



PETRONAS
Fluid Technology
Soluti▶ns™

TAKING YOU TO THE NEXT LEVEL
IN MAXIMISING PERFORMANCE
PRODUCT CATALOGUE

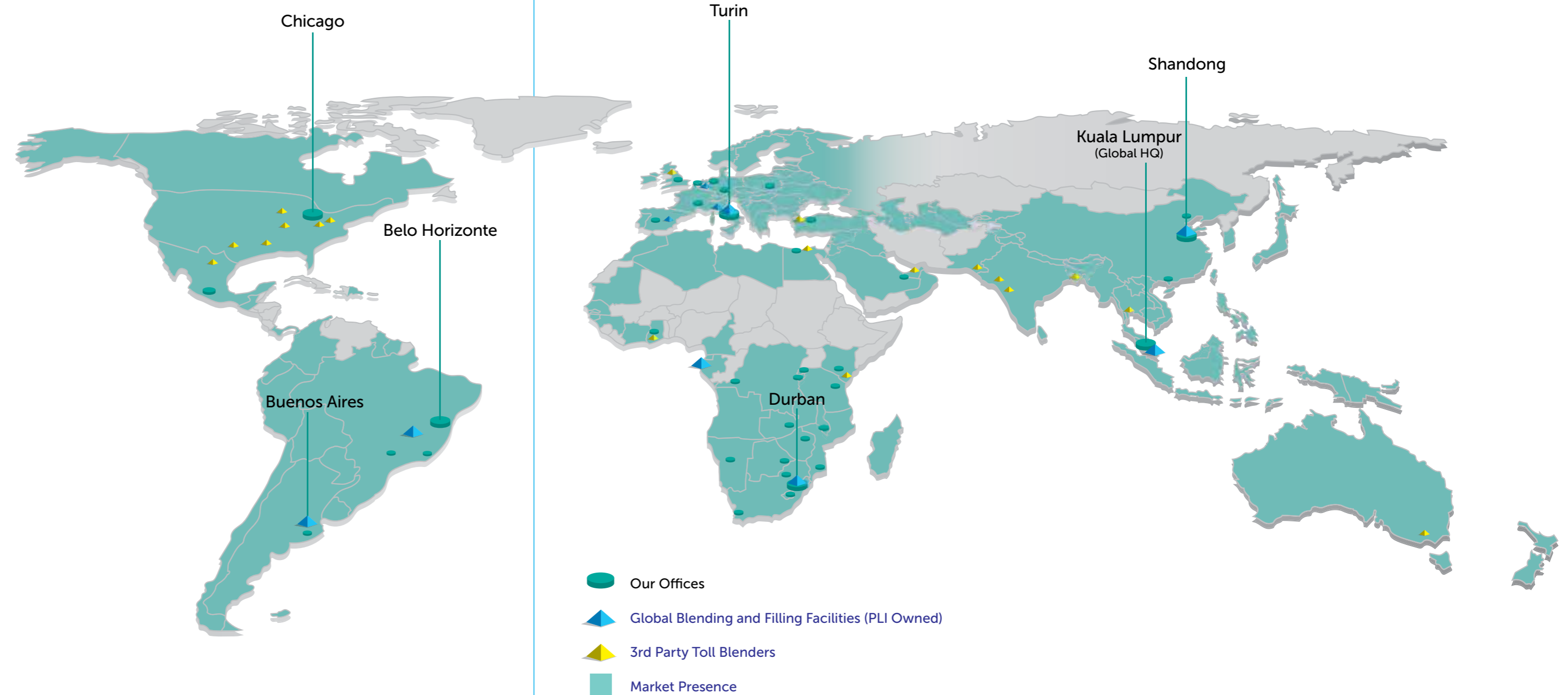
Maximising performance with the right product for the right application

Welcome to PETRONAS

PETRONAS Lubricants International (PLI) is the global lubricant division of PETRONAS, one of the most successful petrochemical companies in the world.

Our mission is to deliver proven product technology and related services benefiting from our 100 years of experience. We believe in maximising your productivity with value-added products and services that are global, yet personal – our presence in 128 countries ensures our technical expertise reaches you wherever you are.

PLI's differentiator is product excellence, developed by world-class Technology Centers, brought to your market with local expertise. Our passion for performance improvement makes us an obvious choice for key OEMs and delivers success in Formula One Motorsport. Now, it has translated into a comprehensive industrial product range and tailor-made services for you.



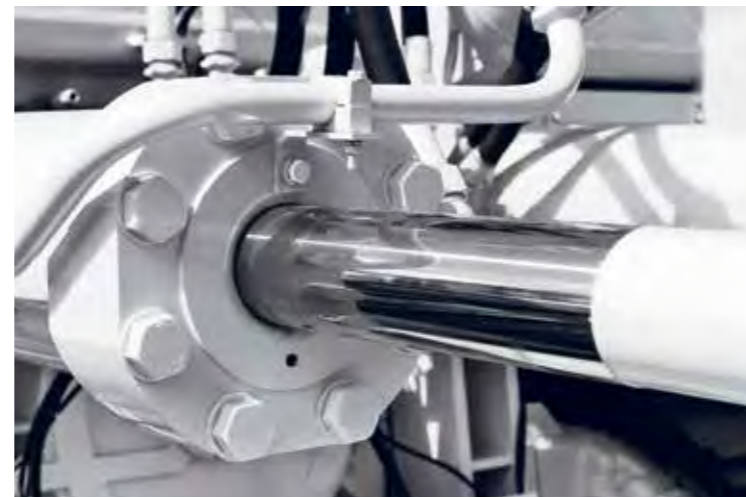
PETRONAS Fluid Technology Solutions™

An Approach that Makes a Difference!

At PETRONAS we believe success starts with understanding customers' needs and challenges. Focusing our expertise and applying the latest innovations in lubrication science, we have developed Fluid Technology Solutions™ – an intelligent approach to customers' fluid requirements that maximizes business performance through tailor-made product offerings and expert services.

Thanks to FTS™ our customers gain:

- 💧 longer uptimes and reduced unscheduled downtimes
- 💧 improved fuel and energy efficiencies
- 💧 significant improvement in maintenance costs
- 💧 round-the-clock service support



Great Partnerships for the Highest Performance

We are committed to constantly challenging and pushing the limits of our products performance. By working closely with worldwide OEM leaders, we are able to combine engineering expertise with lubrication science to deliver relevant value to our mutual customers, helping their equipment and business perform at their highest level.



Mercedes-Benz

- 💧 Supplier of first fill for all high-performance Mercedes-Benz AMG engines
- 💧 Co-branded Mercedes genuine oil "Powered by PETRONAS"



- 💧 Supplier of first fill and service fill for CNHi agriculture machinery and Iveco Industrial automotive fleet
- 💧 Dedicated brands for CNHi (AmbrA & AkcelA) and PETRONAS Urania Next (Iveco)

Automotive



Industrial



PETRONAS Motorsports

MERCEDES AMG

PETRONAS Formula One Team

Developing Fluid Technologies Solutions™ only gets better when it's combined with motorsports! The most challenging environments, the highest performance requirements, the toughest competition and one goal: to be **THE BEST**. We successfully engage in the most demanding motorsports such as Formula One, Superbikes and off-road rallies. And our great 'track' experience is always translated into day-to-day solutions for all industries we serve.



Innovative Product Identification System

Choosing the right product for an application can be a challenge. To ease the selection process we have developed an innovative Product Identification System that helps you make the right choices. Follow the guide below and find out how and where to look for the information you need.

Product Quality Levels

Increasing performance and protection
Improving uptime and lowering maintenance costs

SUPREME
Supreme quality products meeting or exceeding the most stringent OEM and/or industry specifications

PREMIUM
Premium quality products meeting or exceeding demanding OEM and/or industry specifications

STANDARD
High quality products meeting or exceeding industry and/or OEM specifications

BASIC
No OEM approvals / Basic or not meeting industry specifications
Price fighters

1 Technical Data Sheets

2 Pack Labelling

3 Communication Materials

	Steam, gas, combined cycle turbines with / without associated gear drives	Steam, gas, combined cycle turbines without associated gear drives
SUPREME	PETRONAS Jenteram SYN • Very good varnish control • High anti-wear protection • Up to 4x longer oil life* • Excellent performance	PETRONAS Jenteram U • Excellent varnish control • Very good anti-wear protection • Up to 3x longer oil life* • High performance
PREMIUM	PETRONAS Jenteram G • Very good varnish control • High anti-wear protection • Up to 3x longer oil life* • High performance	
STANDARD	PETRONAS Jenteram • Very good anti-wear protection • Up to 1.5x longer oil life* • Very good performance	
BASIC	First price turbine oils	

*vs. minimum requirements of DIN 51515 Part II for industrial turbine oils based on TOST results (ASTM D943)

Application areas cover:
 • description of the systems / types of equipment
 • description of operating conditions

One of the most comprehensive sets of data on the market to deliver all important product information for end users

Our products are continuously being tested against new OEM specifications. If you don't see required approval please contact our sales representative or visit our website for latest updates.

Technical Data Sheet
Version 2.0_23.05.2016



PETRONAS HYDRAULIC ESF SERIES

Supreme Performance Energy Saving Hydraulic Fluids

PETRONAS Hydraulic ESF Series are supreme performance anti-wear hydraulic fluids specially developed to reduce fuel/energy consumption in modern mobile and industrial hydraulic equipment operating under normal to extremely heavy duty conditions including latest high speed and high pressure systems. Formulated with a unique semi synthetic combination of selected base oils enhanced with high shear stable VI improver and advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives coupled with friction modifiers, PETRONAS Hydraulic ESF fluids provide excellent anti-wear protection, highly stable performance across wider temperature range as compared to normal viscosity index products, over 5x longer lasting performance* and up to 6% direct reduction in fuel consumption in mobile equipment / up to 10% energy savings in stationary industrial equipment.**

Applications

- PETRONAS Hydraulic ESF Series are recommended for use in:
- various mobile and industrial hydraulic systems operating under normal to extremely heavy duty conditions that demand good control of fluid viscosity during operating cycle
 - modern hydraulic systems using high speed & high pressure pumps and operating under high temperatures
 - hydraulic systems subjected to high and/or rapid variations in operating and/or ambient temperatures
 - outdoor hydraulic systems operating in cold climates, where high protection is required in subzero temperatures and cold start-ups are frequently encountered
 - hydraulic systems where high precision and stable efficiency of the system is required (e.g. moulding machines)
 - hydraulic systems with smaller reservoirs & smaller coolers generating high thermal stress on hydraulic fluids
 - sensitive to sludge and varnish formation systems with tight tolerance pumps and servo valves

Features and Benefits

Features	Benefits
Energy saving	Helps to achieve energy costs saving and/or fuel consumption economy of up to 10% and 6% respectively
High Viscosity Index	Ensures superior performance and protection over a wide temperature range
Low temperature protection	Ensures proper protection of equipment components during cold starts
Excellent anti-wear protection	Protects equipment components from excessive wear and provides longer equipment life
Excellent wet and dry filterability	Maintains excellent filter efficiency without giving rise to undue pressure drop, thus increasing filter lifetime
Excellent thermal and oxidation stability	Maintains performance levels under high temperatures and pressure, enabling long oil drain intervals
Excellent rust & corrosion protection	Inhibits the corrosion process that occurs in presence of water, improving equipment life
Excellent water separability	Due to excellent water separability the system is protected from water degenerative effects, maintaining hydraulic system efficiency at required level and reducing maintenance costs
Excellent air release and foam stability	Maintains excellent efficiency in hydraulic systems, ensures smooth operation due to fast air release. Protects the system from air degenerative effects reducing maintenance costs
Excellent multi metal compatibility	Compatible with most metal alloys ensuring trouble free performance of the system
Excellent compatibility with most seal and elastomers	Compatible with most seals and elastomers, which prevents oil leaks and contamination due to seal erosion

Typical Properties

Characteristic	Method	Specification	46	68
Specific Gravity @15°C	ASTM D 4052	(1)	0.867	0.868
Kinematic Viscosity at 40°C, cSt	ASTM D 445	±10%	46	68
Kinematic Viscosity at 100°C, cSt	ASTM D 445	(1)	8.8	12
Viscosity Index	ASTM D 2270	Min. 140	175	174
Flash Point, °C	ASTM D 92	**	220	230
Pour Point, °C	ASTM D 97	**	-33	-30
TAN, mgKOH/g	ASTM D 664	(1)	0.40	0.40
FZG, Stages Passed	ISO 14635-1	Min. 10	10	10
Water Separability, 40/37/3 - mins	ASTM D 1401	**	10	10
Copper Strip Corrosion	ASTM D 130	Max. 2	1a	1a
TOST life, hours	ASTM D 943	Min. 1000	5200	5200
Foam Sequence I, mL		Max. 150/0	0/0	0/0
Foam Sequence II, mL	ASTM D 892	Max. 75/0	0/0	0/0
Foam Sequence III, mL		Max. 150/0	0/0	0/0

Performance Levels

- Bosch Rexroth RDE 90235
- DIN 51524 Part II HLP and III HVLP (2006)
- Eaton 03-401-2010
- Eaton Lubricant Specification E-FDGN-TB002-E
- Fives Cincinnati P-68/P-69/P-70
- ISO 11158 HV (FDS 2008)
- Parker Denison HF0/HF1/HF2

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Key Applications

PETRONAS Hydraulic ESF Series are **supreme performance** anti-wear hydraulic fluids specially developed to reduce fuel/energy consumption in modern mobile and industrial hydraulic equipment operating under **normal to extremely heavy duty conditions including latest high speed and high pressure systems.**

Product positioning
Supreme = supreme
Premium = premium
Standard = high

Technology

Formulated with a unique semi synthetic combination of selected base oils enhanced with high shear stable VI improver and advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives coupled with friction modifiers, PETRONAS Hydraulic ESF fluids provide **excellent anti-wear protection, highly stable performance across wider temperature range as compared to normal viscosity index products, over 5x longer lasting performance* and up to 6% direct reduction in fuel consumption in mobile equipment / up to 10% energy savings in stationary industrial equipment.****

Equipment operating conditions

Proof of Performance

PETRONAS Hydraulic ESF Series meet or exceed key industrial specifications and OEM requirements.

