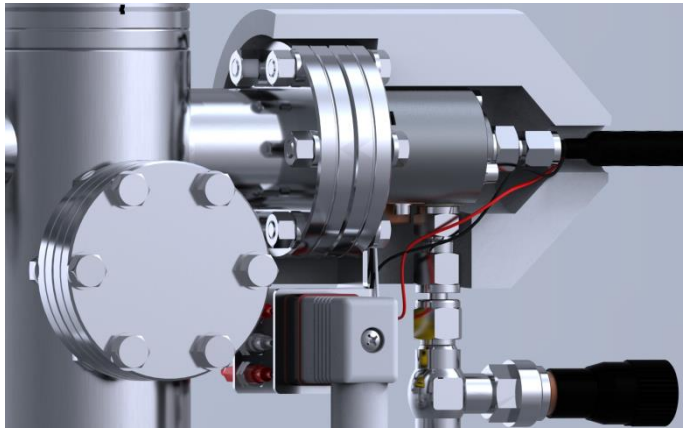
# Hiden *QIC* Series

## Advantages of the Hiden Evolved Gas Analyser Interface for Thermal Analysis

# Advantages of the Hiden Interface

- Designed for optimum sensitivity and response time
- No interaction between inlet materials and sampled gas
- Optimised pumping system for the use with any standard carrier gas including Helium. (Use of He improves heat transfer and aids mass spectral analysis by removing potential spectral overlaps but can cause pumping issues if inadequate pumping configuration used)
- Complete control of mass spectrometer ion source parameters for soft ionisation mode.
- Software package designed specifically for thermal analysis applications
- Simple integration of software packages for triggering analysis and combining mass spectrometer and thermal analysis data.
- Mass spectrometer can be decoupled from thermal analysis equipment and used as a standalone instrument connected to any other equipment requiring gas analysis capability

# *QIC* Inlet Technology

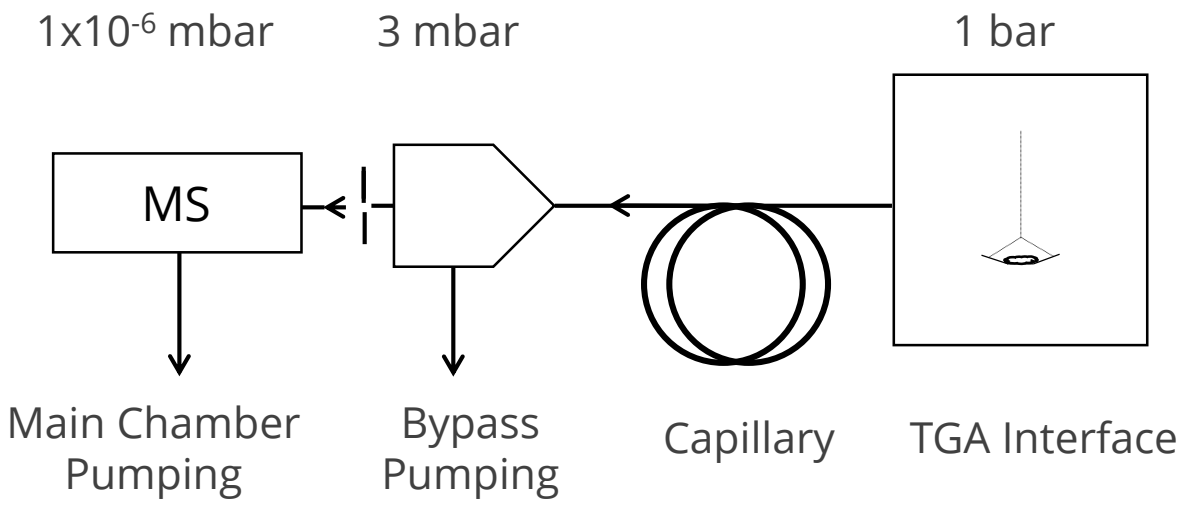


| | | |
|---|---|---|
| Quartz and Platinum Wetted Surfaces | → | No memory effects |
| Heated Capillary | → | No condensation effects |
| Flow Matched | → | Optimum response / recovery |
| Minimal Internal Volume | → | ppb detection |
| Interchangeable Sampling Capillaries | → | Analysis from 10 mbar to 2 bar |

