BRB

A Subsidiary of PETRONAS Chemicals Group

Petrolad®
Lube Oil Additives

Efficiency meets endurance

Contents

From components to packages

The Petrolad® line-up

Based on an innovation strategy of not only addressing the challenges our customers face, but also anticipating their future needs, BRB International continues to develop the forward-looking Petrolad® line-up of gear and engine oil additives. As the need for resource efficiency and tailored solutions becomes increasingly pressing, this fast-forward approach is more relevant than ever.

The Petrolad® range is designed to boost the performance, efficiency and endurance of your gear and engine lubricant systems. The portfolio includes additives for engine, driveline, hydraulic and off-road applications as well as special additives such as sulphonates and fuel additives. We deliver our non-homologated Petrolad® gear and engine oil solutions as individual components or in complete package systems, depending on your needs. In combination with our Viscotech® viscosity modifiers, the Petrolad® solutions help you formulate exceptionally stable, high-performance and cost-effective oil blends. And if the solution you require for an ideal formulation is not readily available, we'll work with you to co-innovate and develop the answer to your wishes.

On the following pages, you'll find details on additives that will take your products to the next level.

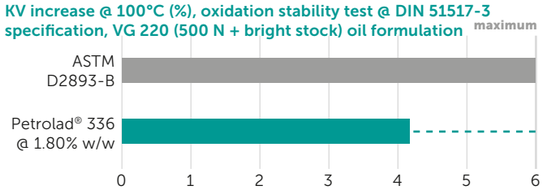
Petrolad® 336

Cost-effective, multi-purpose gear oil additive package

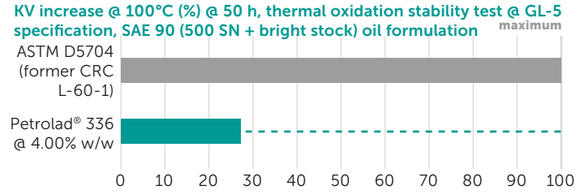
Value for money in a multi-use package

The cost-effective additive package uses a unique sulphur/phosphorus-based technology, making it ideal for clear, low-odour automotive and industrial gear oils. Soluble in various mineral and synthetic base stocks, it meets GL-5 at 4.0% w/w maximum dosage as well as the industrial specifications ISO 12925-1 (L-CKD) and DIN 51517-3 at a very competitive treat rate. It provides an excellent friction coefficient and impressive micro-pitting test results. The package also features key properties for industrial applications like strong water demulsibility/separability, meets AIST 224 standards and exhibits great antioxidation properties and excellent performance according to DIN 51517-3.

KV increase @ 100°C (%), oxidation stability test @ DIN 51517-3 specification, VG 220 (500 N + bright stock) oil formulation



KV increase @ 100°C (%) @ 50 h, thermal oxidation stability test @ GL-5 specification, SAE 90 (500 SN + bright stock) oil formulation



Automotive specifications:

- GL-4 @ 1.80–2.00% treat rate
- GL-5 @ 3.80–4.00% treat rate

Industrial specifications:

- DIN 51517-3 @ 1.80% treat rate
- ISO 12925-1 (L-CKD, enclosed gears) @ 2.00% treat rate

Benefits:

- Cost-effective package due to its competitive dosage, flexible nature and outstanding long-life performance
- Excellent friction coefficient and micro-pitting test results
- Strong water demulsibility/separability, key for industrial applications
- Clearly passes the former CRC L-60-1/-42/-37 tests, among others
- Great antioxidation properties and seal test outcome (as per DIN 51517-3)
- Unique sulphur/phosphorus-based technology, resulting in clear, low-odour gear oils

You'll find details on the extreme-pressure variant **Petrolad® 336EP** on our website:
www.brb-international.com/lac

