



PRECISION™ LITHIUM AND LITHIUM COMPLEX GREASES

Introduction

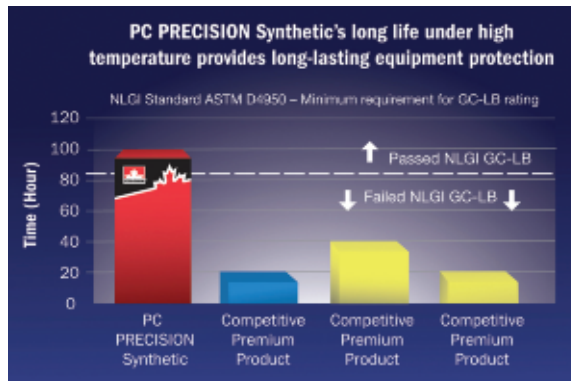
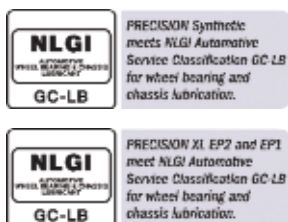
Petro-Canada PRECISION™ greases are premium performance, long life multi-application greases formulated to reduce operating costs and provide long service protection over a wide range of operating temperatures.

PRECISION XL greases are formulated with Petro-Canada Hydro-treated base oils and other selected oils, water-resistant adhesive polymers, extreme pressure additives and inhibitors against oxidation and corrosion. PRECISION Synthetic greases are formulated with synthetic fluids and performance additives for applications over a wider temperature range. The resulting products outperform leading competitive greases by offering longer life at high operating temperatures, better adhesion and excellent load carrying capacity. The outstanding performance of PRECISION XL and PRECISION Synthetic results in lower operating costs by reducing the re-greasing frequency, providing longer equipment protection and reducing maintenance costs to the customer.

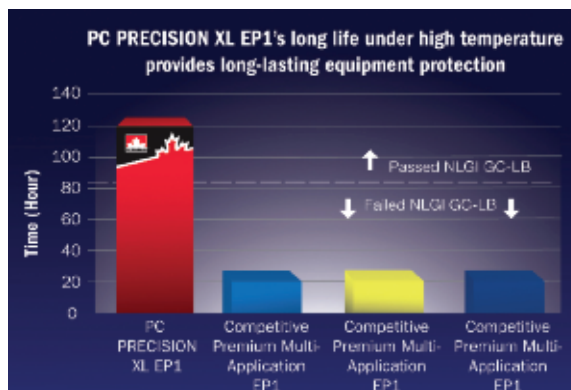
Features and Benefits

Protection Advantage

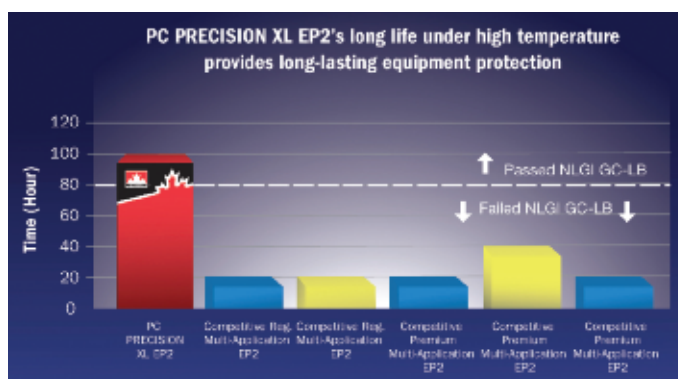
- Long life under high temperature provides long-lasting equipment protection.
- PRECISION Synthetic, PRECISION XL EP1 and EP2 perform better than many of the leading competitive premium multi-application products by lasting 2-3 times longer in the ASTM D3527 test.



ASTM D3527 Bearing Life Performance Test at 160°C (320°F), 1000 rpm speed and 111 N thrust load



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ASTM D3527 Bearing Life Performance Test at 160°C (320°F), 1000 rpm speed and 111 N thrust load

What is the HT difference?

