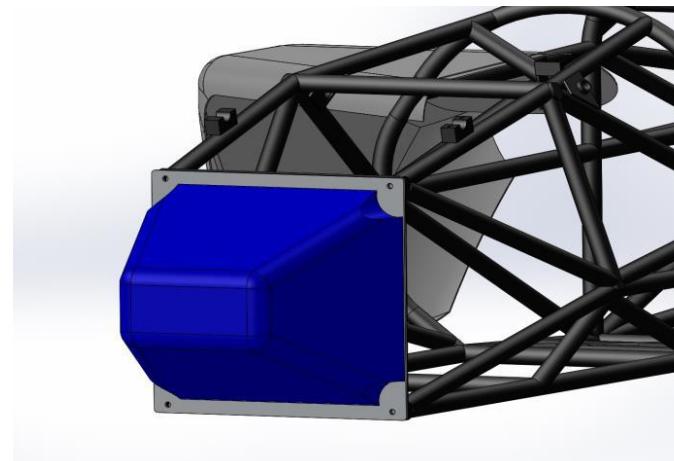
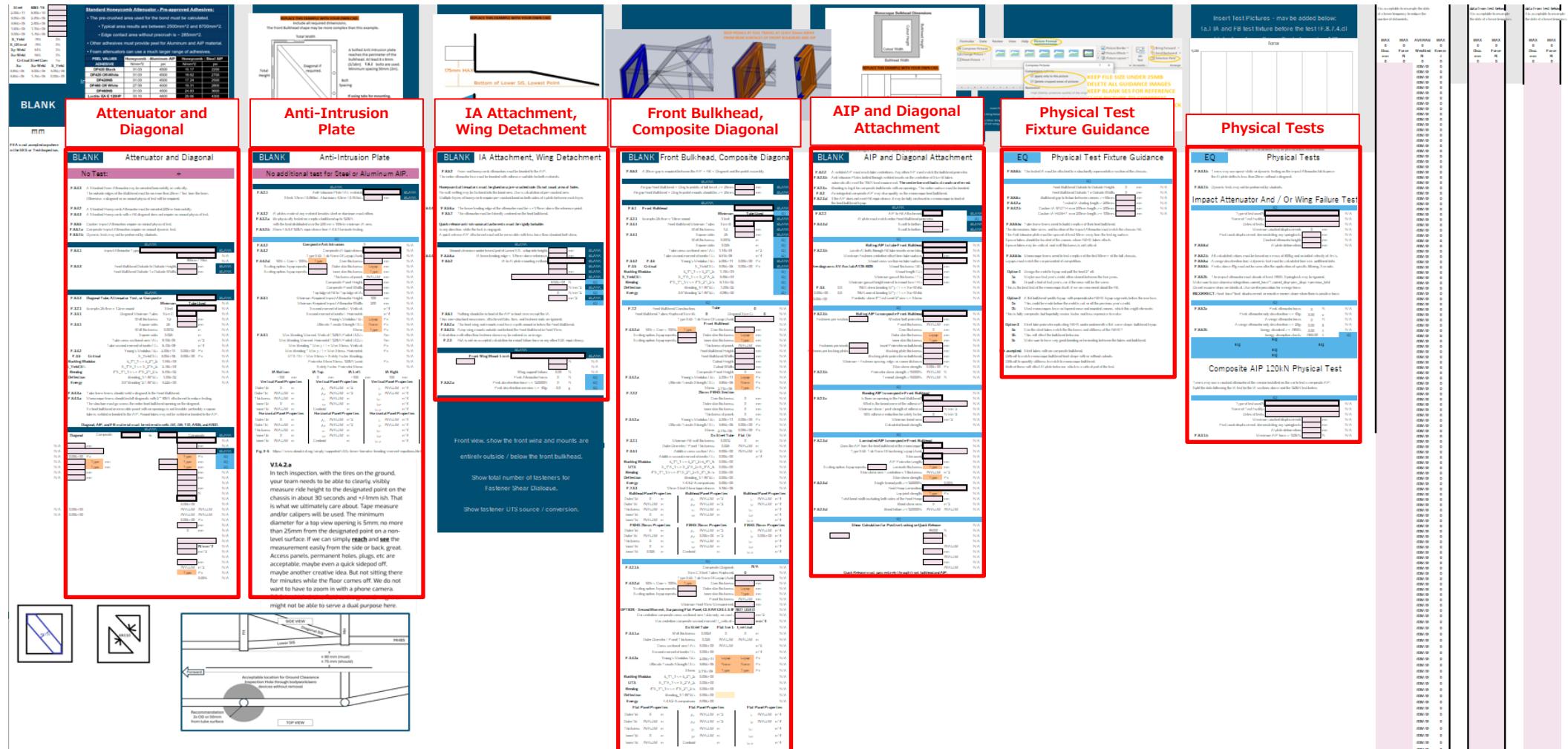


SES Guidance (Structural Equivalency Spreadsheet) (等価構造計算書)

F.8 Front Protection



Sheet Map



音声:@VOICEVOX:玄野武宏(CV:ガロ)

- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- Wing Detachment
- Front Bulkhead
- AIP Attachment
- Physical Tests
- Appendix1
- Appendix2

- Attenuator and Diagonal
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- Appendix1
- Appendix2

Attenuator and Diagonal

IAは4択 テスト方法はそれぞれのタイプに従うこと
There are 4 choices for IA, and the test method should follow each type.

BLANK

Attenuator and Diagonal

No Test: +

赤枠内の項目をそれぞれ選択すること

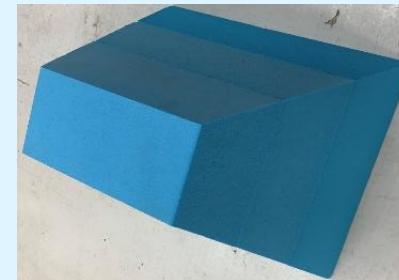
Select the answer for all questions within the red frame.

BLANK			
F.8.4.1	Impact Attenuator Type:	<input type="text"/>	BLANK
		<input type="text"/>	N/A
		<input type="text"/>	N/A
F.8.4.3	Front Bulkhead Outside to Outside Height:	<input type="text"/> mm	BLANK
	Front Bulkhead Outside To Outside Width:	<input type="text"/> mm	BLANK

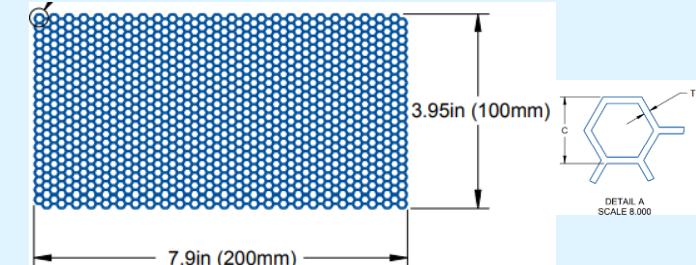
BLANK			
F.8.4.3	Diagonal Tube, Attenuator Test, or Composite	<input type="text"/>	BLANK
F.3.2.1	Example: 25.4mm x 1.2mm round	Steel	N/A
F.3.4.1	Diagonal Minimum Tube: Size C	<input type="text"/>	N/A
	Wall thickness: 1.2	<input type="text"/> mm	N/A
F.3.4.1	Square side: 25	<input type="text"/> mm	N/A
	Wall thickness: 0.0012	<input type="text"/> m	N/A
	Square side: 0.025	<input type="text"/> m	N/A
	Tube cross sectional area (A): 9.10E-05	<input type="text"/> m^2	N/A
	Tube second moment of inertia (I): 6.70E-09	<input type="text"/> m^4	N/A
F.3.4.2	Young's Modulus (E): 2.00E+11	0.00E+00 Pa	N/A
F.3.5	Critical Buckling Modulus	$E_1*I_1 \leq E_2*I_2: 1.34E+03$	N/A
S_Yield(S):		$S_1*I_1 \leq S_2*I_2: 2.78E+04$	N/A
Bending		$4*S_1*I_1/r \leq 4*S_2*I_2/r: 6.43E+02$	N/A
Deflection Energy		$Bending_1/(48*EI): 1.00E-02$	N/A
		$0.5*Bending^2/(48*EI): 3.22E+00$	N/A

No Test

Standard Foam



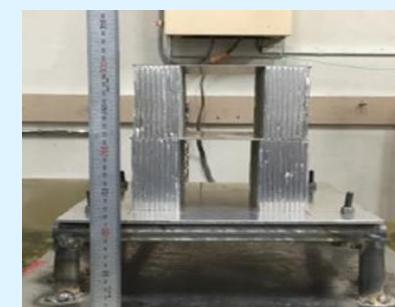
Standard Honeycomb



Need Test

Custom-Non-Composite

Physical Test
Custom IA + AIP + FB Replica



Custom-Composite : モノコック構造の意味

Dynamic Test
Composite IA + AIP + FB Replica



Attenuator and Diagonal

要求されたエビデンスを添付すること Attach the requested evidence

Insert Pictures - may be added left or below:

(a.) Standard Impact Attenuator Receipt

(b.) Adhesive Material Properties -

Indicate selected value, include units conversion

(c.) Composite Material Receipts

(if not already on 3-Point test tab)

- 他チームと共同購入でも、販売元の領収書を添付すること。
Even when purchasing jointly with other teams, attach the vendor's receipt.
 - IAは写真を添付。寸法もわかるようにすること。
IA should attach photos. Ensure dimensions are clearly visible.
 - 接着剤は、どの接着強度で計算したかわかるように図示すること。
The adhesive strength used in calculations must be clearly indicated in the diagram.

(a.)

BSCI, Inc.
170 Barlow Park Lane
Montville, NJ 07815 USA

Phone: (704) 664-3005
Fax: (704) 665-1540

Invoice

Date Invoice #
12/19/2017 23377

B&T

TOKYO UNIVERSITY OF SCIENCE YAMAGUCHI
TAKAHASHI
111 DAIKAKUCHO SANYOUNODA-SHI YAMAGUCHI
SANYOUNODA 756-0884 JAPAN

PAID
12/19/2017

B&T

TOKYO UNIVERSITY OF SCIENCE YAMAGUCHI
TAKAHASHI
111 DAIKAKUCHO SANYOUNODA-SHI YAMAGUCHI
SANYOUNODA 756-0884 JAPAN

WO #	PO #	Terms	Rep	Ship Date	Ship Via	Tracking #
Item		Description	GRN	12/20/2017	UPS World Exp.	SEE BELOW
FSAE Attenuator		STANDARD IMPACT ATTENUATOR, ALL MATERIAL DOWN IMPAX 700			15	\$46.00 2,490.00
SHIPPING		WORLDWIDE EXPEDITED DOWNSIZE OPTION AND LEAST COST AIR FRICTION AVAILABLE. WILL TAKE 5 - 7 BUSINESS DAYS FOR DELIVERY			1	\$1,870.00 \$1,870.00
		TAXES AND CUSTOMS FEES ARE THE RESPONSIBILITY OF THE TIME OF IMPORT				
		UPS TRACKING NUMBERS:				
		1/27/1996/6718215				
		1/27/1996/6718216				
		1/27/1996/6792282				
		1/27/1996/6792284				
		1/27/1996/6642217				

All items are manufactured according to the standards of BSCI, Inc. Through a sequence of a purchase order, shipping documents, bill of lading and delivery note, the customer is indicated for marked item. Testing is designed and validated by the customer in its entirety.

