RG42120Lxxx SERIES

High efficiency modular heatsink profiles

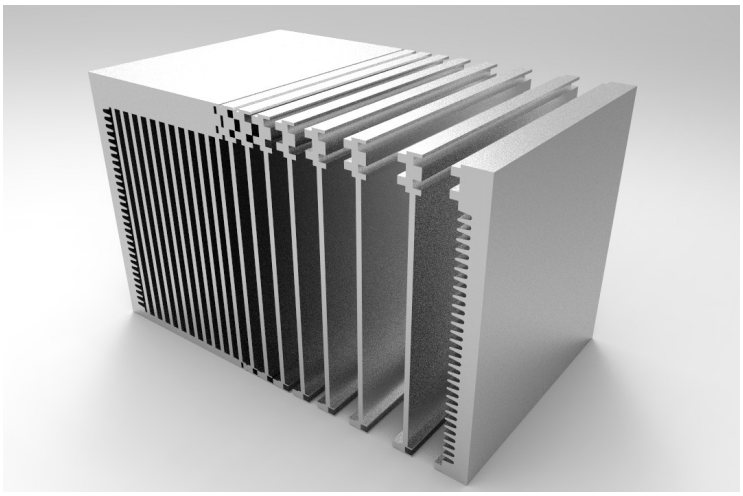
ADVANCED TECHNICAL INFORMATION

HIGHLIGHTS

- Directly from the manufacturer
- Less weight vs extruded technology
  -Space and weight savings
- Excellent thermal dissipation
- Fully custom production
- Good structural integrity
- Welded types for vibration apps
- CNC machined in-house

APPLICATIONS

- High power converters
- Traction converters
- Renewable energy inverters
- UPS



non-contractual image

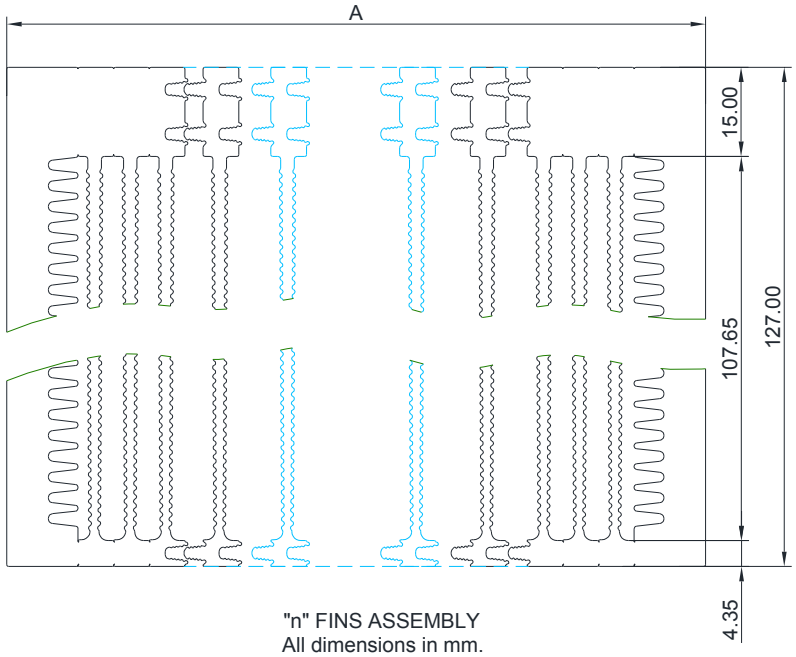
OVERVIEW

Profile of RG42000L series with straight fin, 127mm of total height, specially designed for working together with forced convection cooling system, and high mass lateral fins that can be mount auxiliary components.

DIMENSIONS

The height (127mm.) corresponds to the gross extruded profile, must be taken in consideration the milling of the components mounting side, representing a reduction of 1.00 mm.(real maximum height 126 mm.).

In case of being necessary a critical width dimension it must also be considered the lateral milling and the profile manufacturing tolerances. In great profiles ± 1 fin can be mounted to adjust the optimum dimensions.



"n" FINS ASSEMBLY
All dimensions in mm.

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The overall dimensions of the heatsink, tolerances and approximate weigth for any combination may be calculated, based on the following formulae.

Heatsink width A = 24 + n x 6
Maximum width tolerance: ± (0.4 + n x 0.1)
Total weight (Kgrs): L x (6.59 + n x 0.678) / 1000

L = Heatsink lenght in mm.
n = Number of fins.

Example: RG42120L17/300: Dimensions: **127 x 126 ± 2.10 x 300; Weight = 5.43 Kgrs.**

A = 24 +17 x 6 = 126 ; Tolerance: 0.4 + 17 x 0.1 = 2.10
Weight = 300 x (6.59 + 17 x 0.678) /1000 = 5.43 Kgrs.

Warning. The obtained data are for the raw profile, the final data is machining depends.

