ivf smart Quench

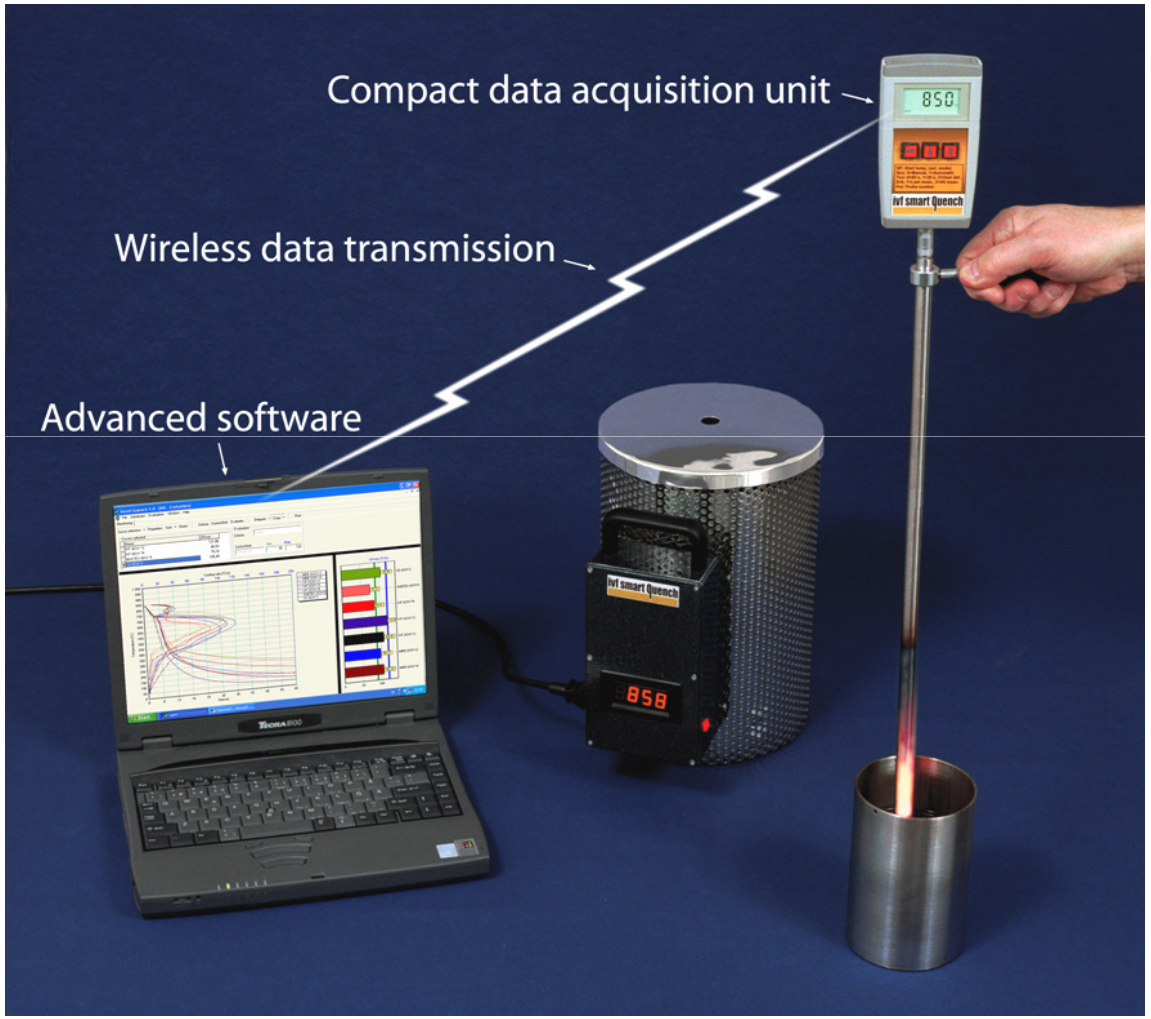
New, advanced system for safeguarding performance of quenching media and quenching systems

