APPENDIX H

CALIBRATION DATA

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 48222
Project No.: 05-53192-004

Customer

TRC ENVIRONMENTAL
DONNA SOLDEN
5 WATERSIDE CROSSING
RECEIVING DEPARTMENT
WINDSOR CT 06095

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM024363 **Certification Date:** 22Mar2007 **Exp. Date:** 21Mar2010
Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	247.1	PPM	+/- 1%	Direct NIST and NMi
AIR		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2753	05Jul2010	SG871418NB	495.1 PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/7506	23Mar2007	TCD/FID

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

METHANE

Date: 23Mar2007	Response Unit:AREA	
Z1 = 0.00000	R1 = 37869382	T1 = 1877481.
R2 = 3769187.	Z2 = 0.00000	T2 = 1876711.
Z3 = 0.00000	T3 = 1876679.	R3 = 3761566.
Avg. Concentration:	247.1	PPM

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999998

Constants:	A = 0.540387
B = 0.000131	C = 0
D = 0	E = 0

APPROVED BY: _____

Scott Specialty Gases AIR LIQUIDE

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OMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

Returned ?

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 49737
Project No.: 05 -69045 -003

Customer
TRC ENVIRONMENTAL
DONNA SOLDEN
5 WATERSIDE CROSSING
RECEIVING DEPARTMENT
WINDSOR CT 06095

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM036386 **Certification Date:** 03Oct2008 **Exp. Date:** 03Oct2011
Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	446.1 PPM	+/- 1%	Direct NIST and NMi
AIR	BALANCE		

** Do not use when cylinder pressure is below 150 psig.
* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2753	05Jul2010	SG871418NB	495.1 PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/7506	17Sep2008	TCD/FID

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis
METHANE
Date: 03Oct2008 Response Unit: AREA
Z1=0.00000 R1=447432.0 T1=403313.0
Z2=447867.0 Z2=0.00000 T2=403673.0
Z3=0.00000 T3=403359.0 R3=447683.0
Avg. Concentration: 446.1 PPM

Second Triad Analysis

Calibration Curve
Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999999846
Constants: A=0.266253685
B=0.001117591 C=0
D=0 E=0

QUALITY ASSURANCE

APPROVED BY: ROBERT LESNIAK
(signature on file)

AIR LIQUIDE
Scott Specialty Gases
Air Liquide America Specialty Gases LLC

ACUBLEND MASTER CLASS

Single-Certified Calibration Standard

2330 HAMILTON BOULEVARD, SOUTH PLAINFIELD, NJ 07080 Phone: 908-754-7700 Fax: 908-754-7303

CERTIFICATE OF ACCURACY: Acublend Master Class Calibration Standard

Product Information
Project No.: 07-83092-006
Item No.: 07022712 VAL
P.O. No.: 49331

Cylinder Number: ALM062299
Cylinder Size: AL
Certification Date: 31Mar2008
Expiration Date: 31Mar2010

Customer

TRC ENVIRONMENTAL
DONNA SOLDEN
5 WATERSIDE CROSSING
RECEIVING DEPARTMENT
WINDSOR, CT 06095

APR 16 2008

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)	Accuracy (+/-%)
METHANE	900.0 PPM	1
AIR	BALANCE	

TRACEABILITY

Description	Traceability Type	Traceable To
ANALYTICAL TRACEABILITY	GAS STANDARDS	SRS

APPROVED BY: H Conza
HERNAN

DATE: 4/2/08

AIR LIQUIDE

Scott Specialty Gases
Air Liquide America Specialty Gases LLC

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 49300
Project No.: 05-62733-014

Customer

TRC ENVIRONMENTAL

ATTN: ACCOUNTS PAYABLE
21 GRIFFIN ROAD NORTH
WINDSOR CT 06095

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM051251 **Certification Date:** 18Feb2008 **Exp. Date:** 17Feb2011
Cylinder Pressure*:** 1800 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	2,480	PPM	+/- 2%	NIST and NMi
AIR		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1000	01Jul2011	K005406	1001. PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/FIA-220/G05000JAS	15Feb2008	FLAME IONIZATION

