Bruker's Q4 TASMAN™ Series 2 benchtop OES
Enhanced analytical performance, flexibility, and usability

Q4 TASMAN™ Series 2 OES Metals Analyzer

- History of Q4 TASMAN
- Q4 TASMAN Series 2
  - Visual Changes
  - Concepts, Key Components
  - Configurations
  - Improvements
- Inside ELEMENTAL.SUITE
- "Hands-on" (in applications lab)
- Q&A Session

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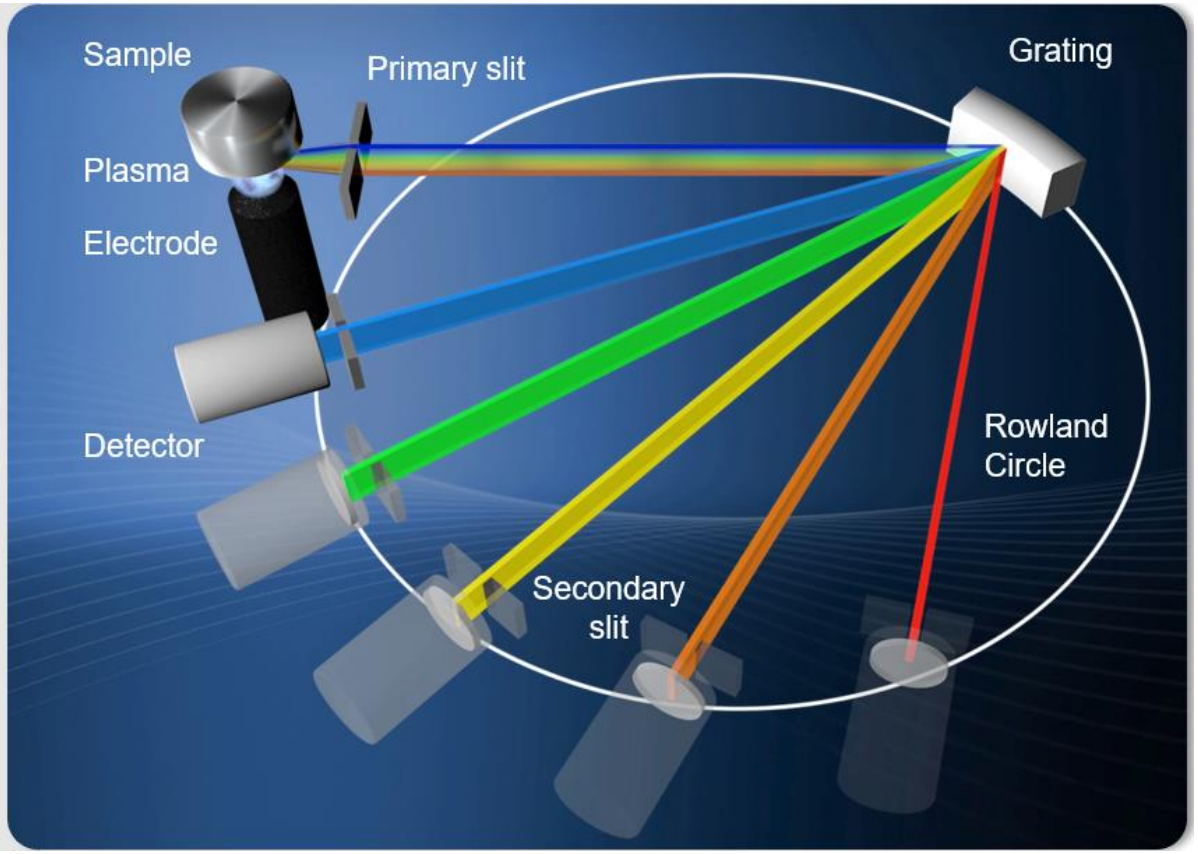
spark-Optical Emission Spectrometry Requirements and Expectations

