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चमड़े की सिकुड़न तापमान का निर्धारण (100°C से उपर)

*Draft Indian Standard*

**DETERMINATION OF SHRINKAGE TEMPERATURE OF LEATHER (OVER 100°C)**

ICS No. 59.140.30

Leather, Tanning Material and Allied Products Sectional  
Committee, CHD 17

Last Date for Comments: 25<sup>th</sup> October, 2023

**FOREWORD**

(Formal clause will be added after finalization of document)

Raw Hides and Skins are susceptible to shrinkage when exposed to moist heat. Tanning of hides and skins confers them with resistance to shrinkage. Different methods of tanning provides different degrees of resistance to shrinkage when subjected to moist heat. Another term which is used for shrinkage temperature is "hydrothermal stability", i.e., the stability of leather in presence of wet heat. At the shrinkage temperature, the leather undergoes sudden and irreversible shrinkage.

Resistance to shrinkage is an important requirement of leather, especially for leathers used in footwear manufacture, as the leather is exposed to moisture and high temperatures during manufacturing. Hence, it is important to test the quality of leather by determining its shrinkage temperature. This draft has been prepared to determine the shrinkage temperature of leather above 100 °C. No ISO standard exists for the determination of shrinkage temperature above 100 °C. ISO 3380 : 1975 exists on the "Determination of Shrinkage Temperature below 100 °C".

In the formulation of this standard, assistance has been derived from the following publications:

*SLC 18* Society of Leather Trades Chemists Test Method

*ISO 3380 : 2015* Leather — Physical and mechanical tests — Determination of shrinkage temperature up to 100 °C

*BS 3144 : 1968* Methods of sampling and physical testing of leather - Method 17

In reporting the result of a test or analysis made in accordance with this standard if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

## **Determination of Shrinkage Temperature of Leather (Over 100°C)**

### **1 SCOPE**

This standard describes the method to measure the shrinkage temperature of leather when heated in water at temperature above 100°C. It is applicable to all types of leather tannages.

### **2 PRINCIPLE**

A strip of leather is slowly heated in water until a sudden shrinkage occurs. The temperature at which shrinkage occurs is a characteristic of the tannage of the leather.

### **3 APPARATUS**

- a) A pressure vessel as shown in **Fig. 1** which has capability of being filled with water and sealed, with a leather specimen suspended in water. The water is to be heated slowly at a rate of approximately 4 °C/minute to a temperature of 115 °C and equivalent pressure to be approximately 70 kpa (0.7bar) in excess of atmospheric pressure. Thermometer inside the pressure vessel to monitor the temperature of water near the specimen over the length of test specimen. The pressure vessel must have a safety valve to release excess pressure.
- b) Heating agent by using LPG gas.
- c) Press knife.

### **4 MATERIAL**

A press knife is used to cut the test specimen. Specimen size should be  $75 \pm 5$  mm long and  $10 \pm 2$  mm wide. A punching device can be used for punching a small hole or slot in the test specimen so that it can be suspended in the apparatus.

Deionised or demineralised water for immersing test specimen and a beaker of 250 ml is required for holding required volume of water.

### **5 PREPARATION OF TEST SPECIMEN**

Cut two specimen strips of  $75 \pm 10$  mm length and  $10 \pm 2$  mm width, parallel to the backbone 'along' direction and perpendicular to the back bone 'across' direction. Cut a small hole or slot from the both the test specimen.

Fill the beaker with deionised or demineralised water and wet the specimen completely for  $5 \pm 1$  minutes to ensure the complete wetting of the test specimen.

### **6 TEST PROCEDURE**

Completely fill the pressure vessel with water at a temperature less than 50 °C, suspend the 'along' direction test specimen in the pressure vessel and seal the vessel. When the test specimen has been completely immersed in water for  $5 \pm 1$  minutes, start heating the water so that the temperature increases at a rate of approximately 4 °C/minute. Monitor the size, length of the test specimen until it rapidly decreases. Record the temperature to the nearest °C (T1) which is the shrinkage temperature in 'along' direction. Stop heating water and allow cooling to room temperature. Repeat the same procedure for 'across' direction test specimen and record the temperature to the nearest °C (T2) which is the shrinkage temperature in 'across' direction.

