

Fitting Braided Brake Hoses

DISCLAIMER: The information in these documents are a collection from experience (friends or myself), magazine articles, mailing lists and Internet web sites etc. So don't take these as 100% correct gospel, hence I don't take any responsibility for any of these guides.



Difficulty Rating: 4/5 - Be prepared to curse and loose your temper.



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Revision 2

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This is a step-by-step guide on fitting braided brake hoses. This guide shows a stainless steel set being fitted to a Vauxhall Nova GTE model. The process will be almost identical with other models.



[Front] Before...



Caution: Brake fluid is poisonous. If any brake fluid is spilt on the paintwork, wash the affected area with cold water immediately. Brake fluid is an effective paint stripper.



Warning: When working on the brake components, take care not to inhale brake dust, since it may contain asbestos which can damage your health.



...and after.

What are braided brake hoses?

The standard items on your car will almost certainly be rubber brake hoses. These are flexible rubber tubes which carry the brake fluid from inside the arch wheel to the caliper or drum brakes. The rest of the braking system usually use copper alloy pipes to the brake servo and master cylinder. The braided brake hoses are PTFE tubes incased in stainless steel braid. This protects them from sharp edges, almost impossible for them to be cut, will not corrode and won't split. They also don't expand under heavy braking.



[Rear] Before...

Why fit replacement items?

These basic rubber hoses are adequate for the job, but like everything, they don't last forever. The ironic thing is that original parts from Vauxhall dealer can cost just as much as aftermarket performance items. But the rubber tubes can experience 'swelling'. This is when under braking the fluid builds up so much, that the rubber tube begins to expand. This is more common due to age. This will reduce your braking performance. The idea is that braided part of the new hose will keep the wall of the internal tube in the same dimensions, no matter what fluid pressure is inside.



...and after.

What benefit's will there be?

As mentioned above, as the brake tubing inside keeps its diameter consistent under extreme circumstances when maximum braking force is applied. So long as every other component in the braking system can keep up to the pressure too. But the original rubber hoses are the most likely component to fail under these pressures. Plus after wear and tear, they become fragile and can split with the constant turning of the steering or suspension travel, i.e. fatigue sets in. The braided items will stand up to this punishment for much longer. Plus most of these aftermarket items are stainless steel too, which means they won't corrode.



OIL BANK LINE
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Are there any different 'types' of braided hoses?

It is illegal to dump oil down the drain. To find your nearest oil bank call the above number.

There are three 'build' types in the Goodridge range. Braided hoses come in two component's, the hose itself and its terminating ends. These are the items that will screw onto your existing brake system pipes. These terminating ends are either chrome/zinc coated on stainless steel or made out of stainless steel. Plus they can be made out of aluminium.

There isn't that much difference, mainly done for corrosion properties. In otherwords, each will last each other out in normal road cars, and they all easily out last the standard rubber hose types. Just that complete stainless steel brake hoses are more expensive than zinc coated ones (remember in both accounts, the braided hoses are always made out of stainless steel).

Are there different fitments for every car?

Most cars in the Vauxhall range use the same 'size' of brake thread, or union. You'll have to see the manufactures list of braided hoses to see if they cover your car.

So are these braided brake hoses easy to fit?

As in true Haynes book style, you simply remove the brake hoses by undoing the screw union, and replace it with the new braided hoses which has the correct thread. You then need to bleed the brake system.

However in real life getting at these unions is very difficult, plus its dirty and the union are VERY easy to round off. In that using correct brake spanners is a must otherwise you'll have to resort to wrenches to grip the union to undo them. Answer is then, NO on old cars. New ones should be easier as the unions shouldn't be so tight or corrode on with dirt and muck.

Parts:



- Bottle of Brake fluid.
- Brake bleeding kit.
- Empty bottle for bleeding the brakes.
- Trolley jack.
- Brake spanners, various sizes (10mm mostly).
- 9mm spanner for brake nipple on caliper.



- Can of WD40.
- Lots of old rags and cloths.
- Large hammer.
- Small pair of stillsons.
- Small 'footprint' tool.
- Flat blade screwdriver.
- Rubber disposable gloves.
- Braided hose set (4)
- Axle stands.
- Brake hose clamp.
- Pair of pliers.
- 22mm and 17mm spanners for brake hoses.

