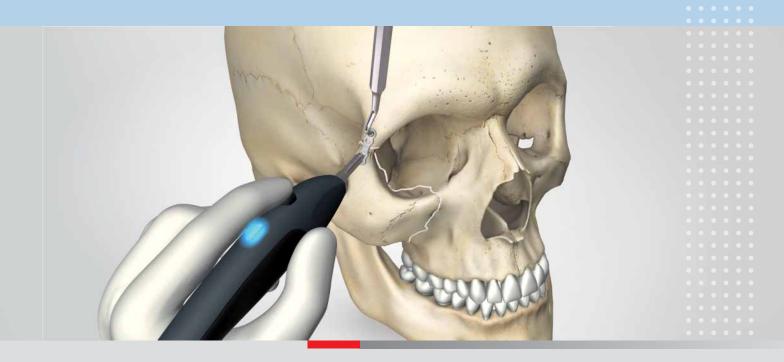
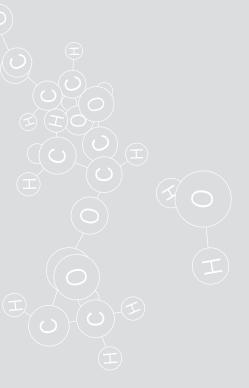
Craniomaxillofacial Surgery



SonicWeld Rx®

Surgical Techniques and Product Range





It's the head that counts – and the face. There is nothing with which we identify ourselves more than with the face. We are how we see ourselves. And more still: four of our five senses – sight, hearing, smell, and taste – are located in the head and the face.

Congenital facial deformities put individuals at a severe disadvantage not only in terms of outward appearance, but functionally too because severe loss of function is a frequent side-effect of such conditions. Of course, acquired defects can have similar consequences as well. Given the anatomical complexities of the cranial and facial structures, reconstruction and correction require a sort of specialization that fits into the broader context. But that's not all - because successful treatment wouldn't be possible without the availability of high-precision and reliable products.

KLS Martin is one of the globally leading suppliers in the field of craniomaxillofacial surgery. Our product portfolio offers you everything you need for advanced osteosynthesis and distraction. This implies that you get more than just standard products. We are always ready to develop patient-specific solutions wherever the need arises.

Table of Contents

Pages 4-17
6-9 10-17
18-19
20 - 47
20-21 22-23 24-27 28-45 46-47

Step by Step to Optimal Fixation

Indications

The KLS Martin Resorb x^{\otimes} and Resorb xG implants are intended for surgical procedures in which an internal fixation by resorbable implants is required for aligning, reconstructing and stabilizing bone tissue.











Surgical Techniques

System Configuration

Configure your operatory

Pages 6-9



Midface Fracture

Zygomatic complex fracture

Pages 10-17







System configuration

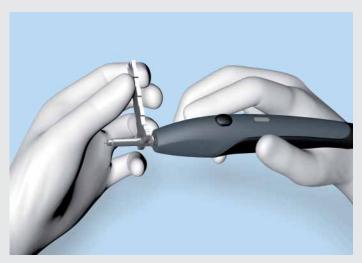
To manage different operative sites and approaches and to facilitate the operation for both right- and left-handed surgeons, it is advantageous to place the SonicWeld Rx® system on a flexible side table.

The SonicWeld Rx® ultrasonic unit must be set up and operated in the non-sterile area of the operating environment.

Sonotrodes, handpieces with connecting cables and the wrench are located in the sterile area of the operating environment, which is why they must be used in sterile condition.

Connect the handpiece to the connecting socket by plugging the connecting cable into the socket following the guide groove.

The connecting cable of the handpiece is approx. 2.95 m long. If this is not long enough, you can order an additional handpiece with long connection cable, which is approx. 6 m long.





Screw the sonotrode manually in place on the handpiece and use the open-end wrench to check it for secure attachment (torque: max. 0.3 Nm).

Plug the mains cable into the ultrasonic unit and then into a mains socket-outlet with ground contact.

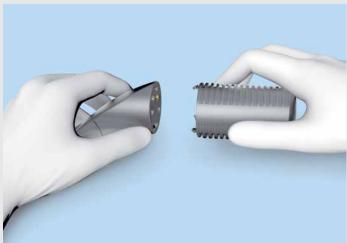
As soon as the unit has been connected to the power supply, it is automatically set to standby mode. Therefore, full switch-off is only possible by pulling the plug of the mains cable out of the socket-outlet.

Upon turning on the unit with the on-standby switch, the handpiece is ready for a self-test. This will be indicated by a display icon at the unit and by the blinking blue LED on the handpiece.

The self-test is performed as soon as the handpiece is operated for the first time. Be sure to keep the tip of the sonotrode out of contact with objects during this process. If the test is successful, the unit is automatically set to working mode.







Using two handpieces, the self-test needs to be triggered with each handpiece.

The two handpieces can only be used alternatingly.

By pressing the activation switch of the other handpiece, an acoustic click can be perceived and the "A" appears in the display side of that handpiece.

Prepare the BOS Drill by plugging in the sterile battery pack into the sterilized handle of the BOS Drill.

Then, insert the appropriate twist drill into the BOS Drill.







The Xcelsior water bath must be set up and operated in the sterile area of the operating environment.

After plugging the mains cable into the device and then into a mains socket-outlet with ground contact, the water bath can be turned on with the on-off switch.

Then, cover the thermal unit 1 with the sterile cover hood 2.

