

Shale Shaker Screen Designation

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Abstract

API RP 13C and ISO 13501 pertain to solids control equipment and provide many good guidelines for optimizing these tools to remove detrimental drilled solids. One important aspect of drilled solids removal involves dressing shale shakers with screens having the smallest openings possible. Shale shaker screens traditionally have been labeled with a “mesh” size. However, with the advent of multilayered screens and screens with various sized rectangular openings, this designation no longer adequately describes shaker screens, and the term “mesh” is now no longer used.

Shaker screens are now designated by determining the largest opening in the wire cloth. The API and ISO documents detailing the test procedures require the unknown screen to be placed in the middle of a stack of ASTM standard test sieves. Selecting the location for the unknown screen in the stack of test sieves can be an iterative, time consuming process. The ISO 13501 and API RP 13C documents have been modified to provide a quick screening tool for initial placement of the unknown screen.

The new screening tool called the “Finder’s Method” will be explained and the entire API RP 13C screen designation process further clarified.

Introduction

Drilled solids, or drill cuttings, are an inherent and unavoidable consequence of drilling an oil well. The disadvantages of the buildup of drilled solids in the drilling fluid have been well documented within the industry¹; indeed, on more than one occasion, drilled solids have been referred to as “evil”². The industry has made great strides to improve upon the first line of defense in drilled solids removal through technology advancements in both shale shakers and shale shaker screens. However, describing increasingly complex shale shaker screens has become more complicated as well.

Screen Designation History

Although the first drilling fluid screening devices came on the scene in the early 1930’s³, specific guidelines for shale shaker screen cloth designation were not released until 1977 by the American Petroleum Institute, or API. This “Recommended Practice” first described in API RP 13E⁴ specifically addressed single layers of screen cloth comprised of square or rectangular mesh, similar to woven wire classification sieves specified by ASTM E-11⁵. Square mesh

screens were relatively easy to designate using mesh count and aperture size (Figure 1, Screen A); however, screen cloth with rectangular openings required mesh count and aperture size in both directions. From the very beginning the API acknowledged that the term “mesh” did not adequately describe even the seemingly simple single-layer screen cloth, requiring additional parameters such as wire diameter and percent open area to be added to the final shaker screen description.

Multi-layered and “sandwich” screen cloth were developed to meet the many drill solids removal challenges such as screen blinding and the need for increasingly higher fluid processing rates. These new and complex screen configurations often resulted in a wide range of aperture sizes (Figure 1, Screen B), and the current “mesh” nomenclature could no longer adequately describe these new screens.

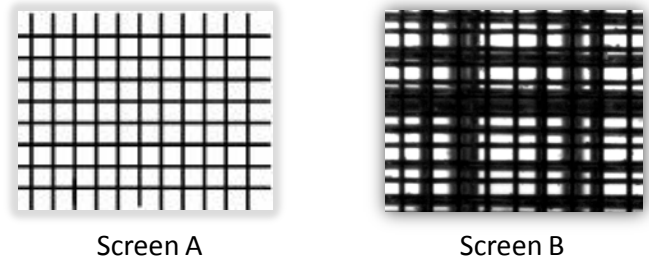


Figure 1. Two different magnified screen images depicting uniform aperture sizes (Screen A) and a wide range of aperture sizes (Screen B). *Images courtesy of Derrick Equipment Company.*

Separation Potential vs. Mesh

When computer-based image analysis was introduced to the industry by Allan Cutt in 1991⁶ the API was quick to incorporate this new method into the third edition of the API RP 13E⁷, describing modern shaker screens using a “separation potential” curve representing the theoretical volume distribution of all the opening sizes present in that particular screen configuration.

The separation potential curve for a shale shaker screen, according to API RP 13E, was to be described by three points (d_{16} , d_{50} and d_{84}) on the theoretical solids separation distribution curve. For sake of simplicity and to maintain consistency with other industrial woven wire mesh applications, the typical screen manufacturer often based their internal screen manufacturers’ labeling on D_{50} , a single value

indicator of the screen's separation⁶. The “D₅₀ cut point” as is often referred to in other industrial settings, is defined as the particle size where 50% (by volume) of particles pass through the screen and 50% are rejected over the screen⁸. Manufactures then correlated the D₅₀ to the aperture size and mesh designation of typical market grade cloth, tensile bolting cloth or ASTM Test Sieves (Table 1), and the final shale shaker screen cloth configuration, no matter how complex, maintained its “mesh” nomenclature.

