



SUBJECT

Diesel Intake Carbon Cleaning

MODEL

E90 (3 Series Sedan)

With M57Y engine (335d)

SITUATION

The Service Engine Soon light is on and the engine may run roughly.

Possible Fault Codes stored:

- 3FF1 air mass sensor
- 4595 rough controller Cylinder 6
- 459B rough controller Cylinder 5
- 4592 rough controller Cylinder 4
- 4596 rough controller Cylinder 3
- 4593 rough controller Cylinder 2
- 459C rough controller Cylinder 1

CAUSE

Based on the above stored “Fault Code” profile, there is excessive carbon buildup in the intake system.

PROCEDURE

The intake valves in both the swirl and tangential ports will be cleaned, including chemical cleaning of the intake manifold.

See the PDF attachment B110314 Preliminary Work.pdf for removal of the intake manifold and valve cover.

Important!

Wear safety goggles and protective gloves.

When working on the oil, coolant or fuel circuit, you must protect the alternator from contamination. Cover the alternator with suitable materials.

Failure to comply with this procedure may result in alternator malfunction.

It is essential to adhere to conditions of absolute cleanliness when carrying out repair work on the fuel system.

- Do not allow any dirt particles or foreign bodies to get into the system.
- Use only fluff-free cloths.

- Remove all traces of dirt contamination before dismantling lines or separate components.
- Seal all fuel system openings with protective caps.

Recycling:

Catch and dispose of escaping fuel.

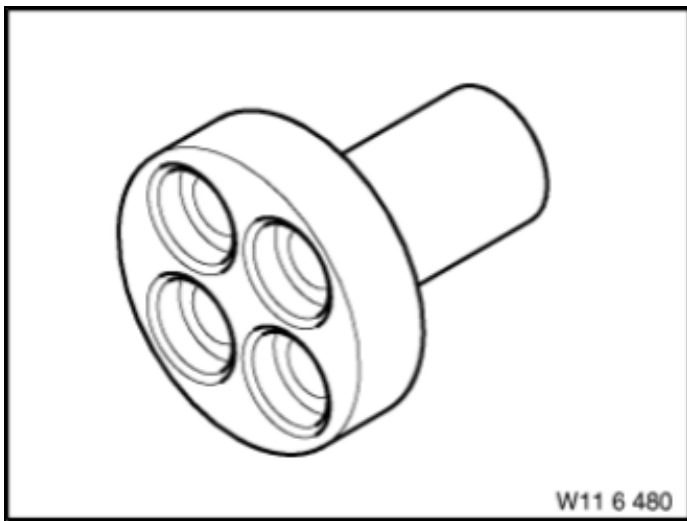
Observe country-specific waste disposal regulations.

This procedure supersedes Repair Instruction RA 1112800, “Cleaning cylinder head intake channels and intake plenum (E90US, M57T2)” found in ISTA/D.

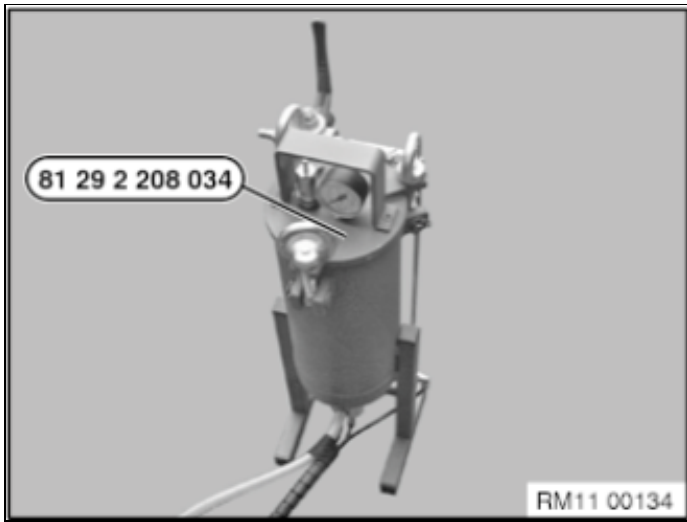
SPECIAL TOOLS REQUIRED



Alignment pin 11 6 080 (used for securing cylinder 1 TDC).



Socket for crankshaft hub 01 6 480 (used for advancing the pistons/valves to TDC).



Carbon blaster 81 29 2 208 034
 For set-up and maintenance of the
 carbon blaster, see attachment BMW
 Group Carbon Blaster.pdf.

