

STAGE II BREAK-EVEN CALCULATION FOR DELAWARE

Federal Highway Administration 2009 Data

Motor Fuel Use - Gasoline Table MF-21 (October 2010)

(thousands of gallons)

2009 TABLE MF-21

STATE	COMBINED GASOLINE AND GASOHOL									SPECIAL FUE			SUMMARY OF TOTAL USE				
	HIGHWAY USE					NONHIGHWAY USE				TOTAL USE	LOSSES ALLOWED FOR EVAPORATION, HANDLING, ETC. 2/	TOTAL CONSUMPTION	PRIVATE AND COMMERCIAL HIGHWAY USE	HIGHWAY		NON-HIGHWAY (GASOLINE ONLY)	TOTAL
	PRIVATE AND COMMERCIAL	PUBLIC USE			TOTAL	PRIVATE AND COMMERCIAL	STATE, COUNTY, AND MUNICIPAL	TOTAL	AMOUNT					PERCENT CHANGE FROM PRIOR YEAR			
FEDERAL CIVILIAN		STATE, COUNTY AND MUNICIPAL	TOTAL														
Delaware	414,087	439	6,155	6,594	420,681	24,385	274	24,659	445,340	2,991	448,331	68,518	489,199	0.8	24,659	513,858	

MONTHLY GASOLINE REPORTED BY STATES - 2009

COMPILED FOR THE CALENDAR YEAR FROM STATE FUEL-TAX REPORTS

(THOUSANDS OF GALLONS)

TABLE MF-33GA
October 2010

STATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL 2/	CHANGE FROM 2008	
														GALLONS	PERCENT
Delaware	35,167	32,836	36,576	37,398	39,054	38,350	40,885	41,830	37,192	37,002	35,409	36,632	448,331	2,459	0.6
														Seasonal Adjustment Factor 0.270034863	

Estimated Occupied Housing Data from the DPC

Year	Kent	from Previous year	New Castle	Growth from Previous year	Sussex	Growth from Previous year	Statewide	Growth from Previous year	
2009	58053		196192		73007		327252		
2010	59124	0.018448659	198173	0.01009725	74901	0.02594272	332198	0.015113735	
2011	60197	0.018148298	200175	0.01010228	76810	0.02548698	337182	0.015003101	
2012	61100	0.015000748	202155	0.00989135	78444	0.02127327	341699	0.013396326	
2013	62003	0.014779051	204066	0.00945314	80110	0.02123808	346179	0.013110954	
2014	62867	0.01393481	205927	0.0091196	81768	0.02069654	350562	0.01266108	
2015	63727	0.013679673	207723	0.00872154	83427	0.02028911	354877	0.012308807	
2016	64565	0.013149842	209449	0.00830914	85095	0.01999353	359109	0.011925259	
2017	65392	0.012808797	211155	0.00814518	86777	0.01976614	363324	0.011737383	
2018	66228	0.012784438	212837	0.00796571	88455	0.01933692	367520	0.011548921	
2019	67023	0.012003986	214402	0.00735304	90141	0.01906054	371566	0.011008925	
									0.13541247 10 year growth

Annual fuel thrupt 10 year growth based on statewide housing growth					
STATE	Year				
Delaware	2009	420,681			
Delaware	2010	427,039			
Delaware	2011	433,446			
Delaware	2012	439,253			
Delaware	2013	445,012			
Delaware	2014	450,646			
Delaware	2015	456,193			
Delaware	2016	461,633			
Delaware	2017	467,051			
Delaware	2018	472,445			
Delaware	2019	477,646			

Gasoline dispensed through ORVR-equipped vehicles using EPA Widespread Use Proposed Rule analysis of % ORVR-equipped vehicles and gasoline dispensed for years 2009 through 2019 adjusted using 2011 DE DMV vehicle registration data.

