

# CRANE SHEAVES

**The designs on page 19 illustrate Timken bearing mountings in a single sheave and in a multiple sheave block. Bearing types TNASW and TNASWE are widely used in crane sheave applications and feature the following:**

Pre-set—no adjustment needed. The inner cone faces, which contact each other, are ground to control bearing internal clearance. Pressing the bearing cup into the sheave hub with the recommended interference fit assures satisfactory bearing operating clearance. Loose cone fits on the pin are used.

Inner cone faces are slotted and chamfered to facilitate relubrication to the center of the bearing through the pin or axle shaft. The cone chamfers eliminate the need to machine a groove on the pin O.D. in order for grease to enter the bearing.

**In addition, the type TNASWE bearings feature extended cone ribs which are ground on the O.D. to offer the following advantages:**

The extended cone rib can eliminate the need to provide spacers between the bearings in a multiple sheave block. Proper clearance between the sheaves can usually be maintained by the bearings alone.

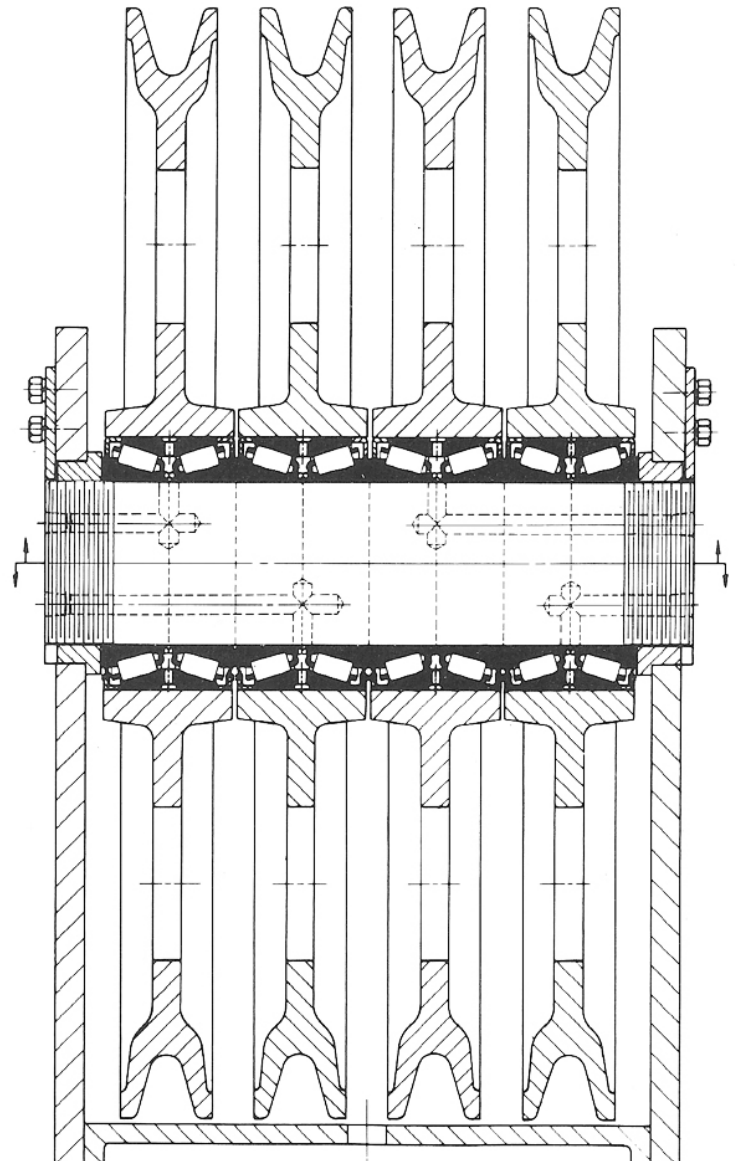
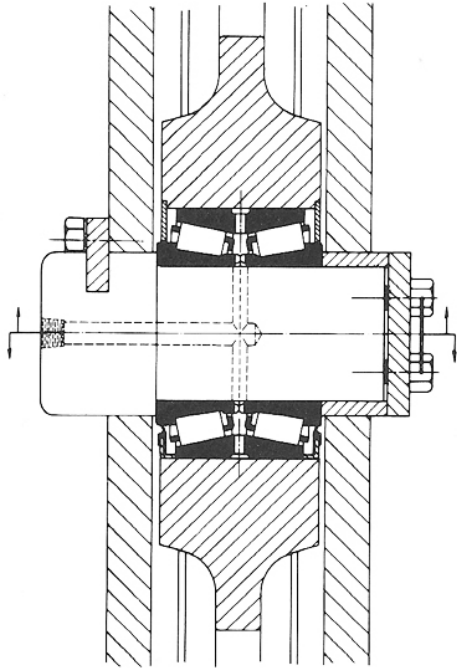
The ground rib O.D. provides a suitable running surface for a rubbing type seal. For most

