

Presented by

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TBCEE12

Cabin Component Design Features

Fire Properties of Corefiller, Adhesive, „Ditch and Pot“

Design features

Cabin interior components, manufactured from sandwich composites, show design features, e.g.

- filled edges
- spliced core seams
- inserts
- certain edge formation („ditch & pot“ folding technology)

Typically, these features just cover a small percentage of the component volume or of the component surface.

Background

Applicable Requirement to interiors:

FAR/CS 25.853 (a) Appendix F part I paragraph (a)(1)(i)

FAA request

From Partial Grant of Exemption under Regulatory Docket N° FAA-2008-1249, we read that FAA considers:

certain adhesive seams and component edges need to fulfil 60-s-vertical Bunsen burner test criteria.

-burn length max. 152 mm/ 6 inches

-burn time max. 15 s

-burn time of drips max. 5 s

No equivalent request from EASA, expressed so far

Filled edges

sandwich panel



core filler

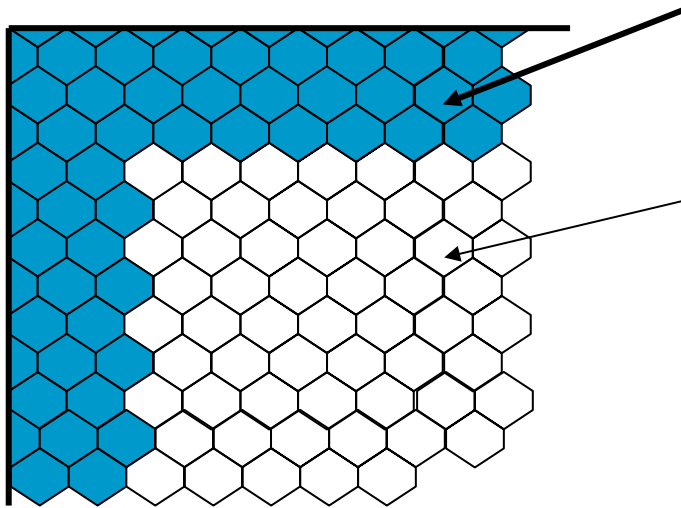
Typically, hot curing systems;
application prior to sandwich curing.

honeycomb core

The core filler mechanically protects component edges.

Edges are shaped by cutting or milling.

Typically applied for flat components with simple edge geometries (partitions, cabinet walls, ...).



5...15 mm (0.2... 0.6 inch)

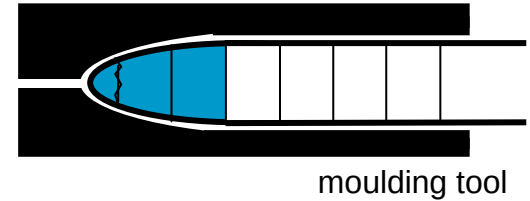
Sketches are not true to scale.

Filled edges

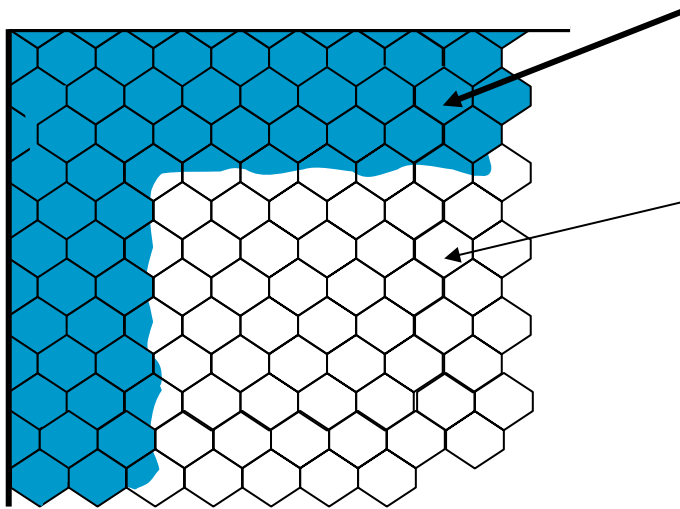
sandwich panel



pregreg



moulding tool



adhesive

Typically, hot curing systems;
application prior to sandwich curing.

honeycomb core

The adhesives supports to shaping of edges (predetermined by moulding tool).

