CASCADA FRESH WATER VERTICAL BUFFER TANK (COUNTER FLOW)

The **Cascada Fresh Water Vertical Buffer Tank (Counter Flow)** is the new compact solution for **FRESH WATER** production (In-line water heating) and heating.

It can be thermally supplied by many heat sources such as Solar Field, Heat Pump, Boiler and Heating Element.

System operation can be fully automated via PLC with real-time display provided via touch screen or computer.

This product series is suitable for small-scale hotel applications and residences with increased Domestic Hot Water (DHW) demand.

INOX

INOX CONTAINER

FRESH WATER

ALL-IN-ONE

COUNTER FLOW

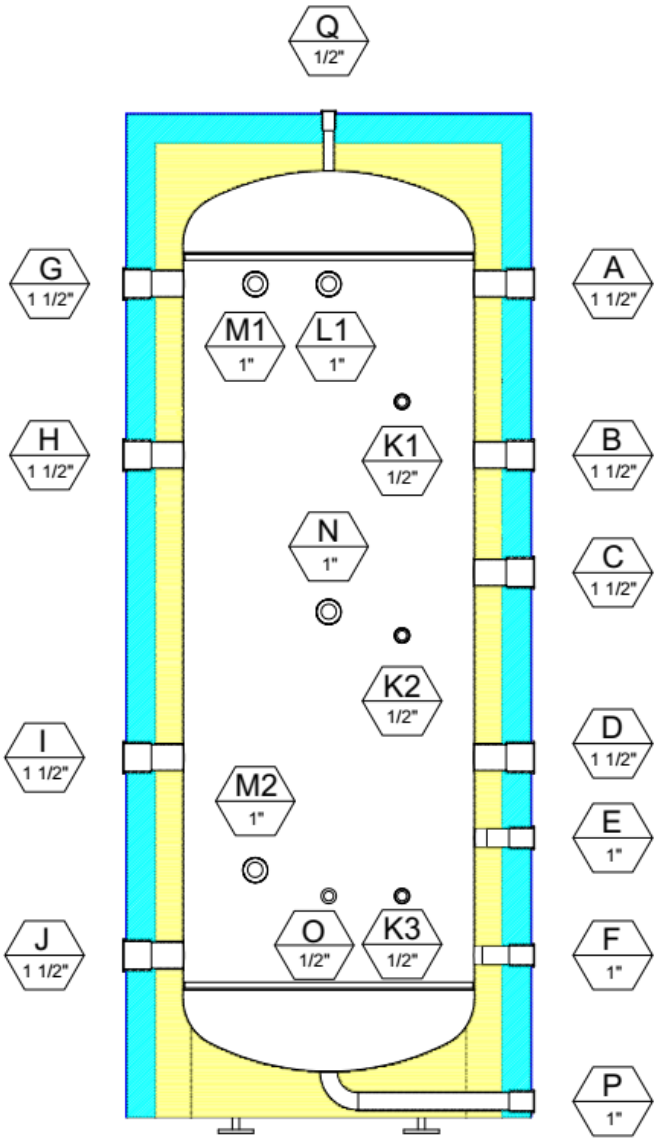
ENERGY SAVE

PRODUCT MODELS

MODEL	CASCADA BF VER-FW-CF-S 300/10	CASCADA BF VER-FW-CF-S 300/15	CASCADA BF VER-FW-CF-S 600/15	CASCADA BF VER-FW-CF-S 600/20	CASCADA BF VER-FW-CF-S 1000/30	CASCADA BF VER-FW-CF-S 1000/45	CASCADA BF VER-FW-CF-S 1500/45 **
Nominal Flow Rate (m^3/h)	1.0	1.5	1.5	2.0	3.0	4.5	4.5
Nominal Power (kW)*	35	53	53	70	105	157	157
Tank Capacity (lt)	285	285	550	550	914	914	-
Solar Heat Exchanger Area (m^2)	1.0	1.0	1.4	1.4	2.0	2.0	-
Height (mm)	1680	1680	2020	2020	2030	2030	2900
Diameter (mm)	690	690	810	810	1000	1000	1000
Weight (kg) [without / with solar H.E]	78 /82	78 / 82	107 / 112	107 / 112	165 / 170	165 / 170	-
*(Primary circuit temperature: 60-55°C, Secondary circuit temperatures: 20-50°C) ** ON DEMAND							

TECHNICAL SPECIFICATIONS	
Buffer tank material	INOX 304
Buffer tank insulation	Polyurethane foam (thickness: 90-100 mm, density: 45 kg/m^3)
Outer casing	PVC leather
Buffer tank welding type	Automatic circular welding
Buffer tank protection	Passivation coating
Buffer tank nominal operating pressure	3 bar
Buffer tank maximum operating pressure	4 bar
Buffer tank test pressure	8 bar
Energy classification	B
Fresh water heat exchanger type	Counter flow, Corrugated
Fresh water heat exchanger material	INOX 316L
Fresh water heat exchanger welding type	Automatic circular welding
Fresh water heat exchanger protection	Passivation coating
Secondary circuit nominal operating pressure	6 bar
Secondary circuit maximum operating pressure	12 bar
Primary circuit nominal operating pressure	3 bar
Primary circuit maximum operating pressure	6 bar
Maximum operating temperature	95°C
Heat transfer pump	Wilo 0-10V / Grundfos PWM
Solar field heat exchanger	Immersed, corrugated
Solar field heat exchanger material	INOX 316L
Solar field heat exchanger nominal operating pressure	3 bar
Solar field heat exchanger maximum operating pressure	6 bar
Automation control system (extra)	Control panel THALES AK400 with 4.3” touch screen

NOMENCLATURE AND TYPICAL HOLES DIAMETERS



CASCADA BF VER-FW-CF-S 300 INOX/LR		
Hole	Nozzle size	Description
A	1 1/2"	HEATING IN
B	1 1/2"	ANODE
C	1 1/2"	HEATING ELEMENT
D	1 1/2"	HEATING RETURN
E	1"	FROM SOLARS
F	1"	TO SOLARS
G	1 1/2"	HEATING IN
H	1 1/2"	HEATING IN
I	1 1/2"	HEATING RETURN
J	1 1/2"	HEATING RETURN
K1	1/2"	SENSOR
K2	1/2"	SENSOR
K3	1/2"	SENSOR
L1	1"	FROM PUMP
M1	1"	HOT WATER
M2	1"	COLD WATER
N	1"	TO PUMP
O	1/2"	FILLING WATER
P	1"	DRAIN
Q	1/2"	AIR RELIEF

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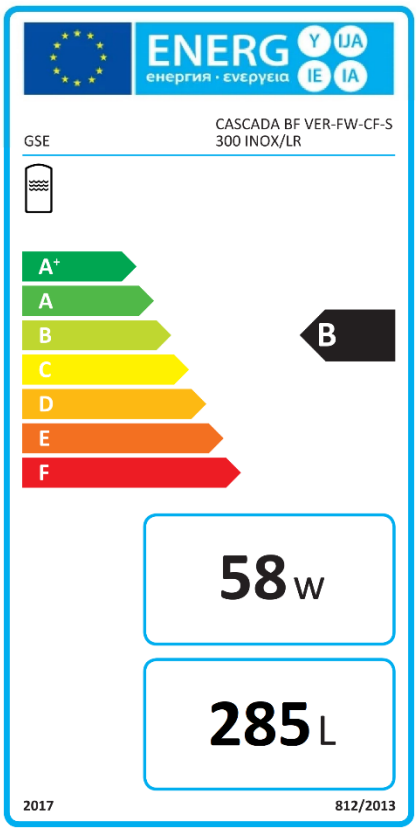
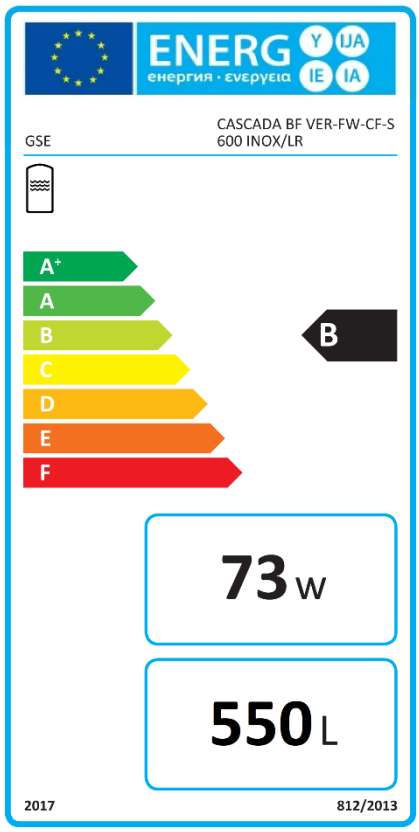
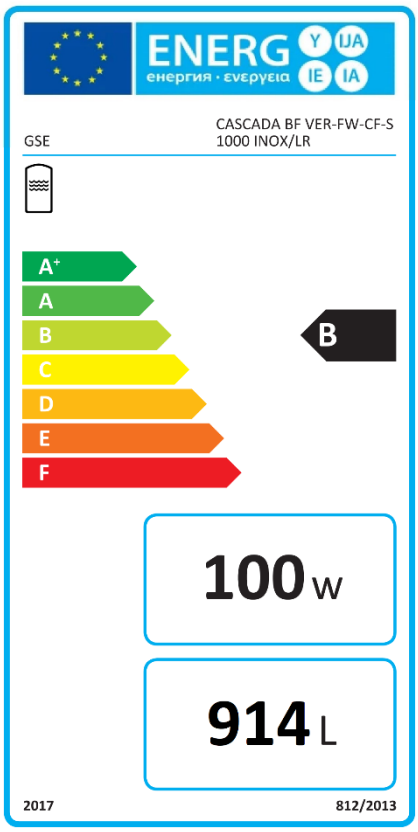
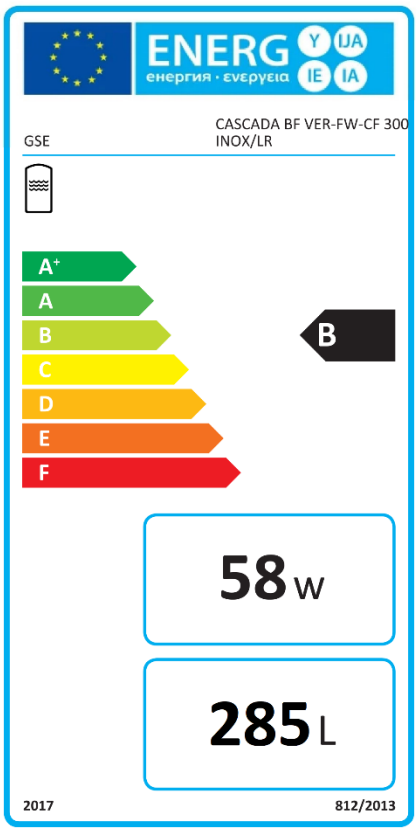
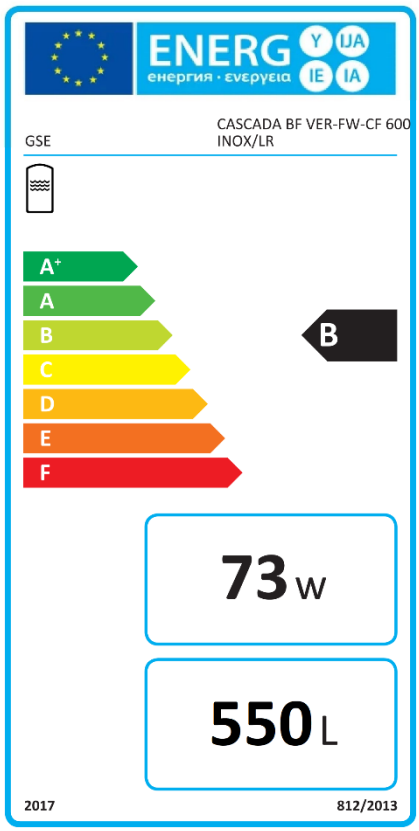
ENERGY LABELS