APPROVED BY: _____
ROBERT LESNIAK

AIR LIQUIDE™ Scott Specialty Gases
Air Liquide America Specialty Gases LLC

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 49300
Project No.: 05-62733-013

Customer

TRC ENVIRONMENTAL

ATTN: ACCOUNTS PAYABLE
21 GRIFFIN ROAD NORTH
WINDSOR CT 06095

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM049930 **Certification Date:** 18Feb2008 **Exp. Date:** 17Feb2011
Cylinder Pressure*:** 1800 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	4,480	PPM	+/- 2%	NIST and NMi
AIR		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1000	01Jul2011	K005406	1001. PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/FIA-220/G05000JAS	15Feb2008	FLAME IONIZATION

APPROVED BY: _____
ROBERT LESNIAK

AIR LIQUIDE™ Scott Specialty Gases
Air Liquide America Specialty Gases LLC

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 49300
Project No.: 05-62733-012

Customer

TRC ENVIRONMENTAL

ATTN: ACCOUNTS PAYABLE
21 GRIFFIN ROAD NORTH
WINDSOR CT 06095

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM013180 **Certification Date:** 18Feb2008 **Exp. Date:** 17Feb2011
Cylinder Pressure*:** 1450 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	8,960	PPM	+/- 2%	NIST and NMi
AIR		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1000	01Jul2011	K005406	1001. PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/FIA-220/G05000JAS	15Feb2008	FLAME IONIZATION

APPROVED BY: ROBERT LESNIAK

TRC Environmental

EPA Method 5 - Meter Box Calibration

3-Point, English Units

Meter Console Information	
Console Model Number	MST-C1
Console Serial Number	90540
DGM Model Number	ME-1
DGM Serial Number	28515

Calibration Conditions	
Date	6-Apr-09
Barometric Pressure	29.74 in Hg
Theoretical Critical Vacuum[1]	14.04 in Hg
Calibration Technician	Frank Pike IV

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K_1	17.647 °R/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 \times °R^{1/2})/(in.Hg \times min)$.

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above[2]	°F	°F	in Hg
5.0	0.60	75.400	77.648	62	62	48	0.3483	63	63	15.0
5.0	1.10	77.723	80.696	62	63	55	0.4610	63	63	15.0
5.0	1.80	80.902	84.725	63	65	63	0.5902	63	63	15.0

Results								
Standardized Data				Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate	ΔH @	
				Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
2.264	0.453	2.265	0.453	1.001	0.001	0.453	1.660	-0.053
2.994	0.599	2.998	0.600	1.001	0.001	0.600	1.740	0.027
3.846	0.769	3.838	0.768	0.998	-0.002	0.768	1.738	0.025
>retest Gamma——>	0.9975	% Deviation——>	0.2	0.9998	<——Y Average		1.713	<——ΔH@ Average

q

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature: _____ Date: 4/6/09

TRC Environmental

EPA Method 5 - Meter Box Calibration

3-Point, English Units

Meter Console Information	
Console Model Number	MST-C1
Console Serial Number	90540
DGM Model Number	ME-1
DGM Serial Number	28515

Calibration Conditions	
Date	13-Jun-09
Barometric Pressure	29.91 in Hg
Theoretical Critical Vacuum[1]	14.12 in Hg
Calibration Technician	Frank Pike IV

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K_1	17.647 °R/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 \times {}^oR^{1/2})/(in.Hg \times min)$.