Petro-Canada starts with the patented HT purity process to produce water-white, 99.9% pure base oils. The result is a range of lubricants, specialty fluids and greases that deliver maximum performance for our customers.



*This test differentiates among wheel bearing greases having distinctly different high temperature characteristics. The longer the life, the better is the protection.

Features and Benefits

Continued

Protection Advantage

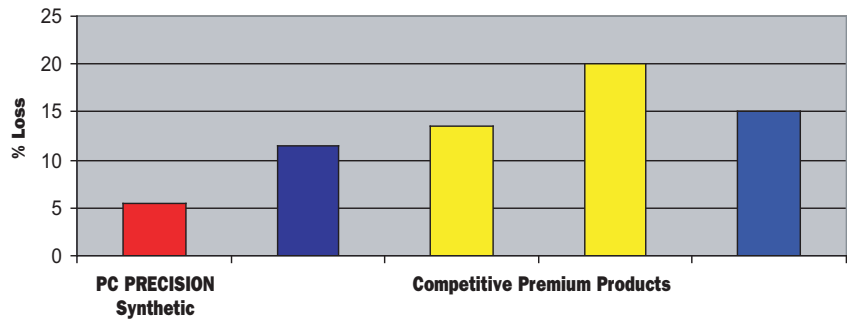
- **Low water washout requiring less re-greasing and maintenance.**
 - PRECISION Synthetic and PRECISION XL EP2's effective water washout resistance can reduce maintenance costs in wet environments.

Protection Advantage

- **High mechanical stability in severe operating conditions.**
 - PRECISION Synthetic, PRECISION XL EP1 and EP2 can also lower maintenance costs as a result of reduced product breakdowns under low to moderately high shear conditions.

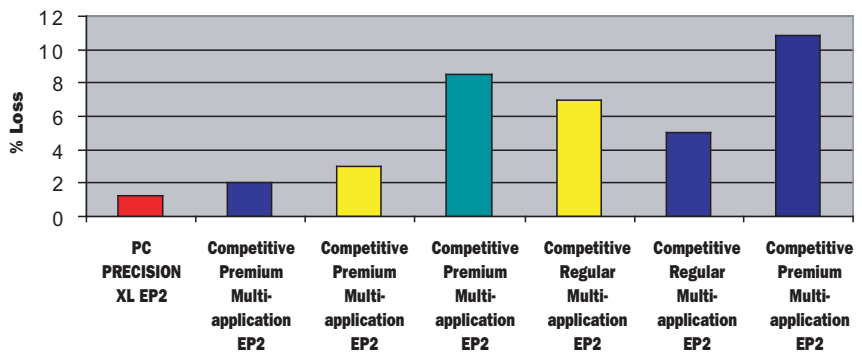
PC PRECISION Synthetic high resistance to water washout requires less re-greasing

ASTM D1264 Determining the water washout at 79°C (174°F), 5.0 mL/sec. water flow rate and 600 rpm bearing speed



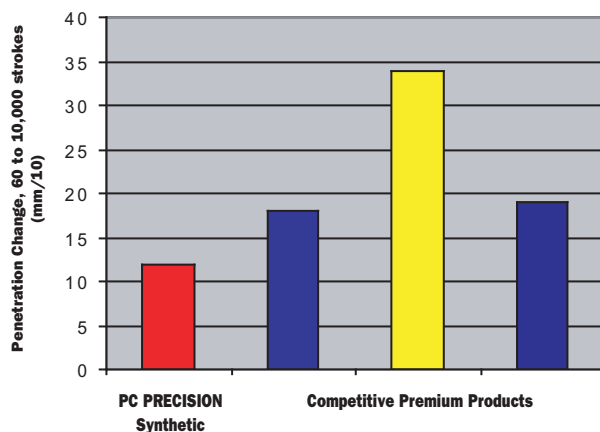
PC PRECISION XL EP2's high resistance to water washout requires less re-greasing

