

2465 Piston Gauge, Setup the piston-cylinders and mass set in COMPASS for Pressure

FLUKE®

Calibration

This procedure is intended for Fluke Calibration customers trained on use of 2465 Piston Gauge and COMPASS for Pressure Calibration Software.

Purpose

This document instructs how to manually setup the metrological elements of a 2465 Piston Gauge in COMPASS for Pressure.

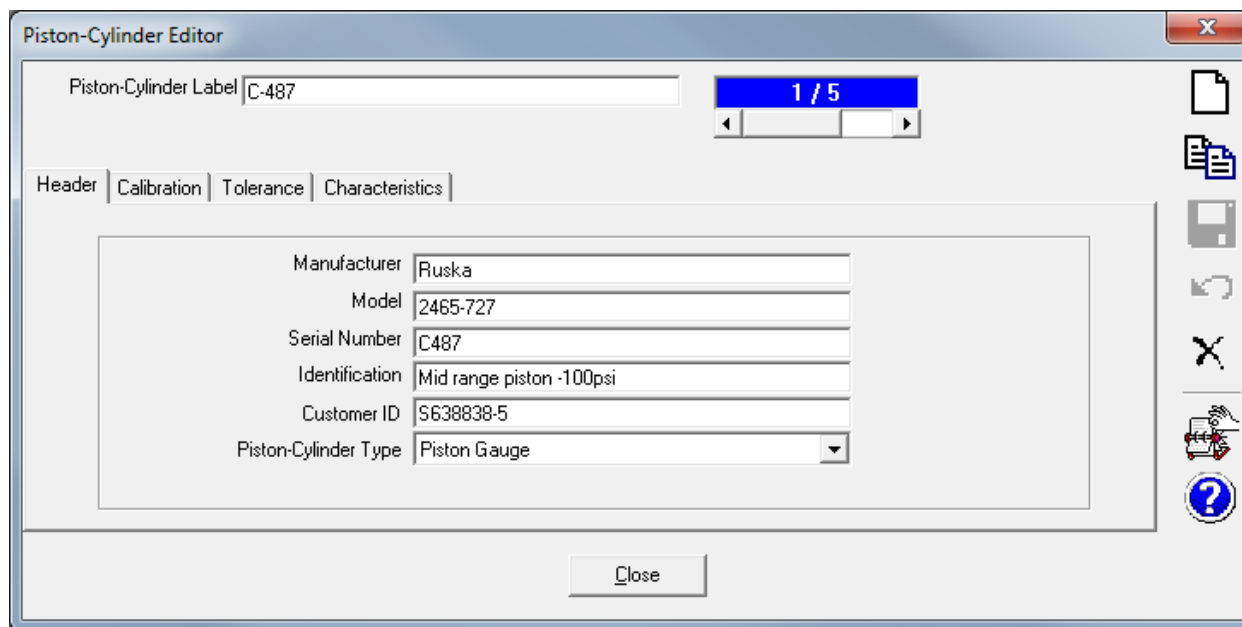
Note

If you have a CD or electronic version of the .pc and .ms WinPrompt files use the COMPASS for Pressure import feature. See the document “Import individual Ruska PC, MS into COMPASS.pdf” and the Application Note, “How to set up COMPASS® for Pressure software for use with Ruska Model 2400 piston gauges”

Instructions

Setup the piston-cylinder, mass set and trim mass set (if applicable) setup files so they can be chosen in the PG Base, Autofloat controller, or PG Monitor setup in COMPASS for Pressure.

Piston-Cylinder Unit C-487 example



The screenshot shows the 'Piston-Cylinder Editor' window. At the top, the 'Piston-Cylinder Label' is 'C-487'. Below this is a tabbed interface with 'Header', 'Calibration', 'Tolerance', and 'Characteristics' tabs. The 'Header' tab is active, displaying a form with the following fields:

Manufacturer	Ruska
Model	2465-727
Serial Number	C487
Identification	Mid range piston -100psi
Customer ID	S638838-5
Piston-Cylinder Type	Piston Gauge

At the bottom of the window is a 'Close' button. The window also features a standard Windows-style title bar with a close button (X) and a vertical toolbar on the right side with icons for file operations and help.

