

Abrasion-resistant belting

Making the right choice

The wear resistance of a conveyor belt is one of the major factors determining its life expectancy and, ultimately, the truest measure of its cost-effectiveness. Selecting the correct type and quality of abrasion-resistant outer cover will largely determine the belt's performance and operational lifetime.

It is a common misconception that a belt described by a supplier as 'abrasion-resistant' should naturally be expected not to wear quickly. Different causes of wear and abrasion require different types of abrasion-resistant covers.

For example, belts that transport heavy or sharp objects, such as rocks, timber or glass, which can cut and gouge the belt surface, require different resistance properties from belts carrying fine materials such as aggregate, sand and gravel. These materials act like sandpaper, continuously scouring the rubber cover.

As a general rule, approximately 80% of conveyor belt surface wear occurs on the top cover, while around 20% occurs on the bottom cover.

Wear on the top cover is primarily caused by the abrasive action of the material being carried. This is particularly severe at the loading point, or loading station, where the belt is exposed to impact from the bulk material, and at the discharge point, where the material is effectively accelerated by the belt surface.

Contrary to popular belief, short belts of less than 50 metres usually wear more quickly because they pass through the loading and discharge points more frequently than longer belts.

For this reason, selecting the correct cover quality and thickness is even more important for shorter conveyor belts.

Wear on the bottom cover is mainly caused by frictional contact with drum surfaces and idlers. The rate and uniformity of this type of wear can be adversely affected

by factors such as misaligned or worn drums and idlers installed at incorrect angles.

Ozone degradation, which causes cracking, and unclean operating environments where waste material accumulates, can also accelerate wear. Belt-cleaning systems, particularly steel-edged scrapers, can also contribute to wear on the top cover surface.



Misaligned drums and idlers cause extra wear.

Thicker is not always better

The actual thickness of the cover is an important consideration. Generally speaking, the more abrasive the material and the shorter the conveyor, the thicker the cover should be. In principle, the difference in thickness between the top cover and the bottom cover should not exceed a ratio of 3:1.

In an effort to extend operational lifetime, many conveyor belt users resort to fitting belts with increasingly thicker covers. However, covers that are too thick can potentially cause other problems.

In reality, the single most important factor is the actual abrasion resistance of the belt cover rubber.



Learn
more about
Fenner Dunlop
Conveyor Belting



International quality standards

There are two internationally recognised sets of standards for abrasion: ISO 10247, covering classes H, D and L, and the longer-established DIN 22102 standards, covering classes Y, W and X.

In general terms, DIN Y relates to normal service conditions, DIN W is intended for more abrasive materials, and DIN X provides resistance to cutting, impact from high drop heights, abrasion and gouging caused by large, heavy and sharp materials.

Each manufacturer uses its own mixture, or recipe, of polymers to create cover compounds with different abrasion-resistance properties. The main polymers used are SBR, or styrene-butadiene rubber, which is a synthetic rubber, and NR, or natural rubber.

In basic terms, SBR offers good general resistance to abrasion, while natural rubber, although considerably more expensive, provides greater resistance to cutting, ripping and gouging.

Many manufacturers try to avoid using natural rubber wherever possible to keep costs and prices low, despite the potentially negative effect this can have on the operational lifetime of the belt.

Buyer beware!

Even wear-resistant covers that conform to international standards may need to be replaced after unacceptably short periods.

It is important for conveyor belt buyers to remember that DIN and ISO standards represent only the minimum benchmark of acceptability.

Even then, testing reveals that, despite manufacturers' claims, more than 50% of belts are found to perform significantly below these minimum standards.

Fenner Dunlop's approach has been to develop a range of abrasion-resistant covers specifically designed to address both individual and combined causes of wear.



ISO /DIN Abrasion testing machine.

To provide a longer-lasting and therefore more cost-effective solution, Fenner Dunlop covers exceed international quality standards by a significant margin. An excellent example is Fenner Dunlop's RA standard abrasion-resistant cover, which exceeds the DIN Y standard by more than 25%.

For extremely abrasive materials, or simply to achieve an even longer working life, Fenner Dunlop has developed its RS cover, which exceeds the highest abrasion standard, DIN W, as well as the equivalent ISO D standard.

Seek advice

More often than not, the quality of a belt, including its ability to resist wear, 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.

