



The Application Versatility of HyPUR-cel[®] Polyurethane Foam Technology

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Versatility

HyPUR-cel® Polyurethane Foam Technology

- Manufacturing Process
- Range of Foam Products
- Range of Applications and Uses
- Raw Material Supply Chain



Brand Recognition



*Flexible Polyurethane Foam
Technology*

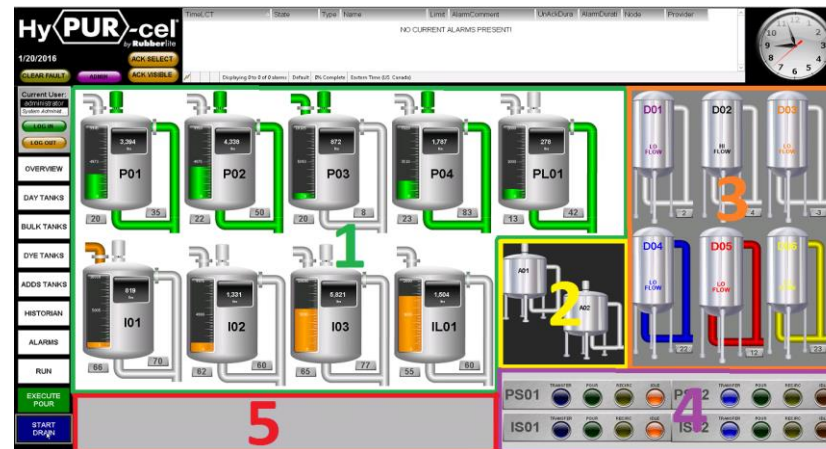
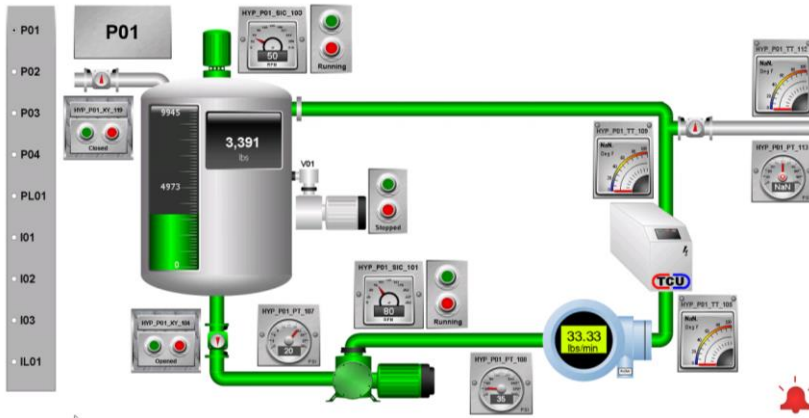


Process Versatility

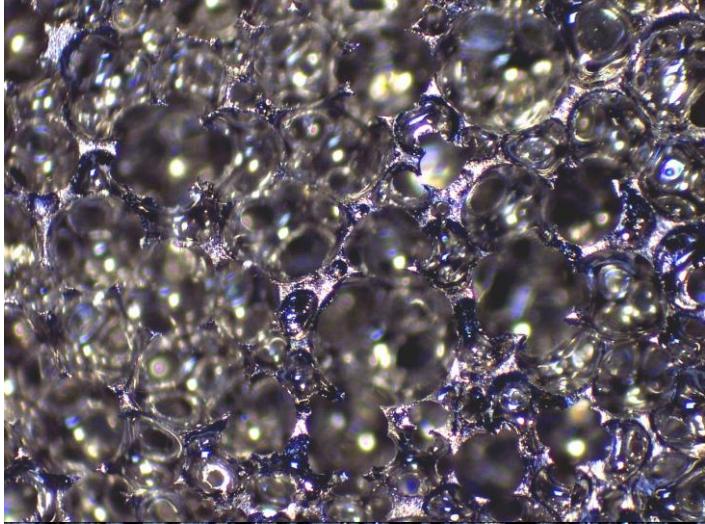
Integrated Design, Development, and Manufacturing

- HyPUR-cel® includes polyester, polyether, and hybrid compositions
- Currently 250+ products manufactured

