

Author: Siegfried Heckl

Translation: Dr. Horst E. Toussaint

Approval: May 2008



VM / Dr. Alexander Risch

ABRASIVES

Essential Components
of Polishing and
Cleaning Agents

Synopsis

The present brochure will discuss the effects and interactions of the various raw materials as used in polishing and cleaning agents.

The efficiency of individual components in polishes and cleaners, alone and combined, will be interpreted on the base of their morphological structure and chemical composition. The focus of the discussion will aim at selected Neuburg Siliceous Earth grades which have found wide acceptance as abrasives or grinding agents in such products.

Based on the physical structure of the abrasives, a theory has been developed for the function of the Siliceous Earth grades SILLITIN and SILLIKOKOLLOID in such formulations. Intentionally, a purely empirical approach has been chosen to interpret the existing relationships between the raw materials, rather than trying to develop mathematical or physical models. The report should be understood as a guideline for practical work, and not so much as a theoretical dissertation.

A multitude of guide formulations for different applications of polishing and cleaning agents is included, with the intent to indicate ways to solve various polishing and cleaning problems by specifying optimum abrasives or their combinations.

The Appendix lists the suppliers of the raw materials used in the guide formulations, as well as their chemical composition. This will offer useful information to the formulator for developing proprietary products, or modifying and optimizing the guide formulations given.

Contents

1	Introduction	Page 4
2	Cleaning and Polishing	
3	Major ingredients of polishing and cleaning agents	Pages 5 to 10
3.1	Abrasives	
3.2	Other ingredients	
4	Guide formulations for polishes	Page 11
4.1	<i>Automotive industry</i>	
4.1.1	Chrome cleaning paste	Page 12
4.1.2.1	Car polish, with solvents, conventional	Page 13
4.1.2.2	Car polish, with solvents, conventional	Page 14
4.1.2.3	Car polish, with solvents, soft paste, high cleaning action	Page 15
4.1.2.4	Car polish LP 40, with solvents	Page 16
4.1.2.5	Car polish LP 51, with solvents	Page 17
4.1.2.6	Car polish LP 67, with solvents, creamy, very easy to rub off	Page 18
4.1.2.7	Car polish LP 62, with solvents, creamy, very easy to rub off	Page 19
4.1.2.8	Car polish, with solvents, detergent resistant	Page 20
4.1.3.1	Car polish, solvent free, with carnauba wax	Page 21
4.1.3.2	Car polish, solvent free	Page 22
4.1.3.3	Car polish, solvent free, cold processable	Page 23
4.1.3.4	Car polish, solvent free	Page 24
4.1.3.5	Car polish PC_01_1200, solvent free	Page 25
4.1.3.6	Car polish, solvent free, detergent resistant	Page 26
4.1.3.7	Car polish LP 66, solvent free, overpaintable	Page 27
4.1.4	Car conditioning cream	Page 28
4.1.5	Water-based varnish cleaner	Page 29
4.1.6	Grinding polish	Page 30
4.1.7	Antifogging agent AB 8, solvent free, good cleaning of glass surfaces	Page 31

4.2	<i>Industrial and household cleaners</i>	
4.2.1	Grinding paste	Page 32
4.2.2	Metal polish ME 2	Page 33
4.2.3	Steel cleansing paste, with paraffin	Page 34
4.2.4	Brass and bronze polish 553-LR	Page 35
4.2.5	Eloxal cleaner	Page 36
4.2.7	Stove cleaner	Page 37
4.2.7.1	Polish emulsion for ceran plates	Page 38
4.2.7.2	Care agent for ceran plates, water-based, care and protection against baking	Page 39
4.2.7.3	Glass ceramics polish GP 16, good cleaning and protection against baking	Page 40
4.2.7.4	Glass ceramics cleaner GR 2, good protection against baking	Page 41
4.2.8	Household cleaner	Page 42
4.2.9	Scouring cleaner	Page 43
4.2.10	Cleansing and care agent for plastic window frames	Page 44
4.2.11	Acrylic glass cleaner PG 3, solvent free creamy, does not cause stress cracking	Page 45
4.2.12	Silicone and wax remover	Page 46

Appendix

Raw material information	Pages 47 to 50
List of suppliers	Pages 51 to 54

1 Introduction

Many articles and objects in daily life tend to gradually lose their original appearance when exposed to light, humidity, oxygen or dirt of various origin. Their surface turns to become dull, rugged and unattractive.

In addition, numerous products made from metal, but also from glass or from plastics, exhibit a more or less pronounced surface roughness after the molding or shaping process, and are partly covered with an oxide layer. This requires a post-treatment step for technical and esthetical reasons.

Surface treatment processes concern both the regeneration of old surfaces and the upgrading or generation of new surfaces. Both objectives are the result of human inventiveness, and create ever new challenges.

Surface treatment generally means the refinement of surfaces via selected physico-chemical methods, such as chrome-plating or painting, or by mechanical operations such as polishing or cleaning.

2 Cleaning and Polishing

Abrasives (grinding agents) of different grain size and in varying amounts are used, according to requirements, to wear off ultrafine surface layers and create surfaces of high quality finish. The conditioning agents included in the product formulations then form a protective film on the surface and even out small irregularities.

Optimum efficiency and quality is obtained with a suitable balance between abrasive, conditioning, surface active and dirt removing ingredients. Polishes based on such combinations have for many years proved their value in industrial and household applications, in car maintenance and in the processing of noble metals.

The Neuburg Siliceous Earth grades SILLITIN and SILLIKOLLOID from Hoffmann Mineral have been successfully used as efficient abrasive agents in high performance polish formulations since the beginning of the 20th century.

3 Major ingredients of polishing and cleaning agents

3.1 Abrasives

- Neuburg Siliceous Earth

As already mentioned, Neuburg Siliceous Earth grades are included as abrasives in manifold polish formulations. The following considerations about the processes that take place during polishing operations, should help to appreciate the interactions which characterize the underlying mechanisms. It is not intended to explore the deeper mathematical and physical interrelations which govern the extremely complex individual process steps, but to offer an approach to help optimize practical product formulations.



Neuburg Siliceous Earth, extracted in the surrounding of Neuburg (Danube), is a natural combination of corpuscular, crypto-crystalline and amorphous silica and lamellar kaolinite: a loose mixture impossible to separate by physical methods. The silica, of high natural fineness, shows round grains and a naturally aged surface. Therefore, the silica portion does not present any sharp-edged structures, and the low grit content (sieve residue) allows a gentle polishing of surfaces.

Property	Unit	Method	SILLITIN V 85	SILLITIN N 85 PURISS	SILLITIN Z 86 PURISS	SILLIKOLLOID P 87 PURISS
Particle size						
d ₅₀	µm	Fraunhofer diffraction spectra (Malvern Laser instrument)	4.0	2.9	1.9	1.5
d ₉₇	µm		17.5	15.9	7.8	5.6
Residue						
> 40 µm	mg/kg	DIN ISO 787 Part 18	< 60	< 10	< 10	< 10
> 200 µm	mg/kg		< 20	< 1	< 1	< 1
Oil absorption	g/100g	DIN ISO 787 Part 5	45	45	55	55
Mineralogical composition						
- Silica	%	based on chemical analyses	77	72	64	60
- Kaolinite	%		18	22	29	33
- Other minerals	%		5	6	7	7

The PURISS grades of Neuburg Siliceous Earth are even more pure than classic SILLITIN. The grit portion (sieve residue) of these products – which is already very low – is further reduced in comparison with standard SILLITIN. Dispersal behavior in low-viscosity systems is considerably improved. These effects are achieved through a final process after actual production.

