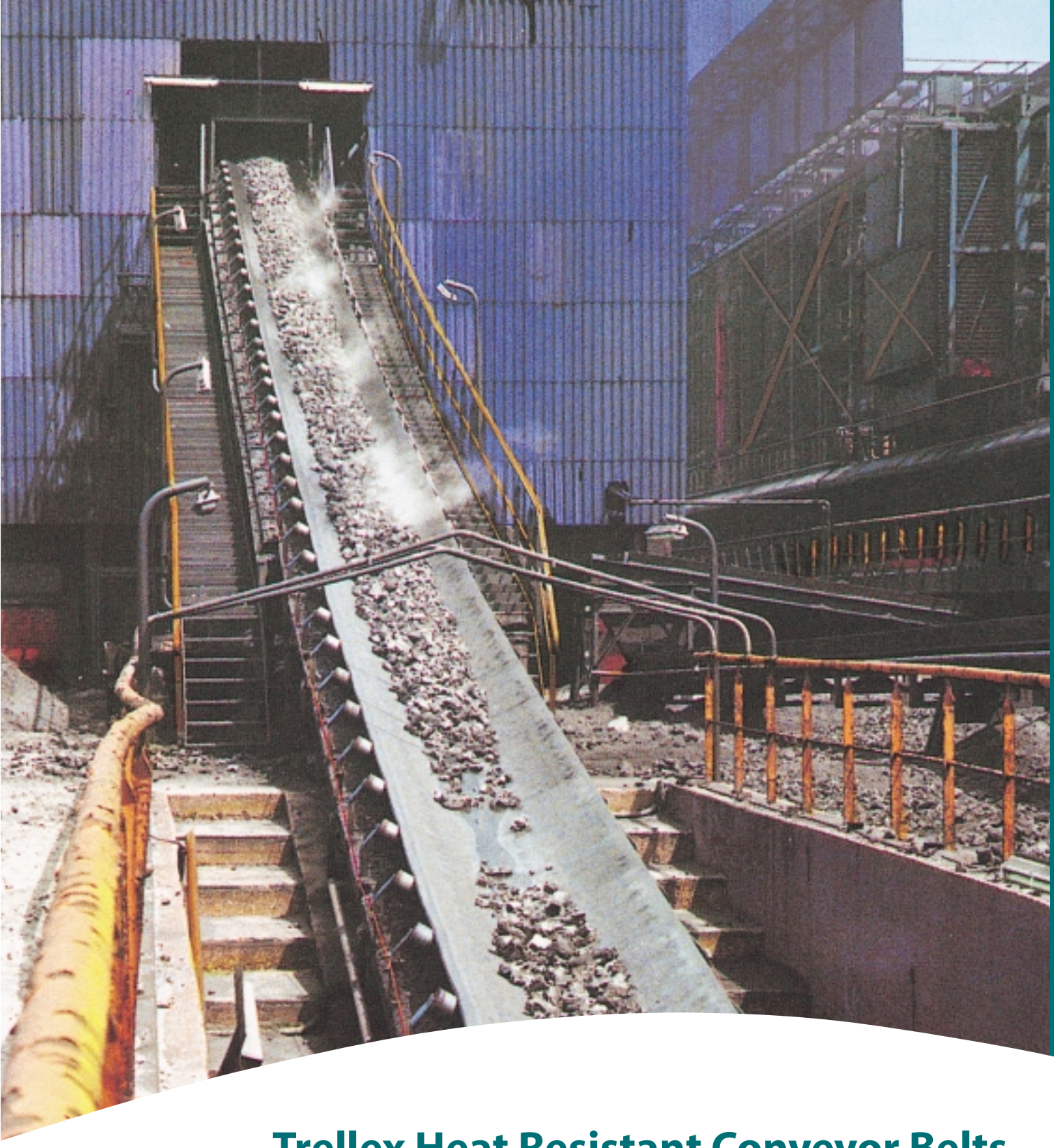


Conveyor Belts

www.metsominerals.com

# Trellex Heat Resistant Conveyor Belts

metso
minerals

# Trellex Heat Resistant Conveyor Belts

With rubber conveyor belting the decisive factor for thermal strength is the composition of the rubber compound. We at Trellex have acquired the necessary know-how for this in over 100 years' experience of producing conveyor belts.
Being a member of a worldwide operating group we have been able to take advantage of technical exchange of ideas and further update our heat resistant conveyor belting. We are thus able to offer our customers a sophisticated and well-proven range of products.
The selection of the most suitable belts is not only dependent on the thermal strain involved, but also on the chemical and mechanical stress.