End User Benefits

- Features & Benefits section has been standardized for all product categories.
- Product features are described through 3 performance levels:
 - excellent – considerably exceeds industrial specifications
 - high – exceeds industrials specifications
 - very good – meets or slightly exceeds industrials specifications

Product performance is benchmarked vs industrial requirements

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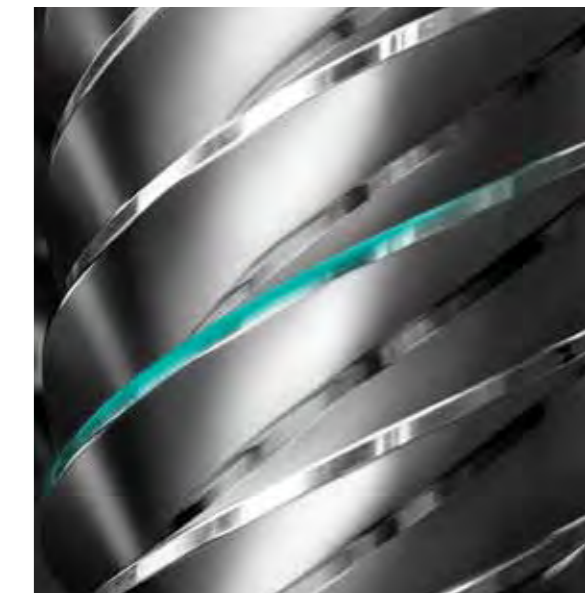
Greases

Greases	42
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Index

40	ATO	23	GEO NG	52	Grease LiX Syn 1/1500
40	Chainsaw	43	Grease Ca 00	52	Grease LiX Syn 2/100 & 2/220
20	Circula	43	Grease Ca G2	52	Grease LiX Syn 2/460
21	Circula Mill	44	Grease CaSx	53	Grease PE HS
20	Circula Mill NT	44	Grease Clay EP 2/470	54	Grease PTFE
19	Circula PM	44	Grease Clay MEP	53	Grease PU
19	Circula Syn	45	Grease Clay MG	54	Grease SF
15	Compressor A M2	46	Grease Clay Semi-syn EST	41	HTO
14	Compressor A M4	45	Grease Clay Syn 2/100	31	Hydraulic
16	Compressor R Syn FG	45	Grease Clay Syn 2/200	29	Hydraulic ESF
16	Compressor R Syn PAO	43	Grease FG	33	Hydraulic FR
15	Compressor R Syn POE	46	Grease Li 2 & Li 3	33	Hydraulic HFC
13	Compressor Syn A PAG	46	Grease Li 2 EP 00 & EP 0	32	Hydraulic HLPD
14	Compressor Syn A PAO	47	Grease Li AS	30	Hydraulic HV
13	Compressor Syn A POE	47	Grease Li EP 1 & EP 2 & EP3	31	Hydraulic HVZF
26	Gear FL	47	Grease Li PT	29	Hydraulic Plus
27	Gear MEP	49	Grease LiCa GEP 0	32	Hydraulic ZF
25	Gear Syn FG	49	Grease LiCa GEP 2.5	38	Jenteram
25	Gear Syn PAG	49	Grease LiCa MG HL	37	Jenteram G
26	Gear Syn PAO	50	Grease LiCa MG XHL	37	Jenteram Syn
27	Gear Syn WI	50	Grease LiCa Semi Syn	38	Jenteram U
35	Genrail 5	50	Grease LiCa TMG	41	Slideway Oil
35	Genrail 6	51	Grease LiX 2/170	48	Tutela GP & SP
35	Genrail Syn 6	51	Grease LiX 2/380 & LiX MEP	48	Tutela SCF
23	GEO BLG	52	Grease LiX Syn 0/460	53	Tutela WB



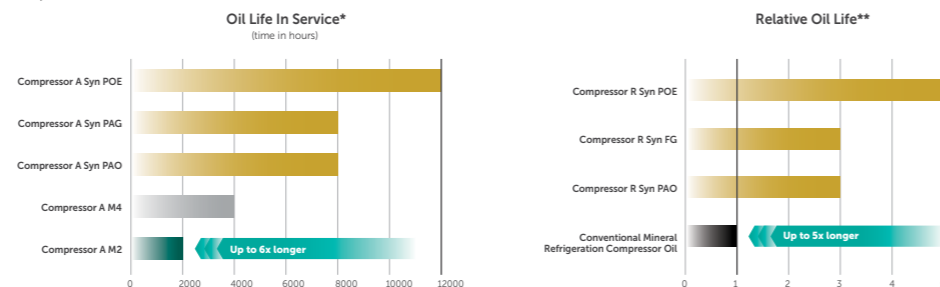
Compressor Oils



Increasing performance and protection
Improving uptime and lowering maintenance costs

	Air compressors (all types)	Refrigeration and air conditioning compressors (all types)
SUPREME	<p>PETRONAS Compressor A Syn POE</p> <ul style="list-style-type: none"> Up to 12 000 hours oil life in service* Excellent system protection against varnish and deposit formation Excellent performance <p>PETRONAS Compressor A Syn PAG</p> <ul style="list-style-type: none"> Up to 8 000 hours oil life in service* Excellent system protection against varnish and deposit formation Excellent performance <p>PETRONAS Compressor A Syn PAO</p> <ul style="list-style-type: none"> Up to 8 000 hours oil life in service* Excellent system protection against varnish and deposit formation Excellent performance 	<p>PETRONAS Compressor R Syn POE</p> <ul style="list-style-type: none"> Up to 5x longer oil life** Excellent system protection against varnish and deposit formation Excellent performance HFC refrigerants <p>PETRONAS Compressor R Syn FG</p> <ul style="list-style-type: none"> Food industry approved Up to 3x longer oil life** Excellent system protection against varnish and deposit formation Excellent performance Ammonia and process gases <p>PETRONAS Compressor R Syn PAO</p> <ul style="list-style-type: none"> Up to 3x longer oil life** Excellent system protection against varnish and deposit formation Excellent performance Ammonia and process gases
PREMIUM	<p>PETRONAS Compressor A M4</p> <ul style="list-style-type: none"> Up to 4 000 hours oil life in service* High system protection against varnish and deposit formation High performance 	
STANDARD	<p>PETRONAS Compressor A M2</p> <ul style="list-style-type: none"> Up to 2 000 hours oil life in service* Very good system protection against varnish and deposit formation Very good performance 	
BASIC	First price compressor oils	

* Maximum values for each product. Individual oil condition strongly depends on the type of compressor and operating conditions. Oil condition monitoring should be carried out during the service to secure optimum oil performance.
** vs. conventional mineral refrigeration compressor oils.



AIR COMPRESSOR OILS FOR ALL AIR COMPRESSOR TYPES

PETRONAS COMPRESSOR A SYN POE

PETRONAS Compressor A SYN POE Series are supreme performance air compressor oils specially developed for up to 12,000 hours oil life in service, even when operating at maximum discharge temperatures up to 120°C.

Performance levels:
ISO 6743-3: DAB and DAJ

Formulated with high viscosity index Polyol Ester (POE) synthetic base oils enhanced with advanced anti-oxidant, anti-wear (zinc-free), anti-rust and anti-foam additives, PETRONAS Compressor A SYN POE oils provide excellent varnish and deposits control, excellent thermal and oxidation stability for long lasting performance.

Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	RPVOT, mins
COMPRESSOR A SYN POE 46	0,954	46	7,5	113	-39	220	6 000
COMPRESSOR A SYN POE 68	0,963	68	9,2	112	-33	230	6 000

AIR COMPRESSOR OILS FOR ALL AIR COMPRESSOR TYPES

PETRONAS COMPRESSOR A SYN PAG

PETRONAS Compressor A SYN PAG Series are supreme performance air compressor oils specially developed for up to 8,000 hours oil life in service, even when operating at maximum discharge temperatures up to 120°C.

Performance levels:
ISO 6743-3: DAJ

Formulated with a mix of high viscosity index Polyalkylene Glycol (PAG) and Polyol ester (POE) synthetic base oils enhanced with advanced anti-oxidant, anti-wear (zinc-free), anti-rust and anti-foam additives, PETRONAS Compressor A SYN PAG oils provide excellent varnish and deposits control, excellent thermal and oxidation stability for long lasting performance.



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	RPVOT, mins
COMPRESSOR A SYN PAG 46	0,986	46	6,8	179	-51	260	4 000
COMPRESSOR A SYN PAG 68	0,991	68	9,1	184	-54	270	4 000

AIR COMPRESSOR OILS FOR ALL AIR COMPRESSOR TYPES

PETRONAS COMPRESSOR A SYN PAO

PETRONAS Compressor A SYN PAO Series are supreme performance air compressor oils specially developed for up to 8,000 hours oil life in service, even when operating at maximum discharge temperatures up to 120°C.

Formulated with high viscosity index Polyalphaolefin (PAO) synthetic base oils enhanced with advanced anti-oxidant, anti-wear (zinc-free), anti-rust and anti-foam additives, PETRONAS Compressor A SYN PAO oils provide excellent varnish and deposits control, excellent thermal and oxidation stability for long lasting performance.

Performance levels:
 ▲ ISO 6743-3: DAB and DAJ



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	RPVOT, mins
COMPRESSOR A SYN PAO 32	0,837	32	6,0	136	-58	244	4 000
COMPRESSOR A SYN PAO 46	0,865	46	7,8	139	-55	268	4 000
COMPRESSOR A SYN PAO 68	0,847	68	10,6	144	-52	268	4 000
COMPRESSOR A SYN PAO 100	0,840	100	14,0	142	-46	271	4 000
COMPRESSOR A SYN PAO 150	0,856	150	19,0	144	-43	271	4 000

AIR COMPRESSOR OILS FOR ALL AIR COMPRESSOR TYPES

PETRONAS COMPRESSOR A M4

PETRONAS Compressor A M4 Series are premium performance air compressor oils specially developed for up to 4,000 hours oil life in service, even when operating at maximum discharge temperatures up to 100°C.

Formulated with high quality selected mineral base oils enhanced with advanced anti-oxidant, anti-wear (zinc free), anti-rust and anti-foam additives, PETRONAS Compressor A M4 oils provide high varnish and deposit control, high thermal and oxidation stability for long lasting performance.

Performance levels:
 ▲ DIN 51506 VDL (1985-09)
 ▲ ISO 6743-3: DAH



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	RPVOT, mins
COMPRESSOR A M4 32	0,865	32	5,4	102	-33	220	2 000
COMPRESSOR A M4 46	0,877	46	6,9	105	-33	220	2 000
COMPRESSOR A M4 68	0,883	68	9,0	107	-30	240	2 000
COMPRESSOR A M4 100	0,895	100	11,5	102	-27	240	2 000

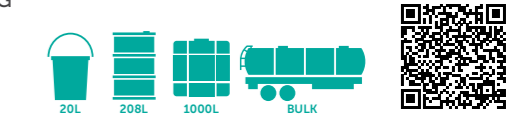
AIR COMPRESSOR OILS FOR ALL AIR COMPRESSOR TYPES

PETRONAS COMPRESSOR A M2

PETRONAS Compressor A M2 Series are high performance air compressor oils specially developed for up to 2,000 hours oil life in service, even when operating at maximum discharge temperatures up to 100°C.

