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**Leaf tobacco - Threshing and redrying –  
Technical specification**

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# Leaf tobacco - Threshing and redrying - Technical specification

## 1 Scope

This Standard specifies technical requirements for each process of threshing and redrying.

This Standard is applicable to flue-cured tobacco and burley tobacco.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 2635, *Flue-cured tobacco*

GB 8966, *Burley tobacco*

GB/T 18771.2-2002, *Tobacco vocabulary - Part 2: Tobacco processing and tobacco products*

GB/T 21136, *Threshed tobacco - Determination of stem content*

GB/T 21137, *Leaf tobacco - Determination of strip particle size*

YC/T 31, *Tobacco and tobacco products - Preparation of test sample and determination of water content - Oven method*

YC/T 137.1, *Package of redried strip - Corrugated carton*

YC/T 147, *Threshed tobacco - Quality inspection*

YC/T 159, *Tobacco and tobacco products - Determination of water soluble sugars - Continuous flow method*

YC/T 160, *Tobacco and tobacco products - Determination of total alkaloids-Continuous flow method*

YC/T 161, *Tobacco and tobacco products - Determination of total nitrogen-Continuous flow method*

A technical process that conducts high temperature treatment to the stem that has been subjected to threshing and classifying, so that the moisture content of the stem reaches the specified indicator, which is conducive to long-term storage.

### **3.8 lamina packing**

A process that conducts batch metering, pre-compression molding, packing-bundling, marking to the redried lamina.

## **4 Technical requirements**

See Annex A for the technical flow of threshing and redrying.

### **4.1 Preparing**

#### **4.1.1 Technical task**

**4.1.1.1** All raw materials of tobacco leaf that enter the production workshop shall be metered and make detailed records.

**4.1.1.2** The quality and quantity of raw materials of tobacco leaf that are put in each batch shall meet the requirements of production regulations.

**4.1.1.3** Prepare raw materials for threshing proportionately according to proportion grade and quantity requirements strictly.

**4.1.1.4** Stack raw materials of tobacco leaf in order according to batch number. The interval between batches is not less than 1m. Do not stack wrong or stack mixed or stack super-highly (the height limit is 2m).

**4.1.1.5** Supply raw materials of tobacco leaf in balance according to batches, sequence or ratio requirements.

#### **4.1.2 Requirements for materials**

**4.1.2.1** The grade quality, moisture content and natural sand content of raw materials of tobacco leaf shall meet technical requirements of GB 2635 and GB 8966.

**4.1.2.2** The origin, type, variety and quantity of raw materials of tobacco leaf shall meet requirements.

**4.1.2.3** The bale has no serious damage. There shall be no mildew, odor, pollution, water stains, sundries, and untreated maggot tobacco leaves in the bale.

#### **4.2.4 Equipment requirements**

**4.2.4.1** Cabinet doors, vacuum butterfly valves, blowout valves, safety valves, cooling towers, condensate pumps, water tanks, meters shall meet the equipment design requirements.

**4.2.4.2** There shall be no damage or deformation of in-cabinet deflector and side-wall deflector.

#### **4.2.5 Process requirements**

**4.2.5.1** When the ambient temperature is lower than 25°C, the moisture content of the tobacco leaf is lower than 16%, or when the tobacco leaf is compacted, it shall use vacuum conditioning.

**4.2.5.2** Steam pressure, water pressure, compressed air pressure shall meet the requirements of technical conditions.

**4.2.5.3** Determine the vacuum conditioning cycle according to tobacco leaf's origin, type, grade, variety, moisture content, and degree of tobacco sticking.

**4.2.5.4** There shall be a gap between the bale and its carrier, between the inner wall and the door of the vacuum cabinet. They shall not be in touch. Stack the bales neatly.

**4.2.5.5** Tobacco leaves after vacuum conditioning shall not be sealed in a vacuum cabinet. The bale storage time after leaving the cabinet shall not exceed 30min. In case of equipment failure, measures shall be taken to unpack the bale.

**4.2.5.6** Tobacco leaves shall be loose and soft after conditioning. Maintain the original color and luster, no flushing or water staining on the lamina.

#### **4.3 Leaf spreading, tipping and loosening**

##### **4.3.1 Technical task**

**4.3.1.1** Spreading the materials continuously, uniformly and neatly on swing bar conveyor according to production requirements.

**4.3.1.2** When tipping and threshing, cut the tip of the tobacco stem less than 1.5mm in diameter.

**4.3.1.3** Exclude non-tobacco leaf material, green, mildew, oily, worm-eaten tobacco leaves and tobacco leaves that do not meet the requirements. Separate shredded cigarettes in tobacco hand.