The workhorse for all metal analysis tasks

- Analytical tool with high flexibility
- Full alloy analysis with excellent data quality (compared to XRF: superior for light elements, better suited for traces and lower concentrations)
- Speed: Time-to-result 25-35 s
- Easy sample preparation
- Reliability: high uptime and robustness of hardware and method, even in the 3rd shift
- Cost-effective: moderate acquisition costs, low operational costs, able to adopt to changing requirements

Optical Emission Spectrometry Principle

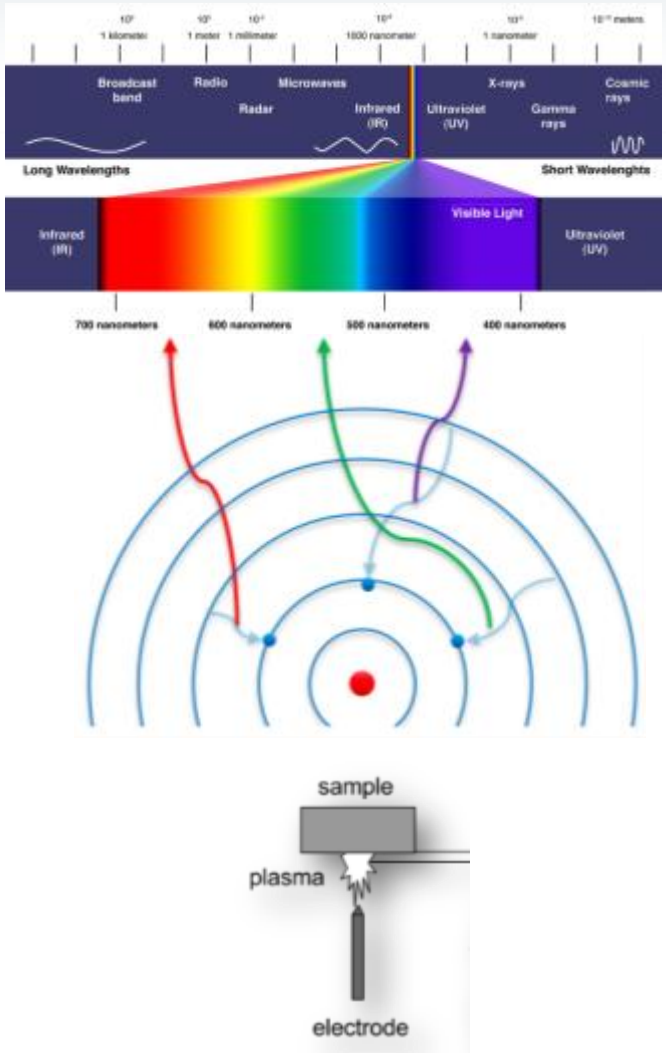


- Emitted light is guided into the optical system and dispersed by a diffraction grating.
- Detectors on specific positions on the Rowland circle are quantifying emitted light.

Useful wavelength in OES: 120 – 800 nm

- The intensity of a specific line correlates directly to the abundance (concentration) of the element in the sample.

Optical Emission Spectrometry
Continuous Improvements



The principles of spark-OES remain. Historical and recent improvements in hardware, methodology and especially software result in many benefits:

- Shorter measurement times
- Better analytical quality
- Reduced argon consumption and operational costs
- Higher system uptime, little maintenance requirements
- Advanced data evaluation algorithms
  (e.g. analysis of non-metallic inclusions)
- More intuitive user interfaces and easy to use software

History of the Q4 TASMAN Continuous Development

- 2008: Introduction of Q4 TASMAN
  - UV/VIS-optics for non-ferrous metals
  - 2009: introduction of dedicates VUV-optics for ferrous metals
- 2010-2017: Continuous Development
  - Availability of all 10 major metal bases (Fe, Al, Cu, Ni, Co, Mg, Ti, Pb, Sn, Zn)
  - New generations of digital spark generator (source) with improved source curves
  - Improved high-resolution CCDs, introduction of ClearSpectrum™ technology
  - Improved spark-stand with co-axial argon flow, new gas distribution module
  - Switch to next generation software platform: ELEMENTAL.SUITE

