Biological drilling protocol

TAILORED TO ALL BONE TYPES

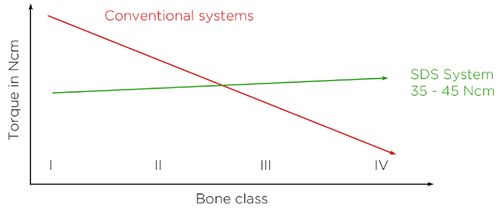
Most conventional implant systems generate higher torques the harder the bone. This is absolutely contraindicated and counterproductive in biological terms as, according to Mammoto's Law, increased pressure on poorly perfused bone leads to resorption. The SDS drilling protocol takes biology and this important biological law into account by generating decreasing insertion torques as the bone gets harder and matching drills and drilling protocols to bone types. This conserves the bone and supports vascularization, which is crucial for the long-term preservation of any tissue.

DRILLING PROTOCOLS

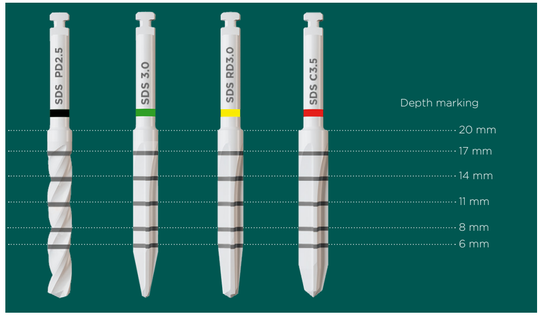
We recommend having these drill sequences on hand during surgery. On the one hand, this will ensure that you follow the protocol perfectly. On the other, depending on bone density, it makes it possible to vary and optimally adapt the implant bed preparation to a potential non-standard situation. The illustrations show the drilling sequences, starting with the rose bur and ending with the form drill projected onto the implant, so that you can see exactly which thread depth remains for stabilization purposes.

CORRECT USE

Drilling should be carried out intermittently and with constant external cooling with precooled (5°C/41°F) sterile Ringer's solution. External cooling prevents the bone tissue from overheating and facilitates bone chip removal or drainage. Preparation is performed under low pressure to the desired depth at a speed of 300–600 rpm.

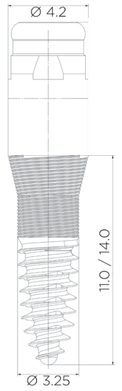


Uniform torque in all four bone types when using the SDS drilling protocol compared to conventional systems.



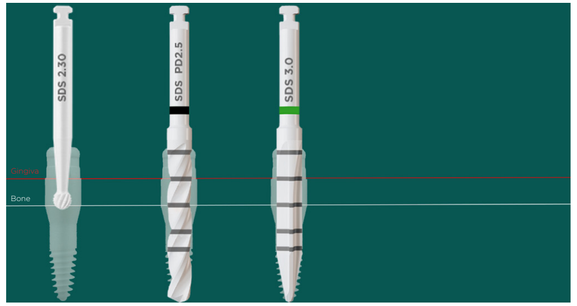
SDS1.2_3.3 Type III and II bone

SDS1.2_3.3

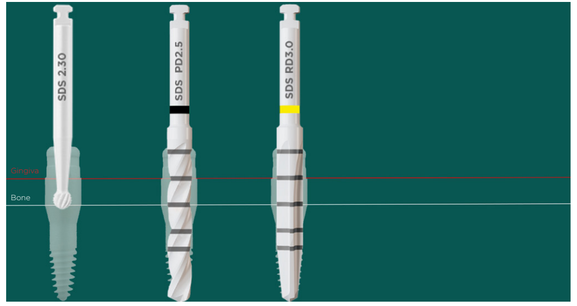


Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS 3.0	300–600/min
SDS RD3.0	300–600/min

SDS1.2 Ø 3.3 mm – Type III bone

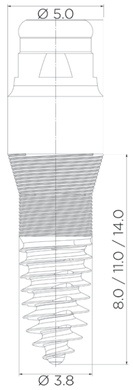


SDS1.2 Ø 3.3 mm – Type II bone

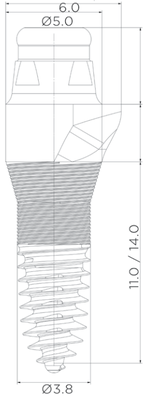


SDS1.2_3.8 Type IV and III bone

SDS1.2_3.8

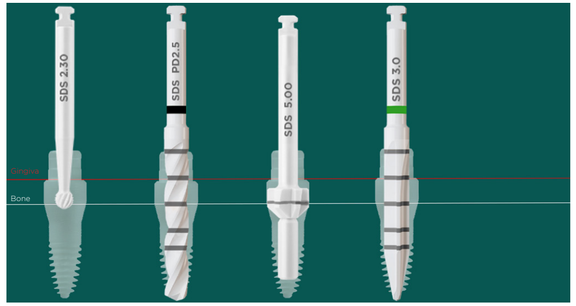


SDS1.2_3.8-ba



Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS 3.0	300–600/min
SDS 5.00	300–600/min
SDS CS5.0	300–600/min

