

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS

INSTALLED ON AIRBUS A319/A320/A321/A330 AIRCRAFT

INSTALLED ON Boeing B737/B747/B767/B777 AIRCRAFT

**Greiner-Project:**  
**Adhesive Testing 1275**  
**Simalfa 309 & Intercoll L1415**

DOCUMENT NUMBER: FTP055  
REV B

PREPARED FOR THE  
FEDERAL AVIATION ADMINISTRATION  
FAA PROJECT# SP1978AC-Q

TABLE OF CONTENTS

Section	Title	Page
TP	TITLE PAGE	1
TOC	TABLE OF CONTENTS	2
EFF	EFFECTIVITY	3
REV	RECORD OF REVISIONS	4
1.0	PURPOSE	5
2.0	REFERENCE	5
3.0	TEST FACILITY	5
4.0	TEST SPECIMENS	5
5.0	TEST WITNESSING	5
6.0	CONDITIONING	5
7.0	TEST CRITERIA	6
8.0	TEST CUSHIONS	6
9.0	TEST SPECIMEN DRAWINGS	9
10.0	REQUIRED TEST EQUIPMENT	9
11.0	TEST PROCEDURE	9
12.0	CONCLUSION	10
App A	REFERENCE DOCUMENTS	APP A-1
App B	MATERIAL CERTIFICATIONS	APP B-1
App C	PRODUCTION DRAWINGS BEING QUALIFIED	APP C-1
App D	REPORT	APP D-1

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
**Greiner Project 1275**

Pg: 3  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

EFFECTIVITY

PAGE  
ALL


REVISION  
B

EFFECTIVE DATE  
15 FEB 2008

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: 4  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

RECORD OF REVISIONS

REV	DATE	APPROVED BY	REMARKS
NC	31 JAN 2008	SPARKMAN	INITIAL RELEASE
A	11 FEB 2008	SPARKMAN	Incorporated test results.
B	15 FEB 2008	SPARKMAN 	Incorporated DER John Buckley's comments.

The purpose of this page is to identify and approve any and all changes made to this document. Changes shall be identified on their respective page in **BOLD/ITALIC** print. The REMARKS column above shall give a brief description of the change.

This document is maintained at the below listed address. Any questions or concerns regarding this document should be addressed to the contact person below.

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## 1.0 PURPOSE

This Flammability Test Plan has been prepared in order to outline the testing to be performed on test specimens to demonstrate compliance with the requirements of 14 CFR 25.853(c), Amdt 25-116. The flammability test method is in accordance with 14 CFR 25.853, App. F, Part II, effective October 27, 2004. Results meeting the criteria of Section 7.0 will show the Alfa Adhesives Simalfa 309 is an acceptable replacement for the Wakol Intercoll L1415.

## 2.0 REFERENCES

- 14 CFR 25.853
- AC 25.853-1
- Aircraft Material Fire Test Handbook, DOT/FAA/AR-00/12

## 3.0 TEST FACILITY

The testing will be accomplished at an FAA Approved test facility.

## 4.0 TEST SPECIMENS

For each test, three vertical and three horizontal specimen cushions will be prepared and covered with a fireblocking layer and an appropriate dress cover to be qualified. Test specimen sets must be manufactured in accordance with test specimen drawings shown in Section 9. The specimen sets must be conformed prior to the testing.

## 5.0 TEST WITNESSING

Witnessing to be performed by the FAA or an authorized designee.

## 6.0 CONDITIONING

The specimens will be conditioned at  $70^{\circ} \pm 5^{\circ}\text{F}$  and  $55\% \pm 10\%$  relative humidity for a minimum of 24 hours prior to testing.

## 7.0 TEST CRITERIA

For each of the burn lengths measured, the burn length may not exceed 17 inches on at least 2/3 of the total number of specimens tested. The average weight loss of the total specimen sets must not exceed 10%.

The materials used in the test specimens comply with 14 CFR 25.853(a). Vertical test reports for the materials used to manufacture these specimens will be included in the final report of this document.

Foams used that are manufactured from the same materials but of differing ILD's and densities, may be qualified by the foam having the lowest ILD and density. Multiple type foams of different percentages may be qualified by testing maximum in both directions. For example, 100% soft/0% hard foams and 50% soft/50% hard foams may only need to be tested in order to establish an envelope qualification.

In order to show equivalence between the two adhesives, both tests must have results with no significant difference (within normal scatter). In the event that significant difference is observed, the Simalfa 309 must show the less critical performance. A passing test for 14 CFR 25.853 (c) compliance is not a requirement to show adhesive similarity.

## 8.0 TEST CUSHIONS

Test Specimen Set No. 1 – btspe409-309, btrpe409-309

Btspe409-309 – bottom / horizontal specimen

Btrpe409-309 – backrest / vertical specimen

The test cushions are manufactured using Greiner PURtec's moulded 60 % Polyurethane AW01, 40 % Polyethylene AP01 (LD24FR), and a PUX 9 fire blocking layer which fully encapsulates the foams. Glue type Simalfa 309 manufactured by Alfa Adhesive is used to bond the fireblocker to the foam, and foam to foam. Cushions are to be tested with no dress covers.

ITEM	DESCRIPTION	MANUFACTURER	PART NUMBER	LOT# (*)
3	Fireblocking layer	Greiner PURtec	PUX 9	1488.00
1	Soft foam, Polyurethane (60 %)	Greiner PURtec	AW01	P2D4000128/ P4DB000148
2	Hard foam, Polyethylene (LD24) (40 %)	Greiner PURtec	AP01	169273
4	Adhesive, foam(not shown)	Alfa Adhesive	Simalfa 309	11983072911
6	Hot melt adhesive			
8	Hook Velcro tape 100% polyester(not shown)	Velcro GmbH	Hook Velcro Tape	0706051118

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
**Greiner Project 1275**

Pg: 7  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Test Specimen Set No. 2 – bts00009-309, btr00009-309

bts00009-309 – bottom / horizontal specimen

btr00009-309 – backrest / vertical specimen

The test cushions are manufactured using Greiner PURtec's moulded 100 % Polyurethane AW01 and a PUX 9 fire blocking layer which fully encapsulates the foams. Glue type Simalfa 309 manufactured by Alfa Adhesive is used to bond the fireblocker to the foam, and foam to foam. Cushions are to be tested with no dress covers.

