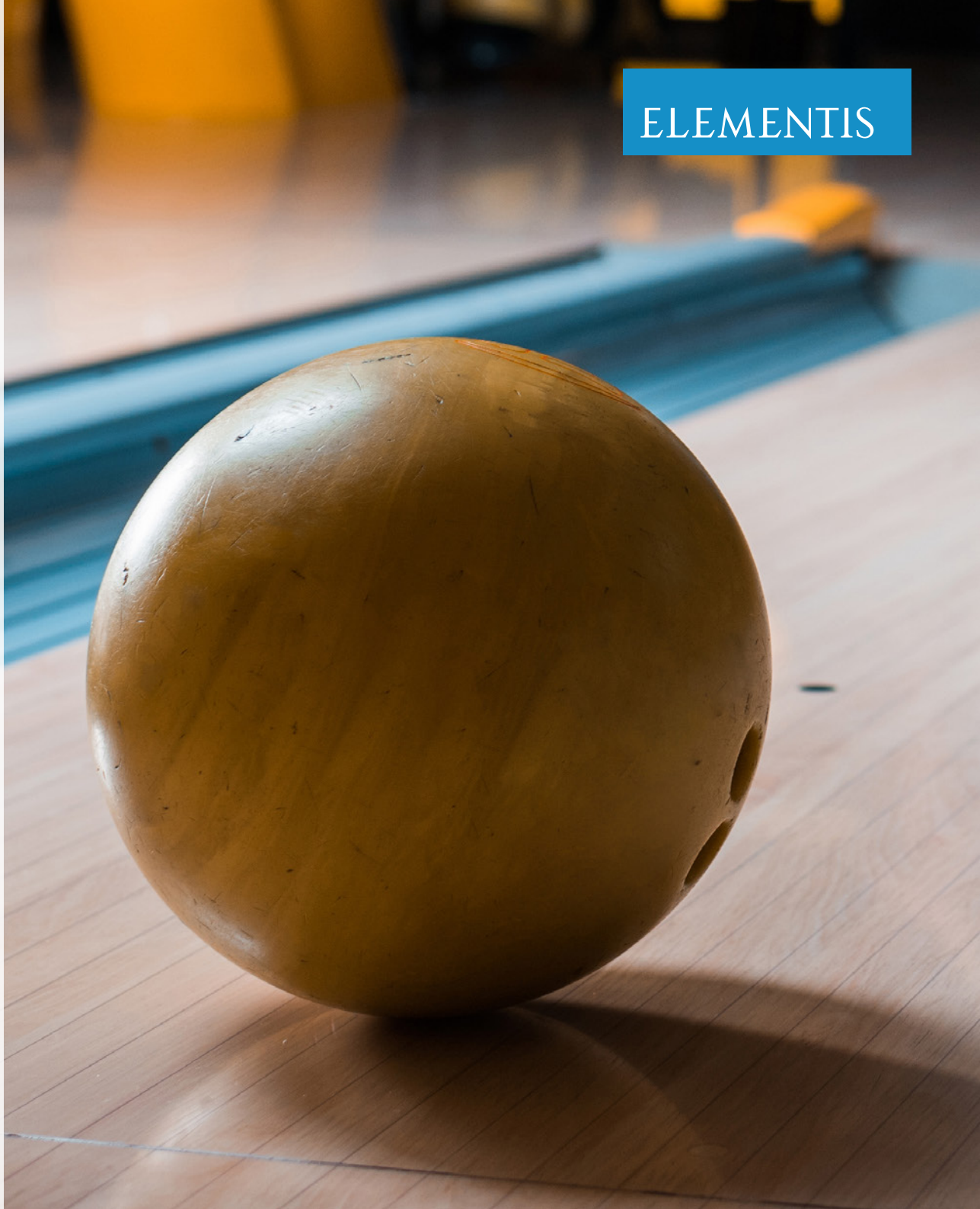
Application Leaflet

RHEOLATE® 350D

Non-ionic associative thickener based on Polyether-Polyol technology for parquet lacquers



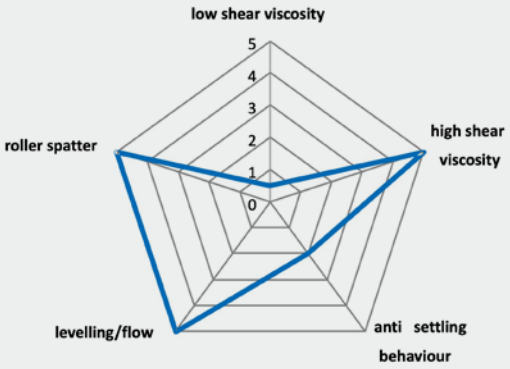
ELEMENTIS

Unique chemistry, sustainable solutions

Key Benefits

- Newtonian flow and high-shear viscosity
- Excellent flow and levelling
- No influence on film properties

FIGURE 1: Product positioning



Chemical data

Composition	Polyether polyol solution
Color Gardner	-1 to 3
Density [g/cm³]	1.02
Viscosity [mPas] Brookfield LVT, Spindle 4; 20 rpm; 25°C	100-8000
Solvent	water

Overview

RHEOLATE® 350 D is a 50% active polyether polyol- based associative thickener designed to impart high- shear viscosity in conventional latex and water- reducible systems.

