

Propane

Handling/Processing

Identification of Petitioned Substance

Chemical Name: Dimethyl methane	CAS Number: CAS Reg. 74-98-6
Other Names: Propane, Propyl Hydride, Bottled Gas	Other Codes: RTECS <u>TX2275000</u>
Trade Names: Propane, n-Propane	DOT ID & Guide 1075 <u>115</u> 1978 <u>115</u>

Characterization of Petitioned Substance

Composition of the Substance:

Empirical formula C₃H₈

Properties of the Substance:

Color	Colorless
Physical State	Gas
Odor	Naturally, pure, odorless. Manufacturers/Processors add a compound that gives propane the odor of rotten eggs.
The compound used to add odor is:	Methyl mercaptan
Boiling point at 14.7 Pisa	-44°F
Molecular weight	44.1 g/mol
Freezing point at atmospheric pressure	-187.8°C/ -310°F
Weight of one liter at 0 ⁰	2.02g Heavier than air
Explosive limits % by volume in air	2.37-9.5

Propane is an odorless gas, when pure. It is a constituent of natural gas and of crude petroleum. It is obtained by a "Stabilization Process" using fractional distillation under pressure. Propane is highly flammable and explosive. Potential symptoms of overexposure are dizziness, confusion, excitation, and asphyxia. Direct contact with the liquid may cause frostbite. Propane should be stored in tight cylinders and prevented from exposure to excessive heat. Propane when exposed to ambient temperatures will boil and evaporate rapidly.

38 **Specific Uses of the Substance:**

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 40 Propane is used as a fuel gas, sometimes mixed with butane. It is used in organic
 41 synthesis, and as a refrigerant. The product is also used as diluent/propellant in
 42 vegetable sprays. It may also be used in combination with iso-butane and butane to
 43 provide pressure to expel products as a spray or aerosol. Propane that is used as a
 44 propellant in aerosol and sprays is pure and does not contain a malodorant (methyl
 45 mercaptan) that gives commercial Liquefied Petroleum Gas (LPG) the characteristic musty
 46 odor with which it is identified.

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 48 **Approved Legal Uses of the Substance:**

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 50 The ingredient must be of purity suitable for its intended used. Under U. S. FDA code of
 51 Federal Regulations, propane is recognized as Generally Recognized As Safe (GRAS)
 52 ingredient in food. And can be used as propellant, aerating agent and as a gas. The
 53 ingredient is used in food at levels not to exceed current good Manufacturing practice.

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 55 **Table 1. Summary of**

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Food Product	Application	ASC Solution	
21 CFR Section 184.1655 and 170.3 (0) (25)	Can be used as propellant, aerating agent and as a gas.	used in food at levels not to exceed current good Manufacturing practice	

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 58 **Action of the Substance:**

59
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Status

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 62 **International:**

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 64 The European Commission in SCF/CS/ADD/MsAd/178 Final dated 29/03/99 issued an
 65 Opinion that they had no toxicological concerns about the use of water based emulsions
 66 and oil based aerosol sprays for baking and frying purposes, which contain propane.

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Evaluation Questions for Substances to be used in Organic Handling
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 70 **Evaluation Question #1: Is the petitioned substance formulated or manufactured by a chemical process?**
 71 **(From 7 U.S.C. § 6502 (21)).**

72
 73 Propane is a constituent of natural gas and crude petroleum and is separated during the
 74 production of gasoline using fractional distillation under pressure.

79 **Evaluation Question #2: Is the petitioned substance formulated or manufactured by a process that**
80 **chemically changes the substance extracted from naturally occurring plant, animal, or mineral sources?**
81 **(From 7 U.S.C. § 6502 (21).)**
82

83 The petitioned substance, propane, is a naturally occurring component of natural gas and
84 crude oil and is released during processing but is not chemically changed.

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86 **Evaluation Question #3: Is the petitioned substance created by naturally occurring biological**
87 **processes? (From 7 U.S.C. § 6502 (21).)**

88 The decomposition of plant and animal life after death is a naturally occurring biological
89 process. Propane is created, along with other hydrocarbons such as crude oil, butane,
90 and gasoline, by the decomposition of organic matter over many years. As such most
91 crude oil, propane, butane, gasoline, and natural gas originate from plant and animal life
92 that thrived millions of years ago in swamps and oceans. These organic materials were
93 deposited with mud and silt from streams and rivers. The sediments eventually
94 hardened to form sedimentary rock. Heat and pressure transformed the soft parts of the
95 plants and animals into solid, liquid or gaseous hydrocarbons known as fossil fuels -
96 coal, crude oil or natural gas. Propane is isolated and extracted when crude oil is refined.

