

PANGEL Dispersion

RECOMMENDATIONS
AND BEST PRACTICES



Dispersion is probably
the most important factor conditioning
PANGEL performance,

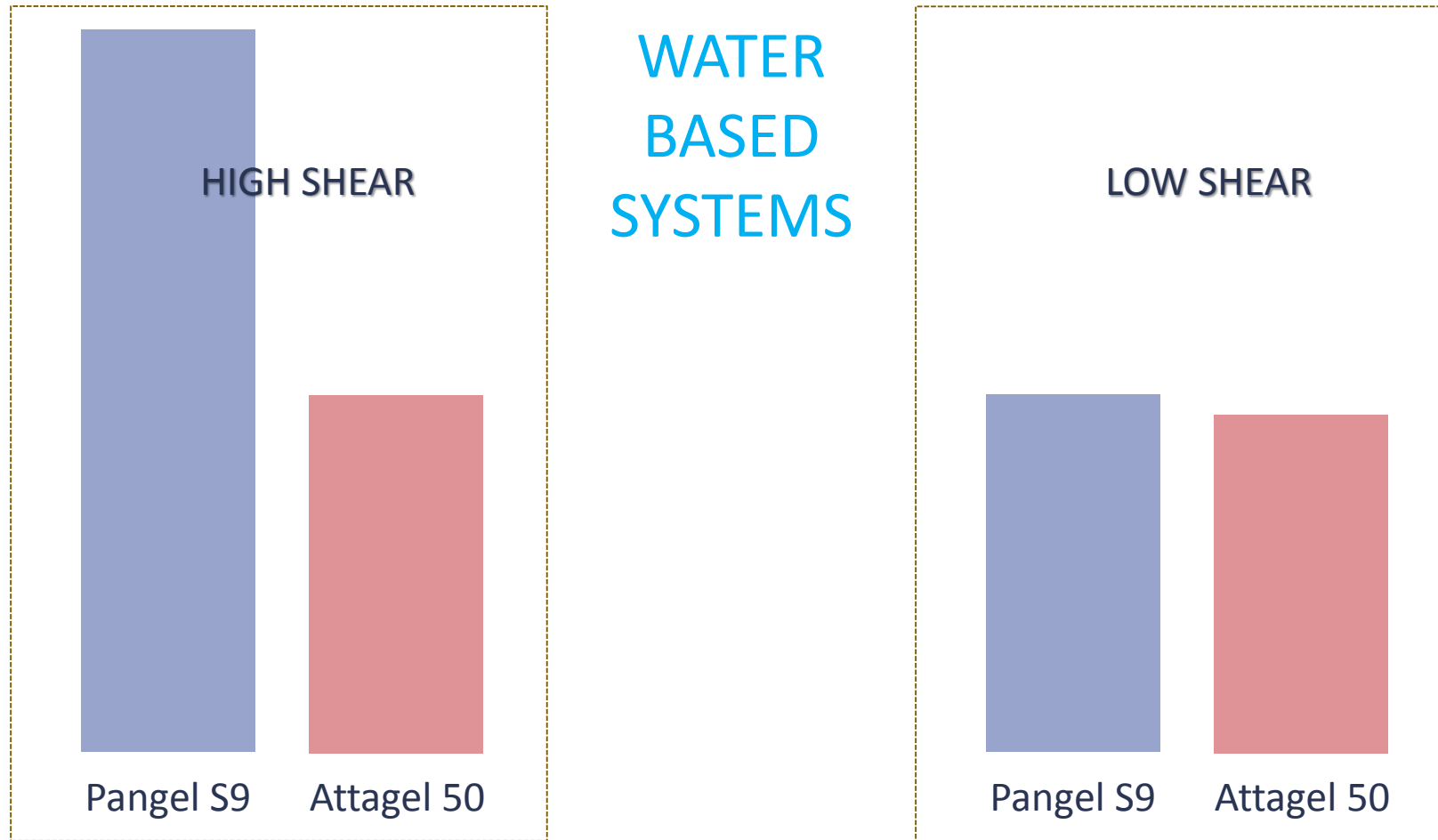
moreover, when the system is
containing other solids
(fillers, pigments, precipitated salts or
aggregates)

AGENDA

- High Shear and equipments recommended
- How to disperse PANGEL in water or solvent systems
- Differences when we are dispersing sepiolite or bentonite based PANGEL
- Best Pangel product recommendation in filled systems according to dispersion conditions

High Shear and Best Recommended Equipments for PANGEL Dispersion

Effect of Shear on Pangel S efficiency





This can be **HIGH SHEAR**



Dissolver mixers like Cowles, Dispermix and many others



Silverson mixers



Ystral from Dispermix



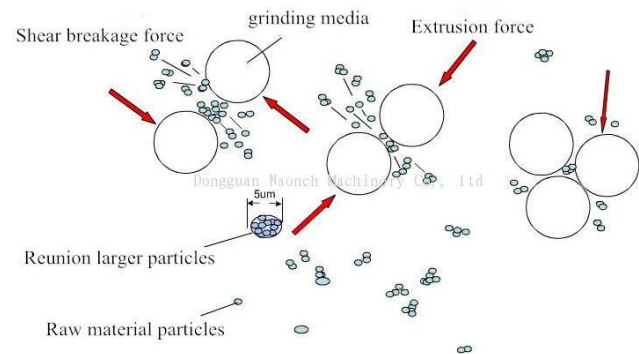
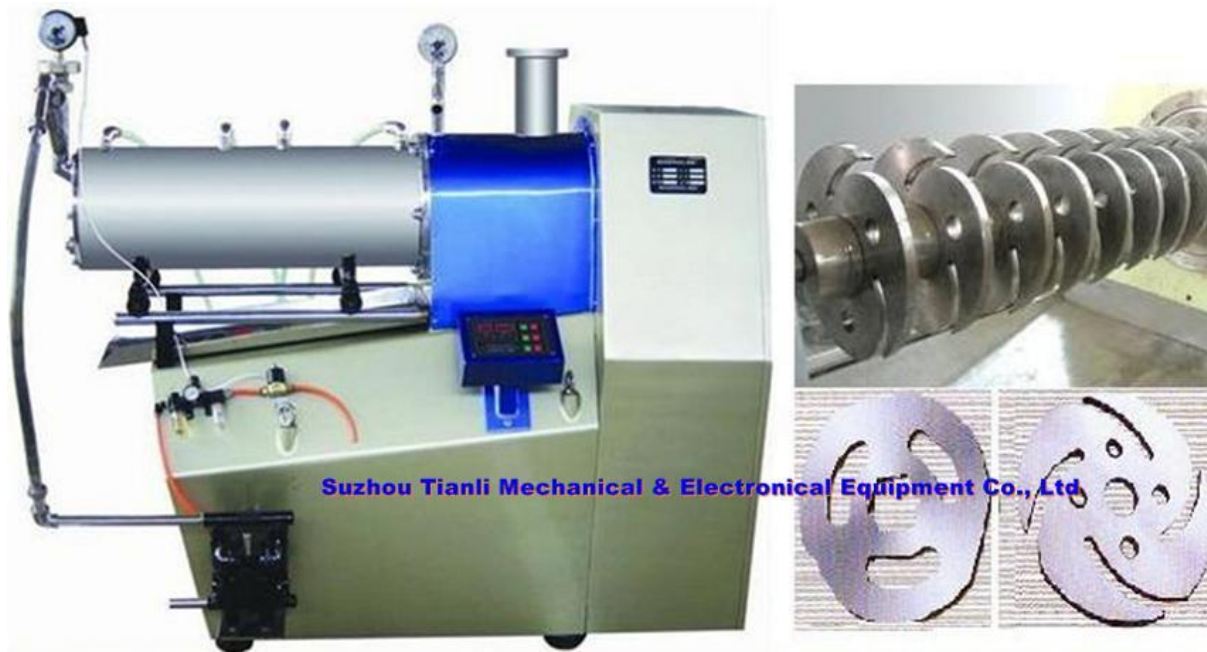
© Cuisine Paradiso

