

National Taipei University of Technology Research Center of Energy Conservation (RCEC) for New Generation of Residential, Commercial, and Industrial Sectors, Dept of Energy and Refrigerating Air-Conditioning



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- Education: PhD, Department of Architectural Engineering, Liverpool University
- Expertise: Clean Room Design, Indoor Air Quality Control, Air Conditioning System Design, Semiconductor Optoelectronics and Factory Systems, Fluid Mechanics, Heat Transfer
- **RCEC Principal Research: Clean room and high-tech factory facilities technology**
- RCEC Research Goals: 1. Use heat recovery technology, optimization of operating parameters and automatic adjustment of energy-saving modes to improve the energy efficiency of clean room air conditioning systems.
 2. The preheating energy consumption of the air conditioning system is reduced by more than 10%.



Can save 13.8% of energy consumption of heating system

Research on energy saving of the heating system of the outdoor air conditioning box by recycling the waste heat of the electric power machine room

Energy consumption analysis and energy saving

research of high-tech factories

Air Cond. System	Cooling Loads
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ee	Chiller System
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Process Tool	ME28007 ME2 MEDIONS:// S P ME28007 F ME28007 ME I <t< th=""></t<>
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2 2000 00 0 0	Item ECF value Unit Operating conditions
38	Low Temperature Chiller 0.1932 (kW/kW) Used in cooling collis of MAU
	High Temperature 0.1597 (kW/kW) Used in cooling coils of Dry Coils and PCW Chiller
	high temperature 0.0313 (kW/kW) Used for preheating and reheating coil in MAU
Operating Condition	Compressed dry air 0.1181 (kWh/m ³) Supply pressure: 6.5 kg/cm ² (about 6.5*10 ⁵ Pa)
, 3	0.1361 (KW/KW) Class 10 How rate: 10,784,534 m ³ /h 0.1704 (kW/kW) Class 100 Elow rate: 9.108,418 m ³ /h
SECHOR	FFU 0.1399 (kW/kW) Class 1,000 Flow rate: 4,629,442 m ³ /h
84.074 31.027 31.027 5112 92	0.0097 (KW/kW) Class 10,000 Flow rate: 238,049 m ³ /h
aztabi sular 9 Kub-WikiC (MI) © 2010ki ⊜Nertis 9 Sulati (Mi © Mith Ni © Cubrac Derr © Imp	Make-up air 0.0127 (kWh/m³) Flow rate: 1,256,053 m³/h DCW 0.0440 //JANA - 3% Water cooled by refrigeration process. Supply
¥7644sH AS#H	Pressure: 5 kg/cm² (about 5*105 Pa)
955 046 056 056 056 056 056 056 056 056 056 05	General exhaust air 0.0010 (kWh/m³) Flow rate: 455,640 m³/h Alkaling exhaust air 0.0007 (kWh/m³) Elow rate: 200,070 m³/h
20176112 20 4017611 2010 Au All 109 A 20176112 50 6 100 km z 5 6 100 km z 5 6 100 km z 100 km z <td< td=""><td>Ankaline exhaust all 0.0007 (kvvi/m*) Flow rate: 208,070 m*/n Acid exhaust alir 0.0010 (kWh/m³) Flow rate: 150,505 m³/h</td></td<>	Ankaline exhaust all 0.0007 (kvvi/m*) Flow rate: 208,070 m*/n Acid exhaust alir 0.0010 (kWh/m³) Flow rate: 150,505 m³/h
GREN	Flammability 0.0022 (kWh/m ³) Flow rate: 72.226 m ³ /h
े सिक्षेर अग्रे 001815 1.2740 Alware 50 क	exnaust air 0.0022 (kWh/m³) Flow rate: 118,854 m³/h

Data Input

Energy consumption analysis and energy saving

research of high-tech factories



Analysis of energy saving effectiveness



Wafer transportation system



Total solution on micro contamination for wafer AMHS

Wafer box (FOUP) with gas purge diffusers



Laminar Air Curtain (LAC)





monitoring sensor system (wafer sense)

Full-Scale Fiber & Chemical Filter Test Rigs



Fiber Filter Test Rig



Loading Capacity testing system for EPA/ULPA



Full Scale Chemical Filter Test Rig.

Large Scale Particle Image Velocimetry (L-PIV)



Gaussian Laser Beam



L-PIV system



Flow Visualization on FOUP by L-PIV



Flow Visualization on hospital operation theater and lung intubation by L-PIV