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98 **Evaluation Question #4: Is there a natural source of the petitioned substance? (From 7 CFR § 205.600 (b)**
99 **(1).)**

100 Propane is produced by distillation from natural gas, or is produced as a byproduct of
101 gasoline production from crude oil. Both natural gas and crude oil are natural sources.

102
103 **Evaluation Question #5: Is there an organic agricultural product that could be substituted for the**
104 **petitioned substance? (From 7 CFR § 205.600 (b) (1).)**
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106 It is unknown at this time if an organic agricultural product could be substituted for
107 propane. However, compressed air and nitrogen are used as propellants, but may or
108 may not be suitable for the petitioned use. An option for organic consumers wishing to
109 have the use of spray cooking oils would be to purchase commercially available pump
110 sprayers themselves, and add the oil of their choice. The pump sprayers look like spray
111 cleaner bottles, can be purchased with little difficulty, and are fairly inexpensive.

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113 **Evaluation Question #6: Are there adverse effects on the environment from the petitioned substance's**
114 **manufacture, use, or disposal? (From 7 CFR § 205.600 (b) (2).)**
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116 Studies have been done that show no significant adverse effects on the environment from
117 propane. Propane released into the environment dissipates rapidly. Propane is a
118 frostbite hazard. Attached in the bibliography is a website for the "The Environmental
119 Working Group Cosmetic Safety Database," which lists some 336 different products that
120 list propane as a propellant in which the products were scored as being low, moderate or
121 high hazard risk. The report list allergies, strong concerns regarding multiple, additive
122 exposure sources and moderate concerns for irritation of the skin, eyes or lungs for
123 propane as an ingredient in some products. There are Material Safety Data Sheets for
124 some products which give OSHA PEL and ACGIHTLV exposure levels that range from
125 800 to 1000 PPM.
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127 **Evaluation Question #7: Does the petitioned substance have an adverse effect on human health as**
128 **defined by applicable Federal regulations? (From 7 CFR § 205.600 (b) (3).)**

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130 There are Material Safety Data Sheets for some products which give OSHA/PEL and
131 ACGIH/TLV exposure levels that range from 800 to 1000 PPM. Product is an
132 Asphyxiant. Risk of Asphyxiation may occur above these levels.

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134 **Evaluation Question #8: Is the nutritional quality of the food maintained when the petitioned**
135 **substance is used? (From 7 CFR § 205.600 (b) (3).)**

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137 Propane is an inert gas. There are no acceptable daily intakes established for propane.
138 Research did not reveal any information on nutritional information of foods in which
139 propane was used a propellant.

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141 **Evaluation Question #9: Is the petitioned substance to be used primarily as a preservative? (From 7**
142 **CFR § 205.600 (b) (4).)**

143
144 Based on information listed in the applicant's petition, the intended use of propane is as a
145 propellant in aerosol food products, not as a preservative.

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147 **Evaluation Question #10: Is the petitioned substance to be used primarily to recreate or improve**
148 **flavors, colors, textures, or nutritive values lost in processing (except when required by law, e.g.,**
149 **vitamin D in milk)? (From 7 CFR § 205.600 (b) (4).)**

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151 According to the applicant's petition, the intended and specified use of propane is as a
152 propellant in aerosol food products, not to recreate or improve flavors, colors, textures,
153 or nutritive values lost in processing.

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155 **Evaluation Question #11: Is the petitioned substance generally recognized as safe (GRAS) when used**
156 **according to FDA's good manufacturing practices? (From 7 CFR § 205.600 (b) (5).)**

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158 Propane is recognized by FDA as a GRAS substance in 21 CFR Section 184.1655 and 170.3
159 (0) (25) when used in accordance with current Good Manufacturing Practices.

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161 **Evaluation Question #12: Does the petitioned substance contain residues of heavy metals or other**
162 **contaminants in excess of FDA tolerances? (From 7 CFR § 205.600 (b) (5).)47**

163 Propane can contain residues of heavy metals and other contaminants. The list of higher
164 boiling contaminants found in numerous laboratory analyses of LP Gas vaporizer
165 deposits is extensive. Not all of these contaminants are found in all samples, but they
166 include iron particles such as rust, iron oxide/sulfide magnetic residues (black powder),
167 other insoluble materials such as copper, zinc, lead, tin, silica, aluminum, calcium,
168 plasticizers such as phthalates and adipates (believed to come from rubber hoses), waxes,
169 and lubrication oils.

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