WILD WELL CONTROL

wildwell.com

Resin for Plug and Abandonment

Tyler James

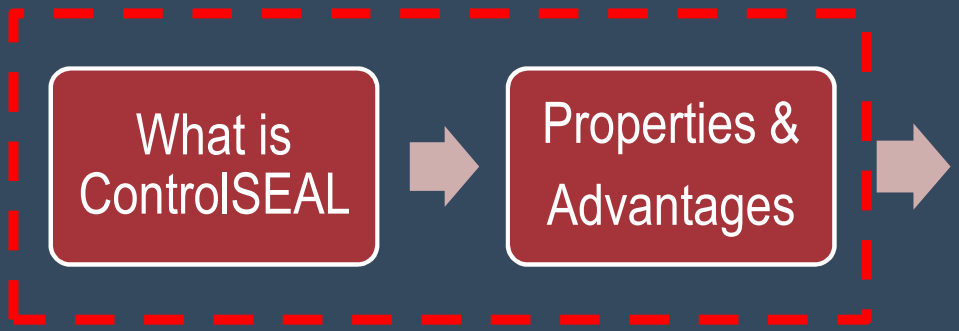
- Mechanical Engineer
- Cement Specialist

CSI Technologies

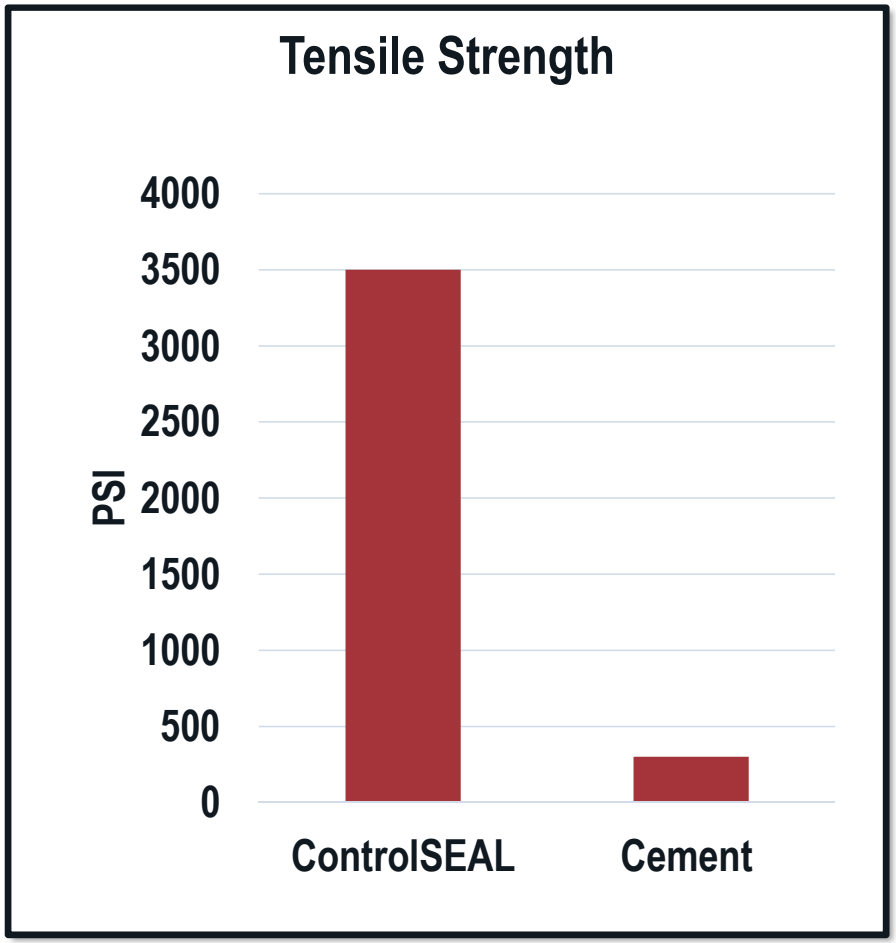
- Cement Experts
- Research Laboratory
- Field Scale Testing

