

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 been 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 drives using roller chains and sprockets 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. 18th Edition. John Wiley and Sons, Inc., USA.

Horton, H. L. (Ed.) 1984. Machinery's handbook. 23rd Edition. Industrial press inc, New York.

ISO 606:1994, Short pitch transmission precision roller chains and chain wheels

Engineering Materials –Roller Chains and Sprockets for Agricultural Machines – Specifications and Applications

1 Scope

This Standard establishes specifications and provides technical information for the proper application roller chains and sprockets 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

Roller chains are used to transmit power at high torque and low speed without slippage.

4 Definitions**4.1****chain pitch**

distance between adjacent joint members

4.2**pitch diameter**

the diameter of the pitch circle that passes through the centers of the link pins as the chain is wrapped on the sprocket

4.3**bottom diameter**

the diameter of a circle tangent to the curve (called the seating curve) at the bottom of the tooth gap

4.4**caliper diameter**

for a sprocket with an odd number of teeth, it is the distance from the bottom of the tooth gap to that of the nearest opposite tooth gap

NOTE:

The caliper diameter is the same as the bottom diameter for a sprocket with an even number of teeth.

4.5

outside diameter

it is the diameter over the tips of the teeth

5 Chains

5.1 Nomenclature

Figure 1 shows the type of chain according number of strands, either single strand or multiple-strand. Figure 2 shows the designation of dimensions of chains. Dimensions of chains are given in Table 1. Figure 3 shows the different types of links.

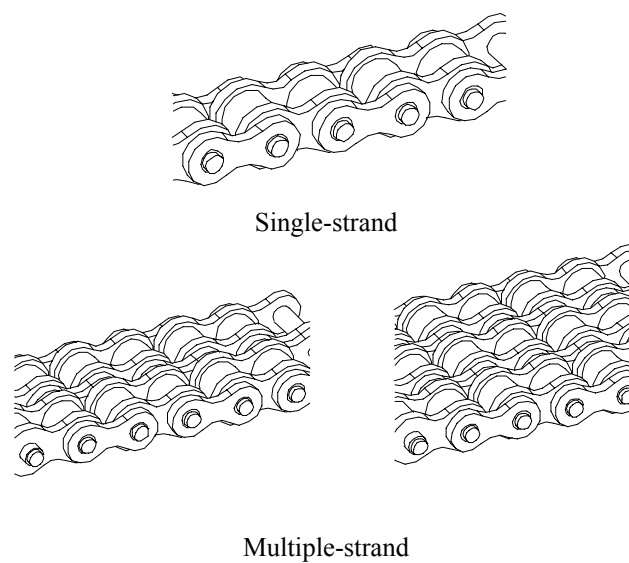


Figure 1 – Types of chains

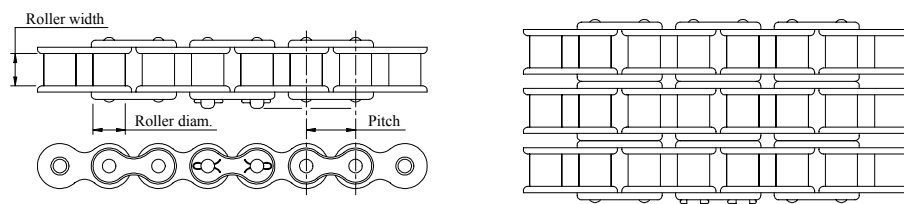
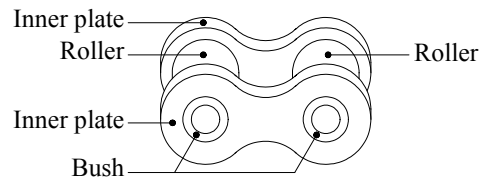
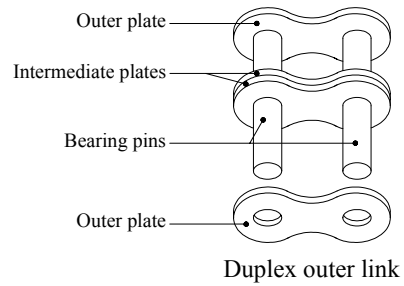
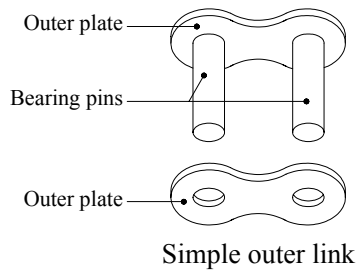


