CERTIFICATE OF CONFORMITY

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** **FM16US0097X**
3. **Equipment:** **Series 100, 200 and 300 Connection Head and Assemblies**
   (Type Reference and Name)
4. **Name of Listing Company:** **Burns Engineering Inc.**
5. **Address of Listing Company:** **10201 Bren Rd E**
   Minnetonka MN 55343
   United States
6. The examination and test results are recorded in confidential report number:

   3015922 dated 28th August 2003

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   FM Class 3600:2011, FM Class 3615:2006, FM Class 3616: 2011, FM Class 3810:2005, ANSI/ISA 60079-0:2013, ANSI/UL 60079-1:2015, ANSI/UL 60079-31:2015, ANSI/NEMA 250: 2003, ANSI/IEC 60529:2004

8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

Certificate issued by:

J. E. Marquedant
VP, Manager, Electrical Systems

13 December 2017
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

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10. Equipment Ratings:

Explosion proof for use in Class I, Division 1, Groups A, B, C and D; dust-ignition proof for Class II/ III, Division 1, Groups E, F and G hazardous (classified) locations, indoors and outdoors (Type 4X) with an ambient temperature rating of -40°C to +60°C.

Flameproof for Class I, Zone 1, AEx db IIC 80°C…140°C Gb; Dust ignition protection by enclosure "t" for Zone 21, AEx tb IIIC T80°C…T140°C Db, Hazardous (Classified) Locations, indoors and outdoors (IP66) with an ambient temperature rating (See Ambient Temperature and maximum surface temperature detailed in Specific Conditions of use.).

11. The marking of the equipment shall include:

Class I, Division 1, Groups A*, B, C, D;

Class II/III, Division 1, Groups E, F, G; T6 Ta = -40°C to +60°C; Type 4X

Class I, Zone 1, AEx db IIC 80°C…140°C Gb Ta**, IP66

Zone 21, Ex tb IIIC T80°C…T140°C Db Ta**, IP66

* When connection head code 25A is used with approval code "AFM", Group A is not included in Explosion proof rating.
** Ambient Temperature ranges detailed in Specific Conditions of use.

12. **Description of Equipment:**

Temperature Sensors - The temperature sensors used with the assemblies described are identified by Series 100, Series 200 or Series 300 and are shown schematically within Burns Drawing 18938. All direct immersion "A" or "B" type sensors have a threaded housing to interface with an enclosure / connection head, and is intended for direct immersion applications. All spring-loaded hex fitting "L" type sensors incorporate a threaded housing to interface with an enclosure, various thermowells and extension fittings. Spring-loaded "C", "E", and "K" type sensors incorporate a spring mechanism that enable the sensor to be removed through the enclosure without disconnecting (unthreading) the assembly components.

The Series 100 Temperature Sensors - are thermocouple Types: E, J, K, K3, T or N in single or dual element configurations.

The Series 200 Temperature Sensors - are wire wound three or four wire single element or three wire dual element Platinum RTDs.

The Series 300 Temperature Sensors - are thin-film three or four wire single element or three wire dual element Platinum RTDs.

Connection Heads - The Burns #5 Connection Head was tested and Approved as described in Approval Report 3052763 as flameproof Ex db IIC Gb, and for use in dust as Ex tb IIIC Db with

Ingress Protection IP66. The Burns #5 Connection Head is available in aluminum (3A, 5A) or epoxy coated aluminum (3E, 5E). The "3" configuration is the #5 head supplied with a moisture proofing kit applied by the user internal to the head. The XD-I, XD-Iwin, and XD-ILwin (19A and 22A) are FM Approved for XP/I/1/ABCD; DIP/II,III/1/EFG; Type 4X and Flameproof I/1/AEx db IIC; IP66, as well as IECEx certified and carry an IECEx Certificate of Conformity of IECEx FTZU 12.0017U as flameproof Ex db IIC Gb and for use in dust as Ex tb IIIC Db, IP68. The Killark enclosure model HK (25A) Carries UL certificate # 20151123-E83969 for XP/I/1/BCD; DIP/II,III/1/EFG; and Flameproof I/1/AEx db IIC; as well as IECEx certificate # IECEx UL 14.0071U certified as flameproof Ex db IIC Gb and for use in dust as Ex tb IIIC Db, IP66. The Yung Chan model XDS (14S) is FM Approved for XP/I/1/ABCD/T6; DIP/II,III/1/EFG/T6; Type 4X, per project 3032414. The PR Electronics model 7501 (75A) Transmitter enclosure is FM approved as Explosionproof / Flameproof per certificate # FM16US0009X.

