

RIGID BRAKE PIPE: REPAIR



Note, one or more warnings are present in this procedure



Equipment required

compressed air nozzle



WARNING

Before carrying out any operation on a vehicle fitted with the Stop & Start system, always follow the safety instructions [Vehicle: Precautions for the repair](#)

This procedure applies to copper pipes diameter 4.7 mm.

Note:



■ This procedure does not apply to:

- hybrid pipes (pipe + hose),
- pipes with diameters 6 mm and 8 mm.

The tightening torques specified in this method only apply to refitted pipes. In the case of factory-fitted pipes (pipes not refitted), refer to the tightening torque procedure (see [Brake circuit: Tightening torque](#)).

REPAIR

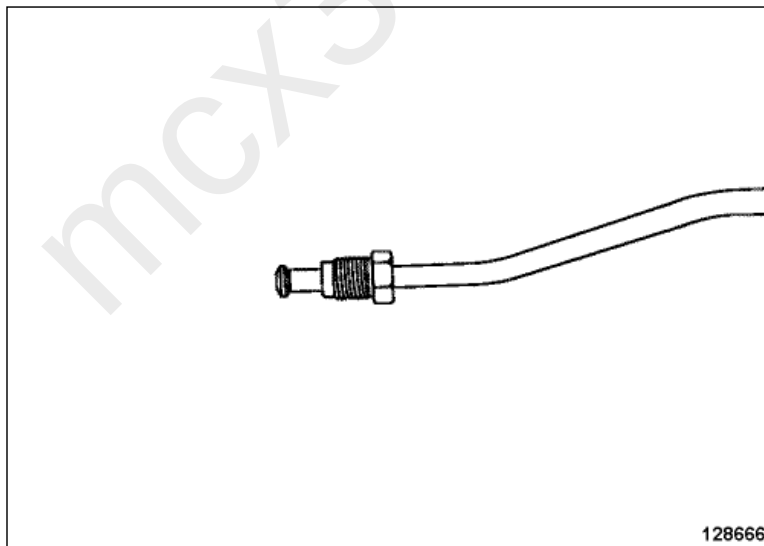
1. PIPE PREPARATION OPERATION

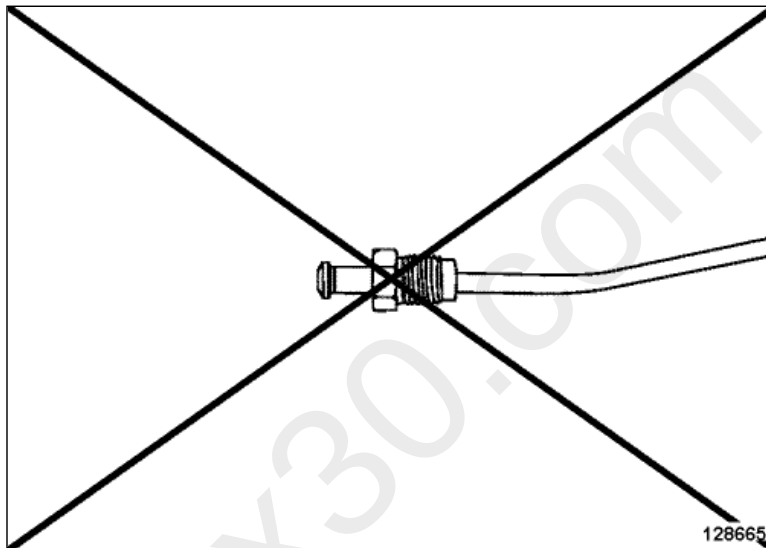
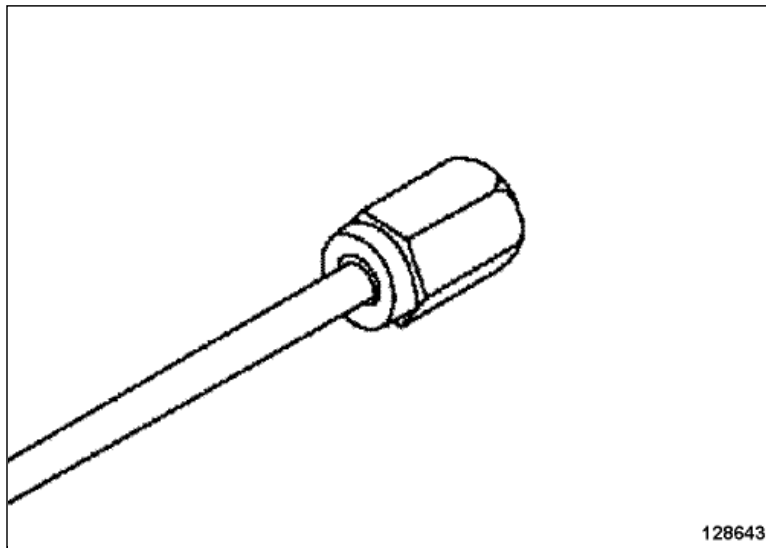


