SPECIFICATION FOR
OIL, LUBRICATING, INTERNAL, COMBUSTION ENGINE

Wherever "specified" is used herein, it shall mean "specified in the invitation to bid and the order."

Wherever reference is made herein to any other specification, standard, regulation, or method, it shall mean the latest revision thereof in effect at the time of invitation to bid.

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1. Intent:

This specification covers the motor crankcase oils for use in the spark-ignition.

2. Kind:

2.1 Gasoline Engine Oils:

2.1.1 Full Synthetic Engine Oils for gasoline powered high performance turbocharged, supercharged, multivalve fuel injected engines of passenger cars, SUVs, and light trucks. Engine oils meet or exceed the API SN, SN PLUS, SP, SQ and ILSAC GF-6A, GF-7A, GF-7B for 5W-20, 5W-30, and 10W-30, which will combat low-speed pre-ignition (LSPI) issues in Turbocharged Gasoline Direct Injection (TGDI) engines and Gasoline Direct Injection (GDI)engines. These engine oils will meet the requirement of latest hybrid and fuel conserving vehicles as per OEM’s recommendation and will provide protection to engines operating on ethanol containing fuels up to E85.

2.1.2 Synthetic Engine Oils for gasoline engines are blends of conventional base stock and synthetic oil meeting the API series categories SN, SM, SL, SJ and ILSAC GF-5. Synthetic Motor oils are used in Passenger cars, SUV’s, light vans and trucks including high performance turbo-charged engines according to OEM’s requirements.

2.1.3 Engine oils meet API service category SN and ILSAC GF-6A, GF-7A can be used for all gasoline and have converted to operate, CNG, LNG and LPG engines, including API service category SN.

3. **Applicable Documents**:

ASTM Designation: D4485-24 or latest revision–Standard Specification for Performance of Active API Service Category Engine Oils.

API (American Petroleum Institute): Latest revision of Engine Oil Program.

SAE (Society of Automotive Engineers): Standards for Motor Oils.

ILSAC (International Lubricants Standardization and Approved Committee): Latest Performance Standard.

ACC (American Chemistry Council): Petroleum Additives Panel Product Approval Code of Practice.

4. **General Requirements**:

4.1 The materials of the engine oil shall be derived from virgin fully synthetic base, synthetic base, re-refined thereof and follow the API1509 Guidelines, Appendix F – API Guidelines for SAE Viscosity – Grade Engine Testing.

4.2 Engine oil viscosity grade shall conform to the latest applicable SAE J300.

4.3 Gasoline engine oil energy conserving classification shall conform to the latest applicable SAE J1423.

4.4 All delivered product shall conform to the latest API/ILSAC requirement revisions.

4.5 ACC Code and ASTM Multiple Test Evaluation Procedure testing practices shall be followed.

4.6 Engine oil offered must comply with the latest applicable OEM requirements and recommendations.

4.7 Engine oil offered must be licensed and approved to the latest applicable API Service Classification displaying the marks to meet Performance Requirements set by U.S. and International Vehicle, Engine Manufacturers, and the Lubricant Industry.

5. Types of Oil:

- **5.1** Gasoline Engine Oils (Fully Synthetic and Synthetic as applicable): Gasoline engine oil offered must be energy conserving, multi-grade, non-Newtonian oil, suitable for automotive spark ignition gasoline and have converted to CNG, LNG and LPG engines.

Typical Physical Characteristics:

6.1.1 The typical physical characteristics of full synthetic high-performance gasoline engine oils will be as stated in Table-1.

TABLE-1, PHYSICAL CHARACTERISTICS OF FULLY SYNTHETIC GASOLINE ENGINE OILS

Properties	Test Method ASTM	5W-20	5W-30	10W-30
ILSAC Performance Standard		GF-6A GF-7A GF-7B	GF-6A GF-7A GF-7B	GF-6A GF-7A GF-7B
API Service Classification		SN, SN Plus, SQ/SP	SN, SN Plus SQ/SP	SN SN Plus SQ/SP
Sp. Gr. @ 60/60^{0}F	D4052	0.850	0.856	0.860
Pour Point ^{0}C	D5950 D97	-40	-39	-38
Flash Point ^{0}C	D92	220	235	239
Viscosity, Cst. @ 40 ^{0}C	D445	47.0	61.5	64.4
@ 100 ^{0}C		8.5	10.5	10.5
Viscosity Index	D2270	160	161	154
Cold Crank Simulator, cP.	D5293	4,780 @-35^{0}C	4,000 @-30^{0}C	3,700 @-25^{0}C
HTHS Viscosity @150^{0}C, Cp.	D4683	2.7	2.9	3.0
Sulfated Ash, wt.%	D874	0.9	0.9	0.9
Phosphorous wt. %	D4951	0.070	0.070	0.070
Zinc wt. %	D4951	0.085	0.085	0.085

6.1.2 The typical physical characteristics of high-quality gasoline engine oils, blend of synthetic and conventional base oils with high-performance additives will be as stated in Table-2.

TABLE-2 PHYSICAL CHARACTERISTICS OF SYNTHETIC GASOLINE ENGINE OILS

Properties	Test Method ASTM	5W-20	5W-30	10W-30
ILSAC Performance Standard		GF-5	GF-5	GF-5
API Service Classification		SN	SN	SN
Sp. Gr. @ 60/60^{0}F	D4052	0.860	0.861	0.869
Pour Point ^{0}C	D97	-36	-36	-36
Flash Point ^{0}C	D92	234	212	252
Viscosity, cSt. @ 40 ^{0}C	D445	47.9	63.95	68.8
@ 100 ^{0}C		8.4	10.7	10.5
Viscosity Index	D2270	152	158	140
Cold Crank Simulator, cP	D5293	5860 @-30^{0}C	6080 @-30^{0}C	6300 @-25^{0}C
Phosphorous wt. %	D4951	0.077	0.077	0.077
Zinc wt. %	D4951	0.085	0.085	0.085

7. Packaging:

7.1. The packaging shall be in accordance with the best commercial practice.

7.2. Packing shall be as specified.

7.3. All offered products shall carry the "API Service Symbol" (referred to in the trade the API Donut) on its container (when so packaged) and the certification mark (starburst symbol) for gasoline engine oils. The symbols shall also be similarly identified (API SERVICE _/_) on its delivery and invoice documentation.

7.4. The oil shall be furnished in 1-gallon/5-gallon cans or 55-gallon drums or it shall be delivered by tank wagon as specified and in compliance with all Federal, State, and City Environmental Regulations for storage, transportation, and disposal.

8. Identification:

8.1. Cans and drums shall be marked with the name of the material, the N.Y.C Specification number, class, type, grade of the material, the net contents, the name of contractor, and the name of the contract or purchase order.

8.2. With tank wagon deliveries, there shall be furnished the specified number of delivery tickets marked with the name, N.Y.C. specification number, class, type, grade of the material, number of gallons delivered, name of the contractor, and the number of the contract or purchase order.

8.3. Unless otherwise provide for, mixed lots varying in origin, brands, or trademarks will not be accepted on any contract or purchase orders.

8.4. Shipping containers shall be marked with the name of the product, this specification number or purchase order number, commodity code number and API Classification and in compliance with all Federal, State and City Environmental Regulations.

8.5. Individual containers shall be marked with the name of the product, the contents and API Service Symbol which identifies the oil's viscosity grade, service category, and energy conserving capabilities.

9. Certification:

9.1. The bidder shall submit, when requested, the API Certification document of the product.

APPENDIX

Note 1: In order that each request for contract or purchase order quotations will result in fair competition and delivery of the Lubricating Engine Oil required; the requisition must contain the following information:

(A) Name of Commodity – OIL, LUBRICATING, INTERNAL, COMBUSTION ENGINE

(B) Specification Number – #30-0-15:26

(C) Type–Fully Synthetic Gasoline Engine oil-5W 20,5W 30,10W 30
Synthetic Gasoline Engine Oil-5W-20, 5W-30, 10W-30

(D) Size of Container – Stated whether Cans, Drums, delivery by Tank Wagon.

(E) Quantity – Number of gallons at 60^0F/15°c.

(F) Delivery – State point(s) and manner of delivery.

Note 2: For the information of the Bureau of Quality Assurance:

If, in the opinion of the inspector, tests and analyses are necessary to determine compliance with any requirement of this specification, then a sample consisting of no less than one gallon shall be randomly chosen.

Note 3: Copies of this specification may be obtained from:

Department of Citywide Administrative Services
Office of Citywide Procurement
Bureau of Quality Assurance
1 Centre Street - 18th Floor
New York, NY 10007.

SPECIFICATION FOR
OIL, LUBRICATING, COMPRESSION – IGNITION, INTERNAL COMBUSTION ENGINE

Wherever "specified" is used herein, it shall mean "specified in the invitation to bid and the order."

Wherever reference is made herein to any other specification, standard, regulation or method, it shall mean the latest revision thereof in effect at the time of invitation to bid.

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1. Intent:

This specification covers the motor crankcase oils for use in the compression-ignition type internal combustion engines.

