Nyliner Plus Materials

Bearings made from Nyliner Plus Thomson Engineered Polymers (TEP) offer a greatly expanded performance range over Thomson's standard bearings which are molded from TEP 110. Thomson's standard Nyliner Plus materials are available off the shelf for all types and sizes of bearings in our catalog.

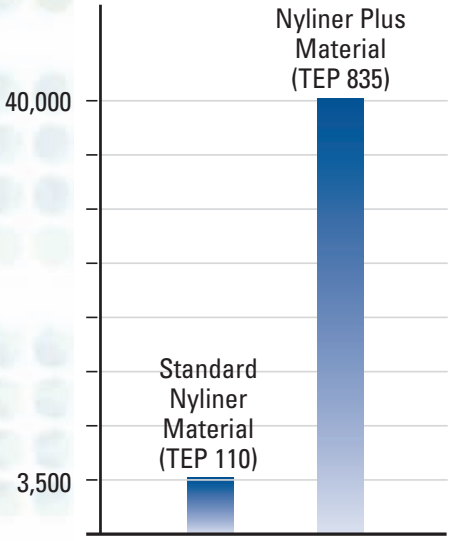
Greatly Increased PV Ratings. Thomson Nyliner Plus materials offer PV ratings previously only available in more expensive and difficult to use bearings. Nyliner Plus materials give PV ratings in the range of 10,000 to 40,000.

Higher Operating Temperatures. All Nyliner Plus materials offer elevated temperature capabilities. Some of these materials withstand temperatures over 400°F. This means higher ambient temperature possibilities and greater resistance to heat caused by running friction.

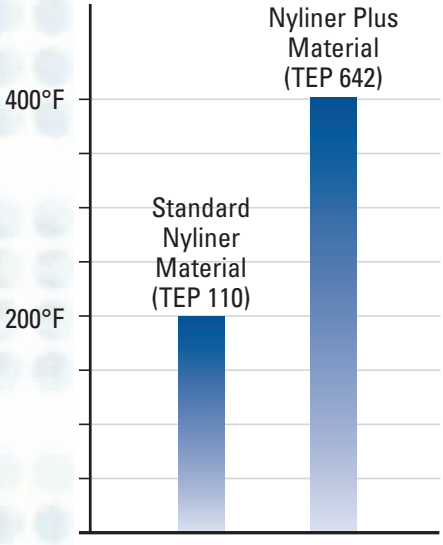
Lower Friction. With the addition of sophisticated internal lubricants, Nyliner Plus materials offer coefficients of friction as low as .06, even when bearings are operated without additional lubrication.

Greatly Increased Bearing Life. Utilizing a combination of high-performance resins and sophisticated internal reinforcement systems, Nyliner Plus material bearings offer extremely long operating life.

Limiting PV



Heat Deflection Temperature



Advantages Over Standard Nyliner Bearings

The charts on this page clearly demonstrate the performance increase of bearings made from Nyliner Plus TEP material compared to bearings made from standard TEP 110 material. (The materials comparison charts on the following pages more specifically compare a wide range of Thomson Engineering Polymers). Most significant is the dramatic increase in PV rating. For example, TEP 110 has a PV rating of 3500 and TEP 835 has a rating of 40,000.

Other characteristics of Nyliner Plus materials also offer significant improvements. For example, TEP 110 has a wear factor of 200. TEP 642 (a relatively economical and popular Nyliner Plus material) has a wear factor of only 18. This means that in similar situations, a bearing made of TEP 642 will last 10 times longer than the same bearing made of TEP 110.

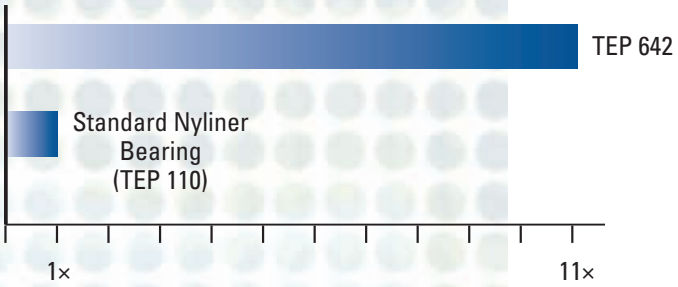
Nyliner Plus material bearings often replace other types of plain bearings. In many cases, cost is not the only advantage. For instance, sintered bronze bushings have always presented the bearing user with several serious disadvantages: they have an unpredictable supply of lubrication, they are subject to corrosion and environmental attack, they require press fitting (which may change during the life of the product), and they often require secondary operations to achieve final dimensional tolerances. Compare the performance characteristics and design advantages with other types of plain bearings. In many cases, Nyliner Plus materials are the best all-around solution to solving bearing-design challenges.

