HANDS ON DEMONSTRATION & SURGICAL SKILLS MODELS

DENTAL Products Catalog

Expert models and skills development systems for demonstration and training
SAWBONES CAN OFFER YOU:

- High quality workshop bones.
- Display models with or without the installation of your implants.
- Biomechanical test material for pre-testing and validation of your implants.
- Digital CAD files.
- Customized models upon request.

SAWBONES MATERIALS GUIDE

**SOLID FOAM**
- Workshop bone.
- Rigid foam throughout.
- Most commonly used for external fixation.

**FOAM CORTICAL SHELL WITH CANCELLOUS**
- Workshop bone.
- Rigid foam cortical wall with inner cancellous material.
- Most commonly used for:
  - Total joint replacement
  - Internal fixation.

**SOLID WHITE PLASTIC**
- Demonstration bone.
- White plastic.
- Very durable.
- Most commonly used for:
  - Product display of external fixation implants.
  - Patient education.

**BIOMECHANICAL TEST MATERIAL**
- Composite blocks.
- Alternative test medium to cadaver bone.
- Most commonly used for:
  - When actual strength properties of real bone are required.
  - For testing, comparing and designing implants and other devices.

**SOLID CLEAR**
- Demonstration bone.
- Clear plastic.
- Very durable.
- Most commonly used for product display of implants.

*Can be converted to radiopaque option. Refer to page 12 for more information.
RADIOGRAPHIC TRAINING SYSTEM
SAFE - SIMPLE - REPEATABLE

- 100% free of ionizing radiation
- Perfect for classroom training or solo
- Smooth operation; no springs or levers
- Laptop and custom software included

Mandible™ Max is created to train radiographic techniques with no concern for radiation exposure. Direct supervision by a licensed dentist is not required. Digital X-Ray system allows students to capture as many images as needed to complete a training exercise. Instructor can access and review the complete history of progress.

Smooth, adjustable jaw mechanism - no springs or levers to bind or wear out.

Mandible™ Max is fully modular; any part can be repaired or replaced as needed, including skin and teeth. #1573 includes: mannequin, digital collimator, sensors, alignment devices, laptop, software and case.

Order reference:
www.sawbones.com/mandible-max or search for part number 1573
MANDIBLE

#1336-5 — Mandible with mucosa. Solid foam.

#1337 — Mandible with teeth indentations. Large. Solid foam.

#1337-1 — Mandible with teeth. Large. Solid foam.

#1337-3 — Mandible with teeth. Large. Foam cortical shell with cancellous.

#1337-9 — Mandible with teeth. Large. Solid white plastic.

#1337-22 — Mandible with teeth. Large. Solid clear.


#1337-65 — Mandible with teeth indentations. Large. Solid foam with radiopaque option.

#1338 — Mandible with teeth. Large. Can be used with maxilla holders #1348-2 & 11. Foam cortical shell with cancellous.

#1338-2 — Mandible with teeth. Can be used with maxilla holders #1348-2 & 11. Large. Solid foam.

#1338-62 — Mandible with bilateral molars removed. Large. Solid foam with radiopaque option.

#5114-1 — Mandible with teeth. Medium. Solid white plastic.
**MAXILLA**

#1345-30 — Mandible/Maxilla. Solid foam.

#1348 — Edentulous Maxilla. Large. Solid foam.

#1348-2 — Maxilla with handle. Large. Can be used as permanent mandible holder for mandibles: #1336-1, #1338-2, #1338, #1338-5, #1338-6, #1338-7, #1338-8, #1338-11. Solid foam.

#1348-6 — Maxilla with sinus mucosa. Large. Solid foam.
FRACTURED/PATHOLOGY

#1336 — Mandible with plateau deformity. Large. Solid foam.

#1336-1 — Mandible. Edentulous pathology with transverse fracture of the horizontal region on the right lateral side. Can be used with maxilla holders #1348-2 & 11. Large. Foam cortical shell with cancellous.

#1337-11 — Mandible with congenital malformation. Solid foam.

#1338-5 — Mandible. Includes fracture between last two molars on right lateral side. Can be used with maxilla holders #1348-2 & 11. Large. Foam cortical shell with cancellous and solid teeth.

#1338-6 — Mandible. Includes fracture between the canine and premolars in front of the foramen on right lateral side. Can be used with maxilla holders #1348-2 & 11. Large. Foam cortical shell with cancellous and solid teeth.

