PX® - PRESS-X DIE

~ASM 6F4 - W.Nr. 1.2777 - 21MoNi33-12

PH HOT WORK TOOL STEEL

TYPICAL APPLICATIONS

- Press Dies
- Upsetting and Punching Tools
- Extrusion Dies

GENERAL:

Delivery Condition:
Solution treated and Aged

Hardness Range:

<table>
<thead>
<tr>
<th>Finkl Std.</th>
<th>BHN</th>
<th>HRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>388-429</td>
<td>41-45</td>
</tr>
<tr>
<td>B</td>
<td>341-375</td>
<td>36-40</td>
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PX® is a precipitation hardening die steel designed specifically to resist thermal shock and to provide excellent wear resistance at elevated temperatures.

PX® performs best on presses and upsetting and punching machines where longer dwell times between the dies and the hot forging stock are usual. It is not recommended for impact forging equipment.

PX® steel is forged utilizing wide die techniques which result in improved properties throughout.

PX® is 100% ultrasonically tested according to the most rigorous standards and is fully warranted.

Typical Chemical Analysis* - % weight

<table>
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<tr>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>Ni</th>
<th>Cr</th>
<th>Mo</th>
<th>V</th>
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<tbody>
<tr>
<td>0.20</td>
<td>0.70</td>
<td>0.25</td>
<td>3.15</td>
<td>0.15</td>
<td>3.35</td>
<td>0.08</td>
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</table>

*Covered under one or more of the following U.S. Patents: 4,069,039; 4,541,862; 4,600,427; 4,887,277; others pending

A distinctive advantage of PX® is its ability to increase its “as-quenched” hardness by the application of heat either by a tempering treatment or from the hot metal being worked. This process takes place through precipitation hardening and accounts for the excellent resistance to abrasion at hot-working temperatures. Where subsequent heating softens a conventional die steel, PX® hardens to approximately 461 Brinell (48 HRc).

A remarkable feature of PX® is that an increased hardness beyond commercial machinability can be obtained from a prehardened and machinable die block by a simple aging operation (950° to 1050°F.) without the hazards of cracking, scaling, decarturization, distortion and warpage that usually attend the hardening of annealed alloy steels.

Another distinct advantage is the ability of PX® to be water cooled (actually flooded) in service without the hazards which usually attend such a practice in ordinary hot work die steels.

These advantages make PX® an efficient and substantially, a cost-saving hot die steel.

Note: Provided technical data and information in this data sheet are typical values. Normal variations in chemistry, size and conditions of heat treatment may cause deviations from these values. We suggest that information be verified at time of inquiry or order. For additional data or metallurgical assistance, please contact us.

®Finkl Steel Trademark
Heat Treating PX®

Quenching
After the steel is thoroughly soaked, cool in still air, permitting as rapid and uniform cooling as possible, to 200°F. Do not water quench as faster cooling rates produces a lower hardness.

Aging
During the aging cycle, PX® undergoes a pronounced precipitation secondary hardening which makes it unique among hot work die steels. It should always be aged prior to use. For aging temperatures up to 1020°F, hold at temperature for four hours for thicknesses up to and including one inch, increasing one hour for each one inch of increase in thickness. Air cool to room temperature. However, when aging temperatures are in the range of 1040°F-1060°F, precipitation hardening takes place rapidly and the total time on temperature should not be more than three to five hours. Longer aging times result in softening below the maximum attainable hardness. In general, maximum attainable hardness (i.e., approximately 48 HRC can be obtained at temperatures lower than 1040°F-1060°F provided the times temperatures are appreciably longer than indicated above. In practice however, it is usually advantageous to temper to less than maximum hardness allowing for the development of further hardness in service.