INTERNATIONAL STANDARD 2791

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Bow shackles

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FOREWORD

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International Standard ISO 2791 was drawn up by Technical Committee ISO/TC 111, *Round steel link chains, chain wheels, lifting hooks and accessories*, and circulated to the Member Bodies in June 1972.

It has been approved by the Member Bodies of the following countries :

Austria	Italy	South Africa, Rep. of
Belgium	Japan	Spain
Bulgaria	Netherlands	Sweden
Canada	New Zealand	Thailand
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France	Portugal	United Kingdom
Ireland	Romania	

The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

Australia
India
U.S.A.

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Bow shackles

0 INTRODUCTION

In common with other items of lifting tackle, shackles are to be manufactured with lifting capacities in the R10 series of preferred numbers based on a module of 1 tonne (see ISO 3). Each lifting capacity is associated with given internal dimensions designed to accept other items with which it would be appropriate to use the shackle.

This International Standard is intended to be read in conjunction with ISO 2415, which gives definitions and specifies the types of shackle pin, material, tolerances on dimensions, workmanship, finish, screw threads, marking and certification.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the dimensions of normal and enlarged bow shackles for lifting capacities in the range 1,0 to 80 t.

All other recommendations relating to normal and enlarged bow shackles are given in ISO 2415.

Three alternative grades are provided, namely grades L [1], M and S.

2 REFERENCES

ISO 3, *Preferred numbers — Series of preferred numbers.*

ISO 2415, *Shackles — General characteristics.*

3 DIMENSIONS

The inside dimensions (inside jaw width, bow diameter and length) which control the capacity of the shackle to accept other items of lifting tackle are given in Table 1.

The diameters of the body and pin, and the outside diameter of the eye determine the strength of the shackle, and are given in Table 2 for the three grades L, M and S.

NOTE — The pin and body diameters actually used may be selected from any standard series of sizes of bar material, such that having regard to the method of manufacture the finished diameters will in no case fall below the minimum values shown.

1) Grade L is intended for marine purposes only.

