



PORTASTEEL® USER MANUAL





Contents

1.	Introduction and Key Features	3
1.1	What does the Portasteel [®] do?	3
1.2	The Portasteel [®]	4
1.3	How does a Portasteel [®] work?	5
2.	Preparation	6
2.1	Tablet Setup	6
2.2	Testing	7
3.	Calculator Mode	8
3.1	Calculating Mass Measurements	11
3.2	Calculating Liquid Level Measurements	18
3.3	Performing Calculations	25
4.	Database Mode	27
4.1	Adding a New Cylinder	28
4.2	Adding a New Folder	30
4.3	Managing Saved Cylinders	32
4.4	Editing Saved Cylinders	33
4.5	Exporting Saved Cylinders	34
4.6	Deleting Saved Cylinders	35
4.7	Navigating the Database	36
4.8	Performing Calculations on Saved Cylinders	38
4.9	Managing Calculation Results	40
4.10	Exporting Calculation Results	43
5.	Maintenance	44



I. Introduction and key features

What does the Portasteele® do?

The Portasteele® is an application which is readily installed on a rugged, secure tablet. The Portasteele® uses information input by the user, including the dimensions of a cylinder and its liquid level, to calculate the mass of agent contained within a cylinder. It can also be used in reverse to calculate a theoretical liquid level for a cylinder, given a value of agent weight. The Portasteele® can be used for CO₂, FM-200 and NOVEC 1230. The Portasteele provides a quick, effective alternative to manually weighing cylinders. It is easy and intuitive to use, allowing users to test cylinders reliably and efficiently.

Portasteele®

The Portasteele® is the first application of its kind. It is a true replacement for the time-consuming and potentially hazardous process of manually weighing cylinders. The application is installed on a rugged, portable tablet, meaning it can be used in almost any environment. It is quick to use, with the user being able to store the dimensions of cylinders on the tablets to be used in the future. It has a friendly user interface, making it accessible to any member of a team or crew.

Portasteele®

Micro USB port: USB cable may be connected to charge the device or to connect to a PC to export data from the Portasteele® application.

Power Button: Powers the device on and off when held down.

Ruggedized Casing: Casing designed to be hard-wearing and shock resistant with a rating of IP 68.

Touch Screen: Capacitive touch screen for easy navigation through and interaction with the Portasteele® application.





How does the Portasteele[®] work?

The Portasteele uses measurements of the dimensions of a cylinder, such as height and circumference, to calculate the volume of the space inside a cylinder. From there it can use the value of the liquid level, also measured by the user, to find out how much of this volume is occupied by the agent inside the cylinder. This information is then used to calculate the mass of the agent inside the cylinder.



2. Preparation

Before using the Portasteele® it is important to ensure that the tablet is set up correctly.

I. Tablet Setup

The tablet should be fully charged on receipt. A charger will accompany the tablet on arrival. The tablet can be charged via PC or electrical outlet and the charger is plugged into the micro-USB socket as shown on page 4.

Once fully charged, the tablet can be switched on using the power button situated on top of the tablet, as shown on page 4.

Once switched on, several basic settings may be altered at the user's discretion such as the time and date and brightness. Only basic settings are accessible in order to avoid compromising the primary function of the tablet.

In order to use certain features of the Portasteele® application, you should also set up an email account for use on the tablet. This can be done during initial preparation, or alternatively the application will prompt you to do so when necessary.

2 Testing

After the initial setup of the tablet, it should be tested to ensure that the Portasteele® tablet is functioning properly and that calculation results are correct. Begin by launching the Portasteele® application, which is shown by its icon on the home screen of the tablet.



Below are some test parameters which will allow the application to be tested, to ensure the inputs are being entered correctly.

Start Calculator Mode by following the instructions on page 8.

When Calculator Mode launches its default mode should be to calculate the mass of a CO₂ cylinder using metric units. If these settings are not correct then alter them, following the instructions on page 9.

To enter measurements, tap in the space above the line next to the corresponding measurement value to be entered, as explained on page 25.

Then use the on screen key pad to enter the correct values, as shown below.

Height	Circumference	Liquid Level	Temperature	Dome Height	Thickness
134	85	103.6	20.2	11	6.6

Once all the measurements have been correctly inputted into the calculator, close the keyboard and tap the 'Calculate' below the input boxes, as explained on page 26.

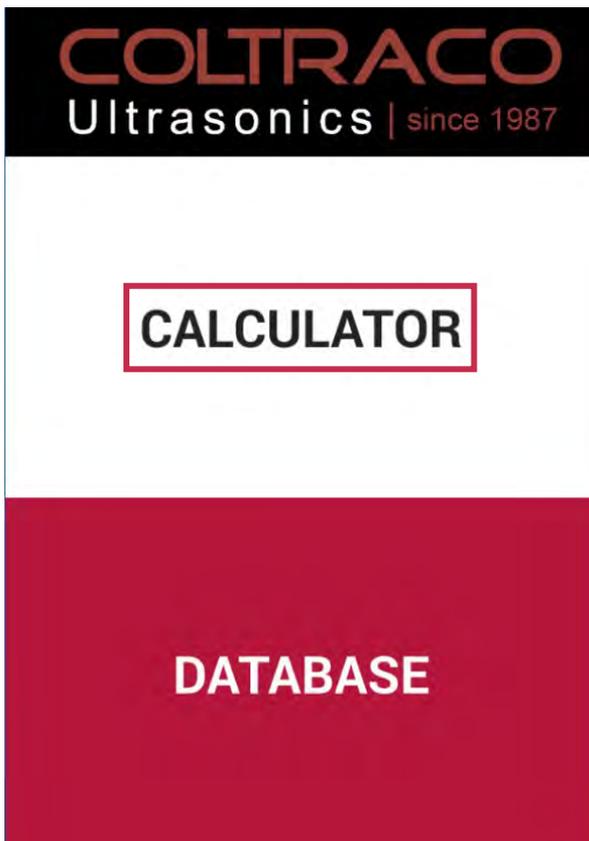
This should calculate the Actual Agent Mass as 45.00. If this is the case then your tablet is functioning correctly and preparation is complete. If this is not the case, please check your inputs again and retry the calculation. If your tablet continues to produce an incorrect result, please get in touch with our technical team, who will be happy to help.



3. Calculator Mode

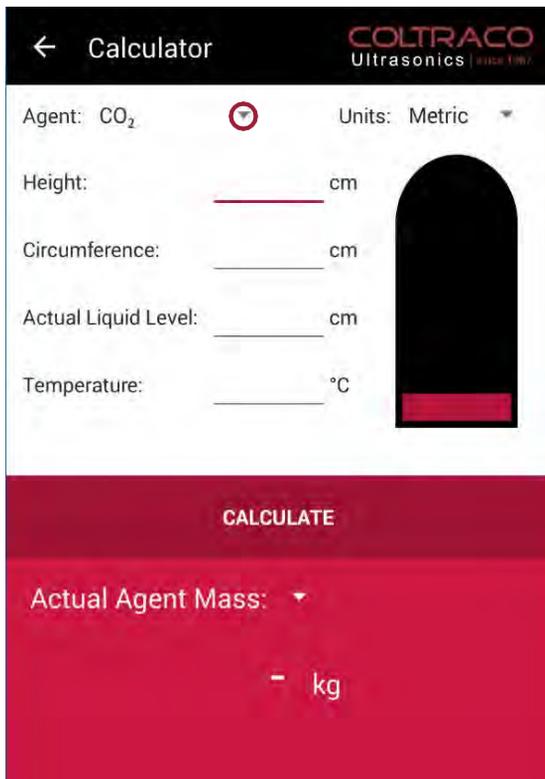
Calculator Mode is used to quickly input measurements for a single cylinder, and receive the calculated result for either Actual Agent Mass or Expected Liquid Level, depending on what has been input.

When the application boots it will open onto its home screen.

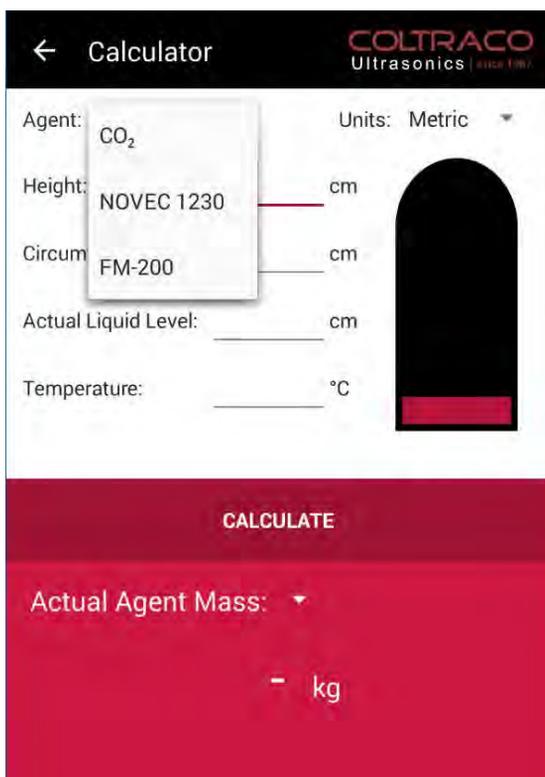


To begin carrying out calculations, select the Calculator option by tapping on the upper half of the screen as highlighted here.

Selecting the Calculator button will open up Calculator mode.