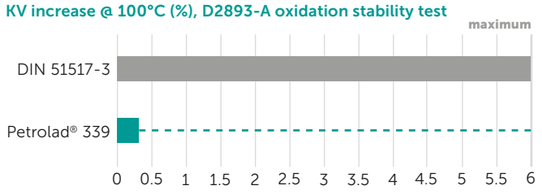
Petrolad® 339

Premium multi-purpose gear oil additive package

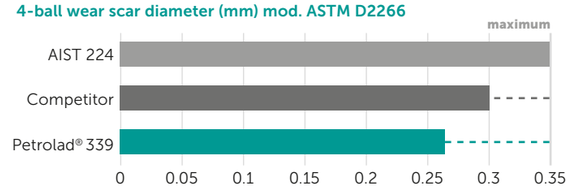
Automotive and industrial solution with an economical treat rate

The premium gear oil additive package delivers outstanding results in automotive and industrial gearboxes. Claimed at GL-5 with a 4.0% w/w dosage in mineral base oil, Petrolad® 339 simultaneously meets GL-4. The package passes the FE-8, FVA-54 and Flender foaming tests in a mineral oil-based formulation at low treat rates. It delivers excellent load-carrying capacity, with a fail load stage higher than 14 in the FZG scuffing test. It is compatible with a wide variety of base stocks and requires no dangerous goods classification. Handling and storage are easy.

KV increase @ 100°C (%), D2893-A oxidation stability test



4-ball wear scar diameter (mm) mod. ASTM D2266



Automotive specifications:

- GL-4 @ 2.00% treat rate
- GL-5 @ 4.00% treat rate

Industrial specifications:*

- DIN 51517-3 @ 1.80% treat rate
- AGMA 9005-F16 (AS) @ 1.80% treat rate

*Assessed in specific tests, detailed in the product data sheet

Benefits:

- Outstanding corrosion/oxidation inhibition
- Passes the Flender foaming tests in a mineral oil-based formulation
- Excellent clean gear characteristics, such as water separability and oxidation stability for prevention of costly industrial gearbox contamination
- Superior extreme pressure performance at competitive treat rates
- Flexibility and savings for producers of both automotive and industrial gear oils in different base stocks
- A low-odour solution, not classified as dangerous goods, for easier handling and storage

Petrolad® 133LS

Limited slip (LS) differential axle performance booster

An additive booster intended to work together with the main package in an automotive gear oil blend to meet selected axle performance requirements of limited slip (LS) differentials, particularly friction reduction. This product is suitable for use in various mineral and (semi-)synthetic finished formulations.

Benefits:

- Excellent contribution towards friction reduction in SAE 75W-90 and 80W-90 gear oil blends
- A competitive treat rate, leading to a highly favourable net treat cost (NTC)
- No noticeable precipitation either with the individual booster or at the finished fluid level
- Great compatibility with our Petrolad® 339 gear oil additive package

Petrolad® 750

ATF additive package

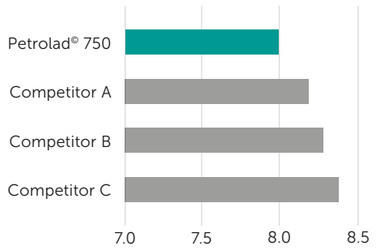
ATF additive package with an economical treat rate

The automatic transmission fluid (ATF) additive package Petrolad® 750 is the result of our decades of experience in ATF formulations. It delivers performance matching or even exceeding many known competing solutions at lower dosage. Blenders can achieve an exceptionally favourable net treat cost (NTC), while at the same time surpassing performance-level demands for Dexron IIIH (GM) and TES-389 (Allison). The package is also suitable for various other specifications and applications, including power steering fluids.

