



康世富全球商业案例表

Application 应用	Status 状态	Description 描述
SRU tail gas (with tar fuelled incinerator) 硫磺回收装置尾气 (带以焦油为燃料的焚化炉)	Operating since 2002 2002 年起投入使用	Located at a Belgian chemical facility owned by Bayer (now Lanxess). Tail gas from a sulfur recovery unit is burned with high sulfur content tars in an incinerator. The off-gas (containing 1% SO ₂) is quenched and cooled before entering the CANSOLV unit which absorbs as much as 99.9% of the SO ₂ leaving as little as 10 ppmv residual SO ₂ in the gas. Recovered SO ₂ is recycled to the Claus unit. Flow is 7,500 SCFM. 位于拜耳 (现名朗盛) 旗下的一家比利时化工厂。尾气来自硫磺回收装置, 与焚化炉高硫含量焦油混同燃烧。废气 (含 1%SO ₂) 先被淬灭冷却, 然后进入康世富装置, 高达 99.9%的SO ₂ 被该装置吸收, 气体中仅残留 10ppmv的SO ₂ 。回收后的SO ₂ 再度循环到克劳斯装置。烟气流量为 7,500 SCFM。
Concentrated Zinc Smelter Off Gas 锌熔炉尾气	Operating since 2002 2002 年起投入使用	The process recovers SO ₂ from a 7% to 10% SO ₂ gas from a metallurgical roaster. The recovered SO ₂ is absorbed to maximum loading in CANSOLV Absorbent DM™ (CANSOLV SO ₂ SAFE™ process) and shipped by truck to a second site where the absorbent is regenerated and product SO ₂ is used in a copper smelting process. The unit has a capacity of 33 tpd of SO ₂ and treats approximately 2500 SCFM of gas. It is owned by the Noranda Income Fund (now Xstrata) and is located near Montreal, Canada. Emissions are approximately 30 to 45 ppmv. 该工艺来自冶金煅烧炉SO ₂ 浓度 7%到 10%的烟气中回收SO ₂ 。回收后的SO ₂ 被吸收至康世富胺液的最大负载量 (康世富SO ₂ SAFE™工艺), 然后用卡车运到另一个地点, 溶剂在此进行再生, SO ₂ 产品则用于熔炼铜工序中。该装置容量为 33 吨SO ₂ /天, 处理的烟气量约 2500 SCFM。装置业主为诺兰达收益基金所有 (目前是Xstrata集团), 设在加拿大蒙特利尔附近。SO ₂ 排放浓度约为 30 到 45ppmv。
Refinery Acid Plant Tail Gas 精炼厂制酸装置尾气	Operating since 2002 2002 年起投入使用	Located at a Los Angeles oil refinery (Conoco Phillips), this unit treats tail gas from a sulfuric acid plant. The gas flow rate through the CANSOLV® SO ₂ Scrubbing System is 25,000 SCFM with an SO ₂ concentration of 5000 ppmv. The outlet SO ₂ concentration is less than 15 ppmv, some three times lower than the California South Coast Air Quality Management District requirement. 位于洛杉矶一家精炼厂 (康菲-菲利普斯), 处理硫酸装置排放的尾气。烟气经过康世富SO ₂ 清洁系统的气体流速是 25,000 SCFM, SO ₂ 浓度为 5000 ppmv。出口SO ₂ 浓度低于 15ppmv, 较“加利福尼亚南部沿海空气质量管制区”要求低三倍左右。
Lead Smelter Off-Gas 铅熔炉尾气	Operating since Dec. 2005 2005 年 12 月起投入使用	Located near Udaipur, India, this unit captures off-gas from a batch lead smelter. Concentration of SO ₂ varies one hundred fold during the process cycle (from 11% at peak down to 1000 ppmv) so very high turndown on absorbent flow is required. Fluctuations in incoming SO ₂ are managed by varying the volume of rich amine, allowing the regeneration side to operate at constant flow, delivering pure SO ₂ at a steady rate to a downstream acid plant. 位于印度乌代浦尔附近, 该装置俘获来自间歇式熔炉的尾气。SO ₂ 浓度在该工序周期内有一百倍的变化 (从峰值 11%跌到 1000ppmv),



