EVONIK
INDUSTRIES

# Product Overview


tego

Evonik. Power to create.


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# Content

# About us


TEGO – one of the successful brands from Evonik Industries.

As the leading supplier of specialty chemicals world-wide, Evonik offers its customers in the coatings industry a unique range of products under the TEGO brand name. Our portfolio is the result of experience gained over 30 years in which we have researched optimal solutions which are ideal for our customers. With more than 200 products, the range currently includes wetting and dispersing additives, defoamers and deaerators, rheological additives, flow and leveling additives, hydrophobing agents, radiation-curing additives, and even co-binders, specialty resins, and nanoresins.

We remove air from paint, make surfaces glossy and ensure lacquers are scratch-resistant. Environmental concerns are of key importance when developing our new products.

Besides our extensive expertise in providing customized solutions, our numerous contacts in more than 40 countries are an additional advantage. This underlines our philosophy of developing intelligent products for new applications not only for, but together with, our customers. We look forward to your challenge and are confident that we can find an advantageous solution for you.

**TEGO – Adding Advantages.**


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# Basic functions and functionalities: TEGO – Adding Advantages

**TEGO additives and specialty resins for functional coatings**

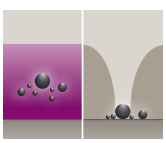
Numerous TEGO additives and specialty resins are available for tailoring the functionalities of coatings to suit a broad range of applications. Our customers can thus differentiate themselves from their competitors by offering innovative coatings.

Floor coatings, for example, can be made electrically conductive using anti-static additives. Silica nanocomposites are particularly effective in rendering high gloss coatings for wood and plastics scratch- and abrasion-resistant. At the same time, such products improve barrier effects against water vapor, gases and solvents.

Surface properties can be manipulated for "easy to clean" characteristics, and architectural paints can be formulated with water repellency properties that increase the longevity of buildings. Release properties lead to blocking resistance which ensures that two coated surfaces, such as window frames, do not stick to each other or that cakes can be removed easily from baking pans.

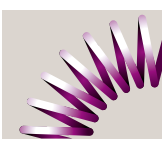
## Basic functions

Anti-settling
TEGO® Dispers
TEGO® VariPlus
TEGO® ViscoPlus

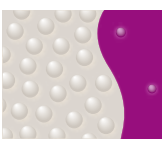


Anti-cratering
TEGO® Wet
TEGO® Twin
TEGO® Glide

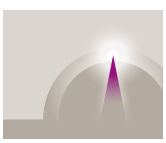
Drying speed
TEGO® VariPlus



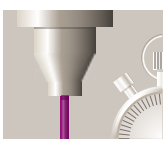
Flexibility
ALBIFLEX®



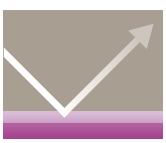
Deaeration
TEGO® Airex



Defoaming
TEGO® Foamex
TEGO® Airex

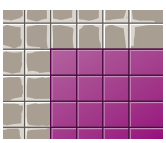


Flow characteristics
TEGO® ViscoPlus
TEGO® Dispers
TEGO® VariPlus

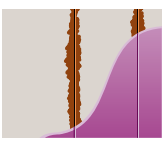


Gloss
TEGO® Dispers
TEGO® VariPlus

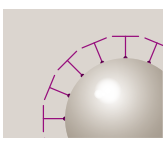
Hardness
TEGO® VariPlus



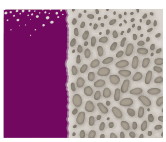
Adhesion
TEGO® AddBond
ADDID®



Corrosion protection
SILIKOPON®
TEGO® AddBond



Pigment wetting
TEGO® Dispers
TEGO® VariPlus



Substrate wetting
TEGO® Wet
TEGO® Twin
TEGO® Glide
TEGO® Rad

Flow
TEGO® Flow
TEGO® Glide
TEGO® Rad

Reactive resin modifiers enable silicone elastomer particles to be bound into a resin matrix of coatings resulting in significantly increased impact strength as required, for example, for wind turbine rotor blades. Even coatings with very good long-term high and low temperature resistance can be formulated with the help of TEGO specialty resins.

Surface haptics can also be precisely adjusted with TEGO products. Touch modifiers ensure that leather and plastics surfaces have a pleasant feel while maintaining their high quality appearance.

The TEGO range of products is founded on 30 years of experience in the research, development and marketing of additives and specialty resins. We will continue in the future to offer, in close co-operation with our customers, innovative technologies for optimizing coatings.


## Functionalities

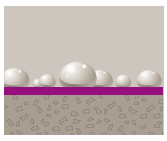
Anti-graffiti
TEGO® Protect
TEGO® Glide
TEGO® Rad
SILIKOPON®

Anti-static
ADDID®

Easy to clean
TEGO® Protect
SILIKOPON®

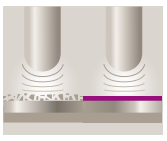
Touch
TEGO® Glide
SILIKOPUR®

Heat resistance
SILIKOPHEN®
SILIKOFTAL®
SILIKOPON®

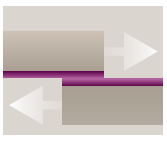


Hydrophobing
TEGO® Phobe

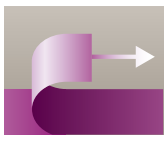
Scratch resistance
NANOCRYL®
NANOPOX®
NANOPOL®



Impact strength
ALBIDUR®



Slip/anti-blocking
TEGO® Glide
TEGO® Rad



Release properties
TEGO® Glide
TEGO® Rad

# TEGO Additives

Additives are added to coatings and printing inks in small quantities and exert a powerful impact. Depending on the type of additive, it is possible to optimize the production process of a coating, adjust application properties or systematically control the properties of the cured coating film. Wetting and dispersing additives affect pigment wetting and rapid development of tinting strength. Defoamers and deaerators ensure a foam-free and defect-free coating film. Surface additives, such as our glide and flow additives and our substrate wetting additives, produce uniform flow behavior and ideal surface smoothness.