Use only 20/30 SAE or 0.45-0.80mm walnut shells which can be sourced locally or through one of the following distributors:

MARCO® Corporate – 800 252 7848 Ext. 284 - marcouisa.com/index.cfm

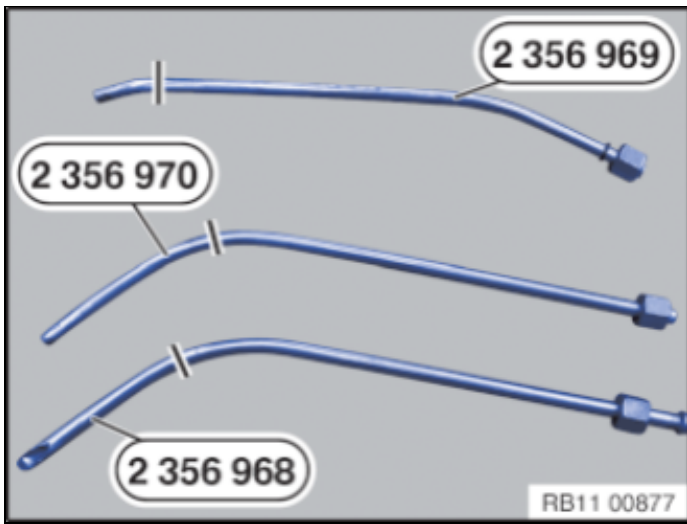
Trinity Tool Company - 800 587 4626 - trinco.com

McMASTER-CARR® - mcmaster.com

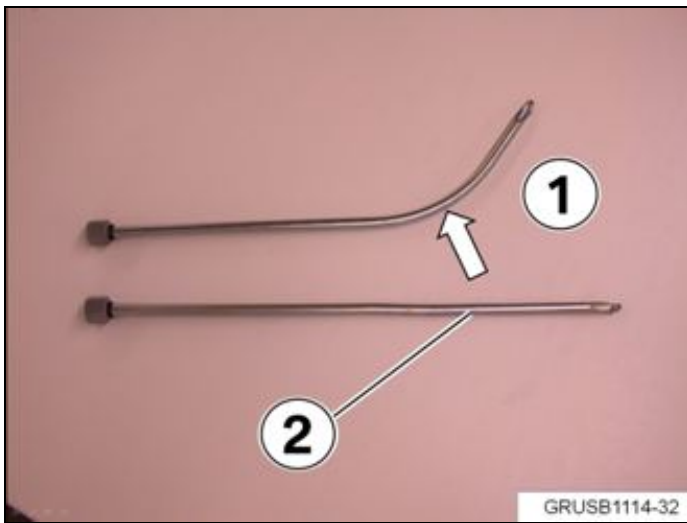


Vacuum adapter for tangential swirl
 port:
 2 356 967
 Vacuum adapter for swirl port:
 2 356 966

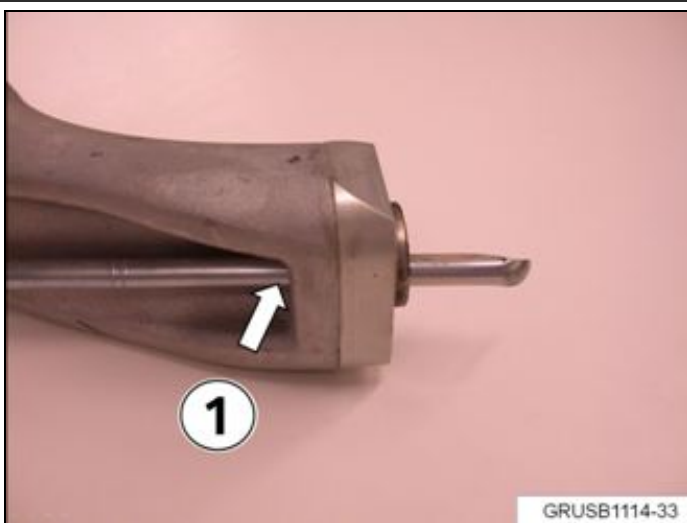
Blasting wand for tangential swirl port:
 2 356 969
 Blasting wands for swirl port:



2 356 970 with straight outlet
 2 356 968 with lateral outlet
 Reference [SI B04 03 14](#) for specific details on the carbon blaster attachments for the M57Y engine.



Modifying wand 2 356 968 (before first use):
 Bend wand 968 (1) straight (2). This will ensure the wand bottoms out inside the swirl port.



Insert wand 968 into the swirl port adapter 966 at one inch and mark off the exposed end (1) with a paint marker. Do not pull the wand past this mark while cleaning!



Set of professional hooks (1)
(purchased separately)
6-piece set PN2KKV3 – Grainger
Professional Hook Set shown as an
example

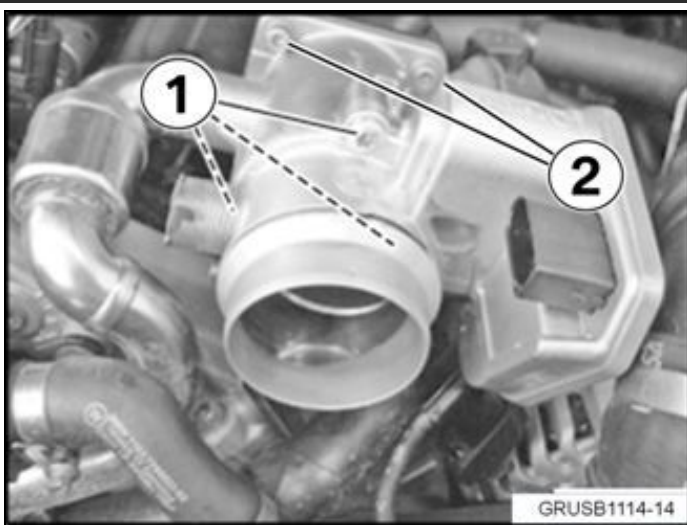


Grind down the tips of the picks (1) to
avoid scratching or gouging the
aluminum in the swirl ports.

