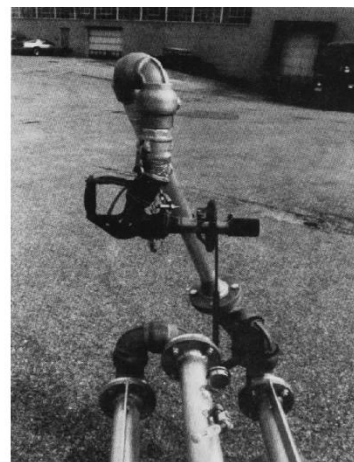
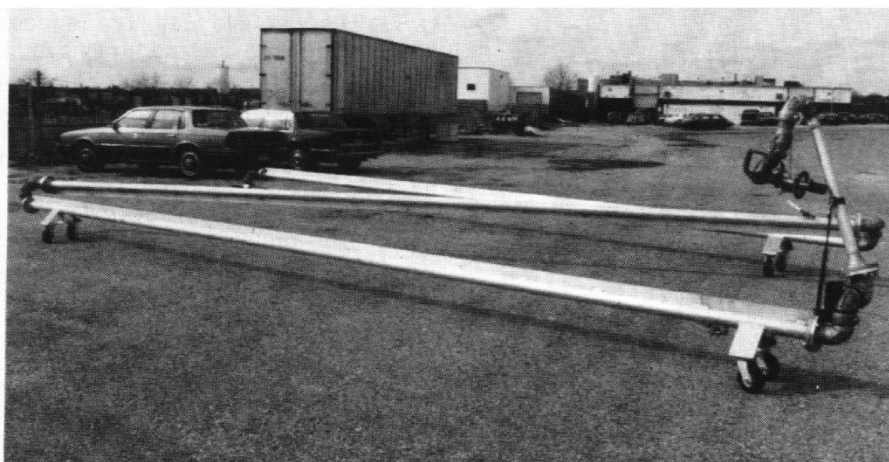


# **GNY AVIATION FUELING PANTOGRAPH ASSEMBLY**

## **Using unique Pantograph Swivel Joints**

**"APPROVED BY US AIR FORCE AFSSEA TEAM"**

Fueling aircraft from trucks, carts, fixed hydrant, mobile or air transportable Hydrant fueling system is accomplished with ease, economy and reliability with the GNY Pantograph Assembly, using unique, U S Patented Pantograph Swivel Joints. In this manner fueling can be accomplished without the use of a fueling hose.



**3" Aluminum fueling Pantograph shown with "overwing" type fueling nozzle.  
(Earlier version of Pantograph was with style 70 Swivel Joints,  
the latest version of Pantograph is with style 20 Swivel Joints)**

**History:** The People at GNY have been manufacturing aviation fueling equipment for over three decades, including aviation swivel joints for GNY aviation Pantograph.

**Size:** Available in size of 3" and 4" Dia. and lengths as required up to 50 meters.

**Flow Rates:** Flow rates up to 700 USGPM (2800 GPM) can be achieved for mobile or fixed installation.

**Working Pressure:** Unit is rated at up to 150 PSI working pressure..

A newer version of Style 20 Swivels (built-in-flanges) has been designed, manufactured and tested for Pantograph application.

**Equipped with optional** (feature) items as per requirement:

Hydrant Coupler	Balance Assembly
Swivel Joints (Style 20 standard and compact unit)	
Spring Loaded Casters	Flow Meter (Positive Displacement)
Supporting Structure Frame	Venturi
Surge Suppressor	Pressure Gage and Stop Cock
Safety Break-Away Coupling	Fueling Nozzle
Tow Bar	Static Grounding Cable/Reel
Deadman Control Assembly	Sampling Connection

