FENNER DUNLOP
CONVEYOR BELTING

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 exposure to heat, the tensile strength and 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 seven days. The reduction in mechanical properties is then measured. The three classes of resistance against accelerated ageing 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 Fenner Dunlop we also carry out routine testing at 175°C to ensure that our belts can withstand even more demanding conditions. The actual working temperature limits that a belt can withstand are much higher and are considered in two ways: the maximum continuous temperature of the conveyed material and the maximum temporary peak temperature.

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 can reduce the life of the belt by as much as 50%. This is why it is essential to use only the highest-quality heat-resistant rubber compound in order to maximise the operational lifetime of the belt.

1. Heat- and wear-resistant covers

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

2. Nature of the material being transported

Cover quality selection can become much more complicated depending on the nature of the material 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, the larger particles allow better air circulation between them.

High temperature environments accelerate the rubber ageing process.

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3. Heat- and wear-resistant covers

Another important consideration is the length of the conveyor. The shorter the conveyor, the less time the belt has to cool down during the return run on the underside. For short conveyors, it is often advisable to use a Class 3 belt rather than a Class 2 belt.

4. Elevator belts

Heat build-up in enclosed environments, particularly elevators, is significantly greater than in conventional conveyor systems. Elevator belts must operate under high tensile loads and withstand continuous material temperatures of up to 130°C.

Conventional textile-reinforced belts cannot withstand high temperatures within the carcass and may stretch permanently. In such cases, a steel-reinforced belt should be used.

Fenner Dunlop heat-resistant belt types

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

Fenner Dunlop Deltahete is recommended for more extreme temperatures in demanding, heavy-duty operating conditions involving high-temperature loads of abrasive materials. It is specifically designed to withstand continuous conveyed-material temperatures of up to 200°C and extreme peak temperatures of up to 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 after continuous exposure to a temperature of 150°C for seven days, Fenner Dunlop Deltahete retains its original pre-test resistance to abrasion.

Fenner Dunlop BVGT combines heat resistance of up to 160°C continuously, with peaks of up to 180°C, with the highest level of oil resistance. It is also fire-resistant in accordance with ISO 340.

The splice

The most critical area is the splice joint, as this is invariably the weakest point in any conveyor belt. The heat-resistant properties of the splice materials should be identical to those of the rubber used in the belt cover.

Keep it moving!

Even the highest-quality heat-resistant belt can be damaged beyond repair if the conveyor is allowed to stop while it is still loaded with hot material. Wherever possible, the material feed should be stopped first, allowing the belt to discharge its load completely before the conveyor is stopped.

Seek advice

More often than not, the quality of a belt is reflected in its price. It is always worth carefully checking the original manufacturer's specifications and requesting documented evidence of tested performance against the relevant international standards before placing an order.