

分析程序清单：

Analysis Program Checklist:

铝基：

Al based:

分析程序 Analysis program	铝铜合金 Al - Cu Alloy		铝镁合金 Al - Mg Alloy		低合金铝 Low Alloy		铝硅铜合金 Al - Si-Cu Alloy		铝锌合金 Al-Zn Alloy	
元素 Element	下限 Min	上限 Max	下限 Min	上限 Max	下限 Min	上限 Max	下限 Min	上限 Max	下限 Min	上限 Max
Al										
Si	0.0030	1.5700	0.0030	1.0000	0.0030	1.6000	0.6000	14.5000	0.0030	0.8000
Fe	0.0030	1.8700	0.0030	0.7500	0.0030	1.3000	0.0030	1.9000	0.0030	0.7000
Cu	0.5000	6.5700	0.0030	0.2500	0.0030	1.0000	0.0030	7.5000	0.0030	2.8000
Mn	0.0030	1.5000	0.0030	0.8000	0.0030	2.3800	0.0030	1.0000	0.0030	0.8000
Mg	0.0030	2.6800	4.0000	8.0000	0.0030	1.5000	0.0030	1.5500	0.1000	4.0000
Zn	0.0030	0.7280	0.0030	0.5500	0.0092	0.4000	0.0030	3.0000	1.0000	8.5000
Cr	0.0030	0.2720	0.0030	0.4000	0.0030	0.4000	0.0030	0.0550	0.0030	0.3500
Ni	0.0030	2.2500	0.0030	0.1500	0.0030	0.1710	0.0030	1.6000	0.0030	0.2000
Sn	0.0030	0.0220					0.0030	0.3000		
Ti	0.0030	0.2040	0.0030	0.2000	0.0030	0.2010	0.0050	0.2800	0.0030	0.2600
Pb	0.0030	0.1300			0.0030	0.9000	0.0030	0.2000		
Zr	0.0030	0.3010					0.0030	0.2000	0.0030	0.2600

1. 仪器分析程序由书豪仪器使用国内外认证标样校准，可满足几乎所有常见牌号。

用户测试特殊需求(如少见的合金牌号、元素、含量范围等)时可能导致无相应认证标样适用。如客户可提供适用的标样或定值可靠的均匀样品，书豪工程师可为用户特别制作分析程序。

The instrument analysis program is calibrated by Soohow Instrument using domestic and foreign certified standards, which can meet almost all common grades.

When users test special requirements (such as rare alloy grades, elements, content ranges, etc.), it may lead to the absence of corresponding certification standards. If the customer can provide suitable standard samples or reliable uniform samples with fixed values, Shuhao engineers can specially create analysis programs for the user.

2. 基体元素含量为总量减去其它元素含量（ $100\% - \sum \text{其它元素含量}$ ）

The content of matrix elements is the total amount minus the content of other elements ($100\% - \sum \text{content of other elements}$)

3. 铸铁测试样品需充分白口化，以保证测试准确。熔体(铁水)测试时，取样模具需满足急冷要求(如铸成印章状、硬币状等)，保证样品白口化；铸铁成品(一般为非白口化样品) 测试时，需重熔后在急冷模具中浇铸，保证样品白口化。

The cast iron test samples need to be fully whitened to ensure accurate testing. During the testing of molten iron, the sampling mold must meet the requirements of rapid cooling (such as being cast into a seal like or coin like shape) to ensure that the sample turns white; When testing finished cast iron products (usually non whitened samples), they need to be remelted and cast in a rapid cooling mold to ensure that the samples are whitened.

4. 典型样品尺寸为直径 15-80mm，厚度 0.8-100mm。尺寸过小或过薄需配置适用的夹具，应与工程师确认方案。

The typical sample size is 15-80mm in diameter and 0.8-100mm in thickness. If the size is too small or too thin, suitable fixtures should be configured and the plan should be confirmed with the engineer.

技术参数及性能特点

Technical parameters and performance characteristics

光学系统

Optical system

- ✧ 多块高性能 CCD 检测器系统，根据应用需要最多达 16 块 CCD 检测器
Multiple high-performance CCD detector systems, up to 16 CCD detectors according to application requirements
- ✧ 每块 CCD 3,648 像素
Each CCD has 3648 pixels
- ✧ 最大 58,368 像素的分辨率(16 x 3,648 像素)
Maximum resolution of 58368 pixels (16 x 3648 pixels)
- ✧ 高性能全息衍射光栅，光栅刻线 2700 条/mm
High performance holographic diffraction grating with 2700 grating lines/mm
- ✧ 温度稳定系统
Temperature stabilization system
- ✧ 采用特殊材料应对漂移
Using special materials to cope with drift
- ✧ 焦距：500 mm
Focal length: 500 mm
- ✧ 谱线波长：130 - 800 nm 由衍射光栅的选择决定。光栅的选择由制造商根据分析元素和分析程序来决定
Spectral wavelength: 130-800 nm is determined by the selection of the diffraction grating. The selection of gratings is determined by the manufacturer based on analysis elements and analysis procedures
- ✧ 全光学系统自动描迹
Automatic tracing of all optical systems
- ✧ 密闭的真空光学室可以避免灰尘、光线的干扰
A sealed vacuum optical chamber can avoid interference from dust and light

