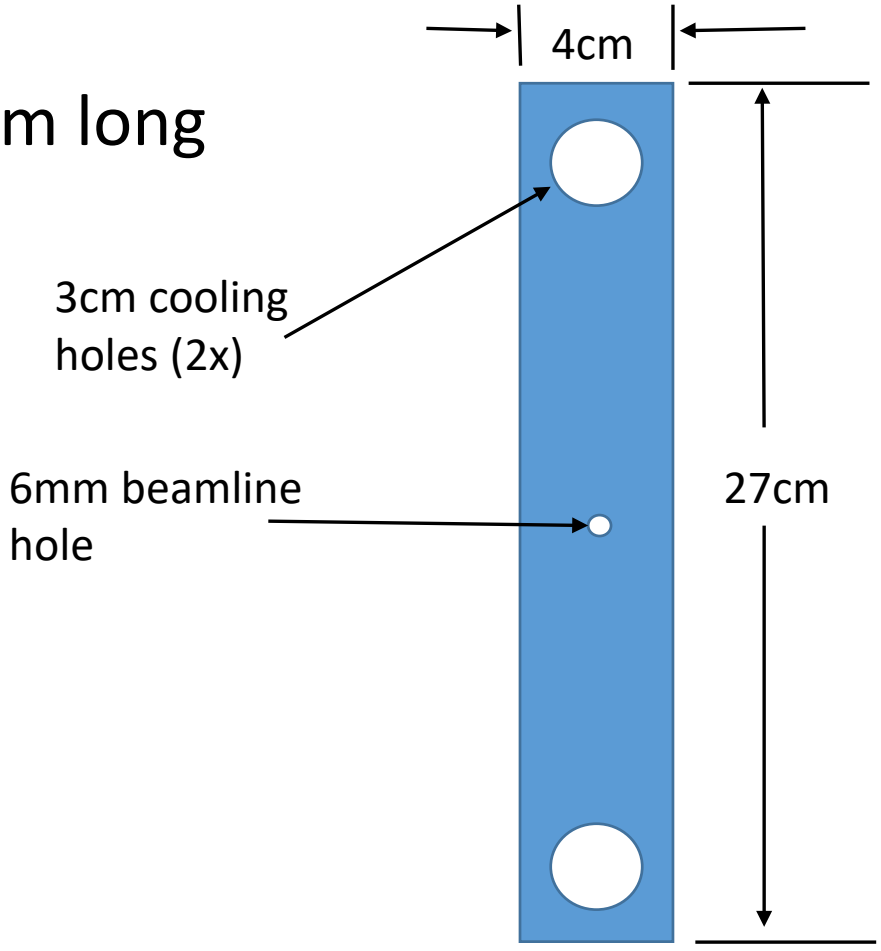
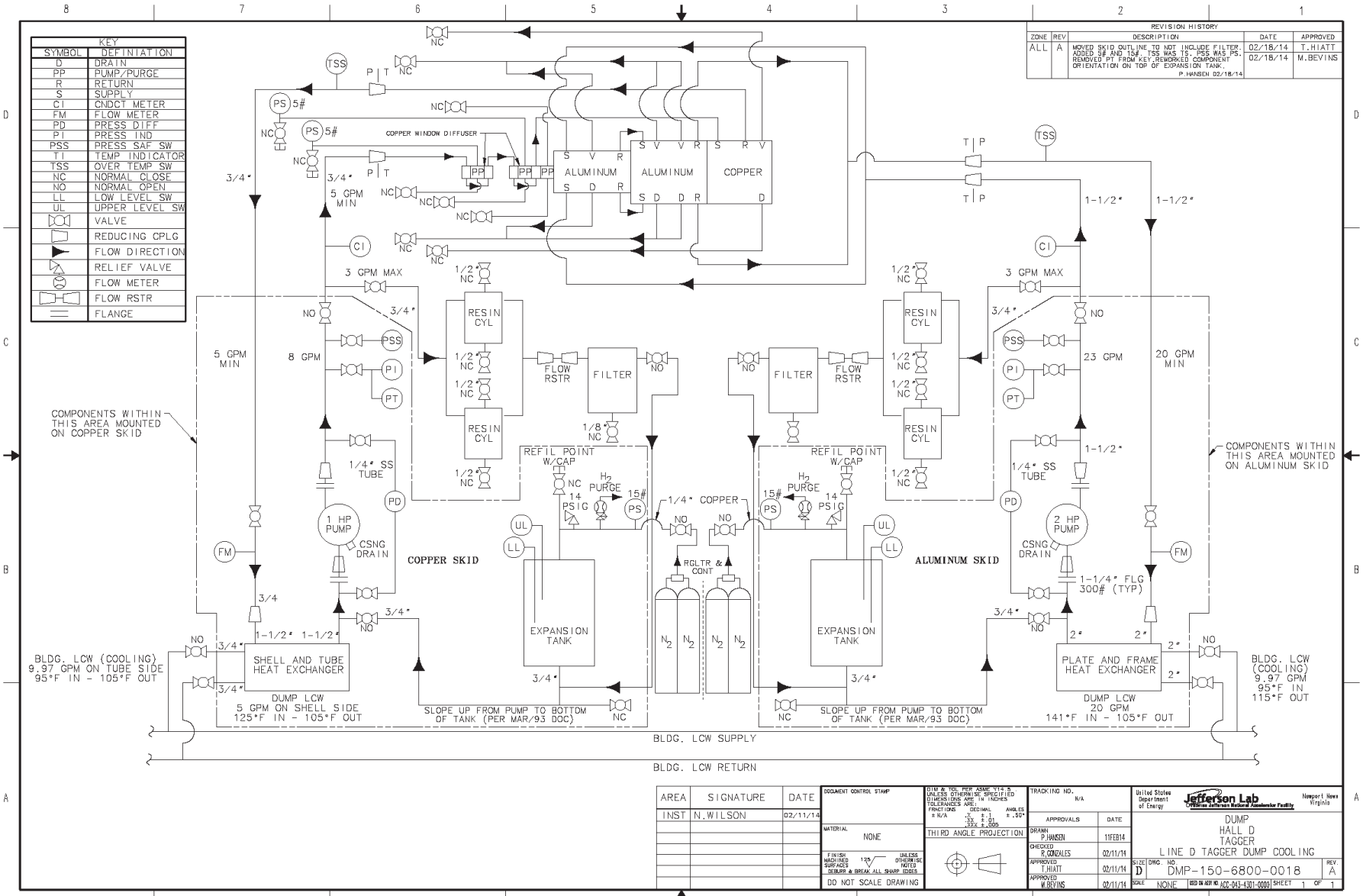
KLF CPS Copper Absorber v1

