AP42 Section:	11.7
Reference:	13
Title:	Particulate Emissions Test For American Olean Tile Company, Fayette, AL, Crushing And Screening Line #2, October 16, 1991, Pensacola POC, Inc., Pensacola, FL, October 1991.

COMPLIANCE DETERMINATION SUBMITTAL FORM

AP-42 Section 11.7
Reference 13
Report Sect. 4
Reference 9

COMPANY American Clean Tire DATE OF TEST 10/16/91

FACILITY NUMBER 404-0007-2002 SOURCE Crushing and Screening Line

( ) 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
1.87	2.31	2.22	2.13

Comments:

Evaluated by: E-Lang Date 12 NOV 91

ADEM Form 175 3/87

PARTICULATE EMISSIONS TEST

FOR

AMERICAN OLEAN TILE COMPANY

Fayette, AL

Date: 22 October 1991

Date of Test: 16 October 1991

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

Permit Number: 404-0007-Z002

I.D.: Crushing & Screening Line #2 (#52)

Average Production Rate: 13.22 TPH

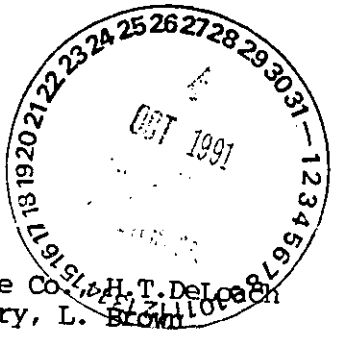
Average Particulate Mass Rate (PMR): 2.1 lbs/hr

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-Z002
Location: Fayette, AL
Test Date: 15 October 1991

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TEST DESCRIPTION

Pensacola P.O.C., Inc. performed particulate emissions test on the Crushing and Screening Line #2 (#52) located at American Olean Tile Company in Fayette, AL on 16 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 and grog. The airborne particulate matter generated by this process is controlled and collected by two baghouses (one for body material and one for grog). Both air streams are combined into a single stack which discharges filtered air into atmosphere. Test was conducted on stack portion downstream from where these two combine.

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.

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

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 16 October 1991, EPA Method 1, 2, 3, & 5 test conducted by our company on Crushing and Screening Line #2 (#52), permit number 404-007-Z002 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)

METHOD 5 PARTICULATE TEST
CALCULATION FORM

Pensacola P.O.C., Inc.

American Olean Tile Co.
Fayette, AL
RUN 1
Line #52

I. Necessary Data

A. Reference Method # 1

. Area of Stack A_s 4.28 ft^2
. No. of equivalent diameters upstream 3.9
. No. of equivalent diameters downstream 7.1
. No. of traverse points 20
. Total test time θ 60 minutes

B. Reference Method # 2

. Average stack temperature $\bar{t}_s$ 57 °F $\bar{T}_s$ = 57 + 460 = 517 °R
. Stack absolute pressure P_s 30.16 "Hg. -13.6 + 30.09
. Barometric Pressure P_b 30.09 "Hg.
. $\overline{\Delta P}$ 1.3 "WG $\sqrt{\Delta P}$ 1.3416

C. Reference Method # 3

% CO_2 0 ; % O_2 20 ; % CO _____ ; % N_2 _____

D. Reference Method # 4

Water collected

Impinger H_2O 3 ml
Silica Gel 12.3 g

E. Reference Method # 5

. Area of nozzle A_n 0.00177 ft^2
. Average $\overline{\Delta H}$ 1.99 in. H_2O
. Average meter temperature $\bar{t}_m$ 64 °F $\bar{T}_m$ = 64 + 460 = 524 °R
. Dry gas meter correction factor Y_m 1.0
. Volume metered V_m 50.3 DCF
. Particulate Weight M 0.0374 g M_n 37.4 mg

II. Calculations

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

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

$$V_{m(std)} = (50.3\ CF)(1.0)\ \frac{(528°F)}{(29.92\ in.HG.)}\ \frac{\left(30.09 + \frac{1.99\ in.\ Hg.}{13.6}\right)}{(524\ °R)}$$

$V_{m(std)}$ = (50.3)(1.0) 17.647 (0.0377) = 51.217 DSCF

Pensacola P.O.C., Inc.

B. Moisture Content of Stack Gas

1. H_2O collected in impingers in standard cubic feet

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

$V_{ws(std)} = 0.04707\ ft^3/ml\ (\ 3\ \ ml) = 0.1412$ SCF

2. H_2O collected in silica gel in standard cubic feet

$V_{wsg(std)} = K\ (W_f - W_i)$

$V_{wsg(std)} = 0.04707\ ft^3/g\ (\ 12.3\ \ g.\ ) = 0.5790$ SCF

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

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

$$B_{ws} = \frac{(0.1412\ SCF) + (0.5790\ SCF)}{(0.1412\ SCF) + (0.5790\ SCF) + (51.217\ SCF)}$$

$$Bws = \frac{0.7202}{51.9372} = 0.01387$$

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

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

$M_d = (.44)(\ 0\ \ \%CO_2) + (.32)(\ 21\ \ \%O_2) + (.28)(\ 79\ \ \%CO) + (.28)(\ \ \ \%N_2)$

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

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

$M_s = 28.84\ (1 - 0.01387) + 18\ (0.01387) =$

$M_s = (\ 28.84\ )(0.98613) + (0.24966) = 28.69$ lb/lb mole

D. Average Stack Gas Velocity

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

$$V_s = 85.49\ ft/sec.\ (.84\ ) \sqrt{\frac{(\ 517\ °R)}{(\ 30.16\ in\ Hg.)(\ 28.69\ lb/lb\ mole)}}\ (1.3416)$$

$V_s = 85.49\ (0.84\ )\ (0.7730)\ (1.3416)$

$= 74.7$ ft/sec

Pensacola P.O.C., Inc.

E. Quantity of Air

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

$Q_a = 74.47 \times 4.28 \times 60 = 19124 \text{ ACFM}$

F. Average Stack Gas Volumetric Flow Rate

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

$$\overline{Q}_s = 19124 \left(1 - 0.0387\right) \frac{528°F}{29.92"Hg} \frac{30.16 \text{ " Hg.}}{517 \text{ °R}}$$

$\overline{Q}_s = 19124 \times 0.98613 \times 17.65 \times 0.0583 = 19406$ DSCF/min

G. Pollutant Mass Rate

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

$$PMR = \frac{(0.03748)}{(51.217 \text{ SCF})} (19406 \text{ SCF/min} \times 60 \text{ min/hr}) \times .0022 \text{ lb/g} =$$

$= 1.87$ LB/HR

H. % Isokinetic Variation

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

$$\%I = \frac{(517)(51.217 \text{ SCF})(29.92 \text{ in. Hg.})}{(0.000177 \text{ ft}^2)(60 \text{ min})(74.47 \text{ ft/sec})(30.16 \text{ in.Hg})\, 528°R \times 60 (1 - 0.01}$$

0.9861

$$\%I = \frac{792257}{745172} = 1.0632 \times 100 = 106.3 \%I$$

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

$C_s = .0154 \left(\frac{mg}{SCF}\right) =$ 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#2 (#52)

Test date: 16 October 1991

Input data summary
Run number: 1

1)	Area of stack (As) in SF:	4.28
2)	Nozzle size in inches:	.18
3)	Area of nozzle (An) in SF:	1.767096E-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:	30.09
11)	Stack static pressure in in. WG:	1
12)	Average delta P in in. WG:	1.8
13)	Square root of delta P:	1.341641
14)	Average delta H in in. WG:	1.99
15)	Average stack temperature (ts) in F:	57
16)	Average stack temperature (Ts) in R:	517
17)	Average meter temperature (tm) in F:	64
18)	Average meter temperature (Tm) in R:	524
19)	Percentage of CO2:	0
20)	Percentage of O2:	21
21)	Percentage of CO and N2:	79
22)	Impinger water gain (Vf) in ml:	3
23)	Silica gel gain (Wf) in grams:	12.3
24)	Volume collected (Vm) in DCF:	50.3
25)	Particulate collected (M) in grams:	.0374
26)	Particulate collected (Mn) in mg:	37.4

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#2 (#52)

Test date: 16 October 1991

Test results summary
Run number: 1

A. Stack absolute pressure (Ps) in in. Hg:	30.16353
B. Standard volume metered (Vm std) in DSCF:	51.21965
C. Moisture content of stack	
1. H2O collected in impingers in SCF:	.14121
2. H2O collected in silica gel in SCF:	.578961
3. Moisture content of stack gas (Bws):	1.386549E-02
D. Molecular weight of stack gas (lb/lb mole)	
1. Dry molecular weight (Md):	28.84
2. Wet molecular weight (Ms):	28.6897
E. Average stack gas velocity (Vs) in ft/sec:	74.4684
F. Actual flow rate (Qa) in ACFM:	19123.49
G. Volumetric flow rate (Qs) in DSCFM:	19419.57
H. Particulate mass rate (PMR) in lb/hr:	1.871753
I. Percent isokinetic variation (I):	106.4883
J. Particulate conc. (Cs) in grains/SDCF:	.0112449

