11.7 Ref. 12

COMPLIANCE DETERMINATION SUBMITTAL FORM

COMPANY American Ocean Tile DATE OF TEST 10 / 15 / 91

FACILITY NUMBER 404 - 0002 - I001 SOURCE Crushing and Screening Line #1

( ) Notification of observation of:
(✓) Test report on sampling of:

Particulate - Method 5	(✓)	VE (initial) - Method 9	( )
Sulfur dioxide - Method 6	( )	GAP Test (initial)	( )
Oxides of Nitrogen - Method 7	( )	SOCMI - Method 21	( )
Other ( )	( )		

This is ( ) initial compliance of ( ) an NSPS source.
(✓) retest (✓) a SIP source.
( ) a NESHAP source.
( ) a RCRA source.
( ) an air toxics source

Note any special considerations (Expiration of Permit, litigation, etc):
Testing required by ADEM to prove compliance

Allowable Emissions (with units)

Run 1	Run 2	Run 3
3.0 lb/Hr	3.0 lb/Hr	3.0 lb/Hr

Submitted by: Larry Brown Date 10-29-91

Emissions

Run 1	Run 2	Run 3	AVG. # /hr
1.03	1.06	.90	.9967

Comments: Test report contained strange Ap's

Evaluated by: E. Lang Date 8 Nov 91

ADEM Form 175 3/87

PENSACOLA P.O.C., INC.

109 South Second St., Pensacola, FL 32507 U.S.A. 904 456-4406

ENVIRONMENTAL TESTING AND TROUBLESHOOTING

October 22, 1991

Mr. Larry Brown
Department of Environmental Management
Engineering Branch, Air Division
Alabama Department of Environmental Management
1751 Cong. W. L. Dixon Drive
Montgomery, AL 36130

RE: **American Olean Tile Company, Fayette, AL**
Permit Numbers 404-0007-Z001 & 404-0007-Z002

Dear Mr. Brown,

Enclosed are the results of the two particulate emissions tests conducted on 15 & 16 October 1991 on subject baghouses.

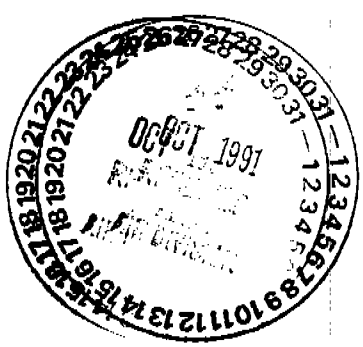
If you have any questions, please give us a call.

Sincerely,

Barbara Sviglin (Schwiglin)

enclosures

cc: American Olean Tile Co., T. DeLoach, Jr.
file



PARTICULATE EMISSIONS TEST

FOR

AMERICAN OLEAN TILE COMPANY

Fayette, AL

Date: 22 October 1991

Date of Test: 15 October 1991

Type of Test: EPA Method 1, 2, 3, & 5

Permit Number: 404-0007-Z001

I.D.: Crushing & Screening Line #1 (#51)

Average Production Rate: 12.15 TPH

Average Particulate Mass Rate (PMR): 1.0 lbs/hr

A.D.E.M. Allowable: 3 lbs/hr

Tested By:

Pensacola P.O.C., Inc.
109 S. Second Street
Pensacola, FL 32507

Phone: 904 456-4406

copies to:
American Olean Tile Co., H.T.DeLoach
A.D.E.M., Montgomery, L. Brown
file

Name: American Olean Tile Company, Permit #404-0007-Z001
Location: Fayette, AL
Test Date: 15 October 1991

TABLE OF CONTENTS

TEST DESCRIPTION

Pensacola P.O.C., Inc. performed particulate emissions test on the Crushing and Screening Line #1 (#51) located at American Olean Tile Company in Fayette, AL on 15 October 1991. The test was conducted to demonstrate compliance with the rules and regulations of the Alabama Department of Environmental Management (A.D.E.M.). A.D.E.M. was notified of testing prior to the test.

The source of airborne particulate is body material. The airborne particulate matter generated by this process is controlled and collected by a baghouse. Filtered air is discharged into atmosphere through a stack.

A total of three sets of particulate emissions were collected isokinetically, each lasting sixty minutes. A total of twenty points were sampled during each run. The samples were extracted through two portholes, ten samples per porthole. The locations of portholes and sampling points are shown on enclosed sketches.

The test was conducted by K. C. Sviglin, Kevin Peavy and Barbara Sviglin of Pensacola P.O.C., Inc., Pensacola, FL.

PENSACOLA P.O.C., INC.

109 South Second St., Pensacola, FL 32507 U.S.A. 904 456-4406

ENVIRONMENTAL TESTING AND TROUBLESHOOTING

22 October 1991

Mr. Larry Brown
Alabama Department of Environmental Management
1751 Cong. W. L. Dixon Drive
Montgomery, AL 36130

RE: American Olean Tile Company
Fayette, AL 35555-6895

Dear Mr. Brown,

Regarding the 15 October 1991, EPA Method 1, 2, 3, & 5 test conducted by our company on Crushing and Screening Line #1 (#51), permit number 404-007-Z001 located at subject site, please be advised that to the best of my knowledge, all applicable field and analytical procedures comply with AL Department of Environmental Management requirements and all test data and plant operating data are true and correct.

Sincerely,

Barbara Sviglin (Schwiglin)

American Olean
an Armstrong company

October 17, 1991

Mr. Chris Sviglin
Pensacola P.O.C., Inc.
109 South Second Street
Pensacola, FL 32507-3607

Dear Mr. Sviglin:

This letter is to document to you the crushing rate of our body preparation plant during the period in which you sampled two of our exhaust stacks for particulate emissions. The crushing rates were as follows:

Line 51, permit #404-0007-Z001, was crushing body material on 10/15/91 at a rate of 12.15 tons per hour.

Line 52, permit #404-0007-Z002, was crushing body material and grog on 10/16/91 at a combined rate of 13.22 tons per hour.

Both of the above crushing rates were maximum for those systems at the time your test was made.

Yours truly,

H. Tyson DeLoach, Jr.

H. Tyson DeLoach, Jr.
Senior Ceramic Engineer

/cm

cc: H. C. Darnell

American Olean Tile Company
P.O. Box 659, Fayette, AL 35555-0659
(205) 932-8944 FAX (205) 932-6895

METHOD 5 PARTICULATE TEST
CALCULATION FORM

Pensacola P.O.C., Inc.

I. Necessary Data

A. Reference Method # 1

American Olean Tile Co.
Fayette, AL
RUN 1
Line #51

. Area of Stack A_s 4.28 ft^2
. No. of equivalent diameters upstream 4.25
. No. of equivalent diameters downstream 12.2
. No. of traverse points 20
. Total test time θ 60 minutes

B. Reference Method # 2

. Average stack temperature $\bar{t}_s$ 62 °F $\bar{T}_s$ = 62 + 460 = 522 °R
. Stack absolute pressure P_s 29.94 " Hg. $\frac{-.8}{13.6}$ + 29.98
. Barometric Pressure P_b 29.88 "Hg.
. $\bar{\Delta P}$ 1.18 "WG $\sqrt{\Delta p}$ 1.086

C. Reference Method # 3

% CO_2 0 ; % O_2 21 ; % CO _____ ; % N_2 _____

D. Reference Method # 4

Water collected

Impinger H_2O 8 ml
Silica Gel 17.1 g

E. Reference Method # 5

. Area of nozzle A_n 0.00291 ft^2
. Average $\bar{\Delta H}$ 3.32 in. H_2O
. Average meter temperature $\bar{t}_m$ 84 °F $\bar{T}_m$ = 84 + 460 = 544 °R
. Dry gas meter correction factor Y_m 1.0
. Volume metered V_m 65.1 DCF
. Particulate Weight M 0.0319 g M_n 31.9 mg

II. Calculations

A. Standard Volume Metered Y_m = Dry Gas Meter Calibration factor

$$V_{m(std)} = (V_m) Y_m \frac{\left(T_{std}\right)}{\left(P_{std}\right)} \left(\frac{P_b + \frac{\bar{\Delta H}}{13.6}}{T_m}\right)$$

$$V_{m(std)} = (65.1\ CF)(1.0)\ \frac{(528°F)}{(29.92\ in.HG.)}\ \frac{\left(29.88 + \frac{3.32\ in.\ Hg.}{13.6}\right)}{(544\ °R)}$$

$$V_{m(std)} = (65.1)(1.0)\ 17.647\ (0.0554) = 63.6\ DSCF$$

Pensacola P.O.C., Inc.

B. Moisture Content of Stack Gas

1. H_2O collected in impingers in standard cubic feet

$V_{ws\,(std)} = F\,(V_f - V_i)$

$V_{ws(std)} = 0.04707\ ft^3/ml\ (\ 8\ \ ml) = 0.377\ SCF$

2. H_2O collected in silica gel in standard cubic feet

$V_{w_{sg}(std)} = K\,(W_f - W_i)$

$V_{w_{sg}(std)} = 0.04707\ ft^3/g\ (\ 17.1\ \ g.\ ) = 0.805\ SCF$

3. Moisture content of stack gas (B_{ws})

$$B_{ws} = \frac{V_{ws\,(std)} + V_{wsg\,(std)}}{V_{wc\,(std)} + V_{wsg\,(std)} + V_{m\,(std)}}$$

$$B_{ws} = \frac{(\ 0.377\ SCF) + (0.805\ SCF.)}{(\ 0.377\ SCF) + (0.805\ SCF\ ) + (\ 63.6\ \ SCF.)}$$

$$Bws = \frac{1.182}{64.782} = 0.0182$$

C. Molecular Weight of Stack Gas (lb/lb mole)

79

1. M_d (Dry molecular weight) = $M_x B_x$

$M_d = (.44)(\ 0\ \ \%CO_2) + (.32)(\ 21\ \ \%O_2) + (.28)(\ \ \%CO) + (.28)(\ \ \%N.)$

$M_d = (\ \ 0\ \ ) + (\ 6.72\ \ ) + (\ 22.12\ ) = 28.84$ lb/lb mole

2. M_s (Wet Molecular Weight) = $M_d\,(1 - B_{ws}) + 18\,B_{ws}$

$M_s = 28.84\,(1 - 0.0182) + 18\,(0.0182) =$

$M_s = (\ 28.84\ )(.9818\ \ ) + (\ 0.3276\ ) = 28.64$ lb/lb mole

D. Average Stack Gas Velocity

$$V_s = K_p\ \ C_p\ \sqrt{\frac{\overline{T_s}}{P_s M_s}}\ \ (\sqrt{\overline{\Delta p}})$$

$$V_s = 85.49\ ft/sec.\ (0.84\ )\ \sqrt{\frac{(\ 522\ ^\circ R)}{(\ 29.94\ in\ Hg.)(\ 28.64\ lb/lb\ mole)}}\ (\ 1.086)$$

$V_s = 85.49\ (0.84\ )\ (0.7802\ )\ (1.086\ )$

$= 60.85$ ft/sec

Pensacola P.O.C., Inc.

E. Quantity of Air

$Q_a = (V_s \text{ ft/sec})(A_s \text{ ft.}^2)(60) = \text{ACFM}$

$Q_a = 60.85 \times 4.28 \times 60 = 15626 \text{ ACFM}$

F. Average Stack Gas Volumetric Flow Rate

$$\overline{Q}_s = Q_a (1 - B_{ws}) \left(\frac{T_{std}}{P_{std}}\right) \left(\frac{P_s}{\overline{T}_s}\right)$$

$$\overline{Q}_s = 15626 \left(1 - 0.0182\right) \left(\frac{528°F}{29.92"Hg}\right) \left(\frac{29.94 \text{ "Hg.}}{522 \text{ °R}}\right)$$

$\overline{Q}_s = 15626 \times 0.9818 \times 17.65 \times 0.0574 = 15543$ DSCF/min

G. Pollutant Mass Rate

$$PMR = \frac{(\text{Mass})}{(V_{m(std)})} (Q_s \times 60 \text{ min/hr}) \left(\frac{1}{454 \text{ g./lb}}\right) = \text{lb/hr.}$$

$$PMR = \frac{(0.03198)}{(63.6 \text{ SCF})} (15543 \text{ SCF/min} \times 60 \text{ min/hr}) \times .0022 \text{ lb/g} =$$

$= 1.029$ LB/HR

H. % Isokinetic Variation

$$\%I = \frac{\overline{T}_s \; V_{m(std)} \; P_{(std)}}{A_n \; \theta \; V_s \; P_s \; T_{(std)} \; 60 \text{ sec/min} \; (1 - B_{ws})} \times 100$$

$$\%I = \frac{(522)(63.6 \text{ SCF})(29.92 \text{ in. Hg.})}{(0.00291 \text{ ft}^2)(60 \text{ min})(60.85 \text{ ft/sec})(29.94 \text{ in.Hg}) \; 528°R \times 60 \; (1 - 0.0152)}$$

0.9818

$\%I = \frac{993320}{993838} = 0.1003978 \times 100 = 100.39 \%$ I

I. ~~$C_s = .0154 \left(\frac{M_n}{V_{m(std)}}\right)$~~

$C_s = .0154 \left(\frac{(\text{mg})}{\text{SCF}}\right) =$ gr/DSCF

Pensacola P.O.C. Inc.
109 S. Second Street
Pensacola, Florida 32507

(904) 456-4406

Client's name: American Olean Tile Company

Location: Fayette, AL, Crushing & Screening Line#1 (#51)

Test date: 15 October 1991

Input data summary
Run number: 1

1) Area of stack (As) in SF:	4.28
2) Nozzle size in inches:	.231
3) Area of nozzle (An) in SF:	2.910309E-04
4) Dry gas meter correction factor (Ym):	1
5) Number of portholes:	2
6) Number of traverse points per porthole:	10
7) Total number of traverse points:	20
8) Duration of traverse points in minutes:	3
9) Total test time in minutes:	60
10) Barometric pressure (Pb) in in. HG:	29.88
11) Stack static pressure in in. WG:	.8
12) Average delta P in in. WG:	1.18
13) Square root of delta P:	1.086278
14) Average delta H in in. WG:	3.32
15) Average stack temperature (ts) in F:	62
16) Average stack temperature (Ts) in R:	522
17) Average meter temperature (tm) in F:	84
18) Average meter temperature (Tm) in R:	544
19) Percentage of CO2:	0
20) Percentage of O2:	21
21) Percentage of CO and N2:	79
22) Impinger water gain (Vf) in ml:	8
23) Silica gel gain (Wf) in grams:	17.1
24) Volume collected (Vm) in DCF:	65.1
25) Particulate collected (M) in grams:	.0319
26) Particulate collected (Mn) in mg:	31.9

Pensacola P.O.C. Inc.
109 S. Second Street
Pensacola, Florida 32507
(904) 456-4406

Client's name: American Olean Tile Company

Location: Fayette, AL, Crushing & Screening Line#1 (#51)

