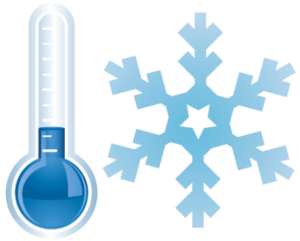
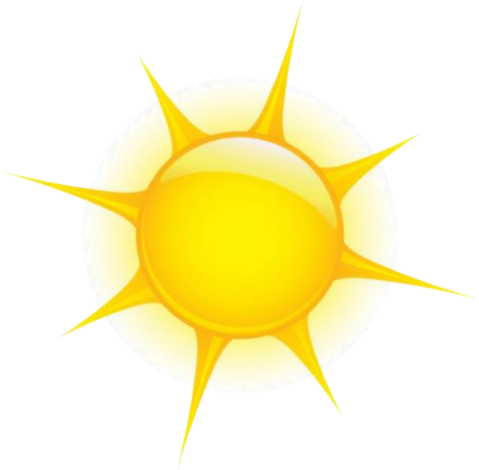
SOUDAL

BUILD THE FUTURE

Effect of Moisture & Temperature on the bonding of Adhesives & Sealants





What are we covering?

- 3 main types of curing systems
- What does Clause E2 of E2/AS1 require?
- Moisture impact on curing systems
- - What does this mean?
- Temperature impact on curing systems
- - What does this mean?
- WANZ Window Systems

3 Main Types of Curing Systems

Curing System	Types of Products
Moisture Cure (or Condensation Cure)	MS Polymers Polyurethanes Silicones
Moisture Loss	PVA's Acrylic Wallboard Adhesives Acrylic Gap Fillers
Solvent Loss	Synthetic Rubber/Resins

3 Main Types of Curing Systems

Clause E2 External Moisture E2/AS1 at time of completion

NZBC	%	Lining System Suppliers	%
For timber framing at the time of installing interior linings	20%	GIB Aqualine Wet Area Systems	18%
For timber weatherboards and exterior joinery at the time of installation	18% or Less	Kopine Ultralock	18%
For reconstituted wood products	18%	Seratone	18%
H1.1 and H1.2 treated framing	20% max.	HardiGlaze	18%
Kiln-dried untreated timber	18% max.	Hydrapanel	18%
		Window Sill Tapes (Traditional)	12-14%

Moisture & its Impact on Curing Systems

What is " Wet vs. Damp"?

Wet	Damp
Means you can even strain water from the item/object. ie: if you can ring water from a hat it is wet 	**Means that you can smell the presence of water in the object.** ie: if the hat feels "clammy" it is likely to be damp. 

Cure System – Moisture Cured

What does this mean?

Too much moisture	Too little moisture
• The GRAB not being made to the substrate	• The bond does not set, as not enough of a curing reaction has taken place

Cure System – Moisture Loss

What does this mean?

Too much moisture	Too little moisture
• Possible diluted strength at the adhesive bond line between the substrate and the adhesive/sealant.	• Generally not a bad thing as moisture is absorbed into the substrate/air.

