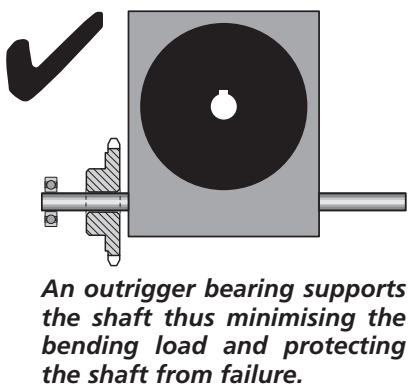
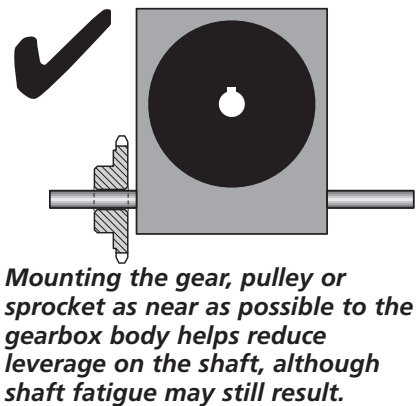
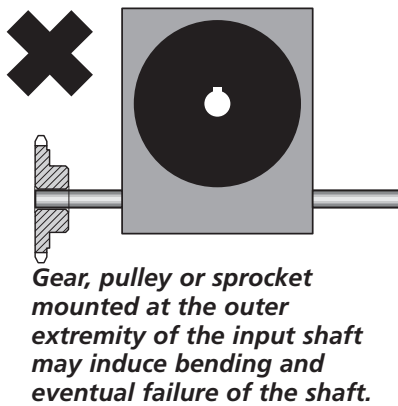
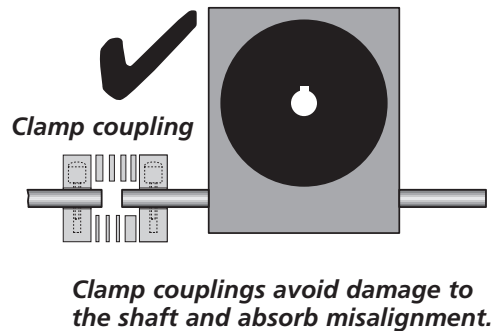
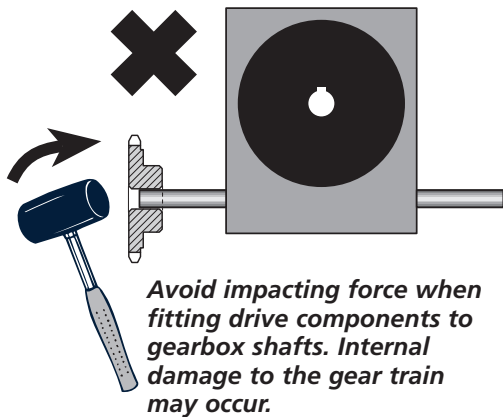


# GEARBOXES

## Gearbox Application



**Customer modified gearboxes have an invalidated warranty.**



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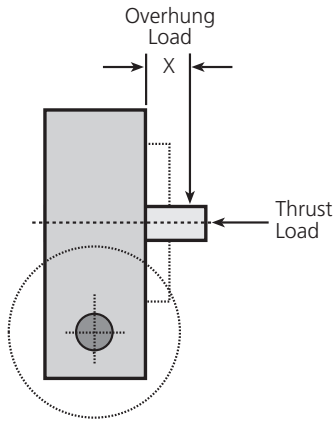
MECHANICAL

# GEARBOXES

The following tables are based on an input speed of 1000 RPM taking a full load torque plus overhung load and thrust load:-

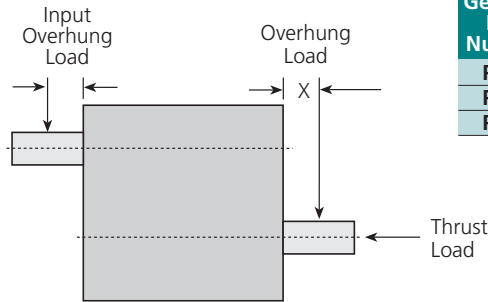
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## P/PF BP TYPE WORM & WHEEL GEARBOXES



