



# Transmission and Drive Train Lubricants

David Turner, CLS, OMA-I, CLGS

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- CITGO Sr. Technical Services Representative
- BS, Chemical Engineering
- 40+ Years Experience in Lubricants
- STLE Certified
  - Certified Lubrication Specialist
  - Oil Monitoring Analyst I
- NLGI Certified
  - Certified Lubricating Grease Specialist
- Active in STLE, NLGI, and ASTM

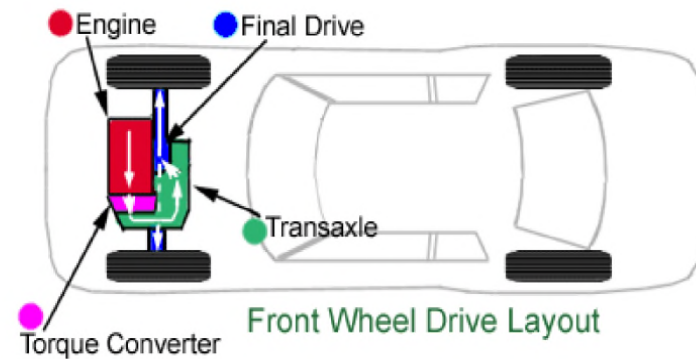
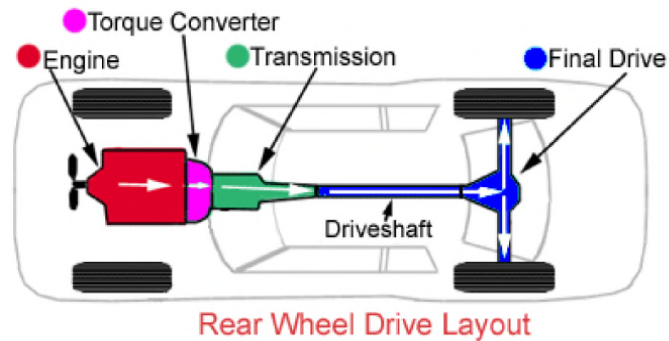




## Agenda

- Automatic Transmission Basics and Trends
  - CITGO/Mystik Automatic Transmission Products
  - Heavy Duty Driveline Trends
  - CITGO/Mystik Heavy Duty Driveline Products
  - Axle Basics and Trends
  - CITGO/Mystik Axle Lubricants
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## What does an automatic transmission do?



### Power Transmission Fluid (PTF)

Describes fluids necessary for proper operation of automatic transmissions, including stepped automatic transmission, dual clutch transmission, continuously variable transmission, etc.

### Automatic Transmission Fluid (ATF)

Generally refers specifically to fluids for stepped automatic transmission



# Types of Transmission

## **Stepped Automatic Transmission (AT)**

Most common automatic transmission that uses a planetary gear set and a torque converter

## **Continuously Variable Transmission (CVT)**

Automatic transmissions that use variator pulleys with an unlimited number gear ratios

## **Dual Clutch Transmission (DCT)**

Automatic transmissions that use manual gearbox architecture with dual clutches

## **Automated Manual Transmission (AMT)**

Manual transmissions that use servos to engage clutch and change gears automatically

## **Dedicated Hybrid Transmission (DHT)**

Combines stepped automatic transmission with electric motor  
(e.g. Toyota's Hybrid Synergy Drive)

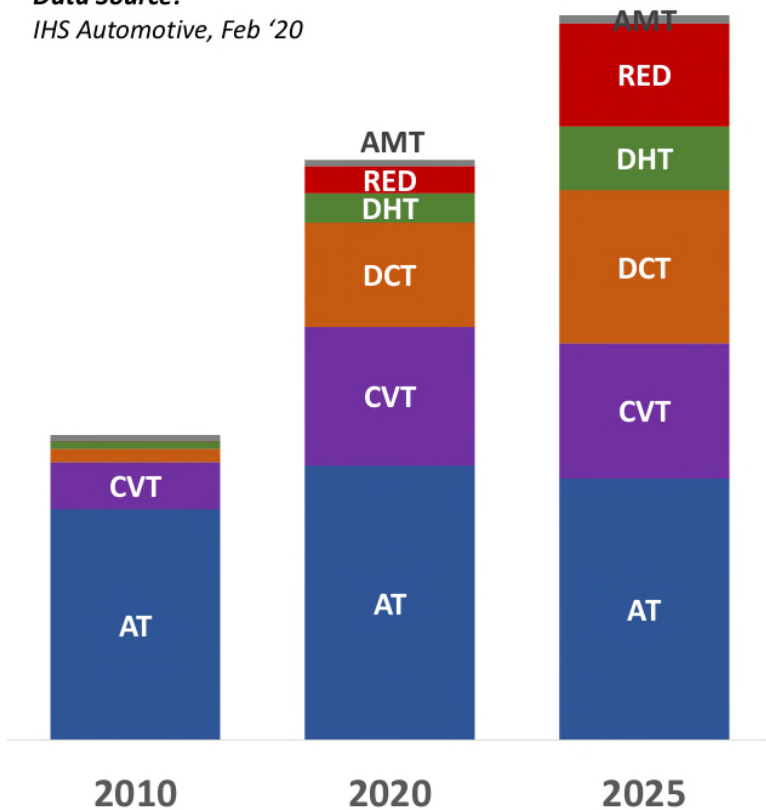
## **Reduction Transmission (Electric)**

Transmissions used by purely electric vehicles to increase torque output from electric motors  
(Nissan Leaf)

## **Manual Transmission (MT)**

# Global Automated Transmission Installations

**Data Source:**  
IHS Automotive, Feb '20



## Automated Manual Transmission (AMT)

Some production increase, market share low and declining

## Reduction Transmission (Electric)

Large electric vehicle increase, market gaining momentum

## Dedicated Hybrid Transmissions (DHT)

Large hybrid vehicle increase, continuing market share growth

## Dual Clutch Transmission (DCT)

Large increase, with market share gain in China and Europe

## Continuously Variable Transmission (CVT)

Increase in production now peaking with electrification

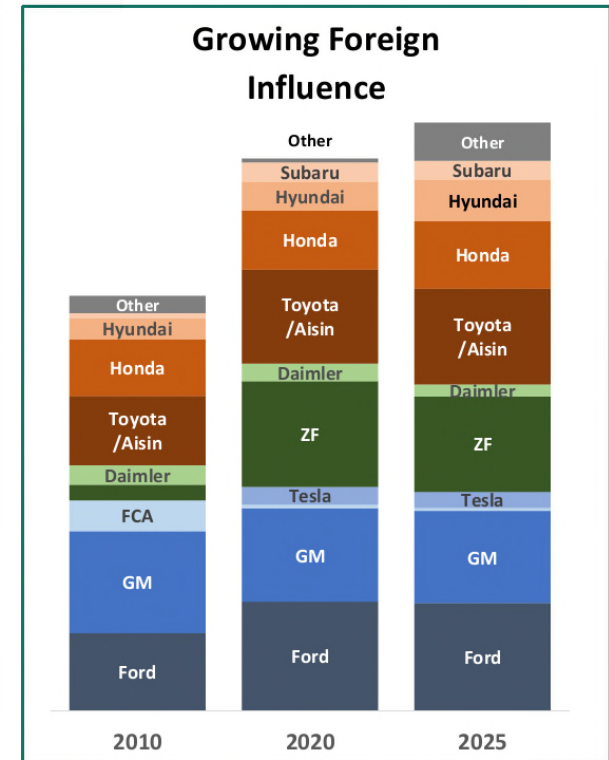
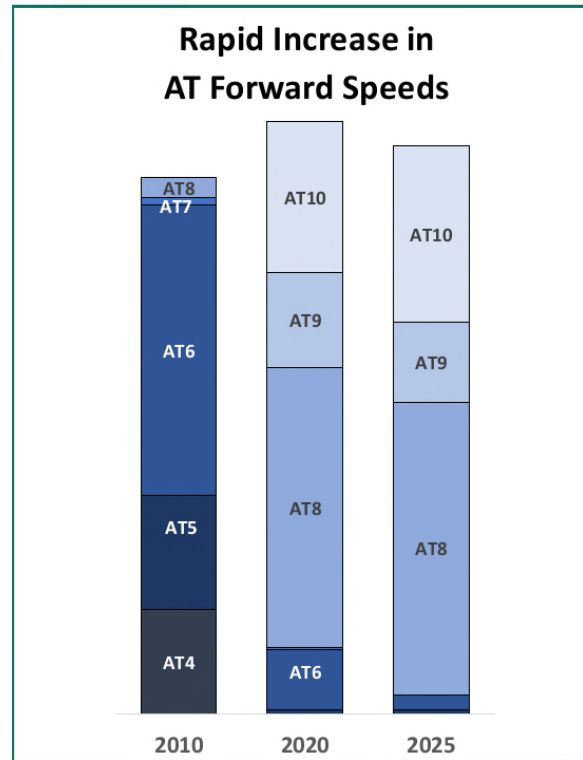
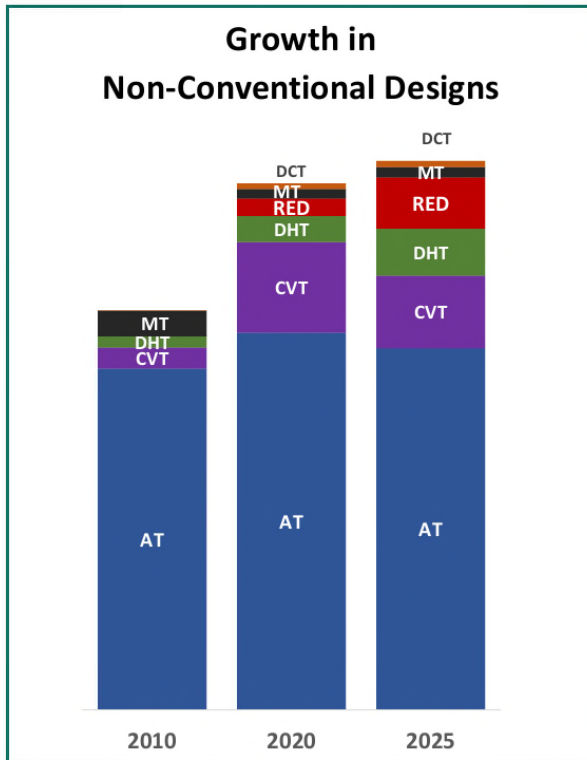
## Stepped Automatic Transmission (AT)