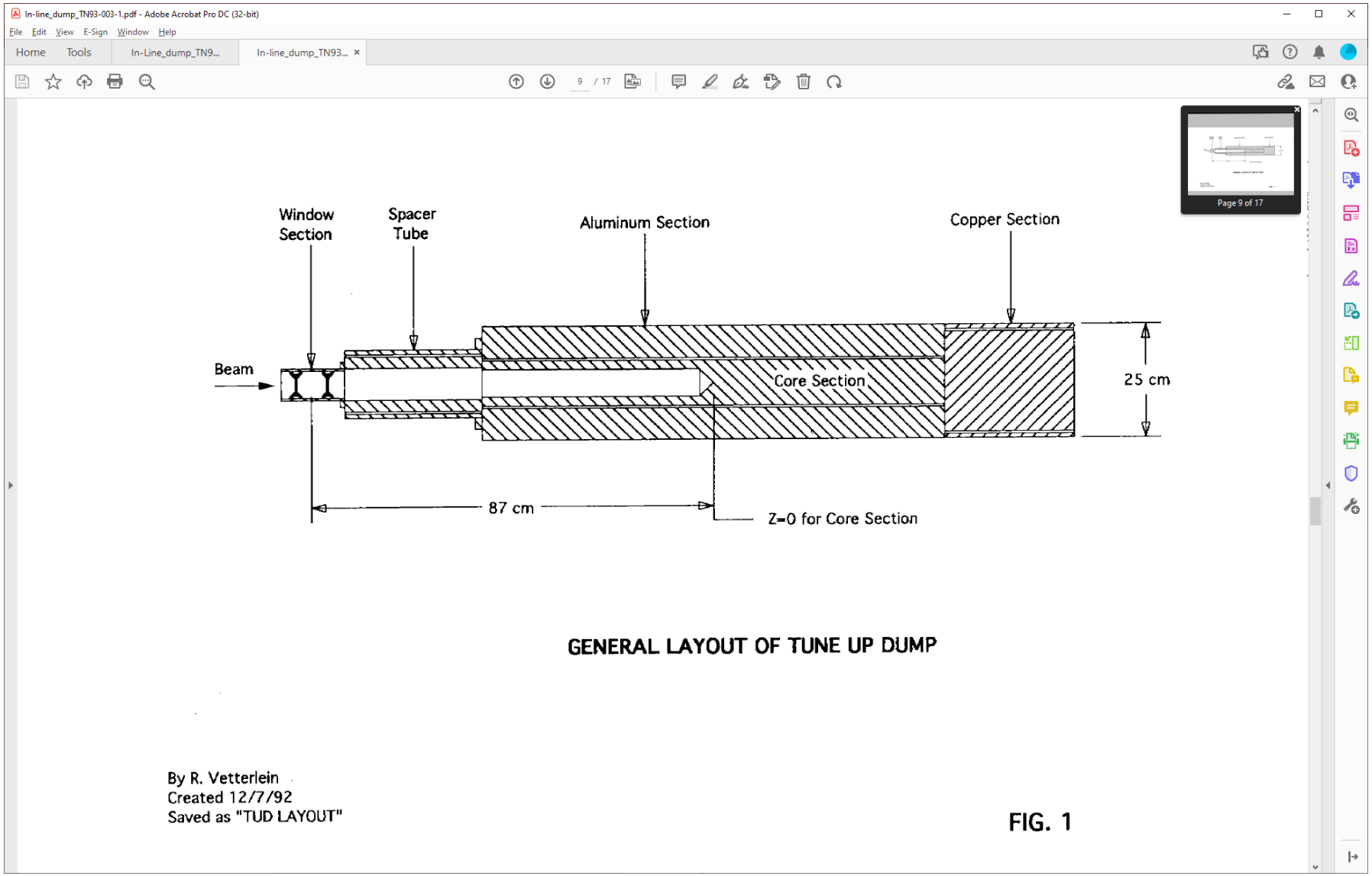
- 3m long

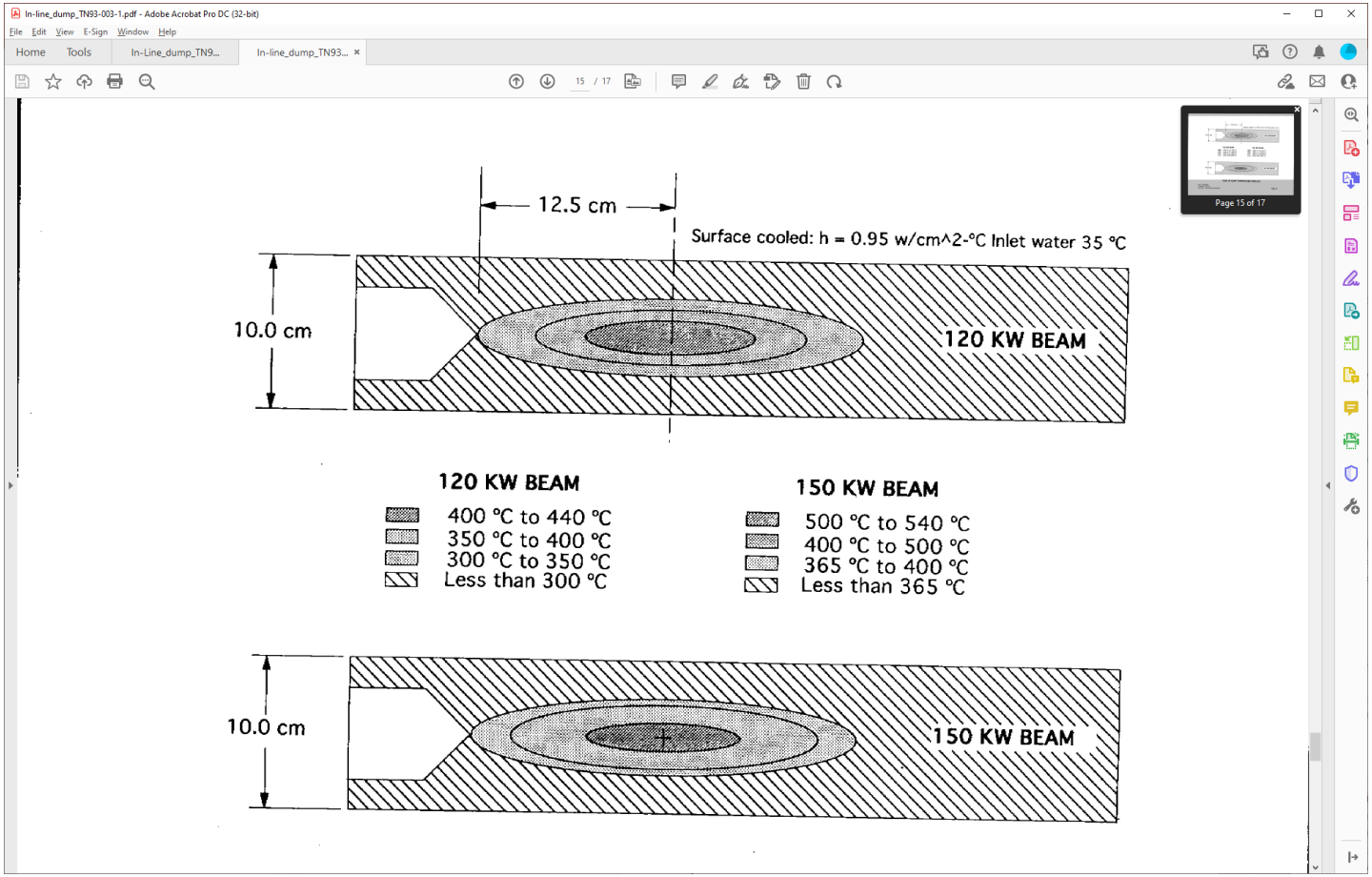


Existing Tagger Dump P&ID



Existing Tagger Dump




In-line_dump_TN93-003-1.pdf - Adobe Acrobat Pro DC (32-bit)
File Edit View E-Sign Window Help
Home Tools
In-Line_dump_TN9...
In-line_dump_TN93...
15 / 17
Page 15 of 17
12.5 cm
Surface cooled: h = 0.95 w/cm^2-°C Inlet water 35 °C
10.0 cm
120 KW BEAM
120 KW BEAM