Based on 18 years' experience of *ivf quenchotest*
with more than 300 units sold to 36 countries worldwide

IVF Industrial Research and Development Corporation
Mölndal, Sweden

Overview of the system

ivf SmartQuench™



Main characteristics

ivf SmartQuench™

- **Small and robust data acquisition unit**
  → Light
  → Easy to use, extremely fast
  → On-site monitoring facilitated
- **Wireless data transmission**
  → High flexibility and accessibility
  → Results immediately available in your PC
  → PC can be placed where convenient
  (up to 10-30 m away)
- **Advanced software**
  → Fast and accurate, quantitative evaluation
  → Formula editor for customized, numerical evaluation
  → Optimized selection of quenchants from database

Applications

Main uses:

- Incoming inspection of quenchants
- Periodic monitoring of quenching characteristics
- Trouble-shooting in case of inconsistent hardening performance
- Comparison between alternative quenchants

Measurements can be made:

- On-site in quench tanks
- In the laboratory to ISO and ASTM standards

Different types of quenchants can be tested:

- Oils, polymers, water-based media, salts and gases

Reliability

- **Each test probe is supplied with a test certificate**
  → Traceability, guarantee of performance
- **Reference oil is supplied with a test certificate**
  → Traceability, guarantee of performance
- **18 years' experience of manufacturing test probes to ISO and ASTM standards (more than 1800 units made)**
  → Long and stable life
- **More than 20 years' experience of R&D of quenching and quenchants**
  → Help available from IVF's experts to assist in planning and evaluating measurements

Customer values

ivf SmartQuench™

- **Cost saving**
  - Minimizing quality costs
  - Maximizing life of quenching media
  - Optimized selection of quenching media
- **Quality assurance**
  - Minimizing variation in results
  - Minimizing rework and rejects
  - Minimizing production downtime
- **Easy to use**
  - Time-saving
  - Suitable for use by a wide range of personnel
- **Access to IVF's quenching knowledge and experience**

Hardware

- **Hand-held data acquisition unit**
  Powered by rechargeable batteries
- **Test probe – to ISO 9950 and ASTM specs.**
  Inconel 600, 12.5 mm dia., 400 mm length.
  With handle
- **Portable furnace**
  Lightweight thermal insulation for rapid heating
- **Equipment to facilitate testing in laboratory**
  2-litre beaker with holder for test probe
- **Portable computer (optional)**
  - Pentium processor, min. 1.7 GHz
  - Min. 20 GB hard disk
  - Min. 256 MB memory
  - Windows® XP Professional (English version)
  - Min. 2 years warranty

Easy to carry

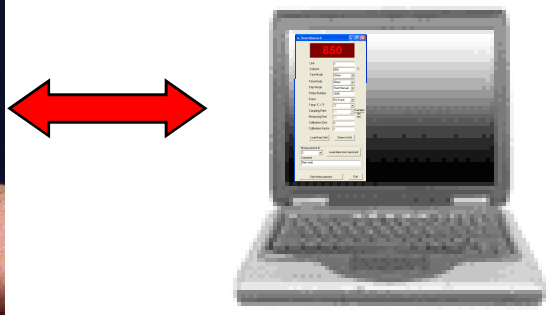
The data acquisition unit with accessories, the test probe with handle, a CD with the computer software and the manual are all contained in a lightweight carrying case