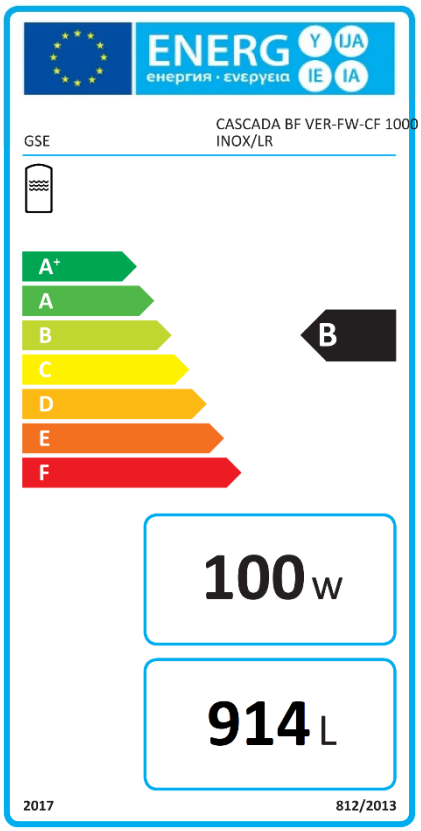












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QUALITY CHARACTERISTICS

QUALITY CHARACTERISTIC	BENEFIT
In Line heating of domestic hot water	***Prevention of Legionella bacteria incubation*** ***Prolongation of equipment lifetime***
Relatively low temperature difference between primary and secondary circuit **(max 5°C)**	***Energy saving due to reduced charging temperatures*** ***Reduced operating costs***
Design based on α **patent (Innovative control)**	***High energy efficiency*** ***Constant water supply at the desired temperature*** ***Minimum pressure drop***
High density polyurethane insulation	***Negligible operation thermal losses*** ***Energy classification: B***
Full compatibility with existing hot water production and heating systems	***Utilization of existing equipment and systems***
Avoiding scale build-up due to **innovative design**	***Prolongation of heat exchanger lifecycle*** ***Stable and reliable operation***
Reverse flow cleaning	***Easy and quick cleaning***
Small size and **ergonomic design**	***Easy installation and space saving in engine rooms***

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AUTOMATION CONTROL SYSTEM THALES AK400 FUNCTIONS

FUNCTIONS	Default	Potential
Control and operation via integrated 4.3'' touch screen	√	
Visualize system operations in real time	√	
Domestic hot water temperature control (set point 1, time-schedule)	√	
Heat pump control (Remote on/off with time-schedule, tank temperature adjustment set point 2)	√	
Boiler control (built-in relay with time-schedule, tank temperature adjustment set point 3)	√	
Variable speed water pump control (PWM/0-10V) for energy transfer	√	
Control of a second variable speed water pump (PWM/0-10V) for energy transfer		√
Solar Field Control with Variable Speed Water Pump (PWM/0-10V)		√
Future firmware upgrades		√

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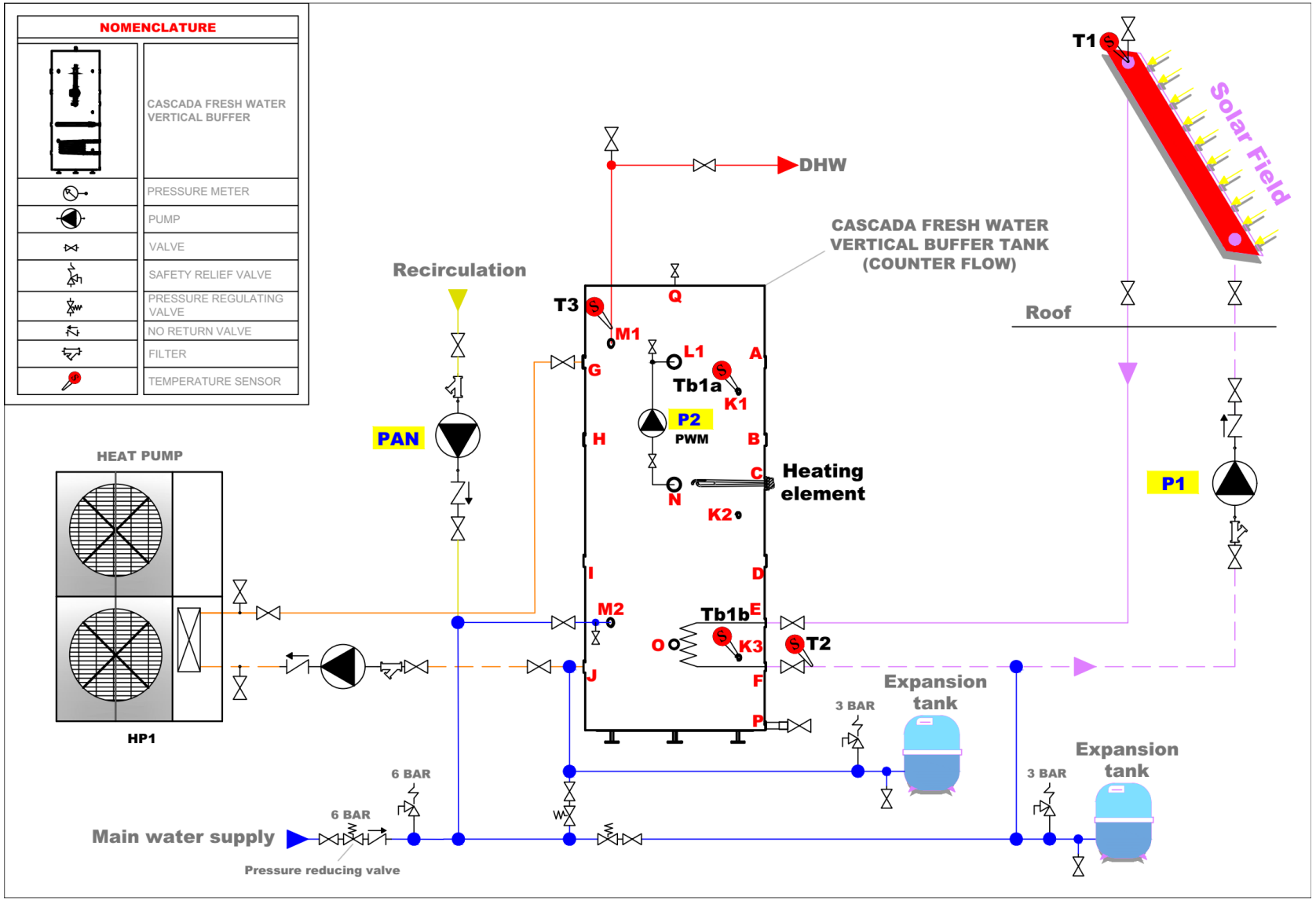
PIPING AND INSTRUMENTATION DIAGRAM (PID)



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TEMPERATURE AND PRESSURE DROP CHARTS

Example of calculating the minimum required tank charging temperature

Suppose the supply we need is 18 lt/min. For the production of 50°C Domestic Hot Water (DHW) and a supply of 18 lt/min (see Figure 1), going vertically downwards we see that the required tank charging temperature must be at least 52.7°C (see Figure 1).

