JET-R(93)02

Endurance Test of 2mm Induction Brazed Beryllium Tiles on a CuCrZr Vapotron

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ABSTRACT

Two millimeters thick Beryllium tiles, induction brazed onto an actively cooled CuCrZr vapotron, have been exposed to 1000 cycles with peak power densities of 12.5 ± 1.5 MW/m^2. During the cycling all tiles maintained the cooling without deterioration. In an area of 200 x 54 mm^2 there was only one 6 x 6 mm^2 area well outside the beam centre which showed increased temperatures.

1. INTRODUCTION

In a previous test the performance limit for induction brazed Beryllium tiles of 2 mm thickness has been measured as 17 MW/m^2 [1] . Aim of the present test was to demonstrate that the tiles can sustain in excess of 1000 cycles at a power density of 75% of this limit.

2. TEST PROCEDURE

The tiles were exposed to approximately 1000 cycles at essentially fixed beam settings. The actual power density pd_{max} could be kept in the range

$$11 \leq pd_{max} \leq 14 \ \ MW/m^2$$

Beam modulation was used for most pulses with on cycles of 1 - 2.5 seconds duration, separated by off periods of 1 - 1.5 seconds. The overall pulse length was between six and eight seconds and the off period between pulses was of the order of four minutes.

[1] C Ibbot - test report on destructive testing of induction brazed Be tiles - to be published.

3. MECHANICAL SET-UP AND INSTRUMENTATION

Two vapotron elements of 27 mm width each were installed side by side with an angle of 14.5° to the plane normal to the beam axis (Fig. 1.) The vapotrons were covered with castellated 2 mm Beryllium tiles. The distance between castellations was 7 mm and the castellations were 1.2 mm deep. The vapotrons used where produced in a batch of four elements. The other two elements were used to measure the performance limit.

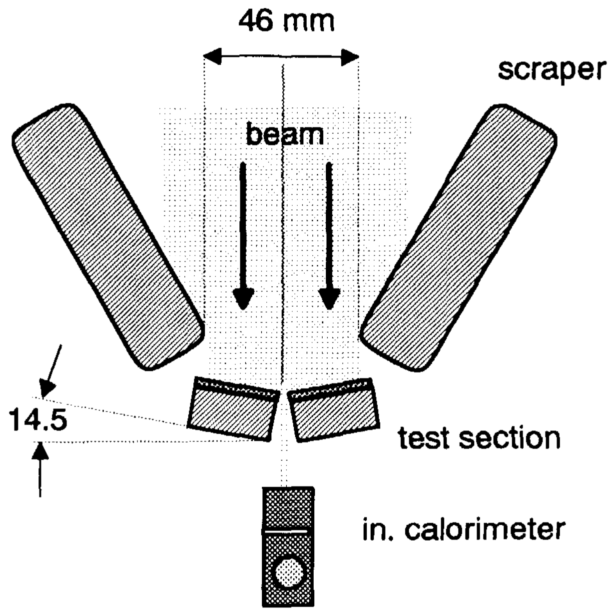

Fig. 1: Layout of the test assembly. The test sections are angled against the beam axis. An inertial calorimeter is installed behind the slot between the two test sections.

The power density was measured by water calorimetry using recently calibrated turbine flowmeters. The accuracy of the measurement is limited to ± 1 MW/m^2 by the noise in the water temperature signal (Signal to noise ratio 7:1 see Fig. 2 on page 8). The correlation between total power P and power density pd_{max} is

$$P = pd_{max} \times \iint g(x, y) dxdy \qquad (1)$$

g(x, y) is the normalised beam profile. For the vertical profile we use that measured with the inertial calorimeter strip, for the horizontal profile we assume constant power density. This means that the quoted power densities are averaged over the exposed width of one element.

The surface temperature was measured with an AGA thermovision 900 system. Transmission and emissivity were determined by heating the test sections without cooling to approximately 400°C. During the cooldown the thermal gradients in the test section can be neglected. Emissivity and transmission are then both adjusted until the measured surface temperature matches the temperature of thermocouples welded into the vapotron side walls 2 mm below the braze.

Table 1: Test Summary

SCAN	AV POWER DENSITY	PEAK POWER DENSITY	NO OF ON CYCLES
Set-up pulses			32
6s on time	12.2	15.1	73
2s on 1s off	12.5	13.8	307
1s on 1s off	12.8	14.8	552
2,5s on 1s off	12.5	13.8	40
Pulses total			1004

4. RESULT

The tile exposure is listed in Table 1. In excess of 1000 cycles have been performed with an average power density of 12.5 MW/m^2. One 6 x 6 mm^2 area well outside the beam centre on the right test section was getting hot from the start of the test. Otherwise no deterioration of the tile performance was observed.

4.1 Surface Temperature

Fig. 3 on page 9 shows the surface temperature distribution during beam on (a) and immediately after beam on (b). The castellation grooves are the hottest section during beam on, after beam on (frame frequency 25 Hz) the temperature distribution is uniform. This shows that the radiation in the castellations is either produced from material with a short cooldown time constant or is due to some effects related to the geometry.

The tile performance is demonstrated by the temperature history of the maximum surface temperature in an area excluding the hot spot (Fig. 4a on page 10). The real surface temperature of the tile has to be taken from an area without castellations . The temperature of such an area in the beam centre is shown in Fig. 4b.

4.1.1 *Temperature Limits During Cycling*

Most of the cycles had been done with one second on time and one second off time. As Fig. 5 on page 11 shows, 90% of the equilibrium surface temperature is achieved within the first second. Within one second after the pulse the surface cools down to less than 100°C. The cooldown in Fig. 5 is fitted with two exponentials. One exponential is derived from the cooldown of the copper as measured by thermocouples. The second exponential is fitted to the surface temperature data points above the noise level and is dominated by the cooldown of the Beryllium.

The peak temperature in the second pulse in Fig. 5 is approximately 40°C above that of the first pulse. Some of this increased temperature is due to an increased power density in the second cycle (3.3% higher beam current). This shows that the bulk temperature was less than 40°C above ambient at the beginning of the second cycle and confirms the extrapolated cooldown. The same is seen in Fig 6 for a pulse with one second on/ one second off periods.

4.2 Power Densities

The power density for each pulse and for both elements is plotted in Fig. 7a-d (pages 12 and 13) against the number of on cycles. Also shown is the power density from the inertial calorimeter. Although the agreement is generally very good the inertial measurement should be regarded as relative only as the slot between the two elements narrows visibly during beam pulses and reduces the exposed width of the calorimeter strip, resulting in a lower indicated power density.

4.3 Temperature Profiles

Fig. 8 on page 14 shows vertical and horizontal temperature profiles as measured by the IR system. The vertical profile shows a good match between calorimetric measurement and surface temperature on the top half, while the bottom half shows a considerable difference. The scale for the vertical dimension is derived from the castellations which can be clearly seen on the temperature.

The horizontal profile shows, that the right element is hotter and has a smaller illuminated area. This is probably caused by a slight rotation of the assembly which increases the angle of incidence on the right element and shifts the whole assembly to the right. The temperature along the horizontal profile varies by 40% of the peak value.

4.4 Pressure

During beam on the entire BE test rig is at the source pressure of 2 - 4 μbar. The gas throughput is of the order of 1 mbarℓ/s. The actual pressure varies considerably during a pulse due to beam pumping and stable beam operation is made difficult by the varying source pressure. To investigate this pumping effect some test pulses have been done during the endurance test.

4.4.1 *Test Rig Pumping Speed*

The tank pressure can be modelled by assuming a constant flow from the source gas supply plus an initial burst from a trapped volume between needle valve and absolute valve (Fig. 9 on page 15). The turbo pump has a nominal pumping speed of 2500 ℓ/s but the actual pumping speed is just 10% of that, due to the high pressure. At this pressure the compression ratio of a turbo pump is rather poor and the pumping speed is mainly determined by the fore-vacuum pump.

4.4.2 *Pumping Of The Plasma Source*

The pulses in Fig. 10 (page 16) have been done at the end of an extended operational period (top trace) and after an extended weekend break (bottom trace). After the break the tank pressure drops to a quarter of its initial value when the arc comes on. After an extended operational period this pressure reduction is much lower (66%). The influence of the beam current shown in Fig. 10 will be discussed next.

4.4.3 *Pumping And Degassing With Beam*

A beam current of 5 Ampere corresponds to a particle flux of 0.75 mbℓ/s which is roughly two thirds of the total gas flow. Nevertheless the beam has very little influence on the tank pressure (Fig. 10). After the long break, beam on is only visible by an initial short pressure spike, probably due to the gas heating effect of the beam. At the end of an operational day the pressure falls during beam on and rises when the beam is off. However, this effect is small compared with the pumping of the arc. Fig. 11 on page 17 compares the tank pressure for sequential pulses in which the timing of the arc and beam have been varied. It is obvious, that the influence of the beam current is much smaller than that of the arc. The pulses in Fig. 11 have been done between the two pulses in Fig. 10 with a break of 20 hours between the last longer operational period (pulse 55762 in Fig. 10). The arc current is larger than the beam current by a factor of 50 and it appears that the pumping effect is dominated by current rather than energy.

5. DISCUSSION

5.1 Accuracy Of The Power Density

In the Beryllium test rig the distance between the test section and the beam source is only 2 m. At this distance neither beamlet divergence nor focusing are important and perveance match can not be determined in the usual way. We have hardly any experience with beam profiles in this distance from the source. One measurement done in the target tank at a comparable distance shows a considerable discrepancy between measured and calculated profiles. [2] The actual power density scaling is surprisingly complex and has caused confusion in previous tests.

In the previous destructive tests [1] we used an array of copper calorimeters in the position of the right element. Fig. 12 (next page) gives the power densities measured with this calorimeter for an extraction voltage of 60 kV.

The average extracted current of the present test was 4.5 A and the calorimetric power density of 12.5 MW/m^2, matches perfectly the power density derived from water calorimetry in this test (12.2 - 12.8 MW/m^2 in table 1).

The horizontal beam profile is not taken into account for calculating the power density. This under-estimates the peak power density by 11% if the surface temperature varies linearly with power density. The vertical profile from surface temperature is wider than that from inertial calorimetry. For calculating the peak power density we used the calorimetric profile. If the actual profile is wider, as shown by the surface temperature, we over-estimate the power density by 20%.

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[2] JET-DN/C(86)31

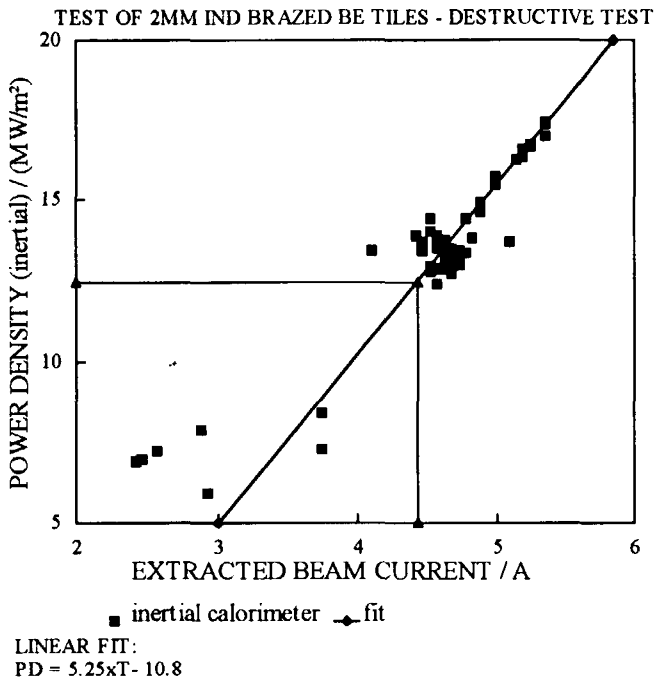


Fig. 12: Power densities measured in a previous test with an inertial calorimeter. For an average current of 4.5 A we expect a power density of 12.5 MW/m^2, which agrees very well with 12.8 MW/m^2 measured with water calorimetry at the same location in this test.

The extracted current tends to increase slightly during a pulse (Fig. 10). A 5% increase in current causes a 10% increase in power density and would lead to a 5% under-estimate in peak power density over a pulse.

The perfect match between the inertial measurement in the previous test and the water calorimetric measurement in the present test suggest that the measured power density is correct. All the water flow meters had been calibrated and showed identical flows and the gain of the thermocouples had been checked. We can therefore assume that the peak power density is 10 - 15% above the measured power density which is averaged over the width of one element and over one pulse.

5.2 Observations

The structure of the Beryllium surface is clearly visible at the beginning of the test and disappears after some hundred cycles (Fig. 13). This is not caused by a coating of the window, as the structure of the copper calorimeter remains clearly visible. This means that reflection of visible light changes during the test. The cause of this has not yet been investigated.

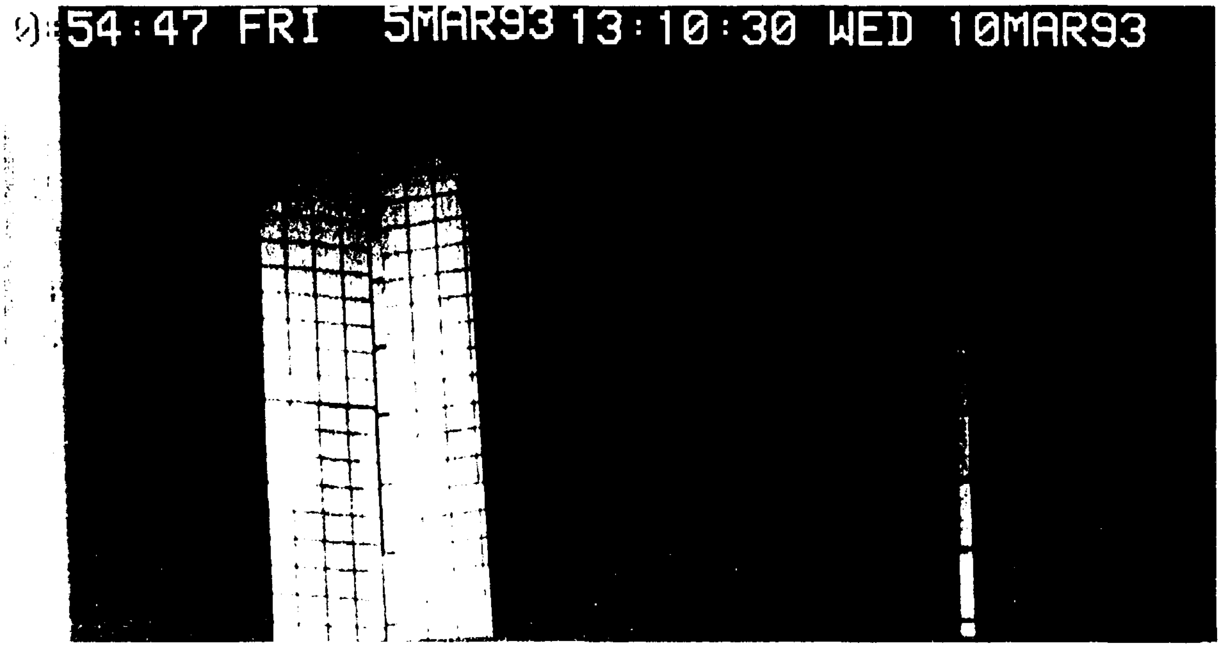


Fig. 13: CCD picture from the unexposed Beryllium surface (left) and after 200 pulses (right). The copper calorimeter appears unchanged hence the change must be on the Be surface.

