

Foreword

The formulation of this National Standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled "Enhancing the Implementation of AFMA Through Improved Agricultural Engineering Standards" which was funded by the Bureau of Agricultural Research (BAR) of the Department of Agriculture (DA).

This Standard was reviewed by the Technical Committee for Study 2 – Development of Standards for Engineering Materials and was circulated to various private and government agencies/organizations concerned for their comments and reactions. These standards were presented to the Philippine Society of Agricultural Engineers (PSAE) and subjected to a public hearing organized by the National Agriculture and Fisheries Council (NAFC). The comments and reactions received during the presentation and public hearing were taken into consideration in the finalization of the standards.

This Standard has technically formulated in accordance with PNS 01:Part 4:1998 – Rules for the Structure and Drafting of Philippine National Standard. It provides specifications and proper application of shafts for agricultural machines and does not cover manufacturing specifications.

In the preparation of this standard, the following references were considered.

Baumeister, Theodore (ed.) 1997. Mark's handbook for mechanical engineers. 10th Edition. Mc Graw Hill Book Company, USA.

Carmichael, C. (ed.) 1950. Kent's Mechanical engineer's handbook. Design and production volume. 12th Edition. John Wiley and Sons, Inc., USA.

Dodge design manual

Faires, V. M. 1969. Design of Machine Elements. Macmillan Company, New York USA.

Shigley, Joseph, E. 1989. Mechanical engineering design. 3rd Edition. Mc Graw Hill Book Company, USA.

Engineering Materials – Shafts for Agricultural Machines – Specifications and Applications

1 Scope

This standard establishes specifications and provides technical information for the proper application of shafts for drives in agricultural machinery.

2 Reference

The following normative references contains provisions which, through reference in this text, constitute provisions of this Standard:

PAES 304:2000:Engineering Materials – Keys and Keyways for Agricultural Machines – Specifications and Applications

3 Application

Shafts are rotating members, usually of circular cross section used to transmit power or motion. It provides the axis of rotation, or oscillation, of elements such as gears, pulleys, flywheels, cranks, sprockets, and the like and controls the geometry of their motion.

4 Materials

Standard shafts for agricultural machines are usually of steel designation 1020 (cold rolled). For special purposes, stainless steel shafts usually of steel designation 304 or 316 shall be used.

5 Power rating

Power ratings of shafts are presented in Tables 2-7. These tables can be used to find the approximate shaft diameter for various service conditions. Standard keyseated shafting, using a safe shear stress of approximately 41.369 MPa is the basis of Tables 2-4. For special application requiring the use of stainless steel shafts, power ratings are computed by multiplying a safe shear stress factor (Table 1) in order to arrive at a correct power rating. For safe shear stress of other materials, use 1/10 of the nominal ultimate tensile strength.

Table 1 – Safe shear stress factors

Safe shear stress, MPa	Factor	Safe shear stress, MPa	Factor	Safe shear stress, MPa	Factor	Safe shear stress, MPa	Factor	Safe shear stress, MPa	Factor
3.447	2.289	20.684	1.260	37.921	1.029	62.053	0.874	96.527	0.754
6.895	1.817	24.132	1.197	41.369	1.000	68.948	0.843	103.422	0.737
10.342	1.587	27.579	1.145	44.816	0.974	75.843	0.817	110.317	0.721
13.790	1.442	31.027	1.101	48.264	0.950	82.738	0.794	117.212	0.707
17.237	1.339	34.474	1.063	55.158	0.909	89.632	0.773	124.106	0.693

Table 2 – Power ratings for cold-rolled steel designation 1020 (Main power-transmitting shafts)