Formulated with high quality selected mineral base oils enhanced with advanced anti-oxidant, anti-wear (zinc free), anti-rust and anti-foam additives, PETRONAS Compressor A M2 oils provide very good varnish and deposit control, very good thermal and oxidation stability for long lasting performance.

Performance levels:
 ▲ DIN 51506 VDL (1985-09)
 ▲ ISO 6743-3: DAG



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	RPVOT, mins
COMPRESSOR A M4 32	0,865	32	5,4	102	-33	220	1 500
COMPRESSOR A M4 46	0,877	46	6,8	102	-33	220	1 500
COMPRESSOR A M4 68	0,883	68	8,8	102	-30	240	1 500
COMPRESSOR A M4 100	0,895	100	11,2	97	-27	240	1 500

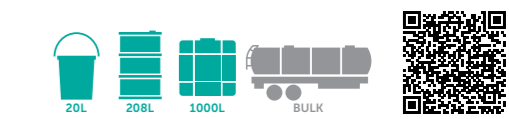
REFRIGERATION COMPRESSOR OILS FOR ALL TYPES OF REFRIGERATION & AIR CONDITIONING COMPRESSORS

PETRONAS COMPRESSOR R SYN POE

PETRONAS Compressor R SYN POE Series are supreme performance compressor oils specially developed for use in refrigeration and air-conditioning compressors using HFC refrigerants.

Formulated with high viscosity index Polyol Ester (POE) synthetic base oils enhanced with advanced pour point depressant, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Compressor R SYN POE oils provide excellent varnish and deposits control, very low pour point and excellent thermal and oxidation stability for up to 5x longer lasting performance vs conventional mineral refrigeration compressor oils.

Performance levels:
 ▲ ISO 6743-3: DRD



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C
COMPRESSOR R SYN POE 22	0,998	22	4,6	127	-57	260
COMPRESSOR R SYN POE 32	0,984	32	5,9	130	-54	260
COMPRESSOR R SYN POE 46	0,991	46	7,3	121	-48	260
COMPRESSOR R SYN POE 68	0,981	68	9,6	121	-39	270
COMPRESSOR R SYN POE 100	0,973	100	11,6	104	-33	265
COMPRESSOR R SYN POE 220	0,979	220	20,1	105	-27	287

REFRIGERATION COMPRESSOR OILS FOR ALL TYPE OF REFRIGERATION & AIR CONDITIONING COMPRESSORS

PETRONAS COMPRESSOR R SYN FG

PETRONAS Compressor R SYN FG Series are supreme performance compressor oils specially developed for use in refrigeration compressors using ammonia or process gas in food processing plants where there is chance of incidental food contact with the oil.

Formulated with high viscosity index Polyalphaolefin (PAO) synthetic base oils enhanced with advanced pour point depressant, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Compressor R SYN FG oils provide excellent varnish and deposits control, very low pour point and excellent thermal and oxidation stability for up to 3x longer lasting performance vs conventional mineral refrigeration compressor oils.

Performance levels:
 ISO 6743-3: DRA



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C
COMPRESSOR A SYN FG 68	0,844	68	6,8	135	-54	268

REFRIGERATION COMPRESSOR OILS FOR ALL TYPE OF REFRIGERATION & AIR CONDITIONING COMPRESSORS

PETRONAS COMPRESSOR R SYN PAO

PETRONAS Compressor R SYN PAO Series are supreme performance compressor oils specially developed for use in refrigeration compressors using ammonia or process gas.

Formulated with high viscosity index Polyalphaolefin (PAO) synthetic base oils enhanced with advanced pour point depressant, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Compressor R SYN PAO oils provide excellent varnish and deposits control, very low pour point and excellent thermal and oxidation stability for up to 3x longer lasting performance vs conventional mineral refrigeration compressor oils.

Performance levels:
 ISO 6743-3: DRA



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C
COMPRESSOR R SYN PAO 46	0,883	46	7,8	139	-60	240
COMPRESSOR R SYN PAO 68	0,844	68	10,6	138	-51	240
COMPRESSOR R SYN PAO 100	0,920	100	14,0	150	-51	240
COMPRESSOR R SYN PAO 150	0,923	150	19,0	152	-48	260

Notes

Dotted lines for notes:

Circulating Oils

Increasing performance and protection
Improving uptime and lowering maintenance costs

	Heavy duty oil circulating systems	Steel Mill oil circulating systems
SUPREME	PETRONAS Circula Syn <ul style="list-style-type: none"> Excellent anti-wear protection Over 4x longer oil life* Excellent water separability 	
PREMIUM	PETRONAS Circula PM <ul style="list-style-type: none"> Excellent anti-wear protection Over 3x longer oil life* Excellent water separability 	PETRONAS Circula Mill NT <ul style="list-style-type: none"> Excellent anti-wear & EP protection Long oil life High water separability
STANDARD	PETRONAS Circula <ul style="list-style-type: none"> Very good anti-wear protection Over 2x longer oil life* Very good water separability 	PETRONAS Circula Mill <ul style="list-style-type: none"> High anti-wear protection Long oil life Excellent water separability
BASIC	First price circulating oils	

*vs. minimum requirements of ISO 11158 HM fluids based on TOST (ASTM D943)

CIRCULATING OILS FOR HEAVY DUTY OIL CIRCULATING SYSTEMS

PETRONAS CIRCULA SYN

PETRONAS Circula SYN Series are supreme performance anti-wear circulating oils specially developed for circulating systems operating under normal to extremely heavy duty conditions.

Formulated with synthetic base oils enhanced with advanced anti-oxidant, anti-wear, anti-rust and anti-foam additives, PETRONAS Circula SYN oils provide excellent anti-wear protection under toughest operating conditions, excellent water separability, excellent resistance to sludge formation, high thermal and oxidation stability for more than 4x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HM fluids based on TOST (ASTM D943)



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	TOST life, hours
CIRCULA SYN 150	0,872	17.5	128	128	-39	240	10	0/0	4 100
CIRCULA SYN 220	0,875	22.8	127	127	-36	240	10	0/0	4 100
CIRCULA SYN 320	0,878	29.1	124	124	-30	240	10	0/0	4 100
CIRCULA SYN 460	0,881	37.2	123	123	-27	240	20	0/0	4 100
CIRCULA SYN 680	0,884	47.9	121	121	-24	240	20	0/0	4 100

CIRCULATING OILS FOR HEAVY DUTY OIL CIRCULATING SYSTEMS

PETRONAS CIRCULA PM

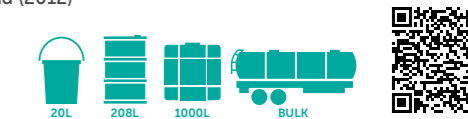
PETRONAS Circula PM Series are premium performance anti-wear circulating oils specially developed for paper machine circulating systems operating under normal to extremely heavy duty conditions.

Formulated with high quality selected mineral base oils enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives coupled with friction modifiers, PETRONAS Circula PM oils provide excellent anti-wear protection under toughest operating conditions, excellent water separability, excellent resistance to sludge formation, high thermal and oxidation stability for more than 3x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HM fluids based on TOST (ASTM D943)

Performance levels:

- ◆ DIN 51524 Part II HLP (2006)
- ◆ DIN 51517 Part II CL and Part III CLP (2009)
- ◆ Voith VN 108 Wet End (2012)
- ◆ Voith VN 108 Dry End (2012)
- ◆ Voith VN 108 Press Rolls (2012)
- ◆ Voith VN 108 Hydraulic Rolls (2012)
- ◆ SKF Dry End Requirements (2006)



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	FZG, Stages Passed	TOST life, hours
CIRCULA PM 150	0,881	150	14,6	96	-21	240	10	0/0	12	3 200
CIRCULA PM 220	0,895	220	19,2	98	-21	240	10	0/0	12	3 200
CIRCULA PM 320	0,902	320	24,9	100	-18	240	15	0/0	12	3 200

CIRCULATING OILS FOR HEAVY DUTY OIL CIRCULATING SYSTEMS

PETRONAS CIRCULA

PETRONAS Circula Series are high performance anti-wear circulating oils specially developed for a wide range of heavy duty circulating systems.

Formulated with high quality selected mineral base oils enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Circula oils provide very good anti-wear, rust and corrosion protection, smooth operation of the circulating system and up to 2x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HM fluids based on TOST (ASTM D943)

Performance levels:
 ▲ DIN 51524 Part II HLP (2006)
 ▲ ISO 11158 HM (FDIS 2008)



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	TOST life, hours
CIRCULA 150	0,880	150	14,5	95	-21	240	20	0/0	2 000
CIRCULA 220	0,898	220	19,0	97	-21	240	20	0/0	2 000
CIRCULA 320	0,915	320	24,8	99	-18	240	20	0/0	2 000
CIRCULA 460	0,928	460	31,3	98	-18	240	20	0/0	2 000

CIRCULATING OILS FOR STILL MILL OIL CIRCULATING SYSTEMS

PETRONAS CIRCULA MILL NT

PETRONAS Circula Mill NT Series are premium performance anti-wear circulating oils specially developed for Morgan No-Twist Mill system.

Formulated with high quality selected mineral base oils enhanced with advanced anti-wear, extreme pressure, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Circula Mill NT oils provide excellent anti-wear protection, excellent water separability, high rust and corrosion protection and long lasting performance.

Performance levels:
 ▲ MORGOL® No-Twist Mill Lubricant Specification



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	FZG, Stages Passed
CIRCULA MILL NT 100	0,887	100	11,1	96	-18	240	15	0/0	>12
CIRCULA MILL NT 460	0,925	460	31,5	99	-12	290	15	0/0	>12

n/a – not applicable

CIRCULATING OILS FOR STILL MILL OIL CIRCULATING SYSTEMS

PETRONAS CIRCULA MILL

PETRONAS Circula Mill Series are high performance circulating oils specially developed for steel mill equipment where MORGOL® lubricant is recommended.

Formulated with high quality selected mineral base oils enhanced with advanced anti-oxidant, anti-rust and anti-foam additives, PETRONAS Circula Mill oil provides excellent water separability*, high rust and corrosion protection and very good oxidation stability for longer lasting performance.

Performance levels:
 ▲ MORGOL® Advanced Lubricant Specification



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL
CIRCULA MILL 460	0,928	460	31,3	98	-12	290	10	0/0

*better performance compared to typical industrial standards for MORGOL® Lubricant Specification based on UEC Dynamic Demulsibility Endurance Test.

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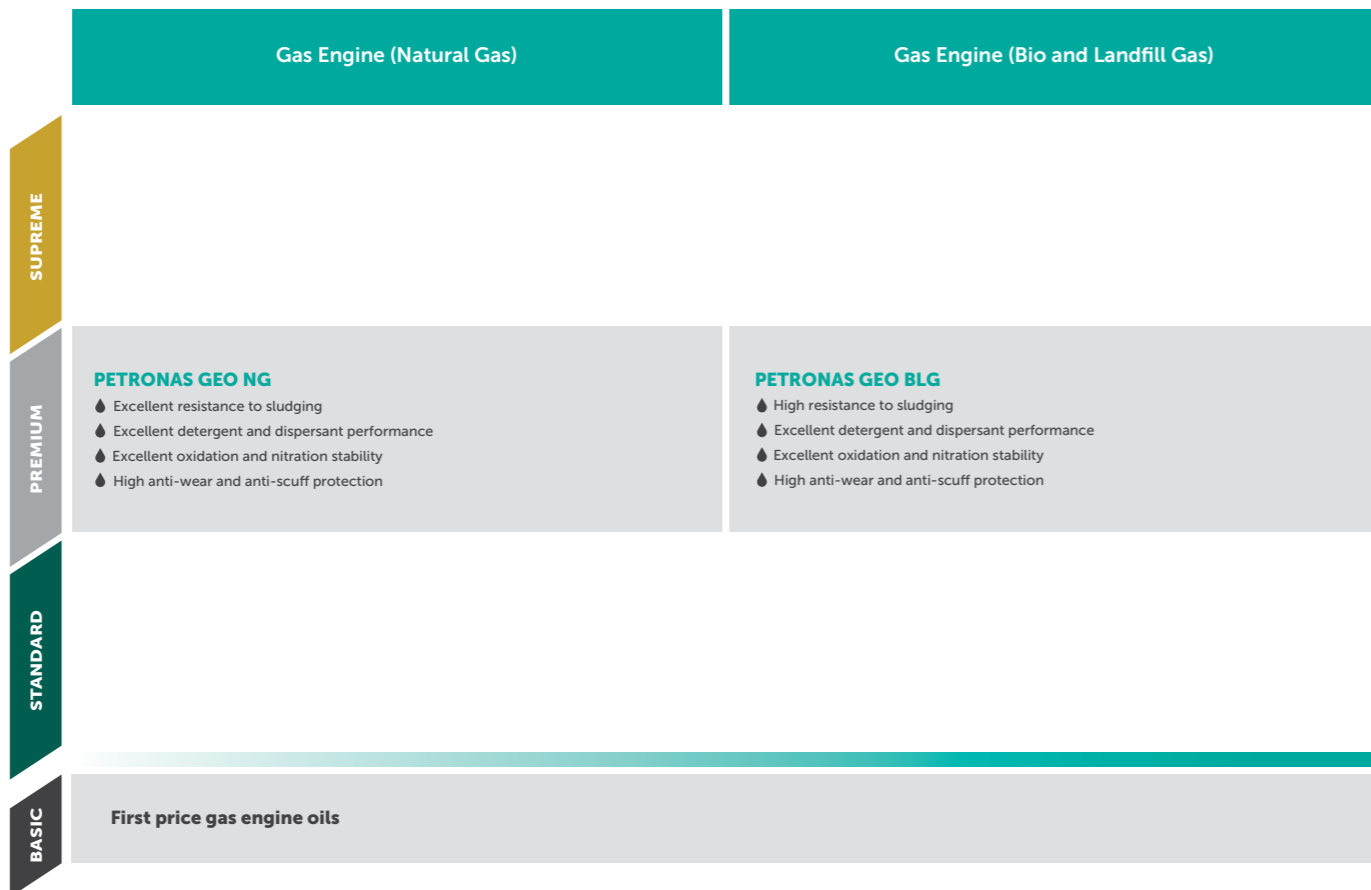
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Gas Engine Oils



Increasing performance and protection
Improving uptime and lowering maintenance costs



GAS ENGINE OILS

PETRONAS GEO NG

PETRONAS Geo NG Series is a premium performance natural gas engine oil specially developed for the lubrication of a wide range of spark-ignited gas-fueled engines in order to improve fuel-efficiency and reduce emissions.

