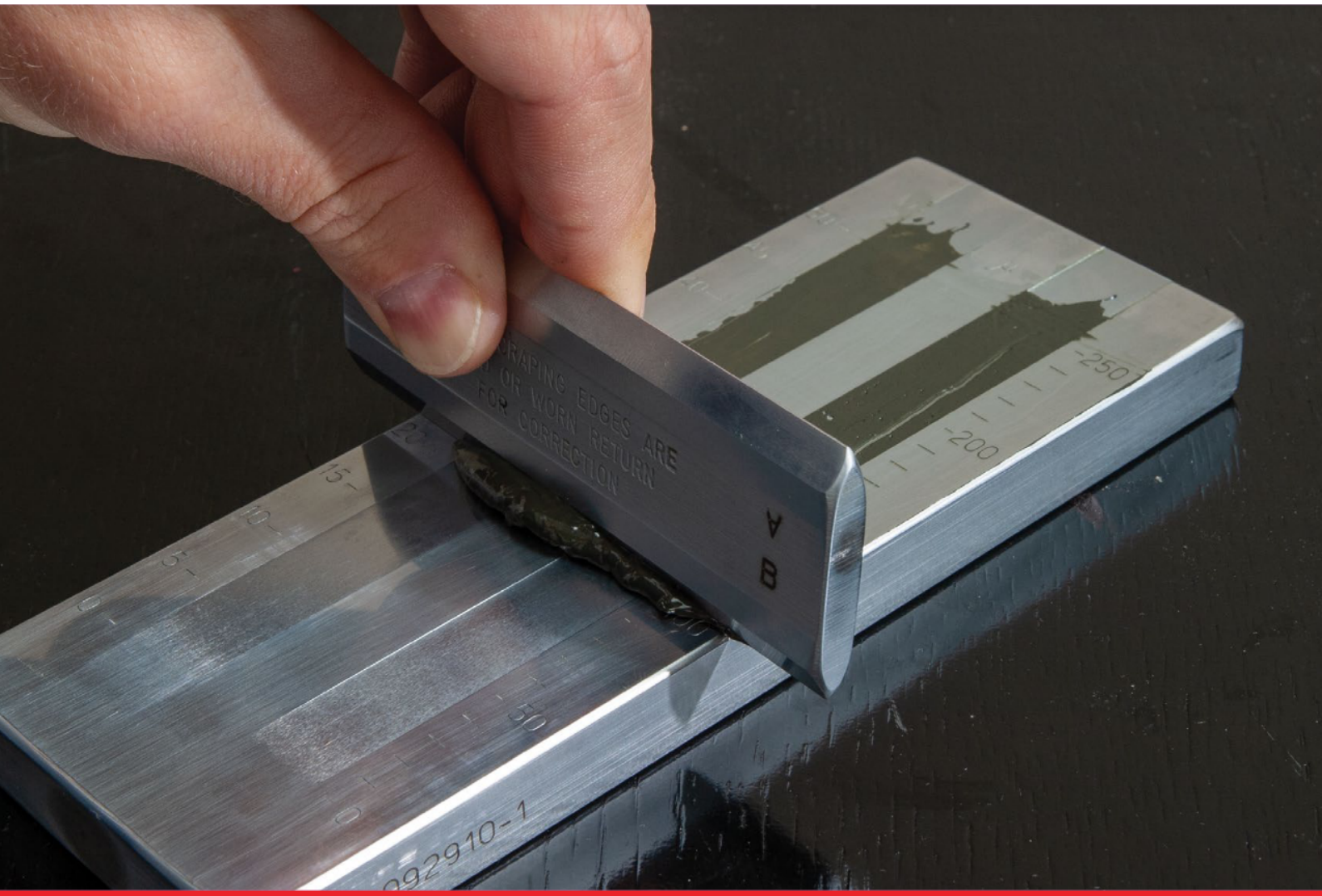
Key Grease Tests for Selecting a Heavy-Duty Grease

Presented by: NORIA

Powered by: BADASS GREASE



As with most lubricants, grease's primary purpose is reducing the friction between moving machine components, which minimizes machine wear. But grease also serves other purposes, including acting as a contamination barrier and as a vehicle for heat transference. Grease can increase machine performance and lifespan when applied correctly and at appropriate intervals.