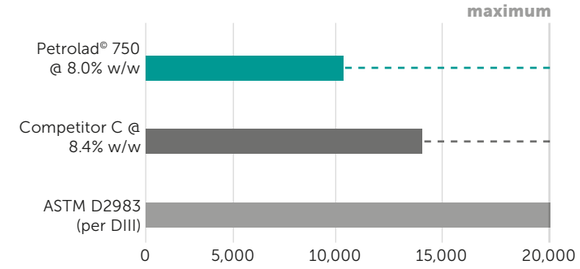
Benefits:

- Cost-effective and reliable
- Outstanding seal compatibility, e.g. with polyacrylate nitrile
- Exceptional 192-hour oxidation control and 3-hour copper results
- Excellent low-temperature properties
- Global coverage of specs and needs of leading transmission fluid types
- Suitable for GR I, II and III base oil blends

Efficiency superiority (% w/w) @ Dexron IIIH specification



Brookfield Viscosity @ -40°C; GR II ATF blend results (cP)



Petrolad® 1846

Multi-purpose, ashless hydraulic oil additive package

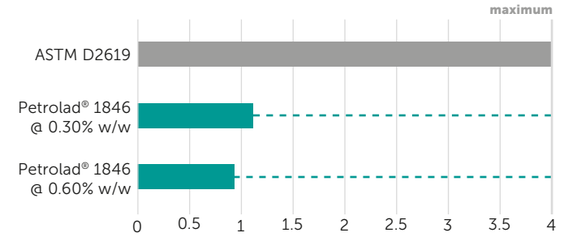
For synthetic and mineral-based hydraulic fluids

The additive is specially designed for ashless hydraulic fluids, compressor fluids and other industrial oils.
A single-source, highly versatile package that offers significant cost savings. Thanks to outstanding corrosion protection, good filterability, demulsification and excellent anti-wear properties, it helps extend fluid and equipment service life. It features low treat rates and offers exceptionally high oxidation stability. With appropriate base oil types and quantities, Petrolad® 1846 enables biodegradable hydraulic oil formulations (see product data sheet).

Specifications:

- Hydraulic: DIN 51524 Part 1 (R&O) @ 0.30% treat rate
- Turbine: AIST 120 @ 0.30% treat rate
- Compressor: DP 6521 @ 0.30% treat rate
- Gear: DIN 51517 Part 2 @ 0.30% treat rate

Hydrolytic stability: acidity of water layer (mg KOH/25g), GR III BO, ISO VG 32



Benefits:

- Outstanding anti-wear (AW) results
- Minimised hydraulic system contamination
- Cost savings and reduced environmental impact thanks to low treat rate
- Good steel and copper protection
- Excellent filterability
- Extended fluid and equipment life

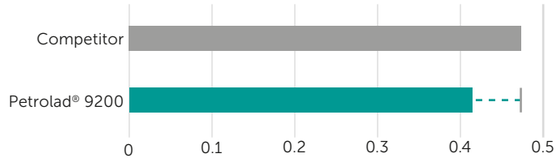
Petrolad® 9200

Multi-purpose engine oil additive package

Versatility and cost-effectiveness

The multi-purpose engine oil additive package is designed for cost-effective and reliable petrol and diesel passenger-car lubricants as well as heavy-duty diesel oils using a cascade technology. Suitable for vehicles not requiring API certification. It is also suitable for motorcycle oils meeting JASO T903:2016 specifications. The solution delivers excellent wear and rust protection, deposit control and antioxidation in engines without booster packages. Thanks to optimised performance on a cascade basis and coverage of multiple key application segments for versatile lubricant manufacturers and blenders, the package offers outstanding cost-effectiveness. It also shows strong results as per various requirements of 10W-40 and 10W-30 engine oil blends.

4-ball wear scar diameter (mm) in 10W-40, ASTM D4172



JASO T903:2016 specification	Test limits	10W-30 results	10W-40 results
Dynamic friction index (DFI)	1.50–2.50	1.94	1.95
Static friction index (SFI)	1.60–2.50	1.77	1.69
Stop time index (STI)	1.60–2.50	1.95	1.92

Passenger car specifications (multi-/mono-grade):

- SL/CF @ 6.00% treat rate, SJ/CF-4 @ 5.75% treat rate, SJ/CF @ 4.50% treat rate, among others (cascade basis)

Motorcycle specifications:

- JASO MA2 T903:2016

Benefits:

- Excellent wear and rust protection, deposit control and antioxidation
- Cost savings thanks to optimised performance on a cascade basis and versatility
- Strong results regarding requirements for 10W-40 and 10W-30 engine oils

Petrolad® 8830

Heavy-duty engine oil additive package for CI-4

Heavy-duty engine solution with a cost-effective treat rate

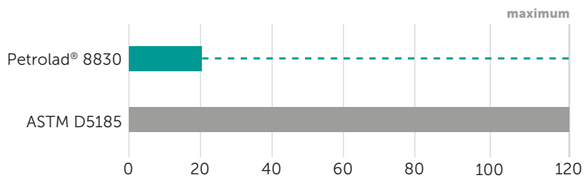
A top-tier additive package designed to fulfill the CI-4 performance needs of diesel engine oils, rendering API certification unnecessary. It offers highly competitive treat rates tailored to various 15W-XX and 10W-XX viscosity grades, to meet the demands of contemporary, efficient trucks. This versatile product seamlessly integrates with a variety of mineral and synthetic blends, demonstrating exceptional results, particularly in GR II/III base stocks across diverse global regions.

Available in certain regions only. Please contact your local salesperson.

Dosage (% w/w)*	API specification		
Viscosity grade	CI-4	CH-4	CF-4
SAE 5W-30	9.6	–	–
SAE 5W-40	9.6	–	–
SAE 10W-30	9.6	8.6	6.2
SAE 10W-40	9.6	8.6	6.2
SAE 15W-30	8.8	8.0	5.8
SAE 15W-40	8.8	8.0	5.8

* The above table shows the key performance levels.
Please contact our technical service for more profiles.

High-Temperature Corrosion Bench Test (HTCBT) Pb Conc. Change (mg/kg), GR II 15W-40 CI-Blend



Benefits:

- Optimised costs due to its low treat rate(s) and simultaneous performance coverage of other heavy-duty API specs, making it a single-source solution for versatile engine oil blenders
- Aimed at prolonging the drain intervals of engine oils found in heavy-duty vehicles beyond their warranty periods
- Outstanding anti-wear and antioxidation results, significant deposit control and minimal foaming

Petrolad® 9330

Light-duty engine oil additive package for SN performance level

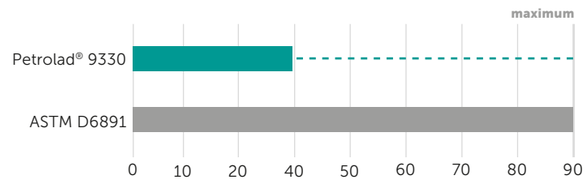
Advanced formulation for improved engine performance and durability

An exceptional additive package targeted to exceed the SN performance demands of gasoline engine oils, eliminating the necessity for API certification. It has competitive treat rates in diverse 5W-XX and 0W-XX viscosity grades, essential for peak performance in modern passenger vehicles. This adaptable product seamlessly integrates into both mineral and synthetic blends, delivering outstanding outcomes, particularly in GR II/III base stocks spanning various global geographies.

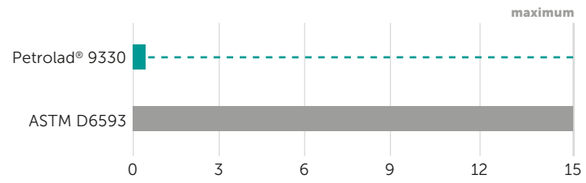
Available in certain regions only. Please contact your local salesperson.