Formulated with high quality selected mineral base oils enhanced with advanced anti-wear, anti-oxidant, detergent, dispersant, anti-rust and anti-foam additives, PETRONAS Geo NG oil provides excellent piston deposit, sludge and ash control, excellent TBN retention and thermal stability as well as resistance to oxidation/nitration.

Performance levels:

- ◆ Caterpillar 3500 and 3600 series
- ◆ MAN
- ◆ GE Jenbacher Class A & B gases, Type 2, 3, 4 and 6 engines
- ◆ MTU
- ◆ Guascor
- ◆ MWM TR-0199-99-2015
- ◆ Wartsila
- ◆ Waukesha



Product	SAE grade	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	TAN, mgKOH/g	TBN, mgKOH/g	Sulfated Ash, %wt
PETRONAS GEO NG SAE 40	40	0,876	121,8	13,5	106	-30	270	0,42	5,38	0,48

GAS ENGINE OILS

PETRONAS GEO BLG

PETRONAS Geo BLG Series is a premium performance bio and landfill gas engine oil specially developed for bio and landfill applications.

Formulated with the highest quality selected mineral base oils enhanced with advanced anti-wear, anti-oxidant, detergent, dispersant, anti-rust and anti-foam additives, PETRONAS Geo BLG oil provides excellent anti-wear protection, excellent TBN retention, reduced combustion chamber deposits, low oil consumption and extra protection against landfill gas*.

Performance levels:

- ◆ GE Jenbacher Class B & C gases, Type 2, 3, 4 and 6 engines
- ◆ Waukesha
- ◆ MAN (M3271-4)



Product	SAE grade	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	TAN, mgKOH/g	TBN, mgKOH/g	Sulfated Ash, %wt
PETRONAS GEO NG SAE 40	40	0,874	119,3	13,3	107	-33	270	0,96	4,51	0,50

*Landfill gases are essentially composed of methane and contain a lot of impurities like halogens, siloxane and sulphur, which can harm gas engines.

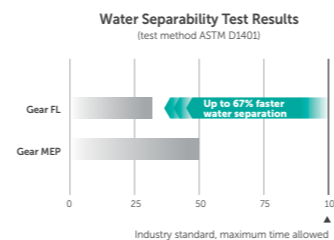
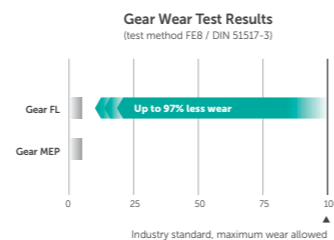
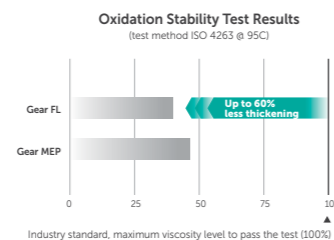
Industrial Gear Oils



Increasing performance and protection
Improving uptime and lowering maintenance costs

	Industrial enclosed spur / helical / bevel / planetary gears	Industrial worm gears
SUPREME	PETRONAS Gear Syn FG Food industry approved Excellent micropitting, extreme pressure and anti-wear protection Up to 5x longer oil life** Excellent performance incl. energy saving	
	PETRONAS Gear Syn PAG Excellent micropitting, extreme pressure and anti-wear protection Up to 5x longer oil life** Excellent performance incl. energy saving	PETRONAS Gear Syn WI Excellent extreme pressure and anti-wear protection Extremely long oil life – possible “fill for life” applications Excellent performance incl. outstanding load carrying capabilities
	PETRONAS Gear Syn PAO Excellent extreme pressure and anti-wear protection Up to 3x longer oil life** Excellent performance incl. energy saving	
PREMIUM	PETRONAS Gear FL Excellent micropitting, extreme pressure and anti-wear protection Up to 1.6x longer oil life* Excellent performance	
	PETRONAS Gear MEP Excellent extreme pressure and anti-wear protection Up to 1.5x longer oil life* High performance	
STANDARD		
BASIC	First price gear oils	

* vs. minimum requirements of industrial gear oils to pass the viscosity increase test (ISO 4263-4 @95°C)
 ** vs. conventional mineral gear oils



INDUSTRIAL GEAR OILS FOR ENCLOSED SPUR / BEVEL / HELICAL AND PLANETARY GEARS

PETRONAS GEAR SYN FG

PETRONAS Gear Syn FG Series are supreme performance industrial gear oils specially developed for various types of enclosed industrial gears operating under normal to extremely heavy duty conditions, primarily used within the food manufacturing environment.

Formulated with high viscosity index water soluble polyalkylene glycol synthetic base oil (PAG) enhanced with advanced extreme pressure, anti-oxidant, anti-rust, anti-foam and food approved additives, PETRONAS Gear Syn FG oils provide excellent extreme pressure, anti-wear and micropitting protection, superior performance across wide temperature range, energy saving, reduced bulk oil temperatures, smooth operation of the gear drives and up to 5x longer lasting performance vs conventional mineral gear oils.

- Performance levels:
- David Brown Type G lubricant
 - DIN 51517 Part III
 - Flender BA T 7300 A+B
 - FDA 21 CFR 178.3570



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C
GEAR SYN FG 150	1,057	150	29.0	234	-45	220
GEAR SYN FG 220	1,057	220	41.9	246	-45	230
GEAR SYN FG 320	1,062	320	60.6	259	-39	na
GEAR SYN FG 460	1,067	460	80.0	265	-36	na
GEAR SYN FG 680	1,072	680	122.2	282	-33	na

INDUSTRIAL GEAR OILS FOR ENCLOSED SPUR / BEVEL / HELICAL AND PLANETARY GEARS

PETRONAS GEAR SYN PAG

PETRONAS Gear Syn PAG Series are supreme performance industrial gear oils specially developed for various types of enclosed industrial gears operating under normal to extremely heavy duty conditions.

Formulated with high viscosity index water soluble polyalkylene glycol synthetic base oil (PAG) enhanced with advanced extreme pressure, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Gear Syn PAG oils provide excellent extreme pressure, anti-wear and micropitting protection, superior performance across wide temperature range, energy saving, reduced bulk oil temperatures, smooth operation of the gear drives and up to 5x longer lasting performance vs conventional mineral gear oils.

- Performance levels:
- David Brown Type G lubricant
 - DIN 51517 Part III
 - Flender BA T 7300 A+B



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	FZG, Stages Passed
GEAR SYN PAG 150	1,057	150	29,0	234	-45	260	>12
GEAR SYN PAG 220	1,057	220	41,9	246	-45	270	>12
GEAR SYN PAG 320	1,058	320	60,6	259	-39	280	>12
GEAR SYN PAG 460	1,067	460	83,0	265	-36	280	>12
GEAR SYN PAG 680	1,072	680	122,2	282	-33	280	>12

INDUSTRIAL GEAR OILS FOR ENCLOSED SPUR / BEVEL / HELICAL AND PLANETARY GEARS

PETRONAS GEAR SYN PAO

PETRONAS Gear Syn PAO Series are premium performance industrial gear oils specially developed for various types of enclosed gear drives operating under normal to extremely heavy duty conditions.

Formulated with high viscosity index synthetic base oil (PAO) enhanced with advanced extreme pressure, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Gear Syn PAO oils provide excellent extreme pressure and anti-wear protection, energy saving, reduced bulk oil temperatures, smooth operation of the gear drives and up to 3x longer lasting performance vs conventional mineral gear oils.

Performance levels:
 ◆ AGMA 9005-E02
 ◆ DIN 51517 Part III
 ◆ U.S. Steel 224



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	FZG, Stages Passed
GEAR SYN PAO 150	0,868	150	18,0	133	-42	236	>12
GEAR SYN PAO 220	0,872	220	23,0	128	-33	238	>12
GEAR SYN PAO 320	0,877	320	29,0	123	-33	238	>12
GEAR SYN PAO 460	0,881	460	37,0	122	-33	238	>12
GEAR SYN PAO 680	0,885	680	48,0	121	-27	238	>12

INDUSTRIAL GEAR OILS FOR ENCLOSED SPUR / BEVEL / HELICAL AND PLANETARY GEARS

PETRONAS GEAR FL

PETRONAS Gear FL Series are premium performance industrial gear oils specially developed for various types of enclosed industrial gears operating under normal to extremely heavy duty conditions.

Formulated with high quality selected mineral base oils enhanced with advanced extreme pressure, anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Gear FL oils provide excellent extreme pressure, anti-wear and micropitting protection, energy saving, reduced bulk oil temperatures, smooth operation of the gear drives and up to 1,6x longer lasting performance*.

*vs. minimum requirements of industrial gear oils to pass the viscosity increase test (ISO 4263-4 @95°C)

Performance levels:
 ◆ AGMA 9005-E02
 ◆ David Brown S1.53.10
 ◆ DIN 51517 Part III
 ◆ Fives Cincinnati Machine Gear
 ◆ GM LS 2 EP Gear Oil
 ◆ ISO 12925-1 CKC/CKD
 ◆ Siemens MD Flender Gear drives - Revision 15
 ◆ U.S. Steel 224



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	FZG, Stages Passed
GEAR FL 150	0,856	150	14,7	97	-27	240	>12
GEAR FL 220	0,860	220	18,9	96	-21	250	>12
GEAR FL 320	0,868	320	23,9	95	-21	250	>12

INDUSTRIAL GEAR OILS FOR ENCLOSED SPUR / BEVEL / HELICAL AND PLANETARY GEARS

PETRONAS GEAR MEP

PETRONAS Gear MEP Series are premium performance industrial gear oils specially developed for various types of enclosed industrial gears operating under normal to heavy duty conditions.

Formulated with high quality selected mineral base oils enhanced with advanced extreme pressure, anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Gear MEP oils provide excellent extreme pressure and anti-wear protection, smooth operation of the gear drives and up to 1,5x longer lasting performance*.

*vs. minimum requirements of industrial gear oils to pass the viscosity increase test (ISO 4263-4 @95°C)

Performance levels:
 ◆ AGMA 9005-E02
 ◆ David Brown S1.53.101
 ◆ DIN 51517 Part III
 ◆ Fives Cincinnati Machine Gear
 ◆ GM LS 2 EP Gear Oil
 ◆ ISO 12925-1 CKC/CKD
 ◆ U.S. Steel 224



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	FZG, Stages Passed
GEAR MEP 68	0,877	68	8,5	94	-30	230	>12
GEAR MEP 100	0,877	100	11,0	94	-27	240	>12
GEAR MEP 150	0,880	150	14,4	93	-27	240	>12
GEAR MEP 220	0,881	220	18,5	93	-21	250	>12
GEAR MEP 320	0,884	320	23,7	94	-21	240	>12
GEAR MEP 460	0,894	460	29,9	93	-18	240	>12
GEAR MEP 680	0,932	680	38,3	93	-18	250	>12
GEAR MEP 1000	0,945	1000	48,9	93	-12	250	>12

INDUSTRIAL GEAR OILS FOR ENCLOSED WORM GEARS

PETRONAS GEAR SYN WI

PETRONAS Gear Syn WI Series are supreme performance industrial gear oils specially developed for worm gear drives operating across wide temperature range.