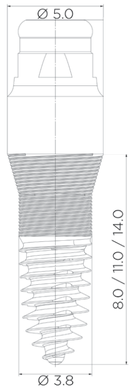
SDS1.2 Ø 3.8 mm – Type IV bone



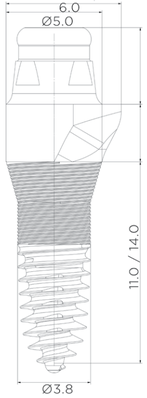
SDS1.2 Ø 3.8 mm – Type III bone

SDS1.2_3.8 Type II and I bone

SDS1.2_3.8

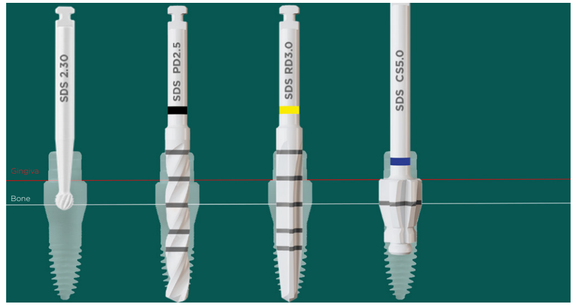


SDS1.2_3.8-ba

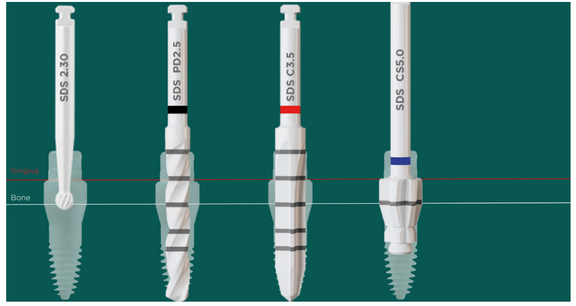


Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS RD3.0	300–600/min
SDS CS5.0	300–600/min
SDS C3.5	300–600/min

SDS1.2 Ø 3.8 mm – Type II bone

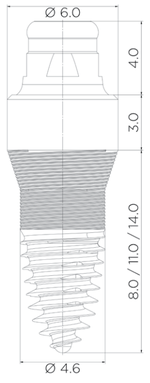


SDS1.2 Ø 3.8 mm – Type I bone

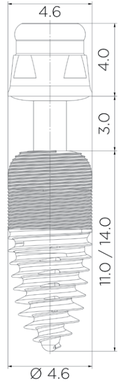


SDS1.2_4.6 Type IV and III bone

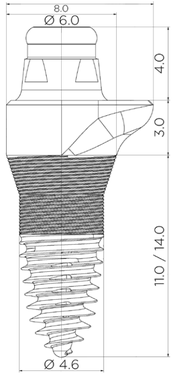
SDS1.2_4.6



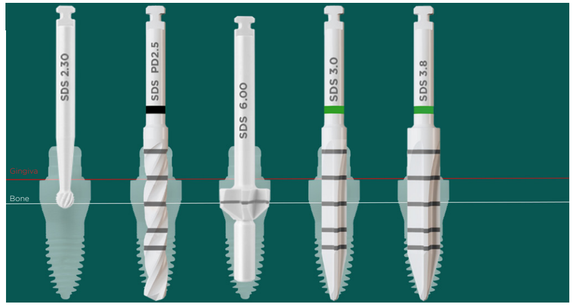
SDS1.2_4.6-ov



SDS1.2_4.6-ba



SDS1.2 Ø 4.6 mm – Type IV bone



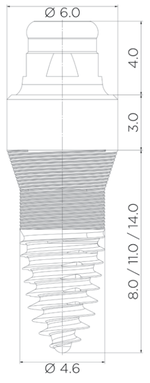
SDS1.2 Ø 4.6 mm – Type III bone

Recommended rpm

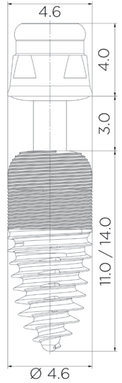
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS 6.00	300–600/min
SDS 3.0	300–600/min
SDS 3.8	300–600/min
SDS CS6.0	300–600/min

SDS1.2_4.6 6 Type II and I bone

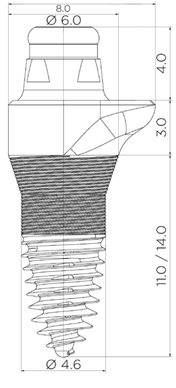
SDS1.2_4.6



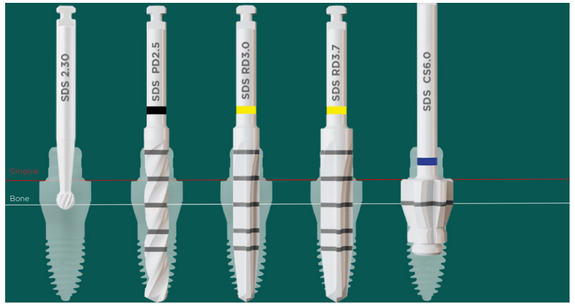
SDS1.2_4.6-ov



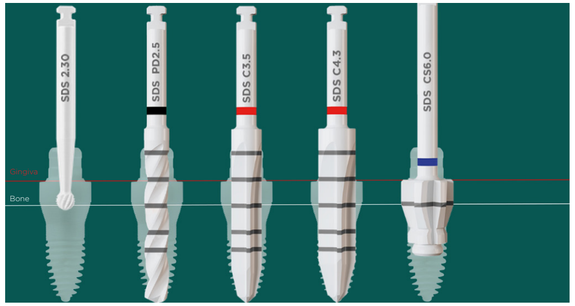
SDS1.2_4.6-ba



SDS1.2 Ø 4.6 mm – Type II bone



SDS1.2 Ø 4.6 mm – Type I bone

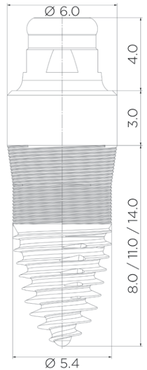


Recommended rpm

SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS RD3.0	300–600/min
SDS RD3.7	300–600/min
SDS CS6.0	300–600/min
SDS C3.5	300–600/min
SDS C4.3	300–600/min