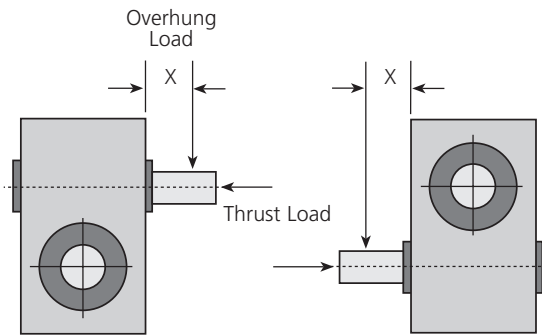
Gearbox Part Number	Distance 'X' mm	OUTPUT SHAFT		INPUT	
		Overhung Load kg	Thrust Load kg	Overhung Load kg	
P20	PF20	10	12	5	6
P30	PF30	12	20	12	8
P40	PF40	15	30	20	10
P45	PF45	20	45	30	12
P55	PF55	20	60	40	14
P60	PF60	25	70	50	16
P70	PF70	30	80	60	20
	BP50	25	60	40	20
	BP60	30	80	60	25

## PP TYPE DOUBLE REDUCTION GEARBOXES



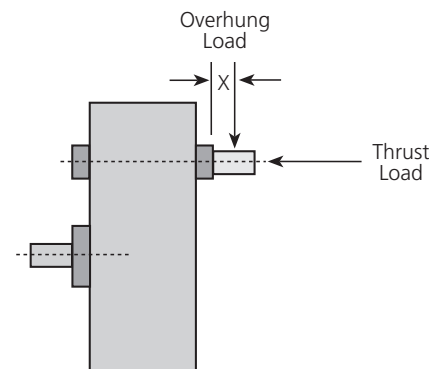
Gearbox Part Number	Distance 'X' mm	OUTPUT SHAFT		INPUT
		Overhung Load kg	Thrust Load kg	Overhung Load kg
PP35	12	12	10	6
PP50	20	30	20	10
PP60	25	45	35	15

## E TYPE CROSSED HELICAL GEARBOXES



Gearbox Part Number	Distance 'X' mm	THRUST LOADS - KG	
		Overhung Load kg	Thrust Load kg
E20	6	15	10
E30	10	20	15
E40	12	40	30
E55	20	60	40
E60	25	80	50

## FF TYPE SPUR GEAR REDUCTION GEARBOXES

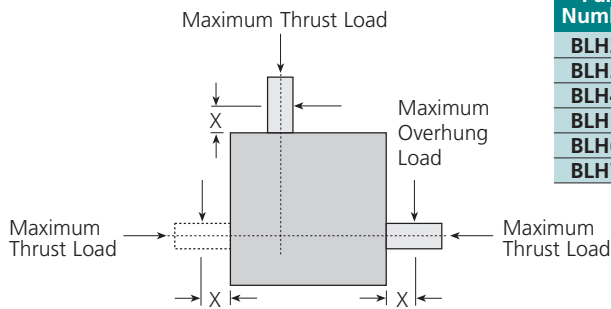


Gearbox Part Number	Distance 'X' mm	OUTPUT SHAFT		INPUT
		Overhung Load kg	Thrust Load kg	Overhung Load kg
FF10	8	10	10	6
FF15	10	20	20	12
FF20	15	40	30	16
FF30	20	60	40	20
FF40	30	80	50	30
FF50	40	100	60	40

# GEARBOXES

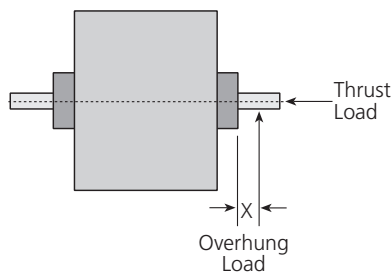
The following tables are based on an input speed of 1000 RPM taking a full load torque plus overhung load and thrust load:-

## BLH/ BLHT TYPE BEVEL GEARBOXES



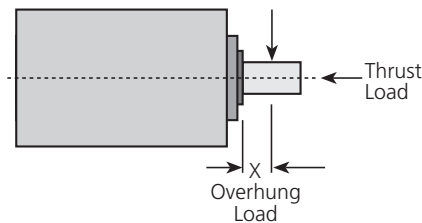
Gearbox Part Number	THRUST LOADS - KG		
	Distance 'X' mm	Overhung Load kg	Thrust Load kg
BLH20	6	4	3
BLH30	10	8	6
BLH40	12	12	10
BLH50	20	20	15
BLH60	25	30	25
BLH70	30	40	35