The TEGO® Phobe and TEGO® Protect product lines impart water repellency and provide the coating with, for example, an anti-graffiti effect and therefore easy to clean properties.

Evonik's comprehensive chemical and technological competence forms the basis for a varied range of additives. We make the most of Evonik's expertise in organically modified polysiloxanes and silicone resins, its surfactant know-how, its sophisticated emulsification technology for the production of easy to incorporate defoamer emulsions as well as its know-how in the targeted synthesis of specialty polymers and their functionalization.

**TEGO – Adding Advantages.**

- **Deaerators**
- **Defoamers**
- **Wetting and Dispersing Additives**
- **Surface Control Additives**
- **Radiation-Curing Additives**
- **Substrate Wetting and Anti-Cratering Additives**
- **Rheological Additives**
- **Hydrophobing Agents**
- **Anti-Graffiti Additives**
- **Others**

Deaeration Defoaming

## Deaerators

**TEGO® Airex** deaerators prevent the formation of air inclusions and pinholes in waterborne, solventborne and radiation-curing coatings. This is particularly important in high viscosity or high solids formulations and essential for airless/airmix application in high film thickness. With our modern product portfolio of solvent-free deaerators for solventborne high solids and emission-free formulations, we contribute to further reduce the VOC-content.

Furthermore, preventing foam formation during production and application is particularly important in the case of waterborne formulations. TEGO® Foamex defoamers have proven their worth in this situation (see also page 11).

## Product Overview Deaerators

| Product | Waterborne | UV | UV PU/waterborne | Solventborne | 2-pack solvent-free | High Solids | Pigmented | Unpigmented | 2-pack epoxy | 2-pack PU | Acrylate | Alkyd | Alkyd/melamine | NC | Polyester/melamine | PU/acrylic | Acid-curing | Styrene-acrylic | UPE | UV acrylate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEGO® Airex 900 | | • | | • | • | • | • | | • | | | | | | | | | | | • |
| TEGO® Airex 901 W | • | | | | | | • | • | | | • | | | | | • | | • | | |
| TEGO® Airex 902 W | • | | • | | | | | • | | • | • | • | • | | • | • | | • | | |
| TEGO® Airex 904 W | • | | • | | | | • | • | | | • | • | | | | • | • | | | |
| TEGO® Airex 910[1] | | • | | • | • | | | • | • | | | | | | | | | | • | • |
| TEGO® Airex 920[1] | | • | | | | | • | • | | | | | | | | | | | | • |
| TEGO® Airex 921[1] | | • | | | | | • | • | | | | | | | | | | | | • |
| TEGO® Airex 922[1] | | | | • | • | | • | • | • | • | | | | | | | | | | |
| TEGO® Airex 931 | | | | • | | • | • | • | • | • | • | • | • | • | • | | • | | | |
| TEGO® Airex 932 | | | | • | | • | • | • | • | • | • | • | • | • | • | | • | | | |
| TEGO® Airex 940 | | | | • | • | | • | • | • | • | | • | | | | | | | • | |
| TEGO® Airex 944 | | | | • | • | • | • | | • | • | | • | | | | | | | • | |
| TEGO® Airex 947 | | | | • | • | • | • | • | • | • | | | | | | | | | | |
| TEGO® Airex 950 | | | | • | | • | | • | | | | | • | | • | | | | | • |
| TEGO® Airex 962 | | | | • | | • | | • | | • | • | | • | | • | | | | • | • |
| TEGO® Airex 990 | | • | | • | • | • | | • | • | • | • | | • | | • | | | | • | • |
| TEGO® Airex 991 | | | | • | • | • | • | | • | • | | | | | | | | | | |
| TEGO® Foamex N | | • | | • | • | | • | | • | | | | | | | | | | | • |

[1] silicone-free

## Defoamers

**TEGO® Foamex** defoamers prevent foam formation during production and application of waterborne coatings and printing inks. Pre-existing foam is destroyed and air occlusions are prevented. TEGO® Foamex defoamers are available as emulsions, solutions or concentrates. Because of their optimized particle size, emulsions have the greatest possible effectiveness and compatibility especially when added to the let-down and in clear coats. The highly effective defoamer concentrates provide fast and flawless processing during the dispersion of the mill base.

TEGO® Airex defoamers (see page 10) also accelerate the escape of air from the liquid paint film and inhibit formation of air occlusions and pinholes. TEGO® Airex defoamers are available for waterborne, solventborne, solvent-free and radiation-curing coatings.

Defoaming

## Product Overview Defoamers

| Product | Grinding stage | Let-down stage | Pigmented | Unpigmented | 2-pack epoxy | 2-pack PU | Acrylate | Alkyd | Polyester | PU | PU/acrylic | Styrene acrylic | Vinyl acetate | Others |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEGO® Foamex 1488 | • | • | • | • | • | | • | | | | | • | • | |
| TEGO® Foamex 1495 | • | • | • | • | • | | • | | | | | • | • | |
| TEGO® Foamex 3062 | • | | • | | | | | | | | | • | • | |
| TEGO® Foamex 7447 | | • | • | • | | | • | | | | | • | | |
| TEGO® Foamex 800 | | • | • | • | | • | • | | | | • | | | |
| TEGO® Foamex 8030 | | • | • | | • | | • | | | | | • | • | |
| TEGO® Foamex 805 N | | • | | • | | • | • | | • | • | | • | | |
| TEGO® Foamex 8050 | • | | • | | | | • | | | | | • | | |
| TEGO® Foamex 810 | • | | • | • | | | • | • | | | • | • | | |
| TEGO® Foamex 815 N | | • | • | | • | | • | • | | | | • | | |
| TEGO® Foamex 822 | | • | • | • | | • | • | • | | • | • | • | | • |
| TEGO® Foamex 823 | | • | • | • | | • | • | • | | • | • | • | • | |
| TEGO® Foamex 825 | | • | • | • | | • | • | | | | • | • | | |
| TEGO® Foamex 830[1] | • | • | • | • | | • | • | | • | • | | | | |
| TEGO® Foamex 831[1] | • | • | • | • | | | • | • | • | | • | • | • | • |
| TEGO® Foamex 832[1] | • | • | | | | | | | | | | | | |
| TEGO® Foamex 833[1] | | • | • | • | | | • | | • | | • | • | | • |
| TEGO® Foamex 835 | • | • | • | | | | | | | | | • | | |
| TEGO® Foamex 840 | • | • | • | • | • | | • | • | | • | | • | | |
| TEGO® Foamex 842 | • | • | • | • | | | • | | | | | • | | |
| TEGO® Foamex 843 | | • | • | | | | • | | | • | | • | | • |
| TEGO® Foamex 845 | | • | • | • | | | • | | • | | | • | | |
| TEGO® Foamex 855 | • | • | • | | | | • | | | | | • | • | |
| TEGO® Foamex 860 | • | • | • | | | | • | | | | • | • | | |
| TEGO® Foamex 883 | • | | • | | | | • | | | | | • | • | |
| TEGO® Foamex K 3[1] | • | | • | | | | • | | | | | • | • | |
| TEGO® Foamex K 7[1] | • | • | • | | | | • | | | | | • | • | |
| TEGO® Foamex K 8 | • | • | • | | | | • | | | | | • | • | • |
| TEGO® Foamex N | • | | • | | | • | | • | | | | | | |
| TEGO® Twin 4000 | | • | • | • | | | • | • | | | • | • | | • |

