Hall C Target Configuration June 2022



Engineering Report

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| Document Title: Hall C Target Configuration June 2022 |
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Description: Configuration report for the Hall C Target ladder installed for the June 2022 run period. This document gives BDS positions, target thicknesses, cell thicknesses and overall assembly data. The target configuration can be found in JLAB Drawing TGT-3011-1001-0201 which can be found in the JLAB document repository. This report is equivalent to TGT-RPT-22-003 with the exception of the solid targets installed.

#  Revision History

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| --- | --- | --- |
| Revision: 0 | 6/6/2022 | Original |

# Purpose and Scope

This report documents the configuration for the Hall C Target as installed for June 2022 to August 2022 run period. Target thicknesses and uncertainties are included.

# Target list and lifter positions

The following lifter positions were determined by alignment of the system.

|  |  |  |
| --- | --- | --- |
| Target name | Lifter position  | Target Material |
| Loop 1 10 cm | 31,444,060.00 | 10 cm Loop 1 |
| Loop 2 10 cm | 23,813,468.00 | 10 cm Loop 2 |
| Loop 3 10 cm | 16,163,420.00 | 10 cm Loop 3 |
| 10 cm dummy | 11,399,761.76 | Aluminum 7075 |
| Optics #1 +/-8 cm | 10,099,281.76 | Carbon |
| Optics #2 +/-3 cm | 9,384,017.76 | Carbon |
| BeO | 8,095,313.76 | BeO |
| Carbon Hole | 7,380,049.76 | Carbon |
| Carbon 0.5% | 6,664,785.76 | Carbon |
| Empty | 5,949,521.76 | N/A |
| Empty | 5,234,257.76 | N/A |
| Empty | 4,518,993.76 | N/A |
| Empty | 3,803,729.76 | N/A |
| Empty | 3,088,465.76 | N/A |
| Empty | 2,373,201.76 | N/A |
| Empty | 1,657,937.76 | N/A |
| Home | 0 | N/A |

# Target Thicknesses

## Cells

Hydrogen loops entrance and exit window thicknesses are given below. Loop 1 is in standby with helium gas. Loop 2 is connected to the H2 panel and Loop 3 is connected to the D2 panel.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Target | Entrance (mm) | Exit (mm) | Length (mm) | Material |
| Loop 1 (10 cm)  | 0.130 ± 0.012 | 0.188 ± 0.013 Tip0.184 ± 0.017 wall | 100 ± 0.26 | AL 7075 |
| Loop 2 (10 cm)  | 0.150 ± 0.011 | 0.191± 0.019 Tip0.219 ± 0.018 wall | 100 ± 0.26 | AL 7075 |
| Loop 3 (10 cm)  | 0.116 ± 0.0086 | 0.184 ± 0.021 Tip0.14 ± 0.023 wall | 100 ± 0.26 | AL 7075 |

Entrance windows are fabricated from Al7075 (lot 377271B2)

[CMTR HT 377271B2 | Jefferson Lab Electronic Logbook (jlab.org)](https://logbooks.jlab.org/entry/3858694)

Exit windows are fabricated from Al7075 (lot # 308151)

[Material Certification (lot # 308151)for AL7075 to be used for Hall C 10 cm exit windows | Jefferson Lab Electronic Logbook (jlab.org)](https://logbooks.jlab.org/entry/3479210)

## Dummy Targets

The dummy targets are aluminum foils mounted on separate frames with foils located at Z positions corresponding to the cryotarget exit and entrance windows.

[Certs for dummy target foils 0.05" and 0.032" thick | Jefferson Lab Electronic Logbook (jlab.org)](https://logbooks.jlab.org/entry/3868416)

|  |  |  |
| --- | --- | --- |
| Target  | Thickness Total (g/cm2) | Material |
| 10 cm Dummy Upstream | 0.1703 ± 0.0002 | Al 7075 |
| 10 cm Dummy Downstream | 0.1677 ± 0.0002 | Al 7075 |

## Optics Target

The optics target has two positions with carbon (99.95% C) foils in a linear array with foils located nominally at:

1. Two foils located at Z = ± 8 cm
2. Two foils located at Z = ± 3 cm

The nominal thickness of each carbon foil is: 0.044 ± 0.001 g/cm2.

## Solid Targets

Solid targets are located on the solid target ladder nominally at Z = 0.

|  |  |  |
| --- | --- | --- |
| Target name | Thickness (g/cm2)  | Target Material |
| BeO | N/A | N/A |
| Carbon Hole | 0.171 ± 0.001 | Carbon 99.95% |
| Carbon 0.5% | 0.1749 ± 0.00035 | Carbon 99.95% |

Batch/lot numbers correspond to assays for each material filed in Target elog.