Shaft diameter, mm	Power ratings at various rpm, watts															
	40	60	80	100	150	200	300	400	500	600	800	1,000	1,200	1,400	1,600	1,800
16	138	207	276	345	517	690	1,035	1,380	1,724	2,069	2,759	3,449	4,139	4,828	5,518	6,208
19	238	358	477	596	894	1,192	1,788	2,384	2,980	3,576	4,768	5,960	7,152	8,344	9,536	10,728
25	565	848	1,130	1,413	2,119	2,825	4,238	5,651	7,063	8,476	11,301	14,127	16,952	19,777	22,603	25,428
29	805	1,207	1,609	2,011	3,017	4,023	6,034	8,046	10,057	12,068	16,091	20,114	24,137	28,160	32,183	36,205
32	1,104	1,655	2,207	2,759	4,139	5,518	8,277	11,037	13,796	16,555	22,073	27,591	33,110	38,628	44,146	49,664
35	1,469	2,203	2,938	3,672	5,509	7,345	11,017	14,690	18,362	22,034	29,379	36,724	44,069	51,414	58,759	66,103
38	1,907	2,861	3,814	4,768	7,152	9,536	14,303	19,071	23,839	28,607	38,142	47,678	57,213	66,749	76,285	85,820
44	3,028	4,543	6,057	7,571	11,357	15,142	22,713	30,284	37,855	45,426	60,569	75,711	90,853	105,995	121,137	136,279
51	4,521	6,781	9,041	11,301	16,952	22,603	33,904	45,206	56,507	67,809	90,411	113,014	135,617	158,220	180,823	203,426
57	6,437	9,655	12,873	16,091	24,137	32,183	48,274	64,365	80,456	96,548	128,730	160,913	193,095	225,278	257,461	289,643
64	8,829	13,244	17,658	22,073	33,110	44,146	66,219	88,292	110,365	132,439	176,585	220,731	264,877	309,023	353,169	397,316
70	11,752	17,628	23,503	29,379	44,069	58,759	88,138	117,517	146,896	176,276	235,034	293,793	352,551	411,310	470,069	528,827
76	15,257	22,885	30,514	38,142	57,213	76,285	114,427	152,569	190,712	228,854	305,138	381,423	457,708	533,992	610,277	686,561
89	24,227	36,341	48,455	60,569	90,853	121,137	181,706	242,274	302,843	363,411	484,549	605,686	726,823	847,960	969,097	1,090,234
102	36,165	54,247	72,329	90,411	135,617	180,823	271,234	361,646	452,057	542,468	723,291	904,114	1,084,937	1,265,759	1,446,582	1,627,405
114	51,492	77,238	102,984	128,730	193,095	257,461	386,191	514,921	643,651	772,382	1,029,842	1,287,303	1,544,763	1,802,224	2,059,684	2,317,145
127	70,634	105,951	141,268	176,585	264,877	353,169	529,754	706,339	882,924	1,059,508	1,412,678	1,765,847	2,119,017	2,472,186	2,825,356	3,178,525
140	94,014	141,021	188,027	235,034	352,551	470,069	705,103	940,137	1,175,171	1,410,206	1,880,274	2,350,343	2,820,411	3,290,480	3,760,549	4,230,617
152	122,055	183,083	244,111	305,138	457,708	610,277	915,415	1,220,554	1,525,692	1,830,831	2,441,107	3,051,384	3,661,661	4,271,938	4,882,215	5,492,492
165	155,183	232,774	310,365	387,957	581,935	775,913	1,163,870	1,551,827	1,939,783	2,327,740	3,103,653	3,879,567	4,655,480	5,431,393	6,207,307	6,983,220

Table 3 – Power ratings for cold-rolled steel designation 1020 (Line shafts)