SDS1.2_5.4 Type IV and III bone

SDS1.2_5.4



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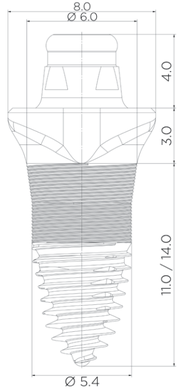
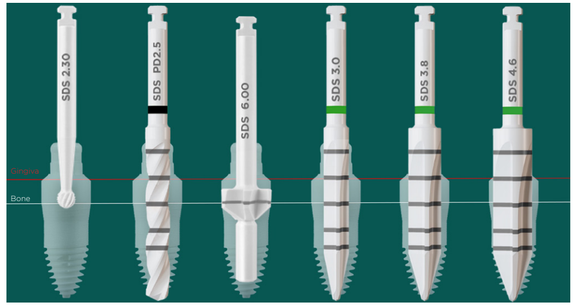
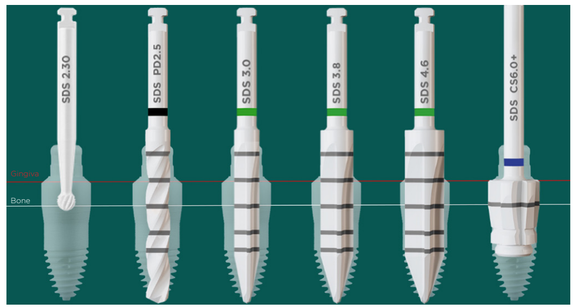


Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS 6.00	300–600/min
SDS 3.0	300–600/min
SDS 3.8	300–600/min
SDS 4.6	300–600/min
SDS CS6.0+	300–600/min

SDS1.2 Ø 5.4 mm – Type IV bone

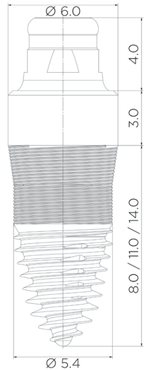


SDS1.2 Ø 5.4 mm – Type III bone

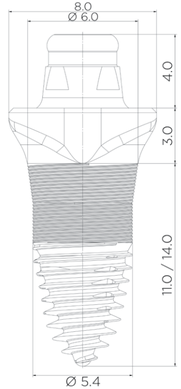


SDS1.2_5.4 Type II and I bone

SDS1.2_5.4

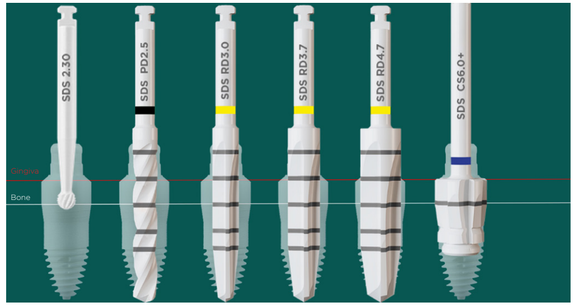


SDS1.2_5.4-ov

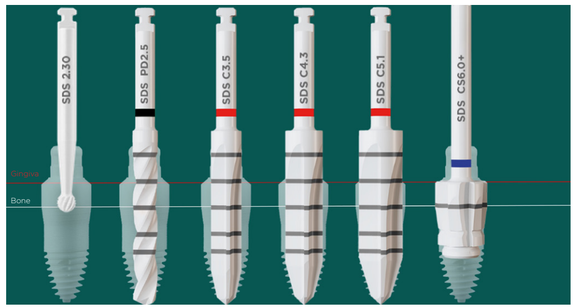


Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS RD3.0	300–600/min
SDS RD3.7	300–600/min
SDS RD4.7	300–600/min
SDS CS6.0+	300–600/min
SDS C3.5	300–600/min
SDS C4.3	300–600/min
SDS C5.1	300–600/min

SDS1.2 Ø 5.4 mm – Type II bone

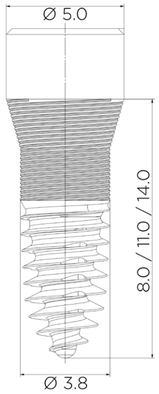


SDS1.2 Ø 5.4 mm – Type I bone

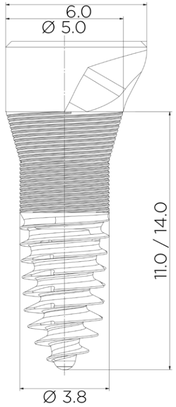


SDS2.2_3.8 Type IV and III bone

SDS2.2_3.8

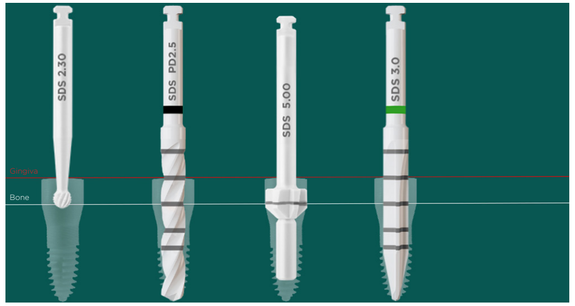


SDS2.2_3.8-ba



Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS 5.00	300–600/min
SDS 3.0	300–600/min
SDS CS5.0	300–600/min

