

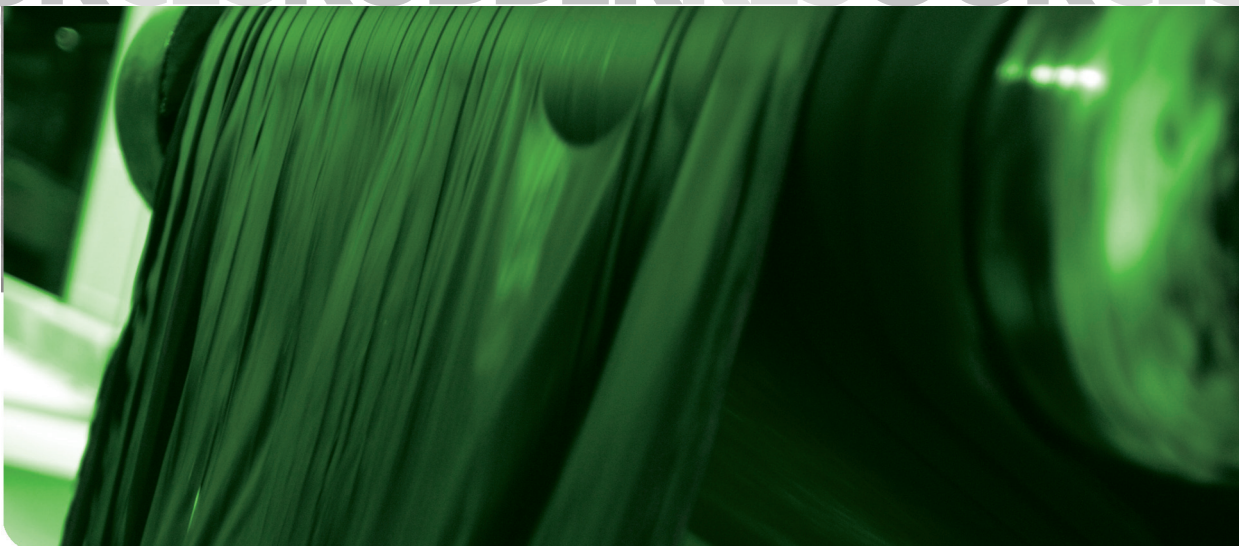


Ecorr[®] RBR

Reclaim Butyl Rubber

Ecorr[®] RBR70

Ecorr[®] RBR7050



Ecorr®

The explanation of the brand name and parts of the mission together explain the reasons why reclaim is used.

Eco - Ecological

Rubber Resources strives to recycle rubber waste in order to preserve the environment and natural resources for future generations. Reclaim replaces virgin material in order to take some of the pressure off our environment.

Eco - Economical

Strong costs benefits can be obtained with Ecorr®RBR grades. Even with the current low polymer prices. As the below recipe comparison demonstrates, there are price as well as volume benefits.

rr - regular rubber

Waste Rubber is reversed into regular rubber, which has regained its viscosity, chemical and mechanical properties.