Shaft diameter, mm	Power ratings at various rpm, watts															
	40	60	80	100	150	200	300	400	500	600	800	1,000	1,200	1,400	1,600	1,800
16	138	207	276	345	517	690	1,035	1,380	1,724	2,069	2,759	3,449	4,139	4,828	5,518	6,208
19	238	358	477	596	894	1,192	1,788	2,384	2,980	3,576	4,768	5,960	7,152	8,344	9,536	10,728
25	565	848	1,130	1,413	2,119	2,825	4,238	5,651	7,063	8,476	11,301	14,127	16,952	19,777	22,603	25,428
29	805	1,207	1,609	2,011	3,017	4,023	6,034	8,046	10,057	12,068	16,091	20,114	24,137	28,160	32,183	36,205
32	1,104	1,655	2,207	2,759	4,139	5,518	8,277	11,037	13,796	16,555	22,073	27,591	33,110	38,628	44,146	49,664
35	1,469	2,203	2,938	3,672	5,509	7,345	11,017	14,690	18,362	22,034	29,379	36,724	44,069	51,414	58,759	66,103
38	1,907	2,861	3,814	4,768	7,152	9,536	14,303	19,071	23,839	28,607	38,142	47,678	57,213	66,749	76,285	85,820
44	3,028	4,543	6,057	7,571	11,357	15,142	22,713	30,284	37,855	45,426	60,569	75,711	90,853	105,995	121,137	136,279
51	4,521	6,781	9,041	11,301	16,952	22,603	33,904	45,206	56,507	67,809	90,411	113,014	135,617	158,220	180,823	203,426
57	6,437	9,655	12,873	16,091	24,137	32,183	48,274	64,365	80,456	96,548	128,730	160,913	193,095	225,278	257,461	289,643
64	8,829	13,244	17,658	22,073	33,110	44,146	66,219	88,292	110,365	132,439	176,585	220,731	264,877	309,023	353,169	397,316
70	11,752	17,628	23,503	29,379	44,069	58,759	88,138	117,517	146,896	176,276	235,034	293,793	352,551	411,310	470,069	528,827
76	15,257	22,885	30,514	38,142	57,213	76,285	114,427	152,569	190,712	228,854	305,138	381,423	457,708	533,992	610,277	686,561
89	24,227	36,341	48,455	60,569	90,853	121,137	181,706	242,274	302,843	363,411	484,549	605,686	726,823	847,960	969,097	1,090,234
102	36,165	54,247	72,329	90,411	135,617	180,823	271,234	361,646	452,057	542,468	723,291	904,114	1,084,937	1,265,759	1,446,582	1,627,405
114	51,492	77,238	102,984	128,730	193,095	257,461	386,191	514,921	643,651	772,382	1,029,842	1,287,303	1,544,763	1,802,224	2,059,684	2,317,145
127	70,634	105,951	141,268	176,585	264,877	353,169	529,754	706,339	882,924	1,059,508	1,412,678	1,765,847	2,119,017	2,472,186	2,825,356	3,178,525
140	94,014	141,021	188,027	235,034	352,551	470,069	705,103	940,137	1,175,171	1,410,206	1,880,274	2,350,343	2,820,411	3,290,480	3,760,549	4,230,617
152	122,055	183,083	244,111	305,138	457,708	610,277	915,415	1,220,554	1,525,692	1,830,831	2,441,107	3,051,384	3,661,661	4,271,938	4,882,215	5,492,492
165	155,183	232,774	310,365	387,957	581,935	775,913	1,163,870	1,551,827	1,939,783	2,327,740	3,103,653	3,879,567	4,655,480	5,431,393	6,207,307	6,983,220

Table 4 – Power ratings for cold-rolled steel designation 1020 (Small, short shafts)

Shaft diameter, mm	Power ratings at various rpm, watts															
	40	60	80	100	150	200	300	400	500	600	800	1,000	1,200	1,400	1,600	1,800
16	193	289	386	482	723	964	1,446	1,928	2,410	2,892	3,856	4,820	5,784	6,748	7,712	8,676
19	333	500	666	833	1,249	1,666	2,499	3,332	4,165	4,998	6,663	8,329	9,995	11,661	13,327	14,993
25	790	1,185	1,579	1,974	2,962	3,949	5,923	7,897	9,872	11,846	15,795	19,743	23,692	27,641	31,590	35,538
29	1,124	1,687	2,249	2,811	4,217	5,622	8,433	11,245	14,056	16,867	22,489	28,111	33,734	39,356	44,978	50,600
32	1,542	2,314	3,085	3,856	5,784	7,712	11,568	15,425	19,281	23,137	30,849	38,561	46,274	53,986	61,698	69,411
35	2,053	3,080	4,106	5,133	7,699	10,265	15,398	20,530	25,663	30,795	41,060	51,325	61,590	71,855	82,120	92,385
38	2,665	3,998	5,331	6,663	9,995	13,327	19,990	26,654	33,317	39,980	53,307	66,634	79,961	93,288	106,615	119,941
44	4,233	6,349	8,465	10,581	15,872	21,163	31,744	42,325	52,906	63,488	84,650	105,813	126,975	148,138	169,300	190,463
51	6,318	9,477	12,636	15,795	23,692	31,590	47,384	63,179	78,974	94,769	126,358	157,948	189,537	221,127	252,716	284,306
57	8,996	13,493	17,991	22,489	33,734	44,978	67,467	89,956	112,445	134,934	179,912	224,890	269,868	314,846	359,824	404,802
64	12,340	18,509	24,679	30,849	46,274	61,698	92,547	123,397	154,246	185,095	246,793	308,491	370,190	431,888	493,586	555,285
70	16,424	24,636	32,848	41,060	61,590	82,120	123,181	164,241	205,301	246,361	328,482	410,602	492,722	574,843	656,963	739,084
76	21,323	31,984	42,646	53,307	79,961	106,615	159,922	213,229	266,537	319,844	426,459	533,073	639,688	746,302	852,917	959,532
89	33,860	50,790	67,720	84,650	126,975	169,300	253,950	338,600	423,250	507,900	677,200	846,500	1,015,801	1,185,101	1,354,401	1,523,701
102	50,543	75,815	101,086	126,358	189,537	252,716	379,074	505,432	631,790	758,149	1,010,865	1,263,581	1,516,297	1,769,013	2,021,729	2,274,446
114	71,965	107,947	143,930	179,912	269,868	359,824	539,737	719,649	899,561	1,079,473	1,439,298	1,799,122	2,158,946	2,518,771	2,878,595	3,238,419
127	98,717	148,076	197,435	246,793	370,190	493,586	740,379	987,173	1,233,966	1,480,759	1,974,345	2,467,931	2,961,518	3,455,104	3,948,690	4,442,276
140	131,393	197,089	262,785	328,482	492,722	656,963	985,445	1,313,927	1,642,408	1,970,890	2,627,853	3,284,817	3,941,780	4,598,743	5,255,707	5,912,670
152	170,583	255,875	341,167	426,459	639,688	852,917	1,279,376	1,705,834	2,132,293	2,558,751	3,411,668	4,264,585	5,117,502	5,970,419	6,823,337	7,676,254
165	216,882	325,323	433,764	542,205	813,307	1,084,409	1,626,614	2,168,818	2,711,023	3,253,227	4,337,636	5,422,045	6,506,454	7,590,863	8,675,272	9,759,681

