



FM APPROVALS
Project ID: 3038640

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APPROVAL REPORT

TECHNIWELD USA LLC WELDING BLANKETS AND CURTAINS FOR USE IN HOT WORK OPERATIONS

Prepared for:

TECHNIWELD USA LLC
6205 Boat Rock Blvd.
Atlanta, GA 30336

Project ID: 3038640

Class: 4950

Date of Approval: _____

Authorized by: _____

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From

TECHNIWELD USA LLC
6205 Boat Rock Blvd.
Atlanta, GA 30336

I INTRODUCTION

- 1.1 TECHNIWELD USA LLC submitted various welding fabrics to determine if they meet the approval requirements of the Standard listed below for welding pads, blankets and curtains.
- 1.2 This Report may be reproduced only in its entirety and without modification.
- 1.3 Standards: Title Class Number Date Approval Standard for Welding Pads, Welding Blankets and Welding Curtains for Hot Work Operations 4950 April, 2002 1.4 Definitions for Welding Pads, Welding Blankets and Welding Curtains
 - 1.4.1 Welding pad is a heat resistant fabric designed to be placed directly under a hot work operation such as welding or cutting. Intended for use in horizontal applications with severe exposures such as that resulting from molten substances or heavy horizontal welding. Designed to prevent the ignition of combustibles that are located adjacent to the underside of the pad.
 - 1.4.2 Welding blanket is a heat resistant fabric designed to be placed in the vicinity of a hot work operation. Intended for use in horizontal applications with light to moderate exposures such as that resulting from chipping, grinding, heat treating, sand blasting and light horizontal welding. Designed to protect machinery and prevent the ignition of combustibles such as wood that are located adjacent to the underside of the blanket.
 - 1.4.3 Welding curtain is a heat resistant fabric designed to be placed in the vicinity of a hot work operation. Intended for use in vertical applications with light to moderate exposures such as that resulting from chipping, grinding, heat treating, sand blasting and light horizontal welding. Designed to prevent sparks from escaping a confined area.
- 1.5 Examination included the Fire and Thermal Resistance Tests, Paper Ignition Tests, and Charring Embrittlement Tests on the test specimens, both before and after weathering.
- 1.6 Tests show that welding blankets 0100S09, 0100S10, 0300S04, 0200P07, 0200P08, 0102P05, 0208P05, and welding curtains 0100S05, 0300S02, 0200P01, 0200P02, 0200P03, 0200P04, 0200P05, 0200P06, 0200P11, 0200P12, 0200P14, 0205P01, 0205P02, 0203P28, 0203P03, 0102C03, 0208P01, 0208P02, 0208P03 and 0103P17 as tested, meet the Approval requirements of the Standard listed above.



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- 1.7 Listings: The tested specimens meet the Approval criteria of FM Approvals when used as specified in the CONCLUSIONS of this report. The product will be listed in the Approval Guide, A Publication of FM Approvals.

II DESCRIPTION

- 2.1 TECHNIWELD USA LLC welding curtain 0100S05 is a 25 oz/yd² (850 g/m²) E-Glass Fiberglass cloth that is made from an 8-harness satin weave fabric. It is available in 39 – 59 in. (1 – 1.5 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.2 TECHNIWELD USA LLC welding blanket 0100S09 is a 38 oz/yd² (1300 g/m²) E-Glass Fiberglass cloth that is made from a 12-harness satin weave fabric. It is available in 39 – 59 in. (1 – 1.5 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.3 TECHNIWELD USA LLC welding blanket 0100S10 is a 47 oz/yd² (1600 g/m²) E-Glass Fiberglass cloth that is made from a 12-harness satin weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.4 TECHNIWELD USA LLC welding blanket 0300S02 is a 16 oz/yd² (560 g/m²) acid-leached amorphous silica cloth that is made from an 8-harness satin weave fabric provided with a hydrochloric treatment coating. It is available in 36 in. (0.91 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.5 TECHNIWELD USA LLC welding blanket 0300S04 is a 34oz/yd² (1150 g/m²) acid-leached amorphous silica cloth that is made from a 12-harness satin weave fabric provided with a hydrochloric treatment coating. It is available in 36 in. (0.91 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.6 TECHNIWELD USA LLC welding curtain 0200P01 is an 18 oz/yd² (600 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.7 TECHNIWELD USA LLC welding curtain 0200P02 is a 24 oz/yd² (815 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.8 TECHNIWELD USA LLC welding curtain 0200P03 is a 29 oz/yd² (1000 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.



