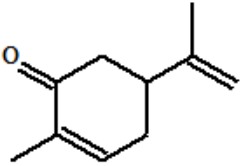


## Carvone

<b>CAS-No.:</b>	99-49-0 2244-16-8 6485-40-1 The scope of this Standard includes, but is not limited to the CAS number(s) indicated above; any other CAS number(s) used to identify this fragrance ingredient should be considered in scope as well.	<b>Molecular formula:</b>	C <sub>10</sub> H <sub>14</sub> O
<b>Structure:</b>			
<b>Synonyms:</b>	<p>99-49-0 (Carvone):            p-Mentha-6,8-dien-2-one;            1-Methyl-4-isopropenyl-6-cyclohexen-2-one;            2-Cyclohexen-1-one, 2-methyl-5-(1-methylethenyl)-;            5-Isopropenyl-2-methylcyclohex-2-en-1-one;            6,8(9)-p-Menthadien-2-one.</p> <p>2244-16-8 (d-Carvone):            (S)-2-Methyl-5-(1-methylvinyl)cyclohex-2-en-1-one;            d-p-Mentha-6,8(9)-dien-2-one;            d-1-Methyl-4-isopropenyl-6-cyclohexen-2-one;            2-Cyclohexen-1-one, 2-methyl-5-(1-methylethenyl)-, (S)-.</p> <p>6485-40-1 (l-Carvone):            l-p-Mentha-1(6),8-dien-2-one;            l-p-Mentha-6,8(9)-dien-2-one;            l-1-Methyl-4-isopropenyl-6-cyclohexen-2-one;            2-Cyclohexen-1-one, 2-methyl-5-(1-methylethenyl)-, (R)-;            5-Isopropenyl-2-methylcyclohex-2-en-1-one.</p>		

<b>History:</b>	Publication date:	2020 (Amendment 49)	Previous Publications:	2008
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<b>Implementation dates:</b>	For new submissions*:	February 10, 2021
	For existing fragrance compounds*:	February 10, 2022
*These dates apply to the supply of fragrance mixtures (formulas) only, not to the finished consumer products in the marketplace.		

<b>RECOMMENDATION:</b>	<b>RESTRICTION</b>
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## Carvone

### RESTRICTION LIMITS IN THE FINISHED PRODUCT (%):

Category 1	0.20 %	Category 7A	0.039 %
Category 2	0.060 %	Category 7B	0.039 %
Category 3	0.020 %	Category 8	0.013 %
Category 4	0.59 %	Category 9	0.18 %
Category 5A	0.20 %	Category 10A	0.18 %
Category 5B	0.039 %	Category 10B	0.43 %
Category 5C	0.059 %	Category 11A	0.013 %
Category 5D	0.013 %	Category 11B	0.013 %
Category 6	0.66 %	Category 12	17 %

### FLAVOR REQUIREMENTS:

Due to the possible ingestion of small amounts of fragrance ingredients from their use in products in Categories 1 and 6, materials must not only comply with IFRA Standards but must also be recognized as safe as a flavoring ingredient as defined by the IOFI Code of Practice ([www.iofi.org](http://www.iofi.org)). For more details see chapter 1 of the Guidance for the use of IFRA Standards.

### CONTRIBUTIONS FROM OTHER SOURCES:

**SEE ANNEX I**

### ANNEX I

#### Natural Complex Substances (NCS) containing Carvone

Concentration in NCS (%)	CAS number of ingredient	Name of NCS	Botanical name	CAS number of NCS	Essential oil category
0.5	6485-40-1	Basil oil, chemotype estragole	Ocimum basilicum L.	8015-73-4	E2.12
0.2	99-49-0	Bucchu oil, crenulata	Agathosma crenulata (L.) Pill.	92346-82-2	E2.12
59	2244-16-8	Caraway seed oil	Carum carvi L.	8000-42-8	H2.12
0.06	2244-16-8	Carrot seed	Daucus carota L.	8015-88-1	H2.12