Formulated with high viscosity index polyalkylene glycol synthetic base oil (PAG) enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Gear Syn WI oils provide excellent anti-wear protection, outstanding load carrying properties, smooth operation of the gear drives systems and extremely long lasting performance allowing in some cases even "filled for life" type of applications.

Performance levels:
 ◆ David Brown Type G lubricant
 ◆ Defense standard 05-50.1 No. 29 for grades 150 220 and 460
 ◆ DIN 51517 Part III



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	FZG, Stages Passed
GEAR SYN WI 150	0,998	150	25,0	201	-30	260	>12
GEAR SYN WI 220	1,095	220	33,2	197	-30	260	>12
GEAR SYN WI 320	1,095	320	44,8	199	-30	270	>12
GEAR SYN WI 460	1,095	460	60,9	205	-28	270	>12

Hydraulic Oils

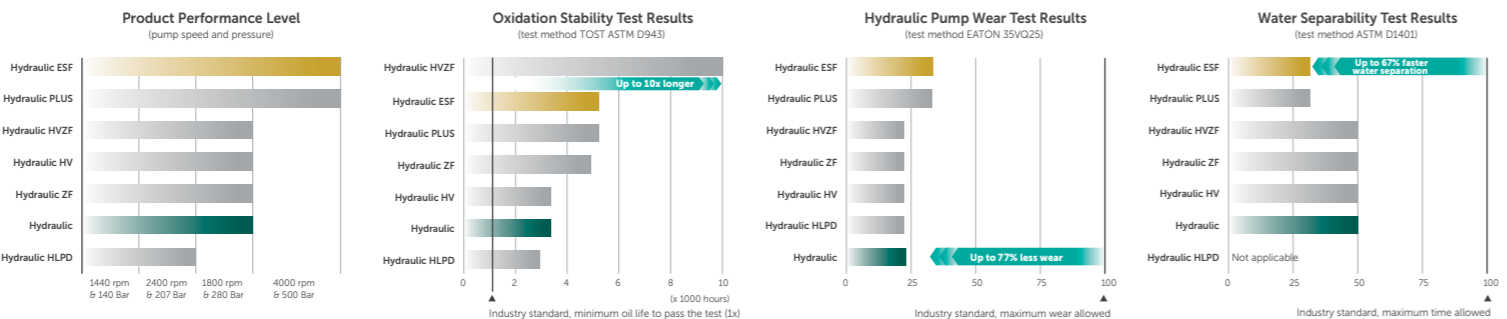


Increasing performance and protection
Improving uptime and lowering maintenance costs

	Modern, anti-wear hydraulic fluids for multipurpose applications	Zinc-free, anti-wear hydraulic fluids for multipurpose applications	Detergent-enhanced hydraulic fluids for high water contamination control	Fire-resistant hydraulic fluids for fire hazard applications
SUPREME	PETRONAS Hydraulic ESF ▲ Energy / Fuel-saving up to 10%/6%** ▲ Excellent anti-wear protection ▲ Over 5x longer oil life* ▲ Excellent and highly stable performance over wide temperature range ▲ Mobile and industrial applications	PETRONAS Hydraulic HVZF ▲ Excellent anti-wear protection ▲ Up to 10x longer oil life* ▲ High and stable performance over wide temperature range ▲ Mobile and industrial applications	PETRONAS Hydraulic HLPD ▲ High water tolerance (up to 3%) ▲ Excellent anti-wear protection ▲ Up to 3x longer oil life* ▲ Excellent performance ▲ Mobile and industrial applications	PETRONAS Hydraulic FR ▲ Excellent fire resistance ▲ High anti-wear protection ▲ High and stable performance over wide temperature range ▲ Environmentally friendly ▲ Mobile and industrial applications
PREMIUM	PETRONAS Hydraulic PLUS ▲ Excellent anti-wear protection ▲ Over 5x longer oil life* ▲ Excellent performance ▲ Mobile and industrial applications	PETRONAS Hydraulic HVZF ▲ Excellent anti-wear protection ▲ Up to 10x longer oil life* ▲ High and stable performance over wide temperature range ▲ Mobile and industrial applications	PETRONAS Hydraulic HLPD ▲ High water tolerance (up to 3%) ▲ Excellent anti-wear protection ▲ Up to 3x longer oil life* ▲ Excellent performance ▲ Mobile and industrial applications	PETRONAS Hydraulic HFC ▲ Excellent fire resistance ▲ Very good anti-wear protection ▲ Very good performance ▲ Industrial applications
STANDARD	PETRONAS Hydraulic HV ▲ Excellent anti-wear protection ▲ Over 3x longer oil life* ▲ High and stable performance over wide temperature range ▲ Mobile and industrial applications	PETRONAS Hydraulic ZF ▲ Excellent anti-wear protection ▲ Up to 5x longer oil life* ▲ High performance ▲ Mobile and industrial applications	PETRONAS Hydraulic HLPD ▲ High water tolerance (up to 3%) ▲ Excellent anti-wear protection ▲ Up to 3x longer oil life* ▲ Excellent performance ▲ Mobile and industrial applications	PETRONAS Hydraulic HFC ▲ Excellent fire resistance ▲ Very good anti-wear protection ▲ Very good performance ▲ Industrial applications
BASIC	PETRONAS Hydraulic ▲ Excellent anti-wear protection ▲ Over 3x longer oil life* ▲ High performance ▲ Mobile and industrial applications			

First price hydraulic fluids

*vs. minimum requirements of ISO 11158 HM for anti-wear hydraulic fluids based on TOST (ASTM D943).
 ** vs. conventional, standard viscosity hydraulic fluids. Actual results may vary depending on different application conditions, type & condition of equipment, current oil used.



MODERN, ANTI-WEAR HYDRAULIC FLUIDS FOR MULTIPURPOSE APPLICATIONS

PETRONAS HYDRAULIC ESF

PETRONAS Hydraulic ESF Series are supreme performance anti-wear hydraulic fluids specially developed to reduce fuel/energy consumption in modern mobile and industrial hydraulic equipment operating under normal to extremely heavy duty conditions including latest high speed and high pressure systems.

Formulated with a unique semi synthetic combination of selected base oils enhanced with high shear stable VI improver and advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives coupled with friction modifiers, PETRONAS Hydraulic ESF fluids provide excellent anti-wear protection, highly stable performance across wider temperature range as compared to normal viscosity index products, over 5x longer lasting performance* and up to 6% direct reduction in fuel consumption in mobile equipment / up to 10% energy savings in stationary industrial equipment.**

*vs. minimum requirements of ISO 11158 HV for anti-wear hydraulic fluids based on TOST (ASTM D943)
 ** vs. conventional, standard viscosity hydraulic fluids. Actual results may vary depending on different application conditions, type & condition of equipment, current oil used.

- Performance levels:
- ▲ Bosch Rexroth RDE 90235
 - ▲ DIN 51524 Part II HLP and III HVLP (2006)
 - ▲ Eaton 03-401-2010
 - ▲ Eaton Lubricant Specification E-FDGN-TB002-E
 - ▲ Fives Cincinnati P-68/P-69/P-70
 - ▲ ISO 11158 HV (FDIS 2008)
 - ▲ Parker Denison HF-0/HF-1/HF-2



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	FZG, Stages Passed	TOST life, hours
HYDRAULIC ESF 46	0,867	46	8,8	174	-33	220	10	0/0	10	5 200
HYDRAULIC ESF 68	0,868	68	12	175	-30	230	10	0/0	10	5 200

MODERN, ANTI-WEAR HYDRAULIC FLUIDS FOR MULTIPURPOSE APPLICATIONS

PETRONAS HYDRAULIC PLUS

PETRONAS Hydraulic PLUS Series are premium performance anti-wear hydraulic fluids specially developed for a wide range of modern mobile and industrial hydraulic equipment operating under normal to extremely heavy duty conditions including latest high speed and high pressure systems.

Formulated with the highest quality selected base oils enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives coupled with friction modifiers, PETRONAS Hydraulic PLUS fluids provide excellent anti-wear protection under toughest operating conditions and over 5x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HV for anti-wear hydraulic fluids based on TOST (ASTM D943)

- Performance levels:
- ▲ Bosch Rexroth RDE 90235
 - ▲ DIN 51524 Part II HLP (2006)
 - ▲ Eaton 03-401-2010
 - ▲ Eaton Lubricant Specification E-FDGN-TB002-E
 - ▲ Fives Cincinnati P-68/P-69/P-70
 - ▲ ISO 11158 HM (FDIS 2008)
 - ▲ Parker Denison HF-0/HF-1/HF-2



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	FZG, Stages Passed	TOST life, hours
HYDRAULIC Plus 32	0,871	32	5,4	102	-33	220	10	0/0	10	5 200
HYDRAULIC Plus 46	0,867	46	6,9	105	-33	220	10	0/0	10	5 200
HYDRAULIC Plus 68	0,868	68	8,8	102	-30	230	15	0/0	10	5 200

MODERN, ANTI-WEAR HYDRAULIC FLUIDS FOR MULTIPURPOSE APPLICATIONS

PETRONAS HYDRAULIC HV

PETRONAS Hydraulic HV Series are premium performance anti-wear hydraulic fluids specially developed for a wide range of mobile and industrial hydraulic equipment operating under normal to heavy duty conditions, subjected to high variations in operating and/or ambient temperatures, including cold start-ups.

Formulated with high quality selected base oils enhanced with high shear stable VI improver and advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Hydraulic HV fluids provide high anti-wear protection, more stable performance across wide temperature range as compared to normal viscosity index products and over 3x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HV for anti-wear hydraulic fluids based on TOST (ASTM D943)

Performance levels:

- ▲ ASTM D 6158 HV
- ▲ Bosch Rexroth RD90220
- ▲ DIN 51524 Part II HLP and III HVLP (2006)
- ▲ Eaton 03-401-2010
- ▲ Fives Cincinnati P-68/P-69/P-70
- ▲ GM LS-2 (2004)
- ▲ ISO 11158 HV (FDIS 2008)
- ▲ JCMAS HK P041 (2004)
- ▲ Parker Denison HF-0 / HF-1 / HF-2
- ▲ SAE MS1004
- ▲ SEB 181 222 (2007)
- ▲ U.S. Steel 126, 127 and 136



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence l, mL	FZG, Stages Passed	TOST life, hours
HYDRAULIC HV 32	0,873	32	6,2	143	-33	220	15	0/0	12	3 500
HYDRAULIC HV 46	0,877	46	7,9	146	-33	220	15	0/0	12	3 500
HYDRAULIC HV 68	0,880	68	10,5	142	-30	230	15	0/0	12	3 500
HYDRAULIC HV 100	0,877	100	14,2	145	-27	240	20	0/0	12	3 500
HYDRAULIC HV 150	0,884	150	18,7	141	-27	240	20	0/0	12	3 500

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MODERN, ANTI-WEAR HYDRAULIC FLUIDS FOR MULTIPURPOSE APPLICATIONS

PETRONAS HYDRAULIC

PETRONAS Hydraulic Series are high performance anti-wear hydraulic fluids specially developed for a wide range of mobile and industrial hydraulic equipment operating under normal to heavy duty conditions.

Formulated with high quality selected base oils enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Hydraulic fluids provide high anti-wear protection, smooth operation of the hydraulic system and over 3x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HV for anti-wear hydraulic fluids based on TOST (ASTM D943)

Performance levels:

- ▲ ASTM D 6158 HM (2005)
- ▲ Bosch Rexroth RD90220
- ▲ DIN 51524 Part II HLP (2006)
- ▲ Eaton 03-401-2010
- ▲ Fives Cincinnati P-68/P-69/P-70
- ▲ GM LS-2 (2004)
- ▲ ISO 11158 HM (FDIS 2008)
- ▲ JCMAS HK P041 (2004)
- ▲ Parker Denison HF-0 / HF-1 / HF-2
- ▲ SAE MS1004
- ▲ SEB 181 222 (2007)
- ▲ US Steel 126, 127 and 136



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence l, mL	FZG, Stages Passed	TOST life, hours
HYDRAULIC 10	0,856	10	2,7	108	-39	150	10	0/0	12	3 500
HYDRAULIC 15	0,860	15	3,4	98	-39	150	10	0/0	12	3 500
HYDRAULIC 22	0,868	22	4,3	101	-36	170	10	0/0	12	3 500
HYDRAULIC 32	0,871	32	5,4	102	-33	220	15	0/0	12	3 500
HYDRAULIC 46	0,877	46	6,8	102	-33	220	15	0/0	12	3 500
HYDRAULIC 68	0,883	68	8,7	99	-30	230	15	0/0	12	3 500
HYDRAULIC 100	0,886	100	11,2	97	-27	240	30	0/0	12	3 500
HYDRAULIC 150	0,890	150	14,7	97	-27	240	30	0/0	12	3 500

ZINC FREE, ANTI-WEAR HYDRAULIC FLUIDS FOR MULTIPURPOSE APPLICATIONS

PETRONAS HYDRAULIC HVZF

PETRONAS Hydraulic HVZF Series are ashless premium performance anti-wear hydraulic fluids specially developed for a wide range of mobile and industrial hydraulic equipment operating under normal to heavy duty conditions and presence of water that may cause filter blockage.

