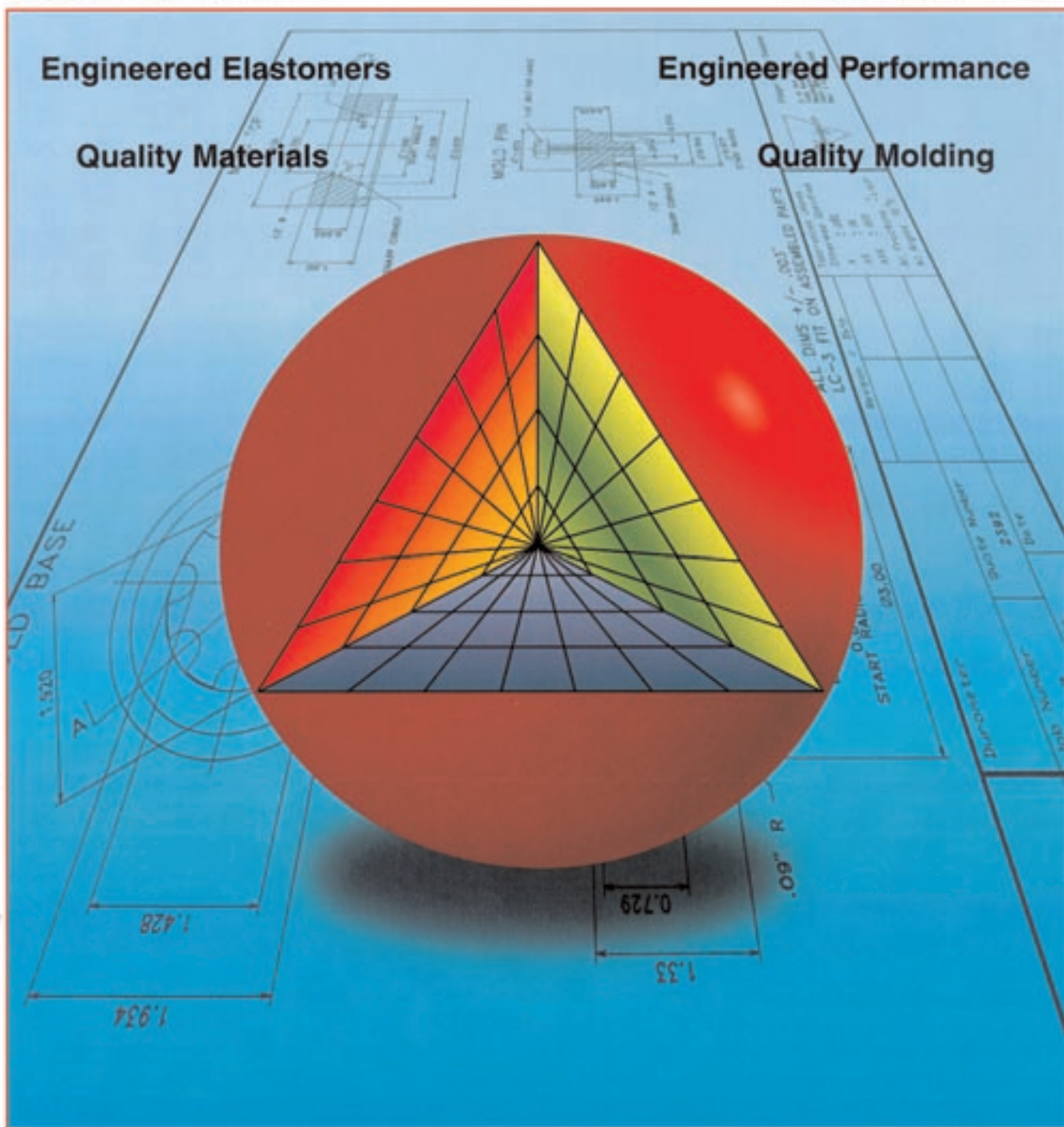


PLEIGER PLASTICS

Tough Polyurethanes

Tough Applications



PLEIGER



PLEIGER PLASTICS COMPANY - Founded in Performance

Founded in 1986, Pleiger Plastics Company was one of the first molders in the United States to process Vulkollan®, Europe's highest performance polyurethane. With a total of five locations in Europe and the United States, the group of Pleiger companies offer the highest performing polyurethane systems for molded engineering parts. Pleiger Plastics' business philosophy is to provide high performance, high quality polyurethanes worldwide.

