



CITGO Tractor Hydraulic Fluids

The webinar will begin in less than 10 minutes.

Abdul Maye

8/12/2022





CITGO Tractor Hydraulic Fluids

The webinar will begin in less than 5 minutes.

Abdul Maye

8/12/2022





CITGO Tractor Hydraulic Fluids

Abdul Maye

8/12/2022



Abdul Maye

- **CITGO Sr. Product Specialist**
- **BS, Chemistry**
- **15 Years Experience in Lubricants**
- **STLE Certified**
 - **Oil Monitoring Analyst I**



Agenda

- THF Requirements
 - Background
 - Trends
 - Regulation: NIST
- CITGO
 - Performance Attribute
 - Performance Level/Claims
 - J20C
 - J20D
 - Supporting Data
- CITGO TransGard Tractor Hydraulic Fluid
- Mystik JT-5 Tractor Trans-Hydraulic Fluid
- CITGO TransGard Synthetic Blend Low-Temp Tractor Hydraulic Fluid
- Mystik JT-5 Synthetic Blend TFX Tractor Hydraulic Fluid



Major Tractor Manufacturers



**New Deere 8R
Series Row Crop
Tractor**



**New Holland
Genesis T8 Series**



**Kubota
M Series**

**Is Your Farm Utilizing the Best in Current Technology
Precision Farming - GPS “Connected” Tractors – Nutrient Management Tools
If you have taken advantage of these technologies – Mystik Farm Lubricants are Your Next Step**



**Case IH
Maxum Series**



**Mahindra
M Force 105 S
Series**



**AGCO
8650 Row Crop**

Impact of OEM / Equipment Design Trends

OEM / Equipment Trend

Minimize raw material and component cost

Higher power output and right sizing of components

Smaller sumps

Smaller cooling packages

Low viscosity

Tighter tolerance in electromechanical valves

Extended drain interval

Impact and Potential Issues

Low-cost hardware may have quality issue.
Can be blamed on lubricant

Higher unit loading:
gear distress, clutch wear / slippage

Low residence time:
aeration, shear and oxidation

Higher operating temperature: oxidation

Decreased film thickness: wear issues

Increased importance of oil cleanliness

Requires appropriate lubricant maintenance and oil monitoring. User's may extend against OEM recommendation

OEMs Dominate Tractor Hydraulic Fluid Specifications

- No governing body like API, etc.
 - John Deere, CNH, AGCO
- Very few OEM approval programs for market general
 - Most are self-certifying from available/open specs(e.g. “meets J-20C”)
- Change in specification drives change in lubricant
 - Specs updated to support new hardware changes
 - Engine emission regulations have not historically influenced driveline.





NIST – National Institute of Standards and Technology

NIST Handbook 130

2.39 Tractor Hydraulic Fluid

- Tractor Hydraulic Fluid shall meet at least one current and/or verifiable OEM's specifications for respective tractors.
- Suitability for use claims shall be based upon appropriate field, bench, and or rig testing
- Any manufacturer of tractor hydraulic fluid making suitable for use claims, shall provide, upon request by a duly authorized representative of the director, credible documentation of such claims.
- If the product performance claims published by a blender or a marketer are based on the claim(s) of one or more additive suppliers, documentation of the claims shall be provided upon request to a duly authorized representative of the Director.
- Supporting data shall, upon request, be supplied directly to the Director's office by the additive supplier(s)

Tractor Hydraulic Fluid - Trend

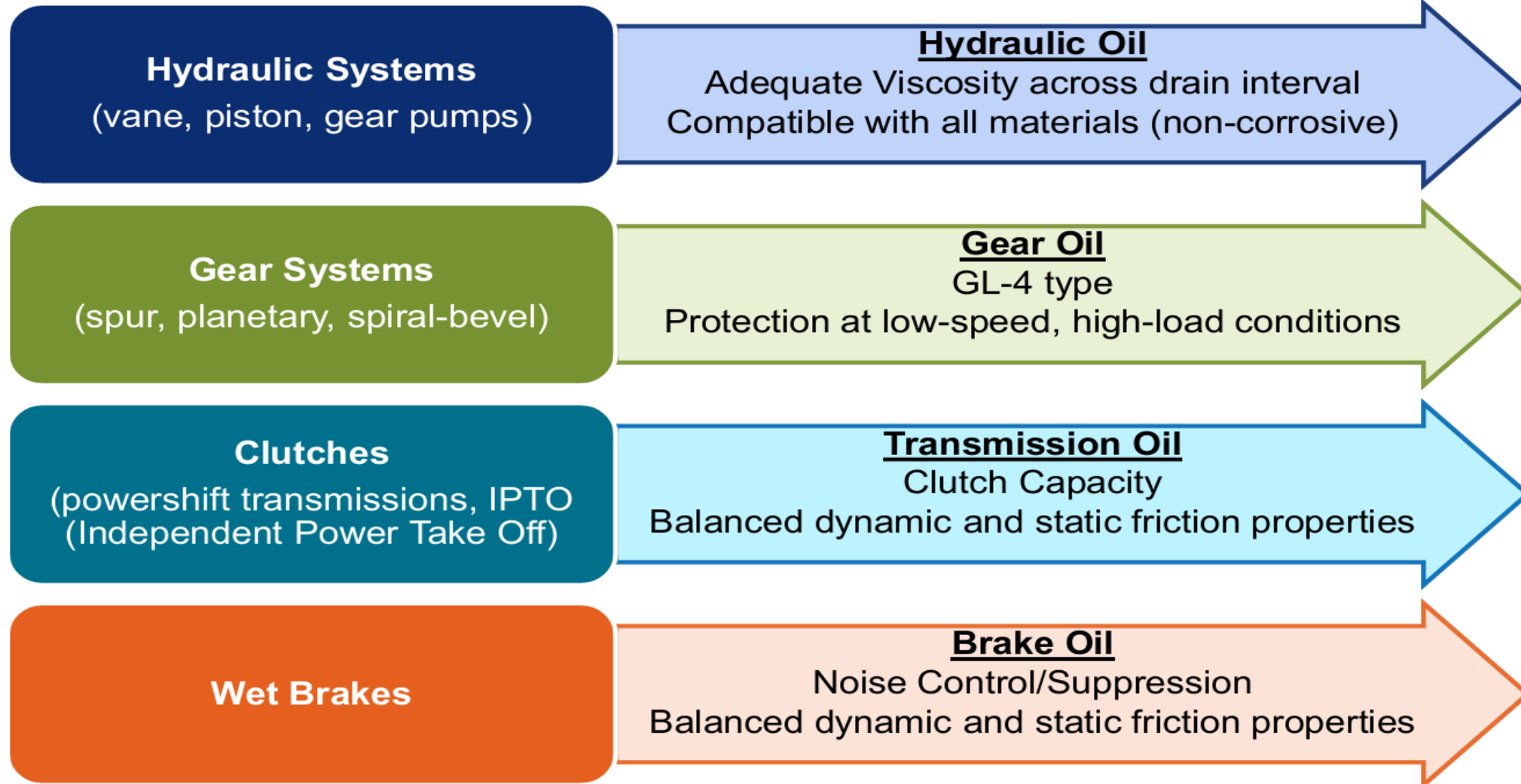
- NCWM adopt revision to Handbook 130 that impact THF marketers – effective January 1, 2020.
- Requires any obsolete specifications marketed as THF to be accompanied by specific warning on the front package.
- Shift to higher quality oil standard after NCWM mandate.
- Viscosity Index Improver trend
- Most important NA Specification according to marketers such as:
 - John Deere J20C, CNH 3525 and 3540, Massey Ferguson M1143/M1145, Volvo WB 101, API GL-4 and others



