volta™
Belting Technology

The Next Step
in **Belting**

Belts for Retrofits

Conveying Solutions

The Principle of Selection

Volta belts made from radically different materials than conventional plied belts. **Volta belts can replace plied belts without retrofitting the conveyor but there is no chart of equivalents where a given plied belt reference can automatically be replaced by a specific Volta type.** Instead, the user needs to consider three factors - product load, operating temperature and friction. These factors permit one to calculate the suitable Volta types which can work in these conditions. This calculation is expressed as the 'pull force'. This limits the selection of a Volta belt type that conforms to both the pull force and that works with the 'MPD' of the conveyor (see below for a definition of 'MPD').
Further factors can reduce the range of choice further; e.g. food grade, requirement for a texture and chemical action. These are all secondary factors in belt selection.

Let us look in detail at the required information needed to choose a belt.

A Volta flat belt can be selected in almost all situations and applications by taking the following 8 things into account:

1. **Maximum Load;** confirm the maximum load on the belt. This is the maximum weight that could be on the belt at any given moment. **If there is accumulation, this must also be noted.**

2. **Pull Force (PF);** This is the strength of the belt required or available, expressed in a unit of weight across the belt width. e.g. kg/cm for metric. Additional PF can be available in a given belt by increasing the pretension.

3. **MPD;** Confirm the pulley diameter – we only need to consider the smallest pulley diameter; this is called Minimum Pulley Diameter (MPD). N.B. Any fabrications welded onto the belt such as guides, cleats and side wall, will increase the required MPD of the base belt. **In most cases, Volta will copy all welded/fabricated elements (guides, cleats and side wall) from the original ply belt. Note that this does not mean that a Volta fabrication can work on the same MPD as the replaced ply belt.**

4. **Working Temperature;** as a rule of thumb, measure **belt** temperature immediately before and immediately after the intake and outfeed. Consult regarding use of belt in applications where belt temperature is over 40 degrees Celsius.

5. **Back Flexing/Contra-Flexion;** Where the belt bends around more than two pulleys, there may be extra pulleys where the belt flexes in the opposite direction from its normal working direction (see below in description of centre drive and Z conveyors). Note and report the MPD of the back- flexing (contra-flexion) pulleys around which the belt wraps backwards. They must be at least 50% larger than the recommended MPD.

6. **Slide bed construction;** the slide bed is the support surface/element that is under the belt.This can be; steel plate or profile, rollers, plastic plate or profile, UHMW that is located under the belt (ultra-low friction material such as PE1000) or, rarely, wood.

7. **Angle of incline/decline;** Where a section or even all of the belt is not working on a horizontal plane, note the conveyor angle.

8. **Start/Stop;** We recommend fitting a soft start to the conveyor. If not, this will reduce the available pull force. Consult on this.

Use the Volta Pull Force Calculator to confirm suitability of a given belt or ask for Volta to do so.

A short survey of some conveyor types and additional comments where relevant.

1. Simple 2 axle horizontal conveyor.



2. Incline 2 axle conveyor.

Note point C above concerning increased MPD.

3. Z or L conveyor

(Z has 2 transition zones and an L conveyor has one). Each zone consists of a forward flexing transition marked with a blue arrow and, opposite this, a back-flexing transition marked with a black arrow.



Rollers used on a back-flexing transition (the forward flexing transition underneath does not require rollers).

Note the comments above in point C concerning increased MPD. Also, note that there will be transition areas as noted above in point E – extra care is needed here in guiding the belt around the transitions by using rollers to form a radius. If the existing ply belt uses a fixed 'shoe' to guide the belt around the transitions, (as indicated above by black arrows) it should be replaced with rollers like in the photo below. If the transitions are not a true radius, this should be corrected (sometimes conveyors are built so that the belt bends in a series of arcs or straight lines and an arc – this is incorrect technique).

4. Centre drive/multiple pulleys

Make sure the MPD takes the back flexing into account - point E above.

