Banding Tape Application Care :

1. **Use temperature** : **Temperature of Banding tape *must be at room temperature at the time of application.* Storage, when not in use, must be under refrigeration.** Since the banding tape are required to be stored under refrigeration, it is suggested that the tape be removed from refrigerator about 24 hours prior to use, the purpose is to ensure that it is at ambient temperature at the time of use. It is best to retain the roll in plastic packaging till ambient temperature is achieved to avoid condensation of moisture on the Banding Tape. It is very important to note that Under cold condition, it may not unwind properly or chatter or break easily. Upon utilizing the banding tape, to store the remaining tape it is necessary to tie knot on the roll end to help in the subsequent pull out and store such tape in a sealed plastic bag in refrigeration and off course follow the preparation before use all over again.
2. **Drawing the tape from the roll must always be consolidated,** which means all the ends (threads) of the width must be pulled together or the tape is bound to split. To avoid splitting of the tape while being pulled it is best to tie the tape into a simple knot and pull the knot ensuring a consolidated pull of tape. When you cut the tape at the end of application, tie knot on the roll end. This will help in the subsequent pull out
3. **Application condition** : Banding Tape is suitable for either hot or cold application. Hot application is widely preferred for dynamic application like in rotating machines. During the hot banding stage, the resin impregnating the tape is softened by heat thus facilitating , at an equivalent amount of pull used in cold application, a better penetration of the glass yarn. The thickness of band is therefore about 10 % lower than that of cold banding. A residual pull amounting to 60 to 70 % of the original pull may be obtained. Certain static application like Transformer Core banding are successfully cold banded without further curing. In all cases a firm anchoring of the tape at the start of banding operation and a final locking at the end of banding, which secures the band, is necessary.
4. **Banding Tension** : **Banding tape must be always be applied under tension**. Therefore the tension equipment must be under calibration and **should have jerk- free operation**. Tape tension should not exceed the maximum specified value. A calibrated tension measuring device is necessary to obtain consistent banding tension. Uniform tension across the width of Banding tape is necessary both at the time of application or testing to obtain optimum strength. Recommended pull during banding from 50 to 100 kg per cm. This may vary from job to job. Take Precaution not to harm/damage to underlying insulation during tape application or during curing stage….

.....due to wrong pull tension. For soft winding banding tension of less than 50kg per cm is also known to have worked well. The tension device for applying Banding Tape to armature must have flat, rotating pulleys and a tension drum which be capable of creating a steady uniform tension from 30 to 100Kgs per cm without damage to the tape. The device should feed the tape straight to the banding surface without twists or turns. Jerks cause high momentary surge in tension going beyond the tensile strength of the Banding Tape causing it to break fully or partially.

5 **Consolidation of Windings** : Optimum results are obtained when the band is applied to a consolidated winding in such a manner that the restraining force of the band is applied to a consolidated band exceeds the tangential forces generated by the rotating armature.

6 **Determination of Tangential force (F)** which the banding will have to withstand.

Which is worked out using the formula:

$$F(Kg) = \frac{P \times R \times N^2}{5.6 \times 10^6}$$

Where

P= Weight in Kg of winding

R = Reading distance in mm between winding & axis of rotation .

N = Max. service speed (RPM)

7 **Determination of require no of tape Turns** :

Which is worked out from the formula:

$$n = \frac{F \times Ks}{C \times L}$$

Where

F = Force in Kg as worked out .

L = Width of tape used in Cm

Ks = safety coefficient (normally Ks=5)

C = Tensile breaking stress of tape in Kg/cm i.e. 180Kg/cm minimum.

8 **Residual Pull** is the permanent remaining pressure exerted on the winding.

Residual pull of banding depends on four basic features

i. The stiffness of winding on to which the banding is being applied.

ii. The amount of pull applied

iii. The temperature of application (generally at 80 to 100°C- the resin flows well & offers optimal setting of glass yarn)

iv. Banding speed i.e. if the banding speed is too high, the tape turns will have inadequate time to set.

The above factors are best addressed with following operating parameters

Pull : 50 to 100 kg/cm for practically stiff windings. For protruding winding heads and uncompressed winding heads the pull should not be more than 50 kg/cm

Temp : 80 to 100°C

Banding speed : 10 approx m/min.

9 **Securing the tape end** : After banding operation it is important to secure firmly the tape end by hot sealing usually done with hot soldering iron, so that the band does not open subsequently while the equipment in operation.

10 **Curing/Baking temperature and time cycle** : Banding Tape must be cured after banding operation When baking the armature to cure the Glass Fibre Banding Tape, be sure that the correct temperature setting and time cycle is being used. Must ensure temperature indicating controller is calibrated and functioning properly. The curing time to be considered is the time starting once the job has reached the recommended curing temperature. A true curing time-temperature cycle recorder is highly recommended to avoid subjectivity. Curing temp. & duration can be selected from following table, which is exclusive of the time the job requires to reach the desired temp.

Time (Hrs)	3.5	5	10
Temperature(ºC)	160	150	135

11. **Speed of application :** Normally between 10 to 15 m/min**.**

12. **Final locking :** After completion of band, secure the end of tape by hot Soldering Iron to prevent opening or sliding back of the tape, which if happens will compromise the desired tension built up.

13 **Transportation :**

Banding Tape require special/quick transportation arrangements. Mutual consultation is suggested for appropriateness depending on transit period, available modes, handling etc. Considering the sensitivity of banding tape promptness is required by the buyer to take delivery of consignment & store under refrigeration suitably.

In addition to quality, storage & appropriate application play equally important role on product's performance.

14. Disclaimer The above notes are prepared from customer feedback, available information & data. This compilation of notes is for private reference, not meant for wide circulation and is without any claim. The information contained herein is in good faith, without any express or implied liability, warranty, intent of infringement and therefore shall not be liable for any claim, damages, loss etc. from its use, etc. It is not possible for us be aware of all application and process at various entities. Therefore, it is imperative that the user establishes satisfactory performance independently for any proposed application of the product.

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