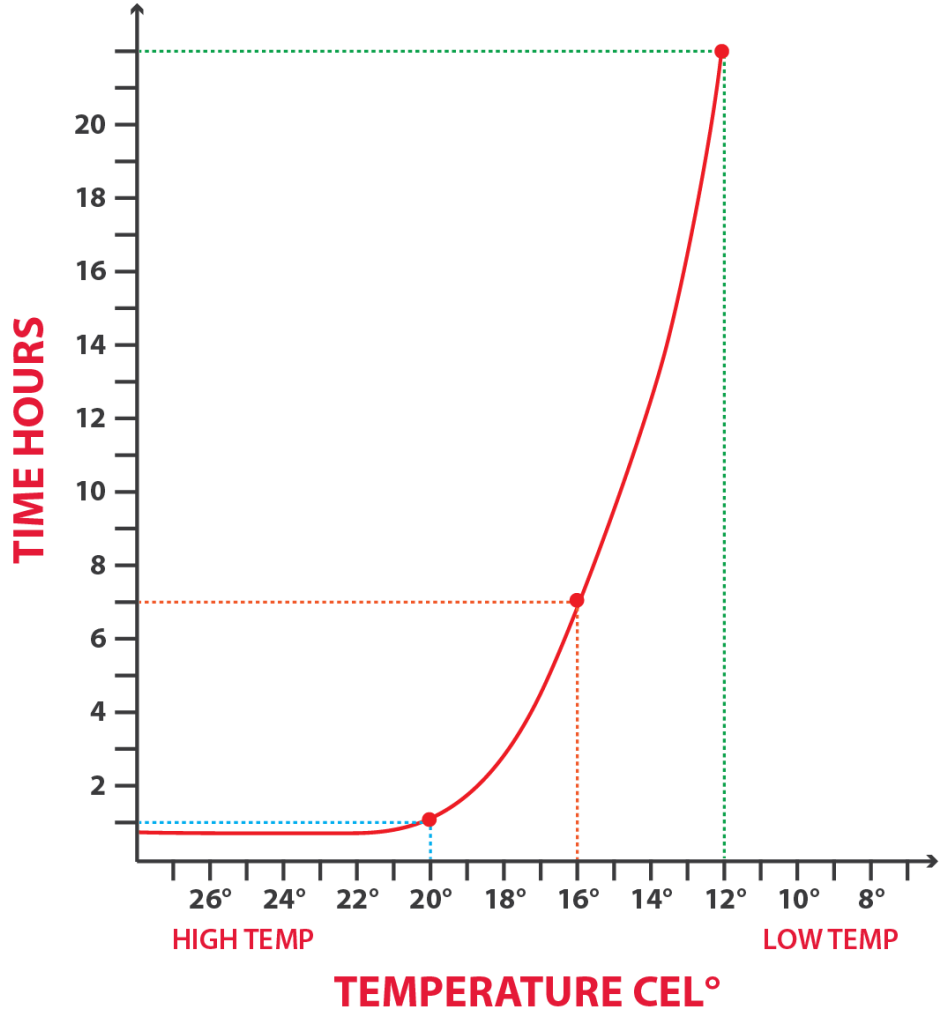
Cure System – Solvent Loss

What does this mean?

Too much moisture	Too little moisture
• The GRAB not being made to the substrate • The adhesive may skin