



Product Data

Optigear Synthetic PD...ES Range

High Performance Synthetic Gear Oil

Description

Castrol Optigear™ Synthetic PD...ES Range is based on synthetic hydrocarbons (PAO) with Castrol's advanced gear oil system which gives special plastic deformation (PD) and surface improvement performance. The additive package, when activated by high specific loads and corresponding temperatures, helps to equalize surface roughness without creating abrasion leading to the surface improvement (plastic deformation).

Optigear Synthetic PD...ES is a CLP-HC gear oil (according to DIN 51502) and exceeds the minimum requirements according to DIN 51517, part 3, CLP gear oils and is formulated with detergent type additives.

Optigear Synthetic PD...ES is classified as follows :

- DIN 51517-3 for CLP gear oils
- DIN 51517-4 for C LPX gear oils

Optigear Synthetic PD 150 ES to PD 460 ES gear oils are approved by Flender (Flender gear units - Listing T 7300, Rev. 16, formerly Siemens Mechanical Drives).

Application

Castrol Optigear Synthetic PD...ES may be used in spur gear, bevel gears or planetary gear units and in heavy loaded gear units. It is also suitable for the lubrication of oil-lubricated rolling bearings. It is especially designed to reduce friction losses and can reduce energy consumption compared to more conventional lubricants. The lower friction observed with Optigear Synthetic PD...ES means less stress in the contact point subsurface area, which means lower risk for pittings and micropittings.

Being synthetic based it will also withstand higher temperatures and provide extended life. Depending on the specific application, Optigear Synthetic PD...ES may be used in an operating temperature range from -40°C to +100°C, and up to +120°C for short periods. (Note the lower operating temperature is dependent on the pour point).

The beneficial effects of the special PD additives contained in Optigear Synthetic PD...ES will be reduced if mixed with other lubricants. If mixing with other oils cannot be avoided, contact our local technical support team for advice on compatibility (as a guide at least <5% of other oils is preferred). Optigear Synthetic PD...ES is compatible with most commonly used elastomer seal materials.

Advantages

- High load carrying capacity
- Very low friction coefficient and frictional torque
- Superior micropitting protection
- Surface smoothing effect
- Excellent bearing lubrication suitability
- Good filtration properties
- Long life lubricant

Typical Characteristics

Name	Method	Units	PD 68 ES	PD 100 ES	PD 150 ES	PD 220 ES	PD 320 ES	PD 460 ES	PD 680 ES
Appearance	Visual	-	Clear & Bright	Clear & Bright	Clear & Bright	Clear & Bright	Clear & Bright	Clear & Bright	Clear & Bright
ISO Viscosity Grade	-	-	68	100	150	220	320	460	680
Density @ 15°C / 59°F	ISO 12185 / ASTM D4052	kg/m³	846	849	851	853	855	858	860
Kinematic Viscosity @ 40°C / 104°F	ISO 3104 / ASTM D445	mm²/s	71.5	105	158	230	330	460	670
Kinematic Viscosity @ 100°C / 212°F	ISO 3104 / ASTM D445	mm²/s	11.3	15.7	22.1	30.2	40.7	50.5	64.2
Viscosity Index	ISO 2909 / ASTM D2270	-	151	159	167	172	177	172	167
Flash Point - open cup method	ISO 2592 / ASTM D92	°C °F	>250 >482	>250 >482	>250 >482	>250 >482	>250 >482	>250 >482	>250 >482
Copper corrosion (3 h @ 100°C/212°F)	ISO 2160 / ASTM D130	Rating	1	1	1	1	1	1	1
Rust test - synthetic seawater (24 h)	ISO 7120 / ASTM D665B	Rating	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Foam, Sequences I/ II/III tendency / stability	ISO 6247 / ASTM D892	ml/ml	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Pour Point	ISO 3016 / ASTM D97	°C °F	-51 -60	-51 -60	-51 -60	-48 -54	-45 -49	-42 -44	-36 -33

Name	Method	Units	PD 68 ES	PD 100 ES	PD 150 ES	PD 220 ES	PD 320 ES	PD 460 ES	PD 680 ES
Oxidation Stability (312 hrs @ 121°C)	ISO 4263-4 / ASTM D2893	Viscosity increase @ 100°C (%)	0.8	0.8	0.9	1.0	1.0	1.5	3.5
Elastomer Compatibility - with NBR 28, 168 hours @100°C	ISO 1817	-	Pass	Pass	Pass	Pass	Pass	Pass	Pass
FZG Gear Scuffing test A/8.3/90	ISO 14635-1	Failure Load Stage	>12	>12*	>12	>14	>14	>14*	>14*
FZG Micropitting test @ 60°C/ 140°F	FVA 54-7 / DIN 3990-16	Failure Load Stage					>10	>10*	>10*
	FVA 54-7	Micropitting Rating					High	High*	High*
	DIN 3990-16	Micropitting Rating					Very High	Very High*	Very High*
FZG Micropitting test @ 90°C/194°F	FVA 54-7 / DIN 3990-16	Failure Load Stage	-	-	>10	>10*	>10*	>10*	>10*
	FVA 54-7	Micropitting Rating			High	High*	High*	High*	High*
	DIN 3990-16	Micropitting Rating			Very High	Very High*	Very High*	Very High*	Very High*
FE8 Bearing Wear test (F.562831.01-7.5/ 80-80)	DIN 51819-3	Roller wear (Mw ₅₀), mg	<5	<5*	<5	<5*	<5*	<5*	<5*

Subject to usual manufacturing tolerances. *Read across from lower viscosity.

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