3.2 Mechanical Testing

Tensile testing was conducted on each sample using the Instron 4208 Universal Testing Machine. Samples were extracted from the long axis of each material test block and prepared in accordance with "ASTM E8, Figure 9, Specimen Type #4" (See Appendix 1). Results are summarized in Table 2 and stress vs strain curves are illustrated in Figure 1.

Table 2. Mechanical Test Results

	Aluminum	Alumold	Hokotol	QC-10	P-20
Mechanical Properties					
Tensile (psi)	38700	80900	82900	73300	136500
Yield (psi)	21300	75800	77000	66700	118700
Elongation (%)	6	12.5	10.5	9	17

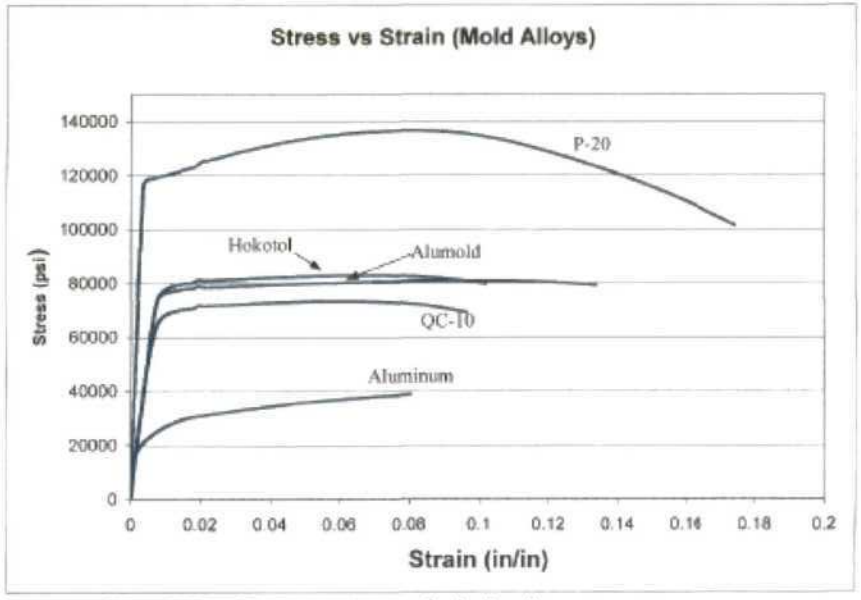

Figure 1. Compiled stress strain curves for the five alloys.

Bodycote

3.3 Hardness Measurements

Rockwell Hardness

Hardness measurements were taken from each sample employing Rockwell measurement techniques (ASTM E18) and Brinell techniques (ASTM E10). The Rockwell "B" technique employs a standard load of 100 kgf to a 1/16" inch diameter ball and records the extent of indentation into the test specimen, which in turn may be correlated to the strength and wear resistance of that material. This measurement technique is sensitive to variation in metallurgical composition, and is best suited to wrought / homogeneous alloys. Measurements were recorded from each material, with the average presented in Table 3.

Brinell Hardness

The Brinell hardness technique employs the standard ASTM E10, in which a 500kgf load is directly applied to the test sample through a 10mm diameter tungsten carbide ball. Hardness measurements are based on the resultant impression. This technique provides reliable hardness characteristics covering the bulk metallurgical properties, thus, is less sensitive to hardness variations associated with microstructural constituents. Measurements are presentec in Table 3.

Table 3. Hardness Results

	Aluminum	Alumold	Hokotol	QC-10	P-20
Brinell Hardness (HB)	76	165	164	140	289
Rockwell Hardness	39.1 HRB	91.1 HRB	89.4 HRB	81.8 HRB	24.7 HRC