

IDFL NEWS

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Fill Power

Many of our clients have stated concerns about the reliability and variances of Fill Power testing.

What is Fill Power?

Fill Power is the ability of down to regain its original volume after being compressed during shipping, storage, or use. The higher the filling power, the greater the ability of down to insulate and provide warmth.

Test Methods

- American Method. 1 oz. of plumage is placed in cylinder, manually stirred and cubic inches of volume measured.
- European Method. 30 g. are placed in a Lorch-built machine which includes a blower/conditioner and an automatic measuring device.
- FIS Method. (Northern Europe) 20 grams of plumage are used to take the measurement.
- Japanese Method. 30 g are placed in a cylinder. A 120 g

disk measures Fill Power in cm from bottom of cylinder

Variables affecting fill power results.

Temperature, Humidity & Static
Temperature should be kept at 70 degrees ($\pm 2^\circ$) and humidity should remain 65% ($\pm 2\%$). Material with excess static may increase fill power results. Proper

humidity helps eliminate static.

Timing of Test

A sample tested immediately upon removal from a drying and sorting machine will test higher than a sample pulled from a compressed moist bale.

Length of Conditioning

The fill power result may increase with additional conditioning time.

This table shows the relationship between down content and Fill Power results. The data was compiled from several hundred test results completed by IDFL's Salt Lake City laboratory. (* Note: The single highest and single lowest down % results were not included in the study.).

<u>Range of Fill Power</u>	<u>Lowest Down %</u>	<u>Highest Down %</u>	<u>Average Down %</u>
450 - 470	67 %	85 %	73.2 %
475 - 495	60	85	74.8
500 - 520	67	86	78.2
525 - 545	72	84	78.9
550 - 570	68	88	79.1
575 - 595	73	87	79.0
600 - 620	72	92	79.4
625 - 645	73	93	82.9
650 - 670	78	93	86.4
675 - 695	83	93	87.8
700 - 720	84	93	89.5
725 - 745	88	96	91.0
750 +	88	95	91.5

Weighing Differences.

Differences in weight of the sample have a direct affect on Fill Power.. An accurate and consistent balance is necessary.

I Need a 600 Fill Power Result!

Often a customer will get a single Fill Power reading of 600. IDFL might test the sample and find 540 on the first day and 580 on the third day. The customer then asks why IDFL cannot get the same high reading.

The answer lies in the many variables that affect Fill Power. Because of the range of results that occur for similar samples some have concluded that Fill Power testing is not accurate and not reproducible.

Repeatability of Fill Power Results.

Some controversy exists on the reproducibility of Fill Power test results. Some studies have mistakenly used results from tests made on subsequent days of the same sample to show that results are not reliable and not repeatable. The length of conditioning needs to be reported.

In our studies and through cross- checking with other labs, we have determined that fill power results can be reproduced. However, the tolerance level needs to be generous.

Acceptable Variances

IDFL suggests that a variance of at least $\pm 5\%$ would be acceptable in determining Fill Power. This means that a sample of 600 Fill Power material might receive a 570 result or a 630 result when retested, even under similar conditions.

Test results taken under different conditions (especially the length of conditioning) might result in variances higher than the expected 5% variance.

We have also cross-checked the US-method with the Lorch machine (European) and find results within this variance level.

Current industry and labeling practices suggest that a 600 Fill Power result should test at 600 or better under all conditions. Considering the variance of results, this means that a sample must **average** more than 600 to pass the 600 test.

Manufacturers and retailers need to agree in advance on an acceptable tolerance level for specific products. Perhaps the industry should review the current labeling practice and adopt an official tolerance level. (Such as 600 FP = $600 \pm 5\%$)

Guidelines for Sending Fill Power Samples

In order to insure the highest and most consistent Fill Power results, we offer the following guidelines for sending samples.

Sample Size and Condition

1. Send at least 100g of material. This allows us to perform a re-check if necessary and cover the normal loss from conditioning and movement of material from one container to another. We continue to receive samples with insufficient amount of plumage.
2. Make sure sample is very clean and dry. Samples with high oxygen numbers and excessive humidity might give lower results.

Shipment of Sample

3. Send samples in a bag which will keep the material lofted. A good shipment method is a paper bag (grocery type bag) sent in a box. Other bags are fine if the sample is not excessively compressed.
4. Send package express if possible to avoid longer exposure to problem climate conditions.

IDFL Test Procedures

1. Sample is checked-in our computer system.
2. A "reference" sample is taken and stored at least 1-year.
3. Verification that enough material has been sent.
4. Sample is loaded in conditioning box.
5. Rush results are taken, if requested.
6. Sample is conditioned for three days and Fill Power is tested.
7. Results are faxed to client.
8. Upon client request a 5-day result is taken.

Please contact IDFL if you have questions about Fill Power or other testing procedures.

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