Low Tox® Turbine Oil (6412-6414)

Provides reduced toxicity without reduced performance

LE's Low Tox® Turbine Oil (6412-6414) provides long-lasting performance, equivalent to conventional turbine oils while providing lower toxicity than biodegradable turbine oils. Its advanced technology formulation – with highly refined mineral oil and specially selected additives – offers low toxicity, but it does not sacrifice lubrication performance or necessitate shortening of lubricant change intervals; there is no worry of premature oxidation or failure of the lubricant as there is with most vegetable oil-based products. Low Tox Turbine Oil meets or exceeds OEM requirements for many generators, turbines and governors; it is especially suited for use in hydroelectric facilities and flood control structures requiring lubricants.

Beneficial Qualities

Environmentally Friendly
- Provides up to tenfold reduction in ecotoxicity
- Ensures low toxic effect on aquatic organisms

Premium Long-Lasting Performance
- Provides long-lasting performance, equivalent to conventional turbine oils.
- Resists hydrolysis better than vegetable or synthetic ester-based oils
- Lasts significantly longer than vegetable-based oils
- Exhibits excellent demulsibility
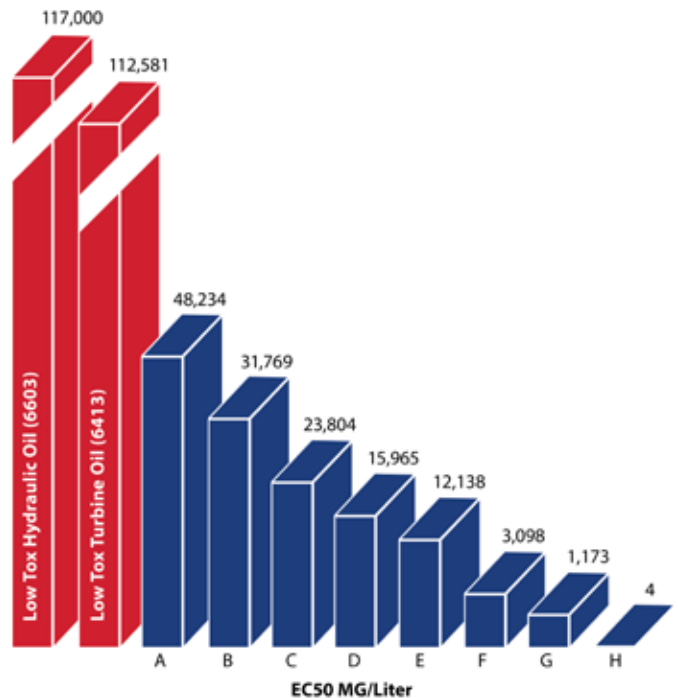- Is compatible with seals

Available Grades
- ISO 46 (6412)
- ISO 68 (6413)
- ISO 100 (6414)

Why Low Toxicity?

One question confronting scientists in environmental risk assessment is whether it is better for a material to be quickly biodegraded and possess relatively high toxicity or be low in toxicity and biodegrade at a slightly slower rate. Lubrication Engineers believes that the latter option provides the best protection of the environment because it minimizes overall impact on the ecosystem.

Microtox Luminescent Bacteria Bioassay Test
Higher EC50 Values Indicate Lower Toxicity

Bar chart (EC50 MG/Liter) with values:
- Low Tox Hydraulic Oil (6603) — A: 117,000
- Low Tox Turbine Oil (6413) — B: 112,581
- C: 48,234
- D: 31,769
- E: 23,804
- F: 15,965
- G: 12,138
- 3,098
- 1,173
- 4

EC 50: Effective concentration measured in milligrams of product per liter of water. Tells you the effective concentration of the product being measured and what quantity it takes to reduce bacterial luminescence metabolic activity by 50%. EC values are applicable to compounds that are not soluble in water, including oils.

LE's Low Tox Hydraulic and Turbine Oils (6603 and 6413) are less toxic to the environment than other conventional and biodegradable products (A-H). A further concern is the toxic effect ont he environment of a lubricant during the time that biodegradation is taking place. LE's Low Tox oils are 55 percent biodegradable in 28 days and have the lowest toxicity of all competitive hydraulic and turbine products, as shown by the test results above.

Low Tox® Turbine Oil

	6412	6413	6414
Color	Straw	Amber	Amber
ISO VG	46	68	100
Relative Density @ 60°F/60°F, ASTM D1298	0.867	0.868	0.873
Viscosity @ 100°C, cSt, ASTM D445	6.910	8.980	11.40
Viscosity @ 40°C, cSt, ASTM D445	45.63	68.58	98.70
Viscosity Index ASTM D2270	95	95	95
Flash Point °C (°F), (COC), ASTM D92	235 (455)	238 (460)	238 (460)
Pour Point °C (°F), ASTM D97	-18 (0)	-15 (+5)	-15 (+5)
Rust Test 4 hrs @ 60°C, Sea H_2O, ASTM D665B	Pass	Pass	Pass
Copper Corrosion 3 hrs @ 100°C, ASTM D130	1a	1a	1a
Oxidation by RPVOT @ 150°C, minutes, ASTM D2272	875	560	560
Acid Number mg KOH/g, ASTM D664	0.06	0.06	0.06
Emulsion Characteristics @ 54°C, oil-water-emulsion/minutes, ASTM D1401	40-40-0/10	40-40-0/20	40-40-0/20
Microtox Bioassay mg/l, EC50	≥100,000	≥100,000	≥100,000
Precipitation Number ASTM D91	0.02	0.02	0.02

Performance Requirements Met or Exceeded
- GE Generators GEH527j
- GE Vertical Waterwheels GE-TPP-77904-1
- Voith Allis Hydro-Hydraulic Turbines
- Woodward Hydraulic Turbine Governors

Typical Applications
- Hydro-turbines
- Generators
- Governors
- Downhole water pumps
- Forestry and logging equipment
- Water and wastewater treatment plants
- Paper mills
- Other applications where low toxicity and minimal environmental impact is desirable.