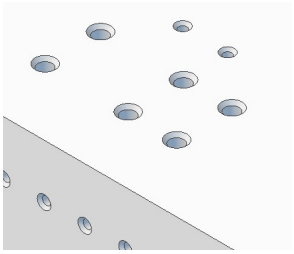
ORDER CODES

RG42120 Lxx / xxx xx
(1) (2) (3) (4)

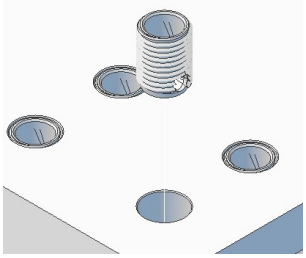
1- General code of heatsink series
2- Number of fins
3- Heatsink lenght in mm.
4- Options (Ex.: R: Milled surface; M: Worked according to plane)

MACHINING OPTIONS AND POSSIBILITIES

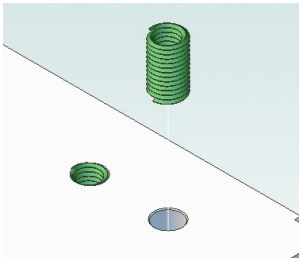
We can offer many options and accessories machining according to the customer needs and if necessary we collaborate actively in the design to achieve optimum results.



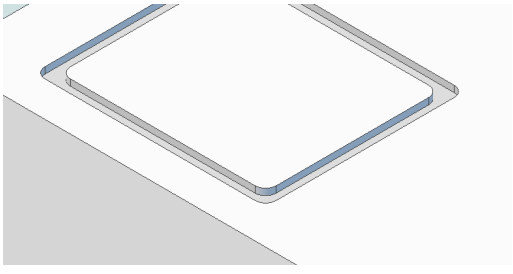
Threaded holes



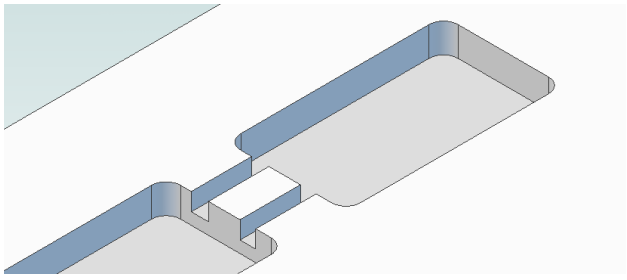
ENSAT inserts



HELICOIL inserts



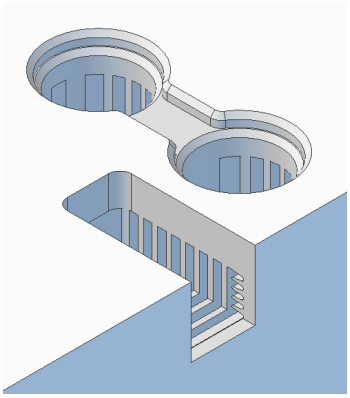
Accommodation sealing gaskets



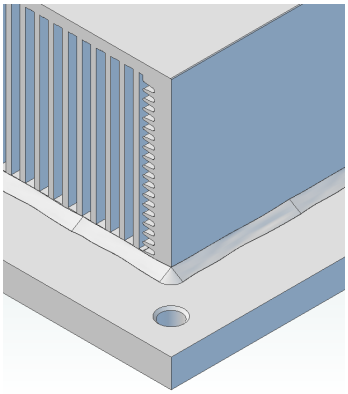
Custom milling

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Complex milling



Welding possibilities

Rectificadores Guasch, S.A. can also offer more complete solutions including semiconductor components and accessories, our R+D+i department is at your disposal to meet the right project to customer needs.

THERMAL RESISTANCE (Rth) VALUES

Rth estimated value can be calculated from the following procedure and the accompanying graphic (for lengths of 50-600 mm).

Data needed:

Number of fins and lenght of heat sink.
Pressure / flow curve of ventilation system (fan data)

Calculation method

The Rth is obtained from the graph corresponding to the desired length heatsink and airflow provided. As the flow rate provided by the ventilation system (fan) is dependent on the pressure loss, it must first establish what will be the real flow-ventilated whole sink.

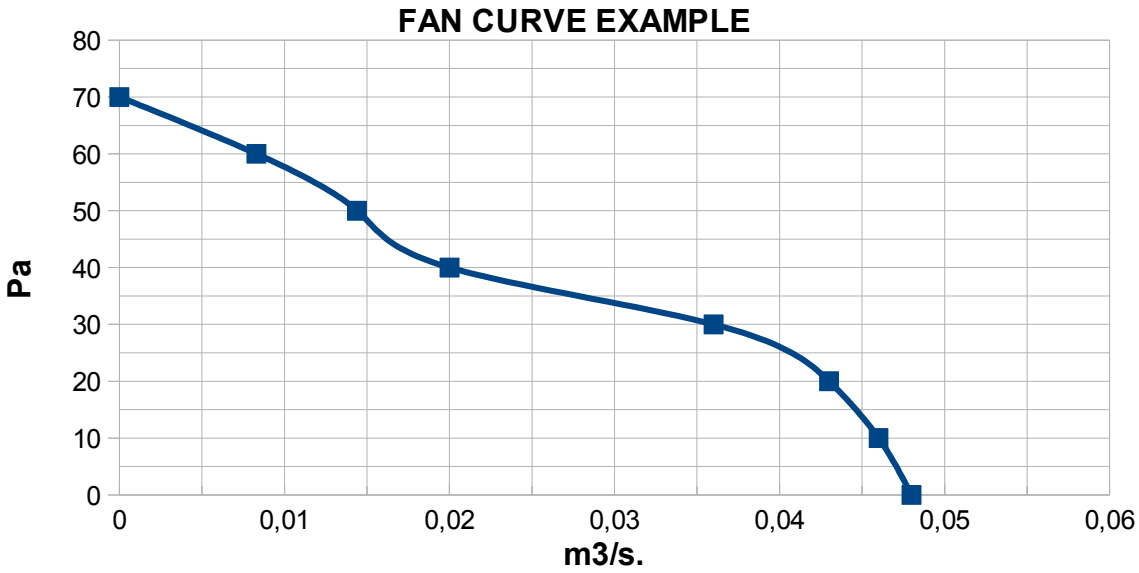
To determine the flow curve is necessary to use the flow / pressure curve (provided by the manufacturer of the fan) and make an approach through iterative calculation (usually three iterations are sufficient), the last result allows for the assembly Rth with acceptable reliability.