Dosage (% w/w)*	API specification		
Viscosity grade	SN	SM	SL
SAE 0W-20	8.5	–	–
SAE 0W-30	8.5	–	–
SAE 5W-30	7.6	7.3	–
SAE 5W-40	7.6	–	–
SAE 10W-30	–	7.3	–
SAE 10W-40	–	–	7.0
SAE 15W-40	–	7.3	–

Seq. IVA Engine Test: Valve System Average Cam Wear (microns) of GR III 5W-30 SN Blend



Seq. IVA Engine Test: Oil Screen Sludge (%) of GR III 5W-30 SN Blend



Benefits:

- Optimised costs due to its low treat rate(s) and simultaneous performance coverage of other light-duty API specs, making it a single-source solution for versatile engine oil blenders
- Outstanding anti-wear and antioxidation results, significant deposit control and minimal foaming

Petrolad® 9430

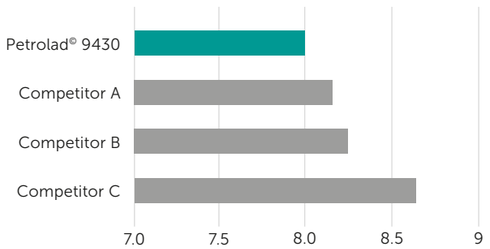
Light-duty engine oil additive package

Versatility at the SP performance level

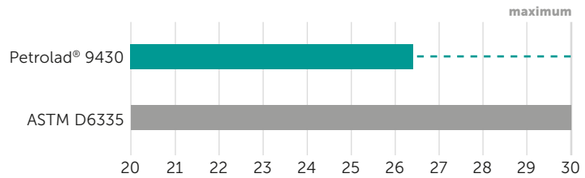
A high-quality additive package, specifically designed to meet the SP performance requirements of gasoline engine oils where no API certification is needed. It offers one competitive treat rate across the entire relevant viscosity grade range in modern passenger cars, making it ideal for versatile blenders. The product is suitable for various mineral and synthetic formulations, and exhibits particularly great results in GR III-based blends.

Available in certain regions only. Please contact your local salesperson.

Competitive SP dosage (% w/w) @ SAE 5W-30



TEOST 33C high-temperature deposit mass (mg) of GR III SW-30 SP blend



Benefits:

- Optimised costs due to its low, uniform treat rate across all covered viscosity grades
- Excellent fuel economy and deposit/filterability performance contribution to the finished engine oil
- Great antioxidation/rust results and minimal foaming

Petrolad® 5101

Universal tractor transmission oil additive package

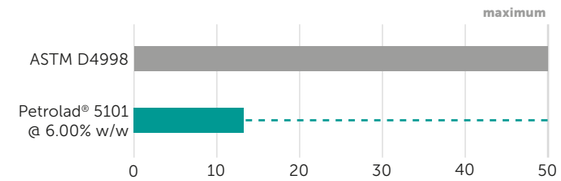
Universal off-road performance

The off-road additive package, designed for universal tractor transmission oil (UTTO) fluids, is suitable for transmissions, power steering and hydraulic systems. It meets the needs of traditional vehicles in the largest tractor markets worldwide and is also used in non-agricultural applications with wet brakes, powershift transmissions and hydraulics. The package is proven to work in various base oil formulations with especially favourable qualities in GR II blends, providing economical treat rates. Its outstanding features include superior friction control and minimal foaming, excellent anti-wear properties and protection of drive gears without damage to soft yellow metals in hydraulic pumps. It also provides antioxidation and copper corrosion prevention in axial piston hydraulic pumps. Additionally, it eliminates chatter in wet brakes and reduces operator fatigue.

Specifications:

- John Deere J20C/J20D @ 6.00% treat rate
- Case New Holland MAT 3505, 3525/3526 @ 6.00% treat rate
- Massey Ferguson CMS M1135/41/43/45 @ 6.00% treat rate

FZG low-speed tractor gear wear: mass loss (mg) GR II BO formulation



Benefits:

- Superior friction control and minimal foaming
- Outstanding (low-speed) anti-wear qualities to protect the final drive gears, without damaging the soft yellow metals in many hydraulic pumps
- Oxidation and copper corrosion prevention in axial piston hydraulic pumps
- Eliminated chatter in wet brakes and reduced operator fatigue
- Economical treat rate, especially with the wide spec coverage, making it a desirable offering for cost-conscious customers

