

TOTAL STAR CONCEPT

Lubrication solution engineered to maximize
costs savings for your construction machinery fleet



TOTAL

Committed to Better Energy



lubricants.total.com

WHAT IS ★ TOTAL STAR CONCEPT ?

"Total Lubrifiants" product development team had conducted intensive researches and field tests in order to achieve the targeted severe duty performance, extended service capability and simplicity in use without a compromise on a technical performance. That is how the **TOTAL STAR CONCEPT** was born.

The first generation of TOTAL STAR CONCEPT was introduced to the market in the year 2000. Since that time the Concept was constantly evolving, taking into account the feedback of the numerous customers all over the world. In the late 2018 the new generation of the TOTAL STAR CONCEPT was introduced, answering the latest international and manufacturers specifications. Today, TOTAL STAR CONCEPT is efficiently used by a small and a medium-sized construction companies, as well as the major international players, helping them to rationalize the lubrication process.

The Star Concept consists of only two products with self-adaptive formulations and a special additive to be used in some particular applications. Our patented offer covers about 95% of needs in lubricants for the construction machinery*.

★ TOTAL STAR MAX FE 10W-30



TOTAL STAR MAX FE 10W-30 is a very high performance lubricant specially developed for the lubrication of the most recent models of engines, gear boxes and hydraulic circuits of construction and mining machinery of the world's leading manufacturers. It is formulated using synthetic base stocks to achieve the stringent performance requirements, complying with the latest API CK-4 classification and has been specifically developed to address the severe duty operating conditions found in off-highway applications. The reinforced synthetic base stocks and patented self-adaptive formulation makes the product one of the best in class and guarantees the highest performance for each type of application.

★ TOTAL STAR TRANS 80W-110



TOTAL STAR TRANS 80W-110 is a premium heavy duty lubricant, designed for lubrication of highly loaded hypoid axles and final drives, conventional or limited slip self-locking disc differentials, all types of gear boxes (with mechanical or synchronized shifting) and oil immersed braking systems. Due to the modified base oils its "extreme-pressure" properties provide more protection and wear resistance under load, shocks and high temperatures. The product satisfies the latest technical requirements of majority of equipment manufacturers and international standards.

★ TOTAL STAR XL



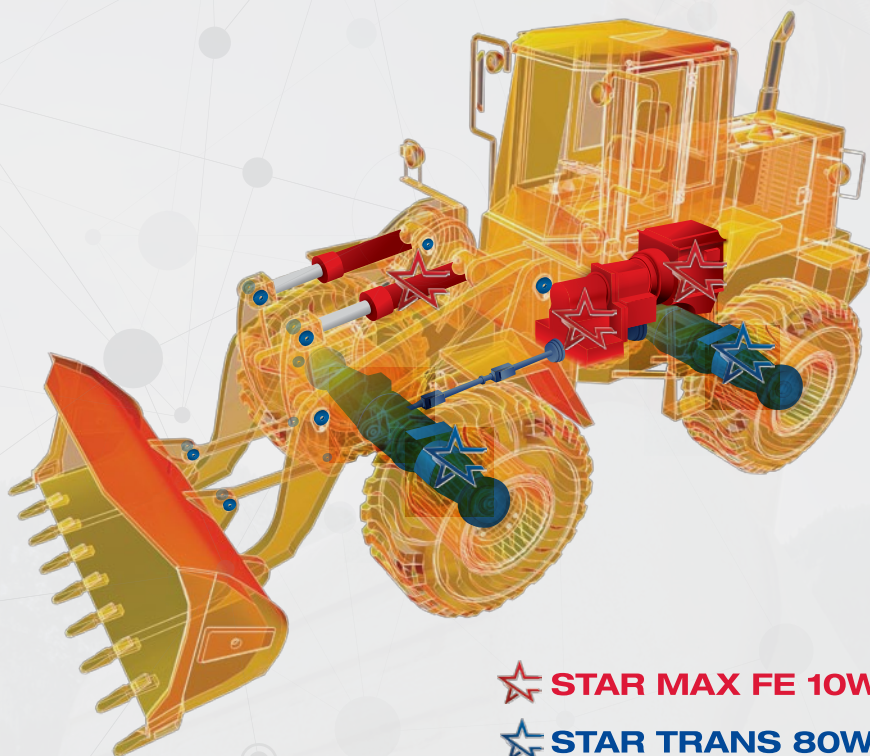
TOTAL STAR XL is a concentrated additive specially developed to maintain the rationalization advantage of the STAR CONCEPT for all machinery types, brands and models without adding several types of lubricants.

