NPRM Bench Foam

JPMA May 27, 2021

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Contract and Manufacturer Lab Members

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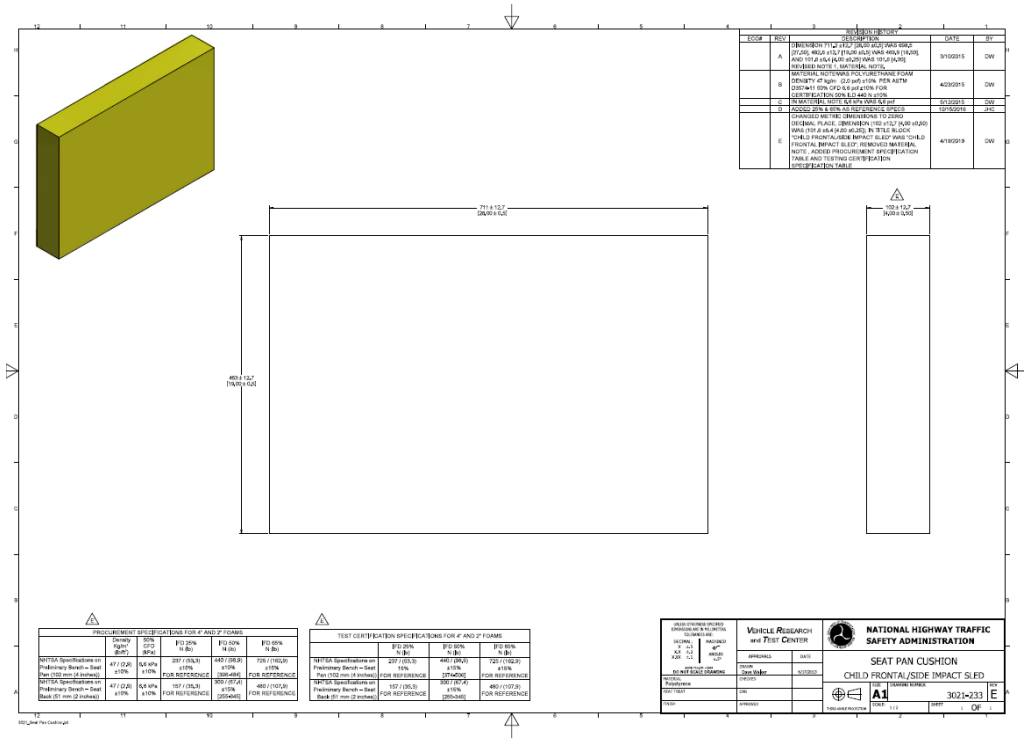
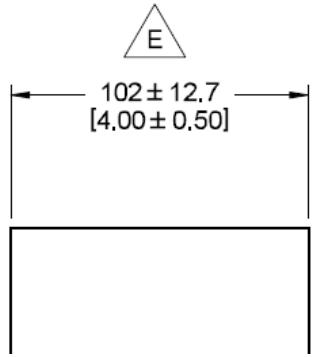
JUVENILE PRODUCTS MANUFACTURERS ASSOCIATION

JPMA (The Juvenile Products Manufacturers Association) is the voice of the industry on quality and safety for baby and children's products in North America.

It does so by advancing the interests of manufacturers, parents, children and the industry at large through product performance certification, events, consumer education, and advocacy with the goal of bringing safe, functional products to market.

Background: The new frontal crash testing NPRM defines the bottom bench foam in the drawing package as 102 ±12.7 mm or 3.5”-4.5” thick.





The JPMA would propose to do a study of these variables to further understand their effect on crash test results.

Currently the JPMA members have not found any studies evaluating the effect of varying thickness on crash test outcomes. Nor any crash effect of having a skived (cut side) vs skinned side facing up.

Allowed variation in foam thickness – real and mock-up

NHTSA Specification for 4” Polyurethane Foam IFD 50%
Density = 47 Kg/m^3 ± 10%
50% CFD(compression force deflection) = 6.6 Kpa ±10%
IFD = 440 N ±10% for procurement 396-484 N
IFD = 440 N ±15% for test certification 374-506 N

There has been some discussion about the method to determine the IFD and the variation that seem to be present between different test labs. Factors may include the load cell size,

The JPMA's theory is that varying thickness will cause repeatability and reproducibility issues.

If this is the case the JPMA would recommend having a mold made for both the 4" base and the 2" back foam.

Molded pieces would yield:

- **A consistent foam thickness**
- **A consistent surface finish**
- **Lower per piece cost (since the secondary cutting operation is eliminated).**
- **Should be a more consistent IFD**
- **Alignment with how vehicle manufacturers create their seating foam**

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Below is a quote from Woodbridge for making molds for the back and bottom foam pieces and the piece price.

Date: November 9, 2020

Ref: NHTSA-tooling and molded child seat blocks with WNV (Job P-0831.01)

No.	Description	Quantity	Each	Total
1	Aluminum Mold with WNV, 19" x 28" x 4".	1	$9,000.00	$9,000.00
2	Aluminum Mold with WNV, 22" x 28" x 2".	1	$9,000.00	$9,000.00
3	Molded parts, 19" x 28" x 4". B surface has WNV (3mm pattern)	10	$200.00	$2,000.00
4	Molded parts, 22" x 28" x 2". B surface has WNV (3mm pattern)	10	$200.00	$2,000.00
5	Set-up fee (per part)	2	$750.00	$1,500.00

Grand Total **$23,500**

Picture for reference only of WNV on B Surface
3mm offset of the b surface

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What is WNV?