PQIA study
based on 37
retail samples

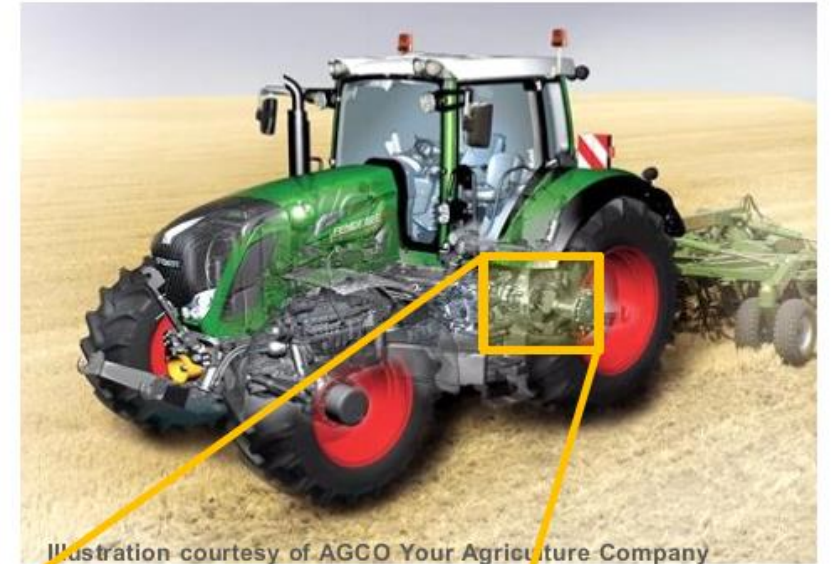
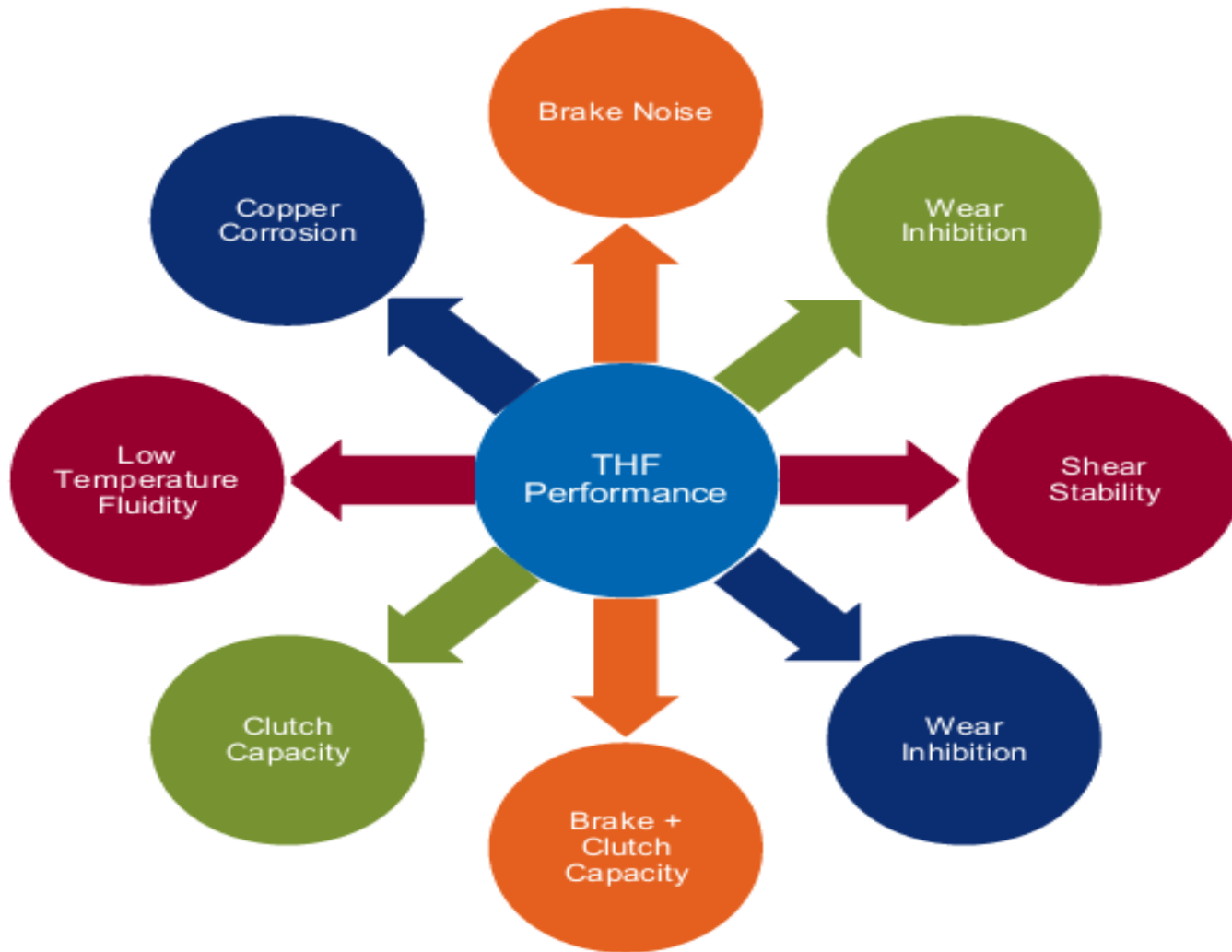
Tractor Hydraulic Fluid Requirements

Must fulfill many requirements due to common sump



THF Formulations

Balance Over Many Performance Areas



Components Lubricated by Tractor Fluid

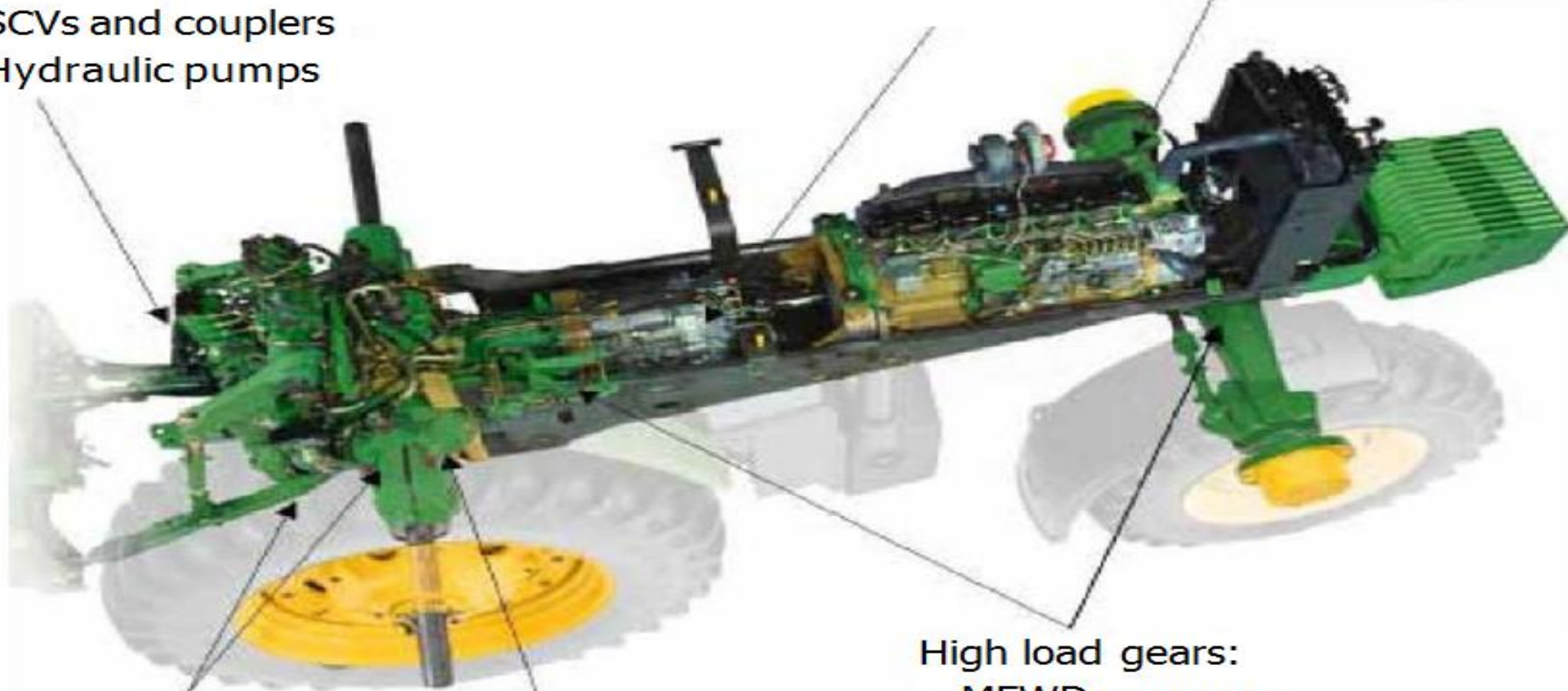
Hydraulic system:

