VGS PLATE

PAN HEAD HEX SCREW FOR LIFTING

ELC-4645 | ESR-4645 | ETA-11/0030 | REUSABLE

ONE SCREW FOR ALL TRANSPORT APPLICATIONS

The head shape guarantees full compatibility with all screw-based transport and lifting systems (WASP, WASPL, RAPTOR, RAPTOR MINI and RAPTOR MAXI).

REUSABLE: LESS WASTE, IMPROVED COST EFFICIENCY

Unlike traditional single-use solutions, this screw is designed for repeated use in transport and lifting operations. Testing carried out in collaboration with the University of Maine and the University of Bologna confirms that performance is maintained after repeated reuse cycles. Following a practical yet rigorous inspection, the screw can be reused for lifting applications.

USE IN STRUCTURAL CONNECTIONS

The screw is certified in Canada for permanent metal-to-timber structural connections in buildings. The optimised head design, featuring a reinforced underhead and no sharp edges, ensures reliable load transfer with an enhanced safety factor, even when used with thick plates.

CANADIAN DESIGN VALUES

USA, EU and more design values available online.

VIDEO | MANUALS

BIT INCLUDED

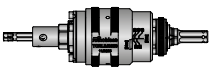
DIAMETER [mm]	9 — (11) — 13
LENGTH [mm]	60 — 60 — 280 — 1500
SERVICE CONDITION	DRY
ATMOSPHERIC CORROSIVITY	C1 C2
WOOD CORROSIVITY	T1 T2
MATERIAL	Zn E-COATING electrogalvanised carbon steel with black E-Coating

DOWNLOAD AND READ

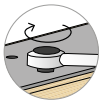
the complete manual before the installation

METAL-TO-TIMBER RECOMMENDED USE:

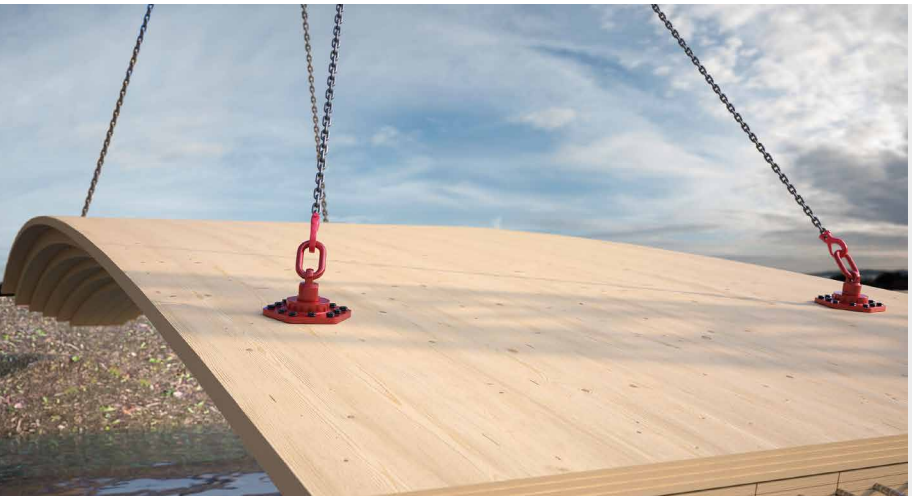
NO IMPACT



TORQUE LIMITER



$M_{ins,rec}$



FIELDS OF USE

- WASP
- RAPTOR
- RAPTOR MINI
- RAPTOR MAXI
- structural metal-to-timber connections

REUSABLE

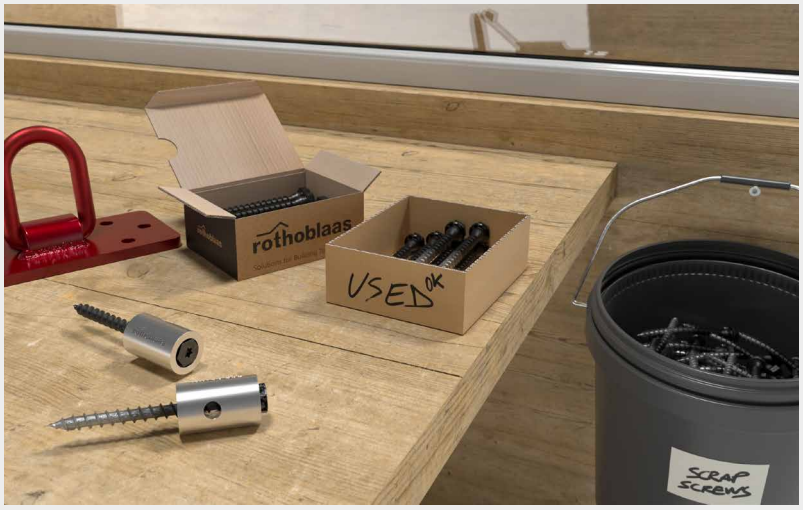
The reusability of the screw for transporting timber elements has been thoroughly analysed and tested. Follow the instructions for use before installation.

BLACK E-COATING

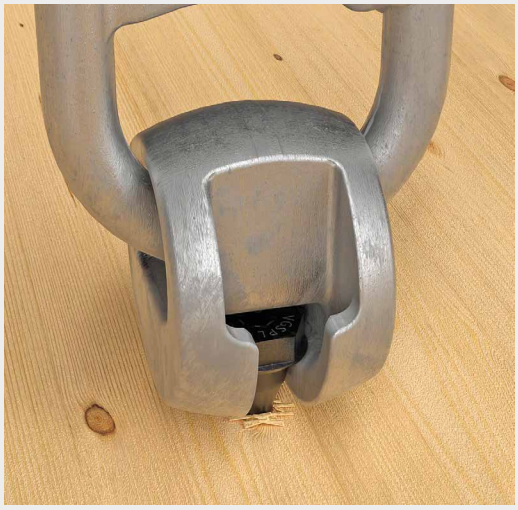
The black finish and "LIFT" head marking allow easy on-site identification and clear differentiation from screws not approved for lifting.
The wear of the coating provides a visual indication of the number of reuse cycles.

HEXAGONAL HEAD WITH TORX DRIVE

The combination of a robust hexagonal head and TORX drive allows the screw to be repeatedly installed and removed.