THE WOODBRIDGE GROUP

Mastering Science To Serve Our Customers™

INNOVATION ADVANTAGES

- Expands density/hardness window
- Improves quality of thinner parts
- Maintains quality at lower density
- Increased design flexibility
- Potential design cost reduction
- Significantly reduces the potential for voids throughout the part
- Improves A-surface visual quality

WNV™

WOODBRIDGE NETWORK VENTING

WNV™ Woodbridge Network Venting technology is designed to offer robust and consistent venting for Polyurethane seat cushion applications.

WNV™ technology expands the hardness/density window for greater manufacturing flexibility, while improving and maintaining the quality of thinner and lower density parts. This solution provides cost savings through design flexibility, while improving A-surface quality and significantly reducing the potential for voids throughout the part.

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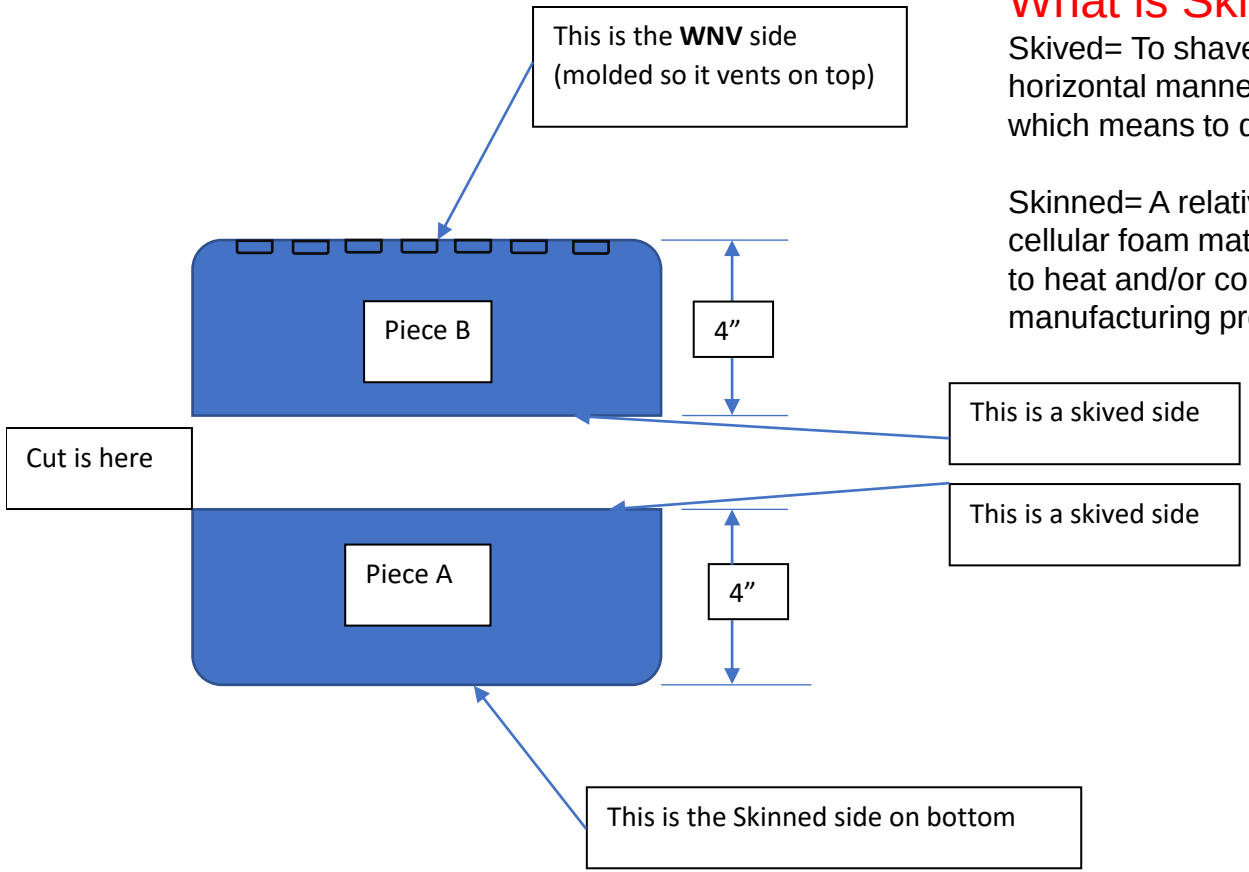
What is Skived vs Skinned?

Skived= To shave or cut off the surface of a material in a horizontal manner. Sometimes referred to as splitting, which means to divide sharply or cleanly into layers.

Skinned= A relatively dense layer at the surface of a cellular foam material. This layer is the result of exposure to heat and/or contact with a mold during the manufacturing process.



JPMA proposes a sample plan such as this:

	Thin	Nominal	Thick
A - Skin Up	3	3	3
A - Skin Down	3	3	3
B - WNV Up	3	3	3
B - WNV Down	3	3	3

Thin= 3.5”, Nominal= 4”, Thick=4.5”

Plan is to test at Graco and Dorel, one seat at each location, in one mode:

- **2 different CR models**
- **2 different CR modes**
- **1 Acceleration sled; 1 Deceleration sled**
- **3 repeats in each of the conditions in chart above.**

Total number of tests = 72 , Graco 36 Dorel 36.

Questions?

Discussion;
What does NHTSA think of one-piece molds?

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