Table 1. ASTM screen cloth designations⁵

ASTM sieve Designation [mesh count]	Nominal Aperture Size [micron]	Aperture Variation [± micron]	Maximum Aperture Size [micron]	Typical Wire Diameter [micron]
20	850	29.1	977	0.5
30	600	21.2	701	0.4
40	425	15.5	506	0.28
50	300	11.5	365	0.2
60	250	9.9	308	0.16
70	212	8.7	264	0.14
80	180	7.6	227	0.125
100	150	6.6	193	0.1
120	125	5.8	163	0.09
140	106	5.2	141	0.071
170	90	4.6	122	0.063
200	75	4.1	104	0.05
230	63	3.7	89	0.045
270	53	3.4	77	0.036
325	45	3.1	67	0.032
400	38	2.9	58	0.03

To illustrate, the image analysis method outlined by Cutt and adapted by API RP 13E is performed on two different screen mesh configurations, such as Screen A and Screen B depicted in Figure 1. The results of the analysis will yield different separation curves for each screen, with a much wider range of d₁₆, d₅₀ and d₈₄ for Screen B compared to Screen A (Figure 2). However, image analysis for each screen could also potentially yield nearly identical D₅₀ values. Based on both API RP 13E and ASTM screen cloth designations (Table 1), both screen manufactures could reasonably designate their screen as a “200 Mesh” screen with nominal and D₅₀ cut points of approximately 72 micron.

Although both screens were labeled according to the current recommended practice, correlating the maximum particle size allowed through the shaker screen (the D₁₀₀) with “mesh” size and the D₅₀ cut point continued to be confusing to the end users of the shaker screens in the field. Members of API Subcommittee 13, the group responsible for writing standards on Drilling, Completion and Fracturing Fluids, were continually asked the following questions:

1. “Which number should I look at when selecting a shaker screen?”
2. “Why do screens with similar part numbers (i.e. 200 mesh) separate particles differently?”

3. “How do I know if my shaker screen has been labeled properly?”
4. “How can I be assured that the screen I choose will remove particles down to the size I require?”
5. “What is the largest sized particle that the shaker screen will allow through into my drilling fluid?”
6. “What is the difference between screen ‘designation’ and screen ‘performance’?”

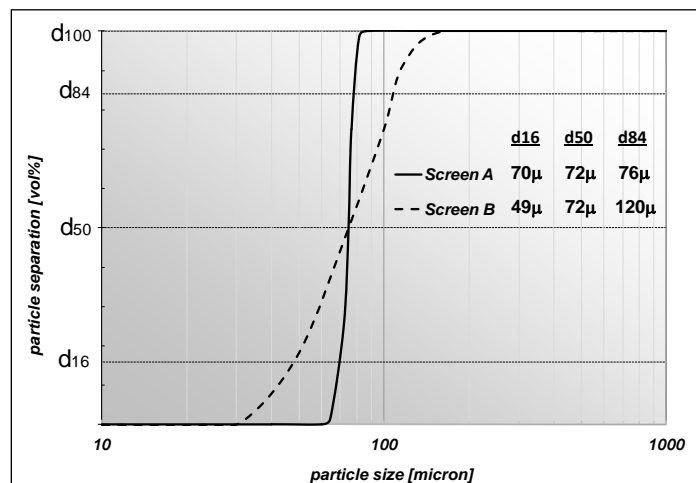


Figure 2. Theoretical separation curves of two different shaker screens

The New API RP 13C

Subcommittee 13 of the American Petroleum Institute has organized Task Group 5 to take on the challenges of answering these questions and reconciling the issues arising between D₅₀ cut point and D₁₀₀ maximum separation point. The cut point of a shaker screen is important and was the first problem addressed by the committee. Unfortunately, the cut point of a screen in the field under real operating conditions depends upon so much more than just the aperture sizes or distance between the wires of the screen cloth. The actual separation potential or cut point curve is largely dependent upon the size distribution of particles presented to the screen, not just the physical aperture sizes of the wire cloth. Shaker motion and energy (G-Force) combined with the multitude of different drilling fluid properties, additives, and even the drilled solids themselves all influence the separation performance of the shaker screen.