ITEM	DESCRIPTION	MANUFACTURE R	PART NUMBER	LOT# (*)
3	Fireblocking layer	Greiner PURtec	PUX 9	1488.00
1	Soft foam, Polyurethane (100 %)	Greiner PURtec	AW01	P2D4000128/ P4DB000148
2	Not used			
4	Adhesive, foam(not shown)	Alfa Adhesive	Simalfa 309	11983072911
6	Hot melt adhesive			
8	Hook Velcro tape 100% polyester(not shown)	Velcro GmbH	Hook Velcro Tape	0706051118

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
**Greiner Project 1275**

Pg: 8  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Test Specimen Set No. 3 – btspe409-L1415, btrpe409-L1415

Btspe409-L1415 – bottom / horizontal specimen

Btrpe409-L1415 – backrest / vertical specimen

The test cushions are manufactured using Greiner PURtec's moulded 60 % Polyurethane AW01, 40 % Polyethylene AP01 (LD24FR), and a PUX 9 fire blocking layer which fully encapsulates the foams. Glue type Intercoll L1415 manufactured by Wakol is used to bond the fireblocker to the foam, and foam to foam. Cushions are to be tested with no dress covers.

ITEM	DESCRIPTION	MANUFACTURER	PART NUMBER	LOT# (*)
3	Fireblocking layer	Greiner PURtec	PUX 9	1488.00
1	Soft foam, Polyurethane (60 %)	Greiner PURtec	AW01	P2D4000128/ P4DB000148
2	Hard foam, Polyethylene (LD24) (40 %)	Greiner PURtec	AP01	169273
5	Adhesive, foam(not shown)	Wakol	Intercoll L1415	07020168
6	Hot melt adhesive			
8	Hook Velcro tape 100% polyester(not shown)	Velcro GmbH	Hook Velcro Tape	0706051118



FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
**Greiner Project 1275**

Pg: 9  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Test Specimen Set No. 4 – bts00009-L1415, btr00009-L1415

bts00009-L1415 – bottom / horizontal specimen

btr00009-L1415 – backrest / vertical specimen

The test cushions are manufactured using Greiner PURtec's moulded 100 % Polyurethane AW01 and a PUX 9 fire blocking layer which fully encapsulates the foams. Glue type Intercol L1415 manufactured by Wakol is used to bond the fireblocker to the foam, and foam to foam. Cushions are to be tested with no dress covers.

ITEM	DESCRIPTION	MANUFACTURER	PART NUMBER	LOT# (*)
3	Fireblocking layer	Greiner PURtec	PUX 9	1488.00
1	Soft foam, Polyurethane (100 %)	Greiner PURtec	AW01	P2D4000128/ P4DB000148
2	Not used			
5	Adhesive, foam(not shown)	Wakol	Intercol L1415	07020168
6	Hot melt adhesive			
8	Hook Velcro tape 100% polyester(not shown)	Velcro GmbH	Hook Velcro Tape	0706051118

## 9.0 TEST SPECIMEN DRAWINGS

The test specimen drawings are:

ftp055, rev N/C

See Appendix C for test specimen drawings.

## 10.0 REQUIRED TEST EQUIPMENT

Refer to appendix A or test facility's FAA Approved Test Procedures.

## 11.0 TEST PROCEDURE

Refer to appendix A or test facility's FAA Approved Test Procedures.

## 12.0 CONCLUSION

**Table 12-1 Test Results**

Set #	Serial #	Burn across	Weight Loss	Weight Loss Average
Set No. 1 – btspe409-309, btrpe409-309	001	15.9	7.06%	8.66%
	002	17.0	10.0%	
	003	17.0	8.89%	
Set No. 2 – bts00009-309, btr00009-309	001	16.0	5.80%	4.96%
	002	16.8	5.28%	
	003	14.5	3.80%	
Set No. 3 – btspe409-L1415, btrpe409-L1415	001	16.4	6.67%	8.91%
	002	17.0	11.23%	
	003	16.4	8.84%	
*Set No. 4 – bts00009-L1415, btr00009-L1415	001	12.8	4.98%	6.64%
	002	18.0	7.92%	
	003	18.0	7.03%	

- This is a failed test.

The test results show that the Simalfa 309 adhesive has equivalent or marginally less critical performance in a 14 CFR 25.853(c) test environment when compared to the Wakol Intercoll L1415 adhesive. The criteria of this test plan have been met, and therefore the Simalfa 309 is approved as an alternate/replacement for the Wakol Intercoll L1415 adhesive.

APPENDIX A  
REFERENCE DOCUMENTS

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
**Greiner Project 1275**

Pg: App A-2  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

- 14 CFR 25.853
- AC 25.853-1
- Aircraft Material Fire Test Handbook, DOT/FAA/AR-00/12 Section 7

APPENDIX B  
MATERIAL CERTIFICATIONS

## Material Certification

according to FAR 25.853 (a), sowie Appendix F, Part I - Vertikal burn test



test prepared for: - test No.: 30-01-08

P/O No. Customer: -

<b>Material description</b>		polyurethane foam AW01
		Lot.-No. P2D4000128 / P4DB000148
article no.:		n.a.
content	%	100
density	kg/m <sup>3</sup>	~ 60
density	pcf	n.a.


<b>test method</b>		
ignition time: 12 sec.	material position: vertical	temp.: 850+-60° C

<b>test results:</b>		set 1	set 2	set 3	test- requirement (maximum)
flame time	sec	0	0	0	15
burn length	cm	11	9,5	10,5	20,3
burn length	inch	4,33	3,74	4,13	8,00
drip flame time	sec	0	0	0	5
passed yes/no					

average flame time	sec	0,00	<b>yes</b>
average burn length	cm	10,33	<b>yes</b>
average burn length	inch	4,07	<b>yes</b>
average drip flame time	sec	0,00	<b>yes</b>

<b>comments</b>	
set 1:	
set 2:	
set 3:	

test results comply to FAR 25.853 (a), sowie Appendix F, Part I

signature:  test date: January, 30rd 2008  
Quality Personnel  
Greiner PURtec

## Material Certification

according to FAR 25.853 (a), sowie Appendix F, Part I - Vertikal burn test



test prepared for: - test No.: 29-01-08

P/O No. Customer: -

Material description		PUX 9 - Textile Fire Blocker
batch no.		1488.00
content	%	100 % cotton
density	gr/m <sup>2</sup>	~ 260
density	pcf	-

test method		
ignition time: 12 sec.	material position: vertical	temp.: 850+-60° C

test results:		set 1	set 2	set 3	test- requirement (maximum)
flame time	sec	0	0	0	15
burn length	cm	6	5	5,5	20,3
burn length	inch	2,36	1,97	2,17	8,00
drip flame time	sec	0	0	0	5

		passed yes/no	
average flame time	sec	0,0	Yes
average burn length	cm	5,5	Yes
average burn length	inch	2,17	Yes
average drip flame time	sec	0,0	Yes

comments	
set 1:	-
set 2:	-
set 3:	-

test results comply to FAR 25.853 (a), sowie Appendix F, Part I

signature:

test date: January, 29th 2008

Quality Personnel  
Greiner PURtec

## Material Certification

according to FAR 25.853 (a), sowie Appendix F, Part I - Vertikal burn test



test prepared for:	-	test No.:	03-12-07
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P/O No. Customer:	-
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<b>Material description</b>		Velcro Hook 25 mm
		Lot.-No.: 0706051118
article no.:		n.a.
content	%	n.a.
density	kg/m <sup>3</sup>	n.a.
density	pcf	n.a.