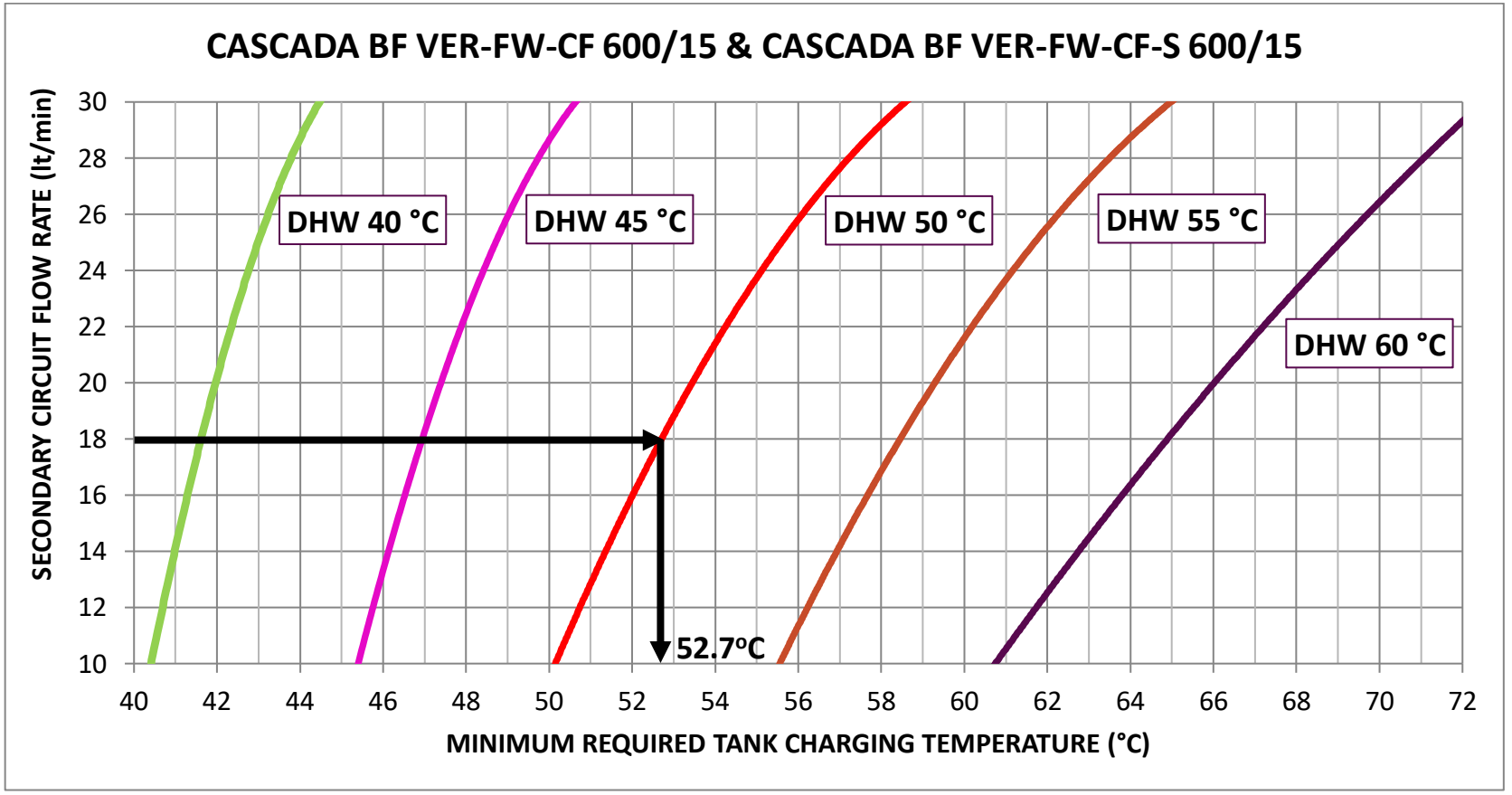

Figure 1

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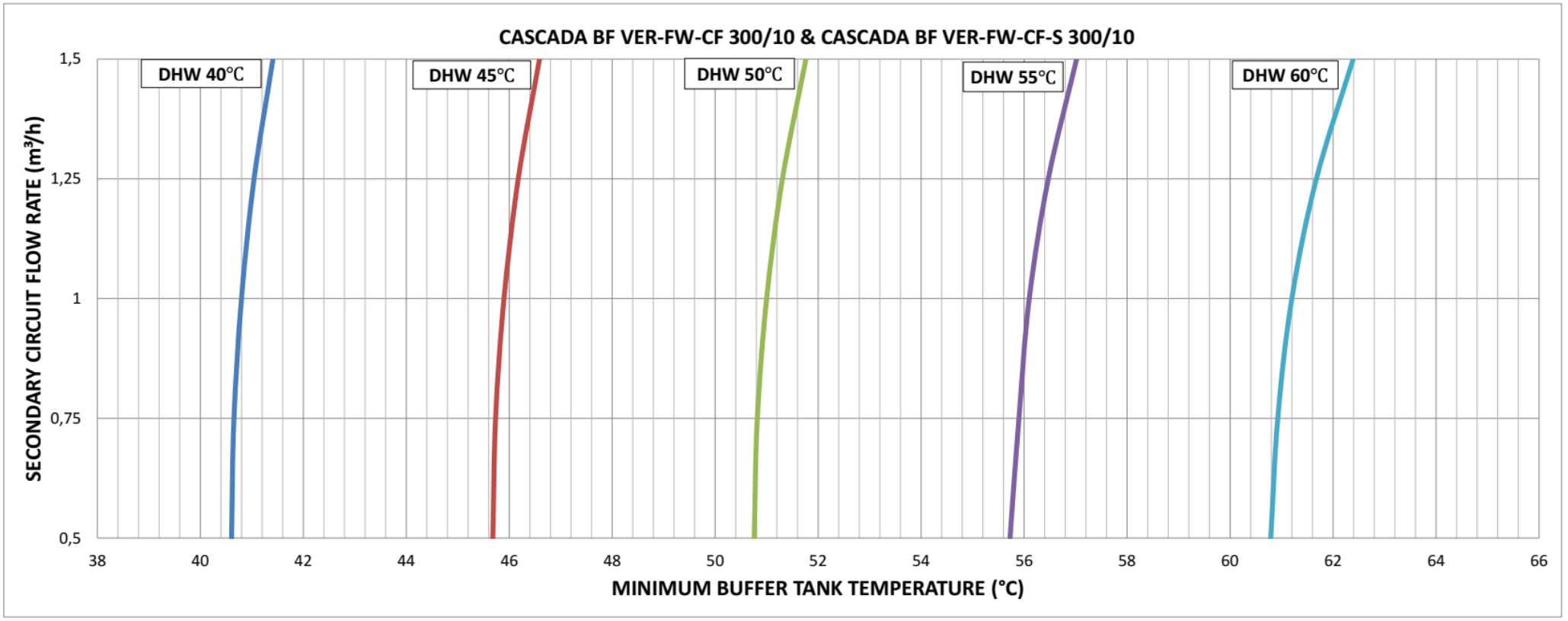
1) CASCADA BF VER-FW-CF 300/10 & CASCADA BF VER-FW-CF-S 300/10

DHW flow rate (m^3/h)	DHW temperature (°C)	Minimum tank charging temperature (°C)	Pressure drop (bar)
0.9	50	5.9	0.26



i) Minimum required primary circuit temperature as a function of the secondary circuit flow rate and the desired DHW temperature

