

Report Date: 24 February 2005

Customer P.O.: 13-PO-2005-26

Test Period: 11 through 23 February 2005

Security Classification: NA

**TEST REPORT**

FOR

ENVIRONMENTAL TESTING OF THE 3" TELETHERAPY CAPSULE

AND THE 8" TELETHERAPY CAPSULE

TESTING PERFORMED BY:

FOR:

**QUALTEST, INC.**


5325 Old Winter Garden Road  
Orlando, Florida 32811-1520

Website: [www.qualtest.com](http://www.qualtest.com)

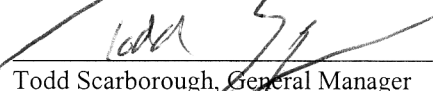
**INTERNATIONAL ISOTOPES, INC.**

4137 Commerce Circle  
Idaho Falls, ID 83401

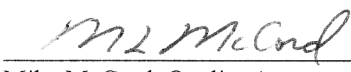
TEST REPORT PREPARED BY:

  
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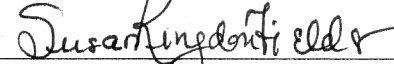
APPROVED BY:

  
Todd Scarborough, General Manager

QUALITY ASSURANCE:

  
Mike McCord, Quality Assurance Manager

being duly sworn, deposes and says that the information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects. Subscribed and sworn to before me,

  
Susan Kingdon Fields, Notary Public in and for the State of Florida at large, this

"CQA Performed IAW One Book"

Not Required  
Bill Kennedy, DCM Orlando QAS, S1002A

2<sup>nd</sup> day of March, 20 05

State of Florida, County of Orange  
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Bonded Thru Budget Notary Services

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**REPORT REVISION RECORD**

**REVISION    DESCRIPTION OF CHANGE**

INITIAL RELEASE

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*Qualtest operates under the relevant quality system requirements of ISO-9001:2000 for providing environmental simulation services as recognized by TRC Registration Certificate #00018. This laboratory also maintains A2LA accreditation to ISO/IEC 17025 for the specific tests listed in A2LA Certificate #1805.01. However, the test results included in this report are not covered by the accreditation.*

**FOREWORD**

The objective of this test program was to subject customer provided test hardware to environmental simulation in compliance with customer stated specifications, including any authorized modifications, deviations or concessions to the original requirements. Test 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. Qualtest measuring instruments used in testing were calibrated according to the requirements of ANSI/NCSL Z540-1-1994 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, Qualtest 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.

**SECTION 1****IMPACT TEST SUMMARY**

Test Start-Finish Dates: 11 February 2005

Responsible Test Technician: Don Hensley

**1-1 TEST HARDWARE**

One (1) unmarked Teletherapy Capsule, measuring 3 inches

**1-2 TEST REQUIREMENTS WITH TOLERANCES**

Drop the rounded end of a 4,990-gram (11-lb) impact tool onto the test item from a height of one (1) meter. Impact the test item anywhere around the circumference where the weld joint meets the side.

Tolerance:

Standard Ambient: 25±10°C, 20 - 80% Relative Humidity, Site Pressure

Drop Height: ±2.5%; Force: ±1%

**1-2.1 Test Specification:**

Customer RFQ fax dated 01/25/05 11:47, Table 1, Class 5, Impact Test

**1-3 TEST SETUP****QUALTEST FURNISHED MEASUREMENT & TEST EQUIPMENT (including any rentals)**

QTI #	Item	Manufacturer	Model Number	Calibration Due
100207	Tape Measure (50 foot)	Lufkin	C-213w/Blank	Indefinite
100255	Scale	Setra	EL 4100S	9/1/2005
100315	Thermo/Hygrometer	Mannix	SAM990DW	10/13/2005

**1-4 TEST DESCRIPTION****1-4.1 Non-Qualtest Personnel, Including Organization, Present for All or Part of the Test:**

None

**1-4.2 Powered/Operational State of the Hardware and by Whom:**

The test item was not operating during the impact test.

