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CHECK LIST

Machine Preparation after long Stop for Accelerator/Experimental Area xxxx

ABSTRACT:

This document lists the different tests without beam to be carried out to ensure the correct functioning of the accelerator/experimental area xxxx after a long stop.

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1. Introduction

This document lists all the required tests to ensure the normal functioning of the accelerator/experimental area xxxx after a long stop. The tests are signed off during the testing and comments are given for future reference. Entry conditions in terms of controls or hardware readiness are noted as well. Guidelines how to use and fill in this document are given in the appendix.

In case of modifications of a given system during the long stop, the modifications and the impact of the modifications are listed as well in the relevant sections.

An extended period is foreseen for carrying out tests. This period is called "Machine Preparation". Many of the tests will therefore be done already before the machine check-out in the form of punctual dry runs. These tests will be executed out in collaboration with the equipment experts. An overview of the different phases before the start-up with beam is shown in Fig. 1.

The tests are coordinated and carried out by the Operations crew of the particular machine.

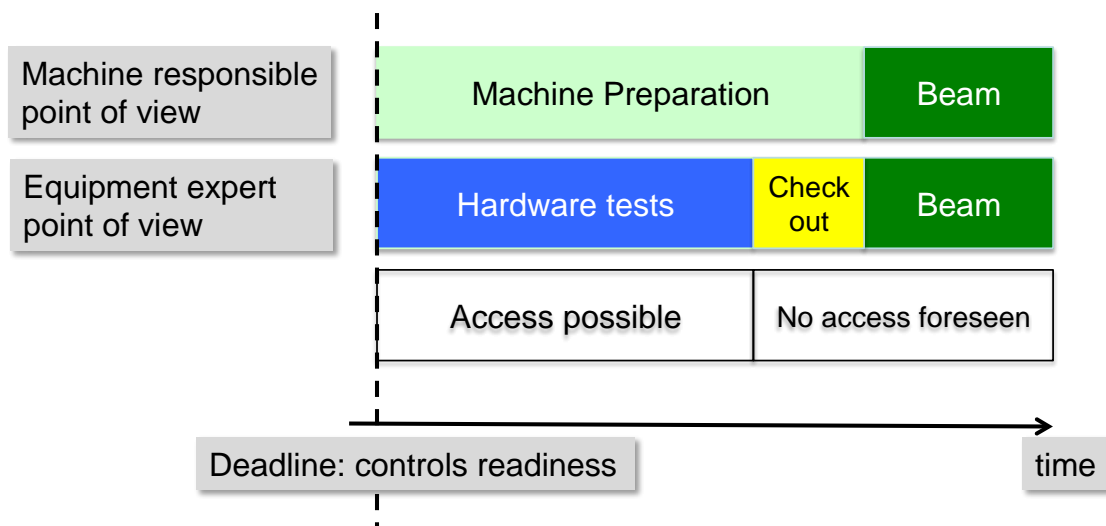


Figure 1: Overview of the phases before the machine's start-up with beam. The machine schedule typically shows the equipment expert's point of view with the "hardware test" and "check-out" period. The "Machine Preparation" period in which all systems are tested in the operational environment with control room applications and appropriate settings, covers both the hardware tests period and the machine check-out.

The Machine Preparation responsible organizes coordination meetings. These meetings will start before the machine preparation period. In these meetings the following items are discussed:

- Equipment, controls and infrastructure readiness as input to test schedule
- Detailed test schedule
- Progress tracking
- Follow-up of issues



In case of major modifications of certain systems, a staged deployment is recommended. In this case the first tests will be scheduled even before the hardware tests.

It should be noted that the paragraph numbering does not indicate the temporal sequence of the test execution. This will have to be defined on a machine-specific basis.

2. Prerequisites for Machine Preparation Period

The following systems are required to be fully operational from the first test. If further modifications of these systems are required while Machine Preparation is already on-going, they have to be communicated to OP.

The systems involve:

- Cooling, ventilation, electrical services
- CCM operational
- CCC consoles operational
- Timing system operational with complete functionality
- CMW, FESA, FGC ready: equipment classes
- All INCA services operational: generation, equipstate, trim (copy, acquire)

To be finished machine specifically.

3. Parameters, Optics, Settings

Entry conditions:

- Generation application working
- Optics upload application
- List of element changes in the sequence
- MAD-x sequence ready for JMad (where applicable); new knobs calculated
- Knob upload application (where applicable)

What	date	who	comments
Prepare optics, check element names, new elements; upload optics for run			
Generate the beam commissioning cycle; check generation rules for equipment updated (circuits, timing,			



RF,...)			

