

Honeywell Solstice[®] yf

**Solstice[®] yf Properties and
Materials Compatibility**

Honeywell

Guidelines for Use and Handling of Solstice® yf

This brochure provides selected properties information for Solstice® yf including thermodynamic data, transport properties, and flammability characteristics.

Solstice yf was originally developed as a low global warming potential replacement for R134a in the automobile air-conditioning application. Because of its desirable environmental properties, along with other factors, it is being investigated in a number of stationary applications as well.

Flammability

Solstice yf can be described as being “mildly flammable” as measured by standard methodology.

This descriptor is used to characterize the flammability in simplistic terms; however, properties such as minimum ignition energy, heat of combustion, and the burning velocity are assessed in order to arrive at such a descriptor. Measurement of Solstice yf flammability properties indicates that a typical static discharge will not have sufficient energy to ignite Solstice yf. Available data appears below.

Upper Flammability Limit [Vol. % in air] (21°C, ASTM E681-01)	12.3
Lower Flammability Limit [Vol. % in air] (21°C, ASTM E681-01)	6.2
Minimum Ignition Energy [mJ at 20 ºC and 1 atm] (In-house method. Tests conducted in 12 liter flask to minimize wall quenching effects)	5000-10000
Autoignition Temperature [°C] (EC Physico/Chemical Test A15, Measured by Chilworth Technology, UK)	405
Heat of Combustion [MJ/kg] per ASHRAE Standard 34 (Stoichiometric composition 7.73% in air)	11.8
Fundamental burning velocity [cm/s] (per ISO 817, Measured by AIST, Japan)	1.5
Minimum Ignition Current (per IEC 79-3, 3rd ed., 1990; measured by UL)	No ignition*
Minimum Ignition Current Ratio (per IEC 79-3, 3rd ed., 1990; measured by UL)	>>1

**Unable to obtain ignition for any current level or test gas mixture when using calibration circuit or spark plug box. After no ignition was obtained using the calibration circuit, attempts were made to obtain ignition using a spark plug.*

It is recommended that risk assessment and risk minimization for use of Solstice yf in facilities and applications should be conducted prior to use.

Selected Physical Properties

Chemical Name	2,3,3,3-Tetrafluoroprop-1-ene
Molecular Formula	CH ₂ CF ₃
Molecular Weight	114
% Volatiles by Volume	100
Water Solubility (in Solstice yf, ppm by mass)	200
ASHRAE Safety Group Classification	A2L

English Units

Boiling Point (°F) @ 1atm	-21
Freezing Point (°F)	Not available
Critical Temperature (°F)	202.5
Critical Pressure (psia)	490.6
Critical Density (lb/ft ³)	29.7
Vapor Density @ 20°C, 1 atm (lb/ft ³)	0.303
Liquid Density (lb/ft ³)	68.2
Liquid Heat Capacity (Btu/lb °F)	0.33
Vapor Heat Capacity @ constant pressure, 1atm (Btu/lb °F)	0.22
Heat of Vaporization at 1 atm (Btu/lb)	77.53
Vapor Pressure at 77°F (psia)	99
Liquid Thermal Conductivity (Btu/hr-ft °F)	0.0368
Vapor Thermal Conductivity (Btu/hr-ft °F)	0.008
Liquid Viscosity (lb/ft-hr)	0.38
Vapor Viscosity (lb/ft-hr)	0.03

Standard International Units

Boiling Point [°C] @ 1.01 bar	-29.5
Freezing Point[°C] @1.01 bar	Not available
Critical Temperature [°C]	94.7
Critical Pressure[bar]	33.8
Critical Density [kg/m ³]	475.6
Vapor Density @ 20°C, 1 atm [kg/m ³]	4.79
Liquid Density [kg/m ³]	1091.9
Liquid Heat Capacity [kJ/kg K]	1.39
Vapor Heat Capacity @ constant pressure, 1.01 bar [kJ/kg K]	0.91
Heat of Vaporization at 1 atm [kJ/kg]	180.25
Vapor Pressure at 25°C [bar]	6.83
Liquid Thermal Conductivity [mW/m·K]	63.59
Vapor Thermal Conductivity [mW/m K]	13.97
Liquid Viscosity [μPa·s]	155.5
Vapor Viscosity [μPa·s]	12.3

Flame Limits measured at ambient temperature and pressure using ASTM E681-85 with electrically heated match ignition, spark ignition and fused wire ignition; ambient air. All measurements at 77°F (25 °C) unless otherwise noted.

