**CO₂-Extract**

**Overview**

- **CO₂-Extract** is made from hop pellets using food grade carbon dioxide in liquid or supercritical form.

- **CO₂-Extract** contains alpha acids, beta acids and essential oils and can be used in the brewing process to partially or entirely replace leaf hops or hop pellets.

- **CO₂-Extract** presents a concentrated and practical alternative to leaf hops or pellets with an excellent shelf life.

**Specification**

- **Description:** Golden green to amber extract, highly viscous at room temperature.

- **Alpha acids**: 20 – 55 %

- **Beta acids**: 15 – 40 %

- **Hop oil**: 3 – 12 %

- **pH**: 4.0 (± 0.5)

- **Viscosity**: 200 – 400 mPas at 45°C (113°F)

- **Density**: 0.9 – 1.0 g / ml at 20°C (68 °F)

* dependent on variety and crop year
Properties

• Appearance
A golden green to amber thick syrup (dependent on variety and extraction conditions) which becomes more fluid on warming.

• Utilization
If CO₂-Extract is boiled for at least 50 minutes, an utilization in the range of 32 – 38 % can be achieved. Actual utilization will vary from brewery to brewery depending on plant and process conditions.

• Flavor
The flavor characteristics of the original hops are almost completely maintained. Early addition of CO₂-Extract during wort boiling imparts mainly bitterness.

• Chemical Residues
Nitrates and heavy metals are almost completely eliminated in CO₂-Extract. Many pesticide and fungicide residues are also largely removed by CO₂-extraction.

• Quality
All Hopsteiner® products are produced in plants accredited to internationally accepted quality standards.

Packaging

CO₂-Extract can be packaged in cans, pails and drums according to customer requirements:
- Cans: 0.5 to 4 kg USA
  0.5 to 10 kg Germany
- Pails: 3 to 20 kg USA only
- Drums: 50 & 200 kg
For convenience of use, customers may have their extract packed in cans to any desired content of alpha acids per container (e.g. 450 g alpha acids per can).

Alternatively, the alpha acids content of CO₂-Extract can be standardized to any particular concentration using glucose syrup (non-GM glucose cannot be guaranteed) and the container filled to a standard weight (e.g. 30 % alpha in 1-kg cans).

Product Use

CO₂-Extract is typically added into the kettle as a complete or partial replacement for leaf hops or hop pellets.

• Dosage
Addition to the kettle is based on the concentration of alpha acids in the CO₂-Extract, an estimated or known utilization and the desired bitter intensity in the beer.

• Addition
For the best utilization CO₂-Extract should be added early in wort boiling. CO₂-Extract is not very suitable for “late hop additions” due to the unpolar character. However, in this situation, better results can be achieved using the pre-isomerized kettle extracts IKE or PIKE due to their better solubility.

If CO₂-Extract is used in cans, it’s not necessary to warm up prior to their use. Punctured containers suspended into the boiling wort will ensure that all of the extract is completely flushed out into the kettle. In case CO₂-Extract is used in automatic dosing units, it should be warmed up to 45°C (113°F) and gently mixed to ensure perfect dosing.
• **Storage**
  
  CO₂-Extract should be stored in sealed containers at < 10°C (50°F). Opened containers should be used within a few days.

• **Best Before Date**
  
  CO₂-Extract is stable 8 years from date of production under the recommended storage conditions.

• **Safety**
  
  CO₂-Extract is a natural substance and may be safely handled using routine precautions to avoid contact with skin and, particularly, eyes. Any material coming into contact with the skin should be washed off with soap and water or proprietary hand cleansers. If CO₂-Extract gets into the eyes, irrigate with excess water until clear and seek medical attention.

  For full safety information please see the relevant Hopsteiner® safety data sheet.

• **Technical Support**
  
  We will be pleased to offer help and advice on the full range of Hopsteiner® products:

  • Copies of all relevant analytical procedures
  • Safety Data Sheets (SDS)
  • Assistance with pilot or full brewery trials
  • Specialist analytical services

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• **Analytical Methods**

• **Concentration of Bitter Substances**
  
  Alpha and beta acids can be measured by any of the following methods:
  – HPLC method according to Analytica-EBC 7.7 or ASBC Hops-14 using the current ICE standard
  – Spectrophotometric method according to ASBC Hops-8 (I)

  The lead conductance value can be measured by any of the following methods:
  – ASBC Hops-8 (II)
  – Analytica-EBC 7.6

• **Concentration of Hop Oils**
  
  Hop oil concentration can be measured by any of the following methods:
  – Analytica-EBC 7.10
  – ASBC Hops-13