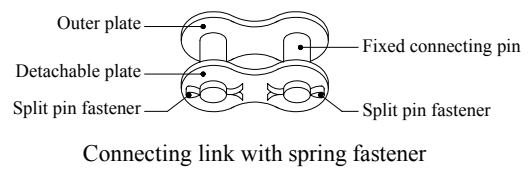
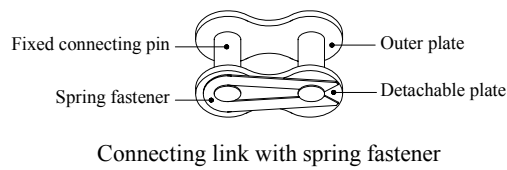
Figure 2 – Designation of dimensions of chains



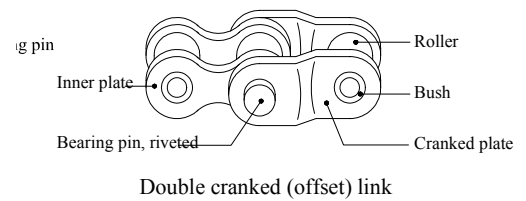
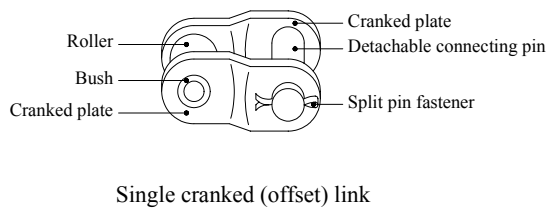
a) Inner link



b) Outer link for riveting



c) Outer links for riveting



d) Cranked (offset) links

Figure 3 – Types of links

Table 1 – Standard roller chain dimensions, mm

Standard chain number	Pitch, P	Max. roller diameter, D _r	Width, W	Pin diameter, D _p
25	6.35	3.30	3.18	2.30
35	9.53	5.08	4.76	3.58
41	12.70	7.77	6.35	3.58
40	12.70	7.92	7.94	3.96
50	15.88	10.16	9.53	5.08
60	19.05	11.91	12.70	5.94
80	25.40	15.88	15.88	7.92
100	31.75	19.05	19.05	9.53
120	38.10	22.23	25.40	11.10
140	44.45	25.40	25.40	12.70
160	50.80	28.58	31.75	14.27
180	57.15	35.71	35.71	17.45
200	63.50	39.67	38.10	19.84
240	76.20	47.63	47.63	23.80

NOTE:

- 1) The right-hand figure in the chain number is zero for roller chains of the usual proportions, 1 for a light-weight chain and 5 for a rollerless bushing chain. The numbers to the left -hand figure denotes the number of 1/8 inch (3.175 mm) in the pitch.
- 2) The letter *H* following the chain number denotes the heavy series. The hyphenated number 2 suffixed to the chain number denotes a double strand, 3 for triple strand, 4 for quadruple strand and so on. For agricultural purposes, only up to Chain number 120 is used.

5.1 Markings**5.2.1** The following information shall be marked on the chains:

- 1) Chain number designation.
- 2) Manufacturer's name and/or its trademark

5.2.2 The following information shall be marked on the packaging:

- 1) Chain number designation.
- 2) Manufacturer's name, trademark, and address.

6 Sprockets**6.1 Nomenclature**

Figure 4 shows the designation of dimensions of sprockets. Standard roller chain sprockets and their dimensions are given in Tables 2-9.

