

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 2014

STANDARDSISO.COM : Click to view the full PDF of ISO 16486-1:2012/Amd 1:2014



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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](mailto:copyright@iso.org)  
Web [www.iso.org](http://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*.

STANDARDSISO.COM : Click to view the full PDF of ISO 16486-1:2012/Amd.1:2014

STANDARDSISO.COM : Click to view the full PDF of ISO 16486-1:2012/Amd 1:2014

# 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/m <sup>3</sup> PA-U 12 compound: (1 000 to 1 040) kg/m <sup>3</sup>	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 <sup>a</sup>	(0,5 to 1,0) % (by mass)			ISO 6964
Pigment or carbon black dispersion	A.3			Annex A

<sup>a</sup> 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 $\leq 20\%$  or Change in tensile strength at yield of injection moulded bar specimens tested in reagent and in the corresponding control fluid $\leq 20\%$	According to Annex B		Annex B
Resistance to weathering	The weathered test pieces shall have the following characteristics:	Preconditioning (weathering): cumulative solar radiation	$\geq 3,5 \text{ GJ/m}^2$	ISO 16871
a) Elongation at break	a) Elongation at break: $\geq 160\%$	Testing speed	25 mm/min	a) ISO 6259-1, ISO 6259-3 <sup>a</sup>  or ISO 527-1, ISO 527-2 <sup>b</sup>
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:	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
		PA-U 11 160 and PA-U 12 160 <sup>c</sup>  PA-U 11 180 and PA-U 12 180 <sup>c</sup>  Test period Test temperature		

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

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].