

Facility/Compound Specific Fugitive Emission Factors

Equipment/Service	Ethylene Oxide ¹	Phosgene ²	Butadiene ³	Petroleum Marketing Terminal ⁴	Gas and Oil Production Operations ⁵				Refinery ⁶
					Gas	Heavy Oil <20°API	Light Oil >20°	Water/Light Oil	
Valves					0.00992	0.0000185	0.0055	0.000216	
Gas/Vapor	0.000444	0.00000216	0.001105	0.0000287					0.059
Light Liquid	0.00055	0.00000199	0.00314	0.0000948					0.024
Heavy Liquid				0.0000948					0.00051
Pumps	0.042651	0.0000201	0.05634		0.00529	0.00113 ¹⁰	0.02866	0.000052	
Light Liquid				0.00119					0.251
Heavy Liquid				0.00119					0.046
Flanges/Connectors	0.000555	0.00000011	0.000307		0.00086	0.00000086	0.000243	0.000006	0.00055
Gas/Vapor				0.000092604					
Light Liquid				0.00001762					
Heavy Liquid				0.0000176					
Compressors	0.000767		0.000004		0.0194	0.0000683	0.0165	0.0309	1.399
Relief Valve	0.000165	0.0000162	0.02996		0.0194	0.0000683	0.0165	0.0309	0.35
Open-ended Lines ⁷	0.001078	0.00000007	0.00012		0.00441	0.000309	0.00309	0.00055	0.0051
Sampling ⁸	0.000088		0.00012						0.033
Connectors					0.00044	0.0000165	0.000463	0.000243	
Other ⁹					0.0194	0.0000683	0.0165	0.0309	
Gas/Vapor				0.000265					
Liquid				0.000287					
Process Drains					0.0194	0.0000683	0.0165	0.0309	0.07

Notes: All factors are in units of (lb/hr)/component.

1. Monitoring must occur at a leak definition of 500 ppmv. No additional control credit can be applied to these factors. Emission factors are from EOIC Fugitive Emission Study, summer 1988.
2. Monitoring must occur at a leak definition of 50 ppmv. No additional control credit can be applied to these factors. Emission factors are from Phosgene Panel Study, summer 1988.
3. Monitoring must occur at a leak definition of 100 ppmv. No additional control credit can be applied to these factors. Emission factors are from Randall, J.L., et al., Radian Corporation. Fugitive Emissions from the 1,3-butadiene Production Industry: A Field Study. Final Report. Prepared for the 1,3-Butadiene Panel of the Chemical Manufacturers Association. April 1989.
4. Control credit is included in the factor; no additional control credit can be applied to these factors. Monthly AVO inspection required.
5. Factors give the total organic compound emission rate. Multiply by the weight percent of non-methane, non-ethane organics to get the VOC emission rate.
6. Factors are taken from EPA Document EPA-453/R-95-017, November 1995, Page 2-13.
7. The 28 Series quarterly LDAR programs require open-ended lines to be equipped with an appropriately sized cap, blind flange, plug, or a second valve. If so equipped, open-ended lines may be given a 100% control credit.
8. Emission factor for Sampling Connections is in terms of pounds per hour per sample taken.
9. For Petroleum Marketing Terminals "Other" includes any component excluding fittings, pumps, and valves. For Oil and Gas Production Operations, "Other" includes diaphragms, dump arms, hatches, instruments, meters, polished rods, and vents.
10. No Heavy Oil - Pump factor was derived during the API study. The factor is the SOCMI without C₂ Heavy Liquid-Pump factor with a 93% reduction credit for the physical inspection.