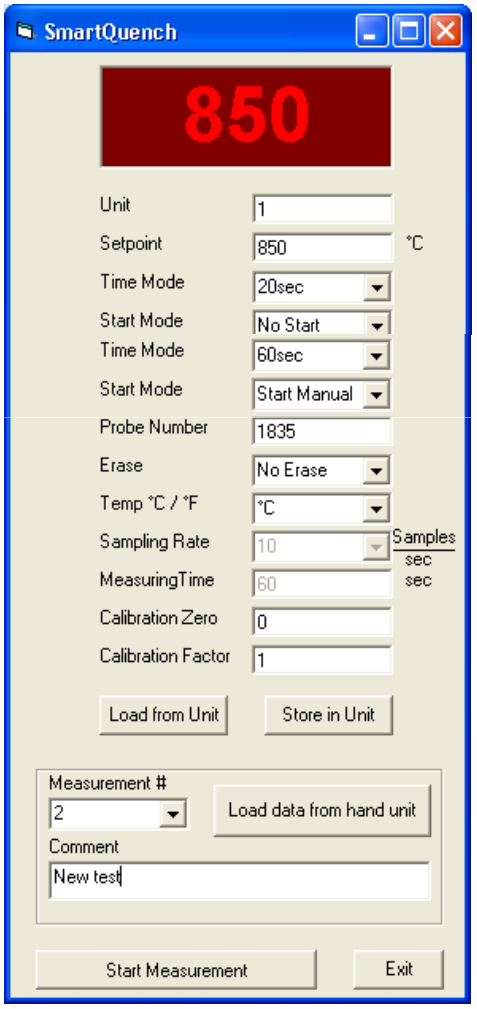
Wireless communication *ivf SmartQuench™*

Wireless data transmission facilitates on-site testing

Wireless communication *ivf SmartQuench™*

- **Data is transferred wirelessly between hand unit and PC**
  - Parameter settings in hand unit can also be downloaded from PC
  - Recorded data downloaded to PC
  - Current probe temperature displayed on PC





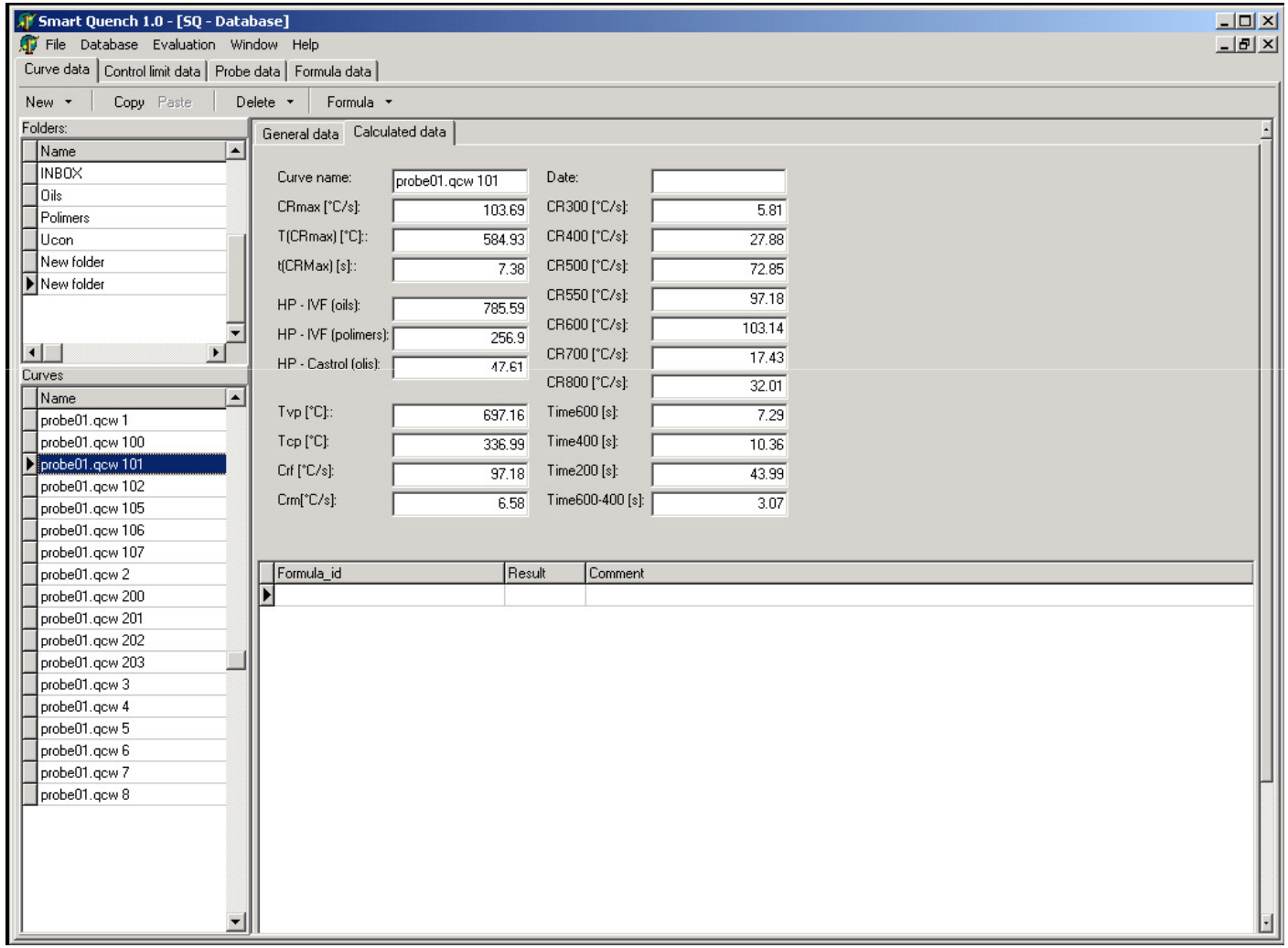
Software characteristics *ivf SmartQuench™*

