# 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC)

<table>
<thead>
<tr>
<th>CAS-No.:</th>
<th>31906-04-4 51414-25-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Molecular formula:</td>
<td>C_{13}H_{22}O_{2}</td>
</tr>
<tr>
<td>Structure:</td>
<td></td>
</tr>
</tbody>
</table>

## Synonyms:
- 3-Cyclohexen-1-carboxaldehyde, 4-(4-hydroxy-4-methylpentyl)-
- 3-Cyclohexen-1-carboxaldehyde, 3-(4-hydroxy-4-methylpentyl)-
- 4-Hydroxyisoheyl 3-cyclohexene carboxaldehyde
- 4-(4-Hydroxy-4-methylpentyl) cyclohex-3-ene-carbaldehyde
- 3-(4-Hydroxy-4-methylpentyl) cyclohex-3-ene-1-carbaldehyde
- HICC
- Lyral (commercial name)
- Kovanol (commercial name)
- Mugonal (commercial name)
- Landolal (commercial name)
- Cyclohexal (commercial name)

## History:
- Publication date: 2020 (Amendment 49)

## Implementation dates:
- 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.

## RECOMMENDATION:
- RESTRICTION

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>0.020 %</td>
</tr>
<tr>
<td>Category 2</td>
<td>0.020 %</td>
</tr>
<tr>
<td>Category 7A</td>
<td>0.020 %</td>
</tr>
<tr>
<td>Category 7B</td>
<td>0.020 %</td>
</tr>
</tbody>
</table>
**3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.10 %</td>
<td>8</td>
<td>0.067 %</td>
</tr>
<tr>
<td>4</td>
<td>0.20 %</td>
<td>9</td>
<td>0.20 %</td>
</tr>
<tr>
<td>5A</td>
<td>0.20 %</td>
<td>10A</td>
<td>0.20 %</td>
</tr>
<tr>
<td>5B</td>
<td>0.20 %</td>
<td>10B</td>
<td>0.20 %</td>
</tr>
<tr>
<td>5C</td>
<td>0.20 %</td>
<td>11A</td>
<td>0.067 %</td>
</tr>
<tr>
<td>5D</td>
<td>0.067 %</td>
<td>11B</td>
<td>0.067 %</td>
</tr>
<tr>
<td>6</td>
<td>0.20 %</td>
<td>12</td>
<td>91 %</td>
</tr>
</tbody>
</table>

**Fragrance ingredient restriction - Note box**

The restrictions as given for the individual categories are not based on the Quantitative Risk Assessment (QRA) methodology but solely represent a pragmatic approach to address the specific situation for 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC).

**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). For more details see chapter 1 of the Guidance for the use of IFRA Standards.

**CONTRIBUTIONS FROM OTHER SOURCES:**

SEE ANNEX II

**ANNEX II**

<table>
<thead>
<tr>
<th>3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC)</th>
<th>CAS number (Aldehyde)</th>
<th>Schiff base</th>
<th>CAS number (Schiff base)</th>
<th>Level of restricted aldehyde in the Schiff base (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC), which can be downloaded from the RIFM Safety Assessment Sheet Database: http://fragrancematerialsafetyresource.elsevier.com/.

The Expert Panel for Fragrance Safety reviewed all the available data for 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC) and recommends the limits for the 12 different product categories, which are the acceptable use levels of 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC) in the various product categories.

REFERENCES:

The IFRA Standard on 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC) is based on at least one of the following publications:

• The RIFM Safety Assessment on 3 and 4-(4-Hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde (HMPCC) if available at the RIFM Safety Assessment Sheet Database: http://fragrancematerialsafetyresource.elsevier.com


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Additional information on the application of IFRA Standards is available in the Guidance for the use of IFRA Standards, publicly available at www.ifrafraction.org.