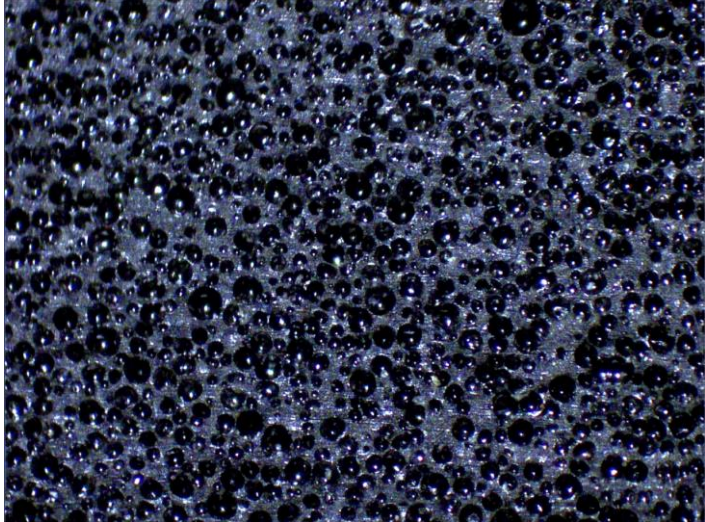
Capable
Nimble
Flexible



Versatility of Products and Applications



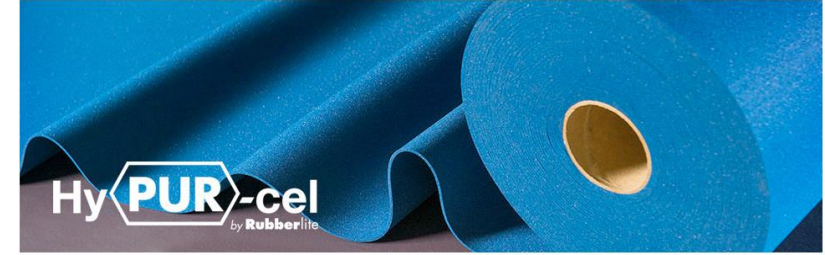
4 lbs./Ft³
79 ppi



30 lbs./ft³
325 ppi



HyPUR-cel[®] Family of Foams



Dimensional Stability

Energy Return

R-Series

I-Series

Highly Thermoformable

T-Series

Elastic Stretch

Flame
Lamination
Capable

S-Series

Dimensional Stability

Energy Dissipation

Comfort and Pressure Management

I-Series-L

V-Series
V-Series-HD*

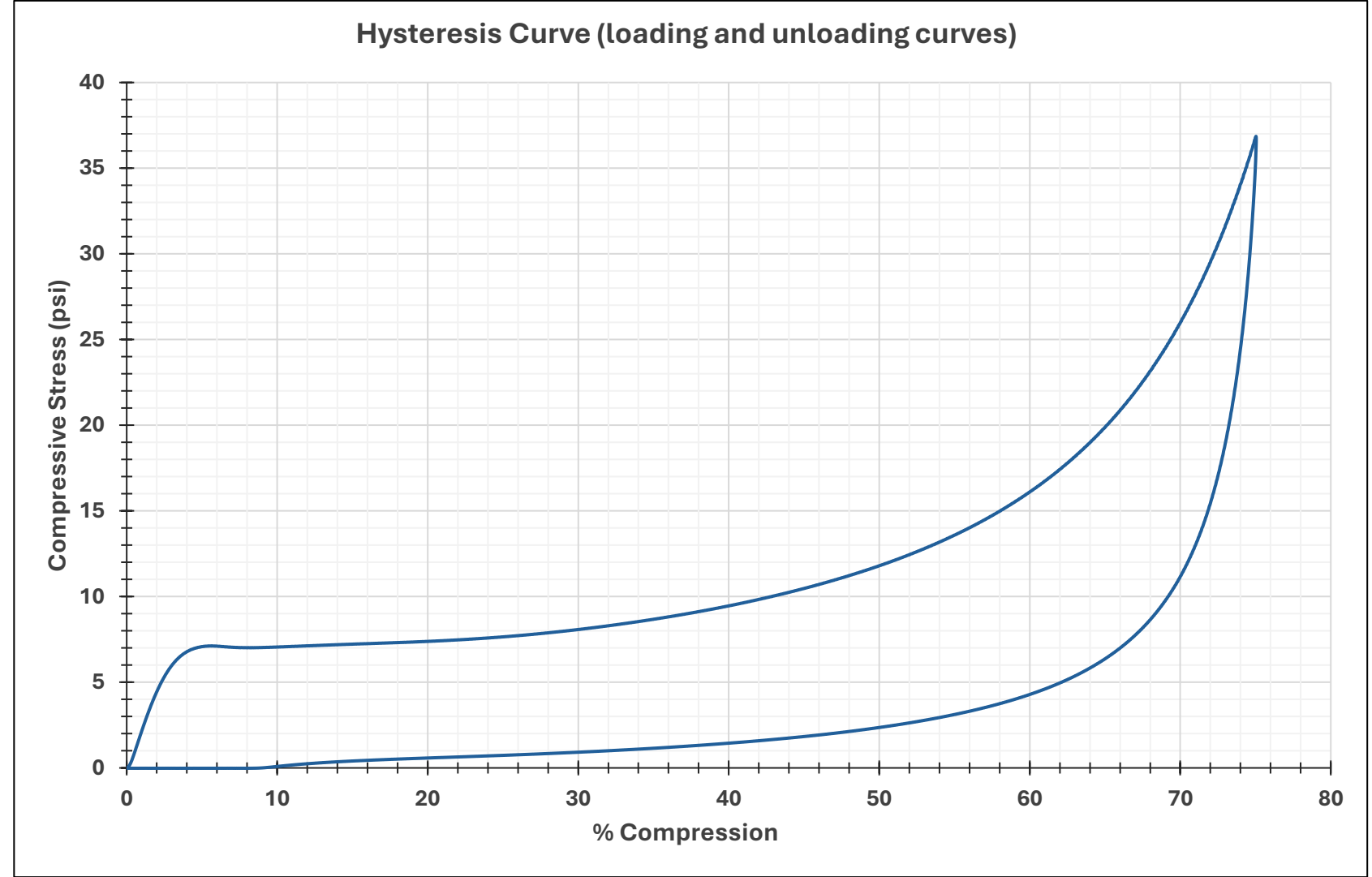
Designing to Properties and Hysteresis Response

