Document Owner: Advanced Creation Testing – Lab Standards	
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Departments Affected: Suppliers, 3rd party labs, Development and Sourcing Teams	

Version	Date	Modifications	Page
04	2011	Distance correction between needle jig and spacing plate	All
05	22.10.2020	Test method adjusted to new format	All
06	28.11.2024	Harmonized PHM-AG0305 and PHM-FW0305 method	All
6.1	29.01.2025	Corrected needle jig size according to ISO 17697-A	All

Remarks:

1 Purpose

To determine the force required to break a stitched seam.

2 Scope

Valid for all types of finished component uppers, textiles and synthetics according to CP.

3 Roles & Responsibilities

User Group	Responsibilities	Section	Detail	Link
Suppliers/ 3rd party labs	Test Execution and Evaluation	Entire file	Required Equipment; Sample Preparation and Conditioning; Test Execution; Data	5 ff.

Quality Teams; Material Teams; Operation Teams	Ensure Standard is executed		Collection, Evaluation and Reporting.	

4 Reference Documents/Terminology

- SATRA TM33 - Strength Perpendicular to Needle Perforations
- ISO 17697-A - Footwear - Test methods for uppers, lining and insocks – Seam Strength
- PHM-FW0002/ PHM-AG0002 - Material Testing Conditions and Cutting

5 Specific Procedure

5.1 Equipment

5.1.1 Equipment

- Tensile machine, compliant with DIN EN ISO 7500-1 standard, with the ability to install a graph writer.
- Loadcell compliant with DIN EN ISO 7500-1 class 0,5

5.1.2 Accessories

- Rubber faced clamps on tensile machine, preferably pneumatic, clamp width not less than specimen width.

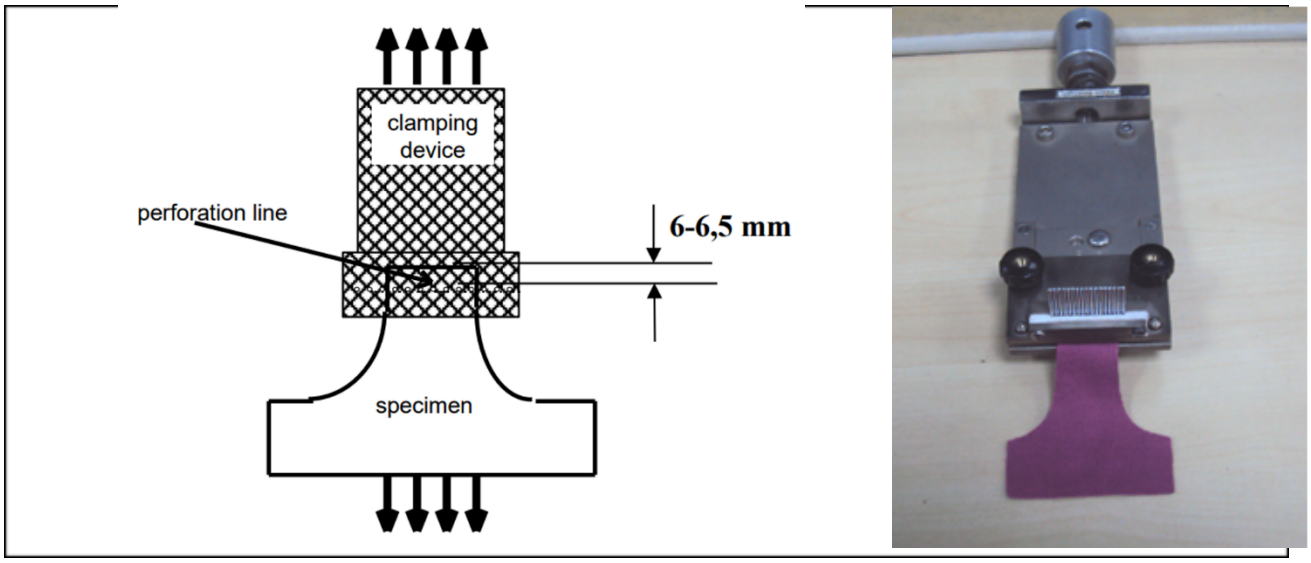

Figure 1 –Needle jig

- Needle jig according to ISO 17697-A (see *figure 1*) with
  - 17 needles per inch, round point, metric size 90 (Singer size 14)
  - Distance between needle jig and spacing plate depending on material:
    - Elastics and loose fabrics (6,0 ± 0,2) mm
    - All other materials (3,0 ± 0,1) mm

5.2 Sample

5.2.1 Sample definition

- 6 test specimens (see figure 2 for specimen dimensions) are cut from the material to be tested in both directions: 3 length and 3 width.
- For specimens smaller than the required size above (e.g. webbing, label), the specimen size is according to the actual size of the specimen.

