A Novel Approach To Extending The Possibilities Of Hot Melt Acrylic Formulation

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7th Afera Technical Seminar, Brussels 2015

ACRYMAX®

Franklin Adhesives & Polymers

Omicron Adhesive Materials Ltd.

CNP Polymer GmbH

Acrynax Evolution

- 1977 Schenectady started project for hot melt PSA for pharmaceutical applications
- 1982 First product 4236 was commercialized
- 1997 Five standard products on range
- Early 2000s discussions with several adhesive manufacturing multi-nationals regarding joint ventures and marketing
- 2006 Finally purchased outright by Franklin International of Colombus, Ohio
- 2012 Acrynax first produced in Europe

Franklin International

- Private, family-owned, founded in 1935
- Corporate headquarters - Columbus, OH
  320 employees
- ISO 9001: 2000 certified
- 2 business units:
  - *Adhesives & Polymers Division*
  - *Construction Division*

Competitive Advantages

- Polymerization capabilities
- Manufacturing flexibility
- Over 40 years of experience in pressure sensitive technology
- Innovation in development and technology
- Ongoing market research & brand support
- Local technical sales support as well as 24/7 online support – FranklinAdhesivesandPolymers.com
- Ability and willingness to customize products to meet customers' needs

Three Product Families

- **Covinax®** – broad family of emulsion PSA products
- **Micronax®** – repositionable product family, designed using microsphere technology
- **Acrynax®** – acrylic hot melt technology for industrial and medical applications

Current Acrynax Portfolio

Acrynax 4326 – High peel and tack permanent adhesive

Acrynax 10127 – High peel and tack permanent adhesive with reduced cold flow

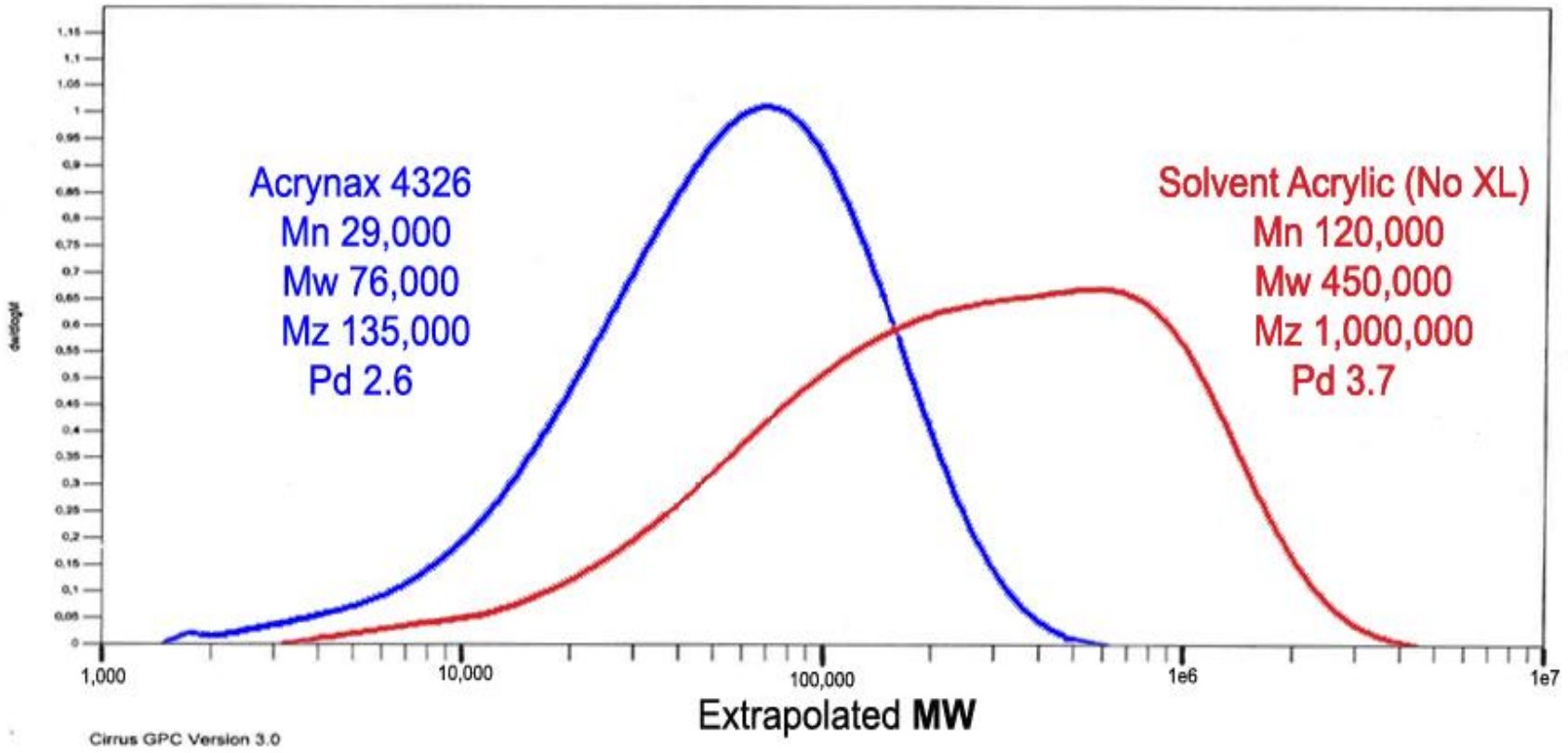
Acrynax 11588 – Balanced peel, tack and shear properties

