



INSULATION SYSTEMS

INSTRUCTION MANUAL



INTRODUCTION

To help installers and users of our range of insulation products, Evocell&Mobius S.r.l. has put together this practical guide which, whilst not addressing exhaustively all the various problems of insulation, gives advice on various technical solutions based on our industry experience which can make the end result easier and more effective. The suggestions contained herein are for consideration only given that the actual installation process is outside the company's competence and therefore cannot be guaranteed as each and every insulation procedure has variable conditions and background.

Evocell&Mobius S.r.l. guarantees the consistent quality and compliance of its products with regard to the regulations and norms currently in force under the CE approvals system.

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Insulation systems

C1

AT

PE-R

PU ALU/PVC

PE-AL

TRIPLEX

HI-TECH

U.V. PROTECTION

SYSTEM COVER

ACCESSORIES



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1 ACCESSORIES AND THEIR TECHNICAL PROPERTIES

With a view to making the application of our products easier, Evocell&Mobius S.r.l. has developed a wide range of accessories. Their correct use is essential in ensuring the long-term performance of the entire insulation system in terms of its impermeability, temperature resistance, durability and pleasing aesthetic presentation.

NEOPRENE ADHESIVE

A contact adhesive with a chloroprene, synthetic resin and solvent base. Designed for use with foamed synthetic rubber insulation material, this product offers long-term durability and temperature resistance to 110 °C. It must only be applied when the ambient temperature is not below 10 °C and not above 30 °C, when the system is completely shut down and never in direct sunlight. The adhesive should be stirred before application and then allowed to dry for around 24 hours before the system is switched on. Surface coverage is around 3/4 sq.m/kg. Drying time before adhesion is between 5 to 10 minutes at a temperature of 20 °c. The product is also available for high temperature insulation.

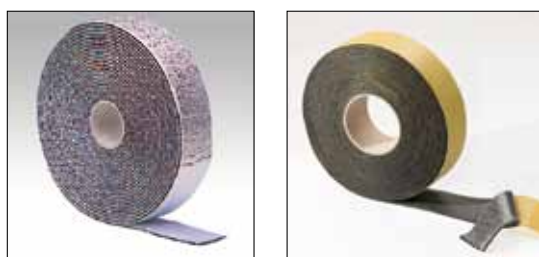


Coverage of adhesive on surfaces	approx. 3-4 sq.m/kg	
Coverage of adhesive on pipes	Thickness mm.	m/kg.
	6	200
	9	130
	13	90
	19	40
	25	30
	32	20

ACCESSORIES AND THEIR TECHNICAL PROPERTIES

SELF-ADHESIVE ELASTOMERIC FOAM TAPE

Insulating adhesive closed-cell foamed elastomeric tape, with the application process (breaking, cutting and adhesive application) of the elastomeric tape allowing it to retain all its insulating and impermeable qualities. The tape is strengthened with a polyester fibre net which is tear-resistant and does not distort during application. The adhesive is permanent acrylic vinyl which has a guaranteed temperature resistance ranging from -20 °C to +85 °C, can be applied even when the ambient temperature is only 5 °C, has excellent UV and water resistance and offers superior adhesion on a range of surfaces. It is particularly suitable for insulation on anti-condensation equipment and in areas where access is difficult. It is also available in a HI-TECH version.



BITUMEN TAPE

Insulating bitumen tape with a resin, rubber and bitumen base that is ideal for moulding itself to application surfaces. It is especially suitable for complex shapes and is ideal for anti-condensation insulation work where several layers can be used. It is also suitable for pipework where the operating temperature does not exceed 80 °C.



ACCESSORIES AND THEIR TECHNICAL PROPERTIES

COLOURED ELASTOMERIC PAINT

A semi-liquid paste that is used to protect expanded insulation material in outdoor use against UV rays.

PAINT TECHNICAL DATA

Available colours	Grey - White Blue - Red (on request)
Density	1,25 - 1,35 Kg/dm ³ to 20 °C
Temperature resistance	from - 50 °C to + 120 °C
Application temperature	from 5 °C to + 30 °C
Drying time	1 - 2 hours
Surface coverage	5 mq/litre
Package	3 litre tin or 20 litre tin

PAINT COVERAGE kg/m on pipework

Diameter mm	thickness 6 mm	thickness 9 mm	thickness 13 mm	thickness 19 mm	thickness 25 mm	thickness 32 mm
6	ml 71	ml 46				
8	ml 64	ml 43				
10	ml 58	ml 42	ml 35	ml 25		
12	ml 53	ml 36	ml 34	ml 24		
14	ml 49	ml 31	ml 34	ml 23		
16	ml 46	ml 29	ml 28	ml 22		
18	ml 43	ml 25	ml 26	ml 20	ml 15	ml 11
20	ml 41					
22	ml 38	ml 22	ml 23	ml 18	ml 14	ml 10
25	ml 35					
27	ml 33	ml 20	ml 20	ml 16	ml 13	ml 9
34	ml 28	ml 18	ml 16	ml 15	ml 12	ml 9
42	ml 23	ml 18	ml 16	ml 14	ml 11	ml 8
48		ml 16	ml 15	ml 13	ml 11	ml 8
54		ml 15	ml 14	ml 12	ml 10	ml 7
60		ml 14	ml 13	ml 11	ml 10	ml 7
70		ml 13	ml 11	ml 10	ml 9	ml 6
76		ml 12	ml 10	ml 9	ml 8	ml 6
89		ml 11	ml 9	ml 9	ml 8	ml 6
102		ml 10	ml 9	ml 8	ml 7	ml 5
108		ml 9	ml 8	ml 8	ml 7	ml 5
114		ml 8	ml 8	ml 7	ml 6	ml 5
127			ml 7	ml 7	ml 6	ml 5
134			ml 7	ml 6	ml 5	ml 4
140			ml 6	ml 5	ml 5	ml 4
160			ml 6	ml 5	ml 4	ml 5

N.B. For perfect protection we recommend applying two layers. The first layer should be diluted with approx. 10% water.

ACCESSORIES AND THEIR TECHNICAL PROPERTIES

PVC TAPE

Made with auto-extinguishing adhesive PVC, this tape is available in black or grey. Has excellent durability, is dilute acid and alkaline solution resistant. Its malleability makes it ideal for application on rough surfaces..



BLACK/GREY PVC TAPE TECHNICAL DATA

Fire resistance	B1 (DIN 4102)
Thickness	mm 0,10
Tear resistance	MPa 15
Elongation breaking point	125%
Temperature limit	+ 80 °C
Storage	approx. 20 °C - 25 °C with relative humidity at 65% max.

ALUMINIUM TAPE

This adhesive aluminium tape has a thickness of 030 mm and is available with a smooth or embossed finish. It is used for finishing and sealing polyurethane units, air conditioning ducting and surfaces protected with aluminium sheeting



ALUMINIUM TAPE TECHNICAL DATA

Fire resistance	from -40 °C to +80 °C
Thickness	mm 0,025
Tear resistance	3%
Temperature resistance	from -40 °C to + 80 °C
Storage	approx. 20 °C - 25 °C with relative humidity at 65% max.

ACCESSORIES AND THEIR TECHNICAL PROPERTIES

ALUMINIUM TERMINALS

To give a professional finish to insulated piping. Available as:

18 mm for insulation between 24 and 34 mm

23 mm for insulation between 43 and 49 mm

28 mm for insulation between 61 and 90 mm

38 mm for insulation between 102 and 115 mm



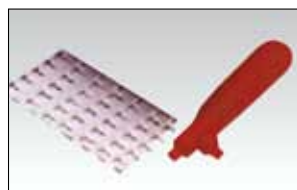
DETERGENT FOR NEOPRENE ADHESIVE

Thanks to its special chemical formula this detergent guarantees thorough cleaning on piping and insulation materials on which the adhesive is to be used.

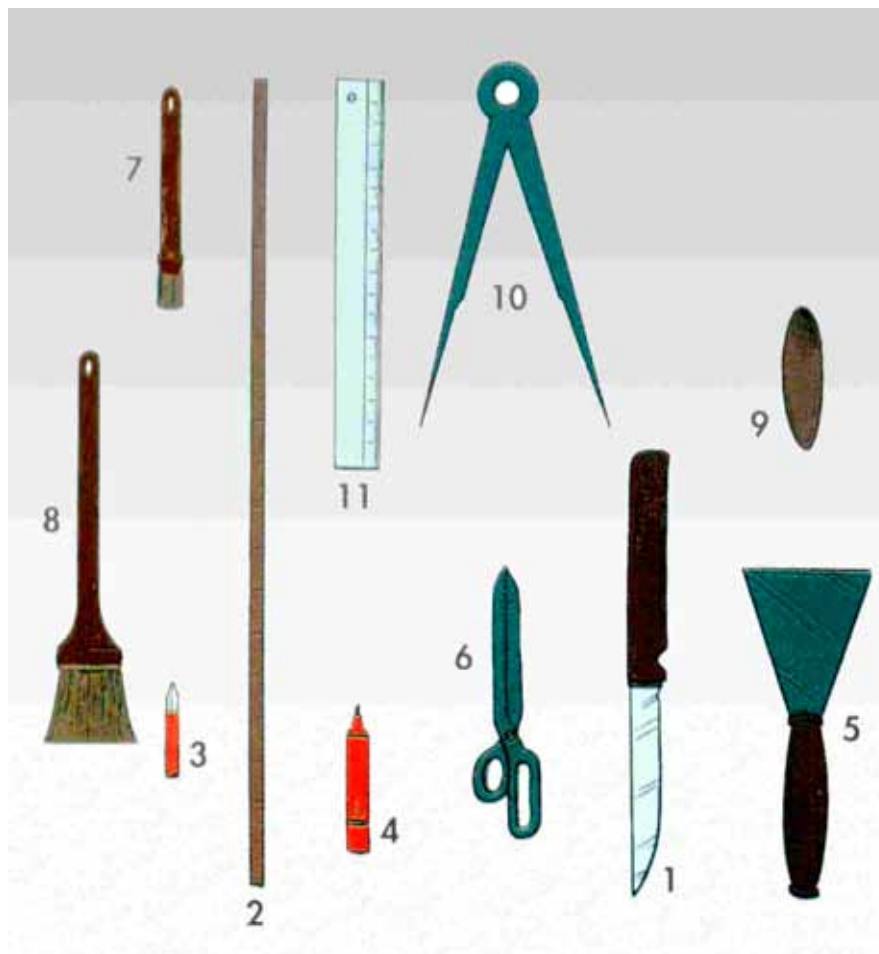


TACKS AND AWLS

For a professional finish using PVC coverings these accessories are indispensable when working on insulating materials.



