

ER &



TREME

TM

Style Ball Bearings

ERX-TREME CORROSION RESISTANT

GOLD LINE ER BEARINGS

ERX-TREME LO DRAG

ERX-TREME RE-LUBRICABLE

ERX-TREME HI TEMPERATURE

ERX-TREME X-TRA LO DRAG



SEALMASTER® GOLD LINE



EMERSON POWER TRANSMISSION



ER & ERX™ STYLE BALL BEARINGS

In addition to the standard of excellence Gold Line ER bearings have created for the past 60 years, SEALMASTER® has expanded its ER style ball bearing product line with ERX-TREME™.

SEALMASTER now brings you seven

ERX-TREME products:

- ERX-TREME *LO DRAG* set screw & SKWEZLOC®
- ERX-TREME *X-tra LO DRAG* set screw & SKWEZLOC
- ERX-TREME *HI TEMP* set screw
- ERX-TREME *CORROSION RESISTANT* SKWEZLOC
- ERX-TREME *RE-LUBE* set screw

ERX-TREME LO DRAG ER style ball bearings seal the bearing chamber with an advanced felt seal that maintains low drag torque requirements while providing a positive barrier to contamination.

X-tra Lo Drag versions are available with oil lubrication for even less rotational torque.

ERX-TREME CORROSION RESISTANT

bearings are the first corrosion resistant SKWEZLOC locking inserts. The concentric locking mechanism is well suited for stainless steel shafts that are frequently found in corrosive environments. Food grade grease is standard in ERX-TREME Corrosion Resistant SKWEZLOC bearings.

ERX-TREME RE-LUBE bearings are the first standard ER style ball bearings that can be re-lubricated without any further modifications to an external housing. ERX-TREME Re-lube bearings have lubrication fittings for the same reason that pillow blocks and flange bearings have them; it extends useful bearing life through the use of proper re-lubrication. Finally, an ER style insert bearing with the same capabilities!!! This ingenious design incorporates a lubrication fitting on the inner race which allows grease to flow from the lubrication fitting, through a groove in the bore, and into the bearing chamber to try to purge out contaminated or old grease and replenish lubrication.

ERX-TREME HI TEMPERATURE ER style ball bearings will operate from 30°F to 400°F. ERX HI Temperature bearings utilize KRYTOX® GPL 227 grease by DUPONT® to extend useful bearing life and reduce maintenance requirements.



SEALMASTER®

STANDARD GOLD "ER"

Set Screw
SKWEZLOC®
METRIC-SKWEZ™



page 2 & 3

ERY™
LO DRAG™
Set Screw
SKWEZLOC



page 4 & 5

ERY-TRA™
LO DRAG™
Set Screw
SKWEZLOC



page 4 & 5

ERY™
CORR. RES™
SKWEZLOC



page 6 & 7

ERY™
RE-LUBE™
Set Screw



page 8 & 9

ERY™
HI TEMP™
Set Screw
Expansion



page 10 & 11

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SEALMASTER®

STANDARD **GOLD LINE** “ER” STYLE BEARINGS FEATURES & BENEFITS

Stephens-Adamson Mfg. Co. introduced the first ER style ball bearings into the US market place in 1937 along with the standard set screw locking SEALMASTER® branded mounted ball bearings. SEALMASTER has been providing ER style ball bearings for all kinds of applications including:

- Ink Rollers
- Plate Cylinders
- Dampening Rollers
- Blanket Cylinders
- Forming Rollers
- Collecting Cylinders
- Calendar Rolls
- Nip Roll
- Live Rolls
- Printing Webs
- Spindles
- Veneers
- Winders
- Bulk Material Handling
- Unit Material Handling
- Agricultural Processing Equipment
- Metal Slitting & Winding
- Plastic Film Transfer
- Packaging Equipment

ER style ball bearings are designed to be pressed into housings which are typically steel plates, conveyor rolls, etc.

SEALMASTER ER ball bearings have many of the same features Gold Line mounted units have:

EXTRA WIDE OUTER...

maintains fit up with roll or housing and provides a large grease cavity.

EXTRA WIDE INNER...

provides better stability on the shaft.

ZONE HARDENED INNER RACE...

provides a fully hardened ball path while leaving the race extension unhardened, allowing for exceptional control of set screw fit and hold. Raceways are ground and honed to ensure longer life and quieter operation.

UNIQUE LAND RIDING METAL RETAINER...

reduces friction and provides improved grease circulation. The retainer is designed to “float” on the ground extension (or lands) of the outer ring while spacing the balls precisely for more even load distribution. This decreases wear on both balls and retainer, while increasing stability especially important in applications involving vibration, shock loading or high operating speeds.



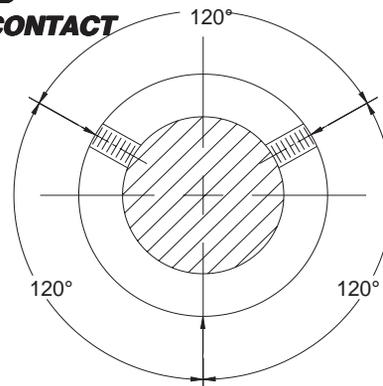
Standard “ER” SET SCREW

SEALMASTER set screws are integrated with Gold Line zone hardened inner races which are post heat treat drilled and tapped to minimize hardening distortion. The soft extended portion of the inner race creates a tightly meshed system and an effective, secure lock.

Set Screws

SEALMASTER set screws, located 120° apart, provide a balanced 3-point contact. This evenly positioned shaft lock design is particularly important in high speed applications where any eccentricity is magnified. This can especially affect roll applications. The set screws come standard with precision ground (not rolled) threads. They also incorporate a unique diamond faceted point that tightly secures the set screws to the shaft and resists any back-out.

BALANCED 3 POINT CONTACT



SPECIALLY-DESIGNED DIAMOND POINT, GROUND THREAD SETSCREWS AT 120°...



...deliver superior shaft holding power with less race distortion than any other setscrew design.



Standard “ER” SKWEZLOC®

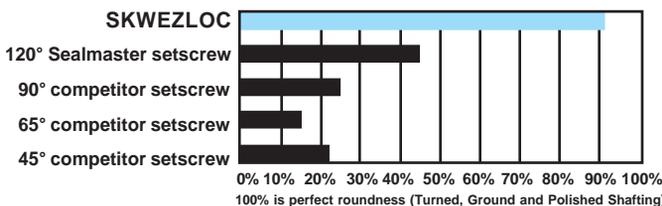
SEALMASTER® Gold Line ER style ball bearings with SKWEZLOC locking collars are designed for applications with strict run out requirements. Because the SKWEZLOC collar centers the shaft in the bore of the bearing, the shaft or roll runs true and saves on equipment maintenance and replacement costs. SKWEZLOC has demonstrated its proven performance in a number of applications demanding smooth and quiet operation.

Ball Path Roundness

SEALMASTER engineers have measured the relative ball-path roundness of various set screw bearings and compared them to the roundness of a SEALMASTER bearing equipped with SKWEZLOC. The results and comparisons are illustrated on the bar chart. The differences - all of which can affect bearing operation and life - are dramatic!!!



Roundness Comparison

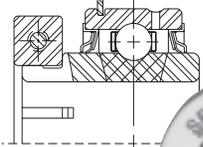


Standard “ER” METRIC-SKWEZ™ Available with ERX-TREME™ designs as Made to Order (MTO)

METRIC-SKWEZ™ “ER” style ball bearings have “Hard Metric” dimensions with a SKWEZLOC locking system.

METRIC-SKWEZ “ER” have ALL METRIC dimensions for easy installation and replacement on imported machinery or OEM equipment intended for international exportation. Also available in housings – pillow blocks, flanges and take-ups. Request catalog MS-98 for more information.

SEALMASTER brand METRIC-SKWEZ “ER” style ball bearings also have all of the standard Gold Line features that have literally made SEALMASTER world famous. Additionally, METRIC-SKWEZ “ER” has:

Metric Dimensions 	Metric Capscrews 
Distinctive Metric Collar 	Metric Bore 

SEALS

Felt Seal

Standard for Gold Set Screw and SKWEZLOC
Optional for METRIC-SKWEZ

The patented felt labyrinth seal with rotating flinger directs contamination away from the sealing surfaces. The felt design provides a tight barrier which retains grease and acts as a filter to reduce the ingress of foreign material. The design operates with less drag and heat generation than rubber contact seals.



Contact Seal

Standard for METRIC-SKWEZ
Available from stock: Gold Set Screw and SKWEZLOC

The SEALMASTER contact seal is recommended where moisture is present. This contact seal is made of a heavy steel shell assembled with a rugged nitrile sealing element. The external steel shell protects the rubber sealing element by deflecting abrasive contamination away. This design gives the SEALMASTER contact seal superior wear characteristics. To specify, attach a “C” to the end of the nomenclature:

ER-16C, ER-23TC



ERX-TREME™

LO DRAG & X-TRA LO DRAG FEATURES AND BENEFITS



Name ERX-TREME LO DRAG
Suffix LO
Example ERX-16 LO
Locking SET SCREW or SKWEZLOC®
Lube Special Channeling Grease
Seal LO DRAG FELT

The SEALMASTER® brand ERX™ LO DRAG ball bearings provide free-running rotation while working to retain grease and maintaining top-notch low drag sealing. The special channeling grease coats and lubricates the internal bearing components with low friction. Unlike other free-running labyrinth designs, the ERX LO DRAG ball bearings utilize the advanced LO DRAG felt seal that provides a positive barrier to contamination.

ERX LO DRAG ball bearings can be specified by attaching the suffix "LO" to standard ERX nomenclature:

ERX-16 LO, ERX-16T LO

Name ERX-TREME X-TRA LO DRAG
Suffix XLO
Example ERX-16 XLO
Locking SET SCREW OR SKWEZLOC
OIL
Seal X-TRA LO DRAG FELT

The SEALMASTER brand X-TRA LO DRAG ball bearings maintain top-notch low drag sealing. X-TRA LO DRAG bearings are lubricated with oil to further enhance free rotation. The X-TRA LO DRAG ball bearings utilize the same superior felt seal that provides a positive barrier to contamination. In addition, the X-TRA LO DRAG felt seals are soaked in oil to act as a lubrication reservoir and reduce seal drag.

ERX X-TRA LO DRAG ball bearings can be specified by attaching the suffix "XLO" to standard ERX nomenclature:

ERX-16 XLO, ERX-16T XLO

LO DRAG AVAILABILITY

Sizes	1/2	5/8	3/4	7/8	15/16	1	1 1/8	1 3/16	1 1/4R	1 1/4
LO	x	x	x	x	x	x	x	x	x	x
XLO	x	x	x	x	x	x	x	x	x	x
T-LO			x			x		x	x	x
T-XLO			x			x		x	x	x

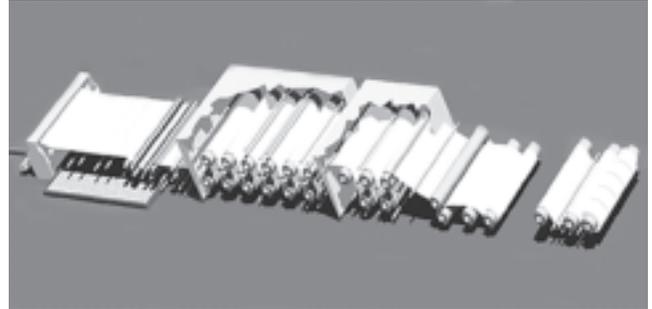
Sizes	1 3/8	1 7/16	1 1/2	1 9/16	1 3/4	1 15/16	2	2 3/16	2 3/8	2 7/16
LO	x	x	x	x	x	x	x	x	x	x
XLO	x	x	x	x	x	x	x	x	x	x
T-LO	x	x	x		x	x	x	x		x
T-XLO	x	x	x		x	x	x	x		x

x = 5 days x = stock size = call for availability

Note: This chart applies to normal order sizes. For larger orders call to plan delivery schedule.

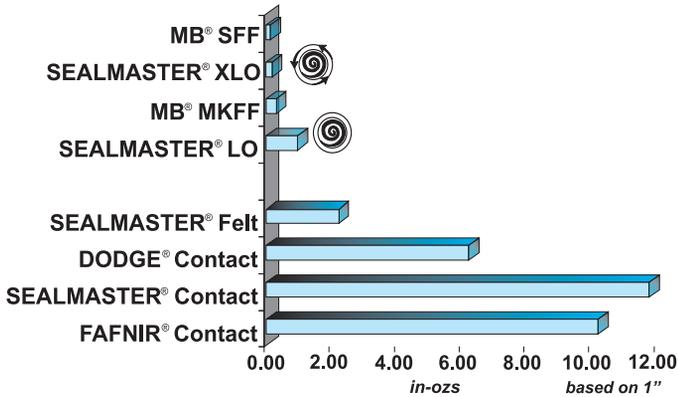
APPLICATIONS

Printing and packaging machinery weave sheets of paper, cardboard, or film through huge webs that are composed of hundreds of rolls. The sheets of material are pulled through the webs where many different processes produce modifications such as printing, cutting, heating, drying, folding, stacking, packing, finishing, etc. The sheets of material typically have a low strength and can be sensitive. If rotational torque is excessive, materials will tear and frequently jam entire machines. ERX-TREME LO & XLO ball bearings are designed to meet the needs of these low drag applications.

