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Inspire the Next

VULCAN

Fast. Durable. Accurate.

Sales presentation - SCRAP

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Products and applications overview

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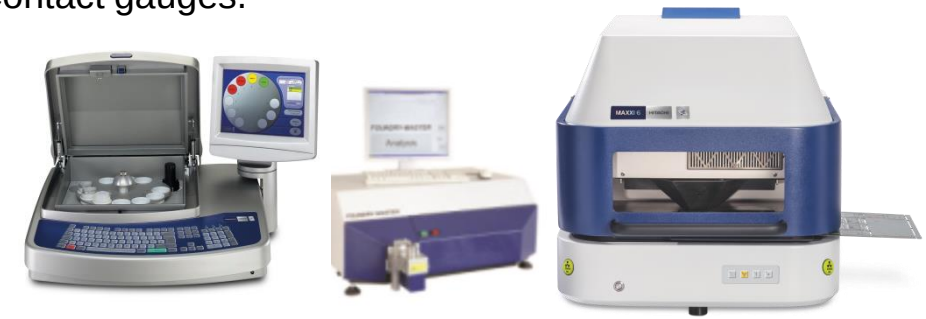
Instruments for quality control, materials analysis and compliance testing

- Handheld XRF analysers.
- Handheld Laser Induced Breakdown Spectroscopy (LIBS).
- Optical Emission tools for metal analysis and PMI.
- Benchtop X-ray Fluorescence elemental analysers.
- Coating Thickness measurement tools.
- Benchtop Magnetic Resonance analysers and spectrometers for QA/QC and education.
- Contact gauges.



Industry applications:

- Metals analysis and testing.
- Full automated on site testing of material
- Metals and materials used as part of manufacturing process QA/QC.
- Photovoltaics – analysis of solar panels and fuels cells.
- ROHS/WEEE compliance testing.
- Soil analysis.
- Special Zirconium determination with mobile OES.
- Low sulfur in fuels analysis.
- Food and agriculture.

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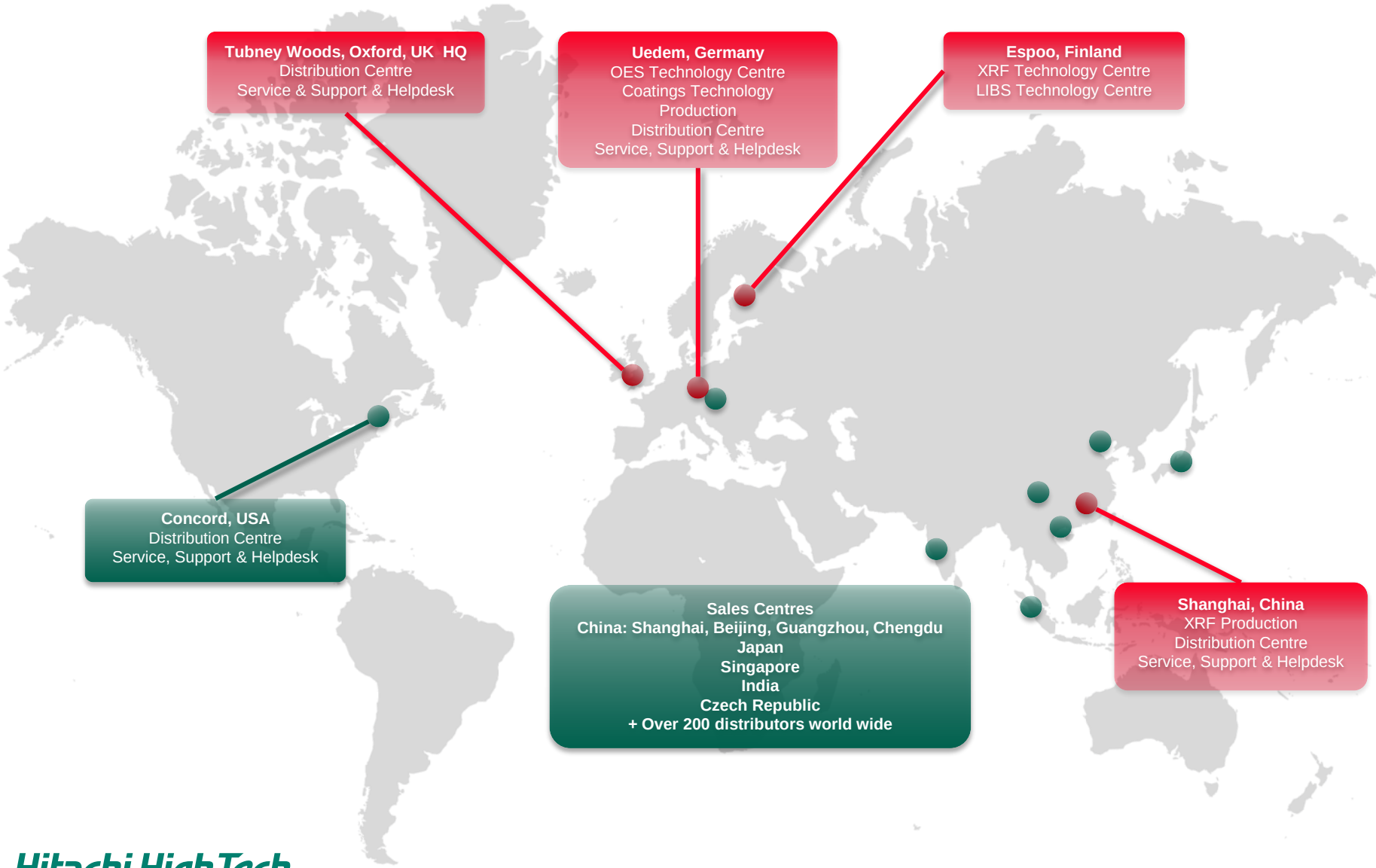
Global locations