**1-4.3 Test Activities and Resulting Measurements from Observed/Recorded Data:**

Atmospheric Conditions: Temp (°C): 20 Relative Humidity (%): 34 Pressure: Site Ambient

Drop	Drop Height	Time	Observation
1	39.4 inches (1 meter)	1127	No visible damage

**1-4.4 Limitations or Departures from the Test Requirements and Authorizing Source:**

None

**1-5 ENVIRONMENTAL TEST DATA**

Compliance verified through test setup and observation (reference photos)



**Figure 1-1. Test setup for impact.**



**Figure 1-2. Test setup for impact.**



**Figure 1-3. Test setup for impact.**



**Figure 1-4. Condition of the 3-inch Teletherapy Capsule following the impact test.**



**Figure 1-5. Condition of the 3-inch Teletherapy Capsule following the impact test.**



**SECTION 2****BENDING (LOAD) TEST SUMMARY**

Test Start-Finish Dates: 22 February 2005

Responsible Test Technician: Don Hensley

**2-1 TEST HARDWARE**

One (1) Teletherapy Capsule, measuring 8 inches

**2-2 TEST REQUIREMENTS WITH TOLERANCES**

Lay the test item across two smooth solid parallel support cylinders that are twice the test item diameter (2D) and 10D apart. Slowly apply a 450-pound (2,000 N) force to the most vulnerable part of the test item using a third parallel cylinder (4D) centered between the supports. The cylinders should have a Rockwell hardness of 50 to 55. Remove the force after reaching the test limit and note any evidence of bending.

Tolerance:

Standard Ambient: 25±10°C, 20 - 80% Relative Humidity, Site Pressure

Force: ±1%

**2-2.1 Test Specification:**

ISO 2919:1999(E), Paragraph 7.7.1

**2-3 TEST SETUP****QUALTEST FURNISHED MEASUREMENT & TEST EQUIPMENT (including any rentals)**

QTI #	Item	Manufacturer	Model Number	Calibration Due
100315	Thermo/Hygrometer	Mannix	SAM990DW	10/13/2005
100352	Load Cell	Omegadyne	LCWD-5k	2/22/2006

**CUSTOMER FURNISHED FIXTURES AND SUPPORT EQUIPMENT**

P/N	S/N	Nomenclature (description, model, manufacturer etc.)
Not marked	Not marked	Cylinder (1 ea.)
Not marked	Not marked	Bending Test Fixture (1 ea.)

**2-4 TEST DESCRIPTION**

**2-4.1 Non-Qualtest Personnel, Including Organization, Present for All or Part of the Test:**

None

**2-4.2 Powered/Operational State of the Hardware and by Whom:**

The test item was not operating during the bending test.

**2-4.3 Test Activities and Resulting Measurements from Observed/Recorded Data:**

Atmospheric Conditions: Temp (°C): 22 Relative Humidity (%): 63 Pressure: Site Ambient

Run	Pounds/force	Time	Observation
1	450	1050	Bent approximately 5/8 inch

**2-4.4 Limitations or Departures from the Test Requirements and Authorizing Source:**

None

**2-5 ENVIRONMENTAL TEST DATA**

Compliance verified through test setup and observation (reference photos).



**Figure 2-1. Test setup for bending (load).**



**Figure 2-2. Test setup for bending (load).**



**Figure 2-3. Test setup for bending (load).**



**Figure 2-4. Test setup for bending (load).**



**Figure 2-5. Condition of the 8-inch Teletherapy Capsule following the bending (load) test.**



**Figure 2-6. Condition of the 8-inch Teletherapy Capsule following the bending (load) test.**

**SECTION 3****BENDING (HAMMER) TEST SUMMARY**

Test Start-Finish Dates: 23 February 2005

Responsible Test Technician: Don Hensley

**3-1 TEST HARDWARE**

One (1) Teletherapy Capsule, measuring 8 inches

**3-2 TEST REQUIREMENTS WITH TOLERANCES**

The test item shall be rigidly clamped in a horizontal position so that one-half of its length protrudes from the face of the clamp. Orient the free end of the test item in a manner that is likely to cause maximum damage when struck by the flat face of a steel hammer. Strike the test item with an impact equivalent to a free vertical fall of 1.4 kg (3.0865 lb) through 1 meter. Note any evidence of bending.