As the evolution of metals continues, Bruker continuously drives the improvement of solutions that let you achieve your goals faster, more reliably, and more cost-effective:

Q4 TASMAN Series 2

Q4 TASMAN Series 2
Visual Changes

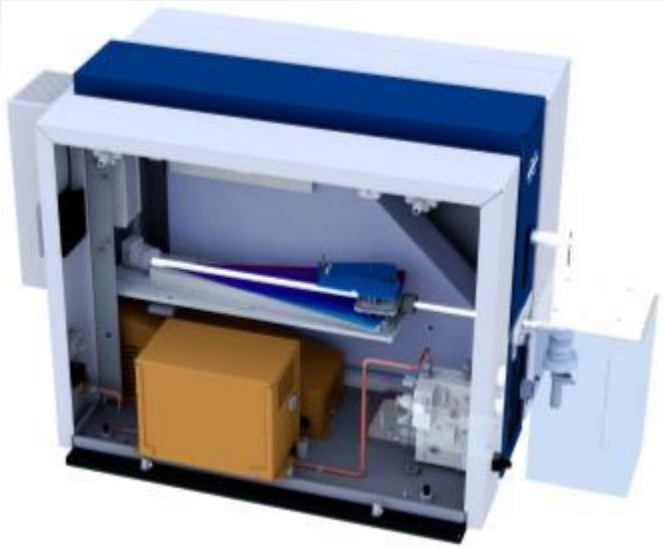
- Bulky side covers with edges
- Old fashioned design

- New side covers
- Improved housing
- New color & design
- Push buttons with status indication

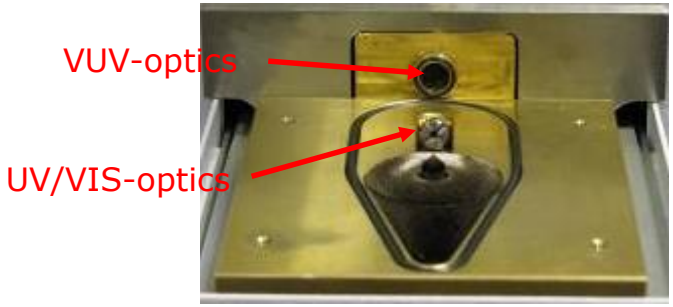
Q4 TASMAN Series 2
MultiVision™ – Dual optics concept

MultiVision™ – Optimal Solution for Your Applications

- Vacuum UV (VUV)-optics
  - λ: 130– 200 nm @ high-resolution
    (for challenging analytical emission lines)
  - Short, direct light path to spark stand
  - Argon purged for highest UV-transparency
  - Sensors with high quantum efficiency
  - Low internal volume, improved purge design, and careful selection of materials
    - outstanding performance
    - reduced argon consumption
    - high reliability



High efficiency VUV optics with small inner volume and superior, direct light coupling

