

# GUE Cooling Services Solution – Full Site Deployment: CHEM-KOTE International – Huntsville, Alabama

**Chem-Kote International** is a name used to mask the identity and protect the confidentiality of a major international Chemical Products Company served by Georgetown Utilities, LLC (GUE). Chem-Kote is over 100 years old, and is a Fortune 500 Corporation with revenues in excess of \$5 billion. Georgetown Utilities Enterprise, LLC – founded in 2003 – is an MBE (minority business enterprise) headquartered in New Hudson, MI, that offers an advanced metallurgical treatment for HVAC equipment, called ProaTEQ. On the strength of a successful 2015 Pilot, this product was successfully deployed for the full fleet of HVAC units at Chem-Kote’s Huntsville, Alabama plant in the summer of 2016.

**Situation:** After careful analysis confirming the favorable technical and financial results delivered by GUE during the 2015 Pilot, in October 2015, GUE leaders met with the Plant Manager, Financial Manager, and Maintenance Manager at the Huntsville Plant, and received an expanded mandate: deploy the Cooling Services Solution across its entire fleet of HVAC equipment at Huntsville. After a vigorous negotiation, Chem-Kote elected to launch the project in March 2016.

**Tasks:** Although Chem-Kote initially identified 90 HVAC units to be treated, in the Condition Assessment Phase, GUE reduced the number of units likely to respond to treatment to 65, totaling 1,460 tons, thus reducing the project cost to Chem-Kote. The overall goals of the Project were to reduce energy consumption and cost, reduce carbon footprint, and restore cooling capacity in the 61 legacy HVAC units, and to verify and guarantee the results of both. GUE focused on restoring loss cooling capacity caused by oil fouling in each unit.

**Action:** On the strength of the Pilot program, leadership at Chem-Kote Huntsville requested that GUE submit a proposal for Full Implementation at the plant. The project was executed in four phases.



*Aerial View of Chem-Kote’s Huntsville Aerospace  
Coatings Plant*

**PHASE I – Condition Assessment** – Perform an inventory of all legacy refrigeration units

**PHASE II – Project Execution** – Pre-Testing of Capacity, ProaTEQ Treatment, and Post-Testing of Capacity. In some cases Treatment only was performed when units were not amenable to the GUE Test Procedures (see below)

**PHASE III – Analysis, Modelling, & Reporting**

**PHASE IV – Financial Settlement** Based on Possible Offsets Due to Performance Guarantees.

Condition Assessment, occurred 30 days prior to starting treatment. During this Phase, each HVAC unit was assigned to one of four Classes:

- A — Treatable, Measurable and Qualified for GUE’s Payback Period Guarantee
- B — Treatable and Measurable
- C — Treatable; not Measurable unless Serviced
- D — Not Treatable

Following the Condition Assessment, Chem-Kote had the option to address issues in the C Group, so that they could be upgraded to B, and Tested. All A, B, and C Units were treated with ProaTEQ. All A and B units received Pre-Treatment and Post-Treatment Capacity Testing. A Snapshot Report documenting the test data and Capacity calculations, was created for each Treated and Tested Unit and delivered.

For each Treated and Tested unit, GUE modeled annual energy use and operating cost for pre- and post-treatment conditions, using GUE’s RTU Analysis Tool, which is based on ASHRAE Bin Methods, and which simulates actual part-load performance in addition to staging of units with multiple refrigeration circuits.

The field testing, combined with the simulation, allowed GUE to quantify:

**Capacity Loss (Tons)** – “Test-In” procedures established the current operating capacity as the unit’s baseline for capacity recovery. The main effect of oil fouling is degradation of heat-transfer capacity, which, according to ASHRAE, can reach 30% on older units.

**Capacity Recovery (Tons)** – This is the principal benefit of the removal of oil fouling and permanent coating of metal with ProaTEQ. Heat transfer in the equipment is improved immediately, and capacity is partially recovered.

**Demand Reduction (kW)** – The second key benefit of ProaTEQ is improved lubricity in compressor oil, which is manifest in a small reduction in kW draw of the compressor. The unit also runs quieter.

**Performance Increase (kW/Ton)** – The combined effects of heat transfer improvement and lubricity improvement led to increases in the performance of the equipment as measured in kW/Ton – the main performance factor used in the industry.

**Results:** The overall results of the project are shown in the table below.

	Units	Value
<b>Condition Class Counts</b>		
A -- Treatable, Measureable, Qualified	count	17
B -- Treatable, Measureable	count	11
C -- Treatable	count	24
D -- Non-Treatable	count	13
Total RTUs In Scope	count	65
<b>Fleet Aggregate Technical Performance</b>		
Capacity Recovery (Tons)	%	35.9%
BTUH/Amp Improvement	%	38.5%
Power Draw (kW) Reduction	%	1.2%
Performance Improvement (kW/Ton Reduction)	%	53.8%
Annual Energy Use Reduction (kWh)	%	19.4%
<b>Fleet Aggregate Financial Performance</b>		
Annual Operating Cost Reduction (\$)	%	10.4%
Simple Payback on Treatment Costs	Yrs	2.3

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**4-Part Guarantee:** In response to CHEM-KOTE’s request that GUE “put skin in the game”, Georgetown Utilities created a 4-part Performance Guarantee, which we consider to be a key differentiator:

1. No Equipment will be damaged (GUE carries over \$5MM insurance)
2. Equipment Capacity will increase by at least 10%,
3. Equipment Performance will improve by at least 10%,
4. Energy consumption was reduced leading to project payback less than 3 years (in this case it was less than 2½ years).

It should be noted that ProaTEQ is typically not an RFP commodity, due to its technical uniqueness. And it is unlikely to be recommended by OEMs because it extends the equipment life and forestalls sales of replacement units and supplemental capacity.

**Summary:** Consistent with the Pilot results delivered months earlier, Georgetown Utilities demonstrated highly favorable results in all the HVAC units treated (Classifications A, B, and C). Georgetown met or exceeded every component of our 4-Part Guarantee, and gave the Chem-Kote a Simple Payback Period (SPBP) of less than 2½ years. The Plant Maintenance Manager and his staff oversaw all work completed on-site, and reviewed and affirmed all of Georgetown’s progress reporting, computations, and analysis. Based on the efficacy of GUE’s cooling service solution, the Plant Manager of the Chem-Kote Aerospace plant in Huntsville recommended Georgetown to his counterpart at the Chem-Kote Aerospace plant in Sylmar, California. With that endorsement, Georgetown Utilities has been engaged by Chem-Kote Aerospace – Sylmar to deploy a similar energy efficiency program to include all its HVAC equipment and product process chillers.

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