




GEOMETRICAL & DIMENSIONAL TOLERANCES FOR ROLL COVERING

This document contains an extract from the ISO 1101 and 6123/3 standard, adjusted to the daily practical use.

Geometrical tolerances define an individual element's deviation from its ideal geometrical shape. Dimensional tolerances define the intervals in which an element is considered acceptable.

All characteristics below are related to tolerances for covered rolls.

TERMINOLOGY - CONVENTIONS

| | | |
|----------------------|--|---|
| Cylindricity | The actual lateral surface of the cylinder must lie between two coaxial cylinders with an inbetween distance of $t = 0.1$ mm. |  |
| Concentricity | The actual center line of the large diameter cylinder needs to be in a zone with a diameter of $t = 0.08$ mm. The tolerance cylinder is located coaxially to the reference axis. |  |
| Run-out | At full rotation around the reference center line A, the radial stroke in each measuring field perpendicular to the center line should not be greater than $t = 0.05$ mm. |  |

STANDARDS AND TOLERANCES

The standard which sets the dimensional deviations for covered rolls is ISO 6123/3. This standard specifies six tolerance classes* defined below. The most narrow tolerances can not be applied to all hardnesses. The harder the covering, the stronger the tolerances can be narrowed.

| | | | | | |
|------------|---------------------|----------|--------------|----------|--------------|
| XXP | Very high precision | P | Precision | Q | Quality |
| XP | High precision | H | High quality | N | Non critical |

* HANNECARD always achieves its performances according to the above mentioned classes P and XP.

DIAMETER TOLERANCES

Cylinders with a length/diameter ratio <15

(rigidity of the cylinder is assumed to be sufficient)

| Hardness Shore A | Class | | | | | |
|----------------------------|---------------------------------|-------|-------|-------|-------|-------|
| < 50 | - | - | - | H | Q | N |
| 50 to 70 | - | - | P | H | Q | N |
| 71 to 99 | - | XP | P | H | Q | N |
| ≈100 | XXP | XP | P | H | Q | N |
| Ø of the covered roll (mm) | Tolerances on the diameter (mm) | | | | | |
| Ø < 40 | ±0,04 | ±0,06 | ±0,10 | ±0,15 | ±0,30 | ±0,50 |
| 40 < Ø < 63 | ±0,05 | ±0,07 | ±0,15 | ±0,20 | ±0,30 | ±0,60 |
| 63 < Ø < 100 | ±0,06 | ±0,09 | ±0,15 | ±0,25 | ±0,40 | ±0,70 |
| 100 < Ø < 160 | ±0,07 | ±0,11 | ±0,2 | ±0,30 | ±0,50 | ±0,90 |
| 160 < Ø < 250 | ±0,08 | ±0,14 | ±0,25 | ±0,40 | ±0,60 | ±1,10 |
| 250 < Ø < 400 | ±0,11 | ±0,18 | ±0,30 | ±0,50 | ±0,80 | ±1,40 |
| 400 < Ø < 630 | ±0,14 | ±0,23 | ±0,40 | ±0,65 | ±1,10 | ±1,80 |
| Ø > 630 | - * | ±0,50 | ±0,75 | ±1,25 | ±2,00 | ±3,00 |

* tolerance should be the subject of agreement between the two parties

Cylinders with a length/diameter ratio between 15 & 25

(rigidity of the cylinder is assumed to be sufficient)

| Hardness Shore A | Class | | | | | |
|----------------------------|---------------------------------|-------|-------|-------|-------|-------|
| < 50 | - | - | - | H | Q | N |
| 50 to 70 | - | - | P | H | Q | N |
| 71 to 99 | - | XP | P | H | Q | N |
| ≈100 | XXP | XP | P | H | Q | N |
| Ø of the covered roll (mm) | Tolerances on the diameter (mm) | | | | | |
| Ø < 40 | ±0,06 | ±0,10 | ±0,15 | ±0,30 | ±0,50 | ±0,80 |
| 40 < Ø < 63 | ±0,07 | ±0,15 | ±0,20 | ±0,30 | ±0,60 | ±1,00 |
| 63 < Ø < 100 | ±0,09 | ±0,15 | ±0,25 | ±0,40 | ±0,70 | ±1,20 |
| 100 < Ø < 160 | ±0,11 | ±0,20 | ±0,30 | ±0,50 | ±0,90 | ±1,50 |
| 160 < Ø < 250 | ±0,14 | ±0,25 | ±0,40 | ±0,60 | ±1,10 | ±1,80 |
| 250 < Ø < 400 | ±0,18 | ±0,30 | ±0,50 | ±0,80 | ±1,40 | ±2,30 |
| 400 < Ø < 630 | ±0,23 | ±0,40 | ±0,65 | ±1,10 | ±1,80 | ±3,00 |
| Ø > 630 | ±0,50 | ±0,75 | ±1,25 | ±2,00 | ±3,00 | ±5,00 |