Thermodynamic & Transport Data – SI Units (reference state: IIR)

Temperature °C	Pressure kPa	Density kg/m ³ Liquid	Density kg/m ³ Vapor	Enthalpy kJ/kg Liquid	Enthalpy kJ/kg Vapor	Entropy kJ/kg·K Liquid	Entropy kJ/kg·K Vapor	cp kJ/kg·K Liquid	cp kJ/kg·K Vapor	cv kJ/kg·K Liquid	cv kJ/kg·K Vapor
-40	62.4	1291.9	3.7945	151.1	336.6	0.8074	6031	1.16	0.78	0.78	0.69
-38	68.7	1286.5	4.1519	153.4	337.9	0.8173	1.6020	1.16	0.78	0.79	0.70
-36	75.5	1281.0	4.5353	155.7	339.3	0.8272	1.6011	1.17	0.79	0.79	0.70
-34	82.8	1275.6	4.946	158.1	340.6	0.8370	1.6003	1.18	0.80	0.80	0.71
-32	90.6	1270.1	5.3856	160.4	342.0	0.8468	1.5996	1.18	0.80	0.80	0.71
-30	99.1	1264.5	5.8553	162.8	343.3	0.8566	1.5990	1.19	0.81	0.81	0.72
-28	108.1	1259.0	6.3566	165.2	344.7	0.8663	1.5984	1.19	0.82	0.81	0.72
-26	117.8	1253.4	6.8911	167.6	346.0	0.8760	1.5980	1.20	0.83	0.81	0.73
-24	128.1	1247.7	7.4602	170.0	347.4	0.8857	1.5976	1.21	0.83	0.82	0.74
-22	139.2	1242.0	8.0658	172.4	348.7	0.8954	1.5973	1.21	0.84	0.82	0.74
-20	150.9	1236.3	8.7093	174.9	350.1	0.9050	1.5970	1.22	0.85	0.83	0.75
-18	163.4	1230.5	9.3925	177.3	351.4	0.9146	1.5968	1.23	0.85	0.83	0.75
-16	176.8	1224.7	10.117	179.8	352.7	0.9242	1.5967	1.23	0.86	0.84	0.76
-14	190.9	1218.8	10.885	182.3	354.1	0.9338	1.5967	1.24	0.87	0.84	0.76
-12	205.9	1212.9	11.699	184.8	355.4	0.9433	1.5967	1.25	0.88	0.84	0.77
-10	221.8	1207.0	12.559	187.3	356.7	0.9528	1.5968	1.25	0.88	0.85	0.77
-8	238.6	1200.9	13.469	189.8	358.0	0.9623	1.5969	1.26	0.89	0.85	0.78
-6	256.4	1194.9	14.431	192.3	359.4	0.9717	1.5970	1.27	0.90	0.86	0.79
-4	275.1	1188.7	15.446	194.9	360.7	0.9812	1.5973	1.27	0.91	0.86	0.79
-2	295.0	1182.5	16.517	197.4	362.0	0.9906	1.5975	1.28	0.92	0.86	0.80
0	315.8	1176.3	17.647	200.0	363.3	1.0000	1.5978	1.29	0.93	0.87	0.80
2	337.8	1170.0	18.837	202.6	364.6	1.0094	1.5981	1.30	0.93	0.87	0.81
4	360.9	1163.6	20.092	205.2	365.9	1.0187	1.5985	1.30	0.94	0.87	0.81
6	385.2	1157.2	21.413	207.8	367.2	1.0281	1.5989	1.31	0.95	0.88	0.82
8	410.8	1150.6	22.804	210.5	368.4	1.0374	1.5993	1.32	0.96	0.88	0.83
10	437.5	1144.0	24.267	213.1	369.7	1.0467	1.5998	1.33	0.97	0.89	0.83