**Carvone**

		oil			
0.2	2244-16-8	Celery seed oil	<i>Apium graveolens</i> L.	8015-90-5	H2.12
0.6	6485-40-1	Cistus oil	<i>Cistus ladaniferus</i> L.	8016-26-0	E2.12
51	2244-16-8	Dill seed oil	<i>Anethum graveolens</i> L.	8006-75-5	H2.12
31.5	2244-16-8	Dill weed oil	<i>Anethum graveolens</i> L.	8006-75-5	E2.12
4	99-49-0	Gingergrass oil	<i>Cymbopogon winterianus</i> Jowitt	8023-92-5	E2.12
0.4	99-49-0	Marjoram oil, sweet	<i>Origanum majorana</i> L.	8015-01-8	E2.12
0.25	6485-40-1	<i>Mentha arvensis</i> oil	<i>Mentha arvensis</i> L.	68917-18-0	E2.24
1	99-49-0	<i>Mentha longifolia</i> oil	<i>Mentha longifolia</i> (L.) Huds.	90063-99-3	E2.12
0.2	6485-40-1	Myrtle oil	<i>Myrtus communis</i> L.	8008-46-6	E2.12
8	99-49-0	<i>Nigella sativa</i> oil	<i>Nigella sativa</i> L.	90064-32-7	H2.12
0.3	99-49-0	Olibanum sacra oil	<i>Boswellia sacra</i>	89957-98-2	K2.12
1	99-49-0	Orange peel oil, sweet terpeneless	<i>Citrus sinensis</i> (L.) Osbeck	68606-94-0	G2.29
1	99-49-0	Orange sweet oil folded	<i>Citrus sinensis</i> (L.) Osbeck	8008-57-9	G2.6
0.2	6485-40-1	Origanum oil (extractive)	<i>Thymus capitatus</i> L. Hoffmanns & Link	8007-11-2	E2.13
0.2	6485-40-1	Parsley herb oil	<i>Petroselinum crispum</i> (Mill.) Nyman ex A.W.Hill	8000-68-8	E2.12
0.1	99-49-0	Peppermint oil	<i>Mentha piperita</i> L.	8006-90-4	E2.12
0.1	99-49-0	Peppermint oil, terpeneless	<i>Mentha piperita</i> L.	68606-97-3	E2.29
67	6485-40-1	Spearmint oil	<i>Mentha spicata</i> L.	8008-79-5	E2.12
60	6485-40-1	Spearmint oil, 60%	<i>Mentha gracilis</i> , Sole	91770-24-0	E2.24
80	6485-40-1	Spearmint oil, 80%	<i>Mentha gracilis</i> , Sole	91770-24-0	E2.29
86.5	6485-40-1	Spearmint oil, terpeneless	<i>Mentha spicata</i> L.	68917-46-4	E2.29
67	6485-40-1	Spearmint, <i>Mentha spicata crispa</i> , extract	<i>Mentha spicata</i> L. <i>spicata</i>	8008-79-5	E2.13
0.2	6485-40-1	Yarrow oil	<i>Achillea millefolium</i> L.	8022-07-9	E2.12

## Carvone

The natural contribution of Carvone is determined by the sum of the natural contributions of each of its isomers.

This is a non-exhaustive indicative list of typical natural presence for Carvone and is intended to be used in the absence of own analytical data. If analysis has shown that the level of the restricted ingredient in a natural complex substance is different from what is provided in this Annex I, then the analytically determined level should be used in place of the indicative level.

It should further be noted that natural complex substances themselves can be restricted by an IFRA Standard.

For a detailed list of natural contributions, please refer to the Annex I of IFRA Standards, publicly available on the IFRA website ([www.ifrafragrance.org](http://www.ifrafragrance.org)).

### INTRINSIC PROPERTY DRIVING RISK MANAGEMENT:

### DERMAL SENSITIZATION AND SYSTEMIC TOXICITY

#### RIFM SUMMARIES:

Recommended concentration levels are based on a comprehensive safety assessment, considering various endpoints. Depending on the outcome of the safety assessment, it might be one or more endpoint(s) that will drive the derivation of the concentration levels. If more than one endpoint is of relevance, the recommended concentration levels for each product category is derived from comparing maximum permitted level per endpoint consideration (dermal sensitization and/or systemic toxicity). Such recommended concentration levels correspond to the lowest level obtained per category.

Additional information is available in the RIFM safety assessment for Carvone, which can be downloaded from the RIFM Safety Assessment Sheet Database: <http://fragrancematerialsafetyresource.elsevier.com/>.

#### EXPERT PANEL FOR FRAGRANCE SAFETY RATIONALE / CONCLUSION:

The Expert Panel for Fragrance Safety reviewed all the available data for Carvone and recommends the limits for the 12 different product categories, which are the acceptable use levels of Carvone in the various product categories.

#### REFERENCES:

The IFRA Standard on Carvone is based on at least one of the following publications:

- The RIFM Safety Assessment on Carvone if available at the RIFM Safety Assessment Sheet Database: <http://fragrancematerialsafetyresource.elsevier.com>

- Api A.M., Belsito D., Bruze M., Cadby P., Calow P., Dagli M. L., Dekant W., Dent M., Ellis G., Fryer A. D., Fukayama M., Griem P., Hickey C., Kromidas L., Lalko J., Liebler D.C., Miyachi Y., Politano V.T., Renskers K., Ritacco G., Salvito D., Schultz T.W., Sipes I. G., Smith B., Vitale D., Wilcox D.K. (2015). Criteria for the Research Institute for Fragrance Materials, Inc. (RIFM) safety evaluation process for fragrance ingredients. Food Chem Toxicol. 2015 Aug;82 Suppl:S1-S19 ([http://fragrancematerialsafetyresource.elsevier.com/sites/default/files/Criteria\\_Document\\_Final.pdf](http://fragrancematerialsafetyresource.elsevier.com/sites/default/files/Criteria_Document_Final.pdf)).

## Carvone

- IDEA project (International Dialogue for the Evaluation of Allergens) Final Report on the QRA2: Skin Sensitisation Quantitative Risk Assessment for Fragrance Ingredients, September 30, 2016 (<http://www.ideaproject.info/uploads/Modules/Documents/qra2-dossier-final--september-2016.pdf>).
- Salvito D.T., Senna R. J., Federle T.W. (2002). A framework for prioritizing fragrance materials for aquatic risk assessment. *Environ Toxicol Chem.* 2002;21:1301-1308 (<https://www.ncbi.nlm.nih.gov/pubmed/12069318>).

Additional information on the application of IFRA Standards is available in the Guidance for the use of IFRA Standards, publicly available at [www.ifrafragrance.org](http://www.ifrafragrance.org).