2. Kind:

2.1 Diesel Engine Oils:

2.1.1 Engine oils are of fully synthetic, multi grade, and are suitable for automotive (including off-road application) diesel and heavy gasoline engines. The engine oils are of API CK-4 heavy duty for on-highway, off- highway and Tier 4 non-road exhaust emission standard applications including 2017 greenhouse gas (GHG 17) complaint diesel engines with lower CO_2 emissions and in addition to EPA 2010 complaint low emission diesel engines with selective Catalytic Reduction (SCR), Diesel Particulate Reduction (DPF) and Exhaust Gas Recirculation (EGR) systems.

2.1.2 Engine Oils shall comply with EPA Greenhouse Gas Emissions Standards for Heavy Duty Vehicles- Phase 3, that sets stronger standards to reduce greenhouse emissions from Heavy Duty (HD)vehicles beginning in Model Years (MY) 2027

3. Applicable Documents:

ASTM Designation: D4485-24 or latest revision–Standard Specification for Performance of Active API Service Category Engine Oils.

API (American Petroleum Institute): Latest revision of Engine Oil Program.

SAE (Society of Automotive Engineers): Standards for Motor Oils.

ILSAC (International Lubricants Standardization and Approved Committee): Latest Performance Standard.

ACC (American Chemistry Council): Petroleum Additives Panel Product Approval Code of Practice.

4. General Requirements:

4.1 The materials of the engine oil shall be derived from virgin fully synthetic base, follow the API1509 Guidelines, Appendix F – API Guidelines for SAE Viscosity – Grade Engine Testing.

4.2 Engine oil viscosity grade shall conform to the latest applicable SAE J300.

4.3 All delivered product shall conform to the latest API/ILSAC requirement revisions.

4.4 ACC Code and ASTM Multiple Test Evaluation Procedure testing practices shall be followed.

4.5 Engine oil offered must comply with the latest applicable OEM requirements and recommendations.

4.6 Engine oil offered must be licensed and approved to the latest applicable API Service Classification. displaying the marks to meet Performance Requirements set by U.S. and International Vehicle, Engine Manufacturers, and the Lubricant Industry.

5. Types of Oil:

5.1 Diesel Engine Oils: Diesel engine oils offered shall be multi-grade oil, suitable for automotive (including off-road application) diesel engines.

Engine oil must have features of "Low-SAPS (Sulfated ash, Phosphorous and Sulfur)" additive technology for increased compatibility with latest exhaust emission control systems.

6 Typical Physical Characteristics:

6.1 The typical physical characteristics of full synthetic high performance diesel engine oils will be as stated in Table-1.

TABLE-1, TYPICAL PHYSICAL CHARACTERISTICS OF FULLY SYNTHETIC DIESEL ENGINE OILS

Properties	Test Method ASTM	5W-30	5W-40	5W-50	10W-30	15W-40
API Service Classification		CK-4, CJ-4, CI-4Plus CI-4, CH-4 SN	CK-4 CJ-4 CI-4 Plus, CI-4, CH-4 SN	CK-4 CJ-4, CI-4 Plus, CI-4, CH-4 SN,	CK-4, CJ-4, CI—4 Plus CI-4 CH-4 SN	CK-4 CJ-4, CI-4 Plus, CI-4, CH-4, SN/SP
Density, 15^{0}C kg/l	D4052	0.851	0.850	0.850	0.869	0.875
Pour Point ^{0}C	D97	-42	-48	-42	-42	-33
Flash Point ^{0}C	D92	241	230	232	223	230
Viscosity, Cst. @ 40 ^{0}C	D445	73	90.0	104.3	76.0	110
@ 100 ^{0}C		12.0	14.6	17.1	11.6	14.4
Cold Crank Simulator, ^{0}C/mPa.s	D5293	6,430 @-30^{0}C	6,500 @-30 ^{0}C	6,500 @-25 ^{0}C	6,500 @-25^{0}C	6,400 @ -20^{0}C
HT/HS @ 150^{0}C	D4683	3.6	3.8	3.8	3.6	4.0
Viscosity Index	D2270	161	169	180	146	133
Sulfated Ash, wt.%	D874	1.00	1.00	1. 00	1.00	1.00
Total Base Number, mg KOH/g	D2896	11.0	10.2	10.5	10.3	10.0
Calcium	D5185	0.150	0.150	0.150	0.150	0.170
Magnesium	D5185					0.070
Phosphorous wt.%	D5185	0.070	0.080	0. 080	0. 080	0.110
Zinc wt. %	D4951	0.088	0. 088	0.088	0.088	0.100

7. Packaging

7.1 The packaging shall be in accordance with the best commercial practice.

7.2 Packing shall be as specified.

7.3. All offered products shall carry the "API Service Symbol" (referred to in the trade the API Donut) on its container (when so packaged) and the certification mark (starburst symbol). The symbols shall also be similarly identified (API SERVICE _/_) on its delivery and invoice documentation.

7.4 The oil shall be furnished in 1-quarter containers, 1-gallon containers, 5-gallon cans or 55-gallon drums or it shall be delivered by tank wagon as specified and in compliance with all Federal, State, and City Environmental Regulations for storage, transportation, and disposal.

7.5 The labels must conform to all OSHA labeling standards and shall include health hazard data. Packaging should be in accordance with Federal and OSHA acceptable standards.

8. Identification:

8.1. Containers and drums shall be marked with the name of material, the N.Y.C. Specification number, class, type, grade of the material, the net contents, the name of contractor, and the name of the contract or purchase order.

8.2. With tank wagon deliveries, there shall be furnished the specified number of delivery tickets marked with the name, N.Y.C. specification number, class, type, grade of the material, number of gallons delivered, name of the contractor, and the number of the contract or purchase order.

8.3. Unless otherwise provide for, mixed lots varying in origin, brands, or trademarks will not be accepted on any contract or purchase orders.

8.4. Shipping containers shall be marked with the name of the product, this specification number or purchase order number, commodity code number and API Classification and in compliance with all Federal, State and City Environmental Regulations.

8.5. Individual containers shall be marked with the name of the product, the contents and API Service Symbol which identifies the oil's viscosity grade, service category, and energy conserving capabilities.

9. Certification:

9.1. The bidder shall submit, when requested, the API Certification document of the product.

10. Liquidated Damages:

10.1 In the event the vendor delivers engine oil that does not meet the specifications, it shall be the responsibility of the vendor pumping out the engine oil from tank or replacement of engine oil at their own expense.

APPENDIX

Note 1: In order that each request for contract or purchase order quotations will result in fair competition and delivery of the Lubricating Engine Oil required; the requisition must contain the following information:

(A) **Name of Commodity** – OIL, LUBRICATING, INTERNAL, COMPRESSION IGNITION COMBUSTION ENGINE

(B) **Specification Number** - #30-O-1:26

(C) **Type** – Fully Synthetic Diesel Engine Oil- Multi-grade- 5W-30, 5W-40, 5W-50, 10W-30, 15W-40

(D) **Size of Container** – Stated whether Containers, Drums, delivery by Tank Wagon.

(E) **Quantity** – Number of gallons

(F) **Delivery** – State point(s) and manner of delivery.

Note 2: For the information of the Bureau of Quality Assurance:

If, in the opinion of the inspector, tests and analyses are necessary to determine compliance with any requirement of this specification, then a sample consisting of no less than one gallon shall be randomly chosen.

Note 3: Copies of this specification may be obtained from:

Department of Citywide Administrative Services
Office of Citywide Procurement
Bureau of Quality Assurance
1 Centre Street - 18th Floor.
New York, NY 10007

SPECIFICATION FOR LUBRICANT: OILS, HYDRAULIC

Wherever "specified" is used herein, it shall mean "specified in the invitation to bid and the order."
Wherever reference is made herein to any other specification, standard, regulation or method, it shall mean the latest revision thereof in effect at the time of invitation to bid.

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1. INTENT:

This specification covers the "Hydraulic Oils" with rust and oxidation inhibitor, and anti-wear characteristics designed to meet the requirement of most fluid power system lubrication.

2. Kind:

a) **HM Hydraulic oils:** Hydraulic Oils with anti-foaming, anti-corrosion, anti-rust, and anti-wear performance.

b) **HV Hydraulic Oils:** Hydraulic Oils with anti-foaming, anti-corrosion, anti-rust, and anti-wear performance having high viscosity Index used for hydraulic circuits subject to strong temperature variation as well as load constraints and very high pressure.

c) **Zinc Free Hydraulic Oils:** High pressure ashless Anti-wear lubricants blended using selected highly refined high-quality mineral oils, combined with a non-zinc, ashless additive system. The non-zinc, ashless anti-wear additive is non-corrosive to silver and yellow metal alloys components of hydraulic systems.

d) **Fire Resistant Hydraulic Fluid:** It is fire resistant hydraulic oil of the type HFDU. It shall not contain water, mineral oil, or phosphate ester, and based on high quality, synthetic, organic esters optimized additive packages to achieve excellent hydraulic performance.

e) **Bio-hydraulic Oils:** Ecofriendly, biodegradable alternative to traditional petroleum-based hydraulic fluids, which are

formulated from Vegetable oils (HETG), deal for applications where the risk of water or soil contamination is high and Synthetic Esters (HEES)for superior thermal and oxidation stability for high-pressure and severe-duty system. It shall meet EPA Vessel General Permit (VGP) requirements of Environmentally Acceptable Lubricants (EAL).