ASTM D1264 Determining the water washout at 79°C (174°F), 5.0 mL/sec. water flow rate and 600 rpm bearing speed



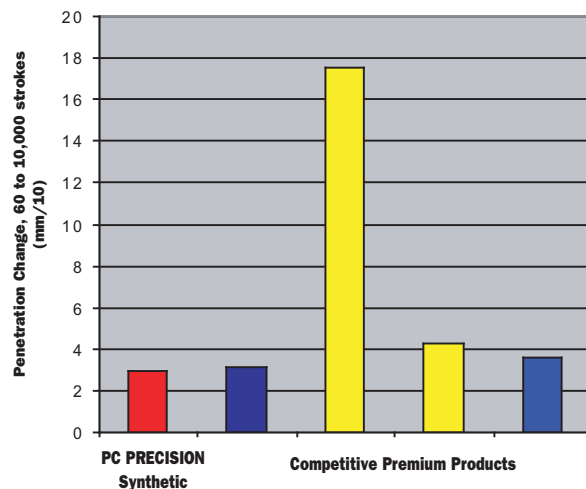
PC PRECISION Synthetic with the lowest break-down under low shear conditions provides extended service life for customers

ASTM D217 at 10,000 strokes, 25°C (77°F)



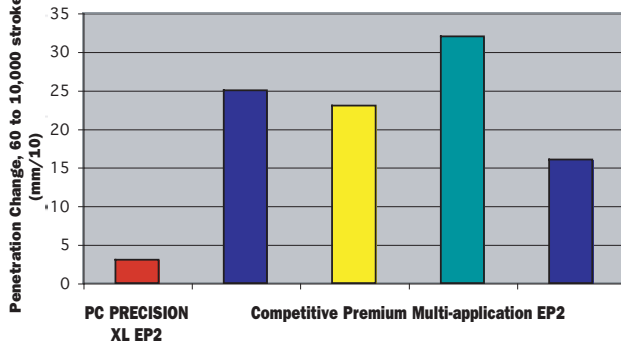
PC PRECISION Synthetic with the lowest break-down under moderate shear conditions provides stability and longer service life for customers

ASTM D217 at 25°C (77°F)



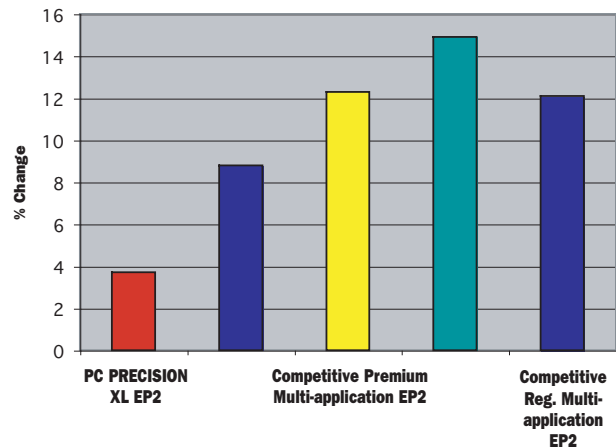
PC PRECISION XL EP2 with the lowest break-down under low shear conditions provides extended service life for customers

ASTM D217 at 10,000 strokes, 25°C (77°F)



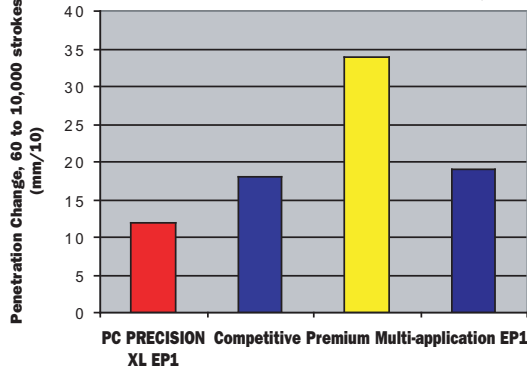
PC PRECISION XL EP2 with the lowest break-down under moderate shear conditions provides stability and longer service life for customers

