

# Southwest Research: Powertrain Engineering

SOUTHWEST RESEARCH INSTITUTE®

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 Engine Certification and Emission Development  
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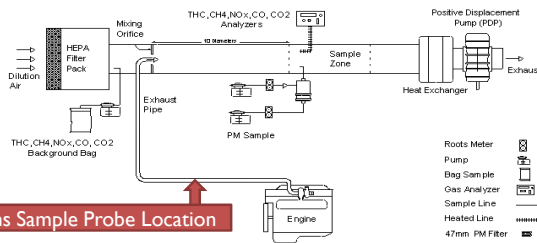


POWERTRAIN ENGINEERING

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## SwRI Virtual Test Cell Tour

- SwRI Building 87 Test Cell No. 20
- This cell is capable of multiple raw or dilute emissions measurements, high speed data acquisition, and automated development testing
- SwRI Developed DAQ Systems
  - HDT – Heavy Duty Transient
  - MoSAIC™ - Measurement System for Automation Instrumentation



Raw Emissions Sample Probe Location

Dilute Emissions Sampling System Schematic

### Example Engine Specifications

Make:	Displacement:	CID	liters
Model:	Year:	Serial Number:	
NO.	TEST PARAMETER	SPECIFICATION	
1	Rated Speed (check point for conditions)		rpm
2	Rated Power (check point for conditions)		kw
3	Fuel Rate at Rated Speed and Power		kg/hr
4	Fuel Temp. at Rated Speed and Power	±	°C
5	Peak Torque Speed		rpm
6	Peak Torque	±	Nm
7	Fuel Rate at Rated Torque Speed and Torque		kg/hr
8	High Idle (governed)		rpm
9	Low Idle (curb idle)		rpm
10	Cranking Speed		rpm
11	Water Inlet Temperature Setpoint	±	°C
12	Water Outlet Temperature	±	°C
13	Pressure Drop Across Intercooler	n/a ±	kpa
14	Air Temperature After Intercooler	n/a ±	°C
15	Engine Oil (SAE rating) / Sump Capacity	/	
16	Engine Coolant Type (water, water+glycol, etc.)		
17	Declared Max Test Speed		rpm
18	Declared Intermediate Speed		rpm
19			rpm
20			rpm
Intake and Exhaust Restrictions			
21	Intake Restriction	±	kpa
22	Exhaust Restriction	±	kpa
23	Intake Restriction Location from Inlet	±	mm
24	Exhaust Restriction Location from Outlet	±	mm



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# SwRI Virtual Test Cell Tour

- Video Placeholder for 4.5 minute video



# SwRI Virtual Test Cell Tour

- Part inspection takes place inside test cell
- Secure storage space to maintain chain of custody
- Customs importation and crate building services available



Engine Article Under Test



Engine Storage



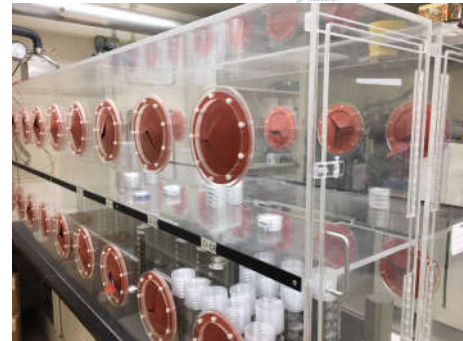
# SwRI Virtual Test Cell Tour



- Particulate Matter (PM) Filter Weigh Room
  - Temperature and humidity controlled storage and weigh chambers
  - 0.1 microgram accuracy scale
  - Anti-static radioactive strips
  - Barcode tracking for check-in/out and weighing records



PM Filter Weigh Chamber



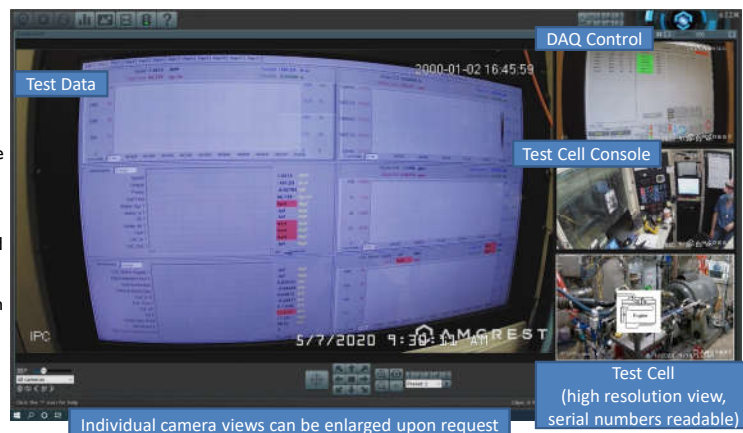
47mm PM Filters



# SwRI Remote Testing Demonstration



- Due to the current health situation created by COVID-19 and respective travel restrictions, remote witness testing has been utilized between Southwest Research Institute (SwRI), an OEM, and a type approval agency in order to proceed to certify an engine family to the applicable regulation
  - Continuous feed of audio and visual equipment to allow for reasonable assessment of the test/inspection. Witness will be able to request information or different views
  - Pre-inspection of critical parts will happen prior to start of test
  - Presentation will be prepared to document engine installation and part inspection
  - Adjusted witness hours to accommodate time difference between US CST and the engine manufacturer or witness as needed
  - Modal averages visible during testing. Test data summaries shared shortly after testing is completed and PM filters are weighed
- Video conferencing software utilized to host online meeting and video conference

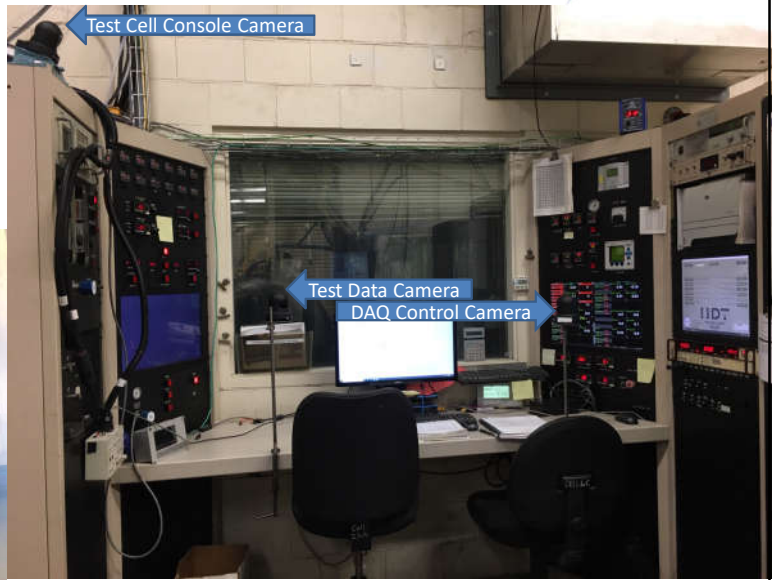


# SwRI Remote Testing Demonstration



- 4 Cameras for Remote Viewing

- Test Data
- DAQ Control (HDT)
- Test cell console
- Test cell



# SwRI Remote Testing Demonstration

- Video Placeholder for 19 minute video



## Contact Information

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