Filling Fats

IOI Loders Croklaan

Let's create together
Market trends

Today’s food market is defined by a number of consumer trends, such as increasing demand for healthier and more premium-quality products. These particular trends are especially prevalent in the chocolate and confectionery sector. Often, a specific product will reflect more than one trend, so it is important that new introductions meet consumer requirements, and have a clear positioning. The main challenge for chocolate and confectionery producers is to keep coming up with exciting new products that surprise consumers and go beyond their expectations.

Confectionery fillings – always something new

It requires a lot of creativity to develop new and distinctive chocolate and confectionery products. Besides outward appearance, product fillings offer the most wide-ranging possibilities to develop something that is genuinely original, exotic, indulgent, extra-healthy – or a combination of these characteristics. Developing innovative and creative fillings requires a wide range of raw materials, of which specialty filling fats are among the most important.
The world’s leading supplier of specialty fats and oils for the food industry

Loders Croklaan has more than a century’s worth of specialized experience in the production and application of vegetable fats for chocolate and confectionery fillings. We’re happy to put our expertise to work for you in selecting, testing and applying the fat that’s exactly right for your filled product.

**Healthier non-hydrogenated, trans-free solutions**

Trans fats occur in vegetable oils after partial hydrogenation. Research has shown that these fats can significantly increase the chance of developing coronary heart disease, and the food industry is working very hard to remove trans fats from their products. Loders Croklaan is the industry front-runner in developing non-hydrogenated vegetable fats, and the first to offer Cocoa Butter Replacers that are completely trans-free. When you create together with Loders Croklaan, you have access to non-hydrogenated and trans-free fat options for healthier, label-friendly solutions and end products.

**Let’s create together**

Creating together with Loders Croklaan makes it possible to provide tailor-made products that appeal to many different types of consumers in a wide variety of markets – and gives you an extra competitive edge.

**Hydrogenation – influencing the melting point**

Hydrogenation is a chemical process in which liquid oils are converted into fats with a higher melting point. Hydrogenation significantly increases the saturated fatty acid level of a fat. What’s more, in partial hydrogenation, trans-fatty acids are created, which negatively impact the level of ‘good’ HDL cholesterol in the blood.
**Innovative product development – selecting the right filling fat**

When developing new products, you need to answer a lot of questions, including which filling fat would be most suitable for your innovative new product. In order to select the right filling fat, you need to determine a number of factors, such as the product characteristics that are desired, the processing facilities that are available, the shelf life that is required, etc. The overview below shows the main factors involved in the selection process.

### Consumer product requirements
- **Type of product**
  - Praline
  - Count line
  - Filled wafer
  - Etc.
- **Positioning of product**
  - Premium
  - Indulgence
  - Economy
  - Discount label
- **Labeling requirements**
  - Trans free
  - Non hydrogenated
  - Non-GMO
- **Logistic requirements**
  - Shelf-life
  - Climate
  - Storage conditions

### Filling requirements
- **Texture**
  - Soft
  - Medium
  - Hard
  - Aerated
- **Flavor**
  - Fast release
  - Intense
  - Full
- **Mouth feel**
  - Creamy
  - Cool melt
  - Clean

### Ingredients / Recipe
- Cocoa butter yes/no
- Nuts yes/no
- Water yes/no
- Lauric yes/no

### Processing
- Tempering yes/no
- Pre-crystallization yes/no
- Laurics in system yes/no
- Rework chocolate yes/no

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**Lauric or non-lauric – an important difference**

Fats for confectionery are divided in lauric and non-lauric types, why is this difference so important?

Lauric fats come from sources such as coconut and palm kernel; their composition is totally different from other (non-lauric) vegetable fats that come from, for example, cocoa or palm.

When lauric and non-lauric fats are mixed together, the melting behavior of the blend will be totally different from either one of the components, and the end-product will turn out a lot softer than expected. The same happens when a lauric filling is combined with a non-lauric coating shell: the coating will soften rapidly and the shelf life will be shortened due to fat bloom appearance. Loders Croklaan therefore always recommends extreme caution in combining lauric and non-lauric fats for confectionery purposes.