To be finished machine specifically.

4. Timing System

Entry conditions:

- Sequence Manager: machines uncoupled, coupled
- Working sets operational
- GMT logging viewer operational
- TGM video operational

What	date	who	comments
Generate timing as part of a cycle			
load cycle in sequence manager; check production of timing events in GMT logger			
Spare cycle			

Examples: LHC mastership (SPS), HiRadMat destination (SPS), COAST (SPS),...

To be finished machine specifically. List of timing signals with verified settings to be provided in the appendix.

5. Main Circuits

Entry conditions:

What	date	who	comments
Ripple, Regulation (auto-trim)			
I_min QF, QD, MB compared to optics requirements (ions, protons)			

Examples: Interlock propagation time test (SPS), Logging through cycle: MB, QF and QD, synchronized start via timing (SPS), FGC state interlock,...



To be finished machine specifically.

6. Auxiliary Circuits

Entry conditions:

What	date	who	comments
Polarity checks following EMDS file xxx			
Power converter ability to follow function			
Power converter works in ppm mode			

Examples: TT10 timing wrt to cycle start (SPS),...

7. RF, Transverse Feedback

Entry Conditions:

What	date	who	comments
Cavities follow programmed functions			
Transverse feedback: all required settings in cycle in DB to: drivable, generate-able, trimmable,...			

Examples: BQM communication with application and interlock system (SPS), Tomoscope and BSM systems working (PSB), ..

8. Dumps, Collimators, Scrapers, Beam Stoppers

Entry Conditions:



What	date	who	comments
Check movement of moveable devices in allowed ranges, reference system			
Check interlocks on switch positions			

9. Kickers, Septa

Entry conditions:

- Conditioning finished of kickers, septa

What	date	who	comments
Girder controls+references			
Kickers control applications and reference settings			

Examples: MKP vacuum software interlock (SPS), MKP timing events + application (SPS), Injection permit from MKD (SPS), BETS MKDs (SPS), BETS MKEs (SPS), Interlocks MDKDs BA1 (SPS), application MKE, application MKD (early dump, flat bottom dump, ...) (SPS), TSU (SPS), Logging all kickers, Girder

10. Vacuum

Entry conditions:

What	date	who	comments
Hardware Interlocks (test every single valve)			
Application, control			
Logging			

11. BI systems

Entry conditions:

What	date	who	comments
BLMs: hardware			



interlocks			
BLMs: connection test			
BLMs: application			

To be finished machine specifically.

List of Mini-scan, BTVE, SEMS reference positions to be attached in the appendix.

Examples: BSRT (SPS), LHC BPM (SPS), BSIs, Mini-scans, special BI interlocks: TIDVG interlock, SEMs reference, mini scan reference positions, BTVE reference position, MOPOS applications for calibration and scope for gate delay

12. Interlocks

Entry conditions:

12.1 Hardware Interlocks

What	date	who	comments
Masking, re-initialize BIC, etc.			

12.1.1 Ring Interlocks + Injection + Extraction

What	date	who	comments

12.1.2 Transfer Lines

What	date	who	comments

12.2 Software Interlocks

Need a table of all interlocks in the appendix.



What	date	who	comments

12.2.1 Ring Interlocks + Injection + Extraction

What	date	who	comments

12.2.2 Transfer Lines

What	date	who	comments

13. Logging and Statistics

Entry conditions:

What	date	who	comments
Restart yearly running sums			
Check each logging variable gets sensible data			

14. Analogue Signals (OASIS)

OASIS signal list to be checked should be provided in the appendix.

15. Applications

To be finished machine specifically.



15.1 YASP

Entry conditions:

What	date	who	comments
Check optics			
Check calibrations			

Examples: Multi-Q (SPS), Tomoscope (PS, PSB)

16. Interfaces with other Machines, Facilities

What	date	who	comments

17. Sequence of tests

In this final chapter a nominal rough sequence of testing is proposed.

APPENDICES

A.1 GUIDELINES FOR CHECKLIST PREPARATION

- Fill the tables with the concrete tests, which test a required functionality. E.g. verify vacuum valve interlocks when in beam
- Prepare required entry conditions for the listed tests
- Delete the examples at the end of each section
- Already existing documents for polarity checks, analogue signal checks etc can be either copied into the Appendix or be published and referred to in the document with a given EDMS number.
- Use the Appendix for lists of reference positions, conventions, etc.



- Final step: define a rough order of the tests in the section "Sequence of tests" or order sections accordingly