



---

## TASE300 Humidity Test

January 20, 2012

---

**Author:**

**Charles Audette**

**2621 Wasco Street / PO Box 1500 / Hood River, OR 97031**

**(541) 387-2120 phone / (541) 387-2030 fax**

[www.cloudcaptech.com](http://www.cloudcaptech.com) / [sales@cloudcaptech.com](mailto:sales@cloudcaptech.com) / [support@cloudcaptech.com](mailto:support@cloudcaptech.com)



Cloud Cap Technology, a Goodrich Company

## Table of Contents

1	Purpose.....	3
2	Humidity Test .....	3
2.1	Test Procedures .....	3
2.2	External Humidity Environment Test .....	3
2.3	Conducting Spot Checks .....	4
3	Test Results .....	4
4	Testing Photos.....	4
5	Test Documents .....	7

## 1 Purpose

This test was designed to establish humidity resistance criteria for the TASE300 following the testing standards and procedures based on DO-160 test criteria, with modifications centered on actual product usage.

## 2 Humidity Test

### Category C - External Humidity Environment

#### 2.1 Test Procedures

1. Moisture shall be provided by steam or by evaporation of water having a percent Hydroxide (pH) value between 6.5 and 7.5 or the water sensitivity shall not be less than 250,000 ohm cm when measured at 25°C.
2. The velocity of the air throughout the exposure area shall be between 0.5 and 1.7 meters per second.
3. The test chamber should be vented to prevent the buildup of pressure.
4. Provisions shall be made to prevent water from dripping onto the equipment.

#### 2.2 External Humidity Environment Test

1. Install the equipment in the test chamber and insure its configuration is representative of that used in actual service.
2. Stabilize the equipment at 38 +/- 2°C and 85 +/- 4 RH.
3. Over a two hour period, +/- 10 minutes, raise the chamber temperature to 55 +/- 2°C and humidity to 95 +/- RH.
4. Maintain the chamber at this setting for six hours minimum.
5. During the next 16 hour period, +/- 15 minutes, decrease the temperature gradually to 38 +/- 2°C. During this period, keep the humidity as high as possible and do not allow it to fall below 85%.
6. Steps 2.3-2.5 constitute a cycle, which shall be repeated for a total of 48 hours of exposure.
7. At the end of the exposure period, remove the equipment from the test chamber and drain off (do not wipe) any condensed moisture. Within one hour after the two cycles are completed, apply normal supply power and turn on the equipment. Allow 15 minutes maximum following the application of primary power for the equipment to warm up.
8. After the warm-up period, determine compliance with the applicable equipment performance standards.

## 2.3 Conducting Spot Checks

For conducting spot checks on the performance of the equipment under test, the equipment may be operated at the end of each cycle. The period of removal shall not exceed 20 minutes, and the equipment shall not be operated for more than 15 minutes of this twenty minute period.

## 3 Test Results

The humidity test was a success. The gimbal ran without any problems and passed all of CCT's compliance and performance standards. Some of the outer screws and lens rims had developed some iron oxidization but upon opening the gimbal. There was no further evidence of rust beyond the outer covers. The rust on the lens wiped off and the screws also easily cleaned or replaced.

