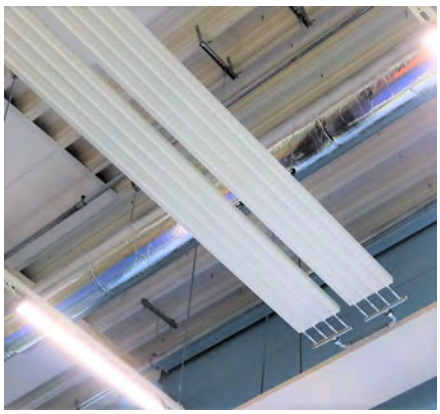
Version 2.3



USER MANUAL

ituCalc

Using the ItuCalc calculation tool for sizing ItuGraf and ItuString+ radiant ceiling systems.

ituCalc

TABLE OF CONTENTS

1. INTRODUCTION TO THE CALCULATION TOOL

The ItuCalc calculation tool makes it easy to calculate the heating and cooling outputs of ItuGraf and ItuString+ panels. The new design tool also helps in selecting compatible valves, actuators and pump groups for radiant panels.

Log in to the tool using your personal username and password at **www.itucalc.fi**.
Users must complete a registration form, after which they will be provided with the username and password required for logging in.

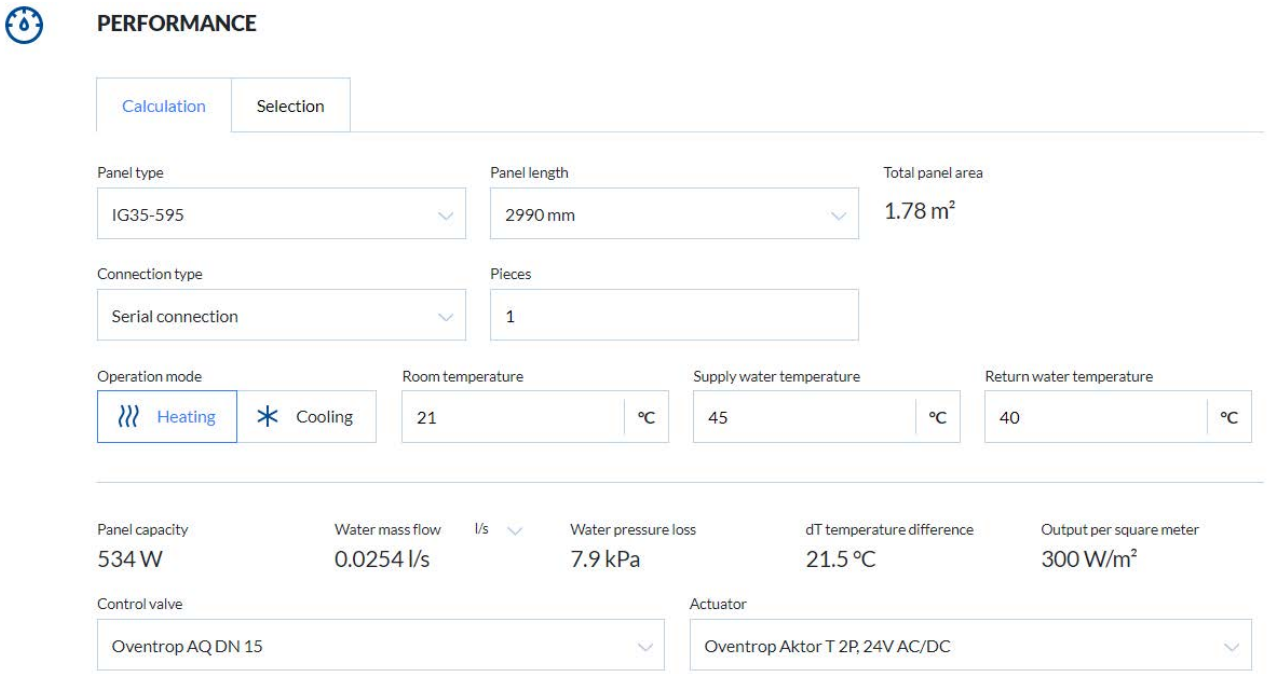
The programme opens in the ItuGraf calculation section. First, you will find general information about ItuGraf panels and technical specifications. The top menu on the website allows users to switch between the ItuGraf and ItuString+ calculation sections and to select the language (Finnish or English).

