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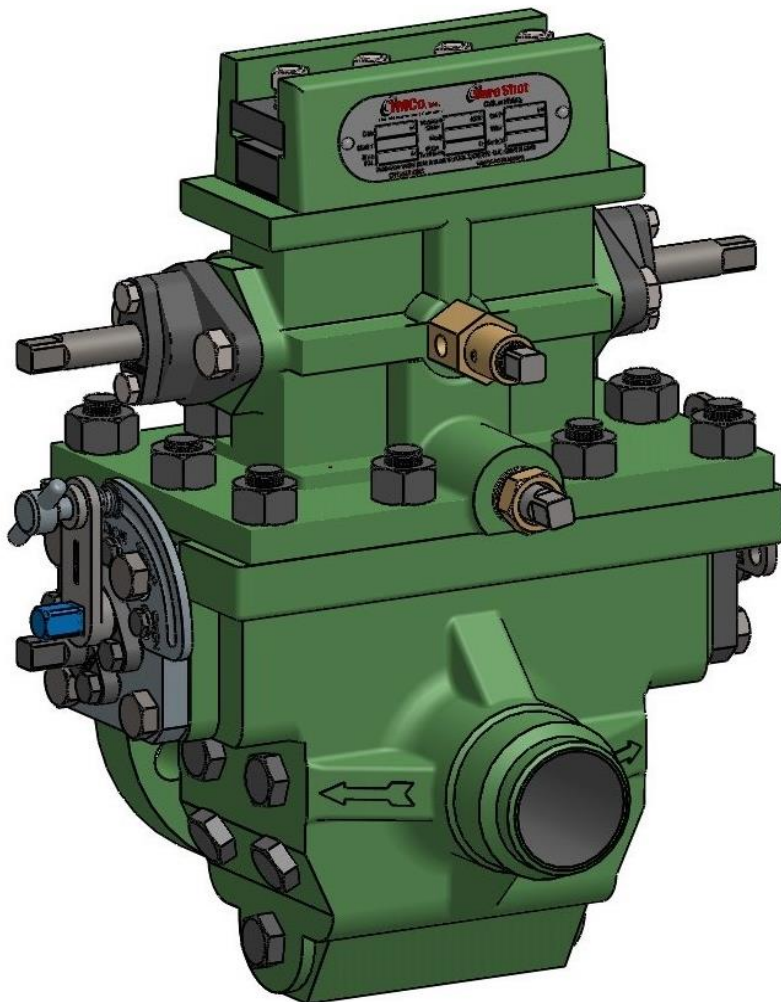
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**Title: Instruction for Installation, Operation, & Maintenance of
ANSI Class 150-900 Sure Shot® Dual Chamber Orifice Fittings**



Sure Shot®



TMCo, Inc. has manufactured and tested the Sure Shot® Orifice Fitting to be operated for specific design and flow conditions. The Sure Shot® Orifice Fitting will perform its intended function when it is installed, operated, and maintained in strict accordance with these instructions. Conditions specified on nameplate must never be exceeded. To maintain a safe environment for the equipment and plant personnel, all warnings and safety precautions identified in this document must be strictly followed.



DANGER

**SERIOUS PERSONAL INJURY OR
DEATH OCCURRENCE WARNING**

TMCo, Inc. requests the user to read all nameplate information to determine the MAOP (maximum allowable operating pressure) or CWP (Cold Working Pressure) before placing the product in service. Operating this product above the MAOP / CWP may lead to serious injury or death. Do not install the product if the nameplate is missing or has been altered in any form; instead, contact your local TMCo, Inc. office immediately for instructions.

Read all instructions prior to installing, operating, or servicing this product. This manual is specific to certain forms and types of the Sure Shot® Orifice Fitting. Do not use this manual if it is not specific to the equipment you are using. To obtain the correct manual, please contact TMCo, Inc. @ 713-465-3255. Follow all warnings, cautions, and instructions marked on and supplied with the Sure Shot® Orifice Fitting, including this manual.

Prior to using the Sure Shot® Orifice Fitting, all associated personnel should be informed and educated in its proper installation, operation, and maintenance. If you do not understand any of these instructions, contact TMCo, Inc. @ 713-465-3255 immediately for assistance and clarification. To ensure proper performance, only use qualified personnel to install, operate, and maintain the Sure Shot® Orifice Fitting.

Install the Sure Shot® Orifice Fitting as specified in the installation instructions herein and per local applicable codes and national standards. Connect all features to the proper pressure sources.

When replacement parts are required, ensure the use of replacement parts specified by TMCo, Inc. Unauthorized parts and procedures can affect the performance and risk the safe operation of the Sure Shot® Dual Chamber Orifice Fitting. Non OEM part substitutions may result in fire, improper operation, or other hazards.

Ensure that all equipment openings, access plugs, and protective covers are in place to prevent personal injury.

READ AND FOLLOW THE TMC_O, INC. SURE SHOT[®] ORIFICE FITTING OWNER'S MANUAL. PLEASE OBSERVE AND NOTE ALL PRODUCT WARNINGS AND INSTRUCTIONS.

NOTICE

TMC_O, Inc. shall not be liable for technical or editorial errors in this manual. TMC_O, Inc. shall not be liable for any damages, including, but not limited to, loss of production, loss of profits, etc.

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1.0 INTRODUCTION

1.1 GENERAL

This manual provides installation, operation, and maintenance instructions for use with the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting. It is important to read this manual in its entirety before beginning any of the listed operations, and to observe all warnings, cautions, and notices described herein which are intended to highlight potential safety concerns and may endanger personnel and equipment if ignored.

1.2 DESCRIPTION

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is a Simple, Safe, Accurate, Economical, Greaseless Orifice measurement device, using the principle of differential pressure to measure flow. Features of the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting includes:

1.2.1 COMPONENTS

UPPER CHAMBER SEALING BAR GASKET

Seals easily by tightening square head clamping bar screws. Non-Asbestos flat gasket is easy to replace.

