

EPAct/V2/E-89: Assessing the Effect of Five Gasoline Properties on Exhaust Emissions from Light-Duty Vehicles Certified to Tier 2 Standards

Final Report on Program Design and Data Collection

Appendix E Spreadsheets of Detailed Round Robin Fuel Inspection Data

Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

National Renewable Energy Laboratory
U.S. Department of Energy

Coordinating Research Council

NOTICE

This technical report does not necessarily represent final EPA decisions or positions. It is intended to present technical analysis of issues using data that are currently available. The purpose in the release of such reports is to facilitate the exchange of technical information and to inform the public of technical developments.

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 1

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7208	0.7212	-	0.7213	0.7211	-	-	-	-	-	-	-	-	-	0.7211
API Gravity, 60°F	°API	D4052	64.6	64.5	-	64.5	64.6	-	-	-	-	-	-	-	-	-	64.6
Ethanol	vol. %	D5599	-	-	11.46	10.21	-	-	-	9.59	-	-	-	10.13	10.09	10.14	10.03
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	92.6	91.9	-	-	-	93.0	-	-	93.0	92.3	94.6	-	-	93.8	92.9
5% evap	°F		112.0	112.7	-	-	-	111.6	-	-	111.9	112.4	113.6	-	-	112.5	112.5
10% evap	°F		117.2	117.6	-	-	-	116.7	-	-	116.7	117.1	118.0	-	-	117.2	117.3
20% evap	°F		124.0	124.1	-	-	-	120.0	-	-	123.4	124.0	124.1	-	-	123.9	123.9
30% evap	°F		130.8	131.6	-	-	-	130.9	-	-	130.8	131.3	131.5	-	-	130.9	131.2
40% evap	°F		139.9	140.1	-	-	-	139.5	-	-	139.5	139.8	140.0	-	-	139.5	139.9
50% evap	°F		148.8	149.4	-	-	-	148.7	-	-	148.1	149.3	149.1	-	-	148.6	148.9
60% evap	°F		172.0	171.2	-	-	-	170.5	-	-	171.8	173.9	172.7	-	-	177.3	172.3
70% evap	°F		223.9	223.3	-	-	-	223.9	-	-	224.2	225.0	224.3	-	-	225.7	224.1
80% evap	°F		254.7	253.1	-	-	-	252.8	-	-	254.5	255.5	255.2	-	-	256.0	254.6
90% evap	°F		300.0	300.7	-	-	-	298.5	-	-	299.6	300.3	300.5	-	-	302.5	300.2
95% evap	°F		334.2	334.6	-	-	-	333.6	-	-	334.1	334.6	335.1	-	-	338.0	334.5
FBP	°F		367.8	368.0	-	-	-	366.3	-	-	366.3	365.1	372.6	-	-	367.7	368.0
Recovery	vol. %		98.4	98.2	-	-	-	98.5	-	-	97.8	98.5	98.4	-	-	98.4	98.4
Residue	vol. %		1.0	1.1	-	-	-	1.0	-	-	1.1	1.0	1.0	-	-	1.1	1.0
Loss	vol. %		0.6	0.7	-	-	-	0.5	-	-	1.1	0.5	0.6	-	-	0.5	0.6
Corrected Recovery	vol. %		98.4	98.2	-	-	-	-	-	-	98.5	98.4	-	-	-	-	98.4
Corrected Loss	vol. %		0.6	0.7	-	-	-	-	-	-	0.5	0.6	-	-	-	-	0.6
DVPE (EPA equation)	psi	D5191	10.11	10.16	10.02	10.11	9.28	10.09	-	10.00	-	-	10.05	9.88	-	10.05	10.07
Aromatics	vol. %	D1319	-	15.8	-	15.0	15.4	16.2	-	15.8	-	-	-	-	14.2	15.5	15.4
Olefins	vol. %	D1319	-	8.5	-	7.7	8.0	7.2	-	6.5	-	-	-	-	7.7	7.5	7.6
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.0
Benzene	vol. %	D3606	-	-	-	0.64	-	-	-	0.59	-	-	-	0.62	0.56	0.71	0.62
S	mg/kg	D5453	29	33	28	28	-	-	-	32	-	-	-	-	-	30	30
RON	-	D2699	94.7	-	94.9	-	-	-	-	94.8	-	-	-	-	-	94.9	94.8
MON	-	D2700	85.4	-	85.8	-	-	-	-	87.3	-	-	-	-	-	86.7	86.3
(RON+MON)/2	-	-	90.1	-	90.4	-	-	-	-	91.1	-	-	-	-	-	90.8	90.6
C	mass %	D5291 mod.**	82.40	-	-	-	80.50	-	-	-	-	-	-	-	81.72	82.16	81.70
H	mass %	D5291 mod.**	14.01	-	-	-	14.12	-	-	-	-	-	-	-	14.36	13.60	14.02
O	mass %	D5599	-	-	4.4	3.9	-	-	-	3.7	-	-	-	3.9	3.9	3.9	3.9
Net Heat of Combustion	MJ/kg	D4809	42.042	-	-	-	-	-	-	41.848	-	-	-	-	-	41.958	41.950
Water	mass %	E-1064	-	-	-	-	-	-	-	0.052	-	-	-	0.089	-	-	0.0705
Lead	g/l	D3237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	-	1A	-	-	-	-	-	-	1A
Solvent Washed Gum Content	mg/100ml	D381	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	-	>240	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA Act/V2/E-89 Program

Fuel Inspection Data

Fuel: 2

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7217	0.7221	-	0.7222	0.7221	-	-	-	-	-	-	-	-	-	0.7220
API Gravity, 60°F	°API	D4052	64.3	64.3	-	64.2	64.3	-	-	-	-	-	-	-	-	-	64.3
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	<0.10	<0.10
Distillation	IBP	D86	75.6	80.0	91.6	86.1	85.3	79.3	82	-	-	80.9	85.4	85.8	87.4	83	83.5
	5% evap		106.2	106.0	112.1	104.6	103.1	99.2	97	-	-	104.8	105.5	106.1	115.6	105	105.4
	10% evap		122.5	122.4	126.3	119.4	120.2	116.4	117	-	-	121.5	121.3	122.0	130.8	121	121.7
	20% evap		156.4	155.9	156.9	151.0	151.5	150.9	152	-	-	154.7	153.0	153.9	163.0	153	154.4
	30% evap		192.2	192.1	191.3	188.0	187.5	189.0	190	-	-	191.1	189.3	189.9	197.2	190	190.6
	40% evap		218.9	219.6	219.0	216.9	216.7	217.8	218	-	-	218.8	217.7	217.9	222.2	218	218.5
	50% evap		237.0	237.6	237.7	235.1	235.2	236.6	237	-	-	236.9	236.4	236.0	238.9	236	236.7
	60% evap		252.6	253.2	253.2	254.5	250.0	251.8	253	-	-	252.5	252.0	251.8	257.0	251	252.7
	70% evap		271.4	271.9	272.7	270.4	270.1	271.0	271	-	-	271.7	271.4	271.2	275.8	272	271.7
	80% evap		305.8	305.7	305.6	304.0	305.1	304.6	306	-	-	304.7	305.4	305.0	313.4	305	305.9
	90% evap		340.0	340.7	341.2	339.7	339.4	337.5	342	-	-	337.2	337.4	340.6	344.0	341	340.1
	95% evap		351.8	352.5	353.8	351.6	352.2	351.0	356	-	-	351.1	350.9	352.1	359.5	353	353.0
	FBP		374.7	376.3	376.3	370.0	375.8	375.2	373	-	-	371.3	377.8	380.8	377.9	375	375.3
Recovery	vol. %		97.9	97.1	97.5	97	96.2	97.3	97	-	-	97.1	96.5	97.1	97.4	96.8	97.2
Residue	vol. %		1.1	1.1	1.0	0.5	1.3	1.1	1.2	-	-	1.1	1.0	0.9	1.2	0.9	1.0
Loss	vol. %		1.0	1.8	1.3	2.5	2.6	1.6	1.8	-	-	1.8	2.5	2.0	1.4	2.3	1.8
Corrected Recovery	vol. %		98	97.2	97.7	97.7	-	-	-	-	-	97.1	97.2	97.5	97.3	-	97.5
Corrected Loss	vol. %		0.9	1.7	1.5	1.8	-	-	-	-	-	1.8	1.8	1.6	1.5	-	1.6
DVPE (EPA equation)	psi	D5191	10.14	10.28	10.01	10.30	9.43	10.08	10.25	-	-	-	10.20	10.14	-	10.38	10.20
Aromatics	vol. %	D1319	-	13.8	-	13.7	14.1	14.2	14.1	-	-	-	-	-	14.4	14.1	14.1
Olefins	vol. %	D1319	-	7.2	-	6.8	7.8	6.3	5.7	-	-	-	-	-	6.9	7.2	6.8
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79.1
Benzene	vol. %	D3606	-	-	-	0.55	-	-	0.46	-	-	-	-	0.52	-	0.50	0.51
S	mg/kg	D5453	22	26	22	22	-	-	25	-	-	-	-	-	-	23	23
RON	-	D2699	96.0	-	96.2	-	-	-	96.1	-	-	-	-	-	-	95.7	96.0
MON	-	D2700	88.3	-	88.7	-	-	-	88.4	-	-	-	-	-	-	89.1	88.6
(RON+MON)/2	-	-	92.2	-	92.5	-	-	-	92.3	-	-	-	-	-	-	92.4	92.3
C	mass %	D5291 mod.**	84.88	-	-	-	84.77	-	-	-	-	-	-	-	85.44	85.39	85.12
H	mass %	D5291 mod.**	14.22	-	-	-	14.63	-	-	-	-	-	-	-	14.61	14.25	14.43
O	mass %	D5599	-	-	-	-	-	-	<0.1	-	-	-	-	<0.1	<0.01	-	<0.1
Net Heat of Combustion	MJ/kg	D4809	44.320	-	-	-	-	-	43.600	-	-	-	-	-	-	43.960	43.960
Water	mass %	E-1064	-	-	-	-	-	-	0.005	-	-	-	-	0.014	-	-	0.0095
Lead	g/l	D3237	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 3

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7347	0.7351	-	0.7350	0.7350	-	-	-	-	-	-	-	-	-	0.7350
API Gravitv. 60°F	°API	D4052	60.8	60.8	-	60.8	60.8	-	-	-	-	-	-	-	-	-	60.8
Ethanol	vol. %	D5599	-	-	11.44	10.47	-	-	10.15	-	-	-	-	10.38	10.36	10.42	10.36
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	104.6	104.6	-	-	-	106.7	-	-	-	107.4	105.9	-	-	109.2	106.4
5% evap	°F		135.5	136.3	-	-	-	135.6	-	-	-	135.6	136.2	-	-	137.0	136.0
10% evap	°F		141.6	141.6	-	-	-	141.4	-	-	-	141.6	141.4	-	-	142.3	141.7
20% evap	°F		149.1	149.4	-	-	-	148.7	-	-	-	148.9	148.6	-	-	148.6	148.9
30% evap	°F		155.3	155.3	-	-	-	154.7	-	-	-	154.8	154.9	-	-	155.1	155.0
40% evap	°F		174.5	174.3	-	-	-	174.8	-	-	-	175.3	171.8	-	-	180.1	175.1
50% evap	°F		217.4	218.5	-	-	-	216.8	-	-	-	217.3	216.8	-	-	218.3	217.5
60% evap	°F		231.7	230.9	-	-	-	231.1	-	-	-	231.1	231.5	-	-	224.6	230.2
70% evap	°F		243.5	244.9	-	-	-	242.9	-	-	-	242.1	243.3	-	-	244.6	243.6
80% evap	°F		258.1	259.6	-	-	-	247.7	-	-	-	259.4	257.1	-	-	260.4	257.1
90% evap	°F		295.5	295.7	-	-	-	293.7	-	-	-	296.8	293.2	-	-	300.3	295.9
95% evap	°F		334.4	332.9	-	-	-	332.7	-	-	-	334.1	332.0	-	-	340.2	334.4
FBP	°F		372.2	370.2	-	-	-	366.4	-	-	-	368.5	364.5	-	-	371.8	368.9
Recovery	vol. %	98.6	98.6	-	-	-	98.9	-	-	-	98.4	98.0	-	-	98.2	98.4	
Residue	vol. %	1.0	1.0	-	-	-	1.0	-	-	-	1.1	1.0	-	-	1.0	1.0	
Loss	vol. %	0.4	0.4	-	-	-	0.1	-	-	-	0.5	1.0	-	-	0.8	0.6	
Corrected Recovery	vol. %	98.6	98.6	-	-	-	-	-	-	-	98.4	98.1	-	-	-	98.4	
Corrected Loss	vol. %	0.4	0.4	-	-	-	-	-	-	-	0.5	0.9	-	-	-	0.6	
DVPE (EPA equation)	psi	D5191	6.99	7.04	6.85	7.04	6.33	-	6.89	-	-	-	6.99	6.88	-	6.78	6.93
Aromatics	vol. %	D1319	-	15.1	-	14.6	14.3	15.7	-	14.6	-	-	-	-	15.0	15.9	15.0
Olefins	vol. %	D1319	-	8.1	-	7.5	7.5	7.8	-	6.8	-	-	-	-	8.0	7.3	7.6
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.0
Benzene	vol. %	D3606	-	-	-	0.58	-	-	0.54	-	-	-	-	0.57	0.63	0.75	0.61
S	mg/kg	D5453	20	23	19	21	-	-	23	-	-	-	-	-	-	26	22
RON	-	D2699	98.1	-	98.3	-	-	-	97.7	-	-	-	-	-	-	97.8	98.0
MON	-	D2700	87.6	-	88.2	-	-	-	86.9	-	-	-	-	-	-	87.6	87.6
(RON+MON)/2	-	-	92.9	-	93.3	-	-	-	92.3	-	-	-	-	-	-	92.7	92.8
C	mass %	D5291 mod.**	81.69	-	-	-	80.50	-	-	-	-	-	-	-	81.80	82.44	81.61
H	mass %	D5291 mod.**	14.13	-	-	-	14.12	-	-	-	-	-	-	-	14.39	14.04	14.17
O	mass %	D5599	-	-	4.3	3.9	-	-	3.8	-	-	-	-	3.9	3.9	3.9	3.9
Net Heat of Combustion	MJ/kg	D4809	41.996	-	-	-	-	-	40.860	-	-	-	-	-	-	41.750	41.536
Water	mass %	E-1064	-	-	-	-	-	-	0.051	-	-	-	-	0.067	-	-	0.059
Lead	g/l	D3237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 4

