

DESCRIPTION

An aluminum wedge designed to utilize the *Part# B3150, GEX Wedge Array Card* for the measurement of electron beam depth-dose profile and energy estimation for surface energies ranging from approximately 1.70 to 4.10 MeV.

SPECIFICATIONS

Product Dimensions	Product Weight	Packaged Dimensions	Packaged Weight
18cm (L) x 14cm (W) x 2cm (H) ± 0.1mm	3.0 lbs. / 1.36 kg	24cm (L) x 20cm (W) x 11cm (H) ± 0.25 mm	4.8 lbs. / 2.13 kg
Material:	Aluminum Alloy 6061 T631		
Color:	Silver		
Printing:	Engraved serial number denoting A (top) and B (bottom) halves of the wedge.		
Bolts:	3mm hex-head		
Slope Angle:	4.0° ± 0.1°		
Usable Energy Range:	1.7 MeV to 4.1 MeV approximate		
Precision (MeV):	± 2.0 % or better		
Accuracy (MeV):	± 2.0 % or better [^]		

[^]By comparison with polystyrene stack – both methods using equations from Annex A4 of ISO/ASTM 51649:2015.

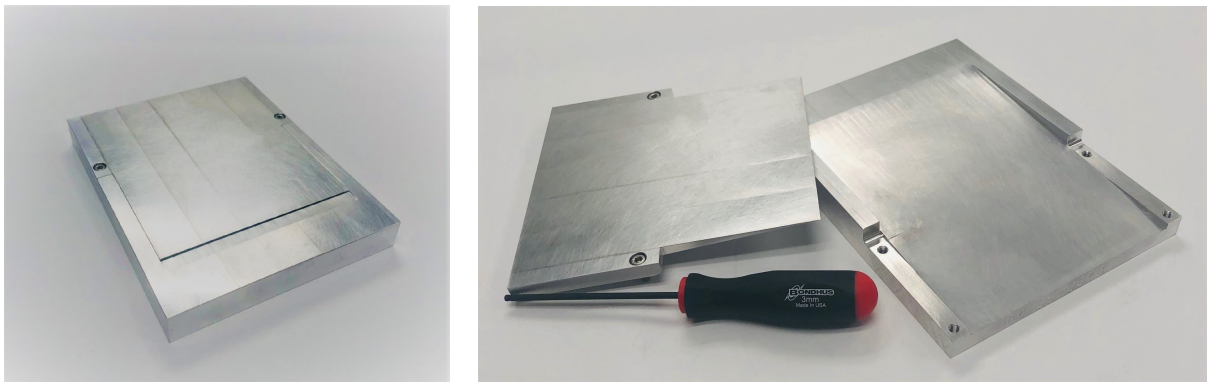
Included Components: 2.5mm hex-head driver tool.

Certification: GEX certificate included with each unit to specify material and dimensions.

Packaging: Unit is packaged in a Pelican brand, latching plastic case with foam protection.

Storage: Store inside of provided packaging or equivalent.