UPPER CHAMBER SEALING BAR O-Ring (900 LB)

Seals easily by tightening square head clamping bar screws. Standard HNBR O-Ring that seals between the upper chamber and the seal bar.

HYDROGENATED NITRILE BUTADIENE RUBBER O-RING SEALS (HNBR)

HNBR O-Rings offer improved wear and extrusion resistance over standard sealing materials. It has excellent chemical compatibility and can be used with oils which have aggressive additives, fluids containing Hydrogen Sulfide, Amines, and Oilfield corrosion inhibitors. The compound also has an extended temperature range (-40°F. to 300°F.).

UPPER AND LOWER THRU COVER SEALS

Standard HNBR O-Ring that seals between Thru Cover and Body.

UPPER AND LOWER CHAMBER BODY SEAL

Standard HNBR O-Ring that seals between the Upper and Lower Chamber.

ECCENTRIC PLUG SHAFT & GEAR SHAFT SEAL

Shaft seals consist of Teflon rings. Shaft packing adjustment is achieved by turning the two bolts located on the packing gland follower of each shaft.

Note: The two bolts must be turned evenly to achieve a proper seal. This configuration provides smooth plug shaft operation.

SEAT PLATE TO UPPER CHAMBER BODY SEAL

Standard HNBR O-Ring, seals between Seat Plate and Upper Chamber.

ORIFICE PLATE SEAL

The orifice plate seal is HNBR material bonded to a stainless steel metal insert. This insert retains seal shape, ensuring no protrusion into the bore. This special shape provides a positive seal between the Orifice Plate and the upstream fitting seat. This conforms to latest AGA 3/API 14.3 and ISO 5167 design specification requirements. Other materials available upon request.

ECCENTRIC PLUG (PATENTED)

The Eccentric Plug provides an effective seal with fewer parts and less maintenance. The plug is CS, coated with Xylan for added corrosion resistance, has SS shafts and holds a PTFE insert, secured by a SS retainer plate. Together, the assembly provides the means for isolating the Upper and Lower Chamber.

Note: U.S. Pat. No. 8,459,305

EQUALIZER VALVE & STANDARD 1/2" NPT BLEED VALVE

Standard equalizer and bleed valve provide simple function and reliability.

PRESSURE TAPS AND DRAIN PLUGS

Standard NPT pipe taps conform to AGA 3/API 14.3 and ANSI requirements.

SAFETY LOCK

The Sure Shot® spring loaded plunger locks the Eccentric Plug in the closed position in order to prevent accidental opening while the Upper Chamber is open. The operator must physically pull the spring loaded plunger to release the safety lock feature to actuate the Eccentric Plug to an open position. The safety lock also provides the operator with an indication of improper location of the Orifice Plate Carrier in the fitting. When trying to close the Eccentric Plug, if the Orifice Plate Carrier is not properly positioned in the fitting, the safety lock will not return to the closed position. This lets the operator know that he needs to investigate the Orifice Plate Carrier position before leaving the site.

STANDARD NACE TRIM

The standard internal materials are compatible with NACE MR-01-75-2000 requirements. It is the user's responsibility to ensure that materials are satisfactory for the intended environment.

1.2.2 FUNCTIONALITY

The TMC_o, Inc. Sure Shot® Dual Chamber Orifice Fitting utilizes an Upper and Lower Chamber (Dual Chamber) design to precisely position an Orifice Plate in the center of a flow stream. Fluid flows through the Orifice Plate to generate a differential pressure across the Orifice Plate. By measuring the resultant pressure drop through pressure taps located in the Lower Chamber Body, and with known or measured fluid process parameters, the flow can be calculated using standard, industry accepted equations.

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting consists of two independent chambers, separated by an Eccentric Plug. Using a XYLAN coated Eccentric Plug with Teflon Insert sealing to a stainless steel seat creates a positive seal for pressure and fluid isolation between the Upper and Lower Chambers. Gear Shafts in each chamber allow the insertion and removal of the Orifice Plate Carrier.

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting allows for inspection of and replacement of the Orifice Plate without depressurization or interruption of process flow. The unique spring loaded safety lock is activated automatically when the Eccentric Plug is in the closed position. This feature also assists to provide precise open and close positioning of the Eccentric Plug.

 **DANGER**
SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is a pressure containing device. Failure to operate the Sure Shot[®] Dual Chamber Orifice Fitting as instructed per this manual could result in serious injury or death.

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is a greaseless orifice fitting with few moving parts. The eccentric isolation plug is one moving part, which can be checked or changed without removing the Upper Chamber of the fitting. All shafts can be removed or inspected without removing the Upper Chamber of the fitting.

Note: These procedures must be performed when the fitting is depressurized.

TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fittings “fully conform” to the AGA 3/API 14.3 requirements, ISO 5167, ANSI Flange Standards, ASTM Material Specifications and NACE MR-01-75-2000 Edition (for internal wetted parts).

When venting the Upper Chamber via the Bleed Valve or draining the Lower Chamber, the operator should refer to his internal company policies and procedures with regard to releasing any process fluids which may endanger maintenance or operations personnel. If necessary, the fluid should be directed to a safe area using the threaded connections available.

TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fittings come standard with telemetry taps on both sides of the orifice fitting and drain plugs located on each side at the bottom of the fitting.

The following spare parts information is also available via our website: www.tmcousa.com. Please contact us directly at 713-465-3255 with orders or questions. When ordering spare parts, please specify fitting serial number, size, and item no. from General Parts list 1.3.