[1] silicone-free

## Wetting and Dispersing Additives

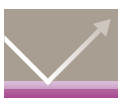
**TEGO® Dispers** wetting and dispersing additives promote pigment wetting and stabilization. They prevent floating, flooding and settling of pigments so that color coverage and intensity remain consistent during storage. At the same time, they ensure maximum color yield for the pigment while minimizing the number of milling steps. Since these additives lower viscosity, coatings and pigment concentrates can be produced cost-effectively because pigment concentration can be maximized during dispersion.

For manufacturing water-based pigment concentrates, we recommend TEGO® Dispers 757 W which is also the preferred product for corrosion resistant waterborne coatings and, like TEGO® Dispers 750 W and TEGO® Dispers 755 W, satisfies the highest demands in regards to optical and rheological properties.

The TEGO® Dispers 65x series' technology is currently the market standard for alkylphenolethoxylate-free universal pastes for waterborne and solventborne formulations. Modern, solventborne formulations can be developed particularly well with TEGO® Dispers 656, 670 and 685. For UV systems we recommend TEGO® Dispers 685 for all pigment types and TEGO® Dispers 688 for matting agents. All TEGO® Dispers products are alkylphenolethoxylate-free.


Anti-settling


Flow characteristics


Gloss


Pigment wetting

## Product Overview Wetting and Dispersing Additives

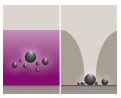
| Product | Waterborne | UV | Polar solvents | Non-polar solvents | 2-pack solvent-free | Universal pigment concentrates | Binder-containing | Binder-free | Carbon blacks | Organic pigments | Inorganic pigments | Fillers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEGO® Dispers 610 | | | • | | | | • | | | | • | • |
| TEGO® Dispers 610 S[2] | | | • | | | | • | | | | • | • |
| TEGO® Dispers 628 | | | • | • | | | • | | | | • | • |
| TEGO® Dispers 630 | | | • | | | | • | | | | • | • |
| TEGO® Dispers 650 | • | | • | • | | • | • | • | • | • | | |
| TEGO® Dispers 651 | • | | | | | • | • | • | • | • | • | • |
| TEGO® Dispers 652 | • | • | • | | • | | • | | | | • | • |
| TEGO® Dispers 653 | • | | | | | • | • | • | • | • | • | • |
| TEGO® Dispers 655 | • | • | • | • | • | • | • | • | | • | • | • |
| TEGO® Dispers 656 | • | • | • | • | • | • | • | • | | • | • | • |
| TEGO® Dispers 660 C | • | | | | | | | • | • | • | • | |
| TEGO® Dispers 662 C | | | • | • | | | | | • | • | • | |
| TEGO® Dispers 670 | | | • | | | | • | • | • | • | • | • |
| TEGO® Dispers 671 | | | • | • | | | • | • | • | • | • | |
| TEGO® Dispers 672 | | | • | • | | | • | | • | • | • | |
| TEGO® Dispers 685 | | • | • | | • | | • | | • | • | • | |
| TEGO® Dispers 688 | | • | • | | • | | | | | | | • |
| **TEGO® Dispers 690[1]** | | • | • | | | | • | • | • | • | • | |
| TEGO® Dispers 700 | | | • | | | | • | | | | • | • |
| TEGO® Dispers 710 | | • | • | | | | • | | • | • | • | |
| TEGO® Dispers 715 W | • | | | | | | • | | | | • | • |
| TEGO® Dispers 735 W | • | | | | | | • | • | | | • | • |
| TEGO® Dispers 740 W | • | | | | | | | • | | • | | |
| TEGO® Dispers 741 W | • | | | | | | • | • | • | • | • | • |
| TEGO® Dispers 745 W | • | | | | | | • | • | • | • | • | • |
| TEGO® Dispers 750 W | • | | | | | | • | • | • | • | • | • |
| TEGO® Dispers 752 W | • | | | | | | | • | | | • | • |
| TEGO® Dispers 755 W | • | | | | | | • | • | • | • | • | • |
| TEGO® Dispers 757 W | • | | | | | | • | • | • | • | • | • |
| TEGO® Dispers 760 W | • | | | | | | • | • | • | • | | |
| TEGO® Dispers 761 W | • | | | | | | • | • | • | • | | |
| TEGO® Dispers 765 W | • | | | | | | • | • | • | • | • | • |
| LIPOTIN® A | • | | | | | | • | | • | • | • | • |
| LIPOTIN® DB | | | | • | | | • | | • | • | • | • |

[1]new [2] containing silicone

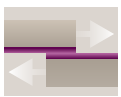
## Surface Control Additives

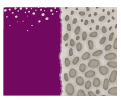
Our multi-purpose surface control additives, **TEGO® Glide and Flow,** improve the flow/leveling and reduce cratering. They prevent pigment flooding and flotation. Slip, scratch resistance and anti-blocking of a coating can be adjusted.


