

X-MET 8000 Smart — Technical Datasheet and Equipment Overview

Classification: Handheld XRF Analyzer — Entry-Level Alloy Verification

Executive Summary

The X-MET 8000 Smart represents Hitachi High-Tech Analytical Science's entry-point configuration for alloy sorting and basic material verification. It delivers lab-quality XRF analysis in a 1.5 kg handheld format, targeting scrap metal recyclers, incoming QC operators, and production floor supervisors who require fast alloy identification without the capital expenditure of higher-end configurations.

Key value proposition: **Rapid alloy ID and elemental quantification for the mid-range industrial segment at the lowest entry price point in the X-MET 8000 series.**

1. Physical and Environmental Specifications

Parameter	Specification
Dimensions (W x L x H)	93 x 210 x 272 mm
Weight (with battery)	1.5 kg
Weight (without battery)	1.3 kg
Ingress protection	IP54
Durability standard	MIL-STD-810G
Operating temperature	-10°C to +50°C
Max. sample temperature	100°C

IP54 rating — dust-protected (limited ingress does not interfere with operation) and splash-resistant from any direction. Suitable for scrap yards, production floors, and workshop environments.

MIL-STD-810G compliance — tested under Method 514.6 (vibration, Category 4) and Method 516.6 (shock and drop). Field-proven for 1-metre drops onto concrete without calibration drift or detector damage.

2. X-Ray Tube

Parameter	Value
Anode material	Rhodium (Rh)
Max. tube voltage	40 kV

Parameter	Value
Max. power	4 W
Max. anode current	200 μ A

The 40 kV Rh-anode tube delivers effective excitation of characteristic X-ray lines for elements with atomic number $Z \geq 19$ (potassium through uranium). The excitation efficiency is optimised for mid-to-heavy transition metals, post-transition metals, and noble metals — covering approximately 95% of alloy identification scenarios encountered in scrap sorting and production QC.

Single fixed filter. The Smart utilises one permanent filter optimised for general alloy analysis (stainless steels, low-alloy steels, Al alloys with limitations, Cu alloys, Ni alloys, Ti alloys, Co alloys, Zr alloys). The absence of a filter-wheel mechanism improves mean time between failures and reduces power consumption.

Limitation: The single-filter configuration does not provide optimised conditions for light-element detection (Mg, Al, Si, P, S). For applications requiring reliable determination of these elements, consider the X-MET 8000 Optimum or Expert.

3. Detector

Parameter	Specification
Type	Large-area Silicon Drift Detector (SDD)
Energy resolution	~130–160 eV at Mn K α (5.9 keV)
Cooling	Thermoelectric (Peltier) — no liquid nitrogen

Detectable element range: K – U (potassium, Z=19 through uranium, Z=92)

The SDD delivers sufficient energy resolution to separate adjacent characteristic lines in multi-element spectra, enabling accurate alloy grade matching against the built-in library. Peltier cooling eliminates the logistical burden of liquid nitrogen, making the instrument truly field-portable.

Coverage includes: Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Nb, Mo, Ag, Sn, Sb, W, Pb, Bi — the principal alloying elements in commercial steels, non-ferrous alloys, and superalloys. Al is detectable but with reduced accuracy compared to configurations with light-element optimisation.

4. Measurement Window

Standard configuration: Shield Window — a transparent polymer membrane that protects the detector from mechanical damage during contact with sharp or rough metal surfaces.

Quick-Swap system: Tool-free field replacement of the analytical window in under 60 seconds. No service technician required. Reduces instrument downtime to near-zero.

5. Display and User Interface

Parameter	Specification
Screen size	4.3 inches
Technology	Blanview sunlight-readable touchscreen
Resolution	480 x 800 px (portrait orientation)
Glove compatibility	Yes — resistive touch optimised for industrial gloves

Blanview technology maintains high contrast under direct sunlight, eliminating the readability issues common to standard TFT displays in outdoor scrap yard environments.

Icon-based interface — 13 languages supported (including Russian, English, Chinese, German, French, Italian, Japanese, Korean, Polish, Portuguese, Spanish). Operator training typically requires 15–30 minutes.

6. Calibration Methods

Fundamental Parameters (FP) — physics-based matrix correction model that calculates elemental concentrations from measured X-ray intensities without requiring alloy-specific calibration standards.

Pre-installed calibrations:

- **Alloy** — alloy grade identification and quantitative chemical analysis
- **RoHS** — restricted substance screening (Pb, Hg, Cd, Cr VI, Br)

7. Power and Battery

Parameter	Specification
Battery type	Li-Ion, 6.2 Ah
Batteries supplied	1
Operating time	10–12 hours
Charger	110/230 V, 50/60 Hz with UK/US/Euro/AU adapters
Charging time	~8 hours (full charge)

A single battery supports a full 8-hour shift without recharging. Typical throughput: 1,000–1,500 measurements per charge depending on measurement time configuration.