Remember that the graphics are reduced to one fin, so that the flow rate will compare initial flow / 'n' fins, and the end result will be the Rth / "n" fins.

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Example:

Heat sink reference: RG42120L17/300 (15 fins, 300 mm length).
Fan curve (just as an example):



1-Choosing a mean flow in the fan chart and record the value of pressure and the flow rate for each tab:

Selected flow: 0.030 m^3/s
Flow by fin: 0.00176 m^3/s

2-Search in the graph corresponding to 300 mm. the value of pressure flow rate corresponding to fin; 47 Pa in this example (remember that the relationship of flow for one fin is fan flow / 17).

3-Get back flow from fan curve, 0.016 m^3/s in this example, 0.0009m^3/s by fin (recall that the relationship in the data flow corresponds to the one fin flow x 17).

Repeat the process 2 and 3 the times that necessary to obtain a minimum variation in the result, in this example, after three iterations, we obtain a flow value for fin 0.045m^3/s, 0.0026m^3/s by fin.

5-Read Rth value at right of the graph, in this example 0,86K/W.

6-Get the full Rth applying RTHfin / "n" fins (0,86/17)

7-Result: Rth value estimate = 0.0506K/W

WARNING. The obtained thermal resistance value is only for large area heat distribution and should be taken as guidance. Assembly suitability for real applications should be verified. It's not suitable to replace measurements under field conditions.

More accurate simulations can request to our R+D+i indicating the following (please contact with our comercial agent):

-Heat sink Reference (number of fins and lenght)
-Total power dissipated (W)
-Temperature cooling air (°C)
-Curve pressure / flow of fan (or ventilation system).

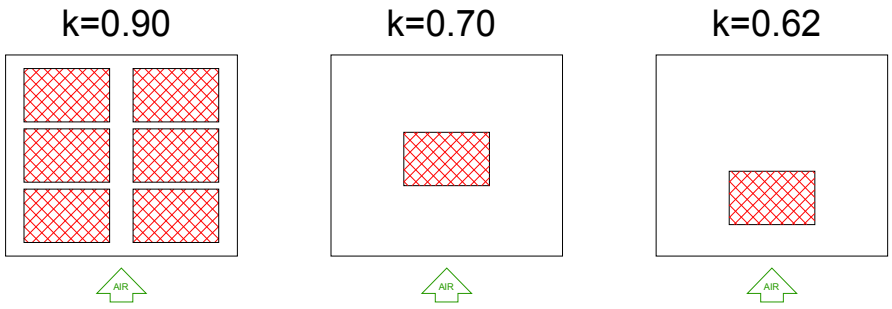
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HEATSINK EFFICIENCY CONSIDERATION

Heatsink efficiency depends on the semiconductor size and positioning. All data is referred to a large surface area, in case of small base plate semiconductors, RTHhs value must be corrected by experimental values.

Example:



The increment of air temperature is often underestimated, in some cases it is important to consider the air increase.

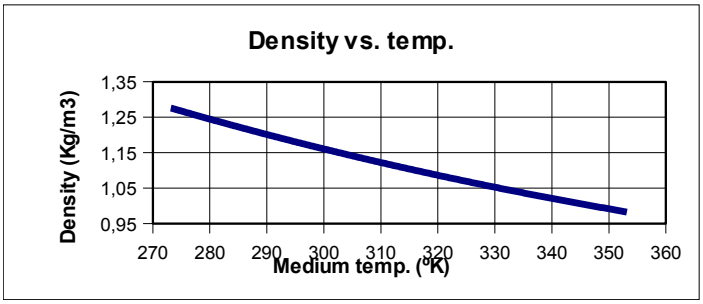
The air temperature increment can be calculated as follows:

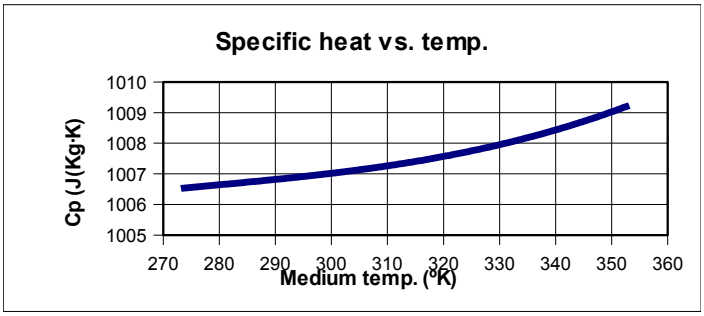
$$\Delta_{AIR} = P / F \times \rho \times Cp$$

Δ_{AIR}: Air temperature increment.
P: Total dissipated power (W.)
F: Air volume flow ($m^3/s.$)
ρ: Air density (Kg/m^3)
Cp: Specific heat capacity ($J/Kg \cdot K$)

Also, air density and specific heat capacity is also temperature dependent.