- SCVs and couplers
- Hydraulic pumps

Wet hydraulic **clutches**

Hydraulic system:

— Steering



High load gears:

- **Differential**
- Final **drives**

Hydraulic brakes

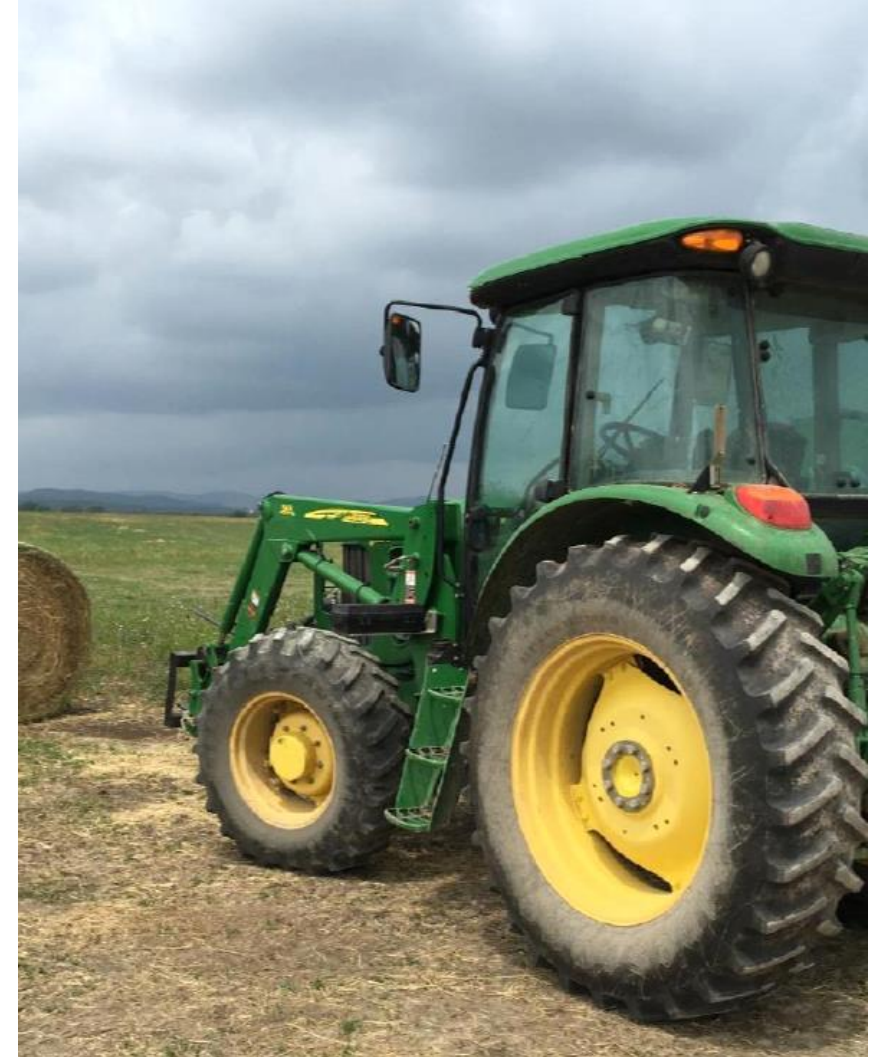
High load gears:

- MFWD gear case
- Transmission

Tractor Transmission-Hydraulic Fluid

Critical Functions

- Transmission operation and protection
 - Clutch engagement
 - Friction plate compatibility
- Differential gear protection
 - Extreme pressure contact points
 - Gear fatigue and corrosion protection
- Wet brake functionality
 - Ensure enough friction for stopping
 - Not too much friction to avoid brake chatter
- Hydraulic Operation to perform necessary work
 - Thick enough for good power transfer
 - Thin enough to allow cold temperature flow



Tractor Transmission-Hydraulic Fluid

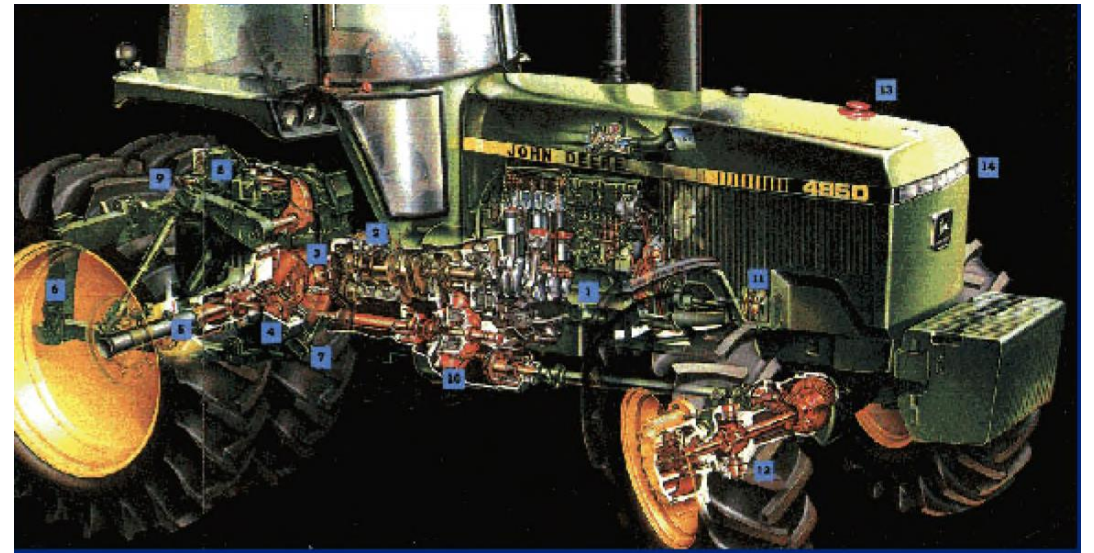
Critical Properties

- Viscosity
 - Cold Temperature – winter start-up viscosity
 - Hot Temperature viscosity – operating viscosity
 - Viscosity Index – Efficiency viscosity profile
 - Retained Viscosity – Ultimate protection and reliability
- Water Handling
 - Water emulsifying
 - Corrosion protection
- Targeted Function
 - Brake chatter control
 - Stopping power



John Deere J20C Test Overview

Test	Property	CITGO THF and Mystik JT-5 THF
JD Physical	Physical and Chemical	Pass
JDQ 19	Water Sensivity and Solids Additive Loss	Pass
JDQ 22	Rust Protection	Pass
JDQ 33	Foaming Characteristics	Pass
JDQ 23	Oil Compatibility, Additive Separation	Pass
JDQ 102	Shear Stability Viscosity	Pass
Allison C-4 Test	Oxidation Stability Test	Pass
JDQ 84	Hydraulic Pumps Perormance	Pass
JDQ 94	Power Shifting Transmission	Pass
JDQ 95	Final Drive Performance	Pass
JDQ 96	Wet Brakes Performance	Pass