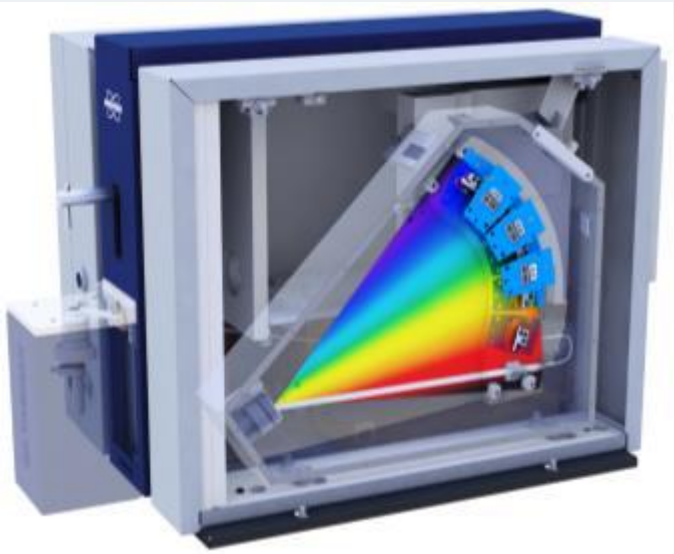


Spark-stand chamber after 100 burns

Q4 TASMAN Series 2
MultiVision™ – Dual optics concept

MultiVision™ – Optimal Solution for Your Applications

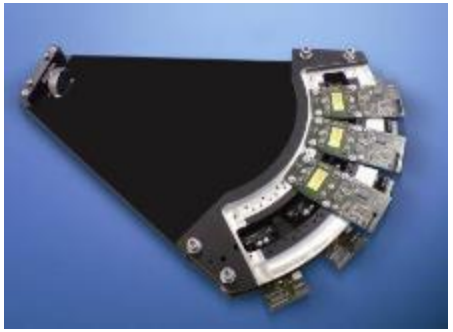
- UV/VIS-optics
  - λ: 190– 620 nm coverage
  - Optimized Rowland Grating (ORG)
  - Fiber-light guide
    (deep UV-transmission, long-life)
  - Highest reliability



No-purge (air) UV/VIS-optics; light transmission by optical fiber

Additionally, both optics feature

- High resolution sensors
- Temperature stabilization
- Optional active thermal control system



Q4 TASMAN Series 2 Configurations

MultiVision™ – The Optimal Solution for Your Applications

MultiVision allows the optimal choice between three variants to match your analytical needs in the most economical way:

- **Q4 TASMAN 200**
  Ideal for all **non-ferrous** applications
  (elements in the VUV-range not required)
- **Q4 TASMAN 170**
  The choice for **ferrous** applications with important elements like: C, P, S, As, Sn, B
- **Q4 TASMAN 130**
  The most powerful variant, capable of analyzing **nitrogen** (N) in steel, **oxygen** (O) in copper

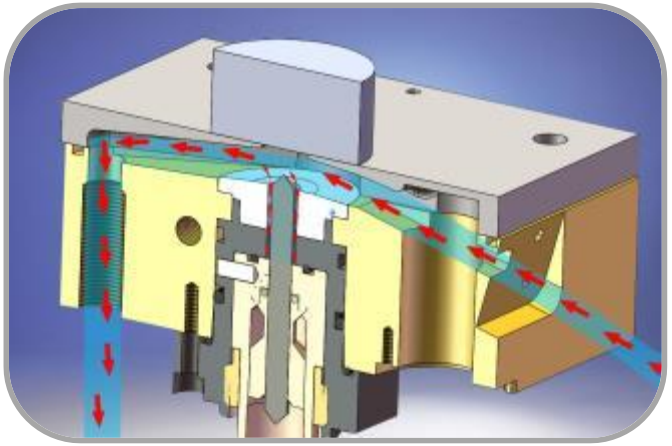
Q4 TASMAN Series 2
SmartSpark™ – Advanced Digital Source

SmartSpark™,
the new, optimized digital spark source

- Produces ultra-stable sparks with 1–1,000 Hz, spark frequency and variable discharge times
- Source waveform control with 1 µs resolution
- Provides high excitation power (peak current), suitable for all matrices
- Uses matrix-optimized high-energy pre-sparking
- allows application-specific fine-tuning of spark-parameter settings

