

Commercial Proposal for the Supply of Optical Emission Spectrometers (OES) for Metal Analysis

Direct shipments from China for metallurgical enterprises, laboratories, and precision machinery manufacturing plants in Russia, Kazakhstan, Belarus, Ukraine, and CIS countries

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Supplier Company: Metal-Asia.pw — Direct industrial equipment shipments from China

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1. Customer Challenges and Our Solutions

1.1. Key Challenges of OES Operation in the CIS Region

Metallurgical laboratories and quality control departments in Russia, Kazakhstan, and Belarus face a complex set of problems when purchasing and operating optical emission spectrometers:

Problem	Causes	Consequences	Metal-Asia Solution
High cost of original consumables	Exclusive distributors inflate argon, electrode, and window prices by 2-3x	Analysis cost increases by 40-60%	Direct consumable shipments from China at factory prices
Calibration and verification difficulties	No accredited centers in regions	Equipment downtime 2-4 weeks	On-site verification by engineer, remote calibration
Outdated software without updates	Manufacturer refusal to support old versions	Incompatibility with Windows 10/11, vulnerabilities	Software update to current Elemental.Suite version
Incorrect setup for GOST alloys	Default databases oriented toward DIN/ASTM	Errors in identifying domestic steel grades	Pre-installed GOST 4543, GOST 5632, GOST 19265 database

Problem	Causes	Consequences	Metal-Asia Solution
High argon consumption	Unoptimized purge system	8-12 l/hour consumption, high costs	ArgonShield technology, reducing consumption to 4-5 l/hour
Extended delivery times	Shipments through Europe, bureaucracy	4-6 months waiting	Direct contract with Bruker factory in China, 6-10 weeks

1.2. Target B2B Segments

Segment	Customer Profile	Recommended Model	Number of Channels
Large metallurgy	MMK, NLMK, Evraz, AMT, Kazchrome	Q4 TASMAN 130 / Q8 MAGELLAN	Full UV (130-620 nm)
Medium metal plant	CHTPZ, TMK, Severstal, Ural Steel	Q4 TASMAN 170	170-620 nm
Non-ferrous metallurgy	Ural Aluminum, Norilsk Nickel, UGMK	Q4 TASMAN 200	200-620 nm
Machinery manufacturing	Uralvagonzavod, KAMAZ, BelAZ, MAZ	Q4 MOBILE / Q2 ION	Mobile versions
Independent laboratories	Testing centers, research institutes	Q4 TASMAN 170 / Q4 POLO	Medium resolution
Scrap recycling	Scrap metal companies, collection points	Q2 ION	Compact, economical
Aerospace industry	UEC, UAC, KHAZ, Antonov ASTC	Q4 TASMAN 130	UV for C, N, O, P, S

2. Overview of Spark-OES Technology

2.1. Operating Principle of Optical Emission Spectrometer

Spark Optical Emission Spectroscopy (Spark-OES) is a method for analyzing the chemical composition of metals and alloys based on measuring the intensity of characteristic radiation from atoms excited by an electric discharge in the interelectrode gap.

Analysis Stages:

1. Sample preparation — surface cleaning with abrasive disc to remove scale and contaminants
2. Sample placement in spark stand with argon purge
3. Pre-spark cycle — burning off contaminated layer (2-5 seconds)
4. Main spark discharge — excitation of atoms in the interelectrode gap
5. Radiation registration by diffraction grating and CCD/PMT detectors
6. Spectrum processing and concentration calculation using calibration curves

2.2. OES Advantages Over XRF

Parameter	Spark-OES	XRF
Elemental Range	C, N, O, P, S, B + all metals	Mg-U (depends on model)

Parameter	Spark-OES	XRF
Detection Limit	0.1-10 ppm (ppb for PMT)	1-500 ppm
Accuracy	0.5-2% relative	2-5% relative
Sample Preparation Required	Yes (cleaning)	No (except coatings)
Argon Required	Yes (high purity 5.0)	No
Analysis Time	15-45 seconds	3-60 seconds
Cost of Ownership	Higher (argon, electrodes)	Lower
Carbon Analysis	Yes (including low concentrations)	No