Formulated with high quality selected base oils enhanced with high shear stable VI improver with advanced anti-wear (zinc-free), anti-oxidant, anti-rust and anti-foam additives, PETRONAS Hydraulic HVZF fluids provide excellent anti-wear protection, more stable performance across wide temperature range as compared to normal viscosity index products and up to 10x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HV for anti-wear hydraulic fluids based on TOST (ASTM D943)

Performance levels:

- ▲ DIN 51524 Part II HLP and III HVLP (2006)
- ▲ Eaton Brochure 03-401-2010
- ▲ Fives Cincinnati P-68, P-69 and P-70
- ▲ ISO 11158 HV (FDIS 2008)
- ▲ Parker Denison HF-0, HF-1, HF-2



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence l, mL	FZG, Stages Passed	TOST life, hours
HYDRAULIC HVZF 32	0,871	32	6,2	146	-33	220	15	0/0	>12	9 950
HYDRAULIC HVZF 46	0,877	46	8,0	146	-33	220	15	0/0	>12	9 950
HYDRAULIC HVZF 68	0,883	68	10,6	146	-30	230	15	0/0	>12	9 950

ZINC FREE, ANTI-WEAR HYDRAULIC FLUIDS FOR MULTIPURPOSE APPLICATIONS

PETRONAS HYDRAULIC ZF

PETRONAS Hydraulic ZF Series are ashless premium performance anti-wear hydraulic fluids specially developed for a wide range of mobile and industrial hydraulic equipment operating under normal to heavy duty conditions and presence of water that may cause filter blockage.

Formulated with high quality selected base oils enhanced with advanced anti-wear (zinc-free), anti-oxidant, anti-rust and anti-foam additives, PETRONAS Hydraulic ZF fluids provide excellent anti-wear protection under tough operating conditions and up to 5x longer lasting performance*.

*vs. minimum requirements of ISO 11158 HV for anti-wear hydraulic fluids based on TOST (ASTM D943)

Performance levels:

- ◆ DIN 51524 Part II HLP (2006)
- ◆ Eaton Brochure 03-401-2010
- ◆ Fives Cincinnati P-68 / P-69 / P-70
- ◆ ISO 11158 HM (FDIS 2008)
- ◆ Parker Denison HF-0 / HF-1 / HF-2



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence l, mL	FZG, Stages Passed	TOST life, hours
HYDRAULIC ZF 32	0,871	32	5,4	102	-33	220	15	0/0	>12	4 950
HYDRAULIC ZF 46	0,877	46	6,8	102	-33	220	15	0/0	>12	4 950
HYDRAULIC ZF 68	0,883	68	8,9	104	-30	230	15	0/0	>12	4 950

DETERGENT ENHANCED HYDRAULIC FLUIDS FOR HIGH WATER CONTAMINATION CONTROL

PETRONAS HYDRAULIC HLPD

PETRONAS Hydraulic HLPD Series are premium performance anti-wear hydraulic fluids specially developed for a wide range of modern mobile and industrial hydraulic equipment operating under normal to heavy duty conditions, including systems where water contamination is a frequent challenge.

Formulated with high quality selected base oils enhanced with advanced anti-wear (zinc-free), anti-oxidant, anti-rust, anti-foam additives and detergent content, PETRONAS Hydraulic HLPD fluids provide excellent anti-wear protection, up to 3x longer lasting performance* and maintain high system efficiency even with up to 3% of water contamination.

*vs. minimum requirements of ISO 11158 HV for anti-wear hydraulic fluids based on TOST (ASTM D943)

Performance levels:

- ◆ Daimler Chrysler DBL 6721 (2000)
- ◆ DIN 51524 Part II HLPD (2006) w/o demulsibility performance



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence l, mL	FZG, Stages Passed	TOST life, hours
HYDRAULIC HLPD 32	0,871	32	5,4	102	-33	220	na	0/0	>12	2 900
HYDRAULIC HLPD 46	0,877	46	6,9	105	-33	220	na	0/0	>12	2 900
HYDRAULIC HLPD 68	0,883	68	8,9	104	-30	230	na	0/0	>12	2 900

FIRE RESISTANT HYDRAULIC FLUIDS FOR FIRE HAZARD APPLICATIONS

PETRONAS HYDRAULIC FR

PETRONAS Hydraulic FR Series are premium performance, fire resistant, anti-wear hydraulic fluids specially developed for mobile and industrial equipment operating under normal to heavy duty conditions, recommended whenever a major fire hazard exists associated with industrial hydraulic systems.

Formulated with high viscosity index synthetic base oil enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Hydraulic FR fluids provide high anti-wear protection, smooth operation of the hydraulic systems and contribute to mitigate the risks of violent explosions or fire in the immediate vicinity of flames or hot metal surfaces.

Performance levels:

- ◆ Factory Mutual Approval
- ◆ HFD Fluid



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Manifold Ignition Test, °C	Water Separability, 40/37/3 - mins	Foam Sequence l, mL	TOST life, hours
HYDRAULIC FR 46	0,926	46	8,8	174	-30	300	450	30	30/0	8 50
HYDRAULIC FR 68	0,934	68	12,0	175	-27	300	450	30	30/0	8 50

FIRE RESISTANT HYDRAULIC FLUIDS FOR FIRE HAZARD APPLICATIONS

PETRONAS HYDRAULIC HFC

PETRONAS Hydraulic HFC Series are high performance, fire resistant, anti-wear hydraulic fluids specially developed for industrial hydraulic equipment operating under normal to moderate conditions, recommended whenever a major fire hazard exists associated with industrial hydraulic systems.

Formulated with balanced water-glycol base enhanced with advanced anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Hydraulic HFC fluids provide very good anti-wear protection, smooth operation of the hydraulic systems and contribute to mitigate the risks of violent explosions or fire in the immediate vicinity of flames or hot metal surfaces.

Performance levels:

- ◆ Factory Mutual Approval
- ◆ HFD Fluid



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Manifold Ignition Test, °C	Water Separability, 40/37/3 - mins	Foam Sequence l, mL	TOST life, hours
HYDRAULIC HFC 46	1,084	46	n/a	n/a	-45	n/a	700	n/a	50/0	n/a

Railroad Diesel Engine Oils



Increasing performance and protection
Improving uptime and lowering maintenance costs

	Generation 6 Railroad Diesel Engines	Generation 5 Railroad Diesel Engine
SUPREME	<p>PETRONAS Genrail 6 Syn</p> <ul style="list-style-type: none"> Excellent detergent and dispersant performance Excellent thermal and oxidation stability High anti-wear protection 	
PREMIUM	<p>PETRONAS Genrail 6</p> <ul style="list-style-type: none"> Excellent detergent and dispersant performance Excellent thermal and oxidation stability High anti-wear protection 	
STANDARD		<p>PETRONAS Genrail 5</p> <ul style="list-style-type: none"> Excellent detergent and dispersant performance Excellent thermal and oxidation stability High anti-wear protection
BASIC	<p>First price railroad diesel engine oils</p>	

RAILROAD DIESEL ENGINES OILS (GENERATION 6)

PETRONAS GENRAIL SYN 6

PETRONAS Genrail SYN 6 series is a premium performance railroad diesel engine oil specially developed for use in EMD and GE Engines Generation 6, fitted with silver bearings, requiring a zinc-free lubricant.

Formulated with selected semisynthetic base oils enhanced with advanced detergent/dispersant, anti-wear and anti-oxidant additives, PETRONAS Genrail SYN 6 oil provides advanced dispersant technology, which maximises engine cleanliness and extends oil and filter life, excellent thermal and oxidation stability and very good TBN retention for extended oil drain intervals.

Performance levels:
 GE Generation 6
 GM EMD

LMOA Generation 6

Product	SAE grade	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	TBN, mgKOH/g	Sulfated Ash, %wt
GENRAIL SYN 6 SAE 20W-40	20W-40	0,875	138,0	15,8	120	-24	240	9,2	1

PETRONAS GENRAIL 6

PETRONAS Genrail 6 series are premium performance railroad diesel engine oils specially developed for use in EMD and GE Engines Generation 6, fitted with silver bearings, requiring a zinc-free lubricant.

Formulated with selected mineral base oils enhanced with advanced detergent/dispersant, anti-wear and anti-oxidant additives, PETRONAS Genrail 6 oils provide advanced dispersant technology, which maximises engine cleanliness and extends oil and filter life, excellent thermal and oxidation stability and very good TBN retention for extended oil drain intervals.

Performance levels:
 GE Generation 6
 GM EMD

LMOA Generation 6

Product	SAE grade	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	TBN, mgKOH/g	Sulfated Ash, %wt
GENRAIL 6 SAE 40	40	0,880	144,9	14,9	103	-24	250	9,1	1
GENRAIL 6 SAE 20W-40	20W-40	0,879	136,2	15,3	115	-24	240	9,2	1

RAILROAD DIESEL ENGINES OILS (GENERATION 5)

PETRONAS GENRAIL 5

PETRONAS Genrail 5 are high performance railroad diesel engine oils specially developed for high output railroad engines, Generation 5, fitted with silver bearings, requiring a zinc-free lubricant.

Formulated with selected mineral base oils enhanced with detergent/dispersant, anti-wear and anti-oxidant additives, PETRONAS Genrail 5 oils provide good dispersant technology which will extend oil and filter life, maintain engine cleanliness, high thermal and oxidation stability, excellent corrosion protection for engines containing yellow metals and silver parts burning high sulphur fuels.

Performance levels:
 GE Generation 4 long Life
 GM EMD

LMOA Generation 6

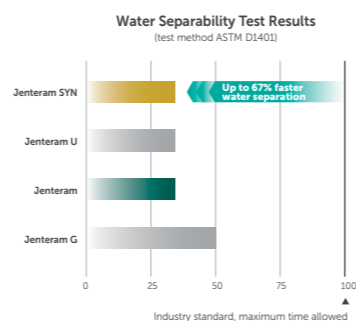
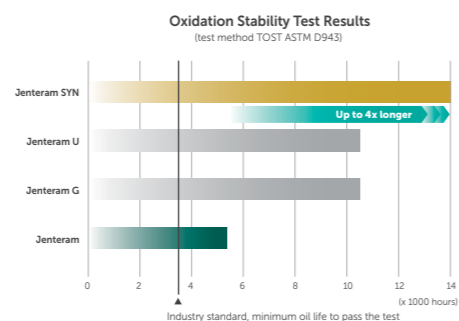
Product	SAE grade	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	TBN, mgKOH/g	Sulfated Ash, %wt
GENRAIL 5 SAE 40	40	0,866	138,1	14,5	104	-24	250	13	1,4
GENRAIL 5 SAE 20W-40	20W-40	0,64	135,1	15,5	119	-24	240	13	1,4

Turbine Oils

Increasing performance and protection
Improving uptime and lowering maintenance costs

	Steam, gas, combined cycle turbines with / without associated gear drives	Steam, gas, combined cycle turbines without associated gear drives
SUPREME	PETRONAS Jenteram SYN <ul style="list-style-type: none"> Very good varnish control High anti-wear protection Up to 4x longer oil life* Excellent performance 	
PREMIUM		PETRONAS Jenteram U <ul style="list-style-type: none"> Excellent varnish control Very good anti-wear protection Up to 3x longer oil life* High performance
STANDARD	PETRONAS Jenteram G <ul style="list-style-type: none"> Very good varnish control High anti-wear protection Up to 3x longer oil life* High performance 	
BASIC	PETRONAS Jenteram <ul style="list-style-type: none"> Very good anti-wear protection Up to 1.5x longer oil life* Very good performance 	
	First price turbine oils	

*vs. minimum requirements of DIN 51515 Part II for industrial turbine oils based on TOST results (ASTM D943)



TURBINE OILS FOR STEAM / GAS / COMBINED CYCLE TURBINES WITH/WITHOUT ASSOCIATED GEAR DRIVES

PETRONAS JENTERAM SYN

PETRONAS Jenteram SYN Series are supreme performance synthetic turbine oils specially developed for use in modern steam, light and heavy duty gas turbines, combined cycle turbines with or without associated gear drives.

