



Fifth Edition

MOLD & CORE TEST HANDBOOK

Published by the **American Foundry Society**

EXAMPLE LABORATORY REPORT FORMS

A most important aspect of sand control is careful documentation and maintenance of data. This becomes even more significant as casting problems arise, and the necessity exists for analysis of all production factors to permit careful review and study of trends.

The maintenance of data depends upon the detail with which information is recorded. Variations in the general format of sand test reports will manifest themselves, depending upon the amount of testing performed. A number of examples of sand test report forms are presented as a guide from which individual company report forms can be developed.

If you have any questions about the forms, please contact AFS Customer Service at:
estoreservices@afsinc.org

AFS GRAIN FINENESS NUMBER

Date: _____

Test Number: _____

Material/Sand Type: _____

Tester: _____

USA Sieve No.	Amount Retained on Sieve		Multiplier	Product
	Grams	Percent		
6			.03	
12			.05	
20			.10	
30			.20	
40			.30	
50			.40	
70			.50	
100			.70	
140			1.00	
200			1.40	
270			2.00	
Pan			3.00	
Total				

AFS Grain Fineness Number: _____

GREEN PROPERTIES (AFS STANDARD 2" X 2" SPECIMEN)

Date: _____

Test Number: _____

Material: _____

Tester: _____

Moisture (percent by weight)						
Density (in grains)						
Permeability Number						
Mold Hardness " ? "Scale (3 rams)						
Green Compression Strength (psi)						
Compactibility (percent)						

DRY COMPRESSION STRENGTH (AFS STANDARD 2" X 2" SPECIMEN)

HOT COMPRESSION STRENGTH (AFS STANDARD 1-1/8" X 2" SPECIMEN)

Dry Compression Strength (psi)						
Hot Compression Strength	psi @ 1650F (899C)					
	psi @ 1850F (1010C)					
	psi @ 2000F (1093C)					

SIEVE ANALYSIS, AFS CLAY CONTENT AND LOSS ON IGNITION

USA Standard Sieves (In accordance with ASTM Specification E11-70 and ISO)	Standard	Alternate					
	3.35 mm	No. 6					
	1.70 mm	No. 12					
	850 μm	No. 20					
	600 μm	No. 30					
	425 μm	No. 40					
	300 μm	No. 50					
	212 μm	No. 70					
	150 μm	No. 100					
	106 μm	No. 140					
	75 μm	No. 200					
	53 μm	No. 270					
	PAN	PAN					
Total Weight (grams)							
AFS Clay Content < 20 μm (percent by weight)							
AFS Grain Fineness Number							
Loss on ignition (percent by weight) @1850°F (1010°C)							

REMARKS:

SAND—PHYSICAL PROPERTY TESTS

Date: _____

Test Number: _____

Material: _____

Tester: _____

	Physical Properties				
Green Sand Tests	Moisture				
	Green Permeability				
	Green Compression				
	Mold Hardness				
	Compactability				
	Specimen Weight				
Dry Sand	Compactability				
	Specimen Weight				
Miscellaneous Tests	Combustible				

Sand-Physical Property Tests (page 2 of 2)

Screen Analysis

<i>U.S. Mesh</i>					
6					
12					
16					
20					
30					
40					
50					
70					
100					
140					
200					
270					
PAN					
Total Screen					
minus 20 Micron AFS Clay					
Total					
AFS Grain Fineness No.					

FINENESS TESTS

Date: _____

Test Number: _____

Material: _____

Tester: _____

U.S. Sieve Series	Percent Retained
6	
12	
16	
20	
30	
40	
50	
70	
100	
140	
200	
270	
PAN	

AFS Fineness No.	
AFS Clay	
Specimen Weight	
Moisture	
Permeability	
Compactability	
Green Compression Strength	
Green Shear Strength	
Mold Hardness	
Loss on Ignition	

BINDER EVALUATION WORKSHEET CHEMICALLY BONDED, SELF-SETTING

Date: _____

Test Number: _____

Material: _____

Tester: _____

Date:	Humidity:	Percent RH	Temperature (°F/°C) ____ °F (____ °C)
-------	-----------	------------	--

Component	Name	Amount	Percent	Temp
Sand				
Additive I				
Additive II				
Catalyst				
Binder				

Bench Life

Time: _____

Number of Rams: _____

	Time
Mixing Complete	
Sand in Test Box	
Stripped	

Test Box		
Time	Temperature	Hardness

Tensile Test 93%RH **Average**

1. 7.

3. 9. **Stabilized Humidity**

5. 11. **Stabilized Humidity**

Total **Weight**

Tensile Test %RH **Average**

2. 8.

4. 10. **Stabilized Humidity**

6. 12. **Stabilized Humidity**

Total **Weight**

G.C.S. **Time** **Value**

COLD BOX EVALUATION WORKSHEET

BENCH LIFE

Date: _____ Time Started: _____

Mix No.: _____ Time Finished: _____

Material ID: _____ Tester: _____

Time	Minutes after completion of mix			Time	Minutes after completion of mix		
	Density	Tensile Strength	Scratch Hardness		Density	Tensile Strength	Scratch Hardness
1				1			
2				2			
3				3			
Avg.				Avg.			

Time	Minutes after completion of mix			Time	Minutes after completion of mix		
	Density	Tensile Strength	Scratch Hardness		Density	Tensile Strength	Scratch Hardness
1				1			
2				2			
3				3			
Avg.				Avg.			

Time	Minutes after completion of mix			Time	Minutes after completion of mix		
	Density	Tensile Strength	Scratch Hardness		Density	Tensile Strength	Scratch Hardness
1				1			
2				2			
3				3			
Avg.				Avg.			

COMMENTS:

HOT BOX EVALUATION WORKSHEET

Date: _____ Time Started: _____

Mix No.: _____ Time Finished: _____

Material ID: _____ Tester: _____

Formulation

Lot No. _____ Resin Type _____ Product No. _____ Source _____

Lot No. _____ Additive _____ Product No. _____ Source _____

Lot No. _____ Additive _____ Product No. _____ Source _____

Lot No. _____ Additive _____ Product No. _____ Source _____

Total Sand _____ GMS Total Resin _____ GMS _____ % based sand

Catalyst Weight in Mixture _____ GMS _____ % based sand

Additive Weight in Mixture _____ GMS _____ % based sand

Additive Weight in Mixture _____ GMS _____ % based sand

Slow Pressure _____ (psi) Blow Time _____ (seconds) Cure Temperature _____ (____) °F (°C)

Hot Tensile Strength (psi) 10 seconds after removal from core box

Cure Temperature _____ (_____) °F (°C) Time: _____

Cure Time (seconds)	20	30	40	50	60
Sample #1					
Sample #2					
Average					

Hot Tensile Strength (psi) 5 minutes after removal from core box

Cure Temperature _____ (_____) °F (°C) Time: _____

Cure Time (seconds)	20	30	40	50	60
Tensile Strength					
Density					
Scratch Hardness					

Cold Tensile (psi)

Cure Temperature _____ (_____) °F (°C)

Time: _____

Cure Time (seconds)	20	30	40	50	60
Sample #1					
Sample #2					
Average					

Density (grams)

Cure Temperature _____ (_____) °F (°C)

Time: _____

Cure Time (seconds)	20	30	40	50	60
Sample #1					
Sample #2					
Average					

Scratch Hardness

Cure Temperature _____ (_____) °F (°C)

Time: _____

Cure Time (seconds)	20	30	40	50	60
Sample #1					
Sample #2					
Average					