Hysteresis Curves and Hysteresis Loss

- A compression (loading) and decompression (unloading) curve.
- Visualizes and Quantifies the elastic and viscoelastic response.
- Hysteresis loss is the measure of energy lost or dissipated during compression and recovery.
- This is quantified as the difference between the loading energy and unloading energy or the area under the loading and unloading curves, expressed as a percentage of the loading energy

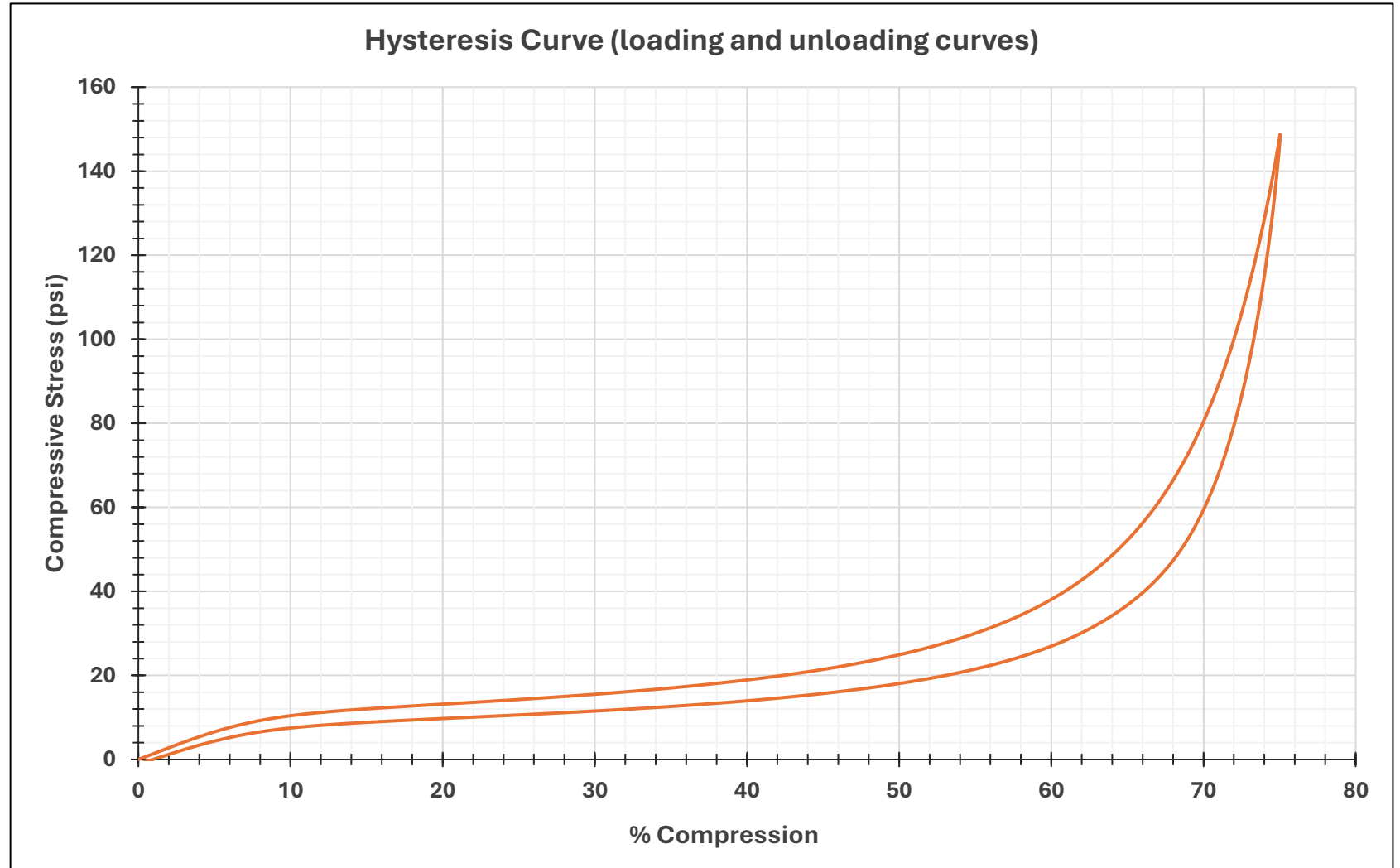
High Hysteresis Loss

- Large area between loading and unloading curves
- Generally associated with lower resilience and energy absorption
- Example = 73.7%



Low Hysteresis Loss

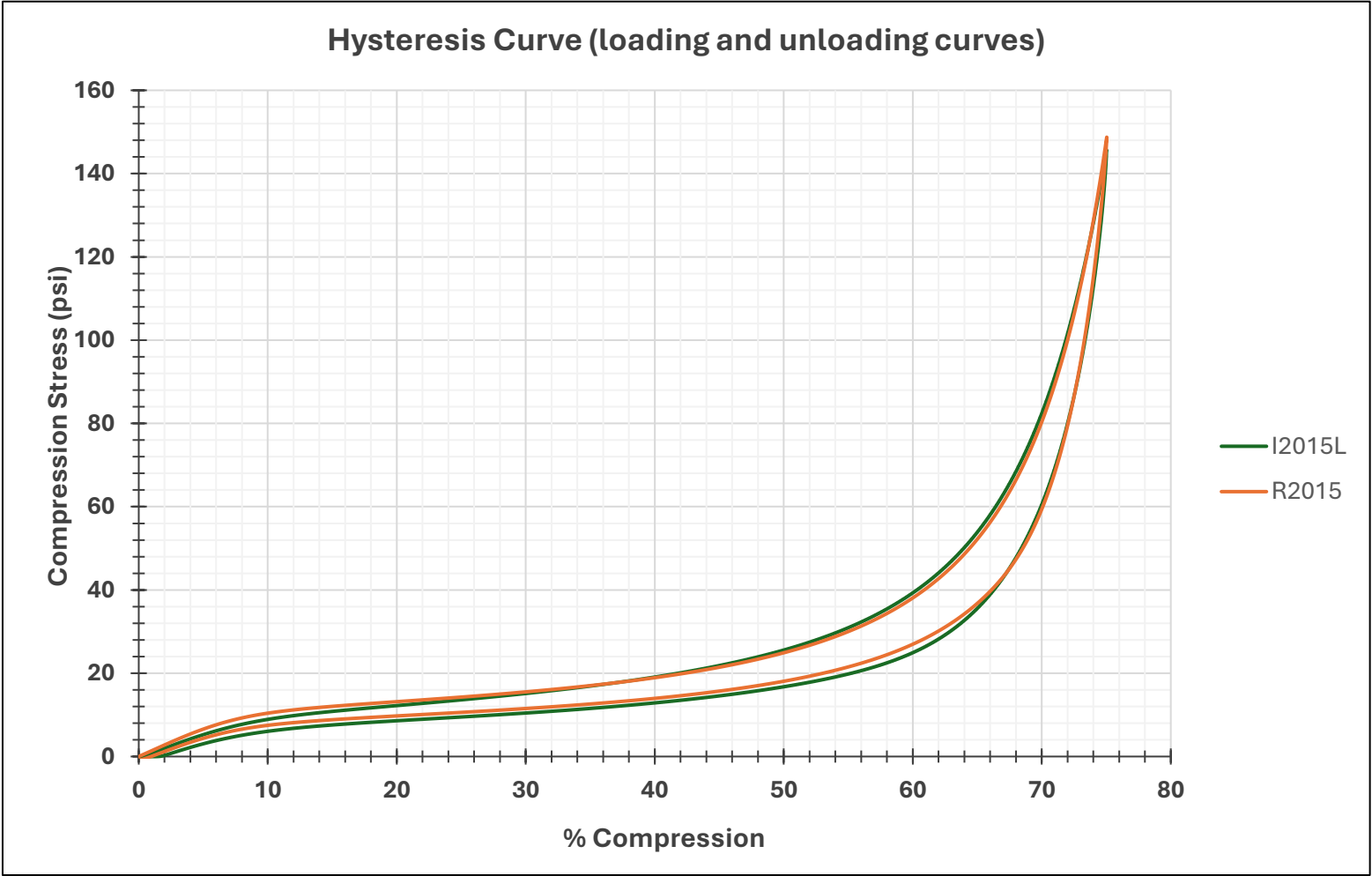
- Smaller area between loading and unloading curves
- Generally associated with higher resilience and energy return
- Example = 28%