* According to the external estimation

ADVANTAGES OF TOTAL STAR CONCEPT : RATIONALIZATION AND SIMPLIFICATION

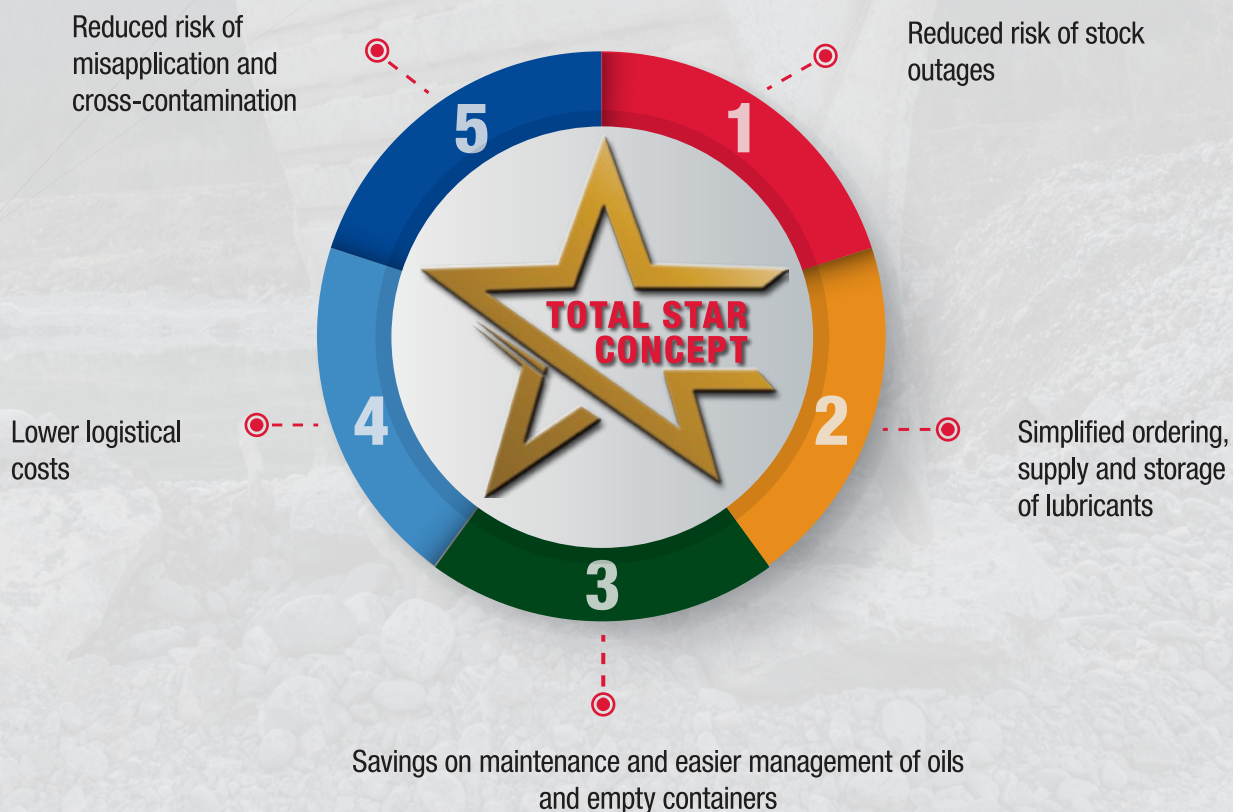
TIME SAVED AND COSTS REDUCED

STAR MAX FE 10W-30 and STAR TRANS 80W-110 cover the whole range of requirements with no concessions when it comes to performance.



