高科技產業污染防治技術

豐映科技股份有限公司

奧特拉斯能源系統股份有限公司

RESI Corporation / Atlas Innotek Corporation

揮發性有機氣體及臭氣處理技術

CONTROL OF VOLATILE ORGANICS, HALOGENATED ORGANICS, AND ORDORS

豐映科技股份有限公司(RESI)與Atlas Innotek技術合作，提供各種揮發性有機氣體、鹵化有機氣體、毒性氣體及臭氣之全面性解決方案。所提供之技術包括：高溫脈衝波反應器（PDR）、熱觸媒氧化技術、再生式氧化熱處理技術、及活性碳吸附技術。

系統特性

- 世界性的 TURNKEY 服務
- 模組化設計，處理容量：10 - 5,000 Nm^3/min
- 完備的實驗室支援，提供可行性分析、最適化設計及處理性能電腦模擬
- 符合環保法規的模組化空氣淨化系統
- 先進的控制系統

控制系統

利用可程式型控制器設定吸附及脫附行程，並利用連續監測記錄系統進行流量、排放濃度、溫度、及其他系統參數。此系統並可利用數據機與中央控制系統連線，進行系統遙控、故障排除及記錄分析。

工業應用

- 化學及石化工業
- 塑膠及橡膠工業
- 油漆及溶劑工業
- 汽車工業
- 航太工業
- 塗裝及電鍍工業
- 農產及食品加工業
- 電子及電腦工業
- 製藥及醫學工業
- 其他

RESI Corporation provides a total engineering solution and a full spectrum of technologies for the removal and control of volatile organics, halogenated organics, air toxics and odors. The technologies provided by RESI and his cooperation partner, Manchester Corporation, include Thermal-Catalytic Oxidation, Regenerative Thermal Oxidation, and Active Carbon Adsorption.

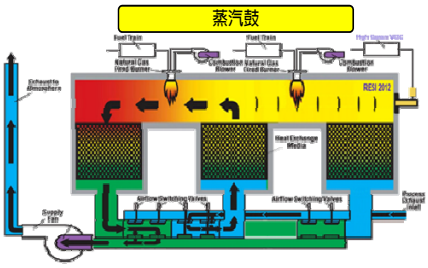
	專利編號	專利名稱
發明專利	I 448657	一種使用氣體逆流爆轟衝擊波的連續化學反應方法及應用該方法之爆轟反應器
新型專利	M440814	用於有害化學廢氣處理的高溫脈衝波反應器
新型專利	M464636	可產生蒸汽的蓄熱再生型氧化器
發明專利	ZL 2012 1 0143533.6	一種連續化學反應方法及應用該方法之爆轟反應器
發明專利	I504844	一種揮發性有機化學廢氣處理並回收能源的方法及使用該方法的蓄熱再生氧化型蒸氣鍋爐

CONTROL SYSTEM

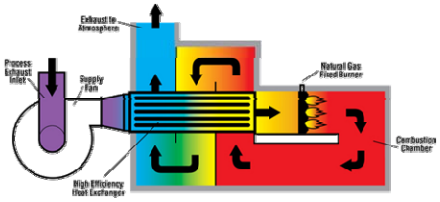
A programmable controller provides automatic setting of adsorption and desorption cycles, as well as on-line monitoring for record keeping and reporting in compliance with regulations. Flow rates, discharge parameters, temperatures, valve status and other key operating information are continuously recorded and available for reporting purposes. The control unit can be connected to a central location via modem, for remote monitoring and trouble-shooting.