## 4 Testing Photos



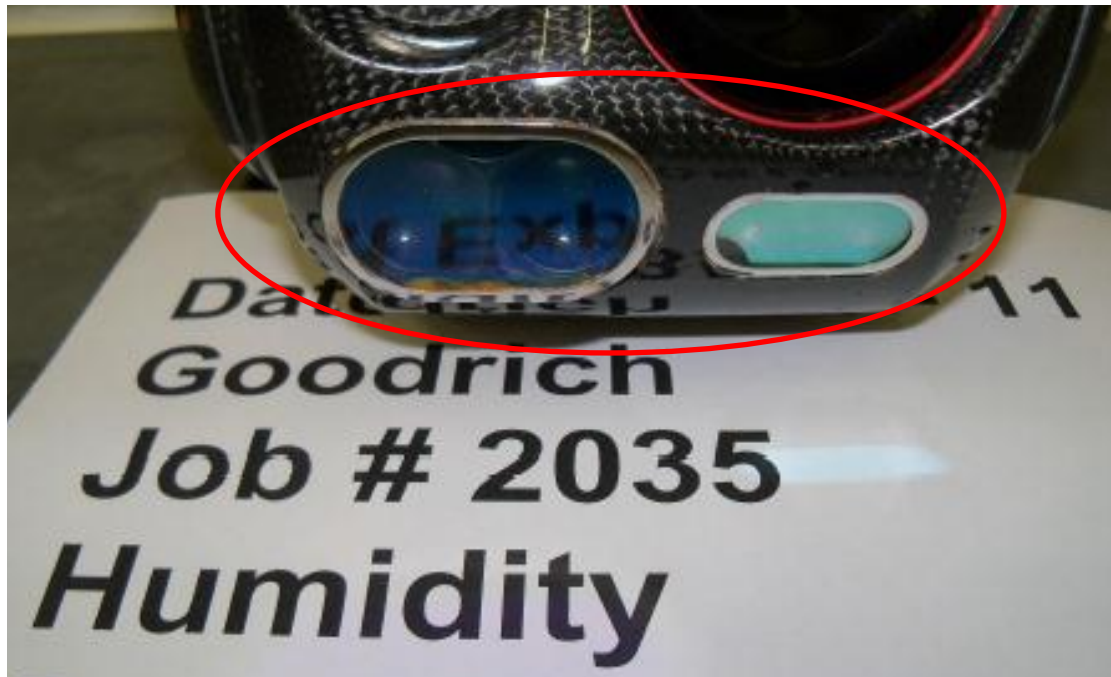
**Figure 1 - TASE300 Humidity Test**

Minor iron oxidation on clevis base screws (Figure 2).



**Figure 2 - Clevis Base Screws**

Minor iron oxidation on lens rims (Figure 3).



**Figure 3 - Lens Rim**

Minor iron oxidation on clevis access cover screws (**Figure 4**).



**Figure 4 - Clevis Access Cover Screws**

## 5 Test Documents

GF9 – 10/04

December 28, 2011

Certification No: CTC 2035

Attention: Charles Audette  
Goodrich - Cloud Cap Technology  
205 Wasco Loop  
Hood River, OR 97031

Reference: a. RTCA DO-160F  
b. PO# M03844  
c. Quote CTQ 10800  
d. Cascade TEK Job No. 2035



Cascade Technical Sciences  
5245-A NE Elam Young Pkwy  
Hillsboro OR, 97124  
Phone: (503) 648-1818  
Fax: (503) 648-1798  
www.cascadetek.com



TESTING CERT #2582.01

### CERTIFICATION

Cascade Technical Sciences hereby certifies that One (1) Tase 300 Gimbal, S/N 044, was subjected to the following tests:

1. Humidity: Per Reference (a) RTCA DO-160F, Section 6.3.1, Category C and (c) Item 1, sample was exposed to two temperature and humidity cycles per specification, with temperature extremes of +38°C and +55°C, with humidity between 85% and 95%.
2. Blowing Dust: Per Reference (a) RTCA DO-160E, Section 12.4, Category D and (c) Item 2, sample was exposed to 1 hour per direction of blowing dust at an air velocity of 0.5-2.4 m/s, and concentration of 3.5 to 8.8 g/m<sup>3</sup>, with conditions of +25°C, below 30%RH. Test was repeated at +55°C for a total of two runs.
3. Blowing Sand: Per Reference (a) RTCA DO-160F, Section 12.5, Category S and (c) Item 3, sample was exposed to one hour per direction of blowing sand at 18-29 m/s air speed, concentration level of 2.2 gm/m<sup>3</sup>. Conditions of +25°C, below 30%RH, for two runs. Test repeated at temperature of +55°C, for a total of 2 runs.

Testing was done in accordance with the above references as evidenced and reported in the accompanying data. The test sample was returned to the customer's facility for evaluation.

The original of this report is on file at Cascade Technical Sciences, Inc. under the above referenced certification number for review by authorized personnel. The results of the testing reported herein relate only to the actual item tested.

Respectfully submitted,



David Bowles  
Quality Manager  
Cascade Technical Sciences, Inc.

This test certification shall not be reproduced, except in full, without written authorization from Cascade Technical Sciences.  
Total number of pages in this document is 56.

