



***Spraying Systems Co.***<sup>®</sup>  
Experts in Spray Technology

## **TJ14 & TJ16 Tank Cleaning Machine**



**TJ14**



**TJ16**

**Operation & Maintenance Instructions**

**MI-TJ14 & TJ16**

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**IMPORTANT!** Read all instructions in this manual before operating machine.

## GENERAL SAFETY INFORMATION

### READ AND FOLLOWING INSTRUCTIONS:

**WARNING:** All safety related and operating instructions should be read before the nozzle is operated. Follow all operating instructions. Failure to do so could result in serious injury.

- **WARNING:** It is important to recognize proper safety precautions when using a pressurized spray system. Fluids under pressure can penetrate skin and cause severe injury.
- **WARNING:** When dealing with pressure applications, the system pressure should never exceed the lowest rated component. Always know your system and all component capabilities, maximum pressures and flow rates.
- **WARNING:** Before performing any maintenance, make sure all liquid supply lines to the machine are shut off and /or disconnected and chemical/fluid are drained.
- **WARNING:** The use of any chemicals requires careful control of all worker hygiene.
- **WARNING:** Spraying Systems Co. does not manufacture or supply any of the chemical components used in this equipment and is not responsible for their effects. Because of the large number of chemicals that could be used and their different chemical reactions, the buyer and user of this equipment should determine compatibility of the materials used and any of the potential hazards involved.
- **WARNING:** Spraying Systems Co. strongly recommends the use of appropriate safety equipment when working with potentially hazardous chemicals.
- **WARNING:** Before use be sure appropriate connections are secure and made to withstand weight and reaction forces of the operating unit.

This equipment includes but is not limited to:

- Protective hat
- Safety glasses or face shield
- Chemical-resistant gloves and apron
- Long sleeve shirt and long pants



**NOTE:** Always remember to carefully read the chemical manufacturer's label and follow all directions.

- **WARNING: DO NOT USE TO SPRAY FLAMMABLE LIQUIDS--SUCH USE COULD RESULT IN FIRE OR EXPLOSION CAUSING BODILY INJURY OR DEATH.**
- **WARNING:** It is important to operate equipment within the temperature range of all components. Also insure that appropriate time lapses or proper safety equipment is used when handling components after they're exposed to high temperatures.
- **WARNING:** Never operate tank cleaning equipment in the open due to the potential of bodily injury.
- **WARNING:** Removed equipment from the tank before attempting any repairs.
- **WARNING:** If walking on top of a tank is deemed safe and is necessary, use proper safety precautions to protect individuals as well as the equipment.
- **WARNING:** Do not put any part of your body in the tank during operation of the tank cleaner. This is NOT a safe procedure for verification of operation.
- **WARNING:** Proper hoisting procedures should be used when installing and removing all equipment.
- **WARNING:** To insure the safety of the equipment as well the individuals using them, only use Spraying Systems Co. components.
- **WARNING:** When packaging and transporting use structurally sound boxes or crates that can handle the weight of the equipment.
- **WARNING:** Tank cleaners should be flushed out with clean water before they're stored or shipped to minimize health hazards or cross contamination.
- **WARNING:** Do not use any equipment outside the intended purposes of the product. Misuse can result in personal injury or product damage.

The container being cleaned should be sealed as best as possible while the TankJet 65 models is running its cycle. The combination of temperature, cleaning solution, spray impact and the potential toxic materials being cleaned can cause a hazard to anyone in the path of the spray.

