Manual Verder Liquids

Verder Liquids Manual

Pages

Step 1. Data used in all calculations

On this page you declare two things.

- all the global variables, which will be used throughout the calculations.
- the type of system based on the pump (hydraulic / diaphragm / peristaltic / lobe)

Read more by clicking on the link below:

→ Step 1. Data used in all calculations /steps/step-1.-data-used-in-all-calculations

Step 2. Main calculation

The main calculation consists of two sections.

On the left you have "suction line" and on the right the "discharge line". You can swipe on them to open these sections.

> Note: if you swipe from too far on the left or right, this triggers a browser setting where it will try to load the previous/next page in your history. Therefore this swipe gesture works best in the app itself since you have an empty browser history in the app.

Read more by clicking on the link below:

→ Step 2. Main Calculation /steps/step-2.-main-calculation

Step 3. Results

This page has all the results based on the inputs you gave in steps one and two, with an export to PDF function.

Read more by clicking on the link below:

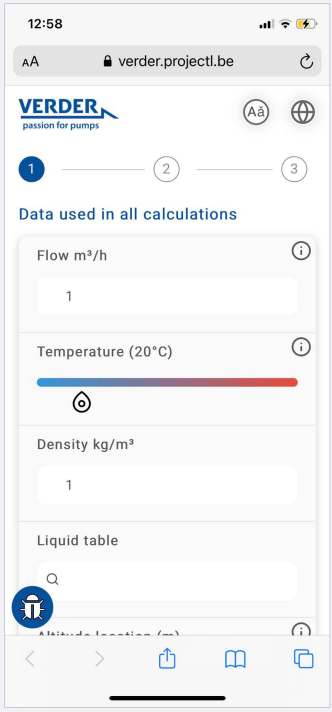
→ Step 3. Results /steps/step-3.-results

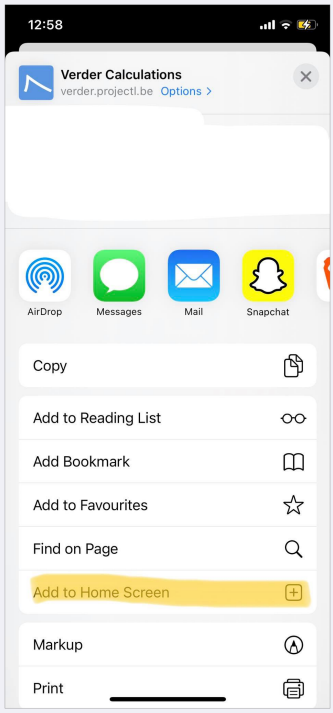
General

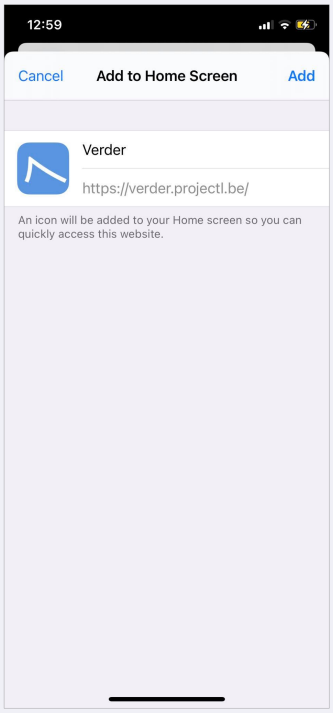
Installation

iOS (iPhone, iPad)

- [ ] Open the website in safari (https://verder.projectl.be)
- [ ] Click on the share icon (on iPhone this is at the center bottom, on iPad the top right corner)
- [ ] Click on "Add to Home Screen"
- [ ] Confirm by clicking on "Add"



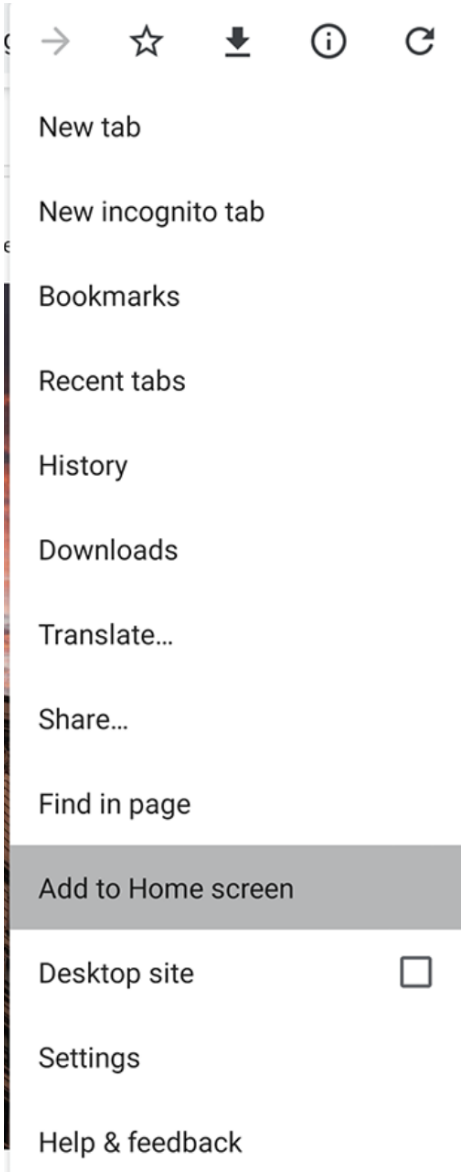




Android

- [ ] Open https://verder.projectl.be in your default browser
- [ ] Click the three vertical dots in the top right corner
- [ ] A dropdown menu will open, select "Add to Home screen"