3. Technical Product Range of Bruker OES Spectrometers

3.1. Bruker Q4 TASMAN Stationary Spectrometers

3.1.1. Q4 TASMAN 200 (Standard Model)

Parameter	Specification
Optical System	Paschen-Runge, 500 mm focal length
Wavelength Range	200 – 620 nm
Detector	Multi-element CCD (uncoated, UV-aging resistant)
Number of Channels	Up to 64 analytical channels
Resolution	< 30 pm (picometers) in UV range
Excitation Source	Digital pulse source SmartSpark, 50-1000 Hz
Discharge Duration	10 µs – 2 ms
Spark Stand	Coaxial argon purge, automatic sample clamping
Available Matrices	Fe, Al, Cu, Ni, Co, Ti, Pb, Sn, Zn, Mg, ALL
Analyzable Elements	Ag, Al, As, B, Bi, C, Ca, Cd, Ce, Co, Cr, Cu, Fe, Hg, La, Mg, Mn, Mo, N, Na, Nb, Ni, P, Pb, S, Sb, Se, Si, Sn, Ta, Te, Ti, V, W, Zn, Zr, etc.
Detection Limit	0.5-10 ppm (depends on element and matrix)
Repeatability	< 1% RSD for main elements
Analysis Time	15-30 seconds
Argon Consumption	4-5 l/hour (standard), 2.5 l/hour (economy mode)
Computer	Built-in PC with Windows 10 IoT
Software	Bruker Elemental.Suite 2024
Dimensions	550 x 700 x 820 mm (W x D x H)
Weight	75 kg

Parameter	Specification
Power Supply	220V / 50-60 Hz, 500 W
Operating Temperature	10-35°C, relative humidity < 80%
Price FOB Shanghai	from 48,000 USD

3.1.2. Q4 TASMAN 170 (with UV Optics)

Parameter	Specification
Optical System	Paschen-Runge 500 mm + separate UV chamber
Wavelength Range	170 — 620 nm
Additional Optics	UV chamber with MgF2 lenses
C, P, S Analysis	Full carbon, phosphorus, sulfur analysis
C Detection Limit	1-5 ppm in iron alloys
P, S Detection Limit	2-10 ppm
Other Parameters	Similar to Q4 TASMAN 200
Price FOB Shanghai	from 58,000 USD

3.1.3. Q4 TASMAN 130 (Premium with Nitrogen)

Parameter	Specification
Optical System	Paschen-Runge 500 mm + evacuated UV chamber
Wavelength Range	130 — 620 nm
Additional Optics	Evacuated or nitrogen-purged UV chamber
N, O Analysis	Nitrogen and oxygen determination in metals
N Detection Limit	5-20 ppm in iron alloys
O Detection Limit	10-50 ppm in copper and copper alloys
Application	High-alloy steels, titanium alloys, high-purity copper
Other Parameters	Similar to Q4 TASMAN 170
Price FOB Shanghai	from 72,000 USD

3.2. Bruker Q4 MOBILE Mobile Spectrometer

Parameter	Specification
Concept	Fully mobile OES with hybrid cable
Optical System	Patented CCD optics in probe
Wavelength Range	165 — 420 nm (including UV C, P, S)
Detector	Multi-channel CCD in probe unit

Parameter	Specification
Excitation Source	Spark + arc mode
Probe	Ultra-light, cable length up to 4 m
Probe Weight	1.2 kg (one of the lightest in the industry)
Hybrid Cable	Combined (argon + electrical)
Argon	External cylinder or built-in cartridge
Power Supply	220V mains or autonomous inverter
Main Unit Dimensions	450 x 350 x 250 mm
Main Unit Weight	18 kg
Application	On-site PMI, analysis of large components, weld seams
Price FOB Shanghai	from 42,000 USD

3.3. Bruker Q2 ION Compact Spectrometer

Parameter	Specification
Concept	Ultra-compact stationary OES
Optical System	Patented compact optics
Wavelength Range	170 — 420 nm
Detector	High-sensitivity CCD
Excitation Source	Digital, 50-1000 Hz
Matrices	Fe, Al, Cu, Ni, Zn (basic set)
Expansion	Optional modules for Ti, Mg, Pb, Sn
Dimensions	380 x 520 x 340 mm
Weight	32 kg (lightest stationary OES)
Argon Consumption	3-4 l/hour
Application	Small laboratories, scrap recycling, training centers
Price FOB Shanghai	from 32,000 USD

3.4. 2025 New Release — Bruker Q4 POLO

Parameter	Specification
Optical System	MultiVision Dual-Optics, 2 independent paths
Wavelength Range	130 — 785 nm (record for OES)
Additional Elements	Li, Na (alkali metals in aluminum)
ArgonShield Technology	New coaxial purge system with lens protection
Lenses	MgF2 with fluorine coating
Temperature Compensation	AAC (Active Automatic Compensation) — dynamic drift correction

