



Model Casting Technology

Trouble shooting

Dear Customer:

By choosing Dentaurem products, you have selected a harmonizing system of high quality products for the production of partial dentures that fit accurately and are aesthetically pleasing.

To achieve the desired accuracy and aesthetics, it is important to work with precision and closely follow the instructions provided.

Should you have difficulty in processing our material, we will be pleased to assist you in any way we can.

This brochure contains numerous practical tips for avoiding errors when using our products and also explains their possible causes.

Should you require more detailed assistance, our consultants are available at the following number +49 72 31/803-410 (Germany).

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Problem analysis in working procedure

| No. | Problem | Possible Cause | Remedy |
|-----|--|--|---|
| 1 | Investment material sets too quickly. | <p>Soiled mixing or measuring beaker (residues of set material).</p> <p>Temperature (of room, powder or liquid) too high.</p> <p>Inaccurate ratio of powder to liquid (consistency too thick).</p> <p>Mixing time too long.</p> | <p>Use only clean mixing or measuring beakers; rinse under running water after every use; do not use the same mixing beakers for plaster and investment.</p> <p>Ensure that mixing liquid and powder are at the correct temperature for processing (18 – 22 °C, 64.4 – 71.6 °F); if necessary, store mixing liquid in refrigerator (10 – 12 °C, 50 – 53.6 °F) – not in freezer.</p> <p>Observe mixing ratio; use scales and measuring cups.</p> <p>Shorten mixing time.</p> |
| 2 | Investment material sets too slowly. | <p>Temperature (of room, powder or liquid) too low.</p> <p>Inaccurate ratio of powder to fluid (consistency too thin).</p> <p>Mixing time too short or insufficient.</p> <p>Soiled mixing or measuring beaker (foreign material, detergent, soap).</p> <p>Investment material too old.</p> | <p>Increase room temperature; warm liquid up, do not store powder in cool place.</p> <p>Observe mixing ratio; use scales and measuring cups.</p> <p>Increase mixing time.</p> <p>Use only clean mixing or measuring beakers; rinse under running water after every use; do not use the same mixing beakers for plaster and investment.</p> <p>Note „use-by“ date; always use fresh material.</p> |

| No. | Problem | Possible Cause | Remedy |
|-----|---|--|--|
| 3 | Bubbles form in mixed investment material. | Insufficient vacuum; material not correctly mixed and evacuated. | Check vacuum and seals of mixing unit; change hose filter; observe mixing time. |
| 4 | Soft surface of duplicate model after removal from duplicating material. | <p>Premature removal from duplicating mould.</p> <p>Mixing ratio or mixing time not observed.</p> <p>Duplicating mould damp.</p> <p>Duplicating material too old or too watery.</p> <p>Investment too old.</p> <p>Insufficient mixing of investment material.</p> <p>Duplicating mould too cold.</p> <p>Setting time of investment too long.</p> | <p>Observe correct setting time.</p> <p>Observe mixing ratio and time given in instructions for investment.</p> <p>Check for dampness in duplicating mould before filling with investment; if necessary remove and blow dry.</p> <p>Use fresh duplicating material; Duplicast, Duplikat also available as concentrate!</p> <p>Note „use-by“ date; always use fresh material.</p> <p>Observe processing instruction for investment and duplicating materials.</p> <p>Keep duplicating mould at room temperature (18 – 22 °C, 64.4 – 71.6 °F).</p> <p>See no. 2.</p> |
| 5 | Silicone film on model (partial). | <p>Silicone has not set properly.</p> <p>Milling oil residue on master model; both silicone components not correctly mixed (faulty mixing device).</p> <p>Blocking out wax unsuitable.</p> | <p>Observe processing instructions for duplicating silicone.</p> <p>Steam off oil residues.</p> <p>Use Blocking out wax (Order No. 110-310-00).</p> |