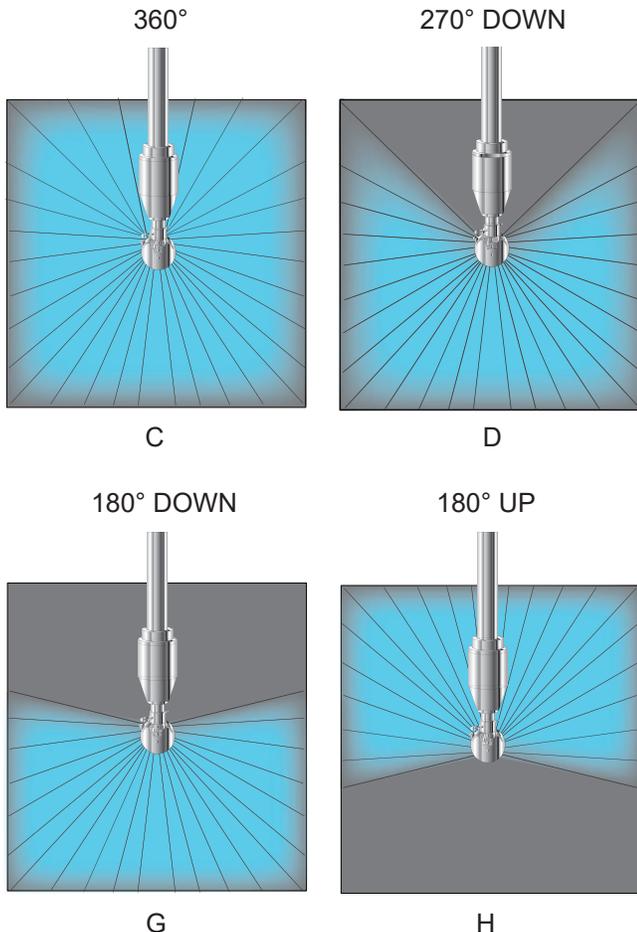
## PRINCIPLES OF OPERATION

The TJ14 & TJ16 are hydraulically driven rotating heads with hole patterns ejecting streams of liquid for spanning internal tank surfaces to be cleaned, sanitized, treated, or rinsed. Specially designed for small apertures, the TJ14 model will fit through an opening as small as a 2" and the TJ16 size, a 3" (3.06" I.D.) schedule 40 pipe. The unit may be installed on a permanent basis (C.I.P.) or be fitted for use in a portable manner. Many types of fluids, sanitizers, detergents, solvents, and caustics may be used through this unit to assist its cleaning effectiveness. (Please note caution below) The cleaning effectiveness of any unit is proportional to all the applicable variables, such as volume, pressure, chemicals, impingement, drainage, soils, etc. The unit will only operate properly when mounted in the vertical position (upright or suspended), provisions can be made to alter the unit for operation in any attitude. With the choice of impact patterns it can clean almost any type of contained area within its range.



**CAUTION:** *If chemicals, hazardous materials, operations, and equipment are used in conjunction with this cleaning equipment, it is the responsibility of the user to establish appropriate associated safety and health practices. Prior to application, the user must consult and determine the applicability of regulatory (federal, state, local and facility) safety and environmental agency limitations.*

### STANDARD IMPACT PATTERNS FOR TJ14 & TJ16:



## TECHNICAL SPECIFICATIONS

### TANKJET 14 MODEL - FOR ASSEMBLY DRAWING:

SSCo. Part #	Description
TJ14-C	360° coverage with solid stream spray inserts   3/4" NPT
TJ14-D	270° coverage with solid stream spray inserts   3/4" NPT
TJ14-G	180° down coverage with solid stream spray inserts   3/4" NPT
TJ14-H	180° up coverage with solid stream spray inserts   3/4" NPT
TJ14B-C	360° coverage with solid stream spray inserts   3/4" BSPT
TJ14B-D	270° coverage with solid stream spray inserts   3/4" BSPT
TJ14B-G	180° down coverage with solid stream spray inserts   3/4" BSPT
TJ16B-H	180° up coverage with solid stream spray inserts   3/4" BSPT

### TANKJET 16 MODEL - FOR ASSEMBLY DRAWING:

SSCo. Part #	Description
TJ16-C	360° coverage with solid stream spray inserts   1-1/2" NPT
TJ16-D	270° coverage with solid stream spray inserts   1-1/2" NPT
TJ16-G	180° down coverage with solid stream spray inserts   1-1/2" NPT
TJ16-H	180° up coverage with solid stream spray inserts   1-1/2" NPT
TJ16B-C	360° coverage with solid stream spray inserts   1-1/2" BSPT
TJ16B-D	270° coverage with solid stream spray inserts   1-1/2" BSPT
TJ16B-G	180° down coverage with solid stream spray inserts   1-1/2" BSPT
TJ16B-H	180° up coverage with solid stream spray inserts   1-1/2" BSPT

### MATERIALS:

The TJ14 & TJ16 models are made of 316 (UNS S31600) stainless steel with the exceptions of the rotor, bushing, and washer, which are made of virgin Teflon. No lubricants are required.

## **CONSTRUCTION:**

Referring to the Parts List on page 10, the unit consists of two basic components; the drive, comprising of the body, motor, rotor, and shaft; and the nozzle head, comprising of the nozzle body, bushings, nozzles, and elbow shaft. These unit's construction does not require lubrication of any kind for operation.

## **PRINCIPLE OF ROTATION:**

The liquid enters the inlet cap (1) and then flows through the oblique and bypass holes in the motor (2) causing the rotor disk (3) to rotate at high speed. The unique construction of the rotor disk allows the side opposite the holes to strike the driving arm of the shaft (7) rotating it ahead about 3° to 4° per revolution of the rotor disk. Thus, for every 100 revolutions of the rotor disk there is 1 revolution of the driving arm, which is part of the shaft, creating 1 revolution of the ball. The liquid streams that pass through the drive holes and down the bypass in the motor combine in the shaft and are distributed out the holes in the ball. The rotational speed of these units can be regulated through the use of various motor bypass plugs, which influences the fluid diversion to provide additional speed, reference the trouble shooting section and the drawing parts list for additional information and location.