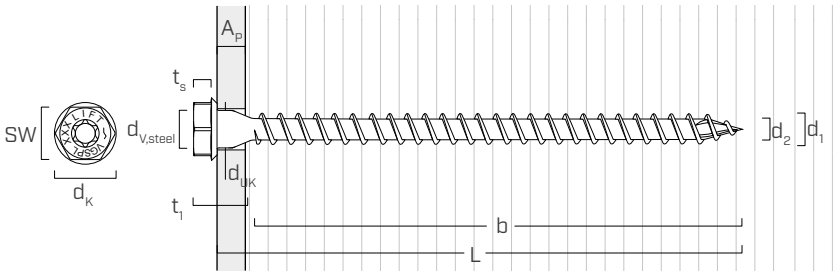


The JIG REUSE enables verification of plastic deformation, thread wear and coating degradation, ensuring safe reuse.



Despite the hexagonal head, VGS PLATE is fully compatible with lifting hooks such as WASP and WASPL, thanks to the integrated pan head washer.

GEOMETRY AND MECHANICAL CHARACTERISTICS



Nominal diameter	**d_1**	**[mm]**	**11**
Head diameter	d_K	[mm]	20,00
Root diameter	d_2	[mm]	6,60
Head thickness	t_1	[mm]	16,25
Wrench size	SW	-	17
Hexagonal head thickness	t_s	[mm]	5,75
Underhead diameter	d_{UK}	[mm]	12,00
Steel plate thickness	A_p	[mm]	3 - 20
Hole diameter on steel plate	$d_{v,steel}$	[mm]	13,0
Pre-drilling hole diameter(1)	$d_{V,S}$	[mm]	6,0
Pre-drilling hole diameter(2)	$d_{V,H}$	[mm]	7,0

(1) Pre-drilling valid for softwood.
(2) Pre-drilling valid for hardwood and beech LVL.

MECHANICAL PROPERTIES

Nominal diameter	**d_1**	**[mm]**		**11**
Factored tensile strength	Φf_u	[kN]		23,17
Bending yield strength	F_{yb}	[MPa]		1026
Factored shear strength of the screw	Φv_s	[kN]		13,14
Specified withdrawal resistance per millimeter of threaded shank (tip included)	Y_w	[N/mm]	G=0.35	96,02
			G=0.42	111,10
			G=0.49	125,68
			G=0.55	137,85

CODES AND DIMENSIONS

d_1 [mm] *[in]*	CODE	L [mm]	b [mm]	*L [in]*	*b [in]*	pcs
11 *0.44* SW 17 TX 50	**VGSPL1160**	60	50	*1 15/16*	*1 15/16*	25
	VGSPL1180	80	70	*2 3/4*	*2 3/4*	25
	VGSPL11100	100	90	*3 1/2*	*3 1/2*	25
	VGSPL11120	120	110	*4 3/8*	*4 3/8*	25
	VGSPL11140	140	130	*5 1/8*	*5 1/8*	25
	VGSPL11160	160	150	*6*	*6*	25
	VGSPL11180	180	170	*6 3/4*	*6 3/4*	25
	VGSPL11200	200	190	*7 1/2*	*7 1/2*	25
	VGSPL11240	240	230	*9 1/16*	*9 1/16*	25
	VGSPL11280	280	270	*10 5/8*	*10 5/8*	25

RELATED PRODUCTS

TORQUE LIMITER

TORQUE LIMITER

CODE	stop torque [Nm] *[ft·lbs]*	weight [g] *[lbs]*	pcs
TORLIM1235 incl. TORLIMBIT + TX4050	12 - 35 *9 - 26*	730 *1.61*	1
TORLIM3063 incl. TORLIMBITL + TX5050	30 - 63 *22 - 46*	1180 *2.6*	1

JIG REUSE

INSPECTION JIG FOR REUSABLE SCREWS

CODE	description	pcs
JIGREVGSPL11	inspection jig for reusable screws	1

Lifting system

Solutions engineered for the safe lifting and handling of timber elements.
The product range includes devices designed to accommodate different load configurations and on-site handling requirements.

RAPTOR MINI

RAPTOR

RAPTOR MAXI

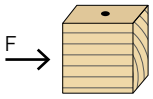
WASP

The comprehensive technical documentation is available at www.rothoblaas.com

rothoblaas.com

MINIMUM DISTANCES FOR SHEAR LOADS | TIMBER

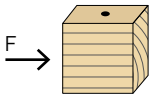
screws inserted **WITHOUT pre-drilled hole** — **G ≤ 0.44**



d_1		**11** [mm]	***0.44*** *[in]*
S_P	**12·d‡**	132	*5 3/16*
S_Q	**5·d**	55	*2 3/16*
a_L	**15·d‡**	165	*6 1/2*
a	**10·d‡**	110	*4 3/8*
e_Q	**10·d**	110	*4 3/8*
e_P	**5·d**	55	*2 3/16*
S_x	**2·d**	22	*7/8*

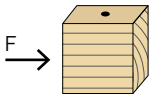
‡ For Western Red Cedar, this minimum spacing shall be increased by 50%.

