

Tobacco



Tobacco in general

Tobacco is a plant that grows natively in North and South America. Records indicate tobacco was cultivated as early as 1 B.C. by the Native Americans.

China's tobacco market, which is the largest in the world by far (38% of the cigarettes smoked globally), is one of the few markets served directly by a domestic industry. Of the 3.5 trillion cigarettes smoked outside of China, about half are smoked by only ten countries: Russia, USA, Japan, Indonesia, Ukraine, Turkey, India, Brazil, Korea and Italy.

The main tobacco producing countries outside of China are India, Brazil, USA and Indonesia. The major 4 multinational tobacco production companies are Philip Morris International, British American Tobacco, Japan Tobacco and Imperial Tobacco.

Facts & Figures

- There are over 1 billion smokers in the world.
- Approximately 10 million cigarettes are purchased a minute...
- 5 trillion cigarettes are produced on an annual basis
- Tobacco taxes are a major source of income for almost every government in the world.



Tobacco fields.

Tobacco plantations and manufacturing process

Tobacco is cultivated over an area extending from the tropics and subtropics to temperate latitudes such as the Mediterranean. Tobacco is a valuable crop for countries such as Cuba, India, China and the United States.

Leaf tobacco consists of the dried and fermented leaves of the tobacco plant of the nightshade (Solanaceae) family. Tobacco is an annual plant with 20 to 30 leaves growing up to 60cm in size depending on variety and environmental conditions.

The two major tobaccos sold today are Virginia tobacco (*Nicotiana tabacum* L.) and wild tobacco (*Nicotiana rustica* L.). *Nicotiana tabacum* L. is a blend of Oriental, Asian and American tobaccos.

The first step in tobacco processing is the harvesting of the tobacco leaves.

The next step is curing and fermentation which constitutes the crucial tobacco ripening processes. Curing allows for the slow oxidation and degradation of carotenoids. This allows for the agricultural product to take on properties that are usually attributed to the "smoothness" of the smoke.

With regard to curing, a distinction is drawn between natural curing (sun or air) and artificial curing (fire or hot air). During the curing process relative humidity is very important (*See the tobacco curing schedule on page 3*). In some cases, after curing a further drying process is required in order to adjust the moisture content to about 10-12%.

The next step is fermentation where there are also two possibilities, one being natural and the alternative being chamber fermentation.

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Tobacco plantations and manufacturing process

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The final stage of the production process is the aging where the content of the aromatic substances are markedly increased.

In order to have the best quality tobacco leaves for further processing, the leaves should have moisture content between 12-16%, so an ambient relative humidity of 60 to 68% is required to maintain equilibrium. If lower than 60% rh, the tobacco leaves will lose moisture and weight causing poor quality.

Any temperatures over 25°C will negatively affect the tobacco leaves and will reduce the quality of the tobacco in addition to causing post-production fermentation.

Why the need to measure the relative humidity and CO₂?

Storage & transport

Tobacco is stored between all phases of processing. If the tobacco is not stored at the correct temperature and humidity, the quality of the tobacco won't meet requirements.

If tobacco becomes heated, it may dry out and the aromatic substances contained in it are volatilized. In this case, the tobacco acquires a hay like, bitter, sharp flavor. It may also become hard and brittle, meaning that the leaves break under the slightest mechanical stress and eventually end up as

powder. During storage and transport, a temperature below 24°C is always recommended. As the moisture content of the tobacco leaves is very important (and varies between the different tobaccos) the relative humidity level must be monitored during storage and transport.

Moisture content levels:

- Oriental tobacco: 12-14%
- Virginia tobacco: 10-13%
- Virginia & Burley: 10-12%

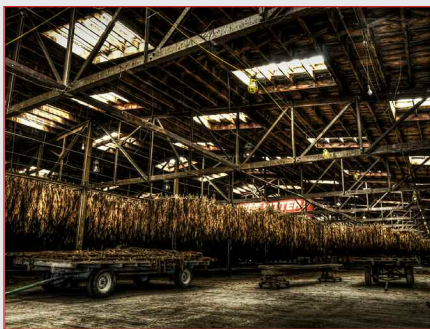
In order to maintain these moisture levels an equilibrium relative humidity level between 60 and 70% is required.