Table 5 – Power ratings for stainless steel designation 304 and 316 (Main power-transmitting shafts)

Shaft diameter, mm	Power ratings at various rpm, watts															
	40	60	80	100	150	200	300	400	500	600	800	1,000	1,200	1,400	1,600	1,800
16	128	192	256	321	481	641	962	1,282	1,603	1,923	2,565	3,206	3,847	4,488	5,129	5,770
19	222	332	443	554	831	1,108	1,662	2,216	2,770	3,324	4,432	5,540	6,647	7,755	8,863	9,971
25	525	788	1,050	1,313	1,970	2,626	3,939	5,252	6,565	7,879	10,505	13,131	15,757	18,383	21,009	23,636
29	748	1,122	1,496	1,870	2,804	3,739	5,609	7,478	9,348	11,218	14,957	18,696	22,435	26,174	29,914	33,653
32	1,026	1,539	2,052	2,565	3,847	5,129	7,694	10,258	12,823	15,388	20,517	25,646	30,775	35,905	41,034	46,163
35	1,365	2,048	2,731	3,414	5,120	6,827	10,241	13,654	17,068	20,481	27,308	34,135	40,962	47,789	54,616	61,443
38	1,773	2,659	3,545	4,432	6,647	8,863	13,295	17,727	22,158	26,590	35,453	44,317	53,180	62,043	70,907	79,770
44	2,815	4,222	5,630	7,037	10,556	14,075	21,112	28,149	35,187	42,224	56,298	70,373	84,448	98,522	112,597	126,672
51	4,202	6,303	8,404	10,505	15,757	21,009	31,514	42,019	52,523	63,028	84,037	105,047	126,056	147,065	168,075	189,084
57	5,983	8,974	11,965	14,957	22,435	29,914	44,871	59,827	74,784	89,741	119,655	149,568	179,482	209,396	239,310	269,223
64	8,207	12,310	16,414	20,517	30,775	41,034	61,551	82,068	102,585	123,102	164,136	205,169	246,203	287,237	328,271	369,305
70	10,923	16,385	21,846	27,308	40,962	54,616	81,924	109,232	136,540	163,848	218,464	273,080	327,697	382,313	436,929	491,545
76	14,181	21,272	28,363	35,453	53,180	70,907	106,360	141,813	177,266	212,720	283,626	354,533	425,439	496,346	567,252	638,159
89	22,519	33,779	45,039	56,298	84,448	112,597	168,895	225,194	281,492	337,791	450,388	562,985	675,582	788,179	900,776	1,013,373
102	33,615	50,422	67,230	84,037	126,056	168,075	252,112	336,150	420,187	504,224	672,299	840,374	1,008,449	1,176,523	1,344,598	1,512,673
114	47,862	71,793	95,724	119,655	179,482	239,310	358,964	478,619	598,274	717,929	957,238	1,196,548	1,435,858	1,675,167	1,914,477	2,153,786
127	65,654	98,481	131,308	164,136	246,203	328,271	492,407	656,542	820,678	984,813	1,313,084	1,641,355	1,969,626	2,297,897	2,626,168	2,954,439
140	87,386	131,079	174,771	218,464	327,697	436,929	655,393	873,857	1,092,322	1,310,786	1,747,715	2,184,644	2,621,572	3,058,501	3,495,430	3,932,359
152	113,450	170,176	226,901	283,626	425,439	567,252	850,879	1,134,505	1,418,131	1,701,757	2,269,009	2,836,262	3,403,514	3,970,766	4,538,019	5,105,271
165	144,242	216,363	288,485	360,606	540,909	721,211	1,081,817	1,442,423	1,803,029	2,163,634	2,884,846	3,606,057	4,327,269	5,048,480	5,769,692	6,490,903