3. Classification:

The hydraulic oils shall be of the following grades:

Type 1- These oils are light to medium grade oil, similar to the characteristics of ISO (International Organization for Standardization) Grades 32, 46 and 68.

Type 2- This is heavy grade oil similar to the ISO Grade 100

These hydraulic oils are applicable to the following systems:

Pump Type	Hydraulic Oils
Vane, Gear and Axial Piston Pumps	ISO 32, ISO 46, ISO 68
Oil Gear Pumps requiring heavy oil	ISO 100

4. Applicable Documents:

- ISO (International Organization for Standardization)-ISO 32, ISO 46, ISO 68, and ISO 100.
- ASTM Designation D6158-23 or latest revision: Standard specification for Mineral Hydraulic Oils.
- ASTM Designation D2422-24 or latest revision: Standard Classification of Industrial Fluid Lubricants by Viscosity System.

5. Requirements: HM Hydraulic oils:

5.1 These hydraulic oils shall be formulated from virgin petroleum base stock, re-refined petroleum base stock, or combination thereof with the latest zinc additive technology to provide outstanding anti-wear and thermal stability performance.

5.2 The HM hydraulic oils shall meet or exceed the specification requirement of:

- Eaton Brochure 694 (35VQ25A)
- Cincinnati Machine P-68(ISO 32), P-70(ISO 46, P-69 (ISO 68)
- Denison (Parker Hannifin) HF-0, HF-1, HF-2 (ISO 32, 46, 68)
- ANSI/AGMA 9005-FI6 R&O, (ISO 32, 46, 68, 100)

- US Steel (AIST) 126, 127 (ISO 32, 46, 68)
- DIN 51524-2 Part-2 HLP

5.3 Physical Characteristics:

The typical physical characteristics of HM hydraulic oils shall be as stated in Table-1:

TABLE -1: Typical Physical Characteristics of HM Hydraulic Oils

Properties	Test Method ASTM	Test Limits			
		Type 1			Type 2
		ISO 32	ISO 46	ISO 68	ISO 100
Viscosity @40^{0}C, cSt.	D445	30.4-33.60	43.7-48.3	64.6-71.4	95.0-105.0
Viscosity Index, Min.	D2270	99	98	98	95
Flash Point, COC, ^{0}C, Min.	D92	200	205	235	250
Pour Point, ^{0}C, Max.	D97	-24	-24	-18	-15
Copper Strip Corrosion 3 hr.@ 100^{0}C Max.	D130	1a	1a	1a	1a
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN, Min.	D943	3000	3000	3000	3000
Color, Max.	D1500	1.5	1.5	2.0	4.0
Neutralization Number, mg. KOH/g, Max.	D664	0.8	0.8	0.8	0.8
Foaming Characteristics, Max. Sequence 1 Tendency/Stability, ml, @24^{0}C Sequence 2 Tendency/Stability, ml, @93.5^{0}C Sequence 3 Tendency/Stability, after test @93.5^{0}C, ml, @ 24.^{0}C	D892	20/Nil 15/Nil 20/Nil	20/Nil 15/Nil 20/Nil	30/Nil 20/Nil 30/Nil	30/Nil 20/Nil 40/Nil
Water Separability Minutes to 40-40-0 @54^{0}C, Max.	D1401	20	20	20	25
Rust Preventive Characteristics Procedure A & B	D665	Pass	Pass	Pass	Pass
Zinc Content, %wt. Min.	D4951	0.04	0.04	0.04	0.04

6. Requirements: HV Hydraulic Oils:

6.1 These hydraulic oils shall be formulated from synthetic base stock with the latest zinc additive technology to provide outstanding anti-wear and thermal stability performance for use in hydraulic system where the equipment will be subject to a wide range of start-up and operating temperatures.

6.2 The HV hydraulic oils shall meet or exceed the specification requirement of:

- Eaton 35VQ25A-1-286-S, M-2950-S,
- Bosch-Rexroth RD/RE 90220, 90221 Cincinnati Machine P-68 (ISO 32), P-70 (ISO 46) P-69 (ISO 68)
- Denison (Parker Hannifin) HF-0, HF-1, HF-2 (ISO 32, 46, 68)
- ANSI/AGMA 9005-FI6 R&O, (ISO 32, 46, 68, 100)
- US Steel (AIST) 126, 127 (ISO 32, 46, 68)
- DIN 51524-2 HLP, 51524-3 HVLP

6.3 <u>Physical Characteristics:</u>

The physical characteristics of HV hydraulic oils shall be as stated in Table-2:

TABLE -2: Typical Physical Characteristics of HV Hydraulic Oils

Properties	**Test Method ASTM**	**Test Limits**		
		ISO 32	**ISO 46**	**ISO 68**
Viscosity @40^{0}C, cSt.	D445	32.0	46.0	68.0
Viscosity @100^{0}C, cSt.	D445	6.28	8.15	10.9
Viscosity Index	D2270	151	152	151
Brookfield Viscosity, Cp @-20^{0}C	D2983	1090	1870	3990
Flash Point, COC, ^{0}C, Min.	D92	208	216	222
Pour Point, ^{0}C, Max.	D97	-48	-48	-42
Copper Strip Corrosion 3 hr.@ 100^{0}C Max.	D130	1a	1a	1a
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN,Min.	D943	5000	5000	5000
FZG Gear Test, Fail Load Stage DIN 51354		11	$\geq$ 12	$\geq$ 12
Foam Sequence I, II, III, ml	D892	20/0	20/0	20/0
Water Separability Minutes to <3ml @54^{0}C,	D1401	10	10	10
Rust Preventive Characteristics Procedure A & B	D665	Pass	Pass	Pass
Zinc Content, %wt. Min.	D4951	0.04	0.04	0.04

7. Requirements: Zinc Free Hydraulic Oils:

7.1 These are high pressure ashless Anti-wear hydraulic oils, which are blends of high-quality mineral base stock and a non-zinc ashless additive system.

7.2 The Zinc Free hydraulic oils shall meet or exceed the specification requirement of:

- DIN 51524 Pt 2 (HLP)
- Cincinnati Lamb – P-68 (ISO 32), P-69 (ISO 68), P-70 (ISO 46)
- Parker Denison HF-0

7.3 <u>Physical Characteristics:</u>

The physical characteristics of Zinc Free hydraulic oils shall be as stated in Table-3:

TABLE -3: Typical Physical Characteristics of Zinc Free Hydraulic Oils

Properties	**Test Method ASTM**	**Test Limits**		
		ISO 32	**ISO 46**	**ISO 68**
Viscosity @40^{0}C, cSt.	D445	32.50	47.00	68.00
Viscosity @100^{0}C, cSt.	D445	5.42	6.77	8.60
Viscosity Index	D2270	100	97	97
Flash Point, COC, ^{0}C, min.	D92	215	235	248
Pour Point, ^{0}C, Max.	D97	-15	-15	-12
Copper Strip Corrosion 3 hr.@ 100^{0}C Max.	D130	1a	1a	1a
FZG Gear Test, Fail Load Stage DIN 51354		11	≥ 12	≥ 12
Foam Sequence I, II, II1, ml	D892	10/0 5/0 5/0	10/0 10/0 20/0	10/0 10/0 15/0
Water Separability Minutes to <3ml @54^{0}C,	D2711	6 (54^{0}C)	9 (54^{0}C)	10 (54^{0}C)
Rust Preventive Characteristics Procedure A & B	D665	Pass	Pass	Pass
Air release @50^{0}C, mins	D3427	4	6	8
TBN, mg KOH/g	D974	0.25	0.26	0.28

8. Requirements: Fire Resistant Hydraulic Fluid:

8.1 Fire Resistant- High ignition temperature and low heat release properties that limit the spread of fire.

8.2 Possess excellent shear stability

8.3 No-toxic/nontoxic to aquatic life

8.3 Shall be fully biodegradable

8.4 <u>Physical Characteristics:</u>

The physical characteristics of fire-resistant hydraulic oils shall be as stated in Table-4:

TABLE -4: Typical Physical Characteristics of Fire-Resistant Hydraulic Oils

Properties	**Test Method ASTM/ISO/DIN**	**Test Limits**
Appearance		Yellow Amber
Viscosity @40^{0}C, cSt.	D445	49.7
Viscosity @100^{0}C, cSt.	D445	9.7
Viscosity Index	D2270	185
Flash Point, COC, ^{0}C	D92	300
Fire Point, COC, ^{0}C	D92	362
Auto Ignition Temperature ^{0}C	DIN 51794	>400
Pour Point, ^{0}C, Max.	D97	<-20
Density @ 15 ^{0}C	D1298	0.919
Gear Lubrication (FZG), load stage	DIN 51354-2	<12
Foam Test @25 ^{0}C, ml Sequence 1	D892	50-0
Water Separability ml-ml-ml (min)	D1401	41-39-0 (30)
Corrosion protection: Steel and non-ferrous metals Steel: distilled water	ISO 4404-2 D665A	Pass Pass
Air release, minutes	D3427	7
Elastomer combability	ISO 6072	Pass
Shear Stability, %	D2603	<1
Acid Number, mg KOH/g	D974	2.0
Vane Pump, Vickers 104C (100 hrs. at 140 bar), mg	D2882	<5

9. Bio-hydraulic Oil:

9.1 Ecofriendly, biodegradable alternative to traditional petroleum-based hydraulic fluids, which are formulated from Vegetable oils (HETG), ideal for applications where the risk of water or soil contamination is high and Synthetic Esters (HEES)for superior thermal and oxidation stability for high-pressure and severe-duty systems.

