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# What is required to safely fill LHC

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Machine protection consisting of passive and active systems will be used to prevent damage during the LHC injection process. Concerning beam 2, parts of the SPS extraction and transfer line beam interlock system has already been successfully tested during the TI 8 commissioning. Key elements of the final system for beam 2 will be validated during the LHC sector test with low intensity beam, together with parts of the passive protection system, the TDI and at least one transfer line collimator TCDI. The remaining issues after the sector test will be discussed in detail, where the entire injection protection system together with post mortem, management of critical settings, sequencer and software interlocking system must be tested with beam, for different intensities and filling patterns during the LHC beam commissioning. Requirements from other systems and interdependencies for test modes, such as inject & dump, are important input for the overall LHC commissioning strategy and will be discussed.

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