Thank you for your business. Please pay this invoice.

All products sold by BSCI, Inc. are sold "as is" and without warranty of any kind. Expressed and implied warranties are hereby rejected. BSCI, Inc. shall not be liable for any damages, direct or indirect, arising from the use of any product. The customer agrees that no claim shall assert at liability and responsibility in connection therewith. All past due accounts will be charged a 1% monthly, 18% APR.

Subtotal	\$4,270.00
Sales Tax (0.0%)	\$0.00
Payments/Credits	-\$4,270.00
Balance	\$0.00

www.rollbarpadding.com

(b.)

TECHNICAL SHEET

CEMEDINE

二液常温硬化形エポキシ系接着剤

セメダイン EP-007 (クリアタイプ)

セメダイン EP-008 (クリア・ラッセルタイプ)

SG-EPOシリーズは、全く新しいタイプの二液常温硬化形エポキシ系接着剤です。SG(Second Generation=第二世代)エポキシの名前とおり、従来のエポキシ系接着剤の欠点(たとえば、はく離接着性、耐熱性)を改良し、構造用の加熱硬化型接着剤に匹敵する性能を有しています。

特 性

特に優れたエポキシ系接着剤に比べて、すぐれている点。

- ①はく離接着性が大きい。
- ②耐熱性が良い。
- ③耐熱老化性が良好である。

- ④オーバーフィルタブル性にとっても、強度が低下しない。
- ⑤接着性が良好である。

用 途

金属、プラスチック、ガラスなどの伝統的な接着剤の適用に及んでいます。

1. 自由車輌、自動車、航空機関係の溶接、コーキング、接着、接着剤の充填等。
2. 建築構造の接着剤。
3. 電線端子の接着剤。
4. 機械部品、光学部品のガラス接着。
5. テクニカルセメント、セメント接着剤、工具の接着などに用いられます。また、接着剤外にも、モールディング、コーティング、ラミネートなどに用いられます。また、接着剤外にも、モールディング、コーティング、ラミネートなどに用いられます。

セメダインEP-007は、主として、工具の接着などに用いられます。また、接着剤外にも、モールディング、コーティング、ラミネートなどに用いられます。

使 用 方

1. 鋼板・アルミニウム板等の金属接着剤、主として、工具の接着などに用いられます。

2. 不透明樹脂、ガラス、セラミック等の接着剤、主として、工具の接着などに用いられます。

3. 耐熱性接着剤、主として、工具の接着などに用いられます。

4. オーバーフィルタブル性の接着剤、主として、工具の接着などに用いられます。

5. 耐熱性接着剤、主として、工具の接着などに用いられます。

■ 性状 EP-007

項目	単位	値	単位	値
外観	透明	透明	外観	透明
不透明度(%)	89.7	99.0	JIS K 6833	99.0
粘度(cP)	100	100	粘度(cP)	100
比重(g/cm ³)	1.17	0.98	比重(g/cm ³)	1.17
溶剂	無	無	溶剂	無
硬化時間(25°C)	80分	500分 ^a ±5%	硬化時間(25°C)	90分
グリル耐熱性(220°C)	3時間	3時間	グリル耐熱性(220°C)	3時間
耐熱性(400°C)	48時間	48時間	耐熱性(400°C)	48時間

項目	単位	値	単位	値
不透明度(%)	99.0	99.0	JIS K 6833	99.0
粘度(cP)	2.0	2.0	粘度(cP)	2.0
比重(g/cm ³)	1.1	1.1	比重(g/cm ³)	1.1
硬化時間(25°C)	120分	500分 ^a ±5%	硬化時間(25°C)	120分
グリル耐熱性(220°C)	3時間	3時間	グリル耐熱性(220°C)	3時間
耐熱性(400°C)	48時間	48時間	耐熱性(400°C)	48時間

■ 性状 EP-008

項目	単位	値	単位	値
外観	透明	透明	外観	透明
不透明度(%)	89.7	99.0	JIS K 6833	99.0
粘度(cP)	100	100	粘度(cP)	100
比重(g/cm ³)	1.17	0.98	比重(g/cm ³)	1.17
溶剂	無	無	溶剂	無
硬化時間(25°C)	80分	500分 ^a ±5%	硬化時間(25°C)	90分
グリル耐熱性(220°C)	3時間	3時間	グリル耐熱性(220°C)	3時間
耐熱性(400°C)	48時間	48時間	耐熱性(400°C)	48時間

項目	単位	値	単位	値
不透明度(%)	99.0	99.0	JIS K 6833	99.0
粘度(cP)	2.0	2.0	粘度(cP)	2.0
比重(g/cm ³)	1.1	1.1	比重(g/cm ³)	1.1
硬化時間(25°C)	120分	500分 ^a ±5%	硬化時間(25°C)	120分
グリル耐熱性(220°C)	3時間	3時間	グリル耐熱性(220°C)	3時間
耐熱性(400°C)	48時間	48時間	耐熱性(400°C)	48時間

^aはく離接着性を考慮して、工具の接着などに用いられます。

セメダインEP-008は、主として、工具の接着などに用いられます。

(c.)

プリブレグ検査表 CERTIFICATE OF CONFORMITY		三菱ケミカル株式会社 MITSUBISHI CHEMICAL CORPORATION
品名	CSテープ	検査日 2019.11.25 INSPECTION DATE
品番	TR 350G 100SB4ZFW5	
SIZE	W: 1000mm L: 125m (125m)	
LOT NO	MA958B	
CASE NO	MA958B-03	
項目 (ITEM)	測定値 (LOT AV.)	
プリブレグ目付(g/m ²) (PAW)	151.0	
織繩目付(g/m ²) (FAW)	100.6	
相割合率(%) (R.C.)	33.4	
APPEARANCE INSPECTION		
欠陥名 (DEFECT TYPE)	欠点個数 (NO. OF DEFECT)	補償長(m)
その他(OTHER)	1	0.5
合計 (TOTAL)	1	0.5
検査員 (INSPECTOR)		
合 格		

Attenuator and Diagonal

要求されたエビデンスを添付すること Attach the requested evidence

BLANK		
F.8.4.1	Impact Attenuator Type:	BLANK
		N/A
		N/A
F.8.4.3	Front Bulkhead Outside to Outside Height:	355mm (14in)
	mm	BLANK
	Front Bulkhead Outside To Outside Width:	mm
		BLANK

BLANK		BLANK	
F.8.4.3 Diagonal Tube, Attenuator Test, or Composite		Minimum	Tube Used
F.3.2.1	Example: 25.4mm x 1.2mm round	Steel	N/A
F.3.4.1	Diagonal Minimum Tube:	Size C	N/A
	Wall thickness:	1.2	N/A
F.3.4.1	Square side:	25	N/A
	Wall thickness:	0.0012	N/A
	Square side:	0.025	N/A
	Tube cross sectional area (A):	9.10E-05	m^2
	Tube second moment of inertia (I):	6.70E-09	m^4
F.3.4.2	Young's Modulus (E):	2.00E+11	Pa
F.3.5	Critical Buckling Modulus	S_Yield(S):	3.05E+08
	E_1*I_1 <= E_2*I_2:	0.00E+00	Pa
S_Yield(S):	S_1*A_1 <= S_2*A_2:	1.34E+03	N/A
Bending	4*S_1*I_1/r <= 4*S_2*I_2/r:	2.78E+04	N/A
Deflection	Bending_1/(48*EI):	4.43E+02	N/A
Energy	0.5*Bending^2/(48*EI):	1.00E-02	N/A
		3.22E+00	N/A

Standard IAで、FBHにDiagonalが必要になる場合は、これらの入力も忘れないこと。

When using Standard IA and Diagonal is required for FBH, do not forget these inputs.

※Standard honeycombの接着面積についてはAppendix1を参照のこと

For the bonding area of standard honeycomb, refer to Appendix.

- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- Wing Detachment
- Front Bulkhead
- AIP Attachment
- Physical Tests
- Appendix1
- Appendix2

Composite AIP の場合はPhysicalテストが必須 Physical test is required for Composite AIP

No additional test for Steel or Aluminum AIP.

BLANK			
F.8.2.1	Anti-Intrusion Plate (AI) material:	Steel	EQ
Steel: 1.5mm (0.060in), Aluminum: 4.0mm (0.157in):		mm	BLANK

F.8.3.2 AI plates made of any material besides steel or aluminum must either:

F.8.3.2.a Be physically tested on a replica bulkhead up to 120kN,
with the load distributed over the 200 mm x 100mm minimum IA area.

F.8.3.2.b Show F.8.3.4 120kN equivalence from F.4.3.1 laminate testing.

EQ			
F.8.3.2	Composite Anti Intrusion:	Steel	N/A
F.8.3.2	Composite AI Equivalence:		N/A
	Type SES Tab Name Of Layup Used:		N/A
F.4.3.2.d 50% < Core < 100%:	Typo	Core thickness:	mm
Scaling option, layup repeats:		Outer skin thickness:	Layup mm
Scaling option, layup repeats:		Inner skin thickness:	Typo mm
		Thickness of panel:	#VALUE! mm
		Composite Panel Height:	mm
		Composite Panel Width:	mm
		Top Edge of FB to Top Edge of IA:	mm
F.8.3.1	Minimum Required Impact Attenuator Height:	100	mm
	Minimum Required Impact Attenuator Width:	200	mm
	Second moment of inertia I, Vertical:		m^4
	Second moment of inertia I, Horizontal:		m^4
	Young's Modulus (E):	Layup	Pa
	Ultimate Tensile Strength (S):	Name	Pa
	Shear:	Typo	Pa
			N/A

Composite AIP -

Physicalテスト必須 Physical test required

EQ			
F.8.2.1	Anti-Intrusion Plate (AI) material:	Composite	EQ
Steel: 1.5mm (0.060in), Aluminum: 4.0mm (0.157in):		mm	N/A

F.8.3.2 - AIP 3-Point & Shear or 120kN Physical Test required.

F.8.3.2 AI plates made of any material besides steel or aluminum must either:

F.8.3.2.a Be physically tested on a replica bulkhead up to 120kN,
with the load distributed over the 200 mm x 100mm minimum IA area.

F.8.3.2.b Show F.8.3.4 120kN equivalence from F.4.3.1 laminate testing.