Savings with Ecorr®RBR in Innerliner compound

| | Prices | | | | |
|---|----------------|----------------|-----------------|-------------------|-------------------|
| XIIR | 2.55 Euros | 2.83 USD | | | |
| Ecorr®RBR | 1.00 Euros | 1.11 USD | | | |
| Euro/USD exchange rate | | 1.11 | | | |
| | | | Prices | | |
| Innerliner compound | A - Phr | B - Phr | USD p/kg | Recipe - A | Recipe - B |
| XIIR | 100 | 90 | 2.83 | 283.00 | 254.70 |
| Ecorr® RBR | | 20 | 1.11 | | 22.20 |
| Carbon black | 60 | 60 | 2.50 | 150.00 | 150.00 |
| Koresine resin | 4 | 4 | 9.99 | 39.96 | 39.96 |
| Struktol 40 MS | 7 | 7 | 3.81 | 26.67 | 26.67 |
| Par. oil | 8 | 8 | 1.35 | 10.80 | 10.80 |
| Stearic acid | 2 | 2 | 1.39 | 2.78 | 2.78 |
| MgO | 0.15 | 0.15 | 3.39 | 0.51 | 0.51 |
| MBTS | 1.5 | 1.5 | 5.75 | 8.63 | 8.63 |
| ZnO | 3 | 3 | 3.72 | 11.16 | 11.16 |
| Sulfur | 0.5 | 0.5 | 4.88 | 2.44 | 2.44 |
| Total phr and USD | 186.15 | 196.15 | | 535.94 | 529.84 |
| Costs in USD per kg batch | | | | 2.88 | 2.70 |
| Savings in USD per kg batch | | | | | -0.18 |
| Tire production per day | | | | | 20,000 |
| Kg batch per day (at an average weight of 1kg per innerliner) | | | | | 20,000 |
| Saving per day (USD) | | | | | 3,559 |
| Annually (USD, 350 days) | | | | | 1,245,152 |

Butyl Reclaim Ecorr® RBR70; a cost saving additive

Allowing you a thinner inner liner. So less compound at less costs. How?

Firstly you will find the obvious compound savings when using Ecorr® RBR70.

Secondly by using Ecorr® RBR70 in your halobutyl inner liner compound you improve the adhesion to the carcass and simultaneously you improve the air permeability.

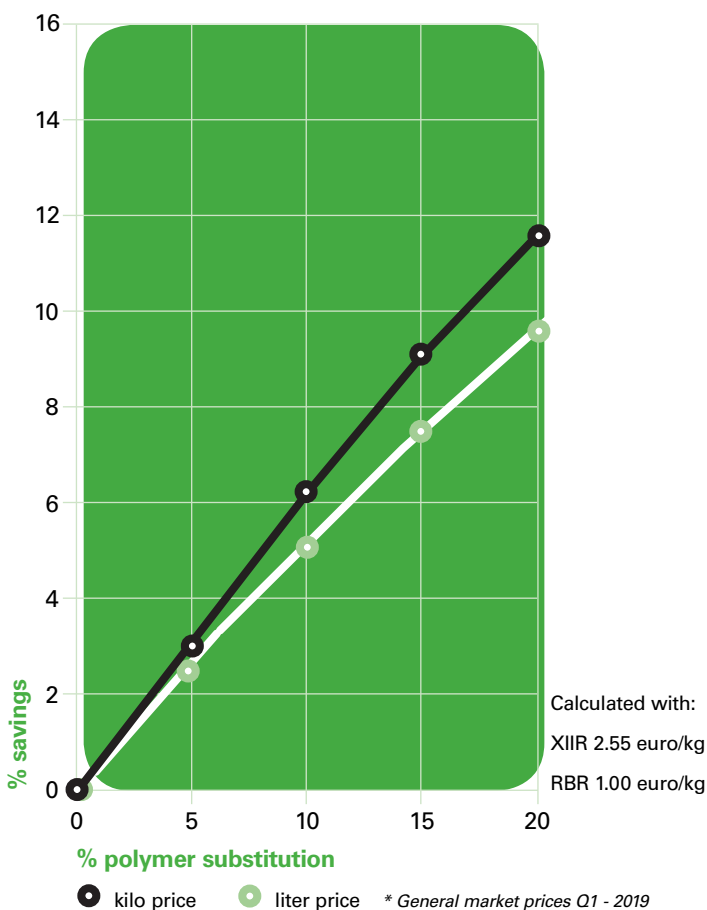
Last not least, the usage of Ecorr® RBR70 provides better ageing resistance. Especially the dynamic properties are improved.

Value is therefore added next to the easy cost saving.