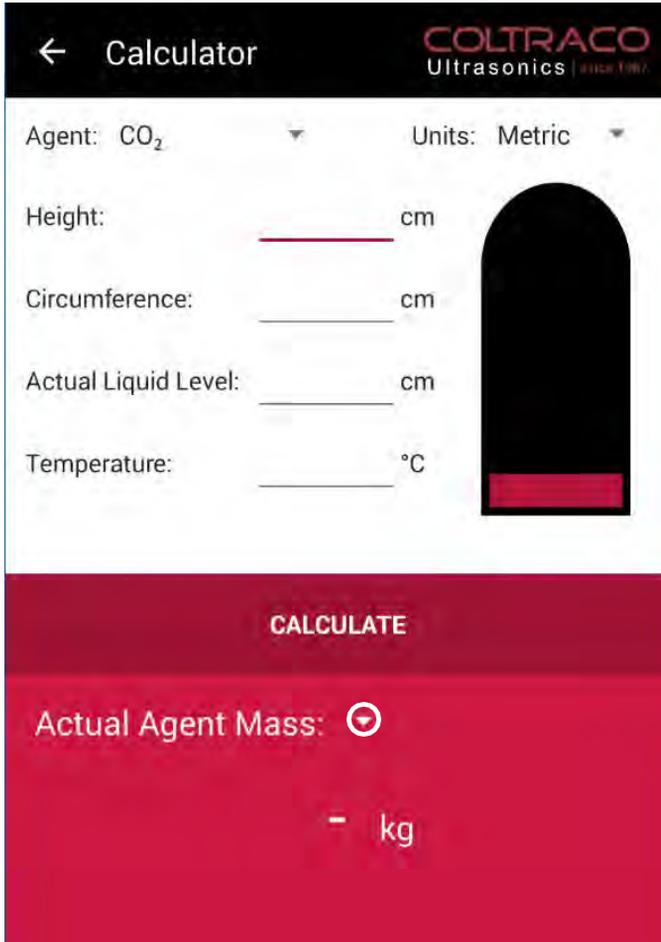


Start by using the drop down menus to select the agent type. To do this, tap on the drop down arrow next to agent, which can be seen here



Then select the desired agent from the drop down menu by tapping on the correct option.

Follow the same procedure to select the desired unit type (metric or imperial).



There is a similar drop down menu which can be used to change between calculating Actual Agent Mass and calculating Expected Liquid Level, as shown here.

Once these options have been selected, the measurements for the cylinder need to be entered into the calculator.



Part I – Calculating Mass Measurements

To calculate mass, the calculate type must be set to Actual Agent Mass – ensure this is correct before proceeding.

The measurements which need to be inputted into the calculator are slightly different depending on the agent in question. Please ensure you refer to the correct section for the cylinder you are measuring.

Accurate measurements are key to achieving accurate results; where possible follow the recommendations of accuracy given.

CO₂

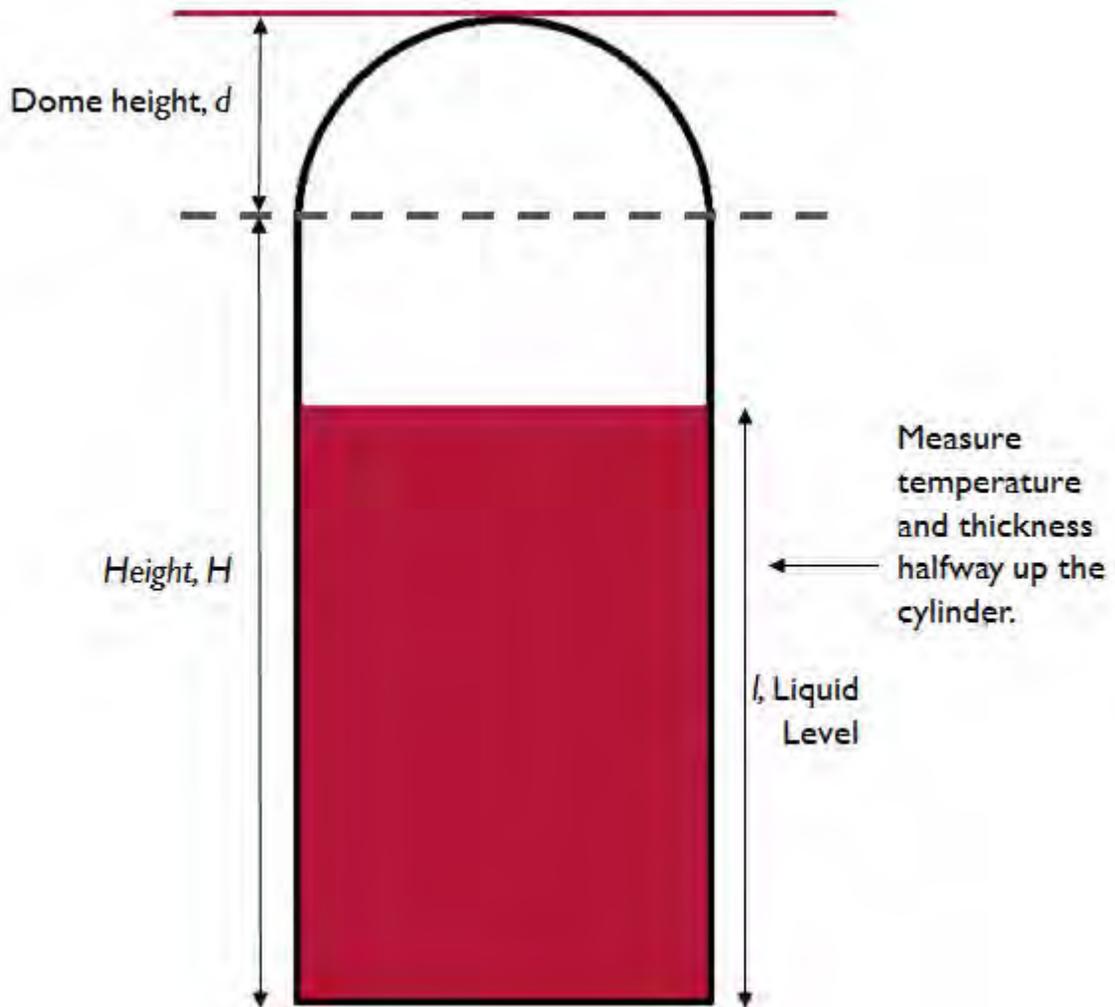
The measurements which need to be taken are:

- Height, this needs to be measured from the base of the cylinder to the point at which the cylinder begins to curve, shown as H in the diagram overleaf. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
- Circumference, this is the distance around the cylinder, and should be measured roughly half way up the cylinder, using a flexible measuring tape. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
- Liquid Level, this should be found using a Portalevel[®] unit, ensuring that you follow all the appropriate preparations and instructions in the corresponding Portalevel[®] manual. Once found, the liquid level should be measured from the base of the cylinder to the height located using the Portalevel[®], shown as l in the diagram overleaf. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
- Temperature, this should be measured using a Portatherm[®] temperature probe, or other appropriate method. It should be measured around half way up the cylinder and the full readout on the Portatherm[®] should be entered into the calculator. This must be measured in °C for metric units and °F for imperial units. If not using the Portatherm[®], this needs to be measured to the nearest 0.1 °C or nearest 0.1 °F.
- Dome Height, this is the *vertical* height of the domed section at the top of the cylinder, shown as d in the diagram overleaf. This should be measured with the ruler or tape held at close to vertical as possible, and not following the curvature of the dome. This is shown as d in the diagram below. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
- Thickness, this is the thickness of the cylinder. It should be measured around half-way up the cylinder using a Portagauge[®] or other thickness measuring device. The full readout on the Portagauge[®] should be input into the calculator. This must be measured in millimetres for metric units and inches for imperial units. If not using the Portagauge[®], this needs to be measured to the nearest 0.1 mm or nearest 0.1 ”.

CO₂ Cylinder

The grey dashed line shows the point at which the cylinder *begins* to curve, it is important that measurements are correctly taken relative to this point.

The red line shows the top of the cylinder, the dome height should not include any components of the valves or tubing at the top of the cylinder.



NOVEC 1230

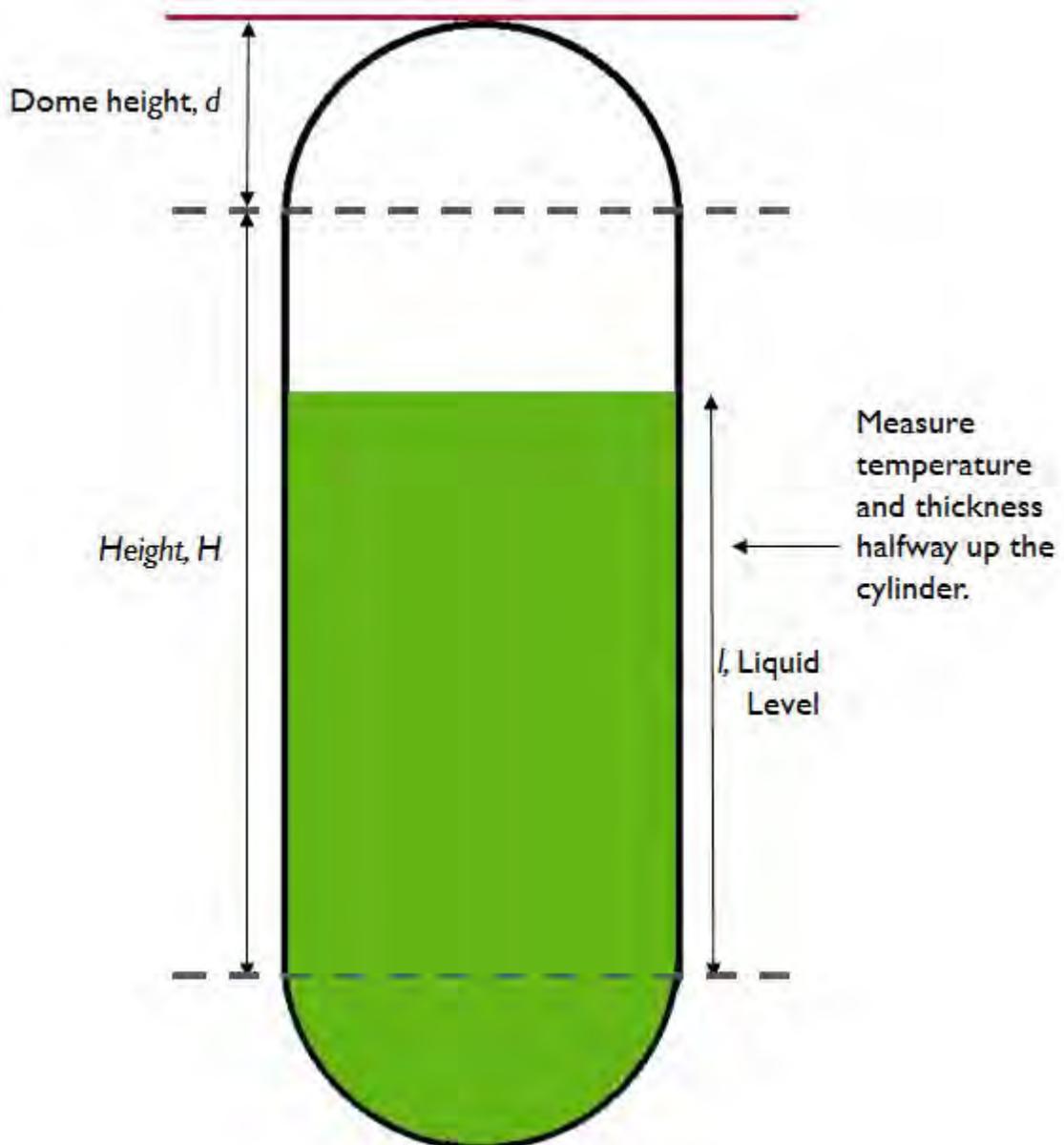
The measurements which need to be taken are:

- Fill Weight, this is the mass of agent with which the cylinder was originally filled, and should be printed on the side of the cylinder. This must be measured in kilogrammes for metric units and pounds for imperial units. This needs to be measured to the nearest 0.1 kg or nearest 1 lb.
- Height, this needs to be measured from the base of the cylinder to the point at which the cylinder begins to curve, shown as H in the diagram overleaf. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
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NOVEC 1230 Cylinder

The grey dashed lines shows the points at which the cylinder *begins* to curve, it is important that measurements are taken correctly relative to these points.