The objective of this test program was to subject customer provided test hardware to environmental simulation in compliance with customer stated specification, including any authorized modification, deviations or concessions to the original requirements. The hardware consisted of items identified in the appropriate sections of this report. In addition to test hardware identification, each section contains information that describes the associated test setup and performance and the resulting data. CascadeTEK, Inc measuring instruments used in testing were calibrated according to the requirements of ANSI/NCSL Z540-1-1944, ISO/IEC 17025-2005 and are NIST traceable. Calibration records are on file and available for inspection by request. Because the test methods are well established and are qualitative or semi-quantitative in nature, CascadeTEK, Inc does not apply measurement uncertainty unless obligated by contract. Measured value related to the corresponding tolerance requirement is used to decide whether a test meets the requirements of the specification. Any test hardware operational setups and resulting evaluations or inspections performed by the customer are not included in this report, unless they were explicitly requested. While observations and/or specification compliance statements may be reported, no interpretations or opinions regarding customer product performance are intended. Unless otherwise indicated in the appropriate report section, all contract obligations were met and the test objective achieved.



Cascade Technical Sciences, Inc.

TEST DATA FORM DS10

DATE STARTED 11-8-2011	CUSTOMER Goodrich	TECHNICIAN SIGNATURE <i>Tom Allegretti</i>
DATE COMPLETED 11-11-2011	SPECIMEN DESCRIPTION Tase 300 Gimbal	ENGINEER SIGNATURE <i>Terry Lee</i>
TEMPERATURE (LABORATORY) +75°F	TYPE OF TEST Humidity	ENGINEER <i>TERRY LEE CANALDA</i>
HUMIDITY (LABORATORY) 32%	TEST SPECIFICATION RTCA DO-160F, Cat C, 6.3.1	PARAGRAPH NUMBER 2035
SPECIMEN NUMBERS (P/N - S/N) M/N- Tase 300 S/N- 044		

PHOTO - Yes

DATE/TIME	REMARKS	TECH
11-8-11	<b>TEST SUMMARY:</b> Expose non-operating sample to 2 temperature & humidity cycles per specification. Temperature extremes of +38°C & +55°C with humidity between 85% & 95%. Customer to perform pre & post exposure operational tests per specification.	TA
1245	Customer & sample on-site. Begin set up for exposure (check operation).	TA
1315	Customer reports sample operating o.k. Power down sample and begin exposure	TA
	11-9-11.	
11-9-11		
0707	Begin ramp of chamber to +38°C & 85%RH with sample non-operating. O.T. protection is set at 0°C & +65°C.	TA
0801	Begin 3 hour stabilization period at +38°C & 85%RH.	TA
1101	Begin exposure of 2 temperature and humidity cycles per specification.	TA
1602	Chamber currently at +55°C & 95%RH and continue exposure.	TA
11-10-11		
0700	Continue humidity exposure with chamber at +43°C & 96%RH. O.T. protection is set at 0°C & +65°C.	TA
1603	Continue exposure with chamber at +55°C & 96%RH and cycling o.k.,	TA
11-11-11		
0646	Chamber at +43°C & 96%RH. Continue exposure with O.T. protection set at 0°C & +65°C.	TA
0953	Customer on-site with chamber at +39°C & 96%RH and continue exposure.	TA
1101	2 cycles complete and chamber to ramp to ambient conditions.	TA
1131	Chamber at ambient conditions with customer to check sample operation (open chamber door).	TA
1152	Customer reports sample operating o.k. with minor exterior rust on exterior of sample noted.	TA
	- Test Complete -	

Test Data Form DS10-10/04



Cascade Technical Sciences, Inc.

**TEST EQUIPMENT LIST**

TEST: *Humidity*      JOB NUMBER: *2035*      DATE: *11-8-2011*

EQUIPMENT DESCRIPTION	MANUFACTURER	MODEL	S/N	CAL NO.	CALIBRATED DATE (MM/DD/YY)	CALIBRATION DUE DATE (MM/DD/YY)
CSZ-32	CSZ	ZH/32/2/2/H/AC	ZN9432039	***	REFERENCE	***
CONTROLLER	WATLOW	F4	004575	096	<i>1-17-2011</i>	<i>1-31-2012</i>
CHART RECORDER	PARTLOW	MRC5000	1312455	136	<i>1-17-2011</i>	<i>1-31-2012</i>

DS2-8/04 Test Equipment List

