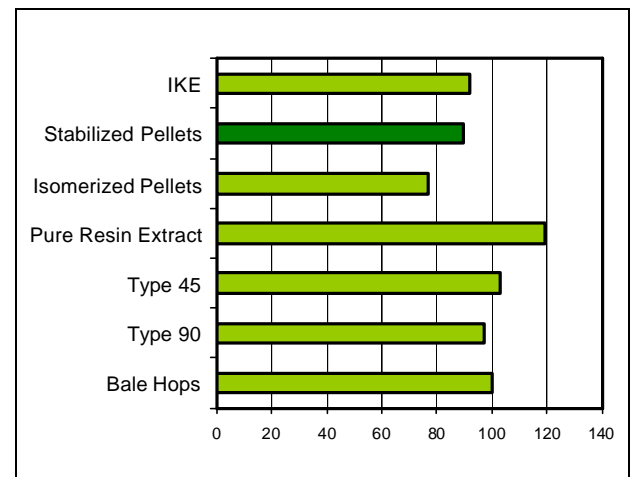


## Stabilized Pellets

### ❖ Overview

- **Stabilized Pellets** offer improvements in utilization of  $\alpha$ -acids due to the presence of excess  $Mg^{++}$  ions, added as  $MgO$  during processing
- **Stabilized Pellets** can be produced as either Type 90 or Type 45 pellets
- **Stabilized Pellets** can replace conventional alpha and aroma hop products without any change to beer quality
- **Stabilized Pellets** show reduced loss of bittering potential compared to standard pellets after prolonged storage

**Relative cost of Bitterness using Different Hop Products**



### ❖ Specifications

- **Description:** Cylindrical pellets produced from whole hops which are dried, milled, blended with food grade  $MgO$ , pelletised and vacuum packed.
- **Consistency:** A solid which normally breaks up to a powder (variety dependent)
- **Color:** Typically dark green (depending on variety)
- **Alpha-acid:** Typically in the range 2-20% (dependent upon hop variety)
- **Beta-acid:** Typically in the range 1-15% (dependent upon hop variety)
- **Hop oils:** Typically 1-6% of product but hop variety dependent
- **Moisture:** Typically 7-9%

## ❖ Properties

### □ Appearance:

Green pellets, approximately 6mm x 10-15mm in size (diameter x length). Pellets should break apart readily upon opening the packs.

### □ Utilization:

In normal use, **Stabilized pellets** result in a utilization of around 38-45%. This improved utilization, compared to standard pellets, is due to the Mg<sup>++</sup> ions catalyzing the rapid conversion of a-acid to iso-a-acids.

### □ Flavor:

Brewing trials demonstrate that beers of identical flavor can be produced when **Stabilised Pellets** are used as a direct replacement for standard pellets.

### □ Stability:

When stored at ambient or cool temperatures in unopened packs, losses of a-acid should be less than 5% per year. Care should be taken to avoid damage to the vacuum packs, as any contact with oxygen will result in the degradation of a-acid to non-bitter products.

### □ Quality:

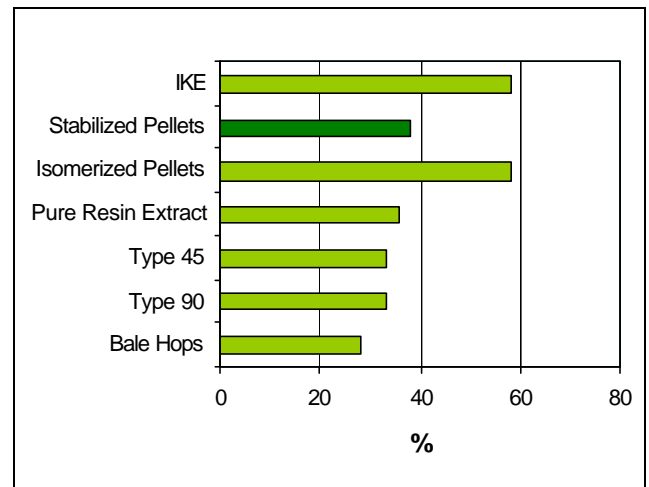
All Hopsteiner® products are produced in plants accredited to internationally accepted quality standards.

## ❖ Packaging

**Stabilized Pellets** are normally packed in laminated foils, within cartons, either as 'hard' packs under vacuum or as 'soft' packs under inert gas (CO<sub>2</sub> or N<sub>2</sub>) at atmospheric pressure.

Packaging sizes range from 2kg (4.5 lbs) to 150kg (330 lbs); normally 20 kgs (44 lbs) in the US.

## Typical Utilization of Kettle Hop Products



## ❖ Product Use

**Stabilized pellets** are used in similar ways to raw hops or regular pellets, contributing bitterness and hop character to beer. **Stabilized pellets** can be added late in the boil, maximizing hop character whilst still achieving good utilization of hop bitter acids.

### □ Dosage:

The quantity of pellets to be added can be calculated using the pellet a-acid content and a utilization of 40%. To establish the impact on beer aroma, trial or pilot brews are recommended as the quantity and quality of hop oil will vary between the hop varieties used.

❑ **Addition:**

Similarly to standard pellets, **Stabilized Pellets** can be manually weighed and added directly into the boiling wort.

**Stabilized Pellets** can be automatically dosed into the kettle.

❑ **Storage:**

**Stabilized Pellets** should be cool stored at <5°C (41°F). Opened foils/cartons should be used quickly to avoid deterioration of bitter acids and hop oil. It is essential to maintain **Stabilized Pellets** at a consistently cool temperature to avoid uncontrolled and uneven conversion of  $\alpha$ -acids to iso- $\alpha$ -acids.

❑ **Safety:**

There are no known serious, health hazards in normal use. If dust is generated, it is advisable to wear dust masks. Hop pellets are a combustible material.

For full safety information please see the relevant Steiner material safety data sheet.

❖ **Analytical Methods**

❑ **Concentration of  $\alpha$ -,  $\beta$ - and pre-formed Iso- $\alpha$ -acids:**

Measured by HPLC using the EBC 7.8 method together with the current ICE & ICS standards; sample preparation according to EBC 7.5 or 7.7 methods.

Alternatively, ASBC Hops-15 may be used in conjunction with the additional step of calibration for  $\alpha$ - &  $\beta$ -acids using the current ICE standards.

❑ **Concentration of Hop oils:**

Hop oil concentration can be measured by either the IOB 6.3 or ASBC hops-13 methods.

❖ **Technical Support**

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

- ❑ Copies of all relevant analytical procedures
- ❑ Material Safety Data Sheets (MSDS)
- ❑ Assistance with pilot or full brewery trials
- ❑ Specialist analytical services

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