#1338-7 — Mandible. Includes fracture through left side and mandibular angle and right side superior fragment fracture scored inferiorly. Can be used with maxilla holders #1348-2 & 11. Large. Foam cortical shell with cancellous and solid teeth.

#1338-8 — Mandible. Includes comminuted fracture of the left with black pad on inner surface. Large. Foam cortical shell with cancellous and solid teeth.

#1338-9 — Mandible. Partially edentulous. Solid foam.

#1338-9-1 — Mandible. Includes two canine, one right molar, and 2-3 mm mucosa. Can be used with maxilla holder #1348-11. Foam cortical shell with cancellous and solid teeth.
#1338-11 — Mandible. Large. Includes sagittal fracture between anterior incisors. Can be used with maxilla holders #1348-2 & 11. Foam cortical shell with cancellous and solid teeth.

#1338-19 — Mandible. Includes two canine and one right molar. Can be used with maxilla holder #1348-19. Foam cortical shell with cancellous and solid teeth with the radiopaque option.

#1343 — Mandible with ridge deformity. Large. Solid foam.

#1348-11 — Maxilla, partially edentulous, with handle. Solid foam.

#1348-19 — Maxilla, partially edentulous, with handle. Solid foam with radiopaque option.

#1337-29-5 — Maxilla, partially edentulous, includes gum tissue and sinus lining.
MANDIBLE

#1337-21 — Mandible. Solid foam.

FRACTURED/PATHOLOGY

SOLID RIGID POLYURETHANE FOAM

Solid rigid polyurethane foam is used as an alternative test medium for human cancellous bone. It does not replicate the structure of human bone, however, it does provide consistent properties in the range of human cancellous bone. This closed cell polyurethane foam is most commonly used for testing screw pullout, insertion and stripping torque.

The ASTM F-1839-08 “Standard Specification for Rigid Polyurethane Foam for Use as a Standard Material for Testing Orthopaedic Devices and Instruments” states “The uniformity and consistent properties of rigid polyurethane foam make it an ideal material for comparative testing of bone screws and other medical devices and instruments”.

<table>
<thead>
<tr>
<th>DENSITY (PCF)</th>
<th>Compression</th>
<th>Tensile</th>
<th>Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume Fraction</td>
<td>Strength (MPa)</td>
<td>Modulus (MPa)</td>
<td>Strength (MPa)</td>
</tr>
<tr>
<td>ASTM D1622</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5*</td>
<td>0.08</td>
<td>0.07</td>
<td>0.60</td>
</tr>
<tr>
<td>8</td>
<td>0.13</td>
<td>0.11</td>
<td>1.5</td>
</tr>
<tr>
<td>10*</td>
<td>0.16</td>
<td>0.14</td>
<td>2.2</td>
</tr>
<tr>
<td>12*</td>
<td>0.19</td>
<td>0.16</td>
<td>3.2</td>
</tr>
<tr>
<td>15*</td>
<td>0.24</td>
<td>0.20</td>
<td>4.9</td>
</tr>
<tr>
<td>20*</td>
<td>0.32</td>
<td>0.27</td>
<td>8.4</td>
</tr>
<tr>
<td>25*</td>
<td>0.40</td>
<td>0.34</td>
<td>12.9</td>
</tr>
<tr>
<td>30*</td>
<td>0.48</td>
<td>0.41</td>
<td>18</td>
</tr>
<tr>
<td>35*</td>
<td>0.56</td>
<td>0.47</td>
<td>24.4</td>
</tr>
<tr>
<td>40*</td>
<td>0.64</td>
<td>0.54</td>
<td>31</td>
</tr>
<tr>
<td>50*</td>
<td>0.80</td>
<td>0.68</td>
<td>48</td>
</tr>
</tbody>
</table>

*Foam meets ASTM F1839-08.

SOLID FOAM BLOCK TOLERANCES:

Foam density +/- 10%
Block dimensions +/- 2mm

Our foam is available in a range of sizes and densities, from 0.08 to 0.80 grams per cubic centimeter (5 to 50 pounds per cubic foot).
**CELLULAR RIGID POLYURETHANE FOAM**

This closed cell polyurethane foam has a cell size that is closer to human cancellous bone and is most commonly used for testing subsidence, press-fit devices and cement augmentation.