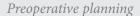
Place the sterile water container with the frame 3 into the sterile cover hood.

The water container can then be filled up with sterile fluid (e. g. aqua destilata, physiologic saline) until the water level reaches the marking (approx. 500 ml).

The water bath is ready for action, when the orange thermo control display "OK" lights up. Depending on the amount of liquid in the water container, heating time of the device is normally approx. 20 minutes.



Source: Prof. Dr. Dr. Rolf Ewers, Astrid Reichwein



The x-ray shows a right-sided zygomatic complex fracture. The following three fractures are identified:

- fracture of the zygomatic arch
- fractures of the inferior orbital rim and anterior and posterior maxillary sinus walls
- 3 fracture of the lateral orbital rim

After fracture reduction, a "three point fixation" will be performed with Resorb x° plates and SonicPins Rx using the SonicWeld Rx $^{\circ}$ system.



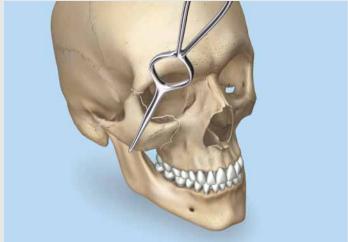


Patient positioning

The patient is placed on his back on the OR table. Normally, a nasotracheal intubation is aimed.

For the installation of the SonicWeld Rx® system and its accessories, please see page 7 - 10.



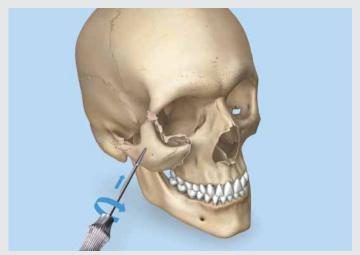


1. Approach / Zygoma reduction

First, the zygoma needs to be mobilized into its proper position. There are various options to perform the reduction.

Option 1

With a retractor via a transoral approach placed through the maxillary vestibular incision.





Option 2

A threaded reduction tool can be used for zygoma reduction inserted percutaneously into the zygoma.

The surgeon can use the Byrd zygoma reduction screw with a conventional screwdriver handle.

2. Bending the lateral orbital wall plate

A 4-hole plate with bar is typically used for this fracture. The template of the plate is placed across the frontozygomatic fracture area and bent to fit the bone surface. Then, the template is removed from the patient. The appropriate resorbable plate is put on the template and both parts are hold in the preheated water of the Xcelsior water bath.

After only a few seconds the resorbable plate is formable and automatically adapts to the shape of the template.







The material cools down quite fast and the implant keeps its shape.

The plate is then placed across the frontozygomatic fracture area. It fits to the bone surface perfectly.



4. Fixation of lateral orbital wall plate

Predrilling

Next, predrill the pilot hole through the positioned plate using a SonicWeld Rx® twist drill. The special twist drills are characterized by a triple ring identification marking.

- Twist drills for Ø 1.6 mm SonicPins Rx are marked with 3 green rings
- Twist drills for Ø 2.1 mm SonicPins Rx are marked with 3 red rings



Plate-holding forceps, curved



BOS Drill



Twist drill with BOS attachment for 1.6-mm SonicPins Rx





The first SonicPin is placed in the unstable zygomatic fracture.

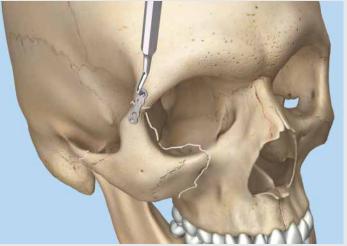
Secure a SonicPin Rx on the tip of the standard sonotrode and seat it into the top of the pilot hole. Apply slight pressure and then activate the ultrasonic unit of the SonicWeld Rx® system by pressing the activation switch. During activation period there is a light and acoustic feedback.

Maintain slight pressure until the head is fully welded into the pilot hole. Then release the switch, but do not yet remove the sonotrode. Allow the SonicPin Rx to cool down for at least two seconds. Finally spin the sonotrode left and right.

Then lift it away.

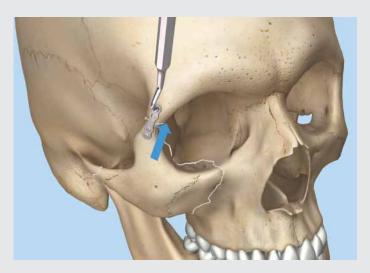


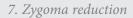




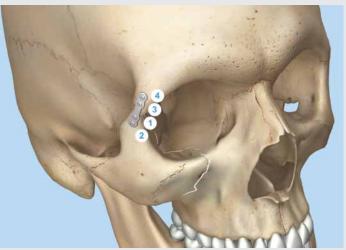
6. Insertion of second SonicPin Rx

The second SonicPin Rx is inserted in the same way also in the unstable zygomatic fracture part to maintain the plate in the correct position.





After reduction of the zygomatic fragment into cranial direction the plate holding instrument is assembled during inserting further pins.



8. Insertion of further SonicPins Rx

The third and fourth SonicPins Rx are inserted in the same way as before into the stable bone.

Option:

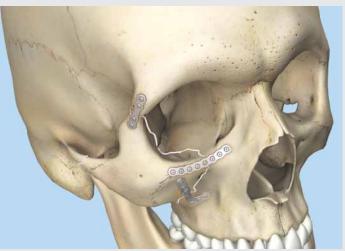
For smoothing the contours, the smoothing sonotrode may be used as follows: Bring the sonotrode in contact with the plate, press the activation switch until the material liquefies, release the activation switch and finally release the sonotrode.



