

**SPECIFICATION
FOR
OILS, MOTOR, LUBRICANTS AND GREASES**

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers the types of motor oils, lubricants and greases that are usually purchased by the state of North Carolina for use in automobiles, trucks, and other motorized equipment.

I. CLASSIFICATION

The products covered by this specification are separated into groups then categorized as shown below. Description, SAE viscosity grades, and API service (where applicable) are specified under the itemized detailed requirements for each product.

Table 1. Groups and categories of motor oils, lubricants and greases.

GROUP	CATE- GORY	DESCRIPTION
A. Two-cycle Motor Oil	1	Multipurpose outboard/air cooled motor oil
	2	Biodegradable bar and chain oil
	3	Biodegradable two-cycle motor oil
B. Motor Oil	1	Mineral based motor oil
	1.1	SAE 5W-20 (SN)
	1.2	SAE 5W-30 (SN)
	1.3	SAE 10W-30 (SN)
	1.4	SAE 10W-40 (SN)
	1.5	SAE 10W-30 (CJ-4)
	1.6	SAE 15W-40 (CJ-4)
	1.7	SAE 10W (CF)
	1.8	SAE 30 (SN)
	1.9	SAE 5W-30, (SN, DEXOS 1)
	1.10	SAE 40 (SN)
	2	Synthetic motor oil, Group III base allowed
	2.1	SAE 5W-20 (SN)
	2.2	SAE 5W-30 (SN)
	2.3	SAE 10W-30 (SN)
	2.4	SAE 10W-40 (SN)
	2.5	SAE 10W-30 (CJ-4)
2.6	SAE 15W-40 (CJ-4)	
2.7	SAE 5W-30 (SN, Dexos 1)	

GROUP	CATEGORY	DESCRIPTION
C. Hydraulic Oil	1	Hydraulic oil
	1.1	ISO 32AW
	1.2	ISO 46AW
	1.3	ISO 68AW
	2	Biodegradable hydraulic oil
	2.1	ISO 32
	2.2	ISO 46
	2.3	ISO 68
	3	Synthetic, biodegradable hydraulic oil
	3.1	ISO 32
	3.2	ISO 46
	3.3	ISO 68
	D. Gear Lubricant Oil	1
1.1		SAE 75W-90 or SAE 80W-90
1.2		SAE 80W-140 or SAE 85W-140
2		Synthetic extreme pressure gear oil
2.1		SAE 75W-90
2.2		SAE 80W-140
E. Drive Train Oil	1	Transmission drive train oil, conventional
	1.1	SAE 30
	1.2	SAE 50
	2	Transmission drive train oil, synthetic
	2.1	SAE 30
	2.2	SAE 50
F. Heat Transfer Oil – (for heating asphalt)	1.1	ISO 46
	1.2	ISO 68
G. Transmission Fluid	1	Transmission Fluid
	1.1	Type Dexron VI
	1.2	Type ATF+4
	1.3	Type Mercon V
	1.4	Type Schedule One TES-389
	2	Universal Tractor Fluid
	2.1	Regular grade
	2.2	Winter grade
	2.3	Biodegradable universal tractor fluid
	3	Transmission fluid, synthetic
	3.1	Type Dexron VI
	3.2	Type ATF+4
	3.3	Type Mercon V
	3.4	Type TES-295 for Allison Transmission Extended

GROUP	CATE-GORY	DESCRIPTION
		Warranty
H. Grease	1	Extreme pressure multipurpose wheel bearing and chassis grease
	2	Synthetic extreme pressure multipurpose wheel bearing and chassis grease
	3	Extreme pressure multipurpose grease with molybdenum disulphide (“moly”)

II. APPLICABLE STANDARDS AND REFERENCES

The following documents shall form a part of this specification to the extent described herein under "Requirements." The issue or revision for the respective document which is in effect on date of bid opening shall apply, except where specifically otherwise called for.