Three vertical dots



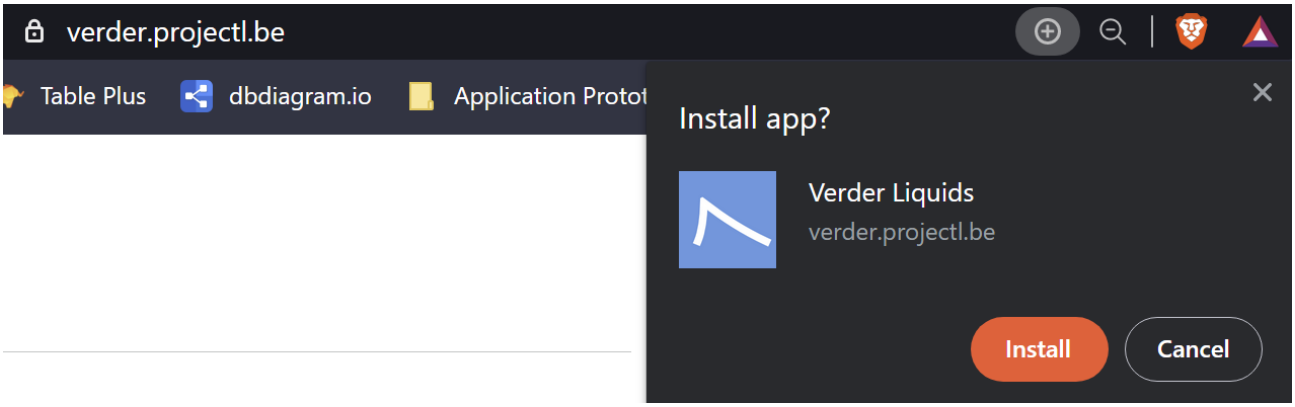
Windows / MacOS

On windows / MacOS the process to install the web application is the same:

- [ ] Open https://verder.projectl.be in google chrome

- [ ] In the URL bar you'll see a "+" icon on the right if your browser is supported. If not you should update your browser first.
- [ ] Click the "+" icon
- [ ] Confirm the installation

Note the "+" icon on the right



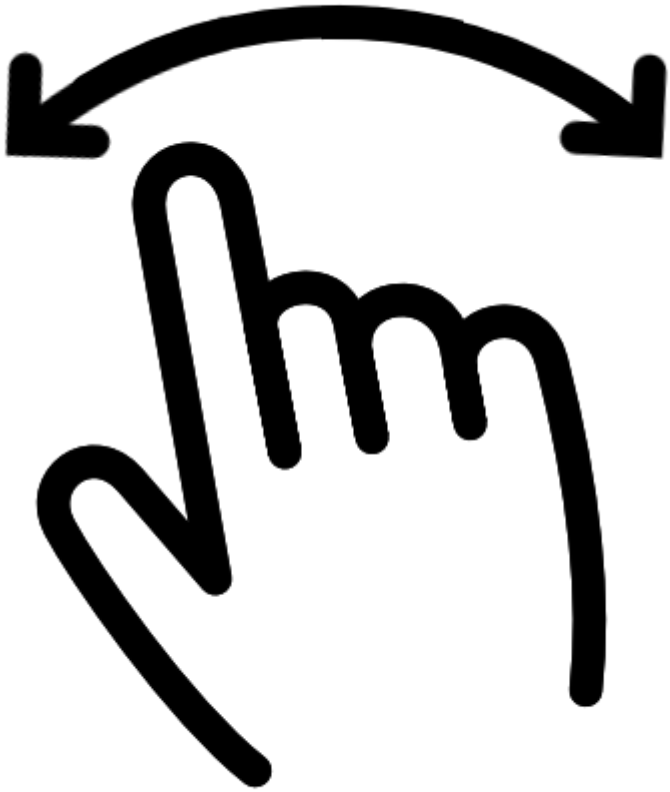
Confirm by clicking "install"

Icons

Some icons are used throughout the application and indicate a specific action can be taken. In this page you'll find an overview of these icons.