CAUTION

To avoid causing a breakdown in hydraulic brake circuit, do not squash or bend the rigid pipe when cutting.

■ Cut the pipe at the desired length using a pipe cutter.





- Put the nuts or bolts on the pipe before forming the rivets.

2. MAKING THE RIVETS

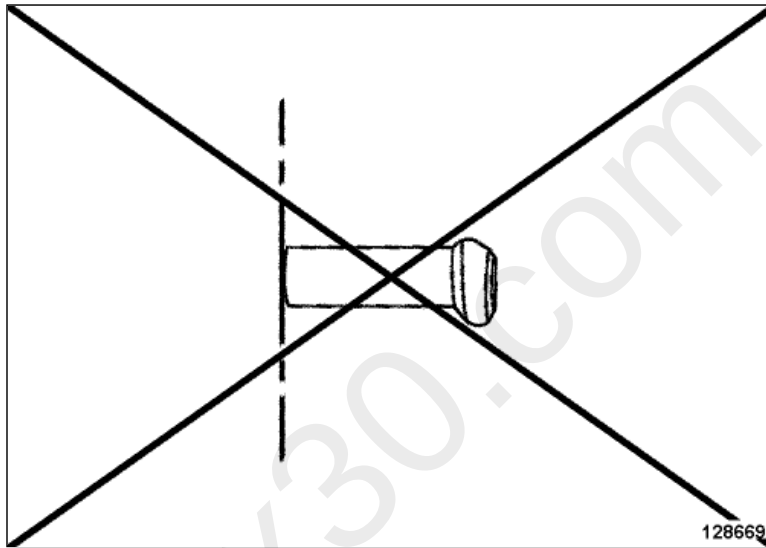
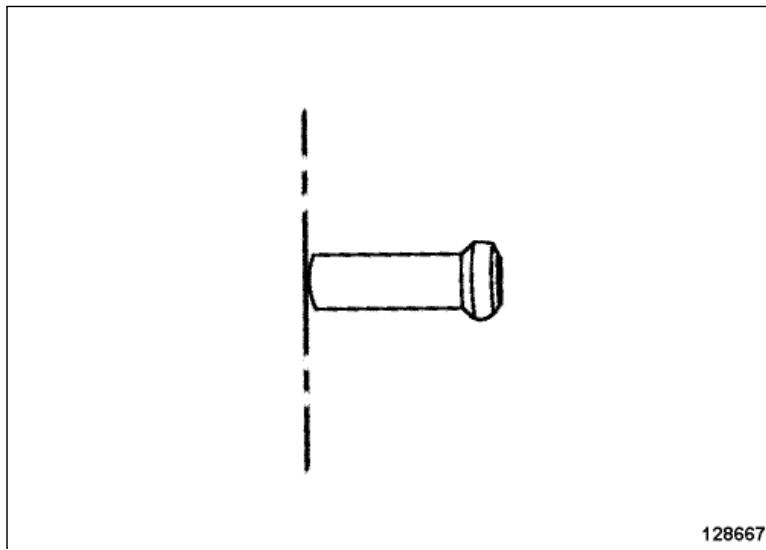


