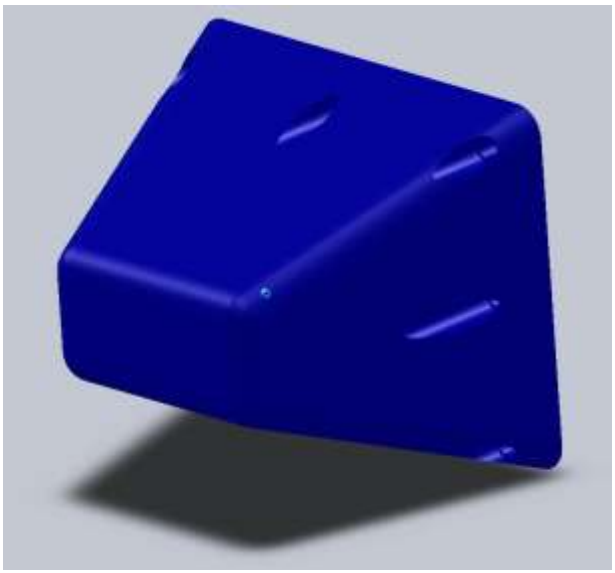


In 2011, the Formula SAE Rules Committee has tested a Type 11 impact attenuator specimen built from Dow Impaxx® 700 energy absorbing foam. Our test results indicated that the specimen satisfied the requirements of B3.21.1. Properly fabricated and mounted impact attenuators made from Dow Impaxx® 700 and which meet the Type 11 dimensions will be accepted as complying with Rule B3.21.11 and as such are exempt from physical testing.

Teams building a Type 11 impact attenuator must support their use of Dow Impaxx® 700 by bringing a receipt for the material to technical inspection. The technical inspectors may choose to verify the dimensions and the material and have the authority to conduct any measurements, inspections or tests they feel are necessary. However, teams have the burden of proof to show their foam is the required material. Examples of good documentation include a receipt from that competition year, a packing slip or letter of donation.

There is no required supplier of the Dow Impaxx® 700 foam

****In 2015 there is one clarification added. If the attenuator is made of more than one piece of foam those pieces must be glued together using a structural adhesive that is compatible with the Impax foam. Segments may not be stacked without glue.**

- Examples of Impact Attenuator Testing Set Up

Related Downloads:

- Impact Attenuator Drawing
- Solid Model - Parasolid (no change from Type 11)
- Solid Model - Step (no change from Type 11)

Frequently Asked Questions:

Question 1: Is the mounting scheme shown on the part drawing the only allowable configuration?

Answer: The team should determine the best method of attaching the standard design to their vehicle. The mounting shown on the part print is a suggested method that could be used. Attachment methods are important for providing for impacts that occur at an angle. Since the required testing is done with the attenuator crushing

parallel to the vehicle axis mounting is really evaluated. Teams should use good engineering practice and calculations to determine the best mounting method for their vehicle.