Table 6 – Power ratings for stainless steel designation 304 and 316 (Line shafts)

Shaft diameter, mm	Power ratings at various rpm, watts															
	40	60	80	100	150	200	300	400	500	600	800	1,000	1,200	1,400	1,600	1,800
16	128	192	256	321	481	641	962	1,282	1,603	1,923	2,565	3,206	3,847	4,488	5,129	5,770
19	222	332	443	554	831	1,108	1,662	2,216	2,770	3,324	4,432	5,540	6,647	7,755	8,863	9,971
25	525	788	1,050	1,313	1,970	2,626	3,939	5,252	6,565	7,879	10,505	13,131	15,757	18,383	21,009	23,636
29	748	1,122	1,496	1,870	2,804	3,739	5,609	7,478	9,348	11,218	14,957	18,696	22,435	26,174	29,914	33,653
32	1,026	1,539	2,052	2,565	3,847	5,129	7,694	10,258	12,823	15,388	20,517	25,646	30,775	35,905	41,034	46,163
35	1,365	2,048	2,731	3,414	5,120	6,827	10,241	13,654	17,068	20,481	27,308	34,135	40,962	47,789	54,616	61,443
38	1,773	2,659	3,545	4,432	6,647	8,863	13,295	17,727	22,158	26,590	35,453	44,317	53,180	62,043	70,907	79,770
44	2,815	4,222	5,630	7,037	10,556	14,075	21,112	28,149	35,187	42,224	56,298	70,373	84,448	98,522	112,597	126,672
51	4,202	6,303	8,404	10,505	15,757	21,009	31,514	42,019	52,523	63,028	84,037	105,047	126,056	147,065	168,075	189,084
57	5,983	8,974	11,965	14,957	22,435	29,914	44,871	59,827	74,784	89,741	119,655	149,568	179,482	209,396	239,310	269,223
64	8,207	12,310	16,414	20,517	30,775	41,034	61,551	82,068	102,585	123,102	164,136	205,169	246,203	287,237	328,271	369,305
70	10,923	16,385	21,846	27,308	40,962	54,616	81,924	109,232	136,540	163,848	218,464	273,080	327,697	382,313	436,929	491,545
76	14,181	21,272	28,363	35,453	53,180	70,907	106,360	141,813	177,266	212,720	283,626	354,533	425,439	496,346	567,252	638,159
89	22,519	33,779	45,039	56,298	84,448	112,597	168,895	225,194	281,492	337,791	450,388	562,985	675,582	788,179	900,776	1,013,373
102	33,615	50,422	67,230	84,037	126,056	168,075	252,112	336,150	420,187	504,224	672,299	840,374	1,008,449	1,176,523	1,344,598	1,512,673
114	47,862	71,793	95,724	119,655	179,482	239,310	358,964	478,619	598,274	717,929	957,238	1,196,548	1,435,858	1,675,167	1,914,477	2,153,786
127	65,654	98,481	131,308	164,136	246,203	328,271	492,407	656,542	820,678	984,813	1,313,084	1,641,355	1,969,626	2,297,897	2,626,168	2,954,439
140	87,386	131,079	174,771	218,464	327,697	436,929	655,393	873,857	1,092,322	1,310,786	1,747,715	2,184,644	2,621,572	3,058,501	3,495,430	3,932,359
152	113,450	170,176	226,901	283,626	425,439	567,252	850,879	1,134,505	1,418,131	1,701,757	2,269,009	2,836,262	3,403,514	3,970,766	4,538,019	5,105,271
165	144,242	216,363	288,485	360,606	540,909	721,211	1,081,817	1,442,423	1,803,029	2,163,634	2,884,846	3,606,057	4,327,269	5,048,480	5,769,692	6,490,903