CITGO TRANSGARD Tractor Hydraulic Fluid

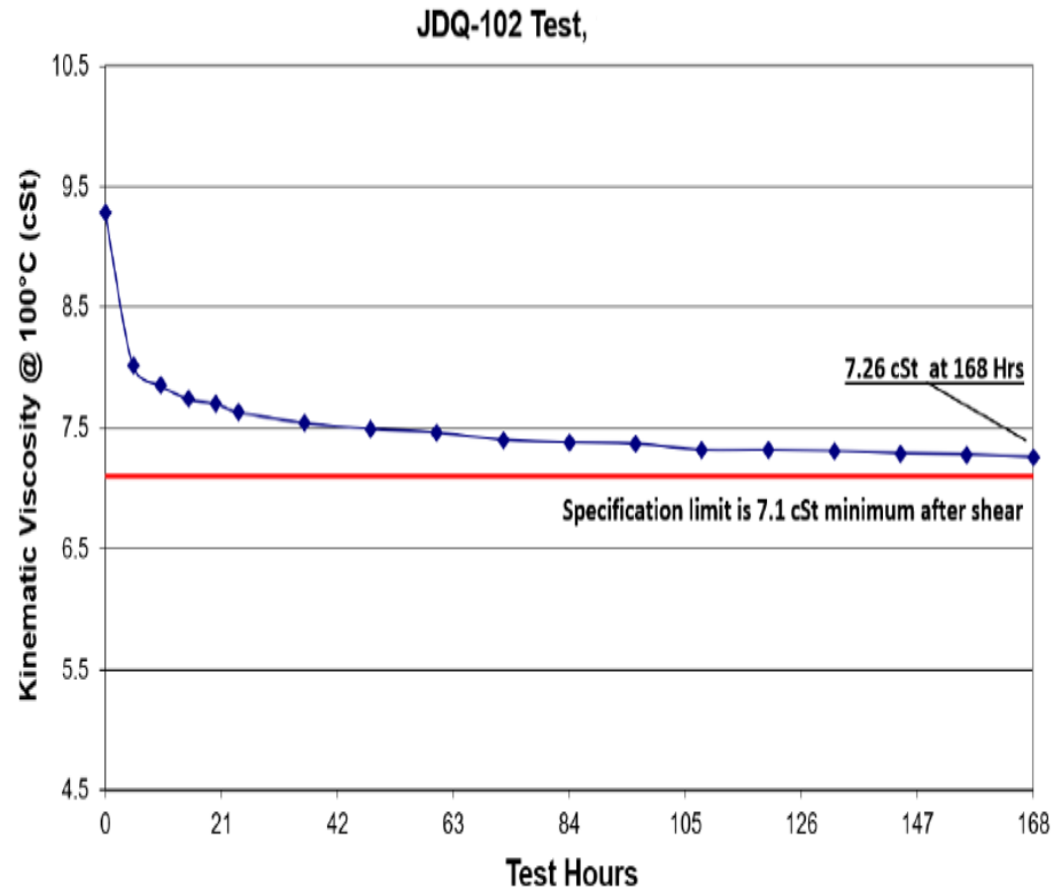
- TransGard Tractor Hydraulic Fluid is formulated with a dispersant viscosity modifier to “meet” the performance requirement of JD J20C.
- Reduces wear on transmission, differential and final drive gears at elevated temperatures.
- TransGard THF provides oxidation stability and resist build up of sludge, and varnish on transmission and hydraulic components.
- Other typical fluids in the marketplace state “suitable for use” for JD J20C because the fluid may not meet the J20C requirements.



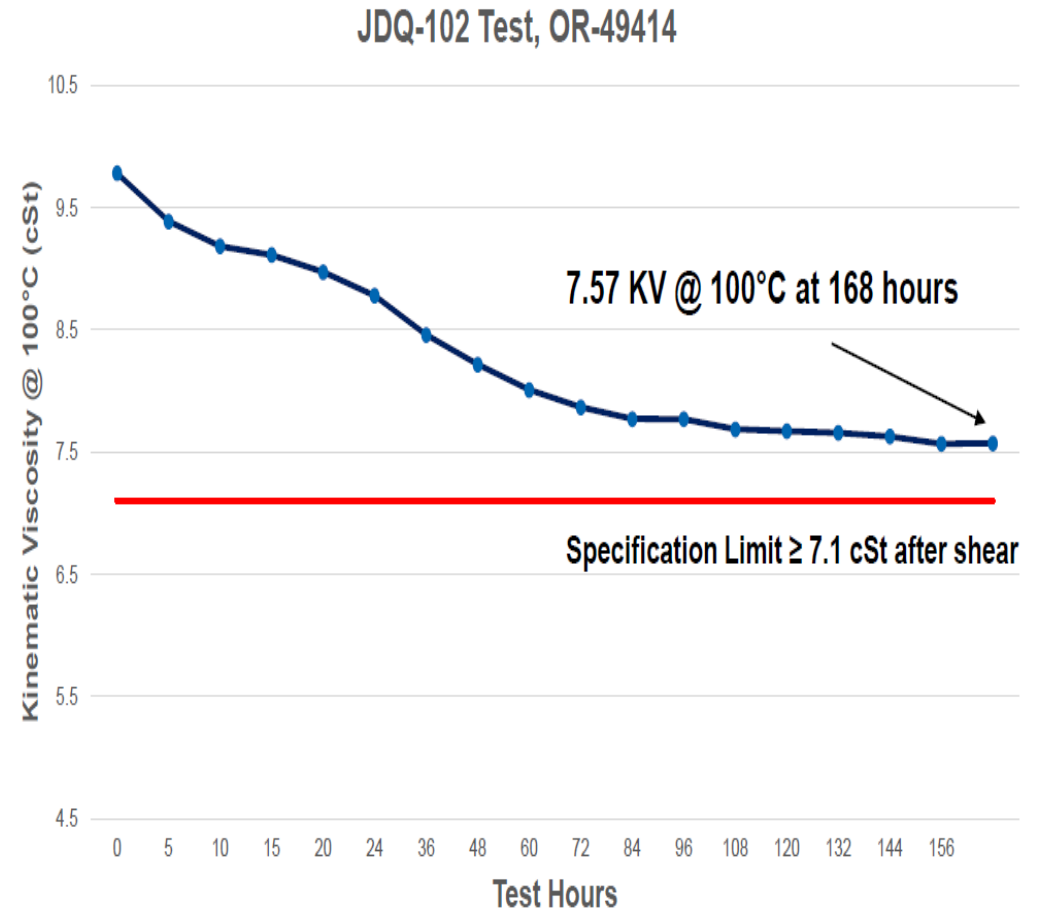
CITGO TRANSGARD Tractor Hydraulic Fluid

Shear Stability Test – JDM JDQ 102

Reference Fluid



CITGO TransGard THF



Mystik JT-5 Tractor Trans-Hydraulic Fluid

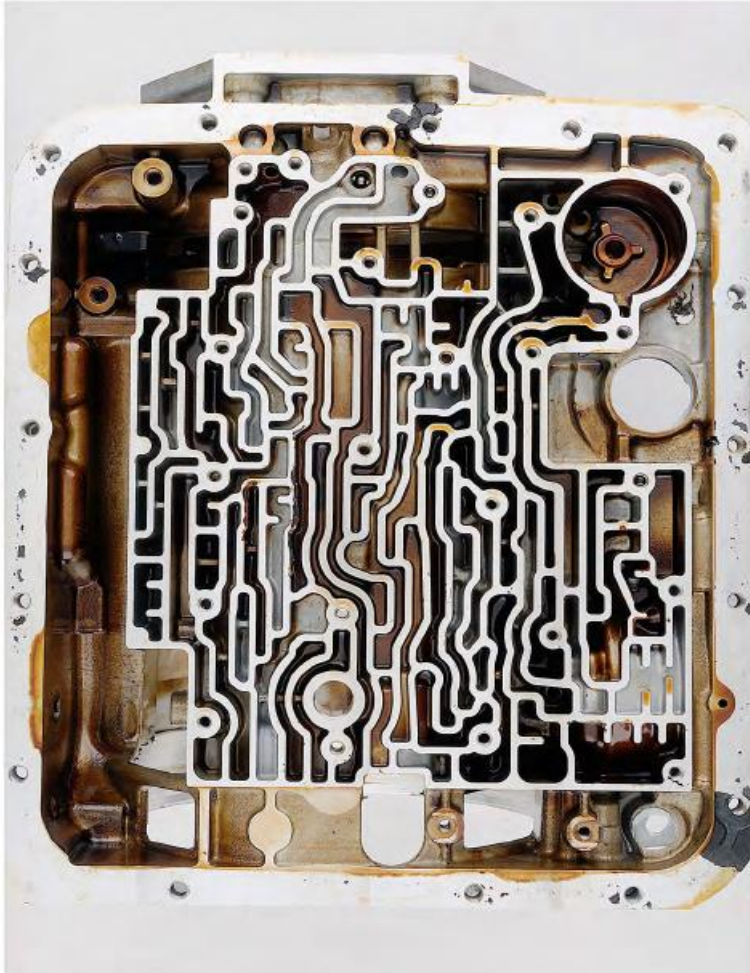
- Formulated to “meet” the JD J20C specification to provide protection and performance at an equivalent level or surpassing competition.
- Other typical fluids in the marketplace state “suitable for use” for JD J20C because the fluid may not meet the J20C requirements.
- Mystik JT-5 is formulated using with a dispersant viscosity modifier to meet the performance requirement of JD J20C.
- Meets John Deere J20C and many other tractor OEM specifications.



