



Formerly Known As: Whitmore Tor Armor®

Shell Gadus (TOR Armor)

- Reduces Noise
- Reduces Wear
- Long Carry Down

Biodegradable Top-Of-Rail Friction Modifier

Shell Gadus (TOR Armor) is a top-of-rail friction modifier that is specifically designed to provide a friction coefficient between 0.3 and 0.4 at the wheel-rail interface. Shell Gadus (TOR Armor) substantially reduces noise, wear, and lateral forces. High lateral forces lead to loosened tie plates and fasteners and can result in low rail rollover.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

Features

During normal rolling, Shell Gadus (TOR Armor) acts as a lubricant. But when wheel creep occurs the sliding friction immediately converts to “positive friction”, controlling the creep condition and returning the wheels to a healthy rolling motion. The result is a substantial reduction of vibrations, corrugations and high-frequency squealing.

The positive friction generated by Shell Gadus (TOR Armor) reduces lateral creep, thus reducing lateral forces. This has been measured on instrumented track at TTCI and Class 1 and 2 railways.

Users can achieve a year-round solution by using regular Shell Gadus (TOR Armor) in hot to moderate climates and adding Shell Gadus (TOR Armor Arctic) in areas where temperatures dip below 10°F (-12°C) for extended periods of time. Both grades of Shell Gadus (TOR Armor) are fully compatible and can be mixed in trackside applicators without changes to the performance characteristics other than the low temperature usage.

Shell Gadus (TOR Armor) contains no solvents or latex or toxic materials. It dries quickly between the wheel and the rail due to frictional heat, but it will not harden in the holding tank or at the ports of the applicator. It will not corrode holding tanks, pumps or other steel components. The carry-down distance will depend on conditions such as curvature, braking and gradient, but 3 miles (5 km) is achievable in the vast majority of cases. In some cases, reductions in lateral forces have been measured at 6 miles from the applicator. The long carry distance often results in a reduction in the number of applicators needed.

Shell Gadus (TOR Armor) does not affect braking or tractive effort.

Benefits

- WEAR - Reduces or eliminates creep, hunting (also known as yaw), and corrugations.
- NOISE - Stops or substantially reduces high-pitched squeal.
- REDUCES FUEL CONSUMPTION IN CURVES – Studies have shown that using TOR friction

modifiers reduce fuel consumption 3– 15% depending on the radius of the curve.

- LATERAL FORCES - Greatly reduces rail damage by reducing lateral forces and angle of attack.
- QUIET - Smoother, quieter ride for transit customers.
- LONG CARRY DOWN – Will carry 3-5 miles (5-8 km).
- WIDE TEMPERATURE RANGE – Shell Gadus (TOR Armor) can be used from -10°F (-12°C) to 140°F (60°C) while Shell Gadus (TOR Armor Arctic) can be used from -31°F (-35°C) to 90°F (32°C) which allows year-round use with one grade in some areas. In climates with both extreme high and low temperatures, a combination of the use of both products can be used to achieve a temperature range of -31°F (-35°C) to 140°F (60°C).
- ADHESION - Improves adhesion on stretches of track that are prone to low friction. This can result in allowing more cars to be added.
- LOW CONSUMPTION – 300 ml (1.25 cups) per 1000 axles for freight, 175 ml (0.75 cup) per 1000 axles for transit rail.
- SAFE - contains no heavy metals, petroleum solvent or hazardous ingredients. Easily passes the OECD 301B test for “Ready Biodegradability”.

Specifications, Approvals & Recommendations

For a full listing of equipment approvals and recommendations, please consult your local Shell & Whitmore Reliability Solutions Helpdesk.



Main Applications

Shell Gadus (TOR Armor) optimizes friction at the wheel / rail interface.

US Patent No. 9,617,498, No. 10,214,225, No. 10,814,890 and patents pending.

Typical Physical Characteristics

Properties			Method	Shell Gadus (Tor Armor Arctic)	Shell Gadus (Tor Armor)
Brookfield Viscosity Spindle 6 @ 60 rpm	@ 77°F (25°C)	cps	ASTM D2983	15,000	8,000 - 16,000
Specific Gravity	@ 60°F (15.5°C)	g/cc	Gardner Method	1.26	1.22
Flash Point Cleveland Open Cup		°F (°C)	ASTM D92	None	None
% Solids		%		10 - 15	18 - 23
Application Rate 1,000 Axels	Transit Freight Mixed	ml ml ml		175 300 - 425 220 - 300	175 300 220
Usable Temperature Range		°F (°C)		10 (-12) to 140 (60)	-31 (-35) to 90 (32)
Appearance				Smooth Dark Gray Paste	Smooth Dark Gray Paste

These characteristics are typical of current production. Whilst future production will conform to Shell & Whitmore Reliability Solutions specification, variations in these characteristics may occur.

Health, Safety & Environment

Health and Safety

Shell Gadus (TOR Amor) is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

Guidance on Health and Safety is available on the appropriate Safety Data Sheet, which can be obtained from <http://www.epc.shell.com/>

Protect the Environment

Take used oil to an authorized collection point. Do not discharge into drains, soil or water.

Additional Information

Advice

Advice on applications not covered here may be obtained from your Shell & Whitmore Reliability Solutions representative.