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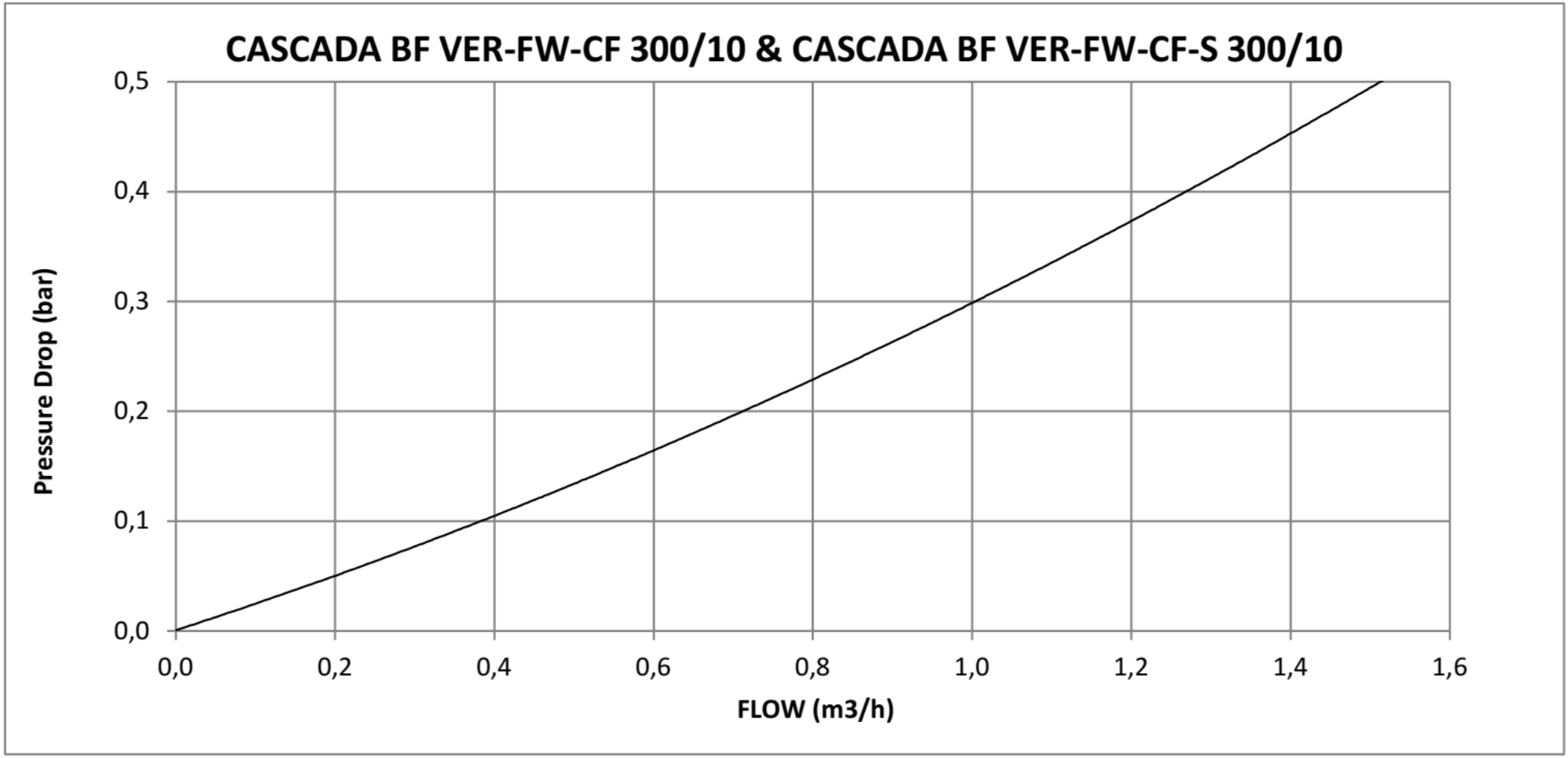

ii) Secondary circuit (DHW) pressure drop diagram

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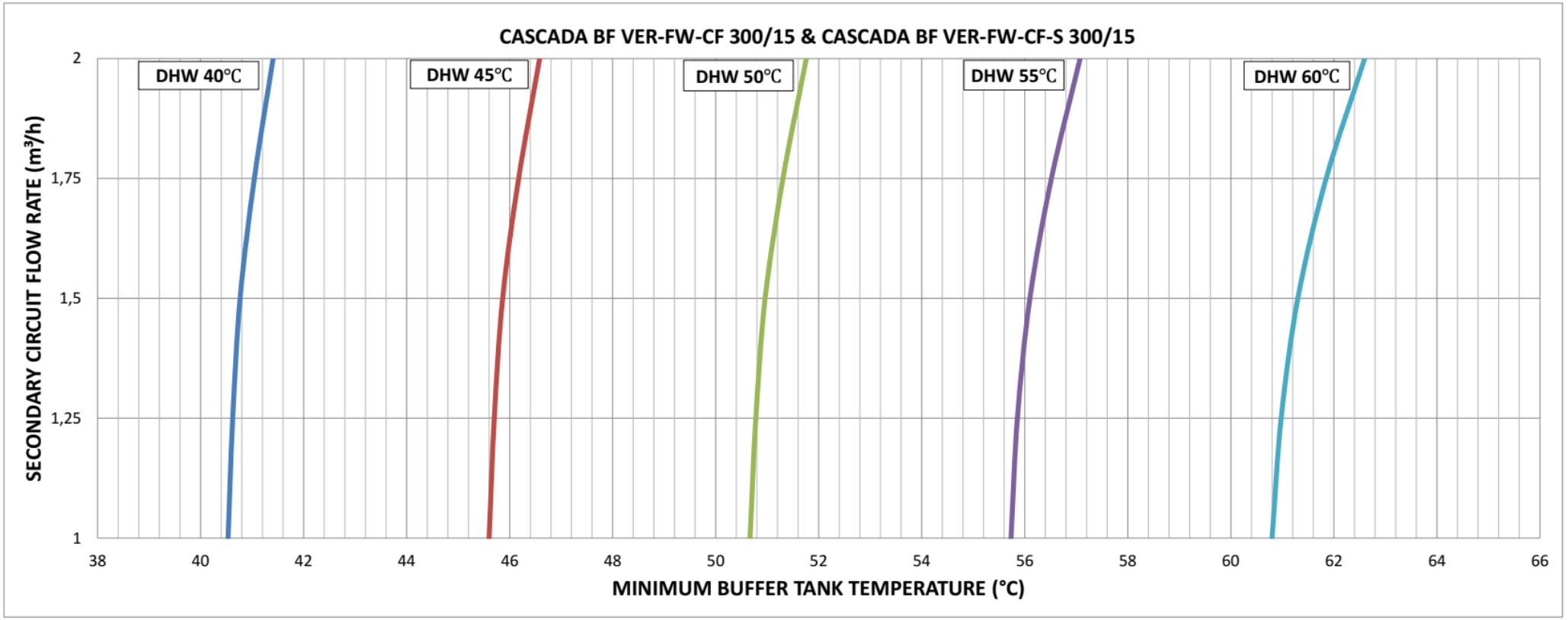
2) CASCADA BF VER-FW-CF 300/15 & CASCADA BF VER-FW-CF-S 300/15

DHW flow rate (m^3/h)	DHW temperature (°C)	Minimum tank charging temperature (°C)	Pressure drop (bar)
1.4	50	50.8	0.44



i) Minimum required tank charging temperature as a function of the secondary circuit flow rate and the desired DHW temperature

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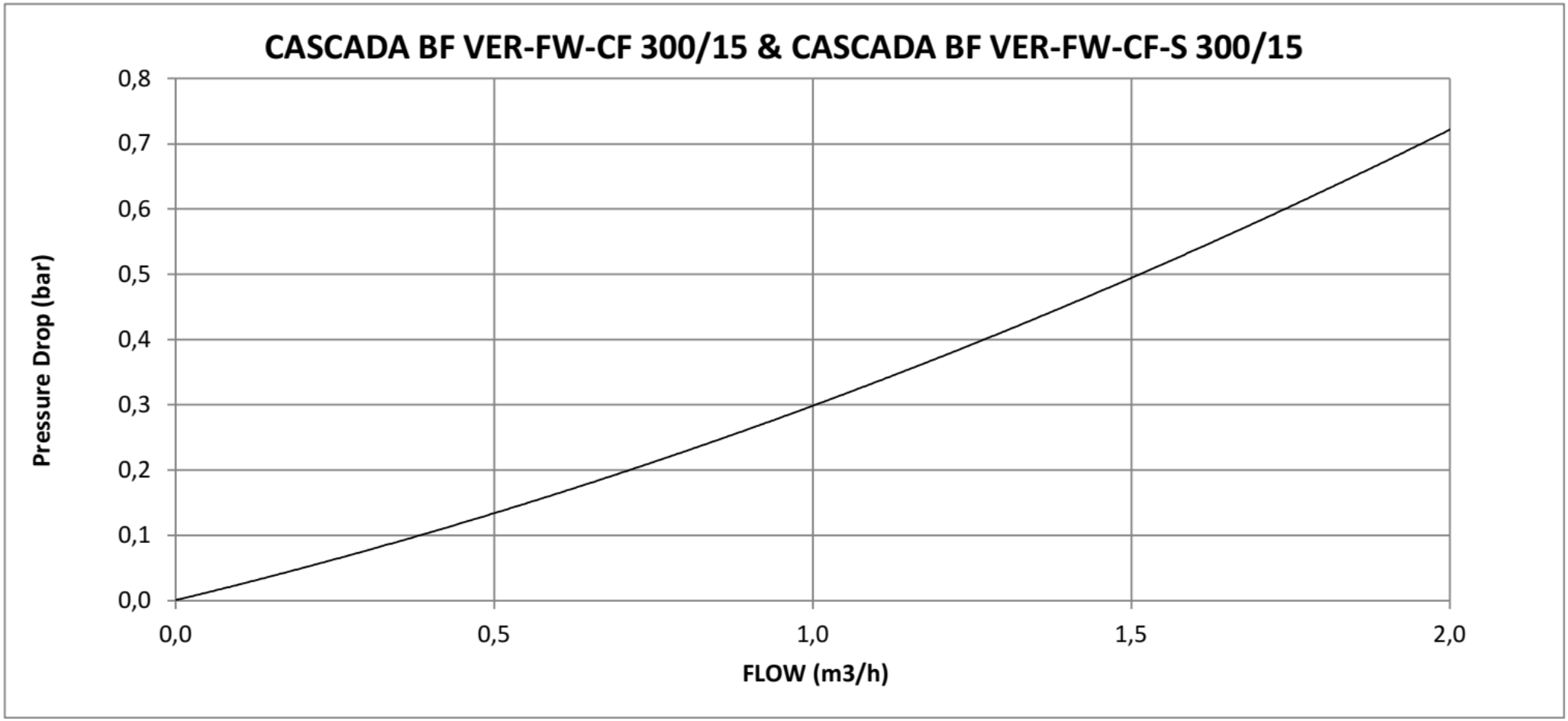