CLEANING THE INTAKE MANIFOLD

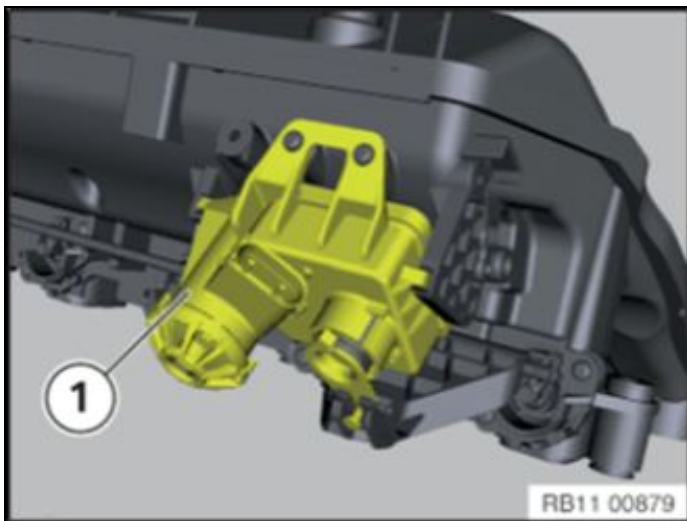
Note:

Unless it is necessary for another reason, replacing the intake manifold is not required when performing this procedure.



Note:

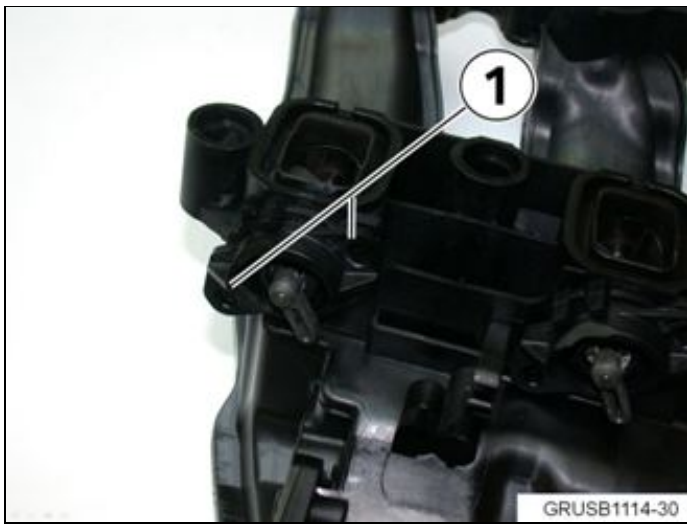
Picture shows M57T2 Europe
Release the three screws (1).
Remove the throttle valve from the
exhaust-gas recirculation valve.
Release the four screws for the
exhaust-gas recirculation valve (2).



Remove the swirl flap actuator (1).



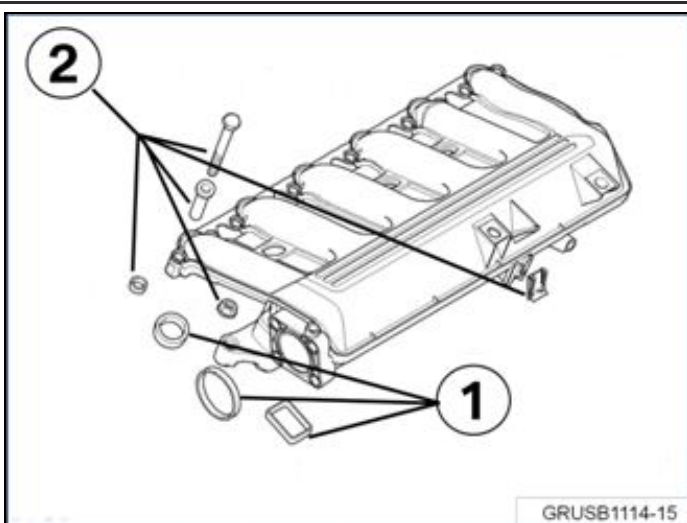
Carefully pry out the swirl flap linkage, starting at the actuator end (1) and then prying at the opposite end (2).



Remove the screws for the swirl flap (1). Repeat for the remaining five swirl flaps.



Slide out the swirl flap (1). Repeat for the remaining five swirl flaps.



Note:
Remove all intake seals (1). Replace these with new gaskets when reinstalling.
Remove all bolts, seals and fasteners (2) from the intake manifold before cleaning. These parts will be reinstalled.