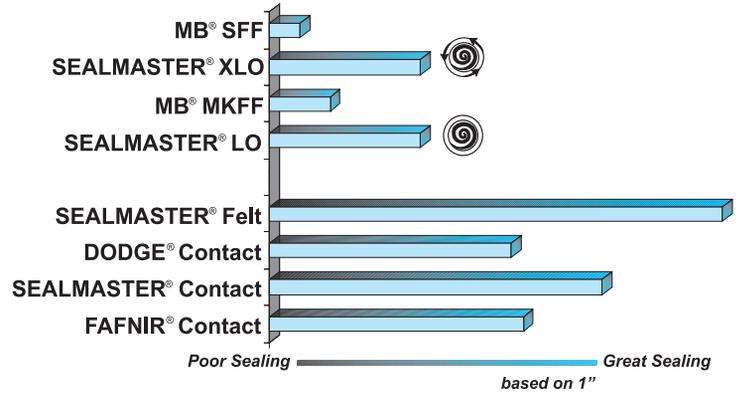


Web Example

BEARING ROTATIONAL TORQUE COMPARISON CHART



RELATIVE SEALING EFFECTIVENESS COMPARISON CHART



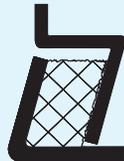
Note: Grease lubrication will increase useful bearing life over oil.

DODGE is a registered trademark of Reliance Electric Industrial Company; MB is a mark of MB Manufacturing, Inc.; FAFNIR is a registered mark of The Torrington Company. Emerson Power Transmission Corp. is not affiliated with these companies.

SEALS

LO DRAG FELT

The advanced LO DRAG felt labyrinth seal with rotating flinger is designed to direct contamination away from the sealing surface and reduce rotational torque. Unlike most low drag seal designs, the LO DRAG felt seal provides an excellent barrier which works to retain grease and acts as a filter to reduce the ingress of debris.

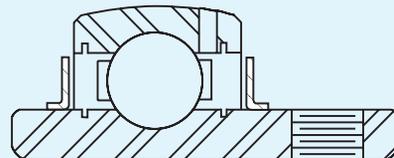


X-TRA LO DRAG

The X-TRA LO DRAG felt labyrinth seal is the same as the LO DRAG felt seal with one difference; it is soaked in oil to act as a lubrication reservoir and lower seal friction.

Competition

Some competitive low drag seals utilize a labyrinth design to deter contamination from entering the bearing. Labyrinth sealing systems have openings that lead directly into the bearing chamber. It does not take much for fine particles to find the openings and enter the chamber. Other competitive low drag seals only use a flinger pressed onto the inner ring to preclude contamination. This is even more susceptible to contamination ingress.



ERX-TREME™

CORROSION RESISTANT FEATURES AND BENEFITS



- Name** ERX-TREME CORROSION RESISTANT
- Suffix** T CR
- Example** ERX-16T CR
- Locking** SKWEZLOC® Only
- Lube** FOOD GRADE GREASE
- Seal** SAFEGARD SEALS - See next page

ERX-TREME CR bearings are the first corrosion resistant SKWEZLOC inserts. The concentric locking mechanism reliably clamps to stainless steel shafts which are frequently found in corrosive environments. Each component of the ERX-TREME corrosion resistant bearings is made with a corrosion resistant coating to protect from rusting (see opposing page). Thin Dense Chrome (TDC) coats the races and retaining ring. The collar and flingers are coated with the SEALMASTER Fluoropolymer that has been made famous by the Beverage Bearing housing. The collar cap screw is coated with a zinc phosphate protective layer. Stainless steel balls and food grade grease are also standard.

ERX Corrosion Resistant SKWEZLOC ball bearings can be specified by attaching the suffix "CR" to standard ERX-T nomenclature:

ERX-16T CR

CORROSION RESISTANCE AVAILABILITY

Sizes	3/4	1	1 3/16	1 1/4R	1 1/4	1 3/8	1 7/16
T CR	x	x	x	x	x	x	x

Sizes	1 1/2	1 11/16	1 3/4	1 15/16	2 3/16	2 7/16
T CR	x	x	x			

= call for availability
 = stock size
 = available summer 1998

Note: This chart applies to normal order sizes. For larger orders call to plan delivery schedule.

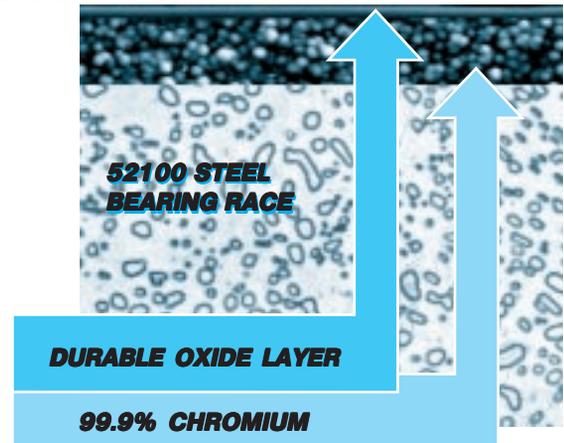
COATINGS PROTECT

Thin Dense Chrome Coating

The advanced process used to coat 52100 bearing steel with Thin Dense Chrome (TDC) is what differentiates it from decorative chrome. Decorative chrome flakes because the coating is not bonded well to the steel. The TDC process creates an ultra strong bond between the steel and the protective 99.9% pure Chromium layer. This is why TDC has three properties that make it an ideal corrosion resistant bearing coating:

- 1. Corrosion Resistance**
Chromium naturally forms a durable, non-flaking Chrome Oxide Layer at the surface. Tests have proven TDC can outlast steel in salt spray tests by a factor of 15.
- 2. Increased Hardness**
TDC is even harder than industry standard ball-paths.
- 3. Inherent Oil Retention**
TDC has a unique nodular microstructure that allows for a million tiny reservoirs to fill up with oil. This protects and lubricates the race surfaces.

CORROSION RESISTANT TDC COATING

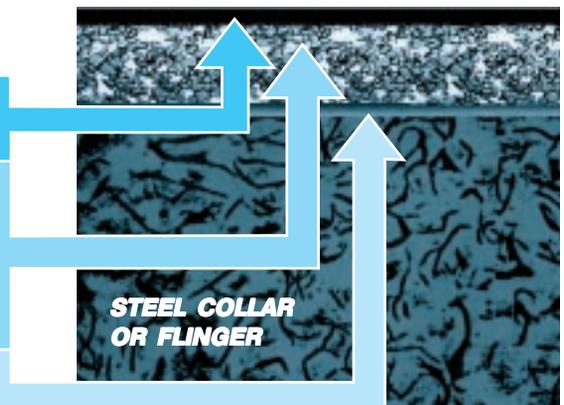


Fluoropolymer

ERX™ Corrosion Resistant SKWEZLOC® Collars feature a corrosion-resistant matrix with a fluoropolymer rich surface on a molecular binder layer to provide excellent corrosion and weathering resistance, abrasion durability, anti-peeling, and “Non-stick” properties. Fluoropolymer is a coating that features 3 protective layers:

- 1. Fluoropolymer Rich Surface**
non-stick release layer... resistant to most chemical attacks.
- 2. Fluoropolymer and Binder Matrix**
Hard dense material that has excellent wear and abrasion resistance; is resistant to most hydrocarbon solvents...all but the most concentrated acids...detergents, bases up to PH 11...high temperatures, up to 400°F (200°C) continuous duty...as well as atmospheric corrosion conditions.
- 3. Molecular Binder Layer**
Provides peeling-resistant bond...reduces blistering and adds to corrosion protection.

CORROSION RESISTANT FLUOROPOLYMER COATING



SEALS

Safeguard Spring

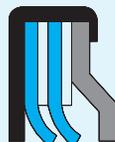
SEALMASTER Safeguard spring seals are the ultimate sealing mechanism to diminish the inlet of wet contaminants and retain grease.



sizes 3/4 - 1 3/4

Safeguard Double Lip

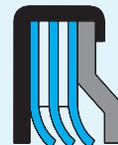
SEALMASTER Safeguard Double Lip seals utilize two rubber sealing barriers to help keep out wet contaminants and keep in grease. The exposed member of the steel shell is coated with the Fluoropolymer.



MADE TO ORDER
sizes 1 15/16 - 2 3/16

Safeguard Triple Lip

SEALMASTER Safeguard Triple Lip seals utilize three rubber sealing barriers to lessen the happenstance of wet contaminants entering the bearing. The exposed member of the steel shell is coated with the Fluoropolymer.



MADE TO ORDER
size 2 7/16



SEALMASTER®



ERX-TREME™

RE-LUBE FEATURES AND BENEFITS



- Name** ERX-TREME Re-Lube
- Suffix** RL
- Example** ERX-16 RL
- Locking** SET SCREW Only
- Lube** Premium Lithium Complex NLGI #2
- Seal** STANDARD FELT

ERX-TREME Re-lube bearings are the first ER style ball bearings that can be re-lubricated without any further modifications to the external housing. ERX-TREME Re-lube bearings have lubrication fittings for the same reason that pillow blocks and flange bearings have them; it extends useful bearing life through relubrication. Finally, an ER style insert bearing with the same capabilities!!! This design can save a lot of time and money; you won't have to provide special methods to re-lubricate your ER style ball bearings.



ERX™ Re-Lube ball bearings can be specified by attaching the suffix "RL" to standard ERX nomenclature:

ERX-16 RL

RE-LUBE AVAILABILITY

Sizes	1/2	5/8	3/4	7/8	15/16	1	1 1/8	1 3/16
RL	x	x	x	x	x	x	x	x

Sizes	1 1/4R	1 1/4	1 3/8	1 7/16	1 1/2	1 9/16	1 11/16	1 3/4
RL	x	x	x	x	x	x	x	x

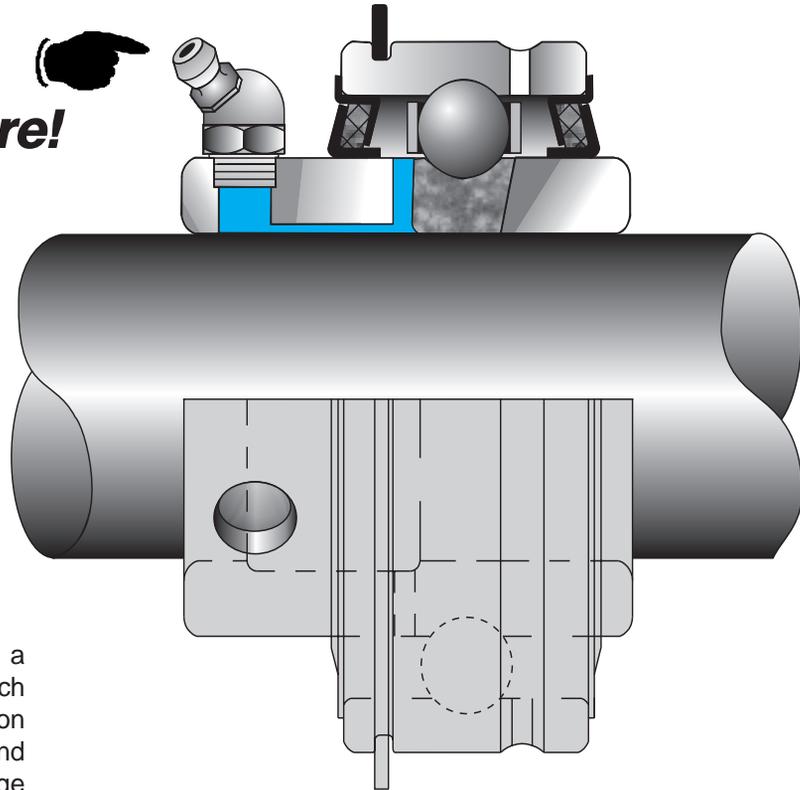
Sizes	1 7/8	1 15/16	2	2 3/16	2 1/4	2 3/8	2 7/16
RL	x	x	x	x	x	x	x

x = stock size

Note: This chart applies to normal order sizes. For larger orders call to plan delivery schedule

HOW IT WORKS!