Applications. Use Nyliner Plus materials in applications that require high performance, easy installation, long life, and moderate cost. Some highly successful Nyliner Plus material applications include:

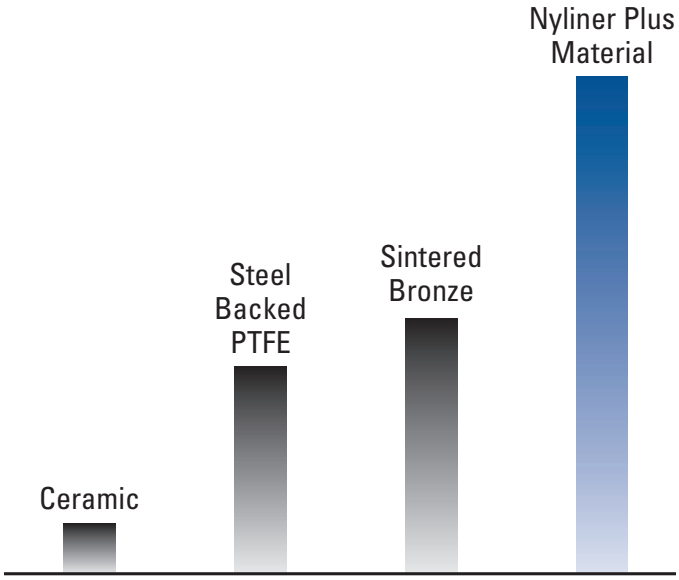
- Hydraulic cylinder piston rod bushings;
- High-load pivots in outboard marine engine mounts;
- Automotive and light-truck suspension bushings;
- Fractional horsepower electric motor bearings.

Call our Applications Engineering Department for help in deciding which Nyliner Plus material is best for your application.

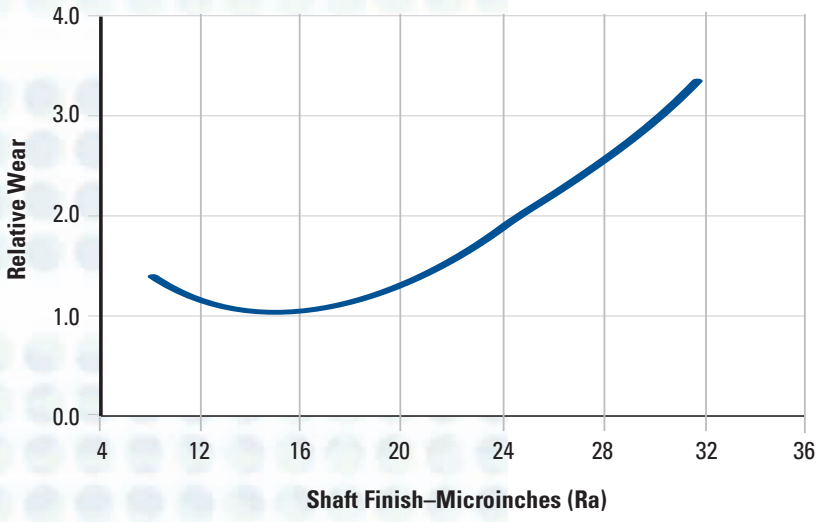
Relative Bearing Life



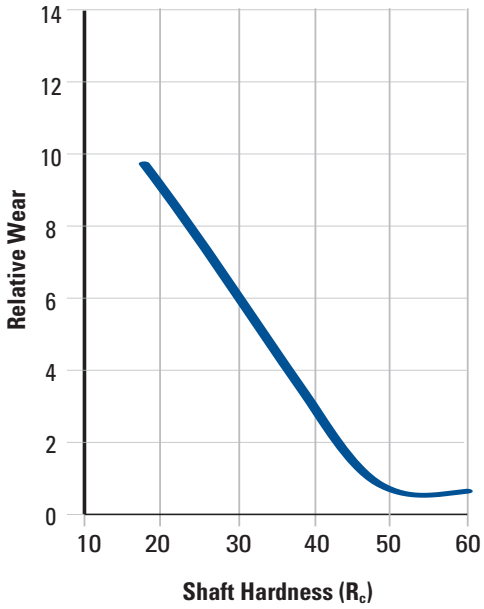
Plain Bearings— Performance to Cost Ratio Load Rating Per $



