WF-Note-225

Baking of the FNAL Vacuum Tees

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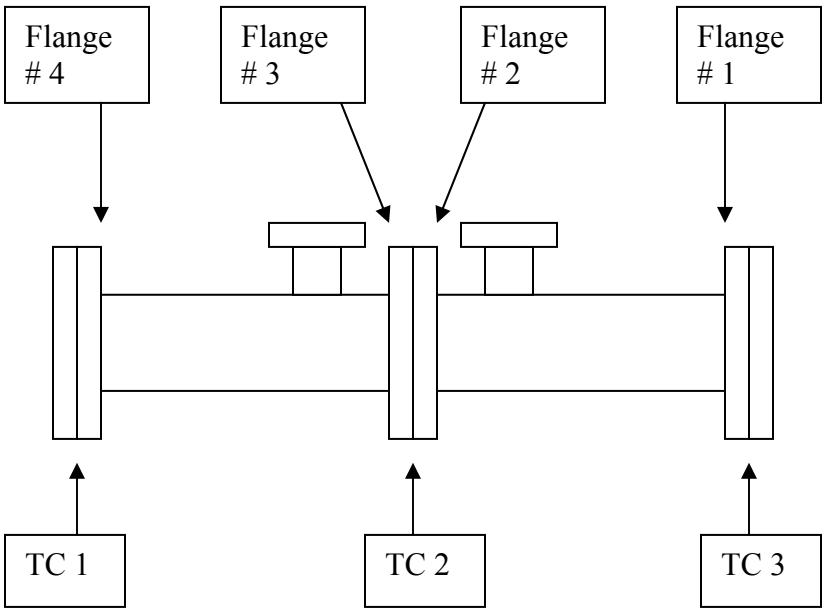
The Titanium-Stainless Steel Tees fabricated for Fermilab were vacuum leak checked and baked to ensure their performance under realistic conditions.

The following figure shows a schematic of the two tees as they were assembled and connected to a leak detector (Pfeiffer Quality Test Dry HLT275) at the APS Vacuum Shop. One of the smaller flanges was connected to the leak detector, and the second one was blanked. The bigger flanges were numbered for identification. Three thermocouples were installed to monitor the temperature of the device during baking. Two electric heating tapes were wrapped around the structure and connected to two variacs. Variac #1 controlled the temperature of flange #4, which was read by thermocouple TC1. Variac #2 controlled the temperatures of flanges # 3, 2 and 1, which were read by thermocouples TC2 and TC3.



The following tables show the progression of the baking during the two days it lasted:

time	Variac 1 (V)	TC 1 (°C)	Variac 2 (V)	TC 2 (°C)	TC 3 (°C)	remarks
7/22/04 10:00	0→30	32	0→30	32	35	
11:00	30→35	49	30→35	54	50	
13:00	35→50	69	35→45	75	74	
14:13	50→65	92	45→55	98	97	

14:45	65	115	55	115	115	
15:25	65→60	133	55→52	127	128	

Leak checked:

	Flange # 4	Flanges # 3 and 2	Flange # 1
Background (mbar l / s)	3×10^{-10}	4×10^{-10}	4×10^{-10}
Reading (mbar l / s)	5×10^{-10}	8×10^{-10}	7×10^{-10}

time	Variac 1 (V)	TC 1 (°C)	Variac 2 (V)	TC 2 (°C)	TC 3 (°C)	remarks
15:40	60→40	134	52→35	128	128	Added Al foil
15:52	40	129	35	123	124	
7/23/04 7:35	40→32	96	35→28	84	98	
8:50	32→26	86	28→22	72	85	
9:27	26	80	22	64	78	
11:07	26→22	71	22→18	54	66	
11:56	22→18	65	18→14	50	60	
13:54	18→10	53	14→7	41	49	
14:44	10→0	47	7→0	37	44	
15:50	0	39	0	32	38	

Leak checked:

	Flange # 4	Flanges # 3 and 2	Flange # 1
Background (mbar l / s)	2×10^{-10}		
Reading (mbar l / s)	6×10^{-10}	No response	No response

Leak checked again (on 7/26/04, after the weekend) and there was no response in any of the flanges, but the leak detector background level was higher this day (6×10^{-10} mbar l/s).