before adhesion takes place	• Not such a bad thing • More solvent is absorbed back into the timber initially

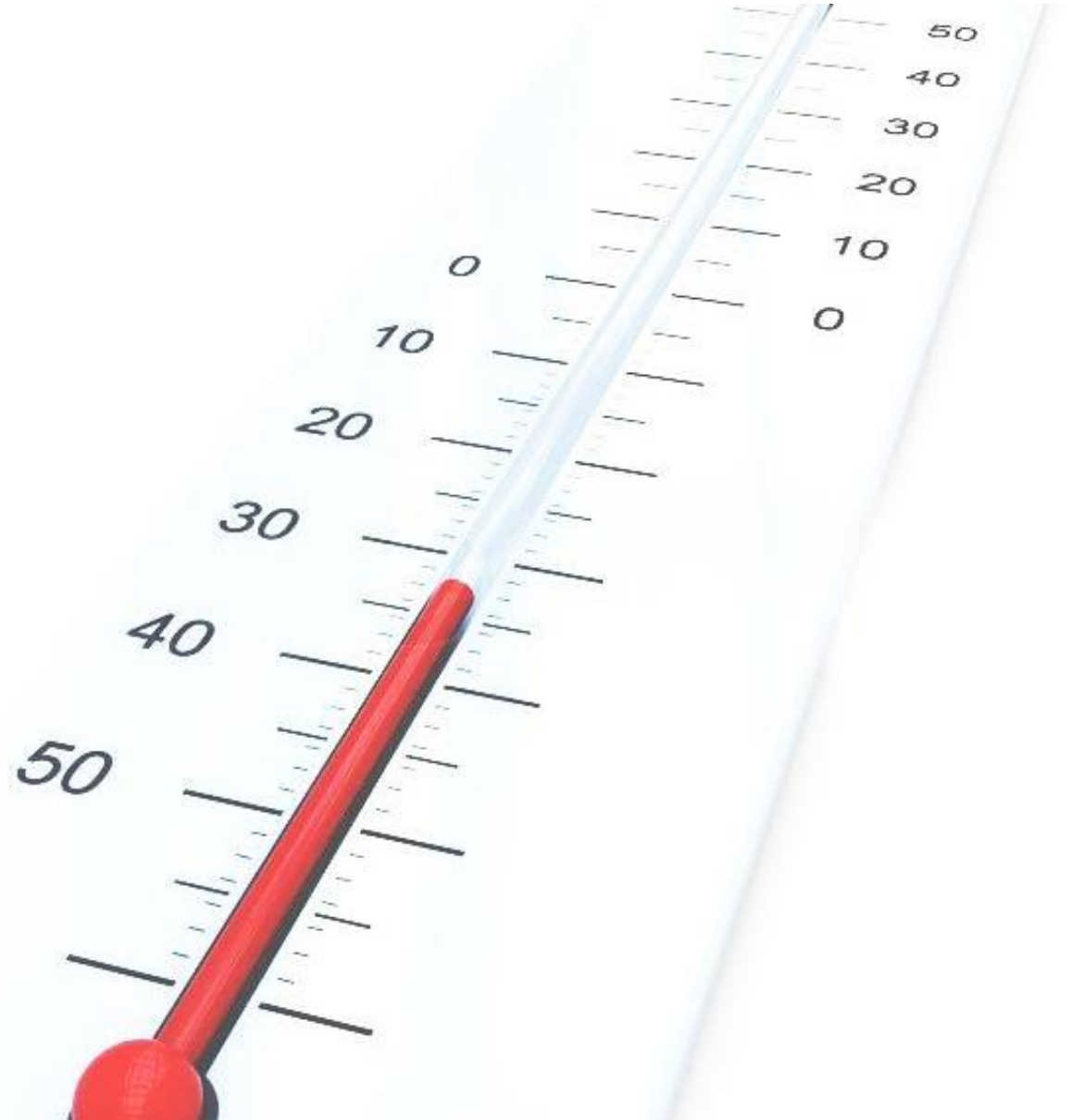
Temperature & its impact on Curing Systems