| No. | Problem | Possible Cause | Remedy |
|-----|---|--|--|
| 6 | Surface of duplicating model soft when removed from silicone. | <p>Premature removal from duplicating mould (investment material not yet set).</p> <p>Spatulation (mixing) time too short.</p> <p>Soiled mixing or measuring beaker (foreign material, cleaning agent, plaster residue).</p> | <p>Observe correct setting time for investment material.</p> <p>Increase mixing time of investment (see instructions).</p> <p>Use only clean mixing or measuring beakers; rinse under running water after every use; do not use the same mixing containers for plaster and investment.</p> |
| 7 | Formation of crystals on duplicating model | <p>Time between removal from agar and drying is too long.</p> | <p>Put duplicating model into drying cabinet immediately after removal from agar.</p> |
| 8 | Investment material adhering to duplicating material (film formation). | <p>Mixing ratio too thin.</p> <p>Damp duplication mould; premature removal of model; duplicating mould too cold.</p> <p>Setting time of investment material too long.</p> | <p>Observe mixing ratio and setting time.</p> <p>Warm duplicating mould to room temperature (18 – 22 °C, 64.4 – 71.6 °F).</p> <p>See no. 2.</p> |
| 9 | Investment material adhering to silicone duplicating material. | <p>Mixing fluid or powder too cold.</p> <p>Premature removal of model.</p> <p>Silicone not completely set.</p> <p>Silicone tension reducing agent not blown dry.</p> | <p>Observe processing instructions for investment.</p> <p>Observe setting time for investment.</p> <p>Observe processing instructions for duplicating silicone.</p> <p>Use Lubrofilm® as instructed.</p> |
| 10 | Inaccurate edges on duplicating model (silicone duplicating). | <p>Inadequate degreasing of silicone mould.</p> | <p>Use Lubrofilm® as instructed.</p> |

| No. | Problem | Possible Cause | Remedy |
|-----|---|---|--|
| 11 | Bubbles on duplicating model (gel and silicone duplicating). | Pouring of investment too fast. Inadequate vibration. Vacuum too poor while mixing. | Pour investment more slowly. Set vibrator higher. Improve vacuum, check seal. |
| 12 | Surface too soft after hardening (gel duplicating). | Drying temperature too high or time too long. Hardener too old. | Properly dried models are light in colour before hardening and absorb hardener well; observe post dipping drying period. Use new immersion or cold model hardener (Remadur, Order No. 167-301-00). |
| 13 | Burnt model following hardening (gel duplicating). | Drying temperature too high. | Set temperature of drying cabinet lower; see processing instructions for investment. |
| 14 | Hardener is not absorbed (gel and silicone duplication). | Very dense surface due to silicone duplication. Hardener thickened. Temperature of drying cabinet too low; immersion time too long. | Hardening not required; see processing instructions for investment. Use new hardener. Increase temperature of drying cabinet; drying of models after dipping; shorten immersion time (5 - 10 s). |
| 15 | Dust-like disintegration of duplicate model surface following hardening. | Investment too long in duplicating material. Model burnt or dried too long after immersion. | Observe processing instructions for investment. Check temperature of drying cabinet; reduce post dipping drying time. |
| 16 | Cracking of ring during preheating. | Preheating times and temperatures not observed. | Observe processing instructions for investment. |

| No. | Problem | Possible Cause | Remedy |
|-----|---|---|--|
| 16 | Cracking of ring during pre-heating. | <p>Defective temperature controls of oven.</p> <p>Wrong mixing liquid (expansion too high).</p> <p>Different liquids for model and ring.</p> <p>Mixing liquid spoilt (storage too warm or cold).</p> <p>Soiled mixing or measuring beaker (foreign material, cleaning agent, plaster residue).</p> <p>Ring with funnel upwards in oven.</p> <p>Temperature in oven too high when loading rings (> 100 °C / 212 °F).</p> <p>Machine oil used as ring isolation.</p> | <p>Check oven settings, thermocouples, control system.</p> <p>Use only the correct mixing liquid for the investment.</p> <p>Always use the same mixing liquid for model and ring.</p> <p>Use only good mixing liquid.</p> <p>Use only clean mixing or measuring containers; rinse under running water after every use; do not use the same mixing beakers for plaster and investment.</p> <p>Place ring in oven with funnel downwards.</p> <p>Allow oven to cool to room temperature.</p> <p>Use vaseline or silicone spray.</p> |
| 17 | Casting did not flow correctly. | <p>Final temperature of pre-heating furnace too low.</p> <p>Ring has cooled down through excessive melting time in casting unit.</p> <p>Ring partially cooled.</p> <p>Ring located too close to oven door.</p> | <p>Check final temperature of preheating furnace.</p> <p>If necessary pre-melt metal, warm crucible up beforehand, check performance of melting equipment.</p> <p>Observe model and coat thickness; use rema®-Form ring formers.</p> <p>Do not overfill oven; if necessary move front rings to the back.</p> |

