

Shackles combined with Round slings



your reliable partner

Dear Customer,

For over 90 years the production of high tensile shackles has been our core business and competence. The designs and quality standards of our wire rope- and chain accessories are the result of requirements put forward by our customers in markets throughout the world.

For many years untested combinations of round slings with shackles have been used in lifting applications worldwide. Van Beest has now tested combinations of Green Pin® shackles with several types of round slings. Please find the results of the tests in this brochure.

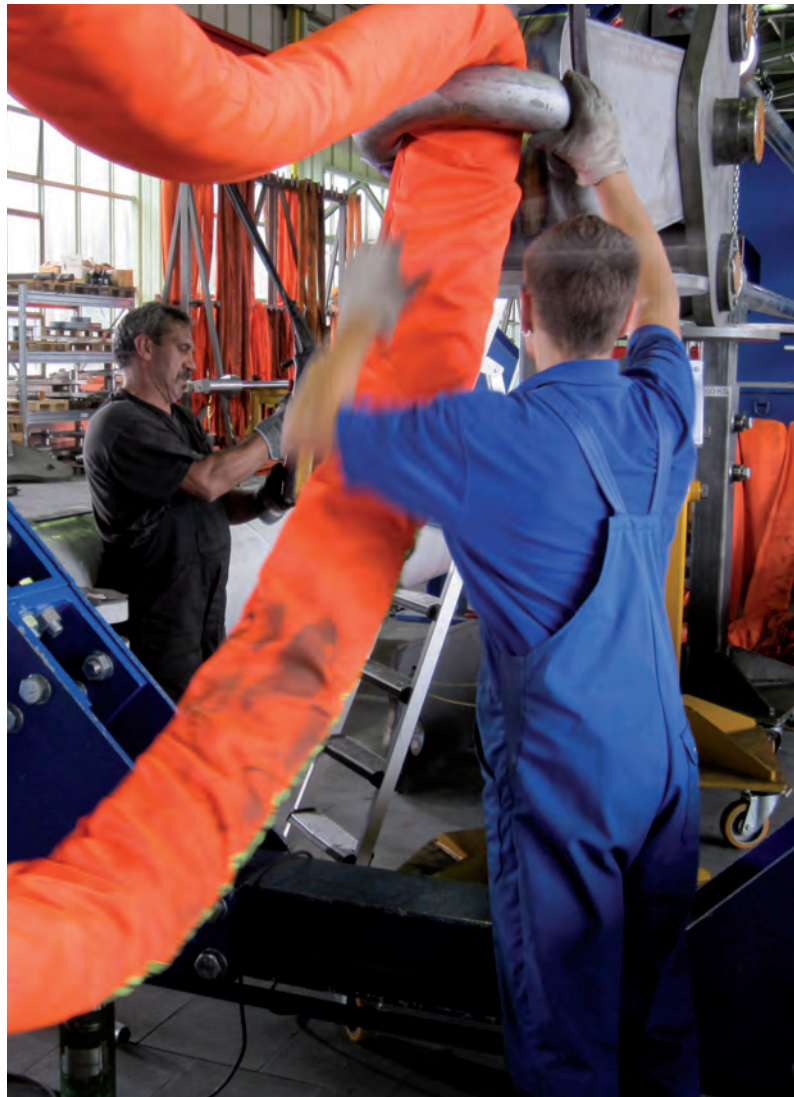
We trust this brochure will provide you with guidance in your selection of the correct Green Pin Shackle with a round sling and will assist you in serving your customers' needs.

In addition, our skilled salespeople and technicians are always at your service. Please do not hesitate to contact us for any question related to shackles, hooks or other wire rope- and chain accessories.

Kind regards,



Richard Meer
Vice President Sales



VAN BEEST B.V., Manufacturer and Supplier of wire rope- and chain fittings. Registered trade marks 'Green Pin' and 'Excel'



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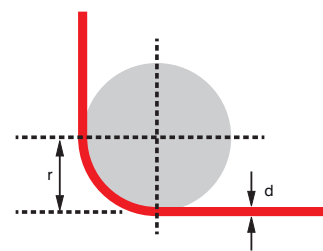
We reserve the right to make amendments on specifications mentioned in this brochure without prior notification. Specifications show general compliance with the various standards and should not be taken to meet all terms of the contract or purchase order.

Chamber of Commerce Rotterdam, Registration Number 23009317
VAT Number NL 0091.33.835.B01

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Background

Round slings made out of textile fibres are frequently used in combination with shackles with the same WLL in everyday lifting applications. But in many cases the bend radius of the shackle is a sharp edge for the sling as defined by the rule of thumb (bend radius of the bearing surface of a sling has to be greater than the thickness of the sling). As there are no standards or regulations for assessing these situations Van Beest has tested the breaking strength of certain combinations of round slings and shackles together with SpanSet GmbH & Co. KG and the DGUV (German Social Accident Insurance - Metal and Surface Treatment Technical Committee).



definition of a sharp edge:
radius edge (r) < thickness of lifting gear (d)

Selecting products for the test

The spectrum of tested lifting capacities for the combinations of round slings and shackles covered the most common increments of the load capacities ranging from 0.5 t up to 150 t. We tested round slings made of classic polyester fibres as well as round slings of high performance fibres such as those used in the SpanSet Magnum-X series. The latter is of particular interest since the properties of the fibre material used in these slings differs from those of conventional polyester fibres.

Standard Green Pin® shackles were used in the tests. These shackles have a uniform high quality, produced by upset forging from round bars. This makes them very different from standard imported drop forged shackles. Green Pin® Standard shackles are ideal for use together with round slings.

Test procedure

A test plan was drawn up in cooperation with the DGUV that took into account the usual combination of parts with the same WLL.