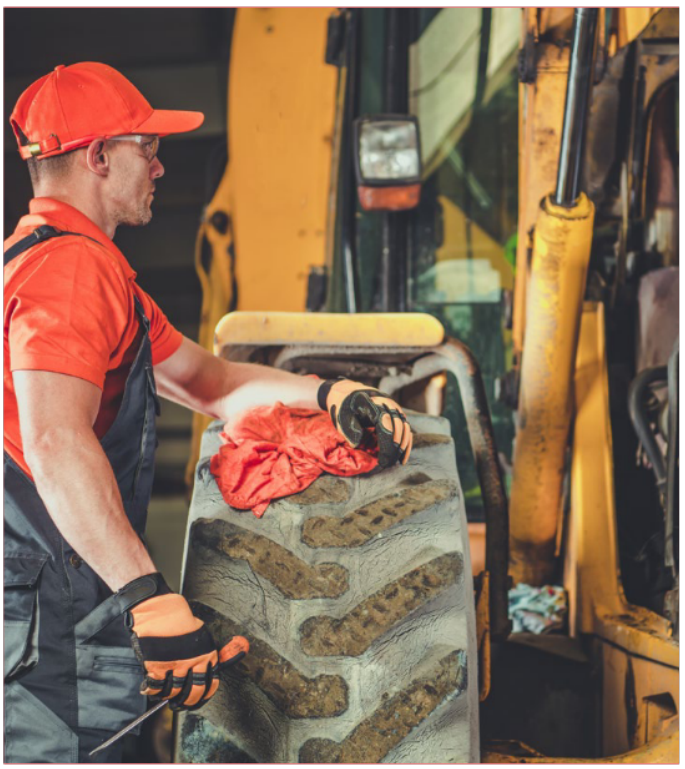
Standards and categorizations for grease are set by The National Lubricating Grease Institute (NLGI). Greases are categorized based on their relative hardness and ability to resist deformation from outside forces, factors that are represented by the grease's NLGI consistency number (NLGI grade).

The Importance of Grease Selection and Best Practices

Different lubricants serve different functions. While performing well in its intended application, a high-quality turbine lube would not perform well in an application that requires engine oil. It is essential to select a high-quality and durable grease that is suited to your specific application.