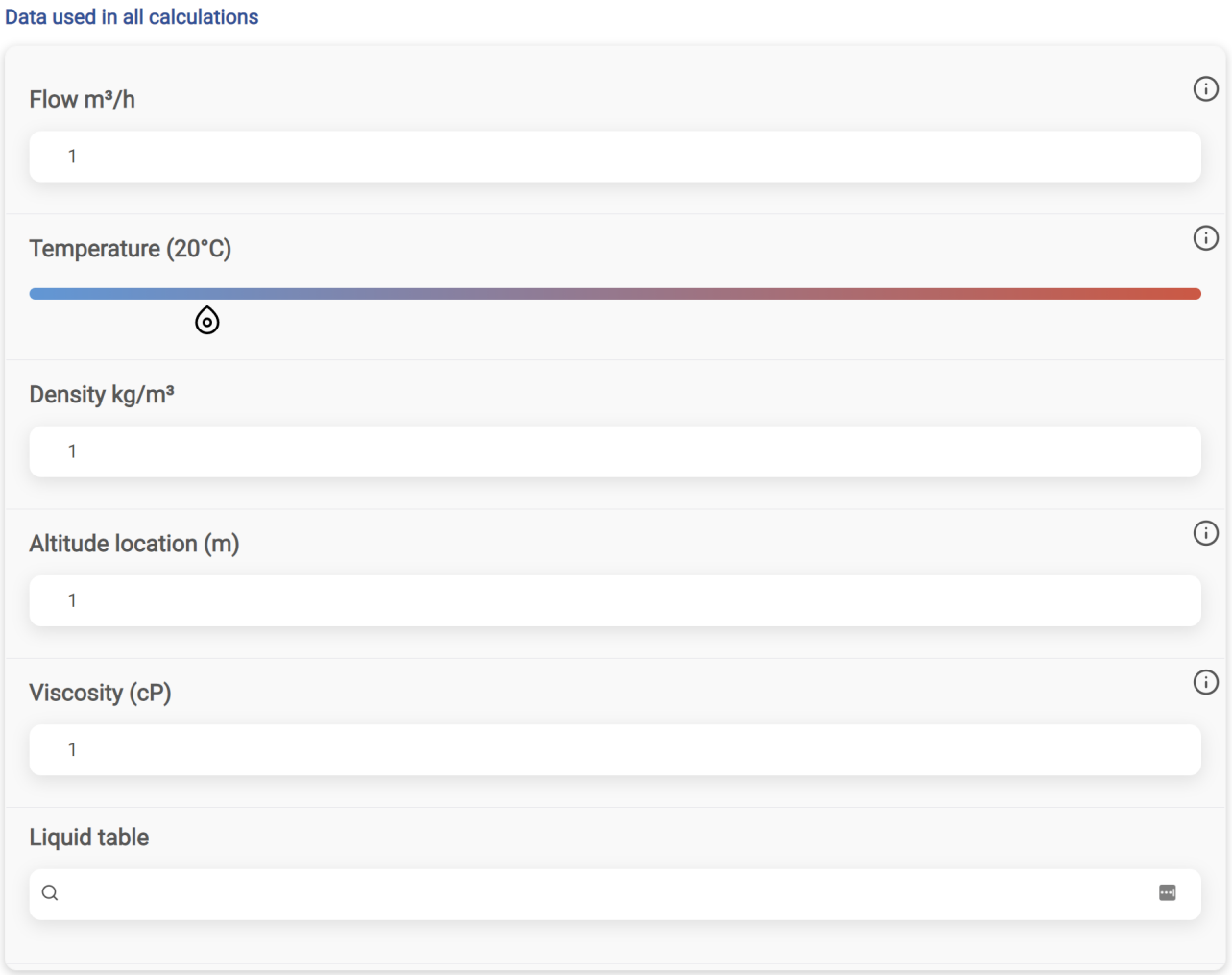
Swipe Icon

The icon below is used to demonstrate you can swipe in the direction specified by the arrow. (if the arrow goes in both directions, you can also swipe both directions)



Step 1. Data used in all calculations

1. Input fields



Overview of the input fields

Below you will find a table with the fields and their properties. if there is no min/max value it's represented as a dash. E.g. min: 0 with no maximum value would be: 0/- or vice versa.

Field	Description	Min/max value	Metric	Imperial
Flow	Volume displacement in time	0/-	m³/h	gal/m
Temperature	Liquid temperature	0°C/140°C	°C	°F

Density	Mass / volume ratio	0/-	kg/m³	lb(m)/ft³
Altitude	Height location above sea level	-/-	m	ft
Viscosity	Thickness of the fluid "measure of it's resistance to deformation at a given rate"	-/-	cP	lb(f)s/ft²

2. Liquid table

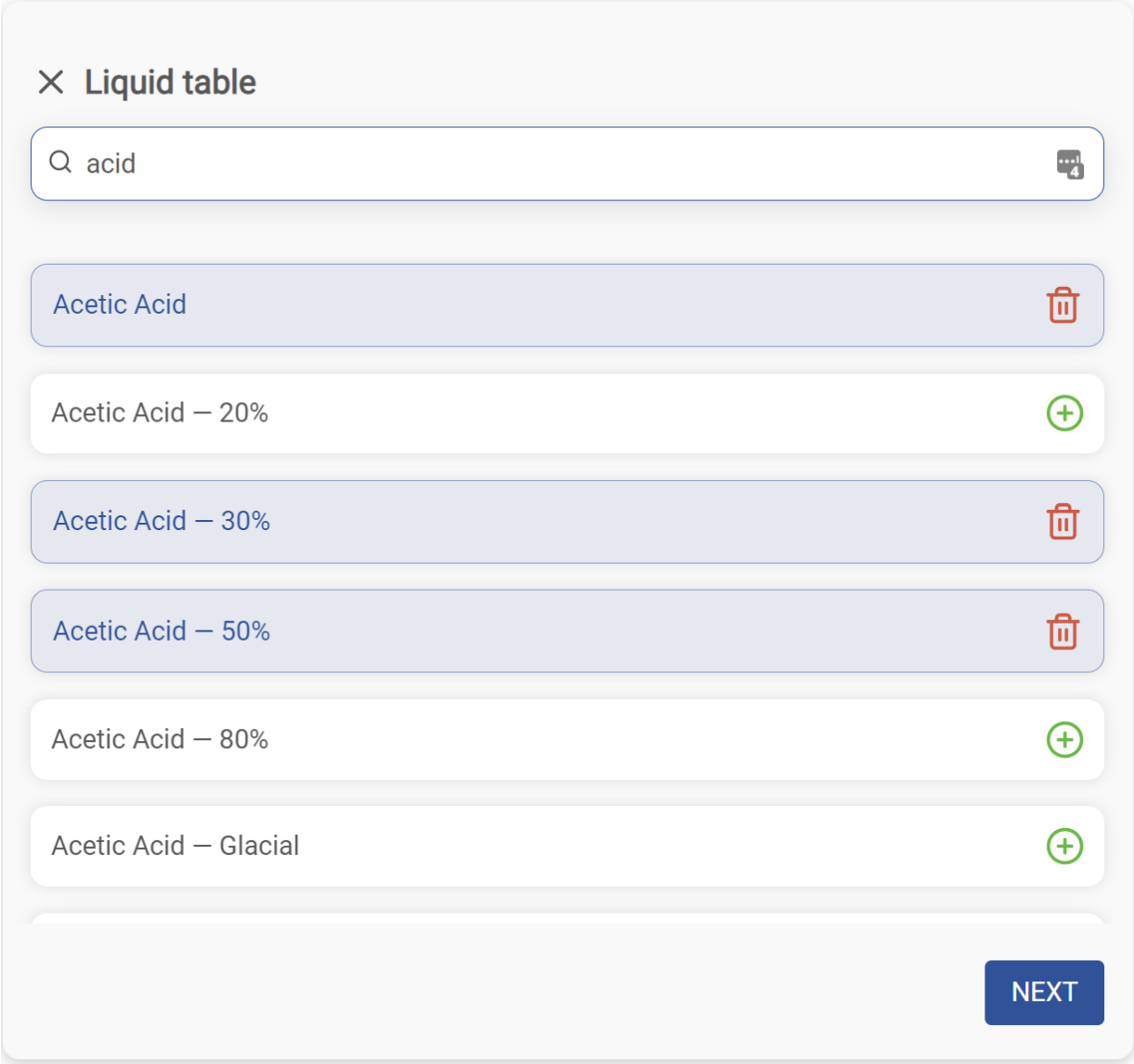
The section "Liquid table" can be used to compare how liquids would interact with certain materials.