9.2 Requirements: Bio-hydraulic Oils

It shall meet EPA Vessel General Permit (VGP) requirements of Environmentally Acceptable Lubricants (EAL).

9.3 <u>Physical Characteristics:</u>

The physical characteristics of Bio-hydraulic oils shall be as stated in Table-5:

TABLE -5: Typical Physical Characteristics of Bio-Hydraulic Oils

Properties	Test Method	32	46	68
Base Stock		HEES	HEES	HEES
Density @15°C	ASTM D4052	0.8223	O.8226	0.8262
Viscosity cSt. @40°C @100°C	ASTM D445	 31.8 6.5	 46 8.52	 68 12.0
Viscosity Index	ASTM D2770	164	165	175
Flash Point °C	ASTM D92	235	252	237
Pour Point °C	ASTM D97	-46	-35	-41
Brookfield Viscosity cP @-20°C cP @-30°C	ASTM D2983	 1020 2410	 1430 4730	 2330 7250
Air Release @50°C	ASTM D3427	2.95	2.18	6.38
Copper Corrosion 3hr. @ 100°C	ASTM D130	1a	1a	1a
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass
Oxidation Stability	ASTM D943	>10,000	>10,000	>10,000
FZG (A/8.3/90)	DIN 5182	12	12	12
Biodegradability % in 28 days	OECD 301B	>60	>60	>60
Ecotoxicity Algae, 72 h, EC-50, mg/L Daphnia magna, 48 h, EC-50, mg/L Fathead minnow, 96 h, LC-50, mg/L	 OECD 201 OECD 202 OECD 203	 >100 >100 >100	 >100 >100 >100	 >100 >100 >100

10. Packaging:

10.1 The oil shall be packed in cans or 55-gallon drums or it shall be delivered by tank wagon as specified and in compliance with all Federal, State and City Environmental Regulations for storage, transportation, and disposal.

10.2 The labels must conform to all OSHA labeling standards and shall include health hazard data. Packaging should be in accordance with Federal and OSHA acceptable standards.

10.3 Shipping Containers shall be marked with the name of the product, this specification number, net contents, grade of the material, name of contractor, contract number or purchase order number, and commodity code number. Containers shall be in compliance with all Federal, State, and City Environmental Regulations.

10.4 Unless otherwise provided for, mixed lots varying in origin, brands, or trademarks will not be accepted on any contract or purchase order.

11. Liquidated Damages:

11.1 In the event the vendor delivers hydraulic oil that does not meet the specifications, it shall be the responsibility of the vendor pumping out the hydraulic oil from tank or replacement of hydraulic oil at their own expense.

12. Quality Assurance Provisions:

12.1 All tests outlined on Section 5,6,7,8 and 9 shall be conducted and certification of compliance shall be provided. Any applicable method of test or examination may be employed if it is satisfactory to the Department of Citywide Administrative Services [DCAS] or satisfactory to a laboratory approved of by the Commissioner of the Department of Citywide Administrative Services. The test reports shall be available to DCAS or the using agency for follow up.

APPENDIX

Note 1: In order that each request for contract or purchase order quotations will result in fair competition and delivery of the Hydraulic Oil required, the requisition must contain the following information:

(A) **Name of Commodity** – Lubricant: Oils, Hydraulic

(B) **Specification Number** – 30-O-31:26

(C) **Kind** – HM Hydraulic Oils, HV Hydraulic Oils, Zinc Free Hydraulic Oils, Fire-Resistant Hydraulic Fluid and Bio-hydraulic Oils.

(D) **Size of Container** – State whether cans, drums, or delivery by tank wagon

(E) **Quantity** – State number of gallons

(F) **Delivery** – State point(s) and manner of delivery.

Note 2: For the information of the Bureau of Quality Assurance:

If, in the opinion of the inspector, tests and analyses are necessary to determine compliance with any requirement of this specification, then a sample consisting of no less than one gallon of each type shall be randomly chosen.

Note 3: Copies of this specification may be obtained from:

Department of Citywide Administrative Services
Office of Citywide Procurement
Bureau of Quality Assurance
1 Centre Street - 18th Floor
New York, NY 10007.

SPECIFICATION FOR LUBRICANT: OILS, HYDRAULIC

Wherever "specified" is used herein, it shall mean "specified in the invitation to bid and the order."
Wherever reference is made herein to any other specification, standard, regulation or method, it shall mean the latest revision thereof in effect at the time of invitation to bid.

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1. INTENT:

This specification covers the "Hydraulic Oils" with rust and oxidation inhibitor, and anti-wear characteristics designed to meet the requirement of most fluid power system lubrication.

2. Kind:

a) **HM Hydraulic oils:** Hydraulic Oils with anti-foaming, anti-corrosion, anti-rust, and anti-wear performance.

b) **HV Hydraulic Oils:** Hydraulic Oils with anti-foaming, anti-corrosion, anti-rust, and anti-wear performance having high viscosity Index used for hydraulic circuits subject to strong temperature variation as well as load constraints and very high pressure.

c) **Zinc Free Hydraulic Oils:** High pressure ashless Anti-wear lubricants blended using selected highly refined high-quality mineral oils, combined with a non-zinc, ashless additive system. The non-zinc, ashless anti-wear additive is non-corrosive to silver and yellow metal alloys components of hydraulic systems.

d) **Fire Resistant Hydraulic Fluid:** It is fire resistant hydraulic oil of the type HFDU. It shall not contain water, mineral oil, or phosphate ester, and based on high quality, synthetic, organic esters optimized additive packages to achieve excellent hydraulic performance.

e) **Bio-hydraulic Oils:** Ecofriendly, biodegradable alternative to traditional petroleum-based hydraulic fluids, which are

formulated from Vegetable oils (HETG), deal for applications where the risk of water or soil contamination is high and Synthetic Esters (HEES)for superior thermal and oxidation stability for high-pressure and severe-duty system. It shall meet EPA Vessel General Permit (VGP) requirements of Environmentally Acceptable Lubricants (EAL).

3. Classification:

The hydraulic oils shall be of the following grades:

Type 1- These oils are light to medium grade oil, similar to the characteristics of ISO (International Organization for Standardization) Grades 32, 46 and 68.

Type 2- This is heavy grade oil similar to the ISO Grade 100

These hydraulic oils are applicable to the following systems:

Pump Type	Hydraulic Oils
Vane, Gear and Axial Piston Pumps	ISO 32, ISO 46, ISO 68
Oil Gear Pumps requiring heavy oil	ISO 100

4. Applicable Documents:

- ISO (International Organization for Standardization)-ISO 32, ISO 46, ISO 68, and ISO 100.
- ASTM Designation D6158-23 or latest revision: Standard specification for Mineral Hydraulic Oils.
- ASTM Designation D2422-24 or latest revision: Standard Classification of Industrial Fluid Lubricants by Viscosity System.

5. Requirements: HM Hydraulic oils:

5.1 These hydraulic oils shall be formulated from virgin petroleum base stock, re-refined petroleum base stock, or combination thereof with the latest zinc additive technology to provide outstanding anti-wear and thermal stability performance.

5.2 The HM hydraulic oils shall meet or exceed the specification requirement of:

- Eaton Brochure 694 (35VQ25A)
- Cincinnati Machine P-68(ISO 32), P-70(ISO 46, P-69 (ISO 68)
- Denison (Parker Hannifin) HF-0, HF-1, HF-2 (ISO 32, 46, 68)

- ANSI/AGMA 9005-FI6 R&O, (ISO 32, 46, 68, 100)
- US Steel (AIST) 126, 127 (ISO 32, 46, 68)
- DIN 51524-2 Part-2 HLP

5.3 Physical Characteristics:

The typical physical characteristics of HM hydraulic oils shall be as stated in Table-1:

TABLE -1: Typical Physical Characteristics of HM Hydraulic Oils

Properties	Test Method ASTM	Test Limits			
		Type 1			Type 2
		ISO 32	ISO 46	ISO 68	ISO 100
Viscosity @40^{0}C, cSt.	D445	30.4-33.60	43.7-48.3	64.6-71.4	95.0-105.0
Viscosity Index, Min.	D2270	99	98	98	95
Flash Point, COC, ^{0}C, Min.	D92	200	205	235	250
Pour Point, ^{0}C, Max.	D97	-24	-24	-18	-15
Copper Strip Corrosion 3 hr.@ 100^{0}C Max.	D130	1a	1a	1a	1a
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN, Min.	D943	3000	3000	3000	3000
Color, Max.	D1500	1.5	1.5	2.0	4.0
Neutralization Number, mg. KOH/g, Max.	D664	0.8	0.8	0.8	0.8
Foaming Characteristics, Max. Sequence 1 Tendency/Stability, ml, @24^{0}C Sequence 2 Tendency/Stability, ml, @93.5^{0}C Sequence 3 Tendency/Stability, after test @93.5^{0}C, ml, @ 24.^{0}C	D892	20/Nil 15/Nil 20/Nil	20/Nil 15/Nil 20/Nil	30/Nil 20/Nil 30/Nil	30/Nil 20/Nil 40/Nil
Water Separability Minutes to 40-40-0 @54^{0}C, Max.	D1401	20	20	20	25
Rust Preventive Characteristics Procedure A & B	D665	Pass	Pass	Pass	Pass
Zinc Content, %wt. Min.	D4951	0.04	0.04	0.04	0.04

6. Requirements: HV Hydraulic Oils:

6.1 These hydraulic oils shall be formulated from synthetic base stock with the latest zinc additive technology to provide outstanding anti-wear and thermal stability performance for use in hydraulic system where the equipment will be subject to a wide range of start-up and operating temperatures.

