1 **EU-TYPE EXAMINATION CERTIFICATE**

2 Component intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU

3 Certificate Number: **Sira 18ATEX2074U** Issue: **1**

4 Component: **Temperature Sensors**

5 Applicant: **Minco Products Incorporated**

6 Address: 7300 Commerce Lane
Minneapolis
Minnesota 55432
United States of America

7 This component and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

8 CSA Group Netherlands B.V. notified body number 2813 in accordance with Articles 17 and 21 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this component has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of a component intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN IEC 60079-0:2018 EN 60079-7:2015+A1:2018 EN 60079-11:2012

10 The sign 'U' is placed after the certificate number to indicate that the product assessed is a component and may be subject to further assessment when incorporated into equipment. Any limitations of use are listed in the schedule to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified component. If applicable, further requirements of this Directive apply to the manufacture and supply of this component.

12 The marking of the component shall include the following:

II 1G
Ex ia IIC Ga

II 2G
Ex eb IIC Gb

Refer to Product Description, service temperature and maximum surface temperature table

Project Number 80042292

Signed: J A May

Title: Director of Operations

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SCHEDULE

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13 **DESCRIPTION OF COMPONENT**

The B216681 model series Miniature Temperature Sensor are evaluated as components for use in particular installations. The B216681 is comprised of either thermocouple (E, J, K or T) or RTD (Resistance Temperature Detectors) type sensors, and are available in single or dual element configurations with a variety of case designs. Various springs and rings are available to fit flanged case sensors (Minco case type B). Case tip Babbitt layer available on Minco case styles A and B.

The B216681 is provided with flying leads from 18 AWG (0.823 mm2) to 30 AWG (0.05 mm2) in various lengths, depending upon the configuration, within a braided stainless steel jacket. The sensing element is enclosed by a metallic case, which is filled with a non-metallic cement / solid insulation. Optional accessories (i.e. case-tip Babbitt layers, springs and retaining rings and feedthrough) are not considered to contribute to the protection concept.

The operating ambient temperature range is -60°C to +200°C (apart from RTDs with an elastomer-filled cable, which is limited to +125°C).

Resistance temperature detector (RTD) sensors are designed to be installed in or beneath the Babbitt layer of bearing shoes. They monitor metal temperature to give early warning of oil film breakdown before catastrophic failure can occur. RTDs have metal cases and insulated leads to withstand rough handling and harsh environments.

Ambient Temperature (Connecting Parts):
$-60°C \leq T_{amb} \leq +125°C$

Process Temperature (Sensor Location):
Thermocouple
$-60°C \leq T_{amb} \leq +200°C$
Resistive
$-60°C \leq T_{amb} \leq +200°C$
Resistive Limitation with feedthrough
$-60°C \leq T_{amb} \leq +85°C$ (Available to +135°C on special order)

RTD leadwire limitations:
Temperature range reducing to 180°C (356°F) for Polyimide insulated Leadwires.
Temperature range reducing to 180°C (356°F) for FEP Jackets on cables.
Temperature range reducing to 125°C (257°F) for Elastomer filled cables.

Thermocouple Leadwire limitations:
Temperature range reducing to 180°C (356°F) for Polyimide insulated Leadwires.
Temperature range reducing to 180°C (356°F) for FEP Jackets on cables.
Temperature range reducing to 125°C (257°F) for Elastomer filled cables.

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Lead Wire Covering temperature limitations:

Designation	Description	Rating	Maximum Surface Temp assigned
T	PTFE insulated leads only	260°C	200°C
S	Stainless Steel Braid over PTFE Insulated Leads	260°C	200°C
F	FEP over TFE Insulated leads	200°C	135°C
R	FEP over stainless steel braid	200°C	135°C
E	FEP over stainless steel braid with Elastomer Fill	125°C	85°C
K	Polymide insulated leads only	200°C	135°C
KS	Stainless steel braid over polyimide insulated leads	200°C	135°C
P	PFA Teflon insulated leads Thermocouple Only	260°C	200°C
PS	Stainless Steel Braid over PFA Teflon insulated leads Thermocouple Only	260°C	200°C

For Ex ia protection:
Entity parameters:
Ui = 30 V
Ii = 46 mA
Pi =0.4 W
Cable: Ci = 0.28 nF/m
Li = 0.0013 mH/m
Ri = 0.16 Ω/m

For increased Safety, Ex eb protection:
Ui = 30 V
Ii = 46 mA
Pi =0.4 W

Model Codes: Type B216681 a b c d e f Temperature Sensors, where the designations for a b c d e f are outlined below

Designation	Values	Description
a		Case Configuration
	1	Case Style A
	2	Case Style B
	3	Case Style C
	4	Case Style D
	5	Case Style Short B
b		Sensor Element
	1	Thin Film RTD in Short Case

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Designation	Values	Description
	2	Thin Film RTD in Long Case
	3	Wirewound RTD in Short Case
	4	Wirewound RTD in Long Case
	5	Thermocouple Junction Ungrounded
	6	Thermocouple Junction Grounded
c	2, 3, 4	Number of leads
d	XX	Lead Length inches
e		Lead wire covering
	T	PTFE insulated leads only
	S	Stainless Steel Braid over PTFE Insulated Leads
	F	FEP over TFE Insulated leads
	R	FEP over stainless steel braid
	E	FEP over stainless steel braid with Elastomer Fill
	K	Polymide insulated leads only
	KS	Stainless steel braid over polyimide insulated leads
	P	PFA Teflon insulated leads Thermocouple Only
	PS	Stainless Steel Braid over PFA Teflon insulated leads Thermocouple Only
F		Optional Selections
	(Blank)	None
		Feedthrough
		Babbitt layer on case tip (Case styles A, B only)
		Spring and Rings (Flanged Case Styles B Only)
		Stainless Steel or Paper ID Tag attached to sensor leads

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report number	Comment
0	28 November 2019	R70217565A	The release of the prime certificate.
1	20 May 2020	R80042292A	Transfer of certificate Sira 18ATEX2074U from Sira Certification Service to CSA Group Netherlands B.V.

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15 SCHEDULE OF LIMITATIONS

15.1 For EPL Gb, this device must be installed in an appropriately certified (e.g. Ex p, Ex d, Ex eb, or equivalent protection concept) enclosure, which provides a minimum ingress protection of at least IP54 and meets the enclosure requirements of IEC/EN 60079-0 and IEC/EN 60079-7

Temperature

The hazardous locations maximum surface temperature assigned is contingent upon the rated ambient and process temperatures, as well as the power dissipated in the sensing element, as follows.

Model S___ (RTD) power dissipation	Maximum surface temperature assigned				
	85°C	100°C	135°C	200 °C	350 °C
	Maximum ambient / process temperature				
0.1 W	+70°C	+85°C	+120°C	+185°C	+200°C
0.2 W	+65°C	+80°C	+115°C	+180°C	+200°C
0.4 W	+50°C	+65°C	+100°C	+165°C	+200°C

Model TC___ power dissipation	Maximum surface temperature assigned				
	85°C	100°C	135°C	200 °C	350 °C
	Maximum ambient / process temperature				
0.1 W	+70°C	+85°C	+120°C	+185°C	+200°C

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

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Certificate Annexe

Certificate Number: **Sira 18ATEX2074U**

Component: **Temperature Sensors**

Applicant: **Minco Products Incorporated**

Issue 0

Drawing	Sheets	Rev.	Date (Sira Stamp)	Title
B216681	1 to 10	A	19 Nov 19	B216681 Temperature Sensor

Issue 1 – No new drawings were introduced.

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