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- 2.9 TECHNIWELD USA LLC welding curtain 0200P05 is a 35 oz/yd² (1200 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.10 TECHNIWELD USA LLC welding curtain 0200P06 is a 51 oz/yd² (1760 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.11 TECHNIWELD USA LLC welding blanket 0200P07 is a 61 oz/yd² (2100 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.12 TECHNIWELD USA LLC welding blanket 0200P08 is an 88 oz/yd² (3000 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.13 TECHNIWELD USA LLC welding curtain 0200P11 is a 28 oz/yd² (950 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.14 TECHNIWELD USA LLC welding curtain 0200P12 is a 59 oz/yd² (2000 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.15 T TECHNIWELD USA LLC welding curtain 0200P14 is a 41 oz/yd² (1400 g/m²) E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.16 TECHNIWELD USA LLC welding curtain 0205P01 is an 18 oz/yd² (600 g/m²) Dyed E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 59 in. (1 – 1.5 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.17 TECHNIWELD USA LLC welding curtain 0205P02 is a 24 oz/yd² (825 g/m²) acid-leached amorphous silica cloth. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.18 TECHNIWELD USA LLC welding curtain 0203P02 is an 18 oz/yd² (600 g/m²) acrylic coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71



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- in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
- 2.19 TECHNIWELD USA LLC welding curtain 0203P28 is a 22 oz/yd² (750 g/m²) acrylic coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.20 TECHNIWELD USA LLC welding curtain 0203P03 is a 24 oz/yd² (815 g/m²) acrylic coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.21 TECHNIWELD USA LLC welding curtain 0102C03 is a 17 oz/yd² (570 g/m²) Silicon Coated E-Glass Texturized Fiberglass cloth that is made from twill cross weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.22 TECHNIWELD USA LLC welding blanket 0102P05 is a 32 oz/yd² (1080 g/m²) Silicon Coated E-Glass Texturized Fiberglass cloth that is made from an 8-harness satin weave fabric. It is available in 39 – 59 in. (1 – 1.5 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.23 TECHNIWELD USA LLC welding curtain 0208P01 is an 18 oz/yd² (600 g/m²) Vermiculite Coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.24 TECHNIWELD USA LLC welding curtain 0208P02 is a 24 oz/yd² (815 g/m²) Vermiculite Coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.25 TECHNIWELD USA LLC welding curtain 0208P03 is a 29 oz/yd² (1000 g/m²) Vermiculite Coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.26 TECHNIWELD USA LLC welding blanket 0208P05 is a 35 oz/yd² (1200 g/m²) Vermiculite Coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 71 in. (1 – 1.8 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.
 - 2.27 TECHNIWELD USA LLC welding curtain 0103P17 is a 12 oz/yd² (400 g/m²) Neoprene Coated E-Glass Texturized Fiberglass cloth that is made from a plain weave fabric. It is available in 39 – 59



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in. (1 – 1.5 m) width rolls of 55 yd (50 m) length. Proprietary formulations and specifications are on file at FM Approvals.

III EXAMINATIONS AND TESTS

- 3.1 Samples were submitted for examination and testing as follows:
 - 3.1.1 Tests conducted were as required by the Standard listed in paragraph 1.3 above.
 - 3.1.2 The TECHNIWELD USA LLC welding pad, blanket and curtain samples were selected from inventory at random and are representative of typical production.
 - 3.1.3 Specimens of the pad and blanket materials were subjected to the Fire and Thermal Resistance Test where an array of thermocouples were located beneath each test specimen and temperatures were monitored during the cutting operation. Temperatures did not exceed 500°F (260°C). Test specimens of the welding curtain materials were hung vertically in accordance with the 4950 Standard during the Fire and Thermal Resistance testing on the blanket and pad specimens. The curtain samples were then visually inspected after the test for charring or burned holes.
 - 3.1.4 Specimens of the pad material were prepared and tested according to the Paper Ignition Test. This test replaced the array of thermocouples by a sheet of paper 11 inches by 17 inches in a shallow pan beneath the blanket or pad specimen. Upon completion of each cutting test, the paper was inspected for signs of burning or holes burned through the sheet. No signs of burning, including through holes, were noted.
 - 3.1.5 Specimens of the blanket material were prepared and tested according to the Paper Ignition Test. This test replaced the array of thermocouples by a sheet of paper 11 inches by 17 inches in a shallow pan beneath the blanket specimen. Upon completion of each cutting test, the paper was inspected for signs of burning or holes burned through the sheet. No signs of burning were observed. However, burned-through holes less than one half inch in diameter, were noted, which is acceptable for welding blankets.
 - 3.1.6 Charring Embrittlement tests were performed on the blanket samples above after they were subjected to the Paper Ignition Test. The Charring Embrittlement test involved first removing any slag that could be easily removed. This was followed by bending the samples over a 1 inch diameter pipe to 90 degrees five times on the short dimension center line followed by bending along the long dimension centerline over the pipe to 90 degrees five times. The specimens were then turned over and the bending process was repeated five times along each the short and long centerlines. Upon completion of the bending cycles, each specimen was inspected for cracking of the fabric or formation of openings through the fabric.
 - 3.1.7 Upon completion of the 1000 hours of UV exposure, selected critical specimens of the blanket and curtains were subjected to tests in accordance with the 4950 Standard.

