Fitting Instructions

PSDesigns / (Redish Motorsport) E46 Rear Subframe Reinforcement V2 Plate Kit

Widely regarded as the world's best E46 Subframe Reinforcement plate kit!

Before starting, we suggest you watch our video showing some of the key steps of the process:

http://youtu.be/1LLppagTUXQ

Warning!
There is a significant amount of welding and prep work required for this task. If you don't feel confident welding yourself then please contract someone to carry out the welding section of the task.

Top tips;
Disconnect the battery before you start so you don't forget later on once welding.
Use a hose or bags to cover any open fuel lines on the chassis or tank to protect against the elements and sparks.

We're here to help!
If you've purchased our kit and have any questions or need any help just give us a call and we'll be happy to assist you.

0044 (0)7500 900809

PSDesigns accept no liability for any loss, damage or injury incurred as a result of fitting this kit. The kit is fitted at the owner's risk. Please ensure adequate safety precautions are followed at all times.

Remove the entire exhaust system, heat shields, under trays, prop-shaft, complete rear axle system, fuel tank, pipes, filler neck, and carbon canister, to leave you with a bare underside like below:

Clean any dirt from the floor (around the 4x subframe mounting points) to expose a perfectly clean floor free of dirt, oil, grease and road film:

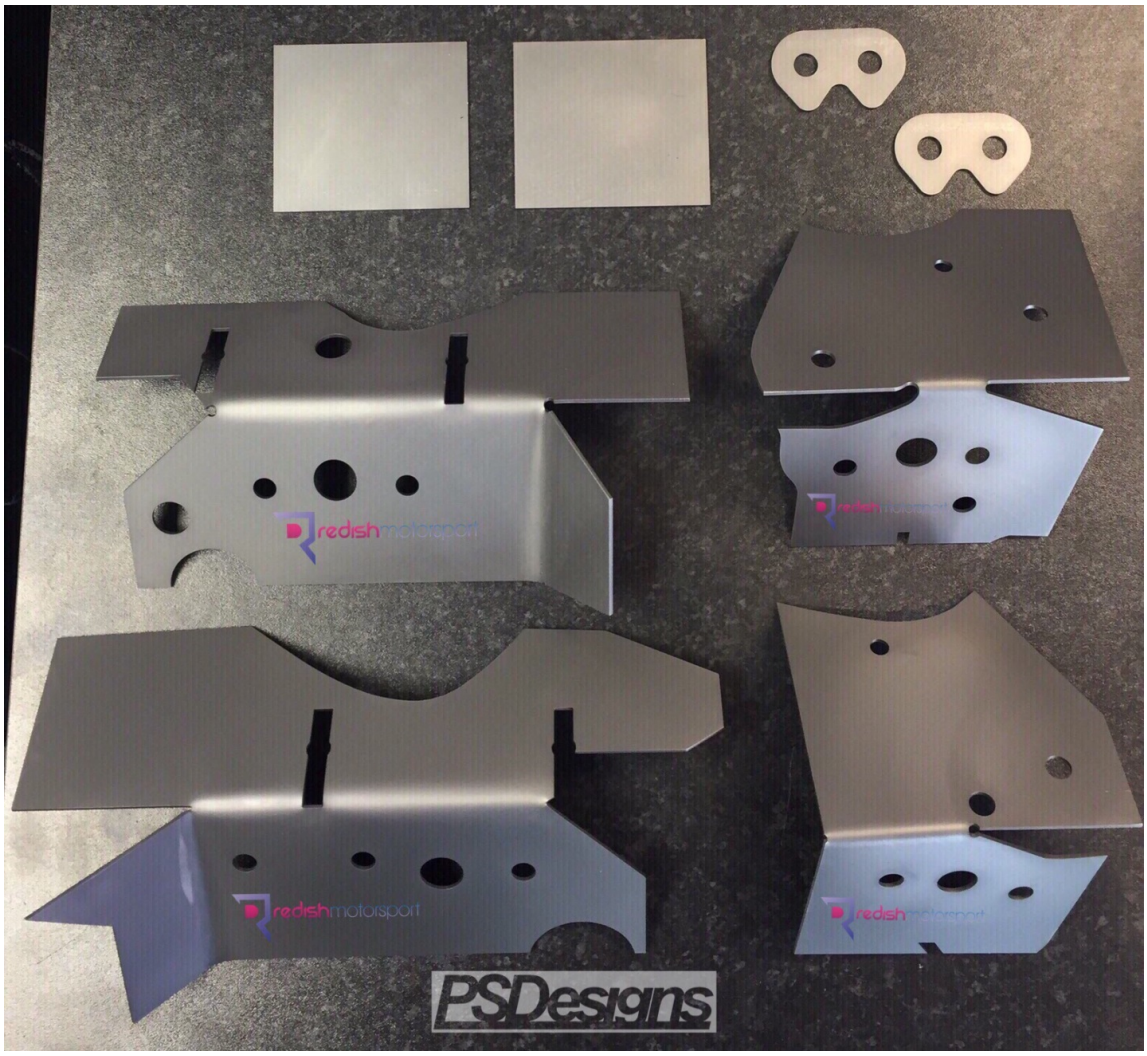
Identify any hairline cracks (if applicable) around the front mounting holes and next to the rear mounting holes.
Centre-punch the ends of any hairline cracks BEFORE you take the underseal and factory paint off the floor.
Drill 1.5mm 'stop' holes at the ends of any hairline cracks found.