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min	in H_2O	cubic feet	cubic feet	°F	°F		see above[2]	°F	°F	in Hg
5.0	0.60	415.000	417.280	72	73	48	0.3483	72	72	15.0
5.0	1.10	417.357	420.376	73	73	55	0.4610	72	72	15.0
5.0	1.80	420.651	424.528	73	74	63	0.5902	72	72	15.0

Results								
Standardized Data				Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate	ΔH @	
				Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$)	($Q_{m(std)}$)	($Vcr_{(std)}$)	($Q_{cr(std)}$)	(Y)	(ΔY)	($Q_{m(std)(corr)}$)	(ΔH@)	(ΔΔH@)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O	
2.263	0.453	2.258	0.452	0.998	0.002	0.452	1.646	-0.053
2.998	0.600	2.989	0.598	0.997	0.001	0.598	1.725	0.026
3.853	0.771	3.827	0.765	0.993	-0.003	0.765	1.727	0.027
Pretest Gamma—>	0.9998	% Deviation—>	0.4	0.9960	<—Y Average		1.699	<—ΔH@ Average

q

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

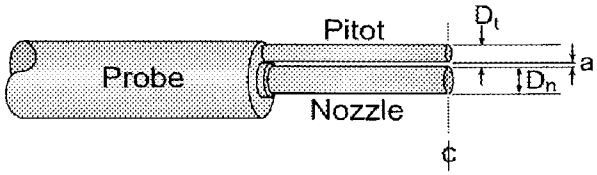
I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature: _____ Date: _____

S-Type Pitot Geometric Calibration
Part 1 - Probe Configuration

TRC Probe Identification	P3-1 (mini)
Technical Specialist	Steve Boyko
Date	July 29, 2008

A.

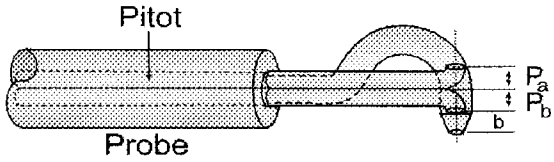


D_t = 0.255

D_n = na

a = na

B.

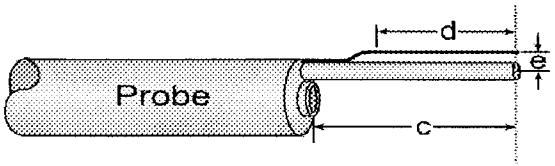


P_a = 0.310

P_b = 0.312

b = na

C.



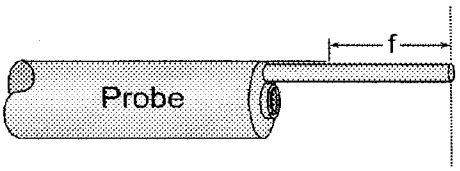
c = 3.150

d = na

e = na

OR

D.



OR

c = 3.150

f = 2.200

Specifications (EPA Method 2)

D_t = 3/16" to 3/8"	$c \geq 3"$	$P_a = P_b$
D_n = 1/2"	$d \geq 3"$	
$a \geq 3/4"$	$e \geq 3/4"$	$1.05\ D_t \leq P \leq 1.50\ D_t$
$b \geq 0$	$f \geq 2"$	

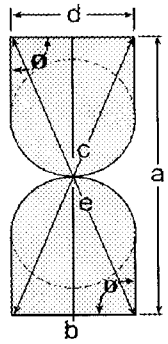
If these specifications are met, proceed with Part 2 Pitot alignment.

S-Type Pitot Geometric Calibration
Part 2 - Pitot Alignment

TRC Probe Identification: P3-1 (mini)
Technical Specialist: Steve Boyko
Date: July 29, 2008

A. Transverse Tube Axis

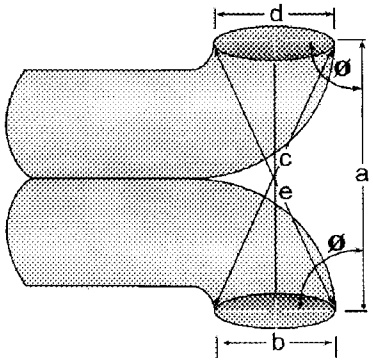
($80^\circ < Ø < 100^\circ$)
($80^\circ < Ø' < 100^\circ$)



a =	0.622
b =	0.250
c =	0.664
d =	0.250
e =	0.666
Ø =	88.4
Ø' =	88.9

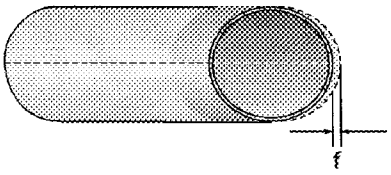
B. Longitudinal Tube Axis

($85^\circ < Ø < 95^\circ$)
($85^\circ < Ø' < 95^\circ$)