Note:

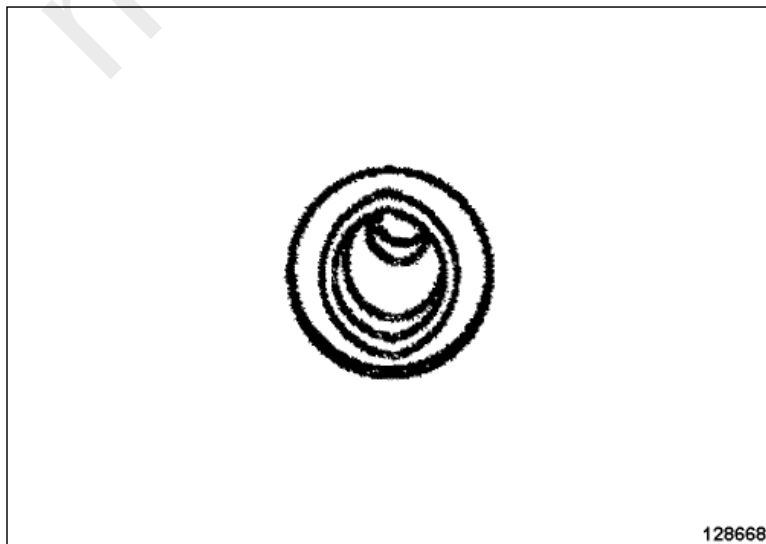
To make the rivets, fit the rivet press in a vice.

- Fit the pipe in the rivet press.
- Adjust the length of the pipe to be shaped.
- Torque tighten the press end piece (40 N.m).

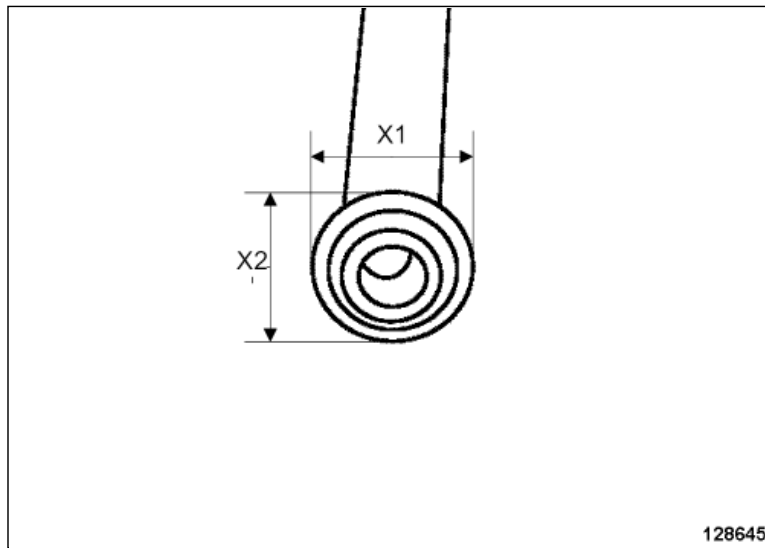
3. CHECKING THE RIVETS



- Visually inspect:
- the uniformity of the rivets' diameter,
 - the rivet centring in relation to the pipe shaft.



- Visually check that the internal diameter of the pipe is not oval-shaped.



- Check that the diameter of the end panel is not oval shaped using a sliding calliper.