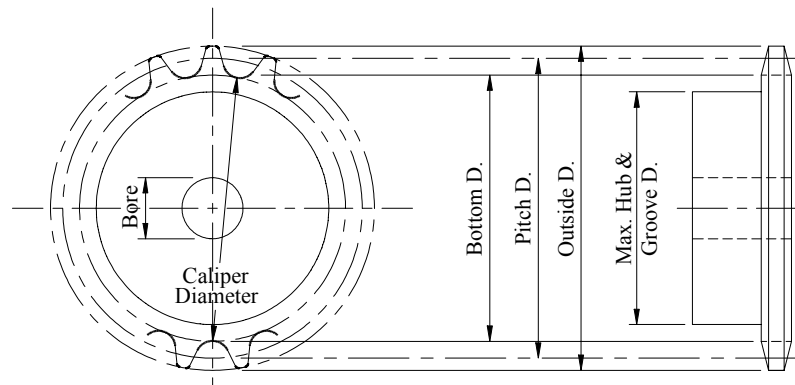


Figure 4 – Designation of dimensions of sprockets

Table 2 – Standard roller chain sprocket diameters for chain number 25, mm

No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter
11	22.54	25.44	43	86.99	90.57	76	153.66	157.34
12	24.53	27.51	44	89.01	92.60	77	155.68	159.36
13	26.53	29.57	45	91.03	94.62	78	157.70	161.39
14	28.54	31.63	46	93.05	96.64	79	159.72	163.40
15	30.54	33.68	47	95.07	98.67	80	161.74	165.43
16	32.55	35.73	48	97.09	100.69	81	163.76	167.45
17	34.56	37.78	49	99.11	102.72	82	165.78	169.48
18	36.57	39.82	50	101.13	104.74	83	167.81	171.49
19	38.58	41.87	51	103.15	106.76	84	169.83	173.52
20	40.59	43.90	52	105.17	108.79	85	171.85	175.54
21	42.61	45.94	53	107.19	110.81	86	173.87	177.56
22	44.85	47.97	54	109.21	112.83	87	175.89	179.58
23	46.63	50.01	55	111.23	114.86	88	177.91	181.60
24	48.65	52.04	56	113.25	116.88	89	179.93	183.63
25	50.66	54.08	57	115.27	118.90	90	181.95	185.65
26	52.68	56.11	58	117.29	120.93	91	183.97	187.67
27	54.70	58.14	59	119.31	122.96	92	179.64	189.69
28	56.71	60.17	60	121.33	124.97	93	188.01	191.72
29	58.73	62.20	61	123.35	127.00	94	190.03	193.74
30	60.75	64.22	62	125.37	129.02	95	192.06	195.76
31	62.77	66.26	63	127.39	131.04	96	194.08	197.78
32	64.78	68.28	64	129.41	133.07	97	196.10	199.80
33	66.80	70.31	65	131.43	135.09	98	198.12	201.83
34	68.82	72.34	66	133.45	137.12	99	200.14	203.85
35	70.84	74.36	67	135.47	139.13	100	202.16	205.87
36	72.86	76.39	68	137.50	141.16	101	204.18	207.89
37	74.88	78.42	69	139.52	143.18	102	206.20	209.91
38	76.90	80.44	70	141.54	145.21	103	208.22	211.94
39	78.91	82.47	71	143.56	147.22	104	210.24	213.96
40	80.93	84.49	72	145.58	149.25	105	212.26	215.98
41	82.95	86.52	73	147.60	151.27	106	214.29	218.00
42	84.97	88.54	74	149.62	153.30	107	216.31	220.02
			75	151.64	155.31	108	218.33	222.05

Table 3 – Standard roller chain sprocket diameters for chain number 35, mm

No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter
11	33.83	38.18	43	130.56	135.93	76	230.61	236.13
12	36.82	41.28	44	133.59	138.97	77	233.64	239.16
13	39.82	44.38	45	136.62	142.01	78	236.68	242.20
14	42.83	47.47	46	139.65	145.04	79	239.71	245.24
15	45.84	50.55	47	142.68	148.08	80	242.74	248.28
16	48.85	53.63	48	145.71	151.12	81	245.77	251.31
17	51.86	56.69	49	148.74	154.16	82	248.81	254.35
18	54.88	59.76	50	151.77	157.20	83	251.84	257.38
19	57.90	62.83	51	154.81	160.23	84	254.87	260.42
20	60.92	65.89	52	157.84	163.27	85	257.91	263.45
21	63.94	68.95	53	160.87	166.31	86	260.94	266.48
22	67.31	72.00	54	163.90	169.34	87	263.97	269.52
23	69.99	75.06	55	166.93	172.38	88	267.00	272.55
24	73.01	78.11	56	169.96	175.42	89	270.04	275.59
25	76.04	81.16	57	173.00	178.45	90	273.07	278.62
26	79.06	84.21	58	176.03	181.49	91	276.10	281.66
27	82.09	87.26	59	179.06	184.53	92	269.61	284.69
28	85.12	90.30	60	182.09	187.56	93	282.17	287.73
29	88.14	93.35	61	185.13	190.60	94	285.20	290.76
30	91.17	96.39	62	188.16	193.63	95	288.23	293.79
31	94.20	99.44	63	191.19	196.67	96	291.27	296.83
32	97.23	102.48	64	194.22	199.71	97	294.30	299.86
33	100.26	105.53	65	197.25	202.74	98	297.33	302.90
34	103.29	108.57	66	200.29	205.78	99	300.37	305.93
35	106.31	111.61	67	203.32	208.81	100	303.40	308.97
36	109.34	114.65	68	206.35	211.85	101	306.43	312.00
37	112.37	117.69	69	209.38	214.88	102	309.46	315.03
38	115.40	120.73	70	212.42	217.92	103	312.50	318.07
39	118.43	123.77	71	215.45	220.95	104	315.53	321.10
40	121.46	126.81	72	218.48	223.99	105	318.56	324.14
41	124.50	129.85	73	221.51	227.02	106	321.60	327.17
42	127.53	132.89	74	224.55	230.06	107	324.63	330.20
			75	227.58	233.09	108	327.66	333.25

