APPLICATION INFORMATION

ADDITIVES FOR PUTTIES

TS-A 5

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Contents

Introduction

Putties based on polyester and epoxy resins are widely used all around the world. There are many different kinds of putty, such as common car repair putty, reinforced putty, spray putty and casting putties. Other putties may be used to repair marine components such as yachts or improve the finish of stone or concrete surfaces.

The wide range of putties also leads to different requirements concerning properties and quality of the material. But most types of putties have basic requirements in common, such as:

- Proper application consistency
- Fast curing and easy sanding
- Adhesion to substrate
- Good storage stability
- Reduced air entrapments

For additional information on additives and technical topics please contact us:
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Note

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Additives for putties

Proper application consistency

The compound is usually applied with a putty knife. In order for the putty to be distributed quickly and evenly on a surface, it must have a special, smooth texture that is sometimes referred to as butter-like consistency. This consistency is what facilitates a uniform surface without craters and holes.

Besides the filler, wetting and dispersing additives and thixotropic agents have a strong influence on this viscosity.

Preferred choice of:
Wetting and dispersing additives for UP and EP:
BYK-W 966, BYK-W 980
Rheology additives for UP:
CLAYTONE-AF, CLAYTONE-APA, GARAMITE-1958, RHEOBYK-100 and **RHEOBYK-7590**
Rheology additives for EP:
GARAMITE-7305 in combination with **RHEOBYK-R 607**

Fast curing and easy sanding

After curing, the putty is sanded. This can be done manually or with a grinding machine. Dry grinding is more common, but wet grinding is also possible under conditions where the water will evaporate fast enough. To minimize labor time, curing should be short and grinding should be as easy as possible.

Preferred choice for
UP resins: **BYK-W 966, BYK-W 969, BYK-W 980**
EP resins: **BYK-9076, BYK-W 969, BYK-W 980**

Adhesion to substrate

One of the most important properties of a putty is excellent adhesion to the substrate. Putties must still adhere perfectly, even when exposed to elevated temperatures to smooth substrates such as steel. In contrast to some other products on the market, BYK additives are designed to have no negative impact on the adhesion of the putty to the surface.

None of the recommended wetting and dispersing additives reduce adhesion.

Good storage stability

Storage stability of the putty itself ultimately has to match the operator's expectations. This means that the putty should not cure during storage before it can even be used, and the resin should not separate out on top of the compound (requiring it to be remixed before use).

Preferred choice for
UP resins: **BYK-W 966, BYK-W 980**
EP resins: **BYK-W 940, ANTI-TERRA-204**

Reduced air entrapments

Many air bubbles are incorporated into the compound while the putty is being mixed. A vacuum is often used to reduce the amount of entrapped air. Air release additives will help to reduce the incorporation of air during mixing and minimize the time for the vacuum treatment.

Preferred choice for
UP resins: **BYK-A 515, BYK-A 555**
EP resins: **BYK-A 501, BYK-A 530**