INDUSTRIAL APPLICATIONS

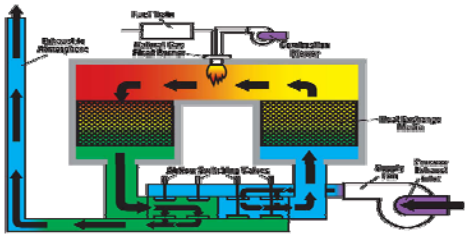
- Aerospace
- Automotive
- Chemicals
- Coating
- Degreasing
- Electronics
- Pharmaceutics and Medical
- And More



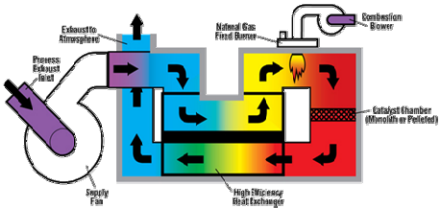
PDR-RTO技術（專利技術）



DFTO技術



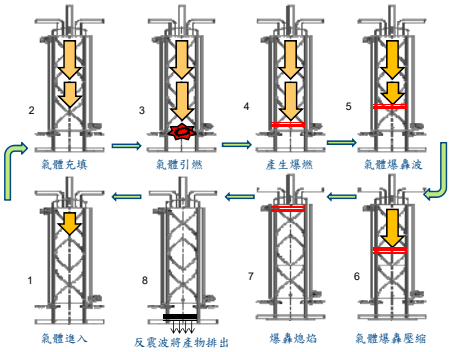
RTO技術



RCO技術

高溫脈衝波反應器技術（PDR）

可燃氣體與適量空氣或氧之混合氣在一管狀容器中的某點著火時，突然增加燃燒傳播速度，使得火焰面非常快速進行並與其前方壓縮波結合生成衝擊波，且使其速度達音速以上並趨於安定的現象稱為爆轟（Detonation），而此局部反應區域稱為爆轟波。爆轟波通過後，其化學組成即發生變化，此爆轟波若撞到物質，不但在極短時間內給予強烈的衝擊壓力及高溫，同時也會產生機械的破壞作用。



高溫脈衝波反應器Pulse Detonation Reactor是一種類似汽車引擎的一種用於有害化學廢氣處理的高溫反應器,於2012年由張榮興博士發明。其運作原理如下：

（1）將需要使用高溫反應或破壞的有害化學廢氣噴注進高溫脈衝波反應器；
（2）將燃料送入高溫脈衝波反應器；
（3）將空氣/水/助劑注入高溫脈衝波反應器；
（4）利用爆轟促進器促進燃料、有害化學廢氣及空氣/水/助劑的混合；
（5）利用安裝於爆轟促進器下游端的點火裝置組將混合氣體點燃；
（6）利用爆轟促進器使得該混合氣體回火產生逆流爆轟；
（7）當爆轟高溫衝擊波抵達高溫脈衝波反應器進料端時利用爆轟高溫衝擊波使得火焰熄焰；
（8）連續重複上述氣體反應物及有害化學廢氣的混合、點燃、逆流爆轟、熄焰的程式，使得有害化學廢氣能連續利用爆轟高溫衝擊波的高溫、高壓進行反應或破壞。

基本技術：RTO / RCO / TO、高溫脈衝波反應器、內置式水管鍋爐

- ✧ 能安全處理各種高濃度VOC廢氣
- ✧ 能源使用效率高、設備安全性高
- ✧ VOC處理幾乎不需使用外加熱能（> 500 ppm)
- ✧ 系統縮載比大，操作彈性高

活性碳再生技術(CA)

RESI的活性碳吸附系統可徹底將廢氣中的溶劑蒸氣吸附。廢氣利用排風機送入活性碳吸附塔，將有機溶劑吸附去除。系統利用蒸汽週期性地將活性碳再生，所產生溶劑蒸氣再利用冷凝器冷凝，並進行溶劑及水之分離。活性碳床再利用空氣冷卻及乾燥，以供繼續吸附使用。再生週期則利用間歇性的連續採樣監測設備決定之。

再生式氧化熱處理技術(RTO)

RESI 的再生式氧化熱處理系統可徹底將廢氣中的溶劑蒸氣焚化，並達到99%以上的破壞去除效率及95%以上的能源回收效率。廢氣首先被送入預熱系統預熱，然後與高溫火焰接觸，並維持在800 ℃以上高溫，將揮發性有機溶劑徹底破壞。

利用多個陶瓷填充蓄熱床的特殊設計，RESI 的 RTO 系統隨時都可以維持在最佳的操作條件。處理後的排氣則經冷卻後，視需要作處理，以達環保單位之要求。RTO 的再生週期則視熱回收效率及利用間歇性的連續採樣監測設備決定之。三床式再生系統設計，省能源、操作維護簡單。

