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JAPANESE INDUSTRIAL STANDARD

Casting Clamps for
Power Line Use

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Casting Clamps for Power Line Use

C 3701-1981

1. Scope

This Japanese Industrial Standard specifies aerial cable hangers, hereinafter referred to as the "clamps", mainly used for overhead power lines of extra-high tension.

Remark: In this standard, the units and numerical values in { } are based on the International System of Units (SI) and are additionally given for reference only.

2. Classification and Applicable Wires

The classification of clamps and the applicable wires (conductors) are as given in Table 1.

Table 1

Unit: mm²

Classification	Applicable wires		
	Cast iron		Cast aluminum alloy
	—	With aluminum lining	
Strain clamp	Hard-drawn copper stranded conductors 38, 55, 75, 100, (38), (55), (75), (100), 150, 200, 240	Aluminum conductors steel reinforced 80, 120, 160, 200, 240, 330	Aluminum conductors steel reinforced 80, 120, 240, 330, 410, 610, 810 Hard-drawn aluminum stranded conductors 300, 400, 510, 660, 850, 980, 1260
Suspension clamp	Hard-drawn copper stranded conductors 38, 55, 75, 100 (38), (55), (75), (100), 150, 200, 240, (150), (200), (240)	—	Aluminum conductors steel reinforced 80, 120, 160, 200, (80), (120), 240, 330, 410, 610, 810 Hard-drawn aluminum stranded conductors 300, 400, 510, 660, 850, 980, 1260

Table 1 (Continued)
Unit: mm²

Classification	Applicable wires		
	Cast iron		Cast aluminum alloy
	—	With aluminum lining	
Free-center type suspension clamp	Aluminum conductors steel reinforced (120), (160), (200), (240), (330), (410), (610), (810)	—	Aluminum conductors steel reinforced (120), (160), (200), (240), (330), (410), (610), (810)
Strain clamp for ground wire	Galvanized steel stranded wires Class 1: 55, 70, 90	—	—
Bar-type strain clamp for ground wire	Galvanized steel stranded wires Class 2: 38, 45	—	—
Suspension clamp for ground wire	Galvanized steel stranded wires Class 1: 55, 70, 90	—	—

Table 1 (Continued)

Unit: mm²

Classification	Applicable wires		
	Cast iron		Cast aluminum alloy
	—	With aluminum lining	
Fixed-type suspension clamp for ground wire	Galvanized steel stranded wires Class 1: 55, 70, 90 Class 2: 38, 45	—	—
Jumper clamp for ground wire	Galvanized steel stranded wires Class 1: 55, 70, 90 Class 2: 38, 45	—	Aluminum stranded conductors 100, 110 Aluminum alloy conductors steel reinforced 79, 97, 120
Free-center type suspension clamp for ground wire	Aluminum alloy conductors steel reinforced (79), (97), (120)	—	—

Remark: Those attached with parentheses are specified to be protected by preformed armour rod.



3. Performances

3.1 Appearance There shall be no defect detrimental to practical service such as crack, fissure or rust when clamps are subjected to the test of 6.1.

3.2 Construction Clamps shall be so constructed that they meet the requirements of 4., 5. and 9. when subjected to the test of 6.2.

3.3 Zinc Coating Hot Dipped The zinc coating hot dipped shall meet the requirements of Table 2 when subjected to the test of 6.3. The threaded part of clamping nut where tapping is performed, however, need not fulfill the above requirements.

Table 2

Components	Coated amount mg/cm ²	Uniformity
Cast iron body Cast iron clamp fitting Cotter pin Hanger	50 min.	The end point shall not come within 4 times dipping.
Clamping bolt Clamping nut Clamping washer Cotter bolt Nut for cotter bolt	35 min.	

3.4 Wire Holding Force The wire holding force shall meet the requirements given in Tables 3 to 5 when subjected to the test of 6.4.

3.5 Tensile Load

3.5.1 Tensile Load of Body The body of clamp shall not cause any crack or fissure when the appropriate tensile load given in Tables 3 to 5 is applied in the test of 6.5.1.

3.5.2 Tensile Load of Tightening Link The tightening link shall not cause any crack or fissure when the appropriate tensile load given in Tables 3 to 5 is applied in the test of 6.5.2.