<b>test method</b>		
ignition time: 12 sec.	material position: vertical	temp.: 850+-60° C

test results:					test-
		set 1	set 2	set 3	requirement (maximum)
flame time	sec	0	0	0	15
burn length	cm	12	15	14	20,3
burn length	inch	4,72	5,91	5,51	8,00
drip flame time	sec	0	0	0	5

passed yes/no			
average flame time	sec	0,00	<b>yes</b>
average burn length	cm	13,67	<b>yes</b>
average burn length	inch	5,38	<b>yes</b>
average drip flame time	sec	0,00	<b>yes</b>

<b>comments</b>	
set 1:	
set 2:	
set 3:	

test results comply to FAR 25.853 (a), sowie Appendix F, Part I

A handwritten signature in black ink, appearing to read "W. K. Kallen", is written over the bottom of the page.



## Material Certification

according to FAR 25.853 (a), sowie Appendix F, Part I - Vertikal burn test



test prepared for:	Incoming Inspection	test No.:	15-11-07
--------------------	---------------------	-----------	----------

P/O No. Customer:	Intern
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<b>Material description</b>		Polyethylene Foam LD 24 FR (= AP01)
		Lot.-No. 169273
article no.:		n.a.
content	%	-
density	kg/m <sup>3</sup>	24
density	pcf	n.a.

<b>test method</b>		
ignition time: 12 sec.	material position: vertical	temp.: 850+-60° C

test results:					test-
		set 1	set 2	set 3	requirement (maximum)
flame time	sec	0	0	0	15
burn length	cm	12,5	13	12	20,3
burn length	inch	4,92	5,12	4,72	8,00
drip flame time	sec	1	1	1	5

passed yes/no			
average flame time	sec	0,00	yes
average burn length	cm	12,50	yes
average burn length	inch	4,92	yes
average drip flame time	sec	1,00	yes

<b>comments</b>	
set 1:	
set 2:	
set 3:	

test results comply to FAR 25.853 (a), sowie Appendix F, Part I

signature:

A handwritten signature in black ink, appearing to read "H. Friesenberger".

test date: November, 15th 2007

Quality Personnel  
Greiner PURtec

**ALFA**  
Klebstoffe AG

*Rein J. J. J.*

## Produktionsprüfzeugnis / Production Analysis

Rafz, 29.11.07

**SIMALFA®** 309  
**Farbe / Color** rot  
**Prod. Datum / Prod. Date** 29.11.2007  
**Charge Nr. / Batch no.** 11983072911

### Prüfungen / Tests:

Viskosität Brookfield RVF, Spindel Nr. 2 bei 10/20 U/min. .../20 x 20 = mPa/s  
Viscosity Brookfield RVF, Spindel No. 2 by 10/20 r/min. .../20 x 20 = mPa/s

Wert / Value : 31/45 = 900

### Spritztest / Spray test :

Resultat / Result : i.O. / ok

**Der Prüfer / inspected by:** *R. Kern* / R. Gehring

Bei Rückfragen sind Ihre Ansprechpartner:  
In case of questions please contact:

Th. Simmler oder/or M. Bellante; ++41 (0)43 433 30 30

## TELEFAXNACHRICHT



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Wakol Bottenbacherstraße 30 • D 66954 Pirmasens

Greiner PURtec GmbH  
Qualitätssicherung  
z. Hd. Herrn Weinrich  
Erwin Greiner Straße  
**A 4690 Schwanenstadt**

Fax-Nr.: 0043/7673/6003-33

Ihr Zeichen: -  
Ihr Datum: -  
Unser Zeichen: fr  
Unser Datum: 31.05.2007  
Ihnen schreibt: Jürgen Fritz  
Tel. Durchwahl: 06331/8001-129  
Fax-Nr.: 06331/8001-851

### Qualitätsprüf-Zertifikat DIN 55 350-18-4.2.2

Bestelldaten: per Fax  
Produkt: Intercoll L 1415 rot  
Artikelnummer: 1415  
Chargennummer: 07020168

Prüfung	Methode	Spezifikation	Ist-Daten	Einheit
Auslaufzeit:	WPV 8 (4mm)	55 ± 5	56	sec
Festkörpergehalt:	WPV 1 T3	22,3 ± 2	21,2	%
Dichte:	WPV 27 T2	0,83 ± 0,05	0,84	g/ml
Filmversprödung	WPV 11		entspricht	

Mit freundlichen Grüßen  
Wakol GmbH

i.A. Jürgen Fritz



Wakol GmbH  
Sitz der Gesellschaft Pirmasens, HRA 2028  
Geschäftsführer: Heinz Dieter Groß, Dr. Götz Hillert

Wakol Waller Kolodziej GmbH & Co. KG  
Sitz der Gesellschaft Pirmasens, HRA 2208  
Geschäftsführer: Heinz Dieter Groß, Dr. Götz Hillert

Bottenbacher Str. 30  
66954 Pirmasens  
www.wakol.com

APPENDIX C  
DRAWINGS BEING QUALIFIED

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
**Greiner Project 1275**

Pg: App C-2  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

The part numbers being qualified under this test plan are listed below:

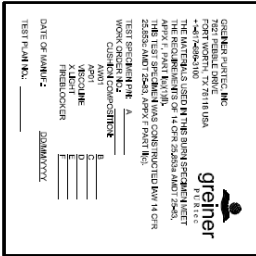
Part Numbers of Burn Test Samples:			
GREINER P/N	DESCRIPTION	FOAM & FIREBLOCKING USED	DRESS COVER MATERIAL
Btspe409-309	Horizontal specimen	60 % PU/ 40 % PE, PUX 9	N/A
Btrpe409-309	Vertical specimen	60 % PU 40 % PE, PUX 9	N/A
Bts00009-309	Horizontal specimen	100% PU, PUX 9	N/A
Btr00009-309	Vertical specimen	100% PU, PUX 9	N/A
Btspe409-L1415	Horizontal specimen	60 % PU/ 40 % PE, PUX 9	N/A
Btrpe409-L1415	Vertical specimen	60 % PU 40 % PE, PUX 9	N/A
Bts00009-L1415	Horizontal specimen	100% PU, PUX 9	N/A
Btr00009-L1415	Vertical specimen	100% PU, PUX 9	N/A

Drawings for the above listed Greiner part numbers follow.