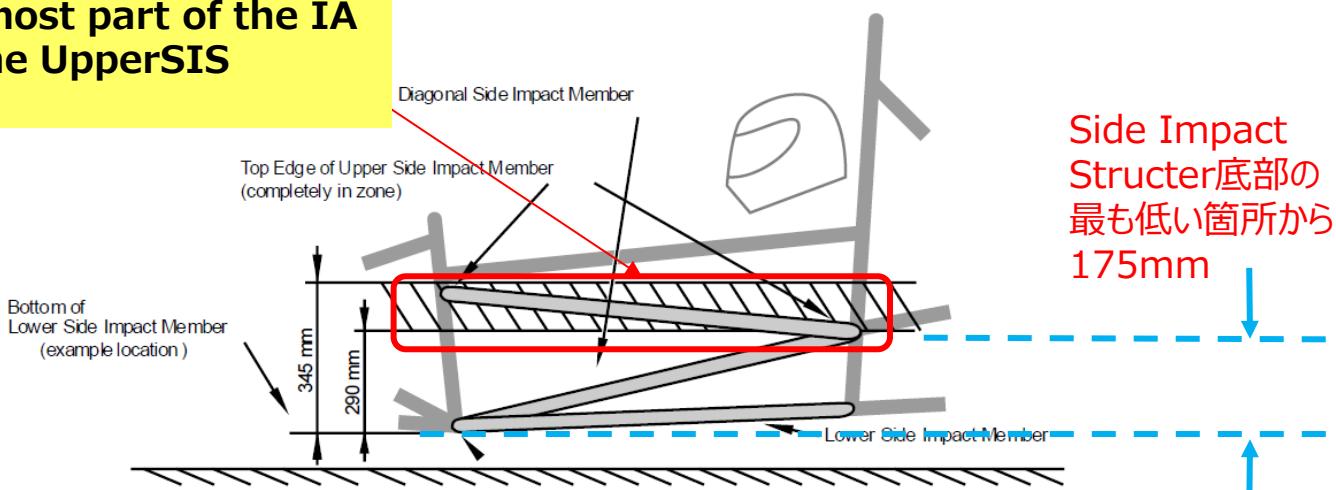
BLANK			
F.8.3.2	Composite Anti Intrusion:	Composite	EQ
F.8.3.2	Composite AI Equivalence:		BLANK
	Type SES Tab Name Of Layup Used:		BLANK
F.4.3.2.d 50% < Core < 100%:	Typo	Core thickness:	mm
Scaling option, layup repeats:		Outer skin thickness:	Layup mm
Scaling option, layup repeats:		Inner skin thickness:	Typo mm
		Thickness of panel:	#VALUE! mm
		Composite Panel Height:	mm
		Composite Panel Width:	mm
		Top Edge of FB to Top Edge of IA:	mm
F.8.3.1	Minimum Required Impact Attenuator Height:	100	mm
	Minimum Required Impact Attenuator Width:	200	mm
	Second moment of inertia I, Vertical:		m^4
	Second moment of inertia I, Horizontal:		m^4
	Young's Modulus (E):	Layup	Pa
	Ultimate Tensile Strength (S):	Name	Pa
	Shear:	Typo	Pa
			BLANK

- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- Wing Detachment
- Front Bulkhead
- AIP Attachment
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- Appendix2

REPLACE THIS EXAMPLE WITH YOUR OWN CAD.

BLANK	
Ground clearance under lowest part of Lower SIS, setup ride height:	mm mm
F.6.4.4.b F.8.5.6.a IA lower leading edge < 175mm above reference:	BLANK BLANK
F.8.5.2 IA to Al plate mounting method:	Bonded EQ N/A N/A
Adhesive brand and name?:	BLANK
F.8.5.3.b Minimum Bond Shear Requirement: 9.50E+04 N	EQ
Minimum shear / peel strength of adhesive:	N/mm ² BLANK
F.5.5.3 50% adhesive reduction for safety factor:	0 N/mm ² EQ
Area (show measurement or calc): mm ²	BLANK
Calculated bond strength:	EQ

側面衝突してもIA最前面が
UpperSISに当たるように
Assuming a collision with
the side of the vehicle,
request the positional
relationship where the
frontmost part of the IA
hits the UpperSIS



Side Impact Structer底部の
最も低い箇所から
175mm



取付は、Lower Side Impact Structure 底面の最も低い箇所から175mm以下
ただし、V.1.4.2により最低地上高の上限があるため高すぎるとREJECTになります。

The mounting point shall be no more than 175 mm from the lowest point on the bottom surface of the Lower Side Impact Structure. However, since there is an upper limit of ground clearance in V. 1.4.2, if the ground clearance is too high, REJECT will occur.

要求されたエビデンスを添付すること

各チームの考え方や計算方法があるため、具体例は示さない。

Attach the requested evidence Since each team has a different way of thinking and calculation methods, we will not provide specific examples.

Insert Pictures - continued:

(d.) Wing Detachment Material Properties

(e.) Other Wing Detachment Calculations
(if not using standard fastener shear)

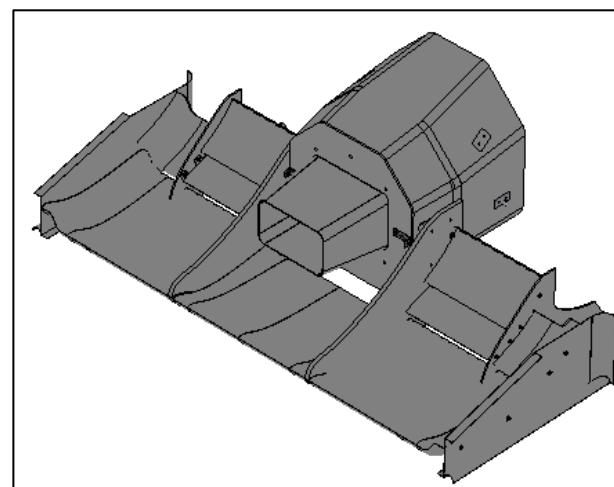
Insert measurement of IA front top edge height.

Shear Dimensions

Do not count holes as part of the area.

Even with precrush, honeycomb bond area is
usually <50% of the face.

Include calculation of bond area.



AIP 及び IA 固定方法については、下記アイソメ図に加え、三面図にブラケット・ステイ・ボルトなどの詳細情報を入力して添付すること。

また、どのような順番で破断していくか説明して計算すること。

例年、これらの不備が多く再審査の原因となっている。

For AIP and IA fixing methods, in addition to the isometric drawings below, attach detailed information such as brackets, stays, and bolts on the three-view drawings. Also, explain the sequence of failure and perform calculations accordingly. These deficiencies frequently cause re-examination each year.

引用したCAD図は東海大学のものである
大変分かりやすく、審査しやすい図面である
詳細は示さないが、敬意を持って紹介する

The diagram cited is from Tokai University.

It is an exemplary diagram, so I respectfully introduce it as a reference.

- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- **Wing Detachment**
- Front Bulkhead
- AIP Attachment
- Physical Tests
- Appendix1
- Appendix2

Front Wing を含む場合の考え方は従来と同様
The concept when including the Front Wing is the same as before.

Front Wing Mount Limit は5種類あり入力項目が違うので要注意
Please note that there are 5 types of Front Wing Mount Limit and the input items are different.

F.8.8.2.a	Front Wing Mount Limit:	BLANK <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> No Front Wing Front Wing Physically Tested With IA Front Wing Physically Tested Without IA Fastener Shear Dialogue Wing Support Hand Calc </div>
-----------	-------------------------	--

次の場合は項目選択以外の入力不要

- Front Wingが無い
- IAと共に物理テストを行った

No input required except for item selection in the following cases:

- No front wing
- Physical testing conducted alongside IA

F.8.8.2.a	Front Wing Mount Limit:	EQ <table border="1" style="margin-top: 5px; border-collapse: collapse;"> <tr> <td style="width: 30%;">No Front Wing</td> <td style="width: 10%; text-align: center;">N/A</td> </tr> <tr> <td>Peak Attenuator Force:</td> <td style="text-align: center;">0 N</td> <td style="text-align: center;">EQ</td> <td></td> <td></td> </tr> <tr> <td>Peak deceleration force <= 120000N</td> <td style="text-align: center;">0 N</td> <td style="text-align: center;">EQ</td> <td></td> <td></td> </tr> <tr> <td>Peak deceleration remains <= 40g:</td> <td style="text-align: center;">0.0 g</td> <td style="text-align: center;">EQ</td> <td></td> <td></td> </tr> </table>	No Front Wing	N/A	N/A	N/A	N/A	Peak Attenuator Force:	0 N	EQ			Peak deceleration force <= 120000N	0 N	EQ			Peak deceleration remains <= 40g:	0.0 g	EQ		
No Front Wing	N/A	N/A	N/A	N/A																		
Peak Attenuator Force:	0 N	EQ																				
Peak deceleration force <= 120000N	0 N	EQ																				
Peak deceleration remains <= 40g:	0.0 g	EQ																				

IA無しでテストした場合には、ファスナのせん断力で計算、また独自の計算をする場合は、計算結果とIAのピーク荷重を算出して記入してください。

When testing without IA, calculate using the fastener shear force. If performing your own calculations, calculate and record both the calculation result and the IA peak load.

F.8.8.2.a	Front Wing Mount Limit:	BLANK <table border="1" style="margin-top: 5px; border-collapse: collapse;"> <tr> <td style="width: 30%;">Fastener Shear Dialogue</td> <td style="width: 10%; text-align: center;">BLANK</td> <td style="width: 10%; text-align: center;">BLANK</td> <td style="width: 10%; text-align: center;">BLANK</td> </tr> <tr> <td>Shear Diameter:</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">Fastener UTS (Screenshot):</td> <td style="text-align: center;">MPa</td> </tr> <tr> <td>Total number of fasteners (n*2 for double shear):</td> <td style="text-align: center;">0.00</td> <td style="text-align: center;">0.00 N</td> <td></td> </tr> <tr> <td>Number_of_fasteners * 0.577 * UTS * pi * OD^2 / 4:</td> <td style="text-align: center;">0.00</td> <td style="text-align: center;">0 N</td> <td></td> </tr> <tr> <td>Peak Attenuator Force:</td> <td style="text-align: center;">0 N</td> <td style="text-align: center;">EQ</td> <td></td> </tr> <tr> <td>Peak deceleration force <= 120000N</td> <td style="text-align: center;">0 N</td> <td style="text-align: center;">EQ</td> <td></td> </tr> <tr> <td>Peak deceleration remains <= 40g:</td> <td style="text-align: center;">0.0 g</td> <td style="text-align: center;">EQ</td> <td></td> </tr> </table>	Fastener Shear Dialogue	BLANK	BLANK	BLANK	Shear Diameter:	mm	Fastener UTS (Screenshot):	MPa	Total number of fasteners (n*2 for double shear):	0.00	0.00 N		Number_of_fasteners * 0.577 * UTS * pi * OD^2 / 4:	0.00	0 N		Peak Attenuator Force:	0 N	EQ		Peak deceleration force <= 120000N	0 N	EQ		Peak deceleration remains <= 40g:	0.0 g	EQ	
Fastener Shear Dialogue	BLANK	BLANK	BLANK																											
Shear Diameter:	mm	Fastener UTS (Screenshot):	MPa																											
Total number of fasteners (n*2 for double shear):	0.00	0.00 N																												
Number_of_fasteners * 0.577 * UTS * pi * OD^2 / 4:	0.00	0 N																												
Peak Attenuator Force:	0 N	EQ																												
Peak deceleration force <= 120000N	0 N	EQ																												
Peak deceleration remains <= 40g:	0.0 g	EQ																												

BLANK

Physical Tests

Insert Test Pictures - may be added below:

(a) IA and FR load fixtures before the test (F.8.7.4.d)
物理テストをした場合
 テスト前後の写真・実験方法を示す写真を添付すること
 (F.8.7.6.d)
 If you did a physical test, please attach photos before and after the test and photos showing the experimental method.

which shows the deflection was less than 25.4mm
 (F.8.7.6.d)

(c.) IA / AIP Force Displacement Curve

Paste in IA data from test below:
 It is acceptable to resample the data at a lower frequency to reduce the number of datapoints.