Recommended procedure for Manifold Cleaning

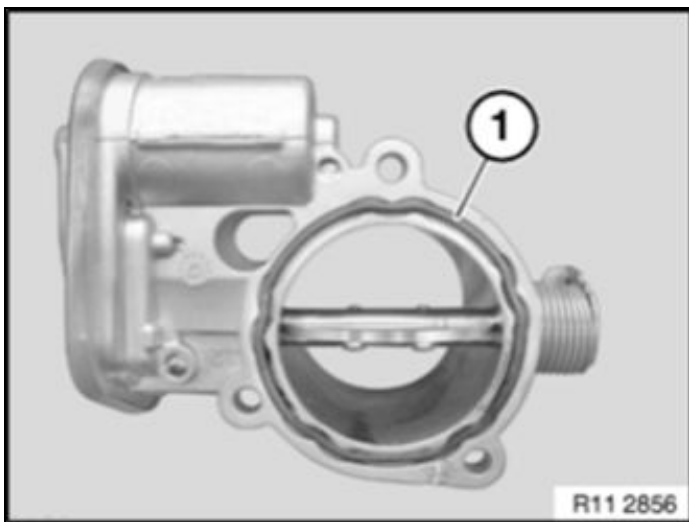
Send the intake manifold and swirl flaps to an engine machine shop or equivalent automotive parts repair/reconditioning (i.e., radiator repair shop) facility for ultrasonic cleaning or a suitable, mild solvent parts cleaning “hot tank” process. Ensure that all ports, swirl and tangential flaps are toughly cleaned.



Use an appropriate parts cleaner (1) and spray clean the throttle plate and throttle bore (2).

Note:

Do not spray any cleaner onto the electrical components of the valve.



Installation note:

Clean the sealing surfaces.
Replace the gasket (1).

Use an appropriate parts cleaner (1) and spray clean the inner bore of the EGR valve (2).

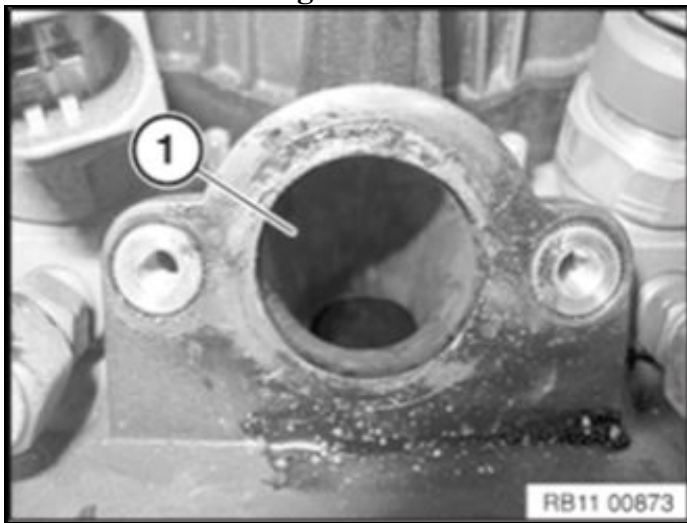
Note:

Scrape away any excessive buildup before spraying with parts cleaner. Do



not spray any cleaner onto the electrical components of the valve.

Valve Cover Cleaning



Wipe out excessive carbon buildup in the swirl ports of the valve cover (1).

CARBON BLASTING CYLINDER HEAD

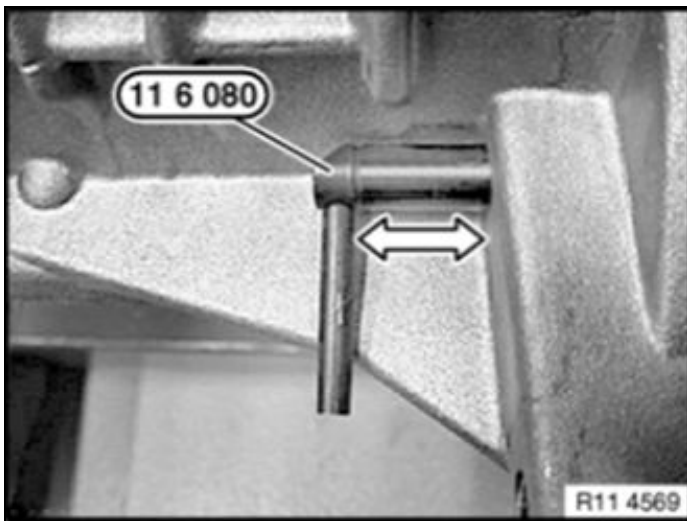
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Remove the protective cap in the direction of the arrow.