As an abrasive, Neuburg Siliceous Earth offers particular application benefits:

- * Siliceous Earth can be as readily incorporated into straight aqueous systems as into solvent/water mixtures.
- * As a result of its low tendency towards sedimentation, Siliceous Earth efficiently contributes to the stability of such dispersions.
- * Neuburg Siliceous Earth, in particular the very fine-particle SILLIKOLLOID 87 PURISS, helps to adjust the desired thixotropy and structural viscosity in polishing and cleaning agents. The further addition of costly rheological additives can, therefore, be minimized or even completely eliminated.
- * In polishing operations, the relatively loose clusters of Siliceous Earth are destroyed under the action of the shearing forces. The flat kaolinite platelets cover the surface to be polished, and prevent a direct contact of the silica particles; this way, the development of grooves in soft surfaces is prevented. On the other hand, certain asperities which stand out from the surface, are quickly leveled away, because they cannot be covered by the small amount of kaolinite present.
- * Neuburg Siliceous Earth is available in 4 different particle size distributions, in order to offer optimum abrasivity for different polishing requirements. The proper choice of the Siliceous Earth grade greatly depends on the state of the surface to be treated. For sensitive surfaces, or limited fouling, the finer products such as SILLIKOLLOID 87 PURISS or SILLITIN Z 86 PURISS are preferred. Grossly fouled or less delicate surfaces can safely be polished with SILLITIN N 85 / SILLITIN N 85 PURISS or SILLITIN V 85.

- **Aluminum oxide**

Contrary to Siliceous Earth, aluminum oxide (Al_2O_3) is characterized by a structure which will be divided up into ever smaller segments during polishing operations. Particularly on delicate parts, this finally gives rise to a highly glossy, scratch-free surface.

Aluminum oxide - also called alumina or, in its coarsely crystalline form corundum, in suitable combinations with Siliceous Earth opens up further application areas which would be difficult to attack with the individual abrasives alone. Polishing grade alumina counts among the hardest minerals in nature.

- **Siliceous Earth/alumina blends**

Combinations of Siliceous Earth and alumina are outstandingly suited for upgrading heavily fouled, but sensitive surfaces.

The coarse, very hard alumina particles serve to erode all the rough surface asperities. The action of the polishing forces also causes a deagglomeration of the Siliceous Earth particles. The kaolinite then covers the surface, and the released fine silica grains break up the alumina crystals which likewise disintegrate into lamella-type fragments. Jointly with the kaolinite, they build up a roof-tile-like protective layer on the surface, which is already smooth and free from loose particles.

The final result, after removing the residues of the polishing agents and abraded particles with polishing cloth or polishing wool, is an extremely smooth and highly glossy surface.

2.2 Other ingredients

In response to environmental considerations and to growing customer preference for physiologically non-hazardous products, aqueous formulations based on native raw materials are gaining ever more in importance.

The general makeup of a formulation also plays a vital role. It is of high importance whether a formulation is based on solvents, on oil/water or water/oil emulsions, because mineral particles show a strong tendency towards flocculation in non-polar (organic) systems.

- **Waxes for surface protection**

Surface conditioning agents generally contain hard waxes, which produce a decorative surface sealing that is heat resistant and protects against moisture and dirt.

Usual hard waxes in polishing formulations are the following.

Carnauba wax

- a natural wax obtained from the Brazilian fan palm,
- is predominantly used in water-based, environmentally friendly polishes.

Crude petroleum waxes

- i. e. C₂₆-C₃₂ waxes extracted from bituminous lignite,
- are readily soluble in white spirit and thus are uniformly and homogeneously distributed throughout the polishing system.

Typical representatives of this class are:

- acid waxes
- ester waxes
- partly saponified ester waxes.

Fischer-Tropsch waxes

- fully synthetic products from the hydrogenation of coal, are characterized by a high portion of non-branched (linear) carbon chains. They are often used after partial saponification.

- **Silicone oil**

Silicone oils mostly are linear poly-dialkylsiloxanes of different molecular weights. In view of their extraordinarily low surface tension, they are capable of near-perfectly wetting all sorts of surfaces.

The resulting lubricating action helps to reduce the forces required for polishing, and to enhance the gloss. The chemical stability of polysiloxanes over a wide range of temperatures ensures long-lasting glossiness. The pronounced hydrophobic nature of these substances is responsible for the desired water repellent effect.

- **Water**

An environmentally friendly solvent, water today represents an essential constituent of many polish formulations. As a disadvantage, water requires longer polishing times and higher energy input. With its high specific heat capacity, water in particular plays an important role in automated polishing operations, where it acts as a cooling medium and thus minimizes thermal damage to temperature sensitive surfaces such as paints and plastics.

- **Solvents**

For certain applications, solvents still today cannot be eliminated. In such cases, it is recommended to use highly purified white spirit (free from hazardous substances), by itself or in combination with water. White spirit has a low specific heat capacity and low heat of evaporation, which implies less effective cooling, but easier evaporation.

- **Surfactants**

Surfactants are the generic term for all sorts of surface or interface active substances. Frequently, surfactants are merely understood as detergents which decrease the surface tension of water, and thus impart to the cleaner a high dirt removal and cleaning potential.

In view of the widespread use of cleaning agents, their formulations resp. the surfactants included are expected to meet stringent requirements with respect to environmental properties. As a result, current-day development projects very much aim at using surfactants which are obtained from renewable resources (fats and oils).

Modern cleaners, therefore, should be formulated with surfactants from oleochemical (renewable) raw materials, such as ethoxylated fatty alcohol or fatty acid alkanolamides, in replacement of the still largely used sulfonates. The new surfactants are distinguished by being readily degradable under aerobic and/or anaerobic conditions.

Surfactants also include other substances which are often treated separately in the literature. As the following discussion will show, the same chemical substances can often be used for very different purposes.

Emulsifiers

Emulsifying agents or detergents decrease the interfacial tension between two immiscible liquids, and form a coherent layer between their interfaces.

White spirit and water cannot normally be mixed. The addition of an emulsifier in polishes based on white spirit/water mixtures as solvents, however, makes it possible to obtain stable emulsions. Suitable emulsifiers here are ethoxylated fatty alcohol and similar products.

Dispersing agents

Dispersing agents facilitate, or indeed allow to obtain a dispersion of solid materials in a liquid. They reduce the surface tension of the particles to be dispersed to the point to achieve good wetting, followed in the process by fine dispersion of the solid particles in the liquid phase. Dispersing agents are particularly useful in polishes with very high abrasive content. Suitable products, among others, are fatty alcohol and their polyglycol ethers.

- **Preserving agents (microbiocides)**

In environmentally friendly, water-based polishes, microbiological attack can lead to spoilage, similar as found in food products. The formulations, therefore, include microbiocides which act to prevent growth and spreading of microorganisms. N-Formal and isothiazolinone have proved suitable additives in this respect.

- **Thickeners and thixotroping agents**

Thickeners are used to increase the viscosity of liquid systems, and thus allow to deliberately adjust the working viscosity of cleaners and polishes. Partly, they also contribute to thixotropic properties which are particularly appreciated when working with polishes on inclined or even vertical surfaces: run-off and drip-off are minimized. Equally, thixotropy and structural viscosity as brought about by many thickeners, play an important role for storage stability. They minimize or completely prevent a sedimentation of the heavier abrasive particles, and thus counteract de-mixing. At the same time, these physical features allow an easy redispersion of deposits in the cleaning or polishing agent by simple stirring or shaking.

Suitable thickeners are organic aluminum compounds (e.g., Bentonite) and/or carboxylic acids, fumed silica, and to a certain extent the abrasives themselves. Especially the very fine particle SILLIKOLLOID is used in many formulations, besides its mild polishing action, for viscosity adjustment.

4 **Guide formulations for polishes**

Manifold are the materials used to produce technical and consumer goods, and as manifold are the application areas for **polishing agents**.

Their product range extends from coarse polishes for kitchen stoves via paint and varnish conditioners to ultrafine polishes for optical glassware and plastics goods.

The following selection contains base formulations for very different requirements, which can of course be modified and optimized to adjust for desired end properties or special problem areas.

In view of the complex way of action as typical for polish formulations, there will often be a need for individual adjustments and optimization in order to respond to particular requirements. The expertise our Technical Service specialists and the various test facilities of our laboratories are available to assist our customers.