Parameter	Specification
Resolution	< 25 pm in UV range
Software	Elemental.Suite with AI analysis assistant
Dimensions	580 x 720 x 840 mm
Weight	82 kg
Price FOB Shanghai	from 85,000 USD

4. Comparative Model Specifications Table

Criterion	Q2 ION	Q4 MOBILE	Q4 TASMAN 200	Q4 TASMAN 170	Q4 TASMAN 130	Q4 POLO
Type	Compact stationary	Mobile	Stationary	Stationary UV	Stationary premium	Premium 2025
Range, nm	170-420	165-420	200-620	170-620	130-620	130-785
Resolution, pm	< 40	< 35	< 30	< 30	< 25	< 25
Detector	CCD	CCD (in probe)	CCD Multi-Chip	CCD Multi-Chip	CCD Multi-Chip UV	CCD MultiVision
C (carbon)	Yes	Yes	No	Yes (ppm)	Yes (ppm)	Yes (sub-ppm)
N (nitrogen)	No	No	No	No	Yes (ppm)	Yes (ppm)
O (oxygen)	No	No	No	No	Yes	Yes
P, S (phosphorus, sulfur)	Yes	Yes	Yes	Yes (ppm)	Yes (ppm)	Yes (sub-ppm)
Li, Na (alkali)	No	No	No	No	No	Yes
Maximum Channels	32	48	64	64	64+	80
Analysis Time	15-30 s	15-30 s	15-30 s	15-30 s	15-30 s	10-25 s
Argon Consumption, l/h	3-4	4-6	4-5	4-5	4-5	3.5-4.5
Weight, kg	32	18 (unit) + 1.2 (probe)	75	78	82	82
Dimensions, mm	380x520x340	450x350x250	550x700x820	550x700x820	550x700x840	580x720x840
Power, W	400	350	500	500	550	600
Price from, USD	32,000	42,000	48,000	58,000	72,000	85,000

5. Detector and Optics Technical Specifications

5.1. Bruker ClearSpectrum CCD Detectors

Parameter	Value
Type	Pixel CCD without UV coating
Number of Pixels	2048 x 64 (for each CCD chip)
Pixel Size	14 x 14 μm
Dynamic Range	$> 10^6$ (linear)
Dark Current	< 10 electrons/sec at 25°C
Quantum Efficiency	$> 60\%$ in the 130-620 nm range
Integration Time	1 ms – 65 s
Cooling	Peltier, -10°C (stabilized)
Service Life	> 15 years (no coating aging warranty required)

5.2. Optical System

Component	Specification
Diffraction Grating	Holographic, 2400 or 3600 lines/mm
Focal Length	500 mm (Paschen-Runge)
Housing Material	Cast iron with temperature stabilization
Environmental Protection	Sealed optical chamber with argon purge
Wavelength Calibration	Automatic using built-in reference lines
Stability	< 1 pm drift over 24 hours

6. Delivery Specifications and Configuration

6.1. Standard Configuration (All Models)

Item	Quantity	Description
OES Spectrometer	1 pc.	Main unit with complete optics
Computer	1 pc.	Built-in or external (model-dependent)
Monitor	1 pc.	LCD 24" (for stationary models)
Printer	1 pc.	Laser printer for reports
Calibration Samples	1 set	Set of 5-12 CRM for each matrix
Argon Regulator	1 pc.	For argon 5.0 cylinder
Electrodes	10 pcs.	Tungsten electrodes for spark discharge
Abrasive Disc	1 pc.	For sample cleaning (16 mm)
Software Package	1 license	Elemental.Suite + GOST databases

Item	Quantity	Description
Calibration	1 pc.	Factory calibration for all matrices
Operation Manual	1 pc.	In Russian
Warranty Card	1 pc.	12 months

6.2. Options and Extensions

Option	Compatibility	Price, USD
Additional Matrix (Ti, Mg, Pb, etc.)	All TASMAN, Q2 ION	+ 3,500
Automatic Sample Table	Q4 TASMAN	+ 8,500
Sample Recognition System (barcode)	Q4 TASMAN, Q4 POLO	+ 2,200
LIMS Integration	All	+ 1,800
Extended CRM Base (50+ samples)	All	+ 4,500
Personnel Training (2 days)	All	+ 1,500
Commissioning (on-site)	All	+ 3,200 (excluding airfare)
Annual Consumables Set	All	+ 2,800

7. Customs Clearance and HS Code Classification

7.1. HS Codes

HS Code	Name	Import Duty	VAT
9027 30 000 0	Spectrometers, spectrophotometers, optical spectrographs	0%	20%