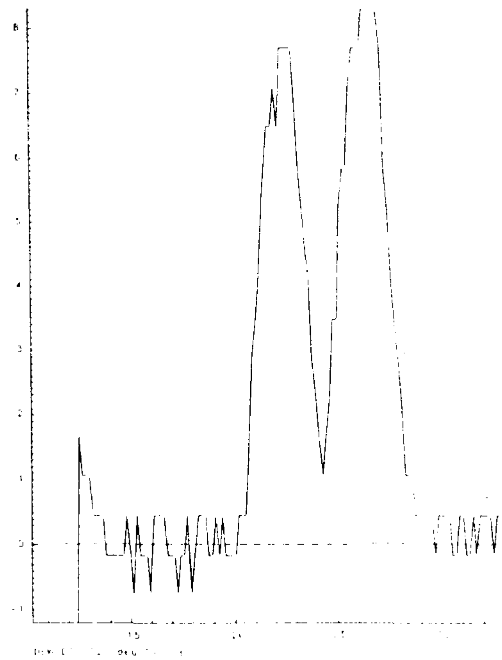


Fig. 2: Water temperature signal for a pulse with two on cycles of 2.5 seconds and 1.5 seconds off period. The signal to noise ratio is 7:1.

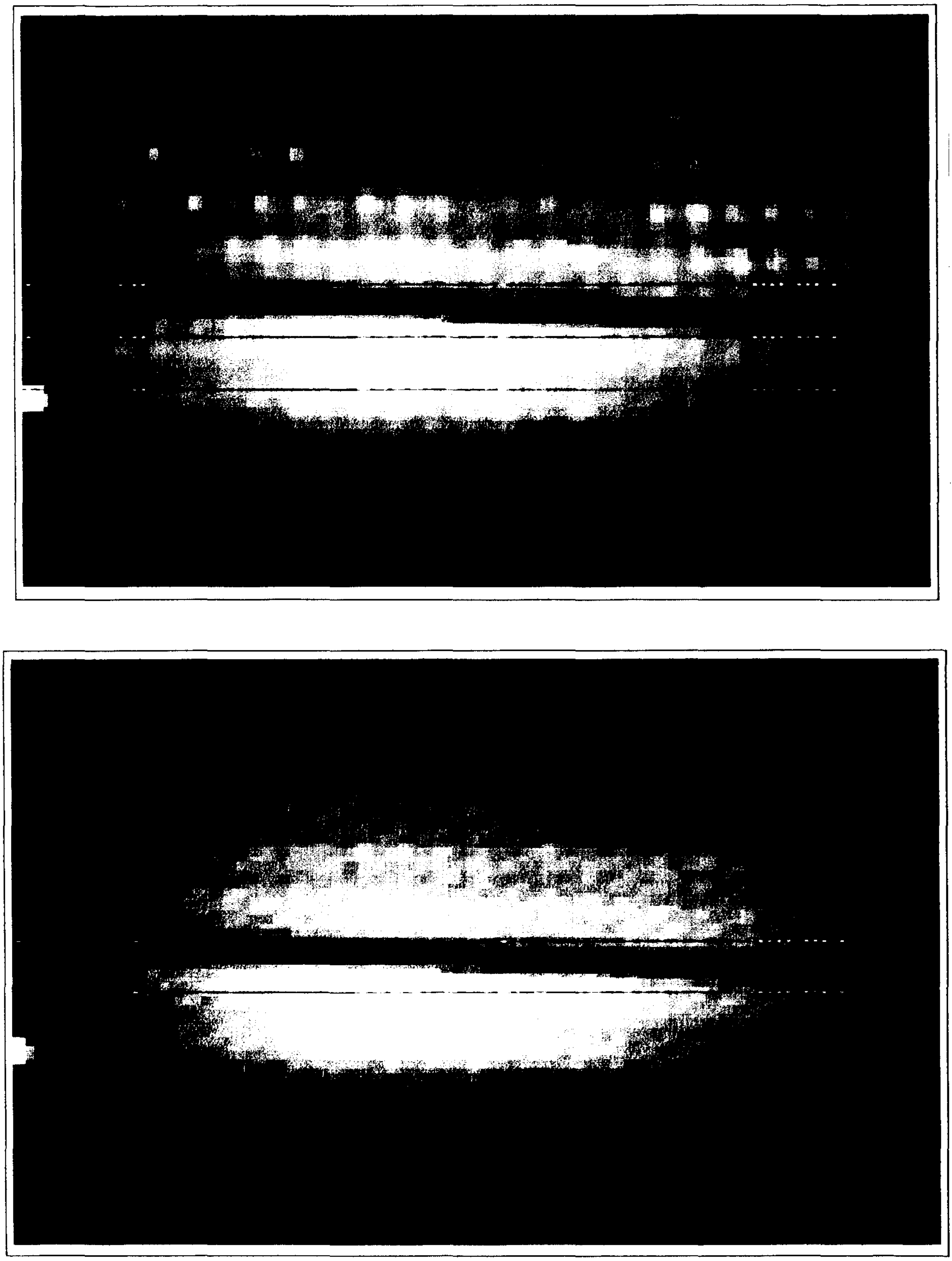
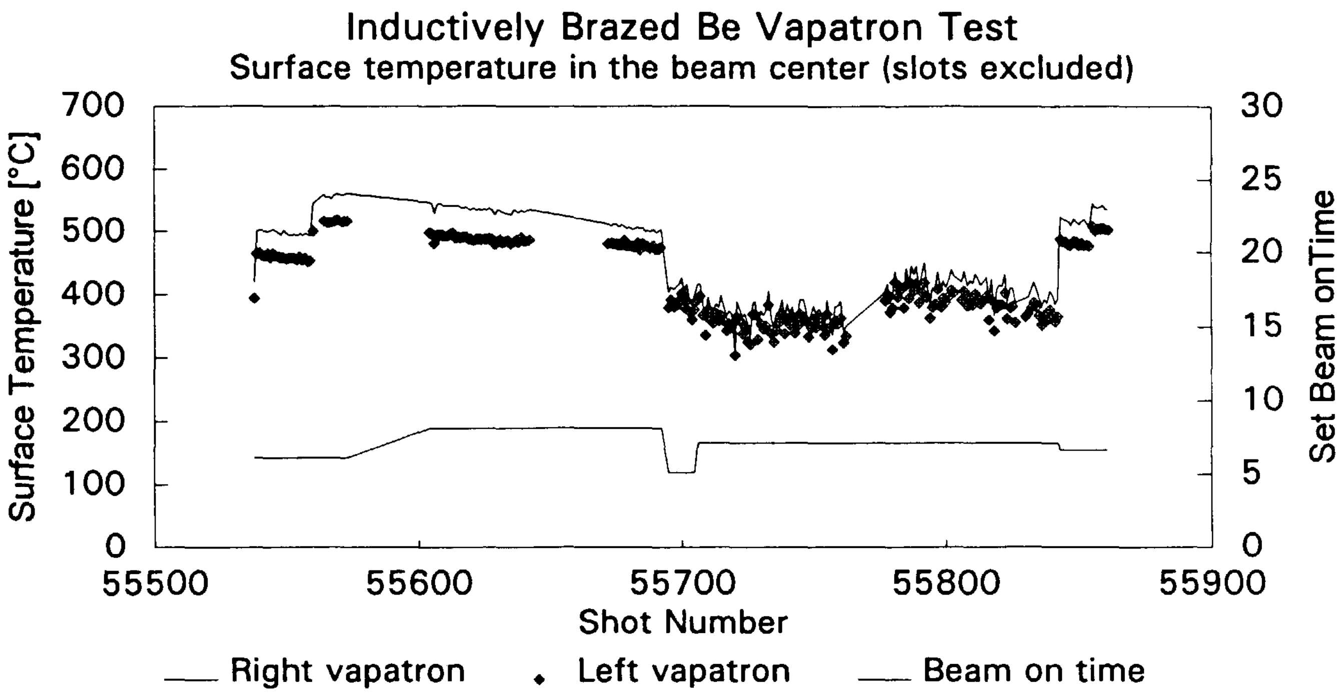


Fig. 3: IR image of the element surface during beam on (top) and immediately after beam on (bottom). Pulse 55862, frames 129 and 130 - 6.438 and 6.48 seconds after beam on. Temperature range: top: 280 - 550°C, bottom: 250 - 450°C. Note: Castellations are only visible during beam on. The hot spot is well outside beam centre area.



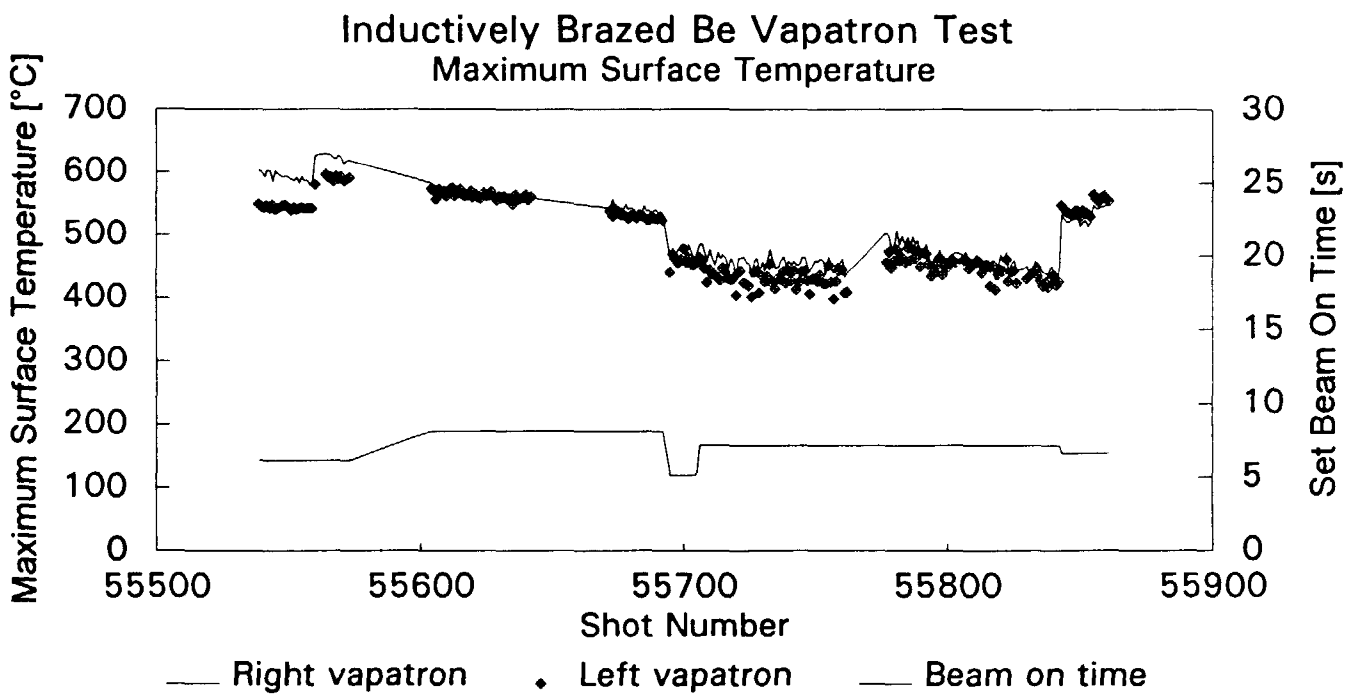


Fig. 4: History of the surface temperature for the peak temperature (bottom) and for a small uncastellated area in the beam centre (top). No hot spot develops during the endurance test. The temperature scatter is small except for the one second on cycles, number 55693-55842.

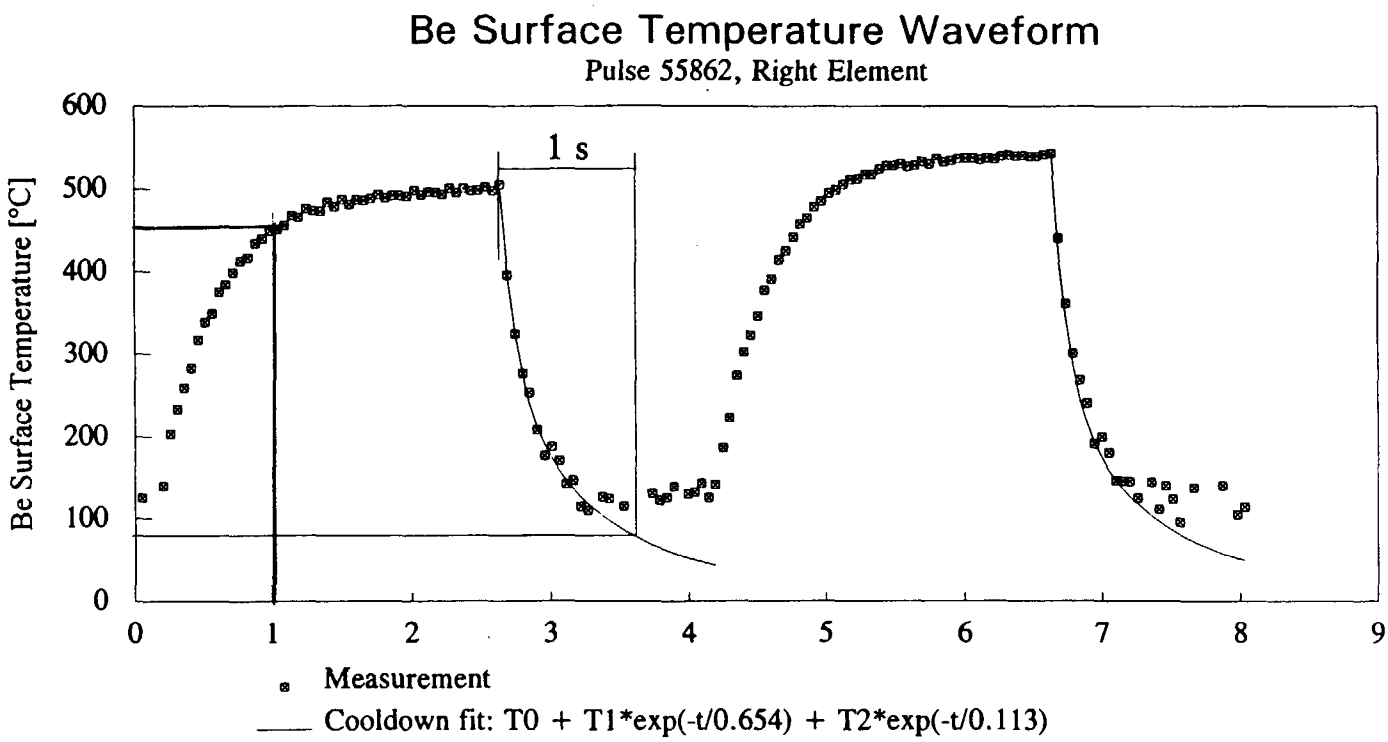


Fig. 5: Surface temperature in the beam centre for a pulse with 2.5 seconds on, 1.5 seconds off periods. The surface heats up to 90% of the equilibrium temperature within one second and cools down to below 100 Celsius within one.