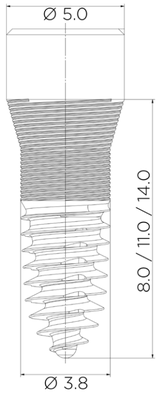
SDS2.2 Ø 3.8 mm – Type IV bone



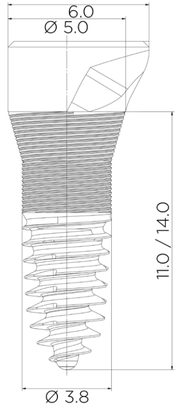
SDS2.2 Ø 3.8 mm – Type III bone

SDS2.2_3.8 Type II and I bone

SDS2.2_3.8

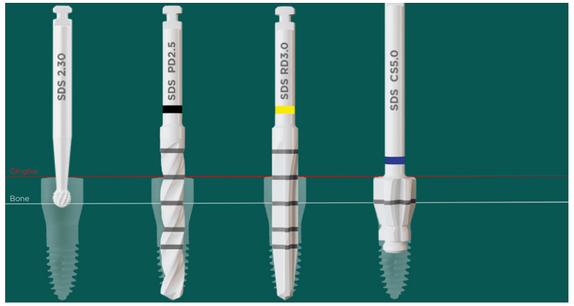


SDS2.2_3.8-ba

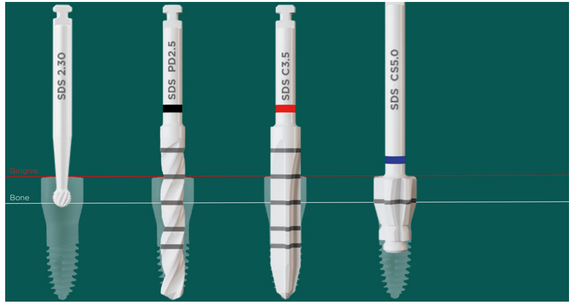


Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS RD3.0	300–600/min
SDS CS5.0	300–600/min
SDS C3.5	300–600/min

SDS2.2 Ø 3.8 mm – Type II bone

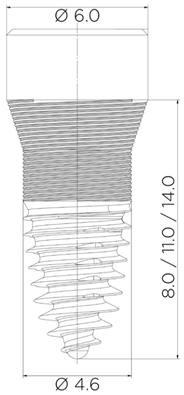


SDS2.2 Ø 3.8 mm – Type I bone

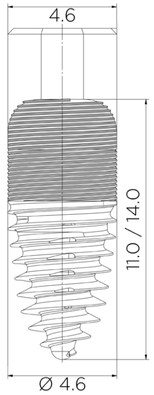


SDS2.2_4.6 Type IV and III bone

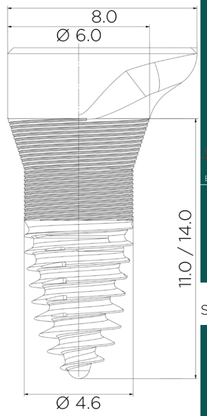
SDS2.2_4.6



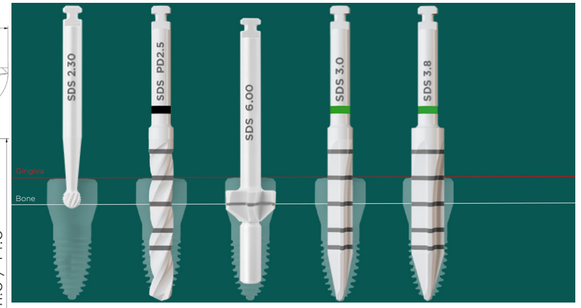
SDS2.2_4.6-ov



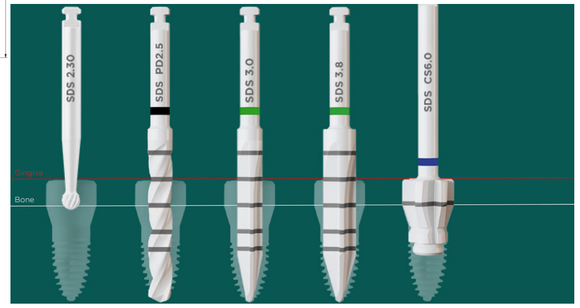
SDS2.2_4.6-ba



SDS2.2 Ø 4.6 mm – Type IV bone



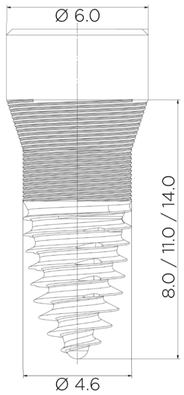
SDS2.2 Ø 4.6 mm – Type III bone



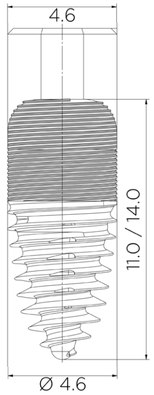
Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS 6.00	300–600/min
SDS 3.0	300–600/min
SDS 3.8	300–600/min
SDS CS6.0	300–600/min