Piston-Cylinder Editor

Piston-Cylinder Label: C-487

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Header | Calibration | Tolerance | Characteristics

Calibration Date	11/1/2011
Calibration Due Date	10/21/2013
Calibration Performed By	Fluke Calibration
Certification ID	111101C-487
M&TE Device	<input type="checkbox"/>
Record Last Edited	2/14/2012 12:26:27 PM
Record Last Edited By	Admin

Close

Piston-Cylinder Editor

Piston-Cylinder Label: C-487

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Header | Calibration | Tolerance | Characteristics

Effective Area Tolerance Type	%Reading	<p>Choose %Reading 0.00081% (shown as 8.1 ppm on cal. cert.) If shown in area units on cal. cert. divide the uncertainty by the effective area and multiply by 100 to get %Rdg tolerance.</p> <p>For example if unc. is 7.0E-10 m2 and A₀ is 8.396396E-05 m2 then %Reading is 0.00083.</p>
%Span	0.00083	

Close

A_0 = Effective Area (note this also contains the reference temp value for COMPASS)

c = Piston Thermal Expansion (actually a combination of both piston and cylinder expansion so thus cylinder is generally 0, or can split the value between the two fields to avoid confusion ... either way - these two fields are added together in the pressure formula)

b1 = Pressure Expansion

b2 = Pressure Expansion 2nd (Second order relationship ... generally 0)

Reference Level Offset = In COMPASS, this field is only used on some DH Instruments/Fluke pistons, and would be noted on the calibration report. Surface Tension field is 0 unless oil is being used in the system. For Rotation Rates I am not sure if you have the hardware to monitor this and/or what its limits are or if these even apply to a 2465 so I just put what is generally acceptable. Basically if the piston is spinning it is centered so ok to take data as long as it does spin too fast <~50 RPM to where it might actually create lift.

L1 = Same label in the calibration report. The effective length of the piston, from top of mass loading surface to the location where changes in test fluid density have no impact on the pressure calculation. The L1 value is used only with Ruska piston gauges. It is used with the Hanger Depth ("D") dimension of the sleeve weight in determining fluid head pressure relative to the float position line on the mounting post or indicator. The unit of measure is the same as what is selected in "Reference Level Offset" field.

Max Sink Rate = Same label in the calibration report. Fall rate limit that this piston might see as it naturally sinks through its float zone. Used to determine Ready/Not Ready with some systems.

Piston-Cylinder Unit TL-1463 example

Piston-Cylinder Editor

Piston-Cylinder Label: TL-1463

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Header | Calibration | Tolerance | Characteristics

Manufacturer	Ruska
Model	2465-725
Serial Number	TL-1463
Identification	Lo Range - 25 psi
Customer ID	S638837-6
Piston-Cylinder Type	Piston Gauge

Close

Piston-Cylinder Editor

Piston-Cylinder Label: TL-1463

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Header | Calibration | Tolerance | Characteristics

Calibration Date	10/31/2011
Calibration Due Date	10/21/2013
Calibration Performed By	Fluke Calibration
Certification ID	11101TL-1463
M&TE Device	<input type="checkbox"/>
Record Last Edited	2/14/2012 11:05:51 AM
Record Last Edited By	Admin

Close

Piston-Cylinder Editor

Piston-Cylinder Label: TL-1463

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Header | Calibration | Tolerance | Characteristics

Effective Area Tolerance Type: %Reading

%Span: 0.00081

Choose %Reading
0.00081% (shown as 8.1 ppm on cal. cert.)
If shown in area units on cal. cert. divide the uncertainty by the effective area and multiply by 100 to get %Rdg tolerance.

For example if unc. is 2.7E-09 m² and A₀ is 3.357445E-04 m² then %Reading is 0.00081.

Close

Piston-Cylinder Editor

Piston-Cylinder Label: TL-1463

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Header | Calibration | Tolerance | Characteristics

Effective Area	3.357384E-4	m ²	Piston Thermal Expansion	1.500E-5	/C
Temperature Reference	23	C	Cylinder Thermal Expansion	0.000E0	/C
Mass	4.719390E-2	kg	Pressure Expansion	4.047E-5	/MPa
Mass Resolution	0.0000001	kg	Pressure Expansion 2nd	0.000E0	/MPa ²
Average Density	7.8	g/cm ³	Reference Level Offset	0.000E0	in
Min Rotation Rate (RPM)	0		L1	1.600E0	in
Max Rotation Rate (RPM)	0		Surface Tension(N/m)	0	
			Max Sink Rate	0.08	in/min

Close

Piston-Cylinder Unit V-1478 example

Piston-Cylinder Editor

Piston-Cylinder Label V-1478 5 / 5

Header Calibration Tolerance Characteristics

Manufacturer	Ruska
Model	2465-729
Serial Number	V1478
Identification	High Range-1000psi
Customer ID	S638838-4
Piston-Cylinder Type	Piston Gauge