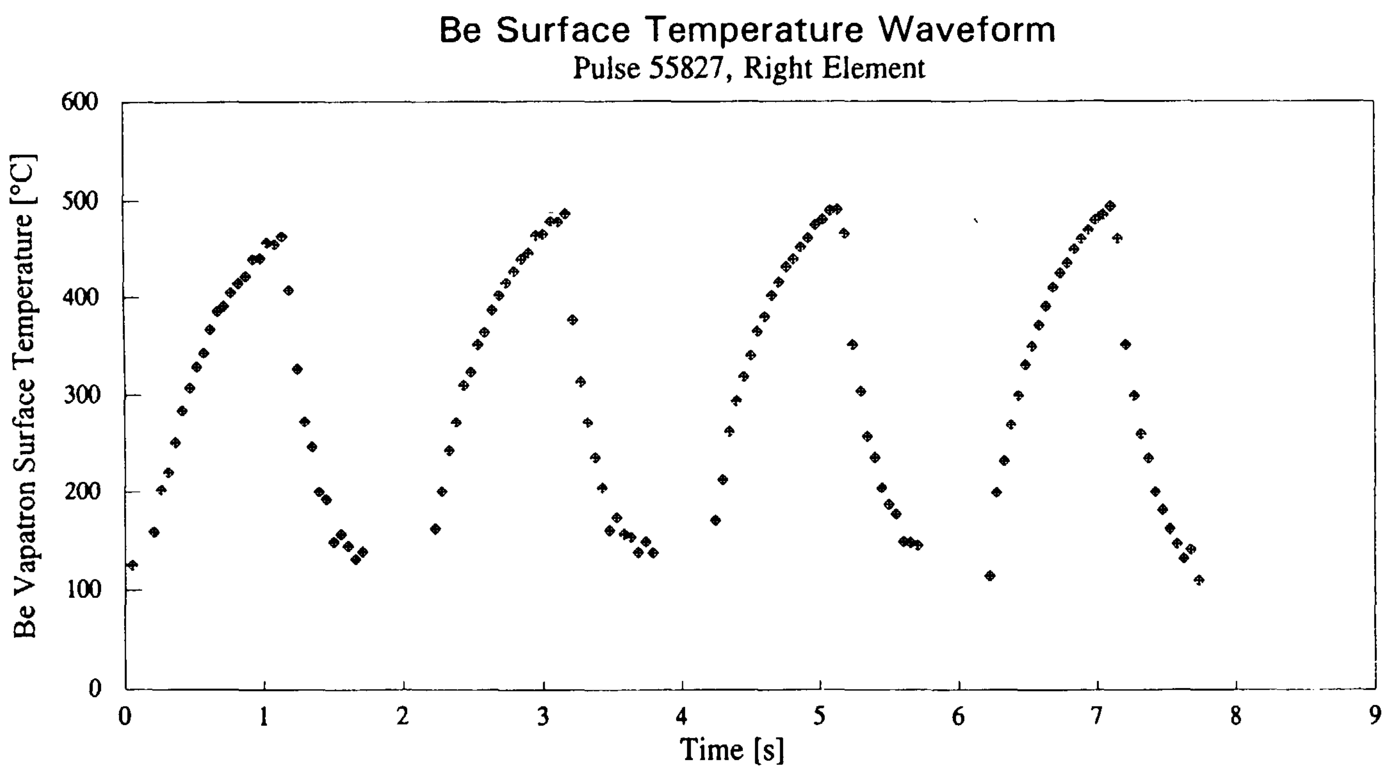
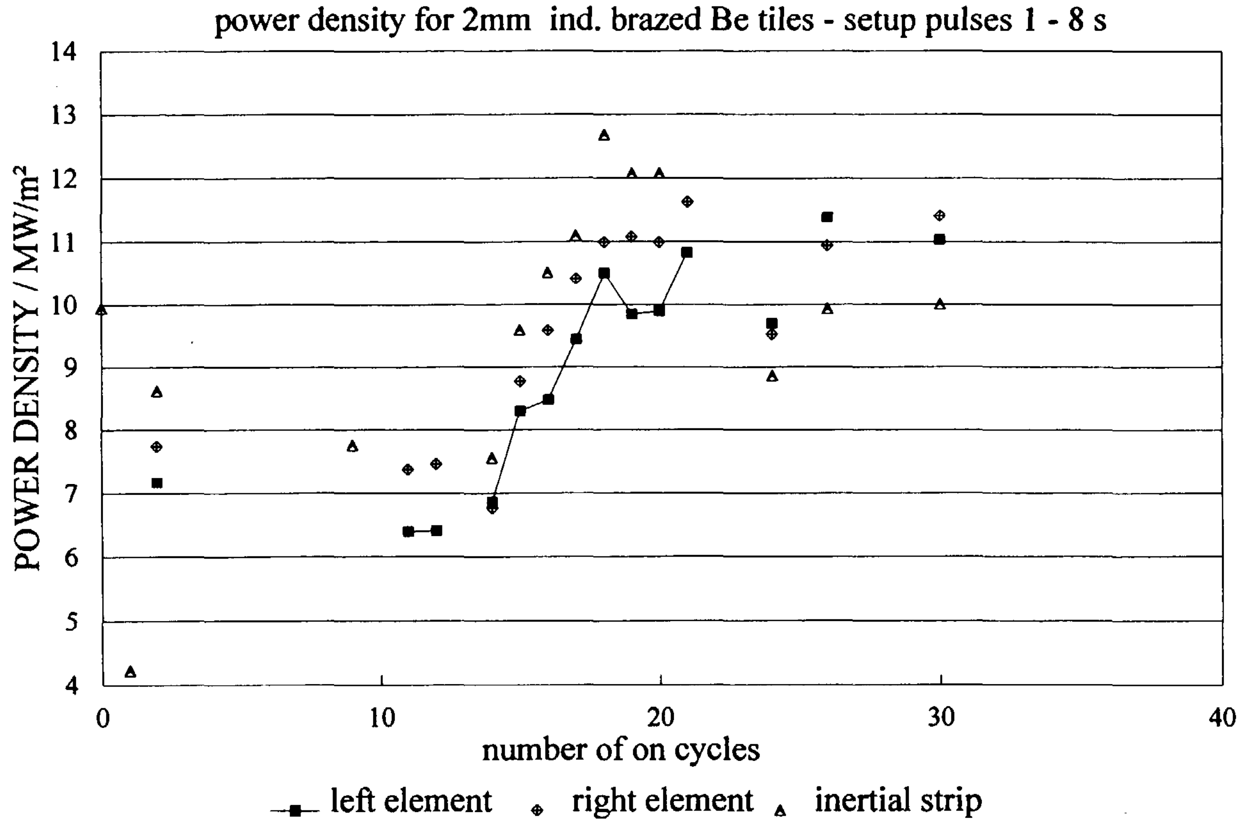


Fig. 6: As Fig. 5 but for a pulse with one second on/one second off periods. Equilibrium is essentially achieved in the second period where the temperature is 20 Celsius above the first on period.



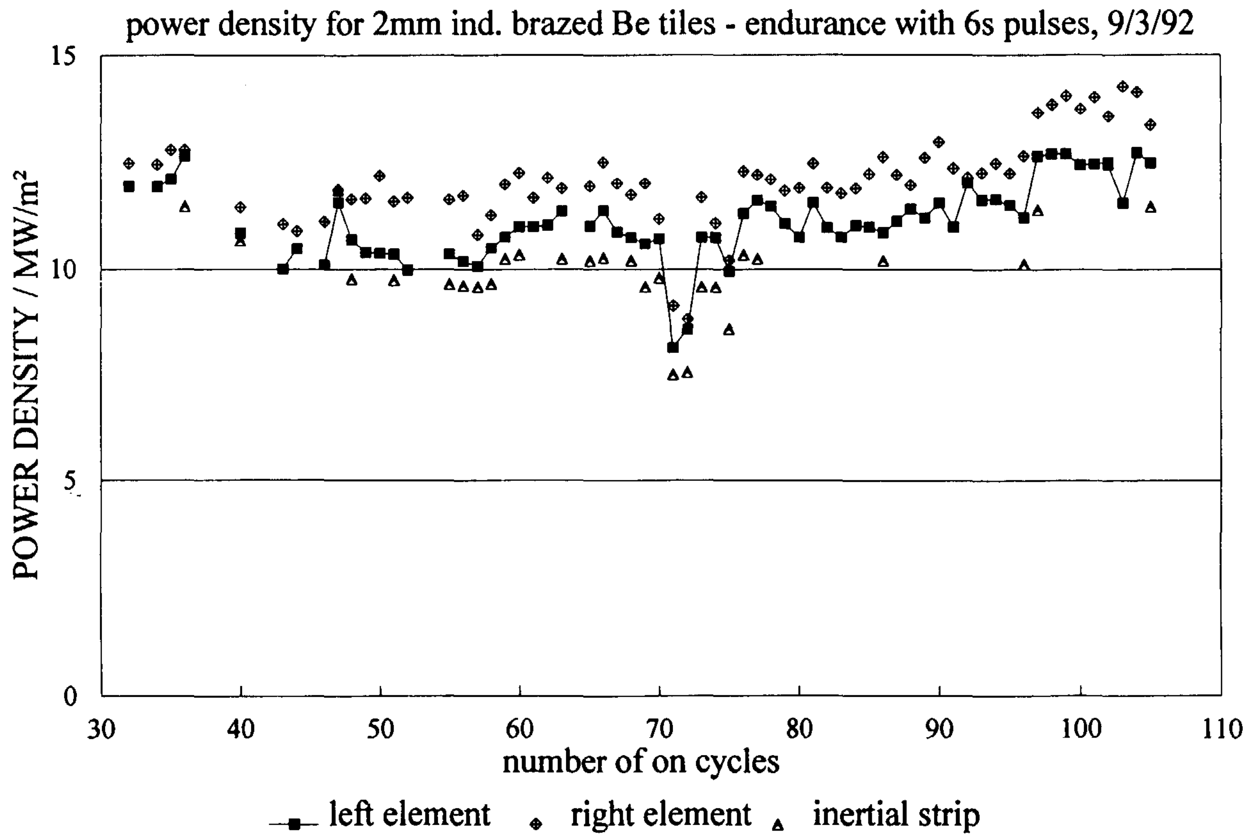
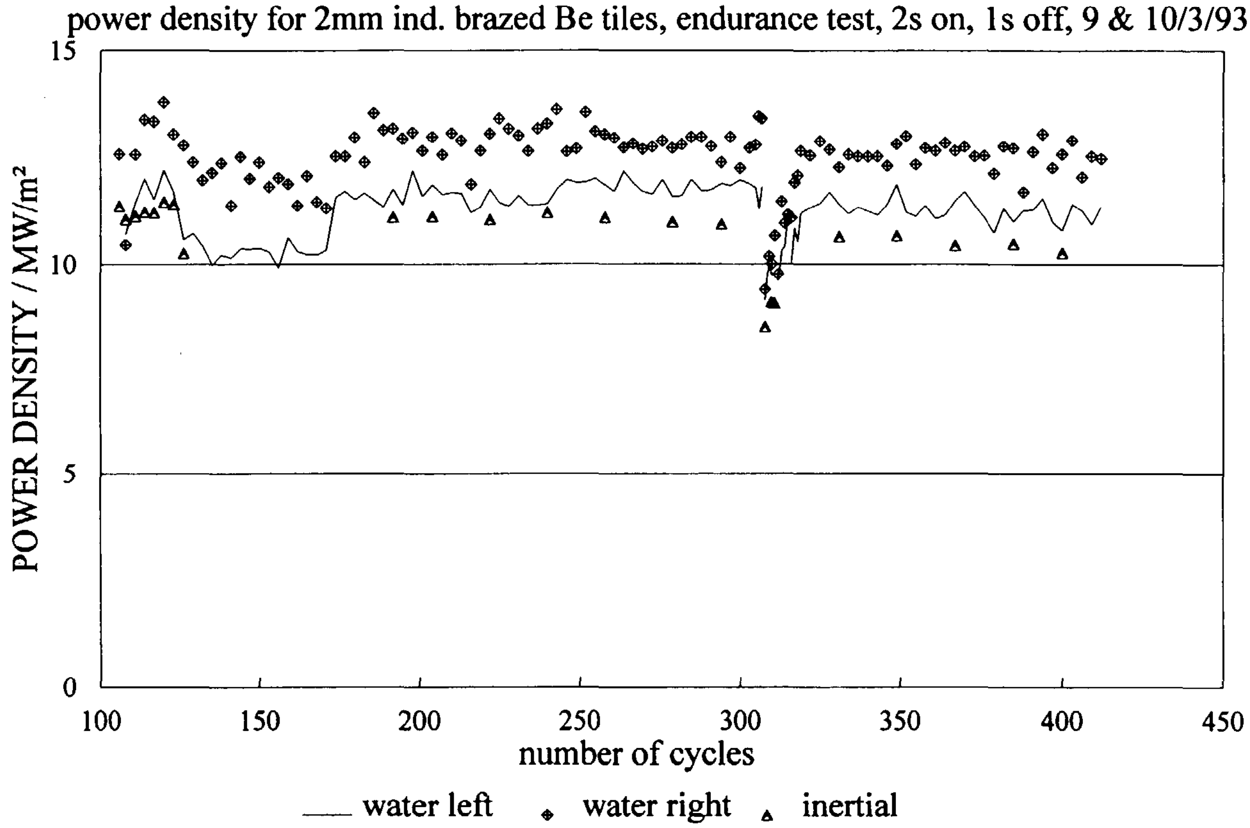


Fig. 7: a and b: Power densities during the endurance test for both elements from water calorimetry and from the inertial calorimeter. Set-up pulses and unmodulated pulses had a six seconds on period.



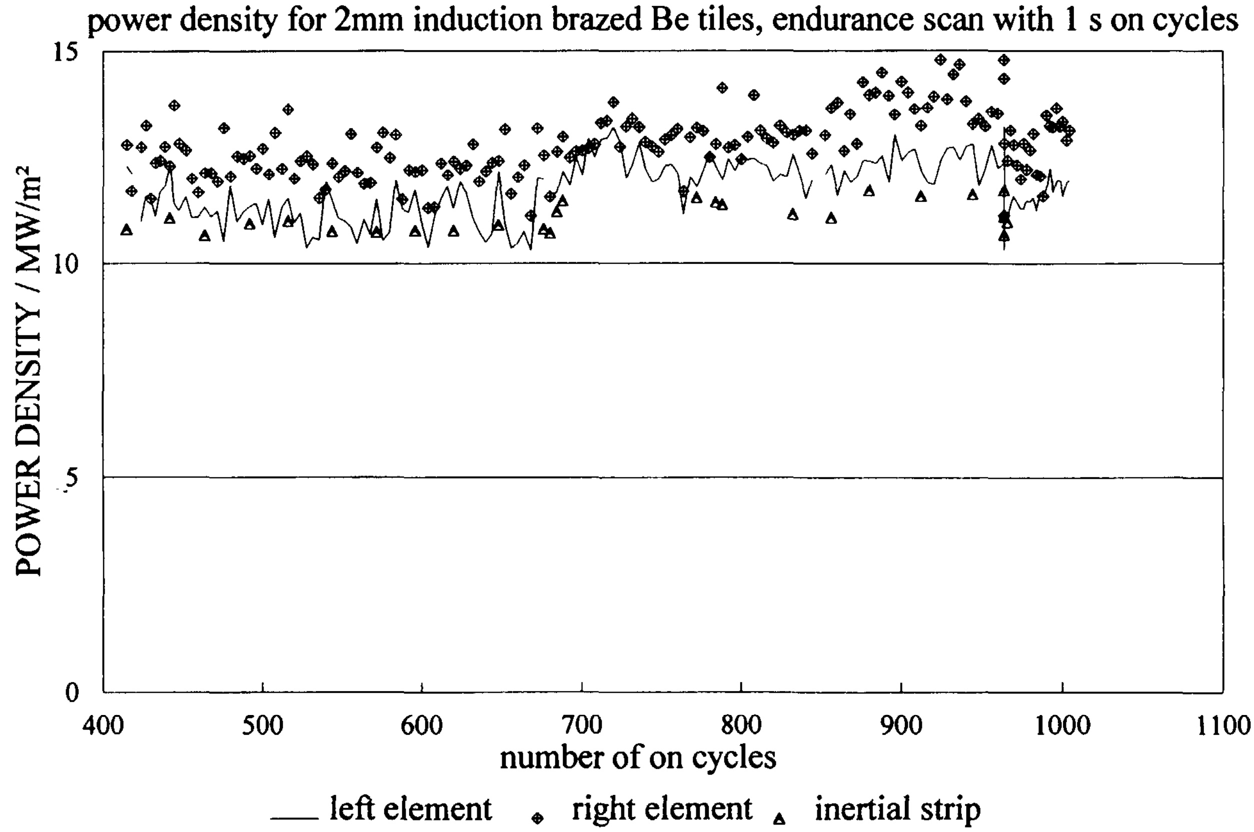
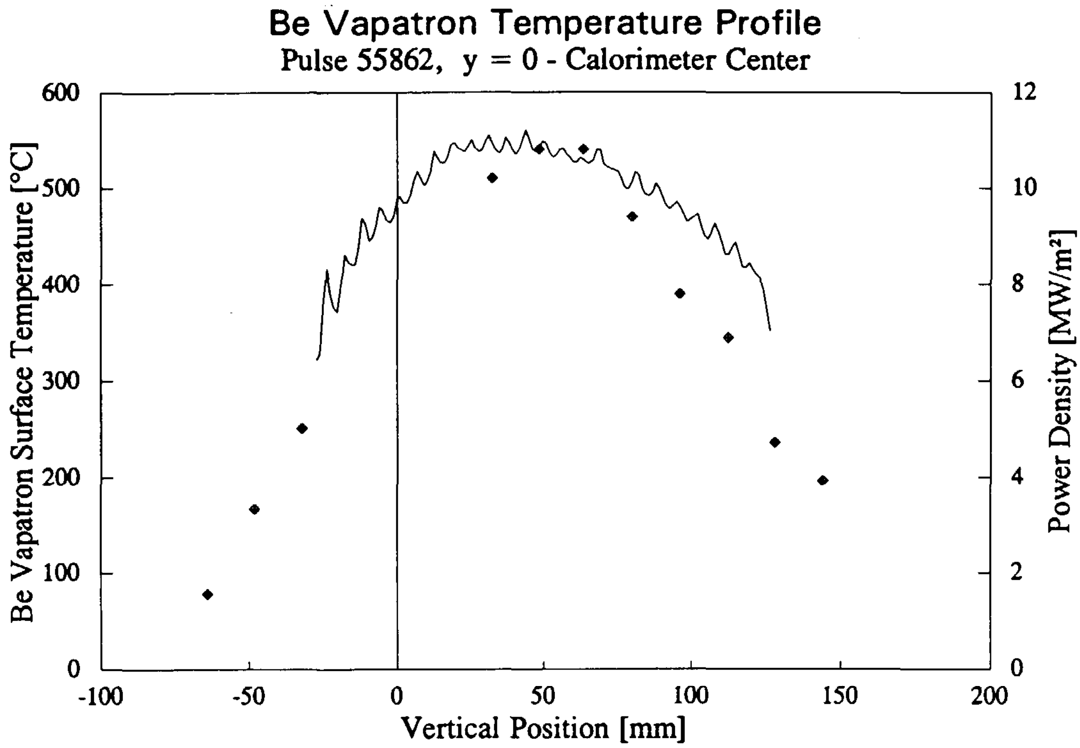