8. Data Storage

Parameter	Specification
Internal memory	16 GB flash
Result capacity	Up to 100,000 results with spectra and images

Each stored result includes: timestamp, alloy grade ID, elemental concentrations (%), full spectrum, sample image (if camera fitted), and GPS coordinates (if GPS module fitted).

Optional integrated camera:

- Resolution: 640 x 480 px
 - Magnification: 6x
 - Field of view on sample: ~7.5 x 6 mm
 - Technology: CMOS
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9. Connectivity

Interface	Specification
USB	2.0 (PC connection, flash drive, printer)
Bluetooth	2.0 + EDR (wireless printer, barcode scanner)
Wi-Fi	802.11 b/g (network sync, ExTOPE Connect cloud)

ExTOPE Connect — Hitachi's cloud service for automatic data synchronisation, fleet management, and remote results sharing.

10. Radiation Safety

- Password-protected X-ray activation
 - Proximity infrared sensor — automatic tube shutdown when pulled away from sample
 - Count rate sensor for emergency shutoff
 - Visible warning lights during X-ray emission
 - Fail-safe mechanism — guaranteed tube shutdown on any power or control failure
 - **Certifications:** CE, CB
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11. Software

On-board firmware: Icon-driven OS with pre-calibrated measurement modes. One-button measurement — press the trigger, receive alloy ID and composition in 15 seconds (standard) or 5 seconds (fast mode).

Included PC software:

- **Spectrum Display** — spectrum visualisation and comparison
 - **Report Generator** — custom-branded report creation with tamper-proof PDF and CSV export
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12. Standard Delivery Scope

1. X-MET 8000 Smart analyser
2. SS316 stainless steel check sample (calibration verification)
3. Battery charger (with regional adapters)
4. Li-Ion battery — 1 pc.

5. USB cable
6. USB flash drive with user manual and safety guide (13 languages)
7. Shoulder / neck strap
8. Wrist strap
9. Holster and belt
10. Background plate
11. Light radiation shield
12. Carry case
13. Warranty card

13. Optional Accessories

Accessory	Purpose
Window Shield	Additional detector protection for sharp/rough surfaces
Integrated Camera	Sample visual documentation, precise positioning (640x480, 6x)
Small-spot collimator (3 mm)	Analysis of welds, small fasteners, isolated features
GPS receiver	Geotagging of measurement results (3.0 m CEP accuracy)
Benchtop Stand	Laboratory mode for cup/pouch samples (9.5 kg, chamber 188x188x146 mm)
Bipod	Hands-free support for measurements >30 seconds
Bluetooth printer	On-site result printing
Barcode scanner	Rapid sample ID input
Telescopic pole	Access to hard-to-reach areas
Backpack	Field transport

14. Measurement Performance

Standard measurement time: 15 seconds for alloy identification **Fast mode:** 5 seconds for preliminary assessment **Extended mode:** 30–60 seconds for improved precision on trace elements

Surface preparation: Generally not required for scrap sorting — clean a ~1 cm² area of rust and debris. For laboratory-grade accuracy, surface grinding is recommended.

Sample geometry: Flat contact required. Automatic compensation for small-diameter tubes (from 1 mm).

15. Application Fit Matrix

Application	Fit	Notes
Scrap metal sorting	Excellent	Primary use case — alloy ID and grade verification
Basic alloy QC	Excellent	Incoming/outgoing material verification
Production floor control	Good	Mid-process verification of stock materials
Aluminium alloy differentiation (5xxx/6xxx)	Not suitable	Requires Mg/Si determination — see Optimum/Expert
303 vs 304 stainless separation	Not suitable	Requires S determination — see Optimum/Expert
RoHS screening	Good	Pre-installed calibration ready for use
Hot sample analysis (>100°C)	Not suitable	See Optimum/Expert with HERO™ option
Geochemical/soil analysis	Not suitable	See Expert Geo

16. Positioning Within the X-MET 8000 Series

Feature	Smart	Optimum	Expert	Expert Geo
Tube voltage	40 kV	40/50 kV	50 kV	50 kV
Filter wheel	Single	6-position	6-position	6-position
Element range	K – U	Mg – U	Mg – U	Mg – U + REE
Light elements (Mg, Al, Si, P, S)	No	Yes	Yes	Yes
Hot samples (400°C)	No	Optional HERO™	Optional HERO™	Optional HERO™
Camera	Optional	Optional	Standard	Standard
Empirical calibrations (CRM)	No	No	Yes	Geo-optimised
GPS	Optional	Optional	Optional	Standard
Batteries supplied	1	2	2	2

About the Author

Maksim Vedunkov — analytical equipment specialist with extensive experience in portable XRF analyser deployment across industrial recycling, manufacturing QA/QC, and alloy verification sectors.

- RU: <https://metal-asia.pw/authors/maksim-vedunkov>
- EN: <https://metal-asia.pw/en/authors/maksim-vedunkov>

Specifications are based on Hitachi High-Tech Analytical Science official documentation. Parameters may vary by hardware revision. Confirm current specifications at time of order.