

DURABOND[®]

SLIDE

When to use DuraBond Slides

If problems with rigidity, lubrication, heat, cold, friction, wear, or corrosion are blocking the way to a design solution, our DuraBond Slides can clear a path—reliably and efficiently.

In general, DuraBond Slides are designed to operate dry. They offer self-lubrication with high performance.

The technical data presented here represents typical performance values under controlled conditions. The requirements for your particular applications should be reviewed with a DuraBond Slide technical development engineer.

DuraBond Slides Applications

- Wherever low-cost, high performance dry bearings are desired for service from 10,000 to 40,000 PV.
- Where bearing lubrication is undesirable or impossible.
- Where high temperatures up to 550°F or low temperatures down to -400°F occur and oils are useless.
- In corrosive environments, with non-lubricating liquids, or under conditions of high or low humidity, or where high vacuums are present.
- In lubricated applications where friction and wear rates are unacceptable during starting and stopping, or where stick-slip is a problem.
- Where the electrical and insulative properties are important.
- Where space and weight must be saved.
- Wherever other slides—bronze, roller or ball bearing—are causing problems.
- Where vibration dampening is desirable.

Design Criteria

Bearing Pressure

Bearing pressure is measured in pounds per square inch (psi). It is calculated by distributing the total load in pounds that the bearing is carrying by the projected area (length x width in inches). This gives the average pressure, psi, that the bearing must support. Elevated temperatures reduce load capacity; lower temperatures generally increase static load capacity.

Bearing Speed

Sliding or surface velocity is measured in surface feet per minute (SFM). DuraBond bearings are generally limited to 400 feet per minute under dry, low-load operation. Higher speeds are possible with lubricants or liquid coolants.

Bearing PV

The third parameter is the *product* of operating pressure and surface velocity, defined as PV. $P \times V = PV$. It is in effect a measure of the work the bearing is doing. While it is not the final answer, PV is an invaluable general guide in matching bearing to application.

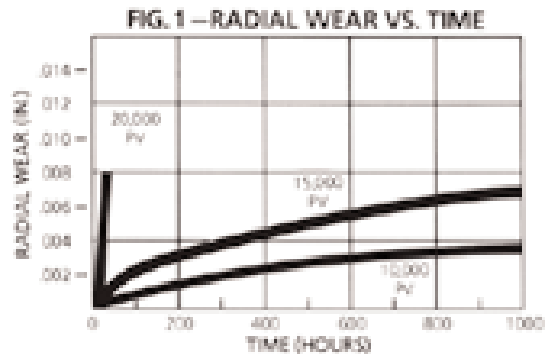
Design Criteria for DuraBond Slides

(All values are for dry running conditions - ambient temperature)

Recommended Operating Limits	DuraBond Slide
Temperature - Typical Range °F	-400/+550
Maximum PV (continuous)	10,000
Maximum P - PSI (static)	1,000
Maximum V - SFM (no load)	400
Slide Hardness - Minimum	Rc 35
Slide Finish Recommended RMS	8-24
Slide Material	Steel
Engineering Information	
Friction—Static & Dynamic	.15-.25
Water Absorption ASTM D570	0%
Flammability ASTM D635	Non-Flammable
Chemical Resistance	Inert
Thermal Conductivity	
BTU/hr/sq. ft./°F/in.	2.3
Linear Coefficient of 78°F - 200°F	BD 3.5×10^{-5}
Thermal Expansion	BL 6.2×10^{-5}
	78°F - 300°F
	BL 7.0×10^{-5}

Performance Considerations

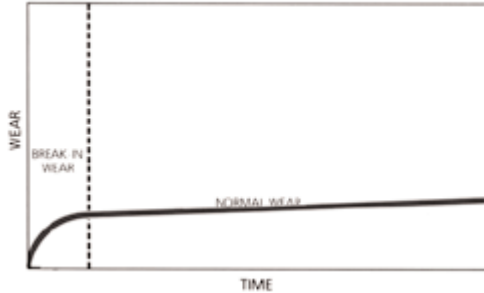
For continuous non-lubricated service, DuraBond Slides are capable of operating at PV values up to approximately 10,000. Fig. 1 shows wear rates as a function of time at various PV values. For intermittent or short-time duty, higher PV values can be used. Use of lubricants permit higher PV values.



Slide hardness. DuraBond Slides are designed to operate against surfaces that have minimum hardness and finish requirements; however, performance is optimized when the hardest possible running surface is used. Softer materials such as stainless steel or aluminum are not recommended. DuraBond Slide bearing surfaces are hardened to Rc 58-62.

