

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
NATIONAL MEASUREMENT LABORATORY
GAITHERSBURG, MARYLAND 20899

CERTIFICATE OF ANALYSIS

International Temperature Scale of 1990

Argon Triple-Point Cell
Pond Engineering Model K38
Serial Number 98343

Tested for
Pond Engineering, Inc.
Berthoud, Colorado

27 May 1999

27 May 1999

Pond Engineering, Inc.
Attn.: Stanley Pond
2401 South County Road 21
Berthoud, CO 80513

Subject: Quality evaluation of Ar TP cell (s/n 98343)
Purchase Order No.: K38-290

Dear Mr. Pond:

A comparison of your argon triple-point cell (Model K38, s/n 98343) was made against our laboratory standard argon triple-point cell (Ar-1). The measurement system included an ASL Model F18 operating at a frequency of 30 Hz with a 100 Ω Tinsley Model 5685 reference resistor, temperature controlled to within ± 8 mK, and a 25.5 Ω SPRT. The depth from the inside bottom of the reentrant well to the liquid surface of your fixed-point cell is stated to be 13.2 cm; the depth of our cell is 13.4 cm. Corrections were made for the difference in hydrostatic head effects due to the different immersion depths. As shown in figure 1, the triple-point temperature of your cell is 0.10 mK lower than that of the NIST reference cell Ar-1 cell. We assign an expanded uncertainty ($k=2$) of 0.10 mK on the realized value of our cell to account for impurities and measurement errors.

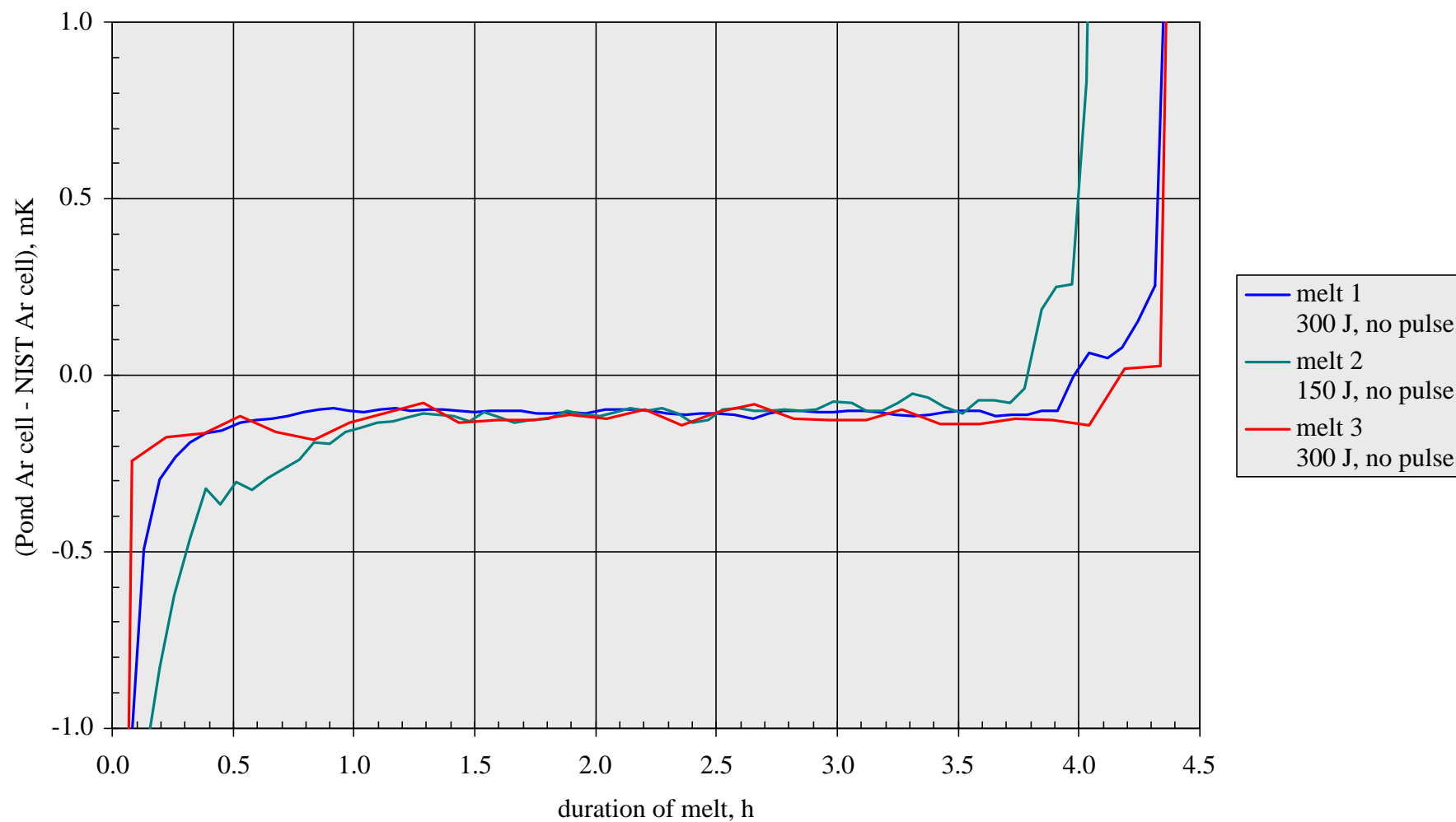
Figure 2 gives an example of the immersion characteristics an L&N 8167 SPRT in your cell relative to the ITS-90 assigned hydrostatic-head effect for argon. A thermometer must track the hydrostatic-head effect over the bottommost 3 cm of the reentrant well to exhibit proper immersion in a fixed-point cell.

Sincerely,

Dr. B. W. Mangum
Leader, Thermometry Group
Process Measurements Division

Test No. 836/261065-99
Purchase Order No. K38-290

Figure 1. Argon Triple-Point Cell Comparison of Pond Engineering Model K38 s/n 98343 with NIST SPRT Lab Standard Ar-1



**Figure 2. Immersion Test of Pond Engineering Ar Triple-Point Cell
Model K38, s/n 98343**