Pg: App C-3  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

**GENERAL NOTES (UNLESS OTHERWISE SPECIFIED):**

- 1 MATERIAL SUPPLIER DEFINED PER GREENER DOCUMENT NO. SL-1 (COM).
- 2 CUSHION SHALL BE MANUFACTURED PER GREENER PROCESS SPEC. PS-1.
- 3 BOND FIBRE BLOCK AND FOAM USING ADHESIVE IN BOW ON DRAWING.
- 4 ALL DIMENSIONS ARE IN INCHES.
- 5 BOND VELCRO ON PURVES TEXTILE FREELOCKER USING PURVES ADH02.
- 6 ALL MATERIALS USED COMPLY WITH 14 CFR 23.655a.
- 7 PLACARD AND VELCRO ARE OPTIONAL.



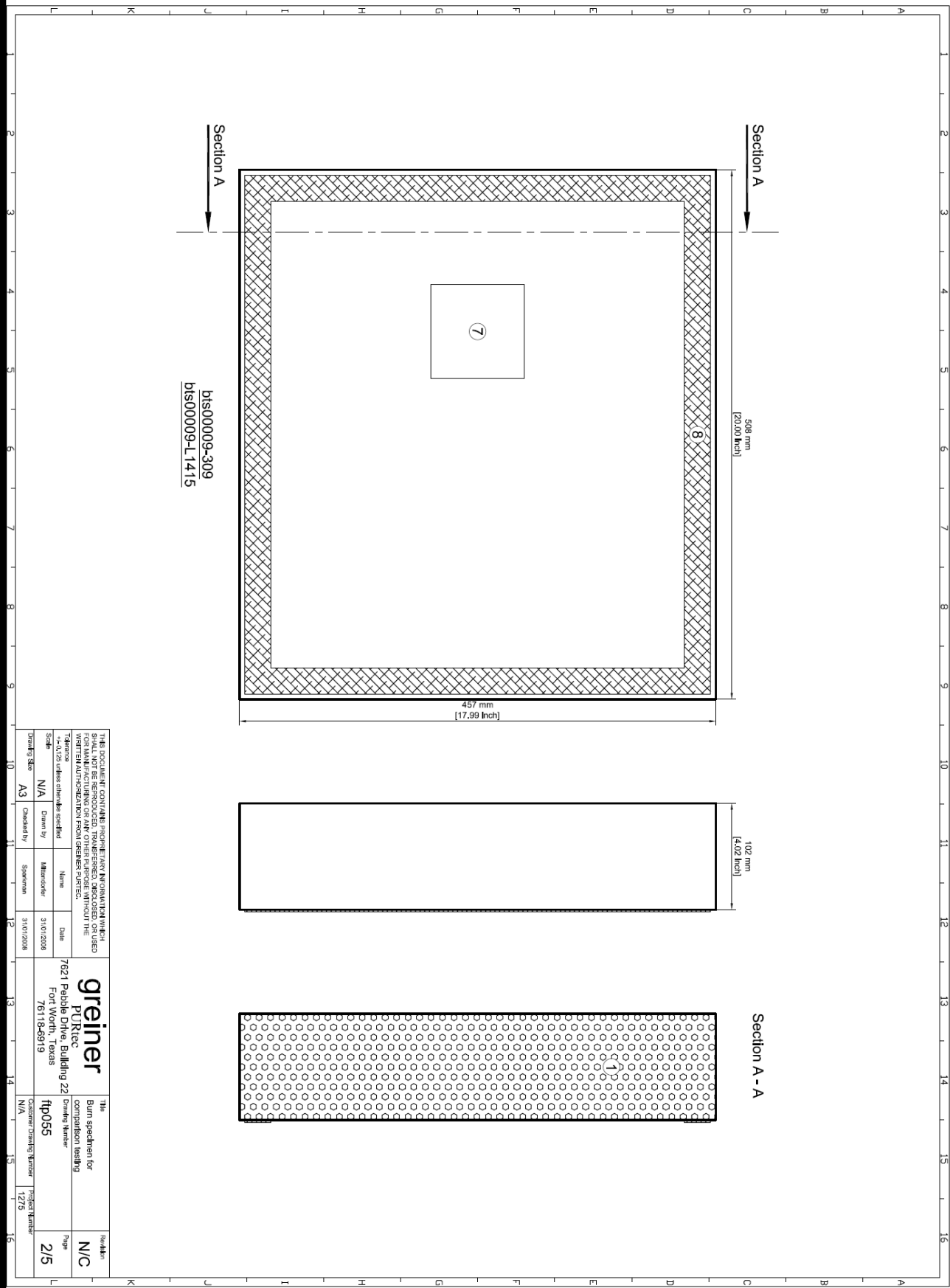
SPECIMEN P/N	$\Delta^A$	AWOI %	AOI %	VISCOSITY	X LIGHT	FIREBROOKER
	"B"	"C"	"D"	"E"	"F"	"G"
bhs00008-309	N/A	N/A	N/A	Pak 9		Pak 9
bhs00009-1415	100	N/A	N/A	Pak 9		Pak 9
bhs00010-309	60	N/A	N/A	Pak 9		Pak 9
bhs00011-1415	60	40	N/A	N/A		Pak 9
bhs00008-309	100	N/A	N/A	N/A		Pak 9
bhs00009-1415	100	N/A	N/A	N/A		Pak 9
bhs00010-309	60	N/A	N/A	N/A		Pak 9
bhs00011-1415	3	2	N/A	N/A		Pak 9

Ind. Rev	Revision Description	Approved by	Date
-	Initial release	M. Bendorfer	31/01/2008

<p>THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION WHICH IS NOT TO BE DISTRIBUTED OUTSIDE THE COMPANY OR FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN AUTHORIZATION FROM GREINER PARTICLES.</p> <p>7 References          1. Various materials and methods as specified.          2. Various materials and methods as specified.</p> <p>8 Vertical Specimen</p> <p>9</p>									
<p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p>26</p> <p>27</p> <p>28</p> <p>29</p> <p>30</p> <p>31</p> <p>32</p> <p>33</p> <p>34</p> <p>35</p> <p>36</p> <p>37</p> <p>38</p> <p>39</p> <p>40</p> <p>41</p> <p>42</p> <p>43</p> <p>44</p> <p>45</p> <p>46</p> <p>47</p> <p>48</p> <p>49</p> <p>50</p> <p>51</p> <p>52</p> <p>53</p> <p>54</p> <p>55</p> <p>56</p> <p>57</p> <p>58</p> <p>59</p> <p>60</p> <p>61</p> <p>62</p> <p>63</p> <p>64</p> <p>65</p> <p>66</p> <p>67</p> <p>68</p> <p>69</p> <p>70</p> <p>71</p> <p>72</p> <p>73</p> <p>74</p> <p>75</p> <p>76</p> <p>77</p> <p>78</p> <p>79</p> <p>80</p> <p>81</p> <p>82</p> <p>83</p> <p>84</p> <p>85</p> <p>86</p> <p>87</p> <p>88</p> <p>89</p> <p>90</p> <p>91</p> <p>92</p> <p>93</p> <p>94</p> <p>95</p> <p>96</p> <p>97</p> <p>98</p> <p>99</p> <p>100</p>									

