



To:	TSSA	From:	Renzo Pupulin
Company:	Delta M Corporation	Phone:	416 - 747- 2345
Pages:	9	Location:	Toronto
Our File:	ANR-2403	Date:	October 11, 2012

Your File: 828326

Subject: Request for Design Registration

Dear Ms. Francis,

CSA has reviewed the documentation submitted by TSSA on behalf of Delta M Corporation. These fittings have been registered by CSA for the Province of Québec. In accordance with an agreement between CSA, the Provinces of Québec and Saskatchewan; this registration is recognized by Quebec and Saskatchewan. These fittings are acceptable for use in these Provinces.

The letters CSA will be applied as a prefix to the CRN indicate which fittings have been registered in this manner. A copy of the stamped Statutory Declaration is attached.

The CRN is CSA-0F7833.56R1.

The cost for this service is \$ [REDACTED] plus HST.

A copy of the Statutory Declaration with an original stamp affixed will be forwarded to you along with our invoice by regular mail.

Yours truly

Renzo Pupulin C.E.T.
Product Group Manager
Gas Appliances and Accessories
renzo.pupulin@csa-international.org



TECHNICAL STANDARDS & SAFETY AUTHORITY
 14th Floor, Centre Tower
 3300 Bloor Street West
 Toronto, Ontario
 Canada M8X 2X4

Show facsimile of manufacturer's logo or trademark, as it will appear on the fitting, in the space below



STATUTORY DECLARATION
Registration of Fittings

I, C. MIKE LINDAHL, ENGINEERING MANAGER
 (Name and Position, e.g. President, Plant Manager, Chief Engineer)

of DELTA M CORPORATION
 (Name of Manufacturer)

Located at 1003 LARSEN DRIVE, OAK RIDGE, TN, 37830, USA 865-483-1569 865-483-1142
 (Plant Address) (Telephone No.) (Fax No.)

do solemnly declare that the fittings listed hereunder, which are subject to the **Technical Standards and Safety Act**, Boilers and Pressure Vessels Regulation, comply with all of the requirements of
 One or more of the standards on the attached sheet...

(Title of recognized North American Standard)

which specifies the dimensions, materials of construction, pressure/temperature ratings, identification marking the fittings and service;

or are not covered by the provisions of a recognized North American standard and are therefore manufactured to comply with
 as supported by the attached data which identifies the dimensions, material of construction, pressure/temperature ratings and the basis for such ratings, the marking of the fitting for identification and service.

I further declare that the manufacture of these fittings is controlled by a quality system meeting the requirements of ISO 9001:2008, Delta M QSM which has been verified by the following authority, UNDERWRITERS LABORATORY, CSA

The items covered by this declaration, for which I seek registration, are category F type fittings. In support of this application, the following information and/or test data are attached as follows:

- See attached sheet -

(drawings, calculations, test reports, etc.)

Declared before me at Delta M Corp in the County
 the 17th day of February, AD 2012

Commissioner for Oaths:

Pamela S. Clabough My Commission Expires

(Printed name)

June 25, 2014

Pamela S. Clabough

(Signature)

C. Mike Lindahl

(Signature of Declarer)



FOR OFFICE USE ONLY

To the best of my knowledge and belief, the application meets the requirements of the **Technical Standards and Safety Act**, Boilers and Pressure Vessels Regulation, and CSA Standard B51 and is accepted for registration in Category F

CRN: CSA - OF 78 33.56 R1

Registered by: A. BANWATT

Dated: OCTOBER 11, 2012

NOTE: This registration expires on APRIL 13, 2022



***Note:** See the attachment for the scope of the registration

**COMPARISON OF FLANGE AND FITTING PRESSURE RATINGS WITH
PROBE PRESSURE RATING**

Prepared By: *R. S. MacLachlan* Date *2/1/12*
Reviewed By: *C. Hinds* Date *2/2/12*
Reviewed By: *A. J. White* Date *2/6/12*

1.0 Background

The purpose of this report is to prove the materials used in Delta M Corporation flanges and fittings will meet or exceed applicable standards listed below.

This document originally existed as part of the registration scope for the Canadian Registration Numbers (CRN). This information is important to manufacturing efforts at Delta M Corporation, and should exist in controlled form.

2.0 Applicable Standards

ANSI/ASME B31.1 Power Piping
ASME B16.11 Forged Fittings, Socket-Welding and Threaded
ASME B16.5 Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24
Metric/Inch Standard

3.0 Evaluation

3.1 FLANGES

The instrument probe assembly was designed with the boiler code and has been issued CSA Certificates of Compliance 1221835 (95764-1) and 1145207 (95764). As the information and table below indicate, the weakest point of the system is deemed to be the flange. NPT fittings were rated above probe materials, so for NPT fittings, probe ratings predominate.