Calculations can be downloaded and printed in PDF format as well as saved in my project, making it easy to continue a calculation project.

We will be happy to provide training if you would like to familiarize the program with an expert. Please contact us under sales@itula.com to ask more.

2. ITUGRAF CALCULATOR

2.1 CALCULATION: HEATING

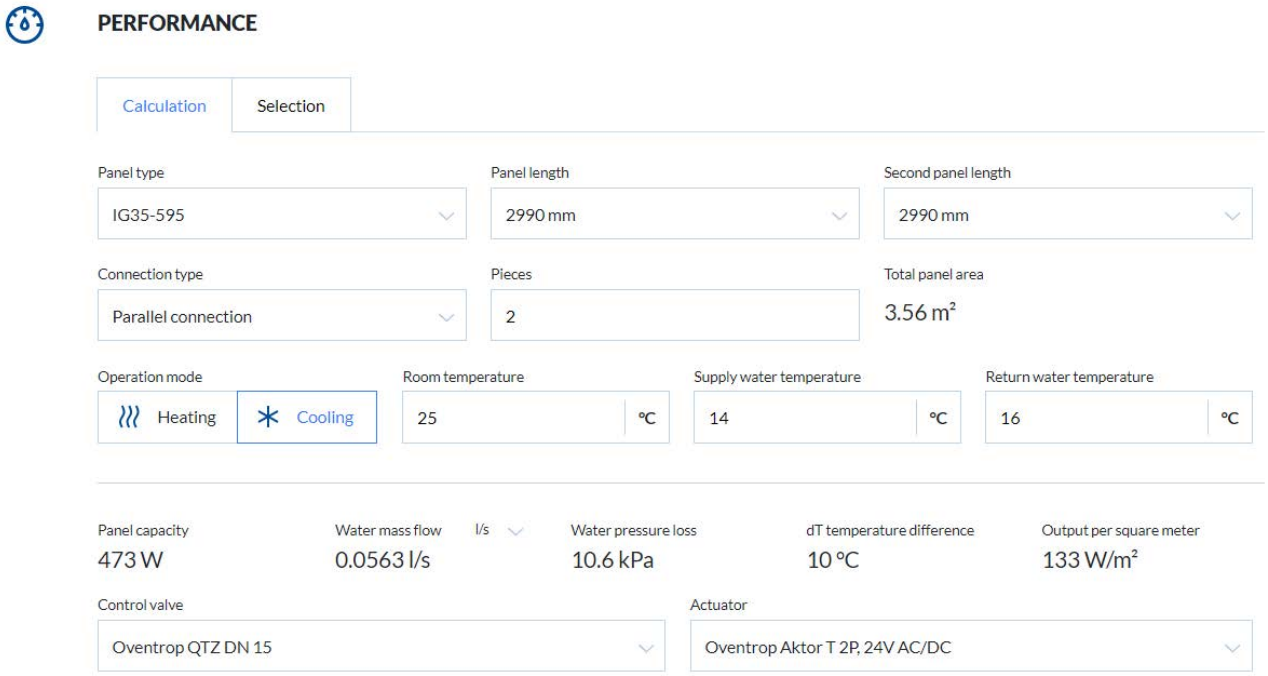


The ItuCalc is now in the ItuGraf calculation section and the operation mode selected is heating. The panel type selected for the calculation is ItuGr-595 and the length is 2990 mm (= ItuGraf panel of 595 mm x 2990 mm). The set values are room temperature: 21 degrees, supply water temperature: 45 degrees, and return water temperature: 40 degrees. The programme calculates the panel capacity, water mass flow and water pressure loss. The results also show the temperature difference and output per square metre.

Select a constant flow valve according to the pressure loss (the Oventrop AQ valve for the flow in the example). When the valve has been selected, a suitable actuator for the valve can be determined. In the calculation, a 24V thermal two-point actuator has been selected as actuator. Other actuator options include an electric three-point control actuator and a 0-10V actuator as well as a 0-10V thermal actuator and a 230V two-point actuator.

You can print out a PDF of the calculation by selecting "Generate PDF" at the top right-hand corner of the page.