Grease Goes Here!



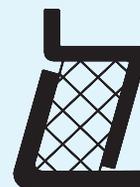
This ingenious design incorporates a lubrication fitting with the inner race which allows grease to flow from the lubrication fitting, through a groove in the bore, and into the bearing chamber to try to purge out contaminated or old grease and replenish lubrication levels.

Caution: ERX™ Re-lube bearings are intended to be used on stationary shafting only.

SEALS

Standard Felt Seals

The patented felt labyrinth seal with rotating flinger is designed to direct contamination away from the sealing surfaces. The felt design creates a tight barrier which provides for grease retention and attenuates the ingress of foreign material. The design operates with less drag and heat generation than rubber contact seals.





SEALMASTER®



ERX-TREME™

HI-TEMPERATURE FEATURES AND BENEFITS

Made with DuPont®
Krytox® GPL 227
Grease



KRYTOX and NOMEX are registered trademarks of E.I. Du Pont de Nemours and Company. Emerson Power Transmission Corp. is not affiliated with this company.

- Name** ERX-TREME HI TEMPERATURE
- Suffix** HI
HIY (FOR EXPANSION TYPE)
- Example** ERX-16 HI
- Locking** SET SCREW Only
- Lube** KRYTOX® GPL 227
- Seal** NOMEX® FELT

ERX-TREME HI Temperature ball bearings will operate from 30°F to 400°F. ERX HI Temperature bearings utilize Krytox® GPL 227 DuPont® high temperature grease to extend useful bearing life and reduce maintenance requirements. A brass land-riding retainer is provided standard to ensure proper heat capabilities (brass has a melting point of 1250°F). Larger internal clearances are designed into the ERX HI Temperature bearings to allow for thermal expansion due to temperature changes.

ERX HI Temperature ball bearings can be specified by attaching the suffix "HI" to standard ERX nomenclature:

ERX-16 HI

HI TEMP AVAILABILITY

Sizes	1/2	5/8	3/4	7/8	15/16	1	1 1/8	1 3/16	1 1/4R	1 1/4
HI	x	x	x	x	x	x	x	x	x	x
HIY			x	x	x	x	x	x	x	x

Sizes	1 3/8	1 7/16	1 1/2	1 9/16	1 11/16	1 3/4	1 7/8	1 15/16	2	2 3/16
HI	x	x	x	x	x	x	x	x	x	x
HIY	x	x	x	x	x	x	x	x	x	x

Sizes	2 1/4	2 3/8	2 7/16	2 1/2	2 11/16	2 15/16	3	3 3/16	3 7/16
HI	x	x	x	x	x	x	x	x	x
HIY	x	x	x	x	x	x	x	x	x

x = 5 days x = stock size x = 2 weeks = call for availability

Note: This chart applies to normal order sizes. For larger orders call to plan delivery schedule.



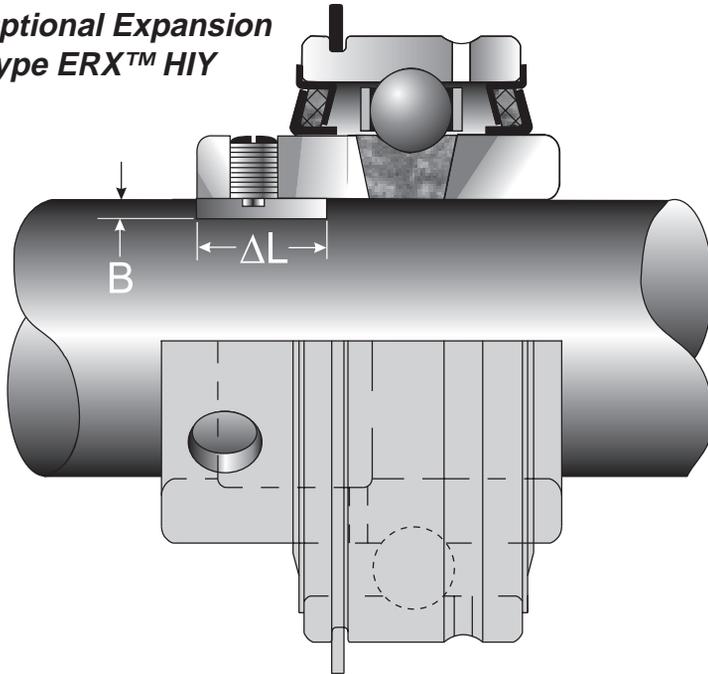
HI TEMP

SEALMASTER®



OPERATES 30° F to 400° F

Optional Expansion Type ERX™ HIY



An expansion type ERX™ HI Temperature bearing is available. It uses a half-dog set screw combined with a lock wire and is recommended for applications that require expansion capability. This may be essential when shafts grow in length due to temperature changes. The single half-dog set screw has a cylindrical nub that protrudes out of the bottom of the set screw. The nub is used to mate loosely with a slot milled into the shafting. As the shaft spins, the nub interferes with the slot and positively turns the inner ring. See HIY installation instructions. Note: All expansion bearings must be used in conjunction with a fixed bearing to stabilize the system.

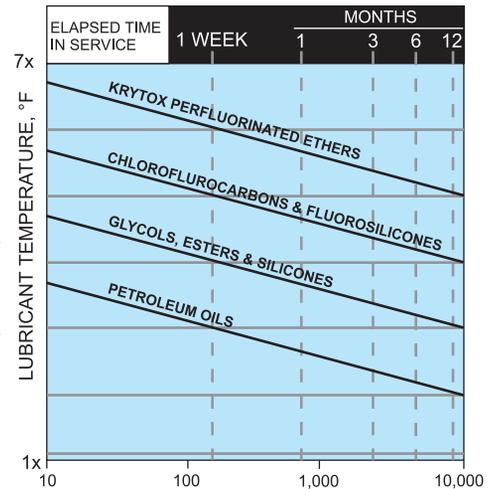
Refer to page 20 for HIY installation instructions. Contact Sealmaster Application Engineering At (630) 898-9620 for more information about half dog set screw and wire installation. ERX HI Temperature EXPANSION ball bearings can be specified by attaching the suffix "HIY" to standard ERX nomenclature:

ERX-16 HIY

TESTS SHOW KRYTOX® CAN IMPROVE LIFE UP TO 45 TIMES COMPARED WITH OTHER HIGH TEMP GREASES

Krytox grease has a superior service life and therefore diminishes re-lubrication frequency. This synthetic lubricant provides superior performance and extended life. It is chemically inert in ultra-severe environments and provides thermal stability and predictable viscosity, even under extreme loads and pressure. Our engineers have found that, compared to other high temperature greases, the thermal stability and lubricity of Krytox can improve a high temperature bearing life 4 to 45 times. The chart confirms this testing. For example, the chart illustrates at moderate temperatures, the Krytox service life runs off the chart while silicon oil greases last about one month. Depending on your needs you may not have to relubricate ever. Contact application engineering for more information.

These are estimates only because factors other than temperature play a role in determining the service life of a lubricant. The values are based primarily on thermal and oxidative stabilities. Contamination from external sources, wear debris or attrition by leakage are important factors in the service life of a lubricant.



SEALS

Nomex® Felt

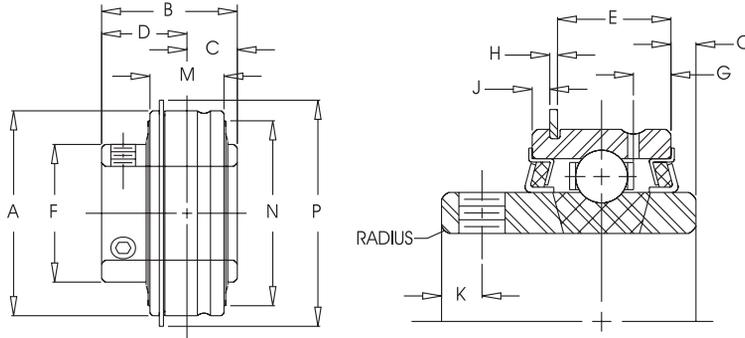
The Nomex felt seal uses the same dependable design as the patented felt labyrinth seal with rotating flinger that works to direct contamination away from the sealing surfaces. The Nomex felt design provides a tight barrier which retains needed grease and attenuates the ingress of foreign material while withstanding higher temperatures. The design operates with less drag and heat generation than rubber contact seals. Nomex, a DuPont® brand, is a heat retardant felt-like material that is often used to protect Firemen.





SEALMASTER®

GOLD LINE SET SCREW ER & ERX™ BEARINGS



SET SCREW

SHAFT DIAM.	STD. BRG NO.	ERX BRG NO.	Dimensions in Inches														UNIT WT.	
			A	B	C	D	E	F	G	H	J	K	M	N	RAD	O		P
1/2 9/16 5/8 11/16 3/4 20	ER-8 ER-9 ER-10 ER-11 ER-12 ER-204	ERX-8 ERX-10 ERX-12	47MM 1.8504	1 7/32	13/32	13/16	31/64	1 3/16	11/64	3/64	3/32	3/16	5/8	1 5/8	.040	.094	2 1/16	.56
7/8 15/16 1 25	ER-14 ER-15 ER-16 ER-205	ERX-14 ERX-15 ERX-16	52MM 2.0472	1 3/8	33/64	55/64	39/64	1 3/8	13/64	3/64	3/32	7/32	3/4	1 55/64	.040	.135	2 17/64	.68
1 1/16 1 1/8 1 3/16 1 1/4 30	ER-17 ER-18 ER-19 ER-20R ER-206	ERX-18 ERX-19 ERX-20R	62MM 2.4409	1 1/2	5/8	7/8	11/16	1 19/32	7/32	1/16	1/8	7/32	7/8	2 5/32	.040	.188	2 1/32	.93
1 1/4 1 5/16 1 3/8 1 7/16 35	ER-20 ER-21 ER-22 ER-23 ER-207	ERX-20 ERX-22 ERX-23	72MM 2.8346	1 11/16	11/16	1	3/4	1 55/64	7/32	1/16	1/8	1/4	15/16	2 17/32	.040	.219	3 5/64	1.37
1 1/2 1 9/16 40	ER-24 ER-25 ER-208	ERX-24 ERX-25	80MM 3.1496	1 15/16	3/4	1 3/16	29/32	2 1/16	1/4	1/16	1/8	5/16	1 3/32	2 53/64	.062	.203	3 13/32	2.00
1 5/8 1 11/16 1 3/4 45	ER-26 ER-27 ER-28 ER-209	ERX-27 ERX-28	85MM 3.3465	1 15/16	3/4	1 3/16	29/32	2 19/64	1/4	1/16	1/8	5/16	1 3/32	3 1/16	.062	.203	3 19/32	2.31
1 13/16 1 7/8 1 15/16 2 50	ER-29 ER-30 ER-31 ER-32R ER-210	ERX-30 ERX-31 ERX-32R ERX-210	90MM 3.5433	2 1/32	3/4	1 9/32	29/32	2 15/32	19/64	3/32	1/8	3/8	1 1/8	3 7/32	.062	.188	3 25/32	2.43
2 2 1/8 2 3/16 55	ER-32 ER-34 ER-35 ER-211	ERX-32 ERX-35	100MM 3.9370	2 3/16	7/8	1 5/16	31/32	2 23/32	19/64	3/32	1/8	3/8	1 3/16	3 9/16	.080	.281	4 3/16	3.00
2 1/4 2 3/8 2 7/16 60	ER-36 ER-38 ER-39 ER-212	ERX-36 ERX-38 ERX-39	110MM 4.3307	2 9/16	1	1 9/16	1 1/32	2 63/64	19/64	3/32	1/8	7/16	1 1/4	3 29/32	.080	.375	4 19/32	4.00
2 1/2 2 11/16 70	ER-40 ER-43 ER-214	ERX-40 ERX-43	125MM 4.9213	2 3/4	1 1/16	1 11/16	1 7/64	3 7/16	5/16	7/64	5/32	7/16	1 3/8	4 7/16	.080	.375	5 9/32	5.56
2 7/8 2 15/16 75	ER-46 ER-47 ER-215	ERX-47	130MM 5.1181	3 1/16	1 5/16	1 3/4	1 15/64	3 41/64	3/8	7/64	5/32	7/16	1 1/2	4 5/8	.080	.563	5 1/2	6.37
3 3 3/16 80	ER-48 ER-51 ER-216	ERX-48 ERX-51	140MM 5.5118	3 1/4	1 5/16	1 5/16	1 25/64	3 59/64	7/16	7/64	3/16	17/32	1 11/16	4 63/64	.120	.469	5 7/8	7.85
3 1/4 3 3/8 3 7/16	ER-52 ER-54 ER-55		150MM 5.9055	3 3/8	1 11/32	2 1/32	1 41/64	4 5/32	7/16	7/64	3/16	15/32	1 15/16	5 19/64	.120	.375	6 9/32	9.50
3 15/16 4	ER-63 ER-64		190MM 7.4803	4 5/8	1 15/16	2 11/16	2 5/32	5 11/64	11/16	1/8	7/32	3/4	2 1/2	6 21/32	.120	.688	8	22.0