##### **4.3.2 Requirements for materials**

**4.4.4.3** Tobacco leaves should be loose after conditioning, without sticking, water stains, flushing leaves, steamed slices. Ensure the original color of tobacco leaf.

**4.4.4.4** After single ordering, tobacco leaf is characterized by soft lamina. Tobacco tendons do not break easily when held by hand. Lamina can be torn off from the tobacco tendon. The tear is not smooth.

**4.4.4.5** After double ordering, tobacco leaf is characterized by soft tobacco lamina and tendon when held by hand. Lamina can be torn off from the tobacco tendon easily. The tear is smooth.

**4.4.4.6** In case of failure, shut down the soda valve in time. when the downtime is more than 15min, the tobacco leaves in the cylinder shall be transferred out to dry.

## **4.5 Sand sieving selection**

### **4.5.1 Technical task**

Remove debris such as sand, tobacco bugs and eggs mixed in tobacco leaves. Separate shredded tobacco.

### **4.5.2 Requirements for materials**

Meet the requirements for single-ordering technical indicators in 4.4.2.

### **4.5.3 Process requirements**

**4.5.3.1** Tobacco leaf flow is uniform, in line with equipment process capacity.

**4.5.3.2** Sieving holes are not blocked. The output is smooth after sieving.

## **4.6 Leaf base, tip selection**

### **4.6.1 Technical task**

**4.6.1.1** Manually pick out green tobacco, moldy tobacco, sundries, and other tobacco leaves that do not meet technical requirements.

**4.6.1.2** Manually open bundle of bundled tobacco hands.

### **4.6.2 Requirements for materials**

**4.6.2.1** Meet the requirements for single-ordering technical indicators in 4.4.2.

**4.6.2.2** Tobacco leaves are loose. The flow distribution is uniform.

### **4.6.3 Process requirements**

NOTE 3: For burley tobacco, the lamina rate for the lamina of which the size is greater than 12.7mm×12.7mm is respectively reduced by 2%, 3% and 5% according to first-class tobacco, medium-class tobacco and low-class tobacco based on flue-cured tobacco and the lamina rate of other specifications shall remain unchanged.

#### **4.8.4 Equipment requirements**

The sealing and abrasion resistant materials are good, stable. The sealing is good and it shall not fall easily.

#### **4.8.5 Process requirements**

**4.8.5.1** According to the specific situation of different types, grades and varieties of tobacco leaves, control the feeding flow of tobacco leaves. Make technical adjustments to the frame, the speed of the roller, the air volume, the air speed, and the speed of the throwing roller.

**4.8.5.2** Reasonably adjust the amount of threshing air at each level of threshing line. The ratio of the production rate of the first-class threshing and classifying to the production rate of whole-line lamina is 60%~65%. The ratio of the production rate of the second-class threshing and classifying to the production rate of whole-line lamina is 20%~25%.

**4.8.5.3** According to lamina content in stem, timely adjust the air volume of the stem-backing system.

**4.8.5.4** When the production is over or the tobacco leaf grade is changed, the residual material in the machine shall be removed.

#### **4.9 Strips storing and leaf distribution**

##### **4.9.1 Technical task**

**4.9.1.1** Further mix the lamina of each formulation group uniformly.

**4.9.1.2** Further balance the moisture of lamina.

**4.9.1.3** Realize balanced production in previous and next procedures.

##### **4.9.2 Requirements for materials**

**4.9.2.1** The moisture content of material and flow are uniform.

**4.9.2.2** Same with 4.8.3.

##### **4.9.3 Quality requirements**

After strips storing and leaf distribution, the coefficient of variation of nicotine (that is, standard deviation / mean of nicotine × 100%) is less than 10%.

moisture content of the left, middle and right of the redryer tail is extremely poor, less than or equal to 1%.

**4.10.3.3** The lamina temperature of the redryer tail is 50°C~55°C.

**4.10.3.4** The content of class-one sundries is zero. The content of class-two and class-three sundries shall not exceed 0.00665%.

**4.10.3.5** Lamina rate difference of lamina with a size greater than 12.7mm×12.7mm before drying and after drying: less than 4% for first-grade tobacco, less than 5% for medium-grade tobacco, less than 6% for low-grade (interior) tobacco. The lamina rate difference of burley tobacco is increased by 1% based on flue-cured tobacco.

#### **4.10.4 Equipment requirements**

**4.10.4.1** The instrument works as normal. The display is accurate. The equipment automatic control system works normally.

