Cables for PV-systems: Overview of check routine according to EN 50618:2014

Table 2

No. 1 Electrical tests

No.	Kind of test	Test conditions
1.1	Conductor Resistance	Measuring of conductor resistance acc. to EN 50395
1.2	High voltage test at complete cable	Dielectric test in water at complete cable with 6,5 kV AC or 15 kV DC
1.3	Absence of faults	Dielectric test at complete cable with 10 kV AC (100% during production)
1.4	Measurement of insulation resistance	
1.4.1	Insulation resistance at 20°C	According to EN 50395, Minimum insulation resistance listed in Table 1 of EN 50618
1.4.2	Insulation resistance at 90°C	According to EN 50395 Minimum insulation resistance listed in Table 1 of EN 50618
1.5	Long term resistance of insulation to d.c.	Long term test (240h) sccording to EN 50395 with d.c. voltage 1,8kV
1.6	Surface resistance of sheath	According to EN 50395, Minimum resistance : $10^9\ \Omega$

No. 2 Constructional and dimensional test

No.	Kind of test	Test conditions
2.1	Conductor	Max. diameter of wire in conductor according to 6.1 of EN 60228:2005 Continuity of tin shall be ensured
2.2	Thickness of insulation	Wall thickness of insulation not less than stated in 5.2.3 of this standard
2.3.1	Thickness of sheath	Wall thickness of sheath not less than stated in 5.2.3 of this standard
2.4	Ovality value	Ovality maximal 15%
2.5.1	Sheath colour	Colour shall be black unless otherwise agreed. Colour shall be throughout the whole of sheath
2.6.1	Sheath marking	Visual examination of minimum markings and measurement of distance

No. 3, 4, 5, and 8 Requirements for Insulation and sheathing material
Table B.1

No.	Kind of test	Test conditions
1	Mechanical characteristics	
1.1.1	Tensile test before ageing according to EN 60811-501	Minimum tensile strength for insulation and sheath:8,0 N/mm² Minimum elongation at break for insulation and sheath: 125%
1.2	Tensile test after ageing in oven at 150°C according to 60811-401	Measuring of tensile strength at insulation and sheath (variation max. -30%) and elongation at break (variation max.-30%).
1.3	Hot set test at 250°C according to EN 60811-507	elongation under load, max. 100% permanent elongation after cooling, max. 25%
1.4	Thermal endurance properties for 20.000h according to EN 60216-1 + 60216-2	Complete cable, tests acc. to EN 60216-2 for thermal index 120(20.000h) 4 test sequences (last sequence min. 5000h).

1.5	Cold elongation test.	Tensile test at low temperature (only for cables with diameters ≥ 12,5mm), elongation at break min. 30%
1.6	Sheath resistance against acid and alkaline solution According to EN 60811-404	Tensile and elongation test after storing in N-Oxal-acid and N-sodium hydroxide solution. Variation of tensile strength max. ± 30%, elongation at break min. 100%.
1.7	Compatibility test according to EN 60811-401	Tensile and elongation test after storing in a heating cabinet (135℃ – 7days) Variation of tensile strength and elongation at break: max. ± 30% for insulation, max. -30% for sheath

No. 6 Cold impact test

No.	Kind of test	Test conditions
6	Cold impact test according to EN 60811-506	No cracks

No. 7 Cold bending test

No.	Kind of test	Test conditions
7	Cold bending test according to EN 60811-504	Cable diameter ≤ 12,5 mm No cracks

No. 9 Ozone resistance test

No.	Kind of test	Test conditions
9	Ozone resistance test on complete cable	Method A according to EN 60811-403 or Method B according to EN 50396 No cracks

No. 10 Weathering/UV resistance test on sheath

No.	Kind of test	Test conditions
10.1	Weathering test according to EN 50289-4-17 (method A)	Test acc. to method A of ISO 4892-2: 500 h at 60W/m², 300-400nm, 65℃, 50%RH, cycles: 18 min spraying, 102min drying with Xenon-lamp
10.2	Result to be obtain	Variation of tensile strength and elongation at break: max. -30%

No. 11 Dynamic penetration test

No.	Kind of test	Test conditions
11.1	Dynamic penetration test acc. to Annex D	No penetration before minimum value according to following formula is reached: $F = 150 \cdot \sqrt{D_n}$

No. 12 Damp heat test

No.	Kind of test	Test conditions
12	Damp heat test according to EN 60068-2-78 Tensile test after ageing climatic chamber	Tensile test after storing for 1000h at 90℃ and 85%rH max. variation of tensile strength and elongation at break : max. -30%.

No. 13 Shrinkage test at complete cable

No.	Kind of test	Test conditions
13	Shrinkage test according to EN 60811-503	Maximum shrinkage is 2 % after storing for 1h at 120°C

No. 14 Test of vertical flame propagation

No.	Kind of test	Test conditions
14.1	Test for vertical flame propagation at complete cable according to EN 60332-1-2	Distance between lowest end of upper fixation and starting point of charring shall be minimum 50mm. Additionally the spread of charring below lowest end of upper fixation shall be less than 540mm

No. 15 Smoke emission

No.	Kind of test	Test conditions
15	Smoke emission of complete cable according to EN 61034-2	Result to be obtained : light ransmittance, min. 60%

No. 16 Assessment of halogens

No.	Kind of test	Test conditions
16	Absence of halogen according to EN 50525-1	min. pH-value: 4,3 max. conductivity: 10µS/mm Chlorine and Bromine content, expressed in HC: max. 0,5% Flouride content: max. 0,1%