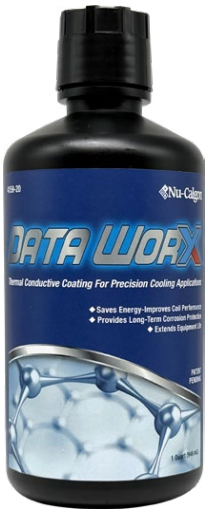
Specialty Products

Data Worx

Data Worx™ is a transformative graphene-powered coating for precision cooling applications. Data Worx, a patent-pending coating, uniquely expedites heat transfer and provides superior corrosion resistance to the coil.

Data Worx provides the following benefits:

- Energy Savings
- Superior Heat Transfer
- Improved System Performance
- Corrosion Protection
- Extended Equipment Life
- Lower Peak Demand



Description

Data Worx is an air-dry water-based coating powered by GMG Graphene, specifically optimized for the precision cooling market. Data Worx provides a novel way of increasing heat transfer of air-cooled coils used in data centers, specifically air-cooled chillers, computer room air conditioners (CRAC), computer room air handlers (CRAH), and other opportunities to expedite heat away from the rack servers. In addition, Data Worx provides best-in-class corrosion resistance where independent testing demonstrated corrosion resistance to 30,000 hours per ASTM B117. Data Worx uniquely expedites heat transfer from new or in service coils while protecting them from corrosive environments to optimize their performance and longevity.

The coating is specifically developed for air-cooled round tube plate fin (RTPF) and microchannel heat exchangers made of copper/aluminum or all, aluminum-construction; but also heat exchangers of stainless steel or ferrous alloys. Data Worx can be used on previously coated and non-coated coils after the coil is properly prepared for its application. Data Worx can be applied on equipment panels when properly cleaned and dried.

Benefits of Graphene

There are many properties of GMG's Graphene that are beneficial for a particular application. For its use in Data Worx, the following qualities of high-purity graphene are utilized:

• High surface area

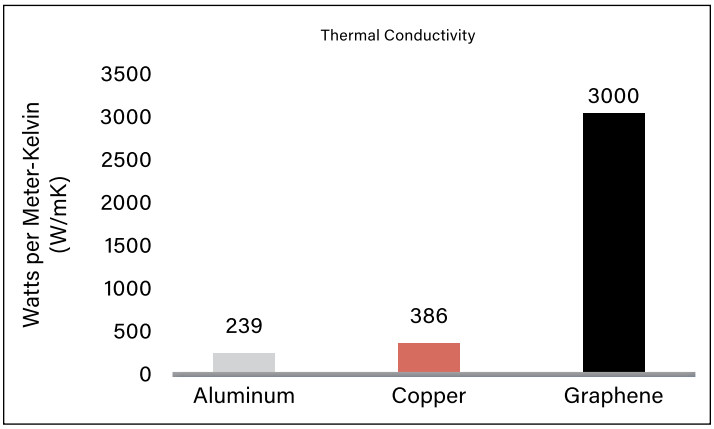
Approximately 0.04 wt. ounces (one gram) has a micro surface area up to 3200 sq. feet within the thin coating layer. With the application of Data Worx, it provides added surface area of the precision cooling coils to help reject heat.

• High Thermal Conductivity

Graphene has a reported thermal conductivity of approximately 3000 Watts per Meter-Kelvin (W/mK), making it 12 times more conductive than aluminum and 7 times more than copper! An integrated high conductor in the coating aids in rejecting heat from the metal constructed coil.

• Impermeability

Even the smallest atom, helium, cannot pass through a sheet of graphene. This impervious layer prevents oxygen from reaching metal surfaces, making it exceptional in eliminating metal corrosion. Graphene has hydrophobic (water repealing) properties when applied in a coating that aids in reducing corrosion.



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Application:

Data Worx is specifically formulated for use in the precision cooling market:

- Data Centers
- Air-Cooled Chillers
- Computer Room Air Conditioners (CRACs)
- Computer Room Air Handlers (CRAHs)
- Other

The best investment opportunites for Data Worx are in the commerical market where measurable gains in performance and corrosion protection are desired where energy of these systems is commonly monitored. This is especially true in markets where systems are operating at or above average running time and energy costs. Data Worx provides an opportunity for the service provider to provide a solution to address business owners' ongoing OPEX concerns, while better protecting the existing assets to prolong CAPEX discussions.

Additional Data Worx opportunities include coastal or other corrosive applications whether in the commerical, industrial, or residential markets. Data Worx perserves further coil degradation, restores some lost heat exchanger capability to prolong CAPEX in system replacement.

In addition to outdoor coils, Data Worx has shown benefit when applied ot evaporators. Third party testing has shown Data Worx to have antimicrobial properties, which is another benefit for the indoor coil. Application of Data Worx for the evaporator is best done before the system is commissioned to allow proper coating cure.

Packaging

1 Quart **4159-20**

Note: Larger package sizes are planned based on market demand.