**4.10.4.2** The heating and humidifying system and transmission components are intact. Mesh is not blocked.

**4.10.4.3** Steam, water, compressed air pipes and nozzles are unblocked. Nozzle atomization effect is good.

**4.10.4.4** Various valves and pipe joints have no running, emitting, dripping or leaking. Condensate circuit is clear.

**4.10.4.5** The air speed of the mesh surface is even in all areas.

#### **4.10.5 Process requirements**

**4.10.5.1** Steam pressure, water pressure, and compressed air pressure meet equipment requirements.

**4.10.5.2** Preheat the equipment before feeding. Preheat 20min ahead in summer, 25min ahead in winter.

**4.10.5.3** Timely adjust the speed of the feeding scraper, the feeding conveyor belt and the uniform blade roller according to the tobacco leaf flow. Adjust the speed of the screen according to the moisture content and thickness of the tobacco leaf.

**4.10.5.4** Set the temperature of the drying room according to the moisture content of lamina. Use arc constant temperature method. Slowly dry at a low temperature. The temperature of drying room does not exceed 100°C. The temperature of cooling room is 35°C~45°C. The temperature of conditioning room is 55°C~65°C. For burley tobacco, increase the temperature by 5°C on

**4.11.4.2** The sieving holes of the tobacco stem shaker shall not be blocked. Stem delivery is smooth.

#### **4.11.5 Process requirements**

**4.11.5.1** Steam pressure and compressed air pressure meet equipment requirements.

**4.11.5.2** Before feeding, the equipment shall be preheated for 15min~20min.

**4.11.5.3** Distribute the tobacco stems evenly on the grill belt. Send them into the stem dryer to dry.

**4.11.5.4** According to the stem flow and moisture content, reasonably set the mesh belt speed and drying room temperature. The drying room temperature does not exceed 120°C.

#### **4.12 Debris and detritus disposal**

##### **4.12.1 Technical task**

**4.12.1.1** Separately bake the broken lamina generated by the production line. Sieve the baked broken lamina according to the required specification.

**4.12.1.2** After excluding the stem contained in the broken lamina of which the size after sieving is greater than 2.36mm×2.36mm, blend into the baked lamina uniformly. Separately pack the detritus of which the size is less than 2.36mm×2.36mm or pack by size according to customer needs.

##### **4.12.2 Requirements for materials**

The material flow is uniform.

##### **4.12.3 Quality requirements**

**4.12.3.1** The moisture content of baked debris and detritus is 11%~13%. The percentage of stem in debris and detritus is less than or equal to 0.5%.

**4.12.3.2** Requirements for sundries by debris and detritus: the content of class-one sundries is zero; the content of class-two and class-three sundries shall not exceed 0.00665%.

##### **4.12.4 Process requirements**

The redrying temperature for debris and detritus is less than or equal to 100°C. The moisture content after drying is uniform and consistent.

The stem packing shall meet the following requirements (or according to the contract requirements):

- a) Sack packing: shall be lined with film bag; net weight of stem packing is  $(30.0 \pm 0.2)\text{kg} \sim (50.0 \pm 0.2)\text{kg}$ ;
- b) Carton packing:  $(200.0 \pm 0.8)\text{kg}$ .

#### **5.2.4 Process requirements**

**5.2.4.1** Marks are clear and complete. Weighing is accurate.

**5.2.4.2** Packaged tobacco stems shall be stacked neatly in the designated position.

**5.2.4.3** Do not stack in the open air.

**5.2.4.4** The stem temperature before packing shall not exceed  $50^{\circ}\text{C}$ .

#### **5.3 Debris and detritus packing**

##### **5.3.1 Technical task**

Pack and mark the baked debris and detritus according to a certain packing specification and mass.

##### **5.3.2 Material standard**

Same with 4.12.3.

##### **5.3.3 Quality requirements**

The debris and detritus packing shall meet the following specification requirements (or according to the contract requirements):

- a) Sack packing (lined with film bag): net weight is  $(25.0 \pm 0.2)\text{kg} \sim (30.0 \pm 0.2)\text{kg}$ ;
- b) Carton packing:  $(150.0 \pm 0.5)\text{kg}$ .

##### **5.3.4 Process requirements**

**5.3.4.1** Weighing is accurate. Marks are clear and complete.

**5.3.4.2** The packed debris and detritus shall be stacked neatly in the designated position.

**5.3.4.3** Do not stack in the open air.

**5.3.4.4** Collect floor debris and detritus. After excluding sundries, put into the

#### **7.4.1.5 Testing of moisture content of cold room lamina**

In the cold room sampling room, from the horizontal left and right sides of the dryer, vertically sample 100g~150g at the same time. Immediately put into a sample container. Seal and mark. Send for testing. Sample once every hour for each production shift.

