



Hashemite University

Faculty of Engineering

Mechanical Engineering Department

Strength of Material Lab

Group #:.....

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Experiment Title: Compression Test

Experiment date: 22/10/2020

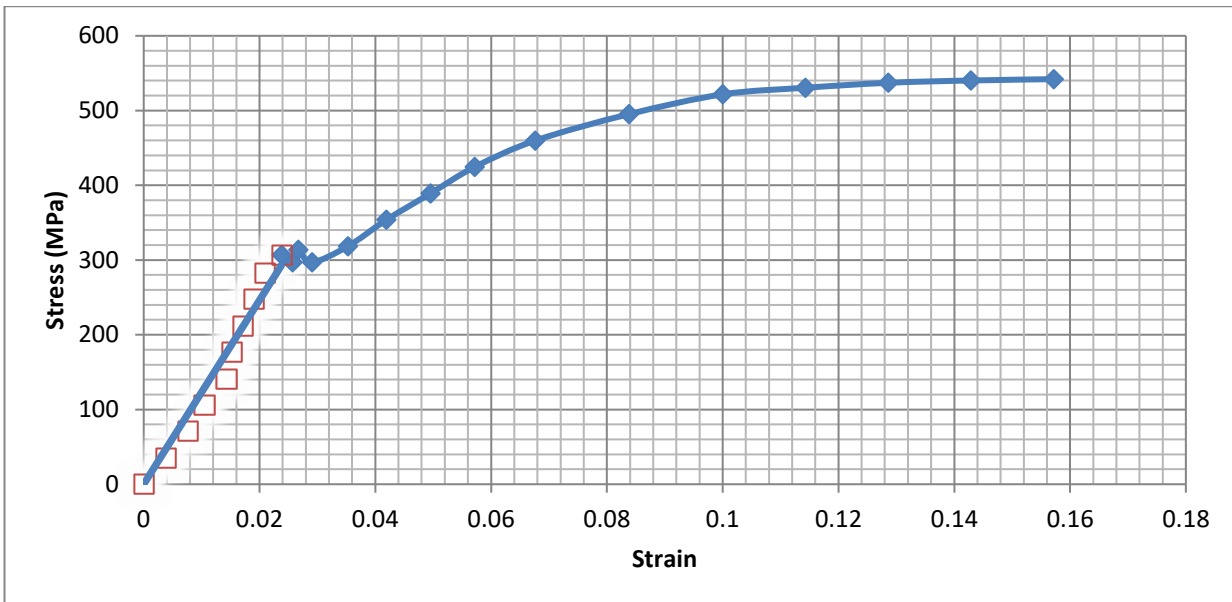
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No.	Item	Answer	No.	Item	Answer
1	Proportional Limit	310	2	Yield Strength	24.74 KN
3	Yield Strength for an offset of 0.2%		4	Ultimate and fracture stress	540 Mpa
5	Percentage of shortening	15.8% Solution: $(L_0 - L) / L_0 * 100\%$	6	Final Length	8.42mm Solution: $e = (L_0 - L) / L_0$ $0.158 = (0.01 - L) / 0.01$ in mm
No.	Item	Answer	No.	Item	Answer
7	Final Area	$9.3278 * 10^{-5}$ Solution: $L_0 * A_0 = L * A$ $A = (0.01 * 7.854 * 10^{-5}) / 8.42 * 10^{-3}$	8	Percentage of increasing in Area	18.76% Solution: $(A - A_0) / A_0 * 100\%$
9	Modulus of Elasticity	12.5 GPa Solution: $E = \text{slope} = (100 * 10^6 - 0) / (0.008 - 0)$	10	Modulus of Resilience	4.095MPa Solution: $0.5(315 * 10^9 * 0.026)$
11	Modulus of Toughness	56.88MPa Solution: $3/2(540 * 10^6 * 0.158)$	12	Shear Modulus of Elasticity*	5.04MPa Solution: $12.5 * 10^9 / 2(1 + 0.24)$

13	<i>Bulk Modulus of Elasticity*</i>	8.013 Mpa Solution: $K = EW/3(1-2V)$ $= 12.5 \cdot 10^{-9} / 3(1-2V)$		

Given that a Compression Test is applied on **Brass** specimen initially has **9mm Diameter** and **10 mm Height**, the result was **the Stress-Strain curve** below:



Q1: According to this result, fill the table below with units (show your calculations in details in the provided space):

*Use the Poisson's Ratio as **0.24**.

Q2: State the **differences** between **compression** and **tensile test**.

	Tensile Test	Compression Test
Load Direction	Outward to steel	Inward to steel
The change in length	elongation	shorten
The change in cross section area	decrease	increase
Ultimate Strength	Higher	Lower

Q3: State the **differences** between the **brittle material** and the **ductile material** with respect to each test (Tensile & Compression Tests).

Answer :

*ductile material : can be drawn into wires ,show deformation and affected by temperature .
On the other hand . Brittle material : can breaking ,cracking or snapping easily ,do not show deformation and it is affected by pressure (stress).

Q4: is the **Compression Test** needs **higher energy** than **Tensile Test** or not? State Why?

Answer: Yes; because the ultimate stress in compression test is higher than tensile test .

Q5: Why we need to **lubricate** the surfaces of the specimen?

Answer : to reduce the friction between the plate of machine and sample .