2.2 CALCULATION: COOLING



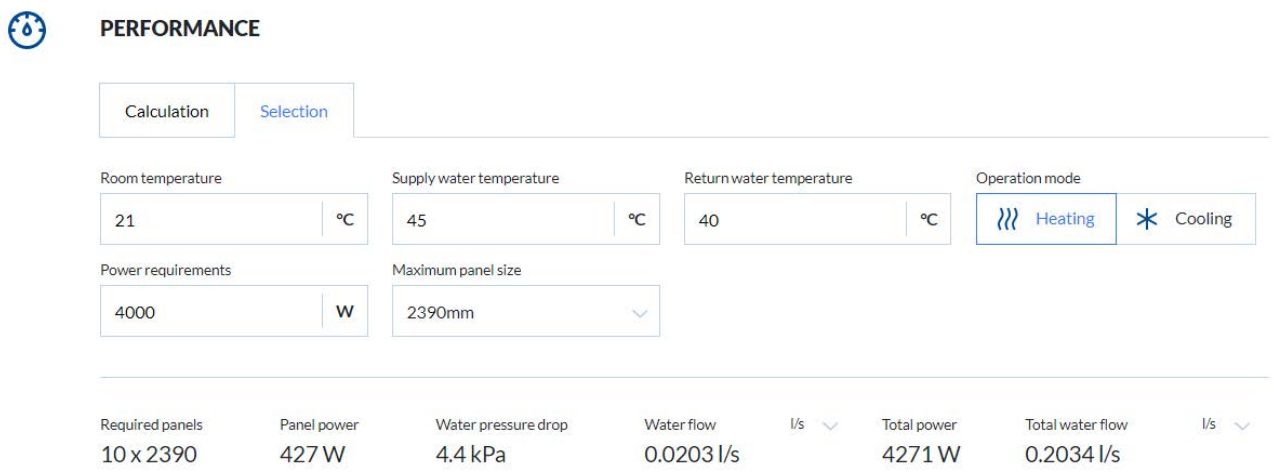
Two ItuGraf 595 mm x 2990 mm panels have been selected for cooling. The panels are connected in parallel. The set values are room temperature: 25 degrees, supply water temperature: 14 degrees, and return water temperature: 16 degrees. The calculation gives the capacity, flow and pressure loss for a pair of panels connected in parallel, as well as the temperature difference and output per square metre.

An Oventrop QTZ constant flow valve and a 24V two-point thermal actuator have been selected for the panels.

Panels can be connected in series or in parallel in the programme. A maximum number of panels has been set for different connection types for panels that are of different sizes, and the programme flags it if the number is exceeded.

2.3 SELECTION

The selection section opens in the second tab:



In the selection section, the idea is to calculate the total number of panels required when the power is known. The set values here are room temperature: 21 degrees, supply water temperature: 45 degrees, and return water temperature: 40 degrees. The power requirement is 4000 W and the maximum panel size on the site in question can be ItuGraf panels of 2390 mm in length.

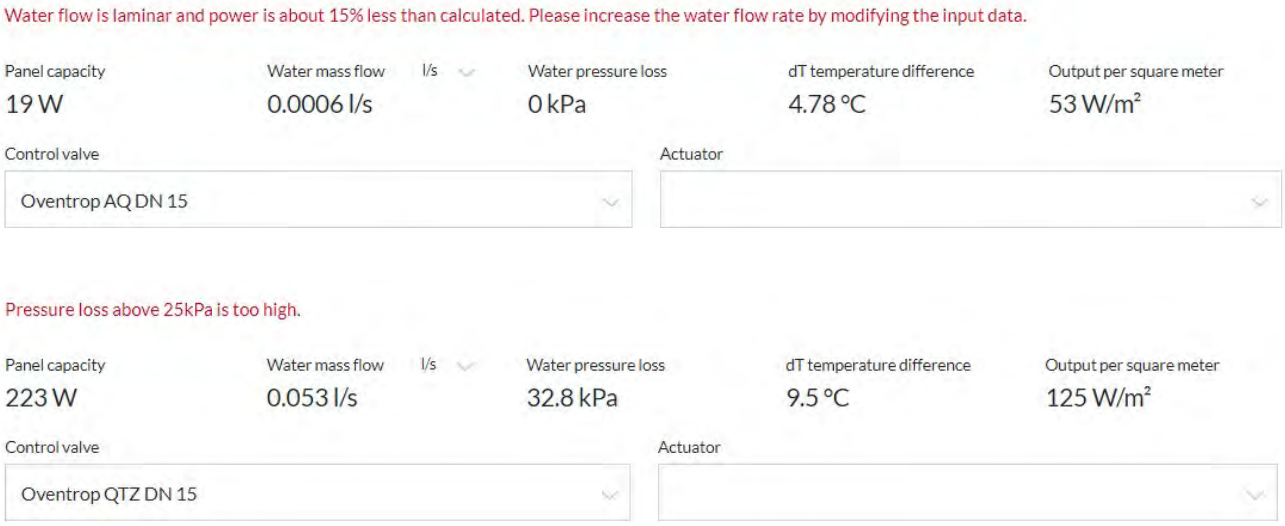
In the example here, the calculated panel requirement is 10 panels of 2390 mm in length. ItuCalc also provides sizing information for an individual panel and the total for all panels.

