DANIEL®
SIMPLEX® ORIFICE
PLATE HOLDER

2" - 8" CLASS 150-2500

FOR API 14.3 SERVICE APPLICATIONS
PARTS LIST AND OPERATION INSTRUCTIONS

DANIEL MEASUREMENT AND CONTROL, INC.
AN EMERSON PROCESS MANAGEMENT COMPANY
HOUSTON, TEXAS

Part Number 3-9008-004
Revision C

MAY 2009

DANIEL®

EMERSON.
Process Management

IMPORTANT INSTRUCTIONS

Daniel Measurement and Control, Inc. (Daniel) designs, manufactures and tests products to function within specific conditions. To use this product as intended, owners and operators must strictly adhere to both the information printed on the product nameplate and to all instructions provided in this manual prior to installation, operation, and maintenance.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

Read nameplate to determine maximum allowable operating pressure (MAOP) before placing product in service.

Operating this product above MAOP may lead to serious injury or death.

Product Owners (Purchasers):

- Inform and educate your personnel in the proper installation, operation, and maintenance of this product.
- To ensure proper performance, select qualified personnel to install, operate, repair and maintain this product.
- Save this instruction manual for future reference.

Product Operators:

- **Read all instructions prior to installing, operating, and maintaining this product**. If this instruction manual is not the correct manual for your Daniel product, telephone Daniel at 1-713-827-6314 and Daniel will provide you the requested manual. You may also download the correct manual from *www.daniel.com.*
- If you do not understand any of the instructions, then contact your Daniel representative for clarification.
- Follow all warnings, cautions, and instructions marked on, and supplied with, this product.
- Install this product as specified in the INSTALLATION section of this manual and per applicable local and national codes.
- Connect all products to the proper electrical and pressure sources when, and if, applicable.
- Use only replacement parts specified by Daniel. Unauthorized parts and procedures can affect this product's performance and place the safe operation of your process at risk.

Look-alike substitutions may result in fire, hazards or improper operation.

- Ensure that all components are in place prior to, and during, operation of the product to prevent personal injury.
- Save this instruction manual for future reference.
- **ALWAYS READ AND FOLLOW THE DANIEL SIMPLEX® ORIFICE FITTING OWNER'S MANUAL AND ALL PRODUCT WARNINGS.**

DANIEL SIMPLEX® ORIFICE FITTINGS
2" - 8" 150-2500

NOTICE

THE CONTENTS OF THIS PUBLICATION ARE PRESENTED FOR INFORMATIONAL PURPOSES ONLY, AND WHILE EVERY EFFORT HAS BEEN MADE TO ENSURE THEIR ACCURACY, THEY ARE NOT TO BE CONSTRUED AS WARRANTIES OR GUARANTEES, EXPRESSED OR IMPLIED, REGARDING THE PRODUCTS OR SERVICES DESCRIBED HEREIN OR THEIR USE OR APPLICABILITY. ALL SALES ARE GOVERNED BY DANIEL'S TERMS AND CONDITIONS, WHICH ARE AVAILABLE UPON REQUEST. WE RESERVE THE RIGHT TO MODIFY OR IMPROVE THE DESIGNS OR SPECIFICATIONS OF SUCH PRODUCTS AT ANY TIME.

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PRODUCT NAMES USED HEREIN ARE FOR MANUFACTURER OR SUPPLIER IDENTIFICATION ONLY AND MAY BE TRADEMARKS/REGISTERED TRADEMARKS OF THESE COMPANIES.

DANIEL AND THE DANIEL LOGO ARE REGISTERED TRADEMARKS OF DANIEL INDUSTRIES, INC. THE EMERSON LOGO IS A TRADEMARK AND SERVICE MARK OF EMERSON ELECTRIC CO.

WARRANTY

1. LIMITED WARRANTY: Subject to the limitations contained in Section 2 herein and except as otherwise expressly provided herein, Daniel Measurement and Control, Inc. ("Daniel") warrants that the firmware will execute the programming instructions provided by Daniel, and that the Goods manufactured or Services provided by Daniel will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Daniel, whichever period expires first. Consumables and Services are warranted for a period of 90 days from the date of shipment or completion of the Services. Products purchased by Daniel from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Daniel has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If Buyer discovers any warranty defects and notifies Daniel thereof in writing during the applicable warranty period, Daniel shall, at its option, promptly correct any errors that are found by Daniel in the firmware or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Daniel to be defective, or refund the purchase price of the defective portion of the Goods/Services. All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Daniel are not covered by this limited warranty, and shall be at Buyer's expense. Daniel shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Daniel representative. All costs of dismantling, reinstallation and freight and the time and expenses of Daniel's personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Daniel. Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Daniel and can be amended only in a writing signed by an authorized representative of Daniel. Except as otherwise expressly provided in the Agreement, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES. **Buyer acknowledges and agrees that corrosion or erosion of materials is not covered by this warranty.**

2. LIMITATION OF REMEDY AND LIABILITY: DANIEL SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE. THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF WARRANTY HEREUNDER SHALL BE LIMITED TO REPAIR, CORRECTION, REPLACEMENT OR REFUND OF PURCHASE PRICE UNDER THE LIMITED WARRANTY CLAUSE IN SECTION 1 HEREIN. IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL DANIEL'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXCEED THE PRICE TO BUYER OF THE SPECIFIC GOODS MANUFACTURED OR SERVICES PROVIDED BY DANIEL GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. BUYER AGREES THAT IN NO EVENT SHALL DANIEL'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXTEND TO INCLUDE INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES. THE TERM "CONSEQUENTIAL DAMAGES" SHALL INCLUDE, BUT NOT BE LIMITED TO, LOSS OF ANTICIPATED PROFITS, REVENUE OR USE, AND COSTS INCURRED INCLUDING WITHOUT LIMITATION FOR CAPITAL, FUEL AND POWER, AND CLAIMS OF BUYER'S CUSTOMERS.

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1.0 INTRODUCTION

1.1 General

Daniel Measurement & Control Inc. designed this manual to assist in the installation, operation and maintenance of the Daniel Simplex® Orifice Fitting.