The red line shows the top of the cylinder, the dome height should not include any components of the valves or tubing at the top of the cylinder.



FM-200

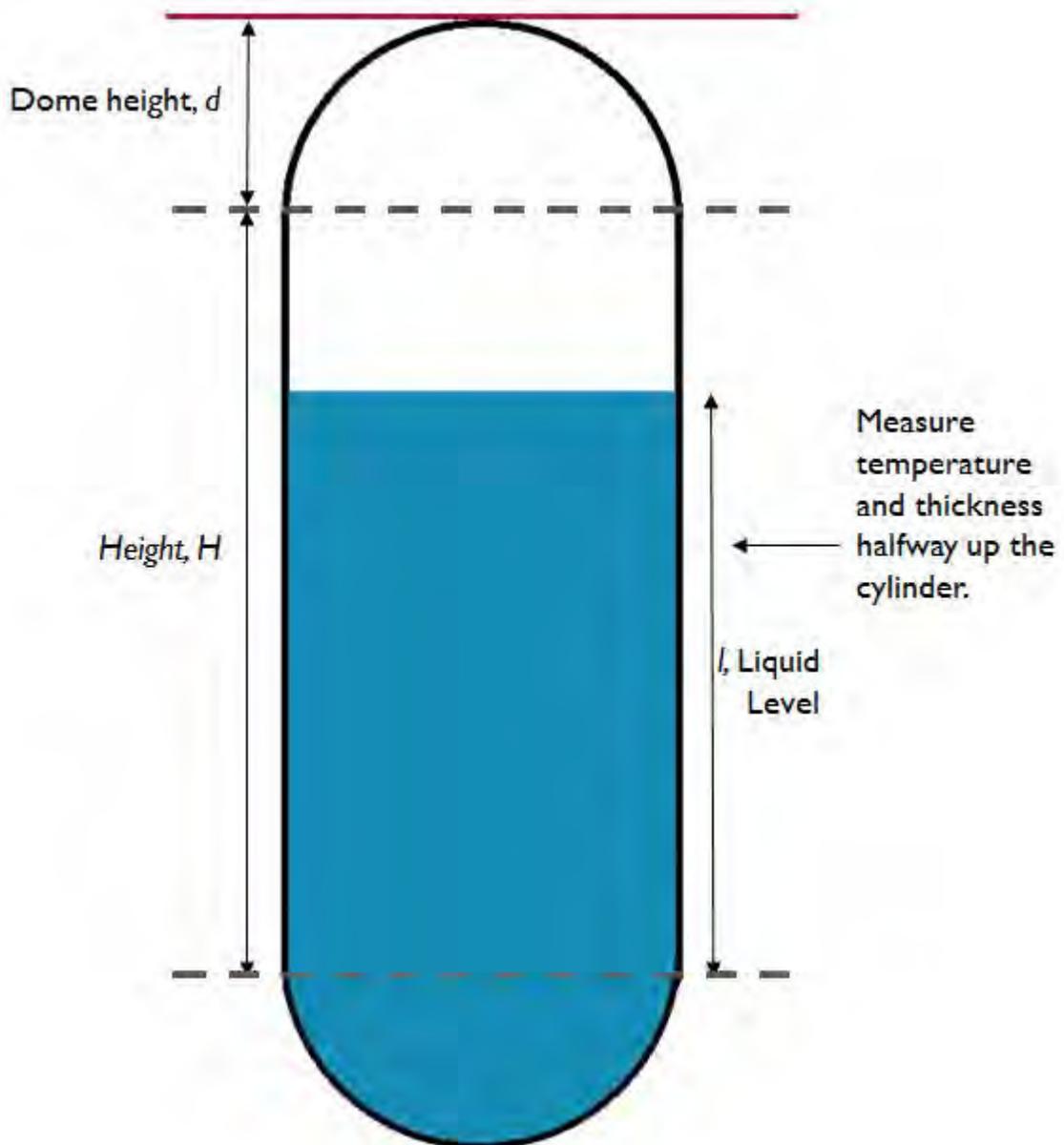
The measurements which need to be taken are:

- Height, this needs to be measured from the base of the cylinder to the point at which the cylinder begins to curve, shown as H in the diagram overleaf. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
- Circumference, this is the distance around the cylinder, and should be measured roughly half way up the cylinder, using a flexible measuring tape. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
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- Thickness, this is the thickness of the cylinder. It should be measured around half-way up the cylinder using a Portagauge[®] or other thickness measuring device. The full readout on the Portagauge[®] should be input into the calculator. This must be measured in millimetres for metric units and inches for imperial units. If not using the Portagauge[®], this needs to be measured to the nearest 0.1 mm or nearest 0.1 ”.

FM-200 Cylinder

The grey dashed lines shows the points at which the cylinder *begins* to curve, it is important that measurements are taken correctly relative to these points.

The red line shows the top of the cylinder, the dome height should not include any components of the valves or tubing at the top of the cylinder.





Part 2 – Calculating Liquid Level Measurements

To calculate liquid level, the calculate type must be set to Expected Liquid Level – ensure this is correct before proceeding.

The measurements which need to be inputted into the calculator are slightly different depending on the agent in question. Please ensure you refer to the correct section for the cylinder you are measuring.

Accurate measurements are key to achieving an accurate results, where possible follow the recommendations of accuracy given.

CO₂

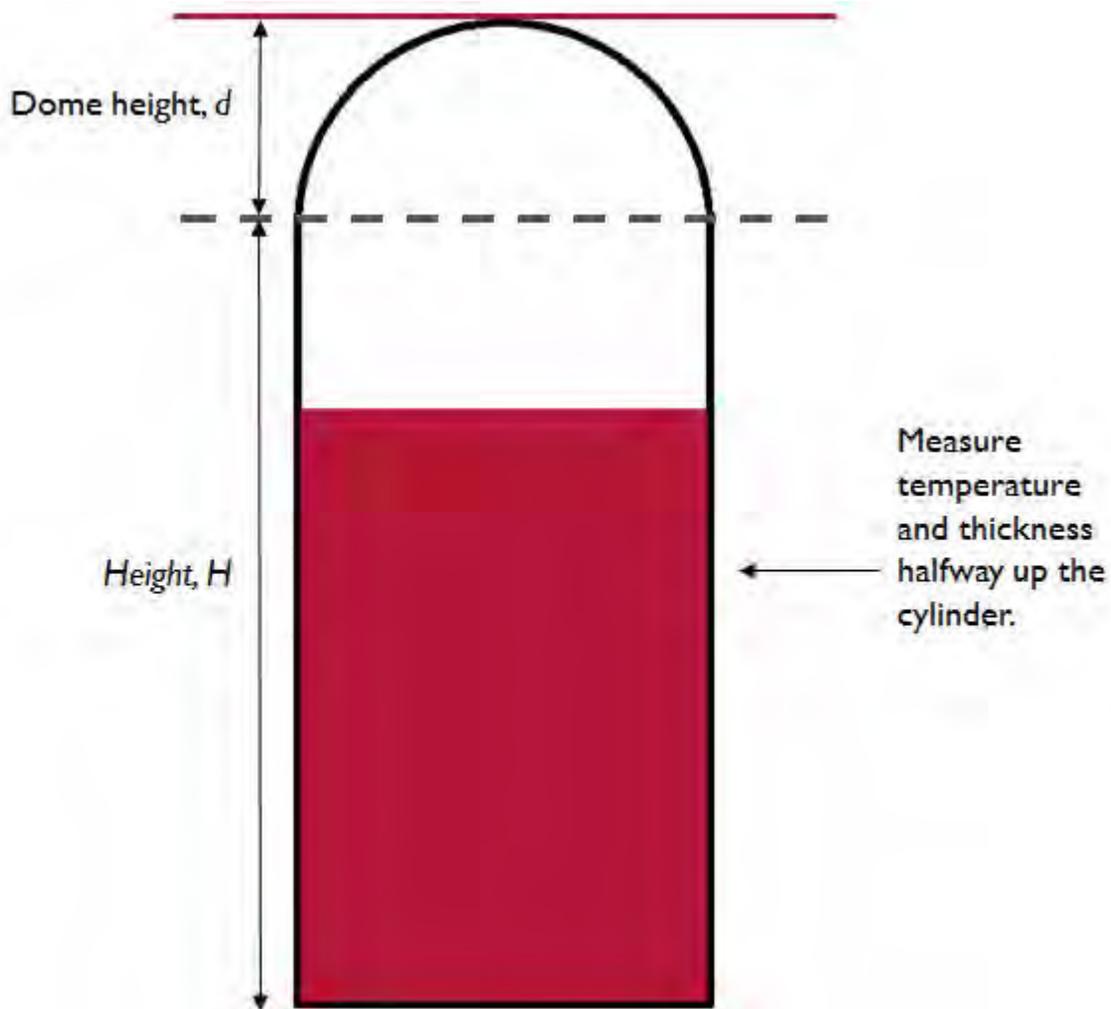
The measurements which need to be taken are:

- Actual Agent Mass, this is the mass of agent with which the cylinder was originally filled, and should be printed on the side of the cylinder. This must be measured in kilogrammes for metric units and pounds for imperial units. This needs to be measured to the nearest 0.1 kg or nearest 1 lb.
- Height, this needs to be measured from the base of the cylinder to the point at which the cylinder begins to curve, shown as *H* in the diagram overleaf. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
- Circumference, this is the distance around the cylinder, and should be measured roughly half way up the cylinder, using a flexible measuring tape. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
- Temperature, this should be measured using a Portatherm[®] temperature probe, or other appropriate method. It should be measured around half way up the cylinder and the full readout on the Portatherm[®] should be entered into the calculator. This must be measured in °C for metric units and °F for imperial units. If not using the Portatherm[®], this needs to be measured to the nearest 0.1 °C or nearest 0.1 °F.
- Dome Height, this is the *vertical* height of the domed section at the top of the cylinder, shown as *d* in the diagram overleaf. This should be measured with the ruler or tape held at close to vertical as possible, and not following the curvature of the dome. This is shown as *d* in the diagram below. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
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CO₂ Cylinder

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NOVEC 1230

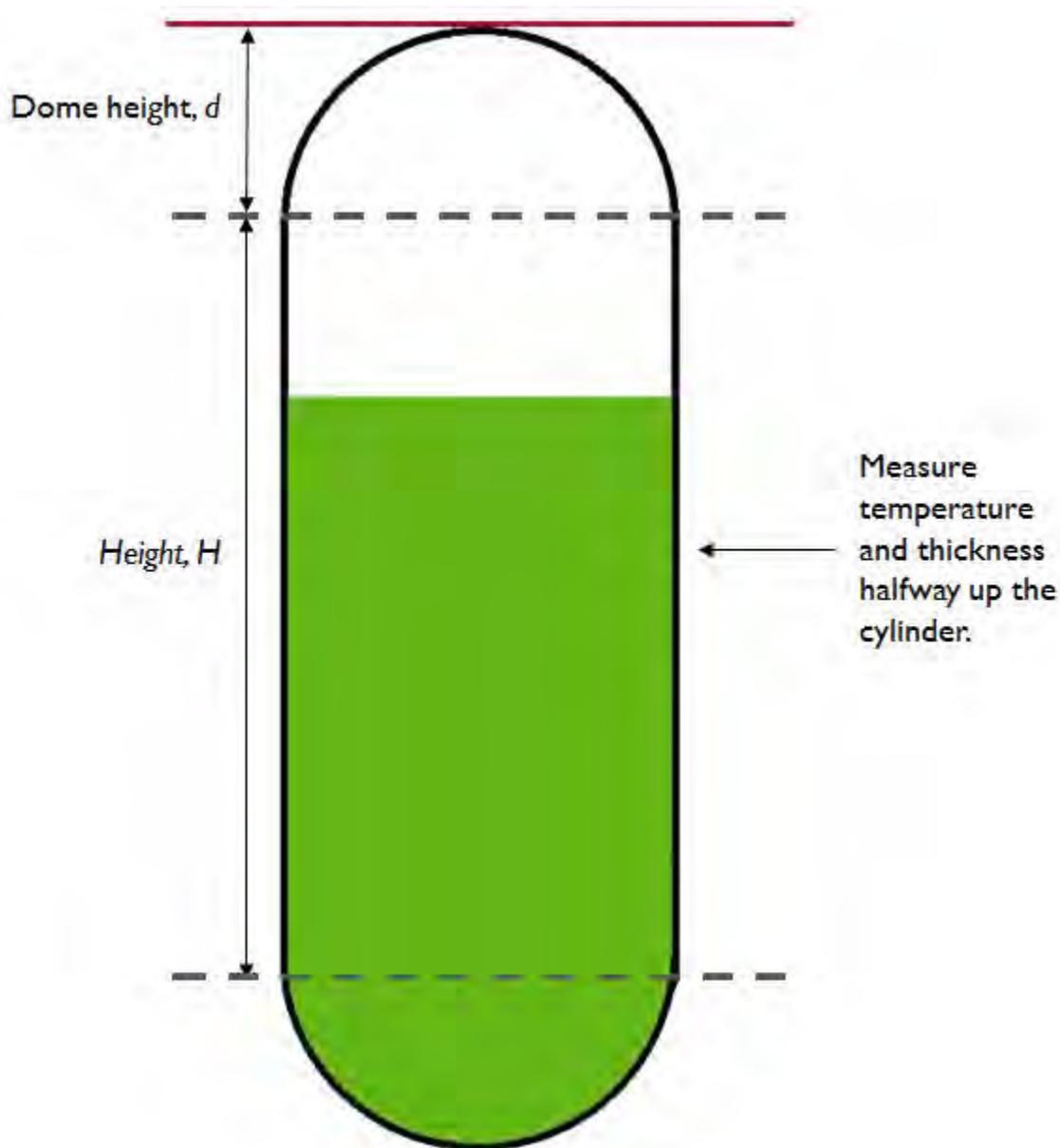
The measurements which need to be taken are:

- Fill Weight, this is the mass of agent with which the cylinder was originally filled, and should be printed on the side of the cylinder. This must be measured in kilogrammes for metric units and pounds for imperial units. This needs to be measured to the nearest 0.1 kg or nearest 1 lb.
- Height, this needs to be measured from the base of the cylinder to the point at which the cylinder begins to curve, shown as H in the diagram overleaf. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
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NOVEC 1230 Cylinder

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The red line shows the top of the cylinder, the dome height should not include any components of the valves or tubing at the top of the cylinder.



FM-200

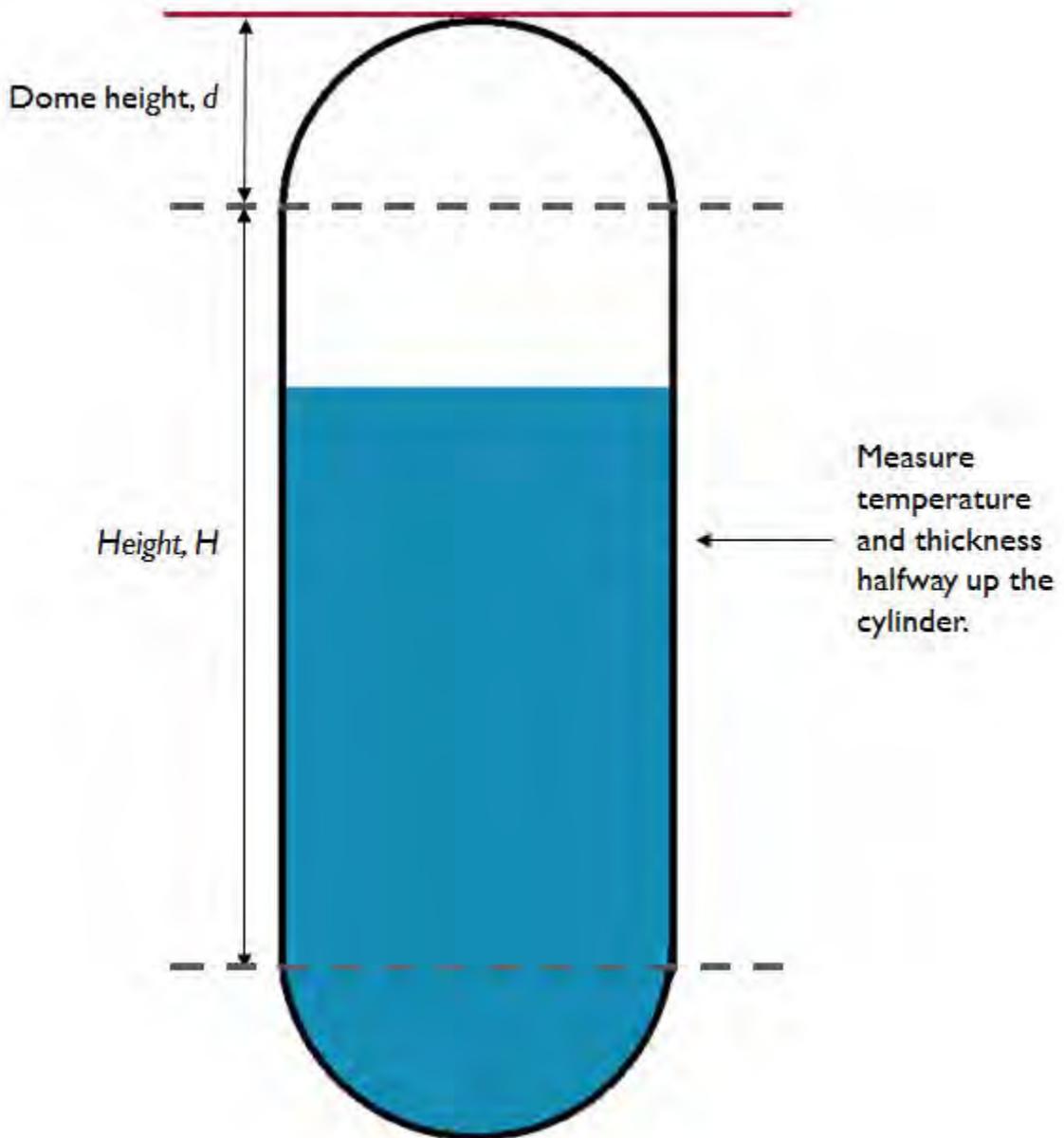
The measurements which need to be taken are:

- Actual Agent Mass, this is the mass of agent with which the cylinder was originally filled, and should be printed on the side of the cylinder. This must be measured in kilogrammes for metric units and pounds for imperial units. This needs to be measured to the nearest 0.1 kg or nearest 1 lb.
- Height, this needs to be measured from the base of the cylinder to the point at which the cylinder begins to curve, shown as H in the diagram overleaf. This must be measured in centimetres for metric units and inches for imperial units. This needs to be measured to the nearest 0.1 cm or nearest 0.1 ”.
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- Temperature, this should be measured using a Portatherm[®] temperature probe, or other appropriate method. It should be measured around half way up the cylinder and the full readout on the Portatherm[®] should be entered into the calculator. This must be measured in °C for metric units and °F for imperial units. If not using the Portatherm[®], this needs to be measured to the nearest 0.1 °C or nearest 0.1 °F.
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- Thickness, this is the thickness of the cylinder. It should be measured around half-way up the cylinder using a Portagauge[®] or other thickness measuring device. The full readout on the Portagauge[®] should be input into the calculator. This must be measured in millimetres for metric units and inches for imperial units. If not using the Portagauge[®], this needs to be measured to the nearest 0.1 mm or nearest 0.1 ”.

