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STEEL REAR PLATE

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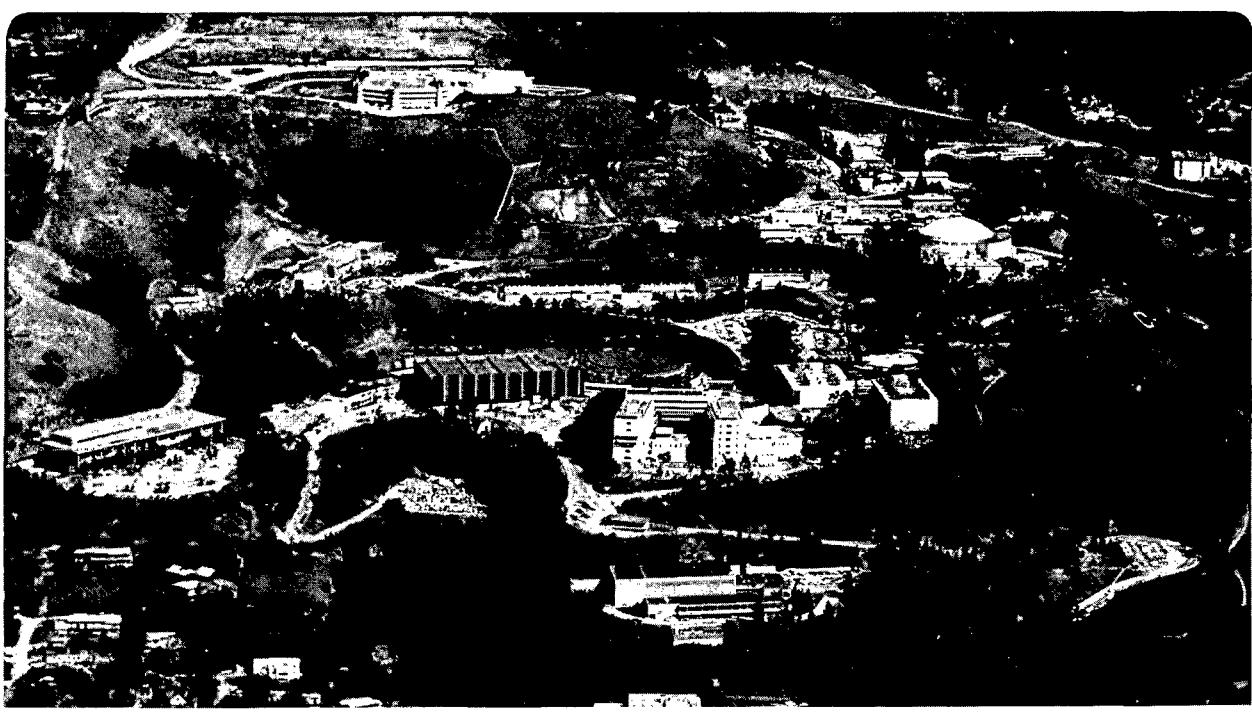
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ENGINEERING NOTE		D32221	M5284	1 OF 2
AUTHOR	DEPARTMENT	LOCATION	DATE	
MARTIN FONG	MECHANICAL	B29C	1/9/79	
PROGRAM - PROJECT - JOB				
DOUBLET III NBIS				
VACUUM VESSEL				
TITLE				
STEEL REAR PLATE				

THE MATERIAL SELECTED IS AISI C1008 PLATE. IT IS SELECTED FOR ITS MAGNETIC PROPERTY. THE C1008 MATERIAL IS NON ASME CODE APPROVED, BUT THE CODE DOES NOT INCLUDE 15 PSIG VESSELS. THE CODE SAFETY FACTOR OF FOUR IS FOLLOWED IN CALCULATING THE PLATE THICKNESS. THE TENSILE STRENGTH OF THE C1008 IS TESTED BY ANAMET LABORATORY, INC IN BERKELEY, CALIFORNIA.

TENSILE STRENGTH OF C1008

LONGITUDINAL DIRECTION = 45,300 psi

TRANSVERSE DIRECTION = 45,600 psi

THE ALLOWABLE STRESS, S_A , IS

$$S_A = \frac{45,300}{4} = 11,325 \text{ psi}$$

THE FLAT PLATE EQUATION FROM UG-39(d) 2 ON P. 37 (ALSO ON P. 16 OF M5207) IS

$$t = d \sqrt{2 \left(\frac{C P}{S_A E} + \frac{1.9 W h_g}{S_A E d^3} \right)}$$

$$d = 90.6 \text{ in}$$

$$C = 0.3$$

$$P = 15 \text{ psi}$$

$$E = 1$$

$$W h_g = 221,184 \text{ in-lb}$$

FROM P. 15 OF M5207

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THE MINIMUM THICKNESS IS

$$t_{\min} = 90.6 \sqrt{2 \left[\frac{(0.3)(15)}{(11,325)(1)} + \frac{(1.9)(221,184)}{(11,325)(1)(90.6)^3} \right]}$$

$$= 2.710 \text{ in}$$

THE PLATE THICKNESS WILL BE 2.875 in. PLUGGING THE THICKNESS BACK INTO THE EQUATION AND CALCULATE S_A .

$$S_A = 2 \left(\frac{90.6}{2.875} \right)^2 \left[(0.3)(15) + \frac{(1.9)(221,184)}{(90.6)^3} \right] = 10,060 \text{ psi}$$

$$4S_A = 4(10,060) = 40,240 \text{ psi}$$

THIS MEANS THE 2.875 in C100B PLATE CAN HAVE A 5,000 PSI VARIATION IN THE MINIMUM TENSILE STRENGTH.

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