**Fat bloom**

Sometimes, the surface of chocolate becomes dull, and white crystals may often even be visible on the surface. This phenomenon is known as bloom, and consumers often associate it with a loss of quality. Sugar bloom is caused by moisture or condensation on the surface of the chocolate. Fat bloom is a more complex phenomenon and can result from both high ambient temperature storage and migration of fat crystals from the filling to the chocolate shell. It is an ongoing problem in the industry. Fat bloom can, however, be prevented by choosing the right fat for a filling.
Options in filling fats – the Loders Croklaan portfolio

Once the requirements that the filling fat have to meet are clear, a match can be made with one of the products from the Loders Croklaan portfolio. The diagram below defines the different product groups, and gives a general idea of their key characteristics.
Creamelt™-premium quality for excellent chocolate fillings

- Clean melting
- Cool-melting varieties available
- Intense and long-lasting flavor release
- Excellent eating characteristics for ultimate indulgence
- Fully compatible with cocoa butter
- High tolerance for nuts and seeds
- Long shelf life due to excellent stability of taste and texture
- Production process requires tempering
- Label-friendly: non-hydrogenated and free from trans fats

**Performance diagram:**

![Performance diagram](image)

**Polymorphic fats**

Some fats, like cocoa butter, can crystallize in several different forms. These so-called polymorphic fats have only one form that is stable, and also ensures the end product will have the right hardness, contraction and gloss after it has been cooled. In order to obtain this stable crystal form, the filling needs to be tempered.

**Tempering**

Tempering or pre-crystallization, is necessary to stabilize the fat crystals in the product – especially when polymorphic fats are used – and ensures the qualities of the filling will remain stable. This is done by cooling the filling in a controlled way until crystallization has started. After this has taken place, the filling can be slightly heated to obtain the desired temperature for depositing.
**Creamelt™ – selection diagram**

**Consumer product requirements**
- **Type of product**
  - Praline
  - Count line
  - Filled wafer
  - Filled bar
- **Positioning of product**
  - Premium
  - Indulgence
- **Labeling requirements**
  - Trans free
  - Non-hydrogenated
  - Non-GMO
- **Logistic requirements**
  - Long shelf-life
  - Tolerant to different climates
  - Normal storage conditions

**Filling requirements**
- **Texture**
  - Medium
  - Hard
  - Aerated
- **Flavor**
  - Fast release
  - Intense
  - Full
- **Mouth feel**
  - Cool melt
  - Clean melt

**Ingredients / Recipe**
- High % cocoa butter possible
- Allow nuts in recipe
- Water in filling possible
- No lauric fats in recipe

**Processing**
- Requires tempering
- Requires pre-crystallization
- Care with laurics in system
- Possible to rework chocolate

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**FEATURED PRODUCT**

**Creamelt™ 501: for cool-melting indulgence**

**NMR VALUES OF CREAMELT 501**

The steep line and low percentage of solids at 35°C indicate cool and clean melting properties which create confectionery fillings with the best possible taste experience.

**Typical recipe for a truly indulgent cool-melting filling**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creamelt™ 501</td>
<td>40.0%</td>
</tr>
<tr>
<td>Cocoa powder</td>
<td>5.0%</td>
</tr>
<tr>
<td>Hazelnut paste</td>
<td>15.0%</td>
</tr>
<tr>
<td>Full-cream milk powder</td>
<td>5.0%</td>
</tr>
<tr>
<td>Sugar</td>
<td>34.6%</td>
</tr>
<tr>
<td>Lecithin</td>
<td>0.4%</td>
</tr>
</tbody>
</table>
Biscuitine™ – all-round flexibility in development and production

- Flexible, suitable for use in a wide range of products
- Flexible, needs no tempering, fits many processes
- Flexible, can be used in recipes with nuts, cocoa and other ingredients
- Cost-effective
- Good eating characteristics
- Label-friendly: free from hydrogenated and trans fats

Performance diagram:
**Biscuitine™ – selection diagram**

**Consumer product requirements**
- **Type of product**
  - Filled wafer
  - Count line
  - Filled bar
  - Praline
- **Positioning of product**
  - Premium bakery
  - Economy
  - Discount label
- **Labeling requirements**
  - Trans free
  - Non-hydrogenated
  - Non-GMO
- **Logistic requirements**
  - Long shelf life
  - Tolerant to different climates
  - Normal storage conditions