1.3 GENERAL PARTS LIST- NACE TRIM STANDARD

PARTS IDENTIFICATION & MATERIALS LIST QUANTITY BY SIZE

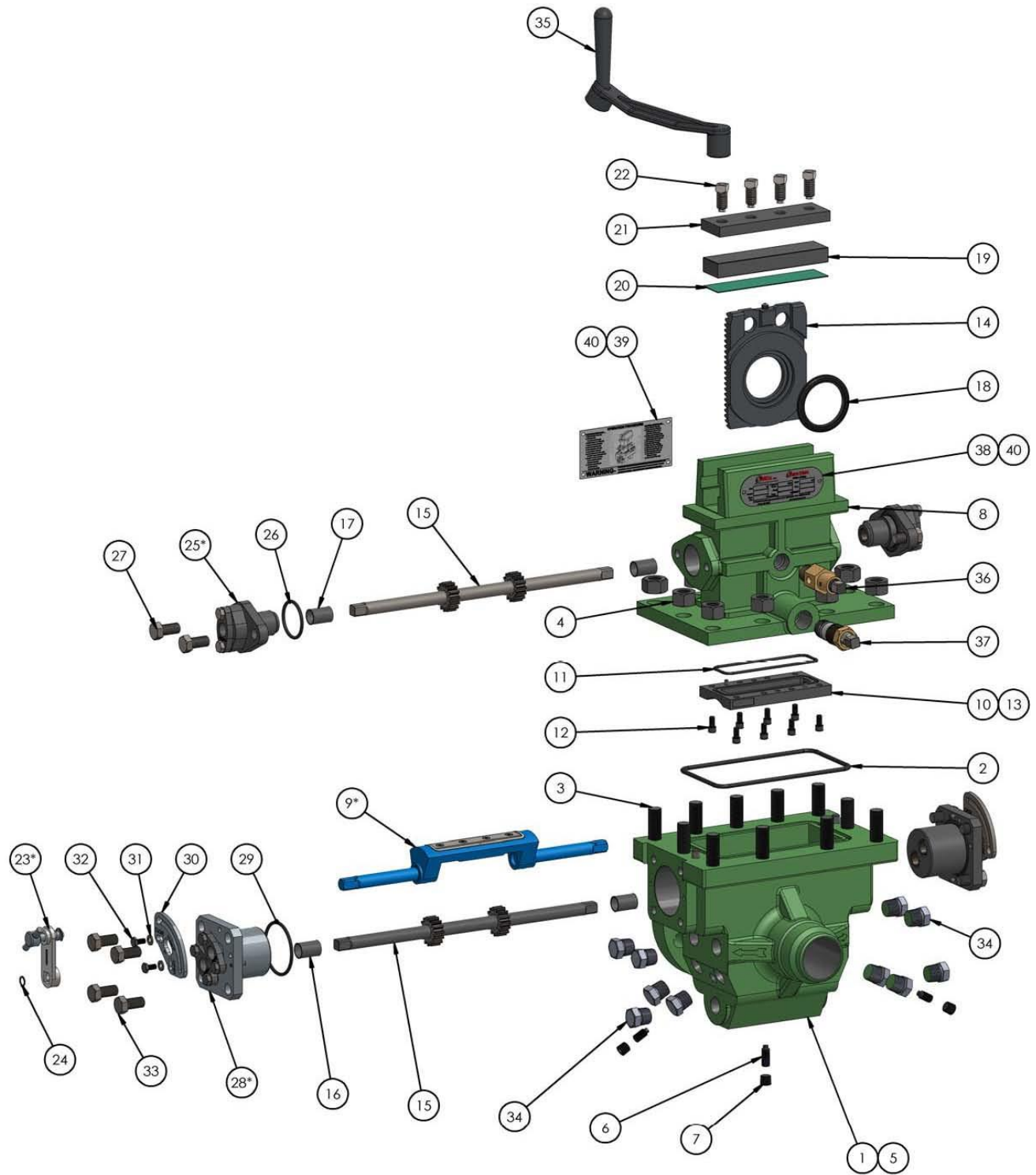
ITEM	DESCRIPTION	MATERIAL	2IN	3IN	4IN	6IN	8IN	10IN	12IN	16IN
1.	Lower Chamber Body	A-216 WCB-WCC	1	1	1	1	1	1	1	1
2.	Lower Chamber Body O-Ring	HNBR D70	1	1	1	1	1	1	1	1
3.	Stud, Full Thread	A-193 Gr B7M	11	14	14	18	18	18	24	28
4.	Nut -Heavy Hex	A-194 Gr 2HM	11	14	14	18	18	18	24	28
5.	Dowel Pin	SS	2	2	2	2	2	4	4	2
6.	Alignment Screw, Allen Head (Factory Set)	Alloy Steel	3	3	3	3	3	3	3	3
7.	Plug Allen Head	A574	3	3	3	3	3	3	3	3
8.	Upper Chamber Body	A-216 WCB-WCC	1	1	1	1	1	1	1	1
9.*	Eccentric Plug Valve Assembly (Patented)		1	1	1	1	1	1	1	1
10.	Seat	A-351 CF8M/304SS	1	1	1	1	1	1	1	1
11.	Seat and Upper Chamber Seal, O-Ring	HNBR D70	1	1	1	1	1	1	1	1
12.	Bolt, Socket Head, Seat Plate	304SS	8	8	8	12	12	16	16	16
13.	Dowel Pin, Seat Plate	316SS	2	2	2	2	2	2	2	2
14.	Plate Carrier w/Plunger	A-351 CF8M/A-516/304SS	1	1	1	1	1	1	1	1
15.	Upper/Lower Gear Shaft	304SS	2	2	2	2	2	2	2	2
16.	Gear Shaft Spacer (Lower Chamber)	304SS	2	2	2	2	2	2	2	2
17.	Gear Shaft Spacer (Upper Chamber)	304SS	0	0	0	2	2	0	0	0
18.	Orifice Plate Seal Ring	304SS /HNBR Bonded	1	1	1	1	1	1	1	1
19.	Sealing Bar, Coated	A36	1	1	1	1	1	1	1	1
20.	Sealing Bar, Gasket (**O-Ring)	Non-Asb Fiber (**HNBR)	1	1	1	1	1	1	1	1
21.	Clamping Bar, Coated	CS	1	1	1	1	1	1	1	1
22.	Clamping Bar Screws, Coated	CS Gr 8	4	5	6	7	8	11	13	16
23.*	Locking Arm Assembly		1	1	1	1	1	1	1	1
24.	Locking Arm Retaining Ring	SS	1	1	1	1	1	1	1	1
25.*	Upper Chamber Thru Cover Assembly		2	2	2	2	2	2	2	2
26.	Upper Chamber Thru Cover O-Ring	HNBR	2	2	2	2	2	2	2	2
27.	Bolt, Hex Head, Upper Cham. Thru Cover	CS Gr 8	4	4	4	4	4	4	4	4
28.*	Lower Chamber Thru Cover Assembly		2	2	2	2	2	2	2	2
29.	Lower Chamber Thru Cover O-Ring	HNBR	2	2	2	2	2	2	2	2
30.	Orientation Plate	SS	2	2	2	2	2	2	2	2
31.	Lock Washer, Orientation Plate	SS	4	4	4	4	4	4	4	4
32.	Screw, Hex Head, Orientation Plate	SS	4	4	4	4	4	4	4	4
33.	Bolt, Hex Head, Lower Cham. Thru Cover	CS Gr 8	8	8	8	8	8	8	8	8
34.	Plug NPT , Hex Head	A-105	10	10	10	10	10	10	10	10
35.	Crank Handle, Plated	CS	1	1	1	1	1	1	1	**
36.	Bleed Valve	1215/304SS/PTFE	1	1	1	1	1	1	1	1
37.	Equalizer Valve	1215/316SS/PTFE/316SS	1	1	1	1	1	1	1	1
38.	Name Tag	SS	1	1	1	1	1	1	1	1
39.	Operating Tag	SS	1	1	1	1	1	1	1	1
40.	Button Head Rivet	SS	6	6	6	6	6	6	6	6