Test date: 15 October 1991

Test results summary
Run number: 1

A. Stack absolute pressure (Ps) in in. Hg:	29.93882
B. Standard volume metered (Vm std) in DSCF:	63.61613
C. Moisture content of stack	
1. H2O collected in impingers in SCF:	.37656
2. H2O collected in silica gel in SCF:	.804897
3. Moisture content of stack gas (Bws):	1.823304E-02
D. Molecular weight of stack gas (lb/lb mole)	
1. Dry molecular weight (Md):	28.84
2. Wet molecular weight (Ms):	28.64235
E. Average stack gas velocity (Vs) in ft/sec:	60.86242
F. Actual flow rate (Qa) in ACFM:	15629.47
G. Volumetric flow rate (Qs) in DSCFM:	15533.22
H. Particulate mass rate (PMR) in lb/hr:	1.028156
I. Percent isokinetic variation (I):	100.3995
J. Particulate conc. (Cs) in grains/SDCF:	7.722256E-03

Pensacola P.O.C. Inc.
109 S. Second Street
Pensacola, Florida 32507

(904) 456-4406

Client's name: American Olean Tile Company

Location: Fayette, AL, Crushing & Screening Line#1 (#51)

Test date: 15 October 1991

Input data summary
Run number: 2

1)	Area of stack (As) in SF:	4.28
2)	Nozzle size in inches:	.231
3)	Area of nozzle (An) in SF:	2.910309E-04
4)	Dry gas meter correction factor (Ym):	1
5)	Number of portholes:	2
6)	Number of traverse points per porthole:	10
7)	Total number of traverse points:	20
8)	Duration of traverse points in minutes:	3
9)	Total test time in minutes:	60
10)	Barometric pressure (Pb) in in. HG:	29.93
11)	Stack static pressure in in. WG:	.8
12)	Average delta P in in. WG:	1.14
13)	Square root of delta P:	1.067708
14)	Average delta H in in. WG:	3.18
15)	Average stack temperature (ts) in F:	66
16)	Average stack temperature (Ts) in R:	526
17)	Average meter temperature (tm) in F:	95
18)	Average meter temperature (Tm) in R:	555
19)	Percentage of CO2:	0
20)	Percentage of O2:	21
21)	Percentage of CO and N2:	79
22)	Impinger water gain (Vf) in ml:	8
23)	Silica gel gain (Wf) in grams:	16.3
24)	Volume collected (Vm) in DCF:	65.2
25)	Particulate collected (M) in grams:	.033
26)	Particulate collected (Mn) in mg:	33

Pensacola P.O.C. Inc.
109 S. Second Street
Pensacola, Florida 32507
(904) 456-4406

Client's name: American Olean Tile Company

Location: Fayette, AL, Crushing & Screening Line#1 (#51)

Test date: 15 October 1991

Test results summary
Run number: 2

A. Stack absolute pressure (Ps) in in. Hg:	29.98882
B. Standard volume metered (Vm std) in DSCF:	62.53337
C. Moisture content of stack	
1. H2O collected in impingers in SCF:	.37656
2. H2O collected in silica gel in SCF:	.767241
3. Moisture content of stack gas (Bws):	.0179625
D. Molecular weight of stack gas (lb/lb mole)	
1. Dry molecular weight (Md):	28.84
2. Wet molecular weight (Ms):	28.64528
E. Average stack gas velocity (Vs) in ft/sec:	59.99757
F. Actual flow rate (Qa) in ACFM:	15407.38
G. Volumetric flow rate (Qs) in DSCFM:	15225.62
H. Particulate mass rate (PMR) in lb/hr:	1.060599
I. Percent isokinetic variation (I):	100.6845
J. Particulate conc. (Cs) in grains/SDCF:	8.126861E-03

Pensacola P.O.C. Inc.
109 S. Second Street
Pensacola, Florida 32507

(904) 456-4406

Client's name: American Olean Tile Company

Location: Fayette, AL, Crushing & Screening Line#1 (#51)

Test date: 15 October 1991

Input data summary
Run number: 3

1)	Area of stack (As) in SF:	4.28
2)	Nozzle size in inches:	.231
3)	Area of nozzle (An) in SF:	2.910309E-04
4)	Dry gas meter correction factor (Ym):	1
5)	Number of portholes:	2
6)	Number of traverse points per porthole:	10
7)	Total number of traverse points:	20
8)	Duration of traverse points in minutes:	3
9)	Total test time in minutes:	60
10)	Barometric pressure (Pb) in in. HG:	29.91
11)	Stack static pressure in in. WG:	.8
12)	Average delta P in in. WG:	1.03
13)	Square root of delta P:	1.014889
14)	Average delta H in in. WG:	2.88
15)	Average stack temperature (ts) in F:	68
16)	Average stack temperature (Ts) in R:	528
17)	Average meter temperature (tm) in F:	98
18)	Average meter temperature (Tm) in R:	558
19)	Percentage of CO2:	0
20)	Percentage of O2:	21
21)	Percentage of CO and N2:	79
22)	Impinger water gain (Vf) in ml:	7
23)	Silica gel gain (Wf) in grams:	16
24)	Volume collected (Vm) in DCF:	62.4
25)	Particulate collected (M) in grams:	.0281
26)	Particulate collected (Mn) in mg:	28.1

Pensacola P.O.C. Inc.
109 S. Second Street
Pensacola, Florida 32507
(904) 456-4406

Client's name: American Olean Tile Company

Location: Fayette, AL, Crushing & Screening Line#1 (#51)

Test date: 15 October 1991

Test results summary
Run number: 3

A. Stack absolute pressure (Ps) in in. Hg:	29.96882
B. Standard volume metered (Vm std) in DSCF:	59.44313
C. Moisture content of stack	
1. H2O collected in impingers in SCF:	.32949
2. H2O collected in silica gel in SCF:	.75312
3. Moisture content of stack gas (Bws):	1.788677E-02
D. Molecular weight of stack gas (lb/lb mole)	
1. Dry molecular weight (Md):	28.84
2. Wet molecular weight (Ms):	28.64611
E. Average stack gas velocity (Vs) in ft/sec:	57.15609
F. Actual flow rate (Qa) in ACFM:	14677.69
G. Volumetric flow rate (Qs) in DSCFM:	14441.08
H. Particulate mass rate (PMR) in lb/hr:	.9011108
I. Percent isokinetic variation (I):	100.9085
J. Particulate conc. (Cs) in grains/SDCF:	.0072799

P Line #1 (#51)

COMPANY NAME: American Olean Tile Co. DATE TESTED: 10/15/91

LOCATION: Fayette, AL PAGE 1 OF 3

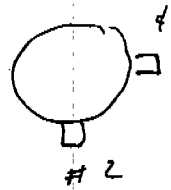
RUN NO.: 1 PORT NO.: 1 & 2 OPERATING RATE: _____

TEST START TIME: 7:32 AM TEST STOP TIME: 8:46 AM

AMB. TEMP.: 66 FDB %RH: 86 K: 2.8 Cp: 0.84 ΔHa: 1.79

BAR. PRESS.: 29.88 "Hg NOZZLE NO.: II

LEAK TESTS	TRAIN		PITOT	
	PRETEST	POSTTEST	PRETEST	POSTTEST
"WG	20	16		
SECs	60	60	✓	
METER IN	749.265	614.677		
METER OUT	749.265	614.677		



PT.	MIN'S	GAS METER VOL CF	ΔP	ΔH	VAC "WG	TEMPERATURE F GAS METER IN	GAS METER CORR.	GAS METER OUT	GAS METER CORR.	STACK	STACK CORR.
1	3.0	749.3	1.20	3.36	6.0	58	58	58	58	60	60
2		752.5	1.10	3.08	6.0	63	63	58	58	61	61
3		755.7	1.10	3.08	6.0	79	79	58	58	61	61
4		758.8	1.10	3.08	6.0	87	87	58	59	61	61
5		761.9	1.20	3.36	6.0	93	93	60	60	61	61
6		768.2	1.20	3.36	6.0	97	97	64	64	61	61
7		768.4	1.20	3.36	6.0	101	101	66	66	61	61
8		771.7	1.20	3.36	6.0	106	106	68	68	61	61
9		775.0	1.10	3.08	6.0	108	108	70	70	61	61
10		778.2	1.10	3.08	6.0	110	110	70	70	61	61
11		781.3	1.30	3.64	6.0	85	85	71	71	61	61
12		784.7	1.10	3.08	6.0	91	91	71	71	62	62
13		786.8	0.96	2.69	5.0	98	98	72	72	62	62
14		790.9	0.93	2.60	5.0	104	104	73	73	62	62
15		793.8	1.30	3.64	6.0	107	107	75	75	62	62
16		797.2	1.40	3.92	7.0	110	110	76	76	63	63
17		800.7	1.40	3.92	7.0	111	111	78	78	63	63
18		804.3	1.30	3.64	7.0	112	112	80	80	63	63
19		808.8	1.30	3.64	7.0	116	116	80	80	63	63
20		811.2	1.20	3.36	6.0	117	117	82	82	63	63
	↓	814.4									
		65.1	1.18	3.32				84		62	
		65.1	1.18	3.32			84				62

NOTES: 3.4 "WG. ACROSS BAGHOUSE

KCS

Line #1 (#51)

COMPANY NAME: AMERICAN OLEAN CO DATE TESTED: 10/15/9

LOCATION: FAYETTE AL PAGE 2 OF 2

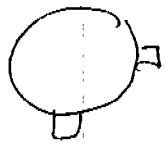
RUN NO.: 2 PORT NO.: 2 & 1 OPERATING RATE:

TEST START TIME: 9:27 AM TEST STOP TIME: 10:36 AM

AMB. TEMP.: 63 FDB %RH: K: 2.8 Cp: 0.84 ΔHa: 1.79

BAR. PRESS.: 29.93 "Hg NOZZLE NO.: II

LEAK TESTS	TRAIN		PITOT	
	PRETEST	POSTTEST	PRETEST	POSTTEST
"WG	16	16		
SECs	60	60		
METER IN	814.716	890.008		
METER OUT	814.716	890.009		



PT.	MIN'S	GAS METER VOL CF	ΔP	ΔH	VAC "WG	TEMPERATURE F GAS METER IN	GAS METER CORR.	GAS METER OUT	GAS METER CORR.	STACK	STACK CORR.
1	3.0	814.7	1.20	3.36	6.0	72	72	72	72	64	64
2		818.0	0.96	2.69	5.0	89	89	72	72	66	66
3		821.0	0.93	2.60	5.0	97	97	73	73	64	64
4		824.0	0.88	2.46	5.0	101	101	74	74	64	64
5		826.9	0.88	2.46	5.0	105	105	75	75	64	64
6		829.8	1.20	3.36	6.0	107	107	76	76	65	65
7		833.0	1.30	3.64	7.0	111	111	77	77	65	65
8		836.5	1.20	3.64	7.0	113	113	79	79	67	67
9		839.9	1.30	3.64	7.0	115	115	80	80	67	67
10		843.4	1.20	3.36	6.0	116	116	82	82	67	67
11		846.7	1.20	3.36	6.0	93	93	82	82	67	67
12		850.1	1.10	3.08	6.0	101	101	82	82	67	67
13		853.4	1.10	3.08	6.0	108	108	82	82	67	67
14		856.6	1.10	3.08	6.0	112	112	82	82	67	67
15		859.8	1.10	3.08	6.0	114	114	83	83	67	67
16		863.1	1.20	3.36	6.0	117	117	83	83	67	67
17		866.4	1.20	3.36	6.0	118	118	85	85	67	67
18		869.8	1.30	3.64	7.0	120	120	87	87	67	67
19		873.2	1.20	3.36	6.0	120	120	87	87	67	67
20	↓	876.6	1.10	3.08	6.0	121	121	88	88	67	67
		879.9									
				3.18							
		65.2	1.14	3.03		168		81		66	
		65.2	1.14	3.18			95				66

NOTES: 3.4" across Baghouse

KCS

Line #1 (#51)

COMPANY NAME: AMERICAN OLEAN DATE TESTED: 10/15/91

LOCATION: FAYETTE AL. PAGE 3 OF 3

RUN NO.: 3 PORT NO.: 1 & 2 OPERATING RATE: _____

TEST START TIME: 11:10 AM TEST STOP TIME: 12:18 PM

AMB. TEMP.: 65 FDB %RH: _____ K: 2.8 Cp: 0.84 $\Delta\overline{Ha}$: 1.79

BAR. PRESS.: 29.91 "Hg NOZZLE NO.: II

L E A K T E S T S				
	TRAIN		PITOT	
	PRETEST	POSTTEST	PRETEST	POSTTEST
"WG	17	17		
SECs	60	60		✓
METER IN	880.187	942.766		
METER OUT	880.169	942.768		

PT.	MIN'S	GAS METER VOL CF	ΔP	ΔH	VAC "WG	TEMPERATURE F GAS METER IN	GAS METER CORR.	GAS METER OUT	GAS METER CORR.	STACK	STACK CORR.
1	3.0	880.2	1.10	3.08	5.0	80	80	79	79	66	66
2		883.4	1.00	2.80	5.0	94	94	80	80	67	67
3		886.5	1.00	2.80	5.0	99	99	80	80	67	67
4		889.6	1.00	2.80	5.0	106	106	81	81	66	66
5		892.6	0.98	2.74	5.0	110	110	81	81	67	67
6		895.7	1.10	3.08	5.0	112	112	82	82	68	68
7		898.9	1.20	3.36	6.0	115	115	83	83	67	67
8		902.2	1.20	3.36	6.0	117	117	84	84	67	67
9		905.6	1.20	3.36	6.0	118	118	85	85	67	67
10		908.9	1.10	3.08	6.0	120	120	86	86	68	68
11		912.2	0.98	2.74	5.0	98	98	86	86	68	68
12		915.3	0.91	2.55	5.0	106	106	86	86	68	68
13		918.3	0.83	2.32	4.0	110	110	86	86	68	68
14		921.2	0.86	2.41	4.0	112	112	86	86	68	68
15		924.1	0.85	2.38	4.0	115	115	88	88	68	68
16		927.0	0.85	2.38	4.0	115	115	88	88	68	68
17		929.9	1.10	3.08	5.0	118	118	89	89	68	68
18		933.0	1.10	3.08	5.0	121	121	90	90	68	68
19		936.2	1.10	3.08	5.0	120	120	90	90	68	68
20		939.4	1.10	3.08	5.0	120	120	91	91	68	68
		942.6									
		62.4	1.03	2.88		110		85		68	
								87			
		62.4	1.03	2.88			98				68

NOTES: 4.4 "WG ACCMSC BAROMSC KCS

CLIENT: American Olean Tile Company DATE: 10-15-91

LOCATION: Fayette, AL SOURCE: Crushing & Screening Line # (#51)

Run Number 1

Nozzle Size 0.230 (1) 0.231 (2) 0.231 (3) 0.231 Average

02 21 % CO2 0 % CO ____ %

Water:	In	Out	Color	Gain
cyclone	-0-	-0-		
impinger #1	100	184	Little cloudy	
impinger #2	100	103	mostly clear	
impinger #3	-0-	1	clear	
			Total	8 ml

Stack Temp.