Correct diameter if $(x_1) = (x_2)$

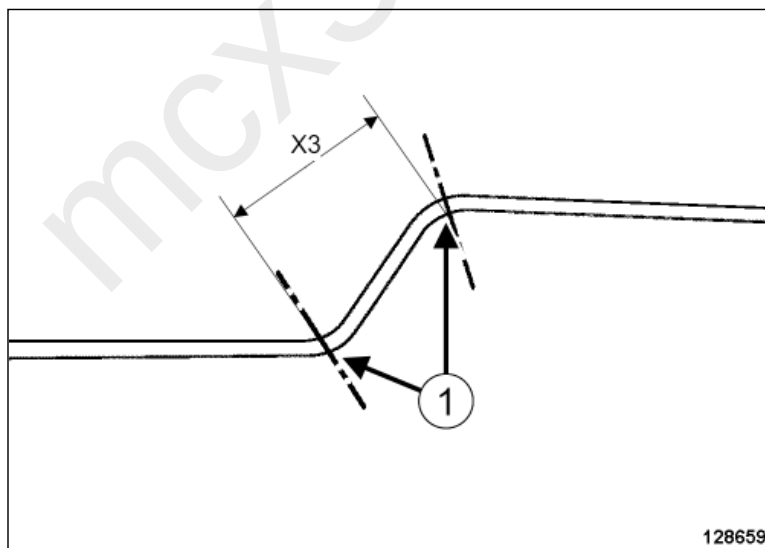
4. PREPARATION OF THE PIPE BEFORE BENDING



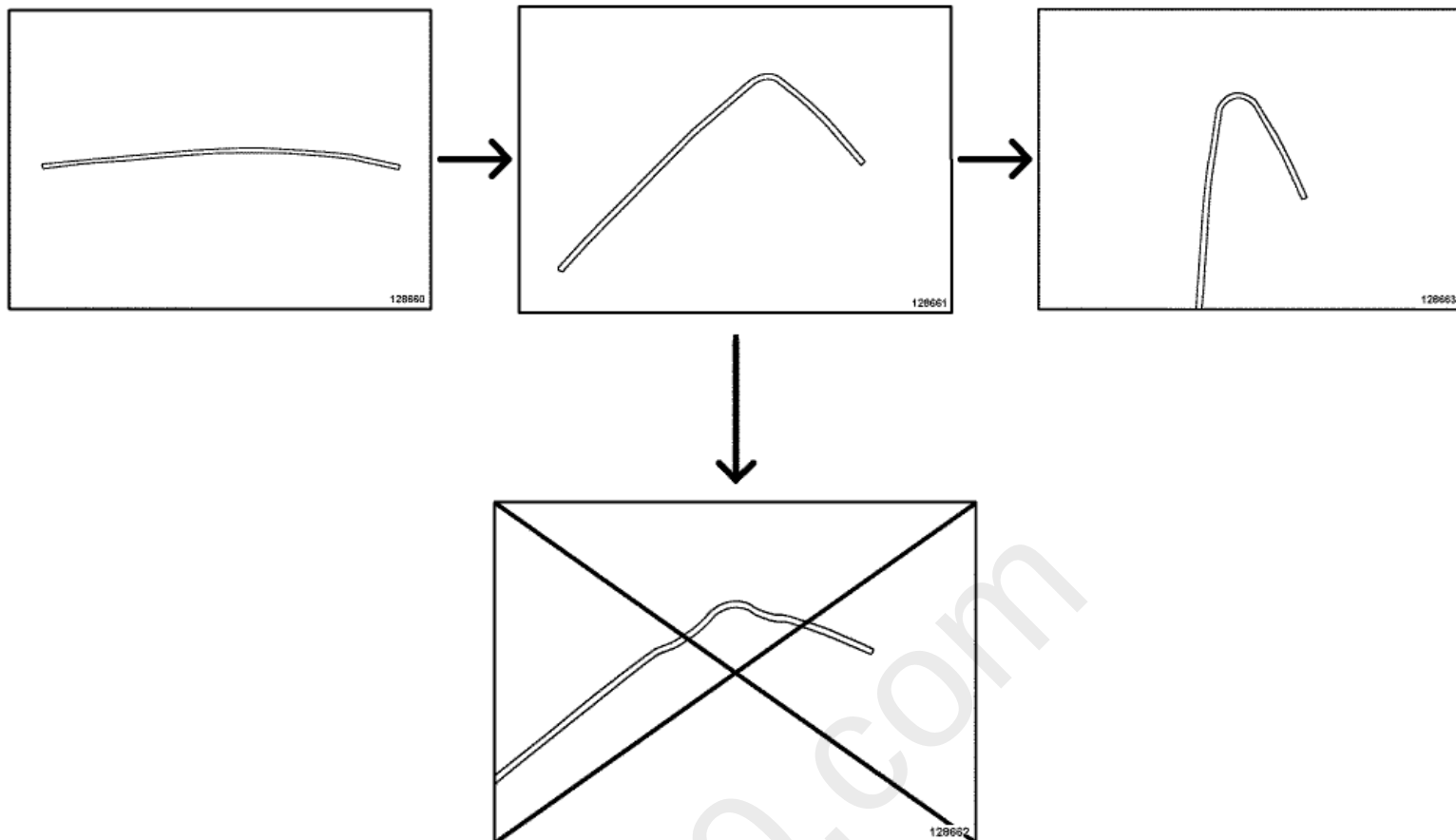
Note:

Impurities may spread inside the pipe while the rivets are being made.

- Blow inside the pipe in both directions using a compressed air nozzle.
- Put plugs on the bolts or nuts at the ends of the pipe.
- Put the original pipe on a flat base plate that is the length of the pipe.



- Measure the dimensions (x_3) (in mm) curve after curve, between each curve radius "centre" (1) of the old pipe.



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CAUTION

To avoid weakening the pipe, either bend once or bend progressively by increasing the bend (that is, by continually decreasing the curve radius). Do not install a rigid pipe on a vehicle that may have been bended and then unbended alternatively to reach the correct curve radius.

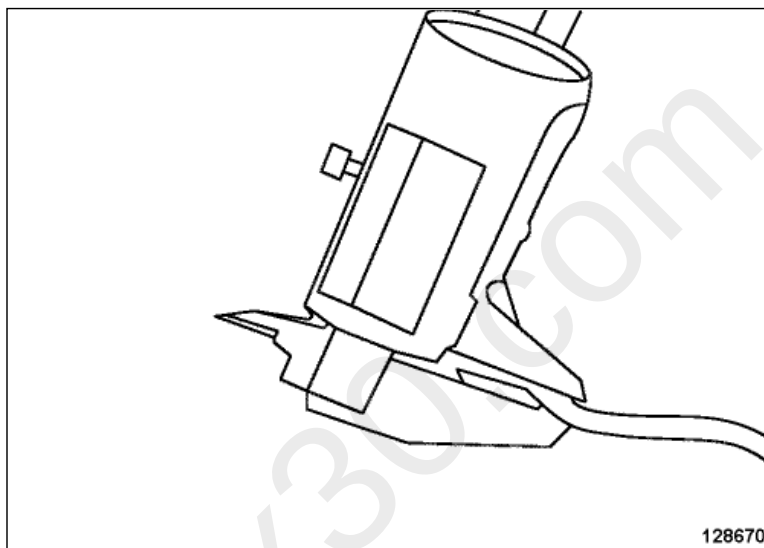
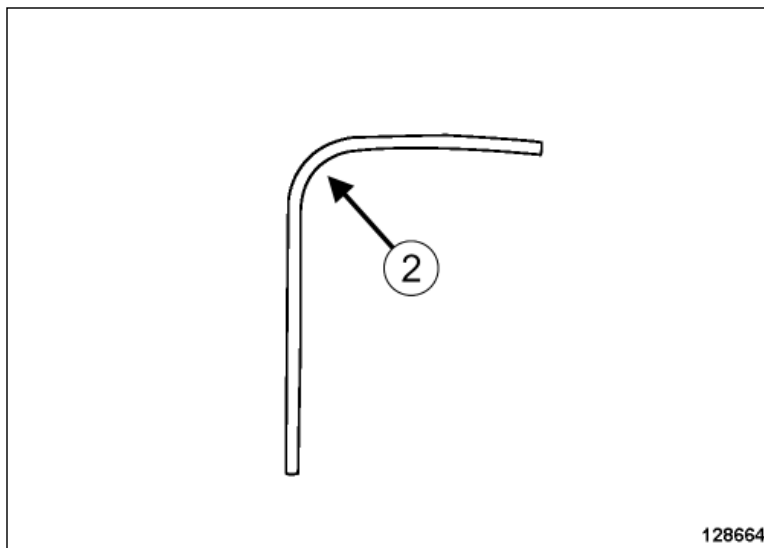


Note:

During the bending operation, the required angle should be passed slightly in order to compensate for material elasticity.