Paste in COMPOSITE AIP data from test below:
 It is acceptable to resample the data at a lower frequency.

Paste in FRONT WING ONLY data from test below:
 It is acceptable to resample the data at a lower frequency.

**物理テストをした場合、実験結果の生データを入力する事
 * 1mm毎の圧縮データを推奨**

If you did a physical test, you will need to input the data of the experimental results.

***Compressed data in 1mm increments is recommended.**

- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- Wing Detachment
- **Front Bulkhead**
- AIP Attachment
- Physical Tests
- Appendix1
- Appendix2

F.8.4.3より次の条件ではDiagonalが必要となる

- 標準IA (Form) でフロントバルクヘッドの外側寸法が $400 \times 350\text{mm}$ より大きい
- 標準IA (Honeycomb) を使用している

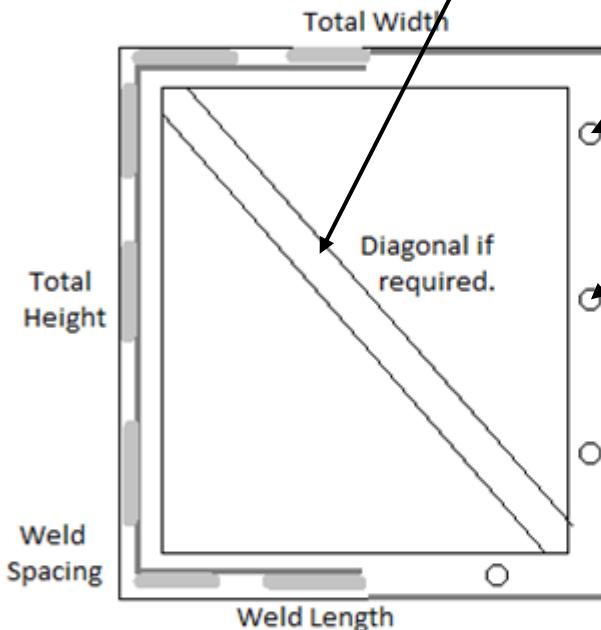
F.8.4.3 requires a diagonal under the following conditions:

- When the outer dimensions of the front bulkhead exceed $400 \times 350\text{mm}$ in standard IA (Form)
- When standard IA (Honeycomb) is used

REPLACE THIS EXAMPLE WITH YOUR OWN CAD.

Include all required dimensions.

The Front Bulkhead shape may be more complex than this example

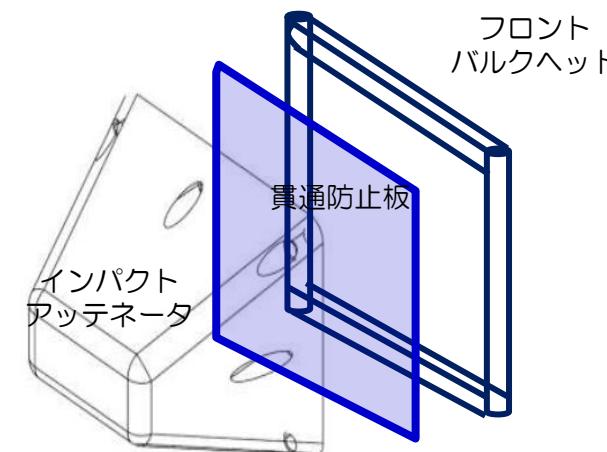


If not matched to the outside perimeter of the bulkhead, a welded Anti Intrusion plate reaches at least to the centerline of the bulkhead tubes. At least 50% of the plate perimeter is welded, with 25mm (1in) minimum welds.

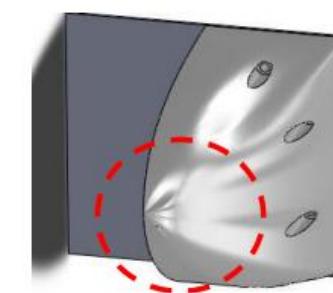
BH に直接穴を開けてボルト締結する場合

→ インサートを入れること。(レギュレーション要件)

When connecting bolts by directly drilling holes in BH → Put in the insert. (Regulation requirements)



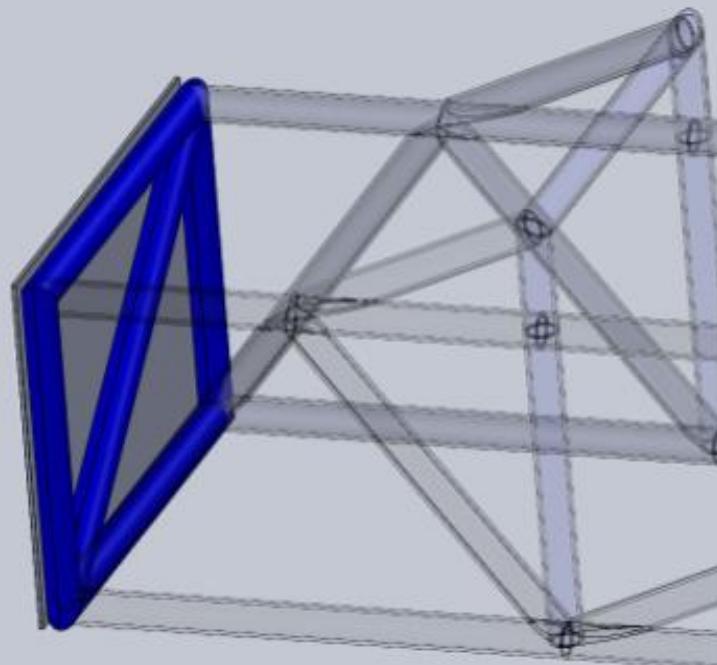
標準IAはいかなる加工、形状変更禁止
Standard IA prohibits any processing or shape modification



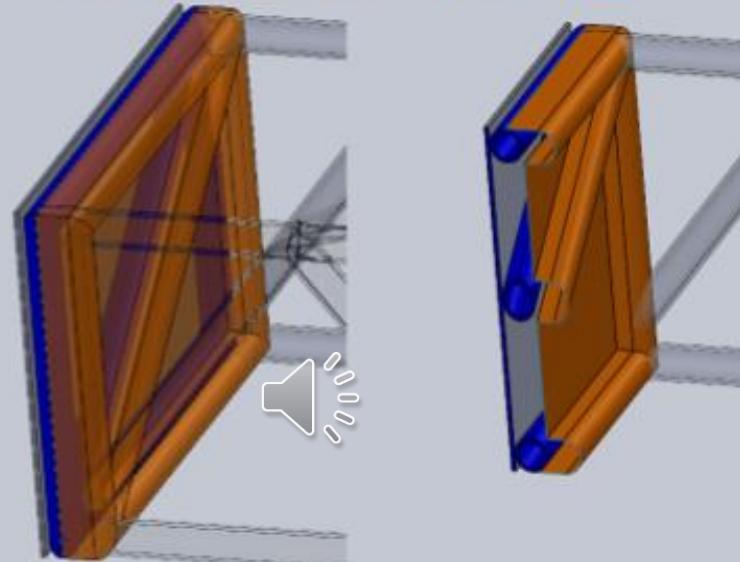
NOT PERMITTED: changed design or dimensions for Standard IA TYPE12

AIPを間隔溶接する場合、比率が計算できること

When welding AIP, be able to calculate the ratio of welded and non-welded areas.



KEEP PEDALS AT FULL TRAVEL AT LEAST 25mm AWAY
FROM REAR SURFACES OF FRONT BULKHEAD AND AIP



Front Bulkhead CAD with dimensions required.

Show 25mm gap to pedal assembly.

Pedal attachments preferably >25mm behind FB.

全ペダルにおいて、フルストローク時に（調整可能範囲の最大条件で）、
上の図のオレンジ色サーフェースの領域に抵触し入らないことを証明する3D図を添付すること。

※ペダルの状態（フルストロークなど）が不明なため、審査できないとの指摘が多いので注意

Attach a 3D CAD capture that proves that pedal assembly do not conflict with or enter the orange surface area shown above at full stroke (maximum adjustable range).

※Please note that submissions where the pedal condition (such as full stroke) is unclear cannot be reviewed, as this has been pointed out by many individuals.

※Q&Aで質問された以下の内容については、Appendix2を参照のこと

- Pedal Assemblyの範囲
- Pedal Full Travelの定義

Tube と Compositeで入力項目が違う Tube and composite have different input items

F.8.6.3 A 25mm gap is required between the AIP + FB + Diagonal and the pedal assembly.

BLANK		
Air gap Front Bulkhead + Diag to pedals at full travel >= 25mm:	<input type="text"/>	mm
Air gap Front Bulkhead + Diag to pedal mounts should be >= 25mm:	<input type="text"/>	mm
BLANK		
F.6.1 Front Bulkhead		
Minimum	Tube	EQ
	Tube Used	EQ
F.3.2.1 Example: 25.4mm x 1.6mm round		
Steel	BLANK	BLANK
F.3.4.1 Front Bulkhead Minimum Tube: Size B		
Wall thickness: 1.2	<input type="text"/> mm	BLANK
Square side: 25	<input type="text"/> mm	BLANK
Wall thickness: 0.0012	<input type="text"/> m	EQ
Square side: 0.025	<input type="text"/> m	EQ
Tube cross sectional area (A): 1.14E-04	<input type="text"/> m ²	EQ
Tube second moment of inertia (I): 8.51E-09	<input type="text"/> m ⁴	EQ
F.3.4.2 F.3.5 Young's Modulus (E): 2.00E+11 0.00E+00 Pa	<input type="text"/>	BLANK
F.3.5 Critical S_Yield(S): 3.05E+08 0.00E+00 Pa	<input type="text"/>	BLANK
Buckling Modulus E_1*L_1 <= E_2*L_2: 1.70E+03	<input type="text"/>	EQ
S_Yield(S): S_1*A_1 <= S_2*A_2: 3.48E+04	<input type="text"/>	EQ
Bending 4*S_1*L_1/r <= 4*S_2*L_2/r: 8.17E+02	<input type="text"/>	EQ
Deflection Deflection_1/(48*EI): 1.00E-02	<input type="text"/>	EQ
Energy 0.5*Bending^2/(48*EI): 4.09E+00	<input type="text"/>	EQ
EQ		
F.7.2 Front Bulkhead Construction: Tube 0	<input type="text"/>	N/A
Front Bulkhead Tubes Replaced Size B: 0	<input type="text"/>	N/A
Type SES Tab Name Of Layup Used: <input type="text"/>	<input type="text"/>	N/A
Front Bulkhead		
F.4.3.2.d 50% < Core < 100%: Type	Core thickness: <input type="text"/> mm	N/A
Scaling option, layup repeats: <input type="text"/>	Outer skin thickness: <input type="text"/> Layup mm	N/A
Scaling option, layup repeats: <input type="text"/>	Inner skin thickness: <input type="text"/> Type mm	N/A
Thickness of panel: #VALUE! mm		
Front Bulkhead Height: <input type="text"/> mm	<input type="text"/>	N/A
Front Bulkhead Width: <input type="text"/> mm	<input type="text"/>	N/A
Cutout Height: <input type="text"/> mm	<input type="text"/>	N/A
Cutout Width: <input type="text"/> mm	<input type="text"/>	N/A
F.3.4.2.a Composite Panel Height: 0	<input type="text"/> mm	N/A
Young's Modulus (E): 2.00E+11 Layup Pa	<input type="text"/>	N/A
Ultimate Tensile Strength (S): 3.65E+08 Name Pa	<input type="text"/>	N/A
Shear: 2.11E+08 0.00E+00 Pa	<input type="text"/>	N/A
F.7.2.2 5mm FBHS Section		
Core thickness: 0 mm	<input type="text"/>	N/A
Outer skin thickness: 0 mm	<input type="text"/>	N/A
Inner skin thickness: 0 mm	<input type="text"/>	N/A
Thickness of panel: 0 mm	<input type="text"/>	N/A
F.3.4.2.a Young's Modulus (E): 2.00E+11 0.00E+00 Pa	<input type="text"/>	N/A
Ultimate Tensile Strength (S): 3.65E+08 0.00E+00 Pa	<input type="text"/>	N/A
Shear: 2.11E+08 0.00E+00 Pa	<input type="text"/>	N/A
0 x Steel Tube Flat (h)	<input type="text"/>	N/A

Tube

F.8.6.3 A 25mm gap is required between the AIP + FB + Diagonal and the pedal assembly.