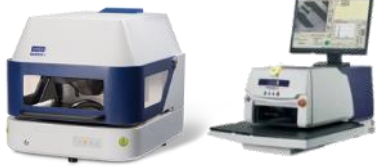
XRF & LIBS – industries & applications

XRF LIBS

PMI Inspection
Manufacturing QA/QC
Recycling

Coating thickness / metal finishing

Electronics / precious metals



Mining

Chemical / Petro chemical

Mining, cement

Wood preservatives

Release liners

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OES industries & applications

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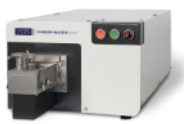
Metalworking

QA/QC, PMI

Metal sorting, recycling

Metals production foundries

Non-ferrous metals, metals manufacturing, foundries



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Complete solution for all your coatings analysis needs

Hitachi has over 25 years experience in coating thickness analysis.

We can meet all of our customers coating thickness analysis needs.

Contact gauges CMI Series	Handheld XRF X-MET8000 Series	Benchtop XRF X-Strata, Maxxi, FT
		
Portable Low cost Fast Paint thickness Anodised over Al Thick coatings (up to mm)	Portable Single layer Solution analysis Camera PMI of uncoated part Can measure large parts	Small spot analysis Multi-layer (up to 4) Camera Programmable table for multi-location analysis and surface scanning

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The complete solution for alloy identification

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Analysis – LIBS, XRF & OES:

Vulcan Series
The fastest alloy ID tools on the market. No X-Rays.

X-MET8000 Series
For fast, reliable, non-destructive identification and analysis of alloys.

Mobile and portable OES
High performance analysis of alloyed and trace elements; nitrogen analysis in duplex steels, L-grade separation.

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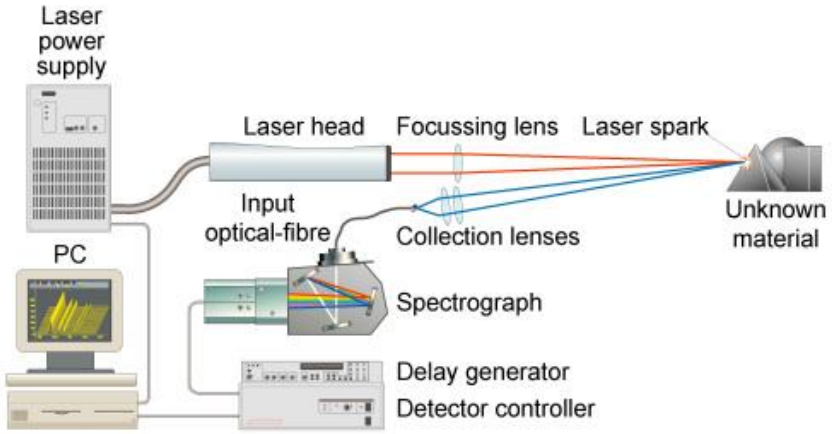
What is LIBS?

1. LIBS stands for Laser-Induced Breakdown Spectroscopy.
2. It is a fast growing analytical technique, which can potentially measure all elements in the periodic table, in samples of all types (gas, solids, liquids).



How does the Vulcan work?