- **Standard database format**
  → User-friendly
- **High-performance smoothing algorithm**
  → Efficient noise reduction
- **Built-in and user-defined numerical parameters (CR_{max}, t[T], HP, etc.) calculated automatically**
  → Quantitative evaluation of quenchants
- **Control limits can be set for all characteristics**
  → Evaluation enhanced
- **Database filtering of selected characteristics**
  → Optimized selection of quenchants
- **Flexible report configuration**
  → To suit to the application

Software details

ivf SmartQuench™

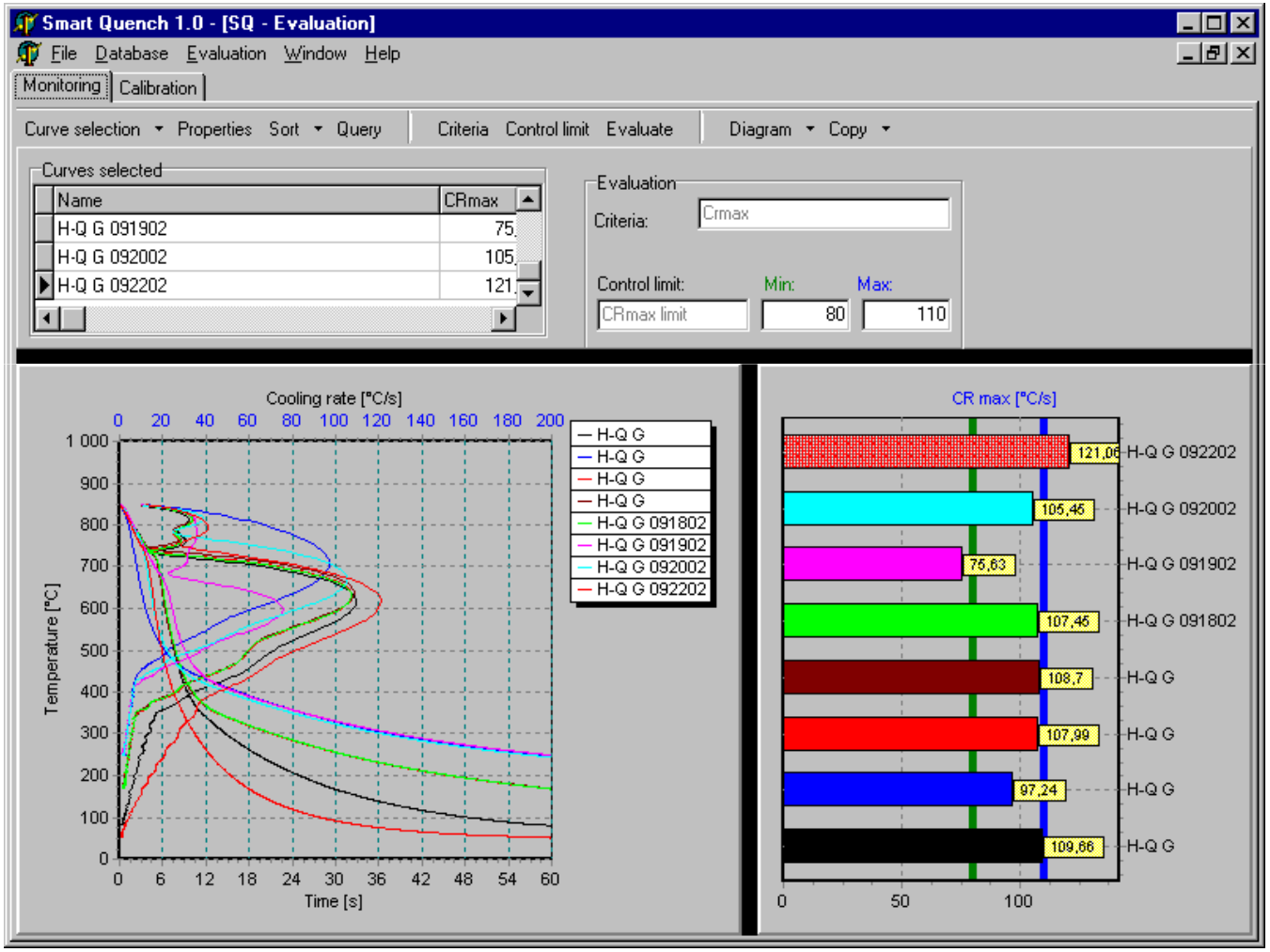
Data INPUT



Software details

ivf SmartQuench™

Evaluation



Software details

ivf SmartQuench™

CALCULATION FORMULA editor

User-defined formula:

$$F_1 = c_1(\text{VARIABLE}_1)^{exp1} + c_2(\text{VARIABLE}_2)^{exp2} + \ldots + c_N(\text{VARIABLE}_N)^{expN}$$

where VARIABLE_N can be e.g.:

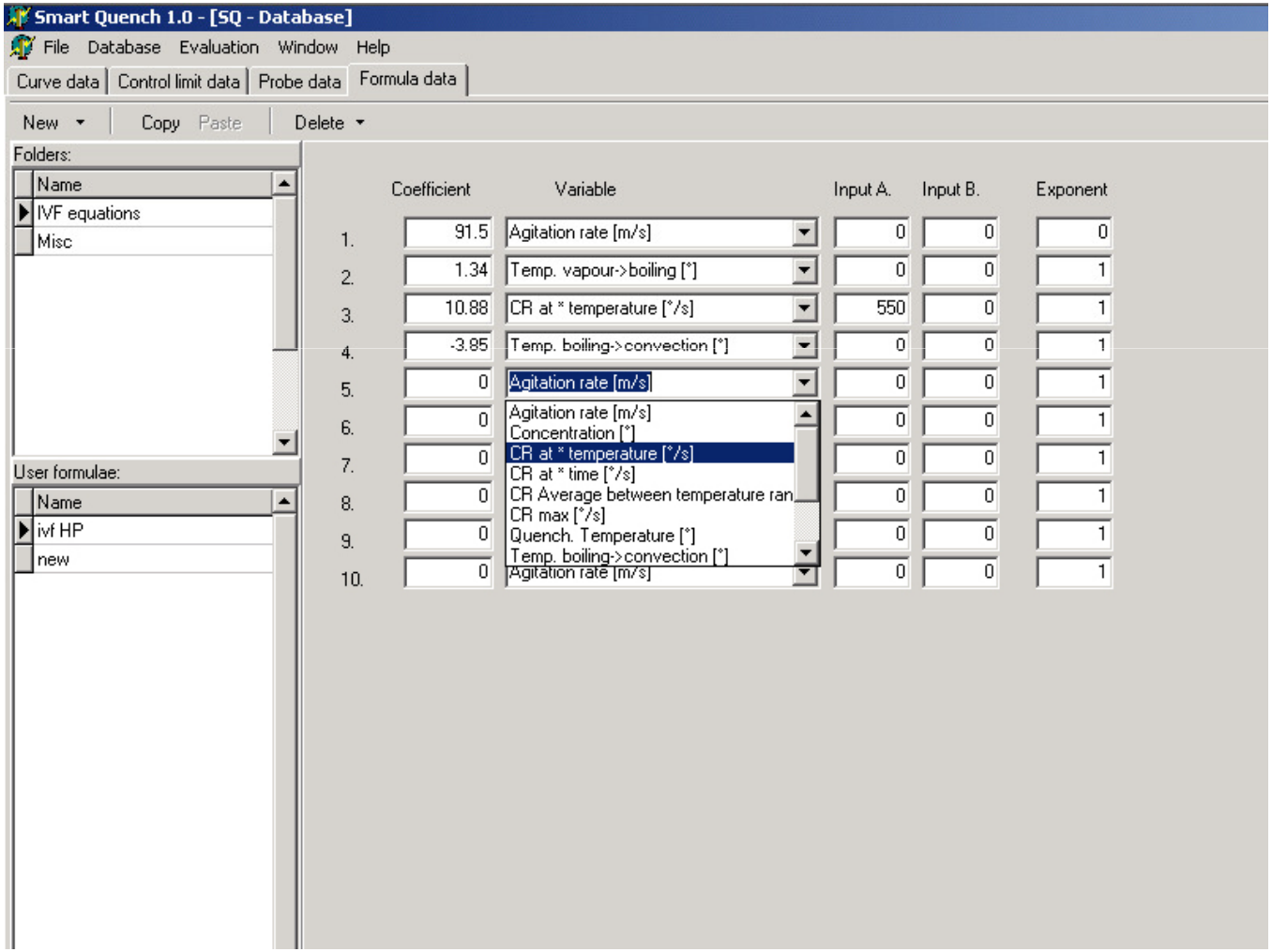
CRmax [°C/s]
CR(T) [°C/s]
CR(t) [°C/s]
T_{CRmax} [°C]
Tvp [°C]
Tcp [°C]
T(t) [°C]
Agitation rate [m/s]
Concentration [%]
...

