

TEXAS SHAKER Laboratory Test

1.0 Test objectives and details

The tests have been performed to validate a proposed screen size to scalp and clean a maximum of 10,000 bu/hr of soybeans to <0.5% fines.

[REDACTED]

[REDACTED]

[REDACTED]

1.2 Screen cloth on lab screen

Top deck: 24/64" round hole punch plate
Bottom Deck A: 11/64" round hole punch plate
Bottom Deck B: 5 mesh, 0.168" c.o.

1.3 Screen parameters

Slope: 6 deg.
Stroke: 1"
Driven shaft speed: 475 rpm

The lab screen has a screen area of 18" x 10', the proposed screen for [REDACTED] has a screen area of eight decks with 6' x 10' per deck, split on two cutpoints, a total of 240 ft² per cutpoint. The lab screen offers 1/16 of the screen area of one cutpoint on the product screen. There was no aspiration on the machine during the test.

1.4 Product specifications

Material: whole soybeans
Bulk density: 45 pcf, 56 lbs/bu

[REDACTED]

2.0 Test reports

2.1 Test 1

Simulation of 10,000 bu/hr of original material through 24/64" round hole punch plate: 485 lbs in 60 seconds on lab screen

Oversize: 170g
Undersize: 482 lbs

Notes: 80% of the undersize passed within the first two feet of the screen. All material (except for single kernels) was gone after approximately 5 ft.

2.2 Test 2

Simulation of 10,000 bu/hr of original material through 24/64" round hole punch plate: 485 lbs in 60 seconds on lab screen

Repetition of Test 1, results were very similar.

2.3 Test 3

Simulation of 10,000 bu/hr of undersize from test 1 on 11/64" round hole punch plate: 485 lbs in 60 seconds on lab screen

Undersize: 373g, which equals 0.17% of the feed

Sample analysis showed 1.8% of <4 mesh (0.1874") and 0.18% of <5 mesh (0.1575") in the oversize

2.4 Test 4

Simulation of 10,000 bu/hr of undersize from test 2 on 5 mesh, 0.168 c.o. woven wire screen cloth: 485 lbs in 60 seconds on lab screen

Undersize: 779g, which equals 0.37% of the feed

Sample analysis showed 1.7% of <4 mesh (0.1874") and 0.10% of <5 mesh (0.1575") in the oversize

3.0 Summary

The scalping deck seems to be sufficiently sized for 10,000 bu/hr of throughput through the 24/64" openings. The majority of the material passed within the first two feet (which is important to give the material as much time as possible on the bottom deck), almost all material has passed after 4-5 ft of screen length.

The testing on the fines removal deck led to the conclusion that a woven wire screen cloth is a better choice compared to the round hole punch plate with 11/64" openings. Even though the actual opening on the woven wire mesh was slightly smaller (0.168" versus 0.172" on the round hole, this one was used because it was readily available in the lab), it screened out 0.37% of the feed compared to only 0.17% on the round hole punch plate. This means the screening efficiency more than doubled.

We recommend the use of a similar wire mesh screen cloth in the actual application to assure that the fines rate can be dropped under the necessary limits. The larger the opening (combined with open area) will be that can be used, the better screening efficiency can be expected.