screws inserted **WITHOUT pre-drilled hole** — **0.44 < G ≤ 0.50**



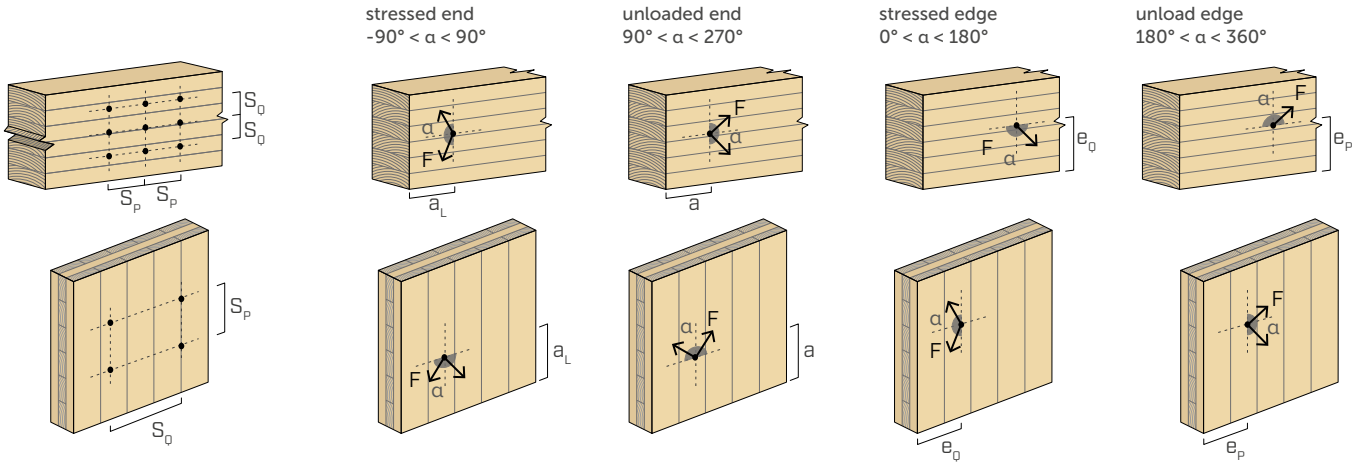
d_1		**11** [mm]	***0.44*** *[in]*
S_P	**18·d**	198	*7 13/16*
S_Q	**7·d**	77	*3 1/16*
a_L	**22·d**	242	*9 1/2*
a	**15·d**	165	*6 1/2*
e_Q	**12·d**	*132*	*5 3/16*
e_P	**7·d**	77	*3 1/16*
S_x	**3·d**	33	*1 5/16*

screws inserted **WITH pre-drilled hole**



d_1		**11** [mm]	***0.44*** *[in]*
S_P	**5·d†**	55	*2 3/16*
S_Q	**4·d**	44	*1 3/4*
a_L	**12·d†**	132	*5 3/16*
a	**7·d†**	77	*3 1/16*
e_Q	**7·d**	77	*3 1/16*
e_P	**3·d**	33	*1 5/16*
S_x	**1.5·d**	17	*11/16*

† For Douglas Fir–Larch and Western Red Cedar, this minimum spacing shall be increased by 50%.
d = d_1 = nominal diameter of the screw



NOTES

- The minimum spacing and distances comply with Clause 12.12.5 of CSA O86:24, where d_1 refers to the nominal diameter of the self-tapping screw.
- The spacing, end, and edge distances for Rothoblaas screws installed in the narrow face of CLT panels shall comply with the specifications outlined in ETA-11/0030.
- The placement of fasteners subjected to axial loading shall be determined in accordance with Clause 12.12.5 of CSA O86:24.

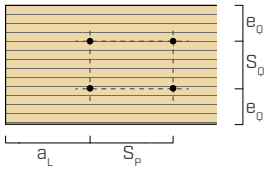
MINIMUM DISTANCES FOR AXIAL STRESSES | TIMBER

screws inserted **WITH and WITHOUT pre-drilled hole**

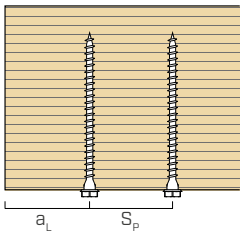
SCREWS INSERTED WITH α = 90° ANGLE WITH RESPECT TO THE GRAIN

d_1		11 [mm]	*0.44 [in]*
S_P	**7·d†**	77	*3 1/16*
S_Q	**5·d**	55	*2 3/16*
a_L	**10·d†**	110	*4 3/8*
e_Q	**4·d**	44	*1 3/4*

† For Douglas Fir–Larch and Western Red Cedar, this minimum spacing shall be increased by 50%.



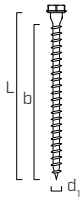
plan

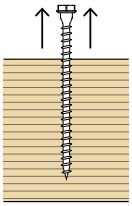


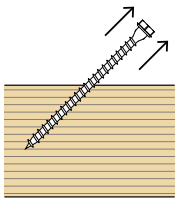
front

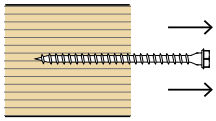
STRUCTURAL VALUES | AXIAL TENSION

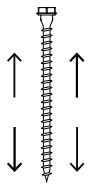
STRENGTH VALUES
CSA 086:24









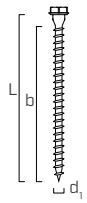
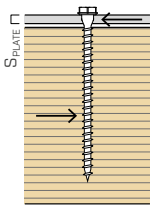
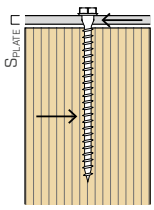
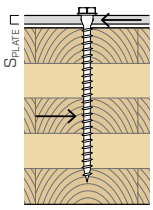
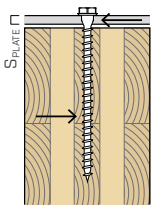


geometry				TENSION[1] thread withdrawal α = 90°				α = 45°				end grain α = 0°				steel tension
				factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}				factored withdrawal resistance P_{rw}[2][3]				factored tension resistance T_{rs}
				G				G				G				
d_1	L		b	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55	
[mm] *[in]*	[mm]	*[in]*	[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
11 *0.44*	60	*2 3/8*	50	2,62	3,03	3,43	3,76	2,38	2,76	3,12	3,42	1,31	1,52	1,72	1,88	23,17
	80	*3 1/8*	70	3,97	4,59	5,19	5,69	3,61	4,17	4,72	5,18	1,98	2,29	2,60	2,85	
	100	*4*	90	5,31	6,14	6,95	7,62	4,83	5,59	6,32	6,93	2,65	3,07	3,48	3,81	
	120	*4 3/4*	110	6,65	7,70	8,71	9,55	6,05	7,00	7,92	8,68	3,33	3,85	4,35	4,78	
	140	*5 1/2*	130	8,00	9,25	10,47	11,48	7,27	8,41	9,52	10,44	4,00	4,63	5,23	5,74	
	160	*6 1/4*	150	9,34	10,81	12,23	13,41	8,49	9,83	11,12	12,19	4,67	5,41	6,11	6,71	
	180	*7 1/8*	170	10,69	12,37	13,99	15,34	9,72	11,24	12,72	13,95	5,34	6,18	6,99	7,67	
	200	*8*	190	12,03	13,92	15,75	17,27	10,94	12,66	14,32	15,70	6,02	6,96	7,87	8,64	
	240	*9 1/2*	230	14,72	17,03	19,27	21,13	13,38	15,48	17,52	19,21	7,36	8,52	9,63	10,57	
	280	*11*	270	17,41	20,14	22,79	24,99	15,83	18,31	20,71	22,72	8,70	10,07	11,39	12,50	

α = screw-to-grain angle

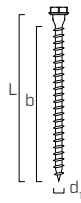
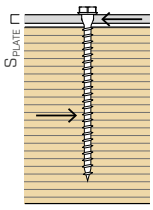
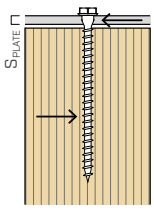
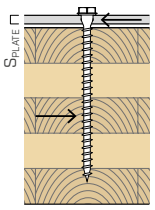
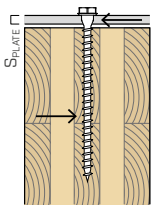
NOTES and GENERAL PRINCIPLES on page 11.

