METRIC FDA/USDA/3A Dairy Self-Lubricating Linear Bearings

Food Process
Packaging Machinery
Bio/Pharmaceutical
Medical Systems

RoHS compliant

ETX Scraper Seals
Thin Wall Stainless/PTFE
European Stainless/PTFE
Fluidline

LM76 Linear Bearings
The Engineering Edge
### TWM Thin Wall Closed

![TWM Thin Wall Closed Diagram]

**ORDERING P/N EXAMPLE**

<table>
<thead>
<tr>
<th>Bearing Shell Material</th>
<th>Self-Lube Liner</th>
<th>Part Number</th>
<th>Working Bore (mm)</th>
<th>Bore Tolerance</th>
<th>Outside Diameter (mm)</th>
<th>Length Tolerance h14</th>
<th>Max Shaft Diameter (mm)</th>
<th>Housing Bore Diameter (mm)</th>
<th>MAX STATIC LOAD</th>
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<tr>
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**All LM76 FDA Linear Bearings are compatible with soft 300 Series (303,304,316) Stainless Steel Shafting - Rb25. LM76 also supplies Armoloy® Coated Shafting for additional hardness and chemical resistance.**

**NOTE 1.** LM76 European Metric linear bearings can be slip fit into a housing and retained with stainless snap rings or with a light pressfit. Press-fit should not exceed .0127mm.

**NOTE 2.** TWM-FDA Bearings are only supplied in closed version.

LM76 140 Industrial Drive  East Longmeadow, Ma USA 01028  
1-413-525-4166  Fax: 413-525-3735  www.LM76.com
European Metric Closed

ORDERING P/N EXAMPLE
L6 FDA

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Working Bore mm</th>
<th>Max Shaft Dia. h6 or h7 Tolerance</th>
<th>ID Bore Tolerance -000</th>
<th>O.D. Diameter</th>
<th>Bearing Length h14 Tolerance</th>
<th>Retaining Ring</th>
<th>Retaining Groove Width</th>
<th>Housngt Bore Diameter h7</th>
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<td>B</td>
<td>D</td>
<td>W</td>
<td>N</td>
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ETX SCRAPER SEALS

LM76 Stainless European Metric linear bearings can be modified with ETX scraper seals. ETX Seals are self-lubricating snap-in scraper seals which are FDA/USDA/3A Dairy/USPVI/Caustic Wash Down compliant. Because they are designed with an interference fit on the shaft, they do increase friction. ETX Scraper Seals are long wearing and will not allow debris to include between the bearing and the shaft. Excellent for cheese process, dairy, meat and poultry applications. To add ETX Seals, add 2ETX to the part number.

NOTE: ETX Scraper Seals are only available in closed style bearings.

Ordering Example: L12TWMSLSS-2ETX

LM76 140 Industrial Drive East Longmeadow, Ma USA 01028
1-413-525-4166 Fax: 413-525-3735 www.LM76.com
European Metric Open

<table>
<thead>
<tr>
<th>Max PSI</th>
<th>Max PV</th>
<th>Max Velocity (Meters per Minute) Lubricated</th>
<th>Max Velocity (Meters per Minute) Unlubricated</th>
<th>Max Operating Temp °F/°C</th>
<th>Minimum Operating Temp °F/°C</th>
<th>Static Coefficient of Friction</th>
<th>Dynamic Coefficient of Friction</th>
<th>Minimum Shaft Hardness</th>
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<tr>
<td>1000</td>
<td>10.000</td>
<td>121</td>
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<td>-400/204</td>
<td>.3</td>
<td>.09-.15</td>
<td>Rb25</td>
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</tbody>
</table>

Bearing Shell Material: 300 Stainless Steel
Self-Lube Liner: PTFE

ORDERING P/N EXAMPLE

LX 6 FDA

LM76 FDA Linear Bearings are compatible with soft 300 Series (303,304,316) Stainless Steel Shafting - Rb25. LM76 also supplies Armoloy® Coated Shafting for additional hardness and chemical resistance.

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FluidLine Metric Closed

FluidLine Linear Bearings offer a 1 piece construction that allows it to stay in service even after there is significant wear. Unlike our stainless bearings with a FDA compliant PTFE liner (.64mm - .89mm thick), once you wear through the PTFE liner, the bearing must be replaced because the shaft will be in contact with the stainless steel bearing shell. Because Fluidline is a piece design, it can stay in service longer - it will just get more loose fitting. Great for conveyor indexers and check weight underweight pushers. NOTE: Fluidline is a non-metallic linear bearing and thus it will dissipate heat more slowly. Not made for high speed, long travel applications. Closed style only.

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<tr>
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<tr>
<td>1000</td>
<td>10,000</td>
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<td>Rb25</td>
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</table>

**ORDERING P/N EXAMPLE**

FDL 50

Fluidline Linear Bearings are compatible with soft 300 Series (303,304,316) Stainless Steel Shafting - Rb25. LM76 also supplies Armoloy® Coated Shafting for additional hardness and chemical resistance.

**NOTE 1.** LM76 European Metric linear bearings can be slip-fit into a housing and retained with stainless snap rings or with a light press-fit. Pressfit should not exceed .0127mm.