Mystik JT-5 Tractor Trans-Hydraulic Fluid

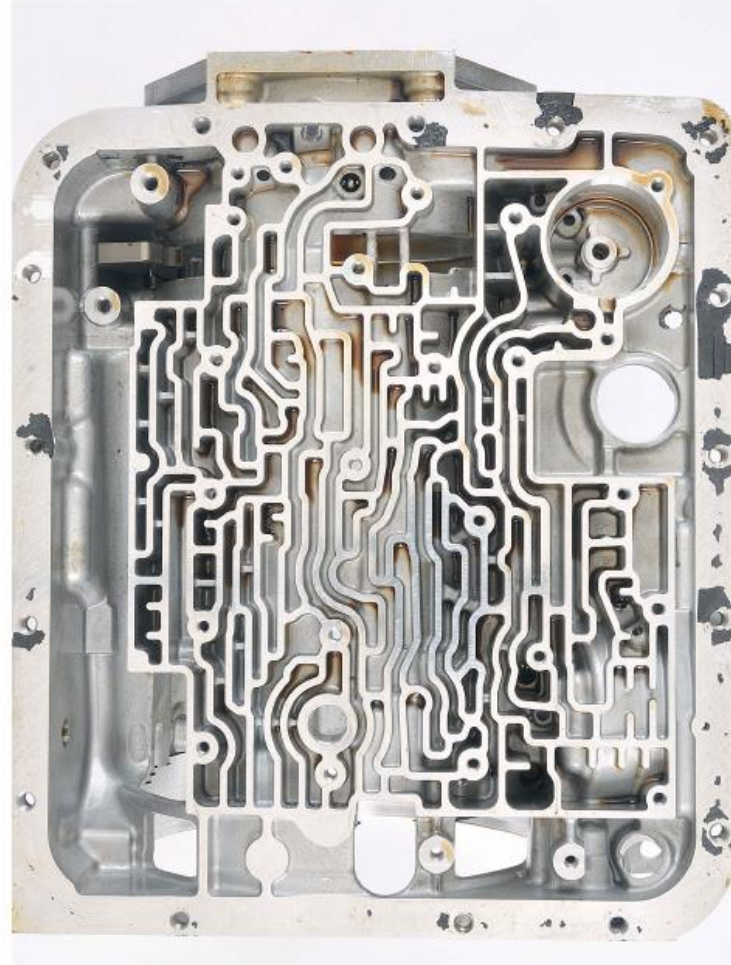
Bottom Case (SFU Type THF)

Case



Bottom Case (Mystik JT-5 THF)

Case



Mystik JT-5 Tractor Trans-Hydraulic Fluid

Sump Pan (SFU Type THF)



Sump Pan (Mystik JT-5 THF)



Mystik JT-5 Tractor Trans-Hydraulic Fluid

Forward Clutch Piston Housing (SFU Type THF)

Piston Housing



Forward Clutch Piston Housing (Mystik JT-5 THF)

Piston Housing



Mystik JT-5 Tractor Trans-Hydraulic Fluid

Forward Piston (SFU Type THF)

Forward Piston



Forward Piston (Mystik JT-5 THF)

Forward Piston



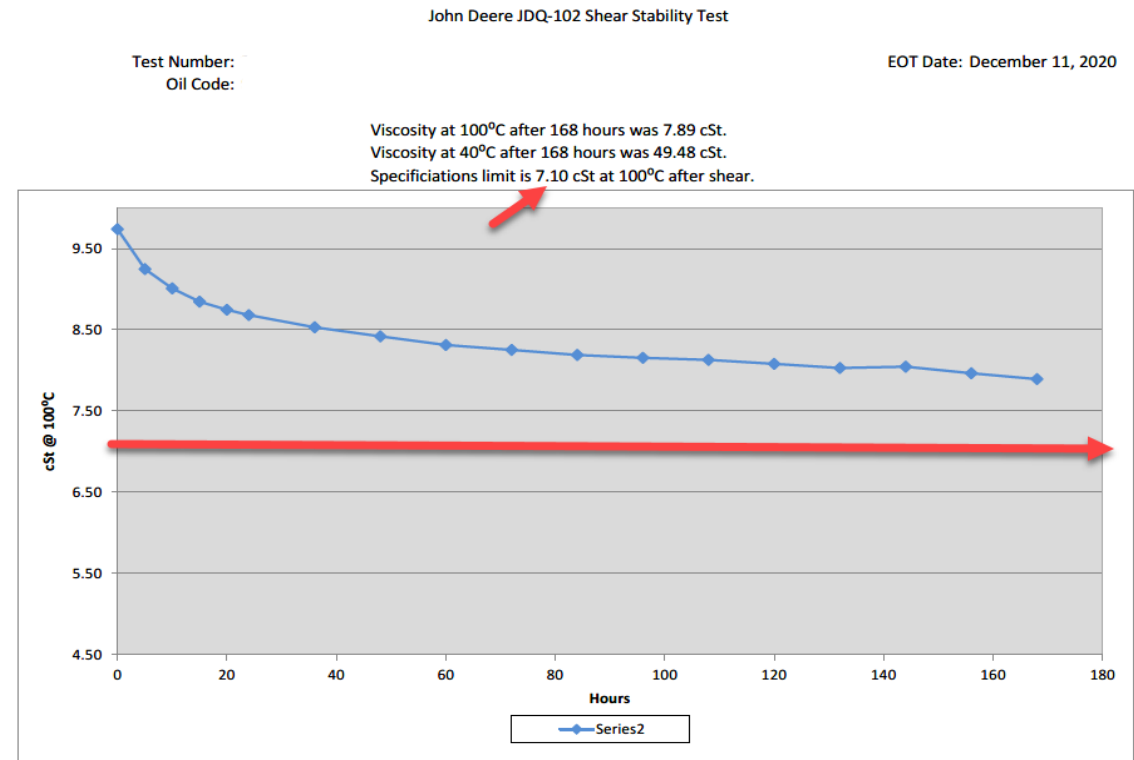
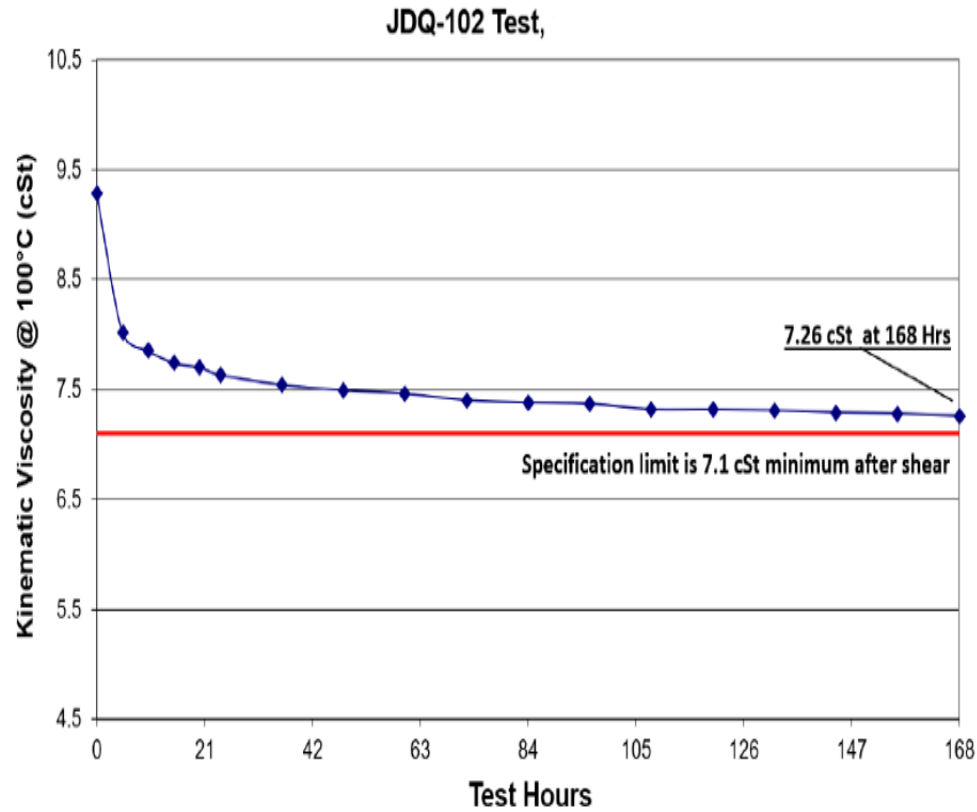
Mystik JT-5 Tractor Trans-Hydraulic Fluid