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7343	0.7349	-	0.7347	0.7346	-	-	-	-	-	-	-	-	-	0.7346
API Gravitv. 60°F	°API	D4052	60.9	60.8	-	60.9	60.9	-	-	-	-	-	-	-	-	-	60.9
Ethanol	vol. %	D5599	-	-	10.74	9.96	-	-	-	-	10.02	-	-	10.05	9.85	9.83	9.94
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	0.06	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	87.9	90.8	-	-	-	90.7	-	-	87.8	89.3	91.7	-	-	90.8	89.9
5% evap	°F		114.8	115.2	-	-	-	112.8	-	-	118.6	114.5	117.4	-	-	118.0	115.9
10% evap	°F		125.4	126.1	-	-	-	124.0	-	-	127.9	125.2	128.1	-	-	127.1	126.3
20% evap	°F		140.6	140.8	-	-	-	139.0	-	-	141.9	140.3	142.3	-	-	141.3	140.9
30% evap	°F		151.7	151.8	-	-	-	150.6	-	-	152.4	151.2	152.4	-	-	152.1	151.7
40% evap	°F		158.9	162.3	-	-	-	157.8	-	-	162.9	160.7	160.4	-	-	165.1	161.2
50% evap	°F		220.2	220.5	-	-	-	218.6	-	-	225.1	220.9	224.2	-	-	223.8	221.9
60% evap	°F		245.1	246.2	-	-	-	239.2	-	-	248.2	246.5	248.0	-	-	247.9	245.9
70% evap	°F		269.5	270.1	-	-	-	266.5	-	-	272.4	269.0	269.9	-	-	272.3	270.0
80% evap	°F		302.2	302.3	-	-	-	301.8	-	-	308.3	300.8	302.5	-	-	306.6	303.5
90% evap	°F		336.5	335.7	-	-	-	336.2	-	-	340.5	336.5	337.3	-	-	339.8	337.5
95% evap	°F		350.6	351.0	-	-	-	350.4	-	-	355.2	350.3	350.7	-	-	355.7	352.0
FBP	°F	370.5	370.8	-	-	-	368.8	-	-	368.7	368.0	371.1	-	-	370.7	369.8	
Recovery	vol. %	97.5	97.3	-	-	-	97.0	-	-	97.3	97.5	97.2	-	-	97.5	97.4	
Residue	vol. %	1.1	1.1	-	-	-	1.1	-	-	1.1	1.1	1.1	-	-	1.0	1.1	
Loss	vol. %	1.4	1.6	-	-	-	1.9	-	-	1.6	1.4	1.7	-	-	1.5	1.5	
Corrected Recovery	vol. %	97.7	97.3	-	-	-	-	-	-	-	97.4	97.5	-	-	-	97.5	
Corrected Loss	vol. %	1.2	1.6	-	-	-	-	-	-	-	1.5	1.4	-	-	-	1.4	
DVPE (EPA equation)	psi	D5191	10.03	10.11	9.70	10.11	9.28	10.03	10.10	-	10.05	-	9.32	9.93	-	10.00	10.01
Aromatics	vol. %	D1319	-	15.7	-	15.7	15.6	16.0	-	-	15.1	-	-	-	14.7	15.6	15.5
Olefins	vol. %	D1319	-	7.4	-	6.4	8.0	6.1	-	-	6.1	-	-	-	6.7	6.9	6.8
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.8
Benzene	vol. %	D3606	-	-	-	0.54	-	-	-	-	0.51	-	-	0.52	0.57	0.57	0.54
S	mg/kg	D5453	20	24	19	20	-	-	-	-	30	-	-	-	-	21	21
RON	-	D2699	96.9	-	97.3	-	-	-	97.2	-	-	-	-	-	-	97.1	97.1
MON	-	D2700	87.0	-	87.8	-	-	-	87.5	-	-	-	-	-	-	87.9	87.6
(RON+MON)/2	-	-	92.0	-	92.6	-	-	-	92.4	-	-	-	-	-	-	92.5	92.4
C	mass %	D5291 mod.**	82.18	-	-	-	81.35	-	-	-	-	-	-	-	82.21	82.23	82.21
H	mass %	D5291 mod.**	14.18	-	-	-	14.11	-	-	-	-	-	-	-	14.27	13.90	14.12
O	mass %	D5599	-	-	4.0	3.7	-	-	-	-	3.8	-	-	3.8	3.7	3.7	3.7
Net Heat of Combustion	MJ/kg	D4809	42.256	-	-	-	-	-	41.678	-	-	-	-	-	-	41.924	41.952
Water	mass %	E-1064	-	-	-	-	-	-	-	-	0.063	-	-	0.090	-	-	0.077
Lead	g/l	D3237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	1.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 5

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7571	0.7575	-	0.7574	0.7573	-	-	-	-	-	-	-	-	-	0.7573
API Gravity, 60°F	°API	D4052	55.2	55.1	-	55.1	55.2	-	-	-	-	-	-	-	-	-	55.2
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.10	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86	91.3	92.6	100.4	93.9	99.7	93.5	-	-	89.9	92.0	92.3	95.1	94.8	94	94.1
5% evap	°F		127.2	129.8	134.6	122.4	127.6	126.7	-	-	125.3	129.2	131.2	128.7	135.3	125	128.6
10% evap	°F		144.7	146.8	149.4	140.1	145.2	143.5	-	-	142.4	145.9	147.4	145.5	150.5	143	145.4
20% evap	°F		172.8	174.3	175.1	168.2	171.9	170.3	-	-	170.4	173.9	174.2	172.7	176.4	171	172.6
30% evap	°F		199.9	200.9	200.1	196.6	198.3	198.2	-	-	197.7	200.5	200.8	199.6	202.3	198	199.4
40% evap	°F		222.0	223.6	222.3	221.6	221	221.2	-	-	220.3	223.4	222.5	222.7	223.3	221	222.1
50% evap	°F		237.0	238.0	237.2	237.0	236.1	236.4	-	-	235.4	237.7	237.2	237.8	237.9	236	237.0
60% evap	°F		247.6	248.2	248.0	241.1	246.9	247.2	-	-	247.2	248.2	247.9	247.8	248.1	248	247.2
70% evap	°F		258.6	258.6	258.3	258.5	257.5	258.0	-	-	257.8	258.5	258.4	258.5	258.7	260	258.5
80% evap	°F		273.3	273.8	273.6	272.6	272.1	272.3	-	-	271.8	273.3	273.1	273.2	274.0	274	273.1
90% evap	°F		300.9	300.6	301.1	298.0	298.8	298.1	-	-	299.7	300.7	300.4	299.7	300.6	301	300.0
95% evap	°F		324.3	323.4	325.2	320.5	321.6	323.1	-	-	322.0	325.5	323.8	323.8	324.5	324	323.5
FBP	°F		357.2	358.9	356.4	351.3	358.7	356.6	-	-	354.3	363.5	360.5	358.2	358.5	360	357.8
Recovery	vol. %		98.0	98.0	98.8	97.2	98	98.1	-	-	98.5	98.4	98.3	98.1	98.7	97.3	98.2
Residue	vol. %		1.0	1.0	0.8	0.6	1.1	1.0	-	-	1.0	1.0	1.0	0.8	1.0	1.0	0.9
Loss	vol. %		1.0	1.0	0.4	2.2	0.9	0.9	-	-	0.5	0.6	0.7	1.1	0.3	1.7	0.9
Corrected Recovery	vol. %		98.1	98.0	98.8	97.8	-	-	-	-	98.4	98.3	98.3	98.7	-	98.3	
Corrected Loss	vol. %		0.9	1.0	0.4	1.6	-	-	-	-	0.6	0.7	0.9	0.3	-	0.8	
DVPE (EPA equation)	psi	D5191	6.98	7.04	6.90	7.01	6.34	6.89	7.05	-	-	-	6.99	6.85	-	6.86	6.95
Aromatics	vol. %	D1319	-	35.2	-	35.6	33.4	34.8	-	34.0	-	-	-	-	34.3	35.8	34.7
Olefins	vol. %	D1319	-	7.4	-	6.2	7.3	7.1	-	5.7	-	-	-	7.5	7.0	6.9	
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	58.4	
Benzene	vol. %	D3606	-	-	-	0.55	-	-	0.48	-	-	-	-	0.52	-	0.49	0.51
S	mg/kg	D5453	22	27	22	24	-	-	26	-	-	-	-	-	-	25	24
RON	-	D2699	96.6	-	96.6	-	-	-	97.2	-	-	-	-	-	-	96.2	96.7
MON	-	D2700	86.2	-	86.6	-	-	-	86.1	-	-	-	-	-	-	86.4	86.3
(RON+MON)/2	-	-	91.4	-	91.6	-	-	-	91.7	-	-	-	-	-	-	91.3	91.5
C	mass %	D5291 mod.**	86.25	-	-	-	86.08	-	-	-	-	-	-	-	86.99	86.98	86.58
H	mass %	D5291 mod.**	12.70	-	-	-	12.92	-	-	-	-	-	-	-	13.02	13.04	12.92
O	mass %	D5599	-	-	-	-	-	-	<0.1	-	-	-	-	<0.1	<0.01	-	<0.1
Net Heat of Combustion	MJ/kg	D4809	43.260	-	-	-	-	-	42.672	-	-	-	-	-	-	42.914	42.948
Water	mass %	E-1064	-	-	-	-	-	-	0.004	-	-	-	-	0.024	-	-	0.014
Lead	g/l	D3237	-	-	-	-	-	-	<0.003	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 6

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7340	0.7343	-	0.7342	0.7341	-	-	-	-	-	-	-	-	-	0.7342
API Gravitv. 60°F	°API	D4052	61.0	61.0	-	61.1	61.1	-	-	-	-	-	-	-	-	-	61.1
Ethanol	vol. %	D5599	-	-	11.74	10.66	-	-	9.97	-	-	-	-	10.58	10.44	10.55	10.56
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	0.01	-	-	-	-	<0.10	0.06	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	105.6	106.3	-	-	-	106.1	-	-	106.4	106.9	106.6	-	-	108.8	106.7
5% evap	°F		129.8	130.7	-	-	-	129.3	-	-	130.7	130.7	129.5	-	-	131.9	130.4
10% evap	°F		135.8	136.3	-	-	-	135.0	-	-	135.7	136.4	135.4	-	-	136.7	135.9
20% evap	°F		142.7	143.0	-	-	-	141.9	-	-	142.4	143.1	142.3	-	-	143.1	142.6
30% evap	°F		148.4	148.7	-	-	-	147.5	-	-	147.9	148.8	147.9	-	-	148.6	148.3
40% evap	°F		153.9	153.4	-	-	-	152.7	-	-	153.0	154.2	152.6	-	-	154.1	153.4
50% evap	°F		186.7	187.9	-	-	-	185.6	-	-	189.4	189.3	185.1	-	-	195.7	188.5
60% evap	°F		227.4	228.0	-	-	-	225.3	-	-	230.3	229.1	226.7	-	-	230.8	228.2
70% evap	°F		265.6	266.9	-	-	-	264.8	-	-	270.7	266.9	265.3	-	-	273.7	267.7
80% evap	°F		308.8	309.6	-	-	-	306.8	-	-	313.2	310.2	307.3	-	-	314.9	310.1
90% evap	°F		340.1	340.1	-	-	-	338.7	-	-	342.2	340.5	336.9	-	-	344.3	340.4
95% evap	°F		351.5	351.4	-	-	-	350.6	-	-	354.5	352.2	350.5	-	-	358.0	352.7
FBP	°F	370.8	371.3	-	-	-	367.4	-	-	370.1	363.8	371.2	-	-	369.9	369.2	
Recovery	vol. %	98	97.7	-	-	-	98.3	-	-	97.6	98.0	97.5	-	-	97.1	97.8	
Residue	vol. %	1.0	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	-	-	1.1	1.0	
Loss	vol. %	1.0	1.3	-	-	-	0.7	-	-	1.4	1.0	1.5	-	-	1.8	1.2	
Corrected Recovery	vol. %	98.1	97.7	-	-	-	-	-	-	-	98.0	97.7	-	-	-	97.9	
Corrected Loss	vol. %	0.9	1.3	-	-	-	-	-	-	-	1.0	1.3	-	-	-	1.1	
DVPE (EPA equation)	psi	D5191	7.28	7.22	7.19	7.29	6.56	7.27	7.35	-	-	-	7.14	7.25	-	7.19	7.24
Aromatics	vol. %	D1319	-	15.1	-	14.7	15.3	-	-	15.1	-	-	-	-	14.4	15.4	15.0
Olefins	vol. %	D1319	-	9.6	-	8.9	8.4	-	-	8.1	-	-	-	-	8.8	9.0	8.8
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65.6
Benzene	vol. %	D3606	-	-	-	0.66	-	-	0.61	-	-	-	-	0.64	0.69	0.82	0.68
S	mg/kg	D5453	23	28	23	24	-	-	22	-	-	-	-	-	22	23	
RON	-	D2699	96.3	-	96.5	-	-	-	95.8	-	-	-	-	-	-	96.4	96.3
MON	-	D2700	86.5	-	87.4	-	-	-	85.6	-	-	-	-	-	-	86.9	86.6
(RON+MON)/2	-	-	91.4	-	92.0	-	-	-	90.7	-	-	-	-	-	-	91.7	91.5
C	mass %	D5291 mod.**	81.95	-	-	-	81.00	-	-	-	-	-	-	-	81.72	81.42	81.52
H	mass %	D5291 mod.**	14.14	-	-	-	14.13	-	-	-	-	-	-	-	14.30	14.26	14.21
O	mass %	D5599	-	-	4.4	4.0	-	-	3.8	-	-	-	-	4.0	3.9	4.0	4.0
Net Heat of Combustion	MJ/kg	D4809	41.980	-	-	-	-	-	41.752	-	-	-	-	-	-	41.624	41.785
Water	mass %	E-1064	-	-	-	-	-	-	0.058	-	-	-	-	0.087	-	-	0.073
Lead	g/l	D3237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 7

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7206	0.7209	-	0.7208	0.7208	-	-	-	-	-	-	-	-	-	0.7208
API Gravivt. 60°F	°API	D4052	64.6	64.6	-	64.6	64.6	-	-	-	-	-	-	-	-	-	64.6
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86	96.2	100.7	102.7	100.2	-	97.5	100	-	-	101.4	101.3	100.4	100.4	100	100.1
5% evap	°F		126.9	129.0	130.5	122.1	-	124.3	125	-	-	128.1	130.2	128.0	131.7	128	127.6
10% evap	°F		136.1	138.1	138.6	133.4	-	134.9	136	-	-	136.9	138.6	137.1	139.8	137	137.0
20% evap	°F		148.7	149.3	149.9	146.2	-	147.8	148	-	-	149.4	150.4	149.2	151.1	149	149.0
30% evap	°F		161.5	161.8	162.5	159.2	-	160.2	161	-	-	162.1	163.2	162.3	163.7	161	161.7
40% evap	°F		176.5	176.8	176.7	174.4	-	175.6	176	-	-	177.1	177.6	176.8	178.4	177	176.6
50% evap	°F		192.9	193.5	193.5	191.7	-	192.3	192	-	-	193.3	193.9	193.4	194.7	193	193.1
60% evap	°F		209.8	210.9	210.4	208.9	-	209.9	209	-	-	210.7	211.1	210	211.5	210	210.2
70% evap	°F		227.8	229.7	228.7	227.3	-	228.6	228	-	-	228.7	229.5	228.6	229.2	229	228.6
80% evap	°F		248.8	252.5	251.8	249.6	-	250.8	251	-	-	252.1	253.0	251.6	252.9	252	251.5
90% evap	°F		296.9	298.8	299.7	293.5	-	299.8	298	-	-	299.4	302.0	297.2	300.3	297	298.4
95% evap	°F		327.3	329.9	331.3	326.8	-	328.7	329	-	-	329.2	330.1	329.4	331.6	329	329.3
FBP	°F		357.0	360.4	359.4	355.4	-	365.5	360	-	-	358.3	382.5	359.6	362.8	359	361.8
Recovery	vol. %	98.3	97.7	98.7	96.6	-	97.5	98.5	-	-	98.4	98.4	97.7	98.6	97.9	98.1	
Residue	vol. %	1.0	1.1	0.8	0.6	-	1.1	1.0	-	-	1.0	1.0	1.1	1.1	0.8	1.0	
Loss	vol. %	0.7	1.2	0.5	2.8	-	1.4	0.5	-	-	0.6	0.6	1.2	0.3	1.3	1.0	
Corrected Recovery	vol. %	98.4	97.8	98.7	97.4	-	-	-	-	-	98.4	98.4	97.9	98.6	-	98.2	
Corrected Loss	vol. %	0.6	1.1	0.5	2.0	-	-	-	-	-	0.6	0.6	1.0	0.3	-	0.8	
DVPE (EPA equation)	psi	D5191	7.19	7.22	7.06	7.17	6.45	7.00	7.22	-	-	-	7.13	7.07	-	7.32	7.15
Aromatics	vol. %	D1319	-	17.8	-	16.8	17.9	17.6	15.5	-	-	-	-	-	16.5	16.7	17.0
Olefins	vol. %	D1319	-	8.0	-	7.7	8.3	7.1	6.8	-	-	-	-	-	7.4	7.3	7.5
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75.5
Benzene	vol. %	D3606	-	-	-	0.56	-	-	0.51	-	-	-	-	0.54	0.57	0.55	0.55
S	mg/kg	D5453	22	25	21	22	-	-	24	-	-	-	-	-	-	23	23
RON	-	D2699	91.2	-	91.3	-	-	-	91.2	-	-	-	-	-	-	92.1	91.2
MON	-	D2700	84.4	-	83.9	-	-	-	84.2	-	-	-	-	-	-	84.7	84.2
(RON+MON)/2	-	-	87.8	-	87.6	-	-	-	87.7	-	-	-	-	-	-	88.4	87.7
C	mass %	D5291 mod.**	85.20	-	-	-	84.40	-	-	-	-	-	-	-	85.72	85.32	85.16
H	mass %	D5291 mod.**	14.05	-	-	-	14.39	-	-	-	-	-	-	-	14.37	14.20	14.25
O	mass %	D5599	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.01	-	<0.1
Net Heat of Combustion	MJ/kg	D4809	43.872	-	-	-	-	-	43.548	-	-	-	-	-	-	43.786	43.735
Water	mass %	E-1064	-	-	-	-	-	-	0.005	-	-	-	-	0.033	-	-	0.019
Lead	g/l	D3237	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 8