# Capillary Transfer Line

- Inert materials
- Heated
- User changeable quartz capillary liners
- Range of sampling flow rates
- Robust
- Flexible
- Lightweight
- Easy maintenance

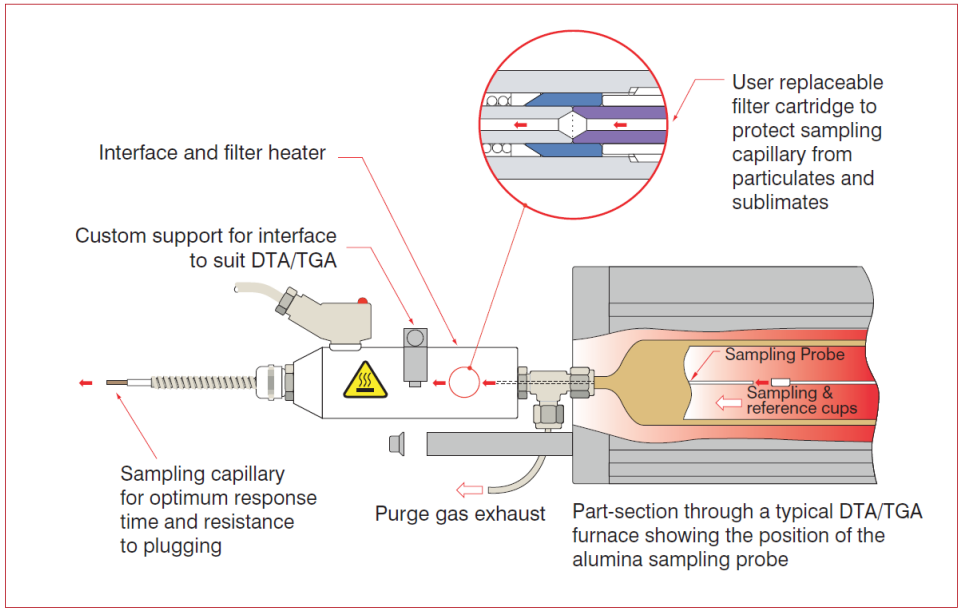
# *QIC* Series Sampling Schematic




**The *QIC* Inlet pumping configuration with integral bypass pumping allows a significantly higher gas sampling rate than single stage inlet systems**

- Fast sampling speed from 150 ms from sampling point to detection
- Large bore capillary minimises blockages (dia. 320 µm)
  – heated 2 µm particulate filter can also be fitted
- Bypass pumping allows light gases ($H_2$, He) to be sampled
- High flow sampling rate (16 sccm) minimises dead volumes in TGA