See following page for fitting exploded view.

*Denotes Sub-Assembly

**Standard 1/2" Ratchet, 1/2" & 13/16" Socket

***For 900lb Fittings

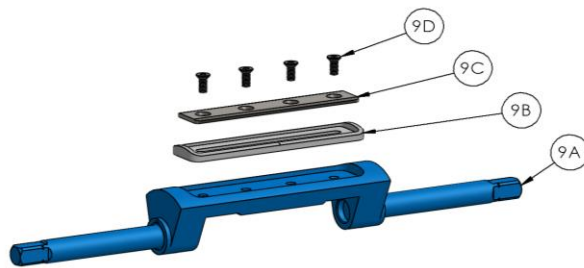


SUB-ASSEMBLIES

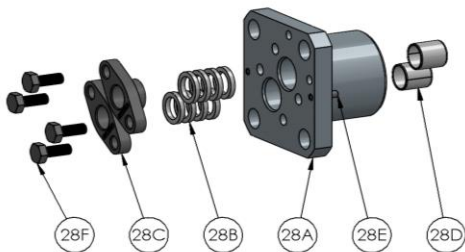
ITEM	DESCRIPTION	MATERIAL	2IN	3IN	4IN	6IN	8IN	10IN	12IN	16IN
9.*	Eccentric Plug Valve Assembly		1	1	1	1	1	1	1	1
9.A	Eccentric Plug Body, Coated	1018HF/304SS	1	1	1	1	1	1	1	1
9.B	Insert	PTFE	1	1	1	1	1	1	1	1
9.C	Retainer Plate	304SS	1	1	1	1	1	1	1	1
9.D	Screw, Allen Head	304SS	4	5	6	8	10	11	12	15
23.*	Lock Arm Assembly		1	1	1	1	1	1	1	1
23.A	Locking Arm	SS	1	1	1	1	1	1	1	1
23.B	Indicator Lock Plunger	SS	1	1	1	1	1	1	1	1
23.C	Lock Arm Spring	SS	1	1	1	1	1	1	1	1
23.D	Plunger Retainer Ring	SS	1	1	1	1	1	1	1	1
25.*	Upper Chamber Thru Cover Assembly		2	2	2	2	2	2	2	2
25.A	Upper Thru Cover	A105 / 1018HF	1	1	1	1	1	1	1	1
25.B	Packing Ring	Virgin Teflon	4	4	4	4	4	4	4	4
25.C	Cover Gland Follower	SS	1	1	1	1	1	1	1	1
25.D	Bolt, Hex Head, Gland Follower	SS	2	2	2	2	2	2	2	2
25.E	Split Bearing	A-316/PTFE Teflon Fibers	1	1	1	1	1	1	1	1
28.*	Lower Chamber Thru Cover Assembly		2	2	2	2	2	2	2	2
28.A	Lower Thru Cover	A105 / 1018HF	1	1	1	1	1	1	1	1
28.B	Packing Ring	Virgin Teflon	8	8	8	8	8	8	8	8
28.C	Cover Gland Follower	SS	2	2	2	2	2	2	2	2
28.D	Split Bearing	316SS/PTFE Teflon Fibers	2	2	2	2	2	2	2	2
28.E	Dowel Pin	SS	2	2	2	2	2	2	2	2
28.F	Bolt, Hex Head, Gland Follower	SS	2	2	2	2	2	2	2	2



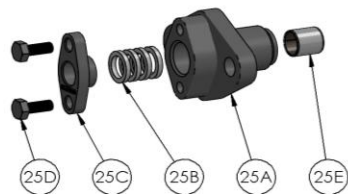
(23) Lock Arm Assembly



(9) Eccentric Plug Assembly



(28) Lower Chamber Thru Cover Assembly



(25) Upper Chamber Thru Cover Assembly

2.0 INSTALLATION

2.1 METER TUBE INSTALLATION

The Orifice Fitting (meter) is typically installed in a meter run to complete a metering unit. If the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is not already connected to a meter tube, a meter tube which meets the applicable code requirements, such as AGA 3 / API 14.3, should be fabricated and attached to the Orifice Fitting, inspected, and tested prior to installation in the process line.

Prior to installation of the meter, the meter tube assembly must be cleaned of all dirt, scale, foreign matter, grease, oil, water, or other contaminants.

