# 3C VORTEX

## GASOLINE INDUCTION CLEANING SYSTEM

**READ AND COMPLETELY UNDERSTAND THIS MANUAL BEFORE USING THE 3C VORTEX GASOLINE INDUCTION CLEANING SYSTEM!**

***THIS SYSTEM IS FOR USE IN MULTI-PISTON GASOLINE POWERED ENGINES ONLY!**

# USER MANUAL

Rev 2.25

ATS|CHEMICAL

WWW.AUTOMOTIVETESTSOLUTIONS.COM

WWW.ATSCHEMICALS.COM

ATS TECH SUPPORT

800.572.6112

# STOP THE CARBON BANDIT IN HIS TRACKS!

# ALWAYS USE PROPER SAFETY PRECAUTIONS

ATS Chemicals **cannot be responsible** for any action taken by a shop or technician that is not stated in the following information. Operating outside of these guidelines is done so at the user's own risk.

- For Professional Use Only
- Never mix other brands of chemical with 3C Chemicals. **ADVERSE CHEMICAL REACTIONS MAY OCCUR!**
- Do not use any other chemicals in the 3C Vortex. **ENGINE DAMAGE WILL OCCUR!**
- **Never add chemical to the reservoir without the engine running. ENGINE DAMAGE MAY OCCUR!**
- Always use common sense when using the 3C Vortex system.
- Wear eye protection and always use nitrile or latex gloves.
- Have a fire extinguisher available in the area.
- Run the vehicle outside or in a well-ventilated area.
- Make sure the vehicle's engine oil and coolant levels are at the correct levels.
- Check for both pending and hard DTCs.
- If the vehicle's engine is making any unusual noise check and repair prior to cleaning.
- If the engine is misfiring check and repair misfire before cleaning the engine.
- The 3C Vortex will start and stop manually by opening and closing the 3C chemical control valve. If there is a problem, first turn off engine and then close the 3C chemical control valve.
- If you need help or have questions, call 800-572-6112 for assistance

DO NOT USE THE 3C VORTEX ON ANY EXOTIC ENGINE SUCH AS, BUT NOT LIMITED TO; FERRARI, MASERATI, MCLAREN, BUGATTI, KOENIGSEGG, LAMBORGHINI, ETC.

DO NOT USE THE 3C VORTEX ON BMW N63-S63 V8 TWIN TURBO ENGINES, AUDI VW 3.2l OR 4.2l NATURALLY ASPIRATED WITH INTAKE RUNNER LENGTH CONTROL, VARIABLE COMPRESSION RATIO (VCR) ENGINES, DIESEL ENGINES OR ROTARY ENGINES.

