

This form must be completed and uploaded to the “My Team” area on the FSG website **no later than the date specified** in the Action Deadlines. **A printed copy of this form must be presented together with the vehicle at Technical Inspection.**

The Impact Attenuator Data (IAD) and supporting calculations must be submitted electronically in Adobe Acrobat format (\*.pdf).

**Contact Details**

Car number(s) (eg. 42 (FSG))

Team name

University name

**Team Contact Person**

Last name, first name

Telephone number

E-mail address

Please NOTE: FS Germany accepts only dynamic test as mentioned in T3.19.1!

**The Impact Attenuator Data (IAD) must include the following points:**

**If the IA (Impact Attenuator) is a “Standard IA Design”, the following points must be included:**

1. The first **two pages** must always be this FSG Impact Attenuator Data Form, including the completed general and (if applicable) testing summary
2. The report must be written in English and in „engineering style“ (e.g. contents, captions, symbols, page numbers)
3. Images and description of the design of the Impact Attenuator (IA), positioning on the Anti-Intrusion Plate (AIP) and IA volume (T3.17.2) above the ground (dimensions in mm)
4. Method for attachment of the IA to the AIP (including data sheets, with referenced strength values highlighted), e.g. if they are bonded together). Note: for mounting the Standard IA to the AIP the adhesive shear strength must be at least 24 MPa (T3.17.7).
5. Dimensions of the front bulkhead (FBH) (dimensions in mm)
6. Proof of additional diagonal or X-bracing in the FBH or equivalent per T3.17.7 if the FBH width is larger than 400 mm and/or height is larger than 350 mm
7. Design of the AIP (material, thickness and dimension in mm)
8. Method for attachment of the IA assembly to the FBH
9. Current receipt of the material, a packing slip or letter of donation of the IA. Note: these must be actual receipts, no (open) offer or request forms.
10. Pictures (or sketches) and description of the attachment on the car, including front wing attachments and non-crushable object(s) such as sensors, if applicable.

**If the IA (Impact Attenuator) is a “Team’s Own IA Design”, the following additional points must be included:**

1. FS Germany accepts only dynamic impact attenuator tests (e.g. sledge test or drop down) with real test data (see T3.19.1), including impact attenuator, anti intrusion plate (AIP), (representative) front bulkhead and, if applicable (per T3.19.4) the front wing, other non-crushable object(s) and/or structurally representative dummies thereof in front of the AIP.
2. Description of the test set up (including sensor, data acquisition system, test fixture)



3. If alternative materials are used for the AIP, equivalency to T3.17.3 must be proven by physical testing as in T3.19.2. Test fixture must be made from the same materials as the intended chassis (consistent with SES).
4. If the test is accomplished at a company or research center, a letter of conformity must be attached.
5. If the test is accomplished at the university, an official of the university (with contact details) must sign a letter of conformity (must be attached to the report).
6. Graphs of average deceleration and peak deceleration over an interval of time, absorbed energy over an interval of time and force over displacement and/or interval of time.
7. Pictures before and after the dynamic impact attenuator test, including proof of measurement of permanent deflection of the AIP (proof, T3.19.2). Note: the FBH cannot be structurally compromised after the test.

**General Summary**

IA type

IA description (e.g. form/shape/lay-up)

IA to AIP attachment

IA to AIP attachment description (e.g. adhesive type/name, method &amp; shear strength)

AIP thickness &amp; material

AIP description

AIP to FBH attachment

AIP to FBH attachment description

FBH type

FBH description (e.g. dimensions tubes/material/lay-up)

FBH dimensions (width &amp; height, mm)

FBH with diagonal or X-brace (T3.17.7)?

Dynamic testing (T3.19)

**Dynamic Testing Summary**

Test type (e.g. barrier/drop test), date &amp; site

Test speed ( $> 7$  m/s)Test weight ( $\leq 300$  kg)Energy absorbed ( $\geq 7350$  J)Peak deceleration ( $\leq 40$  g)Avg. deceleration ( $\leq 20$  g)

Peak force (kN)

Aerodynamic devices and/or sensors in front of FBH (add description)?

Aerodynamic devices, sensors and/or dummies thereof included in test (add description)?

