ECOGAMMA

allSun, ***the line of cables to be used in photovoltaic-systems***

FG7R-0,6/1 kV

(0,9/1,5 kV in c.c.)

G7 cables are suitable for use in environments with high risk of fire and explosion due to the fire propagating resistant properties of the compounds according to CEI 20-22 II standard. In case cables are involved in a fire they have a reduced emission of halogens gasses and fumes with a low content of hydrochloric acid (lower that 18% measured according CEI 20-37). The **UV resistance** characteristic of the G7 cables, proved by the approval organisation IMQ according to the CENELEC standard HD 605-A1, makes it suitable for external use and so also in applications of photovoltaic systems.

FG21M21 (1500 V cc)

FG21M21 cable is designed to be used in photovoltaic systems.
Is resistant to flam propagation and the insulating and sheathing materials are LS0H (low smoke zero halogens).
Manufactured according to the new CEI 20-91 standard, has been subjected to a long duration test so to guaranty a long duration life service.
Are **marked IEMMEQU**, by the Italian Institute for the Quality Mark.

Icel® conduttori di energie

CSQ CERTIFICAZIONE DEI SISTEMI QUALITÀ DELLE AZIENDE UNI EN ISO 9001

FG7R–0,6/1 kV

Single-core power cables, G7 rubber insulated, PVC sheathed, with flexible conductors for fixed installations. Resistant to fire propagation with reduced emission of corrosive gases under fire conditions.

Tab. CEI-UNEL 35375

Nominal cross-sectional area of conductors n x mm²	Maximum diameter of conductor wires mm	Thickness of insulation specified value mm	Indicative core diameter Mm	Thickness of the sheath specified value mm	Maximum overall diameter mm	Indicative cable weight g/m	Maximum conductors resistance at 20°C ohm/km
1 x 1,5	0,26	0,7	2,9	1,4	6,7	51	13,3
1 x 2,5	0,26	0,7	3,4	1,4	7,2	65	7,98
1 x 4	0,31	0,7	3,9	1,4	7,8	80	4,95
1 x 6	0,31	0,7	4,4	1,4	8,4	105	3,30
1 x 10	0,41	0,7	5,3	1,4	9,4	150	1,91
1 x 16	0,41	0,7	6,4	1,4	10,4	200	1,21
1 x 25	0,41	0,9	8,2	1,4	12,2	300	0,780
1 x 35	0,41	0,9	9,5	1,4	13,6	390	0,554
1 x 50	0,41	1,0	11,2	1,4	15,4	540	0,386
1 x 70	0,51	1,1	13,2	1,4	17,3	740	0,272
1 x 95	0,51	1,1	14,7	1,5	19,4	940	0,206
1 x 120	0,51	1,2	16,6	1,5	21,4	1200	0,161
1 x 150	0,51	1,4	18,6	1,6	23,8	1480	0,129
1 x 185	0,51	1,6	20,7	1,6	26,0	1830	0,106
1 x 240	0,51	1,7	23,5	1,7	29,2	2340	0,0801
1 x 300	0,51	1,8	26,1	1,8	32,0	2950	0,0641
1 x 400	0,51	2,0	29,8	1,9	36,5	3930	0,0486

FG7R–0,6/1 kV

Single-core flexible conductor cable

Nominal voltage: Uo/U = 0,6/1 kV . (0,9/1,5 kV d.c).

Maximum voltage: 1,2 kV a.c., 1,8 kV d.c.

Applicable standards: CEI 20-13, CEI 20-11, CEI 20-29, CEI 20-22 II, CEI EN 60332-1-2, CEI EN 50267; HD 605-A1.

Conform to the European Directives: L.V.D. 2006/95/EC - 2002/95/CEE (RoHS).

Conductor: flexible, plain annealed copper.

Insulation: hard ethylene propylene rubber (HEPR) compound, of type G7, with reduced emission of halogen (corrosive gases) under fire conditions.

Colour of the insulation: black.