9. Positioning and fixation of the infraorbital rim plate

For this fracture the curved 8-hole plate is the best choice. The first SonicPin is placed in the unstable zygomatic fracture.

After shaping the infraorbital rim plate in the Xcelsior waterbath and if applicable, cutting it with the scissors, it is positioned through a lower eyelid incision. Please make sure that the lateral orbital wall has been properly reduced prior to placing this plate.



10. Positioning and fixation of zygomatico-maxillary buttress plate

A L-shaped plate is the ideal solution for this fracture. It is important to three-dimensionally adapt this plate.

- The horizontal portion must be adapted to the most lateral portion of the lateral maxillary buttress, where the bone is still thick enough for insertion of the SonicPins Rx.
- The vertical portion is placed along the alveolar bone.
 The dental roots must not be harmed.

The L-shaped plate is positioned through a maxillary vestibular incision.





Finally after the plate is inserted successfully, the wound can be closed.



Postoperative treatment

The x-ray shows the patient postoperatively.

Remark:

Please note that Resorb x^{\otimes} plates and SonicPins Rx are not visible on the x-ray photograph.

References

Abdel-Galil, K. & Loukota, R., Fixation of comminuted diacapitular fractures of the mandibular condyle with ultrasoundactivated resorbable pins. Br J Oral Maxillofac Surg, 46(6), 2008,

Aldana, P. R., et al.,

S. 482-484

Ultrasound-aided fixation of a biodegradable cranial fixation system: uses in pediatric neurosurgery.

J Neurosurg Pediatr, 3(5), 2009, S. 420-424

Aldana, P. R., et al.,

Ultrasound-aided fixation of biodegradable implants in pediatric craniofacial surgery. Pediatr Neurosurg, 47(5), 2011, S. 349-353

Arnaud, E. & Renier, D.,

Pediatric craniofacial osteosynthesis and distraction using an ultrasonic-assisted pinned resorbable system: a prospective report with a minimum 30 months' follow-up.

J Craniofac Surg, 20(6), 2009, S. 2081-2086

Basa, S.,

S. 1468-1474

Does ultrasonic resorbable pin fixation offer predictable results for augmentation eminoplasty in recurrent dislocations?

J Oral Maxillofac Surg, 72(8), 2014,

Buijs, G. J., et al.,

Mechanical strength and stiffness of the biodegradable SonicWeld Rx® osteofixation system. J Oral Maxillofac Surg, 67(4), 2009. S. 782-787

Burger B. W.,

Use of ultrasound-activated resorbable poly-D, L-lactide pins (SonicPins) and foil panels (Resorb x®) for horizontal bone augmentation of the maxillary and mandibular alveolar ridges. J Oral Maxillofac Surg, 68(7), 2010, S. 1656-1661

Chen, Y. B. & Zhang, H. Z.,

Ultrasound-aided biodegradable osteosynthesis system: application in fixation of oral and maxillofacial fractures.

Zhonghua Yi Xue Za Zhi, 93(18), 2013, S. 1418-1421

Cho P. W. J., et al.,

Biomechanical study of SonicWeld Rx® pin in cortical bone graft layering technique. J Oral Maxillofac Surg, 69(5), 2011, S. 1519-1524

Cristofaro, M. G., et al.,

A new system of resorbable rigid three-dimensional fixation using ultrasounds (SonicWeld Rx®+ Sonic Pins Rx) adopted in craniofacial traumatology: the author's experience.

It J Maxillofac Surg, 20, 2009, S. 4-52

Eckelt U., et al.,

Ultrasound aided pin fixation of biodegradable osteosynthetic materials in cranioplasty for infants with craniosynostosis.

J Craniomaxillofac Surg, 35(4-5), 2007, S. 218-221

Heidemann W., et al.,

Degradation of poly(D,L)lactide implants with or without addition of calciumphosphates in vivo. Biomaterials, 22(17), 2001, S. 2371-2381

Heidemann W. & Gerlach K. L., Sonographic examinations on the degradation of bioresorbable osteosynthesis materials. Biomed Tech, 46(9), 2001, S. 236-240

Heidemann W, et al.,

In vivo investigation of the degradation of poly(D,L)lactide and poly(L-lactide-co-glycolide) osteosynthesis material.

Mund-, Kiefer- GesichtsChir, 7, 2003, S. 283-288

Iglhaut, G.,

The Minimally Invasive Shell Technique for Bone Augmentation.

Oralchirurgie Journal, 9(3), 2009

Iglhaut, G., et al.,

Shell technique using a rigid resorbable barrier system for localized alveolar ridge augmentation. Clin Oral Implants Res, 25(2), 2014, S. 149 - 154

Lee, J. H. & Park, J. H.,

The clinical usefulness of ultrasound-aided fixation using an absorbable plate system in patients with zygomatico-maxillary fracture.

Arch Plast Surg, 40(4), 2013, S. 330-334

Mai, R.,

Bone welding – a histological evaluation in the jaw. Ann Anat, 189(4), 2007, S. 350-355

Meara, D. J., et al.,

Fixation of Le Fort I osteotomies with poly-DL-lactic acid mesh and ultrasonic welding – a new technique.