12	465.6	1137.4	25.807	215.8	371.0	1.0560	1.6003	1.34	0.98	0.89	0.84
14	495.0	1130.6	27.425	218.5	372.2	1.0653	1.6008	1.34	0.99	0.89	0.84
16	525.8	1123.8	29.127	221.2	373.5	1.0746	1.6013	1.35	1.00	0.90	0.85
18	558.0	1116.9	30.916	223.9	374.7	1.0838	1.6018	1.36	1.01	0.90	0.85
20	591.7	1109.9	32.796	226.6	375.9	1.0931	1.6024	1.37	1.02	0.90	0.86
22	626.9	1102.8	34.772	229.3	377.1	1.1023	1.6029	1.38	1.04	0.91	0.87
24	663.6	1095.5	36.848	232.1	378.3	1.1115	1.6034	1.39	1.05	0.91	0.87
26	701.9	1088.2	39.029	234.9	379.5	1.1208	1.6040	1.40	1.06	0.91	0.88
28	741.9	1080.8	41.321	237.7	380.6	1.1300	1.6045	1.41	1.07	0.92	0.88
30	783.5	1073.3	43.729	240.5	381.8	1.1392	1.6051	1.42	1.09	0.92	0.89
32	826.9	1065.7	46.26	243.4	382.9	1.1484	1.6056	1.43	1.10	0.92	0.90
34	872.0	1057.9	48.92	246.2	384.0	1.1576	1.6061	1.44	1.12	0.93	0.90
36	918.9	1050.0	51.717	249.1	385.1	1.1668	1.6066	1.45	1.13	0.93	0.91
38	967.7	1042.0	54.658	252.0	386.1	1.1759	1.6071	1.46	1.15	0.93	0.92
40	1018.4	1033.8	57.753	254.9	387.2	1.1851	1.6075	1.47	1.17	0.94	0.92
42	1071.1	1025.5	61.01	257.8	388.2	1.1943	1.6079	1.49	1.19	0.94	0.93
44	1125.7	1017.0	64.44	260.8	389.2	1.2035	1.6083	1.50	1.21	0.94	0.94
46	1182.5	1008.3	68.053	263.8	390.1	1.2128	1.6087	1.51	1.23	0.95	0.94
48	1241.3	999.4	71.863	266.8	391.1	1.2220	1.6089	1.53	1.25	0.95	0.95
50	1302.3	990.4	75.884	269.9	392.0	1.2312	1.6092	1.55	1.28	0.96	0.96
52	1365.6	981.1	80.13	272.9	392.9	1.2405	1.6094	1.57	1.30	0.96	0.97
54	1431.1	971.6	84.619	276.0	393.7	1.2498	1.6095	1.59	1.33	0.96	0.97
56	1498.9	961.8	89.371	279.2	394.5	1.2592	1.6095	1.61	1.37	0.97	0.98
58	1569.2	951.7	94.407	282.3	395.2	1.2685	1.6095	1.63	1.40	0.97	0.99
60	1641.9	941.3	99.754	285.5	395.9	1.2779	1.6093	1.66	1.44	0.97	1.00
62	1717.1	930.6	105.44	288.8	396.6	1.2874	1.6091	1.68	1.49	0.98	1.01
64	1794.9	919.5	111.5	292.1	397.2	1.2969	1.6087	1.72	1.53	0.98	1.01
66	1875.4	907.9	117.96	295.4	397.7	1.3065	1.6082	1.75	1.59	0.98	1.02
68	1958.6	895.8	124.89	298.8	398.2	1.3162	1.6076	1.79	1.65	0.99	1.03
70	2044.5	883.2	132.33	302.2	398.6	1.3260	1.6068	1.84	1.72	0.99	1.04