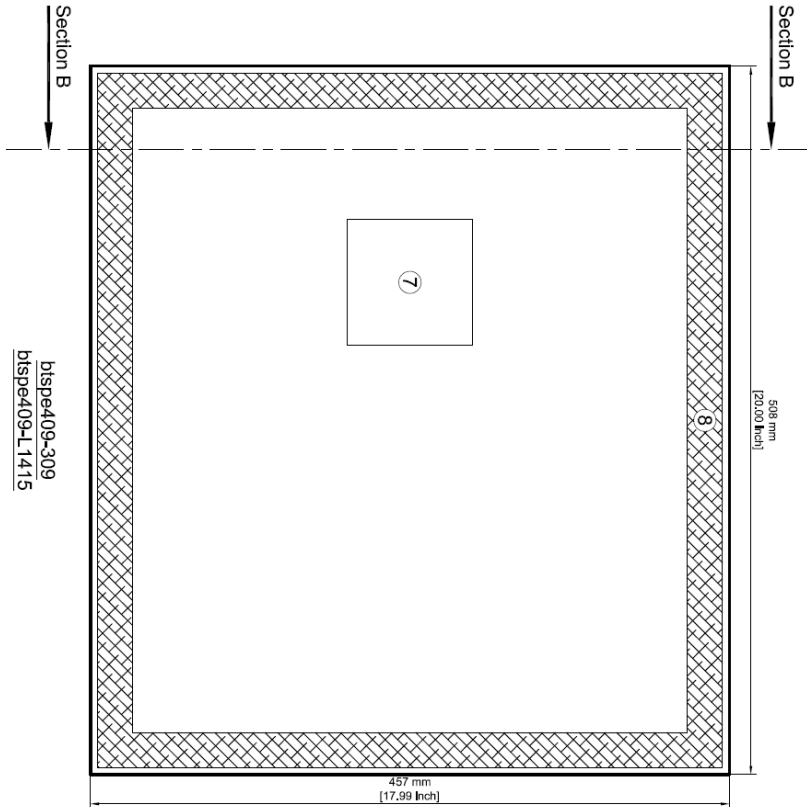
FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App C-4  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

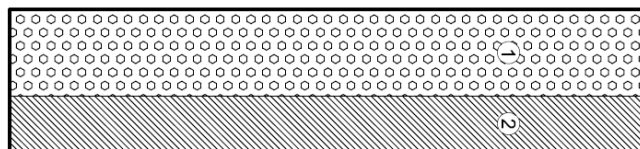


FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App C-5  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055



bispe409-309  
bispe409-L1415

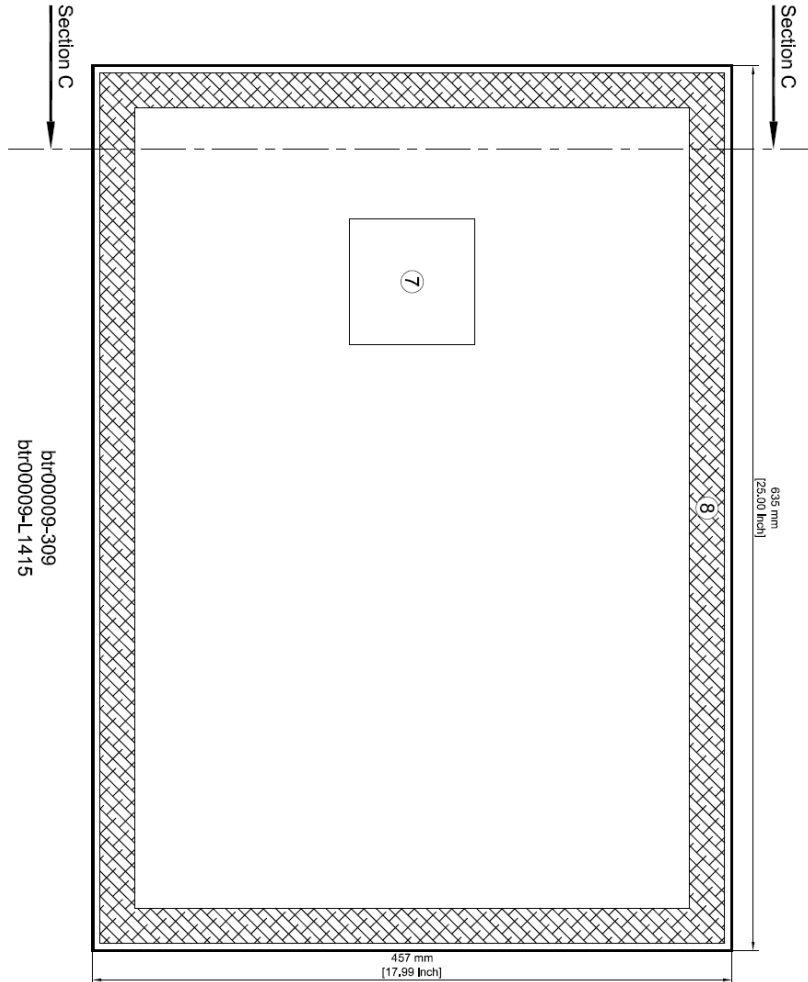


THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION WHICH SHALL NOT BE REPRODUCED, TRANSMITTED, OR USED WITHOUT THE WRITTEN AUTHORIZATION FROM GREINER PAPER, INC.				<b>greiner</b>		Title		Revision
Reference		Name		Date		PUR Rec		
14-175 various styles specified				7621 Pebble Drive, Building 22		Burn specimen for		N/C
Style		Material		Fort Worth, Texas		comparison testing		
Drawing No. A3		Drawn by		76118-6919		Drawing Number		3/5
Created by		Specification		FTP055		Customer Drawing Number		
		N/A		Project Number		1275		

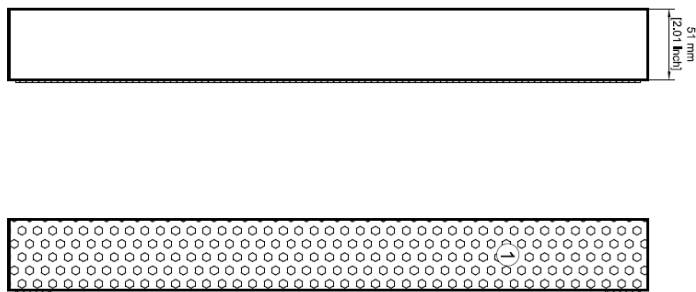


FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App C-6  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055