ANSI/AGMA 9005	Industrial Gear Lubrication, ANSI/AGMA 9005-E02 http://myagma.agma.org/iweb/Purchase/ProductDetail.aspx?Product_code=9005-E02
API	Engine Service Classification System Publication 1509
API	Engine Oil Licensing and Certification System (EOLCS) Licensee Directory (online).
API	Appendix E – API Base Oil Interchangeability Guidelines for Passenger Car Motor Oils and Diesel Engine Oils
API	Lubricant Service Designations for Automotive Manual Transmissions, Manual Transaxles, and Axles
ASTM D 92	Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
ASTM D 97	Standard Test Method for Pour Point of Petroleum Products
ASTM D 130	Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
ASTM D 217	Standard Test Methods for Cone Penetration of Lubricating Grease
ASTM D 445	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
ASTM D 566	Standard Test Method for Dropping Point of Lubricating Grease
ASTM D 665	Standard Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water
ASTM D 877	Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes
ASTM D 1264	Standard Test Method for Determining the Water Washout Characteristics of Lubricating Greases
ASTM D 1401	Standard Test Method for Water Separability of Petroleum Oils and Synthetic Fluids
ASTM D 2265	Standard Test Method for Dropping Point of Lubricating Grease Over Wide Temperature Range
ASTM D 2270	Standard Practice for Calculating Viscosity Index From Kinematic Viscosity at 40 and 100°C
ASTM D 2509	Standard Test Method for Measurement of Load-Carrying Capacity of Lubricating Grease (Timken Method)
ASTM D 4950	Standard Classification and Specification of Automotive Service Greases
ASTM D 5864	Standard Test Method for Determining Aerobic Aquatic Biodegradation of Lubricants or Their Components

9150-1

ISO 24254	Lubricants, industrial oils and related products (class L) -- Family E (Internal combustion engine oils) 2007
ISO 11158	Lubricants, Industrial Oils and Related Products (Class L) - Family H (Hydraulic Systems) 2009
ISO 12925-1	Lubricants, Industrial Oils and Related Products (Class L) - Family C (Gears) - Part 1: Specifications for Lubricants for Enclosed Gear Systems 1996 & Corrections 2002

Japanese Automotive Standards Organization (JASO) Classifications

National Lubricating Grease Institute (NLGI) Certification Marks - Certified products directory

<https://www.nlgi.org/certifications/product/listing-of-certified-products/>

National Marine Manufacturers Association (NMMA) TC-W3 Oil Certification Program

Certified products directory -> <http://www.nmma.org/certification/certification/oil/tc-w3.aspx>

OECD 301B CO	Evolution Test (the Modified Sturm Test)
SAE J183	Engine Oil Performance And Engine Service Classification
SAE J2360	Lubricating Oil, Gear Multipurpose (Metric) Military Use

Manufacturer OEM fluid standards which may be obtained from the respective manufacturers:

Allison Schedule One TES-389 Approvals list – <https://fdlrd.swri.org/Allison/ApprovedFluidsList.aspx?Id=2>
Allison Transmission Div TES-295 - Approvals list ->

<http://www.allisontransmission.com/service/autoapp/172/viewpage.jsp?ThisPage=3>

Case MS-1204 and MS-1210

Caterpillar TO-2 and TO-4 – Datasheet - <http://parts.cat.com/cda/files/3051923/7/TO4+06-23-06.pdf>

Chrysler AFT+4, ATF+3, & MS-9602- Certified approvals list -

<http://www.centerforqa.com/licensedatf4brands.html>

Denison HF-0 - Certified approvals list - <http://fluidsinfo.pagesperso-orange.fr/Sommaire.htm>

Dexcos 1 (GM) – Certified approvals list -

<http://www.gmdexos.com/licensedbrands/dexos1licensedbrands.html>

Dexron VI (GM) – License holders - <http://www.gmpowertrain.com/VehicleEngines/DEXRON-VI.aspx>

Duetz-Allis PF821XL

DANA SHAES (Formerly) Eaton PS-163, & PS-037

DANA SHAES 256 Rev C (Axle/Line Haul) – Approved lubricant suppliers -

http://www.dana.com/wps/wcm/connect/34cf31004bf07cb6ad88bfa3dcd60c94/DEXT-DriveAxleApprovedLubricantSupplierManual_Mech_LR.pdf?MOD=AJPERES

