



PURELASE 180 Cooling Fluid Program



Northrop Grumman's Cutting Edge Optronics has teamed with Nalco Company to provide a treated cooling water program designed to maintain cooling performance and protect the equipment in the system.

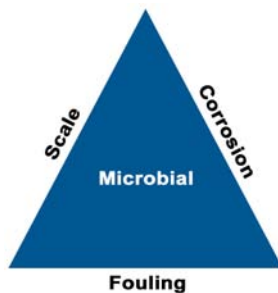
The **M**echanical design of the system, the **O**perational parameters and the **C**hemical treatment (**MOC**) have been integrated into the treated cooling fluid program to ensure that the cooling system:

- Operates efficiently with optimal heat transfer
- Maintains a clean environment
- Protects the critical components of the system

This treatment strategy promotes long service life and protects the system from unexpected downtime.

Two alternatives are often considered for cooling water media – glycol and water. In certain scenarios, one may consider using glycol-based cooling media. But, glycol should only be used when freeze protection is required, since it does not transfer heat as well as water and will eventually break down, becoming a food source for microbiological activity in the system and potentially contributing to corrosion. Water, on the other hand, is a great medium for transferring heat, but there are side effects when using water that must be managed to maintain optimal system performance and preserve equipment integrity.

Some commonly encountered challenges include:



- Scale
- Corrosion
- Fouling
- Microbiological activity

Corrosion and scale (mineral deposits) are managed in the system by using the specially formulated **460-PURELASE 180** cooling fluid. Fouling (dirt or other contaminants) in the system can be managed by eliminating leaks, performing periodic cleanings (procedures designed specifically for the system) and periodically refreshing the 460-PURELASE 180 treatment fluid. Since bacteria or other microbial growth are dynamic living organisms, managing microbiological activity is crucial to maintaining cooling system heat transfer and minimizing corrosion. Following the cleaning and treatment procedures designed for the system is the optimal approach.

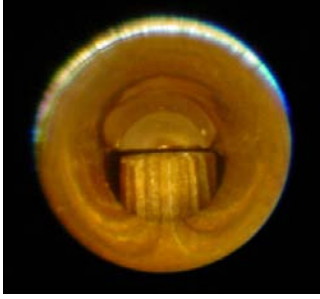


Clean vs. dirty rod (from corrosion products and fouling) contained in a flow tube. Diodes on the outside of the flow tube pump light into the rod. If the rod is dirty as shown on the top rod, then the amount of light penetrating the rod is reduced and consequently the power of the laser output is reduced.

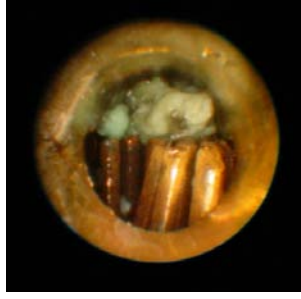
The cooling system management program, including the PURELASE 180 cooling fluid is designed to minimize the effects of corrosion, scale, fouling, and microbial contamination in these systems and allow the system to continue providing reliable service with optimal efficiency for the life of the equipment. This chemical treatment program includes the following:

- Instructions on implementing the program
- Cleaning Fluid 460-CCL2567
- Cooling Fluid 460-PURELASE 180
- Material Data Safety Sheets
- Packaging that meets global shipping requirements

(Continued on the Reverse Side)



Clean Heat Exchanger



Fouled Heat Exchanger

The heat exchanger has pin fins that act as heat sinks. When the heat sinks are fouled as shown above, coolant flow through the heat sink can be restricted and the heat transfer is reduced.

The Benefits of the PURELASE 180 Cooling Fluid Program:

- Ease of applying treatment, no mixing or dilution of products
- Ease of handling
- Ease of shipping
- Simple usage instructions
- Accurate and consistent protection
- Proper chemical treatment for asset preservation
- Proper chemical treatment for avoiding process interruption/downtime from water related issues
- Technical support and troubleshooting
- Regulatory compliance with country specific regulations around the world

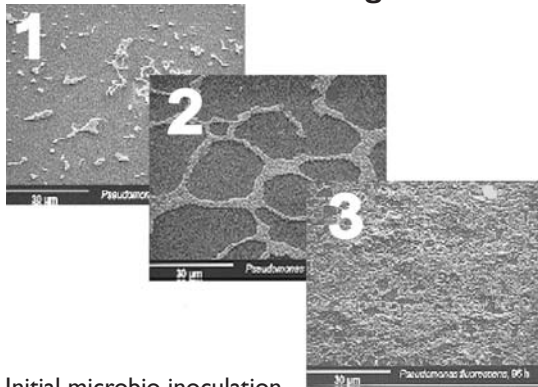
For more information or to find out how to order, please contact:

Northrop Grumman Corporation
 Space Technology, Cutting Edge Optronics
 20 Point West Blvd.
 St. Charles, MO 63301
 Telephone: 636.916.4900
 Fax: 636.916.4994
www.st.northropgrumman.com/ceolaser
st-ceolaser-info@ngc.com

	Copper	Biofilm
Thermal Conductivity Btu/hr ft°F	232	0.4

Biofilm formation and its impact on reduction in heat transfer and thermal conductivity

Stages of Biofilm



1. Initial microbio inoculation
2. Colony formation.
3. Complete coverage of metal surface by biofilm

Northrop Grumman Corporation

Cutting Edge Optronics, Inc. (CEO), a business unit of Northrop Grumman's Space Technology sector, designs and manufactures high-power, diode-pumped, solid-state lasers, laser diodes and arrays for military and commercial applications. It is based in St. Charles, MO, with worldwide distributors serving Europe, Asia and Australia.

Nalco Company

Established in 1928, Nalco is the leading provider of integrated water treatment and process improvement services, chemicals and equipment programs for industrial and institutional applications. It has established a global presence with over 10,000 employees operating in 130 countries supported by a comprehensive network of manufacturing facilities, sales offices and research centers.

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 St. Charles, MO 63301
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Flushing, Cleaning and Charging Chiller Systems (New and Existing)



Purpose

Existing cooling water systems might contain treatment chemicals that can be incompatible with 460-PURELASE 180. Additionally, existing systems might contain corrosion by-products and bacteria. These materials will increase system corrosion and impede performance of 460-PURELASE 180.

For best results, these materials must be removed from the system before starting the new treatment program. Additionally, metal surfaces should be passivated before starting any treatment program. Passivation helps to minimize corrosion and prepares the metal surface for the corrosion inhibitors in the treatment program. The following procedure will remove old treatment chemicals and bacteria, sanitize the cooling circuit, passivate metal surfaces, and improve system performance and reliability.

Procedure

1. Drain the system completely.
2. Remove filter cartridge from filter housing if an in-line filter is being used.
3. Add the 460-CCL2567 cleaning solution to the cooling system until full.

4. Circulate the prepared cleaner for a minimum of 30 minutes.
5. Drain the system completely.
6. Refill the system with cleanest water available (preferably, distilled, demineralized or reverse osmosis water).
Circulate for 20 minutes.
7. Drain the system completely.
8. Refill the system with cleanest water available (preferably, distilled, demineralized or reverse osmosis water). Circulate for 10 minutes.
9. Drain the system completely.
10. Install a new filter cartridge in the filter housing.
11. Record the cleaning date on a sticker with a six-month reminder to dump and clean the system. Affix the sticker to the chiller cabinet.
12. Fill chiller coolant reservoir with 460-PURELASE 180.
13. System is ready for use.

Note: If loss of water occurs during operation, top off the system to the fill line with 460-PURELASE 180.

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