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7187	0.7192	-	0.7192	0.7191	-	-	-	-	-	-	-	-	-	0.7191
API Gravitv. 60°F	°API	D4052	65.1	65.1	-	65.1	65.1	-	-	-	-	-	-	-	-	-	65.1
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86	79.7	79.8	91.2	85.7	-	-	84	-	-	82.4	79.9	83.8	86.7	84	83.7
5% evap	°F		107.2	109.5	112.6	103.1	-	-	100	-	-	108.3	107.8	107.1	116.9	108	108.1
10% evap	°F		122.4	124.7	126.9	118.8	-	-	118	-	-	123.4	123.2	122.2	130.3	124	123.4
20% evap	°F		151.1	153.5	153.0	146.9	-	-	148	-	-	152.0	151.3	149.8	157.9	152	151.6
30% evap	°F		180.9	182.9	180.9	177.9	-	-	178	-	-	181.7	180.5	220.8	185.6	182	185.1
40% evap	°F		204.1	205.5	204.6	202.3	-	-	203	-	-	205.0	203.8	203.6	207.4	205	204.4
50% evap	°F		220.6	221.7	220.6	220.3	-	-	220	-	-	221.3	220.5	220.8	222.7	222	221.1
60% evap	°F		233.3	234.5	233.8	229.7	-	-	234	-	-	233.7	233.3	233.7	234.8	234	233.5
70% evap	°F		245.5	246.9	246.0	245.1	-	-	245	-	-	247.2	246.1	245.2	248.5	248	246.4
80% evap	°F		262.8	265.0	264.6	262.4	-	-	263	-	-	263.7	263.3	262.9	266.6	266	264.0
90% evap	°F		301.3	304.2	304.3	299.2	-	-	302	-	-	304.3	302.1	299.5	310.0	304	303.1
95% evap	°F		328.9	331.3	331.3	327.0	-	-	330	-	-	331.2	329.1	326.0	338.2	332	330.5
FBP	°F		357.3	364.8	364.1	355.7	-	-	363	-	-	362.1	359.8	359.2	362.7	360	360.9
Recovery	vol. %	97.5	97.9	97.6	96.65	-	-	96.7	-	-	97.6	97.2	97.7	97.7	96.9	97.5	
Residue	vol. %	1.0	1.0	0.9	0.1	-	-	1.1	-	-	1.0	1.0	0.9	1.1	1.1	0.9	
Loss	vol. %	1.5	1.1	1.5	3.3	-	-	2.2	-	-	1.4	1.8	1.4	1.2	2.0	1.7	
Corrected Recovery	vol. %	97.7	97.9	97.8	97.2	-	-	-	-	-	97.5	97.5	98.0	97.7	-	97.7	
Corrected Loss	vol. %	1.3	1.1	1.3	2.3	-	-	-	-	-	1.5	1.5	1.1	1.2	-	1.4	
DVPE (EPA equation)	psi	D5191	10.16	10.43	10.00	10.25	9.41	-	10.32	-	-	-	10.24	10.25	-	9.93	10.20
Aromatics	vol. %	D1319	-	15.8	-	15.5	15.1	-	15.9	-	-	-	-	-	15.6	16.2	15.7
Olefins	vol. %	D1319	-	6.3	-	5.9	6.1	-	6.5	-	-	-	-	-	7.2	6.2	6.4
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	78.0
Benzene	vol. %	D3606	-	-	-	0.53	-	-	0.48	-	-	-	-	0.50	-	0.48	0.50
S	mg/kg	D5453	22	25	21	22	-	-	26	-	-	-	-	-	-	22	23
RON	-	D2699	95.2	-	95.6	-	-	-	95.5	-	-	-	-	-	-	95.6	95.5
MON	-	D2700	87.7	-	87.7	-	-	-	87.6	-	-	-	-	-	-	88.1	87.8
(RON+MON)/2	-	-	91.5	-	91.7	-	-	-	91.6	-	-	-	-	-	-	91.9	91.7
C	mass %	D5291 mod.**	84.69	-	-	-	84.75	-	-	-	-	-	-	-	85.56	85.49	85.12
H	mass %	D5291 mod.**	14.15	-	-	-	14.50	-	-	-	-	-	-	-	14.48	14.16	14.32
O	mass %	D5599	-	-	-	-	-	-	<0.1	-	-	-	-	<0.1	<0.01	-	<0.1
Net Heat of Combustion	MJ/kg	D4809	44.046	-	-	-	-	-	44.098	-	-	-	-	-	-	43.966	44.037
Water	mass %	E-1064	-	-	-	-	-	-	-	-	-	-	-	0.020	-	-	0.020
Lead	g/l	D3237	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	0.001
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 9

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7450	0.7453	-	0.7454	0.7459	-	-	-	-	-	-	-	-	-	0.7454
API Gravity, 60°F	°API	D4052	58.2	58.1	-	58.2	58.2	-	-	-	-	-	-	-	-	-	58.2
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86	82.2	84.4	91.2	88.3	85.1	-	85	-	-	84.1	84.0	84.9	87.1	84	85.3
5% evap	°F		105.4	106.9	108.1	103.0	104.9	-	103	-	-	104.6	107.2	105.6	111.2	102	105.1
10% evap	°F		114.9	116.6	117.3	112.9	115.3	-	115	-	-	114.4	116.0	115.1	119.4	113	115.1
20% evap	°F		130.3	132.1	131.2	128.0	131.0	-	131	-	-	129.8	130.9	130.1	134.4	129	130.3
30% evap	°F		147.3	149.0	147.2	144.9	147.7	-	149	-	-	146.6	147.8	146.9	151.4	146	147.2
40% evap	°F		168.0	170.1	167.9	164.9	167.5	-	169	-	-	167.0	168.4	168.2	173.1	166	167.7
50% evap	°F		193.2	195.3	192.6	190.2	192.6	-	194	-	-	192.1	194.2	192.5	199.2	191	192.8
60% evap	°F		225.1	224.2	225.7	222.4	224.6	-	227	-	-	224.7	226.7	223.9	231.9	223	224.7
70% evap	°F		260.7	259.2	261.0	258.9	260.2	-	261	-	-	260.4	261.7	259.6	265.7	260	260.3
80% evap	°F		293.8	292.3	293.9	287.1	294.1	-	290	-	-	292.6	294.8	291.7	299.0	292	292.2
90% evap	°F		342.2	342.5	343.0	339.7	341.8	-	344	-	-	341.7	341.2	340.9	349.5	341	341.8
95% evap	°F		364.3	363.2	365.2	363.1	362.8	-	365	-	-	362.5	363.0	363	367.8	363	363.5
FBP	°F		381.1	384.4	385.0	375.9	387.7	-	387	-	-	380.2	394.1	390.3	381.2	381	384.7
Recovery	vol. %	98	98.0	97.8	96.6	98.1	-	97.8	-	-	97.5	97.9	97.7	97.4	97.2	97.6	
Residue	vol. %	1.1	1.1	0.9	0.6	1.0	-	0.9	-	-	1.1	1.1	0.8	1.0	0.5	1.0	
Loss	vol. %	0.9	0.9	1.3	2.8	1.0	-	1.3	-	-	1.4	1.0	1.5	1.6	2.3	1.4	
Corrected Recovery	vol. %	98.1	97.9	98	97.6	-	-	-	-	-	97.4	98.0	98	97.4	-	97.9	
Corrected Loss	vol. %	0.8	1.0	1.1	1.8	-	-	-	-	-	1.5	0.9	1.2	1.6	-	1.2	
DVPE (EPA equation)	psi	D5191	10.28	10.40	10.19	10.34	9.41	-	10.32	-	-	-	10.31	10.22	-	10.32	10.30
Aromatics	vol. %	D1319	-	36.1	-	35.7	35.1	-	35.7	-	-	-	-	-	34.6	37.3	35.8
Olefins	vol. %	D1319	-	7.5	-	6.1	6.4	-	5.5	-	-	-	-	-	6.2	6.2	6.2
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58.0
Benzene	vol. %	D3606	-	-	-	0.57	-	-	0.52	-	-	-	-	0.52	-	0.55	0.54
S	mg/kg	D5453	23	27	22	23	-	-	24	-	-	-	-	-	-	23	23
RON	-	D2699	94.5	-	94.6	-	-	-	94.6	-	-	-	-	-	-	94.3	94.5
MON	-	D2700	84.4	-	84.7	-	-	-	85.3	-	-	-	-	-	-	84.9	84.8
(RON+MON)/2	-	-	89.5	-	89.7	-	-	-	90.0	-	-	-	-	-	-	89.6	89.7
C	mass %	D5291 mod.**	86.91	-	-	-	85.50	-	-	-	-	-	-	-	87.03	87.15	87.03
H	mass %	D5291 mod.**	12.65	-	-	-	12.84	-	-	-	-	-	-	-	13.02	12.78	12.82
O	mass %	D5599	-	-	-	-	-	-	<0.1	-	-	-	-	<0.1	<0.01	<0.1	<0.1
Net Heat of Combustion	MJ/kg	D4809	43.540	-	-	-	-	-	42.854	-	-	-	-	-	-	43.234	43.209
Water	mass %	E-1064	-	-	-	-	-	-	0.007	-	-	-	-	0.011	-	-	0.009
Lead	g/l	D3237	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 10

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7641	0.7646	-	0.7644	0.7643	-	-	-	-	-	-	-	-	-	0.7644
API Gravim. 60°F	°API	D4052	53.4	53.4	-	53.4	53.4	-	-	-	-	-	-	-	-	-	53.4
Ethanol	vol. %	D5599	-	-	10.35	9.88	-	-	9.83	-	-	-	-	9.82	9.70	9.87	9.82
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	0.06	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	103.8	103.7	-	-	-	107.4	-	-	104.4	104.6	103.0	-	-	106.1	104.7
5% evap	°F		130.1	130.8	-	-	-	129.1	-	-	130.5	129.2	129.9	-	-	130.7	130.0
10% evap	°F		136.7	136.7	-	-	-	135.9	-	-	136.1	136.4	136.1	-	-	136.5	136.3
20% evap	°F		144.6	144.8	-	-	-	144.1	-	-	144.1	144.1	144.2	-	-	144.3	144.3
30% evap	°F		151.1	152.0	-	-	-	151.1	-	-	150.8	150.9	150.6	-	-	150.7	151.0
40% evap	°F		161.7	163.9	-	-	-	162.5	-	-	160.1	161.8	158.4	-	-	162.5	161.6
50% evap	°F		215.7	217.4	-	-	-	217.2	-	-	217.9	216.6	216.8	-	-	218.4	217.1
60% evap	°F		260.7	262.1	-	-	-	261.3	-	-	261.9	260.8	261.2	-	-	262.8	261.5
70% evap	°F		285.9	292.1	-	-	-	291.1	-	-	292.5	291.6	290.8	-	-	288.6	290.4
80% evap	°F		317.6	318.0	-	-	-	317.2	-	-	317.7	316.9	316.3	-	-	318.8	317.5
90% evap	°F		340.2	340.3	-	-	-	339.2	-	-	340.5	340.0	338.9	-	-	342.2	340.2
95% evap	°F		353.0	354.0	-	-	-	355.3	-	-	353.8	354.0	353.4	-	-	356.8	354.3
FBP	°F	371.3	373.0	-	-	-	375.7	-	-	371.3	369.9	374.7	-	-	371.1	372.4	
Recovery	vol. %	98.4	98.5	-	-	-	97.9	-	-	98.5	97.8	98.3	-	-	98.0	98.3	
Residue	vol. %	1.0	1.0	-	-	-	1.0	-	-	1.0	1.1	1.0	-	-	1.0	1.0	
Loss	vol. %	0.6	0.5	-	-	-	1.1	-	-	0.5	1.1	0.7	-	-	1.0	0.7	
Corrected Recovery	vol. %	98.4	98.5	-	-	-	-	-	-	-	97.8	98.3	-	-	-	98.3	
Corrected Loss	vol. %	0.6	0.5	-	-	-	-	-	-	-	1.1	0.7	-	-	-	0.7	
DVPE (EPA equation)	psi	D5191	7.19	7.19	7.08	7.16	6.45	7.00	7.19	-	-	-	7.10	7.08	-	7.02	7.11
Aromatics	vol. %	D1319	-	33.5	-	34.5	33.5	34.2	-	-	-	-	-	32.7	35.6	34.0	
Olefins	vol. %	D1319	-	7.5	-	6.2	6.1	6.6	-	-	-	-	-	6.1	6.0	6.1	
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	50.1	
Benzene	vol. %	D3606	-	-	-	0.53	-	-	0.50	-	-	-	0.51	0.49	0.58	0.52	
S	mg/kg	D5453	23	27	24	25	-	-	25	-	-	-	-	-	25	25	
RON	-	D2699	98.5	-	98.6	-	-	-	99.7	-	-	-	-	-	98.4	98.5	
MON	-	D2700	86.8	-	87.4	-	-	-	86.7	-	-	-	-	-	87.4	87.2	
(RON+MON)/2	-	-	92.7	-	93.0	-	-	-	93.2	-	-	-	-	-	92.9	92.9	
C	mass %	D5291 mod.**	83.46	-	-	-	82.85	-	-	-	-	-	-	83.45	83.49	83.47	
H	mass %	D5291 mod.**	12.72	-	-	-	12.90	-	-	-	-	-	-	13.04	12.67	12.83	
O	mass %	D5599	-	-	3.7	3.6	-	-	3.6	-	-	-	3.5	3.5	3.6	3.6	
Net Heat of Combustion	MJ/kg	D4809	41.486	-	-	-	-	-	40.770	-	-	-	-	-	41.374	41.210	
Water	mass %	E-1064	-	-	-	-	-	-	0.058	-	-	-	0.076	-	-	0.067	
Lead	g/l	D3237	-	-	-	-	-	-	<0.003	-	-	-	-	-	-	<0.003	
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	1A	
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	<0.5	
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	>240	

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 11

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7593	0.7598	-	0.7597	0.7597	-	-	-	-	-	-	-	-	-	0.7596
API Gravity, 60°F	°API	D4052	54.6	54.5	-	54.6	54.6	-	-	-	-	-	-	-	-	-	54.6
Ethanol	vol. %	D5599	-	-	10.81	10.30	-	-	9.92	-	-	-	-	10.40	10.15	10.21	10.30
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	90.4	92.0	-	-	-	94.2	-	-	92.7	90.5	91.9	-	-	92.1	92.0
5% evap	°F		115.9	115.9	-	-	-	114.6	-	-	113.7	115.6	116.4	-	-	117.2	115.4
10% evap	°F		124.5	124.9	-	-	-	123.9	-	-	123.4	124.8	125.1	-	-	125.4	124.4
20% evap	°F		137.8	137.8	-	-	-	137.6	-	-	137.1	137.7	137.6	-	-	137.9	137.6
30% evap	°F		148.3	148.3	-	-	-	148.2	-	-	147.2	148.4	148.2	-	-	148.3	148.1
40% evap	°F		157.5	157.1	-	-	-	157.0	-	-	155.1	156.6	155.6	-	-	156.7	156.5
50% evap	°F		189.6	188.4	-	-	-	190.0	-	-	188.6	189.7	189.2	-	-	196.4	189.3
60% evap	°F		230.5	231.6	-	-	-	231.0	-	-	230.0	231.8	231.5	-	-	233.1	231.1
70% evap	°F		251.3	252.4	-	-	-	251.0	-	-	250.2	251.7	251.9	-	-	252.9	251.4
80% evap	°F		270.2	270.9	-	-	-	269.1	-	-	269.4	269.8	270.7	-	-	272.8	270.0
90% evap	°F		297.7	299	-	-	-	299.0	-	-	298.0	298.5	299.5	-	-	302.8	298.6
95% evap	°F		324.3	325.5	-	-	-	325.5	-	-	323.4	324.9	326.1	-	-	336.0	325.0
FBP	°F		359.5	361.6	-	-	-	358.6	-	-	358.0	358.9	368.0	-	-	361.2	360.8
Recovery	vol. %	98.4	97.6	-	-	-	97.5	-	-	97.2	98.0	97.7	-	-	97.9	97.9	
Residue	vol. %	1.0	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0	
Loss	vol. %	0.6	1.4	-	-	-	1.5	-	-	1.8	1.0	1.3	-	-	1.1	1.1	
Corrected Recovery	vol. %	98.4	97.6	-	-	-	-	-	-	-	98.0	97.9	-	-	-	98.0	
Corrected Loss	vol. %	0.6	1.4	-	-	-	-	-	-	-	1.0	1.1	-	-	-	1.0	
DVPE (EPA equation)	psi	D5191	9.91	10.03	9.76	9.99	9.11	-	10.02	-	-	-	9.95	9.91	-	9.87	9.93
Aromatics	vol. %	D1319	-	35.9	-	35.4	34.8	35.7	33.8	34.4	-	-	-	-	17.4	35.1	35.0
Olefins	vol. %	D1319	-	7.5	-	6.6	7.1	7.0	7.2	6.8	-	-	-	-	8.9	6.3	6.9
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.8
Benzene	vol. %	D3606	-	-	-	0.53	-	-	0.50	-	-	-	-	0.51	0.57	0.57	0.54
S	mg/kg	D5453	23	28	22	24	-	-	27	-	-	-	-	-	-	22	24
RON	-	D2699	97.8	-	98.2	-	-	-	97.4	-	-	-	-	-	-	97.8	97.8
MON	-	D2700	85.6	-	86.3	-	-	-	85.0	-	-	-	-	-	-	85.5	85.6
(RON+MON)/2	-	-	91.7	-	92.3	-	-	-	91.2	-	-	-	-	-	-	91.7	91.7
C	mass %	D5291 mod.**	83.65	-	-	-	83.10	-	-	-	-	-	-	-	83.67	83.71	83.68
H	mass %	D5291 mod.**	12.44	-	-	-	12.74	-	-	-	-	-	-	-	12.76	12.50	12.61
O	mass %	D5599	-	-	3.9	3.7	-	-	3.6	-	-	-	-	3.8	3.7	3.7	3.7
Net Heat of Combustion	MJ/kg	D4809	41.462	-	-	-	-	-	40.970	-	-	-	-	-	-	41.092	41.175
Water	mass %	E-1064	-	-	-	-	-	-	0.055	-	-	-	-	0.076	-	-	0.0655
Lead	g/l	D3237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 12

