Application Note

ISOMET

AN1906 *June 19*

Use of Anti-Corrosion Inhibitors with all Isomet Water Cooled Devices

Unless stated all case parts for Isomet water-cooled modulators, deflectors and RF amplifiers are manufactured from clear Anodized or 'Alocrom' plated aluminium. Aluminium offers significant benefits in terms of low mass and high thermal conductivity. High thermal conductivity is necessary for effective cooling of the AO transducer and absorber faces. However Aluminium is prone to corrosion particularly if other components in the cooling system contain metals such as Copper and Brass.

Corrosion can cause restricted flow of coolant around the AO device case and eventually lead to total blockage and device failure. As a result we strongly recommend the use of an anti-corrosion inhibitor.

Please note, this document is for guidance only.
Isomet cannot be held responsible for the effectiveness or otherwise of corrosion inhibitors.
It is the responsibility of the system integrator to establish the correct coolant properties appropriate for the system design.

Coolant Water.

Guideline only. Please refer to the specific data sheet for the selected corrosion inhibitor.

- De-ionized water is not recommended.
(It is known as the "universal solvent" and will even attack some types of stainless steel).

- Distilled water is preferred.

- Coolant must be PH neutral.

- Filtering is advised (50 -75um filter cartridge)

- Use a corrosion inhibitor (necessary)

Example corrosion inhibitors:	Typical concentration
Optishield (preferred choice):	10%
Optishield II:	10%
DowFrost HD / DowCAL:	25%
Copal (Fernox):	5%

- DO NOT use an algaecide when aluminium parts are in the cooling circuit.

Always refer to the manufacturer's web site for the suitability and application instructions for any corrosion inhibitor.

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The addition of a corrosion inhibitor such as Optishield should allow the use of our standard aluminum AO devices in most laser coolant circuits with greatly reduced risk of corrosion.

Notes:

- Optishield (standard) has some algaecide properties.
- The corrosion inhibitor concentrations must be checked regularly according to the manufacturer's instructions.
- It is important to check compatibility with other potentially sensitive components in the same coolant system.
- Allowance must be made for the reduced cooling capacity when additives are used in water. As a general rule, add 10% to the chiller rating.

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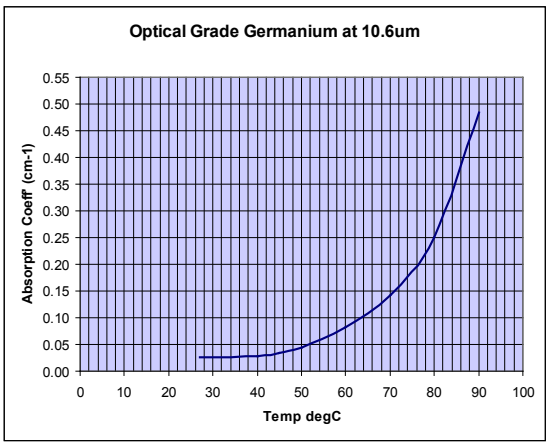
Coolant Temperature Specification for Germanium CO_2 Modulators/Deflectors

Flow rate and Coolant temperature measured at the AO device
Minimum : < 20 degC, at > 1litre/min.
Recommended : 18 deg C, at 2.5 litres/min

The optical absorption in Germanium increases rapidly with temperature. It is very important especially for input optical powers above100W, to maintain a temperature of less than 20degC at the AO device. Higher temperatures will lead to an increase in optical absorption, lower efficiency and increased thermal lensing. Optical damage is highly likely at temperatures above 30degC.



Optical path lengths
1209 series: 3.2cm
AOM600 series: 2.1cm

Warranty and Damage

- Since we have no control over the operating conditions of our high power industrial devices, we are unable to warranty against surface damage to the optical faces.
- Warranty may be void if no corrosion inhibitors are used in the cooling system.

Brass case parts and heatsinks

Certain laser types are manufactured with only Brass and Copper in the cooling circuit. e.g. Coherent Diamond Series. (to our knowledge)

For applications using these lasers and a shared coolant circuit, we can supply Brass or Te-Copper versions of selected AO devices and water cooled Drivers. With care, it may then be possible to avoid the use of additives, since only brass metal is exposed to the coolant. Nevertheless, we would still recommend the use of a corrosion inhibitor as an added safety factor.

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