## J/XJ NT/ NH TYPE PLANETARY GEARBOXES



Gearbox Part Number	THRUST LOADS - KG		
	Distance 'X' mm	Overhung Load kg	Thrust Load kg
J & XJ 51-52-53	6	5	5
J & XJ 64-65-66	6	5	5
NT & NH 61-62-63	10	12	10
NT & NH 91-92	15	20	15
NT & NH 121-122	20	25	20

## EHD TYPE EPICYCLIC GEARBOXES



Gearbox Part Number	THRUST LOADS - KG		
	Distance 'X' mm	Overhung Load kg	Thrust Load kg
EHD04*	10	20	15
EHD06*	10	25	15
EHD08*	12	30	20
EHD12‡	20	60	60
EHD16‡	30	100	100

\* Ball bearings  
‡ Taper roller bearings

Putting loading on bearings may reduce the bearing / gearbox life and alter the running quality of the unit.

### Material Near Equivalents (to be used as a guide only)

EN24 817 M40: DIN 34CrNiMo6 equiv. - AISI/SAE/ASTM 4337/4340

EN36 655 M13: DIN 15NiCr13/14NiCr14 equiv. - AISI/SAE/ASTM 3310/3415/9314

EN8 080 M40: DIN C40E/Ck40 - AISI/SAE/ASTM 1040

316 S11: DIN X2CrNiMo 17-2-2 - AISI/SAE/ASTM 316L

303 S31/22: DIN X8CrNiS 18-9 equiv. - AISI/SAE/ASTM 303

Aluminium Housings (square design) 6082-T6 Grade (HE30)

Aluminium Housings (round design) 2014A Grade (HE15)

Delrin DE/E 9446 NC-010 (Dupont)



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# GEARBOXES

## Mass Moment of Inertia Reflected at Input of Gearboxes

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Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
P20-10	2.04 x 10 <sup>7</sup>
P20-12	1.96 x 10 <sup>7</sup>
P20-15	1.90 x 10 <sup>7</sup>
P20-20	1.85 x 10 <sup>7</sup>
P20-30	1.80 x 10 <sup>7</sup>
P20-60	1.80 x 10 <sup>7</sup>
P20-120	1.79 x 10 <sup>7</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
PF20-10	2.51 x 10 <sup>7</sup>
PF20-12	2.43 x 10 <sup>7</sup>
PF20-15	2.36 x 10 <sup>7</sup>
PF20-20	2.32 x 10 <sup>7</sup>
PF20-30	2.28 x 10 <sup>7</sup>
PF20-60	2.25 x 10 <sup>7</sup>
PF20-120	2.25 x 10 <sup>7</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
P30-10	7.62 x 10 <sup>7</sup>
P30-12	7.13 x 10 <sup>7</sup>
P30-15	6.71 x 10 <sup>7</sup>
P30-20	6.38 x 10 <sup>7</sup>
P30-30	6.14 x 10 <sup>7</sup>
P30-60	5.98 x 10 <sup>7</sup>
P30-120	5.95 x 10 <sup>7</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
PF30-10	9.20 x 10 <sup>7</sup>
PF30-12	8.71 x 10 <sup>7</sup>
PF30-15	8.30 x 10 <sup>7</sup>
PF30-20	7.96 x 10 <sup>7</sup>
PF30-30	7.72 x 10 <sup>7</sup>
PF30-60	7.56 x 10 <sup>7</sup>
PF30-120	7.53 x 10 <sup>7</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
P40-10	2.69 x 10 <sup>6</sup>
P40-12	2.54 x 10 <sup>6</sup>
P40-15	2.42 x 10 <sup>6</sup>
P40-20	2.31 x 10 <sup>6</sup>
P40-30	2.22 x 10 <sup>6</sup>
P40-60	2.20 x 10 <sup>6</sup>
P40-120	2.18 x 10 <sup>6</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
PF40-10	3.78 x 10 <sup>6</sup>
PF40-12	3.62 x 10 <sup>6</sup>
PF40-15	3.49 x 10 <sup>6</sup>
PF40-20	3.39 x 10 <sup>6</sup>
PF40-30	3.32 x 10 <sup>6</sup>
PF40-60	3.27 x 10 <sup>6</sup>
PF40-120	3.26 x 10 <sup>6</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
P45-10	5.20 x 10 <sup>6</sup>
P45-12	4.70 x 10 <sup>6</sup>
P45-15	4.29 x 10 <sup>6</sup>
P45-20	3.95 x 10 <sup>6</sup>
P45-30	3.72 x 10 <sup>6</sup>
P45-60	3.57 x 10 <sup>6</sup>
P45-120	3.53 x 10 <sup>6</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
PF45-10	7.34 x 10 <sup>6</sup>
PF45-12	6.84 x 10 <sup>6</sup>
PF45-15	6.43 x 10 <sup>6</sup>
PF45-20	6.09 x 10 <sup>6</sup>
PF45-30	5.86 x 10 <sup>6</sup>
PF45-60	5.70 x 10 <sup>6</sup>
PF45-120	5.66 x 10 <sup>6</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
P55-10	1.11 x 10 <sup>5</sup>
P55-12	1.00 x 10 <sup>5</sup>
P55-15	9.10 x 10 <sup>4</sup>
P55-20	8.30 x 10 <sup>4</sup>
P55-30	7.80 x 10 <sup>4</sup>
P55-60	7.40 x 10 <sup>4</sup>
P55-120	7.30 x 10 <sup>4</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
PF55-10	1.96 x 10 <sup>5</sup>
PF55-12	1.84 x 10 <sup>5</sup>
PF55-15	1.75 x 10 <sup>5</sup>
PF55-20	1.67 x 10 <sup>5</sup>
PF55-30	1.62 x 10 <sup>5</sup>
PF55-60	1.58 x 10 <sup>5</sup>
PF55-120	1.57 x 10 <sup>5</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
P60-10	2.37 x 10 <sup>5</sup>
P60-12	2.08 x 10 <sup>5</sup>
P60-15	1.85 x 10 <sup>5</sup>
P60-20	1.65 x 10 <sup>5</sup>
P60-30	1.52 x 10 <sup>5</sup>
P60-60	1.42 x 10 <sup>5</sup>
P60-120	1.40 x 10 <sup>5</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
PF60-10	3.80 x 10 <sup>5</sup>
PF60-12	3.68 x 10 <sup>5</sup>
PF60-15	3.14 x 10 <sup>5</sup>
PF60-20	3.10 x 10 <sup>5</sup>
PF60-30	2.88 x 10 <sup>5</sup>
PF60-60	2.82 x 10 <sup>5</sup>
PF60-120	2.79 x 10 <sup>5</sup>