Table 1 compares flange pressure ratings with probe materials at various pressure and temperature combinations.



CLASS	MATERIALS WORST OF 304, 304L, 316, 316L	WORST OF HAST B, HAST C, INCONEL 600, ALLOY 20, MONEL
150	230 PSI @ 0°F to 80 PSI @ 800°F for 304L, 316L	230 PSI @ 0°F to 80 PSI @ 800°F for Monel, Alloy 20
300	600 PSI @ 0°F to 33 PSI @ 800°F for 304L, 316L	600 PSI @ 0°F to 430 PSI @ 800°F for Monel, Alloy 20
400	800 PSI @ 0°F to 440 PSI @ 800°F for 304L, 316L	800 PSI @ 0°F to 575 PSI @ 800°F for Monel, Alloy 20
600	1200 PSI @ 0°F to 660 PSI @ 800°F for 304L, 316L	1200 PSI @ 0°F to 800 PSI @ 800°F for Alloy 20
900	1800 PSI @ 0°F to 985 PSI @ 800°F for 304L, 316L	2250 PSI @ 0°F to 1295 PSI @ 800°F for Alloy 20

TABLE 1: FLANGE PRESSURE RATING VERSUS MATERIAL, CLASS AND PRESSURE (DATA TAKEN FROM B16.5, TABLE 2)

Notes:

1. Temperature range of use: -20 to 800°F

2. The probe derating ratio was taken as: $Dr = \frac{SF@800°F}{SF@0°F} = 0.548$

The lowest ratio was selected corresponding to 316L SS. Thus the probe pressure rating is 3000 PSI at 0-100°F (tested) and 1644 PSI at 800°F.

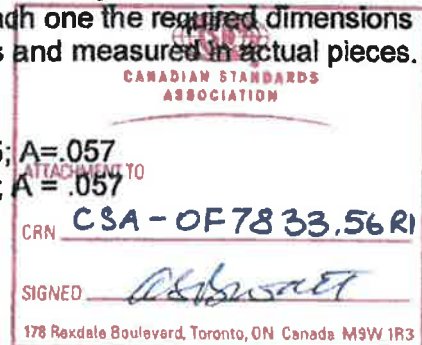
3. From comparison of the table with the probe test and derating calculation, it is concluded that for flange classes 150 to 900 and temperatures between 0°F and 800°F, the rating of the flange is the rating of the flanged probe.

3.2 NPT THREADED FITTINGS:

The design pressure P was calculated using Eqn. 4 from B31.1, paragraph 104.1.2. It was applied to: a) 1 1/2" NPT fitting mad from 1/2" NPT hex nipple manufactured to B16.11 dimensions, b) 3/4" NPT machined round nipple manufactured to B16.11 dimensions, c) 1" NPT hex fitting made from 1" NPT hex plug manufactured to B16.11 dimensions. For each one the required dimensions to enter in Eqn. 4 were determined from drawings and measured in actual pieces.

For each:

- a) 1/2" NPT fitting: Do = .84; d=.376; tm=.2325; A=.057
- b) 3/4" NPT fitting: Do = .75; d-.500; tm = .125; A = .057



c) 1.0" NPT fitting: $D_o = 1.315$; $d = .75$; $t_m = .2825$; $A = .0696$
 γ was calculated in each case as $\gamma = d/(d + D_o)$.
 The values of SF were taken from Appendix A of B31.1 for 316L (because it is the worst case) for 0-100°F and 800°F temperature.

Considering that the calculated pressure will be higher for fittings above 1" because the ID remains at that of the 1" fitting, they were not calculated. The design pressure for each fitting at both temperatures is shown in Table 2 below.