Production slowly declining, with growing diversity of designs

# Transmission Hardware Trends

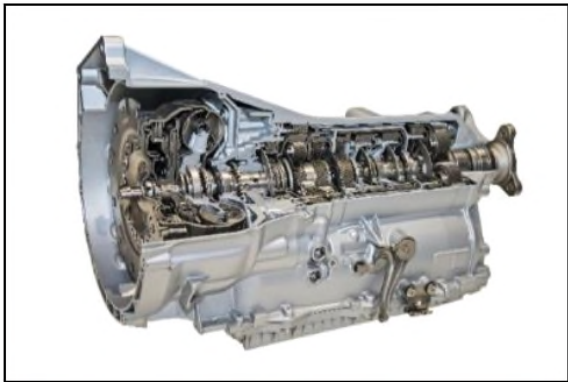
## North America Installations – CAFÉ Impacts

Data Source: HIS Automotive, Feb'20

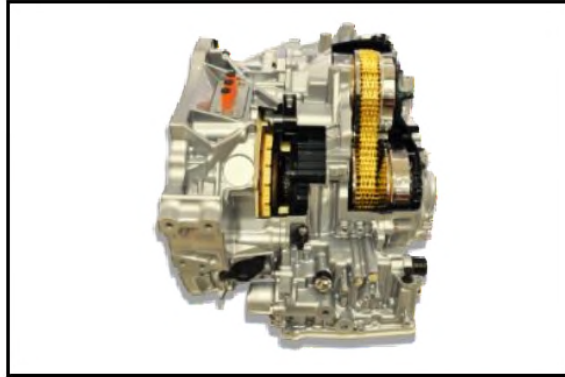


## ATF Industry Trends

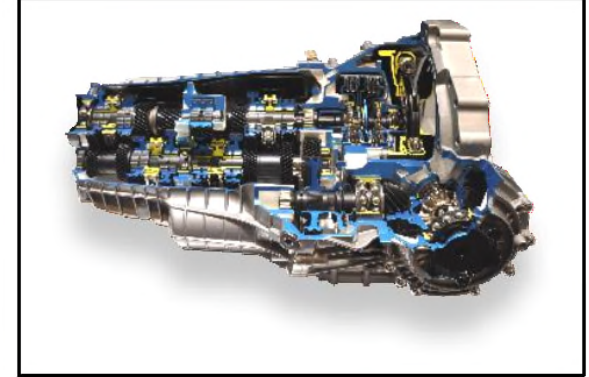
- ATF technology is in constant change due to improvements in emissions and fuel efficiency.
- Latest automated transmission technology specifies only synthetic fluids for precise control of fluid properties.
- Fill for life and new technology is driving the industry for extended drains in ATF.



**Step AT**



**CVT**

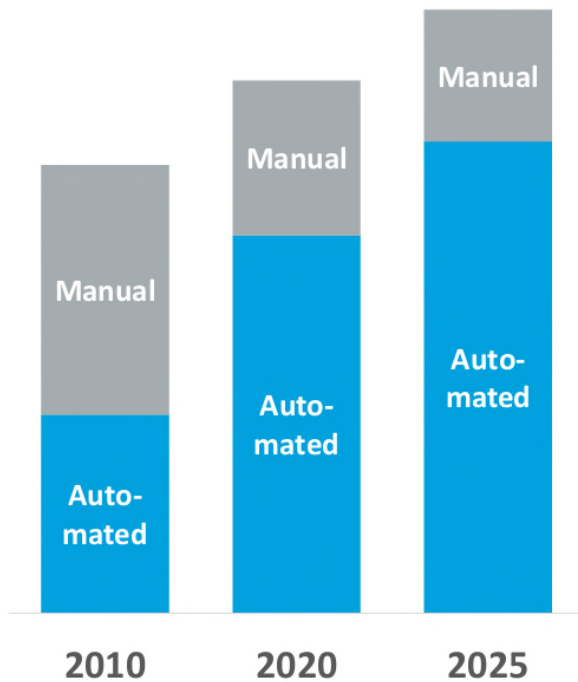


**DCT**



# Global Transmission Installations

Global Light Duty Transmission Installations



## Passenger Car And Light Duty Truck Transmission Installations

### Manual

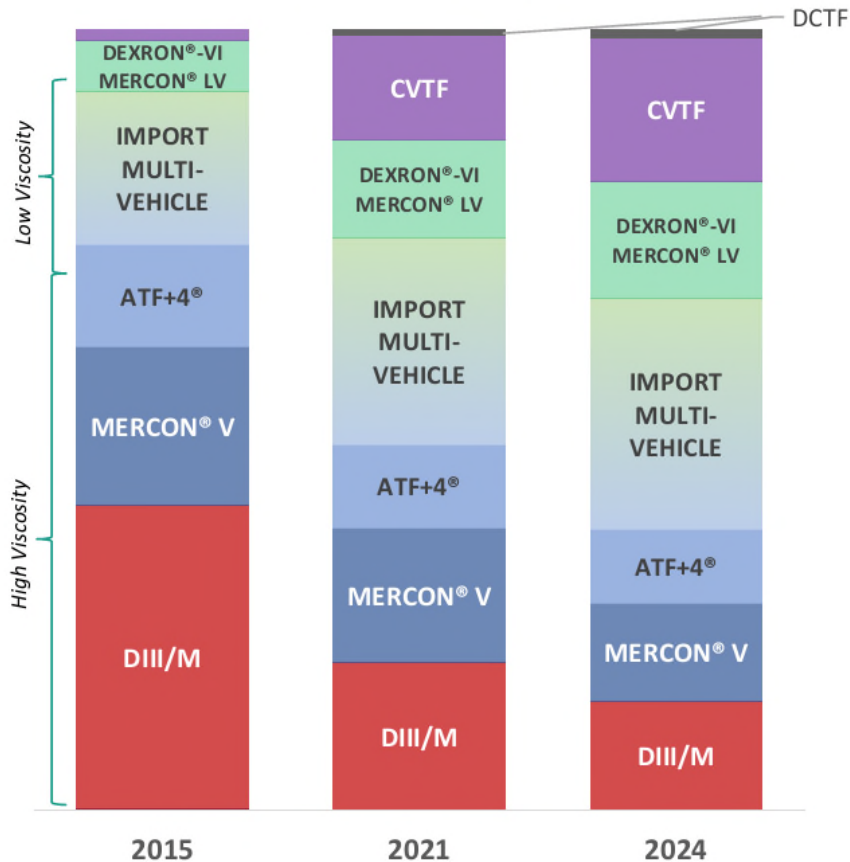
Market share declining with inherent lower cost now being offset by fuel economy *debit*

### Automated

Market share increasing with fuel economy now better than manual. Increasing diversity in design

# ATF Market Review: Low Viscosity ATF Growth

US SERVICE FILL PROJECTION

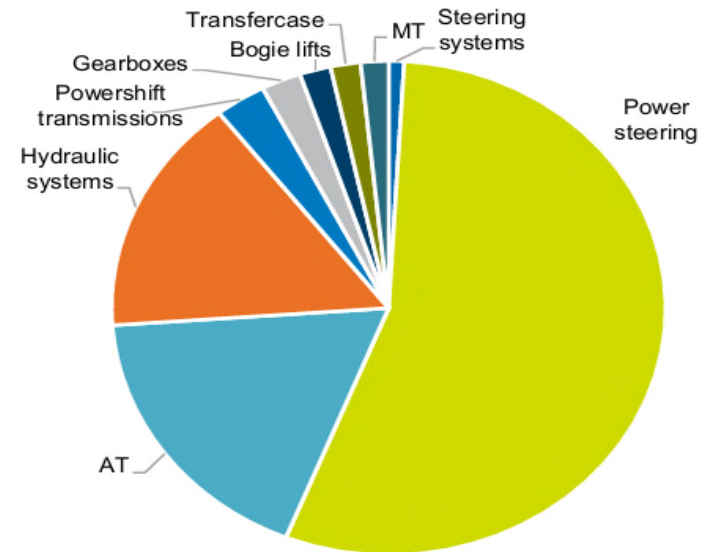
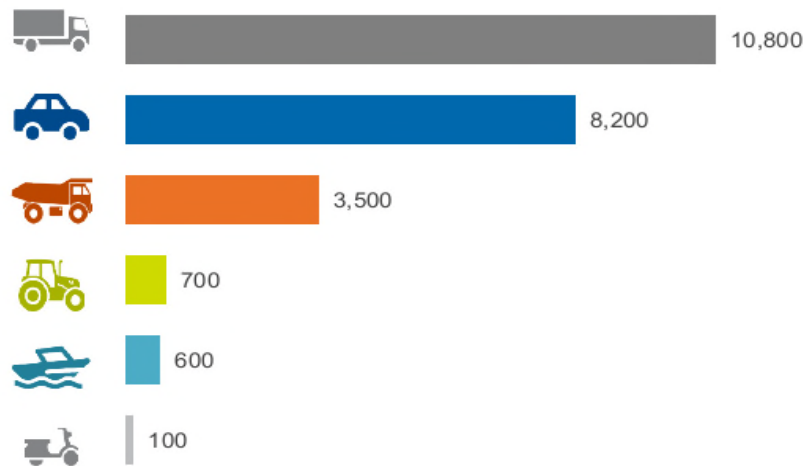