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#2 (#52)

Test date: 16 October 1991

Input data summary
Run number: 2

1) Area of stack (As) in SF:	4.28
2) Nozzle size in inches:	.18
3) Area of nozzle (An) in SF:	1.767096E-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:	30.14
11) Stack static pressure in in. WG:	1
12) Average delta P in in. WG:	1.66
13) Square root of delta P:	1.28841
14) Average delta H in in. WG:	1.85
15) Average stack temperature (ts) in F:	65
16) Average stack temperature (Ts) in R:	525
17) Average meter temperature (tm) in F:	80
18) Average meter temperature (Tm) in R:	540
19) Percentage of CO2:	0
20) Percentage of O2:	21
21) Percentage of CO and N2:	79
22) Impinger water gain (Vf) in ml:	4
23) Silica gel gain (Wf) in grams:	11.5
24) Volume collected (Vm) in DCF:	48.8
25) Particulate collected (M) in grams:	.0455
26) Particulate collected (Mn) in mg:	45.5

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#2 (#52)

Test date: 16 October 1991

Test results summary
Run number: 2

A. Stack absolute pressure (Ps) in in. Hg:	30.21353
B. Standard volume metered (Vm std) in DSCF:	48.28318
C. Moisture content of stack	
1. H2O collected in impingers in SCF:	.18828
2. H2O collected in silica gel in SCF:	.541305
3. Moisture content of stack gas (Bws):	1.488561E-02
D. Molecular weight of stack gas (lb/lb mole)	
1. Dry molecular weight (Md):	28.84
2. Wet molecular weight (Ms):	28.67864
E. Average stack gas velocity (Vs) in ft/sec:	72.01921
F. Actual flow rate (Qa) in ACFM:	18494.53
G. Volumetric flow rate (Qs) in DSCFM:	18506.18
H. Particulate mass rate (PMR) in lb/hr:	2.302005
I. Percent isokinetic variation (I):	105.3377
J. Particulate conc. (Cs) in grains/SDCF:	.0145123

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#2 (#52)

Test date: 16 October 1991

Input data summary
Run number: 3

1) Area of stack (As) in SF:	4.28
2) Nozzle size in inches:	.18
3) Area of nozzle (An) in SF:	1.767096E-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:	30.16
11) Stack static pressure in in. WG:	1
12) Average delta P in in. WG:	1.76
13) Square root of delta P:	1.32665
14) Average delta H in in. WG:	1.84
15) Average stack temperature (ts) in F:	73
16) Average stack temperature (Ts) in R:	533
17) Average meter temperature (tm) in F:	89
18) Average meter temperature (Tm) in R:	549
19) Percentage of CO2:	0
20) Percentage of O2:	21
21) Percentage of CO and N2:	79
22) Impinger water gain (Vf) in ml:	5
23) Silica gel gain (Wf) in grams:	11.4
24) Volume collected (Vm) in DCF:	49.4
25) Particulate collected (M) in grams:	.0428
26) Particulate collected (Mn) in mg:	42.80001

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#2 (#52)

Test date: 16 October 1991

Test results summary
Run number: 3

A. Stack absolute pressure (Ps) in in. Hg:	30.23353
B. Standard volume metered (Vm std) in DSCF:	48.10616
C. Moisture content of stack	
1. H2O collected in impingers in SCF:	.23535
2. H2O collected in silica gel in SCF:	.536598
3. Moisture content of stack gas (Bws):	1.579333E-02
D. Molecular weight of stack gas (lb/lb mole)	
1. Dry molecular weight (Md):	28.84
2. Wet molecular weight (Ms):	28.6688
E. Average stack gas velocity (Vs) in ft/sec:	74.7077
F. Actual flow rate (Qa) in ACFM:	19184.94
G. Volumetric flow rate (Qs) in DSCFM:	18903.97
H. Particulate mass rate (PMR) in lb/hr:	2.220088
I. Percent isokinetic variation (I):	102.743
J. Particulate conc. (Cs) in grains/SDCF:	1.370137E-02

(W)

COMPANY NAME: American Clean Tile Co DATE TESTED: 10/16/9

LOCATION: Fayette, AL, Crushing & Screening Line 2 (#52) PAGE 1 OF 3

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

TEST START TIME: 7:33 AM TEST STOP TIME: 8:41 AM

AMB. TEMP.: 40 FDB %RH: K: 1.11 Cp: 0.84 ΔHa: 1.79

BAR. PRESS.: 30.09 "Hg NOZZLE NO.: III

#2

#1

LEAK TESTS	TRAIN		PITOT	
	PRETEST	POSTTEST	PRETEST	POSTTEST
"WG	17	15		
SECs	60	60	✓	
METER IN	842.912	993.322		
METER OUT	842.912	993.324		

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	942.9	1.90	2.11	4.0	46	46	38	38	55	55
2		945.7	1.90	2.11	4.0	49	49	39	39	56	56
3		948.2	1.70	1.89	4.0	58	58	40	40	58	58
4		950.6	1.70	1.89	4.0	63	63	40	40	60	60
5		953.0	1.70	1.89	4.0	70	70	41	41	61	61
6		955.4	2.00	2.22	4.0	75	75	43	43	60	60
7		958.0	2.10	2.33	5.0	79	79	46	46	58	58
8		960.7	2.10	2.33	5.0	81	81	49	49	56	56
9		963.5	1.70	1.89	4.0	84	84	50	50	54	54
10		966.0	1.80	2.00	4.0	84	84	53	53	53	53
11		968.4	1.60	1.78	4.0	69	69	54	54	55	55
12		970.9	1.50	1.67	3.0	75	75	55	55	54	54
13		973.2	1.70	1.89	4.0	80	80	56	56	54	54
14		975.6	1.70	1.89	4.0	83	83	57	57	56	56
15		978.1	1.80	2.00	4.0	86	86	59	59	57	57
16		981.0	1.80	2.00	4.0	88	88	60	60	58	58
17		983.2	1.80	2.00	4.0	90	90	61	61	60	60
18		985.6	1.70	1.89	4.0	91	91	62	62	59	59
19		988.0	1.90	2.11	4.0	93	93	63	63	57	57
20	↓	990.6	1.80	2.00	4.0	94	94	63	63	57	57
		993.2									
		50.3	1.80	1.99		77		51		57	
		50.3	1.80	1.99			64				57

KCS

NOTES: 3.9" WG (mag. gage) across dry dust collector
5.0" WG (manometer) across reg. baghouse

COMPANY NAME: AMERICAN OLEAN CO. (#52) DATE TESTED: 10/16/91

LOCATION: PAYETTE AL. Crushing & Screening Line 2 PAGE 2 OF 3

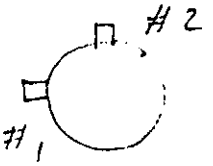
RUN NO.: 2 PORT NO.: 1 & 2 OPERATING RATE: _____

TEST START TIME: 9:24 AM TEST STOP TIME: 10:32 AM

AMB. TEMP.: 49 FDB %RH: 51 K: 1.11 Cp: 0.84 ΔHa: 1.79

BAR. PRESS.: 30.14 "Hg NOZZLE NO.: III

LEAK TESTS	TRAIN		PITOT	
	PRETEST	POSTTEST	PRETEST	POSTTEST
"WG	15	14	✓	
SECs	60	60		
METER IN	993.444	042.426		
METER OUT	993.444	042.428		



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	992.5	1.50	2.00	4.0	60	60	59	59	55	55
2		996.0	1.70	1.89	4.0	71	71	59	59	56	56
3		998.5	1.60	1.78	4.0	80	80	60	60	58	58
4		001.0	1.60	1.78	4.0	84	84	61	61	60	60
5		003.4	1.60	1.78	4.0	89	89	62	62	62	62
6		005.8	1.80	2.00	4.0	92	92	64	64	64	64
7		008.3	1.80	2.00	4.0	95	95	65	65	64	64
8		010.9	1.80	2.00	4.0	97	97	67	67	64	64
9		013.4	1.70	1.89	4.0	99	99	69	69	65	65
10		015.9	1.60	1.78	4.0	101	101	70	70	66	66
11		018.3	1.50	1.67	3.0	86	86	70	70	66	66
12		020.7	1.50	1.67	3.0	91	91	70	70	66	66
13		023.0	1.60	1.78	3.0	94	94	71	71	66	66
14		025.4	1.60	1.78	3.0	97	97	72	72	68	68
15		027.8	1.60	1.78	3.0	98	98	73	73	69	69
16		030.2	1.60	1.78	3.0	100	100	74	74	70	70
17		032.5	1.60	1.78	3.0	100	100	74	74	72	72
18		034.9	1.70	1.89	3.0	102	102	75	75	71	71
19		037.3	1.80	2.00	3.0	104	104	76	76	70	70
20		039.8	1.70	1.89	3.0	105	105	76	76	69	69
		042.3									
		18.8'	1.66'	1.85'		92'		68'		65'	
		48.8	1.66	1.85			80				65