# GEARBOXES

## Mass Moment of Inertia Reflected at Input of Gearboxes

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
P70-10	4.81 x 10 <sup>-5</sup>
P70-12	4.19 x 10 <sup>-5</sup>
P70-15	3.70 x 10 <sup>-5</sup>
P70-20	3.28 x 10 <sup>-5</sup>
P70-30	3.00 x 10 <sup>-5</sup>
P70-60	2.82 x 10 <sup>-5</sup>
P70-120	2.76 x 10 <sup>-5</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
PF70-10	7.09 x 10 <sup>-5</sup>
PF70-12	6.47 x 10 <sup>-5</sup>
PF70-15	5.98 x 10 <sup>-5</sup>
PF70-20	5.57 x 10 <sup>-5</sup>
PF70-30	5.28 x 10 <sup>-5</sup>
PF70-60	5.09 x 10 <sup>-5</sup>
PF70-120	5.04 x 10 <sup>-5</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
E20-1	3.84 x 10 <sup>-6</sup>
E20-2	2.21 x 10 <sup>-6</sup>
E20-3	1.89 x 10 <sup>-6</sup>
E20-4	1.78 x 10 <sup>-6</sup>
E20-5	1.73 x 10 <sup>-6</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
E30-1	2.90 x 10 <sup>-5</sup>
E30-2	1.42 x 10 <sup>-5</sup>
E30-3	1.12 x 10 <sup>-5</sup>
E30-4	1.02 x 10 <sup>-5</sup>
E30-5	9.72 x 10 <sup>-6</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
E40-1	1.49 x 10 <sup>-4</sup>
E40-2	6.99 x 10 <sup>-5</sup>
E40-3	5.40 x 10 <sup>-5</sup>
E40-4	4.83 x 10 <sup>-5</sup>
E40-5	4.62 x 10 <sup>-5</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
E50-1	4.65 x 10 <sup>-4</sup>
E50-2	2.39 x 10 <sup>-4</sup>
E50-3	1.94 x 10 <sup>-4</sup>
E50-4	1.78 x 10 <sup>-4</sup>
E50-5	1.72 x 10 <sup>-5</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
E60-1	1.33 x 10 <sup>-3</sup>
E60-2	6.79 x 10 <sup>-4</sup>
E60-3	5.52 x 10 <sup>-4</sup>
E60-4	5.07 x 10 <sup>-4</sup>
E60-5	4.90 x 10 <sup>-4</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
E60B-1	1.25 x 10 <sup>-3</sup>
E60B-2	6.32 x 10 <sup>-4</sup>
E60B-3	5.10 x 10 <sup>-4</sup>
E60B-4	4.67 x 10 <sup>-4</sup>
E60B-5	4.51 x 10 <sup>-4</sup>