To assure proper installation, operation and maintenance, it is imperative that product owners and product operators read and follow the information contained in this manual.

1.2 Description

The Daniel Simplex® Orifice Fitting (the "Simplex®") is an orifice plate holding device that houses, and accurately positions an orifice plate, within a pipe or tube, to measure flow. It is just one component of an orifice plate flow measurement system. The Simplex® is designed to:

1) position an orifice plate, concentric to flow moving through a pipe or tube, within API 14.3.2 or ISO 5167 location requirements.

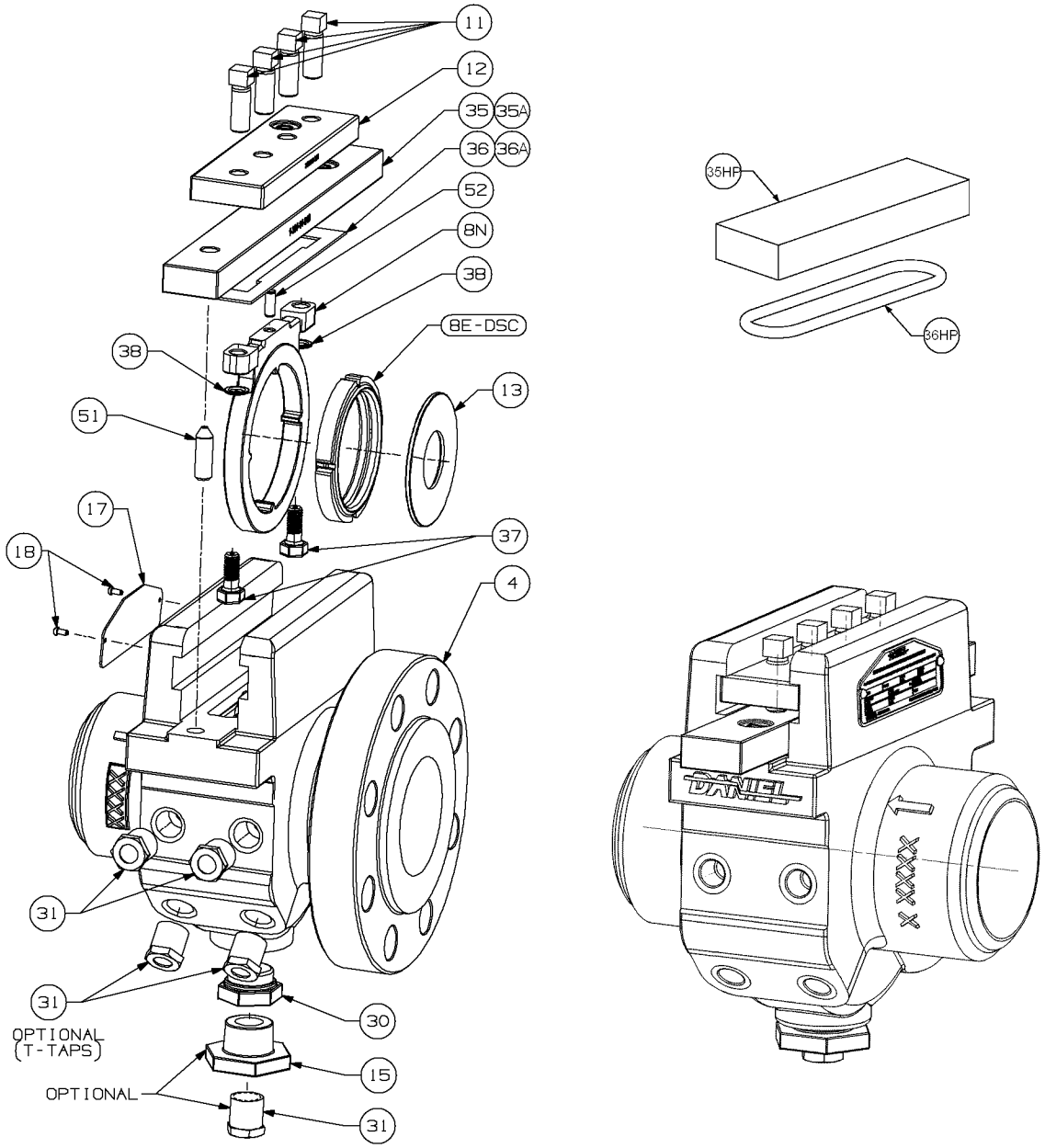
The orifice plate held within a Simplex® restricts flow moving through the pipe or tube. This restriction creates a what is known as a differential pressure. Differential pressure is the difference in pressure between two points. Within a orifice plate flow measurement system differential pressure across an orifice plate held within a Simplex® is the difference between the pressure at the upstream meter tap before the gas passes through the orifice (one point) and the pressure at the downstream meter tap after it has passed through the orifice (the second point).

The rate of flow moving through the Simplex® is determined from the recorded values of differential pressure. These values, along with other information gathered from the flowing fluid and other elements, are used to calculate the amount of fluid passing through the flow measurement system.

The Simplex® single chamber design allows for the inspection and the replacement of an orifice plate without removing the Simplex® from the pipe or tube. Therefore, using a Simplex® eliminates the effort required to remove and inspect an orifice plate housed in conventional orifice flange union installations.

Daniel designs and manufactures all Simplex® units to applicable AGA recommendations and in accordance with selected ANSI, ASME, ASTM and ISO 5167 specifications.

Products bearing the "CE" mark are designed and manufactured in compliance with the European Union Pressure Equipment Directive (PED) 97/23/EC.