Specifications:

PROPERTIES	RESULT	TEST METHOD
Salt Spray	30,000 Hours	ASTM 8117
Salt Spray, Acidic	3,000 Hours	ASTM G85 A1
Sal/Sulfur Dioxide Spray	720 Hours	ASTM G85-09: A4
Water Immersion	500 Hours	ASTM D870
Cross Hatch	Level 0 European 5B, B-A	ASTM D3359-88 53151
UV Resistance	Exceeds 1000 Hours	ASRM D4587
Flexibility	PASS	ASTM D522M
Thermal Conductivity	15 W/mK	ASTM E1225
C5 Condensation	PASS	ISO 6270
C5 Chemical Resistance	PASS	ISO 7523
Viscosity (Krebs, KU)	93-98	
Viscosity (Centipoise, cP)	1300-1500	
Solids % by volume/wt.	30-50%	
Density	1.016 Kg/L	
pH	8-10	
Gloss at 20°/60°	65/92	
VOC	165 grams/liter	
Flash Point	Water-born/non-flammable	
Dry Film Thickness	15 microns	
Ambient Temperature Recommendation for Cool Worx Spraying	45°F to 100°F	

Coating: Water-based graphene-powered coating, black colored. Air curing formulation.

Data Worx cures after 24 hours room temperature with relative humidity below 80%. Curing times can be quicker or slower depending on ambient temperature and humidity. Never coat a coil when the outdoor ambient is below 45°F or relative humidity is above 80%.

Application Method: Spray formulation. One-time application with proper surface preparation and post-coating care is maintained.

Estimated Coverage: 20 sq. ft coil surface area using the three light coat method

Mixing: Data Worx requires mixing before use, see directions for use.

Thinning: Do not dilute Data Worx. Thinning may result in a change in coating performance.

Maintenance: To maintain peak coil performance, on-going maintenance of the coil with specified cleaners is required. See Data Worx Applicator Guide (26-C186) for additional information.

Transportation: Data Worx is not classified as a Dangerous Good by US Department of Transportation (DOT), Transportation of Dangerous Goods (TDG), IATA (air transport) or IMDG (marine transport). No special transport conditions are necessary unless required by other regulations. Please consult Nu-Calgon's Data Worx Safety Data Sheet (SDS) for further details.

Storage: Store Data Worx in its original container in a conditioned environment (50°F to 85°F climate) and away from direct sunlight. The shelf-life of Data Worx is five plus years when stored in its original unopened container. Once opened, the partially used DAta Worx contents have an anticipated shelf-life of one year. Data Worx must be thoroughly mixed prior to each use.

Directions:

General: Data Worx is to be applied by Nu-Calgon trained professionals only. Consult Data Worx and applicable Nu-Calgon coil cleaner safety data sheet (SDS) before use. Nu-Calgon requires applicator training and acknowledgment on its proper use and handling before sale. This process is required for any warranty consideration.

For full details on Data Worx, including applicable set-up criteria, supplies required during use and clean-up, consult the applicator guide (26-186) that can be found at www.dataworxcoating.com.

Process:

Procedure: Data Worx application is recommended over a two-day period to allow the condenser coil to thoroughly dry before applying Data Worx. If necessary, Data Worx can be applied in one day if a power blower (optional) is used along with turning on the system to help facilitate drying the coil. **It's necessary for the coil to be bone-dry for proper Data Worx adhesion to the coil.**

For this reason, the two-day method is preferred to allow overnight drying during system operation – especially if line-up of systems will be coated at a jobsite. For days when applying Data Worx on outdoor units, apply when the outdoor temperature is between 50°F - 100°F when there is no immediate rain in the forecast. Lower humidity days are preferred if circumstances dictate. Data Worx can be applied in higher humidity situations, such as coastal regions, it simply will take longer for the coating to fully cure to provide max benefit.

DAY ONE

1. Take inventory of tools/supplies to ensure proper items are ready at the job site.

2. Review the condition of the outdoor coil for Data Worx application that requires cleaning preparation. Data Worx can be applied on coated or non-coated aluminum and/or copper constructed precision cooling coil or coils of stainless steel of ferrous construction. (Data Worx can be applied on other surfaces with proper preparation for Data Worx adhesion– see Nu-Calgon for details.)

   a. For new coils or coils in good condition where dust/grime simply need to be removed, use Nu-Calgon's Tri-Pow'r HD per label instructions at a 4:1 dilution ('B' setting on the Nu-Calgon Coil Gun) followed by a thorough rinse with fresh water.

   b. For corroded coils or previously coated coils where the coating is starting to separate from the coil, Nu-Calgon's Nu-Brite is required to aggressively clean and etch the previous coating on the coil for best adhesion. (Note: if the coil is too severely corroded, this is not a Data Worx opportunity.) Use Nu-Brite at a 10:1 dilution ('E' setting on the Nu-Calgon Coil Gun) followed by a thorough rinse with fresh water.

3. **OPTIONAL:** If Data Worx is to be applied to the coil on the same day, a power blower is required to help facilitate drying of the coil surface. It is also recommended to turn the system on (air conditioning mode if heat pump) to ensure the coil surface is bone-dry before Data Worx application.