Gearbox Part Number	Mass Moment of Inertia Reflected at Input of Gearbox Kg m <sup>2</sup>
BLH20-1	4.67 x 10 <sup>-7</sup>
BLH30-1	2.26 x 10 <sup>-6</sup>
BLH40-1	6.83 x 10 <sup>-6</sup>
BLH50-1	5.10 x 10 <sup>-5</sup>
BLH60-1	2.04 x 10 <sup>-4</sup>
BLH70-1	4.49 x 10 <sup>-4</sup>

### Loctite Products & (Current Food Approvals)

- 603\* : Retainer for bearings (-40 to +150°C)  
(National Sanitary Foundation (NSF) P1 Approval)
- 567 : Thread sealant (-40 to +200°C)  
(WRC potable water Approval Number 9903504)
- 577 : Thread sealant (-50 to +150°C)  
(WRC potable water Approval Number 0302507 & NSF P1)
- 5367 : Silicone sealant (-40 to +250°C)
- 641 : Bearing fit (-40 to +150°C)
- 222\* : Thread Lock - used on capscrew/grubscrew to prevent loosening (-40 to +150°C) (NSF P1)

\*most frequently used by Ondrives - others dependent on design or by request  
Note: FDA Approvals are being phased out and replaced by NSF approvals

### Material Properties of Wormwheels used in P & PF Range of Gearboxes

**Material:** Aluminium Bronze (BS/DGS CA104) (ASTM B150: 63200) (DIN Cu Al 10Ni) (UNS C63200)  
**Tensile Strength:** 700-850N/mm<sup>2</sup>, 0.2% proof stress 350-600 N/mm<sup>2</sup>  
**Young's Modulus:** 125 N/mm<sup>2</sup> x 10<sup>3</sup>  
**Density:** 7.59 g/cm<sup>3</sup>  
**Coefficient of Linear Expansion:** 17.1°C x 10<sup>-6</sup>  
**Electrical Conductivity:** %IACS 8  
**Thermal Conductivity:** 80 W/m °C

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# GEARBOXES

## Grease Technical Data

Shell Nerita Grease HV

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### Shell Nerita Grease HV - Synthetic High Speed Bearing Grease

A very high performance grease specially designed for the lubrication of heavily loaded, high-speed bearings. It consists of a blend of lithium soap, Shell XHVI synthetic base oil and carefully selected additives recommended for use where conventional greases are inadequate in anti-wear and extreme-pressure properties or in their oxidation resistance. Suitable over a wide temperature range from -30°C to a peak of +130°C, it gives extended bearing and grease life.

#### **Performance Features**

- Outstanding mechanical stability
- Long operational life
- Lead and nitrite free
- Wide operating temperature Range
- Excellent wear protection
- Heavy load capability
- Good oil separation

#### **Typical Physical Characteristics**

NLGI Consistency	2 to 3
Colour	Light Brown
Soap Type	Lithium
Base Oil (type)	Synthetic
Kinematic Viscosity (IP 71/ASTM-D445)	
40°C cSt	40
100°C cSt	7.2
Dropping Point (IP 132/ASTM-D566-76)	190°C
Cone Penetration Worked @ 25°C (IP 50/ASTM-D217)	
60 Strokes	250 - 280
100,000 Strokes change 0.1mm	+20 max.
Oil Separation on Storage of Grease (IP 121)	
7 days @ 40°C	4.8%
Emcor Steel Corrosion Test (IP 220)	
Distilled water 0 - 5 scale	0 - 0
Mechanical Stability (SKF V2F)	Pass
Bearing Life	
FAG FE9 Test @ 150°C L50 hours	> 250
SKF ROF Test @ 130°C L50 hours	> 1500
Extreme Pressure Properties (IP 239/ASTM-D2596)	
Shell Four Ball Test, Load at which welding occurs	315kg
Timken Wear & Lubricant Testing Machine, OK Load	50lbs
Minimum Operating Temperature	-30°C
Maximum Operating Temperature	+130°C (+140°C peak)

These characteristics are typical of current production. Whilst future production will conform to Shell's specification, variations in these characteristics may occur.

