

Pump Life Expectancy

Question: "How long will the reference air pump last?"

Answer: It's difficult to say, there are several factors that need to be considered.

The life of a pump can vary greatly from site to site. If the analyser is located in an air conditioned control room then several years would be the expected life, if it were located in a hot and dirty heat treat shop then the life could be as short as six months.

There are three key factors that reduce the life of the pump.

- **Operating temperature.**
As this increases the pump life decreases. If the internal temperature exceed 35°C the analyser will turn off the backlight display and cycle the pump on and off to assist reducing the temperature and extending the life of the pump.
- **Particulate loading of the air being pumped.**
This is mainly a problem on heat treatment sites; the grit in these places gets lodged in the diaphragm increasing the load on the pump. The analysers are fitted with a filter on the reference air inlet to the analyser to extend the pump's life.
- **The amount of restriction in the reference airline to the probe.**
The greater the restriction the greater the load is on the pump's phosphor bronze bearings.

The normal flow range from the reference air pump connected to an oxygen probe is 100 to 120 cc per minute. The zirconia sensor will work properly with a reference air flow rate as low as 10 cc per minute.

The common mode of failure for the pump is a worn phosphor bronze bearing eventually causing the motor to "pole out" thereby greatly increasing the current drain. The 1730 series transmitters constantly monitor the current consumption of the pump and will raise one of two alarms if the current is outside of standard operating conditions:

Ref Air Pump Overload

This alarm is raised on the transmitter when it detects the pump current consumption exceeds 250mA. At this level the transmitter automatically switches off the reference air pump to prevent damage to the pump drive circuitry.

Ref Air Pump Fail

This alarm is raised on the transmitter when it detected the pump current consumption is less than 15mA. This would occur if the pump goes open circuit or is unplugged.