Blenders and inverted blades conical mixers



shaide.en.alibaba.com

This also can be HIGH SHEAR



Bead Mill



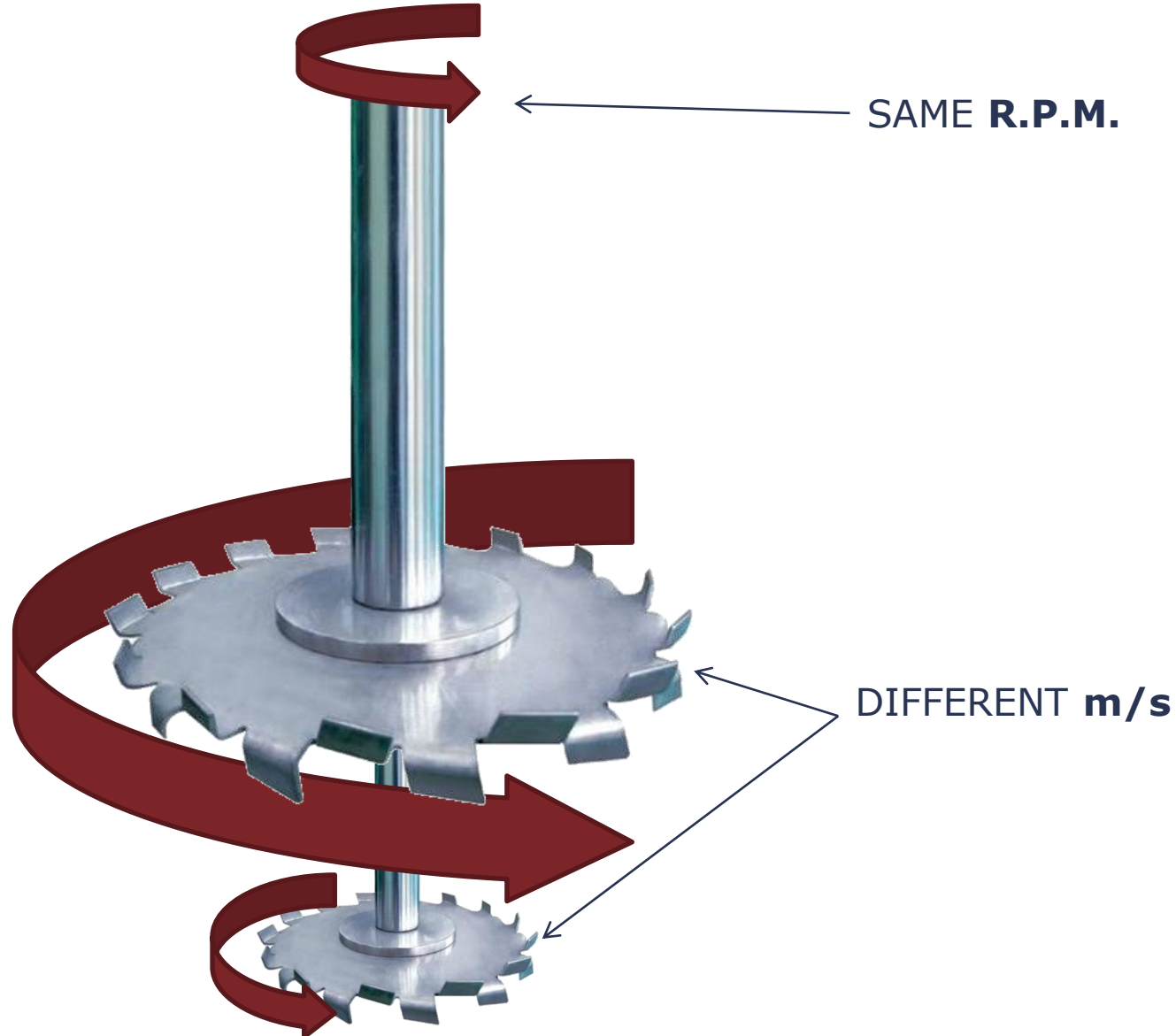
This will **never** be HIGH SHEAR



Propellers, anchor like, helicoidal, rub and rotary, screw mixers and shakers cannot provide high shear

Image from Carl Eric Johnson, Inc.

MIXER SPEED



HIGH SHEAR	> 18 m/s
MEDIUM SHEAR	≈ 10 m/s
LOW SHEAR	< 5 m/s

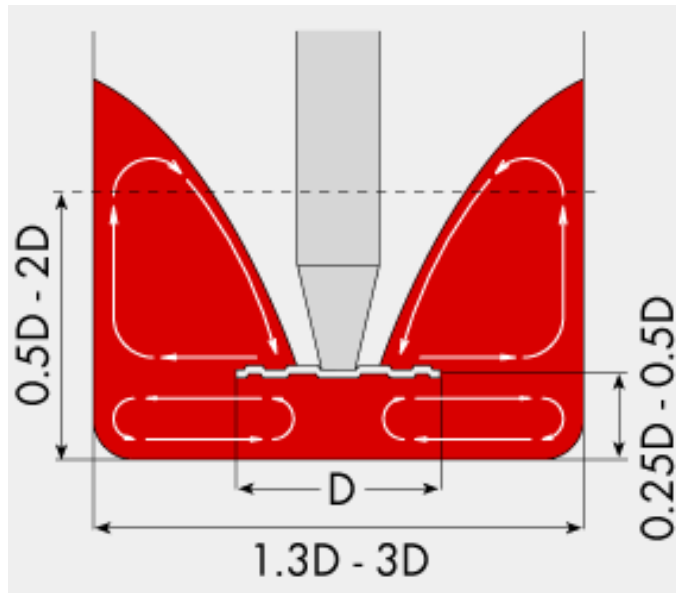
Peripheral speed (m/s) is the key value to determine the right speed, without considering disk and mixer dimensions and power

A simple formula can help us to calculate **peripheral speed** knowing the disk **diameter** and rotation speed in **rpm**

$$V(\text{m/s}) = \text{RPM} \cdot \pi \cdot d(\text{cm}) / (60 \cdot 100)$$

Mixer Geometry and proper shear

Optimum mixing chamber design



All, Pangel concentration, peripheral speed and mixing chamber design needs to be oriented toward the formation of a vortex with doughnut shape (toroidal), what will guarantee a perfect shear of the dispersion