To specify SET SCREW ERX™ LO DRAG
USE "LO"

i.e. ERX-16 LO
Availability Pg 4

ERX-LO



To specify SET SCREW X-TRA LO DRAG
USE "XLO"

i.e. ERX-16 XLO
Availability Pg 4

ERX-XLO



To specify SET SCREW ERX HI TEMP
USE "HI"

i.e. ERX-16 HI
Availability Pg 10

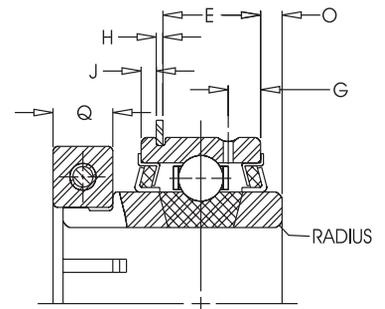
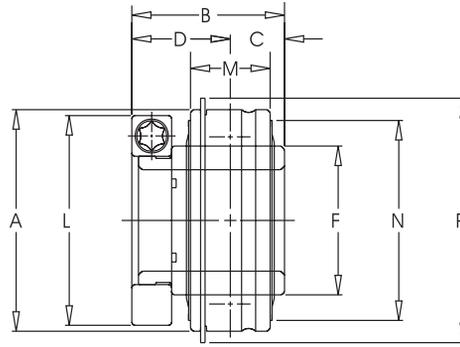
ERX-HI





GOLD LINE SKWEZLOC® ER & ERX™ BEARINGS

SKWEZLOC®



SHAFT DIAM.	STD. BRG NO.	ERX BRG NO.	Dimensions in Inches															UNIT WT.	
			A	B	C	D	E	F	G	H	J	L	M	N	RAD	O	P		Q
3/4	ER-12T	ERX-12T	47MM 1.8504	1 9/32	13/32	7/8	31/64	1 3/16	11/64	3/64	3/32	1 3/4	5/8	1 5/8	.040	.094	2 1/16	3/8	.56
1	ER-16T	ERX-16T	52MM 2.0472	1 7/16	33/64	59/64	39/64	1 3/8	13/64	3/64	3/32	1 15/16	3/4	1 55/64	.040	.135	2 17/64	3/8	.68
1 1/8	ER-18T	ERX-18T	62MM																
1 3/16	ER-19T	ERX-19T	2.4409	1 9/16	5/8	15/16	11/16	1 19/32	7/32	1/16	1/8	2 3/16	7/8	2 5/32	.040	.187	2 21/32	3/8	.93
1 1/4	ER-20RT	ERX-20 RT																	
1 1/4	ER-20T	ERX-20T										2 7/16							
	ER-22T	ERX-22T	72MM	1 3/4	11/16	1 1/16	3/4	1 55/64	7/32	1/16	1/8	-	15/16	2 9/16	.040	.219	3 5/64	7/16	1.37
1 7/16	ER-23T	ERX-23T	2.8346									2 9/16							
1 1/2	ER-24T	ERX-24T	80MM 3.1496	2	3/4	1 1/4	29/32	2 1/16	1/7	1/16	1/8	2 11/16	1 3/32	2 53/64	.062	.203	3 13/32	7/16	2.00
1 11/16	ER-27T	ERX-27T	85MM																
1 3/4	ER-28T	ERX-28T	3.3465	2	3/4	1 1/4	29/32	2 19/64	1/4	1/16	1/8	2 15/16	1 3/32	3 1/16	.062	.203	3 19/32	7/16	2.31
1 15/16	ER-31T	ERX-31T	90MM 3.5433	2 3/32	3/4	1 11/32	29/32	2 15/32	19/64	3/32	1/8	3 3/8	1 1/8	3 7/32	.062	.188	3 25/32	9/16	2.43
2	ER-32T	ERX-32T	100MM																
2 3/16	ER-35T	ERX-35T	3.9370	2 1/4	7/8	1 3/8	31/32	2 23/32	19/64	3/32	1/8	3 1/2 3 5/8	1 3/16	3 9/16	.080	.281	4 3/16	9/16	3.00
2 7/16	ER-39T	ERX-39T	110MM 4.3307	2 5/8	1	1 5/8	1 1/32	2 63/64	19/64	3/32	1/8	4 1/8	1 1/4	3 15/16	.080	.375	4 37/64	11/16	4.00



ONLY Applicable to Standard GOLD LINE ER BEARINGS

Single Lip Contact Seal

Available on all sizes. Recommended where moisture conditions prevail. To specify, add suffix "C" (ER-16C, ER-16TC).

To specify SKWEZLOC®
ERX™ LO DRAG
USE "LO"
i.e. ERX-16T LO
Availability Pg 4
ERX-T LO



To specify SKWEZLOC
X-TRA LO DRAG
USE "XLO"
i.e. ERX-16T XLO
Availability Pg 4
ERX-T XLO

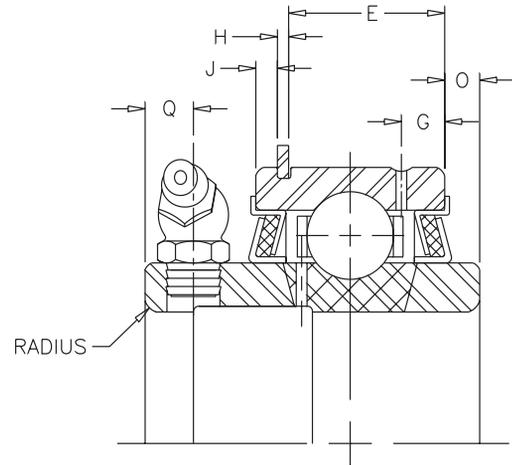
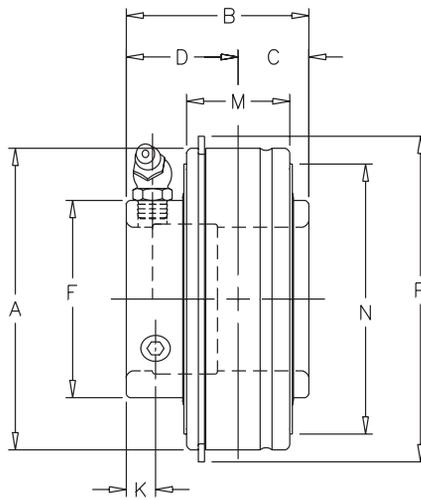


To specify SKWEZLOC
ERX CORROSION RESISTANT
USE "CR"
i.e. ERX-16T CR
Availability Pg 6
ERX-T CR





ERX-TREME™ RL RELUBE BEARING ASSEMBLIES



SET SCREW

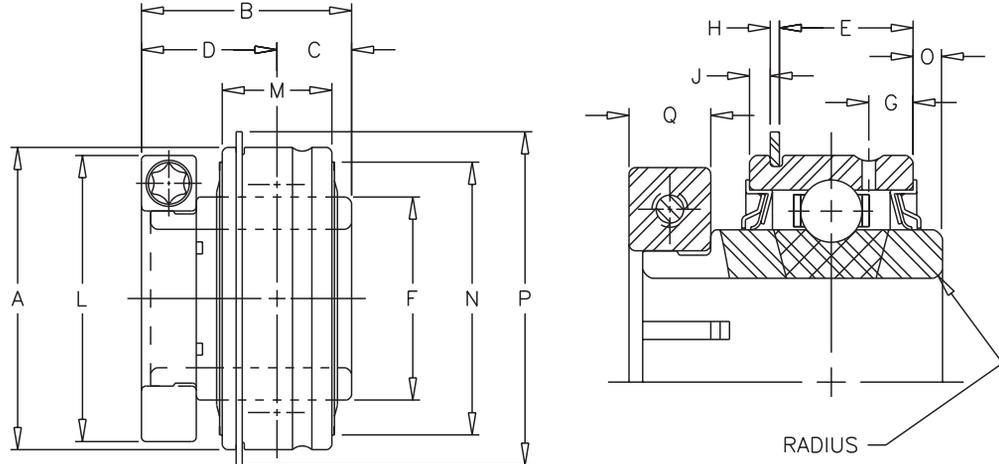
SHAFT DIAM. IN	BRG NO.	Dimensions in Inches															UNIT WT.		
		A	B	C	D	E	F	G	H	J	K	M	N	RAD	O	P		Q	
1/2	ERX-8 RL	47MM																	
5/8	ERX-10 RL	1.8504	1 7/32	13/32	13/16	31/64	1 3/16	11/64	3/64	3/32	3/16	5/8	1 5/8	.040	.093	2 1/16	3/16	.56	
3/4	ERX-12 RL																		
7/8	ERX-14 RL	52MM																	
15/16	ERX-15 RL	2.0472	1 3/8	33/64	55/64	39/64	1 3/8	13/64	3/64	3/32	7/32	3/4	1 55/64	.040	.135	2 17/64	3/16	.68	
1	ERX-16 RL																		
1 1/8*	ERX-18 RL	62MM																	
1 3/16*	ERX-19 RL	2.4409	1 9/16	5/8	15/16	11/16	1 19/32	7/32	1/16	1/8	7/32	7/8	2 5/32	.040	.187	2 21/32	9/64	.93	
1 1/4	ERX-20 RL	72MM																	
1 3/8	ERX-22 RL	2.8346	1 11/16	11/16	1	3/4	1 35/64	7/32	1/16	1/8	1/4	15/16	2 9/16	.040	.219	3 5/64	3/16	1.37	
1 7/16	ERX-23 RL																		
1 1/2	ERX-24 RL	80MM																	
1 9/16	ERX-25 RL	3.1496	1 15/16	3/4	1 3/16	29/32	2 1/16	1/7	1/16	1/8	5/16	1 3/32	2 53/64	.062	.203	3 13/32	9/32	2.00	
	ERX-27 RL	85MM																	
1 3/4	ERX-28 RL	3.3465	1 15/16	3/4	1 3/16	29/32	2 19/64	1/4	1/16	1/8	5/16	1 3/32	3 1/16	.062	.203	3 19/32	9/32	2.31	
	ERX-30 RL	90MM																	
1 15/16	ERX-31 RL	3.5433	2 1/32	3/4	1 9/32	29/32	2 15/32	19/64	3/32	1/8	3/8	1 1/8	3 7/32	.062	.187	3 25/32	5/16	2.43	
2	ERX-32 RL	100MM																	
2 3/16	ERX-35 RL	3.9370	2 3/16	7/8	1 5/16	31/32	2 23/32	19/64	3/32	1/8	3/8	1 3/16	3 9/16	.080	.281	4 3/16	5/16	3.00	
2 3/8	ERX-38 RL	110MM																	
2 7/16	ERX-39 RL	4.3307	2 9/16	1	1 9/16	1 1/32	2 63/64	19/64	3/32	1/8	7/16	1 1/4	3 15/16	.080	.375	4 19/32	3/8	4.00	

* B & D Dimensions differ from standard model sizes.

Caution: ERX Re-lube bearings are intended to be used on stationary shafting only.