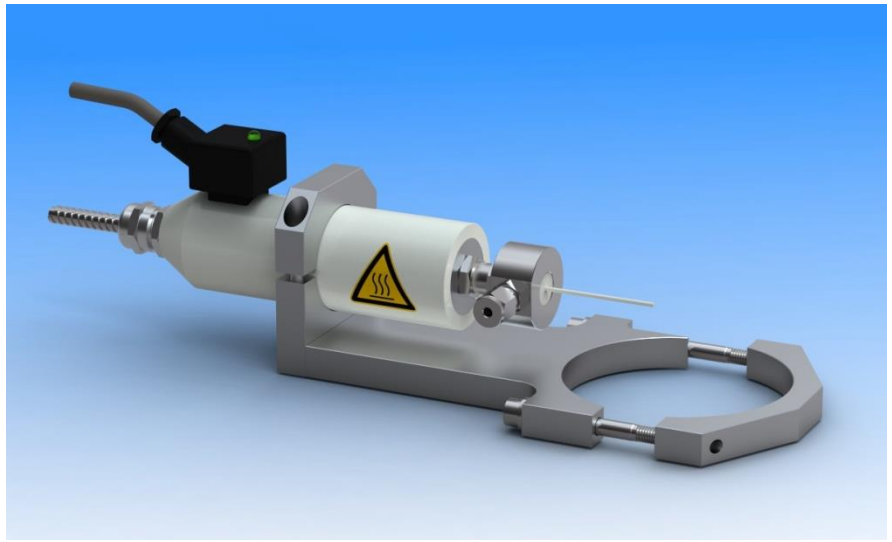
# Thermal Analysis Mass Spectrometry



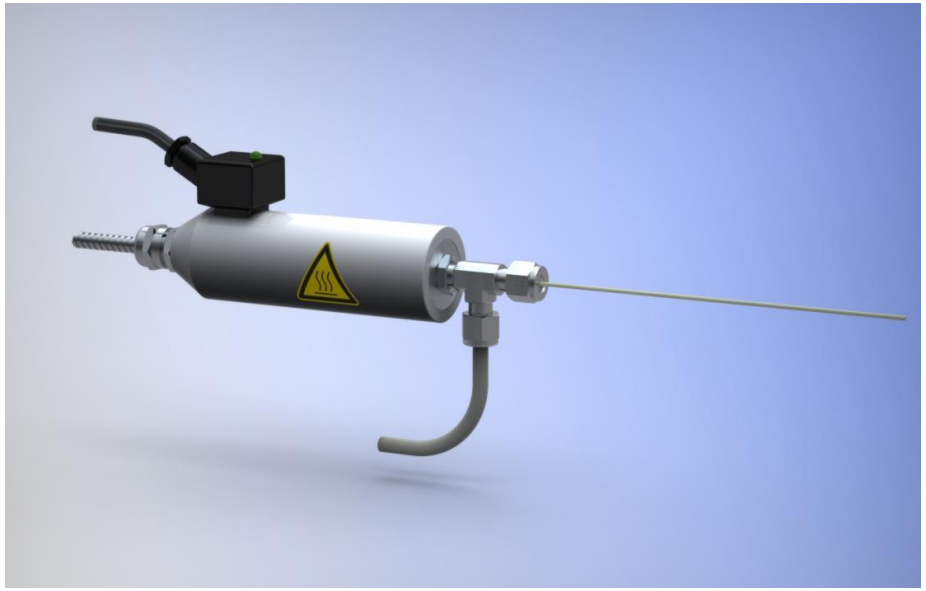

Key Features of *QIC* Inlet for TGA applications:

- Fast response
- Low dead volume
- No memory effects
- Heated Inlet - no cold spots
- Custom engineered interfaces for TGA/DSC systems

# TGA-MS Inlets



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



Includes:

- Heated Filter
- Custom support brackets
- Integrated sample gas exhaust

# Soft Ionisation

The unique Hiden soft ionisation mode enables users to preferentially set the ionisation potential to enhance key species with simultaneous suppression of fragmentation ion background.

This powerful technique can simplify the analysis of otherwise complex cracking patterns from multi-component gas/vapour mixtures (e.g. $H_2O$ and $NH_3$, shown below).

The ionisation energy can be altered down to 4 eV, in 0.1 eV increments, the critical control region being 8 to 20 eV.