ii) Secondary circuit (DHW) pressure drop diagram

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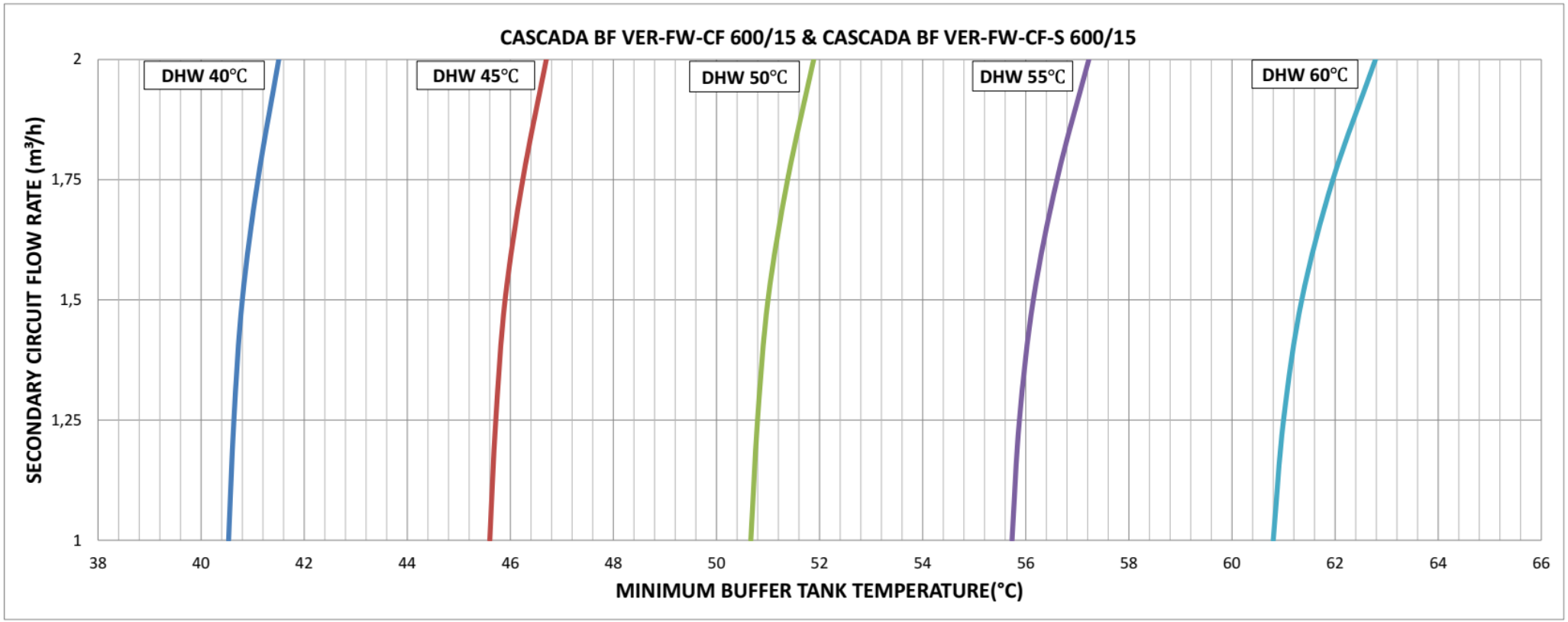
3) CASCADA BF VER-FW-CF 600/15 & CASCADA BF VER-FW-CF-S 600/15

DHW flow rate (m^3/h)	DHW temperature (°C)	Minimum tank charging temperature (°C)	Pressure drop (bar)
1.5	50	51	0.20



i) Minimum required tank charging temperature as a function of the secondary circuit flow rate and the desired DHW temperature

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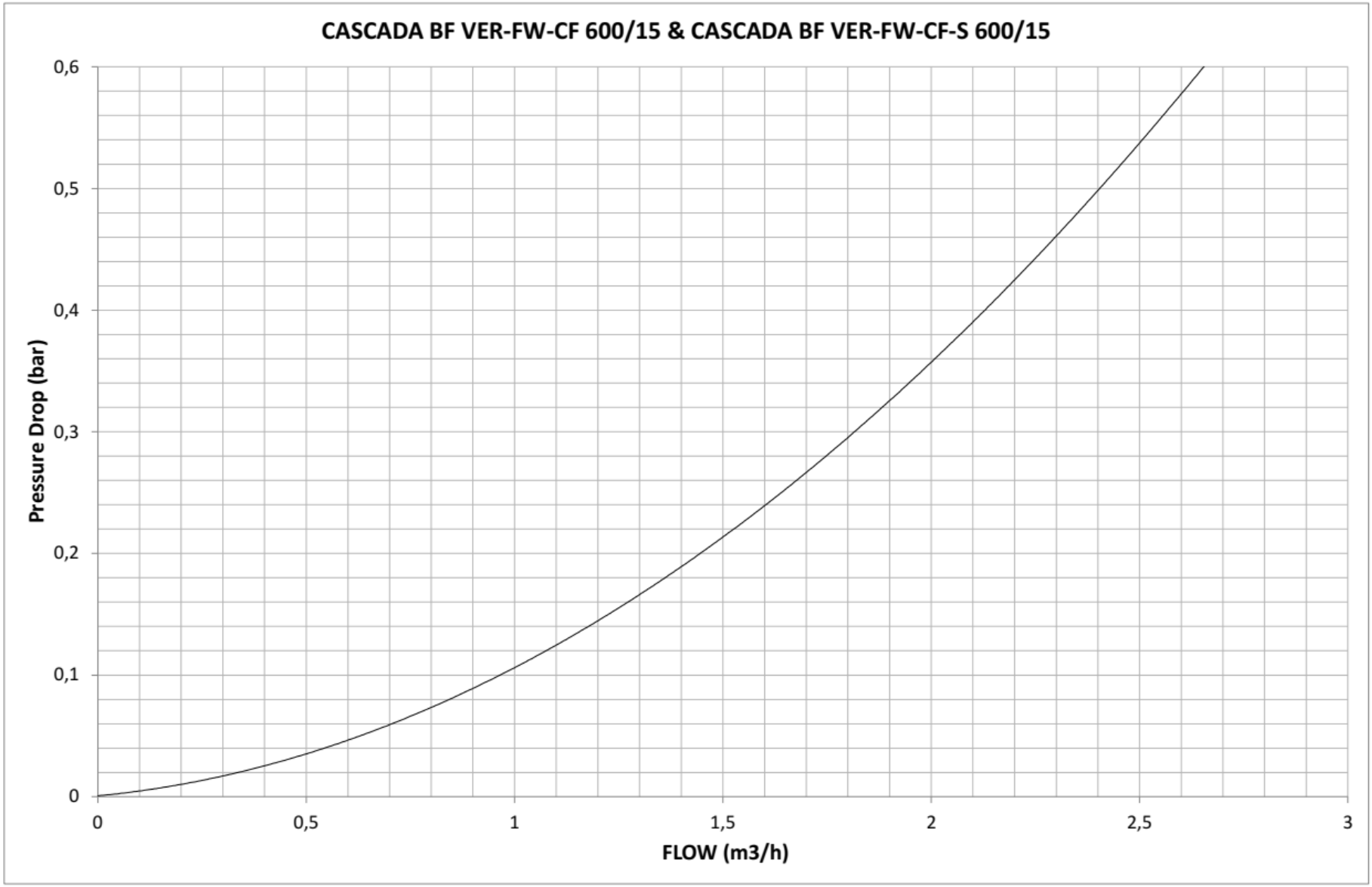