觸媒氧化熱處理技術(RCO)

RESI 的觸媒氧化熱處理系統可徹底將廢氣中的溶劑蒸氣於低溫條件下利用觸媒進行催化性焚化，並達到99%以上的破壞去除效率。廢氣首先被送入預熱系統預熱，然後與 250 至 400 ℃ 的觸媒接觸，利用觸媒的催化作用將揮發性有機溶劑徹底破壞。

採用先進的電腦化控制系統，RESI 的 RCO 系統隨時都可以維持在最佳的操作條件。處理後的排氣則經冷卻後，視需要作處理，以達環保單位之要求。RCO 的再生週期則視熱回收效率及利用間歇性的連續採樣監測設備決定之。

CARBON ADSORPTION SYSTEMS

RESI's Carbon Adsorption Systems collect airborne solvent vapor from an exhaust source. A blower fan drives vapors through a bed of activated carbon where emissions are adsorbed. Periodically, steam is passed over the adsorption unit to vaporize the adsorbed solvent, which is fed into a condenser. The water/solvent mixture is separated; the adsorption bed is then cooled and dried with ambient air to prepare the unit for its next adsorption cycle. Cycle times are determined by intermittent continuous sampling

SYSTEM FEATURES

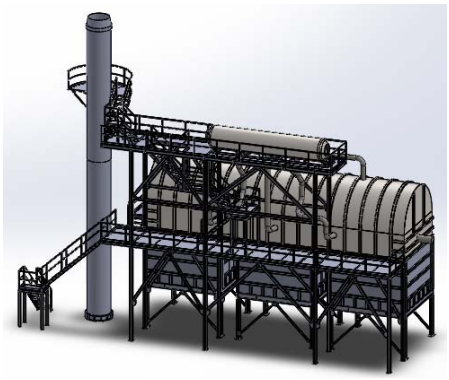
- Turnkey installation available worldwide
- Single bed or multiple bed units
- Steam regeneration
- Air stripping modules for compliance with EPA regulations
- Advanced electronic control allow for remote monitoring and trouble shooting

REGENERATIVE THERMAL OXIDATION

RESI's Regenerative Thermal Oxidation (RTO) Systems will incinerate airborne waste solvents to over 99% efficiency with 95%+ energy recovery efficiency. The gases are drawn through a preheater, exposed to a flame, then held in a combustion chamber at 800 ℃ or higher to complete the destruction. With our thermal regeneration design, up to 98% of the energy can be recovered. With a multiple bed configuration, our system provides optimal thermal conditions at all times. The gas stream is then cooled and post-processed to meet EPA regulation and permit requirements.

.CATALYTIC THERMAL OXIDATION

RESI's Catalytic Thermal Oxidation (CTO) Systems will incinerate airborne waste solvents to over 99% efficiency. The gases are drawn through a preheater, flow through a catalyst bed which is held at an elevated temperature about 250 to 400 ℃ to complete the destruction. With our catalytic thermal oxidation design, minimum energy will be used. The gas stream is then cooled and post-processed to meet EPA regulation and permit requirements.



SYSTEM FEATURES

- Turnkey installations: 200 - 100,000 scfm
- Laboratory supported feasibility and treatability studies
- Modualized design, easy maintenance and easy operation
- Chlorinated systems complete with quench tower, scrubbers and water treatment systems
- Advanced electronic controls allow for remote monitoring and trouble-shooting
- And many others

