

CITGO HYDURANCE™ AW FLUIDS

Date 04/13



DESCRIPTION: CITGO HyDurance AW Fluids are superior antiwear hydraulic and circulating oils specially formulated to provide outstanding resistance to sludge formation, are chemically stable, and exhibit excellent antiwear protection and filterability.

QUALITIES: CITGO HyDurance AW Fluids are formulated with high quality base stocks and premium additive components to offer trouble-free service in high-pressure, high-output industrial hydraulic circuits.

CITGO HyDurance AW Fluids offer:

Thermal Stability: Superior resistance to heat-related sludging in sensitive electro-hydraulic servos.

Hydrolytic stability: Will not contribute to the formation of metal-etching acids or corrosive reactants.

Rust and Corrosion Protection: 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.

Wear Protection: Excellent antiwear protection to pumps, motors, valves, and other hydraulic circuit components. Approved against stringent equipment performance requirements.

Anti Foam Performance: Resistant to foaming and will not foster abnormal air entrainment in properly designed hydraulic circuits.

Demulsibility: Readily separate water permitting draining of contaminating water from circulating systems.

Excellent filterability: Premium performance in wet and dry filterability testing.



CITGO HyDurance™ AW 68 Fluid

(Continued)

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APPLICATIONS: CITGO HyDurance AW Fluids are recommended for service in industrial and mobile hydraulic systems when used in accordance with equipment manufacturers' recommendations. They are designed to provide maximum service life to vane, piston, and gear pumps as well as other circuit components such as motors and servos.

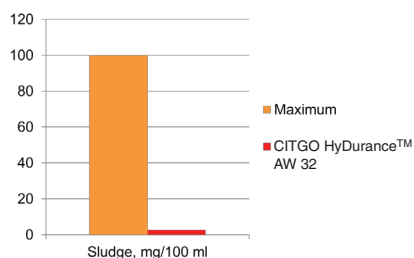
CITGO HyDurance AW Fluids are also recommended for use as a gear and bearing lubricant in industrial applications where rust and oxidation inhibited oils are required.

CITGO HyDurance AW All Temp Fluid is a special multigrade antiwear fluid meeting FMC Hi Performance Hydraulic Oil Grade 32 requirements. CITGO HyDurance™ AW All Temp Fluid offers excellent low temperature pumpability and is recommended for use in mobile and other hydraulic equipment in heavy duty all weather service.

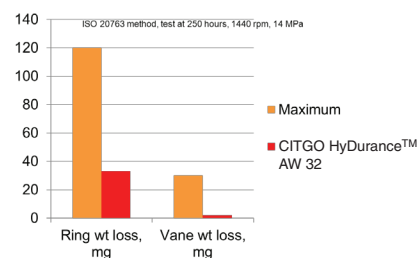
CITGO HyDurance AW Fluids meet or exceed:

- ASTM D 6158 HM (2005)
- Cincinnati Machines P-68, 69, 70
- Parker Denison HF-0 (Revision J)
- DIN 51524-2 (2006)
- Eaton Brochure 03-401-2010
- General Motors LS-2 (1997)
- JCMAS HK P041 (2004)
- ISO 11158 HM (FDIS 2008)
- SEB 181 222 (2007)
- US Steel 126, 127, 136

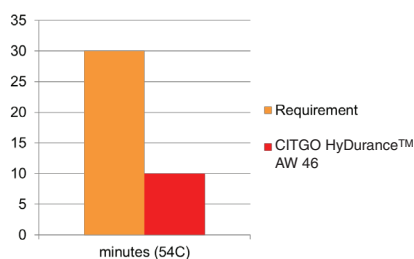
Parker Denison HF-0 Thermal Stability



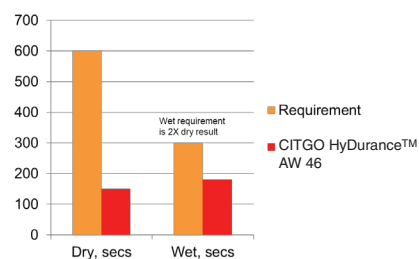
V104C Vane Pump Wear Data



Parker Denison HF-0 Demulsibility



Parker Denison HF-0 Filterability



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TYPICAL PROPERTIES:

CITGO HYDURANCE™ AW FLUIDS

GRADE	All Temp ⁽¹⁾	22	32	46	68	100	150
Material Code	633621001	633606001	633607001	633608001	633609001	633610001	633611001
Gravity, ASTM D 4052, °API	33.4	33.7	32.6	31.2	30.8	28.6	29.3
Density, lb/gal	7.15	7.13	7.18	7.24	7.26	7.36	7.33
Flash Point, ASTM D 92, COC, °F (°C)	385 (196)	399 (204)	417 (214)	446 (230)	468 (242)	471 (244)	500 (260)
Viscosity, cP at -40°C ⁽²⁾	13,900	—	—	—	—	—	—
cP at -35°C ⁽²⁾	7,200	—	—	—	—	—	—
cP at -20°C ⁽²⁾	—	—	—	—	—	—	—
cSt at 40°C	31.2	22.3	32.3	46.6	68	98	149
cSt at 100°C	6.31	4.45	5.59	6.96	9.0	11.1	14.8
Viscosity Index	159	110	111	106	107	98	99
FZG (A/8.3/90), pass load, ISO 14635-1	—	12	12	12	12	12	12
Pour Point, ASTM D 97, °F (°C)	-54 (-48)	-40 (-40)	-27 (-33)	-22 (-30)	-17 (-27)	-6 (-21)	0 (-18)
Color, ASTM D 1500	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
Oxidation Test, ASTM D 943, Hrs.	4800	>6000	>6000	>6000	4530	4030	2850
Rust Test, ASTM D 665 A, B ⁽⁴⁾	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Meets Cincinnati Machines Requirement	—	—	P-68	P-70	P-69	—	—
AFNOR NF E 48-603	—	HM22	HM32	HM46	HM68	HM100	HM150
ISO VG No.	32 ⁽⁵⁾	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) A multigrade, high VI type which may be used in most applications requiring a multiviscosity range of ISO-VG 22, 32, 46.