							Average	

4TH Impinger Temperature (end of run): 54 deg. F

Silica Gel:	In	Out	Color	Gain in g
impinger #4	282.7 (61.8)	299.8	< ½ pink	17.1

Filter: Pretest Weight 0.6371 g Post-test Weight 0.6607 g Gain 0.0236 g

Wash: Desicated Weight 15.5249 g Container # 216 Weight 15.5166 g Gain 0.0083 g

0.0319

PPOC Form 101 (5/90)

BLD

CLIENT: American Olean Tile Company DATE: 10-15-91

LOCATION: Fayette, AL SOURCE: Crushing & Screening Line # (#51)

Run Number 2

29.93

Nozzle Size 0.231 (1) 0.231 (2) 0.231 (3) 0.231 Average

02 21 % CO2 0 % CO ____ %

Water:	In	Out	Color	Gain
cyclone	-0-			
impinger #1	100	98	Yellow Sandy	
impinger #2	100	109	clear	
impinger #3	-0-	1		
			Total	8 ml

Stack Temp.

							Average	

4TH Impinger Temperature (end of run): 54 deg. F

Silica Gel:	In	Out	Color	Gain in g
impinger #4	269.2 (61.4)	285.5	< ½ pink	16.3

Filter: Pretest Weight 0.6353 g Post-test Weight 0.6631 g Gain 0.0278 g

Wash: Desicated Weight 15,5219 g Container # 217 Weight 15,5167 g Gain 0.0052 g

0.0330

PPOC Form 101 (6/90)

BLD

CLIENT: American Olean Tile Company DATE: 10-15-91

LOCATION: Fayette, AL SOURCE: Crushing & Screening Line # (#51)

Run Number 3

Nozzle Size 0.231 (1) 0.231 (2) 0.230 (3) 0.231 Average

B.P. 29.64 Temp. 64

O2 21 % CO2 0 % CO ____ %

Water:	In	Out	Color	Gain
cyclone	-0-	-0-		
impinger #1	100	100		
impinger #2	100	106	clear	
impinger #3	-0-	1		
			Total	7 ml

Stack Temp.

							Average	

4TH Impinger Temperature (end of run): 53 deg. F

Silica Gel:	In	Out	Color	Gain in g
impinger #4	280.3 (62.0)	296.3	< 1/2 pink	16.0

Filter: Pretest Weight 0.6306 g Post-test Weight 0.6508 g Gain 0.0202 g

Wash: Desicated Weight 15.5264 g Container # 218 Weight 15.5185 g Gain 0.0079 g

0.0281

PPOC Form 101 (5/90)

RLD

NOMENCLATURE

A_n = Cross-sectional area of nozzle, ft^2 (3 significant digits)

A_s = Area of stack, $ft.^2$

B_{ws} = Water vapor in the gas stream, proportion by volume (dimensionless)

C_p = Pitot tube coefficient (dimensionless)

c_s = Particulate concentration, grains/DSCF

c_{50} = Particulate concentration (c_s adjusted to 50% excess air) grains/DSCF

C_{12} = Particulate concentration (c_s adjusted to 12% CO_2) grains/DSCF

E = Emission rate in terms of applicable standard

E_c = Emission rate corrected for anisokinetic sampling conditions

EA = Excess air, %

I = Percent of isokinetic sampling

K_m = Orifice correction factor (dimensionless)

K_p = Pitot tube constant,

$$85.49 \text{ ft/sec.} \left[\frac{(\text{lb/lb-mole})\ (\text{in. Hg})}{(^{\circ}\text{R})\ (\text{in. } H_2O)} \right]^{1/2}$$

L_a = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to 0.02 CFM or 4% of the average sampling rate, whichever is less.

L_i = Individual leakage rate observed during leak check conducted prior to the "I^{th}" component change (i = 1, 2,.....n), CFM

L_p = Leakage rate observed during the post-leak check, CFM

m_n = Total amount of particulate matter collected, mg

m_a = Mass residue of acetone after evaporation, mg

M_d = Molecular weight of stack gas; dry bulb basis, lb/lb-mole

M_s = Molecular weight of stack gas; wet basis, lb/lb-mole

P_{bar} = Barometric pressure at the sampling site, in. Hg.

P_m = Meter pressure, in. Hg.

P_s = Absolutely stack pressure, in. Hg.

P_g = Stack static pressure, in. H_2O

P_{std} = Standard absolute pressure, 29.92 in. Hg.

PMR = Particulate mass rate, lb/hr.

Q_a = Volumetric flow rate, ACFM

Q_s = Volumetric flow rate, DSCFM

$\bar{t}_m$, $\bar{T}_m$ = Average temperature of meter, ^oF, ^oR

$\bar{t}_s$, $\bar{T}_s$ = Average temperature of stack, ^oF, ^oR

t_a, T_a = Ambient temperature, ^oF, ^oR

t_{std}, T_{std} = Standard temperature, 68^oF, 528^oR

v_s = Average stack gas velocity, ft/sec.

V_a = Volume of acetone blank, ml

V_{aw} = Volume of acetone used in wash, ml

V_f = Water collected by impingers, ml

V_{lc} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of gas sample as measured by dry gas meter, ACF

V_{mc} = Volume of gas sample, corrected for leak, ACF

$V_{m(std)}$ = Volume of gas sample measured by dry gas meter, corrected to standard conditions, DSCF

$V_{w(std)}$ = Volume of water vapor in gas sample, corrected to standard conditions, SCF

V_n = Volume collected at stack conditions through nozzle, ACF

V P = Velocity pressure

W_a = Weight of residue in acetone wash, mg.

W_f = Water collected by Silica gel, mg

Y = Dry gas meter calibration factor (dimensionless)

$\overline{\Delta H}$ = Average pressure difference of orifice, in. H_2O

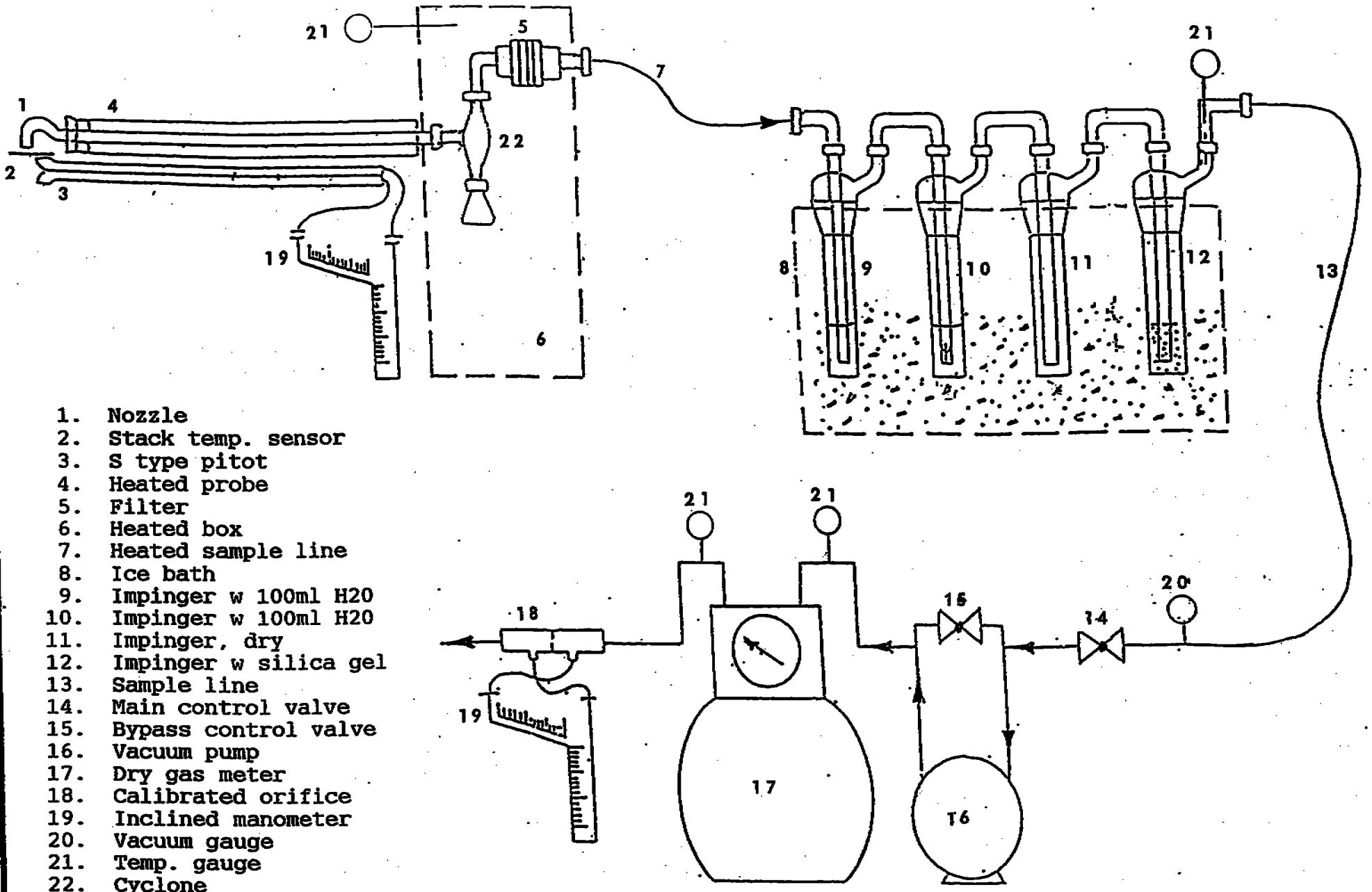
ΔP = Velocity head of stack gas, in. H_2O

$\overline{\sqrt{\Delta P}}$ = Average of the square roots of the velocity pressure, in. H_2O

ΔH_a = Value of ΔH measured for a specific orifice when operated under the following conditions: 0.75 CFM of dry air (M.W. = 29) at 68°F, 29.92 in. Hg.

θ = Total sampling time, minutes

% CO_2, % O_2, % N_2, % CO -Number % by volume, dry basis from gas analysis



1. Nozzle
2. Stack temp. sensor
3. S type pitot
4. Heated probe
5. Filter
6. Heated box
7. Heated sample line
8. Ice bath
9. Impinger w 100ml H20
10. Impinger w 100ml H20
11. Impinger, dry
12. Impinger w silica gel
13. Sample line
14. Main control valve
15. Bypass control valve
16. Vacuum pump
17. Dry gas meter
18. Calibrated orifice
19. Inclined manometer
20. Vacuum gauge
21. Temp. gauge
22. Cyclone

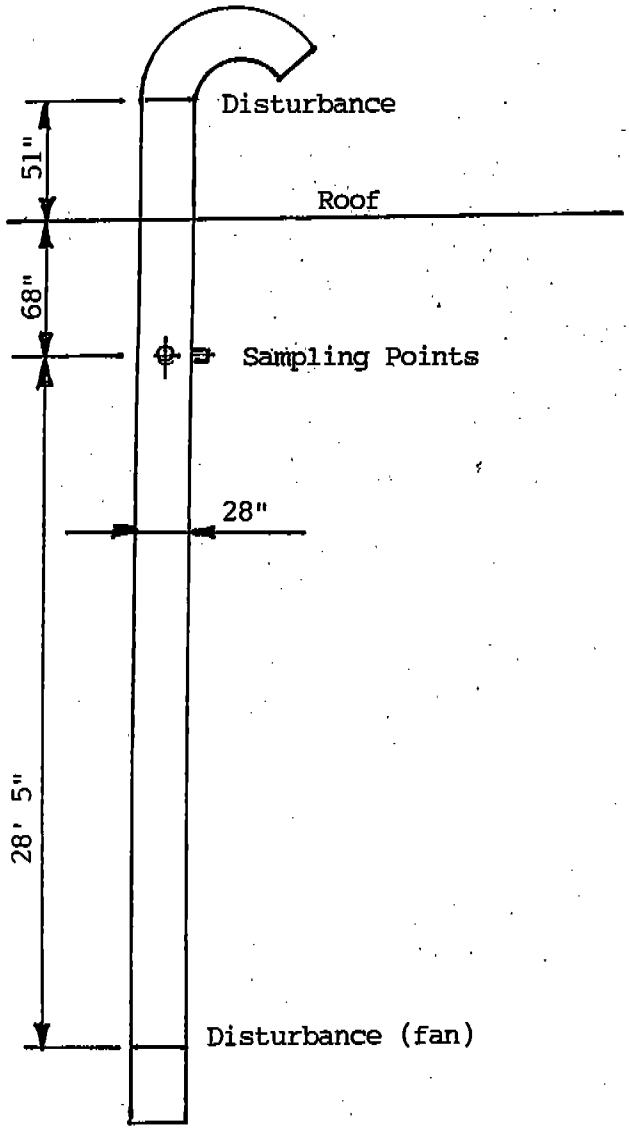
Pensacola P.O.C., Inc.
109 S. Second Street
Pensacola, FL 32507

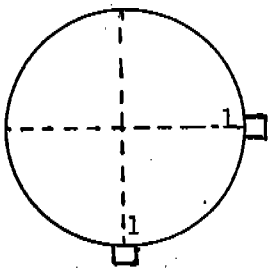
EPA METHOD 5, PARTICULATE SAMPLING TRAIN

Client : American Olean Tile Company

Location : Fayette, AL

Source : Crushing & Screening Line #1 (#51)





Point Number	Distance in Inches
1.	0.7
2.	2.3
3.	4.1
4.	6.3
5.	9.6
6.	18.4
7.	21.7
8.	23.9
9.	25.7
10.	27.3

Pensacola P.O.C., Inc.
109 S. Second Street
Pensacola, FL 32507

EPA METHOD 1 SAMPLE POINTS LOCATIONS

EQUIPMENT CALIBRATION

NAME: Pensacola P.O.C., Inc.

DATE OF CALIBRATION: 4 October 1991

CALIBRATION PERFORMED BY: K. C. Sviglin

1. CALIBRATION OF METERING CONSOLE

CONSOLE NUMBER: RAC 986-3046

DRY GAS METER NUMBER: Rockwell 26883

DRY GAS METER CORRECTION FACTOR: 1.0

AMBIENT TEMPERATURE: 79.5 FDB 68.3 FWB

BAROMETRIC PRESSURE (Pb): 30.05"Hg.

