Calculating Lube Requirements

VOLUME REQUIRED

V = A x T x Service Factor
A = Equivalent Area
T = Film Thickness

SERVICE FACTORS AFFECTING VOLUME

Service Conditions	Service Factor Severity
Standard in Plant	1.0
Shock Loading	1.3 — 3.0
Extreme Heat	1.3 — 3.0
High Speed	1.0 — 0.5
Dirt & Water Environment	1.3 — 8.0
Process Contamination	.75 — .25

FILM THICKNESS, REPLACEMENT

Manual System — Terminating

- Grease – 0.002 Film Thickness per Application (8 hours)

Automatic System — Terminating

- Oil – 0.001 Film Thickness every 1 hour period
- Grease – 0.001 Film Thickness every 4 hour period

Automatic System — Circulating

- Oil – 0.001 Film Thickness every 1 minute period

EQUIVALENT AREA

Rolling Element Bearings

A = D^2R
D = Shaft Diameter
R = Number of Rows
(Consider needle & long roller types as two rows)

Plain Bearings

A = π D L
π = 3.14
D = Shaft Diameter
L = Length of Bearing

Slides, Gibs, and/or Ways

A = L x W
L = Length of Surface
W = Width of Surface
(Area of Largest Contact Surface)

Gears - Calculate Each Gear in Train

A = π P.D. x W
π = 3.14
P.D. = Pitch Diameter of Gear
W = Width of Gear

Large Bull Gears

A = 2 π P.D. x W
π = 3.14
P.D. = Pitch Diameter of Pinion
W = Width of Pinion Gear

Worm Gears

A = π ($P.D._1$ + $P.D._2$) W
π = 3.14
P.D. = Pitch Diameter of Worm
$P.D._2$ = Pitch Diameter of Worm Gear
W = Width of Worm Gear

Labyrinth Seals

A = π D L x 3
π = 3.14
D = Shaft Diameter
L = Total Length of Sealing Surfaces

Ball Screw

A = π P.D. x (Rows + Length of Travel)
π = 3.14
P.D. = Pitch Diameter of Ball Race
Rows = No. of Rows in Engagement with Shaft (Consider each row 1")

Chain

A = 3DW + .1LW
D = Sprocket Diameter
W = Chain Width
L = Chain Length

Linear Guide Bearings

A = D^2 x 3
D = Shaft Diameter

Notes:

1. All units are in inches
2. These general guidelines for calculating lubricant replacement volumes will normally provide adequate levels of lubrication. However, since every operating condition on each different type of equipment is beyond the scope of a single set of guidelines, it is the equipment builder's and/or equipment user's responsibility to insure that the lube points on his, or her equipment receive adequate lubrication under the actual operating conditions encountered.

Lube Design Chart

Customer: _____ Type of System: Manual Automatic Date: _____

Machine or Equipment: _____ Lubricant : _____ Operating Tem. (F): _____ Page ____ of ____

Ref. No.	Location or Name of Bearing	Bearing		Volume Calculation	Lube Volume (CU.IN./HR)	Divider Grouping	Notes
		Size	Type				

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