
PHILIPPINE AGRICULTURAL ENGINEERING STANDARD PAES 315: 2002
Engineering Materials – Pins for Agricultural Machines
– Specifications and Applications

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 has been technically prepared in accordance with PNS 01-4:1998 (ISO/IEC Directives Part 3:1997) – Rules for the Structure and Drafting of International Standards. It provides specifications and proper application of pins for agricultural machines.

The word “shall” is used to indicate requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that certain course of action is preferred but not necessarily required.

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

Hummel, B. L. (Ed.) 1967. Machine design, Fastening and joining, Vol. 39 No. 34. Penton Publishing Co., Cleveland, Ohio.

ISO 2340:1986, Clevis pins without head

ISO 2341:1986, Clevis pins with head

JIS B 1351:1987, Split pins

JIS B 1352:1988, Taper pins

JIS B 1353:1990, Taper pins with split

JIS B 1354:1988, Parallel pins

JIS B 1355:1990, Dowel pins

**Engineering Materials – Pins for Agricultural Machines
– Specifications and Applications**

1 Scope

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

2 Application

Pins offer an inexpensive and effective approach to assembly where loading is primarily in shear.

3 Classification

Classification and types of pins are shown in Table 1.

Table 1 – Types of pins

Classification	Type	Note	Use
Split	-	-	Used as locking device for other fasteners. Used with a slotted nut on bolt, screws, or studs, it provides a convenient, low-cost locknut assembly.
Taper	Class A	Manufactured by grinding	Used for light-duty service in the attachment of wheels, levers and similar components to shafts
	Class B	Manufactured by turning	
Taper w/ split	-	-	
Parallel	Class A	One end is flat chamfered, the other is round chamfered	<ol style="list-style-type: none"> 1. Holding laminated sections together with surfaces either drawn up tight or separated in some fixed relationship. 2. Fastening machine parts where accuracy of alignment is a primary consideration. 3. Locking components on shafts.
	Class B	Both ends are flat chamfered	
	Class C	Both ends are not chamfered	
Dowel	Class A	Applied with quenching and tempering	
	Class B	Applied with carburizing, quenching and tempering	
Clevis w/ head	Class A	Without split pin holes	
	Class B	With pin holes	
Clevis w/o head	Class A	Without pin hole	
	Class B	With pin hole	

4 Nomenclature

Nomenclature and designation of dimensions of pins shall conform to Figures 1-7.