**NOTE 2.** Fluidline Bearings are only supplied in closed version.
PTFE Bearing Engineering Data

Terms:

P = Pressure
PSI = Pressure per square inch
SFM = Surface Feet per Minute
PV = Is the unit of measure determined by 2 values - Pressure (PSI) and Velocity (SFM)
Formula: P=W/(dxb)  W = Static Load  d = Bearing Inside Diameter  b = Bearing Length

Example:

50kg (500) load on a 25mm ID bearing x 58mm Long
P = W/(dxb):
P = 500/(25x58) = 0.3448N/mm2 and the velocity is 0.25m/s
PV = 0.3448 x 0.25
Result: PV = 0.862N/mm2 m/s

Rule of Thumb: Plain Bearings, due to their increased contact area, are prone to "Sticktion" - the force or torque required to get them moving is higher when they are in motion. We use a .3 multiplier i.e., 45kg will take 13.5 kg to get the system moving. Design your drives around this figure.

Over-Turning Moment Loads:

Plain bearings are more susceptible to moment loading than ball or roller systems in all three axis: pitch, yaw and roll.

NOTE: Please contact LM76 Engineering for more information on moment loading.

OPEN Bearing Orientation Load Depreciator Max Static Load

2:1 Ratio for Moment Loading

To specify bearing spacing relative to the c/g load point, we will use the following example for a vertical axis:

1. Determine where the C/G (center of gravity) is located along the moment arm. For our example, we have illustrated (Figure 1.0) a liquid filling machine which has a c/g load point 305mm from the centerline of the shafting. Employing the 2:1 ratio - spacing between bearings must be a minimum of 1/2 the distance of the c/g load point on the moment arm - therefore, spacing between bearings must be a minimum of 153mm.

Rule of thumb: Use all the distance between bearings that is physically available up to a 1:1 ratio - more is always better.

Understanding PV (Inverse Equation):

The total PV rating for our FDA/PTFE/Self-Lubricating liner is 10,000. PV works like this: If you go up on load, you go down in speed. If you go up on speed, you go down on load.

Rule of thumb: With a light load and lubrication, you can design around 121m/min system speed. Unlubricated, you can design around 30m/min system speed.

Press-fit vs. Slip-Fit

LM76 linear bearings can be slip-fit into a housing and retained with stainless snap rings. They can also be press-fit with a light press - DO NOT EXCEED .127mm

Bearing Edge Loading:

Edge loading is a condition resulting from excessive moment loading, lack of paralelism between shafts or any situation where bearing and shaft centerlines are out of alignment. Edge loading results in higher friction and wear. Extreme cases will cause sticking & slipping and in severe situations, system seizure.

Rule of thumb: Use all the distance between bearings that is physically available up to a 1:1 ratio - more is always better.
Sanitation Standard Operating Procedures (SSOPs)

Consistently using correct cleaning and sanitizing procedures in dairy and food processing plants is the foundation to producing high quality, safe food. Sanitation Standard Operating Procedures (SSOPs) are detailed procedures specifying what to clean, how to clean, how often to clean, and the records used for monitoring.

A food processing or beverage plant’s wash down areas are unique environments that undergo harsh abuse from pressure washer sprays and a multitude of chemicals used in the cleaning and sanitation of equipment.

In the baking industry, warm water and soap is a common washdown combination. However, meat, poultry and dairy products require more aggressive chemicals like sodos (sodium hydroxide) and self-foaming cleaners, foaming acids and self-foaming chlorinated caustic cleaners like chlorine to sanitize bearings, shafting and direct food contact areas. At LM76, we understand the issues associated with FDA complaint materials, both food contact and outside food contact applications and aggressive chlorinated foaming agents and sodos like sodium hydroxide.

LM76 Materials & Coatings Stainless Steels: 303, 304 and 316 are common bearing shells and shafting materials. In addition, we turn to proven and compliant PTFE self-lubricating liners that are highly inert to chemical washdown. NOTE: if you have questions about washdown LM76 also employs a number of proven and compliant coatings such as hardcoat anodized aluminum, electroless nickel plated aluminum for pillow blocks, flange blocks, shaft supports, shaft end supports and Armoloy® coated stainless steel shafting: 300 - 440c/420c.
LM76 was founded in 1976 and has been a proven, international designer/manufacturer of plain-style linear motion bearings. LM76 designed the original drop-in replacement for linear ball bearings in 1976 - our ceramic coated linear bearing. Our ceramic coated linear bearing has registered some the highest accelerations seen by any product in our industry: +120G’s along with fastest dynamic system speeds. To date, we have not found an excelleration or system speed where it has failed when properly employed. It has the longest life test of any linear bearing we are aware of:

<table>
<thead>
<tr>
<th>PSI</th>
<th>ft/min</th>
<th>Final Distance</th>
<th>Wear</th>
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<tbody>
<tr>
<td>100</td>
<td>100</td>
<td>One Hundred Million Linear Feet</td>
<td>.00004&quot;</td>
</tr>
</tbody>
</table>

LM76 is a prolific designer and manufacturer of special designs: ID’s / OD’s/ Lengths / Geometries made from a myriad of Materials. We design around your unique application, not a catalog product.

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