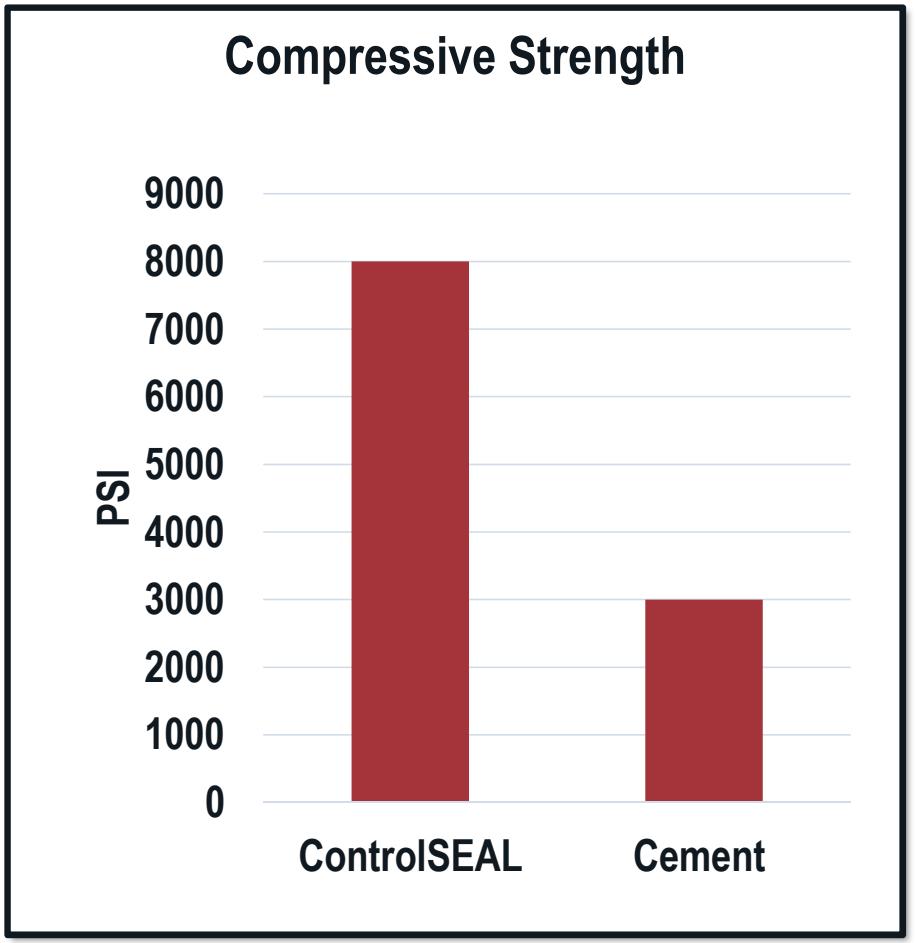
ControlSEAL Resin

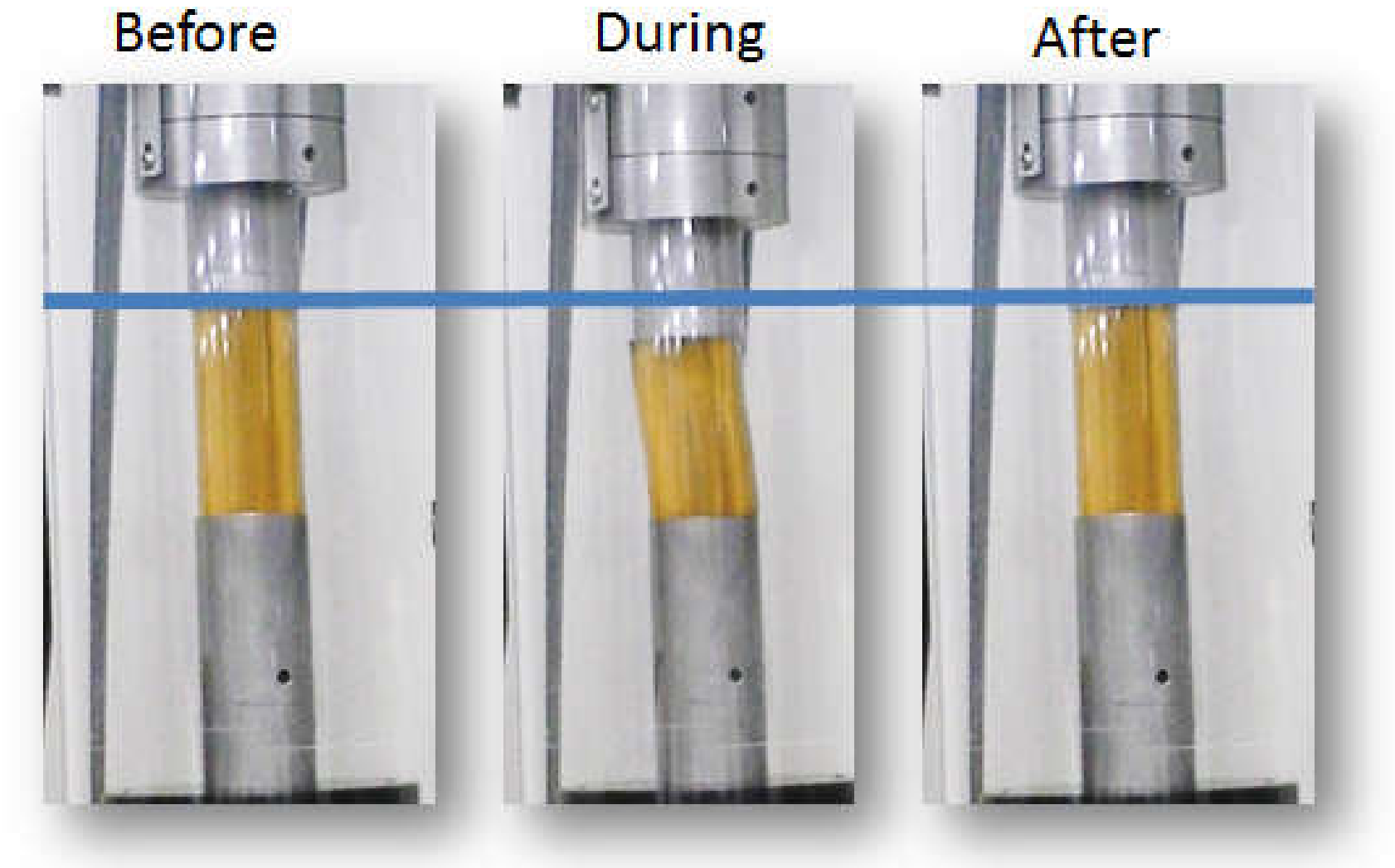
Introduction to ControlSEAL



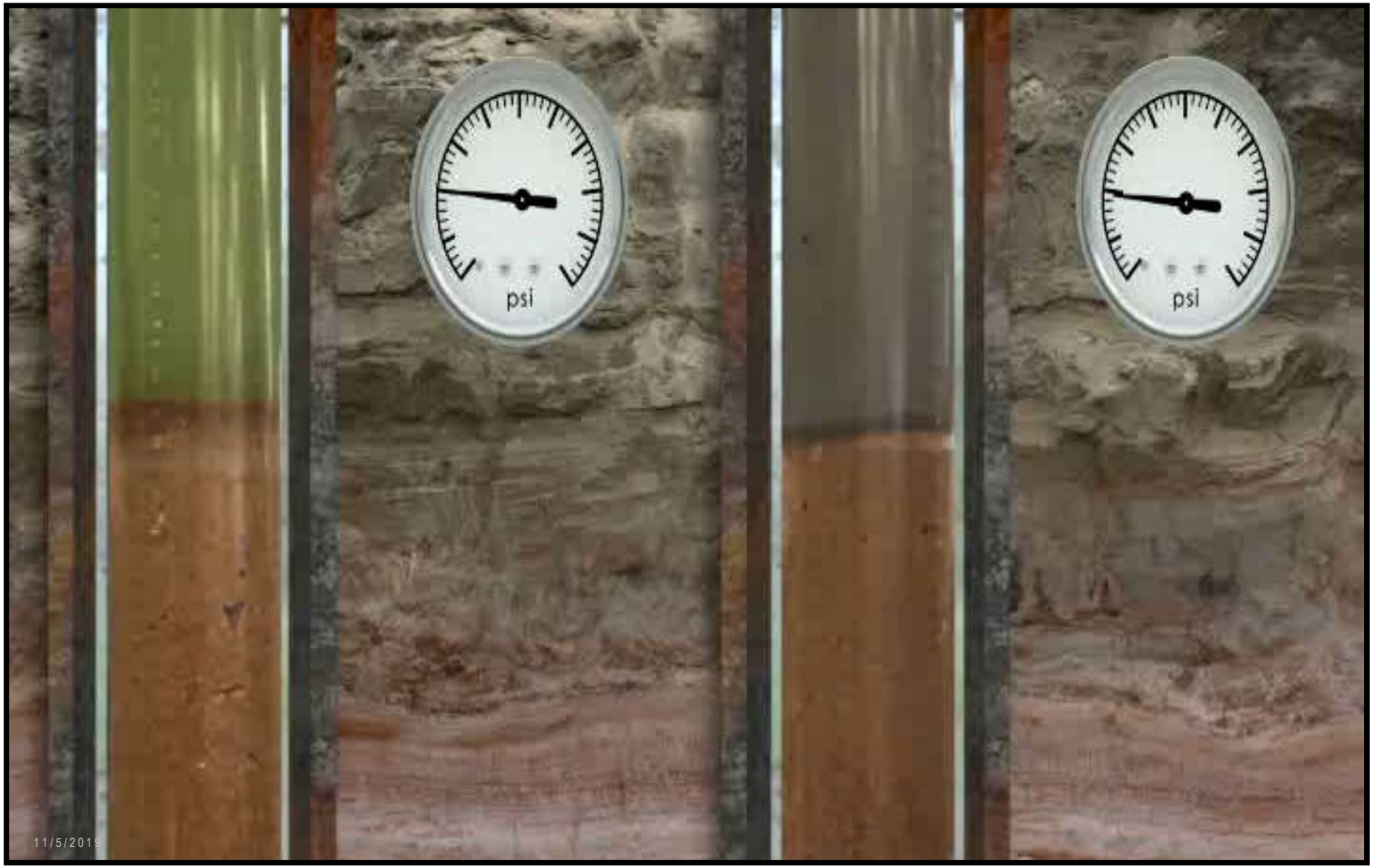
Mechanical Properties

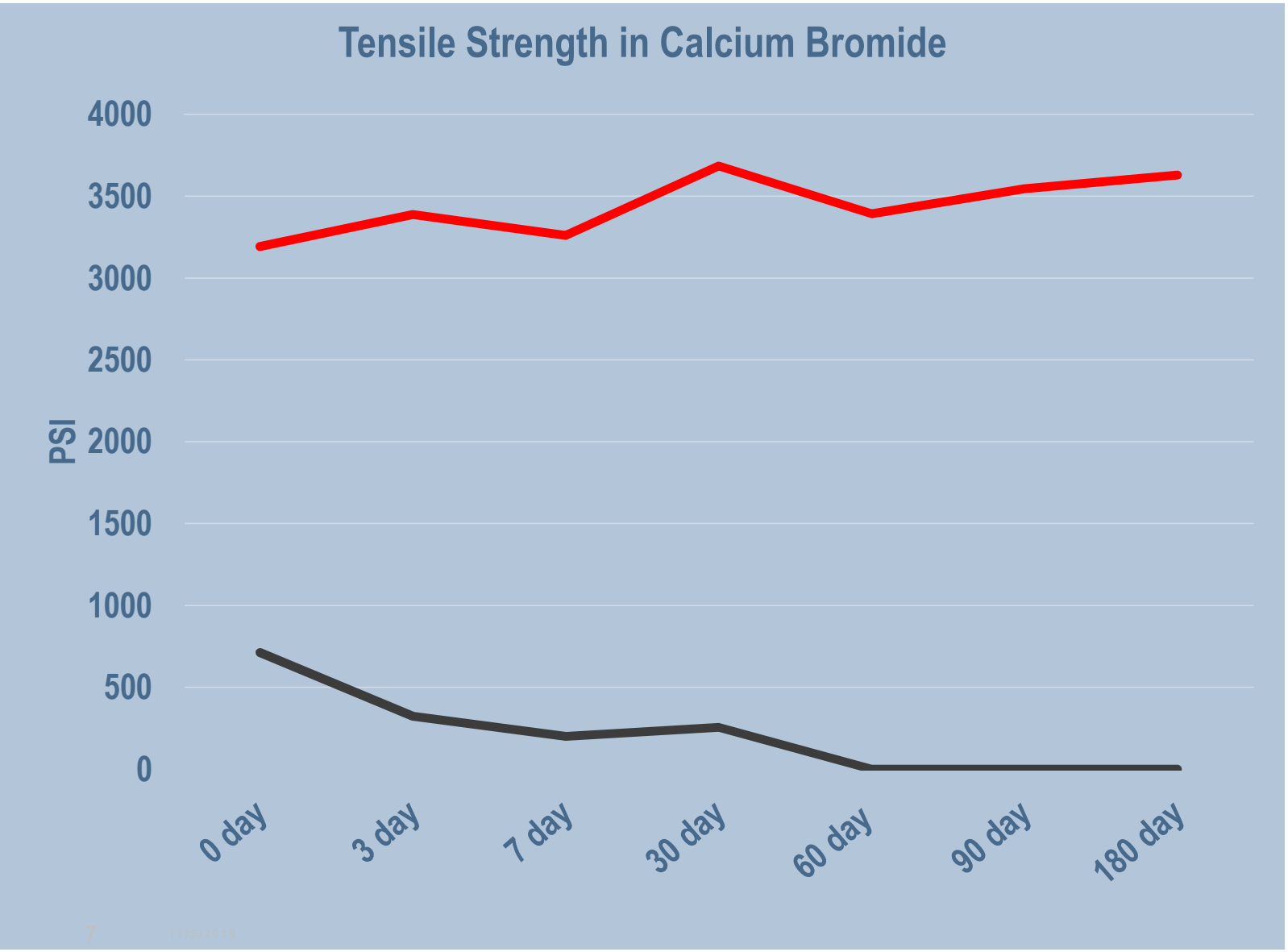





Before
During
After

Solids Free




Tensile Strength in Calcium Bromide
4000
3500
3000
2500
2000
1500
1000
500
0
PSI
0 day
3 day
7 day
30 day
60 day
90 day
180 day

ControlSEAL RESIN IN WATER BASED FLUIDS

Bonding

Brittle

Immiscible in water

Flexible

Solids Free

Incompatible with Water

Resin

Thermal Degradation

Chemical Degradation

Chemically Inert

Tg

Shrinkage

High Compressive Strength

WILD WELL CONTROL

What is ~~Resin~~ ~~Synthetic Resin~~ Thermosetting Polymer

Resin

From Wikipedia, the free encyclopedia

For other uses, see Resin (disambiguation).

In polymer chemistry and materials
typically convertible into polymers.[1]
particularly woody plants, produce r
insects and pathogens.[2]

Synthetic resin

From Wikipedia, the free encyclopedia

Some are thermosetting plastics in which the term "resin" is loosely applied to the reactant or product

that require only one monomer, the monomer compound is the "resin". For example, liquid methyl methacrylate is often called the "resin" or "casting resin" while in the liquid state, before it

Thermosetting polymer

From Wikipedia, the free encyclopedia
(Redirected from

A plastic that is irreversibly cured from a liquid…. curing changes the resin into an infusible, insoluble polymer network.

