# 1. Product and Company Identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>Phenprocoumon</th>
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</thead>
<tbody>
<tr>
<td>Product code</td>
<td>04 2171 5</td>
</tr>
<tr>
<td>Company information</td>
<td>Manufacturer: F. Hoffmann-La Roche AG</td>
</tr>
<tr>
<td></td>
<td>Postfach</td>
</tr>
<tr>
<td></td>
<td>CH-4070 Basel</td>
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<tr>
<td></td>
<td>Switzerland</td>
</tr>
<tr>
<td></td>
<td>Phone +41-61/688 54 80</td>
</tr>
<tr>
<td></td>
<td>Fax +41-61/681 72 76</td>
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</table>

# 2. Composition/Information on ingredients

<table>
<thead>
<tr>
<th>Characterization</th>
<th>pharmaceutical active substance (coumarin derivative)</th>
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<tbody>
<tr>
<td>Chemical name</td>
<td>- 3-(α-Ethylbenzyl)-4-hydroxycoumarine</td>
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<tr>
<td></td>
<td>- 3-(1-Phenylpropyl)-4-hydroxycoumarine</td>
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<tr>
<td></td>
<td>- 4-Hydroxy-3-(1-phenylpropyl)-2H-1-benzopyrane-2-one</td>
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<tr>
<td>Synonyms</td>
<td>- MARCOUMAR substance</td>
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<tr>
<td></td>
<td>- Liquamar</td>
</tr>
<tr>
<td></td>
<td>- Marcumar</td>
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<tr>
<td>CAS number</td>
<td>435-97-2</td>
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<tr>
<td>EINECS number</td>
<td>207 108 9</td>
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<tr>
<td>Roche number</td>
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<tr>
<td>Empirical formula</td>
<td>C_{18}H_{16}O_{3}</td>
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<tr>
<td>Molecular mass</td>
<td>280.32 g/mol</td>
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</table>

![Chemical Structure](image-url)
3. Hazards identification

Most important hazards
- Toxic by inhalation, in contact with skin and if swallowed.

4. First-aid measures

Eye contact
- rinse immediately with tap water for 10 minutes - open eyelids forcibly
- consult physician

Skin contact
- remove immediately contaminated clothes, wash affected skin with water and soap - do not use any solvents
- consult physician

Inhalation
- remove the casualty to fresh air and keep him/her calm
- get medical treatment

Note to physician
- in cases of acute poisoning, primarily irritations of mucous membranes and skin: symptomatic treatment
- only after a delay of several hours, at low doses even only after 1 - 2 days, disturbance of coagulation through blocking of the production of vitamin-K-dependent coagulation factors: decrease of the quick-value (time of prothrombin)
- in case of suspected intake use as prophylaxis 10 - 20 mg Konakion i.v., if necessary repeated once a day for the following days; surveillance of the coagulation by determination of the time of prothrombin (quick) immediate (starting value), then during 2 - 3 days 3 times per day, finally in longer intervals (up to 1 week, if a decrease has been observed)
- if disturbances of coagulation did occur, there have to be transfused coagulation-factors

5. Fire-fighting measures

Suitable extinguishing media
- water spray jet, dry powder, foam, carbon dioxide

Specific hazards
- consider dust explosion hazard
- substance is hazardous for water: contain fire-fighting wastewater

Protection of fire-fighters
- precipitate gases/vapours/mists with water spray

6. Accidental release measures

Environmental protection
- do not allow to enter drains or waterways

Methods for cleaning up
- collect solids (avoid dust formation) and hand over to waste removal
## 7. Handling and storage

### Handling

**Technical measures**
- local exhaust ventilation necessary
- take precautionary measures against electrostatic charging
- avoid dust formation; very high dust explosion hazard
- processing in closed systems, if possible superposed by inert gas (e.g. nitrogen)