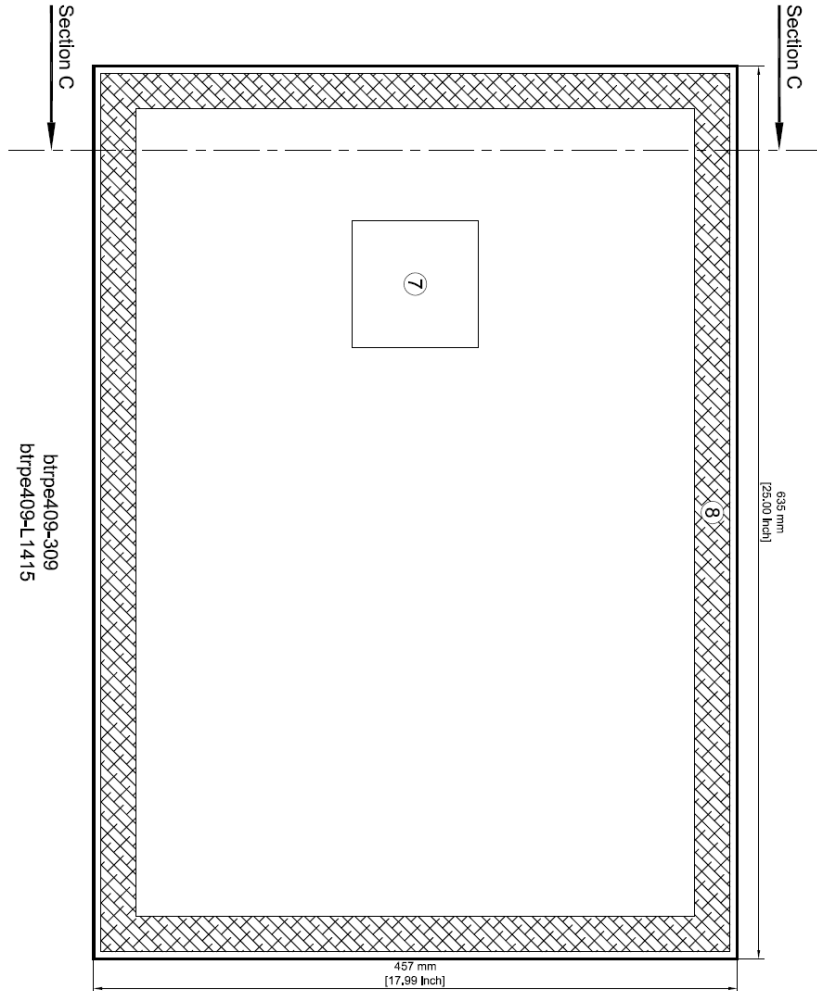
btr00009-309  
btr00009-L1415



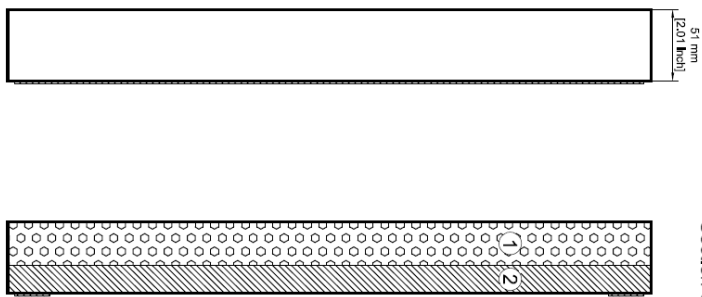
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Title		Revision	
Bum specimen for comparison testing		N/C	
Drawing Number		Page	
ftp055		4/5	
Customer Drawing Number		Project Number	
N/A		1275	
Drawing Size: A3			
Scale: N/A			
Drawn by: M. W. W. 3/10/2008			
Checked by: S. W. W. 3/10/2008			
Reference		Name	
1-2011 series drawings modified		7621 Pebble Drive, Building 22 Fort Worth, Texas 76118-6919	
Date		3/10/2008	

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App C-7  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055



btrpe409-309  
btrpe409-L1415



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Reference	Scale	Drawn by	Name
7621 Pebble Drive, Building 22 Fort Worth, Texas 76118-0919	N/A	3/15/2008	76118-0919
Drawn by	Checked by	Specimen	3/15/2008
A3			
Title		Revision	
Burn specimen for combustion testing		N/C	
Drawing Number		Page	
ftp055		5/5	
Customer Drawing Number		Project Number	
N/A		1275	

APPENDIX D  
TEST REPORT

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App D-2  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Testing was conducted at Starr Aircraft in Sherman, Texas and witnessed by Greiner PURtec Director of Quality & Certification, John Sparkman, on February 6, 2008.

STARR AIRCRAFT PRODUCTS HORIZONTAL BURN TEST CALIBRATION DATA

Control Room Temperature: 71 F  
(70 +/- 5 degrees F)

Control Room Humidity: 52 %  
(55% +/- 10%)

Anemometer Reading: 1875 F.P.M.  
(1700 - 1918 F.P.M.)

Oil Burner Fuel Pressure: 90 P.S.I.  
(P.S.I.)

Hot Wire Anemometer  
Above Top of Vertical Cushion: 16 F.P.M.  
(25 +/- 10 F.P.M.)  
Above Top of Horizontal Cushion: 7 F.P.M.  
(Less Than 10 F.P.M.)

Calibration routine started at 22:37:22 on 2/5/2008

Calorimeter reading: 10.95  
Target heat flux: 10.5 +/- .5 BTU/sq ft-secs.  
Calorimeter calibration PASSED at 22:40:48 on 2/5/2008.

Thermocouple readings in degrees Fahrenheit:  
TC 1 temperature 1815 - PASSED  
TC 2 temperature 1807 - PASSED  
TC 3 temperature 1855 - PASSED  
TC 4 temperature 1800 - PASSED  
TC 5 temperature 1856 - PASSED  
TC 6 temperature 1809 - PASSED  
TC 7 temperature 1808 - PASSED  
Average thermocouple temperature: 1822 F  
Target temperature: 1900 +/- 100 degrees Fahrenheit.  
Thermocouple calibration PASSED at 22:44:55 on 2/5/2008

Calibration routine finished at 22:45:41 on 2/5/2008

STARR AIRCRAFT PRODUCTS INC®  
SCIENTIFIC DATA LOG

0042

Test Number: Test Specimen P/N  
htspe 409-L1415 Test Date: 2-6-08  
Customer: Greiner Purtec, Inc. / Weber  
Control Room Temperature: 71 °F Control Room Humidity: 52%  
Anemometer Reading at burner: 1875 FT/MIN  
Air Velocity Across Top of Vertical Specimen: 16 FT/MIN  
Air Velocity Across Top of Horizontal Specimen: 7 FT/MIN  
Fuel Pressure Reading: 90 P.S.I.  
Calorimeter Reading: 10.95 BTU/FT²SEC.