PREVIOUS CALIBRATION DATE: 24 April 1991

ΔH "H20	V1 CF	V2 CF	θ Sec	t1 F *	t2 F *	V2-V1 CF	Qm	Km
0.5	727.5	729.5	300	91	73	2.0	0.3934	0.7059
1.0	729.9	733.0	300	99	75	3.1	0.6064	0.7662
1.5	733.6	737.0	300	108	79	3.4	0.6622	0.6797
2.0	737.8	741.9	300	116	83	4.1	0.7958	0.7040
3.0	742.5	747.7	300	119	90	5.2	1.0133	0.7295
							Av. Km	0.7171

KCS

$$\overline{\Delta Ha} = 0.921 / \overline{Km}^2 = \frac{0.921}{0.5142} = 1.79$$

* t1 & t2 are corrected

EQUIPMENT CALIBRATION (continued)

NAME: Pensacola P.O.C., Inc.

DATE OF CALIBRATION: 10/8/91

CALIBRATION PERFORMED BY: KCS

2. CALIBRATION OF COLE PARMER DIGI-SENSE THERMOMETER/SENSOR:

	ASTM Thermometer	Cole Parmer Digi-Sense
Ice Bath	32.0	32.0
Boiling Water		212.0

EQUIPMENT CALIBRATION (continued)

NAME: Pensacola P.O.C., Inc.

DATE OF CALIBRATION: 10/8/91

CALIBRATION PERFORMED BY: KCS

3. CALIBRATION OF "METER IN" THERMOMETER

ASTM Thermometer	Cole-Parmer Digi Sense	Meter In Therm. Reading
	65.3	65.2
	77.8	77.6
	80.1	80.0
	90.6	90.5
	100.0	99.9
	110.9	110.8
	120.5	120.3

4. CALIBRATION OF "METER OUT" THERMOMETER

ASTM Thermometer	Cole-Parmer Digi Sense	Meter Out Therm. Reading
	65.3	65.4
	77.8	77.9
	80.1	80.1
	90.6	90.7
	100.0	100.2
	110.9	110.9
	120.5	120.4

EQUIPMENT CALIBRATION (continued)

NAME: Pensacola P.O.C., Inc.

DATE OF CALIBRATION: 10/8/91

CALIBRATION PERFORMED BY: KCS

5. CALIBRATION OF 4TH IMPINGER THERMOMETER

ASTM Thermometer	Cole-Parmer Digi Sense	4th Impinger Therm. Reading
	40.6	38
	51.2	49
	65.3	64
	77.8	78

6. CALIBRATION OF "HOT BOX" THERMOMETER

ASTM Thermometer	Cole-Parmer Digi Sense	Hot Box Therm. Reading
	201.6	205
	232.8	235
	255.1	260
	300.2	305

EQUIPMENT CALIBRATION (continued)

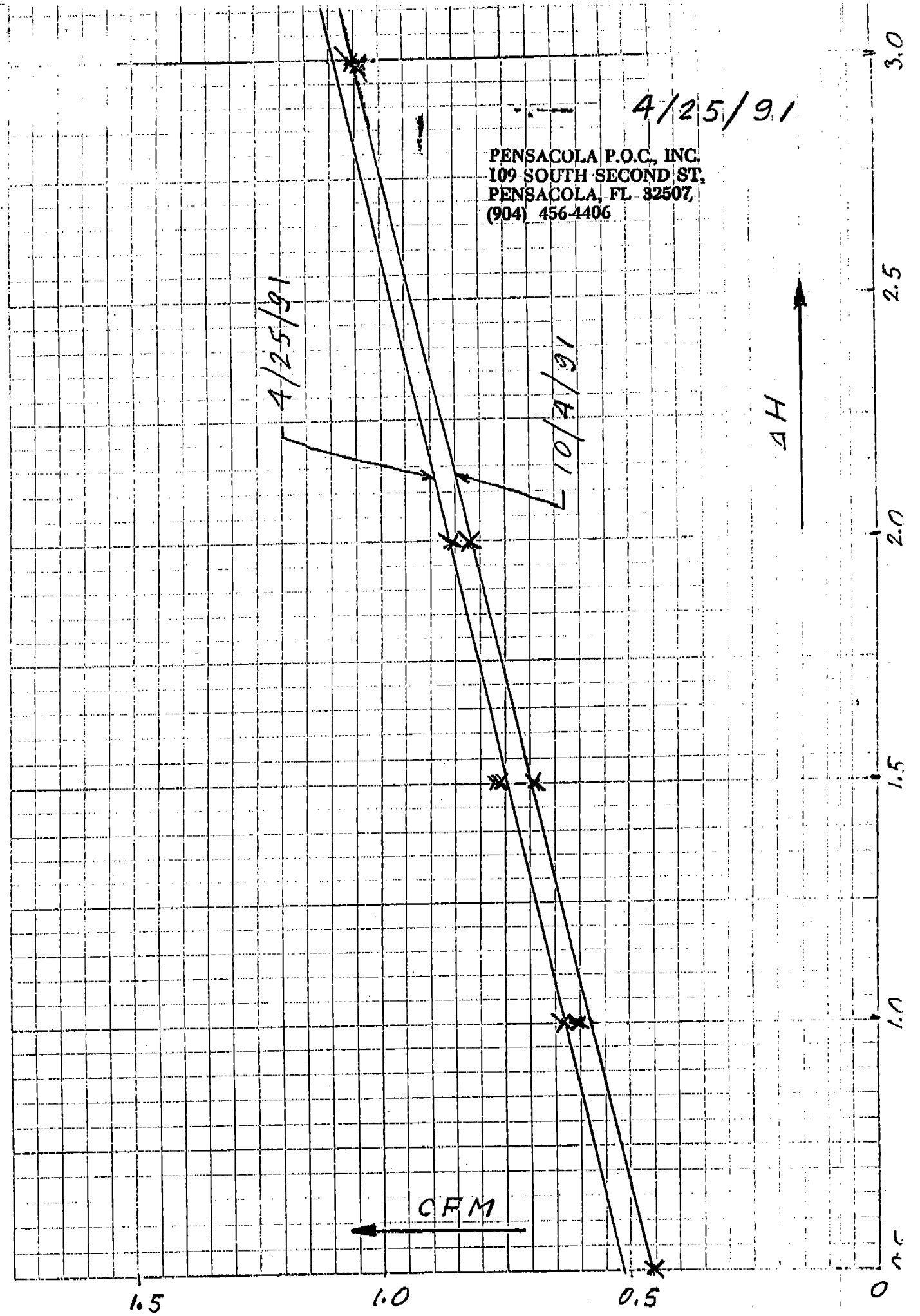
NAME: Pensacola P.O.C., Inc.

DATE OF CALIBRATION: 10/8/91

CALIBRATION PERFORMED BY: KCS

7. CALIBRATION OF STACK THERMOMETER

ASTM Therm.	Cole-Parmer Digi Sense	Altek	Stack Therm.	
			Extech	Fluke
90			89	
98			98	
110			108	
120			118	
130			131	
141			142	
150			150	
160			159	
175			177	
		200	201	
		300	302	
		400	401	
		500	503	
		600	605	
		700	703	
		800	805	
		900	905	
		1,000	1,008	
		1,200	1,194	
		1,400	1,395	
		1,600	1,595	
		1,800	1,794	


4/25/91
PENSACOLA P.O.C., INC.
109 SOUTH SECOND ST,
PENSACOLA, FL 32507
(904) 456-4406
4/25/91
10/4/91
ΔH
3.0
2.5
2.0
1.5
1.0
0
CFM
1.5
1.0
0.5

DESCRIPTION, OPERATING INSTRUCTIONS, AND PROCEDURES

MODEL 2414

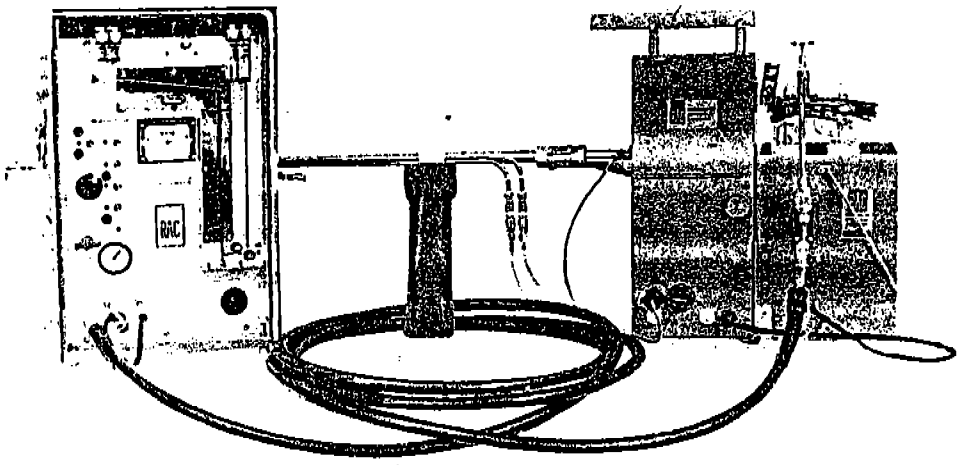
STAKSAMPLR WITH MODULAR SAMPLE CASE

RESEARCH APPLIANCE COMPANY
P.O. Box 265
Cambridge, Maryland 21613

WARNING: DO NOT SAMPLE IN EXPLOSIVE AREA

Reliable Accurate Control

BULLETIN 2343-R3



modular, portable RAC STAKSAMPLR™

this versatile, efficient, field-proven system takes isokinetic samples of process & combustion effluents to EPA sampling standards

features

- Designed & manufactured to EPA specifications (Federal Register) for sampling the emissions from stationary sources
- First stack sampling system made specifically to EPA design (1969)
- Modular sample case features separate, interchangeable impinger (ice bath) compartment and lightweight aluminum construction
- With glassware installed, complete 2-module sampling case weighs only 32 lbs; detached impinger module weighs only 14 lbs w/glassware
- A series of stack samples can be taken with one set-up (and with minimum downtime) by using several impinger modules equipped with different, preassembled trains
- ASTM & Power Test Code approved
- Ready-to-use, fully portable system
- Easy to install & operate
- Control unit can be located up to 300' from sample collecting unit
- Stainless steel pitobe assembly permits one-point sampling & flow measurements
- Pyrometer unit (optional, P/N 9927-26) takes concurrent stack temperature readings
- Variety of pitobe designs & probe tip sizes available
- Interchangeable 2.5", 3" & 4" dia particulate filters
- Ball-joint connections on glassware assure flexible vacuum-tight assembly, minimize the breakage experienced with solid connections
- Design of glassware connections prevents particle buildup at fitting inlets (if misaligned) & hang-ups if stopcock grease is used
- Nomograph is available to permit fast, accurate, on-site calculations
- Monorail suspension-guidance system for sample case & pitobe is easy to assemble, provides secure mounting & smooth traverse during sampling
- Integrated umbilical cord available in lengths of 25', 50', 75', 100', 200' and 300'
- Optional accessories enhance system's inherent capabilities & versatility

application

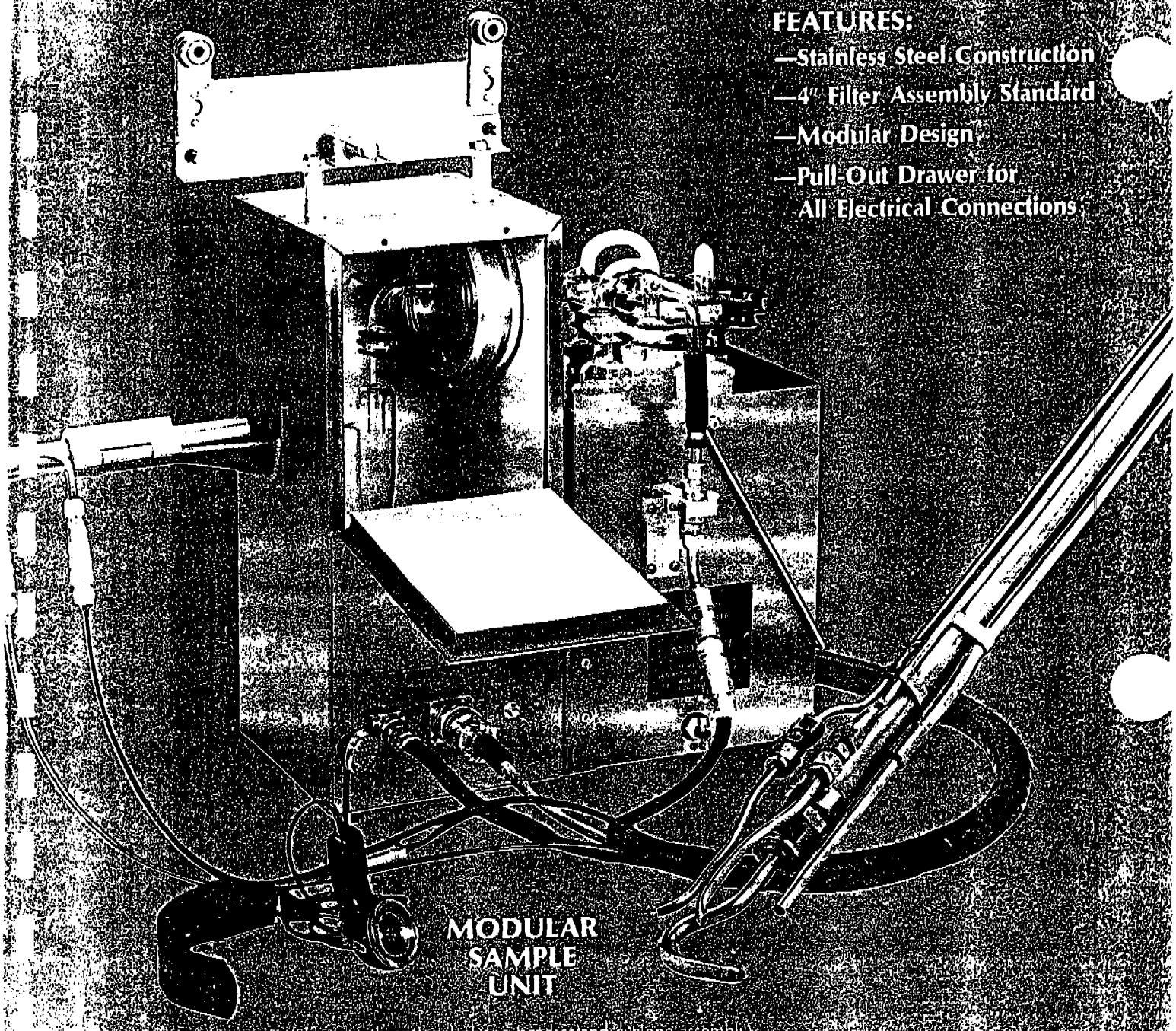
The RAC Staksamplr System takes accurate, low cost, isokinetic samples of the effluents (particulates, gases, vapors or mists) in the emissions from chemical and combustion processes. This efficient, flexible system samples all gas stream effluents in accordance with **Environmental Protection Agency (EPA) standards,** as specified in the **Federal Register.** Introduced in 1969, the RAC Staksamplr was the *first* system made to the *EPA design* for stationary source sampling apparatus.

