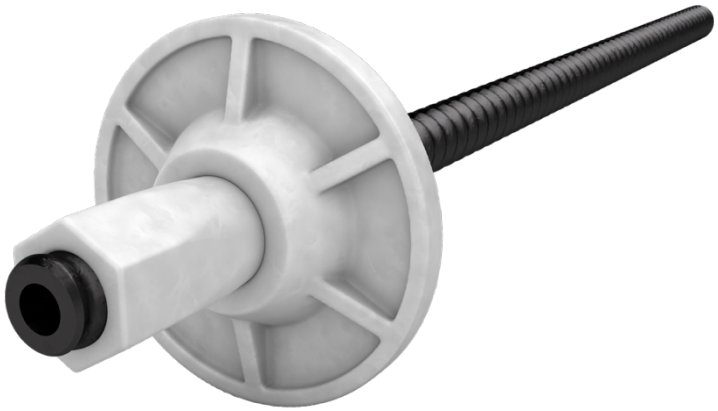
SANDVIK

GRP bolts

Product code: CS20, CS25, CS32, and CR32
Product specification: geo tech, tunneling, and mining
Category: GRP solid and hollow bar, continuously threaded

Introduction

Glass-reinforced plastic (GRP) bolts are used as an alternative to conventional steel ground support elements. Due to advances in production technologies and the growing use of mechanical excavation methods, GRP systems have become increasingly important in tunneling worldwide.
Applications range from cuttable bolts for mechanical excavation to fully grouted dowels, injection lances, and pre-support systems. Sandvik Ground Support offers a comprehensive portfolio of GRP solutions for a wide range of applications, supported by extensive expertise both in production and application.



Main advantages

— Lightweight system components ensure easy handling and installation
— High tensile load-bearing capacity
— Tough and durable, yet easy to cut using mechanical excavators or shearers
— Enhanced corrosion resistance
— Anti-static components – EX-proof system
— Tough and resistant continuous thread form adjusted to the demands in the construction industry

System description

— Composite system consisting of high-strength glass fibers and high-performance resin
— German approval for underground application
— Available in two different versions:
  – Type CS – fully threaded solid bars
  – Type CR – fully threaded self-drilling (rotary drilling only) hollow bars with advanced, resistant composite structure
— Installation in combination with Mineral Bolt, cementitious grout, or Fasloc® resin cartridges

System components

— Threaded solid bars type CS
— Threaded hollow bars type CR
— GRP nuts
— GRP plates
— Couplings

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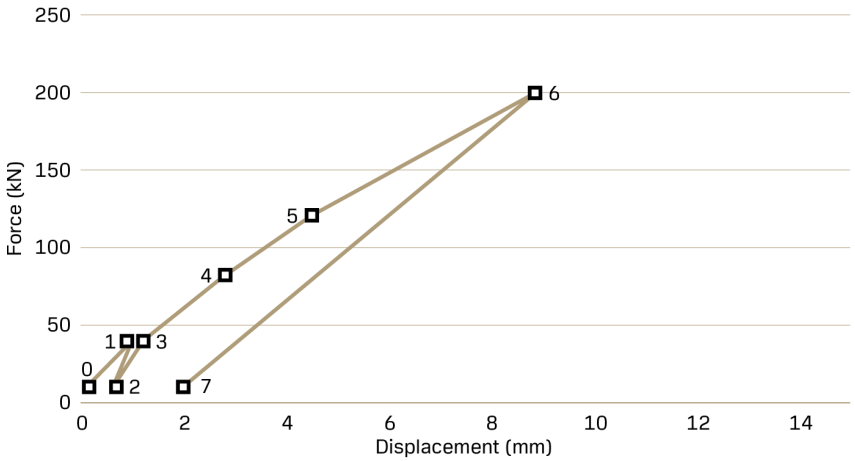
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Specifications

