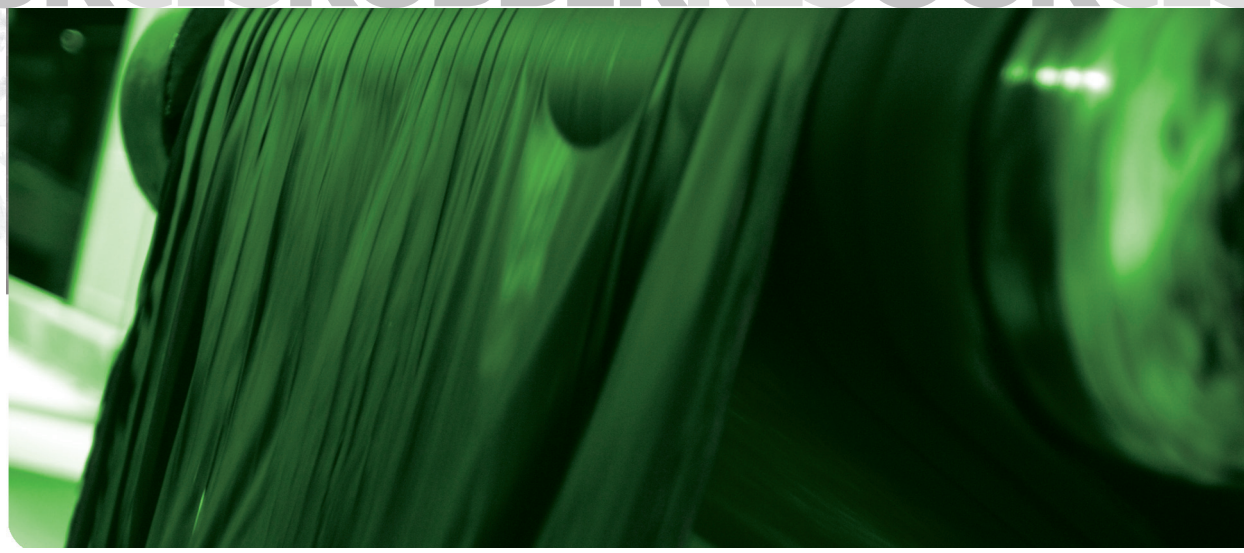
Ecorr® RNR

Reclaim Natural Rubber

Ecorr® RNR40 B11
Ecorr® RNR30 B01
Ecorr® RNR30 B91
Ecorr® RNR20 B52
Ecorr® RNR20 B66

RUBBER RESOURCES

An ELG Company



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®RNR grades. Even with the current low polymer prices. As the below recipe comparison demonstrates, there are price as well as volume benefits.

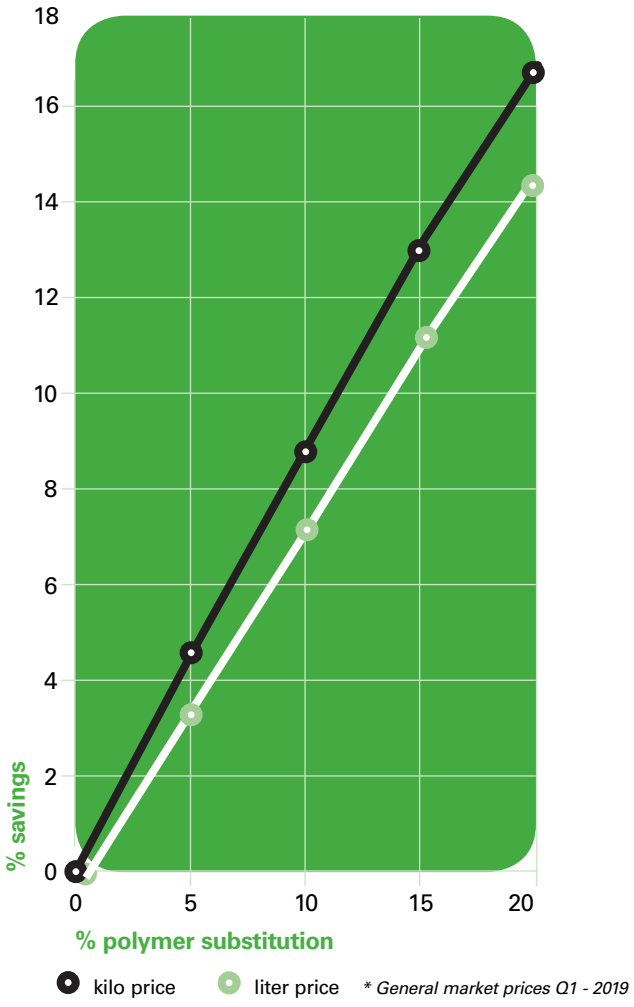
rr - regular rubber

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

Savings with Ecorr®RNR in Carcass compound

	Prices				
NR	1.27 Euros	1.4 USD			
Ecorr®RNR	0.65 Euros	0.72 USD			
Euro/USD exchange rate		1.1			
			Prices		
Carcass compound	**A - Phr**	**B - Phr**	**USD p/kg**	**Recipe - A**	**Recipe - B**
Natural rubber	80	70	1.40	112.00	98.00
Peptiser	1	1	12.10	12.10	12.10
BR	20	20	2.75	55.00	55.00
Ecorr®RNR	0	20	0.72	0.00	14.30
Carbon black	45	45	1.19	53.46	53.46
Low aromatic oil	6	6	1.39	8.32	8.32
Stearic acid	2	2	1.54	3.08	3.08
TMQ	3	3	3.47	10.40	10.40
ZnO	5	5	2.75	13.75	13.75
MBTS	1.0	1.0	5.12	5.12	5.12
PVI	0.1	0.1	3.03	0.30	0.30
Sulfur	3.2	3.2	3.91	12.30	12.30
Total phr and USD	**166.25**	**176.25**		**285.82**	**286.12**
Costs in USD per kg batch				1.72	1.62
Savings in USD per kg batch					-0.10
Tire production per day					20,000
Kg batch per day (at an average					100,000
weight of 5 kg per carcass)					
Saving per day (2x3)					**-$9,584**
Annually (350 days x 4)					**-$3,354,467**