Acrynax Molecular weights

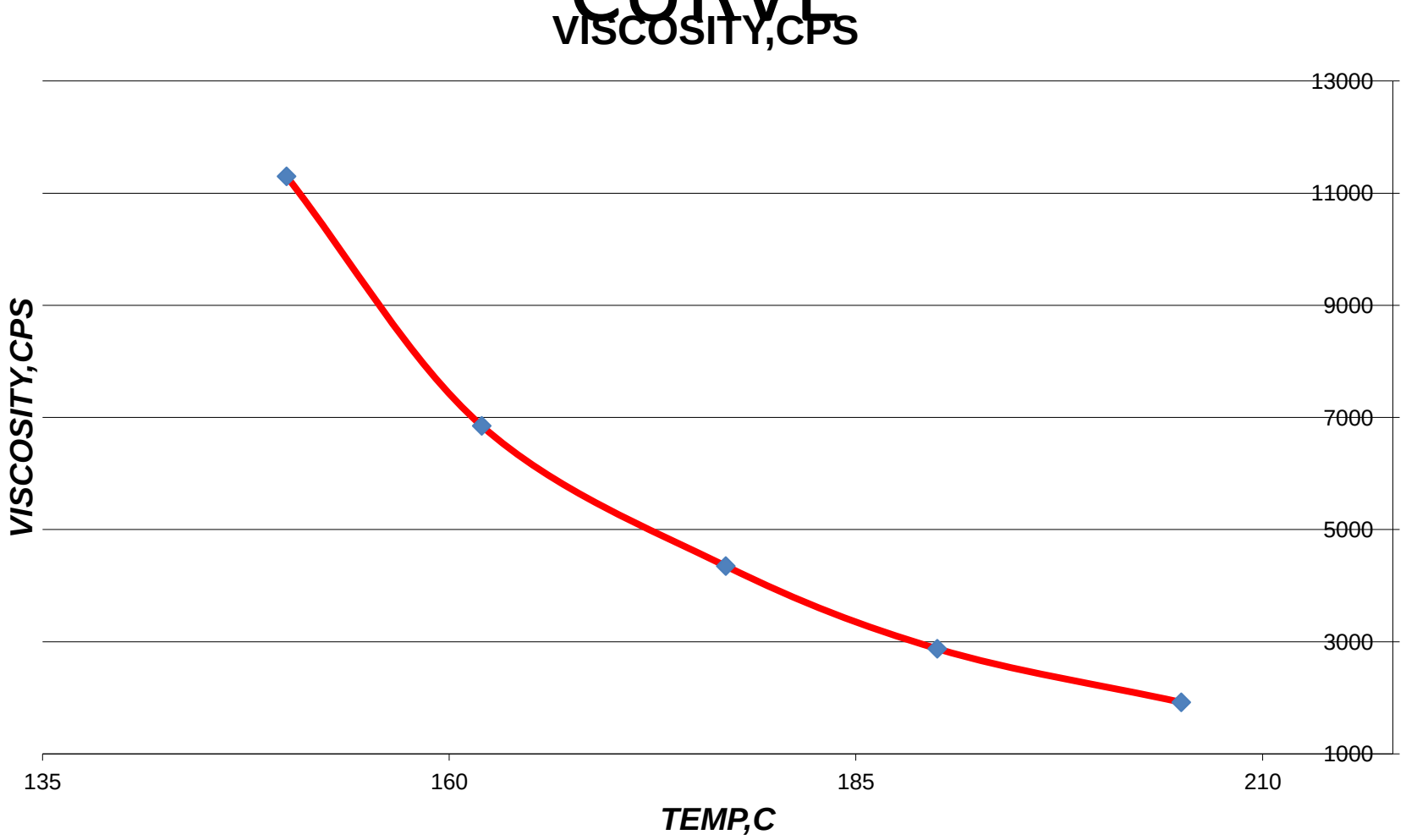
These polymers are all based on the same monomeric constituents but are differentiated by their molecular weight distribution.

	Mn	Mw	Pd
Acrynax 4326	20,000-30,000	85,000-95,000	3-5
Acrynax 10127	17,000-30,000	65,000-85,000	3-5
Acrynax 11588	15,000-35,000	80,000-110,000	3-6
Acrynax 11891	15,000-20,000	80,000-90,000	4-5

