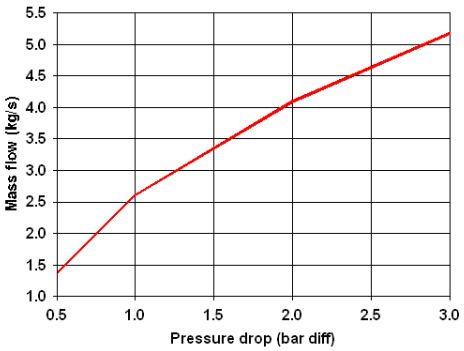
The 60 Second Guide to PEW

This short guide will show you within 60 seconds how easy it is to use PEW and how quickly you can perform calculations and display the results both graphically and in a table.

We will calculate the flowrate of water in 500ft of 2" unlined cast iron pipe up a 10ft hill for pressure drops between 0.5 and 3 bar diff.



Summary: Demonstration

	Pressure drop	Mass flow	Velocity	Reynolds number
	bar diff	kg/s	m/s	
Incompressible - No 1	0.5000	1.372	0.6343	33340
Incompressible - No 2	1.000	2.608	1.205	63360
Incompressible - No 3	2.000	4.095	1.892	99480
Incompressible - No 4	3.000	5.175	2.392	1.257e5

Starting PEW

1. Click on **Start** | **Programs** | **PEL** | **PEW**. The main PEW window appears.

   There are the usual menus and tool bars at the top of the screen.

   The first thing we need to do is to select the type of calculation.

2. Click on the **Add a new case** button on the toolbar to display the Calculation Type window. The different types of calculation are displayed on the left; click on **Fluid Flow**. The available calculations for Fluid Flow are displayed on the right hand side; click on **Incompressible** and then click **OK**.

   The Incompressible data input Window is displayed.

   Next, we need to input the pipework data

3. Click on **Flow** to calculate the flow rather than the pressure drop (the default).

4. Double-click on the box for entering the pipe Length to highlight the default value of 10m. (Doing this will cause the default to be automatically replaced with what you type in without having to delete it first.) Type in **500** followed by a space followed by **ft**. Press **Enter** on the keyboard or click on another input box to do the conversion.

5. Double-click on the Diameter box to highlight the default value. Select the menu item **Tools** | **Pipe Inner Diameter Calculator…** Click on **2"** and **Schedule 40** and then **OK**. The result will be pasted back into the Pipe Diameter.

6. Double-click on the pipe Roughness to highlight the default value. Select the menu item **Tools** | **Pipe Roughness Calculator…** Click on **"Cast iron, concrete, timber"** and then click **OK.**

7. Double-click on the Static head loss to highlight the default value and type in **10 ft**. Don't forget the space!

8. Click on the **Edit…** button next to the Fittings Loss (velocity heads). In the Number of Items column, type in **1** for one 90 degree circular bend. At the bottom of the form, type in **5** miscellaneous losses and then click the **Edit pipe…** button to return to the main input form.

   Now we need the density & viscosity of water. We will use the Physical Property Calculator to generate them.

9. Place the cursor in the **Density** box. Next, select **Tools** from the menu-bar at the top of the screen then **Calculate Physical Property**. When the Calculator appears, if any components are displayed in the worksheet click **Clear Worksheet** to clear them. Next, click **Add Component**. This will bring up the Select Components window; enter **water** in the Search for Name box and then click **Add to Stream** to add water to the Calculator and then click **Close**

to return to the Calculator. Enter a temperature of **20°C** and a pressure of **1 bar** and click **Calculate**. The Calculator returns a density of 999.48 kg/m3. Click **OK** to return this value to the Incompressible Flow window.

10. Place the cursor in the **Viscosity** box and repeat the above. The Calculator will remember the component was water, the temperature and the pressure so all you need to do is to click **Calculate** followed by **OK**.

Finally, we need to enter the pressure drop.

11. Double-click on the Pressure drop to highlight the default value and type in **0.5 bar diff**.

So now we are ready to do the calculation.

12. Click on the **Calculate** button on the toolbar and the results appear in blue on the right hand side. You should get a value of 1.372kg/s for the Mass flow.

We need to repeat the calculation over a range of pressure drops between 0.5 and 3 bar. We'll do it at 1, 2 & 3 bar. But we want to save each set of results not overwrite them so we need to copy the calculation before we make the changes.

13. Click on the **Copy** button on the toolbar. This produces a copy of the first case. Change the title from "Copy of No 1" to "**No 2**".

14. Double-click on the Pressure drop and change the value to **1 bar diff**.

15. Click on the **Calculate** button on the toolbar to re-calculate the flowrate. You should get 2.608 kg/s for the flowrate.

16. Repeat the last 3 steps for pressure drops of **2 and 3 bar diff**. You should get flowrates of 4.095 & 5.175 kg/s.

Now we are ready to plot the graph

17. Click on the **Create a graph** button on the toolbar.

18. Click on **Incompressible** in the *Graph – select calculation type* window and the click **OK**.

19. Click on **Pressure drop** in the *Graph – select X axis* window and then click **OK.**

20. Click on **Mass flow** in the *Graph – select Y axis* window and then click **OK.**

And there's your graph. Now let's create a Summary Table

21. Click on the **Create a summary** button on the toolbar & enter **Demonstration** as the summary title.

22. Click on the **Add a case to the current summary** button on the toolbar.

23. From the *Summary – select case* window, select all 4 cases by clicking on the first case, holding the left mouse button down and dragging the mouse to the last case. These are the rows for the table. Click **OK**.

24. Click on the **Add a variable to the current summary** button on the toolbar.

25. From the *Summary – select variable* window, hold the **Ctrl** key down and click on **Pressure drop, Massflow, Velocity,** & **Reynolds number**. These will be the columns for the table. Click **OK**.

And there's your Summary Table!

This program is developed, maintained and supported by PEL Support Services, ABB. We run a Hotline telephone and email service to answer any queries about the PEL products. You can contact us:

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