2 LIST OF TOOLS



1 - Long-bladed knife

2 - Rigid ruler

3 - Chalk

4 - Marker pen

5 - Spatula

6 - Scissors

7 - Brush for small surfaces

8 - Brush for larger surfaces

9 - Whetstone

10 - Compass

11 - Rigid smaller ruler

3 HINTS FOR INSULATION WORK

A - Always ensure that pipes and sheets are completely clean and that they are not contaminated with dust, dirt or liquids (oil, water etc).

B - Make sure that your tools are sharp, that adhesives and paint are fresh and that brushes are in good order.

C - Never install insulating materials on functioning equipment; make sure that the equipment is not switched back on until at least 36/48 hours after the insulation material has been installed.

D - Insulation material should be protected with a coating of paint or PVC or aluminium material within 48 hours of installation, especially on outdoor equipment.

E - Before insulating pipework ,ducts, metal tanks etc. ensure that any rust is treated with an anti-corrosion agent that has been allowed to dry for at least 24/36 hours.

F - Make sure that the parts joined by adhesive are joined by pressure and not by pulling.

G - Ensure that junction points and critical points like pumps, flanges, fittings and supports are perfectly sealed.

H - Never insulate pipework that is too close together; optimum separation distance is at least 3/4 cm.

4 ADVICE FOR WORKING WITH ADHESIVES

A - Ensure that you are working in the best environmental conditions (check instructions on the adhesive tin or on the technical data sheet). It is better to use smaller tins to avoid the premature evaporation of the solvents in the adhesive.

B - Always use the correct size brushes (depending on the surface to be glued) that have short, stiff bristles.

C - Spread the adhesive in the right quantity on the surface to be glued, ensuring that the surface is clean and free from dust, dirt, oils and fats.

D - Before joining the surfaces to be glued it is advisable to allow the solvents to evaporate. Remember that the treated surfaces adhere only when the adhesive is no longer “tacky”.

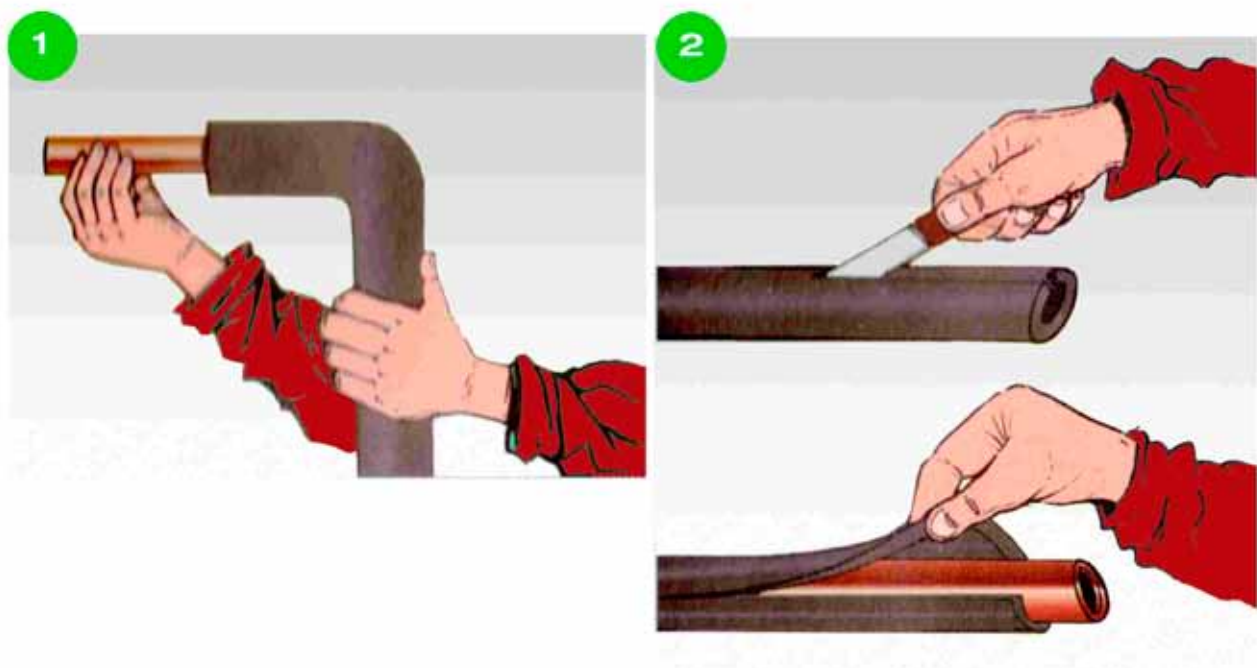


5.1 INSULATING PIPEWORK

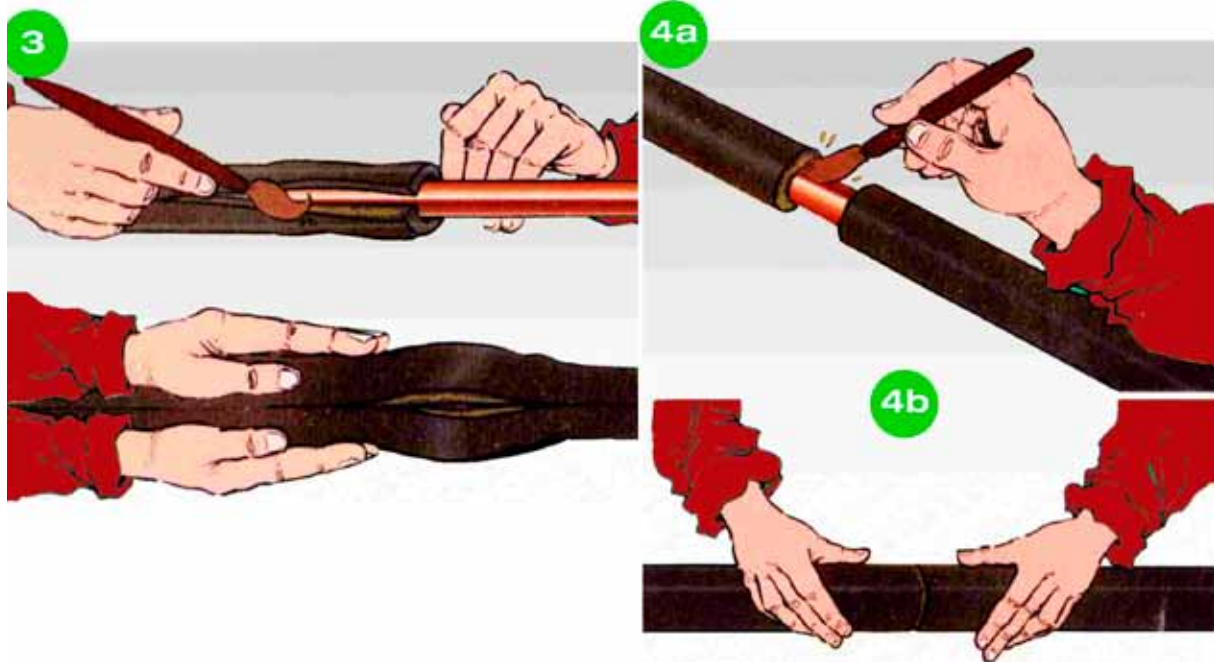
When the pipe ends are free and not yet assembled, the insulation material can be threaded over the pipe, this applies also to curved sections (fig. 1).

NB. This application works subject to the following limitations: for insulation material with a thickness 6-9-13 mm up to a diameter of 1 and 1/4" (42-43 mm), for insulation material with a thickness of 19 mm up to 3/4" (27/28 mm). For large wall thickness insulation material or pipes with a larger diameter than those above proceed using the method detailed in figs. 2 and 3.

NOTE: For best insulation practice it is advisable to glue the ends of the insulation material (figs. 4 and 4b).

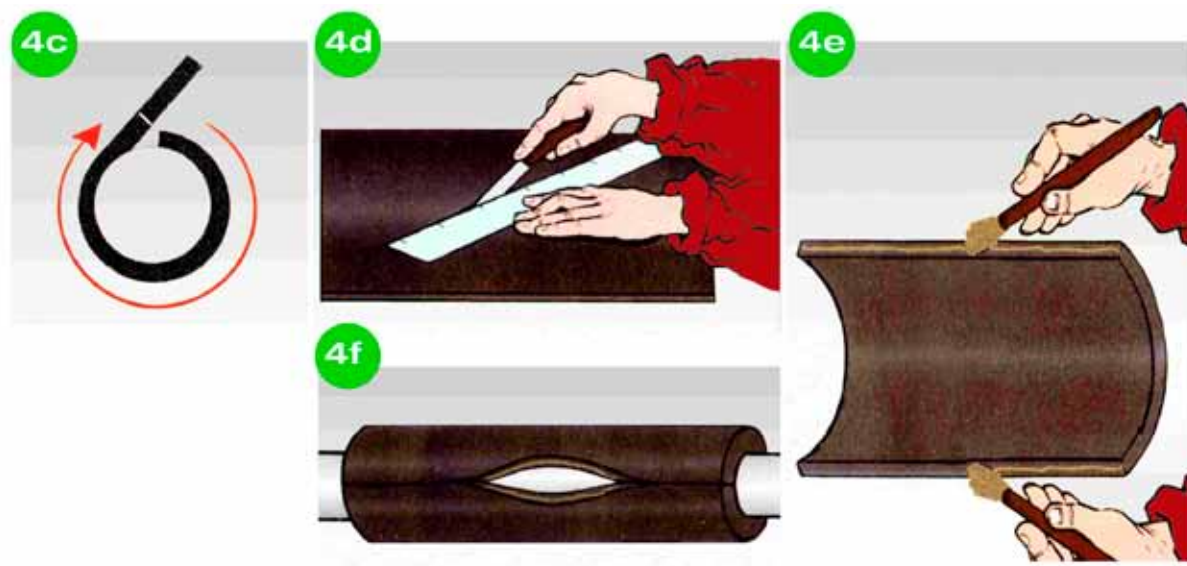


INSULATING PIPEWORK



STRAIGHT PIPES WITH A DIAMETER ABOVE 160 mm

- A** - Wrap a strip of the insulation sheet to be applied around the pipe (fig. 4c) and mark the circumference.
- B** - Copy the mark on the material and cut (fig. 4d)
- C** - Glue the parts to be joined (fig. 4e).
- D** - Insulate the pipe (fig. 4f).