GOLD LINE METRIC-SKWEZ™ BEARINGS



METRIC-SKWEZ™ ER-TMC

HARD METRIC ER Style Extended Inner Ring Bearing Assembly

CONTACT SEALS

SHAFT DIA.	BRG. NO.	Dimensions in Millimeters/Inches										Weight in Kilograms/Pounds					UNIT WT.	
		A	B	C	D	E	F	G	H	J	L	M	N	RAD	O	P		Q
20MM	ER-204TMC	47MM 1.8504	33 1-9/32	13 1/2	20 25/32	12 31/64	30 1.182	4 11/64	1 3/64	2 3/32	44 1-3/4	16 5/8	41 1-5/8	1 .040	5 .188	52 2-1/16	10 3/8	0.3 .56
25MM	ER-205TMC	52MM 2.0472	37 1-7/16	14 9/16	22 7/8	15 39/64	35 1.375	5 13/64	1 3/64	2 3/32	49 1-15/16	19 3/4	47 1-55/64	1 .040	5 .188	58 2-17/64	10 3/8	0.3 .68
30MM	ER-206TMC	62MM 2.4409	40 1-9/16	16 5/8	24 15/16	17 11/16	40 1.587	6 7/32	2 1/16	3 1/8	56 2-3/16	22 7/8	55 2-5/32	1 .040	5 .188	67 2-21/32	10 3/8	0.4 .93
35MM	ER-207TMC	72MM 2.8346	44 1-3/4	17 11/16	27 1-1/16	19 3/4	47 1.852	6 7/32	2 1/16	3 1/8	65 2-9/16	24 15/16	65 2-9/16	1 .040	6 .219	78 3-5/64	11 7/16	0.6 1.37
40MM	ER-208TMC	80MM 3.1496	51 2	19 3/4	32 1-1/4	23 29/32	52 2.060	6 1/4	2 1/16	3 1/8	68 2-11/16	28 1-3/32	72 2-53/64	2 .062	5 .203	87 3-13/32	11 7/16	0.9 2.00
45MM	ER-209TMC	85MM 3.3465	51 2	19 3/4	32 1-1/4	23 29/32	58 2.296	6 1/4	2 1/16	3 1/8	75 2-15/16	28 1-3/32	78 3-1/16	2 .062	5 .203	91 3-19/32	11 7/16	1.0 2.31
50MM	ER-210TMC	90MM 3.5433	53 2-3/32	19 3/4	34 1-11/32	23 29/32	63 2.463	8 19/64	2 3/32	3 1/8	86 3-3/8	29 1-1/8	82 3-7/32	2 .062	5 .188	96 3-25/32	14 9/16	1.1 2.43
55MM	ER-211TMC	100MM 3.9370	57 2-1/4	22 7/8	35 1-3/8	25 31/32	69 2.711	8 19/64	2 3/32	3 1/8	92 3-5/8	30 1-3/16	90 3-9/16	2 .080	7 .281	106 4-3/16	14 9/16	1.4 3.00
60MM	ER-212TMC	110MM 4.3307	67 2-5/8	25 1	41 1-5/8	32 1-1/32	76 2.981	8 19/64	2 3/32	3 1/8	105 4-1/8	32 1-1/4	100 3-15/16	2 .080	10 .375	116 4-37/64	17 11/16	1.8 4.00

Note: ERX-TREME™ options available on an MTO basis. Please contact application engineering at 630-898-9620 for availability.

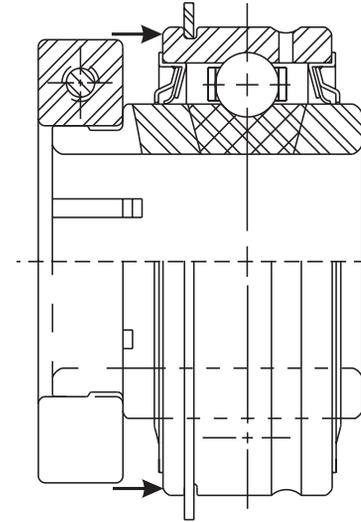


Felt Seals Optional.
To specify, remove C suffix, as ER-204TM.
Consult SEALMASTER® for availability.

HOUSING INSTALLATION

The ER insert should be pressed into a housing (not provided with the insert). We recommend machining the housing ID to the dimensions called out in the table below. When installing into the housing pressure should be applied only to the face of the **outer ring**. This avoids pushing the inner race into the rolling elements which creates excessive forces and can permanently indent the raceways.

For ER products (other than ERX-TREME™ Re-lube) if possible, machine a lubrication groove into the housing ID. SEALMASTER® recommends drilling a hole into the housing to link the lubrication groove with a fitting or connector to allow for re-lubrication.



SHAFT TOLERANCING

Shaft Size	Recommended Shaft Tolerances	
	Shaft Tolerance (in)	Shaft Tolerance (mm)
1/2-1 5/16in.	+0.000 to -0.0005	
2-3 31/16in.	+0.0000 to -0.0010	
3 1/4-4 15/16	+0.0000 to -0.0015	
20-50mm	+0.0000 to -0.0005	+0.0000 to -0.0130
55-60mm	+0.0000 to -0.0010	+0.0000 to -0.0255

BORE TOLERANCING

Bore Size	Bore Tolerances	
	Bore Tolerance (in)	Bore Tolerance (mm)
1/2-1 5/16in.	+0.0006 - 0	
2-3 31/16in.	+0.0006 - 0	
3 1/4-4 15/16in.	+0.0007 - 0	
20-30mm	+0.0006 - 0	+0.015 - 0
35-50mm	+0.0007 - 0	+0.017 - 0
55-60mm	+0.0008 - 0	+0.020 - 0

RECOMMENDED HOUSING I.D.

Cartridge Number	Dimensions in mm/inches									
	O.D. Of Cartridge Diameters		Stationary Housing				Revolving Housing			
			Diameter		Theoretical Fit		Diameter		Theoretical Fit	
	Min.	Max.	Min.	Max.	Tight	Loose	Min.	Max.	Tight	Loose
ER-8 thru	46.9875	47.0002	46.9976	47.0129	0.0025	0.0254	46.9849	47.0002	0.0152	0.0127
ER-12T, ER-204	1.8499	1.8504	1.8503	1.8509	0.0001	0.0010	1.8498	1.8504	0.0006	0.0005
ER-14 thru	51.9836	51.9989	51.9963	52.0090	0.0025	0.0254	51.9836	51.9963	0.0152	0.0127
ER-16T, ER-205	2.0466	2.0472	2.0471	2.0476	0.0001	0.0010	2.0466	2.0471	0.0006	0.0005
ER-17 thru	61.9836	61.9989	61.9963	62.0090	0.0025	0.0254	61.9836	61.9963	0.0152	0.0127
ER-19T,ER-206	2.4403	2.4409	2.4408	2.4413	0.0001	0.0010	2.4403	2.4408	0.0006	0.0005
ER-20 thru	71.9836	71.9988	71.9963	72.0090	0.0025	0.0254	71.9836	71.9963	0.0152	0.0127
ER-23T, ER-207	2.8340	2.8346	2.8345	2.8350	0.0001	0.0010	2.8340	2.8345	0.0006	0.0005
ER-24, ER-24T	79.9846	79.9998	79.9973	80.0100	0.0025	0.0254	79.9846	79.9973	0.0152	0.0127
ER-25, ER-208	3.1490	3.1496	3.1495	3.1500	0.0001	0.0010	3.1490	3.1495	0.0006	0.0005
ER-26 thru	84.9808	85.0011	84.9986	85.0138	0.0025	0.0330	84.9833	84.9986	0.0178	0.0178
ER-28T, ER-209	3.3457	3.3465	3.3464	3.3470	0.0001	0.0013	3.3458	3.3464	0.0007	0.0007
ER-30, ER-31	89.9795	89.9998	89.9973	90.0125	0.0025	0.0330	89.9820	89.9973	0.0178	0.0178
ER-31T, ER-210	3.5425	3.5433	3.5432	3.5438	0.0001	0.0013	3.5426	3.5432	0.0007	0.0007
ER-32 thru	99.9795	99.9998	99.9973	100.0125	0.0025	0.0330	99.9820	99.9973	0.0178	0.0178
ER-35T, ER-211	3.9362	3.9370	3.9369	3.9375	0.0001	0.0013	3.9363	3.9369	0.0007	0.0007
ER-36 thru	109.9795	109.9998	109.9972	110.0125	0.0025	0.0330	109.9820	109.9972	0.0178	0.0178
ER-39T, ER-212	4.3299	4.3307	4.3306	4.3312	0.0001	0.0013	4.3300	4.3306	0.0007	0.0007
ER-40	124.9756	125.0010	124.9959	125.0163	0.0051	0.0406	124.9782	124.9985	0.0229	0.0229
ER-43, ER-214	4.9203	4.9213	4.9211	4.9219	0.0002	0.0016	4.9204	4.9212	0.0009	0.0009
ER-46	129.9743	129.9997	129.9947	130.0150	0.0051	0.0406	129.9769	129.9972	0.0229	0.0229
ER-47, ER-215	5.1171	5.1181	5.1179	5.1187	0.0002	0.0016	5.1172	5.1180	0.0009	0.0009
ER-48	139.9743	139.9997	139.9946	140.0150	0.0051	0.0406	139.9769	139.9972	0.0229	0.0229
ER-51, ER-216	5.5108	5.5118	5.5116	5.5124	0.0002	0.0016	5.5109	5.5117	0.0009	0.0009
ER-52, ER-54	149.9743	149.9997	149.9946	150.0149	0.0051	0.0406	149.9768	149.9972	0.0229	0.0229
ER-55	5.9045	5.9055	5.9053	5.9061	0.0002	0.0016	5.9046	5.9054	0.0009	0.0009
ER-63, ER-64	189.9691	189.9996	189.9945	190.0301	0.0051	0.0610	189.9691	190.0047	0.0305	0.0356
	7.4791	7.4803	7.4801	7.4815	0.0002	0.0024	7.4791	7.4805	0.0012	0.0014

SHAFT MOUNTING INSTALLATION PROCEDURES FOR BALL BEARINGS

Note: Setscrew marks on the shaft can be removed by backing out the setscrews and using a flat punch to tap down the set screw burrs on the shaft.

SETSCREW LOCKING:

1 INSPECT SHAFT

- Clean/remove burrs.
- Check diameter
Reference page 16.
- Clean Mounting Surface.



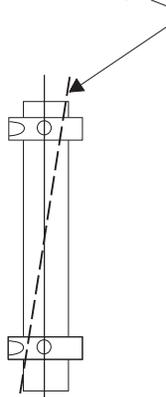
2 PLACE BEARING ON SHAFT

- Apply light film of oil on shaft.
- Do not hammer bearing onto shaft.

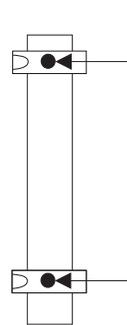


3 CHECK ALIGNMENT

- Bearing and shaft must be in alignment.
- Rotate shaft to make sure it turns smoothly.

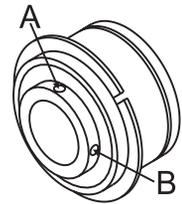


4 ALIGN SETSCREWS ON EITHER END OF SHAFT



5 ALTERNATE TORQUING OF SETSCREWS

- Step 1: Torque setscrew "A" to 1/2 recommended torque.
- Step 2: Torque setscrew "B" to full recommended torque.
- Step 3: Torque setscrew "A" to full recommended torque. (Reference page 21).
- Double Lock: Repeat on opposite end.



SKWEZLOC® LOCKING COLLAR:

1 INSPECT SHAFT

- Clean/remove burrs.
- Check diameter
Reference page 16.
- Clean Mounting Surface.



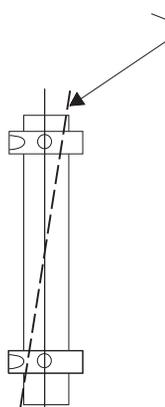
2 PLACE BEARING ON SHAFT

- Do not hammer bearing onto shaft.

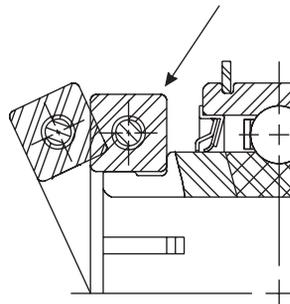


3 CHECK ALIGNMENT

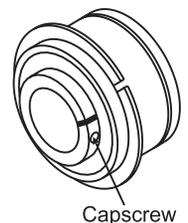
- Bearing and shaft must be in alignment.
- Rotate shaft to make sure it turns smoothly.



4 PUSH LOCKING COLLAR TIGHTLY AGAINST INNER RING SHOULDER



5 TORQUE CAPSCREW TO RECOMMENDED VALUE (Reference page 21).



RELUBRICATION

ER & ERX™ bearing inserts are shipped with high quality lubricants in the bearing. Periodic re-lubrication of fresh lubricant will help flush out contaminants, replenish lubrication, and extend useful bearing operating life. The following recommendations detail the type of lubricant and re-lubrication frequency for each specific ER & ERX design.

RELUBRICATION PORTS OF ENTRY

**STANDARD GOLD LINE ER
ERX LO DRAG & XTRA LO DRAG
ERX-T CORR. RESISTANT
ERX HI TEMPERATURE**

The above units are designed with a relubrication groove in the Outer race OD. Re-lubrication of these bearings requires a passage from a fitting or connector on the machine to the ER lubrication groove.

ERX RE-LUBE

ERX Re-lube bearings can be re-lubricated through the fitting mounted on the inner race extension. This is the only ER bearing in the family that already has a re-lubrication device built into the bearing. This bearing should only be applied in applications where the shaft and inner ring do not rotate (dead shaft).

SPECIAL RE-LUBRICATION INSTRUCTIONS FOR ERX LO DRAG & ERX XTRA LO DRAG

These bearings are specially designed for applications which require the bearing to rotate with less torque or drag than a standard bearing.