Anti-graffiti


Anti-cratering


Touch


Slip/anti-blocking


Substrate wetting


Release properties


Flow

## Product Overview Surface Control Additives

| Product | Waterborne | UV | Solventborne | Slip | Leveling | Low foaming | Compatible | Recoatable | Anti-blocking/scratch-resistance | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| TEGO® Flow 300[1] | | | • | | • | | • | • | | |
| TEGO® Flow 370[1] | | • | • | | • | • | • | • | | |
| TEGO® Flow 425 | • | • | • | | • | | • | • | | |
| TEGO® Flow ATF 2 | | | • | • | | | | | • | anti-crater effect |
| TEGO® Flow ZFS 460[1] | | • | • | | • | • | | • | | |
| TEGO® Glide 100 | • | • | • | • | • | | • | • | | universal |
| TEGO® Glide 110 | • | • | • | • | • | | • | | | anti-crater effect |
| TEGO® Glide 130 | • | • | • | • | • | | • | | | |
| TEGO® Glide 406 | • | | • | • | • | | • | • | | |
| TEGO® Glide 410 | • | | • | • | • | | • | | • | |
| TEGO® Glide 411 | | | • | • | • | | | | • | |
| TEGO® Glide 415 | | | • | • | • | | • | • | | |
| TEGO® Glide 432 | | • | | • | • | • | | | | |
| TEGO® Glide 435 | | • | | • | • | | | | | |
| TEGO® Glide 440 | • | • | • | • | • | | • | | | |
| TEGO® Glide 450 | • | • | • | • | • | | • | • | | |
| TEGO® Glide 482 | • | | | • | | • | | | • | anti-blocking |
| TEGO® Glide A 115 | | | • | • | • | | | | • | |
| TEGO® Glide B 1484 | | | • | | • | • | | • | | |
| TEGO® Glide ZG 400 | | • | • | • | • | | • | | | |

[1] silicone-free

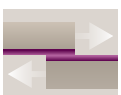

## Product Overview Radiation-Curing Multifunctional Additives

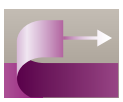
| Product | Waterborne UV | UV | Slip/anti-blocking | Wetting | Flow | Low foaming | Compatible | Recoatable | Release |
|---|---|---|---|---|---|---|---|---|---|
| TEGO® Rad 2010 | | • | • | • | • | • | | | • |
| TEGO® Rad 2011 | | • | | • | • | • | • | • | |
| TEGO® Rad 2100 | | • | | • | • | | • | • | |
| TEGO® Rad 2200 N | • | • | • | • | • | | • | | |
| TEGO® Rad 2250 | • | • | • | • | • | | • | | |
| TEGO® Rad 2300 | | • | • | • | • | • | • | | |
| TEGO® Rad 2500 | | • | • | | | • | | | • |
| TEGO® Rad 2600 | | • | • | | | • | | | • |
| TEGO® Rad 2700 | | • | • | | | • | | | • |

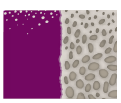
## Radiation-Curing Multifunctional Additives

The **TEGO® Rad** range comprises cross-linkable, acrylate additives for radiation-curing formulations. These multifunctional products improve slip, substrate wetting and anti-cratering, scratch resistance and leveling. In addition, some of the additives have release and defoaming properties.


Anti-graffiti


Slip/anti-blocking

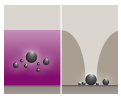

Release properties


Substrate wetting

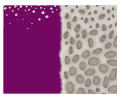

Flow

## Substrate Wetting and Anti-Cratering Additives

**TEGO® Wet and TEGO® Twin** substrate wetting and anti-cratering additives enable uniform wetting for coatings and printing inks even on very low energy or contaminated surfaces. Good wetting is a fundamental prerequisite for optimum adhesion. Defects in the coating surface such as cratering and poor leveling are minimized or improved.



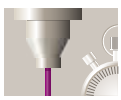
Anti-cratering



Substrate wetting

## Rheological Additives

The **TEGO® ViscoPlus** product range consists of associative, polyurethane thickeners which satisfy the latest requirements of the industry. All TEGO® ViscoPlus products are liquid and free from organic solvents, alkylphenolethoxylates and organotin compounds. Each TEGO® ViscoPlus product has a different rheological profile. The various products combine easily with each other due to their excellent compatibility.



Flow characteristics

Anti-settling

## Product Overview Substrate Wetting and Anti-Cratering Additives

| Product | Waterborne | UV | Solventborne | Static | Dynamic | Anti-crater | Low foaming |
|---|---|---|---|---|---|---|---|
| TEGO® Twin 4000 | • | • | • | • | | | • |
| TEGO® Twin 4100 | • | • | • | • | | • | • |
| **TEGO® Twin 4200**[1] | • | • | • | • | • | • | • |
| TEGO® Wet 240 | • | | | • | | • | |
| TEGO® Wet 250 | • | | | • | | • | |
| TEGO® Wet 260 | • | | | • | | • | |
| TEGO® Wet 265 | • | | | • | | • | • |
| TEGO® Wet 270 | • | • | • | • | | • | |
| TEGO® Wet 280 | • | • | • | • | | • | |
| TEGO® Wet 500[2] | • | • | | | • | | • |
| TEGO® Wet 505[2] | • | | | | • | | • |
| TEGO® Wet 510[2] | • | | | | • | | • |
| TEGO® Wet KL 245 | • | | • | • | | • | |

[1] new [2] silicone-free

## Product Overview Rheological Additives

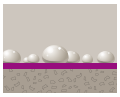
| Product | Waterborne | Newtonian | Newtonian, high-shear | Pseudoplastic | Strong pseudoplastic | Remark |
|---|---|---|---|---|---|---|
| TEGO® ViscoPlus 3000[1] | • | • | | | | solvent-free |
| TEGO® ViscoPlus 3010[1] | • | | • | | | solvent-free |
| TEGO® ViscoPlus 3030[1] | • | | | • | | solvent-free |
| TEGO® ViscoPlus 3060[1] | • | | | | • | solvent-free |

[1] silicone-free

## Hydrophobing Agents

**TEGO® Phobe** products are used to make waterborne exterior paints hydrophobic. Used in silicone resin paints in small amounts, TEGO® Phobe 1650 or TEGO® Phobe 1670 is characterized by low water absorption. For additional water-beading effect and for hydrophobing silicate systems, TEGO® Phobe 1505 and TEGO® Phobe 1401 are recommended.