5.2 INSULATING BENDS - ELBOWS

ELBOWS

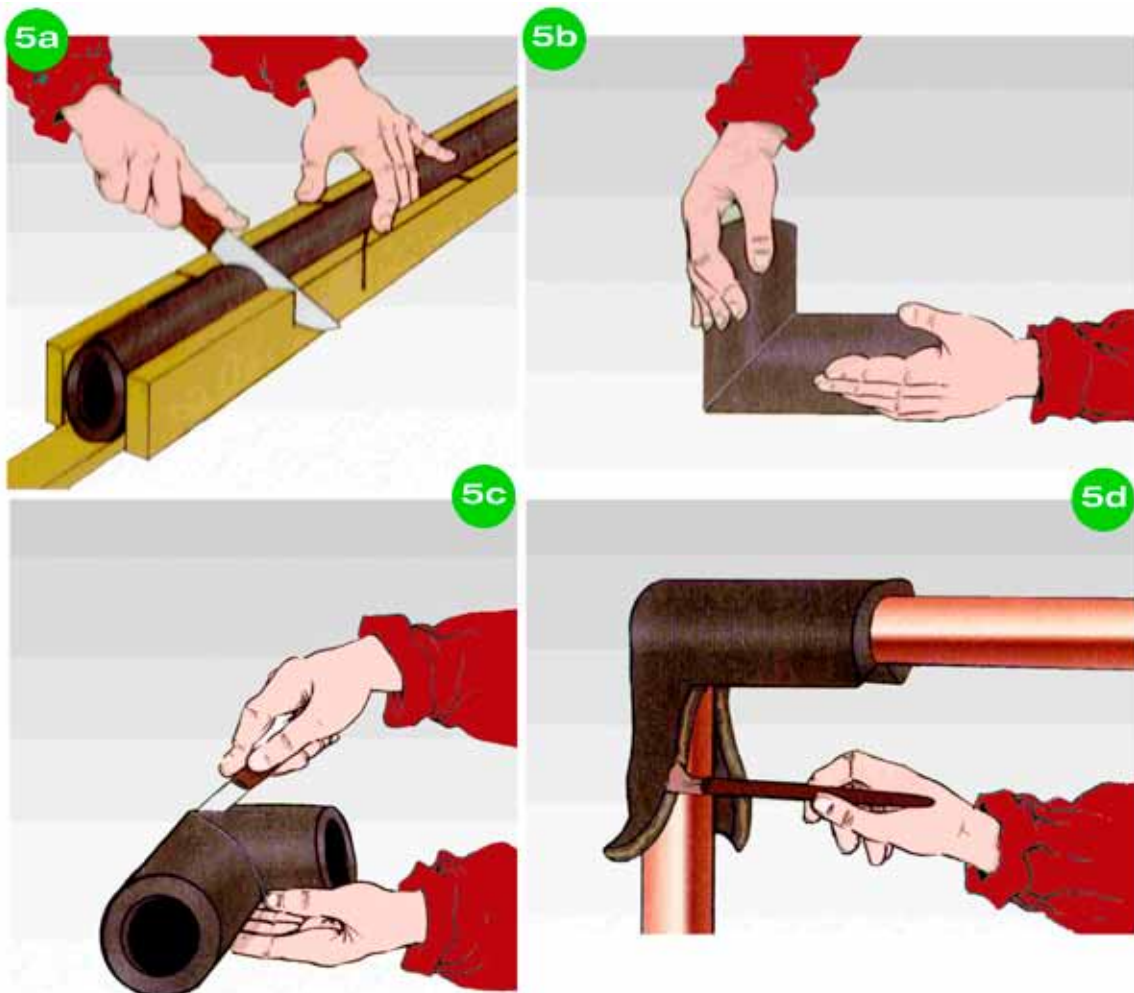
Proceed as indicated in **figs. 5a,b,c,d.**

A - Make a 45° cut in the tube to produce two sections

B - Join the two parts

C - Cut lengthwise

D - Thread onto the pipe and glue the cut edges



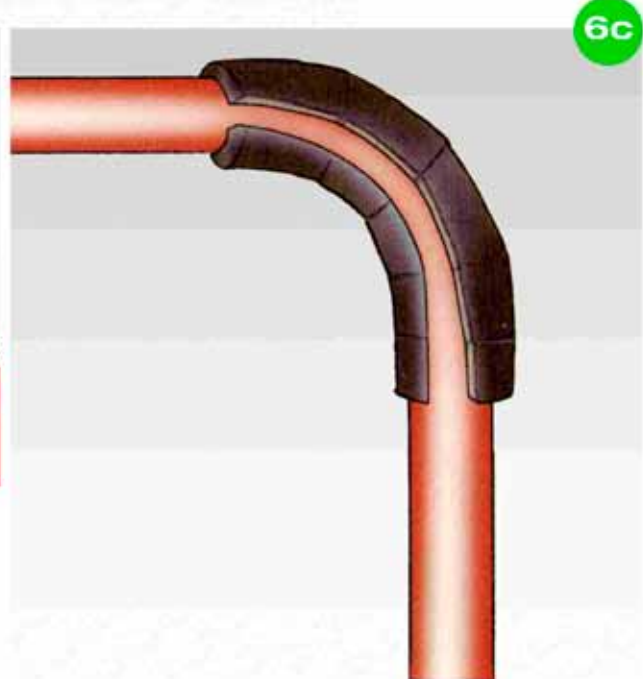
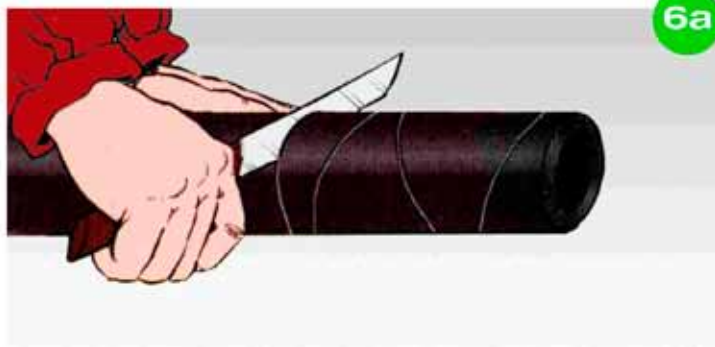
INSULATING BENDS - ELBOWS

STANDARD BENDS (DIMA 3)

A - Cut the insulation tube into 3, 4 or 5 sections as indicated (fig. 6a).

B - Glue the various sections (fig. 6b).

C - Cut the joined piece lengthwise, slide onto the curved pipe and glue the cut edges (fig. 6c).



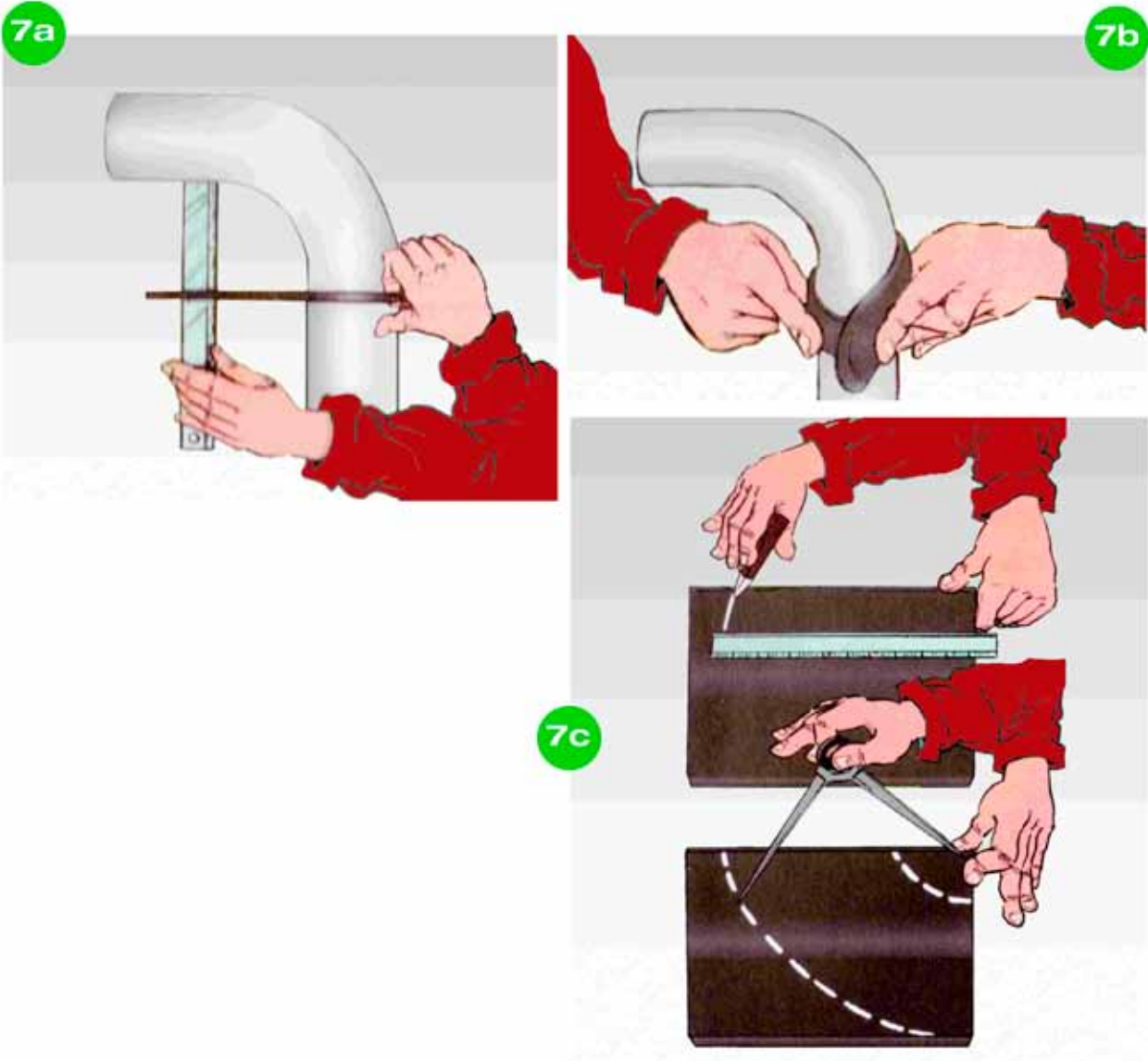
INSULATING BENDS - ELBOWS

LARGE RADIUS BENDS (DIMA 5)

A - Measure the internal radius of the bend to be insulated (fig. 7a).

