



Super TUTOR,
the line of flexible cables PVC insulated,
resistant to fire propagation and reduced emission
of corrosive gasses; with super characteristics in
reliability, flexibility and in respect of the environment.
For mobile and fixed installations

SUPER SAFE

Afiam cables, marked IMQ on the complete range, is resistant to fire propagation (CEI 20-22 II). In case they are involved in a fire they have a reduced emission of halogens gasses and fumes with a low content of hydrochloric acid (lower than 18% measured according CEI 20-37).

SUPER RELIABILITY

Withstanding the 60.000 cycles in the "Two pulley flexing test" (a number of cycles double of those foreseen by the HD 21 standard), Super Tutor offers a higher resistance to the dynamic stresses improving the **duration** and **safety** characteristics.

SUPER FLEXIBILITY

Provided with a sheath of a special PVC compound, Super Tutor is more flexible and sliding, also at temperatures near to 0 °C.

SUPER ECOLOGICAL

Super TUTOR operates where reliability is to be guaranteed, no fear of fire is needed and helps energy to do well its own job, as in nature are able to do only few other strong elements: sun, water and wind. The respect for the environment is insured by the employment of compounds lead free.

It belongs to the ecological line named ECOGAMMA marked by the Wind Mill sign of clean energy.



Super TUTOR FROR-450/750 V



Multicore **flexible** power cables, PVC insulated, PVC sheathed.

Resistant to fire propagation with low emission of corrosive gasses under fire conditions

Number and nominal cross-sectional area of conductors mm ²	Maximum diameter of conductor wires mm	Thickness of insulation specified value mm	Thickness of sheath specified value mm	Mean overall dimensions		Indicative Cable weight g/m	Maximum resistance of conductors at 20°C ohm/km
				MIN mm	MAX mm		
2 x 1	0,21	0,7	1,0	6,9	8,7	85	19,5
2 x 1,5	0,26	0,7	1,0	7,3	9,2	100	13,3
2 x 2,5	0,26	0,8	1,2	9,0	11,2	150	7,98
2 x 4	0,31	0,8	1,2	10,0	12,5	195	4,95
2 x 6	0,31	0,8	1,3	11,2	13,9	260	3,30
3 G 1	0,21	0,7	1,0	7,3	9,1	100	19,5
3 G 1,5	0,26	0,7	1,0	7,8	9,8	120	13,3
3 G 2,5	0,26	0,8	1,2	9,5	11,9	180	7,98
3 G 4	0,31	0,8	1,3	10,9	13,5	245	4,95
3 G 6	0,31	0,8	1,4	12,0	14,9	330	3,30
4 G 1	0,21	0,7	1,0	7,9	9,9	115	19,5
4 G 1,5	0,26	0,7	1,1	8,7	10,9	150	13,3
4 G 2,5	0,26	0,8	1,2	10,4	12,9	220	7,98
4 G 4	0,31	0,8	1,3	11,9	14,7	300	4,95
4 G 6	0,31	0,8	1,4	13,2	16,3	405	3,30
5 G 1	0,21	0,7	1,1	8,9	11,1	150	19,5
5 G 1,5	0,26	0,7	1,2	9,6	12,0	180	13,3
5 G 2,5	0,26	0,8	1,3	11,6	14,3	265	7,98
5 G 4	0,31	0,8	1,5	13,4	16,5	375	4,95
5 G 6	0,31	0,8	1,5	14,6	18,0	495	3,30

If specifically requested, and for agreed quantities a version of the cable without the protective conductor (green/yellow) can be supplied.

CABLES FOR CONTROL AND SIGNALLING CIRCUITS

Super TUTOR FROR-300/500 V



Multicore **flexible** cables for control and signalling circuits, PVC insulated, PVC sheathed.

Resistant to fire propagation with low emission of corrosive gasses under fire conditions

Number and nominal cross-sectional area of conductors mm ²	Maximum diameter of conductor wires mm	Thickness of insulation specified value mm	Thickness of sheath specified value mm	Mean overall dimensions		Indicative Cable weight g/m	Maximum resistance of conductors at 20°C ohm/km
				MIN mm	MAX mm		
7 G 1	0,21	0,6	1,0	8,9	11,1	165	19,5
10 G 1	0,21	0,6	1,2	11,6	14,3	240	19,7
12 G 1	0,21	0,6	1,2	11,9	14,8	270	19,7
14 G 1	0,21	0,6	1,3	12,7	15,7	300	19,7
16 G 1	0,21	0,6	1,3	13,4	16,5	350	19,7
19 G 1	0,21	0,6	1,4	14,3	17,7	400	19,7
24 G 1	0,21	0,6	1,5	16,8	20,7	510	19,8
27 G 1	0,21	0,6	1,6	17,4	21,4	610	19,8
7 G 1,5	0,26	0,7	1,2	10,5	13,1	230	13,3
10 G 1,5	0,26	0,7	1,3	13,5	16,7	340	13,4
12 G 1,5	0,26	0,7	1,4	14,2	17,5	380	13,4
14 G 1,5	0,26	0,7	1,4	14,8	18,3	420	13,4
16 G 1,5	0,26	0,7	1,5	15,8	19,4	480	13,4
19 G 1,5	0,26	0,7	1,5	16,7	20,5	560	13,4
24 G 1,5	0,26	0,7	1,7	19,8	24,3	700	13,5
27 G 1,5	0,26	0,7	1,8	20,4	25,0	770	13,5