With so many variables affecting the overall performance of the shale shaker screen, the API Task Group chose to describe only physical aspects of the shaker screen itself and not address the performance of the screen. Rather than address “separation potential”, “cut point curve” or even “D₅₀ cut point”, the Task Group has elected to outline a procedure to describe the largest openings in the shaker screen, regardless of the range of aperture sizes or separation potential. This procedure was first released to the industry within the existing Recommended Practice 13C in 2004, and adapted as ISO 13501 in 2005 with the fourth and latest edition released in 2010⁹.

The full background on how Task Group 5 came to determine the final procedure has been documented in detail along with additional information about the test itself¹⁰. However, to further educate the industry on the differences between the new API RP 13C versus the replaced RP 13E, a Work Group within the Task Group has published a document relating to the most frequently asked questions about the recommended practice¹¹. The “Explanation and Frequently Asked Questions” is attached as an appendix to this paper.

API RP 13C procedure for screen designation

Shale shakers are the first line of defense in the removal of drilled solids and cuttings from the drilling fluid as the fluid arrives to surface via the flowline. As drilled solids flow across a shale shaker screen, they flow through any opening large enough for them to pass through. Many small solids pass through the large openings. The distribution of openings in a screen does not correlate with the distribution of solids passing through the screen because each size particle does not pass through only holes exactly its size. The size of the largest openings ultimately controls the quality of the drilling fluid remaining in the drilling fluid system. The procedure as defined by API Task Group 5 identifies the largest opening in the screen with a relatively simple laboratory procedure. The final procedure was validated by both independent and “round robin” comparison studies.

The API RP 13C was also destined to become an ISO Document; therefore, the word “mesh” could no longer be used, as the technical definition of “mesh” utilizes English units and ISO requires metric units. The term “mesh” is defined by ASTM as *number of wires or openings per linear inch*⁵. For example, to comply with the metric requirements of the ISO Standard Document, a 60 mesh screen would need to be re-labeled as 236 openings per meter, 23.6 openings per centimeter, or 2.36 openings per millimeter. A drastic shaker screen nomenclature change could potentially cause confusion during the screen selection process in the field and on the rig. In light of this, the new RP 13C “API Number” screen designations were prescribed to follow the ASTM Standard Sieve numbers.

Section 9 in the API Recommended Practice 13C details the procedure used to obtain maximum opening size screen of the unknown or test screen. The test screen is to be placed in the middle of a stack of four ASTM standard screens mounted on a sieve shaking device. The two screens above and two screens below the unknown screen are used to evaluate classification of aluminum oxide grit during the sieving process. A known distribution of four grit sizes matching the four ASTM screen sizes is added to the top screen, and all five screens are placed in a dry sieve shaking apparatus such as a Ro-tap® or other commercially-available motorized sieve shaking device.



Figure 3. API RP 13C screen designation testing apparatus. Image courtesy of Derrick Equipment Company

Following the prescribed 10 minute sieving period, the mass of grit captured on each screen is weighed. The grit remaining on the unknown test screen indicates the maximum particle size the test screen will allow to pass. The particle size is then correlated to ASTM Test Sieve numbers, and the screen designation or API Screen Number is determined according to Table 2.

Table 2. API RP 13C Screen Designation⁹

API Screen Designation	D100 Separation [micron]	API Screen Designation	D100 Separation [micron]
API 6	3075.0 - 3675.0	API 60	231.0 - 275.0
API 7	2580.0 - 3075.0	API 70	196.0 - 231.0
API 8	2180.0 - 2580.0	API 80	165.0 - 196.0
API 10	1850.0 - 2180.0	API 100	137.5 - 165.0
API 12	1550.0 - 1850.0	API 120	116.5 - 137.5
API 14	1290.0 - 1550.0	API 140	98.0 - 116.5
API 16	1090.0 - 1290.0	API 170	82.5 - 98.0
API 18	925.0 - 1090.0	API 200	69.0 - 82.5
API 20	780.0 - 925.0	API 230	58.0 - 69.0
API 25	655.0 - 780.0	API 270	49.0 - 58.0
API 30	550.0 - 655.0	API 325	41.5 - 49.0
API 35	462.5 - 550.0	API 400	35.0 - 41.5
API 40	390.0 - 462.5	API 450	28.5 - 35.0
API 45	327.5 - 390.0	API 500	22.5 - 28.5
API 50	275.0 - 327.5	API 635	18.5 - 22.5

