



SHED SIMULATOR

DESIGN PRINCIPLE

The SHED Simulator is a computer-controlled device that uses a mass flow controller to inject a known quantity of sample gas into a SHED. The timed injections may be performed as a single shot or as multiple shots on an hourly basis for a 24-, 48-, or 72-hour diurnal test. The injections may vary in length from hour to hour and may also vary in rate with each injection. The actual injection will be within 0.5% of the intended injection on a mass flow basis. Additionally the MFC is capable of up to 14 separate gas calibrations.

COMPACT PACKAGING

The system is housed in a suitcase-type enclosure for ease of portability. Small wheels and a carrying handle will allow for the system to be moved from cell to cell effortlessly. Lightweight and portable, the case includes storage for detachable external tubing, connectors, solenoid, and power cord.

CONTROL COMPUTER

The SHED Simulator is controlled by a mini-computer housed within the case.

COMPUTER SPECIFICATIONS //

- Industrial PC with 10" touch screen
- Windows operating system
- 4GB compact flash card
- Ethernet port - 10BaseT LAN
- Resolution: VGA 640x480
- Watch dog timer
- Remote start control TTL input
- (2) USB ports

TUBING AND CONNECTIONS

- 7 foot long, 1/4" OD SS braided flexible tubing for connecting the simulator to the N₂ and sample gas cylinders
- 7 foot long, 1/4" OD SS braided flexible tubing for connecting the simulator to the SHED
- Color-coded, keyed quick connects for all external tubing connections



APPLICATION SOFTWARE

The Microsoft Visual Basic® application software includes up to 10 pre-built user profiles, which are editable in Notepad.

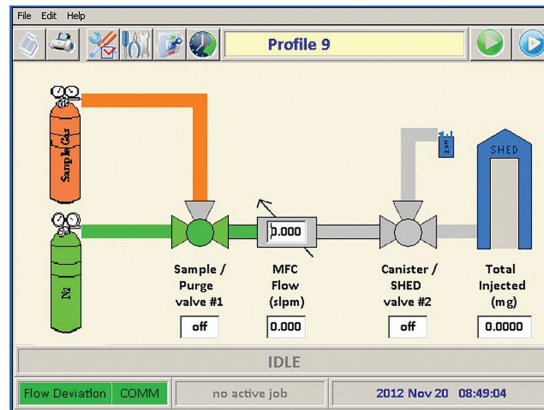
THIS PROFILE DEFINES THE FOLLOWING VARIABLES //

- Sample gas flow rate (slpm)
- Sample gas injection time (either 24, 48, or 72 hours with each hour having its own injection rate)
- Nitrogen purge time (minutes)
- Sample gas line fill time (minutes)
- Total number of test cycles
- Inject by volume or mass

TEST CONFIGURATION

THE SOFTWARE ALLOWS FOR THE FOLLOWING INFORMATION TO BE ENTERED AND LOGGED TO THE REPORT //

- Start time and date
- Operator name (up to 16 characters)
- Sample gas (up to 16 characters)
 - Defaults to last sample gas used
- Sample gas concentration (ppm propane)
- Cell code for test
- Unique sequential simulator assigned test run number (up to 1 million)
- Number of days to run test (1 to 3 days)



REPORT LOGGING

IN ADDITION TO LOGGING THE ABOVE INFORMATION, THE SHED SIMULATOR ALSO LOGS THE FOLLOWING //

- State changes (ex: solenoid 1 changes from open to closed)
- Mass flow deviations greater than +/- 1% of full scale
 - Logs one record for the deviation and one record when back in tolerance
- Temperature, pressure, and flow rate for each injection

Hour	Set pt (slpm)	Time (sec)	Hour	Set pt (slpm)	Time (sec)
1	0	0	13	0	0
2	0	0	14	4.5	600
3	0	0	15	0	0
4	4.5	600	16	4.5	600
5	0	0	17		
6	4.5	600	18		
7	0	0	19		
8	0	0	20		
9	4.5	600	21		
10	0	0	22		
11	4.5	600	23		
12	0	0	24		

SOFTWARE SCREENS

MAIN MENU // Displays system status, set point, and process variables

DIAGNOSTIC SCREEN // Use to manually energize the individual I/Os

CONFIGURATION SET-UP SCREEN // Set the test configuration

FILE/COPY SCREEN // Copy profile and data files