Today, the RAC Staksamplr is the most widely used — and most widely copied — system of its type. With hundreds of units now in use around the world, Research Appliance Company has the most extensive in-the-field operating experience of any manufacturer of this kind of equipment. RAC's expertise is reflected in progressive modifications and improvements to the basic design. It also has produced a wide range of accessories that have been developed or adapted to meet specialized stack sampling requirements.

Designed to operate with its sampling probe in a horizontal or vertical position, the versatile RAC Staksamplr can be used in round or rectangular stacks and ducts with flow velocities from 400 to 10,000 fpm and temperatures to approximately 2000°F. (NOTE: If flows below 400 fpm are encountered, measurements can be made by an accessory micromanometer (P/N 994084) that measures velocities down to approx. 65 fpm.)

The RAC Staksamplr collects samples of water vapor (Method 4), particulates (Methods 5 & 17), sulfur dioxide gas (Method 6), sulfuric acid mist, including sulfur trioxide (Method 8), inorganic lead (Method 12), fluorides (Methods 13A & B), mercury (Methods 101 & 102) and beryllium (Methods 103 & 104) all in accordance with EPA Methods as published in the Federal Register.

Engineered for ease of installation and operation, this advanced RAC system meets all accepted standards for stack sampling operations.



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—Stainless Steel Construction

—4" Filter Assembly Standard

—Modular Design

—Pull-Out Drawer for All Electrical Connections

MODULAR SAMPLE UNIT

(Shown with optional phone headset and cyclone assembly)

Andersen Also Manufactures The Following Stack Sampling Equipment:

Method 6 SO_2 Sampling Trains
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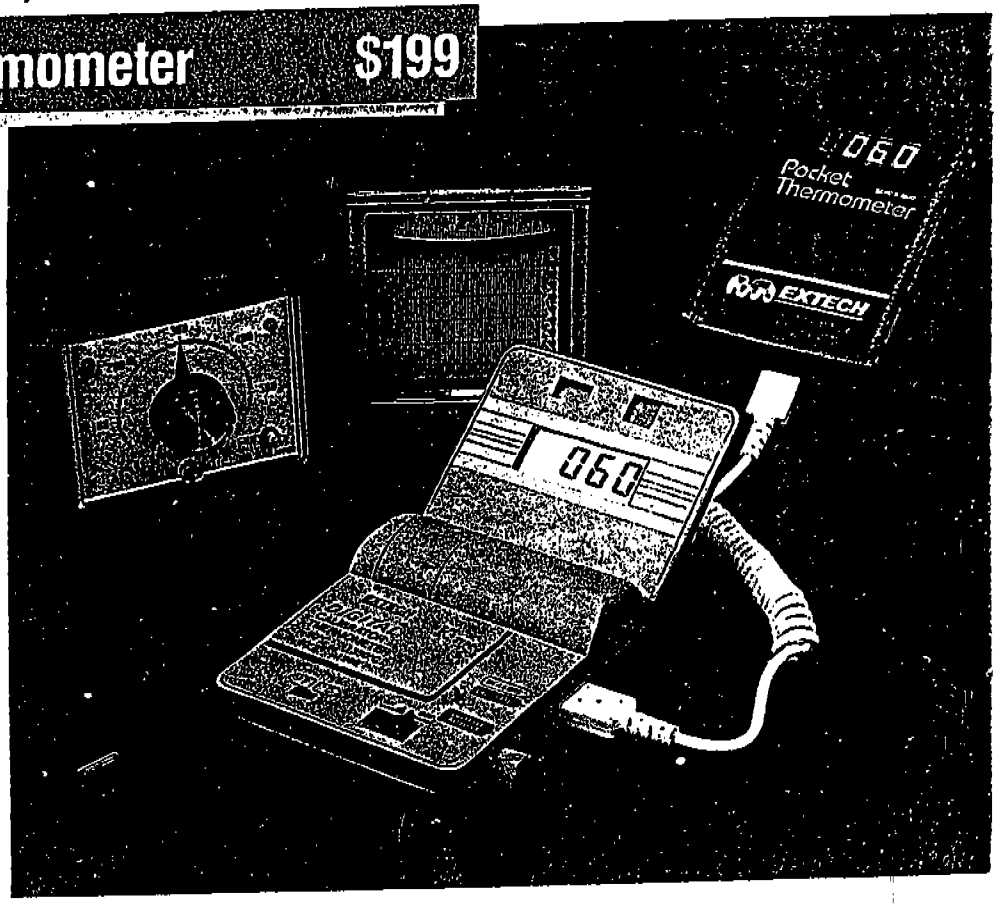
Calibrate J or K thermocouple devices. . .and measure temperatures

Oyster Calibrator/Thermometer $199



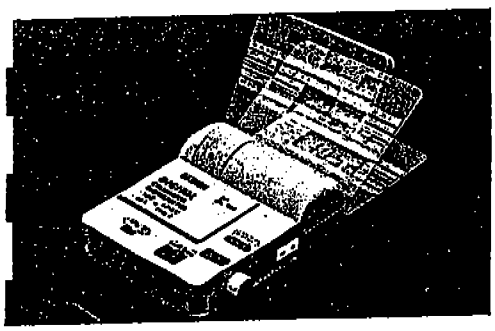
Accurate to 0.2% and switchable from °C to °F.

Precision mV calibration output. Calibrate other thermocouple thermometers, transmitters, controllers or recorders by simply plugging the appropriate Calibration Cable into device to be calibrated. Then set the desired temperature on Calibrator's digital display to send the precise millivolt equivalent (according to latest ASTM and IPTS standards) of that temperature value to your device. You now adjust your device to the correct temperature according to the Calibrator.

Switch to measure mode. Now you have versatile thermometer for measuring temperatures over a wide range with 1° resolution. Switchable from °F to °C increases versatility in both measure and calibrate modes.

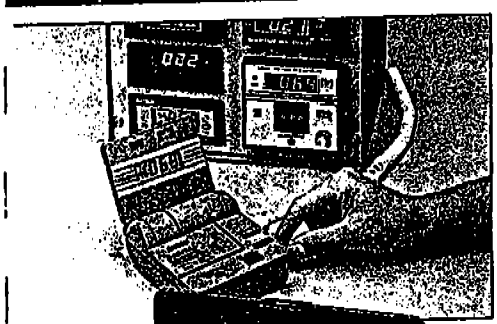
Accuracy plus. Automatic Cold Junction Compensation and linearization provide accuracy better than ±0.2% of reading.

NBS Certificate. A Certificate of Traceability to the National Bureau of Standards calibration is available for an additional charge.



Versatile

Large digital display in hinged cover adjusts (from 90 to 180°) for best viewing angle. Automatically shuts off when closed.



Portable

Rugged industrial design for field, plant or benchtop use. Neckstrap included for hands-free operation.

Complete

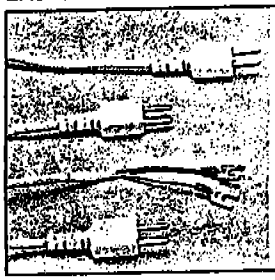
Complete kit includes meter, General Purpose Temperature Probe, Thermometer Calibration Cable (order Process Cable separately, see below), battery and carrying case.

SPECIFICATIONS

Temperature Range to calibrate or measure	
Type J (Iron/Constantan)	-70 to 1400°F or -50 to 750°C
Type K (Chromel/Alumel)	-70 to 1999°F or -50 to 1350°C
Resolution:	1°F or 1°C
Accuracy:	Better than ±0.2% of reading, ±1 digit input and output
Cold Junction Compensation:	0.03°C/°C (0.02°F/°F)
Input Impedance:	2 Meg ohms
Output Current:	18 micro Amps
Ambient Range:	0 to 50°C or 32 to 122°F
Power:	9 volt battery
Dimensions:	3-3/4 x 4-1/4 x 2" (96x108x45mm) folde
Weight:	12 oz. (340 grams) with battery
Input/Output Connection:	Standard sub-miniature connector

Type J	Type K		
LAJ43141J	LAJ43141K	Calibrator/Thermometer Includes Thermometer Calibration Cable and battery	$1
LAJ43142J	LAJ43142K	Calibrator/Thermometer Kit Includes General Purpose Temperature Probe, Thermometer Calibration Cable, battery and carrying case	$2

Options:			
LAJ431431	LAJ431432	Thermometer Calibration Cable	$
LAJ431433	LAJ431434	Process Calibration Cable	$
LAJ431NBS		NBS Traceability Certificate	$



Thermometer Calibrator Cable. Coiled 5ft (1.6 cable with molded, sub-miniature connectors both ends for calibration of other thermocoupl thermometers (supplied with Calibrator).

Process Calibration Cable. Coiled 5ft (1.6m) cable with molded connector at one end and spade lugs at other end for calibration of controllers, transmitters and recorders (order separately).

Find the Temperature Probe for your specific measurement requirements on page 6.

EXTECH CERTIFICATE OF TRACEABILITY

We certify that this product was calibrated using standards whose calibrations are traceable to the National Bureau of Standards.

Calibrated to Standard: Honeywell Model 2745 S/N P-7945

Extech Part No. 43142K

Extech Serial No. 2273-6488

Date 6/2/88

Tom Nguyen — Service Manager

Gerald W. Blakeley, III — President

EXTECH INSTRUMENTS

EXTECH INSTRUMENTS CORPORATION
150 Bear Hill Road, Waltham, MA 02154 U.S.A.
Telephone: (617) 890-7440 Telex: 940913. FAX: 617-890-7864

Thermocouple Indicators

Fluke

- **Compatible With Type J and Type K Thermocouples**
- **Temperature Readable in °C and °F**
- **Unaffected by Wide Temperature Swings**

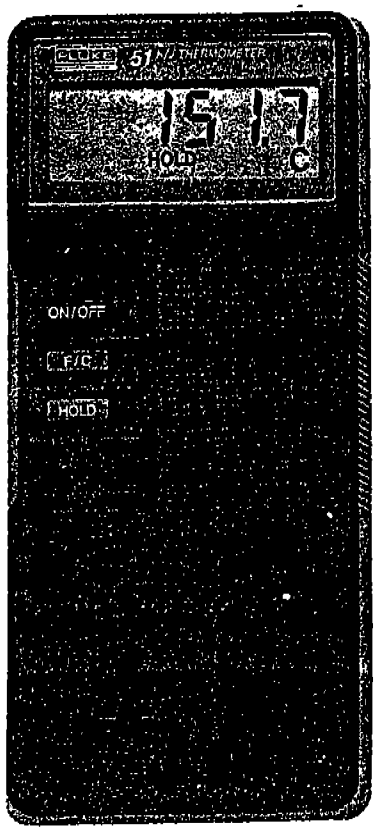
These hand-held digital thermocouple indicators, representing the latest in temperature-measurement technology, are ideal for plant maintenance, production maintenance, process control, and HVAC-R applications.

Both indicators possess high accuracy, resolution, and repeatability for precise measurements to a tenth of a degree. A special digital noise filter eliminates any "rattling" of the last digit.

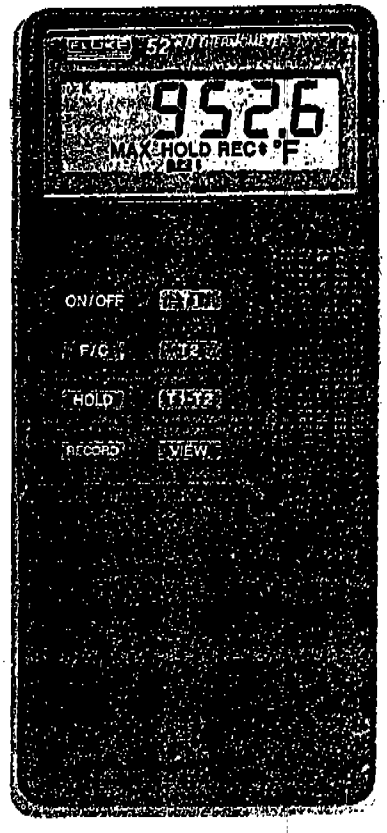
An automatic, 2-second self-test checks all of the critical functions and the battery when the unit is turned on. Switch from Celsius to Fahrenheit at the touch of a button. With another button, freeze the displayed value for viewing at your convenience.

The 7972E offers dual temperature measurement, and also calculates the differential between T_1 and T_2 ($T_1 - T_2$). An exclusive "SCAN" mode cycles continuously through all three temperature input modes, perfect for measuring and comparing trend information. This unit also has a "RECORD" mode which stores the highest and lowest differential temperature readings, a feature that makes overnight monitoring easier than ever before.

The probes available for use with the 7971E and 7972E make these indicators adaptable to many applications. A general purpose bead probe is included with each unit (two with the 7972E).



Catalog Number 7971E



Catalog Number 7972E

Each Unit Includes:

1. Insulated Bead Probe (2 Probes with 7972E)
2. Battery
3. Instruction Manual

Call TRANSCAT®
800-828-1470

For a complete selection of Fluke temperature accessories see page 38.

Specifications

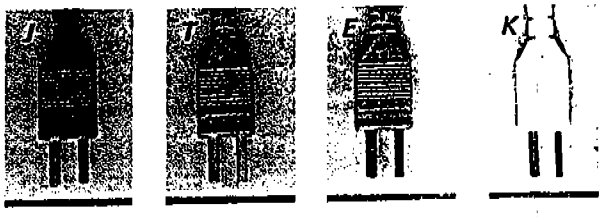
Range	
Type J Thermocouple	-328 to 1400°F (-200 to 760°C)
Type K Thermocouple:	-328 to 2498°F (-200 to 1370°C)
Resolution	
High:	0.1°C or 0.2°F
Low:	1°C or 1°F
Accuracy	
Type J Thermocouple:	±(0.1% of reading + 1.4°F) ±(0.1% of reading + 0.8°C)
Type K Thermocouple.	±(0.1% of reading + 1.3°F) ±(0.1% of reading + 0.7°C)
Operating Temperature:	32 to 122°F (0 to 50°C)
Power Supply:	9V battery
Size:	6.5" x 2.9" x 1.1" (166 x 75 x 28 mm) HWD
Weight:	10 oz (280g)

Ordering Information:

Catalog No.	Description	Price
7971E-S	Thermocouple Indicators, Single Input	$129.00
7972E-S	Thermocouple Indicators, Dual Input	$169.00
3259E-S	Immersion Probe	$ 32.00
8383E-S	Surface Probe	$ 69.00
8427E-S	Air Probe	$ 49.00
8428E-S	Piercing Probe	$ 36.00
8429E-S	Exposed Junction Probe	$ 43.00
7957E-S	Multipurpose Holster	$ 10.00
7959E-S	Soft Carrying Case	$ 13.00
8507E-S	Soft Combination Carrying Case	$ 16.00

Digi-Sense® J, T, E, K thermometer

- *Accepts types J, T, E, and K thermocouple probes*
- *Accurate to ±0.1% with a resolution of 0.1 or 1°*
- *Stores and recalls up to eight readings*
- *Field calibration capability eliminates probe errors*
- *Three-year warranty*



Measure and store temperature readings quickly and accurately with the Digi-Sense® JTEK thermocouple thermometer. Accepts types J, T, E, and K thermocouple probes. This microprocessor-based thermometer features automatic or manual field probe-calibration. Single-point, manual calibration allows you to calibrate the thermocouple probe to nearly any known temperature standard (such as freezing or boiling water). The unit cancels the inherent probe error and provides a typical system accuracy of better than ±0.5°C.