PRODUCT PHOTOS



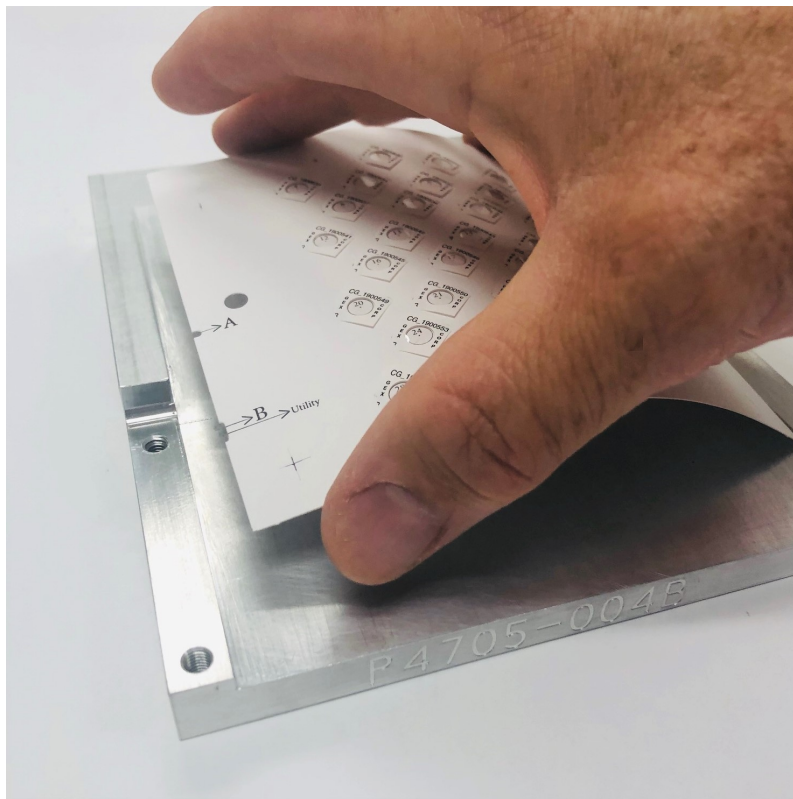
USAGE

Preparing the Wedge for an Ebeam Energy Test Using the GEX Part# B3150 Wedge Card

1. Place the wedge on a flat surface and loosen the screws to remove half A (the “A” serial number) from B (the “B” serial number).

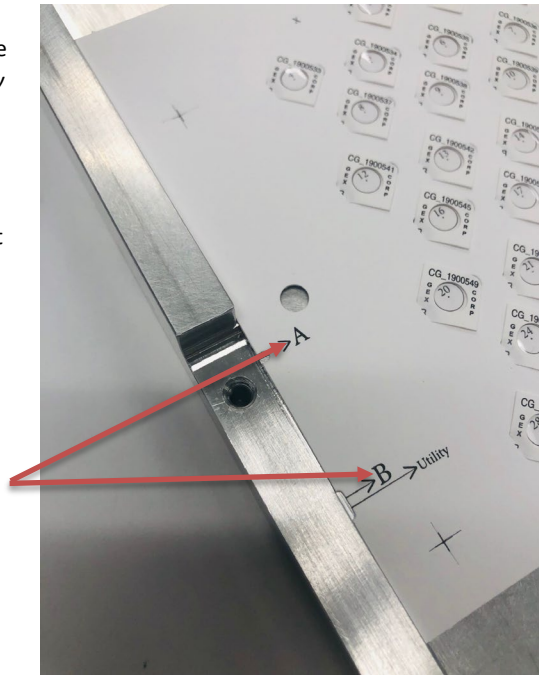


2. Open a package of the B3150 wedge card in a UV protected area or cover the dosimeters while preparing the wedge to protect from UV exposure.
3. Refer to GEX Doc# 100-143, B3150 Wedge Array Card – Product Specifications and Usage (PSU) for specifications of the card and handling instructions.
4. Determine which Card Position Mark (A or B) to use for the energy of the beam that you will be measuring.
 - 4.1. For energies at the wedge surface of 3.5 MeV or greater, it is suggested to use the A position alignment of the card in the wedge.
 - 4.2. For energies at the wedge surface less than 3.5 MeV, it is suggested to use the B position alignment of the card.
 - 4.3. Some users may need to experiment with the position to determine which is best for their use.
 - 4.4. NOTE: The Utility position is not needed or used.
5. Insert the card onto the bottom half of the wedge. The card is designed to be held in place by the precise tension of the paper when the edges are in the aluminum channel.