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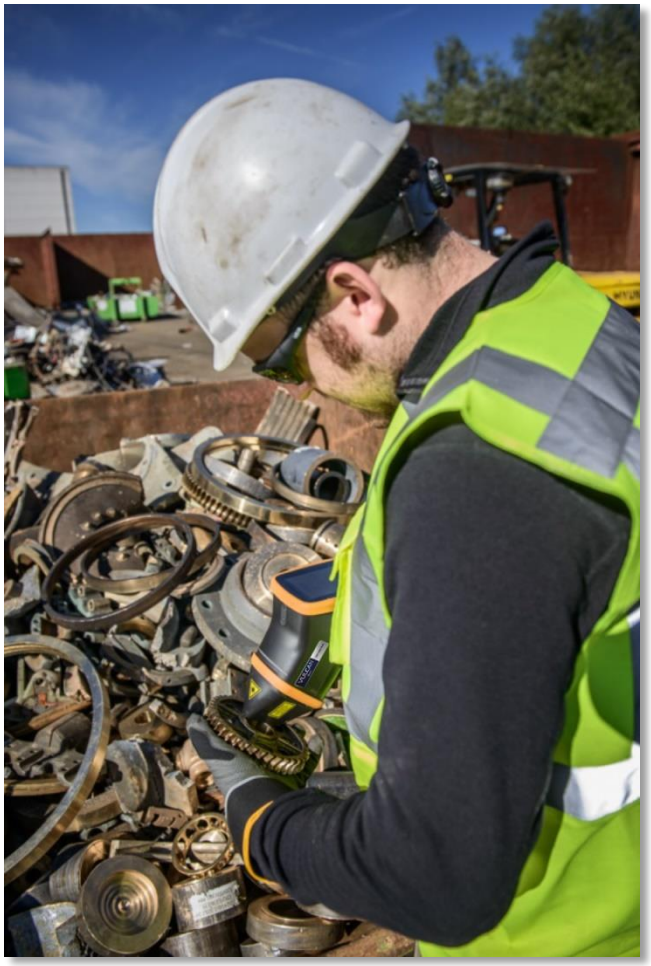
Laser and optics

- The Vulcan has a pulsing, miniature diode, solid state passively, Q-switched laser.
- The laser head is encased with the light collection optics in a small aluminium housing on a rotating platform.

Excitation

- Each laser pulse hits the sample surface causing a tiny amount of the sample to be ejected.
- Plasma formed with temps of 10,000ºC at the sample surface.
- In the plasma the sample is energized forming atomic and ionic species of elements in the sample.
- Each element emits light with characteristic wavelengths.



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Emission and effect on the sample

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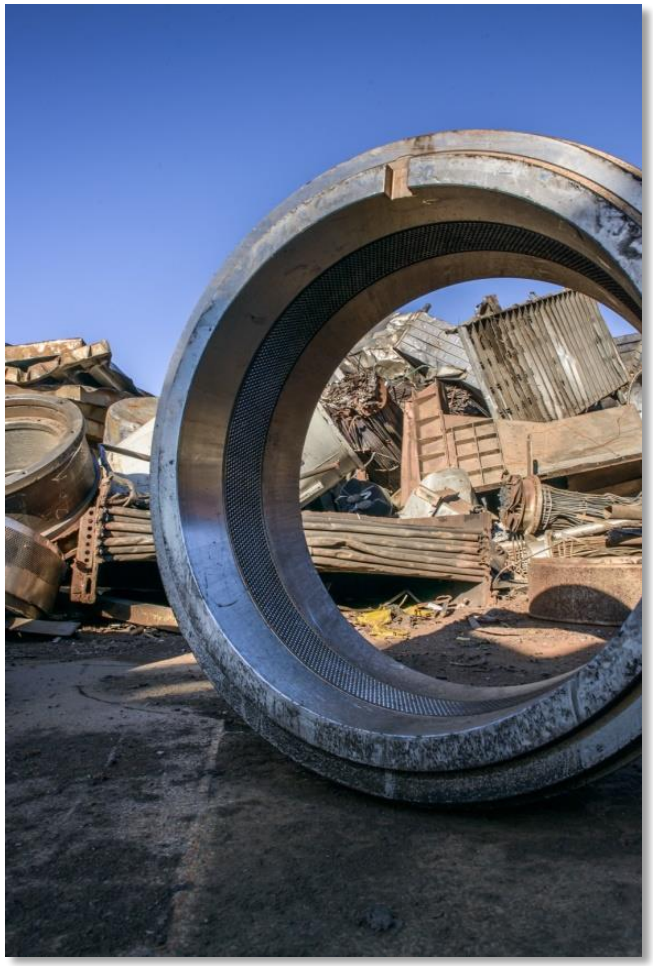
Emission

- After each pulse the plasma cools and characteristic light emissions can be observed as the energised ions return to their original atomic states.
- In a typical test, the sample will be hit by thousands of pulses.