KCS

NOTES: 3.8" WG ACROSS DRY DUST COLLECTOR

5.0" WG " " REGULAR BAGHOUSE

COMPANY NAME: AMERICAN OLEAN DATE TESTED: 10/16/91

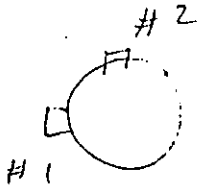
LOCATION: 4445 TTC AL. Crushing & Screening (#32) Line 2 PAGE 3 OF 3

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

TEST START TIME: 11:03 AM TEST STOP TIME: 12:08 PM

AMB. TEMP.: 57 FDB %RH: K: 1.015 Cp: 0.84 ΔHa: 1.79

BAR. PRESS.: 30.16 "Hg NOZZLE NO.: III



LEAK TESTS	TRAIN		PITOT	
	PRETEST	POSTTEST	PRETEST	POSTTEST
"WG	15	16	✓	
SECs	60	60		
METER IN	042.668	092.242		
METER OUT	042.668	092.247		

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	042.7	1.90	2.00	4.0	73	73	71	71	70	70
2		045.3	1.80	1.89	4.0	82	82	71	71	69	69
3		047.8	1.70	1.79	3.0	88	88	71	71	70	70
4		050.2	1.70	1.79	3.0	95	95	72	72	71	71
5		052.6	1.80	1.89	4.0	98	98	72	72	71	71
6		055.1	2.00	2.10	4.0	101	101	73	73	72	72
7		057.7	2.00	2.10	4.0	104	104	74	74	73	73
8		060.3	2.10	2.21	4.0	105	105	76	76	74	74
9		063.0	2.00	2.10	4.0	107	107	75	78	72	72
10		065.7	1.90	2.00	4.0	109	109	79	79	71	71
11		068.3	1.60	1.68	3.0	98	98	79	79	71	71
12		070.7	1.50	1.58	3.0	101	101	80	80	72	72
13		073.0	1.50	1.58	3.0	103	103	80	80	72	72
14		075.3	1.50	1.58	3.0	105	105	81	81	73	73
15		077.6	1.60	1.68	3.0	106	106	81	81	74	74
16		080.0	1.70	1.79	3.0	108	108	81	81	75	75
17		082.4	1.60	1.68	3.0	108	108	82	82	76	76
18		084.8	1.80	1.89	3.0	108	108	83	83	76	76
19		087.3	1.80	1.89	3.0	109	109	83	83	75	75
20		089.8	1.50	1.58	3.0	109	109	84	83	74	74
	✓	092.1									
		49.4	1.76	1.89			89				73

NOTES:

6.1" W.G.

4.1 W.G.

KCS

CLIENT: American Olean Tile Company DATE: 10-11-91

LOCATION: Fayette, AL SOURCE: Crushing & Screening Line #3 (#52)

Run Number 1

Nozzle Size 0.180 (1) 0.181 (2) 0.180 (3) 0.180 Average

O2 21 % CO2 0 % CO ____ %

Water:	In	Out	Color	Gain
cyclone	-0-	-0-		
impinger #1	100	100	little cloudy	
impinger #2	100	102	clear	
impinger #3	-0-	1	clear	
			Total	3 ml

Stack Temp.

							Average	

4TH Impinger Temperature (end of run): 48 deg. F

Silica Gel:	In	Out	Color	Gain in g
impinger #4	286.2 (GIB)	298.5	± 1/3 pink	12.3

Filter: Pretest Weight 0.6287 g Post-test Weight 0.6613 g Gain 0.0326 g

Wash: Desicated Weight 15.5317 g Container # 219 Weight 15.5269 g Gain 0.0048 g

0.0374

PPOC Form 101 (5/90)

BLH

CLIENT: American Olean Tile Company DATE: 10-16-91

LOCATION: Fayette, AL SOURCE: Crushing & Screening Line # (#52)

Run Number 2

Nozzle Size 0.180 (1) 0.180 (2) 0.180 (3) 0.180 Average

O2 21 % CO2 0 % CO ____ %

Water:	In	Out	Color	Gain
cyclone	-0-	-0-		
impinger #1	100	100	little cloudy	
impinger #2	100	103	clear	
impinger #3	-0-	1	clear	
		Total	4	ml

Stack Temp.

							Average	

4TH Impinger Temperature (end of run): 49 deg. F

Silica Gel:	In	Out	Color	Gain in g
impinger #4	287.0 (281.9)	298.5	± 1/3 pink	11.5

Filter: Pretest Weight 0.6253 g Post-test Weight 0.6657 g Gain 0.0404 g

Wash: Desicated Weight 15.5241 g Container # 220 Weight 15.5190 g Gain 0.0051 g

0.0455

PPOC Form 101 (6/90)

BLD

CLIENT: American Olean Tile Company DATE: 10.16.91

LOCATION: Fayette, AL SOURCE: Crushing & Screening Line # (#52)

Run Number 3

Nozzle Size .181 (1) .180 (2) .180 (3) .180 Average

O2 21 % CO2 0 % CO ____ %

Water:	In	Out	Color	Gain
cyclone	-0-	-0-		
impinger #1	100	100	Light colored	
impinger #2	100	104	Clear	
impinger #3	-0-	1	Clear	
			Total	5 ml

Stack Temp.

							Average	

4TH Impinger Temperature (end of run): 49 deg. F

Silica Gel:	In	Out	Color	Gain in g
impinger #4	275.2 (615)	286.6	+1/3 pink	11.4

Filter: Pretest Weight 0.6259 g Post-test Weight 0.6627 g Gain 0.0368 g

Wash: Desicated Weight 15.5194 g Container # 221 Weight 15.5134 g Gain 0.0060 g

0.0428

PPOC Form 101 (5/90)

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

$\overline{t_m}$, $\overline{T_m}$ = Average temperature of meter, ^oF, ^oR

$\overline{t_s}$, $\overline{T_s}$ = 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

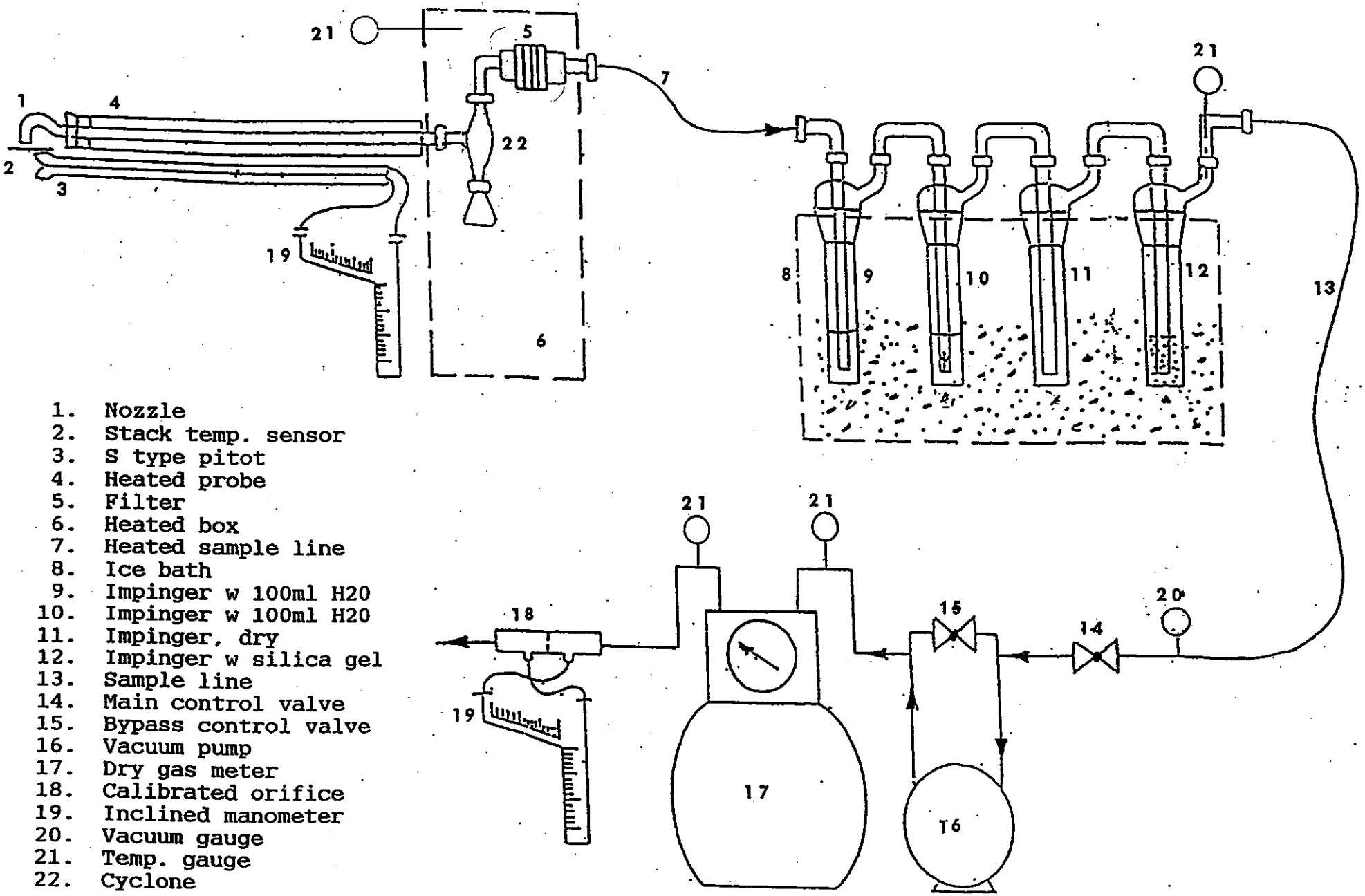
Δp = Velocity head of stack gas, in. H_2O