Thermodynamic & Transport Data – SI Units (reference state: IIR)

Temperature °C	Pressure kPa	Speed of Sound		Thermal Conductivity		Viscosity		Surface Tension mN/m Liquid
		Liquid m/s	Vapor m/s	Liquid mW/m·K	Vapor mW/m·K	Liquid µPa·s	Vapor µPa·s	
-40	62.4	735.9	133.7	85.5	8.5	358.5	9.5	15.2
-38	68.7	726.7	134.0	84.8	8.7	347.8	9.6	14.8
-36	75.5	717.5	134.2	84.1	8.8	337.6	9.7	14.5
-34	82.8	708.4	134.4	83.3	9.0	327.9	9.8	14.2
-32	90.6	699.4	134.7	82.6	9.1	318.5	9.9	13.9
-30	99.1	690.4	134.9	81.9	9.3	309.6	9.9	13.6
-28	108.1	681.4	135.0	81.2	9.4	301.0	10.0	13.3
-26	117.8	672.5	135.2	80.5	9.6	292.8	10.1	13.0
-24	128.1	663.6	135.4	79.8	9.7	284.9	10.2	12.7
-22	139.2	654.8	135.5	79.1	9.9	277.3	10.3	12.5
-20	150.9	646.0	135.6	78.4	10.0	269.9	10.3	12.2
-18	163.4	637.2	135.7	77.7	10.2	262.9	10.4	11.9
-16	176.8	628.5	135.7	77.0	10.3	256.1	10.5	11.6
-14	190.9	619.7	135.8	76.3	10.5	249.6	10.6	11.3
-12	205.9	611.0	135.8	75.6	10.7	243.2	10.7	11.0
-10	221.8	602.4	135.8	74.9	10.8	237.1	10.7	10.7
-8	238.6	593.7	135.8	74.3	11.0	231.2	10.8	10.5
-6	256.4	585.1	135.7	73.6	11.2	225.5	10.9	10.2
-4	275.1	576.4	135.6	72.9	11.3	220.0	11.0	9.9
-2	295.0	567.8	135.5	72.3	11.5	214.6	11.1	9.6
0	315.8	559.2	135.4	71.6	11.7	209.4	11.2	9.4
2	337.8	550.6	135.2	70.9	11.8	204.4	11.2	9.1
4	360.9	542.0	135.1	70.3	12.0	199.5	11.3	8.8
6	385.2	533.4	134.8	69.6	12.2	194.7	11.4	8.6
8	410.8	524.8	134.6	69.0	12.4	190.1	11.5	8.3
10	437.5	516.2	134.3	68.3	12.5	185.6	11.6	8.0
12	465.6	507.5	134.1	67.7	12.7	181.3	11.7	7.8
14	495.0	498.9	133.7	67.1	12.9	177.0	11.8	7.5
16	525.8	490.3	133.4	66.4	13.1	172.9	11.9	7.3
18	558.0	481.6	133.0	65.8	13.3	168.8	11.9	7.0
20	591.7	472.9	132.6	65.2	13.5	164.9	12.0	6.8
22	626.9	464.2	132.1	64.5	13.7	161.1	12.1	6.5
24	663.6	455.5	131.7	63.9	13.9	157.3	12.2	6.3
26	701.9	446.8	131.1	63.3	14.1	153.6	12.3	6.0
28	741.9	438.1	130.6	62.7	14.3	150.0	12.4	5.8
30	783.5	429.3	130.0	62.0	14.5	146.5	12.6	5.6
32	826.9	420.5	129.4	61.4	14.7	143.1	12.7	5.3
34	872.0	411.7	128.8	60.8	14.9	139.7	12.8	5.1
36	918.9	402.9	128.1	60.2	15.1	136.4	12.9	4.9
38	967.7	394.1	127.3	59.6	15.4	133.2	13.0	4.6
40	1018.4	385.2	126.6	59.0	15.6	130.0	13.2	4.4
42	1071.1	376.4	125.7	58.4	15.8	126.9	13.3	4.2
44	1125.7	367.4	124.9	57.8	16.1	123.8	13.4	4.0
46	1182.5	358.5	124.0	57.2	16.3	120.8	13.6	3.8
48	1241.3	349.4	123.1	56.6	16.6	117.8	13.7	3.6
50	1302.3	340.3	122.1	56.1	16.9	114.9	13.9	3.4
52	1365.6	331.1	121.0	55.5	17.2	112.0	14.0	3.2
54	1431.1	321.8	120.0	54.9	17.5	109.1	14.2	3.0
56	1498.9	312.3	118.8	54.4	17.8	106.3	14.4	2.8
58	1569.2	302.6	117.6	53.8	18.1	103.5	14.6	2.6
60	1641.9	292.7	116.4	53.3	18.5	100.8	14.8	2.4
62	1717.1	282.6	115.1	52.8	18.9	98.0	15.0	2.2
64	1794.9	272.3	113.7	52.3	19.3	95.3	15.3	2.0
66	1875.4	261.8	112.3	51.8	19.7	92.5	15.5	1.8
68	1958.6	251.0	110.8	51.3	20.2	89.8	15.8	1.7
70	2044.5	240.0	109.3	50.9	20.8	87.1	16.1	1.5