Typical Distribution Profile vs Solvent Acrylic

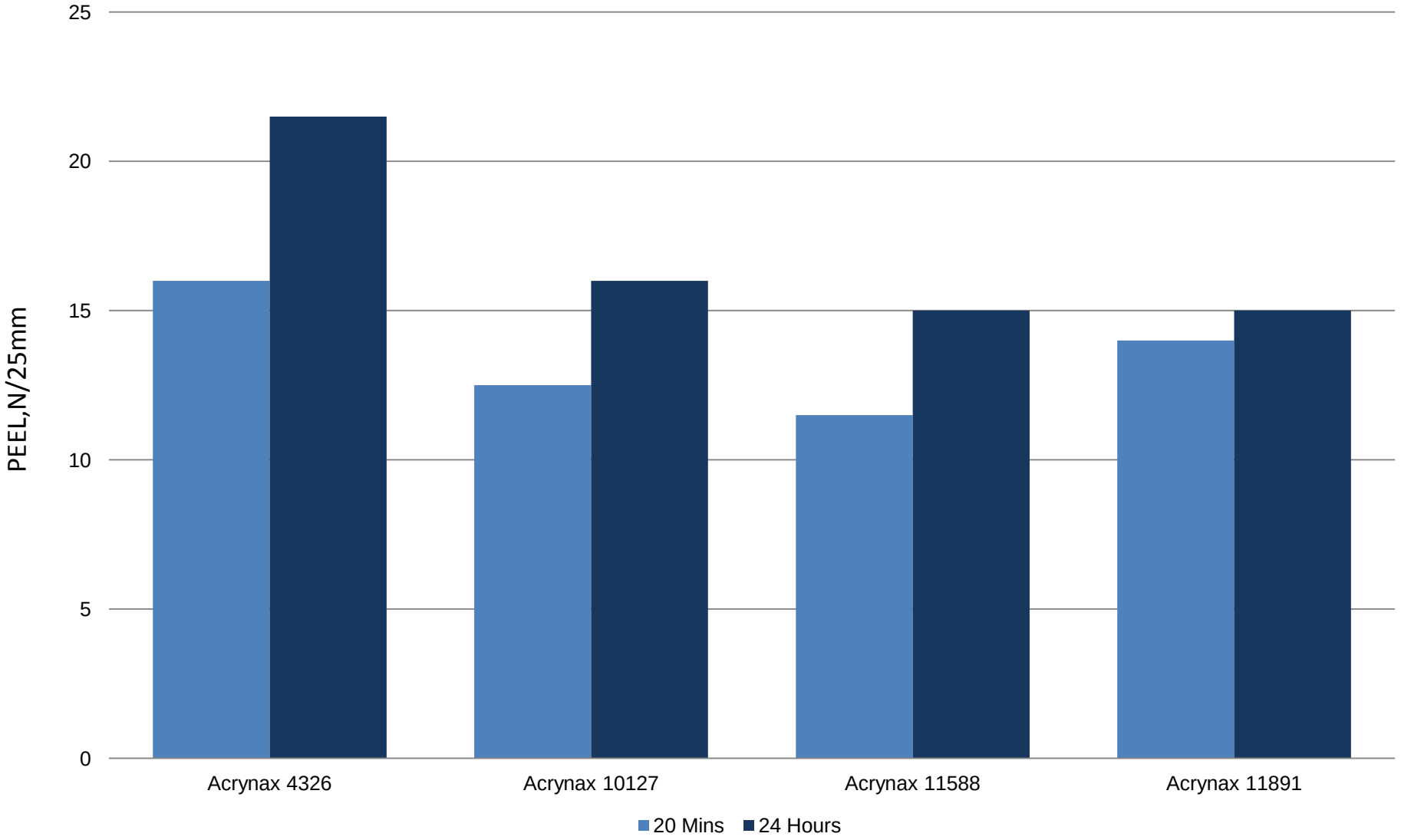


VISCOSITY VS. TEMPERATURE CURVE



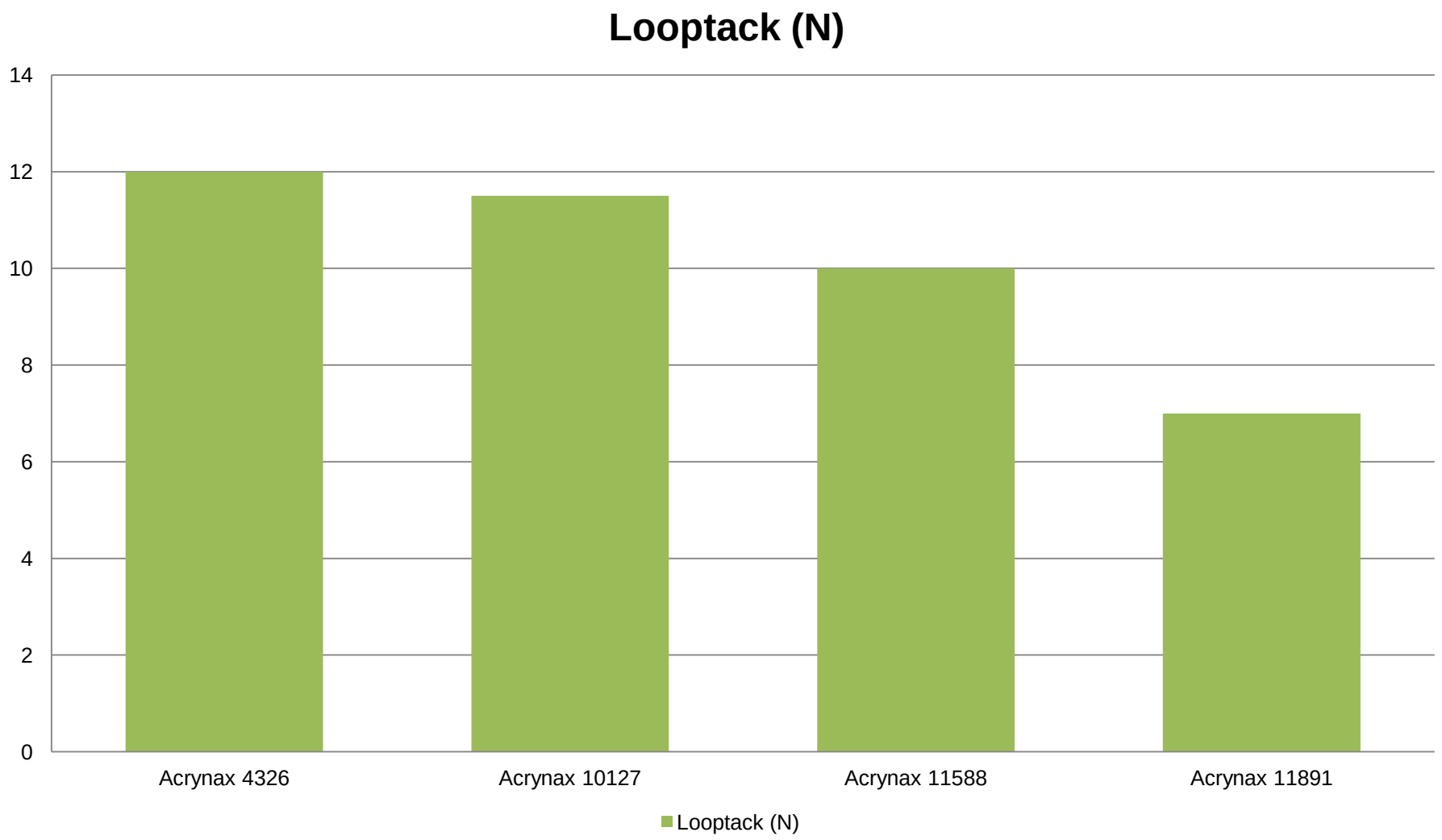
ACRYNAX COMPARISON

180 Peel Adhesion



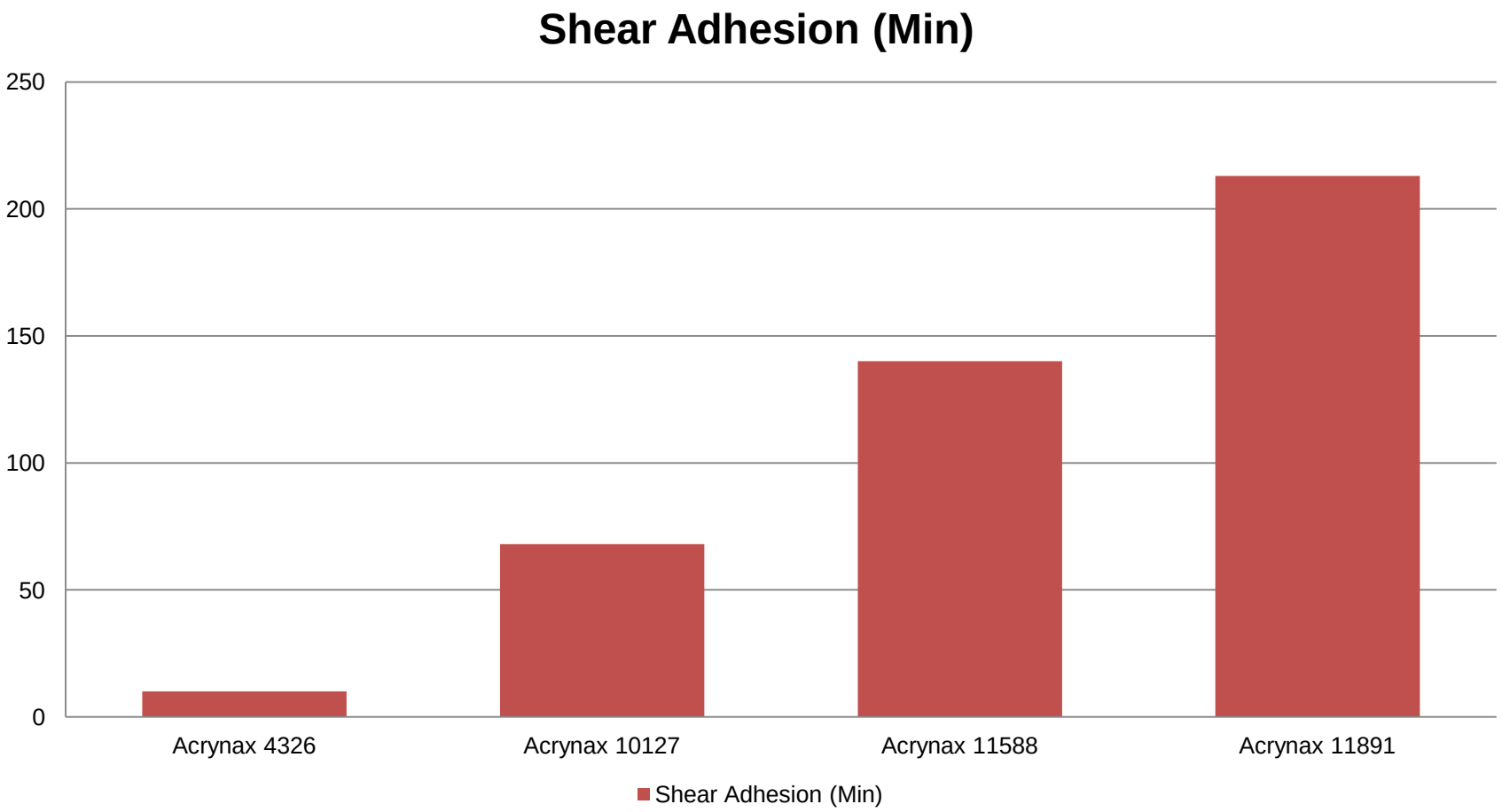
ACRYNAX COMPARISON

Looptack



ACRYNAX COMPARISON

Cohesion Strength



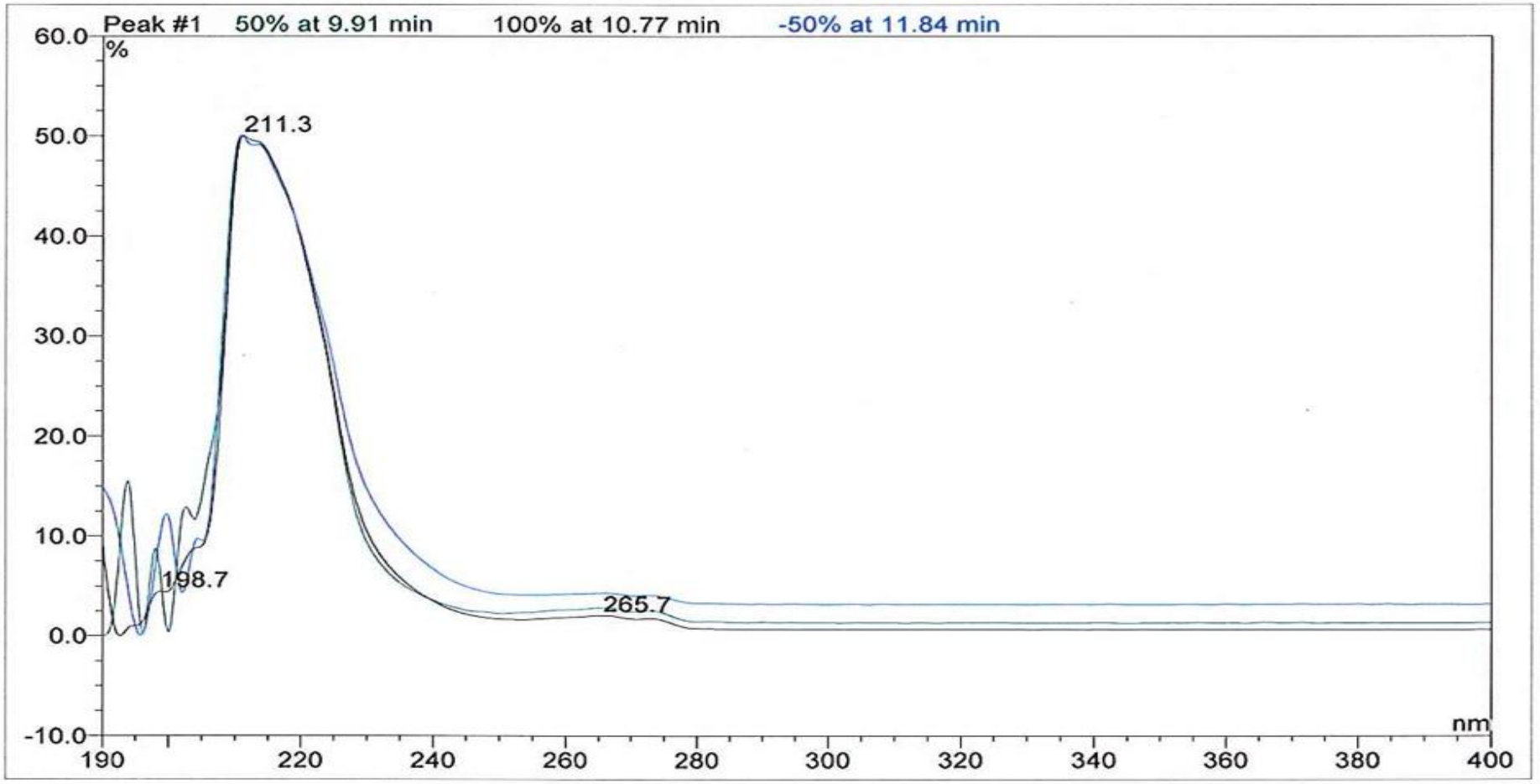
Acrynax Adhesive Properties