TEGO® Phobe products from the 6000 range are suitable for long-term protection against water on mineral substrates such as natural stone, brick and concrete.



Hydrophobing

## Product Overview Hydrophobing Agents

| Product | Waterborne | Solventborne | Hydrophobing | Water-beading effect | Impregnation | Primer | Silicone resin paints and plasters | Silicate emulsion paints and plasters | Printing inks | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| TEGO® Phobe 1401 | • | | • | • | | | • | • | • | |
| TEGO® Phobe 1500 N | • | | • | • | | | • | • | • | |
| TEGO® Phobe 1505 | • | • | • | • | | | • | • | | |
| TEGO® Phobe 1650 | • | | • | | | | • | | • | strong early water-resistance |
| **TEGO® Phobe 1670**[1] | • | | • | | | | • | • | | good color development, no snail trails |
| TEGO® Phobe 6010 | | • | • | • | • | • | | | | |
| TEGO® Phobe 6510 | • | | • | | • | • | | | | |
| TEGO® Phobe 6600 | • | | • | • | • | • | | | | for impregnation of neutral substrates and primers |

[1]new

## Product Overview Anti-Graffiti Additives

| Product | Dosage | Applications/effect |
|---|---|---|
| TEGO® Protect 5000 N | 1 - 3% | for matt, unpigmented and/or pigmented formulations, especially good release properties |
| TEGO® Protect 5001 | 2 - 5% | for clear coats, marked water-beading effect, high solvent resistance |
| TEGO® Protect 5100 N | 2 - 8% | for waterborne 2-pack PU anti-graffiti coatings |

## Anti-Graffiti Additives

**TEGO® Protect** provides polyurethane coatings with anti-graffiti and easy to clean characteristics. This range of products can be used in solvent or water-borne coatings.


Anti-graffiti

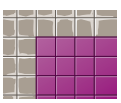

Easy to clean

## Product Overview Other Additives

| Product | Waterborne | UV | Solventborne | Solvent-free | Adhesion promoter | Hammer finish | Reduced drying-up | Anti-static |
|---|---|---|---|---|---|---|---|---|
| ADDID® 230 | • | | • | • | | | | • |
| ADDID® 240 | • | | • | • | | | | • |
| ADDID® 900[1] | • | • | • | | • | | | |
| TEGO® Hammer 501[1] | • | | • | | | • | | |
| TEGO® Humectant 7000 | • | | | | | | • | |

[1] containing silicone


Anti-static


Adhesion

# TEGO Co-Binders

Co-binders are added to the formulation to give the coating or printing ink specific properties. In contrast to additives, the concentrations used with these products range between 5.0 and 20.0% relative to the main binder. The incorporation can take place in addition to or as a partial exchange of the main binder.

The two groups of TEGO co-binders are based on different technologies. They offer customized solutions for diverse tasks.

TEGO® VariPlus products are co-binders based on modified ketone-aldehyde resins. Their hard-resin character provides the formulator with a simple means of increasing the hardness, gloss, anti-blocking properties and drying speed of printing inks and coatings. Their hyperbranched polymeric structures yield low solution viscosities, so that VOC levels can be reduced.

Ketone-aldehyde resins improve the adhesion properties on many substrates and complement the TEGO® AddBond product group in some applications. Selected products are suitable specifically for pigment grinds with high color strength.

TEGO® AddBond products are acid polyesters which, because of their special polymer structure and type of functional groups, improve the bonding of coatings on plastics and metals, thus increasing corrosion resistance.

This expertise, combined with a sound knowledge of interfacial chemistry, makes Evonik a strong partner for meeting the challenges of coating formulation.

**TEGO – Adding Advantages.**

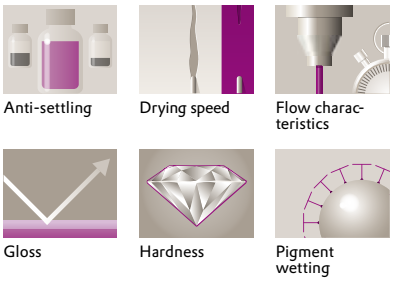
- **TEGO® VariPlus**
- **TEGO® AddBond**

## TEGO® VariPlus

**TEGO® VariPlus** products are widely compatible hard resins used as co-binders in paints, lacquers, printing and other inks. They not only increase the solids content and accelerate drying speed but also improve numerous properties such as hardness, gloss and film build. Adhesion on various substrates is increased, which together with its resistance to hydrolysis, enhances corrosion protection.

Several TEGO® VariPlus products can be used as pigment concentrate resins for the most diverse pigments. This enables excellent gloss to be obtained even at high pigment loading.

Resins such as TEGO® VariPlus SK and TEGO® VariPlus CA which contain hydroxyl groups are also used for modification of (for example PUR) binders.