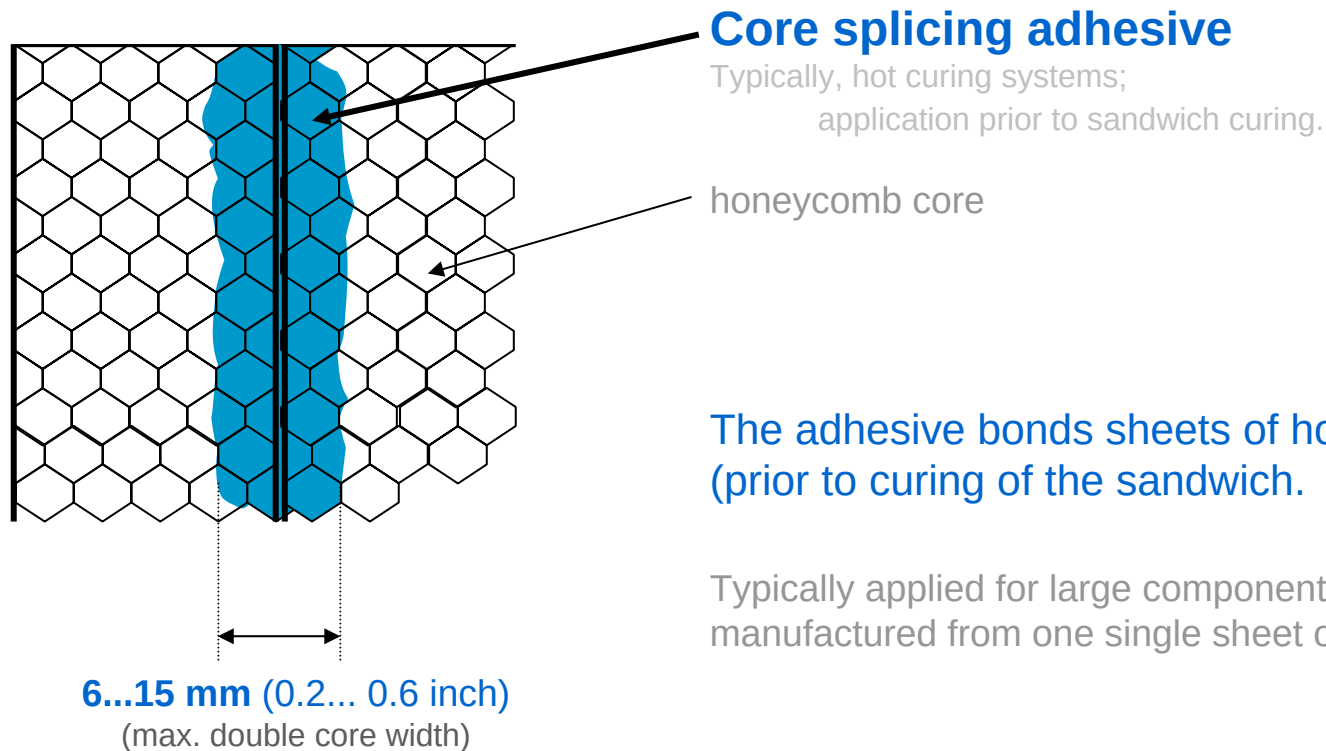
During sandwich curing, the adhesive expands and fills the space between core, prepeg and moulding tool, generating (complex) shapes - supporting the formation of a homogenous surface which won't require much filling and sanding.

3...10 mm (0.1... 0.4 inch)

Typically applied for components with advanced edge geometries (e.g. OHSC door).