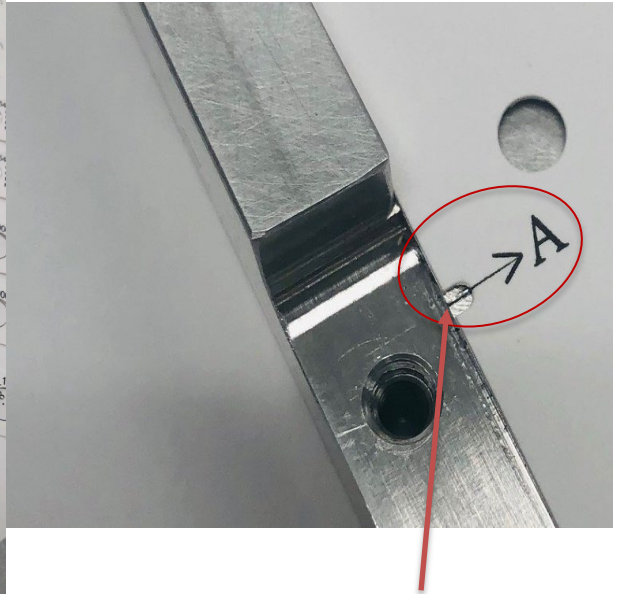


6. Adjust the B3150 wedge array card along the slope of the wedge until the Card Position Mark is aligned with the desired Depth Mark (A or B) on the left side of the aluminum channel.

- 6.1. The Card Position Mark printed on the B3150 Wedge Array Card and the Depth Mark scribed in the aluminum on the P4705 Wedge are the same exact font size for precise alignment.

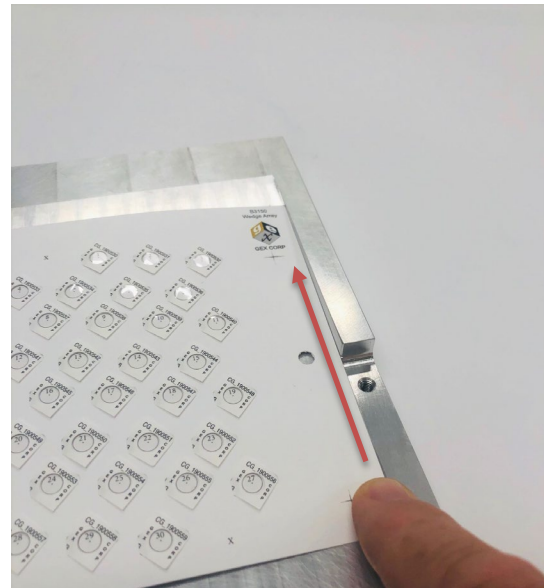
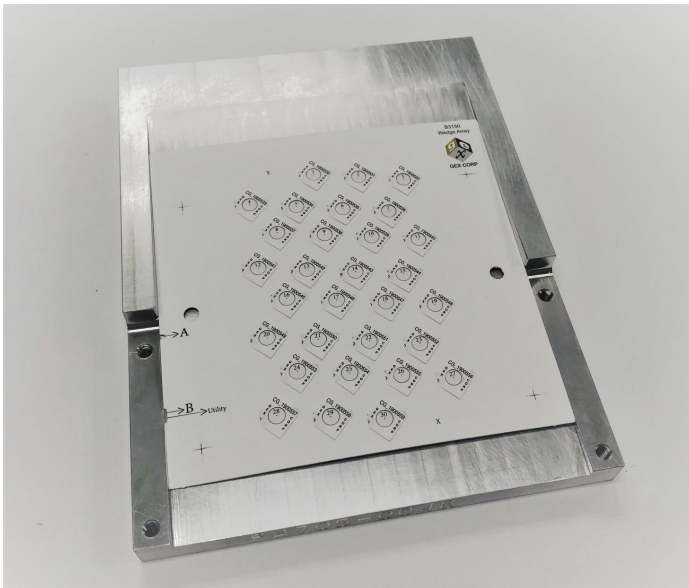