Effect on sample

- A (virtually) non-destructive technique.
- A microscopic amount of material is consumed – as little as 1 billionth of a gram.
- During the pulse the power density at the sample surface can exceed 1Gigawatt per cm^2.
- However, the average power density of a test is less than 1 Watt – almost no sample heating surrounding the test area.



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Vulcan Series

The fastest tools for scrap sorting and valuation

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Optimise throughput – maximise profit

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- One second measurement regardless of the alloy type.
- Faster than any handheld XRF or handheld LIBS instrument on the market!
- Up to 5-10 times faster than HHXRF, especially when sorting Aluminium alloys.
- Up to 3 times faster than competing LIBS instruments!

- 304/316 separation in just one second.
- Sort 2024/2014, 6061/6063, 7050/7075, 3003/3004 etc.
- Sort Titanium alloys based on V, Al and Mo content.
- Calibrated for wide range of common alloys including stainless steels, Ni, Cu, Co, Ti alloys and much more.
- The speed enables to sort large volumes of scrap metal in minimum time, maximising throughput thus profits.

SPEED

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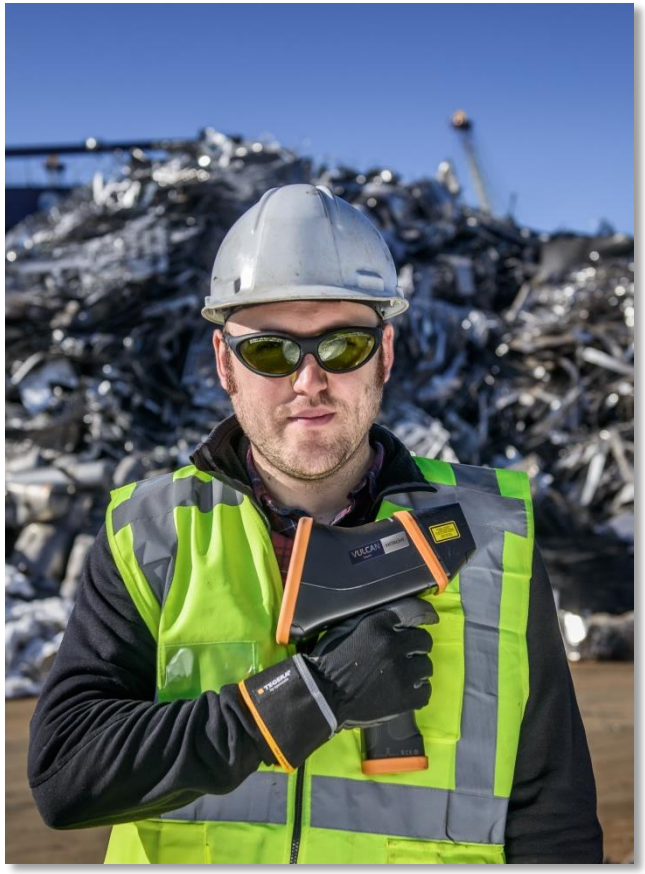
No X-Rays – less hassle

- Vulcan is a laser analyser so no expensive and time consuming radiation safety classes are required.
- Typically no registration of the instrument is needed, however it is always important to check local legislation before operating the instrument.
- The operator can safely hold the samples in hand when taking a measurement, something one should never do when using handheld XRF device.
- It is strongly recommended to use laser safety goggles when operating any class 3B laser.
- The nominal ocular hazard distance (NOHD) for Vulcan series is 1.5 meters / 5 ft.



Truly rugged tool

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Vulcan is the most rugged LIBS instrument on the market:

- IP54 (NEMA 3) equivalent – splash water and dust proof.
- MIL-STD-810G compliant – drop and vibration tested.
- Widest operating temperature range (0 – 40 °C / 32 – 104 °F).
- High strength plastic housing.
- Dragontrail™ scratch and impact resistant display.
- Recessed measurement optics, protected by sapphire glass – no punctured detectors.

RUGGED &
DURABLE

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Robust and high performance calibrations

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- Empirically calibrated by using certified reference materials – traceable calibrations.
- Comprehensive calibrations for all common alloys:

– Aluminium (Al), titanium (Ti), cobalt (Co), copper (Cu), lead (Pb), magnesium (Mg), nickel (Ni) and tin (Sn).

– Stainless steels, tool steels, low alloy steels.

– Pure element identification for Bi, Cd, Cr, Ge, Hf, In, Mn, Mo, Nb, Sb, Si, Ta, V, W, Y and Zr.

- Not limited to light alloys (Al, Mg, Ti) like some competing products.
- Robust screening mode to automatically select the calibration based on sample matrix.
- Possibility to adjust the calibrations to correct for systematic error (single point).
- Typical detection limits 0.02% – 0.2% depending on element and matrix.
- Stable performance throughout the operating temperature range (0 – 40 °C / 32 – 104 °F).

