

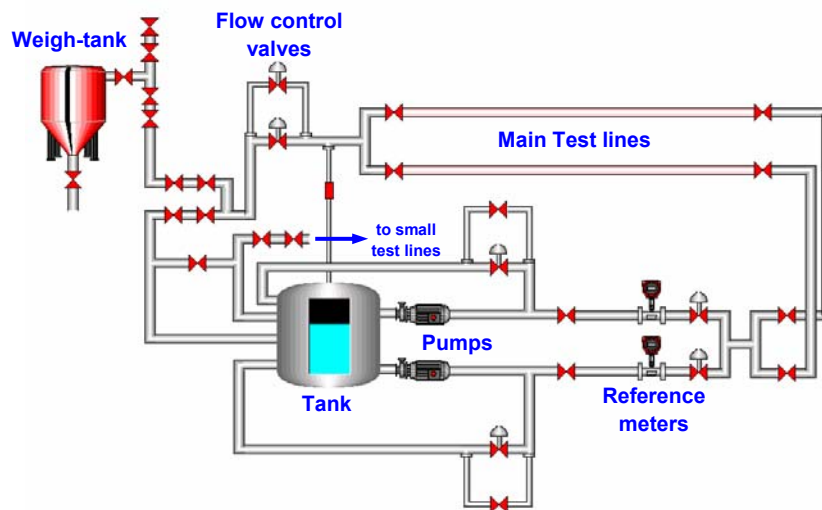


OIL FLOW TEST FACILITY

NEL is recognised as a world renowned authority on flow measurement technology, R & D and calibrations. This reputation has been built up through decades of research and testing in NEL's flow facilities, combined with an active role in the development of many national and international flow measurement standards.

NEL's oil flow measurement facility is a modern purpose built flowmeter calibration and evaluation facility. The facility has four separate flow lines, covering a wide range of flowrates with a selection of three different oils. Combining these oils with NEL's unique temperature control system allows independent variation in the test temperature and viscosity. The test sections can be constructed to offer long straight lengths upstream or, if necessary, specific configurations designed to replicate actual installations.

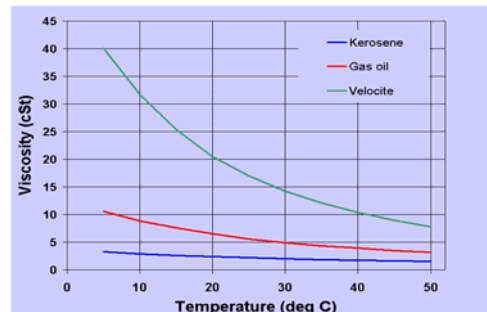
NEL operates the UK primary standard oil flow standard, which is independently accredited by UKAS (United Kingdom Accreditation Service), an independent 3rd party body. The facility is operated by multi-skilled teams supported by technical experts. The facilities are all housed in a state of the art testing building, providing a comfortable and safe working environment.



Oil Flow Measurement Applications

Accurate oil flow measurement is one of the most important requirements in the oil and gas industry. In fiscal metering, an additional 0.03% uncertainty in 50,000 bbls/day results in an increased exposure of more than \$100,000 in one year alone.

The fluid viscosity can also have an impact on the measurement performance of some meter technologies.



Viscosity ranges of oils in NEL facility

Many types of flowmeters are affected by installation effects for example bends, valves or headers upstream of the meter. This can result in significant errors in the measured flow which, if used for fiscal or allocation purposes, can result in very significant financial exposure to those involved.

Testing Services

- UKAS accredited oil meter calibrations
- Oil flowmeter performance evaluation
- Evaluation of temperature / viscosity effects
- Installation effects testing
- Oil flowmeter development testing
- Flow conditioner compliance testing
- Evaluation of Δp through meter / components
- Flow control valve characterisation
- Valve Cv evaluation



Facility Services



In addition to the instrumentation and equipment available in the facility, NEL also offers:

- Handling of dangerous goods
- Handling and storage of radioactive sources
- Overhead crane (5 tonnes)
- Power supplies (110VAC, 240 VAC, DC)
- Mains air supply @ 7 bar (100 psi)

Subject to availability, the facilities can be hired on a day rate or per meter basis for short, medium or long term testing. Full details of facility rates are available on request.

Oil Flow Test Facilities Specifications

Oils and properties	Density range (kg/m ³)	Viscosity range (cSt)
Kerosene	780 to 810	1.5 to 3
Gas oil	805 to 835	3 to 10.5
Lubricating oil	825 to 855	8 to 40.0
Operating conditions		
Flowrates:	0.05 l/s to 200 l/s (approx. 30 bbl/day to 105,000 bbl/day)	
Line pressure:	0 to 5 bar (72 psi)	
Line temperature	5 to 45°C (controlled to < 1°C)	
Line sizes	1-inch to 8-inch	
Horizontal line length	25m	
Vertical line height	5m	
Reference		Uncertainty
Primary gravimetric standard:	6t, 1.5t, 600kg, 150kg weigh-tanks	0.03%
Secondary standard:	2 off 5" turbine meters	0.08%
Test Instrumentation		Offline Instrumentation
Temperature, pressure, Δp		Density measurement
High speed Δp / pressure		Viscosity measurement
Velocity profiling Pitot traverse system		
Note: 1) Test sections can be constructed with bends, valves etc to replicate specific installations. 2) Gas injection into oil flow test sections is also possible to assess gas breakout effects.		

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