J Oral Maxillofac Surg, 70(5), 2012, S. 1139-1144

Müller-Richter, U. D., et al., Treatment of intracapsular condylar fractures with resorbable pins. J Oral Maxillofac Surg, 69(12), 2011,

Pietrzak W.S.,

S. 3019-3025

Bioabsorbable polymer applications in musculoskeletal fixation and healing. In: Pietrzak W. S. (ed.), Orthopedic biology and medicine: Musculoskeletal tissue regeneration, biological materials and methods,

Totawa: Humana Press, 2008, S. 509-529

Pilling E., et al.,

An Experimental study of the biomechanical stability of ultrasound-activated Pinned (SonicWeld Rx $^{\circ}$ + Resorb x $^{\circ}$) and screwed fixed (Resorb x $^{\circ}$) resorbable materials for osteosynthesis in the treatment of simulated craniosynostosis in sheep.

Br J Oral Maxillofac Surg, 45(6), 2007, S. 451-456

Pilling, E., et al.,

An experimental in vivo analysis of the resorption to ultrasound activated pins (SonicWeld Rx®) and standard biodegradable screws (Resorb x®) in sheep.

Br J Oral Maxillofac Surg, 45(6), 2007,

Reichwein, A.,

S. 447-450

Clinical experiences with resorbable ultrasonicguided, angle-stable osteosynthesis in the panfacial region.

J Oral Maxillofacial Surg, 67(6), 2009, S. 1211-1217

Schneider, M., et al.,

Stability of fixation of diacapitular fractures of the mandibular condylar process by ultrasound-aided resorbable pins (SonicWeld Rx® System) in pigs.

Br J Oral Maxillofac Surg, 49(4), S. 297-301

Schneider, M., et al.,

Ultrasound-aided resorbable osteosynthesis of fractures of the mandibular condylar base: an experimental study in sheep.

Br J Oral Maxillofac Surg, 50(6), 2012,

Br J Oral Maxillofac Surg, 50(6), 2012, S. 528-532

Stelnicki, E. J., et al.,

Use of absorbable poly (D,L) lactic acid plates in cranial-vault remodeling: presentation of the first case and lessons learned about its use. Cleft Palate Craniofac J, 42(4), 2005, S. 333-339

Völker, W., et al.,

The use of resorbable osteosynthesis materials. Laryngorhinootologie. 90(1), 2011, S. 23-25

Wood, R. J., et al.,

New resorbable plate and screw system in pediatric craniofacial surgery.

J Craniofac Surg, 23(3), 2012, S. 845-849

SonicWeld Rx®

SonicWeld Rx® System

52-500-20-04	SonicWeld Rx® basic set, consisting of:
52-500-21-04	Ultrasonic unit SonicWeld Rx®
52-500-23-04	Handpiece with finger activation
52-501-21-04	Standard sonotrode, straight
52-502-01-04	Wrench for sonotrodes



52-500-21-04 Ultrasonic unit, alone Sonic Weld Rx®















52-502-01-04 Gabelschlüssel für Sonotroden





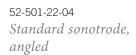


Accessories



52-500-24-04 Handpiece with finger activation 6 m cable











52-501-23-04 Smoothing sonotrode, straight







52-501-24-04 Smoothing sonotrode, angled





SonicWeld Rx®

Xcelsior Water Bath

Xcelsior water bath



52-400-10-04 Xcelsior water bath complete





52-400-13-04 Cover hood



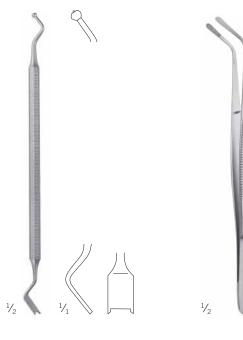


52-400-14-07 Water container with frame





Instruments









St 1 unit(s)