Fig 7: c and d: Power densities during the endurance test for both elements from water calorimetry and from the inertial calorimeter. Modulated pulses with two seconds on and one second off (top) and with one second on, one second off (bottom).



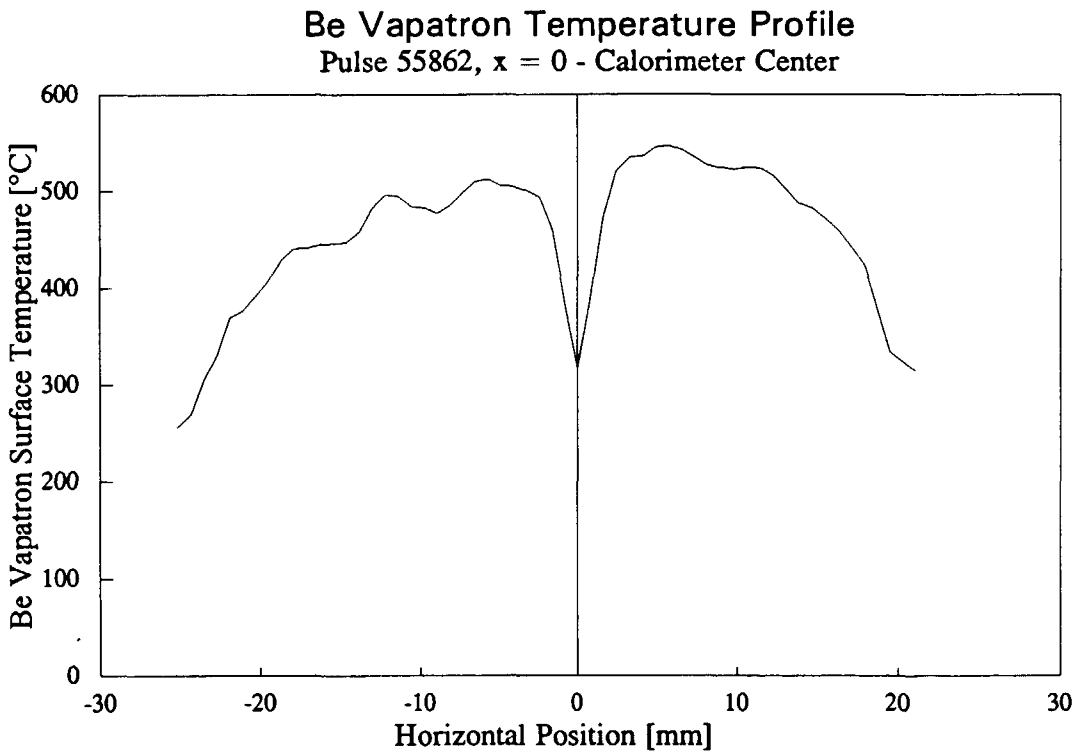


Fig. 8: Vertical and horizontal temperature profiles from the IR camera. Note:

- The right element is hotter than the left element.
- In the horizontal direction there is a clear variation in power density across one element.

time	gas pulse length	12.7
dt	time increment	0.01
Q0	equilibrium gas flow ' mbl/s	1.1
LT	conductance for trapped volume	0.018
VT	Volume of trap	0.0045
S	turbo pumping speed	265
V	overall volume	700
p0	starting trap pressure	1000

formula: dP = Qo-Po x exp(-Lt/Vt*t)+PxS/Vx dt

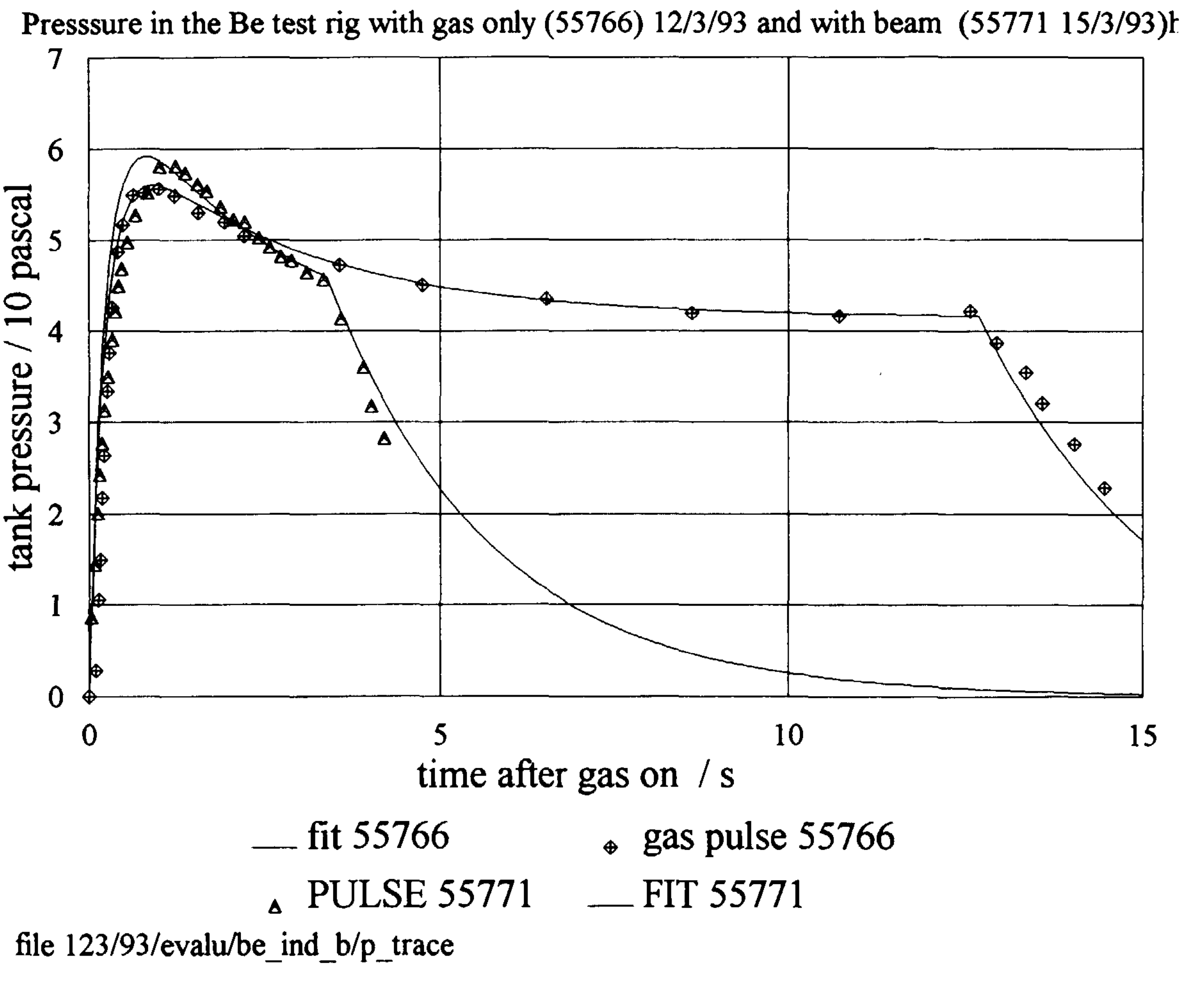


Fig. 9: Pressure in the Beryllium test rig during a gas pulse with and without arc in the plasma source. The fit assumes constant flow plus a burst from a trapped volume. The pressure drop with arc is similar to that at the end of the gas pulse.

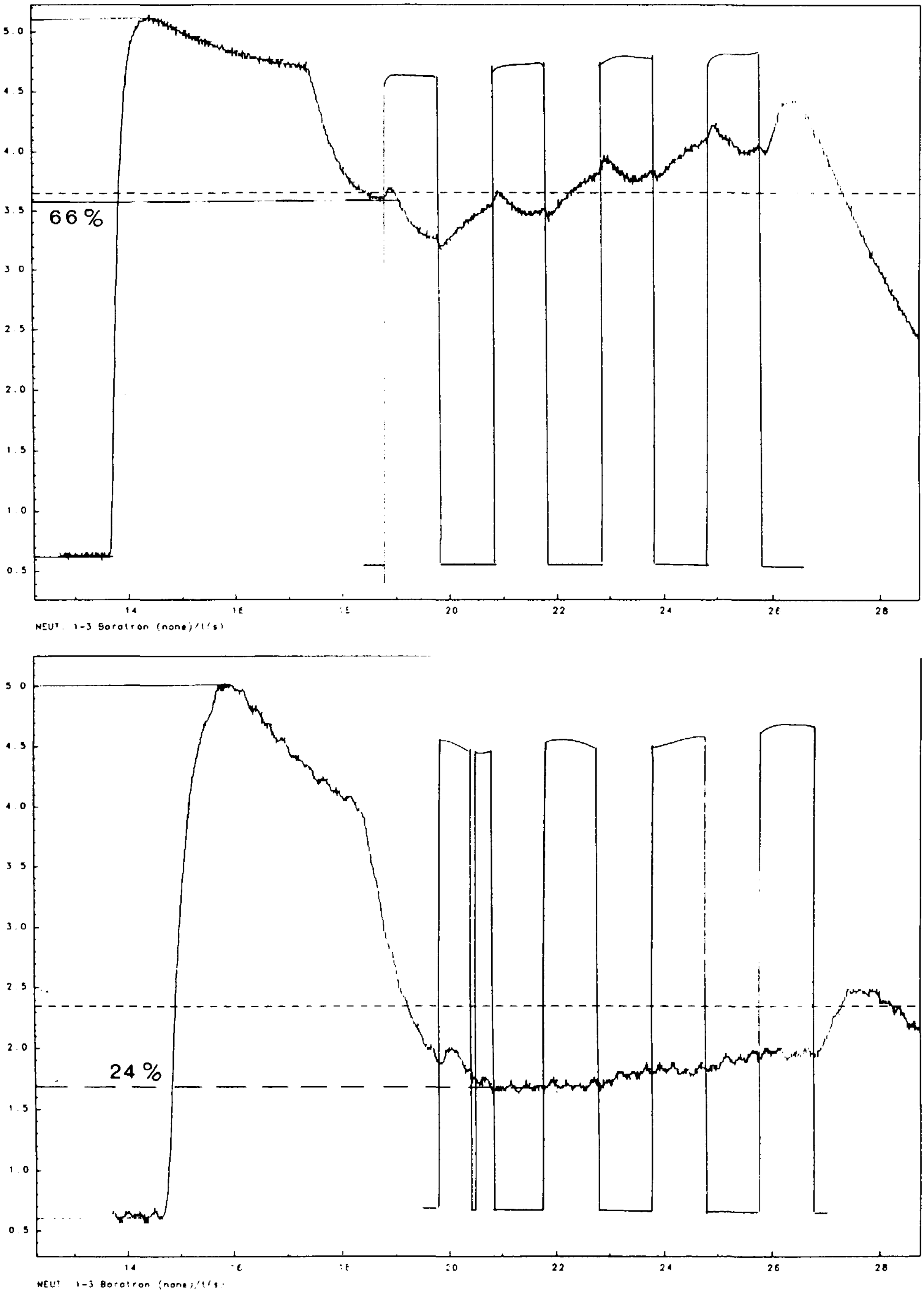


Fig. 10: Pressure in the Beryllium test rig during a beam pulse at the end of an operation day (top) and after an extended break (bottom). The pressure in the presence of beam more than doubles after sufficient operation and degassing with beam becomes visible. The beam current is indicated (modulated beam).

Be test rig, pressure with different arc and beam timing

pulse	55766	55767	55768	55769
gas on	13.6	13.6	14	14
fil on		12.5	12.5	12.5
arc on		22.3	**17.8**	17.8
beam on		23.8	23.8	**18.8**
off	26	30.8	30.8	25.8

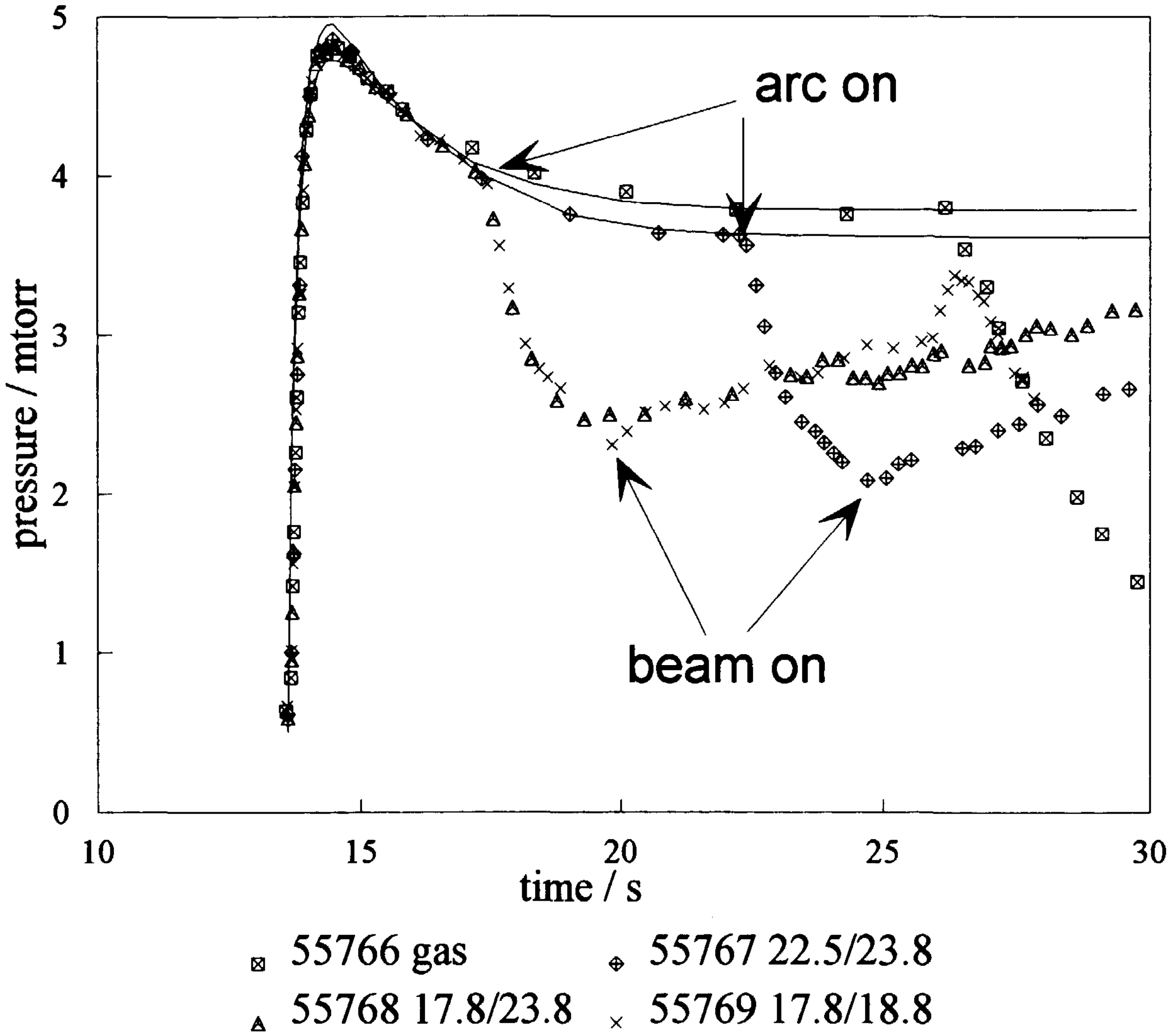


Fig. 11: Pressure traces for pulses with different arc and beam timings. The influence of the arc is large, that of the beam hardly visible.