Characteristic value/type [1) 2)]	Symbol	CS20-190	CS25-300	CS32-560	CR32-315
Nominal external diameter	$D_{e,nom}$	20 mm	25 mm	32 mm	32 mm
Nominal cross-section [3)]	S_0	186 mm²	346 mm²	580 mm²	340 mm²
Nominal weight [3)]	m	0.60 kg/m	0.90 kg/m	1.30 kg/m	0.95 kg/m
Ultimate load bar [4)]	$F_{m,nom}$	190 kN	300 kN	560 kN	315 kN
Ultimate strength bar	$R_{m,nom}$	1,000 N/mm²	900 N/mm²	1,000 N/mm²	900 N/mm²
Ultimate elongation bar	A	2.5 %	1.7 %	2.5 %	1.5 %
Shear force bar	$F_{S,nm}$	90 kN	160 kN	230 kN	140 kN
Modulus of elasticity	E	40,000 N/mm²	51,000 N/mm²	40,000 N/mm²	61, 000 N/mm²
Delivery lengths	L	1.00-6.00 m	1.00-6.00 m	1.00-6.00 m	1.00-6.00 m
Ultimate load nuts & coupling					
Steel hex nut	–	–	200 kN	130 kN	180 kN
GRP domed nut	–	70 kN	70 kN	90 kN	105 kN
GRP hex nut	–	70 kN	170 kN	120 kN	200 kN
Steel coupling	–	–	165 kN	180 kN	200 kN

1) Note: all values are subject to change; other designs and dimensions are available upon request; corresponding plates according to manufacturer specifications.
2) According to manufacturer specifications or German approval for underground application.
3) Characteristic fractile value.
4) Calculated from the characteristic ultimate strength value and nominal weight, rounded.

In-situ pull testing (DIN 21521-2): load-displacement diagram CR32-315 with Mineral Bolt MI



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Order information

Article number	Article designation	Weight
206111194020	CS20-190, L = 2,000 mm, 45° tip, antistatic	1.20 kg
206111194024	CS20-190, L = 2,400 mm, 45° tip, antistatic	1.44 kg
206111194030	CS20-190, L = 3,000 mm, 45° tip, antistatic	1.80 kg
206111194040	CS20-190, L = 4,000 mm, 45° tip, antistatic	2.40 kg
206111194060	CS20-190, L = 6,000 mm, 45° tip, antistatic	3.60 kg
206111194118	CS20-190, L = 11,800 mm, 45° tip, antistatic	7.08 kg
206211304020	CS25-300, L = 2,000 mm, 45° tip, antistatic	1.80 kg
206211304024	CS25-300, L = 2,400 mm, 45° tip, antistatic	2.16 kg
206211304030	CS25-300, L = 3,000 mm, 45° tip, antistatic	2.70 kg
206211304040	CS25-300, L = 4,000 mm, 45° tip, antistatic	3.60 kg
206211304060	CS25-300, L = 6,000 mm, 45° tip, antistatic	5.40 kg
206211304118	CS25-300, L = 11,800 mm, 45° tip, antistatic	10.62 kg
206311564020	CS32-560, L = 2,000 mm, 45° tip, antistatic	2.60 kg
206311564024	CS32-560, L = 2,400 mm, 45° tip, antistatic	3.12 kg
206311564030	CS32-560, L = 3,000 mm, 45° tip, antistatic	3.90 kg
206311564040	CS32-560, L = 4,000 mm, 45° tip, antistatic	5.20 kg
206311564060	CS32-560, L = 6,000 mm, 45° tip, antistatic	7.80 kg
206311564118	CS32-560, L = 11,800 mm, 45° tip, antistatic	15.34 kg
206312314020	CR32-315, L = 2,000 mm, 45° tip, antistatic	1.90 kg
206312314024	CR32-315, L = 2,400 mm, 45° tip, antistatic	2.28 kg
206312314030	CR32-315, L = 3,000 mm, 45° tip, antistatic	2.85 kg
206312314040	CR32-315, L = 4,000 mm, 45° tip, antistatic	3.80 kg
206312314060	CR32-315, L = 6,000 mm, 45° tip, antistatic	5.70 kg
206312314118	CR32-315, L = 11,800 mm, 45° tip, antistatic	11.21 kg
206111193020	CS20-190, L = 2,000 mm, antistatic	1.2 kg
206111193024	CS20-190, L = 2,400 mm, antistatic	1.44 kg
206111193030	CS20-190, L = 3,000 mm, antistatic	1.8 kg
206111193040	CS20-190, L = 4,000 mm, antistatic	2.4 kg
206111193060	CS20-190, L = 6,000 mm, antistatic	3.6 kg
206111193118	CS20-190, L= 11,800 mm, antistatic	7.08 kg
206211303020	CS25-300, L = 2,000 mm, antistatic	1.8 kg
206211303024	CS25-300, L = 2,400 mm, antistatic	2.16 kg
206211303030	CS25-300, L = 3,000 mm, antistatic	2.7 kg
206211303040	CS25-300, L = 4,000 mm, antistatic	3.6 kg
206211303060	CS25-300, L = 6,000 mm, antistatic	5.4 kg
206211303118	CS25-300, L = 11,800 mm, antistatic	10.62 kg
206311563020	CS32-560, L = 2,000 mm, antistatic	2.60 kg
206311563024	CS32-560, L = 2,400 mm, antistatic	3.12 kg
206311563030	CS32-560, L = 3,000 mm, antistatic	3.90 kg
206311563040	CS32-560, L = 4,000 mm, antistatic	5.20 kg
206311563060	CS32-560, L = 6,000 mm, antistatic	7.80 kg
206311563118	CS32-560, L = 11,800 mm, antistatic	15.34 kg
206312313020	CR32-315, L = 2,000 mm, antistatic	1.90 kg