11-180-15-07 Scissors





SonicWeld Rx®





50-800-03-07 BOS Drill w/o battery pack

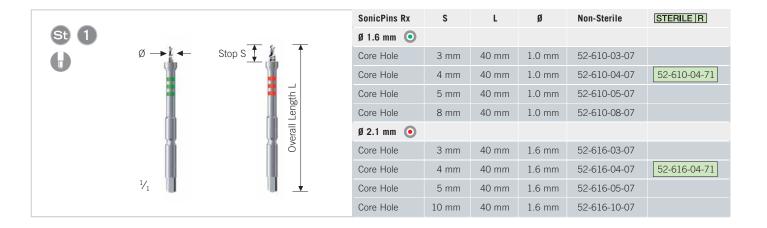




50-800-02-04
Battery pack,
sterile



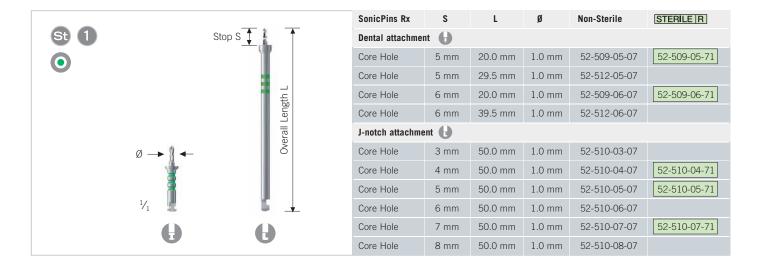




SonicWeld Rx®

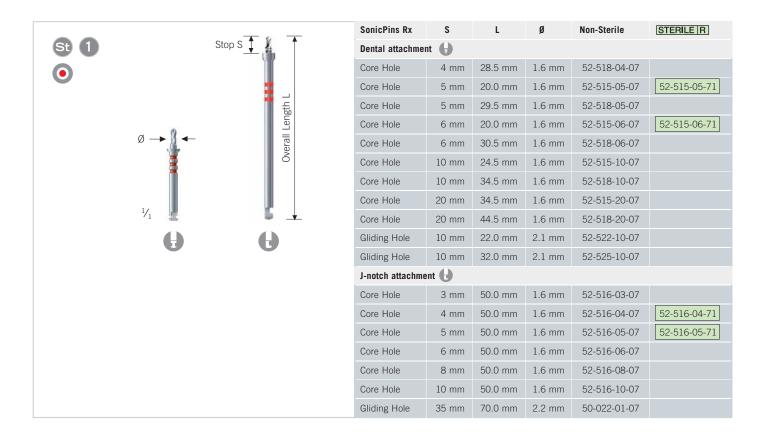
Twist Drills

Twist drills for 1.6-mm SonicPins Rx





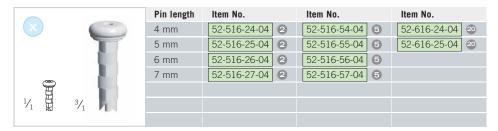
Twist drills for 2.1-mm SonicPins Rx



SonicWeld Rx® Implants

SonicPins Rx

1.6-mm SonicPins Rx



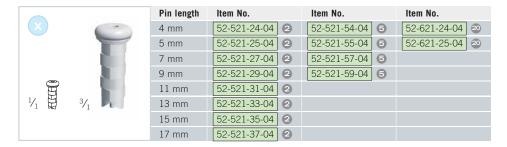


1.6-mm Micro SonicPins Rx

			Pin length	Item No.	Item No.
X			5 mm	52-519-25-04 2	52-519-45-04
8					
1/1	3/1	Pell			