## **CLEANING DIAMETER:**

The cleaning and wetting distances are a function of rotational speed and liquid pressure applied. The slower the ball rotates and the higher the pressure applied, the greater the distances. The cleaning diameter of the TJ14 model is 12 ft (3.6 m) and the TJ16 model is 24 ft (7.3 m), but the actual results will also depend on the type and condition of soils to be removed.

## **INSTALLATION**

The TJ14 & TJ16 are easy to install as it has a single female pipe thread connection. It may be installed on a tripod, suspended from a pipe, manhole cover, etc, but the unit must be vertical. The factory will preset the approximate speed (RPM) and spray pattern for the particular field application. In all installations a suitable strainer should be used (such as a 20 Mesh "Y" strainer) to prevent dirt or scale from clogging the waterways or openings.



***WARNING: In closed tanks, provisions should be made for adequate venting during operation to allow the escape of any gases or volatile vapors which may be produced during operation. This will also prevent the tank from collapsing due to vacuum formation, which can be caused by a cold rinse cycle in a warm tank.***

## **OPERATION**

To start the unit, turn on the fluid. An in-line valve is advised for a slow build-up of liquid pressure in the unit to prevent "water hammer". To stop the unit, turn off the liquid. The unit should always be handled carefully. If the unit is dropped or maltreated it may cause internal damage to the drive pod assembly, which in turn can affect the performance of the unit. If handled properly the unit will perform well and provide dependable service.

### **TANKJET® 14:**

<b>Pipe Connection:</b>	3/4" Female NPT or BSPT
<b>Operating Pressure Range:</b>	50-200 PSI (3.5-14 BAR)
<b>Max. Operating Temp:</b>	250° F (121° C)
<b>Flow Capacity:</b>	13-34 GPM (49-129 LPM)
<b>Head Rotation Speed:</b> (Factory Set)	3-15 RPM
<b>Effective Cleaning Dia.:</b>	To 12 ft maximum (3.6 m)
<b>Overall Head Length x Body Diameter:</b>	6.56" x $\text{Æ}2"$ (178 mm x $\text{Æ}51\text{mm}$ )
<b>Approximate Weight:</b>	2 lbs (.9 kgs)
<b>Materials of Construction:</b>	316 SS & Teflon
	** Recommended Strainer - 20 Mesh (1/32" opening) (not included)

### **TANKJET® 16:**

<b>Pipe Connection:</b>	1-1/2" Female NPT or BSPT
<b>Operating Pressure Range:</b>	50-200 PSI (3.5-14 BAR)
<b>Max. Operating Temp:</b>	250° F (121° C)
<b>Flow Capacity:</b>	30-76 GPM (114-288 LPM)
<b>Head Rotation Speed:</b> (Factory Set)	3-15 RPM
<b>Effective Cleaning Dia.:</b>	To 24 ft maximum (7.3 m)
<b>Overall Head Length x Body Diameter:</b>	8.98" x $\text{Æ}2"$ (178mm x $\text{Æ}51\text{mm}$ )
<b>Approximate Weight:</b>	2 lbs (.9 kgs)
<b>Materials of Construction:</b>	316 SS & Teflon

\*\* Recommended Strainer - 20 Mesh (1/32" opening)  
(not included)

\*\* Required for most applications to prevent fouling or plugging of the unit from foreign material, i.e., scale, grit, and soils in solution. Additional strainers and/or finer mesh screens may be required depending upon the amount, nature, and size of foreign materials in solution.

## TROUBLE SHOOTING

If any trouble should arise, the following steps may be taken: Refer to the Parts List.

- A.** Check units for external damage, look for evidence of mishandling that may have damaged shafts, bearings, or alignment.
- B.** If the ball fails to rotate and no liquid passes:
1. Check for liquid pressure and volume at the unit.
  2. Check strainer for filter blockage.
  3. Remove ball (8) by removing pin and check for clogged jet holes.
  4. Recheck for flow through the shaft.
- C.** If the shaft fails to rotate and sufficient liquid passes:
1. Check for shaft freedom, by hand, in the vertical and rotational axis.
  2. If the ball is free, insert a motor bypass plug. If the unit now rotates, the problem is minor friction. If the unit still does not rotate, check for:
    - a. Contamination in the unit.
    - b. Wear of any one of the following parts: The bushings, washers, and the rotor.
    - c. Galling and straightness of the shafts.

**Replace all defective parts. No lubrication!**

## SERVICING

### DISASSEMBLY:

Refer to the Parts List.