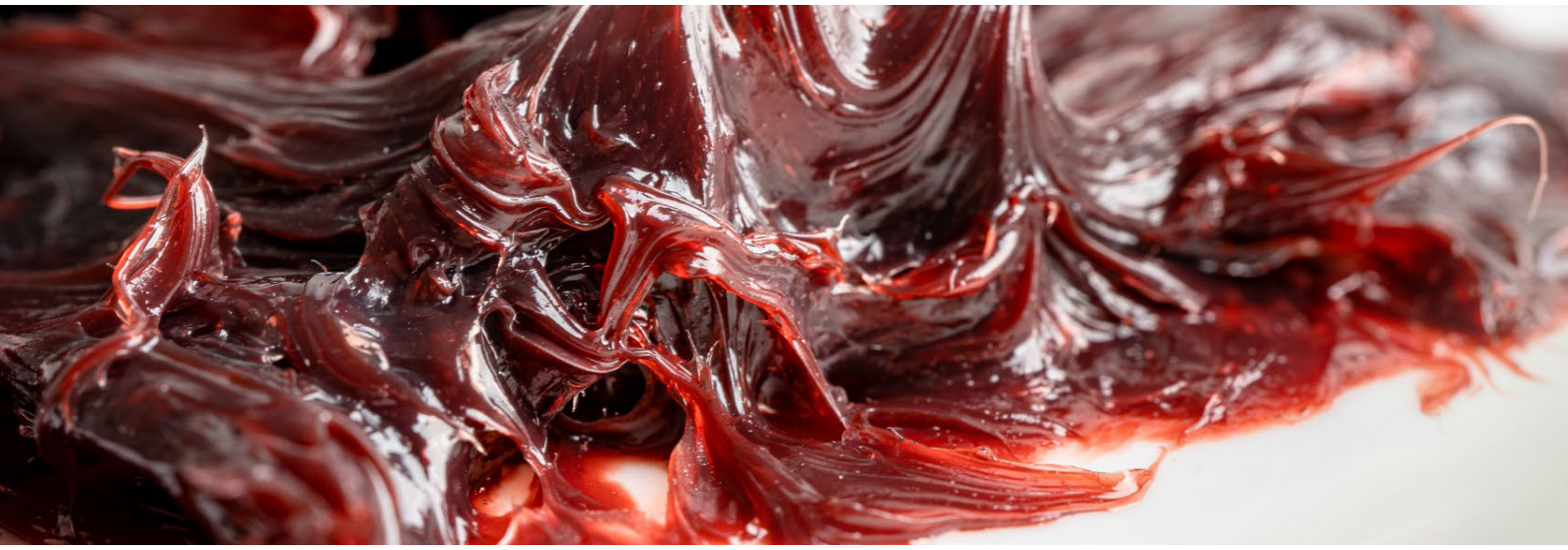
The health of a machine depends on the health of the lubricant. An inferior grease may fail before it is scheduled to be replaced, leading to machine wear and production disruption. On the other hand, a high-quality, heavy-duty grease is dependable; heavy-duty greases are explicitly designed to handle harsh environments and working conditions.

However, a heavy-duty grease's longevity and special qualities are diminished unless properly cared for with best practice maintenance techniques.



Application and Environment

Mining, agriculture, and construction applications typically submit machinery to heavier loads and harder work than other applications. Heavy-duty greases are specifically designed to include additives that react in situations found in these heavy-duty industries. These greases have additives that can help separate and even soften machine component surfaces, preventing them from welding together.



Choosing a Grease Type

Generally, the Original Equipment Manufacturer (OEM) will recommend a specific type of grease. These suggestions can usually be found in the machine's manual or obtained by contacting the OEM, but they are often vague and can cause more confusion than when the selection process began. To select the right grease, you must consider many aspects, including:

- **Base oil viscosity**
  Viscosity is one of the most important attributes of grease. Typically, speed factors are used to determine the minimum and optimum viscosity requirements.
- **Thickener type**
  A grease's consistency is primarily determined by the type of thickener used in its production. This is also where the NLGI scale comes into play. Operating temperature and speed factors are used to determine the optimum consistency for a given application.
- **Additive Package**
  Additive packages should be selected based on factors specific to each application. For example, heavy-load applications require a grease with extreme pressure additives (EP), while a high-speed application will not.

Badass Grease is made with ISO 460 base oil with the Heavy Duty/Mining industry in mind. Lithium Complex is the chosen thickener due to its mechanical stability characteristic, wide temperature range and water resistance.

It is important to remember that one type of grease may not be enough for your operation; many different kinds of grease may be required. The variety of greases needed depends on the machine and the application.

Heavy-duty Grease

A high-quality, heavy-duty grease will be designed to handle various heavy-duty applications. Optimized blends of mineral and synthetic oils can be combined with complex thickener systems to produce greases with:

- Excellent wear control
- Superior corrosion protection
- High extreme pressure performance
- Water resistance

> "Selecting the right grease is essential for optimizing operations." — Noria Corporation

Best Practices and Regreasing Calculations

It is not enough to select the proper grease; you must also perform proactive maintenance to ensure the grease performs at an optimum level.