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		<p>所以要求对溶剂流量进行大范围调节。SO₂输入的波动量靠改变富胺量进行控制，使得再生一侧能以恒定流量工作，并以稳定速度将纯SO₂送到下游制酸车间。</p>
<p>SRU tail gas (with acid gas fuelled incinerator) 硫磺回收装置尾气 (带以酸气为燃料的焚化炉)</p>	<p>Operating since July 2006 2006年7月起投入使用</p>	<p>Classic CANSOLV sulfur unit tail gas design at a BP refinery in the Western US. Part of the refinery acid gas bypasses the SRU and fuels an incinerator to oxidize the tail gas. After waste heat recovery, CANSOLV[®] SO₂ Scrubbing System captures the SO₂ down to 140 ppmv, though the owner can lower this by modulating heat input and circulation. Pure SO₂ is recycled to the thermal stage of the SRU, reducing both the duty of the thermal stage and the air input (and corresponding inter load). The SRU capacity increases by 15% with this strategy (without oxygen enrichment). Furthermore, zero COS and CS₂ emissions are achieved without any special catalysts. Flow: 12000 SCFM, inlet SO₂: 4%.</p> <p>这是美国西部一家BP精炼厂典型的康世富硫磺装置尾气设计。精炼厂酸气中的一部分绕过硫磺回收装置，作为焚化炉的燃料使尾气氧化。废热回收后，康世富SO₂清洁系统将SO₂俘获，使其低至 140ppmv排放，尽管业主也可以通过调节热输入和循环将其降低。纯SO₂再度循环到硫磺回收装置的热阶段，降低热阶段的负荷，也降低空气输入量（以及相应的中间负载）。采用这一策略后，硫磺回收装置的容量提高了 15%（无富氧）。此外，不采用任何专用催化剂，也能实现COS和CS₂零排放。烟气流量：12000 SCFM，入口SO₂浓度：4%。</p>
<p>Refinery Fluid Coker Flue Gas 精炼厂流化焦化装置废气</p>	<p>Operating since Sept. 2006 2006年9月起投入使用</p>	<p>This unit removes SO₂ from refinery fluid coking unit (FCU). Gas volume is 280,000 SCFM and inlet SO₂ concentration is 2000 ppmv. Outlet concentration requirement is 25 ppmv. The unit run-length design basis is 3 years between shutdowns. The plant is owned by Valero Refining and is located in the state of Delaware, USA.</p> <p>该装置从精炼厂流化焦化装置（FCU）中去除SO₂。气体容量为 280,000 SCFM，SO₂入口浓度 2000ppmv。出口浓度要求为 25ppmv。装置运行周期设计原则是三年一停。设备业主是Valero精炼，位于美国特拉华州。</p>
<p>Refinery FCCU Flue Gas 精炼厂催化裂化装置废气</p>	<p>Operating since Dec. 2006 2006年12月起投入使用</p>	<p>This unit removes SO₂ from refinery catalytic cracking unit (FCCU) off-gas. The volume of gas is 435,000 SCFM and inlet SO₂ concentration is 800 ppmv. Outlet concentration requirement is 25 ppmv and the unit must run 5 years without interruption between scheduled shutdowns. This is the largest CANSOLV[®] SO₂ Scrubbing System designed to date. Captured sulfur dioxide will be fed to the refinery sulfur unit and converted to sulfur. The plant is owned by Valero Refining and is located in the state of Delaware, USA.</p> <p>该装置从精炼厂催化裂化装置（FCCU）废气中去除SO₂。气体容量为 435,000 SCFM，SO₂入口浓度 800ppmv。出口浓度要求为 25ppmv，而且装置必须运行 5 年不间断运行，不得在预先安排的停车之间中断。这是迄今为止设计的最大型的康世富SO₂清洁系统装置。被俘获的二氧化硫将送至精炼厂硫磺装置，转化成硫磺。设备业主是Valero精炼，位于美国特拉华州。</p>



