LIQUIDS FILLING AND PACKAGING

Liquids can be either thin (eg oils, milk, syrups and juices) or thick and viscous (eg sauces, pickles, hot jams and confectionery). The type of filler used is different for each group of liquids. The packaging requirements of different liquids are similar in that the liquid must be contained but they differ according to whether the liquid is spoiled by air, light, bacteria etc.

Filling
Low viscosity (thin) liquids
The simplest filler is a jug but this is often too slow for small businesses. A simple filler can be made by fitting one or more taps to the base of a bucket, as seen in Figure 1. The bucket should be stainless steel for hot acid liquids (eg fruit juices) or food grade plastic for cold filling. Iron and copper should not generally be used in food handling. A more sophisticated system in which the volume of liquid filled into each container is controlled, is obtained using a piston filler, as seen in Figure 2. This is made from glass or the materials described above.

Viscous liquids
Because these liquids do not flow easily, the piston filler is the preferred option.

Liquids that contain particles
Both low and high viscosity liquids may contain particles of food (eg fruit, pickles, sauces and pickles). The fillers described above will tend to become blocked by particles and a simple filler made from a stainless steel or plastic funnel is more suitable, as seen in Figure 3.

Packaging
Different foods require protection against different environmental factors such as light, heat, air, moisture and against microbial and insect contamination. The extent of the protection will also depend on the shelf life required. In Table 1, selected liquid foods are grouped into 'long' and 'short' shelf life for convenience.

Sealing
Jars
Screw caps are usually hand fitted. Omnia caps can be fitted using a simple manually operated capper, as seen in Figure 4.
Bottles
Roll on screw caps can be fitted using the manual capper, Figure 5. Corks can be inserted by hand after soaking overnight in clean water. Crown caps can be sealed using the equipment shown in Figure 6.

Cans
A small manually operated can seamer is available to form the double seam needed to seal cans.

Plastic films
Although it is possible to seal plastic bags by folding the film over a used hacksaw blade and fusing it with a flame, the quality of the seal is variable and forms a relatively poor barrier to air and moisture. Also the appearance is not as good. A better (and faster) option is to use a bar type heat sealer. If electricity is not available, it is possible to modify the sealer to heat the bar directly with a flame. The seal formed with this equipment is broader and hence has better barrier properties and a better appearance. Sachets can be made by either purchasing film in the form of a tube or cutting the film and sealing the long side to make a tube. The end is sealed and liquids are filled through a long tube, see Figure 7. It is important that liquids do not adhere to the inside of the film as they may then become trapped in the seal and reduce its strength.
<table>
<thead>
<tr>
<th>Food</th>
<th>Protection required against</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light</td>
<td>Air</td>
</tr>
<tr>
<td>Short shelf life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Cream</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Yoghurt</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Long shelf life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar syrup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit juice/cordial/puree</td>
<td>Some</td>
<td>/</td>
</tr>
<tr>
<td>Beer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spirits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft drinks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinegar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sauces</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1

* Carbonated beverage containers must be properly sealed to prevent loss of carbon dioxide and vinegar must also be sealed to prevent loss of acetic acid.
A semi-automatic heat sealer is available for sealing film lids onto plastic pots at up to 100 pots an hour, but it is expensive and requires a source of compressed air. A cheaper and simpler sealer is available which will seal 60 pots/hour or alternatively an electric iron can be fitted to a suitable stand and pressed down onto the surface of the pots to seal the film. Ceramic pots may be sealed with a cork stopper covered with candlewax or beeswax.

**Equipment suppliers**

*Note: This is a selective list of suppliers and does not imply ITDG endorsement.*

**Jar sealer**

- Thomas Hunter Limited
  - Mill Road
  - Omnia Works
  - Rugby
  - Warwickshire
  - United Kingdom

- IDB
  - 615 Galle Road
  - Kabubedda
  - Moratuwa
  - Sri Lanka

**Bottle sealer**

- AMBESCO
  - 5600 W Raymond Street
  - Indianapolis
  - IN 46241
  - USA

**Can seamer**

- MB Group
  - Apex Plasa
  - Forbury Road
  - Reading
  - RG1 IAX
  - United Kingdom

**Heat sealer**

- Thames Packaging Equipment Company
  - Senate House
  - Tyseen Street
  - London
  - E82ND
  - United Kingdom

**Pot sealer**

- Chadwicks of Bury Limited
  - Villiers Street
  - Bury
  - BL9 6BS
  - United Kingdom

**Piston filler**

- AMBESCO
  - 5600 W Raymond Street
  - Indianapolis In 46241
  - USA
References and Further Reading

Packaging food in Glass, Technical Brief, ITDG
Packaging Materials, Technical Brief, ITDG
Small-scale food Processing: A guide to appropriate equipment, Edited by Peter Fellows & Ann Hampton, ITDG Publishing/ CTA 1992
Appropriate Food Packaging by Peter Fellows & Barry Axtell, ILO/TOOL 1993