Note: Addition of lubricant to the bearing will increase bearing drag.

If re-lubrication is necessary:

1. Add a very small amount of lubricant
2. Check bearing rotational torque

(be sure that the bearing still rotates freely enough for the application.)

RECOMMENDED RELUBE INTERVALS

STANDARD GOLD LINE ER, ERX-T CORROSION RESISTANT, ERX-RE-LUBE

	SPEED	OPERATING TEMPERATURE	CLEANLINESS	GREASE INTERVAL
	100 RPM	-20° UP TO 120° F	CLEAN, DRY	6-12 MONTHS
	500 RPM	120° TO 150° F	CLEAN, DRY	2-6 MONTHS
	1000	150° TO 210° F	CLEAN, DRY	2 WEEKS TO 2 MONTHS
	1500 RPM	OVER 210° TO 250° F	CLEAN, DRY	DAILY TO WEEKLY
	1500 TO MAX CATALOG	-20° TO 150° F	LIGHTLY CONTAMINATED, HUMID	1 WEEK TO 1 MONTH
	1500 TO MAX CATALOG	150° TO 250° F	CONTAMINATED, SOME MOISTURE	DAILY TO 2 WEEKS
	1500 TO MAX CATALOG	-20° TO 250° F	HEAVILY CONTAMINATED, WET	DAILY TO 2 WEEKS

Note: Actual performance and specific applications will dictate the required re-lube interval for all ER and ERX bearings.

RECOMMENDED LUBRICANT SPECIFICATIONS

ERX LO DRAG 		X-TRA LO DRAG 	
Thickener	Sodium Complex	Thickener	NA
NLGI	#3	NLGI	NA
Oil	Petroleum	Oil	Petroleum
Oil Viscosity	285-350 SUS @100° F 60-75 cSt @40° C	Oil Viscosity	120-165 SUS @100° F 25-35 cSt @40° C
Frequency	See Special Inst. Pg 18	Frequency	DAILY

ERX RE-LUBE & STANDARD GOLD LINE 		ERX CORROSION RESISTANT FOOD GRADE GREASE 	
Thickener	Lithium or Lithium Complex	Thickener	Aluminum Complex
NLGI	#2	NLGI	#2
Oil	Petroleum	Oil	Mineral
Oil Viscosity	700-1200 SUS @100 F 150-260 cSt @40 C	Oil Viscosity	1800-2200 SUS @100° F 400-500 cSt @40° C
Frequency	See Page 18	Frequency	See Page 18

ERX HI TEMP 		*No substitute - mixing with other lubricants can seriously compromise bearing performance. Contact SEALMASTER® Engineering for further information.
*Grease	Krytox® GPL 227	
Frequency	See Page 18	

RECOMMENDED RELUBE INTERVALS

ERX HI TEMPERATURE

SPEED	OPERATING TEMPERATURE	CLEANLINESS	GREASE INTERVAL
100 RPM	200 UP TO 300 F	CLEAN	6-12 MONTHS
500 RPM	200 UP TO 300 F	CLEAN	2-6 MONTHS
1000	200 UP TO 300 F	CLEAN	2 WEEKS TO 2 MONTHS
1500 RPM	200 UP TO 300 F	CLEAN	DAILY TO WEEKLY
1500 TO MAX CATALOG	200 UP TO 300 F	CLEAN	DAILY TO WEEKLY
100 RPM	300 UP TO 400 F	CLEAN	3 TO 6 MONTHS
500 RPM	300 UP TO 400 F	CLEAN	1 TO 3 MONTHS
1000	300 UP TO 400 F	CLEAN	1 WEEK TO 1 MONTH
1500 RPM	300 UP TO 400 F	CLEAN	DAILY TO 1 WEEK
1500 TO MAX CATALOG	300 UP TO 400 F	CLEAN	DAILY
TO MAX CATALOG	200 UP TO 400 F	CONTAMINATED	1 WEEK TO 1 MONTH
TO MAX CATALOG	200 UP TO 400 F	HEAVILY CONTAMINATED	DAILY TO 1 WEEK
TO MAX CATALOG	200 UP TO 400 F	SEVERLY CONTAMINATED	DAILY

Note: Depending on your requirements - you MAY NOT have to relubricate ERX-HI temperature bearings.

ERX™ BEARING MAX SPEEDS

SHAFT SIZE	LO	XLO & HI	TCR
1/2 9/16 5/8 11/16 3/4	5800	2900	6500
1 3/16 7/8 15/16 1	5000	2500	2500
1 1/16 1 1/8 1 3/16 1 1/4R	4300	2150	2200
1 1/4 1 5/16 1 3/8 1 7/16	3700	1850	2000
1 1/2 1 9/16	3300	1650	1900
1 5/8 1 11/16 1 3/4	3000	1500	1000
1 13/16 1 7/8 1 15/16	2800	1400	300
2 2 1/8 2 3/16	2500	1250	300
2 1/4 2 5/16 2 3/8 2 7/16	2300	1150	650
2 1/2 2 11/16		1000	
2 7/8 2 15/16		800	
3 3 3/16		600	

For standard ER bearings refer to rating tables on page 22 & 23.

Note: Table assumes that bearings are operating at room temperature. Contact Application Engineering for more information, (630)898-9620.

Optional Expansion Type for HI Temp

Expansion bearings allow for linear shaft expansion or contraction caused by temperature variations. Without this expansion capability, bearings may be subjected to excessive thrust loads and misalignment which could damage the bearing, mounting surfaces, and frameworks.

The ERX-TREME™ HI TEMP bearing can be specified to accommodate shaft expansion. To specify, Attach HIY to ERX™ size: ERX-16 HIY. This will include a half dog set screw and wire assembly with the unit. This is strictly an MTO item with approximately 2 week delivery lead time.

Notes:

- When using an expansion bearing, ALWAYS use a fixed bearing as the second support bearing.
- Half-dog set screw and lock wire bearings are also available for the entire SEALMASTER® Mounted Ball Bearing Gold Line.
- Half-dog set screw and lock wire systems are not recommended for high speed or vibration applications. Sealmaster Application Engineering can be contacted for specifics.

A half dog set screw and lock wire shaft locking system positively locks the shaft to the inner race while maintaining rotation and allowing for shaft expansion or contraction. The entire system is composed of three main components:

1. Half-Dog Set Screw - This is a set screw with a cylindrical nub.
2. Shaft Slot - One slot must be machined into the shaft by the user. The half-dog set screw's nub engages with the shaft slot for a positive lock with the inner race to support rotation.
3. Lock Wire - This resides in a groove on the O.D. of the inner race that is in alignment with the slot on the top on the half-dog set screw. It prevents the half-dog set screw from backing out.

Only one half-dog set screw should be used in this arrangement. No other set screw should be installed. The half-dog set screw's nub is engaged within the shaft slot, but not tightened into the shaft.

When shafting is heated, it grows longer. This growth in shaft length is particularly problematic when shafts are long and temperature differentials are large.

The difference in linear expansion between the shaft (shaft length between bearing centers) and the bearing mounting structure must be taken in consideration in high temperature applications. For example, in the case where the shaft, bearings and bearing support structure are all in a heated environment, the effect of thermal expansion on the bearings can be insignificant (assuming that all components are made of steel).

The shaft expansion concern arises when the shaft is in a heated environment but the bearings and bearing support structure are not. In this case the slot length in the shaft should be machined so as to accommodate the amount of linear shaft expansion. Calculate the minimum slot length (ΔL) as follows:

$$\Delta L = \alpha \cdot X \cdot \Delta \text{TEMP}_{\text{sys}}$$

where:

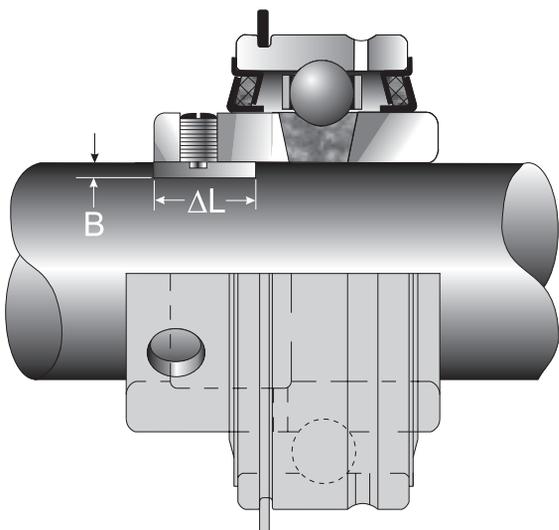
ΔL = differential linear expansion (inches)

α = coefficient of thermal expansion (inch/inch/°F)

($\alpha = 7 \times 10^{-6}$ inch/inch/°F for most carbon steel shafting)

X = length of shaft (inches)

$\Delta \text{TEMP}_{\text{sys}}$ = operating shaft temperature (°F) - operating bearing support structure temperature (°F)



Shaft Slot Dimensions

Bore Sizes	Slot Width (C)	Min. Slot Depth (B)	Point Dia. (P)
1/2 to 1/4R	13/64	3/32	5/32
1 3/16 to 1 3/4	9/32	3/32	13/64
1 11/16 to 2 5/16	21/64	1/8	1/4
2 3/8 to 2 7/16	21/64	1/8	19/64
2 1/2 to 3 7/16	3/8	5/32	11/32

SETSCREW & CAPSCREW INFORMATION

STANDARD DUTY			SET SCREW AND CAPSCREW INFORMATION									
SHAFT SIZE	STD. BRG NO.	ERX BRG NO.	SET SCREW LOCKING				SKWEZLOC® LOCKING					
			THREAD	HEX SIZE	TIGHTEN TO (IN.-LBS.)	TIGHTEN TO (FT.-LBS.)	THREAD	TORX® SIZE	TIGHTEN TO (IN.-LBS.)	TIGHTEN TO (FT.-LBS.)	* TIGHTEN TO N-M	
1/2 9/16 5/8 11/16 3/4 20 mm	ER-8 ER-9 ER-10 ER-11 ER-12 ER-204	ERX-8 ERX-10 ERX-12	1/4-28	1/8	65-85	5.5-7.0	8-32	T-25	63-70	5.3-5.8	7-8	
13/16 7/8 15/16 25 mm	ER-13 ER-14 ER-15 ER-205	ERX-14 ERX-15					8-32					
1 1 1/16 1 1/8 1 3/16 30 mm 1 1/4R	ER-17 ER-18 ER-19 ER-206 ER-20R	ERX-18 ERX-19 ERX-20R					8-32					
1 1/4 1 5/16 1 3/8 35 mm 1 7/16	ER-20 ER-21 ER-22 ER-207 ER-23	ERX-20 ERX-22 ERX-23	5/16-24	5/32	125-165	10.5-14.0	10-24	T-27	81-90	6.8-7.5		9-10
1 1/2 1 9/16 40 mm	ER-24 ER-25 ER-208	ERX-24 ERX-25	5/16-24	5/32	125-165	10.5-14.0	10-24	T-27	81-90	6.8-7.5		
1 5/8 1 11/16 1 3/4 45 mm	ER-26 ER-27 ER-28 ER-209	ERX-27 ERX-28	5/16-24	5/32	125-165	10.5-14.0	10-24	T-27	81-90	6.8-7.5		
1 13/16 1 7/8 1 15/16 50 mm 2R	ER-29 ER-30 ER-31 ER-210 ER-32R	ERX-30 ERX-31 ERX-32R	3/8-24	3/16	225-300	19.0-25.0	1/4-20	T-30	162-180	13.5-15.0	18-20	
2 2 1/8 55 mm 2 3/16	ER-32 ER-34 ER-211 ER-35	ERX-32 ERX-35	3/8-24	3/16	225-300	19.0-25.0	1/4-20	T-30	162-180	13.5-15.0		
2 1/4 2 5/16 60 mm 2 3/8 2 7/16	ER-36 ER-37 ER-212 ER-38 ER-39	ERX-36 ERX-38 ERX-39	3/8-24	3/16	225-300	19.0-25.0	1/4-20	T-45	360-400	30.0-33.3	40-45	
2 1/2 2 11/16 70 mm	ER-40 ER-43 ER-214	ERX-40 ERX-43	7/16-20	7/32	350-450	29.0-38.0	-	-	-	-	-	
2 7/8 2 15/16 75 mm	ER-46 ER-47 ER-215	ERX-47	7/16-20	7/32	350-450	29.0-38.0	-	-	-	-	-	
3 80 mm 3 3/16	ER-48 ER-216 ER-51	ERX-48 ERX-51	7/16-20	7/32	350-450	29.0-38.0	-	-	-	-	-	
3 1/4 3 3/8 3 7/16	ER-52 ER-54 ER-55		7/16-20	7/32	350-450	29.0-38.0	-	-	-	-	-	
3 1/2 90 mm	ER-56 ER-218		1/2-20	1/4	500-650	42.0-55.0	-	-	-	-	-	
3 15/16 4	ER-63 ER-64		5/8-18	5/16	1100-1400	90.0-120.0	-	-	-	-	-	

* Applicable to METRIC-SKWEZ™ ONLY



SEALMASTER® ENGLISH RATING TABLES

All speeds listed are for the standard set screw felt seal; the shaded area indicates the maximum speed ratings for SKWEZLOC® felt seal. ERX max speeds are on page 19. Values in the table represent loads at ideal conditions with press fit mounting to the shaft. ABMA recommends de-rating of slip mounted bearings. To obtain de-rated load, divide load in table by 1.3. To obtain de-rated load for ERX-HI, divide load in table by 1.5. Values in the table represent equivalent radial loads only. For combined load determination, see THE BEARING SELECTION SECTION. Areas designated by “_” exceeds maximum value for standard bearings, Consult SEALMASTER® Application Engineering for load and speed applications not covered in this table.

