

## ***How to Use Kalsec<sup>®</sup> Craft Brew Solutions<sup>™</sup>***

The use of Kalsec<sup>®</sup> Craft Brew Solutions<sup>™</sup> is a new way of thinking to provide hop bitterness, aroma, and flavor, as well as other spice and fruit character, to craft beer. Traditionally, craft brewers have added large amounts of whole or pelletized hops, often for significant bitterness and hop-forward character. In addition, raw spices and fruits have been used for increasingly special ‘blast-in-your-face’ character for some beer styles. However, there are many disadvantages in this approach:

- The use of traditional whole hop or hop pellets for bitterness has decreasing bitterness utilization as the quantity of hops and gravities have increased. This means that an inefficient and extraordinary amount of hops need to be added to the brewkettle for bitterness.
- For a highly hopped Double or Imperial IPA, the amount of wort loss becomes significant just from the amount of wort absorbed onto the hop material.
- The aroma and flavor impact of spices diminish during storage, so more needs to be added for the same effect.
- Fruit storage can be quite a challenge to maintain freshness.
- Climbing on top of a fermenter or maturation tank to add dry hops, fruits, or spices can be a serious safety hazard.
- The use of traditional hops for dry hopping has been estimated to cause as much as 10% beer loss, which is absorbed onto the hop material.
- The addition of micro-organisms and agrichemicals into final beer from dry hopping has been documented and could be a significant risk.

There are options and flexibility now available by using hop, spice, and natural flavor extracts! Kalsec<sup>®</sup> Craft Brew Solutions<sup>™</sup> provides an alternative to supplement traditional methods of adding hop bitterness, aroma, and flavor, as well as spice and fruit character, to your craft beer.

### **Bitterness**

#### *Approach*

Foundation bitterness can be provided by using Bitter Blaster<sup>™</sup>, which is simply pre-isomerized hop alpha acids in an easy to use form.

#### *Brewkettle/Whirlpool*

Supplement bitter hops by  $\frac{1}{4}$  -  $\frac{1}{2}$  with Bitter Blaster<sup>™</sup>, the rest of your BUs can come from traditional hops if desired. By adding Bitter Blaster<sup>™</sup> at the end of the brewkettle boil or into the whirlpool, bitterness utilization of 50% – 60% is achieved compared to 30% or less from traditional hops. Since Bitter Blaster<sup>™</sup> is a liquid hop extract, significantly less wort loss is experienced and the cost of bitterness is less than from traditional hopping.

#### *Post-fermentation*

Better yet, boost bitterness utilization even further by adding Bitter Blaster<sup>™</sup> after fermentation.

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### **Foam Enhancement**

#### *Approach*

Add Head Master<sup>™</sup> after fermentation to provide a creamy hop-derived beer foam.

### **Aroma Hopping**

#### *Approach*

Hop aroma and flavor top notes can be achieved by using Trop Hopical<sup>™</sup>, for an American Craft citrus hop top note, or Hopfenatic<sup>™</sup>, for a classic European hop top note.

#### *Brewkettle/Whirlpool*

Trop Hopical<sup>™</sup> or Hopfenatic<sup>™</sup> can be added along with traditional hops to the whirlpool to give some aroma hop character. The yeast from fermentation will refine the hop character somewhat.

#### *Post-fermentation*

Better yet, boost aroma hop character even further by adding Trop Hopical<sup>™</sup> or Hopfenatic<sup>™</sup> after fermentation.

### **Spice and Orange Aroma**

#### *Approach*

A spice and orange Belgian-style Wit character top note can be achieved by using Witty Fusion<sup>™</sup>.

#### *Brewkettle/Whirlpool*

If desired, add some coriander spice and orange peel to the whirlpool, then supplement the aroma and flavor by adding Witty Fusion<sup>™</sup>.

#### *Post-fermentation*

Better yet, boost spice and orange character even further by adding Witty Fusion<sup>™</sup> after fermentation.

### **What Do I Do With This Stuff?**

- Pour Craft Brew Solutions<sup>™</sup> liquid extracts directly into the brewkettle or into the whirlpool. It will rapidly disperse into the hot wort. This works, especially for Bitter Blaster<sup>™</sup>, but for aroma products, such as Trop Hopical<sup>™</sup>, Hopfenatic<sup>™</sup>, and Witty Fusion<sup>™</sup>, some aroma character will be vaporized and lost.
- Add Craft Brew Solutions<sup>™</sup> liquid extracts aseptically directly into an empty maturation or Bright Beer tank, then fill with fermented beer. The product will slowly disperse into the beer; faster if the beer is somehow mixed, for example by using a carbonation stone.
- For craft brewers who filter beer, Craft Brew Solutions<sup>™</sup> liquid extracts can be added to the D.E. pre-coat and body-feed tank.
- The ideal and best approach is to dose Craft Brew Solutions<sup>™</sup> liquid extracts into a moving beer stream. Syringe pumps and fittings are available that can assist with this type of addition.