Application Note

ISOMET

AN0901 *July 09*

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 Nickel plated or coated Aluminium. This metal 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.

Coolant Water

- Do NOT use de-ionized water.
(It is known as the "universal solvent" and will even attack some types of stainless steel).

- Coolant must be PH neutral. Limits $4.5 < ph < 8.5$

- Use distilled water with a conductivity of more than 50 microsiemens/cm

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

- Use a corrosion inhibitor (necessary) and an algaecide (if required)

Example corrosion inhibitors:

Optishield II: concentration 10%
DowFrost HD: concentration 25%
Copal (Fernox): concentration 5%

Algaecides:

Chloramine-T: 1gram / 4 litres

The addition of a corrosion inhibitor such as Optishield II (preferred) should allow the use of our standard Nickel plated aluminium AO devices in most laser coolant circuits with greatly reduced risk of corrosion.

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Notes:

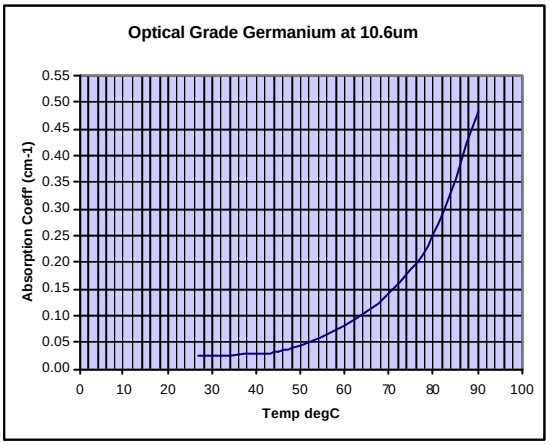
It is important to check compatibility with other potentially sensitive components in the same coolant system.

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.

Coolant Temperature for Germanium CO_2 Modulators/Deflectors

The coolant temperature measured at the Ge AO device must be less than 20degC, at a flow rate > 1litre/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 versions of our AO devices and water cooled Driver heatsinks. With care, it may then be possible to avoid the use of additives, since only brass metal is exposed to the coolant.

However we would still recommend the use of Optishield II as an added safety factor.

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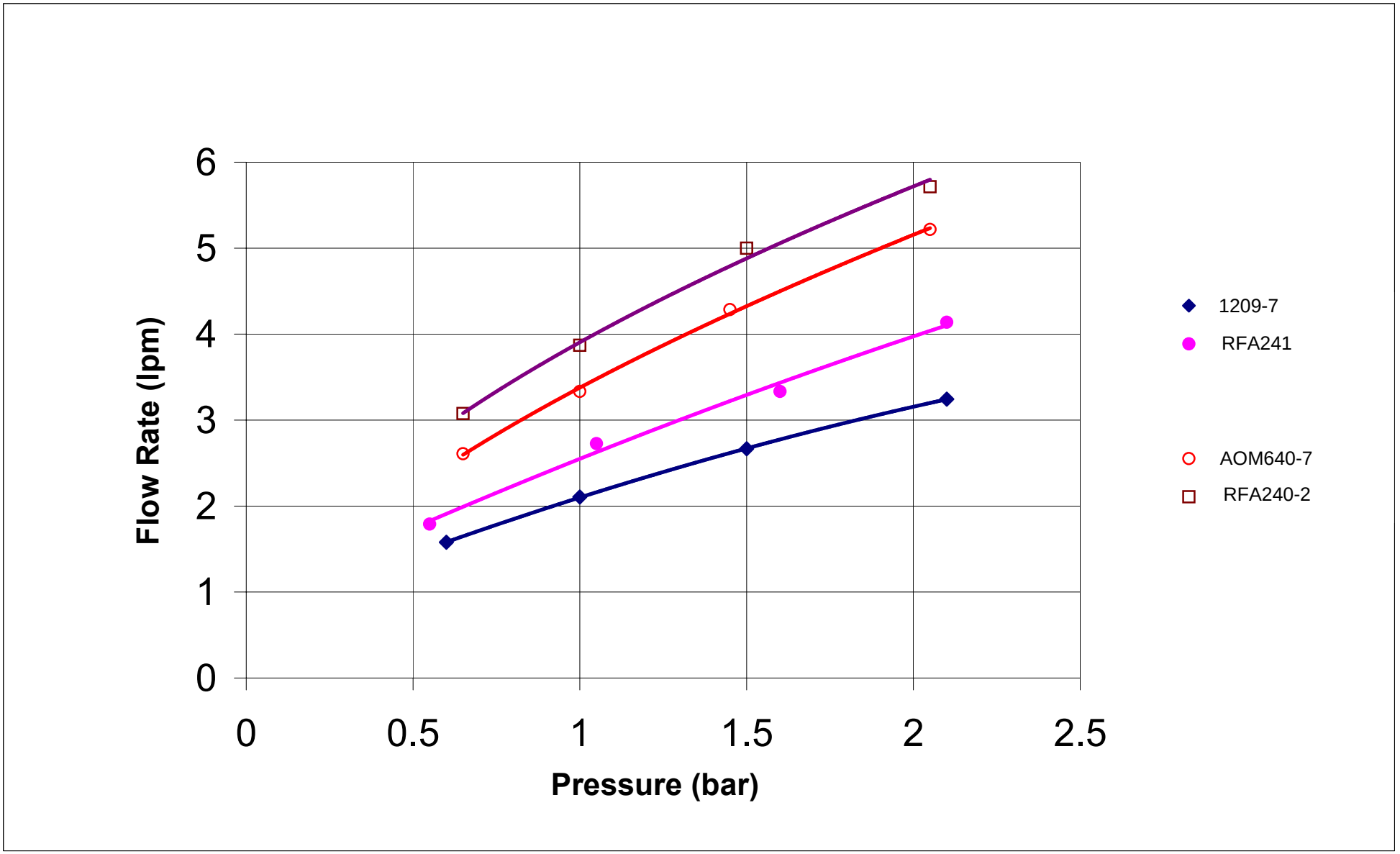
Flow Rate (lpm)
6
5
4
3
2
1
0
0
0.5
1
1.5
2
2.5
Pressure (bar)
1209-7
RFA241
AOM640-7
RFA240-2