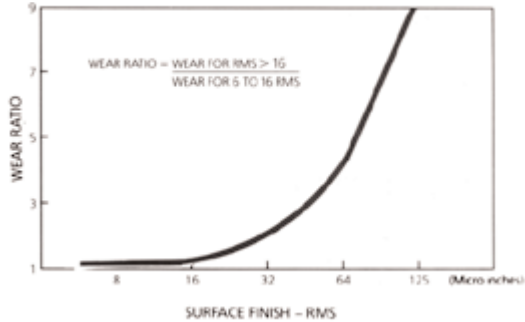
Friction and wear. DuraBond Slides utilize custom compounds of PTFE. Like PTFE, they exhibit very low friction at low speeds, and low friction at high loads. These properties are diametrically opposed to most other materials and give DuraBond Slides their smooth start/stop characteristics. They eliminate most stick-slip problems.

FIG. 2 – TYPICAL WEAR BEHAVIOR FOR RULON BEARINGS.



Wear rate. DuraBond Slides are self-lubricating because a small quantity of Durabond or PTFE material is transferred to the mating surface during start-up. After initial break-in, the wear rate levels out.

FIG. 3 – WEAR VS. SURFACE FINISH



Surface finish. Best performance is achieved with a surface finish in the range of 8–16 microinches RMS, however, acceptable performance can be obtained with finishes up to 32 microinches. DuraBond Slide surface finish is 10-16 RMS.

Load. DuraBond Slides are generally limited to 1,000 psi. However, actual bearing deformation is a function of thickness, temperature, and load. Refer to Fig. 4. At elevated temperatures and heavy load, RULON will not shatter, but will merely deform. This eliminates sudden breakdowns and possible damage to other components.

Friction. Friction decreases rapidly with increase in load, because friction at start-up (static friction) and very slow speeds is extremely low. Stick-slip is virtually non-existent in DuraBond Slides. This makes them ideal for oscillating or start/stop applications. When fully lubricated with oil, DuraBond compounds exhibit a coefficient of friction in the .05–.08 μ range of lubricated metal bearings. (See Fig. 5 & 6)

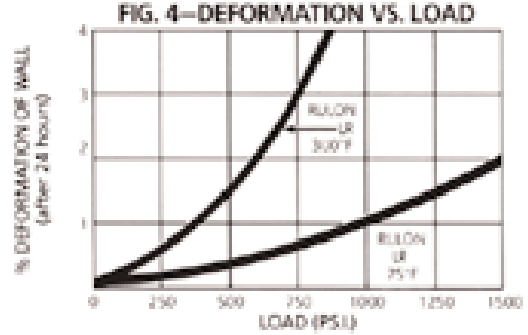


FIG. 5—COEFFICIENT OF FRICTION VS. LOAD (AT LOW SPEEDS)

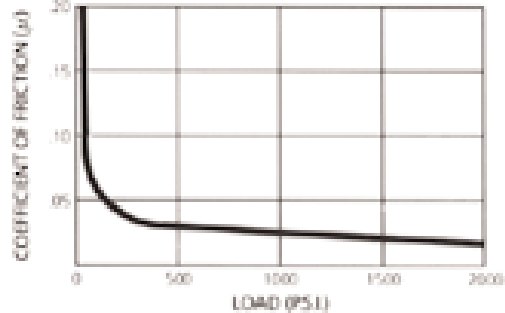
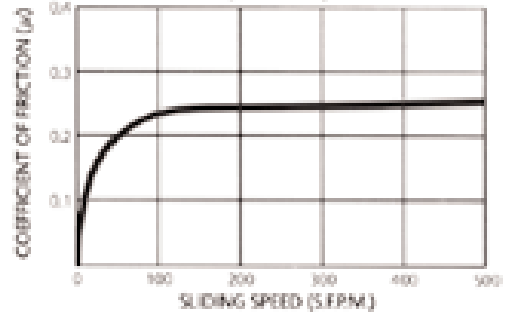


FIG. 6—COEFFICIENT OF FRICTION VS. SPEED (AT 100 P.S.I.)



Corrosion resistance. DuraBond material is practically inert to all acids, bases, and solvents.

Lubrication. Although Durabond Slides can operate without lubrication, a small amount of lubrication applied to the slide facilitates break-in. Recommended lubricants include natural, petroleum based, way lube oils such as MOBIL Vactra #2, 3-in-1 oils and lighter weight oils for speeds over 400ft./min. *Caution: Do not use fluorocarbon or silicon based oils, grease or WD40™! The additives in these lubricants create a barrier and can cause a stick slip and or binding condition in the slide.*

Clearance. Durabond Slides are set up with 0.0005" to 0.0015" clearance depending on slide size. If your application requires less clearance, or as additional clearance develops over time, the adjustable gib can be tightened to achieve the desired rigidity. Care should be taken to adjust all setscrews equally throughout the full range of travel to achieve optimum performance.

Accuracy. Straight line accuracy is 0.0001"/inch