2.1-mm SonicPins Rx





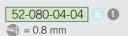
2.1-mm Endobrow SonicPins Rx

		Pin length	Item No.
X		4 mm	52-641-14-04
		5 mm	52-641-15-04
<u>@</u>			
1/1	3/1		

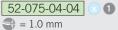
SonicWeld Rx® Implants

Resorb x[®] Plates









52-175-04-04 **(A) (1)** Template





52-077-04-04

⇒ = 1.0 mm

52-177-04-04 (a) (1) Template



3 = 1.0 mm



52-075-08-04 = 1.0 mm

52-176-04-04 **(a) (1)** Template

52-175-08-04 **(4) (1)** Template

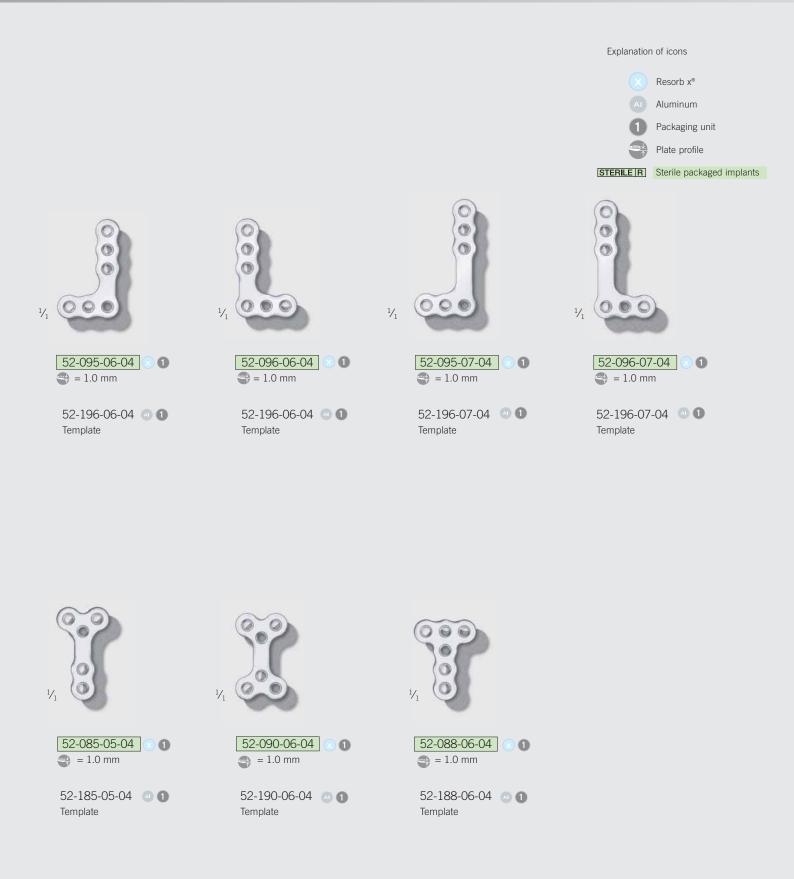






52-076-08-04 × = 1.0 mm

52-176-08-04 **1** Template



SonicWeld Rx® Implants

Resorb x[®] Meshes and Templates

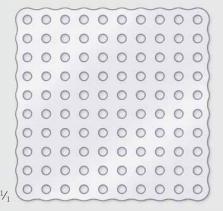


52-303-26-04

flexible, 29 x 29 mm

= 0.3 mm

= 0.6 mm



52-303-50-04

51 x 51 mm

⇒ = 0.3 mm

52-306-50-04

51 x 51 mm

= 0.6 mm

52-308-50-04

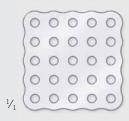
51 x 51 mm

= 0.8 mm

52-310-50-04

51 x 51 mm

= 1.0 mm



52-303-25-04

26 x 26 mm

⇒ = 0.3 mm

52-306-25-04

26 x 26 mm

⊕ = 0.6 mm

52-310-25-04

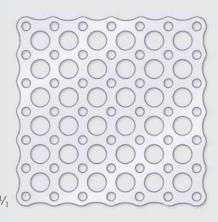
26 x 26 mm

== 1.0 mm



52-313-25-04 🕡 🕕

25 x 25 mm Template



52-303-51-04

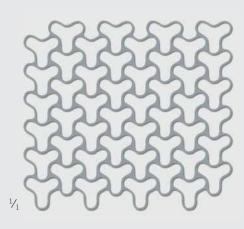
flexible, 51 x 51 mm

⇒ = 0.3 mm

52-306-51-04

flexible, 51 x 51 mm

= 0.6 mm



52-313-50-04 11 11

50 x 50 mm

Template

Explanation of icons

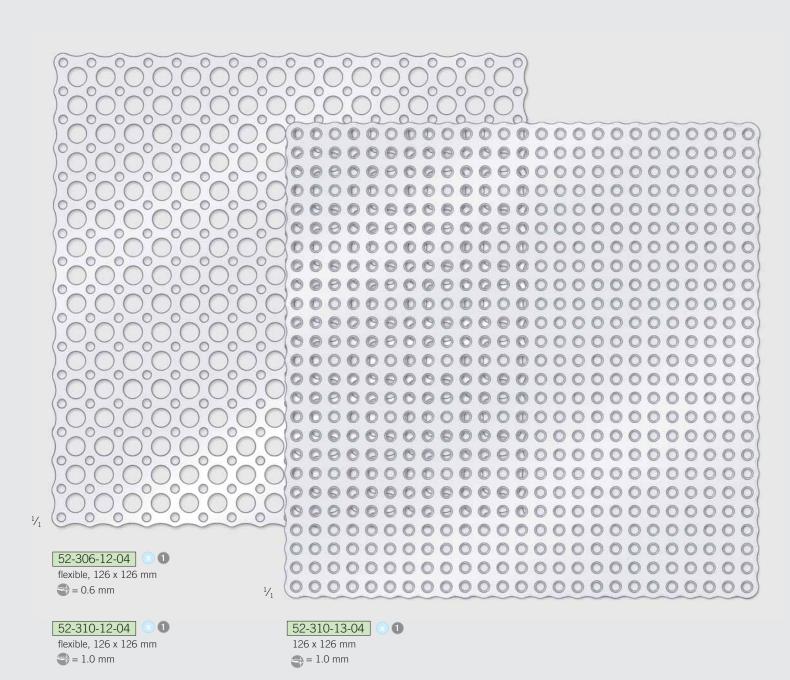
Resorb x®

Titanium

1 Packaging unit

Plate profile

STERILE | R Sterile packaged implants



SonicWeld Rx® Implants

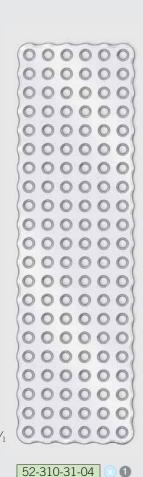
Resorb x® Meshes



= 0.6 mm

52-310-27-04 29 x 104 mm

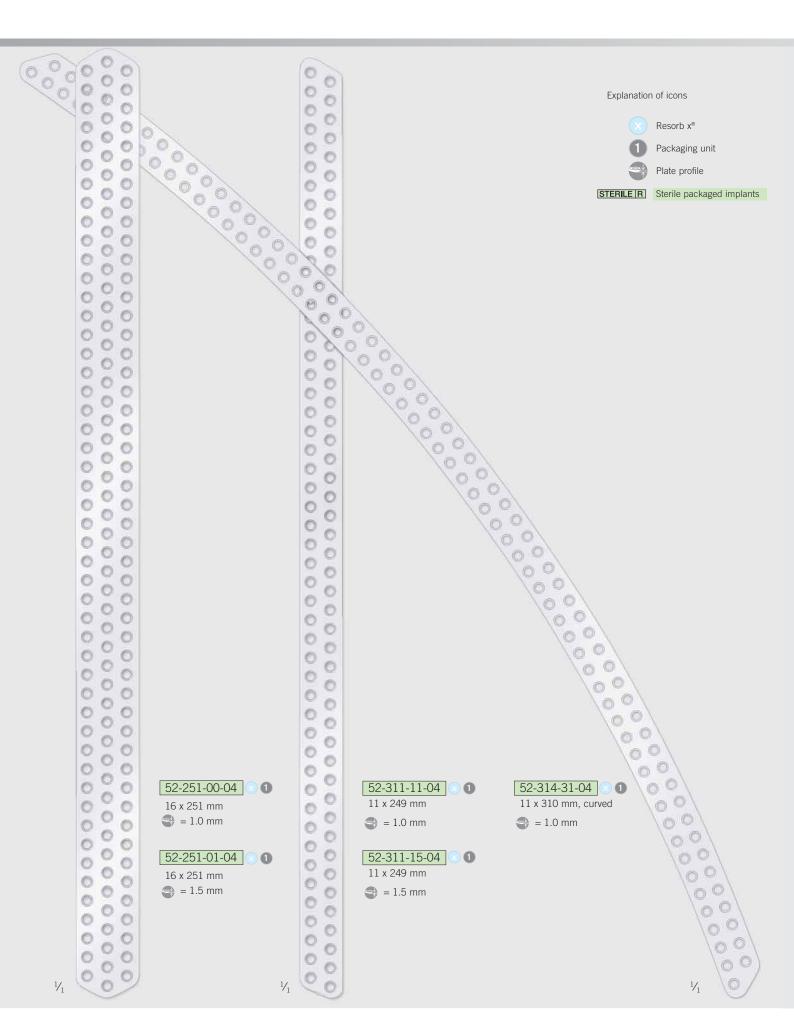
29 x 104 mm = 1.0 mm



31 x 106 mm

= 1.0 mm

52-308-11-04 × 1 11 x 126 mm = 0.8



SonicWeld Rx® Implants

Resorb x[®] Orbita Floor Meshes & Burr Hole Covers