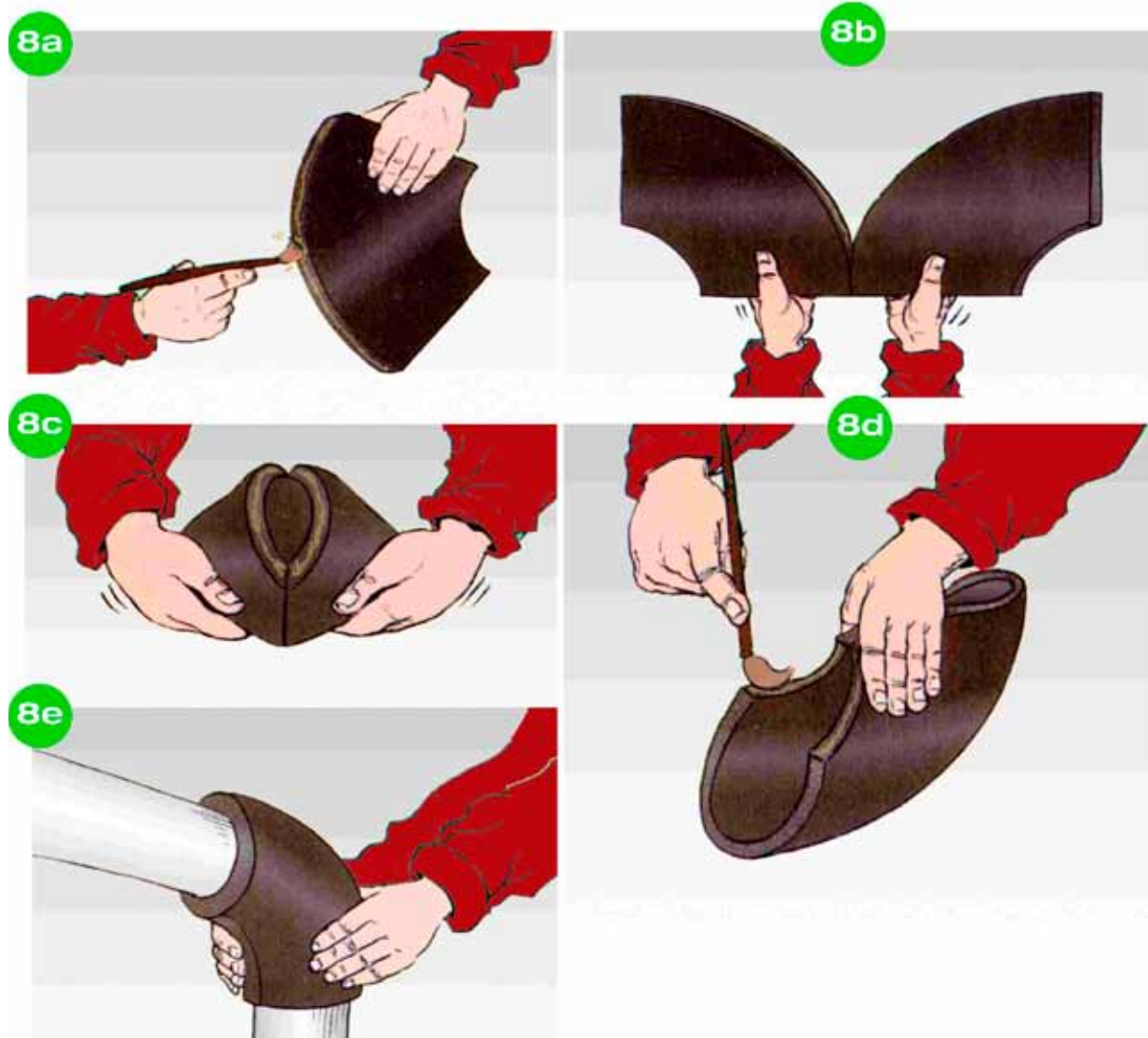
B - Measure the circumference of the pipe using a piece of tape of the thickness with which the pipe is to be insulated (fig. 7b).

C - With chalk, trace the measurements on the insulating material and with a compass draw the bend (fig. 7c).



INSULATING BENDS - ELBOWS

D - Cut the first section and then use that as a template for the second and then glue correctly and proceed as in figs. 8a, 8b, 8c, 8d, 8e.



5.3 INSULATING T-FITTINGS, REDUCERS AND ANGLED PIPEWORK

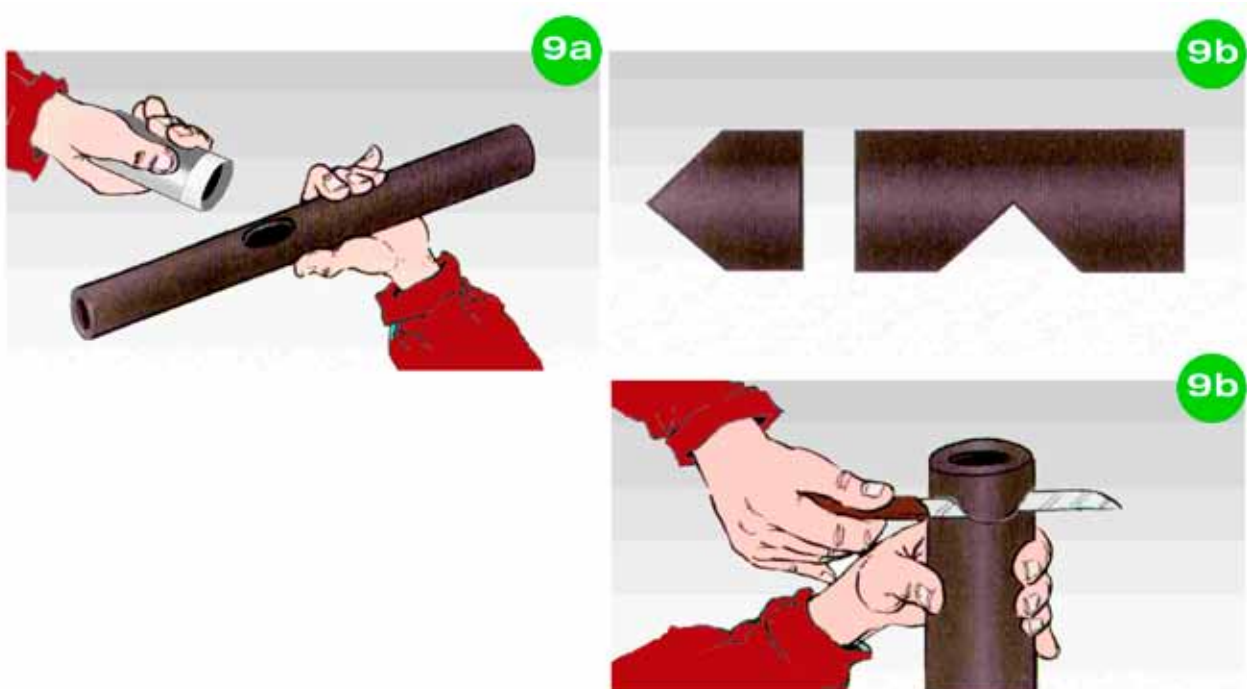
T-FITTINGS

Proceed as illustrated in the illustrations below (figs. 9a and 9b).

Prepare with a suitably sharpened metallic pipe that has the same diameter as the T-pipe to be insulated (fig. 9a).

Cut the insulation tube at a 45° angle (two sections of the correct length fig. 9b). In both cases join the two sections with glue (fig. 9c).

Cut the joined pieces as in fig. 9d and then fit to the T-pipe section (fig. 9e) and glue.