★ **STAR MAX FE 10W-30**

★ **STAR TRANS 80W-110**





BEFORE: Multiple products



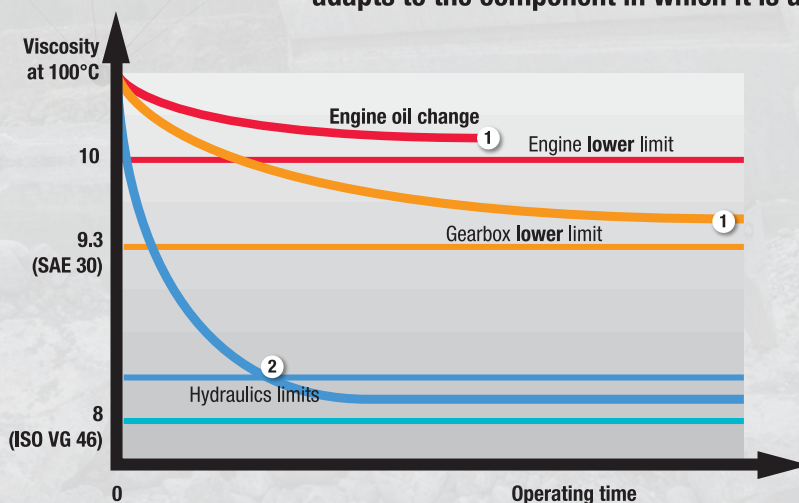
AFTER: Only two (2) STAR CONCEPT products

TOTAL STAR CONCEPT offers a different approach to the lubrication process of construction machinery, significantly reducing the TCO (Total Cost of Ownership). This is possible due to the rationalization of lubricants management, simplification of the on-site service operations and reduction of operational costs related to the unplanned equipment downtime. The unique market offer, with only two products, satisfies the needs in lubrication of 95% of the construction machinery fleet, significantly reduces the risk of misuse and optimizes the warehouse management. Taking into account the Fuel Economy properties of TOTAL STAR CONCEPT products, the overall savings you might achieve can be significantly higher than the pure cost of the products.

HOW DOES IT WORK ? SELF-ADAPTIVE FORMULATION

- Derived from TOTAL Technology Research, **STAR MAX FE** is covered by a PATENTED APPLICATION for its SELF-ADAPTIVE CAPABILITY.
- This unique characteristic enables **STAR MAX FE** to offer high performance in engines, gearboxes and hydraulic systems.

STAR MAX FE 10W-30 viscosity automatically adapts to the component in which it is used



Engine
10W-30
"Stay in grade"

Gearbox
SAE 30

Hydraulics
ISO VG 46

- Performance when used in the engine
- Performance when used in the gearbox
- Performance when used in the hydraulic system

① The viscosity stays within the manufacturer-authorized grade.

② After a short period of operation, ISO VG 46 grade is attained in the hydraulic circuit.

TOTAL STAR CONCEPT : HELPS TO SAVE FUEL AND CONTRIBUTES TO THE CO₂ EMISSION DECREASE

FUEL ECONOMY

3% reduction in fuel consumption*

TOTAL STAR CONCEPT reduces fuel consumption due to the essential characteristics of its two lubricants:

- ✓ Viscosity grades which reduce power losses in the components lubricated components.
- ✓ Components that optimize the friction coefficients responsible for friction losses.



* Mean value measured according to test protocol. Reduction between 2% and 5% according to equipment type, when compared with standard lubricants.

REDUCED CO₂ EMISSIONS

For a typical fleet of 5 machines
(1 excavator, 2 dumpers and 2 loaders)

9,300 litres of fuel saved per year

**25 TONNES OF
CO₂ NOT EMITTED**

Machinery	Use	Average consumption (L/h)	Average annual operating time (h)	Annual consumption (L)	Savings due to the use of STAR CONCEPT (L)	Tonnes of CO ₂ not emitted
Hyd. Excavator 65T	Extraction	45	2,000	90,000	2,700	7.3
Dumper (x2)	Extraction	25	2,000	100,000	3,000	8.1
Loader (x2)	Extraction	30	2,000	120,000	3,600	9.7
TOTAL				310,000	9,300	25.1

LOW SAPS

STAR MAX FE 10W-30 has been specially formulated using Low SAPS technology (Low SAPS = Low Sulphated Ash, Phosphorus and Sulphur).

To comply with new emission standards, equipment manufacturers are installing systems for the post-treatment of exhaust gases (diesel particulate filters, urea injection, catalytic converters, the high ash...) and recommend the use of low-sulphur fuels together with Low SAPS lubricants.

The high ash levels in conventional lubricants can clog and damage such anti-pollution systems. Therefore, the Low SAPS content of **STAR MAX FE 10W-30** promotes trouble-free operation of diesel emission control systems.