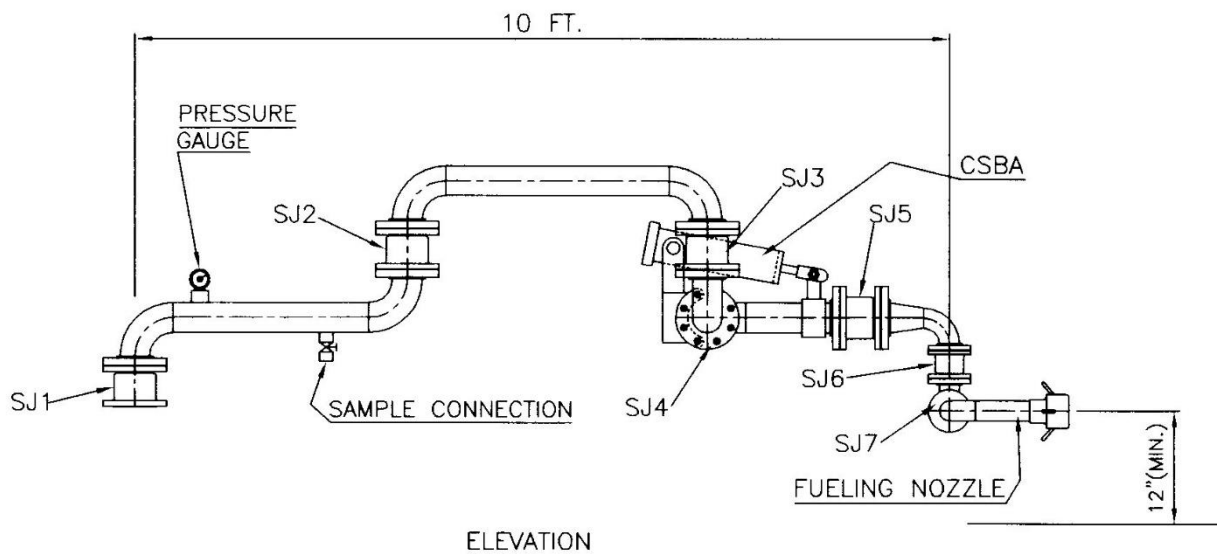


# GNV AVIATION FUELING PANTOGRAPH ASSEMBLY

Using unique Pantograph Swivel Joints

"APPROVED BY US AIR FORCE AFSSEA TEAM"





SJ1-SJ7 PANTOGRAPH SWIVEL JOINT (US PATENTED UNIT)  
 FOR MORE DETAIL REFER TO SKETCH AND LIST OF FEATURE.  
 CSBA: COMPRESSION SPRING BALANCE ASSEMBLY.  
 PIPES: A 312 TP 304 Sch.20.  
 ELBOWS: A 403 WP 304 Sch.40/80.  
 FASTNERS: STD.  
 GASKET: STD.  
 WORKING ENVELOP FOR LOADING IS MIN. 12" TO MAX. 55"  
 SWIVELS SJ6 & SJ7 ARE 3"NB SIZE.

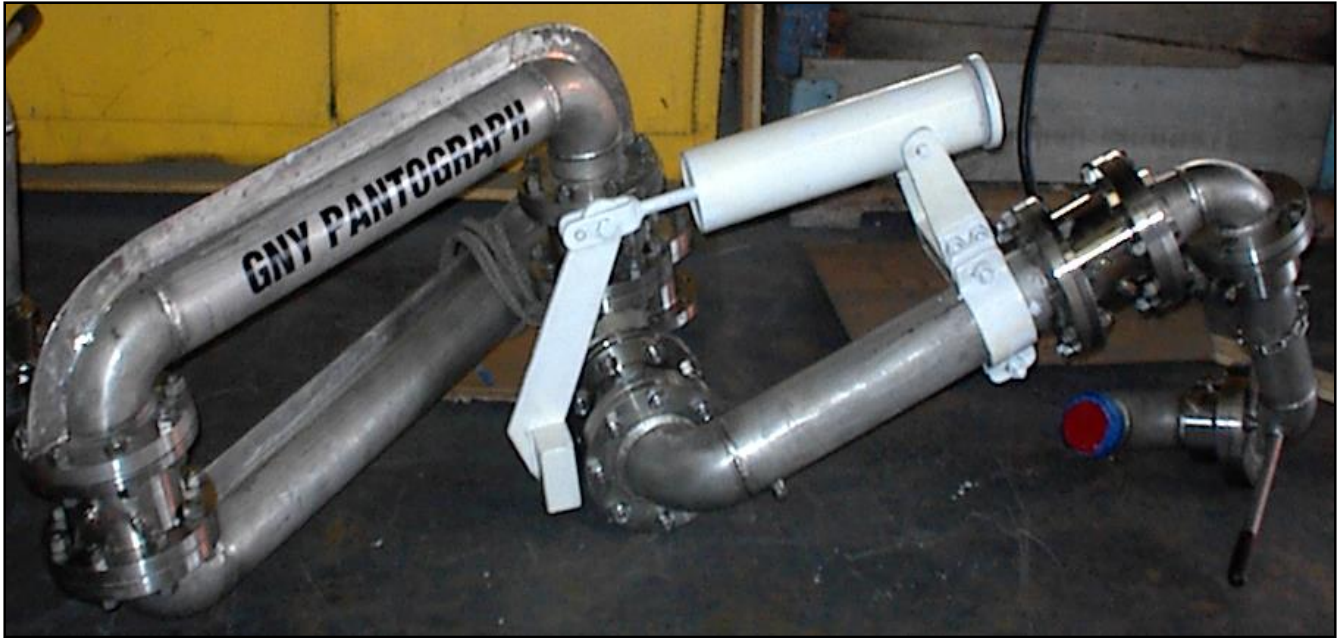
GNY EQUIPMENT, LLC  
 20 DREXEL DRIVE  
 BAY SHORE, NY 11706, USA  
 Phone: (631) 273 4940  
 Fax: (631) 273 5018  
 gnyequip@gnyequipment.com  
 www.gnyequipment.com