RHEOLATE® 350 D has low odor and is a VOC-free, high-performance, non-ionic associative thickener. It provides exceptional flow and levelling and is particularly suitable for use with small-particle-size binders in gloss and semi-gloss paints. RHEOLATE® 350 D imparts viscosity at high shear rates improving film-build and providing the related increased hiding.

RHEOLATE® 350 D may be used alone or, if greater mid-shear-rate viscosity is required, with a co-thickener.

RHEOLATE® 350 D has outstanding color acceptance and stability. In addition it does not impair recoat ability, intercoat adhesion or blocking resistance.

Features

- Provides high-shear viscosity
- Provides Newtonian flow
- Excellent flow and levelling
- No influence on film properties
- Low odor and free of VOC

Handling

RHEOLATE® 350 D can be used as supplied, or if required, diluted with water or glycol for easier incorporation. Addition can take place at any point in the paint manufacturing process. It can be post-added. However, addition before dilution of the mill-base is recommended.

RHEOLATE® 350 D contributes mainly to high-shear- rate viscosity and can be used to modify the rheological properties of other thickeners including cellulose, polyacrylates (ASE and HASE), clays and urethane associative thickeners. Information regarding its co-use with other RHEOLATE®, BENTONE® and BENAQUA® rheological additives is available on request.

The typical levels of use for RHEOLATE® 350 D are 0.5 to 5.0% (as delivered), by weight of the system. To achieve optimum properties the system's surfactant blend might need modification. Further advice is available on request.

Parquet lacquer systems

- High hardness and scratch resistance
- Excellent chemical resistance
- Superior water resistance

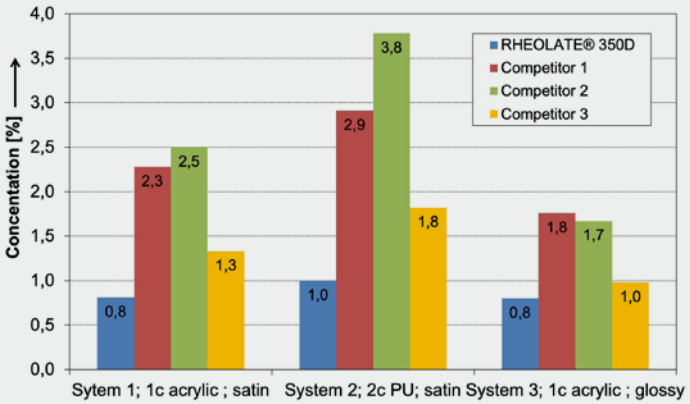
The physical and chemical resistance of a parquet lacquer formulation is determined by the selected binder technology chosen. The binder represents about 80% of the formulation of a parquet lacquer. The space left for the additive "cocktail" is therefore limited.

Parquet lacquers are horizontally applied and therefore require Newtonian flow to ensure excellent levelling.

The thickener needs to provide the required flow without negatively impacting on the film properties.

Name	Active content [%]	Description
RHEOLATE® 350D	50	Polyether Polyol (PEPO/VOC free)
Competitor 1	20	Hydrophobically modified polyether (HMPE/no organic solvents)
Competitor 2	20	Hydrophobic ethoxylated aminoplast technology (HEAT/ VOC free)
Competitor 3	30	Hydrophobically modified polyether (HMPE/VOC < 0.1%)

FIGURE 2: Required loading levels



Poor levelling will immediately be noticed as gloss differences that are caused by variations in film thickness and by brush mark drags or “orange peel surfaces” after roller application.

The performance of RHEOLATE® 350 D was evaluated in comparison to 3 market reference Newtonian thickeners.

The performance evaluation of RHEOLATE® 350D was performed in 3 different systems.

System 1: 1 component, acrylic satin

System 2: 2 component PU, satin

System 3: 1c acrylic, glossy

The loading level of the thickeners to achieve a target viscosity of 25-30 sec. (DIN 4 cup) was tested in the 3 systems. This has been visualized in **FIGURE 2**.

RHEOLATE® 350 D required the lowest loading to achieve the required systems viscosity.