Tobacco leaves are highly hygroscopic. If the relative humidity is excessive, the tobacco absorbs so much water vapor that it becomes a nutrient medium for molds. Mold, mustiness, mildew stains and a musty odor reduce the quality of the tobacco. Depending on the mold, white, grey, green or black spots are visible on the tobacco leaves.

In the case of excessive heat and humidity, the fermentation process may start up again. In which case the temperature in storage may rise by up to 2°C per day. It is highly recommended to monitor the temperature so that adjustments can be made in order to stop the fermentation process if required.

Like the raise in temperature due to the fermentation process, there is also a increase in the CO₂ levels if excessive heat and humidity are allowed to remain in the storage area.

continued



*Tobacco hanging warehouse
... Tobacco fermentation ...
Tobacco storage.*

Storage & transport

(continued)

Because increased levels of CO₂ are an indication of fermentation, monitoring the CO₂ in the storage areas and during transport acts as an alarm system for excessive fermentation activity. Additionally if the CO₂ concentration is too high, lives could be put a risk.

Smoke testing chambers & tobacco sample conditioning

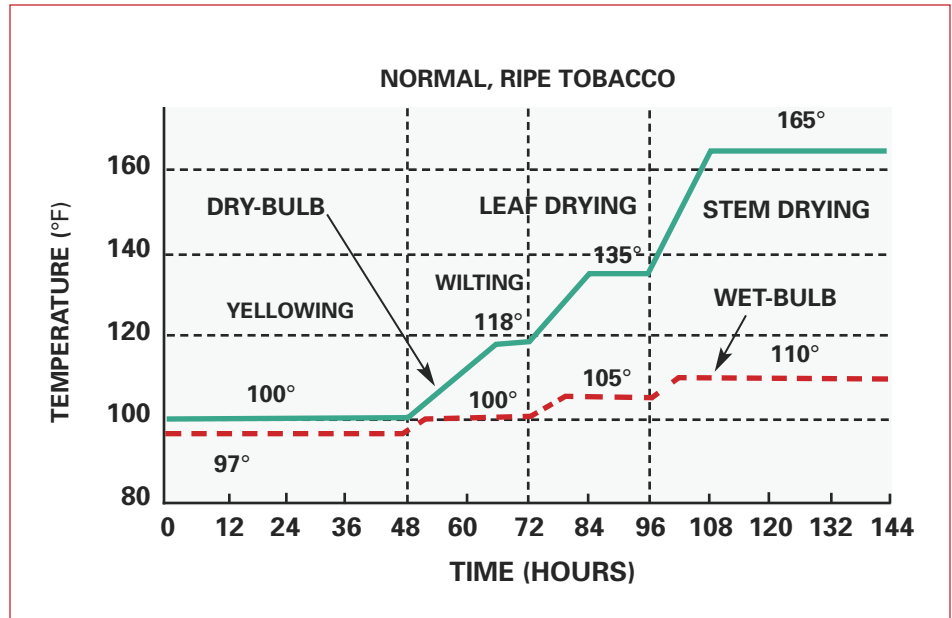
There are many guidelines and regulations that need to be followed while manufacturing tobacco products. ISO 3402:1999—Tobacco and tobacco products—Atmosphere for conditioning and testing is the generally accepted standard.

Each and every cigarette manufacturer must ensure compliance with market regulations. The standard guidelines usually specify certain relative humidity levels and a certain temperature level that must be maintained during storage and production.

Additionally, regulations guide the measuring and reporting of these parameters:

- Tar
- Nicotine
- Carbon monoxide
- Other smoke emissions associated with tobacco-related diseases

TOBACCO CURING SCHEDULE



In order to get the best quality dried tobacco, the tobacco curing schedule (in °F) must follow this trend.