ii) Secondary circuit (DHW) pressure drop diagram

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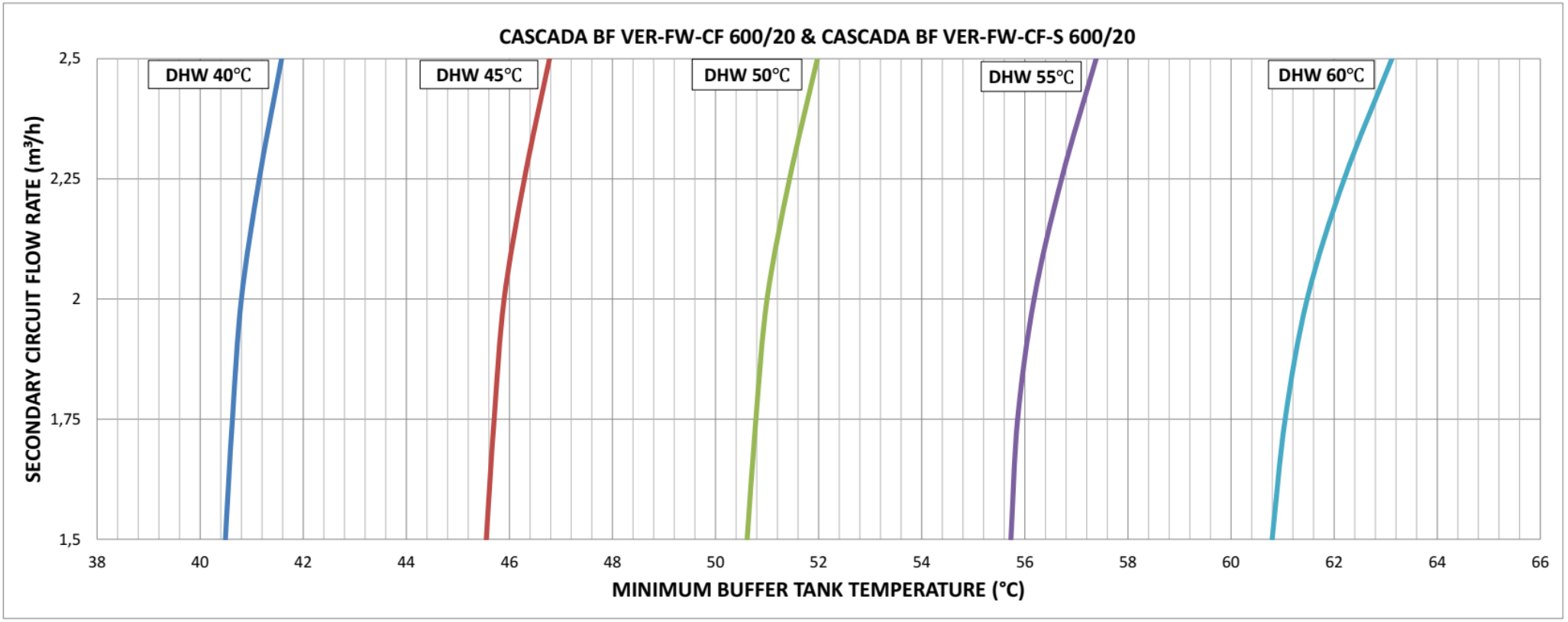
4) CASCADA BF VER-FW-CF 600/20 & CASCADA BF VER-FW-CF-S 600/20

DHW flow rate (m^3/h)	DHW temperature (°C)	Minimum tank charging temperature (°C)	Pressure drop (bar)
2	50	51	0.36



i) Minimum required tank charging temperature as a function of the secondary circuit flow rate and the desired DHW temperature

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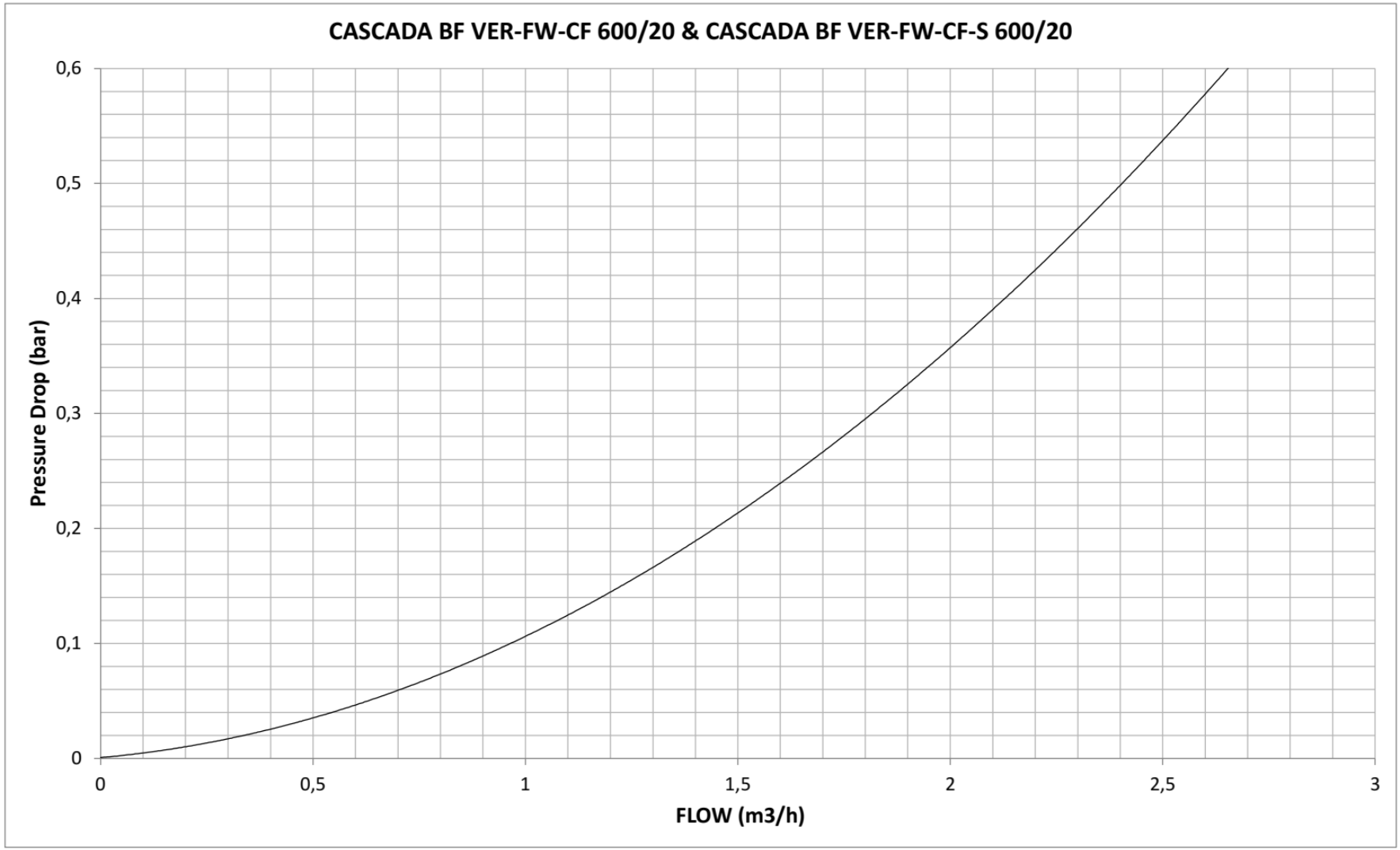

ii) Secondary circuit (DHW) pressure drop diagram

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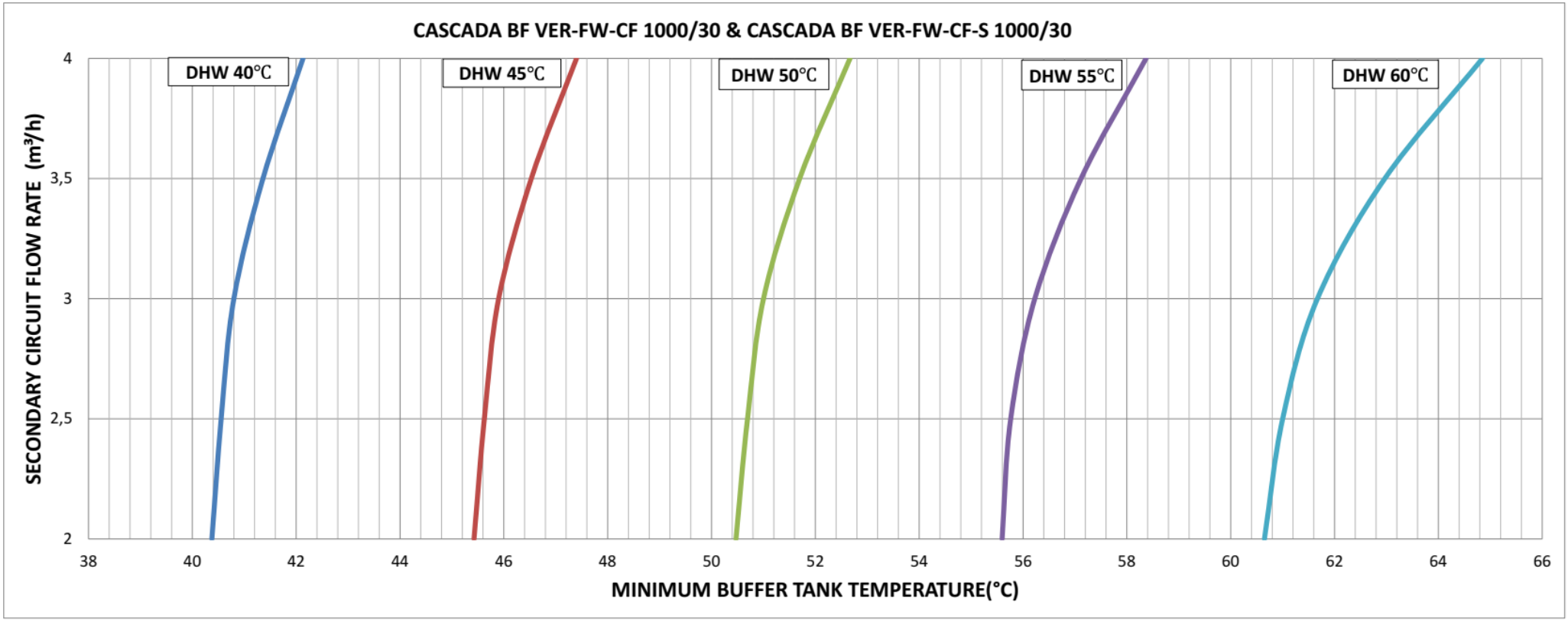
5) CASCADA BF VER-FW-CF 1000/30 & CASCADA BF VER-FW-CF-S 1000/30