Finder's method

Although the screen designation process detailed in API RP 13C is reproducible, laboratory technicians frequently had difficulty guessing which ASTM Standard Sieves to use for the screen designation test. Hours of guesswork and numerous iterations were often required to determine where the unknown test screen should be placed. To resolve this issue, the Finder's Method was incorporated into the API RP 13C to quickly determine initial placement of the test screen within the stack of standard ASTM screens. Although the Finder's Method is a useful screening tool, reliable and accurate screen designation and determination of the final API Number requires the standard screen designation procedure.

The Finder's Method calls for a known distribution of approximately 40 grams of aluminum oxide grit allotted in ~5.0 g increments from API 60 (250 micron) to API 230 (63 micron) as illustrated in Table 3. The entire mass of test grit is placed on the test screen and the screen positioned in the motorized sieve shaking device for 10 minutes. The mass of grit remaining on the screen at the end of the test is weighed. Based on the known mass of each grit size, the size of the smallest particle captured on the test screen can be approximated.

Table 3. Example of test grit distribution for the Finder's Method

ASTM Sieve Number	Nominal Aperture Size [micron]	Mass of Test Grit [gram]	Cumulative Mass of Test Grit [gram]
60	250	0.0	0.0
70	212	4.8	4.8
80	180	5.1	9.9
100	150	4.7	14.6
120	125	5.1	19.7
140	106	5.2	24.9
170	90	4.6	29.5
200	75	5.2	34.7
230	63	4.8	39.5

In this example, the ASTM Sieve Number is plotted versus cumulative mass of test grit as shown in Figure 4. After sieving the example grit distribution, 28 g of aluminum oxide grit was retained on the test screen. According to the cumulative plot, 28 g retained grit corresponds to a maximum aperture of 90 and 106 micron, corresponding with API 170 and API 140 screen designations, respectively. The test screen should therefore be placed between ASTM 170 and ASTM 140 standard test sieves when performing the API RP 13C screen designation procedure.

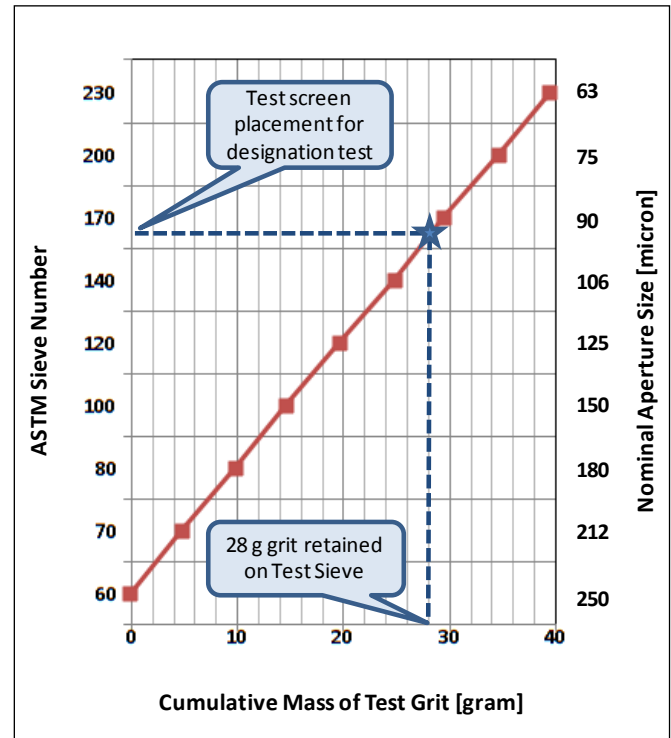


Figure 4. Finder's Method example results determining initial test screen placement between ASTM 140 and ASTM 170 test sieves.