Regreasing intervals should be set and adhered to as closely as possible. Waiting until a machine shows signs of problems before regreasing means it is too late to prevent damage: damage has already occurred.

Many factors influence when to set intervals. This calculator can be used to determine the optimal frequency of regreasing and the amount of grease needed.

When regreasing, it is vital to remove the old grease. This old grease will likely contain some level of contamination, which will transfer and corrupt the new grease if it comes into contact. Additionally, the old and new greases may be incompatible due to different viscosity levels or the presence of certain additives.

It is also essential to use the correct amount of grease. It may seem counterintuitive, but overgreasing can be just as damaging as under greasing or not adding grease at all. If too much grease is added to a component like a bearing, it can overfill the bearing cavity, forcing grease to leak from seals and opening avenues for contamination and moisture ingression.

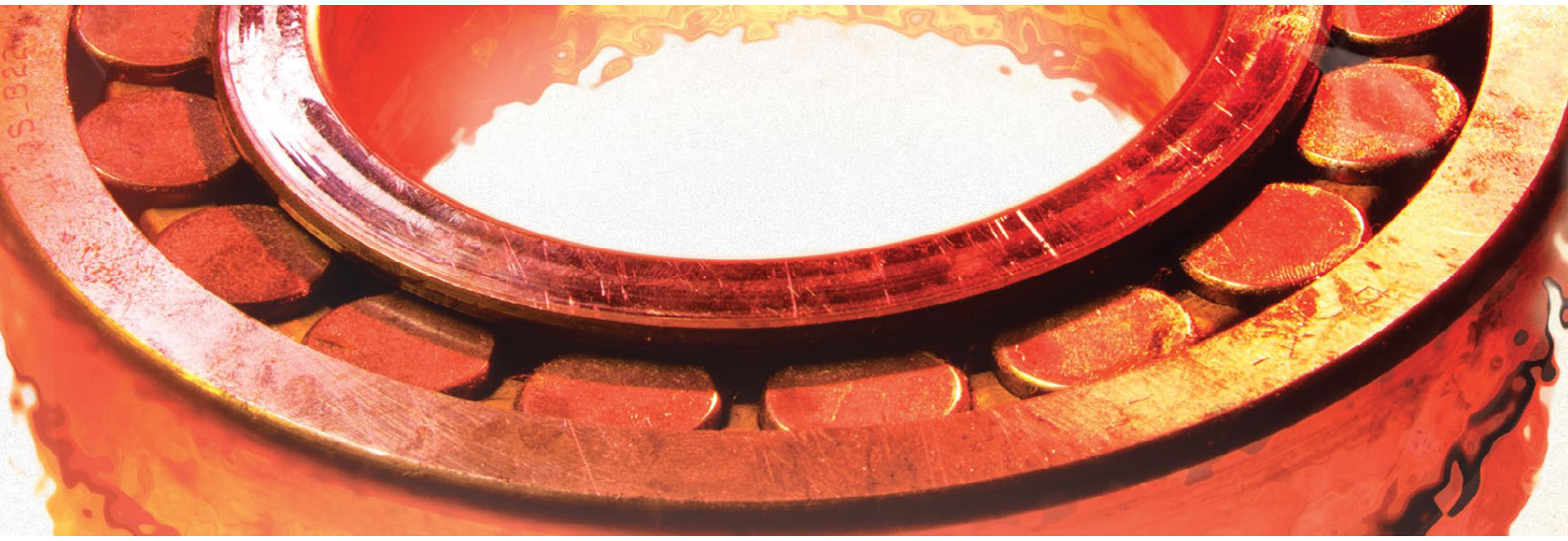
Finally, ensure that zerks are kept clean before regreasing. These fittings can become covered in grease, allowing dirt to stick to exposed surfaces. If this dirt build-up is not wiped away before regreasing, it can be dragged into the machine with the new grease.

