

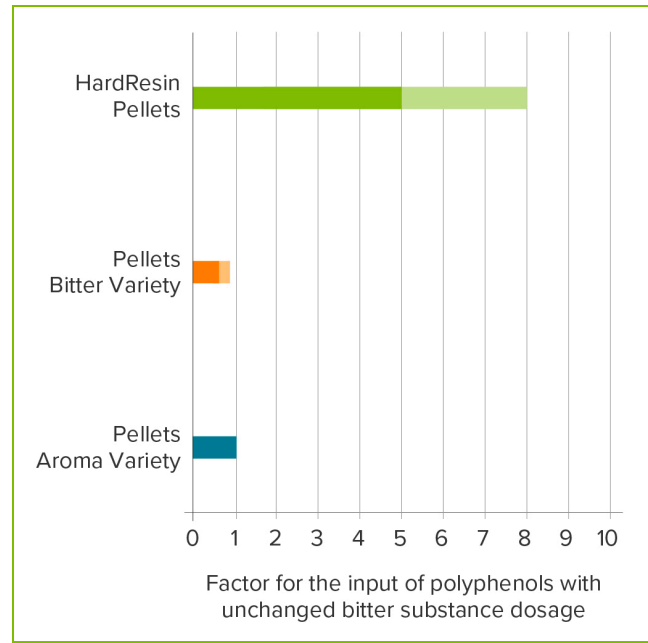
## HARDRESIN PELLETS

### OVERVIEW

**HardResin Pellets** are a hop product made from leaf hops, added to the wort kettle during the boiling process. They impart a smooth bitterness and mouthfeel to beer.

**HardResin Pellets** can release glycosidically bound hop compounds to impart a pleasant hop aroma to beer.

**HardResin Pellets** are rich in antioxidative polyphenols.



### SPECIFICATIONS

<b>Short description</b>	de-bittered hop powder (from production of CO <sub>2</sub> Hop extract) compressed into cylindrical pellets, which easily breaks up into a powder
<b>Hop oils</b>	< 0.1 %
<b>Moisture content</b>	< 11 %
<b>Xanthohumol</b>	> 0.3 %
<b>Total resin</b>	3.5 - 8.5 %
<b>Hard resin</b>	30 - 50 % of total resins

### PROPERTIES

#### APPEARANCE

HardResin Pellets are pale yellow-green pellets, approximately 8 mm x 10 - 25 mm in size (diameter x length).

#### FLAVOR

HardResin Pellets produce a smooth bitterness. The hard resins and polyphenols in the pellets have been shown to contribute to improved mouthfeel and overall beer flavor. Moreover, key flavor compounds (e.g. linalool) released from hop glycosides produce a pleasant hop aroma.

#### QUALITY

All Hopsteiner® products are processed in facilities which fulfill internationally recognized quality standards. A monitoring system for residues is in place.

## PACKAGING

Our products are delivered in their respective recommended standard packaging. Alternatives may be possible upon customer request.

Standard packages of our processing plants in the USA (US) and Germany (DE) are:

- softpack under inert gas in 5-layer aluminum composite foils (US / DE)

Suitable pack sizes are available on request.

## USAGE

HardResin Pellets are employed to enhance the quality of the bitterness and to increase mouthfeel. HardResin Pellets also improve the physical stability of the finished beer through the precipitation of undesirable proteins.

## DOSAGE

The quantity of HardResin Pellets added to the wort kettle depends on the application and will vary according to the raw materials and other hop products used in the brewing process. They can be added at any time during the boil. To determine their impact on beer flavor, brewing trials are recommended as the quality and quantity of the compounds imparting the bitterness, aroma and flavor (the latter are released from the hop glycosides) will vary among varieties. Typical additions range from 20 to 100 g/hl.

## APPLICATION

HardResin Pellets can be manually weighed out and added directly to the wort. Alternatively, owing to their free-flowing nature, additions of HardResin Pellets can be automated.

## STORAGE

The recommended storage temperature in the original unopened packaging is < 5 °C (41 °F).

Short-term, transport-related temperature deviations do not affect product quality.

## BEST BEFORE DATE

Under the recommended storage conditions, the shelf life from the date of production/ packaging is at least 5 years.

## SAFETY

Ensure good ventilation of the workplace and wear personal protective equipment. Avoid contact with eyes and skin. Do not inhale vapors or dusts. For full safety information, please refer to the relevant Hopsteiner® safety data sheet.

## ANALYTICAL METHODS

International approved methods listed in committees such as ASBC or Analytica-EBC using current standards are applied.

## PRODUCT ANALYTICS

Concentration of bitter substances

- Analytica-EBC 7.5
- Analytica-EBC 7.7 (HPLC)
- ASBC Hops-14 (HPLC)
- ASBC Hops-6A (Spectro)

Concentration of hop oils

Due to the low amount of hop oil, the concentration cannot be measured using any of the methods currently available.

## TECHNICAL SUPPORT

We are pleased to offer assistance and advice on:

- safety data sheets
- support for brewing trials on a pilot or commercial scale
- analytical services and information about analytical procedures

Disclaimer: The information provided in this document is believed to be correct and valid. However, Hopsteiner® does not guarantee that the information provided here is complete or accurate and thus assumes no liability for any consequences resulting from its application.

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