ItuCalc displays an image of a selected individual panel below the calculation section as shown below. You can download 2D images of the standard product for the design from the button below the detailed image.

2.4 WARNINGS

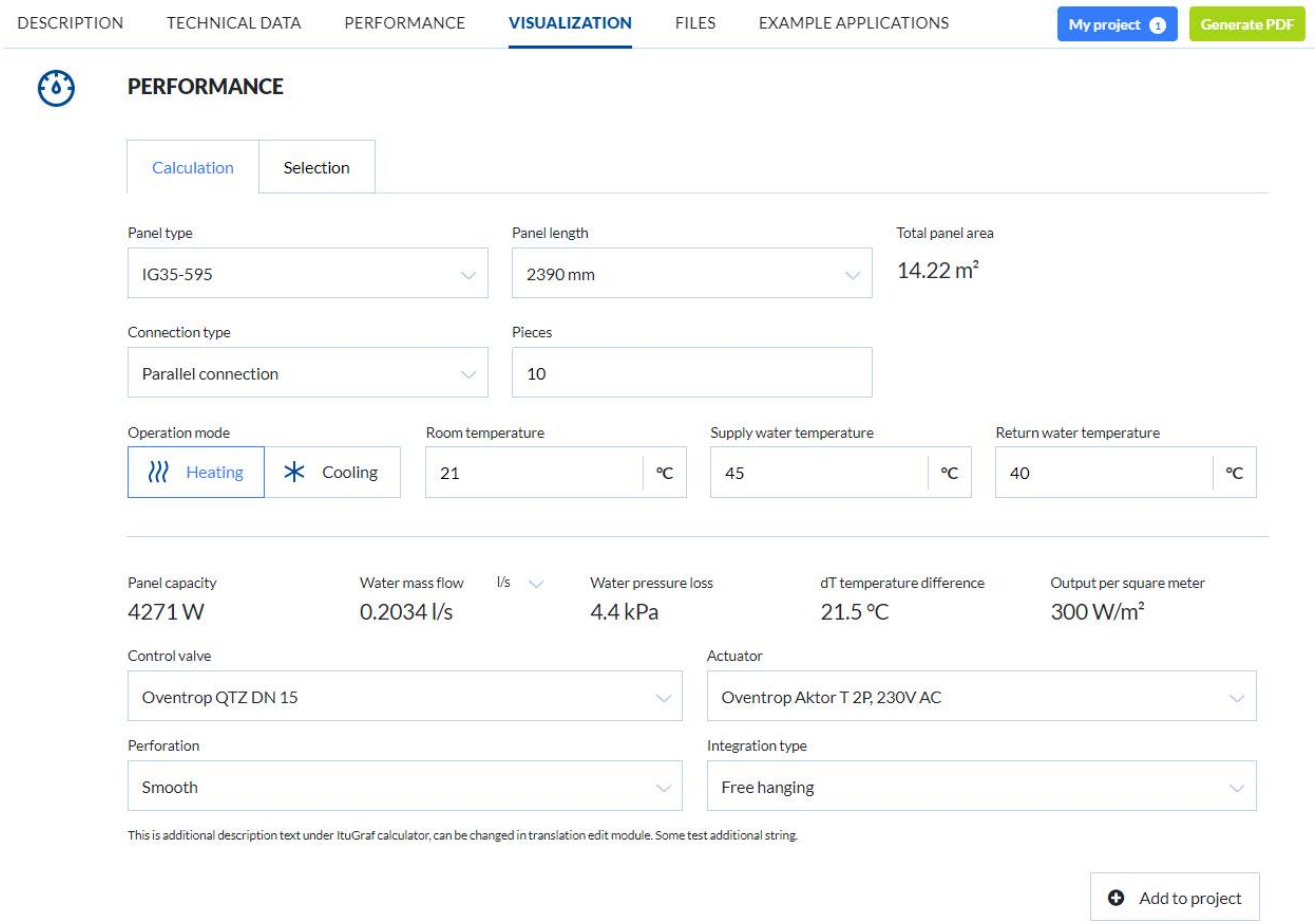
ItuCalc shows a warning if the flow in the panel pipe is laminar or the pressure loss is too high (25 kPa as maximum recommended). In this case, you should reset the calculation values.