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206312313024	CR32-315, L = 2,400 mm, antistatic	2.28 kg
206312313030	CR32-315, L = 3,000 mm, antistatic	2.85 kg
206312313040	CR32-315, L = 4,000 mm, antistatic	3.80 kg
206312313060	CR32-315, L = 6,000 mm, antistatic	5.70 kg
206312313118	CR32-315, L = 11,800 mm, antistatic	11.21 kg
206121011036	Hex but C20, WS36/L70 mm, antistatic	0.08 kg
206140015014	Round plate C20-HN, Ø = 140 mm, antistatic	0.4 kg
206140015017	Round plate C20-HN, Ø = 170 mm, antistatic	0.68 kg
206140016020	Domed nut C20 WS36/70, antistatic	0.18 kg
206140016017	Round plate C20-DN, Ø = 170 mm, antistatic	0.46 kg
206140016020	Round plate C20-DN, Ø = 200 mm, antistatic	0.75 kg
206221011041	Hex nut CS25, WS41/L80 mm, antistatic	0.13 kg
206240015017	Round plate C25-HN, Ø = 170 mm, antistatic	0.68 kg
206240015020	Round plate C25-HN, Ø = 200 mm, antistatic	1.16 kg
206221015041	Domed nut C25, WS36/L70 mm, antistatic	0.19 kg
206240016017	Round plate C25-DN, Ø = 170 mm, antistatic	0.46 kg
206240016020	Round plate C25-DN, Ø = 200 mm, antistatic	0.74 kg
206231011200	Coupling R25, L150 mm, steel	0.64 kg
950111011007	Domed plate S235, 200x200x10-028 mm	3.1 kg
206221022041	Hex nut R25, WS41/L150 mm, steel	1.09 kg
206321011046	Hex nut C32, WS46/L100 mm, antistatic	0.17 kg
206340015017	Round plate C32-HN, Ø = 170 mm, antistatic	0.68 kg
206340015020	Round plate C32-HN, Ø = 200 mm, antistatic	1.12 kg
206321015046	Domed nut C32, WS46/L100 mm, antistatic	0.32 kg
206340016017	Round plate C32-DN, Ø = 170 mm, antistatic	0.46 kg
206340016020	Round plate C32-DN, Ø = 200 mm, antistatic	0.74 kg
206321521001	Hex nut R32, WS43/L100 mm, steel	0.82 kg
950111011044	Domed plate S235, 200x200x10-034 mm	3.0 kg
206331011200	Coupling R32, L200 mm	1.08 kg

Off-size lengths are available on request.
Order information for further system components is available on request.

System accessories

Drill bits

- Wide range of drill bit designs for varying ground conditions
- Optimized in terms of cuttability and drilling performance
- System-compatible with the DSI Hollow Bar System
- Drill bit selection and technical specifications – see DSI Hollow Bar System catalogue section

Load-bearing system components

- Steel nuts
- Steel couplings
- Steel plates
- Various types and dimensions available upon request – see DSI Hollow Bar System catalogue section

Mesh

- GRP bolt mesh available upon request

Legal disclaimer

All dimensions, weights, quantities, and specifications are those applicable at the time of this publication and may be amended from time to time. Please contact your local representative for final confirmation of any key specifications.

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