The following factors are decisive:

- Nature and composition of the conveyed material (coarseness, surface structure, shape and size of the particles)
- Rate of cooling down of the conveyed material on the belt
- Cohesion and spreading of the conveyed material on the belt
  a) as a dense cohesive mass
  b) loose, so that the air can pass through and cool the conveyed material
- Localization of heat up to the end of conveyor route
- Conveyor length
- Belt speed
- Adequate cooling down of the conveyor belt during the return run
- Temperature value in the conveyor belt itself

Please note that the service life of the belt is also affected by the thickness of the top cover. A thicker top cover will always ensure a longer service life of the belt.
We therefore recommend a minimum cover thickness of 4:2 mm for Termo and High-Heat. A top cover thickness of min. 6:2 mm is proposed for all Retardant belts.

| Main fields of application | for |
|---|---|
| – Cement factories | - Clinker |
| – Coking plants | - Raw meal |
| – Steel works | - Coke |
| – Foundries | - Slag |
| – Power stations | - Metal pieces |
| – Fertilizer industry* | - Foundry sand |
| – Chemical industry* | - Preforms |
| | - Ash |
| | - Fertilizers* |
| | - Sulphur* |

*) These applications require special rubber qualities. Please ask for our advice and offer

**The complete range of covers**

| Quality | Elastomer | Permanent material temperature up to °C | Occasional peaks up to °C | Tensile strength N/mm² | Elongation at break % | Abrasion mm² |
|---|---|---|---|---|---|---|
| Retardant<br>Retardant K | EPM | 190 | 250 | ≥ 12,5 | ≥400 | ≤ 115 |
| Retardant Super<br>Retardant Super K | EPM | 190 | 250 | ≥ 12,5 | ≥ 400 | ≤ 115 |
| TSTRP | EPDM | 180 | 250 | ≥ 15 | ≥ 400 | ≤ 110 |
| High Heat T | IIR/EPDM | 170 | 190 | ≥ 12,5 | ≥ 500 | ≤ 250 |
| High Heat TC | CI/IIR | 170 | 190 | ≥ 12,5 | ≥ 450 | ≤ 250 |
| Termo TXT | SBR | 130 | 150 | ≥ 20 | ≥ 500 | ≤ 150 |
| Termo TK | SBR | 130 | 150 | ≥ 17 | ≥ 500 | ≤ 150 |

*TSTRP is a special cover grade for steel cord elevator belts. The other cover grades can also be used for textile elevator belts, but with reduced temperature range. Please ask for our advice.*