Thermodynamic and Transport Data – English Units (reference state: ASHRAE)

Temperature °F	Pressure psia	Density lb _m /ft ³ Liquid	Density lb _m /ft ³ Vapor	Enthalpy Btu/lb _m Liquid	Enthalpy Btu/lb _m Vapor	Entropy Btu/lb _m •F Liquid	Entropy Btu/lb _m •F Vapor	c _p Btu/lb _m •F Liquid	c _p Btu/lb _m •F Vapor	cv Btu/lb _m •F Liquid	cv Btu/lb _m •F Vapor
-40	9.0	80.65	0.2369	0.00	79.81	0.0000	0.1902	0.28	0.19	0.19	0.17
-35	10.3	80.18	0.2683	1.39	80.61	0.0033	0.1898	0.28	0.19	0.19	0.17
-30	11.8	79.71	0.3029	2.79	81.42	0.0066	0.1896	0.28	0.19	0.19	0.17
-25	13.3	79.23	0.3410	4.20	82.23	0.0098	0.1893	0.28	0.19	0.19	0.17
-20	15.1	78.75	0.3827	5.62	83.03	0.0131	0.1891	0.28	0.19	0.19	0.17
-15	17.0	78.26	0.4283	7.05	83.84	0.0163	0.1890	0.29	0.20	0.19	0.17
-10	19.1	77.77	0.4781	8.50	84.64	0.0195	0.1888	0.29	0.20	0.20	0.18
-5	21.4	77.28	0.5323	9.95	85.44	0.0227	0.1887	0.29	0.20	0.20	0.18
0	23.9	76.78	0.5913	11.41	86.24	0.0259	0.1887	0.29	0.20	0.20	0.18
5	26.6	76.27	0.6552	12.89	87.04	0.0291	0.1887	0.30	0.21	0.20	0.18
10	29.6	75.76	0.7245	14.37	87.84	0.0322	0.1887	0.30	0.21	0.20	0.18
15	32.8	75.24	0.7995	15.87	88.63	0.0354	0.1887	0.30	0.21	0.20	0.19
20	36.3	74.72	0.8805	17.38	89.42	0.0385	0.1887	0.30	0.21	0.20	0.19
25	40.1	74.19	0.9679	18.90	90.21	0.0417	0.1888	0.30	0.22	0.21	0.19
30	44.1	73.65	1.0620	20.43	90.99	0.0448	0.1889	0.31	0.22	0.21	0.19
35	48.5	73.11	1.1633	21.98	91.77	0.0479	0.1890	0.31	0.22	0.21	0.19
40	53.1	72.55	1.2723	23.54	92.54	0.0510	0.1891	0.31	0.23	0.21	0.19
45	58.1	71.99	1.3893	25.11	93.30	0.0541	0.1892	0.31	0.23	0.21	0.20
50	63.5	71.42	1.5150	26.69	94.06	0.0572	0.1894	0.32	0.23	0.21	0.20
55	69.2	70.84	1.6498	28.28	94.81	0.0603	0.1896	0.32	0.24	0.21	0.20
60	75.3	70.25	1.7943	29.89	95.55	0.0634	0.1897	0.32	0.24	0.21	0.20
65	81.7	69.65	1.9492	31.51	96.29	0.0664	0.1899	0.33	0.24	0.22	0.20
70	88.6	69.04	2.1152	33.15	97.01	0.0695	0.1901	0.33	0.25	0.22	0.21
75	95.9	68.42	2.2930	34.80	97.72	0.0726	0.1903	0.33	0.25	0.22	0.21
80	103.7	67.78	2.4834	36.46	98.42	0.0756	0.1904	0.33	0.25	0.22	0.21
85	111.9	67.14	2.6874	38.14	99.11	0.0787	0.1906	0.34	0.26	0.22	0.21
90	120.6	66.47	2.9060	39.84	99.78	0.0817	0.1908	0.34	0.26	0.22	0.21
95	129.8	65.80	3.1402	41.55	100.44	0.0848	0.1910	0.34	0.27	0.22	0.22
100	139.6	65.10	3.3914	43.28	101.07	0.0878	0.1911	0.35	0.27	0.22	0.22
105	149.8	64.39	3.6608	45.02	101.70	0.0909	0.1913	0.35	0.28	0.22	0.22
110	160.6	63.67	3.9502	46.78	102.30	0.0940	0.1914	0.36	0.29	0.23	0.22
115	172.0	62.92	4.2613	48.57	102.87	0.0970	0.1915	0.36	0.29	0.23	0.23
120	183.9	62.14	4.5962	50.37	103.43	0.1001	0.1916	0.37	0.30	0.23	0.23
125	196.5	61.35	4.9572	52.20	103.96	0.1032	0.1917	0.37	0.31	0.23	0.23
130	209.7	60.52	5.3471	54.05	104.45	0.1062	0.1917	0.38	0.32	0.23	0.23
135	223.6	59.66	5.7692	55.94	104.92	0.1093	0.1917	0.39	0.33	0.23	0.24
140	238.1	58.77	6.2274	57.85	105.34	0.1125	0.1917	0.40	0.34	0.23	0.24
145	253.4	57.83	6.7265	59.79	105.73	0.1156	0.1916	0.41	0.36	0.23	0.24
150	269.4	56.84	7.2722	61.77	106.06	0.1188	0.1914	0.42	0.38	0.23	0.24