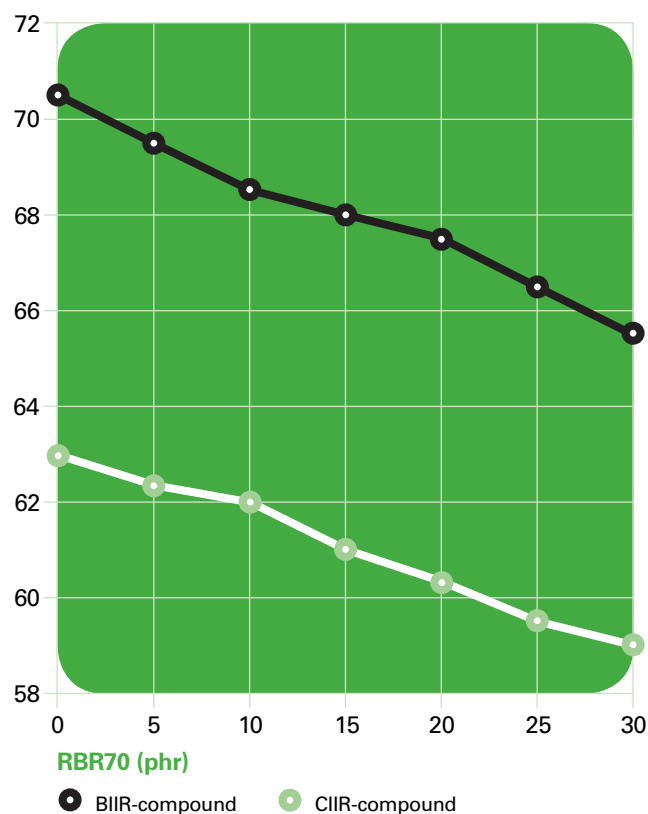
Summary

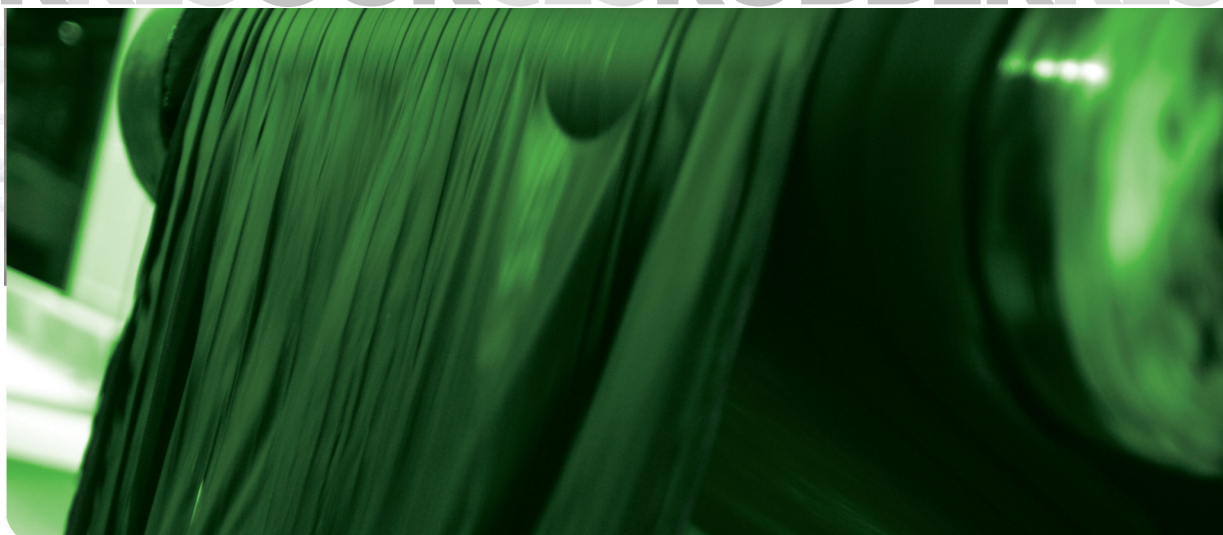
- Less compound at less costs
- Improved adhesion
- Improved air permeability
- Improved ageing resistance