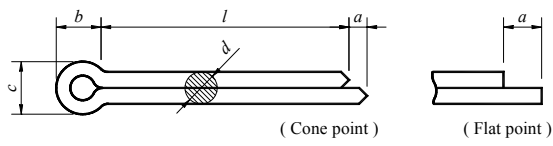


Figure 1 – Split pin

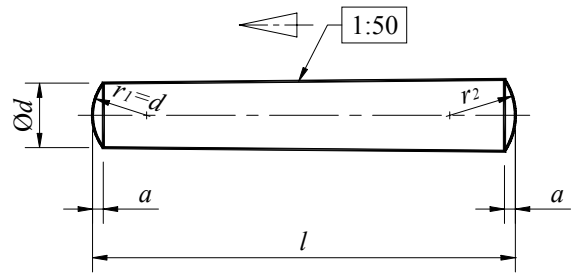


Figure 2 – Taper pin

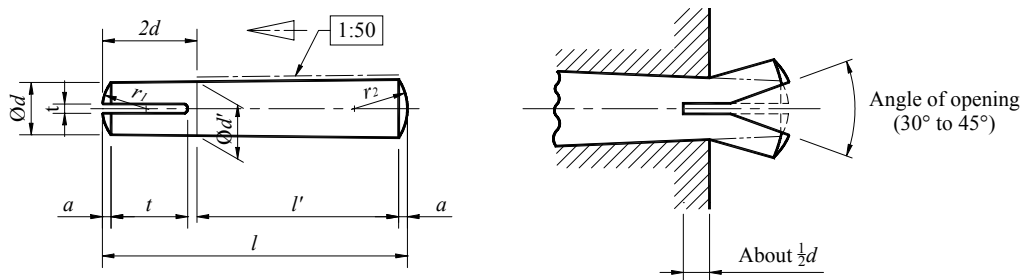


Figure 3 – Taper pin w/ split

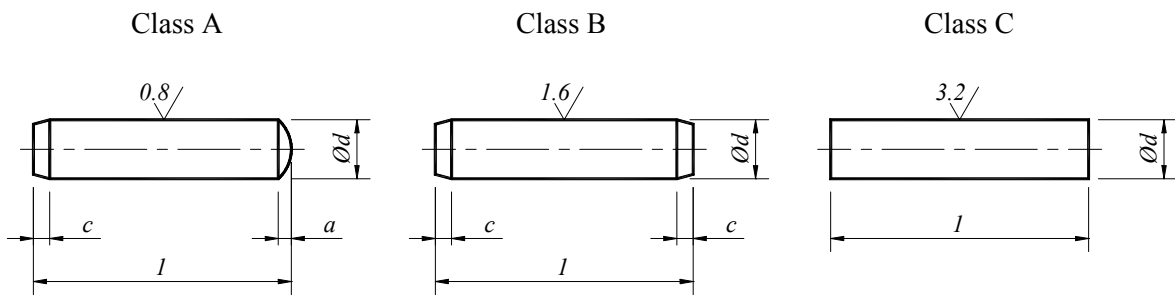


Figure 4 – Parallel pin

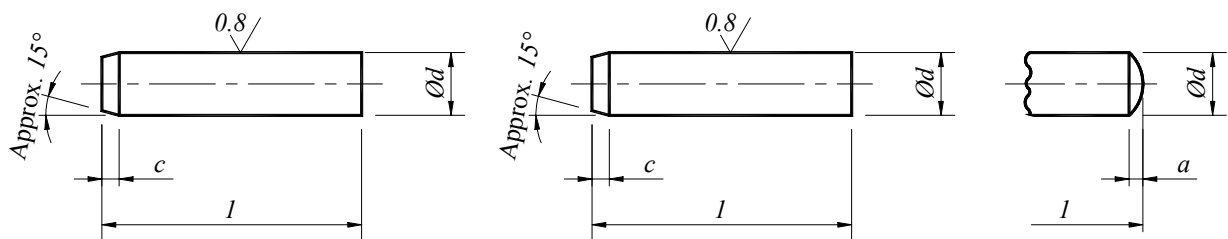


Figure 5 – Dowel pin (Hardened parallel pin)