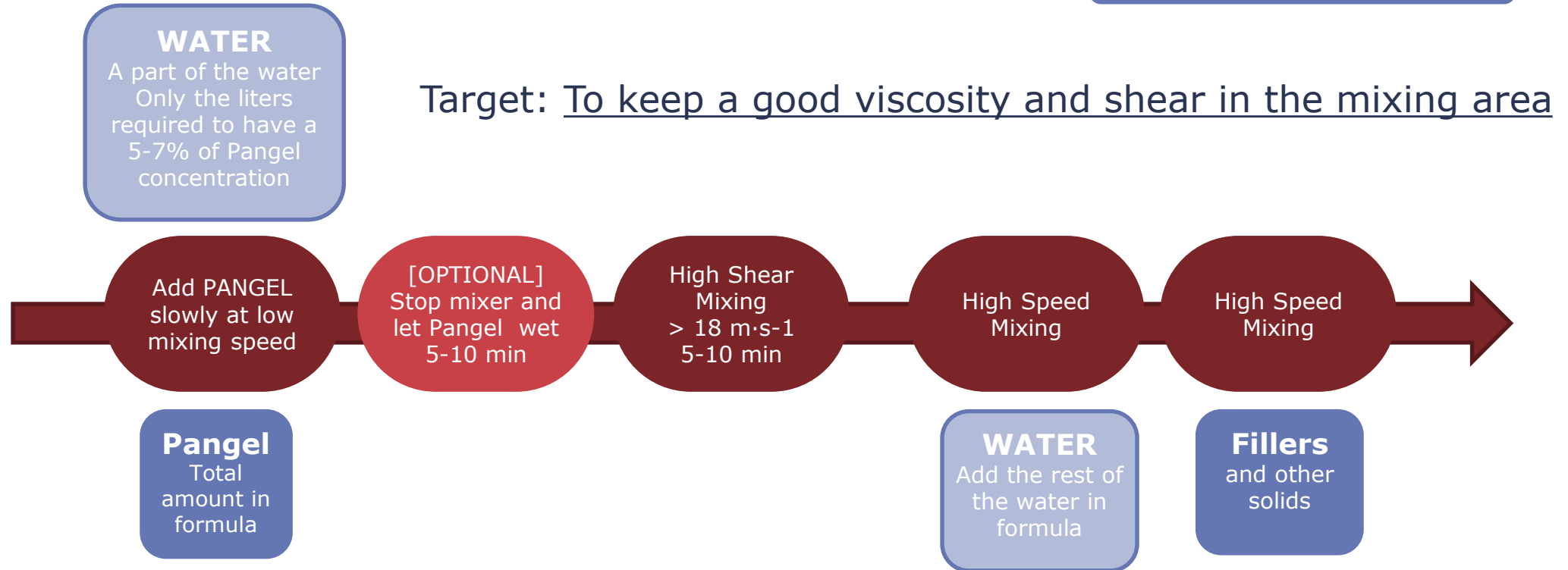
SEPIOLITE BASED PANGEL

DISPERSION IN WATER BASED SYSTEMS

Dispersing Sepiolite Based Pangel in Water

Standard procedure for water systems containing fillers

Pangel S9, AD, S15, C150



Dispersing Sepiolite Based Pangel in Water

How to make a **PREGEL**?

A **pre-gel** is a dispersion of clay in water or solvent that can be prepared in a different vessel of smaller scale, and used at any time in different points of production.



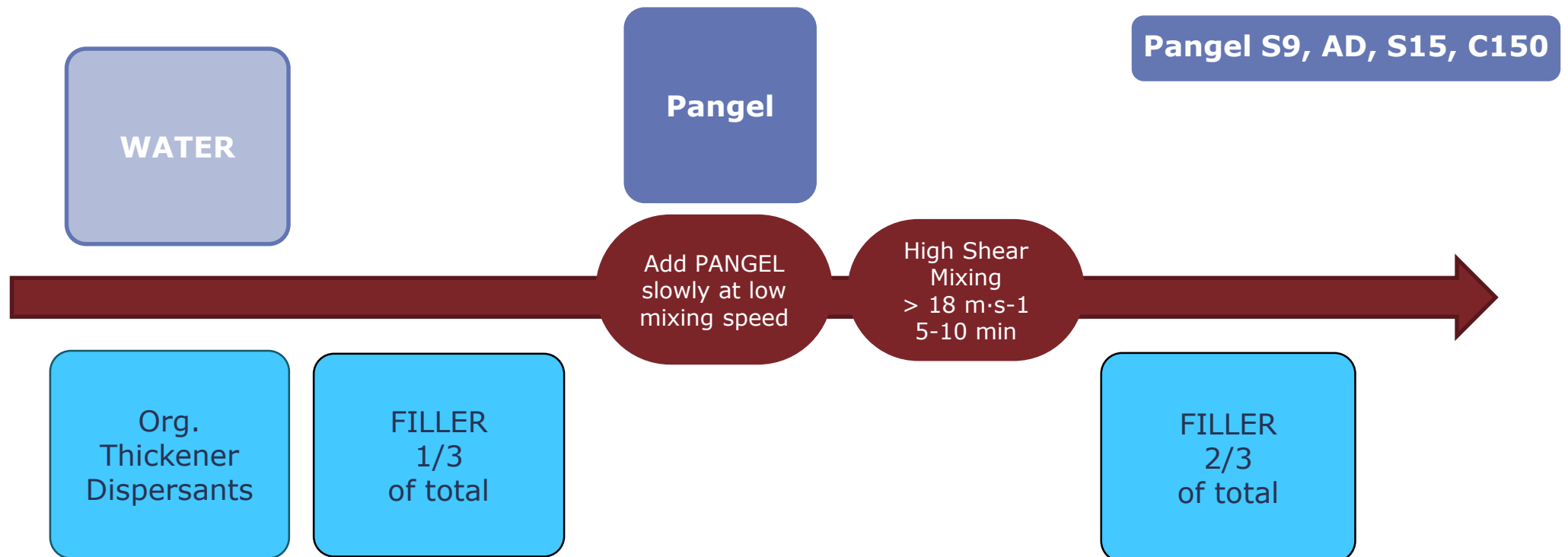
Target: To apply maximum shear to Pangel with no interferences. Pangel is ready to be used at any time.

Dispersing Sepiolite Based Pangel in Water

How disperse Pangel if there are high levels of dispersants or wetting agents

Ocasionaly the presence of dispersants can reduce Pangel capacity to build a gel structure while can interfere in the dispersion of pigments.