sizes of TNASWE bearings, special rubbing seals are commercially available. The added efficiency of these seals over metal closures allows the sheave-bearing relubrication cycle to be extended to once a year under moderate service conditions. For information on manufacturers of these seals, contact The Timken Company.

As shown on the designs on page 19, below centerline, the seals are pressed into the sheave hub until they bottom against the bearing cup face. The seal O.D. is made to suit the recommended cup seat (sheave hub bore) so that no counter-boring of the hub is required.

When TNASW bearings are used, or TNASWE bearings for which no rubbing seals are available are used, close clearance metal closures should be provided by the crane builder to exclude contamination and insure that grease is retained in the bearing cavity.

When a crane builder provides the bearing closures, several design variations are possible. For example, as shown on the design above the centerline, flat washers can be staked in place on the sheave hub (left) or L-shaped stampings can be pressed into the hub bore (right). Regardless of its design, the closure should be securely located, and should be made to have as close a clearance as practical with respect to diametral clearance between the rotating and non-rotating part.



The above designs show Timken type TNASWE bearings which are applied with a tight fit in the sheave bore and a loose cone fit on the pin. The cups are fitted in the sheaves by cooling the cups and heating the sheaves. Grease is supplied through holes in the pin leading to the groove and slots in the bearing cone faces.

## BEARING SELECTION GUIDELINES

The following pages show bearing suggestions for a full range of sheave loads and pin sizes. Type TNASW bearings have been included with type TNASWE to meet nearly any combination of pin size and sheave load requirement.

Allowable sheave loads are based on the following formula (assuming no side loads on the sheave):

$$P = \frac{C(90)2 \times SF}{LF \times AF \times f}$$

Where:

P = Allowable sheave load — N (lbs.)

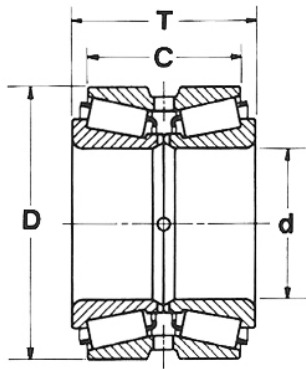
C(90)2 = Basic two row dynamic radial rating — N (lbs.)

SF = Speed Factor =  $\left(\frac{500}{RPM}\right)^3$  Assuming average RPM = 15 to 30 depending on sheave diameter

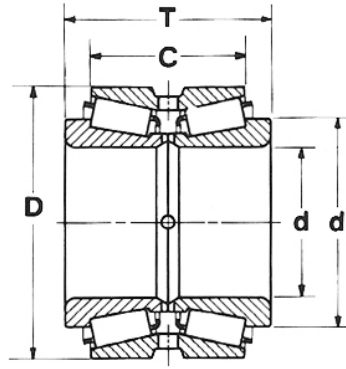
LF = Life Factor =  $\left(\frac{L_{10}}{3000}\right)^3 = 2.0$ —Where L<sub>10</sub> is 30000 hours

