

Required Standard for CVS and Dilution Tunnel System for Exhaust Test of Diesel Vehicle

KES G – B807

(EST)1988-12-04

Contents

1.Scope of Application

2.Purpose

3.Principle of Preparing Instrument
Specification

4.Basic Item for Dilution Tunnel System of
Diesel

Additional Rules
Appendix

1. Scope of Application

This standard shall be applicable to CVS system and Dilution Tunnel for exhaust test.

2. Purpose

This standard shall specify CVS system and Dilution Tunnel for diesel vehicle.

3. Principle of Preparing Instrument Specification

- (1) Attached content specified by this standard shall be based.
- (2) Clarify the utility of instrument in the future and identify if specification specified by this standard conforms to the purpose.
- (3) Comparing (1), (2), describe the required function up to small instrument clearly and revise the existing specification.
- (4) Upon completing of the above process of specification revision, transfer it to instrument manufacturer or manufacturer capable to produce instrument and receive specification from manufacturer.
- (5) Based on data received from manufacturer and the above data, repeat the process of (3), (4) until getting satisfied result.

4. Basic Item for Diesel Dilution Tunnel System

- (1) General Regulation
- (2) CVS System
- (3) Dilution System and Its System
- (4) Special Note

Additional Rules

This standard shall be effective from Dec. 4, 1989

KIA Spec.

1. General Specification

1.1 Electrical

(1) All A.C. circuits shall use Korean power(system concept and its distribution scheme).

(2) All A.C. power, which will be used by all analyzers, recorder and controllers, etc., shall be filtered and refined by their own system and protected for unexpected occasions by as followings.

(a) AVR

(b) Individual circuit breaker

(c) Fuses

(d) Interlock functions.

(3) All benches and consoles shall have one instrument grade and one utility grade power outlet.

(4) All signal an power interconnection cable to be supplied.

(5) For all motors, motor starter be supplied.

(6) All electronic circuit boards and associated mounting racks be with gold plated edge connectors.

(7) To suppress spikes all DC inductive load (including solenoid valves and long cable runs) be with sufficient protecting system and specify.

1.2 Mechanical

(1) All fittings be swagelok fittings.

- (2) Pumps be shock mounted to isolate pump vibration from analytic components.
- (3) Provide performance curves in the operating conditions form the pumps used.
- (4) For all analyzer and gas bypass steams, use uniform flow meter and clarify the whole specifications.
- (5) All tubing necessary to connect each analyzers, flow conditioners etc. be supplied and deburred and blown out with clean, filtered, dry air. All documentation of system cleanliness be supplied to KIA Motors.
- (6) All exhaust tubing and ports be without any traps where liquid water can gather.
- (7) All sample line volumes be minimized.
- (8) No flow restrictions, which may cause water condensation be placed downstream of the sampling pump.
- (9) All flow systems be with means to forward flush and back flush.
- (10) All filter which ill be used just upstream of every analyzers be uniform type and dimension.
- (11) All filters be located and mounted to give easy access during maintenance.
- (12) All analyzer benches, consoles and rack be above floor level, cleanly labeled and easily accessible.

4.2 CVS System (For Diesel Vehicle)

4.2.1 General

- (1) Sample : Exhaust gas from diesel vehicle.
- (2) Type : CFV or PDP approved by EPA.
- (3) Functions
 - (a) Measuring the instantaneous flow rate and constant rate sample collection for subsequent analysis of diluted exhaust gas for more than or equal to 3 phase in a test.
 - (b) Flow management to analyzer the sample by analyzer.
- (4) Flow rate : 9/12/18m³/min (automatic or manually selectable)
- (5) Flow rate accuracy : $\pm 0.5\%$ at 0.1 sec.
- (6) Ambient monitoring : CVS unit should arrange the analysis sample inlet to check the ambient air for major emissions component when not used for test.
- (7) Control
 - (a) Fully manual control
 - (b) External control by computer system
 - (c) Partial control by driver's or remote pendant.(control extent be specified)
- (8) Basic Operation
 - (a) Fill bag

- (b) Calibration
 - (c) Continuous sample management
 - (d) leak check
 - (e) Purge
- (9) Stop/Resume function : Be able to abruptly stop operation maintaining the status and continuous the remaining test.
- (10) Automatic Purge : Selectable numbers of the cycle of fill & evacuation automatically performed up to 3 cycle.
- (11) All surfaces material be inert and not permeable to vehicle exhaust gas. (this feature should be approved by the method agreed each other in advance)
- (12) Every part of the power line be equipped with circuit breaker in step order to protect the system from power shock.
- (13) Remote control by analyzer
- (a) Read bag (1, 2, 3, 4, 5, 6)
 - (b) Continuous measurement by analyzer
 - (c) analyzer/CVS reset
 - (d) CPU on

2.2 Sampling System

(1) Ambient air filter : 3 stage as follows

- (a) Partial filter
- (b) Absolute filter
- (c) Active carbon filter
- (d) Permitted pressure loss : less than 4mm Ag for each stage.
- (e) Port for checking the pressure loss be prepared
- (f) Combined filtering efficiency : 99.97% (over 0.3 μ m)

(2) Cyclone

- (a) Pressure loss : 20mmAg/9m³/.min
- (b) Permitted internal pressure : -2000mmAg
- (c) Efficiency : 99% of separation (over 10 μ m)
- (d) Dust collector removable

(3) Blower

- (a) Capacity be sufficient for maintaining the critical flow (or constant flow) for every test condition.

(4) Sample bag

- (a) Material : Tedlar
- (b) Capacity (volume) : 200L
- (c) Inside piping : Teflon be arranged to keep homogeneous sample mixing