TECHNICAL INFORMATION BULLETIN HEAT RESISTANT BELTING

A GUIDE TO HEAT RESISTANT CONVEYOR BELTS

Of all the demands placed on conveyor belts, heat is usually the most unforgiving and damaging. High temperature environments accelerate the ageing process, which causes the rubber to harden and crack. Heat also has a seriously harmful effect on the belt carcass itself because it damages the adhesion between the cover and the carcass and between the fabric plies contained within the carcass. This literally causes the belt to fall apart. This is commonly referred to as 'de-lamination'. As rubber becomes harder and less elastic due to the exposure to heat the tensile strength and the elongation at break can fall by as much as 80%. This effectively destroys its operational strength and flexibility. At the same time, resistance to abrasion can decrease by as much as 40% or more.

Heat resistance should not be confused with fire resistance. Heat resistant belts are designed to carry materials at high temperatures. Fire resistant belts are engineered so that they do not continue to burn once the source of ignition is no longer present.

ISO 4195 HEAT RESISTANCE TESTING

ISO 4195 'accelerated ageing' laboratory tests are used to accurately measure heat resistance and consequently the anticipated working life of the belt. Rubber samples are placed in high-temperature ovens for a period of 7 days. The reduction in mechanical properties is then measured. The three classes of resistance against accelerated aging within ISO 4195 test methods are: Class 1 (100°C), Class 2 (125°C) and Class 3 (150°C).

In order to handle even more extreme temperatures at Dunlop we also carry out routine testing at a 175°C in order to ensure that our belts can handle even more extreme temperatures. The actual working temperature limits that a belt can withstand are much higher and are viewed in two ways – the maximum *continuous* temperature of the conveyed material and the maximum temporary *peak* temperature.

High temperature environments accelerate the rubber ageing process

SELECTING THE CORRECT BELT TYPE

The cover acts as a barrier between the heat source and the carcass. An increase of only 10°C in the core temperature of the belt carcass will reduce the life of the belt by as much as 50%. This is why it is essential that only the very best heat resistant rubber compound is used to in order to maximise the operational lifetime of the belt.

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1. HEAT AND WEAR RESISTANT COVERS

Generally speaking, belt covers that have a high resistance to heat have a lower resistance to wear. When selecting a heat resistant belt, we recommend a maximum abrasion resistance of 150mm^3 to avoid premature replacement.

2.NATURE OF MATERIAL BEING TRANSPORTED

Cover quality selection can become much more complicated depending on the nature of the materials being carried. For example, fine materials usually cause a greater concentration of heat on the belt surface due to the lack of air circulation between the hot particles. However, in the case of coarse materials such as clinker, although the actual temperature of the material can be extremely high, coarse materials allow a better air circulation between the particles.

3. CONVEYOR LENGTH

Another consideration is the length of the conveyor. The shorter the conveyor then the less time there is for the belt to cool down on the return run (underside). For short conveyors it is often advisable to use a Class 3 belt, rather than a Cl. 2.

4. ELEVATOR BELTS

The heat build up in enclosed environments, particularly elevators, is far higher than conventional conveyor systems. Elevator belts need to operate under high tensile loads and be able to withstand continuous material temperatures as high as 130°C. Conventional textile reinforced belts cannot withstand high temperatures within the carcass and will stretch permanently. In these cases the belt should be steel-reinforced.

DUNLOP HEAT RESISTANT BELT TYPES

Dunlop Betahete is a high performance heat and wear resistant rubber compound designed to handle materials at continuous temperatures up to 160°C and peak temperatures of up to 180°C. Betahete consistently exceeds the requirements demanded by ISO 4195 Class 2 (T125) and has an outstanding level of abrasion resistance that exceeds the international standards applicable to purely abrasion resistant belts by more than 50%.

Dunlop Deltahete is recommended for more extreme temperatures in demanding heavy-duty service conditions to convey high temperature loads of abrasive materials. It is specifically designed to withstand a maximum *continuous* temperature of the conveyed material as high as 200°C and extreme peak temperatures as high as 400°C. Deltahete exceeds the highest requirements of Class 3 and is therefore effectively Class 4, although this category does not yet exist within the ISO 4195 classifications. ISO 4195 laboratory testing has shown that even when continually exposed to 150° heat for 7 days, Dunlop Deltahete still retains its original (pre-test) resistance to abrasion.

Dunlop BVGT is heat resistant (up to160°C continuous with peaks up to 180°C) combined with the highest level of oil resistance and is also fire resistant (ISO 340).

THE SPLICE

The most critical area is the splice joint because this is invariably the weakest point in any belt. The heat resistant qualities of the splice materials should be identical to the rubber used in the belt cover.

KEEP IT MOVING!

Even the very best heat resistant belt can be damaged beyond repair if a conveyor is allowed to stop while it is still loaded with hot materials. Wherever possible, the feed to the conveyor should be stopped first and the belt allowed to fully discharge its load before being stopped.

SEEK ADVICE

As often as not, the quality of a belt reflected in its price. It is always worth the effort to check the original manufacturers specifications very carefully and ask for documented evidence of tested performance compared to the relevant international standard before placing your order.

WE ARE HERE TO HELP

For more information on this subject please contact your local Dunlop sales representative or Dunlop's Application Engineering team on +31 (0) 512 585 555.