- Type F:** true vehicle requirement <0.1%  
low cost, hard shift, other applications
- DIII/M:** declining to <20%  
low cost also keeping market afloat
- MERCON V:** also declining to <20%  
all out of warranty period
- ATF+4:** stable at ~10%  
still used by Chrysler
- Import Multi-Vehicle;** growing to >25%  
greater, if also for GM and Ford licensed applications
- DEXRON-VI/MERCON LV:** increasing, >10%  
Fords now reaching 150,000 mile ODI
- Ultra Low Viscosity [ULV]** – negligible demand  
Recently introduced, also with long ODI
- CVTF:** growing to >10% demand  
•CVT installations up, with relatively short ODIs
- DCTF:** less than 1% demand  
few DCT installations in US

## Industry Trends

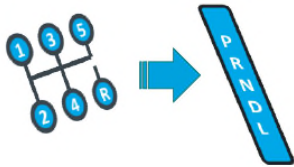
### Dex/Merc is more than just PC ATF:

Number of Vehicle Models – Dex/Merc



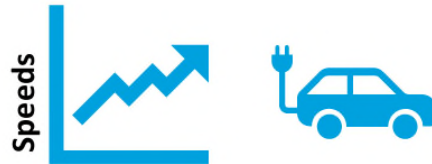
**Due to the many applications of Dex/Merc there will still be a demand for many years in the service fill market**

# Market Summary



## Growing use of automated transmissions

- Now providing better fuel economy than manuals
- Manual production is now lower than automatics



## Stepped Automatics are still the majority




- Gaining more gears – most now >8-speeds
- Major manufacturers are Ford, GM, ZF and Toyota
- CVTs and DCTs are gaining market share
- Increasing use of hybrid and reduction gear boxes for electric motors



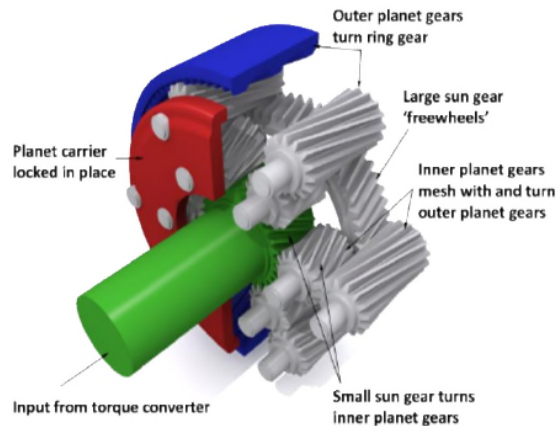
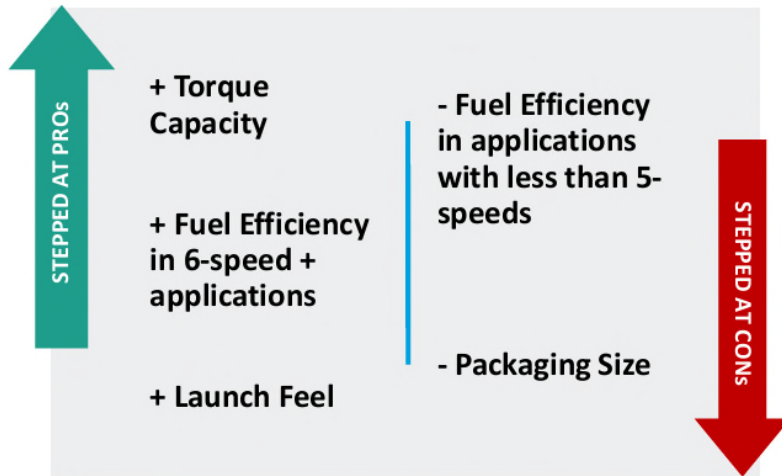
## Most automatic transmission fluids are now lower viscosity

- Less churning loss leads to better fuel economy
- Import multi-vehicle ATFs gaining market share, often with GM and Ford approvals
- CVT fluid demand increasing, with short drain intervals

# Comparison of Passenger Car Automatic Transmissions

AT Type	Planetary	CVT	DCT
			
<b>Torque Capacity</b>	Best	OK	Good
<b>Fuel Economy</b>	OK	Good	Best
<b>Manufacturing Costs</b>	Expensive	Most expensive	Least expensive
<b>Ideal Car Segment</b>	Full-size/luxury	Micro to medium	Medium – Full
<b>Primary Global Region</b>	North America	Asia	Europe
<b>General Advantages</b>	<ul style="list-style-type: none"> <li>➤ Easily handles high loads and torque</li> <li>➤ Smooth start and comfortable gear shifts</li> <li>➤ Most widely used and proven AT</li> </ul>	<ul style="list-style-type: none"> <li>➤ Infinite gear ratios for optimum engine rpm range</li> <li>➤ Unnoticeable gear shifting with constant acceleration</li> <li>➤ Suited for FWD and hybrid vehicles</li> </ul>	<ul style="list-style-type: none"> <li>➤ Rapid comfortable shifting without interruption</li> <li>➤ Suited for diesel engines and/or front wheel packaging</li> <li>➤ Choice of driving style (MT or AT)</li> </ul>

# Stepped Planetary Automatic Transmission



## Hardware

- **Planetary Gearset** – gear ratio control
- **Torque Converter** – fluid-coupling to transfer power from engine to transmission
- **Clutch Packs**
- **Valve-Body**

## Market

- Most common global transmission type

## Manufacture

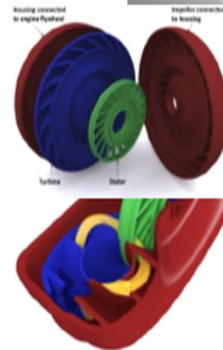
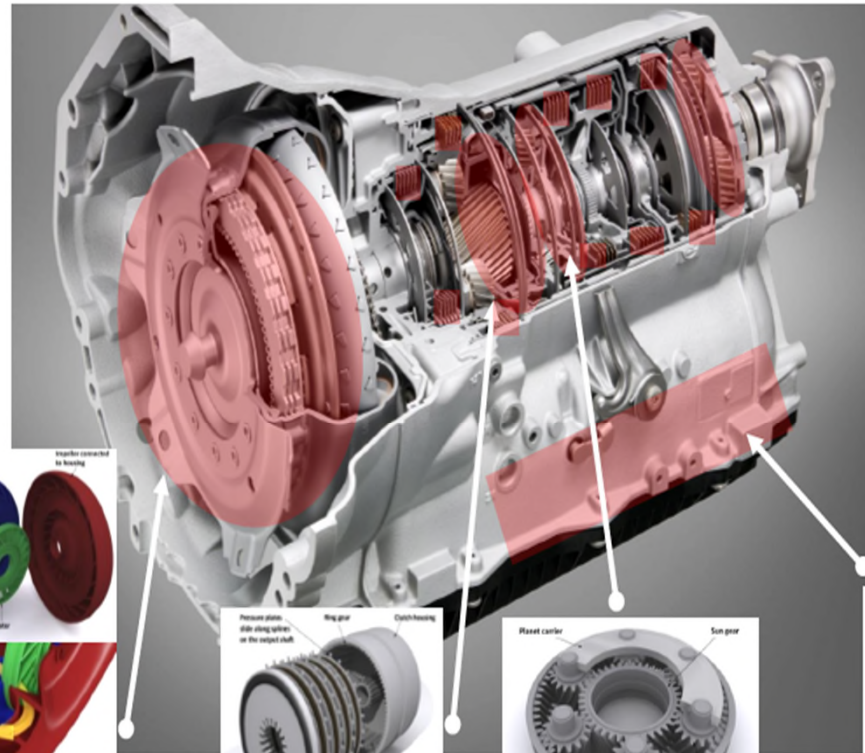
- GM Hydra-Matic was the first mass-produced fully automatic planetary AT

# Automatic Transmission Hardware

Photo source: BMWBLOG.COM

There are 4 major components in the automatic transmission:

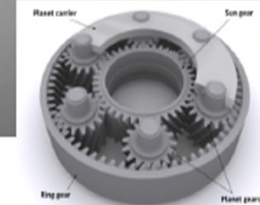
- **Torque Convertor:** transfers power from the engine to the transmission
- **Planetary Gear Set:** changes output speed
- **Valve Body:** the “brain” of the transmission
- **Clutches (plate or band):** changes gear ratios