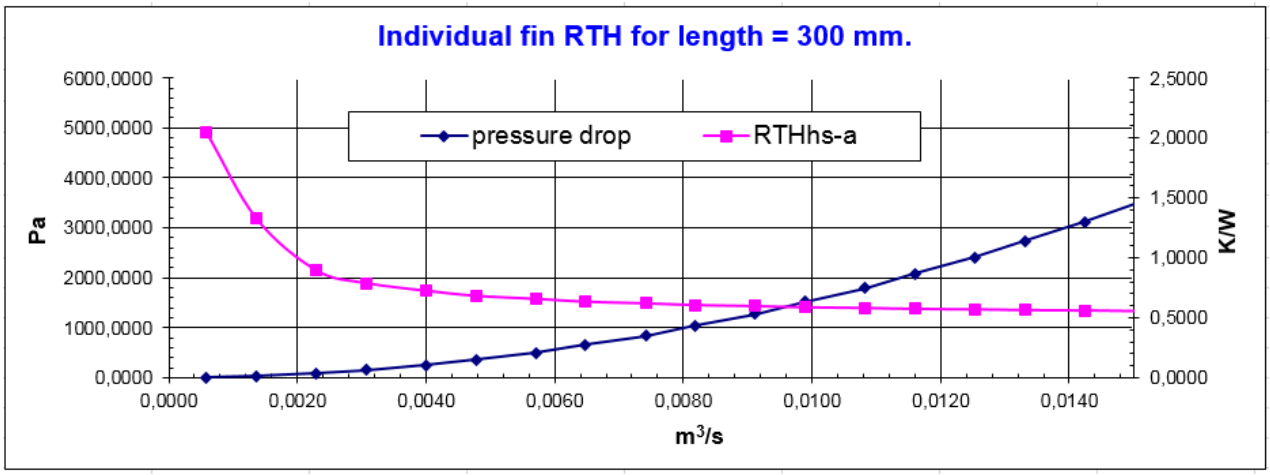
T_{AIR} (medium)		Density	Sp. Heat C.
ºC	ºK	ρ (kg/m³)	Cp (J/kgK)
0	273,15	1,276184	1006,5243
5	278,15	1,253187	1006,6113
10	283,15	1,230884	1006,6973
15	288,15	1,209257	1006,7854
20	293,15	1,188290	1006,8784
25	298,15	1,167965	1006,9789
30	303,15	1,148266	1007,0896
35	308,15	1,129178	1007,2128
40	313,15	1,110686	1007,3509
45	318,15	1,092775	1007,5061
50	323,15	1,075433	1007,6803
55	328,15	1,058646	1007,8758
60	333,15	1,042400	1008,0942
65	338,15	1,026685	1008,3375
70	343,15	1,011489	1008,6073
75	348,15	0,996799	1008,9054
80	353,15	0,982606	1009,2332