Our Technical Service suggestions and the information contained in this brochure are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

Guide Formulation No. 4.1.1

Chrome cleaning paste
Automotive industry

Raw Material		% by weight
Hoechst-Wachs O	(2)	2.0
Stearic acid		3.0
Oleic acid		0.7
Flavex 909	(12)	1.2
Paraffin oil		3.7
White spirit		36.2
Aluminiumoxid P 30	(5)	35.0
SILLITIN Z 86 PURISS	(10)	17.0
Aerosil 200	(1)	1.2
		100.0

Remarks:

- Start with Hoechst-Wachs O, stearic acid, oleic acid, Flavex 909, paraffin oil and white spirit, melt at approx. 90 °C;
- add Aluminiumoxid P 30 and SILLITIN Z 86 PURISS and stir in Aerosil 200 with a high speed mixer;
- let cool down to 50 °C;
- the filling temperature is 40 °C.

Suppliers:

- (1) Degussa AG, Frankfurt/Main (Germany)
- (2) Clariant GmbH, Augsburg (Germany)
- (5) Almatis GmbH, Frankfurt/Main (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
- (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
- (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-6/01.2006/6132980

Guide formulation No. 4.1.2.1

**Car polish, with solvents
 conventional
 Automotive industry**

Raw material		% by weight
Hoechst-Wachs LP	(2)	2.5
Hoechst-Wachs E	(2)	1.0
Emulsogen OG	(2)	1.5
Exxsol D 145/160	(11)	36.5
Siliconöl AK 350	(3)	2.0
Siliconöl AK 12500	(3)	2.0
Softened water		41.5
SILLITIN N 85 PURISS	(10)	13.0
		100.0

Remarks:

- Start with Exxsol D 145/160;
- heat Hoechst-Wachs LP, Hoechst-Wachs E, Emulsogen OG, Siliconöl AK 350 and Siliconöl AK 12500 to 95 °C to melt the wax;
- stir in hot water at 95 °C;
- stir in SILLITIN N 85 PURISS and let cool down.

Suppliers:

- (2) Clariant GmbH, Augsburg (Germany)
- (3) Wacker Chemie AG, München (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
- (11) ExxonMobil Chemical Central GmbH, Köln (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.1.2.2

**Car polish, with solvents
conventional (basis: Kahl)
Automotive industry**

Raw material		% by weight
Kahlwachs S	(14)	2.0
Siliconöl 556	(15)	2.0
Siliconöl 10000	(15)	0.5
Siliconöl DC 531	(15)	2.0
Oleic acid	(25)	4.0
White spirit 180-200 °C		15.0
Carbopol 940	(16)	0.2
Diethylaminoethanol DEAE	(13)	1.0
Softened water		43.3
SILLITIN N 85 PURISS	(10)	30.0
		100.0

- Remarks:**
- Heat Kahlwachs S, Siliconöl 556, Siliconöl 10000, Siliconöl DC 531, oleic acid, white spirit and Carbopol 940 to 100 °C - 105 °C to melt the wax;
 - add diethylaminoethanol and hot water at 95 °C;
 - stir in SILLITIN N 85 PURISS with a high speed mixer, let cool down to approx. 35 °C and fill out.

- Suppliers:**
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (13) Riedel-de Haën AG, Seelze (Germany)
 - (14) Kahl & Co., Trittau (Germany)
 - (15) Dow Corning GmbH, Wiesbaden (Germany)
 - (16) Noveon Europe B.V.B.A., Brussels (Belgium)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.1.2.3

**Car polish, with solvents
 soft paste, high cleaning action (basis: Clariant)
 Automotive industry**

Raw material		% by weight
Hoechst-Wachs LP	(2)	6.5
Oleic acid	(25)	0.5
Stearic acid, technical grade		1.0
Siliconöl AK 350	(3)	6.0
Petroleum		17.0
Diethylaminoethanol DEAE	(13)	0.8
Softened water		53.2
SILLITIN N 85 PURISS	(10)	15.0
		100.0

- Remarks:**
- Heat Hoechst-Wachs LP, oleic acid, stearic acid, Siliconöl AK 350 and Petroleum to approx. 85° C;
 - stir in Diethylaminoethanol to the clear solution;
 - heat water to approx. 50 °C and stir in SILLITIN; add the solution to the water/SILLITIN-mixture;
 - let cool down the emulsion to approx. 45 °C by stirring and fill out.

- Suppliers:**
- (2) Clariant GmbH, Augsburg (Germany)
 - (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (13) Riedel-de Haën AG, Seelze (Germany)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.1.2.4

**Car polish LP 40, with solvents
 (basis: Wacker)
 Automotive industry**

Raw material		% by weight
Siliconöl-Emulsion E 32	(3)	4.0
Siliconöl-Emulsion E 1044	(3)	1.0
Siliconöl-Emulsion E 10	(3)	1.0
Carbopol EZ 2	(16)	0.3
SILLITIN N 85 PURISS	(10)	5.0
Shellsol T	(12)	5.0
White spirit 100-140 °C		10.0
Softened water		73.4
Triethanolamine	(25)	0.2
Formaldehyde 40 %		0.1
		100.0

Remarks:

- Disperse Carbopol EZ 2 in water at RT;
- stir in the emulsions, SILLITIN N 85 PURISS, white spirit, Shellsol T, triethanolamine and formaldehyde in that order.

Suppliers:

- (3) Wacker Chemie AG, München (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
- (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
- (16) Noveon Europe B.V.B.A., Brussels (Belgium)
- (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.1.2.5

**Car polish LP 51, with solvents
 (basis: Wacker)
 Automotive industry**

Raw material		% by weight
Siliconwachs W 23	(3)	2.00
Wacker-BELSIL CM 1000	(3)	1.00
Trennmittel TPR	(3)	0.75
Siliconöl AK 12500	(3)	0.25
White spirit 100-140 °C		5.00
Shellsol T	(12)	10.00
Oleic acid	(25)	2.00
Carbopol EZ 2	(16)	0.30
SILLITIN N 85 PURISS	(10)	10.00
Diethyl aminoethanol	(25)	1.00
Triethanolamine	(25)	0.20
Softened water		67.40
Formalin solution 40 %		0.10
		100.00

- Remarks:**
- Disperse Carbopol EZ 2 in water at RT;
 - stir in the mixture of Siliconwachs W 23, Wacker-BELSIL CM 1000, Trennmittel TPR, Siliconöl AK 12500, white spirit, Shellsol T and oleic acid;
 - then stir in SILLITIN N 85 PURISS, diethyl aminoethanol, triethanolamine and formalin solution.

- Suppliers:**
- (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
 - (16) Noveon Europe B.V.B.A., Brussels (Belgium)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.1.2.6

**Car polish LP 67, with solvents
 creamy, very easy to rub off (basis: Wacker)
 Automotive industry**

Raw material		% by weight
Siliconöl-Emulsion E 32	(3)	2.50
Siliconöl AK 350	(3)	0.60
Siliconöl AK 12500	(3)	0.40
Trennmittel TPR	(3)	0.70
Carbopol EZ 2	(16)	0.10
SILLITIN N 85	(10)	3.00
Shellsol T	(12)	5.00
White spirit 100-140 °C		5.00
Softened water		82.50
Triethanolamine	(25)	0.10
Preservative		on demand
		99.90

- Remarks:**
- Disperse Carbopol EZ 2 in water at RT;
 - stir in Siliconöl-Emulsion E 32 and the mixture of Siliconöl AK 350, Siliconöl AK 12500, Trennmittel TPR, Shellsol T and white spirit;
 - then stir in SILLITIN N 85 and triethanolamine.