6.2 The HV hydraulic oils shall meet or exceed the specification requirement of:

- Eaton 35VQ25A-1-286-S, M-2950-S,
- Bosch-Rexroth RD/RE 90220, 90221 Cincinnati Machine P-68 (ISO 32), P-70 (ISO 46) P-69 (ISO 68)
- Denison (Parker Hannifin) HF-0, HF-1, HF-2 (ISO 32, 46, 68)
- ANSI/AGMA 9005-FI6 R&O, (ISO 32, 46, 68, 100)
- US Steel (AIST) 126, 127 (ISO 32, 46, 68)
- DIN 51524-2 HLP, 51524-3 HVLP

6.3 Physical Characteristics:

The physical characteristics of HV hydraulic oils shall be as stated in Table-2:

TABLE -2: Typical Physical Characteristics of HV Hydraulic Oils

Properties	Test Method ASTM	Test Limits		
		ISO 32	ISO 46	ISO 68
Viscosity @40^{0}C, cSt.	D445	32.0	46.0	68.0
Viscosity @100^{0}C, cSt.	D445	6.28	8.15	10.9
Viscosity Index	D2270	151	152	151
Brookfield Viscosity, Cp @-20^{0}C	D2983	1090	1870	3990
Flash Point, COC, ^{0}C, Min.	D92	208	216	222
Pour Point, ^{0}C, Max.	D97	-48	-48	-42
Copper Strip Corrosion 3 hr.@ 100^{0}C Max.	D130	1a	1a	1a
Oxidation Stability, TOST Hours to 2.0 mg KOH/g TAN,Min.	D943	5000	5000	5000
FZG Gear Test, Fail Load Stage DIN 51354		11	$\geq$ 12	$\geq$ 12
Foam Sequence I, II, III, ml	D892	20/0	20/0	20/0
Water Separability Minutes to <3ml @54^{0}C,	D1401	10	10	10
Rust Preventive Characteristics Procedure A & B	D665	Pass	Pass	Pass
Zinc Content, %wt. Min.	D4951	0.04	0.04	0.04

7. Requirements: Zinc Free Hydraulic Oils:

7.1 These are high pressure ashless Anti-wear hydraulic oils, which are blends of high-quality mineral base stock and a non-zinc ashless additive system.

7.2 The Zinc Free hydraulic oils shall meet or exceed the specification requirement of:

- DIN 51524 Pt 2 (HLP)
- Cincinnati Lamb – P-68 (ISO 32), P-69 (ISO 68), P-70 (ISO 46)
- Parker Denison HF-0

7.3 Physical Characteristics:

The physical characteristics of Zinc Free hydraulic oils shall be as stated in Table-3:

TABLE -3: Typical Physical Characteristics of Zinc Free Hydraulic Oils

Properties	Test Method ASTM	Test Limits		
		ISO 32	ISO 46	ISO 68
Viscosity @40^{0}C, cSt.	D445	32.50	47.00	68.00
Viscosity @100^{0}C, cSt.	D445	5.42	6.77	8.60
Viscosity Index	D2270	100	97	97
Flash Point, COC, ^{0}C, min.	D92	215	235	248
Pour Point, ^{0}C, Max.	D97	-15	-15	-12
Copper Strip Corrosion 3 hr.@ 100^{0}C Max.	D130	1a	1a	1a
FZG Gear Test, Fail Load Stage DIN 51354		11	$\geq$ 12	$\geq$ 12
Foam Sequence I, II, II1, ml	D892	10/0 5/0 5/0	10/0 10/0 20/0	10/0 10/0 15/0
Water Separability Minutes to <3ml @54^{0}C,	D2711	6 (54^{0}C)	9 (54^{0}C)	10 (54^{0}C)
Rust Preventive Characteristics Procedure A & B	D665	Pass	Pass	Pass
Air release @50^{0}C, mins	D3427	4	6	8
TBN, mg KOH/g	D974	0.25	0.26	0.28

8. Requirements: Fire Resistant Hydraulic Fluid:

8.1 Fire Resistant- High ignition temperature and low heat release properties that limit the spread of fire.

8.2 Possess excellent shear stability

8.3 No-toxic/nontoxic to aquatic life

8.3 Shall be fully biodegradable

8.4 <u>Physical Characteristics:</u>

The physical characteristics of fire-resistant hydraulic oils shall be as stated in Table-4:

TABLE -4: Typical Physical Characteristics of Fire-Resistant Hydraulic Oils

Properties	**Test Method ASTM/ISO/DIN**	**Test Limits**
Appearance		Yellow Amber
Viscosity @40^{0}C, cSt.	D445	49.7
Viscosity @100^{0}C, cSt.	D445	9.7
Viscosity Index	D2270	185
Flash Point, COC, ^{0}C	D92	300
Fire Point, COC, ^{0}C	D92	362
Auto Ignition Temperature ^{0}C	DIN 51794	>400
Pour Point, ^{0}C, Max.	D97	<-20
Density @ 15 ^{0}C	D1298	0.919
Gear Lubrication (FZG), load stage	DIN 51354-2	<12
Foam Test @25 ^{0}C, ml Sequence 1	D892	50-0
Water Separability ml-ml-ml (min)	D1401	41-39-0 (30)
Corrosion protection: Steel and non-ferrous metals Steel: distilled water	ISO 4404-2 D665A	Pass Pass
Air release, minutes	D3427	7
Elastomer combability	ISO 6072	Pass
Shear Stability, %	D2603	<1
Acid Number, mg KOH/g	D974	2.0
Vane Pump, Vickers 104C (100 hrs. at 140 bar), mg	D2882	<5

9. Bio-hydraulic Oil:

9.1 Ecofriendly, biodegradable alternative to traditional petroleum-based hydraulic fluids, which are formulated from Vegetable oils (HETG), ideal for applications where the risk of water or soil contamination is high and Synthetic Esters (HEES)for superior thermal and oxidation stability for high-pressure and severe-duty systems.

9.2 Requirements: Bio-hydraulic Oils

It shall meet EPA Vessel General Permit (VGP) requirements of Environmentally Acceptable Lubricants (EAL).

9.3 Physical Characteristics:

The physical characteristics of Bio-hydraulic oils shall be as stated in Table-5:

TABLE -5: Typical Physical Characteristics of Bio-Hydraulic Oils

Properties	Test Method	32	46	68
Base Stock		HEES	HEES	HEES
Density @15°C	ASTM D4052	0.8223	O.8226	0.8262
Viscosity cSt. @40°C @100°C	ASTM D445	 31.8 6.5	 46 8.52	 68 12.0
Viscosity Index	ASTM D2770	164	165	175
Flash Point °C	ASTM D92	235	252	237
Pour Point °C	ASTM D97	-46	-35	-41
Brookfield Viscosity cP @-20°C cP @-30°C	ASTM D2983	 1020 2410	 1430 4730	 2330 7250
Air Release @50°C	ASTM D3427	2.95	2.18	6.38
Copper Corrosion 3hr. @ 100°C	ASTM D130	1a	1a	1a
Rust Test, Procedure A & B	ASTM D665	Pass	Pass	Pass
Oxidation Stability	ASTM D943	>10,000	>10,000	>10,000
FZG (A/8.3/90)	DIN 5182	12	12	12
Biodegradability % in 28 days	OECD 301B	>60	>60	>60
Ecotoxicity Algae, 72 h, EC-50, mg/L Daphnia magna, 48 h, EC-50, mg/L Fathead minnow, 96 h, LC-50, mg/L	 OECD 201 OECD 202 OECD 203	 >100 >100 >100	 >100 >100 >100	 >100 >100 >100

10. Packaging:

10.1 The oil shall be packed in cans or 55-gallon drums or it shall be delivered by tank wagon as specified and in compliance with all Federal, State and City Environmental Regulations for storage, transportation, and disposal.

10.2 The labels must conform to all OSHA labeling standards and shall include health hazard data. Packaging should be in accordance with Federal and OSHA acceptable standards.

10.3 Shipping Containers shall be marked with the name of the product, this specification number, net contents, grade of the material, name of contractor, contract number or purchase order number, and commodity code number. Containers shall be in compliance with all Federal, State, and City Environmental Regulations.

10.4 Unless otherwise provided for, mixed lots varying in origin, brands, or trademarks will not be accepted on any contract or purchase order.

11. Liquidated Damages:

11.1 In the event the vendor delivers hydraulic oil that does not meet the specifications, it shall be the responsibility of the vendor pumping out the hydraulic oil from tank or replacement of hydraulic oil at their own expense.