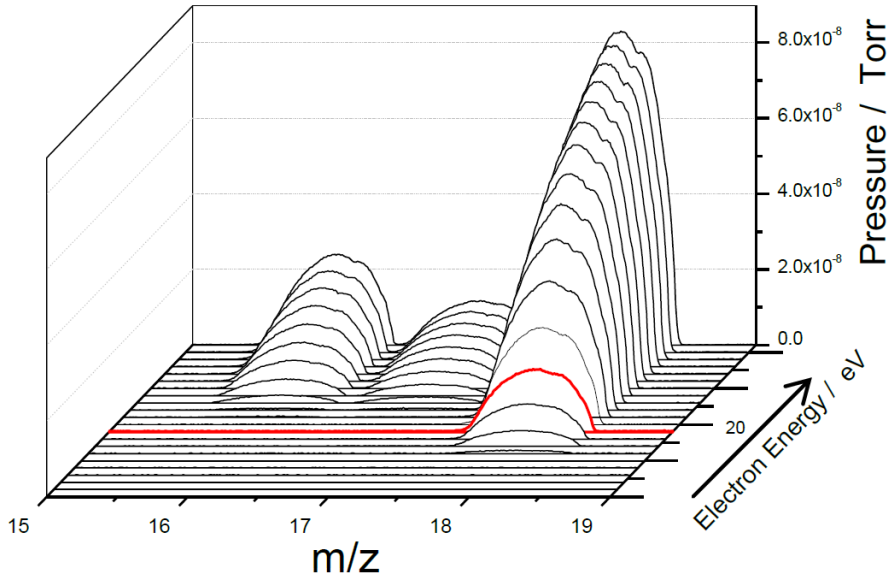



**Figure 1 A: m/z *vs* Electron energy-$H_2O$/Air**

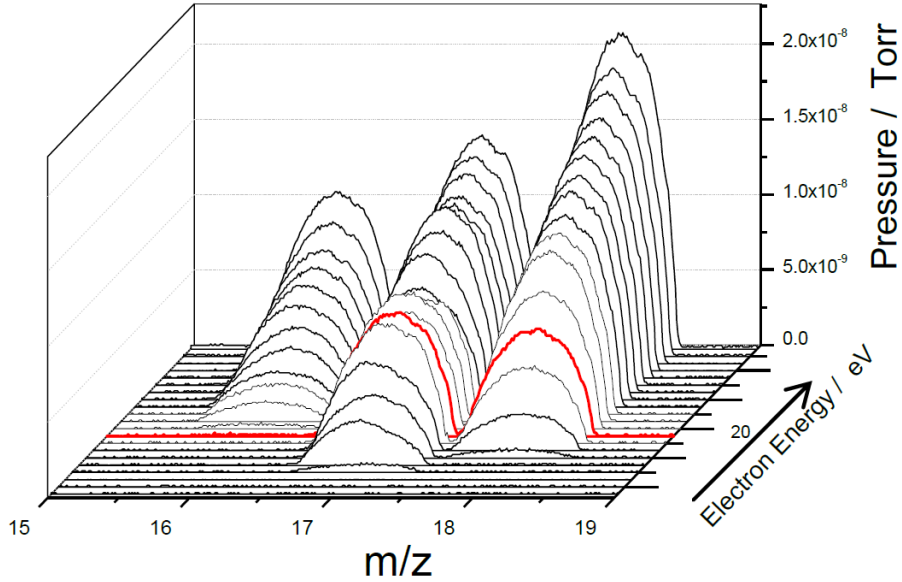
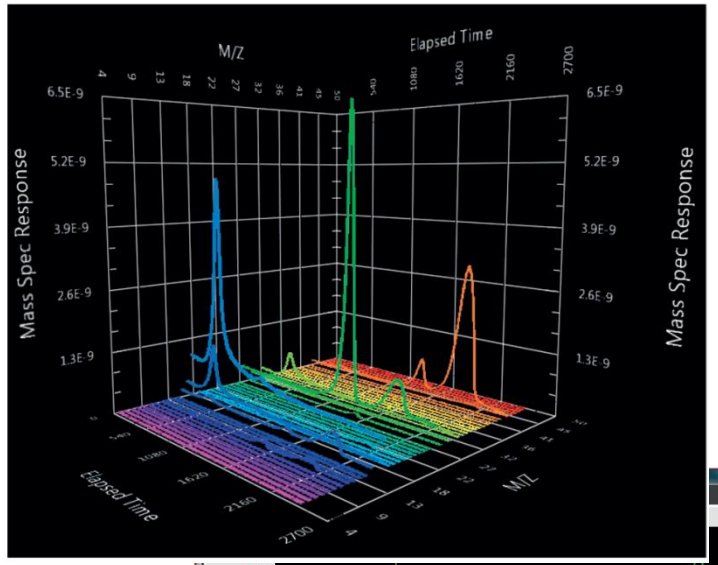
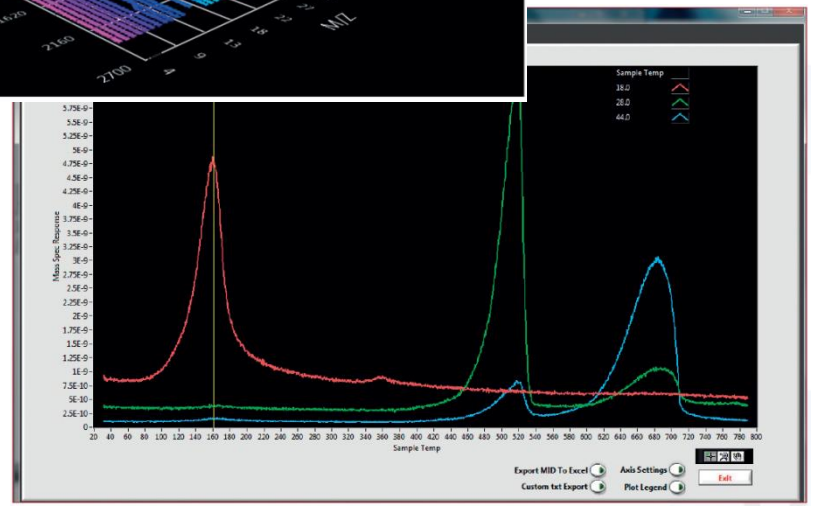



