

YORK INTERNATIONAL CORPORATION	ENGINEERED SYSTEMS (ESG) <u>ENGINEERING STANDARD</u>	STANDARD NO.	R-1101
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	SUPERSEDES	08-20-09	
	ECN	DX09-0403	
	PREPARED BY	M. Fetrow	
	APPROVED BY	G. Nickey	
	APPROVED BY		
	YORK SYNTHETIC OIL SPECIFICATION		

This standard, defining the requirements of materials to be furnished or services to be performed, is not subject to interpretation.

1. SCOPE

1.1 This standard describes the characteristics and processing of York Synthetic Oil, alpha designations G, H, J, K, L, M, N, O, P, Q, R, S, T, W, Y and includes synthetic oils purchased from other vendors listed in 10.0.

2. RELATED STANDARDS

2.1 ESG Standard C-130: York International Corporation Signature,
York Trademark

3. MATERIAL CHARACTERISTICS

3.1 York Synthetic oils shall have no additives allowed, unless directly specified.

3.2 At the time of packaging the York Synthetic Oils shall comply with the key characteristics marked with an (*) and listed in Table 3.2(a), 3.2(b), 3.2(c) and 3.2(d).

TABLE 3.2(a)

YORK ALPHA DESIGNATION		"G"	"H"	"J"	"K"
TYPE OF OIL ⁽⁴⁾		POE ⁽⁵⁾	POE ⁽⁶⁾	POE ⁽⁶⁾	POE ⁽⁶⁾
CHARACTERISTICS	TEST METHOD				
Specific Gravity @ 15.6°C	ASTMD-4052	1.05	0.957	0.925	0.981
Flash, °F	ASTMD-92	520	511	480	465
Fire, °F	ASTMD-92	550	565	530	545
* Viscosity, CS @ 40°C	ASTMD-445	290 - 350	58 - 70	40 - 54	28.8 - 35.2
Viscosity, CS @ 100°C	ASTMD-445	27 - 32	8 - 10	6 - 8	5.2 - 6.2
Pour Point, °F	ASTMD-97	-30	-45	-49	-40
* Metals Content PPM (3)	DCP /ICP	1 Max.	1 Max.	1 Max.	1 Max.
* Karl Fischer Moisture, PPM Max.	ASTM D-6304	100 Max.	50 Max.	50 Max.	50 Max.
Dielectric Strength KV	ASTMD-877	43.6	33.8	43.6	46.8
Separation Temp., °F		< -90 ⁽²⁾	30 @ ⁽¹⁾	-30 @ ⁽¹⁾	-94 ⁽¹⁾
* Total Acid Number, MG KOH/g.	ASTMD-974	0.2 Max.	0.1 Max.	0.1 Max.	0.1 Max.
Hydroxyl Number		<4.5mgKOH/g	<4.5mgKOH/g	<4.5mgKOH/g	<4.5mgKOH/g
Viscosity Index,	ASTMD-2270	148	114	94	113
Additive Concentration	Liquid Chromatography	0	0	0	0
Supplier		CPI	CPI	CPI	CPI
Supplier Designation		4214-320Y	Solest 68Y	Solest 46Y	Solest 32Y

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TABLE 3.2 (b)

YORK ALPHA DESIGNATION		"L"	"M"	"N"	"O"
TYPE OF OIL ⁽⁴⁾		POE ⁽⁵⁾	PAG	PAG	POE ⁽⁵⁾
CHARACTERISTICS	TEST METHOD				
Specific Gravity @ 15.6°C	ASTMD-4052	0.941	0.958	0.98	0.973
Flash, °F	ASTMD-92	460	350	400	531
Fire, °F	ASTMD-92	520	390	445	579
* Viscosity, CS @ 40°C	ASTMD-445	108 - 132	19.8 -24.2	28 - 38	25 - 29
Viscosity, CS @ 100°C	ASTMD-445	12.9	5.0	7.0	5.68
Pour Point, °F	ASTMD-97	-15	-65	-60	-14
* Metals Content PPM (3)	DCP /ICP	1 Max	1 Max	1 Max	1 Max
* Karl Fischer Moisture, PPM Max.	ASTM D-6304	50 Max	1000 Max	1000 Max	50 Max
Dielectric Strength KV	ASTMD-877	47	----	----	----
Separation Temp., °F Max.		0 ⁽¹⁾	----	----	< -90 ⁽²⁾
* Total Acid Number, MG KOH/g.	ASTMD-974	0.1 Max	----	----	0.1 Max
Hydroxyl Number		----	----	----	2.0
Viscosity Index,	ASTMD-2270	95	161	210	144
Additive Concentration	Liquid Chromatography	None	None	None	None
Supplier		CPI	CPI	CPI	CPI
Supplier Designation		Solest 120 Y	CP-1506-22Y	CP-1506-32Y	CP-4214-32Y