火花台

Spark table

- ✧ 开放式的火花台,可以分析重达 20Kg 的各种形状样品
Open spark stage, capable of analyzing samples of various shapes weighing up to 20Kg
- ✧ 电极易于拆卸维护

Electrodes are easy to disassemble and maintain

- ✧ 氩气吹扫火花台，低氩气消耗
Argon gas blowing spark table, low argon gas consumption
- ✧ 使用便捷的样品夹,支持快速样品更换
Convenient sample holder for quick sample replacement
- ✧ 不同样品的适配器可满足各种样品的需求（可选）
Adapters for different samples can meet the needs of various samples (optional)

火花电源

Spark power supply

- ✧ 全自动控制火花源
Fully automatic control of spark source
- ✧ 半导体控制放电激发
Semiconductor controlled discharge excitation
- ✧ 1 到 100 A 等离子体电流
1 to 100 A plasma current
- ✧ 放电参数由密码保护
Discharge parameters are password protected
- ✧ 特别的分析要求可有不同的激发参数
Special analysis requirements may have different excitation parameters
- ✧ 火花光源放电稳定，不受供电系统波动的影响
Spark light source discharge is stable and not affected by power supply system fluctuations
- ✧ 激发参数由激发线和分析程序标定和控制
Excitation parameters are calibrated and controlled by excitation lines and analysis programs
- ✧ 火花源可有多种参数设置
Spark sources can have multiple parameter settings
- ✧ 火花频率: 200 到 1000 Hz (可控)
Spark frequency: 200 to 1000 Hz (controllable)
- ✧ 火花持续时间 10-10000 us (可控)
Spark duration 10-10000 us (controllable)

控制、电子采集和数据读出系统

Control, electronic acquisition, and data readout systems

- ✧ 电子系统具有微处理器控制的多通道积分和数据系统采集功能

The electronic system has multi-channel integration and data acquisition functions controlled by microprocessors

- ✧ 高速 16 位模数转换器
High speed 16 bit analog-to-digital converter
- ✧ ISP 混合信号 Flash 微控制器 100MHz
ISP mixed signal Flash microcontroller 100MHz
- ✧ 多种连接源
Multiple connection sources
- ✧ 高速读出及高速 USB 接口支持快速数据控制与处理系统
High speed readout and high-speed USB interface support for fast data control and processing systems
- ✧ 最多 16 块 CCD 模块，由制造商根据应用情况选择
Up to 16 CCD modules, to be selected by the manufacturer based on the application situation

WinLab10 分析软件：分析软件、校正软件、统计功能

WinLab10 analysis software: analysis software, calibration software, statistical functions

- ✧ 计算每种元素的校正曲线需考虑到各种基体（参考线）
Calculating the correction curve for each element requires consideration of various matrices (reference lines)
- ✧ 智能化：用一组标样即可完成标准化
Intelligence: Standardization can be completed with a set of standards
- ✧ 便于操作的用户图形界面
Easy to operate user graphical interface
- ✧ 创建或修改分析程序
Create or modify analysis programs
- ✧ 常用的操作功能键
Common operation function keys
- ✧ 可选的输出方式（强度，强度比，未校正的浓度，校正后的浓度等）
Optional output methods (intensity, intensity ratio, uncorrected concentration, corrected concentration, etc.)
- ✧ 标准化
Standardization
- ✧ 校正元素间的干扰
Correction of interference between elements

- ◇ 自动标准化
Automatic standardization
- ◇ 标准偏差和相对标准偏差功能
Standard deviation and relative standard deviation functions
- ◇ 国际标准物质库
International Standard Material Library
- ◇ 支持 C 当量或其他参数的计算
Support the calculation of C equivalent or other parameters
- ◇ 可标记超出工作曲线范围的元素分析结果
Element analysis results that can be marked beyond the working curve range
- ◇ 具有根据分析时间或激发次数自动再校正功能
Equipped with automatic recalibration function based on analysis time or excitation frequency
- ◇ 统计功能软件
Statistical function software
- ◇ 统计计算
Statistical calculations
- ◇ 可打印所有激发结果或是最多 100 次的激发平均结果，及其标准偏差和相对标准偏差
Can print all excitation results or the average result of up to 100 excitations, as well as their standard deviation and relative standard deviation
- ◇ 可连接外部计算机或中心系统
Can connect to external computers or central systems

尺寸

Size

- ◇ 尺寸: L93 x W40 x H63 cm
Dimensions: L93 x W40 x H63 cm
- ◇ 重量: 约 100 Kg
Weight: approximately 100 Kg

电源

Power supply

- ◇ 220V +/- 10%, 单相, 50/60 Hz, 10 A, 1.0 KVA
220V +/- 10%, single-phase, 50/60 Hz, 10 A, 1.0 KVA