$\overline{\sqrt{\Delta p}}$ = 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

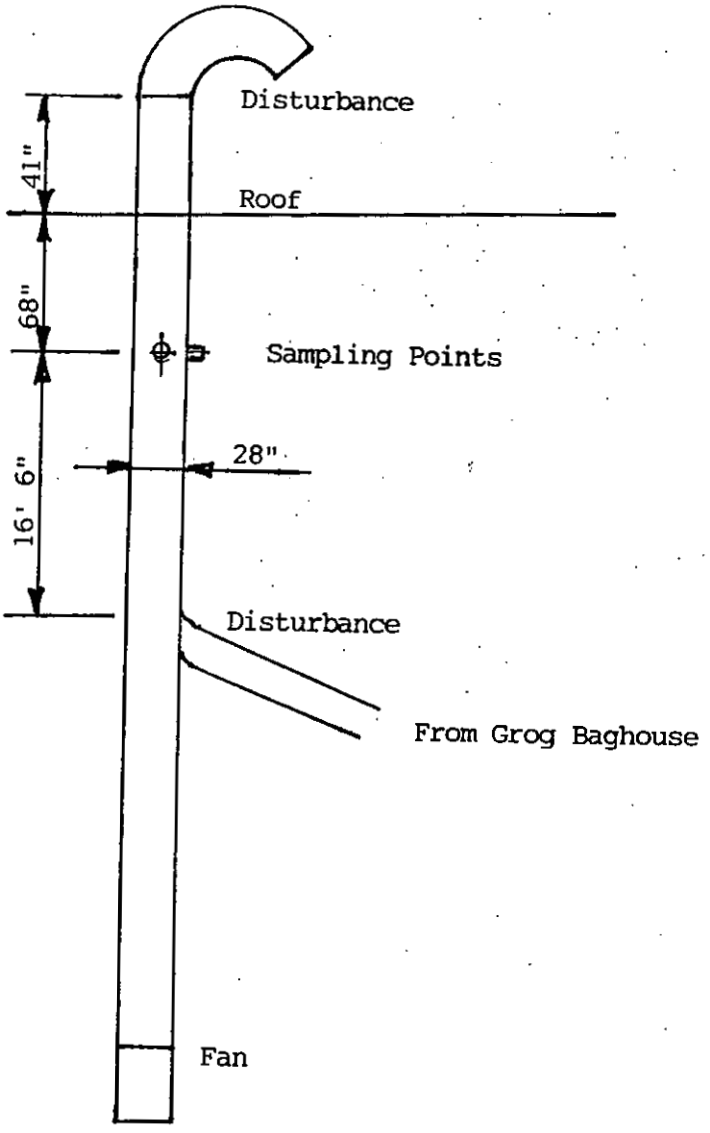
Pensacola P.O.C., Inc.
109 S. Second Street
Pensacola, FL 32507

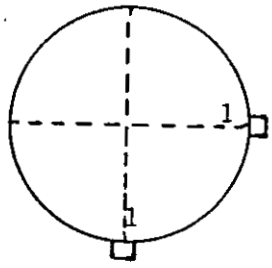
EPA METHOD 5, PARTICULATE SAMPLING TRAIN

Client : American Olean Tile Company

Location : Fayette, AL

Source : Crushing & Screening Line #2 (#52)





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	0 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)

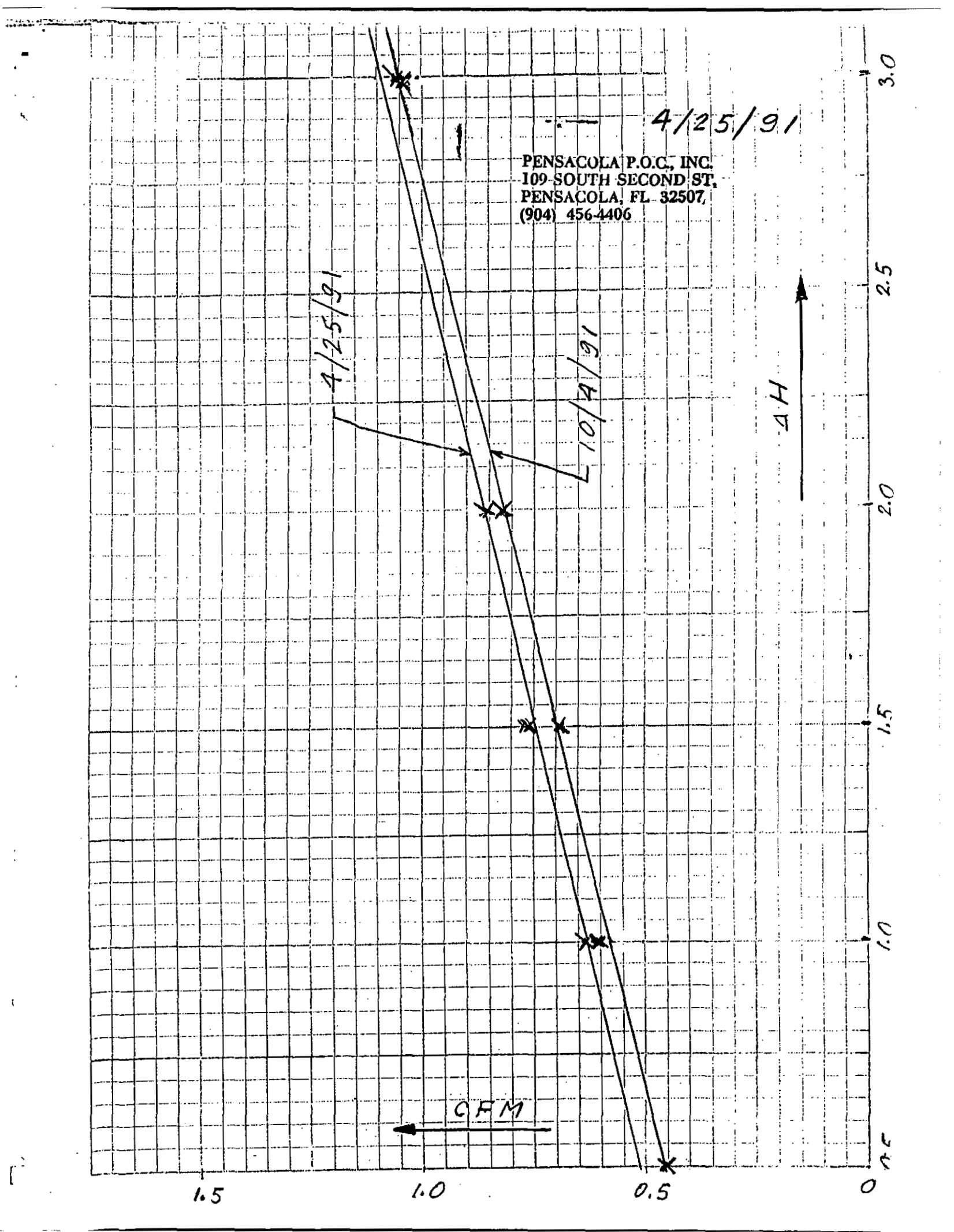
NAME: Pensacola P.O.C., Inc.