Inspect (and clean) the left side of the floor where it is spot welded to the chassis/wheel arch.
We have found cracks starting where the floor has dropped slightly in many cars.
Example picture below and also on our video http://youtu.be/1LLppagTUXQ?t=2m from 2:00 minutes onwards.

If you found evidence of the 3 or 4 spot welds moving, flexing, or popping (and/or the floor dropping slightly) then clean the seam sealer off and dig it out from between the 2 panels.
Stitch weld in 3 or 4 places (below or close to the OEM spot welds) to strengthen and hold the floor to the chassis.

Weld the cracks fully to contain the separation of the hairline(s) cracks. Then smooth back carefully to allow our reinforcement plates to sit flush against the subframe threaded mounting areas on the floor.

Identify plates 001, 002, 003, & 004.
Offer up plate numbers 001, 002, 003, & 004 to the floor and mark the outline (and plug weld holes) with a marker pen.
Clean off paint and sealer around that line and inside of it (wire wheel or flap disc on a grinder works well).



Before welding, spray a light coating of weld through primer on the back of the plates and the bare metal floor.

Weld our laser cut reinforcement plates to the floor to strengthen the subframe mounting area, strengthen any hairline cracks you may have found, take away pressure from spot welds, and spread the torsional loading & unloading energy over a much greater surface area - thus reducing the risk of ever having the issue again.

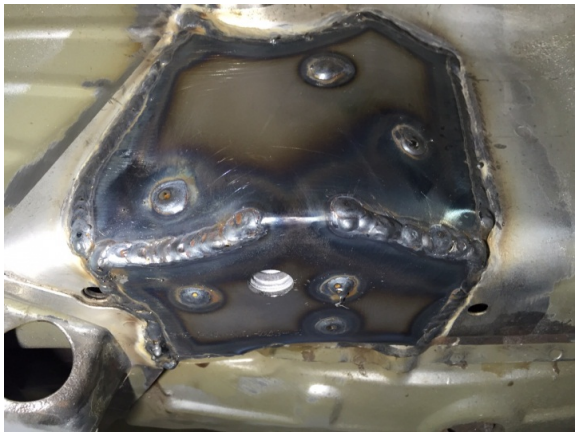
Plate identification and welded plate pictures on the next page……

PSD-E46-SUB-001-V2 - QTY.1 – Located at the NSR Differential carrier mounting location. This is the most problematic location and the area where most cracks and even material separation can be found.
Check fitment & hole line up. Bolt the plate to the chassis via the subframe mounting bolt hole. Tack weld the plate to the chassis in 8-10 places to hold it tight. Once held tight, use a hammer to form the left part of the plate tight against the floor. Hold it tight whilst you add 2-4 more tack welds to secure the left side of the plate.
Now you can fully weld the plate perimeter, then the 3 plug welds. For the plug welds, carefully drill through the first layer of sheet metal making up the floor panel in the plug weld locations, (use the holes in the plate as a guide to the location) this will allow the plug welds to adequately join all layers of metal to the chassis plate. Then the 2 rectangle plug-style weld 'slots'. Once welded, use a flap disc or grinding disc to smooth down the plug welds flat with the chassis plate.