400 °C to 440 °C
350 °C to 400 °C
300 °C to 350 °C
Less than 300 °C
150 KW BEAM
500 °C to 540 °C
400 °C to 500 °C
365 °C to 400 °C
Less than 365 °C
10.0 cm
150 KW BEAM

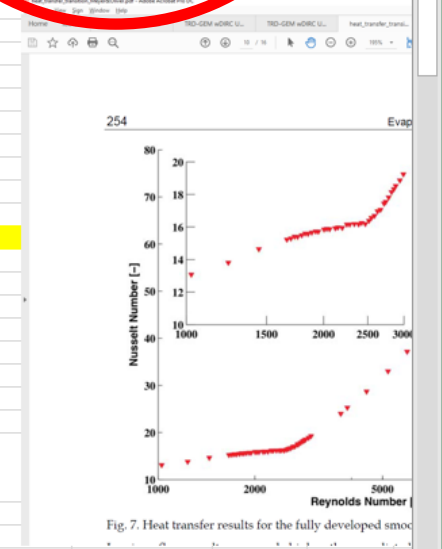
Water cooling

CPS Absorber cooling water_v1 - tanabe [Compatibility Mode] - Excel

File Home Insert Page Layout Formulas Data Review View Acrobat Tell me what you want to do... Timothy Whitlatch Share