- 3.1.8 UV exposed specimens of the blankets were prepared and tested according to the Paper Ignition test. A sheet of paper 11 inches by 17 inches was placed in a shallow pan beneath the blanket specimen. Upon completion of each cutting test, the paper was inspected for signs of burning or holes burned through the sheet. No signs of burning were observed.
- 3.1.9 All data is on file at FM Approvals under Project ID: 3038640 along with other documents and correspondence applicable to this program.
- 3.2 A summary of the test results from Fire and Thermal Resistance Testing are as follows:

Sample Model	Fire and Thermal Resistance Testing		Test Observations
	Warp Direction/ Max Temp °F (°C)	Fill Direction/ Max Temp °F (°C)	
*0100S05	-	-	No fabric damage
*0100S09	368 (187)	579 (304)/ (repeat test) 320 (160)	Large drop of slag causing fabric damage
*0300S02	-	-	No fabric damage
0300S04	146 (63)	114 (46)	No fabric damage
*0200P05	-	-	No fabric damage
0200P07	325 (163)	228 (109)	Moderate Slag
*0205P01	-	-	No fabric damage
0203P02	167 (75)	246 (119)	No fabric damage
0102C03	159 (71)	142 (61)	No fabric damage
0102P05	222 (106)	228 (109)	No fabric damage
*0208P02	-	-	No fabric damage
*0208P01	-	-	No fabric damage
0208P05	428 (220)	414 (212)	Minor fabric damage
*0103P17	-	-	No fabric damage
<p>* Specimens were hung vertically in accordance with the 4950 Standard during the Fire and Thermal Resistance testing for blanket and pad specimens. The curtain samples were then visually inspected after the test. There were no charring or burn holes observed.</p>			

- 3.3 A summary of the test results from Pre and Post UV Paper Ignition Testing are as follows:

Sample Model	Paper ignition testing		Unweathered Test Observations/Weathered Test Observations
	(W) un-weathered/Weathered	(F) Un-Weathered/Weathered	
*0100S05	Fail	Fail	Paper Ignited

*0100S09	Pass/fail	Pass/Fail	No paper ignition observed/paper Ignited
*0300S02	Fail	Fail	Paper Ignited
0300S04	Pass/Pass	Pass/Pass	No paper ignition observed/Some discoloration
*0200P05	Fail	Fail	Paper ignited
0200P07	Not Tested/Pass	Not Tested/Pass	Tested weathered samples only
0200P08	Pass	Pass	No paper ignition observed
*0205P01	Fail	Fail	Paper ignited
0203P02	Pass/Fail	Pass	Paper ignition observed/Minor discoloration
0102C03	Pass/Pass	Pass/Pass	Paper ignition observed
0102P05	Pass/Pass	Pass/Fail	No paper ignition observed/ (F) paper Ignited
*0208P02	Fail	Fail	Paper Ignited
*0208P01	Fail	Fail	Paper Ignited
0208P05	Pass/pass	Pass/not tested	No paper Ignition observed and Minor discoloration
*0103P17	Fail	Fail	Paper ignited
<p>* Specimens were hung vertically in accordance with the 4950 Standard during the Fire and Thermal Resistance testing for blanket and pad specimens. The curtain samples were then visually inspected after the test. There were no charring or burn holes observed.</p> <p>(W) = Warp Direction / (F) = Fill Direction</p>			

IV MARKING

- 4.1 Roll Goods - Welding pads, welding blankets and welding curtains are labeled and packaged upon completion of manufacturing. The label shall contain, at a minimum, the manufacturer's name, product trade name, the FM Approvals Approval mark, and the words, "APPROVED WELDING BLANKET" [0100S09, 0100S10, 0300S04, 0200P07, 0200P08, 0102P05, 0208P05] or the words "APPROVED WELDING CURTAIN" [0100S05, 0300S02, 0200P01, 0200P02, 0200P03, 0200P04, 0200P05, 0200P06, 0200P11, 0200P12, 0200P14, 0205P01, 0205P02, 0203P28, 0203P03, 0102C03, 0208P01, 0208P02, 0208P03 and 0103P17]. For roll goods a permanent mark identifying this information shall be printed every 3 feet (1 m) on one side of the product.
- 4.2 Use Limitations - The manufacturer shall supply written information with each welding pad, welding blanket or welding curtain indicating the limitations of Approval for each category of heat resistant fabric and the types of hot work applications to which it has been Approved.