Example of drilling for "Plug Welds"

PSD-E46-SUB-002-V2 – QTY.1. – Designed specifically to follow the contours of the OSR subframe Differential carrier location face/area.
Check fitment & hole line up. Bolt the plate to the chassis via the subframe mounting bolt hole. Tack weld the plate to the chassis in 8-10 places to hold it tight. Once held tight, use a hammer to form the left part of the plate tight against the floor. Add 2-4 more tack welds to secure the left side of the plate.
Now you can fully weld the plate perimeter, then the 2 plug welds, again for the plug welds, carefully drill through the first layer of sheet metal in the plug weld locations to allow the plug welds to adequately join the 3 layers of metal to the chassis plate, finally weld the 2 rectangle plug-style weld 'slots'.
Once welded, use a flap disc or grinding disc to smooth down flat the 2 plug welds.

PSD-E46-SUB-003-V2 - QTY.1. - For use at the OSF Differential carrier location face/area. This is the other major problem area on the sub-frame and where cracking is again most common. This plate has been design to dramatically strengthen the OSF location face, spreading the torque loading and unloading over a far greater area, of a stronger material to the original subframe, and repair/cover existing hairline crack(s) or damage.
Check fitment & hole line up. Bolt the plate to the chassis via the subframe mounting bolt hole. Tack weld the plate to the chassis in 6-8 places to hold it tight. Once held tight, use a hammer to curve form the left part of the plate tight against the floor. Once the left plug weld hole has touched the chassis add a tack weld inside it.
Do the same for the right side of the plate and again tack weld inside the plug weld hole once it's tight against the chassis.
Now you can fully weld the plate perimeter, then the 6 plug welds, again drilling first as above and finally weld the 2 join lines.
Once welded, use a flap disc or grinding disc to smooth back the left horizontal join line and left plug weld as well as the 3 underside plug welds.



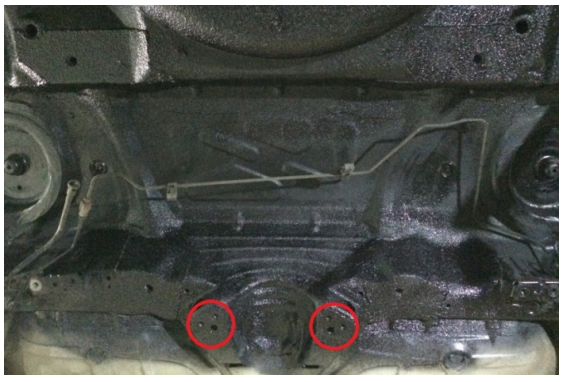
PSD-E46-SUB-004-V2 - QTY.1. - Tailored to fit the NSF Differential Carrier location face/area.
Check fitment & hole line up. Bolt the plate to the chassis via the subframe mounting bolt hole. Tack weld the plate to the chassis in 6-8 places to hold it tight. Once held tight, use a hammer to curve form the right part of the plate tight against the floor. Once the far right plug weld hole has touched the chassis add a tack weld inside it.
Now you can fully weld the plate perimeter, then the 5 plug welds (drilling first as for previous locations), and finally the 1 join line.
Once welded, use a flap disc or grinding disc to smooth back the right horizontal join line and right plug weld as well as the 2 underside plug welds.

PSD-E46-SUB-005-V2 - Qty.2. - Included in the kit but fitting is optional, they allow the boot floor to be cut from inside the vehicle to gain access to the internal bracing of the subframe to allow welding of the internal features, these plates are used to cap the holes cut in the boot floor. Required for cars built before early 2000.