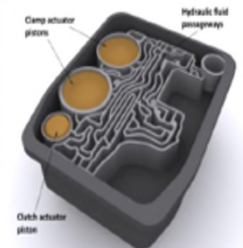
Torque Convertor



Clutches

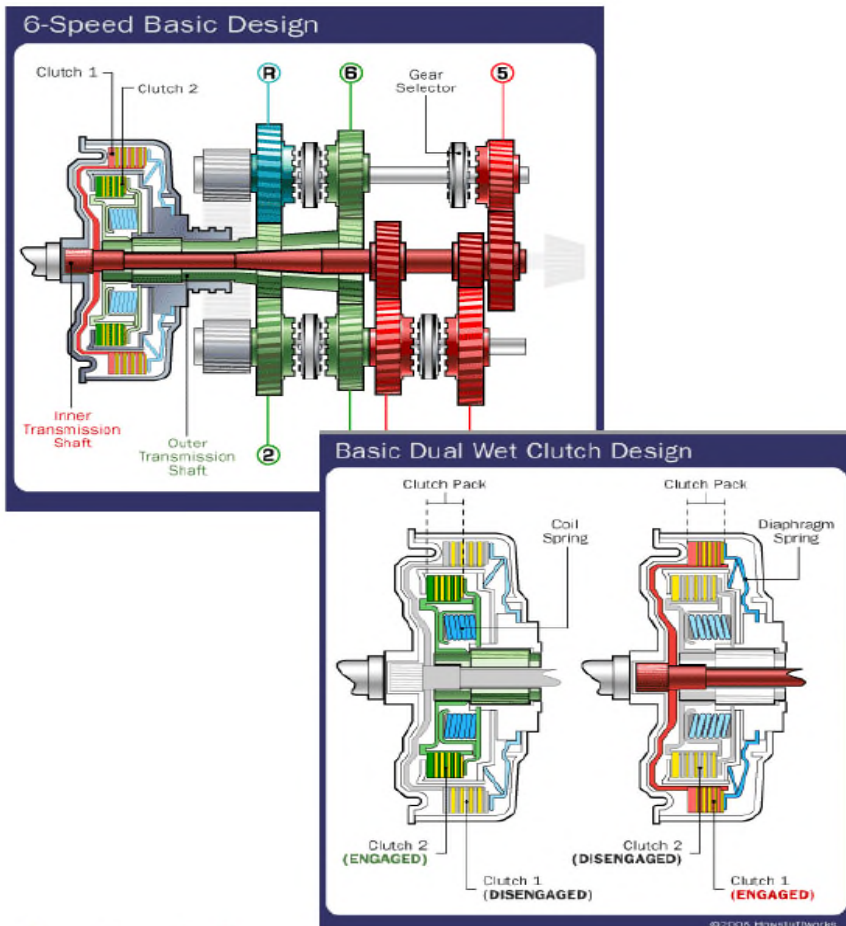


Planetary Gear



Valve Body

# Dual Clutch Transmission

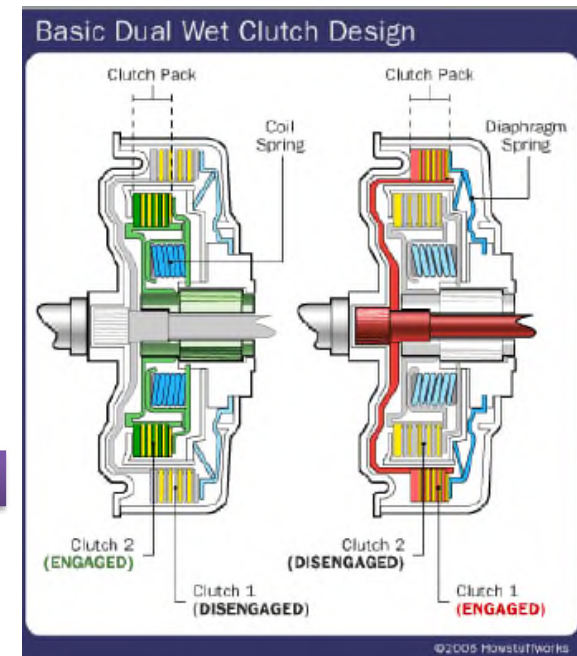
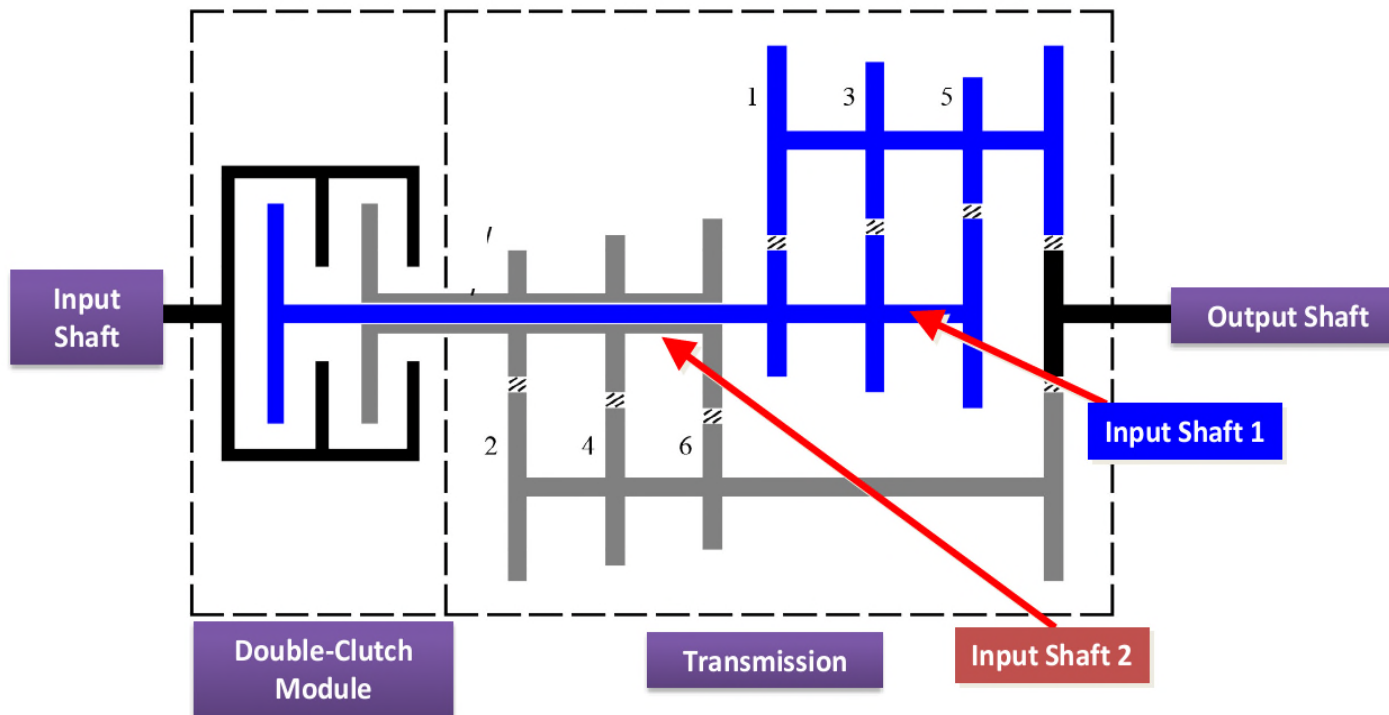


- Gear sets are similar to manual transmission
- Co- liner shafts with constantly meshed gears and synchronizers
- Two clutches eliminates shift shock
- To activate, hydraulic pressure forces coil springs and diaphragm springs and to disengage clutch, fluid pressure is reduced.
- “Wet” DCT application- clutch components bathed in lubricating fluid
  - Reduce friction
  - Limit heat production
- “Dry” DCT – application
  - Clutch is more similar to manual transmission clutch
  - Lower torque capacity
  - Better fuel economy
- Driving style is similar to conventional stepped automatic.

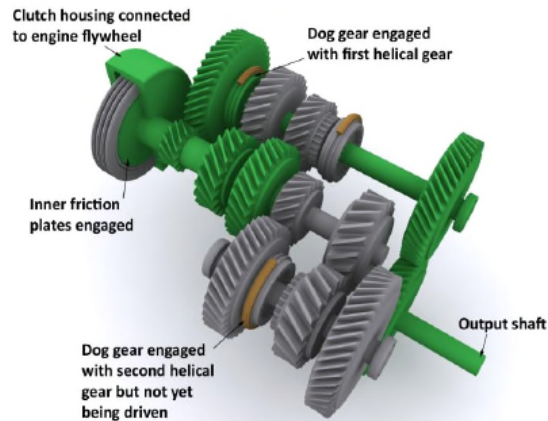


# Dual Clutch Transmissions, How They Work

- Two input shafts are connected to two different clutches
  - 1, 3, 5 gears are connected to one
  - 2, 4, 6 gears are connected to the other



# Dual Clutch Transmission Technology



DCT Pros

+ Fuel Efficiency  
+ Shift Feel  
+ MT manufacturing (EU)