## Retardant

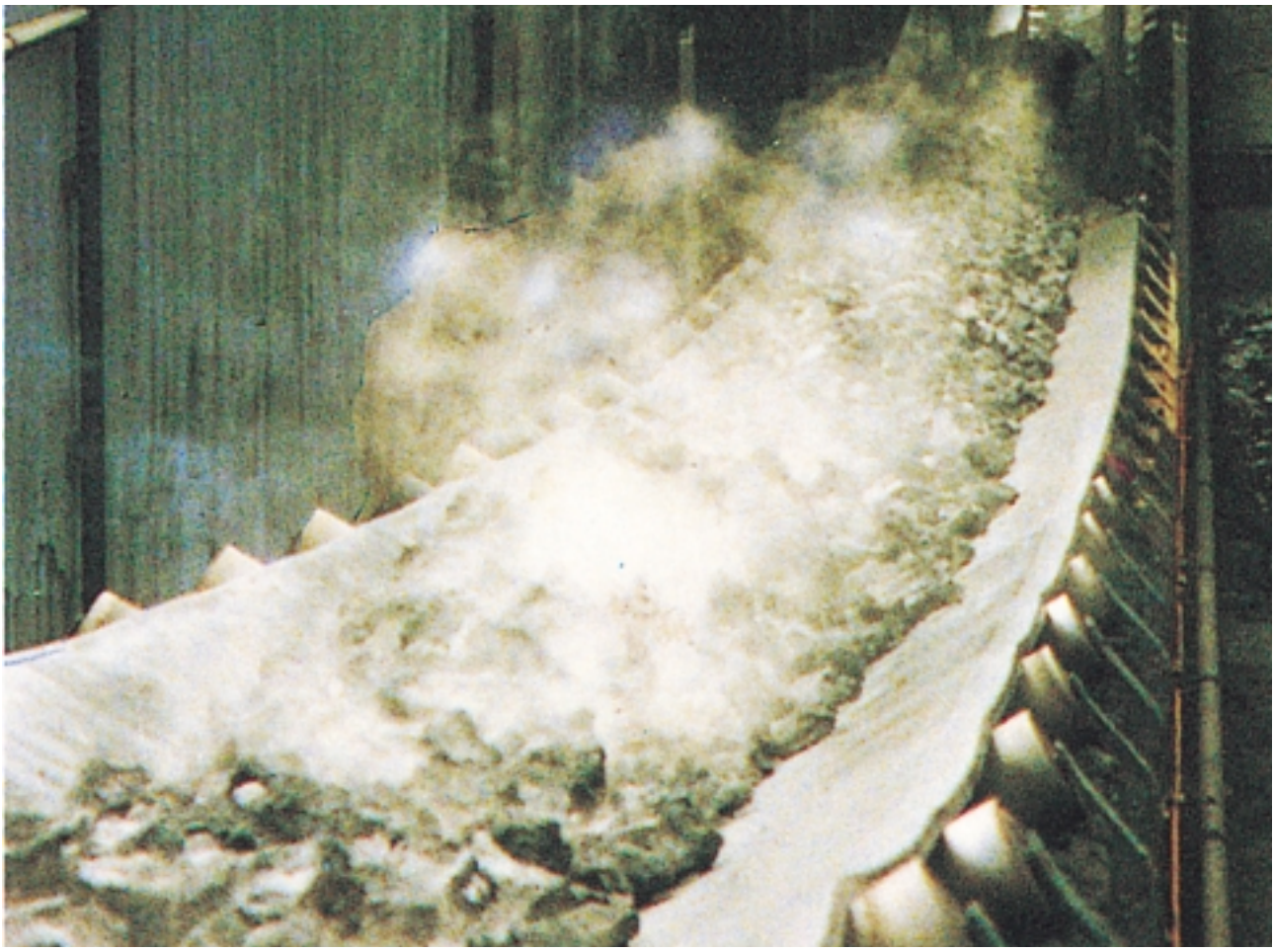
This is an ideal belt for conveying hot materials with permanent temperatures of up to 190 °C and occasional peaks up to 250 °C.
Retardant Super combines the proven rubber characteristics of all Retardant belts with an additional metal breaker. This special reinforcement embedded in the top cover protects the carcass and thus the whole belt from being burnt by red hot pockets in the conveyed material. It is particularly suitable for conveying hot materials such as clinker, slag, coke etc.
Retardant Super has high flexibility and good throughability characteristics despite the metal breaker. It can therefore also be used for small pulley diameters.
Retardant K and Retardant Super K are heat resistant as well as flame retardant. Their application is recommended in case of risk of fire by spontaneous ignition of the material conveyed.

## High-Heat

The Trellex heat resistant conveyor belt High-Heat is designed to withstand high temperature loads. The hot material to be conveyed may have a continuous temperature of up to 170 °C.
This highly heat resistant conveyor belt has proved to be particularly ideal for use in coking plants, foundries, sand and ballast drying plants.
The temperature of 170 °C may be temporarily exceeded (see product range table). The High Heat is also available in TC, which is resistant against chemicals.

