

# Xstrata Technology - 30 years at technological forefront



The ISASMELT plant at the YMG lead-zinc complex in China.



A copper electro-winning tankhouse that uses ISA PROCESS.

**X**STRATA Technology (XT) develops, markets and supports technologies for the global mineral processing and metals smelting and refining industries.

For more than 30 years, the technology has been developed at Xstrata's operating sites, to enable robust technology designed and operated by operators to be transferred to other operating sites.

Two of the key technologies, the ISASMELT smelting process and Tankhouse Technology, incorporating the ISA PROCESS/Kidd Process for electro-winning and electro-refining, have been key technologies used in a number of metal processing sites in Asia.

ISASMELT technology is the versatile TSL (top submerged lance) smelting solution used in base metal smelting operations including copper, lead and scrap, as well as ISACONVERT continuous converting technology, used in converting copper matte to blister. ISASMELT is responsible for more than 6mtpa of copper concentrate being smelted world wide.

The ISA PROCESS and Kidd Process are permanent stainless steel cathode technologies including the waxless ISA 2000 system, BR and HP Cathodes and Duplex Cathodes as well as integrated electrode handling systems, such as robotic cathode stripping machines. There are more than 21 copper refineries using ISA or Kidd Process in the Asian region alone.

The key to all XT's technologies is robust design that was designed by operators for operators. Importantly, the technology is provided as a package, which, depending on the project, provides the client a comprehensive, tailored solution involving integrated process and equipment design, detailed engineering, equipment supply, operator training, commissioning assistance and ongoing process and maintenance support. Clients get the latest technology based on technologies originally developed for use in Xstrata's Australian operations.

One of the first smelters to use ISASMELT technology was Vedanta's copper smelter at Tuticorin, India, in 1996. While the original smelter was based on a design capacity of 60,000 tonnes per year of copper in matte, this was

soon increased to 150,000 tonnes per year with oxygen enrichment to the lance. In 2005 a new ISASMELT plant was built and has enabled up to 1,300,000 tonnes per year of copper concentrate to be treated through just one furnace. At the same time, XT provided a copper refinery to produce LME grade copper cathode, utilizing the ISA 2000 stainless steel cathode technology and stripping machines.

The smelter, one of the first copper smelters with a capacity greater than 1 million tonnes/year of concentrate, reached design capacity within two months of start up. The training of operators at an Xstrata site before they started their own plant, as well as commissioning assistance provided by the experienced XT personnel was instrumental in ensuring quick and safe start up, a feature of the ISASMELT package today. Further development by Vedanta engineers over time has enabled the Tuticorin site to be one of the world's lowest cost copper producers.

While Xstrata Technology's smelting and refining technology has been at the forefront of a number of Chinese operations, a recent development in lead smelting has been the integration of ISASMELT technology with traditional lead blast furnace technology.

Developed in collaboration with Yunnan Metallurgical Group (YMG), the ISA-YMG process uses an ISASMELT furnace to replace the sinter plant, to produce bullion and lead-rich slag. The lead-rich slag is cooled and fed to a lead blast furnace to produce discard slag and bullion. Replacement of the sinter plant by an ISASMELT furnace allows efficient and improved capture of sulphur bearing gases and direct production of lead bullion, which provides a cleaner and low cost route for lead production.

The ISA-YMG process forms the core of a new greenfield lead and zinc complex at YMG's Qujing operation in China. Another lead ISASMELT is being integrated into Kazzinc's existing lead smelter in Ust-Kamenogorsk, Kazakhstan, which also has an integrated copper ISASMELT and ISA PROCESS being installed.

## 斯特拉塔技术——30年的技术发展

斯特拉塔科技公司 (XT) 开发、营销和支持的技术面向全球矿产加工和金属冶炼及精炼行业。

三十多年来, 斯特拉塔在其作业现场开发技术, 这使运营商设计和操作的稳健技术能够被其他作业现场采用。

ISASMELT冶炼工艺和Tankhouse关键两项核心技术, 结合用于电解提炼和电精炼的ISA工艺/Kidd工艺, 已被亚洲的一些金属加工场作为关键技术采用。

ISASMELT技术是用于铜、铅和尾矿等贱金属冶炼作业的通用顶吹浸没喷枪 (TSL) 冶炼解决方案, 而ISACONVERT连续吹炼技术用于将冰铜吹炼为气泡。目前, 全球采用ISASMELT冶炼的铜精矿每年超过600万吨。

ISA工艺和Kidd工艺是永久不锈钢阴极技术, 包括waxless ISA2000系统、BR和HP Cathodes和Duplex Cathodes, 以及综合电极处理系统, 如机器人阴极剥离机。仅亚洲地区就有超过21家铜精炼厂使用ISA或Kidd工艺。

斯特拉塔所有技术的核心是运营商为运营商设计的稳健设计。重要的是, 该技术成套提供, 针对项目为客户提供全面的、量身打造的解决方案, 其中包括整合的工艺及设备设计, 详细的工程设计, 设备供应, 操作人员培训, 调试援助, 和现有的工艺和维护支持。客户将获得最新的技术, 新技术基于斯特拉塔最初为其澳大利亚作业开发的技术。

1996年, Vedanta在印度Tuticorin的铜冶炼厂采用ISASMELT技术, 是最早使用该技术的冶炼厂之一。该冶炼厂最初的设计产能为每年从冰铜中冶炼6万吨铜, 但通过富氧的喷枪, 其产能很快提

高至15万吨/年。2005年, 在一家新建的ISASMELT工厂中, 仅一个熔炉每年就能加工130万吨铜精矿。与此同时, 斯特拉塔建成了一座铜精炼厂生产LME级电解铜, 采用ISA 2000不锈钢阴极技术和剥离机。

该冶炼厂是精矿产能最早超过1百万吨的铜冶炼厂之一, 投产后两个月内就达到了设计产能。建厂之前, 运营商在斯特拉塔的作业现场接受培训, 斯特拉塔经验丰富的工作人员提供的调试协助对于确保快速和安全投产至关重要, 这就是ISASMELT成套技术的一个特点。Vedanta工程师持续的开发活动使Tuticorin成为全球成本最低的铜生产商之一。

虽然在中国的一些作业现场, 斯特拉塔科技公司的冶炼和精炼技术已属前沿, 但公司最近关于铅冶炼的一项开发将ISASMELT技术与传统的铅鼓风炉技术结合了起来。

与云南冶金集团 (YMG) 合作开发的ISA YMG工艺使用一种ISASMELT熔炉取代烧结机生产黄金和富含铅的矿渣。富含铅的矿渣冷却后被送入铅高炉用于生产废渣和金银。用ISASMELT炉替代烧结机能有效地改善含硫气体俘获和粗铅的直接生产, 这为较清洁的低成本铅生产提供了一条出路。

在云南冶金集团的中国曲靖作业中, ISA - YMG工艺成为新建的铅和锌生产基地的核心。另一个铅ISASMELT正被纳入Kazzinc在哈萨克斯坦Ust-Kamenogorsk现有的铅冶炼厂中, 该厂将铜ISASMELT与ISA工艺结合在一起安装。

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