AF = Application Factor = 1.0

f = Weighted Average Load Factor = .75 or 75% of max sheave load



**TNASW**  
Figure 1

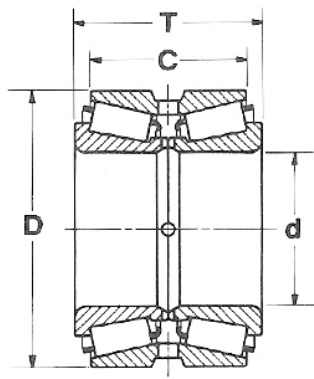


**TNASWE**  
Figure 2

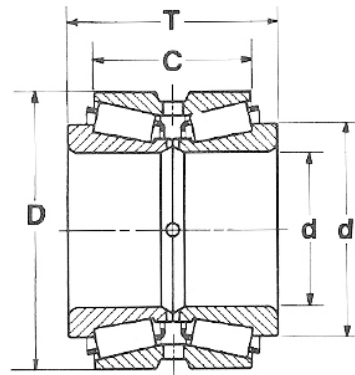
Allowable Sheave Load $\frac{lb}{N}$	Nominal Pin Dia. & Brg. Bore $d$ $\frac{in.}{mm}$	Bearing Part Number		fig.	Bearing Dimensions				Recommended Fitting Practice			
		Cone	Cup		Cup O.D. $D$ $\frac{in.}{mm}$	Width		Rib O.D. $d_1$ $\frac{in.}{mm}$	Pin Dia.-Cone Seat $\frac{in.}{mm}$	Cone Fit (loose) $\frac{in.}{mm}$	Sheave Bore-Cup Seat $\frac{in.}{mm}$	Cup Fit (tight) $\frac{in.}{mm}$
						T $\frac{in.}{mm}$	C $\frac{in.}{mm}$					
2900 12900	0.7500 19.050	NA05076SW	05185D	2*	1.8504 47.000	1.3750 34.925	0.9926 25.212	1.2741 32.362	0.7495-0.7490 19.037-19.025	0.005-0.0015 0.013-0.038	1.8474-1.8484 46.924-46.949	0.0020-0.0040 0.051-0.102
6800 30200	1.1811 30.000 @	NA26118SW	26284D	1	2.8338 71.979	1.6835 42.761	1.4375 36.512	—	1.1801-1.1796 29.975-29.962	0.005-0.0015 0.013-0.038	2.8318-2.8328 71.928-71.953	0.0020-0.0040 0.051-0.102
6100 27100	1.1813 30.005	NA15117SW	15251D	2*	2.5000 63.500	2.0001 50.803	1.4375 36.512	1.8017 45.763	1.1808-1.1803 29.992-29.980	0.0005-0.0015 0.013-0.038	2.4970-2.4980 63.424-63.449	0.0020-0.0040 0.051-0.102
9700 43100	1.5000 38.100	NA24776SW	24720D	2*	3.0000 76.200	2.3125 58.738	1.5625 39.688	2.2933 58.250	1.4995-1.4990 38.087-38.075	0.0005-0.0015 0.013-0.038	2.9970-2.9980 76.124-76.149	0.0020-0.0040 0.051-0.102
16000 71200	1.7500 44.450	NA435SW	432D	2*	3.7500 95.250	2.8126 71.440	2.0000 50.800	2.5598 65.019	1.7495-1.7490 44.437-44.425	0.0005-0.0015 0.013-0.038	3.7470-3.7480 95.174-95.199	0.0020-0.0040 0.051-0.102
18000 80100	2.0000 50.800	NA456SW	452D	2*	4.2500 107.950	2.9376 74.615	2.1250 53.975	3.1141 79.098	1.9995-1.9990 50.787-50.775	0.0005-0.0015 0.013-0.038	4.2470-4.2480 107.874-107.899	0.0020-0.0040 0.051-0.102
26500 117900	2.3750 60.325	NA558SW	552D	1	4.8750 123.825	3.1250 79.375	2.5000 63.500	—	2.3745-2.3740 60.312-60.300	0.0005-0.0015 0.013-0.038	4.8720-4.8730 123.749-123.774	0.0020-0.0040 0.051-0.102
32000 142300	2.7500 69.850	NA643SW	632D	1	5.3750 136.525	3.7500 95.250	3.0000 76.200	—	2.7495-2.7490 69.837-69.825	0.0005-0.0015 0.013-0.038	5.3720-5.3730 136.449-136.474	0.0020-0.0040 0.051-0.102
19500 86700	2.7559 70.000	NA483SW	472D	2*	4.7244 120.000	2.9376 74.615	2.1250 53.975	3.6540 92.812	2.7554-2.7549 69.987-69.974	0.0005-0.0015 0.013-0.038	4.7214-4.7224 119.924-119.949	0.0020-0.0040 0.051-0.102