TABLE 3.2 (c)

YORK ALPHA DESIGNATION		"P"	"Q"	"R"	"S"
TYPE OF OIL ⁽⁴⁾		POE ⁽⁵⁾	PAG	PAG	POE ⁽⁵⁾⁽⁷⁾
CHARACTERISTICS	TEST METHOD				
Specific Gravity @ 15.6°C	ASTMD-4052	0.990	0.985	0.999	0.990
Flash, °F	ASTMD-92	460	500	460	550
Fire, °F	ASTMD-92	540	540	490	610
* Viscosity, CS @ 40°C	ASTMD-445	135-165	41 - 51	59 - 74	73-89
Viscosity, CS @ 100°C	ASTMD-445	21	8.15	10.0	12.5
Pour Point, °F	ASTMD-97	-30	-55	-55	-29
* Metals Content PPM (3)	DCP /ICP	1 Max	1 Max	1 Max	1 Max
* Karl Fischer Moisture, PPM Max.	ASTM D-6304	100 Max	1000 Max	1000 Max	100 Max
Dielectric Strength KV	ASTMD-877	28	----	----	----
Separation Temp., °F Max.		< -90 ⁽²⁾	----	----	< -90 ⁽²⁾
* Total Acid Number, MG KOH/g.	ASTMD-974	0.15 Max	----	----	0.1Max
Hydroxyl Number		<4.5mgKOH/9	----	----	----
Viscosity Index,	ASTMD-2270	160	153	136	140
Additive Concentration	Liquid Chromatography	None	None	None	80% Min. of Theoretical ⁽⁸⁾
Supplier		CPI	CPI	CPI	CPI
Supplier Designation		CP-4214-165Y	CP-1506-46Y	CP-1506-68Y	CP-4214-85Y

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TABLE 3.2 (d)

YORK ALPHA DESIGNATION		"T"	"W"	"Y"
TYPE OF OIL ⁽⁴⁾		POE ⁽⁹⁾	POE	POE
CHARACTERISTICS	TEST METHOD			
Specific Gravity @ 15.6°C	ASTMD-4052	0.982	0.955	0.977
Flash, °F Min.	ASTMD-92	495	520	400°F
Fire, °F Min.	ASTMD-92	-----	605	-----
* Viscosity, CS @ 40°C	ASTMD-445	31.5 – 33.5	198 - 242	250-310
Viscosity, CS @ 100°C	ASTMD-445	5.9	20	23-27
Pour Point, °F Max.	ASTMD-97	-60	-17°C	>-20°C
* Metals Content PPM (3)	DCP /ICP	1 Max	1 Max	-----
* Karl Fischer Moisture, PPM Max.	ASTM D-6304	50 Max	50 Max	-----
Dielectric Strength KV	ASTMD-877	-----	-----	-----
Separation Temp., °F Max.		-----	-----	-----
* Total Acid Number, MG KOH/g.	ASTMD-974	0.1 Max	0.1 Max	0.1 Max
Hydroxyl Number		-----	-----	-----
Viscosity Index, Min.	ASTMD-2270	118	113	-----
Additive Concentration	Liquid Chromatography	95% Min. of Theoretical	-----	-----
Supplier		CPI	CPI	(11)
Supplier Designation		CP-2931AY	SOLEST 220Y	FREAL UX300

Note that the information in brackets 1,2, and 3 are the typical values seen by this fluid.

- (1) Separation Temp. is for mixture of 20% by weight oil and 80% by weight R-134a Refrigerant.
- (2) Separation Temp. is for mixture of 20% by weight oil and 80% by weight R-22 Refrigerant.
- (3) Metals for evaluation are Silicon, Iron, Copper, Aluminum, Tin, Phosphorus, Magnesium, Zinc, Calcium, Lead, Barium and Molybdenum, silver, chromium, sodium, nickel, titanium, vanadium
- (4) Type of Oil:
 POE = Polyolester
 PAG = Polyalkylene Glycol
- (5) Specially formulated for HCFCs
- (6) Specially formulated HFCs
- (7) Unique chemistry to York International
- (8) Phenolic antioxidant
- (9) Specially formulated for Maneurop supplied HFC compressors.
- (10) At 20°C
- (11) Japan Energy Corporation.