A29 20

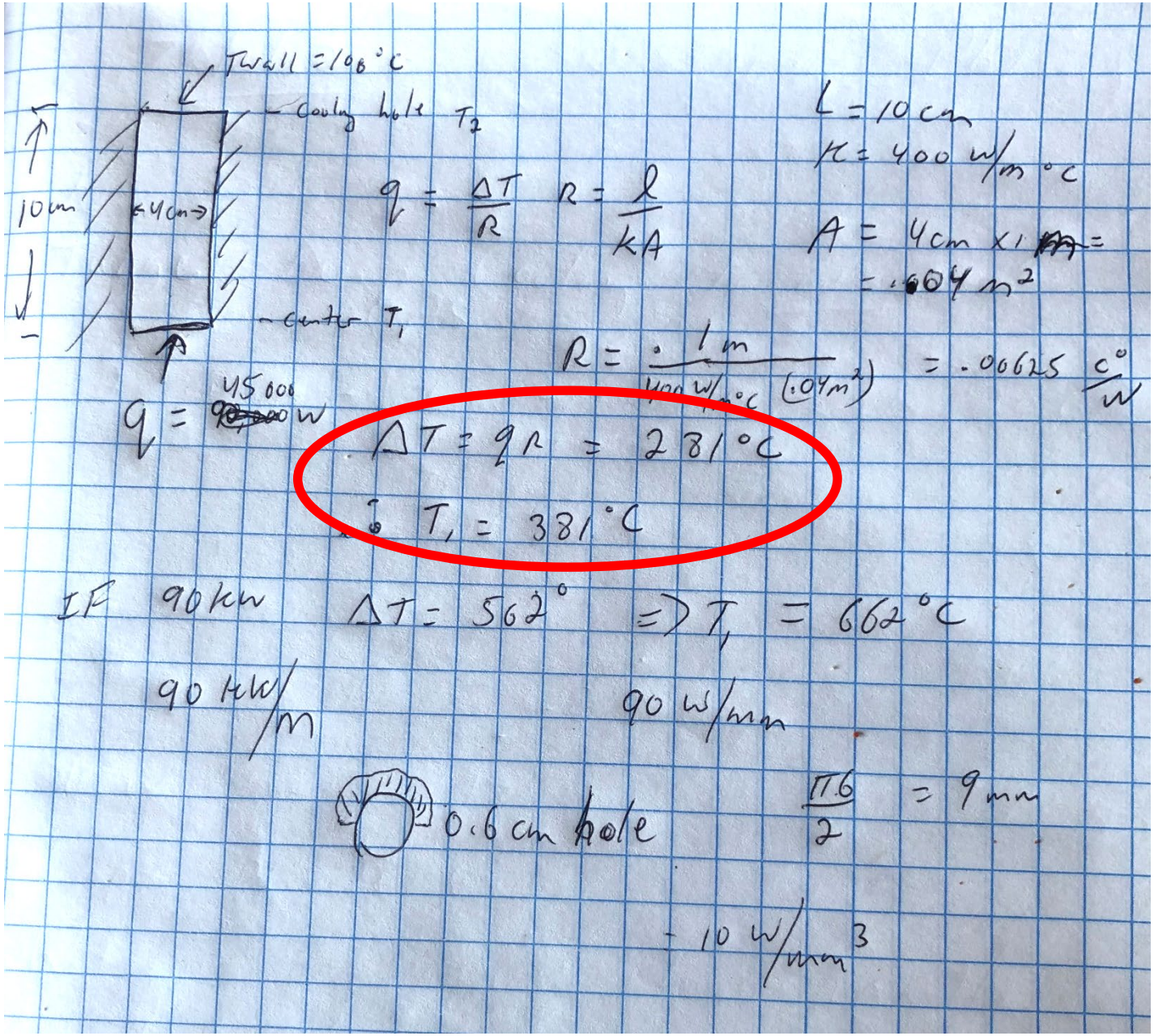
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Kl ng CPS 45KW total, 2 circuits LCW																
2			Units		Units		Units										
3	d			30	m	0.098425	ft	0.03	M	ID of tube				Heat Exchange with wate at DP row 28			
4	L	3	m	3000	mm									Twater =	40.38222144	C	average
5	epsilon					0.000005	ft	e/d =	5.08E-05					N_{ud} =	223		From Oliver &
6	nu	0.00000929	ft^2/sec	at 37°C										K =	0.623	W/MK	From White
7	oil Power	45	kW	4500	W									Pr =	4.84	extrapolate fr m White a	
8														f =	0.023334503	friction factor	
9														h =	Nud K/D	W/M^2 K	
10																	
11														h =	4630.966667		
12																	
13														q =	hA(Tw-Twall)	=	mCpdeltaT =
14														A =	piDL	use L for ar a inside cool	
15																	
16										P=mCpdeltaT				Twall =	91.93341443		
17										3.8 factor=	1kg/s=15.83gpm						
18											Cp =	4.18	KJ/Kg*K				
19										KW=KJ/s=(kg/s)(kj/kg*C)C							
20																	
21																	
22																	
23																	
24																	
25																	
26	DeltaP					f	v	Re	q	DT							h
27	(psi)	(ft/sec)	(no units)	(no units)			(ft/sec)		(gpm)	(deg.C)		V	DP				
28	0.14	0.45631317	0.000533	6.546688		0.023332	2.98734	31650.11	10.20016002	16.76444							
29	20	5.45398555	5.72E-05	8.485699		0.013888	46.28088	490334.2	158.0243164	1.082112							
30	0.04	0.24390965	0.000985	6.0131		0.027657	1.466653	15538.82	5.00783143	34.14662		1.466653	0.04				
31	20	5.45398555	5.72E-05	8.485699		0.013888	46.28088	490334.2	158.0243164	1.082112		46.28088	20				
32	40	7.71310034	4.44E-05	8.704354		0.013199	67.13756	711305.4	229.2386574	0.745947		67.13756	40				
33	45	8.18097833	4.27E-05	8.739381		0.013093	71.49669	757489.3	244.1227395	0.700467		71.49669	45				
34	50	8.62350834	4.12E-05	8.770157		0.013001	75.62952	801275.7	258.2341515	0.66219		75.62952	50				
35	55	9.04441185	3.99E-05	8.797536		0.01292	79.56854	843008.6	271.6837828	0.629408		79.56854	55				
36	60	9.44658008	3.88E-05	8.822143		0.012848	83.33908	882956.5	284.5581496	0.600932							
37	65	9.83231229	3.78E-05	8.844448		0.012784	86.96137	921333.7	296.9263142	0.5759							
38	70	10.2034727	3.69E-05	8.864811		0.012725	90.45186	958314.6	308.8444628	0.553677							
39	75	10.5615976	3.62E-05	8.88352		0.012672	93.82416	994043.2	320.3590438	0.533776							
40	80	10.9079711	3.54E-05	8.900799		0.012622	97.08966	1028640	331.5089849	0.515823							
41	85	11.2436793	3.48E-05	8.916836		0.012577	100.258	1062209	342.3272993	0.499522							
42	90	11.5696505	3.42E-05	8.931781		0.012535	103.3376	1094836	352.8422756	0.484636							



