” are available.

Table II	Size Range (inches)				
	WIDTH				
THICKNESS	.75 - 18	>18 - <24	24 - 36	>36 - 48	>48 - 60
.0251 - .1874	•	•	•	•	
.075 - .1250	•	•	•	•	
.0291 - .075	•	•	•	•	
.0178 - .029	•	•	•	•	
.015 - .0177	•	•	•	•	

Typical Surface Characteristics
Spectral Gloss @ 85° 40
Ra 20-35

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Fabrication

InvariGrain is readily welded or soldered. While formation of a heat tint scale can be avoided through use of shield gasses, care must be taken to remove this scale through chemical means.

Flux residue must be thoroughly removed after soldering. Since InvariGrain is essentially non-directional, it is not necessary to orient panels in relation to the rolling direction. However, to avoid the possibility that any subtle directional differences will be visible, we recommend panels be fabricated to maintain orientation of the original sheet alignment. Titanium's relatively low modulus of elasticity, compared to other metals like stainless steel, results in substantial springback behavior during forming. This must be accounted for in tooling setups. Further, bend radii that are more generous than those used for most other metals are recommended. Additionally, titanium is more susceptible to galling than other metals and may require a more aggressive lubrication technique.

Fire Resistance

Since titanium is dimensionally stable at temperatures approaching 3,000°F, InvariGrain provides an added measure of protection in the event of a fire.

Flatness

InvariGrain is supplied within five I units of flatness, which is well below standard commercial allowances.

Installation

InvariGrain is supplied with a high grade UV resistant protective plastic covering designed to withstand the elements for several weeks. However, it is advisable to remove this material promptly after installation to prevent adhesive residue from remaining on the finish.

Despite the uniform finish, titanium has a certain degree of natural color variation. It should be further noted that any metallic surface, even a painted one, is sensitive to misalignment of panels on differing planes. Care should be taken to ensure installation within reasonable tolerances in order to maximize visual consistency in panels.

After installation is completed, any stains from tools or construction debris must be removed.

Maintenance

Designed to be essentially maintenance free, InvariGrain will last indefinitely without requiring attention. It may, however, be appropriate to clean the surface to maintain its original appearance. Any detergent/ammonia solution can be effective for general cleaning. There are a variety of aerospace cleaners and solvents on the market that are appropriate to address stains and adhesive residues.

Environmental Impact

Titanium is recyclable and extremely stable at ambient temperatures. Further, without VOC emissions, which are inherent in coated products, InvariGrain is an environmentally sensible solution.

Warranty

For warranty information, please contact a representative.