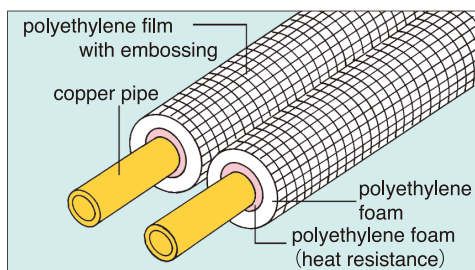


IPO-TUBE

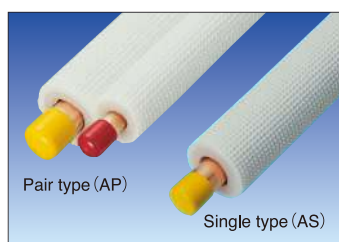
IPO-TUBE AS·AP

● 20*30*50 meter coil with insulation



- 1** Polyethylene foam which has excellent heat resistance characteristic is used in the insulation layer thus allowing for an even higher level of heat insulation. It is possible to use this pipe at continuous temperature of 100°C and intermittent temperatures of up to 120°C.
- 2** Because heat insulation material and copper pipe form one covered pipe it is not necessary to insert insulation material after the pipe is fitted. Therefore the total process of fitting the pipe can be done quickly.
- 3** According to the combination of polyethylene resin and the closed cell construction of the insulation layer, creates very effective resistance to dew build up.

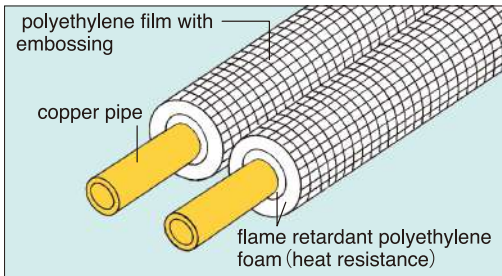
| | Item code | Copper pipe | | | Insulation | Coil meter | Color of end cap | Packing |
|--------|-----------|--------------|---------------------|----------------|----------------|------------|------------------|--------------|
| | | Nominal size | Outer diameter (mm) | Thickness (mm) | Thickness (mm) | (M) | | (pcs/carton) |
| Pair | AP-23 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 1 |
| | AP-23-30 | 3/8" | 9.52 | 0.8 | 9 | 30 | ③ | |
| | AP-24 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 1 |
| | AP-24-30 | 1/2" | 12.70 | 0.8 | 10 | 30 | ④ | |
| | AP-25 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 1 |
| | | 5/8" | 15.88 | 1.0 | 10 | 10 | ⑤ | |
| | AP-35 | 3/8" | 9.52 | 0.8 | 9 | 20 | ③ | 1 |
| | | 5/8" | 15.88 | 1.0 | 10 | 10 | ⑤ | |
| AP-36 | 3/8" | 9.52 | 0.8 | 9 | 20 | ③ | 1 | |
| | 3/4" | 19.05 | 1.0 | 10 | 10 | ⑥ | | |
| AP-46 | 1/2" | 12.70 | 0.8 | 10 | 20 | ④ | 1 | |
| | 3/4" | 19.05 | 1.0 | 10 | 10 | ⑥ | | |
| Single | AS-2 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 2 |
| | AS-2-30 | | | | | 30 | | 1 |
| | AS-2-50 | | | | | 50 | | 1 |
| | AS-3 | 3/8" | 9.52 | 0.8 | 9 | 20 | ③ | 2 |
| | AS-3-30 | | | | | 30 | | 1 |
| | AS-3-50 | | | | | 50 | | 1 |
| | AS-4 | 1/2" | 12.70 | 0.8 | 10 | 20 | ④ | 2 |
| | AS-4-30 | | | | | 30 | | 1 |
| | AS-4-50 | | | | | 50 | | 1 |
| | AS-5 | 5/8" | 15.88 | 1.0 | 10 | 20 | ⑤ | 2 |
| | AS-5-30 | | | | | 30 | | 1 |
| | AS-5-50 | | | | | 50 | | 1 |
| | AS-6 | 3/4" | 19.05 | 1.0 | 10 | 20 | ⑥ | 1 |
| | AS-7 | 7/8" | 22.22 | 1.15 | 10 | 20 | ⑦ | 1 |



IPO-TUBE ASFR·APFR

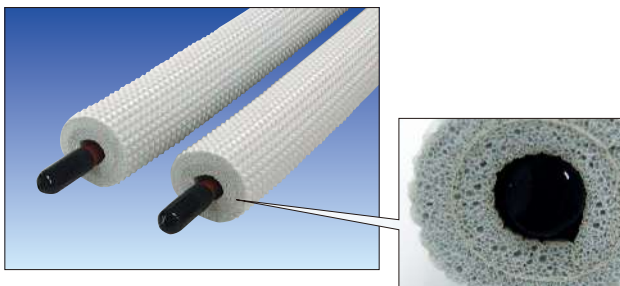
● EURO CLASS B_{L,s2,d0} approved Flame Retardant Insulation

