

Testing of Cores Sands

By:

Pushkraj Janwadkar

CEO & Executive Director

Versatile Equipments Pvt. Ltd.

We know that, there is a wide variety of cores with wide variety of base materials which, are used in foundries today. To name a few,

1. Resin coated sand cores
2. Cold box Cores
3. CO2 cores (Silicate based)
4. No-bake / Air set cores
5. Green sand cores etc.

Testing of the cores becomes a necessity since, it forms an internal surface of the casting and most of the times the core is surrounded by metal from all sides and is liable for production of scrap if the core quality deteriorates.

Following shall be the flow of proceeding article

- Representative Sample
 - Drawing Sample
 - Reducing the drawn sample
 - Basic Set of common tests
 - Equipment selection
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Before proceeding towards testing we must understand basics of sampling and sample preparation for testing.

Representative Sample

Before testing we must make sure that the sample being tested represents the bulk that we are planning to analyze for usability or correction or raw material acceptance.

Free flowing sand has a tendency of segregating immediately upon shifting of place or vibrations that's the reason why it is difficult to obtain a *representative* sample.

- **Drawing the Sample:**

If sand is in heap or trolley, the complete section of sand right from top of the heap to bottom needs to be sampled to get representative sample for which a simple equipment called Sand Sampler (VJS) is used. The sand sampler has vertical slot which collects sample at various depths to make a fairly representative sample.

For Moving sand we must make sure that, complete cross-section of the moving sand falls in to our sample collection basket.

For Prepared sand which is being collected in sample collection bin can directly be taken for further process.

- **Reducing the drawn sample:**

Once sample quantity is obtained it may have to be reduced to further smaller quantity to directly use for testing.

Sample splitter (VJL) is the equipment which can divide the sample in two representative halves on each pass of sample through the equipment thus providing efficient means of obtaining small quantity of representative sample.

As a bottom line, one may opt for Sand sampler and Sand splitter to obtain a representative sample which can enhance accuracy of further testing and help the user obtain reliable and repeatable results.

Basic set of common tests

1. Hardness : Scratch Hardness
2. Strength:
 - a. Tensile
 - b. Transverse
 - c. Shear
 - d. Compression
3. Gas evolution
4. Permeability
5. Clay contents
6. Dilation & distortion properties



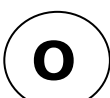
Equipments Selection for Core Sand Combinations:

Testing of Sands has mainly two aspects after drawing representative sample from bulk

1. Specimen preparation
2. Testing

We must make sure that, before thinking about opting for a test we must have the necessary sample preparation accessories. We should also know the standards of testing which are going to be followed and instruct manufacturer accordingly for specimen size. Example of Standards being: IS (Indian Standards), AFS (American Foundry Society Standards,) DIN Standards etc

In the following section, simple list of equipments is given to have a formidable Sand testing laboratory in place followed by a selection chart.

Legend for the Selection Chart		
Sr	Symbol	Meaning
1		Necessary : Equipment is a must to run the test
2		Equivalent : Indicates that, there are other methods to run the test
3		Optional : Indicates that the equipment is optional yet may be required for better results

Note: Reader may acquire Photos and information of individual equipment from <http://www.sandtesting.com/showlist.php>

Basic Green + Cold Box Sand testing	Basic No-bake Sand testing	Advanced Green + Cold Box Sand testing	Green Sand + Shell Sand testing	CO2 Sand Testing
Sand Rammer	Tensile Strength Core Box	Pneumatic Squeezer /Sand rammer	Sand Rammer	Tube Filler Accessory
Tube Filler Accessory	Transverse Core Box	Tube Filler Accessory	Tube Filler Accessory	Sand Rammer
Sand Rammer Base	Tensile Strength Accessory	Splitting Strength Accessory	Sand Rammer Base	Base Block
Universal Sand Strength Machine	Transverse Testing Accessory	Core Tensile Strength Accessory	Universal strength machine	Electropermeter
Tensile Strength Accessory	Universal Strength machine	Core Transverse Testing Accessory	Splitting Strength Accessory	Permeability Meter
Splitting Strength Accessory	Permeability meter	Permeability meter	Hot shell tensile tester (Shooter mounted)	Mould Perm Tester
Permeability meter	Mold Permeability Accessory	Mold Permeability Accessory	Shell Transverse Attachment	Core Permeability Tube
Base Permeability Accessory	Base Permeability Accessory	Base Permeability Accessory	Cold Shell Tensile Strength Accessory	Core Hardness Tester
Sieve Shaker	Core permeability accessory	Core permeability accessory	Permeability meter	Universal Strength Machine (Hydraulic)
Set of Sieves	Sieve Shaker	Sieve Shaker	Core permeability Accessory	High Strength Attachment
Sand splitter	Set of sieves	Set of sieves	Sieve shaker	Splitting Strength Attachment
Methylene Blue Clay Tester	Sand splitter	Sand splitter	Set of Sieves	Tensile Strength Attachment

Ultrasonic Cleaner	Core Sand Mixer	Methylene Blue Clay Tester	Sample Splitter	Shear Strength Attachment
Cold Box Shooter	Digital Balance	Ultrasonic Cleaner	Methylene Blue Clay Tester	Transverse Strength Attachment
Lab Muller	Core gas determinator	Cold Box Shooter	Ultrasonic Cleaner	Tensile Strength Attachment
Core Sand Mixer	Drying Oven	Lab Muller	Sand Shooter	Splitting Strength Attachment
Digital Balance	Mold Hardness Tester (B Scale)	Core Sand Mixer	Hot Distortion Tester	Sand Mixer
Auto Clay washer	Core Hardness Tester	Wet Tensile Tester	Digital Balance	Co2 Gassing Accessories For Tensile Specimen
Rapid Dryer	Impact penetration tester	Hot Distortion Tester	Auto Clay washer	Co2 Gassing Accessories For Transverse Specimen
Moisture teller		Dilatometer	Core gas determinator	Co2 Gassing Accessories For Compression Specimen
Mold Hardness Tester (B-Scale)		Sand Rammer For Dilatometer	Rapid Dryer	Tensile Core Box
Core Hardness Tester		Digital Balance	Moisture teller	Transverse Core Box
Mouldability/ Friability tester		Auto clay washer	Mold Hardness Tester (B-Scale)	
		Rapid Dryer	Stick point tester	
		Moisture teller	Core Hardness tester	
		Universal Strength	Impact penetration	

		machine (Digital)	tester	
		Shear strength Accessory	Mouldability/ Friability tester	
		Analytical Balance		
		Mold Hardness Tester (B- Scale)		
		Impact penetration tester		
		Mouldability/ Friability tester		

Author:

Pushkraj Janwadkar

CEO & Executive Director

Versatile Equipments Pvt. Ltd.

B69 MIDC Gokul Shirgaon,
Kolhapur, Maharashtra -416234

INDIA

pushkraj@versatile.in

+91-9822681608

+91-9325810777