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7514	0.7518	-	0.7518	0.7517	-	-	-	-	-	-	-	-	-	0.7517
API Gravivt. 60°F	°API	D4052	56.6	56.5	-	56.5	56.5	-	-	-	-	-	-	-	-	-	56.5
Ethanol	vol. %	D5599	-	-	10.63	9.91	-	-	9.83	-	-	-	-	9.89	9.68	9.85	9.83
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	90.6	89.9	-	-	-	92.1	-	-	92.9	89.4	92.7	-	-	91.6	91.3
5% evap	°F		110.1	110.5	-	-	-	110.8	-	-	111.9	109.3	111.3	-	-	111.4	110.7
10% evap	°F		116.4	116.6	-	-	-	117.0	-	-	117.6	116.3	117.5	-	-	116.9	116.9
20% evap	°F		124.8	125.5	-	-	-	123.8	-	-	125.5	125.1	125.5	-	-	124.2	125.0
30% evap	°F		133.6	134.1	-	-	-	133.2	-	-	133.9	133.7	134.1	-	-	134.0	133.8
40% evap	°F		142.4	142.8	-	-	-	142.3	-	-	143.0	143.1	143.3	-	-	143.0	142.8
50% evap	°F		152.6	152.8	-	-	-	151.3	-	-	151.5	152.1	153.0	-	-	153.3	152.2
60% evap	°F		196.0	197.6	-	-	-	200.1	-	-	200.8	198.0	198.3	-	-	210.2	198.5
70% evap	°F		273.9	275.0	-	-	-	275.5	-	-	276.0	274.7	275.3	-	-	280.4	275.1
80% evap	°F		307.6	308.1	-	-	-	307.7	-	-	308.0	307.7	308.0	-	-	312.2	307.9
90% evap	°F		339.9	340.3	-	-	-	340.1	-	-	339.4	339.4	339.9	-	-	341.7	339.8
95% evap	°F		357.8	357.8	-	-	-	357.5	-	-	357.0	358.0	358.3	-	-	365.0	357.7
FBP	°F		376.3	377.8	-	-	-	376.3	-	-	373.6	373.4	378.0	-	-	379.5	375.9
Recovery	vol. %	98.0	97.8	-	-	-	97.8	-	-	97.4	97.8	97.8	-	-	97.5	97.9	
Residue	vol. %	1.1	1.1	-	-	-	1.1	-	-	1.1	1.1	1.1	-	-	1.1	1.1	
Loss	vol. %	0.9	1.1	-	-	-	1.1	-	-	1.5	1.1	1.1	-	-	1.4	1.1	
Corrected Recovery	vol. %	98.1	97.8	-	-	-	-	-	-	-	97.8	98.0	-	-	-	97.9	
Corrected Loss	vol. %	0.8	1.1	-	-	-	-	-	-	-	1.1	0.9	-	-	-	1.0	
DVPE (EPA equation)	psi	D5191	10.15	10.18	9.99	10.23	9.35	-	10.20	-	-	-	10.13	10.01	-	10.14	10.13
Aromatics	vol. %	D1319	-	34.3	-	35.4	34.5	-	-	34.6	-	-	-	-	38.0	35.1	34.8
Olefins	vol. %	D1319	-	8.0	-	6.8	6.8	-	-	6.4	-	-	-	-	7.5	6.0	6.9
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48.5
Benzene	vol. %	D3606	-	-	-	0.57	-	-	0.52	-	-	-	-	0.55	0.60	0.62	0.57
S	mg/kg	D5453	19	22	17	18	-	-	21	-	-	-	-	-	-	19	19
RON	-	D2699	101.2	-	100.4	-	-	-	99.9	-	-	-	-	-	-	100.0	100.4
MON	-	D2700	87.4	-	87.9	-	-	-	88.5	-	-	-	-	-	-	88.1	88.0
(RON+MON)/2	-	-	94.3	-	94.2	-	-	-	94.2	-	-	-	-	-	-	94.1	94.2
C	mass %	D5291 mod.**	84.31	-	-	-	81.80	-	-	-	-	-	-	-	83.40	83.76	83.32
H	mass %	D5291 mod.**	12.26	-	-	-	12.72	-	-	-	-	-	-	-	13.00	12.74	12.68
O	mass %	D5599	-	-	3.9	3.6	-	-	3.6	-	-	-	-	3.6	3.6	3.6	3.6
Net Heat of Combustion	MJ/kg	D4809	41.648	-	-	-	-	-	41.084	-	-	-	-	-	-	41.388	41.373
Water	mass %	E-1064	-	-	-	-	-	-	0.053	-	-	-	-	0.078	-	-	0.066
Lead	g/l	D3237	-	-	-	-	-	-	<0.003	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 13

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7537	0.7541	-	0.7541	0.7540	-	-	-	-	-	-	-	-	-	0.7540
API Gravivt. 60°F	°API	D4052	56.0	56.0	-	56.0	56.0	-	-	-	-	-	-	-	-	-	56.0
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86	93.5	94.9	100.6	96.0	97.7	93.2	99	-	93.8	93.8	97.2	97.7	102.0	97	96.6
5% evap	°F		126.1	129.3	131.0	123.2	125.2	125.6	123	-	123.8	126.6	129.9	129.4	135.2	123	127.0
10% evap	°F		139.3	141.7	142.5	135.7	138.6	137.9	137	-	137.6	139.6	141.7	142.2	146.3	137	139.8
20% evap	°F		158.7	160.7	160.0	154.9	157.6	156.8	157	-	157.2	158.5	159.4	160.9	163.8	157	158.7
30% evap	°F		178.7	179.6	179.4	175.0	177.1	176.8	177	-	176.6	178.1	179.4	180.3	181.1	177	178.2
40% evap	°F		200.4	200.6	201.0	198.1	198.9	198.9	199	-	198.4	199.9	200.7	201.7	203.2	198	199.9
50% evap	°F		222.8	223.4	223.0	220.8	221.7	221.0	222	-	221.1	223.0	223.3	223.6	225.0	222	222.5
60% evap	°F		245.2	245.3	245.8	242.8	244.9	244.5	245	-	244.0	245.7	246.0	246.3	246.7	245	245.2
70% evap	°F		269.9	269.5	270.5	268.2	269.4	269.2	270	-	268.4	269.8	270.2	270.8	271.2	270	269.8
80% evap	°F		303.7	304.0	305.1	301.2	302.5	302.5	305	-	301.7	302.4	304.3	303.9	306.0	303	303.5
90% evap	°F		338.2	338.5	339.3	336.8	336.6	337.2	337	-	336.7	337.7	338.2	338.4	339.6	339	337.9
95% evap	°F		354.4	354.4	355.8	352.1	353.3	353.7	356	-	353.1	354.0	353.5	354.8	356.5	355	354.4
FBP	°F		376.6	379.0	374.9	370.3	379.0	375.6	385	-	373.6	375.8	384.0	376.9	379.3	377	377.5
Recovery	vol. %		97.9	98.0	98.7	98.0	97.1	97.7	98.5	-	97.5	98.1	98.1	98.3	98.4	96.9	98.2
Residue	vol. %	1.1	1.1	0.8	0.4	1.2	1.1	0.9	-	1.1	1.1	1.1	1.0	1.0	1.0	1.0	
Loss	vol. %	1.0	0.9	0.5	1.6	1.7	1.2	0.6	-	1.4	0.8	0.8	0.7	0.6	2.1	0.9	
Corrected Recovery	vol. %	98.0	98.0	98.7	98.3	-	-	-	-	-	98.1	98.2	98.4	98.4	-	98.3	
Corrected Loss	vol. %	0.9	0.9	0.5	1.3	-	-	-	-	-	0.8	0.7	0.6	0.6	-	0.8	
DVPE (EPA equation)	psi	D5191	6.92	6.98	6.86	6.98	6.28	6.77	6.96	-	-	-	6.96	6.89	-	6.92	6.9
Aromatics	vol. %	D1319	-	34.9	-	34.2	33.4	34.7	33.9	-	-	-	-	-	34.1	33.5	34.1
Olefins	vol. %	D1319	-	7.4	-	6.5	6.8	6.5	5.2	-	-	-	-	6.6	5.1	6.3	
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	59.6	
Benzene	vol. %	D3606	-	-	-	0.53	-	-	0.49	-	-	-	0.50	-	0.53	0.51	
S	mg/kg	D5453	21	25	21	22	-	-	26	-	-	-	-	-	22	23	
RON	-	D2699	95.7	-	95.9	-	-	-	95.8	-	-	-	-	-	95.9	95.8	
MON	-	D2700	85.8	-	85.7	-	-	-	86.1	-	-	-	-	-	85.6	85.8	
(RON+MON)/2	-	-	90.8	-	90.8	-	-	-	91.0	-	-	-	-	-	90.8	90.8	
C	mass %	D5291 mod.**	87.07	-	-	-	86.44	-	-	-	-	-	-	86.9	86.63	86.76	
H	mass %	D5291 mod.**	12.74	-	-	-	13.11	-	-	-	-	-	-	13.16	13.60	13.15	
O	mass %	D5599	-	-	-	-	-	-	<0.1	-	-	-	<0.1	<0.01	<0.1	<0.1	
Net Heat of Combustion	MJ/kg	D4809	43.230	-	-	-	-	-	43.184	-	-	-	-	-	43.098	43.171	
Water	mass %	E-1064	-	-	-	-	-	-	-	-	-	-	0.014	-	-	0.014	
Lead	g/l	D3237	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	<0.001	
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	1A	
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	1.5	-	-	-	-	-	-	1.5	
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	>240	

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 14

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7220	0.7228	-	0.7223	0.7222	-	-	-	-	-	-	-	-	-	0.7223
API Gravity, 60°F	°API	D4052	64.2	64.1	-	64.2	64.2	-	-	-	-	-	-	-	-	-	64.2
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.10	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86	98.9	99.6	101.3	99.1	102.9	-	101	-	-	99.2	103.1	99.0	100.7	99	100.4
5% evap	°F		126.4	127.9	129.4	122.9	127.2	-	123	-	-	126.4	128.3	125.7	130.4	124	126.5
10% evap	°F		135.5	137.0	136.9	132.6	136.0	-	134	-	-	135.4	136.0	134.9	137.8	134	135.5
20% evap	°F		147.5	148.8	148.1	144.7	147.0	-	146	-	-	147.6	147.7	146.8	149.4	146	147.3
30% evap	°F		160.2	161.4	160.5	157.9	159.6	-	159	-	-	160.4	160.4	159.5	161.8	159	160.0
40% evap	°F		175.7	176.4	175.5	173.2	174.6	-	174	-	-	175.7	175.7	174.4	177.4	174	175.1
50% evap	°F		192.7	193.7	192.9	191.1	192.2	-	193	-	-	193.5	193.3	192.3	195.0	192	192.8
60% evap	°F		211.7	212.8	212.9	210.7	211.5	-	212	-	-	212.6	212.9	211.5	213.8	210	212.0
70% evap	°F		237.1	238.4	238.6	234.5	235.8	-	237	-	-	238.1	237.9	236.6	239.5	236	237.3
80% evap	°F		280.6	281.7	280.8	275.7	279.9	-	281	-	-	279.8	281.5	278.3	284.7	277	280.1
90% evap	°F		337.8	339.0	340.0	337.5	338.5	-	338	-	-	337.6	339.5	337.7	340.4	338	338.5
95% evap	°F		354.8	354.0	355.6	353.4	354.6	-	355	-	-	354.4	354.2	353.8	355.7	354	354.5
FBP	°F		372.4	373.6	373.5	366.7	380.3	-	388	-	-	373.2	381.5	385.9	374.2	369	377.5
Recovery	vol. %		98.1	97.9	98.6	97.0	98.8	-	98.5	-	-	98.0	97.6	98.0	98.7	97.7	98.0
Residue	vol. %	1.1	1.1	0.9	0.8	1.0	-	0.9	-	-	1.1	1.1	0.7	1.0	0.6	1.0	
Loss	vol. %	0.8	1.0	0.5	2.2	0.2	-	0.6	-	-	0.9	1.3	1.3	0.3	1.7	1.0	
Corrected Recovery	vol. %	98.2	97.6	98.6	97.6	-	-	-	-	-	98.0	97.9	98.2	98.7	-	98.1	
Corrected Loss	vol. %	0.7	1.0	0.5	1.6	-	-	-	-	-	0.9	1.0	1.1	0.3	-	0.9	
DVPE (EPA equation)	psi	D5191	7.25	7.23	6.99	7.24	6.77	-	7.31	-	-	-	7.17	7.22	-	7.09	7.14
Aromatics	vol. %	D1319	-	16.9	-	16.2	17.0	-	17.0	-	-	-	-	-	17.9	16.6	16.9
Olefins	vol. %	D1319	-	9.3	-	8.8	9.0	-	7.6	-	-	-	-	-	8.5	7.7	8.5
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74.6
Benzene	vol. %	D3606	-	-	-	0.54	-	-	0.49	-	-	-	-	0.51	0.53	0.52	0.52
S	mg/kg	D5453	23	27	23	23	-	-	25	-	-	-	-	-	-	24	24
RON	-	D2699	91.1	-	91.7	-	-	-	91.5	-	-	-	-	-	-	91.5	91.5
MON	-	D2700	84.3	-	84.5	-	-	-	85.1	-	-	-	-	-	-	84.6	84.6
(RON+MON)/2	-	-	87.7	-	88.1	-	-	-	88.3	-	-	-	-	-	-	88.1	88.1
C	mass %	D5291 mod.**	84.82	-	-	-	85.21	-	-	-	-	-	-	-	85.66	85.42	85.28
H	mass %	D5291 mod.**	13.96	-	-	-	14.55	-	-	-	-	-	-	-	14.39	14.24	14.29
O	mass %	D5599	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.01	-	<0.1
Net Heat of Combustion	MJ/kg	D4809	44.000	-	-	-	-	-	42.770	-	-	-	-	-	-	43.786	43.519
Water	mass %	E-1064	-	-	-	-	-	-	0.005	-	-	-	-	0.024	-	-	0.015
Lead	g/l	D3237	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 15

