

Application Note

CAP437 North Sea – Meteorological data for Wind, Temperature, Humidity & Pressure

Reference: AN0007

Introduction

CAP437 is the Standard for Offshore Helicopter Landing Areas. CAP437 provides the criteria applied by the CAA in assessing the standards of offshore helicopter landing areas for worldwide use by helicopters registered in the United Kingdom. There are various parts to CAP437, however, this Application Note is going to focus on the meteorological data and specifically performance including wind, air temperature, humidity and pressure only.

Compliance Table

Question from CAP437		WS	WO	MP	MXM
The wind measuring equipment should provide an accurate and representative measurement of wind speed and direction.		X	X	X	X
Wind direction data should be oriented with respect to True North.		X	X	X	X
The wind speed measurement should be to an accuracy of within ±1kt, or ±10% for wind speeds in excess of 10kt, of the actual wind speed (whichever is the greater), over the following ranges: In tolerance operating range 0 to 100 knots Recoverable range 0 to 130 knots		X	X	X	X
With wind speeds in excess of 2kt, the wind direction system should be capable of producing an overall accuracy better than ±10°.		X	X	X	X
The sensor should be sampled at a minimum rate of four times every second.		Internal & output	Internal & output	Internal only	Internal only
Where wind systems measure the gust, the equipment should calculate the three-second gust as a rolling average of the wind speed samples.			X	X (1Hz)	X (1Hz)
The equipment should be capable of producing two- and ten-minute rolling averages of the wind speed and direction. The algorithms used for the production of such averages should be defined. The average direction displayed should take regard of the numerical discontinuity at North.		1Hz only via WindDisplay Only	X (1Hz) & via WindDisplay	X (1Hz optional see KN1102)	X

Client Systems Use

Please note from the table that only WindSonic and WindObserver are able to provide the 4Hz output rate required for client systems to calculate the 3-second gust under WMO-No. 8 Seventh Edition 2008 ISBN 978-92-63-10008-5 also used for CAP437.

Relevant sections of WMO-No. 8 Seventh Edition 2008 ISBN 978-92-63-10008-5 are Chapter 5, sections 5.8.2 and 5.8.3

MaxiMet

MaxiMet has the option to provide customer selectable vector rolling average and 3 second gust in accordance with WMO-No. 8 Seventh Edition 2008 ISBN 978-92-63-10008-5, however, MaxiMet provides this using 1Hz. We accept that there may be up to 10% deviation in maximum gust values due to a peak falling between the 1 Hz outputs. We balance this reduction in sampling with the power savings of approx. 20mA @ 12VDC compared to running at 4 Hz.

MetPak

MetPak has the option to provide customer selectable vector rolling average and 3 second gust in accordance with WMO-No. 8 Seventh Edition 2008 ISBN 978-92-63-10008-5, however, MetPak provides this using 1Hz. We accept that there may be up to 10% deviation in maximum gust values due to a peak falling between the 1 Hz outputs. Please see KN1102 as this is not loaded as standard.

WindObserver

WindObserver has the option to provide customer selectable vector rolling average and 3 second gust in accordance with WMO-No. 8 Seventh Edition 2008 ISBN 978-92-63-10008-5, however, WindObserver provides this using 4Hz.

Specific Modes

Full details of the specific modes can be found in manuals, an example is below:

WindObserver Mode

The direction and magnitude outputs are derived from the vector sum of U and V over the RWALONG averaging period (default 10 minutes in P1).

The gust output is derived from the vector sum of U and V over 3 readings (3 seconds in P1), and the max gust is the maximum of the gust value over the RWASHORT period (default 60 seconds in P1). The max gust value is reset to zero at the end of each RWASHORT period.

New issue of CAP 437 8th December 2016

Please note that there are no changes to the specification requirements (shown in the tables in this Application Note) for wind, air temperature, and relative humidity and pressure sensors in this latest issue.

Air Temperature, Humidity & Pressure

Previously we have focused on wind data and the table below focusses on other parameters that are measured by MaxiMet & MetPak.

Question from CAP437		MXM	MP
Temperature In-tolerance operating range -25°C to +50°C Recoverable range -30°C to +70°C		X	X
The equipment should be capable of measurement to an accuracy better than ±1.0°C for air temperature and dew point for the above ranges		X	X
Humidity In-tolerance operating range 5 to 100% RH condensing Recoverable range 0-100% RH condensing		X	X
Dew point should be displayed for temperatures below zero		X	X
Temperature and dew point measurements should be measured to a resolution of 0.1°C		X	X
Pressure A minimum of two co-located sensors should be used. The pressure sensors should be accurate to within 0.5hPa of each other.		Single sensor only so unable to comply	Single sensor only so unable to comply
Pressure In-tolerance operating range 900-1050hPa Recoverable range 850-1200hPa		X	X
Pressure sensor accuracy ±0.5hPa across the above pressure ranges		650-1100hPa +/- 0.5hPa 1100-1200hPa +/-1 hPa	650-1100hPa +/- 0.5hPa 1100-1200hPa +/-1 hPa
Pressure sensor should provide an output with a minimum system resolution of 0.1 hPa.		X	X

It can be seen above that although MaxiMet and MetPak offer a compact single output solution; neither meets the criteria for pressure measurement under CAP437 as they only have one pressure sensor and requirements are for two or more that can be compared with each other.