A **thermosetting**
polymer network

soluble

Thermoset resin

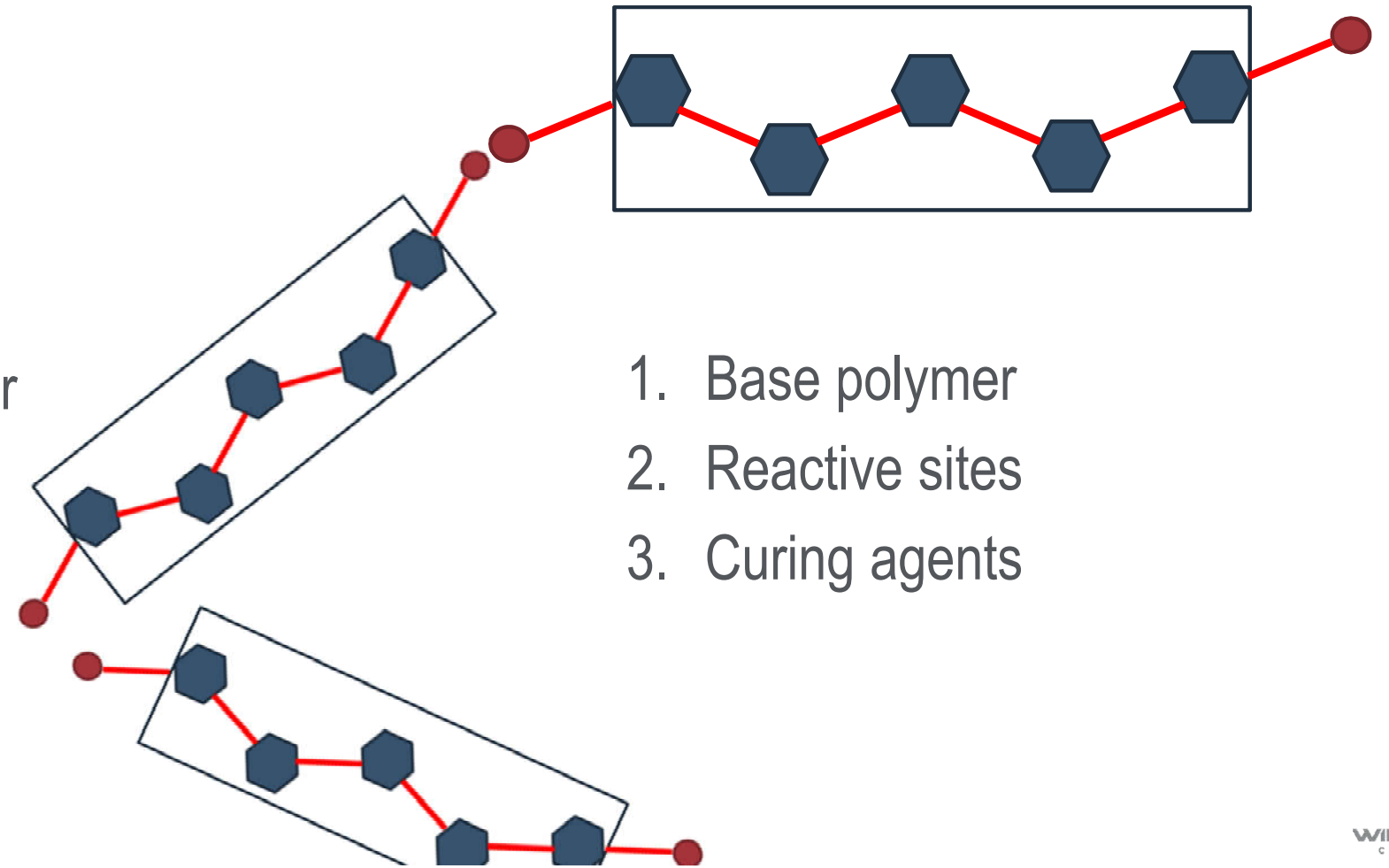
in

semiconductors and integrated circuits. Once hardened a thermoset resin cannot be reheated and melted to be shaped differently.

Thermosetting polymers may be contrasted with thermoplastic polymers, which are commonly produced in pellets, and shaped into their final product form by melting and pressing or injection molding.

Resin "*Thermosetting Polymer*"

- Epoxy
- Furan
- Phenolic
- Polyester



1. Base polymer
2. Reactive sites
3. Curing agents

WILD WELL CONTROL

Resin as a Durable Barrier

Fluid Properties

- Contamination
- Placement Technique
- Handling Time
- Viscosity

Set Mechanical Properties

- Chemical Stability
- Thermal Stability
- Shrinkage
- Adhesion
- Glass Transition Temperature
- Strength (Tensile and Compressive)
- Young's Modulus / Poission's Ratio
- Resilience