SPECIFICATIONS & APPROVALS

STAR MAX FE 10W-30			
	ENGINE OIL	HYDRAULIC CIRCUIT	GEAR BOX
International Specifications	API CK-4/ CJ-4/ CI-4+/ CI-4/ SM/ ACEA E9/ E7/ E5 JASO DH-2 (approved)	ISO VG 46 (after 100 hours service) - HV	API GL-4
Compliant with Manufacturers' Requirements	Meets the requirements: CATERPILLAR: ECF-3/ ECF-2/ ECF-1a CUMMINS: CES 20081/ 86 KOMATSU Approved: MTU: Type 2.1 DEUTZ: DQC III 10-LA VOLVO: VDS-4.5 MB: 228.31 RENAULT: RLD-3 MAN: M3575/ M3275 MACK: EOS-4.5 DETROIT DIESEL DFS 93K222	As a replacement for fluids: JCMA HK 46W (long duration) CATERPILLAR HYDO Advanced 10 CATERPILLAR TO-4 (SAE 10W) KOMATSU HO-46 (HO) CNH MAT3509	As a replacement for fluids: ZF TE ML 07D CATERPILLAR TO-4 (SAE 30) KOMATSU TO-30 ALLISON C4/ TES 439 KOMATSU AXO 80* VOLVO CE WB 101/ 102* * With STAR XL additive (For more information please consult our technical department)

PRODUCT BENEFITS

- 1 STAR MAX FE 10W-30 has approvals or meets the requirements of the majority of the world's leading construction equipment manufacturers and international standards.
 - 2 Low SAPS Technology Lubricant, specially developed for engines both with and without particulate filter.
 - 3 Improves cold temperature performance and provides substantial fuel economy*
 - 4 Maintains the drain intervals recommended by the OEMs.
- * Compared to one standard 15W-40 Engine oil.

STAR TRANS 80W-110	
AXLES / DIFFERENTIALS / WET BRAKES	
International Specifications	API GL-5 LS API GL-4
Compliant with Manufacturers' Requirements	CATERPILLAR CASE KOMATSU VOLVO LIEBHERR... * For more information, please see technical datasheet

PRODUCT BENEFITS

- 1 Meets the technical requirements of the majority of equipment manufacturers and international standards.
- 2 High-technology chemistry for a wide range of applications.
- 3 Exceptional resistance to pressure and shock borne by high-load gearing.
- 4 Friction performance suited to "limited slip disc self-locking differentials"*
- 5 Maintains the drain intervals recommended by the OEMs.

* With STAR XL additive if necessary
(For more information please consult our technical department)

ADDITIONAL SERVICES ENSURING THE LONG LIFE OF YOUR EQUIPMENT

It is highly recommended to use TOTAL STAR CONCEPT products with the additional services that minimize the risk of damage of your equipment and will help you to follow the manufacturers recommendations regarding the drain intervals and a type of lubricants required for each particular machinery model and dedicated country.

TOTAL LUBCONSULT

TOTAL LUBCONSULT is a web tool with a secured access for the management of the Manufacturer recommendations (Machinery model/ Components/ Specifications/ Drain intervals). For more details please contact your local TOTAL technical support team.

TOTAL ANAC

TOTAL ANAC service means establishing a diagnostic assessment of all the mechanical parts (engine, transmission and hydraulic components) of your equipment based on sampling the oil used in operating machinery. The oil analysis is one of the most effective predictive tools to reduce the maintenance costs and ensure reliability of your machinery.



TOTAL ANAC OFF-ROAD AN "EXPERT" DIAGNOSTIC SYSTEM

TOTAL ANAC OFF-ROAD is a tailor-made diagnostic system for engines and transmission components of the construction and mining machinery fleet, based on the scientific interpretation of oil analysis in service. The measured parameters and new advanced interpretation rules allow to have more relevant and personalized diagnosis for each machinery. It is recommended for the systematic monitoring of the lubricant behavior and the wear of the mechanical parts. As a result, this diagnostic tool allows to reduce the maintenance costs of your equipment.

OBJECTIVES

Reduces your operating costs due to equipment repair and downtime. Reinforces the longevity and the reliability of your machinery fleet.

For more information please visit
<http://www.lubricants.total.com/what-is-anac.html>



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