Software details

ivf SmartQuench™

F_1=3.54CR(550℃) + 12.3CR(325℃) - 168

Formula editor

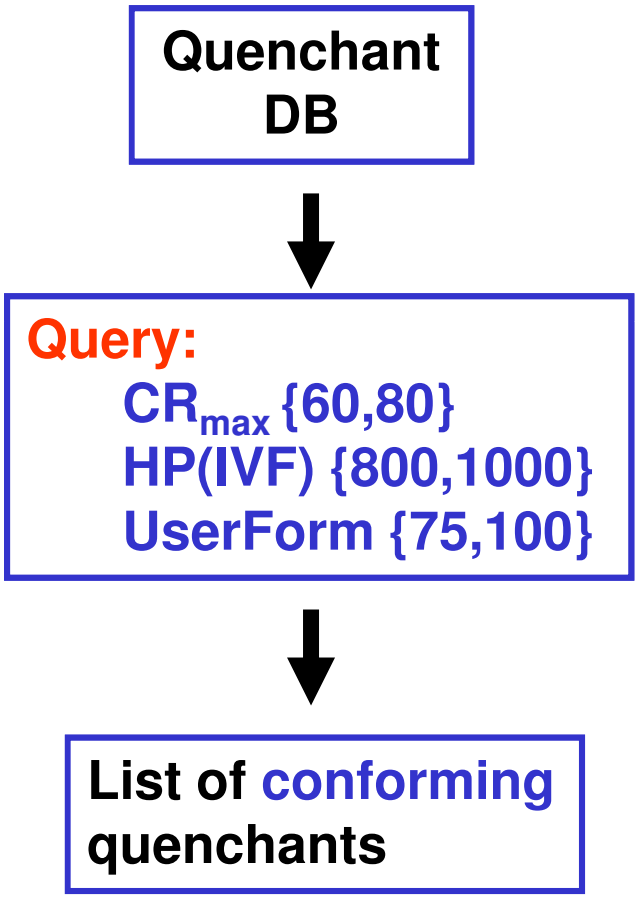


Software details

ivf SmartQuench™

Selecting quenchants by data filtering