Conclusions

1. As the shale shakers are the first line of defense in effective removal of evil drilled solids, the choice of shale shaker screens are critical.
2. Shale shaker screen technologies have improved over the years; however, describing and labeling increasingly complex screen configurations has also become very complicated.
3. Due to inconsistencies in screen labeling leading to ambiguous "mesh" designations, API RP 13E was replaced by API RP 13C to describe the maximum screen aperture size in a consistent, reproducible manner.
4. The grit remaining on the unknown test screen indicates the maximum particle size the test screen will allow to pass. The particle size is then correlated to ASTM Test Sieve numbers, and the screen designation or API Screen Number is determined.
5. The final screen designation as determined by API RP 13C does not describe the performance of the screen on a shale shaker processing drilling fluid in the field.
6. The "Finders Method" is a quick and effective way to determine the initial placement of the test screen within the standard ASTM screen stack.
7. To ensure your shaker screens on the rig are removing the maximum amount of evil drilled solids possible, it is critical to specify shaker screens that conform to API RP 13C.

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Appendix

API RP 13C: An Explanation and Answers to Frequently Asked Questions¹¹

Author's Note: The document in the Appendix is reproduced with permission by API SC13 Task Group 5.

Summary

API has revised the shale shaker screen testing procedures and numbering convention. By using the new API Screen Number, confusion among screen types is reduced and comparison between screen types can be made fairer. Some screens which may previously have been named "200 mesh" may now have an API Screen Number of only 100 to 140. However, ALL screens which are tested according to RP 13C and have the same API Screen Number will remove solids of a similar size.

Note: The change from using D_{50} to D_{100} (50% of a specific particle size removed versus 100%) will change the rating of most screens – the extent of the change being dependent upon screen type/design.

The new number describes the size at which particles will be rejected (removed) under laboratory test conditions. The new API number is NOT intended to describe how the screen (or indeed the shaker) will operate in the field. This will depend upon several other parameters such as fluid type and properties, shaker design, operating parameters, ROP, bit type, etc.

The greatest value of the new numbering system is that ALL conforming screens are measured using the same process which will allow cross-comparison of screen designs/types based on a uniform solids size removal value.

Any manufacturer labeling their screens as "conforming to API RP 13C" must supply the test data for that screen upon request to the end user/purchaser.

Definitions

Mesh: Mesh, as it relates to a piece of woven wirecloth, is a measure of the number of holes in a linear inch (such as 100 mesh) or in a linear inch in each direction (such as 100 x 60 mesh).

D_{50} Cut Point: The D_{50} cut point of a screen is the particle size at which half of those particles reporting to the screen will pass through the screen and half will be retained.

D_{100} Cut Point: The D_{100} cut point of a screen is the largest particle size which will pass through the screen.

API Screen Number: The API Screen Number is determined using a specific test procedure (as described in API RP 13C). The test uses a specifically graded sample of aluminum oxide, which passes through the unknown screen mounted amongst a stack of ASTM test sieves. The test method determines the D_{100} cut point of the test screen and relates it to the D_{100} of an 'equivalent' standard ASTM test sieve.

Screen Conductance: Conductance, measured in kilodarcies per millimeter (kD/mm), defines a Newtonian fluid's ability to flow through a unit area of screen in a laminar flow regime under prescribed test conditions. All other factors being equal the screen with the higher conductance number should process more flow.

Non-Blanked Area: The non-blanked area of a screen describes the net unblocked area in square feet (ft²) or square meters (m²) available to permit the passage of fluid.

Background

The use of the term “mesh” (when considering the capabilities of shaker screens) was made obsolete by the introduction of oblong mesh and multi-layer screens which resulted in variations in “aperture sizes”.

The following photomicrographs (enlarged 60x) show four different screens from four different manufacturers.