Centre drive arrangement multiple pulleys

Multiple pulleys

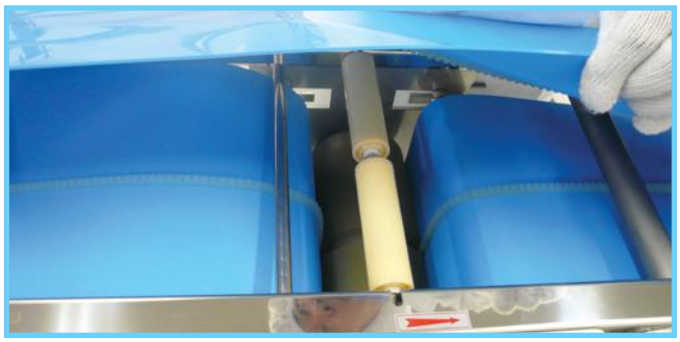
5. Small Pulley Transfer Conveyor

Three things are worthy of note in addition to the normal issues:

1. Continuous row of transfer conveyors will sometimes use small pulley diameters to allow the transfer of a product. Volta might have a belt option that works on the MPD of the conveyor but the conveyors may be so close together that the belt thickness is critical. Ply belts can be under 1mm thick and so where belts are positioned like this, check there is room for a thicker Volta belt. A special 1mm thick belt is available now for this situation.
2. In some cases, belts can have welded guides, meaning a larger MPD is required - take especial care where the conveyor is centre driven, as in the photo below left - see point E above.
3. Small diameters or even static nose bars with a small radius are common in biscuit and confectionary belts. In such situations, Volta may select a reinforced belt – this is only possible in a dry application (dry food and no wash-down). A fully homogeneous belt may note work due to a combination of very small MPD + (wide) high friction steel plate slide bed.

N.B. ACR belts can provide a more hygienic solution but require an MPD of 20mm.

Small diameter pulley

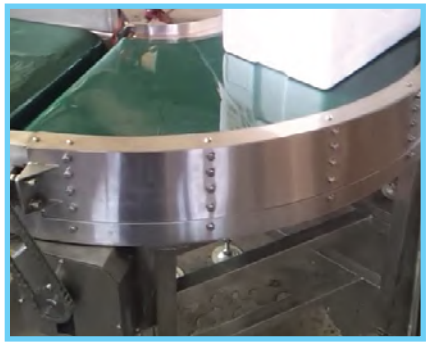


Centre drive narrow transfer with welded bottom guide

6. Trough Conveyor

No special requirement, but ensure there is a transition area at each end of the section under tension where the belt folds into the trough gradually at the intake and flattens out gradually at the discharge. The length of each transition area should be at least the same as the belt width for a 10° angle of trough.

7. Curved conveyors



Volta belts are suited to use for curves.

8. Bucket elevators

Bucket elevators are sometimes friction driven straps with riveted buckets. Volta can replace with scoop cleats but the throughput should be calculated to ensure the required volume of material can be conveyed. Consult Volta or use our throughput calculator.

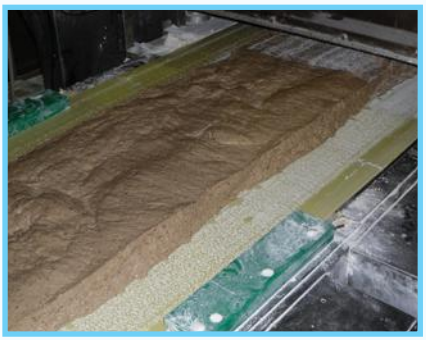
Recommendations after belt selection:

A. Closing the belt; Belts are easily closed on site with a Volta butt-welding tool. Alternatives are to use the Volta lace for 3-5mm thick M material belts or mechanical fasteners. Care should be taken to conform to the relevant MPD required by the joint.

B. Tracking the belt; Volta belts are not self-tracking. Conventional means can be used including crowning pulleys, welded guides and automatic correcting systems. In addition, UHMW elements can be positioned at key points to help control belt movement. Some examples are shown here. This is a unique solution for Volta belt tracking.

UHMW roundel mounted on pulley

UHMW support on return



UHMW pieces holding 3mm Volta belt

C. Tensioning the belt;

The pull force calculation includes a pretensioning value for the belt. Measure this carefully. E.g. for 0.75% - mark 1000mm on the belt before assembly. Mount over pulleys and tension until the marks are 1007.5mm apart.

D. Controlling the product in process;

A major cause of belt failure is due to ingress of product under the belt. Study the flow of product in real time and use Volta material as skirting to prevent ingress. It can touch a Volta belt without grooving it.

E. Cleaning the belt;

Where a belt needs to be cleaned, Volta will require a shorter and less aggressive disinfection than a ply belt. QA departments must re-assess all aspects of the current cleaning process including concentrations of chemicals used, exposure time, amount of water used and temperature of water used.

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