Realizing that every application has unique performance requirements, Pleiger's selection of high performance polyurethanes began to evolve. Pleiger Plastics Company now selects from MDI, TDI, NDI, and PPDI hard segments and polyether, polyester, and polycaprilactone soft segments to design a polyurethane system for the most demanding applications. This vast array of materials allows Pleiger Plastics to offer value added engineered solutions which optimize performance and cost requirements.

Pleiger Plastics strives to build long term business relationships with its customers by offering engineering services, prototyping, cost competitiveness, high quality and timely deliveries. These deep rooted business principles allow us to provide our customers with **The Pleiger Solution**

The Pleiger Solution

By offering full service molding, Pleiger Plastics gives its business partners cost effective solutions to difficult problems. Starting with short turn-around quotations, The Pleiger Solution lets our customers build the framework for a successful molding project. Pleiger offers its customers engineering services to design or re-design molded parts to optimize performance and moldability. Once designs are finalized, low cost prototypes are made for field testing and ultimate material selection.



A full testing lab is used to insure that products which are manufactured by Pleiger meet our published specifications. These lab services can also be used to identify existing products and to determine an appropriate substitute. All of these services are combined to optimize design and performance, which leads to longer lasting products that can be effectively molded and delivered anywhere in the world.



Plei-Tech®- Designed to Perform

All of Pleiger Plastics' polyurethanes are marketed under the registered name of **Plei-Tech®**. The Plei-Tech® name has become known worldwide for high quality and high performance.

The proper selection of a polyurethane depends on a wide variety of considerations. These include temperature and environmental concerns, chemical resistance, cut and tear resistance, hardness, abrasion resistance, dynamic performance and cost. In most cases, molded parts require two or more of these properties in conjunction, and a Plei-Tech® compound can be selected with these needs in mind.

Frequently, there is more than one Plei-Tech® compound which appears to meet the needs of a particular application. In these cases, prototype parts of each compound are made and field tested for the customer to decide on the most cost effective polyurethane compound. This process avoids over engineering of polyurethane parts.

This chart is used as a broad generalization to identify which product is best for an application. Sometimes certain combinations of compounds will act differently than shown on the chart.

	MDI	TDI	NDI	PPDI	ESTER	ETHER	CAPROLACTONE
Abrasion Resistance	2	1	4	3	3	1	2
Cut & Tear Resistance	2	1	4	3	3	1	2
Dynamic Performance	2	1	4	3	3	1	2
Service Temperature	1	2	3	4	1	3	2
Water Resistance	2	1	3	4	1	3	2
Chemical Resistance	2	1	4	3	3	1	2
Cost	1	2	3	4	1	3	2
Durometer Range	3	4	2	1	3	1	2
Lead Time	2	1	3	4	3	1	2

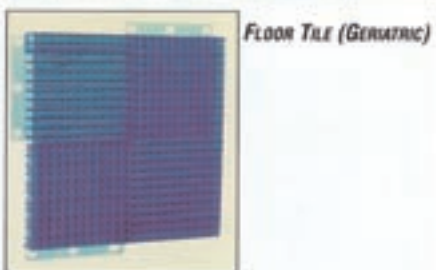
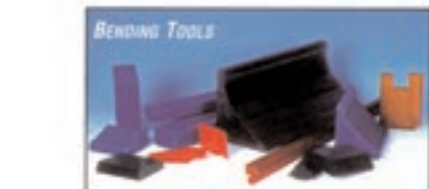
1-low 4-high 1-low 3-high

For Example:

MDI/ESTER is a good choice for a low cost, abrasion and chemical resistant material. PPDI/ETHER is a high cost material that is excellent in wet dynamic conditions.