DANA SHAES 429 (Axle/Vocational) - Approved lubricant suppliers -

http://www.dana.com/wps/wcm/connect/34cf31004bf07cb6ad88bfa3dcd60c94/DEXT-DriveAxleApprovedLubricantSupplierManual_Mech_LR.pdf?MOD=AJPERES

Ford M2C134D - Reference - <http://engineers.ihs.com/document/abstract/KGLPJBAAAAAAAAAA>

Ford M2C48B and Other Ford specification references. - <http://www.oilspecifications.org/ford.php>

John Deere J20C and J20D

Kubota UTD fluid - <http://www.messicks.com/Articles/superudt.aspx>

Mack GO-J and Mack GO-J Plus – Approved oils -

<http://www.macktrucks.com/assets/mack/Service%20Information/PV776-88955900.pdf>

Massey Ferguson M1139

Mercon V (Ford)

Vickers M-2950-S (Mobile) and Vickers I286S (Industrial) –

<http://eatonsite.com/HydPLL/pdfs/03-401-2010.pdf>

Vickers 35VQ-25

Vane Test-

http://www.eaton.com/ecm/groups/public/@pub/@eaton/@hyd/documents/content/ct_233701.pdf

Volvo Truck Corporation VDS-2 and VDS-4 -

http://www.volvotrucks.com/SiteCollectionDocuments/VTNA_Tree/ILF/parts_and_service/service/approved_oils/PV776-89005729.pdf

American National Standards Institute (ANSI) documents may be obtained from:

American National Standards Institute
25 West 43rd Street, 4th floor
New York, NY 10036 or online at www.ansi.org

American Petroleum Institute (API) documents may be obtained from:

American Petroleum Institute
Division of Marketing
2101 L Street, NW
Washington, DC 20037 or online at www.api.org

American Society for Testing and Materials (ASTM) documents may be obtained from:

ASTM International
PO Box C700
West Conshohocken, PA, 19428-2959 or online at www.astm.org

International Organization for Standardization (ISO) documents may be obtained from:

International Organization for Standardization
1, ch. de la Voie-Creuse CP 56, CH-1211
Geneva 20, Switzerland or online at www.iso.org

Japanese Automotive Standards Organization (JASO) documents may be obtained from:

Society of Automotive Engineers of Japan, Inc.
10-2 Gobancho, Chiyoda-ku
Tokyo, 102-0076 Japan or online at www.jsae.or.jp

National Lubricating Grease Institute (NLGI) documents may be obtained from:

NLGI International Headquarters
4635 Wyandotte Street Suite 202
Kansas City, MO 64112 or online at www.nlgi.com

National Marine Manufacturers Association (NMMA) documents may be obtained from:

National Marine Manufacturers Association
200 E. Randolph Dr. Suite 5100
Chicago, IL. 60601 or online at www.nmma.org

Organisation for Economic Co-operation and Development (OECD) documents may be obtained from:

OECD Washington Center - For Northern America
2001 L Street, NW, Suite 650
Washington DC 20036-4922 or online at www.oecdwash.org

Society of Automotive Engineers (SAE) documents may be obtained from:

SAE World Headquarters
400 Commonwealth Drive
Warrendale, PA 15096-0001 or online at www.sae.org

III. REQUIREMENTS

All products must have proven, documented, and certified product stability.

The API Engine Oil Licensing and Certification System (EOLCS) licensee online directory shall be used by the state to verify API certification for motor oils and other oils as applicable. It is the responsibility of the bidder to verify the offered product is properly listed on the API website prior to the qualified product listing submission deadline. Meeting the API requirements, but without actual API licensing and certification, is not sufficient when an API certification is required in this specification.

Products shall be marked to indicate the SAE or ISO viscosity grade designations as specified in each product description. Products marked with a wider range of SAE or ISO viscosity grade designations (multigrade) are only to be considered if that range is noted in each product requirement herein.