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
CFM
3.0
2.5
2.0
1.5
1.0
1.5
1.0
0.5
0

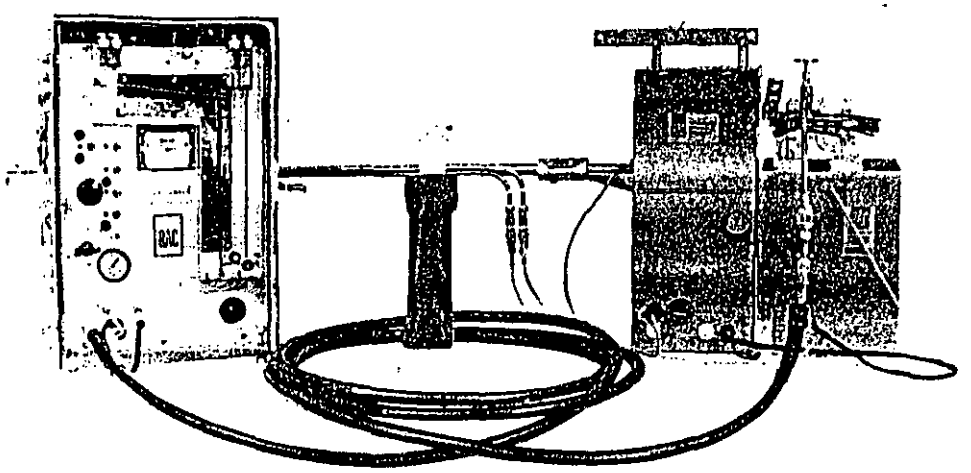
DESCRIPTION, OPERATING INSTRUCTIONS, AND PROCEDURES

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 temper*ature 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 assem*bly, 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

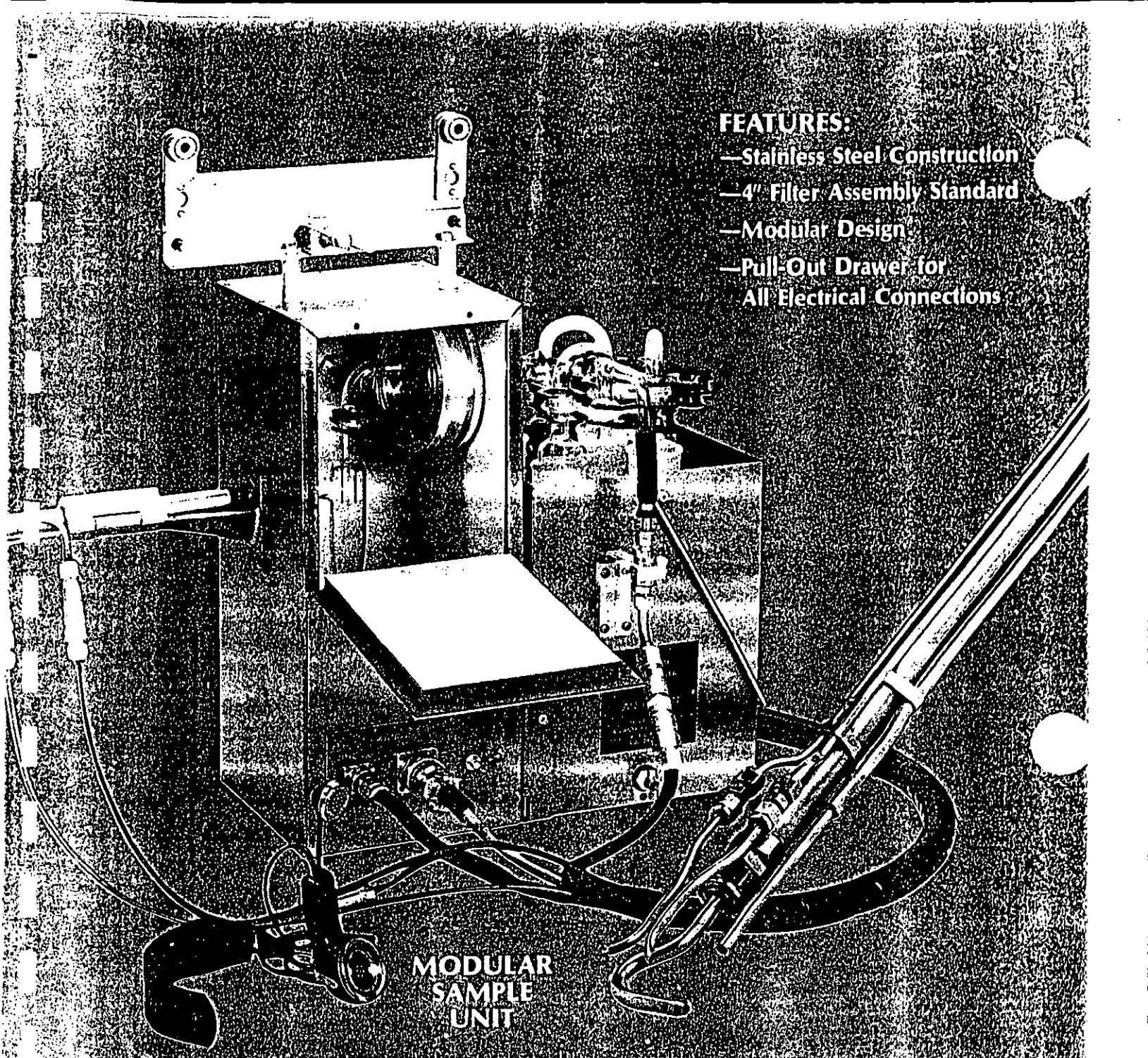
The RAC Staksamplr System takes accurate, low cost, isokinetic samples of the effluents (particulates, gases, vapors or mists) in the emissions from chemical and combustion processes. This efficient, flexible system samples all gas stream effluents in accordance with **Environmental Protection Agency (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.



FEATURES:

—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
Method 7 NOx Sampling Trains
High Volume (HVSS) Stack Trains
[illegible] Stack Sampling Trains
[illegible] Filter Assemblies
Aluminum Thimble Assemblies
Paper Thimble Assemblies
Standard Pitot Tubes
S-Type Pitot Tubes
Condensers
Dry Gas Meters
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HCSS Heavy Grain Loading Impactor
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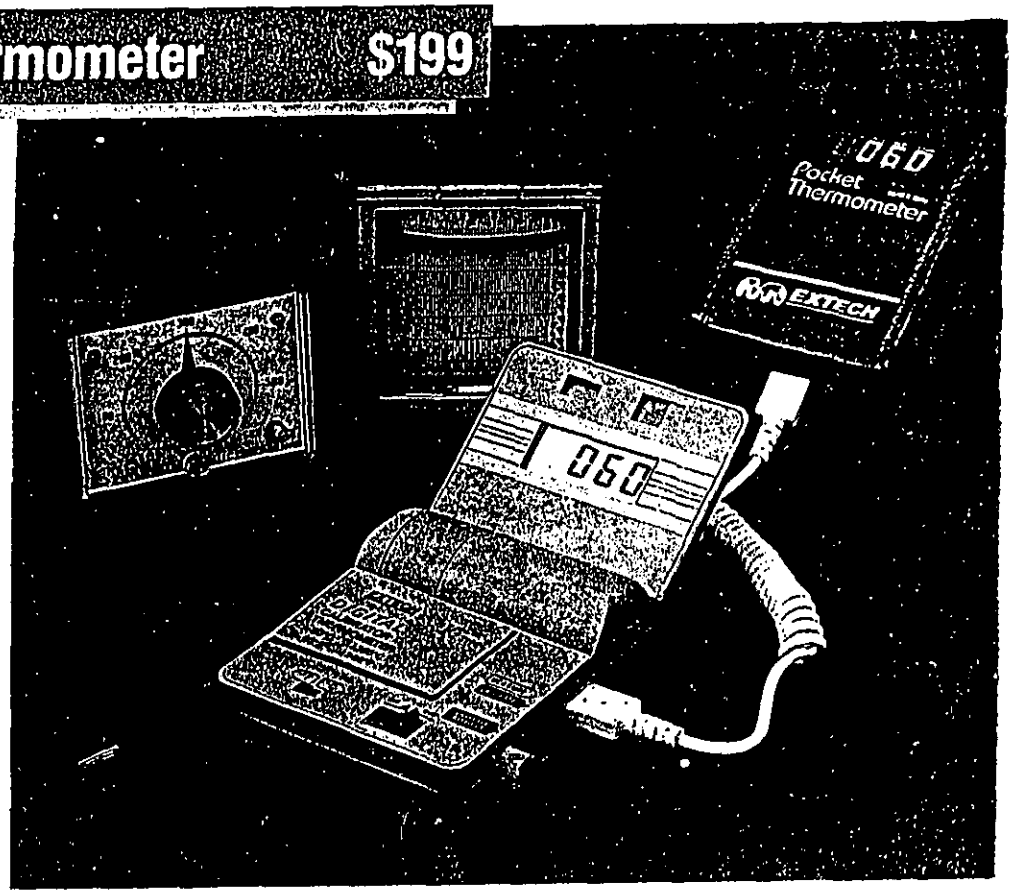
4215 Wendell Drive, Atlanta, Georgia 30336 (404) 691-1910 Telex 54-2523

Calibrate J or K thermocouple devices. . .and measure temperatures

Oyster Calibrator/Thermometer $199



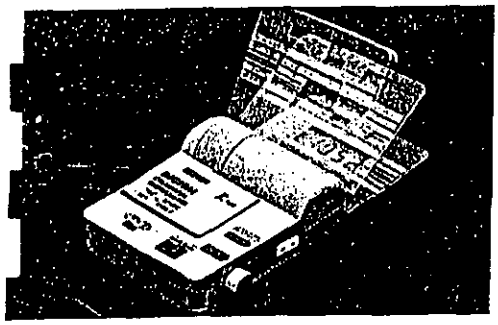
. ıccurate to 0.2% and switchable from °C to °F.

