

Allied-Signal Aerospace Company

Garrett Auxiliary Power Division
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June 7, 1990

Dr. Richard Niemeier
Director, Division of Standards Development
and Technology Transfer
National Institute for Occupational Safety and Health
4676 Columbia Parkway
Mail drop C - 14
Cincinnati, Ohio 45226

Dear Dr. Niemeier,

Allied-Signal Aerospace Company has utilized many different types of coolants in our jet engine manufacturing divisions. Outlined below I have provided basic information about the types, uses, and problems associated with coolants at these divisions.

STRAIGHT CUTTING OILS

SELECTION

Based on the metal to be machined and the type of machining process.

LENGTH OF TIME USING COOLANT

Varies with the machining process, however, straight cutting oils last 3 to 4 times longer than soluble coolants. Can be used in a machine

ADDITIVES

There are not additives added to straight cutting oils

CONTAMINATION

Contamination does not usually present a problem in straight cutting oils.

SOLUBLE/SYNTHETIC CUTTING OILS

Based on the metals to be machined and the type of machining process.

Soluble, synthetic and semi-synthetic coolants last in a machine from 1 week to several weeks. Near the end of its service life, it must be changed quickly following a shut-down week-end. Following a shut-down, the coolant release a rotting odor. Employees usually complain and initiate the changing of their coolant. Hydrogen sulfide has been suspected, but has not been detected by traditional industrial hygiene instrumentation.

Additives added to these coolants include biocides and anti-foams. The addition of biocides is controlled and added by maintenance personnel only. Anti-foams are added by operators when necessary.

Contamination in soluble and synthetic coolants ranges from tramp oils, metal fragments, chewing tobacco, mold, bacteria such as enterococci streptococcus.

PERSONAL PROTECTIVE EQUIPMENT

Barrier creams.

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ENGINEERING CONTROLS

Local exhaust ventilation is on most machines which utilize oil as the cutting fluid. This is usually the addition of a smog hog or smokeeater type of LEV. They are usually in need of maintenance and don't appear to work as well as they could. Traditional industrial hygiene sampling has not revealed exposures in excess of recognized standards.

No engineering controls have been implemented in areas where water-based coolants are used.

WORK PRACTICES

Employees are responsible to initiate the cleaning of their machines by calling it in the Maintenance department who will send out a machine cleaner who will vacuum out the old coolant and replace it with fresh coolant.

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ADVERSE HEALTH EFFECTS EXPERIENCED

Skin Irritation

Not a significant problem for straight cutting oils.

A significant problem with some coolants. Can cause defatting and dermatitis, usually not hypersensitivity, but a chronic dermatitis.

Respiratory Irritation

Not a significant problem for straight cutting oils.

Can be a significant problem with some soluble and synthetic coolants. We have had several employees experience bloody noses while working with these materials. This varies with the coolant, and rpm of the machining process. New ceramic tooling used as the cutting tool can increase and even double the rpm's handled by a metal part. These higher rpm's create more coolant mist escaping into the work area and has resulted in more employee complaints.

The semi-synthetic/synthetic coolants used at our facility are recycled. We have used a recycling process for approximately two years.

The machinists have expressed their dislike with this process. When it is necessary to add coolant to their machines due to evaporation over a period of several days, they supply coolant directly into their machines through and overhead spigot. The problem with this is that the coolant can become too rich if the coolant is not changed before the ratio of water to coolant is affected.

The above information is very general, without providing specific results from detailed health studies. However, our jet engine manufacturing facilities have many machining operations using a variety of coolants.

I hope you have found this information useful, and look forward to learning more about the information that you discover in your studies.

Sincerely,

A handwritten signature in cursive script that reads "Darolyn K. Wall".

*Darolyn K. Wall CIH
Industrial Hygienist
Allied-Signal Aerospace Company*