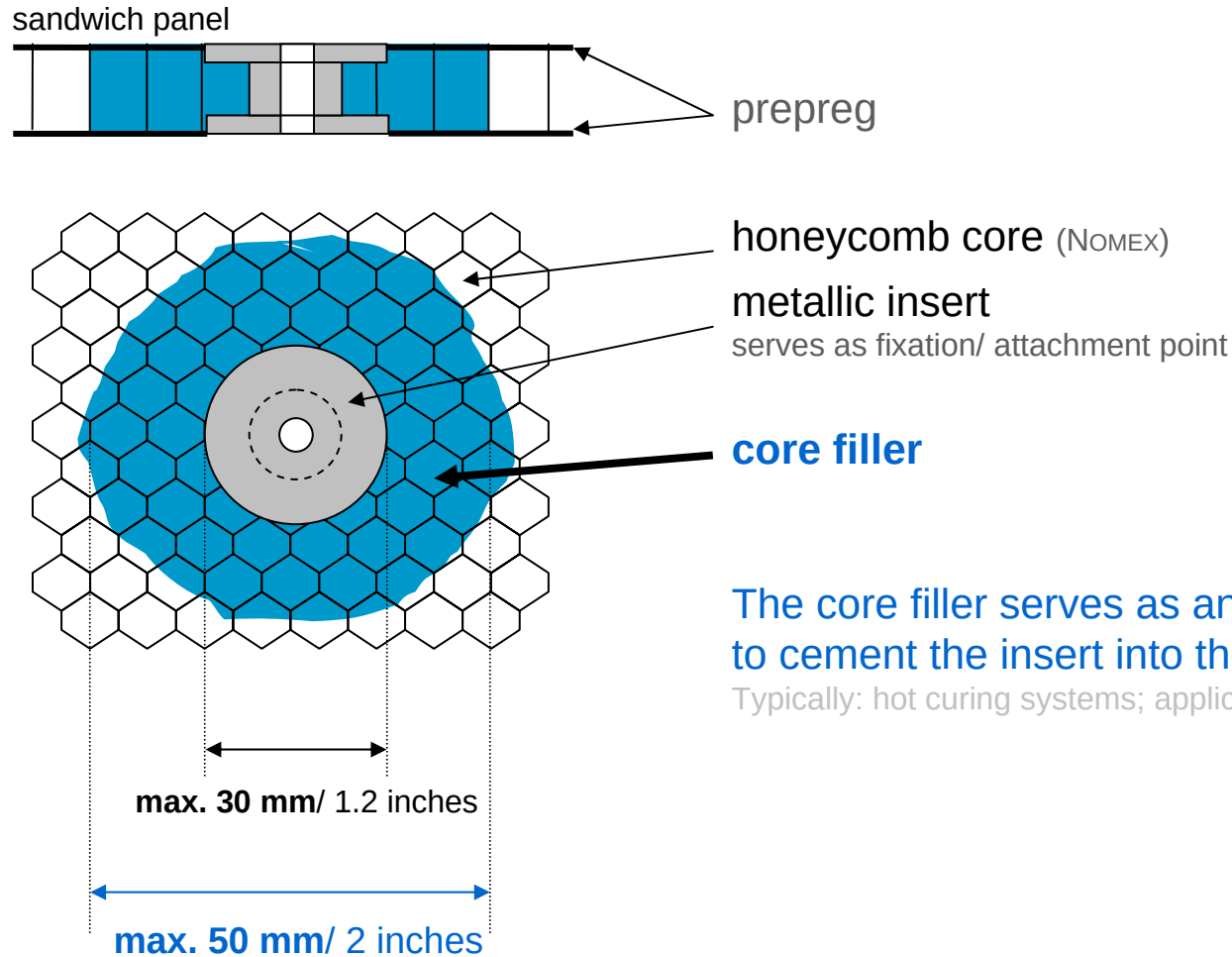
Sketches are not true to scale.

Spliced core seams



Sketches are not true to scale.