Pleiger Design - Plei-Tech® Performance

- The Perfect Design
- The Proper Compound
- High Quality Production
- Outstanding Performance



Properties and Applications - The Pleiger Solution

CUT AND ABRASION RESISTANCE

Cut and abrasion resistance are two areas where polyurethanes shine. Even a commodity grade polyurethane will last longer than rubber in most applications. Depending on the Plei-Tech® compound selected, it is not uncommon that service lives are five to ten times longer than steel or rubber.

When cut and abrasion resistance is combined with dynamic performance, an excellent scraper compound results. This type of compound is typically used for snow plow edges, high speed conveyor scrapers and construction equipment.



DYNAMIC PERFORMANCE

Dynamic Performance is a material's ability to resist heat buildup and maintain modulus during continual compression cycles. This is commonly referred to as Hysteresis Performance.



Dynamic Performance is one characteristic of polyurethanes which sets average grade materials apart from high performance compounds.

Hysteresis is the most important criteria which should be considered for high cycle applications such as wheels, couplings and bumpers. However, good abrasion resistance and bondability will work in conjunction to give long part life.



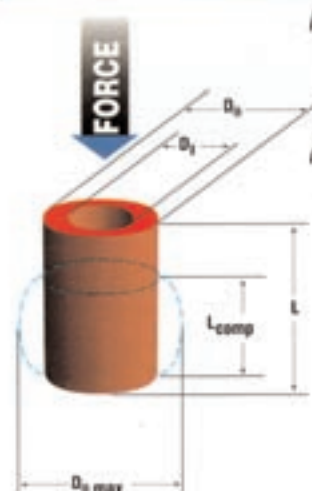
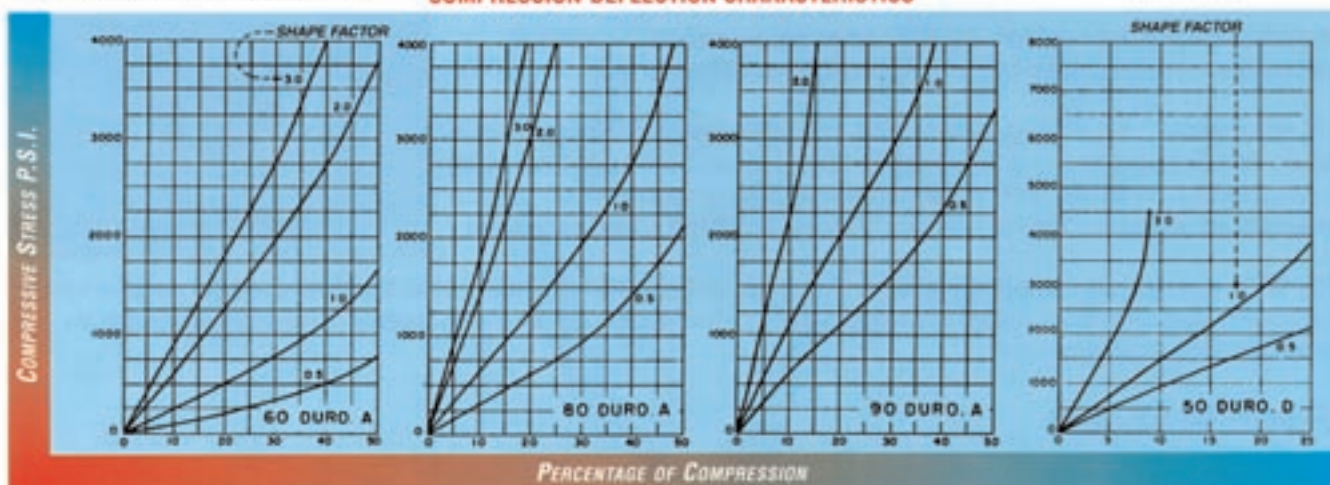
SHOCK ABSORPTION AND VIBRATION DAMPENING

Plei-Tech® polyurethanes are frequently used in demanding applications where shock absorption, vibration dampening and noise reduction are required. Common polyurethanes which do not exhibit excellent dynamic performance, low compression set, and high cut and tear resistance will quickly fail in these applications.