2.1. Selecting the liquids

First of all you have to select the liquids you want to compare you can do this by following these steps:

- [ ] Click on the search bar.
- [ ] Enter a search query. (in the example we use "acid")
- [ ] The search results will now load as soon as you stop typing.
- [ ] Add/remove liquids by clicking on them (if it's highlighted it's added to the comparison)

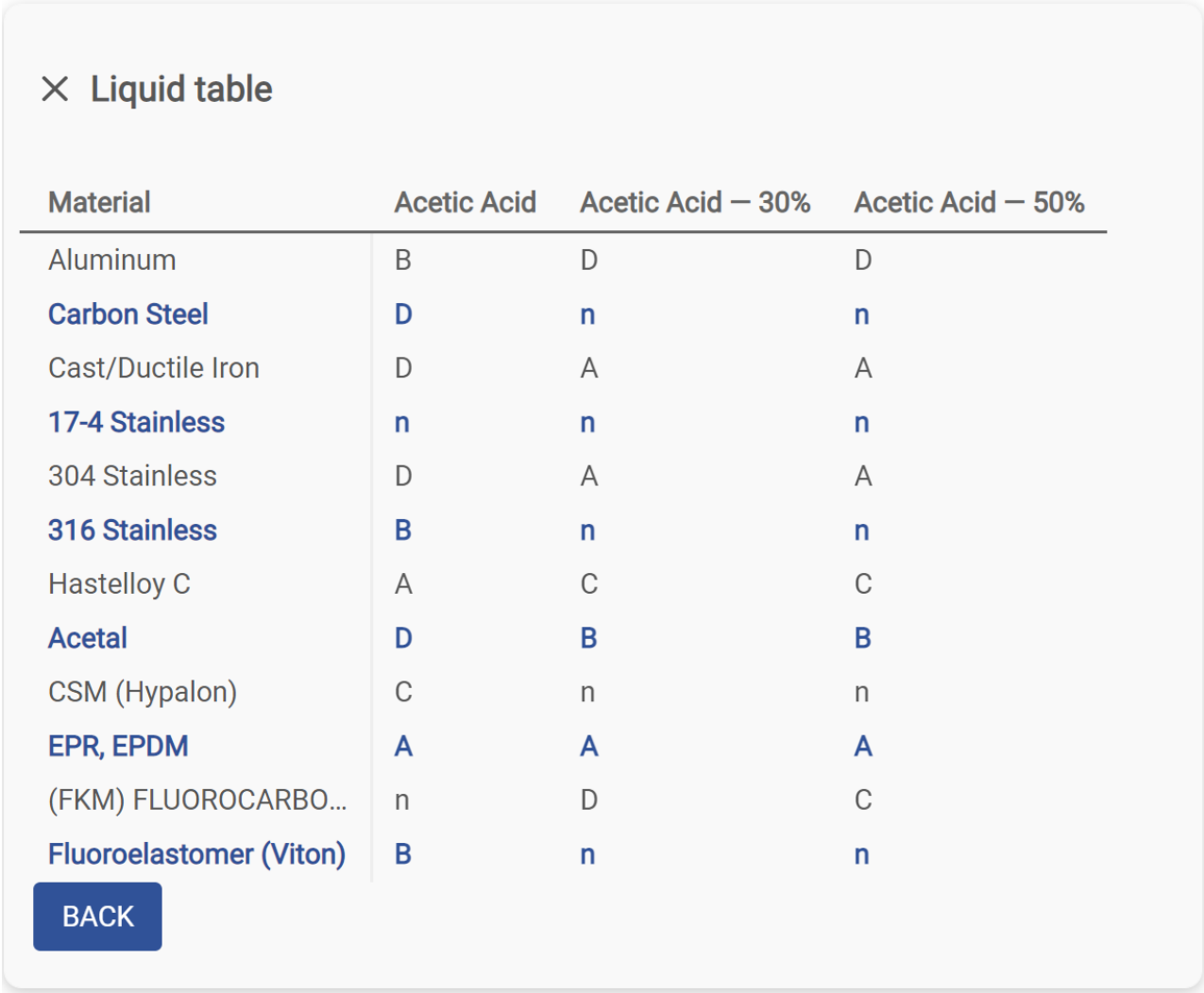
After these steps you should have something similar to this:



Search results for query "acid"

2.2. The comparison table

Now you can just click on "next" and the comparison table will be displayed. If it doesn't fit the screen, you can scroll both horizontally (for more liquids) and vertically (for more materials).



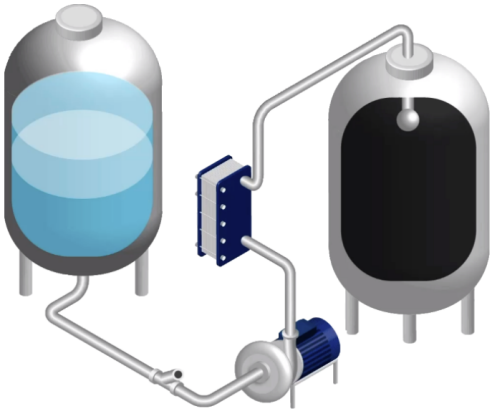
Comparison table for Acetic Acid, Acetic Acid - 30% and Acetic Acid - 50%

Selecting the pump type / schema

As indicated by the Swipe Icon (see Icons for more) you can swipe horizontally on the image, by doing so the schema shown in step 2 will change to the selected one.