| No. | Problem | Possible Cause | Remedy |
|-----|--|--|--|
| 17 | Casting did not flow correctly. | <p>Wax up too thin.</p> <p>When torch melting used, wrong gas setting or wrong part of flame used for melting.</p> <p>Incorrect arrangement or size of casting sprues.</p> <p>Metal quantity too low.</p> <p>Casting pressure too low.</p> <p>Casting temperature too low.</p> | <p>Increase thickness of wax up (e.g. 0.35 mm for base surfaces).</p> <p>Use burner with „shower head“: correct flow of gas.</p> <p>Avoid sharp bends in sprues; design as short as possible; select thicker sprues; mount in the flow direction of the metal; wax sprues well; additional sprues for supplying braces etc.; see description „sprue arrangement“.</p> <p>Determine required amount of metal beforehand.</p> <p>Check or reset pressure / torque of casting machine.</p> <p>Increase casting temperature.</p> |
| 18 | Casting flash or closed retentions. | <p>Not perfectly clean; adhesive applied too thick.</p> <p>Excessive hardener on model.</p> <p>Ring setting time too short before placing in oven.</p> <p>Preheat ramp and temperatures not observed.</p> <p>Wrong application of fine investment.</p> <p>Different mixing liquids for model and coat.</p> | <p>Wax edges cleanly; with plastic retentions do not apply excessive adhesive.</p> <p>Neutralize unabsorbed hardener by drying.</p> <p>Observe setting time.</p> <p>See processing instructions for investment.</p> <p>See processing instructions for fine investment.</p> <p>Use one single type of liquid.</p> |

| No. | Problem | Possible Cause | Remedy |
|-----|--|---|--|
| 18 | Casting flash or closed retentions. | Separation of model from ring through mechanical shock (impact) shortly before casting. | Remove ring carefully from oven and place it in centrifuge without impact. |
| 19 | Very strong adhesion of investment to casting when divesting. | Melt is too hot. Rings heated too long or too high. | Observe casting temperature. Observe maximum preheat temperature and holding time; see processing instructions. |
| 20 | Rough structure on tissue side of casting. | Melt is too hot. Drying time for duplicate models not observed. Investment breaking away during duplicating process caused by damp duplicating mould. Use of unsuitable model hardeners. Duplicating model dried too long after immersion. Preheat temperature of ring too high. | Do not allow melt to boil; release centrifuge in time; see processing instructions. See processing instructions for investment; see no. 15, dust-like disintegration. Observe hardening time and mixing ratio. Use Dentaurem immersion or cold hardener (cold hardener Remadur, Order No. 167-301-00). See processing instructions for investment. Observe maximum preheat temperature. |
| 21 | Bubbles on framework or plate surfaces. | Inadequate waxing during modelling; inadequate adaptation of waxes and wax patterns to duplicating model. Wax surface tension reducing agent not used or used incorrectly. | Apply hot wax between teeth on model; warm model up and adapt wax patterns etc. well. Use Lubrofilm® as instructed. |

| No. | Problem | Possible Cause | Remedy |
|-----|---|--|--|
| 21 | Bubbles on framework or plate surfaces. | Poor venting of material because mixing consistency too thick (bubbles cannot escape, setting time too short). | Observe processing instructions for investment; use fine investment; coating fabrication without vacuum; without fine investment mix coating with vacuum (use air-vents); with models duplicated with silicone, spray model and wax lightly with distilled water before investing. |
| 22 | Bubbles on tissue side of the framework. | Investment too thick during model fabrication; processing time too short; bubbles cannot escape. Vacuum unit not performing correctly. | Observe mixing ratio. Check vacuum unit. |
| 23 | Porosity in casting. | Gas absorption through use of already cast material. Pouring temperature too high (metal overheated). Old crucible used. Same crucible used to cast different alloys. Incorrect gas setting for torch casting. | Use new metal only (remanium® GM 380+, GM 800+ and GM 900). Observe recommended casting temperature. Use only new crucibles. Melt only one alloy in each crucible. Readjust flame setting. |
| 24 | Shrinkage in casting. | Incorrect wax-up or attachment of casting sprues. | Avoid accumulations of material; allows metal to flow from thick to thin areas; also see description „casting sprue arrangement“. |