- Suppliers:**
- (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
 - (16) Noveon Europe B.V.B.A., Brussels (Belgium)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.1.2.7

**Car polish LP 62, with solvents
 creamy, very easy to rub off (basis: Wacker)
 Automotive industry**

Raw material		% by weight
Siliconöl-Emulsion E 1044	(3)	2.50
Siliconöl AK 100	(3)	1.50
Carbopol EZ 2	(16)	0.10
SILLITIN N 85	(10)	3.00
Shellsol T	(12)	5.00
White spirit 100-140 °C		5.00
Softened water		82.80
Triethanolamine	(25)	0.10
Preservative		on demand
		100.00

- Remarks:**
- Disperse Carbopol EZ 2 in water at RT;
 - stir in Siliconöl-Emulsion E 1044 and the mixture of Siliconöl AK 100, Shellsol T and white spirit;
 - then stir in SILLITIN N 85 and triethanolamine.

- Suppliers:**
- (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
 - (16) Noveon Europe B.V.B.A., Brussels (Belgium)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.1.2.8

**Car Polish, with solvents
 detergent resistant (basis: Goldschmidt)
 Automotive industry**

Raw material		% by weight
Carnauba wax		2.0
White spirit, free from aromatic compounds		15.0
Tego Polish Additiv ACS	(8)	10.0
Tegiloxan 350	(8)	5.0
Water		63.0
SILLITIN N 85 PURISS	(10)	5.0
		100.0

Remarks:

- Take warm white spirit to solve the wax;
- stir in the other ingredients in the given sequence until emulsified.

Suppliers:

- (8) Goldschmidt GmbH, Essen (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.
 VM-5/01.2006/6132980

Guide formulation No. 4.1.3.1

**Car polish, solvent free
 with carnauba wax
 Automotive industry**

Raw material		% by weight
Softened water		59.8
Carnauba Selbstganzwachs 2090	(14)	3.0
Siliconöl-Emulsion E 1656	(3)	8.0
Siliconöl-Emulsion VP 1044	(3)	20.0
SILLITIN Z 86 PURISS	(10)	9.0
Acticide MBS	(6)	0.2
		100.0

- Remarks:**
- Heat water to 95°C;
 - add Carnauba Selbstganzwachs 2090 by sprinkling and stir until dissolved;
 - let cool down to 40 °C;
 - stir in emulsions of silicone oil, SILLITIN Z 86 PURISS and Acticide MBS.

- Suppliers:**
- (3) Wacker Chemie AG, München (Germany)
 - (6) Thor GmbH, Speyer (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (14) Kahl & Co., Trittau (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-6/01.2006/6132980

Guide formulation No. 4.1.3.2

**Car polish, solvent free
 (basis: Kahl)
 Automotive industry**

Raw material		% by weight
Softened water		55.5
SILLITIN N 85 PURISS	(10)	4.0
Celite S	(19)	2.0
Monoethylene glycol		1.0
Acticide MBS	(6)	0.2
4052-Emulsion	(14)	20.0
SM 2059	(17)	11.0
SM 2079	(17)	5.0
Perfume		0.3
Salcare SC 95	(18)	1.0
		100.0

Remarks: - Stir in all components in the given sequence.

Suppliers: (6) Thor GmbH, Speyer (Germany)
 (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 (14) Kahl & Co., Trittau (Germany)
 (17) GE Bayer Silicones, Erkrath (Germany)
 (18) Ciba Specialty Chemicals Inc., Basel (Switzerland)
 (19) Lehmann & Voss & Co., Hamburg (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-6/01.2006/6132980

Guide formulation No. 4.1.3.3

**Car Polish, solvent free
 cold processable (basis: Goldschmidt)
 Automotive industry**

Raw material			% by weight
Water, demimeralized	}		29.46
Hoechst-Wachs KLE	}	* wax emulsion (2)	3.54
Tego Carbomer 140		(8)	0.2
SILLITIN N 85 PURISS		(10)	5.0
Tego Polish Additiv E 3400/5		(8)	7.6
Tego Polish Additiv E 35		(8)	8.6
Water, demineralized			45.6
			100.0

Remarks: * Wax emulsion: Scatter Hoechst-Wachs KLE in hot water and mix until homogeneous emulsion is formed.

- Add pre-prepared wax emulsion to the mixing vessel;
- mix Tego Carbomer 140 and SILLITIN N 85 PURISS and add homogeneous to the emulsion;
- stir in the other ingredients in the given sequence.

Suppliers: (2) Clariant GmbH, Augsburg (Germany)
 (8) Goldschmidt GmbH, Essen (Germany)
 (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information. VM-5/01.2006/6132980

Guide formulation No. 4.1.3.4

**Car polish, solvent free
 (basis: Clariant)
 Automotive industry**

Raw material		% by weight
Hoechst-Wachs KSL	(2)	4.0
Softened water		82.1
Genapol OX-060	(2)	1.5
Kelzan S	(4)	0.3
Siliconöl AK 350	(3)	6.0
SILLITIN N 85 PURISS	(10)	6.0
Acticide MBS	(6)	0.1
		100.0

- Remarks:**
- Melt Hoechst Wachs KSL, Genapol and Siliconöl AK 350 at 90 °C, stir in 90 °C hot water;
 - stir in Kelzan and SILLITIN to the hot emulsion;
 - let the batch cool down to approx. 30 °C by stirring;
 - add Acticide MBS.

- Suppliers:**
- (2) Clariant GmbH, Augsburg (Germany)
 - (3) Wacker Chemie AG, München (Germany)
 - (4) CP Kelco Germany GmbH, Hamburg (Germany)
 - (6) Thor GmbH, Speyer (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-6/01.2006/6132980

Guide formulation No. 4.1.3.5

**Car polish PC_01_1200, solvent free
(basis: BYK-Cera)
Automotive industry**

Raw material		% by weight
Novacer 1200	(20)	5.7
Siliconöl-Emulsion E 10	(3)	5.7
SILLITIN N 85 PURISS	(10)	6.0
Aerosil 200	(1)	2.0
Softened Water		80.6
		100.0

- Remarks:**
- Mix 25% of water with Novacer 1200 and Siliconöl-Emulsion E 10;
 - add SILLITIN N 85 PURISS with sufficient dispersing energy;
 - add rest of water;
 - add Aerosil 200 with sufficient dispersing energy.

- Suppliers:**
- (1) Degussa AG, Frankfurt/Main (Germany)
 - (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (20) BYK-Cera bv, Deventer (Belgium)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.1.3.6

**Car Polish, solvent free
detergent resistant (basis: Goldschmidt)
Automotive industry**

Raw materials		% by weight
Tagat S	(8)	3.6
Water, demineralized		10.0
Hoechst-Wachs S	(2)	4.0
Lunacerin W 60	(21)	2.0
Tegin M	(8)	1.8
Tegiloxan 350	(8)	5.0
Tego Polish Additiv C 3191	(8)	3.0
Water, demineralized		70.4
Sodium chloride		0.2
SILLITIN N 85 PURISS	(10)	on demand
		100.0

- Remarks:**
- Heat up Tagat S and water and stir until homogeneous;
 - mix wax and Tegin M until is melt;
 - add Tegiloxan and Polish Additives and homogenize;
 - to finalize the product add hot water with sodium chloride and cool down immediately.

- Suppliers:**
- (2) Clariant GmbH, Augsburg (Germany)
 - (8) Goldschmidt GmbH, Essen (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (21) Paramelt B.V., Heerhugowaard (The Netherlands)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.1.3.7

**Car polish LP 66, solvent free
overpaintable (basis: Wacker)
Automotive industry**

Raw material		% by weight
Trennemulsion TNE 50	(3)	3.0
Siliconöl-Emulsion E 32	(3)	1.0
Carbopol EZ 2	(16)	0.3
SILLITIN Z 86	(10)	5.0
Softened water		90.5
Triethanolamine	(25)	0.2
Preservative		on demand
		100.0

- Remarks:**
- Disperse Carbopol EZ 2 in water at RT;
 - stir in the other ingredients.