Unique memory capability stores, changes, or retains indefinitely the calibration for the full NIST[1] temperature range of each of the four thermocouple types (J, T, E, K). Store and recall up to 8 measurements. Internal computer-assisted factory calibration means there is no component drift. In addition, this four curve thermometer includes instant-on operation, ΔT function, PEAK and VALLEY, HOLD function, and RECALL.

Access all unit functions on the positive-response membrane keypad. Splash resistant display shield protects the meter's solid-state electronics. The JTEK is compact—ideal for hand-held use in the laboratory or field. A built-in stand on the back case allows you to angle the unit for easy viewing.

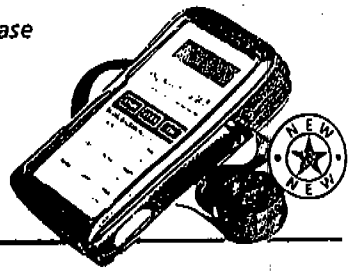
Thermometer accepts probes with ANSI color-coded miniconnectors. Probe and handles sold separately. Choose from our wide selection of probes on pages 1020-1030.

L-08528-10 Digi-Sense JTEK thermocouple thermometer $185.00
L-09376-04 Replacement batteries, 9V. Pack of four $9.30/pk

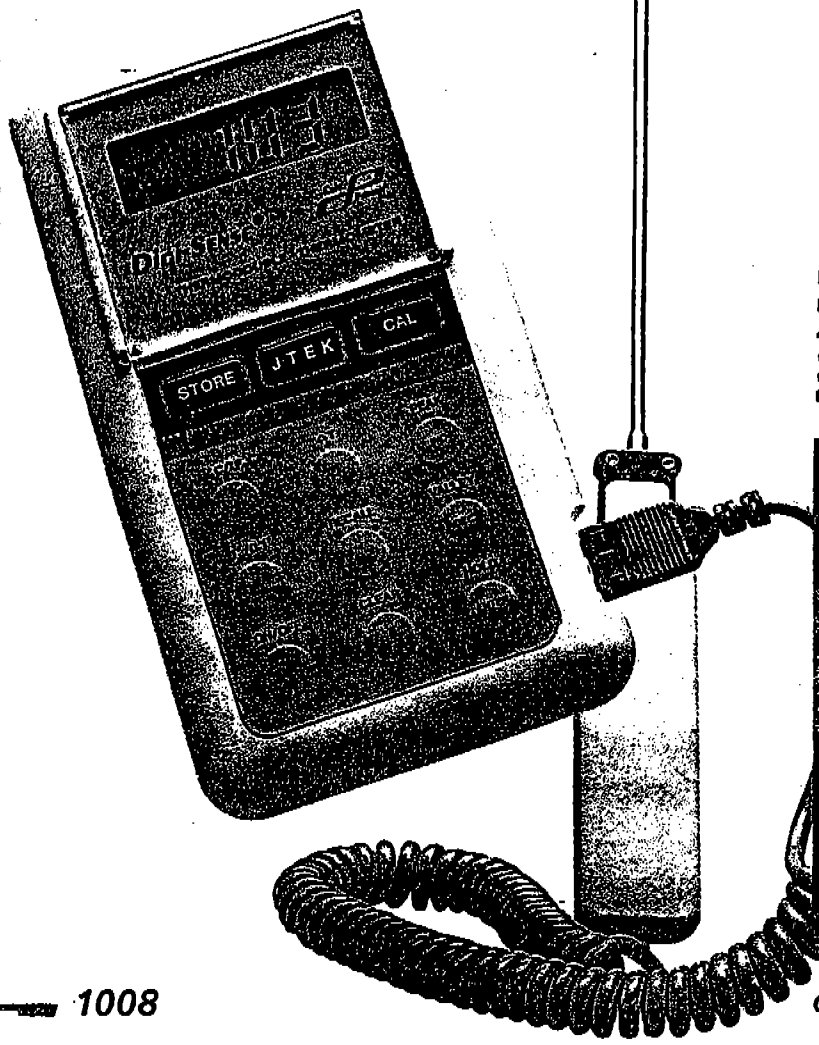
New clear window carrying case

Protect your meter while in use with the clear window case. Features an adjustable strap to keep hands free for holding onto your probes.

L-08520-10 Clear window carrying case $20.00



JTEK thermometer 08528-10 shown with type E probe (not included)

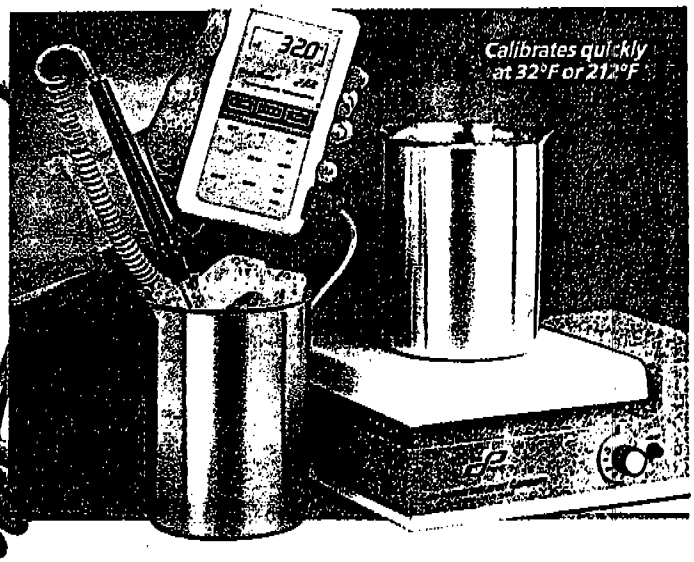


Specifications

Ranges (NIST)[1] J: −310 to 1832°F (−190 to 1000°C)
K: −418 to 2507°F (−250 to 1375°C)
T: −418 to 752°F (−250 to 400°)
E: −418 to 1652°F (−250 to 900°C)

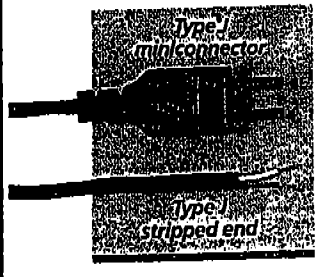
Accuracy: ±0.1% of rdg, ±0.8°F (0.4°C) above −238°F (−150°C)
Differential (ΔT) accuracy: ±0.3°C
Resolution: 0.1/1°F or C switchable; autoranging to 1° above 999.9°
Display: 4 digit LCD **Output:** none
Power: one 9V battery (included) **Low battery signal:** yes
Battery life: approximately 100 hours of continuous operation
Dimensions: 3⅝" x 6⅝" x 1⅛" **Shpg wt:** 1 lb (0.5 kg)

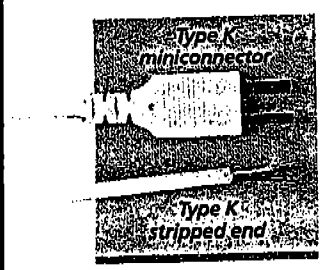
[1]National Institute of Standards and Technology, formerly National Bureau of Standards (NBS).
[1]Range for type E will extend to 1000°C with accuracy of 0.2% of reading.
Digi-Sense—Reg TM Cole-Parmer Instrument Co.

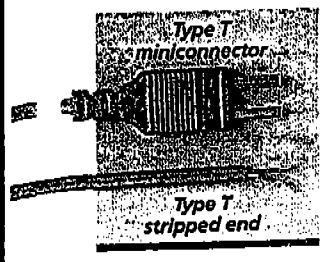


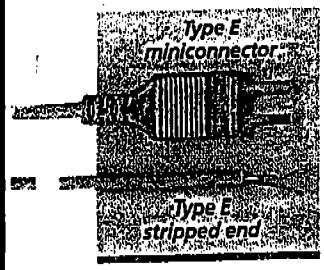
Integral-handle Type J, K, T, and E

- *Durable 5½" long glass-filled nylon handles*
- *Choose 5 ft coiled cables with miniconnectors or 10 ft straight cables with stripped ends*







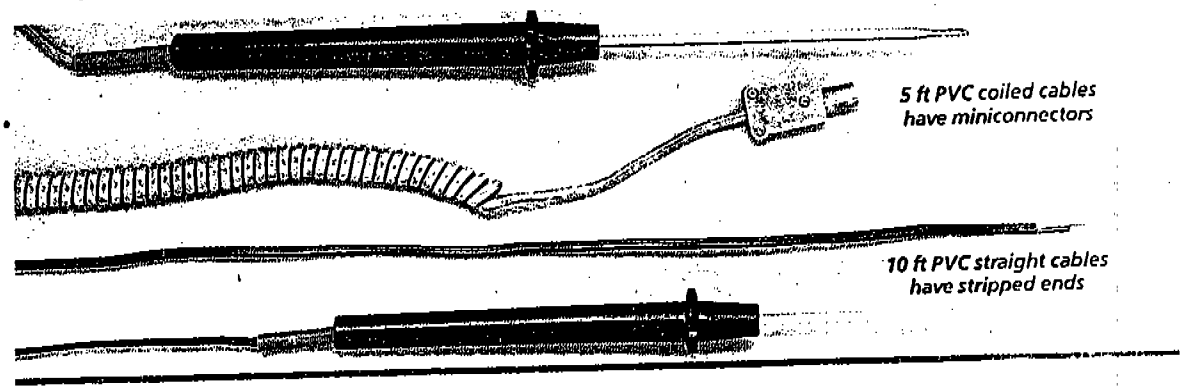


Choose integral-handle thermocouple probes with 5 foot coiled cables or 10 foot straight cables (surface/general-purpose microprobe available with coiled cable only). Coiled cables have miniconnector plugs for quick attachments. Straight cables have stripped-end probe leads which attach to standard connectors or screw-terminal instruments. Use spade lugs for good connections when you attach straight cable probe leads to screw terminals. Choose the spade lug which matches the metal wire in your probe lead; for more information on spade lugs and standard connectors see page 1035.

Each probe is equipped with a durable 5½" long glass-filled nylon handle. Strain relief spring on handle protects the cable connection against repeated flexing and tugging. Cables feature PVC insulation and are ANSI color coded for easy identification: type J cables are black, type K are yellow, type T are blue, and type E are purple.

All probes listed below have grounded tips except surface temperature, 45° angle surface, and air temperature probes, which have ungrounded tips. Each probe type has a characteristic time constant (response time). Five time constants are needed to reach 99% of final reading. For example, a probe with a time constant of 5 seconds reaches its final reading in about 25 seconds. See descriptions below for the time constant of each probe.

Teflon—Reg TM E. I. du Pont de Nemours & Co.



Discounts You save:

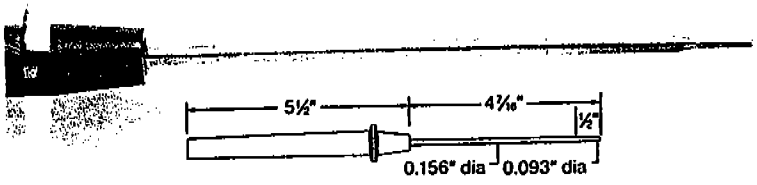
10% on orders of 6-10 probes in any assortment; 15% on orders of 11-24 probes; and 20% on orders of 25-50. Call us for applicable discount on larger orders.

Extension cables

Increase cable length with these extension cables for types J, K, T, and E thermocouple probes with miniconnectors. All cables have 20-gauge thermocouple wire with PVC/PVC insulation.

Length	Type J cat. no.	Type K cat. no.	Type T cat. no.	Type E cat. no.	Price
10 ft	L-08517-30	L-08516-30	L-08505-30	L-08537-30	$12.25
25 ft	L-08517-35	L-08516-35	L-08505-35	L-08537-35	20.00
50 ft	L-08517-50	L-08516-50	L-08505-50	L-08537-50	35.50

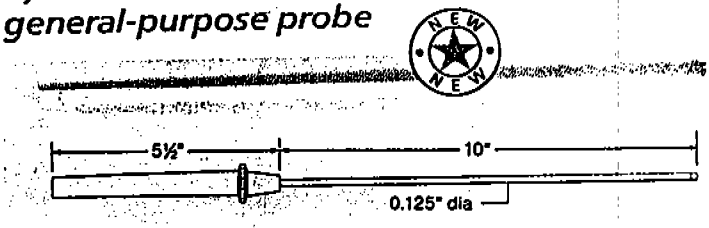
A) General-purpose probe



Use these probes to measure liquids, gases, or small-object surfaces—tip diameter is just 0.093". Probe is 316 stainless steel (SS). Time constant: 1 second (liquids).