Other Considerations

Grease Dry-Out

Grease dry-out is one of the main disadvantages of using grease instead of oil. Grease tends to cake together and dry out, causing the oil held within the grease to bleed out. Many different things can cause grease dry-out, including:

- Contamination
- Incompatible greases
- Thermal run-away
- Base-oil oxidation
- Vibration and Centrifugal Forces
- Hydrostatic exhaustion
- Mechanical wring out
- High-temperature violability



Changing Grease Based on Temperature

Weather, and more specifically, the temperature, can affect grease performance. Viscosity specifically is beholden to changes in temperatures, and as weather changes, this must be considered. For this, we can refer back to a grease's NLGI number. Generally, grease becomes thinner in hot temperatures and thicker in cold temperatures. To counteract these effects, viscosity stabilizing additives can be used, or different styles of grease can be applied.

Important Grease Tests

When selecting which grease test to perform, application is your key focus. In the heavy duty, off highway/mining world, these two tests are the most "practical" of the group.

High-temperature Life (ASTM D3527)

This test is used to evaluate the high-temperature performance of greases. The grease is placed into a modified wheel-hub assembly. The hub is then rotated at 1000 rpm at an elevated temperature. Failure occurs when the motor driving the assembly exceeds a certain torque value. The results of this test are reported in hours and are easily interpretable: the longer the grease lasts in the test, the longer it will perform at high temperatures.

Badass grease outperformed competitors in this test. The test administrators noted that, while the test was halted at the 120-hour mark, the grease could have performed longer.

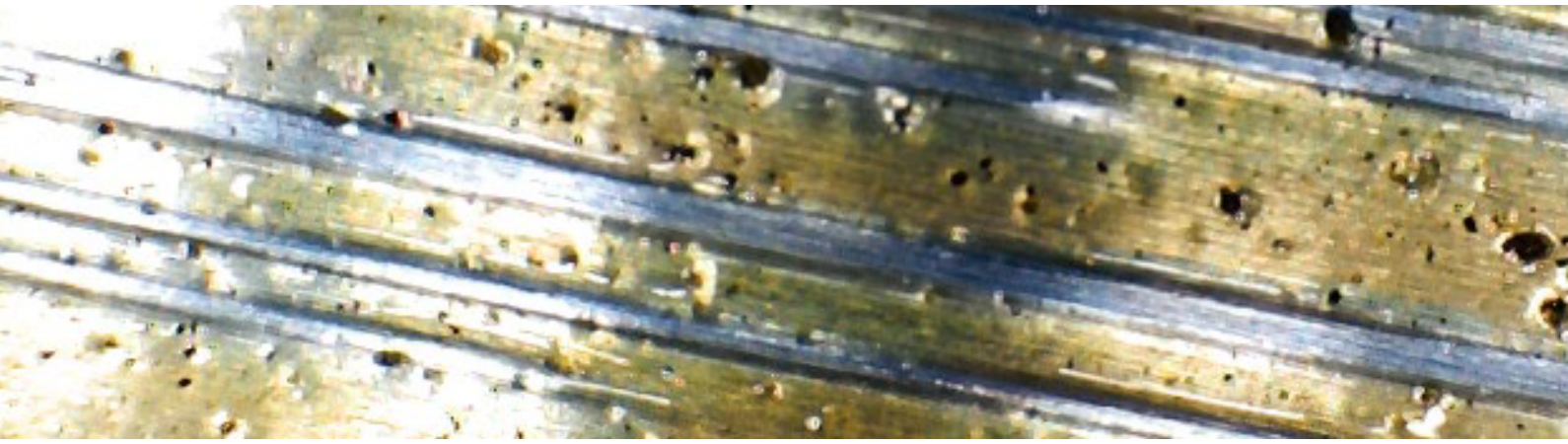
If you glance at the product data sheet it shows the test reaching the 240-hour mark. More than doubling competitor A and six times better than Competitor B.