Shock absorbing applications are common and highly varied, which include prosthetic body parts, coal car draft gears and pump check balls.



COMPRESSION-DEFLECTION CHARACTERISTICS



Plei-Tech® polyurethanes, based upon NDI, PPDl, and TDI are typically used in shock absorbing applications. Depending upon the application requirements, these compounds are varied in configuration, durometer and chemical make up to offer the best performance.

$$\text{Area in Compression} = \frac{\pi}{4} (D_0^2 - D_1^2)$$

$$\text{Area Free to Bulge} = \pi L (D_0 + D_1)$$

$$\text{Shape Factor} = \frac{(D_0^2 - D_1^2)}{4 L (D_0 + D_1)}$$

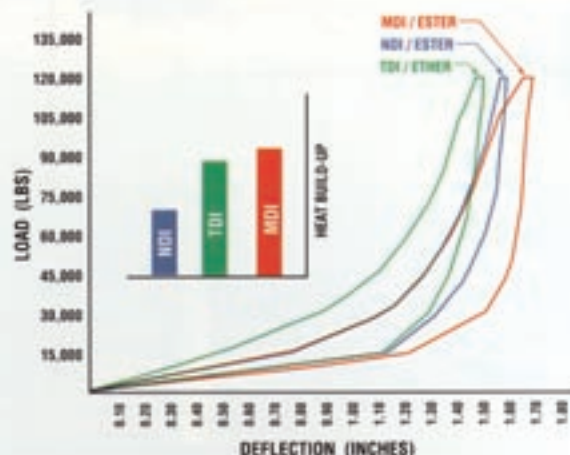
$$\text{Stress} = \frac{4 (\text{Force})}{\pi (D_0^2 - D_1^2)}$$

$$D_{0 \text{ max}} = 1.4 D_0$$

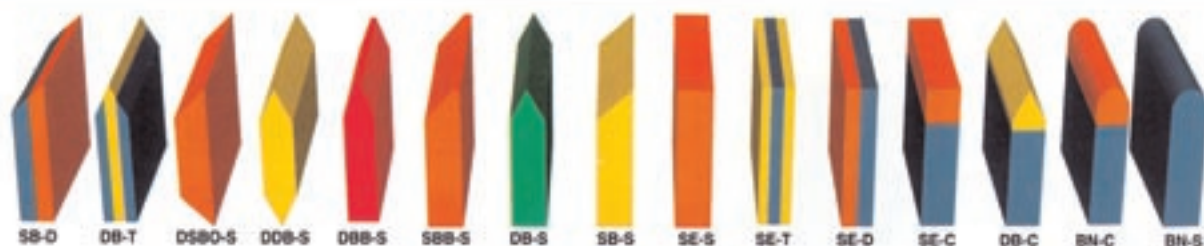
$$\% \text{ comp} = \left(\frac{L - L_{\text{comp}}}{L} \right) \times 100$$

Shape factor and durometer are the two criteria which most effect spring rates of elastomers. By varying durometer and shape factor, a wide range of spring curves can be achieved. Shape factor is defined as area in compression divided by area free to bulge.

As a general rule, compression elements should not be compressed more than 25% of the original height. As the frequency of compression increases, the percentage of compression should decrease in order to maximize part life.