Card Position Marks on the B3150 Energy Wedge Array Card

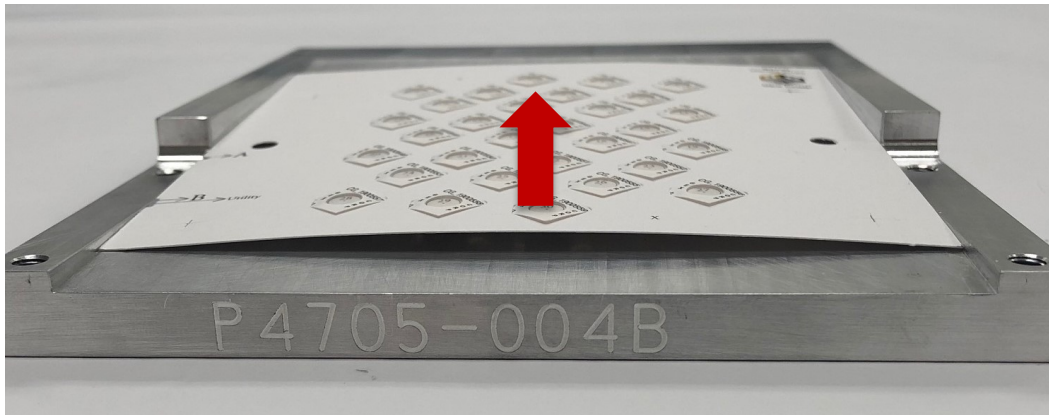


Depth Mark scribed into the aluminum

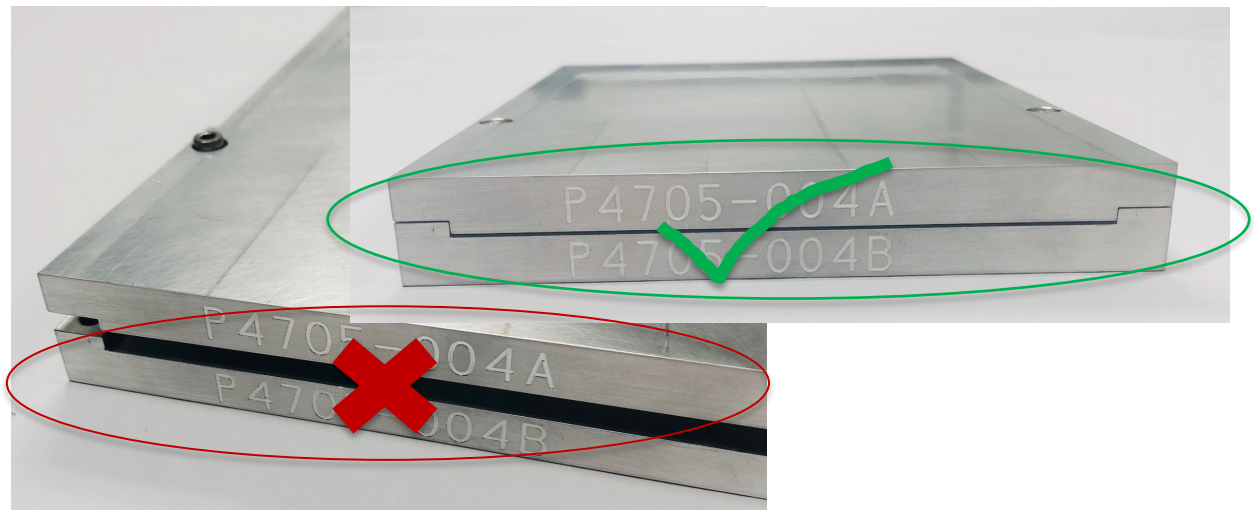
7. Once the alignment is complete, press down with your finger on the bottom left edge and run your finger along the edge of the card up the slope. This is to ensure the card is in the aluminum channel.
 8. Repeat step 7 along the opposite edge, as shown in the image below.
- NOTE:** Alternatively, the user may choose to use a strip of dosimeter film such as B3 or CTA oriented lengthwise down the slope of the wedge.
9. Verify that the card is in the channel and the alignment marks are maintained in alignment.