BLANK		
les. Air gap Front Bulkhead + Diag to pedals at full travel >= 25mm:	<input type="text"/>	mm
Air gap Front Bulkhead + Diag to pedal mounts should be >= 25mm:	<input type="text"/>	mm
BLANK		
EQ		
F.6.1 Front Bulkhead	Composite	EQ
Minimum	Tube Used	N/A
F.3.2.1 Example: 25.4mm x 1.6mm round		
Steel	BLANK	N/A
F.3.4.1 Front Bulkhead Minimum Tube: Size B		
Wall thickness: 1.2	<input type="text"/> mm	N/A
Square side: 25	<input type="text"/> mm	N/A
Wall thickness: 0.0012	<input type="text"/> m	N/A
Square side: 0.025	<input type="text"/> m	N/A
Tube cross sectional area (A): 1.14E-04	<input type="text"/> m ²	N/A
Tube second moment of inertia (I): 8.51E-09	<input type="text"/> m ⁴	N/A
F.3.4.2 F.3.5 Young's Modulus (E): 2.00E+11 0.00E+00 Pa	<input type="text"/>	N/A
F.3.5 Critical S_Yield(S): 3.05E+08 0.00E+00 Pa	<input type="text"/>	N/A
Buckling Modulus E_1*L_1 <= E_2*L_2: 1.70E+03	<input type="text"/>	N/A
S_Yield(S): S_1*A_1 <= S_2*A_2: 3.48E+04	<input type="text"/>	N/A
Bending 4*S_1*L_1/r <= 4*S_2*L_2/r: 8.17E+02	<input type="text"/>	N/A
Deflection Deflection_1/(48*EI): 1.00E-02	<input type="text"/>	N/A
Energy 0.5*Bending^2/(48*EI): 4.09E+00	<input type="text"/>	N/A
EQ		
F.7.2 Front Bulkhead Construction: Composite 0	<input type="text"/>	EQ
Front Bulkhead Tubes Replaced Size B: 2	<input type="text"/>	EQ
Type SES Tab Name Of Layup Used: <input type="text"/>	<input type="text"/>	BLANK
Front Bulkhead		
F.4.3.2.d 50% < Core < 100%: Type	Core thickness: <input type="text"/> mm	BLANK
Scaling option, layup repeats: <input type="text"/>	Outer skin thickness: <input type="text"/> Layup mm	EQ
Scaling option, layup repeats: <input type="text"/>	Inner skin thickness: <input type="text"/> Type mm	EQ
Thickness of panel: #VALUE! mm		
Front Bulkhead Height: <input type="text"/> mm	<input type="text"/>	BLANK
Front Bulkhead Width: <input type="text"/> mm	<input type="text"/>	BLANK
Cutout Height: <input type="text"/> mm	<input type="text"/>	BLANK
Cutout Width: <input type="text"/> mm	<input type="text"/>	BLANK
F.3.4.2.a Composite Panel Height: 0	<input type="text"/> mm	EQ
Young's Modulus (E): 2.00E+11 Layup Pa	<input type="text"/>	BLANK
Ultimate Tensile Strength (S): 3.65E+08 Name Pa	<input type="text"/>	BLANK
Shear: 2.11E+08 0.00E+00 Pa	<input type="text"/>	BLANK
F.7.2.2 5mm FBHS Section		
Core thickness: 0 mm	<input type="text"/>	EQ
Outer skin thickness: 0 mm	<input type="text"/>	EQ
Inner skin thickness: 0 mm	<input type="text"/>	EQ
Thickness of panel: 0 mm	<input type="text"/>	EQ
F.3.4.2.a Young's Modulus (E): 2.00E+11 0.00E+00 Pa	<input type="text"/>	EQ
Ultimate Tensile Strength (S): 3.65E+08 0.00E+00 Pa	<input type="text"/>	EQ
Shear: 2.11E+08 0.00E+00 Pa	<input type="text"/>	EQ
0 x Steel Tube Flat (h)	<input type="text"/>	EQ

Composite

BLANK		
F.7.2 Front Bulkhead Construction: Composite 0	<input type="text"/>	EQ
Front Bulkhead Tubes Replaced Size B: 2	<input type="text"/>	EQ
Type SES Tab Name Of Layup Used: <input type="text"/>	<input type="text"/>	BLANK
Front Bulkhead		
F.4.3.2.d 50% < Core < 100%: Type	Core thickness: <input type="text"/> mm	BLANK
Scaling option, layup repeats: <input type="text"/>	Outer skin thickness: <input type="text"/> Layup mm	EQ
Scaling option, layup repeats: <input type="text"/>	Inner skin thickness: <input type="text"/> Type mm	EQ
Thickness of panel: #VALUE! mm		
Front Bulkhead Height: <input type="text"/> mm	<input type="text"/>	BLANK
Front Bulkhead Width: <input type="text"/> mm	<input type="text"/>	BLANK
Cutout Height: <input type="text"/> mm	<input type="text"/>	BLANK
Cutout Width: <input type="text"/> mm	<input type="text"/>	BLANK
F.3.4.2.a Composite Panel Height: 0	<input type="text"/> mm	EQ
Young's Modulus (E): 2.00E+11 Layup Pa	<input type="text"/>	BLANK
Ultimate Tensile Strength (S): 3.65E+08 Name Pa	<input type="text"/>	BLANK
Shear: 2.11E+08 0.00E+00 Pa	<input type="text"/>	BLANK
F.7.2.2 5mm FBHS Section		
Core thickness: 0 mm	<input type="text"/>	EQ
Outer skin thickness: 0 mm	<input type="text"/>	EQ
Inner skin thickness: 0 mm	<input type="text"/>	EQ
Thickness of panel: 0 mm	<input type="text"/>	EQ
F.3.4.2.a Young's Modulus (E): 2.00E+11 0.00E+00 Pa	<input type="text"/>	EQ
Ultimate Tensile Strength (S): 3.65E+08 0.00E+00 Pa	<input type="text"/>	EQ
Shear: 2.11E+08 0.00E+00 Pa	<input type="text"/>	EQ
0 x Steel Tube Flat (h)	<input type="text"/>	EQ

Composite

- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- Wing Detachment
- Front Bulkhead
- AIP Attachment
- Physical Tests
- Appendix1
- Appendix2

要求されたエビデンスを添付すること

BLANK			
F.8.2.2	AIP to FB Attachment:	<input type="button" value="Welded"/>	EQ
Al plate must at least reach the centerline of Front Bulkhead tubes.			EQ
F.8.2.3.a	At least half the perimeter must be welded:	<input type="text"/>	BLANK
Shortest weld >= 25mm (1in):		<input type="text"/>	BLANK
Bolting AIP to tube Front Bulkhead		<input type="button" value="EQ"/>	N/A

選択肢は4種類
それぞれ入力項目が違う
There are 4 types of input options The contents of the filling are different depending on what you choose

Welded

BLANK			
F.8.2.2	AIP to FB Attachment:	<input type="button" value="Welded"/>	EQ
Al plate must at least reach the centerline of Front Bulkhead tubes.			EQ
F.8.2.3.a	At least half the perimeter must be welded:	<input type="text"/> %	BLANK
Shortest weld >= 25mm (1in):		<input type="text"/> mm	BLANK

Bolted

BLANK			
F.8.2.2	AIP to FB Attachment:	<input type="button" value="Bolted"/>	EQ
Al plate must match entire Front Bulkhead perimeter.			EQ
F.8.2.3.b	Number of 8mm critical fasteners (8 required):	<input type="text"/>	BLANK
Minimum distance between bolt centers:		<input type="text"/> mm	BLANK

BLANK			
Bolting AIP to tube Front Bulkhead		<input type="button" value="Nut And Bolt"/>	EQ
Locate Al bolts through FB tube inserts or on tabs:			BLANK
Maximum Fastener centerline offset from tube surface:			BLANK
Mount cross section on tube surface:			BLANK
Screws diameter: <input type="text"/> mm			BLANK
Mount thickness (B): <input type="text"/> mm			BLANK
Mount length (L): <input type="text"/> mm			BLANK
Mount thickness (T): <input type="text"/> mm			BLANK
Mount face (H): <input type="text"/> mm			BLANK
<= Su-Weld: <input type="text"/>			EQ
<= Su-Weld: <input type="text"/>			EQ
Area <= Shear: <input type="text"/>			EQ

ボルトを選択した場合、
2種類の選択肢がある
If you select a bolt, two
types of options will
appear

Bonded

BLANK			
BONDING AIP to composite Front Bulkhead			
F.8.2.3.c	Is there an opening in the Front Bulkhead?	<input type="checkbox"/>	EQ
What is the brand name of the adhesive?		<input type="text"/>	EQ
Minimum shear / peel strength of adhesive:		<input type="text"/> N/mm ²	BLANK
50% adhesive reduction for safety factor:		<input type="text"/> 0 N/mm ²	EQ
Minimum bond area:		<input type="text"/> mm ²	BLANK
Calculated bond strength:		<input type="text"/>	EQ

Laminated

BLANK			
F.8.2.3.d	Laminated AIP to composite Front Bulkhead		EQ
Does the AIP form the front bulkhead of the monocoque?		<input type="checkbox"/>	EQ
Type SES Tab Name Of Enclosing Layup Used:		<input type="text"/>	BLANK
Skin used:		<input type="text"/>	BLANK
AIP Perimeter Length:		<input type="text"/> mm	BLANK
Scaling option, layup repeats:		<input type="text"/>	Laminate thickness: <input type="text"/> Typo mm
Skin shear area - centerline x 1 thickness:		<input type="text"/> #VALUE! m ²	EQ
Skin shear strength:		<input type="text"/> Typo Pa	EQ
F.8.2.3.d	Single tearout path >=12000N:	<input type="text"/> 0.00%	EQ
Front Hoop Lamination:		<input type="text"/>	BLANK
Lap joint strength:		<input type="text"/> Typo Pa	EQ
Total bond width including both sides of the Front Hoop:		<input type="text"/> mm	BLANK
Bond shear area:		<input type="text"/> 0 m ²	EQ
F.8.2.3.d	Bond failure >=12000N: <input type="text"/> #VALUE! #VALUE!		EQ