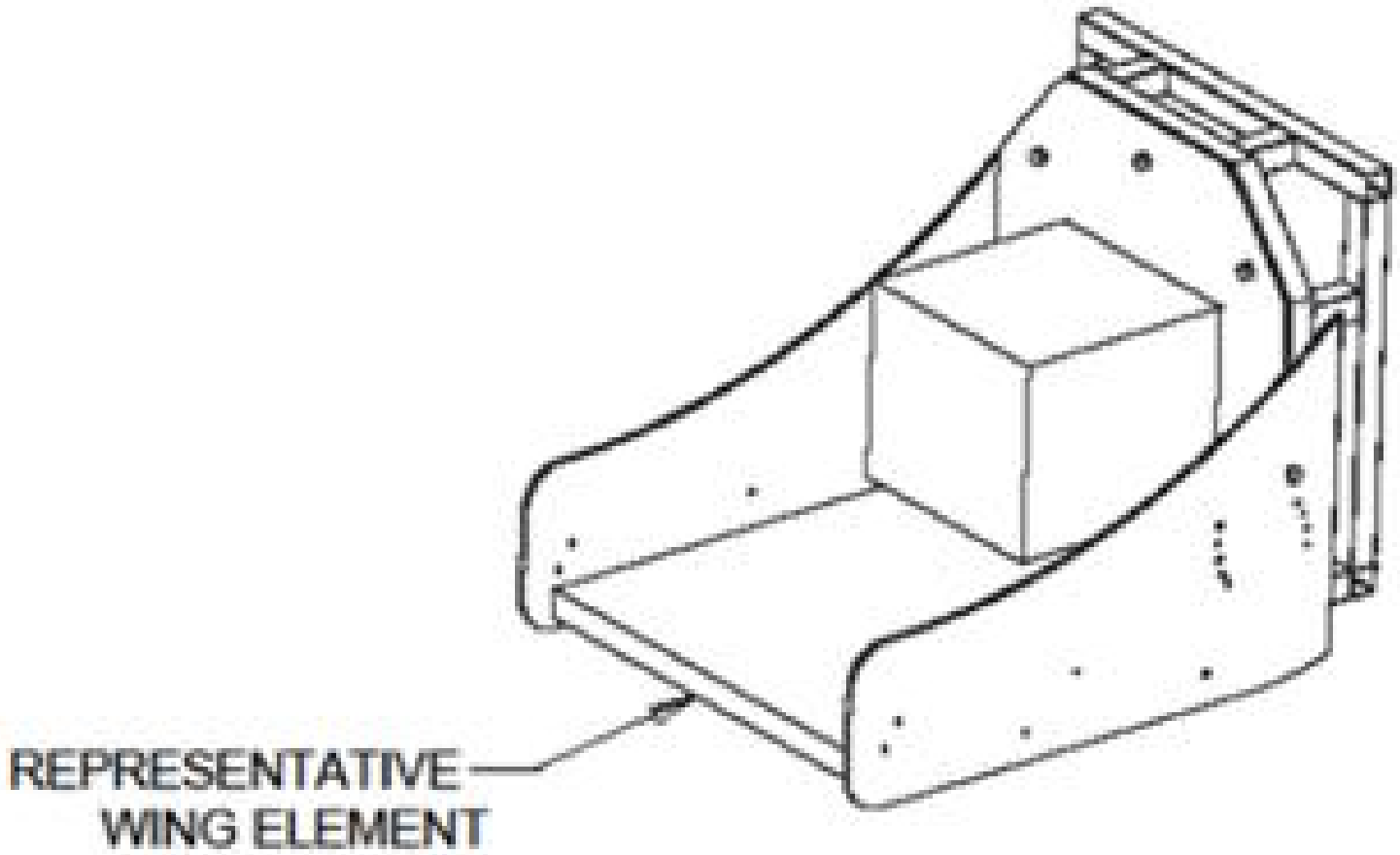
Question 2: Rule T3.20.1 requires the attenuator to be mounted to the anti-intrusion plate and sets a maximum deflection for the plate. How should this be handled with the standard design?

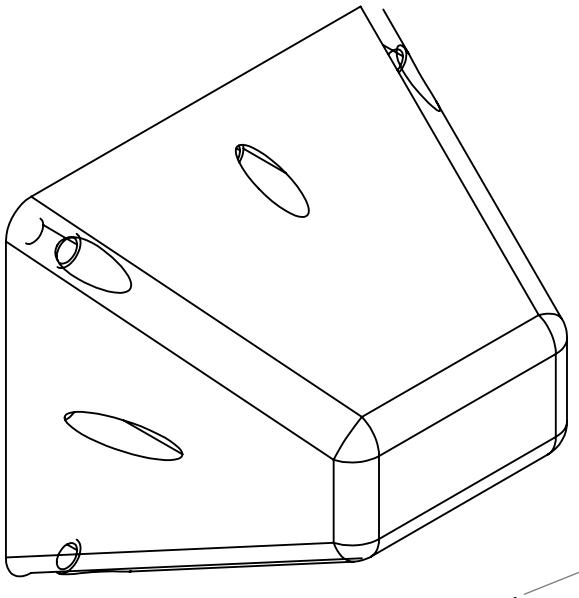
Answer: To address this, teams should determine, either by testing or analysis, that their configuration for front bulkhead and anti-intrusion plate can support the required 117,720 N (26,755 lb) of load from the anti-intrusion plate assuming a uniform pressure applied load across the area where the anti-intrusion plate mounts. These calculations or test data should be included in the impact attenuator data submission and should include predicted strength and deflections. Deflections must be less than the 25.4mm (1 inch) maximum called out in rule T3.20.8.