29500 131200	2.9990 76.175	NA575SW	572D	2*	5.5115 139.992	3.6250 92.075	2.6250 66.675	4.3080 109.423	2.9985-2.9980 76.162-76.149	0.0005-0.0015 0.013-0.038	5.5085-5.5095 139.916-139.941	0.0020-0.0040 0.051-0.102
22000 97900	3.0000 76.200	NA495SW	493D	1	5.3750 136.525	2.7500 69.850	2.1250 53.975	—	2.9995-2.9990 76.187-76.175	0.0005-0.0015 0.013-0.038	5.3720-5.3730 136.449-136.474	0.0020-0.0040 0.051-0.102
35000 155700	3.0000 76.200	NA659SW	654D	1	6.0000 152.400	3.7500 95.250	3.0000 76.200	—	2.9995-2.9990 76.187-76.175	0.0005-0.0015 0.013-0.038	5.9970-5.9980 152.324-152.349	0.0020-0.0040 0.051-0.102
29500 131200	3.2500 82.550	NA580SW	572D	2*	5.5115 139.992	3.6250 92.075	2.6250 66.675	4.3229 109.802	3.2490-3.2480 82.525-82.499	0.0010-0.0030 0.025-0.076	5.5085-5.5095 139.916-139.941	0.0020-0.0040 0.051-0.102
22000 97900	3.3750 85.725	NA497SW	493D	2*	5.3750 136.525	2.8750 73.025	2.1250 53.975	4.2828 108.783	3.3740-3.3730 85.700-85.674	0.0010-0.0030 0.025-0.076	5.3720-5.3730 136.449-136.474	0.0020-0.0040 0.051-0.102
39000 173500	3.4990 88.875	NA678SW	672D	1	6.6250 168.275	3.6250 92.075	2.7500 69.850	—	3.4980-3.4970 88.849-88.824	0.0010-0.0030 0.025-0.076	6.6220-6.6230 168.199-168.224	0.0020-0.0040 0.051-0.102
31500 140100	3.5000 88.900	NA596SW	592D	2*	6.0000 152.400	3.6250 92.075	2.5000 63.500	4.7725 121.222	3.4990-3.4980 88.875-88.849	0.0010-0.0030 0.025-0.076	5.9970-5.9980 152.324-152.349	0.0020-0.0040 0.051-0.102
47000 209100	3.5000 88.900	NA759SW	752D	1	6.3750 161.925	4.1250 104.775	3.3750 85.725	—	3.4990-3.4980 88.875-88.849	0.0010-0.0030 0.025-0.076	6.3720-6.3730 161.849-161.874	0.0020-0.0040 0.051-0.102
51000 226900	3.7500 95.250	NA776SW	774D	1	7.1250 180.975	4.1250 104.775	3.3750 85.725	—	3.7490-3.7480 95.225-95.199	0.0010-0.0030 0.025-0.076	7.1220-7.1230 180.899-180.924	0.0020-0.0040 0.051-0.102
34500 153500	3.9370 100.000 @	NA56393SW	56650D	2*	6.5000 165.100	3.5000 88.900	2.5000 63.500	5.4249 137.792	3.9350-3.9340 99.949-99.924	0.0010-0.0030 0.025-0.076	6.4970-6.4980 165.024-165.049	0.0020-0.0040 0.051-0.102
39000 173500	4.0000 101.600	NA691SW	672D	1	6.6250 168.275	3.6250 92.075	2.7500 69.850	—	3.9990-3.9980 101.575-101.549	0.0010-0.0030 0.025-0.076	6.6220-6.6230 168.199-168.224	0.0020-0.0040 0.051-0.102

@Dimension shown is maximum value having minus tolerance.