Pump type

Centrifugal



Step 2. Main Calculation

Overview

When you get to the main calculations step, you are first presented with an animation of the schema. You can stop/replay this animation by tapping or clicking on it.

You can either click on / pull the gray rectangle on the side to open the settings.

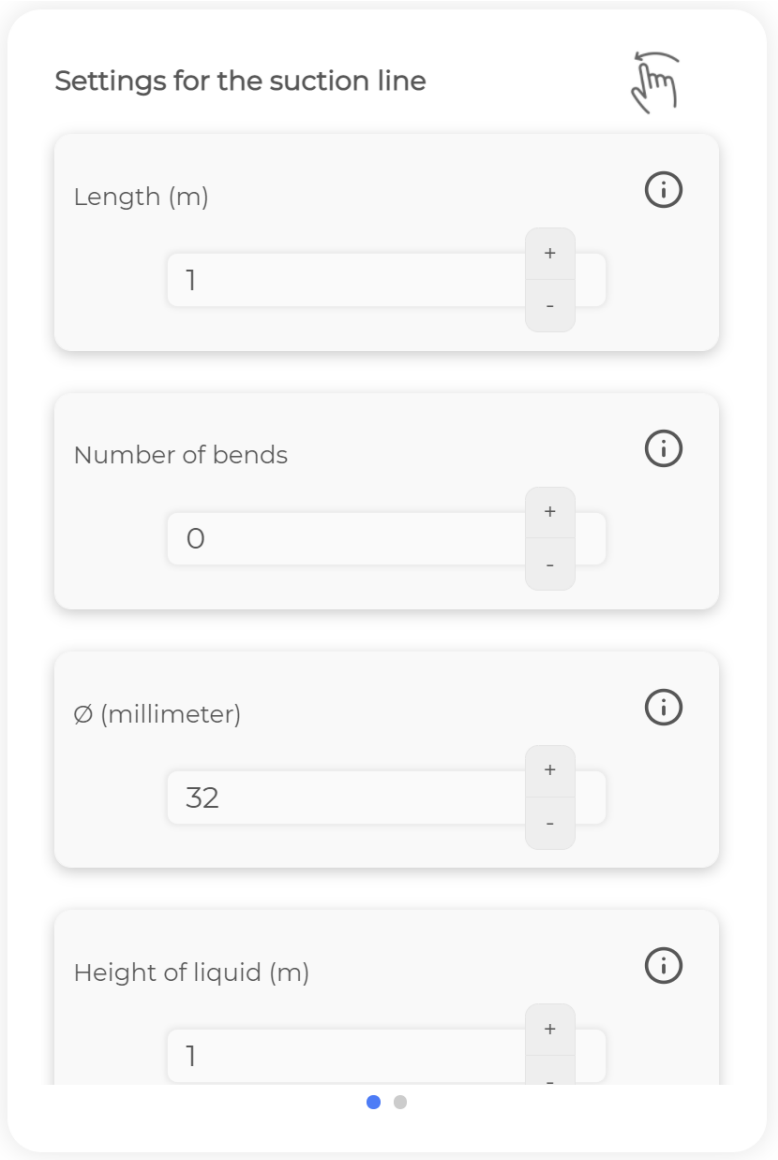
On the top you have the steps, you can click on "Data used in all calculations" or "Results" to go to that step.

Suction/Discharge settings

The settings consist of two pages:

- General inputs
- Losses in other components

You can navigate between pages by swiping as indicated by the Swipe Icon.



Suction Line Settings

1. Input Fields

Suction line

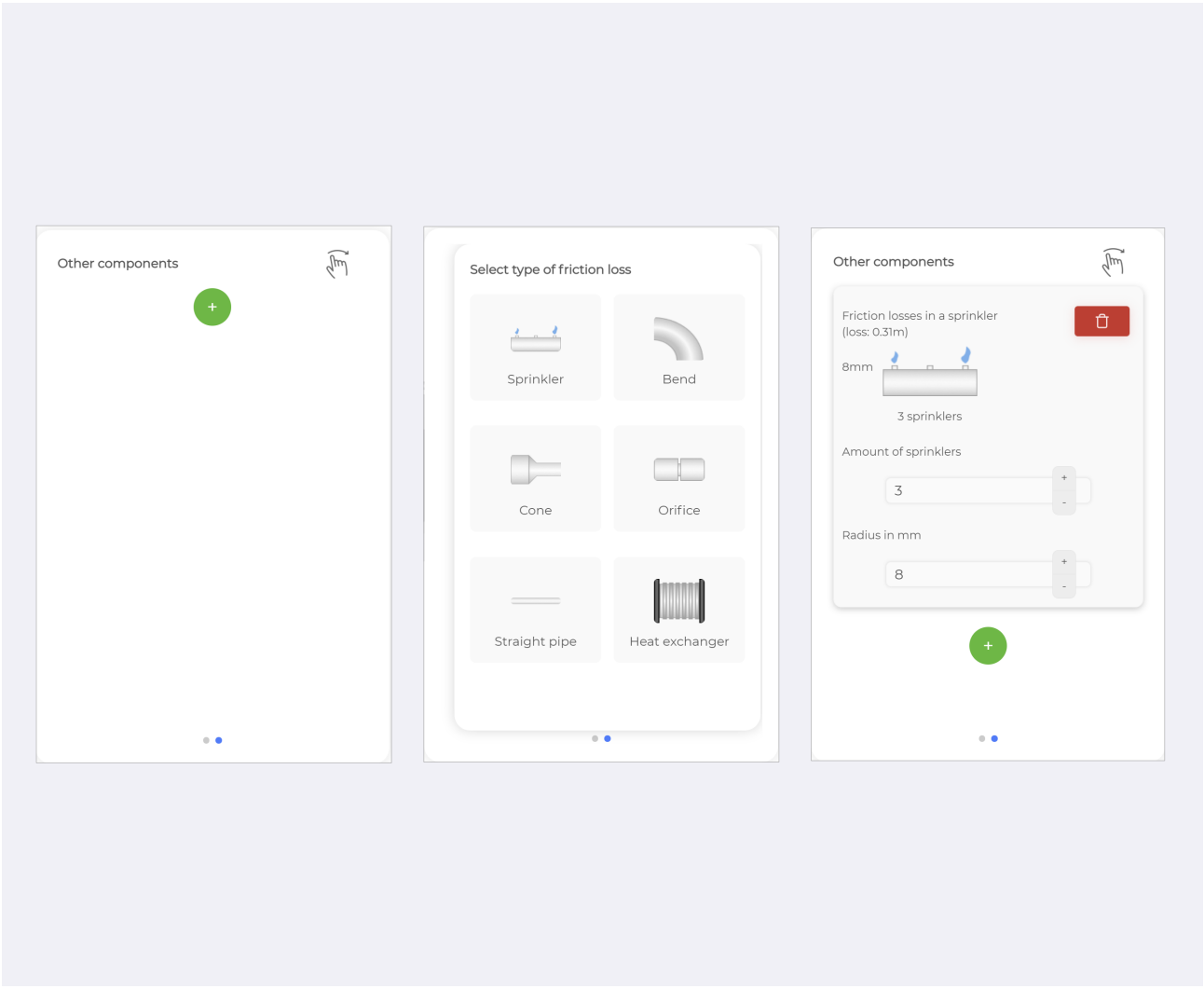
Field	Description	Metric	Imperial
Length	Horizontal and vertical length	m	ft
Bends	Number of bends		
Ø	Inside diameter of the piping	mm	inch
Height Liquid	Height from tank-outlet level up to liquid level	m	ft
Height	Height of bottom vessel above suction of the pump	m	ft
R/Ø	Radius to diameter ratio, value determines pressure losses in bends.		
Pressure	Relative static pressure on the liquid level in the suctionvessel (0 = atmospheric)	bar	lbs(f)/ft²