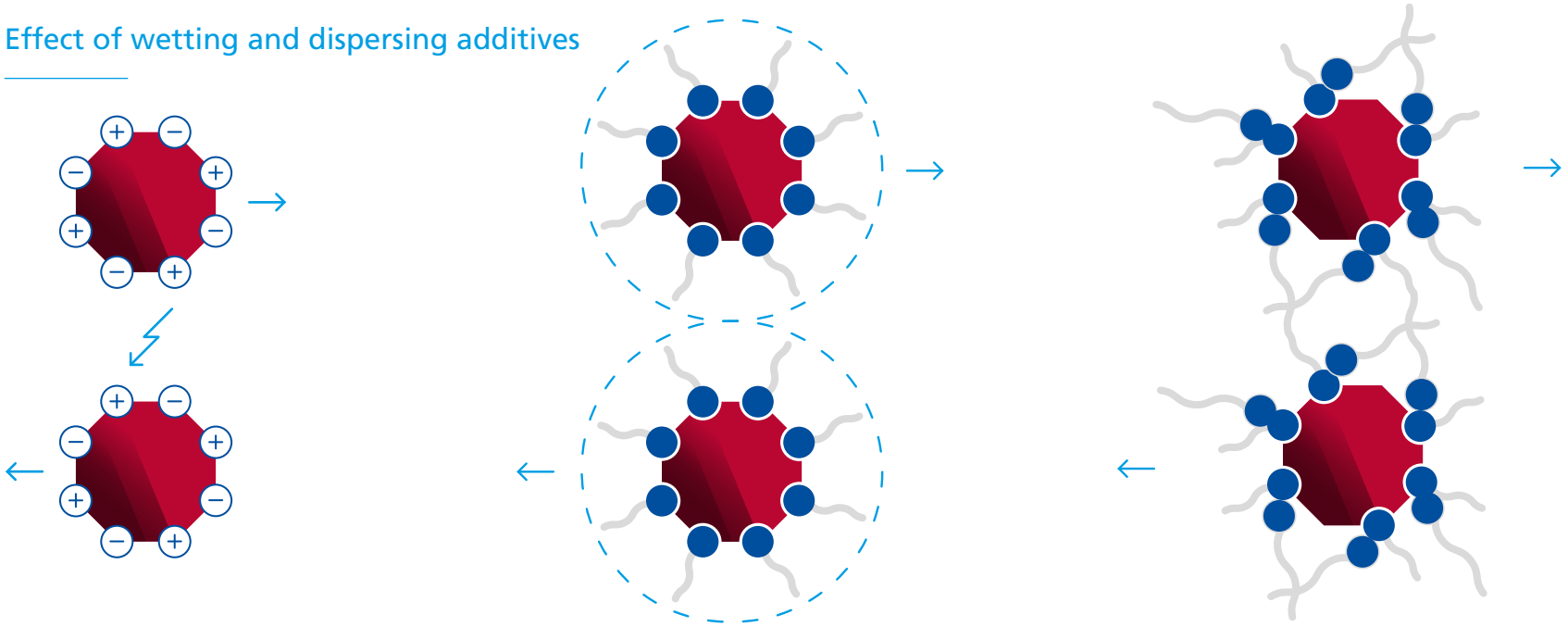
Polyester putties

Most putties are based on unsaturated polyester resins as they combine the required properties with economically favorable costs.

From an additive perspective, the main focus in putties is on wetting and dispersing additives. These additives absorb onto the filler surface and minimize the interaction between the polar filler particles. This process reduces viscosity and provides an opportunity to increase filler load.

Increasing the filler load in the formulation produces a putty with reduced abrasion resistance, which means better sandability. At the same time, these additives also make it easier to incorporate the filler into the resin and shorten the production time.

Effect of wetting and dispersing additives

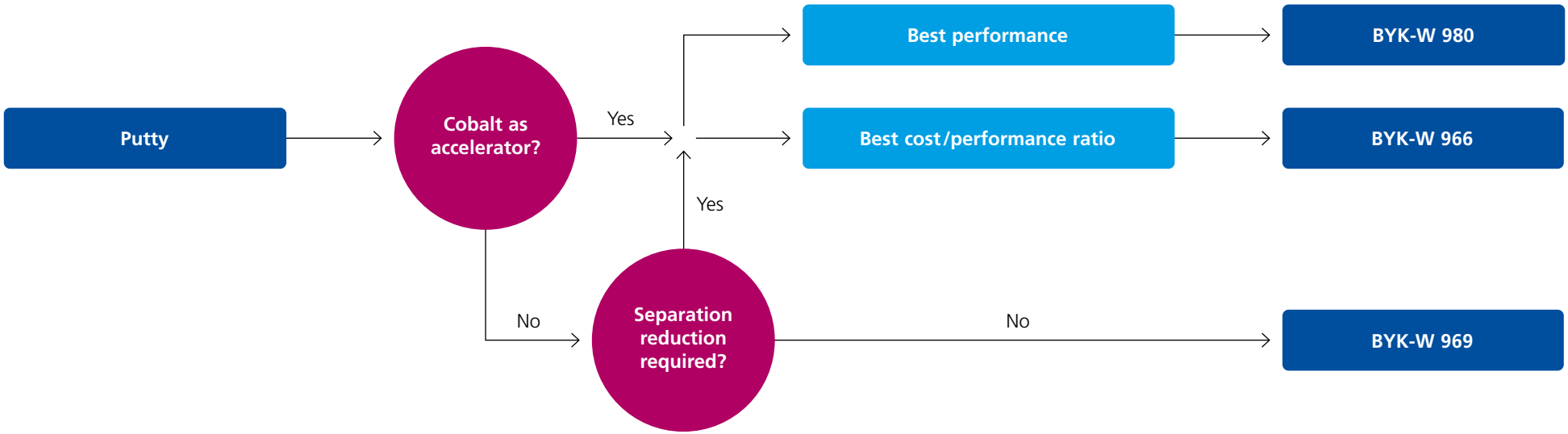


Putty without additive
Strong interaction between filler particles:
- Difficult filler incorporation
- High viscosity
- Poor sandability
- Resin separation during storage