Thermocouple Readings:

No. 1 1815 °F  
No. 3 1855 °F  
No. 5 1856 °F  
No. 7 1808 °F

No. 2 1807 °F  
No. 4 1800 °F  
No. 6 1809 °F  
Avg. = 1822 °F

Specimen Set Weights:	Before Burn	After Burn	% Weight Loss
Specimen Set No. 1	<u>6.123</u> LBS	<u>5.714</u> LBS	<u>6.6676</u> LBS
Specimen Set No. 2	<u>6.370</u> LBS	<u>5.654</u> LBS	<u>11.2298</u> LBS
Specimen Set No. 3	<u>6.320</u> LBS	<u>5.761</u> LBS	<u>8.8424</u> LBS

Average Percent Weight Loss-All 3 Specimen Sets: 8.9132 %

Specimen Set Burn Length:	H/T Length #1	H/B Length #2	V/F Length #3	V/B Length #4
Specimen Set No. 1	<u>14.2</u> in.	<u>16.4</u> in.	<u>12.2</u> in.	<u>0.0</u> in.
Specimen Set No. 2	<u>14.5</u> in.	<u>17.0</u> in.	<u>16.7</u> in.	<u>1.6</u> in.
Specimen Set No. 3	<u>11.9</u> in.	<u>16.4</u> in.	<u>10.5</u> in.	<u>0.0</u> in.

Results of This Test: Pass: ✓ Fail: \_\_\_\_\_

Remarks:

Authorized Signature: Alan W. Hefner Date: 2-6-08

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App D-4  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Test Specimen P/N: btspe 409-L1415

STARR AIRCRAFT HORIZONTAL BURN TEST RESULTS FOR TEST #0042 on 2/5/2008

Test 0042 Set A

Beginning weight: 6.123

Ending weight: 5.714

Hor./Top Length 1: 14.2

Hor./Bot Length 2: 16.4

Ver./Fr. Length 3: 12.2

Ver./Bk. Length 4: 0.0

Percentage weight loss 6.6676%. Test PASSED.

Test 0042 Set B

Beginning weight: 6.370

Ending weight: 5.654

Hor./Top Length 1: 14.5

Hor./Bot Length 2: 17.0

Ver./Fr. Length 3: 16.7

Ver./Bk. Length 4: 1.6

Percentage weight loss 11.2298%. Test FAILED - excess weight loss.

Test 0042 Set C

Beginning weight: 6.320

Ending weight: 5.761

Hor./Top Length 1: 11.9

Hor./Bot Length 2: 16.4

Ver./Fr. Length 3: 10.5

Ver./Bk. Length 4: 0.0

Percentage weight loss 8.8424%. Test PASSED.

Average percentage weight loss 8.9132%. Test PASSED.

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App D-5  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

STARR AIRCRAFT PRODUCTS INC®  
SCIENTIFIC DATA LOG

0042  
0043

Test Specimen P/N  
Test Number: 6tspc 409-309 Test Date: 2-6-08  
Customer: Greiner Purtec, Inc. / Weber  
Control Room Temperature: 71 °F Control Room Humidity: 52 %  
Anemometer Reading at burner: 1875 FT/MIN  
Air Velocity Across Top of Vertical Specimen: 16 FT/MIN  
Air Velocity Across Top of Horizontal Specimen: 7 FT/MIN  
Fuel Pressure Reading: 90 P.S.I.  
Calorimeter Reading: 10.95 BTU/FT²SEC.

Thermocouple Readings:

No. 1 1815 °F  
No. 3 1855 °F  
No. 5 1856 °F  
No. 7 1809 °F

No. 2 1807 °F  
No. 4 1800 °F  
No. 6 1807 °F

Aug. = 1822 °F

Specimen Set Weights:	Before Burn	After Burn	% Weight Loss
Specimen Set No. 1	<u>6.430</u> LBS	<u>5.976</u> LBS	<u>7.0617</u> LBS
Specimen Set No. 2	<u>6.519</u> LBS	<u>5.866</u> LBS	<u>10.0264</u> LBS
Specimen Set No. 3	<u>6.452</u> LBS	<u>5.878</u> LBS	<u>8.8939</u> LBS

Average Percent Weight Loss-All 3 Specimen Sets: 8.6607 %

Specimen Set Burn Length:	H/T	H/B	V/F	V/B
	Length #1	Length #2	Length #3	Length #4
Specimen Set No. 1	<u>9.5</u> in.	<u>15.9</u> in.	<u>12.4</u> in.	<u>0.0</u> in.
Specimen Set No. 2	<u>14.9</u> in.	<u>17.0</u> in.	<u>13.8</u> in.	<u>0.0</u> in.
Specimen Set No. 3	<u>15.1</u> in.	<u>17.0</u> in.	<u>11.6</u> in.	<u>0.0</u> in.

Results of This Test: Pass: ☒ Fail: ☐

Remarks:

Authorized Signature: Alan W. Hefner Date: 2-6-08

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App D-6  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Test Specimen P/N : btspe 409-309

STARR AIRCRAFT HORIZONTAL BURN TEST RESULTS FOR TEST #0042 on 2/6/2008

Test 0042 Set A

Beginning weight: 6.430

Ending weight: 5.976

Hor./Top Length 1: 9.5

Hor./Bot Length 2: 15.9

Ver./Fr. Length 3: 12.4

Ver./Bk. Length 4: 0.0

Percentage weight loss 7.0617%. Test PASSED.

Test 0042 Set B

Beginning weight: 6.519

Ending weight: 5.866

Hor./Top Length 1: 14.9

Hor./Bot Length 2: 17.0

Ver./Fr. Length 3: 13.8

Ver./Bk. Length 4: 0.0

Percentage weight loss 10.0264%. Test FAILED - excess weight loss.

Test 0042 Set C

Beginning weight: 6.452

Ending weight: 5.878

Hor./Top Length 1: 15.1

Hor./Bot Length 2: 17.0

Ver./Fr. Length 3: 11.6

Ver./Bk. Length 4: 0.0

Percentage weight loss 8.8939%. Test PASSED.

Average percentage weight loss 8.6607%. Test PASSED.



STARR AIRCRAFT PRODUCTS INC.  
SCIENTIFIC DATA LOG

0042  
0044

Test Specimen P/N  
Test Number: 6TS 00009 - L1415 Test Date: 2-6-08  
Customer: Greiner Portec, Inc. / Weber  
Control Room Temperature: 71 °F Control Room Humidity: 52 %  
Anemometer Reading at burner: 1875 FT/MIN  
Air Velocity Across Top of Vertical Specimen: 16 FT/MIN  
Air Velocity Across Top of Horizontal Specimen: 7 FT/MIN  
Fuel Pressure Reading: 90 P.S.I.  
Calorimeter Reading: 10.95 BTU/FT<sup>2</sup>SEC.