Group A - MOTOR OIL FOR LUBRICATING TWO CYCLE ENGINES

Category 1 Multipurpose Outboard/Air Cooled Motor Oil

Minimum Flash Point, C, ASTM D 92	193
Viscosity @ 40C, cSt, ASTM D 445	46 – 110
Maximum Pour Point, C, ASTM D 97	-20

This motor oil shall have been tested and certified by the National Marine Manufacturers Association (NMMA) for service TC-W3 and each container shall state same. The motor oil shall be satisfactory for use in any fuel to oil ratio as specified by the engine manufacturer, up to and including 50:1.

Category 2 Biodegradable Bar And Chain Oil

Minimum Flash Point, C, ASTM D 92	193
Viscosity @ 40C, cSt, ASTM D 445	46 – 110
Maximum Pour Point, C, ASTM D 97	-20

Category A.2. must pass a nationally recognized test for biodegradability.

Category 3 Biodegradable Two-Cycle Engine Oil

Minimum Flash Point, C, ASTM D 92	150
Viscosity @ 40C, cSt, ASTM D 445	32 - 65
Maximum Pour Point, C, ASTM D 97	-30

Category A.3. must pass a nationally recognized test for biodegradability.

Group B - MOTOR OIL FOR DIESEL AND GASOLINE ENGINE SERVICE**Category 1 Motor Oil, Mineral Based**

Table 2. Specification category for mineral based motor oil.

CATEGORY	SAE GRADE	API SERVICE CATEGORY
1.1	5W-20	SN
1.2	5W-30	SN
1.3	10W-30	SN
1.4	10W-40	SN
1.5	10W-30	CJ-4
1.6	15W-40	CJ-4
1.7	10W	CF
1.8	30	SN
1.9	5W-30	SN, Certified for DEXOS 1
1.10	40	SN

1. The motor oil must carry current API certification in the respective API service category as listed in Table 2. Meeting API requirements, but without actual API certification, is not sufficient.
2. Packaging of the product and quantity packaged shall be defined in the Invitation For Bids.
3. Products in this category (B.1.x) shall be offered in virgin form.
4. SAE grade must be as specified in Table 2.

Category 2 Synthetic Motor Oil, Group III Base Allowed

Table 3. Categories for group III synthetic motor oil.

CATEGORY	SAE GRADE	API SERVICE CATEGORY
2.1	5W-20	SN
2.2	5W-30	SN
2.3	10W-30	SN
2.4	10W-40	SN
2.5	10W-30	CJ-4
2.6	15W-40	CJ-4
2.7	5W-30	SN, Certified for DEXOS 1

1. The motor oil must carry current API certification in the respective API service category as listed in Table 3. Meeting API requirements, but without actual API certification, is not sufficient.
2. Packaging of the product and quantity packaged shall be defined in the Invitation For Bids.

3. Product must be formulated in whole or in part with Groups III and IV base stocks. Inclusion of Group 1 and/or Group II base stock in the total proportion of no more than 30% by weight is permitted. Base stock groups are as defined in "Appendix E – API Base Oil Interchangeability Guidelines for Passenger Car Motor Oils and Diesel Engine Oils."
4. Manufacturer's published documentation or letter of certification is required to confirm the groups of base stock used.
5. Products in this category (B.2.x) shall be offered in virgin form.
6. SAE grade must be as specified in Table 3.

Group C - HYDRAULIC OIL

Category 1 Hydraulic Oil

This product shall be especially blended for service in hydraulic systems employing either vane or gear type pumps on snow removal and road construction equipment and hydraulic-operated equipment. THIS OIL IS **NOT** INTENDED FOR USE IN HYDRAULIC BRAKES AND AUTOMOBILE-TYPE POWER STEERING UNITS.

This hydraulic oil shall satisfy the requirements of hydraulic systems used in the applications stated. Oil shall have good demulsibility characteristics and shall not produce deleterious effects on neoprene, leather or other type seals used in such hydraulic systems. Product shall contain corrosion, oxidation, antiwear and foam inhibitors in sufficient quantities and quality to adequately protect the hydraulic system including pumps, motor and valves. This oil shall meet for automotive applications: Vickers M-2950-S, and for industrial applications: Denison HF-0 and Vickers I-286S.