### Product Overview TEGO® VariPlus

| Product | Waterborne | UV | Solventborne | Adhesion to metal | Adhesion to plastic | Hardness | Gloss | Viscosity reduction / increased solids content | Drying time | Pigment wetting and stabilization | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TEGO® VariPlus AP | | • | • | • | | | • | • | | | formaldehyde-free, solid |
| TEGO® VariPlus SK | | • | • | • | • | • | • | • | • | | formaldehyde-free, solid |
| TEGO® VariPlus 1201 TF | | | • | | • | • | • | | • | • | formaldehyde-free, free of tin-organic components |
| TEGO® VariPlus CA | | | • | • | | | • | • | • | | solid |
| TEGO® VariPlus TC | | | • | • | | | • | • | | • | solid, very wide compatibility and solubility |
| TEGO® VariPlus UC | • | | • | | | | • | • | | • | 100% liquid, very wide compatibility and solubility |
| TEGO® VariPlus UC W 40 | • | | | | | | • | | | • | non-ionic solution, free of organic solvents, for formulating universal pigment concentrates |
| TEGO® VariPlus DS 50 | • | | | | • | • | • | • | • | • | formaldehyde-free, aqueos emulsion, free of organic solvents |
| TEGO® VariPlus 3350 UV | | • | | • | • | | • | | | | in tripropylene glycol diacrylate |

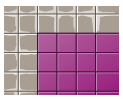
## TEGO® AddBond

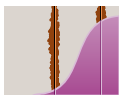
The **TEGO® AddBond** range of products comprises special, widely compatible polyester resins which improve the adhesion of the most diverse coating and printing ink formulations.

Adhesion is improved on numerous critical substrates. The range of products is also effective on metals, minerals and various plastics. Therefore, TEGO® AddBond products are frequently used in primers, for example to increase corrosion protection.

They also improve intercoat adhesion in multicoat finishes. In effect finishes, they increase cohesion within the film.

TEGO® AddBond products help to enhance gloss, hardness or flexibility.


Adhesion


Corrosion protection

### Product Overview TEGO® AddBond

| Product | Waterborne | UV | Solventborne | Adhesion on metal | Adhesion on plastic | Hardness | Flexibility | Fixation of aluminum pigments | Remark |
|---|---|---|---|---|---|---|---|---|---|
| TEGO® AddBond LTH | | • | • | • | | • | | • | solid |
| TEGO® AddBond LTW | | | • | • | • | | • | • | |
| TEGO® AddBond LTW-B | | | • | • | • | | • | • | |
| TEGO® AddBond 2220 ND | | | • | • | • | | • | • | especially suitable for alkyd systems |
| TEGO® AddBond HS | | | • | • | • | | • | | especially suitable for high solids coatings |
| TEGO® AddBond 1270 | • | | • | • | • | | • | | after neutralization suitable for waterborne formulations, good acrylate compatibility |
| TEGO® AddBond 2325 | | | • | • | • | | • | | especially suitable for thermoplastic acrylic enamels |
| TEGO® AddBond DS 1300 | • | | | • | • | | • | • | aqueous emulsion, free of organic solvents |

# TEGO Specialty Binders

TEGO specialty binders' unique properties, such as weathering stability and high resistance to heat and cold, result from a combination of organic chemistry and inorganic silicone chemistry. This distinguishes them from purely organic binders.

Targeted variation of the organic groups on the siloxane backbone results in compounds which, thanks to their broad property spectrum, can be used in many diverse areas of application. Their exceptional properties include excellent chemical resistance, good elasticity, excellent release characteristics and an especially high level of eco-compatibility.

Because of their highly crosslinked basic structure, TEGO silicone hybrid systems, silicone resins and silicone resin emulsions have proved particularly valuable as binders wherever especially high demands are made on the coating.

They are, for example, particularly suitable for high-temperature resistant, weatherproof, or easy to clean pigmented coatings.

TEGO specialty binders enable formulation of air-drying coating systems as well as the stoving enamels used on ovens, cookware, and exhaust systems.

In new product development, Evonik focuses heavily on eco-friendly products which also comply with the new requirements of the VOC directive. Thanks to our strong concentration on future coating technologies, we are already able to offer aqueous silicone resins for heat-resistant corrosion protection.

**TEGO – Adding Advantages.**

- **Silicone-Epoxy Resins**
- **Silicone Resins**
- **Silicone-Polyester Resins**
- **Silicone-Modified Polyurethane Emulsion**
- **Reactive Silicone-Based Resin Components**

## Silicone-Epoxy Resins

The product group **SILIKOPON®** and the product SILIKOFTAL® ED are silicone-epoxy hybrid systems which combine the advantages of both technologies.

SILIKOPON® EF and SILIKOFTAL® ED are ultra-high solids products with a very low VOC content and are the basis for isocyanate-free, air-drying, 2-pack anti-corrosion top coats. The coatings are highly resistant to chemicals and exhibit high color fastness as well as excellent gloss retention during outdoor use.

SILIKOPON® EC and SILIKOPON® EW are medium solid silicone epoxy hybrid resins for high-temperature resistant corrosion protection coatings. Both are stoving resins and are distinguished by good adhesion and resistance to solvents.


Anti-graffiti


Easy to clean


Heat resistance


Corrosion protection

## Product Overview Silicone-Epoxy Resins

| Product | Non-volatile content | Bemerkung |
|---|---|---|
| SILIKOPON® EF | 98% | for 2-pack isocyanate-free curable high solids top coats with a low VOC content (100-250 g/l), with good corrosion, excellent gloss, weathering resistance and anti-graffiti effect |
| SILIKOFTAL® ED | 100% | for 2-pack isocyanate-free curable high solids top coats with a low VOC content (100-250 g/l), with good corrosion, weathering resistance and anti-graffiti effect |
| SILIKOPON® EC | 53% | stoving system, solventborne, for stoving enamels (heat resistant up to 650 °C, depending on formulation), excellent adhesion and resistance to solvents |
| SILIKOPON® EW | 53% | stoving system, solventborne, for stoving enamels (heat resistant up to 650 °C, depending on formulation), excellent adhesion and resistance to solvents |

## Silicone Resins

### Heat resistance up to 650 °C
(formulation-dependent)

**SILIKOPHEN®** products consist of phenyl-methyl silicone resins which, depending on the formulation, provide corrosion protection up to 650 °C. Applications include exhaust systems and combustion chambers.

