

HYDREX™ XV ALL SEASON HYDRAULIC FLUID

Introduction

Petro-Canada's HYDREX™ XV hydraulic fluid is a semi-synthetic, long life, anti-wear fluid designed for all season use in heavy duty hydraulic systems. HYDREX XV provides excellent operating and maintenance benefits for increased productivity in very hot or cold temperatures. Within the HYDREX product line, HYDREX XV offers the highest potential for fuel and energy efficiencies.

HYDREX XV starts with the HT purity process to produce a 99.9% pure, crystal clear base oil. By removing the impurities that can hinder the performance of competitive conventional oils, and blending in our specialty additives, HYDREX XV achieves distinct performance advantages. HYDREX XV retains its 'fresh oil' properties longer providing resistance to oxidative breakdown and outstanding wear protection in year round temperatures.

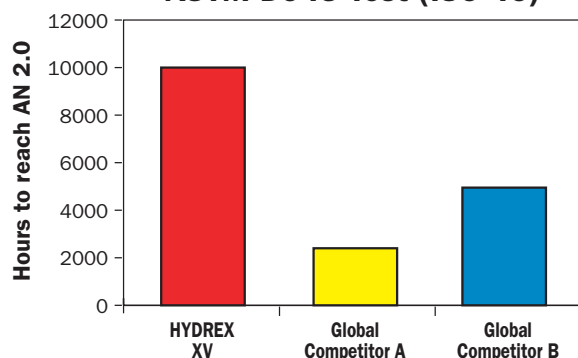
Features and Benefits

- **All Season Performance**
 - Allows hydraulic systems to start at temperatures as low as -34°C (-29°F) and run as high as 90°C (194°F)[‡]
 - Shorter warm-up time on cold days and faster, smoother response for hydraulic systems
 - Extra protection from wear during periods of extreme high temperatures for greater peace of mind
- **Consolidate to one product all year long**
 - Inventory consolidation to just one fluid for reduced costs and less chance of misapplication
 - Helps protect against equipment failure during the wide temperature swings of spring and fall and eliminates chance of damage due to missed seasonal oil changes

- **Outstanding oxidation and thermal stability**

- Longer oil life, which helps extend drain intervals for reduced change-out costs and less reservoir exposure to external contaminants
- Helps minimize sludge build up in the reservoir that can lead to equipment wear and shorten filter life
- Prevents varnish build up that can interfere with servo and directional valve operational

**Oxidation Life Comparison
ASTM D943 Test (ISO 46)**



HYDREX XV lasts significantly longer than leading global competitors (multigrades).

- Minimizes harmful sludge build up in the reservoir that can lead to shortened oil life and equipment wear

What is the HT difference?

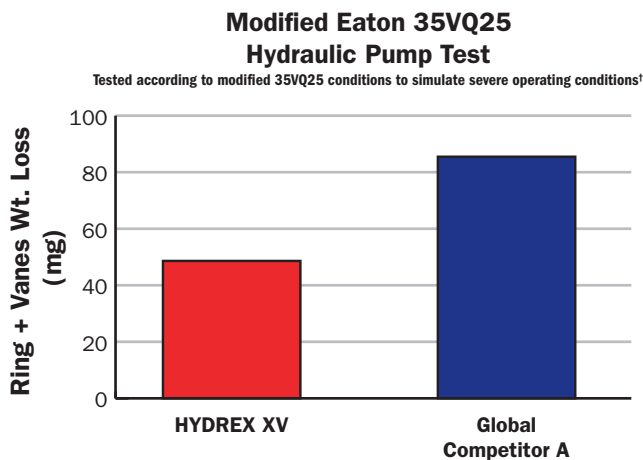
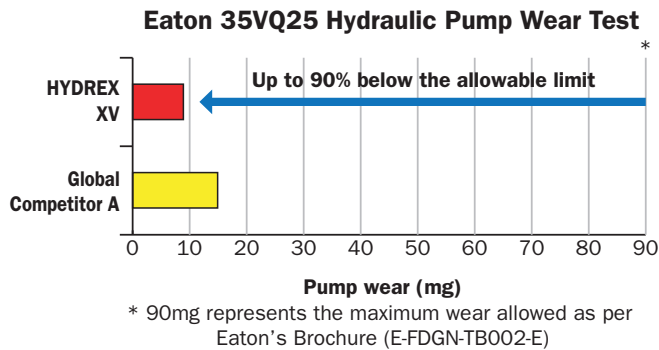
Petro-Canada Lubricants starts with the HT purity process to produce water-white, 99.9% pure base oils. The result is a range of lubricants, specialty fluids and greases that deliver maximum performance for our customers.



[‡] based on Petro-Canada's definition of mobile equipment applications

- **Exceptional anti-wear protection**

- Extends equipment life
- Reduces maintenance and mechanical failure
- Protects equipment being driven longer, harder and faster in tougher conditions
- Improves operating reliability over a wide range of pressures



[†]Test duration: 100 h/cartridge; Outlet pressure: 3200 psig;
Inlet temperature: 104 °C (220 °F)
Four ASTM D943 copper & iron coils added to reservoir for 200 h

HYDREX provides significantly better wear protection than the leading global competitor, even under severe conditions.