1. Remove ball (8) by removing spring pin or bolt (10-2") (13-3").
2. Unscrew inlet cap (1) from body (4).
3. Gently push shaft (7) up into body (4) and remove the motor (2) and rotor disk (3).
4. Continue to push shaft (7) thru body (4) and remove shaft completely.
5. Remove bushing (6) and washer (5) from body (4).
6. The shaft (7) is a one piece assembly with the driving arm attached on the TJ14. On the TJ16 the shaft (7) has a driving arm (10) attached by mounting screws (9).
7. The 3" body (4) has a bottom cap (11) that may need to be removed.

### ASSEMBLY:

Refer to the Parts List.

1. The body (4) and lower cap (11) must be assembled. (75-16-X(B) ONLY).
2. Align the holes in the driving arm (10) with the holes in the shaft (7) and install screws. (75-16-X(B) only).
3. Locate the bushing (6) and washer (5) onto the shaft (7).
4. Lower the shaft (7) and bushing into the body (4) bore.
5. Gently push shaft (7) into body, place rotor disk (3) on shaft (7) and locate motor (2) thru hole in rotor and shaft.
6. Gently lower the shaft, rotor, motor assembly into the body (4) until shaft locates on washer (5) and bushing (6) and push into body.
7. Install the cap (1) into the body.
8. Install the ball (8) onto the shaft and insert pin or bolt (10-2") (13-3").
9. On the bolted assemble install lockwasher (11) and hex nut (12) and tighten.

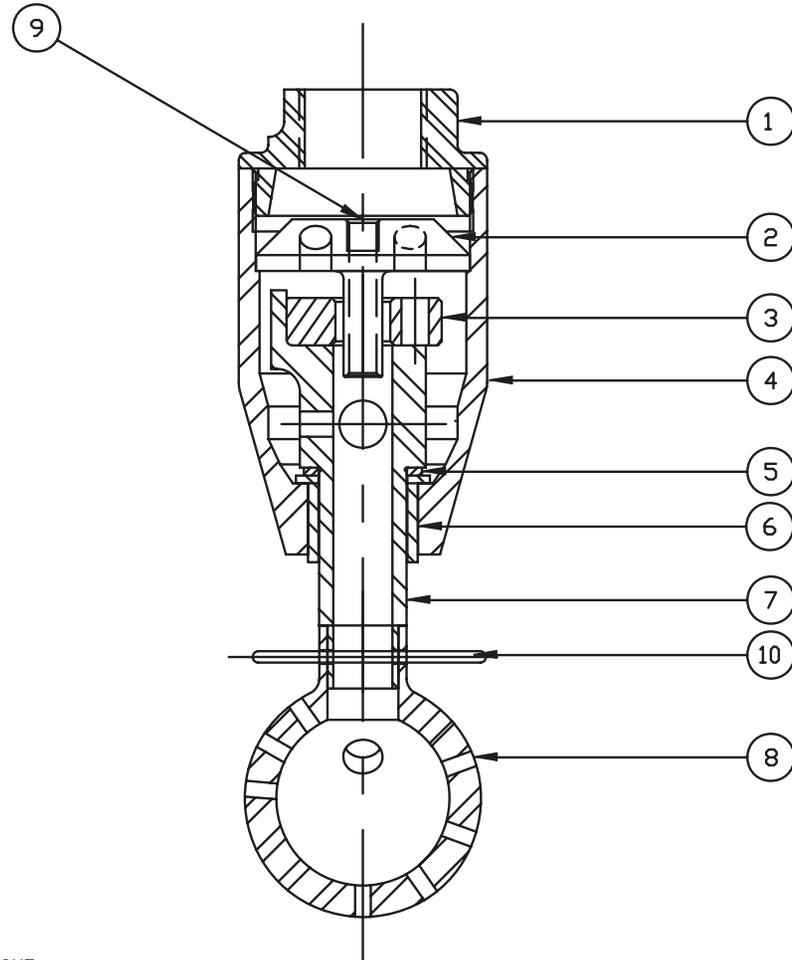
## WARRANTY

For newly purchased units the warranty is 18 months from the date of shipment or 12 months from the date of installation, whichever occurs first. This warranty includes manufacturing defects but does not cover the wear parts that include the bushings. This warranty will be void if parts other than those supplied by Spraying System Co. are used.

TJ14\_--\_ TANKJET

ITEM NO.	DESCRIPTION	TJ14_--_ TANKJET QTY.	REPL.
1	INLET CAP	1	
2	MOTOR	1	●
3	DISK ROTOR	1	●
4	BODY	1	
5	WASHER	1	●
6	BUSHING	1	●
7	TROLL BALL SHAFT	1	●
8	BALL	1	
9A	BYPASS PLUG	1	
9B	SOLID PLUG	1	
10	PIN SPRING	1	●

● FOR ABCKTJ14 REPAIR KIT (INCLUDES ALL ITEM MARKED WITH (●))



**TORQUE:**

INLET CAP (ITEM 1) WHILE HOLDING BODY (ITEM 4)  
TO 60 FT.-LBS.