Installation note:

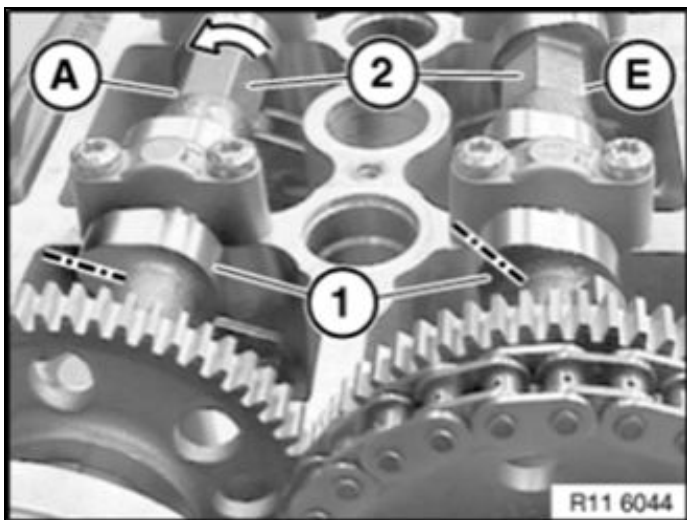
Reinstall the protective cap with some grease.



Crank the engine at the central bolt using 01 6 480 in the direction of rotation until the piston of the 1st cylinder is in the TDC setting. Secure the crankshaft in the TDC setting with special tool 11 6 080.

Important!

Do not turn the engine back. Special tool 11 6 080 must be removed before starting the engine.



Make note of the rotation of the camshafts (2) and the position of the camshaft lobes (1) when cylinder 1 is at TDC.

The position of the camshaft lobes for the next cylinder to be cleaned must be in the TDC position for that next cylinder.

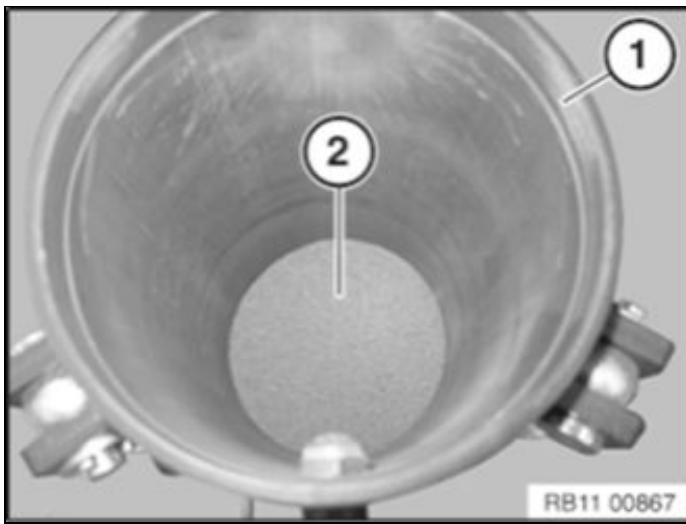
After each cleaning, the engine must be cranked over to the TDC of the next cylinder to be cleaned (firing order 1 5 3 6 2 4).

Note:

Do not crank the engine backward!

(A) Exhaust cam

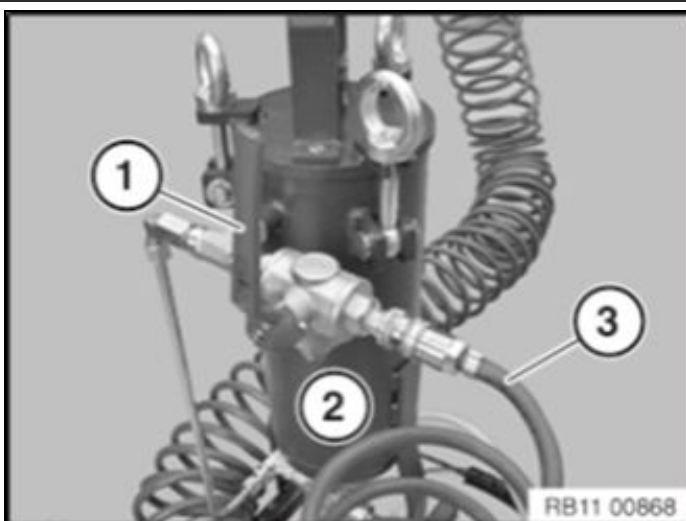
(E) Intake cam



Remove the top from the carbon blaster (1) and fill with walnuts (2).

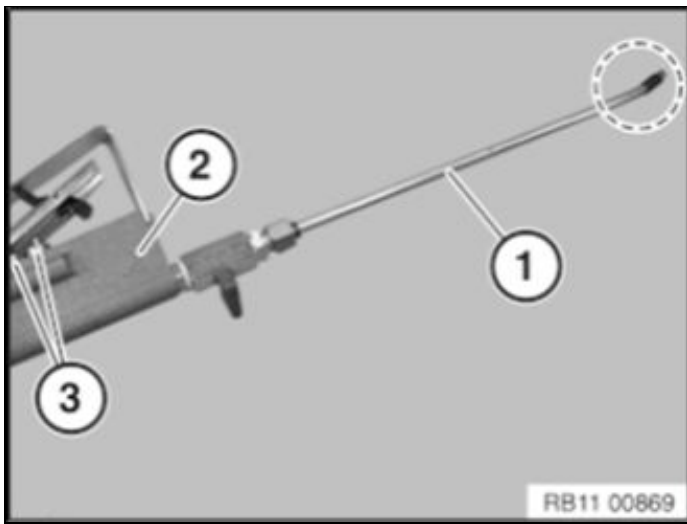


Do not overfill the cylinder!
Fill the cylinder until the material is approximately 30mm (1) below the air inlet port on the side of the cylinder. Reinstall the top.