Durable Barriers

BARRIER LIFE TIMELINE

Barrier Placement

Initial Seal

Pressure Test

Temperature Pressure Fatigue Damage

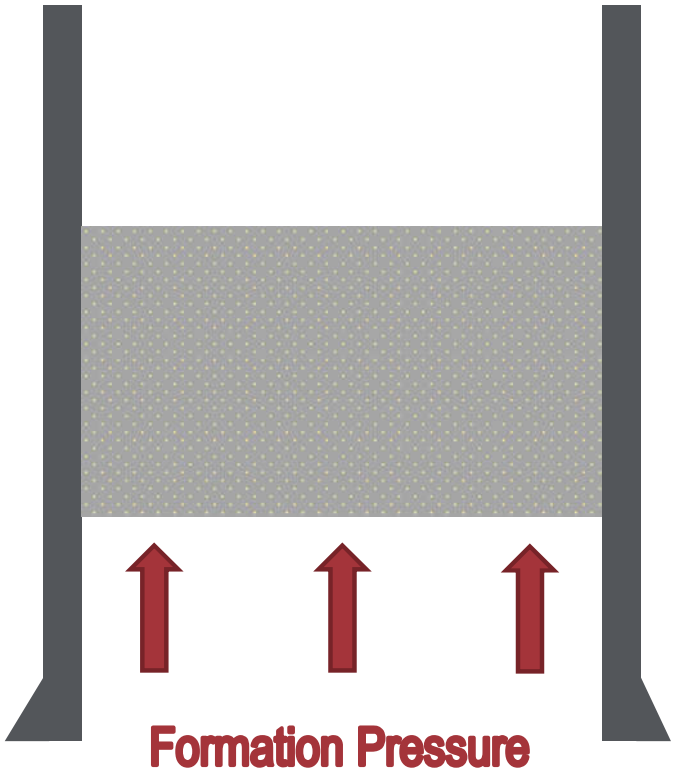
Definition of *durable* in English:

durable

ADJECTIVE

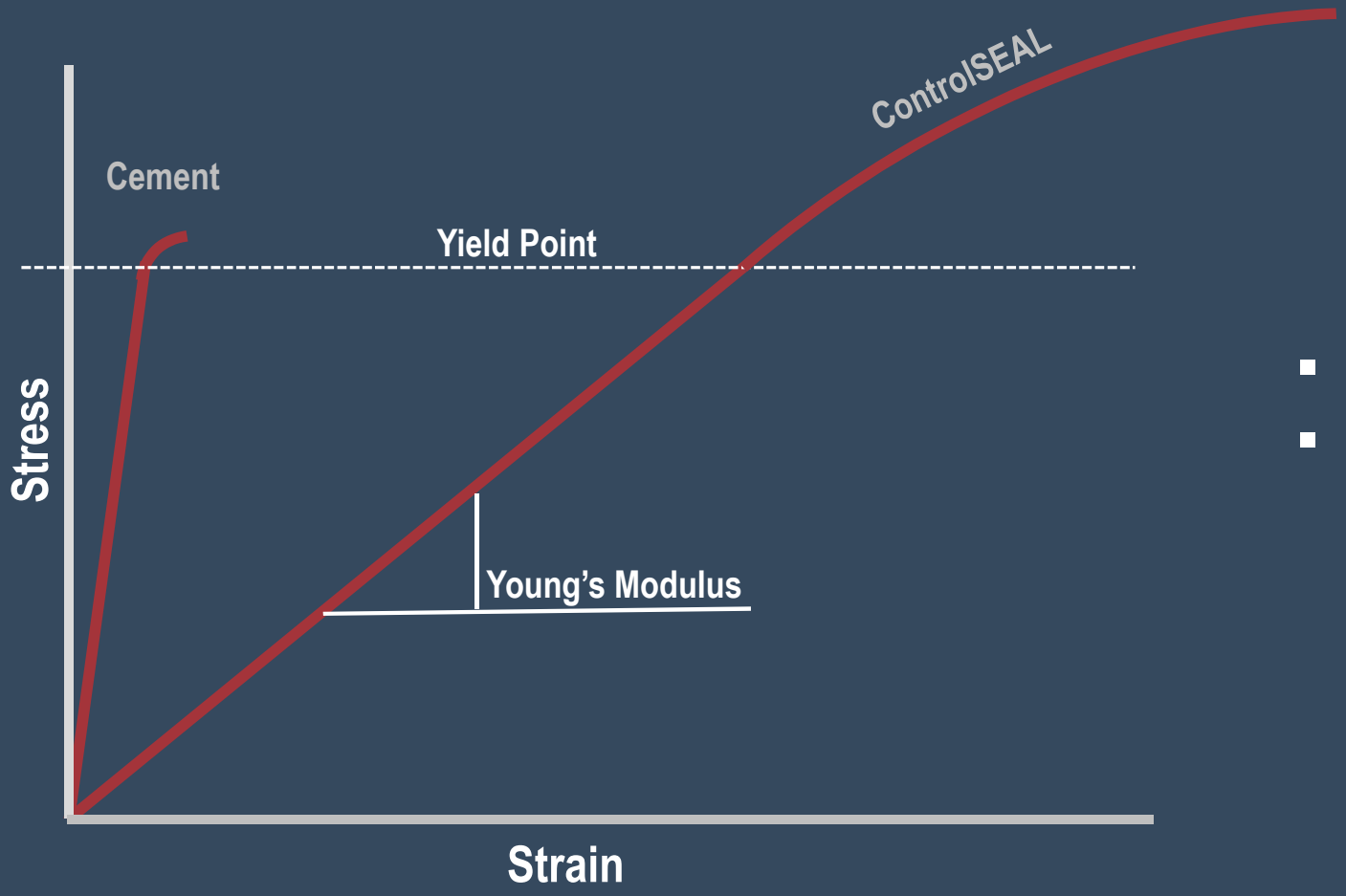
1 Able to withstand wear, pressure, or damage; hard-wearing.

