

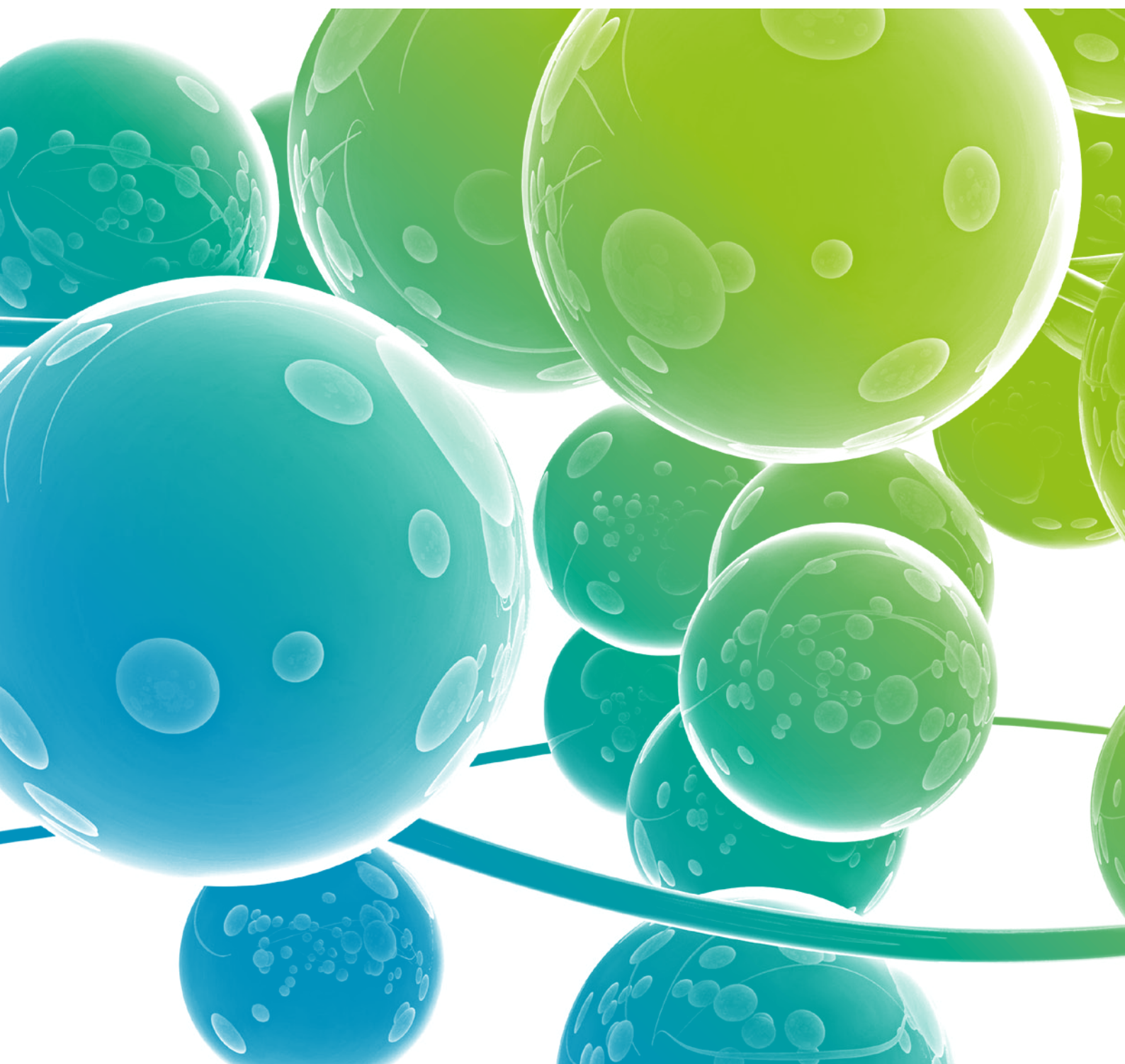
# Levasil and Bindzil colloidal silica dispersions