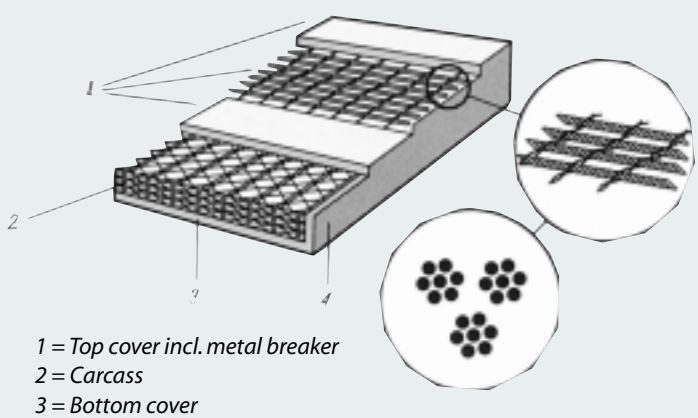
## Termo

The Trellex heat resistant conveyor belt Termo has proved to be outstanding in the medium temperature range.
Optimum life is also achieved by means of a rubber cover of adequate thickness on the carrying side , as long as a material temperature of 130 °C is not exceeded. Occasionally higher peaks are still acceptable (see product range table).
The Termo-quality is also available in a flame resistant version TK.



## Belt construction and stock range

**Retardant Super**




*1 = Top cover incl. metal breaker*
*2 = Carcass*
*3 = Bottom cover*
*4 = Solid rubber edge*

The carcass is made of the most up-to-date polyester/polyamide fabric (EP). The very strong, low stretch polyester yarn (E) in the longitudinal direction of the belt (warp) provides low elongation and shortens the length required for tension take-up. The equally strong but elastic polyamide twisted yarn (P) in the transversal direction (weft) assures good troughability of the belt. The combination of these two synthetic fibres makes the belt capable of dealing with heavy work loads and impacts without being pierced.

Very good straight running properties have been provided by careful production processes. A skim layer treated with special adhesive surrounds every single ply making it difficult to separate the plies from the outer rubber covers.

### Stock range of Heat-resistant belts

| Belt type | | Cover mm thickness, Top | Bottom | Thickness (approx.) mm | Weight (approx.) kg/m² | Belt width mm |
|---|---|---|---|---|---|---|
| Termo | EP 315/2 | 5 | 1,5 | 9,5 | 11 | 500 - 800 |
| Termo | EP 500/4 | 5 | 1,5 | 10,3 | 12,2 | 800 - 1000 |
| Retardant | EP 400/3 | 5 | 1,5 | 10 | 10,9 | 500 - 800 |
| High Heat | EP 400/3 | 4 | 2 | 9 | 10,3 | 650 |

*On request also other belt strengths and widths are available. Additionally to heat resistant EP-belts, there are also belts with steel- and aramid carcass.*