2MM INDUCTION BRAZED BE ELEMENTS, ENDURANCE TEST, SET-UP PULSES

		Offset:	2.7	0.35		MEASURED PEAK PD											
		EXTRACTED				Water	Water	Inertial	ARC								
NUMBER	NOTES	VOLTAGE		CUR-	PERV	PEAK PD	PEAK PI	PEAK I	CURRENT		MODULATION		ON TIME		BD's	Flow	Flow
		set	is	RENT	[10^-7]	MW/m²	MW/m²	MW/m²	set	is	on	off	set	is		m³/h	m³/h
55446	PINI flow 58,p1=6.25,p2=1.66,p3=1.5	60	56.5	2.2	1.770				100	101	1.054	0.000	1.054	0.04	21	3.500	3.500
55447		60		3.05					200		1.054	0.000	1.054	0.03		3.500	3.500
55448		60		3.55					200		1.054	0.000	1.054	0.12		3.500	3.500
55449		60		3.39					200		1.054	0.000	1.054	0.54	11	3.500	3.500
55450		60	60.6	3.25	2.260				200	167	1.054	0.000	1.054	1	1	3.500	3.500
55451		60		3.27				9.95	200		1.054	0.000	1.054	1	1	4.470	4.450
55452		60		3.28				4.23	200		5.054	0.000	5.054	5	1	4.470	4.450
55453		60	60.8	3.37	2.325	7.18	7.75	8.62	200	170	5.054	0.000	5.054	4.96	1	4.470	4.450
55454		60	60.6	3.4	2.355				200	175	6.054	0.000	6.054	6	1	4.470	4.450
55455		60	60.6	3.44	2.380				200	175	6.054	0.000	6.054	6	0	4.470	4.450
55456		60		3.5					200		6.054	0.000	6.054	6.01	1	4.470	4.450
55457		60		3.55					200		6.054	0.000	6.054	5.96	2	4.470	4.450
55458		60		3.58					200		6.054	0.000	6.054	5.96	2	4.470	4.450
55459		60		3.59					200		6.054	0.000	6.054	6.01	0	4.470	4.450
55460		60		3.59				7.76	200		6.054	0.000	6.054	6.01	1	4.470	4.450
55461		60							200		6.054	0.000	6.054	6.01		4.470	4.450
55462		60		3.56		6.40	7.38		200		6.054	0.000	6.054	6.01	0	4.470	4.450
55463		60	60.8	3.62	2.481	6.41	7.47		200	177	6.054	0.000	6.054	6	0	4.470	4.450
55464		60	60.9	3.62	2.475				200	178	6.054	0.000	6.054	6	0	4.470	4.450
55465	Increase arc current	60		3.6		6.87	6.77	7.57	200		6.054	0.000	6.054	6	1	4.470	4.450
55466		60	60.8	3.85	2.625	8.29	8.78	9.60	210	191	6.054	0.000	6.054	6	1	4.470	4.450
55467		60	60.8	3.97	2.700	8.47	9.58	10.52	220	197	6.054	0.000	6.054	6	1	4.470	4.450
55468		60	60.8	4.04	2.743	9.44	10.41	11.10	230	204	6.054	0.000	6.054	6	1	4.470	4.450
55469		60	60.8	4.22	2.856	10.51	10.99	12.69	240	215	6.054	0.000	6.054	6	1	4.470	4.450
55470		60	60.8	4.13	2.800	9.85	11.08	12.08	240	213	6.054	0.000	6.054	6.01	1	4.470	4.450
55471		60	60.8	4.15	2.812	9.90	11.00	12.08	240	213	6.054	0.000	6.054	6.01	1	4.470	4.450
55472	Modulated	60	60.6	4.21	2.863	10.83	11.63		240		6.054	1.000	6.054	2.99	66	4.470	4.450
55473	Gas equib time reduced to 7sec	60	58	3.83	2.795				240		7.254	1.000	7.254	2.98	93	4.470	4.450
55474	Gas equib time reduced to 6sec	60	60.4	4.18	2.858				240	211	8.254	1.000	8.254	3	114	4.470	4.450

COMMENTS Settings for the endurance test established. Pulses 55539-55466 lost in adjusting power supplies. Beam volatage readout has and ofsett of +2.7kV.
Beam current offset +0.35A. Modulation tried at the end

55475	Aborted, Flow: 38,	60							240		1.054	0.000	1.054			3.500	3.500
55476		60	60.6	3.21	2.152				240	191	1.054	0.000	1.054	0.76	6	3.500	3.500
55477		60	60.8	3.34	2.228	9.71	9.53	8.87	240	208	6.054	0.000	6.054	5.78	6	4.360	4.470
55478	Gas Flow: 48	60	60.8	3.28	2.188				240	205	6.054	0.000	6.054	6.01	1	4.360	4.470
55479		60	60.8	3.72	2.481	11.39	10.94	9.94	240	214	6.054	0.000	6.054	6.01	1	4.380	4.480
55480		60	61	3.75	2.489				240	213	6.054	0.000	6.054	6.01	1	4.380	4.480
55481		60	60.9	4	2.662				240	217	6.054	0.000	6.054	6.01	1	4.380	4.480
55482		60							240		6.054	0.000	6.054			4.380	4.480
55483		60							240		6.054	0.000	6.054			4.380	4.480
55484		60	60.9	3.9	2.595				240	215	6.054	0.000	6.054	6.01	1	4.380	4.480
55485		60	60.9	4.09	2.721	11.04	11.41	10.01	240	219	6.054	0.000	6.054	5.96	2	4.460	4.480
55486		60	60.9	3.9	2.595				240	214	6.054	0.000	6.054	6.01	1	4.460	4.480
55487		60	60.9	4.03	2.682				240	216	6.054	0.000	6.054	6.01	1	4.460	4.480

induction brazed Be tiles, 2mm, endurance test with 6s UNMODULATED pulse length

Offset: 3.1 0.42

NUMBER	NOTES	EXTRACTED VOLTAGE [kV]		CUR-	PERV	PEAK POWER DENSITY Water	Water	Inertial	ARC CURRENT		MODULATION		ON TIME		BD's	Flow	Flow
		set	is	RENT	[10^-7]	MW/m²	MW/m²	MW/m²	set	is	on	off	set	is		m³/h	m³/h
55488	No gas	60							350		1.000	0.000	1.054			3.500	3.500
55489	No Grid 1 volts	60							350		1.000	0.000	1.054			3.500	3.500
55490		60	63.6	4.28	2.594	11.94	12.48		240	218	6.000	0.000	6.000	6	1	4.340	4.450
55491		60	63.6	4.29	2.601				240	214	6.000	0.000	6.000	6	1	4.340	4.450
55492		60	63.6	4.34	2.634	11.93	12.45		240	216	6.000	0.000	6.000	6	1	4.340	4.450
55493		60	63.6	4.38	2.661	12.11	12.79		240	216	6.000	0.000	6.000	6	1	4.340	4.450
55494		60	63.6	4.47	2.722	12.65	12.79	11.48	240	218	6.000	0.000	6.000	5.9	3	4.340	4.450
55495		60	63.6	4.34	2.634				230	206	6.000	0.000	6.000	6	1	4.340	4.450
55496		60	63.6	4.39	2.668				230	206	6.000	0.000	6.000	6	1	4.340	4.450
55497		60	63.6	4.45	2.708				230	207	6.000	0.000	6.000	6	1	4.340	4.450
55498		60	63.6	4.53	2.762	10.86	11.45	10.68	230	207	6.000	0.000	6.000	6	1	4.340	4.450
55499	Temp trip Rt hand	60	63.7	4.5	2.735				230	200	6.000	0.000	6.000	1.67	1	4.340	4.450
55500	No beam trip not reset	60			ERR				230		6.000	0.000	6.000			4.340	4.450
55501		60	63.7	4.58	2.789				230	200	6.000	0.000	6.000	1.63	16	4.340	4.450
55502		60	63.9	4.69	2.848				230	208	6.000	0.000	6.000	5.15	18	4.340	4.450
55503		60	64	4.6	2.781				220	202	6.000	0.000	6.000	5.91	3	4.340	4.450
55504		60	64	4.64	2.808	10.01	11.06		220	203	6.000	0.000	6.000	5.95	2	4.340	4.450
55505		60	64	4.66	2.821	10.49	10.90		220	203	6.000	0.000	6.000	6.01	1	4.340	4.450
55506		60	64	4.7	2.848				220	203	6.000	0.000	6.000	5.87	4	4.340	4.450
55507		60	64	4.72	2.861	10.10	11.13		220	203	6.000	0.000	6.000	5.96	1	4.340	4.450
55508		60	64	4.75	2.881	11.57	11.87	11.87	220	204	6.000	0.000	6.000	6.01	1	4.340	4.450
55509		60	64	4.72	2.861	10.71	11.64	9.79	220	204	6.000	0.000	6.000	6.01	0	4.340	4.450
55510		60	63.6	4.76	2.916	10.40	11.66		220	204	6.000	0.000	6.000	6	1	4.340	4.450
55511		60	63.7	4.8	2.936	10.38	12.19		220	204	6.000	0.000	6.000	5.95	2	4.340	4.450
55512		60	63.6	4.79	2.937	10.37	11.59	9.75	220	204	6.000	0.000	6.000	5.91	3	4.340	4.450
55513		60	63.6	4.79	2.937	9.99	11.68		220	204	6.000	0.000	6.000	5.96	1	4.340	4.450
55514		60		4.79	ERR				220		6.000	0.000	6.000	6	1	4.340	4.450
55515		60	63.6	4.79	2.937				220	204	6.000	0.000	6.000	6	1	4.340	4.450
55516		60	63.7	4.78	2.923	10.36	11.64	9.66	220	203	6.000	0.000	6.000	6.01	1	4.340	4.450
55517		60	63.7	4.8	2.936	10.19	11.73	9.63	220	203	6.000	0.000	6.000	5.82	5	4.340	4.450
55518		60	63.6	4.79	2.937	10.08	10.82	9.60	220	203	6.000	0.000	6.000	5.88	4	4.340	4.450
55519		60	63.6	4.82	2.957	10.50	11.28	9.67	220	204	6.000	0.000	6.000	6	1	4.340	4.450
55520		60	63.7	4.88	2.990	10.77	12.00	10.26	230	211	6.000	0.000	6.000	6.01	1	4.340	4.450
55521		60	63.7	4.86	2.976	11.01	12.26	10.34	230	211	6.000	0.000	6.000	6	1	4.340	4.450
55522		60	63.7	4.91	3.010	11.00	11.68		230	210	6.000	0.000	6.000	5.86	4	4.340	4.450
55523		60	63.7	4.92	3.017	11.04	12.14		230	211	6.000	0.000	6.000	6.01	1	4.340	4.450
55524		60	63.7	4.91	3.010	11.37	11.90		230	211	6.000	0.000	6.000	6.01	1	4.340	4.450
55525		60		4.12	ERR				230		6.000	0.000	6.000			4.400	4.450
55526		60	63.6	4.89	3.004			10.26	230	211	6.000	0.000	6.000	6.01	1	4.400	4.450
55527		60	63.6	4.92	3.024				230	210	6.000	0.000	6.000	5.96	2	4.400	4.450
55528		60	63.6	4.92	3.024	11.02	11.95	10.21	230	210	6.000	0.000	6.000	6	1	4.400	4.450
55529		60	63.6	4.92	3.024	11.37	12.50	10.28	230	211	6.000	0.000	6.000	6	1	4.400	4.450
55530		60	63.5	4.89	3.011	10.88	12.02		230	210	6.000	0.000	6.000	6.01	0	4.400	4.450
55531		60	63.6	4.89	3.004	10.76	11.75	10.21	230	210	6.000	0.000	6.000	5.96	1	4.400	4.450

