MAJILITE

Primer
PU(polyurethane)/PVC comparison for Cold Flex and other properties

A Meridian Industries company

Cost and Performance for PU and PVC

- Both are polymers, but different monomers.
- Performance is very different.
- PVC (polyvinylchloride) is low on the performance scale and one of the least expensive thermoplastics.
- PUs are on the high performance end of the spectrum.

PVC

- Contain plasticizers for flexibility.
- Plasticizers migrate out, making them brittle.
- Generally PVC has poor Cold Flex properties.

PUs

- Do not contain plasticizers which leach out over time changing performance.
- Have excellent flexibility.
- Have excellent low temperature flex properties.

Advantages/Disadvantages PU/PVC

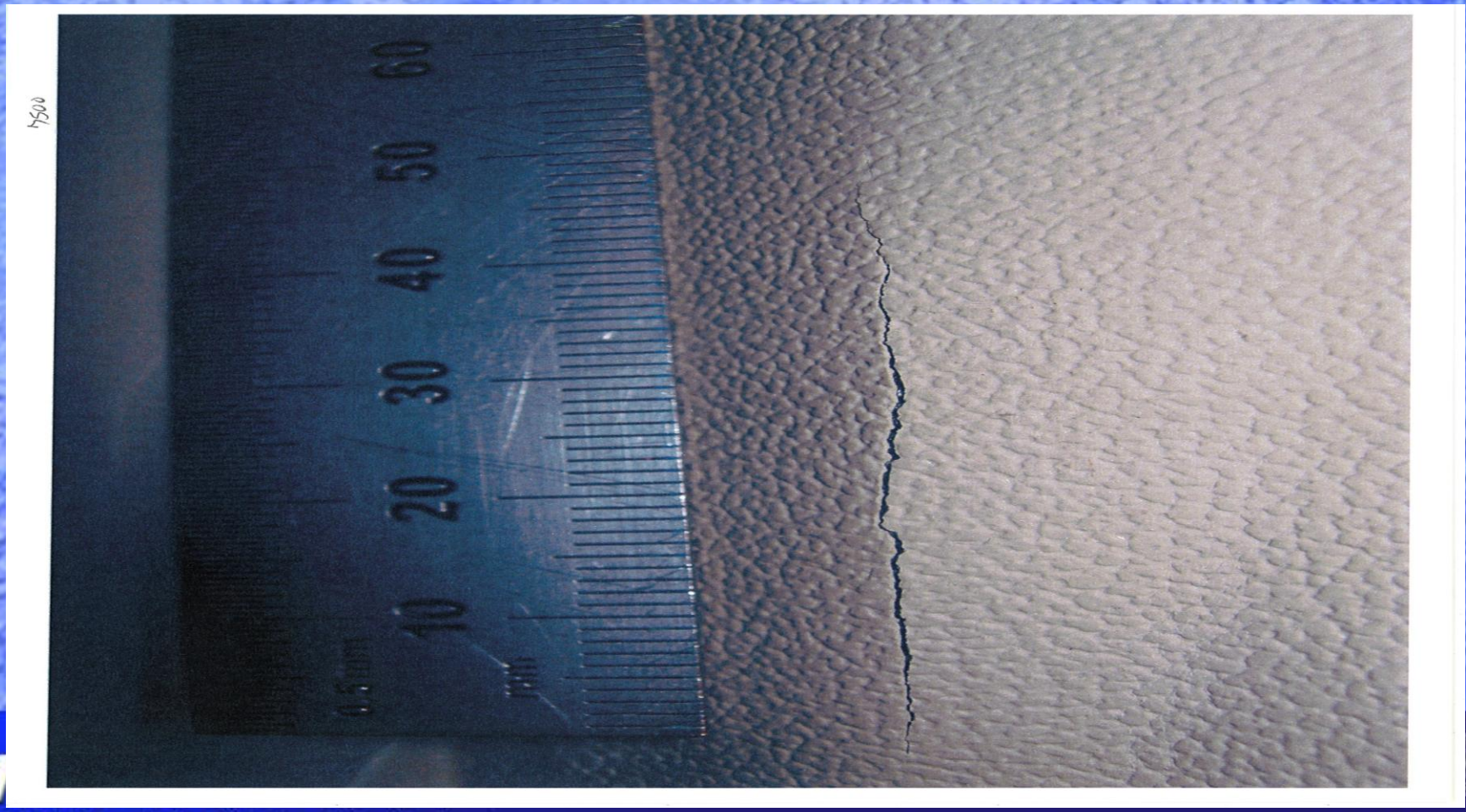
Property	PU	PVC
Weight	Low	High
Air Permeability	Good High	Poor Low
Toughness	Excellent	Poor
Fogging	Excellent	Poor
Brittleness at low temperature	Excellent	Poor
Cost	High	Low
Heat resistance	Excellent	Poor