Year	ORVR Pene	DE DMV % vehicles ORVR-equipped	EPA % vehicles ORVR-equippe d	EPA% gasoline dispensed in ORVR-equipped vehicles
2009	63.4%	55.5%	54.3%	62.1%
2010	68.3%	60.3%	59.0%	66.9%
2011	73.0%	64.954%	63.6%	71.5%
2012	77.2%	69.3%	67.9%	75.6%
2013	81.0%	73.2%	71.7%	79.3%
2014	84.4%	76.8%	75.2%	82.6%
2015	87.1%	80.1%	78.4%	85.3%
2016	89.6%	82.9%	81.2%	87.7%
2017	91.6%	85.4%	83.6%	89.7%
2018	93.2%	87.4%	85.6%	91.3%
2019	94.7%	89.4%	87.5%	92.7%
2020	96.0%	90.9%	89.0%	94.0%

Incompatibility Excess Emission Factors							#VOC/1000 gal			
CARB Gilbarco test at V/L Ratio of 1.0-1.2							0.86			
CARB Gilbarco test at V/L Ratio of 1.0-1.2 as adjusted by API for 100% ORVR penetration an							0.78			
CARB Wayne-Dresser test at V/L Ratio of 0.9-1.1							0.06			
CARB Wayne-Dresser test at V/L Ratio of 0.9-1.1 as adjusted by API for 100% ORVR penetra							0.08			
Weighted thrupt average of two tests (53.8% Gilbarco/46.2% Wayne-Dresser)							0.46			
Incompatibility Excess Emissions										
Year	Annual Thrupt	EF (#/1K gal)	Stage II RP	Vac Assist of S2 Syst	ORVR Penetration	IEE tons/year	IEE tons/day	Additional Emissions w/o Stage II (tpd)	UST Contrc Benefit Ne to Break Ev	Additional Emissions w/o Stage II (tpy)
2008								1.402		
2009	420,681	0.46	0.985	0.951	0.634	57.06	0.167			
2010	427,039	0.46	0.985	0.951	0.683	62.40	0.183			
2011	433,446	0.46	0.985	0.951	0.730	67.69	0.199			
2012	439,253	0.46	0.985	0.951	0.772	72.53	0.213			
2013	445,012	0.46	0.985	0.951	0.810	77.08	0.226	0.803	0.577	273.6
2014	450,646	0.46	0.985	0.951	0.844	81.30	0.239	0.684	0.445	233.0
2015	456,193	0.46	0.985	0.951	0.871	84.99	0.249	0.565	0.316	192.5
2016	461,633	0.46	0.985	0.951	0.896	88.42	0.260	0.446	0.186	152.0
2017	467,051	0.46	0.985	0.951	0.916	91.50	0.269	0.327	0.058	111.4
2018	472,445	0.46	0.985	0.951	0.932	94.21	0.277	0.296	0.020	101.0
2019	477,646	0.46	0.985	0.951	0.947	96.71	0.284	0.266		90.5
2020					0.960			0.235		80.1

MOVES MODEL RUNS FOR DEVELOPING STAGE II INCREMENTAL BENEFIT

2008

yearId	iterationId	countyId	processName	VOC	
2008	W	10001	Refueling Displacement Vapor Loss	4.31	
			Refueling Spillage Loss	2.23	
		10001 Total			6.54
		10003	Refueling Displacement Vapor Loss	11.91	
			Refueling Spillage Loss	6.73	
		10003 Total			18.64
		10005	Refueling Displacement Vapor Loss	6.54	
			Refueling Spillage Loss	3.27	
		10005 Total			9.81
		W Total			34.99
	WO	10001	Refueling Displacement Vapor Loss	28.73	
			Refueling Spillage Loss	4.46	
		10001 Total			33.18
		10003	Refueling Displacement Vapor Loss	79.41	
			Refueling Spillage Loss	13.45	
		10003 Total			92.86
		10005	Refueling Displacement Vapor Loss	43.60	
			Refueling Spillage Loss	6.54	
		10005 Total			50.13
		WO Total			176.18