12. Quality Assurance Provisions:

12.1 All tests outlined on Section 5,6,7,8 and 9 shall be conducted and certification of compliance shall be provided. Any applicable method of test or examination may be employed if it is satisfactory to the Department of Citywide Administrative Services [DCAS] or satisfactory to a laboratory approved of by the Commissioner of the Department of Citywide Administrative Services. The test reports shall be available to DCAS or the using agency for follow up.

APPENDIX

Note 1: In order that each request for contract or purchase order quotations will result in fair competition and delivery of the Hydraulic Oil required, the requisition must contain the following information:

(A) **Name of Commodity** – Lubricant: Oils, Hydraulic

(B) **Specification Number** – 30-O-31:26

(C) **Kind** – HM Hydraulic Oils, HV Hydraulic Oils, Zinc Free Hydraulic Oils, Fire-Resistant Hydraulic Fluid and Bio-hydraulic Oils.

(D) **Size of Container** – State whether cans, drums, or delivery by tank wagon

(E) **Quantity** – State number of gallons

(F) **Delivery** – State point(s) and manner of delivery.

Note 2: For the information of the Bureau of Quality Assurance:

If, in the opinion of the inspector, tests and analyses are necessary to determine compliance with any requirement of this specification, then a sample consisting of no less than one gallon of each type shall be randomly chosen.

Note 3: Copies of this specification may be obtained from:

Department of Citywide Administrative Services
Office of Citywide Procurement
Bureau of Quality Assurance
1 Centre Street - 18th Floor
New York, NY 10007.

SPECIFICATION FOR GREASE MULTIPURPOSE

Wherever "specified" is used herein, it shall mean "specified in the invitation to bid and the order."

Wherever reference is made herein to any other specification, standard, regulation or method, it shall mean the latest revision thereof in effect at the time of invitation to bid.

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1. Intent:

This specification covers multipurpose grease for lubrication of chassis systems, wheel bearings of passenger cars, trucks, and other vehicles and also for other industrial uses.

2. Grades:

2.1 The multipurpose grease shall be of the four types as follows and shall be as specified.

Type A - Grease, Multipurpose.

This grade is used to meet the performance requirement for chassis grease, wheel bearing grease, universal joint grease and other automotive uses.

Type B – Grease, Multipurpose with Molybdenum Disulfide.

This should have a minimum requirement of 3% Molybdenum Disulfide to provide additional wear prevention and friction reducing qualities.

Type C - Grease, Multipurpose, Extreme-Pressure. This is a high performance, extreme pressure capability grease, with an excellent resistance to heat.

Type D - Grease, Multipurpose, Synthetic Base. This grade of supreme performance and is used for a wide variety of applications at extreme temperatures. The combination of the complex grease thickener with synthetic base fluids performs well under severe operating conditions and provides excellent

mechanical stability, high dropping point, excellent low temperature pump ability and very low starting and running torque.

Type E – Grease, Multipurpose, Calcium Sulfonate Thickeners. It has high-viscosity base fluid and performs effectively in severe conditions such as heat, moisture and heavy loads. It has molybdenum disulfide for retention of EP performance and equipment protection in severe sliding situation for heavily loaded applications or environments highly contaminated with water. It is applicable to Heavy-duty trucks including Chassis, Spring Saddles, Kingpins, Tie-rods, U-joints, hinge and bucket pins and fifth wheels. The EP properties derived from calcium thickener also have inherently better thermal stability than those from conventional sulfur/phosphorous EP additives. Calcium sulfonate grease and lithium complex both have the advantage of being compatible with each other.

3. <u>Requirement</u>:

3.1.1 Composition: - The grease shall be a smooth homogeneous mixture of a well-refined mineral oil or synthetic fluid, and a base of Lithium/Lithium-Complex soap or calcium sulfonate thickener.

3.1.2 Condition in Container: - The grease as received shall be a smooth homogeneous mixture. There shall be no corrosion of the container.

3.1.3 Odor: - The odor of the grease shall not be obnoxious, objectionable, or artificially scented to cover up rancid fats and disagreeably smelling oils.

3.1.4 Resistance to Water (Water test only):- When tested for its resistance to the solvent action of water, the multipurpose grease shall not disintegrate.

3.1.5 Rust Prevention: - When tested for its rust prevention properties, the test material shall have a pass rating, shall be no red rust or black spots on the material.

3.1.6 Storage Stability: - The change in worked penetration in the grease shall not exceed 5 strokes when tested for a period of 30 days.

3.1.7 Consistency: - The consistency of tested samples shall be the same for all formulations of the grease.

4. Physical Characteristics: The typical physical characteristics of the greases will be as stated in Table 1:

TABLE 1: THE TYPICAL PHYSICAL CHARACTERISTICS OF MULTIPURPOSE GREASES

Tests	Test Method ASTM	Type A	Type B	Type C	Type D	Type E
NLGI Grade	D 217	2	1-2	2	2	2
Thickener Type	D 128	Lithium	Lithium Complex	Lithium Complex	Lithium Complex	Calcium Sulfonate
Dropping Point, °C, Min	D 2265	180	232	260	280	280
Worked Penetration, 25°C/60 Strokes	D 217	265-295	280-325	265-295	265-295	Min.265
Water Washout % wt. loss @79^{0}C Max	D 1264	3.5	3	3	3	1
Timken OK Loads, lbs., Min.	D 2509	45	50	40	40	60
Copper Strip Corrosion @100^{0}C, Min.	D 4048	1b	1b	1b	1a	1a
Oxidation Stability, Pressure Drop @100 hrs. psi,	D942	5	3.5	3.5	3.5	
Base oil Viscosity, Kin, cSt. @40°C @100°C	D445	180-235 15.0-15.6	320-345 24.5-32.0	150-220 13.2-18.3	198-242 21.4-26.2	198-242
Temperature Range		-30°C to +130°C	-30°C to +162°C	-18°C to +204°C	-40°C to 150°C	
Molybdenum Disulfide%, Min.	D 128		3		0.75	3
Four-Ball Wear, mm,1 hr,75°C, 1200 rpm, 40 kgf, Max	D 2266		0.4	0.5	0.5	0.38
Four-Ball EP, Weld Load,kgf,	D 2596		400	250	315	500
Water Spray Resistance, mass%	D4049					20

5. **Preparation for Delivery**:

5.1 Packing: The grease shall be packed in small cans, 35 lb pails, 120 or 400 lb. drum as specified.

5.2 Marking: Individual container shall be plainly marked with:

1. Grease, Multipurpose or
   Grease, Multipurpose with Molybdenum Disulfide or
   Grease, Multipurpose, Extreme Pressure, High Temperature Resistance or
   Grease, Multipurpose, Synthetic Base
   Grease, Multipurpose, Calcium Sulfonate
2. Color
3. Net Contents
4. Chemical Abstract Services Number for all chemicals
5. Name of Manufacturer, Vendor or Packer.
6. Date of Manufacture or Code indicating date of manufacture, batch number and storage stability data (change in work penetration and pressure)
7. Recommendations for use
8. Directions for use

5.3 Precautionary Markings: - Precautionary marking shall include all applicable health hazard data.

5.4 Unless otherwise specified, mixed lots of varying origin, brands or trademarks will not be accepted on any contract or purchase order.

APPENDIX

Note 1: In order that each request for contract or purchase order quotations will result in fair competition and delivery of the multipurpose grease required, the requisition must contain the following information:

(A) **Name of Commodity** -- Multipurpose Grease

(B) **Specification Number** -- 30-G-6:26

(C) **Type** – Type A, Type B, Type C, Type D, Type E

(D) **Size of Container** – Tubes, Cans, Pails, Drums

(E) **Quantity** -- State Number of pounds.

(F) **Delivery** – State Point(s) and manner of delivery

Note 2: For the information of the Bureau of Quality Assurance:

If, in the opinion of the inspector, tests and analyses are necessary to determine compliance with any requirement of this Specification, a sample consisting of not less than one pound of each type shall be randomly chosen.

Note 3: Copies of this specification may be obtained from:

Department of Citywide Administrative Services
Office of Citywide Procurement
Bureau of Quality Assurance
1 Centre Street - 18th Floor
New York, NY 10007.

SPECIFICATION FOR OIL, LUBRICATING, GEAR

Wherever "specified" is used herein, it shall mean "specified in the invitation to bid and the order."

Wherever reference is made herein to any other specification, standard, regulation or method, it shall mean the latest revision thereof in effect at the time of invitation to bid.

1. Intent:

This specification covers the "Synthetic Gear Oil" designed for use in heavy-duty drivetrains that requires gear lubricants with relatively high viscosity and excellent load-carrying capability and also where extreme pressures and shocking loading may be the factors.

2. Kind:

The gear oil will be multi-grade and shall be manufactured from synthesized hydrocarbon base fluids.

3. Requirements:

3.1 The gear oils shall be formulated with virgin synthetic base oils, re-refined base stock of same quality, or combination thereof. They shall incorporate additives which are designated to bring the base stock(s) in compliance with the product's required performance characteristics.