Thermodynamic and Transport Data – English Units (reference state: ASHRAE)

Temperature °C	Pressure psia	Speed of Sound		Thermal Conductivity		Viscosity		Surface Tension
		ft/s	ft/s	Btu/hr;ft·°F	Btu/hr;ft·°F	lb _m /ft·hr	lb _m /ft·hr	dyne/cm
		Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid
-40	9.0	2414.3	438.6	0.0494	0.0049	0.87	0.0231	15.2
-35	10.3	2372.4	439.8	0.0489	0.0050	0.83	0.0234	14.7
-30	11.8	2330.8	440.9	0.0483	0.0052	0.80	0.0236	14.3
-25	13.3	2289.6	441.9	0.0477	0.0053	0.77	0.0239	13.9
-20	15.1	2248.7	442.8	0.0471	0.0054	0.74	0.0242	13.5
-15	17.0	2208.0	443.6	0.0465	0.0055	0.71	0.0244	13.1
-10	19.1	2167.6	444.2	0.0460	0.0056	0.68	0.0247	12.7
-5	21.4	2127.4	444.7	0.0454	0.0058	0.66	0.0250	12.2
0	23.9	2087.4	445.1	0.0449	0.0059	0.63	0.0252	11.8
5	26.6	2047.5	445.4	0.0443	0.0060	0.61	0.0255	11.4
10	29.6	2007.9	445.5	0.0438	0.0062	0.59	0.0258	11.1
15	32.8	1968.4	445.4	0.0432	0.0063	0.57	0.0260	10.7
20	36.3	1928.9	445.3	0.0427	0.0064	0.55	0.0263	10.3
25	40.1	1889.6	444.9	0.0421	0.0066	0.53	0.0266	9.9
30	44.1	1850.3	444.4	0.0416	0.0067	0.51	0.0269	9.5
35	48.5	1811.1	443.8	0.0411	0.0068	0.50	0.0271	9.1
40	53.1	1771.9	442.9	0.0406	0.0070	0.48	0.0274	8.8
45	58.1	1732.7	441.9	0.0400	0.0071	0.46	0.0277	8.4
50	63.5	1693.4	440.8	0.0395	0.0073	0.45	0.0280	8.0
55	69.2	1654.1	439.4	0.0390	0.0074	0.43	0.0283	7.7
60	75.3	1614.8	437.9	0.0385	0.0075	0.42	0.0286	7.3
65	81.7	1575.3	436.1	0.0380	0.0077	0.41	0.0289	7.0
70	88.6	1535.8	434.2	0.0375	0.0079	0.39	0.0293	6.6
75	95.9	1496.1	432.0	0.0370	0.0080	0.38	0.0296	6.3
80	103.7	1456.3	429.7	0.0365	0.0082	0.37	0.0299	6.0
85	111.9	1416.4	427.1	0.0360	0.0083	0.36	0.0303	5.6
90	120.6	1376.4	424.3	0.0355	0.0085	0.35	0.0307	5.3
95	129.8	1336.4	421.3	0.0350	0.0087	0.33	0.0311	5.0
100	139.6	1296.2	418.0	0.0345	0.0089	0.32	0.0315	4.7
105	149.8	1255.8	414.5	0.0340	0.0090	0.31	0.0319	4.4
110	160.6	1215.3	410.7	0.0335	0.0092	0.30	0.0324	4.1
115	172.0	1174.4	406.6	0.0331	0.0094	0.29	0.0328	3.8
120	183.9	1133.2	402.3	0.0326	0.0097	0.28	0.0334	3.5
125	196.5	1091.4	397.7	0.0321	0.0099	0.27	0.0339	3.2
130	209.7	1048.7	392.7	0.0317	0.0101	0.26	0.0345	2.9
135	223.6	1005.1	387.5	0.0312	0.0104	0.25	0.0351	2.6
140	238.1	960.4	381.9	0.0308	0.0107	0.24	0.0358	2.4
145	253.4	914.2	375.9	0.0304	0.0110	0.23	0.0366	2.1
150	269.4	866.6	369.5	0.0300	0.0113	0.23	0.0375	1.9