▣ Shape the pipe using a bender, curve after curve, while respecting the original shape of the pipe.

5. CHECKING BENDING



Check the out-of-roundness of the outer diameter at the centre of the curve radius(2) using a sliding calliper (the out-of-roundness of the outer diameter is correct if it is less than 10% flattening):

- nominal diameter of the pipe: 4.75 mm,
- minimum diameter after bending: 4.30 mm.

6. REFITTING THE PIPE

Note:



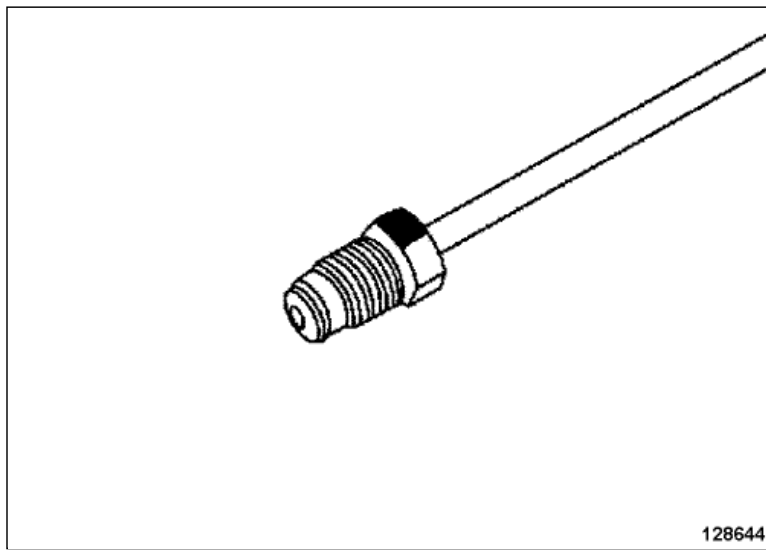
When refitting the rigid brake pipe:

- respect the original routing as much as possible,
- adjust the pipe routing by hand when fitting inside the clips.

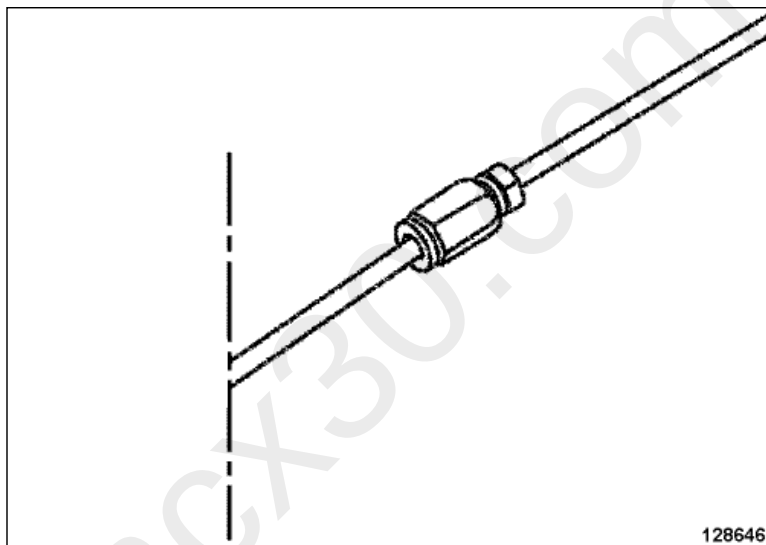


CAUTION

Contact points between the rigid brake pipe and the surrounding components could cause damage to the pipe. In order to avoid these contacts, adjust the pipe routing by hand.



Torque tighten the brake pipe bolts 14 N.m.



Torque tighten the underbody unions (female/male) 10 N.m.



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