3.1 The gear oil shall meet and exceed the requirements for MIL-PRF-2105E, API Service Categories GL-5, and MT-1.

3.2 The gear oil shall meet the low and high temperature requirements of the SAE Lubricant Viscosity Classification J-306 and SAE Gear Oil Standard J-2360

3.4 The gear oil shall meet or exceed the following industry and builder specification:

- Dana – SHAES 256 Rev C (75W-90)
- Dana – SHAES 429 Rev A (80W-140)
- Eaton Axle Div. PS-037/163/109
- Mack GO-H/S, GO-J Plus (SAE 75W-90 0nly),
- Mack GO-J (SAE 80W-140 0nly)
- Arvin Meritor 0-76 E&N, 0-76-B & O-80
- International TMS-6816
- Daimler Chrysler MB235.6 (SAE 75W-90 0nly)
- Daewoo avia Transmission, Eaton (SAE 80W-140 0nly)

3.5 NYC requires the use of a single manufacturer's brand of gear oil to avoid the inherent risks of incompatibility among the different manufacturer's oil products. In the event of more than one brand is being supplied within the duration of the contract, the supplier must notify the OCP/DCAS in advance of delivery for approval.

4. Applicable Documents:

ASTM Designation: D7450-24 or latest revision- Standard Specification for Performance of Rear Axle Gear Lubricants Intended for API Category GL-5 Service.

API (American Petroleum Institute): Latest revision of Gear Oil Program.

SAE (Society of Automotive Engineers): Lubricant Viscosity Classification SAE J306 and Gear Oil Standard SAE J2360.

5. Applications:

The gear oils shall be formulated for use in universal duty hypoid or spiral bevel-gear truck differentials of over-the-road truck fleets, as well as in off-road vehicle axles.

6. Typical Physical Characteristics:

The typical physical characteristics of synthetic high performance gear oils will be as stated in Table-1.

TABLE-1 Physical Characteristics of Synthetic Gear oils

Properties	Test Method ASTM	Test Results	
		75W-90	80W-140
Density at 15^0C	D4052	0.903	0.912
Flash Point, ^{0}C	D92	204	201
Pour Point, ^{0}C	D97	-48	-40
Kinematic Visc. cSt., @40^0C	D445	126	271
Kinematic Visc. cSt., @100^0C	D445	17.3	30.5
Brookfield Viscosity Cp @-18 ^{0}C	D2983	7,125	20,500
Brookfield Viscosity Cp @-26 ^{0}C	D2983		75,000
Brookfield Viscosity Cp @-40 ^{0}C	D2983	145,000	
Viscosity Index	D2270	151	152
Timken, OK Load	D2509	50	85
FZG (A/8.3/90) Pass Load Stage	D5182	12	12

7. Packing:

7.1 All packing shall be in accordance with the best commercial practice.

7.2 The Gear Oil shall be packed in 5-gallon containers, 55-gallon drums, or delivered in tank wagons equipped with meters.

7.3 The deliveries shall be made in compliance with all Federal, State, and City Environmental Regulations for storage, transportation, and disposal.

7.3 Packing shall be as specified in the bid/purchase order.

8. Identification:

8.1. In addition to the labeling requirements of applicable Federal, State and Local authorities, cans and drums shall be marked with the name of the material, the N.Y.C. Specification number, the net contents, the name of contractor, and the name of the contract or purchase order.

8.2. With tank wagon deliveries, there shall be furnished the specified number of delivery tickets marked with the name, N.Y.C. specification number, class, type, grade of the material, number of gallons delivered, name of the contractor, and the number of

the contract or purchase order.

APPENDIX

Note 1: In order that each request for contract or purchase order quotations will result in fair competition and delivery of the lubricating gear oil required, the requisition must contain the following information:

(A) **Name of Commodity** - Oil, Lubricating, Gear

(B) **Specification Number** - #30-G-01:26

(C) **Type** - SAE 75W-90 and 80W-140, Synthetic Gear Oil

(D) **Size of Container** - Stated whether Cans, Drums, delivery by Tank wagon.

(E) **Quantity** - Number of gallons

(F) **Delivery** - State point(s) and manner of delivery.

Note 2: For the information of the Bureau of Quality Assurance:

If, in the opinion of the inspector, tests and analyses are necessary to determine compliance with any requirement of this specification, then a sample consisting of no less than one gallon shall be randomly chosen.

Note 3: Copies of this specification may be obtained from:

Department of Citywide Administrative Services
Office of Citywide Procurement
Bureau of Quality Assurance
1 Centre Street - 18th Floor.
New York, NY 10007

SPECIFICATION FOR
LUBRICANT: FLUID, AUTOMATIC TRANSMISSION

Wherever "specified" is used herein, it shall mean "specified in the invitation to bid and the order."

Wherever reference is made herein to any other specification, standard, regulation or method, it shall mean the latest revision thereof in effect at the time of invitation to bid.

1. INTENT:

This specification covers the "Automatic Transmission Fluid", for use in vehicles with self-shifting or automatic transmission.

2. Requirements:

2.1 The automatic transmission fluid shall be formulated from full synthetic, and synthetic base stock. They shall incorporate additives which are designated to bring the base stock(s) in compliance with the respective product's required classification and performance characteristics.

2.2 Automatic transmission fluid offered must meet SAE J311.

2.3 The proposed automatic transmission fluid shall be formulated for miscibility with fluids used for initial OEM factory fill and with other OEM qualified fluids, resistance to oxidation, operation in a range from very low temperature to very high temperatures, component lubrication, anti-foam protection, protection against corrosion, compatibility with elastomeric materials, OEM shift-feel characteristics, clutch, and band friction characteristic retention versus temperature and duty cycle, and anti-wear protection.

2.4 Automatic transmission fluid offered must be "fill for-life" type under normal service and in color as specified.

3. Type:

The automatic transmission fluid shall be of the following qualities:

Type 1- Multi-Vehicle Automatic Transmission Fluid

Type 2- Automatic Transmission Fluid DEXRON VI

Type 3- Synthetic Automatic Transmission Fluid Heavy Duty

Type 4- Automatic Transmission Fluid ULV

Type 5- Continuously Variable Transmission (CVT) Fluid

4. Product Description and Typical Physical Characteristics:

4.1 Type 1- Multi-Vehicle Automatic Transmission Fluid

Multi-vehicle ATF is an advanced technology, high performance, multipurpose power transmission fluid, formulated with fully synthetic based stocks and additives to provide oxidation and thermal stability, friction control, load carrying ability, corrosion, wear protection, and to protect against the formation of sludge, varnish, other harmful deposit, and foam for use in a variety of vehicles.

It shall have recommendation for use in applications requiring Dexron III, Allison C-4, Ford Mercon and Mercon V. It should have no recommendation for use in CVT or DCT transmissions. It meets or exceeds the requirements of JASO 1-A-LV-15.

Industry Specifications and OEM Approval:

Manufacturer	Specification
Aisin Warner transmissions	JWS 3309
Allison	C4, TES-295, TES-389
Chrysler	ATF+3, ATF+2, ATF+4
Ford	MERCON V, MERCON LV, WSS-M2C922, XT-9QMM5
General Motors	DEXRON VI, DEXRON-III, T-IV, ATF Saturn T IV, AW-1
Honda/Acura	ATF-Z1, ATF DW-1
Hyundai/Kia	SP-II, SP-III, SP-IV, SP-IV-RR, SPH-IV
Isuzu	ATF II, ATF 111, Genuine ATF, 08200-9001
Jaguar	Fluid 8432, JLM 20238, JLM 20292, JLM 21044, K-17
Land Rover	TYK500050, LR0022460:LV
MAN	339 VI, 339Z2, 339A, 339D, 339F
Mazda	ATF M-V, FZ, F-1, FW 6A EL, FW 6AX EL, JWS3317
Mercedes	MB236.10-15, MB 236.3, MB236.41, MB236.5-9
Mitsubishi	Diamond SP-II, SP-III, DiaQueen ATF J2-3, MS991156
Nissan	Matic-D, Matic-J, Matic-K, Matic S, Matic
Peugeot	PSA Peugeot Citroen Z 000169756
Porsche	000 043 204 41, 000 043 205 09, 000 043 205 28
Saab	3309-T-IV, 93 165147-AW-1
Subaru	Subaru ATF, Subaru ATF-HP, K0140Y0700
Suzuki	3314, 3317
Toyota/Lexus	Type T, T-III, T-IV, WS, FZ, Type D-III, Type T-IV
Volvo	1161521, 1161540/1161640, 1273.41

Typical Physical Characteristics:

Typical physical characteristics of multi-vehicle automatic transmission Fluid will be as stated in Table-1

Table-1 Typical Physical Characteristics of Multi-vehicle Automatic Transmission Fluid

Test	Method	Results
Viscosity at 40°C, cSt.	ASTM D-445	33.0
Viscosity at 100°C, cSt.	ASTM D-445	6.78
Viscosity Index	ASTM D-2270	170
Appearance		Red
Brookfield Viscosity at -40 ^{0}C, cP	ASTM D-2983	10,500
Pour Point, ^{0}C	ASTM D-97	-48
Flash Point, °C	ASTM D-92	208
Density @ 15 ^{0}C kg/l	ASTM D-1298	0.850

4.2 Type 2- Automatic Transmission Fluid DEXRON VI

Automatic transmission fluid Dexron VI is full synthetic, a high-performance transmission fluid specially developed for all 2006 and beyond General Motors vehicles equipped with hydramatic automatic transmissions. It shall be formulated with full synthetic base stocks and advance additive technology to provide outstanding oxidation resistance, friction durability, wear protection, and shear stability.