Petrolad® 5201

Super tractor oil universal additive package

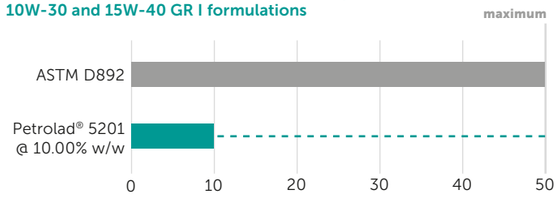
Designed for the global tractor market

The universal off-road additive package is designed specifically for super tractor oil universal (STOU) applications for traditional tractor equipment common in global markets. It is suitable for crankcases, transmissions, power steering and hydraulic systems. The solution also covers several universal tractor transmission oil (UTTO) specifications, making it a flexible package ideal for blenders seeking cost-effective solutions. Its outstanding features include boosted soot control for reduced viscosity increase, superior anti-wear results for limited pitting and scoring in final drives and excellent friction performance in transmission clutches. It offers favourable 10W-30 and 15W-40 outcomes in GR I STOU formulations.

Specifications:

- ZF TE ML 06/A/B/C/D, 07B (STOU) @ 10.00% w/w treat rate
- John Deere J27 (STOU) @ 10.00% w/w treat rate
- Caterpillar TO-2, MIL-L-2104D (UTTO) @ 10.00% w/w treat rate

Foaming volume (ml) @ end of 5-minute blowing period, ASTM D892 foaming tendency sequence II @ 93°C, 10W-30 and 15W-40 GR I formulations



Benefits:

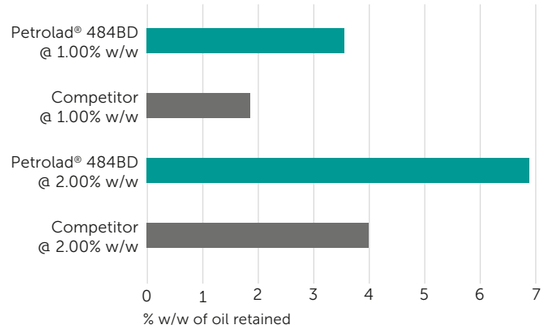
- Boosted soot control for a reduced viscosity increase
- Superior anti-wear results, leading to limited pitting and scoring in final drives
- Excellent friction performance in transmission clutches
- Desirable 10W-30 and 15W-40 results in GR I STOU formulations

Petrolad® 484BD

Biodegradable tackifier additive

The efficient, biodegradable tackifier additive is specifically formulated to dissolve easily in natural vegetable oils. It can be used for various applications, including steel cable and chain lubricants, rust protection, chainsaw and slideway lubricants, rock-drilling oils, rail curve and other greases, sealants and anti-misting agents for neat metalworking fluids.

Cling test results for biodegradable tackifier additive based on rapeseed oil in Brookfield viscometer no. 1 set-up



Benefits:

- Quickly and easily dissolves in natural vegetable oils, including rapeseed oil and synthetic esters
- All components are biodegradable (90% by OECD 301B)
- Petrolad® 484BD is FDA-approved
- Equips biodegradable vegetable oils with superior tackifying properties
- Typically used at a treat rate of 1.00–3.00% w/w

Petrolad® 484FT and 485FT

Tackifier additives

Efficiency and easy handling

Two extremely efficient, easy-to-handle tackifier additives specifically formulated for mineral oil-based lubricants for various applications like chain lubricants, rust protection, chainsaw and slideway lubricants, rock-drilling oils, rail curve greases, sealants and anti-misting agents for neat metalworking fluids. Petrolad® 484FT is characterised by low viscosity for easy handling, while Petrolad® 485FT is a concentrated tacky resin solution. It is a clear liquid even at low temperatures (>5°C) and can be easily dissolved in a large range of base oils.