4. Documentation - take photos before and after Data Worx application.

NOTE: It's imperative any rust surfaces are previously addressed with a mechanical brush and rust converter to ensure proper Data Worx adhesion.

DAY TWO

5. **Ensure it is a favorable day for painting – not windy and above a 50°F outdoor temperature.** Tape off equipment panels with rough surface painter's tape to protect them from overspray. Lay down paint drop cloths and prepare necessary tools/supplies for applying Data Worx. Ensure PPE is present including nitrile gloves; disposable APF-10 disposable mask, APF-1000 respirator when spraying Data Worx with a HVLP sprayer. Nu-Calgon recommends the 3M Powerflow Face Mounted PAPR; 3M product number 6900PF, an APF-1000 rated respirator, plus dermal protection.

6. For small/medium size jobs, Nu-Calgon recommends the Graco TrueCoat 360 for its spraying versatility from any angle to provide as much coil coverage as possible. For repetitive larger applications, Titan CapSpray 115 (6 stage HVLP) or Graco Triton Air-Assisted Airless Spray Systems is recommended.

7. **Turn off system.** Proceed to shake each bottle of Data Worx vigorously for one minute to ensure paint contents are properly mixed. Fill the sprayer bottle with Data Worx, toggle the paint coverage setting on the sprayer to a light setting and confirm nozzle orientation. Test spray pattern on a piece of cardboard before spraying coil.

8. **Spray method:** Nu-Calgon guidelines for applying Data Worx to refrigerant coils requires three light coatings. At a minimum, the air intake side requires this three-coat method to assist in energy savings. It's advantageous to cover as much of the backside of the coil as reasonable, if easy to access, to improve the benefits of Data Worx.
Use the three light coat method as follows:

a. **First Coating:** Have the sprayer tip positioned **90 degrees (straight-on) to the coil**, with the sprayer tip 2 to 3 inches away from the coil surface. Starting at the top left corner of the coil, coat in continuous sweeping motions of the coil surface. This coating provides coverage to the interior of the coil, roughly four-inch paint penetration into the coil - including the first coating pass of the tube bundle (for RTPF coils) or parallel tube bundles (microchannel coil designs). Proceed with providing the first coating to the entire coil surface.

FIRST COAT: Position sprayer 90º to coil, 2-3 inches away. Make sweeping left to right motions to paint inside coil. Coating provides minimum four-inch depth coverage into coil. See figure 1.


FIGURE 1

b. **Second Coating:** Rotate the sprayer position **45 degrees LEFT to the coil** with the sprayer tip 2 to 3 inches away from the coil surface. This sprayer orientation angle in relation to the coil will coat on **left side** of the aluminum fin panels of the coil. Starting a the top left corner of the coil, coat in continuous sweeping motions, left to right – depress the trigger after each sweep and repeat sweeping left to right paint coverage as you progress down the coil. Apply the second coating immediately after the first coating - no need to wait.

SECOND COAT: Tilt sprayer 45º LEFT of the coil, 2-3 inches away. Make sweeping motions to paint coil. Coating step paints one side of each fin. See figure 2.


FIGURE 2

c. **Third Coating:** Rotate the sprayer position **45 degrees RIGHT to the coil** with the sprayer tip 2 to 3 inches away from the coil surface. This sprayer orientation angle in relation to the coil will coat **right side** of the aluminum fin panels of the coil. Starting at the top left corner of the coil, coat in continuous sweeping motions, left to right – depress the trigger after each sweep and repeat sweeping left to right paint coverage as you progress down the coil. Apply the third coating immediately after the second coating- no need to wait.

THIRD COAT: Tilt sprayer 45º RIGHT of the coil, 2-3 inches away. Make sweeping motions to paint coil. Coating step paints opposite side of each fin. See figure 3

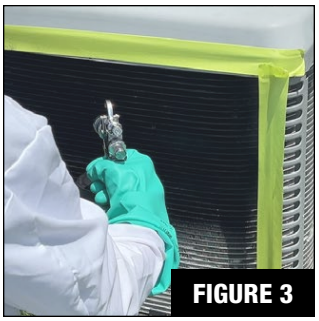
FIGURE 3

9. After painting is complete, document Data Worx application with pictures and reassemble necessary equipment panel(s) and start removing overspray tape from the unit. Allow 10 minutes before turning on the system so that Data Worx is touch dry. As the system operates, it expedites the curing of Data Worx.

Drying Time: As with any coating, the drying time varies with jobsite temperature and humidity. At 75°F, with a relative humidity of 50%, Data Worx is touch dry in five minutes, surface can be handled in one hour and it fully cures in 24 hours. Lower ambient temperatures and higher humidity level will extend a full cure up to a few days.

10. Pour any unused Data Worx back into its original container. Refer to the Data Worx applicator guide for further instructions with job site clean-up.

11. **Apply supplied Data Worx decal to equipment panel. Record application date.**

For more information, consult www.dataworxcoating.com.