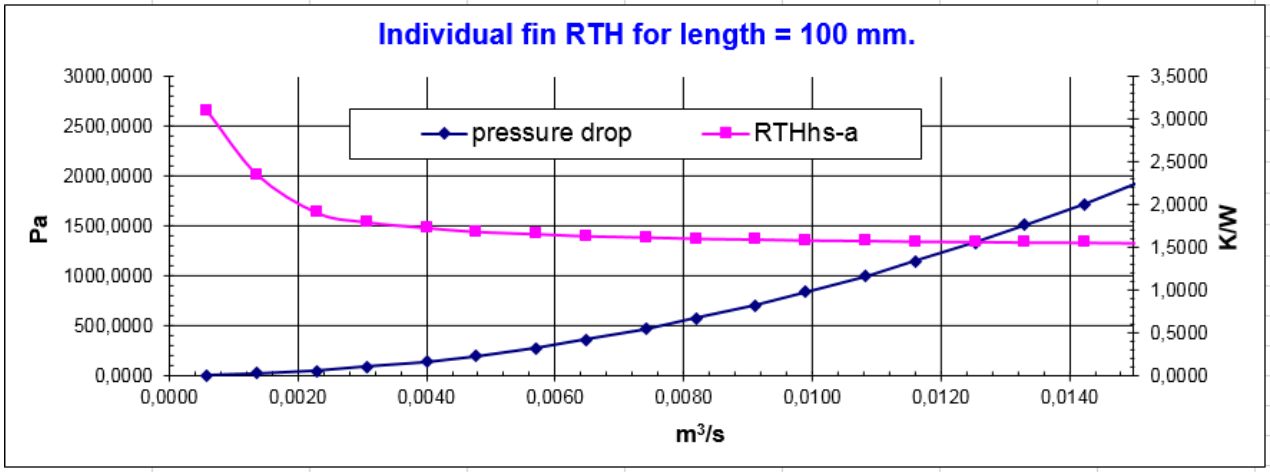


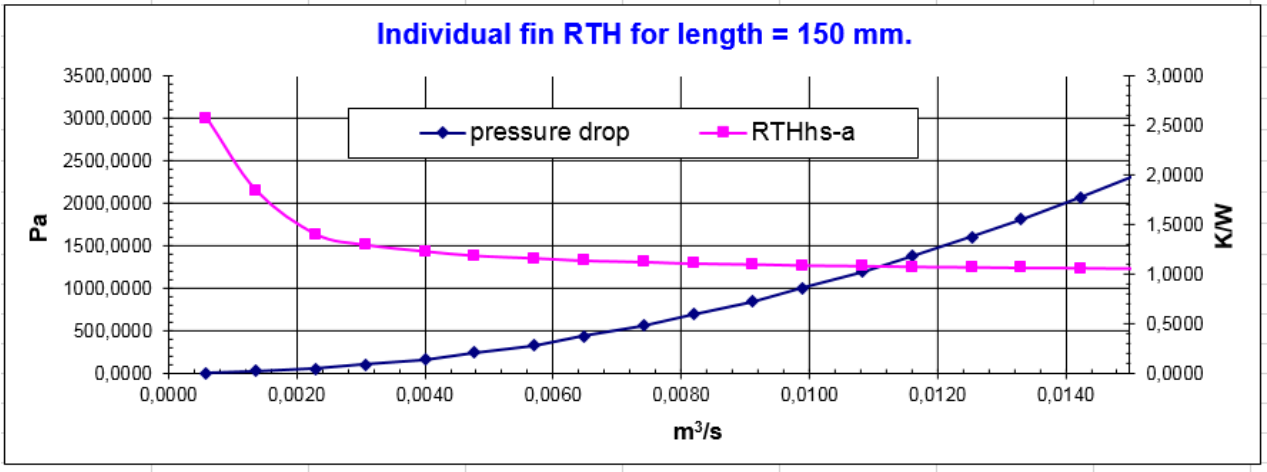


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GRAPHIC DATA

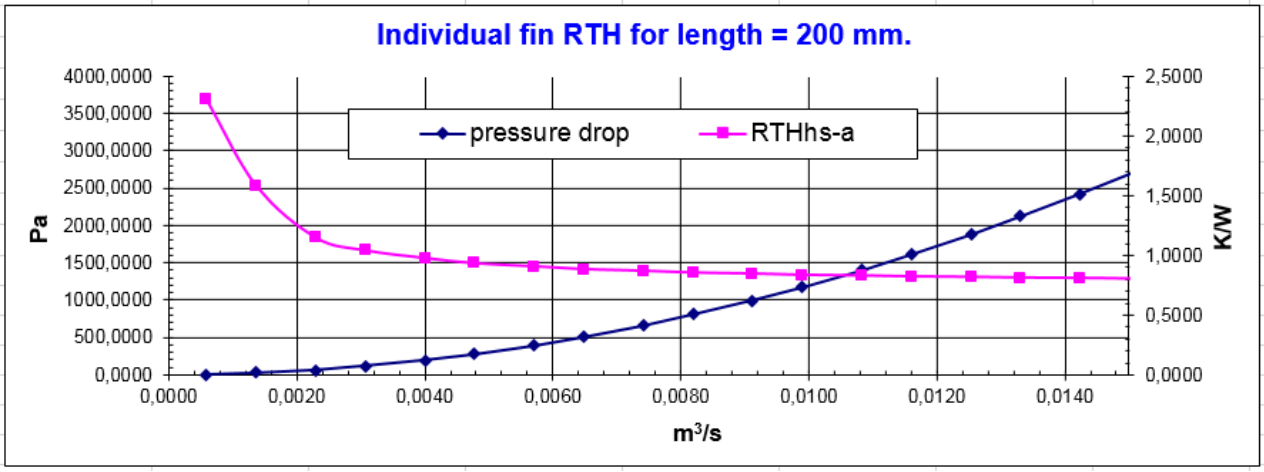


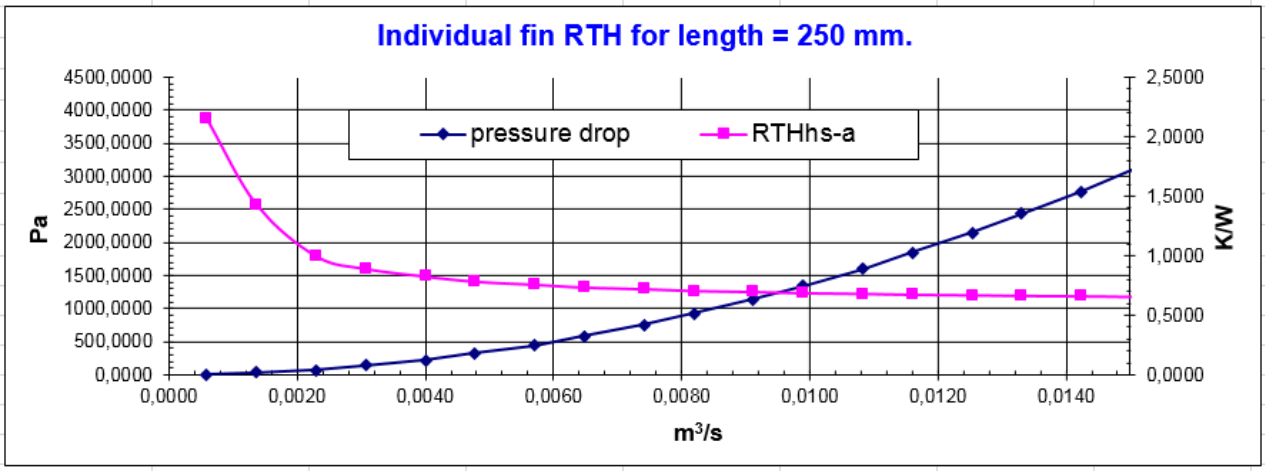