…delivering

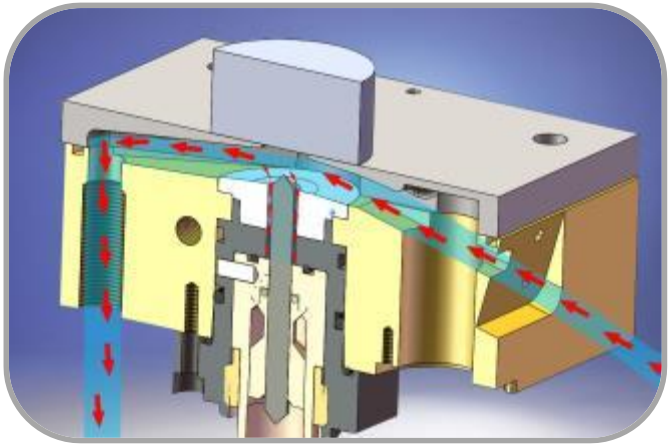
- improved analytical precision
- shorter time-to-result
- improved long term stability
- lower argon consumption (combined with an optimized co-axial argon flow design)



Q4 TASMAN Series 2
Spark-Stand with Flexibility Built In

Low-maintenance spark stand

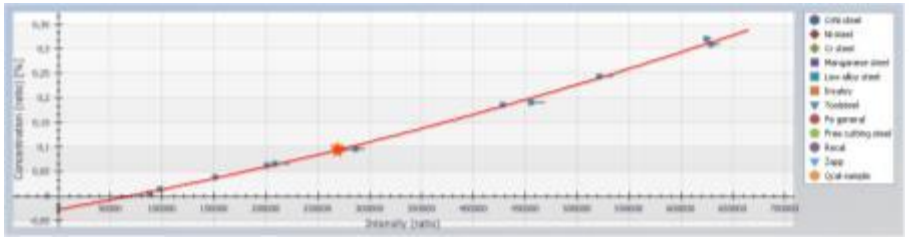
- large and robust sample stage accepting bulky samples
- Unique pneumatic driven sample clamp
  - 120 mm sample height
  - improved operational safety and convenience
  - constant pressure on sample
- Optimized co-axial argon flow
  - directs the gas where it is needed: at the burn spot
  - efficiently directs condensate away (especially useful on “soft” matrices)
  - eliminates need for stand-by flow
  - improves analytical data with irregular shaped or small samples (pieces, wires, tubes, foils, ...) using adapter kits

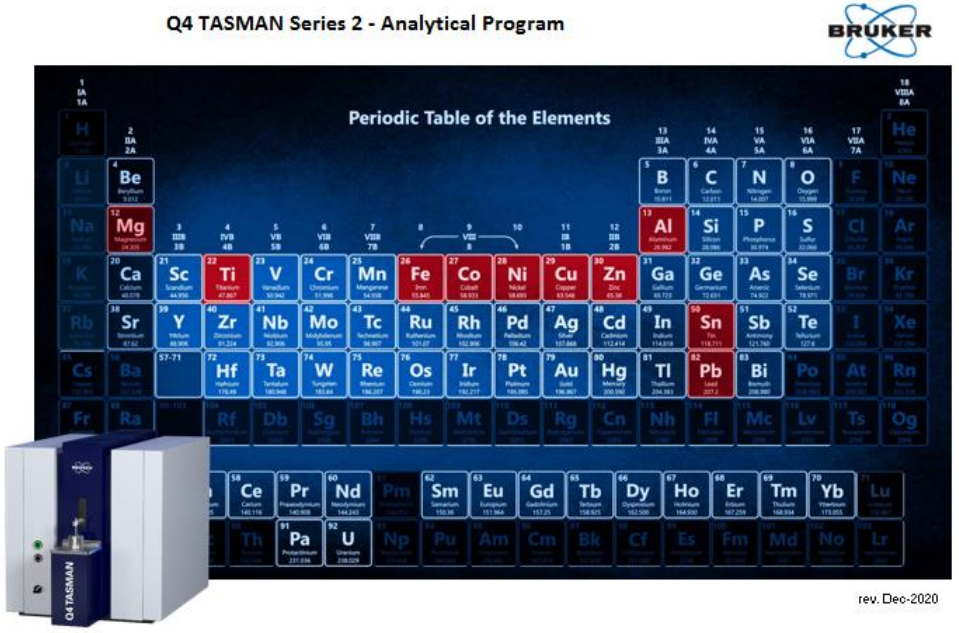


Q4 TASMAN Series 2 Analytical Programs

Analytical Solution Packages (ASPs)