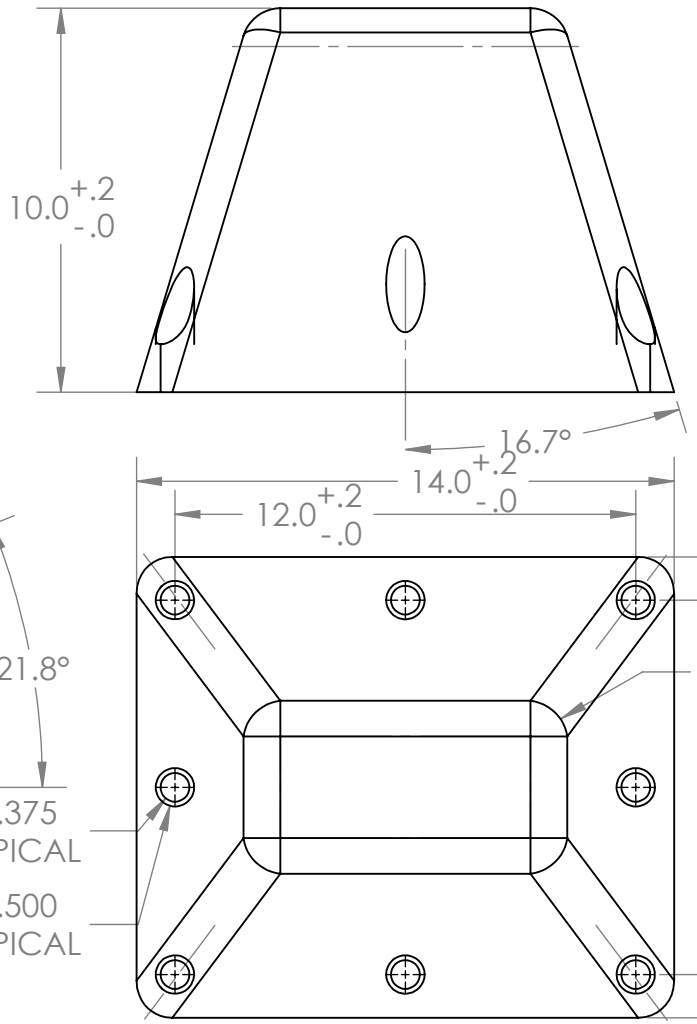
Question 3: Are we required to submit an impact attenuator data submission by the action deadline on the website? What should be included in this submission? Should we include pictures, dimensions or other information?

Answer: Yes, please see T3.21.2 for the specific details of what must be included in the submission and be sure to include the necessary anti-intrusion plate information (Question #2 above).

EXAMPLES OF IMPACT ATTENUATOR TEST SETUPS


REPRESENTATIVE
WING ELEMENT





For 2012 the standard attenuator may require the addition of a diagonal tube in the plane of the front bulkhead that connects two nodes. An optional configuration is an "X" brace that connects all four corners of the front bulkhead.

Fore more information see the following pages.

Note: Attenuators purchased from BSCI will not include optional radii on edges or mounting holes. Mounting holes shown are for reference only - attachment is up to the team to determine.

Updated	11/19/11	UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±0.015 ANGULAR: MACH ± 0.3 TWO PLACE DECIMAL ± 0.010 THREE PLACE DECIMAL ± 0.003	DRAWN	WBR	3/14/11
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL Impax 700 Foam	The Type 12 attenuator is unchanged from the 11 but for 2012 the additional front bulkhead diagonal tube is required, see note.		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