Personnel installing the meter tube shall ensure the connecting process lines are also cleaned adequately to prevent foreign material from entering the meter tube and or meter during the installation process.

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is shipped with a shipping disc in place of an Orifice Plate. The shipping disc is installed in the Dual Chamber Orifice Fitting before shipment and is held in place by the Orifice Plate Seal Ring (18). Its purpose is to provide the operator with a means to push the seal ring out of the carrier when installing the Orifice Plate during meter tube installation. The shipping disc should be discarded when installing the Orifice Plate.

2.2 SURE SHOT[®] INSTALLATION

 **DANGER**
SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is a pressure containing device. Failure to operate the Sure Shot[®] Dual Chamber Orifice Fitting as instructed per this manual could result in serious injury or death.

The meter must be installed with the flow arrow indicating the correct flowing direction. The flow directional arrow is cast or stamped into the Lower Chamber Body (1) casting on all Sure Shot[®] Dual Chamber Orifice Fittings.

The orifice meter may be installed in either the horizontal position with the Sealing Bar (19) access at the top, or with the Sealing Bar (19) access rotated to either the right hand or left hand side of the meter. For raised face ANSI Class 600 and above, the downstream companion flange to the meter is required to be close tolerance female flange or ring type joint. For raised face ANSI Classes 150 and 300, the downstream companion flange to the meter requires dowel pin alignment.

Adequate maintenance and operating clearance around the meter should be verified prior to final installation. Clearance is required for the Crank Handle (35) to operate the Upper & Lower Gear Shafts (15), Eccentric Plug (9*), and Clamping Bar Square Head Screw (22). Adequate clearance for the removal of the Clamping Bar (21) should be provided. Also allow adequate clearance for all secondary process equipment connecting to the pressure taps, telemetering taps, and Lower Chamber Body Drain Plug (34).

The TMCo, Inc. Sure Shot® Dual Chamber Orifice Fitting is shipped with the Orientation Plate (30) and Lock Arm Assembly (23*) factory installed. This device serves to function as a position indicator and safety lock for the Eccentric Plug (9*). When the Orifice Plate Carrier (14) is in the Lower Chamber (1) it will also ensure proper positioning for the Orifice Plate Carrier (14).

The TMCo, Inc. Sure Shot® Dual Chamber Orifice Fitting does not require a grease gun for lubrication of any parts. The Eccentric Plug (9*) is a greaseless device which provides a seal between the upper and lower chambers of the Sure Shot® Dual Chamber Orifice Fitting.

The TMCo, Inc. Sure Shot® Dual Chamber Orifice Fitting requires no additional assembly for installation.

The TMCo, Inc. Sure Shot® Dual Chamber Orifice Fitting is factory shipped with the Orifice Plate Carrier (14) / Plate Seal Ring (18) installed in the Lower Chamber Body (1) of the fitting. The Orifice Plate Carrier (14) should be removed prior to any field testing. To remove the Orifice Plate Carrier (14), the following steps should be taken:

 **DANGER**
SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

The TMCo, Inc. Sure Shot® Dual Chamber Orifice Fitting is a pressure containing device. Failure to operate the Sure Shot® Dual Chamber Orifice Fitting as instructed per this manual could result in serious injury or death.

Step 1: First check the fitting to make sure there is no pressure contained in the upper or lower chambers of the fitting from test performed during fabrication. To verify that there is no pressure in the fitting or meter tube open the Equalizer Valve (37) and Eccentric Plug (9*) to relieve any pressure that may be trapped between the upper and lower chambers. Open the Bleed Valve (36) to relieve any remaining pressure in the Sure Shot® Dual Chamber Orifice Fitting. If the operator hears pressure, the operator should **STOP** until all the pressure has been released before proceeding to remove the Orifice Plate.

Step 2: Using the supplied TMCo Crank Handle (35), place Crank Handle (35) on Lower Gear Shaft (15) and turn gear shaft until carrier engages with Upper Chamber Gear Shaft (15). Place Crank Handle (35) on Upper Chamber Gear Shaft (15), turn until carrier contacts the bottom of Sealing Bar (19). Using TMCo supplied Crank Handle (35), loosen Clamping Bar

Screws (22) and remove Clamping Bar (21). Using TMCo supplied Crank Handle (35), place Crank Handle (35) on Upper Chamber Gear Shaft (15) and turn until carrier bumps Sealing Bar (19) to assist in breaking Gasket (20) loose from the upper chamber. After the top Gasket (20) is dislodged from upper chamber sealing area, remove Sealing Bar (19) and Gasket (20) from the fitting. Place the TMCo supplied Crank Handle (35) on the Upper Chamber Gear Shaft (15) and operate until carrier is removed from fitting.

Step 3: Re-install the Sealing Bar Gasket (20), if supplied, Sealing Bar (19), and Clamping Bar (21) with Square Head Screws (22) and tighten the screws to the recommended torque values of a recommended torque, see tables 5.3 for torque values.

Step 4: Complete a post installation inspection before starting field testing procedures.

2.3 METER OR METER TUBE PRESSURE TEST



DANGER

SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

The TMCo, Inc. Sure Shot® Dual Chamber Orifice Fitting is a pressure containing device. Failure to operate the Sure Shot® Dual Chamber Orifice Fitting as instructed per this manual could result in serious injury or death.

Pressure testing of the meter tube with the installed meter should be conducted prior to placing the meter in service. Internal company field testing procedures should be followed. Please also reference Sure Shot® Installation procedures, paragraph 2.2.

2.4 ORIFICE PLATE INSTALLATION



DANGER

SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

The TMCo, Inc. Sure Shot® Dual Chamber Orifice Fitting is a pressure containing device. Failure to operate the Sure Shot® Dual Chamber Orifice Fitting as instructed per this manual could result in serious injury or death.

Bring complete meter tube to operating pressure.

To install the Orifice Plate Carrier (14) and Orifice Plate, follow the procedures described in paragraph 4.2.

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is now ready for service operation as a measurement device.