Class B_L



- 1 APFR and ASFR are insulated with flame retardant polyethylene, which has EURO CLASS B_{L,s2,d0} grade in Europe. Both items are new and have EURO CLASS B_{L,s2,d0} grade for all of insulation.
- 2 It is possible to use this pipe at continuous temperature of 100°C and intermittent temperature of up to 110°C.

| | Item code | Copper pipe | | | Insulation | Coil meter | Color of end cap | Packing |
|---------|------------|--------------|---------------------|----------------|----------------|------------|------------------|--------------|
| | | Nominal size | Outer diameter (mm) | Thickness (mm) | Thickness (mm) | (M) | | (pcs/carton) |
| Pair | APFR-23 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 1 |
| | APFR-23-30 | 3/8" | 9.52 | 0.8 | 9 | 30 | ③ | |
| | APFR-24 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 1 |
| | APFR-24-30 | 1/2" | 12.70 | 0.8 | 10 | 30 | ④ | |
| | APFR-25 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 1 |
| | | 5/8" | 15.88 | 1.0 | 10 | 20 | ⑤ | |
| | APFR-35 | 3/8" | 9.52 | 0.8 | 9 | 20 | ③ | 1 |
| | | 5/8" | 15.88 | 1.0 | 10 | 20 | ⑤ | |
| APFR-36 | 3/8" | 9.52 | 0.8 | 9 | 20 | ③ | 1 | |
| | 3/4" | 19.05 | 1.0 | 10 | 20 | ⑥ | | |
| APFR-46 | 1/2" | 12.70 | 0.8 | 10 | 20 | ④ | 1 | |
| | 3/4" | 19.05 | 1.0 | 10 | 20 | ⑥ | | |
| Single | ASFR-2 | 1/4" | 6.35 | 0.8 | 9 | 20 | ② | 2 |
| | ASFR-2-30 | | | | | 30 | | 1 |
| | ASFR-2-50 | | | | | 50 | | 1 |
| | ASFR-3 | 3/8" | 9.52 | 0.8 | 9 | 20 | ③ | 2 |
| | ASFR-3-30 | | | | | 30 | | 1 |
| | ASFR-3-50 | | | | | 50 | | 1 |
| | ASFR-4 | 1/2" | 12.70 | 0.8 | 10 | 20 | ④ | 2 |
| | ASFR-4-30 | | | | | 30 | | 1 |
| | ASFR-4-50 | | | | | 50 | | 1 |
| | ASFR-5 | 5/8" | 15.88 | 1.0 | 10 | 20 | ⑤ | 2 |
| | ASFR-5-30 | | | | | 30 | | 1 |
| | ASFR-5-50 | | | | | 50 | | 1 |
| | ASFR-6 | 3/4" | 19.05 | 1.0 | 10 | 20 | ⑥ | 1 |
| | ASFR-7 | 7/8" | 22.22 | 1,15 | 10 | 20 | ⑦ | 1 |



IPO-TUBE

IPO-TUBE ASK

- Straight pipe with insulation
- Expanded pipe end (one side)

| Item code | Copper pipe | | | Insulation Thicness (mm) | Length (M) | Packing (pcs/carton) |
|-----------|--------------|---------------------|---------------|--------------------------------|---------------|-------------------------|
| | Nominal size | Outer diameter (mm) | Thicness (mm) | | | |
| ASK-3 | 3/8" | 9.52 | 0.8 | 9 | 4 | 12 |
| ASK-4 | 1/2" | 12.70 | 0.8 | 10 | 4 | 9 |
| ASK-5 | 5/8" | 15.88 | 1.0 | 10 | 4 | 6 |
| ASK-6 | 3/4" | 19.05 | 1.0 | 10 | 4 | 6 |
| ASK-7 | 7/8" | 22.22 | 1.0 | 10 | 4 | 4 |
| ASK-10 | 1" | 25.40 | 1.0 | 10 | 4 | 4 |
| ASK-11 | 1"+1/8" | 28.58 | 1.0 | 10 | 4 | 2 |
| ASK-12 | 1"+1/4" | 31.75 | 1.1 | 10 | 4 | 2 |
| ASK-13 | 1"+3/8" | 34.92 | 1.1 | 10 | 4 | 2 |
| ASK-14 | 1"+1/2" | 38.10 | 1.35 | 10 | 4 | 2 |
| ASK-15 | 1"+5/8" | 41.28 | 1.2 | 10 | 4 | 2 |
| ASK-16 | 1 +3/4" | 44.45 | 1.25 | 10 | 4 | 2 |

ASK type is insulated straight copper pipe, one end is expanded and unnecessary for fitting a socket. As temper grade is 1/2H, can be bended by tools easily.