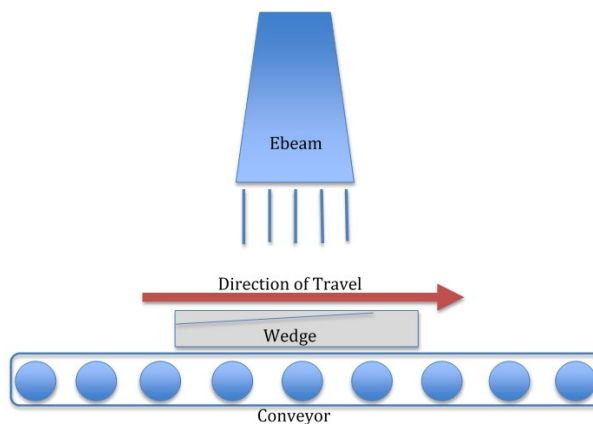
- 9.1. The card should bow upward when the edges are in the channel as shown in the image below.



10. Using care not to move the card, place the top half of the wedge on top of the bottom half and tighten the screws.
 - 10.1. The tension is enough to hold it in place unless it is physically bumped and moved.
 - 10.2. One tightened, there should be very little gap between the two halves all the way around the wedge. Verify the gap is acceptable.



11. Irradiation of the Wedge:
 - 11.1. The A half always faces perpendicular to the beam.
 - 11.2. The wedge should traverse the beam area parallel to the length of the wedge. See diagram below.
 - 11.3. Target a surface dose of 15 kGy to the wedge and perform the irradiation.



12. Measurement of the Dosimeters:

- 12.1. Measure the dosimeters in sequence from top to bottom of the wedge. The positions are numbered, and the dosimeters are in sequence by serial number from lowest to highest to assist the user in performing this step.

13. Analysis of Wedge Data

- 13.1. Plot the depth-dose profile using depth (cm of aluminum) on the x-axis and dose (kGy) on the y-axis of a graph.
- 13.1.1. When using the B3150 wedge card with this wedge the corresponding depth data for each position on the card is provided on the certificate, *GEX Doc# QF-82-10, Certificate of P4705 Wedge Depths for B3150 Energy Wedge Array Card* issued for the specific serial number of the wedge being used.

Preparing the Wedge for an Ebeam Energy Test Using a Film Strip

Conceptually steps 11 – 13 will be the same no matter the dosimeter used, however, GEX currently offers no guidance on the use of CTA or B3 film strips with the wedge but either can likely be used. Refer to Annex A3 of *ISO/ASTM 51649:2015(E) Standard Practice for Dosimetry in an Electron Beam Facility for Radiation Processing at Energies Between 300 keV and 25 MeV* for details on depth-dose measurement and estimation of electron energy from the results.

PRECAUTIONS

- Do not drop the wedge or it may become permanently damaged. It is not warranted against physical damage from careless handling or accidents.
- Heating during irradiation may cause the wedge to become hot – handle with care.
- Never forcefully tighten the screws; the purpose is simply to hold the halves together to ensure the irradiation geometry and prevent movement of the B3150 Energy Wedge Array Card during irradiation.

REFERENCES

- 1) ISO/ASTM 51649 - Practice for Dosimetry in an Electron Beam Facility for Radiation Processing at Energies Between 300 keV and 25 MeV.

RELATED DOCUMENTS

- GEX Doc# 100-143, B3150 Energy Wedge Array Card – Product Specification and Usage (PSU)
- GEX Doc# QF-82-10, Certificate of P4705 Depths for B3150 Energy Wedge Array Card Dosimeters

REVISION HISTORY

DATE	CHANGE DESCRIPTION	REVISION
08/17/2020	Initial release.	A