

# XRT

## 智能传感 矿石分选机

XRT Intelligent  
Sensor-based Ore Sorter

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碳中和  
**SorterX**

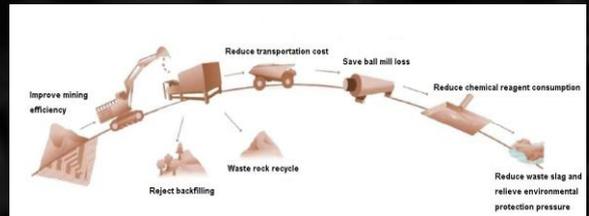
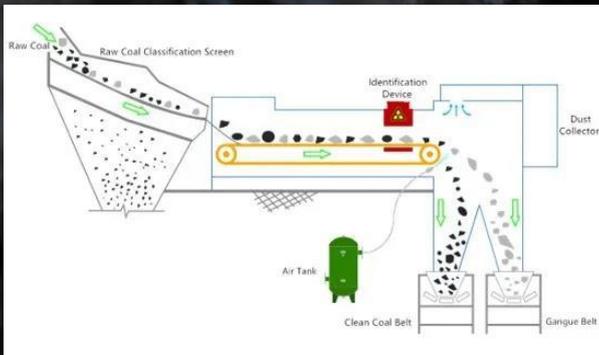


## ■ 什么是XRT智能分选 What's XRT

XRT分选机的工作原理：

基于X射线和传感器技术，XRT智能分选机将原煤排队后，使用X射线对原矿进行扫描，由探测器采集数据，采用传感器和大数据分析，通过智能算法识别区分矿石与废石，并用气排枪喷出废石，实现高效自动智能分选。

Based on the X-ray and sensor technology, XRT intelligent sorter scans the raw ore with X-rays and collects data from the detector. With the help of Big data analysis and intelligent algorithms, the ore and waste rock was identified and the high-pressure blower sprays waste stone away to realize efficient automatic intelligent sorting.