DESCRIPTION:

No. TJ14\_--\_  
Tankjet



**Spraying Systems Co.®**  
Spray Nozzles and Accessories  
P.O. Box 7900 - Wheaton, IL 60189-7900

Rev. No.

Ref.

Parts List No.

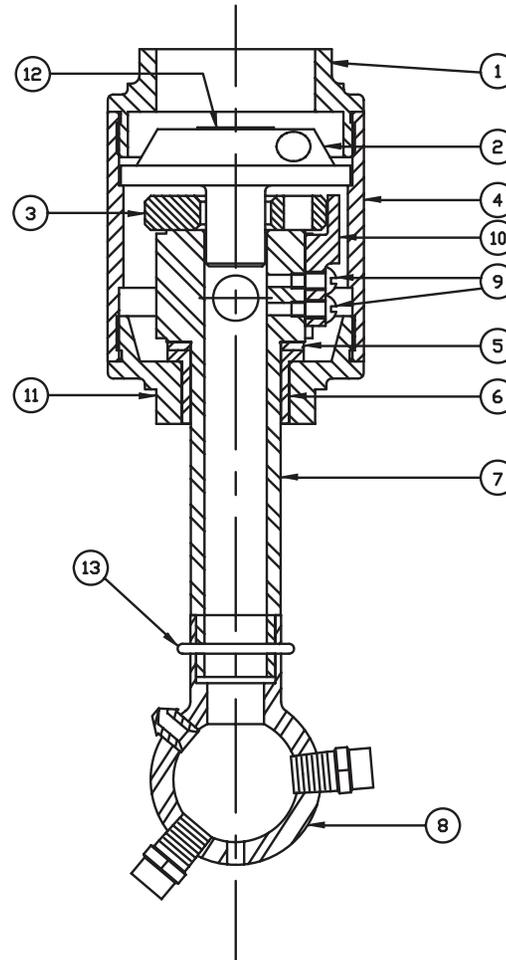
PL TJ14

SHEET OF

TJ16\_\_ TANKJET

ITEM NO.	DESCRIPTION	TJ__ TANKJET QTY.	REPL.
1	INLET CAP	1	
2	MOTOR	1	●
3	DISK ROTOR	1	●
4	BODY	1	
5	WASHER	1	●
6	BUSHING	1	●
7	TROLL BALL SHAFT	1	●
8	BALL	1	
9	SCREW RD. HD. #8-32 X .375 LG.	2	●
10	DRIVING ARM	1	●
11	BOTTOM CAP	1	
12A	BYPASS PLUG	1	
12B	SOLID PLUG (NOT INSTALLED)	1	
13	SPRING PIN	1	●

● FOR ABCKTJ16 REPAIR KIT (INCLUDES ALL ITEM MARKED WITH (●)).

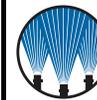


TORQUE REQUIREMENTS:

INLET CAP (ITEM 1) WHILE HOLDING DISK ROTOR (ITEM 3)  
TO 80 FT.-LBS.

DESCRIPTION:

No. TJ16\_\_  
Tankjet



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Spray Nozzles and Accessories  
P.O. Box 7900 - Wheaton, IL 60189-7900

Rev. No.

Ref.