Flange Neck Version (FN) Weld Neck Version (WN)

Figure 1-1. Exploded and Assembled View

1.3 Parts and Materials List

ITEM NO.	DESCRIPTION	MATERIAL / DESCRIPTION	QTY.
4	Body	Cast CS A216 WCB (Class 150-2500)	1
8N	Plate Carrier	Type 316 Stainless Steel	1
8E-DSC 8TSC 8MSC*	Orifice Plate Sealing Unit	DSC - Synthetic Rubber (Class 150-600) TSC - PTFE (Class 900-2500) MSC - Type 316 Stainless Steel	1
8NSC-14.3	Sealing Bar/Orifice Plate Carrier Assembly	(See page 4-1)	
11 11XP	Clamping Bar Screw	11- Heat Treated Alloy Steel (Class 150-900) 11XP - Heat Treated Alloy Steel (Class 1500-2500)	Table 1.3
12 12HP	Clamping Bar	12 - CRS (Chemically Treated)(Class 150-900) 12HP - CRS (Chemically Treated)(Class 1500-2500)	1 1
13	Orifice Plate	Type 304 or 316 Stainless Steel	1
15	Reducer (Optional)	1" X 1 / 2" NPT - CRS	1
17	Nameplate		1
18	Nameplate Fastener		2
30	Drain Plug	1 / 2" NPT - CRS	1
31	Meter Tap Plug	1 / 2" NPT - CRS	2 (4)[1]
31P	Thread Protectors	1 / 2" Polymer Plugs	
35 35A 35HP	Sealing Bar	35 - CRS (Chemically Treated) (Class 150-600) 35A CRS (Chemically Treated) (Class 900) 35HP - CRS (Chemically Treated) (Class 1500-2500)	1
52	Sealing Bar/Plate Carrier Dowel Pin	CRS	1
36 36A 36HP	Sealing Bar Gasket	36 - Composite (Class 150-600) 36A - Composite (Class 900) 36HP - Synthetic Composition (Class 1500-2500)	1
37	Plate Carrier Screw	Stainless Steel	2
38	Plate Carrier Washer	Stainless Steel	2
51	Sealing Bar/Body Dowel Pin	Type 316 Stainless Steel	1

*Indicates parts interchangeable

[1]Quantity is four for telemetering tap option

Notes:

1. All Daniel Simplex® Orifice Fittings are supplied with pipe plugs on one side only. If additional quantities are required, please contact the factory direct.

* Indicates Interchangeable Parts for all line sizes of specified pressure rating(s).

General Notes:

- Most parts available in other materials upon specification.
- Telemetering taps are standard on 2" through 4" ANSI 150 -600 and optional on other sizes.
- CS (Carbon Steel), CRS (cold rolled steel), NPT (pipe thread)
- The materials listed above indicate standard “A” trim.
- NACE trim in compliance with MR0175-2002 is standard on 2" through 8" ANSI 150-600
- Materials are available for applications handling sour process fluids outside of the NACE MR0175-2002 specification upon request.

WHEN ORDERING PARTS, PLEASE SPECIFY:

(1) catalog number, (2) size, (3) serial number and date of the original purchase, (4) part number, (5) material, (6) quantity of parts required.

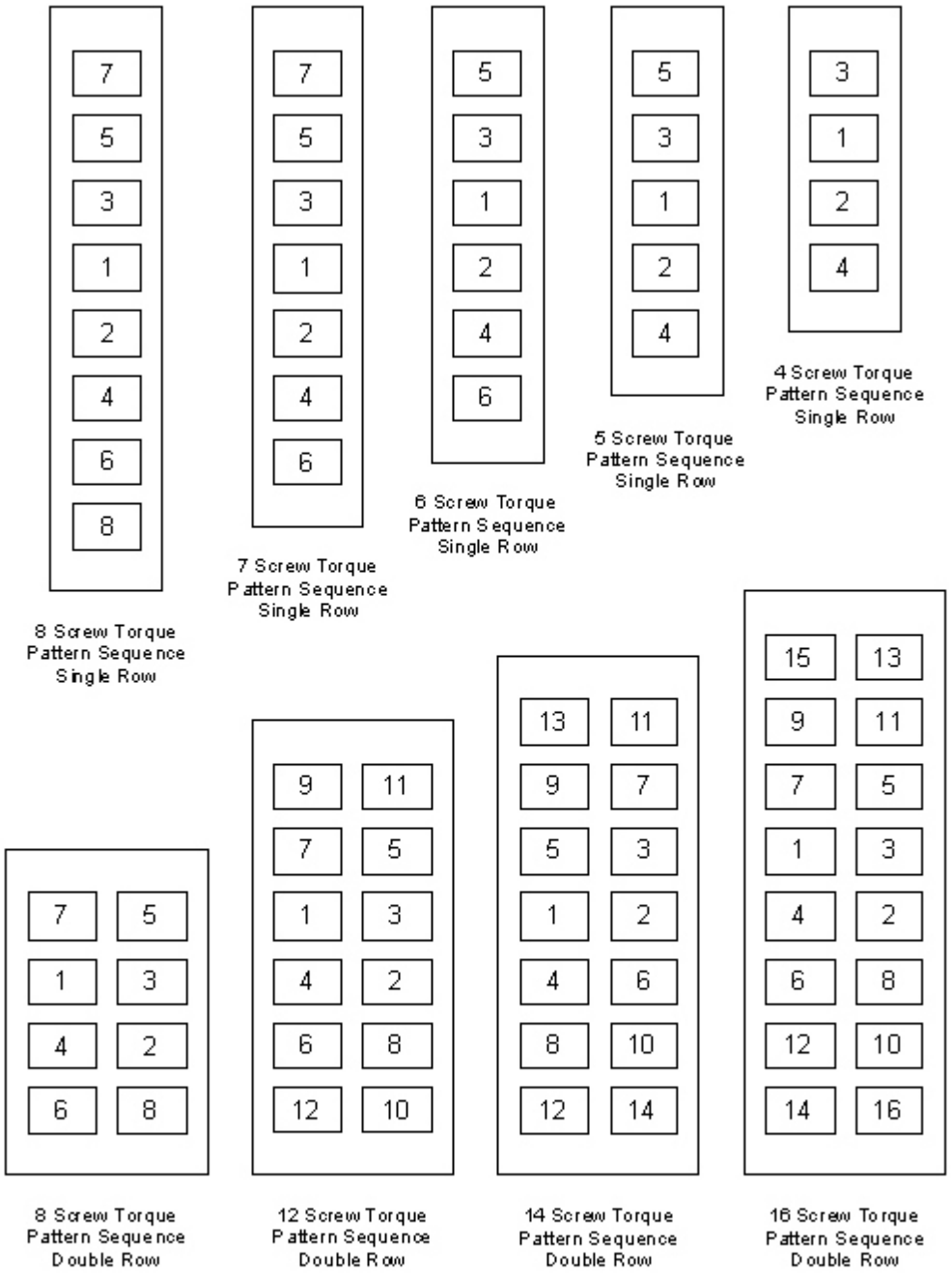
1.4 Clamping Bar Screw (11) Quantity and Torque Requirements