3.0 OPERATING INSTRUCTIONS



DANGER

**SERIOUS PERSONAL INJURY OR
DEATH OCCURRENCE WARNING**

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting is a pressure containing device. Failure to operate the Sure Shot[®] Dual Chamber Orifice Fitting as instructed per this manual could result in serious injury or death.

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting design allows the operator to remove the Orifice Plate Carrier (14) without interruption or shutdown of the process flow. Isolation of the Upper Chamber Body (8) from the Lower Chamber Body (1) is accomplished by an Eccentric Plug (9*). The Lower Chamber Body (1) houses the Orifice Plate Carrier (14) and the Orifice Plate during all flow measurement functions. The Upper Chamber Body (8) provides a transfer chamber for Orifice Plate removal or inspection via the Orifice Plate Carrier (14).

The Orifice Plate Carrier (14) is factory set with a three pin alignment configuration that concentrically aligns the Orifice Plate within the process flow stream. Positioning of the Alignment Screws (6) are factory set at TMC_o, Inc. manufacturing facility and are field adjustable only by a qualified technician. If adjustment is required please contact TMC_o, Inc. by phone @ 713-465-3255 before tampering or altering the factory set adjustments in any manner.

At the top of the Orifice Plate Carrier (14) is a ball plunger. When the Eccentric Plug (9*) is rotated to the closed position, a machined surface on the Eccentric Plug (9*) contacts the ball plunger. A constant, downward (compressive) force is applied to the top of the Orifice Plate Carrier (14) to maintain it in the correct vertical orientation relative to the flow stream, along with the three Alignment Screws (6) mentioned earlier. The ball plunger limits movement of the carrier in the upward position which might occur during vibration, turbulent flow or back turning the Lower Gear Shaft (15) after the Eccentric Plug (9*) is closed in the locked position.

The Orifice Plate Carrier (14) is transferred between the Lower and Upper Chambers (1, 8) by two gear shafts. One gear rack is located on each side of the Orifice Plate Carrier (14). In each chamber, two gears are attached to a SS shaft, known as the Gear Shaft (15). When rotated, the pinion gears of the Gear Shaft (15) will engage with the gear racks on the Orifice Plate Carrier (14), which allows the carrier to move between the Upper and the Lower Chambers (1, 8) of the fitting during routine Orifice Plate inspections or Orifice Plate changes during normal operation.

4.0 ORIFICE PLATE REMOVAL INSTRUCTIONS

With the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting operating at line pressure with the Orifice Plate located in the flow stream, the following steps should be followed to safely remove the Orifice Plate Carrier (14).

Step 1: Verify the Bleed Valve (36) is in the closed position by turning the valve stem clockwise until it stops.

Step 2: Open the Equalizer Valve (37) by turning the valve stem counter clockwise one full turn. This action equalizes pressures between the Upper Chamber (8) and Lower Chamber (1). Allow approximately (10) ten seconds to equalize the two chambers.

Step 3: Pull back the spring loaded indicating Lock Plunger (23B). Next take the TMC_o, Inc. supplied Crank Handle (35) and place it on the Eccentric Plug Body Shaft (9A) and rotate the Eccentric Plug (9*) to the open position. The Lock Plunger (23B) will travel freely down the Orientation Plate (30) groove until the Eccentric Plug (9*) comes to its full open position.

Step 4: Using the TMC_o, Inc. supplied Crank Handle (35), slowly rotate the Lower Gear Shaft (15) until the Orifice Plate Carrier (14) has advanced upward from the Lower Chamber Body (1) and engages with the gears of the Upper Gear Shaft (15). Rotate the Upper Gear Shaft (15) until the Orifice Plate Carrier (14) has advanced fully into the Upper Chamber Body (8) and stops against the bottom of the Sealing Bar (19).

Step 5: Once the Orifice Plate Carrier (14) is completely out of the Lower Chamber Body (1), close the Eccentric Plug (9*) by placing the TMC_o, Inc. supplied Crank Handle (35), on the Eccentric Plug Body Shaft (9A). Rotate the shaft until the spring loaded Lock Plunger (23B) seats itself into the hole adjacent to the "Close" indicator on the safety lock Orientation Plate (30). The Eccentric Plug (9*) is now in the closed position. The isolation of the Upper Chamber Body (8) from the lower Chamber Body (1) is now complete.

Step 6: Close the Equalizer Valve (37) by turning the valve stem clockwise.

Step 7: Open the Bleed Valve (36) by turning the valve stem counter clockwise.



**SERIOUS PERSONAL INJURY OR
DEATH OCCURRENCE WARNING**

Opening the Bleed Valve (36) releases any line pressured stored in the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting directly to the atmosphere. Operator should review company standard procedures for releasing pressurized fluids to atmosphere. Failure to reference company standard procedures could cause personal injury or death.

Note: Upon complete depressurization of the Upper Chamber Body (8) via the Bleed valve (36) the operator may remove the Orifice Plate Carrier (14) with the Orifice Plate from the Upper Chamber Body (8).



DANGER

SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

Never place any part of your head or body over the top of the Dual Chamber Orifice Fitting while mounted in a vertical position or in front of the top of the Dual Chamber Orifice Fitting if mounted on its side when removing the Orifice Plate Carrier (14). Failure to follow instructions within this manual may result in serious injury or death.

Step 8: Using the Crank Handle (35), loosen the Clamping Bar Square Head Screws (22), but **DO NOT** remove the Clamping Bar (21) from the Upper Chamber (8) of the fitting.

Note: The Clamping Bar Square Head Screws (22) should not be removed from the Clamping Bar (21).

Step 9: Take the TMC_o, Inc. supplied Crank Handle (35) and place it on the Upper Gear Shaft (15). Rotate the Upper Gear Shaft (15) until the Orifice Plate Carrier (14) bumps the Sealing Bar (19). This will help break the Gasket (20) seal from the Upper Chamber (8) and also give the operator a final check to insure all the pressure has been properly removed from the Upper Chamber (8).

