

FERRULES

ZEN® Ferrules according to EN 13411-3

Nominal Rope Ø mm	Measured Rope Ø mm min. max.		FERRULES TO BE USED ACCORDING TO EN 13411-3			
			single layer round strand ropes with fibre core and cable laid ropes	single layer round strand ropes with IWRC and rotation-resistant round strand ropes		spiral strands (2 ferrules)
				metallic cross sectional area factor C min. 0,283	C up to 0,487	
2,5	2,5	2,7	2,5	3	-	-
3	2,8	3,2	3	3,5	-	-
3,5	3,3	3,7	3,5	4	-	-
4	3,8	4,3	4	4,5	-	5
4,5	4,4	4,8	4,5	5	-	6
5	4,9	5,4	5	6	-	6,5
-	5,5	5,9	6	6,5	7	7
6	6,0	6,4	6	6,5	7	7
6,5	6,5	6,9	6,5	7	8	8
7	7,0	7,4	7	8	9	9
-	7,5	7,9	8	9	10	10
8	8,0	8,4	8	9	10	10
-	8,5	8,9	9	10	11	11
9	9,0	9,5	9	10	11	11
-	9,6	9,9	10	11	11	12
10	10,0	10,5	10	11	11	12
-	10,6	10,9	11	12	12	13
11	11,0	11,6	11	12	13	13
-	11,7	11,9	12	13	13	14
12	12,0	12,6	12	13	14	14
-	12,7	12,9	13	14	14	16
13	13,0	13,7	13	14	16	16
-	13,8	13,9	14	16	16	18
14	14,0	14,7	14	16	18	18
-	14,8	15,9	16	18	18	20
16	16,0	16,8	16	18	20	20
-	16,9	17,9	18	20	22	22
18	18,0	18,9	18	20	22	22
-	19,0	19,9	20	22	22	24
20	20,0	21,0	20	22	24	24
-	21,1	21,9	22	24	24	26
22	22,0	23,1	22	24	26	26
-	23,2	23,9	24	26	26	28
24	24,0	25,2	24	26	28	28
-	25,3	25,9	26	28	28	30
26	26,0	27,3	26	28	30	30
-	27,4	27,9	28	30	30	32
28	28,0	29,4	28	30	32	32
-	29,5	29,9	30	32	32	34
30	30,0	31,5	30	32	34	34
-	31,6	31,9	32	34	34	36
32	32,0	33,6	32	34	36	36
-	33,7	33,9	34	36	36	38
34	34,0	35,7	34	36	38	38
-	35,8	35,9	36	38	38	40
36	36,0	37,8	36	38	40	40
-	37,9	37,9	38	40	40	44
38	38,0	39,9	38	40	44	44
-	40,0	42,0	40	44	48	48
40	40,0	42,0	40	44	48	48
-	42,1	43,9	44	48	48	52
44	44,0	46,2	44	48	52	52
-	46,3	47,9	48	52	52	56
48	48,0	50,4	48	52	56	56
-	50,5	51,9	52	56	56	60
52	52,0	54,6	52	56	60	60
-	54,7	55,9	56	60	-	-
56	56,0	58,8	56	60	-	-
-	58,9	59,9	60	-	-	-
60	60,0	63,0	60	-	-	-

For accommodation of steel wire ropes with a higher tensile grade than 1960 N/mm² please refer to our technical department.

XL-FERRULES

XL & Z-FERRULES

Pressed ferrule dimensions		
ZEN Code No.	Ø mm	tolerance in mm
2,5	5	
3	6	
3,5	7	+0,2 0
4	8	
4,5	9	
5	10	
6	12	
6,5	13	
7	14	+0,4 0
8	16	
9	18	
10	20	
11	22	+0,5 0
12	24	
13	26	
14	28	+0,7 0
16	32	
18	36	
20	40	+0,9 0
22	44	
24	48	
26	52	+1,1 0
28	56	
30	60	
32	64	+1,4 0
34	68	
36	72	
38	76	+1,6 0
40	80	
44	88	+1,9 0
48	96	
52	104	+2,1 0
56	112	+2,3 0
60	120	+2,4 0

Round strand rope with Steel core - metallic area C up to 0,487				Ferrules		
Rope Ø measured 1770 N/mm ² grade min.	Rope Ø measured 1960 N/mm ² grade max.	Rope Ø measured 1770 N/mm ² grade min.	Rope Ø measured 1960 N/mm ² grade max.	Ferrule No.	Pressed Ferrule Dimensions Ø mm	Tolerance mm
46,3	50,7	45,6	48,9	XL 52	100	+2,1
50,8	54,3	49,0	51,5	XL 54	108	+2,3
54,4	58,2	51,6	55,8	XL 56	116	+2,4
58,3	61,9	55,9	59,2	XL 60	124	+2,5
62,0	65,8	59,3	63,4	XL 64	132	+2,6
65,9	69,7	63,5	66,9	XL 68	140	+2,8
69,8	73,6	67,0	71,2	XL 72	148	+3,0
73,7	77,4	71,3	74,5	XL 76	156	+3,2
77,5	81,3	74,6	78,8	XL 80	164	+3,3
81,4	85,2	78,9	82,1	XL 84	172	+3,5
85,3	89,1	82,2	86,5	XL 88	180	+3,6
89,2	93,1	86,6	90,1	XL 90	188	+3,8
90,2	95,1			Z 94	190	+3,8
95,2	101,5			Z 102	212	+3,8
101,6	106,8			Z 102	214	+3,8

For accommodation of steel wire ropes with a higher tensile grade than 1960 N/mm² please refer to our technical department.