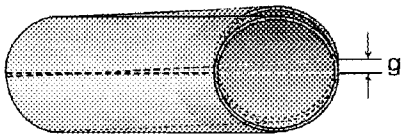


a =	0.622
b =	0.408
c =	0.738
d =	0.406
e =	0.739
Ø =	89.0
Ø' =	89.4

C. (f < 1/8") or 0.1625



D. (g,1/32") or 0.03125



f =	0.015
g =	0.020

Pitot Calibration = good

NOTE: Values in parentheses are EPA Method 2 Specifications.

Probe Thermocouple Calibration

			Tolerance °R = °F + 460	
Thermocouple Identification	P3-1			
Expected Stack Temperature(T_s)		°R	% Change	Allowable
Reference Thermometer(T_{ref}) boiling pt	575	°R		
Thermocouple Readout	573	°R	0.35%	1.50%
Reference Thermometer(T_{ref}) freezing pt	492	°R		
Thermocouple Readout	492	°R	0.00%	1.50%

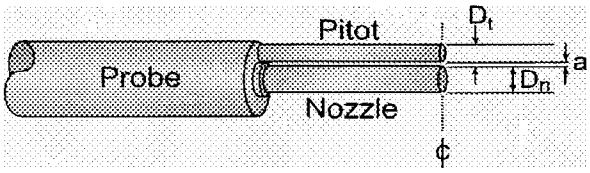
Technician: Steve Boyko Date: 29-Jul-08

Reviewed By: _____ Date: 29-Jul-08

S-Type Pitot Geometric Calibration
Part 1 - Probe Configuration

TRC Probe Identification	P3-1 (mini)
Technical Specialist	Steve Boyko
Date	June 15,2009

A.

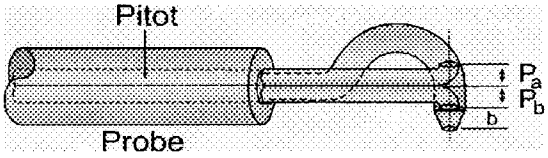


D_t = 0.253

D_n = na

a = na

B.

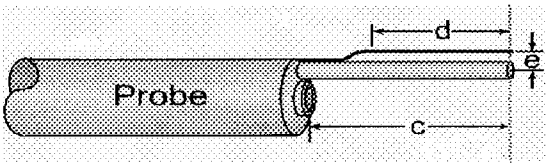


P_a = 0.311

P_b = 0.312

b = na

C.



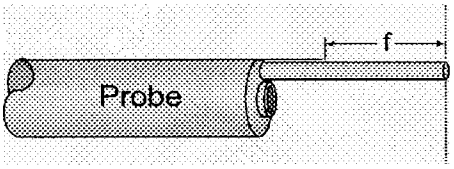
c = 3.150

d = na

e = na

OR

D.



OR

c = 3.100

f = 2.150

Specifications (EPA Method 2)

D_t = 3/16" to 3/8"	$c \geq 3"$	$P_a = P_b$
D_n = 1/2"	$d \geq 3"$	
$a \geq 3/4"$	$e \geq 3/4"$	$1.05\ D_t \leq P \leq 1.50\ D_t$
$b \geq 0$	$f \geq 2"$	

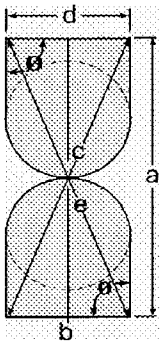
If these specifications are met, proceed with Part 2 Pitot alignment.

