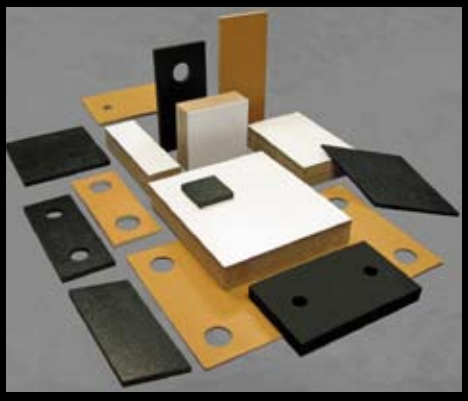
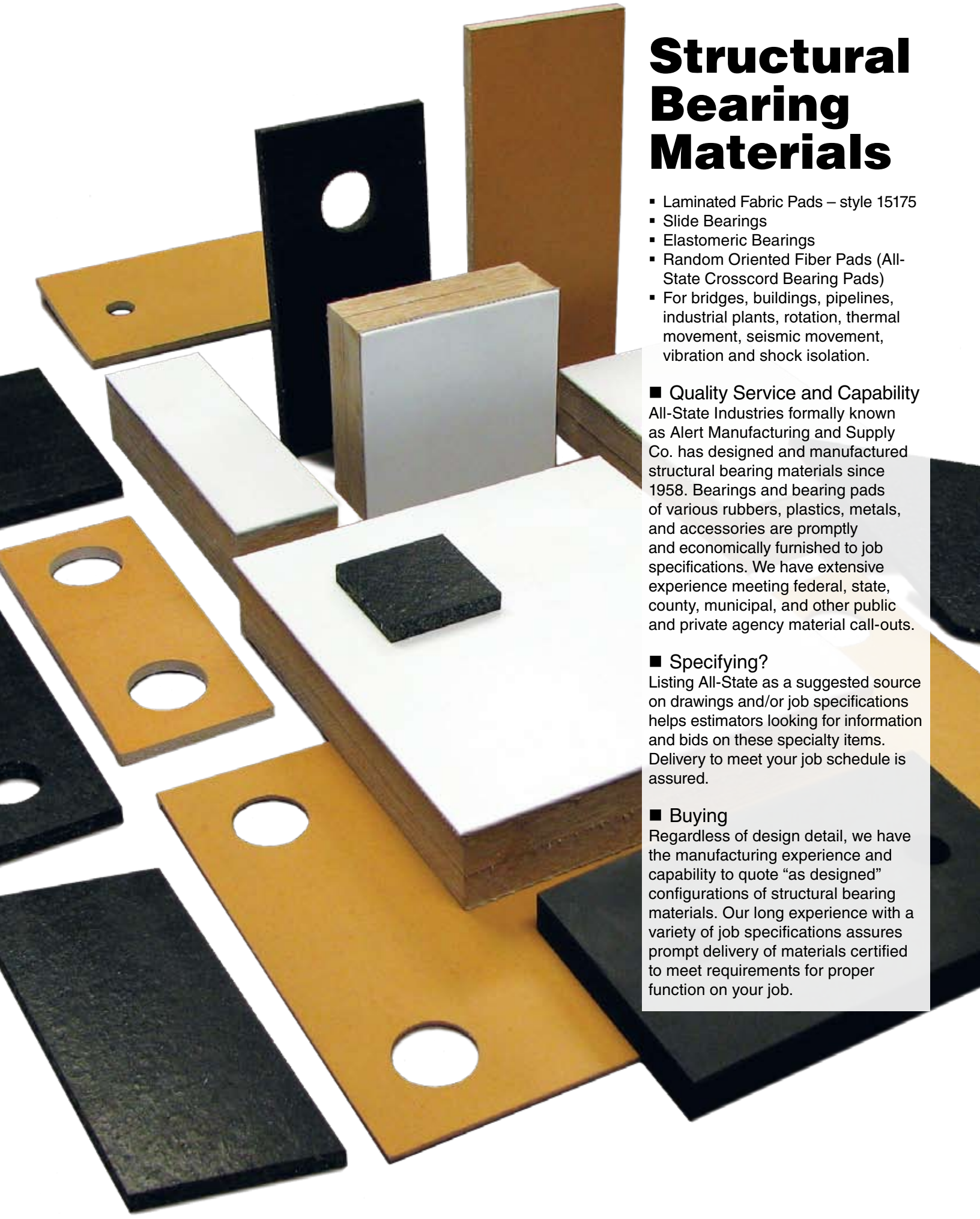


all-state
INDUSTRIES, inc.