重要配件品牌说明

Important accessory brand description

序号 S/N	名称 Name	品牌 Brand	所属地 Territory
1	光栅 Grating	Newport	美国 United States
2	CCD	东芝 Toshiba	日本 Japan
3	真空泵 Vacuum pump	鲍斯 Bao Si	中国 China
4	真空挡板阀 Vacuum baffle valve	川北真空 Chuanbei Vacuum	中国 China
5	芯片 Chip	Silicon Lab	美国 United States
6	电容 Capacitance	威世（VASHAY）	美国 United States
7	电磁阀 Solenoid valve	亚德客（AIRTAC）	中国台湾 Taiwan, China
8	计算机 Computer	戴尔 Dell	美国 United States
9	打印机 Printer	惠普 HP	美国 United States
10	标准样品 Standard samples	SUS	德国 Germany

售后服务及保修期

After sales service and warranty period

安装

Installation

由卖方受过专业培训的工程师进行免费安装调试、交付使用以及人员培训（为期 3-5 个工作日）。交付使用前需要进行验收测试，表明部件和分析系统运转良好。在满足本技术协议规定 SOOHOW 光谱仪的所有技术指标后，由双方签署验收报告。

Free installation, commissioning, delivery, and personnel training (lasting 3-5 working days) will be provided by the seller's engineers who have received professional training. Acceptance testing is required before delivery to demonstrate that the components and analysis system are functioning properly. After meeting all technical specifications of the SOOHOW spectrometer specified in this technical agreement, both parties shall sign an acceptance report.

验收

Check and accept

买方按合同规定的供货范围进行清点验收。在仪器至少稳定 24 小时的情况下，用具有良好均匀性的国家或国际一级标准光谱样品测试，结果符合仪器的指标要求。

The buyer shall conduct inventory and acceptance according to the supply scope specified in the contract. When the instrument is stable for at least 24 hours, test with a national or international first-class standard spectral sample with good uniformity, and the results meet the requirements of the instrument's indicators.

培训

Train

安装调试时，在买方现场进行免费培训。培训内容包括分析仪安装、分析仪试车运行、分析测试样品、分析用户样品、培训实验室操作人员（设备原理、日常操作，软件应用、日常维护及维修），使用户能独立操作仪器。

Free training will be provided at the buyer's site during installation and debugging. The training content includes analyzer installation, analyzer trial operation, analysis of test samples, analysis of user samples, training of laboratory operators (equipment principles, daily operation, software application, daily maintenance and repair), enabling users to operate instruments independently.

保修期

Warranty period

卖方负责仪器的保修及售后技术支持，整机系统保修 1 年（从安装调试完成，验收合格之日算起，但不超过仪器发货运单标明的出货日期后十二个月）。

The seller is responsible for the warranty and after-sales technical support of the instrument, with a one-year warranty for the entire system (calculated from the date of installation and commissioning completion and acceptance, but not exceeding twelve months after the shipment date indicated on the instrument shipping waybill).

保修范围不包括自然损耗和不正当操作所造成的损坏，保修范围内不收取维修及更换配件的费用。在保修期内，任何由于仪器质量产生的问题，卖方将负责免费服务和部件更换。但由于用户现场条件、人为操作不当、人力不可抗拒等外部原因，以及合同规定以外的任何额外服务，将按规定收费。

The warranty scope does not include damage caused by natural wear and tear and improper operation, and no repair or replacement parts will be charged within the warranty scope. During the warranty period, the seller

will be responsible for free service and component replacement for any issues arising from the quality of the instrument. However, due to external factors such as on-site conditions, improper human operation, and force majeure, as well as any additional services beyond the contractual provisions, fees will be charged according to regulations.

保修期内，接到故障通知后 3 小时内做出响应，3 个工作日内派工程师到达用户现场，免收维修费。对于非人为损坏的零备件予以免费更换,消耗品除外。如使用不当造成的损坏，卖方负责维修，用户需承担必要的零部件费用。如有异议,双方协商处理。

During the warranty period, respond within 3 hours after receiving the fault notification, and send engineers to the user's site within 3 working days, free of repair fees. Non human damaged spare parts will be replaced free of charge, except for consumables. If damage is caused by improper use, the seller is responsible for repairing it, and the user shall bear the necessary component costs. If there is any disagreement, both parties shall negotiate and handle it.

卖方负责终身维修。保修期外，卖方应继续向用户提供优质服务。在接到故障通知后 3 小时内做出响应，3 个工作日内派工程师到达用户现场，并以优惠价格提供所需备件和易耗品，买方需支付相关维修费和必要的备件和易耗品费用。

The seller is responsible for lifelong maintenance. Outside the warranty period, the seller shall continue to provide high-quality services to the users. Respond within 3 hours after receiving the fault notification, dispatch engineers to the user's site within 3 working days, and provide the required spare parts and consumables at a discounted price. The buyer is required to pay for the relevant maintenance fees and necessary spare parts and consumables.