Table 7 – Power ratings for stainless steel designation 304 and 316 (Small, short shafts)

Shaft diameter, mm	Power ratings at various rpm, watts															
	40	60	80	100	150	200	300	400	500	600	800	1,000	1,200	1,400	1,600	1,800
16	179	269	358	448	672	896	1,344	1,792	2,240	2,688	3,584	4,480	5,376	6,272	7,169	8,065
19	310	465	619	774	1,161	1,548	2,323	3,097	3,871	4,645	6,194	7,742	9,290	10,839	12,387	13,936
25	734	1,101	1,468	1,835	2,753	3,670	5,505	7,341	9,176	11,011	14,681	18,352	22,022	25,692	29,362	33,033
29	1,045	1,568	2,090	2,613	3,919	5,226	7,839	10,452	13,065	15,678	20,904	26,129	31,355	36,581	41,807	47,033
32	1,434	2,151	2,867	3,584	5,376	7,169	10,753	14,337	17,921	21,506	28,674	35,843	43,011	50,180	57,349	64,517
35	1,908	2,862	3,817	4,771	7,156	9,541	14,312	19,083	23,853	28,624	38,165	47,707	57,248	66,790	76,331	85,872
38	2,477	3,716	4,955	6,194	9,290	12,387	18,581	24,775	30,968	37,162	49,549	61,936	74,324	86,711	99,098	111,486
44	3,934	5,901	7,868	9,835	14,753	19,671	29,506	39,341	49,176	59,012	78,682	98,353	118,023	137,694	157,364	177,035
51	5,872	8,809	11,745	14,681	22,022	29,362	44,044	58,725	73,406	88,087	117,450	146,812	176,175	205,537	234,900	264,262
57	8,361	12,542	16,723	20,904	31,355	41,807	62,711	83,614	104,518	125,421	167,228	209,035	250,843	292,650	334,457	376,264
64	11,470	17,205	22,939	28,674	43,011	57,349	86,023	114,697	143,371	172,046	229,394	286,743	344,091	401,440	458,788	516,137
70	15,266	22,899	30,532	38,165	57,248	76,331	114,496	152,662	190,827	228,993	305,324	381,655	457,986	534,316	610,647	686,978
76	19,820	29,729	39,639	49,549	74,324	99,098	148,647	198,197	247,746	297,295	396,393	495,492	594,590	693,688	792,786	891,885
89	31,473	47,209	62,946	78,682	118,023	157,364	236,047	314,729	393,411	472,093	629,458	786,822	944,187	1,101,551	1,258,915	1,416,280
102	46,980	70,470	93,960	117,450	176,175	234,900	352,350	469,799	587,249	704,699	939,599	1,174,498	1,409,398	1,644,298	1,879,197	2,114,097
114	66,891	100,337	133,783	167,228	250,843	334,457	501,685	668,914	836,142	1,003,370	1,337,827	1,672,284	2,006,741	2,341,197	2,675,654	3,010,111
127	91,758	137,637	183,515	229,394	344,091	458,788	688,183	917,577	1,146,971	1,376,365	1,835,154	2,293,942	2,752,731	3,211,519	3,670,307	4,129,096
140	122,129	183,194	244,259	305,324	457,986	610,647	915,971	1,221,295	1,526,619	1,831,942	2,442,590	3,053,237	3,663,884	4,274,532	4,885,179	5,495,827
152	158,557	237,836	317,115	396,393	594,590	792,786	1,189,180	1,585,573	1,981,966	2,378,359	3,171,146	3,963,932	4,756,718	5,549,505	6,342,291	7,135,078
165	201,592	302,387	403,183	503,979	755,969	1,007,958	1,511,937	2,015,916	2,519,895	3,023,875	4,031,833	5,039,791	6,047,749	7,055,707	8,063,666	9,071,624

6 Shaft set-up

In order to provide support for the shaft and for shaft alignment, bearings should be used. Bearings should be mounted on adequate supports so that accurate alignment may be maintained. Misalignment may cause shaft or bearing failure.

7 Keys and keyways

Standards on the use of keys and keyways are specified in PAES 304:2000.