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Rubber, chloroprene (CR) — General purpose types — Evaluation procedure

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Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 2475 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

This third edition cancels and replaces the second edition (ISO 2475:1987). The main technical difference in this new edition of ISO 2475 in comparison with the second edition is the inclusion of a new clause giving the required format for a test report (clause 9).

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Rubber, chloroprene (CR) — General purpose types — Evaluation procedure

1 Scope

This International Standard specifies

- physical and chemical tests on raw rubbers;
- standard materials, standard test formulae, equipment and processing methods for evaluating the vulcanization characteristics of general purpose chloroprene rubbers (CR).

General purpose chloroprene rubbers fall into three broad classes based on the type of polymerization modifier used in their preparation:

- a) sulfur-modified types;
- b) mercaptan-modified types;
- c) types modified by other products. For class c), either standard test formula 5.1 or 6.1 may be used.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 37:1977, *Rubber, vulcanized — Determination of tensile stress-strain properties*.

ISO 247:1990, *Rubber — Determination of ash*.

ISO 248:1979, *Rubbers, raw — Determination of volatile matter content*.

ISO 289:1985, *Rubber, unvulcanized — Determination of Mooney viscosity*.

ISO 471:1983, *Rubber — Standard temperatures, humidities and times for the conditioning and testing of test pieces*.

ISO 1795:1974, *Raw rubber in bales — Sampling*.

ISO 1796:1982, *Rubber, raw — Sample preparation*.

ISO 2393:1973, *Rubber test mixes — Preparation, mixing and vulcanization — Equipment and procedures*.

ISO 3417:1977, *Rubber — Measurement of vulcanization characteristics with the oscillating disc curemeter*.

ISO 6502:1983, *Rubber — Measurement of vulcanization characteristics with rotorless curemeters*.

3 Sampling and sample preparation

3.1 A sample of mass approximately 1 500 g shall be taken by the method described in ISO 1795.

3.2 Preparation of the test portion shall be in accordance with ISO 1796.

4 Physical and chemical tests on raw rubber

4.1 Mooney viscosity

Determine the Mooney viscosity in accordance with ISO 289, on a test portion prepared as indicated in 3.2. Record the result as ML (1 + 4) at 100 °C.

4.2 Volatile matter

Determine the volatile matter content by the oven method specified in ISO 248.

If the rubber is in a suitable form, which is not the case if it is in chip form, the hot-mill method specified in ISO 248 may also be used, but with a mill roll temperature of $50^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

4.3 Ash content

Determine the ash content in accordance with ISO 247.

5 Preparation of the test mix for evaluation of sulfur-modified chloroprene rubbers

5.1 Standard test formula

The standard test formula is given in table 1.

The materials shall be NIST^{*)} standard reference materials as indicated in table 1 or other, equivalent, national or international standard reference materials.

Table 1 — Standard test formula for evaluation of sulfur-modified chloroprene rubbers

Material	NIST standard reference material number	Number of parts by mass
Chloroprene rubber (CR), sulfur-modified	—	100,00
Stearic acid	372	0,50
Magnesium oxide ¹⁾	—	4,00
SRF black, low modulus	382	30,00
Zinc oxide	370	5,00
Total		139,50

1) The surface area of the magnesium oxide shall be greater than $125 \text{ m}^2/\text{g}$.

5.2 Procedure

5.2.1 Equipment and procedure

Equipment and procedure for the preparation, mixing and vulcanizing shall be in accordance with ISO 2393.

5.2.2 Premastication

5.2.2.1 Weigh out 500 g of chloroprene rubber.

5.2.2.2 Adjust the mill-roll temperature to $50^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

5.2.2.3 Band the rubber with a mill opening of 1,5 mm and take the time from the instant the rubber is banded.

5.2.2.4 Adjust the nip to maintain a rolling bank of approximately 12 mm in diameter. Mill the rubber for 6 mm, cutting as necessary to maintain a rolling bank and a tight band.

5.2.2.5 Remove the rubber from the mill and allow it to cool to room temperature prior to mixing.

5.2.3 Mill mixing procedure

The standard laboratory mill batch mass, in grams, shall be based on four times the recipe mass.

The surface temperature of the rolls shall be maintained at $50^{\circ}\text{C} \pm 5^{\circ}\text{C}$ throughout the mixing.

A good rolling bank at the nip of the rolls shall be maintained during mixing. If this is not obtained with the nip settings specified hereunder, small adjustments to mill openings may be necessary.

	Duration (min)
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a) Band the premasticated rubber on the mill with a nip setting of 1,5 mm or a suitable setting to maintain a rolling bank	1,0
b) Add the stearic acid	1,0
c) Add the magnesium oxide slowly, spreading it evenly over the entire width of the band. Ensure complete incorporation before adding the SRF black	2,0
d) Add the SRF black. Open the nip at intervals to maintain a rolling blank	5,0
e) Add the zinc oxide	2,0
f) Make three 3/4 cuts from each side ...	2,0
g) Cut the batch from the mill. Set the nip at 0,8 mm and pass the rolled batch lengthways through the mill six times ..	2,0
Total time	15,0
h) Sheet the batch to an approximate thickness of 6 mm and check-weigh the batch (see ISO 2393). If	

^{*)} National Institute of Standards and Technology (formerly the National Bureau of Standards) of the USA.