



USER MANUAL

ituCalc

Using the ItuCalc calculation tool for sizing ItuGraf® heating and cooling panels and ItuString+® radiant ceiling systems.

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1. INTRODUCTION TO THE CALCULATION TOOL

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

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.

>> *Need more information? You can contact us at sales@itula.fi*

2. ITUGRAF CALCULATOR

2.1 CALCULATION: HEATING



PERFORMANCE

Calculation

Selection

Panel type

Panel length

Total panel area

1.78 m²

Connection type

Pieces

Operation mode

Heating

Cooling

Room temperature

 °C

Supply water temperature

 °C

Return water temperature

 °C

Panel capacity

534 W

Water mass flow

0.0254 l/s

Water pressure loss

7.9 kPa

dT temperature difference

21.5 °C

Output per square meter

300 W/m²

Control valve

Actuator

The programme 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 the 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



PERFORMANCE

<input checked="" type="button" value="Calculation"/> <input type="button" value="Selection"/>				
Panel type	Panel length	Second panel length		
IG35-595	2990 mm	2990 mm		
Connection type	Pieces	Total panel area		
Parallel connection	2	3.56 m ²		
Operation mode	Room temperature	Supply water temperature	Return water temperature	
<input type="button" value="Heating"/> <input checked="" type="button" value="Cooling"/>	25 °C	14 °C	16 °C	
Panel capacity	Water mass flow	Water pressure loss	dT temperature difference	Output per square meter
473 W	0.0563 l/s	10.6 kPa	10 °C	133 W/m ²
Control valve	Actuator			
Oventrop QTZ DN 15	Oventrop Aktor T 2P, 24V AC/DC			

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:

PERFORMANCE

Calculation Selection

Room temperature: 21 °C

Supply water temperature: 45 °C

Return water temperature: 40 °C

Operation mode: Heating (selected) Cooling

Power requirements: 4000 W

Maximum panel size: 2390mm

Required panels	Panel power	Water pressure drop	Water flow	Total power	Total water flow
10 x 2390	427 W	4.4 kPa	0.0203 l/s	4271 W	0.2034 l/s

In the selection section, the idea is to calculate the total number of panels required (595 mm panels) 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. The programme also provides sizing information for an individual panel and the total for all panels.

The programme 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

The programme shows a warning if the flow in the panel pipe is laminar or the pressure loss is too high (25 kPa). In this case, you should reset the calculation values. The warnings look like this.

Water flow is laminar and power is about 15% less than calculated. Please increase the water flow rate by modifying the input data.

Panel capacity	Water mass flow	l/s	Water pressure loss	dT temperature difference	Output per square meter
19 W	0.0006 l/s		0 kPa	4.78 °C	53 W/m ²
Control valve			Actuator		
Oventrop AQ DN 15					

Pressure loss above 25kPa is too high.

Panel capacity	Water mass flow	l/s	Water pressure loss	dT temperature difference	Output per square meter
223 W	0.053 l/s		32.8 kPa	9.5 °C	125 W/m ²
Control valve			Actuator		
Oventrop QTZ DN 15					

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).



PERFORMANCE

Calculation
Selection

Panel type
IG35-595

Panel length
2390 mm

Total panel area
14.22 m²

Connection type
Parallel connection

Pieces
10

Operation mode
Heating * Cooling

Room temperature
21 °C

Supply water temperature
45 °C

Return water temperature
40 °C

Panel capacity
4271 W

Water mass flow
0.2034 l/s

Water pressure loss
4.4 kPa

dT temperature difference
21.5 °C

Output per square meter
300 W/m²

Control valve
Oventrop QTZ DN 15

Actuator
Oventrop Aktor T 2P, 230V AC

Perforation
Smooth

Integration type
Free hanging

This is additional description text under ituGraf calculator, can be changed in translation edit module. Some test additional string.

Add to project

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.