Bearing wear as affected by variations in shaft surface finish



Bearing wear as affected by variations in shaft hardness



Chemical Resistance at 77°F

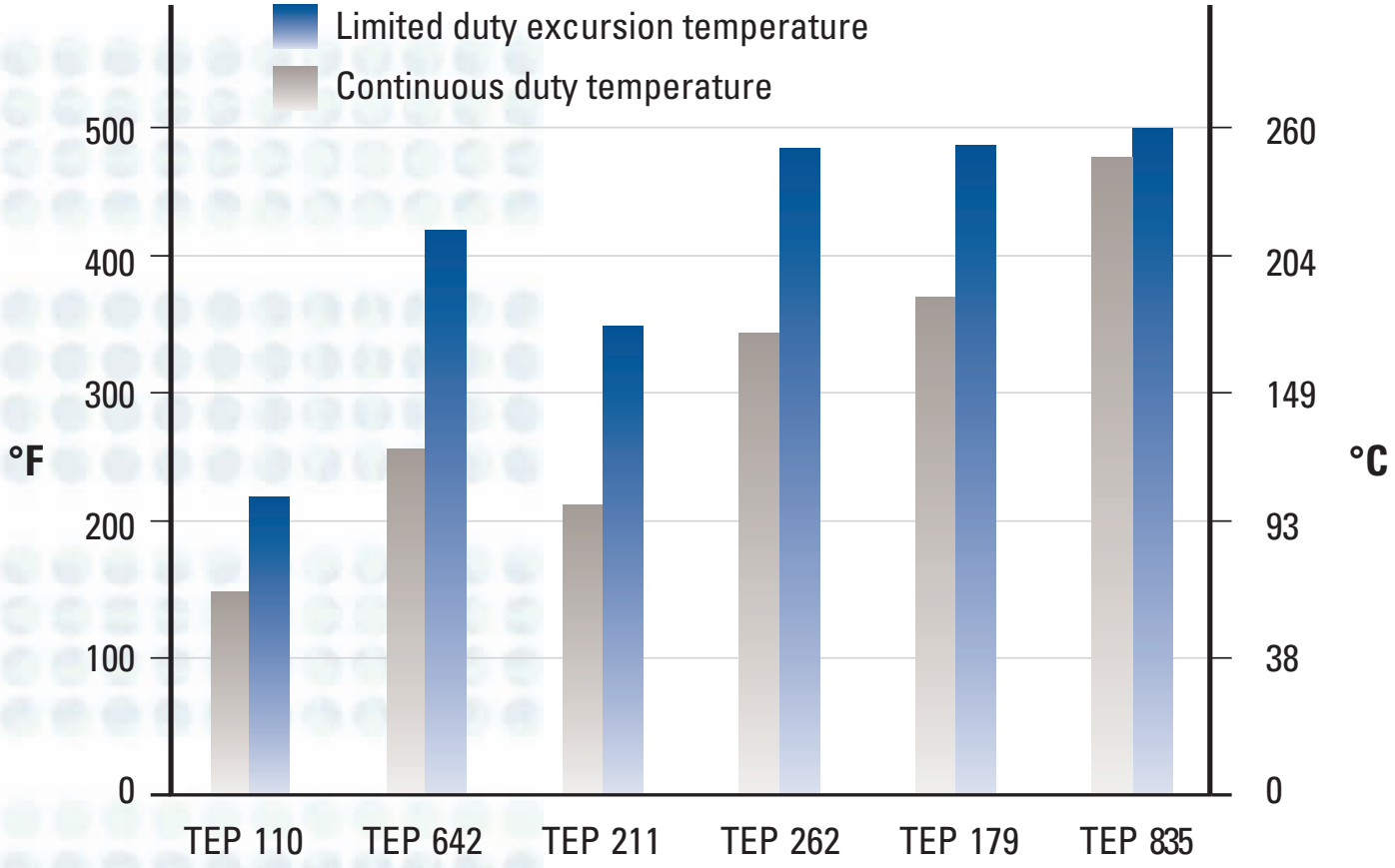
Shows the effect of various chemicals on selected Thomson bearing grade engineering polymers.