**Suitable materials**
- aluminium, glass, plastic

### Storage

**Validity**
- 48 months, at room temperature

**Packaging materials**
- tightly closing; material: aluminium, glass, plastic, metals

## 8. Exposure controls/Personal protection

### Engineering Measures
- see 7.

### Monitoring

**Threshold value (Roche) air**
- IOEL: 10 µg/m³

**Analytics**
- sampling on glass fibre filter and gravimetric or chemical determination

### Personal protective equipment

**Respiratory protection**
- in case of open handling or accidental release: particle mask or respirator with independent air supply

**Hand protection**
- protective gloves (e.g. made of neoprene, nitrile or butyl rubber)

**Eye protection**
- safety glasses

**Body protection**
- protective clothing

**General protective and hygiene measures**
- instruction of employees mandatory
- employees on medical treatment with coumarin derivatives may not carry out any operations with a risk of exposure
9. Physical and chemical properties

Colour:
practically white

Form:
solid substance

Odour:
almost odourless

Solubility:
~ 36'300 mg/l, ethanol 96 % (20 °C)
< 100 mg/l, water (20 °C)
< 100 mg/l, hexane (20 °C)
~ 4'300 mg/l, diethyl ether (20 °C)
~ 28'300 mg/l, methanol (20 °C)

Partition coefficient:
\( \log P_{ow} \) 3.62 (octanol/water)

Dissociation constant:
\( pK_1 = 4.1 \)

Melting temperature:
178 to 181 °C

10. Stability and reactivity

Note:
- no instabilities and dangerous reactions known

11. Toxicological information

Acute toxicity:
- \( LD_{50} \) 190 mg/kg (oral, mouse)
- \( LD_{50} \) 200 mg/kg (oral, rat)
- \( LD_{50} \) 32 mg/kg (i.v., mouse)

Subchronic toxicity:
- anticoagulant: decreased coagulation of blood, affection to bleeding
- substance cumulates because of the long half-life of elimination

Reproduction toxicity:
- in cases of absolute indication, Phenprocoumon is applied also during pregnancy. In cases of longer during therapies during early pregnancies there were seen rarely individual cases of disturbances of bone-growth in the fetus

Note:
- dosage: day 1: 15 mg, day 2: 9 mg, day 3: 3 mg, afterwards depending of the time of prothrombin, in average 0.75 - 0.45 mg/day
- the effect sets in after 1 - 2 days. After reaching an anticoagulation, few amounts of phenprocoumon will be sufficient for a large intensification of the affection of bleeding.
- Phenprocoumon is mostly completely metabolized in the liver
- side-effects: internal and external bleedings, gastro-intestinal disturbances, necrosis of the skin
- elimination half-life: 160 hours

12. Ecological information

Ready biodegradability:
- not readily biodegradable
  < 10 %, 28 days
  (CO₂ Evolution Test, Modified Sturm Test, OECD No. 301B)

Air pollution:
- observe local/national regulations
13. Disposal considerations

Waste from residues - incinerate in qualified installation with flue gas scrubbing
- observe local/national regulations regarding waste disposal

14. Transport information

<table>
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Proper shipping name TOXIC SOLID, ORGANIC, N.O.S. (Phenprocoumon)

15. Regulatory information

Classification and labelling according to EU directives

![Skull and Crossbones] T

R23/24/25 Toxic by inhalation, in contact with skin and if swallowed.
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

Emission limit (Switzerland) 20 mg/m³ at mass-flux ≥ 0.1 kg/h (organic, class 1)

Water hazard class (Germany) 3: strongly hazardous for water (own classification according to directive VwVwS of 17.05.1999)
Phenprocoumon

16. Other information

<table>
<thead>
<tr>
<th>Use</th>
<th>pharmaceutical active substance (anticoagulant)</th>
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<tr>
<td>Safety-lab number</td>
<td>BS-4192</td>
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<tr>
<td>Edition documentation</td>
<td>changes from previous version in sections 4, 8, 14</td>
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The information in this safety data sheet is based on current scientific knowledge. It should not be taken as expressing or implying any warranty concerning product characteristics.