2013

yearId	iterationId	countyId	processName	VOC	
2013	W	10001	Refueling Displacement Vapor Loss	2.08	
			Refueling Spillage Loss	2.22	
		10001 Total			4.30
		10003	Refueling Displacement Vapor Loss	7.80	
			Refueling Spillage Loss	7.97	
		10003 Total			15.77
		10005	Refueling Displacement Vapor Loss	3.15	
			Refueling Spillage Loss	3.17	
		10005 Total			6.32
		W Total			26.39
	WO	10001	Refueling Displacement Vapor Loss	13.87	
			Refueling Spillage Loss	4.44	
		10001 Total			18.31
		10003	Refueling Displacement Vapor Loss	52.02	
			Refueling Spillage Loss	15.94	
		10003 Total			67.96
		10005	Refueling Displacement Vapor Loss	20.99	
			Refueling Spillage Loss	6.34	
		10005 Total			27.33
		WO Total			113.60

2017

yearId	iterationId	countyId	processName	VOC	
2017	W	10001	Refueling Displacement Vapor Loss	1.06	
			Refueling Spillage Loss	2.00	
		10001 Total			3.05
		10003	Refueling Displacement Vapor Loss	2.53	
			Refueling Spillage Loss	6.11	
		10003 Total			8.65
		10005	Refueling Displacement Vapor Loss	1.72	
			Refueling Spillage Loss	3.04	
		10005 Total			4.76
		W Total			16.46
	WO	10001	Refueling Displacement Vapor Loss	7.06	
			Refueling Spillage Loss	3.99	
		10001 Total			11.05
		10003	Refueling Displacement Vapor Loss	16.88	
			Refueling Spillage Loss	12.23	
		10003 Total			29.11
		10005	Refueling Displacement Vapor Loss	11.46	
			Refueling Spillage Loss	6.08	
		10005 Total			17.53
		WO Total			57.69

2020

yearId	iterationId	countyId	processName	VOC	
2020	W	10001	Refueling Displacement Vapor Loss	0.78	
			Refueling Spillage Loss	2.02	
		10001 Total			2.80
		10003	Refueling Displacement Vapor Loss	1.81	
			Refueling Spillage Loss	5.86	
		10003 Total			7.67
		10005	Refueling Displacement Vapor Loss	1.22	
			Refueling Spillage Loss	2.97	
		10005 Total			4.19
		W Total			14.67
	WO	10001	Refueling Displacement Vapor Loss	5.23	
			Refueling Spillage Loss	4.04	
		10001 Total			9.27
		10003	Refueling Displacement Vapor Loss	12.05	
			Refueling Spillage Loss	11.73	
		10003 Total			23.78
		10005	Refueling Displacement Vapor Loss	8.14	
			Refueling Spillage Loss	5.94	
		10005 Total			14.08
		WO Total			47.12

SUMMARY

tpd peak ozone season daily (7 days/wk operation)							
	displacement		spillage		Stage 2 benefit	S2 benefit	
Year	with S2	w/o S2	with S2	w/o S2	disp only	for disp & spillage	
2008	0.247	1.649	0.133	0.266	1.402	1.535	
2013	0.142	0.944	0.145	0.290	0.803	0.948	
2017	0.058	0.385	0.121	0.242	0.327	0.448	
2020	0.041	0.276	0.118	0.236	0.235	0.353	
	Model Inputs:						
	Displacement						
	Stage II overall control efficiency					85.06%	
	Thruput covered by Stage II					98.5%	
	RE for annual insp. program					90.9%	
	Stage II control efficiency					95%	
	Spillage CE (used model default)					50%	

LOST BENEFIT FOR NEW STATIONS w/o STAGE II

Emission Increases Due to Waiving Stage 2 Requirement for New Facilities Starting in 2014						
Year	% ORVR Thruput	Daily non-Stage 2 Thruput (in Kgals)	Daily non-Stage2, non-ORVR Thruput	Excess Emissions w/o S2 (tons/day)	Avoided Incompat- ibility (tons/day)	Net loss w/o Stage 2
2014	84.4	100	15.6	0.0585	0.018	0.0405
2015	87.1	200	25.8	0.0942	0.0373	0.0569
2016	89.6	300	31.2	0.1139	0.0575	0.0564
2017	91.6	400	33.6	0.1226	0.0784	0.0442
2018	93.2	500	34	0.1241	0.0997	0.0244
2019	94.7	600	31.8	0.1161	0.1215	-0.0054
Assumptions:						
7 new stations per year; 5 large stations, 2 medium stations; based on past 5 years of new permits issued.						