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4.3 Markings denoting FM Approvals Approval shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under the FM Approvals Facilities and Procedures Audit Program.

V REMARKS

5.1 Based on the test procedures contained in the Approval Standard, welding pads are exposed to the most severe test conditions and have the strictest acceptance criteria. As such, samples that meet the performance criteria as welding pads shall be considered to have qualified for use as welding blankets. They shall be qualified for use as welding curtains provided that they maintain their flexibility and dimensional stability and do not melt or deform.

5.2 Based on the test procedures contained in the Approval Standard, welding blankets and welding curtains are exposed to similar test conditions, with the welding blanket having the more critical acceptance criteria. As such, welding blankets shall be considered to have qualified for use as welding curtains provided that they maintain their flexibility and dimensional stability and do not melt or deform.

5.3 Welding pads, welding blankets and welding curtains that meet the criteria contained in this Standard shall not be limited in size as it pertains to the length or width of the finished product provided they are of seamless construction. Seams provided along the outer perimeter of the item shall be allowed.

VI FACILITIES AND PROCEDURES AUDITS

The TECHNIWELD USA LLC manufacturing location in Shanghai, China is subject to periodic audit inspections to determine that the quality and uniformity of the materials have been maintained and will provide the same level of performance as originally Approved. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

VII MANUFACTURER'S RESPONSIBILITIES

7.1 The manufacturer shall supply written information with each welding pad, welding blanket or welding curtain indicating the limitations of Approval for each category of heat resistant fabric and the types of hot work applications to which it has been Approved.

7.2 The manufacturer shall notify FM Approvals of any planned change in the Approved product, prior to general sale or distribution, using Form 797, Approved Product Revision Report.

VIII DOCUMENTATION

The following documents describe the Approved welding blankets, pads and curtains and are filed under Project ID: 3038640

Document	Date	Description
Facilities and Procedures Audit	June 2, 2010	Product information and



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Manual for Techniweld @ Atlanta, Georgia		Quality Control
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IX CONCLUSIONS

9.1 The test results from this project indicate that welding blankets 0100S09, 0100S10, 0300S04, 0200P07, 0200P08, 0102P05, 0208P05 and welding curtains 0100S05, 0300S02, 0200P01, 0200P02, 0200P03, 0200P04, 0200P05, 0200P06, 0200P11, 0200P12, 0200P14, 0205P01, 0205P02, 0203P28, 0203P03, 0102C03, 0208P01, 0208P02, 0208P03 and 0103P17 meet FM Approvals 4950 requirements for Welding Blankets and Welding Curtains for hot work operations. These products will appear in the FM Approvals Approval Guide as follows:

Welding Pads, Welding Blankets and Welding Curtains for Hot Work Operations

Performance of welding blankets, curtains and/or pads may be drastically reduced if they exhibit any of the following characteristics:

- discoloration
- attached slag
- rips and/or tears
- frayed material
- holes of any size

Welding blankets, curtains and/or pads which have any of the characteristics shown above may be reused if the affected area(s) is/are completely removed by cutting out the entire affected section to the nearest edge of the pad, blanket or curtain. The welding blanket, curtain or pad can be placed back in service such that there are no openings in the blanket, pad or curtain.

In order to be effective, the welding blanket, curtain or pad must completely cover the surface(s) to be protected.

Category Model:	Welding Blankets
	0100S09, 0100S10, 0300S04, 0200P07, 0200P08, 0102P05, 0208P05
Category Welding Curtains Model:	0100S05, 0300S02, 0200P01, 0200P02, 0200P03, 0200P04, 0200P05, 0200P06, 0200P11, 0200P12, 0200P14, 0205P01, 0205P02, 0203P28, 0203P03, 0102C03, 0208P01, 0208P02, 0208P03, 0103P17

- 9.2 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 9.3 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.



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TESTING SUPERVISED BY:

M. P. DeSousa

PROJECT DATA RECORD:

3038640

ORIGINAL TEST DATA:

PDR for Project ID: 3038640

REPORT BY:

REPORT REVIEWED BY:

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