## Quality comparison of rubber cover

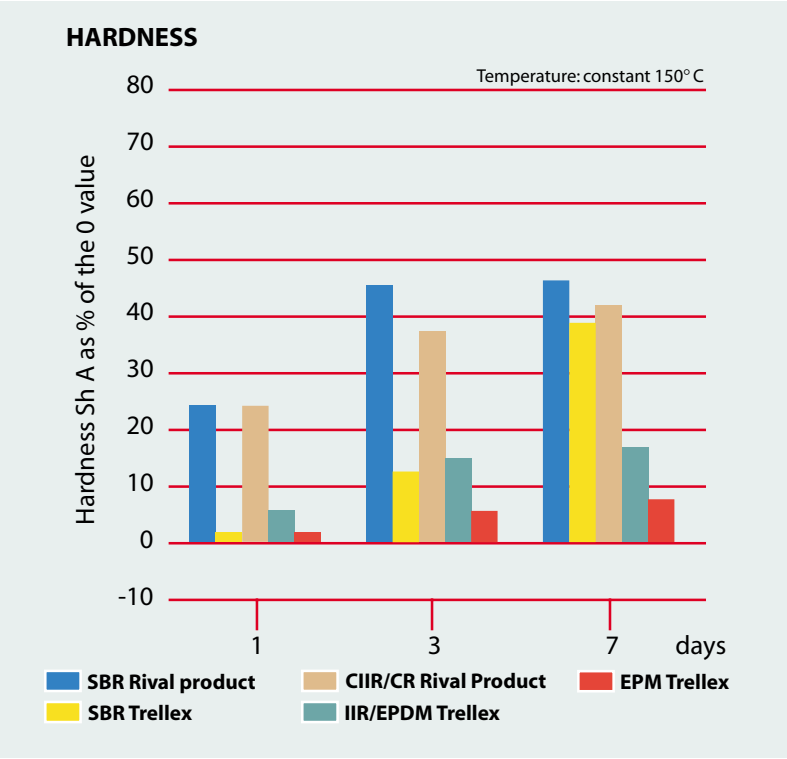
A large range of hot material conveyor belts from different manufacturers are available on the international market. Indeed the sheer number of names and descriptions make it almost impossible for the user to discern , which product is best for his particular requirements.
The majority of these conveyor belts use one of the rubber mixtures in the list below with the following main types of elastomers:

1. Mixture based on SBR (styrene butadiene rubber)
2. Mixture based on IIR (butyl rubber)
3. Mixture based on EPDM or EPM (ethylene propylene rubber)

Unfortunately, the strong competition in the conveyor belt market has led to a situation in which manufacturers advertise the thermal strength of the various rubber mixtures in a way that is sometimes misleading or even inaccurate. Of course, as a rule, it is not immediately noticeable when a rubber cover plate is occasionally subjected to temperatures that are too high. The processes which take place inside the material and the changes in its technological properties can only be proven accurately by examination in the laboratory.
We have tested various comparable belts in accordance with the DIN 53508 standard. We chose the EP 630/4 type of belt with 6:2 mm cover plates, which we subjected to a constant temperature of 150°C for a period of 7 days and then took measurements on the outer 2 mm of the cover plates.

We at Metso Minerals consider that a rubber mixture must be capable of permanently retaining the strength which the manufacturer claims for it. This is why the rubber mixture we use for our Retardant belt is based on EPM (ethylene propylene rubber) with peroxide cross-linking to give our conveyor belts the longest possible service life.
To illustrate exactly what we mean we have used our measurements to prepare the following 4 graphs which we would like you to consider.