**Figure 1 B: m/z *vs* Electron energy-$NH_3$/ $H_2O$/Air mix**

# EGAsoft Software for Evolved Gas Analysis

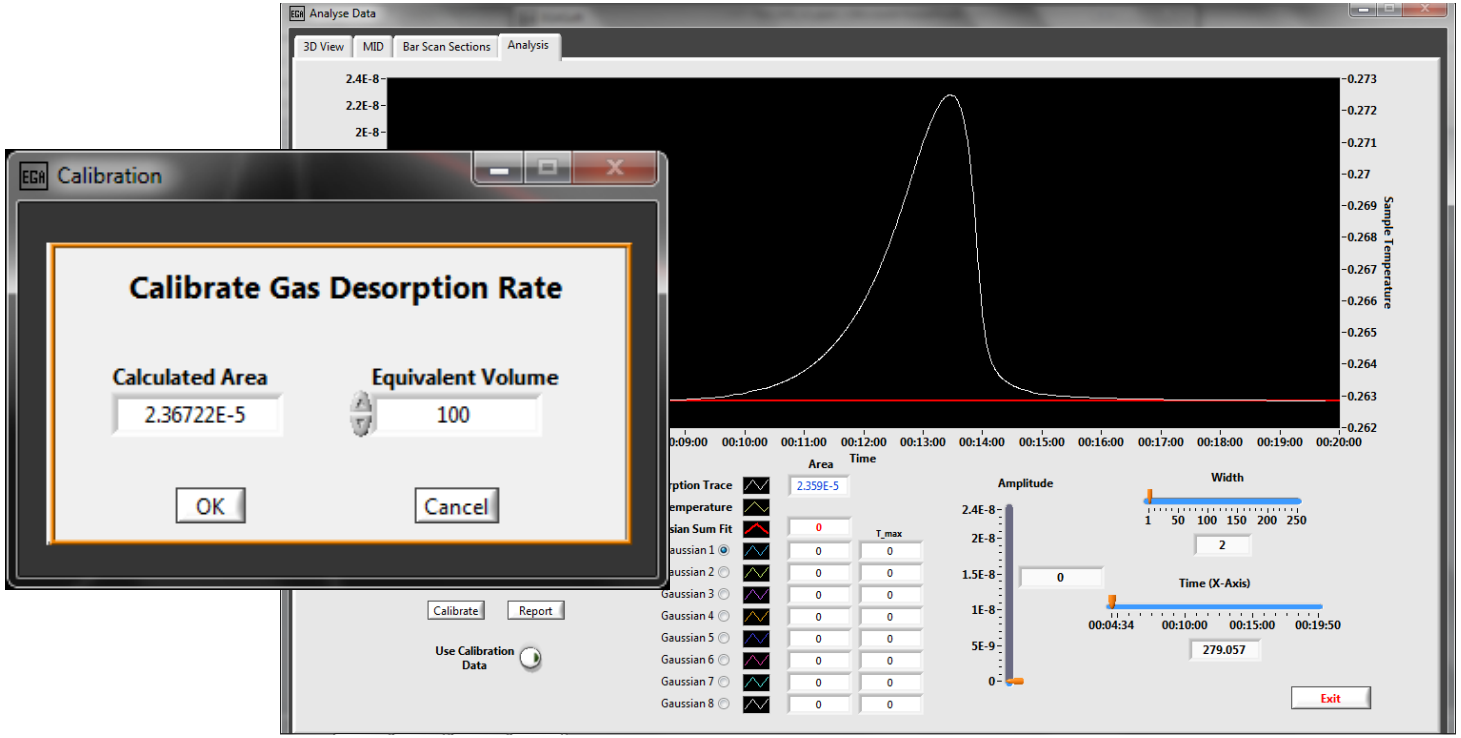



A complete, application specific, software package for Evolved Gas Analysis data acquisition and analysis.