INSULATING T-FITTINGS, REDUCERS AND ANGLED PIPEWORK

9c



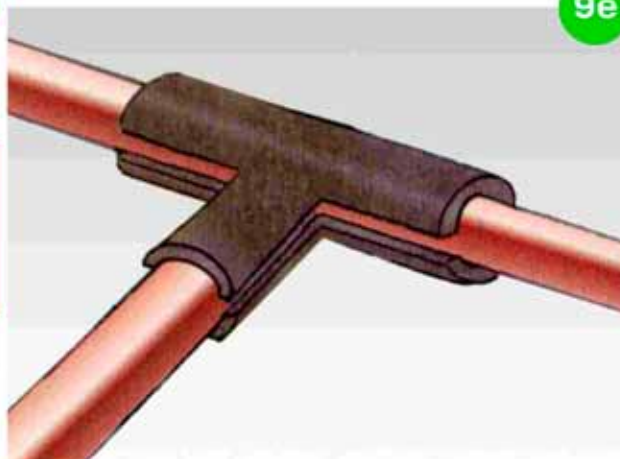
9c



9d



9e

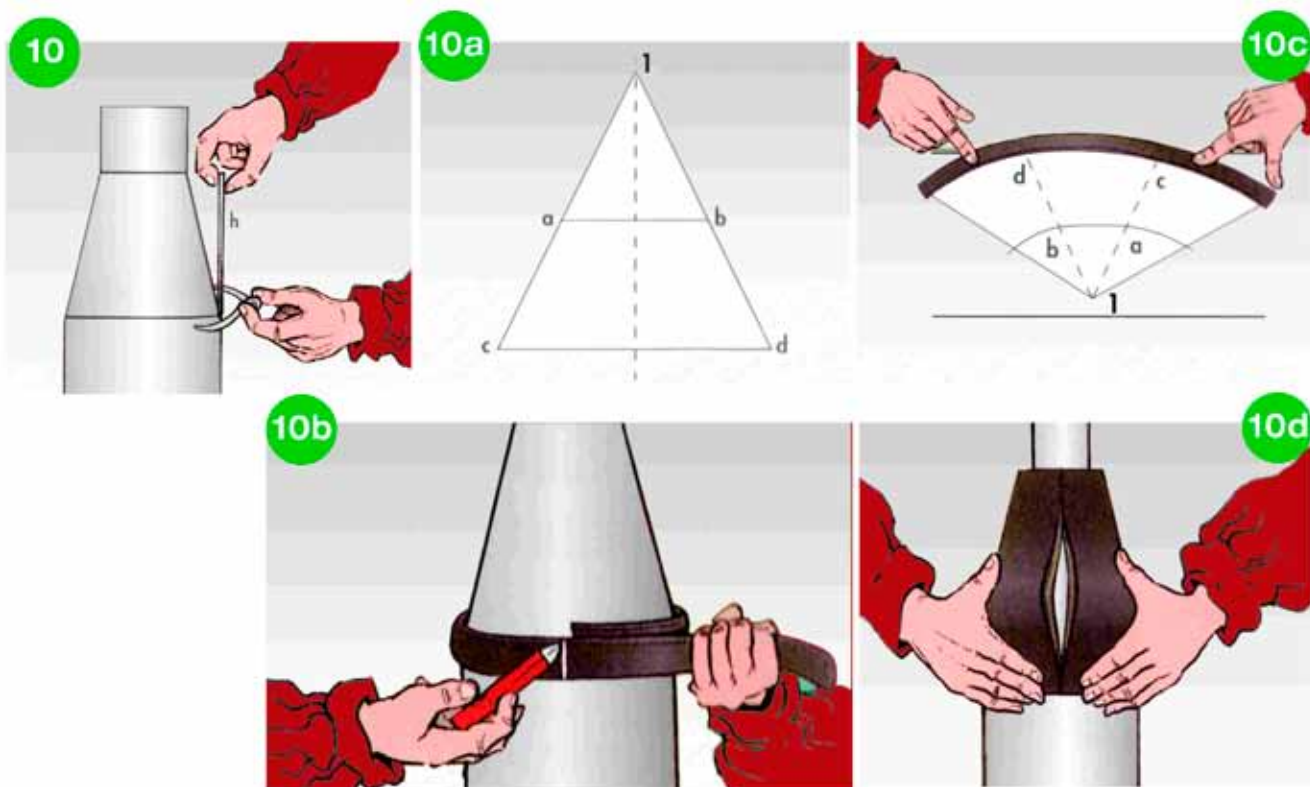


INSULATING T-FITTINGS, REDUCERS AND ANGLED PIPEWORK

REDUCERS

(fig. 10) Measure the height of the section to insulate (including the welding) and the smaller and larger diameter added to twice the thickness of the insulation material. Mark the measurements on the material being careful to trace the median with the compass to mark the two circumference arcs on the external points of the sectors *ab* and *cd* (fig. 10a).

Measure the circumference of the pipe with the larger diameter with a strip of the same insulating material to be used and mark half of that circumference on the median, obtaining points *e* and *d* (fig. 10b and 10c). Join those points, cut, glue and connect (fig. 10d).

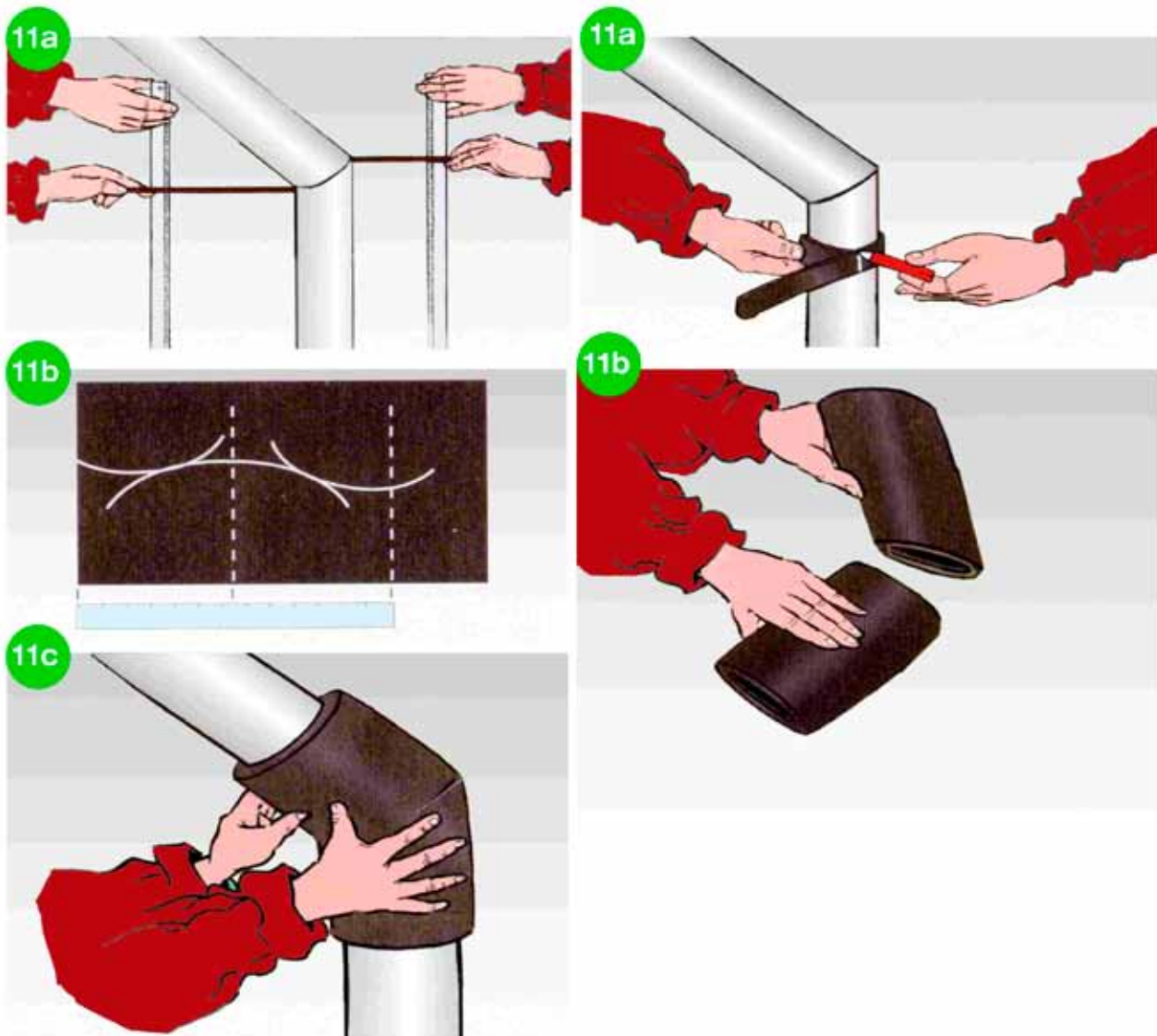


INSULATING T-FITTINGS, REDUCERS AND ANGLED PIPEWORK

ANGLED PIPEWORK

The procedure is much the same as that used for elbows, taking care to mark on the material the circumference and the internal and external dimensions of the pipe to be insulated (sequence fig. 11a).

Then proceed to glue the sections and fit onto the pipe (figs. 11b and 11e).

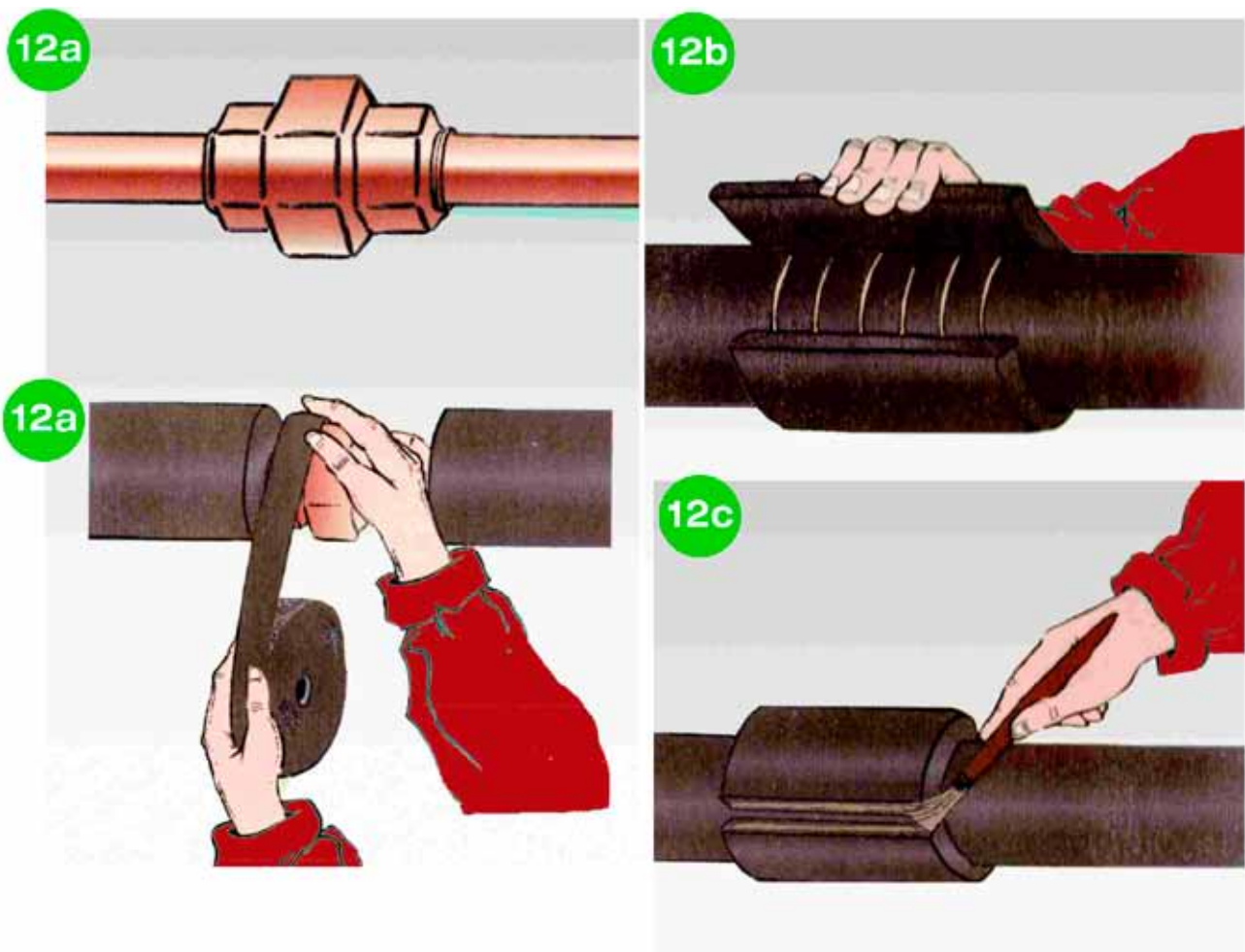


5.4 INSULATION OF FLANGES AND FITTINGS

FITTINGS

Proceed as indicated in the sequence of illustrations (figs. 12a, 12b, 12c). Having insulated the section of pipework, cover the fitting with anti-condensation adhesive tape (fig. 12a).