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

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

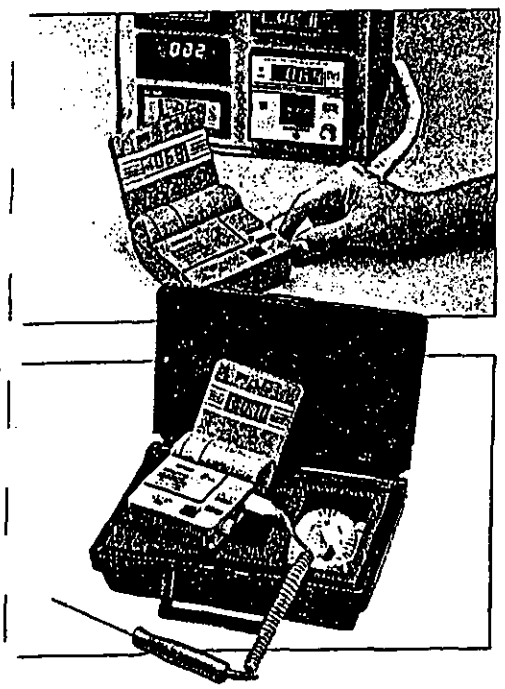
Accuracy plus. Automatic Cold Junction ompensation and linearization provide ac- *curacy* better than ± 0.2% of reading.

NBS Certificate. A Certificate of Traceability) the National Bureau of Standards calibration ı 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

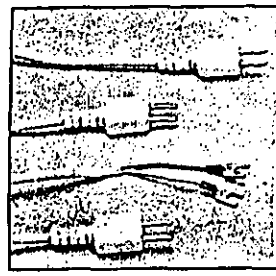
Complete kit includes meter, General Purpose *Temperature* Probe, Thermometer Calibration Cable (order Process Cable separately, see below), battery and carrying case.

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 thermocouple 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. 2273-6A88

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

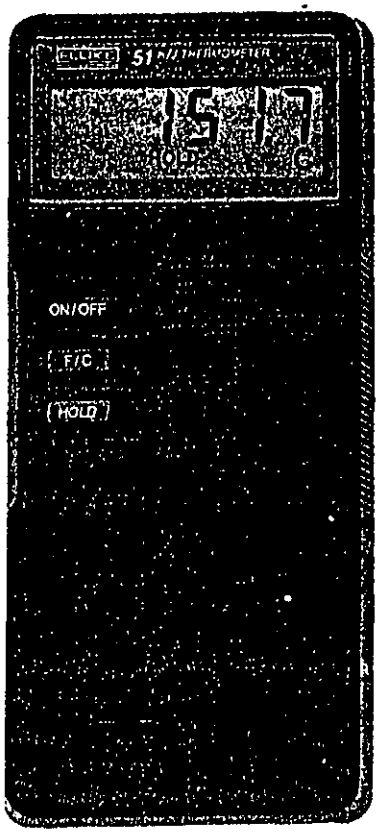
These hand-held digital thermocouple indicators, *representing the latest in* temperature-measurement technology, are ideal for plant maintenance, production maintenance, process control, and HVAC-R applications.

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.

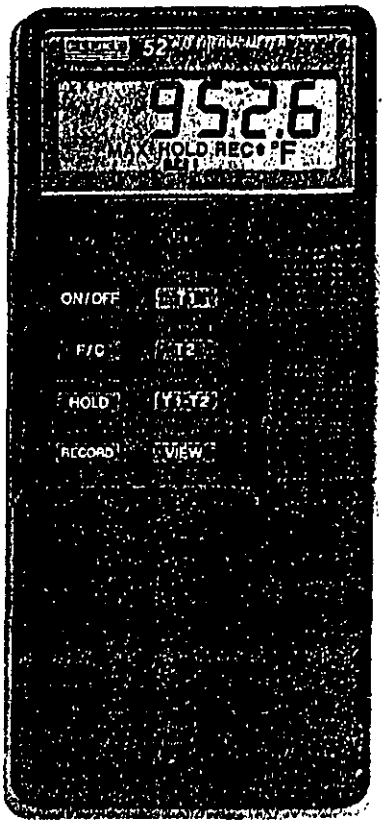
An automatic, 2-second self-test checks all of the critical functions and the battery when the unit is turned on. Switch from Celsius to Fahrenheit at the touch of a button. With another button, freeze the displayed value for viewing at your convenience.

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

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

Specifications

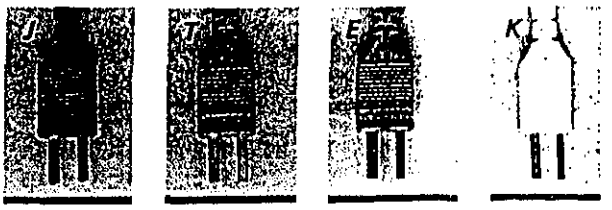
Range	
Type J Thermocouple	-328 to 1400°F (-200 to 760°C)
Type K Thermocouple:	-328 to 2498°F (-200 to 1370°C)
Resolution	
High:	0.1°C or 0.2°F
Low:	1°C or 1°F
Accuracy	
Type J Thermocouple:	±(0.1% of reading + 1.4°F)
	±(0.1% of reading + 0.8°C)
Type K Thermocouple:	±(0.1% of reading + 1.3°F)
	±(0.1% 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.

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

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.

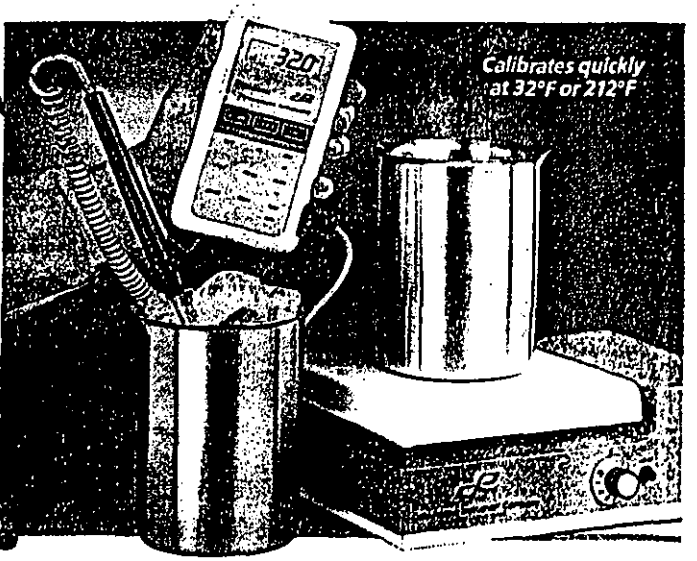
L-08520-10 Clear window carrying case $20.00

Specifications

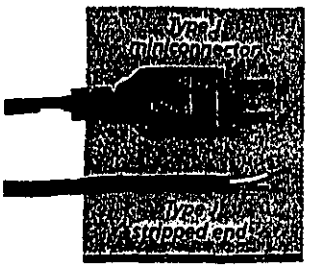
Ranges (NIST)[1] J: −310 to 1832°F (−190 to 1000°C)
K: −418 to 2507°F (−250 to 1375°C)
T: −418 to 752°F (−250 to 400°)
E: −418 to 1652°F (−250 to 900°C)

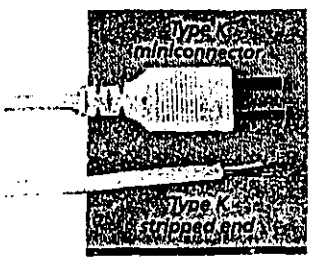
Accuracy: ±0.1% of rdg, ±0.8°F (0.4°C) above −238°F (−150°C)
Differential (ΔT) accuracy: ±0.3°C
Resolution: 0.1/1°F or C switchable; autoranging to 1° above 999.9°
Display: 4 digit LCD Output: none
Power: one 9V battery (included) Low battery signal: yes
Battery life: approximately 100 hours of continuous operation
Dimensions: 3⅜" x 6⅜" x 1⅛" Shpg wt: 1 lb (0.5 kg)

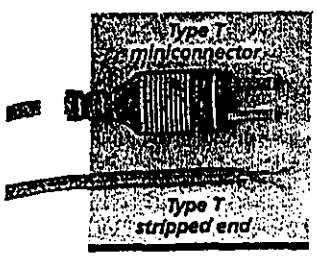
[1]National Institute of Standards and Technology, formerly National Bureau of Standards (NBS).
[2]Range for type E will extend to 1000°C with accuracy of 0.2% of reading.