ASTM D217 at 10,000 strokes, 25°C (77°F)



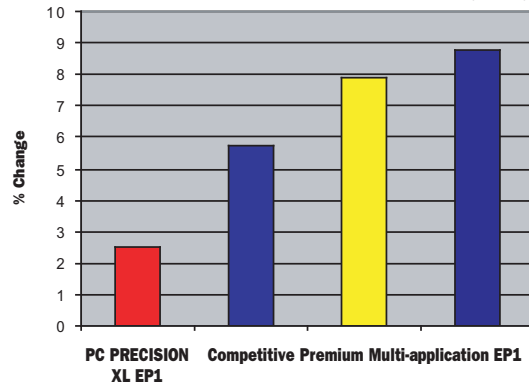
PC PRECISION XL EP1 with the lowest break-down under low shear conditions provides extended service life for customers

ASTM D217 at 10,000 strokes, 25°C (77°F)



PC PRECISION XL EP1 with the lowest break-down under moderate shear conditions provides stability and longer service life for customers

ASTM D217 at 10,000 strokes, 25°C (77°F)



*The significance of the tests is to demonstrate the stability of the grease under normal and moderate shear conditions. The lower the number in the graph, the better is the grease performance, and the longer its service life.

State of the art formulations

- Excellent protection against rust and corrosion.
- Prevents scoring or spalling under high loads.
- Reduces friction and wear.
- Provides corrosion protection.
- Seals bearings from water and contaminants.
- Resists leakage, dripping and throw-off.
- Resists change in consistency during service.
- Maintains mobility under various conditions.

Applications

Petro-Canada PRECISION Greases are formulated to provide protection covering a wide range of applications especially where severe operating conditions exist. PRECISION greases are recommended for a full range of automotive and industrial applications, including:

- | | |
|-------------------------|--------------------|
| • Fleet | • Agriculture |
| • Mining | • Marine |
| • General Manufacturing | • Power Generation |
| • Forestry | • Automotive |
| • Construction | • Rail Lines |
| • Pulp & Paper | • Steel Mills |

PRECISION SYNTHETIC

PRECISION SYNTHETIC

PRECISION Synthetic is developed to lubricate equipment in arctic environments. It delivers excellent cold weather protection with no compromise on high temperature performance. It has an operating range of -45°C to 170°C (-49°F to 338°F). PRECISION Synthetic meets the NLGI's stringent standard GC-LB for automotive wheel bearing (GC) and chassis (LB) lubrication.

Specific applications include:

- Centralized systems on heavily loaded mining machinery such as dragline booms
- Wheel bearings on high performance racing cars
- Forestry, construction and mining mobile equipment
- Conveyors and equipment in refrigerated areas
- Pumpjacks
- Lubrication of wheel bearings and chassis components on trucks operating in wide extremes of temperature, e.g. near Arctic to southern desert

PRECISION SYNTHETIC MOLY

PRECISION Synthetic Moly contains 3% Molybdenum disulphide for protection against vibration and shock loading. It is recommended for use in equipment operating in rough severe conditions such as shock loaded mobile equipment used in mining, forestry or construction industries, as well as heavy mining equipment. Operating range is -40°C to 170°C (-40°F to 338°F).

PRECISION SYNTHETIC HEAVY 460

PRECISION Synthetic Heavy 460 is formulated with a medium high viscosity base oil and unique additive package, and is designed primarily for the lubrication for dryer felt-roll bearings in paper machines where an extended life at high temperatures is required and frequent grease replenishment is not possible. Operating range is -30°C to 170°C (-22°F to 338°F).