15175 SHOCK PADS AND STRUCTURAL BEARING MATERIALS

SPECIFICATIONS

www.all-stateind.com



Structural Bearing Materials

- Laminated Fabric Pads – style 15175
- Slide Bearings
- Elastomeric Bearings
- Random Oriented Fiber Pads (All-State Crosscord Bearing Pads)
- For bridges, buildings, pipelines, industrial plants, rotation, thermal movement, seismic movement, vibration and shock isolation.

■ Quality Service and Capability

All-State Industries formally known as Alert Manufacturing and Supply Co. has designed and manufactured structural bearing materials since 1958. Bearings and bearing pads of various rubbers, plastics, metals, and accessories are promptly and economically furnished to job specifications. We have extensive experience meeting federal, state, county, municipal, and other public and private agency material call-outs.

■ Specifying?

Listing All-State as a suggested source on drawings and/or job specifications helps estimators looking for information and bids on these specialty items. Delivery to meet your job schedule is assured.

■ Buying

Regardless of design detail, we have the manufacturing experience and capability to quote “as designed” configurations of structural bearing materials. Our long experience with a variety of job specifications assures prompt delivery of materials certified to meet requirements for proper function on your job.

ALL-STATE SHOCK PADS FOR

Bridges and Structures Bearing Pads

Bearing pads of All-State 15175 have long been used for their isolation properties and for uniform load bearing of highway, railroad, and pedestrian bridges, and for similar structural uses in buildings and pipelines. In addition to fixed-end bearing pads, All-State pads faced with bonded P.T.F.E. (polytetrafluoroethylene) fluorocarbon resin mated to polished stainless steel are often used for structural expansion bearings. High compressive strength and limited compressive creep and set make All-State pads ideal for the load support and distribution properties required in structural bearing uses.

Effective performance through a wide temperature range coupled with excellent weathering resistance, ready availability, easy installation, and no need for replacement are All-State features. All-State pads also offer effective blocking of structure-borne vibration, thereby assisting in noise reduction.

Concrete, steel, and timber structures use All-State bearing pads for:

- Beams
- Columns
- Girders
- Mullions
- Trusses
- Weatherstripping

ALL-STATE SHOCK PADS FOR

Heavy Machinery Mounting

Shock, vibration and noise sources are important causes of reduced employee efficiency, excessive maintenance of production equipment and foundations, and poor product quality. All-State 15175 is extensively used for effective impact shock absorption and vibration isolation, using pads for mounting of such heavy equipment sources as well as protecting sensitive equipment from outside disturbances. All-State pads reduce noise by effective blocking of structure-borne vibration.

All-State 15175 Shock Pads are superior mountings in these typical uses:

- Air conditioning and refrigeration equipment
- Cooling towers
- Compressors and pumps
- Engines and motors
- Generators and turbines
- Grinding machines, pulverizers, shredders
- Hammers: drop, forging, etc.
- Lathes, milling, planing machinery
- Looms
- Lumber sawmills and planing mills
- Mining machinery
- Presses: hydraulic, mechanical; forging, stamping, punching
- Printing presses
- Shears and press brakes
- Steel mill craneways, blooming and slabbing mill tables, impact strippers billet testers, etc.
- Tumbling, shakeout and molding machines
- Protection of general industrial machinery, controls and instruments