Temperature Transmitters - Optional temperature transmitters provide a 4 to 20 ma loop output proportional to a temperature input from one of the temperature sensors described above.

Direct Immersion Assemblies - Direct immersion Type "A" and "B" assemblies consist of a temperature sensor described above; a connection head described above and, optionally, a temperature transmitter described above.

Spring Loaded Thermowell Assemblies (in-Direct Immersion) - Spring loaded hex fitting Type "L" assemblies consist of a temperature sensor described above; a connection head described above, optionally, a temperature transmitter described above. Spring loaded Type "C", "E", and "K" assemblies consist of a temperature sensor described above, a connection head described above and, optionally, a temperature transmitter described above.

a-b-cd-e-f/ A/-g/hj [k to l] m. Connection Head with Direct Immersion Assembly.

a = Series 100A, 110A, 120A, 200A, 300A, 100B,110B, 120B, 200B or 300B.
b = Accuracy option 10, 05 or blank.
c = Element lead wire configuration or thermocouple type A, B, C, E, J, K, K3, N or T.
d = Thermocouple configuration D, E, F, G or blank.
e = Connection head 3A, 3E, 5A, 5E, 14S (Code AFM only), 19A or 22A, 25A*, 75A, or N
f = Sheath length Specify LLL (12.5 inches, shown as "125") for L<=99.9. Code LLLL for L>99.9 for L>99.9 (L=150" = 1500).
A = Approvals: AFM or AFP
g = Lead wire 'L_, Lead wire length in inches 'Y_, Sheath 'S_, Sheath Diameter 'D_', Sheath Material 'M_' Sheath Finish 'F_ Sheath Certifications 'R_ Sheath Coating 'C_ Sheath Bending 'B_, Compression Fitting FC032, FC132, Lead wire Configuration C01, C10, C20, C22, C23, C24, C30, C54, C60, Lead Wire Termination 'T_ Strain Relief 'F_ and Lead Wire Material Options M01, M02, M03 and M05 not affecting hazardous ratings. Order of CODE use in part number is determined by the manufacturer.
h = Transmitter type: Txx, various head mounted transmitters not affecting the hazardous rating.
j = XMTR calibration blank or M.
k = Min temperature for 4mA output.
l = Max temperature for 20 mA output.
m = Temperature scale C or F.

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Note: * When connection head code 25A is used with approval code "AFM", Group A is not included in Explosion proof rating. Separator character "/" used prior to additional option code details. If no additional options "/" is omitted. Separator character '"/" used prior to transmitter related option code details. If no transmitter options "/" is omitted.

ab-c-de-f-g-h-ijkIm/ A/ n/W-o-p-q-r/uv [w to x]y. Connection Head with Spring Loaded (style C, E & K) and Spring Loaded Hex (style L) Thermowell Assembly.

a = Series 100, 200 or 300.
b = Sensor style C, E, K or L.
c = Accuracy option 10, 05 or blank.
d = Sensor type A, B, C, E, J, K, K3, N or T.
e = Thermocouple configuration D, E, F, G or blank.
f = Connection head 3A, 3E, 5A, 5E, 14S (Code AFM only), 19A, 22A, 25A*, 75A, or "N". (19A, 22A, 25A, allowed only with L style sensors).
g = Standard Length Extension material type 1A, 2A, 3A, 1B, 2B, 3B, 1C, 2C, 3C, 1D, 2D, 3D (nA and nB allowed with C&K style sensors, nC and nD allowed with L style sensors) or 'N' for no extension.
h = Immersion length Specify LLL (12.5 inches, shown as "125"). Code LLLL for lengths >99.9", 150" = 1500.
i = Thermowell shape T, R, S or H.
j = Thermowell type T, W or F.
k = Thermowell size 2, 3, 4, 5, 6, 8, 10, 12, 14 or 16.
l = Flanged thermowell rating A, B, C, D E, F or G. (applies to Thermowell Type 'F' only).
m = Thermowell material 02 through 9 (Carbon Steel material type option 04 and 34 derated to Type 4), 12 through 15, 17 through 21, 24 through 28, 31, 34, 35 and 39 through 43.
A = Approvals: AFM or AFP
n = Extension Option 'E', Length option if other than standard of 3.0 inches. 'EN_ _', Various Extension type and material options, (codes TA, TB, TC, TD, TE, TN, and/or M01, M02, M03, M05, M06, M09) not affecting hazardous ratings.
o = Lag extension length blank (0.0 in.), T30, T60 or TXX (X.X inches).
p = Various thermowell feature options, (codes T, F, E, C, R, Z01, Z02, Z03, Z05, Z08 or Q01, Q02, Q03, Q04, Q05) not affecting hazardous ratings
q = Calibration Options 'C', codes 'I', 'F', and/or 'R', blank if no calibration. Not affecting hazardous ratings
r = lead wire, sheath and Miscellaneous options not affecting hazardous ratings
u = Transmitter Type: Txx, various head mounted transmitters not affecting the hazardous rating.
v = XMTR calibration blank or M.
w = Min temperature for 4mA output.
x = Max temperature for 20 mA output.
y = Temperature scale C or F.

