p8-22

Equations

Problem 8.22

The data shown were gathered from a series of Charpy impact tests on a tempered 4340 Steel alloy.

The average of the maximum and minimum impact energies is

$$\mathit{Impact}_{Avg} = \frac{105 + 24}{2} \tag{1}$$

The second impact energy is 50 J

$$\mathit{Impact}_{50} = 50 \tag{2}$$

Now by interpolation from the table we get the answers.

$$\frac{\left(\mathit{Impact}_{Avg} - 63\right)}{(97 - 63)} = \left(T_{Avg} - (-100)\right) / \left(-75 - (-100)\right) \tag{3}$$

$$\frac{\left(\mathit{Impact}_{50} - 40\right)}{(63 - 40)} = \left(T_{50} - (-113)\right) / \left(-100 - (-113)\right) \tag{4}$$

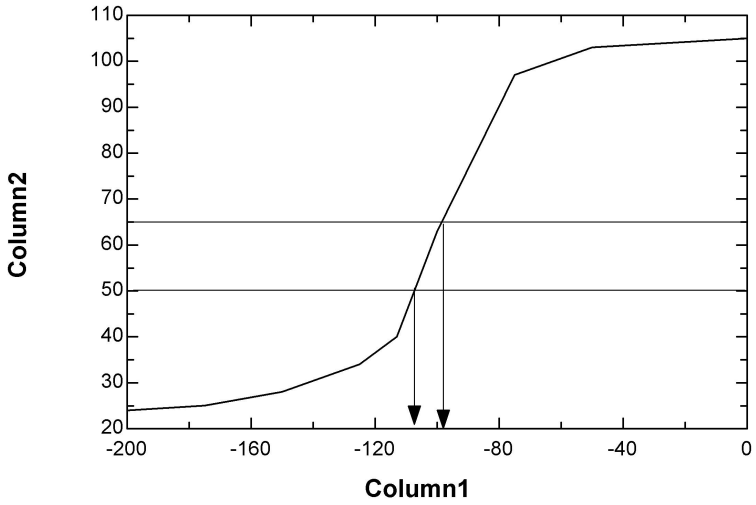
Solution

$\mathit{Impact}_{50} = 50$ $\mathit{Impact}_{Avg} = 64.5$
$T_{50} = -107.3$ $T_{Avg} = -98.9$

Lookup 1

Row	*Column1*	*Column2*
1	0	105
2	-25	104
3	-50	103
4	-75	97
5	-100	63
6	-113	40
7	-125	34
8	-150	28
9	-175	25
10	-200	24

Plot 1


110
100
90
80
70
60
50
40
30
20
Column2
-200
-160
-120
-80
-40
0
Column1