FM-200 Cylinder

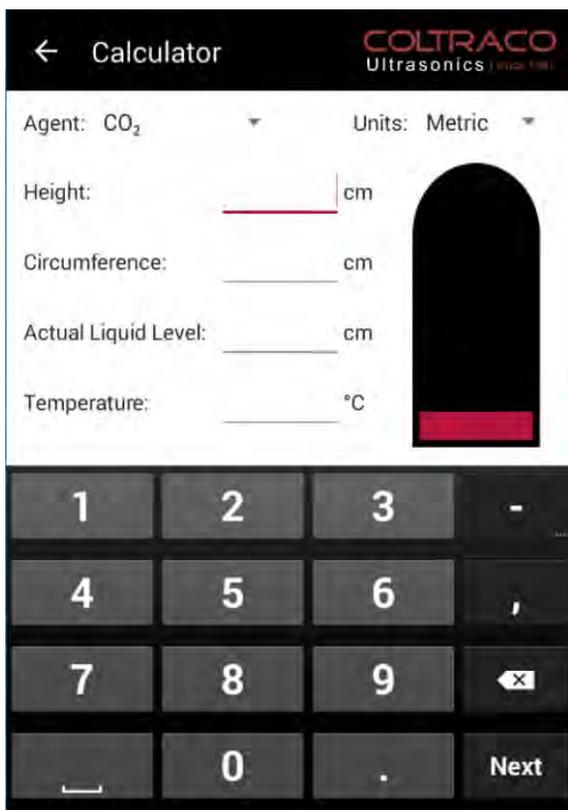
The grey dashed lines shows the points at which the cylinder *begins* to curve, it is important that measurements are taken correctly relative to these points.

The red line shows the top of the cylinder, the dome height should not include any components of the valves or tubing at the top of the cylinder.



Performing Calculations

Once all the necessary measurements have been taken to calculate either mass or liquid level, they can be inputted into the calculator.



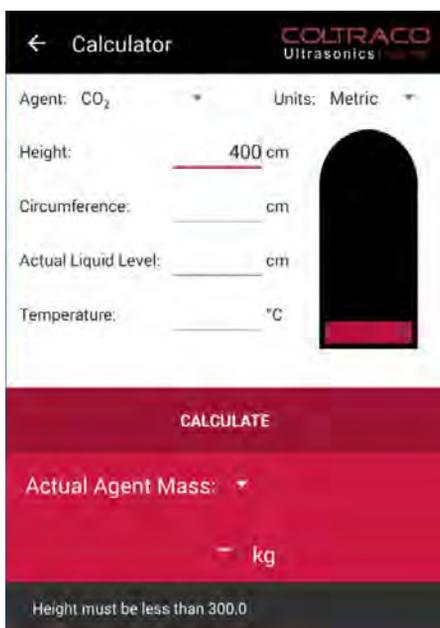
The screenshot shows the 'Calculator' app interface for COLTRACO Ultrasonics. At the top left is a back arrow and the title 'Calculator'. At the top right is the COLTRACO logo and 'Ultrasonics | Model 100'. Below the title, there are two dropdown menus: 'Agent: CO₂' and 'Units: Metric'. The main input area contains five rows, each with a label and a text input field followed by a unit: 'Height: _____ cm', 'Circumference: _____ cm', 'Actual Liquid Level: _____ cm', and 'Temperature: _____ °C'. To the right of these fields is a diagram of a tank with a red liquid level at the bottom. At the bottom of the screen is a numeric keypad with buttons for digits 1-9, 0, a decimal point, a minus sign, a comma, a backspace key, and a 'Next' button.

To input measurements, tap in the space above the line next to the corresponding measurement value to be entered. This will bring up the on-screen keyboard, which can then be used to input the measured value.

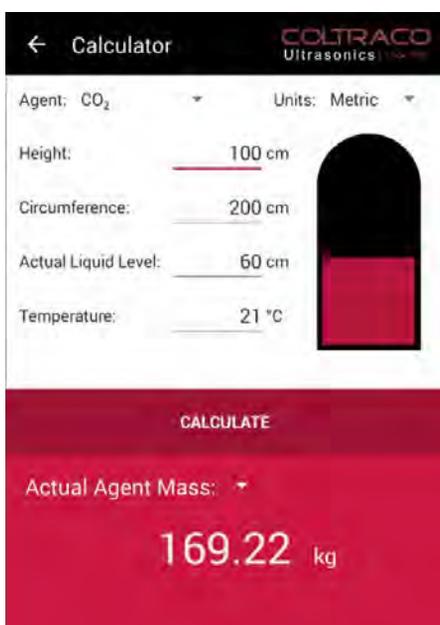
It is important to enter all the values as precisely as possible (including numbers after the decimal point).

Once all the measurements have been correctly inputted into the calculator, close the keyboard and tap the 'Calculate' below the input boxes.

CALCULATE



If something has been input incorrectly, an error message will appear at the bottom of the screen, detailing what it is that must be changed for the inputs to be valid.



When everything has been input correctly, the liquid level / mass calculated will then be displayed at the bottom of the screen.



4. Database Mode

Cylinder Database

The application also has the ability to create and organize records of cylinder dimensions and calculation results. This means that when cylinders are tested again, the record of their dimensions can be simply opened in the app, rather than having to measure all the cylinders each time they are tested. This makes testing cylinders much more efficient. It also allows many cylinders of the same type and dimensions to be tested quickly, with all the results being stored and then exported with a single click.

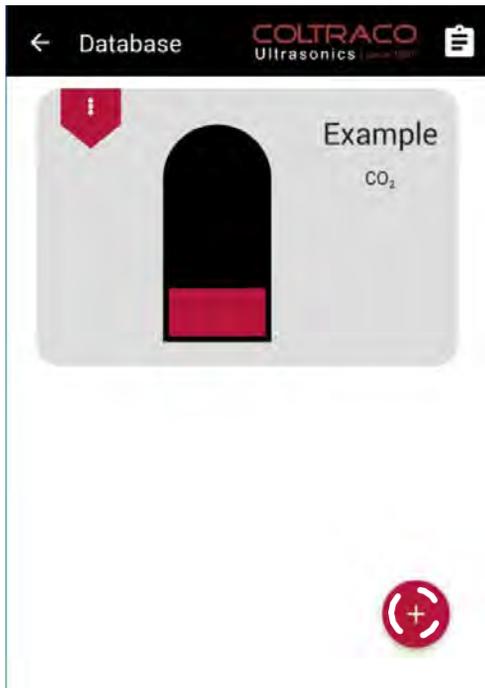
When the application boots it will open onto its home screen.



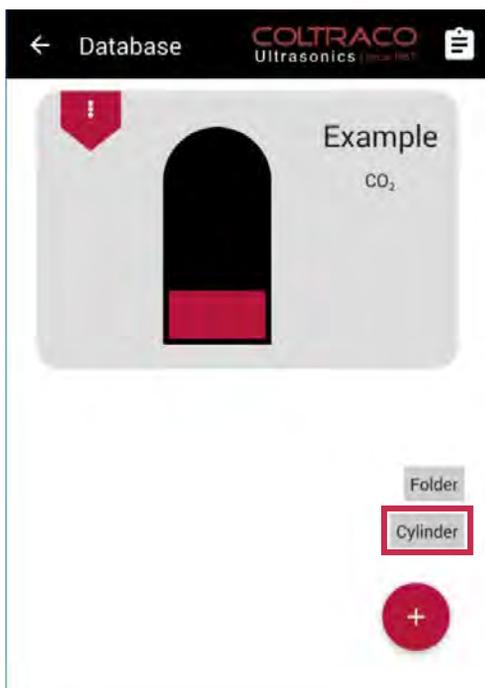
To access the database, select the Database option by tapping on the lower half of the screen as highlighted here. This will open the database into the home folder.

Adding a New Cylinder to the Database

The first time the database is loaded, it will contain only a single example cylinder. New saved cylinders for as many different cylinder types and dimensions as is needed can be added and stored in the database for later use.

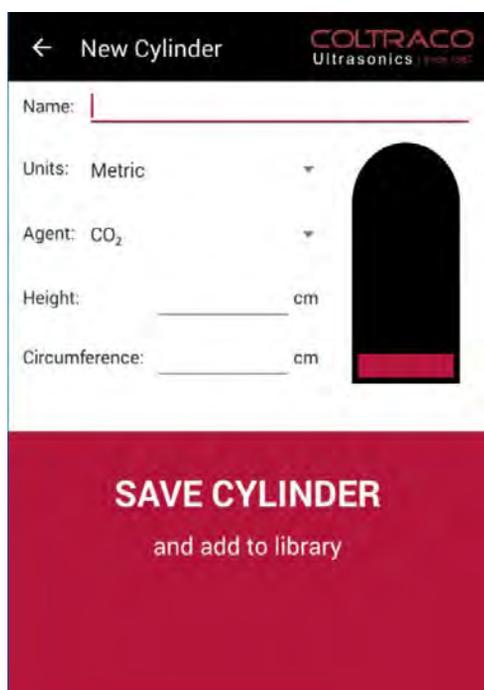


To add a new cylinder to the database, start by clicking the + button in the bottom right, as shown here.



Clicking the + button brings up 2 options: creating a new folder or creating a new cylinder. Choose the second option as shown here to create a new cylinder. This will bring up the New Cylinder creation screen.

The New Cylinder creation screen is very similar to the Calculator Mode as detailed on page 8. The specifications and dimensions of the new cylinder should be input in exactly the same way as in Calculator Mode, the only differences being that the new cylinder being created must be given a unique name to identify it in the database, and that no measured liquid level or mass needs to be inputted, since no calculation is being performed at this stage.



Once all of the required dimensions and cylinder information has been inputted, the cylinder can be added to the database by clicking the Save Cylinder button, as shown here.