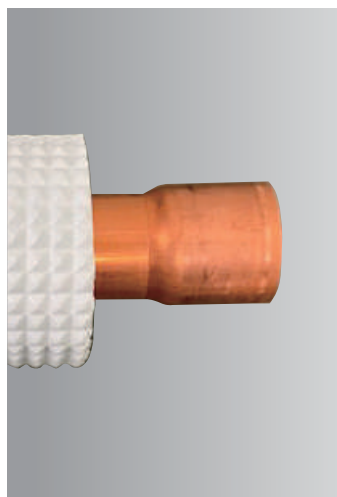
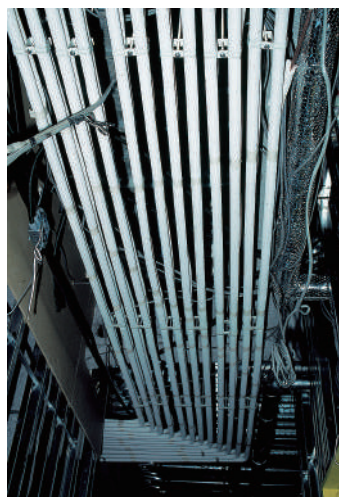
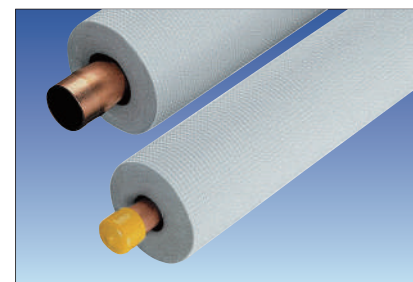
IPO-TUBE ASKFR

- Straight pipe with insulation
- Expanded pipe end (one side)
- EURO CLASS B_L,s1,d0 approved Flame Retardant Insulation

Class B_L

| Item code | Copper pipe | | | Insulation Thicness (mm) | Length (M) | Packing (pcs/carton) |
|------------|--------------|---------------------|---------------|--------------------------------|---------------|-------------------------|
| | Nominal size | Outer diameter (mm) | Thicness (mm) | | | |
| ASKFR-S-3 | 3/8" | 9.52 | 0.8 | 9 | 4 | 12 |
| ASKFR-S-4 | 1/2" | 12.70 | 0.8 | 10 | 4 | 9 |
| ASKFR-S-5 | 5/8" | 15.88 | 1.0 | 10 | 4 | 6 |
| ASKFR-S-6 | 3/4" | 19.05 | 1.0 | 10 | 4 | 6 |
| ASKFR-S-7 | 7/8" | 22.22 | 1.0 | 10 | 4 | 4 |
| ASKFR-S-10 | 1" | 25.40 | 1.0 | 10 | 4 | 4 |
| ASKFR-S-11 | 1"+1/8" | 28.58 | 1.0 | 10 | 4 | 2 |
| ASKFR-S-12 | 1"+1/4" | 31.75 | 1.1 | 10 | 4 | 2 |
| ASKFR-S-13 | 1"+3/8" | 34.92 | 1.1 | 10 | 4 | 2 |
| ASKFR-S-14 | 1"+1/2" | 38.10 | 1.35 | 10 | 4 | 2 |
| ASKFR-S-15 | 1"+5/8" | 41.28 | 1.2 | 10 | 4 | 2 |
| ASKFR-S-16 | 1"+3/4" | 44.45 | 1.25 | 10 | 4 | 2 |

ASKFR type is insulated with flame retardant polyethylene, which has EURO CLASS B_L,s1,d0 grade in Europe. This item is new and have EURO CLASS B_L,s1,d0 grade for all of insulation. ASKFR type is insulated straight copper pipe, one end is expanded and unnecessary for fitting a socket. As temper grade is 1/2H, can be bended by tools easily.



Physical Properties for IPO Tube

Copper pipe

| | AS·AP·ASFR·APFR | ASK·ASKFR |
|---------------------------------------|---|---------------------------|
| Specification | JIS H3300 C1220T / EN 12735-1 12200 | |
| Chemical Component | Cu : 99.90% and above P : 0.015~0.040% * DHP-Cu | |
| Temper Grade | O / R-220 | 1/2 H / R-250 (Half Hard) |
| Tensile strength N/mm ² | Min. 220 | 250~328 |

Insulating material

| | Unit | AS·AP·ASK | | ASFR·APFR·ASKFR |
|-------------------------------|-------------------|----------------------|------------------------------|---------------------------------------|
| | | Regular (outer wall) | Heat resistance (inner wall) | Flame retardant and Heat resistance |
| Thermal Conductivity | W/m.k | Max. 0.043 | | |
| Density | g/cm ³ | Min. 0.010 | | |
| Tensile Strength | N/cm ² | Min. 14.0 | | |
| Shrinkage of thickness | % | Max. 7 (70±5°C) | Max. 7 (120±5°C) | |
| Fire resistance | - | EN 13501-1 CLASS FL | | EN 13501-1 CLASS B _{1,s2,d0} |
| Vapour diffusion conductivity | - | μ < 4000 | | |

Insulating Data

(Internal pipe temperature 5 °C)