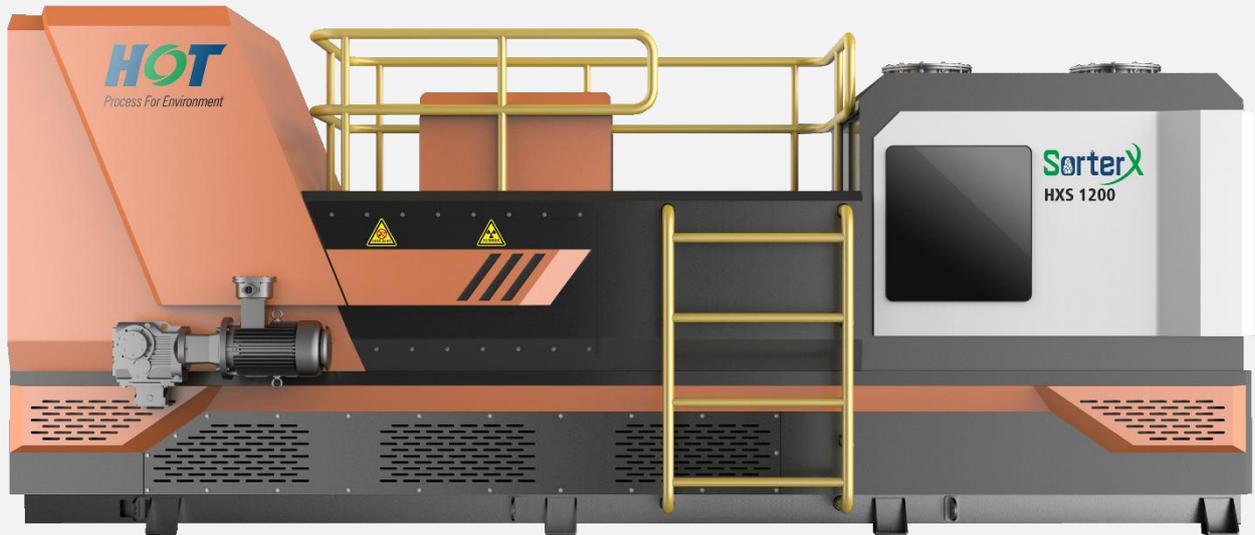
## Why XRT 为什么要用XRT

通过XRT智能分选技术可提高矿山入选矿石的品位，抛弃大量废石并对尾矿、矿渣中的有价值矿物实现回收再利用，从而降低下游（破碎、研磨、浮选等）工序的处理费用，大幅提升矿山效率和经济效益，延长矿山寿命。可广泛应用于各类矿山，包括贵金属，有色和其他矿物，如煤、金、银、钼、铜、锌、钨、钒等。

Through the intelligent sorting technology, the grade of selected ore can be improved, a large amount of waste rock can be discarded, and valuable minerals in tailings and slag can be recovered and reused, so as to reduce the processing cost of downstream processes (crushing, grinding, flotation, etc.). It can be widely applied in all kinds of mines, such as coal, gold, silver, molybdenum, copper, zinc, tungsten, vanadium and so on.

矿物预选 ★ 节能降耗

Ore Pre – concentration, Energy Saving, Carbon Emissions Reduction



**SorterX** is an efficient intelligent ore pre-concentration equipment that combines X-ray transmission(XRT), image recognition and AI algorithm technology.

SorterX 是结合X射线传输技术（XRT）、图像识别以及AI算法的高效智能矿石预富集设备（干选）。



**SorterX** is widely used in the separation of metal/nonmetallic ores, industrial ores, energy (coal preparation) minerals, such as Lithium, Coal, Copper, Lead-zinc Phosphorite, Tungsten, Nickel, Silver, Gold, Antimony, Manganese, Kaolin, etc.

SorterX 矿石分选机广泛用于分选金属/非金属矿石、工业矿石、能源（煤炭分选）等，包括锂、煤、铜、铅锌磷矿、钨、镍、银、金、锑、锰、高岭土等。

## 设备优势 Advantages




**XRT高精度传感**  
XRT high-precision sensing

系统自主研发探测器  
高分辨率成像  
High resolution imaging




**实时智能物质识别**  
Real-time & smart substance identification

AI智能算法软件  
多维度建模、快速识别  
AI Fast identification




**全自动高速喷吹分选**  
Automatic high-speed pneumatic injection

精确喷吹控制  
亚毫秒级响应时间  
Accurate control and reaction

在煤炭领域，XRT智能分选机对炼焦煤、动力煤均有较强的适应性，对原煤的灰分适应性也较好。当灰分低，矸石量少时“打矸”，当灰分高，矸石量大时，可反选“打煤”。喷吹方向灵活多变，解决了从下往上喷的技术难题，且上喷设备已投入应用，可多角度喷选；预判轨迹，精准喷吹。

XRT sorter has strong adaptability to both coking coal and thermal coal, as well as to ash content of raw coal. It can flexibly choose to separate coal or gangue, depending on the ash content and gangue amount. Pneumatic injection direction is flexible, either from lower part to higher part, or from higher part to lower part. The material track can also be predicted and injected precisely.