- Advantage of Acrylic chemistry
- Optically clear
- Highly resistant to UV degradation
- Adhesion to a wide range of materials and can be used for diverse applications
- Skin friendly
- Plasticizer resistant
- Water resistance typical of hot melt adhesives

Unique Acrynax Characteristics

- **Ready to run**: defined molecular

UV Absorbance Spectrum



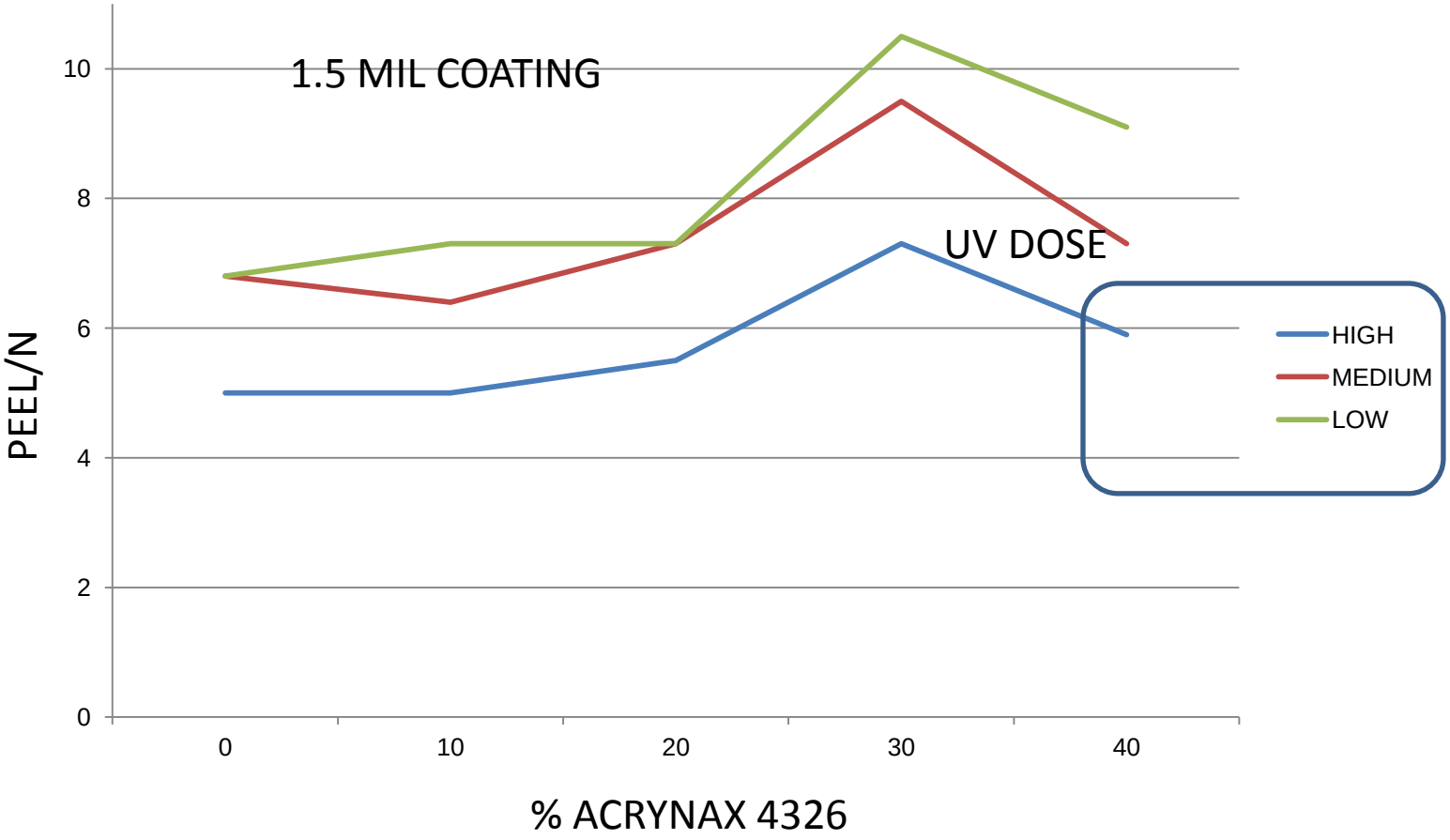
Unique Formulating Opportunity

- Can be blended with most of the commercially available UV-cured Hot Melt Acrylics with minimum gelling and minimum inhibition to cure.
- Will modify the molecular weight distribution of cured UV Acrylics and its resulting adhesive properties.
- Will modify the response to the use of additional ingredients such as Tackifiers and Plasticisers.
- Will modify the Tg and low temperature