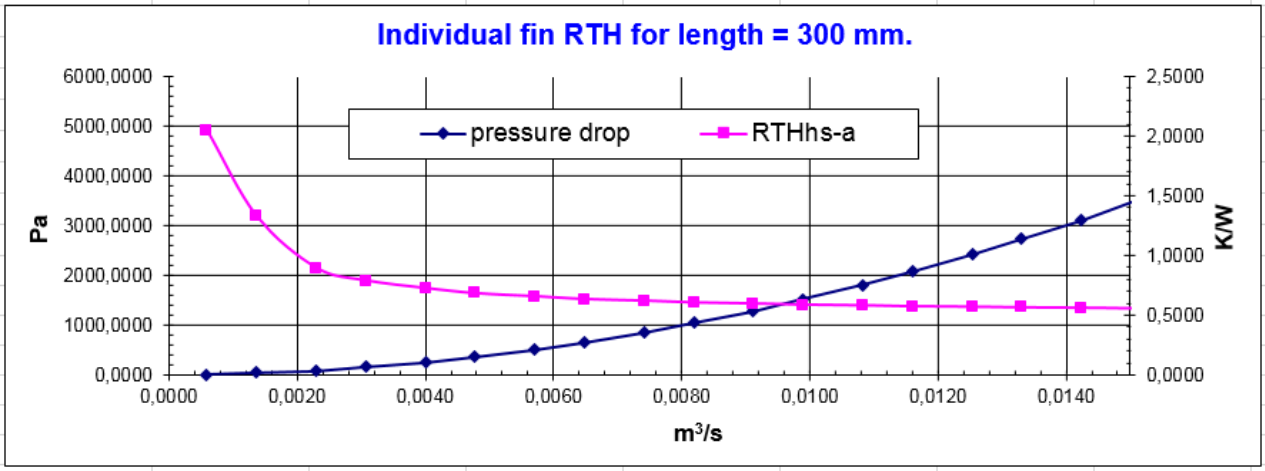


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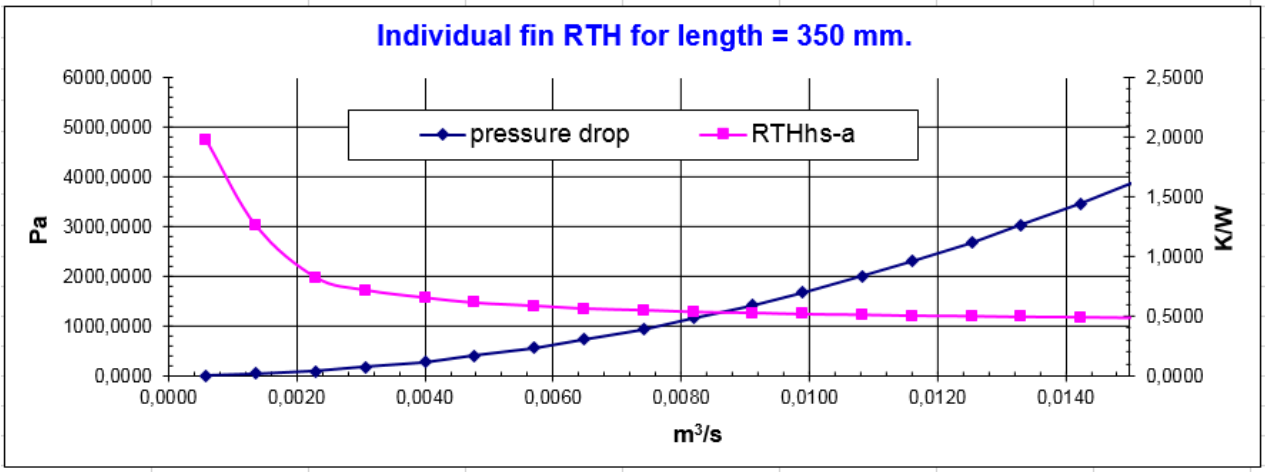
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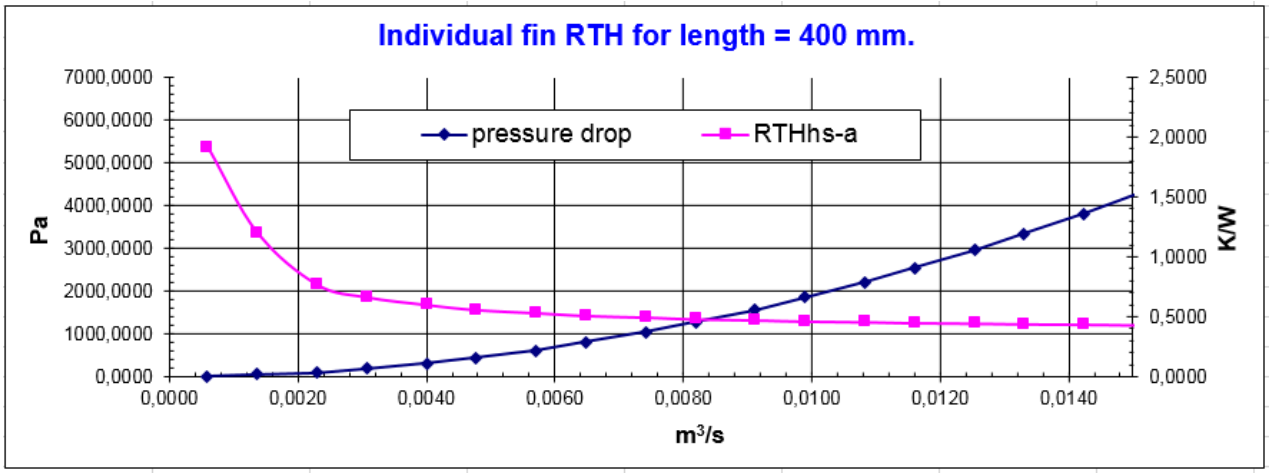


