

# Calibrating the Italian Air Force Brewer Network

One of the products manufactured by Kipp & Zonen is the Brewer spectrophotometer. This instrument measures the concentration of the Ozone layer and can perform high accuracy spectral UV scans. The Brewer is a very complex instrument that requires regular maintenance and calibration. As the manufacturer, Kipp & Zonen, has the knowledge, parts and test equipment to service, repair and calibrate all models of Brewer on site or at the factory in Delft, the Netherlands.



*Brewers being calibrated*

The Italian Air Force has a network of four Mk IV Brewers, which are installed at three sites in northern, central and southern Italy to provide accurate UV and Ozone data. The World Meteorological Organisation (WMO) recommends that Brewers have an Ozone calibration at least every two years, so Kipp & Zonen Brewer service engineers make a bi-annual visit to each site to service and calibrate the four instruments. The most recent visit was in the early autumn of 2008. Thanks to the support of Eurettronica Icas, our Italian distributor, the service and calibration was well organised and planned within an efficient time frame.

After arrival at a site, the first task is to un-pack and set up our reference Brewer. Next we carry out tests and a visual inspection to determine the condition of the Air Force Brewer. Special attention is paid to the mechanical parts, to ensure that all motors and gears are running properly. The tracker is inspected, serviced and levelled to ensure that the Brewer is pointed accurately at the sun at all times.

Humidity is a major threat to the Brewer. Therefore we change the internal desiccant and inspect the seals and gaskets that prevent humid air entering the housing, and replace them if necessary. It may happen that a Brewer is

not in perfect operating condition and our technicians are trained to solve problems using a systematic approach. Often this can be done using available test equipment and spare parts, but in the worst case a Brewer may need to be returned to the factory.

Ozone calibration consists of two types of measurement; a 'sun scan' in which the optimal instrument settings are determined, and Ozone measurements compared with our reference Brewer. The UV calibration can be divided into wavelength calibration and UV response calibration. Wavelength calibration is performed using Mercury and Cadmium spectral lamps and the results are computed to give new Brewer configuration files. A 1000 W reference lamp and a computer program are used to calculate the UV response. Finally, timed UV scans are taken to compare the measurements with our reference Brewer. The calibration is complete when all the tests have been passed successfully.



*Brewers on site in Italy*

The Italian Air Force can now be confident that the Ozone and UV measurements made by their Brewers are accurate and can be confidently supplied to the World Ozone and Ultraviolet Data Centre (WOUDC) in Canada ■



Passion for Precision