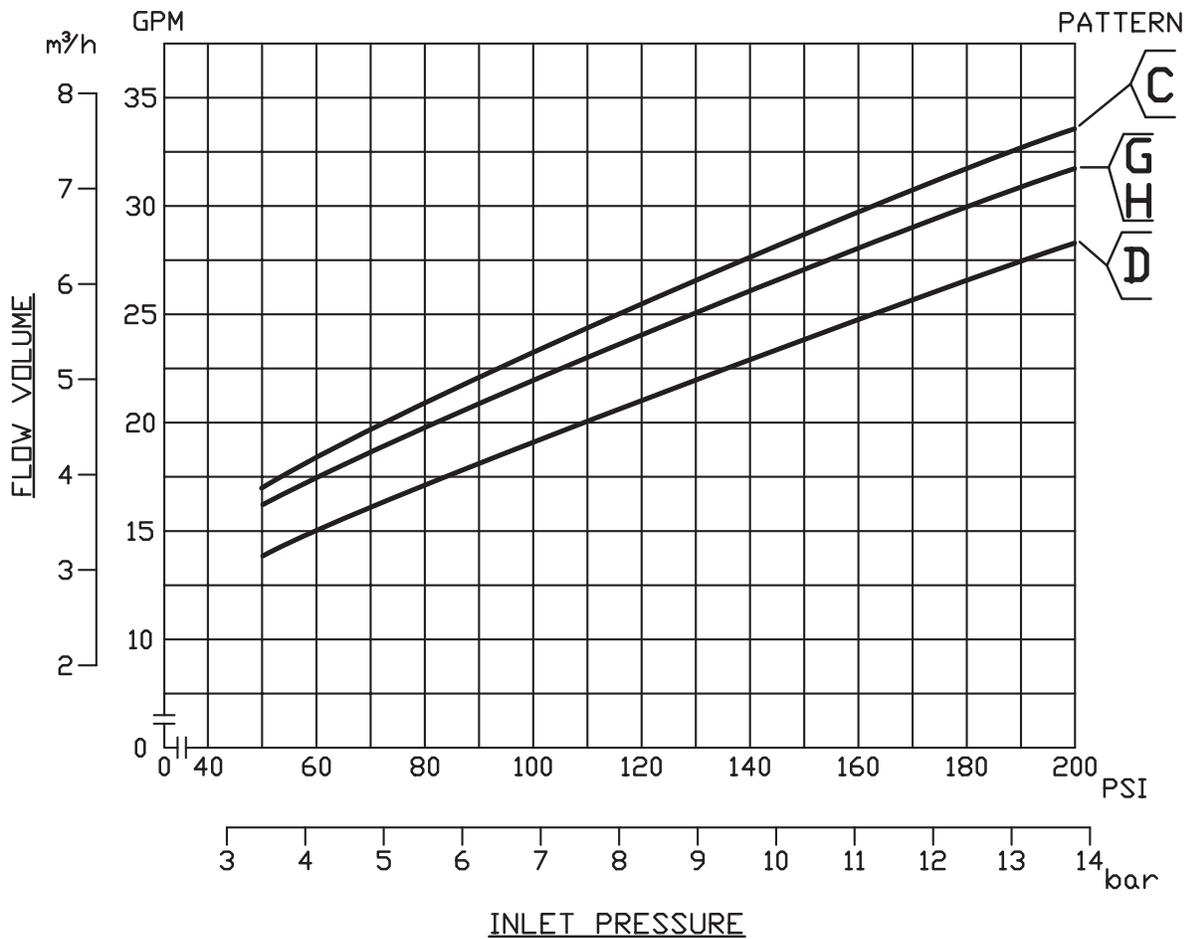
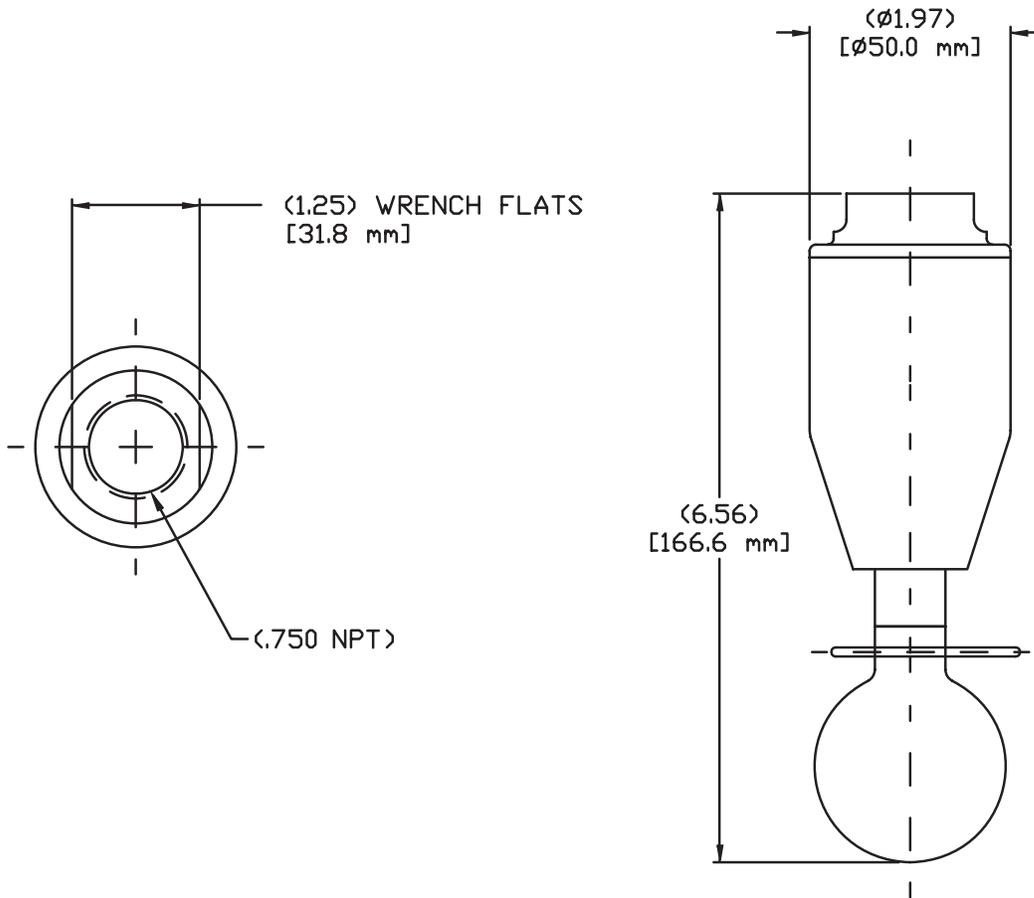
Parts List No.