SDS2.2_4.6 Type II and I bone

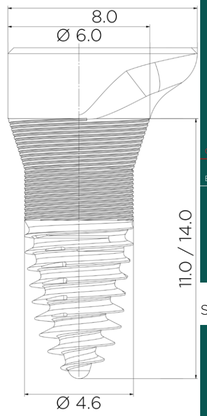
SDS2.2_4.6



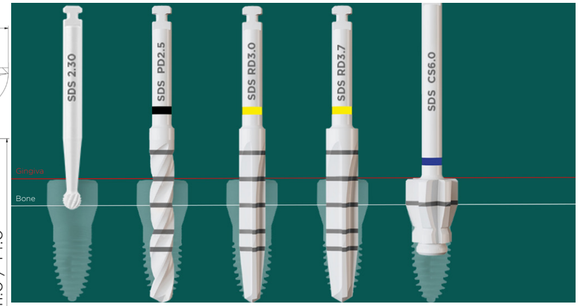
SDS2.2_4.6-ov



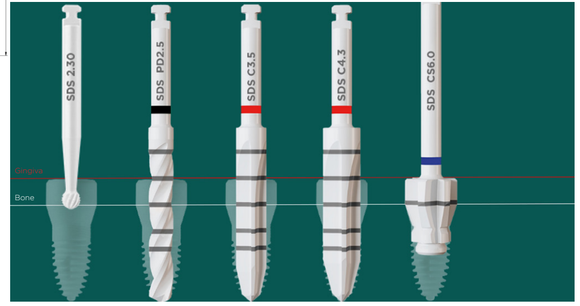
SDS2.2_4.6-ba



SDS2.2 Ø 4.6 mm – Type II bone

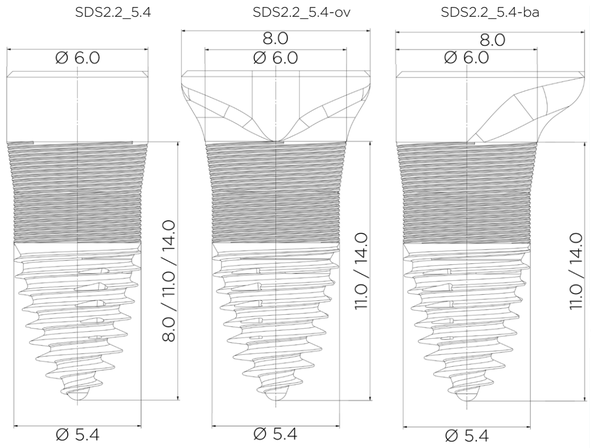


SDS2.2 Ø 4.6 mm – Type I bone

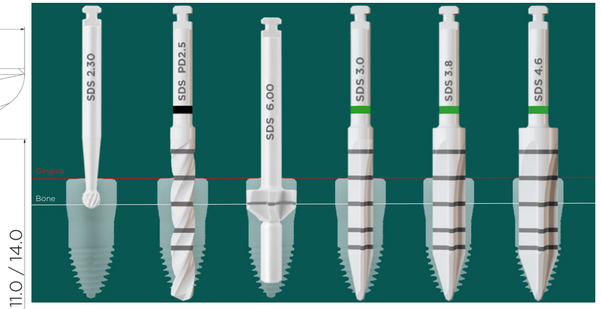


Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS RD3.0	300–600/min
SDS RD3.7	300–600/min
SDS CS6.0	300–600/min
SDS C3.5	300–600/min
SDS C4.3	300–600/min

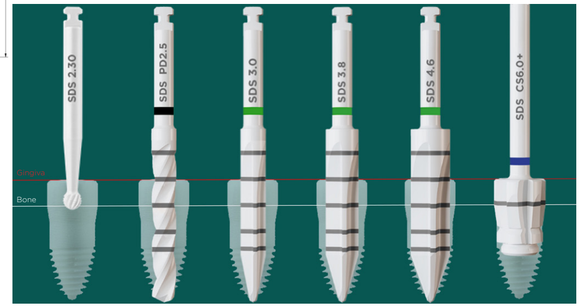
SDS2.2_5.4 Type IV and III bone



SDS2.2 Ø 5.4 mm – Type IV bone



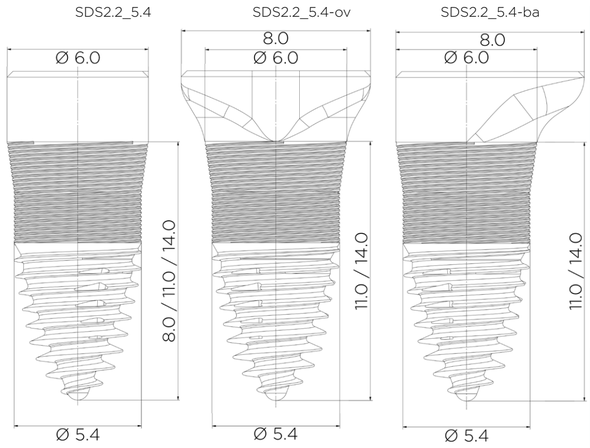
SDS2.2 Ø 5.4 mm – Type III bone



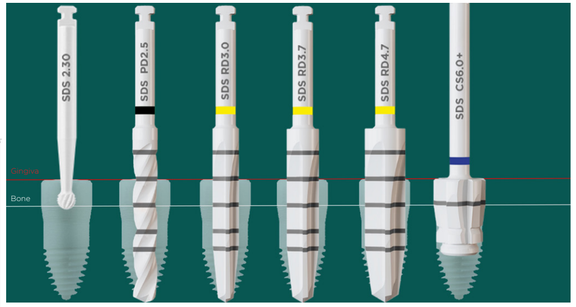
Recommended rpm

SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS 6.00	300–600/min
SDS 3.0	300–600/min
SDS 3.8	300–600/min
SDS 4.6	300–600/min
SDS CS6.0+	300–600/min