Table 3. Cast Iron Clamps

Classifi- cation	Type designa- tion (1)(2)	Applicable wire					Clamp- ing torque kgf·cm {N·m}	Wire holding force kgf {kN}	Test tensile load for body kgf {kN}	Test tensile load for tighten- ing link kgf {kN}		
		Kind of wire	Nominal sectional area mm ²	Composition No. of /Dia. of wires wire mm	Outside dia. mm	Armoured * outside dia. mm						
Strain clamp	TN- 2010	Hard-drawn copper stranded conductor	38	7/2. 6	7. 8	—	1000 {98}	1400 {13. 7} min.	2000 {19. 6}	1400 {13. 7}		
	TN- 2016					13. 0						
	TN- 4013		55	7/3. 2	9. 6	—		2000 {19. 6} min.	4000 {39. 2}	2700 {26. 5}		
			75	7/3. 7	11. 1	—					2700 {26. 5} min.	
	TN- 4021		55	7/3. 2	9. 6	16. 0		2000 {19. 6} min.				
			75	7/3. 7	11. 1	18. 1		2700 {26. 5} min.				
	TN- 5516		100	7/4. 3	12. 9	—	3500 {34. 3} min.	5500 {53. 9}	3500 {34. 3}			
	TN- 5524					20. 9						
	TN- 8519		150	19/3. 2	16. 0	—	5400 {52. 9} min.	8500 {83. 3}	5400 {52. 9}			
	TN-11021		200	19/3. 7	18. 5					7200 {70. 6} min.	11000 {107. 8}	7200 {70. 6}
	TN-12523		240	19/4. 0	20. 0							
	TN- 4521		(150)	19/3. 2	16. 0		3000 {29. 4} min.	4500 {44. 1}	3000 {29. 4}			
			(200)	19/3. 7	18. 5							
	TN- 4525		(240)	19/4. 0	20. 0							
Suspension clamp	SN- 1510	Hard-drawn copper stranded conductor	38	7/2. 6	7. 8	—	1000 {98}	400 { 3. 9} min.	1500 {14. 7}	2500 {24. 5}		
	SN- 1516					13. 0						
	SN- 2513		55	7/3. 2	9. 6	—		600 { 5. 9} min.				
			75	7/3. 7	11. 1	—		800 { 7. 8} min.				
	SN- 2519		55	7/3. 2	9. 6	16. 0		600 { 5. 9} min.				
	SN- 2521		75	7/3. 7	11. 1	18. 1		800 { 7. 8} min.				
	SN- 3516		100	7/4. 3	12. 9	—	1100 {10. 8} min.	3500 {34. 3}	—			
	SN- 3524					20. 9						
	SN- 5019		150	19/3. 2	16. 0	—	1700 {16. 7} min.	5000 {49. 0}				
	SN- 5028					24. 0						
	SN- 6521		200	19/3. 7	18. 5	—	2200 {21. 6} min.	6500 {63. 7}				
	SN- 6531					26. 5						

* Armoured outside dia. means that with preformed armour-rod when the wire is wrapped.

Table 3 (Continued)

Classification	Type designation ⁽¹⁾ (²)	Applicable wire					Clamp- ing torque kgf·cm {N·m}	Wire holding force kgf {kN}	Test tensile load for body kgf {kN}	Test tensile load for tighten- ing link kgf {kN}
		Kind of wire	Nominal sectional area mm ²	Composition No. of / Dia. of wires wire mm	Outside dia. mm	Armoured outside dia. mm				
Suspension clamp	SN- 7523	Hard-drawn copper stranded conductor	240	19/4.0		20.0	1500 {147}	2500 {24.5} min.	7500 {73.5}	
	SN- 7532					28.0				
	SN- 3021		(150)	19/3.2		16.0	—	900 { 8.8} min.	3000 {29.4}	
			(200)	19/3.7		18.5				
	SN- 3025		(240)	19/4.0		20.0				
Free-center suspension clamp	FS- 4027	Aluminum conductor steel reinforced	120	Alumi- num	Steel	16.1	25.7	1400 {13.7} min.	4000 {39.2}	—
				30/2.3	7/2.3					
	FS- 5530		160	30/2.6	7/2.6	18.2	29.0		5500 {53.9}	
	FS- 6534		200	30/2.9	7/2.9	20.3	32.7		6500 {63.7}	
	FS- 7537		240	30/3.2	7/3.2	22.4	35.8		7500 {73.5}	
	FS- 8042		330	26/4.0	7/3.1	25.3	40.9		8000 {78.4}	
	FS-10045		410	26/4.5	7/3.5	28.5	44.1		10000 {98.0}	
	FS-13554		610	54/3.8	7/3.8	34.2	52.8		13500 {132.3}	
	FS-13558		810	45/4.8	7/3.2	38.4	57.0		4500 {44.1} min.	
Strain clamp for ground wire	GN- 8513	Galvanized steel stranded wire, Class 1	55	7/3.2		9.6	2000 {196}	4600 {45.1} min.	8500 {83.3}	5500 {53.9}
			70	7/3.5		10.5		5500 {53.9} min.		
	GN-11015		90	7/4.0		12.0		7100 {69.6} min.	11000 {107.8}	7100 {69.6}
Bar type strain clamp for ground wire	GNB-4511	Galvanized steel stranded wire, Class 2	38	7/2.6		7.8		2200 {21.6} min.	4500 {44.1}	2700 {26.5}
			45	7/2.9		8.7		2700 {26.5} min.		
Suspension clamp for ground wire	GSN-5013	Galvanized steel stranded wire, Class 1	55	7/3.2		9.6		1400 {13.7} min.	5000 {49.0}	—
			70	7/3.5		10.5		1700 {16.7} min.		
	GSN-6515		90	7/4.0		12.0		2200 {21.6} min.	6500 {63.7}	
Fixed-type suspension clamp for ground wire	GS- 2511	Galvanized steel stranded wire, Class 2	38	7/2.6		7.8	1000 {98}	700 { 6.9} min.	2500 {24.5}	—
			45	7/2.9		8.7		900 { 8.8} min.		
	GS- 5013	Galvanized steel stranded wire, Class 1	55	7/3.2		9.6		1400 {13.7} min.	5000 {49.0}	
			70	7/3.5		10.5		1700 {16.7} min.		
	GS- 6515		90	7/4.0		12.0		2200 {21.6} min.	6500 {63.7}	