Formulated with high viscosity index selected synthetic base oils enhanced with advanced zinc-free anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Jenteram SYN oils provide high anti-wear protection, very good varnish control and excellent thermal and oxidation stability for up to 4x longer lasting performance*.

*vs. minimum requirements of DIN 51515 Part II for industrial turbine fluids based on TOST results (ASTM D943)

Performance levels:

- ALSTOM HTGD 90117
- ASTM D-4304 Type I, II and III
- BRITISH STANDARD BS 489
- DIN 51515 Part I and II
- DIN 51524 Part I
- FIVES CINCINNATI P-38
- GENERAL ELECTRIC GEK-32568GH
- ISO 8068 L-TGE and L-TSE
- ISO 8068 L-TSA and L-TGA
- ISO 11158 HH and HL
- SIEMENS AG TLV 9013 04
- SIEMENS AG TLV 9013 05



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	FZG, Stages Passed	TOST life, hours
JENTERAM SYN 32	0,842	32	5,9	130	-33	220	10	0/0	9	14 000
JENTERAM SYN 46	0,845	46	7,6	132	-33	240	10	0/0	9	14 000
JENTERAM SYN 68	0,850	68	10,0	131	-30	240	10	0/0	9	14 000

TURBINE OILS FOR STEAM / GAS / COMBINED CYCLE TURBINES WITH/WITHOUT ASSOCIATED GEAR DRIVES

PETRONAS JENTERAM G

PETRONAS Jenteram G Series are premium performance turbine oils specially developed for use in modern steam, light and heavy duty gas turbines, combined cycle turbines with or without associated gear boxes.

Formulated with high quality selected base oils enhanced with advanced zinc-free anti-wear, anti-oxidant, anti-rust and anti-foam additives, PETRONAS Jenteram G oils provide high anti-wear protection, very good varnish protection and excellent thermal and oxidation stability for up to 3x longer lasting performance*.

*vs. minimum requirements of DIN 51515 Part II for industrial turbine fluids based on TOST results (ASTM D943)

Performance levels:

- ALSTOM HTGD 90117
- ASTM D-4304 Type I, II and III
- BRITISH STANDARD BS 489
- DIN 51515 Part I and II
- DIN 51524 Part I
- FIVES CINCINNATI P-38
- GB 11120-2011 L-TSA and L-TGA
- GENERAL ELECTRIC GEK-32568GH
- ISO 8068 L-TSA & L-TGA
- ISO 8068 L-TSE & L-TGE
- ISO 11158 HH and HL
- SIEMENS AG TLV 9013 05
- SIEMENS AG TLV 9013 04



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Water Separability, 40/37/3 - mins	Foam Sequence I, mL	FZG, Stages Passed	TOST life, hours
JENTERAM G 32	0,853	32	5,6	114	-33	220	5	0/0	9	10 500
JENTERAM G 46	0,859	46	7,1	113	-33	230	15	0/0	9	10 500
JENTERAM G 68	0,868	68	9,3	114	-30	230	20	0/0	9	10 500

Other Oils



AIR TOOL OILS

PETRONAS ATO

PETRONAS ATO Series are high performance air tool oils specially developed for a range of pneumatically operated rock drills in underground and surface mining.

Formulated with high quality selected mineral base oils enhanced with advanced anti-wear, anti-rust, anti-oxidant and anti-foam additives, PETRONAS ATO oils provide excellent anti-wear, metal wetting properties, adhesiveness, fog and emulsion control. The fog generation is kept at minimum and is non-toxic.

Performance levels:
 ▲ ISO 6743-11 Types PAC and PBC



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Foam Sequence l, ml	Timken, lbs
ATO 32	0,871	32	5,4	102	-33	220	0/0	60
ATO 46	0,875	46	6,9	105	-30	220	0/0	60
ATO 100	0,885	100	11,8	107	-27	240	0/0	60
ATO 150	0,895	150	14,7	97	-24	240	0/0	60
ATO 220	0,901	220	18,5	93	-24	250	0/0	60



CHAINSAW OILS

PETRONAS CHAINSAW

PETRONAS Chainsaw Series is a high quality chainsaw oil specially developed for the lubrication of cutting chains and cutter bars of modern chainsaws.

Formulated with selected mineral base oils enhanced with advanced heavy metal free anti-wear, anti-oxidant, anti-rust and adhesive additives, PETRONAS Chainsaw oil provides high anti-wear, high lubricity and adhesive properties for smooth operation of the chainsaws.



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C
CHAINSAW 150	0,895	150	14,7	97	-18	240

SLIDEWAY OILS

PETRONAS SLIDEWAY

PETRONAS Slideway Series are high performance lubricants specially developed for machine-tool ways and slides where precision or slow speeds make it necessary that "stick-slip" of tables and slides are eliminated.

Formulated with high quality selected mineral base oils enhanced with advanced anti-oxidant, anti-rust, extreme pressure, anti-wear and anti-foam additives, PETRONAS Slideway oils provide excellent separation from water-miscible cutting fluids, high anti-wear protection and a combination of adhesiveness and stick-slip characteristics ensuring smooth operation of the machine tools.

Performance levels:
 ▲ DIN 51517 Part III
 ▲ DIN 51524 Part II HLP (2006)
 ▲ Fives Cincinnati Machine (P47)



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	FZG, Stages Passed	Frictional Test
SLIDEWAY 68	0,885	68	8,7	99	-9	220	12	0,78
SLIDEWAY 220	0,900	220	18,7	95	-9	240	12	0,78



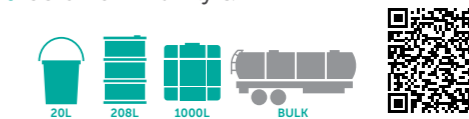
HEAT TRANSFER OILS

PETRONAS HTO

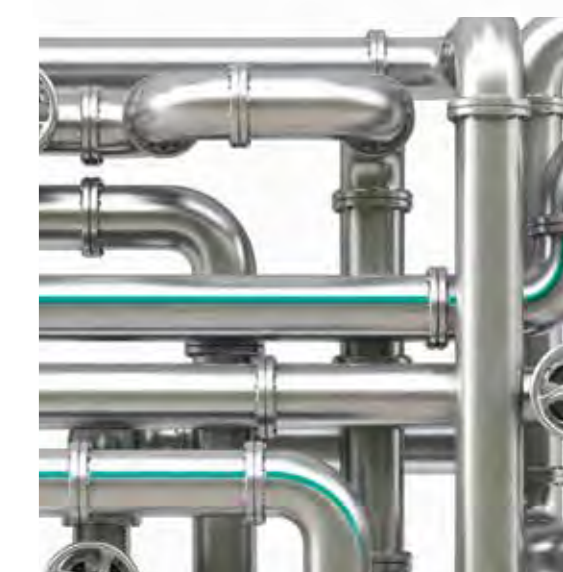
PETRONAS HTO Series are high performance heat transfer fluids specially developed for open and enclosed heat transfer systems operating at high bulk oil temperatures.

Formulated with high quality selected mineral base oils enhanced with advanced anti-oxidant and detergent additives, PETRONAS HTO fluids provide high anti-oxidant protection and detergency to eliminate build-up and deposits.

Performance levels:
 ▲ DIN 1522
 ▲ ISO 6743-12 Family Q



Product	Specific Gravity at 15°C	Kinematic Viscosity at 40°C, cSt	Kinematic Viscosity at 100°C, cSt	Viscosity Index	Pour Point, °C	Flash Point, °C	Closed systems, °C	Open systems, °C
HTO 22	0,868	22	4,3	101	-18	220	-7 to 255	-7 to 130
HTO 32	0,871	32	5,4	102	-15	220	-4 to 305	-4 to 180
HTO 46	0,877	46	6,8	102	-12	240	-2 to 315	-2 to 190



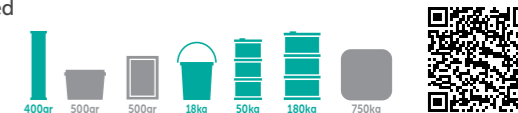


MULTIPURPOSE GREASES

PETRONAS GREASE FG

PETRONAS Grease FG is a NSF H1 approved multipurpose food grade grease based on a combination of aluminum complex thickener technology and mineral white oil. It is suitable for a wide range of applications within the food and beverage processing industries and has excellent resistance to steam, water and oxidation.

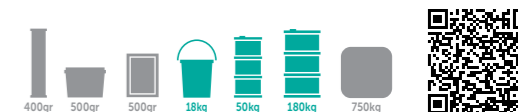
Performance levels:
 ◆ NSF H1 Approved
 ◆ Halal Certified
 ◆ Kosher Certified



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE FG	Aluminum Complex	2	550	240	280	6 000	-20 to 150

PETRONAS GREASE Ca G 2

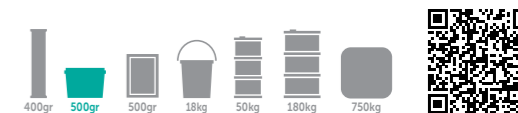
PETRONAS Grease Ca G 2 is a multipurpose anhydrous calcium thickened grease suitable for components exposed to high levels of moisture and water ingress across a range of applications. The inclusion of lubricating solids enables enhanced protection under boundary lubrication and shock load conditions commonly seen in heavy duty equipment and off-road vehicles.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Ca G 2	Calcium (Graphite 10% enhanced)	2	170	150	280	3 000	-15 to 90

PETRONAS GREASE Ca 00

PETRONAS Grease Ca 00 is a semi-fluid calcium grease formulated with a high viscosity base oil and solid lubricants, specifically developed for the lubrication and protection of pneumatic percussion rock drills used in the mining industry.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Ca 00	Calcium	00	300	>60	410	-	-20 to 60

MULTIPURPOSE GREASES

PETRONAS GREASE CaSx

PETRONAS Grease CaSx is suitable for use as a multipurpose, high temperature grease across a wide range of applications and markets where components may be particularly exposed to the elements or operational contaminants. Examples of target industries might include steel, marine, mining and construction



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE CaSx	Calcium Sulfonate complex	2	260	300	280	7 500	-30 to 160 (220)

PETRONAS GREASE Clay EP 2/470

PETRONAS Grease Clay EP 2/470 is based on an inorganic, clay thickener which, in combination with high viscosity mineral base oils, makes it suitable for a variety of industrial applications including plain and rolling element bearings, gears and slideways where conditions involve frequent high temperature operation.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Clay EP 2/470	Inorganic	2	470	Non-melt	280	2 400	-20 to 180 (200)

PETRONAS GREASE Clay MEP

Formulated using a combination of an inorganic clay thickener, high viscosity, mineral base oils and solid lubricant technology, PETRONAS Clay MEP is suitable for a wide range of heavy duty bearing industrial applications exposed to extended periods at higher temperatures such as are experienced on oven conveyors, kiln car bearings and paper mill driers.

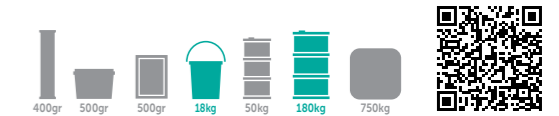


Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Clay MEP	Inorganic	1	470	Non-melt	325	2 000	-20 to 140 (180)

MULTIPURPOSE GREASES

PETRONAS GREASE Clay MG

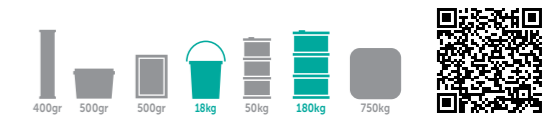
Formulated using an inorganic clay thickener in combination with very high viscosity mineral oils and fortified with a high level of lubricating solids, PETRONAS Grease Clay MG has been developed for the lubrication of components exposed to a combination of oscillating, reciprocating and sliding movement whilst operating at slower operating speeds under high and shock load conditions. Due to the level of solids, this product is not recommended for use in rolling element bearings.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Clay MG	Inorganic (Graphite 6% enhanced)	1	1 250	Non-melt	325	-	-10 to 140 (180)

PETRONAS GREASE Clay Syn 2/100

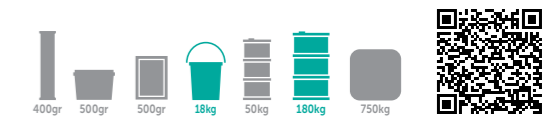
The combination of inorganic clay thickener and a relatively low, synthetic base oil (PAO) make PETRONAS Grease Clay Syn 2/100 particularly well suited to rolling element bearings operating at higher speeds in combination with continuously high temperatures such as electric motor or oven fan bearings in cement or brick making kilns.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Clay Syn 2/100	Inorganic	2	120	Non-melt	280	2 600	-40 to 180