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7424	0.7428	-	0.7428	0.7430	-	-	-	-	-	-	-	-	-	0.7428
API Gravity, 60°F	°API	D4052	58.8	58.8	-	58.8	58.8	-	-	-	-	-	-	-	-	-	58.8
Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	<0.05	<0.10	<0.10
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86	80.8	83.3	92.3	88.3	-	81.1	84	-	-	85.5	86.3	85.2	86.8	80	84.7
5% evap	°F		105.9	106.2	108.5	103.9	-	104.3	102	-	-	105.9	107.2	105.2	111.2	106	105.5
10% evap	°F		115.4	116.4	118.2	113.6	-	114.4	114	-	-	116.0	116.5	115.3	119.5	116	115.6
20% evap	°F		130.9	131.3	131.9	128.4	-	129.8	130	-	-	131.2	130.6	130.2	134.0	131	130.5
30% evap	°F		147.2	147.8	147.4	144.6	-	145.9	146	-	-	147.6	146.6	146.2	150.8	147	146.6
40% evap	°F		167.0	167.6	166.6	164.2	-	165.5	167	-	-	167.1	166.0	166.0	170.6	166	166.3
50% evap	°F		190.4	190.6	189.7	188.0	-	189.3	190	-	-	190.5	189.4	189.0	194.0	190	189.7
60% evap	°F		216.6	217.1	216.5	214.4	-	215.4	217	-	-	217.6	216.2	215.3	220.2	216	216.2
70% evap	°F		243.2	244	243.9	241.9	-	241.8	242	-	-	243.5	242.9	242.4	245.9	244	243.0
80% evap	°F		266.0	266.7	266.9	265.0	-	264.7	265	-	-	265.9	266.1	265.8	268.9	267	265.9
90% evap	°F		299.2	300.5	299.5	298.3	-	298.3	300	-	-	299.9	299.0	300.0	305.2	299	299.4
95% evap	°F		328.2	331.2	331.3	327.2	-	327.3	330	-	-	331.4	329.8	328.4	337.6	328	329.3
FBP	°F		363.0	368.6	363.2	360.4	-	362.4	366	-	-	361.0	364.0	363.2	366.5	365	363.7
Recovery	vol. %		98.4	97.6	97.8	96.8	-	98.1	98.0	-	-	97.4	97.3	97.1	97.9	97.8	97.5
Residue	vol. %	1.0	1.0	0.8	0.5	-	1.0	0.9	-	-	1.0	1.0	1.1	1.1	0.8	0.9	
Loss	vol. %	0.6	1.4	1.4	2.7	-	0.9	1.0	-	-	1.6	1.7	1.8	1.0	1.4	1.6	
Corrected Recovery	vol. %	98.4	97.6	98.0	97.7	-	-	-	-	-	97.2	97.8	97.4	97.9	-	97.7	
Corrected Loss	vol. %	0.6	1.4	1.2	1.8	-	-	-	-	-	1.8	1.2	1.5	1.0	-	1.4	
DVPE (EPA equation)	psi	D5191	10.33	10.37	9.92	10.36	9.45	10.12	10.26	-	-	-	10.31	10.30	-	10.06	10.23
Aromatics	vol. %	D1319	-	36.1	-	35.6	34.6	35.4	33.4	-	-	-	-	-	35.4	36.7	35.3
Olefins	vol. %	D1319	-	7.6	-	7.2	7.2	7.0	6.3	-	-	-	-	-	8.2	7.2	7.2
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57.4
Benzene	vol. %	D3606	-	-	-	0.54	-	-	0.49	-	-	-	-	0.51	0.61	0.53	0.54
S	mg/kg	D5453	22	27	22	23	-	-	25	-	-	-	-	-	-	23	24
RON	-	D2699	95.1	-	95.1	-	-	-	94.9	-	-	-	-	-	-	94.7	95.0
MON	-	D2700	84.6	-	84.7	-	-	-	85.2	-	-	-	-	-	-	84.9	84.9
(RON+MON)/2	-	-	89.9	-	89.9	-	-	-	90.1	-	-	-	-	-	-	89.8	90.0
C	mass %	D5291 mod.**	87.36	-	-	-	85.93	-	-	-	-	-	-	-	87.17	87.06	86.88
H	mass %	D5291 mod.**	12.34	-	-	-	13.00	-	-	-	-	-	-	-	12.89	12.91	12.79
O	mass %	D5599	-	-	-	-	-	-	<0.1	-	-	-	-	<0.1	<0.01	-	<0.1
Net Heat of Combustion	MJ/kg	D4809	43.442	-	-	-	-	-	42.750	-	-	-	-	-	-	43.132	43.108
Water	mass %	E-1064	-	-	-	-	-	-	0.007	-	-	-	-	0.016	-	-	0.012
Lead	g/l	D3237	-	-	-	-	-	-	<0.001	-	-	-	-	-	-	-	<0.001
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 16

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7633	0.7638	-	0.7636	0.7635	-	-	-	-	-	-	-	-	-	0.7636
API Gravitv. 60°F	°API	D4052	53.6	53.6	-	53.6	53.6	-	-	-	-	-	-	-	-	-	53.6
Ethanol	vol. %	D5599	-	-	11.20	10.65	-	-	10.69	-	-	-	-	10.57	10.84	10.62	10.76
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.10	-	-	<0.10
Distillation IBP	°F	D86 (OptiDist or equivalent)	102.4	103.8	-	-	-	107.2	-	-	104.7	101.9	106.1	-	-	105.6	104.5
5% evap	°F		131.7	132.0	-	-	-	134.0	-	-	134.8	131.3	133.6	-	-	133.9	133.0
10% evap	°F		138.7	138.4	-	-	-	139.5	-	-	140.0	138.5	139.5	-	-	139.5	139.2
20% evap	°F		147.5	147.6	-	-	-	147.6	-	-	148.5	147.5	148.1	-	-	148.1	147.8
30% evap	°F		155.3	155.3	-	-	-	154.8	-	-	153.5	155.0	155.8	-	-	156.0	155.1
40% evap	°F		168.5	165.7	-	-	-	177.2	-	-	180.0	169.6	169.1	-	-	174.7	172.1
50% evap	°F		217.4	215.9	-	-	-	220.6	-	-	220.6	218.5	217.7	-	-	220.9	218.8
60% evap	°F		237.5	236.3	-	-	-	238.0	-	-	238.6	237.6	236.5	-	-	238.1	237.5
70% evap	°F		250.8	250.2	-	-	-	252.1	-	-	253.0	251.4	252.0	-	-	253.5	251.9
80% evap	°F		267.8	268.0	-	-	-	268.1	-	-	269.8	267.8	267.7	-	-	271.0	268.6
90% evap	°F		299.6	297.8	-	-	-	300.0	-	-	302.0	298.8	299.8	-	-	306.1	300.6
95% evap	°F		329.0	326.7	-	-	-	329.0	-	-	333.3	326.2	329.3	-	-	342.2	330.8
FBP	°F	362.7	366.4	-	-	-	367.8	-	-	364.5	358.8	369.1	-	-	369.8	365.6	
Recovery	vol. %	98.4	97.8	-	-	-	98.5	-	-	98.3	97.7	98.5	-	-	97.6	98.1	
Residue	vol. %	1.0	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0	
Loss	vol. %	0.6	1.2	-	-	-	0.5	-	-	0.7	1.3	0.5	-	-	1.4	0.9	
Corrected Recovery	vol. %	98.4	97.8	-	-	-	-	-	-	-	97.6	98.5	-	-	-	98.1	
Corrected Loss	vol. %	0.6	1.2	-	-	-	-	-	-	-	1.4	0.5	-	-	-	0.9	
DVPE (EPA equation)	psi	D5191	7.18	7.22	7.02	7.19	6.46	-	7.08	-	-	-	7.14	7.16	-	7.00	7.12
Aromatics	vol. %	D1319	-	35.2	-	35.2	34.5	36.2	34.6	35.6	-	-	-	-	37.1	36.7	35.6
Olefins	vol. %	D1319	-	7.9	-	6.7	6.1	5.5	6.6	5.9	-	-	-	-	8.6	6.7	6.8
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46.9
Benzene	vol. %	D3606	-	-	-	0.63	-	-	0.60	-	-	-	-	0.61	0.60	0.65	0.62
S	mg/kg	D5453	21	25	20	23	-	-	26	-	-	-	-	-	-	22	23
RON	-	D2699	101.5	-	101.0	-	-	-	100.8	-	-	-	-	-	-	100.8	101.0
MON	-	D2700	87.9	-	88.6	-	-	-	88.1	-	-	-	-	-	-	88.4	88.3
(RON+MON)/2	-	-	94.7	-	94.8	-	-	-	94.5	-	-	-	-	-	-	94.6	94.7
C	mass %	D5291 mod.**	83.45	-	-	-	81.99	-	-	-	-	-	-	-	83.42	83.32	83.40
H	mass %	D5291 mod.**	12.44	-	-	-	12.68	-	-	-	-	-	-	-	12.87	12.64	12.66
O	mass %	D5599	-	-	4.0	3.9	-	-	3.9	-	-	-	-	3.8	3.9	3.8	3.9
Net Heat of Combustion	MJ/kg	D4809	41.210	-	-	-	-	-	40.860	-	-	-	-	-	-	40.970	41.013
Water	mass %	E-1064	-	-	-	-	-	-	0.057	-	-	-	-	0.074	-	-	0.066
Lead	g/l	D3237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	1.0
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 20

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7423	0.7427	-	0.7425	0.7424	-	-	-	-	-	-	-	-	-	0.7425
API Gravity, 60°F	°API	D4052	58.9	58.8	-	58.9	58.9	-	-	-	-	-	-	-	-	-	58.9
Ethanol	vol. %	D5599	-	-	22.03	20.90	-	-	20.33	-	-	-	-	18.50	-	19.77	20.31
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	0.03	-	-	-	-	<0.1	-	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	109.7	108.1	-	-	-	107.6	-	-	106.3	107.8	108.6	-	-	107.4	107.9
	5% evap		137.6	138.7	-	-	-	135.6	-	-	137.7	137.0	137.4	-	-	137.4	137.3
	10% evap		142.9	143.2	-	-	-	141.7	-	-	142.7	142.6	142.8	-	-	142.5	142.6
	20% evap		150.0	150.2	-	-	-	149.1	-	-	149.7	149.8	149.8	-	-	149.4	149.7
	30% evap		155.6	155.5	-	-	-	155.0	-	-	155.3	155.4	155.2	-	-	154.9	155.3
	40% evap		159.9	159.8	-	-	-	159.3	-	-	159.4	160.0	159.9	-	-	159.1	159.6
	50% evap		162.9	162.6	-	-	-	162.2	-	-	162.7	163.7	163.0	-	-	162.0	162.7
	60% evap		178.3	181	-	-	-	176.8	-	-	186.3	177.7	176.5	-	-	182.4	179.9
	70% evap		233.2	234.7	-	-	-	235.9	-	-	234.0	236.1	236.1	-	-	233.6	234.8
	80% evap		254.6	253.3	-	-	-	253.7	-	-	252.0	253.9	253.4	-	-	251.1	253.1
	90% evap		299.1	298.8	-	-	-	297.3	-	-	300.9	296.1	298.5	-	-	300.2	298.7
	95% evap		337.2	337.2	-	-	-	335.2	-	-	339.4	334.2	335.2	-	-	338.0	336.6
	FBP		375.0	373.5	-	-	-	373.3	-	-	368.1	362.6	374.2	-	-	376.6	371.9
Recovery	vol. %		98.5	98.9	-	-	-	98.4	-	-	98.5	97.9	98.4	-	-	98.8	98.4
Residue	vol. %		1.0	1.0	-	-	-	1.0	-	-	1.0	1.1	1.0	-	-	1.0	1.0
Loss	vol. %		0.5	0.1	-	-	-	0.6	-	-	0.5	1.0	0.6	-	-	0.2	0.6
Corrected Recovery	vol. %		98.5	98.9	-	-	-	-	-	-	-	97.9	98.4	-	-	-	98.4
Corrected Loss	vol. %		0.5	0.1	-	-	-	-	-	-	-	1.0	0.6	-	-	-	0.6
DVPE (EPA equation)	psi	D5191	6.72	6.73	6.59	6.73	6.08	6.70	6.79	-	-	-	6.71	6.64	-	6.70	6.70
Aromatics	vol. %	D1319	-	14.9	-	14.7	15.7	14.3	-	15.4	-	-	-	-	-	16.3	15.2
Olefins	vol. %	D1319	-	8.4	-	7.7	7.3	7.2	-	6.0	-	-	-	-	-	7.3	7.4
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57.1
Benzene	vol. %	D3606	-	-	-	0.60	-	-	0.57	-	-	-	-	0.59	-	0.69	0.61
S	mg/kg	D5453	20	23	20	21	-	-	22	-	-	-	-	-	-	23	22
RON	-	D2699	102.3	-	101.8	-	-	-	101.6	-	-	-	-	-	-	101.8	101.9
MON	-	D2700	88.8	-	89.5	-	-	-	89.0	-	-	-	-	-	-	89.8	89.3
(RON+MON)/2	-	-	95.6	-	95.7	-	-	-	95.3	-	-	-	-	-	-	95.8	95.6
C	mass %	D5291 mod.**	78.13	-	-	-	77.55	-	-	-	-	-	-	-	78.57	78.00	78.06
H	mass %	D5291 mod.**	13.85	-	-	-	13.86	-	-	-	-	-	-	-	14.06	14.26	14.01
O	mass %	D5599	-	-	8.2	7.8	-	-	7.6	-	-	-	-	6.9	-	7.4	7.58
Net Heat of Combustion	MJ/kg	D4809	40.072	-	-	-	-	-	40.104	-	-	-	-	-	-	39.996	40.057
Water	mass %	E-1064	-	-	-	-	-	-	-	-	-	-	-	0.138	-	-	0.138
Lead	g/l	D3237	-	-	-	-	-	-	<0.0003	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA Act/V2/E-89 Program
 Fuel Inspection Data

Fuel: 21

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7751	0.7756	-	0.7755	0.7753	-	-	-	-	-	-	-	-	-	0.7754
API Gravity, 60°F	°API	D4052	50.8	50.8	-	50.8	50.8	-	-	-	-	-	-	-	-	-	50.8
Ethanol	vol. %	D5599	-	-	20.95	20.90	-	-	20.32	-	-	-	-	18.51	-	20.04	20.14
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	-	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	103.4	103.7	-	-	-	111.8	-	-	108.6	103.6	103.8	-	-	109.3	106.3
	5% evap		133.3	133.7	-	-	-	135.6	-	-	137.1	132.7	134.8	-	-	135.9	134.7
	10% evap		140.6	140.8	-	-	-	141.8	-	-	142.6	140.4	141.4	-	-	141.7	141.3
	20% evap		150.1	149.9	-	-	-	150.9	-	-	150.9	149.5	150.1	-	-	150.4	150.3
	30% evap		157.0	156.7	-	-	-	157.5	-	-	157.6	156.7	157.0	-	-	157.4	157.1
	40% evap		162.5	162.4	-	-	-	162.7	-	-	162.7	162.7	162.3	-	-	162.7	162.6
	50% evap		167.2	167.3	-	-	-	168.1	-	-	167.7	167.9	167.0	-	-	168.1	167.6
	60% evap		214.4	213.1	-	-	-	217.5	-	-	224.5	211.8	216.4	-	-	223.1	217.3
	70% evap		255.4	255.3	-	-	-	253.4	-	-	256.5	255.7	254.9	-	-	255.2	255.2
	80% evap		276.0	275.3	-	-	-	273.5	-	-	274.6	274.4	275.8	-	-	277.2	275.3
	90% evap		305.5	304.6	-	-	-	303.7	-	-	305.6	302.3	305.3	-	-	307.8	305.0
	95% evap		330.2	330.2	-	-	-	329.2	-	-	334.5	329.1	331.3	-	-	334.3	331.3
	FBP		360.6	363.9	-	-	-	359.4	-	-	361.9	354.5	363.2	-	-	359.8	360.5
Recovery	vol. %			98.4	97.9	-	-	-	98.4	-	-	98.4	98.0	98.5	-	-	98.2
Residue	vol. %		1.0	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0
Loss	vol. %		0.6	1.1	-	-	-	0.6	-	-	0.6	1.0	0.5	-	-	0.8	0.8
Corrected Recovery	vol. %		98.4	97.9	-	-	-	-	-	-	98.0	98.5	-	-	-	98.2	98.2
Corrected Loss	vol. %		0.6	1.1	-	-	-	-	-	-	1.0	0.5	-	-	-	0.8	0.8
DVPE (EPA equation)	psi	D5191	7.14	7.17	7.03	7.12	6.40	-	6.98	-	-	-	7.11	6.95	-	6.94	7.06
Aromatics	vol. %	D1319	-	36.7	-	35.0	34.9	37.0	-	35.0	-	-	-	-	35.2	34.5	35.5
Olefins	vol. %	D1319	-	8.0	-	7.6	7.0	7.3	-	6.6	-	-	-	-	6.3	7.1	7.1
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.3
Benzene	vol. %	D3606	-	-	-	0.56	-	0.52	-	-	-	-	0.53	0.73	0.72	0.61	0.61
S	mg/kg	D5453	20	25	19	22	-	27	-	-	-	-	-	-	-	20	22
RON	-	D2699	102.2	-	101.3	-	-	-	101.6	-	-	-	-	-	-	100.3	101.4
MON	-	D2700	86.8	-	88.2	-	-	-	86.8	-	-	-	-	-	-	88.1	87.5
(RON+MON)/2	-	-	94.5	-	94.8	-	-	-	94.2	-	-	-	-	-	-	94.2	94.5
C	mass %	D5291 mod.**	79.55	-	-	-	79.15	-	-	-	-	-	-	-	80.20	80.70	79.90
H	mass %	D5291 mod.**	12.23	-	-	-	12.70	-	-	-	-	-	-	-	12.54	12.24	12.43
O	mass %	D5599	-	-	7.4	7.4	-	-	7.2	-	-	-	-	6.6	-	7.1	7.1
Net Heat of Combustion	MJ/kg	D4809	39.392	-	-	-	-	-	39.182	-	-	-	-	-	-	39.280	39.285
Water	mass %	E-1064	-	-	-	-	-	-	-	-	-	-	-	0.128	-	-	0.128
Lead	g/l	D3237	-	-	-	-	-	-	0.009	-	-	-	-	-	-	-	0.009
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA Act/V2/E-89 Program
 Fuel Inspection Data