PL TJ16

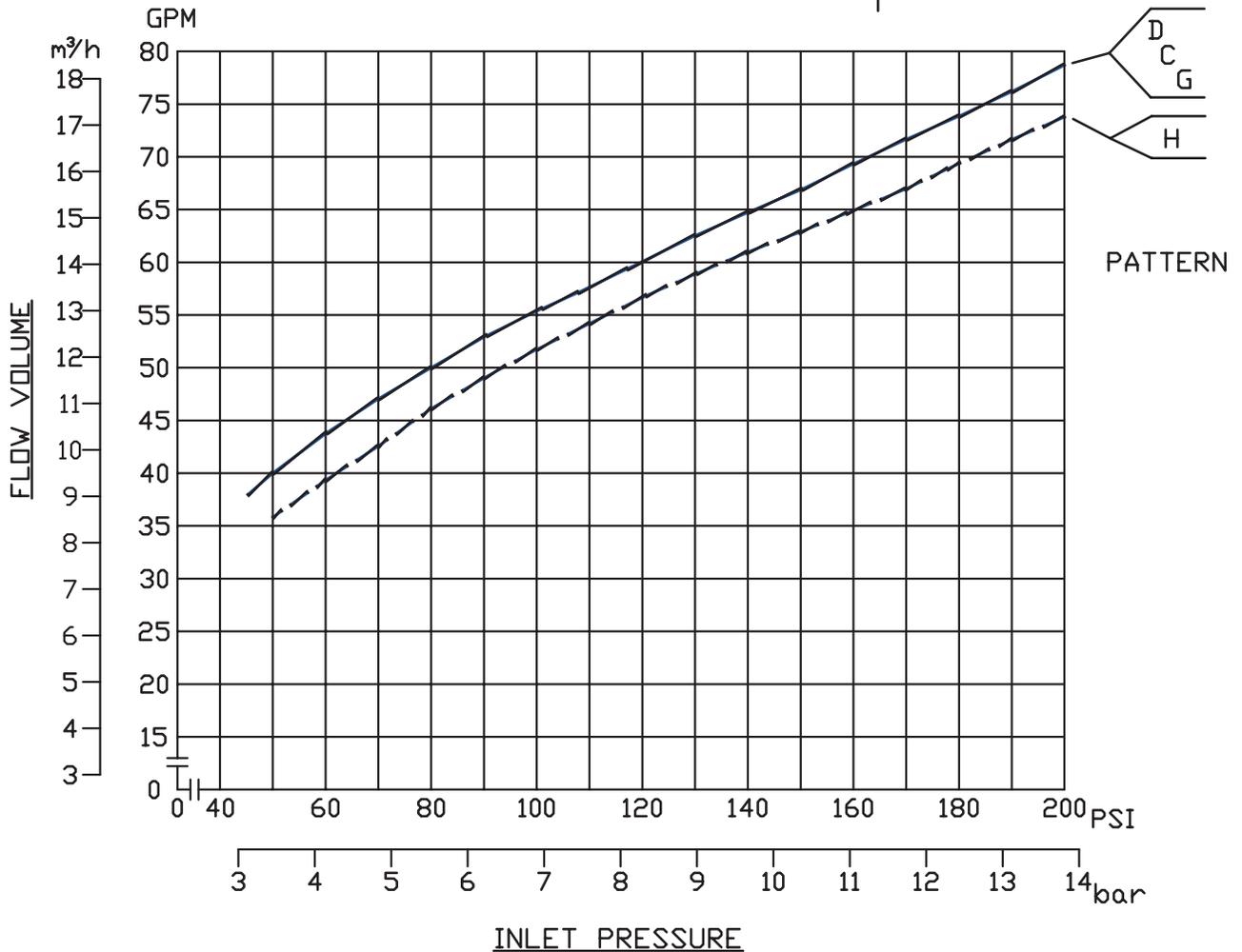
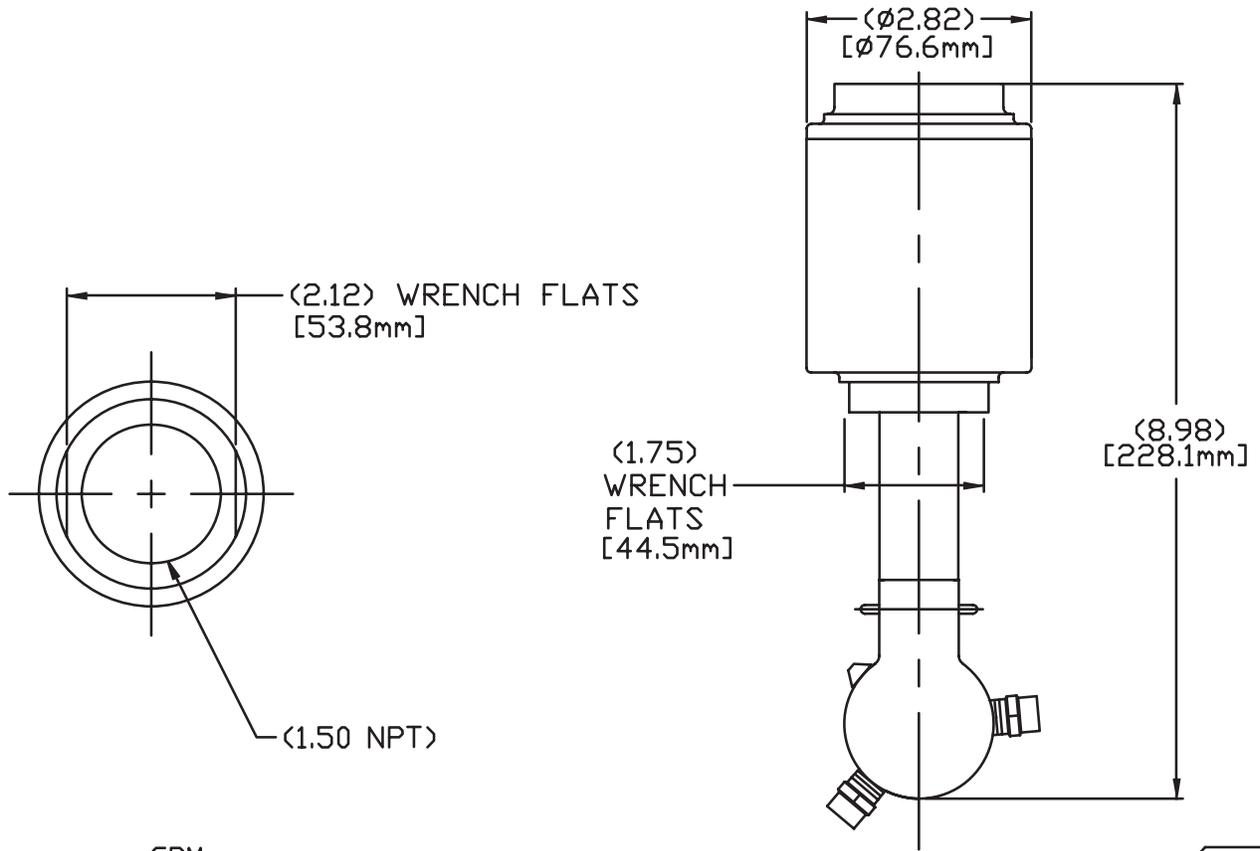
SHEET OF