Rolls of which the length/diameter ratio exceeds 25, or rolls of which the rigidity is insufficient, should be subject of agreement between both parties.

A modification of the tolerances in both directions is allowed, so a tolerance of ± 0.8 for instance can also be expressed as 0.40/-1.20 or 1.60/0 or 0/-1,6, etc.

*For the definition of stroke tolerances, see Part 1 «Terminology - Conventions».

Tolerances are based upon the diameter of the finished cylinder.

(Diameter of the core + 2 times the thickness of the covering)

RUN-OUT TOLERANCES*

| Hardness Shore A | Class | | | | |
|----------------------------|------------------------|------|------|------|------|
| < 50 | - | - | H | Q | N |
| 50 to 70 | - | P | H | Q | N |
| 71 to 99 | - | P | H | Q | N |
| ≈100 | XP | P | H | Q | N |
| ∅ of the covered roll (mm) | Stroke tolerances (mm) | | | | |
| ∅ < 40 | 0,01 | 0,02 | 0,04 | 0,08 | 0,15 |
| 40 < ∅ < 63 | 0,02 | 0,03 | 0,06 | 0,10 | 0,18 |
| 63 < ∅ < 100 | 0,03 | 0,04 | 0,08 | 0,13 | 0,20 |
| 100 < ∅ < 160 | 0,03 | 0,05 | 0,10 | 0,17 | 0,25 |
| 160 < ∅ < 250 | 0,03 | 0,06 | 0,12 | 0,20 | 0,30 |
| 250 < ∅ < 400 | 0,04 | 0,07 | 0,14 | 0,23 | 0,35 |
| 400 < ∅ < 630 | 0,04 | 0,08 | 0,18 | 1,30 | 0,45 |
| ∅ > 630 | 0,05 | 0,10 | 0,25 | 0,35 | 0,55 |

*For the definition of cylindricity tolerances, see Part 1 «Terminology - Conventions».

Tolerances are based upon the diameter of the finished cylinder.

(Diameter of the core + 2 times the thickness of the covering)

CYLINDRICITY TOLERANCES*

| Hardness Shore A | Class | | | | |
|----------------------------|------------------------------|------|------|------|------|
| < 50 | - | - | - | H | Q |
| 50 to 70 | - | - | P | H | Q |
| 71 to 99 | - | XP | P | H | Q |
| ≈100 | XXP | XP | P | H | Q |
| ∅ of the covered roll (mm) | Cylindricity tolerances (mm) | | | | |
| ∅ < 40 | 0,01 | 0,02 | 0,04 | 0,08 | 0,15 |
| 40 < ∅ < 63 | 0,02 | 0,03 | 0,06 | 0,10 | 0,18 |
| 63 < ∅ < 100 | 0,03 | 0,04 | 0,08 | 0,13 | 0,20 |
| 100 < ∅ < 160 | 0,03 | 0,05 | 0,10 | 0,17 | 0,25 |
| 160 < ∅ < 250 | 0,03 | 0,06 | 0,12 | 0,20 | 0,30 |
| 250 < ∅ < 400 | 0,04 | 0,07 | 0,14 | 0,23 | 0,35 |
| 400 < ∅ < 630 | 0,04 | 0,08 | 0,18 | 1,30 | 0,45 |
| ∅ > 630 | 0,05 | 0,10 | 0,25 | 0,35 | 0,55 |

RELATED DOCUMENTS

- Technical info - 'Hardness Specifications'
- Technical info - 'Mechanical services'
- Technical info 'Roll covering process'
- Technical info 'Roll finishing'
- Technical info 'Selection guide'
- Technical info 'Surface characteristics'
- Technical info 'Transport & Packaging'

MORE INFORMATION?

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