Combined peak force ( $\leq 120$  kN)

Max. displacement (during test) (mm)

AIP deformation ( $\leq 25$  mm)



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## Impact Attenuator Data Form

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## 1 Design of IA, positionning on the AIP

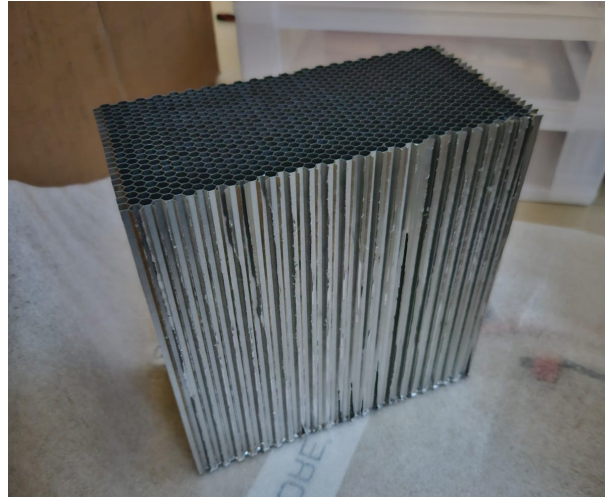


FIGURE 1 – Impact Attenuator

The IA is the Standard honeycomb IA (pre-crushed) one and has a volume of  $100 \times 200 \times 200 \text{ mm}^3$

## 2 Method for attachment of the IA to the AIP

The Crashbox is glued to the Anti Intrusion Plate on its pre-crushed face. Here follows the technical sheet of the glue used.

## 3 Dimensions of the front bulkhead and proof of an additional diagonal

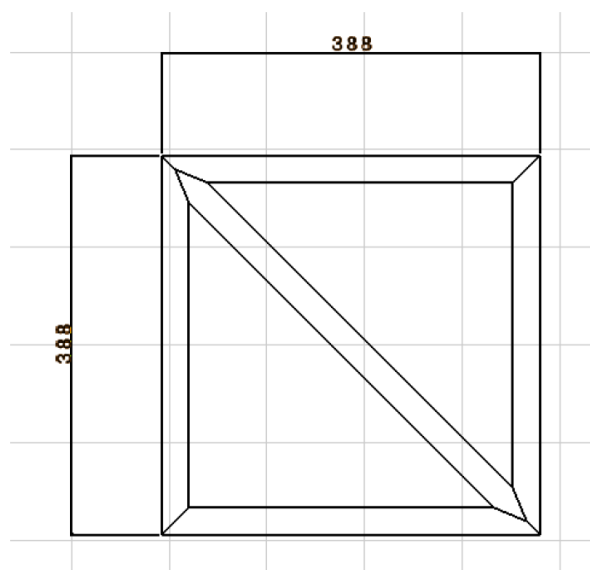


FIGURE 2 – Dimensions of the front bulkhead

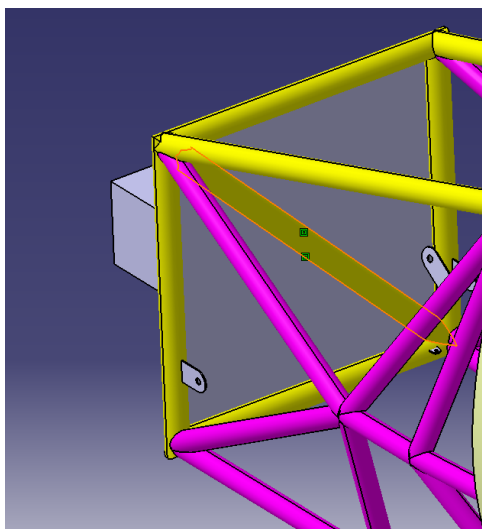


FIGURE 3 – Proof of the presence of an additional diagonal member

The front bulkhead measures  $388mm \times 388mm$ . The tubes have an external radius of  $14mm$ . You can also see on a previous image the effective diagonal tube.