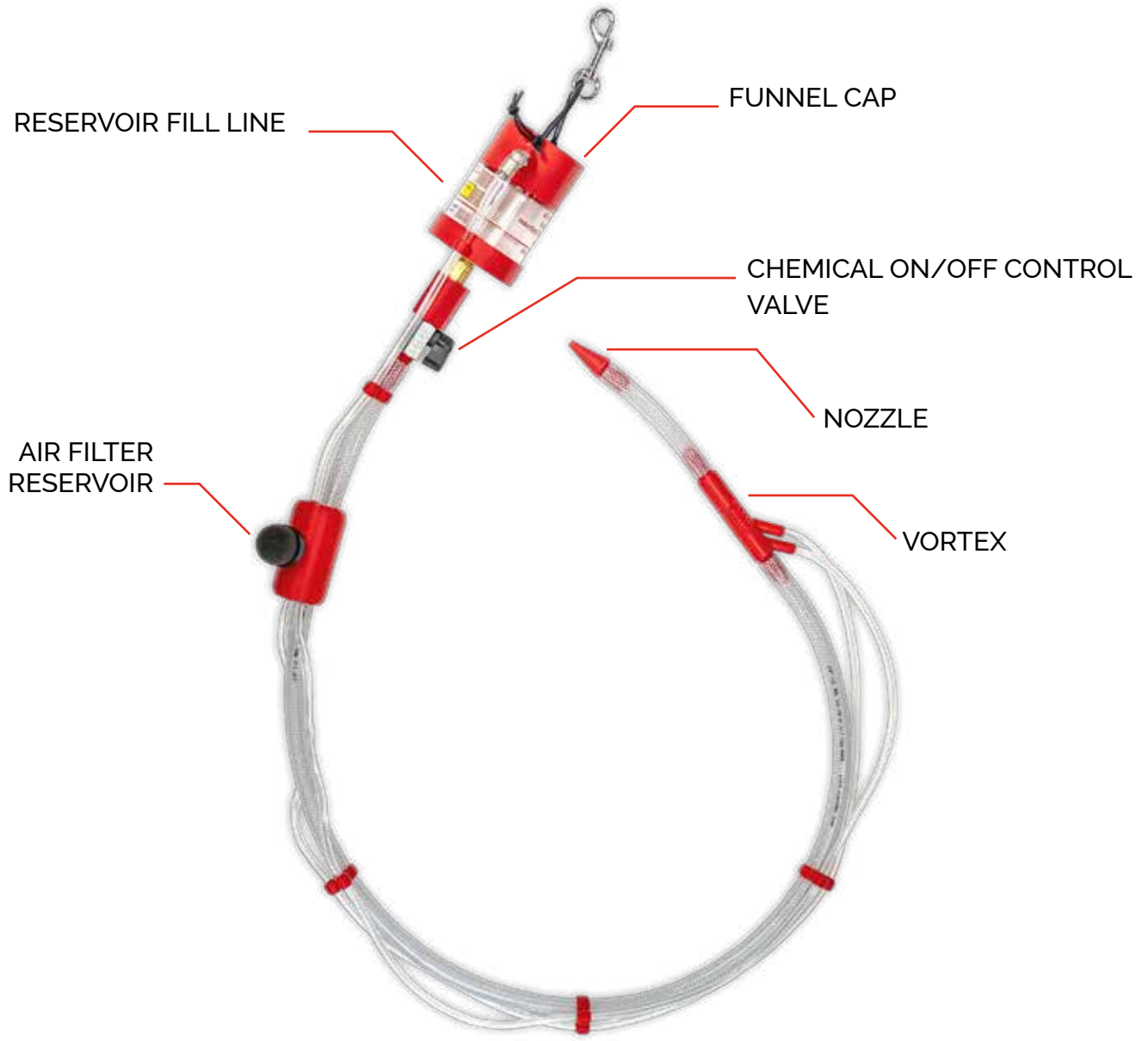
**DO NOT USE IN DIESEL ENGINES.**

**THIS SYSTEM IS FOR USE IN GASOLINE POWERED ENGINES ONLY!**

# GET TO KNOW YOUR

# 3C VORTEX

GASOLINE INDUCTION CLEANING SYSTEM



The chemical control valve controls the flow of chemical to the engine.

CONTROL VALVE: OFF

CONTROL VALVE: ON

# RECOMMENDED CLEANING INTERVALS

The 3C Vortex is designed to limit the carbon accumulation in the gasoline engine. The recommended maintenance for cleaning a Gasoline engine is every 30,000 miles. Some GDI engines will have heavy carbon accumulation with less mileage and will need to be cleaned more frequently (e.g., 12,000 miles).

NOTE: Cleaning results will vary in high mileage engines that have not had regular cleanings. The carbon deposit itself will be different from engine to engine depending on; the type of oil used, the loads placed on the engine, and the number of heat cycles the engine has been through.

# BEFORE YOU START THE CLEANING

## CHECK FOR DTC'S

Connect the OBDII scan tool to the Diagnostic Link Connection (DLC). Pull and record the Diagnostic Trouble Codes (DTC). Leave the scan tool connected for further steps.

## TESTING THE CATALYTIC CONVERTER EFFICIENCY

At this time it is recommended that you check the catalytic converter. This is accomplished by selecting the front and rear O2 or WRAF sensors with the scan tool in graph mode or use the eSCANTM catalytic converter efficiency test. If the rear O2 sensor is oscillating (moving up and down) under a light steady load; the catalytic converter is bad. Do not assume that this will set a code! Many vehicles, such as Toyota, have an aging program where the catalytic converter is not checked until the DTC codes are cleared. If the catalytic converter is not checked this means the Mode 6 data is not updated and is therefore unusable. The only correct way to check the catalytic converter is to drive the vehicle and use the data PIDs for the O2 and/or WRAF. During our 10 years of development of the 3C Vortex, thousands of vehicles were cleaned and no spark plug was ever fouled, no catalytic converter was ever damaged. If the catalytic converter is bad before cleaning it will be bad after cleaning. If the catalytic converter is good before cleaning the catalytic converter efficiency may increase by 10 to 20 percent.

