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| Gamma Blockers Verification Plan |
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|  | Name | Role/Title |
| --- | --- | --- |
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**SUMMARY**

The verification test documents provide, what tests will be going to perform to make sure that the devices are up to specs. Test plan for the factory acceptance and site acceptance to verify that the requirements are met.

# Scope

The following inspections, will be carried out.

**1)Manufacturing:**

1. Inspection of delivered and manufactured components (documentation/geometry)
2. Functional tests of subsystems on a test bench (linear module with stepper motor in simulated GB configuration and variable loads)
3. Vacuum tests of components
4. Geometry measurement (air/under vacuum)
5. Vacuum test of assembled
6. Geometry measurement
7. Adjustment devices test
8. Functional tests

System Acceptance Review SAR

**2)Factory acceptance test FAT**

1. Visual inspection
2. Components documentation
3. Vacuum tests
4. Validation of adjustment devices
5. GB Functional test (power on and power failure, in air/vacuum)

**3)Site acceptance tests SAT**

1. Visual inspection
2. Components documentation
3. Vacuum tests
4. Validation of adjustment devices
5. GB Functional test (power on and power failure, in air/vacuum)

# Preparation

## Test Equipment

|  |  |
| --- | --- |
| **Equipment reference** | **Purpose** |
| Multimeter | electrical properties, limit switches |
| Helium leak detector with vacuum pump station | vacuum properties |
| 3D portable coordinate measuring machine (CMM) | geometry |
| Stepper motor driver | motor testing |
| Additional limit switches | delay time |
| chronograph | time/movement properties |

# Acceptance Data

## GB in A2T section

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Requirement** | Comments | Result |
| Geometry (air/vacuum) |   |   |   |
| Outline dimensions |   x | OK/NOT OK |   |
| GB core diameter |   | OK/NOT OK |   |
| Core thickness |  | OK/NOT OK |  |
| Beamline flanges relative position, coaxial and parallel tolerance |  | OK/NOT OK |  |
| Flange dimensions | DN160 Quick CF |  OK/NOT OK |   |
| **position adjustment range** |   |   |   |
| **Motion range** |   |   |   |
| Open position |   |  OK/NOT OK |   |
| Close position |   |  OK/NOT OK |   |
| Between limit switches |   |  OK/NOT OK |   |
| Between mechanical limits |   |  OK/NOT OK |   |
| **Functional**  |   |   |   |
| Functional in Air |   |  OK/NOT OK |   |
| Functional in vacuum |   |  OK/NOT OK |   |
| limit switches signal |   |  OK/NOT OK |   |
| **Total closing time vacuum/air, engine/without engine** | Test by additional limit switch |   |   |
| Vacuum with working motor | Min 1.5s delay, max 30s overall | OK/NOT OK |  |
| Vacuum without motor | 1.5s delay | OK/NOT OK |  |
| Air with motor | Max 30s | OK/NOT OK |  |
| Air without motor |   |  OK/NOT OK |   |
| **vacuum test** |  Leak rate | According to ESS-0127783 |   |

## GB in Beam Dump section

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Requirement** | Comments | Result |
| Geometry (air/vacuum) |   |   |   |
| Outline dimensions |   x | OK/NOT OK |   |
| GB core diameter |   | OK/NOT OK |   |
| Core thickness |  | OK/NOT OK |  |
| Beamline flanges relative position, coaxial and parallel tolerance |  | OK/NOT OK |  |
| Flange dimensions | DN250 Quick CF |  OK/NOT OK |   |
| **position adjustment range** |   |   |   |
| **Motion range** |   |   |   |
| Open position |   |  OK/NOT OK |   |
| Close position |   |  OK/NOT OK |   |
| Between limit switches |   |  OK/NOT OK |   |
| Between mechanical limits |   |  OK/NOT OK |   |
| **Functional**  |   |   |   |
| Functional in Air |   |  OK/NOT OK |   |
| Functional in vacuum |   |  OK/NOT OK |   |
| limit switches signal |   |  OK/NOT OK |   |
| **Total closing time vacuum/air, engine/without engine** |   |   |   |
| Vacuum with working motor | Min 1.5s delay, max 30s overall | OK/NOT OK |  |
| Vacuum without motor | 1.5s delay | OK/NOT OK |  |
| Air with motor | Max 30s | OK/NOT OK |  |
| Air without motor |   |  OK/NOT OK |   |
| **vacuum test** |  Leak rate | According to ESS-0127783 |   |

# Glossary

| Term | Definition |
| --- | --- |
| CHESS | Collaboration Home at ESS, document management system |
| ESS ERIC | European Spallation Source, a European Research Infrastructure Consortium |
| GB | Gamma Blocker |
| IKC | In-Kind Contribution |
| ISO | International Standard Organization |
| NCBJ | National Centre for Nuclear Research, Poland |

Document Revision history

| Revision | Reason for and description of change | Author | Date |
| --- | --- | --- | --- |
| 1 | First issue | Karol Szymczyk | 2017-07-20 |
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