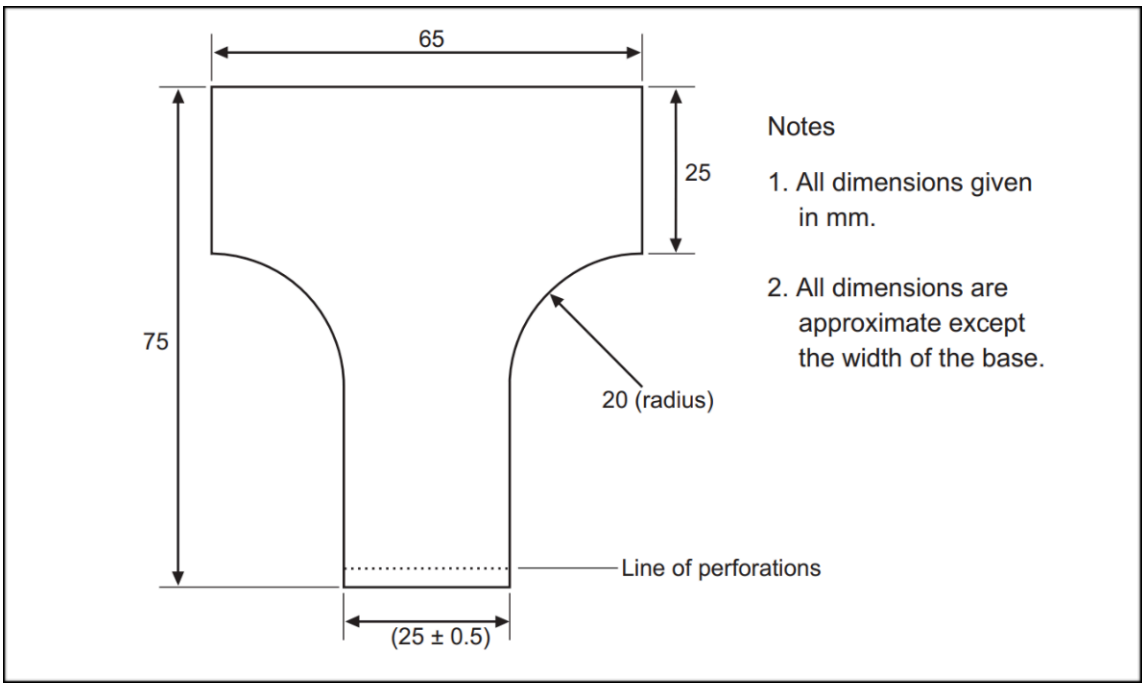

Figure 2: Specimen Dimensions

5.3 **Procedure**

- Set tensile machine to the required test position (distance of clamps) and velocity:
  - Clamp distance: depending on the length of the testing tool, 20 mm of the specimen free length shall be fixed into the lower clamp of the tensile machine as indicated in figure 1.
  - Velocity: 100 mm/min
- Place test specimen into the „needle jig", allowing the needles to secure the base of the T-shaped specimen between the clamping devices
- Fix the needle jig into the upper clamp of the tensile machine, so that it is centrally located, and that the length direction of the specimen is as parallel as possible to the force direction.
- Set load of tensile machine to zero (0).
- The length direction of the specimen must be as parallel as possible to the force direction.
- Run the tensile machine at the required velocity until the material totally breaks.

5.4 **Data Collection, Evaluation and Reporting**

5.4.1 Data collection

- Read the force value in N from the tensile machine
- Calculate the Seam Strength (**SS**) using the following formula:

$$SS = \frac{\text{Recorded force}}{2{,}5}$$

For specimens different from general size use the formula below :

$$SS = \frac{\text{Recorded force}}{\text{Width (cm)}}$$

6 Further Information

In all cases, the instruction manual according to the manufacturer including calibration and maintenance must be followed to ensure safety and quality.