

Hall A Target Configuration

September 2010, DVCS

Revision History

1. September 20, 2010: Original document.

Overview

This document describes the Hall A target configuration for the run period beginning in September 2010. The following tables list the available targets and their BDS (lifter) positions for each running period. The hydrogen and deuterium loop positions are both allowed by the lifter and are loop 1 and 2 respectively. Loop 3 could not be installed because of an interference with the loop plumbing and the scattering chamber.

Target	Material/Description	BDS Encoder	Corrected Encoder
Loop1 15 cm	LH2	34541410	N/A
Loop1 4 cm	LH2	30966626	
Loop2 4 cm	LD2	27382626	
Loop2 15 cm	LD2	23808866	
Optics	Carbon	13881186	
Dummy 15 cm	Aluminum	12549986	
Solid BeO	BeO	9887586	
Solid C hole	Carbon Hole	8581986	
Solid Carbon	Carbon	7118946	
Solid Ta	Ta	5655906	

Standard Solid Target Ladder

The standard solid target ladder is installed. The following table lists the solid targets and their thicknesses. Errors reported are systematic and assume that the foil is of uniform thickness and density (that there are no voids in the material). The standard solid target ladder is shown in JLAB drawing TGT-101-5000-3001.

Target Name	Material	Purity	Thickness (g/cm ²)
Carbon Hole	Carbon	99.95%	0.08388 ± 0.00012
Tantalum	Ta	99.9%	0.021487±0.000078
Carbon	C	99.85%	0.1749±0.0005
BeO	BeO	99.0%	0.149 ± 0.001

Optics target thicknesses

The optics target consists of 13 carbon foils cut from the same sheet. The foils are 99.5% chemically pure carbon. Each foil is $0.0248 \pm 0.001 \text{ g/cm}^2$. Upstream face of each foil is located at 0 cm, $\pm 2.5 \text{ cm}$, $\pm 5 \text{ cm}$, $\pm 7.5 \text{ cm}$, $\pm 10 \text{ cm}$, $\pm 12.5 \text{ cm}$, and $\pm 15 \text{ cm}$. The optics target assembly is shown in JLAB Drawing TGT-101-5001-3012.

Dummy Target

The dummy target has foils placed such that the front faces of the foils are $\pm 7.5 \text{ cm}$ from the nominal center line. The target foils and assembly are shown in JLAB drawing TGT-101-5000-3003. The thicknesses of these foils are shown below. The target foils are made from AL 7075 T-6 plate (this is the same as the cell).

Target	Position	Thickness (g/cm^2)
15 cm dummy	Upstream -7.5 cm	0.359 ± 0.0003
	Downstream + 7.5 cm	0.367 ± 0.0003

Measurements do not take into account any void in the material. The measurement assumes that the material free of voids and is of uniform thickness. The thickness uniformity was measured on both foils and found to be within 0.05 cm.

4 and 15 cm Cells

The target cells are installed at the top of the stack. The cell thicknesses are measured with a MagnaMike Hall Effect gauge. The thickness data for Loops 1 and 2 are given in the first table below. An average of many shots is taken for each position. The first error reported is the standard deviation of this average and the second is a systematic error from the calibration of the instrument.

Target Position	Entrance window thickness (mm)	Exit window thickness (mm)	Wall thickness (mm)
Loop 1 top 15 cm	No Data	0.207 ± 0.055	No data
Loop 1 bottom 4 cm	0.145 ± 0.004	0.149 ± 0.008	0.141 ± 0.014
Loop 2 top 4 cm	0.110 ± 0.004	0.147 ± 0.008	0.142 ± 0.021
Loop 2 bottom 15 cm	0.128 ± 0.002	0.194 ± 0.009	No data

Loop 1 and 2 Cell thicknesses. First error is standard deviation of average second is systematic from calibration data

Pictures

Pictures are included in the DocuShare folder containing this document.