PRECISION SYNTHETIC HEAVY 1500

Precision Synthetic Heavy 1500 is formulated with a very high viscosity base oil and unique additive package, and is designed for service in plain as well as rolling element bearings operating at low speeds, heavy loads and high temperatures; conditions encountered in mining, construction and forestry applications. It features excellent wear protection, load-carrying and high temperature performance. Operating range is -20°C to 170°C (-4°F to 338°F).

PRECISION SYNTHETIC EP00

PRECISION Synthetic EP00 is semi-fluid synthetic grease that is designed primarily for the lubrication of truck/trailer wheel-end bearings. It is also recommended for leaky gearcases. It has an operating range of -40°C to 170°C (-40°F to 338°F).

PRECISION SYNTHETIC EMB

PRECISION Synthetic EMB is formulated for long service life and excellent high and low temperature performance. It is designed to lubricate bearings over a wide temperature range in applications where shock loading is absent

and an extreme pressure (EP) grease is not required. It meets CGE specification 6298 for Class B or F insulation. Applications for use include electric motors where no EP additives are allowed, high speed and anti-friction bearings found on fans, and bearings on electric motors and generators including high temperature units. Operating range is -40°C to 170°C (-40°F to 338°F).

PRECISION XL

PRECISION XL EP2

PRECISION XL EP2 is recommended for lubricating heavy-duty and general-purpose bearings operating at both low or high speeds encountered in the field. It may be used instead of PRECISION XL EP1 in a wet environment due to its thicker consistency. Operating range is -20°C to 160°C (-4°F to 320°F). Specific applications include:

- Wheel bearings including those equipped with disc brakes
- Chassis points, water pumps and steering linkages
- Wet and dry-end bearings on paper machines
- Low-medium speed gear couplings
- Ball mill conveyor and crusher bearings

PRECISION XL EP1

PRECISION XL EP1 is recommended for use in centralized lubrication systems serving both heavy-duty as well as general-purpose bearings. It may be used instead of Precision XL EP2 during cold winter weather due to its softer consistency. Specific applications include industrial and mining equipment served by centralized lubrication systems. Operating range is -25°C to 160°C (-13°F to 320°F).

PRECISION XL HEAVY DUTY

PRECISION XL Heavy Duty is recommended for use in Steel mills, warehouses and fabrication facilities in the general manufacturing industry. It is particularly well suited for bearings subjected to high loads and shock loading on rolling mills and related equipment. It can also be reliably dispensed through long supply lines within the mill. Operating range -10°C to 160°C (14°F to 320°F).

PRECISION XL EMB

PRECISION XL EMB is a non-EP grease, is recommended for bearing lubrication over a wide temperature range in applications where shock loading is absent. PRECISION XL EMB is specifically designed to lubricate electric motors where no EP additives are allowed due to their detrimental effect upon winding insulation. Specific uses include:

- Bearing on electric motors and generators including high temperature units. Meets CGE specification 6298 for Class B or F insulation
- High speed, anti-friction bearing found on fans. Operating range is -25°C to 160°C (-13°F to 320°F).

PRECISION XL EP000

PRECISION XL EP000 is an extreme pressure, semi-fluid lithium grease designed specifically for use in leaky or poorly sealed gear boxes. It has also been used in the gear boxes of continuous miners extracting potash. It is also recommended in leaky speed reducers, chain cases, and bearings in centralized grease systems. Operating range is -25°C to 100°C (-13°F to 212°F).

PRECISION XL EP00

PRECISION XL EP00 is recommended for use in centralized, on-board, truck chassis lubrication systems made by Groeneveld, Robertshaw, Lincoln, Grease Jockey, Interlube, ECOSTAR and Vogel. It is also recommended for use as a gear drive lubricant where a high viscosity gear oil with good low temperature mobility is required. Operating range is -35°C to 100°C (-31°F to 212°F).