Quick Releaseを選択した場合、
入力項目増えるので見逃さないように注意
If you select Quick Release, increase input items

BLANK			
Shear Calculation for Positive Locking on Quick Release			
Positive Locking Shear Requirement:		<input type="text"/> 95000 N	EQ
Shear Diameter: <input type="text"/> mm			EQ
Fastener UTS (Screenshot): <input type="text"/> MPa			BLANK
Number of positive locking diameters in shear:		<input type="text"/>	BLANK
Number_of_fasteners * 0.577 * UTS * pi * OD ² / 4: <input type="text"/> 0			BLANK
Area <= Shear: <input type="text"/> 0.00%			BLANK

Centerline Insertsの場合「Welded Inserts」の対象となる

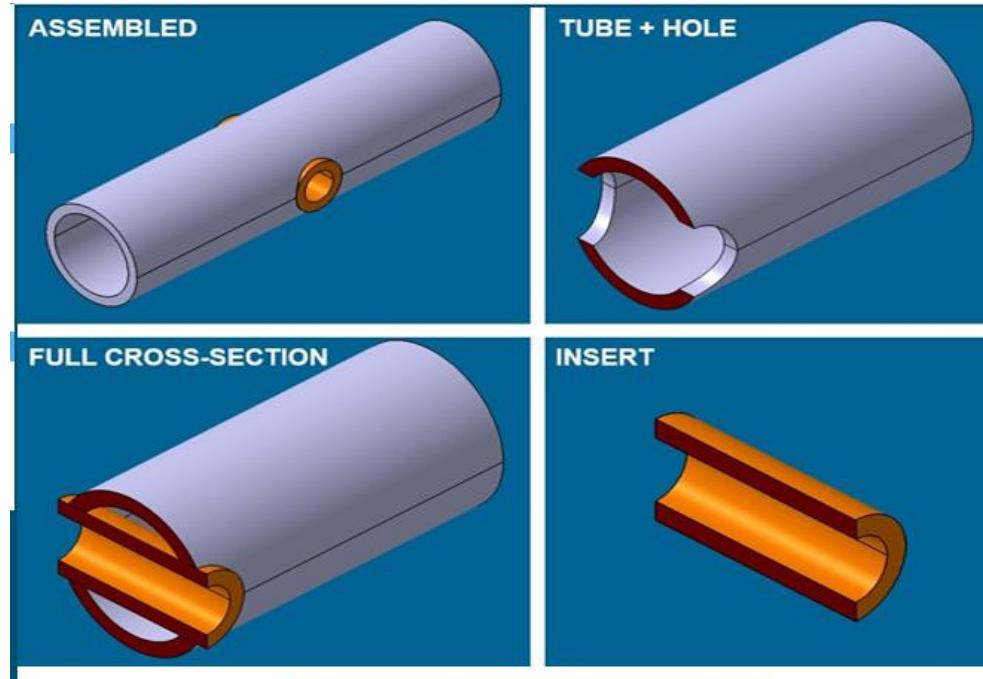
In the case of CentralLine Inserts, it is eligible for "Welded Inserts"

EQ			
Bolting AIP to tube Front Bulkhead	Nut And Bolt	EQ	
F.8.2.3.b locate Al bolts through FB tube inserts or on tabs:	Centerline Inserts	EQ	

「F. 3. 4. 3 Welded Inserts」のシート内でAIP Insertsが
「Yes」に判定されるので、本シートへ入力すること

In the "F. 3. 4. 3 Welded Inserts" sheet, Aip Inserts
is determined to "Yes", so enter into this sheet.

BLANK	
Any removable members along required tubes?	
Tube Chassis BO133: 0	
BLANK	
Any holes over 4mm drilled in F.3.2.1 required tubes?	
Driver Harness: No	
Tube Chassis BO134: 0	
<input checked="" type="checkbox"/> AIP Inserts: Yes	
Tractive Battery: No	
BLANK	
Does the steering rack interrupt any required tubes?	
Tube Chassis BO135: 0	
FILL OUT THIS TAB.	



REPLACE THIS EXAMPLE WITH YOUR OWN CAD

F.5.3.1, F.3.4.3 - HOLES OVER 4mm, STEERING RACK PASS THROUGH
INSERT, OUTSIDE COLLAR, OR PLATE REQUIRED

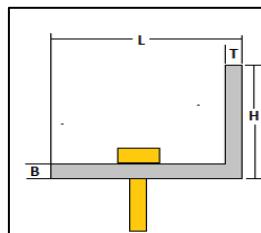
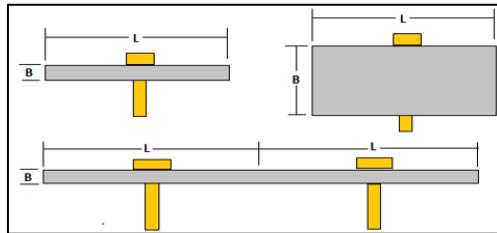
注意: AIP Attachment

Offset Mountsの場合

In the case of "Offset Mounts"

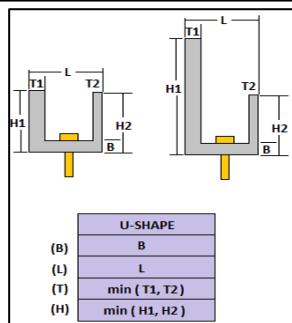
F.8.2.3.b Locate A1 bolts through FB tube inserts or on tabs:	<input type="checkbox"/> Bolt	EQ
Maximum Fastener centerline offset from tube surface:	<input type="checkbox"/> Centerline Inserts	EQ
Mount cross section on tube surface:	<input type="checkbox"/> mm	N/A
See diagrams: EV Acc tab AY28-BI28	<input type="checkbox"/> Mount thickness (B):	<input type="checkbox"/> mm
	<input type="checkbox"/> Mount length (L):	<input type="checkbox"/> mm
	<input type="checkbox"/> Minimum gusset thickness (T):	<input type="checkbox"/> mm
	<input type="checkbox"/> Minimum gusset height normal to mount face (H):	<input type="checkbox"/> mm
F.3.5 0.0 5kN shear bending $M^*y / I \leq Su\text{-Weld}$:	<input type="checkbox"/> A	N/A
0.00E+00 0.0 kN normal bending $M^*y / I \leq Su\text{-Weld}$:	<input type="checkbox"/> A	N/A
0.00E+00 Parabolic shear 3*Test Load/2*area <= Shear:	<input type="checkbox"/> A	N/A
Fill Out Welded Insert Tab		

これらの絵は、「グレーのハッキング面が溶接面」と解釈する。

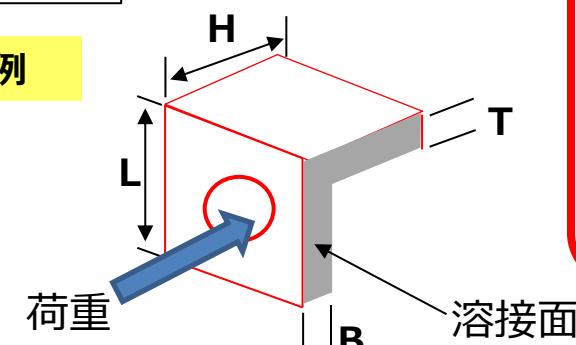


CROSS SECTION	SINGLE LAYER
MOUNT THICKNESS (B)	B
MOUNT LENGTH (L)	L
MINIMUM GUSSET THICKNESS (T)	L
MINIMUM GUSSET HEIGHT (H)	B

L-SHAPE
(B) B
(L) L
(T) T
(H) H



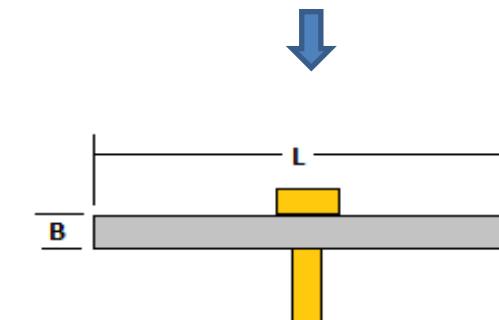
「L-Shape」の例



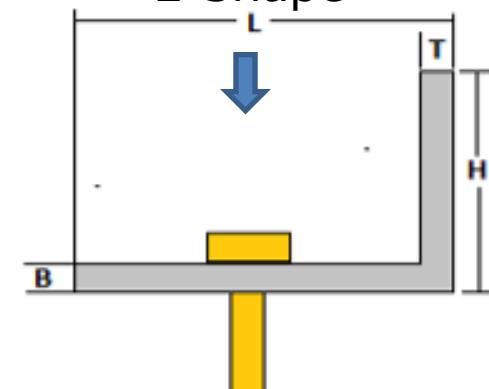
Tab形状を選択し、その形状に応じた(B),(L),(T),(H)を入力する
Select the tab shape and enter (b), (l), (t), and (h) according to the shape.

See diagrams: EV Acc tab AY28-BI28	Mount thickness (B):	<input type="checkbox"/> mm	N/A
	Mount length (L):	<input type="checkbox"/> mm	N/A
	Minimum gusset thickness (T):	<input type="checkbox"/> mm	N/A
	Minimum gusset height normal to mount face (H):	<input type="checkbox"/> mm	N/A

Single Layer



L-Shape



グレーの溶接面に対して矢印方向の荷重が掛かると解釈し、TabのFBHへの取り付け方法を検討すること

Interpreted as a load in the direction of the arrow on the welded surface of the gray, and consider how to attach the TAB to the FBH.

- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- Wing Detachment
- Front Bulkhead
- AIP Attachment
- **Physical Tests**
- Appendix1
- Appendix2

要求されたエビデンスを添付すること Attach the requested evidence

それぞれ空欄で要求される寸法が分かるCAD図や写真を記載すること

Describe diagrams and photos that shows the required dimensions

BLANK

Physical Test Fixture Guidance

- F.8.8.6.b** The tested IA must be attached to a structurally representative section of the chassis.