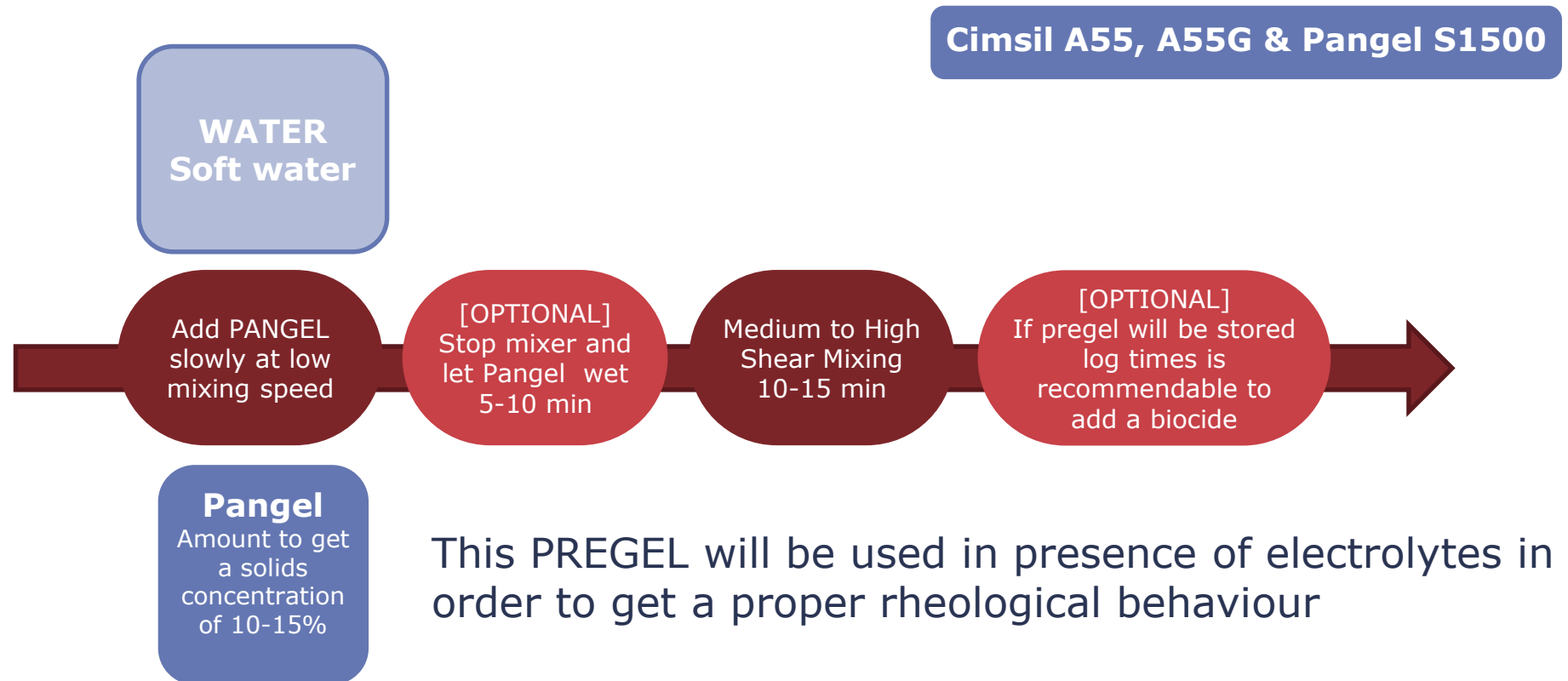
Target: Reduce the interaction Pangel and dispersants



Dispersing Cimsil A55/A55G in Water

How to make a **PREGEL**?

Cimsil A55G is a product designed to be dispersed in difficult shear conditions but requires soluble cations to build a gel structure when it is used



This PREGEL will be used in presence of electrolytes in order to get a proper rheological behaviour

Dispersing Sepiolite Based Pangel in Water

Exceptions for water systems containing fillers

High shear mixing not available

Extremely high solids systems (>85%) so little free water (normally low shear)

If PREGEL is possible

- ✓ Add the pregel together with thickeners or fillers and pigments

If PREGEL is not possible

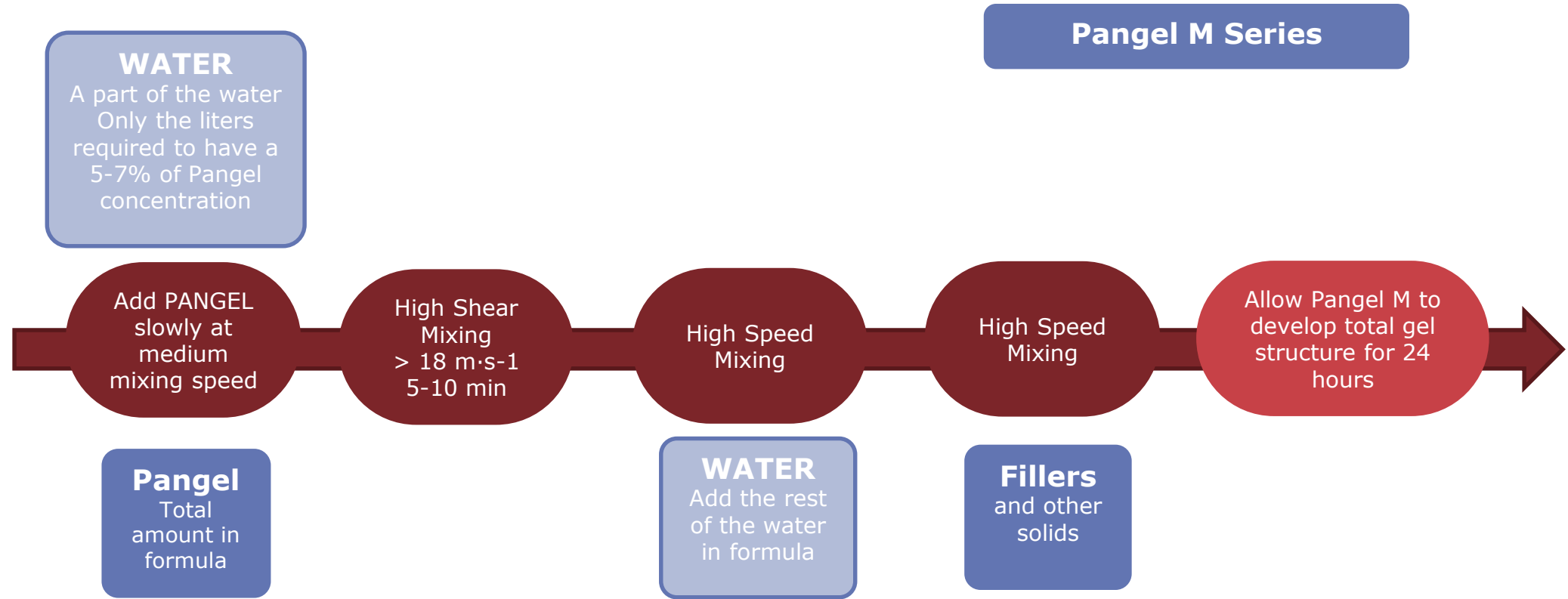
- ✓ Use maximum mixing rate
- ✓ Make mixing time longer (at least 1 hour mixing)
- ✓ Increase mixing temperature at 50°C