Type	Maximum temperature	Miniconnectors (5 ft coiled cable)		Stripped ends (10 ft straight cable)	
		Cat. no.	Price	Cat. no.	Price
J	1400°F/760°C	L-08517-55	$33.00	L-08519-55	$34.50
K	1652°F/900°C	L-08516-55	33.00	L-08514-55	34.50
→ T	550°F/288°C	L-08500-55	39.00	L-08525-55	34.50
E	1600°F/871°C	L-08512-55	39.00	L-08527-55	34.50

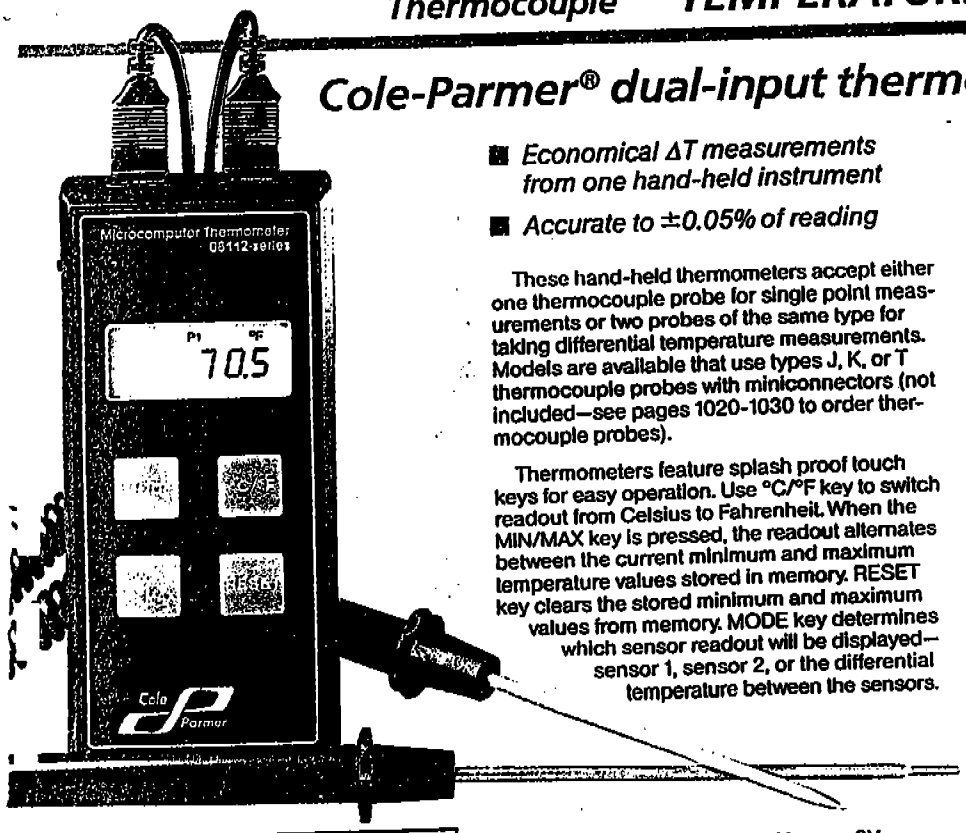
B) New Teflon®-coated general-purpose probe



Good for use with corrosive liquids and other materials. Probe is 316 SS sheath with Teflon® PTFE coating. Not recommended for use at temperatures below 32°F (0°C). Time constant: 1 second.

Type	Temperature range	Miniconnectors (5 ft coiled cable)		Stripped ends (10 ft straight cable)	
		Cat. no.	Price	Cat. no.	Price
J	32 to 302°F (0 to 150°C)	08517-57	$47.75	08519-57	$43.25
K		08516-57	47.75	08514-57	43.25
T		08500-57	47.75	08525-57	43.25
E		08512-57	47.75	08527-57	43.25

Cole-Parmer® dual-input thermocouple thermometer



- *Economical ΔT measurements from one hand-held instrument*
- *Accurate to ±0.05% of reading*

These hand-held thermometers accept either one thermocouple probe for single point measurements or two probes of the same type for taking differential temperature measurements. Models are available that use types J, K, or T thermocouple probes with miniconnectors (not included—see pages 1020-1030 to order thermocouple probes).

Thermometers feature splash proof touch keys for easy operation. Use °C/°F key to switch readout from Celsius to Fahrenheit. When the MIN/MAX key is pressed, the readout alternates between the current minimum and maximum temperature values stored in memory. RESET key clears the stored minimum and maximum values from memory. MODE key determines which sensor readout will be displayed—sensor 1, sensor 2, or the differential temperature between the sensors.

Cat. no.	Type	Price
L-08112-00	J	$179.00
L-08112-10	K	179.00
L-08112-20	T	179.00

Thermometers are powered by one 9V battery (included). Order an optional adapter, above right, to use thermometers with 115 or 230 VAC line power.

L-08402-50 Adapter, 115 VAC, U.S. standard plug $10.00

L-08402-55 Adapter, 230 VAC, European plug $10.00

L-09376-04 Replacement batteries, 9V, Pack of 4 . . . . . $9.30/pk

Specifications

Model no.	Range	Resolution
Type J 08112-00	−50.0 to 640.0°C (−58.0 to 999.8°F)	0.1°C (0.2°F)
Type K 08112-10	−222 to 1372°C (−341 to 2500°F)	1°C (1°F)
Type T 08112-20	−90.0 to 400.0°C (−130.0 to 752.0°F)	0.1°C (0.2°F)

Accuracy: ±0.05% of reading, ± <1°C (± <2°F)
Probes: one or two; types J, K, or T with miniconnectors, sold separately
Display: 4 digit LCD, ⅜" high
Power: 9V battery or optional AC adapter
Battery life: 30 hours
Low-battery signal: yes
Recorder output: none
Dimensions: 6"L x 2¾"W x 1⅜6"H
Shpg wt: 1 lb (0.5 kg)

Type T thermocouple single- or multi-input thermometers

- *Resolution of 0.1°C or F*
- *Accepts up to four probes using optional switchbox*
- *Accurate to ±1% of reading*

This NIST[1]-traceable type T thermocouple thermometer reads temperatures from −112 to 199.9°F or −80 to 199.9°C (switch-selectable) with resolution of 0.1°F or C. Accommodates one type T thermocouple probe with miniconnector. Order probes separately on pages 1020-1030.

Use up to 4 probes at once with the optional switchbox, model 08500-42. The switchbox is held securely to thermometer with two instrument cover screws. Read each probe in sequence by simply turning a switch. Order switchbox separately.

This meter gets up to 500 hours of life with one 9V battery. Low-battery indication signals when only 10 hours of power remains.

L-08500-40 Type T thermocouple thermometer with multiple input option $129.00

L-08500-42 Four probe switchbox $89.00

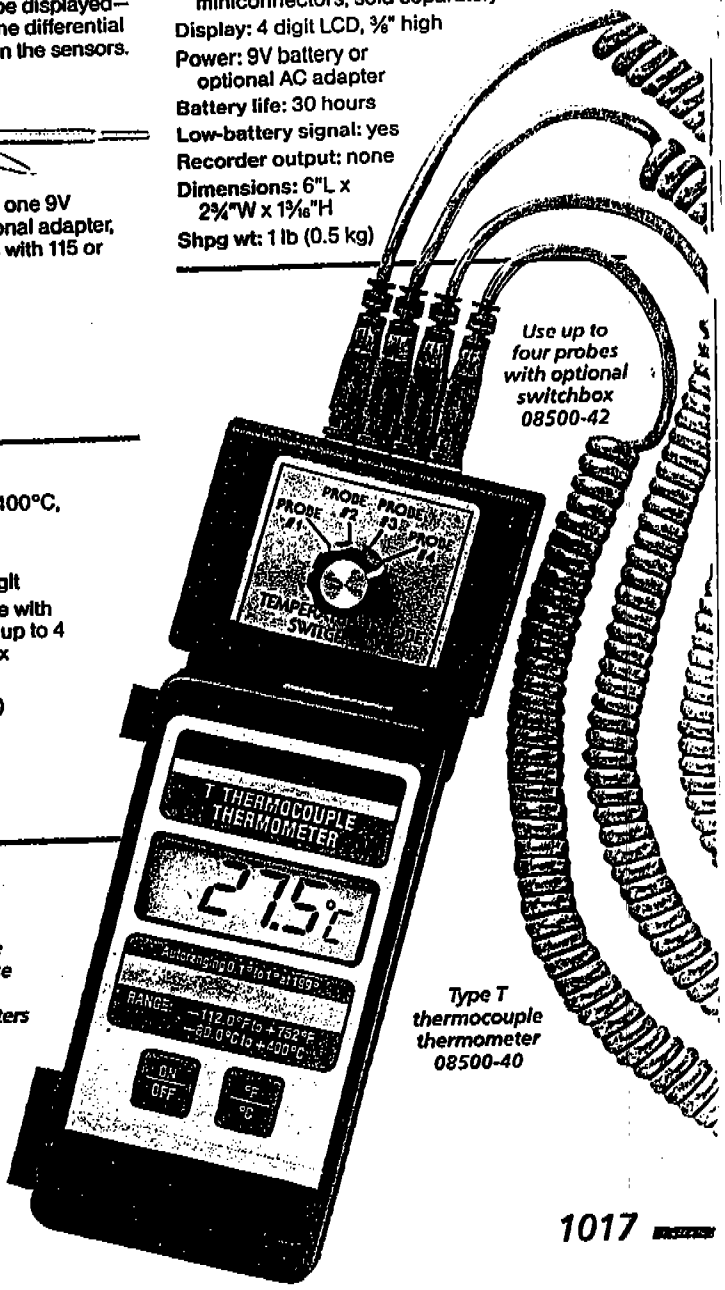
L-09376-04 Replacement batteries, 9V, Pack of 4 . . . . . $9.30/pk

[1]National Institute of Standards and Technology, formerly National Bureau of Standards (NBS).

Specifications

Range: −112 to 752°F or −80 to 400°C, switch selectable
Resolution: 0.1°F or C
Accuracy: ±1% of reading, ±1 digit
Probes: one type T thermocouple with miniconnector (not included); up to 4 probes with optional switchbox
Display: 3½ digit LCD, ½" high
Power: one 9V battery (included)
Low-battery signal: yes
Recorder output: none
Dimensions: 5"L x 3"W x 1¾"H
Shpg wt: 1 lb (0.5 kg)

See pages 1020-1030 for our complete line of type T thermocouple probes for use with these and other type T thermocouple thermometers with miniconnectors.



Use up to four probes with optional switchbox 08500-42

Type T thermocouple thermometer 08500-40

New precision thermocouple probes

- *Single-point calibrated probes available, for improved system accuracy*
- *All probes are traceable to NIST[1] standards*

Choose these integral-handle probes for precision and accuracy. All probes come equipped with ANSI color-coded cables and miniconnectors for easy identification.

Factory calibration virtually eliminates probe error. Single-point calibrated probes ("A-C") are calibrated at 212°F and come with calibration forms.

A) Precision general-purpose probes

An immersion sensor for use with liquids, gases, semisolids. With 5 ft PVC coiled cable and 316 SS sheath. Single-point calibrated. Time constant: 1 second (liquids).

Type	Max temp	Cat. no.	Price
J	1400°F (760°C)	L-93815-00	$59.00
K	1652°F (900°C)	L-93815-10	59.00
T	550°F (288°C)	L-93815-20	65.00
E	1600°F (871°C)	L-93815-30	65.00

B) Precision penetration probes

Sharp tip allows you to penetrate soft or semisoft materials such as semifrozen meats, plastics, and semisolids. Immersible. With 5 ft PVC coiled cable and 316 SS sheath. Single-point calibrated. Time constant: 5 seconds.

Type	Max temp	Cat. no.	Price
J	1400°F (760°C)	L-93816-00	$62.00
K	1652°F (900°C)	L-93816-10	62.00
T	550°F (288°C)	L-93816-20	65.00
E	1600°F (871°C)	L-93816-30	65.00

C) Precision air/gas probes

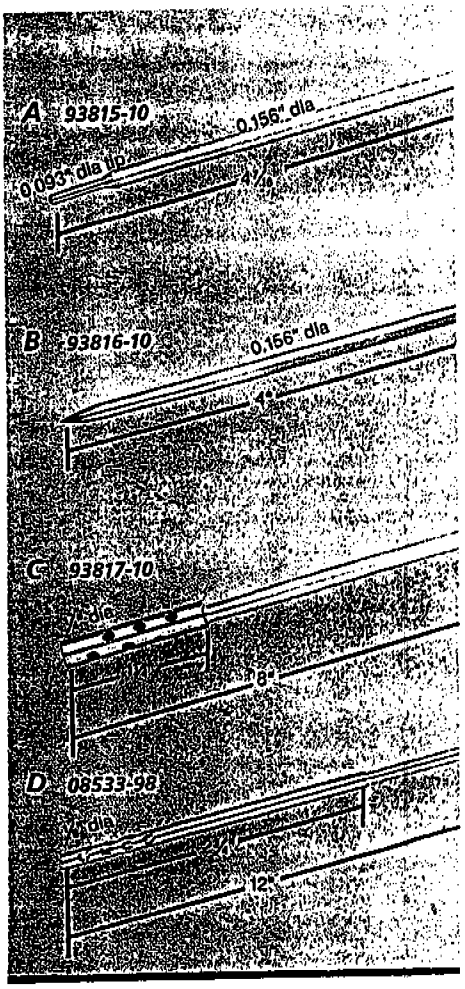
Measure air or gas temperatures. Built-in perforated shield protects exposed tip. With 5 ft PVC coiled cable and 316 SS sheath. Single-point calibrated. Time constant: 45 seconds (5 m/sec air flow).

Type	Max temp	Cat. no.	Price
J	572° (300°C)	L-93817-00	$68.00
K		L-93817-10	68.00
T		L-93817-20	83.00
E		L-93817-30	83.00

D) Quick response, air/gas probes

Exposed tip is protected by built-in perforated shield. With 3 ft PVC straight cable and 304 SS sheath. Time constant: 0.1 sec.

Type	Max temp	Cat. no.	Price
K	932°F (500°C)	L-08533-98	$94.00
E		L-08533-99	94.00



New surface probes

E, F) Straight surface probes

For small-scale applications. With 3 ft PVC straight cable. Probes with ½" diameter tip have Teflon™ guard. Time constant: 0.1 second for ⅛" dia models; 0.2 second for ½" dia models.

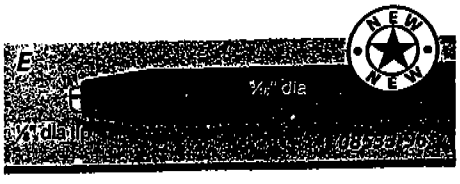
Type	Max temp	Cat. no.	Price
E) New ⅛" dia probes			
K	752°F (400°C)	L-08533-96	$178.00
E		L-08533-97	178.00
F) ½" dia probes with Teflon tip guard			
J	662°F (350°C)	L-08533-94	148.00
K	752°F (400°C)	L-08533-62	130.00
T	662°F (350°C)	L-08533-95	148.00
E	752°F (400°C)	L-08533-82	130.00

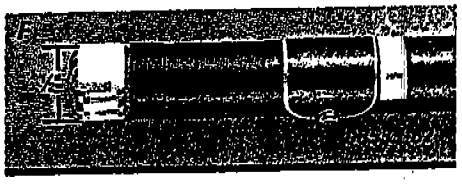
G) Right-angle surface probes

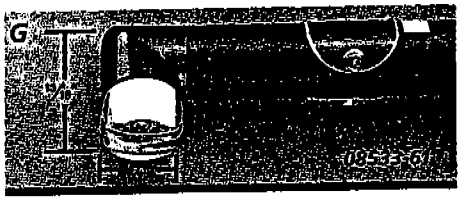
Teflon-guarded thermocouple reaches into tight areas. With 3ft PVC straight cable. Time constant: 0.2 second.