BLANK

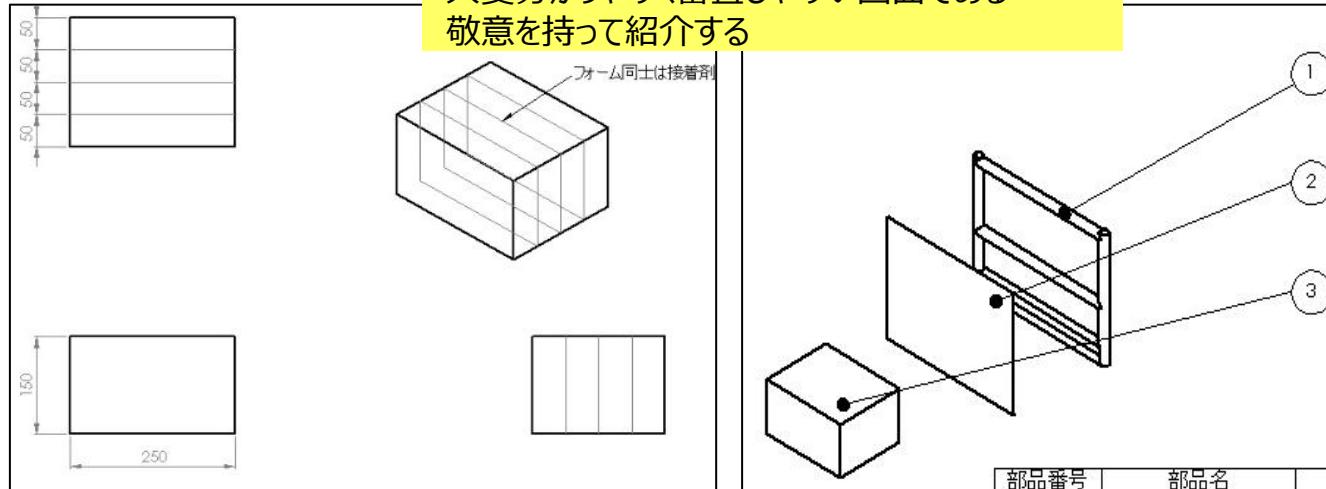
ed. Front Bulkhead Outside to Outside Height: 0 mm BLAN
Front Bulkhead Outside To Outside Width: 0 mm BLAN

F.8.8.6.c Bulkhead gap to fixture between corners $\geq 50\text{mm}$: mm

F.8.4.2.a Tested IA starting length > 200mm: mm BLANK

F.8.4.2.b Custom IA WIDTH over 200mm length >= 200mm: _____ mm BLANK
Custom IA HEIGHT over 200mm length >= 100mm: _____ mm BLANK

引用したCAD図は茨城大学が作成したもので、
大変分かりやすく審査しやすい図面である
敬意を持って紹介する



試験日が分かるものを一緒に表示すること

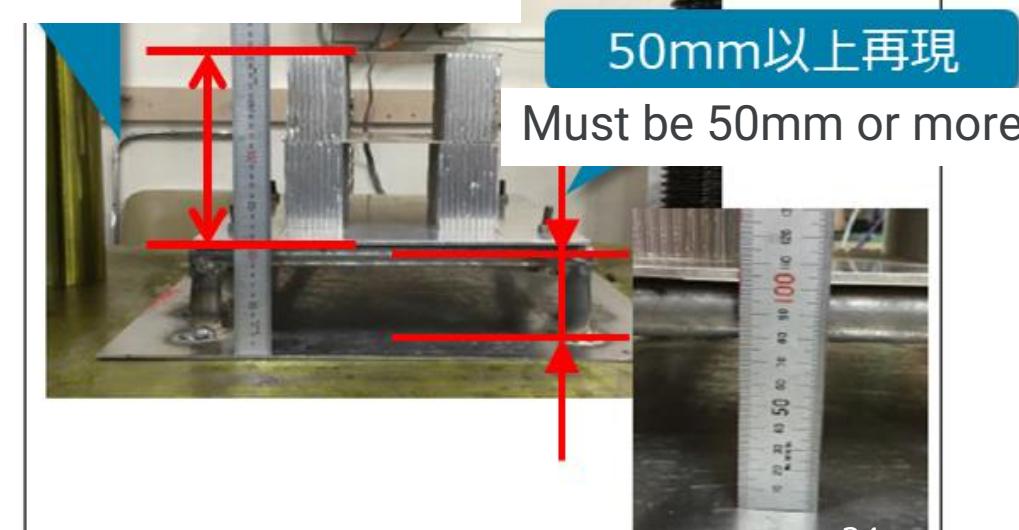
※新聞紙や電波時計など

Display items that show the exam date together

※Such as newspapers or radio-controlled clocks

200mm以上確認

Mast be 200mm or more



Quasi Static と Dynamicで入力項目が違うそれぞれで要求される空欄全てに
入力完了し判定が「EQ」とならなければならない

The input items are different between quasi -static and Dynamic
The input is completed in all the blanks required for each, and the
judgment must be "EQ"

Impact Attenuator And / Or Wing Failure Test

BLANK	
Type of test used?	BLANK
Name of Test Facility	BLANK
Dates of tests	BLANK
Maximum crush displacement:	mm
Post crush displacement, demonstrating any springback:	mm
Crushed attenuator height:	mm
AI plate deformation:	mm
F.8.8.6.d	BLANK
Dynamic	REJECT

F.8.8.2.b All calculated values must be based on a mass of 300kg and an initial velocity of 7m/s.

F.8.8.8.a Average deceleration from a dynamic test must be calculated from raw, unfiltered data.

F.8.8.8.b Peaks above 40g must not be seen after the application of specific filtering. See rule.

F.8.8.2b The impact attenuator must absorb at least 7350J. Springback may be ignored.

Make sure to use stepwise integration: current_force*(current_disp-prev_disp)+previous_total

Do not assume steps are identical. Use similar procedure for average force.

INCORRECT: Final_force*final_displacement, or negative energy slope when there is positive force.

BLANK	
F.8.8.2a	Peak attenuator force: 0 N EQ
	Peak attenuator only deceleration <= 40g: 0.00 g BLANK
	Average attenuator force: 0 N EQ
p.	Average attenuator only deceleration <= 20g: 0.00 g EQ
F.8.8.2b	Energy absorbed >= 7350J: 0.00 J REJECT
	Energy absorption check: 7350.00 J EQ
	EQ
	EQ
	EQ

Composite AIP 120kN Physical Test

Teams may use a crushed attenuator of the version installed on the car to test a composite AIP.
Split the data following the IA test for the IA sections above and the 120kN test below.

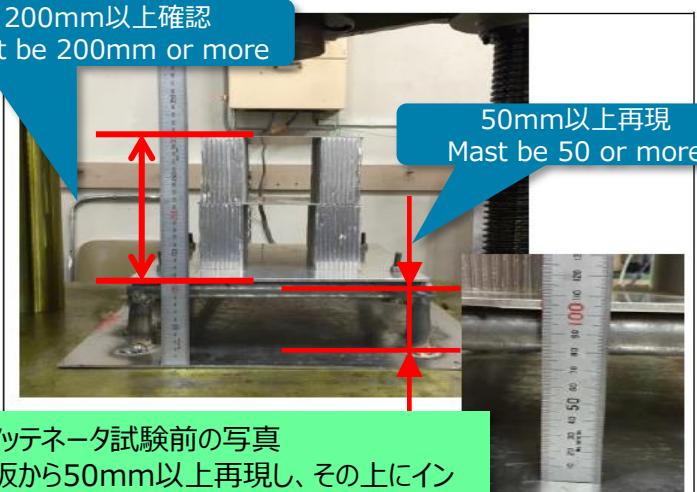
EQ	
Type of test used?:	N/A
Name of Test Facility:	N/A
Dates of tests:	N/A
Maximum crushed displacement:	mm N/A
Post crush displacement, demonstrating any springback:	mm N/A
AI plate deformation:	mm N/A
F.8.3.1.b	Maximum AIP force > 120kN: N N/A

要求されたエビデンスを添付すること Attach the requested evidence

Insert Test Pictures - may be added below:

- (a.) IA and FB test fixture before the test (F.8.7.4.d)
which also shows the method of spacing AIP
(F.8.7.4.d) which also shows the method of spacing AIP at least 50mm from any rigid structure (F.8.7.6.c)
- (b.) IA, Anti-Intrusion Plate after the IA test (F.8.7.4.d)
which shows the deflection was less than 25.4mm
(F.8.7.6.d)
- (c.) IA / AIP Force Displacement Curve

200mm以上確認
Mast be 200mm or more



- ①インパクトアッテネータ試験前の写真
- ②貫通防止板から50mm以上再現し、その上にインパクトアッテネータを載せる
※足の先にプレートを置き、溶接を推奨！
- ① Photo before the impact Attenuator test
- ② Reproduce 50mm or more from the penetration prevention board, and put an impact Attenuator on it.

BLANK

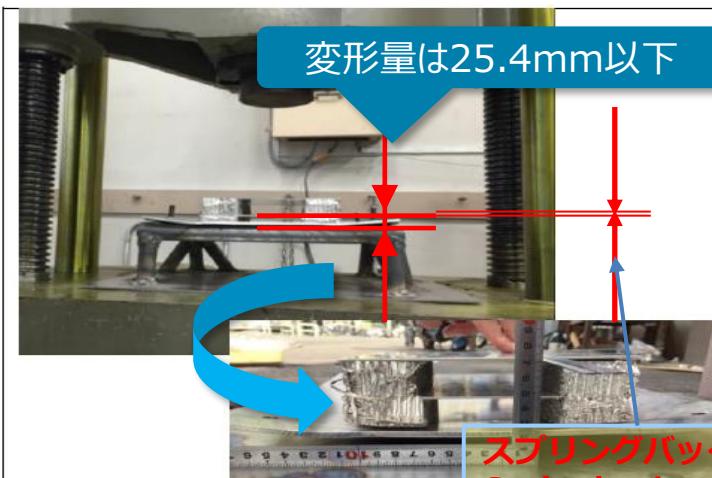
Physical Tests

F.8.4.3.b Teams may use quasi-static or dynamic testing on the Impact Attenuator tab to prove the Al plate deflects less than 25mm without a diagonal.

F.8.7.7.b Dynamic tests may not be performed by students.