BENTONITE BASED PANGEL

DISPERSION IN WATER BASED SYSTEMS

Dispersing Bentonite Based Pangel in Water

Standard procedure for water systems containing fillers

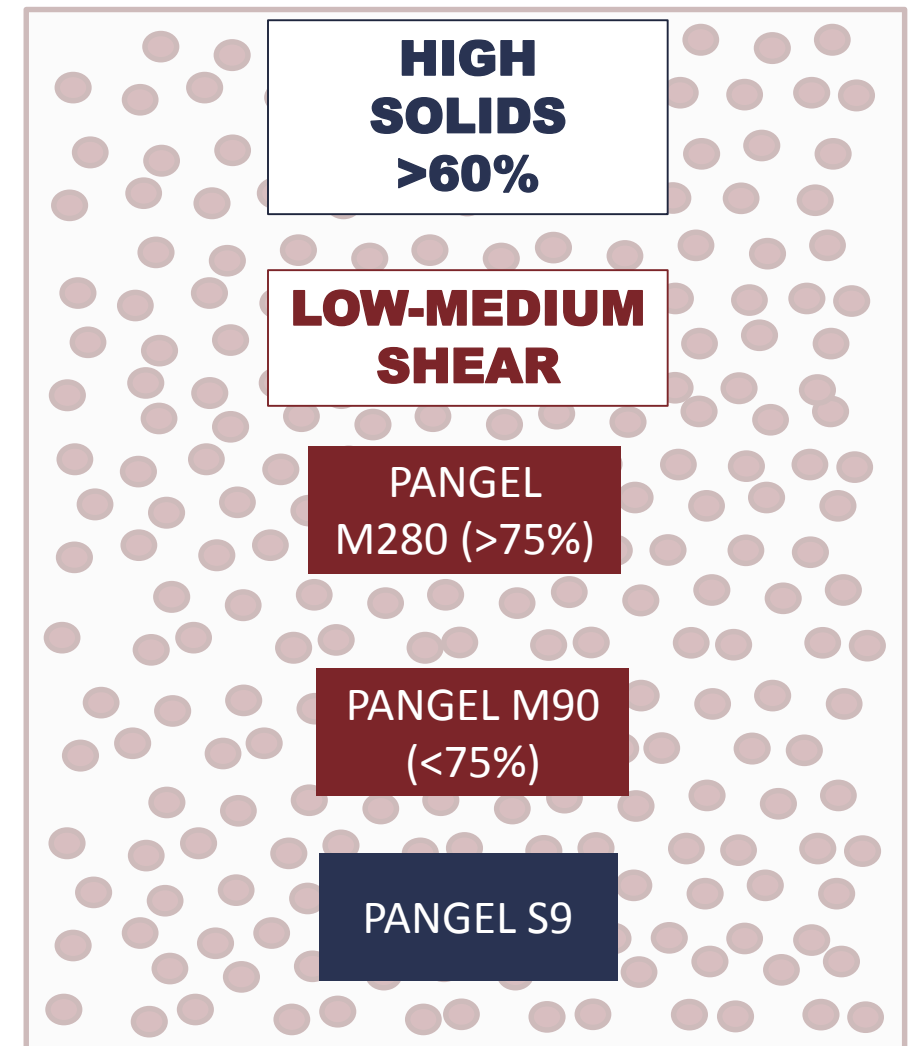


Dispersing Bentonite Based Pangel in Water

How to make a PREGEL?



WATER BASED SYSTEMS

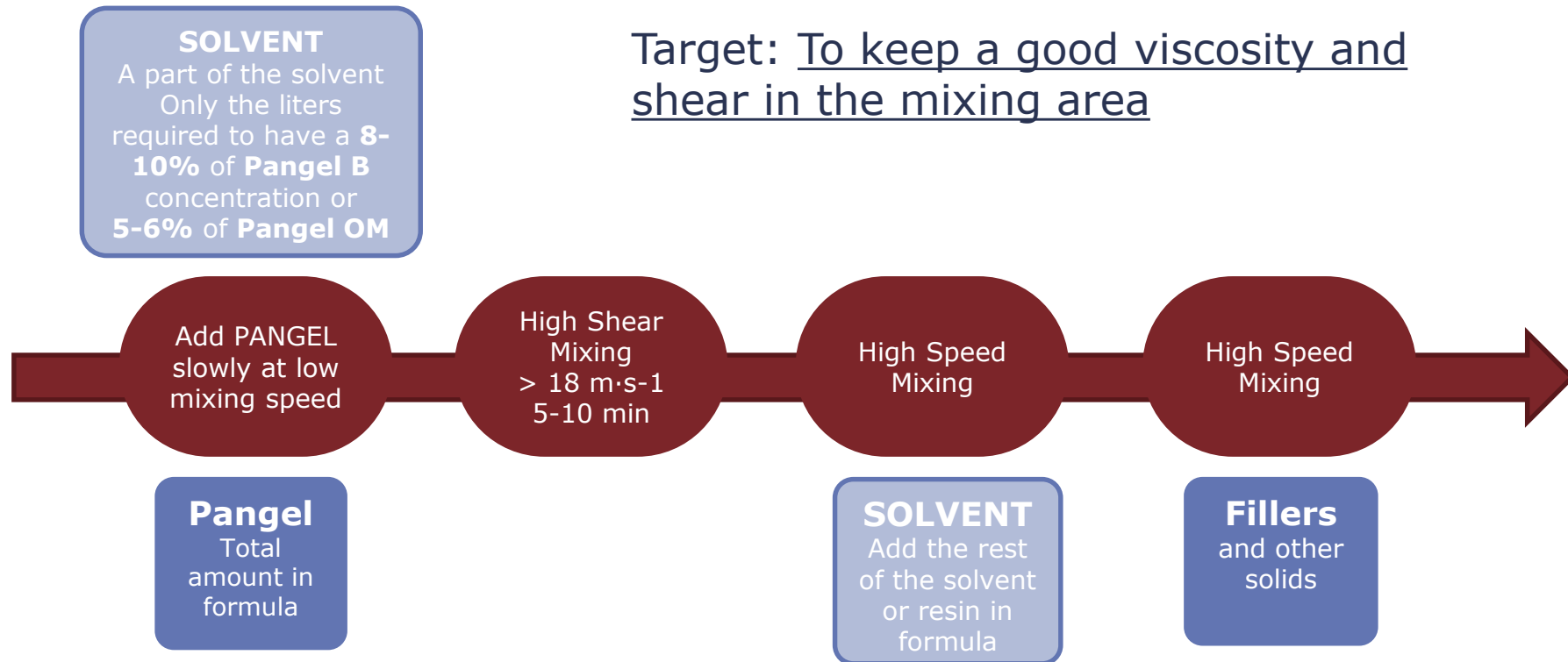


PANGEL ORGANOCLAYS: PANGEL B OM OMD

DISPERSION IN SOLVENT BASED SYSTEMS

Dispersing Pangel B/OMD in Solvent Based Systems

Standard procedure for low solvent systems or 100% solids



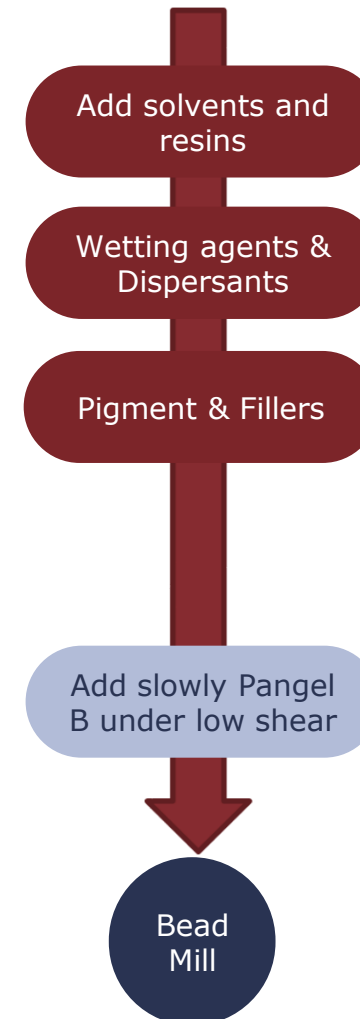
Dispersing Pangel in Solvent Based Systems