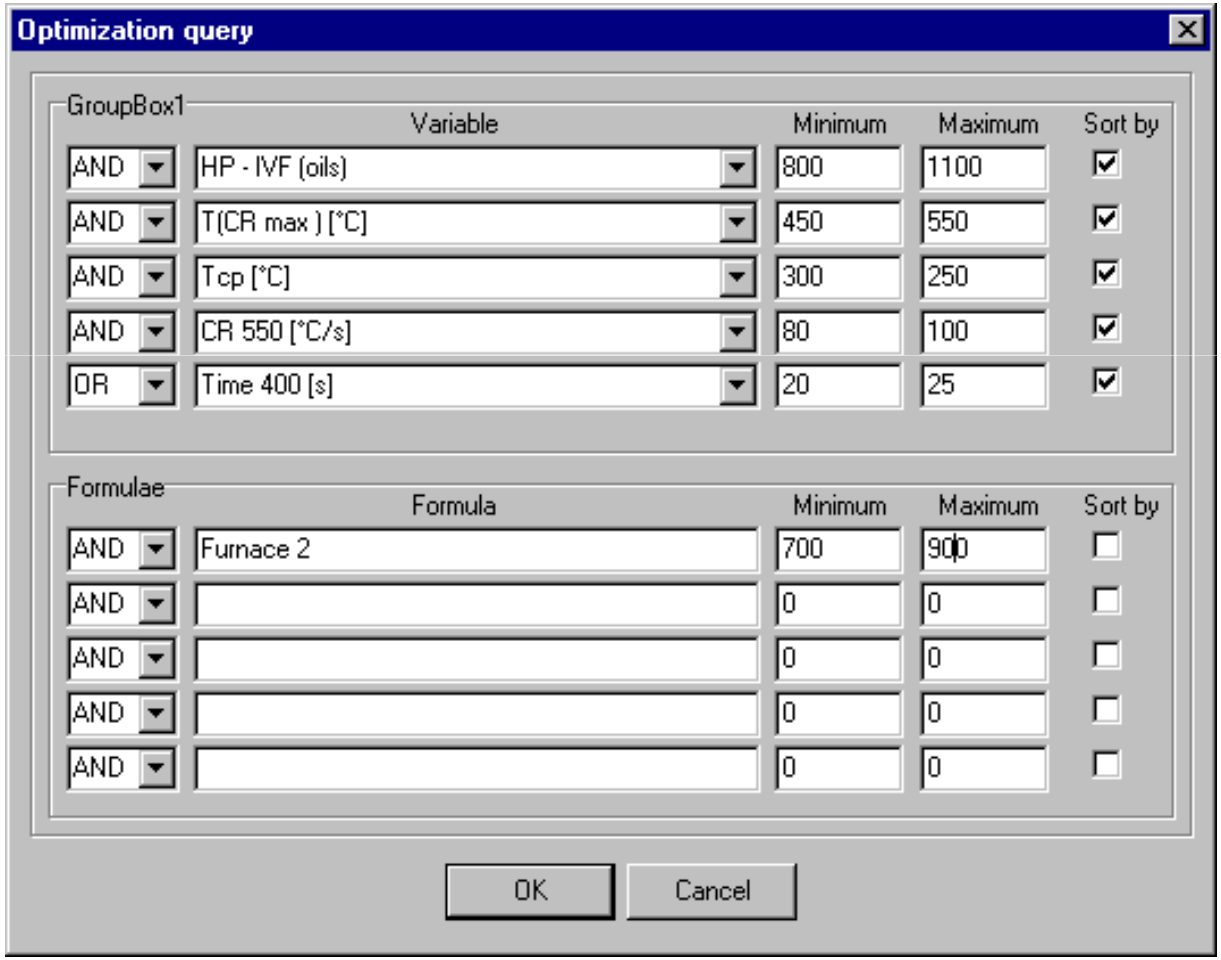
- **General** and **Calculated data** of cooling curves stored in DB
- **Optimum quenchant(s)** can be selected by using data filtering