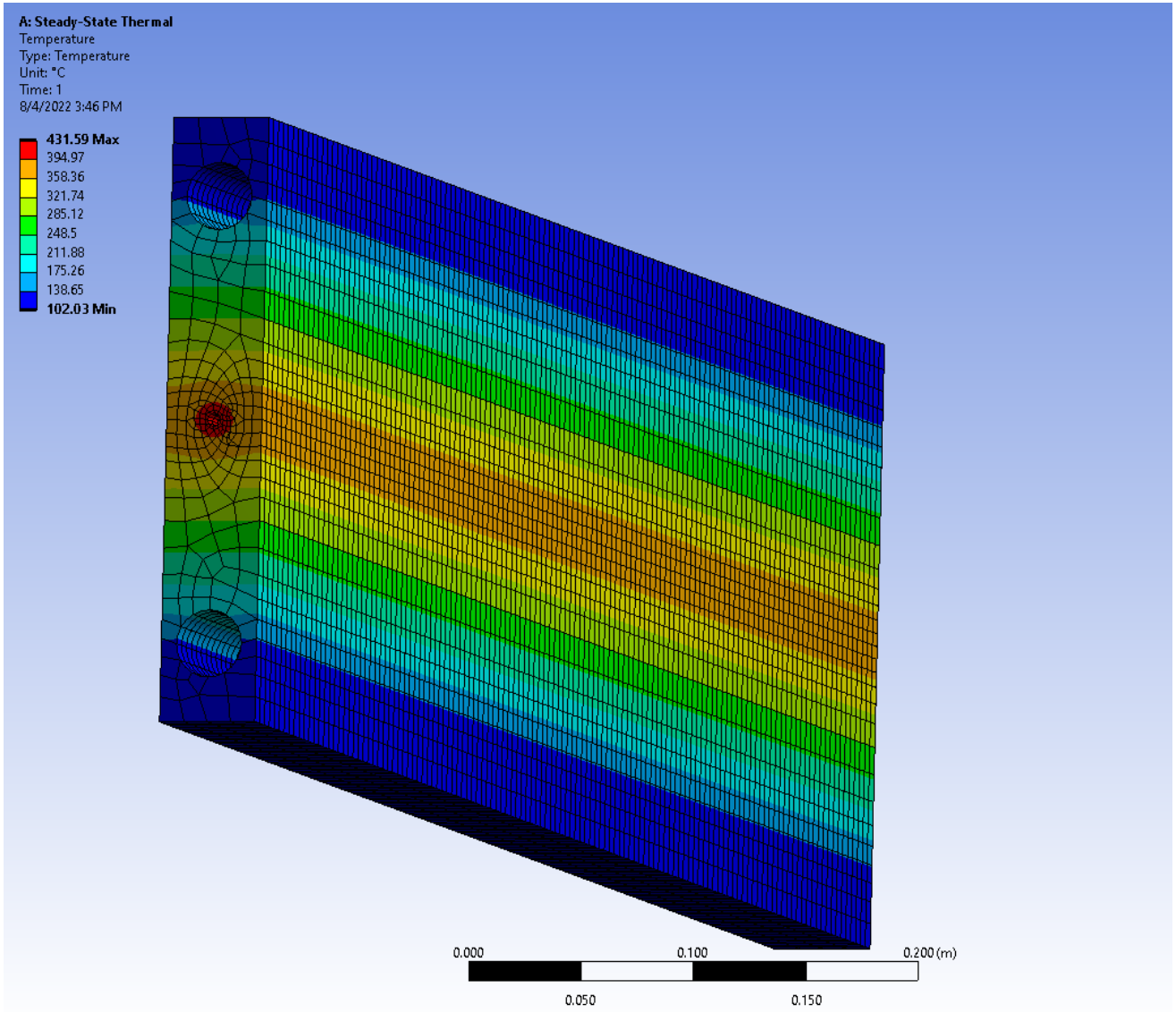
2 paral circuits | air-n2 Hx

Ready 100%

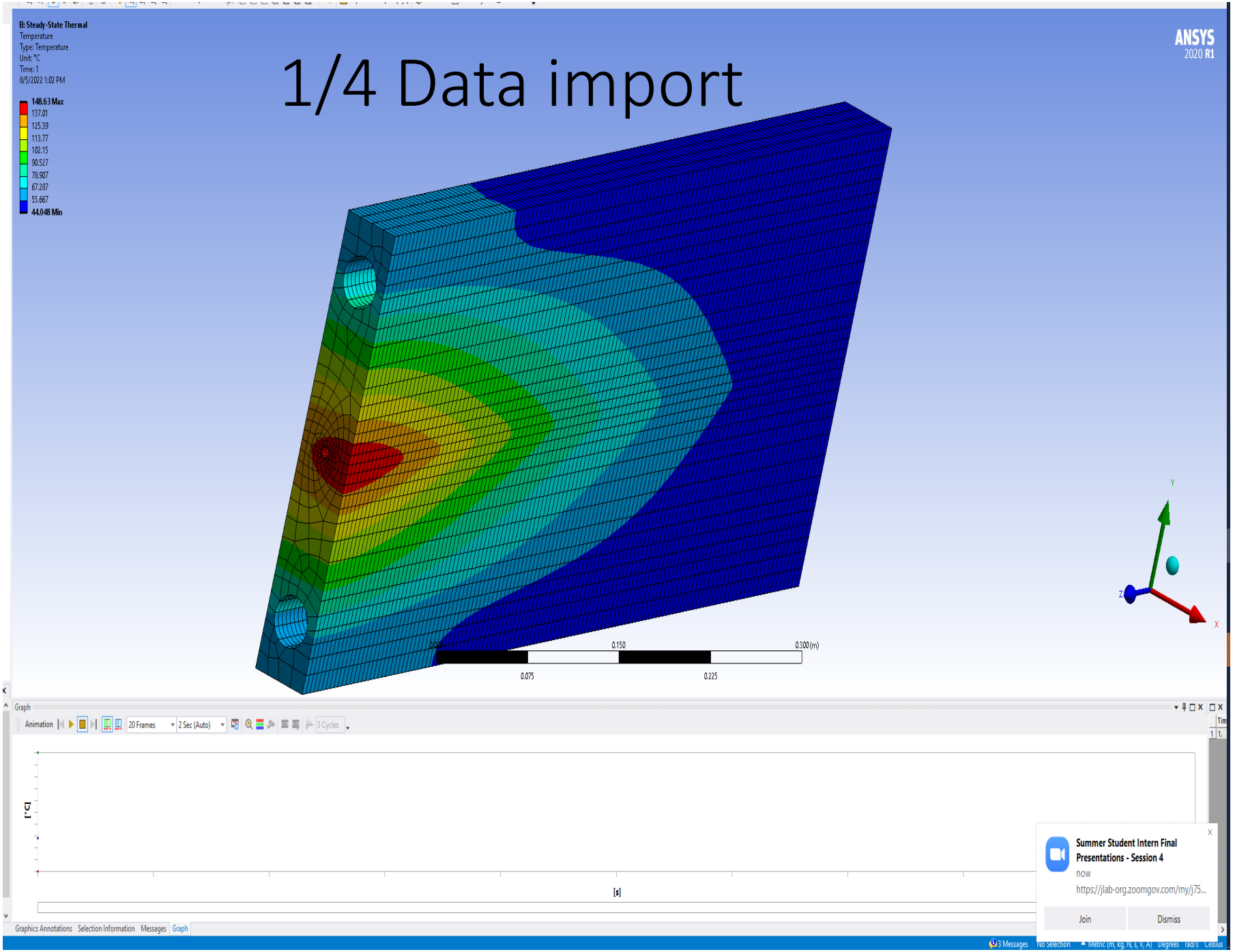