Nominal Size (in.)	ANSI Class	Quantity	Required Torque (ft. - lbs.)	
			Minimum	Maximum
2	150-600	4	40	55
	900	4	70	85
	1500	8	80	95
	2500	10	135	150
3	150-600	4	50	70
	900	4	75	90
	1500	10	80	95
	2500	10	135	150
4	150-600	5	45	60
	900	6	70	85
	1500	12	80	95
	2500	12	130	150
6	150-600	6	40	60
	900	6	75	90
	1500	14	85	100
	2500	14	140	160
8	150-600	8	40	60
	900	8	80	95
	1500	14	90	105
	2500	26	105	130

Recommended Clamping Bar Assembly:

1. Clean all fastening and sealing surfaces of all debris
2. Chase threads by running screw through sealing bar by hand
3. Assemble unit and apply torque to screws per pattern provided
4. Tighten screw as follows:
   a. Install; less than 20% of required torque
   b. Second Pass: 20% -30% of required torque
   c. Third Pass: 50% - 70% of required torque
   d. Fourth Pass: 100% of required torque
   e. Verify that the Sealing Bar (35, 35A, 35HP), Sealing Bar Gasket (36, 36A, 36HP) and Body (4) were brought together evenly and gasket does not leak
   f. Fifth Pass: 100% of required torque four (4) hours after Fourth Pass.

1.5 Clamping Bar Screw (11) Torque Patterns



NOTE: For 26 Screw Double Row use the 14 screw Double Row as reference and continue torque pattern sequence

2.0 INSTALLATION

2.1 General Information

The Daniel Simplex® Orifice Fitting is an essential element in an orifice plate flow measurement system. Other elements in the system usually include, but are not limited to, a meter tube, a flow conditioner, and various data recording devices. Purchasers have the option of acquiring only a Simplex® from Daniel for later installation in a flow measurement system, or purchasing a complete orifice plate flow measurement system containing a Simplex®.

If a Simplex® is purchased separately from a measurement system, then it is the responsibility of the product operators or product owners to assemble and test the flow measurement system containing the Simplex®.

Daniel tests every Simplex® unit to a hydrostatic pressure of 1.5 times it's rated maximum allowable operating pressure at the factory under controlled conditions. Purchasers have the option to order these results from Daniel prior to testing.

When assembling a flow measurement system that will contain a Simplex®, particular attention should be paid to the requirements for permanent joining of components and the non-destructive testing of the completed assembly. See the appropriate code (AGA-3, etc.) for meter tube requirements. The product operator or product owner is responsible for confirming the maximum allowable operating pressure of each item in the flow measurement system prior to performing any pressure test. The product operator should never exceed the maximum allowable operating pressure of the lowest rated component within a flow measurement system.

⚠WARNING

SERIOUS PERSONAL INJURY OR DEATH POSSIBLE

Never exceed the maximum allowable operating pressure of the lowest rated item in the system. The installation technician must confirm the maximum allowable operating pressure (MAOP) of each item in the system, including the Daniel Simplex® Orifice Fitting, prior to performing any leak test.

Failure to confirm the maximum allowable operating pressure of each item in the system could result in serious injury or death.

On installations which require compliance with the European Union Pressure Equipment Directive (PED) 97/23/EC, it is the responsibility of the product operator or product owner to ensure that all essential safety requirements of the directive are met. Particular attention should be paid to the requirements for permanent joining and non-destructive testing.

2.2 Storage

A light spray of rust inhibitor applied to the inside bore of a Simplex® will aid in protecting it's surface finish. A light spray of rust inhibitor applied to the bore of a the meter tube assembly will also protect it's surface finish prior to commissioning.

2.3 Preliminary Steps

It is the responsibility of both the product owners and product operators to ensure that all requirements are met on installations built to comply with the European Union Pressure Equipment Directive (PED) 97/23/EC when required.

It is the responsibility of the product operators to clean the Simplex® and all piping components of foreign matter such as welding debris, scale, oil, grease, and dirt before commissioning.

If product owners or product operators expect that the Simplex® will encounter severe conditions (conditions where there is likely to be an accumulation of sediment for any cause), then Daniel recommends the removal of the **Drain Plug** (30) at the bottom of the Simplex® and the installation of a blow down valve in its place. (See Section 3.0, Maintenance section for instructions concerning severe service conditions).

Daniel recommends that both product owners and product operators record the Simplex® **Nameplate** (17) data for future reference prior to installation. **Nameplate** (17) data contains information that is useful if you need to correspond with a Daniel representative. Always provide the serial number and model number of the fitting when ordering spare parts.

It is the responsibility of both the product owners and product operators to install the Simplex® in a well designed measurement system in accordance with:

- maximum operating pressure of the measurement system
- measurement system test pressures
- minimum and maximum process temperatures and ambient site temperatures
- mass of fluid in both process and test conditions
- chemical composition and toxicity of fluid in operating and test conditions
- traffic, wind and earthquake loading at the measurement site
- reaction forces and moments, which result from supports, attachments, piping, etc.

- corrosion, erosion, fatigue, etc.
- decomposition of unstable fluids in operating and test conditions
- possible damage from external fire

2.4 Commissioning the Daniel Simplex® Orifice Fitting Installation

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The Simplex® is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual can result in serious injury or death.

Commissioning is the process of verifying that a Simplex® performs in accordance with the user's intended operational, maintenance, and measurement requirements.

The information contained in this section addresses commissioning topics for a Simplex® fully, or partially, assembled within an orifice plate flow measurement system.

Purchasers have the option of acquiring a Simplex® from Daniel for later installation in a flow measurement system, or purchasing a complete orifice plate flow measurement system containing a Simplex®.

Daniel packages orifice plates and seal rings separately from the Simplex®.

