Material Specifications

A On the following pages you can find information about the materials, used by ASIM INSTRUMENTS for manufacturing several kinds of instruments.

**Definition “High Grade Steel”**
The standardized term “High Grade Steel”, used by many manufactures as a special characteristic of their products does not say more than steel’s cleanness, concerning the unwanted alloy components phosphorus and sulphur do not exceed percentual limits. A high alloyed tool-steel can also be a ”High Grade Steel“.

**Sources of Supply**
The ASIM INSTRUMENTS purchases all materials for 1A products, as forging for scissors or forceps, from well known suppliers. We do not have any direct influence on the production of these materials, but we are successfully trying to keep the quality of our products on a high level constantly, by careful selection of our supplier.

**Models**
Normally all forging for a product is purchased from the same supplier. In the case of delivery problems, we are however forced to buy from alternative supplier. This matter may be reason for minor deviation in models and sizes. This deviations do not have any effects on function or quality of the instrument. We are always trying to keep changes or deviations as bearable as possible.

**High Grade Stainless Steel**

**Mat.Nº: 1.4117**
Shortcut: X 38 CrMoV 15 (DIN 17442)
AISI synonym: -
Characteristics: martensitic, magnetic, hardness (hardened) 50-58 HRC
Alloy:

<table>
<thead>
<tr>
<th>%C</th>
<th>%Si</th>
<th>%Mn</th>
<th>%P</th>
<th>%S</th>
<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%CU</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.35-0.4</td>
<td>≤1</td>
<td>≤1</td>
<td>≤0.045</td>
<td>≤0.03</td>
<td>14-15</td>
<td>0.4-0.6</td>
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<td>-</td>
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**Mat.Nº: 1.4021**
Shortcut: X 20 Cr 13 (EN 10088,-1,-2,-3, DIN 17440, 17441, 17442)
AISI synonym: 420
Characteristics: martensitic, magnetic, hardness (hardened) 40-47 HRC
Alloy:

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<th>%P</th>
<th>%S</th>
<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%CU</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.16-0.25</td>
<td>≤1</td>
<td>≤1.5</td>
<td>≤0.044</td>
<td>≤0.03</td>
<td>12-14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Mat.Nº: 1.4034
Used for: Scissors, Rongeurs, Bone Cutting Forceps, Conchotomes, Scalpels*, Knives*, Dental Probes, Drills, Ales, Medullary Reamers*.
Shortcut: X 40 Cr 13 (EN 10088,-1,-2,-3, DIN 17441)
AISI synonym: -
Characteristics: martensitic, magnetic, hardness (hardened) 55 HRC
Alloy:

<table>
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<th>%Si</th>
<th>%Mn</th>
<th>%P</th>
<th>%S</th>
<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%Cu</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.43-0.5</td>
<td>≤1</td>
<td>≤1</td>
<td>≤0.04</td>
<td>≤0.03</td>
<td>12.5-14.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

Mat.Nº: 1.4305
Used for: Probes, Handles (full)*, Screws*, Nuts*, Components with low demand*.
Shortcut: X 12 CrNis 18 9 (EN 10088,-1,-2,-3, DIN 17440)
AISI synonym: 303
Characteristics: Machine Steel, austenitic, non magnetic, not for hardening (18/8)
Alloy:

<table>
<thead>
<tr>
<th>%C</th>
<th>%Si</th>
<th>%Mn</th>
<th>%P</th>
<th>%S</th>
<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%Cu</th>
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</tr>
</thead>
<tbody>
<tr>
<td>≤0.1</td>
<td>≤1</td>
<td>≤2</td>
<td>≤0.045</td>
<td>0.15-0.35</td>
<td>17-19</td>
<td>-</td>
<td>8-10</td>
<td>≤1</td>
<td>≤11</td>
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</tbody>
</table>

Mat.Nº: 1.4301
Shortcut: X 12 CrNis 18 8 (EN 10088,-1,-2,-3, DIN 15512T1, 17440,-441,-455,-456,-457,-458,-EEN 10222-5, EEN 10028-7, EEN 10027)
AISI synonym: 304/304H
Characteristics: austenitic, non magnetic, malleable (soft).
Alloy:

<table>
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<th>%C</th>
<th>%Si</th>
<th>%Mn</th>
<th>%P</th>
<th>%S</th>
<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%Cu</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.07</td>
<td>≤1</td>
<td>≤2</td>
<td>≤0.045</td>
<td>≤0.03</td>
<td>17-19.5</td>
<td>-</td>
<td>8-10.5</td>
<td>≤0.11</td>
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</table>

Mat.Nº: 1.4310
Used for: Springs*.
Shortcut: X 12 CrNi 17 7 (EN 10088,-1,-2,-3, DIN 17440,-441,-455 bis 458)
AISI synonym: 301
Characteristics: spring steel, austenitic, non magnetic
Alloy:

<table>
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<th>%C</th>
<th>%Si</th>
<th>%Mn</th>
<th>%P</th>
<th>%S</th>
<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%Cu</th>
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<td>0.05-0.15</td>
<td>≤2</td>
<td>≤2</td>
<td>≤0.045</td>
<td>≤0.15</td>
<td>16-19</td>
<td>≤0.8</td>
<td>6-9.5</td>
<td>≤0.11</td>
<td></td>
</tr>
</tbody>
</table>

