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# APPROVAL REPORT

## LOAD DISC II WEIGHT TRANSDUCER FOR HAZARDOUS (CLASSIFIED) LOCATIONS

Prepared For:  
KISTLER-MORSE CORPORATION  
10201 WILLOWS ROAD NE  
REDMOND, WA 98052

J.I. 3X1A7.AX  
(3810, 3611)  
September 28, 1994



### **Factory Mutual Research**

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LOAD DISC II WEIGHT TRANSDUCER  
FOR HAZARDOUS (CLASSIFIED) LOCATIONS  
FROM  
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10201 WILLOWS ROAD NE  
REDMOND, WASHINGTON 98052

### I INTRODUCTION

1.1 Kistler-Morse Corporation requested examination of the apparatus listed in Section 1.2 to be in compliance with the applicable requirements of the following standards:

<u>Title</u>	<u>Class No.</u>	<u>Issue Date</u>
Electrical Equipment for Use In Hazardous (Classified) Locations General Requirements	3600	March 1989
Electrical and Electronic Test, Measuring, and Process Control Equipment	3810	March 1989
Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1 Hazardous (Classified) Locations	3610	October 1988

Note: Factors applied to voltage or current rather than energy.

Electrical Equipment for Use in Class I, Division 2, Class II, Division 2 Class III, Divisions 1 and 2 Hazardous Locations	3611	April 1986
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FACTORY MUTUAL RESEARCH CORPORATION  
Job Identification J.I. 3X1A7.AX

3.2 Intrinsic Safety (System) Evaluation - The following tests verify the suitability of the Load Disc II as intrinsically safe for use in Class I, Division 1, Group C and D hazardous locations.

3.2.1 System Examination - Installation drawing No. TI-0106, Rev. D references the Intrinsically Safe Interface (ISI) board Model 100 as the source. The board is manufactured by Kistler-Morse. The ISI 100 board was previously Approved for supplying intrinsically safe levels to a Class I, II, III, Division 1, Group C, D, E, F and G hazardous locations under J.I. 1N2A1.AX and re-examined under J.I. OT5H8.AX. The maximum voltage and current capable of being delivered from the ISI 100 board is 21 Vdc and 277 mA (4 Sensors). Analysis of the Load Disc II Transducers revealed no internal capacitance or inductance.

3.2.2 Temperature Examination - Analysis revealed that all components contained within the assembly do not have a surface area greater than 10 cm<sup>2</sup> and have a maximum surface temperature above 200°C (392°F). Utilizing table A9.4.3 of FMRC Class Standard 3610 revealed a temperature code of T4 applied to the label is satisfactory.

3.2.3 Creepage and Clearance Examination - The equipment located in the hazardous location was evaluated under mass fault conditions, therefore creepage and clearance distances are not considered critical.

3.3 Class II and III, Division 1 and 2 Examination - Acceptance of the Load Disc II for use in a Class II, III, Division 1, Group E, F and G, and suitable for Class II, III, Division 2, Group F and G is based on satisfactorily meeting the spark ignition requirements for Class I, Groups C and D as specified in Section 3.2. Also the temperature of exposed surfaces of components exposed to dust not exceeding 165°C (329°F) under mass-fault conditions. The sensors in the Load Disc II assemblies are encapsulated with no arcing circuits. The acceptance of the junction boxes to be located within a Class II and III hazardous location is based on the temperature tests conducted under Section 3.4 and the analysis described under Section 3.2.2.

3.4 Junction Box Dust Blanketing Temperature Test - A sample of the junction box with the field terminal circuit mounted inside was subjected to 21 Vdc and 277 mA with the circuit board covered in a general purpose flour. The power was applied until the assembly attained thermal equilibrium. The results were satisfactory in that there was no significant component temperature nor charring of the flour.

3.5 Nonincendive Evaluation - Nonincendive equipment acceptability is based on the inability of the device to release sufficient electrical or thermal energy under normal operating conditions to cause ignition of the specific hazardous atmospheres. The following examination verifies the suitability of the subject equipment for use in Class I, Division 2, Groups A, B, C and D hazardous locations.