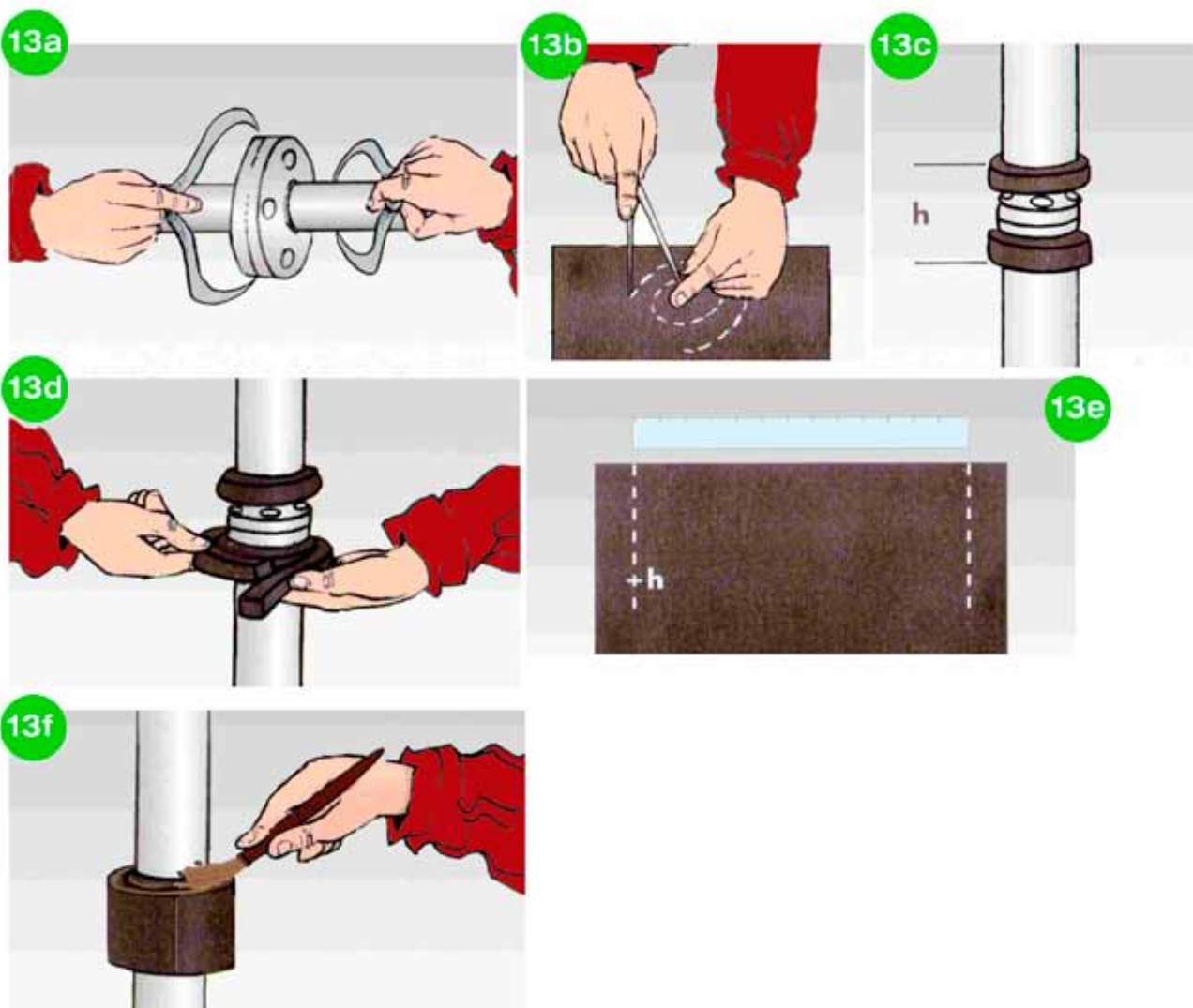
Cover (fig. 12b) the section of pipe with a correctly sized piece of insulating material and glue (fig. 12c).



INSULATION OF FLANGES AND FITTINGS

FLANGE

Proceed as in the sequence of illustrations (fig. 13). Measure the external diameter of the pipe to be insulated and of the bare flange (fig. 13a). With the compass trace the two circumferences on the material (fig. 13b) and prepare the two gaskets that should be glued as indicated (fig. 13c). Mark the h measurement on the material (fig. 13c). Measure the parts shown in the guide (fig. 13d), copy them on the material, cut them out (fig. 13e) and then glue (fig. 13f).



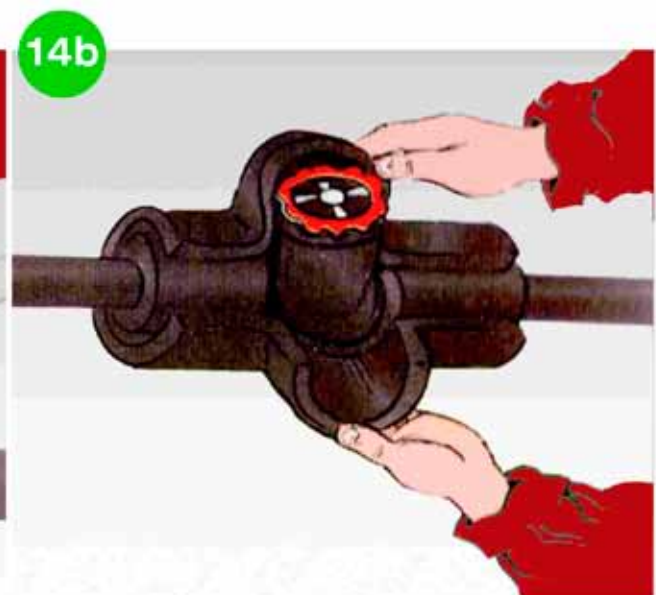
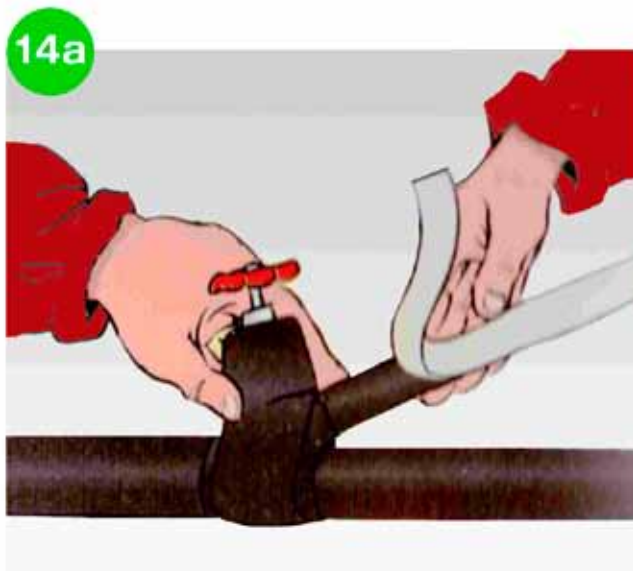
5.5 VALVE INSULATION

SMALL VALVES

Proceed as shown in the illustrations (figs. 14a - 14b), having insulated the pipe.

A - Cover the pipework with anti-condensation adhesive tape (fig. 14a).