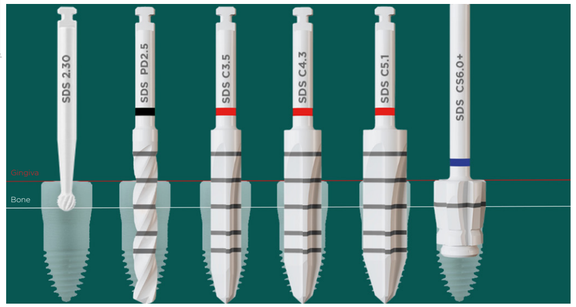
SDS2.2_5.4 Type II and I bone



SDS2.2 Ø 5.4 mm – Type II bone



SDS2.2 Ø 5.4 mm – Type I bone



Recommended rpm

SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS RD3.0	300–600/min
SDS RD3.7	300–600/min
SDS RD4.7	300–600/min
SDS CS6.0+	300–600/min
SDS C3.5	300–600/min
SDS C4.3	300–600/min
SDS C5.1	300–600/min

SDS2.2-si Surgical protocol for external sinus lift with SDS implants

PREREQUISITES

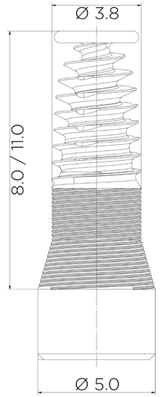
- Good command of common sinus lift techniques (internal/external sinus lift) and knowledge of possible complications
- Experience with PRF matrices/brushing technique/piezo surgery/apical mattress sutures
- Experience with SDS implants
- Three-dimensional x-ray (DVT/CT)
- Inflammation-free sinus
- Intact Schneiderian membrane
- A minimum of 3 mm of residual bone in the area of the maxillary sinus floor for sufficient primary stability
- A maximum of 5 mm of residual bone in the area of the maxillary sinus floor

SURGICAL PROTOCOL

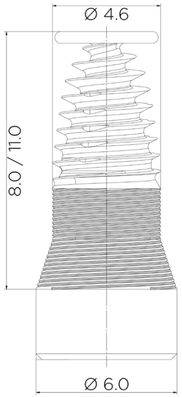
- Preparing the immune system
- Adjusting LDL and vitamin D3 levels
- High-dose vitamin C infusions, single shots (800 mg Augmentin® + 8 mg dexamethasone) i.v. over three days (-1, surgery, +1)
- Alveolar ridge incision with gingival margin incision to adjacent teeth to avoid vertical incision
- Application of brushing technique to avoid periosteal slitting
- Thinning of the vestibular bone in the window area with Safescraper® and simultaneous harvesting of cortical chips
- Detachment of the bone window with piezo surgery without perforation of Schneiderian membrane
- Lift Schneiderian membrane (far towards the medial, dorsal and palatinal aspect-> generate a void space that is as large as possible)
- No tension on the Schneiderian membrane to avoid expulsive forces on the sinus implant
- Implant osteotomy according to drilling protocol
- Reinforce membrane with one layer of A-PRF, insert sinus implant
- Place bony vestibular window cover over the disc to increase the "shadow effect"
- Fill void space with additional A-PRF™ matrices and the cortical bone chips harvested with the Safescraper®.
- Close window (exclusively with cortical bone chips), add one to two A-PRF™ matrices on top
- Saliva-proof and tension-free wound closure by means of the two-layer suture technique (apical mattress sutures and single button/continuous sutures in the wound area)
- Monophilic, atraumatic and absorbable suture material, preferably PGC25 (Atramat®)

SDS2.2_si Type IV to I bone

SDS2.2_3.8-si

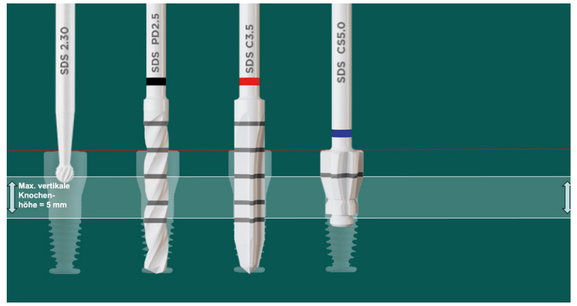


SDS2.2_4.6-si

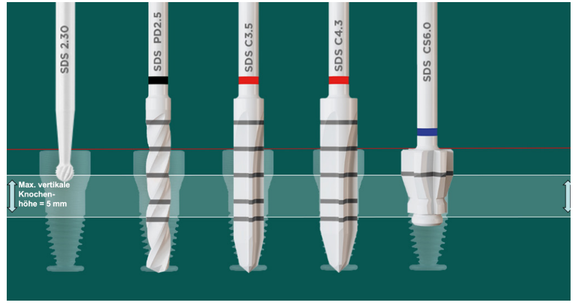


Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS CS5.0	300–600/min
SDS C4.3	300–600/min
SDS CS6.0	300–600/min