Standard procedure for systems with pigments

Pangel OM/OMD Series



Pangel B Series

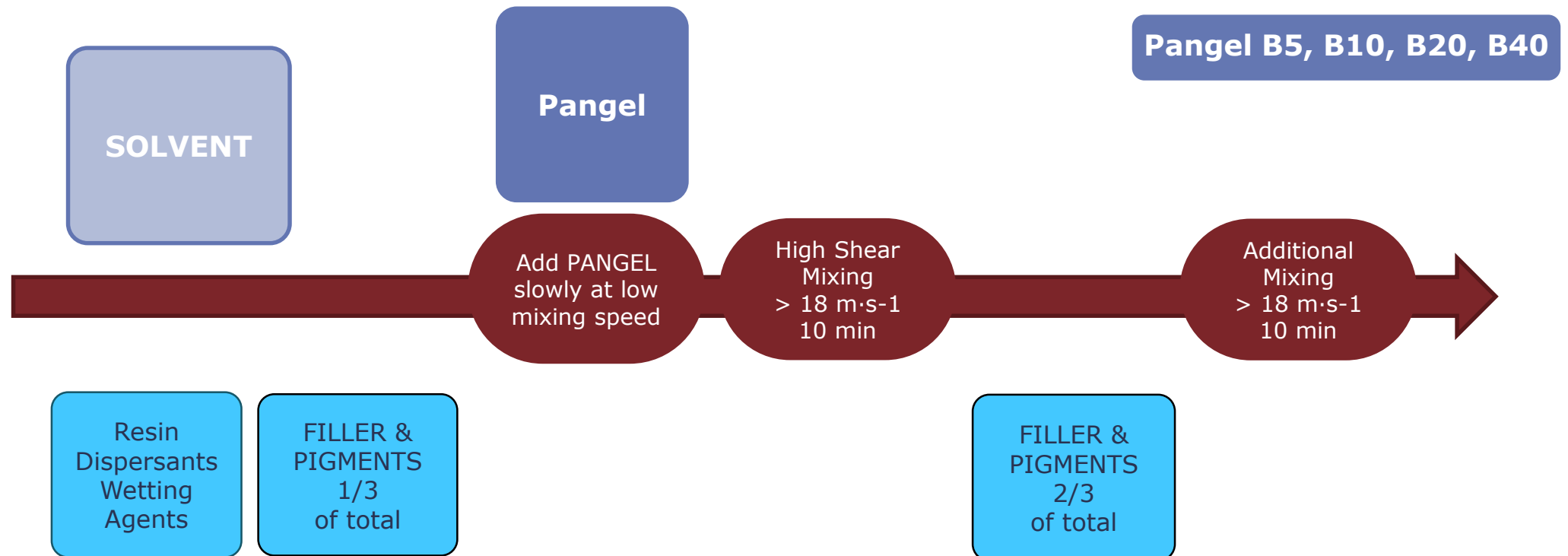


Dispersing Pangel B in Solvent Based Systems

How disperse Pangel B when there is no a bead mill step

If there is no bead mill after dispersion, the addition of Pangel at the end will limit very much its dispersion in the paint and performance.

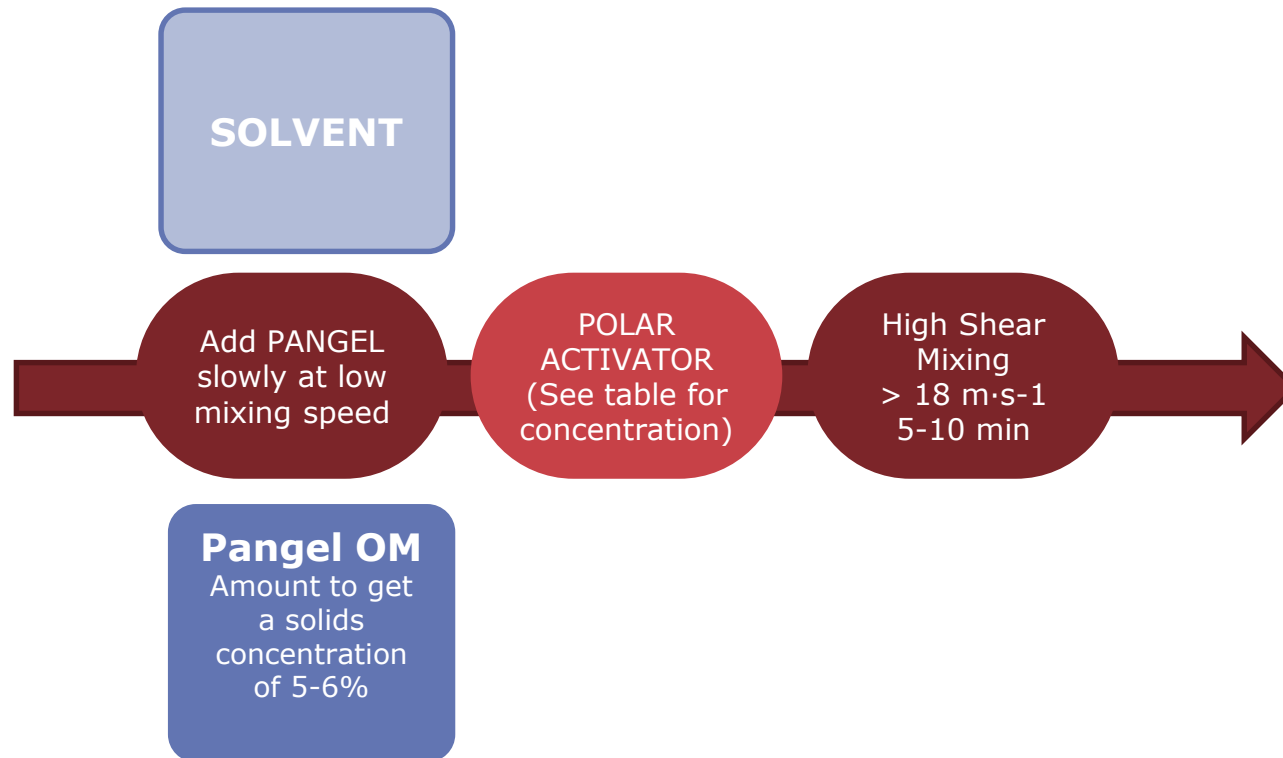
Target: Reduce the interaction Pangel and dispersants



Dispersing Pangel OM in Solvent Based Systems

How to make a PREGEL in solvent?