TITLE: FSAE Impact Attenuator Type 11

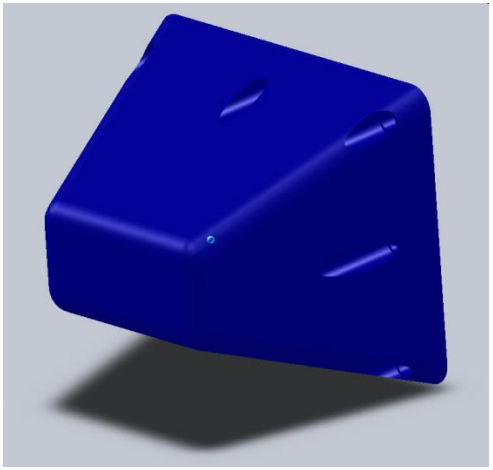
SIZE	DWG. NO.	REV
A	FSAE-IA-12	1

SCALE: 1:8 | WEIGHT: | SHEET 1 OF 1

5 4 3 2 1

IMPACT ATTENUATOR

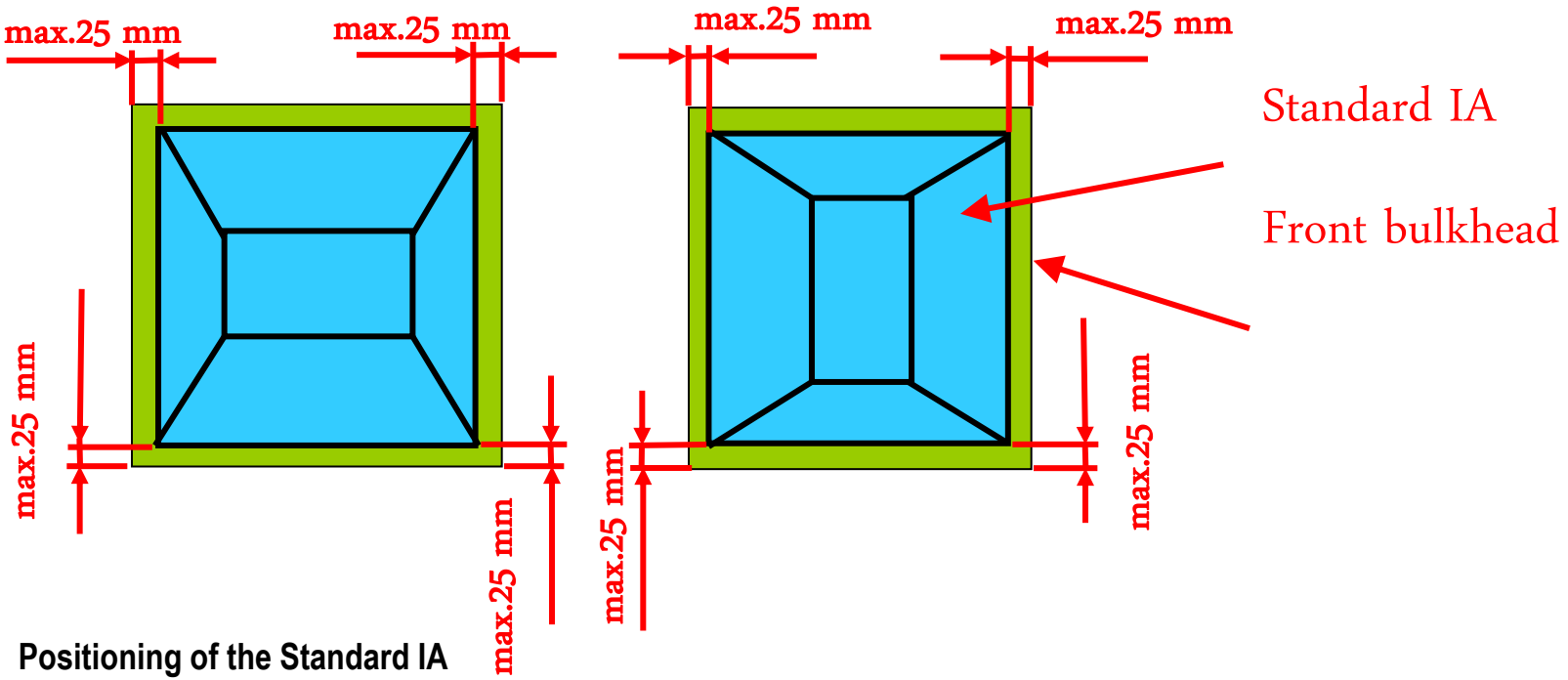
- The 2012 (Type 12) Attenautor is geometrically similar to the 2011 (Type 11)
- For 2012 attenuators purchased in either 2011 or 2012 may be used since they are identical
- There is a new requirement for 2012 that a diagonal tube must be included in the front bulkhead unless the size of the front bulkhead is within 25mm (1 inch) on each side of the standard attenuator – see next page