**Requirements filling**
- **Texture**
  - Soft
  - Medium
  - Aerated
- **Flavor**
  - Fast release
  - Intense
  - Full
- **Mouth feel**
  - Creamy

**Ingredients / Recipe**
- High % cocoa butter possible
- Allow nuts in recipe
- Water in filling possible
- No lauric fats in recipe

**Processing**
- No tempering required
- No pre-crystallization required
- Care with laurics in system
- Possible to rework chocolate

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**FEATURED PRODUCT**

**Biscuitine™ 580 – fast crystallization without trans fats**

**SPEED OF CRYSTALLIZATION AT 15°C**

The lines show Biscuitine™ 580’s very constant and continuous crystallization behavior compared to other non-hydrogenated and non-trans filling fats. Such behavior enables fast, high-quality processing.

Recipe for a cheese-flavored filling based on Biscuitine™ 580

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biscuitine™ 580</td>
<td>43.0%</td>
</tr>
<tr>
<td>Skimmed milk powder</td>
<td>25.5%</td>
</tr>
<tr>
<td>Demineralized whey powder</td>
<td>29.5%</td>
</tr>
<tr>
<td>Salt</td>
<td>0.8%</td>
</tr>
<tr>
<td>Emulsifiers</td>
<td>0.7%</td>
</tr>
<tr>
<td>Lecithin</td>
<td>0.5%</td>
</tr>
<tr>
<td>Cheese flavor</td>
<td>To taste</td>
</tr>
</tbody>
</table>
CLSP™ – The non-hydro alternative for hardened coconut oil in fillings

- Lauric fat
- No tempering required, very fast crystallization: easy to use
- Cool- and clean-melting eating characteristics
- Low-cost solution
- Ideal for fast-moving products
- Low tolerance for cocoa
- Label-friendly: free from hydrogenated and trans fats

Performance diagram:
The steep melting profile shows that CLSP™ 600 can create cool- and clean-melting fillings with optimal processing convenience.

Typical recipe for a trendy green tea filling based on CLSP™ 600

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLSP™ 600</td>
<td>43.0%</td>
</tr>
<tr>
<td>Full-cream milk powder</td>
<td>8.0%</td>
</tr>
<tr>
<td>Skimmed milk powder</td>
<td>4.0%</td>
</tr>
<tr>
<td>Dextrose</td>
<td>15.0%</td>
</tr>
<tr>
<td>Sugar</td>
<td>29.6%</td>
</tr>
<tr>
<td>Lecithin</td>
<td>0.4%</td>
</tr>
<tr>
<td>Green tea flavor</td>
<td>To taste</td>
</tr>
</tbody>
</table>
Durkex™ – high stability for smooth confectionery spreads and very soft fillings

- Excellent solution for soft or aerated fillings
- The standard for production of stable chocolate spreads
- No need for tempering
- Very good eating characteristics
- Excellent value for money
- Label-friendly: free from hydrogenated and trans fats

Performance diagram:

- Flavor stability
- Setting time
- Texture stability
- Pre-crystallization temperature

0 is slow/low
5 is fast/high
**Durkex™ – selection diagram**

**Consumer product requirements**
- **Type of product**
  - Praline
  - Mousse filled bars
  - Confectionery spreads
- **Positioning of product**
  - Premium
  - Indulgence
  - Economy
  - Discount label
- **Labeling requirements**
  - Trans free
  - Non-hydrogenated
  - Non-GMO
- **Logistic requirements**
  - Long shelf life
  - Tolerant to different climates
  - Normal storage conditions

**Filling requirements**
- **Texture**
  - Soft
  - Aerated
- **Flavor**
  - Fast release
  - Intense
  - Full
- **Mouth feel**
  - Clean melt

**Ingredients / Recipe**
- Limited % cocoa butter possible
- Allow nuts in recipe
- Water in filling possible
- No lauric fats in recipe

**Processing**
- No tempering required
- No pre-crystallization required
- Care with laurics in system
- Limited rework chocolate possible

**FEATURED PRODUCT**

**Durkex™ 104 – stability in very soft fillings**

The photo shows a filling with Durkex™ 104 on the left and a filling using an alternative soft filling fat on the right. The filling with Durkex™ is much more stable, with no oil separation.