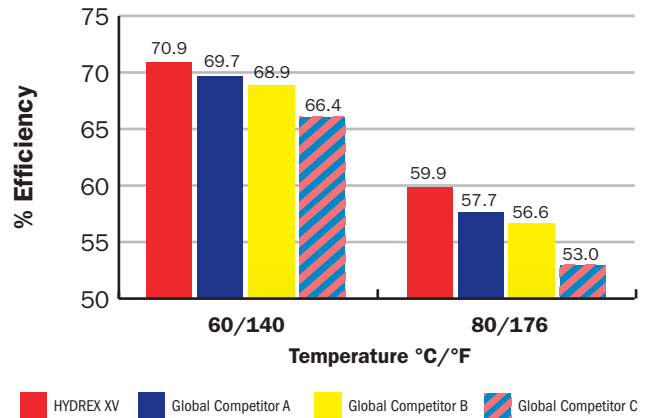
- **High after-shear Viscosity Index to maintain optimal fluid viscosity at operating temperatures**

- 50% improvement in shear stability over previous formulation (KRL test method)
- Increased pump efficiency
- Up to 5.5% lower diesel fuel consumption vs. competitor fluids in heavy equipment and up to 6.0% increased equipment productivity¹
- Reduced carbon dioxide (CO₂) emissions

¹As tested in performance demonstration on excavators

Overall Pump Efficiency of Multigrade Fluids

(Parker Denison T6CM B06 vane pump, 1500 rpm, 250 bar/3625 psi)



HYDREX XV enables energy savings of up to 5% based on pump efficiency testing and demonstrated up to 5.5% fuel savings in heavy equipment.

- **Improved rust and corrosion prevention**

- Iron and other metal components are protected against water damage

- **Excellent water separability and hydrolytic stability allows oil to be reused**

- Oil separates readily from water without loss of performance additives

- **Improved foam and air entrainment performance**

- Prevents overflowing of reservoirs
- Eliminates “sponginess” from hydraulic systems and prevents pump cavitation

Applications

Petro-Canada's HYDREX XV All Season hydraulic fluid is recommended for year-round use in piston, gear and vane hydraulic pumps found on industrial machinery and mobile equipment. HYDREX XV may be used in systems equipped with fine filters down to 3 microns without loss of additives or causing filter plugging.

HYDREX XV hydraulic fluid is approved against the following hydraulic equipment manufacturers' specifications:

- Eaton E-FDGN-TB002-E
- Denison HF-O

HYDREX XV meets the following specifications:

- ISO 11158 HV
- DIN 51524 Part 3 HVLVP
- ASTM D6158 HV
- JCMAS HK and the requirements of the Rexroth A2F10 pump test

HYDREX XV is recommended for use in equipment manufactured by Eaton Vickers, Denison, Bosch Rexroth, Sauer-Danfoss, Racine, Oilgear, Hydreco, Dynex and others.

HYDREX XV is suitable for use where AIST 126 and 127 are required.

Typical Performance Data

PROPERTY	TEST METHOD	HYDREX XV
Start-up Temperature ¹ , °C/°F	–	-34/-29
Operating Temperature Range ² , °C/°F Mobile Equipment Industrial Machinery	–	-14 to 90 / 7 to 194 -14 to 78 / 7 to 172
Kinematic Viscosity, cSt @ 40°C cSt @ 100°C SUS @ 100°F SUS @ 210°F cP @ -40°C (-40°F)	D445 D2983	47.9 9.7 242 58 24,250
Viscosity Index	D2270	192
Flash Point, COC, °C/°F	D92	227/441
Pour Point, °C/°F	D5950	-48/-54
Rust Procedures A & B, 24 hr	D665	Pass
Oxidation Stability, hours to 2.0 AN	D943	+10,000
FZG Failure Load Stage	D5182	>12
Dielectric Breakdown, kV	D877	38
Four-Ball Wear Test, Scar Diam. (mm) 40 kg, 1200 rpm, 75°C, 1 hr	D4172B	0.5

The values quoted above are typical of normal production. They do not constitute a specification.

¹ Start-up is defined by the temperatures at which the oil viscosity is 10,000 cP

² Operating temperature limits are determined by the equipment manufacturer. Petro-Canada has chosen to define the upper operating temperature to be the after-shear oil viscosity of 10 cSt for mobile equipment and 13 cSt for industrial machinery, while the lower operating temperature to be the fresh oil viscosity of 750 cP for both mobile and industrial machinery.

These ranges are only an approximation and the operator should always check the viscosity requirements as specified by their equipment manufacturer. Please refer to TB-1290 for more information on lubricant & hydraulic fluid shear stability. Mobile equipment typically refers to machinery that encompasses a transmission and braking system to allow and prohibit movement. Industrial machinery is typically stationary, with hard piping and auxiliary components in place.

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