**X-ray(passive)**  
x射线 (无源)

**Rapid Recognition**  
快速识别

**Precise Control**  
精确控制

**AI Algorithm**  
AI算法

**SorterX**  
RKS 1200



内容 Content	小功率 Miniwatt	大功率 Superpower	说明 Explanation
部件架构 Component Structure	一体式 Integrative	分体式 Separated	分体式结构复杂，故障率高 The separated structure is complex and has higher failure rate
射线防护 Radiation Protection	容易 Easy	难 Hard	大功率射线源需要多出数吨铅皮做防护 High power radiation source requires tons of extra lead housing for protection
使用寿命 Lifespan	较长 Long	较短 Short	大功率球管整体损耗较大 The overall loss of the high-power bulb tube is high
维护成本 Maintenance Cost	较低 Low	较高 High	分体式高压和冷却部分需要额外定期维护 The separated high pressure and cooling section require additional regular maintenance
维修成本 Repair Cost	较低 Low	较高 High	
更换成本 Replace Cost	较低 Low	较高 High	球管为损耗件且保修期相对较短，大功率价格昂贵，出保后更换费用高 The bulb tube is wearing part with short warranty. High power means high replacement cost after the expiry of warranty
射线泄露风险 Radiation Leakage Risk	较低 Low	较高 High	防护难，泄露风险大 Hard to protect with high possibility of leaking
监管部门 Administrative Supervision	县级 County Level	省级 Provincial Level	功率越高，监管越严格 The higher the power, the stricter the supervision

假设操作员8小时\*300天紧贴设备，年累计辐射剂量仅0.5mSv

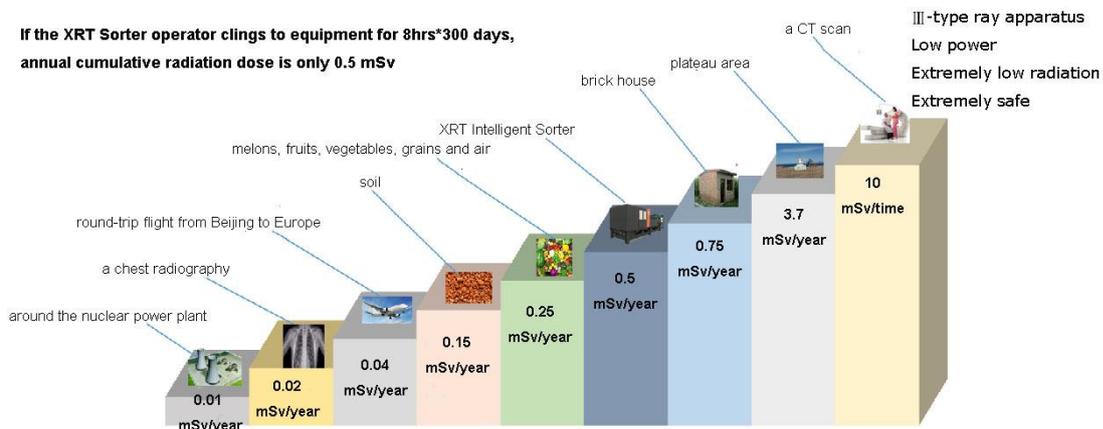
XRT智能光电干选机采用 III类射线装置，一体式射线源，低功率，更安全



分体式射线源



一体式射线源



## 设备参数 Technical Parameter

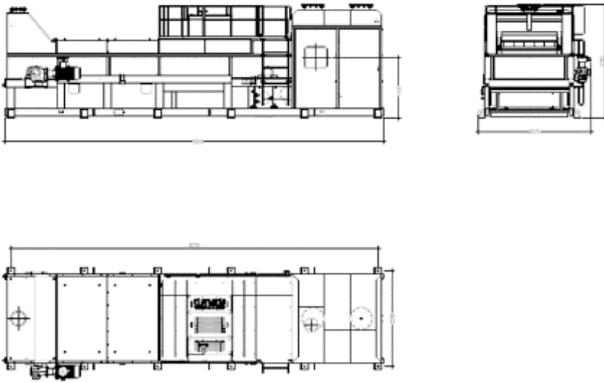


项目 Item	内容 Content	备注 Remark
原矿 Raw coal	适用于原煤破碎初选。适用于钨、锡、锑、铅锌、铜、金、银、钼等金属矿及萤石、磷、硫化铁等非金属矿。 Applicable for raw coal crushing and preliminary sorting; Applicable for tungsten, tin, antimony, lead and zinc, copper, gold, silver, molybdenum and other metallic minerals and fluorite, phosphorus, sulfide and other non-metallic minerals.	
分选原理 Separation principle	XRT	X射线衍射形貌术 X-ray Diffraction Topography
粒度范围 Size fraction	可以根据不同的要求选择多种范围，包括：+8-40mm，+12-60mm，+20-100mm，+50-300mm。 Size range varies according to different requirement, including: +8~40mm, +12~60mm, +20~100mm, +50~300mm.	
产量 Output	40-380吨/小时，由入料原矿及皮带宽度等因素决定。 40-380t/h, depends on feed raw coal characters, belt width, belt speed, feed size and other factors.	
主机尺寸 Dimension	9*2.3*2.5 (m)	
重量 Weight	10 (t)	
功率 Power	< 10KW	