American Oxford Dictionary



1. **Fatigue**
   - Stress Variation
2. **Plug Profile Change**
   - Plastic Deformation
   - Shrinkage
3. **Thermal Degradation**
4. **Corrosion**
   - Chemical Attack

Stress Variation / Fatigue



- Yield Point
- Young's Modulus

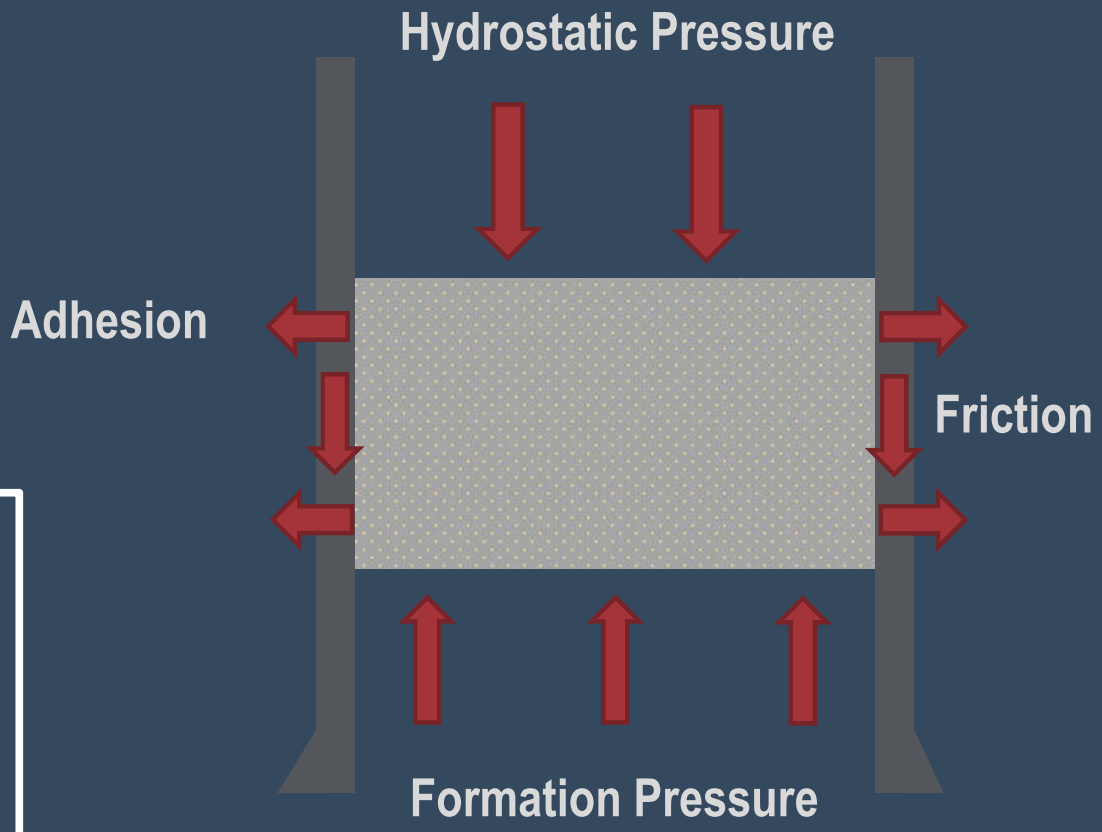
Plug Profile Change

Plastic Deformation

- At stresses below yield point

Shrinkage

- Post set (after pressure test)