ALL-STATE SHOCK PADS FOR

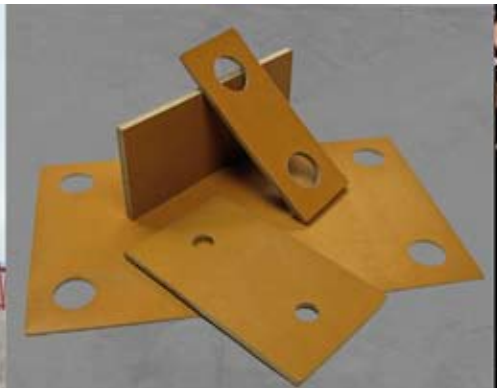
Transportation, Material Handling and Mobile Equipment

Versatile All-State 15175 Shock Pads are widely used for many applications on trucks, railroad equipment, mining, farm, construction, and off-highway vehicles. All-State pads reduce mechanical wear and maintenance by absorbing shock and vibration. Reduced noise improves comfort of personnel and passengers.

Efficient, low-cost All-State pads stand up to the roughest service, offering the highest strength with minimum weight.

Typical uses:

- Automobiles
- Buses
- Construction vehicles
- Conveyors
- Drilling equipment
- Elevators and escalators
- Farm machinery
- Fork lift and straddle trucks
- Hydraulic loaders
- Military vehicles, missile-handling equipment
- Ore bridge trolley rails
- Pipelines
- Railroad locomotives, cars; track and structures
- Track and highway scales
- Ships and vessels



Laminated Fabric Pads

All-State 15175 laminated fabric pads consist of laminated pre-stressed plies of cotton duck impregnated with an oil resistant elastomer. With ultimate compressive strength of up to 18,000 psi, it supports exceptionally high loads with minimum loss of performance to compressive creep and set. All-State laminated fabric pads provide controlled stress distribution, damping, and blocking of structure-borne vibration with service life equal to that of the structure.

■ Typical Structural Uses:

- Highway bridges
- Railroad bridges
- Pedestrian bridges
- Building structural connections
- Precast concrete parking garages
- Roof structures
- Cooling towers
- Timber domes
- Pipelines

■ Standard Sizes

1/8" through 11/32"	48" x 100'
1/2" through 1"	48" x 48'

■ Specifications

Federal

MILITARY: *MIL C-882E:* Cloth, Duck, Cotton Synthetic Rubber Impregnated and Laminated, Oil Resistant

D.O.T. FEDERAL HIGHWAY ADMINISTRATION: *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects* (1985), FP-85, paragraph 555.17, page 378. Preformed Fabric Pads.

National

AASHTO: *Standard Specifications for Highway Bridges* 15th Edition, Division II, 18.10.2 Performed Fabric Pads P.C.I. Design Manual 4th Edition, paragraph 6.5.8., pages 6-19.

State, County, Municipalities, Transit Authorities, and many other public and private agencies have published specification with which our products have achieved full compliance.

■ Physical Properties

THICKNESS TOLERANCE: ±5%
SURFACE HARDNESS: 90 ± Durometer, Shore A
DENSITY: 84 lbs. / cu. ft.

■ Mechanical Properties

COMPRESSIVE STRENGTH, ULTIMATE: 18,000 psi
COMPRESSIVE MODULUS: 16,000 - 23,000 psi
TENSILE STRENGTH: 5,300-6,720 psi
SHEAR MODULUS: 550 psi
ELONGATION, WARP, ULTIMATE: 12%

■ Environmental Properties

TEMPERATURE FOR CONTINUOUS SERVICE: -50° to 200°F.
WEATHERING, OXIDATION, WATER, BRINE, FUNGUS, AND ULTRAVIOLET RESISTANCE: excellent
OIL RESISTANCE, SAE 30, 72 HRS. @ 160°F.: slight swell
GASOLINE, KEROSENE RESISTANCE (ALIPHATIC HYDROCARBONS): Good