induction brazed Be tiles, 2mm, endurance test with 6s UNMODULATED pulse length

NUMBER	NOTES	EXTRACTED VOLTAGE [kV] set	EXTRACTED VOLTAGE [kV] is	CUR-RENT	PERV [10^-7]	PEAK POWER DENSITY Water MW/m²	PEAK POWER DENSITY Water MW/m²	PEAK POWER DENSITY Inertial MW/m²	ARC CURRENT set	ARC CURRENT is	MODULATION on	MODULATION off	ON TIME set	ON TIME is	BD's	Flow m³/h	Flow m³/h
Offset:			3.1	0.42													
55532		60	63.6	4.54	2.769	10.60	12.02	9.59	220	201	6.000	0.000	6.000	6.01	1	4.400	4.450
55533		60	63.5	4.75	2.917	10.73	11.19	9.81	220	204	6.000	0.000	6.000	5.96	2	4.400	4.450
55534		60	63.5	4.44	2.708	8.16	9.15	7.54	200	183	6.000	0.000	6.000	6	0	4.400	4.450
55535		60	63.5	4.45	2.715	8.59	8.84	7.60	200	183	6.000	0.000	6.000	5.96	1	4.400	4.450
55536		60	63.5	4.79	2.944	10.77	11.69	9.59	220	204	6.000	0.000	6.000	6.01	1	4.400	4.450
55537		60	63.6	4.76	2.916	10.75	11.10	9.59	220	204	6.000	0.000	6.000	6.01	1	4.400	4.450
55538	first for IR recorging (4s)	64	67.6	4.79	2.668	9.95	10.21	8.61	220	203	6.000	0.000	6.000	6		4.400	4.450
55539		60	63.5	4.91	3.025	11.31	12.30	10.34	230	211	6.000	0.000	6.000	6		4.400	4.450
55540		60	63.5	4.89	3.011	11.63	12.22	10.26	230		6.000	0.000	6.000	6.01		4.400	4.450
55541		60	63.5	4.89	3.011	11.49	12.11		230	210	6.000	0.000	6.000	6	1	4.400	4.450
55542		60	63.5	4.89	3.011	11.08	11.85		230	210	6.000	0.000	6.000	6.01	1	4.400	4.450
55543		60	63.5	4.88	3.005	10.76	11.92		230	210	6.000	0.000	6.000	6.01	1	4.400	4.450
55544		60	63.5	4.91	3.025	11.57	12.48		230	210	6.000	0.000	6.000	5.96	1	4.400	4.450
55545		60	63.5	4.89	3.011	10.99	11.91		230	210	6.000	0.000	6.000	6.01	0	4.400	4.450
55546		60	63.5	4.91	3.025	10.76	11.78		230	209	6.000	0.000	6.000	6	1	4.400	4.450
55547		60	63.5	4.89	3.011	11.04	11.90		230	209	6.000	0.000	6.000	6	1	4.400	4.450
55548		60	63.5	4.88	3.005	10.99	12.24		230	209	6.000	0.000	6.000	6.01	1	4.400	4.450
55549		60	63.5	4.91	3.025	10.87	12.63	10.21	230	210	6.000	0.000	6.000	5.96	2	4.400	4.460
55550		60	63.5	4.89	3.011	11.14	12.21		230	210	6.000	0.000	6.000	6	1	4.450	4.460
55551		60	63.5	4.89	3.011	11.42	11.98		230	209	6.000	0.000	6.000	5.96	2	4.450	4.460
55552		60	63.5	4.88	3.005	11.21	12.60		230	209	6.000	0.000	6.000	6.01	1	4.450	4.460
55553		60	63.5	4.88	3.005	11.56	12.97		230	210	6.000	0.000	6.000	6	1	4.450	4.460
55554		60	63.5	4.88	3.005	11.00	12.37		230	209	6.000	0.000	6.000	6.01	1	4.450	4.460
55555		60	63.4	4.89	3.019	12.02	12.15		230	210	6.000	0.000	6.000	5.92	2	4.450	4.460
55556		60	63.5	4.89	3.011	11.63	12.26		230	209	[illegible]	[illegible]	6.000	6	0	4.450	4.460
55557		60	63.5	4.88	3.005	11.65	12.49		230	209	6.0(		6.000	6	1	4.450	4.460
55558		60	63.5	4.86	2.991	11.50	12.25		230	210	6.0(		6.000	6.01	1	4.450	4.460
55559		60	63.4	4.88	3.012	11.22	12.65	10.13	230	209	6.000	0.000	6.000	6.01	1	4.450	4.460
55560		60	63.4	5.11	3.167	12.65	13.65	11.41	240	223	6.000	0.000	6.000	5.83	5	4.450	4.460
55561		60	63.4	5.11	3.167	12.71	13.84		240	223	6.000	0.000	6.000	6.01	1	4.450	4.460
55562		60	63.4	5.08	3.147	12.70	14.04		240	222	6.000	0.000	6.000	6	1	4.450	4.460
55563		60	63.4	5.08	3.147	12.45	13.73		240	222	6.000	0.000	6.000	6.01		4.450	4.460
55564		60	63.4	5.07	3.140	12.47	14.01		240	222	6.000	0.000	6.000	6	1	4.450	4.460
55565		60	63.4	5.13	3.181	12.52	13.58		240	222	6.000	0.000	6.000	5.95	1	4.450	4.460
55566		60			ERR				240		6.000	0.000	6.000			4.450	4.460
55567		60	63.4	5.1	3.161	12.46	15.12		240	222	6.000	0.000	6.000	6.01	1	4.450	4.460
55568	base line taken on integrals	60	63.4	5.1	3.161	11.55	14.26		240	222	6.000	0.000	6.000	6.01	1	4.450	4.460
55569		60	63.4	5.08	3.147	12.74	14.14		240	222	6.000	0.000	6.000	6	1	4.450	4.460
55570		60	63.4	5.1	3.161	12.50	13.37	11.49	240	222	6.000	0.000	6.000	6	1	4.450	4.460
					AVG	11.1545	12.162	9.9951									
					MAX	12.7433	15.121	11.873									
					MIN	8.15949	8.8384	7.5449									

induction brazed Be tiles, 2mm, endurance test with 2s on, 1s off modulation, 9 & 10th march 93

		Offset:	3.3	0.39		PEAK POWER DENSITY											
		EXTRACTED				Water	Water	Inertial	ARC								
NUMBER	NOTES	VOLTAGE [KV]		CUR-	PERV				CURRENT		MODULATION			ON TI[ME]	BD's	Flow	Flow
		set	Is	RENT	[10^-7]	MW/m²	MW/m²	MW/m²	set	Is	on	off	set	Is		m³/h	m³/h
55571		60	-3.3	3.11	ERR				240		2.000	1.000	5.300	0.05	107	3.500	3.500
55572		60	56.9	3.68	2.711				240	204	2.000	1.000	5.300	0.05	107	3.500	3.500
55573		60	54	3.71	2.957				240	204	2.000	1.000	5.300	0.04	107	3.500	3.500
55574		60	60.5	3.92	2.634	12.11	12.60	11.39	240	214	5.300	1.000	5.300	5.25	1	4.330	4.440
55575	Modulation not working -90m delay	60	-3.3	-0.39	ERR				240		2.000	1.000	5.300	0.05		4.330	4.440
55576	aborted -no pulse type selected	60	-3.3	-0.39	ERR				240		2.000	1.000	6.300			4.330	4.440
55577		60	60.2	3.73	2.525	10.71	10.47	11.07	240	211	2.000	1.000	6.300	3.98	49	4.330	4.440
55578		60	60.3	4.06	2.742	11.48	12.59	11.15	240	217	2.000	1.000	9.300	5.94	72	4.330	4.440
55579		60	60.3	4.14	2.796	12.02	13.39	11.25	240	2.17	2.000	1.000	9.300	6.02	70	4.330	4.440
55580		60	60.3	4.18	2.823	11.52	13.35	11.23	240	218	2.000	1.000	9.300	6.01	70	4.330	4.440
55581		60	60.3	4.3	2.904	12.23	13.79	11.49	240	221	2.000	1.000	9.300	6	70	4.330	4.440
55582		60	60.3	4.34	2.931	11.70	13.06	11.42	240	220	2.000	1.000	9.300	5.93	72	4.330	4.440
55583		60	60.3	4.17	2.816	10.58	12.80	10.27	230	208	2.000	1.000	9.300	6	71	4.330	4.440
55584		60	60.2	4.22	2.857	10.74	12.40		230		2.000	1.000	9.300	6.05	69	4.330	4.440
55585		60	60.3	4.3	2.904	10.44	11.98		230		2.000	1.000	9.300	6.05	70	4.360	4.450
55586		60	60.3	4.33	2.924	9.99	12.16		230	210	2.000	1.000	9.300	5.95	72	4.360	4.450
55587		60	60.2	4.34	2.938	10.22	12.38		230	210	2.000	1.000	9.300	6.04	70	4.360	4.450
55588		60	60.2	4.36	2.952	10.15	11.39		230	210	2.000	1.000	9.300	6.04	70	4.360	4.450
55589		60	60.3	4.4	2.972	10.37	12.54		230	210	2.000	1.000	9.300	6.03	71	4.360	4.450
55590		60	60.2	4.41	2.986	10.36	12.03		230	211	2.000	1.000	9.300	6.05	70	4.360	4.450
55591		60	60.3	4.43	2.992	10.39	12.41		230	210	2.000	1.000	9.300	6	71	4.360	4.450
55592		60	60.3	4.43	2.992	10.30	11.83		230	210	2.000	1.000	9.300	5.96	71	4.360	4.450
55593		60	60.3	4.47	3.019	9.92	12.05		230	211	2.000	1.000	9.300	5.95	73	4.360	4.450
55594		60	60.2	4.47	3.026	10.64	11.90		230	211	2.000	1.000	9.300	5.91	73	4.360	4.450
55595		60	60.2	4.49	3.040	10.31	11.40		230	211	2.000	1.000	9.300	5.97	72	4.360	4.450
55596		60	60.3	4.46	3.012	10.23	12.09		230	210	2.000	1.000	8.300	5.93	51	4.360	4.450
55597		60	60.3	4.46	3.012	10.22	11.48		230	209	2.000	1.000	8.300	5.95	49	4.360	4.450
55598		60	60.2	4.49	3.040	10.33	11.32		230	210	2.000	1.000	8.100	5.89	48	4.360	4.450
55599		60	60.3	4.69	3.167	11.58	12.55		240	223	2.000	1.000	8.100	5.86	49	4.360	4.450
55600		60	60.2	4.66	3.155	11.73	12.55		240	223	2.000	1.000	8.100	5.93	47	4.360	4.450
55601		60	60.3	4.66	3.147	11.53	12.98		240	224	2.000	1.000	8.100	5.97	46	4.360	4.450
55602		60	60.1	4.68	3.176	11.69	12.41		240	224	2.000	1.000	8.100	5.8	50	4.360	4.450
55603		60	60.1	4.68	3.176	11.51	13.55		240	224	2.000	1.000	8.100	5.91	48	4.360	4.450
55604		60	60.2	4.68	3.168	11.35	13.15		240	228	2.000	1.000	8.100	5.96	46	4.360	4.450
55605		60	60.2	4.65	3.148	11.77	13.18	11.11	240	227	2.000	1.000	8.100	5.95	46	4.360	4.450
55606		60	60.2	4.69	3.175	11.39	12.95		240	228	2.000	1.000	8.100	5.89	48	4.360	4.450
55607		60	60.2	4.69	3.175	12.23	13.10		240	228	2.000	1.000	8.100	5.86	48	4.360	4.450
55608		60	60.2	4.66	3.155	11.60	12.67		240	227	2.000	1.000	8.100	5.9	48	4.360	4.450
55609		60	60.2	4.66	3.155	11.88	13.00	11.13	240	227	2.000	1.000	8.100	5.9	48	4.360	4.450
55610		60	60.1	4.68	3.176	11.65	12.57		240	228	2.000	1.000	8.100	5.91	48	4.360	4.450
55611		60	60	4.68	3.184	11.69	13.08		240	228	2.000	1.000	8.100	5.94	47	4.360	4.450
55612		60	60.1	4.68	3.176	11.67	12.91		240	228	2.000	1.000	8.100	5.96	47	4.360	4.450
55613		60	60.1	4.65	3.156	11.22	11.89		240	228	2.000	1.000	8.100	5.91	47	4.360	4.450
55614		60	60.1	4.65	3.156	11.36	12.68		240	227	2.000	1.000	8.100	5.91	47	4.360	4.450

induction brazed Be tiles, 2mm, endurance test with 2s on, 1s off modulation, 9 & 10th march 93

		Offset:	3.3	0.39		PEAK POWER DENSITY											
		EXTRACTED				Water	Water	Inertial	ARC								
NUMBER	NOTES	VOLTAGE [KV]		CUR-	PERV				CURRENT		MODULATION			ON TI	BD's	Flow	Flow
		set	Is	RENT	[10^-7]	MW/m²	MW/m²	MW/m²	set	Is	on	off	set	Is		m³/h	m³/h
55615		60	60.1	4.68	3.176	11.77	13.07	11.06	240	228	2.000	1.000	8.100	5.94	47	4.360	4.450
55616		60	60.1	4.68	3.176	11.46	13.42		240	228	2.000	1.000	8.100	5.91	48	4.360	4.450
55617		60	60.2	4.66	3.155	11.37	13.18		240	227	2.000	1.000	8.100	5.94	47	4.360	4.450
55618		60	60.1	4.65	3.156	11.62	13.02		240	227	2.000	1.000	8.100	5.95	46	4.360	4.450
55619		60	60.1	4.68	3.176	11.41	12.66		240	228	2.000	1.000	8.100	5.86	48	4.360	4.450
55620		60	60	4.68	3.184	11.40	13.18		240	228	2.000	1.000	8.100	5.9	48	4.360	4.450
55621		60	60	4.68	3.184	11.42	13.29	11.22	240	228	2.000	1.000	8.100	5.89	48	4.360	4.450
55622		60	60.1	4.65	3.156	11.77	13.63		240	228	2.000	1.000	8.100	5.95	46	4.360	4.450
55623		60	60	4.69	3.191	12.00	12.65		240	228	2.000	1.000	8.100	5.86	49	4.360	4.450
55624		60	60	4.68	3.184	11.93	12.72		240	228	2.000	1.000	8.100	5.97	46	4.360	4.450
55625		60	60.1	4.66	3.163	11.94	13.57		240	227	2.000	1.000	8.100	5.91	47	4.360	4.450
55626		60	60.1	4.66	3.163	12.02	13.12		240	227	2.000	1.000	8.100	5.91	48	4.360	4.450
55627		60	60	4.63	3.150	11.88	13.06	11.11	240	227	2.000	1.000	8.100	5.95	47	4.410	4.470
55628		60	60.1	4.66	3.163	11.72	12.97		240	227	2.000	1.000	8.100	5.9	48	4.410	4.470
55629		60	60.1	4.66	3.163	12.20	12.75		240	227	2.000	1.000	8.100	5.91	48	4.410	4.470
55630		60	60.1	4.65	3.156	11.92	12.84		240	227	2.000	1.000	8.100	6	46	4.410	4.470
55631		60	60.1	4.65	3.156	11.72	12.72		240	227	2.000	1.000	8.100	5.91	48	4.410	4.470
55632		60	60.1	4.66	3.163	11.66	12.77		240	228	2.000	1.000	8.100	5.96	46	4.410	4.470
55633		60	60	4.66	3.171	12.01	12.90		240	227	2.000	1.000	8.100	5.95	46	4.410	4.470
55634		60	60	4.65	3.164	11.60	12.74	11.00	240	227	2.000	1.000	8.100	5.97	47	4.410	4.470
55635		60	60	4.65	3.164	11.62	12.82		240	226	2.000	1.000	8.100	5.98	46	4.410	4.470
55636		60	60.1	4.66	3.163	12.01	12.98		240	228	2.000	1.000	8.100	5.9	48	4.410	4.470
55637		60	60	4.63	3.150	11.74	12.99		240	228	2.000	1.000	8.100	5.99	46	4.410	4.470
55638		60	60	4.62	3.144	11.76	12.78		240	228	2.000	1.000	8.100	5.97	47	4.410	4.470
55639		60	60	4.65	3.164	11.91	12.41	10.95	240	227	2.000	1.000	8.100	5.96	47	4.410	4.470
55640		60	60.1	4.63	3.142	11.86	12.99		240	227	2.000	1.000	8.100	5.94	47	4.410	4.470
55641		60	60	4.66	3.171	11.99	12.26		240	227	2.000	1.000	8.100	5.95	47	4.410	4.470
55642		60	60	4.65	3.164	11.90	12.74		240	227	2.000	1.000	8.100	5.95	46	4.410	4.470
55643		60	59.6	4.56	3.134	11.81	12.82		240		1.000	3.000	8.100	2	134	4.410	4.470
55644		60	60	4.65	3.164	11.30	13.47		240	227	6.000	2.000	8.100	6	46	4.410	4.470
55645	arc stab 1.5 > 3.5, gas stab 6 < 4	60	60	4.66	3.171	11.85	13.41		240	228	6.000	2.000	8.100	6	4.6	4.410	4.470

55646		60	-2.7	-0.35	ERR				240		2.000	1.000	8.100		44	4.360	4.450
55647		60	60.9	3.05	2.029	9.14	9.39	8.51	240	202	2.000	1.000	8.100	5.92		4.360	4.450
55648		60	60.9	3.28	2.182	10.00	10.20		240		2.000	1.000	8.100	5.97	44	4.360	4.450
55649		60	61	3.41	2.263	9.74	10.01	9.10	240	207	2.000	1.000	8.100	5.98	42	4.360	4.450
55650		60	60.9	3.46	2.302	9.74	10.68	9.06	240	208	2.000	1.000	8.100	6.05		4.360	4.450
55651	ABORTED	60	-2.7	-0.35	ERR				240		2.000	1.000	8.100			4.360	4.450
55652	ABORTED	60	-2.7	-0.35	ERR				240		2.000	1.000	8.100			4.360	4.450
55653		60	60.9	3.5	2.329	9.59	9.77		240	210	2.000	1.000	8.100	6	44	4.360	4.450
55654	GAS PRESSURE 710 > 730	60	60.9	3.68	2.449	10.32	11.49		240	211	2.000	1.000	8.100	6	44	4.360	4.450
55655		60	60.9	3.69	2.455	10.43	10.97		240	211	2.000	1.000	8.100	6	44	4.360	4.450
55656	GAS PRESSURE 730 > 750	60	60.8	3.88	2.588	11.15	11.17		240	214	2.000	1.000	8.100	6.01	43	4.360	4.450

induction brazed Be tiles, 2mm, endurance test with 2s on, 1s off modulation, 9 & 10th march 93