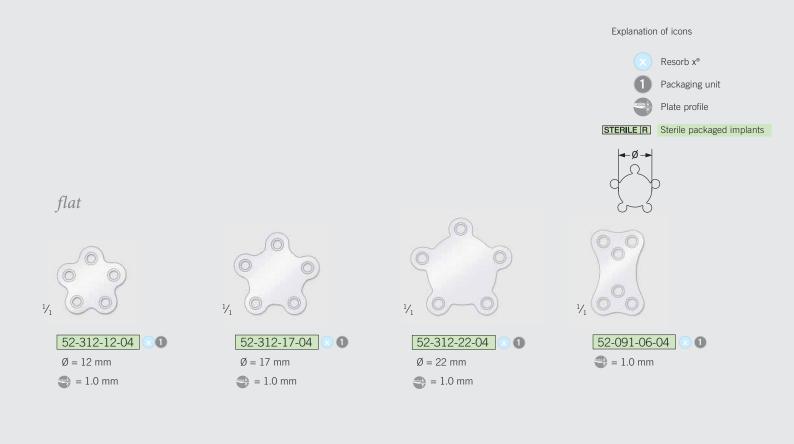












contoured



SonicWeld Rx® Implants

Resorb x® Membranes & Non-Perforated Meshes





SonicWeld RxG Implants

New resorbable polymer

Since Resorb x° was launched back in 2000, the intrinsically amorphous polymer consisting of PDLLA is well-known all over the world.

Now, we are pleased to be able to present another resorbable polymer that supplements the SonicWeld technology:

Resorb xG

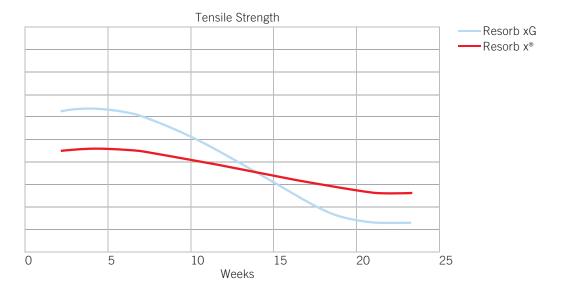
Its base material is PLLA-PGA. The two substances are mixed at a ratio of 85% PLLA (poly-L-lactic acid) and 15% PGA (poly glycolic acid). The initial tensile strength of Resorb xG is significantly higher than that of Resorb x $^{\circ}$. Furthermore, PGA is a substance that binds water easily to store it. Consequently, Resorb xG tends to degrade faster than Resorb x $^{\circ}$ (12 – 14 months).

Thanks to those facts, however, Resorb xG implants tend to be superior to Resorb x^{\otimes} implants in some clinical applications.

Resorb xG implants are also compatible with the SonicWeld Rx $^{\circ}$ technology without any handling differences compared to Resorb x $^{\circ}$ and can be fixed in place with the usual SonicPins Rx.



Resorbable materials maintain the majority of their strength for 8-10 weeks. After the loss of strength, the material will be processed by the body in the Krebs cycle into $\rm CO_2$ and water. Complete degradation of the implant will vary depending on the size and location of the implant, and the age of the patient.

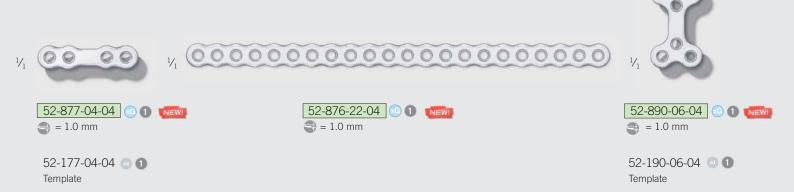


Example for mechanical properties

The chart above compares the tensile strength of Resorb x° and Resorb x° polymers. The measurements were done in vitro with standardized tensile bars at 37°C.