Quick Hand Calc



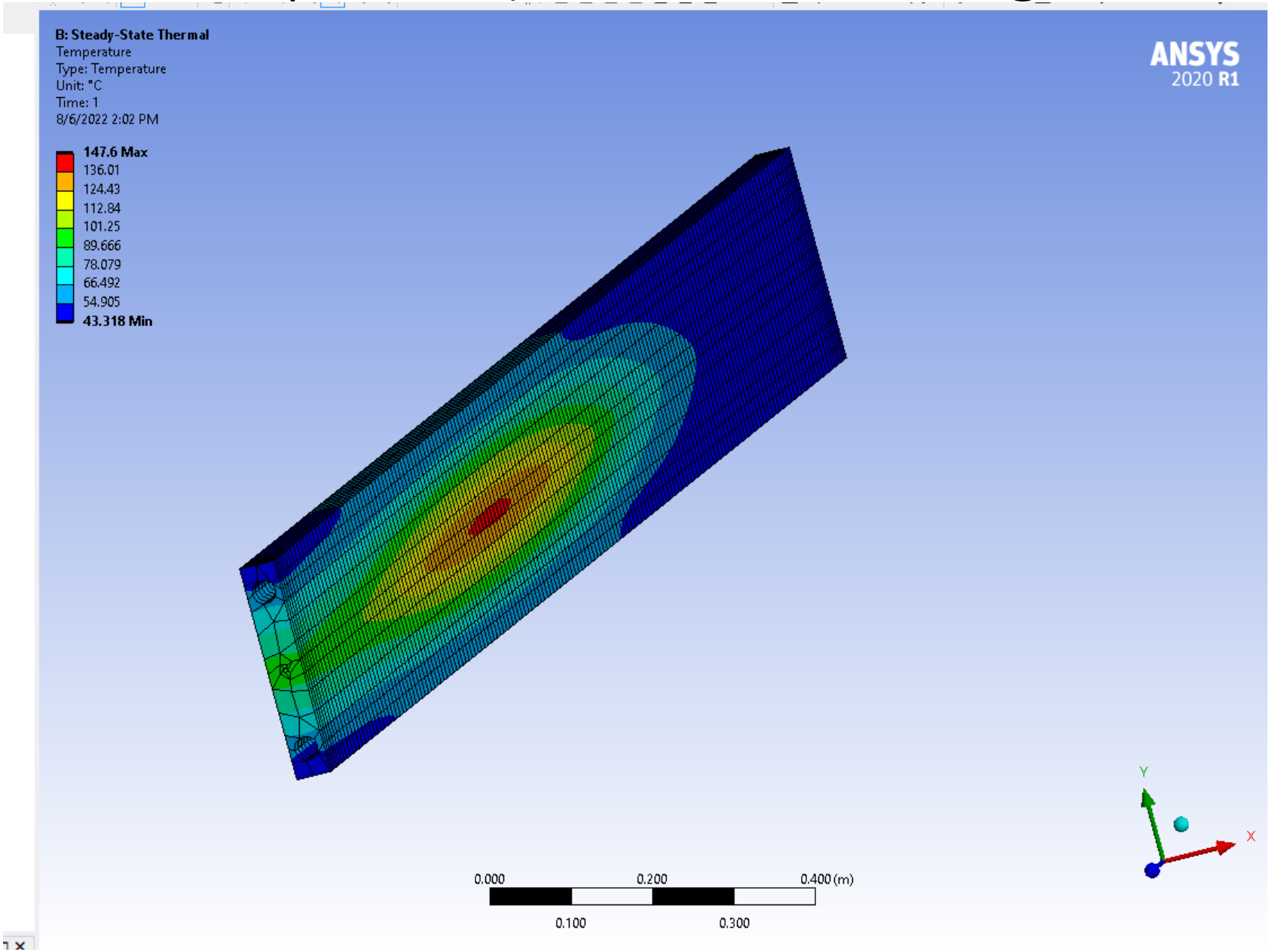
90KW inner hole- 1m long – 5Kw/m^2 cooling inside 3cm holes