The fluid shall exceed all passenger car and light truck manufacturer's warranty requirements for vehicles transmissions or power steering service where Dexron VI, Dexron III H, III, IIE and II type automatic transmission fluid is specified. It will also be recommended Ford Mercon LV, Allison C-4, JASO 1A, Honda Z-1, Hyundai/Kia SP-II/IIIIV, Toyota WS, T-III, T-IV, Mercedes Benz, Nissan Matic C/D/J/K/S fluids.
This should not be used in extended drain heavy duty diesel, Type F, CVT or DCT applications.

Typical Physical Characteristics:

Typical physical characteristics of automatic transmission fluid Dexron VI will be as stated in Table-2.

Table-2 Typical Physical Characteristics of Automatic Transmission Fluid Dexron VI

Test	Method	Results
Viscosity at 40°C, cSt	ASTM D-445	29.5
Viscosity at 100°C, cSt	ASTM D-445	5.92
Viscosity Index	ASTM D-2270	150
Appearance		Red
Brookfield Viscosity at -40 ^{0}C, cP	ASTM D-2983	11,000
Pour Point, ^{0}C	ASTM D-97	-51
Flash Point, °C	ASTM D-92	220
Density @ 15 ^{0}C kg/l	ASTM D-1298	0.829

4.3 Type 3- Synthetic Automatic Transmission Fluid Heavy Duty

Heavy duty synthetic automatic transmission fluid is formulated with premium synthetic base stocks, long-life friction modifiers, special anti-wear additives, shear stable viscosity modifiers, and other performance additives to provide high thermal protection and low temperature flow. It is designed to meet the demanding requirements of modern heavy duty automatic transmissions – conventional as well as hybrid models. It shall be specially designed for use in transmissions requiring Allison TES-295 and TES-468 specifications.

It is recommended for modern high-performance trucks, buses, utility vehicles, haulers, vans, and other equipment requiring Allision TES-295 and TES-468 or MB-Approval 236.91 performance levels.

Industry Specifications and OEM Approval:

Allison TES-295, and TES-468
Former Dexron-III applications
Voith DIWA Transmissions
Voith Turbo H55.633639
ZF TE-ML O4D/14C/16M/20C
MAN 339 Z3
ZF TE-ML 14A, 14B, 14C, 16L, 17C
Mercedes-Benz Sheet 236.91
Caterpillar AT-1

Typical Physical Characteristics:

Typical physical characteristics of heavy-duty synthetic automatic transmission fluid will be as stated in Table-3.

Table-3 Typical Physical Characteristics of Heavy Duty Synthetic Automatic Transmission Fluid

Test	Method	Results
Viscosity at 40°C, cSt	ASTM D-445	38.82
Viscosity at 100°C, cSt	ASTM D-445	7.59
Brookfield Viscosity @ -40^{0}C, cP	ASTM D-2983	8400
Viscosity Index	ASTM D-2270	168
Appearance		Red
Pour Point, °C	ASTM D-97	-54
Flash Point, °C	ASTM D-92	236
Density @ 15 ^{0}C kg/l	ASTM D-4052	0.850

4.4 Type 4- Automatic Transmission Fluid ULV

The Automatic Transmission Fluid ULV is formulated with full synthetic low viscosity base stocks and technologically advanced additives that provide oxidation and thermal stability, friction control, load-carrying ability, for corrosion and wear protection, anti-shudder durability, shift quality and low and high temperature operational characteristics to meet the performance requirement of the 9 and 10 speed transmission designs.

The Automatic Transmission Fluid ULV will meet the performance requirements of the following fluid applications

- Ford Mercon ULV – WSS-M2C949-A
- Mercedes Benz MB236.17
- GM Dexron ULV

Recommended for use in applications requiring Dexron ULV or Mecron ULV fluids such as

- Ford 10R60
- Ford 10R80
- GM 10L80
- GM 10L90

Typical Physical Characteristics:

Typical physical characteristics of automatic transmission fluid ULV will be as stated in Table-4.

Table-4 Typical Physical Characteristics
Automatic Transmission Fluid ULV

Test	Method	Results
Viscosity at 40°C, cSt	ASTM D-445	17.1
Viscosity at 100°C, cSt	ASTM D-445	4.25
Brookfield Viscosity @ -40^{0}C, cP	ASTM D-2983	4,750
Viscosity Index	ASTM D-2270	163
Appearance		Red
Pour Point, °C	ASTM D-97	-54
Flash Point, °C	ASTM D-92	220
Density @ 15 ^{0}C kg/l	ASTM D-4052	0.835

4.5 Type 5- Continuously Variable Transmission (CVT) Fluid

The Continuously Variable Transmission (CVT) Fluid is fully synthetic is designed for modern continuously variable transmissions (CVTs) which rely on high steel-on-steel friction between either a belt or chain and pulleys to transfer power.

Industry Specifications and OEM Approval:

Manufacturer	Specification
BMW	8322 0 136 376/8322 0 429 154 (EZL799/799A)
Daihatsu Ammix	CVTF-DC, CVTF-DFE
Dodge/Jeep	(NS-2/CVTF+4/Mopar CVT 4)
Ford	CVT23, CFT30, WSS-M2C933-A, Motorcraft XT-7-QCFT, MERCON C
General Motors	CVTF I-Green2, DEX-CVT
Honda/Acura	HMMF (without starting clutch), HCF-2
Hyundai/kia	SP-CVT 1, SP-III (CVT only)
Mazda	CVTF 3320
Marcedes Benz	236.20
Mitsubishi	CVTF-J1, CVTF-J4, SP-III (CVT only)
Nissan	NS-1, NS-2, NS-2V, NS-3, Nissan D-Matic (N-CVT only)
Shell	Green 1V
Subaru	(NS-2/Lineartronic CVTF, i-CVTF, K0425Y0710) e-CVTF, High Torque
Suzuki TC	NS-2, CVTF 3320, CVT Green 1, CVT Green 2, CVT Green 3)
Toyota	TC, FE
Volkswagen/Audi	TL 52180, G 052 180 A2, G 052 516 A2

Typical Physical Characteristics:

Typical physical characteristics of automatic transmission Continuously Variable Transmission (CVT) Fluid will be as stated in Table-5.

Table-5 Typical physical characteristics of automatic transmission Continuously Variable Transmission (CVT) Fluid

Test	Method	Results
Viscosity at 40°C, cSt	ASTM D-445	33.78
Viscosity at 100°C, cSt	ASTM D-445	7.22
Viscosity Index	ASTM D-2270	186
Appearance		Amber
Brookfield Viscosity at -40 ^{0}C, cP	ASTM D-2983	12,300
Pour Point, ^{0}C	ASTM D-97	-51
Flash Point, °C	ASTM D-92	200
Density @ 15 ^{0}C kg/l	ASTM D-1298	0.847

5. Packaging:

5.1 The oil shall be packed in cans or 55-gallon drums, or it shall be delivered by tank wagon as specified and in compliance with all Federal, State and City Environmental Regulations for storage, transportation, and disposal.

5.2 The labels must conform to all OSHA labeling standards and shall include health hazard data. Packaging should be in accordance with Federal and OSHA acceptable standards.

5.3 Shipping Containers shall be marked with the name of the product, this specification number, net contents, grade of the material, name of contractor, contract number or purchase order number, and commodity code number. Containers shall be following all Federal, State, and City Environmental Regulations.

5.4 Unless otherwise provided for, mixed lots varying in origin, brands or trademarks will not be accepted on any contract or purchase order.

6. Quality Assurance Provisions:

6.1 All tests outlined on Section 5 shall be conducted and a certification of compliance shall be provided. Any applicable method of test or examination may be employed if it is satisfactory to the Department of Citywide Administrative Services [DCAS] or satisfactory to a laboratory approved of by the Commissioner of the Department of Citywide Administrative Services. The test reports shall be available to DCAS or the using agency for follow up.

6.2 If, upon delivery or any time thereafter, the product fails to meet any aspect of this specification, then the product will be picked up and replaced at no additional cost to the City of New York or its agencies.

APPENDIX

Note 1: In order that each request for contract or purchase order quotations will result in fair competition and delivery of the Automatic Transmission Fluid required; the requisition must contain the following information:

(A) **Name of Commodity** – Lubricant: Oil, Automatic Transmission Fluid

(B) **Specification Number** – 30-AT-01:26

(C) **Kind** – Automatic Transmission Fluid Type 1, Automatic Transmission Fluid Type 2, Automatic Transmission Fluid Type 3, Automatic Transmission Fluid Type 4. and Automatic Transmission Fluid Type 5

(D) **Size of Container** – State whether cans, drums, or delivery by tank wagon

(E) **Quantity** – State number of gallons at 60^0F/15°C.

(F) **Delivery** – State point(s) and manner of delivery.

Note 2: For the information of the Bureau of Quality Assurance:

If, in the opinion of the inspector, tests and analyses are necessary to determine compliance with any requirement of this specification, then a sample consisting of no less than one gallon of each type shall be randomly chosen.

Note 3: Copies of this specification may be obtained from:

Department of Citywide Administrative Services
Office of Citywide Procurement
Bureau of Quality Assurance
1 Centre Street - 18th Floor
New York, NY 10007.