HyPUR-cel® I-Series-L

- Low Resiliency
- Low Hysteresis Loss

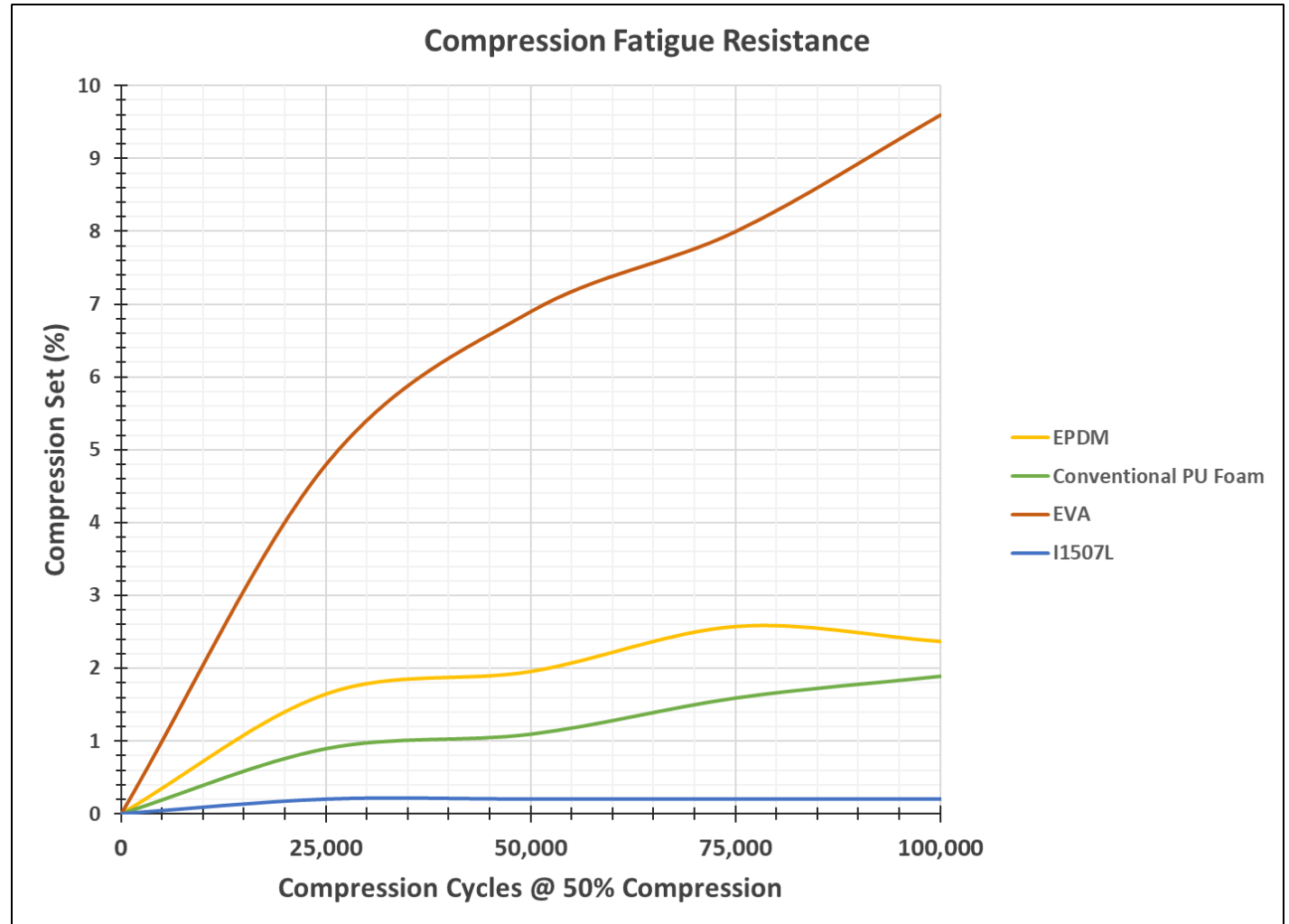
Property	HyPUR-cel® R2015	HyPUR-cel® I2015L
Resiliency	50%	13%
Hysteresis Loss	24.8%	28.9%