The warnings look like this:

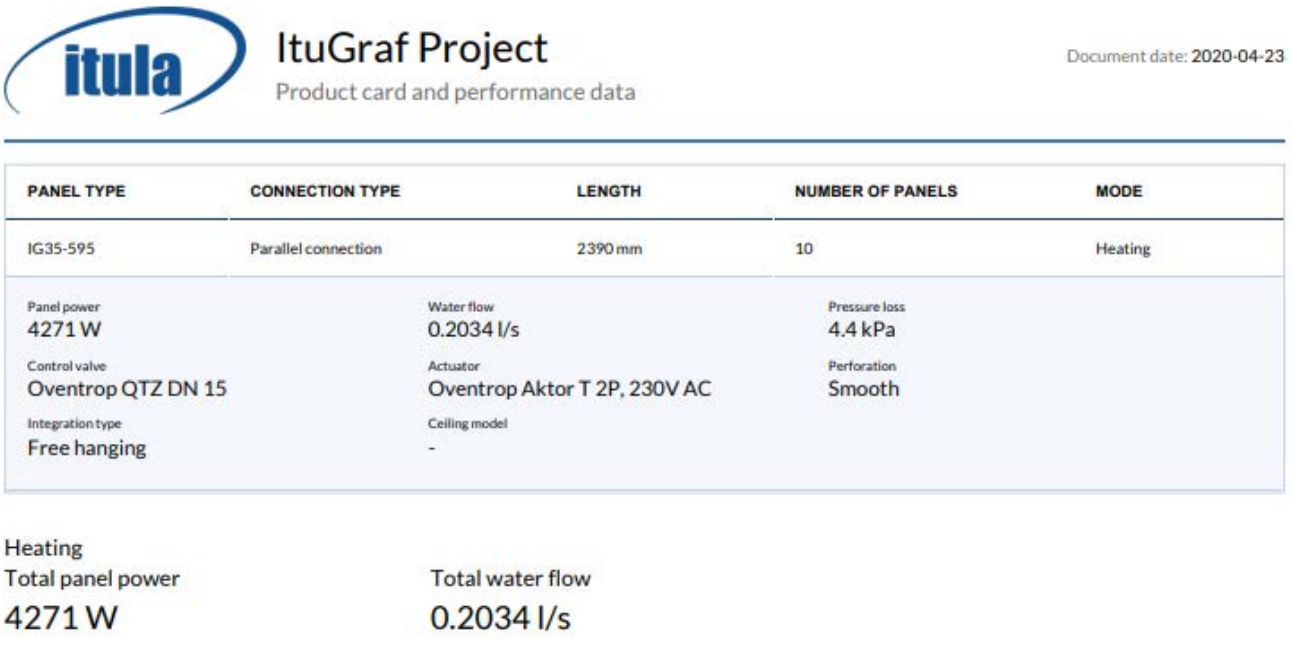


2.5 ADDING PANELS TO A PROJECT

You can add panels sized in the ItuGraf calculator to your project. By adding them to the project, you can save all panel sizes in one record. The panels can be added in the project using the button shown in the bottom right-hand corner of the image (see the image on the next page).