多氟化合物廢氣處理系統

RESI PFC Abatement System

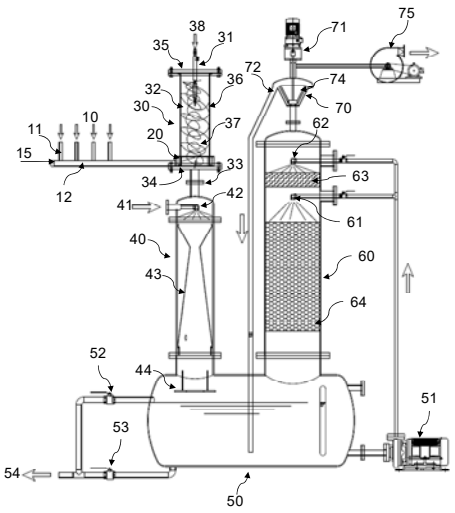
豐映科技股份有限公司（RESI）是台灣地區最有經驗的電漿熔融、熱解、氣化及能源整合系統設計建造專家。RESI 為了有效解決我國電子產業多氟化合物廢氣處理問題，特別精心開發出『渦流電漿反應器多氟化合物廢氣處理』，利用此全氟化物的電漿處理裝置，可以將含有多種全氟化物的廢氣有效處理，並達到 99.9%的破壞去除效率。

渦流電漿反應器

RESI 特殊設計的渦流電漿反應器，其一端裝設一電漿火炬，將多股全氟化物廢氣收集並加入進行反應所需適量水分再以切線方式注入渦流電漿反應器之另一末端，在渦流電漿反應器內形成往電漿火炬方向旋轉的渦流，使全氟化物廢氣與高溫電漿火炬直接接觸後受熱膨脹產生高溫差氣旋渦流，進而形成由電漿火炬往渦流電漿反應器出口方向的逆向高速噴流，使得全氟化物廢氣在渦流電漿反應器內與具有高能量密度的電漿火炬充分混合進行反應而被徹底破壞。

渦流電漿反應器多氟化合物廢氣處理系統

RESI 發展的渦流電漿反應器多氟化合物廢氣處理系統，包含一渦流電漿反應器、一電漿火炬、一文氏滌氣塔、一洗滌液槽、一濕式洗滌塔及一泡沫去除器。



	專利編號	專利名稱
發明專利	I 455755	用於PFCs廢氣處理之渦流電漿反應器
新型專利	M422651	全氟化物的電漿處理裝置及應用於該裝置之渦流電漿反應器
中國發明專利	ZL 2013 1 0123807.X	用於PFCs廢氣處理之渦流等離子體反應器

RESI Corporation has been granted by the Institute of Nuclear Energy Research, Taiwan, for the construction of a plasma melting plant and a plasma gasification and integrated enengy utilization plant in turn-key basis. Both plants have been completed, tested, and demonstrated to be successful. RESI has the most experienced engineers with skillful experiences in using plasma technologies. RESI has developed a patent poending (ROC Patent Application No. 100135156) PFC abatement technology using vortex plasma furnace for semiconductor related industries.

Appications：

Utimate Destruction and Removal of PFCs

$SiH_4 + 2O_2 \rightarrow SiO_2 + 2H_2O$
$CF_4 + 2H_2O \rightarrow CO_2 + 4HF$
$CF_4 + O_2 \rightarrow CO_2 + 2F_2$
$C_2F_6 + 4H_2O + 1/2\ O_2 \rightarrow 6HF + 2CO_2 + H_2O$
$C_2F_6 + 2O_2 \rightarrow 2CO_2 + 3F_2$
$C_3F_8 + 6H_2O + O_2 \rightarrow 8HF + 3CO_2 + 2H_2O$
$C_3F_8 + 3O_2 \rightarrow 3CO_2 + 4F_2$
$SF_6 + 3H_2O \rightarrow SO_2 + 6HF + 1/2\ O_2$
$F_2 + H_2 \rightarrow 2HF$

Vortex Plasma Reactor

RESI has developed a novel plasma apparatus, for the abating emissions of perfluoro compounds, which consists of a vortex plasma reactor, a venturi scrubber, a scrubber liquid sump, a packed tower scrubber, and a foam breaker.

The said vortex plasma reactor has a plasma torch installed at the center of one end, and tangentially injected ports installed at the other end for the intake of flue gas containing perfluoro compounds and an amount of water for chemical reaction, to generate a highly turbulent vortex flow with high temperature gradient for enhancing the chemical reaction and destruction of the said perfluoro compounds. The flue gas from the said vortex plasma reactor is further treated by the said venturi scrubber for quenching and removal of acid gases and particulates, the said packed tower scrubber for the removal of acid gases, and the said foam breaker for the removal of entrained droplets and foams.