5-times the nominal carrying capacity was defined as the target strength to be achieved for round slings with a nominal lifting capacity of below 8 t and 4 times the nominal carrying capacity for slings with a nominal lifting capacity of 8 t or more. The slings were positioned in the bow of the shackles in each case.

The strength tests were then carried out on calibrated 250 t and 600 t tensile testing machines. The test was deemed to have been passed successfully as long as there was no sudden drop in force or a complete breakage of the sling. Damage to the sling sleeve or deformations of the shackle were acceptable in view of the excess load.

Result

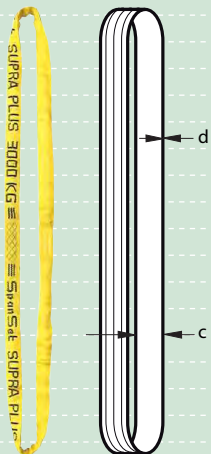
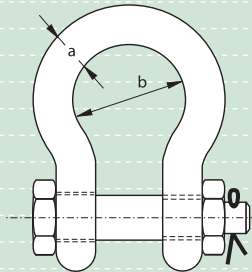
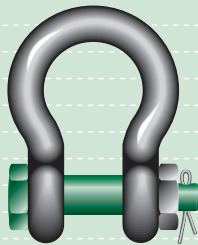
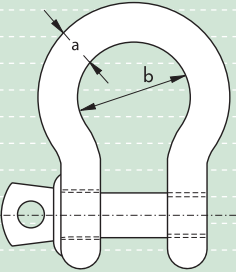
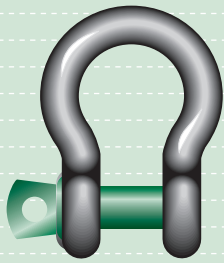
After loading and removal from the machine, the test specimen were examined and the findings recorded in a test report.

In addition to the main criterion i.e. whether the combinations of round slings and shackles had withstood the applied test force, it was also ascertained that the individual components had been easy to separate from one and other, and whether pressure points had led to any damage to the round slings due to contact pressure at the shackle radius.

All of the various combinations that were tested achieved the respective target strength. High performance fibres of a previous generation that were originally used in round slings displayed susceptibility to this type of loading and resulting stresses. This was not observed with the latest generations of SpanSet high performance fibre slings in combination with Standard Green Pin® shackles.

A video of this test can be found on the Green Pin® Youtube Channel





Fabric: Polyester fibre

Green Pin® Shackle type	WLL shackle	dia-meter bow	width bow	WLL round sling	Material width round sling	Material thickness round sling	Proof loading (kN)
	t	a mm	b mm	t	c mm	d mm	kN
G-4161, G-4163	0.5	7	20	0.5	36	5	25
G-4161, G-4163	1	10	26	1	36	6	49
G-4161, G-4163	2	13.5	32	2	37	8	99
G-4161, G-4163	3.25	16	43	3	44	10	148
G-4161, G-4163	4.75	19	51	4	52	12	197
G-4161, G-4163	6.5	22	58	5	59	13	246
G-4161, G-4163	6.5	22	58	6	65	14	295
G-4161, G-4163	8.5	25	68	8	68	17	393
G-4161, G-4163	12	32	83	10	90	19	393
G-4161, G-4163	17	38	99	15	115	21	589
G-4161, G-4163	25	45	126	20	135	23	785
G-4161, G-4163	35	50	138	30	170	27	1178
G-4161, G-4163	42.5	57	160	40	190	37	1570
G-4163	85	75	190	60	190	75	2355
G-4163	85	75	190	80	230	86	3140
P-6036	120	95	238	100	260	96	3924


Fabric: High performance fibre

Green Pin® Shackle type	WLL shackle	dia-meter bow	width bow	WLL round sling	Material width round sling	Material thickness round sling	Proof loading (kN)
	t	a mm	b mm	t	c mm	d mm	kN
G-4161, G-4163	12	32	83	10	55	12	393
G-4161, G-4163	25	45	126	20	80	15	785
G-4161, G-4163	35	50	138	30	90	20	1178
G-4161, G-4163	42.5	57	160	40	110	24	1570
G-4161, G-4163	55	65	180	50	117	23	1962
G-4163	85	75	190	60	150	30	2355
G-4163	85	75	190	80	200	40	3140
P-6036	120	95	238	100	233	47	3924
P-6036	150	105	275	125	267	53	4905
P-6036	150	105	275	150	308	62	5886

• Note: WLL of the combination of Green Pin® shackle and roundsling is limited by the WLL of the round sling for all combinations.






DGUV
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Bestätigung der Definition der Prüfanordnung, der Sicherheitsfaktoren und die Begleitung der Prüfkörperführung an Schälkel/Rundschlingenkombinationen

Hiermit bestätige ich
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bei
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die Definition der Prüfanordnung, der Sicherheitsfaktoren und die Begleitung der Prüfungsdurchführungen, wie sie in folgenden Schriftstücken dokumentiert sind:

- Bericht über die Zugfestigkeit von Kombinationen aus Rundschlingeln und Schälkeln gleicher Nenntragfähigkeit der Fa. SpanSet vom 21.10.2011
- Prüfbericht 863 vom 15.12.2009, 19.10.2010 und 21.10.2011, Fa. SpanSet, Abt. PM / Technisches Büro
- Prüfbericht 948 vom 09.09.2010 und 01.10.2010, Fa. SpanSet, Abt. PM / Technisches Büro

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 Im Auftrag

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A large green rectangular area with horizontal dashed lines, intended for writing notes. The lines are evenly spaced and run horizontally across the entire width of the green area. The green area is positioned on the right side of the page, with a white margin on the left containing the word 'Notes'.

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