Products are to be marked to indicate Anti-Wear formulation and ISO grade specification.

Table 4. Categories and grades of hydraulic oil.

CATE-GORY	ISO GRADE	APPLICATION	VISCOSITY REQUIREMENT @ 40C, cSt, ASTM D-445
1.1	32AW	For use when outside temperature is generally between 32 and 50 degrees Fahrenheit. Used when the equipment will be subjected to below freezing conditions on a regular basis.	Light weight oil: 28.8 – 35.2 centistokes
1.2	46AW	For use when outside temperature is generally between 32 and 100 degrees.	Medium weight oil: 41.4 – 50.6 centistokes
1.3	68AW	For use in some systems where ambient temperatures are generally higher and heavier weight product is recommended.	Heavy weight oil: 61.2 – 74.8 centistokes

Category 2 Biodegradable Hydraulic Oil

Table 5. Categories and grades of biodegradable hydraulic oil.

CATEGORY	ISO GRADE	VISCOSITY REQUIREMENT @ 40C, cSt, ASTM D-445
2.1	ISO 32	28.8 – 35.2
2.2	ISO 46	41.4 – 50.6
2.3	ISO 68	61.2 – 74.8

Biodegradable hydraulic oil shall meet the following specifications:

Flash point, F, ASTM D 92	> 400
Pour point, ASTM D 97	< -30 C
Copper corrosion, 3 hrs @ 100C, ASTM D 130	1b max
Demulsibility, oil/water/emulsion (minutes: 30 max), ASTM D 1401	40-40-0
Vickers 35VQ-25 vane (3000 psi, 2400 RPM, 200F) or M-2950-S	Pass (either)

Product must pass a nationally recognized test for biodegradability, such as OECD 301B test method (also known as the Modified Sturm Test), or ASTM D 5864.

Category 3 Synthetic Biodegradable Hydraulic Oil

This product shall meet all the requirements for Group C, Category 2 products. This product must be blended from fully synthetic base oil stock. Products blended from mineral base oil are not acceptable. Semi-synthetic products are also not acceptable. Certification that product is entirely synthetic shall be furnished upon request.

Table 6. Categories and grades of synthetic, biodegradable hydraulic oil.

CATEGORY	ISO GRADE	VISCOSITY REQUIREMENT @ 40C, cSt, ASTM D-445
3.1	ISO 32	28.8 – 35.2
3.2	ISO 46	41.4 – 50.6
3.3	ISO 68	61.2 – 74.8

Group D - GEAR LUBRICANT OIL**Category 1 Extreme Pressure Gear Oil**

Category 1.1 SAE 75W-90 or SAE 80W-90

Category 1.2 SAE 80W-140 or SAE 85W-140

1. API service categories GL-5 and MT-1
2. These lubricants are intended for use in passenger car, truck, and tractor differentials (particularly hypoid type), steering gears, and other points requiring a lubricant of exceptional load carrying ability.
3. The gear lubricant shall be a homogenous petroleum or synthetic product, or a combination thereof.

4. Data must be furnished upon request to verify product has been tested and meets the requirements of SAE J2360 for each SAE grade.
5. The gear lubricant shall meet Mack GO-J or GO-J Plus.

Category 2 Extreme Pressure Synthetic Gear Oil

1. API service categories GL-5 and MT-1.
2. These lubricants shall be entirely synthetic and are intended for use in passenger car, truck, and tractor differentials (particularly hypoid type), steering gears, and other points requiring a lubricant of exceptional load carrying ability. Certification that product is entirely synthetic shall be furnished upon request.

Category 2.1 SAE 75W90

Category 2.1 shall meet the following specifications: Mack GO-J Plus, SAE J2360, and Dana SHAES-256 Rev. C (axle/line haul).

Category 2.2 SAE 80W140

Category 2.2 shall meet the following specifications: Mack GO-J or GO-J Plus, SAE J2360, and Dana SHAES-429 (axle/vocational).

Group E - DRIVE TRAIN OIL

Category 1 Transmission Drive Train Oil, Conventional

The gear lubricants shall meet Caterpillar TO-4.