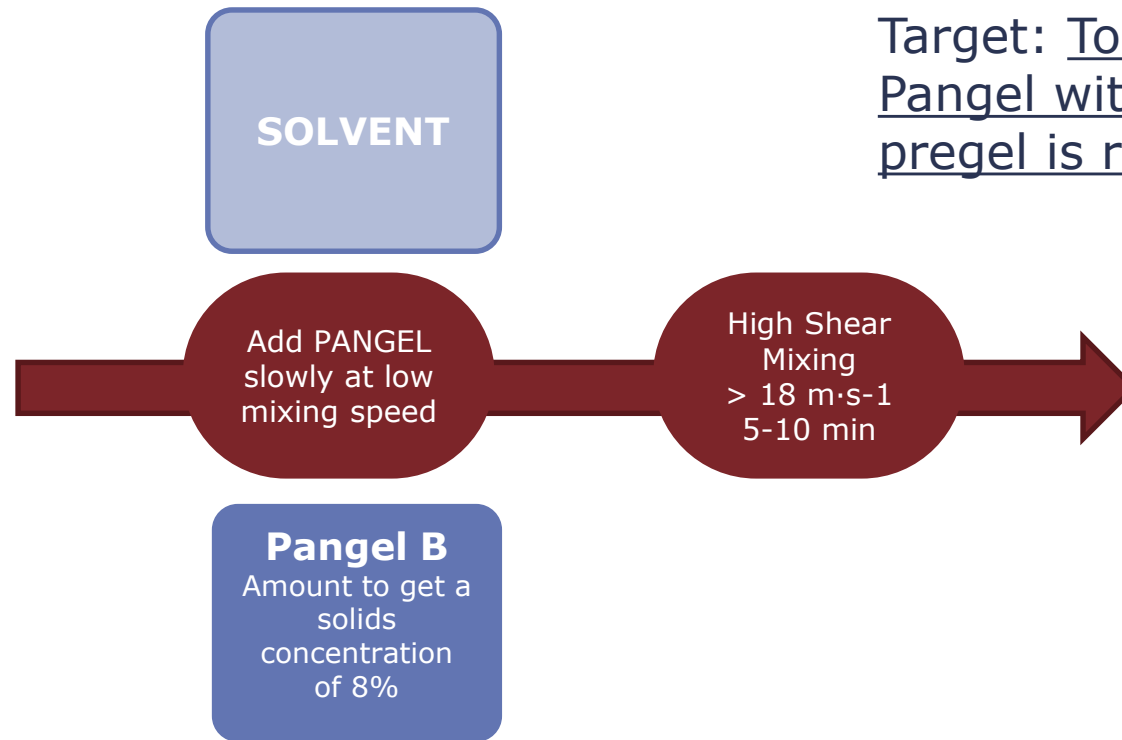
Target: To apply maximum shear to Pangel with no interferences.
Pangel is ready to be used at any time.



Recommended polar activator (based on Pangel OM weight)	
Metanol/H ₂ O (95:5)	33%
Ethanol/H ₂ O (95:5)	50%
Acetone/H ₂ O (95:5)	60%
Propylene carbonate/H ₂ O (95:5)	33%
Propylene carbonate	33%

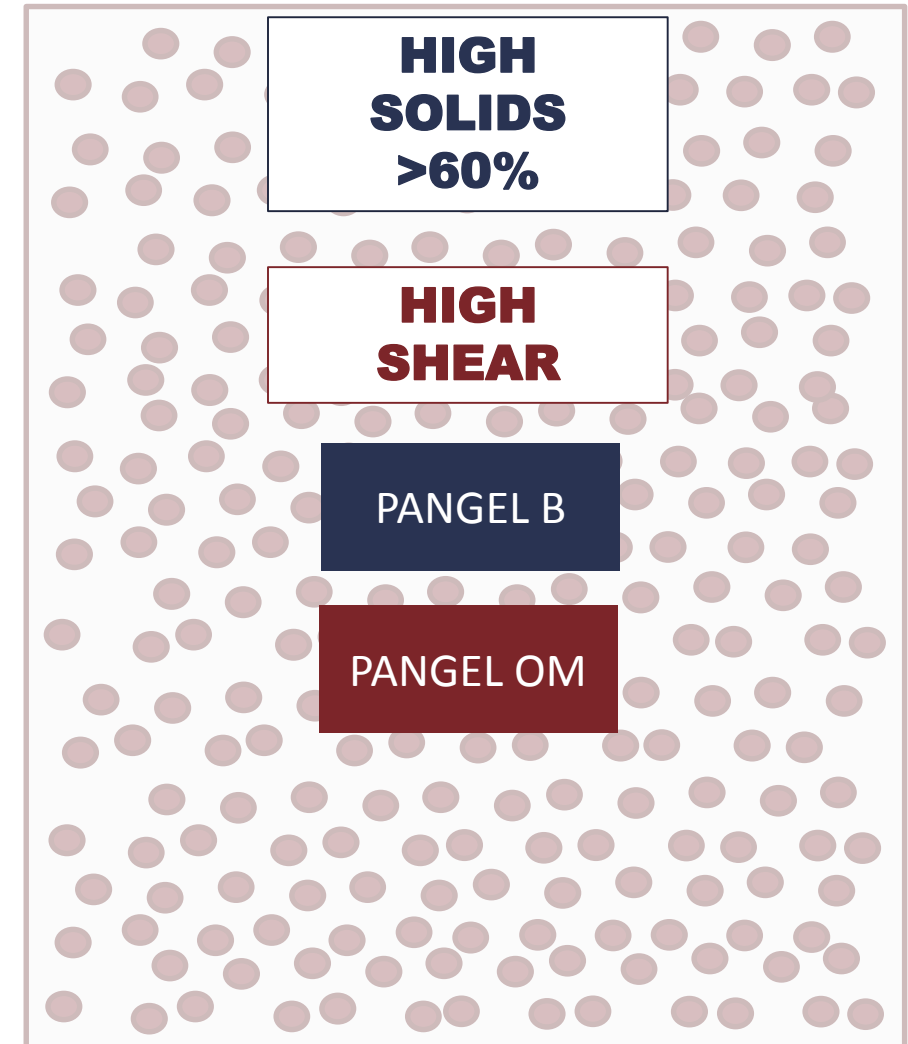
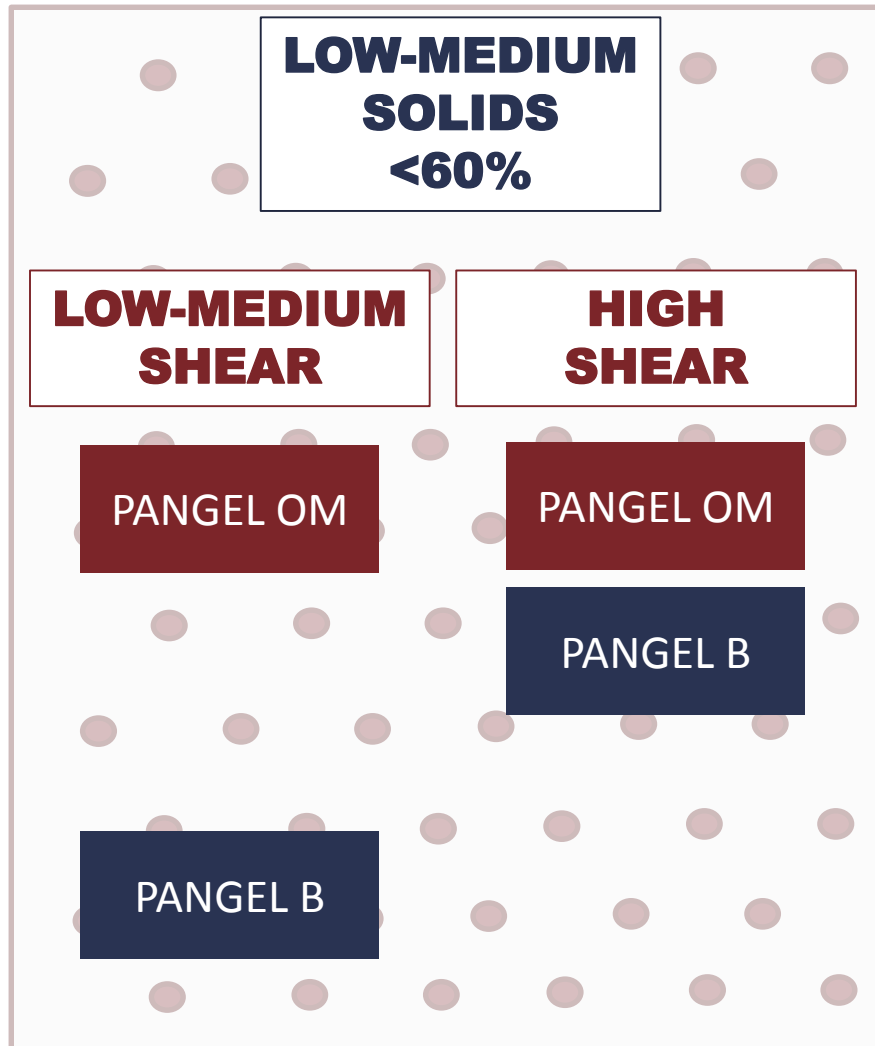
Dispersing Pangel B in Solvent Based Systems