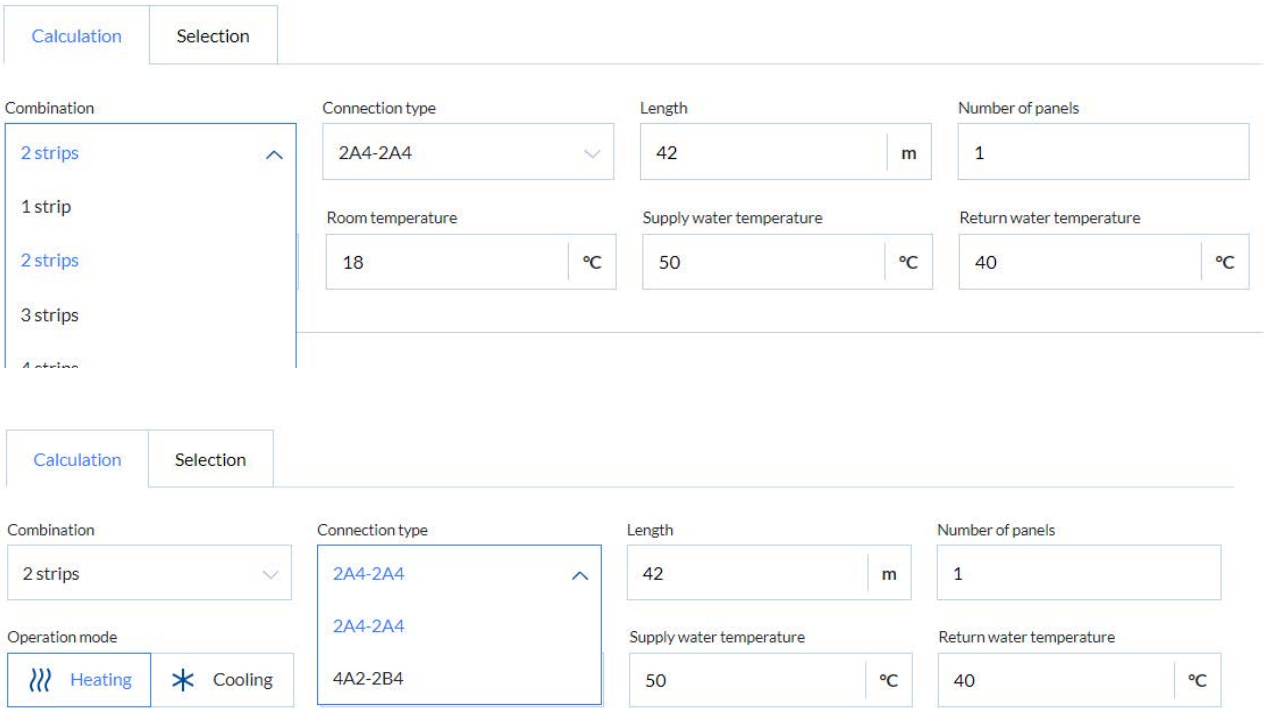
The panels you have added go to the My project section, which appears as a button in the top right-hand corner. My project can be downloaded and printed in PDF format. The image below shows the page on which the panels are added.



3. ITUSTRING+ CALCULATOR

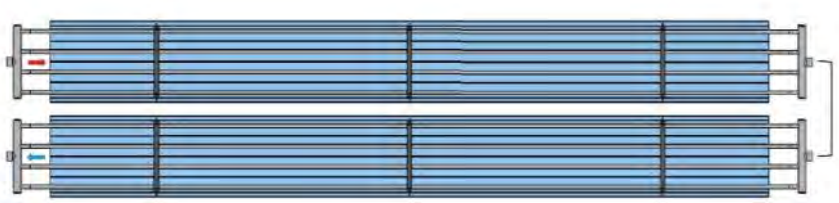
You can choose between the ItuGraf and ItuString+ calculators by selecting the panel type at the top of the page. First you will find general information about ItuString+ panels and their technical specifications. The calculation section appears when you scroll down the page and looks like this:

3.1 CALCULATION: HEATING/COOLING

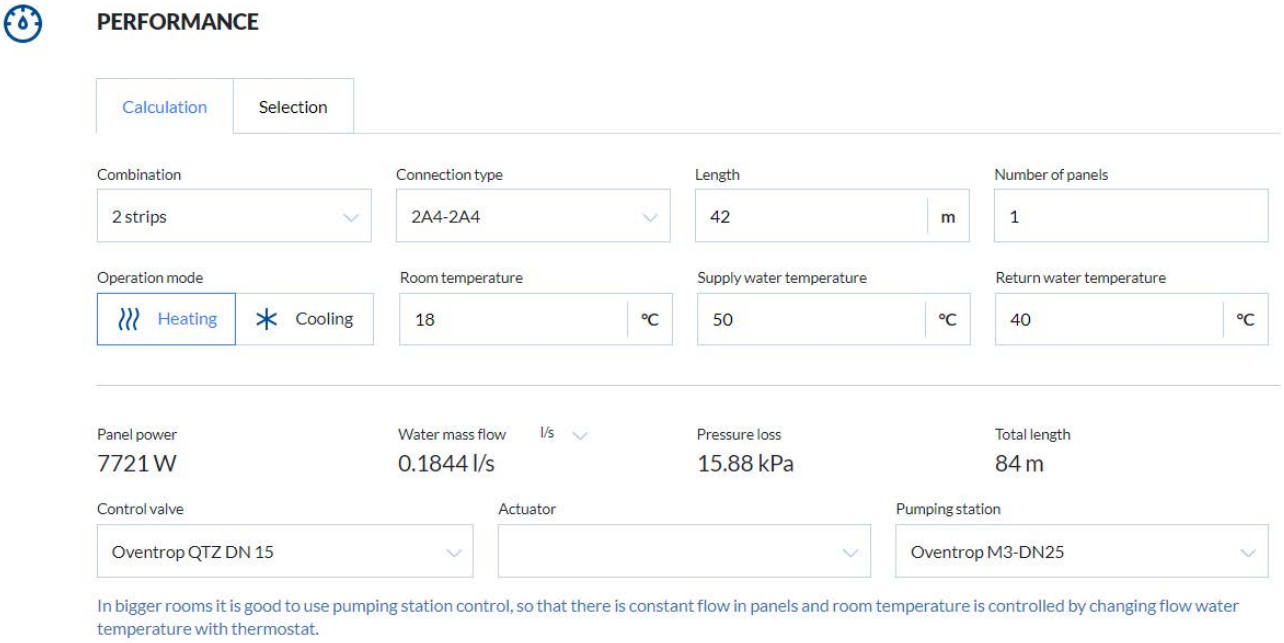


In the calculation section, you select the number of ItuString+ radiant ceiling panels (320 mm wide), which can be between 1 and 4 panels in parallel, and the connection type.
An image of the selected panel combination is displayed at the bottom of the page as shown below. In the example, two panels in parallel connection type 2A4-2A4 are selected, and there are two four-port manifolds with 1" male connections at each end of the panel. The arrows indicate water flow directions.

DETAILED PICTURES



After you have selected the panel combination, you select the total length of the panel as well as the temperature levels. In the example below, the length of the pair of panels is 42 m, the room temperature is set at 18 degrees, the supply water temperature at 50 degrees and return water temperature at 40 degrees.



The calculation gives the output, flow, pressure loss and the total length converted into 320 mm elements. The programme has selected Oventrop QTZ DN15 as the valve for the panels.

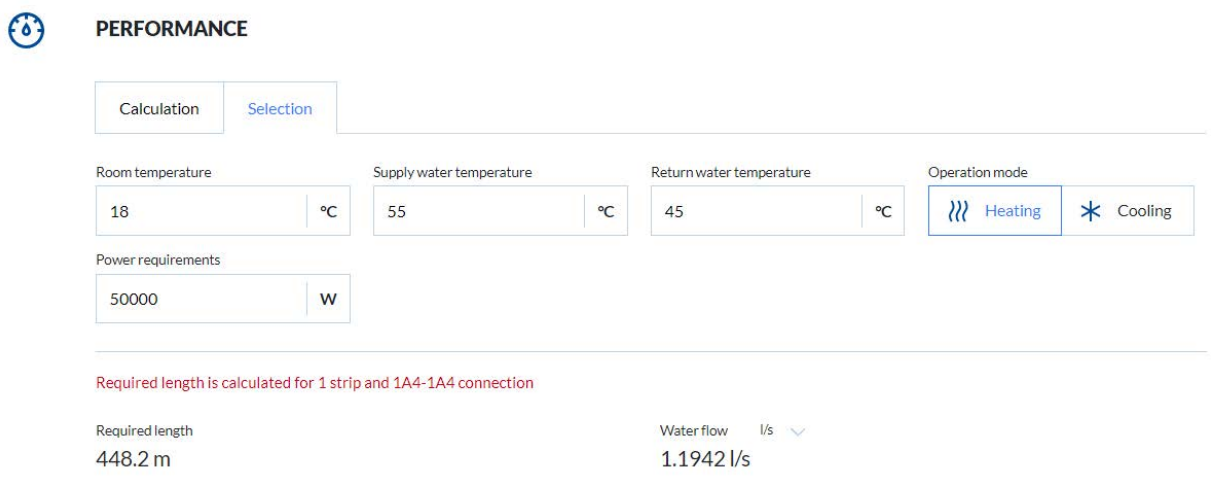
The cooling capacity of ItuString+ radiant panels can be calculated in the same way.