3.3 Table 3.3 shows the recommended acceptable values for field samples. Only those that differ from table 3.2 are listed.

TABLE 3.3

YORK ALPHA DESIGNATION:		"G"	"H"	"J"	"K"	"P"	"S"	"T"	"W"
CHARACTERISTICS	TEST METHOD								
Karl Fischer Moisture, PPM Max.	ASTM D-1533 Method B	< 300	< 300	< 300	< 300	< 300	< 200	< 300	< 200

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4. PRODUCT INFORMATION

- 4.1 The supplier will provide miscibility curves for each grade of York oil and its possible refrigerant combinations as needed.
- 4.2 The supplier will provide solubility curves for each grade of York oil and its possible refrigerant combinations as needed.
- 4.3 The supplier will provide temperature versus viscosity curves for each grade of York oil and its possible refrigerant combinations as needed.
- 4.4 The supplier will provide thermal stability data for each grade of York oil as needed per ASHRAE 97.
- 4.5 The supplier will provide information describing the chemical makeup of the base stock used for each grade of York Synthetic oil as needed.

5. TESTING & QUALITY CONTROL

- 5.1 The supplier shall check all shipments to assure compliance with the key characteristics listed in Table 3.2.
- 5.2 The supplier shall perform tests during packaging to assure that the packaged oils are free from all contamination by the process piping or packaging procedures.
- 5.3 The supplier shall certify that all bulk base-stock product meets their requirements and will provide York International with the documentation to support this upon request.
- 5.4 The supplier shall certify that all York Polyolester oil meets their requirements and will provide York International with the documentation to support this upon request.
- 5.5 The supplier shall keep records of all test results. An 8-ounce sample of each processed lot, identified by batch number, shall be retained for a period of two (2) years.
- 5.6 Copies of certifications and test records shall be forwarded to York=s Engineered Systems Purchasing Department, York, PA upon request.
- 5.7 The supplier will co-operate in providing all reasonable information (demonstrate quality) requested by York Internationals Quality Control Department in the periodic supplier/product quality reviews carried out by York International.

6. PACKAGING

- 6.1 York Oils shall be prepared and packaged by the supplier or an outside source of the supplier's selection, subject to approval by York International.
- 6.2 The packaged oils in their containers shall not contain moisture, as determined by the Karl Fischer method, in excess of the values specified in tables 3.2(a), (b), and (c).

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6.3 York Oils shall be packaged in the size containers specified on the purchase order and identified by the ESG Part Numbers shown in Table 6.1. York Oils G, H, J, K, L, M, N, O, P, Q, R, S, T, W and Y will be packaged in steel containers.

TABLE 6.1

TYPE OF OIL	55 GAL. DRUM (Note 1)	5 GAL. CAN (Note 2)	1 GAL. CAN (Note 3)	1 QT. CAN (Note 4)
YORK OIL "G"	011-00527-000	011-00520-000		
YORK OIL "H"	011-00550-000	011-00549-000	011-00586-000	011-00900-000
YORK OIL "J"	011-00559-000	011-00558-000	011-00974-000	011-00599-000
YORK OIL "K"	011-00534-000	011-00533-000	011-00560-000	011-00572-000
YORK OIL "L"	011-00591-000	011-00592-000	011-00956-000	011-00962-000
YORK OIL "M"	011-00593-000	011-00594-000		
YORK OIL "N"	011-00590-000	011-00595-000		
YORK OIL "O"	011-00596-000	011-00597-000		
YORK OIL "P"	011-00598-000	011-00589-000		
YORK OIL "Q"	011-00911-000	011-00912-000		
YORK OIL "R"	011-00913-000	011-00914-000		
YORK OIL "S"	011-00921-000	011-00922-000		
YORK OIL "T"		011-00937-000	011-00936-000	
YORK OIL "W"	011-00958-000	011-00959-000		
YORK OIL "Y"	011-00960-000	011-00961-000		

- NOTE:
1. Part Number is for 1 gallon supplied in a 55-gallon drum.
 2. Part Number is for 1 can in 5-gallon size.
 3. Part Number is for 1 carton: 6 1-gallon cans per carton.
 4. Part Number is for 1 can in 1-quart size.