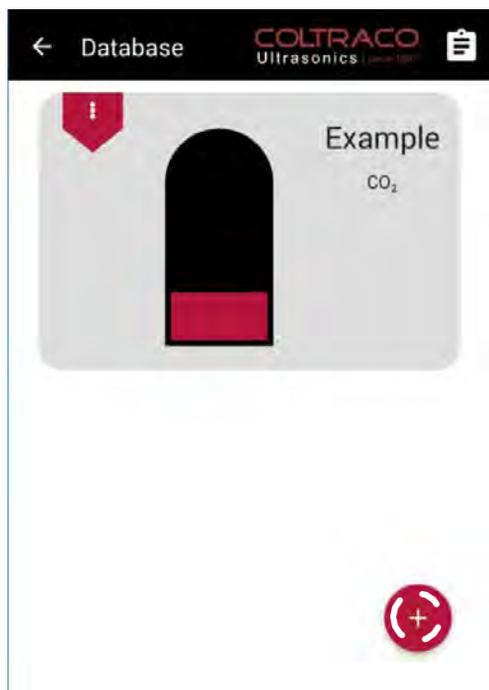
If something has been input incorrectly, an error message will appear at the bottom of the screen, detailing what it is that must be changed for the inputs to be valid.

When everything has been input correctly, the cylinder will be added to the folder you are currently in, and the New Cylinder screen will close, returning to the previous database view.

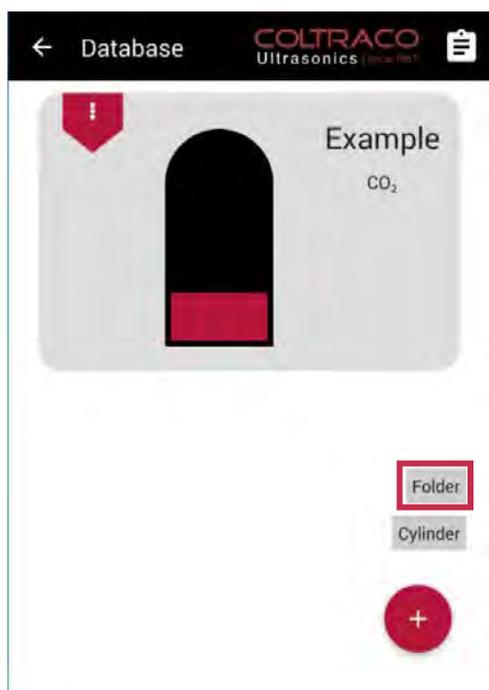
Alternatively, navigating back by using the back key or the back arrow in the top left of the screen will cancel the creation of the new cylinder, and any input will be lost.

Adding a New Folder to the Database

In addition to adding cylinders to the database, new folders and sub-folders can also be created. Within every folder, new cylinders and sub-folders can be created, allowing cylinders to easily be organized.

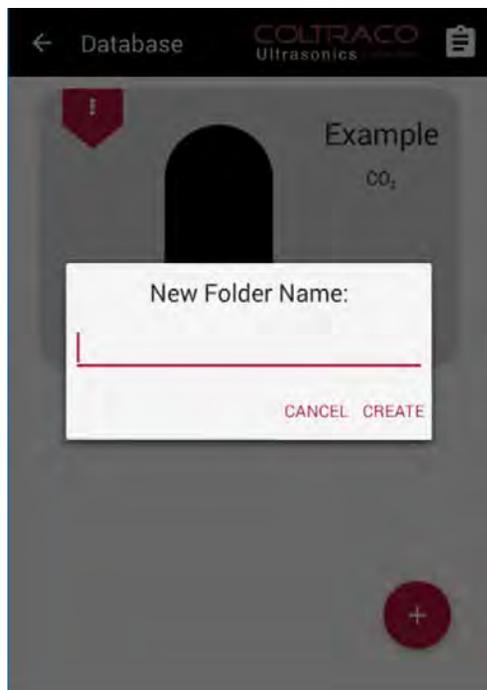


To add a new folder to the database, start by clicking the + button in the bottom right, as shown here.



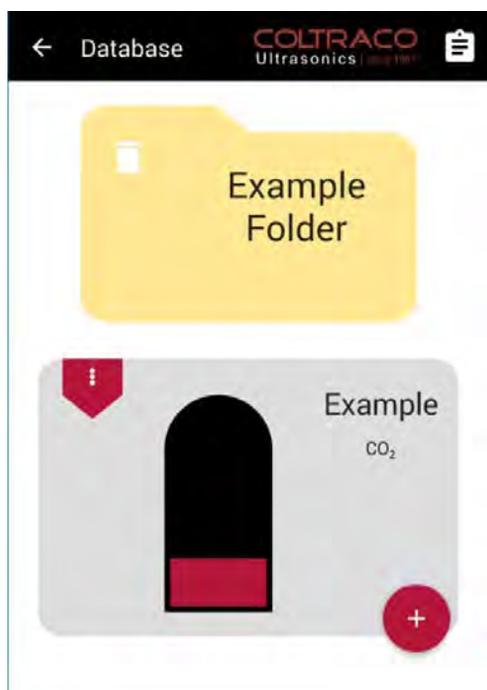
Clicking the + button brings up 2 options: creating a new folder or creating a new cylinder. Choose the first option as shown here to create a new folder.

A dialog will now pop up to name this new folder.



Simply click in the input box to bring up the on-screen keyboard, and use it to enter a unique name for this new folder.

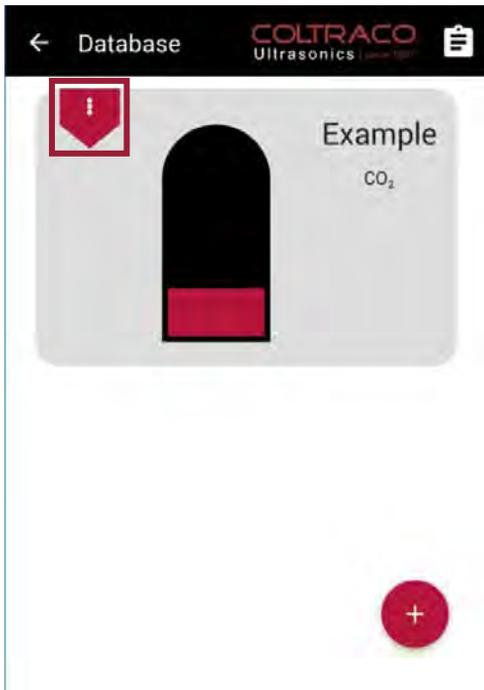
Selecting the Create button will then add this new folder to the database. Alternatively, select the Cancel button to abandon creating this new folder.



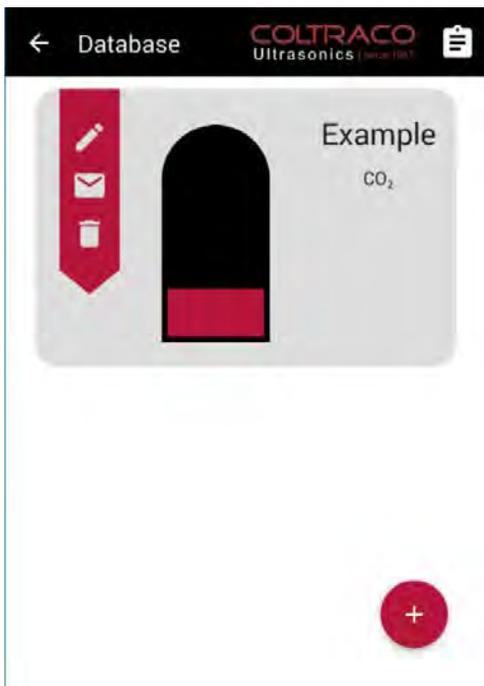
Upon choosing to create this new folder, it will be added to the database.

Managing Saved Cylinders

The first time the database is loaded, it will contain only a single example cylinder. Saved cylinders can be managed from their drop down ribbon, located to the left of the cylinder image.



The first time the database is loaded, it will contain only a single example cylinder. Saved cylinders can be managed from their drop down ribbon, located to the left of the cylinder image as shown here.



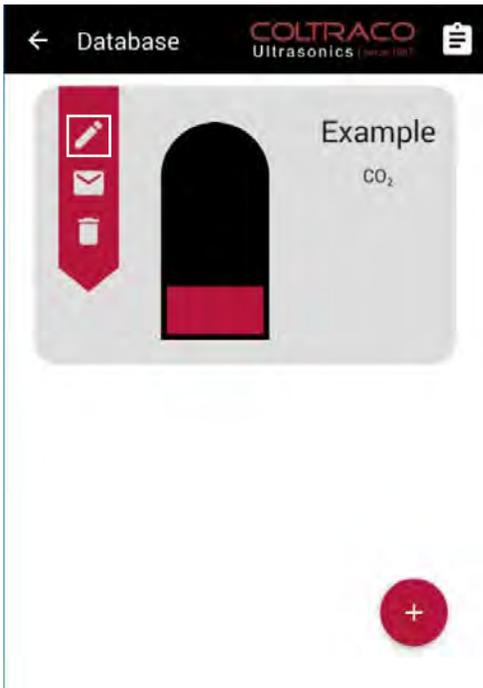
Clicking on the collapsed ribbon will open it up, showing the 3 cylinder management functions.

They are:

1. Edit
2. Export
3. Delete

Editing Saved Cylinders

The first cylinder management option of the drop down ribbon allows the saved dimensions and information of a cylinder to be edited.



Start by clicking on the first item in the drop down ribbon as shown here. This will bring up the cylinder editing screen.



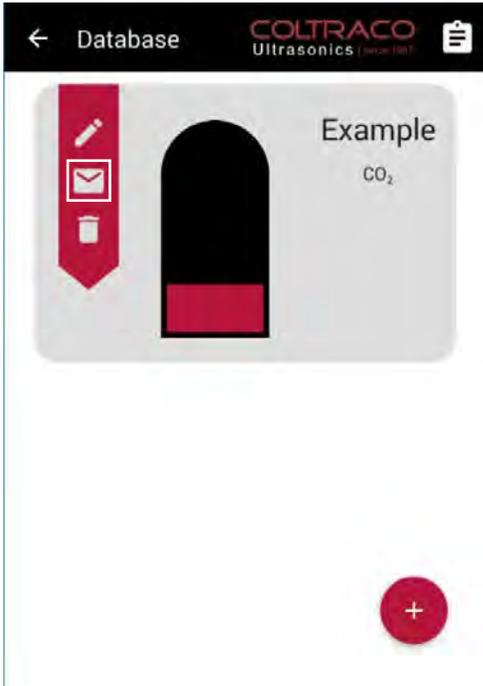
The editing screen is identical to the New Cylinder creation screen detailed on page 29, except that the information input boxes are pre-filled with the current information stored for this cylinder. This information can be altered in exactly the same way as detailed on page 25.

