

HARNEX™ 320

WIND TURBINE GEAR OIL

TOUGH CONDITIONS. TOUGHER PROTECTION.

Introduction

The challenges facing the smooth operation of wind turbine transmissions are severe: high load and torque, temperature swings, corrosion, constant stops and starts and difficult access for maintenance.

What is needed is a gear oil that stands up to these working conditions, while still reducing downtime and maintenance costs.

The right oil for the right application

Petro-Canada's™ HARNEX™ 320 Wind Turbine Gear Oil is a premium synthetic lubricant designed to provide exceptional anti-wear/extreme pressure (AW/EP) protection and corrosion control under the toughest conditions. HARNEX 320 is specially formulated for lubricating wind turbine gearboxes for effective operation and long service life.

HARNEX 320 is designed with polyalphaolefin (PAO) chemistry to deliver good oil film thickness over a broad temperature range. High viscosity index minimizes changes in viscosity at elevated temperatures, while ensuring good low temperature fluidity of the lubricant for cold temperature operation. This helps to ensure smooth operation in all types of climates: from the tropical heat of Costa Rica to the cold prairie winters of Canada.

Meeting and exceeding industry challenges

Technology is constantly changing to meet ongoing maintenance challenges. Filter pore sizes in main oil circuits of 10 microns can be as low as 3 microns in bypass circuits to reduce debris damage. HARNEX 320, with its special formulation and water separating properties, performs well in conjunction with these filters.

HARNEX 320 passes the Hydac Filterability Test HN 30-08 (Multi-Pass, Test Rig with integrated Flender Foam Tester).

HARNEX 320 meets the following industry specifications

- AGMA 9005-E02 (EP)
- DIN 51517-3 (CLP 320)
- ISO 12925-1 Type CKD

GE SERVICE RE-FILL OIL

Petro-Canada's HARNEX 320 is approved by GE as a service re-fill oil for the following GE wind turbines:

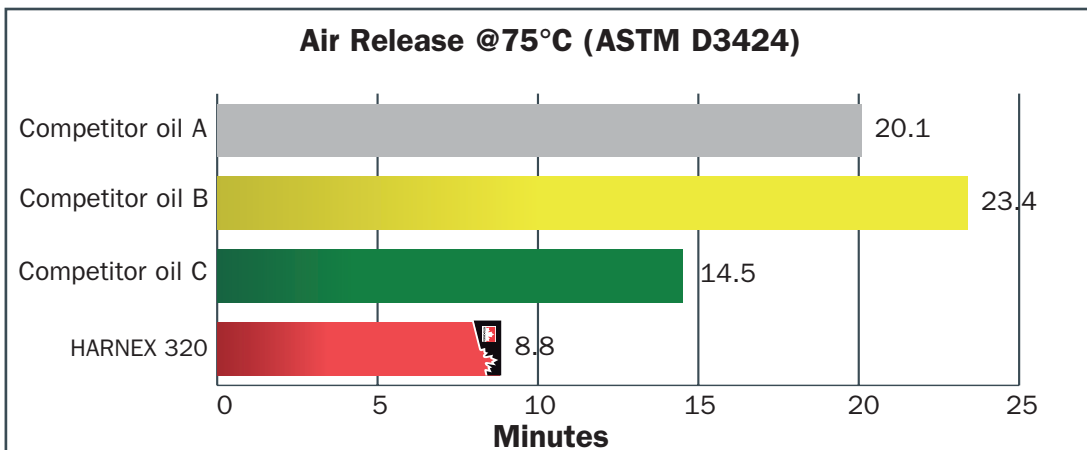
- Platform 1.X with Winergy gearbox
- Platform 2.X with Winergy gearbox

HARNEX 320 can be ordered under the following GE part number

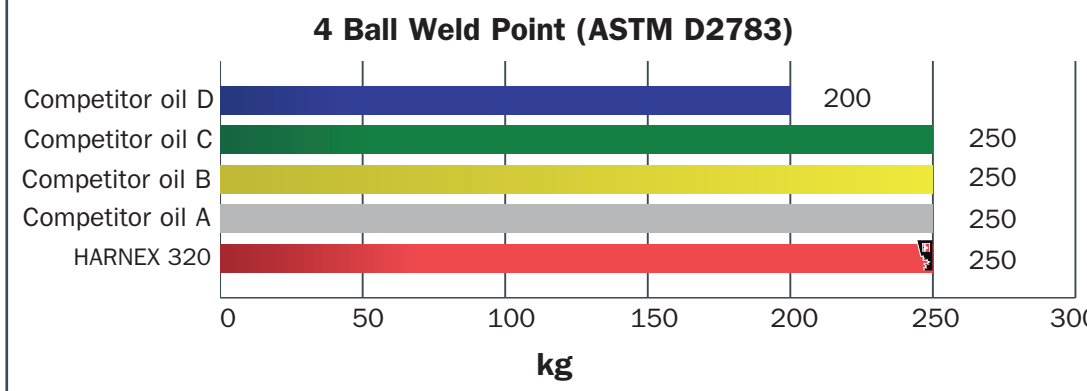
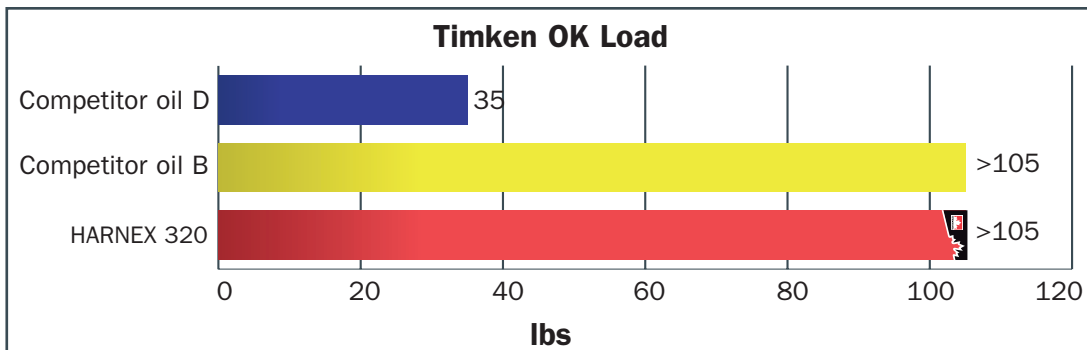
- 109W6955P001 HNX320DRX – HARNEX 320, 205L drum, (54.2 US gallons)