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Extensive grade libraries

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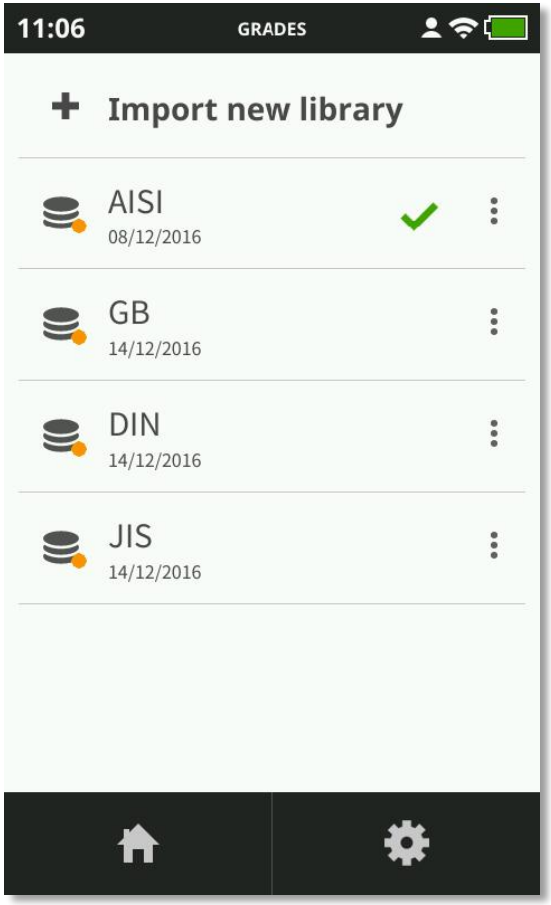
- Over **1500** pre-loaded grades, most extensive library on the market.
- AISI, DIN, GB and JIS libraries.
- Easy to add new grades and edit the existing ones.
- Convenient grade upload and backup tools.
- User selectable grade coefficients for good, possible and no match messages.
- Grade ID only display without chemistry available for quick decision making.



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Ergonomic and stylish

- Built from high quality materials and components.
- Stylish design with bright colours for high visibility in challenging environments.
- Attention to detail from case to accessories – even tools can look nice!
- Compact size.
- Only 1.5 kg with battery (1.3 kg without).
- Well balanced, comfortable to hold and to prevent user fatigue.
- Comes with a wrist strap and a lanyard.

Longest battery life

- Up to 8-10 hours operation on single battery – no need to swap the battery during a working day!
- No competing LIBS instrument on the market can match the Vulcan battery life.
- Two batteries included in the delivery.
- Same battery, charger and power supply that is used in X-MET8000 series – same part numbers and exchangeable between the instruments.

LONG BATTERY LIFE

Built-in camera

- Close focus camera to help targeting the instrument.
- Images are automatically saved in the instrument memory.
- When camera is activated, it turns on automatically when the safety sensor sees the sample and turns off when trigger is being pulled.
- Camera images are attached to the measurement results and can be browsed in the “Results” view later.
- Camera function is optional in some sales packages.

Simple to use

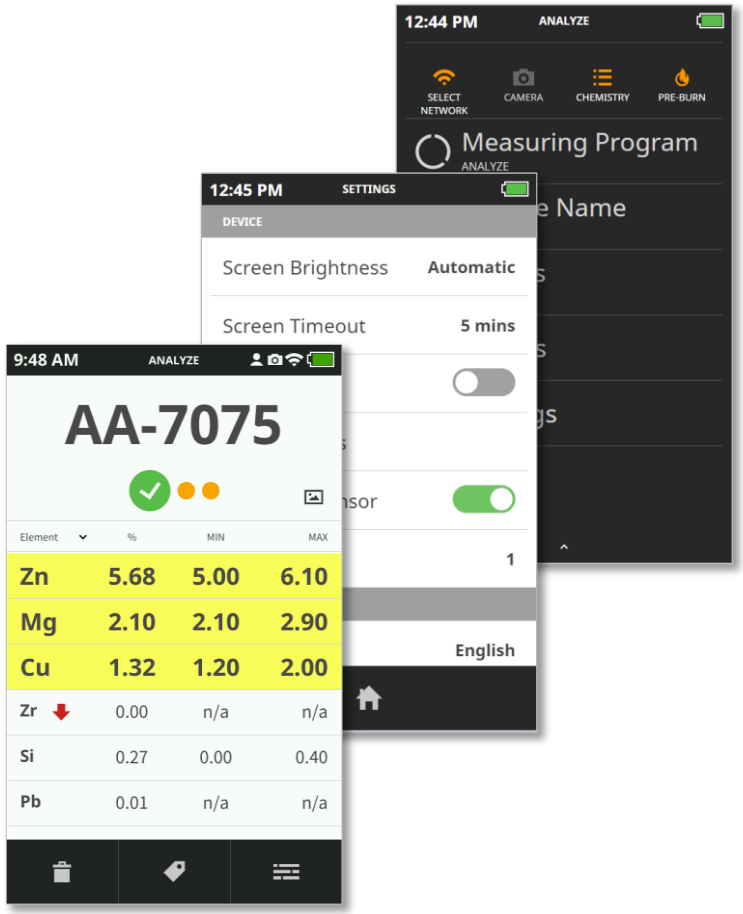
Simple and user-friendly operation greatly reduces or even eliminates the risk of user related errors:

- Fixed measurement time.
- Automatic method selection – no methods to choose from.
- Easy sample naming with clever tagging feature for additional information such as PO numbers lot numbers and quick notes.
- Just point – shoot – read the results on bright and easy to read screen.

SIMPLE TO USE

Simple and functional

- The user interface is based on years of close co-operation with Hitachis' customers and partners.
- Designed for simplicity and ease of use – simple and intuitive user interface greatly reduces the risk of user related errors.
- Easy to read in even the most challenging conditions, even in direct sunlight.
- Possibility to highlight the most important elements for easier readability.
- Quick access to the most important features.
- Tag measurement results with important information such as lot number, PO number, additional information and more.



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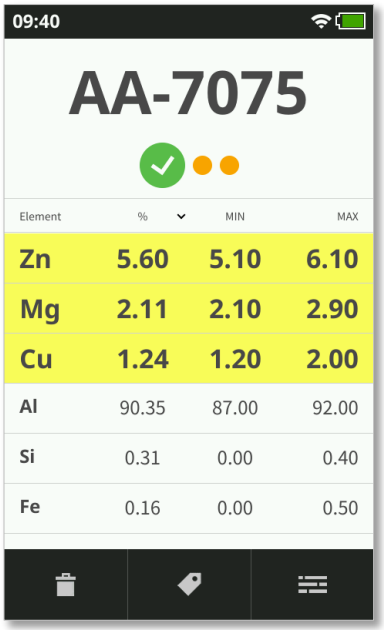
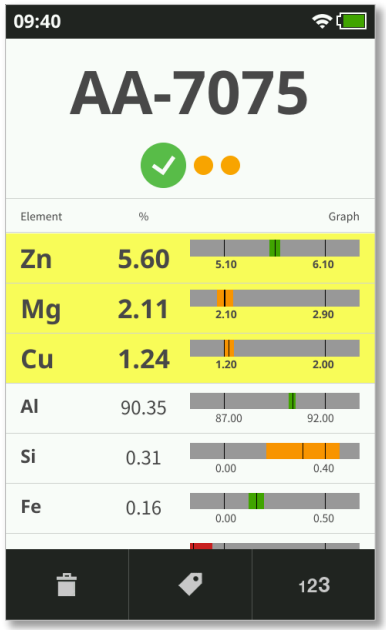
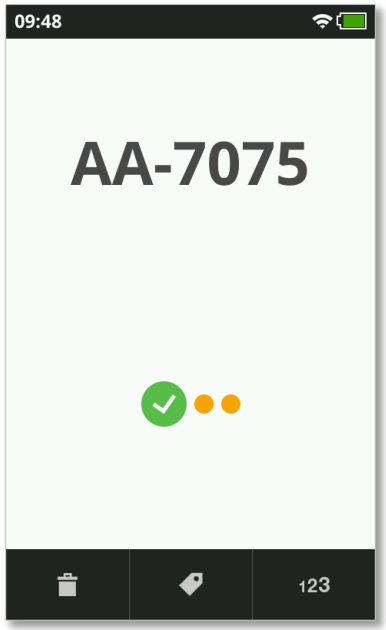
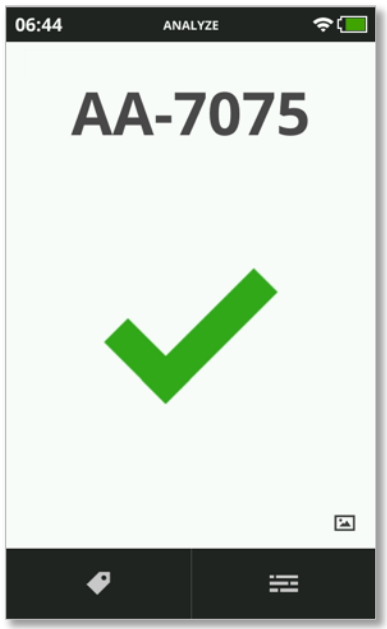
Easy to read results screens

- Main measurement screen with grade ID and full chemistry.
- Main measurement screen with graphical error/precision display.
- Chemistry off, only grade ID and closest matches will be displayed
- Pass/Fail program.
- All the programs are available with advanced averaging functions.









