# ISO

## INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

# ISO RECOMMENDATION

# R 705

## METHOD FOR THE DETERMINATION OF DENSITY OF LATEX

### 1st EDITION
April 1968

# BRIEF HISTORY

The ISO Recommendation R 705, *Method for the determination of density of latex*, was drawn up by Technical Committee ISO/TC 45, *Rubber*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question by the Technical Committee began in 1948 and led, in 1962, to the adoption of a Draft ISO Recommendation.

In November 1963, this Draft ISO Recommendation (No. 618) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

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| Argentina | Germany | Poland |
| Australia | Hungary | Spain |
| Austria | India | Sweden |
| Brazil | Israel | Switzerland |
| Canada | Italy | United Kingdom |
| Chile | Japan | U.S.A. |
| Colombia | Korea, Rep. of | U.S.S.R. |
| Czechoslovakia | Netherlands | Yugoslavia |
| France | New Zealand | |

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council which decided, in April 1968, to accept it as an ISO RECOMMENDATION.

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# METHOD FOR THE DETERMINATION OF DENSITY OF LATEX

## INTRODUCTION

Density determinations are used to calculate the weight of a measured volume of latex in locations where it is not possible to weigh directly. For such purposes it is essential that the density be determined on a latex sample containing the same amount of air as it contained when the volume was measured. Before sampling, the latex is therefore allowed to stand for a minimum period of 24 hours to ensure the removal of air bubbles. The density determination is made at the same temperature as the volume measurement, otherwise a correction should be applied.

## 1. SCOPE

This ISO Recommendation describes a method of test applicable to natural rubber latex which contains preservative agents and has a total solid content up to 63 %.

The method of test is not necessarily suitable for latices from natural sources other than *Hevea brasiliensis,* or for latices of synthetic rubber, compounded latex, vulcanized latex or artificial dispersion of rubber.

## 2. DEFINITION

Density is the mass divided by the volume at a stated temperature. The units should be stated.

## 3. APPARATUS

3.1 *Density bottle,* 50 ml capacity having a ground-glass stopper perforated by a capillary tube and a ground-glass cap and, if desired, an evacuated jacket.

3.2 *Constant temperature bath,* accurate to within ± 0.2 °C and adjustable to a temperature above or below ambient temperature.

3.3 *Balance,* to weigh accurately to the nearest 0.001 g.

3.4 *Two conical flasks,* of at least 200 ml capacity, each fitted with a rubber stopper, a short glass inlet tube with a rubber blowing ball at the external end and a glass outlet tube reaching nearly to the bottom of the flask.

## 4. PROCEDURE

Adjust the temperature of the constant temperature bath to the desired temperature. Stir the sample of latex gently without introducing air bubbles. Fill one of the conical flasks with a suitable amount of the latex and place in the bath. Likewise, partly fill the second conical flask with freshly boiled distilled water and place in the bath. Weigh the clean and dry density bottle to the nearest 0.001 g and immerse up to its neck in the bath with the ground-glass stopper in place but not the cap. Allow the density bottle and the latex and water in the two conical flasks to come to the temperature of the constant temperature bath. This will require a minimum of about 3 hours in the case of a jacketed bottle, and 20 minutes in the case of an unjacketed bottle.

First blow a few millilitres of latex from the conical flask containing the latex and discard. Then blow sufficient latex from the conical flask into the density bottle to fill it completely. Put the stopper in place and wipe clean the top surface immediately, taking care not to remove any latex from the capillary tube. Remove the bottle from the bath and put in place the ground-glass cap immediately. Dry the outside with the minimum of handling and then weigh the bottle to the nearest 0.001 g.

Empty the density bottle and wash free from latex with distilled water. Immerse the bottle in the bath as before. Fill the density bottle with distilled water by blowing from the second conical flask and allow to stand for 5 minutes. While still immersed in the bath, empty and completely refill by the same procedure.

Put the stopper in place and wipe dry the top surface immediately taking care not to remove any water from the capillary tube. Remove the density bottle from the bath and place the ground-glass cap on immediately. Dry the outside with the minimum of handling and then weigh the bottle to the nearest 0.001 g.

## 5. EXPRESSION OF RESULTS

The density is calculated from the following formula :

$$\rho = \frac{M_L \quad \rho_W}{M_W}$$

where

$\rho$     is the density of latex at the temperature of the constant temperature bath in grammes per millilitre;

$M_L$    is the mass of latex in the density bottle, in grammes;

$M_W$    is the mass of water in the density bottle, in grammes;

$\rho_W$    is the density of water at the bath temperature, in grammes per millilitre.

The calculation may also be carried out using other consistent units.

The results of duplicate tests should agree to within 0.001 g/ml or equivalent tolerance if other units are used.

If the temperature of the density determination differs from that of the measured volume of the latex, a correction is applied by calculation, using the formula below and the Table (see p. 7).

$$\rho = A + B - C$$

where

$A$    is the density of latex measured at the temperature of test;

$B$    is the correction value from the Table corresponding to the temperature of test and the dry rubber content of latex;

$C$    is the correction value from the Table corresponding to the temperature of the measured volume of latex and its dry rubber content;

$\rho$    is the corrected density of latex.