SHEAR[4]

geometry				steel-to-timber α = 90°				steel-to-timber α = 0°				steel-to-CLT α = 90°				steel-to-CLT α = 0°			
																			
d_1	L		S_{PLATE}	factored lateral resistance N_r				factored lateral resistance P_{rw}[2]				factored lateral resistance N_r				factored lateral resistance P_{rw}[2]			
				G				G				G				G			
				0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55
[mm] *[in]*	[mm]	*[in]*	[mm] *[in]*	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
	60	*2 3/8*		3,22	3,65	4,07	4,42	1,70	1,98	2,19	2,36	3,05	3,46	3,85	4,18	1,53	1,84	2,08	2,24
	80	*3 1/8*		3,86	4,40	4,93	5,38	2,04	2,31	2,58	2,79	3,65	4,17	4,67	5,09	1,94	2,20	2,45	2,65
	100	*4*		4,49	5,15	5,78	6,19	2,33	2,65	2,96	3,22	4,26	4,88	5,49	5,97	2,22	2,52	2,82	3,06
	120	*4 3/4*		5,09	5,67	6,22	6,67	2,62	2,99	3,35	3,65	4,87	5,48	6,02	6,45	2,49	2,85	3,19	3,47
	140	*5 1/2*	3,2 *1/8*	5,42	6,06	6,66	7,15	2,91	3,33	3,74	4,08	5,25	5,87	6,46	6,94	2,77	3,17	3,56	3,89
	160	*6 1/4*		5,76	6,45	7,10	7,64	3,19	3,67	4,09	4,39	5,58	6,26	6,90	7,42	3,04	3,49	3,93	4,26
	180	*7 1/8*		6,09	6,84	7,54	8,12	3,48	3,92	4,31	4,64	5,92	6,65	7,34	7,90	3,32	3,80	4,18	4,50
	200	*8*		6,43	7,23	7,98	8,56	3,67	4,12	4,53	4,88	6,26	7,04	7,68	8,13	3,56	3,99	4,40	4,74
	240	*9 1/2*		6,85	7,49	8,09	8,56	4,01	4,50	4,97	5,36	6,50	7,11	7,68	8,13	3,90	4,38	4,84	5,16
	280	*11*		6,85	7,49	8,09	8,56	4,34	4,75	5,13	5,43	6,50	7,11	7,68	8,13	4,12	4,51	4,87	5,16
	60	*2 3/8*		3,17	3,60	4,01	4,35	1,61	1,93	2,16	2,33	3,00	3,41	3,79	4,11	1,45	1,74	2,03	2,21
	80	*3 1/8*		3,81	4,35	4,87	5,30	2,02	2,29	2,55	2,76	3,61	4,12	4,61	5,02	1,92	2,18	2,42	2,63
	100	*4*		4,44	5,10	5,73	6,19	2,31	2,63	2,94	3,19	4,22	4,83	5,43	5,93	2,20	2,50	2,79	3,04
	120	*4 3/4*		5,08	5,67	6,22	6,67	2,60	2,97	3,33	3,62	4,82	5,48	6,02	6,45	2,47	2,83	3,17	3,45
	140	*5 1/2*	6,4 *1/4*	5,42	6,06	6,66	7,15	2,89	3,31	3,71	4,05	5,25	5,87	6,46	6,94	2,75	3,15	3,54	3,86
	160	*6 1/4*		5,76	6,45	7,10	7,64	3,17	3,65	4,09	4,39	5,58	6,26	6,90	7,42	3,03	3,47	3,91	4,26
	180	*7 1/8*		6,09	6,84	7,54	8,12	3,46	3,92	4,31	4,64	5,92	6,65	7,34	7,90	3,30	3,80	4,18	4,50
	200	*8*		6,43	7,23	7,98	8,56	3,67	4,12	4,53	4,88	6,26	7,04	7,68	8,13	3,56	3,99	4,40	4,74
	240	*9 1/2*		6,85	7,49	8,09	8,56	4,01	4,50	4,97	5,36	6,50	7,11	7,68	8,13	3,90	4,38	4,84	5,16
11	280	*11*		6,85	7,49	8,09	8,56	4,34	4,75	5,13	5,43	6,50	7,11	7,68	8,13	4,12	4,51	4,87	5,16
0.44	60	*2 3/8*		3,12	3,54	3,94	4,27	1,51	1,82	2,12	2,31	2,96	3,35	3,73	4,04	1,36	1,64	1,91	2,14
	80	*3 1/8*		3,76	4,29	4,80	5,23	2,00	2,27	2,52	2,73	3,57	4,07	4,55	4,95	1,90	2,16	2,40	2,60
	100	*4*		4,40	5,04	5,66	6,18	2,29	2,61	2,91	3,16	4,17	4,78	5,37	5,86	2,18	2,48	2,77	3,01
	120	*4 3/4*		5,03	5,67	6,22	6,67	2,58	2,95	3,30	3,59	4,78	5,48	6,02	6,45	2,46	2,81	3,14	3,42
	140	*5 1/2*	9,5 *3/8*	5,42	6,06	6,66	7,15	2,87	3,28	3,69	4,02	5,25	5,87	6,46	6,94	2,73	3,13	3,51	3,83
	160	*6 1/4*		5,76	6,45	7,10	7,64	3,16	3,62	4,08	4,39	5,58	6,26	6,90	7,42	3,01	3,45	3,88	4,24
	180	*7 1/8*		6,09	6,84	7,54	8,12	3,44	3,92	4,31	4,64	5,92	6,65	7,34	7,90	3,29	3,78	4,18	4,50
	200	*8*		6,43	7,23	7,98	8,56	3,67	4,12	4,53	4,88	6,26	7,04	7,68	8,13	3,56	3,99	4,40	4,74
	240	*9 1/2*		6,85	7,49	8,09	8,56	4,01	4,50	4,97	5,36	6,50	7,11	7,68	8,13	3,90	4,38	4,84	5,16
	280	*11*		6,85	7,49	8,09	8,56	4,34	4,75	5,13	5,43	6,50	7,11	7,68	8,13	4,12	4,51	4,87	5,16
	60	*2 3/8*		3,03	3,43	3,81	4,13	1,42	1,70	1,99	2,23	2,87	3,25	3,61	3,91	1,28	1,53	1,79	2,01
	80	*3 1/8*		3,67	4,18	4,67	5,09	1,96	2,22	2,47	2,67	3,48	3,96	4,43	4,82	1,82	2,11	2,35	2,54
	100	*4*		4,30	4,93	5,53	6,04	2,25	2,56	2,86	3,10	4,09	4,68	5,25	5,73	2,14	2,43	2,72	2,95
	120	*4 3/4*		4,94	5,62	6,16	6,61	2,54	2,90	3,24	3,53	4,69	5,39	5,96	6,39	2,42	2,76	3,09	3,36
	140	*5 1/2*	12,7 *1/2*	5,38	6,01	6,60	7,09	2,83	3,24	3,63	3,96	5,20	5,82	6,40	6,87	2,69	3,08	3,46	3,77
	160	*6 1/4*		5,71	6,40	7,04	7,57	3,11	3,57	4,02	4,36	5,54	6,21	6,84	7,35	2,97	3,41	3,83	4,18
	180	*7 1/8*		6,05	6,79	7,48	8,05	3,40	3,90	4,28	4,60	5,87	6,60	7,28	7,84	3,25	3,73	4,15	4,46
	200	*8*		6,39	7,17	7,92	8,54	3,65	4,09	4,50	4,84	6,21	6,98	7,68	8,13	3,52	3,97	4,37	4,71
	240	*9 1/2*		6,85	7,49	8,09	8,56	3,99	4,48	4,94	5,33	6,50	7,11	7,68	8,13	3,88	4,36	4,81	5,16
	280	*11*		6,85	7,49	8,09	8,56	4,32	4,75	5,13	5,43	6,50	7,11	7,68	8,13	4,12	4,51	4,87	5,16