- Launch feel may be not as smooth as stepped AT

DCT Cons

## Hardware

Combines elements of both manual and automatic transmissions

## Market

DCT currently attracting great interest

Especially in Europe where market share projections approach 20% by 2020

## Manufacture

First commercial transmission introduced by VW

Driven by fuel efficiency and driver comfort

# Continuously Variable Transmission

## Continuously Variable Transmission

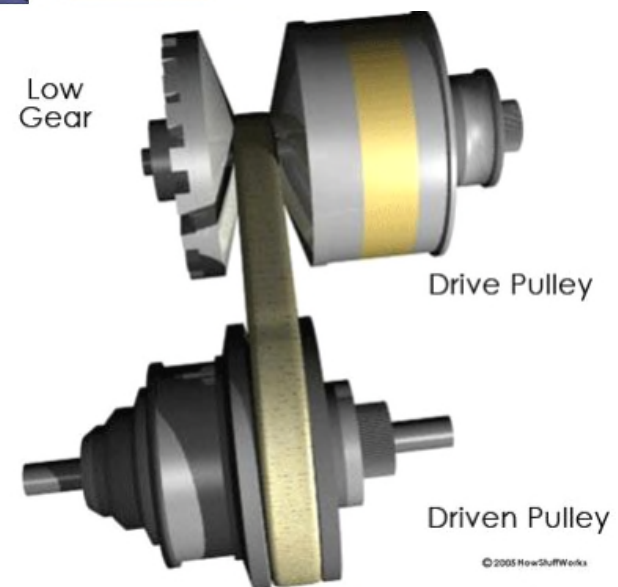
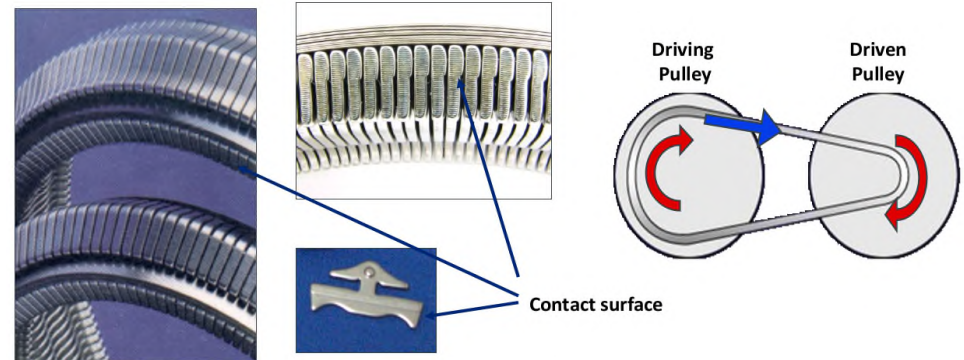
- CVT's constantly change gear ratios in response to engine power.
- CVT allows for smooth power delivery, no 'shift shock'
  - Power can be optimized for acceleration or fuel economy
- CVT cannot handle higher torque applications
- CVT has fewer parts compared to other automatic transmission types
  - Uses two variator pulleys and a belt or chain instead of planetary gear sets
  - Has a continuum of gear ratios rather than discrete steps of ratio

### OEMs Using CVTs Today





- Nissan
- Subaru
- Honda
- Toyota
- Audi
- Ford
- GM

# Continuously Variable Transmission Hardware

- Types of CVT Equipment
  - Steel belt – push or pull belt types (most common)
  - Toroidal – traction driven
  - Hydro mechanical – combination of hydraulic and mechanical
- There are two primary types of CVT's in passenger cars:
  - Variable-diameter pulleys and
  - Toroidal
- Variable diameter pulley CVT
  - Use a belt or chain links and two variable-diameter pulleys to continuously change gear ratios
- Three primary components (in variable diameter pulley CVTs)
  - Belt (rubber or metal links)
  - Variable input (driving) pulleys
  - Variable output (driven) pulleys



# Passenger Car ATF Specification

	OEM	High Viscosity	Low Viscosity	Ultra Low Viscosity
North American OEMs		MERCON® MERCON® V	MERCON® LV	MERCON® ULV
		ATF +3® ATF +4®	948TE	-
		DEXRON® II DEXRON® III	<b>DEXRON® VI</b> DEXRON® HP	DEXRON® ULV
European OEMs	 Mercedes-Benz	MB 236.10	MB 236.12	MB 236.14
		Lifeguard 5	Lifeguard 8	-
Asia Pacific OEMs		Toyota T-IV	Toyota WS	-
		Matic J/K	Matic S	-
		Honda Z-1	Honda DW-1	-
		Hyundai SP-III	Hyundai SP-IV	-

\*Bolted specifications are open to licensing



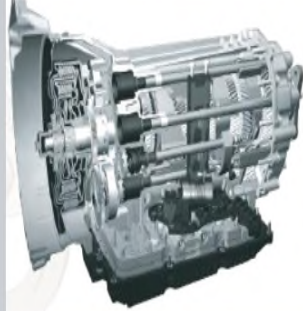


# ATF Formulation Focus

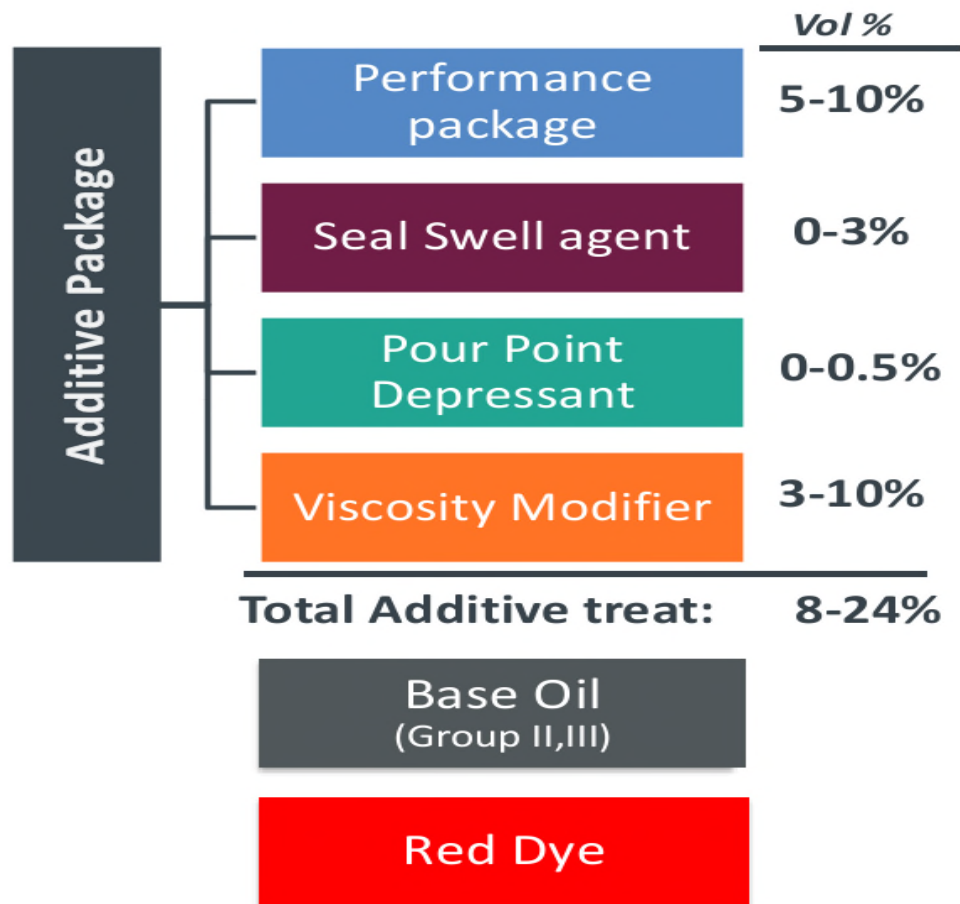
## ATF Performance Requirements

- Acts as a hydraulic fluid
- Large operation range (-40°F to 350°F)
- Should resist oxidation
- Provide anti-wear performance by protecting the gear sets
- Removes heat efficiently
- Should be shear stable
- Protects against corrosion
- Ensure seal performance
- Deliver specialized friction characteristics

## COMMON ATF PROPERTIES

<ul style="list-style-type: none"> <li>• Hydraulic fluid</li> <li>• Foam &amp; aeration control</li> <li>• Flow at low temperatures</li> <li>• Protect seals</li> </ul>	<ul style="list-style-type: none"> <li>• Wear protection</li> <li>• Corrosion inhibition</li> <li>• Dissipate heat</li> </ul>	<ul style="list-style-type: none"> <li>• Friction control</li> <li>• Friction durability</li> <li>• Harness compatibility</li> <li>• Conductivity</li> </ul>
Planetary AT	CVT	DCT
		
<ul style="list-style-type: none"> <li>• Friction characteristics for torque converter and clutches</li> <li>• Optimum torque transfer</li> </ul>	<ul style="list-style-type: none"> <li>• Steel-on-steel friction</li> </ul>	<ul style="list-style-type: none"> <li>• Synchronizer performance</li> <li>• Wet start clutch</li> <li>• Load carrying</li> </ul>

# Basic ATF Formulation



# CITGO TRANSGARD Multi-Purpose ATF

- Market Need:
  - 25% of Consumer Demand
  - Primarily US OEMs
- Consumer Benefits:
  - Designed for use in GM transmissions calling for DEXRON®-III, DEXRON-IIIE and DEXRON-II fluids
  - Also for use in Ford MERCON® type ATF





# CITGO TRANSGARD Synthetic MV High Viscosity ATF

- Market Need:
  - 5% of Consumer Demand
- Consumer Benefits:
  - Synthetic, superior ATF and powershift performance
  - Suitable for Ford MERCON® V, Ford MERCON® (obsolete), GM DEXRON®-IIIH (obsolete), and Allison C-4, TES-295 (not OEM approved) and TES-389 (not OEM approved)
  - In California, we recommend TRANSGARD, MERCON V ATF for MERCON V applications



# CITGO TRANSGARD Synthetic MV Low Viscosity ATF

- Market Need:
  - 30% of Consumer Demand
- Consumer Benefits:
  - Full Synthetic
  - Suitable for use where the following products are recommended: DEXRON®-III, DEXRON®-VI, MERCON® LV/SP, Toyota WS, Honda DW-1, Nissan Matic S, Hyundai SP-IV and many others
  - In California, we recommend TRANSGARD DEXRON VI ATF for DEXRON VI applications



# CITGO TRANSGARD MERCON® V ATF

- Market Need:
  - 9% of Consumer Demand
  - Ford Specification
- Consumer Benefits:
  - Licensed
  - advanced extended life automatic transmission fluid designed for Ford transmissions and transaxles

This product may also be used in automatic transmission units that require a fluid qualified against the Ford MERCON® specification



# CITGO TRANSGARD DEXRON® VI ATF

- Market Need:
  - 10% of Consumer Demand
- Consumer Benefits:
  - Full synthetic, licensed by GM
  - Designed to provide twice the normal service life of a DEXRON®-IIIH ATF
  - Offers enhanced performance for both new and older model transmissions