- ready-to-use analytical programs within a matrix for all alloy groups: precisely tuned analytical performance
- include calibrations and parameters for all relevant element sets
- include standardization samples





Q4 TASMAN Series 2
Analytical Improvements

The new analytical solution packages for the Q4 TASMAN Series 2 available include

- Al: 8, Co: 4, Cu: 10, Fe: 8, Mg: 4, Ni: 6, Pb: 5, Sn: 4, Ti: 4, Zn: 8 Σ = **61**
- Within a given matrix: Extendable any time, without service intervention
- High concentration range extended for many elements

New additions:

- Sc in Al-base: 8 ppm – 0.6% in ASPs:
  - Al 100 (global)
  - Al 140 (Al-Mg alloys)
- C in Ti-base: 28 ppm – 0.16% in ASPs:
  - Ti 100 (orientation)
  - Ti 130 (Ti-Al/V/Nb)

Brand new (available Q1/2021):
"High" nitrogen in steel by the Q4 TASMAN 170

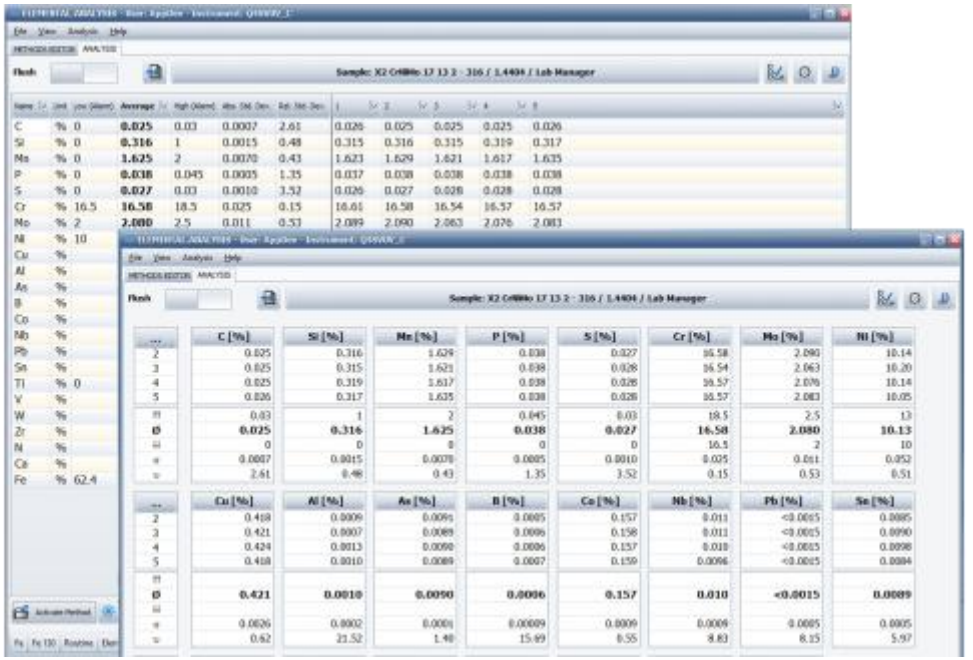
Inside ELEMENTAL.SUITE
Metal Analysis Made Easy

ELEMENTAL.SUITE is Bruker's next generation software combining high functionality with ease-of-use

- Maximum flexibility by plug-in based architecture
- Operates all Bruker OES systems, covering the entire range of applications (incl. automation)

Intuitive Productivity

- Workflow guide you through complex tasks without restricting routine operation
- Automatic average and limit check
- Easy to use screens, layouts with scalable fonts
- Professional Reporting System
- Integrated powerful Analysis Viewer
- Statistical Process Control included
- Universal Export and Publishing to files or SQL-databases