Step 10: After all the pressure has been removed from the Upper Chamber (8), the Clamping Bar (21) can be removed from the top of the fitting.

Step 11: Remove the Sealing Bar (19) and the Sealing Bar Gasket (20), if supplied, from the Upper Chamber Body (8).

Step 12: Place the TMC_o, Inc. supplied Crank Handle (35) on the Upper Gear Shaft (15) and rotate the Upper Gear Shaft (15), raising the Orifice Plate Carrier (14) to the top of the fitting for removal and inspection.



DANGER

SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

Never place any part of your head or body over the top of the Dual Chamber Orifice Fitting while mounted in a vertical position or in front of the top of the Dual Chamber Orifice Fitting if mounted on its side when the Clamping Bar (21) is removed from the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting. Never place the Crank Handle (35) or any other wrench on the Eccentric Plug (9) and at the same time disengage the Safety Locking Arm (23*) when the Clamping Bar (21) is removed from the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting. Failure to follow instructions within this manual may result in serious injury or death.*

4.1 ORIFICE PLATE REPLACEMENT

Step 1: Push in the upstream direction, from the downstream side of Orifice Plate evenly to release the Seal Ring (18) and the Orifice Plate from the Orifice Plate Carrier (14).

Note: Follow your internal company procedures for inspection of Orifice Plate.

Step 2: Inspect the Seal Ring (18) for cuts or damage and replace if necessary.

Step 3: Clean the Orifice Plate seating area on the Orifice Plate Carrier (14).

Step 4: Place the Orifice Plate with the downstream face into the Orifice Plate Carrier (14) seating area.

Step 5: Insert the Orifice Plate Seal Ring (18) into the Orifice Plate Carrier (14) with the flat side, facing the Orifice Plate. Press evenly on the Seal Ring (18) until it snaps into the Orifice Plate Carrier (14).

4.2 ORIFICE PLATE INSTALLATION



DANGER

SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

Never place any part of your head or body over the top of the Dual Chamber Orifice Fitting while mounted in a vertical position or in front of the top of the Dual Chamber Orifice Fitting if mounted on its side when removing the Orifice Plate Carrier (14). Never place the Crank Handle (35) or any other wrench on the Eccentric Plug (9) and at the same time disengage the Safety Locking Arm (23*) when the Clamping Bar (21) is removed from the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting. Failure to follow instructions within this manual may result in serious injury or death.*

Step 1: Insert the Orifice Plate Carrier (14) with Orifice Plate and Seal Ring (18) into the Upper Chamber (8), (ball plunger at top) with the Seal Ring (18) side of the Orifice Plate Carrier (14) facing the upstream.

Step 2: Place the TMC_o, Inc. supplied Crank Handle (35) on the Upper Gear Shaft (15) and back roll two turns. This will help the Gear Shaft (15) align with the Orifice Plate Carrier (14) rack as the carrier travels back down in the top of the fitting. Make sure the Orifice Plate Carrier (14) is level after the gear is engaged.

 **CAUTION**
EQUIPMENT DAMAGE OR PERSONAL INJURY OCCURRENCE WARNING

Align the Orifice Plate Carrier (14) with the Upper Gear Shaft (15). Failure to obtain correct alignment may damage the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting or cause the Orifice Plate Carrier (14) to lodge in the Upper Chamber (8).

Step 3: Rotate the Upper Gear Shaft (15) to lower the Orifice Plate Carrier (14) into the Upper Chamber (8) for the ball plunger to clear the top sealing surface of the Sealing Bar (19) opening in the Upper Chamber (8).

 **CAUTION**
EQUIPMENT DAMAGE OR PERSONAL INJURY OCCURRENCE WARNING

Do not lower the Orifice Plate Carrier (14) onto the Eccentric Plug (9) surface as this may damage and result in loss of sealing capacity.*

Step 4: Install a new Sealing Bar Gasket (20).

Step 5: Reposition the Sealing Bar (19) onto the Sealing Bar Gasket (20) in the top opening of the Upper Chamber (8).

Step 6: Slide the Clamping Bar (21) onto the top of the Sealing Bar (19).

Step 7: Tighten the Clamping Bar Screws (22) to the recommended torque values of table 5.3.



DANGER

SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

The correct installation of the Clamping Bar (21), Sealing Bar (19), Sealing Bar Gasket (20), and Clamping Bar Square Head Screws (22) are essential to maintaining a pressure boundary between the process line pressure and atmospheric pressure. Failure to properly install the Gasket (20), Sealing Bar (19) & Clamping Bar (21) may result in serious injury or death.

Step 8: Close the Bleed Valve (36) by turning the valve stem clockwise until it stops.

Step 9: Open the Equalizer Valve (37) by turning the valve stem counter clockwise one full turn. This action equalizes pressures between the Upper Chamber (8) and Lower Chamber (1).

Step 10: Check for audible and visible leakage by using a leak detection solution.

Step 11: Pull back the spring loaded Indicator Lock Plunger (23B). Next take the TMC_o, Inc. supplied Crank Handle (35) and place it on the Eccentric Plug Body Shaft (9A) and rotate the Eccentric Plug (9*) to the open position. The Lock Plunger (23B) will travel freely down the Orientation Plate (30) groove until the Eccentric Plug (9*) comes to its full open position.

Step 12: Rotate the Upper Gear Shaft (15) to lower the Orifice Plate Carrier (14) to engage the Lower Gear Shaft (15). Shift the Crank Handle (35) to the Lower Gear Shaft (15) and rotate the Orifice Plate Carrier (14) into the Lower Chamber (1). Make sure the Orifice Plate Carrier (14) seats firmly on the three pin alignment.

Step 13: Place the supplied TMC_o, Inc. Crank Handle (35) on the Eccentric Plug Body Shaft (9A) and rotate the Eccentric Plug (9*) to the CLOSED position. The Lock Plunger (23B) will seat itself in the hole adjacent to the "Close" indicator when full travel is reached.