## 4 Design of the AIP

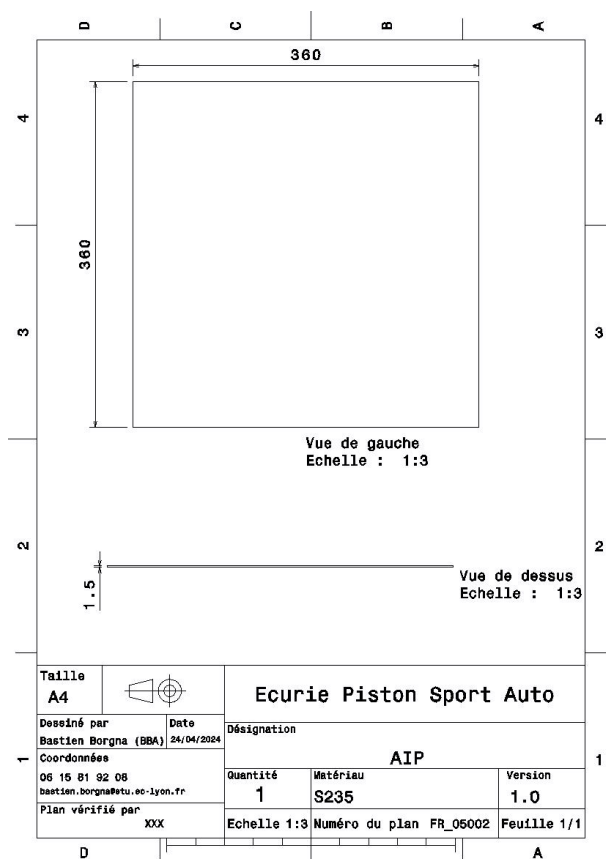


FIGURE 4 – Development plan of the AIP

The AIP is made out of S235 steel and  $1.5mm$  thick, to show compliance with rule T 3.17.3

## 5 Method for attachment of the AIP to the front bulkhead

The AIP is welded on its whole perimeter to the FBH.

## 6 Proof of the IA material reception



Plascore GmbH & Co KG - Feldbom 6 - 55444 Waldlaubersheim

Firma  
Ecole Centrale de Lyon  
36 avenue Guy de Collongue  
69314 ECULLY  
FRANKREICH

### Pro-Forma Invoice

process number 31498  
Voucher Number 2023-00199  
Date 25.10.2023  
Customer Number D62712  
Person in Charge Andreas Buir

In reply please quote these numbers!

### Delivery address

Firma  
Ecole Centrale de Lyon  
36 avenue Guy de Collongue  
69314 ECULLY  
FRANKREICH

Mode of Dispatch	MBE-Online	Our VAT number	DE217658799
Terms of Delivery	FCA Waldlaubersheim (Incoterms 2020)	Our Tax number	06/206/0706/6
References	Order Confirmation 2023-41048	Foreign Tax Number	
Your Reference	Mathieu Asatneau	Your VAT number	
Your Document	Order 10/25/23		

Referring to your above mentioned order we forwarded to you:  
Delivery date: after receipt of pre-payment approximately ..... days/weeks

According to your order we request the following pre-payment:

Item	Item no.	Description	Date of Del.	Quantity/Unit	Unit Price	Total Price SC
1	50170020 (234962)	PACL-XR1-5.7-3/16-20-P-5052 200(+2/-0)x200(+5/-2)x100(+5/-2)mm Expanded Aluminum Honeycomb Core Perforated & Precrushed  Dimensions in Thickness x L-Direction (Ribbon) x W-Direction  Crush strength:380 PSI (± 10%)  Inspection Certificate 3.1: Crush Strength tested per ASTM D 7336  <b>Sale in sets of 2 pieces</b> Commodity Code 75169990  Weight: 0.3800 kg / 2.2800 kg Country of Origin: Germany	01.12.2023	6 pc(s)	52,00	312,00 114
Sub-Total EUR						312,00 SC
plus lower-quantity surcharge						0,00 114
plus Freight per ship date						45,00 114
Sub-Total						357,00
plus VAT with tax-code 114 19,00 % from						67,83
Total EUR						424,83

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persönlich haftende Gesellschafterin  
Huebner-Verwaltungs-GmbH  
HRB-Nr. 4340, Bad Kreuznach

FIGURE 5 – Proof of the IA material reception



Here is the invoice of the IA.

## 7 Annex : IA datasheet

We are currently on holidays and we don't have access to all the information. We will send you the missing ones in the coming weeks.