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**Abstract**

The need for systematic evaluation of the working qualities of molding sands has led to the development of a wide range of sand control tests. Production of sound casting largely depends upon uniform and good quality of molding sand.

**Keywords:**

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**Introduction**

**Different type of Sand Control Test**

- ❖ Shatter Test
- ❖ Strength Test
  - Compressive strength
  - Tensile strength
  - Shear strength
- ❖ Permeability Test

**Shatter Test Highlight**

- ❖ This test measure toughness of sand ,sand mix, coal, coke and soil
- ❖ Measure toughness of sand mix.
- ❖ Capacity of sand mix to withstand rough handling and strain during pattern withdrawal.
- ❖ It is specified by a shatter index number.

**Process**

- ❖ Standard specimen to fall through a given height onto a steel anvil.
- ❖ The broken pieces are put on a 12mm sieve.
- ❖ The ratio of the weight retained on the sieve to the total weight.
- ❖ Percentage gives shatter index.

**EXAMPLE**

Total weight of sample = 50gram  
Weight retained by sieve = 40 gram  
Weight pass by sieve = 10 gram  
Percentage= $40/50 \times 100=80\%$



*Shatter testing equipment*

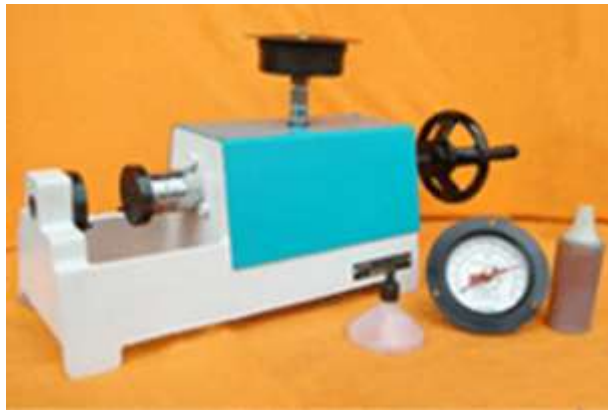
**Strength Test**

**Strength testers are used to estimate the**

- ❖ Compressive
- ❖ Tensile
- ❖ Shear strength.

**Compressive strength**

- ❖ Compressive strength is the pressure required to rupture standard AFS Specimen when subjected to compressive Force.
- ❖ The testing specimen is placed between the Jaw, one static and another moving perpendicular to the force of specimen.
- ❖ The pressure is increasing continuously.



Noted down the reading where the rupture in specimen taken place.

**Observation**

S.NO	COMPRESSIVE STRENGTH
01	5.4X100 gm./cm <sup>2</sup>
02	5.1x100 gm./cm <sup>2</sup>
03	5.2x100 gm./cm <sup>2</sup>

$$\text{Average compressive strength} = \frac{15.7 \times 100}{3} \text{ gm./cm}^2 = 5.23 \times 100 \text{ gm./cm}^2$$

**Shear Strength**

- ❖ Shear strength is the force required on the surface to rupture standard AFS specimen when subjected to shear force.
- ❖ Shear strength is half of the compressive strength.

**Process**

- ❖ The testing specimen is placed between the jaw, one static and another moving perpendicular to the force of specimen.
- ❖ The pressure is increased continuously.
- ❖ Note down the reading where the rupture in specimen takes place.



**Observation**

S.NO	SHEAR STRENGTH
01	2.1 gm./cm <sup>2</sup>
02	2.2 gm./cm <sup>2</sup>
03	2.15 gm./cm <sup>2</sup>

$$\text{Average shear strength} = \frac{6.45 \times 100}{3} \text{ gram/cm}^2 = 2.15 \times 100 \text{ gram/cm}^2$$

**Tensile Strength**

- ❖ Tensile strength is the pressure required to standard specimen when subjected to tensile force.

**Process**

- ❖ The testing specimen is placed between the jaw, one is static another is moving perpendicular to the force of specimen.

- ❖ The tensile force is increasing continuously
- ❖ Note down the reading where the rupture in specimen taken place



**Permeability tester**

**Observation**

S.NO	TENSILE STRENGTH
01	4.6X100 gm. /cm <sup>2</sup>
02	4.3X100 gm. /cm <sup>2</sup>
03	4.1X100 gm. /cm <sup>2</sup>

Average tensile strength =  $13.0 \times 100 / 3$  gram/cm<sup>2</sup>  
 = 4.33x100 gram/cm<sup>2</sup>

**Permeability Test**

- ❖ Permeability is defined as the volume of air going from one side in one minute under a pressure difference of 1gram/cm<sup>2</sup> and through a cross- sectional area of 1 cm<sup>2</sup>.

Experimental value we obtained

Permeability number =  $V.H/P.A.T$

- where
- V= volume of air
  - H =height of specimen
  - P =pressure difference
  - A= area of cross-section of specimen
  - T=time (min)

**Process**

- ❖ Take about 4kg of sand.
- ❖ 160 gram of sodium bentonite.
- ❖ 200cc water in a measuring cylinder.
- ❖ Mix the above components using small capacity sand muller.
- ❖ Take out the sand mix and make sample using hand sand rammer.
- ❖ Kept the sample on the permeability water and taken the reading which shown by the equipment.

**Observation**

S.NO	PERMEABILITY
01	243
02	205
03	227

AVERAGE =  $675 / 3 = 225$

### Conclusion

By experiments to do different type of sand control test

- ❖ We know the condition of sand.
- ❖ We know the strength of the sand.
- ❖ Control the molding sand properties.
- ❖ Production of sound castings largely depends upon good quality of sand.

### References

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