- Suppliers:**
- (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (16) Noveon Europe B.V.B.A., Brussels (Belgium)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.1.4

**Car conditioning cream
Automotive industry**

Raw material		% by weight
Hoechst-Wachs LP	(2)	5.0
Stearic acid		2.0
Siliconöl AK 1000	(3)	7.0
Tego Additiv C 3191	(8)	2.0
Exxsol D 80	(11)	15.0
Brij 721	(9)	0.5
Brij 72	(9)	0.5
Softened water		60.0
SILLITIN Z 86 PURISS	(10)	8.0
		100.0

- Remarks:**
- Heat Hoechst-Wachs LP, stearic acid, Siliconöl AK 1000, Tego Additiv C 3191, Exxsol D 80, Brij 721 and Brij 72, melt at 90 °C;
 - heat water to 95 °C and stir in the hot melt;
 - stir in SILLITIN Z 86 PURISS.

- Suppliers:**
- (2) Clariant GmbH, Augsburg (Germany)
 - (3) Wacker Chemie AG, München (Germany)
 - (8) Goldschmidt GmbH, Essen (Germany)
 - (9) Uniqema, Gouda (The Netherlands)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (11) ExxonMobil Chemical Central GmbH, Köln (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.1.5

**Water-based varnish cleaner
Automotive industry**

Raw material		% by weight
Softened water		51.0
Carnauba Selbstglanzwachs 2090	(14)	1.0
Siliconöl-Emulsion VP 1044	(3)	17.1
SILLITIN Z 86 PURISS	(10)	13.0
Aluminiumoxid P 10 feinst	(5)	6.5
Softened water	└	11.0
Acticide MBS	└* Kelzan solution	(6) 0.2
Kelzan	└	(4) 0.2
		100.0

Remarks:

- Heat water to 95 °C;
 - add Carnauba Selbstglanzwachs 2090 by sprinkling and stir until dissolved;
 - stir in Siliconöl-Emulsion VP 1044;
 - stir in SILLITIN Z 86 PURISS and Aluminiumoxid P 10 feinst with a high speed mixer;
 - stir in Kelzan solution with a high speed mixer.
- * Kelzan solution: Start with water and Acticide MBS;
add Kelzan with a high speed mixer.

Suppliers:

- (3) Wacker Chemie AG, München (Germany)
- (4) CP Kelco Germany GmbH, Hamburg (Germany)
- (5) Almatis GmbH, Frankfurt/Main (Germany)
- (6) Thor GmbH, Speyer (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
- (14) Kahl & Co., Trittau (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-7/01.2006/6132980

Guide formulation No. 4.1.6

**Grinding polish
Automotive industry**

Raw material		% by weight
Softened water, thickener, preserving agent		30.0
Emulsifier		5.0
Oil		5.0
Exxsol D 80	(11)	20.0
SILLITIN V 85	(10)	40.0
		100.0

- Remarks:**
- Start with water;
 - stir in emulsifier;
 - stir in Exxsol and Oil;
 - stir in SILLITIN V 85;
 - finally stir in preserving agent and thickener.

- Suppliers:**
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (11) ExxonMobil Chemical Central GmbH, Köln (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-4/01.2006/6132980

Guide formulation No. 4.1.7

**Antifogging agent AB 8, solvent free,
 good cleaning of glass surfaces (basis: Wacker)
 Automotive industry**

Raw material		% by weight
Siliconöl L 051	(3)	4.0
Carbopol EZ 2	(16)	0.3
SILLITIN N 85	(10)	5.0
Softened water		90.5
Triethanolamine	(25)	0.2
Preservative		on demand
		100.0

Remarks:

- Disperse Carbopol EZ 2 in water at RT;
- stir in the other ingredients one after another.

Suppliers:

- (3) Wacker Chemie AG, München (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
- (16) Noveon Europe B.V.B.A., Brussels (Belgium)
- (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.2.1

Grinding paste
Industrial and household cleaner

Raw material		% by weight
Exxsol D 145/160	(11)	22.0
Hoechst-Wachs LP	(2)	5.0
Stearic acid		2.0
Brij 721	(9)	0.5
Brij 72	(9)	0.5
Softened water		45.0
SILLITIN Z 86 PURISS	(10)	25.0
		100.0

- Remarks:**
- Start with Exxsol D 145/160;
 - heat Hoechst-Wachs LP, stearic acid, Brij 721 and Brij 72, melt at 95 °C;
 - heat water to 95 °C and add to the hot melt;
 - stir in SILLITIN Z 86 PURISS with a high speed mixer.

- Suppliers:**
- (2) Clariant GmbH, Augsburg (Germany)
 - (9) Uniqema, Gouda (The Netherlands)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (11) ExxonMobil Chemical Central GmbH, Köln (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-5/01.2006/6132980

Guide formulation No. 4.2.2

Metal polish ME 2 (basis: Wacker)
Industrial and household cleaner

Raw material		% by weight
Siliconwachs 23087 VP	(3)	1.0
Siliconöl AK 100	(3)	4.0
White spirit 100-140 °C		5.0
Shellsol T	(12)	10.0
Oleic acid	(25)	3.0
Carbopol EZ 2	(16)	0.3
SILLITIN N 85 PURISS	(10)	15.0
Diethyl aminoethanol	(25)	1.0
Triethanolamine	(25)	0.2
Softened water		60.4
Formalin solution 40 %		0.1
		100.0

- Remarks:**
- Disperse Carbopol EZ 2 in water at RT;
 - stir in the mixture of Siliconwachs 23087 VP, Siliconöl AK 100, white spirit, Shellsol T and oleic acid;
 - then stir in SILLITIN N 85 PURISS, diethyl aminoethanol, triethanolamine and formalin solution.

- Suppliers:**
- (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
 - (16) Noveon Europe B.V.B.A., Brussels (Belgium)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-4/01.2006/6132980

Guide formulation No. 4.2.3

**Steel cleansing paste, with paraffin
(basis: Goldschmidt)
Industrial and household cleaner**

Raw material		% by weight
Tegopren 7008	(8)	2.0
Shellsol TD	(12)	10.0
Water		80.0
SILLITIN N 85 PURISS	(10)	4.0
PUR-Mehl	(22)	4.0
		100.0

Remarks: - Blend ingredients in the given sequence while intensive stirring.

Suppliers: (8) Goldschmidt GmbH, Essen (Germany)
(10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
(12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
(22) Beisswenger Füllstoffe GmbH, Schwäbisch Hall (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information. VM-4/01.2006/6132980

Guide formulation No. 4.2.4

**Brass and bronze polish 553-LR
Industrial and household cleaner**

Raw material		% by weight
Exxsol D 145/160	(11)	34.0
Vestowax J 324 AM	(1)	1.0
Paraffin 54/56		1.0
Marlipal O 13/90	(1)	3.0
Softened water		30.6
SILLIKOLLOID P 87 PURISS	(10)	10.0
SILLITIN N 85 PURISS	(10)	13.0
Softened water	┌	7.0
Acticide MBS	└ * Kelzan solution	(6) 0.2
Kelzan	└	(4) 0.2
		100.0

Remarks:

- Heat Exxsol D 145/160, Vestowax J 324 AM, Paraffin 54/56 and Marlipal O 13/90 to 90 °C to melt the wax;
- add gently hot water, at 90 °C;
- stir in SILLIKOLLOID P 87 PURISS and SILLITIN N 85 PURISS, at 75 °C;
- stir in Kelzan solution with a high speed mixer at approx. 40 °C.

* Kelzan solution: Start with water and Acticide MBS;
stir in Kelzan with a high speed mixer.

Suppliers:

- (1) Degussa AG, Frankfurt/Main (Germany)
- (4) CP Kelco Germany GmbH, Hamburg (Germany)
- (6) Thor GmbH, Speyer (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
- (11) ExxonMobil Chemical Central GmbH, Köln (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-7/01.2006/6132980

Guide formulation No. 4.2.5

Eloxal cleaner
Industrial and household cleaner

Raw material		% by weight
Exxsol D 145/160	(11)	35.0
Marlowet 5001	(1)	8.0
Softened water		26.8
SILLITIN N 85 PURISS	(10)	10.0
Aluminiumoxid P 10 feinst	(5)	20.0
Acticide MBS	(6)	0.2
		100.0

- Remarks:**
- Start with Exxsol D 145/160 and Marlowet 5001;
 - add water;
 - incorporate SILLITIN N 85 PURISS;
 - stir in Aluminiumoxid P 10 feinst with a high speed mixer;
 - add Acticide MBS.