Thermocouple Readings:

No. 1	<u>1815</u> °F	No. 2	<u>1807</u> °F
No. 3	<u>1855</u> °F	No. 4	<u>1800</u> °F
No. 5	<u>1856</u> °F	No. 6	<u>1807</u> °F
No. 7	<u>1808</u> °F		

Avg. = 1822 °F

Specimen Set Weights:	Before Burn	After Burn	% Weight Loss
Specimen Set No. 1	<u>7.634</u> LBS	<u>7.254</u> LBS	<u>4.9771</u> LBS
Specimen Set No. 2	<u>7.631</u> LBS	<u>7.027</u> LBS	<u>7.9172</u> LBS
Specimen Set No. 3	<u>7.591</u> LBS	<u>7.057</u> LBS	<u>7.0286</u> LBS

Average Percent Weight Loss-All 3 Specimen Sets: \_\_\_\_\_ %

Specimen Set Burn Length:	H/T	H/B	V/F	V/B
	Length #1	Length #2	Length #3	Length #4
Specimen Set No. 1	<u>7.5</u> in.	<u>12.8</u> in.	<u>9.3</u> in.	<u>0.0</u> in.
Specimen Set No. 2	<u>18.0</u> in.	<u>17.3</u> in.	<u>18.0</u> in.	<u>0.0</u> in.
Specimen Set No. 3	<u>17.8</u> in.	<u>12.2</u> in.	<u>18.0</u> in.	<u>0.0</u> in.

Results of This Test: Pass: \_\_\_\_\_ Fail: ✓

Remarks:

Authorized Signature: Alan W. Hutz Date: 2-6-08

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App D-8  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Test Specimen P/N : 4500009-L1415

STARR AIRCRAFT HORIZONTAL BURN TEST RESULTS FOR TEST #0042 on 2/6/2008

Test 0042 Set A

Beginning weight: 7.634

Ending weight: 7.254

Hor./Top Length 1: 7.5

Hor./Bot Length 2: 12.8

Ver./Fr. Length 3: 9.3

Ver./Bk. Length 4: 0.0

Percentage weight loss 4.9771%. Test PASSED.

Test 0042 Set B

Beginning weight: 7.631

Ending weight: 7.027

Hor./Top Length 1: 18.0

Hor./Bot Length 2: 17.3

Ver./Fr. Length 3: 18.0

Ver./Bk. Length 4: 0.0

Percentage weight loss 7.9172%. Test PASSED.

Test 0042 Set C

Beginning weight: 7.591

Ending weight: 7.057

Hor./Top Length 1: 17.8

Hor./Bot Length 2: 12.2

Ver./Fr. Length 3: 18.0

Ver./Bk. Length 4: 0.0

Percentage weight loss 7.0286%. Test PASSED.

Average percentage weight loss 6.6410%. Test PASSED.

STARR AIRCRAFT PRODUCTS INC®  
SCIENTIFIC DATA LOG

0042  
0045

Test Specimen P/N \_\_\_\_\_  
Test Number: 6ts 00009-309 Test Date: 2-6-08  
Customer: Greiner Portec, Inc. / Weber  
Control Room Temperature: 71 °F Control Room Humidity: 52%  
Anemometer Reading at burner: 1875 FT/MIN  
Air Velocity Across Top of Vertical Specimen: 16 FT/MIN  
Air Velocity Across Top of Horizontal Specimen: 7 FT/MIN  
Fuel Pressure Reading: 90 P.S.I.  
Calorimeter Reading: 10.95 BTU/FT²SEC.

Thermocouple Readings:

No. 1	<u>1815</u> °F	No. 2	<u>1807</u> °F
No. 3	<u>1855</u> °F	No. 4	<u>1800</u> °F
No. 5	<u>1856</u> °F	No. 6	<u>1807</u> °F
No. 7	<u>1808</u> °F		

Aug. = 1822 °F

Specimen Set Weights:	Before Burn	After Burn	% Weight Loss
Specimen Set No. 1	<u>7.918</u> LBS	<u>7.458</u> LBS	<u>5.806</u> LBS
Specimen Set No. 2	<u>8.003</u> LBS	<u>7.581</u> LBS	<u>5.276</u> LBS
Specimen Set No. 3	<u>8.176</u> LBS	<u>7.866</u> LBS	<u>3.796</u> LBS

Average Percent Weight Loss-All 3 Specimen Sets: 4.9597 %

Specimen Set Burn Length:	H/T	H/B	V/F	V/B
	Length #1	Length #2	Length #3	Length #4
Specimen Set No. 1	<u>16.0</u> in.	<u>12.6</u> in.	<u>11.3</u> in.	<u>0.0</u> in.
Specimen Set No. 2	<u>12.6</u> in.	<u>16.8</u> in.	<u>11.9</u> in.	<u>0.0</u> in.
Specimen Set No. 3	<u>13.4</u> in.	<u>10.8</u> in.	<u>14.5</u> in.	<u>0.0</u> in.

Results of This Test: Pass: ☒ Fail: ☐

Remarks:

Authorized Signature: Alan W. Hetty Date: 2-6-08

FLAMMABILITY TEST PLAN/REPORT  
FOR SEAT CUSHIONS  
Greiner Project 1275

Pg: App D-10  
Rev: B  
Eff: 15 FEB 2008  
Doc: FTP055

Test Specimen P/N : lts 00009-309

STARR AIRCRAFT HORIZONTAL BURN TEST RESULTS FOR TEST #0042 on 2/6/2008

Test 0042 Set A

Beginning weight: 7.918

Ending weight : 7.458

Hor./Top Length 1: 16.0

Hor./Bot Length 2: 12.6

Ver./Fr. Length 3: 11.3

Ver./Bk. Length 4: 0.0

Percentage weight loss 5.8061%. Test PASSED.

Test 0042 Set B

Beginning weight: 8.003

Ending weight : 7.581

Hor./Top Length 1: 12.6

Hor./Bot Length 2: 16.8

Ver./Fr. Length 3: 11.9

Ver./Bk. Length 4: 0.0

Percentage weight loss 5.2760%. Test PASSED.

Test 0042 Set C

Beginning weight: 8.176

Ending weight : 7.866

Hor./Top Length 1: 13.4

Hor./Bot Length 2: 10.8

Ver./Fr. Length 3: 14.5

Ver./Bk. Length 4: 0.0

Percentage weight loss 3.7969%. Test PASSED.

Average percentage weight loss 4.9597%. Test PASSED.