If specifically requested, and for agreed quantities a version of the cable without the protective conductor (green/yellow) can be supplied.

**Super TUTOR
FROR-450/750 V**

Multicore power cable
Nominal voltage:
U_o/U = 450/750 V

**Super TUTOR
FROR-300/500 V**

For signalling and control circuits
Nominal voltage:
U_o/U = 300/500 V

Standards: IMQ CPT-007; CEI 20-29, 20-20, 20-34, 20-22 II, 20-37/2-1, 20-11; EN / IEC 60332-1 .

European directives: L.V.D. 2006/95/EC - 2002/95/CE (RoHS).

Conductor: flexible plain annealed copper.

Insulation: PVC of type T12 with reduced emission of corrosive gasses under fire conditions.

Colour of the cores:

Two cores : blue – brown.
Three cores : green/yellow – blue – brown;
Four cores : green/yellow – brown – black – grey;
Five cores : green/yellow – blue – brown – black – grey;
Signalling and control cables : black cores with white progressive numbering inscription – green/yellow.

Sheath: PVC of TM2 quality with low emission of corrosive gasses under fire conditions.
Colour: light grey.

Marking: continuous marking on the sheath: «ICEL “SUPER TUTOR” (cable designation and cross nominal section) CEI 20-22 II IEMMEQU ECOGAMMA production date». Progressive meter marking.

Maximum operating temperature: 60°C on the conductor.

Maximum short circuit temperature: 150°C on the conductor (for maximum 5 seconds).

Minimum permissible bending radii:

For free movements: 5 times the cable overall diameter if lower than 12 mm; 6 times if higher.
For fixed installation: 3 times the cable overall diameter if lower than 12 mm; 4 times if higher.
For repeated windings: 7 times the cable overall diameter if lower than 12 mm; 8 times if higher.

Maximum pulling force during laying: 1,5 kg/mm² of the conductor cross section.

Current carrying capacity: see CEI-UNEL 35024.

Guide to Use: Intended for free movements and when foreseen for fixed installations. Suitable for indoor installations, in dry or damp premises and outdoors for intermittent or temporary use; for installations in which the CEI standards foresee cables resistant to propagation of fire. Not suitable for underground installations.

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 guide to use standards CENELEC HD 516 or CEI 20-40.



The **Super TUTOR** mark identifies the line of PVC electric cables resistant to fire propagation, for fixed and mobile installations.

All the **Super TUTOR** cables belong to the AFIAM cable line and are marked "CEI 20-22 II", so to identify that they are "**resistant to fire propagation**": this means that they conform to the self extinguishing requirements set down in the standard CEI 20-22/2 (test of resistance to propagation of fire), having passed with success the burning test at the CESI laboratory. The test has been carried out on a bunch of cables with at least 10 kg/m of non metallic material.

In other words the electric cables Super TUTOR are self-extinguishing (according to the CEI 20-22/2 test) even if installed in a bunch: in fact if a fire is set it will extinguish at a small distance from the hotbed where it was generated.

The **Super TUTOR** cables are also "**flame retardant on a single vertical cable test**" according to the test CEI 20-35 (EN and IEC 60332-1). Moreover to prevent additional risks coming from the toxic substances emitted by the plastic material during combustion, **Super TUTOR** cables are manufactured with special compounds "**with reduced emission of corrosive gasses**", less than 18% in terms of hydrochloric acid, according to the standard CEI 20-37/0; 20-37/2-0 (EN 50267-1) and 20-37/2-1 (EN 50267-2-1).

All the **Super TUTOR** cables belong to the ecological line "ECOGAMMA", and are marked on the documentation and on the packaging by the Wind Mill sign. In these new ecological cables **lead** and its' compounds have been eliminated. Lead is a heavy metal that can be dangerous, for the environment and to humans if present in high quantities.

The use of the **Super TUTOR** cables is recommended also in installations with danger of fire spread, as in thermal and electrical power plants, chemical plants, workshops, etc...



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