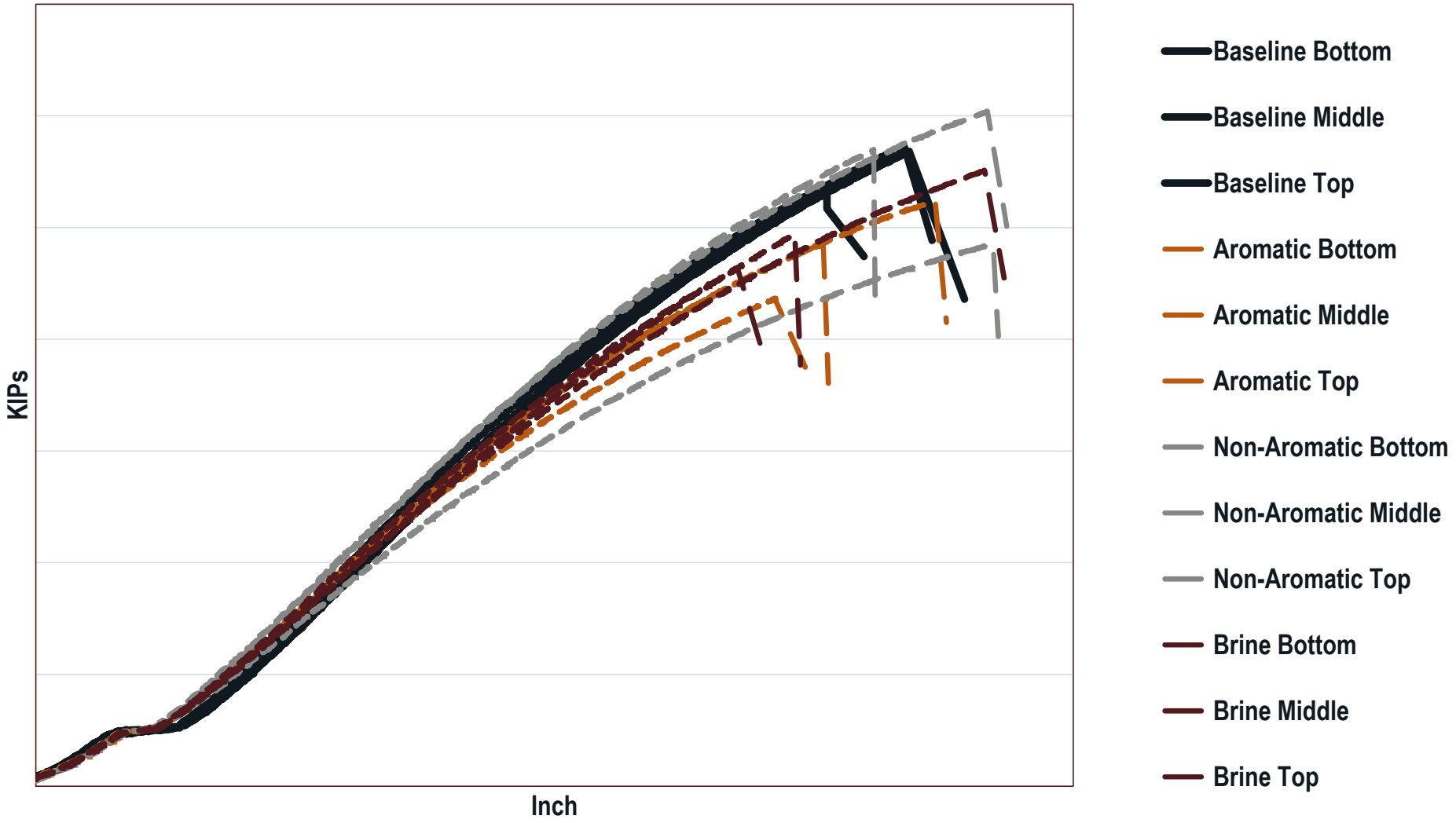


Creep Modulus or Relaxation Modulus

Stress in plug

- Adhesion strength
- Shrinkage (during set)
- Well parameters

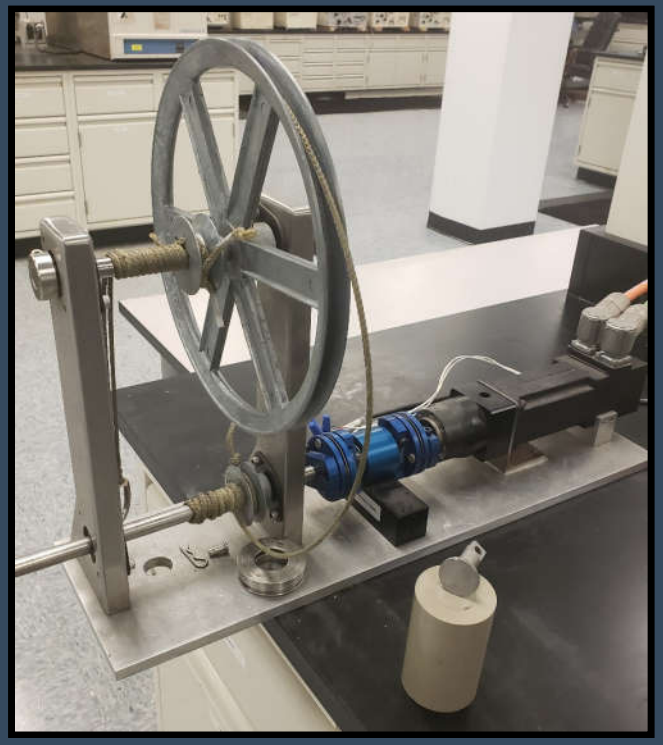
Shrinkage (Post set)


KIPs
Inch
Baseline Bottom
Baseline Middle
Baseline Top
Aromatic Bottom
Aromatic Middle
Aromatic Top
Non-Aromatic Bottom
Non-Aromatic Middle
Non-Aromatic Top
Brine Bottom
Brine Middle
Brine Top

Critical Properties for Durable Barriers

- Young's Modulus
- Yield Point
- Adhesion Strength
- Shrinkage (during set)
- Well Parameters
- Creep Modulus or Relaxation Modulus
- Shrinkage (after set)

How To Measure?



Thank you

Decomworld: Resin Makes Debut

Decomworld: JIP Resin Delivers Knockout Blow Over Cement

Please contact us at:
ControlSEAL@wildwell.com