Benefits:

- Significantly more efficient than known competitor products, enabling equivalent tackiness at lower treat rates
- Low viscosity for easy handling (484FT)
- Quickly and easily dissolves in mineral oil lubricant formulations. It is soluble in paraffinic and naphthenic oils, PAOs, polyisobutylenes and some esters, e.g. trimellitates, and ditridecyl adipate (DTDA)
- Excellent properties relating to clingability and stringiness
- Can typically be used at a treat rate of 0.25–1.00% w/w (Petrolad® 484FT) and 0.15–1.00% w/w (Petrolad® 485FT)

Abbreviations

BO = base oil
CCS = cold-cranking simulator
EP = extreme pressure
FM = friction modifier
HTHS = high-temperature, high-shear
KV = kinematic viscosity
PPD = pour point depressant
RR = re-refined
SSI = shear stability index
TE = thickening efficiency
TR = treat rate (referring to additive dosages)
VG = viscosity grade
VI = viscosity index
VIRG = virgin

Product overview [1]

Petrolad®

Engine oil additives	
Passenger car motor oils (PCMO) and heavy-duty diesel oils (HDDO)	Petrolad® 8770
	Petrolad® 8771SC
	Petrolad® 8830
Passenger car motor oils (PCMO)	Petrolad® 9200
	Petrolad® 9330
	Petrolad® 9430

Driveline additives	
Gear oil	Petrolad® 336
	Petrolad® 336EP
	Petrolad® 339
	Petrolad® 133LS
Automatic transmission fluids (ATF)	Petrolad® 750
	Petrolad® 751

Off-road	
Universal tractor transmission oil (UTTO)	Petrolad® 5101
Super tractor universal (STOU)	Petrolad® 5201

Hydraulic additives	
Ashless	Petrolad® 1846
Zinc-containing	Petrolad® 9530
	Petrolad® 9533

Sulphonates	
Overbased calcium sulphonate detergent	Petrolad® 6779(A)

Coolants	
	Petrolad® 3550
	BRB Long-life coolant

Tackifier additives	
	Petrolad® 484FT
	Petrolad® 485FT

Viscotech®

	Type	Base oil group	Product	KV100 (cSt)	SSI	Applications
Olefin copolymer (OCP) types	Solid		Viscotech® 6540	–	22	Automotive
			Viscotech® 6640	–	25	Automotive
			Viscotech® 6545	–	35	Automotive
			Viscotech® 6550	–	52	Grease
			Viscotech® 6073	–	70	Chain oils
	Liquid in GR II virgin base oils		Viscotech® 6540L	1000, 1300	22	Automotive
			Viscotech® 6540LP	1000, 1100, 1300	22	Automotive
			Viscotech® 6545L	1200	25	Automotive
	Liquid in GR I re-refined base oils		Viscotech® 6540LR	1300	22	Automotive
			Viscotech® 6640LR	1200	25	Automotive
			Viscotech® 6073LR	1200	70	Chain oils
Styrenic types	Solid		Viscotech® 483	–	10	Grease
			Viscotech® 593	–	8	Grease, Automotive
	Liquid in virgin base oils	II	Viscotech® 483L	8.0[2]	10	Grease, Automotive
		III	Viscotech® 494L	9.0[2]	7	Automotive
		III	Viscotech® 494LD	8.5[2]	7	Automotive
		II	Viscotech® 593L	1300	8	Grease, Automotive
		III	Viscotech® 595L	1200	8	Automotive
		II	Viscotech® 533L	1400, 1600	3	Automotive, Hydraulic
		III	Viscotech® 535L	1200	3	Automotive, Hydraulic
		IV	Viscotech® 536L	1300	3	Automotive
New technology	Liquid in virgin base oils	II	Viscotech® 451L	9.0[2]	7	Hydraulic
		III	Viscotech® 431L	8.0[2]	10	Gears

1 Please note that this is an excerpt only. To find out more, visit our website www.brb-international.com/lac
2 At 10% dilution in a GR II BO

A Subsidiary of PETRONAS Chemicals Group

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