How to make a PREGEL in solvent?

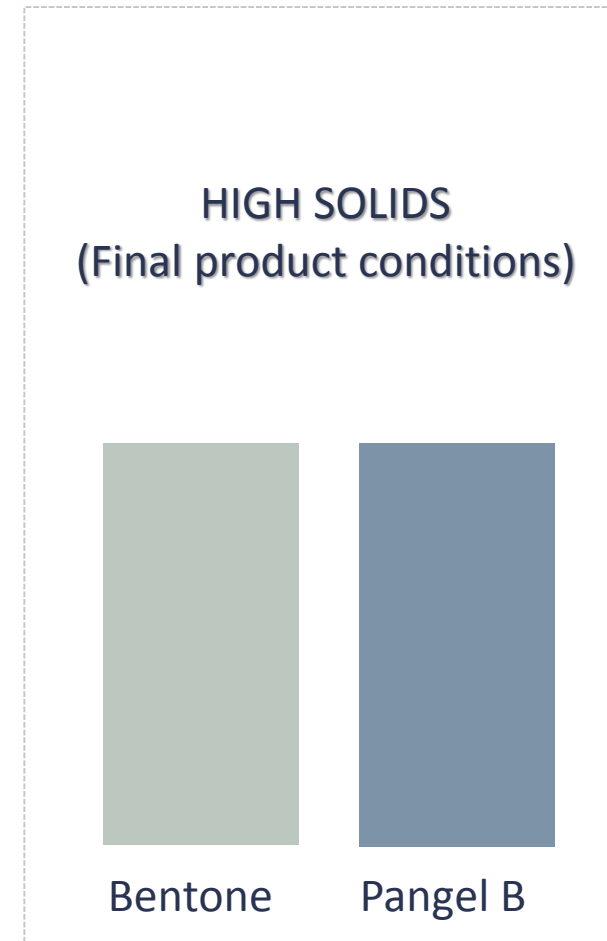
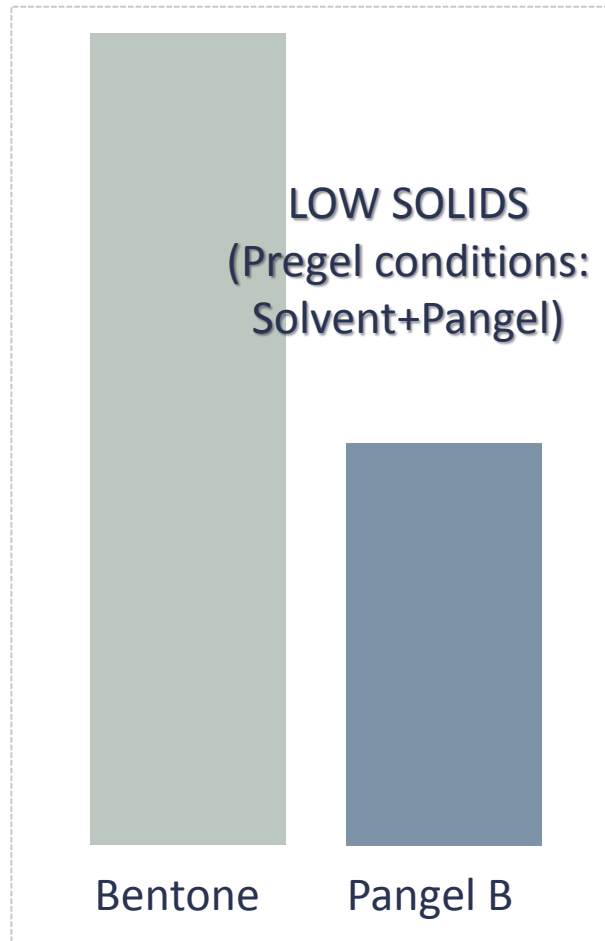


Target: To apply maximum shear to Pangel with no interferences. Pangel pregel is ready to be used at any time.

SOLVENT BASED SYSTEMS



Effect of Solids on Organobentonite Efficiency



Consideration to be Made to Assure Mixing Conditions

- ✓ Type of mixer used. If no security, ask to describe it or show the pictures
- ✓ Check speed of mixer. Consider m/s and calculate it if rpm and disk diameter
- ✓ Presence of pigment milling. Check if there is bead mill or just a Cowles type. A bead mill will guarantee high shear independently of cowles speed.
- ✓ Detect presence of dispersants
- ✓ Check possibility of make a pregel
- ✓ Ask to see the gel, to check viscosity visually (it might look like a mayonnaise).

THANK YOU FOR YOUR ATTENTION



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Inside the earth. Withing our lives.*

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