Discharge line

Field	Description	Metric	Imperial
Length	Horizontal and vertical length	m	ft
Bends	Number of bends		
Ø	Inside diameter of the piping	mm	inch
Height	Height of bottom vessel above suction of the pump	m	ft
R/Ø	Radius to diameter ratio, value determines pressure losses in bends.		
Pressure	Relative static pressure on the liquid level in the suctionvessel (0 = atmospheric)	bar	lbs(f)/ft

2. Losses in other components

You can add components by clicking on the "+" button, this will then present you a menu of what kind of component you would like to add.



If you no longer want a specific component you can just click the trash icon.

Step 3. Results

Vortexes

The program will automatically tell you if there's a risk a vortex will be created.

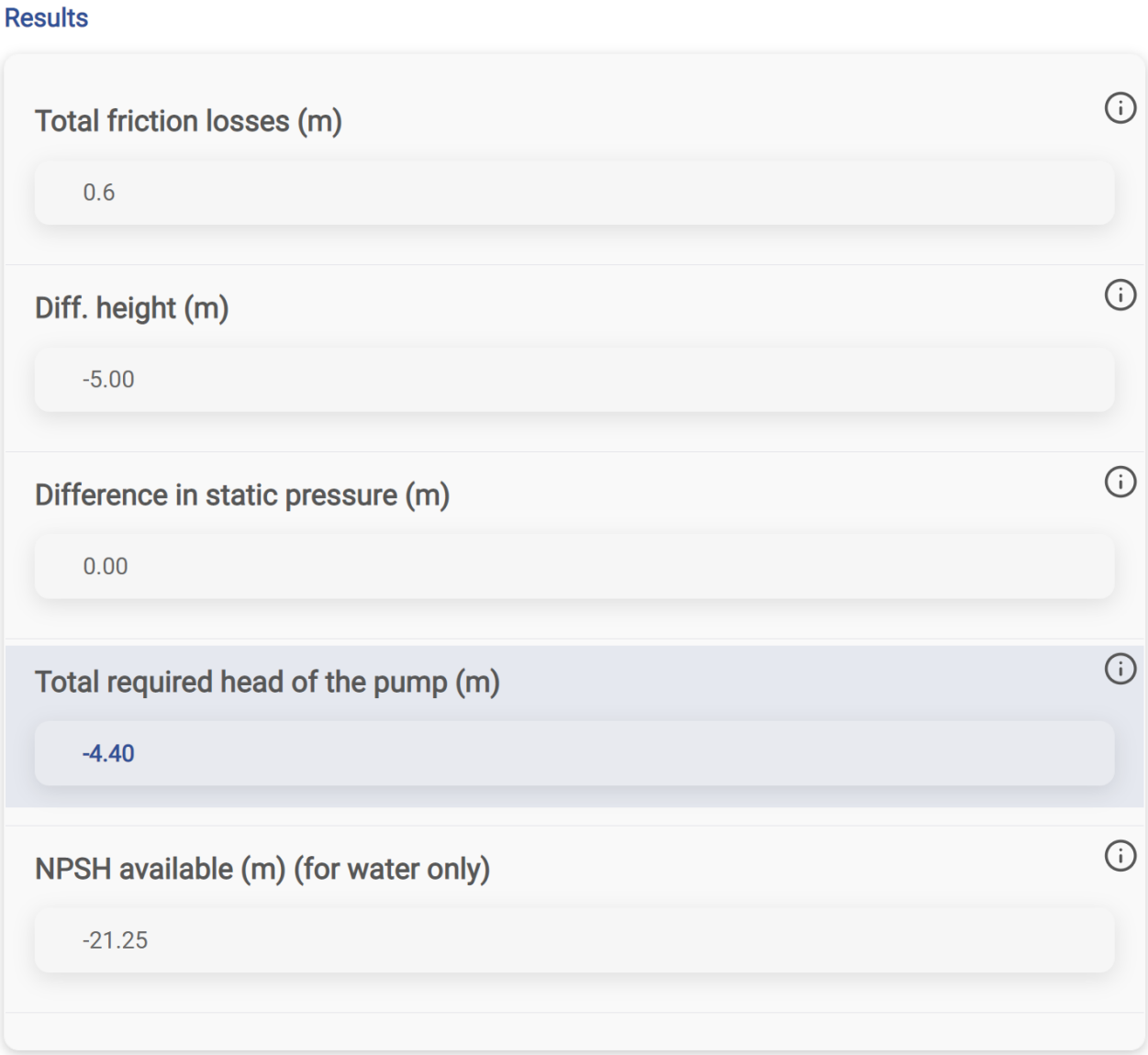
> There is a risk there will be a vortex created in the suctionvessel. Increase the level in the vessel to prevent a vortex.