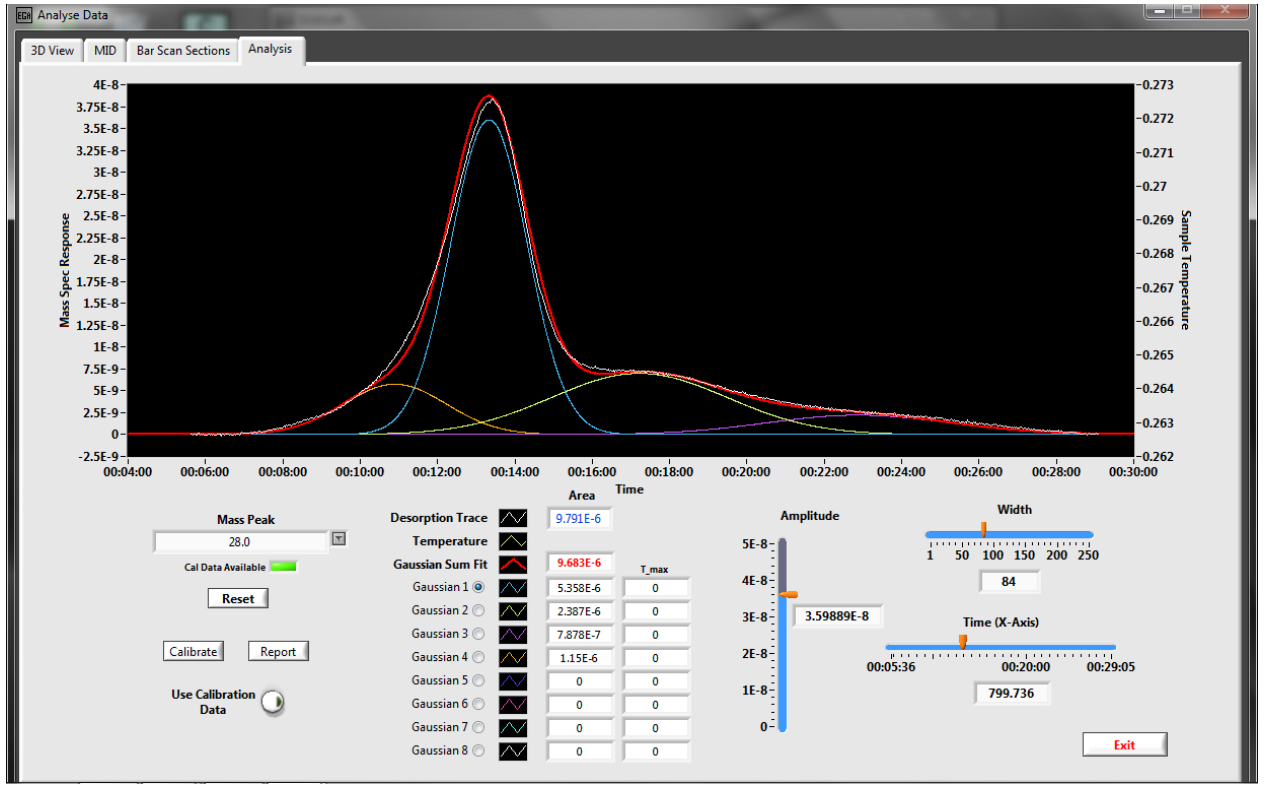
- 3D bar scan view for determination of trends in bar data
- Simple automatic export in formats specific for import to any TGA/DSC manufacturer
- Export spectra to NIST database
- Automatic spectral deconvolution in MID mode
- Automatic start/stop facility
- Auto-sequencing of MS data acquisition files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

# EGAsoft - Quantification



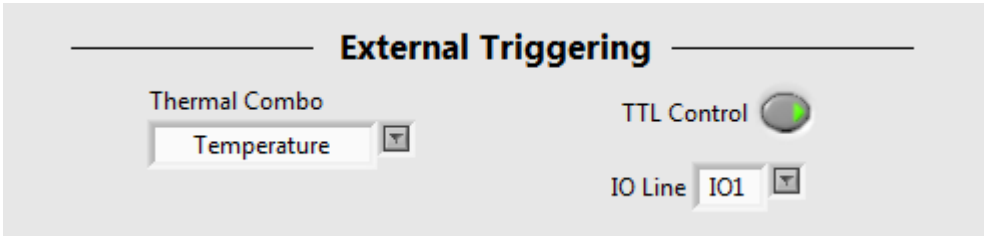

- Calibrate MS response for known quantity of gas
- Calibration data can be used in subsequent runs to quantify desorption quantities