Once the cylinder information is finished being edited, these changes can be committed by clicking the Save Cylinder button, as shown here. In the same way as when creating a new cylinder, this will display an error if any inputs are invalid, as detailed on page 29. When everything has been input correctly, any changes will be committed and applied to the saved cylinder in the database, and in doing so will overwrite any stored calculation results for this cylinder (see page XX for more on storing calculation results).

Alternatively, navigating back by using the back key or the back arrow in the top left of the screen will abandon any changes made to the cylinder being edited.

Exporting Saved Cylinders

The second cylinder management option of the drop down ribbon allows the saved dimensions and information of a cylinder to be exported via email.



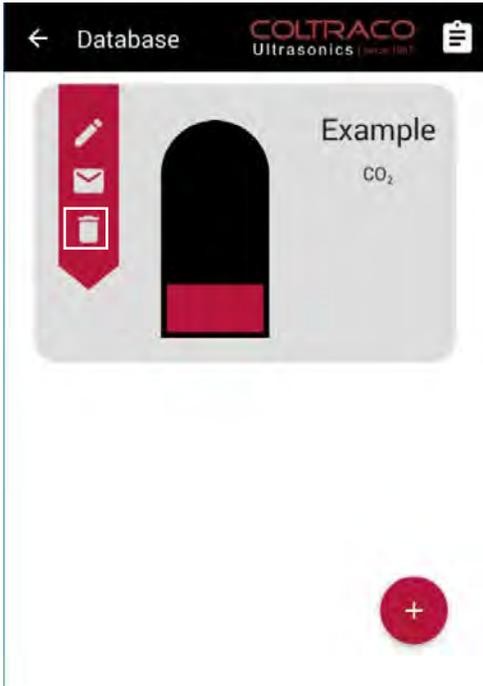
Start by clicking on the second item in the drop down ribbon as shown here. This will bring up the email client if an email account has already been setup, otherwise it will prompt you to do so.



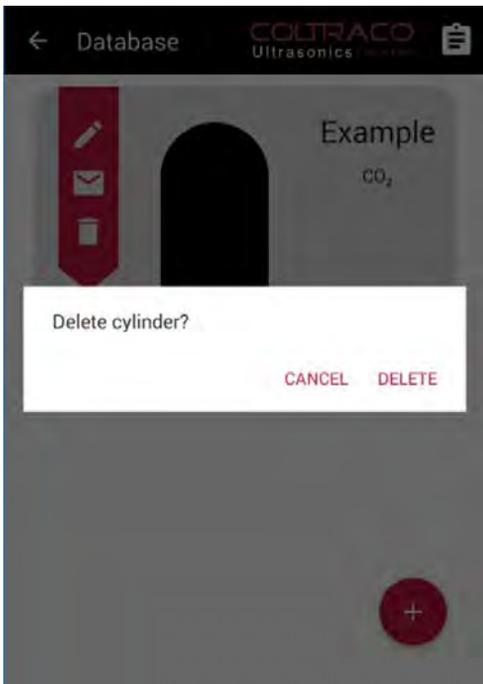
Once an email address has been successfully setup, the application will write a new email and fill it with the information and dimensions of the selected cylinder. This email will be sent from the email account setup on the tablet, and can be sent to any email address chosen, including the same address it is being sent from.

Deleting Saved Cylinders

The final cylinder management option of the drop down ribbon allows a cylinder to be completely removed from the database.



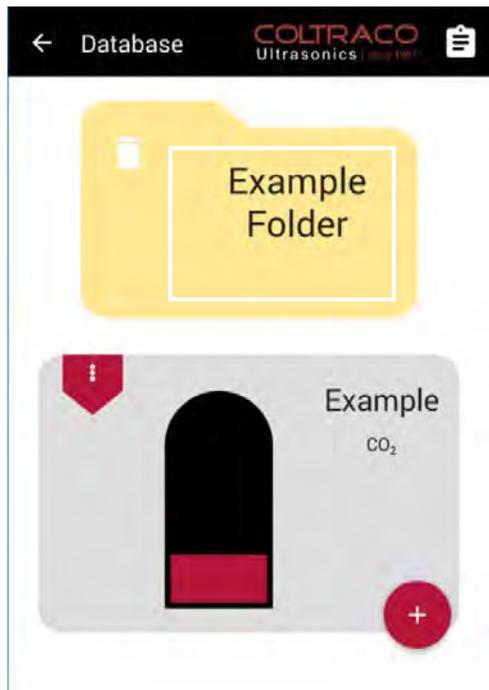
Start by clicking on the third item in the drop down ribbon as shown here. This will then prompt the application to check that you really wish to delete the selected cylinder.



Simply choose Delete to completely remove the selected cylinder, otherwise choose Cancel to keep the cylinder in the database.

Navigating the Database

After creating new folders, they can be opened and dealt with in the same way as the home folder.

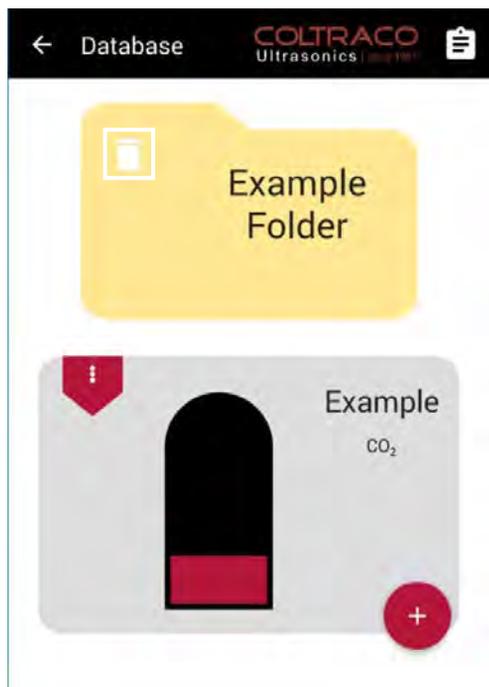


When the database first opens it will be in its home folder. Clicking on a folder will open the selected folder and navigate into this sub-folder.



Any cylinders and folders within the folder selected will now be displayed, and can be managed in exactly the same way as those in the home folder. New folders and cylinders can also be created within the current folder in exactly the same way as detailed previously.

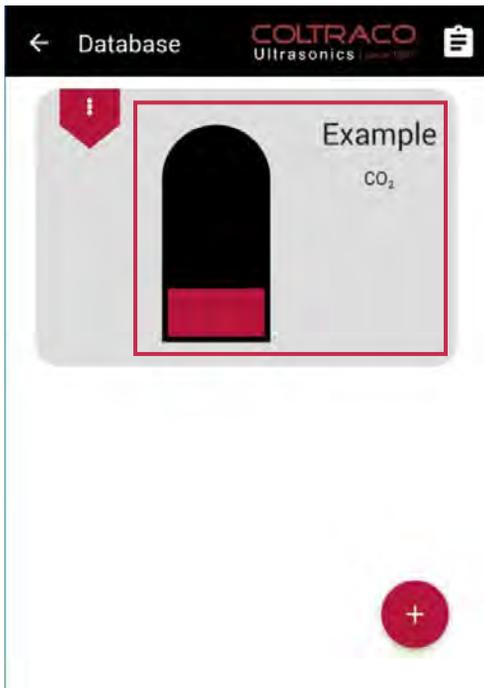
To navigate upwards in the file system, use the back button or the back arrow in the top left of the screen in order to navigate a single level upwards. In other words, this means you will be navigating into the folder containing the current folder you are within. Navigating upwards within the home folder will save and close the database.



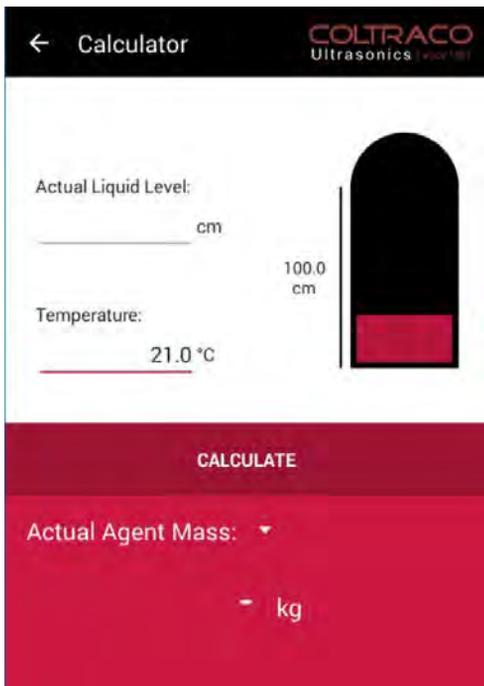
Any sub-folder in the database can be deleted by clicking on the delete icon in the upper left of the folder. This will prompt the application to check that you really wish to completely remove the folder and everything contained within it in the same way as detailed on page 35.

Performing Calculations on Saved Cylinders

After creating saved cylinders, calculations can be performed using this cylinder information.

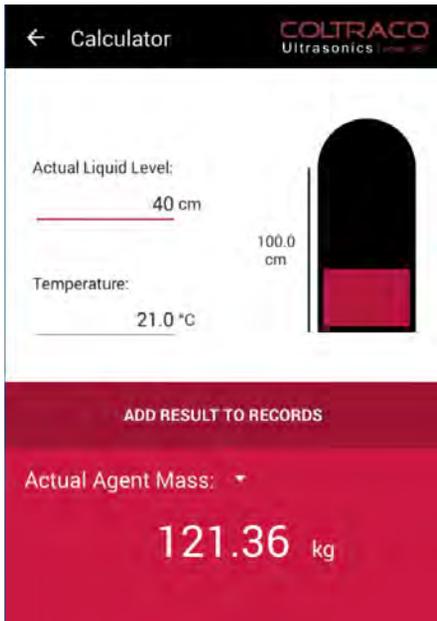


To perform a calculation on a cylinder, simply click on the selected cylinder. This will open up the saved cylinder calculator.

