

## ADVANTAGES AND CONSIDERATIONS OF FLAKE ICE

Keeping perishable products at the right temperature involves certain peculiarities. Flake ice has become one of the most popular types due to its strength and the time required to manufacture it.

Although it may seem an insignificant difference, this type of ice offers significant advantages compared to others. The key factor is that flake ice has a faster cooling effect, which makes it particularly suitable for food preservation and refrigeration of large installations.

On the other hand, flake ice is produced differently and has very specific characteristics. It is a type of fragmented ice, cooled to very low temperatures and dry, which causes the water to be below freezing point. Under normal conditions, it is at 0 °C, but in this process it drops to -7 °C, which gives it better heat transfer properties. In addition, its size, which ranges from 5 to 10 square centimeters and has a thickness of 1.5 to 3 mm, provides the advantage of covering a larger surface area and achieving better contact with the products to be cooled. To summarize, due to its inherent characteristics, flake ice is best suited for cooling and preserving perishable products.

According to the Food and Agriculture Organization of the United Nations (FAO), the advantages and disadvantages of flake ice are as follows:

- It has a greater heat exchange surface area compared to other types of ice.
- Being slightly subcooled (between -5 and -7 °C), it can release 83 kcal per kg as it melts and becomes liquid.
- It can extract more heat than other types of ice, which are at 0 °C (80 kcal per kg).
- It is easy to store and handle when it is equipped with a thermo-insulated container, subcooled to -5 °C and suitably designed for storage.
- The machine is small and compact, taking up little space.
- Ice production starts shortly after starting up the machine, which makes it possible to obtain ice almost "on demand".
- The ice can be used immediately after production, without the need for crushing.

The traditional method of obtaining it was by crushing the ice into bars, but this method is obsolete because it is economically and energetically inefficient. Nowadays it is manufactured by ice generators that continuously supply ice flakes with productions ranging from a few kg to tens of tons per day.

The different working systems of these generators mean that the ice obtained is also different, and even if we group it all together as flake ice, its properties vary significantly.

The main differences are found in:

- The shape and size of the pieces.

- The temperature of the inner core of the flake.
- The percentage of moisture. Both the water retained in the ice mass and its surface wetting.

The main working systems of the generators are:

**Drum machines.** Normally for large productions. The ice is formed on a cylindrical surface, dried and separated by a mechanical means (blade or cutter). Thin, subcooled and very dry sheets are produced.

**Pressing screw machines.** The ice is formed on the inner surface of a tube and passed through nozzles that press it, dry it and cut it into small cylinders or sectors. The internal temperature is not as low as in the first case but it still has hard shapes with sharp edges.

**Spindle machines without pressing.** Similar to the previous case but the ice formed inside the flooded tube is scraped and extracted with a spindle without draining. Generally, small pieces of irregular size and shape are obtained; internal temperature very close to the melting temperature of water and high internal and surface moisture content.

For those who handle fresh fish in contact with ice, it is well known that a low temperature of the flake produces a "burn" or thermal laceration of the skin. On the other hand, hard and sharp-edged particles cause mechanical abrasion, which also deteriorates the skin.

The first two types are therefore not recommended for direct contact with fresh fish. The disadvantage of the third is that due to the water content the thermal storage in the form of latent heat is lower per Kg and therefore its persistency.

When we are talking about the contact of ice directly on the human skin, all these considerations obviously take on greater importance.

It would therefore be grossly inaccurate to group all types of flake or shaved ice in the same category when analyzing its use in these applications.

ITV IQ series ice makers are of the third type mentioned above and produce non-subcooled, non-shearing ice with sufficient water content, which is why we consider them suitable for these purposes.

## TYPES OF CRUSHED AND FLAKE ICE AT ITV

### **IQ F**

The IQF range produces Chip ice with 20% humidity, perfect for the food industry, hospitals, laboratories or spas.

**IQ**

The IQ series produces Diamond ice, designed for cocktails; or Granular ice, ideal for supermarkets or transporting fish, fruit and vegetables.

**SCALA**

The SCALA series for flat flake ice is available in different versions depending on whether or not it includes the condensing unit or whether it is connected remotely.

- Compact Scala
- Split Scala
- Remote Scala
- CO2 Split Scala