α = screw-to-grain angle

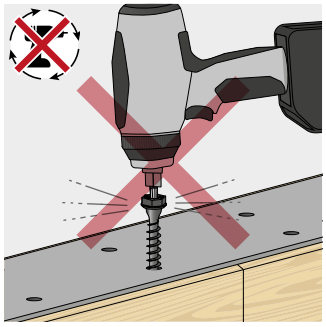
NOTES and GENERAL PRINCIPLES on page 11.

geometry				SHEAR[4]													
				steel-to-timber α = 90°				steel-to-timber α = 0°				steel-to-CLT α = 90°				steel-to-CLT α = 0°			
																			
d_1	L		S_{PLATE}	factored lateral resistance N_r				factored lateral resistance P_{rw}[2]				factored lateral resistance N_r				factored lateral resistance P_{rw}[2]			
				G				G				G				G			
[mm] *[in]*	[mm]	*[in]*	[mm] *[in]*	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55	0.35	0.42	0.49	0.55
	[kN]			[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
	60	2 3/8		2,93	3,31	3,68	3,98	1,32	1,59	1,85	2,08	2,78	3,14	3,48	3,77	1,19	1,43	1,67	1,87
	80	*3 1/8*		3,57	4,06	4,54	4,93	1,92	2,17	2,41	2,60	3,38	3,85	4,30	4,67	1,73	2,06	2,29	2,47
	100	*4*		4,20	4,81	5,40	5,89	2,20	2,50	2,79	3,03	3,99	4,56	5,12	5,58	2,10	2,38	2,66	2,89
	120	*4 3/4*		4,84	5,56	6,09	6,53	2,49	2,84	3,18	3,46	4,59	5,28	5,89	6,31	2,37	2,71	3,03	3,30
	140	*5 1/2*	15,9	5,32	5,95	6,53	7,01	2,78	3,18	3,57	3,89	5,15	5,76	6,33	6,79	2,65	3,03	3,40	3,71
	160	*6 1/4*	*5/8*	5,66	6,34	6,97	7,49	3,07	3,52	3,96	4,32	5,49	6,14	6,77	7,28	2,93	3,36	3,77	4,12
	180	*7 1/8*		6,00	6,72	7,41	7,98	3,36	3,86	4,25	4,56	5,82	6,53	7,21	7,76	3,20	3,68	4,12	4,43
	200	*8*		6,33	7,11	7,85	8,46	3,62	4,06	4,47	4,81	6,16	6,92	7,65	8,13	3,48	3,94	4,34	4,67
	240	*9 1/2*		6,85	7,49	8,09	8,56	3,96	4,45	4,91	5,29	6,50	7,11	7,68	8,13	3,85	4,33	4,78	5,15
	280	*11*		6,85	7,49	8,09	8,56	4,30	4,75	5,13	5,43	6,50	7,11	7,68	8,13	4,12	4,51	4,87	5,16
	60	2 3/8		2,83	3,19	3,54	3,83	1,23	1,47	1,72	1,93	2,68	3,02	3,35	3,62	1,11	1,33	1,55	1,74
	80	*3 1/8*		3,47	3,94	4,40	4,78	1,83	2,11	2,34	2,54	3,29	3,74	4,17	4,53	1,65	1,97	2,23	2,41
	100	*4*		4,10	4,69	5,26	5,74	2,16	2,45	2,73	2,97	3,89	4,45	4,99	5,44	2,05	2,33	2,60	2,82
	120	*4 3/4*		4,74	5,44	6,02	6,45	2,45	2,79	3,12	3,40	4,50	5,16	5,81	6,23	2,33	2,66	2,97	3,23
11	140	*5 1/2*	19,4	5,27	5,88	6,46	6,93	2,73	3,13	3,51	3,83	5,10	5,69	6,26	6,72	2,61	2,98	3,34	3,64
0.44	160	*6 1/4*	*3/4*	5,61	6,27	6,90	7,42	3,02	3,47	3,90	4,26	5,43	6,08	6,70	7,20	2,88	3,30	3,71	4,05
	180	*7 1/8*		5,94	6,66	7,34	7,90	3,31	3,80	4,21	4,53	5,77	6,47	7,14	7,68	3,16	3,63	4,08	4,39
	200	*8*		6,28	7,05	7,78	8,38	3,60	4,03	4,43	4,77	6,10	6,86	7,58	8,13	3,43	3,91	4,30	4,63
	240	*9 1/2*		6,85	7,49	8,09	8,56	3,93	4,42	4,87	5,25	6,50	7,11	7,68	8,13	3,82	4,30	4,74	5,11
	280	*11*		6,85	7,49	8,09	8,56	4,27	4,75	5,13	5,43	6,50	7,11	7,68	8,13	4,12	4,51	4,87	5,16
	60	2 3/8		2,73	3,07	3,40	3,68	1,13	1,36	1,59	1,78	2,55	2,91	3,22	3,48	1,02	1,22	1,43	1,60
	80	*3 1/8*		3,36	3,82	4,26	4,63	1,73	2,06	2,28	2,47	3,19	3,62	4,04	4,39	1,56	1,87	2,17	2,34
	100	*4*		4,00	4,57	5,12	5,59	2,11	2,40	2,67	2,90	3,80	4,34	4,86	5,29	2,01	2,28	2,54	2,75
	120	*4 3/4*		4,64	5,32	5,95	6,38	2,40	2,74	3,06	3,33	4,40	5,05	5,68	6,16	2,29	2,60	2,91	3,17
	140	*5 1/2*	22,2	5,22	5,82	6,39	6,86	2,69	3,07	3,45	3,76	5,01	5,63	6,19	6,64	2,56	2,93	3,28	3,58
	160	*6 1/4*	*7/8*	5,55	6,21	6,83	7,34	2,98	3,41	3,83	4,19	5,38	6,02	6,63	7,12	2,84	3,25	3,65	3,99
	180	*7 1/8*		5,89	6,60	7,27	7,82	3,26	3,75	4,18	4,49	5,71	6,41	7,07	7,61	3,11	3,58	4,02	4,35
	200	*8*		6,23	6,99	7,71	8,31	3,55	4,00	4,40	4,73	6,05	6,80	7,51	8,09	3,39	3,88	4,27	4,59
	240	*9 1/2*		6,85	7,49	8,09	8,56	3,91	4,39	4,84	5,21	6,50	7,11	7,68	8,13	3,80	4,26	4,71	5,07
	280	*11*		6,85	7,49	8,09	8,56	4,24	4,75	5,13	5,43	6,50	7,11	7,68	8,13	4,12	4,51	4,87	5,16