PRECISION XL RAIL CURVE GREASE

PRECISION XL Rail Curve Grease is recommended to provide wear protection on rail gauge faces and wheel flanges of rolling stock with following systems:

- Track-side mechanical lubricators such as Portec and Lincoln
- On-board lubrication systems, such as the Clicomatic system
- Switches, switch plates (hand applied/brushed), fish plates and joint bars
- Other railway applications where graphite greases are recommended

Operating range is -50°C to 120°C (-58°F to 248°F).

PRECISION XL MOLYS

PRECISION XL 3 MOLY EP1

PRECISION XL 3 Moly EP1 contains 3% Molybdenum Disulphide for protection against vibration and shock loading. It is recommended for use in severe operations such as heavy duty, shock loaded equipment found in industrial plants such as Ball mill conveyor and crusher bearings or in off-highway operations. Meets the Bucyrus International MPG - Multi Purpose Grease (SD 4711) specification. Operating range is -25°C to 135°C (-13°F to 275°F).

PRECISION XL 3 MOLY EP2

PRECISION XL 3 Moly EP2 contains 3% Molybdenum Disulphide for protection against vibration and shock loading. It is recommended for use in severe operations such as heavy duty, shock loaded equipment found in industrial plants such as Ball mill conveyor and crusher bearings or in off-highway operations. Meets the Bucyrus International MPG - Multi Purpose Grease (SD 4711) specification. Operating range is -15°C to 135°C (5°F to 275°F).

PRECISION XL 3 MOLY ARCTIC

PRECISION XL 3 Moly Arctic is recommended for heavy duty applications particularly where shock loading or vibration is encountered in mining machinery or in off-highway equipment. Operating range is -45°C to 135°C (-49°F to 275°F). PRECISION XL 3 Moly Arctic is

particularly suited for very low temperature applications.

PRECISION XL 5 MOLY EPO

PRECISION XL 5 Moly EPO contains 5% Molybdenum Disulphide used for protection against vibration and shock loading at lower temperatures. It is suitable for the lubrication requirements of Caterpillar lubricant specifications for 5130 (7TJ & 5ZL), 5230 (7LL) Mining Excavators and 994 (9YF) Wheel Loaders. It is recommended to be used in severe operations such as heavy duty, shock loaded equipment found in industrial plants or in off-highway operations. Meets the Bucyrus International MPG - Multi Purpose Grease (SD 4711) specification. Operating range is -50°C to 120°C (-58°F to 248°F).

PRECISION XL 5 MOLY EP1

PRECISION XL 5 Moly EP1 contains 5% Molybdenum Disulphide used for protection against vibration and shock loading at moderate temperatures. It is suitable for the lubrication requirements of Caterpillar lubricant specifications for 5130 (7TJ & 5ZL), 5230 (7LL) Mining Excavators and 994 (9YF) Wheel Loaders. It is recommended to be used in severe operations such as heavy duty, shock loaded equipment found in industrial plants or in off-highway operations. Operating range is -30°C to 135°C (-22°F to 275°F).

PRECISION XL 5 MOLY EP2

PRECISION XL 5 Moly EP2 contains 5% Molybdenum Disulphide used for protection against vibration and shock loading higher temperatures. It is suitable for the lubrication requirements of Caterpillar lubricant specifications for 5130 (7TJ & 5ZL), 5230 (7LL) Mining Excavators and 994 (9YF) Wheel Loaders. It is recommended to be used in severe operations such as heavy duty, shock loaded equipment found in industrial plants or in off-highway operations. Operating range is -25°C to 135°C (-13°F to 275°F).

PRECISION GENERAL PURPOSE

PRECISION GENERAL PURPOSE EP1

PRECISION General Purpose EP1 is recommended for centralized greasing systems that lubricate heavily loaded conveyor bearings, mobile mining and forestry equipment, as well as high speed industrial bearings. Operating range is -30°C to 135°C (-22°F to 257°F).

PRECISION GENERAL PURPOSE EP2

PRECISION General Purpose EP2 is recommended for use in bearings operating at low to moderate speeds and at medium temperatures. Operating range is -20°C to 135°C (-4°F to 275°F).