Sheath: PVC of type Rz with reduced emission of halogen (corrosive gases) under fire conditions. Resistance to UV exposure, measured according to the CENELEC standard HD 605, for a sure outside non protected to sun light installation.
Colour: light grey.

Marking: continuous marking on the sheath: «ICEL or LOMBARDA (cable designation and cross nominal section) CEI 20-22 II IEMMEQU ECOGAMMA production date Made in Italy», with under the sheath the IEMMEQU thread. Progressive meter marking.

Maximum operating temperature: 90°C on the conductor.

Maximum short circuit temperature: 250°C on the conductor (for maximum 5 seconds).

Minimum permissible bending radii: 4 times the cable overall diameter.

Maximum pulling force during laying: 5 kg/mm² of the conductor cross section.

Current carrying capacity: see CEI-UNEL 35024, 35026.

Guide to Use: for internal installations, also in wet locations and for external installations; for installation in surface mounted or on metallic structures; direct laying in earth permitted. Appropriate to be used in photovoltaic systems due to resistance of the sheath to the UV rays. Cables to be used only for electrical power transmission and to be installed only by skilled personal. See also the guide to use standard CEI 20-67.

Icel
conduttori di energie

FG21M21 (1500 V cc)

Single-core power cables for fixed photovoltaic systems, G21 rubber insulation, M21 rubber sheath, with flexible tinned conductors. Resistant to flam propagation having low emission of smoke and toxic and corrosive gases when exposed to fire. CEI 20-91

Nominal cross-sectional area of conductors n x mm²	Maximum diameter of conductor wires mm	Thickness of insulation specified value mm	Indicative core diameter Mm	Thickness of the sheath specified value mm	Maximum overall diameter mm	Indicative cable weight g/m	Maximum conductors resistance at 20°C ohm/km
1 x 1,5	0,26	0,7	2,9	0,8	5,1	32	13,7
1 x 2,5	0,26	0,7	3,4	0,8	5,7	43	8,21
1 x 4	0,31	0,7	3,9	0,8	6,2	60	5,09
1 x 6	0,31	0,7	4,4	0,9	6,9	82	3,39
1 x 10	0,41	0,7	5,4	1,0	8,2	125	1,95
1 x 16	0,41	0,7	6,5	1,0	9,3	185	1,24
1 x 25	0,41	0,9	8,3	1,1	11,4	280	0,795
1 x 35	0,41	0,9	9,6	1,1	12,8	370	0,565
1 x 50	0,41	1,0	11,3	1,2	14,8	520	0,393
1 x 70	0,51	1,1	13,3	1,2	16,9	720	0,277
1 x 95	0,51	1,1	14,8	1,3	18,7	930	0,210
1 x 120	0,51	1,2	16,7	1,3	20,7	1160	0,164

Current-carrying capacities, for single core cables in free air.
Ambient temperature: 60 °C.
Maximum temperature on the conductor: 120 °C:

Nominal section mm²	A
1,5	30
2,5	41
4	55
6	70
10	98
16	132
25	176
35	218
50	276
70	347
95	416
120	488

Correction factors for ambient air temperatures other than 60 °C.
To be applied to the above current-carrying capacities

Ambient Temperature °C	Rating factor
Up to 60	1,00
70	0,91
80	0,82
90	0,71

Icel
conduttori di energie

FG21M21 (1500 V cc) Single-core flexible conductor cable

Nominal voltage: Uo/U = 0,6/1 kV . (0,9/1,5 kV d.c).

Maximum voltage: 1,2 kV a.c., 1,8 kV d.c.

Applicable standards: CEI 20-91, CEI 20-29, CEI 20-37/4-0, CEI EN 60332-1-2, CEI EN 61034-2, CEI EN 50267, CEI EN 60216-1; CEI EN 50396, CEI EN 60216-1, HD 605-A1.

Conform to the European Directives: L.V.D. 2006/95/EC - 2002/95/CEE (RoHS).

Conductor: flexible, tinned annealed copper.