Material	Aromatic Solvents	Aliphatic Solvents	Chlorinated Solvents	Weak Bases and Salts	Strong Bases	Strong Acids	Strong Oxidants	Esters and Ketones
TEP 166	1	1	1	1	2	5	5	1
TEP 211	2–3	1	1–2	1–3	3–4	5	5	1
TEP 179	2	1	3	1	2	3	2	2
TEP 642†	1	1	1	1	2	5	5	1
TEP 835	5	1	5	1	5	1	1	5
TEP110††	1	1	1	2	1	5	5	1

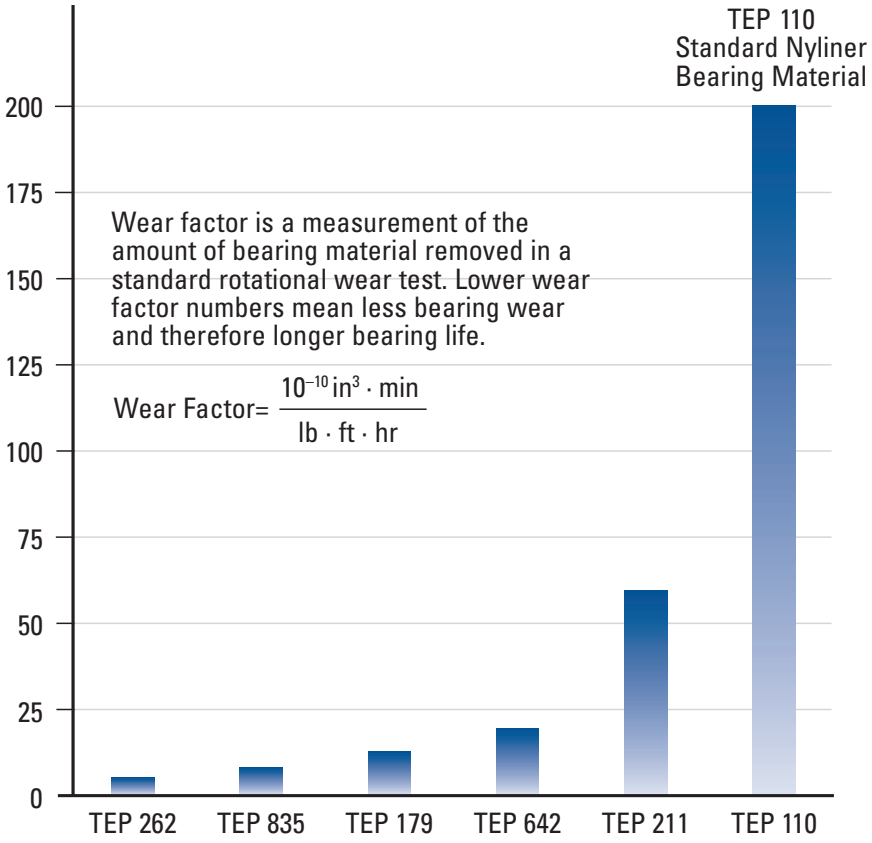
1) Inert
2) Little or no effect
3) Mild effect
4) Softening or swelling
5) Severe degradation of properties

† Thomson's standard Nyliner Plus bearing polymer
†† Thomson's standard Nyliner bearing polymer

