

# AHLSTROM



Laboratory Applications  
of Filter Paper:  
Mining



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# Mining Laboratory Applications of Filter Paper



## ASTM – American Standard Test Methods

### ASTM E278-01 Determination of Phosphorus in Iron Ores

This test has two filtration stages. The first stage can use a qualitative filter, such as grade 631. The second stage requires a hardened, ashless, fine filter. **Grade 95** is recommended.

### ASTM E314-10 Determination of Manganese in Iron Ore

The precipitate from this procedure is very fine and is ashed for a quantitative analysis. The procedure also requires a strong filter when wet. **Grade 95** is a perfect selection for this procedure.

### ASTM E316-11 Determination of Iron in Manganese Ore

This precipitate is larger and requires a medium retention, medium flow ashless grade. **Grade 74** is the recommended media.

### ASTM E738-11 Determination of Aluminum in Iron Ore

This procedure calls for a medium textured qualitative filter for aluminum determination. **Grade 601** is ideal.

### ASTM E945 Zinc Determination in Iron Ore

The zinc is extracted from the ore and precipitated, then collected on **Grade 601**.

### ASTM D2492-02 Forms of Sulfur in Coal

**Grade 74** is used during the initial extraction and to determine the percent of pyritic sulfur. **Grade 54** and **Grade 94** are used to determine the percent of sulfate sulfur.

### ASTM D3177-02 Total Sulfur in the Analysis Sample of Coal and Coke

There are two filtration stages in this procedure. The first stage requires a qualitative filter to remove the non-dissolved portion of the digested material. **Grade 601** is recommended for this step. The second step requires a quantitative filter for collecting and measuring barium sulfate precipitate. **Grade 94** is recommended for this step.

### ASTM D4371-06 Determining the Washability Characteristics of Coal (Float/Sink)

The effectiveness of chemical treatment used to float particulate waste in treatment facilities often requires this test evaluation. The filter paper must have sufficient throughput so that the drainage rate is not adversely affected. **Grade 615** is commonly used in this application.

### ASTM D5263-93 Determining the Relative Degree of Oxidation in Bituminous Coal by Alkali Extraction

The amount of humic acid present in coal correlates to the degree of oxidation. Because of the high solids loading, and presence of fines, the test recommends using a bi-layer filter. **Grade 74** is used as the pre-filter and **Grade 94** as the main filter. This will provide the necessary filtration and ash properties needed for the procedure.

## CFR – Code of Federal Register

### 40CFR SW-846 Method 1311-Toxicity Characteristic Leaching Procedure (TCLP), Sludge

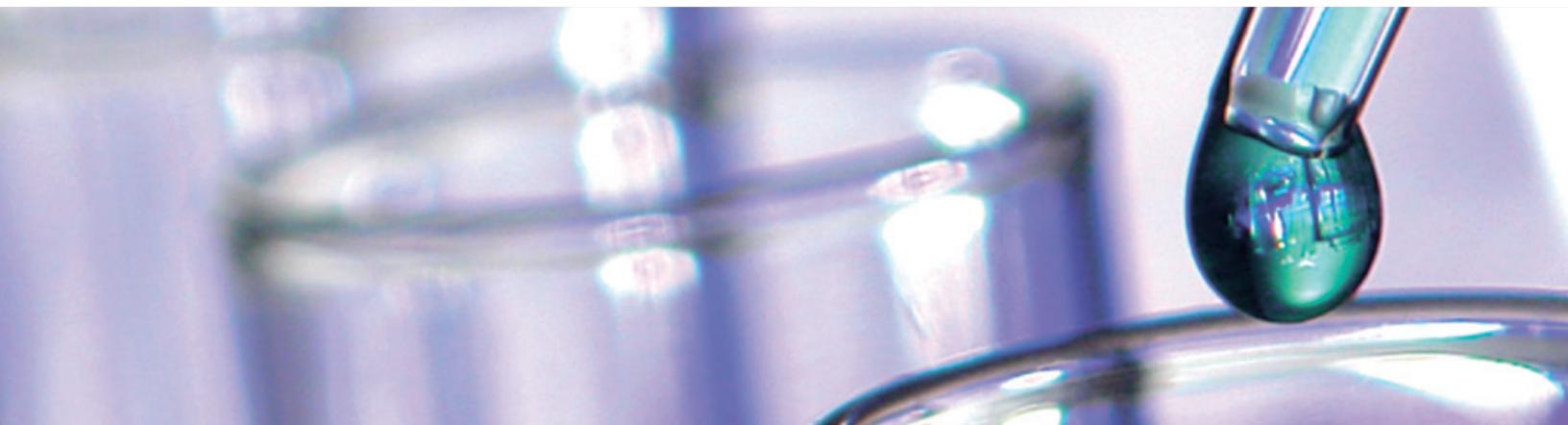
The propensity of sludge to leach potentially hazardous material into the ground water is analyzed with this method. **Grade 151** meets the specified retention and chemical inertness requirements.