Roll Stability (ASTM D1831)

This test is used to determine the mechanical stability of grease. Before testing, the consistency of the grease is measured. The grease is placed into a vessel, which then rotates while a cylinder rolls through the lubricant. After the test is finished, the grease consistency is again measured. A grease that maintains its consistency is considered more mechanically stable than greases that experience consistency changes.

Again Badass grease outperformed the competitors, coming in between 37%-72% more stable than the greases it was tested against.

> Before I made the move to Badass HT #2, I was needing to grease my cutter head every morning. Now with Badass HT #2, I only need to apply grease on every third day. This saves on grease cost but more importantly time. – Scott Bandy of Bandy Logging



Other Tests

There are other tests to consider when choosing a grease — each application has unique needs. However, when it comes to the environments of mining, construction and agricultural operations, high-temperature life and roll stability are two of the most important considerations. Greases that perform well in these factors will result in longer timespans between oil changes, increased equipment optimization, and less downtime.

Depending on your specific needs, you may also want to consider how a grease performs in the following tests:

Leakage Tendency (ASTM D1263)

This test is performed similarly to the roll stability test. The grease is placed into a simulated wheel bearing assembly that is run for six hours at high temperatures. Leakage during this process is collected, and the resulting mass is reported. The lower the mass of the leakage, the better the grease will stay in place.

Resistance to Water Spray (ASTM D4049)

This test determines a grease's propensity to be removed from a surface due to water spray conditions. The test is performed by placing grease on a sheet of stainless steel. The grease is then sprayed at a specific water pressure and temperature, and the amount of grease remaining is measured, yielding the results.

Oil Separation from Grease (Wire Cone Method; ASTM D6184)

In this test, a grease's ability to withstand bleeding is measured. Grease is placed in a wire cone which is suspended over a beaker. The grease is then heated; as the oil separates from the grease, it falls from the cone into the beaker. The test is conducted for 30 hours, and the result is determined by comparing the percentage of leaked oil to the mass of the original sample.

Oil Separation from Grease in Storage (ASTM D1742)

This test determines a grease's ability to resist separation during storage. To perform this test, grease is placed in a sieve which is then placed into a pressure vessel. The grease is then subjected to high pressure for 24 hours, during which time oil separating from the grease is collected. The collected oil is then compared to the mass of the original sample, yielding the test results.

Low-temperature Torque (ASTM D4693)

This test also uses a simulated wheel bearing apparatus into which the candidate grease is packed. The bearing is then cooled to -40 C and rotated. After 60 seconds, the torque is measured and reported in N·m. This reading displays how easily a grease will flow in cold temperatures.

Dropping Point (ASTM D2265)

For this test, grease is applied to the inside wall of a cup which is then suspended and heated. The cup has a hole through which material can drip. The test is conducted by steadily increasing the temperature of the cup until a drop is seen falling from it. The temperature is recorded, yielding the grease's dropping point.

Test Results

The following chart displays the results of the previously described testing. As previously mentioned, Badass Grease outperformed competitors in the high temperature life and roll stability tests, two of the most important qualities for greases used in mining, construction, agriculture and other similar applications.

	BADASS GREASE	Competitor A	Competitor B
Dropping Point, ASTM D2265 (°F)	516	516	565
Leakage of Wheel Bearing Grease ASTM D1263 (g)	0.1	0.2	0.1
High Temperature Life of Grease ASTM D3527 (hrs)	120	101	40
Low Temperature Torque ASTM D4693 (N·m)	8.01	9.8	0.31
Oil Separation Percent ASTM D6184	2.46	0.01	2.47
Oil Separation Percent, Storage of Grease ASTM D1742	0.4	0.0	0.6
Water Spray Resistance Percent ASTM D4049	8.5	7.8	10.3
Roll Stability of Grease Percent ASTM D1831	9.13	15.68	12.47

Application-specific Performance

The importance of selecting the right grease cannot be overstated. Badass grease has demonstrated superior high-temperature life and roll stability — making it suited for heavy-duty operations like mining, construction, and agriculture. These operations demand excellent wear control, high extreme pressure performance, superior corrosion protection, and dependable water resistance. Badass Grease offers these qualities and more, making it the best choice for heavy-duty applications.