If you get this warning, you should increase the "Height of liquid" in Main Calculations / Suction Line

→ Step 2. Main Calculation /steps/step-2.-main-calculation

General Results

At the top you will see some general values:



Example results

Suction / Discharge line results

At the bottom there's a section for the suction line and discharge line results, you can swipe between the two.

Suction line

Liquid speed in suction line (m/s)

0.3

Reynolds number

11052

Friction losses in suction line (m)

0.04

Discharge line

Liquid speed in discharge line (m/s)

0.6

Reynolds number

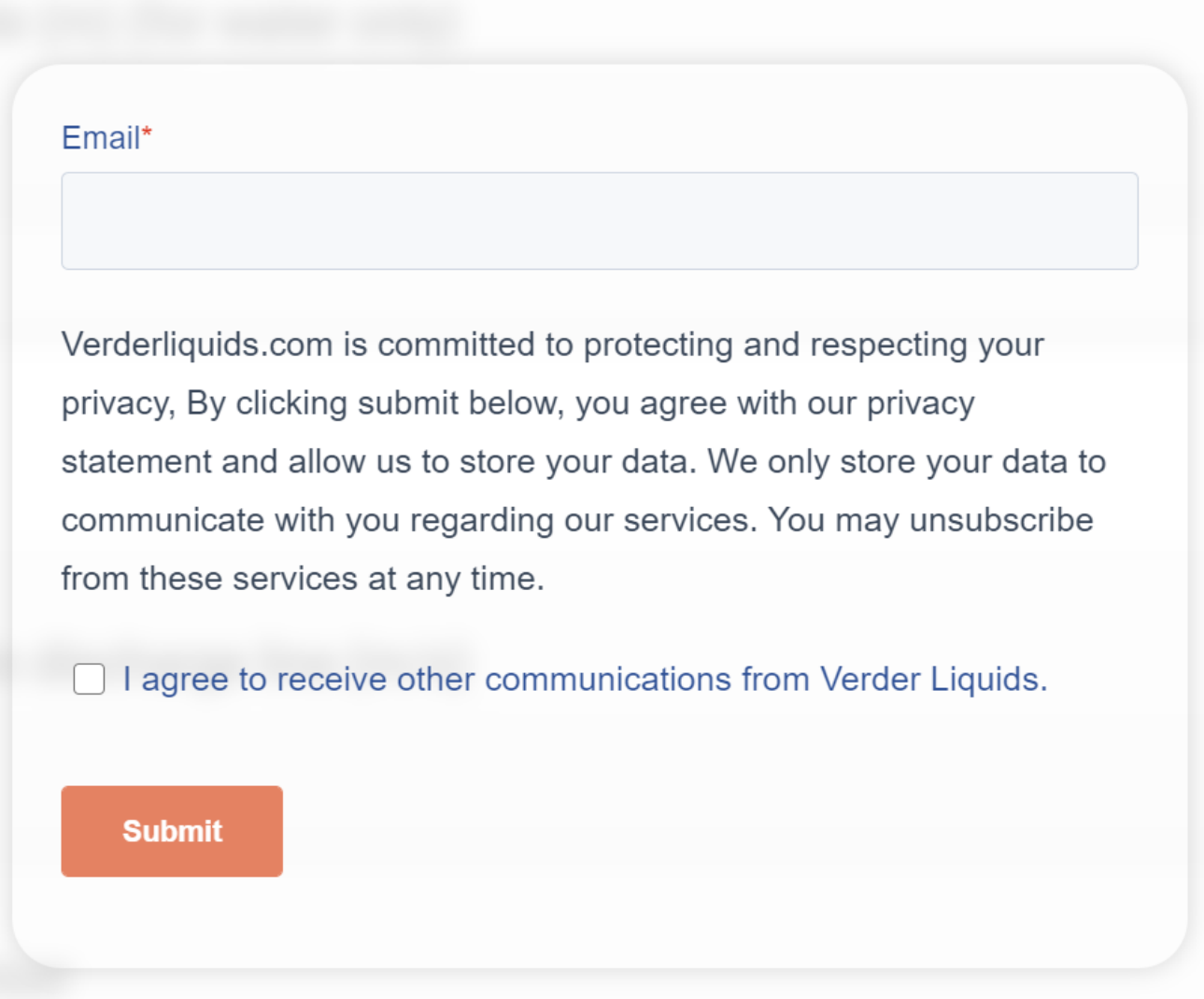
14737

Friction losses in discharge line (m)

0.55

Export to PDF

When you're done with the calculations and want to export the results, you can simply click "Export to PDF", enter your e-mail address and agree to the terms.



Enter your e-mail address and check the checkbox.

Select where you would like to save the file and hit save.