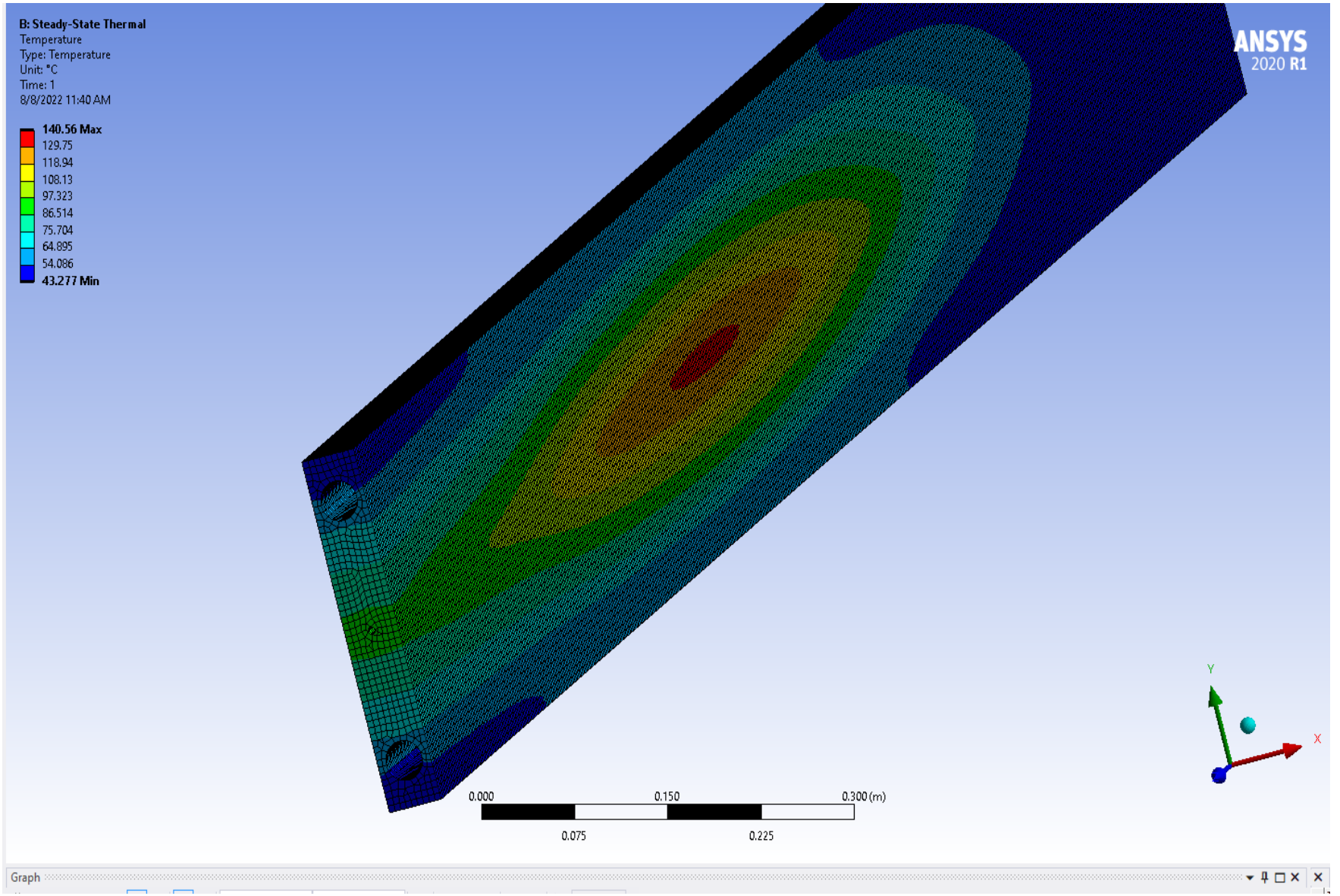
1/4 Data import



All data imported (3.8M nodes – large mesh



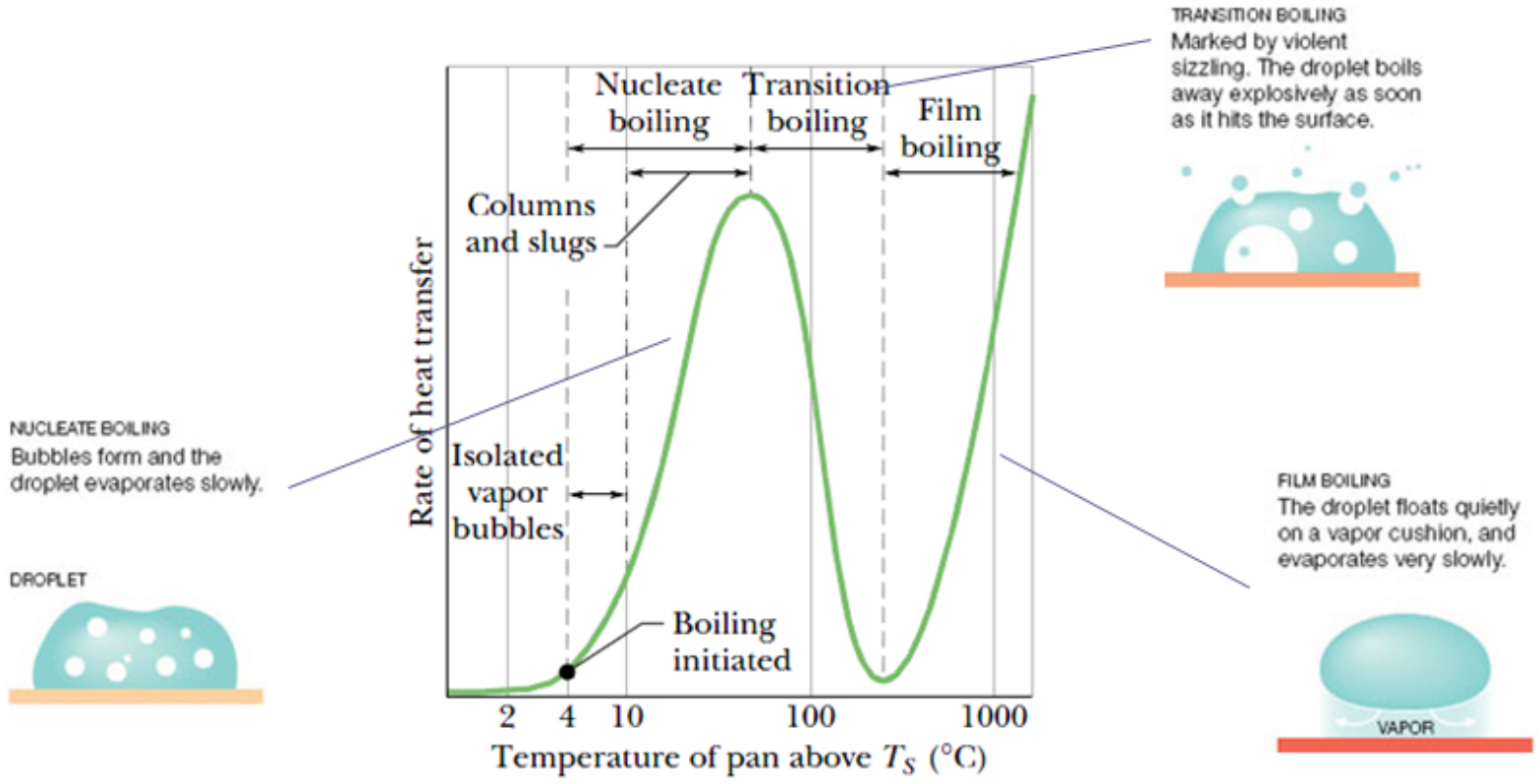
All data imported (3.8M nodes – smaller mesh – 42KW