XRT智能光电矿石分选机是高效环保的智能矿石分选设备。经矿山实际测算，抛废率可高达88%，针对原矿抛废率可达30~60%，金属回收率最高可达99%。金属有效分选粒级范围+8-100mm，煤矿有效分选粒级范围+10-300mm，单机处理量最高可达40~380t/h，是目前国内唯一在有色金属、黑色金属、非金属和煤矿均有实际应用的智能矿石分选机。

XRT sorter is a highly efficient and environmentally friendly intelligent ore sorting equipment, it has been practically applied in the field of coal gangue pre-discarding, non-ferrous metal and ferrous metal pre-concentration. According to the actual calculation, the waste disposal rate can reach as high as 88%, the waste disposal rate for the raw ores can reach up to 30 - 60%, and the metal recovery rate can reach up to 99%. Capacity of single unit of XRT sorter is 40 - 380tph.



### XRT智能干选系统组成

智能矿石分选机主要部件，按照各部分的结构实现功能，可分为以下4个部分：

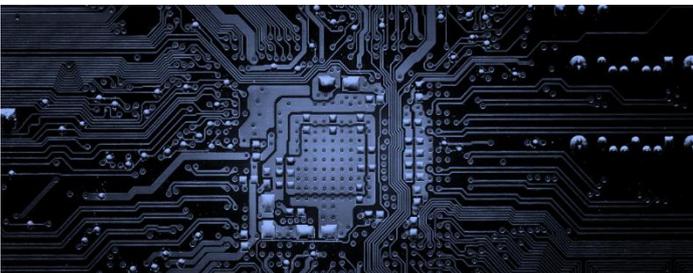
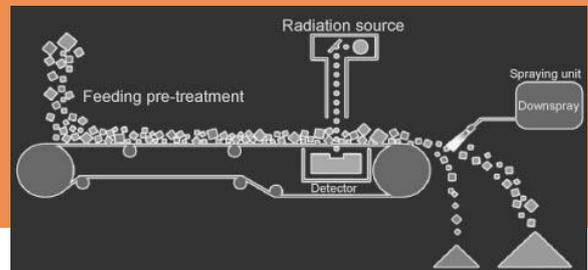
- 给料系统：输送矿石，让矿石间隔、稳定地进入检测区域。
- 检测系统：是矿石分选设备的核心部分
- 信号处理系统：对检测系统获取的特征信息进行高速处理，利用人工智能算法对矿石图像和数据进行分析和识别，并决定是否喷除废石。
- 分离执行系统：利用高压气排枪作为动力，可将目标矿石喷离原有路线，实现分选目的。