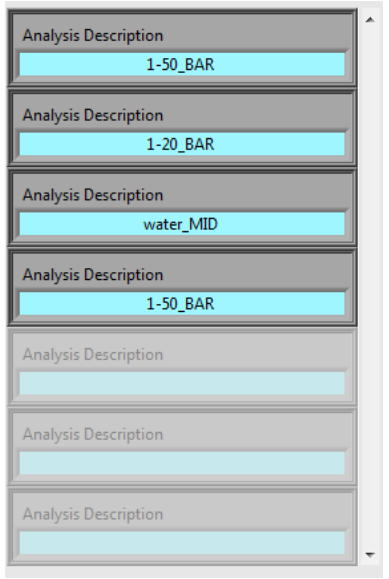
# EGAsoft for Analysis of Desorption Peaks




- Peak Integration Functions
- Gaussian peak fitting and deconvolution of desorption curves

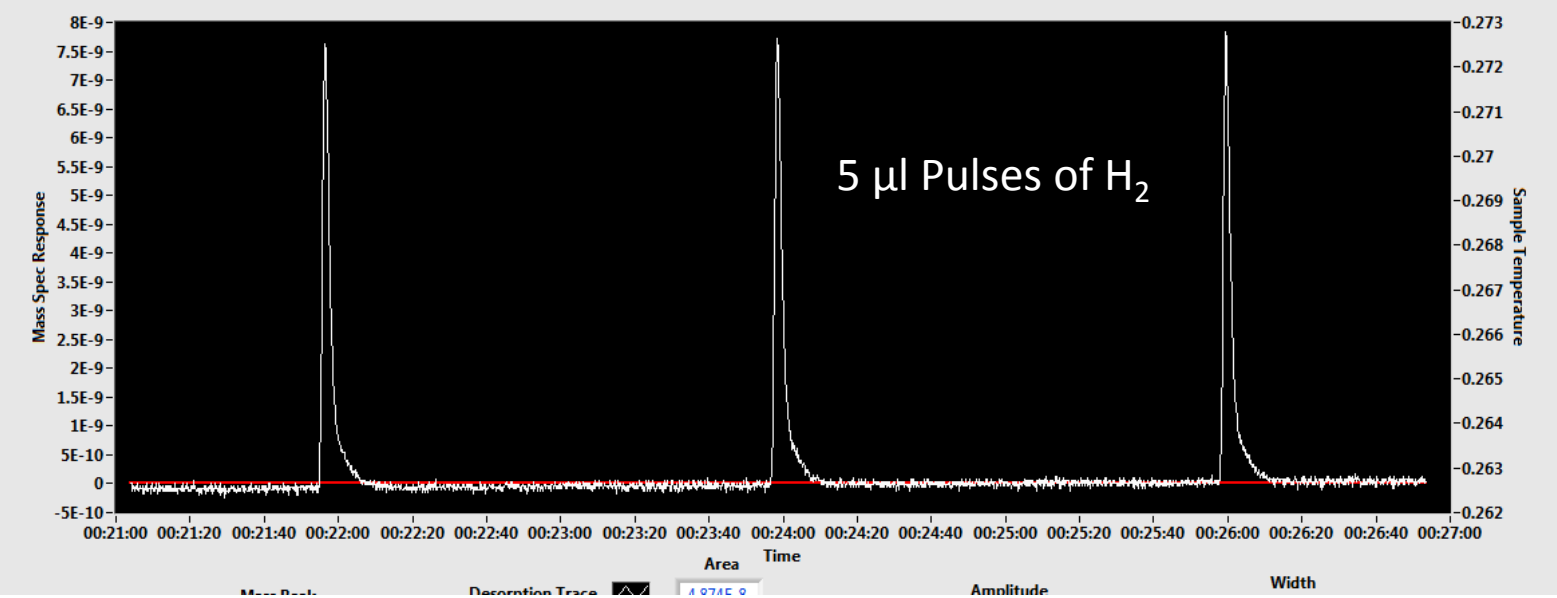
# EGAsoft Integration




- EGAsoft can be triggered from external sources (TTL signal)
- Optimised mass spectrometer analysis can be triggered in sequence – ideal for autosampler systems
- External signals (where available) such as temperature can be recorded by the software