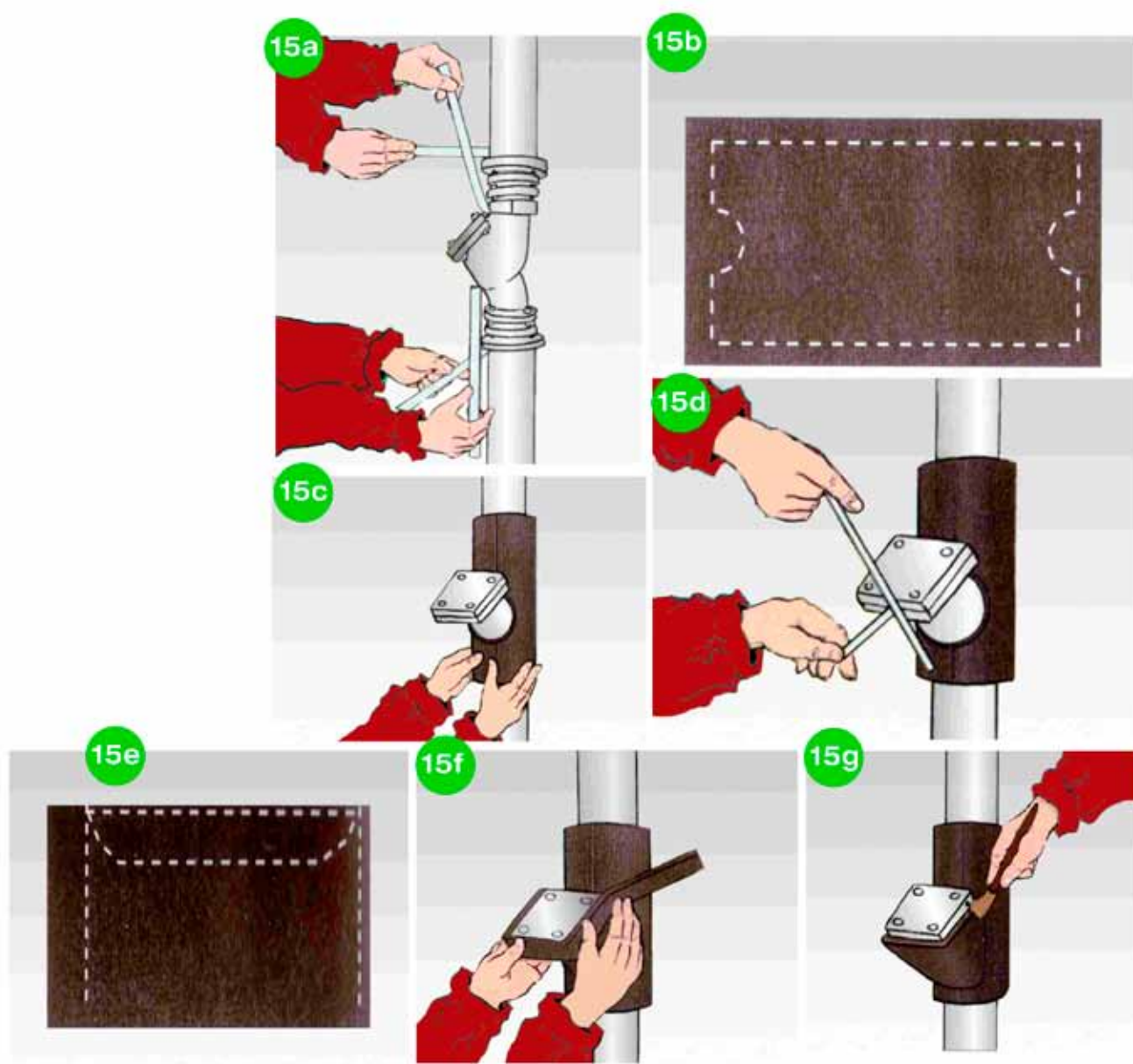
B - Having taken precise measurements, prepare a “jacket “ of insulating material and proceed to glue (fig. 14b).



VALVE INSULATION

INCLINED VALVES

The same procedure should be carried out for inclined valves (sequence figs 15).

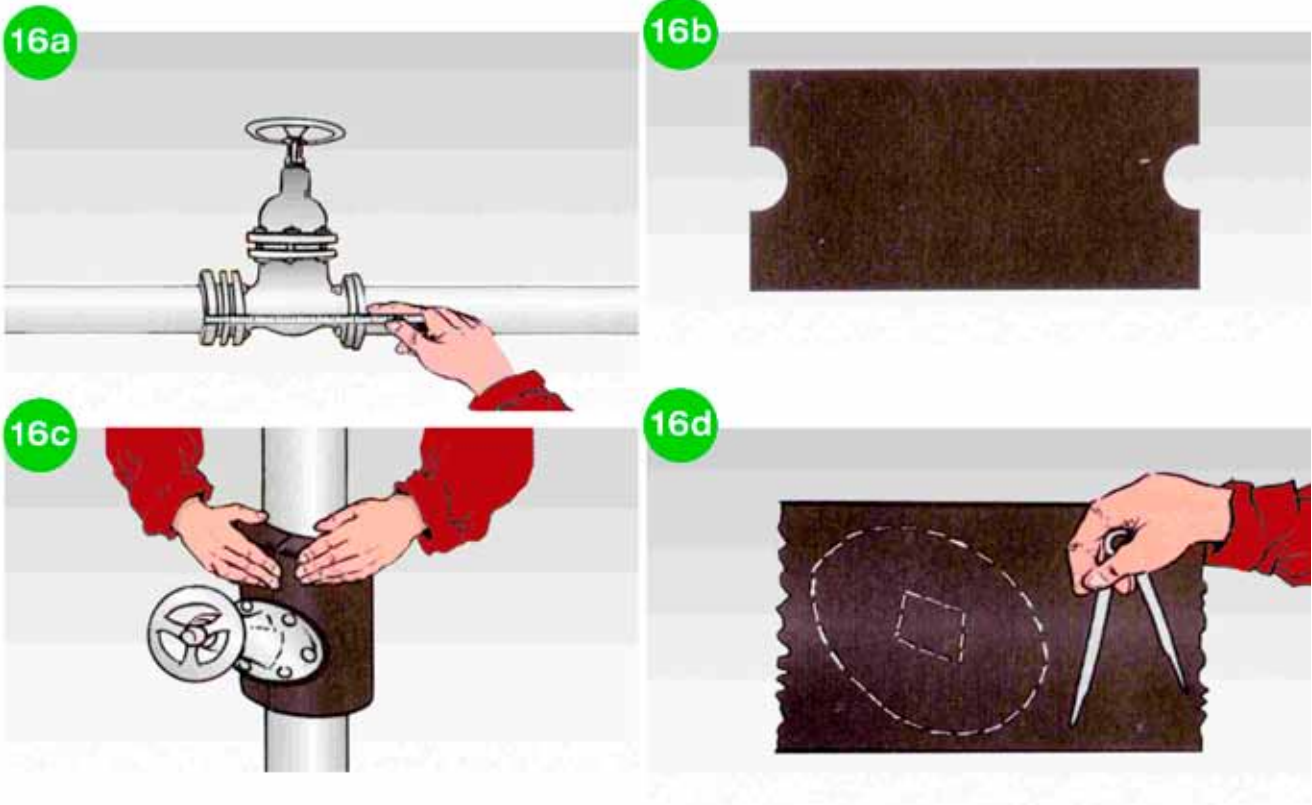


VALVE INSULATION

LARGE VALVES

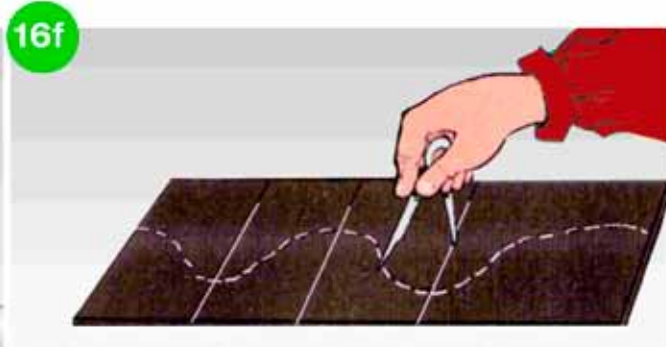
Insulate the section as previously shown using tape. Take the measurements (fig. 16a), copy them onto the material and carefully cut out the measured piece (fig. 16b).

Once the outside edges have been glued, put the two sections together over the body of the valve (fig. 16c). Measure, trace and cut out the circular section for the front (fig. 16d).



VALVE INSULATION

Take the measurements and transfer them onto material (fig. 16e). Trace them as shown (fig. 16f); dress the valve (fig. 16g) carefully glueing the various sections where necessary.



5.6 INSULATION OF TANKS

The correct procedure sees the insulation of the cylindrical part of the tank after the correct measurements have been taken (figs. 17a - 17b) and copied onto the insulating material. The adhesive should be carefully spread on both the surface of the tank and the insulation material itself .

Subsequently the head of the tank must be insulated (fig. 17c). Extra care should be taken in the application of the sealant between the various sections.

A - Determine the length of the curved surface of the dome (using an elastomeric tape with the same thickness as the insulation material).

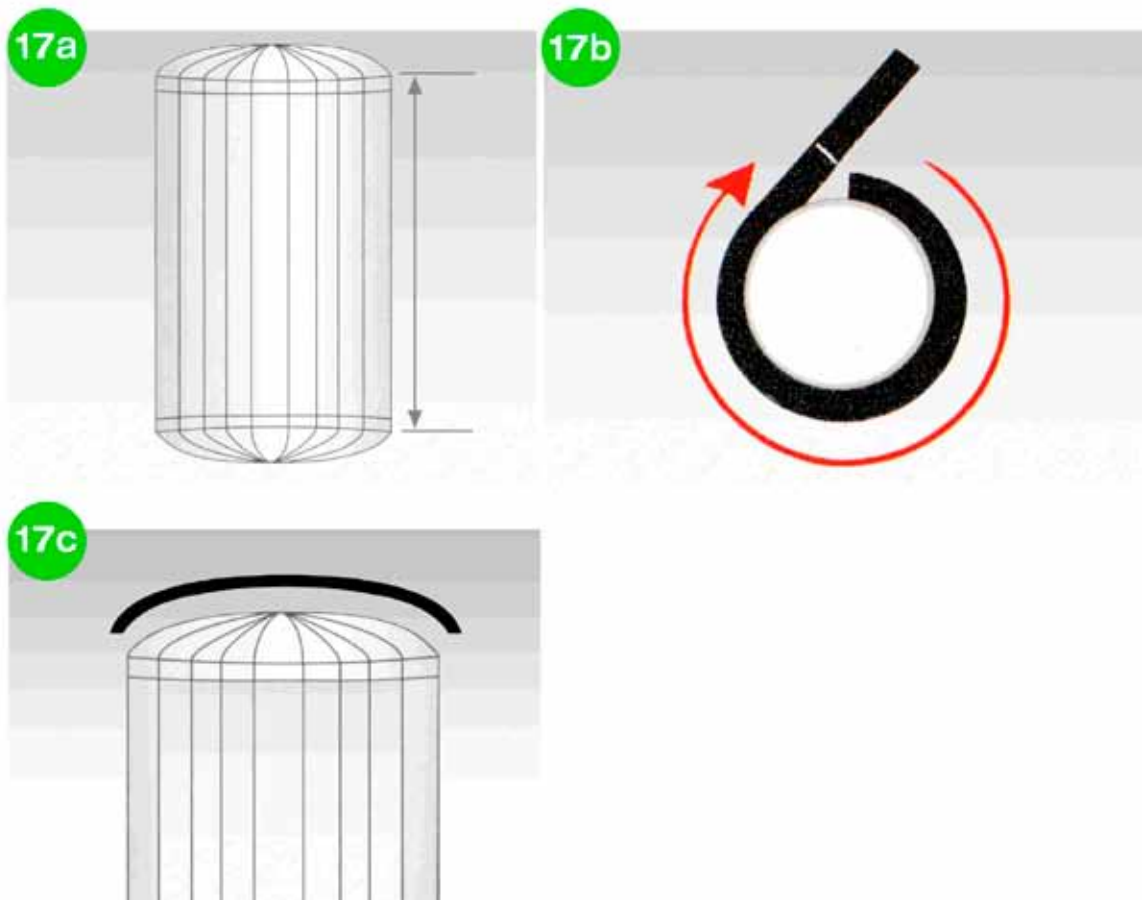
B - Using the length of the curved surface as the diameter, trace a complete disc on an elastomeric sheet. If the disc is too large to be made with a single sheet, glue several sheets together.