S-Type Pitot Geometric Calibration
Part 2 - Pitot Alignment

TRC Probe Identification: P3-1 (mini)
Technical Specialist: Steve Boyko
Date: June 15,2009

A. Transverse Tube Axis

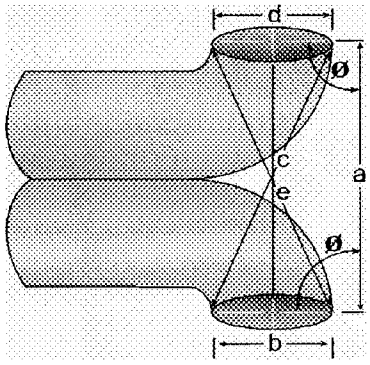
($80^\circ < Ø < 100^\circ$)
($80^\circ < Ø' < 100^\circ$)



a =	0.623
b =	0.250
c =	0.664
d =	0.250
e =	0.665
Ø =	88.2
Ø' =	88.5

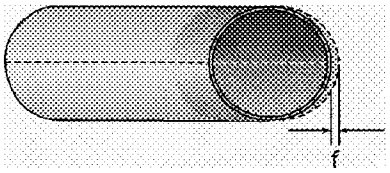
B. Longitudinal Tube Axis

($85^\circ < Ø < 95^\circ$)
($85^\circ < Ø' < 95^\circ$)

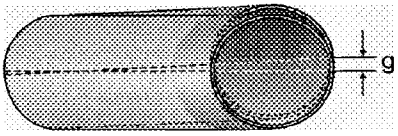


a =	0.623
b =	0.408
c =	0.738
d =	0.406
e =	0.742
Ø =	88.9
Ø' =	89.7

C. (f < 1/8") or 0.1625



D. (g,1/32") or 0.03125



f =	0.015
g =	0.020

Pitot Calibration = good

NOTE: Values in parentheses are EPA Method 2 Specifications.

Probe Thermocouple Calibration

Tolerance
$^\circ R = {}^\circ F + 460$

			% Change	Allowable
Thermocouple Identification	P3-1			
Expected Stack Temperature(T_s)		°R		
Reference Thermometer(T_{ref}) boiling pt	575	°R		
Thermocouple Readout	573	°R	0.35%	1.50%
Reference Thermometer(T_{ref}) freezing pt	492	°R		
Thermocouple Readout	492	°R	0.00%	1.50%

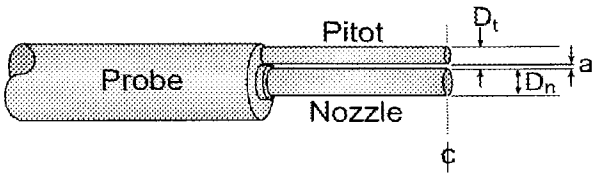
Technician: Steve Boyko Date: June 15,2009

Reviewed By: _____ Date: June 15,2009

S-Type Pitot Geometric Calibration
Part 1 - Probe Configuration

TRC Probe Identification	P3-2
Technical Specialist	Steve Boyko
Date	August 4, 2008

A.

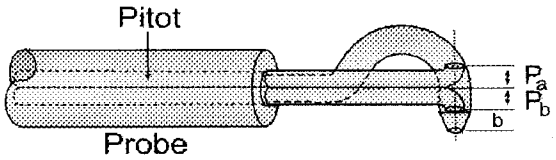


D_t = 0.372

D_n = na

a = na

B.

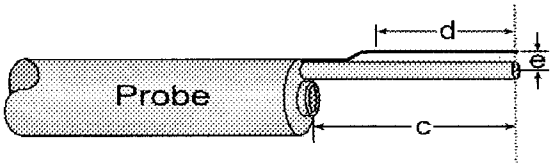


P_a = 0.460

P_b = 0.432

b = na

C.



c = 3.150

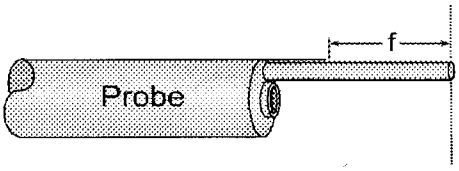
d = na

e = na

OR

OR

D.