■ Engineering Properties

	NOMINAL THICKNESS	15/64"	9/32"	11/32"	1/2"	5/8"	3/4"	1"
	NUMBER OF PLIES	14	17	21	31	39	48	64
	WT./SQ. FT. (LBS.)	1.6	2.0	2.4	3.5	4.4	5.2	7.0
	Typical deflection							
LOAD (PSI)	50	.003	.004	.005	.006	.008	.010	.013
	100	.005	.006	.007	.010	.013	.015	.021
	200	.007	.010	.012	.015	.020	.025	.034
	300	.010	.012	.015	.020	.026	.033	.044
	400	.011	.015	.018	.025	.031	.040	.053
	500	.013	.017	.021	.028	.036	.046	.061
	600	.015	.019	.023	.032	.041	.052	.069
	700	.016	.121	.026	.036	.045	.057	.043
	800	.018	.023	.028	.040	.049	.062	.082
	900	.019	.025	.030	.043	.053	.066	.087
	1000	.020	.027	.032	.047	.058	.070	.093
	1200	.023	.030	.035	.053	.065	.078	.104
	1400	.026	.032	.039	.059	.071	.085	.113
	1600	.028	.032	.039	.059	.071	.085	.113
	1800	.031	.038	.045	.070	.083	.099	.132
	2000	.033	.041	.048	.075	.090	.107	.140
	2200	.035	.044	.051	.080	.096	.114	.148
	2400	.037	.047	.054	.085	.102	.121	.156
	2600	.039	.050	.057	.090	.108	.127	.162

■ Friction Coefficient

Static friction coefficient, dry
… to concrete: 0.60
… to wood: 0.55
… to steel: 0.50

Friction coefficients can be modified to suit requirements through the use of suitable coatings or bonded facings, e.g.: pads can be supplied with an acrylic coating offering a friction coefficient to concrete of 1.0. Values on the order of 0.013 against mirror-polished stainless steel can be obtained using the All-State pad faced with virgin, non-reinforced T.F.E.

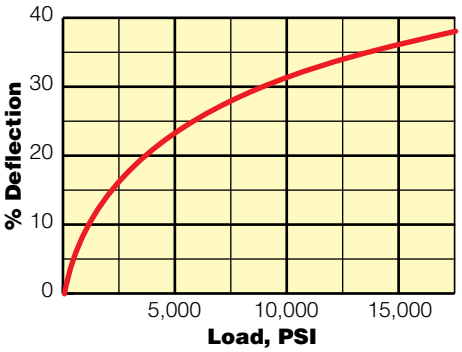
■ Fastening

Mechanical or adhesive attachment of All-State pads can easily be chosen to best suit required conditions. Mechanical means include through bolting, bolting through counterbored holes (thick pads), using flat head screws through steel striker plates, or plates with welded studs, chock bars, dowels, and self-tapping screws, bolts or sheet metal screws from behind pad support steel.

Adhesive bonding is readily accomplished by buffing pad surface, using a properly prepared substrate surface, an elastomeric adhesive suitable for Neoprene bonding, or an epoxy resin adhesive. Bonding instructions specific for the adhesive selected should be followed for best results.