PRECISION GENERAL PURPOSE MOLY EP2

PRECISION General Purpose Moly EP2 is recommended for heavy duty applications in industrial machinery or off-highway equipment where shock loading is encountered. Operating range is -20°C to 135°C (-4°F to 275°F).

Operational Considerations

PRECISION Greases with high thermal stability provide long service life under normal operating conditions up to its maximum recommended temperature. However, actual grease life is dependent upon system design and operating practices. No Nonsense Lubricants Warranty applies.

Typical Performance Data

PROPERTY	TEST METHOD	PRECISION					
		SYNTHETIC EPO0	SYNTHETIC	SYNTHETIC MOLY	SYNTHETIC HEAVY 460	SYNTHETIC HEAVY 1500	SYNTHETIC EMB
NLGI Grade	D217	00	1	1	1 1/2	1 1/2	2
Colour	PCM 264	Gold	Gold	Grey	Gold	Gold	Blue
Texture	PCM 264	Stringy	Buttery	Buttery	Stringy	Stringy	Buttery
Dropping Point, °C/°F	D2265	293/559	294/561	305/581	304/579	277/531	309/589
Worked Penetration, 60 strokes	D217A	415	314	324	315	305	293
Oxidation Stability 100 hrs, psi drop	D942	3	1.5	3	3	6	2
Base Oil Viscosity, cSt @ 40°C/SUS @ 100°F cSt @ 100°C/SUS @ 210°F	D445 D445	488/2558 44/207	100/518 12.7/69	100/518 12.7/69	488/2558 44/207	1495/7895 111.5/535	114/586 15.6/81
Timken OK Load, Kg/lb	D2509	25/55	27/60	27/60	27/60	29.5/65	-
Four Ball Weld Point, kg	D2596	315	250	315	315	315	-
Four Ball Wear scar diam mm	D2266	0.56	0.54	0.59	0.55	0.48	0.56
Copper Corrosion	D4048	1a	1b	1a	1b	1b	1b
Water Washout % @ 79°C/174°F	D1264	27.8	6.7	4.7	8.5	4.8	-
Recommended Operating Temperature Range, °C Temperature Range, °F		-40 to 170 -40 to 338	-45 to 170 -49 to 338	-40 to 170 -40 to 338	-30 to 170 -22 to 338	-20 to 170 -4 to 338	-40 to 170 -40 to 338

The values quoted above are typical of normal production. They do not constitute a specification.

Typical Performance Data

PROPERTY	TEST METHOD	PRECISION XL						
		EP000	EP00	EP1	EP2	EMB	HEAVY DUTY	RAIL CURVE
NLGI Grade	D217	000	00	1	2	2	2	1
Colour	PCM 264	Dark Amber	Green	Green	Green	Blue	Brown	Grey-Black
Texture	PCM 264	Buttery	Buttery	Stringy	Stringy	Buttery	Stringy	Smooth
Dropping Point, °C/°F	D2265	185/365	191/376	307/585	302/576	298/568	284/559	186/367
Worked Penetration, 60 strokes	D217A	452	401	312	274	291	284	322
Oxidation Stability 100 hrs, psi drop	D942	4	2	3	4	2	6	1
Base Oil Viscosity, cSt @ 40°C/SUS @ 100°F cSt @ 100°C/SUS @ 210°F	D445 D445	325/1733 24/119	120/624 13.7/74	220/1168 17.9/92	220/1168 17.9/92	110/575 12/67	420/2267 25.6/127	27.5/142 5.3/44
Timken OK Load, Kg/lb	D2509	18/40	18/40	27/60	27/60	-	27/60	18/40
Four Ball Weld Point, kg	D2596	250	250	315	315	-	315	400
Four Ball Wear scar diam mm	D2266	0.41	0.38	0.5	0.5	0.43	0.64	0.54
Copper Corrosion	D4048	1a	1b	1b	1b	1b	1b	1b
Water Washout % @ 79°C/174°F	D1264	-	-	8.5	3.8	-	6.2	2.8
Recommended Operating Temperature Range, °C Temperature Range, °F		-25 to 100 -13 to 212	-35 to 100 -31 to 212	-25 to 160 -13 to 320	-20 to 160 -4 to 320	-25 to 160 -13 to 320	-10 to 160 14 to 320	-50 to 120 -58 to 248

The values quoted above are typical of normal production. They do not constitute a specification.

