SMOKE TESTING COMPLIANCE ADVISORY – CALIFORNIA'S PERIODIC SMOKE INSPECTION PROGRAM (PSIP) FOR HEAVY-DUTY DIESEL VEHICLES (HDDVs)

This regulatory advisory is to help inform the end user on the proper reading and interpretation of opacity test results using currently available smoke meters for HDDVs.

NEW OPACITY STANDARDS

The California Air Resources Board (CARB) has recently reduced the opacity standards for all HDDVs operating within the State of California. As of July 1st, 2019, HDDVs greater than 6,000 pounds gross vehicle weight rating (GVWR), must be tested annually in accordance with the test procedures set forth in Society of Automotive Engineers (SAE) Recommended Practice J1667 "Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles" as issued February 1996, and shall not exceed a smoke opacity percentage of (Table 1):

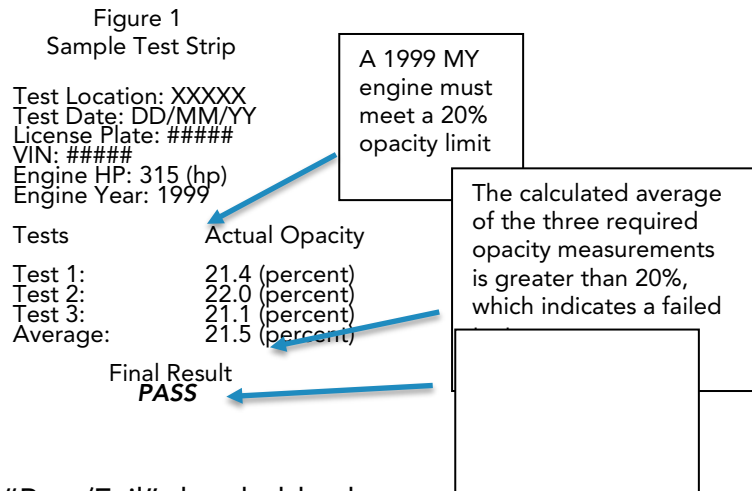**Table 1: Opacity Limits for the HDVIP and PSIP:**

2006 MY (Model Year) and Older Engines without DPFs (Diesel Particulate Filters)	
Pre-1991 MY	40% Opacity Limit
1991-1996 MY	30% Opacity Limit
1997–2006 MY	20% Opacity Limit
2007 MY or subsequent MY Engine	
5% Opacity Limit	
2007 MY and Newer Engines and Engines Equipped with a Level 3 Verified Diesel Emissions Control System (VDECS)	
5% Opacity Limit	
Engines Equipped with a Level 2 VDECS	
20% Opacity Limit	
Two Engine Cranes Driven by a non-DPF Off-Road Engine	
40% Opacity Limit	

PROPERLY INTERPRETING TEST RESULTS WHEN USING EXISTING SMOKE METERS TO DETERMINE COMPLIANCE WITH NEW PSIP OPACITY STANDARDS

Existing smoke meters generally provide a "Pass/Fail" output on the test strip at two opacity thresholds, 40 percent and 55 percent, coinciding with the previous opacity standards in effect since the 1990's. Unless the existing smoke meter settings have been modified to incorporate an appropriate "Pass/Fail" threshold for each lower

opacity standard, **fleets should not rely on the default printout of either "Pass" or "Fail" to determine compliance**.

Rather, compliance with any specific opacity standard must be determined by looking at the calculated average of the three required opacity measurements as shown on the output printout (see Figure 1 below as an example).

Figure 1
Sample Test Strip

Test Location: XXXXX
Test Date: DD/MM/YY
License Plate: #####
VIN: #####
Engine HP: 315 (hp)
Engine Year: 1999

Tests	Actual Opacity
Test 1:	21.4 (percent)
Test 2:	22.0 (percent)
Test 3:	21.1 (percent)
Average:	21.5 (percent)

Final Result
PASS

A 1999 MY engine must meet a 20% opacity limit

The calculated average of the three required opacity measurements is greater than 20%, which indicates a failed

If the user prefers to update the "Pass/Fail" thresholds, they can choose from one of the following options:

1. Manually override the default "Pass/Fail" opacity limit of the smoke meter by following the instructions specified in the operating/user manual or instructions obtained from the manufacturer;

2. Have the smoke meter updated by the manufacturer to accommodate the new opacity standard thresholds.

Manufacturers may have different procedures for setting the "Pass/Fail" opacity threshold. Table 2 shows the most commonly used smoke meters currently on the market and whether a user can manually set the "Pass/Fail" opacity limit by overriding the default "Pass/Fail" factory setting. **Some manufacturers "Pass/Fail" limit settings are higher than 5%, which could lead to faulty pass results (see Table 2 below)**.

Regardless of any differences in the "Pass/Fail" limit settings, all smoke meters listed in Table 2 are compliant with SAE J1667 requirements and can be used to measure smoke opacity from diesel vehicles when properly calibrated. When auditing fleets for compliance with the PSIP regulation, CARB staff will look at the average opacity reading of the three opacity measurements when determining compliance with the applicable opacity standard and will not rely on the "Pass/Fail" output determination on the test printout.

Table 2: Commonly Used Smoke Meters and "Pass/Fail" Limit Reset Capabilities:

Manufacturer	Smoke Meter Model	"Pass/Fail" Limit Settings	Who Can Adjust the "Pass/Fail" Setting	Manufacturer Contact Information
Beryl Technologies LLC	BT2000 Wireless	"Pass/Fail" limits can be set down to 5 percent opacity.	Either user or manufacturer	Phone: (562) 698-2444 Email: sales@beryltechnologies.com Website: www.beryltechnologies.com
Bosch	RTT100	"Pass/Fail" limits can be set down to 10 percent opacity.	Either user or manufacturer	BECS Pacific Phone: (888) 359-3999 Email: info@becspacific.com Website: www.becspacific.com
Caltest Instruments	Caltest 1000	"Pass/Fail" limits can be set down to 10 percent opacity.	Either user or manufacturer	Phone: (310) 835-6909 Email: customerservice@omstardx1.com Website: www.caltest.com
Red Mountain, Inc.	Smoke Check 1667	"Pass/Fail" limits can be set down to 5 percent opacity.	Manufacturer only	Phone: (949) 595-4475 Email: cmurata@redmtnengr.com Website: www.redmtnengr.com
Telonic Berkeley, Inc.	TBM300	"Pass/Fail" limits can be set down to 5 percent opacity.	Either user or manufacturer	Phone: (760) 744-8350 Email: scottm@telonicberkeley.com Website: www.telonicberkeley.com
Wager Company	6500 7500 RHW Wireless	N/A: No "Pass/Fail" setting on devices.	N/A	Phone: (336) 969-6909 Email: bcarpenter@wagerusa.com rharris@wagerusa.com Website: www.wagerusa.com

For More Information:
For further information on the PSIP, please visit our website at www.arb.ca.gov/truckstop.