ItuGraf Project

Product card and performance data

Document date: 2020-04-23

PANEL TYPE	CONNECTION TYPE	LENGTH	NUMBER OF PANELS	MODE
IG35-595	Parallel connection	2390 mm	10	Heating
Panel power 4271 W	Water flow 0.2034 l/s	Pressure loss 4.4 kPa	Perforation Smooth	Control valve Oventrop QTZ DN 15
Integration type Free hanging	Actuator Oventrop Aktor T 2P, 230V AC	Ceiling model -		

Heating
Total panel power
4271 W

Total water flow
0.2034 l/s

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

Calculation

Selection

Combination

- 2 strips ^
- 1 strip
- 2 strips
- 3 strips
- 4 strips

Connection type

2A4-2A4 v

Length

42 m

Number of panels

1

Room temperature

18 °C

Supply water temperature

50 °C

Return water temperature

40 °C

Calculation

Selection

Combination

2 strips v

Connection type

2A4-2A4 ^

2A4-2A4

4A2-2B4

Length

42 m

Number of panels

1

Operation mode

Heating Cooling

Supply water temperature

50 °C

Return water temperature

40 °C

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 outputs at each end of the panel. The arrows indicate water flow directions.

DETAILED PICTURES

Quality heating

www.itula.fi/en

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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.

PERFORMANCE

Calculation Selection

Combination: 2 strips

Connection type: 2A4-2A4

Length: 42 m

Number of panels: 1

Operation mode: Heating (selected), Cooling

Room temperature: 18 °C

Supply water temperature: 50 °C

Return water temperature: 40 °C

Panel power: 7721 W

Water mass flow: 0.1844 l/s

Pressure loss: 15.88 kPa

Total length: 84 m

Control valve: Oventrop QTZ DN 15

Actuator: [empty]

Pumping station: Oventrop M3-DN25

In bigger rooms it is good to use pumping station control, so that there is constant flow in panels and room temperature is controlled by changing flow water temperature with thermostat.

The calculation gives the power, 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 power 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 power requirement. The result is the total required length of the panels and the total water flow.



PERFORMANCE

Calculation

Selection

Room temperature

 °C

Supply water temperature

 °C

Return water temperature

 °C

Operation mode

{ } { } { } Heating

* { } Cooling

Power requirements

 W

Required length is calculated for 1 strip and 1A4-1A4 connection

Required length
448.2 m

Water flow l/s v
1.1942 l/s

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.

DESCRIPTION TECHNICAL DATA **PERFORMANCE** VISUALIZATION FILES [My project](#) [Generate PDF](#)

PERFORMANCE

Calculation Selection

Combination: 2 strips Connection type: 2A4-2A4 Length: 42 m Number of panels: 1

Operation mode: Heating Cooling Room temperature: 18 °C Supply water temperature: 50 °C Return water temperature: 40 °C

Panel power: 7721 W Water mass flow: 0.1844 l/s Pressure loss: 15.88 kPa Total length: 84 m

Control valve: Oventrop QTZ DN 15 Actuator: Pumping station:

In bigger rooms it is good to use pumping station control, so that there is constant flow in panels and room temperature is controlled by changing flow water temperature with thermostat.

[Add to project](#)

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My project

COMBINATION	CONNECTION TYPE	LENGTH	NUMBER OF PANELS	MODE
2 strip(s)	2A4-2A4	42 m	1	Heating
Panel power	Water flow	Pressure loss		
7721 W	0.1844 l/s	15.88 kPa		
Control valve	Actuator	Pumping station		
Oventrop QTZ DN 15	-	-		
2 strip(s)	2A4-2A4	40 m	1	Heating
Panel power	Water flow	Pressure loss		
7354 W	0.1756 l/s	13.89 kPa		
Control valve	Actuator	Pumping station		
Oventrop QTZ DN 15	-	-		
2 strip(s)	2A4-2A4	36 m	3	Heating
Panel power	Water flow	Pressure loss		
6620 W	0.1581 l/s	10.41 kPa		
Control valve	Actuator	Pumping station		
Oventrop QTZ DN 15	-	Oventrop M3-DN32		

Total panel power: 21695 W Total water flow: 0.5182 l/s [Save as PDF](#)