Note: * When connection head code 25A is used with approval code "AFM", Group A is not included in Explosion proof rating. Separator character '/' used prior to additional related option code details. If no additional options '/' is omitted. /W is added when any of the thermowell options in this category are selected (codes T, F, E, C, R, Z, or Q), otherwise /W is omitted. These options do not affect hazardous ratings, otherwise blank. Separator character '/' used prior to transmitter related option code details. If no transmitter options '/' is omitted. For Approval code "AFP" the thermowell is optional and not required for the Flameproof approval.

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13. **Specific Conditions of Use:**

1. Consult the manufacturer if dimensional information on the flameproof joints is necessary.
2. Consult the manufacturer's instructions for the specific information regarding wiring entry number, sizes, position and thread type.
3. Potential electrostatic charging hazard – cleaning of enclosure surfaces should be done with damp cloth.
4. The ambient temperature class and maximum surface temperature for the assembled connection head /enclosure is based on the connection head incorporated into the assembly. See table for temperature ratings for connection head selection.

Connection Head #	Enclosure Description	"Ta" Range	Max. Surface Temp of Enclosure (Gas Atmosphere)	Max. Surface Temp of Enclosure (Zone 21 Dust Atmosphere)
3A	Aluminum enclosure with Waterproofing Kit	-40°C to 100°C	105°C	T105°C
3E	Aluminum enclosure with Waterproofing Kit	-40°C to 100°C	105°C	T105°C
5A	Aluminum enclosure	-40°C to 100°C	105°C	T105°C
5E	Aluminum enclosure	-40°C to 100°C	105°C	T105°C
14S	Stainless Steel enclosure	-40°C to 80°C	100°C	T100°C
19A	Aluminum enclosure with LED indicator	-20°C to 75°C	80°C	T80°C
22A	Aluminum enclosure with LCD indicator	-20°C to 75°C	80°C	T80°C
25A	Aluminum enclosure	-20°C to 70°C	140°C	T140°C
75A	Aluminum enclosure with T75 Transmitter and indicator	-40°C to 85°C	100°C	T100°C

5. Temperature class for probe portion of equipment may be equal to connected process temperature and service temperature limits of the probe used in the installation.
6. Equipment with Connection Head option "N" is to be connected to a suitably certified connection head.
   For Rating Code: AFM, connection head must be certified Explosionproof / Dust Ignitionproof.
   For Rating Code: AFP, connection head must be certified AEx d IIC / AEx tb IIIC

14. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

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16. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
28th August 2003	Original Issue.
11th January 2017	Supplement 9: Report Reference: – 3051889 dated 11th January 2017. Description of the Change: Added Zone ratings with IP66.
2nd March 2017	Supplement 10: Report Reference: – RR208304 dated 2nd March 2017 Description of the Change: Minor updates to equipment listing and documentation updates.
27th September 2017	Supplement 11: Report Reference: – RR210227 dated 27th September 2017 Description of the Change: Minor updates to equipment listing and documentation updates not affecting type of protection.
13th December 2017	Supplement 12: Report Reference: – RR212130 dated 13th December 2017 Description of the Change: Update minimum ambient temperature for Division rating from -25°C to -40°C.