Close

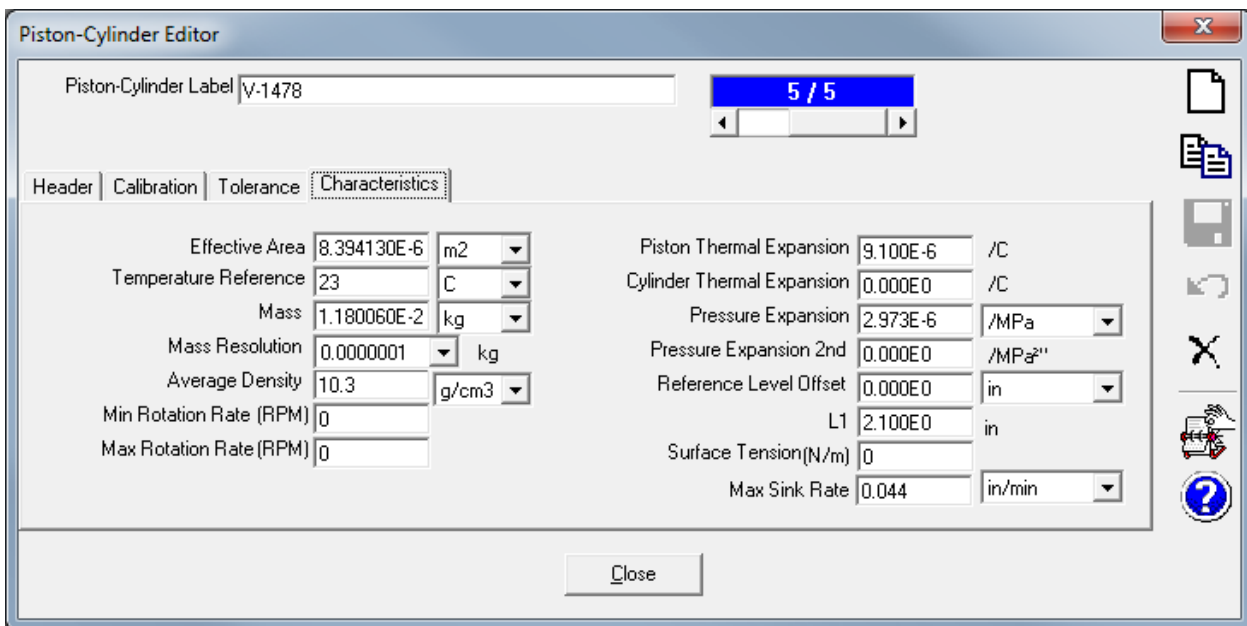
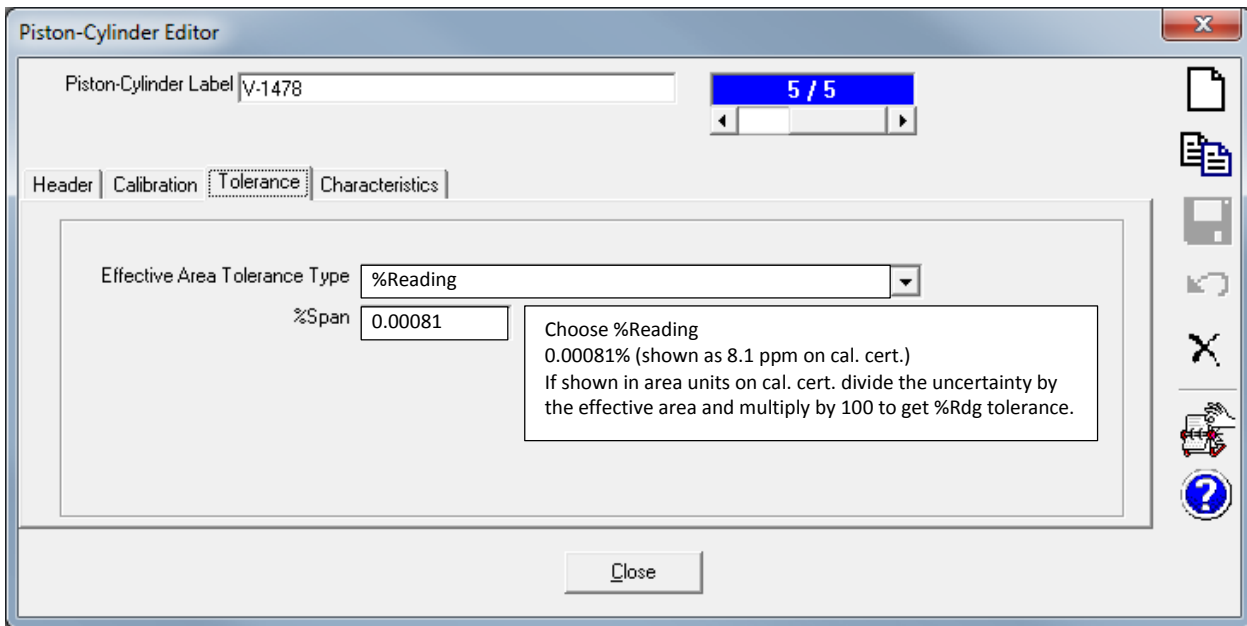
Piston-Cylinder Editor