NORMAL DUTY			REVOLUTIONS PER MINUTE																
SHAFT SIZE	Std. Bearing No.	ERX Bearing No.	L-10 HOURS	50	150	500	1000	1750	2000	2500	3500	4500	5000	5500	6000	6500	7500	8000	10000
1/2	ER-8	ERX-8	5000	619	619	491	390	324	310	287	257	236	228	221	215	209	199	195	181
9/16	ER-9		10000	583	583	390	310	257	246	228	204	188	181	175	170	166	158	154	143
5/8	ER-10	ERX-10	30000	583	404	270	215	178	170	158	141	130	126	122	118	115	109	107	100
11/16	ER-11		50000	491	341	228	181	150	144	133	119	110	106	103	100	97	92	90	84
3/4	ER-12	ERX-12	100000	390	270	181	144	119	114	106	95	87	84	81	79	77	79	71	67
13/16	ER-13		5000	664	664	527	418	347	332	308	276	253	245	237	230	224	213	213	-
7/8	ER-14	ERX-14	10000	625	625	418	332	276	264	245	219	201	194	188	183	177	169	169	-
15/16	ER-15	ERX-15	30000	6258	433	290	230	191	183	170	152	139	135	130	127	123	117	117	-
1	ER-16	ERX-16	100000	418	290	194	154	128	122	114	102	93	90	87	85	82	78	78	-
1 1/16	ER-17		5000	1039	1039	825	654	543	519	482	431	396	383	370	360	351	334	334	-
1 1/8	ER-18	ERX-18	10000	978	978	654	519	431	412	383	342	315	304	294	286	278	265	265	-
1 3/16	ER-19	ERX-19	30000	978	678	454	360	299	286	265	237	218	211	204	198	193	184	184	-
1 1/4R	ER-20R	ERX-20R	100000	654	454	304	241	200	191	178	159	146	141	136	133	129	123	123	-
1 1/4	ER-20	ERX-20	5000	1290	1290	1088	864	717	686	636	569	523	505	489	475	463	-	-	-
1 5/16	ER-21		10000	1290	1290	864	686	569	544	505	452	415	401	388	377	367	-	-	-
1 3/8	ER-22	ERX-22	30000	1290	895	599	475	394	377	350	313	288	278	269	262	255	-	-	-
1 7/16	ER-23	ERX-23	100000	864	599	401	318	264	253	234	210	193	186	180	175	171	-	-	-
1 1/2	ER-24	ERX-24	5000	1638	1638	1381	1096	910	870	808	722	664	641	621	603	-	-	-	-
1 9/16	ER-25	ERX-25	10000	1638	1638	1096	870	722	691	641	573	527	509	493	479	-	-	-	-
			50000	1381	958	641	509	422	404	375	335	308	298	288	280	-	-	-	-
			100000	1096	760	509	404	335	321	298	266	245	236	229	222	-	-	-	-
1 5/8	ER-26		5000	1763	1763	1487	1180	979	937	870	777	715	690	669	-	-	-	-	-
1 11/16	ER-27	ERX-27	10000	1763	1763	1180	937	777	744	690	617	567	548	531	-	-	-	-	-
1 3/4	ER-28	ERX-28	30000	1763	1222	818	650	539	516	479	428	393	380	368	-	-	-	-	-
			100000	1180	818	548	435	361	345	320	286	263	254	246	-	-	-	-	-
1 13/16	ER-29		5000	1760	1760	1485	1178	978	935	868	776	714	689	-	-	-	-	-	-
1 7/8	ER-30	ERX-30	10000	1760	1760	1178	935	776	742	689	616	567	547	-	-	-	-	-	-
1 15/16	ER-31	ERX-31	30000	1760	1221	817	649	538	515	478	427	393	379	-	-	-	-	-	-
2R	ER-32R	ERX-32R	100000	1178	817	547	434	360	345	320	286	263	254	-	-	-	-	-	-
2	ER-32	ERX-32	5000	2176	2176	1835	1457	1209	1156	1073	1010	959	-	-	-	-	-	-	-
2 1/8	ER-34		10000	2176	2176	1457	1156	959	918	852	802	762	-	-	-	-	-	-	-
2 3/16	ER-35	ERX-35	50000	1835	1273	852	676	561	537	498	469	445	-	-	-	-	-	-	-
			100000	1457	1010	676	537	445	426	395	372	353	-	-	-	-	-	-	-

NORMAL DUTY			REVOLUTIONS PER MINUTE																
SHAFT SIZE	STD. Bearing No.	ERX Bearing No.	L-10 HOURS	50	150	250	500	750	1000	1250	1500	1750	2000	2500	3000	3500	4000	4500	-
2 1/4	ER-36	ERX-36	5000	2631	2631	2631	2219	1938	1761	1635	1538	1461	1398	1298	1221	1160	1109	-	-
2 5/16	ER-37		10000	2631	2631	2219	1761	1538	1398	1298	1221	1160	1109	1030	969	921	881	-	-
2 3/8	ER-38	ERX-38	50000	2219	1538	1298	1030	900	817	759	714	678	649	602	567	538	515	-	-
2 7/16	ER-39	ERX-39	100000	1761	1221	1030	817	714	649	602	567	538	515	478	450	427	409	-	-
2 1/2	ER-40	ERX-40	5000	3118	3118	3118	2629	2297	2087	1937	1823	1732	1656	1538	1447	1375	-	-	-
2 11/16	ER-43	ERX-43	10000	3118	3118	2629	2087	1823	1656	1538	1447	1375	1315	1220	1149	1091	-	-	-
			50000	2629	1823	1538	1220	1066	969	899	846	804	769	714	672	638	-	-	-
			100000	2087	1447	1220	969	846	769	714	672	638	610	567	533	506	-	-	-
2 7/8	ER-46		5000	3311	3311	3311	2793	2440	2217	2058	1936	1839	1759	1633	1537	1460	-	-	-
2 15/16	ER-47	ERX-47	10000	3311	3311	2793	2217	1936	1759	1633	1537	1460	1396	1296	1220	1159	-	-	-
			50000	2793	1936	1633	1296	1132	1029	955	899	854	817	758	713	678	-	-	-
			100000	2217	1537	1296	1029	899	817	758	713	678	648	602	566	538	-	-	-
3	ER-48	ERX-48	5000	3885	3885	3885	3277	2863	2601	2415	2272	2158	2064	1916	1803	-	-	-	-
3 3/16	ER-51	ERX-51	30000	3885	2694	2272	1803	1575	1431	1329	1250	1188	1136	1055	992	-	-	-	-
			50000	3277	2272	1916	1521	1329	1207	1121	1055	1002	985	890	837	-	-	-	-
			100000	2601	1803	1521	1207	1055	958	890	837	795	761	706	664	-	-	-	-
3 1/4	ER-52		5000	3975	3975	3975	3516	3071	2791	2591	2438	2316	2215	2056	1935	-	-	-	-
3 3/8	ER-54		10000	3975	3975	3516	2791	2438	2215	2056	1935	1838	1758	1632	1536	-	-	-	-
3 7/16	ER-55		30000	3975	2890	2438	1935	1690	1536	1426	1342	1274	1219	1132	1065	-	-	-	-
			50000	3516	2438	2056	1632	1426	1295	1202	1132	1075	1028	954	898	-	-	-	-
			100000	2791	1935	1632	1295	1132	1028	954	898	853	816	757	713	-	-	-	-
3 1/2	ER-56		5000	4812	4812	4812	4059	3546	3222	2991	2814	2673	2557	2374	-	-	-	-	-
			30000	4812	3337	2814	2334	1951	1773	1646	1549	1471	1407	1306	-	-	-	-	-
			50000	4059	2814	2374	1884	1646	1495	1388	1306	1241	1187	1102	-	-	-	-	-
			100000	3222	2234	1884	1495	1306	1187	1102	1037	985	942	874	-	-	-	-	-
3 15/16	ER-63		5000	6673	6673	6673	5628	4917	4467	4147	3902	3707	3546	-	-	-	-	-	-
4	ER-64		10000	6673	6673	5628	4467	3902	3546	3291	3097	2942	2814	-	-	-	-	-	-
			30000	6673	4627	3902	3097	2706	2458	2282	2148	2040	1951	-	-	-	-	-	-
			50000	5628	3902	3291	2612	2282	2074	1925	1811	1721	1646	-	-	-	-	-	-
			10000	4467	3097	2612	2074	1811	1646	1528	1438	1366	1306	-	-	-	-	-	-

METRIC RATING TABLES



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SEALMASTER® Gold Line METRIC-SKWEZ™ Ball Bearing's load capacity per L_{10} life, speed, and shaft size is indicated in this table. Shaded areas indicate the maximum speed ratings for the optional felt seal. Values in the table represent loads at ideal conditions with press fit mounting to the shaft. ABMA recommends de-rating slip-fit bearings by dividing load by 1.3. Table values represent equivalent radial loads. Consult SEALMASTER Applications Engineering for load and speeds not published.

