



3-in. Gas/Oil/Water Flow Loop

This flow loop has been designed for the study of gas/liquid flow behavior in inclined pipes. It is also capable of simulating risers and severe slugging conditions. This loop is equipped with advanced instrumentations which allows the measurement of two phase flow parameters such as liquid holdup, liquid entrainment, wave and slug characteristics, flow pattern and pressure drop.

Key Specifications

Fluids

Liquid: Tap Water or Mineral Oil
Gas: Air

Operating Conditions

Maximum Pressure: 30 psig
Gas Flow Rate: 0 to 2.52 MMSCFD (Superficial Gas Velocity – 0 to 147 ft/s)
Liquid Flow Rate: 0 to 604 BPD (Superficial Liquid Velocity – 0 to 2 ft/s)

Test Section

Pipe Material: R-4000 PVC
Diameter of Pipe: 3 inch
Test Section: 60.4 ft (241 D)
Inclination Angles: 0 to 30 degree

Instrumentation and Flow Characteristics

Measured Parameters	Instrumentation
Liquid Holdup	<ul style="list-style-type: none"> • Quick Closing Valves • Wire Mesh Sensor
Flow Pattern	<ul style="list-style-type: none"> • Hi-speed Camera • Wire Mesh Sensor • Visual Observation
Pressure Gradient	<ul style="list-style-type: none"> • Differential Pressure Transducer
Wetted Wall Fraction	<ul style="list-style-type: none"> • Wire Mesh Sensor
Liquid Film Height	<ul style="list-style-type: none"> • Wire Mesh Sensor • Capacitance / Conductivity Probe
Flow Field	<ul style="list-style-type: none"> • Particle Image Velocimetry

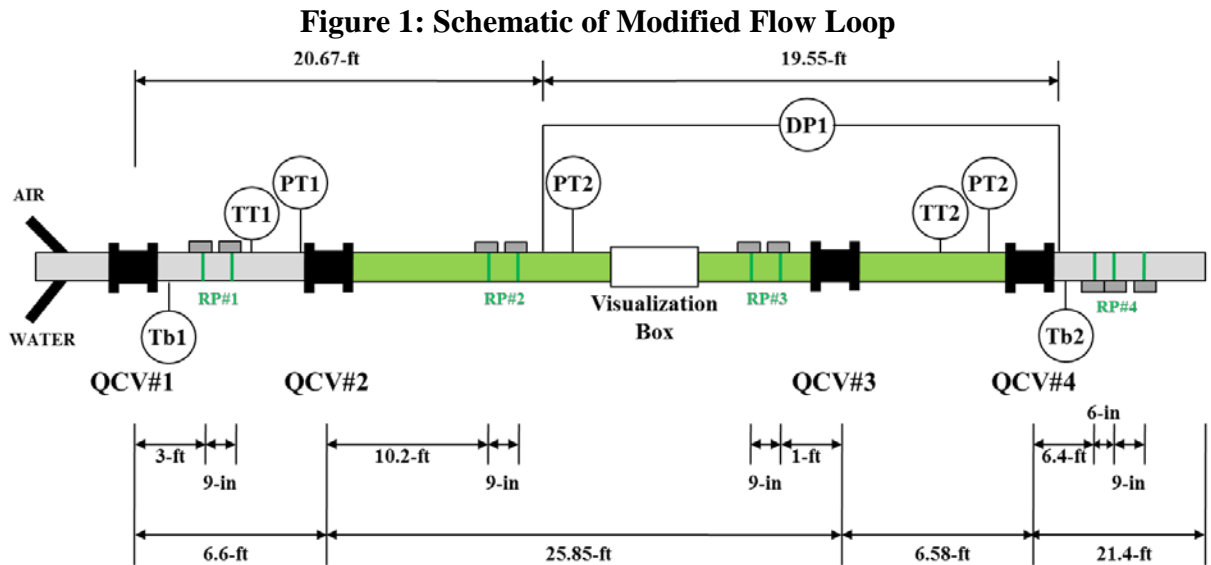


Figure 1. Schematic of Test Section Equipped with Resistance (Conductivity) Probes

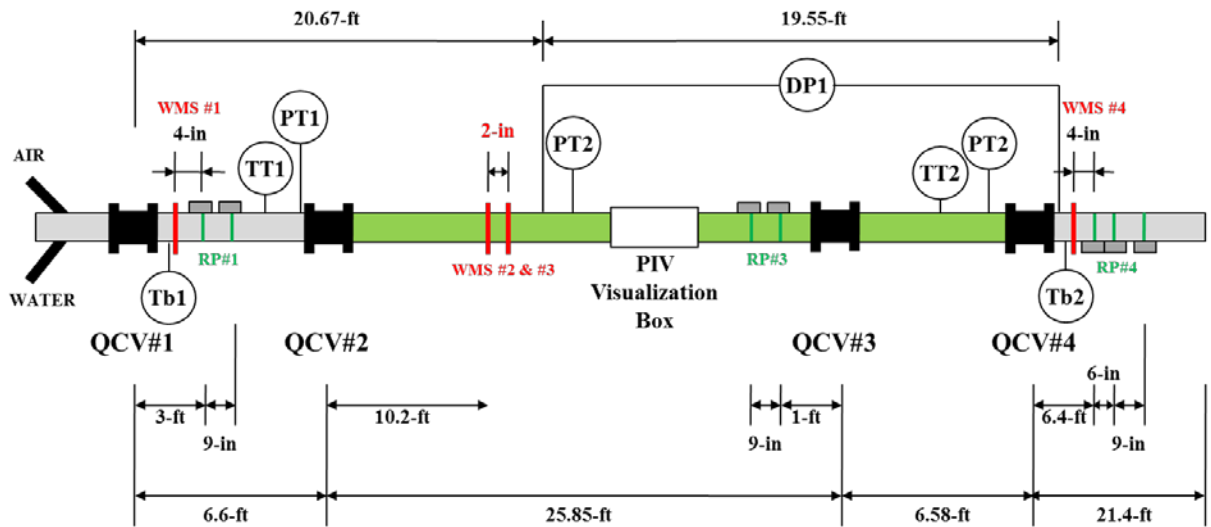


Figure 2. Schematic of Test Section Equipped Wire Mesh Sensors and PIV Visualization Box

TT: Temperature Transducer, PT: Pressure Transducer, DP: Differential Pressure Transducer, QCV: Quick Closing Valve, RP: Resistance (Conductivity) Probe, PIV: Particle Image Velocimetry, WMS: Wire Mesh Sensor



Figure 3. View of 3-in. Gas/Oil/Water Flow Loop

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