Category 1.1 SAE VISCOSITY GRADE - 30

Category 1.2 SAE VISCOSITY GRADE - 50

Category 2 Transmission Drive Train Oil, Synthetic

The gear lubricants shall meet Caterpillar TO-4. These lubricants shall be entirely synthetic. Certification that product is entirely synthetic shall be furnished upon request.

Category 2.1 SAE VISCOSITY GRADE - 30

Category 2.2 SAE VISCOSITY GRADE – 50

Group F - HEAT TRANSFER OIL

Category 1 Paraffin Base (Circulated by Pump) for Heating Asphalt

The heat transfer oil shall meet the following specifications as a minimum:

Table 7.

CATEGORY	ISO GRADE	VISCOSITY REQUIREMENT @ 40C, cSt, ASTM D-445
1.1	ISO 46	41 – 51
1.2	ISO 68	61 – 75

Table 8.

Gravity, API	28-32.5
Viscosity Index	94-106
Pour Point, ASTM D97	≤ 10°F
Flash Point, ASTM D 92	≥ 400°F

Group G - TRANSMISSION FLUID**Category 1 Transmission Fluid****Category 1.1 Dexron VI**

This automatic transmission fluid shall meet all requirements of Dexron VI specifications.

Category 1.2 Type ATF+4

This automatic transmission fluid shall meet all requirements of Chrysler MS-9602 specifications.

Category 1.3 Type Mercon V

This automatic transmission shall meet all requirements of Mercon V specifications.

Category 1.4 Type Schedule One TES-389

This transmission fluid shall meet all requirements of the Allison Transmission "Schedule One TES-389" specification.

Category 2 Universal Tractor Fluid**Category 2.1 Universal Tractor Fluid (regular grade)**

Combination hydraulic, transmission, and differential fluid for use in tractors requiring combination fluid.

Fluid shall comply with the following specifications: John Deere J20C, Caterpillar TO-2 or TO-4, Case MS-1204 and MS-1210, Duetz-Allis PF821XL, Ford M2C134D and M2C48B, Kubota UTD.

Viscosity @ 40C, cSt, ASTM D 445:	52-66
Viscosity @ 100C, cSt, ASTM D 445	9.0-10.0

Category 2.2 Universal Tractor Fluid (winter grade)

Combination hydraulic, transmission, and differential fluid for use in tractors under conditions requiring winter weight combination fluid.

Fluid shall comply with the following specifications: John Deere J20D, Caterpillar TO-2 or TO-4, Case MS-1204 and MS-1210, Duetz-Allis PF821XL, Ford M2C134D and M2C48B, Kubota UTD.

Viscosity @ 40C, cSt, ASTM D 445:	31 – 42
Viscosity @ 100C, cSt, ASTM D 445	7.3 - 9.0

Category 2.3 Biodegradable Tractor Fluid, ISO 46

Product must pass a nationally recognized test for biodegradability, such as OECD 301B test method (also known as the Modified Sturm Test), or ASTM D 5864.

Viscosity @ 40C, cSt, ASTM D 445	41.4 - 50.6
Pour point, C, ASTM D 97	≤ -33
Copper corrosion, 3 hr @ 100C, ASTM D 130	1b max.
Wet brake chatter/squawk, J20C/M1139	Pass
PTO clutch ,J20C/M1139	Pass
High torque axle, J20C/M1139	Pass
Rust, ASTM D 665	Pass
Demulsibility, oil/water/emulsion (minutes: 30 max), ASTM D 1401	40-40-4
Ref. John Deer for J20C & J20D, and Massey Ferguson for M1139	

Category 3 Automatic Transmission Fluid, Synthetic

All products in this category must be blended from fully synthetic base oil stock. Products blended from mineral base oil are not acceptable. Semi-synthetic products are also not acceptable. Certification that product is entirely synthetic shall be furnished upon request.

Category 3.1 Dexron VI

This synthetic automatic transmission fluid shall meet all requirements of Dexron VI specifications.

Category 3.2 Type ATF+4

This synthetic automatic transmission fluid shall meet all requirements of Chrysler MS-9602 specifications.