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The most advanced reporting tools

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Advanced reporting tools

- Vulcan offers the most advanced reporting features on the HH market.
- Direct reporting from the instrument on USB flash drive:
  - .CSV format.
  - Customise the report content directly from the instrument or create a full report.
  - Possibility to automatically delete the results after export.
- Direct reporting to the LiveConnect cloud service when the instrument is connected to WiFi.

What is LiveConnect?

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The most advanced data management tool in the industry:

- Cloud based service for storing and managing data.
- Direct transfer of the results from the instrument to cloud when WiFi is available.
  - Mobile phone hot spot feature can be used to create temporary WiFi connection anywhere where mobile data connection is available.
- Chemistry, grade ID, camera image, spectra, additional information, all stored in one safe location.
- .CSV and .PDF reporting directly from the cloud.
- Access the measurement data immediately from any computer with an Internet connection.
  No software installations or drivers are needed.
- Manage large amounts of data with minimal effort – advanced sort, filter and search functions.
- Multiple instruments can be logged into one account for flexible and reliable fleet management.

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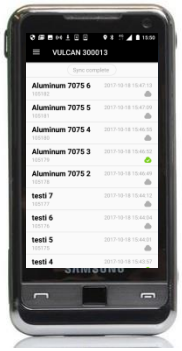
Two ways to connect to LiveConnect

Wi-Fi hotspot



LiveConnect app

Mobile data

See results on mobile phone screen in real time
Attach photos to results
Share results instantly with e-mail, text message, WhatsApp…
Print reports and labels
Upload results to cloud services

Direct upload over Wi-Fi

LiveConnect

(OiConnect)

Notice Vulcan cannot connect to a wireless network that requires authentication done at a web page (e.g. airport, hotel and exhibition Wi-Fis. For Exhibitions and customer demos mobile phone hotspot is recommended.

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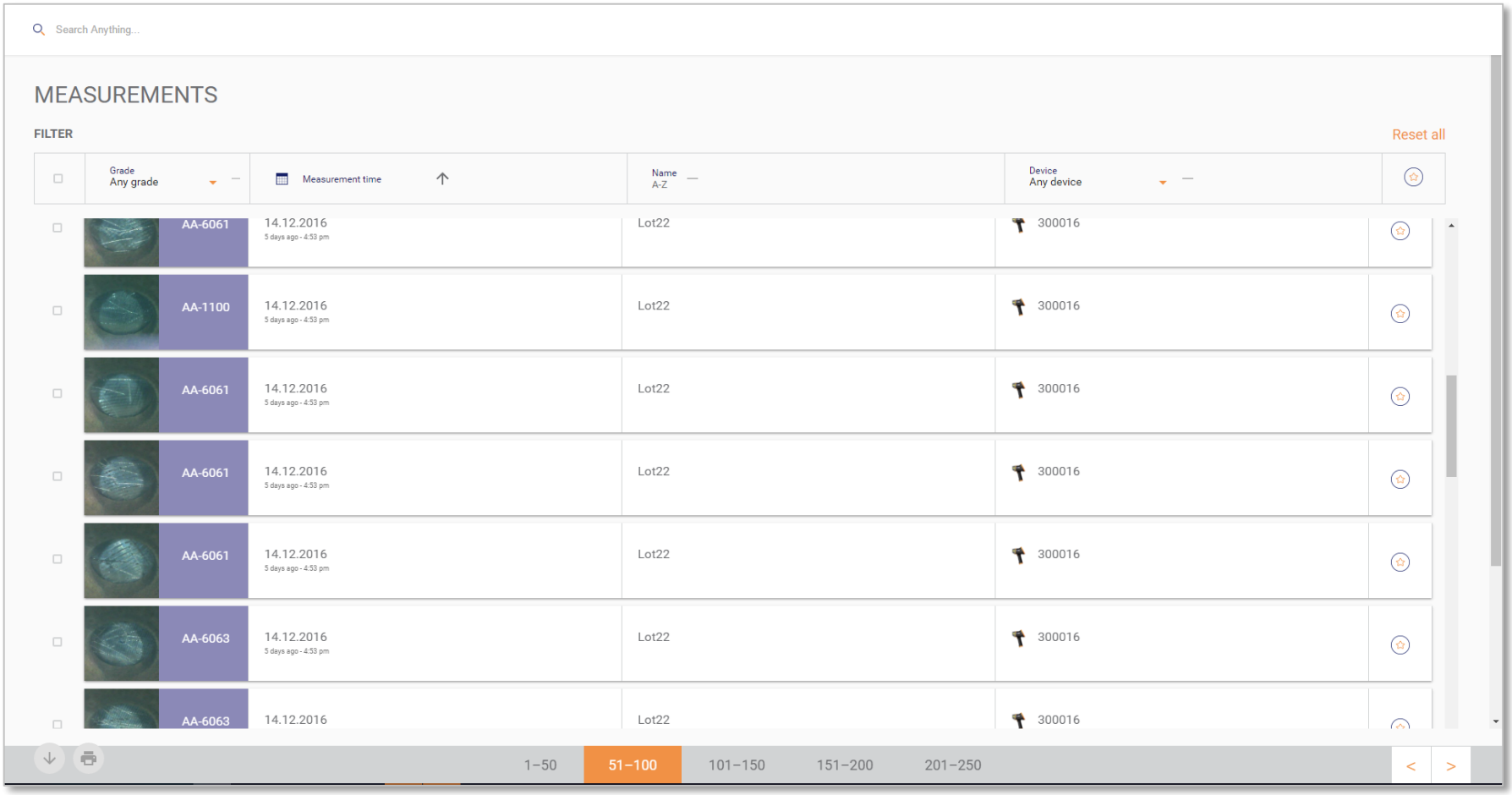
LiveConnect user interface