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Copper Smelter Off-Gas 铜熔炉废气	Start-up Sept. 2007 2007年9月 起投入使用	<p>Located in China, this unit captures off-gas from a batch copper smelter. The volume of the gas is about 25,000 SCFM and the concentration of SO₂ varies from 900 ppmv to 2% during the process cycle. Fluctuations in the SO₂ concentrations are managed by varying the rate of amine flow to the absorption tower and varying the amine liquid levels in the rich amine and lean amine tanks. This permits regeneration of the amine at a constant rate, thus the delivery of a steady flowrate of SO₂ to downstream operations.</p> <p>位于中国，该装置从间歇式铜熔炉俘获废气。烟气的流量约 25,000 SCFM，在每个工序周期期间SO₂浓度从 900ppmv变化到 2%。通过调节流到吸收塔的胺液流量以及富胺罐和贫胺罐的胺液液位来管理SO₂浓度的波动，这样使得胺液以恒定流量进行再生，所以能以稳定流速输送SO₂至下游的酸厂制酸。</p>
Spent Catalyst Roaster 催化焙烧炉	Start-up Dec. 2007 2007年12 月开车	<p>Located near Edmonton, Alberta, Canada. This roaster regenerates spent catalyst from oil and gas processing facilities. It processes 30,000 SCFM of gas containing up to 9000 ppmv SO₂. The product SO₂ is sold in the Edmonton area as dry liquid SO₂.</p> <p>位于加拿大阿尔伯达省埃德蒙顿市。此焙烧炉从石油和烟气处理设备中再生废催化剂。烟气量为 30,000 SCFM，SO₂浓度为 9000ppmv。副产品液体SO₂在埃德蒙顿地区销售。</p>
Coal Fire Cogeneration Boiler 燃煤锅炉尾气	Start-up May 2009 2009年5月 开车	<p>Located in the Guizhou province, China, these four CANSOLV scrubbers treat a combined flow of 600,000 SCFM containing up to 4800 ppmv (13,000 mg/ Nm³) SO₂. The scrubber will produce 130,000 tons per year of commercial grade (98%) sulfuric acid. Based on the regenerator tower size, this is another largest individual CANSOLV[®] SO₂ Scrubbing System designed to date.</p> <p>位于中国贵州省。四套康世富俘获系统用于治理总烟气量为 600,000 SCFM，SO₂浓度为 4800 ppmv (13,000 mg/ Nm³)，每年产出 130,000 吨的工业级纯度为 98%的硫酸。从解析塔的尺寸看，这是目前为止另一个最大的工业应用的康世富SO₂俘获系统设计。</p>
Ferric ball sinter tail gas 铁球团烧结机尾气	Start-up Q3-2009 2009年第三 季开车	<p>位于中国安徽。一套康世富清洁系统用于铁球团烧结机尾气治理，气量为 270,000Nm³/h，SO₂浓度为 2400 ppmv。</p>
Lead Smelter Off-Gas	Start-up Q4-2009	<p>Located in China, this unit captures SO₂ from the offgas of a batch lead smelter as well as from the tail gas of an acid plant. The gas flowrate and SO₂ concentration of the smelter offgas varies with the smelter cycle. A constant flowrate of the smelter offgas is sent directly to acid</p>

<p>铅熔炉尾气</p>	<p>2009年第四季度开车</p>	<p>plant. The CANSOLV unit treats the remainder of the smelter offgas. In order to level the SO₂ concentration in the gas feed to the acid plant, the CANSOLV unit varies the regeneration rate of SO₂ as a function of the SO₂ concentration in the smelter offgas. The advantage of this application is that the acid plant size is minimised and will operate under steady conditions, whereas the CANSOLV unit will handle the varying gas flowrate and SO₂ concentration. Furthermore, heat integration by use of a double effect flowsheet configuration will result in 32% steam savings compared to a conventional single effect design.</p> <p>位于中国，该装置从间歇式熔炉和硫酸厂尾气俘获SO₂，尾气的气体流量和SO₂浓度跟随着熔炉周期而变化，部分尾气以恒定流量输送到酸厂，剩余的尾气由康世富装置处理。为了平衡进入酸厂的烟气中SO₂浓度，康世富装置调节SO₂再生速度。此应用的优势在于可以最小化酸厂的尺寸并且酸厂可在稳定状态下运行，因为康世富装置可处理多变的烟气流量和SO₂浓度。此外，与传统单效设计相比，双效分流热量综合利用配置可节省 32%的蒸汽耗量。</p>