PROPERTY	TEST METHOD	PRECISION XL MOLYS					
		3 MOLY EP1	3 MOLY EP2	3 MOLY ARCTIC	5 MOLY EP0	5 MOLY EP1	5 MOLY EP2
NLGI Grade	D217	1	2	1	0	1	2
Colour	PCM 264	Grey Green	Grey Green	Grey	Grey	Grey	Grey
Texture	PCM 264	Stringy	Stringy	Buttery	Buttery	Buttery	Buttery
Dropping Point, °C/°F	D2265	220/428	241/466	185/365	218/424	227/441	187/369
Worked Penetration, 60 strokes	D217A	336	287	320	359	331	282
Oxidation Stability 100 hrs, psi drop	D942	3.7	8.5	2.5	7	5.0	3
Base Oil Viscosity, cSt @ 40°C/SUS @ 100°F cSt @ 100°C/SUS @ 210°F	D445 D445	210/1114 17.3/89	403/2172 25.1/124	34/174 6.1/47	127/662 14/76	159/837 14.9/79	195/1026 18.2/93
Timken OK Load, Kg/lb	D2509	27/60	27/60	18/40	23/50	23/50	20/45
Four Ball Weld Point, kg	D2596	800	800	250	620	620	620
Four Ball Wear scar diam mm	D2266	0.48	0.52	0.47	0.55	0.53	0.5
Copper Corrosion	D4048	1b	1a	1a	1b	1a	1a
Water Washout % @ 79 °C/174°F	D1264	5.5	1.0	10.3	19.8	3.3	3.5
Recommended Operating Temperature Range, °C Temperature Range, °F		-25 to 135 -13 to 275	-15 to 135 5 to 275	-45 to 135 -49 to 275	-50 to 120 -58 to 248	-30 to 135 -22 to 275	-25 to 135 -13 to 275

The values quoted above are typical of normal production. They do not constitute a specification.

Typical Performance Data

PROPERTY	TEST METHOD	PRECISION GENERAL PURPOSE		
		EP1	EP2	MOLY EP2
NLGI Grade	D217	1	2	2
Colour	PCM 264	Brown	Brown	Grey
Texture	PCM 264	Stringy	Stringy	Stringy
Dropping Point, °C/°F	D2265	191/376	198/388	191/376
Worked Penetration, 60 strokes	D217A	310	265	272
Oxidation Stability 100 hrs, psi drop	D942	1	1	1
Base Oil Viscosity, cSt @ 40°C/SUS @ 100°F cSt @ 100°C/SUS @ 210°F	D445 D445	159/837 14.9/79	159/837 14.9/79	159/837 14.9/79
Timken OK Load, Kg/lb	D2509	18/40	18/40	18/40
Four Ball Weld Point, kg	D2596	250	250	315
Four Ball Wear scar diam mm	D2266	0.58	0.59	0.56
Copper Corrosion	D4048	1b	1a	1a
Water Washout % @ 79°C/174°F	D1264	9.25	3.8	1.8
Recommended Operating Temperature Range, °C Temperature Range, °F		-30 to 135 -22 to 275	-25 to 135 -13 to 275	-25 to 135 -13 to 275

The values quoted above are typical of normal production. They do not constitute a specification.

Health and Safety

To obtain Material Safety Data Sheet (MSDS), contact one of Petro-Canada's TechData Info Lines.

TechData Info Lines

If you would like to know more about LITHIUM GREASES, or any other product in our complete line of quality lubricants, please contact us at:

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