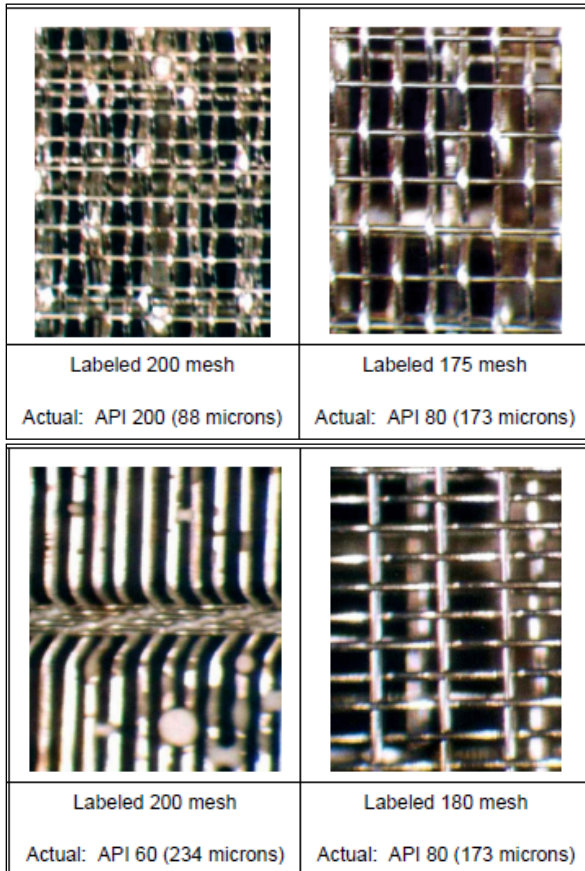


Figure 5 Illustration of the potential confusion caused by ‘non-standard’ screen nomenclature *Images courtesy of Derrick Equipment Company*

Rig-based personnel continued to rely on the ‘mesh number’ indicated by the manufacturer. This may have borne little relationship to the actual separation potential of the screen being used. Hence, comparison of screens from different manufacturers (or even across one manufacturer’s series) could be difficult or inaccurate.

In December 2004, the API SC13 voted to accept API RP 13C entitled “Recommended Practice on Drilling Fluids Processing Systems Evaluation”. The practice combined and updated two previous separate documents API RP 13C and API RP 13E. This document was also passed by International Standards Organization as ISO 13501.

API RP 13C covers a number of subjects relating to fluids treatment systems. However this tutorial only addresses screen testing (cut point and conductance), classification and labeling.

API Screen Number Determination

API RP 13C describes a method to define and compare the absolute (or D_{100}) separation potential of any shale shaker screen to an equivalent standard ASTM test sieve. A representative section of the screen is mounted in a holder (Figure 6) and is placed in the middle of a stack of ASTM test sieves (calibrated according to ASTM E-11). Using a Ro-Tap® or equivalent mechanical sieving device (Figure 7), a defined amount of dry aluminum oxide is sieved and the results collated and graphed. The test is repeated three times and the results from each test are then averaged to determine the D_{100} cut point.



Figure 6 Test screen mounted in screen holder *Image courtesy of Derrick Equipment Company*



Figure 7 Test screen mounted between ASTM test sieves *Image courtesy of Derrick Equipment Company*

This resulting cut point is the absolute or D_{100} cut point. Any particle larger than this value will not pass through the screen. The cut point is cross-referred to Table 5 in the API RP 13C document (Table 4 in this appendix) and compared to standard ASTM sieves of known separation ability.

For example, if the measured D_{100} cut point of the test screen is 114.88 microns (114.88μ), the table indicates that it compares to the ASTM 140 sieve. The test screen would then be classified as an API 140 screen.

Table 4. API RP 13C Screen Designation⁹

D ₁₀₀ (μ)	API Screen Number
>462.5 to 550.0	API 35
>390.0 to 462.5	API 40
>327.5 to 390.0	API 45
>275.0 to 327.5	API 50
>231.0 to 275.0	API 60
>196.0 to 231.0	API 70
>165.0 to 196.0	API 80
>137.5 to 165.0	API 100
>116.5 to 137.5	API 120
>98.0 to 116.5	API 140
>82.5 to 98.0	API 170
>69.0 to 82.5	API 200
>58.0 to 69.0	API 230
>49.0 to 58.0	API 270
>41.5 to 49.0	API 325
>35.0 to 41.5	API 400
> 28.5 to 35.0	API 450

Important Note: API RP 13C states that this test describes the openings of the screen and does not predict the performance of the screen in the field. However, if all other variables are equal, a screen with a higher API Screen Number (smaller holes) should remove more and finer solids.

Comparison with API RP 13E

The predecessor to the new API RP 13C was called API RP 13E. The former procedure used a light source, a microscope and a computer system to measure the size and distribution of apertures within a screen. Values for d₁₆, d₅₀, and d₈₄ were calculated from the results.