A Leader in Squeegee Technology for the Screen Printing Industry:



Plei-Tech® Polyurethane Squeegees

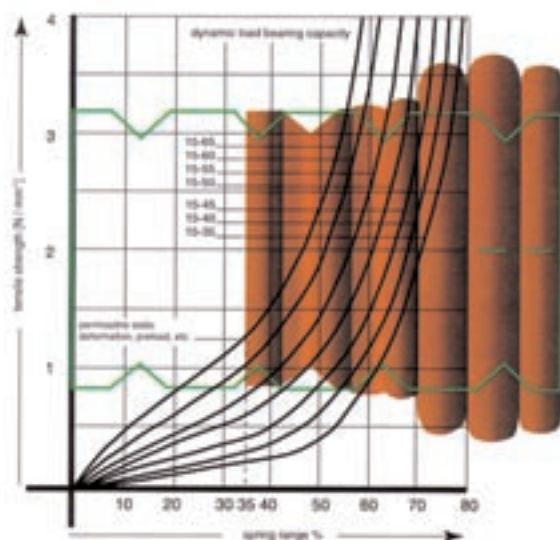
A critical aspect of screen printing is how well the squeegee can resist swelling when exposed to inks and harsh solvents. Plei-Tech® squeegees are available in a variety of polyurethane compounds formulated to perform in these environments.

UV, epoxy, enamel, vinyl, and other solvent based inks are extremely harsh on squeegee blades. Inferior squeegees tend to swell and wear at an accelerated rate due to their inability to resist harsh solvents. Plei-Tech® squeegees are recommended because of their chemical resistance and exceptional abrasion resistance when exposed to high solvent content inks.

Plei-Tech® squeegees are available in a multitude of squeegee profiles designed to meet the exacting demands of your screen printing application. These profiles are molded in a variety of Plei-Tech® compounds, and the correct selection of Plei-Tech® will result in the most cost effective performance.



Foam Products



Pur-Cell is a cellular foam that is excellent for shock absorption of light to medium loads at high frequencies. A cellular Vulkollan piece is able to be compressed up to 70% of its original height with minimal permanent set. Pur-Cell parts are available in custom molded shapes, sheet, rod, and tube.



PUR-CELL

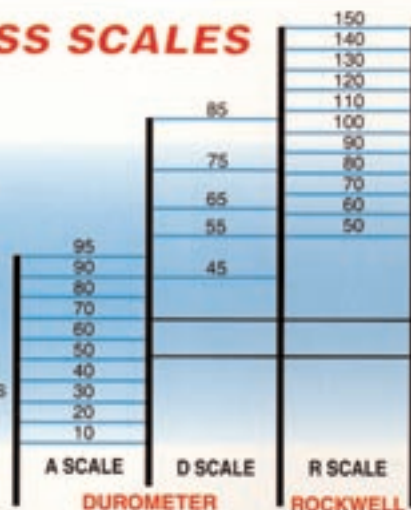


		15-35	15-40	15-45	15-50	15-55	15-60	
Density	kg/m ³	350	400	450	500	550	600	DIN 53420
Tensile Strength	N/mm ²	4	4.50	5.50	6.50	7.50	8	DIN 53455
Elongation	%	390	410	430	450	465	470	DIN 53455
Tear Resistance	kN/m	8	10	12	14	18	20	DIN 53515
Rebound	%	70	70	70	70	70	70	DIN 53512
Compression after 24h @ 70° C	%	4.8	5.8	6.5	7.2	7.5	8.0	DIN 53572



HARDNESS SCALES

PAINTING ROLLERS
FRICTION FEED ROLLERS
VIBRATION ISOLATORS
SOLID TRUCK TIRES
SHEET METAL
FORMING DIE PADS
CHUTE LINERS
DIE SPRINGS
PUNCH STRIPPERS
CUTTING BARS
ANTI-FRICTION ROLLERS
IMPACT PADS
SHEET METAL WIPER DIES
BUSHINGS BEARINGS



POLYURETHANES

POLYPROPYLENE

TEFLON

CAR TIRE TREAD

BICYCLE TUBE

RUBBER BANDS

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