Standard IA TYPE12

IMPACT ATTENUATOR

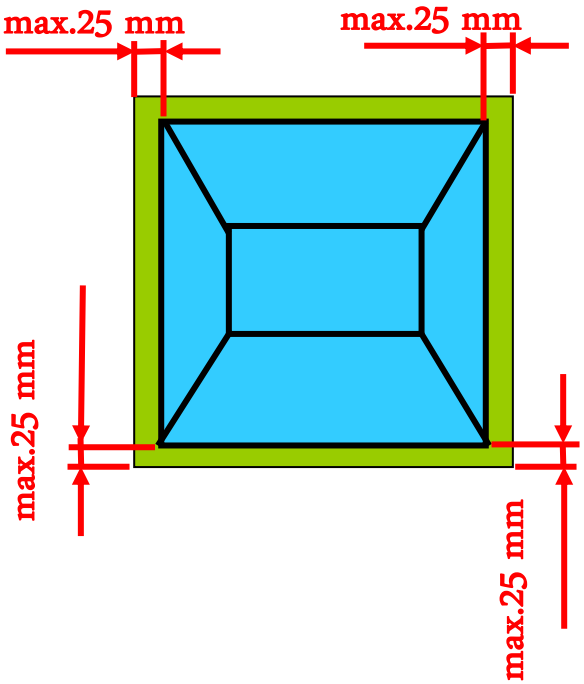
- The standard attenuator may be mounted in either orientation
- If any dimensions exceeds the values given below an additional diagonal must be incldued in the front bulkhead – see next page
- The diagonal tube is required for front bulkheads larger than that shown below because the anti-intrusion plate would deflect more than allowed by B3.21.9

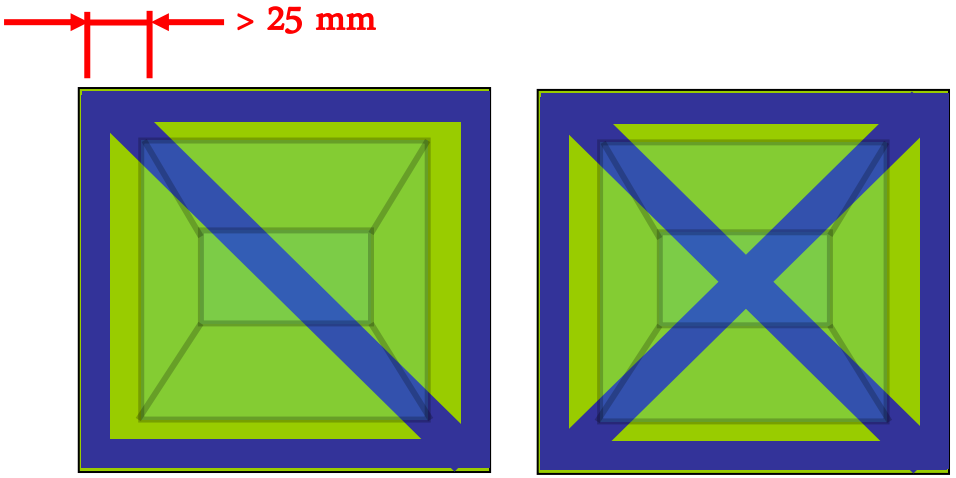


Positioning of the Standard IA

IMPACT ATTENUATOR

- If the front bulkhead exceeds the 25mm (1 inch) requierment on any side than at least on additional diagonal tube must be included in the front bulkhead
- The tube(s) must meet the requirment of 3.3.1 Front Bulkhead Tubing or equivalent
  - Round 1.0 inch (25.4 mm) x 0.049 inch (1.25 mm)
  - See Rule 3.3.1 for other options

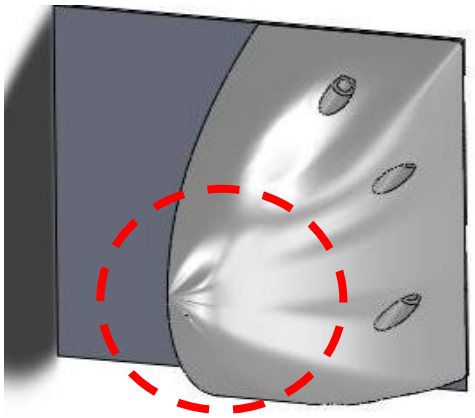




Required Diagonal or X-Brace for Front Bulkheads exceeding 25.4mm (View in cockpit looking forward)

IMPACT ATTENUATOR

- No modifications to the attenuator geometry are permitted besides the fillets/radii included on the drawing



NOT PERMITTED: changed design or dimensions for Standard IA TYPE12

IMPACT ATTENUATOR

- The following details should be submitted with the impact attenuator data submission

Description of:

- Design of IA and positioning to AIP (dimensions)
- Dimension of the front bulkhead
- Design of AIP (material, thickness, dimensions)
- Attachment method of the IA to the AIP
- Attachment method of the AIP to the front bulkhead
- Receipt of the material, a packing slip or letter of donation
- Pictures of attachment to the car