Shear Stability Test – JDM JDQ 102

Reference Fluid

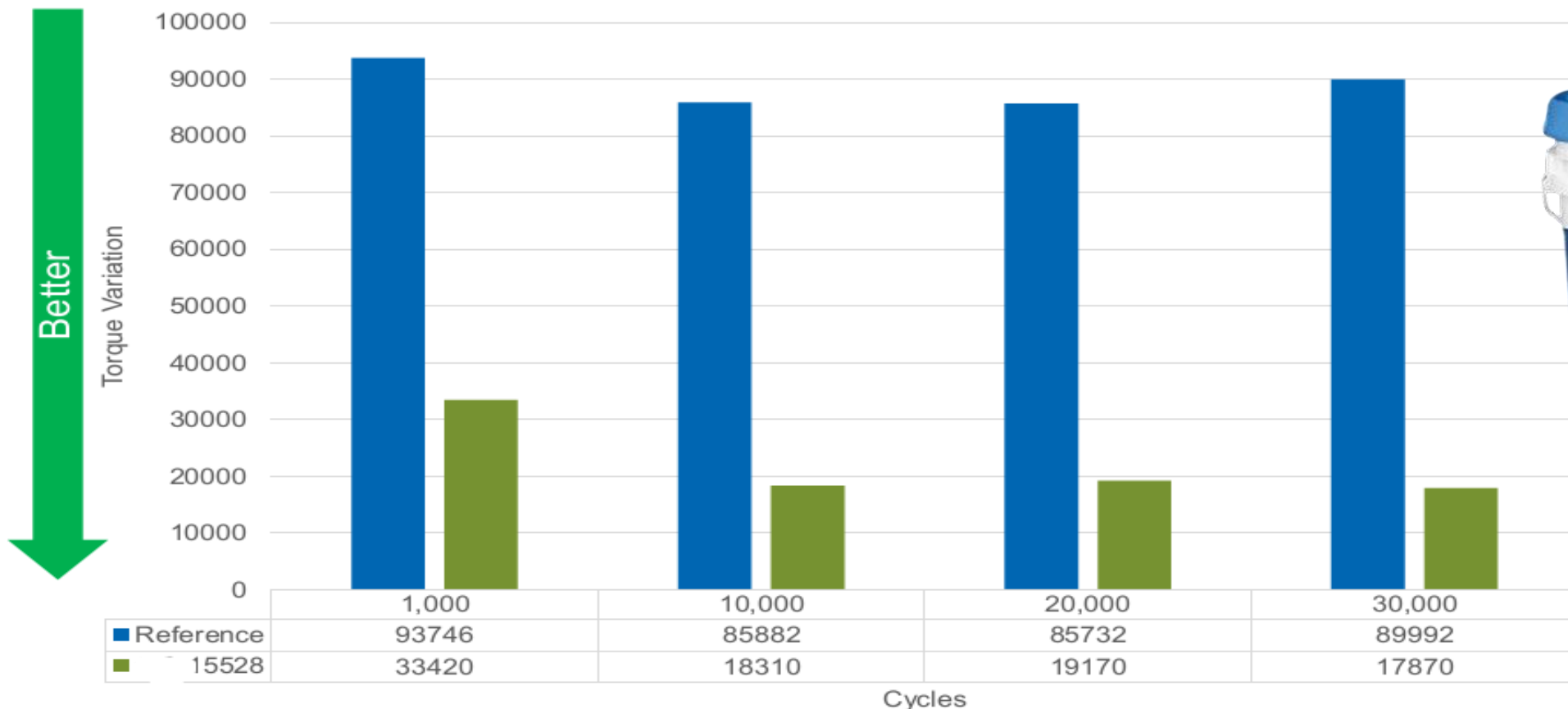
Mystik JT-5 THF



Frictional Characteristics- JDM JDQ 96 Brake Test

Core JDM J20C

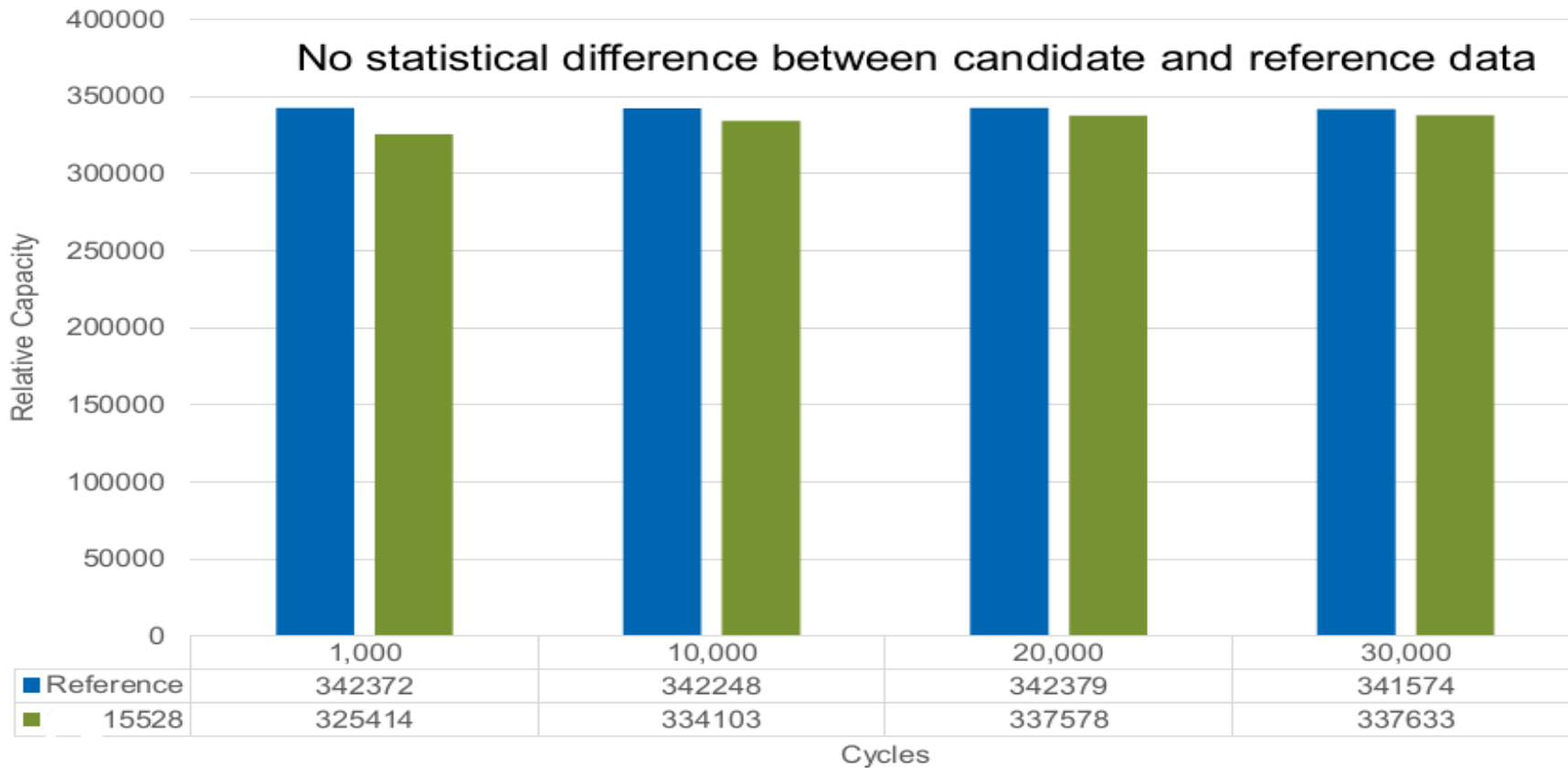
- ✓ JD Phys
 - ✓ JDQ 102
 - ✓ JDQ 95
 - ✓ JDQ 84
 - ✓ JDQ 94
 - ✓ JDQ 96
- Allison C4[†]