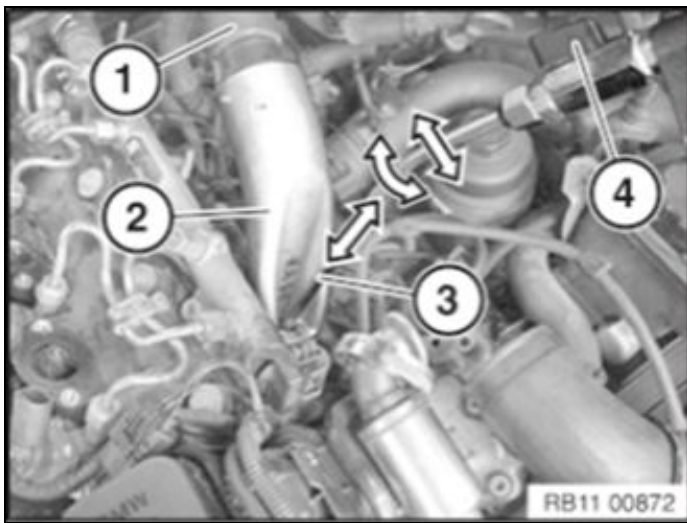


Close the main valve (1) on the blasting tool (2).
Connect the compressed air (3).
Note:
Operating pressure 6 - 8 bar

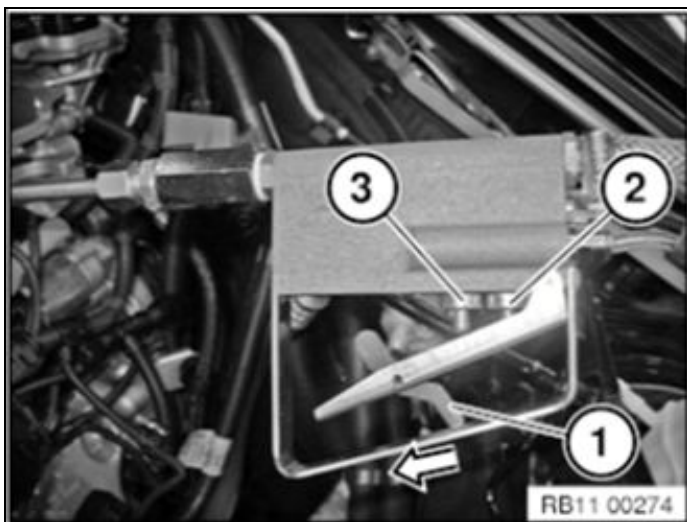
Screw together the necessary blasting



wand 2 356 969 (968, 969 or 970) (1) and actuator (2).
 There are slotted markings on the front section of the wands (969 and 970).
 During the blasting process, only pull the wands out of the vacuum adapter until the mark becomes visible. Wand 968 will have a painted mark (after the wand has been modified by the center).



Tangential ports:
 Connect the vacuum cleaner (1) to vacuum adapter 2 356 967 (2) and direct towards the tangential swirl port of the 1st cylinder.
 Open the main valve on the blasting tool and switch the vacuum cleaner on. Insert the blasting wand (3) into the adapter (2).
 Open the actuator valve (4).



After the wand is inserted into the adapter:
 Unlock trigger (1). When the trigger is moved to stage one (2), only compressed air flows through the blasting wand.
 In stage two (3) (trigger is fully pressed), granulate is added (blasting process).
 Alternate between stage one and two when blasting. This will ensure the ports are not overfilled with blasting media.

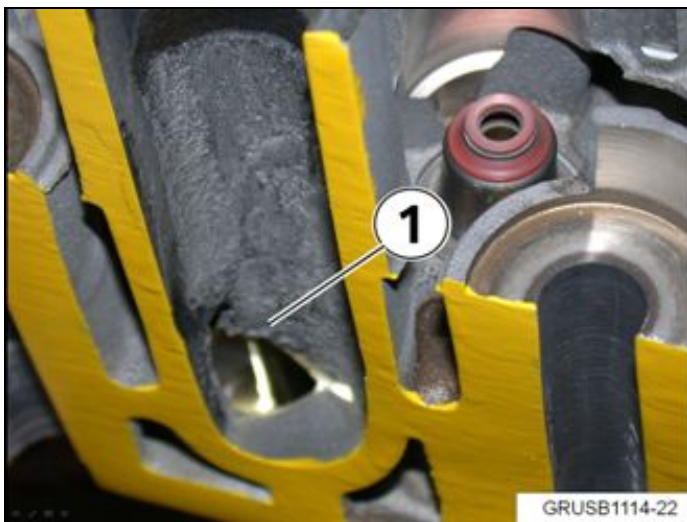


Swirl Ports:

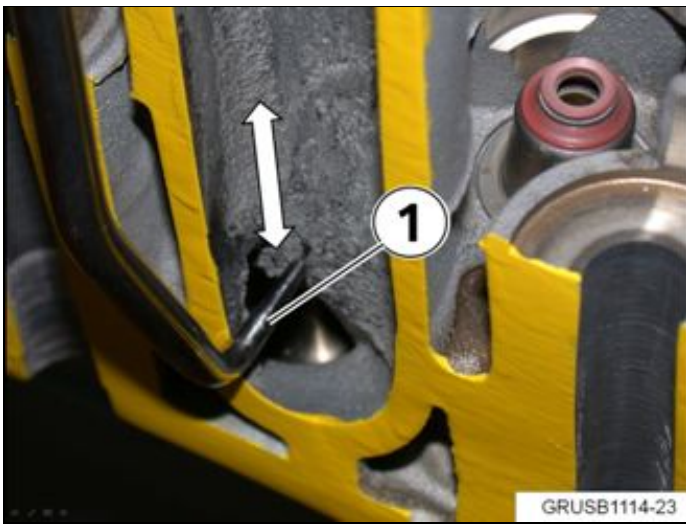
Insert adapter 2 356 966 (1) into the swirl port as shown. Attach a shop vacuum to the large port on the adapter (2).



Use adapter 2 356 970 (straight outlet) first and apply walnuts for about 5-10 seconds. Switch to the 2 356 968 (lateral outlet) adapter and apply another cleaning for about 10-15 seconds. Remove the 966 adapter. Move both wands up and down and rotate during cleaning to expose the entire swirl port to the walnuts.



The cut-away photo shows carbon buildup in the swirl port. After this initial cleaning, there will still be carbon deposits in the tight channel that bends into the bottom of the swirl port (1).



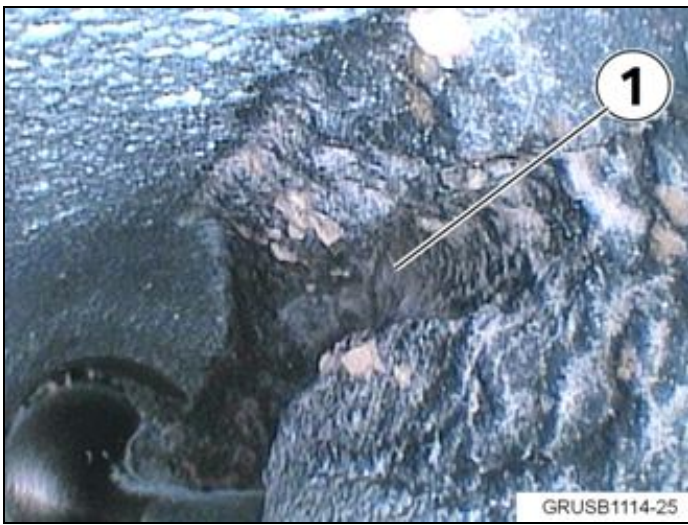
Use the pick set to loosen up the remaining carbon buildup. The carbon is soft, and the “feel” of the pick will be different once the carbon is scraped off the swirl port.



After scraping with picks, apply another blast of walnuts to the swirl port, first with adapter 2 356 970 for 10-15 seconds and then switch to adapter 2 356 968 and blast for another 10-15 seconds.

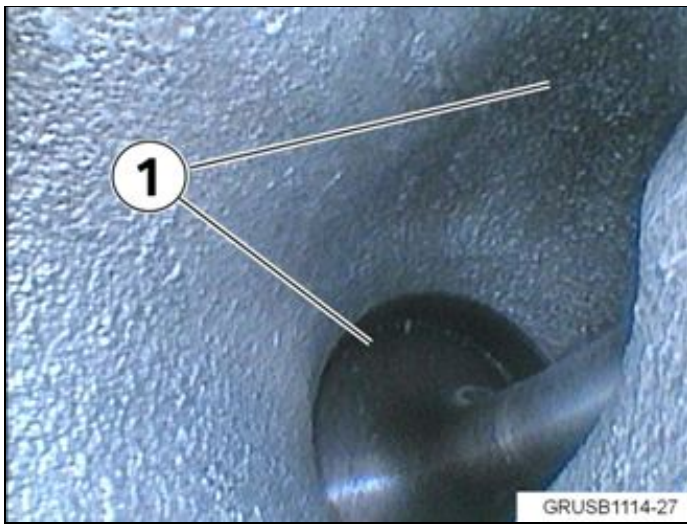
Repeat the blasting/pick scraping again, if needed, until the swirl port and intake valve is clean.

Before cleaning, the swirl port and valve (1) will look similar to the photo (borescope used).