DHW flow rate (m^3/h)	DHW temperature (°C)	Minimum tank charging temperature (°C)	Pressure drop (bar)
3	50	51.1	0.18



i) Minimum required tank charging temperature as a function of the secondary circuit flow rate and the desired DHW temperature

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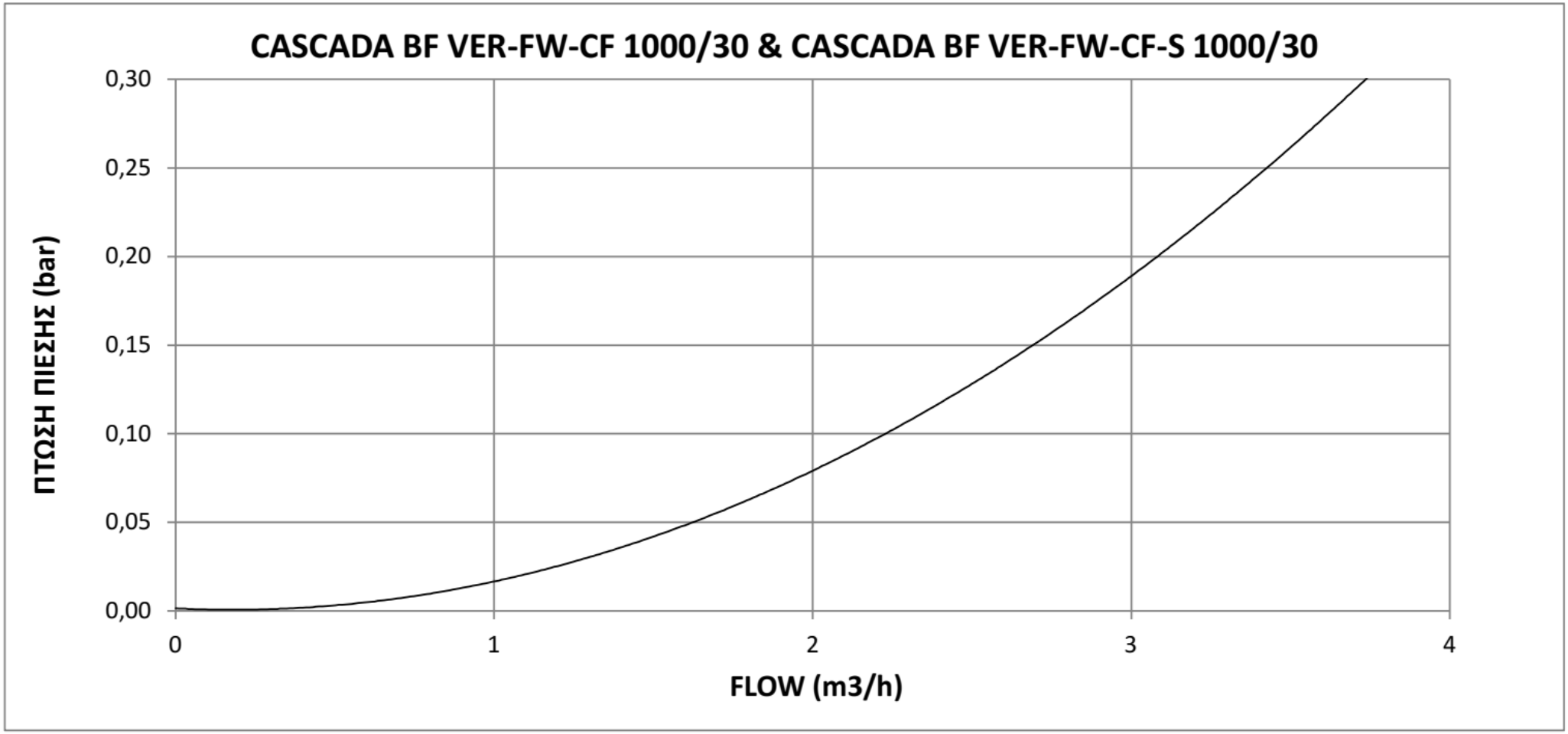

ii) Secondary circuit (DHW) pressure drop diagram

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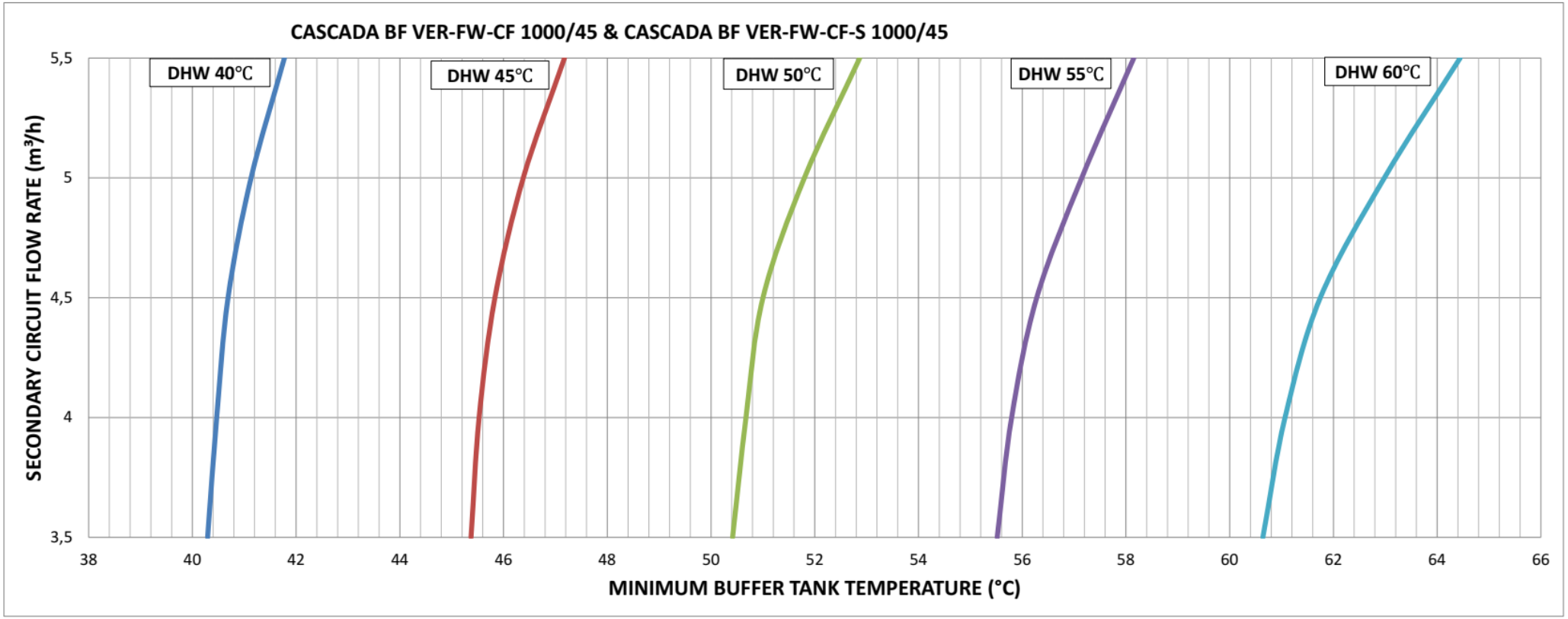
6) CASCADA BF VER-FW-CF 1000/45 & CASCADA BF VER-FW-CF-S 1000/45

DHW flow rate (m^3/h)	DHW temperature (°C)	Minimum tank charging temperature (°C)	Pressure drop (bar)
4.25	50	50.8	0.38



i) Minimum required tank charging temperature as a function of the secondary circuit flow rate and the desired DHW temperature