# Quality comparison of rubber cover plates



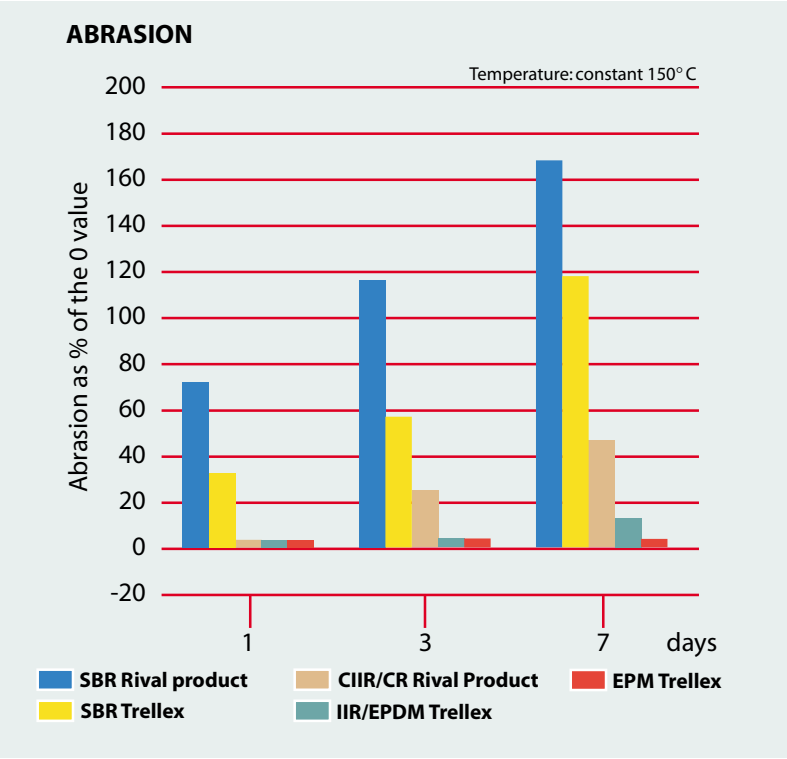

## Hardness

When first put into use all the products compared had a hardness of between 55 and 65 Shore A

Our graph shows how these initial values changed after only 7 days of being subjected to a constant temperature of 150 °C, i.e. the rubber became increasingly hard and progressively less elastic:

| | |
|---|---|
| An SBR rival product | +46 % |
| A Trellex SBR belt | +39 % |
| A CIIR/CR rival product | +42 % |
| A Trellex IIR/EPDM belt | +17 % |

Only the Trellex EPM Retardant belt retained its initial elasticity virtually unchanged at +7 %.




## Abrasion

Precisely this measurement is often taken as one of main criteria when evaluating the quality of conveyor belts. However, as a rule abrasion values are measured when the belt is put into use for the first time.

How does these values change even within a very short period of time ?

Our graph gives an impressive picture of how the abrasion values for all the belts compared deteriorated. The increase in abrasion is virtually linear and after 7 days reaches levels of between 55 % and 170 % above the initial value.

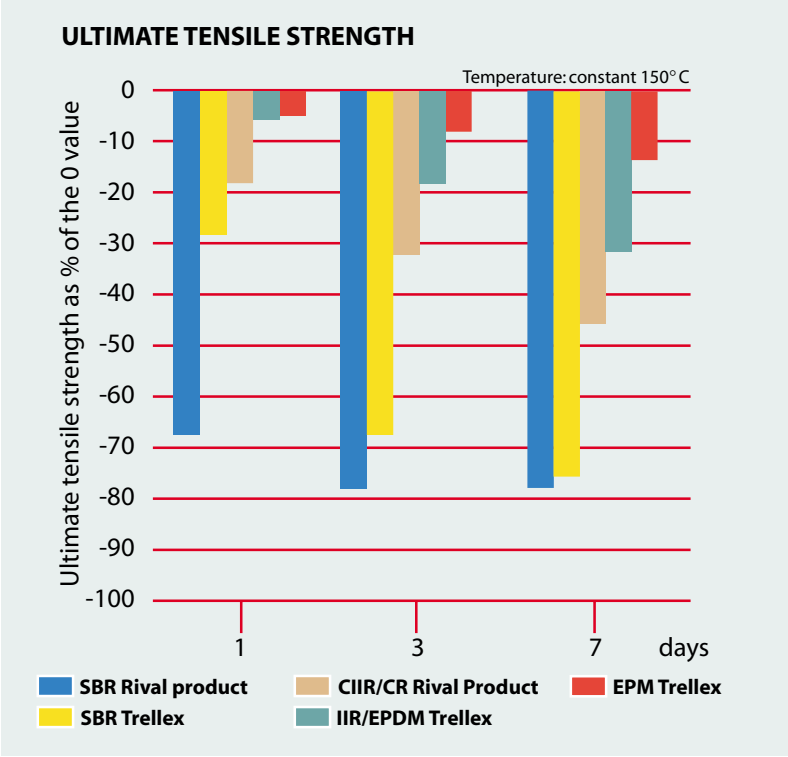
In contrast the Trellex EPM Retardant belt retains its original abrasion resistance even when subjected to high temperatures. Here it is particularly clear to see that this rubber mixture is suitable for conveying hot materials.

## Ultimate tensile strength

This graph shows that in some cases ultimate tensile strength – another of the criteria for assessing belt quality – also changed dramatically after only 7 days at a constant temperature of 150 °C compared to the measurements taken at the beginning of the test.

