



CITGO A/W HYDRAULIC OILS

Date 01/10

DESCRIPTION: A/W Hydraulic Oils are superior antiwear hydraulic and circulating fluids specially formulated with high quality base stocks and improved thermally stable additives. These oils offer outstanding resistance to sludge formation, are chemically stable, and exhibit excellent antiwear protection.

QUALITIES: A/W Hydraulic Oils are made from top quality base stocks and contain all the necessary additive components to offer trouble-free service in high-pressure, high-output industrial hydraulic circuits. A/W Hydraulic Oils have these outstanding properties:

Hydraulic Oils utilize the latest in thermally stable zinc-type additives. This virtually eliminates the formation of heat-related sludging in sensitive electro-hydraulic servos associated with conventional zinc-type oils. These oils are wholly suitable for N/C machine tools and other high-output equipment where sustained heat is prevalent.

These oils exhibit superior hydrolytic stability and will not contribute to either the formation of metal-etching acids or corrosive reactants.

A/W Hydraulic Oils are inhibited against rusting in both fresh and sea water and pass both A and B Sequences of the ASTM D 665 Turbine Oil Rust Test.

These oils offer optimum antiwear protection to pumps, motors, valves, and other hydraulic circuit components. They are approved against stringent performance requirements including Cincinnati Lamb (formerly Cincinnati Milacron) P-68, P-69 and P-70, Denison HF-O, and Eaton M-2950-S and I-286-S.

A/W Hydraulic Oils resist foaming and will not foster abnormal air entrainment in properly designed hydraulic circuits. The oils also readily separate water permitting contaminating water to be drained from the sump.

APPLICATIONS: A/W Hydraulic Oils are recommended for service in vane, piston, and gear pumps when used in accordance with the manufacturers' recommendations. The oils are designed to provide maximum service life to these pumps as well as to other circuit components such as motors and servos.

A/W Hydraulic Oils are also recommended for use as gear and bearing lubricant in industrial applications where rust and oxidation inhibited oils are required.

A/W All-Temp and All-Temp 46 Hydraulic Oils are special multigrade antiwear oils for use in mobile equipment where wide temperature ranges are encountered. Their features include excellent pour point depression, high viscosity index, resistance to oxidation, foaming and corrosion, as well as protection against pump component wear. The CITGO A/W All-Temp Hydraulic Oils are highly recommended for use in mobile and other hydraulic equipment in heavy-duty all-weather service. A/W All Temp meets FMC Hi-Performance, Hydraulic Oil, Grade 32 requirements.

A/W Hydraulic Oils meet the general physical and performance requirements of the European classifications as follows:

AFNOR NF E 48-603 HM

(Continued)



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Date 01/10 - (Continued)

TYPICAL PROPERTIES:

CITGO A/W HYDRAULIC OILS

GRADE	All Temp ⁽¹⁾	All Temp 46	22	32	46	68	100	150
Material Code	633932001	633946001	633410001	633415001	633420001	633430001	633440001	633450001
Gravity, ASTM D 4052, °API	33.4	31.9	33.7	32.6	31.2	30.8	28.6	29.3
Density, lb/gal	7.15	7.21	7.13	7.18	7.24	7.26	7.36	7.33
Flash Point, ASTM D 92, COC, °F (°C)	385 (196)	403 (206)	399 (204)	417 (214)	446 (230)	468 (242)	471 (244)	500 (260)
Viscosity, cP at -40°C ⁽²⁾	13,900	58,200	—	—	—	—	—	—
cP at -35°C ⁽²⁾	7,200	—	—	—	—	—	—	—
cP at -20°C ⁽²⁾	—	2,510	—	—	—	—	—	—
cSt at 40°C	31.2	46.7	22.3	32.3	46.6	68	98	149
cSt at 100°C	6.31	8.07	4.45	5.59	6.96	9.0	11.1	14.8
Viscosity Index	159	146	110	111	106	107	98	99
Pour Point, ASTM D 97, °F (°C)	-54 (-48)	-44 (-42)	-40 (-40)	-27 (-33)	-22 (-30)	-17 (-27)	-6 (-21)	0 (-18)
Color, ASTM D 1500	L1.0	L1.0	L0.5	L0.5	L0.5	L0.5	L3.0	L2.5
Water Separability, ASTM D 1401 ⁽³⁾	40-40-0	40-40-0	40-40-0	40-40-0	40-40-0	40-40-0	40-40-0	40-40-0
Oxidation Test, ASTM D 943, Hrs.	4800	4800	>6000 ⁽⁹⁾	>6000 ⁽⁹⁾	>6000 ⁽⁹⁾	4530	4030	2850
Rust Test, ASTM D 665 A, B ⁽⁴⁾	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Meets Eaton Requirements M-2950-S ⁽⁵⁾	Yes	Yes	Yes	Yes	Yes	Yes	—	—
Meets Eaton Requirements I-286-S ⁽⁶⁾	Yes	Yes	Yes	Yes	Yes	Yes	—	—
Meets Denison HF-O Requirement	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Meets Cincinnati Lamb Requirement	—	—	—	P-68	P-70	P-69	—	—
AFNOR NF E 48-603	—	—	HM22	HM32	HM46	HM68	HM100	HM150
ISO VG No.	32 ⁽⁷⁾	46 ⁽⁸⁾	22	32	46	68	100	150

Notes: (1) Meets FMC Hi-Performance, Hydraulic Oil, Grade 32 requirements.

(2) ASTM D 2893 Brookfield Viscosity.

(3) 30 minutes max. separation time to ≤3ml emulsion. Test temperature is 130°F for grades up through ISO 68. Test temperature is 180°F for ISO 100 and 150.

(4) Pass - No Rust.

(5) This requirement utilizes Eaton 35VQ25A vane pump test and is for mobile equipment.

(6) This requirement utilizes Eaton 104c or 105c vane pump test, ASTM D 2882, and is for industrial, stationary systems.

(7) A multigrade, high VI type which may be used in most applications requiring a multiviscosity range of ISO-VG 22, 32, 46.

(8) A multigrade, high VI type which may be used in most applications requiring a multiviscosity range of ISO-VG 32, 46.

(9) ISO 22, 32, 46 still running in ASTM D 943 at 6,000 hrs.