The D₅₀ was called the ‘mean’ value and was generally considered the primary cut point used to ‘name’ the screen. Figure 8 illustrates how screens classified by their D₅₀ (75 μ) could have very different D₁₀₀ values. The graph also shows a comparison with the standard ASTM 200 sieve.

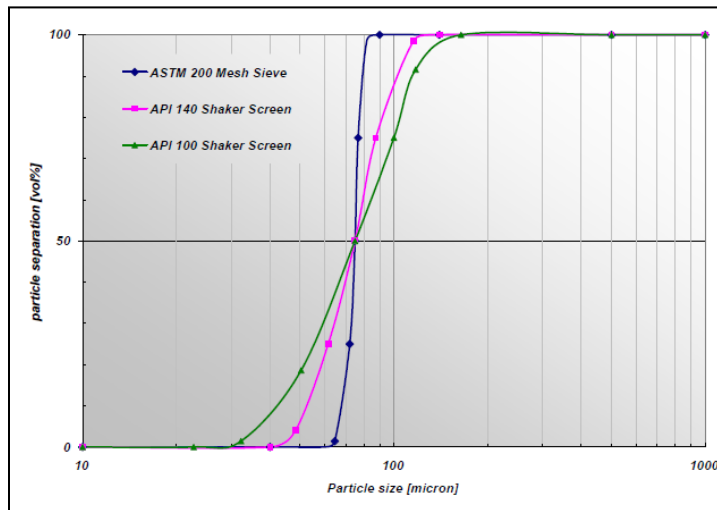


Figure 8. Impact of API RP 13C on screen nomenclature

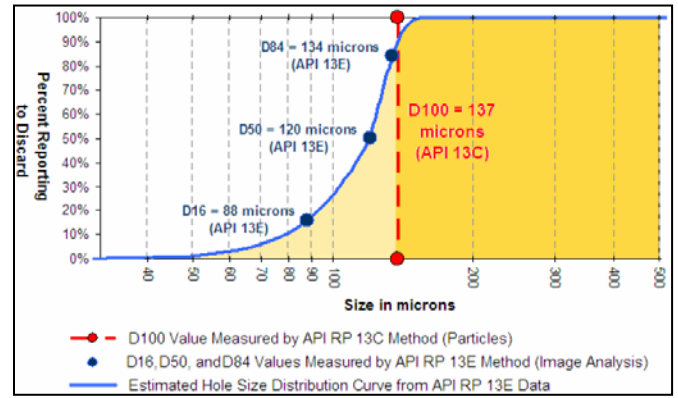


Figure 9 Comparison of API RP 13E (old) and API RP 13C (new) Image courtesy of Brandt NOV

Figure 9 also illustrates the potential difference between the D₅₀ (API RP 13E) and the D₁₀₀ used in the new procedure. The change from API RP 13E to API RP 13C is a positive step because the new procedure moves away from measuring openings in the screen to an actual physical test using real solids. One further advantage of API RP 13C is that any screen with any aperture shape can be tested using the same procedures.

Rig Site Performance

API RP 13C does not predict rig site performance given the myriad combinations of screens, shakers, fluids, flow-rates, solids loadings, etc. Performance will depend upon various factors including the properties of the fluid, the operational parameters of the shaker and the particle size distribution of the drilled solids presented to the screens.

Labeling Requirements

API RP 13C states that the designation system (labeling) will consist of no fewer than the following minimum elements:

1. API Screen Designation or API number (this must be 2X larger than any other information);
2. D₁₀₀ (Equivalent Aperture) in microns (μ);
3. Conductance in kilodarcsies per millimeter (kD/mm);
4. Non-blanked screen area in square meters (m²) or square feet (ft²);
5. Manufacturer’s Designation and/or Part Number: (although not currently required to conform to API RP 13C, API recommends manufacturers use the API screen designation in the part number);
6. Conforms to API RP 13C.

The following information is optional (but recommended):

1. Manufacturer’s name
2. Application or description
3. Country of origin
4. Lot number
5. Date of manufacture
6. Order number
7. Bar code

The label/tag must be permanently attached to the screen in a visible place. Examples are shown in Figures 10 & 11.