For components:

HS Code	Name
9027 90 500 0	Parts and accessories for spectrometers
2804 21 000 0	Gaseous argon (consumable)
8540 11 000 0	X-ray tubes (for excitation block)
8471 80 000 0	Control boards and computing units

7.2. Customs Documentation

1. Purchase and sale contract (Rus/Eng)
2. Invoice with serial numbers
3. Packing list
4. Certificate of Origin (Form ST-1 for RF or standard)
5. Technical specification (Specification)
6. Declaration of Conformity TR TS 020/2011 (Electromagnetic compatibility)
7. Declaration of Conformity TR TS 004/2011 (Low voltage equipment)

8. Implementation and Maintenance Services

8.1. List of Service Services

Service	Description	Timeline	Price
Spare Parts for Analyzers			
CCD Detector (replacement)	Original ClearSpectrum CCD	14-21 days	8,500-12,000 USD
Diffraction Grating	Holographic grating 2400/3600 lines/mm	21-30 days	4,500-6,800 USD
Excitation Source	SmartSpark block / pulse source	14-21 days	3,200-5,500 USD
Spark Stand Window	Quartz / sapphire	In stock	180-450 USD
Tungsten Electrodes (50 pcs.)	Q4 TASMAN, Q2 ION	In stock	120-200 USD
Calibration			
Factory Calibration	On CRM for ordered matrices	5-7 days	Included
Matrix Addition	Installation of calibration for new base	2-3 days	1,200-2,000 USD
Elemental.Suite Update	To latest version	1 day	400-800 USD
GOST Database Loading	GOST 4543, 5632, 19265, 14959, etc.	1 day	300-500 USD
Repair			
Optical System Diagnosis	Drift check, cleaning, adjustment	2-3 days	300 USD
CCD Detector Replacement	With full recalibration	5-7 days	from 9,500 USD
Optical Path Cleaning	Complete disassembly, cleaning, assembly	3-5 days	800-1,200 USD
Excitation Source Repair	Component repair or replacement	3-7 days	from 2,500 USD
Spectrometer Verification	With verification certificate issuance	3-5 days	600-1,000 USD
Remote Diagnostics			
Elemental.Suite Connection	Via TeamViewer / AnyDesk	Same day	Free
Spectrum Analysis	Peak check, problem identification	1-2 hours	Free
Calibration Curve Correction	Remote recalibration	2-3 hours	300 USD
Methodology Consultation	Analysis mode selection	On request	Free

8.2. Service Packages

Package	Silver	Gold	Platinum
Annual Cost	2,400 USD	4,800 USD	8,400 USD
Remote Diagnostics	Unlimited	Unlimited	Unlimited
Engineer Dispatch	1 time/year	2 times/year	4 times/year
Spare Parts Discount	10%	20%	30%
Annual Consumables Set	No	1 set	2 sets
Repair Warranty	3 months	6 months	12 months
Priority	Standard	Elevated	Maximum

Package	Silver	Gold	Platinum
Dedicated Manager	No	Yes	Yes
Quarterly Audit	No	Yes	Yes

9. Delivery, Payment, and Logistics Terms

9.1. Production and Delivery Timelines

Stage	Timeline
Production and Assembly	4-6 weeks
FAT Inspection and Calibration	5-7 business days
Delivery to EAEU Border	14-21 days
Customs Clearance	5-7 business days
Installation and Commissioning	2-3 business days
Total from Order to Launch	8-12 weeks

9.2. Payment Terms

Option	Terms	Discount
100% Prepayment	Full payment before production start	-3%
50/50	50% advance, 50% before shipment	Standard
Letter of Credit	Uncovered letter of credit	+2%

9.3. Logistics Cost (Approximate)

Destination	Method	Cost, USD
Moscow	Sea + railway	1,500-2,200
Chelyabinsk	Auto via Kazakhstan	1,200-1,800
Novosibirsk	Sea + railway	1,400-2,000
Almaty	Auto via Khorgos	800-1,200
Minsk	Auto via Kazakhstan-RF	1,300-1,900

10. Contact Information

For all questions regarding the supply of optical emission spectrometers, technical specifications, after-sales service, and pricing, please contact us at our website www.metal-asia.pw:

Customer Relations Department:

- **WhatsApp:** +86 132 50100874
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Sales Department Working Hours: Monday — Friday: 9:00 AM to 6:00 PM Beijing Time (MSK+5, ALM+2)

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