Putty with BYK-W 969
Filler particles are covered with a layer of monofunctional additive:
- Easy filler incorporation
- Much lower viscosity
- 12 % higher filler load
- Very good sandability
  (not recommended for cobalt-accelerated systems)

Putty with BYK-W 966 or BYK-W 980
Filler particles are covered with a layer of bifunctional additive:
- Easy filler incorporation
- Lower viscosity
- 6 % higher filler load
- Improved sandability
- No resin separation during storage

Selecting a wetting and dispersing additive for polyester putty



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Typical starting formulation of a polyester-based putty

Component	Type	Amount in g
UP resin	Resin	100
BYK-W 966	Wetting and dispersing additive	2
RHEOBYK-100	Castor oil derived thixotrope	1
CLAYTONE-AF	Organoclay-based thixotrope	3
Talc 1 (20 µm)	Filler	70
Talc 2 (30 µm)	Filler	70
Calcium carbonate (10 µm)	Filler	65
Titanium dioxide	Pigment	5

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Additives for polyester putties

Product	Product type	Remarks	Dosage
BYK-A 555	Strong defoamer for any kind of putty where low amount of entrapped air is required or time for vacuum deaeration should be as short as possible	Universal air release additive	0.2–1 % b.o.r.
BYK-W 966	Bifunctional wetting and dispersing additive with anti-separation properties (up to 5 % more filler possible)	Good cost/performance ratio	0.5–1.5 % b.o.f.
BYK-W 969	Monofunctional wetting and dispersing additive with strongest performance concerning increase of filler load (12 % more filler possible)	Not recommended for cobalt-accelerated systems	0.5–1.5 % b.o.f.
BYK-W 980	Strong bifunctional wetting and dispersing additive with anti-separation properties (up to 6 % more filler possible)	High content of active material	0.5–1.5 % b.o.f.
CLAYTONE-AF	Solid thixotrope, maximum performance organophilic bentonite	No impact on adhesion	1–5 % b.o.r.
CLAYTONE-APA	Solid thixotrope, organophilic bentonite	No impact on adhesion	1–5 % b.o.r.
GARAMITE-1958	Solid thixotrope based on Mixed Mineral Technology (MMT)	No impact on adhesion, does not require high shear forces during incorporation	1–5 % b.o.r.
RHEOBYK-100	Castor oil derived thixotrope	Activation required at 45–55 °C	0.5–1.5 % b.o.r.
RHEOBYK-7590	Castor oil derived thixotrope	Activation required at 45–50 °C	0.5–1.5 % b.o.r.

b.o.f. = based on filler b.o.r. = based on resin

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Putties based on epoxy resin

Whenever UP resin characteristics such as mechanical or chemical properties are not sufficient, epoxy resins are the preferred choice for producing an appropriate putty. The basic requirements are very similar to UP putty, but the type of suitable products does differ from polyester putty.

Additives for epoxy putties

Product	Product type	Remarks	Dosage
ANTI-TERRA-204	Multifunctional wetting and dispersing additives with strong anti-sedimentation properties	Usually no viscosity reduction	0.5–1.5 % b.o.f.
BYK-9076	Monofunctional wetting and dispersing additives with strong performance concerning increase of filler load	Very strong performance	0.5–1.5 % b.o.f.
BYK-A 501	Polymeric defoamer for epoxy systems	Alternative to BYK-A 530	0.2–1 % b.o.r.
BYK-A 530	Strong universal defoamer for epoxy systems	Best performance in most epoxy systems	0.2–1 % b.o.r.
BYK-W 940	Multifunctional wetting and dispersing additives with strong anti-sedimentation properties	Usually no viscosity reduction	0.5–1.5 % b.o.f.
BYK-W 966	Bifunctional wetting and dispersing additive with anti-separation properties. Filler increase possible.	Good cost/performance ratio	0.5–1.5 % b.o.f.
BYK-W 980	Strong bifunctional wetting and dispersing additive with anti-separation properties. Filler increase possible.	High content of active material	0.5–1.5 % b.o.f.
BYK-W 985	Monofunctional wetting and dispersing additives with strong performance concerning increase of filler load	Very strong performance	0.5–1.5 % b.o.f.
GARAMITE-7305	Solid thixotrope based on Mixed Mineral Technology (MMT)	No impact on adhesion	1–5 % b.o.r.
RHEOBYK-R 607	Thixotropic booster in conjunction with hydrophilic fumed silica or clay based additives	To be used in the hardener	20–80 % based on thixotropic agent, depending on the hardener

b.o.f. = based on filler b.o.r. = based on resin

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