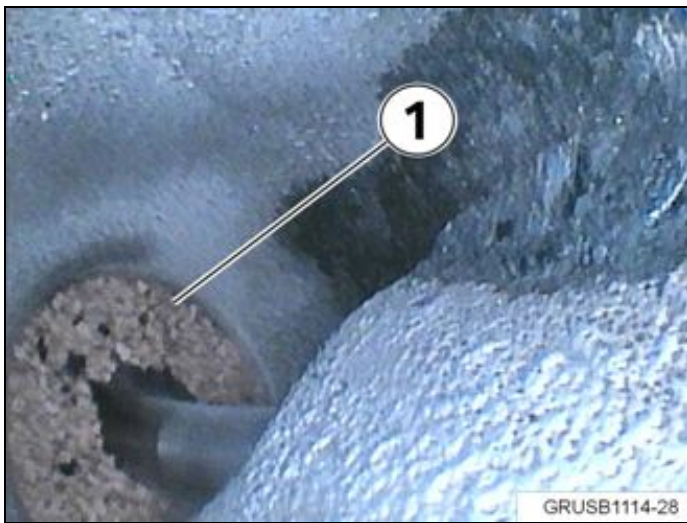


There will still be some carbon buildup (1) in the tighter areas of the swirl port after the initial cleaning. This is when the pick set is used to scrape/loosen this carbon.

Use the walnut blaster/scraping/walnut blaster combination until the swirl port



and valve are clean (1). It may take more than one application to complete.



Note:

Do not leave any used walnut shells in the swirl port (1). The excess shells can be cleared out with compressed air sprayed from the walnut blaster wand (stage one).

Remove locking pin 11 6 080 from the flywheel and continue to the next cylinder for cleaning.

Reassemble the cleaned intake manifold and manifold components, and install the EGR valve and throttle valve onto the intake.

Install the valve cover and intake manifold and check the vehicle after repairs for leaks (air or fuel). Connect to ISTA/D and clear faults. Test drive vehicle and recheck for fault codes and repair/correct as necessary.

PARTS INFORMATION**Note:**

Unless it is necessary for another reason, replacing the intake manifold is not required when performing this procedure.

Part Number	Description	Quantity
13 62 7 796 699	O-ring, camshaft position sensor	1
11 12 7 796 378	Valve cover gasket	1
11 61 7 790 198	Gasket, intake	6
11 61 2 246 945	Gasket, intake	6
11 61 2 245 439	Gasket, EGR valve to intake	1
13 62 7 792 261	Grommet, pressure sensor	1
13 54 7 792 098	O-ring, throttle to EGR valve	1
13 53 7 794 553	O-ring, leakage lines	6
13 53 7 787 236	O-ring, injector	6
13 53 2 247 156	Washer, injector	6
13 51 2 248 189	Washer, fuel return line	2
07 14 6 963 730	Torx bolt M10 X 16-10.9	2
07 14 6 954 965	ASA Bolt with circlip M12 x 1.5 x 39	1

WARRANTY INFORMATION

Covered under the terms of the BMW New Vehicle/SAV Limited Warranty or the BMW Certified Pre-Owned Program.

Defect Code:	11 12 03 76 00	
Labor Operation:	Labor Allowance:	Description:
00 00 006	Refer to KSD2	Performing “vehicle test” (with vehicle diagnosis system – checking faults)
and		
61 21 528	Refer to KSD2	Connect an approved battery charger/power supply(indicated in KSD2 as “Charging battery”)
and		
11 12 601	Refer to KSD	Removing and installing/sealing the cylinder head cover (includes removing and installing the intake manifold)

and		
11 99 000	32 FRU	Work time for disassembling, assembling the intake manifold and cleaning the applicable removed parts. Also included is carbon-cleaning the valves of the 6 cylinders.

Labor operation code 00 00 006 is a Main labor operation. If you are using a Main labor code for another repair, use the Plus code labor operation 00 00 556 instead.

If the microfilter casing is already removed to perform another repair, use the associated labor operation 11 12 614 instead.

Refer to KSD2 for the corresponding flat rate unit (FRU) allowance. Enter the Chassis Number, which consists of the last 7 digits of the Vehicle Identification Number (VIN). Click on the “Search” button, and then enter the applicable flat rate labor operation in the FR code field.

Even though work time labor operation code 11 99 000 ends in “000,” it is not considered a Main labor operation. Also, since the “work time” FRU allowance to be claimed is specified, a separate punch time is not required.

Sublet – Cleaning the Intake Manifold

Sublet Code 3	Sublet amount; see below	Reimbursement for third-party repair
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Invoice this eligible sublet work on the repair order at the actual cost charged with no handling or markup. The sublet amount must also include any discounts or allowances. Itemize the sublet amount in the claim comment section.

ATTACHMENTS

View PDF attachment [B110314 1174 Vacuum System Arrangement \(M57T2TOP SCR\)](#).

View PDF attachment [B110314 Preliminary Work](#).

View PDF attachment [B110314 BMW Group Carbon Blaster](#).