Majilite PU Test Sample Pass Majilite Automotive Test Method 1000 for Cold Flex

60,000 bending cycles @-30°c

PVC Test Sample Fail
Majilite Automotive Test Method 1000 for Cold Flex

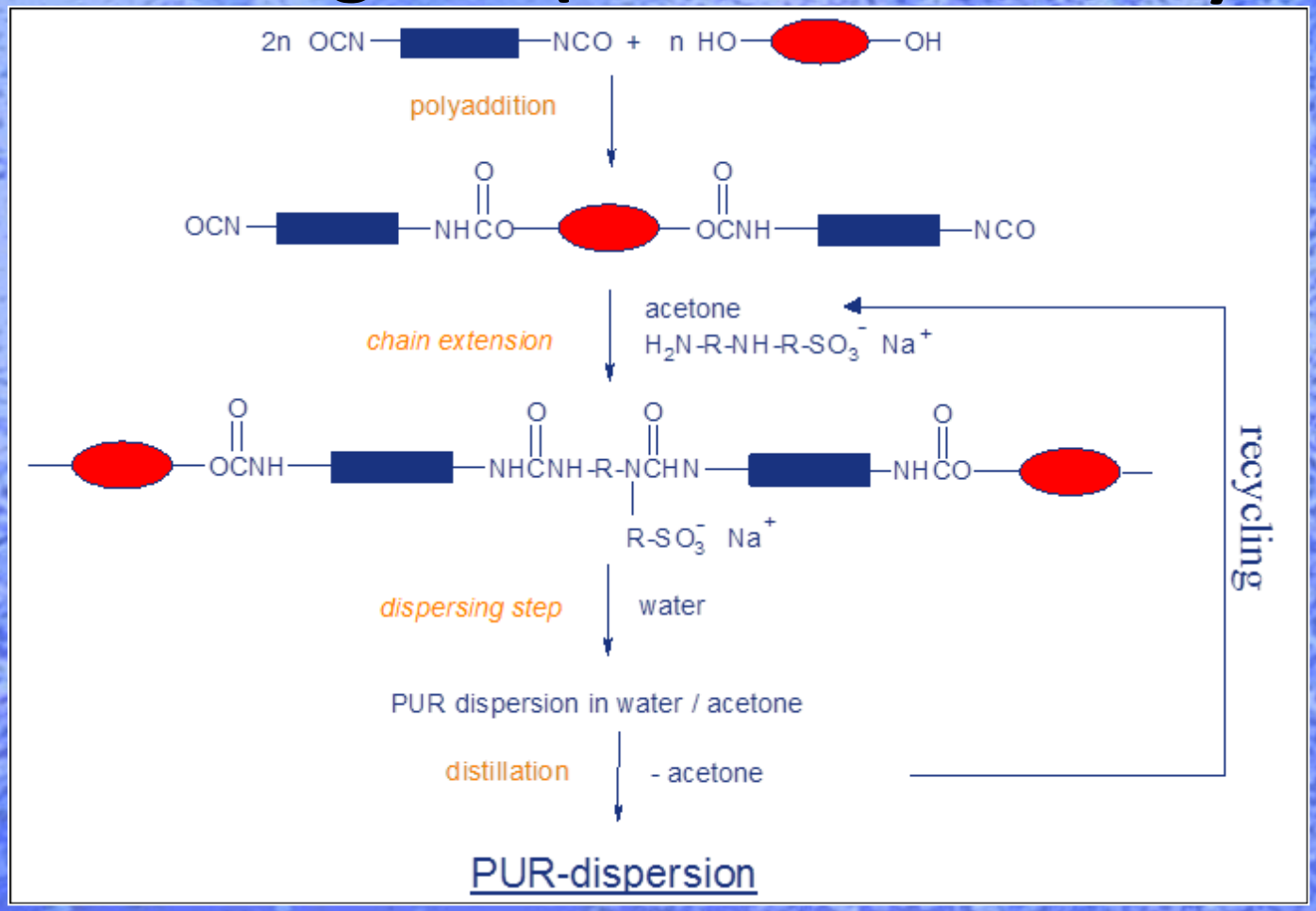
60,000 bending cycles @ -30 c



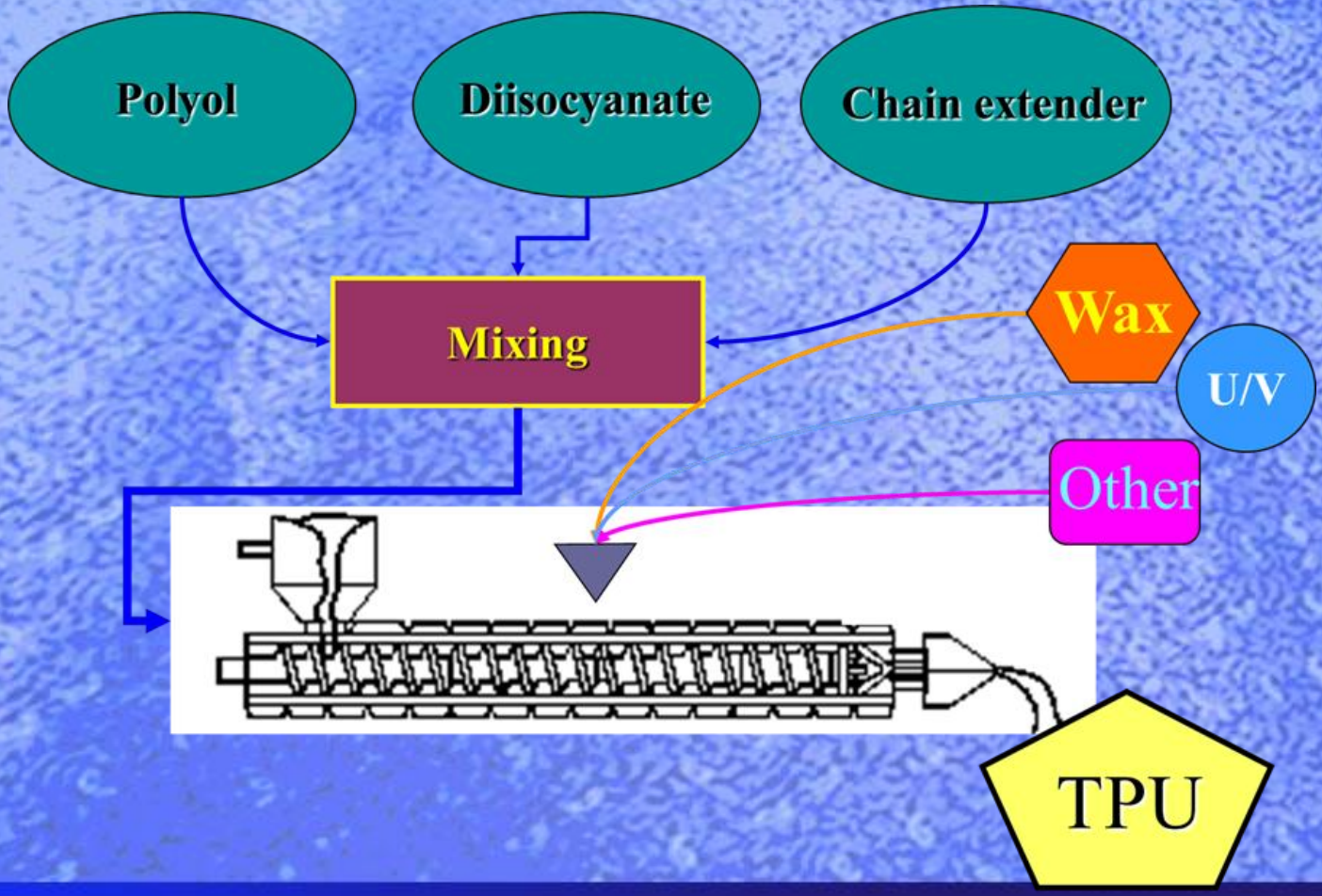
What is PU and how does it differ from TPU? Short answer:

- PU's are crosslinked polyurethanes used in coating applications. They are typically liquids and made with higher functionality than TPUs.
- Normally used for coated fabrics or synthetic leathers.
- TPU (Thermoplastic polyurethane) is supplied as a solid (pellets). Normally used for molded products like fenders, panels etc.

Long Answer:
PU Diagram (Water Based PU)



TPU Diagram

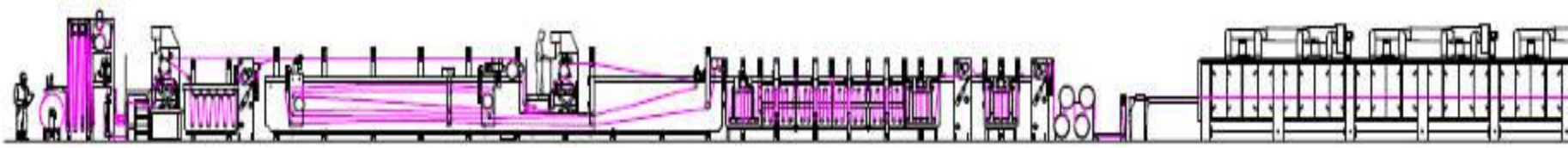

Polyol
Diisocyanate
Chain extender
Mixing
Wax
U/V
Other
TPU

Wet Process vs Dry Process

- Refers to the process used to convert a PU into a synthetic leather or coated fabric.
- Wet process is a coagulate process.
- Dry process is a transfer coated process.

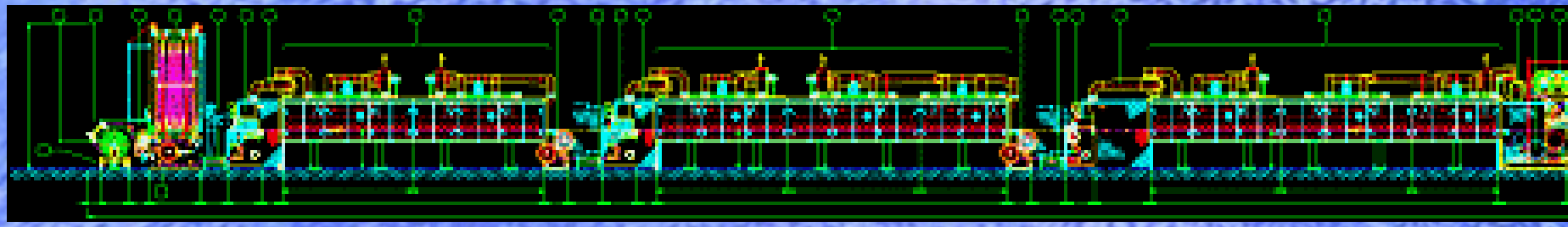
Wet Process coagulated line

- Typically solvent DMF extracted into water.
- More expensive than Dry Process.
- Usually embossed.



Dry Process Transfer Coating Line

- Grain from paper or post embossed.
- One of Majilite's coating lines in Dracut, Ma:



Cold Flex Properties: Wet Process vs Dry Process

- The type of PU used is probably more of a factor for Cold Flex properties than whether it is wet a or dry process.

Points of Interest

- Most leather used in North America contains PU as part of top layers.
- Majilite uses both PU and TPU utilizing the Dry Process.
- Majilite does not coagulate but does use coagulated base substrates made by a wet process.

Any questions or need more information:

Majilite Contact information:
John Tsirovasiles
Automotive Business Manager
Majilite Corporation
1530 Broadway Road
Dracut, Ma. 01826
978 441 6800 ext 7407
Johnt@Majilite.com

Rev 2: 1/23/2012