Features & Benefits

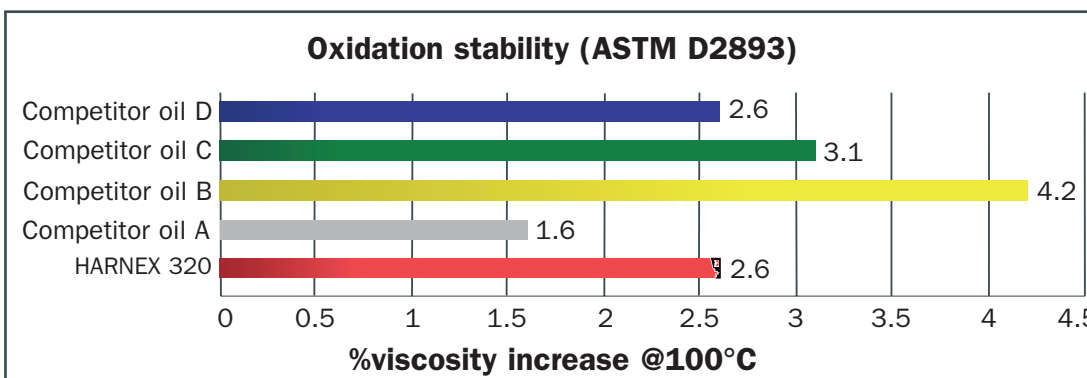
- Protects against micropitting and scuffing of gear teeth and provides extended bearing life under extreme conditions
- Withstands oxidative and thermal breakdown at elevated temperatures to increase time between drain intervals, saving time and labour
- High quality synthetic base stocks with high VI ensure good lubricant film thickness over a broad temperature range
- Low temperature fluidity ensures smooth cold-temperature starts
- Effective water separation
- Resists rust and corrosion
- Excellent air release properties
- Excellent compatibility with seals and coatings



HARNEX 320 provides rapid air release, to maintain lubricating film integrity.



Extreme pressure tests demonstrate excellent load carrying properties and provide protection for gear teeth and bearings.



Oxidation stability by ASTM D2893 at 121°C. HARNEX 320 shows good oxidation stability under extended heating and oxidative conditions, promoting long service life.

Typical Performance Data

PROPERTY	TEST METHOD	HARNEX 320
Density @15°C, kg/L	ASTM D4052	0.862
Viscosity @ 40°C, cSt	ASTM D445	323
Viscosity @ 100°C, cSt	ASTM D445	34.9
Viscosity Index	ASTM D2270	153
Flash Point, COC, °C / °F	ASTM D92	237/459
TAN, mg KOH/g	ASTM D664	0.7
Pour Point, °C / °F	ASTM D5950	-42/-44
Brookfield Viscosity @ -30°C, cP	ASTM D2983	139200
Brookfield Viscosity @ -35°C, cP	ASTM D2983	273600
Mechanical Emulsion @ 82°C	ASTM D1401	40-40-0 (20)
Foam, Sequence 1	ASTM D892	10/0
Foam, Sequence 2	ASTM D892	10/0
Foam, Sequence 3	ASTM D892	10/0
Copper Corrosion, 3 h, 120°C	ASTM D130	1b
Rust Test (Synthetic Sea Water)	ASTM D665B	Pass
Timken OK, lbs.	ASTM D2782	>105
4 Ball Weld, kg	ASTM D2783	250
4 Ball Wear @ 40 kg 1200 rpm, mm	ASTM D4172	0.33
FZG Scuffing Test A/8.3/90	DIN 14635-1	14
FZG Scuffing Test A/16.6/90	DIN 14635-1	14
FZG Micropitting Test @ 60°C	FVA 54/7	Fail 10
FZG Micropitting Test @ 90°C	FVA 54/7	Fail 10
FAG FE8 Test (Stages 1,2,3,4)	DIN 51819-3	Pass
Oxidation Test @ 121 °C Precipitation Number	ASTM D2893	0
Visc. Increase at 100 °C, %		2.7
Static Seal Test (NBR,FKM)	DIN 53521	Pass
Dynamic Seal Test (NBR,FKM)	DIN 3761	Pass
Paints Compatibility	Mäder	Pass
Sealants Compatibility	Loctite	Pass

Operational Considerations

To ensure optimum performance and long service life of HARNEX 320 in your wind turbine, Petro-Canada recommends a thorough flush of the gearbox prior to charging the unit with HARNEX 320. Please see Petro-Canada TechBulletin “Petro-Canada Protocol – Oil Change-Out for Wind Turbines” (TB-1257E) prior to change-out. A Petro-Canada Technical Services Advisor can provide additional information.

To order product or to learn more about how Petro-Canada Lubricants
can help your business visit: **lubricants.petro-canada.com**
or contact us at: **lubecsr@petrocanadalsp.com**



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