# FOR BEST RESULTS

## TO OBTAIN THE BEST RESULTS WITH THE 3C VORTEX:

The engine temperature should be "cold" (ambient temperature) to warm before the cleaning process begins. If the engine is hot the results will not be optimal.

NOTE: **Engines with high mileage or heavy carbon deposits will need to be cleaned twice.** Before cleaning a second time the vehicle MUST BE DRIVEN to completely clear the engine of any 3C Chemical.

## REFRIGERATE THE CHEMICAL

IF THE AMBIENT TEMPERATUREIS GREATER THAN 50˚ F, OR IF THE ENGINE IS HOT; REFRIGERATE THE 3C CHEMICALS AND ALLOW THE CHEMICALS TO FULLY COOL TO 40˚F BEFORE USE.

# CONNECTING THE 3C VORTEX TO A VEHICLE

## STEP 1: THE MOST IMPORTANT STEP

Find a common vacuum port or sensor port on the engine that is behind the throttle plate.

**NOTE: The port must be located behind the throttle plate.** This port should be centrally located and close to the throttle body. Preferably the purge control vacuum port or Positive Crank Case Ventilation (PCV) vacuum port. A common sensor port may also be used. If the engine is not equipped with a common port, then DO NOT CLEAN ENGINE AS THIS WILL RESULT IN ENGINE DAMAGE.

During cleaning, the vacuum port or sensor port must allow equal 3C Chemical delivery to all the cylinders. If a vacuum port or sensor port is used that is not a common port, then most of the 3C Chemical will go into only 1 or 2 cylinders. THIS WILL DAMAGE THE ENGINE AND THE CATALYTIC CONVERTER.

Temperature sensor removed with 3C red ring stop hose installed inside port opening

Some engines have a sensor located in the center of the intake manifold, close to the throttle body. This allows equal distribution of the 3C Chemical to all the cylinders. THIS IS A GOOD PORT TO USE.

However, If the sensor is a Manifold Absolute Pressure (MAP) sensor and there is no Mass Air Flow (MAF) sensor on the vehicle then removing this sensor stops the data to the ECM that is needed to calculate the air weight.
DO NOT USE THIS SENSOR PORT.

# CONNECTING THE 3C VORTEX TO A VEHICLE

## STEP 2:

If you have chosen to use a vacuum port; remove the vacuum hose and test the airflow into the engine. With the vacuum hose removed you should have a high airflow rate into the intake manifold. Some vacuum ports have a restriction built into the port. If this port has a restriction, then **DO NOT USE THIS PORT.**

**Purge and PCV side by side**

If there are two hoses next to each other, such as a purge control vacuum port and PCV port; **USE THE LARGER HOSE OPENING.**

New GM vehicles have the purge valve mounted directly on the intake with a 90° bend directly under the intake manifold. **DO NOT USE THIS PORT.**

Some engines, such as BMW, require removing the throttle body assembly to gain access to the PCV vacuum port. If the engine is equipped with a variable valve lift (e.g.;Valvetronic, BMW, MINI) Unplug the electric stepper motor. This will put the system in default. This will close the throttle plate, allowing the engine to build vacuum.

# CONNECTING THE 3C VORTEX TO A VEHICLE

## STEP 3:

Take the vacuum gauge and connect it to the port you are going to use. Start the engine and let idle. The vacuum port or sensor port must have at least 10"Hg. If your vacuum gauge reads less than 10"Hg then find another port or **DO NOT CLEAN THE ENGINE.**

## STEP 4:

Hang the 3C Vortex from the hood of the vehicle to be cleaned.

Keep 3C Vortex away from moving parts such as belts, pulleys, fans.

Keep 3C Vortex off exhaust components.

# CONNECTING THE 3C VORTEX TO A VEHICLE

## STEP 5:

Use only factory supplied 3C Vortex hoses. These hoses are specifically designed to carry the 3C Chemicals correctly into the engine's induction system.

3C vacuum port hose connection kit

Select the proper 3C Vacuum Port Connection Hose and insert it into the vacuum or sensor port. Make sure the hose has a good tight connection to the port so the 3C Chemical goes into the engine correctly.