FITTING	PRESSURE PSI	
	0-100°F	800°F
½" NPT	7,533	4,126
¾" NPT	6,038	3,308
1" NPT	4,549	2,492

TABLE 2: DESIGN PRESSURE AT TWO TEMPERATURES FOR ½", ¾" AND 1" NPT FITTINGS

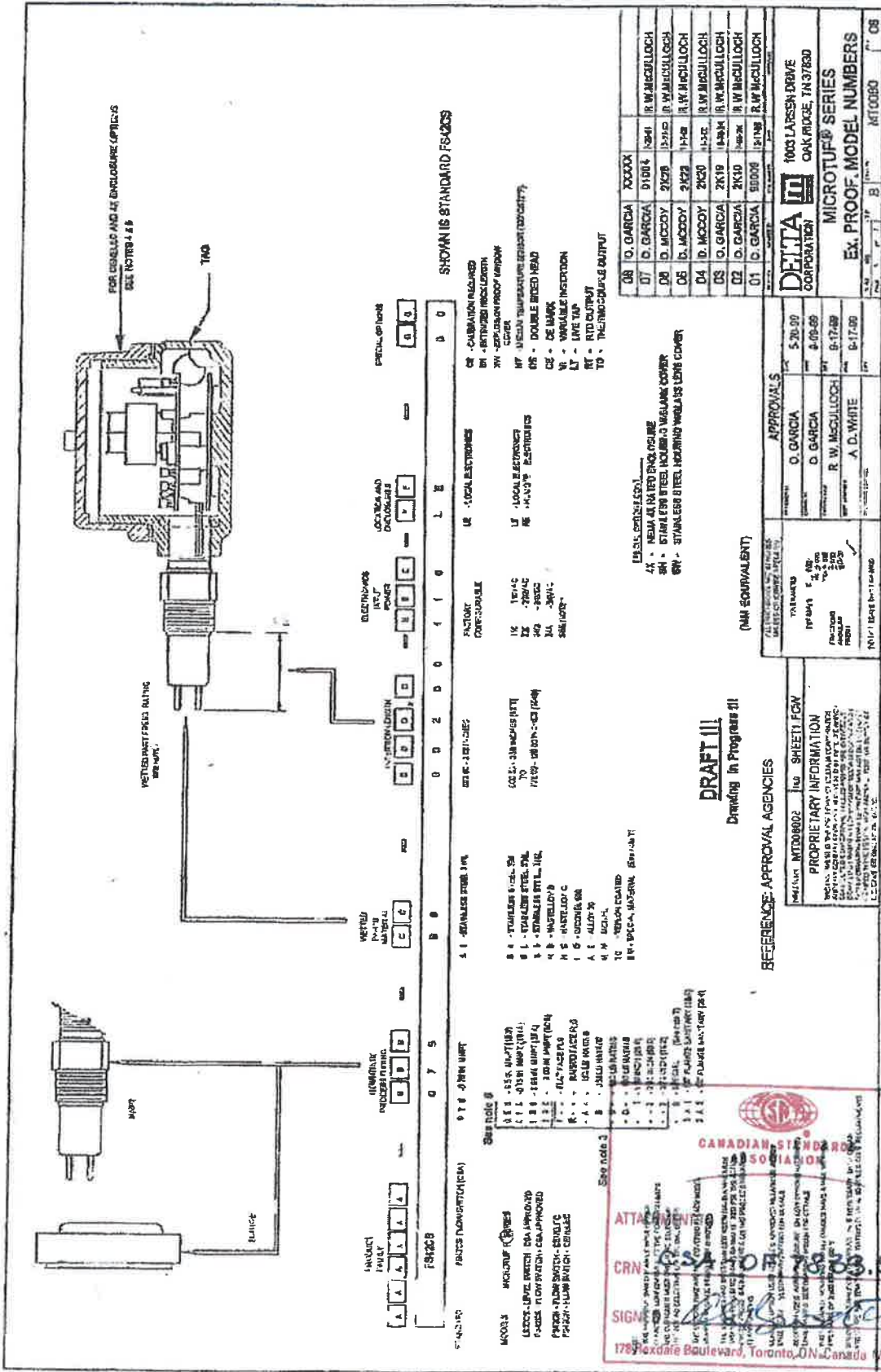
Since all fittings have pressure ratings above the rated pressures of the probes (3,000 PSI at 0-100°F and 1,644 PSI at 800°F), the probe rating is the one to use for NPT fitting probes.

4.0 Summary

This report documents calculations that relate the materials pressure and temperature ratings of Delta M probes to applicable standards. Based on use of the materials within the ranges specified herein, Delta M probes are expected to meet or exceed CSA and CRN requirements.