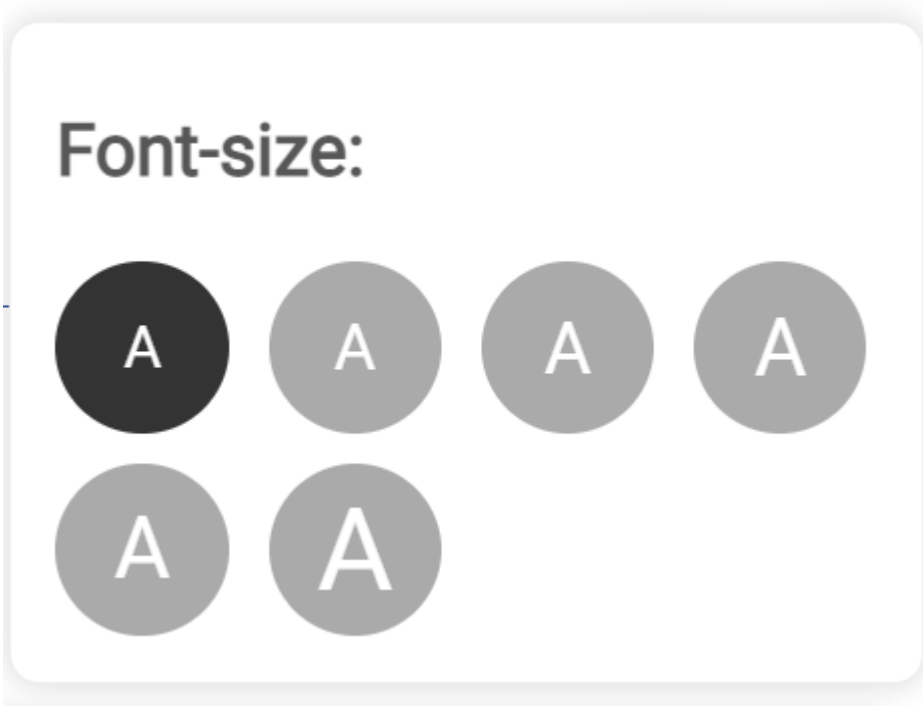
Depending on your browser settings, you may be asked to select a location to save the PDF. If not, the default location is in your downloads folder.

Preferences

Font Size

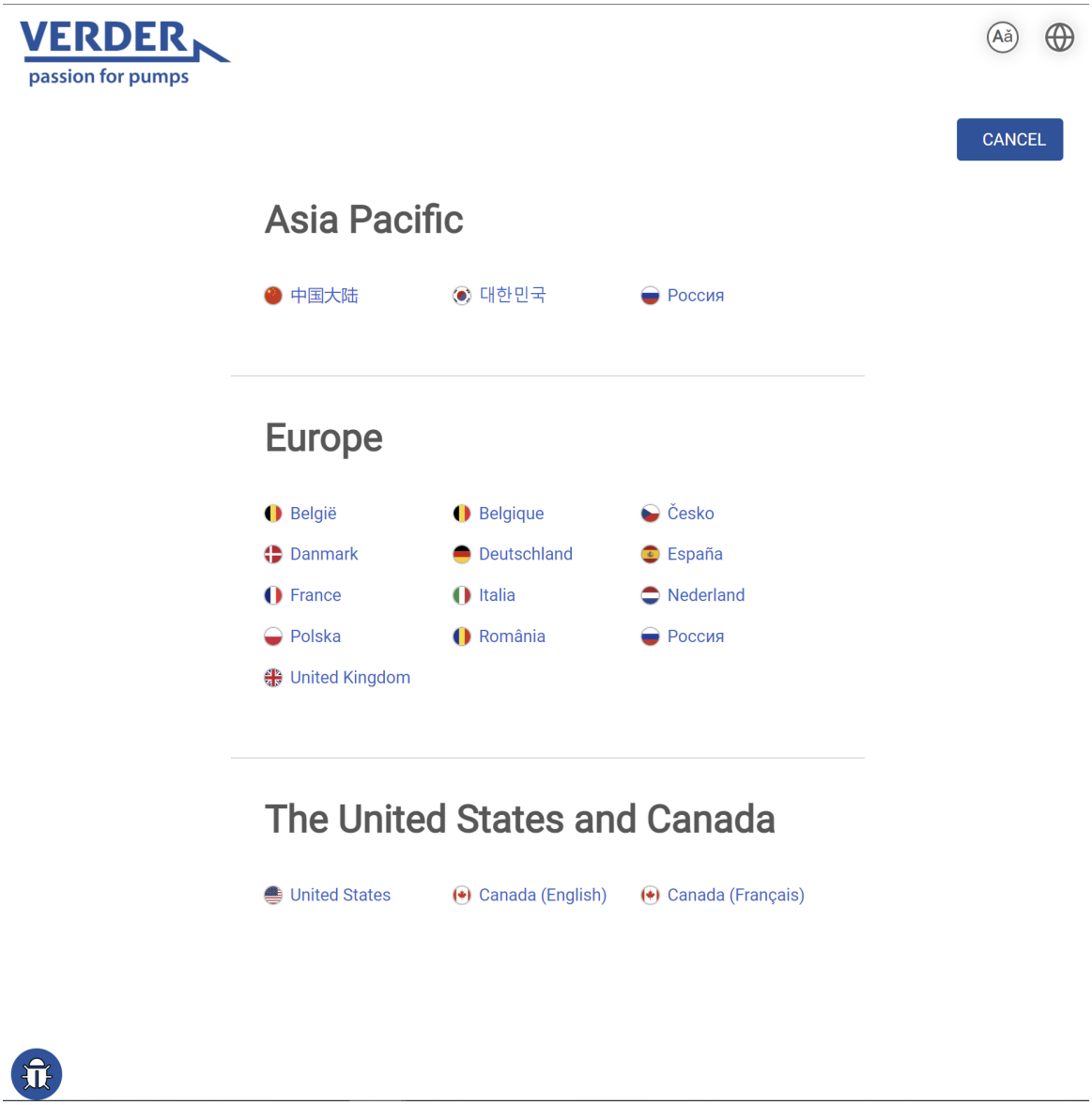
If you think the font size is too small or too big, you can choose between some options by clicking the "Aa" icon on the top right.

This will open a list of options, you can choose one by clicking on it.



Language

You can choose a language by clicking on the globe on the top right.



If you select "United States" the program changes all units to their Imperial counterparts, e.g. meter → feet