HyPUR-cel® I-Series-L Compression Fatigue

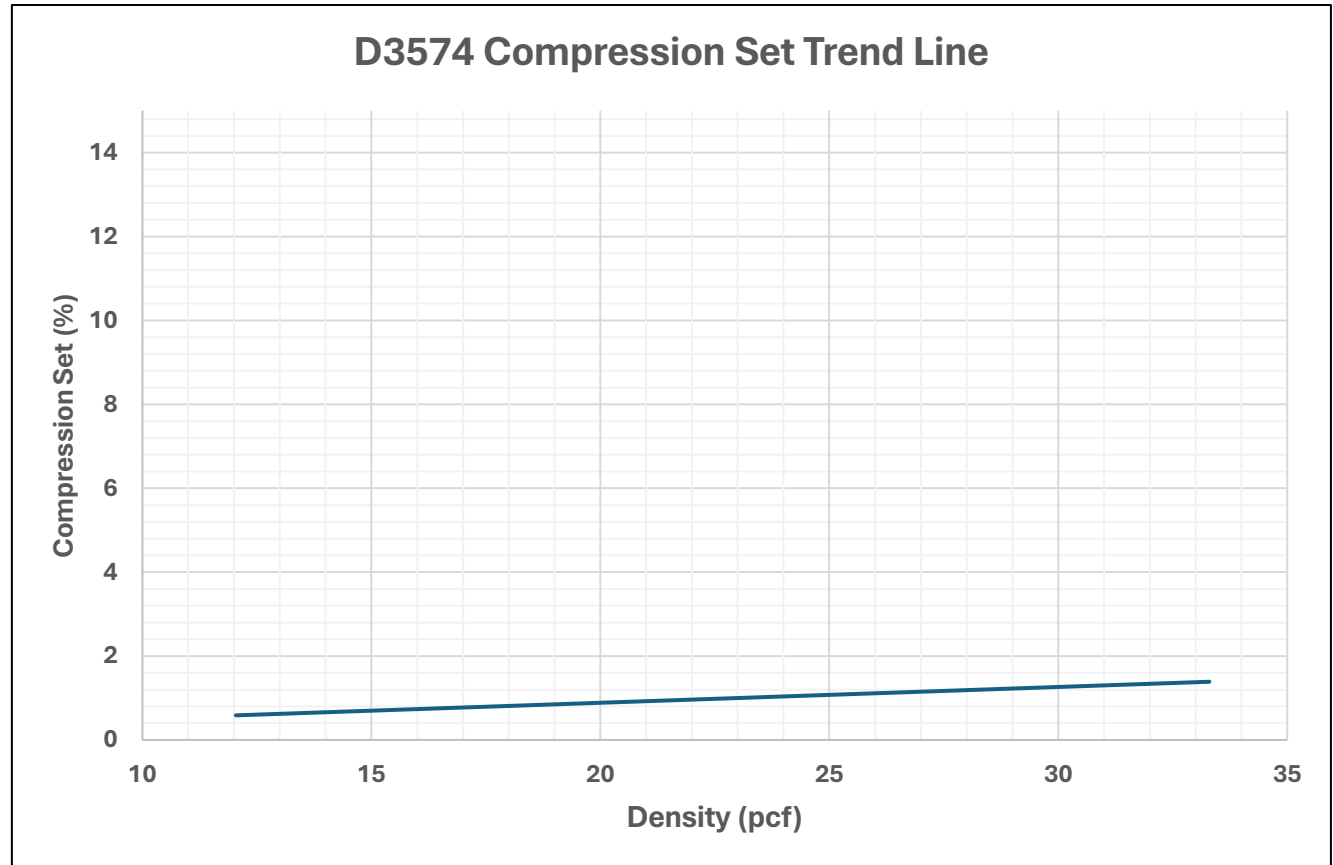
- **I-Series-L** products exhibit outstanding compression fatigue resistance.
- Outperforms even the original I-Series products.

