



GUARDIAN GAWK / GLARE SCREEN

SIMULATED WIND LOAD TESTING

24" X 120" POLYETHYLENE GAWK / GLARE SCREEN

PART NO. P6000961

Prepared by:

W.M. "Wally" Sunnaa , P.E.



MATERIAL

Linear Low Density Polyethylene – Rotational Molding Grade

USE

The Guardian Gawk / Glare screen is for temporary use on highway construction projects to protect the workers from vehicles head light glare and to minimize motorist distraction during construction activities. The gawk/glare screen is designed to be attached to the top of concrete barriers by placing steel pipes in the existing posthole locations on the top of the concrete barrier. For concrete barriers without posthole locations, a steel pipe with a base plate can be anchored to the top of concrete barriers. The screen is restrained from lifting.

Physical Properties

Polyethylene Material (EQUISTAR CHEMICALS- GA 643-662)

<u>Property</u>	<u>Value</u>	<u>Units</u>	<u>ASTM Test Method</u>
Melt Index (190/2.16)	3.6	g/10 min	D 1238
Density	0.9395	g/cm ³	D 1505
ESCR, Cond. A, F ₅₀			
100% Igepal [®]	>1,000	hrs	D 1693
10% Igepal [®]	480	hrs	D 1693
Flexural Modulus, 1% Secant	110,000	psi	D 790
Tensile Strength @ Yield, 2"/min.*	2,600	psi	D 638
Heat Distortion Temperature @ 66 psi		52°C	D 648
@ 264 psi		40°C	D 648
Low Temperature Impact			
1/8" specimen	51	ft-lbs	ARM STD
1/4" specimen	140	ft-lbs	-40°F impact
Meets FDA Requirements	yes		
UV-stabilized	yes		



WIND LOAD CALCULATION

$$q_z = 0.00256 K_z K_u K_d V^2 I \quad (\text{Equation 6-13 -ASCE7-98})$$

Where

q_z = Velocity pressure

V = Wind Speed

K_z = Velocity pressure exposure coefficient at height z

K_u = Topographic factor

K_d = Wind directionality factor

I = Importance factor

Data

- Height of Gawk/Glare Screen and K-rail < 15 ft.
- $V = 90$ mph
- $K_z = 0.85$ (Exposure C, Table 6-5, ASCE 7-98) -----Use 1.0
- $K_u = 1.0$ (flat ground, Equation 6-1, ASCE 7-98)
- $K_d = 0.85$ (Solid Sign, Table 6-6, ASCE 7-98)
- $I = 1.0$ (Category II, Table 6-2, ASCE 7-98)



Wind Velocity Pressure

$$q_z = 0.00256 K_z K_u K_d V^2 I \quad (\text{Equation 6-13 -ASCE7-98})$$

$$q_z = 0.00256 \times 1.0 \times 1.0 \times 0.85 \times 90 \times 90 \times 1.0$$

$$q_z = 17.59 \text{ psf}$$

Factor of safety = 2 (Conservative)

Wind Force

$$\text{Gawk/glare screen area} = 24'' \times 120'' = 2880 \text{ sq. in} = 20 \text{ sq. ft.}$$

$$\text{Force} = 20 \times 17.59 \times 2 = 704 \text{ lbs.}$$

Wind force on Gawk/glare screen = 704 lbs.

Test Load = 800 lbs.



Gawk/Glare Screen Load Testing

Scope

Guardian polyethylene gawk/glare screen is manufactured of rotationally molded linear low-density polyethylene plastic. Polyethylene plastic is very flexible and shatter resistant. The Guardian screen can be installed in areas subjected to wind speeds of up to 90 mph. Testing was designed to simulate the calculated wind force in order to verify that the gawk/glare screen will not catastrophically break at the supports or at the joints.

Test Set Up

The pipe supports for the gawk/glare screen were placed in the designated slots and placed on fixed supports suspending the gawk/glare screen between supports (see photograph no. 1). The gawk/glare screen was loaded using 50 pound sand bags to simulate the calculated wind load.

Test Procedure

The gawk/glare screen was loaded with sand bags in two stages. During the first stage a total of eight sand bags (400 pounds load) were placed on the gawk/glare screen to simulate the calculated wind load of 17.59 pounds per square feet (see photograph no. 2).

The gawk/glare screen was inspected for any cracks, breaks or failure. Deflection measurements were taken at the center and the edges. During the second stage a total of sixteen sand bags (800 pounds) were placed on the gawk/glare screen to simulate double the calculated wind load including a factor of safety. The gawk/glare screen was inspected for any cracks, breaks or failure. Deflection measurements were taken at the center and the edges.



Test Results

<u>Load</u>	<u>Deflection @ Center</u>	<u>Deflection @ Edge</u>
400 lbs.	4"	3.5"
800 lbs.	7.5"	8.5"

Conclusion

Guardian gawk/glare screen was able to withstand 800 pounds loading. This load simulated a 90 miles per hour wind speed with a factor of safety of two. The gawk/glare screen did not break, crack or fail during the testing. The testing concluded that the gawk/glare screen withstood loads equivalent to 90 miles per hour wind speed.