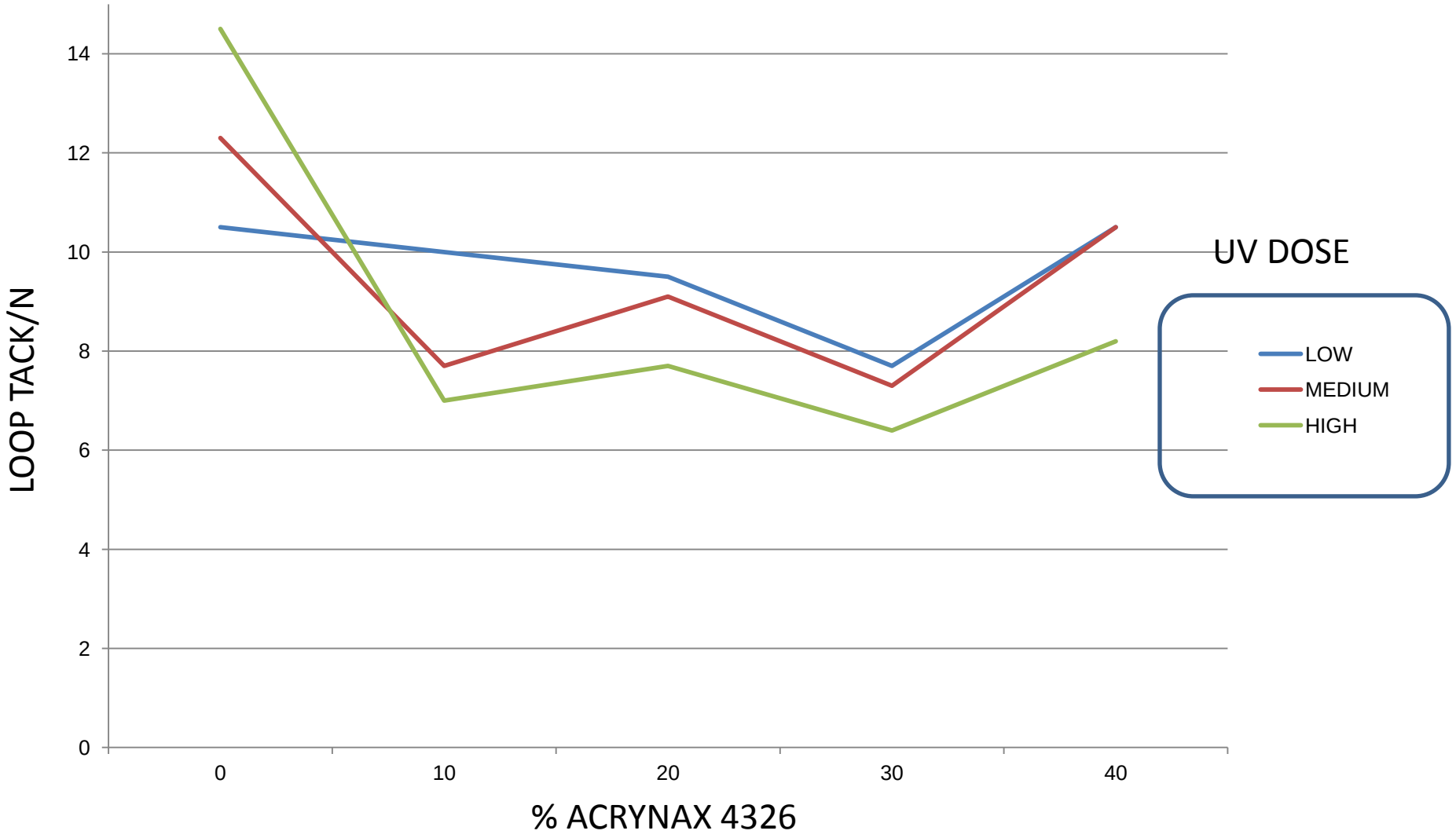
Acrynax Experimental Blends

- 2 commercially available UV acrylics were blended with increasing levels of Acrynax 4326.
- A coat weight of 1.5 mil (28g/sm) were coated onto 1 mil (25 micron)Polyester film and irradiated with increasing levels of UVC.
- Standard PSA tests were performed.

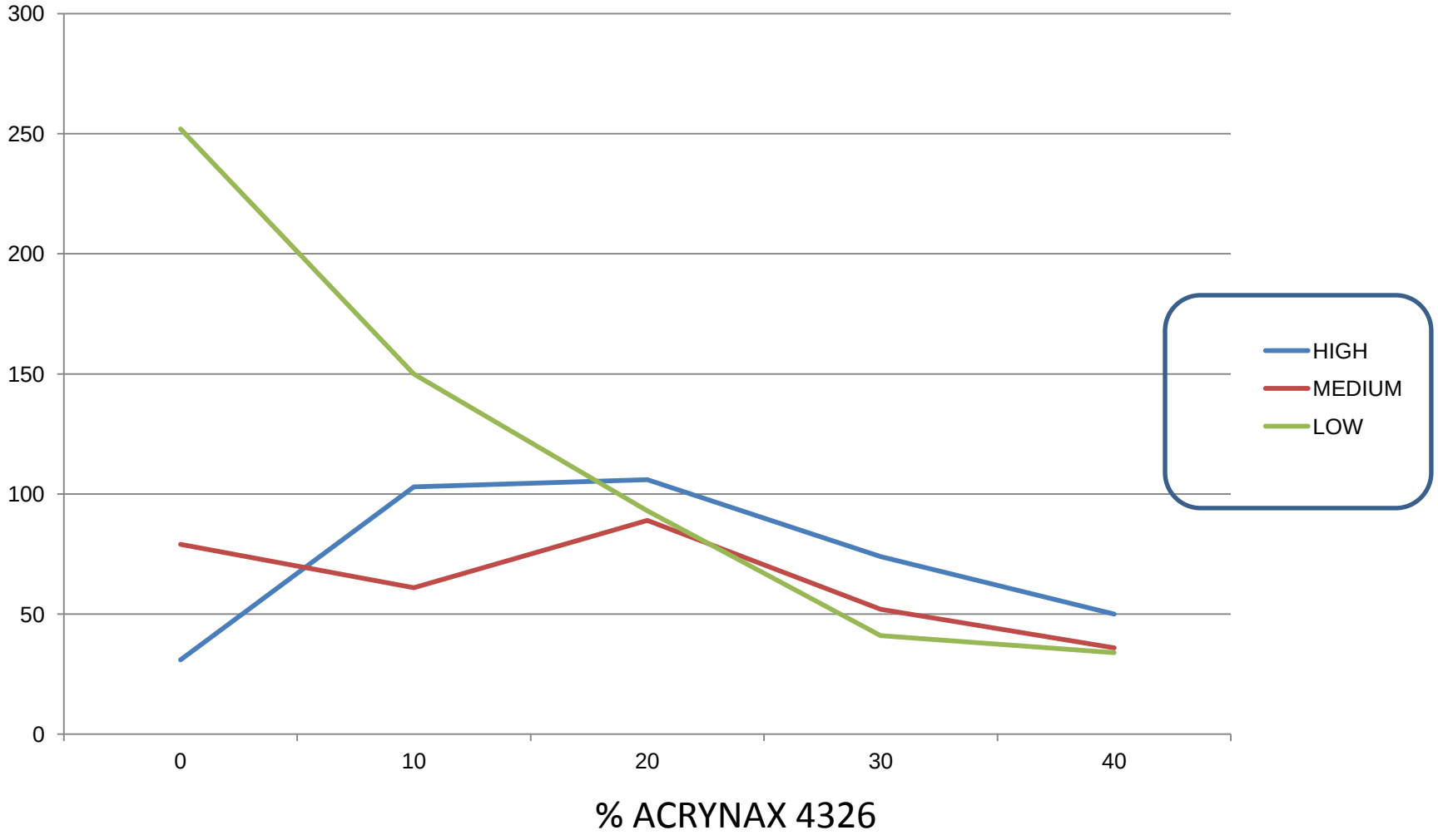
180 PEEL ADHESION
UV-ACRYLIC 1: ACRYNAX 4326 BLEND



