Oct 25 2006

WATER AND AIR HEAT LOAD (Load Pushback Version)

DRAFT

MAIN LINAC - ELECTRON & POSITRON

Components	Quantity Per 36m	Location	Total Heat Load (KW)	To Low Conductivity Water: Heat Load to Water (KW)	Supply Temp (variation) (C)	Delta Temperature (C delta)	Water Flow (l / min)	Maximum Allowable Pressure (Bar)	Typical (water) pressure drop Bar	Acceptable Temp Variation delta C	to Chilled Water: Heat Load to Water (KW)	To Air (chilled water): Heat Load to Air (KW)	Max Space Temp (C)	Source
Non-RF Components														
LCW Skid Pump 1 per 4 rf -Motor/Feeder Loss	0.25	Service Tunnel	0.60	0	N/A	N/A		N/A	N/A	None	0	0.60		based on (1) 30 HP per 4 RF from Clay Table Email dated 9-15-06
~~Fancoils (5 ton Chilled Water) 1.5 Hp~~	~~2~~	~~Service Tunnel~~	~~2.91~~	~~0~~	~~N/A~~	~~N/A~~		~~N/A~~	~~N/A~~	~~None~~	~~0~~	~~0.00~~		**Keith J ^& Marc R load pushback Oct 2006, remove/reduce chilled water load**
Rack Water Skid	0.25	Service Tunnel	0.20	0	N/A	N/A		N/A	N/A	None	0	0.20		based on (1) 5 HP per 4 rf (table4 Ashrae Chap 28) placeholder
Lighting Heat Dissipation ~1.3W/sf		Service Tunnel	1.65	0	N/A	N/A		N/A	N/A	None	0	1.65		* Clay - 14 W per sq m
~~Lighting Heat Dissipation ~1.3W/sf~~	-	~~Accelerator Tunnel~~	~~0.00~~	~~0~~	~~N/A~~	~~N/A~~		~~N/A~~	~~N/A~~	~~None~~	~~0~~	~~0.00~~		
~~People Heat Dissipation 500btuh each~~	0	~~Accelerator Tunnel~~	~~0.00~~	~~0~~	~~N/A~~	~~N/A~~		~~N/A~~	~~N/A~~	~~None~~	~~0~~	~~0.00~~		**Keith J ^& Marc R load pushback Oct 2006**
~~People Heat Dissipation 500btuh each~~	2	~~Service Tunnel~~	~~0.29~~	~~0~~	~~N/A~~	~~N/A~~		~~N/A~~	~~N/A~~	~~None~~	~~0~~	~~0.00~~		**Keith J ^& Marc R load pushback Oct 2006**
AC Pwr Transformer 34.5-.48 kV	0.25	Service Tunnel	2.00	0	N/A	N/A		N/A	N/A	None	0	2.00		* Clay email 3-14-06 typical 112.Kva oil xfmr **Keith J ^& Marc R load pushback Oct 2006 (maybe dirtywatercooled?)**
Emerg. AC Pwr Transformer 34.5-.48 kV		Service Tunnel	1.00	0	N/A	N/A		N/A	N/A	None	0	1.00		* Clay email 3-14-06 typical 112.Kva oil xfmrKeith J **^& Marc R load pushback Oct 2006 (maybe dirtywatercooled?)**
RF Components														
RF Charging Supply 34.5 Kv AC-8KV DC	1/36 m	Service Tunnel	4.00	3.25	40	40	1.17	18	8	10	0			* C.Jensen email 2-27-06 183 kVa 0.84pf oil ps xfmr **Shigeki Apr 18 2006 ** Clay 5-25-06 LLRF meeting **** Sep 18 move all to LCW per Marc Ross ** Move load to Dirty Water per RCassell Oct 20 2006, LCW for now**
Switching power supply 4kV 50kW	1/36 m		7.50	7.20	35	13.6	7.6	13	8	10	0			** Move load to Dirty Water per Rcassell Oct 20 2006 LCW for now**
Modulator	1/36 m	Service Tunnel	7.50	7.50				28.823			0			* Shigeki Fukuda Email 3-1-06 **Shigeki Apr 18 2006 ** **Marc& Keith -remove load to air/chilled - transfer all load to water**
Pulse Transformer	1/36 m	Service Tunnel	6.00	6.00							0			**Shigeki Apr 18 2006** **Marc& Keith -remove load to air/chilled - transfer all load to water**
Klystron Socket Tank	1/36 m	Service Tunnel	1.00	1.00							0			**Shigeki Apr 18 2006** **Marc& Keith -remove load to air/chilled - transfer all load to water**
Klystron Focusing Coil	1/36 m	Service Tunnel	8.40	8.40	*34>						0			* Shigeki Fukuda Email 4-05-06
Klystron Collector	1/36 m	Service Tunnel	61.00	61.00	*35>				2		0			* Shigeki Fukuda Email 3-1-06
Klystron Body	1/36 m	Service Tunnel	10.00	10.00	*35>				5	+ - 2 C	0			* Shigeki Fukuda Email 3-1-06* **Keith Jobe added stability Oct 20 2006**
Klystron Windows	1/36 m	Service Tunnel	0.50	0.50	*35>				1		0			* Shigeki Fukuda Email 3-1-06
Relay Racks	1/36 m	Service Tunnel	9.0	0.0	N/A	N/A		N/A	N/A	None	9			* Shigeki Fukuda Email 3-30-06 **Shigeki Apr 18 2006 (chilled water) ***Rlarsen email** RayLarsen Email 9-15-06 except reduced by 40% per Marc**
Circulators & Dummy Load	1/36 m	Accelerator Tunnel	24.3	24.3							0			**Shigeki Email Apr 28 2006
Waveguide	1/36 m	Accelerator Tunnel	4.00	4.00	N/A	N/A			N/A	+ - 1 C	0			* Shigeki Fukuda Email 3-30-06 ** Keith Jobe added stability Oct 20 2006**
Total			165.3	133.2							9.0	5.5		
RF Component only Loads			154.95											

Total Heat load to Dirty Water (per RF)	**TBD KW**	cooled by process water with rust inhibitor
Total Heat load to Chilled water (per RF)	**9.00 KW**	cooled by chilled water
Total Heat load to Air (per RF)	**5.46 KW**	absorb to wall and ventilation
Total Heat load to LCW (per RF)	**133.2 KW**	cooled by low conductivity water