### 40CFR60 App A Method 5-Determination of Particulate Matter Emissions from Stationary Sources

Air emissions are sampled over a set amount of time through a glass microfiber filter, such as **Grade 161**, maintained at a temperature of 120°C. The mass of particulate matter deposited on the filter is then analyzed gravimetrically. The low mineral content, high reflectance, chemical resistance, loading capacity and heat resistance makes this the ideal media for this test.

### 40CFR60 App A Method 17-Determination of Particulate Matter Emissions from Stationary Sources

This method is used instead of Method 5 when the amount of particulate matter is considered independent of temperature. With the thermal requirement eliminated, **Grade 111** becomes the better recommendation because it has a higher throughput than **Grade 161** while maintaining the necessary low mineral content and chemical resistance.



## STM – Standard Test Methods for the Examination of Water and Waste Water, 22nd Edition

### **STM 2540 Total, Dissolved, Suspended, Fixed and Volatile Solids**

Test method for the measurement of matter suspended or dissolved in water or wastewater. These solids analyses are important for the control of biological and physical wastewater treatment processes and for assessing compliance with regulatory agency effluent requirements. **Grade 161** is our traditional recommendation and continues to be effective. **Grade 169** is a newer grade designed specifically for gravimetric analysis. It has an improved ability to maintain the same weight before and after the drying procedure and is Ahlstrom's current preferred recommendation for this test.

### **STM 2710.B,D,E Tests on Sludges: Oxygen-Consumption Rate, Sludge Volume Index, Zone Settling Rate**

Each of these tests requires the suspended solids concentration to calculate the property of interest. This value is determined via STM 2540, which calls for **Grade 161** or **169**.

### **STM 2710.G Tests on Sludges: Capillary Suction Time**

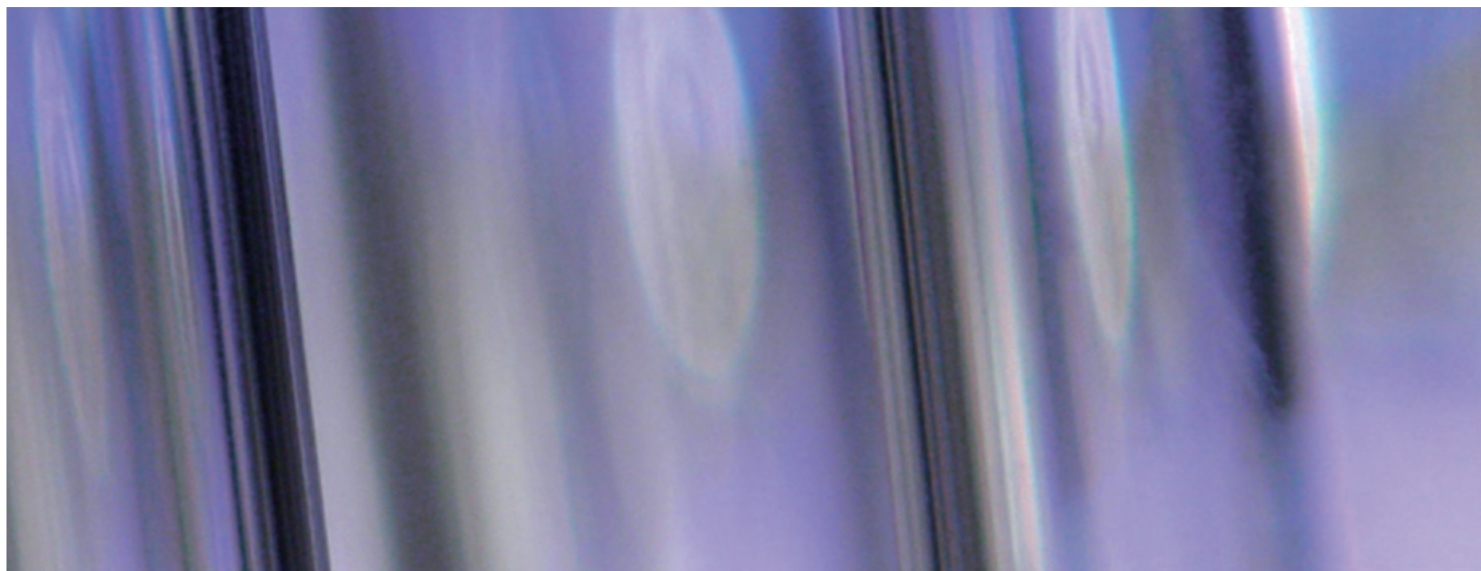
This test measures the rate at which water will be released from sludge. The results help determine any necessary treatments needed to assist in the de-watering process of the sludge. **Grade 243** has the absorption characteristics needed for this application.