6.4 Fifty-five (55) gallon drums shall be DOT-17E qualified tight-head Universal type with two rolling hoops, one 3/4" fitting with plug and one 2" fitting with plug in the top head. Dimensions shall be 22-1/4" diameter and 34-3/4" high.

- (a) Drum material shall be 18/20 gauge rolled steel.
- (b) Heads shall be double-seamed to the body using a seaming compound. The side seam shall be welded.
- (c) Threads of fittings shall conform to ANSI/ASME B1.20.1, NPSM.
- (d) Gaskets compatible with the York oil shall be used with the sealing plugs.

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6.5 Five (5) gallon containers as specified below:

- (a) Cans shall be tight-head Universal type conforming to UN Spec 1A1/Y1.8/300 with flex spout, cap and wire handle. Dimensions shall be 11-1/4" diameter and 13-19/32 ± 1/16" high; tapered at top to facilitate stacking.
- (1) Can material shall be 24-gauge cold rolled steel or tin plated.
 - (2) Heads shall be double seamed to the body using a cured seaming compound. The side seam shall be welded.
 - (3) Cap liner shall be oil resistant material.
 - (4) Interior of can shall be plain - unlined. Exterior shall be painted top and sides; bottom shall be varnished.

6.6 One (1) gallon cans shall be rectangular with 1-1/4" diameter screw neck inner seal, cap and handle. Dimensions shall be 4" x 6-1/2" and 9-1/2" high (10-1/4" with handle).

- (a) Can material shall be 0.0105" thick cold rolled steel with 0.25 lb. electrolytic tin plate.
- (b) Top and bottom shall be seamed to the body using a cured seaming compound. Side seam, screw neck and handle shall be soldered in place.
- (c) Cap liner shall be oil resistant material.
- (d) Test pressure 3 PSI (air).

6.7 One (1) quart can shall be rectangular with 1-3/4" diameter screw x 7/16 high inner seal. Dimension shall be 2-3/8" x 4-9/16" and 6-7/8" high per Fed. Spec. PPP-C-96, Type V, CL. 4.

- (a) Can material shall be 0.0105" thick cold rolled steel with 0.25 lb. electrolytic tin plate.
- (b) Top and bottom shall be seamed to the body using a cured seaming compound. Side seam and screw neck shall be soldered in place.
- (c) Cap liner shall be oil resistant material.
- (d) Test pressure 3 PSI (air).
- (e) One (1) quart containers shall be labeled per purchase order.

6.8 One (1) and five (5) gallon containers shall be lithographed or labeled to show the following data:

- (a) York International Corporation signature per ESG Standard C-130.
- (b) ESG Part Number.
- (c) York Oil Designation.
- (d) Number of gallons.
- (e) Batch number.
- (f) Product contained is hygroscopic.

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6.9 Fifty-five (55) gallon drums shall be stenciled on one (1) end with the following data:

- (a) York International Corporation signature per ESG Standard C-130.
- (b) ESG Part Number.
- (c) York Oil Designation.
- (d) Number of gallons.
- (e) Batch number.
- (f) Product contained is hygroscopic.

6.10 A yellow safety label, with black lettering, shall be placed on all drums or containers and shall read as follows:

CAUTION: Misuse of empty containers can be hazardous. Empty containers can be dangerous if used to store toxic, flammable, or reactive materials. Cutting or welding empty containers might cause fire, explosion, or toxic fumes from residues. Do not pressurize or expose to open flame or heat. Keep container closed.

Ensure Compliance With Local, State And Federal Regulations In Disposing Of This Container Or Residual Contents.

WARNING: As with all oils, this lubricant may lead to dermatitis following prolonged or frequent exposure. Refer to product health safety and environmental data sheets for relevant information.

- (a) A separate caution label is not required on one (1) and five (5) gallon containers provided the required caution information is included on the container label.

6.11 The supplier shall use only new, clean, dry cans and drums which have been received and stored with caps in position. The shortest possible time shall elapse between the removal of the caps and the filling operation. Immediately after filling, the containers shall be recapped. All necessary efforts shall be taken to minimize the contamination of the product. Sufficient torque shall be applied to the cap to prevent leakage of moisture or water into the container.

6.12 Cartons shall be made from 100-pound test corrugated fiberboard and marked with the York Oil Designation, part number and contents.