Product owners and product operators choosing to install a Simplex® into a flow measurement system NOT designed by Daniel must insure that the fabrication techniques and subsequent testing meet recognized industry standards.

Fitting installation personnel must confirm that the line flow direction corresponds to the flow directional indicator (an arrow or "INLET" / "OUTLET" tags) positioned on the Simplex® **Body** (4).

The Simplex® may be installed in any horizontal line with the plate access opening in a vertical (up) position or with the fitting rotated left or right to obtain a horizontal (side) opening position.

- Remove all foreign matter from the meter tube interior and the bore piping section of the Simplex® prior to installation.

- Install the proper end flange gaskets, if required, and tighten all bolting to the appropriate torque, per product operator specifications.

- Install the **Sealing Bar Gasket** (36, 36A, 36HP), **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3), and **Clamping Bar** (12, 12HP) onto the **Body** (4).

- Tighten and secure all **Clamping Bar Screws** (11) to the torque values provided in Section 1.4 and Section 1.5 of this manual.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The correct positioning and installation of the Sealing Bar Gasket (35, 35A, 35HP)**, Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3)**, and Clamping Bar** (12, 12HP) **are essential to providing a pressure barrier between the line pressure and atmospheric pressure.**

Failure to install the **Sealing Bar Gasket** (36, 36A, 36HP), **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3), and **Clamping Bar** (12, 12HP) according to the instructions provided in the manual can result in serious injury or death.

2.5 Commissioning - Line Pressure Test

Conditions:

- The pressure within the Simplex® **Body** (4) and the adjacent metering system is equivalent to atmospheric pressure.
- The **Orifice Plate** (13) and **Orifice Plate Sealing Unit** (8E-DSC or 8TSC or 8MSC) is not installed on the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3)
- The **Sealing Bar Gasket** (36, 36A, 36HP) is installed on the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3)
- The **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) is installed.
- The **Clamping Bar** (12, 12HP) is installed.
- The **Clamping Bar Screws** (11 or 11XP) are tightened to torque requirements per Section 1.4 and Section 1.5.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The Simplex® is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual can result in serious injury or death.

After installing the Simplex® into the service line, personnel may perform a line pressure test of the service line.

Perform a leak test after installing the Simplex® and securing the **Clamping Bar** (12, 12HP).

1. Install a pressure gauge (calibrated to a recognized standard) on the orifice metering system in a location where the gauge will detect the pressure inside the Simplex®. Test personnel must choose a pressure gauge rated for the maximum operating pressure of the system (the Simplex®, service line seals (flange gaskets) and the adjacent piping) determined by the product owner and product operator.

⚠WARNING

SERIOUS PERSONAL INJURY OR DEATH POSSIBLE

Never exceed the maximum allowable operating pressure of the lowest rated item in the system. The operator or installation technician must confirm the maximum allowable operating pressure (MAOP) of each item in the system, including the Simplex®, prior to performing this leak test.

Failure to confirm the maximum allowable operating pressure of each item in the system could result in serious injury or death.

2. Slowly pressurize the orifice metering system at a rate of 1 psig per second (0.15 bars per second) and then stop the pressurization when the pressure inside the plate holder reaches 20 psig (1.4 bar). Hold the system at this pressure for five minutes.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The correct positioning and installation of the Sealing Bar Gasket (36, 36A, 36HP), **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3)**, and Clamping Bar** (12, 12HP) **are essential to provide a pressure barrier between the line pressure and atmospheric pressure.**

Failure to install the **Sealing Bar Gasket** (36, 36A, 36HP), **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3), and **Clamping Bar** (12, 12HP) according to the instructions provided in the manual can result in serious injury or death.

3. During this five-minute hold, test personnel should apply a leak detection solution over all connections and joint areas throughout the entire orifice metering system (including the **Sealing Bar Gasket** (36, 36A, 36HP) and all threaded connections on the Simplex®). No leakage should be visibly, or audibly, detected during this five-minute hold period.

4. If a leak is detected, mark the leak area with a marker and reduce the pressure inside the Daniel Senior® Orifice Fitting to 0 psig (0 bar). Tighten any fastener or connector adjacent to the leak area and repeat the leak test again.

5. If after several attempts to contain the leakage the leakage persists, call your Daniel Customer Service for assistance. Contact information is found in the back of this manual.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

Correct all leaks prior to operation.

Failure to stop any size leak may lead to serious injury or death.

6. Once the 20 psig (1.4 bar) leak test is complete, and no leaks are detected, then slowly raise the pressure inside the orifice metering system at a rate of 10 psig per second (0.70 bars per second) and then stop the pressurization when the pressure inside the Simplex® reaches the maximum operating pressure of the system (the Simplex® and the adjacent piping) determined by the product operator. Hold the system at that pressure for ten minutes.

⚠WARNING

SERIOUS PERSONAL INJURY OR DEATH POSSIBLE

Never exceed the maximum allowable operating pressure of the lowest rated item in the system. The installation technician must confirm the maximum allowable operating pressure (MAOP) of each item in the system, including the Simplex®, prior to performing this leak test.

Failure to confirm the maximum allowable operating pressure of each item in the system could result in serious injury or death.

During this ten-minute hold, test personnel shall apply a leak detection solution over all connections and joint areas throughout the entire orifice metering system (including the **Sealing Bar Gasket** (36, 36A, 36HP) and all threaded connections on the Simplex®). No leakage should be visibly, or audibly, detected during this ten-minute hold period.

European Union Pressure Equipment Directive (PED) 97/23

NOTE: On installations which are required to comply with the European Union Pressure Equipment Directive (PED) 97/23/EC, the installation must be tested to at least 1.43 times the maximum allowable operating pressure (MAOP) of the lowest rated component in the system as determined by the product operator.

⚠WARNING

SERIOUS PERSONAL INJURY OR DEATH POSSIBLE

Never exceed the maximum allowable operating pressure of the lowest rated item in the system. The installation technician must confirm the maximum allowable operating pressure (MAOP) of each item in the system, including the Simplex®, prior to performing this leak test.

Failure to confirm the maximum allowable operating pressure of each item in the system could result in serious injury or death.