### **STM 2710.H Tests on Sludges: Time-to-Filter**

This simpler measurement correlates with the capillary suction time measured in STM 2710.G. Either **Grade 601** or **642** may be used.

### **STM4500-SO<sub>4</sub><sup>2-</sup>.C Total Sulfate in Water: Gravimetric Method**

The gravimetric method with ignition of residue calls for an acid-washed, ashless, hard-finish paper retentive enough for fine precipitate. These requirements are met by **Grade 95**.





## Brand Cross Reference

Ahlstrom	Media Type	Whatman	S&S	Advantec	Albet	Munktell
55	Quantitative	54	1505		FP1505	388
74	Quantitative	40	589/2	3, 5B	FP589/2	389, 390
94	Quantitative	42	589/3	5C	FP589/3	393
95	Hardened Quantitative	542, 50	1507, 589/5		FP1507, FP1574	391
111	Microfiber Glass	GF/A	GF52	GA-55	FPGF50	MGA
151	Microfiber Glass	GF/F	GF55	GF-75		MGF
161	Microfiber Glass	934AH	GF50			MG 550-HA
243	Absorbent		2668			151
601	Qualitative	1	597	2	2043A	FN3, BF1
610	Qualitative	5	602		FP602H	1293
631	Qualitative	4	595, 604, 2020B	1	2040A, FP604	1288, FN100, FN2
642	Qualitative	2		131, 232	2043B	FN5, FN6

The grade recommendations presented are made based on the methods as described in the standard, which may include suggestions of filter type, or on knowledge of current usage. The comparative data included herein is based on publicly available information and/or Ahlstrom's analysis and the comparative grades are not represented or warranted to be exact functional or performance equivalents. All users must make their own determinations and comparisons as to the suitability of any products for their intended end-use.

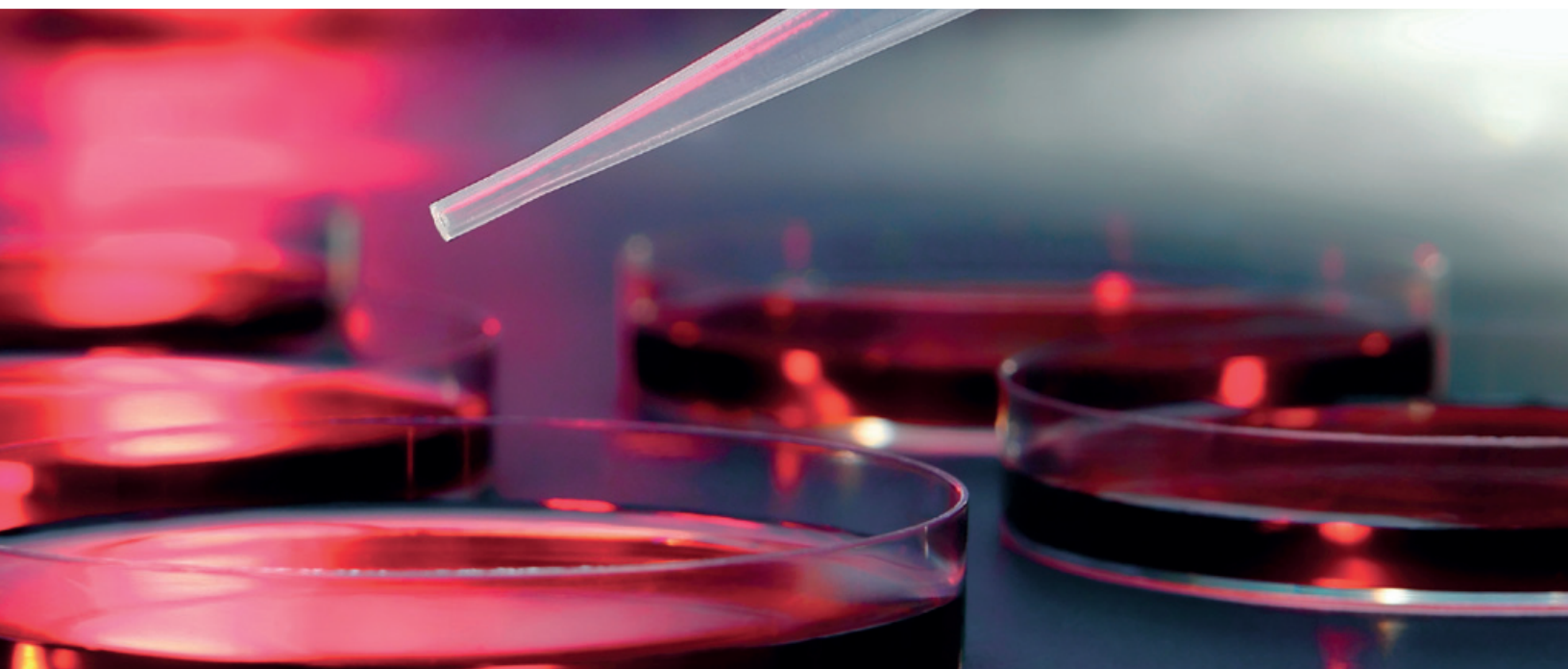
## ASTM E 832-81 Standard Specification for Laboratory Filters