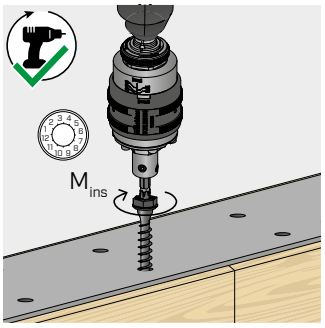
α = screw-to-grain angle

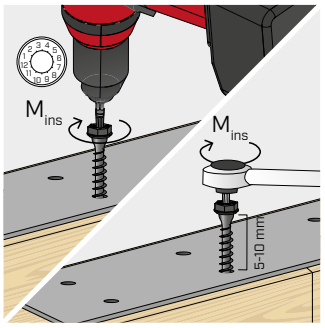
NOTES and GENERAL PRINCIPLES on page 11.

INSTALLATION



The use of pulse screw guns/impact wrenches is not permitted.

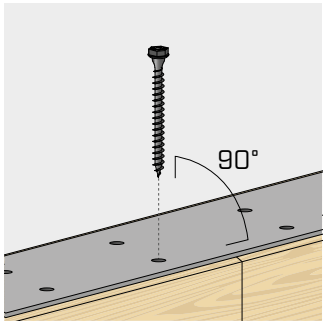




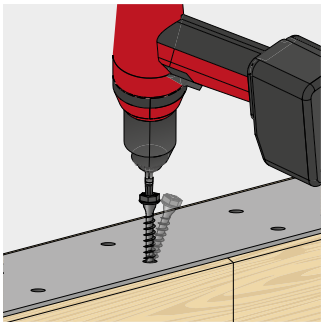
Ensure correct tightening.
We recommend the use of torque-controlled screwdrivers, e.g. with TORQUE LIMITER. Alternatively, tighten with a torque wrench.

VGSPL	d_1 [mm]	$M_{ins,rec}$ [Nm]
Ø11	11	30

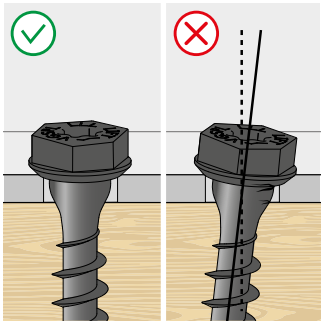
VGSPL	*d_1 [in]*	*$M_{ins,rec}$ [ft·lbs]*
Ø11	*0.44*	*22*



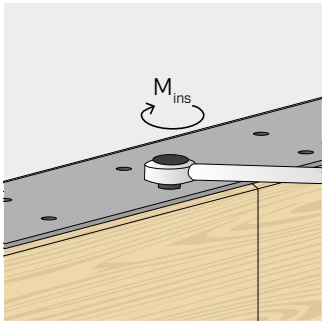
Respect the insertion angle. For very precise inclinations, the use of guide holes or pre-drilling is recommended.



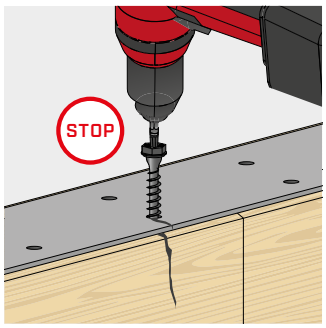
Avoid bending.