#### **Health & Safety**

Shell Nerita Grease HV is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of industrial and personal hygiene are maintained. For further guidance on Product Health & Safety refer to the appropriate data sheet.



# GEARBOXES

## Grease Technical Data

Shell Alvania Grease HDX2

### Shell Alvania Grease HDX2 - High Performance Grease Containing Solid Lubricant

A very high performance grease the lubrication of industrial bearings subjected to the most arduous conditions. It is based on a high viscosity index mineral oil and a lithium/calcium thickener and contains extreme-pressure, anti-oxidation, anti-wear, anti-corrosion and adhesion additives. It also contains molybdenum disulphide to enhance its EP properties. The essential qualities of Shell Alvania Grease HDX2 are its mechanical stability, water resistance, adhesion and exceptional performance in shock loaded conditions. It is recommended for the lubrication of shock loaded heavy duty bearings working in damp hostile conditions.

#### **Performance Features**

- Excellent mechanical stability
- For shock loaded conditions
- Extreme pressure performance
- Good water resistance
- Good adhesion properties

#### **Typical Physical Characteristics**

NLGI Consistency	2
Colour	Dark grey
Soap Type	Lithium/Calcium
Base Oil (type)	Mineral
Kinematic Viscosity (IP 71/ASTM-D445)	
40°C cSt	160
100°C cSt	15.5
Cone Penetration	
Worked @ 25°C 0.1mm (IP 50/ASTM-D217)	265 - 295
Dropping Point (IP 132/ASTM-D566-76)	184°C
Water Resistance	
Water Wash-out (ASTM-D1264)	3%
Water Spray-off (ASTM-D4049)	4.2%
Emcor Steel Corrosion Test (IP 220)	
Distilled water 0 - 5 scale	0 - 0
Mechanical Stability (SKF V2F)	
Condition 1 (50g max.)	Pass
Extreme Pressure Properties (IP 239/ASTM-D2596)	
Shell Four Ball Test, Load at which welding occurs	400kg
Minimum Operating Temperature	-25°C
Maximum Operating Temperature	+120°C (+140°C peak)

These characteristics are typical of current production. Whilst future production will conform to Shell's specification, variations in these characteristics may occur.

#### **Health & Safety**

Shell Alvania Grease HDX2 is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of industrial and personal hygiene are maintained. For further guidance on Product Health & Safety refer to the appropriate data sheet.

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# GEARBOXES

## Gearbox Grease Filling

- Operating ambient temperature range = 0°C to 70°C
- The grease in most applications will run at 80°C but if speed and load are increased, the temperature of the gearbox will rise and may cause damage to the unit. Hand motion will not cause a problem because no thermal build up will arise until you motor power the unit.
- Gearboxes can be packed with wide-range temperature grease operating between -55°C to +155°C.
- Rubber seals (nitrile) oil seals: maximum operating temperature = +100°C
- Carbon steel bearings: maximum operating temperature = +150°C (if fitted with high temperature grease and ZZ Steel shields)
- Stainless steel bearings: maximum operating temperature = +288°C (if fitted with high temperature grease and ZZ Steel shields)
- Standard bearings: maximum operating temperature = +80°C (including hand motion)
- Gearboxes are greased for life. Refilling is only required when boxes are disassembled for refurbishment. Overfilling will cause excessive heat build up and potential failure.
- We are able to modify standard gearboxes to customer's specific requirements.
- Damage caused by customer modifications will invalidate the gearbox guarantee.
- We recommend that shafts are connected by flexible couplings.
- Our gearboxes are designed as speed reducing units, not as multipliers. If used in a speed increasing capacity, service life is not guaranteed.
- Customers will always need to test the units themselves in their particular application to ensure it is adequate for the job and has the desired results for them.



**DO NOT FILL !  
GREASED FOR LIFE**

***Greasing is only  
required if the  
gearbox is to be  
used in special  
applications or if it  
is being refurbished***

**rino**

Toll Free!



**1-888-260-7466**



**516-867-5656**