7. If a leak is detected, mark the leak area and reduce the pressure inside the orifice metering system to 0 psig (0 bar). If a leak is detected at a fastener or connector, then tighten that fastener or connector and repeat the entire leak test again.

8. If several attempts to stop a leak fail, call Daniel Customer Service for assistance.

9. Slowly release the pressure from the orifice metering system until the pressure gauge reads zero (0) psig.

10. The Simplex®, with the orifice metering system, is now ready for orifice plate installation, final pressurization, and operation.

2.6 Commissioning - Orifice Plate Installation

Conditions:

- The pressure within the Simplex® **Body** (4) and the adjacent metering system is equivalent to atmospheric pressure.
- The **Orifice Plate** (13) and the **Orifice Plate Sealing Unit** (8E-DSC or 8TSC or 8MSC) is installed into the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3)
- The **Sealing Bar Gasket** (36, 36A, 36HP) is installed on **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3)
  The **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) is installed.
- The **Clamping Bar** (12 or 12HP) is installed.
- The **Clamping Bar Screws** (11 or 11XP) are tightened to torque requirements per Table 5.2.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The Daniel Simplex® Orifice Fitting is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual can result in serious injury or death.

1. The pressure inside the Simplex® **Body** (4) and adjacent metering system components **MUST** be at atmospheric pressure (0 psia) to begin orifice plate installation. When evacuating the metering system, direct fluid and/or gas to a safe area away from the operator and in accordance with local environmental regulations.

2. **CONFIRM** that the pressure inside the Daniel Simplex® **Orifice Fitting Body** (4) and adjacent metering system components is equivalent to atmospheric pressure.

3. Loosen each **Clamping Bar Screw** (11) two turns. Do not remove the **Clamping Bar** (12, 12HP).

4. Lightly tap the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) to break the seal generated between the **Sealing Bar Gasket** (36, 36A, 36HP) and the **Body** (4).

5. Once the seal is broken, slide the **Clamping Bar** (12, 12HP) out from the **Body** (4).

6. Lift the entire **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) out from the **Body** (4). Note: Tapping the **Sealing Bar** (35, 35A, 35HP) will loosen the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) from the **Body** (4).

7. Remove the **Sealing Bar Gasket** (36, 36A, 36HP) from the Simplex®.

8. Install a new **Sealing Bar Gasket** (36, 36A, 36HP) onto the PC Sub-Assembly. Do not reinstall any gasket once it has been compressed.

9. Install a new **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) onto the **Orifice Plate** (13).

10. Install the **Orifice Plate** (13) and new **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) into the PC Sub-Assembly taking into account the flow direction of the metering system. This can be done using the **Sealing Bar/Body Dowel Pin** (51) located in the **Body (**4) as a reference.

NOTICE

Failure to install the **Orifice Plate** (13) and **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) in a position properly oriented with the direction of flow will result in measurement error and a possible loss of revenue**.**

11. Lower the PC Sub-Assembly into the **Body** (4) aligning the **Sealing Bar** (35, 35A, 35HP) with the **Sealing Bar/Body Dowel Pin** (51) located in the **Body** (4).

12. Continue to lower the PC Sub-Assembly using the **Sealing Bar/Body Dowel Pin** (51) as a guide until it contacts the **Body** (4).

13. Install the **Clamping Bar** (12, 12HP).

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The correct positioning and installation of the Sealing Bar Gasket (36, 36A, or 36HP) **and the Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) **are essential to provide a pressure barrier between the line pressure and atmospheric pressure.**

Failure to *properly* install the gasket and sealing bar / orifice plate carrier can result in serious injury or death.

14. Tighten each **Clamping Bar Screw** (11) to the torque recommended in Section 1.4 and Section 1.5 of this manual.

15. Remove any commissioning equipment (test instruments, tubing, etc.,) from system.

16. The Daniel Simplex® Orifice Fitting is now ready for final pressurization and operation.

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3.0 MAINTENANCE

DANGER

SERIOUS PERSONAL INJURY OR DEATH

The Simplex® is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual can result in serious injury or death.

3.1 Normal Operating Conditions

Under normal measurement conditions, a product operator should inspect the Simplex®, as well as the meter tube, at intervals established by the product operator.

It is the responsibility of the product owner and product operator to perform inspections at appropriate intervals during the life of their system.

1. An external inspection of the Simplex® and metering system shall include a visual assessment of the entire system for vandalism, or other inadvertent damage.

2. Tighten fastener and connector components, if necessary.

3. Natural corrosion and erosion of the orifice metering system internal features require that maintenance personnel perform an inspection of the orifice system's bore diameter to ensure compliance with a metering code (for example, AGA-3).

3.2 Severe Operating Conditions

Under severe conditions where there is likely to be an accumulation of sediment for any cause, a product operator should install a blow down valve in place of the **Drain Plug** (30) at the bottom of the Simplex®.

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4.0 OPERATING INSTRUCTIONS

The Simplex® design allows an operator to install or remove the **Orifice Plate** (13) with a minimum amount of metering system shut-down time.

The Simplex® **Plate Carrier** (8N) is just one piece in a larger assembly. That assembly, referred to as the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) the following parts:

Sealing Bar / Orifice Plate Carrier Assembly (8NSC-14.3)

QUANTITY	DESCRIPTION AND ITEM NUMBER
1	**Plate Carrier** (8N)
1	**Sealing Bar** (35, 35A, 35HP)
2	**Plate Carrier Screws** (37)
2	**Plate Carrier Washers** (38)
1	**Sealing Bar Plate Carrier Dowel Pin** (52)
1	**Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC)
1	**Orifice Plate** (13)

A product operator can remove the entire **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) from the **Body** (4).

To change or inspect, an orifice plate or orifice plate seal, simply push on the **Orifice Plate** (13) and **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) until it pops out of the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3).

By removing the **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) from the **Orifice Plate** (13), a product operator may then closely inspect both parts for signs of damage or wear.

4.1 PLATE REMOVAL

Conditions:

- The Simplex® is operating at working pressure.
- The **Orifice Plate** (13) is located in flow stream.