The following is a table with the ASTM Types and Classes for lab filters. Ahlstrom Grade recommendations are listed.

Type I Qualitative	Description	Precipitate retention	Grade
AA	Very coarse, very fast, gelatinous	Ferric Hydroxide	615
A	Coarse, fast, gelatinous	Ferric Hydroxide	631
B	Medium precipitate, medium flow	Lead Sulfate	601
C	Fine precipitate, slow flow	Barium Sulfate	610
D	Hardened, fine precipitate, slow flow	Barium Sulfate	95
Type II Quantitative	Description	Precipitate retention	Grade
E	Coarse, fast, gelatinous	Ferric Hydroxide	54
F	Medium precipitate, medium flow	Lead Sulfate	74
G	Fine precipitate fine flow	Barium Sulfate	94

## Test Methods

Standard	Test Method	Title	Recommended Grade	Application
ASTM	E278-01	Determination of Phosphorus in Iron Ore	631, 95	Iron Ore
ASTM	E314-10	Determination of Manganese in Iron Ore	95	Iron Ore
ASTM	E316-11	Determination of Iron in Manganese Ore	74	Manganese Ore
ASTM	E738-11	Determination of Aluminum in Iron Ore	601	Iron Ore
ASTM	E945-07	Zinc Determination in Iron Ore	601	Iron Ore
ASTM	D2492-02	Forms of Sulfur in Coal	54, 74, 94	Coal
ASTM	D3177-02	Total Sulfur Analysis Sample of Coal and Coke	601, 94	Coal and Coke
ASTM	D4371-06	Washability Characteristics of Coal (Float/sink)	615	Coke Treatment Facilities
ASTM	D5263-93	Degree of Oxidation in Bituminous Coal by Alkali Extraction	74, 94	Coal
STM	2540.C	Total Dissolved, Suspended, Fixed and Volatile Solids	161 or 169	Water
STM	2710.B,D,E	Tests on Sludges: Oxygen Consumption Rate, Sludge Volume Index, Zone Settling Rate	161 or 169	Sludge
STM	2710.G	Tests on Sludges: Capillary Suction Time	243	Sludge
STM	2710.H	Tests on Sludges: Time-to-Filter	601 or 642	Sludge
STM	4500-SO <sub>4</sub> <sup>2-</sup> .C	Total Sulfate in Water: Gravimetric Method	95	Water, Wastewater
40CFR	Method 1311	Toxicity Characteristic Leaching Procedure	151	Wastewater, Sludge
40CFR60 App. A	Method 5	Determination of Particle Matter Emissions from Stationary Sources	161	Air Emissions
40CFR60 App. A	Method 17	Determination of Particle Matter Emissions from Stationary Sources	111	Air Emissions



# Stay ahead™

Ahlstrom is a high performance materials company, partnering with leading businesses around the world to help them stay ahead. Our products are used in a large variety of everyday applications, such as filters, medical gowns and drapes, wallcoverings, flooring, labels and food packaging. We have a leading market position in the businesses in which we operate. Our 5,200 employees serve customers in 28 countries on six continents. In 2011, Ahlstrom's net sales amounted to EUR 1.6 billion. The company's share is quoted on the NASDAQ OMX Helsinki. More information is available at [www.ahlstrom.com](http://www.ahlstrom.com).

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