

**WM H-13 HOT WORK TOOL  
STEEL  
(AISI H-13)**

**WM H-13** has the same composition of H-11 with the exception that the vanadium has been increased to 1% for better wear resistance.

**WM H-13** is an excellent die casting die steel for aluminum and magnesium die castings, and for long run zinc die castings. It is also recommended for plastic molds where high polish and good physical properties are essential.

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<b>Carbon</b> .....	<b>.35</b>
<b>Manganese</b> .....	<b>.40</b>
<b>Silicon</b> .....	<b>1.00</b>
<b>Chromium</b> .....	<b>5.00</b>
<b>Vanadium</b> .....	<b>1.00</b>
<b>Molybdenum</b> .....	<b>1.50</b>

**TYPICAL APPLICATIONS**

Dies for aluminum die casting, forging machine plungers and pierces, forging die inserts, hot nut tools, hot gripper and header dies, brass forging and pressing dies, brass and aluminum extrusion tools, dies for zinc die casting (exceptionally long runs), forging die block, plastic molds, cold heading die casings.

**THERMAL PRACTICE**

**FORGING** - Heating for forgings must be done slowly and uniformly. Soak through at 1900-2000°F, and reheat as often as necessary, stopping work when the temperature drops below 1650°F. After forging cool slowly in lime, mica, dry ashes, or furnace. H-13 should always be annealed after forging.

**ANNEALING** - Heat slowly to 1550-1650°F, hold until the entire mass is heated through, and cool slowly in the furnace (40°F per hour) to about 1000°F, after which the cooling rate may be increased. Suitable precautions must be taken to prevent excessive carburization or decarburization.

**STRAIN RELIEVING** - When desirable to relieve the strains of machining, heat slowly to 1050-1250°F, allow to equalize, and then cool in still air.

**PREHEAT FOR HARDENING** - Warm slightly before charging into the preheat furnace, which should be operating at about 1400-1450°F.

**HARDENING - H-13** is a steel having very high harden ability, and should be hardened by cooling in still air. The use of a salt bath or controlled atmosphere furnace is desirable to minimize decarburization, and if not available, pack hardening in spent pitch coke is suggested. The temperature employed is usually 1800-1850°F, depending on size.

**TEMPERING** - Tempering practice may vary with size and application, but is usually performed in the range of maximum secondary hardness or higher. Double tempering is recommended. Typical response to tempering after air cooling from 1800\* and 1850°F is shown on the chart.

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<b>Double Tempered From</b>	<b>Air Cooled</b>	
	<b>1800°F</b>	<b>1850°F</b>
<b>300°F</b>	<b>49.0RC</b>	<b>50.0RC</b>
<b>400°F</b>	<b>49.5</b>	<b>50.0</b>
<b>500°F</b>	<b>50.0</b>	<b>50.0</b>
<b>600°F</b>	<b>50.0</b>	<b>50.0</b>
<b>700°F</b>	<b>50.5</b>	<b>50.5</b>
<b>800°F</b>	<b>51.0</b>	<b>51.5</b>
<b>900°F</b>	<b>52.0</b>	<b>52.5</b>
<b>1000°F</b>	<b>51.5</b>	<b>53.0</b>
<b>1050°F</b>	<b>50.0</b>	<b>51.0</b>
<b>1100°F</b>	<b>46.0</b>	<b>48.0</b>
<b>1150°F</b>	<b>39.5</b>	<b>41.0</b>
<b>1200°F</b>	<b>31.0</b>	<b>32.0</b>

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