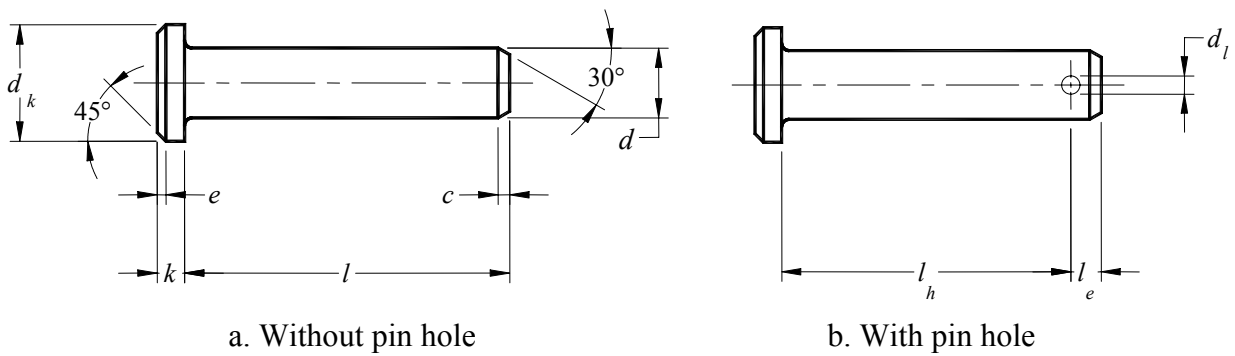


Figure 6 – Clevis pin with head

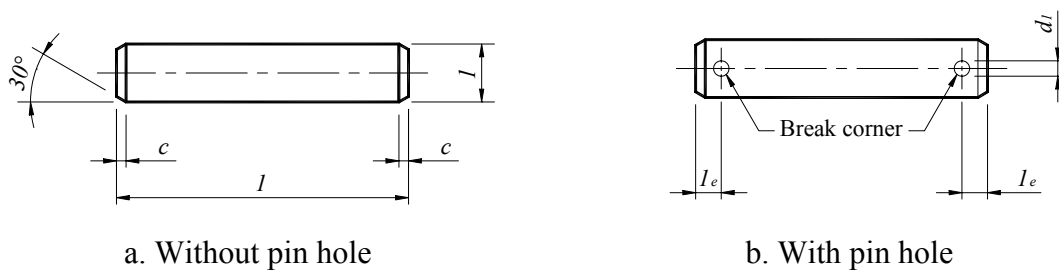


Figure 7 – Clevis pin without head

5 Dimensions

Dimensions of pins shall comply with Tables 2-7. Table 8 specifies the available lengths for all types of pins.

Table 2 – Dimensions of split pins, mm

Nominal diameter	<i>d</i>	<i>c</i>	<i>b</i>	<i>a</i>		Length range
				max.	min.	
0.8	0.7	1.4	2.4	1.6	0.8	5 – 16
1	0.9	1.8	3.0	1.6	0.8	6 – 20
1.2	1.0	2	3.0	2.5	1.2	8 – 25
1.6	1.4	2.8	3.2	2.5	1.2	8 – 32
2	1.8	3.6	4.0	2.5	1.2	10 – 40
2.5	2.3	4.6	5.0	2.5	1.2	12 – 50
3.2	2.9	5.8	6.4	3.2	1.6	14 – 63
4	3.7	7.4	8.0	4.0	2.0	18 – 80
5	4.6	9.2	10.0	4.0	2.0	22 – 100
6.3	5.9	11.8	12.6	4.0	2.0	32 – 125
8	7.5	15.0	16.0	4.0	2.0	40 – 160
10	9.5	19.0	20.0	6.3	3.2	45 – 200
13	12.4	24.8	26.0	6.3	3.2	71 – 250
16	15.4	30.8	32.0	6.3	3.2	112 – 280
20	19.3	38.6	40.0	6.3	3.2	160 – 280

Table 3 – Dimensions of taper pins, mm

Nominal diameter, d	a	Length range	Nominal diameter, d	a	Length range
3	0.4	12 – 45	16	2.0	40 – 200
4	0.5	14 – 55	20	2.5	45 – 200
5	0.63	18 – 60	25	3.0	50 – 200
6	0.8	22 – 90	30	4.0	55 – 200
8	1.0	22 – 120	40	5.0	60 – 200
10	1.2	26 – 160	50	6.3	65 – 200
12	1.6	32 – 180			

Table 4 – Dimensions of taper pins with split, mm

Nominal diameter, d	d'	n , min	t , min	a	Length range
3	3.12	0.6	4.5	0.4	12 – 45
4	4.16	0.6	6	0.5	14 – 55
5	5.20	0.6	7.5	0.63	18 – 60
6	6.24	0.8	8	0.8	22 – 90
8	8.32	0.8	12	1.0	22 – 120
10	10.40	1.0	15	1.2	26 – 160
12	12.48	1.0	18	1.6	32 – 180
16	16.64	1.0	24	2.0	40 – 200
20	20.80	1.6	30	2.5	45 – 200