Procedure:

1. Isolate the orifice metering system supporting the Simplex® and release the working pressure until the entire system reaches atmospheric (ambient) pressure.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

Release pressurized fluid to a safe area.

Failure to direct the released pressurized fluids during the discharge may result in the release fluid causing contamination and/or the accumulation of volatile gas mixtures. Volatile gas mixtures are explosive and/or toxic and may lead to serious injury or death.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The Simplex® is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual can result in serious injury or death.

2. Loosen each **Clamping Bar Screw** (11) two turns when the system reaches atmospheric (ambient) pressure. Do not remove the **Clamping Bar** (12, 12HP).

3. Lightly tap the **Sealing Bar** (35, 35A, 35HP) to break the seal generated between the **Sealing Bar Gasket** (36, 36A, 36HP) and the **Body** (4).

4. Once the seal is broken, slide the **Clamping Bar** (12, 12HP) out from the **Body** (4).

5. Lift the entire **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) out from the **Body** (4). Note: Tapping the **Sealing Bar** (35, 35A, 35HP) will loosen the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) from the **Body** (4).

6. Remove the **Sealing Bar Gasket** (36, 36A, 36HP) from the Simplex®.

7. Remove the **Orifice Plate** (13) and **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) from the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) .

8. Remove the **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) from the **Orifice Plate** (13).

4.2 PLATE INSERTION

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The Simplex® is a device that contains fluid at elevated pressure.

Failure to follow the instructions in this manual can result in serious injury or death.

Conditions:

- The Simplex® is at atmospheric (ambient) pressure.
- The Simplex® is in the orifice metering system.
- **The Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3), **Clamping Bar** (12, 12HP), with **Clamping Bar Screws** (11), are removed from the **Body** (4).

Procedure:

1. Install a new **Sealing Bar Gasket** (36, 36A, 36HP) onto the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3). Do not reinstall any gasket once it has been compressed.

2. Install a new **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) onto the **Orifice Plate** (13).

3. Install the **Orifice Plate** (13) and new **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) into the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) taking into account the flow direction of the metering system. This can be done using the **Sealing Bar/Body Dowel Pin** (51) located in the **Body (**4) as a reference.

NOTICE

Failure to install the **Orifice Plate** (13) and **Orifice Plate Sealing Unit** (8E - DSC) or (8TSC) or (8MSC) in a position properly oriented with the direction of flow will result in measurement error and a possible loss of revenue**.**

4. Lower the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) into the **Body** (4) aligning the **Sealing Bar** (35, 35A, 35HP) with the **Sealing Bar/Body Dowel Pin** (51) located in the **Body** (4).

5. Continue to lower the **Sealing Bar / Orifice Plate Carrier Assembly** (8NSC-14.3) using the **Sealing Bar/Body Dowel Pin** (51) as a guide until it contacts the **Body** (4).

6. Install the **Clamping Bar** (12, 12HP).

7. Tighten each **Clamping Bar Screw** (11) to the torque recommended in Section 1.4 and Section 1.5 of this manual.

8. The Simplex® is now ready for final pressurization and operation.

⚠ DANGER

SERIOUS PERSONAL INJURY OR DEATH

The correct positioning and installation of the Clamping Bar Gasket (36, 36A or 36HP) **and the Sealing Bar / Orifice Plate Carrier Assembly (8NSC-14.3) are essential to provide a pressure barrier between the line pressure and atmospheric pressure.**

Failure to *properly* install the gasket and sealing bar / orifice plate carrier can result in serious injury or death

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5.0 SUPPLEMENTAL INFORMATION

5.1 Recommended Spare Parts for One-Year Operation

ITEM NO.	MATERIAL/DESCRIPTION	QUANTITY
8	8E-DSC **Orifice Plate Sealing Unit** (Elastomer)	5
	8TSC **Orifice Plate Sealing Unit** (PTFE)	1
	8MSC **Orifice Plate Sealing Unit** (Metallic)	1
36	36 **Sealing Bar Gasket** (ANSI 150-600)	5
	36A **Sealing Bar Gasket** (ANSI 900)	5
	36HP **Sealing Bar Gasket** (ANSI 1500-2500)	5
37	**Plate Carrier Screw**	2
38	**Plate Carrier Washer**	2

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DANIEL MEASUREMENT AND CONTROL, INC.
RETURN POLICY FOR WARRANTY AND NON-WARRANTY MATERIAL

Use the following procedure for returning equipment to the Daniel factory in the United States.

Step 1 Obtaining a RMA Number

A Return Material Authorization (RMA) number must be obtained prior to returning any equipment for any reason.

To obtain a RMA number, call the Customer Service Department at 713-827-5033 between 8:00 a.m. and 5:00 p.m. (Central Standard Time), Monday through Friday, except holidays or email daniel.support@emersonprocess.com.

NOTICE

No product returns will be accepted without a RMA number and will be returned at the customer's expense.

For warranty consideration, the product must be returned to Daniel within twelve (12) months of the date of original shipment or within eighteen (18) months of the date of original shipment of the product to destinations outside the United States. The Purchaser must prepay any shipping charges.

In addition, the Purchaser is responsible for insuring any product shipped for return, and assumes the risk of loss of the product during shipment.

- The following information is required at the time the RMA is issued:
  - Customer name
  - Contact name
  - Billing address
  - Contact Phone # and email address
  - Daniel SO #, PO #, or Invoice #
  - Item(s) to be returned
  - Reason for return
  - End user and final destination address
  - Consignee's complete name, address, contact name and phone number

- A RMA number is required for each original order. (Example: Two fittings purchased on two separate orders now being returned require two RMA numbers.)

  For product returns from locations outside the United States, Daniel Customer Service personnel will provide additional shipping requirements.

Step 2 Cleaning and Decontamination

Prior to shipment, thoroughly clean and decontaminate all equipment removing all foreign substances. This includes all substances used for cleaning the equipment. The cleaning and decontamination requirement applies to any part exposed to process fluids or cleaning substances.

Shipping equipment that has not been decontaminated may be in violation of U.S. Department of Transportation (DOT) regulations. For your reference, the requirements for packaging and labeling hazardous substances are listed in DOT regulations 49 CFR 172, 178, and 179.