PETRONAS GREASE Clay Syn 2/220

PETRONAS Grease Clay Syn 2/220 is a synthetic clay-thickened grease offering superior thermal and oxidative stability for a wide range of plain and rolling element bearings found in a variety of industrial markets.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Clay Syn 2/220	Inorganic	2	215	Non-melt	280	2 000	-40 to 180

MULTIPURPOSE GREASES

PETRONAS GREASE Clay Semi-Syn Est

PETRONAS Grease Clay Semi-Syn Est is based on a combination of base oils specifically selected to enable compatibility with a wide range of elastomeric and polymeric materials such as those used in o-rings, seals and pipe valves.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Clay Semi-Syn Est	Inorganic	2	200	Non-melt	280	-	-20 to 90

PETRONAS GREASE Li 2 & Li 3

Based on a shear stable lithium thickener technology, PETRONAS Grease Li 2 and Li 3 represent an excellent choice as a multipurpose grease for a wide range of rolling element bearings operating at speeds up to 3,600 rpm. The relatively low viscosity base oils make them particularly well suited for conditions involving higher speeds and low loads such as electric motor bearings. The choice of NLGI grade will be determined by a combination of factors such as bearing orientation and vibration levels.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Li 2 / Li 3	Lithium	2/3	120	194	285 / 245	2 000	-30 to 120 (130)

PETRONAS GREASE Li EP 00 & Li EP 0

Based on a combination of shear stable lithium thickener technology, high quality mineral base oils and an optimised EP additive system, the Li EP range provides a selection of premium multipurpose greases suitable for a wide variety of industrial applications across multiple markets. The range of consistencies from the semi-fluid NLGI 00 to the stiffer NLGI 3 grades further increases the versatility of this range of products.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Li EP 00	Lithium	00	190	>150	400-430	2 200	-30 to 130
GREASE Li EP 0	Lithium	0	190	>160	355-380	2 600	-30 to 130

MULTIPURPOSE GREASES

PETRONAS GREASE Li EP 1 & Li EP 2 & Li EP 3

Based on a combination of shear stable lithium thickener technology, high quality mineral base oils and an optimised EP additive system, the Li EP range provides a selection of premium multipurpose greases suitable for a wide variety of industrial applications across multiple markets. The range of consistencies from the semi-fluid NLGI 00 to the stiffer NLGI 3 grades further increases the versatility of this range of products.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Li EP 1	Lithium	1	190	190	310-340	2 600	-30 to 130
GREASE Li EP 2	Lithium	2	190	190	265-295	2 800	-30 to 130
GREASE Li EP 3	Lithium	3	190	190	220-250	2 800	-30 to 130

PETRONAS GREASE Li AS

Based on lithium thickener technology and high quality mineral base oils, PETRONAS Grease Li AS contains a blend of specially selected solid lubricants for reduced friction and has been developed specifically for use as an anti-seize lubricant for components such as screw threads, nuts and bolts that enable the connection and assembly of multiple engineered parts.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Li AS	Lithium	1.5	140	190	320	2 400	-

PETRONAS GREASE Li PT

Based on a combination of lithium thickener technology, high quality mineral base oils and an optimised additive system, PETRONAS Grease Li PT is specifically promoted as a post tensioning grease within the construction industry.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Li PT	Lithium	1.5	120	194	320	-	up to 120

MULTIPURPOSE GREASES

PETRONAS GREASE Tutela GP & Tutela SP

PETRONAS Grease Tutela GP is a premium multipurpose lithium EP grease formulated using high quality base oils and an optimised additive system providing protection against loads, wear, corrosion and oxidation. Suitable for the lubrication of a variety of plain and rolling element bearings including wheel bearings, bushes and water pump bearings.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Tutela GP	Lithium	1.5	190	190	280	3 200	-20 to 130

PETRONAS Grease Tutela SP is a premium multipurpose lithium EP grease fortified with molybdenum disulphide for enhanced protection in applications subject to rotational, sliding or oscillating motion and where shock loading may occur. Suitable for use on the chassis components and CV joints of passenger cars, commercial vehicles and agricultural equipment requiring a grease containing solid lubricants.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Tutela SP	Lithium	1.5	190	190	280	3 000	-20 to 130

PETRONAS GREASE Tutela SCF

Based on a lithium thickener and formulated using low viscosity, synthetic base oils, PETRONAS Grease Tutela SCF has been developed to provide protection and remain pumpable even at very low temperatures. Suitable for use in the centralised lubrication system of heavy duty trucks, requiring an NLGI 00/000 semi-fluid grease.

Performance levels:
 ◆ MAN 283 Li-P 00/000
 ◆ MB 264.0
 ◆ Willy Vogel AG (Lubrication systems)



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Tutela SCF	Lithium	00	38	>170	415	2 800	-50 to 110

MULTIPURPOSE GREASES

PETRONAS GREASE LiCa GEP 0

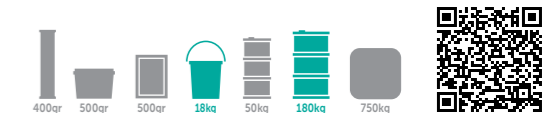
This is a lithium/calcium based multipurpose heavy duty grease ideal for protecting components exposed to high loads and water ingress. Soft consistency enables better product mobility at lower operating temperatures or where centralised lubrication systems are the primary method of application.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiCa GEP 0	Lithium Calcium	0	500	180	370	3 200	-20 to 120

PETRONAS GREASE LiCa GEP 2.5

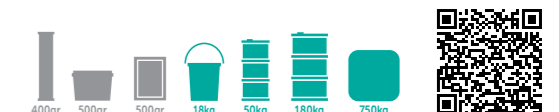
This is a lithium/calcium based multipurpose heavy duty grease ideal for protecting components exposed to high loads and water ingress. The inclusion of solid lubricant technology ensures enhanced protection under boundary and shock load conditions such as those seen across multiple heavy duty markets including rail, agriculture, mining and construction.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiCa GEP 2.5	Lithium Calcium	2.5	500	190	255	4 000	-20 to 120

PETRONAS GREASE LiCa MG HL

The combination of a lithium/calcium thickener, high viscosity base oil, EP additives and 5% solid lubricant technology ensure a water resistant grease suitable for use in a wide variety of applications including pins, bushes, joints and couplings that enable the drive or movement of off-road mining and construction vehicles and equipment.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiCa MG HL	Lithium Calcium (Graphite & MoS2 enhanced)	2	670	190	280	4 600	-20 to 120

MULTIPURPOSE GREASES

PETRONAS GREASE LiCa MG XHL

The combination of a lithium/calcium thickener, very high viscosity base oil, EP additives and 5% solid lubricant technology ensure a water resistant grease suitable for use in a wide variety of applications including pins, bushes, joints and couplings that enable the drive or movement of off-road mining and construction vehicles and equipment, where operating conditions may exceed the capabilities of PETRONAS Grease LiCa MG HL.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiCa MG XHL	Lithium Calcium (Graphite & MoS2 enhanced)	2	1 000	190	280	8 000	-20 to 120

PETRONAS GREASE LiCa Semi-Syn

The combination of a lithium/calcium thickener system and a high viscosity blend of premium quality base oils and synthetic polymers results in a very adhesive product with excellent water resistance suitable for use in a wide variety of heavy duty applications. Suitable for use in a variety of applications on both agricultural and forestry equipment including prop shafts, U joints, chassis components, fifth wheels, splines and slides.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiCa Semi-Syn	Lithium Calcium	2	660	190	280	4 000	-20 to 140

PETRONAS GREASE LiCa TMG

The combination of a lithium/calcium thickener system and a high viscosity blend of premium quality base oils and synthetic polymers results in a very adhesive product with excellent water resistance suitable for the lubrication and protection of a wide variety of exposed, heavy duty components including gears, drive shaft mechanisms and chassis components in industries such as rail, agriculture, mining and cement.

Performance levels:
 ◆ GE D50E8C specification
 ◆ EMD EMS 1026 Type A specification



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiCa TMG	Lithium Calcium	0.5	2 000	185	365	3 400	-20 to 120 (150)

MULTIPURPOSE GREASES

PETRONAS GREASE LiX 2/170

Based on a lithium complex thickener, this is a multipurpose EP grease with enhanced thermal stability for those applications where increased speeds or loads may result in higher operating temperatures. Suitable for both industrial and automotive applications including wheel bearings and prop shafts for passenger cars and on-road commercial vehicles such as trucks and buses.

Performance levels:
 ◆ Mercedes Nenz 265.1
 ◆ Volvo Std 1277.2 (97720)

◆ MAN 284 Li-H2
 ◆ Proven performance in scania trucks



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiX 2/170	Lithium Complex	2	170	>260	280	2 400	-25 to 140 (220)

PETRONAS GREASE LiX 2/380

Based on a lithium complex thickener, this is a multipurpose EP grease with enhanced thermal stability for those applications where increased speeds or loads may result in higher operating temperatures. Suitable for both industrial and automotive applications including wheel bearings and prop shafts for passenger cars and on-road commercial vehicles such as trucks and buses.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiX 2/380	Lithium Calcium	2	380	280	275	3 000	-20 to 160

PETRONAS GREASE LiX MEP

A thermally stable lithium complex thickener, high viscosity mineral base oils and an optimised EP additive package make this product ideal for heavy duty applications exposed to higher operating temperatures. Solid lubricant technology provides enhanced surface protection where sliding and oscillating motion may be prevalent.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiX MEP	Lithium Complex (MoS2 enhanced)	2	380	280	275	3 000	-20 to 160

MULTIPURPOSE GREASES

PETRONAS GREASE LiX Syn 0/460

A soft, lithium complex grease formulated using a combination of high viscosity synthetic base oils and a high performance EP additive package. Suitable for use in centralised lubrication systems or enclosed gear systems requiring excellent mobility, stability and load carrying capability across a wide temperature range.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiX Syn 0/460	Lithium Complex	0	460	>240	355-385	3 400	-40 to 150 (220)

PETRONAS GREASE LiX Syn 1/1500

PETRONAS Grease LiX Syn 1/1500 is based on lithium complex thickener technology, very high viscosity, synthetic base oils and an additive system with enhanced EP and anti-wear performance. This product is especially well suited for use in a wide variety of industrial and heavy duty applications where operating conditions combine very slow movement with high loads and extended periods at elevated temperatures.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiX Syn 1/1500	Lithium Complex	1	1 500	>260	310-340	3 600	-30 to 150 (220)

PETRONAS GREASE LiX Syn 2/100 & 2/220 & 2/460

PETRONAS Grease LiX Syn 2/100, PETRONAS LiX Syn 2/220 and PETRONAS LiX Syn 2/460 are lithium complex greases with synthetic baseoil. The greases contain antioxidants, corrosion inhibitors and EP/AW additives based on bismuth technology. The lithium complex soap, together with the synthetic base oil, makes the product suitable for heavily loaded bearings at elevated temperatures, in wet and corrosive environments.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE LiX Syn 2/100	Lithium Complex	2	100	>260	265-290	3 600	-40 to 150 (220)
GREASE LiX Syn 2/220	(Bismuth enhanced)	2	220	>260	265-290	3 600	-40 to 150 (220)
GREASE LiX Syn 2/460		2	460	>260	265-290	3 600	-40 to 150 (220)

MULTIPURPOSE GREASES

PETRONAS GREASE Tutela WB

Based on a lithium complex thickener and formulated using a combination of high viscosity base oils and a robust additive system, Tutela WB Grease provides enhanced performance and protection in both on and off-road heavy duty applications. Suitable for wheel bearings operating at higher temperatures or as a chassis grease where poor road conditions or off-road operations may lead to increased vibration.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE Tutela WB	Lithium Complex	2.5	540	280	255	3 000	-20 to 160 (200)

PETRONAS GREASE PE HS

PETRONAS Grease PE HS is based on a polyethylene thickening system which in combination with high viscosity mineral base oils ensures excellent resistance to separation due to the centrifugal forces commonly experienced in high speed, flexible couplings. An optimised EP additive system provides balanced protection against the effects of corrosion, oxidation and operational loading.

Performance levels:
 ◆ AGMA Type CG-1 requirements
 ◆ AGMA Type CG-2 requirements



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE PE HS	Polyethylene	1	670	>210	320	3 200	-20 to 120 (140)

PETRONAS GREASE PU

PETRONAS Grease PU is a polyurea based, high temperature grease suitable for use in a wide variety of rolling element bearing applications where operational loads are relatively low. The viscosity of the base oils makes this grease especially well suited to the extended lubrication and protection of high speed rolling element bearings such as those found in electric motor, fan and alternator bearings.



Product	Thickener type	NLGI Grade	Viscosity of Base Oil, at 40°C	Dropping Point, °C	Penetration at 25°C	4-Ball Weld Load, N	Operating temperature range, °C
GREASE PU	Polyurea	2	100	>260	280	2 400	-20 to 140 (180)

Notes

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