

## Product Data

# Castrol Optigear<sup>®</sup> BM

**Castrol Optigear BM**- solid-free gear oils for extremely high pressures containing a newly developed additive combination. Designed to reduce wear caused by surface fatigue, pitting, spalling, scuffing, scoring or irregularities during running-in period also where conventional EP gear oils or oils with solid lubricants fail.

**MICROFLUX TRANS<sup>®</sup>** (**TRANS=TRiple Action Non-sacrificial Surface engineering**) improves friction surfaces to an extent not possible with normal machining processes and conventional EP lubricants. In a tribological system the polarized **MICROFLUX TRANS** additives instantaneously create a passive film on friction surfaces before friction occurs. At a given load level, the **MICROFLUX TRANS** additives release compounds forming a resistant protective layer on friction surfaces. Under severe load, components of the **MICROFLUX TRANS** additive combination are activated and diffuse into the surfaces initiating an improvement of their friction characteristics through plastic deformation. The organic reaction products become a component of the tribopolymer system. Unlike the case with conventional lubricants, the tribopolymers formed by **MICROFLUX TRANS** are long-chained compounds with excellent lubricity and adhesion. The load carrying area is improved, a hydrodynamic lubrication film is easier to maintain. This unique physio-chemical reaction is **CASTROL** surface engineering and achieves a non-sacrificial micro-smoothing of the friction surfaces. The **MICROFLUX TRANS** additive technology provides optimum wear protection and an extremely low coefficient of friction even under extremes of pressure, vibration, shock loads, at high or low speeds or varying operational conditions.

### Advantages

- shortens running-in periods and allows running-in of lubrication surfaces under full load from the start
- outstanding load carrying capacity
- optimum wear protection in high load range
- excellent anti-wear properties
- smoothing of existing pitting
- surface improvement to an extent not possible before
- increase of supporting surfaces and load carrying capacity (70 - 80% after initial run-in)
- reduction of noise levels
- extreme long oil drain intervals
- low foaming tendency

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- extremely low coefficient of friction resulting in energy savings
- compatible with nonferrous metal
- compatible with paints and conventional seal materials
- excellent corrosion protection
- exceeds AGMA specifications 250.04 for EP gear oils

### Usage

In all types of industrial gears, especially operating under extremely heavy loads, even where conventional EP oils fail:

- gears exposed to high sliding friction and high Hertzian surface pressures up to 2000 N/mm<sup>2</sup> (elevators, rolling mills, belt conveyors, extruders, vibrating equipment, crushers, high speed looms, rear axles, separators)
- heavily loaded worm gears (improvement of efficiency)
- eccentrics, cam shafts, planetary gears
- variable speed drives (PIV) with foam-locking
- hypoid gears (API-GL5/GL6)

In all types of bearings, especially for spherical roller bearings, full complement cylindrical roller bearings, thrust bearings

For sealed gear couplings

Cost-benefit offered by MICROFLUX TRANS additive technology

- extended lifetime of machine elements and wear parts, lower maintenance and labor costs by minimized wear and friction
- full load operation within shortest time, virtually eliminating the running-in period
- lower costs for lubricants and waste oil disposal because of significant extensions of both service life and relubrication intervals
- energy savings due to reduced coefficient of friction, lower temperature of lubricant and component, improvement in operating efficiency
- product consolidation, i.e. simplification and reduction of lubes and spare parts
- reduction of noise resulting from high frequency stick-slip
- for "life" lubrication in some applications

### Application

Viscosity recommended by equipment manufacturers must be followed. Miscible with all unleaded gear oils based on mineral oils.

Maximum performance only if applied unmixed.

**Castrol Optigear BM** oils can be filtered in all common filter systems and separators due to their homogeneous, oil soluble additives.

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Attention: Do not use for synchronized gears and for self-locking differential gears

**MICROFLUX TRANS®** registered trade mark of a patented Castrol additive combination for performing surface engineering in tribological systems.

### Typical Characteristics

	Unit	22	100	150	220	320	460	680	1000	3000
Color	-	brown								
ISO viscosity group		22	100	150	220	320	460	680	1000	3000
AGMA		-	3 EP	4 EP	5 EP	6 EP	-	-	-	-
Density @ 15°C/59°F	g/cm <sup>3</sup>	0.890	0.901	0.904	0.910	0.917	0.920	0.930	0.927	0.918
Dyn.viscosity @ 40°C/104°F	mPa.s	19.5	89.2	142	198.3	293.4	422.3	623	927	2750
Kin.viscosity, @ 40°C/104°F	mm <sup>2</sup> /s	21.9	101	157	218	320	459	670	1000	3000
Kin.viscosity, @ 100°C/212°F	mm <sup>2</sup> /s	4.35	11.4	15.0	18.8	24.3	30.6	37.8	50.0	122.0
Viscosity index	VI	106	99	95	97	97	96	94	95	117
Flash Point	°C	<b>165</b>	<b>224</b>	<b>226</b>	<b>232</b>	<b>236</b>	<b>236</b>	<b>238</b>	<b>260</b>	<b>260</b>
	°F	329	435.2	438.8	449.6	456.8	456.8	460.4	500	500
Pour Point	°C	<b>-34</b>	<b>-24</b>	<b>-18</b>	<b>-16</b>	<b>-15</b>	<b>-12</b>	<b>-9</b>	<b>-9</b>	<b>0</b>
	°F	-29.2	-11.2	-0.4	+3.2	+5.0	+10.4	+15.8	+15.8	+32
Copper corrosion 48h/100°C/212°F	-	A1								
SRV® test run Test mode 5 ae(2h, 300N, 50°C/122°F/ball/area)										
Friction coefficient	μ (min)	0.035	0.030	0.030	0.030	0.025	0.025	0.025	0.025	0.025
Friction coefficient(running in period)	μ (max)	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
<b>Wear</b>	mm	<b>0.85</b>								
a) ball/scar Ø	μm	<b>0.8</b>								
b) profile depth Pt										
Lubrimeter test run	mg	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
Test mode Ms abrasion										
Friction coefficient μ(5')	-	0.042	0.040	0.040	0.040	0.035	0.035	0.035	0.035	0.035



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### Typical Characteristics *(continued)*

Friction coefficient $\mu(60')$	-	0.040	0.038	0.038	0.038	0.034	0.034	0.034	0.034	0.034
Wear scar depth	$\mu\text{m}$	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Load carrying capacity	%	98	98	98	98	98	98	98	98	98
FZG Boundary lubrication A/8, 3/90	Damage load stage mg/	>12	>12	>12	>12	>12	>12	>12	>12	>12
Specific weight change	kWh	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27
Seal compatibility Volume change	%	+1	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5
Shore hardness	Shore	0	+3	+3	+3	+3	+3	+3	+3	+3

Subject to usual manufacturing tolerances.

All reasonable care has been taken to ensure that this information is accurate as of the date of printing. Nevertheless, such information may be affected by changes in the blend formulation occurring subsequent to the date of printing. Material Safety Data Sheets are available for all Castrol products. The MSDS must be consulted for appropriate information regarding storage, safe handling and disposal of a product.