If you suspect that a part has been contaminated, the part must be completely drained and flushed to remove contaminants.

⚠WARNING

MAY CAUSE DEATH OR SERIOUS INJURY TO PERSONNEL

Contents may be under pressure or materials may be hazardous

Follow appropriate handling instructions for accessing pressurized equipment. Avoid contact with hazardous materials or contaminated units and parts. Failure to do so may result in death or serious injury.

Decontamination/Cleaning Statement

A blank Decontamination/Cleaning Statement is provided on the "Returned Material Authorization Repair Form for Used Equipment".

- A Decontamination/Cleaning Statement is required for each returned part.
- Fully complete each form and include a signature. If the decontamination statement is incomplete, the customer may be charged for decontamination and cleaning.

If the equipment has been exposed to a known hazardous substance with any characteristic that can be identified in the Code of Federal Regulations, 40 CFR 261.20 through 261.24, the chemical abstracts number and hazardous waste number/hazard code must be stated in the space provided on the form.

Two (2) copies of each Decontamination/Cleaning Statement must be provided:
- One (1) copy must be attached to the outside of the package.
- One (1) copy must be included inside the package.

Step 3 Material Safety Data Sheets (MSDS)

Provide a Material Safety Data Sheet (MSDS) with the returned equipment for each substance that has come in contact with the equipment being returned, including substances used for decontamination and cleaning.

A MSDS sheet is required by law to be available to people exposed to specific hazardous substances, with one exception: if the equipment has only been exposed to food-grade substances or potable water, or other substances for which an MSDS is not applicable, the Decontamination/Cleaning Statement form alone is acceptable.

Two (2) copies of each MSDS must be provided:
- One (1) copy must be attached to the outside of the package.
- One (1) copy must be provided inside the package.

Step 4 Packaging

Shipping a Device With Possible Contamination

To meet DOT requirements for identifying hazardous substances, ship only one device per package.

Shipping a Device Without Any Potential Contamination

Devices being returned may be shipped together in one package, if there is no potential of foreign substance contamination.

Step 5 Shipping

Before returning used equipment:

- Mark each package clearly with a RMA number.
- Include a Decontamination/Cleaning Statement inside the package.
- Attach a duplicate Decontamination/Cleaning statement to the outside of the package.
- Include a MSDS for each substance that has come in contact with the equipment inside the package.
- Attach a duplicate MSDS to the outside of the package.

NOTICE

No product returns will be accepted without a RMA number and will be returned at the customer's expense.

For warranty consideration, the product must be returned to Daniel within twelve (12) months of the date of original shipment or within eighteen (18) months of the date of original shipment of the product to destinations outside the United States. The Purchaser must prepay any shipping charges.

Ship all * mechanical equipment to the following address:

Daniel Measurement and Control, Inc.
Attn: Service Dept.
5650 Brittmoore Rd.
Houston, TX 77041
Ref: RMA#_____

*Mechanical equipment includes: Orifice Fittings, Parts, Plates, Seal Rings, Turbine Meters, Control Valves, Provers, Strainers, Meter Tubes, Ultrasonic Meters, Flow Conditioners, etc.

Ship all * electronic equipment to the following address:

Daniel Measurement and Control, Inc.
Attn: Service Dept.
11100 Brittmoore Park Drive
Houston, TX 77041
Ref: RMA#_____

*Electronic equipment includes: Gas Chromatographs, Petrocount Presets, Danload Preset, Ultrasonic Meter Electronics (CPU boards, transducers, etc.), 2403 Totalizer, MRT 97 Indicator, Preamps, Pick Up Coils, Prover Interface Boards, and the following Flow Computer Models: 2230, 2239, 2270, 2460, 2470, S100, 2100, and 3000.

Daniel Measurement and Control, Inc.
Returned Material Authorization

Repair Form for Used Equipment
Including Decontamination/Cleaning Statement

1. Return Material Authorization (RMA) Number _____

2. Equipment to be returned:
   Model Number _____ Serial Number _____

3. Reason for return: _____
   _____
   _____
   _____

Decontamination/Cleaning Fluids Process

A. List each substance in which the equipment was exposed. Attach additional documents if necessary.

Common Name	CAS# if available	Used for Hazardous Waste (20 CFR 261)	EPA Waste Code if used for hazardous waste
		[ ] Yes [ ] No	
		[ ] Yes [ ] No	
		[ ] Yes [ ] No	
		[ ] Yes [ ] No	
		[ ] Yes [ ] No	
		[ ] Yes [ ] No	

B. Circle any hazards and/or process fluid types that apply:

Infectious	**Radioactive**	**Explosive**	**Pyrophoric**	**Poison Gas**	
Cyanides	Sulfides	Corrosive	Oxidizer	Flammable	Poison
Carcinogen	Peroxide	Reactive-Air	Reactive-Water	Reactive-Other (list)	

Other hazard category (list):

C. Describe decontamination/cleaning process. Include MSDS description for substances used in decontamination and cleaning processes. Attach additional documents if necessary.

Shipping Requirements

Failure to comply with this procedure will result in the shipment being refused.

4. Write the RMA number on the shipping package.

5. Inside the package include one copy of this document and all required Material Safety Data Sheets (MSDS)

6. Outside of the package attach one copy of this document and all required Material Safety Data Sheets (MSDS).

THIS EQUIPMENT, BEING RETURNED "FOR REPAIR," HAS BEEN COMPLETELY DECONTAMINATED AND CLEANED. ALL FOREIGN SUBSTANCES HAVE BEEN DOCUMENTED ABOVE AND MSDS SHEETS ARE ATTACHED.

By: _____ _____

(Signature) (Print name)

Title: _____ Date: _____

Company: _____

Phone: _____ Fax: _____

The sales and service offices of Daniel Measurement and Control are located throughout the United States and in major countries overseas.
Please contact Daniel Measurement Services at
11100 Brittmoore Park Drive, Houston, Texas 77041, or phone (713) 827-6314
for the location of the sales or service office nearest you.
Daniel Measurement Services offers both on-call and contract maintenance service designed to provide single-source responsibility for all Daniel products.