Software details

ivf SmartQuench™

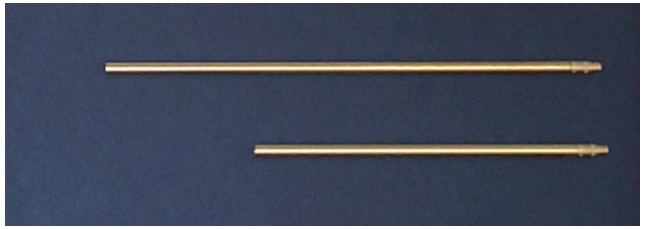
Selecting quenchants by data filtering



Consumables

- **Test probes**

  Inconel 600, 12.5 mm dia.
  L= 400 mm, standard
  L= 600 mm, optional

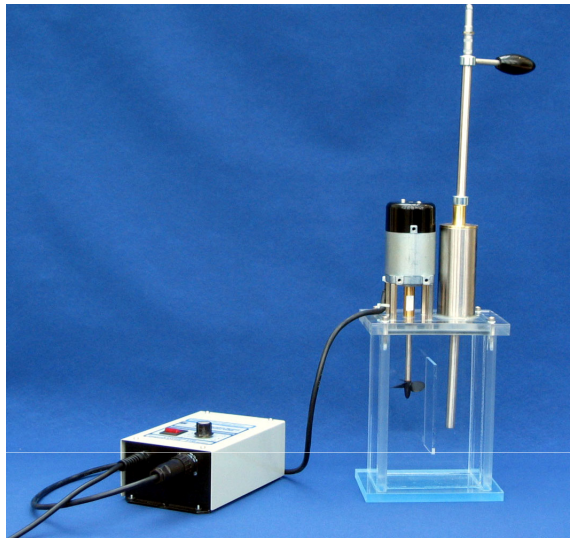


  Made to meet ISO 9950, ASTM D 6200 and ASTM D 6482 standards

Optional items

- **Agitation device**

  For testing polymers to ASTM D 6482 standard



- **Test probes in non-standard dimensions and materials**

  - Inconel, stainless steel, steel, silver, aluminium.
  - L=400–1,500 mm.
  - Single or multiple thermocouples.

- **Thermocouples**

  For testing with real components

- **Adapter for test probes**

  To allow the use of test probes made for *ivf quenchotest*

Items for calibration

- **Reference test probe**

  With certificate
  L=400 mm

- **Reference oil**

  With certificate
  NB. IVF's ref. oil

- **Hand-held, digital temperature measuring instrument with calibrated thermocouple**

  For calibration of the measurement system and the furnace

- **Optical tachometer with reflecting tape**

  For checking the impeller speed of the agitation device

Markets

- Quenchant suppliers
- Commercial heat treaters
- Manufacturers of cars, trucks, automotive components, construction equipment, aircraft, railroad equipment, furnaces, gears, bearings, fasteners, springs, hand tools, forgings, tubes and other semi-finished steel products with own heat treatment facilities
- Research institutes, laboratories, technical schools

Representation

- Representation in some 40 countries worldwide
- Please inquire about your nearest representative

Further information

For further information, please contact:

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From the leader in quenchant testing

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