LOOP TACK
UV ACRYLIC 1: ACRYNAX 4326 BLEND



SHEAR ADHESION
UV-ACRYLIC 1: ACRYNAX 4326 BLEND



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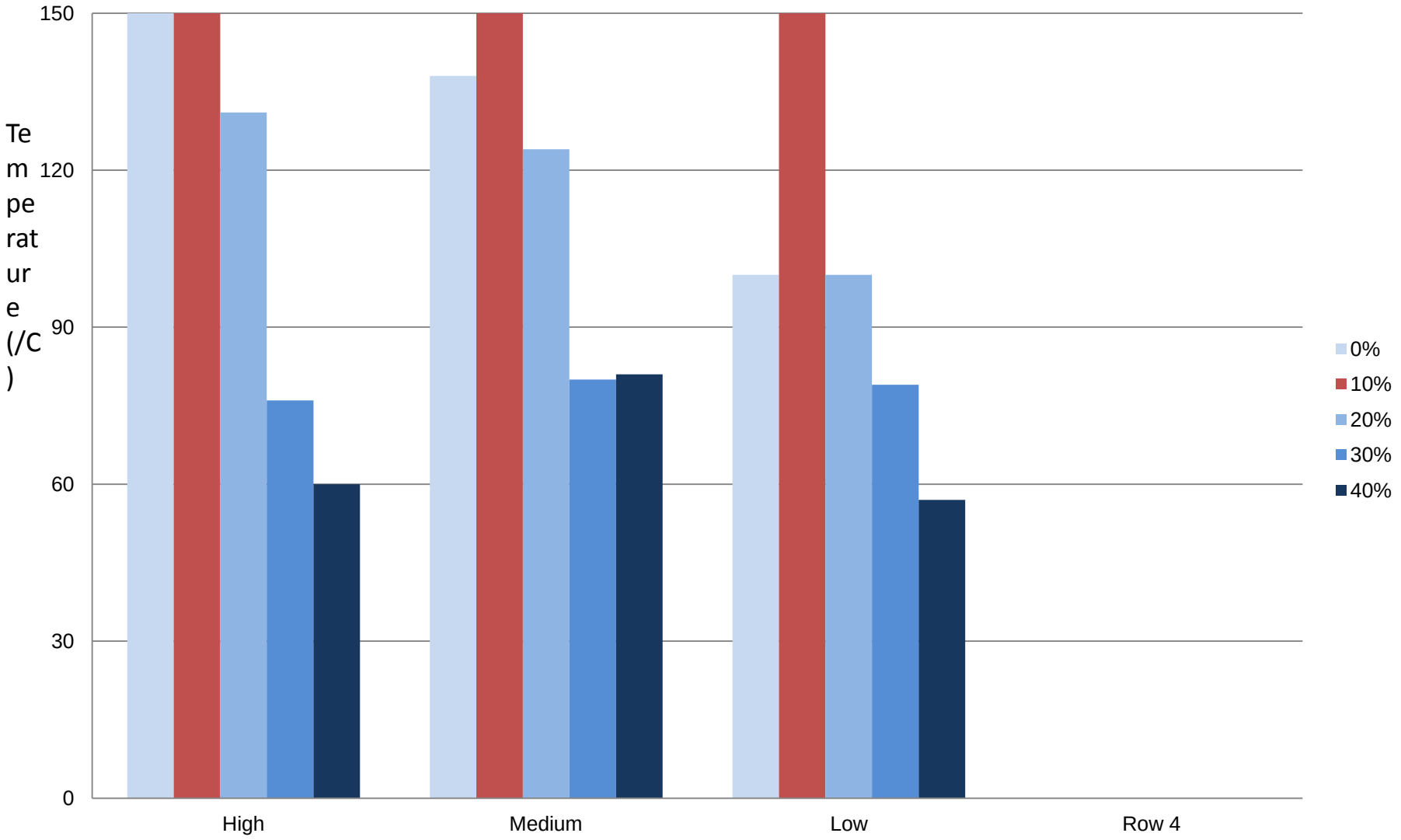
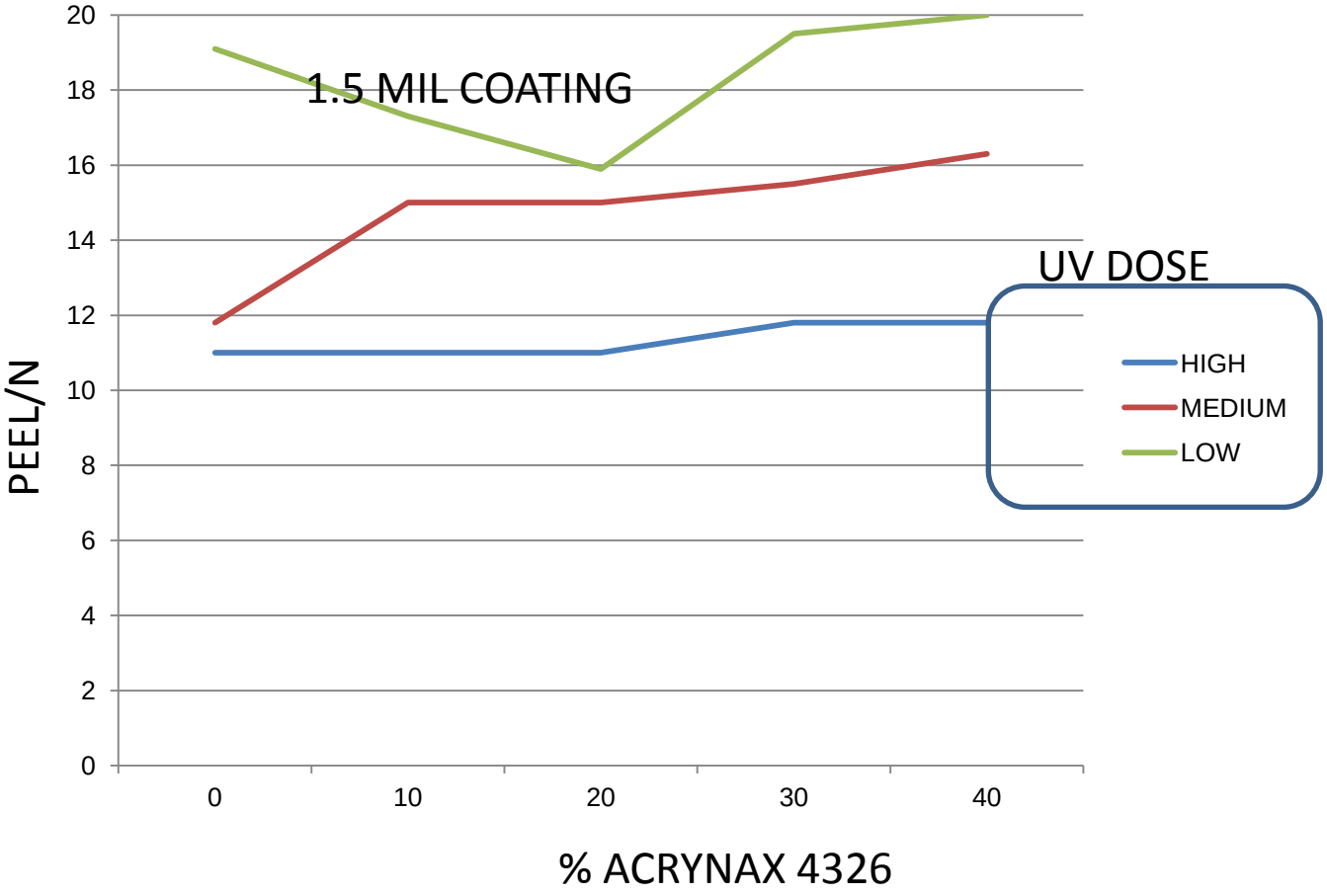
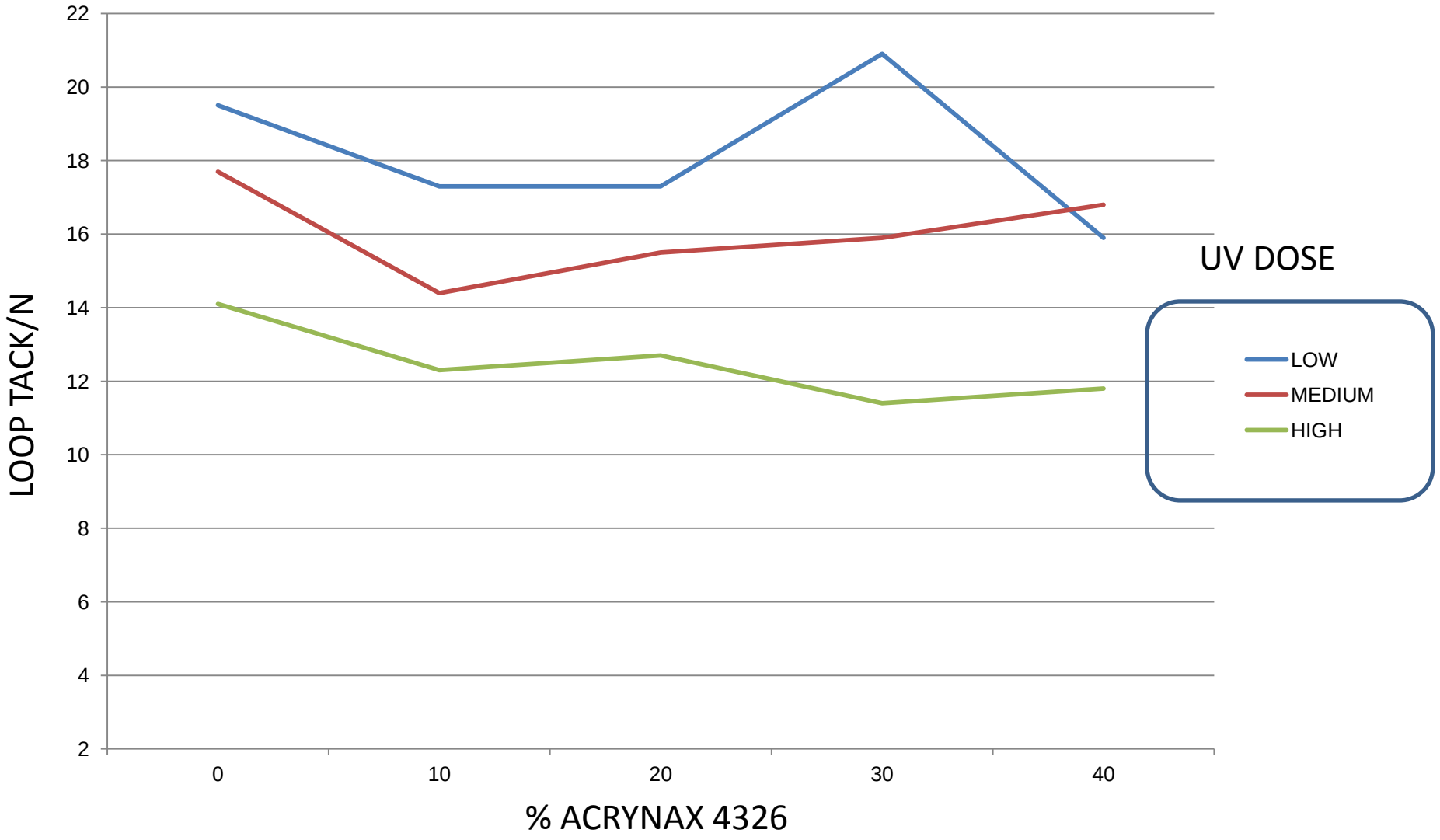
UV ACRYLIC 1: ACRYNAX 4326 BLEND