Standard Duty		REVOLUTIONS PER MINUTE																		LOAD NEWTONS
Shaft Size	ER #	L10 Hours	50	150	500	1000	1750	2000	2500	3500	4000	4500	5000	5500	6000	6500	7500	8000	10000	
20mm	ER-204TM	5000	2753	2753	2186	1735	1440	1377	1278	1143	1093	1051	1015	983	955	930	886	867	805	
		10000	2592	2592	1735	1377	1143	1093	1015	907	867	834	805	780	758	738	703	689	639	
		30000	2592	1797	1203	955	792	758	703	629	601	578	558	541	525	512	488	477	443	
		50000	2186	1516	1015	805	668	639	593	530	507	488	471	456	443	432	411	403	374	
		100000	1735	1203	805	639	530	507	471	421	403	387	374	362	352	342	327	320	297	
25mm	ER-205TM	5000	2954	2954	2345	1861	1544	1477	1371	1226	1172	1127	1088	1054	1024	997	951	931	-	
		10000	2780	2780	1861	1477	1226	1172	1088	973	931	895	864	837	813	792	755	739	-	
		30000	2780	1928	1290	1024	850	813	755	675	645	620	599	580	564	549	523	512	-	
		50000	2345	1626	1088	864	717	686	637	569	544	523	505	489	475	463	441	432	-	
		100000	1861	1290	864	686	569	544	505	452	432	415	401	388	377	367	350	343	-	
30mm	ER-206TM	5000	4621	4621	3668	2911	2416	2311	2145	1917	1834	1763	1702	1649	1602	1560	1487	1456	-	
		10000	4350	4350	2911	2311	1917	1834	1702	1522	1456	1400	1351	1309	1272	1238	1180	1155	-	
		30000	4350	3015	2018	1602	1329	1272	1180	1055	1009	970	937	908	882	858	818	801	-	
		50000	3668	2543	1702	1351	1121	1072	996	890	851	818	790	765	744	724	690	676	-	
		100000	2911	2018	1351	1072	890	851	790	706	676	650	627	608	590	575	548	536	-	
35mm	ER-207TM	5000	5738	5738	4841	3842	3188	3049	2831	2530	2420	2327	2247	2177	2114	2059	-	-	-	
		10000	5738	5738	3842	3049	2530	2420	2247	2008	1921	1847	1783	1728	1678	1634	-	-	-	
		30000	5738	3979	2664	2114	1755	1678	1558	1393	1332	1281	1236	1198	1164	1133	-	-	-	
		50000	4841	3356	2247	1783	1480	1415	1314	1175	1123	1080	1043	1010	981	956	-	-	-	
		100000	3842	2664	1783	1415	1175	1123	1043	932	892	857	828	802	779	758	-	-	-	
40mm	ER-208TM	5000	7286	7286	6145	4877	4047	3871	3594	3212	3072	2954	2852	2763	2684	-	-	-	-	
		10000	7286	7286	4877	3871	3212	3072	2852	2550	2439	2345	2264	2193	2130	-	-	-	-	
		30000	7286	5052	3382	2684	2227	2130	1978	1768	1691	1626	1570	1521	1477	-	-	-	-	
		50000	6145	4261	2852	2264	1879	1797	1668	1491	1426	1371	1324	1282	1246	-	-	-	-	
		100000	4877	3382	2264	1797	1491	1426	1324	1183	1132	1088	1051	1018	989	-	-	-	-	
45mm	ER-209TM	5000	7843	7843	6615	5250	4357	4167	3868	3458	3307	3180	3070	2974	-	-	-	-	-	
		10000	7843	7843	5250	4167	3458	3307	3070	2745	2625	2524	2437	2361	-	-	-	-	-	
		30000	7843	5438	3640	2889	2398	2293	2129	1903	1820	1750	1690	1637	-	-	-	-	-	
		50000	6615	4586	3070	2437	2022	1934	1795	1605	1535	1476	1425	1381	-	-	-	-	-	
		100000	5250	3640	2437	1934	1605	1535	1425	1274	1218	1172	1131	1096	-	-	-	-	-	
50mm	ER-210TM	5000	7831	7831	6605	5242	4350	4161	3862	3453	3302	3175	3066	-	-	-	-	-	-	
		10000	7831	7831	5242	4161	3453	3302	3066	2740	2621	2520	2433	-	-	-	-	-	-	
		30000	7831	5429	3635	2885	2394	2290	2126	1900	1817	1747	1687	-	-	-	-	-	-	
		50000	6605	4579	3066	2433	2019	1931	1793	1603	1533	1474	1423	-	-	-	-	-	-	
		100000	5242	3635	2433	1931	1603	1533	1423	1272	1217	1170	1129	-	-	-	-	-	-	
55mm	ER-211TM	5000	9680	9680	8164	6480	5377	5143	4775	4268	4082	3925	-	-	-	-	-	-	-	
		10000	9680	9680	6480	5143	4268	4082	3790	3387	3240	3115	-	-	-	-	-	-	-	
		30000	9680	6712	4493	3566	2959	2830	2628	2349	2246	2160	-	-	-	-	-	-	-	
		50000	8164	5661	3790	3008	2496	2387	2216	1981	1895	1823	-	-	-	-	-	-	-	
		100000	6480	4493	3008	2387	1981	1895	1759	1572	1504	1446	-	-	-	-	-	-	-	
60mm	ER-212TM	5000	11702	11702	9870	7834	6500	6218	5772	5159	4935	-	-	-	-	-	-	-	-	
		10000	11702	11702	7834	6218	5159	4935	4581	4095	3917	-	-	-	-	-	-	-	-	
		30000	11702	8114	5431	4311	3577	3422	3176	2839	2716	-	-	-	-	-	-	-	-	
		50000	9870	6843	4581	3636	3017	2886	2679	2395	2291	-	-	-	-	-	-	-	-	
		100000	7834	5431	3636	2886	2395	2291	2126	1901	1818	-	-	-	-	-	-	-	-	

This table displays load in Newtons.

All sales are made on our STANDARD TERMS AND CONDITIONS OF SALE in effect at the time a customer's order is accepted. The current Terms and Conditions are set forth below:

STANDARD TERMS AND CONDITIONS OF SALE (January 14, 1998)

These Terms and Conditions, the attendant quotation or acknowledgment and all documents incorporated by specific reference therein, will be the complete and exclusive statement of the terms of the agreement governing the sale of goods ("Goods") by **Emerson Power Transmission Corporation** and its divisions and subsidiaries ("Seller") to Customer ("Buyer"). Buyer's acceptance of the Goods will manifest Buyer's assent to these Terms and Conditions. If these Terms and Conditions differ in any way from the terms and conditions of Buyer's order, or other documentation, this document will be construed as a counteroffer and will not be deemed an acceptance of Buyer's terms and conditions which conflict herewith.

1. **PRICES:** Unless otherwise specified in writing by Seller, Seller's price for the goods shall remain in effect for thirty (30) days after the date of Seller's quotation or acknowledgment of Buyer's order for the Goods, whichever occurs first, provided an unconditional, complete authorization for the immediate shipment of the Goods is received and accepted by Seller within such time period. If such authorization is not received by Seller within such thirty (30) day period, Seller shall have the right to change the price for the Good to Seller's price for the Goods at the time of shipment.

2. **TAXES:** Any tax or governmental charge or increase in same hereafter becoming effective increasing the cost to Seller of producing, selling or delivering the Goods or of procuring material used therein, and any tax now in effect or increase in same payable by the Seller because of the manufacture, sale or delivery of the Goods, may at Seller's option, be added to the price.

3. **TERMS OF PAYMENT:** Subject to the approval of Seller's Credit Department, terms are net thirty (30) days from date of Seller's invoice in U.S. currency. If any payment owed to Seller is not paid when due, it shall bear interest, at a rate to be determined by Seller, which shall not exceed the maximum rate permitted by law, from the date on which it is due until it is paid. Seller shall have the right, among other remedies, either to terminate the Agreement or to suspend further performance under this and/or other agreements with Buyer in the event Buyer fails to make any payment when due. Buyer shall be liable for all expenses, including attorneys' fees, relating to the collection of past due amounts.

4. **SHIPMENT AND DELIVERY:** Shipments are made F.O.B. Seller's shipping point. Any claims for shortages or damages suffered in transit shall be submitted by the Buyer directly to the carrier. While Seller will use all reasonable commercial efforts to maintain the delivery date acknowledged or quoted by Seller, all shipping dates are approximate. Seller reserves the right to make partial shipments and to segregate "specials" and made-to-order Goods from normal stock Goods. Seller shall not be bound to tender delivery of any Goods for which Buyer has not provided shipping instructions.

5. **QUANTITY:** Buyer agrees to accept overruns of up to ten percent (10%) of the order on "made-to-order" Goods, including parts. Any such additional items shall be priced at the price per item charged for the specific quantity ordered.

6. **LIMITED WARRANTY:** Subject to the limitations of Section 7, Seller warrants that the Goods will be free from defects in material and workmanship under normal use, service and maintenance for a period of one year (unless otherwise specified by Seller in writing) from the date of shipment of the Goods by Seller. **THIS IS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY SELLER WITH RESPECT TO THE GOODS AND IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAS BEEN DISCLOSED TO SELLER IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT SELLER'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY SELLER FOR BUYER'S USE OR PURPOSE.** This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, unauthorized modification or alteration, use beyond rated capacity, or improper installation, maintenance or application. To the extent that Buyer or its agents has supplied specifications, information, representation of operating conditions or other data to Seller in the selection or design of the Goods and the preparation of Seller's quotation, and in the event that actual operating conditions or other conditions differ from those represented by Buyer, any warranties or other provisions contained herein which are affected by such conditions shall be null and void. If within thirty (30) days after Buyer's discovery of any warranty defects within the warranty period, Buyer notifies Seller thereof in writing, Seller shall, at its option, repair or replace F.O.B. point of manufacture, or refund the purchase price for, that portion of the goods found by Seller to be defective. Failure by Buyer to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of Buyer's claim for such defects. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. Buyer assumes all other responsibility for any loss, damage, or injury to persons or property arising out of, connected with, or resulting from the use of Goods, either alone or in combination with other products/components.

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8. **EXCUSE OF PERFORMANCE:** Seller shall not be liable for delays in performance or for non-performance due to acts of God, acts of Buyer, war, riot, fire, flood, other severe weather, sabotage, or epidemics; strikes or labor disturbances; governmental requests, restrictions, laws, regulations, orders or actions; unavailability of or delays in transportation; default of suppliers; or unforeseen circumstances or any events or causes beyond Seller's reasonable control. Deliveries may be suspended for an appropriate period of time as a result of the foregoing. If Seller determines that its ability to supply the total demand for the Goods, or to obtain material used directly or indirectly in the manufacture of the Goods, is hindered, limited or made impracticable due to causes addressed in this Section 8, Seller may allocate its available supply of the Goods or such material (without obligation to acquire other supplies of any such Goods or material) among itself and its purchasers on such basis as Seller determines to be equitable without liability for any failure of performance which may result therefrom. Deliveries suspended or not made by reason of this section may be canceled by Seller upon notice to Buyer without liability, but the balance of the agreement shall otherwise remain unaffected.

9. **CANCELLATION:** The Buyer may cancel orders only upon written notice and upon payment to Seller of cancellation charges which include, among other things, all costs and expenses incurred and commitments made by the Seller and a reasonable profit thereon.

10. **CHANGES:** Buyer may request changes or additions to the Goods consistent with Seller's specifications and criteria. In the event such changes or additions are accepted by Seller, Seller may revise the price and delivery schedule. Seller reserves the right to change designs and specifications for the Goods without prior notice to Buyer, except with respect to Goods being made-to-order for Buyer.

11. **TOOLING:** Tool, die, and pattern charges, if any, are in addition to the price of the Goods and are due and payable upon completion of the tooling. All such tools, dies and patterns shall be and remain the property of Seller. Charges for tools, dies, and patterns do not convey to Buyer, title, ownership interests in, or rights to possession or removal, nor prevent their use by Seller for other purchasers, except as otherwise expressly provided by Seller and Buyer in writing with reference to this provision.

12. **ASSIGNMENT:** Buyer shall not assign its rights or delegate its duties hereunder or any interest therein or any rights hereunder without the prior written consent of the Seller, and any such assignment, without such consent, shall be void.

13. **PATENTS AND COPYRIGHTS:** Subject to Section 7, Seller warrants that the Goods sold, except as are made specifically for Buyer according to Buyer's specifications, do not infringe any valid U.S. patent or copyright in existence as of the date of delivery. This warranty is given upon the condition that Buyer promptly notify Seller of any claim or suit involving Buyer in which such infringement is alleged, and, that Buyer cooperate fully with Seller and permit Seller to control completely the defense or compromise of any such allegation of infringement. Seller's warranty as to use only applies to infringements arising solely out of the inherent operation (i) of such Goods, or (ii) of any combination of Goods in a system designed by Seller. In the event such Goods, singularly or in combination, are held to infringe a U.S. patent or copyright in such suit, and the use of such Goods is enjoined, or in the case of a compromise by Seller, Seller shall have the right, at its option and expense, to procure for Buyer the right to continue using such Goods, or replace them with non-infringing Goods; or modify same to become non-infringing; or grant Buyer a credit for the depreciated value of such Goods and accept return of them.

14. **MISCELLANEOUS:** These terms and conditions set forth the entire understanding and agreement between Seller and Buyer, and supersede all other communications, negotiations and prior oral or written statements regarding the subject matter of these terms and conditions. No change, modification, rescission, discharge, abandonment, or waiver of these terms and conditions of Sale shall be binding upon the Seller unless made in writing and signed on its behalf by an officer of the Seller. No conditions, usage or trade, course of dealing or performance, understanding or agreement purporting to modify, vary, explain, or supplement these Terms and Conditions shall be binding unless hereafter made in writing and signed by the party to be bound, and no modification shall be affected by the acceptance of purchase orders or shipping instruction forms containing terms at variance with or in addition to those set forth herein. No waiver by Seller with respect to any breach or default or any right or remedy and no course of dealing, shall be deemed to constitute a continuing waiver of any other breach or default or of any other right or remedy, unless such waiver be expressed in writing and signed by the party to be bound. Seller is not responsible for typographical or clerical errors made in any quotation, orders or publications. All such errors are subject to correction. The validity, performance, and all other matters relating to the interpretation and effect of this contract shall be governed by the law of the state of New York.

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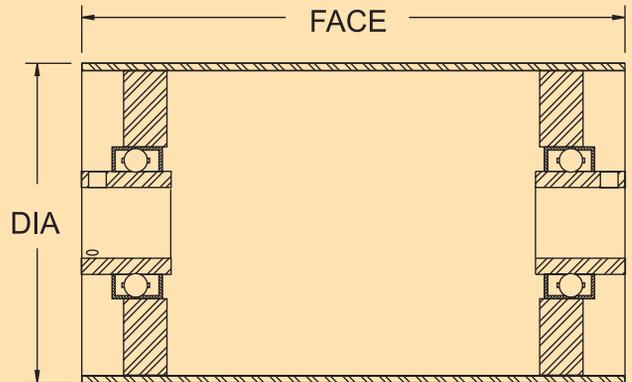


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