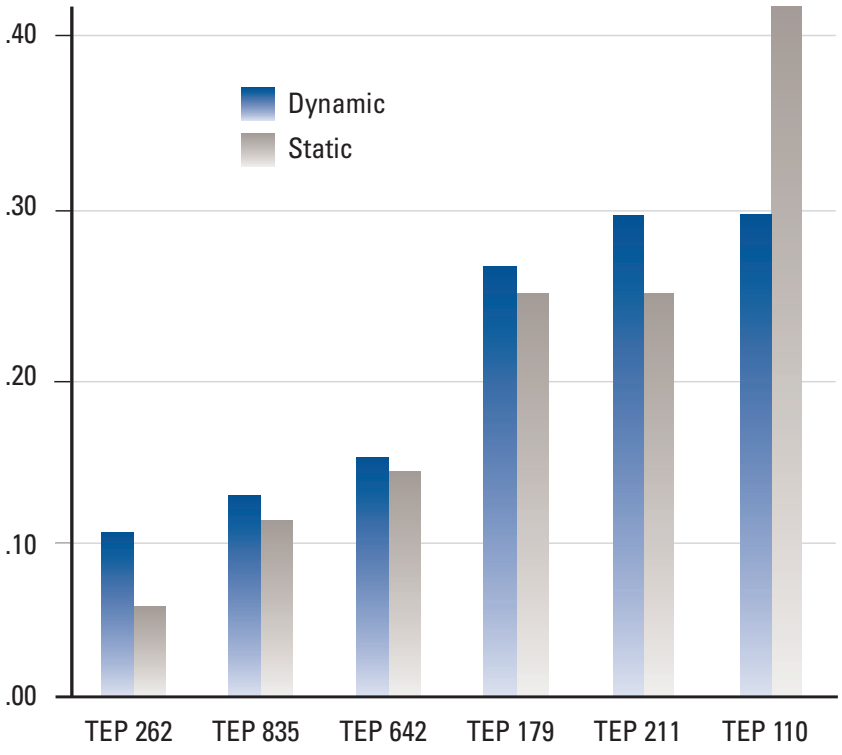
Operating Temperature Range



Wear Factor Against Steel



Coefficient of Friction



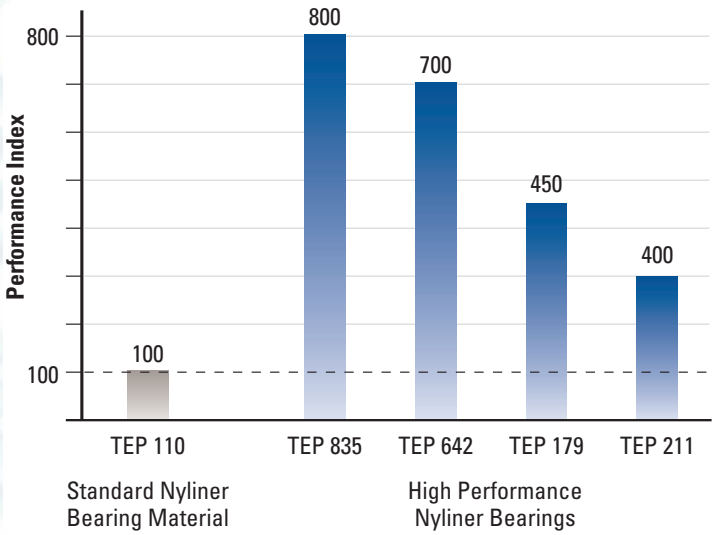
ASTM Property and Test Performance Data

Thomson Engineering Polymers

ASTM Property and Test Performance Data	Units	TEP† 110	TEP 166	TEP 179	TEP 835	TEP 211	TEP 262	TEP†† 642
Tensile Strength @ 73°F 23°C D – 638	psi (MPa)	11,800 (81.4)	13,500 (93.1)	13,500 (93.1)	23,500 (162)	10,000 (69)	6,500 (44.8)	13,500 (93.1)
Yield Strength @ 73°F 23°C D – 638	psi (MPa)	12,900 (88.9)	13,000 (89.6)	13,500 (93.1)	17,500 (120.6)	11,400 (78.6)	7,400 (51.0)	13,000 (89.6)
Flexural Modulus @ 73°F 23°C D – 790	psi (MPa)	410,000 (2827)	500,000 (3,447)	500,000 (3,447)	540,000 (3,723)	410,000 (2,827)	300,000 (2,068)	500,000 (3,447)
Compressive Strength (1% Deformation) D-695	psi (MPa)	4,900 (33.8)	17,500 (120.7)	13,000 (89.6)	17,000 (117.2)	5,200 (35.9)	1,800 (12.4)	17,500 (120.7)
Izod Impact (Notched) D – 256	ft. lb./in. (J/m)	0.9 (48.1)	1.0 (53.4)	0.7 (37.4)	1.0 (53.4)	1.4 (74.7)	0.6 (32.0)	1.0 (53.4)
Coefficient of Friction Static	N/A	0.45	0.13	0.25	0.12	0.6	0.07	0.13
Dynamic	N/A	0.3	0.14	0.26	0.13	0.66	0.15	0.14
Water Absorption (24 hours) D – 570	%	1.5	0.7	0.9	0.5	0.31	0.15	0.7
Heat Deflection Temp. (264psi) D – 648	°F (°C)	200 (93)	350 (177)	450 (232)	490 (254)	235 (113)	210 (99)	350 (177)
Coefficient of Linear Thermal Expansion D – 696	in./in./°F	4.5×10^{-5}	3.2×10^{-5}	1.1×10^{-5}	2.4×10^{-5}	5.8×10^{-5}	5.4×10^{-5}	3.2×10^{-5}
Limiting PV @ 100 RPM	psi × ft./min.	3,500	16,000	35,000	40,000	10,000	12,500	16,000
Wear Factor	10^{-10}in^{-5} • min lb • ft • hr	200	18	80	70	20	90	18

† Standard Nyliner Thomson Engineering Polymer
†† Thomson's standard Nyliner Plus bearing polymer

Relative Performance Index



The Relative Performance Index is based on combining values for flexural modulus, limiting PV, and heat deflection temperature. This provides a means of numerically comparing the performance of different Thomson Engineering Polymers. Call our Applications Engineering Department for help in comparing other engineering resins on this scale.