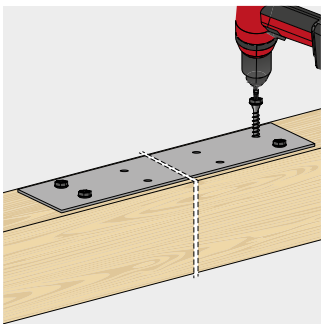
Ensure full contact between the entire surface of the screw head and the metal element.



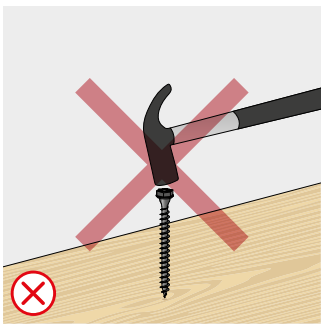
After installation, the fasteners can be inspected using a torque wrench.



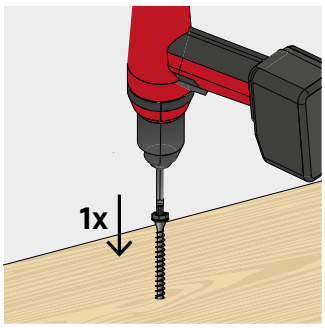
Stop installation if damage to the fastener, timber or metal plates is noticed.



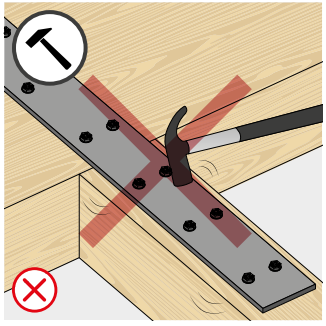
Install the connector assembly by following an installation sequence that ensures uniform tightening of all components.



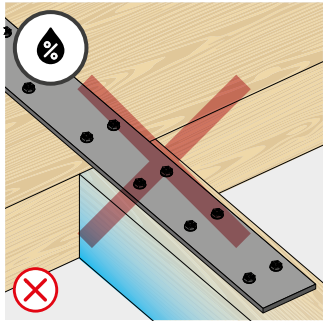
Do not hammer the screw tips into the timber.



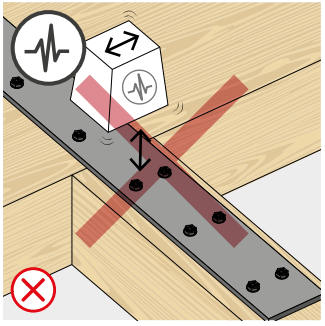
Install screws in one continuous stroke.



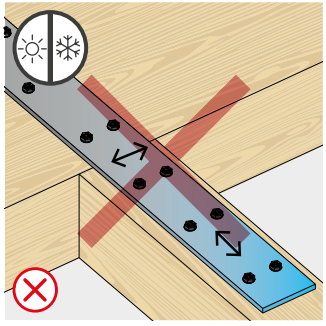
Avoid accidental stress during installation.



Protect the connection and avoid moisture changes and shrinkage and swelling of the timber.



Use not permitted for dynamic loads.

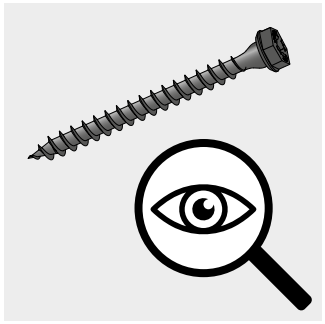


Avoid dimensional changes to the metal.

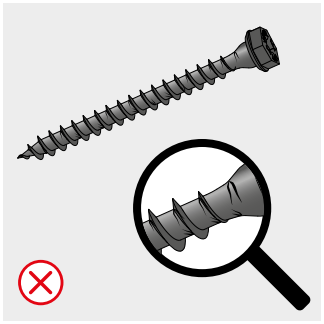
REUSE CRITERIA | LIFTING SCREW

These provisions apply to all lifting screws prior to reuse. Reuse is permitted only if all checks are successfully passed.

VISUAL INSPECTION



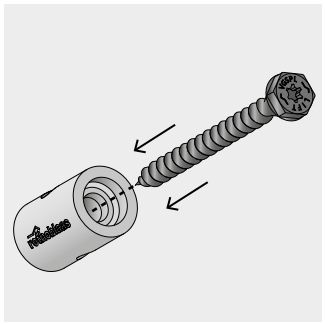
Carefully inspect the condition of the VGS PLATE.

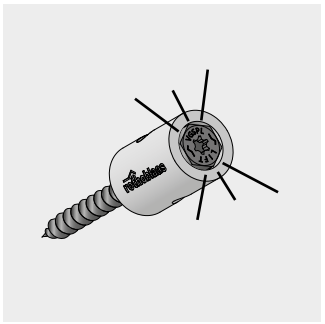


The screw must be fully intact, with no signs of corrosion, coating discontinuity, bending or damage of any kind.

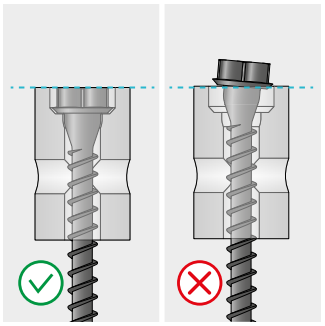
INSPECTIONS WITH JIG REUSE

STRAIGHTNESS (ABSENCE OF PLASTIC DEFORMATION)

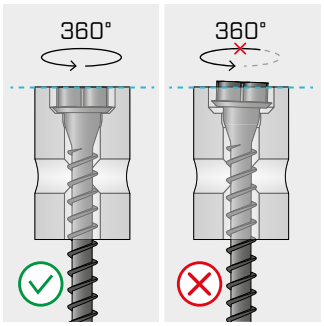




Insert the VGS PLATE into the main bore of the JIG REUSE jig until the head sits firmly against the jig.

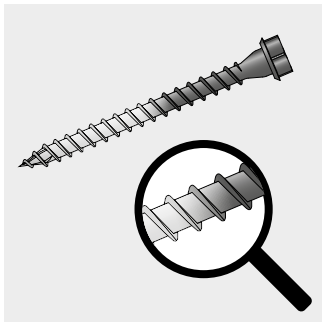


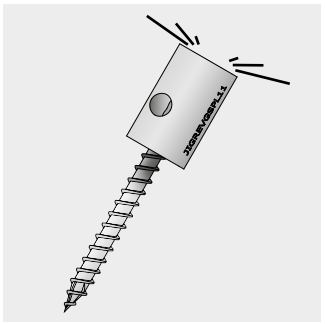
The screw head must be fully seated within the jig.



