Clays in Technical Rubber

Clays find use in a variety of applications, either because of specific technical properties and/or because of their very favourable cost/performance ratio. Fine clays have semi-reinforcing properties and may be used as either the primary filler in rubber or in order to partially replace or extend more highly reinforcing carbon blacks. Less fine (filler) clays confer lower levels of reinforcement and may be more readily used at higher volume loadings. In addition, the processing properties of filler clays are often more advantageous, since they are easier to disperse efficiently. If light coloured articles are to be produced, then china clays such as **Speswhite** and **Polwhite C** or **PoleStar 200R** calcined clay can be used in brightly coloured compounds.

All clay fillers share some common features because of the plate-like shape of their particles, which results in some stiffening of the rubber compound. This gives much better extrusion and calendering properties (exhibiting low die swell and good dimensional stability) than can be obtained from most other mineral fillers.

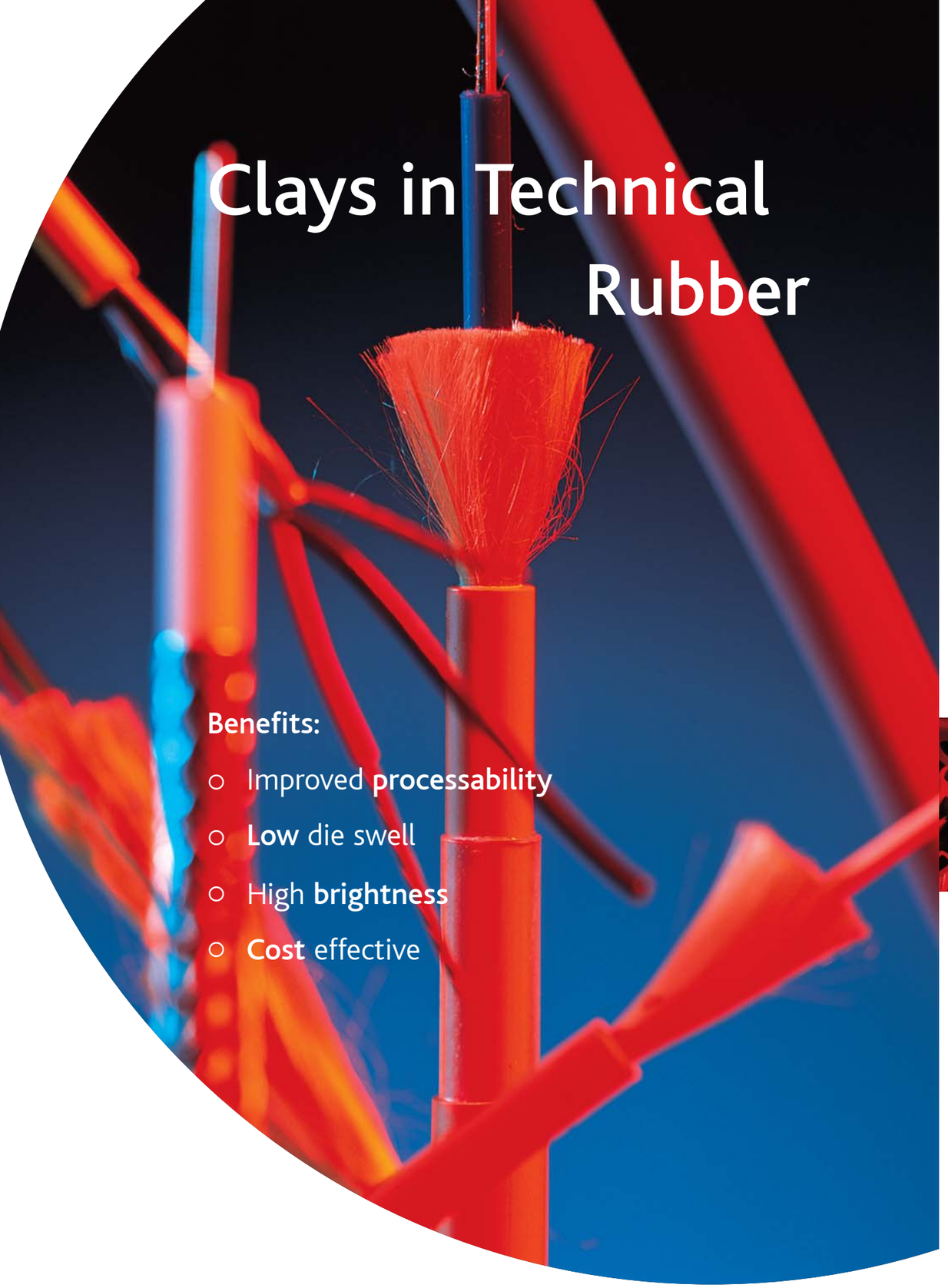
Washing machine seal	
Formulation	**phr**
Vistalon 3666	175
Zinc oxide	5
Stearic acid	1
Titanium dioxide	20
Speswhite clay	100
Polyvest 25	2
Sunpar 2280	25
Struktol WB212	3
TMTD	0,8
Tetrone A	0,8
ZBDC	2,0
Sulphur	2,0
Properties	
Tensile Strength	10,7 MPa
Modulus at 300%	2,8 MPa
Elongation at break	800%
Tear Strength	20 N/mm
Hardness	45° Shore A
Compression set at 70°C	24,2%
Compression set at 100°C	31,3%

Flooring compound	
Formulation	**phr**
Vistalon 4608	60
Vistalon 2504	40
Zinc oxide	5
Stearic acid	2
Paraffin wax	5
Polwhite C clay	200
Sunpar 150	30
Sulphur	1,5
ZDC	0,5
TMTD	0,5
MBT	1,5
Properties	
Tensile Strength	5,8 MPa
Modulus at 300%	3,7 MPa
Elongation at break	440%
Hardness	73 IRHD
Compression set at 70°C	79,3%

In injection mouldings platey china clays or talcs can cause anistropy while synthetic silicas or aluminium silicates give a high viscosity causing difficulties in mold filling. Calcined clay gives, as a consequence of its shape and size, little anistropy and low viscosity. Properties are also very good (but may be boosted by small amounts of synthetic silica) and a typical EPDM injection moulding for a spark plug cap is given below.

Spark Plug Cap	phr
Vistalon 7606	100
Polyethylene Wax	3
PoleStar 200R	120
Precipitated Silica	30
Plasticiser	30
Polyethylene glycol	3
ZMTI	1
Sulphur	0.2
Peroxide (40% on carrier)	8
Curing characteristics	**phr**
Minimum torque (lb/in)	9.7
Maximum torque (lb/in)	73.4
T_2 (min)	1.0
T_{90} (min)	7.7
Mechanical Properties	
Tensile Strength (Mpa)	10.1
Elongation at Break (%)	43.0
Modulus at 100%	3.0
Hardness (Share A)	64

Clays in Technical Rubber



Benefits:

- Improved **processability**
- **Low** die swell
- High **brightness**
- **Cost** effective

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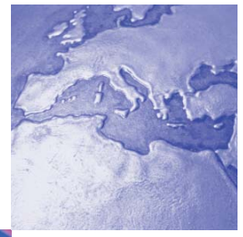

Technical Partnership on a Global Scale

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