Fuel: 22

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7368	0.7372	-	0.7372	0.7372	-	-	-	-	-	-	-	-	-	0.7371
API Gravity, 60°F	°API	D4052	60.3	60.2	-	60.3	60.3	-	-	-	-	-	-	-	-	-	60.3
Ethanol	vol. %	D5599	-	-	22.12	21.22	-	-	20.58	-	-	-	-	18.57	-	20.06	20.51
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	-	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	84.7	90.0	-	-	-	92.5	-	-	91.7	91.3	88.6	-	-	93.0	89.8
	5% evap		119.4	118.0	-	-	-	119.7	-	-	119.8	118.1	117.9	-	-	120.5	118.8
	10% evap		129.9	128.8	-	-	-	130.4	-	-	130.1	129.0	129.1	-	-	130.1	129.6
	20% evap		144.8	143.6	-	-	-	144.5	-	-	144.4	144.2	144.2	-	-	144.7	144.3
	30% evap		154.1	153.7	-	-	-	153.6	-	-	153.5	153.6	153.8	-	-	153.8	153.7
	40% evap		160.0	159.6	-	-	-	159.2	-	-	159.1	159.7	159.6	-	-	159.1	159.5
	50% evap		163.6	163.7	-	-	-	162.9	-	-	162.0	163.6	163.1	-	-	162.6	163.2
	60% evap		168.2	166.3	-	-	-	168.2	-	-	165.5	168.3	166.7	-	-	168.2	167.2
	70% evap		234.5	233.4	-	-	-	234.0	-	-	233.7	233.7	233.9	-	-	234.4	233.9
	80% evap		250.4	253.0	-	-	-	254.9	-	-	254.4	254.8	254.0	-	-	256.5	253.6
	90% evap		297.4	298.1	-	-	-	296.4	-	-	298.3	296.3	297.5	-	-	303.4	297.3
	95% evap		333.9	336.2	-	-	-	333.3	-	-	334.6	333.9	334.8	-	-	342.8	334.5
	FBP	372.9	374.7	-	-	-	364.2	-	-	371.4	362.0	374.0	-	-	377.2	369.9	
Recovery	vol. %		98.9	97.4	-	-	-	98.1	-	-	97.2	97.3	97.6	-	-	97.8	97.8
Residue	vol. %		1.0	1.1	-	-	-	1.0	-	-	1.1	1.1	1.1	-	-	1.0	1.1
Loss	vol. %		0.1	1.5	-	-	-	0.9	-	-	1.7	1.6	1.3	-	-	1.2	1.1
Corrected Recovery	vol. %		98.8	97.5	-	-	-	-	-	-	97.3	97.8	-	-	-	-	97.9
Corrected Loss	vol. %		0.2	1.4	-	-	-	-	-	-	1.6	1.1	-	-	-	-	1.1
DVPE (EPA equation)	psi	D5191	10.05	10.31	9.93	10.27	9.38	10.31	-	-	-	-	10.17	10.11	-	10.22	10.21
Aromatics	vol. %	D1319	-	14.9	-	14.5	15.0	15.3	-	14.6	-	-	-	-	-	15.4	15.0
Olefins	vol. %	D1319	-	7.9	-	6.2	7.3	6.3	-	6.6	-	-	-	-	-	7.1	6.9
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57.6
Benzene	vol. %	D3606	-	-	-	0.59	-	0.56	-	-	-	-	-	0.57	-	0.65	0.59
S	mg/kg	D5453	20	23	20	20	-	-	21	-	-	-	-	-	-	21	21
RON	-	D2699	102.2	-	101.7	-	-	-	101.8	-	-	-	-	-	-	101.3	101.8
MON	-	D2700	88.6	-	89.3	-	-	-	89.8	-	-	-	-	-	-	89.6	89.3
(RON+MON)/2	-	-	95.4	-	95.5	-	-	-	95.8	-	-	-	-	-	-	95.5	95.6
C	mass %	D5291 mod.**	78.34	-	-	-	77.60	-	-	-	-	-	-	-	78.37	78.64	78.24
H	mass %	D5291 mod.**	13.76	-	-	-	13.87	-	-	-	-	-	-	-	14.05	13.71	13.85
O	mass %	D5599	-	-	8.3	7.9	-	-	7.7	-	-	-	-	7.0	-	7.5	7.7
Net Heat of Combustion	MJ/kg	D4809	40.254	-	-	-	-	-	39.816	-	-	-	-	-	-	40.022	40.031
Water	mass %	E-1064	-	-	-	-	-	-	0.105	-	-	-	-	0.121	-	-	0.113
Lead	g/l	D3237	-	-	-	-	-	-	0.004	-	-	-	-	-	-	-	0.004
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 23

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7473	0.7477	-	0.7477	0.7475	-	-	-	-	-	-	-	-	-	0.7476
API Gravity, 60°F	°API	D4052	57.6	57.5	-	57.6	57.6	-	-	-	-	-	-	-	-	-	57.6
Ethanol	vol. %	D5599	-	-	21.77	21.03	-	-	20.26	-	-	-	-	18.50	-	20.04	20.32
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	-	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	110.0	107.4	-	-	-	110.0	-	-	-	108.1	108.5	-	-	110.1	109.0
	5% evap		132.7	133.8	-	-	-	132.8	-	-	-	133.2	132.7	-	-	134.3	133.3
	10% evap		138.8	139.1	-	-	-	138.6	-	-	-	139.1	138.8	-	-	139.1	138.9
	20% evap		146.2	146.5	-	-	-	145.9	-	-	-	146.4	146.0	-	-	146.1	146.2
	30% evap		152.7	152.6	-	-	-	151.9	-	-	-	152.7	152.2	-	-	151.9	152.3
	40% evap		158.2	157.8	-	-	-	157.6	-	-	-	158.0	157.6	-	-	157.4	157.8
	50% evap		162.3	162.9	-	-	-	162.5	-	-	-	162.9	162.4	-	-	162.2	162.5
	60% evap		170.7	165.6	-	-	-	172.6	-	-	-	174.1	169.0	-	-	177.7	171.6
	70% evap		269.9	271.5	-	-	-	269.5	-	-	-	271.0	271.5	-	-	271.9	270.9
	80% evap		311.5	312.5	-	-	-	311.0	-	-	-	311.4	309.3	-	-	312.5	311.4
	90% evap		338.6	339.1	-	-	-	338.1	-	-	-	337.8	338.0	-	-	337.7	338.2
	95% evap		350.3	350.1	-	-	-	348.7	-	-	-	350.0	350.0	-	-	350.8	350.0
	FBP	365.6	367.0	-	-	-	365.2	-	-	-	359.6	365.2	-	-	365.0	364.6	
Recovery	vol. %		97.9	98.3	-	-	-	98.4	-	-	-	98.0	97.9	-	-	98.6	98.0
Residue	vol. %		1.0	1.0	-	-	-	1.0	-	-	-	1.0	1.0	-	-	1.0	1.0
Loss	vol. %		1.1	0.7	-	-	-	0.6	-	-	-	1.0	1.1	-	-	0.4	1.0
Corrected Recovery	vol. %		98.1	98.3	-	-	-	-	-	-	-	98.0	98.1	-	-	-	98.1
Corrected Loss	vol. %		0.9	0.7	-	-	-	-	-	-	-	1.0	0.9	-	-	-	0.9
DVPE (EPA equation)	psi	D5191	6.93	6.96	6.68	6.92	6.28	-	6.81	-	-	-	6.90	6.91	-	6.64	6.84
Aromatics	vol. %	D1319	-	16.3	-	15.4	16.2	16.6	-	15.5	-	-	-	-	14.6	16.5	15.9
Olefins	vol. %	D1319	-	8.1	-	7.3	8.0	7.9	-	6.8	-	-	-	-	7.1	7.0	7.5
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56.4
Benzene	vol. %	D3606	-	-	-	0.58	-	0.68	-	-	-	-	-	0.55	-	0.70	0.63
S	mg/kg	D5453	20	23	19	20	-	22	-	-	-	-	-	-	-	22	21
RON	-	D2699	97.4	-	97.4	-	-	-	97.2	-	-	-	-	-	-	97.7	97.4
MON	-	D2700	86.0	-	87.2	-	-	-	86.4	-	-	-	-	-	-	87.4	86.8
(RON+MON)/2	-	-	91.7	-	92.3	-	-	-	91.8	-	-	-	-	-	-	92.6	92.1
C	mass %	D5291 mod.**	78.82	-	-	-	77.90	-	-	-	-	-	-	-	78.81	77.83	78.34
H	mass %	D5291 mod.**	13.82	-	-	-	13.79	-	-	-	-	-	-	-	13.97	14.88	13.86
O	mass %	D5599	-	-	8.0	7.8	-	-	7.5	-	-	-	-	6.8	-	7.4	7.5
Net Heat of Combustion	MJ/kg	D4809	39.966	-	-	-	-	-	39.896	-	-	-	-	-	-	39.882	39.915
Water	mass %	E-1064	-	-	-	-	-	-	-	-	-	-	-	0.112	-	-	0.112
Lead	g/l	D3237	-	-	-	-	-	-	<0.003	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA Act/V2/E-89 Program
 Fuel Inspection Data

Fuel: 24

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7419	0.7424	-	0.7423	0.7422	-	-	-	-	-	-	-	-	-	0.7422
API Gravity, 60°F	°API	D4052	59.0	58.9	-	58.9	58.9	-	-	-	-	-	-	-	-	-	58.9
Ethanol	vol. %	D5599	-	-	22.2	21.17	-	-	20.44	-	-	-	-	18.68	-	20.08	20.51
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	0.03	-	-	-	-	<0.1	-	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	87.8	90.4	-	-	-	89.8	-	-	91.2	90.7	89.8	-	-	90.5	89.7
	5% evap		116.8	117.3	-	-	-	114.0	-	-	112.3	115.1	116.1	-	-	119.5	115.9
	10% evap		127.3	127.9	-	-	-	125.5	-	-	124.1	127.0	127.0	-	-	128.7	126.9
	20% evap		143.3	143.4	-	-	-	141.7	-	-	141.4	142.9	142.7	-	-	143.5	142.8
	30% evap		152.4	153.9	-	-	-	152.3	-	-	152.5	153.6	153.7	-	-	153.8	153.2
	40% evap		160.5	160.9	-	-	-	159.7	-	-	159.3	160.5	160.5	-	-	160.2	160.4
	50% evap		165.3	165.3	-	-	-	164.4	-	-	163.9	165.5	165.1	-	-	164.8	165.1
	60% evap		171.8	171.3	-	-	-	174.2	-	-	169.7	174.6	172.6	-	-	184.9	172.9
	70% evap		265.1	265.9	-	-	-	265.1	-	-	262.8	267.0	267.2	-	-	269.7	266.1
	80% evap		305.8	306.3	-	-	-	303.6	-	-	302.6	305.4	306.3	-	-	309.6	305.5
	90% evap		338.3	338.6	-	-	-	337.6	-	-	336.1	337.9	338.1	-	-	340.6	338.1
	95% evap		350.6	350.3	-	-	-	349.8	-	-	349.1	350.2	350.6	-	-	353.6	350.3
	FBP		369.5	371.7	-	-	-	366.0	-	-	367.7	363.8	370.1	-	-	370.0	368.2
Recovery	vol. %			98.2	97.6	-	-	-	97.2	-	-	96.4	97.3	97.4	-	-	97.6
Residue	vol. %		1.0	1.0	-	-	-	1.1	-	-	1.1	1.0	1.1	-	-	1.1	1.0
Loss	vol. %		0.8	1.4	-	-	-	1.7	-	-	2.5	1.7	1.5	-	-	1.3	1.4
Corrected Recovery	vol. %		98.3	97.7	-	-	-	-	-	-	-	97.3	97.6	-	-	-	97.7
Corrected Loss	vol. %		0.7	1.3	-	-	-	-	-	-	-	1.7	1.3	-	-	-	1.3
DVPE (EPA equation)	psi	D5191	10.08	10.21	9.76	10.24	9.33	-	10.26	-	-	-	10.19	10.03	-	10.19	10.12
Aromatics	vol. %	D1319	-	14.5	-	15.2	15.9	15.9	-	14.6	-	-	-	-	-	15.9	15.3
Olefins	vol. %	D1319	-	7.5	-	6.2	9.0	7.0	-	7.4	-	-	-	-	-	6.6	7.3
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56.9
Benzene	vol. %	D3606	-	-	-	0.62	-	0.56	-	-	-	-	0.57	-	-	0.71	0.62
S	mg/kg	D5453	20	24	20	20	-	22	-	22	-	-	-	-	21	21	
RON	-	D2699	101.3	-	100.5	-	-	-	100.9	-	-	-	-	-	-	100.5	100.8
MON	-	D2700	88.0	-	88.4	-	-	-	89.6	-	-	-	-	-	-	88.5	88.6
(RON+MON)/2	-	-	94.7	-	94.5	-	-	-	95.3	-	-	-	-	-	-	94.5	94.7
C	mass %	D5291 mod.**	78.48	-	-	-	77.60	-	-	-	-	-	-	-	78.52	78.40	78.47
H	mass %	D5291 mod.**	13.74	-	-	-	13.76	-	-	-	-	-	-	-	14.00	13.94	13.86
O	mass %	D5599	-	-	8.2	7.9	-	-	7.6	-	-	-	6.9	-	7.5	7.6	
Net Heat of Combustion	MJ/kg	D4809	40.262	-	-	-	-	-	-	-	-	-	-	-	39.966	40.114	
Water	mass %	E-1064	-	-	-	-	-	-	0.103	-	-	-	-	0.113	-	-	0.108
Lead	g/l	D3237	-	-	-	-	-	-	0.005	-	-	-	-	-	-	-	0.005
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA Act/V2/E-89 Program
 Fuel Inspection Data