Piston-Cylinder Label V-1478 5 / 5

Header Calibration Tolerance Characteristics

Calibration Date	11/1/2011
Calibration Due Date	10/21/2013
Calibration Performed By	Fluke Calibration
Certification ID	11110V-1478
M&TE Device	<input type="checkbox"/>
Record Last Edited	2/14/2012 12:26:21 PM
Record Last Edited By	Admin

Close



2465A Trim Mass Set example

Mass Set Editor

Mass Set Label: 2465A Trim Mass

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Header | Calibration | Mass Set

Manufacturer: Ruska

Model: 2465A

Serial Number: 24834

Identification: Trim Mass Set

Customer ID: S638838

Mass Set Type: Piston Gauge Trim Mass

Close

Mass Set Editor

Mass Set Label: 2465A Trim Mass

1 / 4

Header | Calibration | Mass Set

Calibration Date: 9 /18/2009

Calibration Due Date: 9 /23/2013

Calibration Performed By: 589

Certification ID:

M&TE Device:

Record Last Edited: 2/14/2012 1:06:26 PM

Record Last Edited By: Admin

Close

Mass Set Editor

Mass Set Label 1 / 4

Header | Calibration | **Mass Set**

Total Trim Mass* (g)

Available Resolution*

Mass Set Density

Mass Density Unit

2465A Mass Set example

Mass Set Editor

Mass Set Label 2 / 4

Header | Calibration | Mass Set

Manufacturer

Model

Serial Number

Identification

Customer ID

Mass Set Type

Mass Set Editor

Mass Set Label: 2 / 4

Header: Calibration | Mass Set

Calibration Date:

Calibration Due Date:

Calibration Performed By:

Certification ID:

M&TE Device:

Record Last Edited:

Record Last Edited By:

Mass Set Editor

Mass Set Label: 2 / 4

Header: Calibration | Mass Set

Individual Masses

14	0.0100000	kg
13	0.0200000	kg
12	0.0300000	kg
11	0.0500000	kg
10	0.1000000	kg
9	0.2000000	kg
8	0.3000000	kg
7	0.5000000	kg
2	1.0000000	kg
3	1.0000000	kg
4	1.0000000	kg
5	1.0000000	kg
6	1.0000000	kg

Individual Mass Settings

Mass Name*:

Nominal Mass:

True Mass*:

Tolerance*:

Mass Density*:

Makeup Mass:

Mass Unit:

Mass Density Unit:

Mass Set Resolution:

Mass Set Total:

2465 Mass Bell example

Mass Bell Editor

Mass Bell 2465A-799 1 / 3

Header Calibration Mass Bell

Manufacturer	Ruska
Model	2465A-799
Serial Number	52798
Identification	Sleeve Weight (Mass #1)
Customer ID	S638837-3

Close

Mass Bell Editor

Mass Bell 2465A-799 1 / 3

Header Calibration Mass Bell

Calibration Date	10/21/2011
Calibration Due Date	10/21/2013
Calibration Performed By	Fluke Calibration
Certification ID	11102152798
M&TE Device	<input type="checkbox"/>
Record Last Edited	2/14/2012 12:49:31 PM
Record Last Edited By	Admin

Close

Mass Bell Editor

Mass Bell 2465A-799 1 / 3

Header Calibration **Mass Bell**

Use "True Mass" value Mass * 1.171384E-1 kg

Mass Resolution * 0.0000001 kg

Use "Density" value Average Density * 3.100E3 kg/m3

Mass Bell Tolerance * 5.855E-7 kg

"Hanger Depth" D (Hanger Mass Depth) 1.9400 in

Sleeve Offset -0.00397 in

Close

If the Sleeve Mass is the light two-piece model and about 120 grams, then enter -0.003937 in (-0.001 m) for the Sleeve Offset.

If the Sleeve Mass is the heavier one piece model and about 500 grams, then enter 0 (zero) for the Sleeve Offset.

End of Procedure