

CONCEPTUAL SPECIFICATION

BEAM DUMPING SYSTEM DILUTION KICKERS MKB, TDE DUMP BLOCK ENTRANCE WINDOW, TDE DUMP BLOCK GAS HANDLING SYSTEM

[LHC-MKB], [LHC-VDWB], [LHC-TDE]

Equipment/system description

The LHC beam dumping block TDE and its entrance window will need to withstand the high intensity HL-LHC beams. Simulations are foreseen to verify if the present system can withstand the repeated beam impact of these beams. Concerns are the temperature rise of TDE block which could lead to a venting of the overpressure of nitrogen within the TDE. Another concern is the entrance window of the TDE. As a possible solution it could be required to install additional dilution kicker magnets on the beam dump lines TD62 and TD68.

As the performance mentioned above can possibly be met by the existing system, any possible modifications are not part of the present baseline.

Layout Versions	LHC sectors concerned	CDD Drawings root names (drawing storage):
V1.1	LS6, TD62 and TD68	LHCMKB, LHCTDE, LHCVDWB

TRACEABILITY

Project Engineer in charge of the equipment
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WP Leader in charge of the equipment
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Main Points

- Concerns *studies* only, so far
 - To be finished by end 2015
- Determine if present beam ***dump block TDE with its N₂ overpressure system*** and ***window VDWB*** are compatible with HL-LHC intensities
- Possible changes required would be extending the dilution pattern = installing additional ***dilution kicker systems MKB*** (up to 50 %)
 - This could have major impact on resources and integration

Parameters assumed

Table 1: Equipment parameters

Characteristics	Units	Value
Maximum beam energy	GeV	7000
Maximum number of bunches		2808
Bunch separation	ns	25
Maximum bunch intensity	# protons	2.2e11
Minimum normalised horizontal and vertical emittance	μm	2.5
Beta-x, Beta-y at the TDE	m	> 5000, > 3700
Minimum time interval between two full energy dumps	hour	1