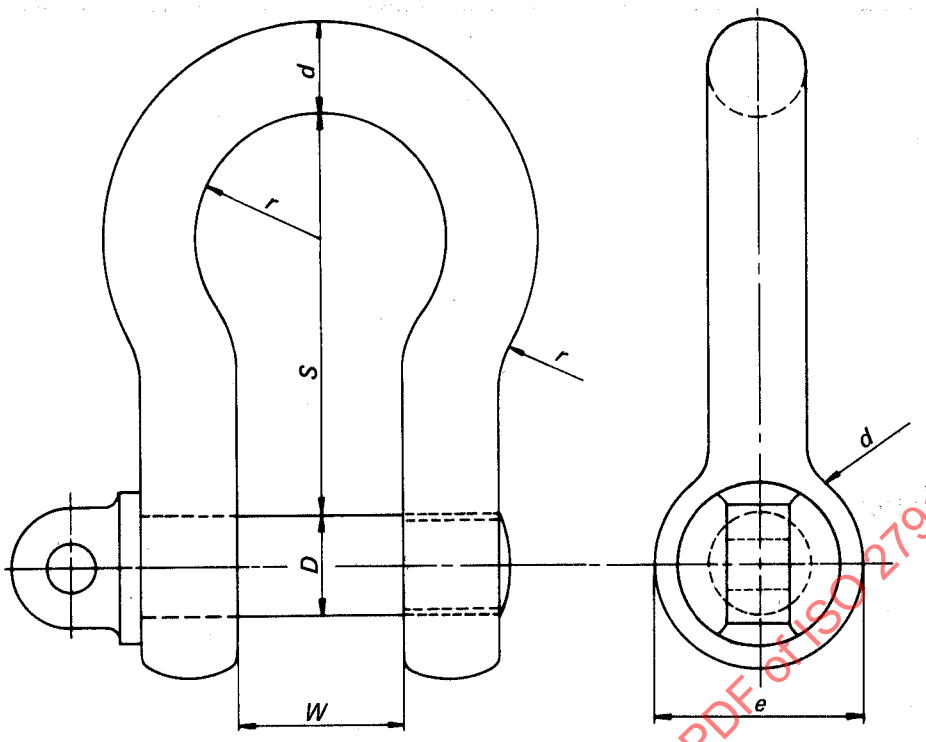

FIGURE – **Dimensions**

TABLE 1 – **Inside dimensions of bow shackles**

Lifting capacity C_p	**Proof load** F_e	**Jaw inside width** W		**Bow diameter** $2r$ $(1{,}7\ W)$		**Inside length** S $(2{,}2\ W)$	
		Normal $(14\sqrt{0{,}1\ F_e})$	Enlarged $(20\sqrt{0{,}1\ F_e})$	Normal	Enlarged	Normal	Enlarged
tonnes	KN	mm	mm	mm	mm	mm	mm
1,0	20	20	28	34	48	50	71
1,25	25	22	32	38	54	55	79
1,6	32	25	36	43	61	63	90
2,0	40	28	40	48	68	70	100
2,5	50	31	45	53	76	78	112
3,2	64	35	51	60	86	89	126
4,0	80	40	57	67	96	99	142
5,0	100	44	63	75	108	111	158
6,3	126	50	71	84	121	124	178
8,0	160	56	80	95	136	140	200
10,0	200	63	90	106	152	157	224
12,5	250	70	100	119	170	175	250
16,0	320	79	113	135	192	198	283
20,0	400	89	126	150	215	221	316
25,0	500	99	142	168	240	248	354
32,0	640	112		190		280	
40,0	800	125		213		313	
50,0	1 000	140		248		350	
63,0	1 260	157		267		394	
80,0	1 600	177		301		444	

NOTE – Values of $2r$ and S are derived from exact values of W and not the tabulated rounded values.

TABLE 2 — **Body, pin and eye diameters of bow shackles**

Lifting capacity	Minimum body material diameter (d)						Minimum pin diameter (D)						Minimum eye outside diameter (e)					
	Grade L		Grade M		Grade S		(1,1 d)						(2 D)					
	normal	enlarged	normal	enlarged	normal	enlarged	Grade L		Grade M		Grade S		Grade L		Grade M		Grade S	
C_p	$14\sqrt{C_p}$	$15{,}8\sqrt{C_p}$	$12{,}5\sqrt{C_p}$	$14\sqrt{C_p}$	$11{,}4\sqrt{C_p}$	$12{,}5\sqrt{C_p}$	normal	enlarged	normal	enlarged	normal	enlarged	normal	enlarged	normal	enlarged	normal	enlarged
tonnes	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1,0	14	16	13	14	12	13	16	17	14	16	13	14	32	34	28	32	26	28
1,25	16	18	14	16	13	14	18	19	15	18	14	15	36	38	30	36	28	30
1,6	18	20	16	18	15	16	20	22	17	20	16	17	40	44	34	40	32	34
2,0	20	23	18	20	17	18	22	25	19	22	18	19	44	50	38	44	36	38
2,5	23	25	20	23	18	20	25	28	22	25	20	22	50	56	44	50	40	44
3,2	25	29	23	25	21	23	28	31	25	28	22	25	56	62	50	56	44	50
4,0	28	32	25	28	23	25	31	35	28	31	25	28	62	70	56	62	50	56
5,0	32	36	28	32	26	28	35	39	31	35	28	31	70	78	62	70	56	62
6,3	36	40	32	36	29	32	39	44	35	39	32	35	78	88	70	78	64	70
8,0	40	45	36	40	33	36	44	49	39	44	36	39	88	98	78	88	72	78
10,0	45	50	40	45	36	40	49	55	44	49	40	44	98	110	88	98	80	88
12,5	50	56	45	50	41	45	55	62	49	55	44	49	110	124	98	110	88	98
16,0	56	64	50	56	46	50	62	70	55	62	50	55	124	140	110	124	100	110
20,0	63	71	56	63	51	56	69	78	62	69	56	62	138	156	124	138	112	124
25,0	70	79	63	70	57	63	77	87	69	77	63	69	154	174	138	154	126	138
32,0	80		71		65		87		78		71		174		156		142	
40,0	89		79		72		98		87		79		196		174		158	
50,0	99		89		81		109		97		89		218		194		178	
63,0	112		100		91		123		110		100		246		220		200	
80,0	126		112		102		138		123		112		276		246		224	

NOTE — Tabulated values of d are rounded up. D is calculated from the exact value of d and rounded.