The ItuString+ calculator allows you to select a pump group, which is selected from the pumping station menu for the desired flow range, which is displayed when the cursor is placed on top of the pumping station. In this example, Oventrop M3-DN25 is selected.

The purpose of the pump group is to operate the ItuString+ control in larger spaces so that there is a constant flow in the panels and the output is adjusted on the basis of the feedback from the room sensor by changing the flow water temperature with a three-way mixing valve. Oventrop's pump groups include a pump, a three-way mixing valve (24V 0-10V control) and thermostatic shut-off valves.

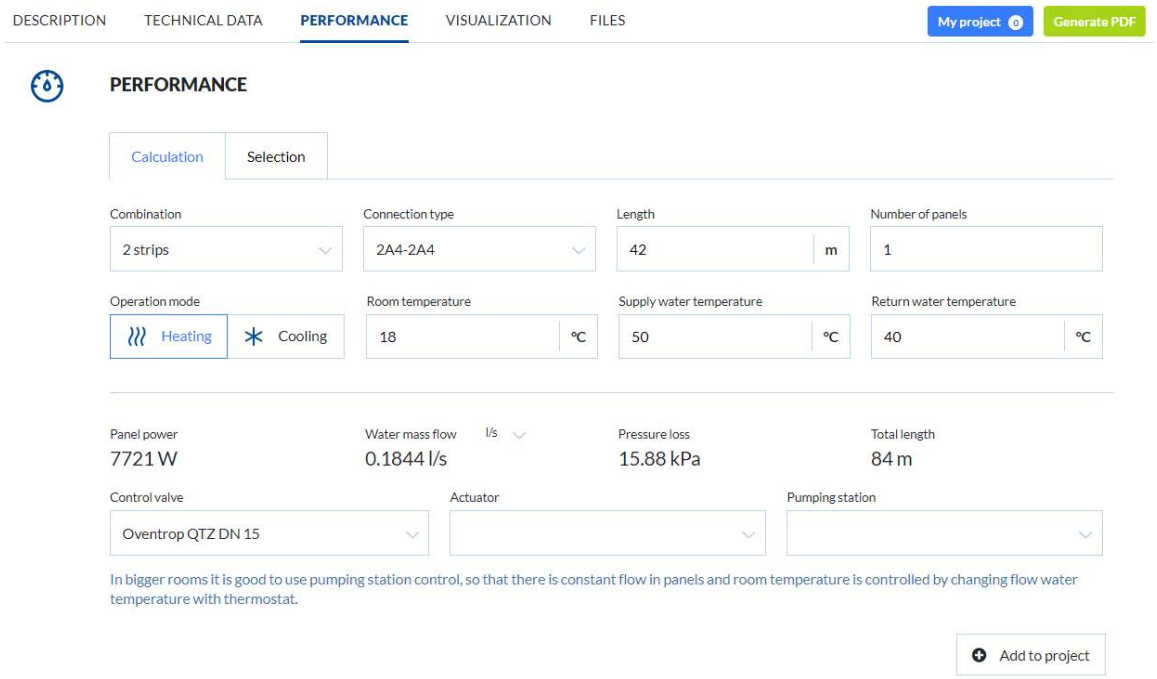
3.2 SELECTION

In the selection section, the total panel requirement is calculated in 320 mm-wide basic elements by entering the temperature levels and the output requirement. The result is the total required length of the panels and the total water flow.



3.3 ADDING PANELS TO A PROJECT

The ItuString+ calculator allows you to add panels sized in the calculator to your project as sites often have different spaces of different sizes, which require panels of different lengths. By adding them to a project, you can save all panel sizes in one record. The panels can be added to the project using the button shown in the bottom right-hand corner of the image.



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