The lower the loading of the thickener, the lower the potential influence on film properties and the larger the formulation flexibility.

FIGURE 3: Viscoelasticity

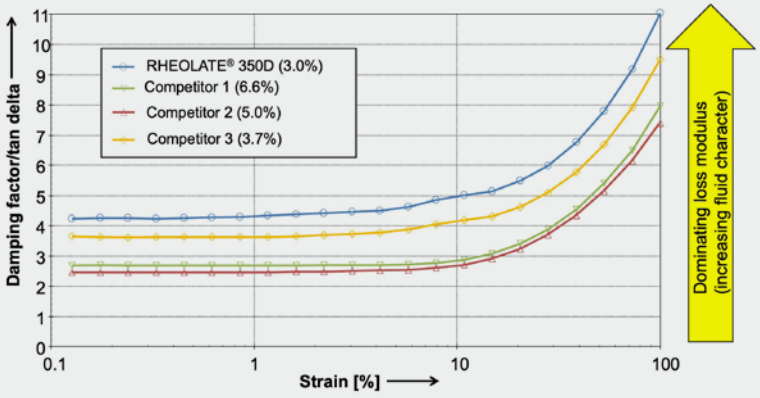
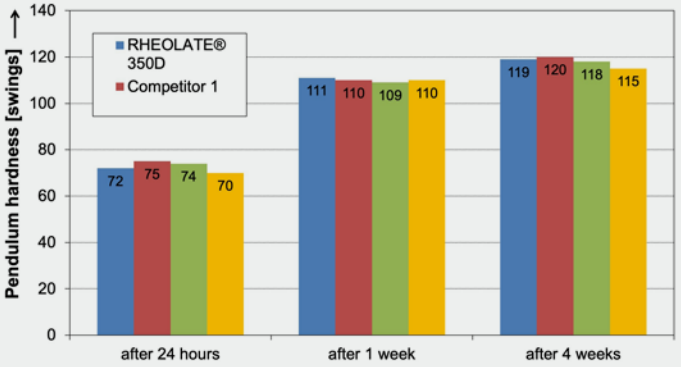


FIGURE 4: Pendulum hardness



To measure the Newtonian flow performance a higher viscosity of 100 sec. in a DIN 4 mm flow cup was chosen. The aim was to ensure to measure a more pronounced differentiation f the tested samples.

The study was made in the 1C acrylic, glossy parquet lacquer and the results are visualized in **FIGURE 3**.

The study was performed as an oscillatory amplitude sweep at a constant angular frequency of 10 rad/s. All data running at a damping factor/tan delta of below 1, the elastic characteristics are dominant. Tan delta values acting above 1 are indicating dominant fluid characteristics. The higher the damping factor the better the flow to be expected.

The product concentration required to achieve the target viscosity has been mentioned alongside with the

The concentration required to achieve the target viscosity of 100 sec (DIN 4 cup) followed the trend already seen in **FIGURE 2**, however, on a higher absolute level.

The sample equipped with RHEOLATE® 350 D showed the highest damping factor over the entirely tested strain rate. Following the above discussed theory, this sample is providing the best levelling.

Another important property of a parquet lacquer is the pedulum hardness. In the given case, the different system were applied on glass plates at a layer thickness of 50 µm. After various hardening times, the pendulum hardness have been determined in accordance with the König method.

The results shown in **FIGURE 4** were taken with the satin, 1c acrylic formulation.

None of the tested rheological additives noticeably influenced the key performance property of hardness in the tested formulations.

Conclusion

RHEOLATE® 350 D PEPO based associative thickener which provides excellent flow and levelling in parquet lacquers.

In all the tested lacquers formulations RHEOLATE® 350 D appears to be the most efficient thickener.

RHEOLATE® 350 D does not influence the key film properties of the parquet lacquers and is by far the best rheological additive to select.

APPENDIX

Test methods:

Rheology data
Determined using the Anton-Paar MCR 301 rheometer, equipped with PP 50 measuring geometry at a gap width of 1 mm, at a temperature of 23°C. In case of the oscillatory, amplitude sweep data shown an fixed angular frequency of 10 rad/s was pre-adjusted.

Flow cup viscosity
Has been tested by the DIN 4 cup.

Pendulum hardness
Tested using the Byk Gardner Pendulum hardness tester in accordance with König.

NOTE:

The information herein is currently believed to be accurate. We do not guarantee its accuracy. Purchasers shall not rely on statements herein when purchasing any products. Purchasers should make their own investigations to determine if such products are suitable for a particular use. The products discussed are sold without warranty, express or implied, including a warranty of merchantability and fitness for use. Purchasers will be subject to a separate agreement which will not incorporate this document.

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