

Figure 1: Maximum current I_{HTS} in the HTS coil in different pulses. 5 kA (840 A through the tape, which is 2.5 times higher than I_{crit} specification) has been achieved in the pulse #6050. I_{vessel} is the current in the vacuum vessel induced by the change of PF coils current.

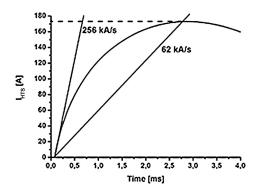


Figure 2: Current in the HTS coil. Current ramp-up speed 100 kA/s.

There had been concerns that the plasma pulses and pulsed magnetic fields might cause a quench in the HTS, i.e. a sudden and potentially damaging transition from superconductor to normal conductor. However, many pulses with and without plasma were fired and no quench occurred. Several experiments have been performed to measure the practical critical current in the coil and to optimise cooling for the best performance. No quench has been observed at DC currents up to 200 A (1.2 kA turns through the coil). In short pulses, when the coil was connected to a capacitor bank, current up to 0.84 kA through the tape (5 kA turns) has been achieved (Fig. 1) with no subsequent degradation of the HTS performance with a current ramp rate up to 0.1 MA/s (Fig. 2). The manufacturers specification for this tape was 330 A, so the current exceeded the specification value by 2.5 times with no visible degradation in performance.