For more info see our video here:
http://youtu.be/aK6ZYBnUEVk

PSD-E46-SUB-006-V2 - Qty.2. - Spacer plates (circled in red below) to accommodate the change in the floor thickness, they ensure seamless fitment of the Differential Carrier Front Support. ESSENTIAL – DO NOT FORGET TO INSTALL THESE. These fit on the chassis/floor in between the 2 front mounts you've just

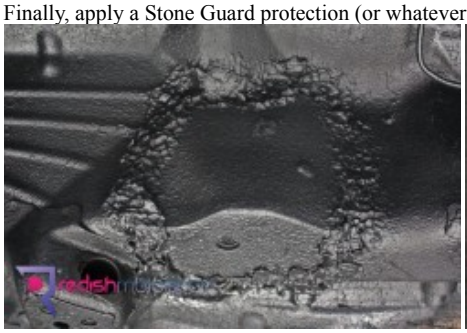
You can either tack weld them to the floor (our preferred method) or push them in as spacers before you install the support and bolts (more tricky). Just to clarify, these are not reinforcement plate and do not strengthen anything, they are just spacer plates.



Once the cracks have been weld repaired and the PSDesigns E46 Rear Subframe Reinforcement Plates have been fully welded, use a high build etch primer to coat the bare metal and offer a strong base protection:
Notice the horizontal welded join lines and plug welds have been ground smooth.

Then an OEM-style seam sealer (spray-applied is the best) over the whole area as well as a heavy seam bead over the weld lines to stop any water or moisture sitting on the plates:


Finally, apply a Stone Guard protection (or whatever protection you prefer) on the entire area:




For a true OEM finish, use BMW-body-coloured spray paint - this shows true attention to detail for our most enthusiastic and OEM loving customers:

If you have decided to change the Subframe mounting bushes, trailing arm bushes, trailing arm ball joints, brake pipes, or anything on the rear axle then this is the time to do it before the axle goes back into place.
Install everything in reverse order, i.e fuel tank, pipes, filler system first, then rear axle, prop-shaft, heat shields, exhaust etc.
Torque check every fixing and paint marked to ensure a perfect and problem-free future:
(Some common torque settings on the last page of this document)

Replace the brake fluid and carry out a full brake bleed using your preferred brake fluid:

Carry out a 4-wheel digital wheel alignment to set up rear toe, rear camber, front toe, front camber (and front castor if applicable):

Clean the vehicle inside & out (your own preference)
Take the vehicle on road test for several miles on varying roads to ensure everything is satisfactory with your work.

Finally, if you were happy with our reinforcement plate kit and would happily recommend it to others, please take a few minutes to review it on a forum, website, google reviews, or your online car journal.

Thanks for purchasing the V2 PSDesigns E46 Rear Subframe Reinforcement Plate Kit,

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Common BMW E46 rear axle related torque settings:

Subframe / diff carrier rear bolts x2 – 77NM
Subframe / diff carrier front studs x2 – 90NM
Subframe / diff carrier front nuts x2 – 77NM
Trailing arm front bush cradle bolts x6 – 77NM
Subframe / diff carrier front support cradle bolts x4 – 25NM
Prop-shaft front rubber coupling to gearbox bolts/nuts x6 – 100NM
Prop-shaft rear CV Joint to diff bolts x6 – 70NM
Prop-shaft centre bearing nuts x2 – 25NM
Gearbox rear cross member bolts x4 – 25NM
Drive shafts to diff torx bolts x12 – M8 thread 60NM. M10 thread & silver 85NM. M10 thread & black 100NM.
Upper & Lower rear arm inner bolts x4 – 77NM (tighten in 'normal height' position only)
Upper & Lower rear arm out nuts x4 – 77NM (tighten in 'normal height' position only)
Diff front bolt (M3 only) x1 – 200NM
Diff front nuts (non M3) x2 – 95NM
Diff rear bolts (M3 only) x2 – 20NM then 90' degree turn
Diff rear nut (non M3) x1 – 174NM
Rear shock absorber lower bolts x2 – 77NM
Rear anti roll bar pivot rubber bracket bolts x4 – 25NM
V-shaped strengthening body brace bolts (M3 only) x3 – 59NM then 90' degree turn