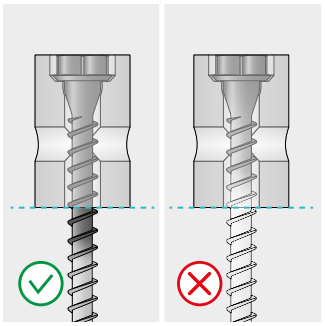
When inserted in the jig, the screw must rotate freely while the head remains fully seated.

NUMBER OF USES

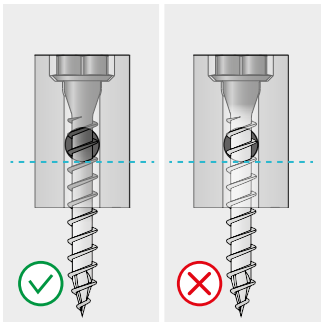




Identify the coating transition zone (wear area) on the VGS PLATE. Carry out this check with the jig and the VGS PLATE in exactly the same position as in the previous inspection.

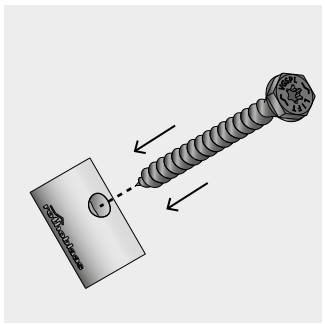


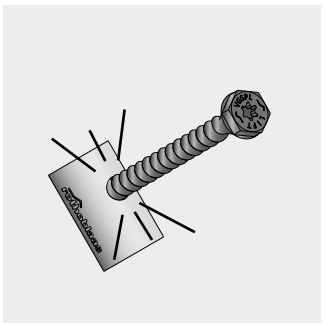
The wear area must remain completely outside the body of the JIG REUSE.



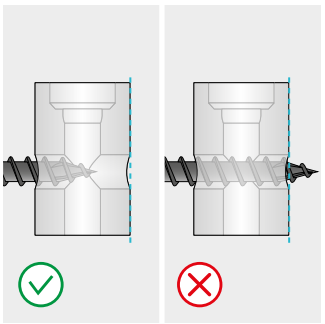
For screws with L ≤ 80 mm, the wear area must be located below the side bore of the JIG REUSE.

THREAD WEAR



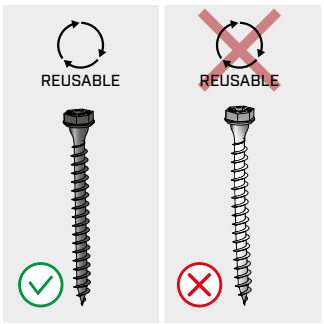


Insert the VGS PLATE into the side bore of the JIG REUSE as deeply as possible.



The tip of the screw must not protrude from the jig.

DISPOSAL



Discard the screw if any one of the above criteria is not met.

STRUCTURAL VALUES

GENERAL PRINCIPLES

- The reference factored lateral resistance for self-tapping screws has been determined following the guidelines in Clause 12.12 of the CSA O86:24 including the withdrawal restraint effect. Listed values are based on standard long term load duration factor (K_D = 1.0), dry service condition factor (K_{SF} = 1.0), and treatment factor (K_T = 1.0).
- The reference lateral design values are calculated for screws inserted without pre-drilling as per CSA O86:24 Clause 12.12.10.5.3. The direction of the bearing-to-grain angle does not influence lateral resistance. In the case of screws inserted with pre-drilling, greater resistance values can be obtained.
- The steel plate is assumed to be ASTM A36 with a minimum ultimate tensile strength, f_u, equal to 58 ksi (400 MPa).
- Withdrawal values given in this datasheet are likewise applicable to CLT connections.
- Connection design requires comparing the screw tensile capacity and thread withdrawal - the minimum of the two governs.
- Not all screw lengths satisfy the required embedment depth in either the side member ($4d_1$) or the main member ($8d_1$). Engineering discretion and judgment should be applied to evaluate the potential impact of reduced penetration on the connection's load-carrying capacity.
- VGS PLATE screws must be positioned in accordance with the minimum distances.
- G is the mean relative density according to CSA O86:24 Table A12. Most common wood species are assumed such as Northern species (G = 0.35), Spruce-Pine-Fir (G = 0.42), Douglas Fir (G = 0.49), and Southern Pine (G = 0.55).
- As part of the connection design, the designer must size and verify both the structural wood members and the steel plates separately.
- Combined shear and tensile stresses shall comply with the interaction criteria outlined in CSA O86:24 Clause 12.12.11.

NOTES

(1) Factored withdrawal resistances were calculated with the entire threaded portion of the screw, b (in millimeters), minus the tip length, L_{tip}. The length of the tip is equal to the nominal diameter of the respective fasteners, d_1, as specified in the ELC-4645 report. Factor for fastener axis-to-grain angle, J_α, and the factor for dowel bearing effect for laterally loaded connections, J_w, varies according to connection geometry. The factored tensile resistance of the connector (P_{rt}) is governed by the lower value between the withdrawal resistance (P_{rw}), head pull-through resistance (P_{pt}) and the steel strength (T_{rs}).

(2) The angle between the fastener axis and the grain direction of the wood member, α, is taken as zero for the end grain calculations. Self-tapping screws installed perpendicular to the panel edge of CLT are assumed to be installed in the end grain of member.

(3) VGS PLATE screws installed in the end grain may not meet the minimum penetration requirement for withdrawal ($20d_1$) specified in CSA O86:24 Clause 12.12.6.1. Discretion and engineering judgment must be exercised to evaluate the impact of reduced penetration on the connection's capacity.

(4) Lateral resistances are factored and according to CSA O86:24 Clause 12.12.10. Values apply to dry service conditions and are representative of a single screw.

INSTALLATION INSTRUCTIONS AND REUSE CRITERIA

The full installation instructions and the reuse guidelines are available at www.rothoblaas.com

REUSE OF LIFTING CONNECTORS

The extensive experimental campaign carried out in collaboration with universities and research institutions has enabled the characterisation of screw behaviour in lifting systems, with a particular focus on safety, sustainability and innovation.

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