Fuel: 25

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7698	0.7704	-	0.7702	0.7705	-	-	-	-	-	-	-	-	-	0.7702
API Gravity, 60°F	°API	D4052	52.1	52.0	-	52.0	52.0	-	-	-	-	-	-	-	-	-	52.0
Ethanol	vol. %	D5599	-	-	21.02	20.52	-	-	20.23	-	-	-	-	18.49	-	19.91	20.03
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	-	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	88.5	88.6	-	-	-	86.8	-	-	88.3	90.4	90.7	-	-	92.2	89.0
	5% evap		114.1	115.0	-	-	-	110.2	-	-	115.2	114.7	114.5	-	-	119.2	113.7
	10% evap		125.8	126.6	-	-	-	122.5	-	-	126.3	126.5	126.3	-	-	129.4	125.5
	20% evap		142.2	142.9	-	-	-	140.5	-	-	143.1	142.5	142.5	-	-	145.1	142.1
	30% evap		153.3	153.7	-	-	-	152.8	-	-	154.0	153.5	153.3	-	-	154.7	153.3
	40% evap		161.2	161.3	-	-	-	160.5	-	-	161.1	160.6	160.7	-	-	161.8	160.9
	50% evap		167.5	166.5	-	-	-	166.7	-	-	167.5	166.8	166.8	-	-	167.2	166.9
	60% evap		191.1	193.9	-	-	-	187.3	-	-	226.8	193.2	191.2	-	-	237.4	191.3
	70% evap		282.1	281.6	-	-	-	280.0	-	-	284.7	283.2	280.9	-	-	288.7	281.6
	80% evap		310.5	312.0	-	-	-	309.9	-	-	314.2	309.7	309.6	-	-	316.8	310.3
	90% evap		337.7	338.9	-	-	-	337.3	-	-	342.1	337.7	337.8	-	-	344.1	337.9
	95% evap		353.5	352.9	-	-	-	352.8	-	-	359.8	353.1	351.0	-	-	362.7	352.7
	FBP		371.7	375.0	-	-	-	371.5	-	-	369.7	368.0	372.7	-	-	376.9	371.8
Recovery	vol. %			97.7	97.4	-	-	97.4	-	-	97.1	97.2	97.1	-	-	97.1	97.4
Residue	vol. %		1.0	1.1	-	-	1.1	-	-	1.1	1.1	1.1	-	-	1.1	1.1	
Loss	vol. %		1.3	1.5	-	-	1.5	-	-	1.8	1.7	1.8	-	-	1.8	1.6	
Corrected Recovery	vol. %		97.9	97.4	-	-	-	-	-	-	97.1	97.4	-	-	-	97.5	
Corrected Loss	vol. %		1.1	1.5	-	-	-	-	-	-	1.8	1.5	-	-	-	1.5	
DVPE (EPA equation)	psi	D5191	10.15	10.25	9.99	10.27	9.38	-	10.31	-	-	-	10.08	10.14	-	10.10	10.16
Aromatics	vol. %	D1319	-	35.2	-	35.1	35.4	36.0	-	35.4	-	-	-	-	35.0	37.9	35.2
Olefins	vol. %	D1319	-	7.5	-	6.5	6.7	7.6	-	5.4	-	-	-	-	5.8	6.8	6.6
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.1
Benzene	vol. %	D3606	-	-	-	0.63	-	-	0.59	-	-	-	-	0.60	0.69	0.75	0.65
S	mg/kg	D5453	24	29	24	25	-	-	27	-	-	-	-	-	-	25	25.7
RON	-	D2699	102.6	-	102.3	-	-	-	102.6	-	-	-	-	-	-	101.3	102.2
MON	-	D2700	88.1	-	88.6	-	-	-	88.2	-	-	-	-	-	-	88.4	88.3
(RON+MON)/2	-	-	95.4	-	95.5	-	-	-	95.4	-	-	-	-	-	-	94.9	95.3
C	mass %	D5291 mod.**	81.94	-	-	-	79.47	-	-	-	-	-	-	-	80.10	80.97	80.62
H	mass %	D5291 mod.**	12.46	-	-	-	12.55	-	-	-	-	-	-	-	12.66	11.85	12.38
O	mass %	D5599	-	-	7.5	7.4	-	-	7.3	-	-	-	-	6.6	-	7.1	7.2
Net Heat of Combustion	MJ/kg	D4809	39.578	-	-	-	-	-	39.352	-	-	-	-	-	-	37.634	38.855
Water	mass %	E-1064	-	-	-	-	-	-	0.113	-	-	-	-	0.120	-	-	0.117
Lead	g/l	D3237	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	0.001
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 26

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7589	0.7594	-	0.7595	0.7594	-	-	-	-	-	-	-	-	-	0.7593
API Gravity, 60°F	°API	D4052	54.7	54.6	-	54.6	54.6	-	-	-	-	-	-	-	-	-	54.6
Ethanol	vol. %	D5599	-	-	15.97	15.85	-	-	15.05	-	-	-	-	14.19	-	15.13	15.24
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	-	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	87.4	90.2	-	-	-	91.1	-	-	85.7	89.0	88.6	-	-	92.9	88.7
	5% evap		110.3	110.4	-	-	-	109.3	-	-	107.4	109.3	110.8	-	-	113.3	109.6
	10% evap		117.4	118.0	-	-	-	116.7	-	-	115.6	116.9	117.9	-	-	119.4	117.1
	20% evap		128.3	128.6	-	-	-	127.5	-	-	126.6	127.3	128.2	-	-	129.7	127.8
	30% evap		139.3	139.2	-	-	-	137.9	-	-	137.6	138.7	139.0	-	-	140.1	138.6
	40% evap		150.5	150.0	-	-	-	149.2	-	-	149.2	149.8	150.0	-	-	151.3	149.8
	50% evap		161.1	160.6	-	-	-	160.0	-	-	159.7	159.7	160.4	-	-	161.3	160.3
	60% evap		177.5	176.4	-	-	-	175.6	-	-	172.4	172.9	173.6	-	-	188.0	174.7
	70% evap		277.9	276.7	-	-	-	277.6	-	-	275.7	276.5	277.3	-	-	280.0	277.0
	80% evap		307.4	308.3	-	-	-	307.6	-	-	304.5	305.4	305.5	-	-	312.7	306.5
	90% evap		339.4	339.6	-	-	-	338.1	-	-	338.1	338.4	338.5	-	-	344.1	338.7
	95% evap		357.3	357.4	-	-	-	357.1	-	-	354.9	356.5	357.1	-	-	357.1	356.7
	FBP		376.0	378.4	-	-	-	379.6	-	-	373.5	378.1	378.3	-	-	376.4	377.3
Recovery	vol. %			98.5	97.7	-	-	-	98.1	-	-	98.0	98.0	98.0	-	-	97.4
Residue	vol. %		1.1	1.1	-	-	-	1.1	-	-	1.1	1.1	1.1	-	-	1.1	1.1
Loss	vol. %		0.4	1.2	-	-	-	0.8	-	-	0.9	0.9	0.9	-	-	1.5	0.9
Corrected Recovery	vol. %		98.5	97.7	-	-	-	-	-	-	98.0	98.1	-	-	-	-	98.1
Corrected Loss	vol. %		0.4	1.2	-	-	-	-	-	-	0.9	0.8	-	-	-	-	0.8
DVPE (EPA equation)	psi	D5191	10.27	10.37	10.08	10.33	9.50	10.14	10.28	-	-	-	10.29	10.16	-	9.96	10.2
Aromatics	vol. %	D1319	-	35.1	-	35.6	34.7	37.3	-	35.4	-	-	-	-	34.0	36.9	35.6
Olefins	vol. %	D1319	-	7.9	-	6.3	6.5	5.7	-	5.6	-	-	-	-	6.5	6.8	6.5
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42.7
Benzene	vol. %	D3606	-	-	-	0.60	-	-	0.56	-	-	-	-	0.59	0.69	0.67	0.62
S	mg/kg	D5453	22	26	21	22	-	24	22	-	-	-	-	-	-	23	23
RON	-	D2699	102.4	-	101.7	-	-	-	101.6	-	-	-	-	-	-	101.1	101.7
MON	-	D2700	88.3	-	88.9	-	-	-	88.0	-	-	-	-	-	-	88.8	88.5
(RON+MON)/2	-	-	95.4	-	95.3	-	-	-	94.8	-	-	-	-	-	-	95.0	95.1
C	mass %	D5291 mod.**	81.6	-	-	-	80.57	-	-	-	-	-	-	-	81.66	82.09	81.48
H	mass %	D5291 mod.**	12.35	-	-	-	12.44	-	-	-	-	-	-	-	12.83	12.18	12.45
O	mass %	D5599	-	-	5.8	5.8	-	-	5.5	-	-	-	-	5.2	-	5.5	5.6
Net Heat of Combustion	MJ/kg	D4809	40.586	-	-	-	-	-	40.122	-	-	-	-	-	-	40.444	40.384
Water	mass %	E-1064	-	-	-	-	-	-	0.084	-	-	-	-	0.091	-	-	0.088
Lead	g/l	D3237	-	-	-	-	-	-	<0.003	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 27

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7432	0.7435	-	0.7435	0.7433	-	-	-	-	-	-	-	-	-	0.7434
API Gravity, 60°F	°API	D4052	58.6	58.6	-	58.6	58.7	-	-	-	-	-	-	-	-	-	58.6
Ethanol	vol. %	D5599	-	-	15.99	15.09	-	-	15.15	-	-	-	-	14.18	14.31	14.71	14.91
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	0.09	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	104.5	102.4	-	-	-	104.7	-	-	101.5	105.9	103.7	-	-	110.6	104.8
	5% evap		135.1	136.3	-	-	-	132.3	-	-	134.5	134.7	136.6	-	-	137.6	135.3
	10% evap		142.5	142.5	-	-	-	141.2	-	-	141.7	142.3	143.0	-	-	143.1	142.3
	20% evap		152.1	152.4	-	-	-	151.4	-	-	151.5	152.1	151.8	-	-	152.7	152.0
	30% evap		158.8	158.5	-	-	-	158.2	-	-	155.0	158.6	158.4	-	-	158.7	158.0
	40% evap		164.0	164.6	-	-	-	163.3	-	-	163.0	164.1	163.3	-	-	164.1	163.8
	50% evap		219.7	221.6	-	-	-	218.1	-	-	223.6	219.7	222.4	-	-	225.3	221.5
	60% evap		249.9	249.9	-	-	-	351.1	-	-	250.5	250.8	251.6	-	-	252.0	265.1
	70% evap		273.5	275.2	-	-	-	274.2	-	-	276.6	274.4	274.6	-	-	275.8	274.9
	80% evap		310.5	310.4	-	-	-	309.6	-	-	312.5	309.6	310.8	-	-	315.9	311.3
	90% evap		340.1	339.3	-	-	-	339.3	-	-	341.4	340.0	340.2	-	-	342.1	340.3
	95% evap		351.4	352.3	-	-	-	351.0	-	-	354.4	350.8	351.6	-	-	351.8	351.9
	FBP		373.7	374.3	-	-	-	373.7	-	-	368.0	367.0	376.2	-	-	372.4	372.2
Recovery	vol. %		98.3	98.3	-	-	-	97.6	-	-	97.7	97.6	98.3	-	-	97.5	98.1
Residue	vol. %		1.0	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0
Loss	vol. %		0.7	0.7	-	-	-	1.4	-	-	1.3	1.4	0.7	-	-	1.5	0.9
Corrected Recovery	vol. %		98.3	98.3	-	-	-	-	-	-	97.6	98.3	-	-	-	-	98.1
Corrected Loss	vol. %		0.7	0.7	-	-	-	-	-	-	1.4	0.7	-	-	-	-	0.9
DVPE (EPA equation)	psi	D5191	7.01	7.03	6.87	6.99	6.35	6.90	7.04	-	-	7.00	7.01	-	-	6.92	6.97
Aromatics	vol. %	D1319	-	14.6	-	14.9	15.3	14.6	-	14.1	-	-	-	-	14.3	16.2	14.9
Olefins	vol. %	D1319	-	8.0	-	7.2	7.2	7.7	-	6.0	-	-	-	-	7.5	8.1	7.4
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62.9
Benzene	vol. %	D3606	-	-	-	0.57	-	-	0.53	-	-	-	-	0.54	0.51	0.66	0.56
S	mg/kg	D5453	25	28	24	26	-	-	26	-	-	-	-	-	-	26	26
RON	-	D2699	101.6	-	100.5	-	-	-	100.7	-	-	-	-	-	-	100.2	100.8
MON	-	D2700	88.8	-	89.6	-	-	-	89.1	-	-	-	-	-	-	89.4	89.2
(RON+MON)/2	-	-	95.2	-	95.1	-	-	-	94.9	-	-	-	-	-	-	94.8	95.0
C	mass %	D5291 mod.**	80.05	-	-	-	79.54	-	-	-	-	-	-	-	80.41	81.08	80.27
H	mass %	D5291 mod.**	13.96	-	-	-	14.05	-	-	-	-	-	-	-	14.19	13.85	14.01
O	mass %	D5599	-	-	5.9	5.6	-	-	5.6	-	-	-	-	5.3	5.3	5.5	5.5
Net Heat of Combustion	MJ/kg	D4809	41.200	-	-	-	-	-	40.830	-	-	-	-	-	-	41.156	41.062
Water	mass %	E-1064	-	-	-	-	-	-	0.088	-	-	-	-	0.091	-	-	0.090
Lead	g/l	D3237	-	-	-	-	-	-	<0.003	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA Act/V2/E-89 Program
 Fuel Inspection Data

Fuel: 28

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7697	0.7701	-	0.7700	0.7699	-	-	-	-	-	-	-	-	-	0.7699
API Gravity, 60°F	°API	D4052	52.1	52.1	-	52.1	52.1	-	-	-	-	-	-	-	-	-	52.1
Ethanol	vol. %	D5599	-	-	15.50	15.73	-	-	14.96	-	-	-	-	14.41	14.67	14.59	14.98
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	0.09	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	104.5	104.5	-	-	-	105.6	-	-	100.6	104.8	103.2	-	-	107.4	103.9
	5% evap		136.7	138.0	-	-	-	133.8	-	-	135.4	137.0	137.0	-	-	136.1	136.3
	10% evap		144.6	144.9	-	-	-	142.9	-	-	143.5	144.6	144.8	-	-	143.6	144.2
	20% evap		154.3	154.3	-	-	-	153.3	-	-	153.7	154.0	154.2	-	-	153.0	154.0
	30% evap		160.6	160.5	-	-	-	160.0	-	-	159.2	160.8	160.0	-	-	159.0	160.2
	40% evap		167.3	165.4	-	-	-	166.5	-	-	162.6	167.5	165.7	-	-	164.3	165.8
	50% evap		216.7	215.8	-	-	-	215.9	-	-	216.9	216.6	217.7	-	-	219.2	216.6
	60% evap		239.7	240.2	-	-	-	240.1	-	-	237.8	241.2	242.0	-	-	241.3	240.2
	70% evap		249.0	254	-	-	-	253.2	-	-	247.3	253.2	252.6	-	-	253.9	251.6
	80% evap		269.1	269.1	-	-	-	268.0	-	-	267.7	268.2	268.3	-	-	270.3	268.4
	90% evap		298.9	299.4	-	-	-	298.6	-	-	298.4	298.0	299.5	-	-	303.2	298.8
	95% evap		328.4	327.3	-	-	-	327.5	-	-	326.0	326.5	327.8	-	-	336.5	327.3
	FBP		363.8	366.3	-	-	-	362.8	-	-	362.4	359.1	364.5	-	-	364.3	363.2
Recovery	vol. %			98.3	98.2	-	-	-	97.7	-	-	98.5	98.2	98.3	-	-	98.2
Residue	vol. %		1.0	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0
Loss	vol. %		0.7	0.8	-	-	-	1.3	-	-	0.5	0.8	0.7	-	-	0.8	0.8
Corrected Recovery	vol. %		98.3	98.2	-	-	-	-	-	-	-	98.2	98.4	-	-	-	98.3
Corrected Loss	vol. %		0.7	0.8	-	-	-	-	-	-	-	0.8	0.7	-	-	-	0.8
DVPE (EPA equation)	psi	D5191	6.92	6.93	6.77	6.92	6.20	-	6.93	-	-	-	6.83	6.83	-	6.80	6.87
Aromatics	vol. %	D1319	-	34.6	-	34.5	34.1	34.6	-	33.7	-	-	-	-	33.4	36.5	34.5
Olefins	vol. %	D1319	-	8.4	-	6.6	7.3	6.9	-	5.4	-	-	-	-	7.1	7.2	7.0
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.5
Benzene	vol. %	D3606	-	-	-	0.57	-	0.54	-	-	-	-	0.55	0.59	0.69	0.59	0.59
S	mg/kg	D5453	22	26	22	24	-	24	-	-	-	-	-	-	24	24	24
RON	-	D2699	103.2	-	102.9	-	-	-	102.8	-	-	-	-	-	-	101.8	102.7
MON	-	D2700	89.0	-	89.8	-	-	-	88.9	-	-	-	-	-	-	89.8	89.4
(RON+MON)/2	-	-	96.1	-	96.4	-	-	-	95.9	-	-	-	-	-	-	95.8	96.1
C	mass %	D5291 mod.**	82.17	-	-	-	81.02	-	-	-	-	-	-	-	81.86	82.05	81.78
H	mass %	D5291 mod.**	12.58	-	-	-	12.60	-	-	-	-	-	-	-	12.79	12.50	12.62
O	mass %	D5599	-	-	5.5	5.6	-	-	5.4	-	-	-	-	5.2	5.3	5.2	5.4
Net Heat of Combustion	MJ/kg	D4809	40.442	-	-	-	-	-	40.180	-	-	-	-	-	-	40.528	40.383
Water	mass %	E-1064	-	-	-	-	-	0.088	-	-	-	-	-	0.094	-	-	0.091
Lead	g/l	D3237	-	-	-	-	-	<0.003	-	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	1A	-	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 29