# EGASoft – MS Sensitivity

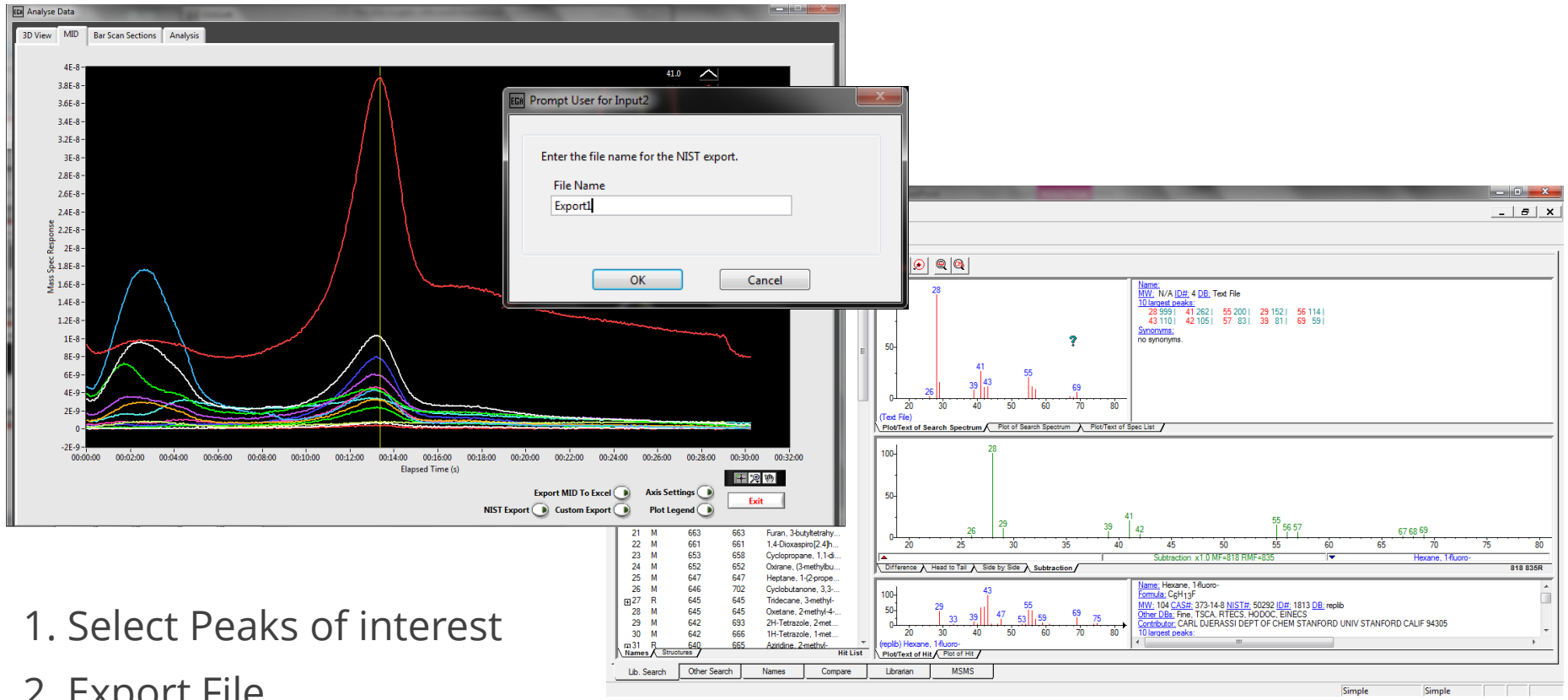



- Integrated area can be used to calibrated MS response for known quantity of gas
- Detection levels to ppb

# EGAsoft Export to TGA Manufacturers Software


- One click custom export of displayed data in formats specific to TGA manufacturers software import requirements.
- Typical export types include .txt, .csv, .asc.

# EGAsoft –Export to NIST Database




1. Select Peaks of interest
2. Export File
3. Open in NIST Database and use the search function to obtain potential matches

# *QIC* Series Key Features

- Custom Interfaces for all TGA Manufacturers
- Sampling interface optimised for fast response
- Flexible, robust and easily maintained transfer line
- Unique software package designed exclusively for TGA applications
- High Sensitivity (ppb levels)
- Soft Ionisation feature for simplification of cracking patterns
- Ideal for sampling gases, vapours and organic material