Certified by:

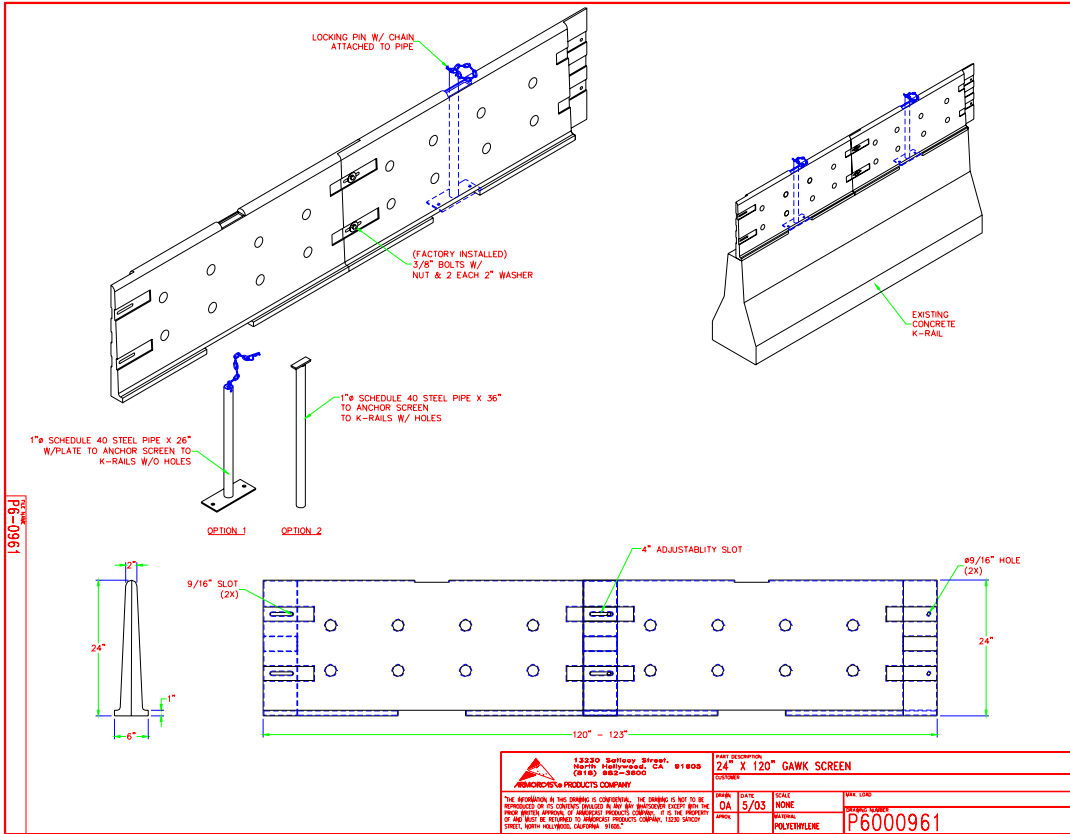
W.M. "Wally" Sunnaa, P.E.



Appendix

ARMORCAST DRAWING NO. A6000961

EQUISTAR MATERIAL SPECIFICATION



Petrothene®

GA 643-662

Linear Low Density Polyethylene
 Rotational Molding Grade
 Melt Index 3.6 Density 0.9395

Applications

PETROTHENE GA 643-662 is a linear medium density polyethylene for rotomolding a variety of objects, including drums, agricultural and chemical storage containers, playground equipment and municipal trash containers.

Certification

GA 643-662 meets the requirements of Food and Drug Administration regulation, 21 CFR 177.1520. This regulation allows the use of this olefin polymer in "...articles or components of articles intended for use in contact with food." Specific limitations or conditions of use may apply. Contact your Equistar sales representative for more information.

Processing Techniques

Specific recommendations for conditions under which GA 643-662 should be processed can be made only when the end use and type of processing equipment are known. For exact recommendations, please contact your Equistar sales representative.

Physical Properties

GA 643-662 is UV-stabilized and is also available in 35-mesh powder as MICROTHENE® MP 643-662.

Property	Value	Units	ASTM Test Method	Sample
Melt Index (190/2.16)	3.6	g/10 min	D 1238	Pellets
Density	0.9395	g/cm ³	D 1505	Compression molded
ESCR, Cond. A, F ₅₀				
100% Igepal®	>1,000	hrs	D 1693	Rotomolded**
10% Igepal®	480	hrs	D 1693	Rotomolded**
Flexural Modulus, 1% Secant	110,000	psi	D 790	Rotomolded**
Tensile Strength @ Yield, 2"/min.*	2,600	psi	D 638	Rotomolded**
Heat Distortion Temperature @ 66 psi	52	°C	D 648	Rotomolded**
@ 264 psi	40	°C	D 648	Rotomolded**
Low Temperature Impact				
1/8" specimen	51	ft-lbs	ARM STD	Rotomolded**
1/4" specimen	140	ft-lbs	-40°F impact	Rotomolded
Meets FDA Requirements	yes			
UV-stabilized	yes			

* Type IV Specimen

** Thickness of specimen is 1/8"

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