Insulation: hard ethylene propylene rubber compound, of type G21 (according to CEI 20-11), low smoke zero halogens (LS0H).

Colour of the insulation: neutral.

Sheath: thermoplastic compound of type M21 (according to CEI 20-11), low smoke zero halogens (LS0H), resistant to UV rays according to the standard HD 605 A1.

Colour of the sheath: black, blue, red.

Marking: continuous marking on the sheath: «ICEL allSun (cable designation and cross nominal section) IEMMEQU ECOGAMMA production date Made in Italy», with under the sheath the IEMMEQU thread. Progressive meter marking.

Maximum operating temperature: 90 °C on the conductor.

Operating ambient temperature: - 40 °C + 90 °C.

Maximum overload temperature: 120 °C on the conductor

Maximum short circuit temperature: 250 °C on the conductor (for maximum 5 seconds).

Minimum permissible bending radii: 6 times the cable overall diameter.

Maximum pulling force during laying: 5 kg/mm² of the conductor cross section.

Guide to Use: to be used for photovoltaic systems according to the indication given in the standard CEI 64-8 section 712. Especially indicated for the interconnection of the different parts of the photovoltaic systems. For internal installations, also in wet locations and for external installations without protection; or in pipes surface mounted or embedded or in similar close systems. Direct laying in earth permitted. Cables to be used only for electrical power transmission and to be installed only by skilled personal.

Further guidance and warnings for the use of these cables are given in the standard CEI 20-91.

Icel®
conduttori di energie

The **allSun** mark distinguishes the ICEL cables suitable to be used in photovoltaic systems, and are **marked IEMMEQU**, by the Italian Institute for the Quality Mark .

The ***G7*** cables belong to the AFIAM cable line and are marked "**CEI 20-22 II**", so to point out that they are "**resistant to fire propagation**". This means that even if installed in bunches with up to 10 kg/m of non metallic material they do not propagate the fire.
The ***G7*** cables are also "**flame retardant on a single vertical cable**" according to the test CEI 20-35 (EN and IEC 60332-1).
Furthermore, to prevent additional risks coming from the toxic substances emitted during the combustion by the plastic material, the ***G7*** cables are manufactured with special compounds "with reduced emission of corrosive gases", less than 18% in terms of hydrochloric acid.
In the IMQ laboratories the ICEL FG7(O)R cables have passes with full success the UV resistant test (not required by the product standard) according the CENELEC standard HD 605, so to have a good performance in respect of UV resistance in a non protected external installation.
The use of the ***G7*** cables in recommended also in installations with danger of explosion or of fire spread, as in thermal and electrical power plants**,** chemical and petrochemical plants, steel plants, fuels distribution plants, etc…

The **FG21M21** cables designed for a working life of at least 25 years in normal use conditions and have positively past the long duration test with a temperature index of 120 °C corresponding to 20.000 hours according to the CENELEC standard EN 60216.
They are **"flame retardant on a single vertical cable"** that means that if installed in bunches of cables in ambient with high risk in case of fire also fire barriers have to be foreseen in the installation.
These cables are manufactured with special compounds that are "**LS0H" (low smoke zero halogen)** so to prevent additional risks coming from toxic substances, and opaque smoke released during the combustion in case of fire, all in conformity to the CEI and CENELEC standards. This characteristic of these cables is verified and controlled by IMQ by test carried out in their laboratories.

The **allSun** cables belong to the ecological line named **ECOGAMMA**, marked on the documentation and on the packaging, by the symbol of the Windmill. In the cable compounds the presence of lead has been taken out, being a heavy metal, that is dangerous, for the environment and for humans, if present in high quantities.

Icel®
conduttori di energie

I.C.E.L. S.C.p.a.
Headquarters and Commercial Departement:
Via Torricelli 4/6 - 48022 Lugo (RA) ITALIA
Tel. 0545/913111 (14 linee r.a.) - Fax 0545/913113
www.icelscpa.it

Production site:
Lugo (RA) ITALIA
Zingonia (BG) ITALIA

June 2010