

# Hall C Target Configuration August 5, 2021



## Engineering Report

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Document Title: Hall C Target Configuration for August 5, 2021 to February 8, 2022	
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Description: Configuration report for the Hall C Target ladder installed for the Fall 2021 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.

# 1 Revision History

Revision: 0	3/3/2022	Original
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## 2 Purpose and Scope

This report documents the configuration for the Hall C Target as installed for Fall 2021 to Feb 8, 2022, run period. Target thicknesses and uncertainties are included.

### 3 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
Titanium 48	5,949,521.76	Ti
Nickel 64	5,234,257.76	Ni
Nickel 58	4,518,993.76	Ni
Iron 54	3,803,729.76	Iron
Silver	3,088,465.76	Ag
Gold	2,373,201.76	Au
Tin	1,657,937.76	Sn
Home	0	N/A

## 4 Target Thicknesses

### 4.1 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)	$0.130 \pm 0.012$	$0.188 \pm 0.013$ Tip $0.184 \pm 0.017$ wall	$100 \pm 0.26$	AL 7075
Loop 2 (10 cm)	$0.150 \pm 0.011$	$0.191 \pm 0.019$ Tip $0.219 \pm 0.018$ wall	$100 \pm 0.26$	AL 7075
Loop 3 (10 cm)	$0.116 \pm 0.0086$	$0.184 \pm 0.021$ Tip $0.14 \pm 0.023$ wall	$100 \pm 0.26$	AL 7075

Entrance windows are fabricated from Al7075 (lot 377271B2)

[CMTR HT 377271B2 | Jefferson Lab Electronic Logbook \(jlab.org\)](#)

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 \(jlab.org\)](#)

### 4.2 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 \(jlab.org\)](#)

Target	Thickness Total (g/cm <sup>2</sup> )	Material
10 cm Dummy Upstream	$0.1703 \pm 0.0002$	Al 7075
10 cm Dummy Downstream	$0.1677 \pm 0.0002$	Al 7075

### 4.3 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  $Z = \pm 8$  cm
2. Two foils located at  $Z = \pm 3$  cm

The nominal thickness of each carbon foil is:  $0.044 \pm 0.001 \text{ g/cm}^2$ .

#### 4.4 Solid Targets

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

Target name	Thickness (g/cm <sup>2</sup> )	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%
Titanium 48	0.3101 ± 0.0.0005	Batch# 103080
Nickel 64	0.2607 ± 0.0005	Lot# I-26094
Nickel 58	0.2408 ± 0.0.0004	Batch# 121441A
Iron 54	0.2052 ± 0.0.006	Batch# 166643
Silver	0.2565 ± 0.0003	Ag 99.95%
Gold	0.4047 ± 0.0006	Au 99.9%
Tin	0.5462 ± 0.0006	Sn 99.75%

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