Cost:



Goodridge set of braided brake hoses

- Braided brake hoses are available from

(4). Stainless steel/PTFE hoses, stainless steel termination's.[fit Nova]	£60
Goodridge set of braided brake hoses (4). Stainless steel/PTFE hoses, zinc coated termination's.[fit Nova]	£40
Brake spanners (set). Quality various, set of 3.	£10
Bottle of brake fluid (Dot 4) - 1/2 Litre	£4
Pack of disposable rubber gloves.	£5

most performance car accessory shops in magazines or on the internet. Try: <http://www.ccmotorsport.co.uk> or <http://www.raldes.co.uk>

- Brake spanners, disposable gloves, axle stands and brake fluid etc. are also readily available from your local car accessory shop. Or try Halfords (<http://www.halfords.co.uk>)
- To see the Goodridge range, visit their web site at <http://www.goodridge.net>

Fitting the Front brake hoses - General Notes:



Just before you start, make sure you note the following:

- If you don't already have it, buy a Haynes service manual for your car. This gives information on where the brake lines are and their torque settings.
- Wear disposable rubber gloves if possible, as brake fluid is poisonous. As there will be a lot of brake fluid loss, most of it will be over your hands and fingers, it can also irritate skin.
- Replacing the brake hoses on the front of the car is easier to do than the rears, depending on what vehicle you are doing the modification on.
- Don't get brake fluid on the paintwork of your car, its an effective paint stripper. Wash ANY deposits with water immediately.
- Don't let the brake reservoir get empty, otherwise you'll run into all sorts of problems with valves etc. Even though brake fluid may be leaking when changing over the brake hoses, because they are small internal diameter tubing, it will take a LONG time for the reservoir to drain out. So periodically check the level of the brake fluid to be safe.
- Undoing the soft copper alloy brake unions can be tricky on older cars, use a brake spanner if possible and use a sudden 'snapping' movement, rather than slow powerful turning. The reason being is that the flat sides can round off, and then its impossible to use a spanner to undo them.
- Check clearance and correct length of the hose(s). They should be fitted with no twists or kinks and full length of travel of the suspension or steering should be possible (with no stretching or being trapped).

Step 1



Jack up the front of the car and remove both road wheels. Support the car on axle stands.

Step 2



Open the bonnet and fill the brake fluid reservoir to the max mark. A lot of fluid will be lost when the brake hoses are removed, you don't want the reservoir to be empty.

Step 3



Under the wheel arches, spray WD40 on all the unions that you need to undo (brackets and bolt on caliper that holds the brake hose etc.).

Step 4

Step 5

Step 6



Use a 10mm brake spanner and loosen (don't remove) the brake union at the bracket. They need a sudden 'snapping' movement rather than loads of pressure.



Use a ring spanner to loosen (not remove) the caliper end of the brake hose. Again use a sudden shock movement to undo.



Now all the main unions are undone. Remove the retaining clip from the support bracket (lever it out with the shaft of a spanner or a screw driver).

Step 7



To reduce the amount of the brake fluid loose, rap some clingfilm round the end of the braided brake hose. Retain the supplied end plug in place.

Step 8



The copper alloy brake pipes will need to move about when fitting the new brake hoses. Release their securing clips as shown under the wheel arch.

Step 9



Completely remove the old rubber brake hose from the bracket end. Brake fluid will leak out. Remove the brake hoses by pulling it through the bracket mouth (may need to tap it with a hammer)

Step 10



Fit the new braided brake hose in its place, again thread through the bracket mouth. Brake fluid will be leaking out the brake pipe, which makes everything slippery and difficult.

Step 11



Screw the union using a brake spanner (observe torque). Don't over tighten it or you'll round off the face of the nut (not good). Refit the securing clip on the bracket.

Step 12



Now the bracket end is fitted, brake fluid shall begin to leak out the other end. Remove the old rubber brake hose and the copper washer(s).

Step 13



Fit the new braided hose in its place along with the new copper washer and bolt as supplied in the kit.