SDS2.2 3811-si Ø 3.8 mm – all bone types

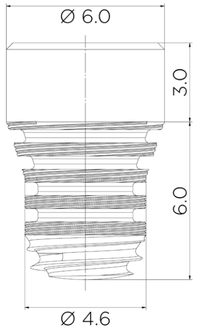


SDS2.2 4611-si Ø 4.6 mm – all bone types

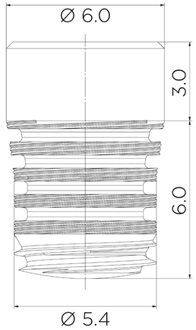


SDS2.2_sh Type IV to I bone

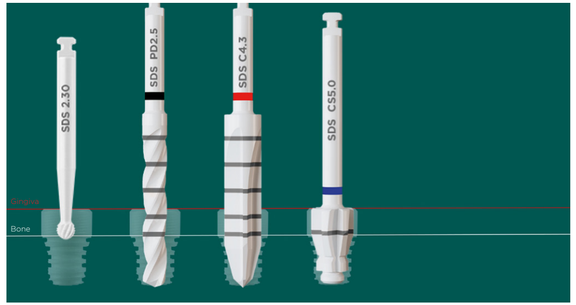
SDS2.2_4.6-sh



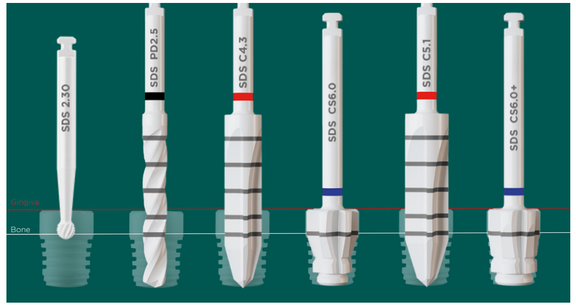
SDS2.2_5.4-sh



SDS2.2 4606-sh Ø 4.6 mm – all bone types



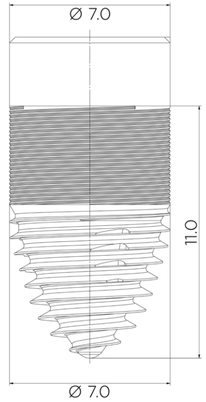
SDS2.2 5406-sh Ø 5.4 mm – all bone types



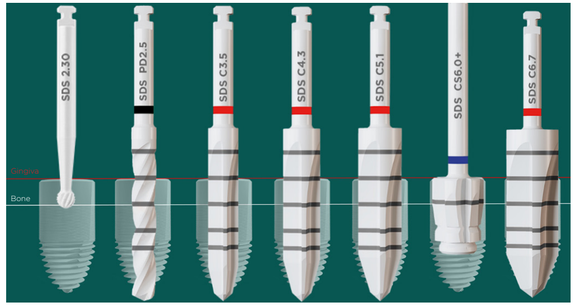
Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS C4.3	300–600/min
SDS C5.1	300–600/min
SDS CS5.0	300–600/min
SDS CS6.0	300–600/min
SDS CS6.0+	300–600/min

SDS2.2_7.0 Type II and I bone

SDS2.2_7.0



SDS2.2 Ø 7.0 mm – type II and I bone



Recommended rpm	
SDS 2.30	6000/min
SDS PD2.5	1000/min
SDS C3.5	300–600/min
SDS C4.3	300–600/min
SDS C5.1	300–600/min
SDS CS6.0+	300–600/min
SDS C6.7	300–600/min

SDS implant indications

SDS1.2

- Suited for all bone types, immediate and late implant placement
- Indicated for implants connected by bridge or splinting, or for implant-supported partial or full dentures
- SDS1.2_3.3 mm Ø implants are exclusively approved as single-tooth implants for upper lateral and lower incisors for fixed prosthetic restorations
- SDS1.2_3.8 mm Ø implants are exclusively approved for single-tooth implants for upper lateral and lower incisors as well as premolars and splinted implants

  SDS1.2_4.6/5.4 mm Ø implants are approved for single-tooth implants for front teeth, canines, premolars and molars and for bridge restorations
- Should be placed at tissue level; the shoulder is always the prosthetic plateau
- At least four implants with Locator™ restoration
- Splint multiple implants

SDS2.2

- Suited for all bone types, immediate and late implant placement
- Indicated for implants connected by bridge or splinting
- SDS2.2_4.6/5.4 mm Ø implants are approved as single-tooth implants for front teeth, canines, premolars and molars and for bridge restorations
- SDS2.2 implants must be placed at tissue level, the shoulder is always the prosthetic plateau; the abutment must be cemented (glass ionomer cement: Ketac™-Cem) + additionally screw-retained additionally.
- Fixed crown/bridge restoration (glass ionomer cement: Ketac™Cem)
- Splint multiple implants

CONTRAINDICATIONS

SDS1.2

- SDS1.2 implants are not suited for indications where there is a risk of excessive bending moments (bridges with more than one pontic, crown/bridge with cantilever)
- SDS1.2 implants are not approved for bone-level positioning
- SDS1.2_3.3 mm Ø implants are not approved for upper central incisors, canines, premolars and molars
- SDS1.2_3.3 mm Ø and 3.8 mm Ø implants are not approved for bridge restorations
- SDS1.2_3.8 mm Ø implants are not approved for upper central incisors, canines and molars
- Implant diameter smaller than 4.6 mm Ø for central upper incisors, canines, molars and/or bridge restorations
- Connection of natural tooth with implant not approved
- Less than four implants with Locator™ restoration not approved

SDS2.2

- SDS2.2 implants are not suited for indications where there is a risk of excessive bending moments (bridges with more than one pontic, crown/bridge with cantilever).
- SDS2.2 implants are not approved for bone-level positioning
- SDS2.2_3.8 mm Ø implants are not approved as single implants in the molar or canine region
- SDS2.2_3.8 mm Ø implant not approved for bridge restoration
- Implant diameter smaller than 4.6 mm Ø for central upper incisors, canines, molars and/or bridge restorations
- Not approved for implant-supported partial or full dentures
- Connection of natural tooth with implant not approved

