COPPER TUBE AND INSULATION FOR AIR CONDITIONING SYSTEMS

1 Preliminary Considerations

Usually in refrigeration and air conditioning driving networks of refrigerant gas are constituted by piping performed with copper pipe and tubes. Copper is one of the most resistant metals and appropriate for the transport of fluids and have the great advantage of having surfaces, both the outside with the inside, fairly regular, smooth, dry and clean.

However, its installation should follow strictly the corresponding technical standards, in addition to be necessary to observe specific care in their handling and storage.

As a rule, for use in refrigeration and air conditioning, the manufacture of copper pipes must satisfy the requirements of standard EN 12735-1 (replacement of the ASTM B 280).

The main advantages of the copper pipe that justify their application so widespread in refrigeration facilities and air conditioning, hydraulic (hot and cold water), the fire fighting installations, installations of combustible gases, the medical gas facility and various industrial installations, are:

- supports high temperatures;
- offers the best conditions of safety;
- is eco-friendly and recyclable;
- is a noble material;
- is a material of long durability;
- presents good mechanical, chemistry and corrosion resistance.

2 Aplication Fields

The main areas of application of copper piping (pipes and accessories) are: cooling and refrigeration (industrial, commercial and domestic, in cars), different electrical components, various decorative elements, hydraulic networks, gas networks (fuels and medicinal), firefighting networks and other industrial installations.

In refrigeration and air conditioning systems they are applied malleable or rigid copper pipes, depending on its diameter; thus:

a. Malleable piping in rolls of 30.50 meters for the diameters given in the following table:

Diameter ["]	Diameter [mm]	Thickness [mm]	Estimate Weigth [kg/m]
1/4	6,35	0,76	0,121
3/8	9,53	0,81	0,203
1/2	12,70	0,89	0,277
5/8	15,88	0,81	0,354
3/4	19,05	0,89	0,467

b. rigid pipe at lengths of 5 meters for the diameters given in the table below:

Diameter ["]	Diameter [mm]	Thickness [mm]	Estimate Weigth [kg/m]
7/8	22,22	0,81	0,569
1	25,40	0,89	0,644
1 1/8	28,57	0,89	0,901
1 3/8	34,92	1,07	1,318
1 5/8	41,27	1,27	1,593
2 1/8	53,97	1,50	2,206
2 5/8	66,67	1,65	2,737

The pipe ends must be kept close with colored indentifying caps to maintain the interior cleanness in conditions of handling and storage.

3 Insulation Rubber Tubes (Armaflex)

The most important functions of a thermal insulation in Air Conditioning installations are controlling external condensation and conservation of energy over a longer or shorter period. The AC Armaflex type insulation tube is flexible elastomeric rubber foam with a closed structure.

Its technical features ensure an efficient thermal insulation and a good control of condensation.

The main technical characteristics of rubber foam insulation pipe are as follows:

- Temperature Range ..... -40 ºC a + 105 ºC
- Thermal Conductivity ..... 0.038 W/m.ºK a 0 ºC
- Water Vapor Diffuser Resistance Factor 3000
- Fire Reaction .....Self extinguishable

- Odor ..... Neutral
- Color ..... Black
- Standard Dimensions ..... Shells 2 meters length and 1 meter wide boards

External Pipe Diameter		Insulating Pipe - Available Dimensions				External Pipe Diameter		Insulating Pipe - Available Dimensions			
["]	[mm]	6 mm	9 mm	13 mm	19 mm	["]	[mm]	6 mm	9 mm	13 mm	19 mm
1/4	6,0	6x09	9x09	-	-	1 1/8	28,0	6x28	9x28	13x28	9x28
3/8	10,0	6x10	9x10	13x10	19x10	1 3/8	35,0	-	9x35	13x35	19x35
1/2	12,0	6x12	9x12	13x12	19x12	1 5/8	42,0	-	9x42	13x42	19x42
5/8	15,0	6x15	9x15	13x15	19x15	2 1/8	54,0	-	9x54	13x54	19x54
3/4	18,0	6x18	9x18	13x18	19x18	2 5/8	64,0	-	9x64	13x64	19x64
7/8	22,0	6x22	9x22	13x22	19x22	-	76,1	-	9x76	13x76	19x76
1	25,0	6x25	9x25	13x25	19x25	3 1/2	88,9	-	9x89	13x89	19x89

The dimensions in terms of diameter and thickness of the walls of the insulating rubber tubing for the most diameters of copper tubes used in refrigeration and air conditioning systems are given in the above table.