Step 14



Again tighten the bolt up to specific torque and don't over tighten. Top up the brake fluid reservoir

Step 15



Bend the securing clips back down under the wheel arch. Repeat the same procedure for the other side of the car.

Fitting the Rear brake hoses - General Notes:



Just before you start, make sure you note the following:

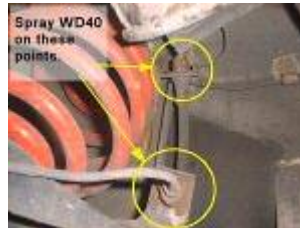
- If you don't already have it, buy a Haynes service manual for your car. This gives information on where the brake lines are and their torque settings.
- You may have to remove the back exhaust box to gain access to the upper end of the brake hose. If not, just remove it off the rubbers that hold it up.
- Wear disposable rubber gloves if possible, as brake fluid is poisonous. As there will be a lot of brake fluid loss, most of it will be over your hands and fingers, it can also irritate skin.
- Don't let the brake reservoir get empty, otherwise you'll run into all sorts of problems with valves etc. Even though brake fluid may be leaking when changing over the brake hoses, because they are small internal diameter tubing, it will take a LONG time for the reservoir to drain out. So periodically check the level of the brake fluid to be safe.
- Undoing the soft copper alloy brake unions can be tricky on older cars, use a brake spanner if possible and use a sudden 'snapping' movement, rather than slow powerful turning. The reason being is that the flat sides can round off, and then its impossible to use a spanner to undo them.
- Check clearance and correct length of the hose(s). They should be fitted with no twists or kinks and full length of travel of the suspension or steering should be possible (with no stretching or being trapped).

Step 1



The worst and most difficult ones to do. Jack up the rear of the car as high as you can go with axle stands. Remove both rear wheels to gain access.

Step 17



Start on the offside first (easiest). Use WD40 on all the brake unions at the upper and lower ends.

Step 18



Use the brake spanner again and begin to loosen the brake union nuts using a sharp 'snapping' action. These are very easy to round off.

Step 19



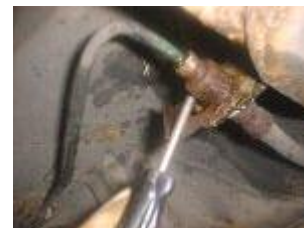
The metal brake pipes will need some movement. Open up the metal tabs that hold the pipes in place at both the upper and lower end of the brake hose.

Step 20



Periodically, you will have to top up the brake reservoir when fluid is being lost. Do not allow this to run dry.

Step 21



Starting at the upper end, with the brake union lose, remove the retaining clip by levering it out with a screw driver.

Step 22

Step 23

Step 24



Completely remove the brake union and pull out the old brake hose by pulling it through the support bracket (again use a hammer to tap it out if stubborn). Brake fluid will begin to pour out.



Fit the new braided hose in the support bracket and screw in the brake union by hand. Again you may have to push the union into the new brake hose because it sits lower on the bracket.



Refit the retaining clip. Tighten up the union by the specified torque or nip it up hard by hand (don't over do it as they are easy to round off).

Step 25



The upper end is complete, the lower end is identical. With the brake union nut loose on the lower end, remove the retaining clip. Completely remove the brake union.

Step 26



Extract the old brake hose from the support bracket. Brake fluid will begin to leak again. Insert the new braided hose, push the brake union into the new hose.

Step 27



Refit retaining clip and hand tighten to torque spec. Bend the metal tabs back to position. The opposite side of the car is the same, but the exhaust may be in the way.

Once the braided hoses are fitted:



To finish off the change over, follow these steps next:

- Top up the brake fluid reservoir back up to max again.
- Once the braided brake hoses are in place (and the **system has been bled**), check the connections are secure. Ideally with the car still up on axle stands, start the engine (to power the brake servo) and get a friend to repeatedly pump on the brake pedal. You then look at every join of the brake termination's to see if there is any seeping brake fluid. If so, then either the bolts or nuts are not done up tight enough or you need new copper washers.
- You ideally need the **brake system to be bled** before you pump the pedal to check leaks because otherwise there is too much air in the system. This means that a lot more force is required to build the brake fluid pressure up to be able to see if it leaks from the joins or not.
- Once no leaks can be observed and the brake fluid reservoir topped up, then you can drive the car. Its best to check the connections again a week later, just to be on the safe side. You'll probably won't notice any difference in braking power, it only happens under extreme conditions, i.e. an emergency. Normal road driving don't require excessive braking forces.