| No. | Problem | Possible Cause | Remedy |
|-----|---|--|--|
| 24 | Shrinkage in casting. | Casting sprues too thin. Spin time too short. | Select larger sprue diameters; see processing instructions and description „casting sprue arrangement“. With motor spinner, spin for at least 10 s and then allow to run down. |
| 25 | Investment material inclusions in casting. | Not perfectly clean funnel. Sharp edges which break off and are entrapped during casting. Ring preheated in oven with opening upwards. Fine investment chipped off. Fine investment applied too thickly. Too rapid preheating (°C/min). | Keep funnel clean. Rounded transition of wax sprues towards funnel. Always place ring in oven with opening downwards. RK 3 too strongly thinned with distilled water; observe instructions. Apply fine investment more thinly. See processing instructions for investment material. |
| 26 | Casting too small. | Mixing ratio not observed. Duplicating material not suitable for investment. Old duplicating material (greasy consistency). | See processing instructions for investment. Use Dentaurem duplicating material (Dubliform, Duplikat, also available in concentrated form). Use fresh duplicating material (Dubliform, Duplikat, also available in concentrated form). |

| No. | Problem | Possible Cause | Remedy |
|-----|---|--|--|
| 26 | Casting too small. | <p>Mixing fluid crystallized (separation of fluid components).</p> <p>Model fabricated with water instead of mixing fluid.</p> <p>Investment heated too quickly.</p> <p>Shore hardness of duplicating silicone very high.</p> | <p>Use fresh mixing fluid; do not store in freezer.</p> <p>Use mixing fluid for model and coat.</p> <p>See processing instructions for investment.</p> <p>Use soft duplicating silicone (Shore hardness 8-12).</p> |
| 27 | Casting too large. | <p>Mixing consistency too thick.</p> <p>Concentration of mixing liquid too high.</p> | <p>Observe ratio of powder to liquid; see processing instructions for investment.</p> <p>Dilute mixing liquid with distilled water.</p> |
| 28 | Different fitting accuracy in one casting. | <p>Deformation of duplicating material during removal of master model or on inserting funnel.</p> <p>Duplicating material old (use only 10 times at most).</p> <p>When using duplicating silicone, incorrect flask system used.</p> <p>Duplicating silicone has separated from flask.</p> <p>Struck button with hammer during removal of investment.</p> | <p>Block out master model with Gumex; use model extraction tongs; use Dentaurem duplicating system with holding device for sprue former.</p> <p>Use fresh duplicating material.</p> <p>With rema® Sil, use Siliform or Neo-Star systems.</p> <p>Remove model carefully from flask; avoid warping of silicone.</p> <p>Avoid impacts to casting.</p> |

Some practical tips

One-piece casting technology

Using single-piece casting technology, there are several methods of making accurately fitting combination dentures with double crowns or parallel milled surfaces (e.g. channel-shoulder-tip attachments).

1. Double pouring process

The investment mixed with a special concentrate is poured into the arc of the silicone duplicating mould. The remaining model is then filled with the standard investment material in standard mixing ratio. In this way, the correct expansion of the investment is achieved, both for the attachments and the model base. For more detailed information, refer to the processing instructions for *rema*[®] dynamic.

2. Cast on technique

The milled primary crowns of remanium[®] star or 2000+ are left in the duplicating mould and the duplicating model is fabricated with the primary components. The secondary structure is waxed up above this and both invested at the same time.

Following casting, the primary and secondary parts can be separated. In this way, an accurate fit is achieved for the combination denture.

3. Duplicating free one piece technique (lift off technique)

When structures are being made without large connectors, these can be made quickly and effectively without duplicating in a single piece casting process using the „lift-off“ technique.

Highly accurate castings through combination work with gel duplication

Soak the plaster models in water for 30 minutes at **45 °C / 113 °F**. After pouring, allow the duplicating material to set by bench cooling only.