Product	Compression Set (%)
HyPUR-cel® I1507L	0.2%
EPDM (15 pcf)	2.37
EVA (4 pcf)	9.6
Conventional PU Foam (15 pcf)	1.89



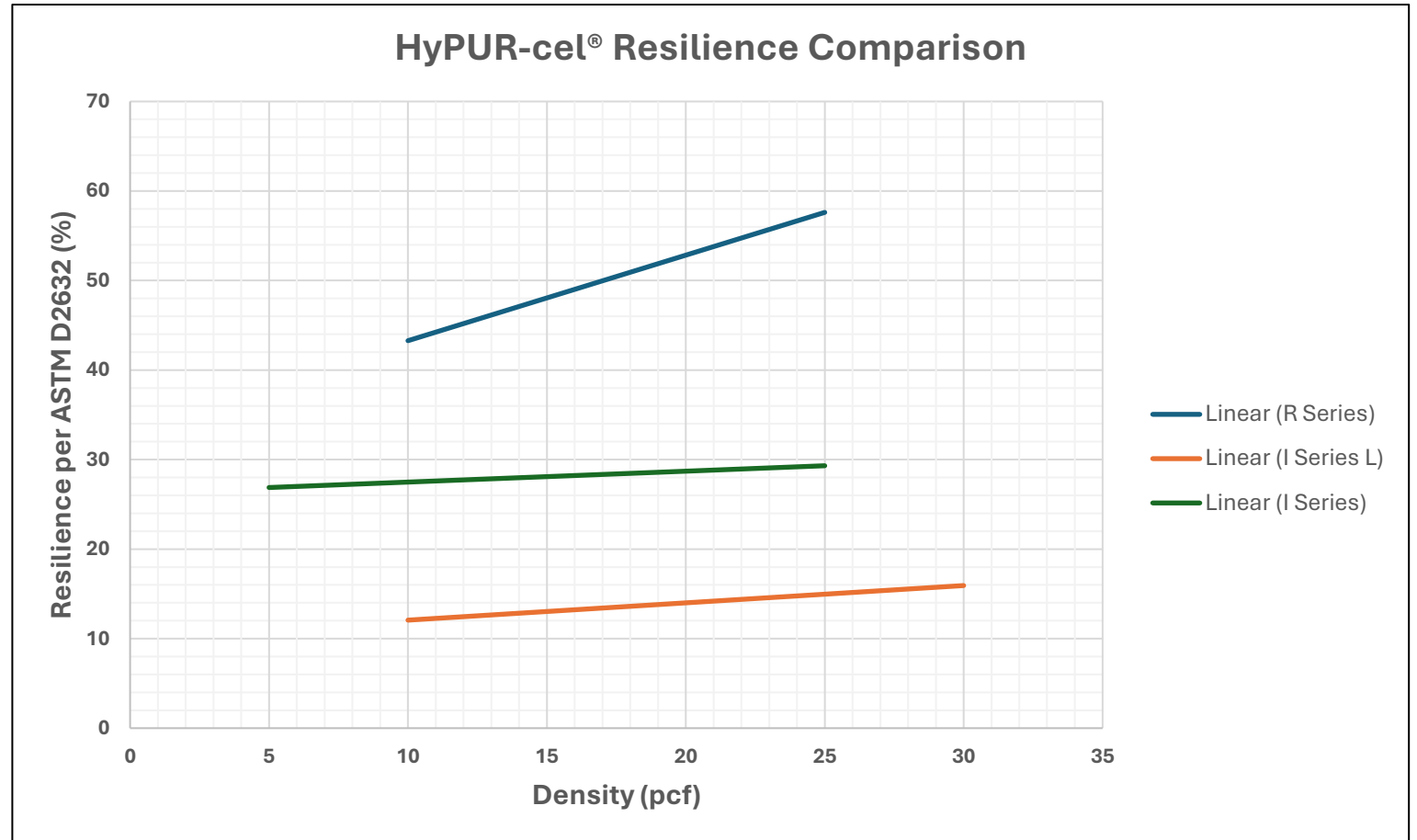
HyPUR-cel® I-Series-L Compression Set

- **I-Series-L** has superb compression set resistance across the entire density range of the series.