## CITGO TRANSGARD ATF + 4®

- Market Need:
  - 6% of Consumer Demand
- Consumer Benefits:
  - Licensed and approved by FCA (Stellantis)
  - Full Synthetic Formulation provides outstanding protection under the most demanding conditions
  - Superior viscosity profile for improved shift performance and extended transmission life



# CITGO TRANSGARD TYPE F ATF

- Market Need:
  - 2% of Consumer Demand
- Consumer Benefits:
  - Recommended for use in all automatic transmissions for which a Type F fluid (Ford Specification M2C33-F) is specified
  - Recommended for service fill of power steering units of many Ford passenger cars and light trucks, and can be used in various AW hydraulic fluid applications



# CITGO TRANSGARD CVT FLUID

- Market Need:
  - 20% of Consumer Demand
- Consumer Benefits:
  - Full Synthetic, designed for Domestic, European and Japanese passenger car transmissions
  - Belt and chain-driven CVTs



## Mystik Multi-Purpose ATF

- Market Need:
  - 25% of Consumer Demand
  - Primarily US OEMs
- Consumer Benefits:
  - Designed for use in GM transmissions calling for DEXRON®-IIIIG/H, DEXRON-IID/E and DEXRON-II fluids
  - Also for use in Ford MERCON® type ATF
  - Suitable for use where Chrysler ATF +3 fluid is required
  - Also suitable for Allison C-4 and TES 389B





## Mystik Synthetic Multi-Vehicle ATF (high viscosity)

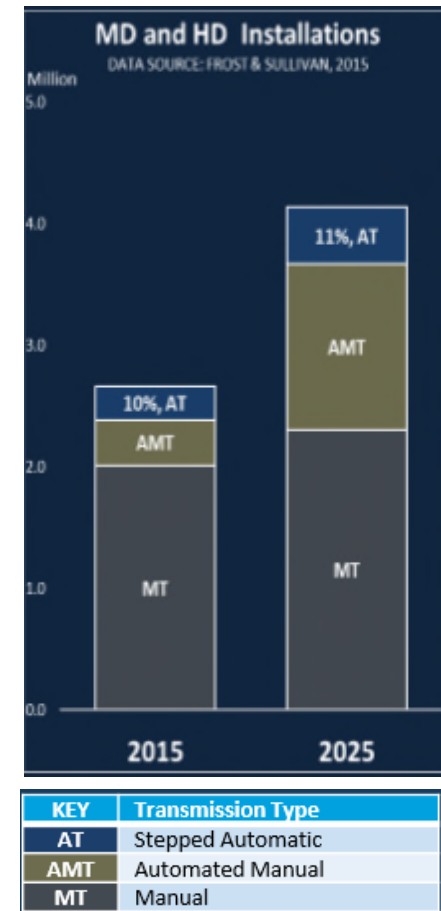
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  - 5% of Consumer Demand
- Consumer Benefits:
  - Synthetic, superior ATF and powershift performance
  - Suitable for Ford MERCON® V, Ford MERCON® (obsolete), GM DEXRON®-II (obsolete), GM DEXRON®-III (obsolete), and Allison C-4, TES-295 (not OEM approved) and TES-389 (not OEM approved)
  - Suitable for multiple European and Asian AFT specifications
  - In California, we recommend TRANSGARD, MERCON V ATF for MERCON V applications



## Heavy Duty Driveline Trends

- All major fleets shifting from manual transmissions to automated manual transmissions (AMT)
  - Integrated offerings offer fuel efficiency benefits up to 8% higher than old models
  - First fill ODI extended to 750,000 miles in some applications
- AMT's dominate on-highway – Allison's automatic transmission (AT) dominates the vocational and medium-duty segment

Source – Afon Chemical



Source – Infineum

## Heavy Duty Driveline Trends

- Until recently, most HD transmissions referred to the viscosity of the oil as SAE 50. This was because Eaton had the majority of the market share. In the 1990's, they learned that axle oil chemistry was too active and caused failures in the transmission. By using an engine oil viscosity designation, there was less error in using axle oils.
- European transmissions are now in the US market. They refer to their oil viscosity as 75W-90 or 75W-80. This is causing confusion in the US and some erroneously using axle oil in Daimler DT12 and Volvo I-shift transmissions.
- Eaton and Allison have taken the approach to remove reference to viscosity and use the specification and a required logo.

Source: BASF



## CITGO Heavy Duty Driveline Products

### CITGO® SYNDURANCE® 668 ATF

- Allison TES 668 approved fluid
- Synthetic transmission fluid for all Allison 1000, 2000, 3000 and 4000 series automatic transmissions
- **Backwards compatible where Allison TES 295 is required**
- Available at Cicero and OKC in Bulk, Totes, Drums, Kegs and Pails



# CITGO Heavy Duty Driveline Products

## CITGARD® DriveShift Synthetic Transmission Fluid

- Synthetic 75W-90 manual transmission fluid
- 500,000 mile drain capable
- **Suitable for use:**
  - Mack mDrive, TO-A Plus
  - Volvo I-Shift, 97305, 97307, 97315, 97318, 97319
  - DANA Manual Transmissions
  - Detroit DT12 AMT
  - Meritor O81, Navistar 6816
  - Eaton PS164 Rev 7
  - ZF Freedomline Manual transmissions
  - API GL-4, MT-1
- Availability: Drums and Pails out of OKC



Source: grainews.ca

## CITGO Heavy Duty Driveline Products

### CITGO® SYNDURANCE® Synthetic MTF

- **Eaton® PS-386 approved fluid**
- Synthetic transmission fluid also meets Mack TO-A Plus, Navistar MPAPS B-6816 Type II and API MT-1
- SAE 75W-90 (SAE 40)
- **Supersedes EATON® PS-164 Rev 7 (SAE 50)**
- Available at OKC in Drums, Kegs and Pails



## CITGO Heavy Duty Driveline Products

### CITGO® QUATRASYN® Synthetic Transmission Fluid

- Long history of proven performance in buses, refuse vehicles, construction material trucks, motor homes, etc.
- Approvals:
  - MAN 339V1, 339Z2
  - VOITH H55.6335.XX (G607)
  - ZF TE-ML 04D; 14B; 16L; 16R; 20B; 25B
  - JASO 1A, M315-2004
- Suitable for use:
  - Allison C-4, TES 295; TES 468 (Not suitable for use in California)
  - Mercedes MB236.5; 6; 7; 9; 10; 11
  - VOLVO 97341
- Availability: Drums and Totes out of OKC and Drums, pails, and 3/1 Gallons out of OKC and Cicero



## CITGO Heavy Duty Driveline Products

### CITGO® CITGEAR® Synthetic Gear Lubricant

- SAE 50
- Meets: API MT-1
- Suitable for use:
  - Eaton PS-164 Rev 7
  - Eaton Road Ranger Extended Drain
  - International TMS 6816
  - Mack TO-A Plus
  - Meritor O-81
  - ZF Freedomline
- Availability: Bulk, Totes, Drums and Kegs out of OKC and Pails out of OKC and Cicero





# CITGO Heavy Duty Driveline Products

## CITGO TRANSGARD® Heavy-Duty Transmission Fluids

- Heavy-Duty transmission fluids designed for construction equipment, powershift transmissions, final drives and wet brakes.
  - Available in SAE 10W, 30, 50 and 60 viscosity grades
  - Formulated to meet the performance requirements of:
    - Allison C-4 – SAE 10W and 30 grades
    - Caterpillar TO-4, CD/TO-2 – all grades
    - Komatsu Micro-Clutch – all grades
- Availability: Bulk out of Atlanta, OKC and Cicero. Totes, Drums and Pails out of OKC and Cicero



## CITGO Heavy Duty Driveline Products

### SYNDURANCE® Synthetic All Seasons HD Transmission Fluid

- Designed for heavy-duty construction equipment powershift transmissions, final drives and wet brakes.
  - Formulated to meet the performance requirements of:
    - Allison C-4
    - Caterpillar TO-4M, TO-4, CD/TO-2
    - Komatsu Micro-Clutch
- Availability: Bulk out of OKC and Cicero. Drums out of OKC



## Mystik Heavy Duty Driveline Products

Mystik® SX-7000 Synthetic MTF

- **Eaton® PS-386 approved fluid**
- Synthetic transmission fluid also meets Mack TO-A Plus, Navistar MPAPS B-6816 Type II and API MT-1
- SAE 75W-90 (SAE 40)
- **Supersedes EATON® PS-164 Rev 7 (SAE 50)**
- Available at OKC in Pails