Cost savings



Air permeability [a.m² / Pa.s]





The grades an their properties

The grades are REACH compliant and fully compliant with the European legislation.

| Key grades | | | RBR70 | | RBR7050 | |
|---------------------|------------------|--------------|--|----------|-----------|--|
| Acetone-extract | % | ASTM D297-18 | 10 ± 2 | | 12 ± 3 | |
| Ashes | % | ASTM D297-18 | 6 ± 2 | | 7 ± 3 | |
| Carbon Black | % | ASTM E 1131 | 32 ± 2 | | 32 ± 3 | |
| Polymer content | % | ASTM E 1131 | 51 ± 3 | | 50 ± 4 | |
| Density | kg/m | ASTM D297-15 | 1160 ± 20 | | 1160 ± 30 | |
| Hardness | Shore A | ASTM D2240 | 51 ± 4 | | 51 ± 4 | |
| Tensile strength | MPa | ASTM D412 | 7 ± 1 | | > 5.7 | |
| Elongation at break | % | ASTM D412 | > 460 | | > 400 | |
| Mooney viscosity | ML(1+4)@100°C | ASTM D1646 | 30 - 45 | | 30 - 45 | |
| Strained | | | 40 mesh | | 40 mesh | |
| Physical appearance | | | Black slabs of 10 kg (60 x 40 x 4 cm) Each slab is packed in a blue coloured low melting foil | | | |
| Curing: | 30 min@160°C | | Packaging: | | | |
| | Reclaim (R.H.C.) | 100 phr | Reinforced cardboard boxes | | | |
| | ZnO | 5 phr | Net weight | [kg] | 1000 | |
| | TMTD | 1 phr | Net weight | [pounds] | 2204 | |
| | Sulphur | 2 phr | Metal crates | | | |
| | MBT | 0,5 phr | Net weight | [kg] | 1080 | |
| | | | Net weight | [pounds] | 2380 | |

Advantages

- Lower raw material costs.
- Lower power consumption and other processing costs resulting from shorter mixing cycles.
- Low calendaring, mixing and extrusion temperature.
- Reduction of die-swell.
- Better air venting properties between bladder and inner liner during vulcanisation.
- Reduced air permeability in an inner liner (results in reduction of inner liner thickness).
- Improved flex fatigue resistance.

Recommended other brochures: *Reclaim in Compounds.*

RBR process

- The exclusive feedstock for Ecorr® RBR reclaim mainly consists of butyl innertubes.
- The scrap is collected from a wide network of certified suppliers and is segregated by supplier to ensure identification and traceability.
- In the first phase of our continuous production process the scrap feedstock undergoes a number of cleaning steps, during which it is rendered absolutely free of sand, steel, stones and other contaminants.
- In the second phase, the reclaiming step breaks the sulphur crosslinks within the butyl rubber.
- During subsequent straining and refining steps, non-homogeneous particles are removed from the reclaimed rubber to ensure high quality.
- The result is a rubber compound that can be used as a masterbatch to which a vulcanisation system is added, or it may be added to a virgin compound, typically at 10-50 phr.

Applications overview

The usage recommendation (PHR) for the most common applications is indicated in the chart below.

For each application it might be necessary to optimize the total compound recipe.

| Key grades | RBR70 | RBR7050 |
|-------------------------|-------|---------|
| Inner liner compounds | 20 | |
| Cable bedding compounds | 50 | 30 |
| Adhesives | 30 | 20 |

Usage recommendation (PHR) based on RR Formulary / Customer Feedback.

Approved raw material

Cutting

Washing

Shredding (down to 3-4 cm)

Separation of contaminants

Mechanical step

Straining

Refining

Straining

Cooling

Extra check on metals

Packaging

Storage

Rubber Resources B.V.



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