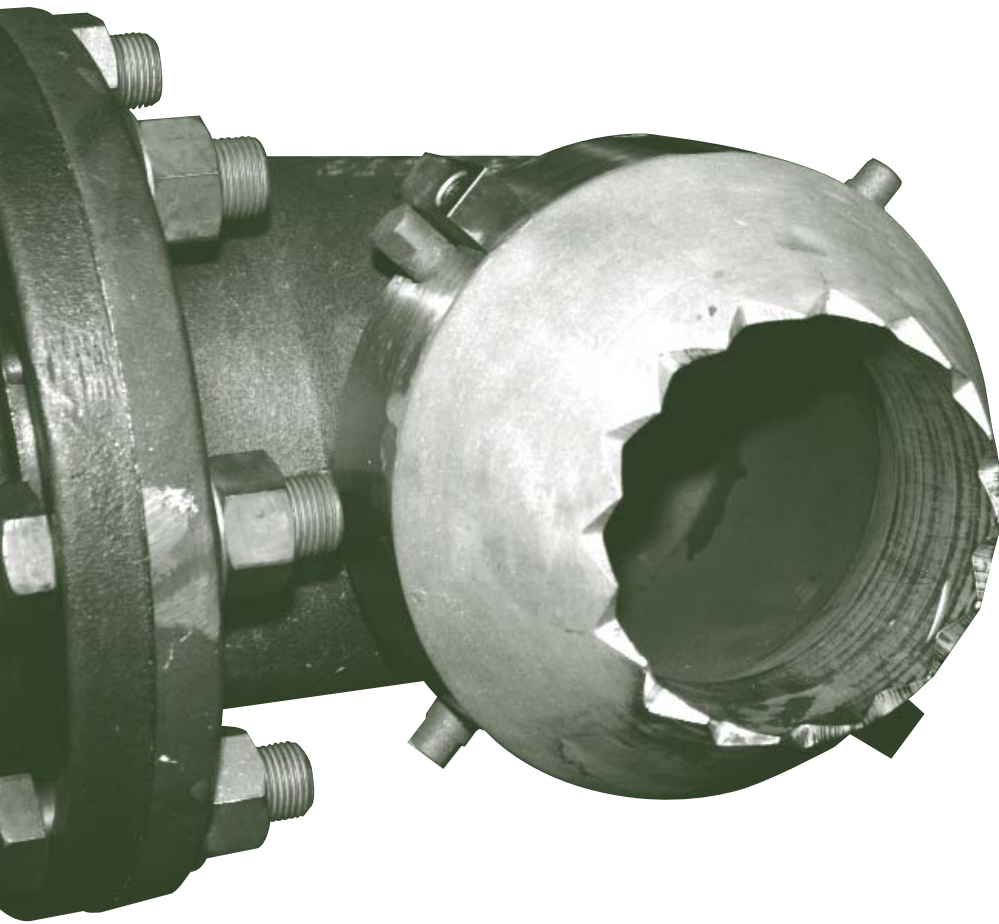


# Aerodynamic Test Hot Gas Laboratory



## Introduction

The Hot Gas Laboratory (HGL) is designed to study the effect of a full scale jet efflux on ship or land based surfaces.

The HGL contains a heavily modified combustion chamber mounted on a bespoke support frame allowing exhaust gas temperatures up to 1100°C at pressures of up to 5 atmospheres.

The facility has been in virtual continuous use since 1998 in support of surface erosion characterisation for current and future Short Take Off and Vertical Landing (STOVL) configurations. The facility has also been utilised to support other test measurements including: - free stream plume surveying (pressure and temperature), heat flux and adiabatic wall temperatures, infra-red signature reduction and a variety of other measurements which require the use of a high mass flow, high temperature and a high pressure jet efflux.



# Aerodynamic Test Hot Gas Laboratory

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## Hot Gas Laboratory

### Facility Utilisation

Surface erosion studies, hot jet airframe interactions, heat shield materials and structural design development, flow field measurements, Infra-red signature reduction and measurement.

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### Capability

Primary Combustion Chamber	Standard Nozzle Area: 12000mm <sup>2</sup> . Temperature Range: 130 - 1100°C Pressure Range: 1.1 – 5 atms. Max. Fuel Rate: 15 l/min (AVTUR / F34). Max. Mass Flow: 12kg/s. Max. Heat Output: 6MW Bespoke support structure.
Nozzles	An extensive suite of symmetric and asymmetric nozzle configurations are available.
Air Supply	500m <sup>3</sup> at 4200kPa, 9 Compressors, with a pump rate of 0.45kg/s per machine allowing long run durations.
Fuel Supply	AVTUR/F34 direct injection atomisation system. Airblast burner suitable for a wide range of jet conditions. Maximum fuel flow rate of 15 litres, per minute via a fixed displacement pump. 6000 litre fuel storage. PID controlled, allowing fine regulation, reduced operator workload, programmable ramp rates and excellent efflux condition repeatability.

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### Special Test Equipment

- Various 3 axis traversing systems.
- Total Pressure/Temperature measurement probes.
- High quality video cameras.
- High resolution Infra-red digital thermal imaging system.
- Non intrusive flow visualisation inc. PIV, shadowgraph.
- Linear motor sample/specimen traversing systems.

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### Data Acquisition

The facility contains a flexible data acquisition system that can accommodate a wide variety of sensors.

Compact pressure scanning hardware is also available that can provide over 1000 pressure measurements.

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### Test Support

Full life cycle support:  
specification, design, manufacture, test, analysis, reporting.



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