Hiden HPR-20 EGA

for evolved gas analysis in TGA-MS
Introduction

The Hiden HPR-20 EGA is configured for continuous analysis of gases and vapours from thermogravimetric analysers (TGA).

Operating to 200°C, the QIC (quartz inert capillary) flexible 2 m capillary inlet provides fast response times of less than 300 ms.

The HPR-20 EGA system has a mass range of 200 amu (300, 510 amu options) and a detection capability from 100% to less than 100 ppb.

The external scroll pump provides enhanced pumping for light gases.
HPR-20 EGA System Schematic
HPR-20 EGA Vacuum Schematic

Key:
- G1: Total pressure gauge
- VR1: QIC inlet bypass control valve
- P1: 60 l/s turbo drag pump
- P2: Scroll pump
- MS: Mass spectrometer vacuum chamber
- Sample: 1x10^-6 mbar
- Capillary: 160°C
- QIC: 120°C

Exhaust vent
HPR-20 EGA Mass Spectrometer

dual Faraday / secondary electron multiplier detectors

electron impact ionisation source

quadrupole mass filter
QIC Inlet Technology

Quartz and Platinum Wetted Surfaces  →  No memory effects
Heated Capillary  →  No condensation effects
Flow Matched  →  Optimum response / recovery
Minimal Internal Volume  →  PPB detection
Interchangeable Sampling Capillaries  →  Analysis from 10 mbar to 2 Bar
Data shows the response of a HPR-20 system to gas and vapour during switching between a dry He stream and a wet H₂ and Ar flow. For clarity, only the H₂ and H₂O data is shown in the graph.
Typical Mass Spectrum of Air

Note: Different species can have the same mass e.g. CO, N₂ m/e 28
Soft Ionisation

Unique to Hiden gas analysis systems, soft ionisation allows users to selectively ionise different gases by setting the ionisation energy for a particular mass.

This powerful technique can simplify the analysis of otherwise complex cracking patterns from multi-component gas/vapour mixtures.

The ionisation energy can be altered from 4 to 150 eV, in 0.1 eV increments. Standard operation is at 70 eV.
Thermal Analysis Mass Spectrometry

Fast response, low dead volume custom engineered interfaces for most TGA/STA systems.

Typical TGA Inlet

TGA-MS data
TGA-MS

MS Inlets for Coupling to TGA Systems

A wide range of custom engineered interfaces are available to suit most TGA instruments.

Features:
- Minimum dead volume
- Controllably heated sample inlet – no cold spots
- Inert materials
EGAsoft Software for Evolved Gas Analysis

A complete, application specific, software package for Evolved Gas Analysis data acquisition and analysis.

- 3D bar scan view for easy determination of trends in bar data
- Simple automatic export in formats specific for import to any TGA/STA manufacturer
- Automatic spectral deconvolution in MID mode
- Automatic start/stop facility
- Auto-sequencing of MS data acquisition files e.g. for use with auto samplers
- Peak integration and data analysis routines
MASsoft Professional control software

A multi-level software package allowing both simple control of mass spectrometer parameters and complex manipulation of data plus control of external devices.
Hiden HPR-20 Users

NASA
Dow Chemical
Exxon-Mobil
Imperial College
MIT
University of British Columbia
University of Queensland
BASF
Seoul National University
Suzuki
University of Cambridge
Beijing Institute of Technology
Samsung
ETH Zürich
KAUST
Durham University
Siemens
Shell
Summary

• Bench-top quadrupole mass spectrometer gas analysis system configured for continuous analysis of gases and vapours from thermogravimetric analysers (TGA).

• Real-time, multi-species analysis – 100 PPB to 100%

• Fast response to permanent gases and vapours – less than 300 ms response time

• Soft ionisation for reduced spectral fragmentation and simplified data interpretation

• The Hiden website is an excellent resource with product pages, brochures, catalogues, product pages with some application notes, presentation and other information.

• Contact +44 1925 445225 for direct support.