Inserts

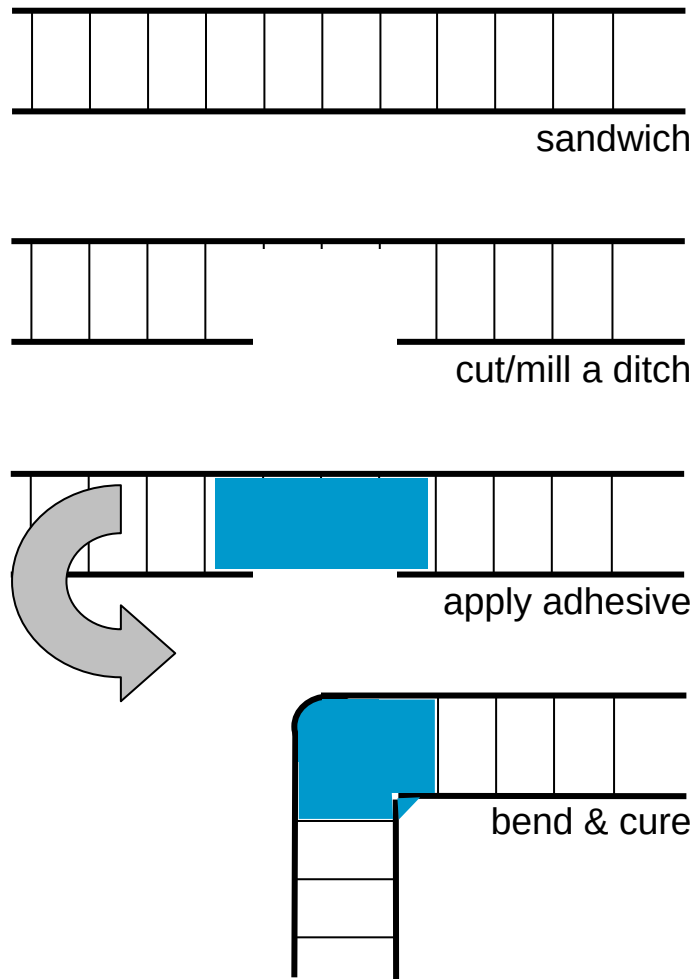


The core filler serves as an adhesive to cement the insert into the sandwich.

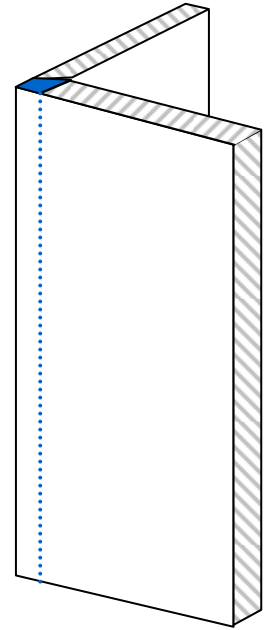
Typically: hot curing systems; application prior to sandwich curing.

Sketches are not true to scale.

„ditch and pot“ component edges



Typically, the production method creates an angled component.



Sketches are not true to scale.

Test sample configuration

Test sample configurations need to be agreed in detail, since the **test method** [FAR 25.853(a) and appendix F, part I] **does not provide comprehensive advice** for testing of component features.

Airworthiness requirements

FAR part 25, **appendix F, part I (b)(2)** „test procedure, specimen configuration“ reads:

...The specimen may be cut from any location in a fabricated part; however, fabricated units, such as sandwich panels, may not be separated for test...

... The edge to which the burner flame is applied must not consist of the finished or protected edge of the specimen but must be representative of the actual cross-section of the material or part as installed in the airplane...

Interpretation I (industry interpretation):

... The edge to which the burner flame is applied must not consist of the finished or protected edge of the specimen...

i.e.: no need to test the edge area.

Interpretation II (FAA interpretation):

... The edge to which the burner flame is applied must not consist of the finished or protected edge of the specimen... i.e. the edge area shall be tested, but the protected edge covering (e.g. the prepreg) shall be removed

contradiction?

Aircraft materials fire test handbook

DOT/FAA/AR-00/12 (**fire test handbook**), para. 1.4.1 „specimen selection“, reads:

...The specimen may be cut from any location in a fabricated part.

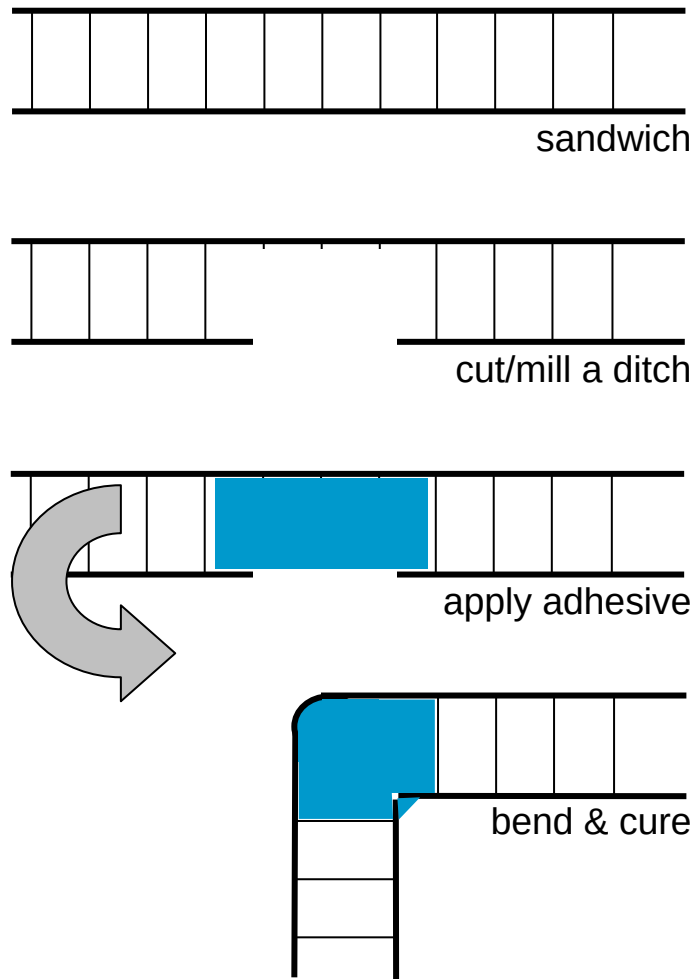
However, the edge to which the burner is applied
must not consist of the finished or protected edge of the specimen.