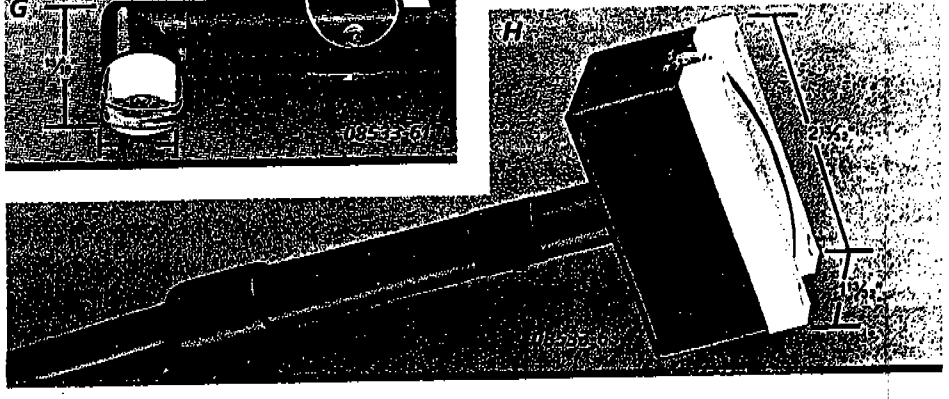
Type	Max temp	Cat. no.	Price
J	662°F (350°C)	L-08533-93	$158.00
K	752°F (400°C)	L-08533-61	140.00
T	662°F (350°C)	L-08533-89	158.00
E	752°F (400°C)	L-08533-81	140.00

[1]National Institute of Standards and Technology, formerly National Bureau of Standards (NBS).
Teflon—Reg TM E. I. du Pont de Nemours & Co.









H) Moving surface probes

For fast, precise temperature measurements of moving or stationary surfaces. Max surface speed: 2500 ft/min. Probe has Teflon tip guard and 3 ft PVC straight cable. Time constant: 0.4 second.

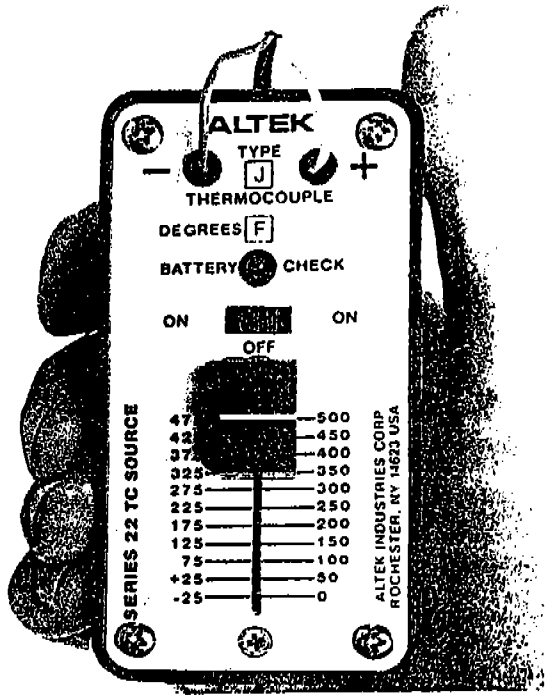
Type	Max temp	Cat. no.	Price
J	482°F (250°C)	L-08533-69	$193.00
K		L-08533-63	170.00

THERMOCOUPLE SOURCE
SERIES 22

ALTEK

DATA SHEET 22

- **DIRECT TEMPERATURE OUTPUT**
  22 Precise Steps
- **0.1% ACCURACY**
  25, 50 or 100 degree resolution
- **DESIGNED FOR INTRINSIC SAFETY**
  Field, shop and control room use
- **POCKET SIZED**
  1 Year Battery Life
- **MODELS FOR TYPES B, E, J, K, R, S, T;**
  °C & °F Cold-Junction Compensated



ALTEK SERIES 22 Thermocouple Sources provide 22 precise temperatures for inputs to transmitters, recorders, controllers, alarms, data acquisition and computer systems. Model 22 provides thermocouple wire output and is cold-junction compensated for ambient temperature variations. Conformity to the particular thermocouple vs millivolt curve is in accordance with the latest ASTM and IPTS standards for exact temperature simulation. Linear millivolt models are also available.

Thermocouple types B, E, J, K, R, S and T are available in both degrees F and C. The table lists the standard ranges. Resolution is 25, 50 or 100 degrees, corresponding to full scale output of 500, 1000, 1700, 2100 and 3100 degrees respectively.

Dual ranges, with an individual "ON" position for each range, allow quick, easy settings for any output. Calibrated accuracy is ±0.1% of span ±1 degree. Negative temperatures add ±2 degrees.

Two built-in AA cells provide power for one year of everyday use. A front panel LED pulses every time the Model 22 is turned on to indicate proper battery voltage.

The low cost ALTEK MODEL 22 is a complete, compact source for checkout and calibration of all thermocouple instruments in the field, shop or control room.

OPERATING INSTRUCTIONS

Select the ALTEK MODEL 22 for the correct thermocouple type, the desired temperature scale (F or C), and range.

Connect the ALTEK Thermocouple Source to the input terminals of the instrument to be tested, the field mounted head or junction box terminals.

Cold-junction compensation and instantaneous automatic standardization is built into the Model 22.

Set the temperature selection switch to the desired temperature and slide the "ON" switch to the selected scale. The Battery Check LED will pulse once indicating proper battery voltage. If no pulse is seen, the batteries should be replaced with 2 "AA" cells. Alkaline cells are preferred for longest life and widest operating temperature range.

End point calibration temperatures of the instrument are then selected on the Model 22 and any required adjustments are made. Intermediate points may then be selected to verify instrument linearity or check critical points.

ALTEK INDUSTRIES CORP.
210 Commerce Drive
Rochester, New York 14623 U.S.A.
(716) 334-3720
TELEX 706189 ALTEK ROC UD
FAX: (716) 334-0673

SPECIFICATIONS

Accuracy:
±0.1% of span ±1 degree. Negative temperatures add ±2 degrees.

Cold Junction Compensation:
Built-in for specified thermocouple type

Cold Junction Temperature Effect:
Within ±0.25 degree at 75° F (20° C) ±0.025 degrees/degree change in ambient

Operating Ambient Temperature:
Minus 10 to + 130 degrees F (Minus 25 to + 55 degrees C)

Ambient Temperature Effect:
Zero: included in cold junction effect
Span: ±0.01% of span/degree

Storage Temperature Limits:
Minus 40 to + 160 degrees F (Minus 40 to + 70 degrees C)

Output Impedance:
Fixed, 50 ohms nominal

Batteries:
2 AA alkaline cells provide 1 year of use at 4 hours each workday

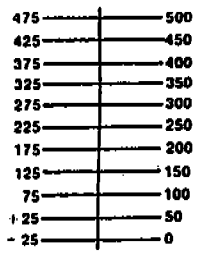
Battery Indicator:
LED light pulse at turn-on in either range

Size:
2⅛ X 4 X 2¼ Inches (54 X 102 X 55 mm)

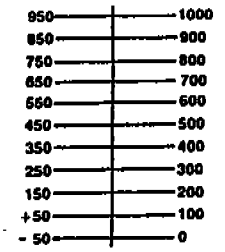
Weight:
6 oz. (0.15 kg)

Optional Carrying Case:
Zippered, with belt loop -

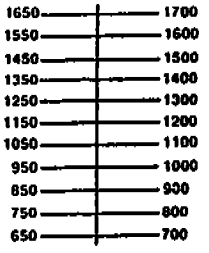
SERIES 22 STANDARD RANGES (FOR OTHER RANGES & TC TYPES CONSULT FACTORY)



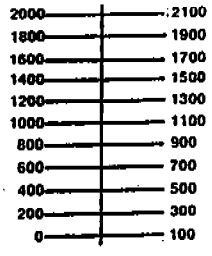
TYPE E,J,K,T DEGREES F
TYPE E,J,K,T DEGREES C



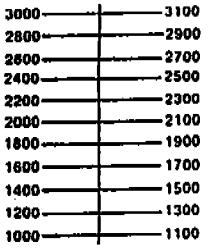
TYPE E,J,K DEGREES F
TYPE E,J,K DEGREES C



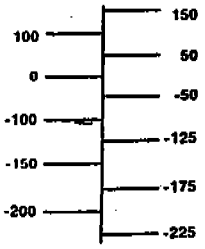
TYPE B,R,S
DEGREES C



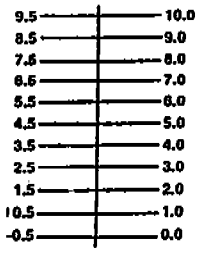
TYPE J,K
DEGREES F



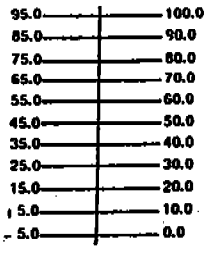
TYPE B,R,S
DEGREES F



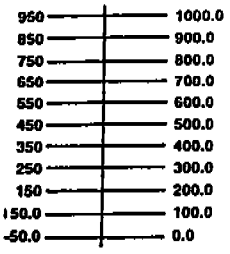
11 POSITION
CRYOGENIC SOURCE
TYPE T DEGREE C
22T150C



±0.1%
10 MILLIVOLT SOURCE
22MV10



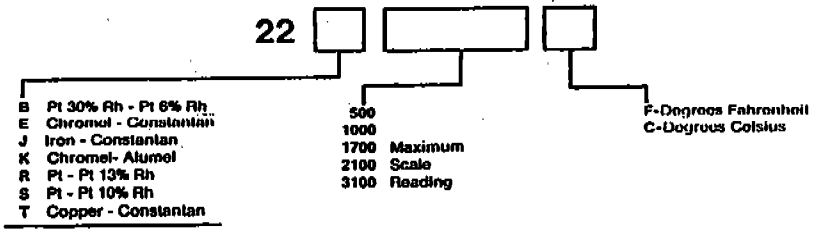
±0.1%
100 MILLIVOLT SOURCE
22MV100



±0.1%
1000 MILLIVOLT SOURCE
22MV1000

ORDERING INFORMATION:

Specify thermocouple type, scale range and ° F or ° C to insure prompt delivery of all the above standard ranges. A 22J 1000F completely describes an Altek 22 position source providing a maximum output of 1000° F for a type J thermocouple. For millivolt output specify 22 MV10, 22 MV100, or 22 MV1000.



PRINCIPLE OF OPERATION:

Altek Series 22 Thermocouple and millivolt sources are self contained, high precision instruments which provide direct signals for the calibration of thermocouple or millivolt devices of all types.

Output signal is controlled by an 11 position switch which operates in 2 interleaved ranges, providing 22 precisely fixed outputs corresponding to the standard table millivolt values of the temperatures selected. Internally, the switch is connected to a thin film voltage divider which is linearized for the particular thermocouple type, scale and range. The divider is driven by an ultra stable reference operating at a level 10 times higher than the output signal to reduce drift and internal thermal effects to negligible levels.

The selected voltage is applied to the input of a precision operational amplifier which controls an output darlington. Current passes through the darlington in series with a stable feedback resistor. Feedback voltage is connected to the balancing terminal of the operational amplifier to automatically keep the output millivolts at exactly the desired value.

Cold junction compensation is provided by a temperature sensitive current source which is set for exact compensation of ambient temperature variation for the particular thermocouple type. Power is provided by 2 AA cells with an average current drain of 1.5 ma when on. The Series 22 will operate down to 1/2 battery voltage, which provides more than 1000 hours of continuous duty with alkaline cells.

OTHER PRODUCTS

Altek designs and manufactures fast, accurate instruments for measurement, generation and simulation of virtually every process control signal. Consult our factory directly or contact your local stocking representative to order precise, low cost Milliamp Calibrators, Voltage Sources, Direct Thermocouple Sources, RTD Simulators and Frequency Sources. Altek also produces calibrators for custom ranges and unique applications. Additional models and ranges are frequently added to the Altek instrument family to meet all of your critical calibration requirements.

ALTEK

CERTIFICATE OF CALIBRATION

This is to Certify that your Altek Unit has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (formally NBS) within the limits of the NIST Calibration Services. Actual records pertaining to these standards are on file and are available for examination.

Certified by: Altek Industries Corp
Recommend Recalibration: Annually

Model K 2100°F Serial No. Serial # 122322

ALTEK INDUSTRIES CORP
210 Commerce Drive, Rochester, NY 14623 U.S.A.
(716) 334-3720 FAX: (716) 334-6673
800-32-ALTEK

Calibration Technician

Thomas Wurtz
Calibration Supervisor

ANDERSEN
SAMPLERS INCORPORATED

This certifies that 'S' Type Pitot Tubes constructed and calibrated by Andersen Samplers, Inc. comply with procedures given in the Environmental Protection Agency Reference Method 2-Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube), Vol. 42, No. 160-Thursday, August 18, 1977. Andersen certifies that at time of shipment baseline coefficient values of 0.84 may be assigned to the pitot tubes.

4215 WENDELL DRIVE □ ATLANTA, GEORGIA 30336 □ (404) 691-1910 □ TELEX: 54-2523

SHIPPING ORDER NO. 680987 PAGE 2 TIME 17:09 DATE 10/28/91

aldrich chemical company, inc.

EMERGENCY CONTACT (414) 273-3850

UPS ZONE ZN5

SOLD TO
ACCOUNT # 934242
PENSACOLA P O C INC
109 SOUTH SECOND STREET
PENSACOLA FL 32507

SHIP TO
PENSACOLA P O C INC
PENSACOLA FL 32507

aldrich chemical company, inc.

2905 West Hope Avenue • Milwaukee, Wisconsin 53216 USA • Telephone (414) 273-3850 Cable Aldrichem TWX 910-262-3052 TELEX 26-843

SHIP TO
ACCOUNT # 934242
PENSACOLA P O C INC
109 SOUTH SECOND STREET
PENSACOLA FL 32507

SO# 680987

PURCHASE ORDER NO. 100691/BS

RETURN REQUESTED

ACETONE

UN 1090

CODE	CATALOG NO.	UNIT	QTY. ORD.	QTY. SHIP	B/O	DESCRIPTION	*	UNIT PRICE	NET AMOUNT
3	32011-0	1LT	1	1		ACETONE, 99.5+%, A.C.S. REAGENT FLAMMABLE LIQUID			
		** SHIP BY IATA ONLY **				RQ 5000LB/2270KG LABEL = FLAMMABLE LIQUID PSN = ACETONE UN 1090 HZ CLASS 3.0 AP = 30L,II IR = GLASS BOTTLE CLEANING FOR AIR POLLUTION TESTING			

PACKING SLIP

THIS IS THE LAST OF 2 PAGES

SHIPPING ORDER NO.	ACCOUNT NO.		PURCHASE ORDER NO.	QUOTE	REQUESTED ROUTING TERMS - NET 30 DAYS F.O.B. PLANT, MILWAUKEE, WI.	SHIPPING CHARGE
680987	934242	03	100691/BS		AIRBORNE STD	

SHIPPING INSTRUCTIONS

AIRBORNE STD

AIR EXPRESS LABELS

STOCK ZONE	PULLED BY	CHECKED BY	PACKED BY