<table>
<thead>
<tr>
<th>DENSITY (PCF)</th>
<th>DENSITY (g/cc)</th>
<th>CELL Size (mm)</th>
<th>COMPRESSION Strength (MPa)</th>
<th>COMPRESSION Modulus (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5</td>
<td>0.12</td>
<td>0.5-2.5</td>
<td>1.4</td>
<td>12.4</td>
</tr>
<tr>
<td>10</td>
<td>0.16</td>
<td>0.5-2.0</td>
<td>2.3</td>
<td>23.0</td>
</tr>
<tr>
<td>12.5</td>
<td>0.20</td>
<td>0.5-1.5</td>
<td>3.9</td>
<td>47.5</td>
</tr>
<tr>
<td>15</td>
<td>0.24</td>
<td>0.5-1.0</td>
<td>4.1</td>
<td>68.4</td>
</tr>
<tr>
<td>20*</td>
<td>0.32*</td>
<td>0.5-1.0</td>
<td>5.4</td>
<td>137.0</td>
</tr>
</tbody>
</table>

*Contains e-glass fibers.

**OPEN CELL RIGID FOAM**

This open cell foam is a composite made of urethanes, epoxies and structural fillers. It is most commonly used in specific applications that require an open-cell structure, cement augmentation and dynamic loading.

<table>
<thead>
<tr>
<th>DENSITY (PCF)</th>
<th>DENSITY (g/cc)</th>
<th>COMPRESSION Strength (MPa)</th>
<th>COMPRESSION Modulus (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5</td>
<td>0.09</td>
<td>0.11</td>
<td>6.2</td>
</tr>
<tr>
<td>7.5</td>
<td>0.12</td>
<td>0.28</td>
<td>18.6</td>
</tr>
<tr>
<td>15</td>
<td>0.24</td>
<td>0.67</td>
<td>53.0</td>
</tr>
<tr>
<td>20</td>
<td>0.32</td>
<td>1.3</td>
<td>105</td>
</tr>
<tr>
<td>30</td>
<td>0.48</td>
<td>3.2</td>
<td>270.0</td>
</tr>
</tbody>
</table>

BLOCK SIZE: 13 cm x 18 cm x 4 cm

#1522-09 — 7.5 PCF
#1522-10 — 10 PCF
#1522-11 — 12.5 PCF
#1522-1300 — 15 PCF
#1522-12 — 20 PCF

#1522-505 — 5.5 PCF
#1522-507 — 7.5 PCF
#1522-524 — 15 PCF
#1522-526-1 — 20 PCF
#1522-525 — 30 PCF
SOLID RIGID POLYURETHANE FOAM SHEETS

This closed cell polyurethane foam is most commonly used for testing screw pullout, insertion and stripping torque.

<table>
<thead>
<tr>
<th>SHEET SIZE:</th>
<th>13 cm x 18 cm x 1 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1522-50</td>
<td>20 PCF</td>
</tr>
<tr>
<td>#1522-102</td>
<td>30 PCF</td>
</tr>
<tr>
<td>#1522-103</td>
<td>40 PCF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHEET SIZE:</th>
<th>13 cm x 18 cm x 1.5 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1522-28</td>
<td>50 PCF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHEET SIZE:</th>
<th>13 cm x 18 cm x 2 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1522-19</td>
<td>10 PCF</td>
</tr>
<tr>
<td>#1522-15</td>
<td>15 PCF</td>
</tr>
<tr>
<td>#1522-18</td>
<td>20 PCF</td>
</tr>
<tr>
<td>#1522-20</td>
<td>30 PCF</td>
</tr>
<tr>
<td>#1522-16</td>
<td>40 PCF</td>
</tr>
<tr>
<td>#1522-24</td>
<td>50 PCF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHEET SIZE:</th>
<th>13 cm x 18 cm x 3 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1522-13</td>
<td>15 PCF</td>
</tr>
<tr>
<td>#1522-14</td>
<td>20 PCF</td>
</tr>
<tr>
<td>#1522-06</td>
<td>30 PCF</td>
</tr>
<tr>
<td>#1522-07</td>
<td>40 PCF</td>
</tr>
<tr>
<td>#1522-08</td>
<td>50 PCF</td>
</tr>
</tbody>
</table>

FOAM SHEET TOLERANCES:

<table>
<thead>
<tr>
<th>Density</th>
<th>+/-10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length and Width</td>
<td>+/-2mm</td>
</tr>
<tr>
<td>Thickness</td>
<td>+/-0.3mm</td>
</tr>
</tbody>
</table>

COMPOSITE SHEETS

This epoxy is filled with short glass fibers and is used to simulate cortical bone for structural testing of fixation devices and total joint replacements.