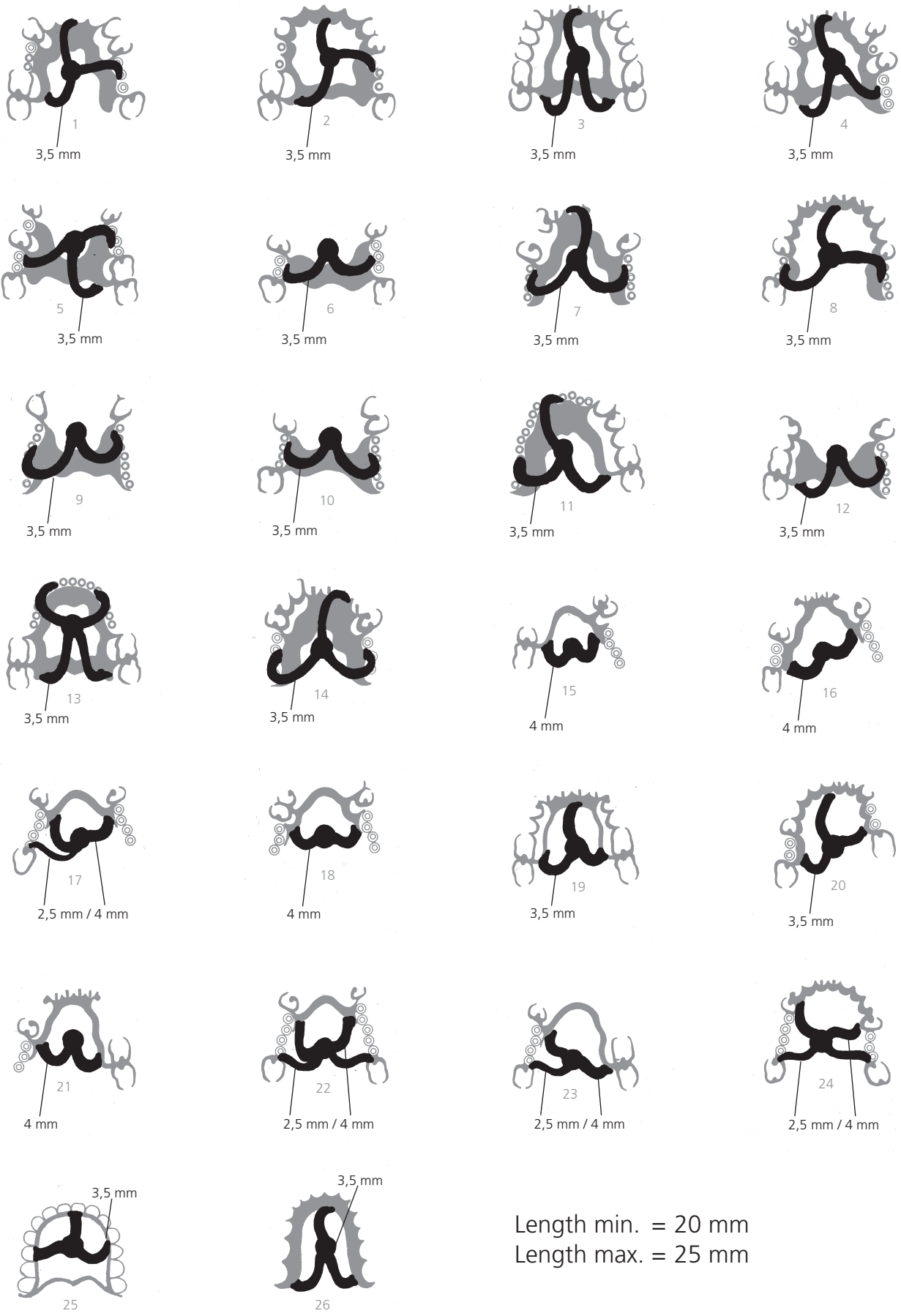
Precious-metal model casting

For model and ring fabrication, mix the investment with distilled water. Care is required as the mixing consistency is different. See instructions.

Setting time, model-drying time and model hardening as for CoCr model casting. Ring pre-heating temperature 1000 °C / 1832 °F. Once this temperature is reached, allow to cool to 700 °C / 1292 °F. Allow to stay at this temperature for 30 minutes before casting.

| | |
|--------------------------|--|
| Storage | The most consistent results are achieved when the investment and the mixing liquid are stored at a constant temperature of 18 °C (64.4 °F). They should be stored at this temperature for at least 12 hours before use. |
| Mixing liquid | Protect from excessive cold and direct sunlight. Close the bottles immediately after removing liquid. Store at room temperature (18 – 22 °C / 64.4 – 71.6 °F). In warm weather, store the liquid in a refrigerator (not in a freezer!). Liquid containing crystals or sediment should not be used. Observe the date of expiration. Storage period in unopened bottle, 24 months. To avoid frost damage during transport, the liquid should be ordered in November before the beginning of winter. |
| Investment powder | Close bag tightly immediately after removing powder. Store in dry area. Storage period in original unopened bags, 36 months. |
| Investing | To achieve better adhesion of the coating material on the dried modelled investment models, it is recommended to spray model and wax up with distilled water to achieve a bubble-free casting surface. |
| Fine investment | To improve the degassing of structures in fine investment, do not invest them with evacuated material. |
| Measuring beakers | Replace soiled measuring beakers with new ones. Order these from manufacturer. |
| Service | In all processing matters not dealt with in the information brochure, please contact our dental technology department under the number + 49 72 31 / 803-410. |

Casting sprue arrangements



Length min. = 20 mm
 Length max. = 25 mm

Notes

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