Intake port with hose removed

Intake port with 3C hose attached

intake port with 3C Vortex nozzle connected

Attach the 3C Vortex Nozzle to the 3C Vacuum Port Connection Hose. Make sure the hose has a good tight connection to the 3C Intake Adapter Hose. If a secure connection cannot be made, then **DO NOT START THE 3C CLEANING.**

**WARNING: Never connect the 3C Vortex to a hose on the engine. Always connect the 3C Vortex directly to a vacuum fitting as shown above.**

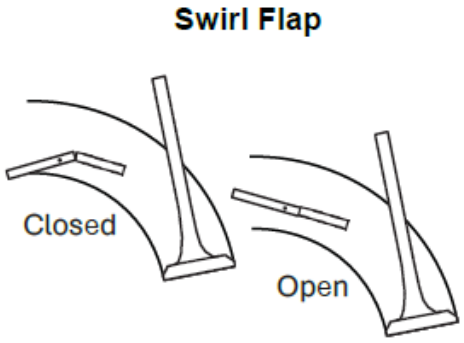
intake port with 90 degree 3C Vortex nozzle

If there is not enough space to allow a tight connection use the 3C Vortex Nozzle with the 90° bend. To install the 90° fitting, hold the hose and grab the straight fitting with pliers while turning the fitting in the hose. Now, pull the straight fitting out of the hose and install the 90° fitting.

# CONNECTING THE 3C VORTEX TO A VEHICLE

## STEP 6:

If the engine has intake swirl flaps these will need to be opened during the entire cleaning process.




These swirl flaps are located close to the intake valves. The swirl flaps are shut during low RPM operating conditions, decreasing airflow volume.

During cleaning, manually open these swirl flaps allowing the 3C Chemical to clean the entire port and valve area. If these are closed the 3C Chemical will be unable to properly clean the induction system. There are 2 types of swirl flaps; vacuum and electric.

**If the swirl flap is vacuum operated:** Pull the vacuum hose off and connect a vacuum pump so the swirl flap can be opened.

Swirl flap vacuum motor

If the diaphragm is blown, manually move the valve to the open position and zip tie it in place (make sure you remove this zip tie when the cleaning is finished). If the diaphragm is blown the valve will need to be replaced. Make sure to note this information on the work order.

**If the valve is electrically operated:** On some engines you can disconnect the linkage and then open the swirl flap. Make sure to reconnect the linkage when the cleaning has been completed.

Vacuum pump on swirl flap motor

On other engines you can hold the swirl flap open with the key in the OFF position. Continue to hold the swirl flap open while turning the key to the ON position. This will put the control of the swirl flap in default or a stuck position.

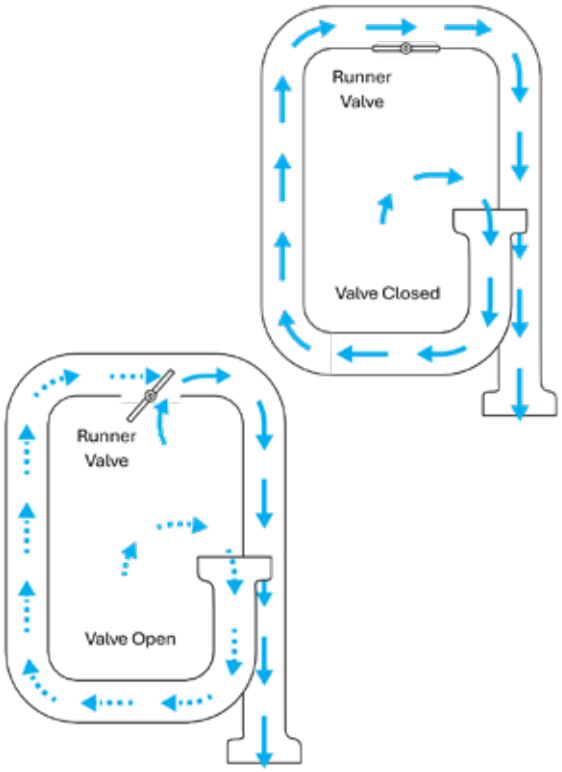
**WARNING: Never force the valve to it's breaking point.**

# CONNECTING THE 3C VORTEX TO A VEHICLE

## STEP 7:

If the engine is equipped with variable intake runner length care must be taken when cleaning the engine.