Frictional Characteristics- JDM JDQ 96 Brake Test

Core JDM J20C

- ✓ JD Phys
 - ✓ JDQ 102
 - ✓ JDQ 95
 - ✓ JDQ 84
 - ✓ JDQ 94
 - ✓ JDQ 96
- Allison C4⁺



TRANSGARD Synthetic Blend LOW-TEMP Tractor Hydraulic Fluid

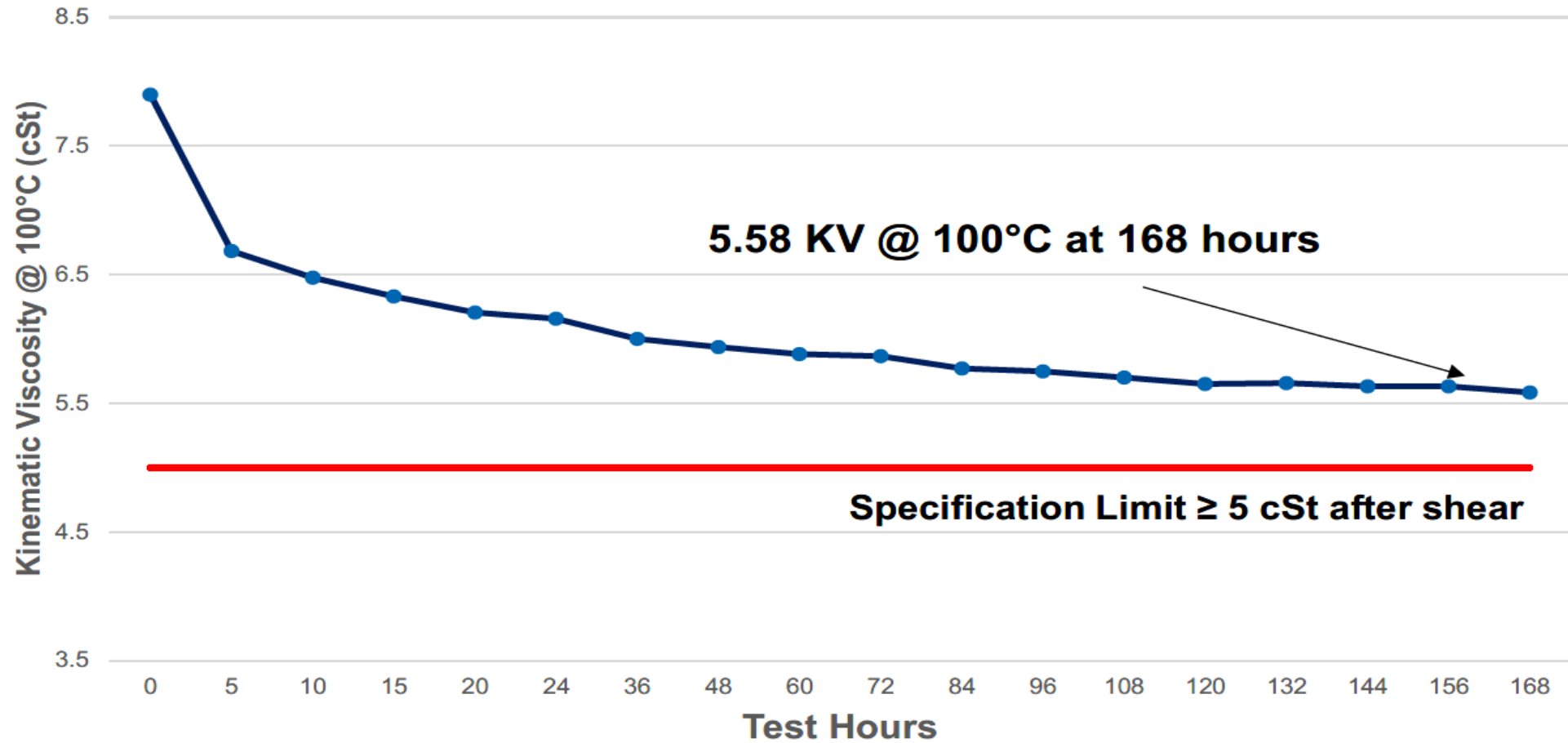
- Formulated to “meet” the John Deere J20D specification to provide protection and performance at an equivalent level or surpassing competition.
- Synthetic Blend
 - Provides outstanding low temperature fluidity
 - Performs well at a wide temperature range
 - Good pumpability in cold weather regions
 - Intended for application where a lower viscosity fluid is desired
 - Shear stable and maintains viscosity over time.



TRANSGARD Synthetic Blend LOW-TEMP Tractor Hydraulic Fluid

Shear Stability Test – JDM JDQ 102

JDQ-102 Test, OR-49546



Fluid Performance Level

J20D Viscometrics

Current OEM	Specification	OEM Status	Claim level
Allison	Allison C-4	Obsolete	SFU
Caterpillar	CAT TO-2	Obsolete	SFU
CNH	Case MS 1210	Obsolete	SFU
Eaton	E-FDGN-TB002-E	Current	SFU
Eaton-Vickers	I-286-S	Obsolete	SFU
Eaton-Vickers	M-2950-S	Obsolete	SFU
John Deere	JDM J20D	Current	Meets*

Mystik JT-5 Synthetic Blend TFX

- Excellent for J20C and beyond!
 - Suitable for CNH MAT 3540
 - Tractor requiring MAT 3540 built before 2013 ONLY
 - Not for top-off of Zinc-free fluids. Drain and refill with Mystik JT-5 TFX (contains Zinc)
- Synthetic Blend
 - Performs well at a wide temperature range
- Shear Stable Viscosity Modifier
 - Maintains viscosity over time