The destruction and removal efficiency, of the said plasma apparatus for the abating emissions of PFCs, has demonstrated to reach 99.9%。

廢水處理與工業用水回收再利用技術

INDUSTRIAL WATER TREATMENT AND RECYCLING

台灣地區水資源的分配不均及季節性欠缺愈來愈嚴重，而且工業用水單價日升，加上廢水處理及排放所需費用也日益增加。使得資源回收及水資源回收再利用，於各種工業都愈來愈顯得重要。

為提供工業界可靠且高效率的工業用水回收技術，豐映科技股份有限公司特引進先進的工業用水回收再利用科技。

值得回收再利用嗎？

考慮工業用水回收再利用的兩項主要考慮因素，包括排放水之水質及回收再利用所需之水質。在許多工業用途上，RESI的技術都顯現極有效率的回收成果；通常安裝設備後約10至18個月即可回收成本。

回收再利用的作法

要有效率的建立工業用水回收再利用系統，通常應採行三項步驟：首先應進行現場查勘，分析水流及其品質、工廠配置情況，以判斷是否可進行工業用水之回收。其次應進行可能節約的費用及建設費用評估，判定財務可行性。最後應進行模型廠試驗，收集數據，作為規劃設計之依據。

為何應選擇RESI?

RESI擁有豐富的資源、經驗與技術，可提供有效率的廢水處理及工業用水回收再利用工程服務。自1975年至今，RESI的合作夥伴Manchester 公司已在美國建立各種創新的方案，提供各種不同客戶以最適化的工程系統。

Manchester於美國北卡州三菱公司美國電子廠所建立的工業用水回收再利用系統，於1993年榮獲美國環保署之水資源回收首獎，技術深獲肯定。選擇RESI，必能獲得最可信賴的高品質工程服務。

工業用水回收再利用技術

工業用水回收再利用技術是一種整合性的科技。大部分情況下，均需要使用多種傳統或新穎技術的巧妙整合，例如薄膜分離技術、過濾、活性碳吸附、紫外線/臭氧處理或離子交換等科技。RESI具有整合各種不同技術，為特定需求建立整合性程序之經驗與能力，利用RESI的研發能力，我們可以提供現場評估、測試、規劃設計、許可申請、工程製造安裝、試車、人員訓練至維護保養的全套服務。

系統特性

- 可行性及處理方案評估
- 模組化設計、操作維護簡易
- 先進的自動化控制系統

工業應用

- 化學及石化工業
- 印刷電路板工業
- 汽車工業
- 食品加工及製藥工業
- 紙漿及造紙工業
- 航太工業
- 塗裝及電鍍工業
- 電子及半導體工業
- 其他

Resources conservation, and water recycling in particular, is becoming more and more critical in a wide range of industries. Both the costs of fresh water as well as the cost of disposal and discharge to waste water treatment systems are rising sharply in Taiwan.

RESI Corporation has established technology cooperation with Manchester Corporation to provide our client a total engineering solution for industrial water recycling.

WHO SHOULD RECYCLE?

Due to the shortage of water resources in Taiwan, everyone should consider water recycling. The two main criteria when investigating water recycling are the quality of water being discharged and the quality of water required for reuse. Many applications result in substantial water cost recovery. The system provided by Manchester/ RESI has a typical payback of ten to eighteen months.

STEPS TOWARD WATER RECYCLING

Three steps are required when optimizing the installation of a water recycling system. They are the site survey, pilot testing and final design and installation. First, a site evaluation shall be performed. An analysis of the water stream and plant layout shall be reviewed to ascertain whether water recycling is viable. Potential savings and process costs shall be evaluated. A pilot test shall be run at the facility for some cases. The data collected will confirm equipment selected, operating parameters and operating costs.

WHY RESI?

