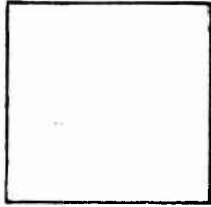


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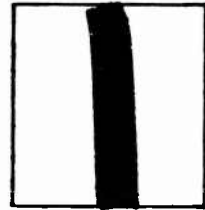
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Report No. 027/4

82238  
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RECALIBRATION OF THERMOCOUPLES

by

D. Willians

Approved: Peter R. Kosting

~~RECEIVED~~

February 11, 1937  
WATERTOWN ARSENAL  
WATERTOWN, MASS.

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REPORT NO. 127/4 TITLE \_\_\_\_\_

DATE DISTRIBUTED 2/15/27 \_\_\_\_\_

	Lo- cal	Other Ord. Work	Army	Navy	Private
Author	1	1	1	1	1
Lab. File	1 ✓	1	1	1	1
Main Office File	1	1	1	1	1
Chief of Ordnance	-	-	2	2	-
Technical Staff	-	-	1	1	-
Springfield Armory	-	-	1	1	-
Watervliet Arsenal	-	-	1	1	-
Rock Island Arsenal	-	-	1	1	-
Frankford Arsenal	-	-	1	1	-
Picatinny Arsenal	-	-	1	1	-
Aberdeen Proving Ground	-	-	1	1	-
Chief, Bureau Ordnance	-	-	-	1	-
Naval Gun Factory	-	-	-	1	-
Chief, Bureau C & R	-	-	-	1	-
Local Circulation	1	1	1	1	as directed
Available for special circulation.	2	2	3	3	1
Other establishments requesting work.	-	2	-	-	-
Private Parties paying for work	-	-	-	-	2

as directed in each case

welding  
and as  
directed

*Mr. ...  
Mr. ...  
Mr. ...  
Mr. ...*

Report No. 027/4  
Watertown Arsenal

February 11, 1937

RECALIBRATION OF THERMOCOUPLES

Object: Recalibration of Iron-Constantan (i.c.) Thermocouples from 35 foot Gas Furnace, Building #44.

Data: Recalibration of I.C. couples  
Standard Pt. couple #91  
Type K Potentiometer #220,332

Couple No.	Calibration Tag #	Position	Temp. Error			Temp. Error			Note
			M.V.	°C	°C	M.V.	°C	°C	
1	26	Top	39.97	712°	0	50.41	878°	+6°	Couple bent.
2	-	Next to top	40.60	722°	+10°	51.14	889°	+17°	Couple bent, protection tube cracked.
3	-	Next to bottom	40.06	714°	+2°	50.31	876°	+4°	-
4	-	Bottom	40.98	729°	+17°	51.51	895°	+23°	-
91	-	-	6.407	712°	-	8.159	872°	-	-

All couples replaced with a new protection tubes as follows:

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<u>Position</u>	<u>Hole No.</u>	<u>Couple No.</u>	<u>Error °C</u>
Top	9	56	-7°
Next to top	8	62	-4° at 617°C +6° at 810°C
Next to bottom	6	59	-4°
Bottom	5	58	-3°

Recommendations:

The cost of base metal thermocouples is shown on the attached table. It is shown to be economical to replace all base metal thermocouples periodically rather than to recalibrate after 6 months' use.

The checking of thermocouples in use has been withheld expecting that additional holes for standard couples would be bored. This was requested quite some time ago.

It is noted that holes in this 35 ft. gas furnace in Building #44 will not be bored until furnace is remodeled and relined.

Respectively submitted,

*D. Williams*

D. Williams.

Approved:

*P. R. Kosting*  
P. R. Kosting

January 15, 1937

Table of Cost of Making Up and Calibrating  
Base Metal Thermocouples

Figures Based on a Production of Thermocouples  
in Lots of Thirty.

Length of couple	2'	3'	4'	5'	8'
Cost Wire and Insulators	\$ 1.14	\$ 1.61	\$ 2.28	\$ 3.74	\$ 4.56
Labor Cost	.30	.35	.50	.55	.65
Overhead	.30	.35	.50	.55	.65
Total	1.74	2.31	3.28	4.84	5.86
If calibrated at 1 temp. Total Cost	2.07	2.65	3.61	5.17	6.19
If calibrated at 2 temp. Total Cost	2.41	2.96	3.94	5.50	6.52
List Price C.A. 8 gage	3.40	4.10	4.80		

When old thermocouples are taken from furnace and calibrated at one temperature, estimated on a basis of 5 thermocouples at a load, the cost would be \$2.00 each. When calibrated at two temperatures, the cost would be \$4.00 each.

Compiled by: H. C. Knowlton