TANKJET® 16 PARTS LIST

# TANKJET® 14 SPECIFICATIONS



# TANKJET® 16 SPECIFICATIONS



# EC DECLARATION OF INCORPORATION

We, **Spraying Systems Co.**<sup>®</sup>

North Avenue and Schmale Road, P.O. Box 7900,  
Wheaton, IL 60187-7901  
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Fax: 1.888.95.SPRAY                      Intl. Fax: 1.630.260.0842  
Visit our Website at <http://www.spray.com> for local representatives

in accordance with the following directive(s):

2006/42/EC                      The machinery directive

hereby declare that:

Equipment                      TankJet<sup>®</sup> Tank Cleaning Devices

Model number                      TankJet<sup>®</sup>19, TankJet<sup>®</sup>16, TankJet<sup>®</sup>14, TankJet<sup>®</sup>9

is in conformity with the applicable requirements of the following documents:

<u>Ref. no.</u>	<u>Title</u>	<u>Edition/Date</u>
EN 982	Safety requirements for fluid power systems and their components – Hydraulics	1996
EN12100-1	Safety of machinery – Basic concepts, general principles for design: Part 1: Basic terminology, methodology	2003
EN12100-2	Safety of machinery – Basic concepts, general principles for design: Part 2: Technical principles	2003
EN ISO 14121-1	Safety of machinery – Risk assessment Part 1: Principles	2007
ASME- B31.1	ASME Boiler and Pressure Vessel Code	2001

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.

Signed by:



Robert J. Adams, P.E.  
Director of Engineering-Industrial Division  
Spraying Systems Co.<sup>®</sup>



***Spraying Systems Co.***<sup>®</sup>

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