SonicWeld Rx@ Implants

Plates and Meshes



Explanation of icons



XG Resorb xG



Titanium



Aluminum



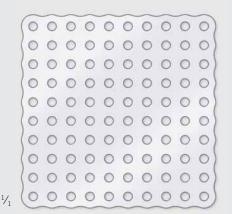
Packaging unit

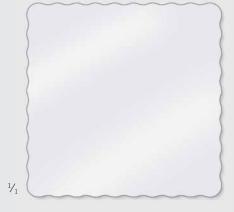


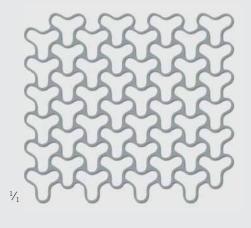
Plate profile

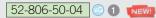


STERILE | R Sterile packaged implants





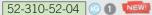












51 x 51 mm

⇒ = 1.0 mm



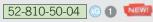




50 x 50 mm Template

51 x 51 mm

= 0.6 mm







51 x 51 mm

⇒ = 1.0 mm



Explanation of icons

Resorb xG

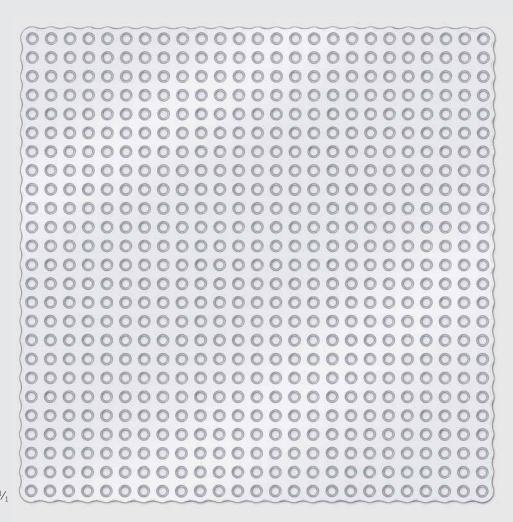


Packaging unit



Plate profile

STERILE | R Sterile packaged implants



52-806-13-04





126 x 126 mm

__ = 0.6 mm

52-810-13-04



1 NEW!

126 x 126 mm

== 1.0 mm

Component Trays



55-969-44-04 Component tray





55-969-46-04 Small parts module





55-962-45-04 Storage rack for clip magazines



Optional Components



55-962-44-04 Bottom part for twist drills





55-962-43-04 Upper part for sonotrodes and small parts





55-963-51-04 *Sliding cover*



Storage Trays and Containers



55-015-30-01 Tray for MiniSet container incl. lid 277 x 171 x 54 mm (L x W x H)





55-861-70-04

MicroStop® MiniSet container

Ext. dimensions 310 x 189 x 90 mm

(L x W x H)

Int. dimensions 283 x 177 x 65 mm

(L x W x H)





55-969-42-04 *Storage tray* 26 x 26 cm





55-440-10-04

MicroStop® container

Ext. Dimensions 272 x 267 x 122 mm
(L x W x H)

Int. Dimensions 267 x 262 x 81 mm
(L x W x H)



Storage Options

Option 1

55-969-44-04	Component tray (also compatible with Level One), consisting of:
55-962-44-04	Bottom part for twist drills
55-962-43-04	Upper part for sonotrodes and small parts
55-015-30-01	Tray for MiniSet container incl. lid



55-969-46-04	Small parts module
55-015-30-01	Tray for MiniSet container incl. lid



55-969-44-04	Component tray, consisting of:
55-962-44-04	Bottom part for twist drills
55-962-43-04	Upper part for sonotrodes and small parts
55-969-42-04	Storage and processing tray, complete, consisting of:
55-964-30-04	Storage tray 26 x 26 cm
55-969-93-04	Silicone mat
55-963-38-04	Lid for storage tray



55-969-46-04	Small parts module
55-969-42-04	Storage and processing tray, complete, consisting of:
55-964-30-04	Storage tray 26 x 26 cm
55-969-93-04	Silicone mat
55-963-38-04	Lid for storage tray

KLS Martin Group

KLS Martin France SARL 68200 Mulhouse · France Tel. +33 3 89 51 3150 france@klsmartin.com

Martin Italia S.r.I. 20864 Agrate Brianza (MB) · Italy Tel. +39 039 605 6731 italia@klsmartin.com

Martin Nederland/Marned B.V. 1271 AG Huizen · The Netherlands Tel. +31 35 523 45 38 nederland@klsmartin.com KLS Martin UK Ltd.
Reading RG1 3EU · United Kingdom
Tel. +44 1189 000 570
uk@klsmartin.com

Nippon Martin K.K. Osaka 541-0046 · Japan Tel. +81 6 62 28 90 75 nippon@klsmartin.com

KLS Martin L.P.
Jacksonville, Fl 32246 · USA
Tel. +1 904 641 77 46
usa@klsmartin.com

KLS Martin do Brasil Ltda. CEP 04.531-011 São Paulo · Brazil Tel.: +55 11 3554 2299 brazil@klsmartin.com

KLS Martin Australia Pty Limited Artarmon NSW 2064 · Australia Tel.: +61 2 9439 5316 australia@klsmartin.com

KLS Martin SE Asia Sdn. Bhd. 14100 Simpang Ampat, Penang · Malaysia Tel.: +604 505 7838 malaysia@klsmartin.com Gebrüder Martin GmbH & Co. KG Representative Office 121471 Moscow · Russia Tel. +7 499 792-76-19 russia@klsmartin.com

Gebrüder Martin GmbH & Co. KG Representative Office 201203 Shanghai · China Tel. +86 21 5820 6251 china@klsmartin.com

Gebrüder Martin GmbH & Co. KG Representative Office Dubai · United Arab Emirates Tel. +971 4 454 16 55 middleeast@klsmartin.com

Gebrüder Martin GmbH & Co. KG A company of the KLS Martin Group KLS Martin Platz $1 \cdot 78532$ Tuttlingen \cdot Germany Postfach $60 \cdot 78501$ Tuttlingen \cdot Germany Tel. +49 7461 706-0 \cdot Fax +49 7461 706-193 info@klsmartin.com \cdot www.klsmartin.com