for the adhesive industry – uses and benefits



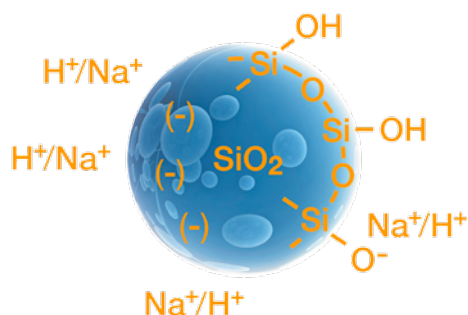
**AkzoNobel**

Tomorrow's Answers Today



# Colloidal silicas from Eka at a glance

Levasil and Bindzil are aqueous colloidal dispersions of amorphous silica. They can be cationic but at most anionic. Further their characteristics vary with particle size (2–100 nm), pH-level (11.5–2) and the additives used. Their viscosity is rather low and they are very resistant to gelling.



Charge stabilization of anionic silica sols



## Recommended Levasil and Bindzil types for adhesives

Small particle sols (30%) with high bonding powers as	Levasil 300/30% Bindzil 830
Aluminate modified sols for high pH stability as	Levasil 200A/30% Bindzil 257/360
Large particle products with high concentrations (45%–50%) as	Levasil 100/45% Levasil 50/50%
Special types with additives (ADH-Series) as ADH06	Levasil 300/30%
ADH16	Levasil 300/30%
Epoxy silane modified Bindzil CC types (30%–40%) as	Bindzil CC301 Bindzil CC401

## Advantages for waterborne adhesives through silica sols

### Adhesive formulations

- Reduced drying time
- Long storage time
- Complexation of residual monomers

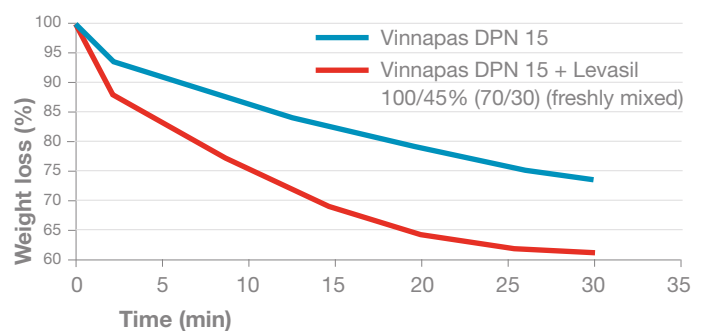
### Bonded joints

- Improved heat resistance
- Improved initial wet bonding strength
- Higher peel strength
- Improved creep resistance
- Modular system for PSAs

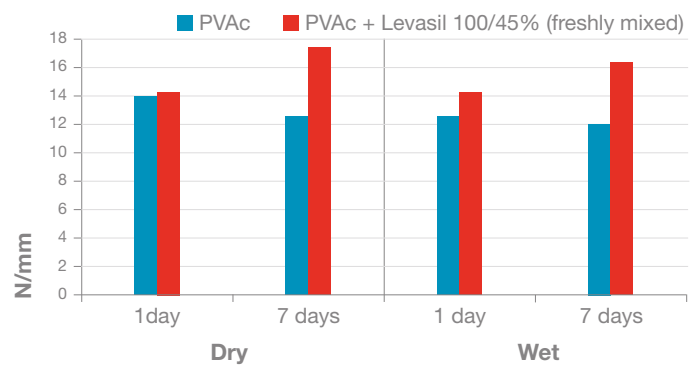
## Superior heat resistance of bonded substrates as most important benefit

With Levasil or Bindzil you have the chance to get a high heat resistance with a one-component system.