<table>
<thead>
<tr>
<th>SHEET SIZE:</th>
<th>13 cm x 18 cm x</th>
</tr>
</thead>
<tbody>
<tr>
<td>#3401-07</td>
<td>1 mm</td>
</tr>
<tr>
<td>#3401-01</td>
<td>2 mm</td>
</tr>
<tr>
<td>#3401-02</td>
<td>3 mm</td>
</tr>
<tr>
<td>#3401-03</td>
<td>4 mm</td>
</tr>
<tr>
<td>#3401-04</td>
<td>6 mm</td>
</tr>
<tr>
<td>#3401-05</td>
<td>8 mm</td>
</tr>
<tr>
<td>#3401-06</td>
<td>10 mm</td>
</tr>
</tbody>
</table>

EPOXY SHEET TOLERANCES:

<table>
<thead>
<tr>
<th>Density</th>
<th>+/-2.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length and Width</td>
<td>+/-2mm</td>
</tr>
<tr>
<td>Thickness</td>
<td>+/-0.3mm</td>
</tr>
</tbody>
</table>

1mm and 2mm are +/-0.2mm (3401-07, 3401-01)
CUSTOM LAMINATED FOAM BLOCKS

Laminated test blocks are manufactured to your specifications using any combination of solid rigid polyurethane foam, cellular rigid polyurethane foam, open cell rigid foam and short fiber filled epoxy sheets.

Blocks are laminated with sheet(s) of solid rigid polyurethane foam or short fiber filled epoxy selected to simulate unicortical or bicortical bone. Standard laminated test blocks are 12 cm x 17 cm with a thickness based on your specified combination of block and sheet sizes. All blocks and sheets are laminated together with 0.64g/cc (40PCF) solid rigid polyurethane foam.

Please see the property tables to make your selection of materials that will best simulate a bone model for your biomechanical test or product demonstration.

CUSTOM MACHINED FOAM

We have a full CNC machining center available to create your custom rigid foam part that may be used in biomechanical tests or product demonstration. We have solid rigid polyurethane foam available in sizes up to 61 cm x 61 cm x 10 cm thick.

To request a quote please email a dimensioned drawing, sketch or 3D CAD model to:

Sawbones Corporate Headquarters
Servicing North America, South America, Asia and Australia
10221 SW 188th Street, PO Box 409
Vashon, Washington 98070, USA
E-mail: info@sawbones.com
Tel: (206) 463-5551
Fax: (206) 463-2526

Sawbones Europe AB
Servicing Europe, Middle East and Africa
Krossverksgatan 3, 216 16
Malmö
Sweden
E-mail: info@sawbones.se
Tel: +46 40 650 70 00
Fax: +46 40 650 70 01
RADIOPAQUE IMAGING
Standard Sawbones models produce a realistic and user friendly image in x-ray or fluoroscopy environments.

For an even higher contrast in detail, most Sawbones models can be made with the radiopaque option. Solid foam models include the enhanced radiopaque visualization properties on the outer surface only. Foam cortical shell models provide this radiopaque imaging enhancement on the inner and outer surfaces.

DIGITAL ANATOMY / CAD FILES
Usage:
- CNC machining.
- Finite element modeling.
- Product information guides.
- CAD software applications.

File formats:
- IGES
- Stl
- Parasolid
- Step
- Sldprt

Most of our bones can be scanned. Please contact us for further information and availability.
SAWBONES CUSTOMER COMMITMENT AND PRODUCT GUARANTEE

At Sawbones, we are committed to providing the highest level of service and product quality. If you are less than completely satisfied with the performance of our products for any reason, we will gladly honor a full refund or replacement.

Contact us anytime with suggestions on how we can improve our products or service.

ORDERING INFORMATION

Please provide the part number, description, and quantity for each item requested.

Indicate precise shipping instructions, if different than the billing address, and purchase order number when applicable.

Credit cards and bank transfers accepted. Please call customer service.

SAWBONES CORPORATE HEADQUARTERS
Servicing North America, South America, Asia and Australia

10221 SW 188th Street, PO Box 409
Vashon, Washington 98070, USA

E-mail: info@sawbones.com
Tel: (206) 463-5551
Fax: (206) 463-2526

SAWBONES EUROPE AB
Servicing Europe, Middle East and Africa

Krossverksgatan 3,
216 16 Malmö, Sweden

E-mail: info@sawbones.se
Tel: +46 (0)40 650 70 00
Fax: +46 (0)40 650 70 01