

## Tea Processing



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## Introduction:

The processing of tea follows many stages, and various methods are used depending on the factory and region. The photos used in this brochure were taken at one of the factories belonging to the Rwanda Tea Authority, and although a relatively old and out dated plant, the process used is the same as in more modern factories, only the equipment used is not of the latest technology.

Each plant engineer has his or her own preference for the exact specifications of the belting they use, but in each process the same criteria must be considered.

## Process Description:



### *1. Picking and transporting of green leaf.*

Whether the leaf is picked by hand or by machine, at most factories the leaf is placed in a bag and transported to the factory in the bag by a tractor/ trailer (**Photo 1**). The off loading of the bags from the trailer varies, but in most cases the bag is conveyed to the withering trough by means of an overhead chain conveyor. In some factories the bags are conveyed on a belt conveyor and the belt can be either a flat slider bed or troughed roller bed. These conveyors are usually long in length and as the tea is still in the bags at this stage the belt does not need to be F.D.A. The conveyor is often also exposed to the elements and this must be taken into consideration when selecting the correct belt. **Breda 20 CK** for flat sliderbed **or Drago 20 CC** for troughed roller beds can be used.

## 2. Withering.

Two methods of withering are being used today. The older traditional method, where the tea leaf is placed in a withering trough with a mesh surface (**Photo 2**). Hot air is then blown through the tea to speed up the withering process. The direction of the airflow is reversed periodically to ensure an even withering takes place. The withered leaf has a moisture content of 72% compared to a green leaf, which has a moisture content of between 78% and 80%



A new method is being experimented with where the tea leaf is placed on a mesh belt and the same method as the old is used, except that the conveyor moves at a very slow speed and the withered tea is dumped off the end of the withering conveyor onto a take away conveyor which conveys the withered leaf to the next phase.

In neither of these methods is our range of belting used, except on the take away conveyor in the new method. This conveyor is normally an **Espot 20 CC** or **Clina 21 CK**.

### ***3. Rolling and Crushing.***

Once the leaf has been withered it is then transported into the factory. This is either done by returning the leaf to the bags and the bags being conveyed to the factory by means of overhead chain or by a troughed belt conveyor or by chute. In the factory the leaf put through the rotor vane where it is rolled and crushed (**Photo 3**). The tea falls onto a flat belt conveyor after this process and is conveyed to the next stage. Due to the high level of moisture at this stage a **Clina 12 CK** or **Clina 21 CK** is recommended. If there is a high chance of the tea getting onto the pulleys then a flexible weft must be used (**Clina 21CK**).



### ***4. Crush, Tear and Curl (C.T.C.).***

The crushed tea is now passed through the C.T.C. machines where the tea is cut down to the final size (**Photo 4**). There are normally three C.T.C. machines in line and the belt recommended here is the **Clina 20 CK**. The belt is highly tensioned and thus the need for a high working load. After this process the moisture content of the tea is between 68% and 70%

When the tea is in the C.T.C. process, the liquid from the leaf is corrosive and **Clina 20 CK**, with its 1,5mm thick PVC top cover, is more durable than other belts.

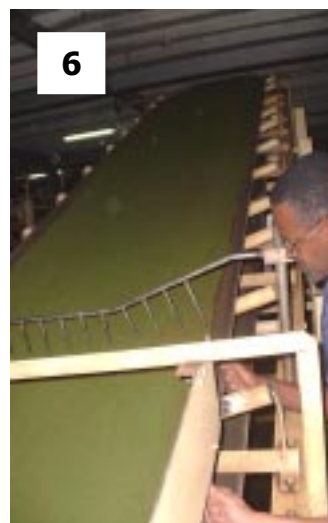
## 5. Fermentation.

After the C.T.C. process the tea is fermented. This is similar to the withering process but now with the tea in a much smaller size. During this process the tea turns from green to brown.

The fermentation is done using two different methods. The one method is to put the tea into small trolleys through which cold air is pumped.