- In discussing curing rates and ambient temperature the process is **logarithmic** NOT linier
- **Therefore:** The rate at which curing takes place could very well be **MUCH** longer than your would normally expect



Substrate Temperature

- Not only is the ambient air temperature important, BUT
- You also need to manage both the substrate (substrate surface & substrate internal) temperature.
- Many adhesives and sealants require a minimum substrate surface temperature of not less than 5˚C (also depending on local conditions, you can get “micro-frosts” which will prevent bonding at lower temperatures).



Moisture Cured

What does this mean?

At Lower Temperatures

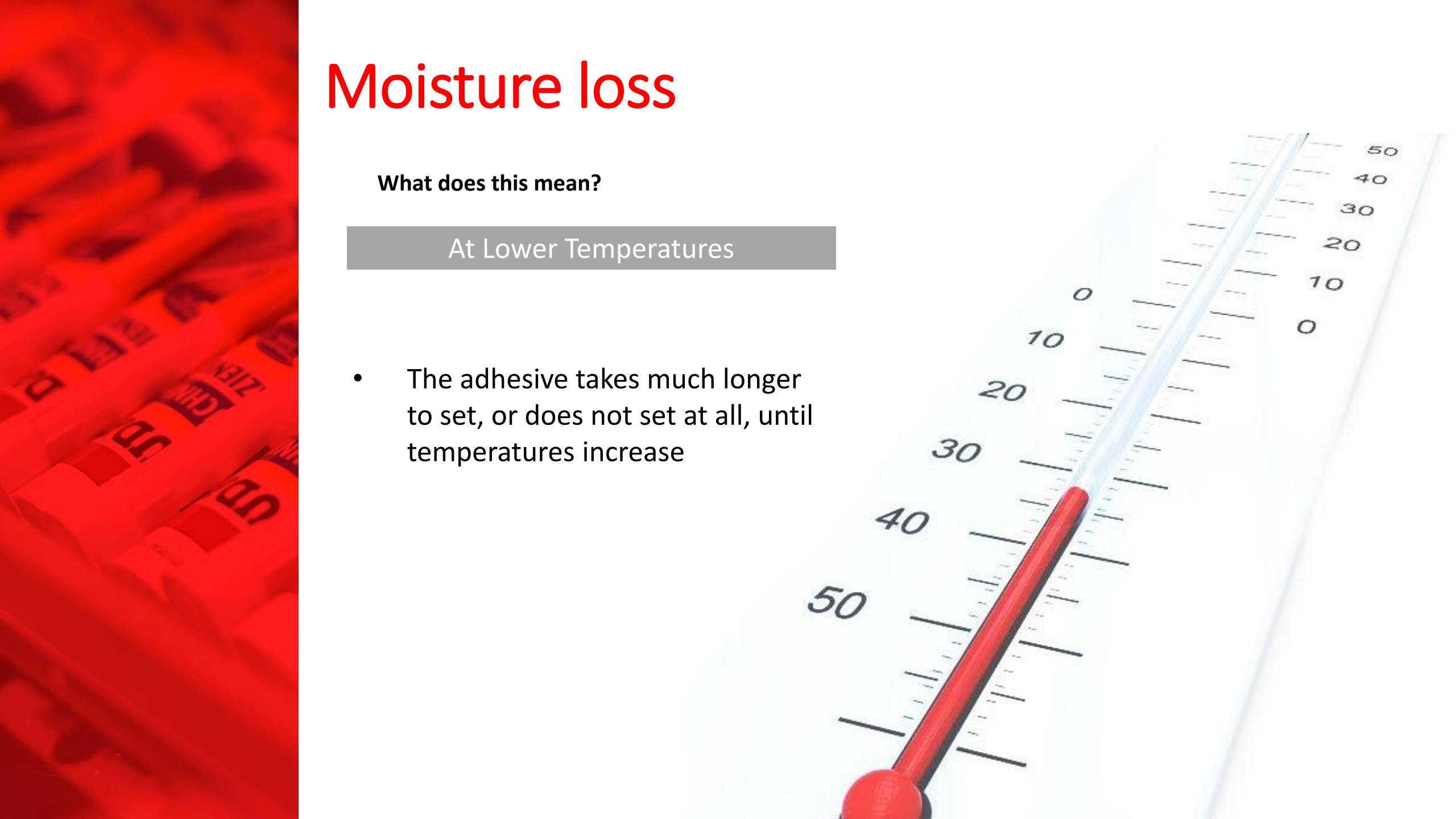
- The adhesive takes much longer to set, or does not set at all. Where items have been clamped they may come apart once the clamps have been removed
- More chance of dirt sticking to sealant joints as it doesn't skin off
- The bond does not set, as not enough of a curing reaction has taken place

Moisture loss

What does this mean?

At Lower Temperatures

- The adhesive takes much longer to set, or does not set at all, until temperatures increase



Solvent Loss

What does this mean?

At Lower Temperatures

- The GRAB not being made to the substrate
- The adhesive may skin before adhesion takes place
- If ambient temperature increases but the substrate temperature does not then there is a possibility of the adhesive skinning before a full bond is created

How are MS “Hybrid” Polymer’s

- effected by changing temperatures

- Published curing/skinning times change with variances in temperature & moisture.
- Curing is logarithmic over time.
- While curing/skinning times are given based on 20°C, 65%R.H., the reality is that in a 24 hour period temperatures constantly change, which can result in apparent longer cure times.
- As temperatures approach 10°C and go below this, the curing process goes into a state of stasis (hibernation). As temperatures increase, so the curing process continues.

W&G Assoc NZ – Window Systems

- moisture & temperature

- Temperature & moisture can effect the bonding of many window/sill tapes.
- When sealing against timber, you should always consider the moisture content of the timber and the temperature at the surface of the substrate
- Sealing against the building wrap and or the window sill tapes can be impaired,
- Plastizor Migration changes, especially in warm conditions

W&G Assoc NZ – Window Systems

- moisture & temperature

- Good practice (in residential fitting) is to seal directly between the “scriber” and the exterior cladding where possibly with a MS based polymer, to create a seal.
- In cold conditions do not trim back PU based expanding foam before it is fully cured
- When sealing against timber, you should always consider the moisture content of the timber and the temperature at the surface of the substrate

In Conclusion

- Both moisture in the substrate and temperature have a big impact on the success of bonding systems
- Curing rates are logarithmic when taking into account against moisture and temperature
- The success of the use of adhesive and sealants to get the best out of them requires awareness and planning
- An increase in the use of adhesive and sealant bonding systems are coming to a construction site near you

Thank you

If you have any questions please contact
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