Red fill color indicates an outlier

Orange fill color indicates data not included in parameter averages

PROPERTY	UNIT	TEST METHOD	Data From 2008 CRC E85 Class Volatility Program					Round Robin Participant										Average
			Lab A	Lab B	Lab C	Lab D	Lab E	F	G	H	I	J	K	L	M	N	O	
Density, 60°F	g/cm ³	D4052	0.7797	0.7800	0.7818	0.7829	0.7788	-	-	-	0.7798	0.7798	-	-	-	0.7799	-	0.7797
API Gravity, 60°F	°API	D4052	49.8	49.7	49.3	49.1	49.8	-	-	-	49.8	49.8	-	-	-	49.8	-	49.8
Uncorrected Ethanol	mass %	D5501 mod.*	-	-	80.28	-	-	-	-	-	-	-	78.90	-	-	-	-	79.59
Uncorrected Methanol	mass %	D5501 mod.*	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	0.01
Ethanol	vol. %	D5501 mod.*	75.80	-	78.51	77.39	-	-	-	-	-	-	76.88	-	-	76.24***	-	77.15
Methanol	vol. %	D5501 mod.*	Not detected	Not detected	Not detected	Not detected	Not detected	-	-	-	-	-	<0.01	-	-	0.62***	-	<0.01
Estimated Hydrocarbon Content	vol. %	100 - D5501 Ethanol - E203 Water	23.57	-	20.69	21.91	-	-	-	-	-	-	22.40	-	-	23.04***	-	22.14
Distillation IBP	°F	D86 (non-OptiDist)	105.1	92.3	109.0	102.1	102.0	-	-	105.1	99.5	-	95.3	94.9	90.6	102.6	-	99.0
5% evap	°F		123.6	132.1	135.1	135.6	135.5	-	-	129.6	127.7	-	132.4	136.3	132.6	143.6	-	132.9
10% evap	°F		147.3	153.7	158.0	156.4	154.9	-	-	151.3	154.0	-	155.6	156.0	155.1	158.6	-	154.3
20% evap	°F		165.6	168.2	170.4	167.6	167.4	-	-	167.2	168.7	-	168.7	167.5	167.5	168.0	-	167.6
30% evap	°F		169.4	170.8	172.7	170.0	169.9	-	-	170.2	171.3	-	171.2	170.0	170.0	170.2	-	170.3
40% evap	°F		170.5	171.7	173.8	170.8	170.8	-	-	171.3	172.2	-	172.1	170.9	170.9	171.1	-	171.2
50% evap	°F		171.2	172.1	174.3	171.3	171.3	-	-	171.9	172.6	-	172.7	171.6	171.4	171.4	-	171.8
60% evap	°F		171.6	172.5	174.7	171.7	171.7	-	-	172.2	173.0	-	173.0	171.9	171.8	171.9	-	172.1
70% evap	°F		172.0	172.8	175.1	172.2	172.0	-	-	172.6	173.4	-	173.4	172.2	172.2	172.3	-	172.5
80% evap	°F		172.5	173.2	175.4	172.4	172.4	-	-	172.9	173.7	-	173.6	172.6	172.6	172.7	-	172.9
90% evap	°F		173.6	174.1	176.1	173.9	173.3	-	-	173.8	174.5	-	174.7	173.6	173.7	173.7	-	173.9
95% evap	°F	175.4	176.1	177.9	177.6	175.5	-	-	175.8	176.3	-	176.9	175.9	176.0	176.1	-	176.2	
FBP	°F		180.6	269.9	181.9	180.6	299.1	-	-	298.2	263.5	-	294.5	286.9	292.0	292.8	-	265.8
Recovery	vol. %		96.3	98.0	95.9	95.6	98.5	-	-	98.6	97.6	-	98.3	97.4	97.6	99.1	-	98.1
Residue	vol. %		1.6	1.1	1.7	1.6	0.8	-	-	0.9	0.6	-	0.6	0.9	0.9	0.9	-	0.8
Loss	vol. %		2.2	0.8	2.4	2.8	0.7	-	-	0.5	1.8	-	1.1	1.7	1.5	0	-	1.1
Corrected Recovery	vol. %		-	-	-	-	-	-	-	98.6	98.0	-	98.5	97.3	97.7	99.0	-	98.2
Corrected Loss	vol. %		-	-	-	-	-	-	-	0.5	1.4	-	0.9	1.8	1.4	0.1	-	1.0
DVPE (EPA equation)	psi	D5191	9.01	9.04	8.76	7.72	9.02	-	-	8.58	9.05	8.12	9.07	-	8.86	-	-	8.92
Benzene	vol. %	D5580	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	0.12
S	mg/kg	D5453	-	-	-	-	-	-	-	18	16	-	-	-	-	14	-	16
C	mass %	D5291 mod.**	-	-	-	-	-	57.88	-	-	-	57.66	-	-	-	57.04	58.39	57.74
H	mass %	D5291 mod.**	-	-	-	-	-	13.1	-	-	-	12.08	-	-	-	13.08	12.92	12.80
O	mass %	D5501 mod.*	26.76	-	27.65	27.21	-	-	-	-	-	-	27.15	-	-	27.03***	-	27.19
Water	mass %	E203	0.81	0.96	1.03	0.90	0.95	-	-	-	-	-	-	-	-	0.91	-	0.93
	vol. %	E203	0.63	0.75	0.80	0.70	0.74	-	-	-	-	-	-	-	-	0.71	-	0.72
Net Heat of Combustion	MJ/kg	D4809	-	-	-	-	-	30.058	-	-	-	-	-	-	-	-	-	30.058
Solvent Washed Gum	mg/100 ml	D381	-	-	-	-	-	2.8	1.0	-	-	-	-	-	-	-	-	1.9
Unwashed Gum	mg/100 ml	D381	-	-	-	-	-	0.6	3.0	-	-	-	-	-	-	-	-	1.8
Acidity (as acetic acid)	mass %	D1613	-	-	-	-	-	-	0.0021	-	-	-	-	-	-	-	-	0.0021
pHe	-	D6423	-	-	-	-	-	-	7.96	-	-	-	8.20	-	-	-	-	8.08
Inorganic Chloride	mg/kg	D7319	-	-	-	-	-	-	Not detected	-	-	-	-	-	-	-	-	Not detected
Copper	mg/l	D1688 modified as outlined in D4806	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	0.02

* Method adapted by individual laboratories to testing of E85 fuels

** Method adapted by individual laboratories to testing of gasolines

*** Data not included in parameter averages due to suspected sample contamination with methanol

Phase 3 of EPA/V2/E-89 Program
 Fuel Inspection Data

Fuel: 30

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7505	0.7509	-	0.7509	0.7508	-	-	-	-	-	-	-	-	-	0.7508
API Gravity, 60°F	°API	D4052	56.8	56.8	-	56.8	56.8	-	-	-	-	-	-	-	-	-	56.8
Ethanol	vol. %	D5599	-	-	10.69	9.88	-	-	9.74	-	-	-	-	9.86	9.67	9.91	9.8
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	0.07	-	<0.10
Distillation	IBP	D86 (OptiDist or equivalent)	91.9	91.0	-	-	-	92.4	-	-	90.3	88.2	91.6	-	-	92.0	90.9
	5% evap		110.9	110.4	-	-	-	109.8	-	-	110.8	109.7	110.4	-	-	108.0	110.3
	10% evap		117.0	117.1	-	-	-	116.1	-	-	116.6	116.4	116.9	-	-	115.0	116.7
	20% evap		125.4	126.1	-	-	-	124.7	-	-	125.4	125.3	125.2	-	-	125.0	125.4
	30% evap		134.4	134.5	-	-	-	132.2	-	-	134.1	134.0	133.9	-	-	134.0	133.9
	40% evap		143.4	143.6	-	-	-	142.6	-	-	142.9	143.2	143.1	-	-	143.0	143.1
	50% evap		153.4	153.6	-	-	-	152.8	-	-	151.7	152.9	153.0	-	-	152.0	152.9
	60% evap		196.8	197.2	-	-	-	196.4	-	-	200.7	196.7	195.5	-	-	208.0	197.2
	70% evap		266.8	267.2	-	-	-	267.9	-	-	268.3	266.7	266.7	-	-	270.0	267.3
	80% evap		295.4	295.7	-	-	-	294.1	-	-	294.4	294.2	293.9	-	-	298.0	294.6
	90% evap		324.3	323.5	-	-	-	323.9	-	-	324.1	323.4	323.6	-	-	329.0	323.8
	95% evap		341.9	341.8	-	-	-	341.4	-	-	341.6	341.7	342.5	-	-	333.0	341.8
	FBP		366.5	368.7	-	-	-	366.4	-	-	363.6	362.7	368.6	-	-	364.0	366.1
Recovery	vol. %		98.2	97.7	-	-	-	98.1	-	-	97.9	98.1	97.8	-	-	97.2	98.0
Residue	vol. %		1.0	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	-	-	1.0	1.0
Loss	vol. %		0.8	1.3	-	-	-	0.9	-	-	1.1	0.9	1.2	-	-	1.8	1.1
Corrected Recovery	vol. %		98.3	97.7	-	-	-	-	-	-	-	98.0	98.0	-	-	-	98.0
Corrected Loss	vol. %		0.7	1.3	-	-	-	-	-	-	-	1.0	1.0	-	-	-	1.0
DVPE (EPA equation)	psi	D5191	10.27	10.28	10.15	10.33	9.44	10.25	10.37	-	-	-	10.26	10.08	-	10.04	10.23
Aromatics	vol. %	D1319	-	33.9	-	35.6	34.5	36.0	-	34.1	-	-	-	-	37.4	37.1	35.5
Olefins	vol. %	D1319	-	6.8	-	5.7	6.7	6.2	-	5.7	-	-	-	-	7.7	6.4	6.5
Saturates	vol. %	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48.2
Benzene	vol. %	D3606	-	-	-	0.58	-	-	0.53	-	-	-	-	0.56	0.53	0.70	0.58
S	mg/kg	D5453	21	25	21	21	-	-	24	-	-	-	-	-	-	25	23
RON	-	D2699	101.3	-	100.5	-	-	-	100.5	-	-	-	-	-	-	100.4	100.5
MON	-	D2700	87.8	-	88.7	-	-	-	87.6	-	-	-	-	-	-	88.3	88.1
(RON+MON)/2	-	-	94.6	-	94.6	-	-	-	94.1	-	-	-	-	-	-	94.4	94.3
C	mass %	D5291 mod.**	83.78	-	-	-	82.64	-	-	-	-	-	-	-	83.58	82.66	83.17
H	mass %	D5291 mod.**	12.36	-	-	-	12.88	-	-	-	-	-	-	-	12.93	13.83	13.00
O	mass %	D5599	-	-	3.9	3.6	-	-	3.6	-	-	-	-	3.6	3.6	3.7	3.6
Net Heat of Combustion	MJ/kg	D4809	41.474	-	-	-	-	-	41.088	-	-	-	-	-	-	41.350	41.304
Water	mass %	E-1064	-	-	-	-	-	-	-	-	-	-	-	0.086	-	-	0.086
Lead	g/l	D3237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	<0.5	-	-	-	-	-	-	-	<0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines

Phase 3 of EPAAct/V2/E-89 Program
 Fuel Inspection Data

Fuel: 31

Red fill color indicates an outlier

PROPERTY	UNIT	TEST METHOD	Laboratory														Average
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Density, 60°F	g/cm ³	D4052	0.7739	0.7744	-	0.7743	0.7742	-	-	-	-	-	-	-	-	-	0.7742
API Gravity, 60°F	°API	D4052	51.1	51.0	-	51.1	51.1	-	-	-	-	-	-	-	-	-	51.1
Ethanol	vol. %	D5599	-	51.0	20.86	20.95	-	-	-	20.19	-	-	-	-	18.45	-	20.11
Total Content of Oxygenates Other Than Ethanol	vol. %	D5599	-	-	-	-	-	-	-	<0.01	-	-	-	-	<0.1	-	<0.10
Distillation	IBP	°F	104.0	105.9	-	-	-	109.7	-	-	-	103.1	106.1	-	-	-	106.3
	5% evap	°F	132.3	133.8	-	-	-	133.3	-	-	-	131.5	131.7	-	-	-	133.8
	10% evap	°F	139.0	139.8	-	-	-	139.5	-	-	-	138.7	138.5	-	-	-	139.5
	20% evap	°F	147.8	148.2	-	-	-	147.8	-	-	-	147.5	147.2	-	-	-	148.6
	30% evap	°F	155.3	155.5	-	-	-	154.9	-	-	-	154.9	154.7	-	-	-	155.9
	40% evap	°F	161.8	161.1	-	-	-	161.5	-	-	-	161.2	161.1	-	-	-	162.1
	50% evap	°F	167.6	167.9	-	-	-	167.4	-	-	-	167.3	166.4	-	-	-	166.8
	60% evap	°F	215.4	218.5	-	-	-	210.8	-	-	-	214.2	210.9	-	-	-	236.1
	70% evap	°F	270.5	273.5	-	-	-	270.3	-	-	-	272.3	271.3	-	-	-	274.0
	80% evap	°F	297.7	298.7	-	-	-	297.2	-	-	-	296.4	294.8	-	-	-	301.8
	90% evap	°F	325.6	325.6	-	-	-	324.6	-	-	-	325.0	325.1	-	-	-	329.6
	95% evap	°F	342.5	343.5	-	-	-	341.7	-	-	-	340.8	342.1	-	-	-	349.6
	FBP	°F	365.2	366.5	-	-	-	365.8	-	-	-	362.9	367.5	-	-	-	366.0
Recovery	vol. %		98.5	98.8	-	-	-	98.4	-	-	-	97.9	97.9	-	-	-	97.6
Residue	vol. %		1.0	1.0	-	-	-	1.0	-	-	-	1.0	1.0	-	-	-	1.0
Loss	vol. %		0.5	0.2	-	-	-	0.6	-	-	-	1.1	1.1	-	-	-	1.4
Corrected Recovery	vol. %		98.5	98.8	-	-	-	-	-	-	-	97.9	98.1	-	-	-	-
Corrected Loss	vol. %		0.5	0.2	-	-	-	-	-	-	-	1.1	0.9	-	-	-	-
DVPE (EPA equation)	psi	D5191	7.05	7.07	6.92	7.05	6.25	-	6.98	-	-	-	7.00	6.88	-	-	6.88
Aromatics	vol. %	D1319	-	35.6	-	35.4	35.8	37.0	-	-	35.4	-	-	-	35.4	-	38.0
Olefins	vol. %	D1319	-	8.4	-	6.6	6.5	6.8	-	5.8	-	-	-	-	6.7	-	5.7
Saturates	vol. %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.6
Benzene	vol. %	D3606	-	-	-	0.61	-	-	0.60	-	-	-	-	0.60	0.60	-	0.79
S	mg/kg	D5453	24	28	24	26	-	-	27	-	-	-	-	-	-	-	22
RON	-	D2699	102.4	-	101.8	-	-	-	101.9	-	-	-	-	-	-	-	100.7
MON	-	D2700	87.8	-	88.7	-	-	-	88.0	-	-	-	-	-	-	-	88.2
(RON+MON)/2	-	-	95.1	-	95.3	-	-	-	95.0	-	-	-	-	-	-	-	94.4
C	mass %	D5291 mod.**	79.94	-	-	-	79.12	-	-	-	-	-	-	-	80.14	-	80.41
H	mass %	D5291 mod.**	12.36	-	-	-	12.51	-	-	-	-	-	-	-	12.65	-	12.45
O	mass %	D5599	-	-	7.4	7.5	-	-	7.2	-	-	-	-	6.6	-	-	7.2
Net Heat of Combustion	MJ/kg	D4809	39.702	-	-	-	-	-	39.204	-	-	-	-	-	-	-	39.266
Water	mass %	E-1064	-	-	-	-	-	-	-	-	-	-	-	0.143	-	-	0.143
Lead	g/l	D3237	-	-	-	-	-	-	<0.003	-	-	-	-	-	-	-	<0.003
Copper Strip Corrosion	-	D130	-	-	-	-	-	-	1A	-	-	-	-	-	-	-	1A
Solvent Washed Gum	mg/100ml	D381	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
Oxidation Stability	min.	D525	-	-	-	-	-	-	>240	-	-	-	-	-	-	-	>240

* Calculated using the following equation: Saturates = 100 - D1319Aromatics - D1319Olefins - D5599Ethanol

** Method adapted by individual laboratories to testing of gasolines