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Sialkot-51360, Pakistan
Telephone : +92 524 270310
Fax : +92 524 562720
E-mail : info@asiminst.com
web site : www.asiminst.com
Mat.Nº: 1.4401  
Used for: Measuring Gauges for Drills and Nails*.  
Shortcut: X 5 CrNiMo 18 10 (EN 10088,-1,-2,-3, DIN 1654T5, 5512T3, 17224,-440,-441,-455 bis 458, EEN 1022-5, EEN 10028-7, EEN 10272)  
AISI synonym: 316  
Characteristics: austenitic, non magnetic  
Alloy:

<table>
<thead>
<tr>
<th>%C</th>
<th>%Si</th>
<th>%Mn</th>
<th>%P</th>
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<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%Cu</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.07</td>
<td>≤1</td>
<td>≤2</td>
<td>≤0.045</td>
<td>≤0.03</td>
<td>16-18.5</td>
<td>2-2.5</td>
<td>10-13</td>
<td></td>
<td>≤0.11</td>
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</tbody>
</table>

Mat.Nº: 1.4441  
Used for: Implants*, Prosthesis*.  
Shortcut: X 2 Cr Ni Mo 18 15 3 (DIN 17443)  
AISI synonym: 316 LVM  
Characteristics: implants steel  
Alloy:

<table>
<thead>
<tr>
<th>%C</th>
<th>%Si</th>
<th>%Mn</th>
<th>%P</th>
<th>%S</th>
<th>%Cr</th>
<th>%Mo</th>
<th>%Ni</th>
<th>%Cu</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.03</td>
<td>≤1</td>
<td>≤2</td>
<td>≤0.025</td>
<td>≤0.01</td>
<td>17-19</td>
<td>2.5-3.2</td>
<td>13-15.5</td>
<td>≤0.1</td>
<td>≤0.1</td>
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Non Iron Metals

Mat.Nº: 2.0402  
Used for: Instruments for low demands  
Shortcut: CuZn40Pb2  
Characteristics: brass, normally chrome platted

Mat.Nº: 2.1030  
Used for: slide Bearings  
Shortcut: CuSN8  
Characteristics: Bronze

Mat.Nº: 3.3315  
Used for: Containers, Handles  
Shortcut: AIMg1  
Characteristics: Aluminum, light weight

Mat.Nº: Copper  
Used for: Malleable Instruments as probes or spatulas, electric components  
Shortcut: Cu  
Characteristics: normally silver, chrome or nickel platted

Mat.Nº: Titanium  
Used for: Implants, Clips, standard instruments as forceps or biopsie-forceps.  
Shortcut: Ti  
Characteristics: light weight, robust, expensive

Mat.Nº: New Silver  
Used for: Malleable Probes, electr. contacts.
Precious Metal

**Silver (Ag)**
Mainly used for malleable copper instruments as plating (galvanic)

**Gold (Au)**
Mainly used for marking instruments with TC inlets (galvanic)

Non Metal Materials (Plastics)

**Ferrozell (HGW 2082)**
Pressed material with synthetic resin and cotton. Used for handles and hammers.

**Delrin (POM)**
Handles, electric insulated components, mandrins

**Teflon (PTFE)**
Bearings, electric insulated components.

Natural Materials

**Wood**
Handles, cases
Replaced by synthetic materials more and more

**Leather**
Cases, pouches

Concluding remark
These pages are only a rough summary of the used materials for surgical instruments. Normally there are used much more materials in different alloys and characteristics, filling a book. Manufacturer's experience and changes in the manufacturing process make changes inevitable.

Literature/Standards
- Steel Key (Wegst-Verlag)
- Table-Book Metal (Europa Lehrmittel)
- Steel Standardization in “Fachkundebuch Metall” (Europa Lehrmittel)
- DIN 100 Paperback (Beuth Verlag)
- DIN 17442 “Forged products or stainless steel for surgical instruments”
- DIN 58298 part 1-11 “Materials, construction and testing of surgical instruments”
Marking and Packing

General points
For identification and product history, all ASIM INSTRUMENTS products are marked with a suitable procedure (mainly etching) and a paper label (1 piece per position).

Exceptions
- Instruments, that cannot be etched, because of small size, material or surface attributes are shipped with the label only.
- Most implants are also marked dimensions (diameter, length)
- Products with serial number are labeled with the serial number instead of the lot/batch Nº.

Labels
The label shipped with each order position contains the following information:
Address of manufacturer (ASIM INSTRUMENTS), Lot/Batch number, ASIM INSTRUMENTS Article Nº, Customer Article Nº, Quantity, Customer’s Order data, Labeling/Etching, Important indications for use, CE-mark, Link to the valid instruction of use.

Packing
All ASIM INSTRUMENTS instruments are non-sterile (not sterile surgical blades), single packed in open poly bags. All items are cleaned mechanically, but must be cleaned and sterilized before use. All goods are shipped in cardboard boxes, packed unbreakable. Special packing is possible on customer’s demands or in fact of the goods conditions.
Instruments supplied without etching:
Effective 14.06.1998 only medical devices that are CE-marked can be sold in European Union legally. The CE-marked must appear in conjunction with the manufacturer’s name. Instruments, not marked with ASIM INSTRUMENTS CE-mark (also Etching and labeling according to the customer’s wants) must be marked by the authorized customer.
Etching and labeling according to customer’s wishes is possible for surcharge.