Table 5 – Dimensions of parallel pins, mm

Nominal diameter, d	a	c	Length range	Nominal diameter, d	a	c	Length range
3	0.4	0.5	8 – 30	16	2	3	26 – 180
4	0.5	0.63	8 – 40	20	2.5	3.5	35 – 200
5	0.63	0.8	10 – 50	25	3	4	50 – 200
6	0.8	1.2	12 – 60	30	4	5	60 – 200
8	1	1.6	14 – 80	40	5	6.3	80 – 200
10	1.2	2	18 – 95	50	6.3	8	90 – 200
12	1.6	2.5	22 – 140				

Table 6 – Dimensions of dowel pins, mm

Nominal diameter, d	a	c	Length range
3	0.4	1.2	8 – 30
4	0.5	1.4	10 – 40
5	0.63	1.7	12 – 50
6	0.8	2.1	14 – 60
8	1	2.6	18 – 80
10	1.2	3	22 – 100
12	1.6	3.8	26 – 100
16	2	4.6	40 – 100
20	2.5	6	50 – 100

Table 7 – Dimensions of clevis pins (with head), mm

Nominal diameter	D_l	d_k	c	e	k	l_e	Length range
3	0.8	5	1	0.5	1	1.6	6 – 30
4	1	6	1	0.5	1	2.2	8 – 40
5	1.2	8	2	1	1.6	2.9	10 – 50
6	1.6	10	2	1	2	3.2	12 – 60
8	2	14	2	1	3	3.5	16 – 80
10	3.2	18	2	1	4	4.5	20 – 100
12	3.2	20	3	1.6	4	5.5	24 – 120
14	4	22	3	1.6	4	6	28 – 140
16	4	25	3	1.6	4.5	6	32 – 160
18	5	28	3	1.6	5	7	35 – 180
20	5	30	4	2	5	8	40 – 200
22	5	33	4	2	5.5	8	45 – 200
24	6.3	36	4	2	6	9	50 – 200
30	8	44	4	2	8	10	60 – 200
33	8	47	4	2	8	10	65 – 200
36	8	50	4	2	8	10	70 – 200
40	8	55	4	2	8	10	85 – 200
50	10	66	4	2	9	12	100 – 200
55	10	72	6	3	11	14	120 – 200
60	10	78	6	3	12	14	120 – 200
70	13	90	6	3	13	16	140 – 200
80	13	100	6	3	13	16	160 – 200
90	13	110	6	3	13	16	180 – 200
100	13	120	6	3	13	16	200

Table 8 – Available lengths for pins

l	5	6	8	10	12	14	16	18	20	22	24	26
	28	30	32	35	40	45	50	55	60	65	70	75
	80	85	90	95	100	120	140	160	180	200		

6 Materials

Materials of pins shall comply with Table 10.

Table 10 – Materials of pins

Type	Material	Hardness
Split	Steel	HV 180 to 240 (1.6 and under)
	Stainless steel	HV 160 to 220 (over 1.6 to 2.5)
Taper	Steel	HV 125 to 245 (for steel pins not conducted by heat treatment)
		HV 225 to 327 (steel pins treated by quenching and tempering)
Taper with split	Stainless steel	HV 208 to 280
	Steel	HV 125 to 245
Parallel	Stainless steel	HV 208 to 280
	Steel	HV 125 to 245
Dowel (Hardened parallel pins)	Steel	HV 550 to 650 (Class A)
		HV 600 to 700 (surface harness for Class B)
Clevis with head	Steel	HV 125 to 245
Clevis without head	Steel	HV 125 to 245

7 Appearance

The surface of the pin shall be smooth and free from cracks, flaws, burrs, rust, and gaps in contacting surface.

8 Designation

Pins shall be designated by the following data in the sequence shown: pin classification, type or its symbol, nominal size, nominal length, material.

Example: Parallel pin, A, 6x30, Steel

9 Markings

The following information shall be marked on the packaging:

- a) Manufacturer's name, trademark and address
- b) Designation