Table 3 (Continued)

Classifi- cation	Type desig- nation ⁽¹⁾ (²)	Applicable wire					Clamp- ing torque kgf·cm {N·m}	Wire holding force kgf {kN}	Test tensile load for body kgf {kN}	Test tensile load for tighten- ing link kgf {kN}
		Kind of wire	Nominal sectional area mm ²	Composition No. of / Dia. of wires wire mm	Outside dia. mm	Armoured outside dia. mm				
Jumper clamp for ground wire	GC- 8	Galvanized steel stranded wire, Class 2	38	7/2.6	7.8	—	1000 {98}	700 { 6.9 } min.	—	—
			45	7/2.9	8.7					
	GC-10	Galvanized steel stranded wire, Class 1	55	7/3.2	9.6					
			70	7/3.5	10.5					
	GC-12		90	7/4.0	12.0					
Free-center suspension clamp for ground wire	GFS-8528	Aluminum alloy con- ductor steel reinforced	79	Alumi- num 12/2.9	Steel 7/2.9	14.5	23.7	1900 {18.6} min.	8500 {83.3}	
				12/3.2	7/3.2	16.0	25.2	2300 {22.5} min.		
			120	12/3.5	7/3.5	17.5	27.9	2700 {26.5} min.		

Notes ⁽¹⁾ Letters mean the following:

- T: strain clamp (omitted for strain clamp for ground wire)
- S: suspension clamp
- G: for ground wire
- N: straight bolt
- B: bar type
- F: free-center type
- C: clamp
- AC: aluminum alloy casting
- A: aluminum lining

⁽²⁾ The figures mean the following:

The figures in the third place and more from the last indicate the value of test tensile load for body expressed in the unit of 100 kgf {0.98 kN}.

The figures in last two places indicate the wire groove width expressed in the unit of mm.

Remark: The double parentheses in the column of applicable wire mean that the related data are those for clamps used for bus in power stations and substation, or for concrete poles, where the clamps are used with reduced wire tension.

Table 4. Cast Iron Clamps with Aluminum Lining

Classifi- cation	Type design- nation ⁽¹⁾ (²)	Applicable wire					Clamping torque kgf•cm {N•m}	Wire holding force kgf {kN}	Test tensile load for body kgf {kN}	Test tensile load for tightening link kgf {kN}
		Kind of wire	Nominal sectional area mm ²	Composition No. of /Dia. of wires wire mm		Outside dia. mm				
				Aluminum	Steel					
Strain clamp	TNA- 3518	Aluminum conductor steel reinforced	80	6/4. 2	1/4. 2	12. 6	1000 {98}	2300 {22. 5} min.	3500 {34. 3}	2300 {22. 5}
	TNA- 7023		120	30/2. 3	7/2. 3	16. 1	2000 {196}	4500 {44. 1} min.	7000 {68. 6}	4500 {44. 1}
	TNA- 8525		160	30/2. 6	7/2. 6	18. 2		5600 {54. 9} min.	8500 {83. 3}	5600 {54. 9}
	TNA-10528		200	30/2. 9	7/2. 9	20. 3		6900 {67. 6} min.	10500 {102. 9}	6900 {67. 6}
	TNA-12530		240	30/3. 2	7/3. 2	22. 4		8200 {80. 4} min.	12500 {122. 5}	8200 {80. 4}
	TNA-13533		330	26/4. 0	7/3. 1	25. 3		8800 {86. 2} min.	13500 {132. 3}	8800 {86. 2}