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AMENDMENT 1
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Personal flotation devices —

Part 7: Materials and components — Safety requirements and test methods

AMENDMENT 1

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Équipements individuels de flottabilité —
Partie 7: Matériaux et composants — Exigences de sécurité et méthodes d'essai

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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 12402-7:2006 was prepared by Technical Committee ISO/TC 188, *Small craft*, Subcommittee SC 1, *Personal safety equipment,* in collaboration with Technical Committee CEN/TC 162, *Protective clothing including hand and arm protection and lifejackets*.

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AMENDMENT 1

Page 1, Normative references

Replace:

"ISO 31 (all parts), *Quantities and units*"

with

"ISO 80000 (all parts), *Quantities and units*

IEC 80000 (all parts), *Quantities and units*"

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Replace:

"ISO 2062, *Textiles — Yarns from packages — Determination or single-end breaking force and elongation at break*"

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with

"ISO 2062, *Textiles — Yarns from packages — Determination of single-end breaking force and elongation at break using constant rate of extension (CRE) tester*"

Page 3, Normative references

Replace:

"ASTM D 471-98, *Standard Test Method for Rubber Property-Effect of Liquids*"

with

"ASTM D 471-06, *Standard Test Method for Rubber Property — Effect of Liquids*"

Page 5, 4.1.4

In the first line, replace "ISO 31" with "ISO 80000 and IEC 80000".

"*Page 6, 4.1.6.3*

Replace the first sentence with the following:

"Where required by the test method, the component or sample of fabric shall be conditioned, in its normal storage state, and then immediately exposed for (24 ± 0,5) h at a temperature of (–30 ± 2) °C, then for (24 ± 0,5) h at a temperature of (60 ± 2) °C."

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Page 7, 4.1.6.4

Add the following after the last list item:

"NOTE This test is not applicable to fabrics related to PFDs complying with ISO 12402-5."

Page 8, 4.3.2.2

Replace the complete subclause with the following:

"**4.3.2.2** Textile woven fabrics shall have an as-received tensile strength as specified in Table 2, measured using the grab method given in ISO 13934-2."

Page 8, 4.3.2.3

Replace the complete subclause with the following:

"**4.3.2.3** Textile knitted fabrics shall have an as-received burst strength as specified in Table 2, measured using the method given in ISO 13938-1 or ISO 13938-2."

Page 9, Table 2

Replace Table 2 with the following:

Table 2 — Fabric

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Property	Exposure	Test method	Number of samples	Sample size[a] (mm × mm)	Compliance criteria
Tensile strength (woven fabrics only)	1 Standard conditioning 2 Accelerated weathering according to 4.1.6.4 3 70 h immersion in: 3.1 fuel B according to ASTM D 471-06 or diesel fuel according to EN 590[b] 3.2 0,5 % detergent according to ISO 6330	ISO 13934-2, except that jaw breaks may be included in the average results.	5 warp and 5 weft for each separate exposure	As specified by test method	Following exposure 1, the average of 5 samples shall be at least 400 N for each direction. Following each separate exposure 2 and 3, the average of 5 samples shall be at least 260 N.

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Table 2 (*continued*)

Property	Exposure	Test method	Number of samples	Sample size[a] (mm × mm)	Compliance criteria
Bursting strength (knitted fabrics only)	1 Standard conditioning 2 Accelerated weathering according to 4.1.6.4 3 70 h immersion in: 3.1 fuel B according to ASTM D 471-06 or diesel fuel according to EN 590[b] 3.2 0,5 % detergent according to ISO 6330	ISO 13938-1 or ISO 13938-2	10 for each separate exposure	130 × 130	Following exposure 1, the average of 10 samples shall be at least 800 kPa. Following each separate exposure in 2 and 3, the average of 10 samples shall retain at least 60 % of the strength determined following standard conditioning.
Elongation at break (woven fabrics only)	Standard conditioning	ISO 13934-1	5 warp and 5 weft	As specified by test method	Following standard conditioning, the average of 5 samples shall not exceed a 60 % increase of elongation at break.
Tearing strength (woven fabrics only)	Standard conditioning	ISO 13937-2	5 warp 5 weft	50 × 200	The average of 5 samples shall be at least 25 N for each direction.
Yarn slippage (woven fabrics only)	Standard conditioning	See 4.3.2.6	5 warp 5 weft	100 × 150	The average of 5 samples shall be at least 220 N.
Openness of weave[c]	Standard conditioning	See 4.3.2.7			The openness of weave shall not exceed 20 %.
Adhesion strength[d]	Standard conditioning	ISO 2411	2 warp and 2 weft or 5 warp and 5 weft	50 × 200 or 75 × 200	The coating adhesion shall be at least 7 N/cm.

[a] Applies to each colour except for fabrics related to PFDs complying with ISO 12402-5, where a minimum of one colour shall be tested.

[b] Exposure tests shall be based on typical fuels used in the intended area of application.

[c] Applies to external cover fabrics only, not to gusset, lining, or drainage fabric.

[d] Applies only to coated fabric with a coating of 185 g/m^2 or more and where the base fabric or scrim does not comply with the applicable strength requirements when fabric is uncoated.

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Page 12, 4.3.3.2

Replace the complete subclause with the following:

"**4.3.3.2** The colour of the material samples shall be measured using the procedures defined in CIE publication No. 15.2 with polychromatic illumination D_{65}, 45/0 geometry and 2° standard observer. The specimen shall have a black underlay with a reflectance of less than 0,04. The specimens shall be conditioned for at least 24 h at (20 ± 2) °C and (65 ± 5) % relative humidity. If the test is carried out in other conditions, the test shall be conducted within 5 min after withdrawal from the conditioning atmosphere."