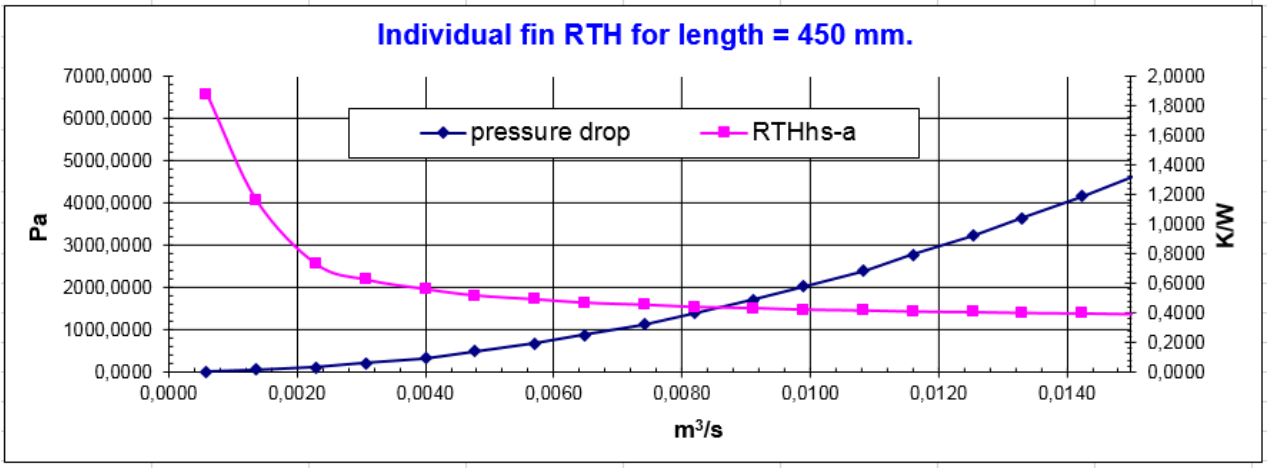




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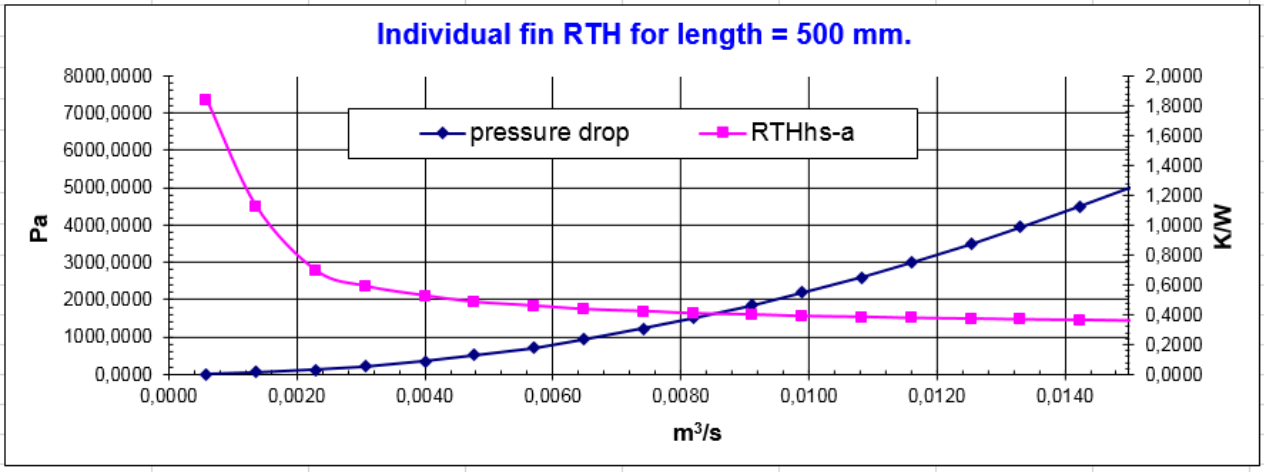