Offset: 3.3 0.39

NUMBER	NOTES	EXTRACTED VOLTAGE [KV]		CUR-RENT	PERV	PEAK POWER DENSITY Water	Water	Inertial	ARC CURRENT		MODULATION			ON TI	BD's	Flow	Flow
		set	is		[10^-7]	MW/m²	MW/m²	MW/m²	set	is	on	off	set	is		m³/h	m³/h
55657	GAS TIMING, ARCSTAB 3.5>1.5, P	60	61	3.75	2.489				240		2.000	1.000	[illegible]	[illegible]	7	4.360	4.450
55658		60	60.9	3.84	2.555	10.04	11.12		240	212	2.000	1.000	[illegible]		44	4.360	4.450
55659	GAS PRESSURE 750>770	60	60.8	4.03	2.688	10.87	11.94		240	216	2.000	1.000	[illegible]		45	4.360	4.450
55660	GAS PRESSURE 770>790	60	60.9	4.12	2.741	10.54	12.11		240	217	2.000	1.000	8.100	5.99	44	4.360	4.450
55661	GAS PRESSURE 790>820	60	60.8	4.29	2.862	11.22	12.68		240	221	2.000	1.000	8.100	6.01	44	4.360	4.450
55662		60	61.1	4.34	2.874	11.35	12.57		240	220	2.000	1.000	8.100	5.9	46	4.360	4.450
55663		60	60.8	4.38	2.922	11.44	12.90		240	222	2.000	1.000	8.100	5.89	47	4.360	4.450
55664		60	60.9	4.44	2.954	11.72	12.71		240	222	2.000	1.000	8.100	5.86	48	4.360	4.450
55665		60	60.9	4.47	2.974	11.42	12.29	10.66	240	223	2.000	1.000	8.100	5.86	48	4.360	4.450
55666		60	60.8	4.5	3.002	11.20	12.59		240	224	2.000	1.000	8.100	5.9	47	4.360	4.450
55667		60	60.9	4.54	3.021	11.35	12.55		240	224	2.000	1.000	8.100	5.9	47	4.360	4.450
55668		60	60.9	4.56	3.034	11.26	12.54		240	224	2.000	1.000	8.100	5.91	47	4.360	4.450
55669		60	60.9	4.56	3.034	11.17	12.54		240	224	2.000	1.000	8.100	5.93	46	4.360	4.450
55670		60	60.9	4.54	3.021	11.41	12.32		240	224	2.000	1.000	8.100	5.91	47	4.360	4.450
55671		60	60.9	4.59	3.054	11.89	12.83	10.68	240	225	2.000	1.000	8.100	5.85	47	4.360	4.450
55672		60	60.9	4.54	3.021	11.23	13.01		240	226	2.000	1.000	8.100	5.86	48	4.360	4.450
55673		60	60.8	4.56	3.042	11.14	12.35		240	225	2.000	1.000	8.100	5.86	48	4.360	4.450
55674		60	61	4.6	3.053	11.38	12.74		240	225	2.000	1.000	8.100	5.95	46	4.360	4.450
55675		60	60.9	4.57	3.041	11.07	12.68		240	224	2.000	1.000	8.100	5.91	47	4.360	4.450
55676		60	61	4.56	3.027	11.17	12.85		240	224	2.000	1.000	8.100	5.92	47	4.360	4.450
55677		60	61	4.54	3.013	11.50	12.67	10.45	240	223	2.000	1.000	8.100	5.94	47	4.360	4.450
55678		60	61	4.59	3.047	11.72	12.77		240	225	2.000	1.000	8.100	5.93	47	4.360	4.450
55679		60	61	4.56	3.027	11.39	12.55		240	224	2.000	1.000	8.100	5.93	47	4.360	4.450
55680		60	60.8	4.56	3.042	11.11	12.55		240	224	2.000	1.000	8.100	5.94	47	4.360	4.450
55681		60	60.9	4.53	3.014	10.74	12.14		240	223	2.000	1.000	8.100	5.89	48	4.360	4.450
55682		60	61	4.56	3.027	11.32	12.78		240	224	2.000	1.000	8.100	5.91	48	4.360	4.450
55683		60	61	4.56	3.027	11.00	12.73	10.48	240	224	2.000	1.000	8.100	5.92	48	4.360	4.450
55684		60	60.9	4.54	3.021	11.28	11.71		240	223	2.000	1.000	8.100	5.95	47	4.360	4.450
55685		60	60.9	4.57	3.041	11.30	12.65		240	224	2.000	1.000	8.100	5.95	47	4.360	4.450
55686		60	60.8	4.56	3.042	11.56	13.07		240	224	2.000	1.000	8.100	5.96	47	4.360	4.450
55687		60	60.9	4.54	3.021	11.01	12.28		240	223	2.000	1.000	8.100	5.91	48	4.360	4.450
55688		60	60.9	4.54	3.021	10.80	12.60	10.28	240	224	2.000	1.000	8.100	5.92	48	4.380	4.450
55689		60	60.9	4.56	3.034	11.42	12.91		240	225	2.000	1.000	8.100	5.92	47	4.380	4.450
55690		60	60.9	4.54	3.021	11.28	12.06		240	225	2.000	1.000	8.100	5.98	46	4.380	4.450
55691		60	60.9	4.54	3.021	10.95	12.54		240	224	2.000	1.000	8.100	5.96	47	4.380	4.450
55692		60	60.9	4.57	3.041	11.38	12.50		240	224	2.000	1.000	8.100	5.97	46	4.380	4.450
						11.2403	**12.48**	**10.699**									
						12.2345	**13.79**	**11.487**									
						9.14244	**9.392**	**8.5076**									

ENDURANCE TEST 2MM INDUCTION BRAZED bERYLLIUM TILES, SCAN WITH 1S ON, 1S OFF MODULATION. 11TH & 15TH OF MARCH

		Offset:	2.7	0.35		PEAK POWER DENSITY											
		EXTRACTED				Water	Water	Inertial	ARC								
NUMBER	NOTES	VOLTAGE [KV]		CUR-	PERV				CURRENT		MODULATION		ON TIME		BD's	Flow	Flow
		set	is	RENT	[10^-7]	MW/m²	MW/m²	MW/m²	set	is	on	off	set	is		m³/h	m³/h
55693	1 sec on 1 sec off / aborted op error	60			ERR				240		1.000	1.000	5.100			4.380	4.450
55694		60	61	4.47	2.967	12.3	12.8	10.8	240	221	1.000	1.000	5.100	2.98	47	4.400	4.450
55695		60	61	4.43	2.940	12.1	11.7		240	220	1.000	1.000	5.100	2.89	49	4.400	4.450
55696	no data avail for integrals	60	61	4.47	2.967				240	220	1.000	1.000	5.100	2.9	49	4.400	4.450
55697		60	61	4.47	2.967	11.0	12.7		240	220	1.000	1.000	5.100	2.86	50	4.400	4.450
55698		60	60.8	4.53	3.022	11.6	13.2		240	222	1.000	1.000	5.100	2.9	49	4.400	4.450
55699		60	61	4.51	2.994	11.5	11.5		240	222	1.000	1.000	5.100	2.92	48	4.400	4.450
55700		60	60.9	4.51	3.001	11.1	12.4		240	222	1.000	1.000	5.100	2.89	49	4.400	4.450
55701		60	60.9	4.5	2.994	11.7	12.4		240	223	1.000	1.000	5.100	2.9	49	4.400	4.450
55702		60	60.9	4.56	3.034	11.8	12.8		240	221	1.000	1.000	5.100	2.9	48	4.400	4.450
55703		60	61	4.53	3.007	12.4	12.3	11.1	240	222	1.000	1.000	5.100	2.91	48	4.380	4.440
55704		60	60.9	4.5	2.994	11.4	13.7		240	222	1.000	1.000	5.100	2.86	50	4.380	4.440
55705		60	60.8	4.48	2.988	11.2	12.8		240	220	1.000	1.000	5.100	2.91	48	4.380	4.440
55706		60	60.9	4.54	3.021	11.6	12.7		240	221	1.000	1.000	7.100	3.82	73	4.380	4.440
55707		60	60.8	4.53	3.022	11.1	12.0		240	220	1.000	1.000	7.100	3.91	72	4.380	4.440
55708		60	60.9	4.53	3.014	11.1	11.7		240	219	1.000	1.000	7.100	3.89	72	4.380	4.440
55709		60	60.8	4.5	3.002	11.3	12.1	10.7	240	222	1.000	1.000	7.100	3.87	73	4.410	4.450
55710		60	60.9	4.53	3.014	11.1	12.1		240	222	1.000	1.000	7.100	3.87	73	4.410	4.450
55711		60	60.9	4.53	3.014	11.2	11.9		240	221	1.000	1.000	7.100	3.91	71	4.410	4.450
55712		60	60.9	4.51	3.001	10.5	13.2		240	221	1.000	1.000	7.100	3.92	71	4.410	4.450
55713		60	60.9	4.51	3.001	11.8	12.1		240	221	1.000	1.000	7.100	3.82	73	4.410	4.450
55714		60	60.9	4.54	3.021	11.0	12.5		240	222	1.000	1.000	7.100	3.89	71	4.410	4.450
55715		60	61	4.53	3.007	11.2	12.5		240	222	1.000	1.000	7.100	3.87	72	4.410	4.450
55716		60	60.9	4.51	3.001	11.3	12.5	11.0	240	222	1.000	1.000	7.100	3.88	71	4.410	4.450
55717		60	60.8	4.48	2.988	11.4	12.2		240	222	1.000	1.000	7.100	3.88	72	4.410	4.450
55718		60	61	4.53	3.007	10.9	12.7		240	220	1.000	1.000	7.100	3.9	71	4.410	4.450
55719		60	60.9	4.53	3.014	11.5	12.1		240	222	1.000	1.000	7.100	3.88	71	4.410	4.450
55720		60	60.9	4.51	3.001	10.6	13.1		240	221	1.000	1.000	7.100	3.88	72	4.410	4.450
55721		60	60.9	4.5	2.994	11.3	12.2		240	221	1.000	1.000	7.100	3.9	71	4.410	4.450
55722		60	60.7	4.51	3.016	11.5	13.6	11.0	240	222	1.000	1.000	7.100	3.9	71	4.420	4.450
55723		60	60.8	4.53	3.022	10.9	12.0		240	220	1.000	1.000	7.100	3.9	72	4.420	4.450
55724		60	60.8	4.5	3.002	11.2	12.4		240	221	1.000	1.000	7.100	3.88	72	4.420	4.450
55725		60	60.9	4.48	2.981	10.3	12.5		240	222	1.000	1.000	7.100	3.86	73	4.420	4.450
55726		60	60.7	4.53	3.029	10.6	12.3		240	222	1.000	1.000	7.100	3.94	71	4.420	4.450
55727		60	60.7	4.51	3.016	10.6	11.5		240	221	1.000	1.000	7.100	3.87	71	4.420	4.450
55728		60	60.7	4.5	3.009	11.9	11.7		240	221	1.000	1.000	7.100	3.9	72	4.420	4.450
55729		60	60.8	4.48	2.988	11.5	12.4	10.8	240	220	1.000	1.000	7.100	3.91	71	4.450	4.460
55730		60	60.8	4.5	3.002	11.1	12.0		240	221	1.000	1.000	7.100	3.88	71	4.450	4.460
55731		60	60.8	4.48	2.988	11.0	12.2		240	221	1.000	1.000	7.100	3.89	72	4.450	4.460

ENDURANCE TEST 2MM INDUCTION BRAZED bERYLLIUM TILES, SCAN WITH 1S ON, 1S OFF MODULATION. 11TH & 15TH OF MARCH

Offset: 2.7 0.35

NUMBER	NOTES	EXTRACTED VOLTAGE [KV] set	EXTRACTED VOLTAGE [KV] is	EXTRACTED CUR-RENT	PERV [10^-7]	PEAK POWER DENSITY Water MW/m²	PEAK POWER DENSITY Water MW/m²	PEAK POWER DENSITY Inertial MW/m²	ARC CURRENT set	ARC CURRENT is	MODULATION on	MODULATION off	ON TIME set	ON TIME is	BD's	Flow m³/h	Flow m³/h
55732		60	60.6	4.48	3.003	10.9	13.0		240	220	1.000	1.000	7.100	3.89	72	4.450	4.460
55733		60	60.7	4.47	2.989	10.5	12.1		240	220	1.000	1.000	7.100	3.89	72	4.450	4.460
55734		60	60.7	4.5	3.009	11.0	11.9		240	220	1.000	1.000	7.100	3.93	71	4.450	4.460
55735		60	60.7	4.51	3.016	10.7	11.9		240	220	1.000	1.000	7.100	3.91	72	4.450	4.460
55736		60	60.7	4.5	3.009	11.5	12.7	10.7	240	220	1.000	1.000	7.100	3.92	71	4.450	4.450
55737		60	60.7	4.53	3.029	10.5	13.1		240	221	1.000	1.000	7.100	3.88	72	4.450	4.450
55738		60	60.7	4.48	2.996	10.7	12.5		240	221	1.000	1.000	7.100	3.87	72	4.450	4.450
55739		60	60.6	4.5	3.017	11.9	13.0		240	220	1.000	1.000	7.100	3.94	71	4.450	4.450
55740		60	60.7	4.48	2.996	11.3	11.5		240	220	1.000	1.000	7.100	3.91	72	4.450	4.450
55741		60	60.7	4.5	3.009	11.2	12.2		240	221	1.000	1.000	7.100	3.88	72	4.450	4.450
55742		60	60.6	4.5	3.017	11.7	12.2	10.8	240	218	1.000	1.000	7.100	3.87	73	4.450	4.450
55743		60	60.7	4.48	2.996	11.0	12.2		240	221	1.000	1.000	7.100	3.91	72	4.450	4.450
55744		60	60.6	4.48	3.003	10.4	11.3		240	221	1.000	1.000	7.100	3.91	72	4.450	4.450
55745		60	60.7	4.51	3.016	11.1	11.3		240	220	1.000	1.000	7.100	3.87	73	4.450	4.450
55746		60	60.7	4.51	3.016	11.5	12.4		240	221	1.000	1.000	7.100	3.86	72	4.450	4.450
55747		60	60.6	4.5	3.017	11.8	12.1		240	221	1.000	1.000	7.100	3.92	71	4.450	4.450
55748		60	60.6	4.48	3.003	11.3	12.4	10.8	240	221	1.000	1.000	7.100	3.87	73	4.440	4.440
55749		60	60.7	4.5	3.009	11.9	12.2		240	220	1.000	1.000	7.100	3.91	72	4.440	4.440
55750		60	60.6	4.48	3.003	11.7	12.3		240	220	1.000	1.000	7.100	3.86	72	4.440	4.440
55751		60	60.6	4.48	3.003	11.1	12.8		240	221	1.000	1.000	7.100	3.92	71	4.440	4.440
55752		60	60.6	4.5	3.017	10.8	11.9		240	220	1.000	1.000	7.100	3.88	73	4.440	4.440
55753		60	60.6	4.47	2.996	10.5	12.2		240	221	1.000	1.000	7.100	3.92	72	4.440	4.440
55754		60	60.6	4.45	2.983	10.7	12.4		240	220	1.000	1.000	7.100	3.88	72	4.440	4.440
55755		60	60.6	4.51	3.023	12.2	12.4	10.9	240	223	1.000	1.000	7.100	3.86	73	4.450	4.450
55756		60	60.6	4.48	3.003	10.9	13.2		240	221	1.000	1.000	7.100	3.93	71	4.450	4.450
55757		60	60.6	4.48	3.003	10.3	11.6		240	220	1.000	1.000	7.100	3.95	71	4.450	4.450
55758		60	60.6	4.47	2.996	10.5	12.0		240	220	1.000	1.000	7.100	3.93	72	4.450	4.450
55759		60	60.6	4.51	3.023	10.8	12.3		240	220	1.000	1.000	7.100	3.89	72	4.450	4.450
55760		60	60.6	4.47	2.996	10.3	11.1		240	220	1.000	1.000	7.100	3.88	73	4.450	4.450
55761		60	60.6	4.48	3.003	12.0	13.2		240	220	1.000	1.000	7.100	3.93	72	4.450	4.450
55762		60	60.5	4.51	3.031	12.0	12.5	10.8	240	220	1.000	1.000	7.100	3.93	72	4.460	4.450
55771	modulated 1 sec on 1 sec off	60	60.75	3.23	2.157	11.6	11.6	10.7	240	210	1.000	1.000	7.100	3.93	66	4.510	4.400
55772		60	60.55	3.38	2.269	11.6	12.6	11.2	240	211	1.000	1.000	7.100	3.86	69	4.510	4.400
55773		60	60.65	3.45	2.310	12.2	13.0	11.5	240	213	1.000	1.000	7.100	3.81	70	4.510	4.400
55774		60	60.75	3.47	2.317	11.8	12.5		240	211	1.000	1.000	7.100	3.86	69	4.510	4.400
55775		60	60.65	3.45	2.310	12.5	12.6		240	211	1.000	1.000	7.100	3.88	68	4.510	4.400
55776		60	60.65	3.53	2.363	12.1	12.6		240	211	1.000	1.000	7.100	3.87	69	4.510	4.400
55777		60	60.75	3.63	2.424	12.9	12.7		240	213	1.000	1.000	7.100	3.89	68	4.510	4.400