Recipe for delicious Acai berry filling based on Durkex™ 104

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durkex™ 104</td>
<td>35.0%</td>
</tr>
<tr>
<td>Sugar</td>
<td>47.6%</td>
</tr>
<tr>
<td>Full-cream milk powder</td>
<td>7.0%</td>
</tr>
<tr>
<td>Skimmed milk powder</td>
<td>10.0%</td>
</tr>
<tr>
<td>Lecithin</td>
<td>0.4%</td>
</tr>
<tr>
<td>Acai flavor</td>
<td>To taste</td>
</tr>
</tbody>
</table>
Prestine™ – Anti-bloom filling fats for optimal appearance throughout shelf life

- Prevents blooming in chocolate-coated products
- Extends shelf life
- Improves brand image
- Very suitable for products with high oil or high nut content
- Very suitable for warm climates and non-optimal storage conditions
- Label-friendly: free from hydrogenated and trans fats

Fat bloom explained

- Fat bloom starts when fat migrates from the filling into the chocolate coating, inducing re-crystallization of the cocoa butter.
- Resulting in a dull surface in many cases with white crystals on top.
- Under storage conditions of 23°C, fat bloom will appear after 4-6 weeks.
Pristine™ – selection diagram

Consumer product requirements
Type of product
• Praline
• Count line
• Filled wafer
• Filled bar
• Positioning of product
  • Premium
  • Indulgence
• Labeling requirements
  • Trans free
  • Non-hydrogenated
  • Non-GMO
• Logistic requirements
  • Extended shelf life
  • Warm climates
  • Difficult, warm storage conditions

Filling requirements
Texture
• Soft
• Medium
• Hard
• Aerated

Flavor
• Fast release
• Intense
• Full

Mouth feel
• Cool melt
• Clean melt

Ingredients / Recipe
• Recipe with high bloom risk
• High % cocoa butter possible
• High nut content causes problems
• Tolerates lauric/non-lauric

Processing
• No tempering required
• No pre-crystallization required
• For lauric and non-lauric systems
• Possible to rework chocolate

FEATURED PRODUCT
Pristine 34F – creating bloom-free filled chocolates

The photo shows the development of fat bloom on filled chocolates stored under similar conditions for the same period of time. Left chocolate is made with Pristine™, the right with a standard filling fat.

Recipe for nut-containing confectionery filling based on Pristine™ 34F

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pristine™ 34F</td>
<td>28.0%</td>
</tr>
<tr>
<td>Hazelnut paste</td>
<td>20.0%</td>
</tr>
<tr>
<td>Full-cream milk powder</td>
<td>3.0%</td>
</tr>
<tr>
<td>Skimmed milk powder</td>
<td>4.0%</td>
</tr>
<tr>
<td>Sugar</td>
<td>44.6%</td>
</tr>
<tr>
<td>Lecithin</td>
<td>0.4%</td>
</tr>
</tbody>
</table>
Let’s create together!

Let our technical experts select the right fat and make it work for you

You’re basing a new filling on Creamelt™ and want to ensure that your production line performs optimally? Or you want to reduce bloom in order to extend product shelf life, and need advice on how to incorporate Prestine™? Our technical experts are happy to assist you in pinpointing the right product or solution for your specific situation.

Loders Croklaan has more than 100 years of specialized experience in the production and application of vegetable fats for confectionery products. Our technical experts are willing and able to work together with your product developers to select the filling fat that suits your product and facilities best. If you wish, we can also supply you with tailor-made products, specially designed and adapted to your specific requirements.

And our support does not stop after the selection process. We can also help you make the fat work to your benefit in other ways, such as optimizing your production process and maximizing the quality of end products.

Fuel your innovation by involving our market experts

Perhaps you are reconsidering your product labeling and want to be updated on global trends and legislation? Or maybe you would like to discuss expected developments in the chocolate and filling-fat market? Our market development experts are at your disposal to share our knowledge and insight, as well as to discuss how you can stay creative and innovative in developing new products.

Please contact a sales manager at one of our regional offices to discuss your requirements and how we can fulfill them. Let’s create together!