Cost Savings



Calculated with:

NR 2.76 euro/kg

RNR 0.58 euro/kg

Main advantage

The activities of the current company started 59 years ago at a tyre producer. These roots still exist; nowadays the tyre industry is the most important application for the Ecorr® grades. The main advantage is shown below, costs savings in a tyre application.

Cost savings per kg price and per litre. Calculated with prices of the first quarter of 2015 and substituted up to 20% in a Truck-Tread compound.

Other advantages

- Lower power consumption resulting from shorter mixing cycles.
- Lower calendering, mixing and extrusion temperature.
- Improved penetration of fabric and cord.
- Lower swelling and shrinkage during extrusion and calendering.
- Increased tack.
- Improved reversion and ageing performance of natural rubber compounds (ozone, UV).
- Lower raw material costs.

The grades and their properties

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

Key Grades			TYRE INDUSTRY			OTHER APPLICATIONS	
			RNR40 B11	RNR30 B01	RNR30 B91	RNR20 B52	RNR20 B66
Acetone-extract	%	ASTM D297-18	13 ± 2	13 ± 2	15 ± 2	16 ± 3	10 ± 4
Ashes	%	ASTM D297-18	5 ± 2	5 ± 2	8 ± 2	13 ± 3	18 ± 4
Carbon Black	%	ASTM E 1131	26 ± 2	28 ± 2	26 ± 2	24 ± 3	26 ± 4
Polymer content	%	ASTM E 1131	56 ± 3	53 ± 3	50 ± 3	46 ± 4	46 ± 4
Density	kg/m	ASTM D297-15	1110 ± 15	1130 ± 20	1140 ± 20	1190 ± 20	< 1350
Hardness	Shore A	ASTM D2240	57 ± 3	54 ± 3	53 ± 5	50 ± 5	57 ± 5
Tensile strength	MPa	ASTM D412	> 8	> 6	6 ± 1	5 ± 1	5 ± 1
Elongation at break	%	ASTM D412	> 250	240 ± 40	> 200	> 200	> 200
Mooney viscosity	ML(1+4)@100°C	ASTM D1646	50 - 70	40 - 65	35 - 65	35 - 65	35 - 65
Heat loss, 100 °C	%	ASTM D1278	< 1	< 1	< 1	< 1	< 1
Physical appearance			Black slabs of 10 kg. (40x60x4 cm). Each slab is packed in a low melting foil.				
Curing	t 90, 150°C		Packaging	Pallets	[cm]	120x100x135	
	Reclaim	100 phr		Net weight	[kg]	1250	
	ZnO	5 phr		Net weight	[pounds]	2755	
	Stearic acid	2 phr					
	Sulphur	3 phr		Pallets	[cm]	120x100x110	
	MBT	0.5 phr		Net weight	[kg]	1000	
	DPG	0.2 phr		Net weight	[pounds]	2204	

Recommended other brochures: Reclaim in Compounds.

The process

The NR-reclaim grades are mechanically and thermally devulcanised, mainly out of rubber Truck Tread peelings without adding any devulcanising agents.

Rubber Resources uses a Banbury mixer in the process; this enables them to produce a customer-based master batch by adding other raw materials.

Approved raw material
↓
Cutting
↓
Separation of metals
↓
Granulating (3.5 mm)
↓
Separation of contaminants
↓
Grinding
↓
Separation of metals
↓
Powder
↓
Thermal step
↓
Mechanical step
↓
Straining
↓
Cooling
↓
Packaging
↓
Storage

The Banbury Mixer

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.

Application:	RNR40 B11	RNR30 B01	RNR30 B91	RNR20 B52	RNR20 B66
Passenger and truck tyres:					
Tread	20	15			
Sidewall	15				
Carcass	30	30	20		
Bead	30	20	10		
Apex	10	10			
Bicycle tyres	50	40			
Solid tyres			20	20	15
Automotive moulded goods		20	15	10	10
Mechanical moulded goods		25	20	15	15
Mats (flooring, automotive)	50	50	40	30	30
Conveyer belts	30	30	20		
Hoses	30	25	20	20	
Shoes	30	30	25	20	20

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

Increase in Mooney viscosity

The phenomenon of the hardening of natural rubber during storage is well known throughout the rubber industry. Due to the high proportion of natural rubber in tyre tread reclaim, the harde-ning behaviour of reclaim during storage is similar to that of natural rubber. The rate of increase depends on storage time and temperature. It can be calculated with the following empirical equation:

$M_t = M_0 * (1 + a * t^{\mathbf{0.55}})$

M_t = Mooney after t days of storage

M_0 = Mooney at the day of production

t = Storage time in days

a = 0.04 for T = 23°C

= 0.15 for T = 50°C

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