

# DIN EN 16643:2016-11 (E)

## Rubber and plastics hoses and hose assemblies - Non-bonded fluoroplastic lined (e.g. PTFE) hoses and hose assemblies for liquid and gaseous chemicals - Specification

---

<b>Contents</b>		<b>Page</b>
European foreword .....		5
Introduction .....		6
1	Scope .....	7
2	Normative References .....	7
3	Terms and definitions .....	8
4	Classification .....	8
5	Hose assembly designs .....	9
6	Materials and construction .....	9
6.1	General .....	9
6.2	Lining .....	9
6.3	Helix wire (optional) .....	9
6.4	Electrical bonding wires (optional) .....	9
6.5	Braid reinforcement .....	9
6.6	Cover (optional) .....	9
7	Dimensions and tolerances .....	10
7.1	Diameters, thickness, bend radii, resistance to vacuum and lowest permitted maximum working pressure requirements .....	10
7.2	Concentricity .....	18
7.3	Length of hose assemblies .....	18
7.3.1	General .....	18
7.3.2	Type SE and Type SC hose assemblies .....	18
7.3.3	Type C hose assemblies .....	18
8	Physical properties of materials used for hoses and hose assemblies .....	18
8.1	General .....	18
8.2	Materials used for the lining .....	19
8.3	Materials used for the helix wire .....	19
8.4	Materials used for the electrical bonding wires .....	19
8.5	Materials used for the over-braid reinforcement .....	19
8.6	Materials used for the cover .....	20
8.7	Materials used for end fittings and couplings .....	20
9	Performance requirements of hoses and hose assemblies .....	20
10	Electrical properties .....	22
10.1	General .....	22
10.2	Electrical bonding .....	22
10.3	Static-dissipative lining and/or static-dissipative cover .....	22
11	Frequency of testing .....	22

12	Type tests .....	23
13	Test report .....	23
14	Marking .....	23
14.1	Hoses .....	23
14.2	Hose assemblies .....	23
15	Storage and admissible storage time .....	24
Annex A (normative) Test frequency for type tests and routine tests .....		25
Annex B (informative) Production acceptance tests .....		27
Annex C (normative) Proof pressure test for fluoroplastic lining .....		28
Annex D (informative) Couplings and fittings .....		29
D.1	General .....	29
D.2	Fluoroplastic lined end fittings .....	29
Annex E (normative) Yield orientation index .....		30
Annex F (normative) Weep test .....		31
F.1	General .....	31
F.2	Test pieces .....	31
F.3	Apparatus .....	31
F.4	Test method .....	31
Annex G (informative) Resistance to chemicals conveyed .....		32
Annex H (informative) Permeability to gas .....		33
H.1	General .....	33
H.2	Test pieces .....	33
H.3	Apparatus .....	33
H.4	Test method .....	33
Annex I (normative) Flame resistance test .....		36
I.1	Test pieces .....	36
I.2	Apparatus .....	36
I.3	Test method .....	36
Annex J (normative) Hose flexibility - Rolling U test .....		38
J.1	General .....	38
J.2	Test pieces .....	38
J.3	Apparatus .....	38
J.4	Test method .....	38
Annex K (informative) Environmental checklist .....		41
Bibliography .....		43
Tables Table 1 -- Dimension requirements, Type SE lining hoses without and with cover .....		11
Table 2 -- Maximum working pressure requirements, Type SE lining hoses without and with cover for two typical braid reinforcements .....		12
Table 3 -- Dimension requirements, Type SC lining hoses without and with cover .....		13

<b>Table 4 -- Maximum working pressure requirements, Type SC lining hoses without and with cover for three typical braid reinforcements .....</b>	<b>14</b>
<b>Table 5 -- Dimension requirements for manufacturing method 1, Type C lining hoses without and with cover .....</b>	<b>15</b>
<b>Table 6 -- Dimension requirements for manufacturing method 2, Type C lining hoses without and with cover .....</b>	<b>16</b>
<b>Table 7 -- Maximum working pressure requirements, Type C lining hoses without and with cover for three typical braid reinforcements .....</b>	<b>17</b>
<b>Table 8 -- Physical properties of fluoroplastic lining .....</b>	<b>19</b>
<b>Table 9 -- Performance requirements of hoses and hose assemblies .....</b>	<b>21</b>
<b>Table A.1 -- Test frequency for type tests and routine tests .....</b>	<b>25</b>
<b>Table B.1 -- Production acceptance tests .....</b>	<b>27</b>
<b>Table H.1 -- Helium test pressures and average helium permeation rates for Type SC hose linings ..</b>	<b>34</b>
<b>Table J.1 -- Rolling U test movement .....</b>	<b>38</b>
<b>Table K.1 -- Environmental checklist .....</b>	<b>42</b>
<b>Figures Figure H.1 -- Arrangement for helium permeation test .....</b>	<b>35</b>
<b>Figure I.1 -- Arrangement for flammability test .....</b>	<b>37</b>
<b>Figure J.1 -- Rolling U test piece .....</b>	<b>39</b>
<b>Figure J.2 -- Typical arrangement of Rolling U test equipment .....</b>	<b>40</b>