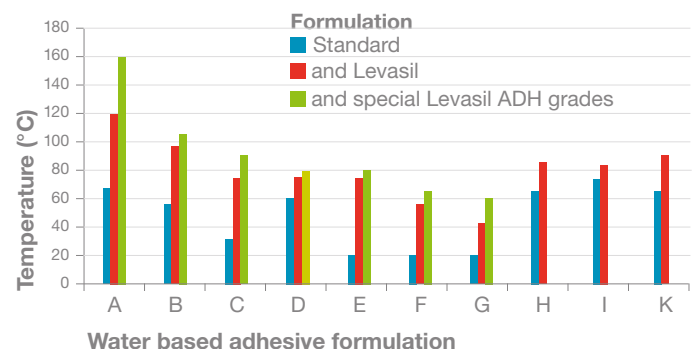
Significantly reduced drying time of PVAc films



Improved shear strength of PVAc based wood/wood joints after 7 days of dry/wet storage according to DIN EN 204 D



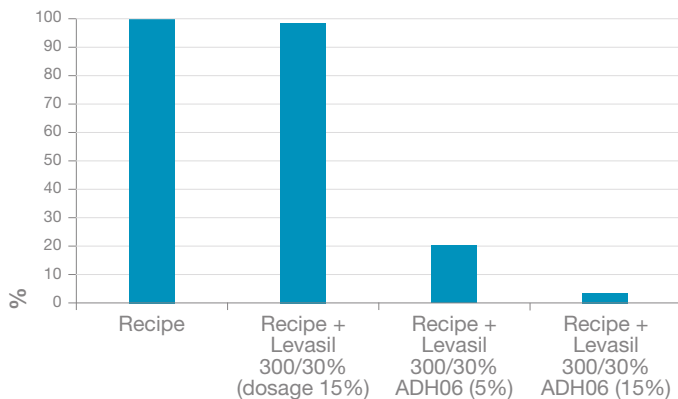
Heat resistance of joints based on various polymers; CR (A) / NR (B) / Acrylics (C, H, I, K) PU (D) / PVAc (E) / Epoxy (F) / B-AN (G) according to internal shear test with NORA standard test pieces



## Further improvements through the newly developed silica sols of the Levasil ADH series

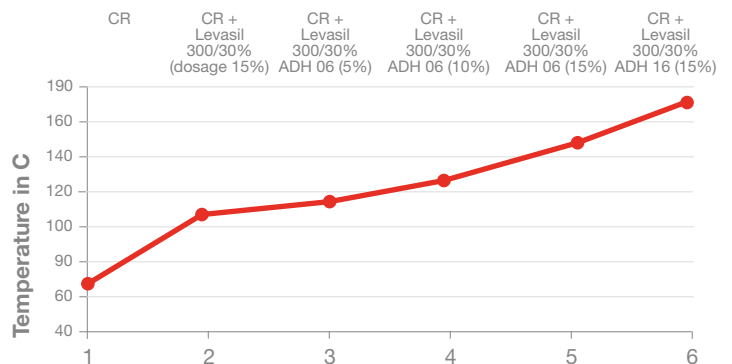
### Almost complete complexation of organic monomers

Residual monomers in CR based adhesive formulation



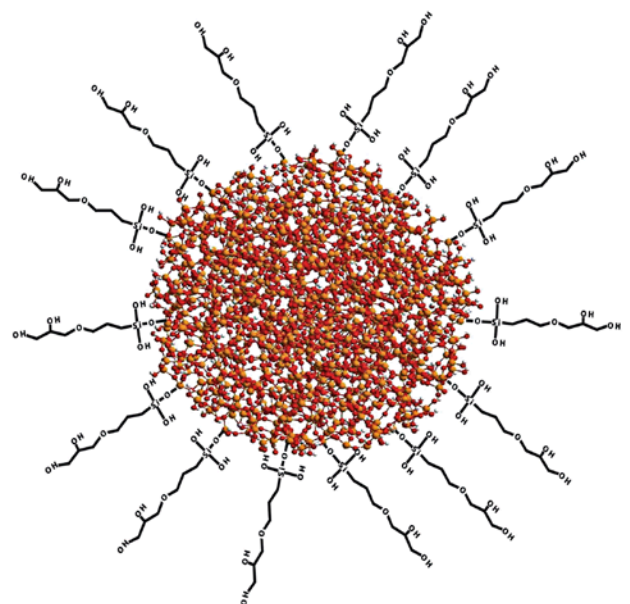
### Outstanding heat strength

Higher thermal stability through the addition of Levasil ADH grades  
Example: Polychloroprene (CR) formulation