\* Rubbing seals commercially available. Consult The Timken Company for manufacturer information.



**TNASW**  
Figure 1



**TNASWE**  
Figure 2

Allowable Sheave Load lb. N	Nominal Pin Dia. & Brg. Bore d in. mm	Bearing Part Number		fig.	Bearing Dimensions				Recommended Fitting Practice			
		Cone	Cup		Cup O.D. D in. mm	Width		Rib O.D. d <sub>1</sub> in. mm	Pin Dia.- Cone Seal in. mm	Cone Fit (loose) in. mm	Sheave Bore- Cup Seat in. mm	Cup Fit (tight) in. mm
						T in. mm	C in. mm					
34500 153500	4.2500 107.950	NA56425SW	56650D	2*	6.5000 165.100	3.5000 88.900	2.5000 63.500	5.4249 137.792	4.2490-4.2480 107.925-107.899	0.0010-0.0030 0.025-0.076	6.4970-6.4980 165.024-165.049	0.0020-0.0040 0.051-0.102
41000 182400	4.3307 110.000 <sup>@</sup>	NA64432SW	64700D	2*	7.0000 177.800	4.0000 101.600	2.7500 69.850	5.7695 146.545	4.3297-4.3287 109.974-109.949	0.0010-0.0030 0.025-0.076	6.9970-6.9980 177.724-177.749	0.0020-0.0040 0.051-0.102
58000 258000	5.0000 127.000	NA798SW	792D	1	8.1250 206.375	4.2500 107.950	3.2500 82.550	—	4.9990-4.9980 126.975-126.949	0.0010-0.0030 0.025-0.076	8.1220-8.1230 206.299-206.324	0.0020-0.0040 0.051-0.102
46000 204600	5.0000 127.000	NA48290SW	48220D	2*	7.1875 182.562	3.6874 93.660	2.8750 73.025	6.1075 155.130	4.9990-4.9980 126.975-126.949	0.0010-0.0030 0.025-0.076	7.1845-7.1855 182.486-182.512	0.0020-0.0040 0.051-0.102
50000 222400	5.6250 142.875	NA48685SW	48620D	2*	7.8750 200.025	3.6876 93.665	2.8750 73.025	6.7717 172.000	5.6240-5.6230 142.850-142.824	0.0010-0.0030 0.025-0.076	7.8720-7.8730 199.949-199.974	0.0020-0.0040 0.051-0.102
51500 229100	6.0000 152.400	NA48990SW	48920D	2*	8.3125 211.138	3.6250 92.075	2.7500 69.850	7.2085 183.096	5.9990-5.9980 152.375-152.349	0.0010-0.0030 0.025-0.076	8.3095-8.3105 211.061-211.087	0.0020-0.0040 0.051-0.102
54500 242400	6.5000 165.100	NA46790SW	46720D	2*	8.8750 225.425	3.7500 95.250	2.7500 69.850	7.7600 197.104	6.4990-6.4980 165.075-165.049	0.0010-0.0030 0.025-0.076	8.8720-8.8730 225.349-225.374	0.0020-0.0040 0.051-0.102
65500 291400	7.0000 177.800	NA87700SW	87112D	2*	11.1250 282.575	4.2500 107.950	3.1250 79.375	9.1816 233.213	6.9990-6.9980 177.775-177.749	0.0010-0.0030 0.025-0.076	11.1220-11.1230 282.499-282.524	0.0020-0.0040 0.051-0.102
69500 309200	7.0000 177.800	NA67791SW	67720D	1	9.7500 247.650	4.0625 103.188	3.3125 84.138	—	6.9990-6.9980 177.775-177.749	0.0010-0.0030 0.025-0.076	9.7470-9.7480 247.574-247.599	0.0020-0.0040 0.051-0.102