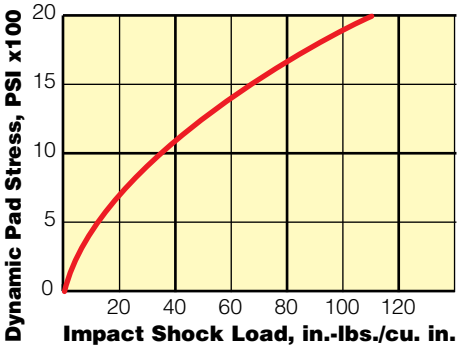
Load Bearing

Load vs Compression



Shock Absorption

Impact Shock vs Stress

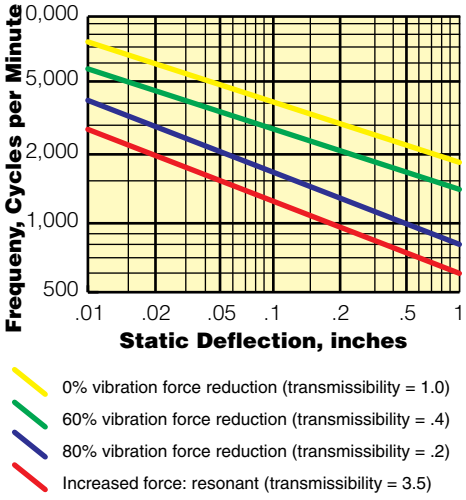


NOTE: Large impact shock loads coupled with high impact frequencies can develop considerable heat and therefore shorten pad service life. At impact loads of 11 in. lbs./cu. in. under forging hammer anvils and impact frequencies typical of these operations, decades of service life can be expected.

Damping properties of All-State Shock Pad: damping curve ratio of successive amplitudes averages 1.6 to 1. Damping ratio is 15% of critical.

Vibraton Isolation

% Reduction



Slide Bearings and Accessories

PTFE (polytetrafluoroethylene) slide bearings utilize the unique self-lubrication, low-friction properties of this chemically inert polymer sliding against polished stainless steel, or against itself bonded to steel.

Typically, the sole plate (or a separate top plate) is bottom faced with stainless steel, seal-welded. Plan dimensions are chosen to keep the PTFE covered in all bearing positions.

The PTFE is epoxy-bonded to a supporting steel plate directly to an All-State laminated Fabric Pad to accommodate rotation or other lack of parallelism in the bearing area. The All-State pad avoids extreme edge loading and upper plate lift-off from the PTFE.

■ Typical Component Specs:

SOLE PLATE OR TOP PLATE: A-36, A-588, or carbon steel
STAINLESS STEEL: 0.087", A-240, type 304, max. 10 microinch RMS finish
PTFE .09375" virgin, unfilled, per ASTMD-1457, AASHTO section 27, page 343
LAMINATED FABRIC PAD: per AASHTO (1985 10.3.12 or *MIL-C-882E* or per *P.C.I. Design Handbook*, 3rd Edition, paragraph 6.5.8.3, pages 6-14
PAD ATTACHMENT: adhesive bonding with epoxy resin adhesive,welded bar stock,keepers,welded stud dowels
COMPRESSIVE STRESS: service Maximum: 2,000 psi
FRICTION COEFFICIENT, MAXIMUM: 0.06

Typical structural uses are those listed for All-State 15175 Preformed Fabric Pads.

Elastomeric Bearings

Plain pads in standard Shore A durometers of 50, 60 and 70 are manufactured to AASHTO, state or custom specifications. Polychloroprene, polyisoprene, polyurethane and other elastomers are available, certified to specification requirements.

■ Design of Structural Grade Elastomeric Bearing Pads

Design Recommendations

1. Use unfactored loads for design
2. Max. compressive stress = 1,000 psi
3. Max. shear stress = 100 psi
4. Max shear deformation = t/2
5. Max. compressive strain = 15%
6. w > 5t or 4"
7. t_t > 1/4" for stems, 3/8" for beams

Design Equations

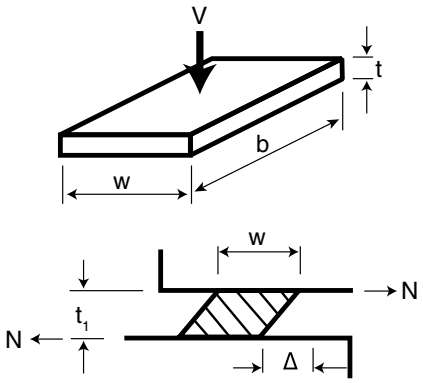
Shape factors = $\frac{wb}{2(w+b)t}$

$$f = \frac{V}{wb}$$

$$N = \frac{wbG_t \Delta_s}{t_t}$$

Notation

b = dimension perpendicular to beam span, inches
w = dimension parallel to beam span, inches
t = thickness of pad, or of each lamination in pads laminated with bonded steel plates, inches
t_t = total thickness of pad or pad assembly, inches
V = unfactored vertical reaction, pounds
N = unfactored compressive stress, psi
f = unfactored compressive stress, psi
G = shear modulus, psi
G_t = long term shear modulus = 0.5G, psi
Δ_s = shear deformation, inches