Impact Attenuator And / Or Wing Failure Test

Type of test used?:	BLANK
Name of Test Facility:	BLANK
Dates of tests:	BLANK

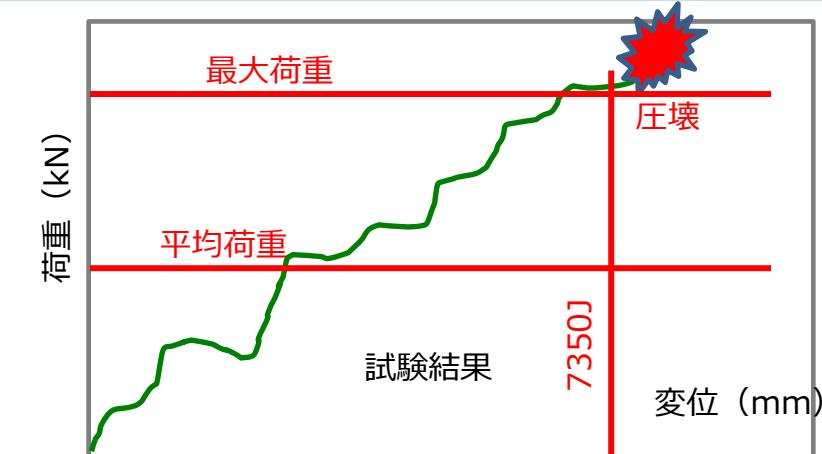
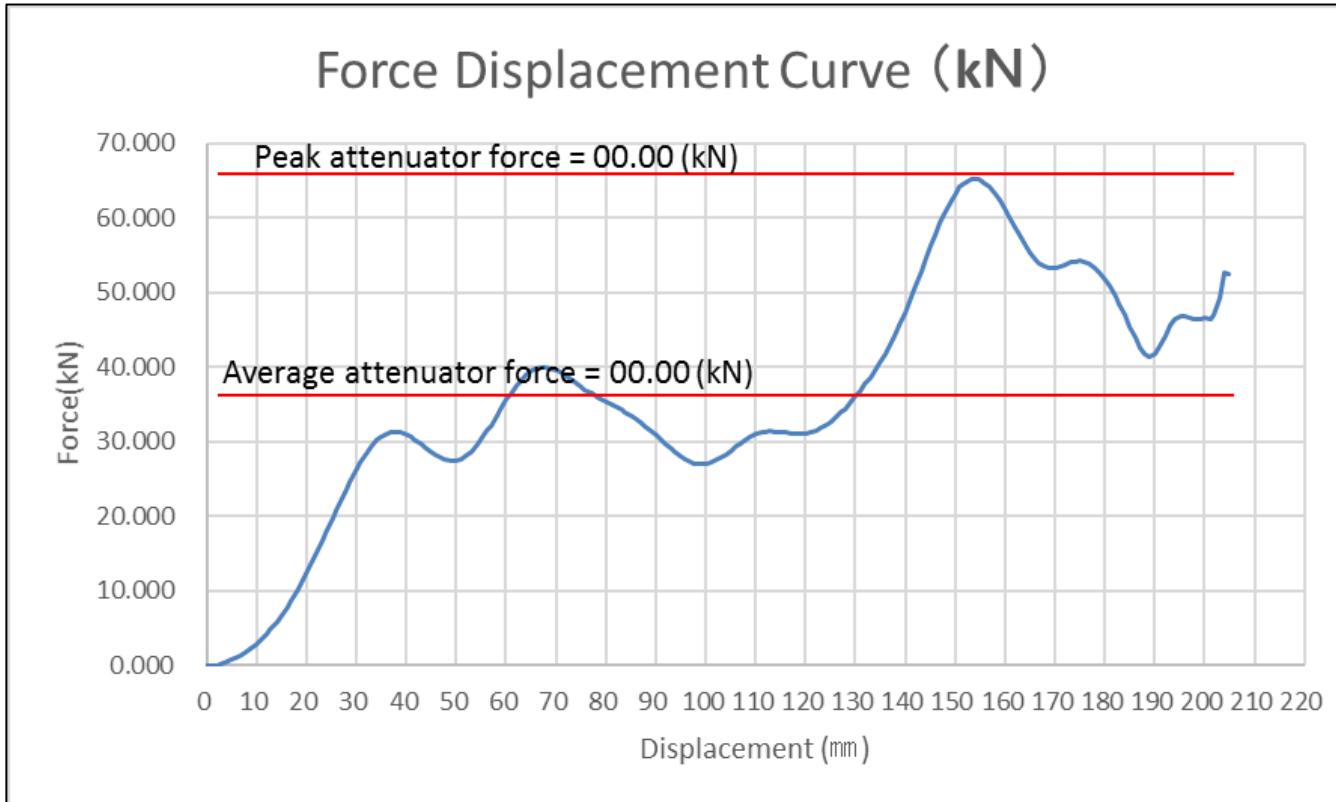


メジャーを入れて、試験前後の写真を記載すること
Describe photos before and after the exam with the scale

「Dates of tests」試験日を証明できる写真を添付すること。
(写真内に日付が分かるものを一緒に撮影する)
Attach a photo that can prove the "exam date."(Take a photo that clearly shows the date within the frame.)

- ①インパクトアッテネータ試験後の写真
- ②貫通防止板の変形量を測定
- ③IAのスプリングバック量も測定
- ① Photo after the impact Attenuator test
- ② Measure the amount of deformation of the AIP
- ③ Measure the springback amount of IA

Physical Tests



Paste in IA data from test below:
It is acceptable to resample the data
at a lower frequency to reduce the
number of datapoints.

MAX	MAX	AVERAG	MAX
Disp.	Force	Weighted	Energy
mm	N	N	J
0	0	0	0

最大変位量までデータを示す
Indicates data up to the
maximum value

1mmごとの荷重値を記入することを推奨する
平均G、ピークG、吸収エネルギーは自動計算
される。

It is recommended to enter the
load value every 1 mm.
The average G, peak G and
absorbed energy are automatically
calculated.

#DIV/0!	0
#DIV/0!	0
#DIV/0!	0

- Attenuator and Diagonal
- Anti-Intrusion Plate
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- Appendix2

ハニカムアッテネータの接着面積について Regarding the bonding area of the honeycomb attenuator

Honeycomb attenuators must be glued on a pre-crushed side. Do not count area of holes.

No wall wetting may be factored into the bond area. Use a calculation of pre-crushed area.

Multiple layers of honeycomb require pre-crushed bond on both sides of a plate between each layer.

上記はSESに記載されている文章である。

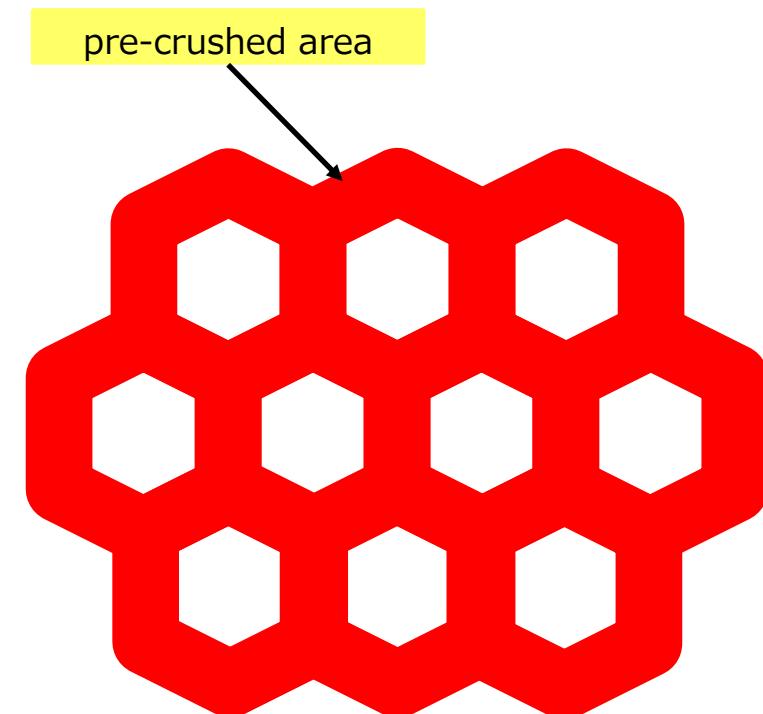
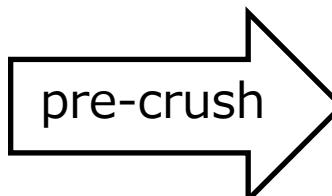
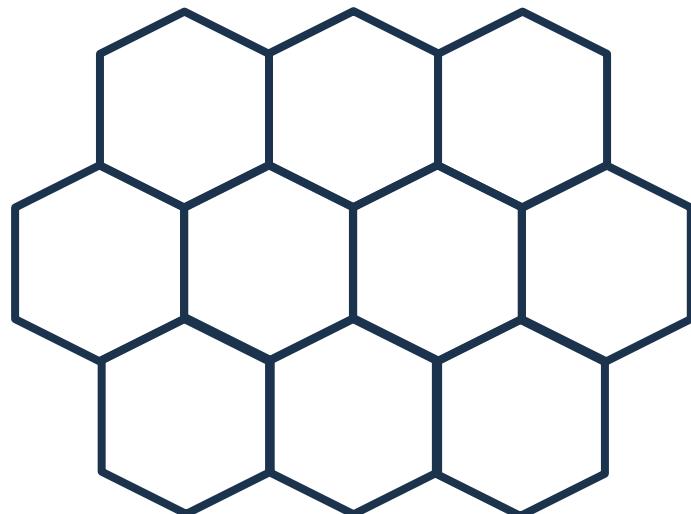
プレクラッシュした部分のみハニカムアッテネータの接着面積として扱われる。

接着面積の算出方法はそれぞれ異なるためここには記載しない。

The above text is from the SES documentation.

Only the pre-crashed portion is treated as the bonding area for the honeycomb attenuator.

The bonding area calculation method differs for each case and is not described here.



- Attenuator and Diagonal
- Anti-Intrusion Plate
- IA Attachment
- Wing Detachment
- Front Bulkhead
- AIP Attachment
- Physical Tests
- Appendix1
- Appendix2

Pedal assemblyの範囲 Pedal Assembly Range

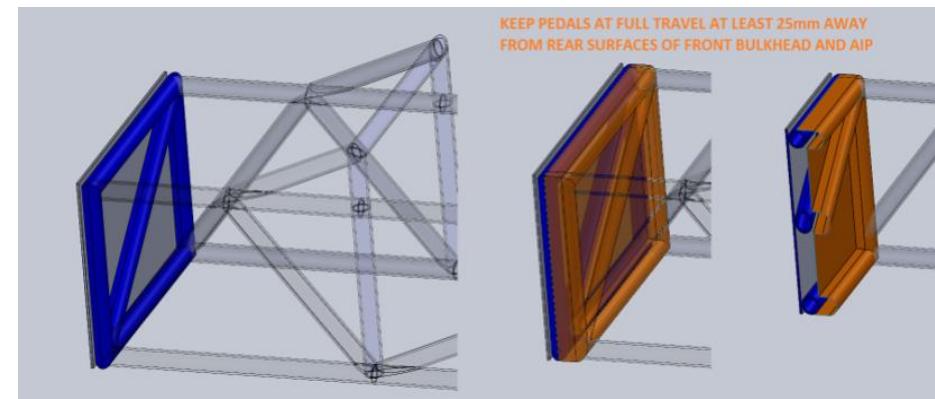
F8.6.3よりフルストローク時および調整可能範囲のフロントバルクヘッドに最も近い条件で、下図のオレンジ色のサークルに接触してはいけません。接触してはいけない「Pedal Assembly」は、ペダルはもとよりマスターシリンダー部分も含むと考えるのが一般的です。

From F8.6.3, under conditions closest to the front bulkhead at full stroke and within the adjustable range, contact with the orange surface shown below must not occur. The “Pedal Assembly” that must not make contact is generally considered to include not only the pedal itself but also the master cylinder section.

Pedal full travelの定義 Definition of Pedal Full Travel

F.8.6.3は、車両が前方から衝突した際に車両前端が25 mm変形することを想定しています。ここでは、ドライバーの足の保護が求められています。衝突の原因がブレーキ抜けである可能性があるので、「Pedal full travel」には「over travel」も含むと考えることが適切です。

F.8.6.3 assumes that the vehicle's front end will deform by 25 mm upon frontal collision. Here, protection for the driver's feet is required. Since brake fade could cause the collision, it is appropriate to consider that “Pedal full travel” includes “over travel.”



おつかれさまでした！
Great work!

SESの作成がんばってください！
Keep up the good work on creating the SES!

大会会場でお会いしましょう！
See you at the tournament venue!