c = 37.500

f = 2.375

Specifications (EPA Method 2)

D_t = 3/16" to 3/8"	$c \geq 3"$	$P_a = P_b$
D_n = 1/2"	$d \geq 3"$	
$a \geq 3/4"$	$e \geq 3/4"$	$1.05\ D_t \leq P \leq 1.50\ D_t$
$b \geq 0$	$f \geq 2"$	

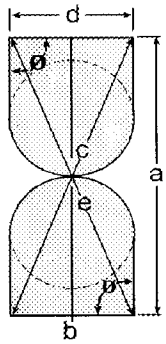
If these specifications are met, proceed with Part 2 Pitot alignment.

S-Type Pitot Geometric Calibration
Part 2 - Pitot Alignment

TRC Probe Identification: P3-2
Technical Specialist: Steve Boyko
Date: August 4, 2008

A. Transverse Tube Axis

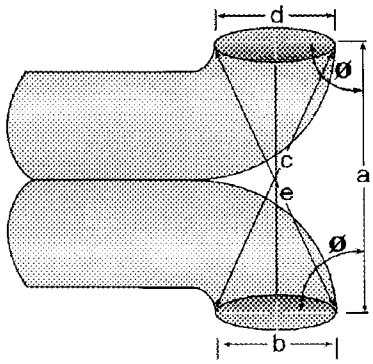
($80^\circ < Ø < 100^\circ$)
($80^\circ < Ø' < 100^\circ$)



a =	0.892
b =	0.380
c =	0.954
d =	0.380
e =	0.959
Ø =	87.5
Ø' =	88.3

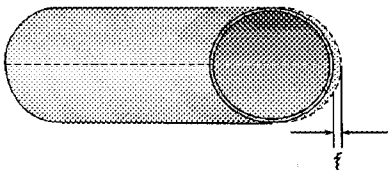
B. Longitudinal Tube Axis

($85^\circ < Ø < 95^\circ$)
($85^\circ < Ø' < 95^\circ$)

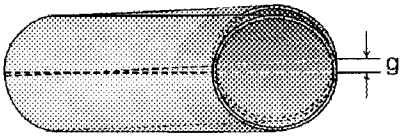


a =	0.892
b =	0.584
c =	1.099
d =	0.619
e =	1.064
Ø =	93.9
Ø' =	87.6

C. (f < 1/8") or 0.1625



D. (g,1/32") or 0.03125



f =	0.015
g =	0.020

Pitot Calibration = good

NOTE: Values in parentheses are EPA Method 2 Specifications.

Probe Thermocouple Calibration

			Tolerance °R = °F + 460	
Thermocouple Identification	P3-2			
Expected Stack Temperature(T_s)		°R	% Change	Allowable
Reference Thermometer(T_{ref}) boiling pt	575	°R		
Thermocouple Readout	573	°R	0.35%	1.50%
Reference Thermometer(T_{ref}) freezing pt	492	°R		
Thermocouple Readout	492	°R	0.00%	1.50%

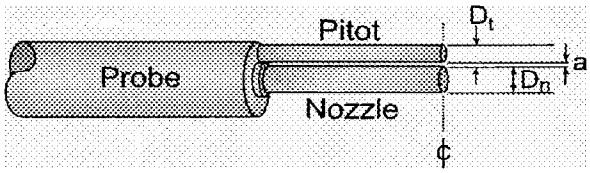
Technician: Steve Boyko Date: 4-Aug-08

Reviewed By: _____ Date: 4-Aug-08

S-Type Pitot Geometric Calibration
Part 1 - Probe Configuration

TRC Probe Identification	P3-2
Technical Specialist	Steve Boyko
Date	June 15,2009

A.

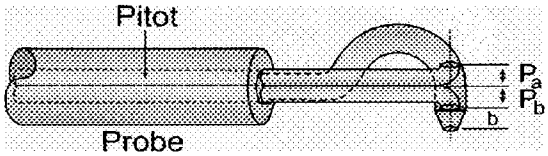


D_t = 0.382

D_n = na

a = na

B.