- Suppliers:**
- (1) Degussa AG, Frankfurt/Main (Germany)
 - (5) Almatis GmbH, Frankfurt/Main (Germany)
 - (6) Thor GmbH, Speyer (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (11) ExxonMobil Chemical Central GmbH, Köln (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-7/01.2006/6132980

Guide formulation No. 4.2.6

Stove cleaner
Industrial and household cleaner

Raw material		% by weight
Exxsol D 145/160	(11)	20.0
Paraffin 54/56		2.0
Siliconöl AK 350	(3)	0.5
Marlipal O 13/90	(1)	2.0
Emulsogen OG	(2)	2.0
Softened water		27.3
Aluminiumoxid P 10 feinst	(5)	20.0
SILLIKOLLOID P 87 PURISS	(10)	25.0
Ammonia (25 %)		1.0
Acticide MBS	(6)	0.2
		100.0

- Remarks:**
- Start with Exxsol D 145/160, add Paraffin 54/56 and Siliconöl AK 350, heat to 65 °C to melt;
 - add Marlipal O 13/90 and Emulsogen OG;
 - heat water to approx. 70 °C and add to the hot melt;
 - stir in Aluminiumoxid P 10 feinst and SILLIKOLLOID P 87 PURISS with a high speed mixer;
 - add ammonia;
 - add Acticide MBS.

- Suppliers:**
- (1) Degussa AG, Frankfurt/Main (Germany)
 - (2) Clariant GmbH, Augsburg (Germany)
 - (3) Wacker Chemie AG, München (Germany)
 - (5) Almatis GmbH, Frankfurt/Main (Germany)
 - (6) Thor GmbH, Speyer (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (11) ExxonMobil Chemical Central GmbH, Köln (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-7/01.2006/6132980

Guide formulation No. 4.2.7.1

**Polish emulsion for ceran plates (basis: Goldschmidt)
Industrial and household cleaner**

Raw material		% by weight
Tagat L2	(8)	2.0
Tego Betain E	(8)	6.0
Tego Polish Additiv C 3191	(8)	10.0
Tegiloxan 350	(8)	5.0
SILLITIN N 85 PURISS	(10)	20.0
Tego Carbomer 140	(8)	0.2
Water		56.8
		100.0

- Remarks:**
- Blend emulsifier and silicone products while stirring;
 - add water with intensive stirring;
 - finally add the blend of SILLITIN N 85 PURISS and Tego Carbomer 140 and stir until homogeneous.

- Suppliers:**
- (8) Goldschmidt GmbH, Essen (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-4/01.2006/6132980

Guide formulation No. 4.2.7.2

**Care agent for ceran plates, water-based
Care and protection against baking (basis:
Goldschmidt)
Industrial and household cleaner**

Raw material		% by weight
Tego Polish Additiv ACS	(8)	15.0
Cyclomethicone		5.0
Tegiloxan 350	(8)	10.0
Water		50.0
SILLITIN N 85 PURISS	(10)	10.0
Aluminium silicate P 15	(5)	10.0
		100.0

Remarks: - Stir in the ingredients in the given sequence until emulsified.

Suppliers: (5) Almatix GmbH, Frankfurt/Main (Germany)
(8) Goldschmidt GmbH, Essen (Germany)
(10) HOFFMANN MINERAL GmbH, Neuburg (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-6/01.2006/6132980

Guide formulation No. 4.2.7.3

**Glass ceramics polish GP 16
good cleaning and protection against baking
(basis: Wacker)
Industrial and household cleaner**

Raw material		% by weight
Siliconöl Finish WR 301	(3)	4.0
Siliconöl AK 100	(3)	2.0
Siliconöl-Emulsion E 32	(3)	0.5
Shellsol T	(12)	20.0
Xanthan TN	(7)	0.5
SILLITIN N 85	(10)	20.0
Citric acid	(25)	3.0
Genapol X 080	(2)	1.0
Genapol X 050	(2)	1.0
Softened water		47.5
Euxyl K 300	(23)	0.3
Parfumöl Citrolo	(24)	0.2
		100.0

- Remarks:**
- Disperse SILLITIN N 85, Xanthan TN, Siliconöl-Emulsion E 32, Genapol X 080 and Genapol X 050 into 85 % of the water at RT;
 - stir in the mixture of Siliconöl Finish WR 301, Siliconöl AK 100 and Shellsol T;
 - finally add Citric acid (predissolved in the remaining water), Euxyl K 300 and Parfumöl Citrolo under stirring one after another.

- Suppliers:**
- (2) Clariant GmbH, Augsburg (Germany)
 - (3) Wacker Chemie AG, München (Germany)
 - (7) Jungbunzlauer International AG, Basel (Switzerland)
 - (10) HOFFMANN MINERAL GmbH; Neuburg (Germany)
 - (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
 - (23) Schülke & Mayr GmbH, Norderstedt (Germany)
 - (24) Symrise GmbH & Co. KG, Holzminden (Germany)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.2.7.4

Glass ceramics cleaner GR 2
good protection against baking (basis: Wacker)
Industrial and household cleaner

Raw material		% by weight
Siliconöl L 653	(3)	4.0
Siliconöl AK 100	(3)	1.0
Shellsol T	(12)	15.0
Oleic acid	(25)	2.0
Carbopol EZ 2	(16)	0.3
SILLITIN N 85	(10)	10.0
Diethylaminoethanol	(25)	1.0
Triethanolamine	(25)	0.2
Softened water		66.0
Euxyl K 300	(23)	0.3
Parfumöl Citrolo	(24)	0.2
		100.0

- Remarks:**
- Disperse Carbopol EZ 2 into water at RT;
 - stir in the mixture of Siliconöl L 653, Siliconöl AK 100, Shellsol T and Oleic acid;
 - finally add SILLITIN N 85, Diethylaminoethanol, Triethanolamine, Euxyl K 300 and Parfumöl Citrolo under stirring one after another.

- Suppliers:**
- (3) Wacker Chemie AG, München (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)
 - (16) Noveon Europe B.V.B.A., Brussels (Belgium)
 - (23) Schülke & Mayr GmbH, Norderstedt (Germany)
 - (24) Symrise GmbH & Co. KG, Holzminden (Germany)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.2.8

**Household cleaner
Industrial and household cleaner**

Raw material		% by weight
Marlon A 360	(1)	15.0
Marlipal O 13/90	(1)	3.0
Marlamid DF 1818	(1)	3.0
Softened water		58.3
K-Na-cumene sulphonate (40 %)	(1)	5.0
Clear potash soap		3.0
POC AS 50/60	(1)	2.0
Ammonia (25 %)		0.5
SILLITIN N 85 PURISS	(10)	10.0
Acticide MBS	(6)	0.2
		100.0

- Remarks:**
- Start with Marlon A 360, Marlipal O 13/90 and Marlamid DF 1818;
 - stir in water, add K-Na-cumene sulphonate;
 - stir in clear potash soap until dissolved;
 - add POC AS 50/60 and ammonia;
 - stir in SILLITIN N 85 PURISS;
 - add Acticide MBS.

- Suppliers:**
- (1) Degussa AG, Frankfurt/Main (Germany)
 - (6) Thor GmbH, Speyer (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-6/01.2006/6132980

Guide formulation No. 4.2.9

**Scouring Cleaner
Industrial and household cleaner**

Raw material		% by weight
Marlipal O 13/90	(1)	2.0
Marlamid DF 1818	(1)	4.0
Softened water		53.8
Hostapur SAS 60	(2)	7.0
Citric acid	(25)	3.0
SILLIKOLLOID P 87 PURISS	(10)	30.0
Acticide MBS	(6)	0.2
		100.0

- Remarks:**
- Start with Marlipal O 13/90 and Marlamid DF 1818;
 - stir in water until mixed thoroughly and homogeneously;
 - add Hostapur SAS 60;
 - stir in citric acid until dissolved;
 - stir in SILLIKOLLOID P 87 PURISS vigorously;
 - add Acticide MBS.