SILIKOPHEN® P resins are stoving resins and can be cold-blended with organic binders (alkyds or acrylics) and are suitable for manufacturing coatings with numerous properties.

SILIKOPHEN® AC resins are high solids products which cure in the presence of a catalyst at room temperature. These products are ideal for the coating of big objects in high temperature applications and provide good flexibility during the heating and the cooling process, as well as an early resistance to solvents after application.


Heat resistance

### Product Overview Silicone Resins

| Product | Non-volatile content | Remark |
|---|---|---|
| **Curing systems** | | |
| SILIKOPHEN® P 40/W | 50 % | water-reducible, good compatibility with organic resins |
| SILIKOPHEN® P 50/X | 50 % | solventborne, good air-drying |
| SILIKOPHEN® P 80/X | 80 % | solventborne, good air-drying, for low VOC formulations |
| **Ambient curing systems** | | |
| SILIKOPHEN® AC 900 | 90 % | high solids, solventborne, ambient curing, good flexibility during the heating and the cooling process |
| SILIKOPHEN® AC 1000 | 100 % | solvent-free, ambient curing, good flexibility during the heating and the cooling proces |

## Silicone-Polyester Resins

### Heat resistance up to 250 °C
(formulation-dependent)

With products of the **SILIKOFTAL®** brand, Evonik offers a wide range of silicone-polyester resins tailored to meet specific customer requirements. The building blocks of the SILIKOFTAL® product range are chemically linked.

This combines the properties of silicones such as heat resistance, weathering resistance and low surface tension with those of polyesters such as low thermoplasticity, high flexibility and good pigmentability.

Particularly worth mentioning is the use of SILIKOFTAL® products for inner and outer coatings for cooking utensils and bakeware which comply with FDA/BfR* regulations.


Heat resistance

### Product Overview Silicone-Polyester Resins

| Product | Non-volatile content | Silicone content | Properties |
|---|---|---|---|
| SILIKOFTAL® HTL 3 | 60 % | 30 % | very good yellowing resistance up to 200 °C, very good boiling water resistance. Listed under FDA 175.300 in cured solvent-free resins; conforms to BfR*. |
| SILIKOFTAL® HTL 2 | 60 % | 50 % | high gloss, low thermoplasticity, good detergent resistance up to 220 °C. Listed under FDA 175.300 in cured solvent-free resins; conforms to BfR*. |
| SILIKOFTAL® HTL | 60 % | 50 % | high gloss up to 220 °C. Listed under FDA 175.300 in cured solvent-free resins; conforms to BfR.* |
| SILIKOFTAL® HTF | 58 % | 50 % | flexible and therefore to a limited extent may be deep drawn. Currently listed under FDA 175.300 in cured solvent-free resins; conforms to BfR.* |
| SILIKOFTAL® HTS | 60 % | 70 % | very good resistance to yellowing and high gloss up to 230 °C. Listed under FDA 175.300 in cured solvent-free resins; conforms to BfR.* |
| SILIKOFTAL® HTT | 75 % | 80 % | good resistance to yellowing up to 250 °C; retains hardness from room temperature to 150 °C; good detergent resistance and high gloss up to 250 °C. Listed under FDA 175.300 in cured solvent-free resins; conforms to BfR.* |
| SILIKOFTAL® non-stick 60 | 60 % | 80 % | for non-stick coatings, properties like SILIKOFTAL® HTT. Listed under FDA 175.300 in cured solvent-free resins; conforms to BfR.* |

*Please note that the evaluation regarding suitability for food contact may change. You can find the latest status on our website www.tego.de

## Silicone-Modified Polyurethane Emulsion

### Non-heat resistant

**SILIKOPUR®** is a waterborne, silicone-modified 1-pack polyurethane emulsion.

With SILIKOPUR® very flexible coating systems for a wide range of substrates such as leather, wood, plastic, rubber and metal can be formulated.

### Product Overview Silicone-Modified Polyurethane Emulsion

| Product | Non-volatile content | Remark |
|---|---|---|
| SILIKOPUR® 8080 | 33% | waterborne silicone modified polyurethane emulsion, high flexibility |

Touch

## Reactive Silicone-Based Resin Components

The **TEGOMER®** range of products consists of linear, reactive polydimethylsiloxanes with various terminal functional groups. These are specially developed for modifying binders, such as polyurethanes, acrylic resins, polyesters and epoxides.

The use of TEGOMER® products as reactive co-binders or coatings additives enables unique siloxane properties, such as flexibility, water repellency, dirt repellency, weather resistance and slip to be incorporated into the profile of the organic binder. With the addition of the TEGOMER® products the properties of the coating can thus be further optimized.

### Product Overview Reactive Silicone-Based Resin Components

| Product | Non-volatile content | Remark |
|---|---|---|
| TEGOMER® C-Si 2342 | 100% | dicarboxyalkylpolydimethylsiloxane |
| TEGOMER® E-Si 2330 | 100% | diepoxyalkylpolydimethylsiloxane |
| TEGOMER® H-Si 2315 | 100% | dihydroxypolydimethylsiloxane |
| TEGOMER® V-Si 2250 | 100% | diacryloxypolydimethylsiloxane |

# TEGO Nanoresins

The nanoresin portfolio offers various products for targeted modification and customization of coatings systems to suit individual applications.

The liquid silica nanocomposites, NANOCRYL®, NANOPOX® and NANOPOL®, are colloidal dispersions of up to 50% w/w amorphous silica in unsaturated (meth-) acrylates, epoxy resins, or solvents. The spherical $SiO_2$ particles are monodisperse with a very narrow particle size distribution. The resulting silica nanocomposites are particularly easy to process because of their low viscosity. The effect is a previously unobtainable, targeted improvement in mechanical properties. The surface hardness and scratch/abrasion resistance of coatings can thus be significantly increased without impairing transparency or gloss.

Furthermore coatings can be modified with the reactive resin modifiers ALBIDUR® and ALBIFLEX.

