INTERNATIONAL STANDARD

ISO 16486-1

First edition
2012-06-01

AMENDMENT 1
2014-04-01

Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing —

Part 1: General

AMENDMENT 1

Systèmes de canalisations en matières plastiques pour la distribution de combustibles gazeux — Systèmes de canalisations en polyamide non plastifié (PA-U) avec assemblages par soudage et assemblages mécaniques —

Partie 1: Généralités

AMENDEMENT 1

Reference number
ISO 16486-1:2012/Amd.1:2014(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 16486-1:2012 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 4, *Plastics pipes and fittings for the supply of gaseous fuels*.

Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing —

Part 1: General

AMENDMENT 1

Page 6, 5.2.5, Table 1

Replace the existing table with the following one:

Table 1 — Characteristics of the compound in the form of granules

Characteristic	Requirement	Test parameters		Test method
		Parameter	Value	
Density	PA-U 11 compound: (1 020 to 1 050) kg/m³ PA-U 12 compound: (1 000 to 1 040) kg/m³	Test temperature	23 °C	ISO 1183-1 ISO 1183-2
Viscosity number	≥ 180 ml/g	Solvent	m-Cresol	ISO 307
Water content	≤ 0,10 %			ISO 15512, Method B
Carbon black content [a]	(0,5 to 1,0) % (by mass)			ISO 6964
Pigment or carbon black dispersion	A.3			Annex A
[a] Only for black compound.				

Page 6, 5.2.5, Table 2

Replace the existing table with the following one:

Table 2 — Characteristics of compound in form of pipe/bar

Characteristic	Requirement	Test parameters		Test method
		Parameter	Value	
Chemical resistance	Change in mean hoop stress at burst between specimens tested in reagent and in the corresponding control fluid ≤ 20 % or Change in tensile strength at yield of injection moulded bar specimens tested in reagent and in the corresponding control fluid ≤ 20 %	According to Annex B		Annex B
Resistance to weathering	The weathered test pieces shall have the following characteristics:	Preconditioning (weathering): cumulative solar radiation	≥ 3,5 GJ/m²	ISO 16871
a) Elongation at break	a) Elongation at break: ≥ 160 %	Testing speed	25 mm/min	a) ISO 6259-1, ISO 6259-3 [a] or ISO 527-1, ISO 527-2 [b]
b) Hydrostatic strength	b) No failure during the test period of any test piece	End caps Orientation Conditioning time Type of test Circumferential (hoop) stress: PA-U 11 160 and PA-U 12 160 [c] PA-U 11 180 and PA-U 12 180 [c] Test period Test temperature	Type A Free 6 h Water-in-water 10,0 MPa 11,5 MPa 165 h 80 °C	b) ISO 1167-1, ISO 1167-2

NOTE 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm².

[a] For test pieces taken from samples in the form of pipe.

[b] For test pieces in the form of injection moulded bar prepared according to ISO 1874-2.

[c] For material classification and designation, see 5.4.

[d] The critical pressure, p_c shall be determined for each new PA-U compound and for every pipe dimension with d_n > 90 mm.

[e] The temperature of cooling for the crack initiation groove shall be appropriate to produce a high speed crack or cracks emanating from the initiation. For some PA-U compounds a crack initiation groove temperature between 0 °C and −60 °C has been found to be suitable.

[f] The critical pressure, $p_{c,S4}$ shall be determined on a pipe produced from the same batch of PA-U compound and the same lot of pipes, as the pipe submitted to the full-scale test.

[g] The value of $p_{c,S4}$ determined in this test is the reference value, $p_{c,S4,REF}$, to be referred to in the requirement of the S4 test specified in ISO 16486-2[10].

Table 2 *(continued)*

Characteristic	Requirement	Test parameters		Test method
		Parameter	Value	
c) Cohesive resistance for electrofusion joint	Length of initiation rupture ≤ $L_2/3$ in brittle failure	Test temperature	23 °C	c) ISO 13954 Joint: Condition 1, ISO 16486-5, Table B.3
Resistance to rapid crack propagation (Critical pressure, p_c) [d] ($e \geq 5$ mm) (Full-scale test)	$p_c \geq 1{,}5$ MOP	Test temperature	0 °C	ISO 13478 [e]
Resistance to rapid crack propagation (critical pressure, p_c,S4) [f] (S4 test)	g	Test temperature	0 °C	ISO 13477
Longitudinal reversion	≤ 3 % pipe shall retain its original appearance	Heating fluid Test temperature Length of test piece Duration of exposure time	Air 150 °C 200 mm According to ISO 2505	ISO 2505
Resistance to slow crack growth for $e > 5$ mm (notch test)	No failure during the test period	Test temperature d_n SDR Test pressure: PA-U 11 160 and PA-U 12 160 [c] PA-U 11 180 and PA-U 12 180 [c] Test period Type of test	80 °C 110 mm or 125 mm 11 18 bar 20 bar 500 h Water-in-water	ISO 13479
Charpy impact strength	$a_{cN} \geq 10$ kJ/m^2 for PA-U 11 and PA-U 12 compounds	Test specimens Test temperature	Notched injection moulded specimens prepared according to ISO 1874-2 0 °C	ISO 179-1/1eA

NOTE 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

[a] For test pieces taken from samples in the form of pipe.

[b] For test pieces in the form of injection moulded bar prepared according to ISO 1874-2.

[c] For material classification and designation, see 5.4.

[d] The critical pressure, p_c shall be determined for each new PA-U compound and for every pipe dimension with $d_n > 90$ mm.

[e] The temperature of cooling for the crack initiation groove shall be appropriate to produce a high speed crack or cracks emanating from the initiation. For some PA-U compounds a crack initiation groove temperature between 0 °C and −60 °C has been found to be suitable.

[f] The critical pressure, $p_{c,S4}$ shall be determined on a pipe produced from the same batch of PA-U compound and the same lot of pipes, as the pipe submitted to the full-scale test.

[g] The value of $p_{c,S4}$ determined in this test is the reference value, $p_{c,S4,REF}$, to be referred to in the requirement of the S4 test specified in ISO 16486-2[10].

ICS 83.140.30;75.200

Price based on 3 pages