Category 3.3 Type Mercon V

This synthetic automatic transmission shall meet all requirements of Mercon V specifications.

Category 3.4 Type TES-295 for Allison Transmission Extended Warranty

1. Product shall meet Allison Transmission Division TES-295.
2. Product shall hold an Allison approval number.

Group H - GREASE**Category 1 Extreme Pressure - Multipurpose Wheel Bearing and Chassis Grease**

1. This grease shall be lithium complex and designated by the manufacturers as suitable for a multipurpose use in cars, light and heavy duty trucks, and industrial equipment.
2. The grease shall meet the following requirements:

NLGI consistency	#2
Resistance to water washout, ASTM D 1264	max washout 5% @ 175F
Dropping point, ASTM D 566 or ASTM D 2265	Minimum 450°F
Worked penetration, ASTM D 217	NLGI #2 265-295
Timken OK value, ASTM D 2509	40 lbs.
ASTM D 4950 for categories LB chassis grease <u>and</u> GC wheel bearing grease	Pass

Category 2 Synthetic Extreme Pressure - Multipurpose Wheel Bearing and Chassis Grease

This grease shall meet all the requirements of Group H, Category 1 and shall be synthetic based. Products must be blended from fully synthetic base oil stock. Products blended from mineral base oil are not acceptable. Semi-synthetic products are also not acceptable. Certification that product is entirely synthetic shall be furnished upon request.

Category 3 Multipurpose "Moly" Water and Heat Resistant Grease

1. This grease shall be lithium complex and designated by the manufacturer as suitable for use in industrial, automotive and construction equipment applications including heavy shock loading conditions.
2. The grease shall meet the following requirements:

NLGI consistency	#2
Resistance to water washout, ASTM D 1264	max washout 5% @ 175F
Dropping point, ASTM D 566 or ASTM D 2265	Minimum 450°F
Worked penetration, ASTM D 217	NLGI #2 265-295
Molybdenum disulphide ("moly") range	1.5 – 5.0%
Timken OK value, ASTM D2509	40 lbs.

IV. WARRANTY

The manufacturer of the oil, fluid, lubricant, or grease offered under this contract (hereafter in this section referred to simply as "manufacturer") warrants that all such products furnished shall be of the grade and quality required herein.

For all products which are advertised in the manufacturer's published literature as providing an extended oil or fluid drain interval (which is defined herein as twice or more as long the vehicle, engine, or machinery manufacturer's recommended drain interval), manufacturer further warrants that these products will not cause mechanical damage when used according to the manufacturer's extended drain interval recommendations, including associated maintenance conditions, in mechanically sound equipment, and that manufacturer will be responsible for the cost of all labor, materials, and mechanical components required to correct the damage done to the equipment by use of the product in accordance with the manufacturer's extended drain interval recommendations (including associated maintenance conditions).

Manufacturer of extended drain products shall make available to end users published information fully explaining the details of the manufacturer's extended drain interval recommendation including recommended associated maintenance (such as filter changes and/or used oil analysis).

V. SERVICE, PARTS, AND MANUALS

The contractor shall provide technical information and service concerning the use of products furnished under this specification when requested by using agencies.

VI. ACCEPTANCE, INSPECTION AND QUALITY ASSURANCE

Normally, sampling and testing will not be required. The state reserves the right, however, to conduct tests, require samples or require test results to insure compliance with the requirements of this specification. Using agencies shall inspect for proper identification of products, damaged or leaking containers and other apparent irregularities.

VII. PACKAGING

The product shall be furnished as specified and shall be packaged in accordance with the best commercial practice. The size and type of container shall be as defined in the Invitation For Bid.

All shipping containers shall be marked to show the brand name and description of the product and the agency purchase order number.

VIII. ORDERING DATA

Purchaser should exercise any desired action offered herein and should specify the following in the Invitation For Bid:

1. Title, number and date of this specification.
2. Category and if applicable in addition, grade.
3. Container size i.e.: Bulk truck load, 5 gal, 55 gal drum, quart, etc.
4. Packaging requirements i.e.: quart containers packaged in lots of 12.