Table 4 – Standard roller chain sprocket diameters for chain number 40 or 41, mm

No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter
11	45.08	50.88	43	173.98	181.14	76	307.32	314.68
12	49.07	55.02	44	178.02	185.19	77	311.36	318.72
13	53.07	59.14	45	182.06	189.24	78	315.40	322.77
14	57.07	63.26	46	186.10	193.28	79	319.44	326.81
15	61.08	67.36	47	190.14	197.33	80	323.49	330.86
16	65.10	71.46	48	194.18	201.38	81	327.53	334.90
17	69.12	75.55	49	198.22	205.44	82	331.57	338.95
18	73.14	79.64	50	202.26	209.49	83	335.61	342.99
19	77.16	83.73	51	206.30	213.53	84	339.65	347.04
20	81.18	87.81	52	210.34	217.58	85	343.69	351.08
21	85.21	91.88	53	214.38	221.63	86	347.73	355.12
22	89.70	95.95	54	218.42	225.67	87	351.78	359.17
23	93.27	100.03	55	222.46	229.72	88	355.82	363.21
24	97.30	104.09	56	226.50	233.77	89	359.86	367.26
25	101.33	108.15	57	230.54	237.81	90	363.90	371.30
26	105.36	112.22	58	234.58	241.86	91	367.94	375.35
27	109.40	116.28	59	238.62	245.91	92	359.29	379.39
28	113.43	120.33	60	242.66	249.95	93	376.03	383.44
29	117.46	124.40	61	246.70	254.00	94	380.07	387.48
30	121.50	128.45	62	250.74	258.04	95	384.11	391.52
31	125.53	132.51	63	254.78	262.09	96	388.15	395.57
32	129.57	136.56	64	258.83	266.14	97	392.20	399.61
33	133.61	140.63	65	262.87	270.18	98	396.24	403.66
34	137.64	144.68	66	266.91	274.23	99	400.28	407.70
35	141.68	148.73	67	270.95	278.27	100	404.32	411.75
36	145.72	152.78	68	274.99	282.32	101	408.36	415.79
37	149.75	156.83	69	279.03	286.36	102	412.40	419.82
38	153.79	160.88	70	283.07	290.41	103	416.45	423.88
39	157.83	164.93	71	287.11	294.45	104	420.49	427.91
40	161.87	168.99	72	291.16	298.50	105	424.53	431.97
41	165.91	173.04	73	295.20	302.54	106	428.57	436.00
42	169.95	177.09	74	299.24	306.59	107	432.61	440.04
			75	303.28	310.63	108	436.66	444.09

Table 5 – Standard roller chain sprocket diameters for chain number 50, mm

No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter	No. of teeth	Pitch diameter	Outside diameter
11	56.37	63.62	43	217.55	226.50	76	384.27	393.47
12	61.36	68.79	44	222.60	231.56	77	389.32	398.52
13	66.36	73.95	45	227.65	236.63	78	394.38	403.59
14	71.36	79.10	46	232.70	241.68	79	399.43	408.64
15	76.38	84.23	47	237.75	246.74	80	404.48	413.71
16	81.40	89.36	48	242.80	251.81	81	409.54	418.76
17	86.42	94.47	49	247.85	256.87	82	414.59	423.82
18	91.45	99.58	50	252.90	261.94	83	419.64	428.87
19	96.48	104.70	51	257.96	266.99	84	424.70	433.94
20	101.51	109.79	52	263.01	272.06	85	429.75	438.99
21	106.55	114.89	53	268.06	277.12	86	434.81	444.04
22	112.16	119.97	54	273.11	282.17	87	439.86	449.10
23	116.62	125.07	55	278.16	287.24	88	444.91	454.15
24	121.66	130.15	56	283.22	292.30	89	449.97	459.22
25	126.70	135.23	57	288.27	297.35	90	455.02	464.27
26	131.74	140.32	58	293.32	302.42	91	460.07	469.33
27	136.79	145.40	59	298.37	307.48	92	449.25	474.38
28	141.83	150.46	60	303.42	312.53	93	470.18	479.45
29	146.88	155.54	61	308.48	317.60	94	475.24	484.50
30	151.92	160.61	62	313.53	322.65	95	480.29	489.55
31	156.97	165.69	63	318.58	327.72	96	485.34	494.61
32	162.01	170.76	64	323.63	332.78	97	490.40	499.66
33	167.06	175.84	65	328.69	337.83	98	495.45	504.73
34	172.11	180.90	66	333.74	342.90	99	500.51	509.78
35	177.15	185.97	67	338.79	347.95	100	505.56	514.85
36	182.20	191.04	68	343.85	353.01	101	510.61	519.90
37	187.25	196.10	69	348.90	358.06	102	515.67	524.95
38	192.30	201.17	70	353.95	363.13	103	520.72	530.01
39	197.35	206.23	71	359.01	368.18	104	525.78	535.06
40	202.40	211.30	72	364.06	373.24	105	530.83	540.13
41	207.45	216.37	73	369.11	378.29	106	535.88	545.18
42	212.50	221.43	74	374.16	383.36	107	540.94	550.23
			75	379.22	388.41	108	545.99	555.29