The strength of the CIIR/CR rival product dropped to approx. 55 % and that of Trellex IIR/EPDM to approx. 68 % of its original level. In the same period of time the SBR mixtures fell to 22-26 % of initial strenght.

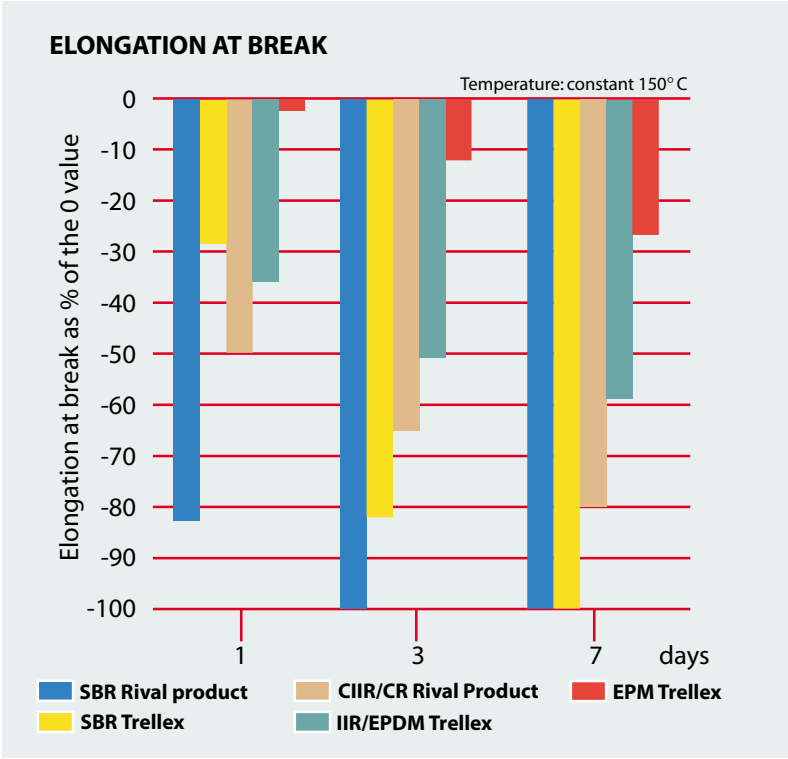
Here, too, it is striking that the ultimate tensile strength of the Trellex EPM belt only fell by 13 % and therefore withstood the high temperature practically unchanged.




## Elongation at break

This graph confirms the findings of the hardness comparison. The elongation at break of the CIIR/CR rival product mixture´s fell to approx. 20 % and that of Trellex IIR/EPDM to approx. 41 % of initial level within 7 days. One of SBR mixtures dropped to 0 in the same period, i.e. the material was virtually "dead" at the end of the test and had completely lost its elasticity. The second SBR mixture reached 0 after only three days.

This comparison also demonstrates that the EPM mixture from Trellex resists high temperatures best of all. The measurements taken after 7 days were still completely satisfactory.




## Summary

What is the significance of this comparison ?

We would like to make our customers aware that the initial specifications often quoted for the purpose of comparison can change within a very short period of time when the conveyor belt are in actual use.
For this reason we wish to give our customers the opportunity to look "in greater depth" at the quality of our belts and to recognize how much "know-how", care and attention to quality go into our products.

**Trellex quality for products with a long service life and for the benefit of our customers.**

**Trellex Conveyor Belts**

**Our range:**

- Aramid conveyor belts
- Elevator belts
- Belts for closed conveying
- Cleat belts
- Flame resistant belts
- Belts for vertical conveying
- Belts with profiled surface
- Paper roll belts
- Flat transmission belts
- Heat resistant belts
- Chemical resistant belts
- Plasterboard belts
- Oil and grease resistant belts
- Multi-ply textile conveyor belts
- Endless produced belts
- Process belts
- Steelcord conveyor belts
- PVC belts
- PU belts
- Wear resistant belts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