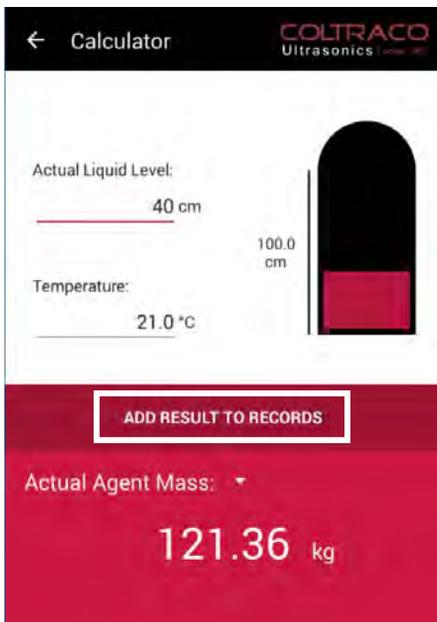


This saved cylinder calculator is very similar to Calculator mode as detailed on page 8, except that the only 2 inputs which can be altered are Temperature and either Actual Liquid Level or Actual Agent Mass, depending on what is being calculated.

Once all the measurements have been correctly inputted into the calculator, close the keyboard and tap the 'Calculate' below the input boxes, in the same way as for Calculator mode, as detailed on page 26.



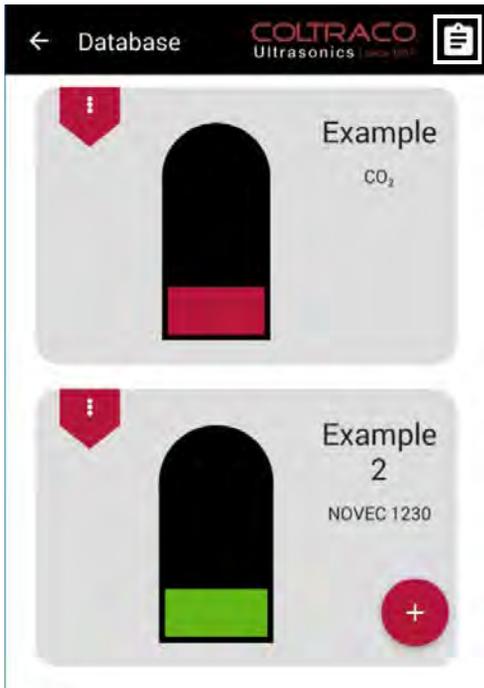
Also in the same way as in Calculator mode, if something has been input incorrectly, an error message will appear. Otherwise the calculation result will appear at the bottom of the screen, as shown here.



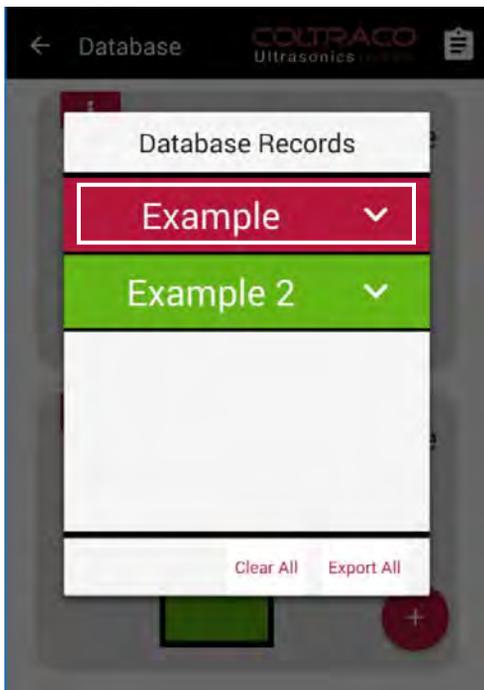
After calculating the result, it is possible to add this result to a list of stored results for this specific cylinder. This can be done by clicking the Add Result To Records button, which is shown here. Every result can be added to the records multiple times, and will bring up a message saying how many times the current result has been stored.

Managing Calculation Records

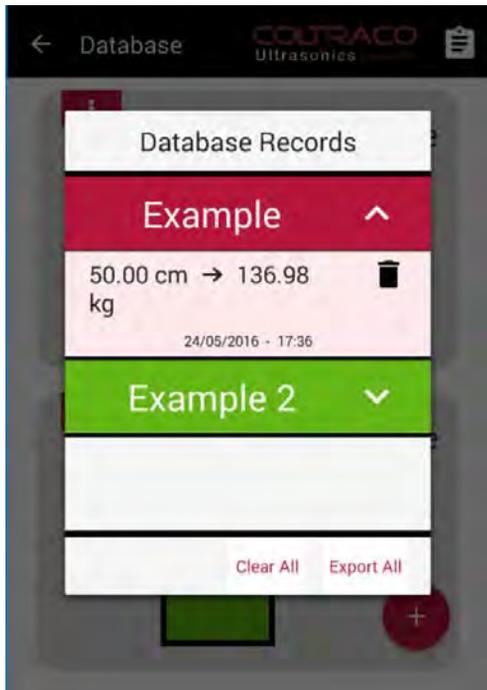
After storing cylinder calculation results, they can be viewed, managed and exported from Database Records.



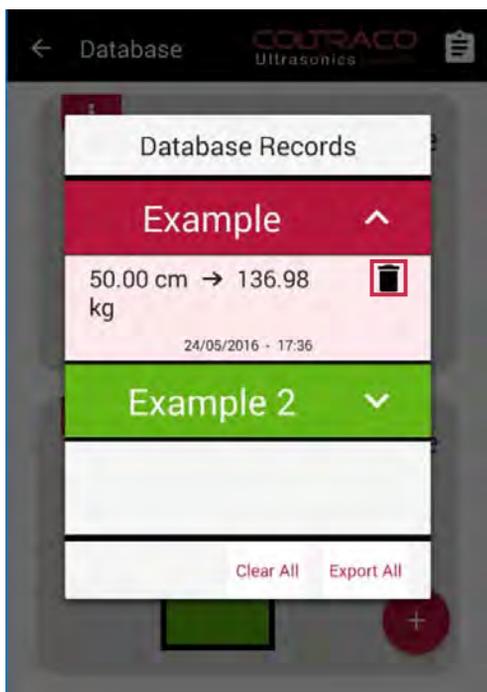
To open up Database Records, simply click the Records icon as seen here.



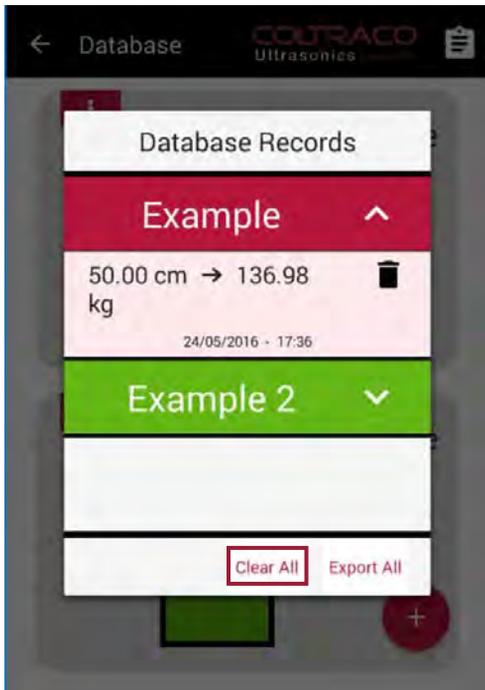
The Database Records organize calculation results by cylinder, as can be seen here. To view the results for a certain cylinder, simply click on the selected cylinder's name. This will open up a drop down list of results.



Opening up the records for a cylinder will show all of the stored records for that cylinder, organized by how new the record is, as seen here.



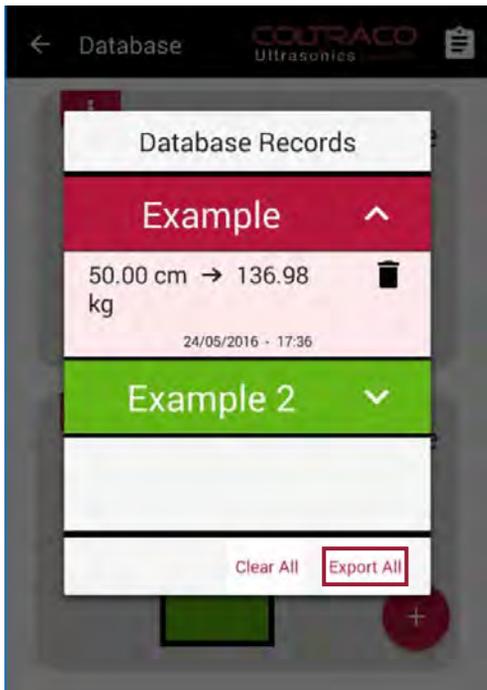
A record can be removed by clicking the delete icon, as shown here. This will permanently remove the selected result from the records.



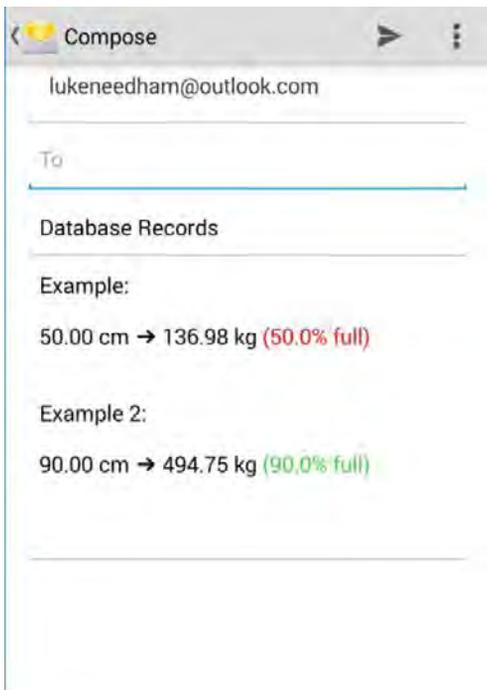
It is also possible to remove every record for every cylinder in Database Records, by clicking the Clear All button, as shown here.

Exporting Calculation Records

It is possible to export all of the calculation results stored in Database Records via email with a single click.



Start by clicking the Export All button, as shown here. This will bring up the email client if an email account has already been setup, otherwise it will prompt you to do so.



Once an email address has been successfully setup, the application will write a new email and fill it with the calculation results from every cylinder. These results are organized by cylinder, and are color-coded according to how full the cylinder was according to the liquid level either input or calculated. This email will be sent from the email account setup on the tablet, and can be sent to any email address chosen, including the same address it is being sent from.



5. Maintenance

Basic maintenance of the tablet involves simple procedures such as recharging the battery. Any major maintenance is carried out by the technical team. Please contact service@sdifire.com for any queries.