

## DISTILLATION

### HISTORY

- Distilling was used as early as 3500 BC in Mesopotamia where perfume makers had developed it as a technique for isolating the scented oils of flowers and plants, what we know as “*attar*”.
- Around 1100 AD wine was first distilled to make spirit by Irish monks who travelled around Europe.
- The results of distillation were considered to have magical powers and this led to alcohol being called “water of life” or “*usige beatha*” in Gaelic, “*eau de vie*” in French and “*aqua vitae*” in Latin.

### Definition

- Distillation is the process of converting a liquid into gas or vapor by heating it and then condensing it back into liquid form.
- When spirits are distilled the original liquid has already been fermented and is an alcoholic ‘wine’ or wash. After the ‘wine’ or wash has been converted into vapor and then condensed back into a liquid it is called a distillate. Impurities are left behind in the original container.
- The equipment used to distill spirits is called a STILL. A still has three essential parts : the **original container** in which the wash or wine is heated to turn into vapor, the **condenser** in which the vapor is cooled, and the **receiver** in which the distillate or distilled spirit is collected.
- This system works because ethanol boils at 78.5°C and water at 100° C. When the alcoholic wash (“wine”) is heated to 78.5°C the alcohol boils off leaving other constituents, mostly water behind.
- The first part of the distillate is the “heads” followed by the “heart” and lastly the “tails”.

- The “heads” and the “tails” contained mostly impurities which also add to the flavor.
- The distiller would decide the amount of impurities required and for what purpose.
- The original liquid from which drinkable spirit is distilled can be grape wine (as in the case of Brandy), sugar wine (for Rum), fruit wine (for Cherry Brandy), or malted or un-malted grain wine (for Whisky, Gin and Vodka).

## **STILLS**

### **POT STILL**

The pot still or the ‘alembic or alambic’ is the earliest and traditional form of still. These were basically enclosed kettles, which narrowed towards the top to collect vapor created by boiling. A downward pipe from the head carried the vapor through cold water and caused it to condense and it could be collected in a receiving chamber.

Copper was the best metal for making the still as it drew out the impurity from alcohol. It produced distilled spirits in batches, one batch at a time. It is a laborious and time consuming process. The stills have to be loaded up, boiled off, cleaned and recharged for every run.

#### **Advantages of Pot Still**

- It produces spirits that are individualistic due to presence of congeners.
- Spirits with pronounced aromas are produced.
- Spirits with heavy body produced.
- Small quantity of wash can be distilled.

#### **Disadvantages of Pot Still**

- It needs more time and labour.
- It is costly to operate.
- Needs frequent cleaning and refilling, after each distillation.

### **PATENT STILL**

It was not until the late 1830's that a new form of still was invented which produced spirit as long as the wash was fed into it. It was called the continuous still or patent still or "Coffey Still" or the columnar still. It had two columns, the "analyzer" and the "rectifier" columns.

The "analyzer" vaporizes the alcohol from the hot wash. The rising alcohol vapors proceeded to the "rectifier" column where they cooled down on coming in contact with the cold wash. This purifies, increases the strength and condenses the alcoholic vapors.

This process produces lighter styles of the spirit (Light body spirits).

### **Advantages of Patent Still**

- It does not require too much labour, cleaning and refilling.
- More quantity is produced as compared to pot still.
- It is cost effective.

### **Disadvantages of Patent Still**

- It is not suitable for distilling small quantities of spirits.
- Aroma and other essential elements that are required in a drink may not be achieved.

## **ALCOHOL CONTENT / PROOF**

Different alcoholic beverages have different alcoholic strengths that are indicated by the word 'proof' on the bottles. In the early days the distiller used to check the strength by adding gunpowder and setting it alight. If it burst with a bang it was too strong and hence "over proof" and if it fizzed out then it was weak and "under proof". If it burned with a steady blue flame it was "proved" to be around 50% alcohol and just right to drink. Hence the proof system was developed.

### **SCALES for measuring alcohol strength**

There are three scales of measuring proof namely:

- **Gay Lussac or GL system:** In this system the proof is equal to the percentage of alcohol in the spirit. So if Vodka has 43% alcohol it is 43° proof GL.
- **British or Canadian Proof:** Bartholomew Sykes devised a hydrometer which calculated that 57.1° % of alcohol is equivalent to 100° % BP. So 100% alcohol is equal to 175° BP.
- **American or US Proof:** In this system 50% alcohol is equal to 100° US proof. Therefore 100 % alcohol is equal to 200° US.

Therefore we can say that :  $100^{\circ} \text{GL} = 175^{\circ} \text{BP} = 200^{\circ} \text{US}$

### **❖ Organization International Metrologique Legale (OIML)**

It is now mandatory for all manufacturers to indicate in % the amount of alcohol on the bottle. OIML is the same as GL, which is the most logical of the systems.