■ Typical Specifications

AASHTO *Standard Specifications for Highway Bridges.* 15th Edition, Criteria Level I (1990). Section M251-90

D.O.T. FEDERAL HIGHWAY ADMINISTRATION: *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects* FP-92 (1992). Section 717.10

Elastometric Bearing Pads P.C.I. Design Manual, 4th Edition (1992), paragraph 6.5.8.1 page 6-19.

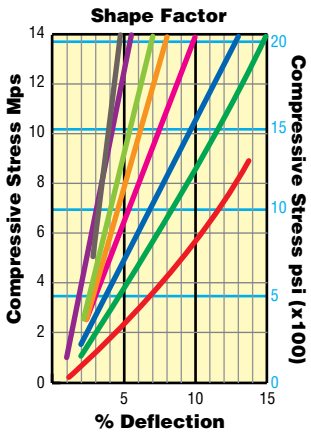
■ Approximate Performance Parameters: (Subject to Design)

Max. Compressive Strain	8% of thickness
Max. Total Load, Compression	800 - 1,000 psi
Max. Dead Load	500 psi
Max. Shear Strain	50% of thickness

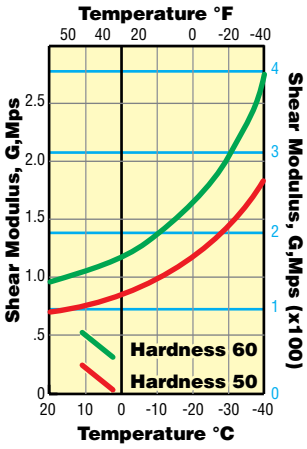
Horizontal Force at Max. Shear Strain must be calculated for each case, approximately 5% of vertical load.

Compressive Stress / Strain of Neoprene Bearings

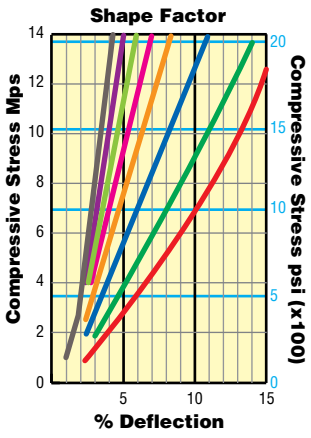
Hardness of Neoprene
50 Durometer A



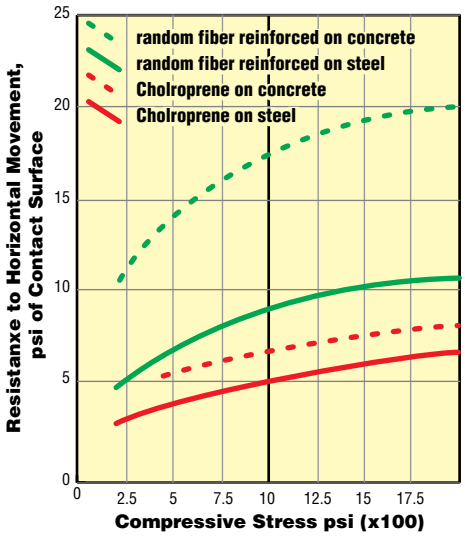
Shear Modulus to Hardness of Neoprene
at Various Temperatures



Hardness of Neoprene
60 Durometer A



Compressive Stress / Strain



T/F Bearing Pads

Milled Rubber and Fiber
A compression molded bearing pad consisting of synthetic fibers and rubber. Excellent abrasion, impact and ozone resistance. These pads are especially suited for use with concrete slabs (bridges, beams, hollow core slabs, etc.)

The preformed fabric pads are made with new unvulcanized rubber and unused fabric fibers.

■ Typical Specifications:

P.C.I. Design Manual, 4th Edition, (1992), paragraph 6.5.8.2, pages 6-19.