<p>Spent Catalyst Roaster 催化焙烧炉</p>	<p>Start-up Jan. 2009 2009年1月开车</p>	<p>Located in Texas, USA. This roaster regenerates spent catalyst from oil and gas processing facilities. The CANSOLV[®] SO₂ Scrubbing System processes 120,000 SCFM of gas containing up to 5000 ppmv SO₂.</p> <p>位于美国的德克萨斯州。焙烧炉从油与气的处理装置再生催化剂。康世富SO₂俘获装置处理 120,000 SCFM的烟气量，SO₂浓度为 5000ppmv.</p>
<p>Refinery Acid Plant Tail Gas 精炼厂硫酸装置尾气</p>	<p>Start-up Q2-2009 2009年第二季度开车</p>	<p>Located in the Middle-East, this unit treats tail gas from a sulfuric acid plant. The gas flow rate through the CANSOLV[®] SO₂ Scrubbing System is 20,000 SCFM with an SO₂ concentration of 2000 ppmv. The unit is designed for outlet SO₂ concentration below 100 ppmv. Regeneration occurs in a stripper common to another Cansolv unit treating FCCU off-gas.</p> <p>位于中东，尾气来自于硫酸厂。康世富SO₂俘获系统处理的烟气量为 20,000 SCFM，SO₂浓度为 2000 ppmv，SO₂排放浓度设计值为低于 100 ppmv。与另一个康世富催化裂化装置共用解析塔进行胺液再生。</p>
<p>Refinery FCCU Flue Gas 精炼厂催化裂化装置尾气</p>	<p>Start-up Q2-2009 2009年第二季度开车</p>	<p>Located in the Middle-East, this unit treats tail gas from a FCC unit. The gas flow rate through the CANSOLV[®] SO₂ Scrubbing System is 115,000 SCFM with an SO₂ concentration of 2000 ppmv. Regeneration occurs in a stripper common to another Cansolv unit treating Acid Plant Tail Gas.</p> <p>位于中东，尾气来自于催化裂化装置尾。康世富SO₂俘获系统处理的烟气量为 115,000 SCFM SCFM，SO₂浓度为 2000 ppmv，与另一个康世富硫酸装置共用解析塔进行胺液再生。</p>
<p>SRU tail gas 硫磺回收装置尾气</p>	<p>Start-up 2009</p>	<p>This CANSOLV unit treats a 11,000 SCFM gas stream from the tail gas incinerator. After waste heat recovery, the CANSOLV[®] SO₂ Scrubbing System captures the SO₂ down to 20 ppmv. Pure SO₂ is recycled to the thermal stage of the SRU. The plant is located in</p>



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	2009 年开车	Canada. 康世富装置处理来自焚化炉流量为 11,000 SCFM 的尾气。在废热回收之后，康世富SO ₂ 俘获系统将SO ₂ 浓度降低至 20 ppmv。纯净的SO ₂ 被循环至硫磺回收装置的热端。工厂位于加拿大。
Sinter machine tail gas 烧结机尾气	Start-up 2009 2009 年开车	Located in Shandong China. The gas flow is 510,000 Nm ³ /h, SO ₂ concentration is 700ppmv, and be treated to 50mg/Nm ³ . 位于中国山东。康世富系统处理气量为 510,000 Nm ³ /h, SO ₂ 浓度为 700ppmv。实现SO ₂ 排放量为 50mg/Nm ³ 。
Steel sinter machine 烧结机尾气	Start-up 2009 2009 年开车	Located in Shandong China. The gas flow is 500,000 Nm ³ /h, SO ₂ concentration is 650ppmv, and be treated through CANSOLV unit to 50mg/Nm ³ . 位于中国山东。康世富系统处理气量为 500,000 Nm ³ /h, SO ₂ 浓度为 650ppmv。实现SO ₂ 排放量为 50mg/Nm ³ 。