C - Cut the disc (curved bottom).

D - Spread a thin layer of adhesive on the insulation material and then on the metal surface.

E - When the glue is dry to the touch (nail test), attach the disc to the bottom and press firmly from the center.

F - Carry out a wet bonding along the circumferential joints of the dome.



5.7 DUCTING INSULATION

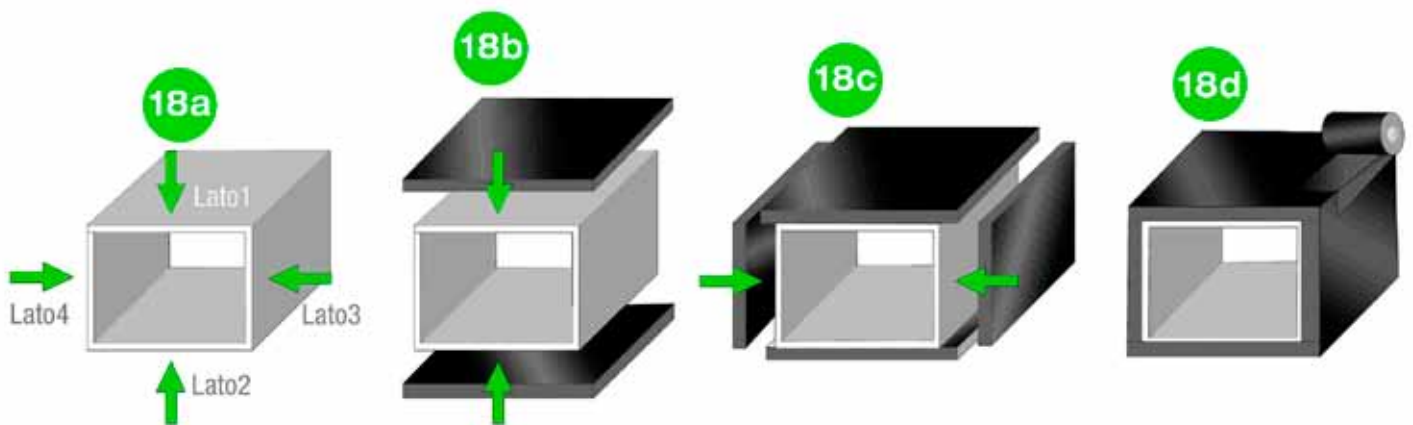
The correct procedure for insulating ducting is described in the illustrations below (figs. 18a, 18b, 18c, 18d).

Fig 18a. Measure sides 1 and 2, transfer them onto the material and cut out.

NB: When measuring the sides it is important to add to this the equivalent of two thicknesses of the insulation material so that this allows correct fitting of the duct with sides 3 and 4.

Measure sides 3 and 4, copy to the material and cut out. Proceed with the insulation as per the illustrations in figs. 18b, 18c and 18d. If necessary seal the joints with adhesive tape.

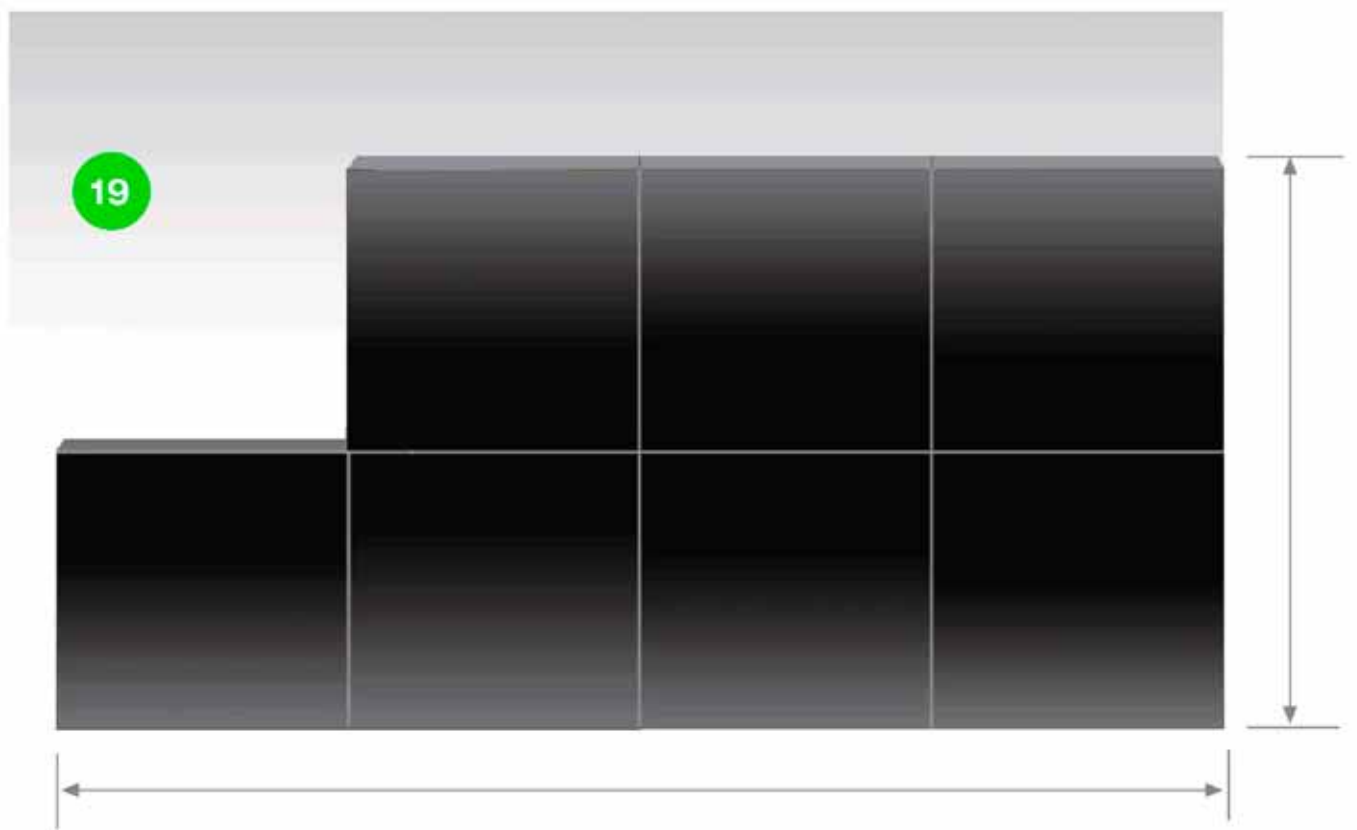
NOTE: this application can be done with standard material (in this case, which adhesive is applied both to the material and the ducting) or with pre-glued material. In both situations we strongly recommend that a suitable solvent is used to clean the surfaces of any grease or dirt before the insulation material is applied.



5.8 INSULATING FLAT SURFACES

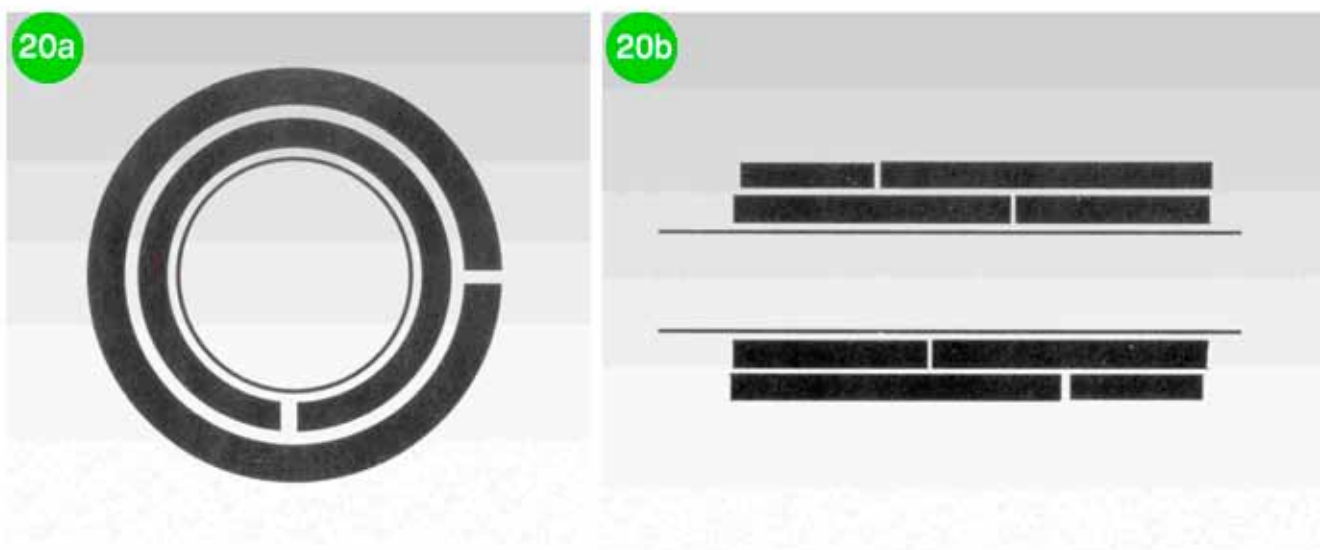
Measure the surface to be insulated, copy the measurements onto the material and cut out.

Only proceed to apply the adhesive to both the insulating material and the surface when the cleanliness of all sections has been checked. Insulation can then be carried out (fig. 19).



5.9 MULTI-LAYER INSULATION

Proceed as in the illustrations (figs. 20a - 20b). It is paramount that the joining sections between the various layers do not correspond; this guarantees superior performance especially in anti-condensation insulation. The adhesive both for insulation tubes and insulation sheets should be applied to all surfaces to be joined.





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