Easy-to-use and read screens with scalable font size

Analysis Viewer:
Information at Your Fingertips

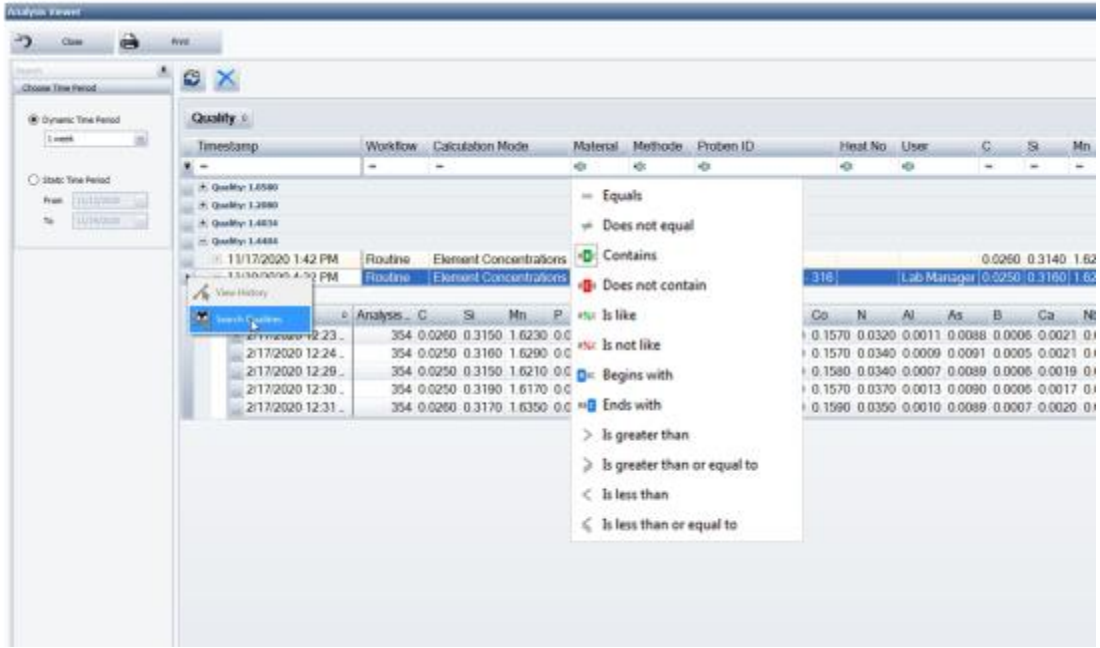
The new Analysis Viewer makes advanced data mining a snap. Queries to the database can be easily created, customized and stored.

- Powerful but easy-to-use grouping and filtering functionality on queries provide the flexibility of a pivot table

Just 1 click away:

- Queries to the Total Materia or internal grade library
- Generation of SPC charts
- Reporting, printing, or exporting

Exploring your data with different views becomes easy: filtering and grouping settings are saved for future use and can often be used in place of an expensive LIMS system



Total Materia : Beyond Grade Libraries

In addition to its internal library ES optionally integrates today's most comprehensive materials database: Total Materia

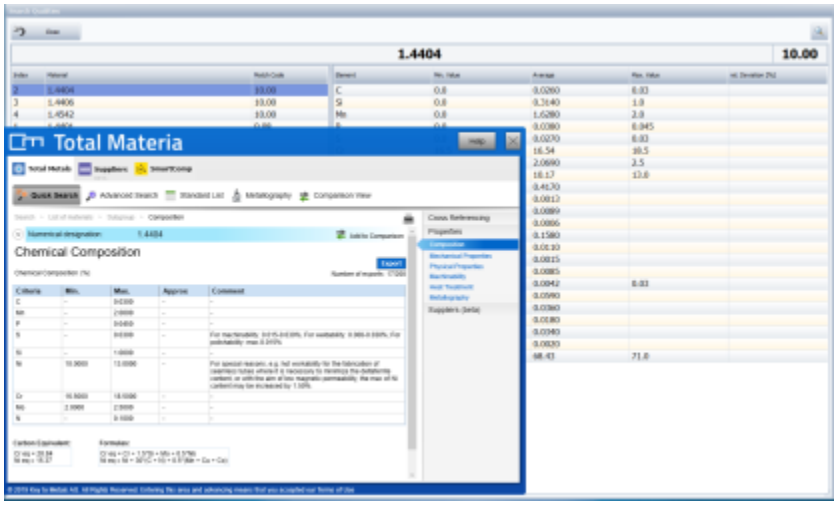
- > 350,000 alloys from >75 countries
- Queried by patented search algorithm: SmartComp
- Bruker's OEM version does not require internet connection, up to 200 exports to the internal library