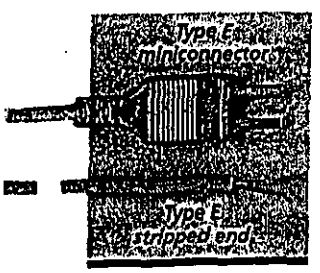


Integral-handle Type J, K, T, and E









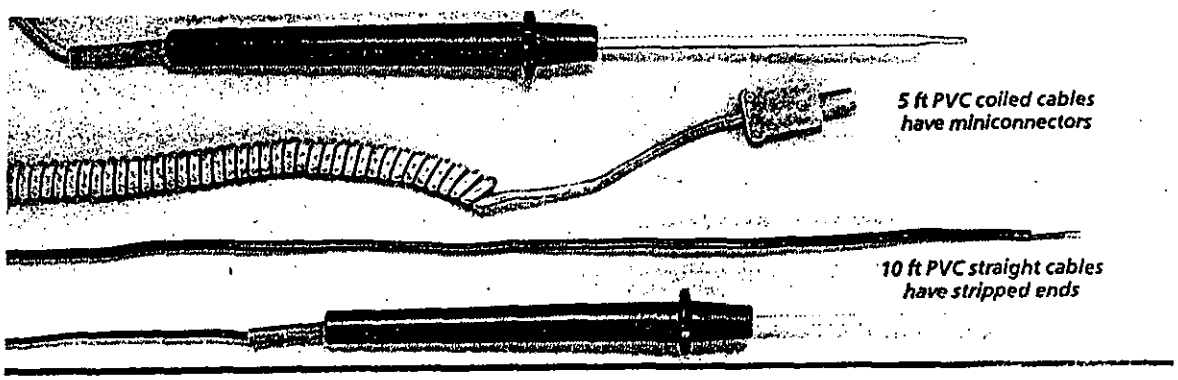
- *Durable 5½" long glass-filled nylon handles*
- *Choose 5 ft coiled cables with miniconnectors or 10 ft straight cables with stripped ends*

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:

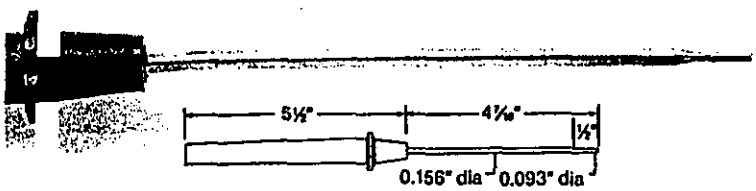
10% on orders of 6-10 probes in any assortment; 15% on orders of 11-24 probes; and 20% on orders of 25-50. Call us for applicable discount on larger orders.

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

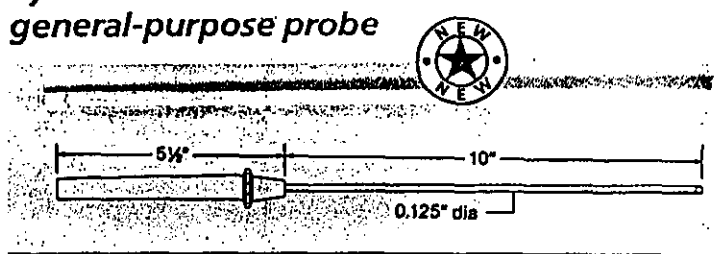
A) General-purpose probe



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

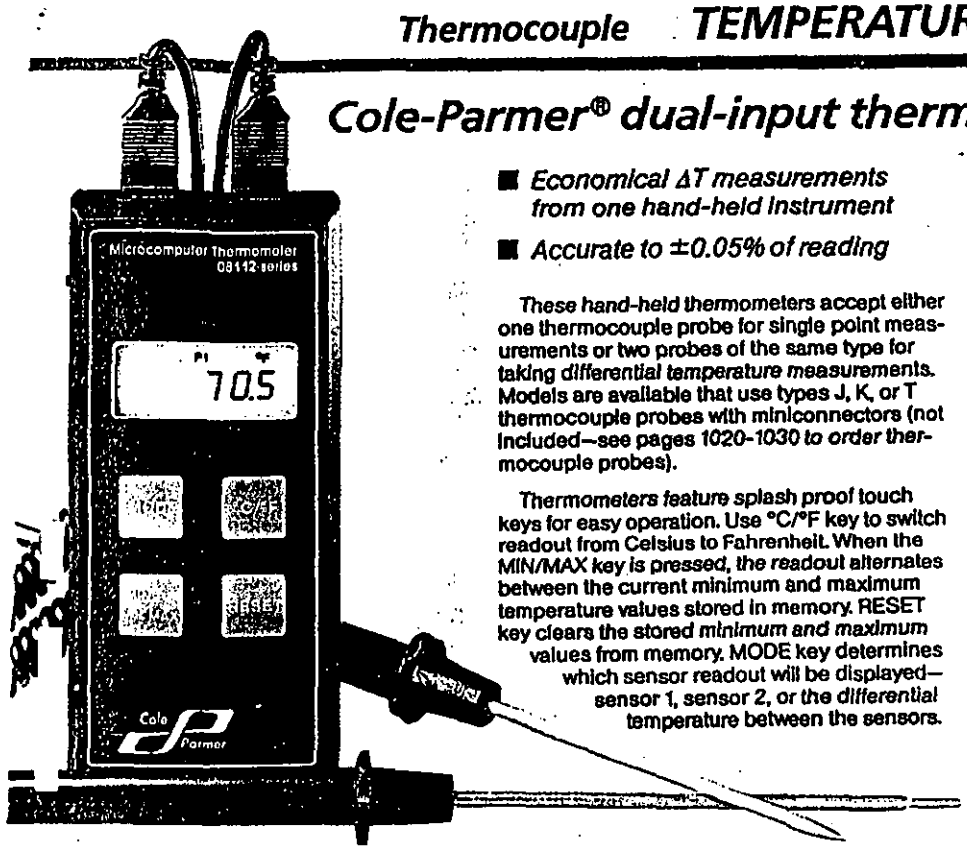
B) New Teflon®-coated general-purpose probe



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 1⅜₁₆"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*

is NIST¹-traceable type T thermocouple th nometer 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 o type T thermocouple probe with minicon- n or. Order probes separately on pages 1( )-1030.

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

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

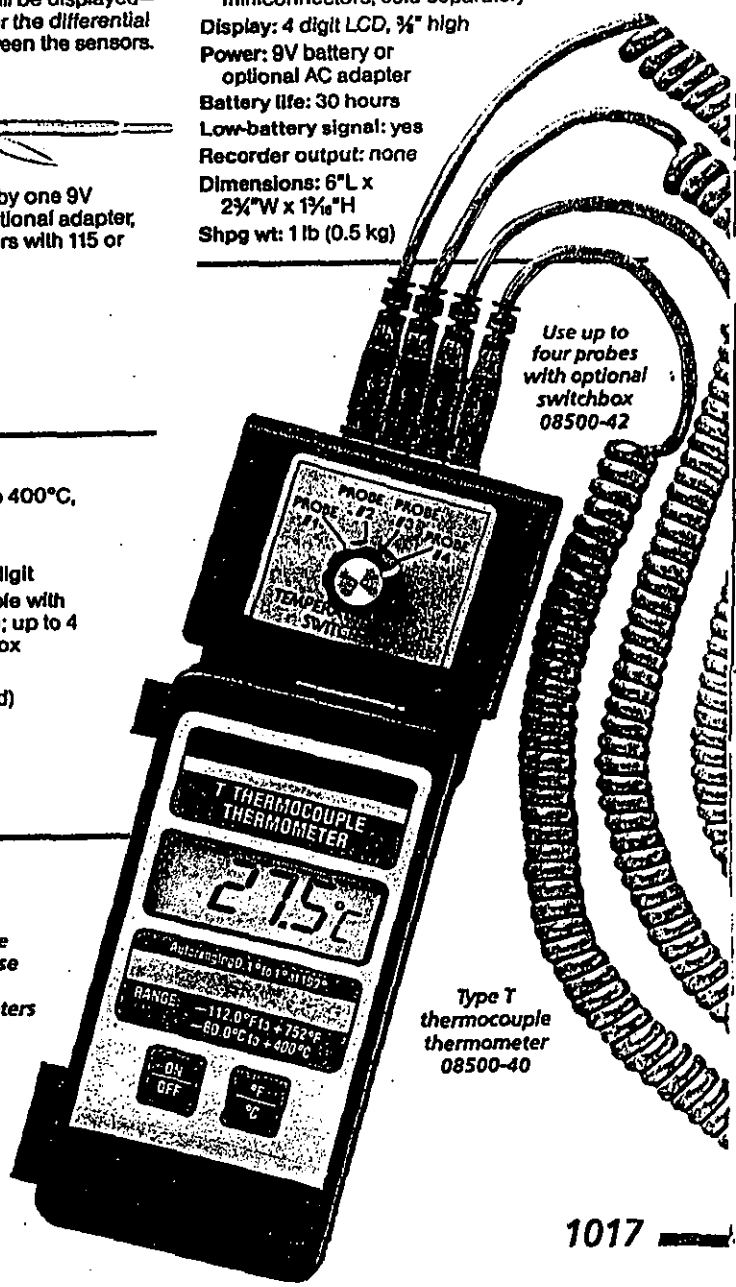
L 8500-40 Type T thermocouple thermometer v multiple input option $129.00
L 8500-42 Four probe switchbox $89.00
L-09376-04 Replacement batteries, 9V.
Pack of 4 . . . . . $9.30/pk

¹ ional Institute of Standards and Technology, formerly f onal 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