Tolerance:

Standard Ambient: 25±10°C, 20 - 80% Relative Humidity, Site Pressure

Force: ±1%

**3-2.1 Test Specification:**

ISO 2919:1999(E), Paragraph 7.7.2

**3-3 TEST SETUP****QUALTEST FURNISHED MEASUREMENT & TEST EQUIPMENT (including any rentals)**

QTI #	Item	Manufacturer	Model Number	Calibration Due
100207	Tape Measure (50 foot)	Lufkin	C-213w/Blank	Indefinite
100255	Scale	Setra	EL 4100S	9/1/2005
100315	Thermo/Hygrometer	Mannix	SAM990DW	10/13/2005

**CUSTOMER FURNISHED FIXTURES AND SUPPORT EQUIPMENT**

P/N	S/N	Nomenclature (description, model, manufacturer etc.)
Not marked	Not marked	Hammer Impact Tool (1 ea.)
Not marked	Not marked	Bending Test Fixture (1 ea.)

**3-4 TEST DESCRIPTION**

**3-4.1 Non-Qualtest Personnel, Including Organization, Present for All or Part of the Test:**

None

**3-4.2 Powered/Operational State of the Hardware and by Whom:**

The test item was not operating during the bending test.

**3-4.3 Test Activities and Resulting Measurements from Observed/Recorded Data:**

Atmospheric Conditions: Temp (°C): 23 Relative Humidity (%): 56 Pressure: Site Ambient

Run	Time	Observation
1	1135	The test item bent

**3-4.4 Limitations or Departures from the Test Requirements and Authorizing Source:**

None

**3-5 ENVIRONMENTAL TEST DATA**

Compliance verified through test setup and observation (reference photos).



**Figure 3-1. Test setup for bending (hammer).**



**Figure 3-2. Test setup for bending (hammer).**



**Figure 3-3. Condition of the 8-inch Teletherapy Capsule following the bending (hammer) test.**



**SECTION 4****HOT LIQUID BUBBLE TEST SUMMARY**

Test Start-Finish Dates: 23 February 2005

Responsible Test Technician: Don Hensley

**4-1 TEST HARDWARE**

One (1) Teletherapy Capsule, measuring 3 inches

One (1) Teletherapy Capsule, measuring 8 inches

**4-2 TEST REQUIREMENTS WITH TOLERANCES**

Ensure that the test items are at ambient temperature and then immerse in 90 to 95°C water. Observe for bubble leaks over a period of at least two (2) minutes.

Tolerance:

Standard Ambient: 25±10°C, 20 - 80% Relative Humidity, Site Pressure

**4-2.1 Test Specification:**

ANSI/HPS N43.6-1997, Paragraph A.2.2.2

**4-3 TEST SETUP****QUALTEST FURNISHED MEASUREMENT & TEST EQUIPMENT (including any rentals)**

QTI #	Item	Manufacturer	Model Number	Calibration Due
100102	Temperature Calibrator	Omega Eng.	OMNI-CAL IIA8	5/5/2005
100315	Thermo/Hygrometer	Mannix	SAM990DW	10/13/2005

**4-4 TEST DESCRIPTION****4-4.1 Non-Qualtest Personnel, Including Organization, Present for All or Part of the Test:**

None

**4-4.2 Powered/Operational State of the Hardware and by Whom:**

The test item was not operating during the hot liquid bubble test.

**4-4.3 Test Activities and Resulting Measurements from Observed/Recorded Data:**Atmospheric Conditions: Temp (°C): 24 Relative Humidity (%): 53 Pressure: Site Ambient

Run	Time	Water Temperature	Duration	Observation
1	1322	92.9°C	2-minutes	No evidence of bubbles

**4-4.4 Limitations or Departures from the Test Requirements and Authorizing Source:**

None

**4-5 ENVIRONMENTAL TEST DATA**

Compliance verified through test setup and observation (reference photos). The test items were returned to the customer following the completion of the test.



**Figure 4-1. Hot liquid bubble test.**



**Figure 4-2. Hot liquid bubble test.**