#### **7.4.1.6 Testing of moisture content of lamina at dryer tail**

##### **7.4.1.6.1 Testing of moisture content of lamina at tail moisture meter probe**

At the moisture meter probe at the lamina redryer tail, randomly extract 100g~150g of sample. Immediately put into a sample container. Seal and mark. Send for testing. Sample once every 2h for each production shift.

##### **7.4.1.6.2 Testing of moisture content at left, middle, right parts at tail**

At the screen width direction at the lamina redryer tail, on the left, middle and right parts, respectively extract 100g~150g of sample at the same time. Immediately put into a sample container. Seal and mark. Send for testing. Sample once every 4h for each production shift.

#### **7.4.1.7 Testing of moisture content of hot box lamina**

At the lamina baler, use a hydraulic tubular sampler ( $\phi 40\text{mm} \times 660\text{mm}$ ) to sample. The sample mass is 80g~120g. Put into a sample container. Seal and mark. Send for testing. The first box of samples of each shift production must be tested. Sample once every 3 boxes after that.

#### **7.4.1.8 Testing of moisture content of stem before packing**

Take 80g~120g of samples at the stem packing material landing position after redrying. Use a glass bottle or plastic bottle to pick. Cap tightly. It shall not use hands to touch. Send for testing after a mark is added. Sample once every hour for each production shift.

#### **7.4.1.9 Testing of moisture content of debris or detritus before packing**

Extract 80g~120g of samples at the packing material landing position of debris or detritus after drying. Use a glass bottle or plastic bottle to pick in 3 times. Take approximately one-third capacity each time. Immediately cap tightly. It shall not use hands to touch. Send for testing after a mark is added. For debris that is blended into lamina after drying, at the exit after the debris is dried, sample according to the above method. For the broken lamina packed in carton, sample once for each box. For the broken lamina packed in sack, sample once every hour for each production shift.

#### **7.4.2 Testing**

1000g~1500g of stems. Sample once every 2h for each production shift.

### **7.9.2 Testing method**

In accordance with YC/T 147.

## **7.10 Temperature testing**

### **7.10.1 Sampling**

#### **7.10.1.1 Testing of bale core temperature after vacuum conditioning**

Randomly select one bale from the bales at the exit of vacuum pre-conditioner. Make a hole in the center of the side of the bale as the temperature measuring point. Test once every 2h for each production shift.

#### **7.10.1.2 Testing of single ordering temperature**

Sample at the exit of single hot-air conditioner. Test once every 2h for each production shift.

#### **7.10.1.3 Testing of double ordering temperature**

Sample at the exit of double hot-air conditioner. Test once every 2h for each production shift.

#### **7.10.1.4 Testing of tip conditioning temperature**

Sample at the exit of tip-conditioning hot-air conditioner. Test once every 2h for each production shift.

#### **7.10.1.5 Testing of lamina temperature after drying**

Sample on the conveyer belt at lamina redryer tail. Test once every 2h for each production shift.

#### **7.10.1.6 Testing of box core lamina temperature**

Insert a needle into the center of the lamina box after packing and pressing to open a hole as temperature measuring point. Test once every 9 boxes.

### **7.10.2 Testing method**

#### **7.10.2.1 Testing instruments and equipment**

Point thermometer.

#### **7.10.2.2 Operating procedures**

Put the tobacco leaf sample into an airtight sample container. Use a

At the packing place, randomly extract 10 sets of strip packs. At the same time, randomly select 5 boxes of finished laminas. Respectively sample once per baler per shift.

#### **7.13.1.2 Testing of net weight of stem**

At the stem packing place, randomly extract 10 sets of packs. At the same time, randomly select 5 boxes (bales) of fished stems. Sample once per shift.

#### **7.13.1.3 Testing of net weight of broken lamina**

At the packing place of broken lamina, conduct in accordance with 7.13.1.2.

#### **7.13.2 Testing method**

In accordance with YC/T 147.

### **7.14 Testing of packing appearance**

#### **7.14.1 Sampling**

##### **7.14.1.1 Testing of strip packing appearance**

Sample at the lamina packing place. Conduct the sample extracted during quality testing.

##### **7.14.1.2 Testing of packing appearance of stem and broken lamina**

Sample at the packing place of stem and broken lamina, conduct the sample extracted during quality testing.

#### **7.14.2 Testing method**

In accordance with YC/T 147.

### **7.15 Testing of chemical composition**

#### **7.15.1 Sampling**

For the testing of chemical composition of crude tobacco, determine once per grade per lot per origin of tobacco leaf. After boxing and before packing, conduct testing of lamina's chemical composition. Test once per 100 boxes (or according to the contract requirements). Evenly mix the excess samples of 7.4.1.7 as testing sample.

#### **7.15.2 Testing items**

The testing items for chemical composition of crude tobacco and lamina include:

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