RESI and Manchester have the resources, experience and expertise to provide cost-effective solutions for waste water treatment and recycling. Since 1975, Manchester has been offering innovative solutions through an engineered approach. Manchester/RESI design solutions to specific needs and provide wastewater treatment and water recycling services to a variety of industries. A system completed by Manchester at Mitsubishi American facility in Durham, NC, which won the 1993 US EPA region IV Water Recycling Award The results for this engineered system are shown ion the chart.

WATER RECYCLING TECHNOLOGY

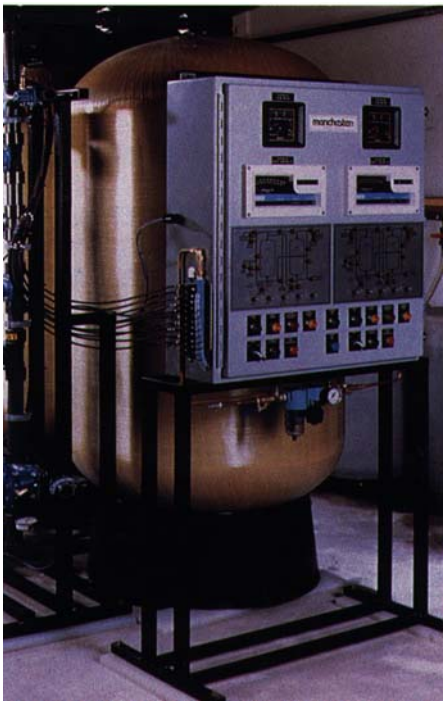
Water recycling is an integrated engineering solution. In most cases, best results are obtained by a judicious combination of several technologies, which may include conventional as well as advanced systems such as membrane separation, filtration, carbon adsorption, UV/ozone treatment and ion exchange. RESI/Manchester engineer systems to meet specific needs, and take responsibility from the site survey, through testing, design, permitting, manufacturing, installation, start-up and training, and equipment services.

SYSTEM FEATURES

- Advanced electronic controls allow for remote monitoring and trouble-shooting
- Laboratory supported feasibility and treatability studies
- Modualized design, turnkey installations, easy maintenance and easy operation

INDUSTRIAL APPLICATIONS

- Aerospace and Automotive Industries
- Chemical and Petrochemical Industries
- Coating and metal processing Industries
- Computer and Semiconductor Manufacturers
- Electroplating and Printed Circuit Industries
- Food and Drug Industries
- Government
- Pulp and Paper
- And More



化學廢棄物收集系統

RESI ChemWaste System

全自動安全可靠的化學廢棄物處理系統

RESI 是台灣最有經驗的廢溶劑資源再生工廠設計建造專家。RESI 為了協助電子工業解決廢棄化學品及廢溶劑處理問題，特別精心設計一套全自動化的模組化廢棄化學品暫存、泵送、貯存及處理系統 ChenWaste System。

ChemWaste 系統提供電子工業 Process Tools 一個安全、有效且經濟的廢棄物清理方案。此系統是由 MPS(模組化泵送系統)、連接管線、貯存槽及全自動圖控電腦控制系統所組成。

MPS 通常安裝於 Process Tools 下方，作為廢溶劑之暫存設施，以便將廢溶劑泵送至集中貯存區，降低廠區廢溶劑處理之風險。

ChemWatse 系統適用於各種製程廢化學品之處理，且可因應各廠特性作元件之選用。所有元組件均設計成符合 NFPA 及 FM 防爆級要求。安全是工業的基本要求，RESI 與客戶一樣關切。

ChemWaste 系統已經使用於台灣積體電路製造股份有限公司、昇利化工股份有限公司、核能研究所電漿熔融廠等廢溶劑應用場所，並證實性能優異。

Safe, Reliable, and Fully Automatical

Waste Handling System

RESI *ChemWaste* System is a modularized chemical waste holding, transportation, storage and handling system. *ChemWaste* System provides safe, efficient, effective and economical waste removal from process tools. The system consists of Mini-Pump Stations (MPS), inter-connecting pipes, storage tanks and computer control system. The MPS are typically located beneath process tools and act as intermediate holding and pumping stations to move chemical waste over long distances to a centralized waste solvent storage tank farm.