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Summary: Vulcan for scrap sorting

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- Fastest alloy sorter on the market.
- Accurate grade ID in just 1 second.
- Rugged – built to withstand even the harshest environments.
- Built-in AISI, DIN and JIS libraries – over 1500 grades in total.
- Pass/fail and averaging functions for rapid and realiable sorting of even the largest batches.
- Pre-burn function to clean the sample surface.
- Point and shoot operation – simple user interface and easy to read screen even in direct sunlight.

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An ideal scrap sorting tool should...

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- Provide precise and accurate grade ID and chemistry. ✓
- Be FAST - deliver results almost instantly. ✓
- Be small, light and ergonomic. ✓
- Be rugged and reliable for outdoor use. ✓
- Be simple and intuitive for anyone to use. ✓
- Provide full day operation with a single battery. ✓
- Provide simple but yet comprehensive data management tools. ✓

Vulcan ticks all the boxes!

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Vulcan sales packages

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Two Vulcan sales packages

Vulcan Expert – performance leader

- Fastest alloy sorter for all common alloy bases, light and heavy.
- For Aluminium, stainless steels, low alloy steels, tool steels, Co, Cu, Ni, Pb, Sn, Ti, Zn alloys.

Vulcan Smart – competitively priced

- Fastest alloy sorter for sorting steels and Nickel alloys.
- Stainless steels, low alloy steels, tool steels and Ni alloys.
- Can be upgraded to include Co, Cu, Pb, Sn, Ti, Zn alloys.

Vulcan sales packages

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	Vulcan Expert	Vulcan Smart
Empirically calibrated with certified reference materials	●	●
Al and Mg alloys	●	**n/a (*)**
Stainless steels, tool steels, low alloy steels Ni alloys	●	●
Co, Cu, Pb, Sn, Ti, Zn alloys	●	**Optional**
Built-in camera	**Optional**	**Optional**
WiFi	●	●
LiveConnect cloud based data management	●	●
Pre-burn to clean the sample surface	●	●
IP54 (NEMA 3) equivalent rating	●	●
MIL-STD-810G compliant	●	●
Battery life	8-10 hours	8-10 hours
Warranty (instrument/battery)	1y / 3m	1y / 3m

(*) Al and Mg calibrations are **not available** for Vulcan Smart

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Warranty & support

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Extended warranty and re-certification plan

- Standard manufacturer's warranty for Vulcan Smart and Vulcan Expert is 1 year for the instrument and 3 months for the batteries.
- One year extended warranties are available for both Vulcan Smart and Vulcan Expert.
- One year extended warranty plan includes a calibration check and re-certification done at Hitachi service hubs.
- Calibration check and re-certification are additional services and not required for the one year warranty extension.
- Warranties can be extended one year at the time up to maximum three times (total warranty period max 4 years including the factory warranty).
- Warranty extension must always be purchased before previous warranty period is over.

Extended Warranty

Service & Global Knowledge Center

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Our service mission is to allow our customers to concentrate on their own business objectives, safe in the knowledge that we are always there to provide full support capability.

- Extended warranty contracts
- Tailored service support contracts
- Global Knowledge Centre
- Technical helpdesk support
- Genuine approved spare parts
- Consumable products
- Service repair at the service facility

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Thank you!