Total Materia not only contains chemical compositions, but also

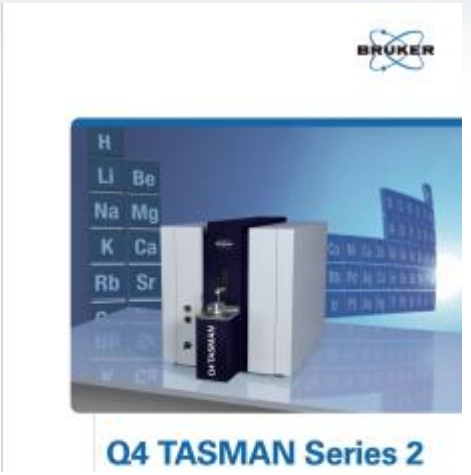
- > 15 million properties (physical, chemical, mechanical, and metallurgical data), including suppliers and proprietary data sheets

Expert knowledge to complex questions:

- Finding equivalents to foreign materials and comparing alternatives side by side
- Deciphering material specifications and finding the correct grade for a specific application

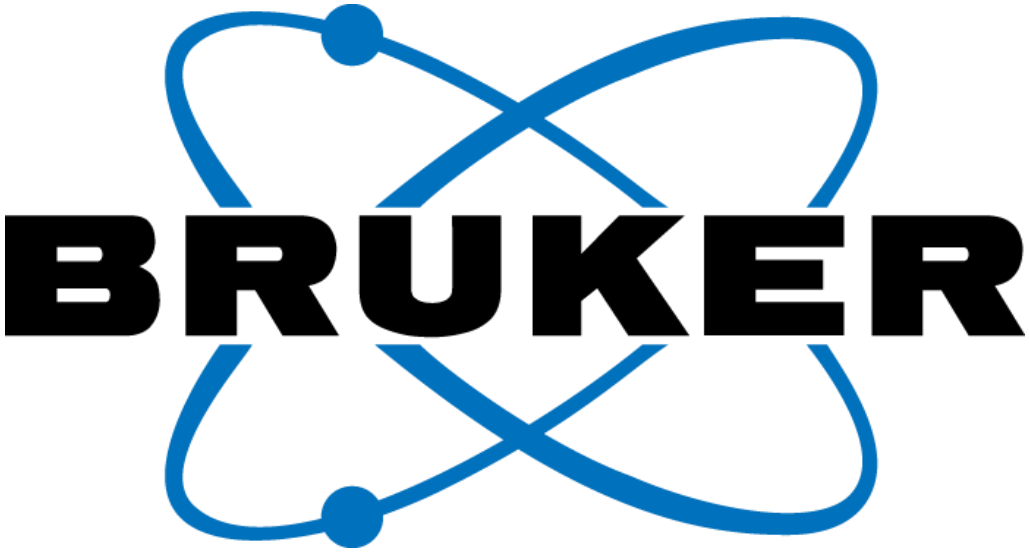


Q4 TASMAN Series 2
Additional Information



For more information, please

- Download the brochure
- Inquire with our w.w. sales channel
- Maybe request a (video) demo



Innovation with Integrity

“Hands-On” session in application lab