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AMENDMENT 1
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Chloroprene rubber (CR) — General-purpose types — Evaluation procedure —

AMENDMENT 1

Caoutchouc chloroprène (CR) — Types à usage général — Méthode d'évaluation —

AMENDEMENT 1

Reference number
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Foreword

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The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to ISO 2475:1999 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

Chloroprene rubber (CR) — General-purpose types — Evaluation procedure —

AMENDMENT 1

Pages 1 and 2

Update Clause 2 (normative references) as follows:

Delete all the years of publication except for that of ISO 9298 (in the case of ISO 1795, delete the dash and footnote).

Replace ISO 471 by ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*.

Page 4

At the end of the list in 5.2.3, replace ISO 471 by ISO 23529.

Page 4, Table 2

Replace the existing table (one single formulation) with the following (which contains two alternative formulations):

Table 2 — Standard test formulations for evaluation of mercaptan-modified chloroprene rubbers [a]

Material	Formulation A (parts by mass)	Formulation B (parts by mass)
Chloroprene rubber (CR), mercaptan-modified	100,00	100,00
Magnesium oxide [b]	4,00	4,00
Carbon black [c]	25,00	25,00
Zinc oxide [d]	5,00	5,00
MTT 80 in polymeric binder (curative) [e]	0,45	—
Sulfur	—	1,00
Di-ortho-tolyl guanidine (DOTG)	—	1,00
N-cyclohexyl-2-benzothiazyl sulfenamide (CBS)	—	1,00
Total	134,45	137,00

[a] The CR test formulation contains 3-methylthiazolidinethione-2 (MTT) (in the case of formulation A) or sulfur/DOTG/CBS (in the case of formulation B) instead of ethylene thiourea, a suspected carcinogen.

[b] The surface area of the magnesium oxide shall be between 130 m^2/g and 200 m^2/g. Magnesium oxide will absorb water and carbon dioxide when exposed to air and this can affect its activity in compounds. Store it in a dry environment.

[c] The current industry reference black (IRB), or an equivalent national or international standard reference material, shall be used.

[d] Class B1a (see ISO 9298:1995, Annex D).

[e] MTT 80 may be obtained from Rhein Chemie Rheinau GmbH, Mülheimer Str. 24-28, D-68219 Mannheim 81, Germany.

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In the list in 6.2.3, replace item e) by:

e) If using formulation A, add the MTT 80 1,0

If using formulation B, add the sulfur, DOTG and CBS 2,0

After item g), replace the total time by:

Total time Formulation A: 15,0

Formulation B: 16,0

In item j), replace ISO 471 by ISO 23529.

Page 7

At the end of the list in 7.2.4, replace ISO 471 by ISO 23529.

Page 8

In Clause 9, second paragraph, replace ISO 471 by ISO 23529.

Replace the text of 10.2 by the following:

Type 2 interlaboratory precision programmes were conducted for formulation A and formulation B in Table 2, using the mill mix procedure. Both repeatability and reproducibility are short term, a period of a few days separating replicate test results. A test result is a value, as specified by this test method, obtained for one determination (measurement) of the selected property.

Three different CR formulations were evaluated for precision: sulfur-modified CR, mercaptan-modified CR (formulation A) and mercaptan-modified CR (formulation B).

The sulfur-modified CR and mercaptan-modified CR (formulation A) were tested in eight laboratories on two different days. The mercaptan-modified CR (formulation B) was tested in five laboratories on four different days. On each of the days, duplicate determinations were made. The estimates of the repeatability parameters therefore contain two undifferentiated sources of variation, i.e. replicates within days and between days.

Page 9, Table 3

Replace the existing table with the following:

Table 3 — Type 2 precision for vulcanization parameters and stress/strain properties of CR

Property	Unit	Mean	Within laboratory			Between laboratories		
			s_r	r	(r)	s_R	R	(R)
CR — Sulfur grade [a]								
M_L	dN·m	5,7	0,28	0,80	14,0	1,16	3,24	56,7
M_H	dN·m	53,9	1,03	2,87	5,3	2,97	8,32	15,4
t_{s1}	min	2,1	0,22	0,61	28,6	0,51	1,43	66,7
$t'_c(90)$	min	8,6	0,52	1,45	16,8	1,36	3,81	44,1
100 % modulus	MPa	3,0	0,10	0,27	9,0	0,17	0,48	16,1
300 % modulus	MPa	11,8	0,41	1,15	9,8	0,60	1,67	14,2
Tensile strength	MPa	26,1	0,77	2,15	8,3	1,66	4,65	17,8
Elongation	%	597	16,65	46,62	7,8	32,00	89,60	15,0
CR — Mercaptan grade (formulation A) [a]								
M_L	dN·m	7,6	0,27	0,77	10,1	1,02	2,87	37,9
M_H	dN·m	47,5	0,69	1,93	4,1	3,31	9,27	19,5
t_{s1}	min	2,2	0,10	0,28	12,9	0,32	0,89	41,1
$t'_c(90)$	min	10,7	0,87	2,43	24,6	2,47	6,91	69,8
100 % modulus	MPa	2,6	0,12	0,34	13,2	0,24	0,67	25,6
300 % modulus	MPa	14,5	0,69	1,94	13,4	1,18	3,31	22,8
Tensile strength	MPa	24,3	1,24	3,48	14,2	1,51	4,23	17,4
Elongation	%	441	23,58	66,03	15,0	34,17	95,67	21,7
CR — Mercaptan grade (formulation B) [b]								
M_L	dN·m	1,7	0,06	0,16	9,3	0,23	0,65	37,7
M_H	dN·m	27,8	0,40	1,14	4,1	2,55	7,23	26,0
t_{s1}	min	2,2	0,11	0,31	14,2	0,28	0,80	36,6
$t'_c(90)$	min	35,7	1,18	3,34	9,4	4,32	12,23	34,3
100 % modulus	MPa	3,5	0,26	0,75	21,4	0,50	1,42	40,8
300 % modulus	MPa	15,4	1,09	3,09	20,1	1,81	5,13	33,3
Tensile strength	MPa	26,5	0,98	2,76	10,4	1,74	4,93	18,6
Elongation	%	479	28,18	79,74	16,7	49,27	139,45	29,1

[a] Curing conditions: 160 °C for 15 min. The curemeter used was the oscillating-disc type.

[b] Curing conditions: 160 °C for 20 min. The curemeter used was the rotorless type.

Page 11, Bibliography

Delete the years of publication of ISO 1629 and ISO 6472.

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