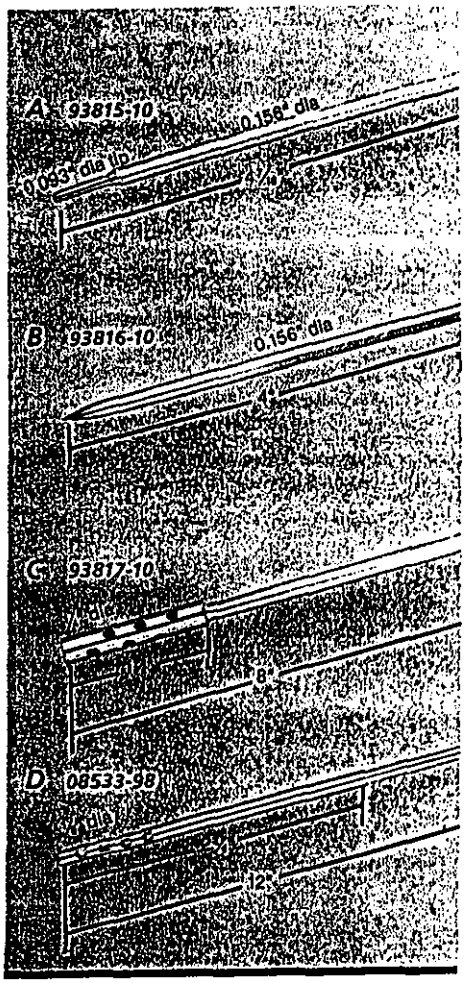
Type T thermocouple thermometer 08500-40

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.

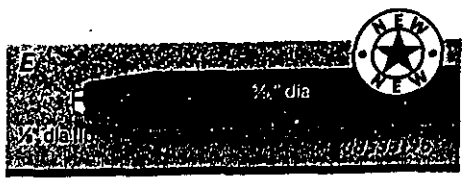
Type	Max temp	Cat. no.	Price
K	932°F (500°C)	L-08533-98	$94.00
E		L-08533-99	94.00

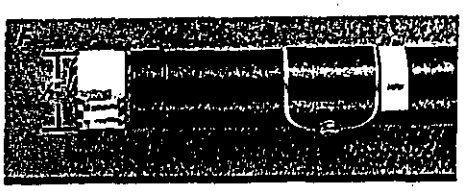
New surface probes

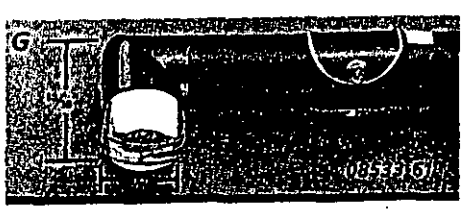
E, F) Straight surface probes

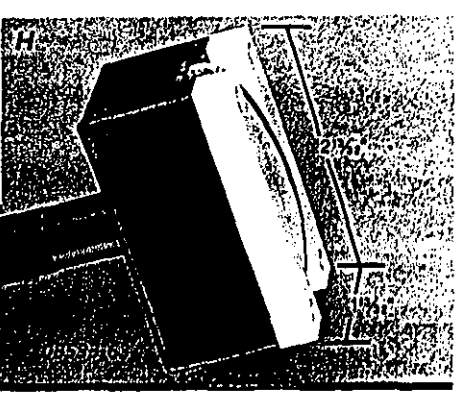
For small-scale applications. With 3 ft PVC straight cable. Probes with ½" diameter tip have Teflon* guard. Time constant: 0.1 second for ¼" dia models; 0.2 second for ½" dia models.

Type	Max temp	Cat. no.	Price
E) New ¼" 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.

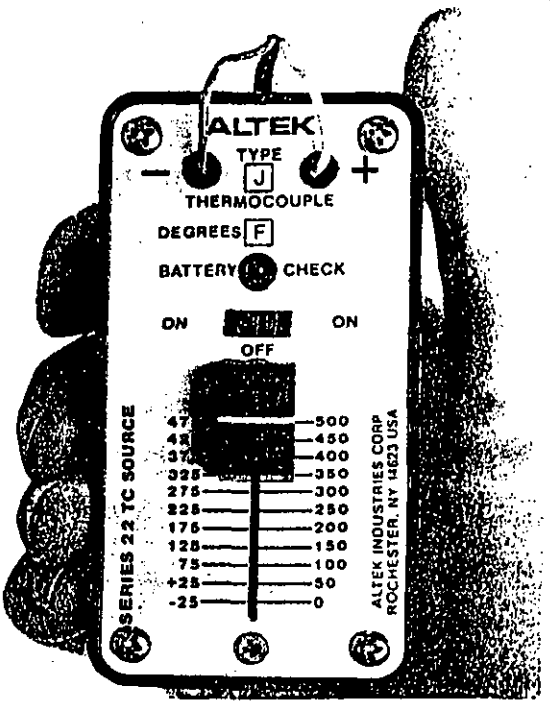
Type	Max temp	Cat. no.	Price
J	482°F (250°C)	L-08533-69	$193.00
K		L-08533-63	170.00

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.

WARRANTY:

Our equipment is guaranteed against defective material and workmanship for a period of three years from date of shipment.

Claims under guarantee can be made by returning the equipment prepaid to our factory. The equipment will be replaced, repaired or adjusted at our option.

The liability of Altek is restricted to that given under our guarantee. No responsibility is accepted for damage, loss or other expense incurred through sale or use of our equipment. Under no condition shall Altek be liable for any special, incident or consequential damage.

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) 334-6673

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

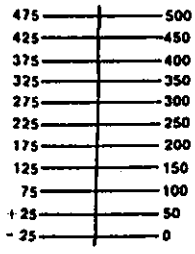
Battery Indicator:
LED light pulse at turn-on in either range

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

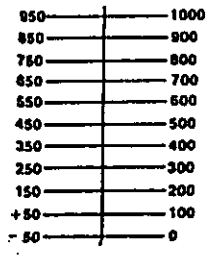
Weight:
6 oz. (0.15 kg)

Optional Carrying Case:
Zippered, with belt loop -

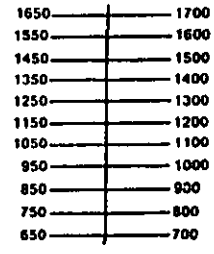
SERIES 22 STANDARD RANGES (FOR OTHER RANGES & TC TYPES CONSULT FACTORY)



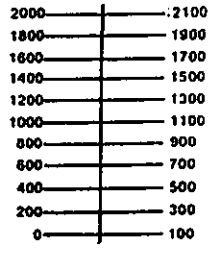
TYPE E,J,K,T DEGREES F
TYPE E,J,K,T DEGREES C



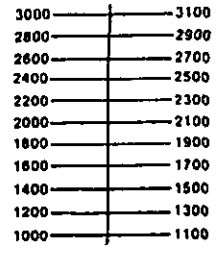
TYPE E,J,K DEGREES F
TYPE E,J,K DEGREES C



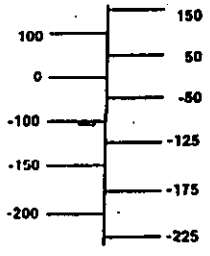
TYPE B,R,S
DEGREES C



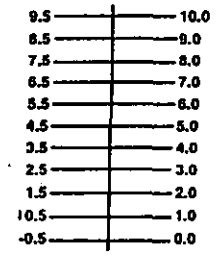
TYPE J,K
DEGREES F



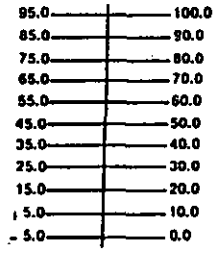
TYPE B,R,S
DEGREES F



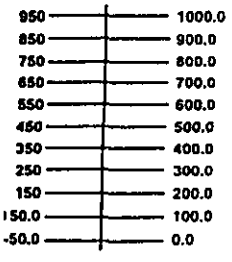
11 POSITION
CRYOGENIC SOURCE
TYPE T DEGREE C
22T150C



±0.1%
10 MILLIVOLT SOURCE
22MV10



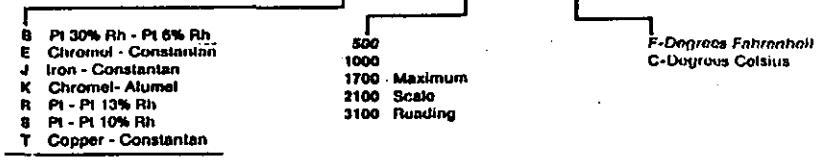
±0.1%
100 MILLIVOLT SOURCE
22MV100



±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) 334-6573
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 OR 680987 PAGE 2 TIME 17:00 DATE 10/08/91

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

SHIP 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	60R-8-8D% 32011-0	1LT	1	1		ACETONE, 99.5+%, A.C.S. REAGENT FLAMMABLE LIQUID			
		** SHIP BY IATA ONLY **				RQ 3000LB/2270KG FP 1 LABEL = FLAMMABLE LIQUID PSN = ACETONE, UN 1090 HZ CLASS 3.0 AP = 305,II 5.0L AC = 307,II 6 IB = GLASS BOTTLE CLEANING FOR AIR POLUTION TESTING			

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

5 62