- Suppliers:**
- (1) Degussa AG, Frankfurt/Main (Germany)
 - (2) Clariant GmbH, Augsburg (Germany)
 - (6) Thor GmbH, Speyer (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-6/01.2006/6132980

Guide formulation No. 4.2.10**Cleansing and care agent for plastic window frames
(basis: Goldschmidt)
Industrial and household cleaner**

Raw material		% by weight
Tego Polish Additiv E 31	(8)	40.0
Tegopren 6846	(8)	1.0
Shellsol TD	(12)	9.0
SILLITIN N 85 PURISS	(10)	8.0
Kelzan AR	(4)	0.5
Water, demineralized		41.5
		100.0

- Remarks:**
- Solve Tegopren 6846 in Shellsol TD at approx. 60 °C;
 - after cooling down add the solution into Tego Polish Additiv E 31 while stirring;
 - premix SILLITIN N 85 PURISS and Kelzan AR, mix with slightly stirring;
 - to finalize the formulation add water.

- Suppliers:**
- (4) CP Kelco Germany GmbH, Hamburg (Germany)
 - (8) Goldschmidt GmbH, Essen (Germany)
 - (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (12) Deutsche Shell Chemie GmbH, Eschborn (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-4/01.2006/6132980

Guide formulation No. 4.2.11

**Acrylic glass cleaner PG 3, solvent free
creamy, does not cause stress cracking (basis:
Wacker)
Industrial and household cleaner**

Raw material		% by weight
Siliconöl-Emulsion E 103 P	(3)	2.0
Carbopol EZ 2	(16)	0.3
SILLITIN Z 86	(10)	10.0
Triethanolamine	(25)	0.2
Softened water		87.5
Preservative		on demand
		100.0

Remarks:

- Disperse Carbopol EZ 2 into water at RT;
- stir in Siliconöl-Emulsion E 103 P, SILLITIN Z 86 and Triethanolamine one after another.

Suppliers:

- (3) Wacker Chemie AG, München (Germany)
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
- (16) Noveon Europe B.V.B.A., Brussels (Belgium)
- (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-0/01.2006/6132980

Guide formulation No. 4.2.12

**Silicone and wax remover
Industrial and household cleaner**

Raw material		% by weight
Softened water		64.95
SILLIKOLLOID P 87 or	(10)	30.00
SILLIKOLLOID P 87 PURISS		
Ammonia		1.40
Oleic acid	(25)	3.50
Perfume		0.15
		100.00

- Remarks:**
- Start with water;
 - stir in SILLIKOLLOID P 87 or SILLIKOLLOID P 87 PURISS until dissolved;
 - add ammonia, add oleic acid slowly;
 - stir in perfume and homogenize.

- Supplier:**
- (10) HOFFMANN MINERAL GmbH, Neuburg (Germany)
 - (25) VWR International GmbH, Darmstadt (Germany)

Our applications engineering advice and the information contained in this formulation are based on experience and are made to the best of our knowledge and belief, they must be regarded however as non-binding advice without guarantee. Working and employment conditions over which we have no control exclude any damage claim arising from the use of our data and recommendations. Furthermore we cannot assume any responsibility for patent infringements, which might result from the use of our information.

VM-4/01.2006/6132980

Raw material information*Abrasives*

Aluminiumoxid P 10 feinst	Polishing grade alumina fine; pure Al ₂ O ₃
Aluminiumoxid P 30	Polishing grade alumina; pure Al ₂ O ₃
Aluminium silicate P 15	Aluminium silicate, fine
Celite S	Diatomaceous earth
PUR-Mehl	Polyurethane flour
SILLITIN	Neuburg Siliceous Earth; natural silica-kaolinite mixture
SILLIKOLLOID	Neuburg Siliceous Earth; natural silica-kaolinite mixture

Waxes

4052 Emulsion	PE-Wax emulsion
Carnauba Wachs	Natural wax obtained from the Brazilian fan palm
Carnauba Selbstglanzwachs 2090	Natural wax obtained from the Brazilian fan palm
Hoechst-Wachs E	Montan ester wax; dropping point = 79 °C to 85 °C
Hoechst-Wachs O	Partly saponified montan ester wax: dropping point = 98 °C to 105 °C
Hoechst-Wachs KLE	Wax-emulsion, 12 %
Hoechst-Wachs KSL	Ester wax; dropping point = 80 °C to 85 °C
Hoechst-Wachs LP	Montan acid wax; dropping point = 81 °C to 87 °C
Hoechst-Wachs S	Montan acid wax; dropping point approx. 85 °C
Kahlwachs S	Montan acid wax; dropping point = 81 °C to 87 °C
Novacer 1200	APEO free non-ionic PE-Wax emulsion
Paracerin W 60	(formerly: Lunacerin W 60) compound of hydrocarbon waxes; dropping point = 63 °C to 68 °C; setting point = 60 °C to 65 °C
Paraffin 54/56	Synthetic n-alkane; setting point = 54 °C to 56 °C
Siliconwachs 23087 VP	Polyfluoroalkylmethyl siloxane
Siliconwachs W 23	Polyalkylmethyl siloxane
Tegopren 6846	Siloxane modified with alkyl
Vestowax J 324 AM	Partly saponified Fischer-Tropsch wax; dropping point = 105 °C to 115 °C

Silicone oils

Finish WR 301	Amino-functional silicone oil
Siliconöl 556	Silicone resin solution
Siliconöl 10000	Polydimethyl siloxane with a viscosity of 10000 mm ² /sec
Siliconöl AK 100	Polydimethyl siloxane with a viscosity of 100 mm ² /sec
Siliconöl AK 350	Polydimethyl siloxane with a viscosity of 350 mm ² /sec
Siliconöl AK 1000	Polydimethyl siloxane with a viscosity of 1000 mm ² /sec
Siliconöl AK 12500	Polydimethyl siloxane with a viscosity of 12500 mm ² /sec
Siliconöl DC 531	Amino-functional silicone, 50 % in white spirit and isopropanol
Siliconöl L 051	Polyether-modified polydimethyl siloxane
Siliconöl L 653	Unreactive amino-functional polydimethyl siloxane
Siliconöl-Emulsion E 10	Water-based emulsion of Siliconöl AK 350
Siliconöl-Emulsion E 32	Water-based emulsion of a polyalkylmethyl siloxane
Siliconöl-Emulsion E 103 P	nonionic stabilised oil-in-water emulsion of a non-reactive medium viscosity polydimethyl siloxane
Siliconöl-Emulsion E 1044	Water-based emulsion of Siliconöl AK 12500
Siliconöl-Emulsion E 1656	Water-based emulsion of amino-functional polydimethyl siloxanes
SM 2059	Reactive silicone oil emulsion
SM 2079	Silicone oil emulsion
Tegiloxan 350	Methyl silicone oil, 350 mPa s
Tego Additiv C 3191	Amino-functional polydimethyl siloxane
Tego Polish Additiv ACS	Amino-functional siloxane
Tego Polish Additiv E 31	17 % o/w emulsion of a highly viscose silicone oil
Tego Polish Additiv E 3400/5	40 % o/w emulsion of a amino siloxane
Tego Polish Additiv E 35	35 % o/w emulsion of a medium viscose silicone oil
Trennemulsion TNE 50	50% aqueous emulsion of a modified silicone oil
Trennmittel TPR	Modified polydimethyl siloxane