Step 14: Close the Equalizer Valve (37) by turning the valve stem clockwise until it stops.

Step 15: Open the Bleed Valve (36) by turning the valve stem counter clockwise.

 **DANGER**
SERIOUS PERSONAL INJURY OR DEATH OCCURRENCE WARNING

Opening the Bleed Valve (36) releases any line pressure stored in the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting directly to the atmosphere. Operator should review company standard procedures for releasing pressurized fluid to atmosphere. Failure to reference company standard procedures could cause personal injury or death.

Step 16: Close the Bleed Valve (36) by turning the valve stem clockwise until it stops.

5.0 ADDITIONAL INFORMATION

5.1 RECOMMENDED SPARE PARTS – ONE YEAR OPERATION

Quantity	Item No.	Description	Material
1	2	Lower and Upper Chamber Body O-Ring	HNBR
1	11	Seat O-Ring	HNBR
2	18	Plate Seal Ring	SS/HNBR Bonded
5	20	Sealing Bar Gasket	Non Asbestos
1	20*	Sealing Bar O-ring	HNBR
2	24	Lock Arm Retaining Ring	SS
40	25B,26B	Packing Ring	Virgin TFE
4	26	Upper Thru Cover O-Ring	HNBR
4	29	Lower Thru Cover O-Ring	HNBR

* O-Ring to seal between the Upper Chamber (8) and the Seal Bar (19) in place of standard Gasket on 900 lb. fitting.

5.2 LUBRICANTS

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting requires no grease or other recommended lubricants for in-service operations. There are no grease fittings on the unit.

The TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting does contain several static O-Rings. As a general rule, all static seals should be coated with a small amount of inert / process compatible grease before insertion to prevent damage during the seal installation processes. The user is responsible for the proper selection and use of any lubricants. The TMC_o Inc. uses a silicone base lubricant on all static O-rings in the initial assembly of the TMC_o, Inc. Sure Shot[®] Dual Chamber Orifice Fitting. Manufacturers' instructions for the use of such lubricants must be strictly followed. The user must consider all possible ranges of operating and ambient temperatures, process fluid constituents including any chemical additives.

5.3 SURE SHOT® DUAL CHAMBER CLAMPING BAR SCREW TORQUE TABLE

Size	Press Class	No. Screws	Screw Size	Torque-Ft Lbs
2IN	150-600	4	1/2-13 UNC	65
3IN	150-600	5	1/2-13 UNC	65
3IN	900	6	1/2-13 UNC	30-35
4IN	150-600	6	1/2-13 UNC	65
6IN	150-600	7	1/2-13 UNC	70
8IN	150-600	8	1/2-13 UNC	75
10IN	150-600	11	1/2-13 UNC	75
12IN	150-600	13	1/2-13 UNC	75
16IN	150-600	16	1/2-13 UNC	75

5.4 SURE SHOT® DUAL CHAMBER STUD TORQUE TABLE

Size	Press Class	No. Studs	Stud Size	Torque-Ft Lbs
2IN	150-600	11	5/8-11 UNC	70
3IN	150-600	14	5/8-11 UNC	90
3IN	900	14	3/4-16 UNC	155
4IN	150-600	14	5/8-11 UNC	90
6IN	150-600	18	5/8-11 UNC	90
8IN	150-600	18	5/8-11 UNC	95
10IN	150-600	18	3/4-16 UNC	155
12IN	150-600	24	3/4-16 UNC	155
16IN	150-600	28	7/8-14 UNC	210

NOTES

WARRANTY

A. LIMITED WARRANTY – Subject to any limitations described in Paragraph B herein, and except as otherwise expressly provided herein, TMC Co, Inc. warrants that the Goods manufactured or Services provided by TMC Co, Inc. will be free from defects in materials and workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for a period of twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment, whichever date comes first. Consumables and services are warranted for a period of ninety (90) days from the date of shipment of completion of services. Products purchased by TMC Co, Inc. from a third party for resale to Buyer shall carry only the warranty extended by the original manufacturer. Buyer agrees that TMC Co, Inc. has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of those products. If Buyer discovers any warranty defects and notifies TMC Co, Inc. thereof in writing during the applicable warranty period, TMC Co, Inc. shall, at its option, promptly correct any errors that are found by TMC Co, Inc. in the services, or repair or replace F.O.B. point of manufacture that portion of the Goods found by TMC Co, Inc. to be defective, or refund the purchase price of the defective portion of the Goods/Services. All repairs or replacements necessitated by inadequate maintenance, normal wear and usage, unsuitable utility sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of TMC Co, Inc. are not covered by this limited warranty, and shall be at the Buyer's expense. TMC Co, Inc. shall not be obligated to pay any costs or charges incurred by the Buyer or any other party except as may be agreed upon in writing by an authorized TMC Co, Inc. representative. All costs of dismantling, reinstallation and freight and the time and expenses of TMC Co, Inc. service personnel for site travel and diagnosis under this warranty clause shall be born by the Buyer unless accepted in writing by TMC Co, Inc. Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the originals warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by TMC Co, Inc. and can be amended only in writing signed by an authorized representative of TMC Co, Inc.

EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS AGREEMENT, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES PROVIDED.

CORROSION OR EROSION OF MATERIALS IS NOT COVERED IN THIS GUARANTEE.

B. LIMITATION OF REMEDY AND LIABILITY – TMC Co, Inc. 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 A herein. In no event, regardless of the form of the claim or cause of action, whether based in contract, negligence, infringement, strict liability, other tort or otherwise, shall TMC Co, Inc.'s liability to Buyer and/or its customers exceed the price to Buyer of the specific Goods manufactured or Services rendered by TMC Co, Inc. giving rise to the claim or cause of action. Buyer agrees that in no event shall TMC Co, Inc.'s liability to Buyer and/or its customers extend to include consequential, incidental, or punitive damages. The term consequential damages shall include but not be limited to, loss of anticipated profits, loss of use, loss of revenue and cost of capital.