The variable intake runner length is only used on naturally aspirated engines to change the length the actual air flow travels in the intake manifold. A longer runner length will provide more air charge at lower RPM levels. A short runner length will provide more air charge at higher RPM levels. With this style intake manifolds the runner length can be longer than 2.5 feet. This will allow the 3C Chemical to puddle in the intake runner.




**NOTE:** Do not intentionally open or close the Intake runner valve while cleaning the engine. Let the engine system work normally during Cleaning.

**NOTE:** If you are cleaning a variable intake runner manifold and have any questions, please call:

ATS TECH SUPPORT
800.572.6112

# CONNECTING THE 3C VORTEX TO A VEHICLE

## STEP 8:

Connect a scan tool to the vehicle. Select OBDII data PIDs for catalytic converter temperature. While cleaning the engine, continuously monitor the temperature of the catalytic converters (B1, and B2 if equipped). The temperature should run between 800˚F and 1500˚F. If the catalytic converter temperature increases to over 1500˚F turn the engine off. Now, turn the 3C chemical control valve off and let sit for 5 minutes or so. Restart the engine and hold the throttle between 2000 - 3000 RPM with the 3C chemical control valve off. This will allow the catalytic converter to cool. Restart the cleaning process when the catalytic converter temperature drops below 1250˚F.

**NOTE:** During normal driving conditions the catalytic converter temperature will run 1000˚F to 1800˚F but will be cooled by the air flowing through the engine and under the vehicle.

Scan tool cat temp.

# CLEANING THE ENGINE

**Never leave the vehicle while cleaning.**
**Never use a throttle stick on the vehicle during induction cleaning.**
**If any problem arises turn off engine and close the 3C chemical control valve IMMEDIATELY!**

## STEP 9:

Make sure the vehicle is outside (preferably), or in a well ventilated area. Start the engine and make sure that the throttle can be snapped open. If the throttle cannot be applied (snapped) in park or neutral then do not start cleaning the engine. (e.g. some vehicles will not allow the throttle to be snapped until they reach 140˚F coolant temp).

**DO NOT CLEAN ANY ENGINE WHERE THE THROTTLE CANNOT BE SNAPPED.**

**WARNING:** In some early model vehicles (1990's) transmission damage can occur when the throttle is held at 3000 RPM in park or neutral. These transmissions are ZF4HP22 and 4T60E.
**DO NOT CLEAN THESE MODELS.**

Get the A, B, and C bottles ready by removing the caps and seals. Use only 3C Vortex Chemical A, B, C to avoid damage to 3C Vortex and vehicle.

**WARNING: KEEP 3C CHEMICAL AWAY FROM HEAT, SPARK OR OPEN FLAME.**
Have a fire extinguisher near the vehicle being cleaned.

# CLEANING THE ENGINE

## STEP 10:

**First, start the engine.**

Hold the 3C reservoir level and fill to the fill line which is 4 oz of 3C Chemical A.

FILL LINE

## STEP 11:

Start the engine and open the 3C Chemical control valve to allow 3C Chemical into engine. Then very quickly open and hold the throttle to 3000 to 4000 RPM.

It will take about 30 seconds to deliver the 3C Chemical in the reservoir to the engine.
**Do not allow 3C Chemical into engine at idle for long lengths of time.**

At the end of the chemical delivery very lightly snap the throttle several times. This will help clear the 3C Chemical out of the intake manifold.
**DO NOT OVER-REV ENGINE.**

The engine does not need to rev high during these snap throttle events, just a 1000 or 2000 RPM gain should work well.

**IF THE ENGINE FEELS LIKE IT IS BOGGING DOWN DON'T LET IT STALL.**
Several quick light snaps will keep it from stalling.

CONTROL VALVE: OFF

CONTROL VALVE: ON

# CLEANING THE ENGINE

## STEP 12:

Close the 3C chemical control valve and let engine idle.

Hold the 3C reservoir level and fill to the fill line which is 4 oz of 3C Chemical B.

Now open the 3C chemical control valve to allow 3C Chemical into engine very quickly open the throttle to 3000 to 4000 RPM.

It will take about 30 seconds to deliver the 3C Chemical in the reservoir to the engine. Do not allow 3C Chemical into engine at idle for long lengths of time.

At the end of the chemical delivery very lightly snap the throttle several times. This will help clear the 3C Chemical out of the intake manifold.