73500 326900	7.0866 180.000 <sup>@</sup>	NA67874SW	67820D	2*	10.5000 266.700	4.3125 109.538	3.3125 84.138	—	7.0846-7.0836 179.949-179.923	0.0010-0.0030 0.025-0.076	10.4970-10.4980 266.624-266.649	0.0020-0.0040 0.051-0.102
56800 252700	7.2500 184.150	LM637349NW	LM637310D	2*	9.5625 242.888	3.7500 95.250	2.7500 69.850	8.4803 215.400	7.2490-7.2480 184.125-184.099	0.0010-0.0030 0.025-0.076	9.5595-9.5605 242.811-242.837	0.0020-0.0040 0.051-0.102
73500 326900	7.5000 190.500	NA67885SW	67820D	2*	10.5000 266.700	4.3125 109.538	3.3125 84.138	9.1444 232.268	7.4990-7.4980 190.475-190.449	0.0010-0.0030 0.025-0.076	10.4970-10.4980 266.624-266.649	0.0020-0.0040 0.051-0.102
116500 518200	8.0000 203.200	NA93800SW	93127D	1	12.5000 317.500	5.7500 146.050	4.3750 111.125	—	7.9990-7.9980 203.175-203.149	0.0010-0.0030 0.025-0.076	12.4960-12.4980 317.398-317.449	0.0020-0.0060 0.051-0.152
73000 324700	8.0000 203.200	LM241149NW	LM241110D	2*	10.8750 276.225	3.7500 95.250	2.8750 73.025	9.4659 240.434	7.9990-7.9980 203.175-203.149	0.0010-0.0030 0.025-0.076	10.8720-10.8730 276.149-276.174	0.0020-0.0040 0.051-0.102
95500 424800	9.2500 234.950	NA8575SW	8520D	2*	12.8750 327.025	4.6250 117.475	3.2500 82.550	11.0065 279.565	9.2490-9.2480 234.925-234.899	0.0010-0.0030 0.025-0.076	12.8710-12.8730 326.923-326.974	0.0020-0.0060 0.051-0.102
102500 455900	9.6250 244.475	NA127096SW	127136D	2*	13.7460 349.148	5.2500 133.350	4.0000 101.600	11.4351 290.452	9.6240-9.6230 244.450-244.424	0.0010-0.0030 0.025-0.076	13.7420-13.7440 349.047-349.098	0.0020-0.0060 0.051-0.152
90000 400300	10.0000 254.000 <sup>@</sup>	LM249747NW	LM249710D	2*	13.6875 347.662	4.0000 101.600	2.7500 69.850	11.5860 294.284	9.9980-9.9970 253.949-253.924	0.0010-0.0030 0.025-0.076	13.6835-13.6855 347.561-347.612	0.0020-0.0060 0.051-0.152
143000 636100	10.2500 260.350	NA221027SW	221576D	1	15.7500 400.050	5.7500 146.050	4.2500 107.950	—	10.2490-10.2480 260.325-260.299	0.0010-0.0030 0.025-0.076	15.7460-15.7480 399.948-399.999	0.0020-0.0060 0.051-0.152
105000 467100	10.5000 266.700	LM251649NW	LM251610D	2*	13.8750 352.425	4.2500 107.950	3.2500 82.550	12.1994 309.865	10.4990-10.4980 266.675-266.649	0.0010-0.0030 0.025-0.076	13.8710-13.8730 352.323-352.374	0.0020-0.0060 0.051-0.152
112000 498200	12.0000 304.800	L357049NW	L357010D	2*	15.5000 393.700	4.2500 107.950	3.2500 82.550	13.7971 350.446	11.9990-11.9980 304.775-304.749	0.0010-0.0030 0.025-0.076	15.446-15.4480 392.328-392.379	0.0020-0.0060 0.051-0.152

<sup>@</sup>Dimension shown is maximum value having minus tolerance.

\* Rubbing seals commercially available. Consult The Timken Company for manufacturer information.