

ICS 59.080.20
CCS W 04



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 3292.1-2008

**Textiles -- Unevenness of textile strands -- Part 1: Capacitance
method**

(English Translation)

Issued on: June 18, 2008

Implemented on: March 1, 2009

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

Table of Contents

Foreword...	3
1 Scope...	5
2 Normative references...	5
3 Terms and definitions...	5
4 Principle...	8
5 Apparatus...	9
6 Standard atmosphere...	10
7 Sampling...	10
8 Procedure...	11
9 Calculations and expression of results...	12
10 Test report...	12

1 Scope

This Part of GB/T 3292 specifies the method for determining the unevenness of linear density along the length of textile strands (including yarns, rovings and slivers) by using capacitance method.

This Part applies to staple-fibre strands and continuous filament yarns. The test range, for staple-fibre strands, is 4 tex ~ 80 ktex; the test range, for filament yarns, is 10 dtex ~ 1 670 dtex. This Part does not apply to fancy yarns and yarns containing conductive materials (such as metal wires); the latter can be measured by the photoelectricity method (see Part 2 of GB/T 3292).

This Part describes the generation process of the CVm-length curve, as well as the determination of periodicities of linear density. This Part also includes the counting of imperfections in the yarn (namely thin places, thick places and neps).

2 Normative references

The terms in the following documents become the terms of this Part by reference to this Part of GB/T 3292. For dated references, all subsequent amendments (not including errata content) or revisions do not apply to this Part.

However, parties to agreements that are based on this Part are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest edition applies to this Part.

GB/T 6529, Textiles - Standard atmospheres for conditioning and testing (GB/T 6529-2008, ISO 139:2005, MOD)

3 Terms and definitions

The following terms and definitions are applicable to this Part of GB/T 3292.

3.1

Unevenness

The unevenness of linear density along the length of the sliver.

One of the time-domain representations of yarn linear density changes. The abscissa represents the length that is calculated from the starting end of the tested yarn; the corresponding ordinate represents the relative size of the linear density of the tested yarn at that point.

3.13

CVm-length curve

The CVm value under normal circumstances, which refers to the CVm value of the capacitor length. Use the electronic method to extend the length of the measuring field; calculate the CVm value under different cutting lengths (this method corresponds to the early cutting and weighing method). Several CVm values under different cutting lengths constitute the CVm-length curve.

4.1 When the sample passes through two capacitance plates, the rate of

change of capacitance is linear with the rate of change of mass of the sample.

The evenness tester calculates these changes and reports them as CVm or Um.

4.2 The fibre dielectric constant is also a factor that determines the capacitance change. As long as the dielectric constant does not change (non-blended strands or perfectly uniform blending), the dielectric constant has no influence on the unevenness value, which completely depends on the variation of mass.

If the dielectric constant is different due to the fibre type or irregular mixing in the blend, the unevenness value will be greater than the true value. Therefore, this difference in results requires attention.

4.3 Compared with the test results of the evenness tester, the unevenness

value that is obtained by the cutting and weighing method has a very high consistency; other studies in recent years also reach this conclusion, so, the result of the evenness tester can be used as the true unevenness value.

4.4 The unevenness value is only valid when both L_b and L_w are known. In principle, they are always reported together. A more preferable method of expression is CV_m (L_b , L_w), such as CV_m (8 mm, 1 000 m). In practice, L_b and

L_w are usually not marked, and are assumed to be the most frequently used conditions in the unevenness tester, namely:

- L_b : 8 mm for yarns, 12 mm for rovings, 20 mm for slivers and tops;
- L_w : total length of the tested yarn on the package.
- calculates and displays the value of CV_m or U_m , and can also calculate the CV_m -length curve, and provides a graph of the periodic variations of linear density;
- calculates and displays the number of imperfections of each level.

Note: Imperfections are usually divided into the following levels:

Neps: +400%, +280%, +200%, +140%.

Thick places: +100%, +70%, +50%, +35%.

Thin places: -60%, -50%, -40%, -30%.

c) Printer (optional), which:

- provides yarn linear density index and graphic output.

d) Twisting device for testing untwisted or low-twist filament yarns, so that the filament yarns pass through the capacitance detection area with an approximately round cross-section. No twisting device is required for the test of monofilaments.

5.3 For calibration, use the procedure built into the instrument as much as

possible. Or use a standard signal of known unevenness provided by the instrument manufacturer. If the instrument manufacturer does not have an available standard, a sample of known and low unevenness can also be used.

6 Standard atmosphere

The standard atmosphere for preconditioning, conditioning and testing shall be in accordance with the standard atmosphere specified in GB/T 6529. Generally, unsupported packages shall be conditioned for 24 h; supported packages shall be conditioned for 48 h.

7 Sampling

7.1

Select laboratory samples according to one of the following methods:

- according to the relevant specification of the product standard;
- by agreement between the relevant parties.

7.2

Recommended sampling amount:

- slivers and tops: 3 packages;

Generally, select the running speed according to the yarn bearing capacity and the needs of test analysis. The following running speeds are recommended.

Other speeds, if used, shall be stated in the test report:

- slivers and tops: 25 m/min;
- rovings: 50 m/min;
- yarns: 400 m/min.

8.5 Guiding facilities

Before the test, adjust the guiding and the tensioning devices to provide a pretension that does not extend the yarn (or otherwise distort the material), to ensure that the sample passes through the condenser detection area without fluttering, which would produce an error of measurement.

8.6 Twisting device

Low-twist strands or non-twisted filament yarns need to pass through a twisting device.

8.7 Operate according to the prescribed procedures in the instrument manual.

9 Calculations and expression of results

9.1

The test results of yarn unevenness mainly include the following indicators:

coefficient of variation unevenness CV_m , yarn imperfections per kilometer, evenness diagram, spectrogram, CV_m -length curve, etc.

9.2 When testing a batch of samples, calculate the CV_m and yarn imperfections

per kilometer average and standard deviation.

9.3 For test results, keep an integer for the yarn imperfections per kilometer, and two decimals for others.