SWAGER



Swager
Our press force capacity ranges from manual hand presses with 250 kN for smaller tasks to automatic machines with an impressive capacity of 40,000 kN for industrial requirements.

TOOLS



Swaging dies
We design and manufacture swaging dies for various types of swaging applications along with angle packings and dies adapters to suit many styles of swagers.

ANNEALING MACHINES



Annealing machines
Annealing machines for cutting up to Ø 64 mm wire rope. With our machines type 1224/1225/1226 you get a tapered rope end.

TEST BEDS

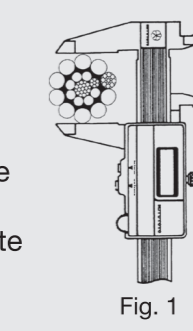


Test beds
We design and manufacture a full range of hydraulic proof load/destruction test machines from 20 to 2500 tonnes.

SWAGING & MARKING

1. Wire rope parameters

Confirm actual wire rope diameter D by measurement, in accordance with Fig. 1. Check rope construction, tensile grade and metallic area. Cut the wire rope by an appropriate method, ensuring that the rope end remains in lay.



2. Preparation of rope end

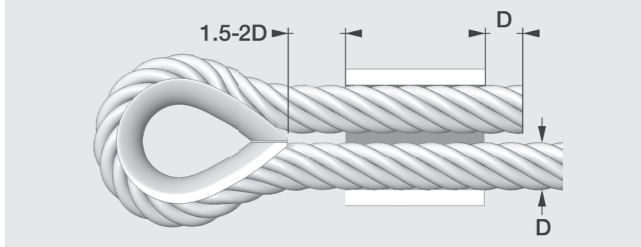
Whipping cord and adhesive tape must be removed if used. For ropes that are severed by annealing process, ensure that the annealed rope portion remains outside the splice after pressing. A rope secured by a Form C ferrule shall not be severed by a heat process.

3. Alignment and condition of the tooling



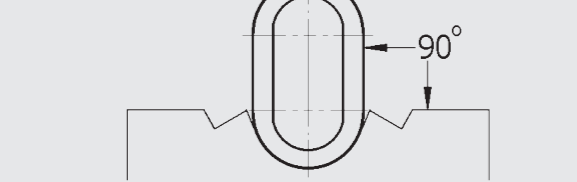
Ensure that the die faces are correctly aligned. Lubricate die bore between pressings with Splice Glide (grease). Dies with worn out cutting edges do no longer assure an accurate swaging procedure according to EN 13411-3 and should be removed from service.

4. Before swaging



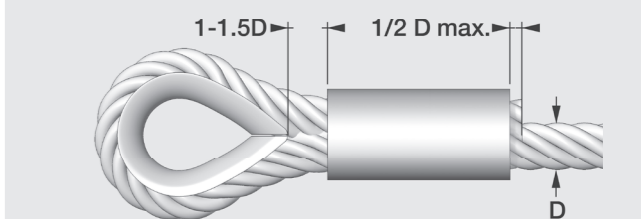
Insert the wire rope in the ferrule and form the eye in the required length. In a soft eye the length from the ferrule to the bearing point of the eye shall be at least (15) times the nominal rope diameter. The rope diameter D should be the guide value of how far the dead end of the rope protrudes out of the ferrule before swaging.

5. Pressing



Ensure that the ferrule is truly vertical within the die bore and that the die faces are correctly aligned. Always set closing pressure according to splice requirement. Do not overpress. Cease pressing immediately when the die faces meet.

6. After swaging



After swaging the rope 'dead-end' should protrude from the splice by up to half of the rope diameter (1/2 D). For the thimble without points the gap between the thimble end and the pressed ferrule should be about 1,5 times the wire rope diameter D. For thimbles with points the gap should be 1 time the wire rope diameter D. Where the rope end has been severed by an annealing process the 'dead end' should protrude by one rope diameter (D).

7. Temperature limits and safety

Limits of safe working temperature for aluminium ferrules:
• Fibre core -40° C up to +100° C.
• Steel core -40° C up to +150° C.

Our ZEN® ferrule-secured system is in accordance with the type testing procedure of EN 13411-3 point 5.1.2. for steel wire ropes defined in EN 12385-4.

8. Marking according to EN 13414 - 1 for single-leg sling

- a) The sling manufacturer's identifying mark
- b) Numbers and/or letters identifying the sling with the certificate conforming to 7.2 of EN 13414-1
- c) The working load limit
- d) Any legal marking

Note: Within the European Union this means CE marking.

9. Marking according to EN 13414 - 1 for multi-leg sling

- a) The sling manufacturer's identifying mark
- b) Numbers and / or letters identifying the sling with the certificate conforming to 7.2 of EN 13414-1
- c) The working load limits and the angles applicable, i.e. the WLL 0° to 45° to vertical and, additionally, the WLL 45° to 60° to the vertical, if applicable
- d) Any legal marking

Note: Within the European Union this means CE marking

10. We offer a simple marking system with text according to customers' specifications.



Available sizes:
Type 1 for ZEN® 8
Type 2 for ZEN® 9 - 18
Type 3 for ZEN® 20 - 60



Marking sample acc. to EN 13414-1