ATTACHMENT 1



FOR DETAILS AND ALL ENCLOSURE CAPTIONS SEE NOTES 1-15

SHOWN IS STANDARD FINISH

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FOR DETAILS AND ALL ENCLOSURE CAPTIONS SEE NOTES 1-15

08	T.O. GARCIA	XXXXX
07	D. GARCIA	D1004
06	D. MCCOY	D3003
05	D. MCCOY	D4002
04	D. MCCOY	D2001
03	D. GARCIA	D3004
02	D. GARCIA	D3005
01	D. GARCIA	D3006

DELTA CORPORATION 1003 LARSEN DRIVE OAK RIDGE, TN 37860	
APPROVALS O. GARCIA D. GARCIA R. W. MCCULLOCH A. D. WHITE	DATE 5-20-90 6-09-89 9-17-89 9-17-90

EX. PROOF, MODEL NUMBERS

MT10060

MT10060

DRAFT III
Drawing in Progress #1

REFERENCE-APPROVAL AGENCIES

DEFLECT INTD0002 - 100 SHEET 10V

PROPRIETARY INFORMATION

178 Dundas Boulevard, Toronto, ON, Canada M9W 1R3

**STANDARDS FOR MATERIAL SPECIFICATIONS AND FOR MACHINING, DIMENSIONS
AND RATING FOR DELTA M MATERIALS USED IN PROBE MANUFACTURE**

I. MATERIAL SPECIFICATION STANDARDS

STAINLESS STEELS 304, 304L, 316, 316L

PIPE AND TUBE

SEAMLESS TUBE – SA213

WELDED TUBE – SA249

SEAMLESS AND WELDED PIPE – SA312

FLANGES AND FITTINGS

FORGED AND HOT ROLLED ALLOY STEEL FOR FLANGES, FITTINGS AND
VALVES – SA182

WROUGHT IRON STAINLESS PIPE FITTINGS – SA403

HASTELLOY B AND C, ALLOY 20 (NO6022, NI2076, NO83201)

SEAMLESS PIPE AND TUBE – SB622

WELDED PIPE – SB619

WELDED TUBE – SB626

WROUGHT NICKEL AND NICKEL ALLOY FITTINGS – B366

NICKEL ALLOY FORGINGS FOR FLANGES – SB564

ALLOY 20 PLATE – B620

ALLOY 20 ROD – B621

INCONEL 600 (NO6600)

SEAMLESS PIPE AND TUBE – SB617

WELDED PIPE – SB517

WELDED TUBE – B516

WROUGHT NICKEL AND NICKEL ALLOY FITTINGS – B366

NICKEL ALLOY FORGINGS FOR FLANGES- SB564

MONEL (NO4400)

SEAMLESS PIPE AND TUBE – SB165

WELDED PIPE – B725

WELDED TUBE – B730

WROUGHT NICKEL AND NICKEL ALLOY FITTINGS – B366

NICKEL ALLOY FORGINGS FOR FLANGES – SB564

II. MACHINING, DIMENSIONS AND RATING STANDARDS

PIPE THREADS, GENERAL PURPOSE – B1.20.1

DRY SEAL THREADS – B1.20.3

PIPE FLANGES AND FLANGED FITTINGS – B16.5

FORGED STEEL FITTINGS, SOCKET – WELDED AND THREADED B16.11

POWER PIPING – B31.1



CERTIFICATE

UL DQS Inc.
Management Systems Solutions

hereby certifies that the company

Delta M Corporation
1003 Larsen Drive
Oak Ridge, TN 37830
USA

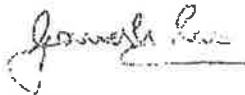
has implemented and maintains a **Quality Management System**.

Scope:
The design and manufacture of fluid flow, level and temperature measurement devices.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2008

Certificate registration no.	10000442 QM08
Date of original certification	2005-01-28
Date of revision	2010-12-07
Date of certification	2011-01-28
Valid until	2014-01-27



Ganesh Rao
President



UL
Net

1130 West Lake Cook Road, Suite 300, Buffalo Grove, IL 60089 USA

Saskatchewan



Saskatchewan
Municipal
Government

Productive Services
330 - 1651 Victoria Avenue
Regina, Saskatchewan
S4P 1V7

787-4500

April 23, 1998

Re: Fittings Registration

The Province of Saskatchewan will be participating with Quebec, Manitoba and the Canadian Standards Association (CSA) in a pilot project for the registration of fittings. We will recognize registrations done by CSA and accept such fittings for use in Saskatchewan.

The letters CSA will be applied as a prefix to the CRN to indicate which fittings have been registered in this manner. I would appreciate if you could inform your clients of this additional marking requirement.

You may also inform your clients that fittings registered by CSA are accepted for use in Saskatchewan.

Yours truly,

A handwritten signature in black ink, appearing to read 'N. Surtess', written over a horizontal line.

N. Surtess, P. Eng.
Executive Director