

UNIRICHLUBE TP3601

Ashless Phosphate Ester Extreme-Pressure / Antiwear Additive

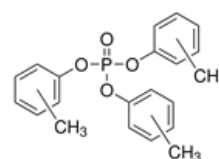
High-purity tricresyl phosphate for load-carrying protection, wear control and formulation flexibility.

PRODUCT OVERVIEW

UNIRICHLUBE TP3601 is a high-purity tricresyl phosphate (TCP) additive designed to provide ashless phosphorus-based antiwear and supplemental extreme-pressure performance in industrial lubricants. Under boundary-lubrication conditions, its phosphate ester chemistry helps form a protective surface film that reduces wear and supports load-carrying capability.

CHEMICAL IDENTITY

Product Name: Tricresyl Phosphate (TCP)
Trade Name: UNIRICHLUBE TP3601
CAS No.: 1330-78-5
Molecular Formula: $C_{21}H_{21}O_4P$ $[(CH_3C_6H_4O)_3PO]$
Molecular Weight: 368.36 g/mol



Representative Chemical Structure

KEY BENEFITS

- Ashless phosphorus chemistry for wear control and load-carrying protection.
- High product purity ($\geq 99.5\%$) with low free phenol (≤ 200 ppm).
- High flash point (> 230 °C) for industrial lubricant formulation and handling.
- Low acid number and controlled moisture support formulation stability and consistency.
- Broad applicability across hydraulic, gear, compressor, circulating-oil and grease formulations.

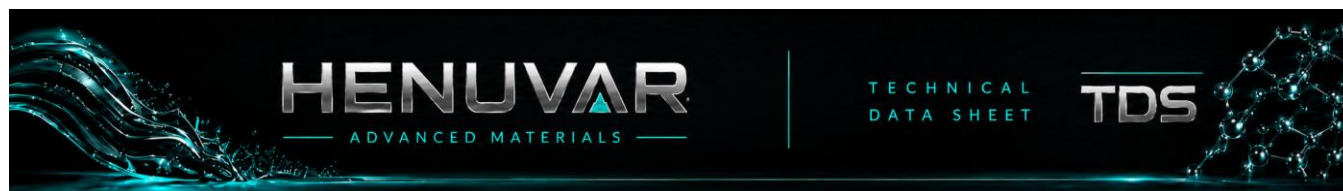
RECOMMENDED TREAT RATE

Typically 0.5–3.0% by mass in the finished lubricant. Begin at the lower end and optimize through finished-fluid testing for the selected base oil, co-additives, target specification and equipment requirements. Performance and compatibility should be verified in the complete formulation.

TYPICAL CHARACTERISTICS

Values shown are typical or internal control values and do not constitute a sales specification unless agreed in writing.

Property	Test Method	Typical / Control Value
Appearance	Visual	Clear liquid, free of visible contamination
Color, APHA	ASTM D1209	≤ 100
Density at 20 °C, g/cm ³	ASTM D4052	1.170
Flash point, °C	ASTM D92	> 230
Kinematic viscosity at 40 °C, mm ² /s	ASTM D445	55–60
Water content, ppm	ASTM D6304	≤ 200
Acid number, mg KOH/g	ASTM D974	≤ 0.1
Phosphorus content, mass %	Internal control	Approx. 8.4
Free phenol (as cresol), ppm	HPLC	≤ 200
Purity, %	HPLC	≥ 99.5



APPLICATION GUIDE

The range below is a formulation starting point, not a guaranteed dosage. Final treat rate must be established through laboratory and field validation of the finished lubricant.

Function	Treat Rate	Typical Applications	Co-additives	Validate
EP/AW additive	0.5–3.0%	Hydraulics; industrial gears; compressors; circulating oils; greases	Selected sulfur EP agents, ZDDP and antioxidants	Wear, load, corrosion, oxidation, seals and deposits

FORMULATION GUIDANCE

- Add to the base oil or partial additive package under moderate agitation and mix until fully homogeneous.
- Evaluate compatibility with sulfur-containing EP agents, ZDDP, metal-containing systems and phenolic or aminic antioxidants.
- Validate wear, load-carrying capacity, corrosion, oxidation stability, hydrolytic stability, seals and deposits in the finished fluid.

PACKAGING

- 230 kg steel drum
- Custom OEM packaging available

STORAGE AND HANDLING

Store in tightly closed original containers indoors or under shelter, protected from moisture, direct sunlight and contamination. If outdoor storage is unavoidable, protect drums from rain and standing water. Do not store above 60 °C; avoid severe cold and large temperature swings. Follow first-in, first-out inventory practice.

HEALTH, SAFETY AND ENVIRONMENT

Tricresyl phosphate requires controlled industrial handling. Consult the current Safety Data Sheet (SDS) before use and observe the specified exposure controls, personal protective equipment, spill response, transport and disposal requirements. Avoid skin contact and release to the environment.

Disclaimer

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