The second method is to use the continuous method. The tea is conveyed from the C.T.C. machine onto the continuous fermenter (**Photos 5 & 6**). The machine consists of a long, slow moving, conveyor, with agitators (also called ball breakers) above the belt to turn the tea over. Fans blow air onto the tea to speed the process. The fermenter normally consists of three or four conveyors either in-line or one above each other (**Photo 7**).

The recommended belt for this application is the **Clina 20 CK**.



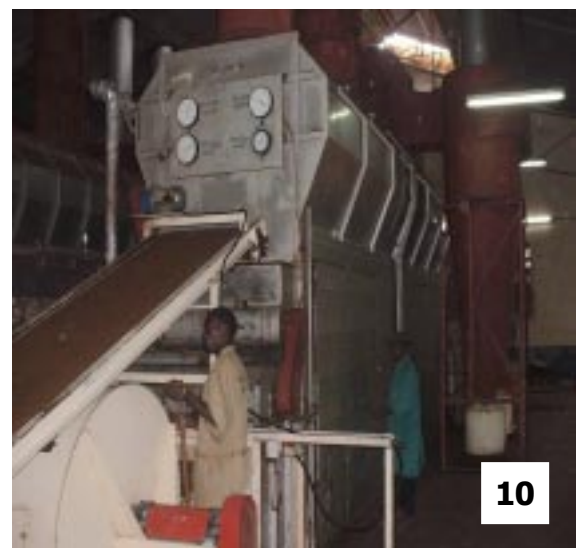
## 6. Drying.

After fermentation the tea is dried by passing through a drier. The feed to the drier is normally by an incline belt conveyor of a vibrating table or a combination of both (**Photos 8, 9 & 10**). The belt used on the conveyor can be **Clina 12 CF** or **Clina 20 CF**.



Up to this stage there has been a lot of moisture and water and it is recommended to use belting with a «K» embossed bottom cover. After drying there is no longer moisture in the tea and the belting no longer has to have a bottom cover. The moisture content after drying is 2% to 3%

After the dryer the tea is hot and some factories do not want the hot tea to be conveyed on PVC belting as the tea absorbs the taste of the PVC. The recommended belt to use directly after the dryer is either **Clina 10 FF** or **Clina 16 FF** (**Photo 11**). The «roughness» of the **Clina 16 FF** allows for the tea to be elevated and very little slippage to occur.





12

## 7. *Sorting.*

The tea is now conveyed to the sorting section, where it goes through a primary and secondary line. A series of static drums extract the fibres from the tea and thereafter it is sorted according to size by means of vibratory mesh screens (**Photo 12 & 13**).

Through out this section the **Clina 10 FF** or **Clina 16 FF** are the preferred belts. When the tea has cooled down and needs to be inclined at a steep angle the **Aster 21 HF** or **Clina 12 CF** fitted with cleats are used.



13

## 8. *Tea Holding Bins.*

After the sorting is completed the tea is stored in mini silos or bins. The tea is conveyed to the top of the silos/bins either by an air conveyor, continuous chain bucket elevator or inclined belt conveyor (**Photo 14**). The recommended belt to be used here is the **Clina 12 CF** with cleats and Runer sidewalls



14

## 9. *Bulking.*

Prior to the tea being packed, the different sizes are mixed in predetermined quantities. Normally a troughed belt runs under the silos/bins and the rate of feed from each silo/bin determines the mixture. The belt used here is a **Clina 21 CK** or **Espot 20 CC**

## **10. Packing.**

The mixture of tea is then packed into bulk bags for shipment to the final tea packers. The tea is conveyed into the packers by continuous chain bucket elevator or inclined belt conveyor (**Photo 15**). The recommended belt to be used here is the **Clina 12 CF** with cleats and Runer sidewalls.

### **Conclusion**

Due to their remote positioning, tea factories often carry their own stocks of belting, and because of their quest to keep down their stocks, the factories try to keep the widths of the belts constant and for this reason also try and use the same type of belting in as many places as possible. For this reason it is common for CK belts to be used on roller bed conveyors where possibly a CC belt would be the better choice.