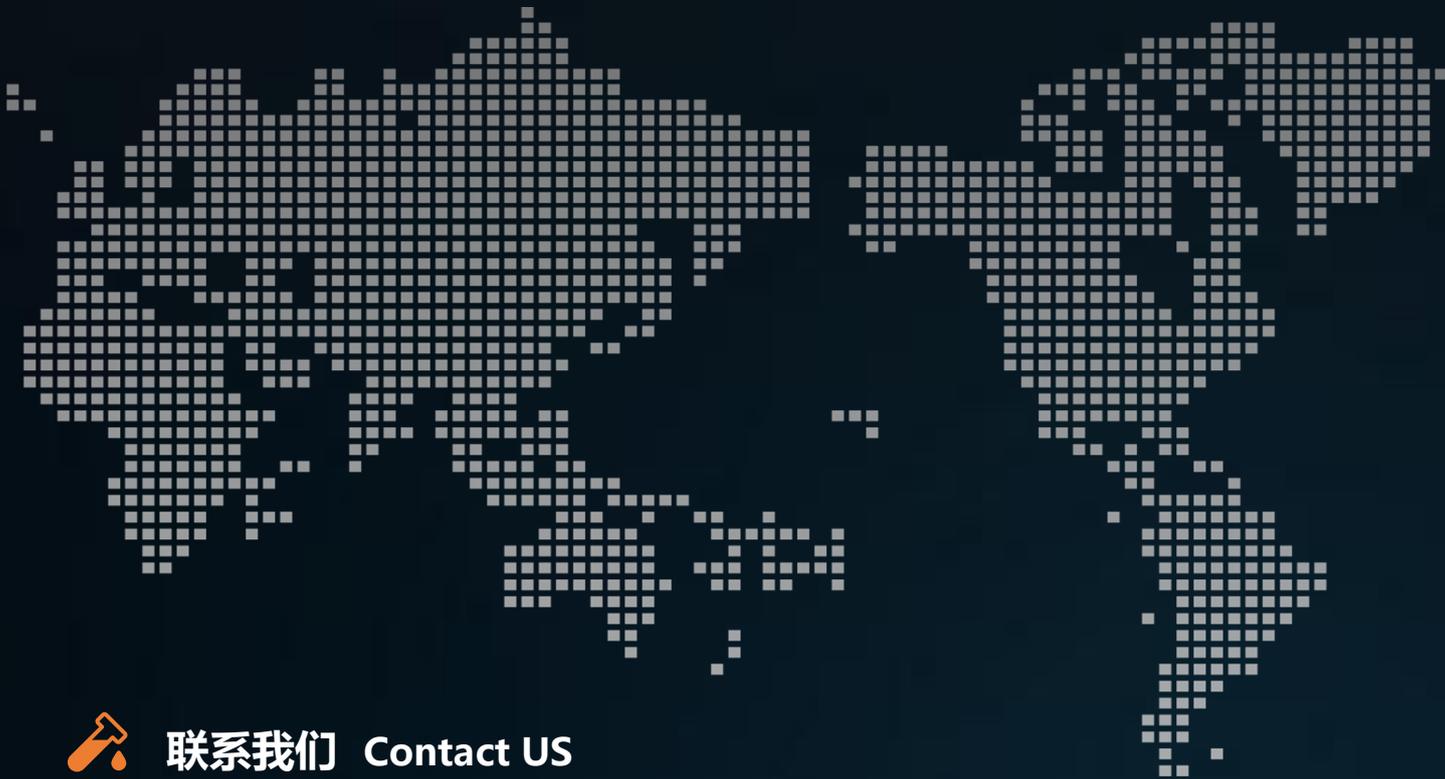
### XRT Intelligent Sorting System

- The main components of the intelligent ore separation machine, according to the structure of each part, can be divided into the following 4 parts: Feeding, Detection, Signal Processing and Sorting and Execution System.

- 高压气排枪具有反应迅速，控制灵敏的优点，相比传统的机械打板，新型的机械手等方式，具有显著的产量优势。
- 喷吹系统独有二个1立方米的风包设计，更安全可靠，安监环保检测合格。
- 设备自带有矿石、废石计量功能，可代替矿石计量器，并能详细分粒级统计。
- 喷吹阀距合理，避免了同类产品喷阀间距宽，导致的喷吹操作时易出现连带喷吹或吹不到，精矿、废石一起被吹出，造成废石品位偏高的问题。
- 采取更安全的III类射线装置实际使用功率160W，仅为同类产品（3000W）的十五分之一。辐射安全无需担心。

- The high pressure air blower has the advantages of quick response and sensitive control.
- The injection system has two unique 1 m<sup>3</sup> air bags.
- The power of the ray source device of the intelligent ore separation machine is 200W, and the actual power is 160W, which is only one fifteenth of the similar products (3000W).





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