Materials Compatibility

A number of plastics and elastomers were evaluated for compatibility with Solstice yf by SAE's Cooperative Research Program. The information below can serve as a guide to identification of compatible classes of plastics and elastomers. Performance of plastics and elastomers can vary considerably with formulation and conditions of use. Solstice yf is an olefin and, like most olefins, may polymerize if certain conditions are present. As a result, certain materials may initiate polymerization of Solstice yf under certain conditions (as an example, peroxide curing agents have been shown to react with Solstice yf and form polymer). Before approving for production the use of a particular material that will come in contact with Solstice yf, the material should be thoroughly evaluated at the conditions associated with the intended application to confirm that they do not cause polymerization.

Plastics

	Rating	24-hr Post Weight Change, %	Physical Change
Polyester	1	4.4	0
Nylon	1	-1.5	1
Epoxy	1	0.3	1
Polyethylene Terephthalate	1	2.0	0
Polyimide	0	0.2	0

0 = best when weight gain < 1 and physical change = 0
 1 = borderline when weight gain > 1 and < 10 and/or physical change up to 2
 2 = incompatible when weight gain > 10 and/or physical change = 2

Elastomers

	Rating	24-hr Post Linear Swell, %	24 -hr Post Weight Change, %	24 -hr Post Change in Hardness
Neoprene WRT	0	0.0	-0.3	1.0
HNBR	0	1.6	5.5	-7.0
NBR	0	-1.2	-0.7	4.4
EPDM	0	-0.5	-0.6	4.4
Silicone	1	-0.5	2.5	-14.5
Butyl Rubber	0	-1.6	-1.9	0.5

0 = less than 10% weight gain and less than 10% linear swell and <10 hardness unit change
 1 = >10% weight gain or >10% linear swell or >10 hardness unit change
 2 = 10% weight gain and >10% linear swell and >10 hardness unit change

Other Elastomer Information

SAE Cooperative Research Program (CRP) has studied hose permeability and O-ring compatibility using samples from a number of commercial suppliers. Samples were exposed to HFO-1234yf/modified ND-8 (PA G) lubricant. Most samples were within target parameters after exposure. Formulations of the following elastomer types having acceptable performance should be commercially available:

- EPDM
- HNBR
- Neoprene
- Butyl rubber
- Chlorobutyl rubber
- Polyamide elastomer



Scan to visit Solstice yf on the web

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