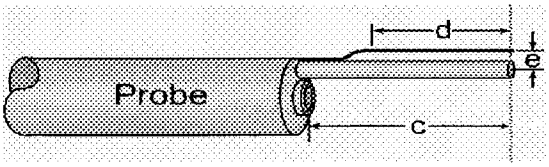


P_a = 0.450

P_b = 0.440

b = na

C.



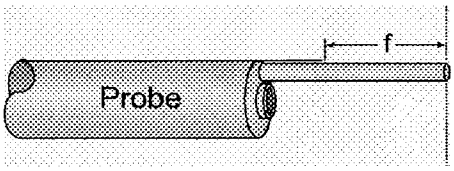
c = na

d = na

e = na

OR

D.



OR

c = 37.500

f = 2.375

Specifications (EPA Method 2)

D_t = 3/16" to 3/8"	$c \geq 3"$	$P_a = P_b$
D_n = 1/2"	$d \geq 3"$	
$a \geq 3/4"$	$e \geq 3/4"$	$1.05\ D_t \leq P \leq 1.50\ D_t$
$b \geq 0$	$f \geq 2"$	

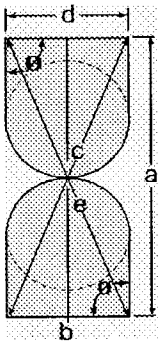
If these specifications are met, proceed with Part 2 Pitot alignment.

S-Type Pitot Geometric Calibration
Part 2 - Pitot Alignment

TRC Probe Identification: P3-2
Technical Specialist: Steve Boyko
Date: June 15,2009

A. Transverse Tube Axis

($80^\circ < Ø < 100^\circ$)
($80^\circ < Ø' < 100^\circ$)

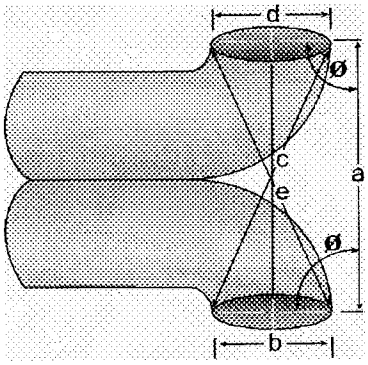


a = 0.890
b = 0.378
c = 0.955
d = 0.380
e = 0.960

Ø = 88.0
Ø' = 88.7

B. Longitudinal Tube Axis

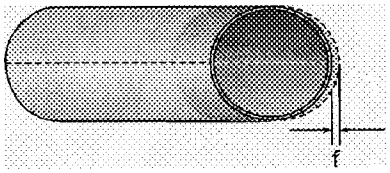
($85^\circ < Ø < 95^\circ$)
($85^\circ < Ø' < 95^\circ$)



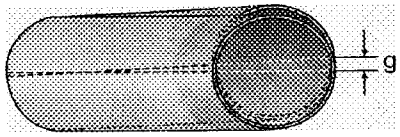
a = 0.890
b = 0.598
c = 1.097
d = 0.619
e = 1.064

Ø = 92.9
Ø' = 87.8

C. (f < 1/8") or 0.1625



D. (g,1/32") or 0.03125



f = 0.015

g = 0.020

Pitot Calibration = good

NOTE: Values in parentheses are EPA Method 2 Specifications.

Probe Thermocouple Calibration

Tolerance
$^\circ R = {}^\circ F + 460$

			% Change	Allowable
Thermocouple Identification	P3-2			
Expected Stack Temperature(T_s)		°R		
Reference Thermometer(T_{ref}) boiling pt	575	°R		
Thermocouple Readout	575	°R	0.00%	1.50%
Reference Thermometer(T_{ref}) freezing pt	492	°R		
Thermocouple Readout	492	°R	0.00%	1.50%

Technician: Steve Boyko Date: June 15,2009

Reviewed By: _____ Date: June 15,2009