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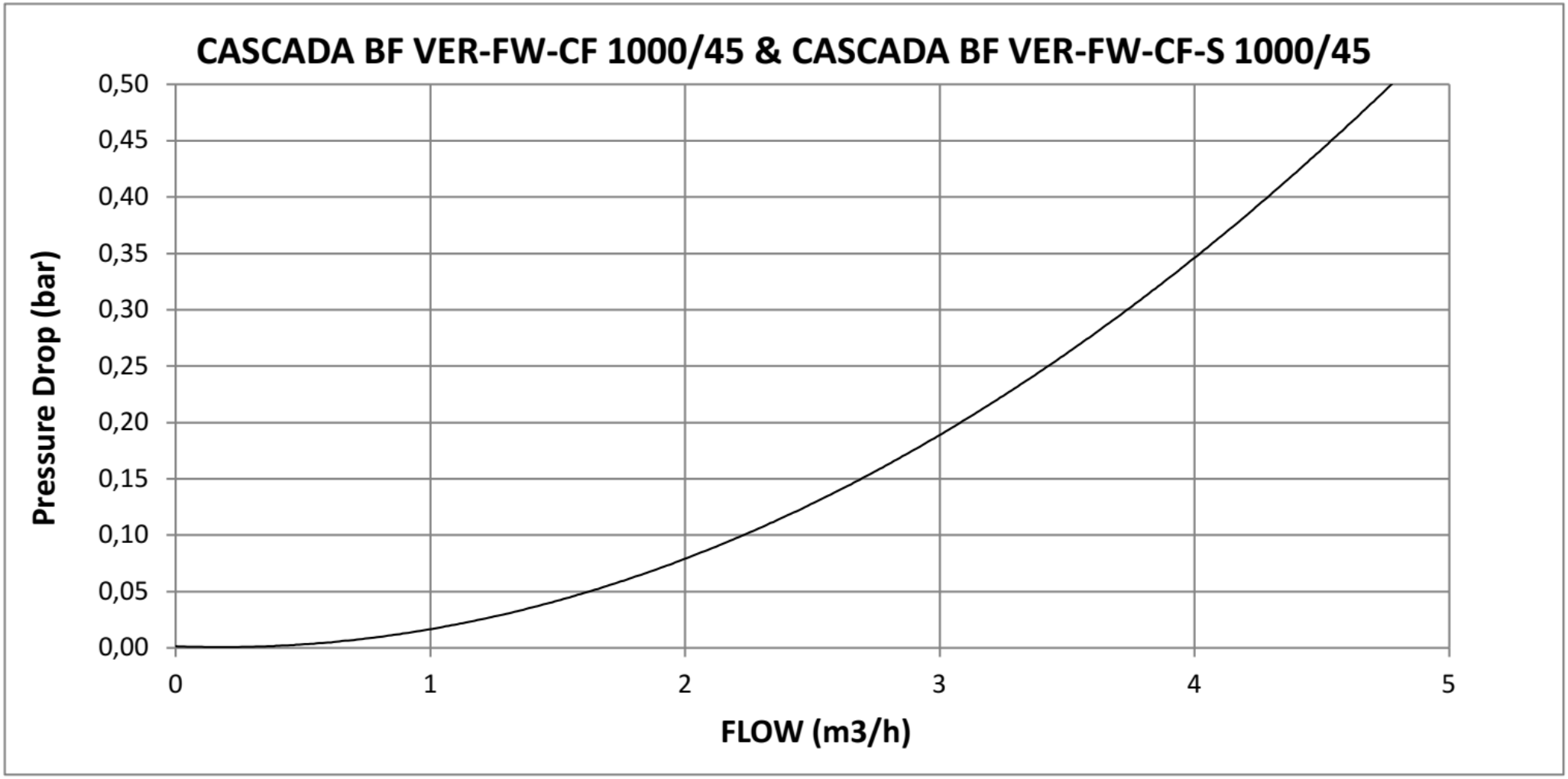

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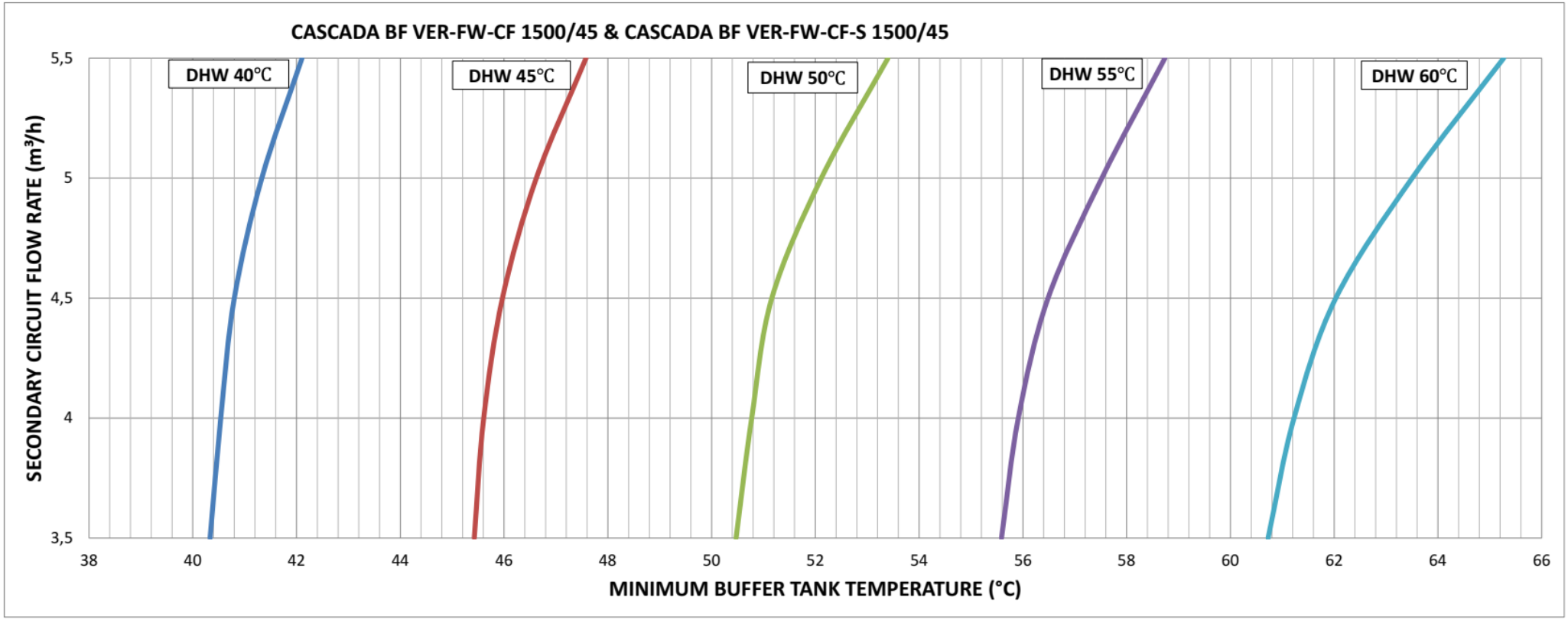
7) CASCADA BF VER-FW-CF 1000/45 & CASCADA BF VER-FW-CF-S 1000/45

DHW flow rate (m^3/h)	DHW temperature (°C)	Minimum tank charging temperature (°C)	Pressure drop (bar)
4.4	50	50.9	0.38



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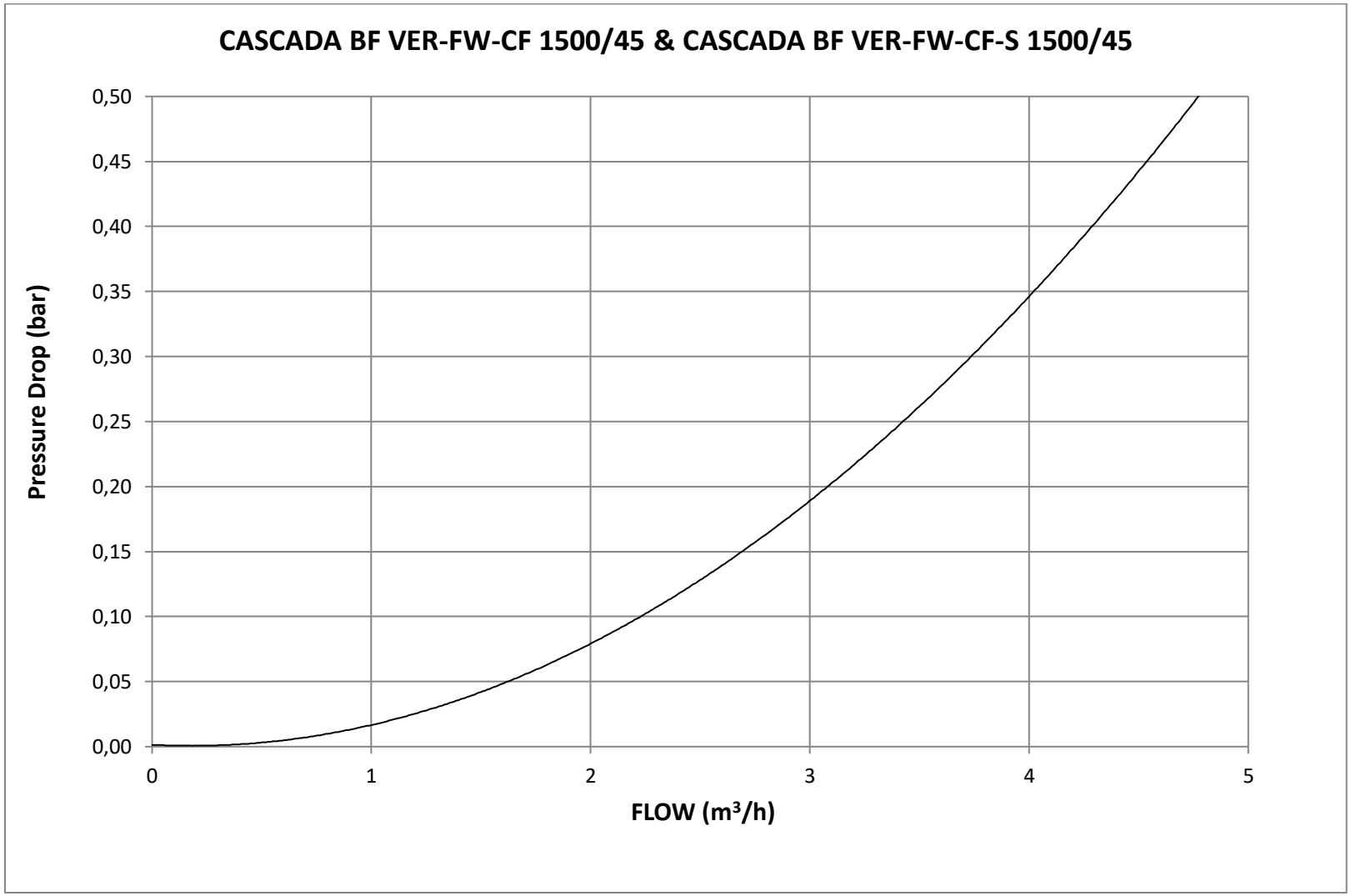

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