6.13 Supplier shall supply an MSDS with each shipment.

7. PURCHASING

7.1 ESG Purchase Order shall specify:

- (a) Quantity
- (b) Size Container
- (c) Type Designation
- (d) ESG Part Number
- (e) ESG Standard R-1101

7.2 All base oils shall be purchased by the refinery source designations and to the requirements of this standard.

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8. APPLICATION (ENGINEERED SYSTEMS INFORMATION ONLY)

8.1 Application for the different types of oils is shown in Table 8.1

TABLE 8.1

DESIGNATION	APPLICATION
YORK OIL "G"	Screw compressors in systems where better oil separation is required with R-22.
YORK OIL "H"	Open and hermetic reciprocating compressors with evaporator temperatures above 20°F. Operating on R134a. Multistage centrifugals operating on R134a with sump pressures above 60 psig and below 85 psig.
YORK OIL "J"	For OT single-stage compressors with R-134a. For Standard OM water chillers on R134a. For multi-stage compressors operating on R134a with sump pressures above 30 psig and below 60 psig.
YORK OIL "K"	YK centrifugal compressors with R-134a. Open Reciprocating compressors operating on R134a with evaporator temp below 20°F. Multistage compressors operating on R134a with sump pressure below 30 psig.
YORK OIL "L"	Multistage compressors operating on R134a with sump pressures above 85 psig.
YORK OIL "M"	Multistage compressors operating on Hydro Carbon applications (for more details consult "M" Compressor Engineering).
YORK OIL "N"	Multistage compressors operating on Hydro Carbons applications (for more details consult "M" Compressor Engineering).
YORK OIL "O"	Multistage compressors operating with R22.
YORK OIL "P"	Screw compressors in systems where a lower viscosity than "G" Oil is required but oil separation is an issue.
YORK OIL "Q"	Multistage compressors operating on Hydro Carbons applications (for more details consult "M" Compressor Engineering).
YORK OIL "R"	Multistage compressors operating on Hydro Carbons applications (for more details consult "M" Compressor Engineering).
YORK OIL "S"	Screw compressors in systems where a lower viscosity than "P" Oil is required but oil separation is an issue.
YORK OIL "T"	Maneurop supplied HFC (R-407C) scroll compressors.
YORK OIL "W"	YTS (Hanbell) screw compressors operating on HFC condensing above 115°F.
YORK OIL "Y"	Hitachi screw compressors operating on HFC.

8.2 Part numbers for York Oil in 5-gallon cans or pails and for cartons of one-gallon cans (6 per carton) are to be called for on the Bill of Material in whole quantities only.

8.3 Packaged York Oils should not be stored outdoors unprotected.

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9. MISCELLANEOUS

- 9.1 The supplier shall have the capabilities to carry out extensive analysis of both new and used oils.
- 9.2 The supplier will provide a list of global manufacturing and distribution facilities.
- 9.3 The supplier will supply a list of global oil analysis facilities that are capable of carrying out after-market analysis.
- 9.4 The supplier will supply a price structure for both the analysis and the interpretation of analysis for oil samples used to provide preventive maintenance services performed by York in the after market, in conjunction with facilities listed under 9.3.
- 9.5 The supplier will supply the locations and names of personal who can be contacted who will provide technical support to York International.
- 9.6 The supplier will supply relevant information regarding the compatibility of elastomers, gaskets and other system components.
- 9.7 The supplier shall not knowingly sell product for use on York equipment except through a recognized York distribution office.

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The following section is reserved for synthetic oils purchased from suppliers and sold under their own label. The specifications and requirements imposed on York oils in the previous section shall not apply to the following oils.

10. APPLICATION

10.1 Application for the different types of oils is shown in Table 10.1

TABLE 10.1

DESIGNATION	APPLICATION
011-00949-000	Copeland supplied HFC (R-407c, R-410a) scroll compressors.
011-00981-000 011-00982-000	Bitzer supplied HFC (R-410a) scroll compressors.

11. SUPPLIER INFORMATION (SMALL TONNAGE SYSTEMS INFORMATION ONLY)

11.1 Supplier, supplier designation, and packaging shown in Table 11.1

TABLE 11.1

Supplier	Supplier designation	Oil type	5 Gal. Container (Note 1)	5 Gal. Container (Note 1)	1 Qt. Container (Note 2)
Copeland	Ultra 32-3MAF or Uniqema RL32-3MAF	POE	011-00949-000		
Idemitsu Lubricants	Daphne Hermetic FVC32D	PVE		011-00982-000	011-00981-000

- NOTE:
1. Part number is for 1 can in 5-gallon size.
 2. Part number is for 1; **Qt. Can.**