

## CONSIDERATIONS FOR THE TYPES OF SHAVED ICE

**Shaved ice** is normally considered ice that, as opposed to cubes, is in the form of small irregularly shaped pieces.

Its main use has been, and continues to be, the preservation of fish, although it is increasingly being utilized for other applications such as: bakeries, the meat industry, hospitals, gyms, laboratories, etc.



The traditional method of obtaining this type of ice was by **crushing bars of ice**, this use is obsolete since it is not economic, nor energy efficient.

It is currently manufactured by means of ice generators that continuously supply shaved ice with productions that range from a few Kg to scores of tons daily.

The different working systems of these generators also ensure that the ice that is produced is different, and although we encompass it all as shaved ice, its properties vary significantly.

We can find the main differences in:

- The shape and size of the pieces.
- The temperature of the internal nucleus of the ice shaving.
- The percentage of humidity. Both the water retained within the ice mass as well as its superficial wetness.





## THE GENERATOR'S MAIN WORKING SYSTEMS ARE:

### Drum Machines

Normally for large productions. The ice is formed on a very cold cylindrical surface, under  $-20^{\circ}\text{C}$ , it is dried and it is separated by mechanical means (blade or drill). Thin sheets are produced that are supercooled and very dry. The thickness is about 2mm and the size is around 30-40 mm. The internal temperature is close to  $-7^{\circ}\text{C}$  due to the amount of time that it remains connected to the cylinder, from when it dries until its separation. And the percentage of water is unlikely to surpass 2%.

### Spindle Machine with Press

The ice is formed on the internal surface of a pipe and is passed through nozzles that press it, dry it and cut it into the shape of small cylinders or sectors with a size of 15-20mm. The internal temperature is not as low as the first case, around  $-2/-3^{\circ}\text{C}$ , but it continues to produce hard forms with sharp edges. The degree of humidity is normally between 5/8%.

### Spindle Machine without Press

This is similar to the previous case but the ice that is formed inside the flooded pipe with a superficial temperature of around  $-15^{\circ}\text{C}$ , is scraped and extracted with a spindle without draining it. Pieces are obtained that are generally small in size with irregular forms and a grain size of between 2 and 10 mm; the internal temperature is very close to that of fusion of the water ( $-0.5^{\circ}\text{C}$ ) and the internal and superficial humidity content is between 12/15%.



For those that manipulate fresh fish in contact with **ice**, it is well known that a low temperature of the shaved ice produces a "burn" or thermal laceration of the skin. On the other hand, the hard particles and with sharp edges cause a mechanical abrasion that also deteriorates it.

The two first types are not, therefore, recommendable for direct contact with fresh fish. The third type would be adequate, although it has the disadvantage that due to the water content, the thermal storage in the form of latent heat is less per Kg and therefore less persistent.

When we are talking about applications of **ice** directly on the human skin all these considerations obviously have greater importance.

It would therefore be largely inaccurate to place all of the types of **shaved or crushed ice** in a same category when analyzing their uses in these applications.

The ITV manufacturers of the IQ series are of the third type mentioned and they produce an ice that is not supercooled, nor sharp but it has sufficient water content; therefore we consider it the most adequate one for these uses.

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