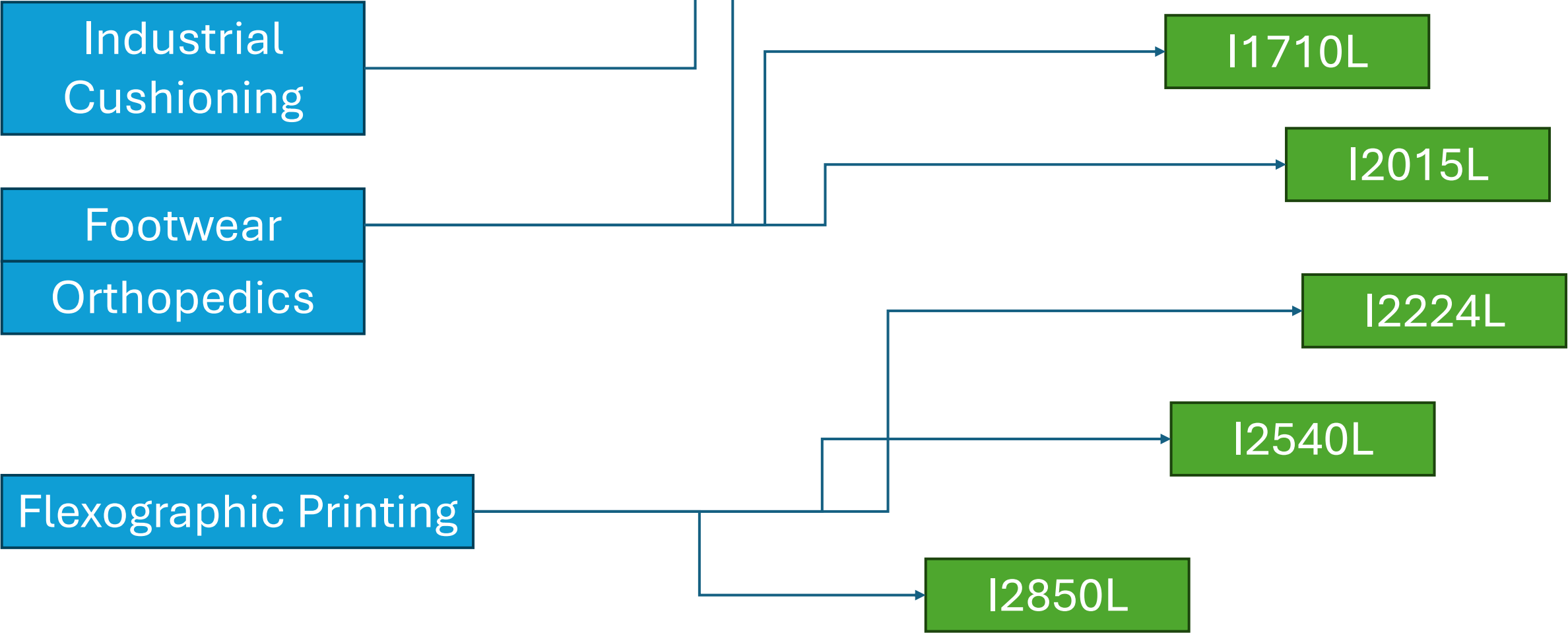


HyPUR-cel® I-Series-L Resilience

- The low resilience of ***I-Series-L*** makes it a preferred material for applications requiring vibration damping and enhanced comfort.



Applications



HyPUR-cel® I-Series-L Example Grades

Material	Density ASTM D3574 (pcf) Nominal	CD 25% ASTM D1056 (psi) Target	Compression Set ASTM D1056 (%) Typical	Compression Set ASTM D3574 (%) Typical	Tensile Strength ASTM D3574 (psi) Typical	Elongation ASTM D3574 (%) Typical	Tear Strength ASTM D624 (lb/in) Typical	Resilience ASTM D2632 (%) Typical
I1507L	15	7	0.3	0.85	90	130	12	13
I1710L	17	12	0.3	0.75	130	125	16.5	13
I2015L	20	15	0.1	0.85	155	160	17.5	13
I2224L	22	24	0.5	1	160	140	19	13
I2540L	25	40	0.5	1	225	125	25	15
I2850L	28	50	0.5	1	250	140	30	15