## STEP 13:

Close the 3C chemical control valve and let engine idle.

Hold the 3C reservoir level and fill to the fill line which is 4 oz of 3C Chemical A.

Now open the 3C chemical control valve to allow 3C Chemical into engine very quickly open the throttle to 3000 to 4000 RPM.

It will take about 30 seconds to deliver the 3C Chemical in the reservoir to the engine. Do not allow chemical into engine at idle for long lengths of time.

At the end of the 3C Chemical delivery very lightly snap the throttle several times. This will help clear the 3C Chemical out of the intake manifold.

# CLEANING THE ENGINE

## STEP 14:

Close the 3C chemical control valve and let engine idle. Repeat Step 12.

Hold the 3C reservoir level and fill to the fill line which is 4 oz of 3C Chemical B.

Now open the 3C chemical valve to allow 3C Chemical into engine very quickly open the throttle to 3000 to 4000 RPM.

It will take about 30 seconds to deliver the 3C Chemical in the reservoir to the engine. Do not allow chemical into engine at idle for long lengths of time.

At the end of the 3C Chemical delivery very lightly snap the throttle several times. This will help clear the 3C Chemical out of the intake manifold.

## STEP 15:

Close the 3C chemical control valve and let engine idle.

Hold the 3C reservoir level and fill to the fill line which is 4 oz of 3C Chemical C.

Now open the 3C chemical control valve to allow 3C Chemical into engine very quickly open the throttle to 3000 to 4000 RPM.

It will take about 30 seconds to deliver the 3C Chemical in the reservoir to the engine. Do not allow chemical into engine at idle for long lengths of time.

At the end of the 3C Chemical delivery very lightly snap the throttle several times. This will help clear the 3C Chemical out of the intake manifold.

# CLEANING THE ENGINE

## STEP 16:

Close the 3C chemical control valve and let engine idle.
Repeat Step 15.

Hold the 3C reservoir level and fill to the fill line which is 4 oz of 3C Chemical C.

Now open the 3C chemical control valve to allow 3C Chemical into engine very quickly  open the throttle to 3000 to 4000 RPM.

It will take about 30 seconds to deliver the 3C Chemical in the reservoir to the engine. Do not allow chemical into engine at idle for long lengths of time.

At the end of the 3C Chemical delivery very lightly snap the throttle several times. This will help clear the 3C Chemical out of the intake manifold.

## STEP 17:

Turn the engine off and remove the 3C Vortex. Re-install the vacuum line or the sensor to engine.

If the engine has heavy carbon buildup or has more than 50,000 miles, it will need to be cleaned at least twice. The vehicle must be driven to clear the 3C Chemical out of intake manifold before a second cleaning can take place.

## CHEMICAL LAYERING: DELIVER THE CHEMICALS IN THIS ORDER

# CLEANING THE ENGINE

## STEP 18:

Always drive the vehicle right after the cleaning process and, while in 1st gear, open the throttle slowly to wide open throttle. This will clear any remaining 3C Chemical out of the induction system.

Make sure it is safe to perform the WOT application and obey the posted speed limit during the drive.

If the engine starts to ping, back out of the throttle and then reapply the throttle. Repeat this until the throttle can be applied with no pinging.

If the engine does not run well, clear Diagnostic Trouble Codes (DTC's).

## STEP 19:

If the engine needs a second cleaning then repeat the above steps.

*High mileage vehicles usually require 2 cleanings.

## STEP 20:

When you have finished cleaning the engine; put the engine back to the way it was before you started the cleaning procedure. Double check all vacuum lines and fittings.

## STEP 21:

If the check engine light is on, clear any DTC's with a scantool.

## STEP 22:

The vehicle is now ready to return to the customer.