ChemWaste Systems are designed to meet a variety of process chemical waste removal needs and plant constraints. All components have been designed to compliant with NFPA codes and Factory Mutual (FM) explosion-proof approval. Safety and reliability are of our top priority concern.

System Components

- Mini-Pump Station (MPS2000, MPS2100)
- Inter-connecting Piping & Fittings
- Storage Tanks
- Computer Control System
- Safety Interlock and VOC Monitors

ChemWaste System is a proven technology. It has provided continuous services in Taiwan Semiconductor Manufacturing Co. Ltd. (tsmc), Shenly Chemical Industries Co. Ltd. and INER plasma melting plant successfully.

MPS - Efficient and Effective Mini-Pump station

- Strainer Module - Removing process debris
- Pump Module - Air driven diaphragm pump
- Air Drive Module – Air supply/control system
- VOC Monitor - Spill and leakage detection
- Nitrogen Blanketing System
- Capacity 2, 3, 5, 10, 20, 50 gallons

System Specifications:

- Constructed of chemically resistant material
- All stainless steel structure and Teflon packing
- Displays chemical storage and removal graphically
- Automatic spill and leakage detection
- Design codes: ASME, ANSI, CNS, FM, NFPA, UFC, JIS, CFR, OSHA
- Overfill alarm and interlock
- Audible and visual alarms
- Central computer control
- On-line event reporting
- Windows compatible man-machine interface

System Performance Reliability

- Minimum time between failure 7,000 hrs

電漿熔融與氣化爐系統

RESI Plasma Melting and Gasification System

電漿熔融氣化及能源回收系統

RESI 是台灣最有經驗的電漿熔融、熱解、氣化及能源整合系統設計建造專家。RESI 接受行政院原子能委員會核能研究所委託，負責統包興建電漿熔融爐系統設備、生質物電漿氣化及能源回收系統等示範性研發系統，均已成功運轉並完成長時間測試。

Plasma Melting and Gasification System

RESI Corporation was granted by the Institute of Nuclear Energy Research, Taiwan, to build a plasma melting plant and a plasma gasification and integrated enengy utilization plant in turn-key basis. Both plants have been completed, tested, and demonstrated to be successful.

電漿熔融爐系統

電漿熔融爐系統主要設備包括：

- 廢棄物貯存系統、螺旋進料器
- 電漿熔融爐、電漿氣化爐
- 第二燃燒室
- 驟冷蒸發器、熱交換器
- 文氏滌氣塔、填充滌氣塔
- 觸媒反應袋室集塵器
- DeNOx 觸媒反應器
- HEPA 絕對過濾器
- 誘引排風機
- 冷卻水供應系統
- 超純水供應系統
- N2、Ar、NH3 及廠用空氣供應系統

電漿氣化及能源回收爐系統

電漿氣化及能源回收系統主要設備包括：

- 廢棄物貯存系統、粉體輸送系統
- 定量給料器、螺旋進料器
- 電漿氣化爐
- 合成氣淨化系統
- 能源回收及利用系統
- 袋室集塵器
- 吸收式冷凍空調系統
- 冷卻水供應系統
- 超純水供應系統
- N2、Ar、NH3 及廠用空氣供應系統

Plasma Melting Plant

The major components of plasma melting plant are:

- Waste storage silos and screw feeder
- Plasma melting furnace, plasma gasifier
- Secondary combustion chamber
- Quench evaporator and heat exchangers
- Venturi scrubber and packed tower scrubber
- Catalytical filters for dioxin destruction
- Catalytical reactor for NOx reduction
- HEPA filter
- Cooling water supply system
- Deionized water supply system
- Gas supply system

Plasma Gasification Plant

The major components of plasma gasification plant are:

- Waste storage silos and pneumatic transport system
- Controlled rate feeder and screw feeder
- Plasma gasifier
- SynGas purification system
- Integrated energy recovery and utilization system
- Bag filters
- Adsorption chiller system
- Cooling water supply system
- Deionized water supply system
- Gas supply system

Appications

- Waste Destruction
- Resources Recovery
- Energy Recovery
- Integrated Gasification Combined Cycle

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