FAQ:



What are the torque specifications?

Depends on what type of braided hose you get. There are three possible types in the Goodridge range, either Aluminium, Stainless Steel or Steel (chrome or zinc coated). See the chart below for torque specification. As a general guide, 6 lbf/ft (or 8Nm) is good hand tight.

Min (lbf/ft) Min (Nm) Max (lbf/ft) Max (Nm)

Steel (Chrome or Zinc plated)	14	19	24	32.5
Stainless Steel	14	19	24	32.5
Aluminium	6	8	12	16

Do I have to fit a whole set or can I just replace the front pair of brake hoses?

The kits you buy usually come with 4 braided brake hoses. You can buy individual brake hoses from your car, most company's that supply rallying parts can sell you these for your car individually. They sometimes can be cheaper this way. But yes you don't have to replace all 4 brake hoses, mostly the front pair will do but most modern cars have rear discs and they will benefit with a set at the rear too. It is NOT advised to mix both rubber and stainless steel replacements in the same braking system.

Do the braided brake hoses kits come with all the parts?

The Goodridge set used in this guide came with all the parts and replacement bolts, nuts and copper washers.

Do I have to replace the copper washers, what's wrong with using the old ones?

Copper washers are similar to a gasket on the engine. Its a seal. Gaskets on the engine either stop leaking gas or fluids. The copper washers in this case stop fluid leaking out. Because you can't guarantee a flat surface on the caliper or brake hose termination, a soft copper washer is used so that it fills these imperfections in, i.e. small pits and bumps which could allow fluid to leak. Because the old copper washer on the caliper has already been used, its already squashed. Its wise to use new copper washers for this purpose, and as most kits supply them anyway, you might as well use them.

What's the difference between a brake spanner and a normal spanner?

Not much. Its the spanner head, or rather the amount of flats it has. The more flats there on the spanner head, the more grip and purchase it has on the nut your undoing. Because brake unions are made of a copper alloy, they are soft and its easy for the flat faces of the nut to found off. So the more surfaces of that nut your trying to undo, the better and the less likely to round off the flats too.

I've rounded one of the brake unions, what can I do?

Due to experience of doing exactly the same thing when fitting these braided brake hoses, they are not easy to undo. The worst point is accessibility. The easy bit is getting the right tool, either grip wrenches, stillsons, pipe grips or even a 'footprint' tool. Anything that has 'teeth' that can grip a pipe will do the job. However, you don't want to squash the brake union otherwise you'll never get it undone. You may need to remove other mechanical parts to get the tool in place and yourself, for example suspension, spring or even the back box exhaust.



Use a brake spanner to undo brake unions.



If the nut rounds off, then use grip wrenches, stillsons...



....or pipe grips to grip the union and undo it.

I've damaged one of the brake unions beyond repair, the thread is no longer there. What can I do?

This is when it gets expensive. The copper alloy brake tubes, as you know, have unions on the end

of the pipe. The only thing holding these unions on are that the copper alloy pipe have flanged ends. They have turned up lips which stop the union falling off. I don't know if you can de-flange them so the pipe becomes flat again so that the brake union can be removed (because you can buy these separately).

Otherwise it means removing the entire copper alloy brake pipe to the brake servo and master cylinder and fitting a new one. This is where it gets expensive. The tool that creates the flanges isn't very mobile and new copper alloy brake tubing is usually done on a bench and then fitted to the car. You can buy the tubing yourself, and cut the required amount, but the tool to do the flanging isn't cheap. It may be possible to rent one.

How long do these braided brake hoses last?

I should imagine for the rest of your cars life. They require no maintenance and as they are already made out of stainless steel and use PTFE plastic, they should not split, burn or corrode. A life time guarantee is usually supplied with the kit as well.