# Mystik Heavy Duty Driveline Products

## Mystik® Lubricants Tenax® Fluids

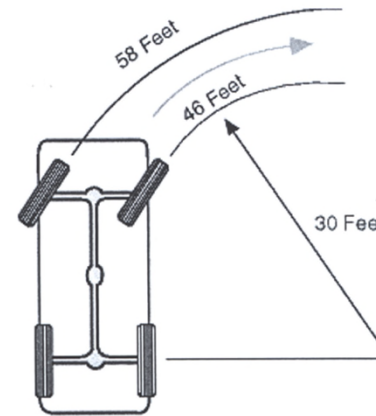
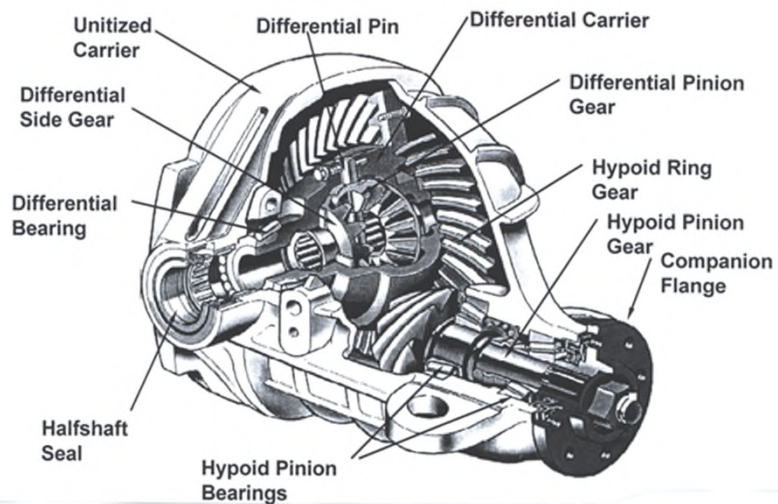
- Heavy-Duty transmission fluids designed for construction equipment, powershift transmissions, final drives and wet brakes.
  - Available in SAE 30 and 50 viscosity grades
  - Formulated to meet the performance requirements of:
    - Allison C-4 – SAE 30 grade
    - Caterpillar TO-4, CD/TO-2 – all grades
    - Komatsu Micro-Clutch – all grades
- Availability: Bulk out of OKC (SAE 50). Drums and Pails out of OKC (SAE 30)



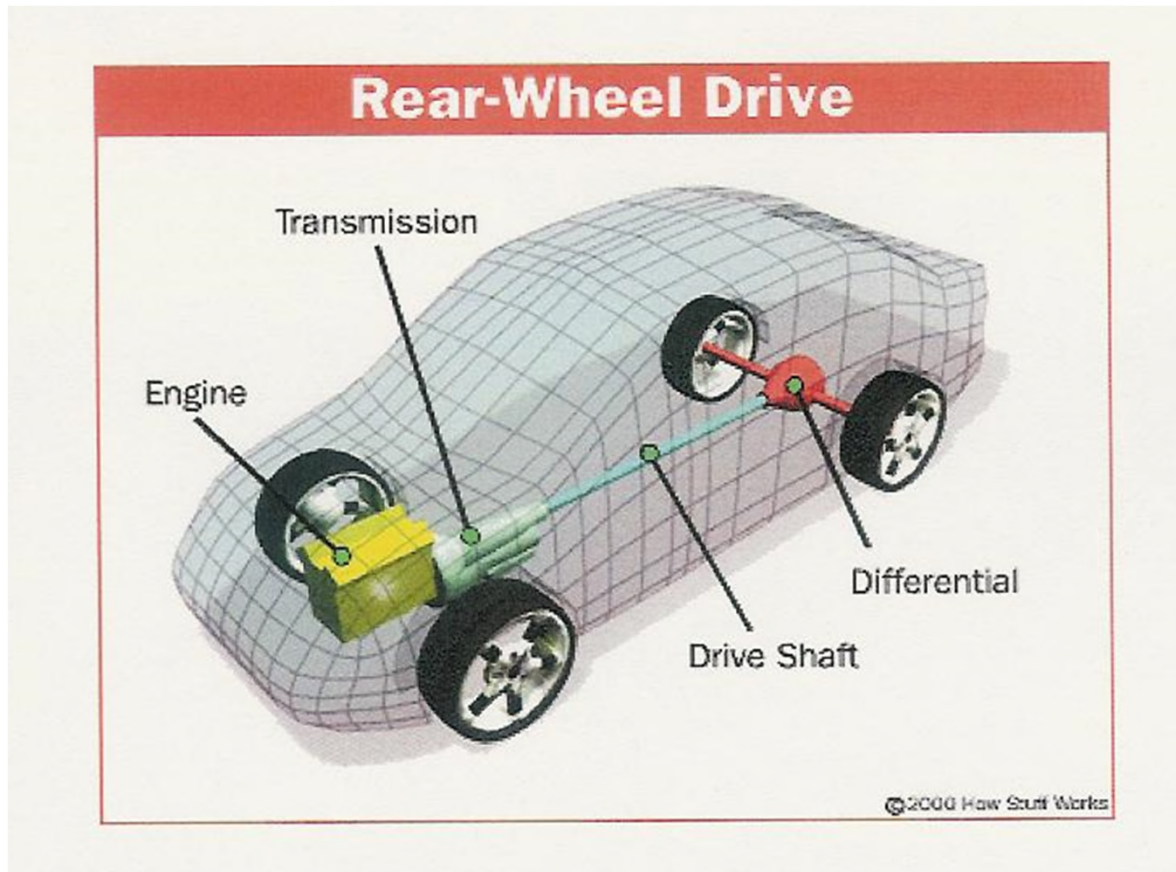
# Differential Fundamentals

Why do we need a Differential?

- Transmit power
- Change power direction
- Change speeds and torques
- **Permit turning**

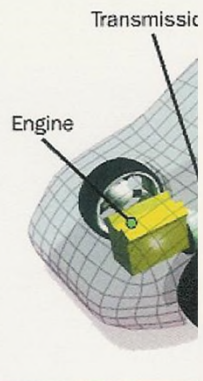


## Front, Rear, and All-Wheel Drives

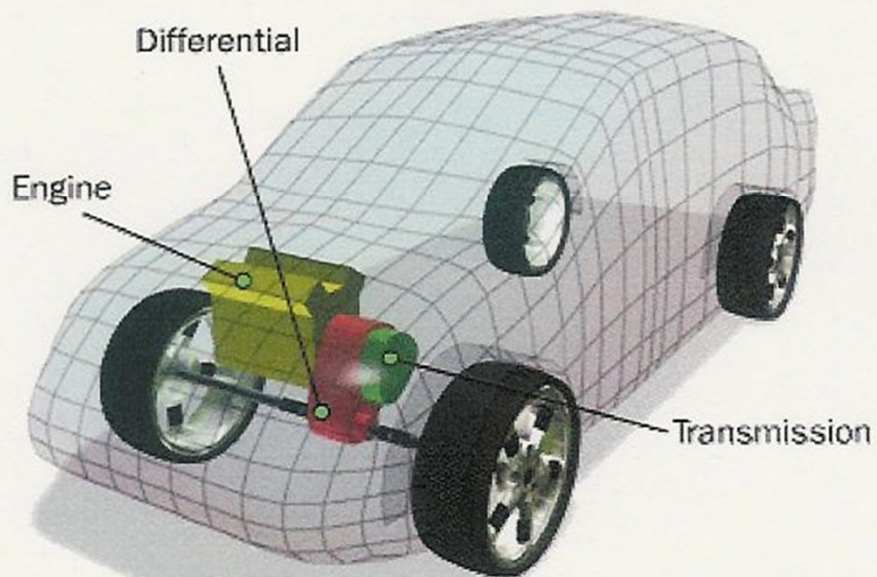


# Front, Rear, and All-Wheel Drives

## Rear-Wheel Drive



## Front-Wheel Drive

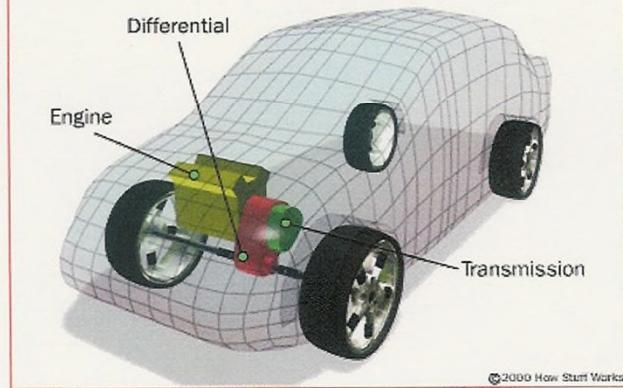


©2000 How Stuff Works

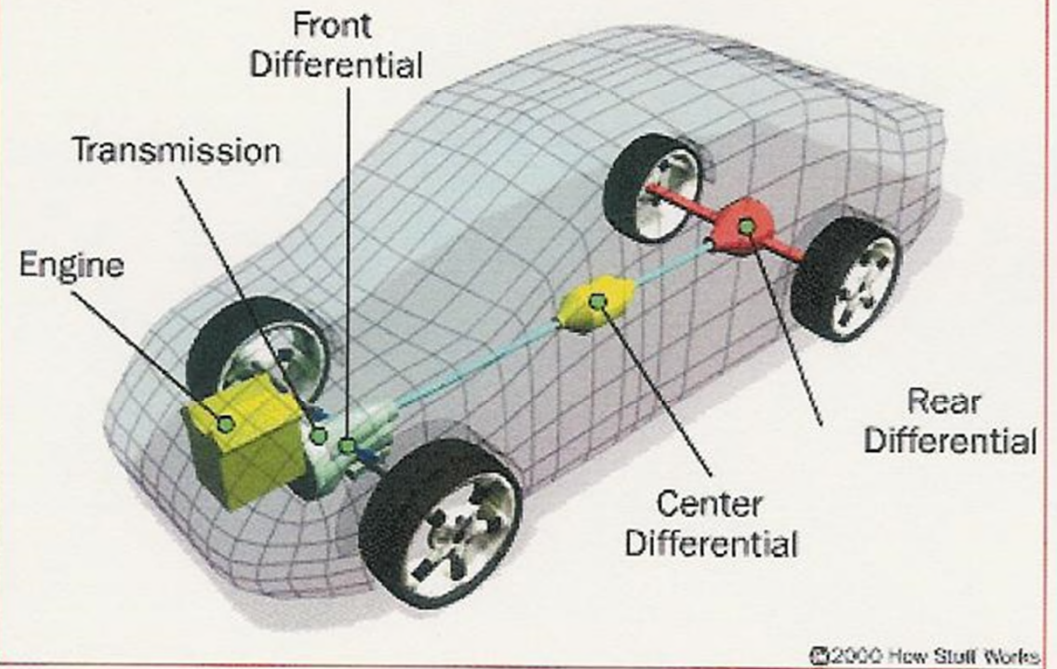
# Front, Rear, and All-Wheel Drives

## Rear-Wheel Drive

### Front-Wheel Drive



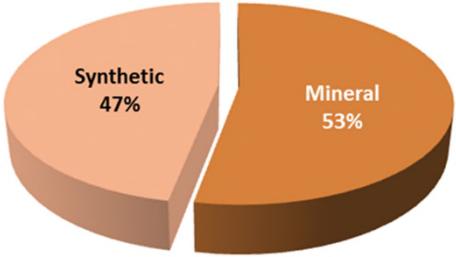
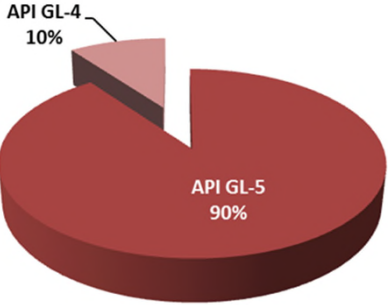
## All-Wheel Drive