■ Approximate Performance Parameters:

MAX. TOTAL LOAD, COMPRESSION	1,500 psi
COMPRESSIVE MODULUS	8,750 psi
SHEAR MODULUS	525-4V/3

The ultimate breakdown limit of the pad, under compressive loading shall be no less than 8,000 psi for the specified thickness, without extrusion or detrimental reduction in thickness.

Crosscord Bearing Pads

Specifically designed for use with pre-cast concrete in applications such as parking decks, barrier walls and bridges, All-State Crosscord Bearing Pads will provide cushioning and allow for structural movement … permitting the ultimate loading capacity while exhibiting the least possible resistance.

Made of compression molded synthetic fibers and vulcanized rubber, the fibers are molded 90° to each other to equalize the deflection in all directions. All-State Crosscord Bearing Pads are highly resistant to abrasion, impact and ozone.

Available in plain form for smaller movement, or fabricated with Teflon® coating or with metal laminations for larger movements, All-State Crosscord Bearing Pads are tested on an on-going basis. Certification and samples are available.

■ Physical Properties

HARDNESS (SHORE A): 80 ± 5
HEAT AGING (PER ASTM D573), DUROMETER, POINT CHANGE: 10 pt. max.
v(70 hrs. @ 212° F in forced air oven)

■ Mechanical Properties

COMPRESSIVE MINIMUM, ULTIMATE: 8,000 psi
INITIAL MINIMUM CRACKING STRAIN: 40%
ULTIMATE BREAKDOWN LIMIT*: 10,000 psi (MIL-G-8826)
SHEAR MODULUS: 210 ± 80 psi, based on tests conducted at 70° to 80° F under uniform compressive stresses of 500, 1,000 and 1,500 psi and at an applied horizontal shear plus slip strain of 50 percent. This value is applicable to both concrete-to-concrete and steel-to-concrete surfaces. G is constant in all directions parallel to the bearing plane.

TENSILE STRENGTH (ASTM D412, DIE C)*: 1,000
TENSILE STRENGTH, OZONE RESISTANCE (PER ASTM D1149): 725 psi min.
(50 hrs. @ 100 pphm @ 100° F)
HEAT AGING, (PER ASTM D1149), TENSILE STRENGTH, % CHANGE: -25% max.
(70 hrs. @ 212° F in forced air oven)

ELONGATION, ULTIMATE: 40% min.
ELONGATION, OZONE RESISTANCE (PER ASTM D1149): 40% min.
(50 hrs. @ 100 pphm @ 100° F)

HEAT AGING (ASTM D573), ELONGATION, % CHANGE: -25% max.
(70 hrs. @ 212° F in forced air oven)

OIL IMMERSION, PER ASTM D4711, VOLUME % CHANGE: 120% max.
(70 hrs. @ 212° F in ASTM #3 oil)

TEAR STRENGTH*, ASTM D624, DIE B: 400 lb.
TEAR STRENGTH OZONE RESISTANCE: 300 lb./min. (50 hrs. 100 pphm @ 100° F)
* 10% variation allowed



For specialists with
detailed information about
these products contact:

All-State Industries, Inc.
2651 Carl Blvd.
Elk Grove Village, IL
60007-6718
847-350-0460
Fax: 847-350-0468
WATS: 800-284-1848

Or visit our Web site at **www.all-stateind.com**

all-state
INDUSTRIES, inc.

520 South 18th St.
West Des Moines, IA
50265-5532
515-223-5843
Fax: 515-223-8305
Toll Free: 800-247-4178

1400 Lakeway Dr.
Lewisville, TX
75057-6000
972-434-4222
Fax: 972-434-0250
Toll Free: 800-441-1562

2651 Carl Blvd.
Elk Grove Village, IL
60007-6718
847-350-0460
Fax: 847-350-0468
Toll Free: 800-284-1848

2810 Bridger Court
Elkhart, IN
46514
574-522-4245
Fax: 574-522-9800
Toll Free: 800-247-4178