Page 12, 4.3.3.3

Delete the complete subclause 4.3.3.3 and renumber current subclause 4.3.3.4 as 4.3.3.3.

Page 12, Table 3

Replace Table 3 with the following:

Table 3 — Chromaticity coordinates x and y and luminance factor β for yellow, orange and red non-fluorescent colours of lifejacket material

Colour	Chromaticity coordinates		Luminance factor
	x	y	β
Yellow	0,389 0,320 0,405 0,500	0,610 0,490 0,400 0,500	> 0,35
Orange	0,500 0,405 0,470 0,600	0,500 0,400 0,330 0,400	> 0,25
Red	0,600 0,470 0,525 0,700	0,400 0,330 0,270 0,300	> 0,15

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Page 13, Table 4

Replace Table 4 with the following:

Table 4 — Chromaticity coordinates x and y and luminance factor β for yellow, yellow-orange, orange, orange-red and red fluorescent colours of lifejacket material

Colour	Chromaticity coordinates		Luminance factor
	x	y	β
Fluorescent yellow	0,380 0,320 0,370 0,440	0,610 0,490 0,440 0,550	> 0,60
Fluorescent yellow–orange	0,440 0,370 0,420 0,505	0,550 0,440 0,390 0,490	> 0,50
Fluorescent orange	0,505 0,420 0,460 0,575	0,490 0,390 0,350 0,425	> 0,40
Fluorescent orange–red	0,575 0,460 0,488 0,630	0,425 0,350 0,320 0,360	> 0,30
Fluorescent red	0,630 0,488 0,525 0,695	0,360 0,320 0,280 0,300	> 0,20

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Page 16, Table 8

Replace Table 8 with the following:

Table 8 — Zippers

Property	Exposure	Test method	Number of samples[a]	Sample length mm	Compliance criteria
Operability force	1 Standard conditioning 2 70 h immersion in fuel B according to ASTM D 471-06 or diesel fuel according to EN 590[b,c] 3 70 h immersion in 0,5 % detergent according to ISO 6330 4 720 h of salt spray according to 4.1.5.2[d] 5 Accelerated weathering according to 4.1.6.4	ASTM D 2062	Six for each separate exposure	150	Following each separate exposure 1 to 5, the force exerted to open or close the zipper shall not exceed 65 N. Additionally, the same samples shall comply with the applicable requirements in the crosswise strength test following this test.
Crosswise strength	1 Standard conditioning 2 70 h immersion in fuel B according to ASTM D 471-06 or diesel fuel according to EN 590[b,c] 3 70 h immersion in 0,5 % detergent according to ISO 6330 4 720 h of salt spray according to 4.1.5.2[d] 5 Accelerated weathering according to 4.1.6.4	See 4.6.2.3	Samples used in the operability force tests	150	Following each separate exposure 1 to 5, the average strength shall be not less than a) 220 N for the top (including slider); b) 220 N for the chain (crosswise); and c) 130 N for the separating unit (crosswise). Following exposures 2 to 4, the average of six samples shall retain at least 60 % of the strength determined following standard conditioning. Following exposure 5, the average of six samples shall retain at least 40 % of the strength determined following standard conditioning.
Resistance to pull-off of slider pull	Standard conditioning	ASTM D 2061	3	150	The pull-and-slider zipper assembly shall not dislodge when subjected to a force of 180 N.
Resistance to twist of pull and slider	Standard conditioning	ASTM D 2061	4 (2 for each direction)	150	The pull and slider shall resist a force of 0,79 Nm torsional stress without significant deformation or rupture.
Holding strength of slider lock	Standard conditioning	ASTM D 2061	3	150	The locking mechanism shall remain locked when subjected to a force of 20 N and the slider shall be operable.

[a] Applies to each colour.

[b] Exposure tests shall be based on typical fuels used in the intended area of application.

[c] Samples shall be blotted dry to remove surface moisture and shall rest for 30 min at ambient temperature prior to the operability force and strength tests.

[d] Applies to zippers employing metallic parts, except those made of stainless steel or equivalent corrosion-resistant metals.

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Page 19, Table 9

Replace Table 9 with the following:

Table 9 — Webbing closures and adjusters

Property	Exposure	Test method	Number of samples[a,b]	Compliance criteria
Tensile strength	1 Standard conditioning 2 70 h immersion in fuel B according to ASTM D 471-06 or diesel fuel according to EN 590[c,d] 3 70 h immersion in 0,5 % detergent according to ISO 6330 4 (70 ± 2) °C for 7 days[c] 5 (−30 ± 2) °C for 24 h[e] 6 720 h of salt spray according to 4.1.5.2 7 Fatigue[f] 8 Accelerated weathering according to 4.1.6.4	See 4.7.1.2.1	5 for each separate conditioning	Following each separate exposure 1 to 8 a) hardware shall have a minimum strength of 890 N; or b) where hardware is intended for use in meeting the PFD horizontal load test requirement for lifejackets, or is a single load-bearing member intended for use in meeting the PFD horizontal load test requirement for buoyancy aids, hardware shall have a minimum tensile strength of 1 600 N. For exposures 2 to 8, the average of 5 samples shall retain at least 60 % of the strength that determined from standard conditioning.

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