For information about Badass Grease products contact:
(888)202-0107 | orders@integratedproductsusa.com | www.badassgrease.com

BADASS GREASE

Badass Grease

HD Agriculture, Construction & Mining Grease

BADASS HIGH TEMPERATURE RED GREASE

Specifically Formulated for: Agriculture, Construction, Mining and Marine Equipment. Red in color.

HIGH LOAD CAPABILITIES

BADASS HD EP Grease is a heavy-duty lithium complex RED grease designed for a broad range of applications requiring exceptional load-barring capabilities, water resistance, and long lubricant life.

HIGH-VISCOSITY OILS

Formulated with high-viscosity base oils and a synergistic combination of high quality EP and Heavy-Duty additives.

AUTOMOTIVE, TRUCKING AND FARMING

This high-temp grease can provide excellent protection of on and off-highway parts like ball joints and drive shafts.

CONSTRUCTION AND MINING

BADASS HD EP Grease is designed for heavy-duty applications found in the construction and mining industry. AVAILABLE WITH 5% MOLY.

Customer Benefits

- Suitable for use with large bearings running under severe operating conditions and medium to low speed bearings
- Minimizes chemical deterioration over an extended period of storage and provides enhanced service life to equipment
- Provides effective wear protection for ball joints, drive shafts and other parts subjected to extreme pressure and shock loading
- Works effectively in water ingress conditions as well as in dusty/harsh environments

Applications

BADASS HD EP Grease can be used wherever lithium greases are recommended or preferred, such as in suspension systems, wheel bearings, universal joints, ball joints and anti-friction plain bearings. Also it is well suited for lubrication in the pulp and paper mill industry, such as paper machine wet ends, felt roller bearings, couplings and press sections.

Packaging Options

- 15 oz. Tubes
- 35 Lb. Pails
- 120 Lb. Kegs

Badass Moly 5% Grease

Heavy Duty Calcium Sulfonate Grease

BADASS 5% MOLY GREASE

Specifically Formulated for: Pins and Bushings, Agriculture, Construction, Mining and Marine Equipment.

MAXIMUM EP AND ANTI-WEAR PROPERTIES

Formulated with an innovative and synergistic combination of solid lubricants which prevent welding and reduce friction even under the most severe operating conditions such as very heavy and shock loads.

HEAVY-DUTY EXTREME PRESSURE GREASE

Formulated with high-viscosity base oil thus exhibiting outstanding film strength and resistance to corrosive saltwater environments.

WATER RESISTANT

Using high viscosity base oil and fortified with Moly and special additives, it exhibits excellent water repellency, oxidation resistance, and a wide operating temperature range.

MEETS CATERPILLAR SPECS!

Meets and exceeds the automotive and industrial testing requirements of ASTM D 4950, earning it the GC-LB classification by the National Lubricating Grease Institute.

Customer Benefits

- Extended service life of equipment
- Excellent performance under heavy and shock loads
- Extraordinary performance at high and low temperatures
- Protects equipment from rusting under humid and water ingress conditions

Applications

Badass Moly 5% Grease is an obvious choice for virtually any multi-purpose or severe extreme-pressure application. It is recommended for the most severe applications in off-highway construction, mining equipment, earth moving machines, Caterpillar equipment, as well as other heavy-duty construction and mining equipment moving at slow to medium speed.

Packaging Options

- 15 oz. Tubes
- 35 Lb. Pails
- 120 Lb. Kegs
- 400 Lb. Drums
- 2,000 Lb. Disposable Totes
- 50,000 Lb. Bulk