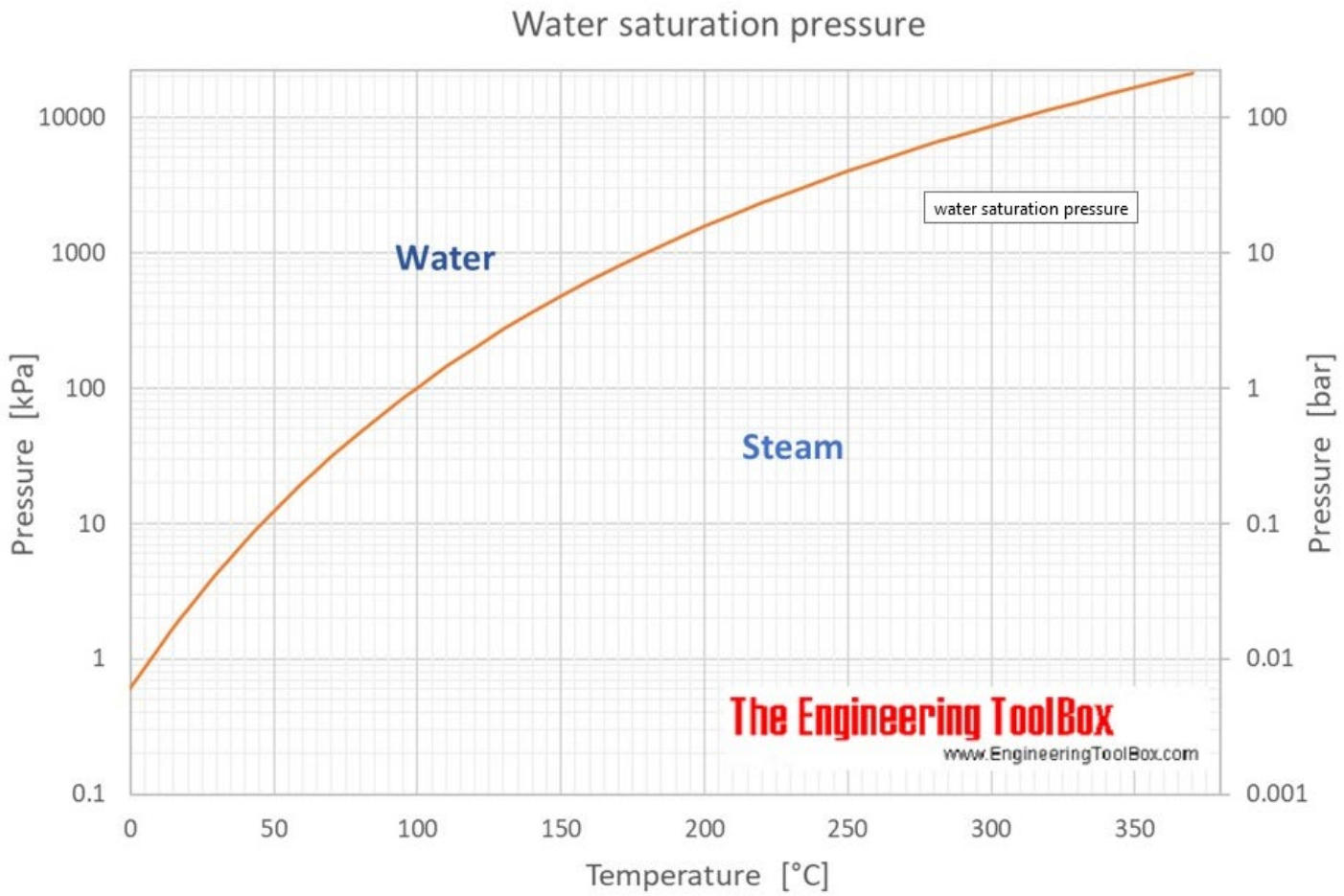


Generic Heat Transfer rate - water

Heat transfer for water (@ 1 atm)

S-shaped graph when heat flux (q") is compared to temperature.




Water saturation pressure
10000
1000
100
10
1
0.1
Pressure [kPa]
100
10
1
0.1
0.01
0.001
Pressure [bar]
0
50
100
150
200
250
300
350
Temperature [°C]
water saturation pressure
Water
Steam
The Engineering ToolBox
www.EngineeringToolBox.com

Nucleate Boiling