## Expoxy silane modified Bindzil CC types for outstanding compatibility with organic dispersions

**High stability** in neutral or even weak acidic pH ranges, through the switch from a charge to a steric stabilization.



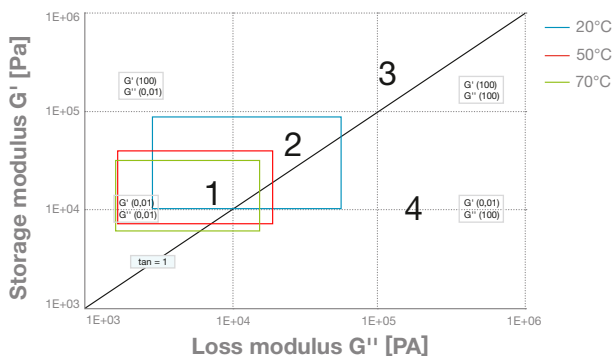
Bindzil CC301, model structure

# Modular system for tailor-made pressure sensitive adhesives (PSAs)

Classification of PSAs by the viscoelastic window, the so called **Chang window**, proposed by E.P.Chang, J. Adhes. 34, 189 (1991):

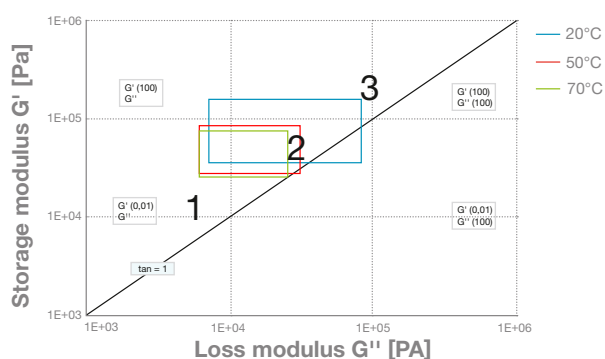
- 1: Removable PSA
- 2: General purpose PSA
- 3: High shear PSA
- 4: Cold temperature PSA

**(A) Viscoelastic window for Ucecryl WB 1440**



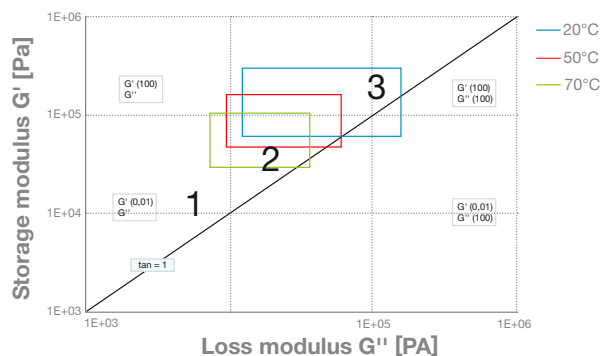
Viscoelastic window for a typical removable acrylic based PSA between 20°C and 70°C, primarily found in area 1

**(B) Viscoelastic window for Ucecryl WB 1440 + Levasil 300/30%**



Due to the addition of Levasil 300/30% (dosage 15%) this PSA is located now only in the general purpose area 2, which a reduced temperature dependency

**(C) Viscoelastic window for Ucecryl WB 1440 + Levasil 300/30% ADH 06**



The addition of Levasil 300/30% ADH06 (dosage 15%) pushes the PSA into the high shear area 3

## Marketing

For polychloroprene and polyurethane based formulations we are marketing through our partner **Bayer Material Science**. For all other systems we sell directly.

### Health, safety and environment

Bindzil Colloidal Silica Dispersions contain no classified raw materials. Before handling the material, read the corresponding Material Safety Data Sheet for health, safety and environmental information. All Bindzil products are approved in accordance with EU directives both for direct and indirect food contact.

### Further Information

For more detailed product information, please refer to the separate product guide. For samples, technical service and further information, please contact your nearest office, visit our website at [www.colloidal silica.com](http://www.colloidal silica.com), or send an e-mail to [colloidal silica@akzonobel.com](mailto:colloidal silica@akzonobel.com)

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