Calculate the average shrinkage temperature of the test specimen to the nearest °C using the formula:

$$\text{Average Shrinkage Temperature} = [T1 + T2]/2$$

## **7 REPORT**

Full description of the material tested, the shrinkage temperature of 'along' and 'across' direction and average shrinkage temperature.

# SHRINKAGE TESTER

\* All dimensions are in "mm"  
\* Dimensions are drawn in 1:2 ratio

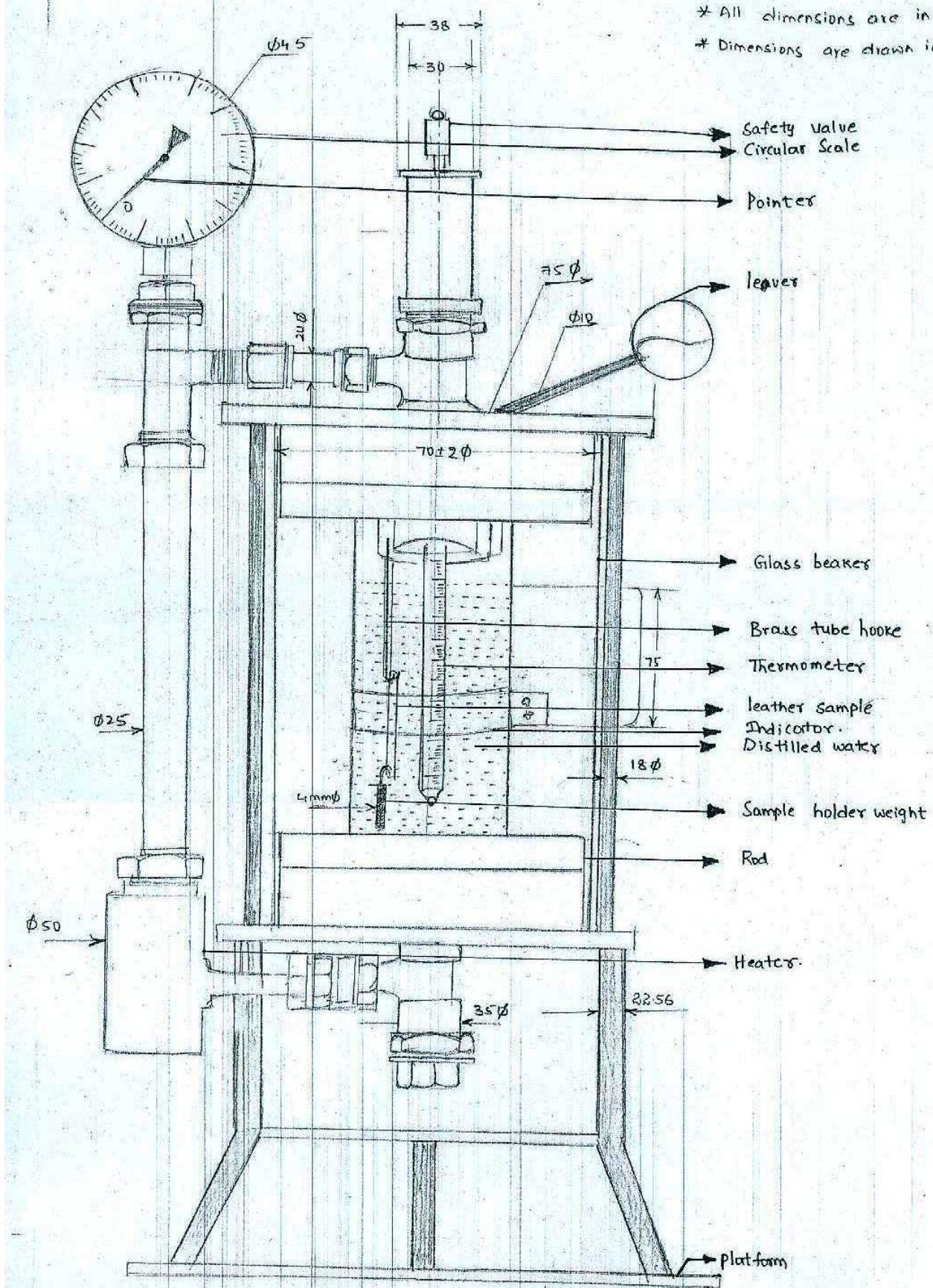


Fig. 1 Schematic Diagram of the Shrinkage Tester