ALBIDUR® products enable the unique properties of silicone elastomer particles to be introduced into a coatings system. Higher impact strength over a wide range of temperatures results in considerably improved low temperature performance, while the glass transition temperature and chemical resistance of the base resin are unaffected.

ALBIFLEX® products are flexible epoxy-silicone co-polymers which combine the advantageous properties of both epoxy resins and silicones. The high elasticity, even at very low temperatures, stems from the inherent properties of silicone. The epoxy resin contributes excellent adhesion to various substrates, high mechanical strength, and good chemical resistance.

**TEGO – Adding Advantages.**

- **NANOCRYL®, NANOPOX® and NANOPOL®**
- **ALBIDUR®**
- **ALBIFLEX®**

# Silica nanocomposites

Evonik's silica nanocomposites are colloidal silica sols in various binders and solvents. These are low viscosity products that are highly transparent and do not exhibit any sedimentation. This means that processability is largely unchanged compared to that of the base resin. The result is an almost perfect combination of the advantageous properties of organic and inorganic materials.

Silica nanocomposites are used wherever these improvements in properties are desirable or necessary without compromising processability as a result of, for example, disproportionate increases in viscosity which can occur with conventional fillers and pigments. The fact that this can be achieved without impairing optical clarity makes silica nanocomposites particularly suitable for use in transparent formulations. Good examples include highly scratch-resistant, steel wool-resistant clear coats for plastics (e.g. PC, PMMA, PET) and wood.

## NANOCRYL® and NANOPOX® – silica nanocomposites for the modification of radiation-curing coatings

### Product overview/Technical data

| Product | Monomer | Characterization | $SiO_2$-content [%w/w] | Dynamic viscosity, 25 °C [mPa·s] |
|---|---|---|---|---|
| NANOCRYL® C 130 | CTFA | trimethylol propane formal acrylate | 50 | 275 |
| NANOCRYL® C 140 | HDDA | hexanediol diacrylate | 50 | 175 |
| NANOCRYL® C 145 | TPGDA | tripropylene glycol diacrylate | 50 | 200 |
| NANOCRYL® C 150 | TMPTA | trimethylol propane triacrylate | 50 | 3,300 |
| NANOCRYL® C 153 | TMPEOTA | ethoxylated trimethylol propane triacrylate | 50 | 1,000 |
| NANOCRYL® C 155 | GPTA | propoxylated glycerine triacrylate | 50 | 1,750 |
| NANOCRYL® C 165 | PPTTA | alkoxylated pentaerythritol tetraacrylate | 50 | 2,500 |
| NANOPOX® C 620 | EEC | cycloaliphatic epoxy resin for cationic curing | 40 | 4,000 |
| NANOPOX® C 680 | TMPO | trimethyl propyl oxirane | 50 | 200 |

Scratch resistance

## NANOPOX® – silica nanocomposites for the modification of heat-cured and room temperature cured epoxy resin coatings

### Product overview/Technical data

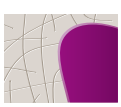
| Product | $SiO_2$-content [w/w%] | Base resin | EEW [g/equiv.] | Dynamic viscosity, 25 °C [mPa·s] | Characteristic |
|---|---|---|---|---|---|
| NANOPOX® C 450 | 40 | DGEBA | 295 | 60,000 | aromatic |
| NANOPOX® C 460 | 40 | DGEBA/DGEBF | 290 | 45,000 | aromatic, crystallization-free |
| NANOPOX® C 620 | 40 | EEC | 220 | 4,000 | cycloaliphatic epoxy resin |
| NANOPOX® C 680 | 50 | TMPO | 232 | 200 | reactiv diluent for czcloaliphatic szstems |

Scratch resistance

## NANOPOL® – silica nanocomposites for the modification of 1- and 2-pack coatings

### Product overview/Technical data

| Product | Characterization | $SiO_2$-content [w/w%] | Dynamic viscosity, 25 °C [mPa·s] |
|---|---|---|---|
| NANOPOL® C 764 | methoxy propyl acetate | 50 | 20 |
| NANOPOL® C 784 | n-butylacetate | 50 | 20 |



Scratch resistance

## ALBIDUR® – silicone elastomer particles for the modification of coatings

**ALBIDUR®** products can be used to modify the fracture toughness of a formulation without affecting the modulus or glass transition temperature and without markedly increasing the viscosity of the mixture. Optimal performance is obtained with the addition of 8 - 10% delivery form in the total formulation (without fillers). This leads to a noticeable improvement of the impact strength with scarcely any effect on the modulus.

Impact strength

### Product overview/Technical data

| Product | Silicone content [w/w%] | Base resin | Dynamic viscosity, 25 °C [mPa·s] | Comments |
|---|---|---|---|---|
| ALBIDUR® EP 2240 A | 40 | DGEBA | 35,000 | EEW: 300 g/equiv. |
| ALBIDUR® EP 5340 | 40 | cycloaliphatic | 4,000 | EEW: 250 g/equiv. |
| ALBIDUR® PU 5640 | 40 | PPG-triol | 2,500 | hydroxyl value: 230 |
| ALBIDUR® VE 3320 | 20 | bisphenol A-vinyl ester | 2,000 | styrene content: 32 % |

## ALBIFLEX® – epoxy-silicone copolymers for the modification of coatings

**ALBIFLEX®** combines normally incompatible epoxy-resin and silicone in one homogeneous copolymer which exhibits the benefits of both its constituent polymers:

- the epoxy component provides excellent adhesion to numerous substrates, high mechanical strength and good chemical resistance
- the silicone component provides high elasticity, even at very low temperatures, good thermal and ageing resistance and excellent dielectric properties

Flexibility

### Product overview/Technical data

| Product | Silicone content [w/w%] | Base resin | EEW [g/equiv.] | Dynamic viscosity, 25 °C [mPa·s] |
|---|---|---|---|---|
| ALBIFLEX® 296 | 40 | DGEBA | 850 | 45,000 |
| ALBIFLEX® 348 | 60 | DGEBA | 1,150 | 30,000 |

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