SDS2.2	4.6 5.4	4.6 5.4	3.8 (4.6) (5.4)	3.8 (4.6) (5.4)	4.6* 5.4*	3.8* (4.6)* (5.4)*	4.6* (5.4)*	4.6* (5.4)*	3.8* (4.6)* (5.4)*	4.6* 5.4*	3.8 (4.6) (5.4)	3.8 (4.6) (5.4)	4.6 5.4	4.6 5.4	SDS2.2
SDS1.2	4.6 5.4	4.6 5.4	3.8 (4.6) (5.4)	3.8 (4.6) (5.4)	4.6 5.4	3.3 3.8 (4.6) (5.4)	4.6 5.4	4.6 5.4	3.3 3.8 (4.6) (5.4)	4.6 5.4	3.8 (4.6) (5.4)	3.8 (4.6) (5.4)	4.6 5.4	4.6 5.4	SDS1.2
region	17	16	15	14	13	12	11	21	22	23	24	25	26	27	region
region	47	46	45	44	43	42	41	31	32	33	34	35	36	37	region
SDS1.2	4.6 5.4	4.6 5.4	3.8 4.6 (5.4)	3.8 4.6 (5.4)	4.6 5.4	3.3 3.8 (4.6) (5.4)	3.3 3.8	3.3 3.8	3.3 3.8 (4.6) (5.4)	4.6 5.4	3.8 4.6 (5.4)	3.8 4.6 (5.4)	4.6 5.4	4.6 5.4	SDS1.2
SDS2.2	4.6 5.4	4.6 5.4	3.8 4.6 (5.4)	3.8 4.6 (5.4)	4.6* (5.4)*	3.8* (4.6)* (5.4)*	3.8* (4.6)* (5.4)*	3.8* (4.6)* (5.4)*	3.8* (4.6)* (5.4)*	4.6* (5.4)*	3.8 4.6 (5.4)	3.8 4.6 (5.4)	4.6 5.4	4.6 5.4	SDS2.2

* Not suitable for the esthetic zone, as SDS2.2 implants can only be ground/individualized to a limited extent
(in brackets) = approved, but mostly second choice or diameter too large | red = recommended diameter

SDS implant indications – special shapes

BALCONY

SDS1.2 and SDS2.2

- Immediate implant placement in premolar region with asymmetric implant position, balcony improves emergence profile

SDS2.2-ba	4.6 5.4	4.6 5.4	3.8 (4.6)	3.8 (4.6)							3.8 (4.6)	3.8 (4.6)	4.6 5.4	4.6 5.4	SDS2.2-ba
SDS1.2-ba	4.6 5.4	4.6 5.4	3.8 (4.6)	3.8 (4.6)							3.8 (4.6)	3.8 (4.6)	4.6 5.4	4.6 5.4	SDS1.2-ba
region	17	16	15	14	13	12	11	21	22	23	24	25	26	27	region
region	47	46	45	44	43	42	41	31	32	33	34	35	36	37	region
SDS1.2-ba	4.6 5.4	4.6 5.4	3.8 (4.6)	3.8 (4.6)							3.8 (4.6)	3.8 (4.6)	4.6 5.4	4.6 5.4	SDS1.2-ba
SDS2.2-ba	4.6 5.4	4.6 5.4	3.8 (4.6)	3.8 (4.6)							3.8 (4.6)	3.8 (4.6)	4.6 5.4	4.6 5.4	SDS2.2-ba

* Not suitable for the esthetic zone, as SDS2.2 implants can only be ground/individualized to a limited extent
(in brackets) = approved, but mostly second choice or diameter too large | red = recommended diameter

SINUS

SDS2.2_3.8-si

- External sinus exclusively in the premolar region, a minimum of 3 mm to a maximum of 5 mm of residual bone

SDS2.2_4.6-si

- External sinus in the molar region, a minimum of 3 mm to a maximum of 5 mm of residual bone

OVAL

SDS1.2 and SDS2.2 with a diameter of 4.6

- SDS1.2_4.6-ov_6x8: UJ/LJ molars, central position, mostly late implant placement
- SDS1.2_4.6-ov: Premolar region, mostly immediate implant placement

SDS1.2 and SDS2.2 with a diameter of 5.4

- UJ/LJ molars, central position, mostly late implant placement

SDS2.2-ov	4.6 5.4	4.6 5.4	4.6	4.6							4.6	4.6	4.6 5.4	4.6 5.4	SDS2.2-ov
SDS1.2-ov	4.6 5.4	4.6 5.4	4.6	4.6							4.6	4.6	4.6 5.4	4.6 5.4	SDS1.2-ov
region	17	16	15	14	13	12	11	21	22	23	24	25	26	27	region
region	47	46	45	44	43	42	41	31	32	33	34	35	36	37	region
SDS1.2-ov	4.6 5.4	4.6 5.4	4.6	4.6							4.6	4.6	4.6 5.4	4.6 5.4	SDS1.2-ov
SDS2.2-ov	4.6 5.4	4.6 5.4	4.6	4.6							4.6	4.6	4.6 5.4	4.6 5.4	SDS2.2-ov

* Not suitable for the esthetic zone, as SDS2.2 implants can only be ground/individualized to a limited extent
(in brackets) = approved, but mostly second choice or diameter too large | red = recommended diameter

SHORT

SDS2.2_4.6-sh

- At least 6 mm of residual bone, pay attention to distance from antagonists/crown height, late implant placement in the premolar region, no immediate restoration

SDS2.2_5.4-sh

- At least 6 mm of residual bone, pay attention to distance from antagonists/crown height, late implant placement in the molar region, no immediate restoration