ENDURANCE TEST 2MM INDUCTION BRAZED bERYLLIUM TILES, SCAN WITH 1S ON, 1S OFF MODULATION. 11TH & 15TH OF MARCH

		Offset:	2.7	0.35		PEAK POWER DENSITY											
		EXTRACTED				Water	Water	Inertial	ARC								
NUMBER	NOTES	VOLTAGE [KV]		CUR-	PERV				CURRENT		MODULATION		ON TIME		BD's	Flow	Flow
		set	is	RENT	[10^-7]	MW/m²	MW/m²	MW/m²	set	is	on	off	set	is		m³/h	m³/h
55778		60	60.75	3.67	2.451	12.5	12.8		240	214	1.000	1.000	7.100	3.89	69	4.510	4.400
55779		60	59.95	3.7	2.521	12.9	13.3		240	213	1.000	1.000	7.100	3.89	68	4.510	4.400
55780		60	60.85	3.73	2.485	12.9	13.4		240	215	1.000	1.000	7.100	3.89	68	4.510	4.400
55781		60	60.85	3.77	2.512	13.2	13.8		240	217	1.000	1.000	7.100	3.93	68	4.510	4.400
55782		60	60.85	3.8	2.532	12.9	12.7		240	215	1.000	1.000	7.100	3.87	70	4.510	4.400
55783		60	60.95	3.85	2.559	12.0	13.2		240	214	1.000	1.000	7.100	3.86	70	4.510	4.400
55784		60	60.85	3.85	2.565	12.3	13.4		240	215	1.000	1.000	7.100	3.87	69	4.510	4.400
55785		60	60.95	3.91	2.598	12.8	13.2		240	216	1.000	1.000	7.100	3.92	69	4.510	4.400
55786		60	60.85	3.94	2.625	12.2	12.9		240	217	1.000	1.000	7.100	3.92	68	4.510	4.400
55787		60	60.85	3.99	2.658	11.9	12.7		240	219	1.000	1.000	7.100	3.87	70	4.510	4.400
55788		60	60.95	4.04	2.685	12.0	12.6		240	219	1.000	1.000	7.100	3.93	69	4.510	4.400
55789		60	60.95	4.11	2.731	12.3	12.9		240	220	1.000	1.000	7.100	3.92	68	4.510	4.400
55790		60	60.95	4.17	2.771	12.3	13.0		240	219	1.000	1.000	7.100	3.88	70	4.510	4.400
55791		60	60.95	4.21	2.798	12.1	13.2		240	220	1.000	1.000	7.100	3.88	70	4.510	4.400
55792		60	60.95	4.26	2.831	11.1	11.7		240	220	1.000	1.000	7.100	3.94	69	4.510	4.400
55793		60	60.95	4.33	2.878	12.0	13.0		240	221	1.000	1.000	7.100	3.94	68	4.510	4.400
55794		60	60.95	4.36	2.898	11.8	13.2	11.5	240	222	1.000	1.000	7.100	3.89	70	4.510	4.400
55795		60	60.85	4.39	2.925	12.2	13.1		240	223	1.000	1.000	7.100	3.94	68	4.510	4.400
55796		60	60.85	4.42	2.945	12.6	12.5		240	224	1.000	1.000	7.100	3.91	69	4.510	4.400
55797		60	60.85	4.45	2.965	12.3	12.8	11.4	240	223	1.000	1.000	7.100	3.96	68	4.510	4.400
55798		60	60.85	4.46	2.971	11.9	14.1	11.4	240	223	1.000	1.000	7.100	3.98	68	4.510	4.400
55799		60	60.95	4.46	2.964	12.5	12.7		240	223	1.000	1.000	7.100	3.96	68	4.510	4.400
55800		60	60.95	4.49	2.984	12.2	12.8		240	223	1.000	1.000	7.100	3.94	69	4.510	4.400
55801		60	60.85	4.48	2.985	12.5	12.4		240	223	1.000	1.000	7.100	3.89	70	4.510	4.400
55802		60	60.95	4.48	2.977	12.4	13.0		240	223	1.000	1.000	7.100	3.92	69	4.510	4.400
55803		60	60.95	4.51	2.997	12.5	14.0		240	224	1.000	1.000	7.100	3.97	68	4.510	4.400
55804		60	60.75	4.52	3.019	12.3	13.1		240	223	1.000	1.000	7.100	3.95	69	4.510	4.400
55805		60	60.95	4.49	2.984	12.3	12.9		240	223	1.000	1.000	7.100	3.98	69	4.510	4.400
55806		60	60.95	4.49	2.984	11.9	12.8		240	224	1.000	1.000	7.100	4	68	4.510	4.400
55807		60	60.95	4.51	2.997	12.1	13.2		240	225	1.000	1.000	7.100	3.99	68	4.510	4.400
55808		60	60.85	4.52	3.011	12.0	13.1		240	223	1.000	1.000	7.100	3.94	70	4.510	4.400
55809		60	61.05	4.52	2.996	12.6	13.0	11.2	240	223	1.000	1.000	7.100	3.95	69	4.510	4.400
55810		60	60.75	4.54	3.032	12.1	13.1		240	224	1.000	1.000	7.100	4.01	68	4.510	4.400
55811		60	60.85	4.52	3.011	11.5	13.1		240	223	1.000	1.000	7.100	3.96	69	4.510	4.400
55812		60	60.95	4.52	3.004	12.0	12.6		240	223	1.000	1.000	7.100	4.01	68	4.510	4.400
55813		60	-2.85	4.51	ERR				240		1.000	1.000	7.100	3.94	69	4.510	4.400
55814		60	60.85	4.49	2.991	12.1	13.0		240	223	1.000	1.000	7.100	3.99	68	4.510	4.400
55815		60	60.95	4.54	3.017	12.3	13.7	11.1	240	224	1.000	1.000	7.100	3.98	69	4.510	4.400
55816		60	60.85	4.52	3.011	11.6	13.8		240	222	1.000	1.000	7.100	3.93	69	4.510	4.400

ENDURANCE TEST 2MM INDUCTION BRAZED bERYLLIUM TILES, SCAN WITH 1S ON, 1S OFF MODULATION. 11TH & 15TH OF MARCH

		Offset:	2.7	0.35		PEAK POWER DENSITY											
		EXTRACTED				Water	Water	Inertial	ARC								
NUMBER	NOTES	VOLTAGE [KV]		CUR-	PERV				CURRENT		MODULATION		ON TIME		BD's	Flow	Flow
		set	is	RENT	[10^-7]	MW/m²	MW/m²	MW/m²	set	is	on	off	set	is		m³/h	m³/h
55817		60	60.85	4.54	3.025	12.2	12.6		240	224	1.000	1.000	7.100	3.93	70	4.510	4.400
55818		60	60.85	4.55	3.031	11.9	13.5		240	223	1.000	1.000	7.100	3.85	71	4.510	4.400
55819		60	60.85	4.52	3.011	12.0	12.8		240	223	1.000	1.000	7.100	3.84	72	4.510	4.400
55820		60	60.75	4.62	3.085	12.4	14.3		250	229	1.000	1.000	7.100	3.81	73	4.510	4.400
55821		60	60.85	4.61	3.071	12.4	14.0	11.7	250	229	1.000	1.000	7.100	3.8	73	4.520	4.415
55822		60	60.75	4.61	3.079	12.3	14.0		250	228	1.000	1.000	7.100	3.81	72	4.520	4.415
55823		60	60.65	4.59	3.073	12.5	14.5		250	229	1.000	1.000	7.100	3.88	71	4.520	4.415
55824		60	60.85	4.59	3.058	11.9	13.9		250	230	1.000	1.000	7.100	3.83	73	4.520	4.415
55825		60	60.85	4.61	3.071	13.0	13.5		250	227	1.000	1.000	7.100	3.87	71	4.520	4.415
55826		60	60.85	4.59	3.058	12.4	14.3		250	228	1.000	1.000	7.100	3.8	73	4.520	4.415
55827		60	60.75	4.61	3.079	12.6	14.0		250	229	1.000	1.000	7.100	3.88	72	4.520	4.415
55828		60	60.75	4.61	3.079	12.7	13.6		250	229	1.000	1.000	7.100	3.87	72	4.520	4.415
55829		60	60.85	4.61	3.071	12.2	13.2	11.6	250	229	1.000	1.000	7.100	3.88	71	4.510	4.410
55830		60	60.85	4.58	3.051	11.9	13.7		250	229	1.000	1.000	7.100	3.88	71	4.510	4.410
55831		60	60.75	4.61	3.079	11.8	13.9		250	229	1.000	1.000	7.100	3.89	71	4.510	4.410
55832		60	60.75	4.61	3.079	12.4	14.8		250	227	1.000	1.000	7.100	3.81	73	4.510	4.410
55833		60	60.65	4.58	3.066	12.7	13.9		250	230	1.000	1.000	7.100	3.86	72	4.510	4.410
55834		60	60.75	4.62	3.085	12.7	14.4		250	229	1.000	1.000	7.100	3.82	73	4.510	4.410
55835		60	60.65	4.61	3.086	12.4	14.7		250	229	1.000	1.000	7.100	3.86	72	4.510	4.410
55836		60	60.75	4.59	3.065	12.7	13.8		250	229	1.000	1.000	7.100	3.87	72	4.510	4.410
55837		60	60.75	4.62	3.085	12.8	13.3	11.6	250	229	1.000	1.000	7.100	3.83	73	4.510	4.410
55838		60	60.65	4.61	3.086	11.8	13.4		250	229	1.000	1.000	7.100	3.87	71	4.510	4.410
55839		60	60.75	4.62	3.085	12.2	13.2		250	229	1.000	1.000	7.100	3.86	71	4.510	4.410
55840		60	60.55	4.61	3.094	12.8	13.6		250	228	1.000	1.000	7.100	3.87	72	4.510	4.410
55841		60	60.65	4.62	3.093	12.2	13.5		250	228	1.000	1.000	7.100	3.87	72	4.510	4.410
55842		60	60.75	4.62	3.085	12.4	14.4		250	229	1.000	1.000	7.100	3.9	71	4.510	4.410
	AVERAGE					11.8	12.8	11.1									
	MAX					13.2	14.8	11.7									
	MIN					10.3	11.1	10.7									

ENDURANCE TEST 2MM INDUCTION BRAZED BERYLLIUM TILES, SCAN WITH 2.5 S, 1.5 S OFF MODULATION. 11TH & 15TH OF MARCH

		Offset:	2.7	0.35		PEAK POWER DENSITY											
		EXTRACTED				Water	Water	Inertial	ARC								
NUMBER	**NOTES**	**VOLTAGE [KV]**		**CUR-**	**PERV**				**CURRENT**		**MODULATION**		**ON TIME**		**BD's**	**Flow**	**Flow**
		set	**is**	**RENT**	**[10^-7]**	**MW/m²**	**MW/m²**	**MW/m²**	**set**	**is**	**on**	**off**	**set**	**is**		**m³/h**	**m³/h**
								Left	**Right**								D6W-DT
55843	modulation 2.5 on 1.5 off	60	60.75	4.61	3.079	11.0	12.4	11.0	250	229	2.500	1.500	6.600	4.93	37	4.520	4.420
55844		60	60.75	4.61	3.079	11.3	13.1		250	231	2.500	1.500	6.600	4.89	38	4.520	4.420
55845		60	60.75	4.59	3.065	11.6	12.8		250	228	2.500	1.500	6.600	4.94	37	4.520	4.420
55846		60	60.65	4.58	3.066	11.4	12.3		250	231	2.500	1.500	6.600	4.92	37	4.520	4.420
55847		60	60.75	4.57	3.052	11.3	12.0		250	229	2.500	1.500	6.600	4.94	37	4.520	4.420
55848		60	60.75	4.59	3.065	11.2	12.8		250	230	2.500	1.500	6.600	4.89	38	4.520	4.420
55849		60	60.75	4.59	3.065	11.4	12.2		250	229	2.500	1.500	6.600	4.95	37	4.520	4.420
55850		60	60.65	4.55	3.046	11.4	12.7		250	229	2.500	1.500	6.600	4.9	38	4.520	4.420
55851		60	60.75	4.58	3.059	11.5	13.0		250	229	2.500	1.500	6.600	4.94	36	4.520	4.420
55852		60	60.65	4.59	3.073	11.2	12.1		250	231	2.500	1.500	6.600	4.95	36	4.520	4.420
55853		60	60.65	4.57	3.060	11.6	12.0		250	229	2.500	1.500	6.600	4.96	37	4.520	4.420
55854		60	60.65	4.57	3.060	11.6	11.6		250	227	2.500	1.500	6.600	4.94	37	4.520	4.420
55855	trip	60	60.75	4.68	3.126	11.7	13.5		260	235	2.500	1.500	6.600	4.66	38	4.520	4.420
55856	trip up 130 140	60	60.65	4.67	3.127	12.2	13.2		260	234	2.500	1.500	6.600	4.96	37	4.520	4.420
55857		60	60.75	4.67	3.119	11.7	13.2		260	235	2.500	1.500	6.600	4.97	36	4.520	4.420
55858		60	60.65	4.67	3.127	11.9	13.7		260	235	2.500	1.500	6.600	4.97	37	4.520	4.420
55859		60	60.65	4.67	3.127	11.9	13.2		260	235	2.500	1.500	6.600	4.95	37	4.520	4.420
55860		60	60.75	4.67	3.119	11.6	13.3		260	235	2.500	1.500	6.600	4.93	37	4.520	4.420
55861		60	60.65	4.65	3.113	11.9	12.9		260	234	2.500	1.500	6.600	4.95	37	4.520	4.420
55862		60	60.75	4.67	3.119	11.9	13.1		260	235	2.500	1.500	6.600	4.95	36	4.520	4.420
	AVERAGE			4.4289		**11.6**	**12.8**										
	MAX					**12.2**	**13.7**										
	MIN					**11.0**	**11.6**										