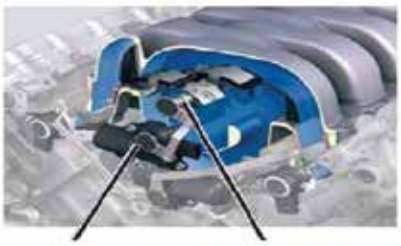
IF THE 3C VORTEX ENCOUNTERS AN UNFORSEEN PROBLEM DURING THE CLEANING PROCESS: **SHUT OFF THE ENGINE AND CLOSE THE CHEMICAL CONTROL VALVE IMMEDIATELY!**

## WARNING: DO NOT CLEAN THESE ENGINES!

BMW N63 Hot V or
BMW S63 Hot V

Audi 3.2L or VW 4.2L
Variable Intake Runner
Length

Audi/VW supercharged engines



variable Intake Manifold Runner Motor V183

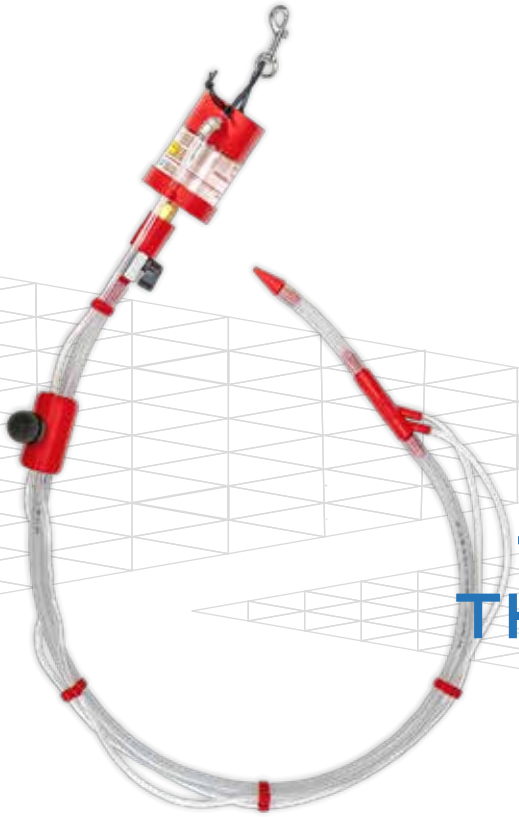
Selector Shaft with Change-Over Flaps

Any Audi or VW Engines with this Intake Manifold System

These engines will have engine damage if cleaned.

**Check www.atschemicals.com/3c-advisories or call (800) 572-6112**

**VW Jetta Sport wagons and Audi S3 wagons must have more than ½ a tank of fuel before cleaning.**



# 3C VORTEX

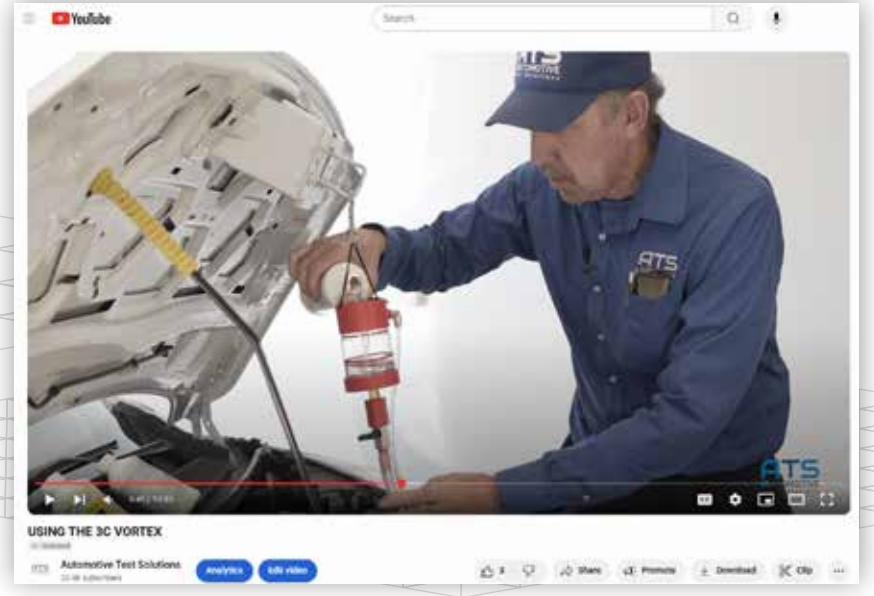
GASOLINE INDUCTION CLEANING SYSTEM

## THE TUNE UP FOR THE MODERN ENGINE

Watch the 3C VORTEX tutorial now!

## CHECK OUT OUR YOUTUBE CHANNEL FOR TUTORIAL VIDEOS!

**https://www.youtube.com/@AutomotiveTestSolutions**




SUBSCRIBE
TO OUR CHANNEL

ATS|CHEMICAL