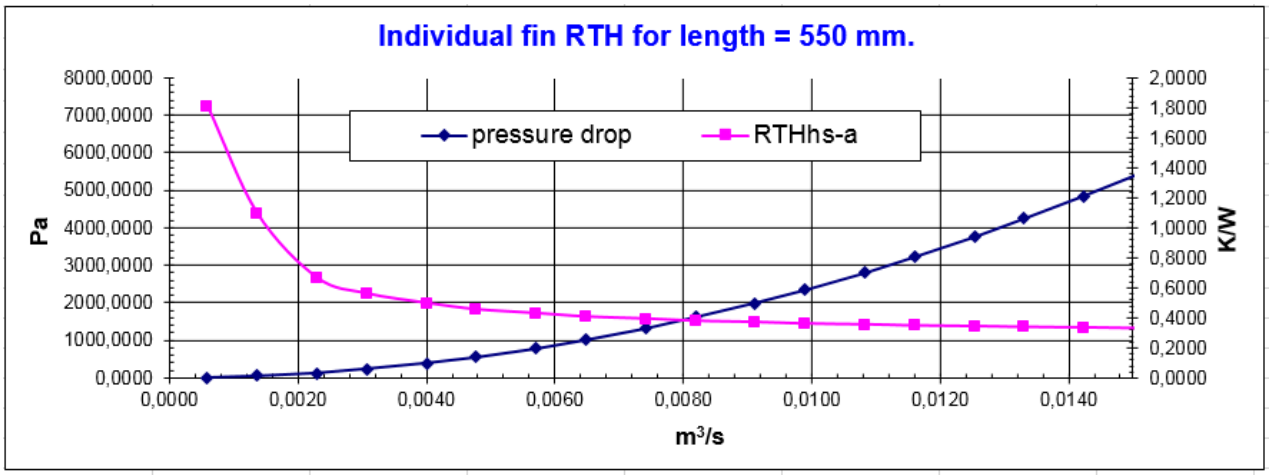


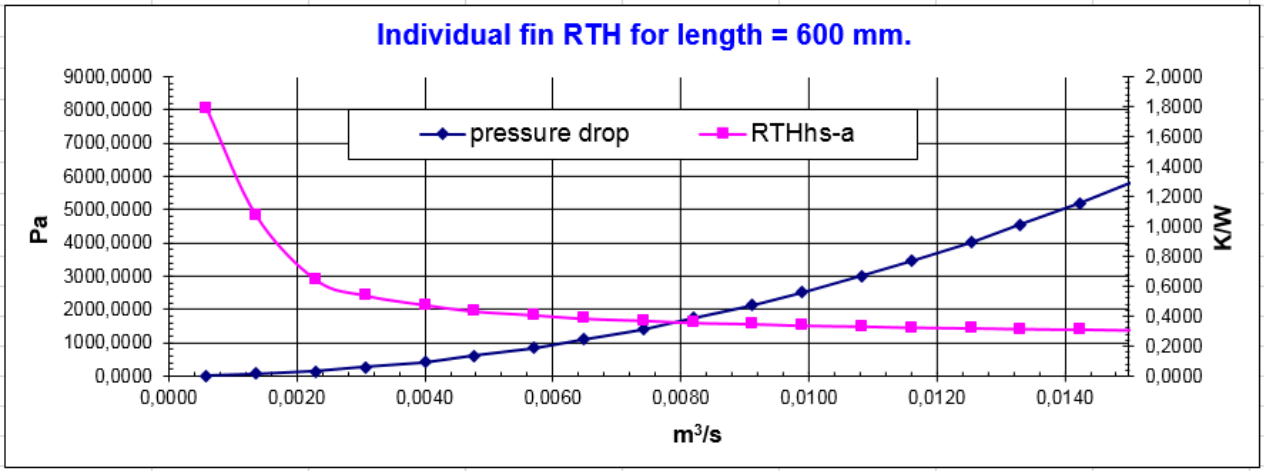


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MEASUREMENT CONVERSION CHARTS

FLOW CONVERSION TABLE

SI unit	Unit to convert	Ab.	Factor
1m^3/s Cubic meter for second	Cubic centimeter for second	cm^3/s	1000000
	Cubic feet for hour	cfh	127132,811835
	Cubic feet for minute	cfm	2118,88199311
	Cubic feet for second	cfs	35,3147248276
	Galon for minute (USA)	gpm	15852,047
	Cubic inch for second	in^3/s	61023,744094
	Liters for hour	l/h	3600000
	Liters for minute	l/m	60000
	Liters for second	l/h	1000
	Cubic meters for hour	m^3/m	3600
	Cubic meters for minute	m^3/h	60
	Cubic yards for hour	yd^3/h	4708,60780593
	Cubic yards for minute	yd^3/m	78,4769753655
	Cubic yards for second	yd^3/s	1,3079595484

SI unit (m^3/s) to unit conversion: Mutiply to factor
Unit to convert to SI unit (m^3/s): Divide to factor

PRESSURE CONVERSION TABLE

SI unit	Unit to convert	Ab.	Factor
1 Pa Pascal	standard atmosphere	atm	9.8692059E-6
	thecnical atmosphere	at	0,000010197
	bar	bar	0,0000102
	column inches of H^{2}O	inH^{2}O	0,0040186465
	column inches of Hg	inAg	0,0002952998
	kilopond per square centimeter	kp/cm^2	0,0000102
	kilopascal	kPa	0,001
	pound force per square feet	lbf/ft^2	0,0208855472
	pound force per square inch	lbf/in^2	0,0208855472
	milibar	mbar	0,0102
	H^{2}O column meters	mH^{2}O	0,0001020408
	H^{2}O column milimeters	mmH^{2}O	0,1020408
	Hg column milimeters	mmHg	0,007500617
	Water column milimeters	mmWC	0,1020408
	megapascal	Mpa	0,000001
	water column meters	mWc	0,0001450377
	newton per square milimeter	N/mm^2	0,0001450377
	pond per square inch	PSI	0,0001450377
	torr	torr	0,007500617

SI unit (Pa) to unit conversion: Mutiply to factor
Unit to convert to SI unit (Pa): Divide to factor

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