# Cold rolled precision strip

**HIGH CARBON STEEL**

Annealed - quenched & tempered

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### AVAILABLE STOCK

<table>
<thead>
<tr>
<th>GRADE</th>
<th>MATERIAL CONDITION</th>
<th>SURFACE ASPECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS</td>
<td>C45E / 1.1191</td>
<td>annealed and skin passed SKP + LC</td>
</tr>
<tr>
<td>CS 70</td>
<td>C67S / 1.1231</td>
<td>annealed and skin passed SKP + LC</td>
</tr>
<tr>
<td>CS 70</td>
<td>C75S / 1.1248</td>
<td>annealed and skin passed SKP + LC</td>
</tr>
</tbody>
</table>

Thickness tolerances according to EN 10140 / 96 - Surface finishes according to EN 10139/97 -
C45E : steel for quenching and tempering (NF EN 10132-3) - C67S and C75S : steel for spring and general purposes (NF EN 10132-4)

### CHEMICAL COMPOSITION: NF EN 10132-3 ET -4

<table>
<thead>
<tr>
<th>GRADE</th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Mo</th>
<th>Ni</th>
</tr>
</thead>
<tbody>
<tr>
<td>C45E</td>
<td>0.42 to 0.50</td>
<td>0.40 max</td>
<td>0.50 to 0.80</td>
<td>0.035 max</td>
<td>0.035 max</td>
<td>0.40 max</td>
<td>0.10 max</td>
<td>0.40 max</td>
</tr>
<tr>
<td>C67S</td>
<td>0.65 to 0.73</td>
<td>0.15 to 0.35</td>
<td>0.60 to 0.90</td>
<td>0.025 max</td>
<td>0.025 max</td>
<td>0.40 max</td>
<td>0.10 max</td>
<td>0.40 max</td>
</tr>
<tr>
<td>C75S</td>
<td>0.70 to 0.80</td>
<td>0.15 to 0.35</td>
<td>0.60 to 0.90</td>
<td>0.025 max</td>
<td>0.025 max</td>
<td>0.40 max</td>
<td>0.10 max</td>
<td>0.40 max</td>
</tr>
</tbody>
</table>

### MECHANICAL PROPERTIES IN SOFT ANNEALED CONDITION : NF EN 10132-3 AND -4

<table>
<thead>
<tr>
<th>GRADE</th>
<th>Yield strength TS 0.2 (N/mm²)</th>
<th>Tensile strength TS (N/mm²)</th>
<th>Elongation E80 min. (%)</th>
<th>Hardness HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>C45E</td>
<td>455 max</td>
<td>570 max</td>
<td>18 min</td>
<td>180 max</td>
</tr>
<tr>
<td>C67S</td>
<td>510 max</td>
<td>640 max</td>
<td>16 min</td>
<td>200 max</td>
</tr>
<tr>
<td>C75S</td>
<td>510 max</td>
<td>640 max</td>
<td>15 min</td>
<td>200 max</td>
</tr>
</tbody>
</table>

The customer can define other tensile strength or hardness. If none is required, tensile strength TS will be applied.

### MECANICAL PROPERTIES IN QUENCHED CONDITION FOR GENERAL ENGINEERING PURPOSES

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Quenched and tempered condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS (N/mm²)</td>
<td>1620 to 1765</td>
</tr>
<tr>
<td>HR 30 N</td>
<td>1570 to 1715</td>
</tr>
<tr>
<td>HR 45 N</td>
<td>1520 to 1670</td>
</tr>
<tr>
<td>HRC</td>
<td>1330 to 1485</td>
</tr>
</tbody>
</table>

The mechanical properties (hardness or tensile strength) must be specified with the order.

### Temperature before oil quenching

<table>
<thead>
<tr>
<th>Grade</th>
<th>Temperature°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>C45E</td>
<td>885 - 900</td>
</tr>
<tr>
<td>C67S</td>
<td>835 - 855</td>
</tr>
<tr>
<td>C75S</td>
<td>825 - 850</td>
</tr>
</tbody>
</table>

Temperature values for information only.

### Hardness after oil quenching and tempering

<table>
<thead>
<tr>
<th>Grade</th>
<th>Hardness HRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>C45E</td>
<td>300° - 400°</td>
</tr>
<tr>
<td>C67S</td>
<td>54</td>
</tr>
<tr>
<td>C75S</td>
<td>55 - 46</td>
</tr>
</tbody>
</table>

Tempering period: 15 min (HRC hardness for information only)

### Hardness conversion:

<table>
<thead>
<tr>
<th>Tensile strength TS (Mpa)</th>
<th>Hardness (HV)</th>
<th>Hardness (HRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>330</td>
<td>100</td>
<td>55</td>
</tr>
<tr>
<td>390</td>
<td>115</td>
<td>64.6</td>
</tr>
<tr>
<td>440</td>
<td>130</td>
<td>71</td>
</tr>
<tr>
<td>510</td>
<td>155</td>
<td>80.5</td>
</tr>
<tr>
<td>580</td>
<td>180</td>
<td>87.3</td>
</tr>
<tr>
<td>630</td>
<td>195</td>
<td>91.7</td>
</tr>
<tr>
<td>690</td>
<td>215</td>
<td>94.6</td>
</tr>
<tr>
<td>740</td>
<td>225</td>
<td>97</td>
</tr>
<tr>
<td>810</td>
<td>245</td>
<td>100</td>
</tr>
<tr>
<td>880</td>
<td>265</td>
<td>103</td>
</tr>
<tr>
<td>960</td>
<td>300</td>
<td>1650</td>
</tr>
</tbody>
</table>

Conversion table for information only.