Mystik JT-5 Synthetic Blend TFX



Mystik JT-5 THF

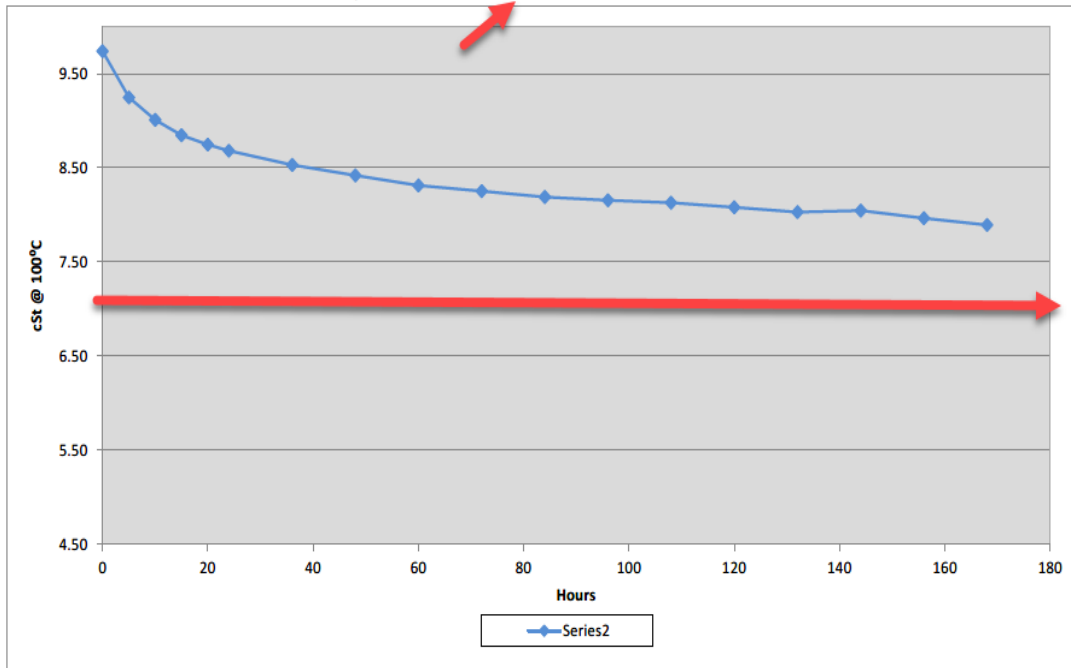
John Deere JDQ-102 Shear Stability Test



EOT Date: December 11, 2020

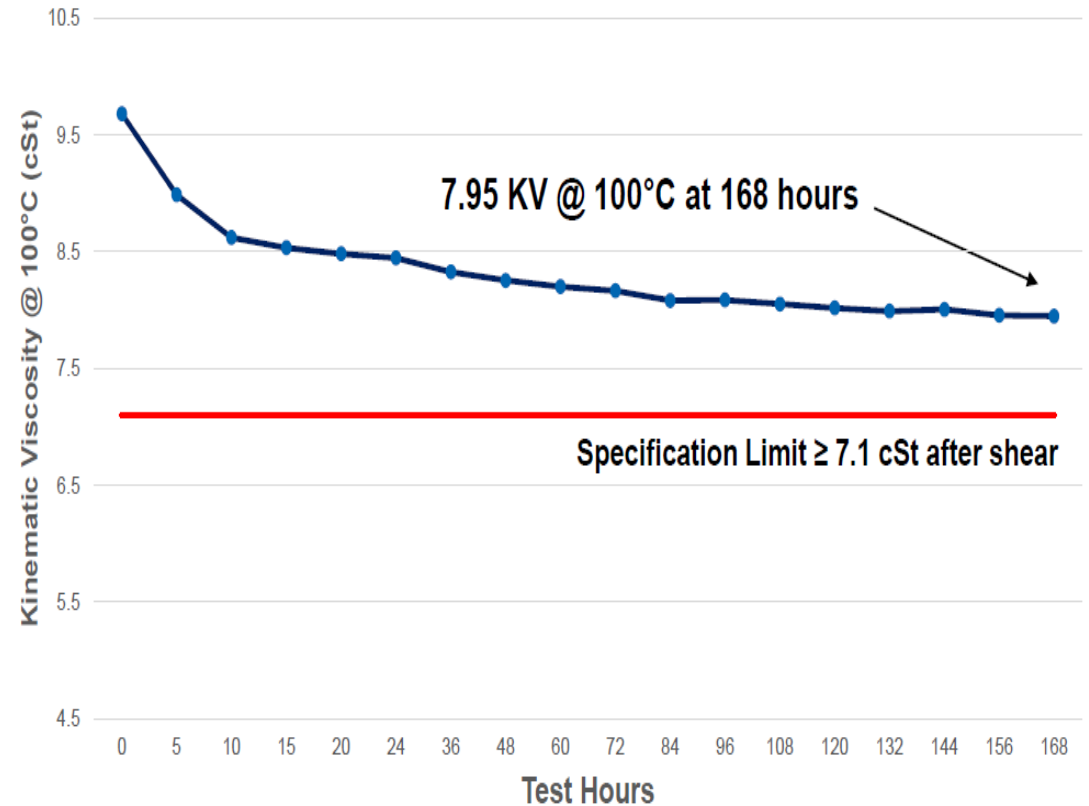
Test Number:
Oil Code:

Viscosity at 100°C after 168 hours was 7.89 cSt.
Viscosity at 40°C after 168 hours was 49.48 cSt.
Specifications limit is 7.10 cSt at 100°C after shear.



Mystik JT-5 SB TFX

JDQ-102 Test, OR-50026



Fluid Performance Level

J20C Viscometrics

Current OEM	Specification	OEM Status	Claim
AGCO	Power Fluid 821XL	Active	SFU
AGCO	CMS M1135	Not Supported	SFU
AGCO	CMS M1141	Not Supported	SFU
AGCO	GIMA-CMS M1143	Active	SFU
AGCO	GIMA-CMS M1145	Active	SFU
Allison	Allison C-4	Obsolete	SFU
API	API GL-4	Obsolete	SFU
ASTM D6973	Eaton 35VQ		SFU
Caterpillar	CAT TO-2	Obsolete	SFU
CASE	JIC 143, 144	Obsolete	SFU
CNH	Ford M2C134-D	Obsolete	SFU
CNH	FNHA 2-C-201.00	Obsolete	SFU
CNH	CNH MAT 3525	Current	SFU
CNH	Case MS 1205	Obsolete	SFU
CNH	Case MS 1206	Obsolete	SFU
CNH	Case MS 1207	Obsolete	SFU
CNH	Case MS 1209	Obsolete	SFU
CNH	CNH MAT 3509	Current	SFU
CNH	CNH MAT 3540	Current	SFU

Current OEM	Specification	OEM Status	Claim
Eaton	E-FDGN-TB002-E	Current	SFU
Eaton-Vickers	I-286-S	Obsolete	SFU
Eaton-Vickers	M-2950-S	Obsolete	SFU
International Harvester	B-5/B-6	Obsolete	SFU
John Deere	JDM J20C	Current	Meets**
Komatsu	Komatsu Dresser B-06-0001/ B-06-0002	Obsolete	SFU
Kubota	UDT	Current	SFU
Mineapolis Moline	Q1766/ 1722/ 1766B	Obsolete	SFU
New Holland	WB NWH 410B	Obsolete	SFU
Oliver	Q-1705	Obsolete	SFU
Renk Doromat	873	Obsolete	SFU
Renk Doromat	874 A / 874 B	Current	SFU
Volvo	WB 101	Current	SFU
White	Q-1826	Obsolete	SFU
ZF	TE-MIL-03E	Current	SFU
ZF	TE-MIL-05F	Current	SFU
ZF	TE-MIL-06K	Current	SFU





How to Contact Us

- Lubes Answer Line
- **800-248-4684**
 - 8:00 AM - 12:00 PM, 1:00 PM – 5:00 PM CT (Mon – Thurs)
 - 8:00 AM - 12:00 PM, 1:00 PM – 4:30 PM CT (Fri)
- lubeshelp@citgo.com
 - Available 24/7



Future Webinars

Future Webinar Date

Future Webinar Title

August 26, 2022

2022 Product Guides

September 2, 2022

Fundamentals of Lubrication

September 16, 2022

Transmission and Drive Train Lubricants

October 7, 2022

CITGO Metalworking Fluids