

# Why N<sub>2</sub>?

## Nitrogen-based Smoke And Low Pressure Fuel Evaporative Test (LPFET) With California BAR-Certified Equipment

*Only nitrogen can be used in BAR-Certified Equipment says the California BAR (Bureau of Automotive Repair) and BAR-certified equipment manufacturers citing "equipment requirements and safety concerns"*

Although smoke machines are not currently the subject of BAR certification, it's obvious that the same "safety concerns" are there when testing with smoke. That's why it's important to choose a smoke machine designed to be used with nitrogen to minimize any of those concerns. In fact, based on the same safety concerns, virtually all automakers using smoke testing recommend or require the use of nitrogen because it is an inert gas.

**Q.** *Is it proven that using air in EVAP system tests is hazardous?*

**A.** **Yes, there are many credible sources. Reports from SAE and University of Alberta both prove that testing with air is hazardous, just to name two.**

A recent SAE International Technical Paper demonstrates the hazards of using air for EVAP system tests and instead recommends using nitrogen.

<http://www.sae.org/technical/papers/2007-01-1235>

Studies from the University of Alberta, Department Of Mechanical Engineering; Combustions & Environment Research Group demonstrates that under normal conditions the fuel tank's vapor space is too rich to burn. But that it only takes 11% of oxygen by volume to support combustion! The air we breathe contains 21% oxygen.

**Q.** *Why did BAR-Certified equipment manufacturers unanimously choose to offer STAR nitrogen-based smoke technology exclusively?*

**A.** **EVAP system testing with air (containing oxygen) exposes tool makers and shops to great liability. To diminish this risk, the safest, proven technology was selected.**

BAR-Certified equipment makers wanted to reduce everyone's liability. Testing a car's EVAP system presents hazards because the system contains potentially explosive fuel vapors. STAR's smoke technology is the only one designed and OEM-approved for nitrogen use.

And the leak-finding benefits of UltraTraceUV® solution were also important. UltraTraceUV is the only ultraviolet dye solution OEM-approved for EVAP testing.

**Q.** *Why do some smoke machine companies say you don't need to use nitrogen with their machines?*

**A.** **Most likely because their machines are not built with the licensed, patented technology to use nitrogen. Sounds like an attempt to put the best marketing 'spin' on a product that CAN'T use nitrogen.**

Ask those companies if they'll put in writing that their machines can legally be used with nitrogen. *Their answer will speak for itself.*

**Q.** *Why aren't OBDII self-tests a safety concern since the LDP adds air to the EVAP system?*

**A.** **The OBDII system's LDP (Leak Detection Pump) self-test is designed to add very little oxygen to the fuel system – so it keeps the vapor space too rich to burn.**

Most LDPs introduce about one or two liters of air volume to the fuel tank. That's not enough oxygen to cause the vapor space to become combustible. By contrast, a typical smoke machine test can introduce 50 times that volume of oxygen.

University studies show that a typical smoke machine, when operated using air, can render the vapor space in an EVAP system flammable between 1 and 5 minutes of the machine's operation (time is dependent on the type of fuel in the tank and vapor space volume).

***As the BAR points out, nitrogen is inexpensive. In fact, it's a small price to pay for safety and peace of mind. Be sure your choice of smoke machine has patented STAR technology inside – the only nitrogen-based smoke technology.***



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