180 PEEL ADHESION
UV-ACRYLIC 2: ACRYNAX 4326



LOOP TACK
UV-ACRYLIC 2:ACRYNAX 4326 BLEND



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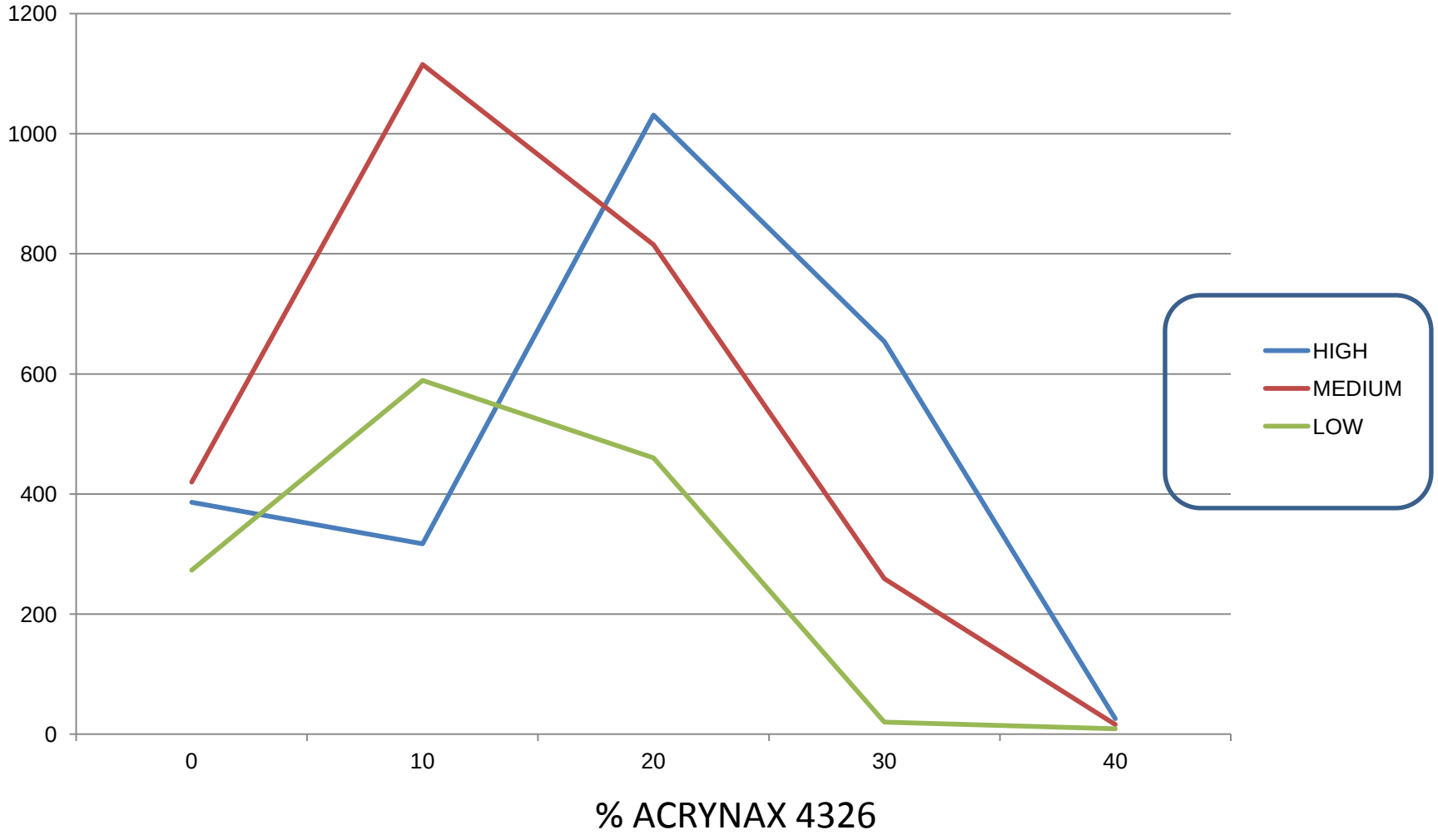

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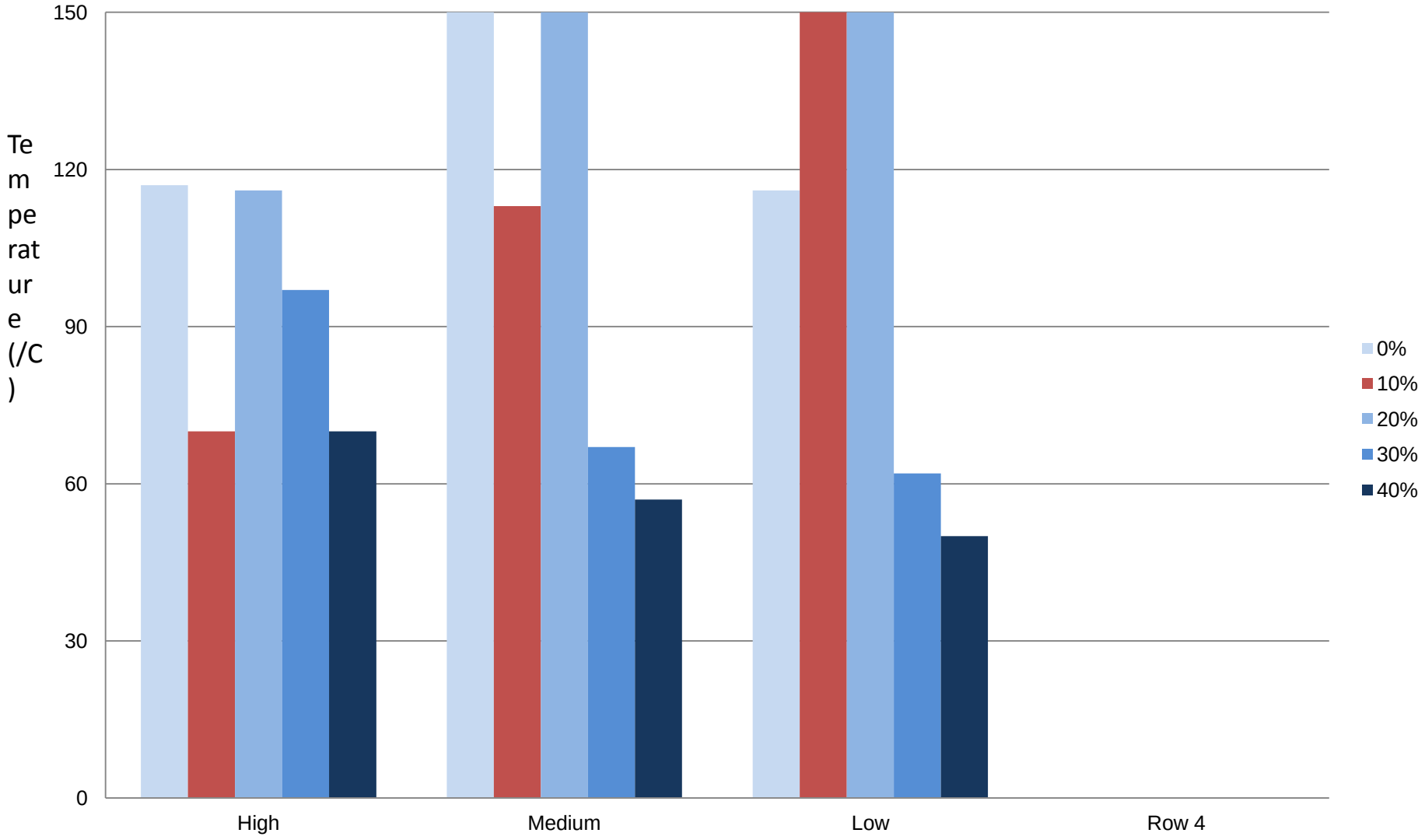

Conclusion

- Acrynax predates most other commercially available Hot Melt Acrylic polymers
- It has a balance of PSA properties which makes them interesting for a range of diverse applications
- They can be run on almost any standard hot melt equipment with virtually no contamination issues
- They can be used to modify and introduce additional formulation possibilities within the new generation of UV cured Acrylic PSAs