Solvents

White spirit 100-140 °C	White spirit free from aromatic compounds with a boiling range of 100 °C to 140 °C
White spirit 180-200 °C	Aromatic white spirit with a boiling range of 180 °C to 200 °C
Exxsol D 145/160	White spirit free from aromatic compounds with a boiling range of 145 °C to 160 °C
Exxsol D 80	High-boiling white spirit free from aromatic compounds with a boiling range of 205 °C to 235 °C
Petroleum	Aromatic white spirit with a boiling range of 200 °C to 240 °C
Shellsol T	Aliphatic hydrocarbon with a boiling range of 182 °C to 212 °C
Shellsol TD	Aliphatic hydrocarbon with a boiling range of 170 °C to 190 °C
White spirit 21	Aromatic white spirit with a boiling range of 135 °C to 185 °C

Emulsifiers

Brij 72	Ethoxylated fatty alcohol
Brij 721	Ethoxylated fatty alcohol
Diethylaminoethanol DEAE	Diethyl amino ethanol
Emulsogen OG	Oleic acid polyglycerine ester
Marlowet 5001	Carboxylic acid ammonium salt
Tegopren 7008	Organo polysiloxane

Surfactants

Genapol OX-060	Fatty alcohol ethoxylate with 6 EO
Genapol X 050	Fatty alcohol ethoxylate with 5 EO
Genapol X 080	Fatty alcohol ethoxylate with 8 EO
Hostapur SAS 60	Secondary n-alkanesulphonate 60 %
Marlamid DF 1818	Soya bean oil fatty acid diethanolamide
Marlon A 360	Sodium-alkyl-benzenesulphonate 60 %
Tego Betain E	Cocamidopropyl betaine

Dispersing agents

Marlipal O 13/90

Fatty alcohol polyglycol ether

Thickeners

Aerosil 200

Carbopol 940

Carbopol EZ 2

Kelzan

Kelzan AR

Kelzan S

Salcare SC 95

Tego Carbomer 140

Xanthan TN

Pyrogenic silica

Polyacrylic acid

Polyacrylic acid

Poly-saccharid (for water-based systems only)

Xanthan-gum, poly-saccharid

Xanthan-gum, poly-saccharid

Polymer

Benzene-free acrylic acid polymer

Poly saccharid

Other ingredients

Acticide MBS

Euxyl K 300

Flavex 909

K-Na-Cumolsulfat

Tagat L2

Tagat S

Tegin M

POC AS 50/60

Wacker-BELSIL CM 1000

Preserving agent; isothiazolinon

Liquid preserving agent

Low-viscosity refined mineral oil with low aromatic content

Sodium-potassium-isopropyl-benzenesulphonate

Solubilizer; PEG-20 glycerol monolaurate

Solubilizer; PEG-20 glycerol monostearate

Stabilizer; palmitic stearic acid ester

Softener; sodium-poly-aldehyde carboxylate

Lubricant; cyclomethicon

List of suppliers

- | | | |
|-----|---|--|
| (1) | Degussa AG | Weissfrauenstr. 9
D-60287 Frankfurt/Main
Phone: +49 (0) 69 – 2 18-01
Fax: +49 (0) 69 – 2 18-3218 |
| (2) | Clariant GmbH | Werk Gersthofen
P. O. Box 10 15 62
D-86005 Augsburg
Phone: +49 (0) 821 – 4 79-0
Fax: + 49 (0) 821 – 49 66 39 |
| (3) | Wacker Chemie AG
Geschäftsbereich Silicone | Hanns-Seidel-Platz 4
D-81737 München
Phone: +49 (0) 89 – 62 79-01
Fax: +49 (0) 89 – 62 79-1770 |
| (4) | CP Kelco Germany GmbH | Neuer Wall 63
D-20354 Hamburg
Phone: +49 (0) 40 – 37 49 92-0
Fax: +49 (0) 40 – 36 57 47 |
| (5) | Almatis GmbH | Olof-Palme-Str. 37
D-60439 Frankfurt/Main
Phone: +49 (0) 69 – 95 73 41-0
Fax: +49 (0) 69 – 95 73 41-13 |
| (6) | Thor GmbH | Landwehrstr. 1
D-67346 Speyer
Phone: +49 (0) 6232 – 6 36-0
Fax: +49 (0) 6232 – 6 36-111 |
| (7) | Jungbunzlauer International AG | St. Alban-Vorstadt 90
CH-4002 Basel
Phone: +41 (0) 61 – 29 55-100
Fax: +41 (0) 61 – 29 55-108 |
| (8) | Goldschmidt GmbH | Goldschmidtstr. 100
D-45127 Essen
Phone: +49 (0) 201 – 1 73-01
Fax: +49 (0) 201 – 1 73-3000 |

- (9) Uniqema
Buurtje 1
NL-2802 BE Gouda
Phone: +31 (0) 182 – 542-911
Fax: +31 (0) 182 – 542-286
- (10) HOFFMANN MINERAL GmbH
Münchener Straße 75
D-86633 Neuburg (Donau)
Phone: +49 (0) 8431 – 53-0
Fax: +49 (0) 8431 – 53-330
- (11) ExxonMobil Chemical Central GmbH
Neusser Landstraße 16
D-50735 Köln
Phone: +49 (0) 221 – 7 70-31
Fax: +49 (0) 221 – 7 70-3320
- (12) Deutsche Shell Chemie GmbH
Kölner Str. 6
D-65760 Eschborn
Phone: +49 (0) 6196 – 4 74-0
Fax: +49 (0) 6196 – 4 74-502
- (13) Riedel-de Haën AG
Wunstorfer Straße 40
D-30926 Seelze
Phone: +49 (0) 5137 – 9 99-0
Fax: +49 (0) 5137 – 9 99-9685
- (14) Kahl & Co Vertriebsges. mbH
Otto-Hahn-Straße 2
D-22946 Trittau
Phone: +49 (0) 4154 – 84 31-0
Fax: +49 (0) 4154 – 8 15 08
- (15) Dow Corning GmbH
Rheingaustraße 34
D-65201 Wiesbaden
Phone: +49 (0) 611 – 2 37-1
Fax: +49 (0) 611 – 2 37-610
- (16) Noveon Europe B.V.B.A.
Chaussée de Wavre 1945
B-1160 Brüssel
Phone: +32 (0) 2 – 678-1911
Fax: +32 (0) 2 – 678-2000

- (17) GE Bayer Silicones GmbH & Co. KG
Falkenberg 1
D-40699 Erkrath
Phone: +49 (0) 2104 – 9 43-0
Fax: +49 (0) 2104 – 9 43-111
- (18) Ciba Specialty Chemicals Inc.
Home & Personal Care Segment
Klybeckstr. 141
CH-4002 Basel
Phone: +41 (0) 61 – 6 36 24 14
Fax: +41 (0) 61 – 6 36 31 83
- (19) Lehmann & Voss & Co.
Alsterufer 19
D-20354 Hamburg
Phone: +49 (0) 40 – 4 41 97-0
Fax: +49 (0) 40 – 4 41 97-219
- (20) BYK-Cera bv
Danzigweg 23
NL-7418 EN Deventer
Phone: +31 (0) 570 – 67 82 00
Fax: +31 (0) 570 – 67 82 50
- (21) Paramelt B.V.
Costerstraat 18
NL-1704 RJ Heerhugowaard
Phone: +31 (0) 72 – 57 50-600
Fax: +31 (0) 72 – 57 50-699
- (22) Beisswenger Füllstoffe GmbH
Blätteracker 7
D-74523 Schwäbisch Hall
Phone: +49 (0) 7907 – 98 99-0
Fax: +49 (0) 7907 – 79 70
- (23) Schülke & Mayr GmbH
Robert-Koch Str. 2
D-22851 Norderstedt
Phone: +49 (0) 40 – 5 21 00-0
Fax: +49 (0) 40 – 5 21 00-318
- (24) Symrise GmbH & Co. KG
Mühlenfeldstrasse 1
D-37603 Holzminden
Phone: +49 (0) 5531 – 90-0
Fax: +49 (0) 5531 – 90-1649

(25) VWR International GmbH

Hilpertstrasse 20a

D-64295 Darmstadt

Phone: +49 (0) 6151 – 39 72-0

Fax: +49 (0) 6151 – 39 72-450