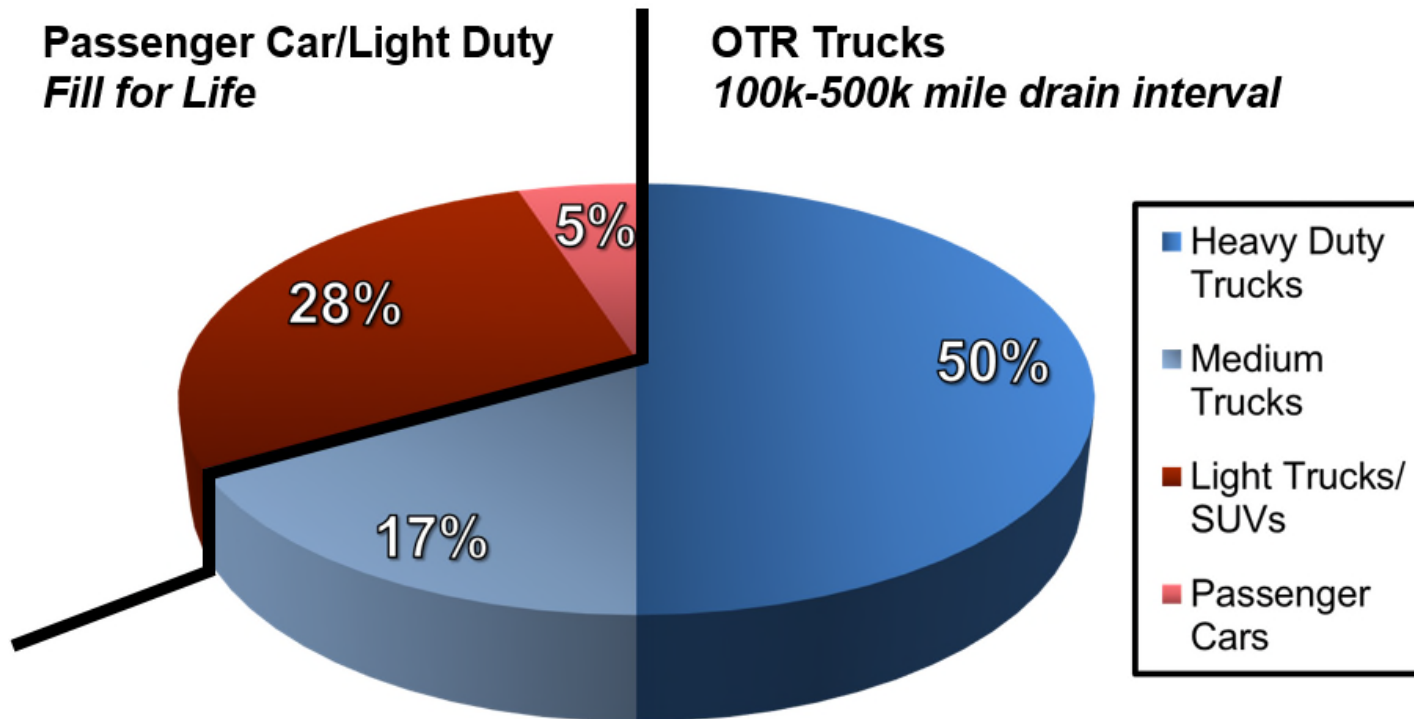


# North America Overview – Axle Fluids






	DI Additive Metric Tons	Finished Fluid Million Gallons
Total Axle Additive Demand 2014	19,145	82.6
Total Axle Additive Demand 2019	19,060	80.4
2014 to 2019 CAGR (%)	(0.1)	(0.5)



## Market Distribution – Axle Fluids



# Heavy Duty Truck Axle Fluids

					
	<b>PACCAR Drive Axle</b>	<b>Meritor Drive Axles</b>	<b>Dana Drive Axles</b>	<b>Detroit Drive Axles</b>	<b>Mack Drive Axles</b>
Specification	SAE J2360	Meritor O76-N Meritor O76-S Meritor O76-B	Dana SHAES-256rE Dana SHAES-429	DFS93K219.01 DFS93K219.03	Mack GO-J Mack GO-J Plus
Viscosity Grade	SAE 75W-90	SAE 75W-90 SAE 75W-85 SAE 80W-140	SAE 75W-90 SAE 75W-85 SAE 80W-140	SAE 75W-90 SAE 75W-85	SAE 75W-90 SAE 75W-140 SAE 80W-140 SAE 85W-140

Source – BASF

# CITGO Heavy Duty Driveline Products

## CITGO® SYNDURANCE® Synthetic Gear Lubricants

- Formerly CITGO Synthetic Gear Lubricants
- For use in major commercial vehicle drive axles – maintains warranty coverage
- Extended drain intervals up to 500,000 miles
- Available in 75W-90 and 80W-140 viscosity grades
- For use in (check viscosity grade):
  - API GL-5, MT-1
  - SAE J2360 (former MIL-PRF-2105E)
  - Dana SHAES 429/256, Rev. C
  - Mack GO-J, GO-J Plus
  - **Detroit DFS 93K219.01**
  - Meritor O-76, Navistar MPAPS-M6821
- Availability: Drums, Kegs and Pails out of OKC and Cicero



## CITGO Heavy Duty Driveline Products

### CITGO® CITGEAR® HD Synthetic Gear Lubricants

- Heavy duty synthetic gear lubricants designed for use in manual transmissions, transfer cases, and differentials of over-the-road trucks, construction equipment, tractors and passenger cars.
- Available in SAE 75W-90, 75W-140, 80W-140 and SAE 50 viscosity grades
- Recommended for use in (SAE 75W-90, 75W-140, and 80W-140):
  - API GL-5, MT-1; SAE J2360
- SAE 50 grade recommended for manual transmissions where an API MT-1 is called for
- Availability: Bulk and Totes out of OKC. Drums, Kegs and Pails out of OKC and Cicero



# CITGO Heavy Duty Driveline Products

## CITGO® Premium Gear Lubricants (MP)

- Heavy duty gear lubricants designed for use in manual transmissions, transfer cases, and differentials of over-the-road trucks, construction equipment, tractors and passenger cars.
- Available in SAE 80W-90/85W-140 (MP)
- Recommended for use in:
  - API GL-5, MT-1
  - SAE J2360 (formerly MIL-PRF-2105E)
  - Mack GO-J
  - PG-2 Limited Slip (LS)
- Availability: (MP) Bulk out of OKC, Cicero and Atlanta. Drums, Kegs and Pails out of OKC and Cicero



## Mystik Heavy Duty Driveline Products

### Mystik® SX-7000 Synthetic Gear Lubricants

- For use in major commercial vehicle drive axles – maintains warranty coverage
- Extended drain intervals up to 500,000 miles
- Available in 75W-90 and 80W-140 viscosity grades
- For use in (check viscosity grade):
  - API GL-5, MT-1
  - SAE J2360 (former MIL-PRF-2105E)
  - Dana SHAES 429/256, Rev. C
  - Mack GO-J, GO-J Plus
  - Detroit DFS 93K219.01
  - Meritor O-76, Navistar MPAPS-M6821
- Availability: OKC: Drums, Kegs, Pails and 3/1 gallons (75W-90) and Drums and Pails (80W-140)



## Mystik Heavy Duty Driveline Products

### Mystik® JT-7® Extended Range Full Synthetic Gear Lubricants

- SAE Grades 75W-90 and 75W-140
- Applications
  - API GL-4
  - API GL-5
  - API MT-1
  - SAE J2360
  - Limited slip service fill
- Can reduce total lubrication costs
- Availability: OKC: Drums, Kegs, Pails and Quarts (75W-90) and Quarts (75W-140)





## Mystik Heavy Duty Driveline Products

### Mystik® JT-7® Multi-Purpose Gear Lubricants

- SAE Grades 80W-90 and 85W-140
- Applications
  - API GL-4
  - API GL-5
  - API MT-1
  - SAE J2360
  - Limited Slip service fill
- Dyed red
- Availability: OKC/Cicero: Bulk (OKC only), Drums, Kegs, Pails and Quarts



# Mystik Heavy Duty Driveline Products

Mystik® Gear Lubricant SAE 90

- SAE 90
- API GL-4
- Economy, EP gear lubricant
- Availability: OKC: Drums and Pails





## Questions

- Please post your questions using the Q&A function.
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