In other words:

„Cut out the sample from wherever you want
- but don't expose the finished edge to the Bunsen burner flame“.

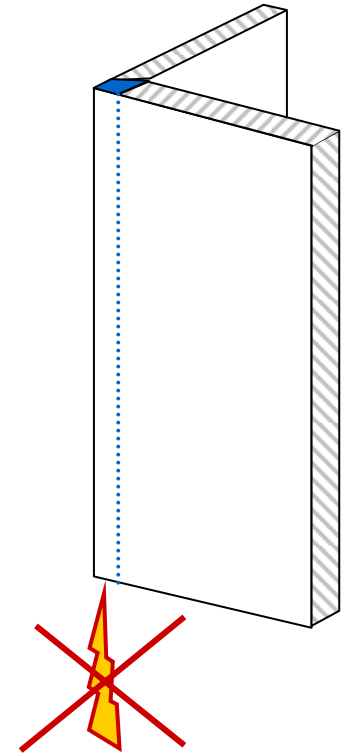
Interpretation - or fact?!

„ditch and pot“



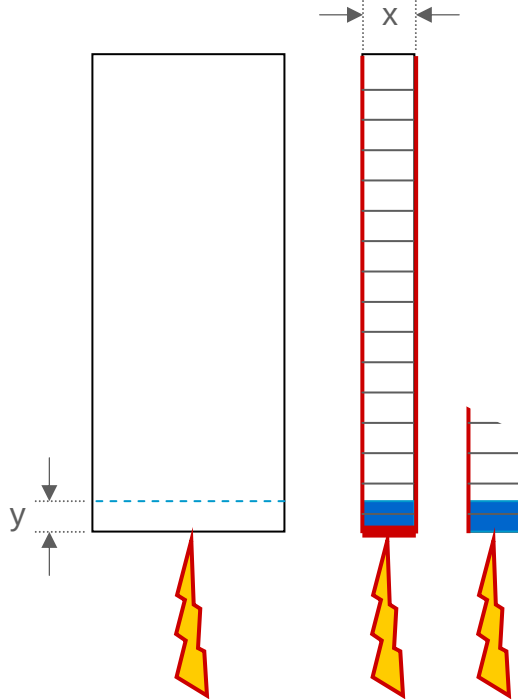
Typically, the production method creates an angled component.

**Not tested
acc. to industry
interpretation**



„as installed...” vs. „appendix F wording“

sandwich panel
core filler, edge *fully capsulated* by prepreg



As installed in the aircraft:

The component consists of an edge filler **fully capsulated** by prepreg layer.

Appendix F, part I, reads:

„The edge to which the burner flame is applied **must not consist of the finished or protected edge** of the specimen **but must be representative** of the actual cross-section of the material or part as installed in the airplane...”

conflict?!

Must the prepreg layer be removed prior to testing?

however, fabricated units, such as sandwich panels, **may not be separated** for test...

Frequently asked questions

Will test coupons of 13 mm/ 0.5 inches thickness qualify thinner or thicker panels?

Suggestion:
Yes, that's generally acceptable.

Do „minor changes to qualified decor materials“ require new testing?

Suggestion:
No, successful initial qualification of a paint or a decor laminate is sufficient.

Further questions or remarks (regulatory point of view, industrial aspects, communication and introduction, ...) ?

ICCAIA*/ Airworthiness Committee / Cabin Safety WG:

Industry suggests the creation of a task group to develop guidance!

*Intl Coordination Council of Aviation Industries Associations

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