<p>API NUMBER (D₁₀₀ Separation, microns)</p> <p>Conductance, yy kD/mm</p> <p>Non-blanked area: xx m² or ft²</p> <p>Conforms to API RP 13C</p>	<p>Manufacturer's designation</p>
<p>API 170 (92 microns)</p> <p>Conductance: 1,4 kD/mm</p> <p>Non-blanked area: 0,67 m²</p> <p>Conforms to API RP 13C</p>	<p>Polygon Plus 170 Screen, Inc. Shaker XYZ Made in USA Lot 456 / 07.08.2009 Order No. 101112</p>  <p>Polygon Plus 170</p>

Figure 10 Horizontal format and labeling example


<p>API NUMBER (D₁₀₀ Separation, microns)</p> <p>Conductance, yy kD/mm</p> <p>Non-blanked area: xx m² or ft²</p> <p>Conforms to API RP 13C</p>	<p>API 170 (92 microns)</p> <p>Conductance: 1,4 kD/mm</p> <p>Non-blanked area: 0,67 m²</p> <p>Conforms to API RP 13C</p> <p>Polygon Plus 170 Screen, Inc. Shaker XYZ Made in USA Lot 456 / 07.08.2009 Order No. 101112</p>  <p>Polygon Plus 170</p>
<p>Manufacturer's designation</p>	

Figure 11 Vertical format and labeling example

Putting the Label to Use

Because screens that conform to API RP 13C have all been tested using the same procedure, the labels are very helpful when it comes to comparing different screens. For example, if it is determined that there is a need for the cut point provided by an API 170 screen then a screen labeled API 170 can be selected regardless of the manufacturer of the screen. All other factors being equal the screen with the higher conductance number should process more flow.

Alternatively, if there is excess shaker capacity but longer screen life is desired, selecting a screen with larger diameter wires and perhaps more bonding material should provide increased screen life. Using screens conforming to API RP 13C can help the operator can make a more informed decision.

Conclusion

By specifying screens that conform to API RP 13C, much of the previous confusion can be eliminated and screen selection/comparison simplified.

Frequently Asked Questions

1. What is the D₁₀₀?
 - a. The D₁₀₀ cut point of a screen is the largest particle size which will pass through the screen.
 - b. D₁₀₀ is a single number determined from a prescribed laboratory procedure – the results of the procedure should yield the same value for any given screen.
 - c. The D₁₀₀ should not be compared in any way to the D₅₀ value used in API RP 13E.
 - d. The method used in API RP 13C provides only the D₁₀₀ value with no provision for d₁₆, d₅₀, or d₈₄ values.
2. What does the API Screen Number tell us?
 - a. The API Screen Number corresponds to the API defined range of sizes into which the D₁₀₀ value falls.
3. What does the API Screen Number NOT tell us?
 - a. The API Screen Number is a single number which defines solids separation potential under specific test conditions. It does NOT define how a screen will operate on a shaker in the field as this will depend upon several other parameters such as fluid type & properties, shaker design, operating parameters, ROP, bit type, etc.
4. Will a screen with a D₁₀₀ of 172μ remove solids finer than 172μ?
 - a. By definition, every particle of the D₁₀₀ size or coarser will be discarded.
 - b. In practice some portion of solids finer than 172μ may be removed.
5. Why is there such a large variance between the old and new labeling values?
 - a. The biggest variation is due to the shift from using D₅₀ to D₁₀₀.
 - b. The previous test procedure (API RP 13E) measured the distribution of the apertures in the screen.
 - c. API RP 13C uses a physical and repeatable test using actual solids (dry aluminum oxide) which measures the coarsest particle that can pass through the screen.
6. Should I use the old screen number or the new API Screen Number when ordering replacement screens?
 - a. Although some companies are changing their part numbers to reflect their conformance to API RP 13C, others are not. It is therefore best to specify the API RP 13C value you want.
7. Should I screen with a finer screen now if what used to be called a “200 mesh” screen is now labeled API 120?
 - a. Users are advised to determine the screens that work best in their applications regardless of what the new API Screen Number happens to be.
8. What is the practical value of API RP 13C to the end user?
 - a. API RP 13C provides an unequivocal procedure and benchmark for comparing different screens.
 - b. The primary intent of API RP 13C is to provide a standard measuring system for screens.