4" GNY PANTOGRAPH  
 TANK-TRUCK FUELING ARM

SKETCH NO. :  
 PANTO-TT-4-12  
 Rev. : 01  
 Sheet 1 of 1  
 Date : 06/06/2003



**GNY 4" BOTTOM TANK-TRUCK FUELING SKIDS  
(JOB: FB1202) for Iceland Prime Contractor /  
US Navy Airstation, Keflavik Airport, Iceland**



4" GNY Pantograph Assembly



4" GNY Pantograph Swivel Joint



## DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND  
WRIGHT-PATTERSON AIR FORCE BASE OHIO


MEMORANDUM FOR: Bill Peil  
GNY Equipment, Inc  
71 East Industry Ct.  
Deer Park NY 11729

18 Jan 2002

FROM: HQ AFMC/SES  
4375 Chidlaw Rd  
Wright-Patterson AFB OH 45433

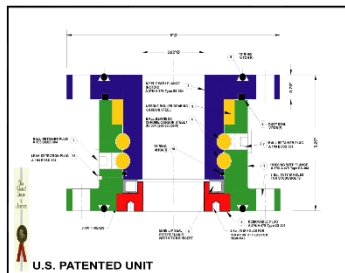
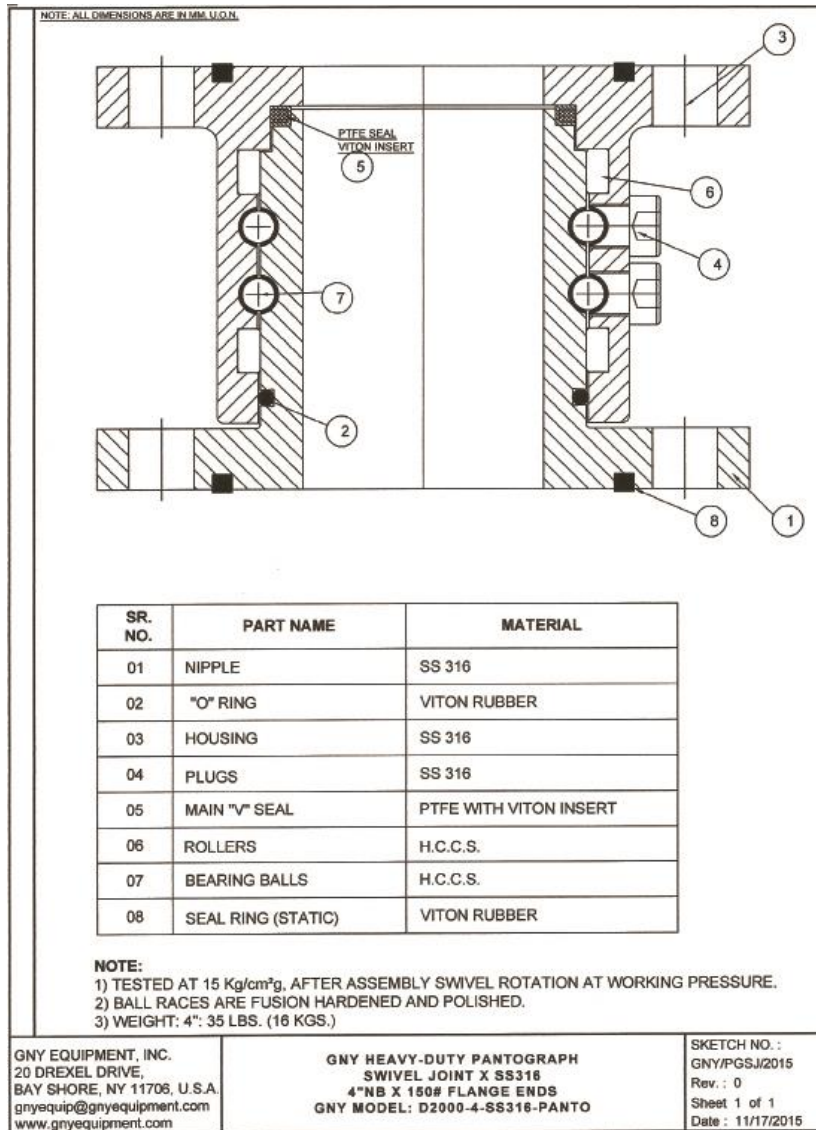
SUBJECT: Pantograph Approval

The GNY fueling pantograph assembly is approved for all fuel servicing operations. We will include this approval in our technical order T.O. 00-25-172, Ground Servicing of Aircraft and Static Grounding/Bonding.

  
HARVEY C. DORNEY, JR., P.E., C.S.P.  
Chief, AFMC System Safety Engineering  
Analysis (SSEA) Team  
Office of Safety

# Pantograph Swivel Joints

## (Style 20 built-in Flanged Units)



# GNY Pantograph Swivel Joints

## (Style 20 Built-in Flanged Units)

- Size: 4"(100 mm) and 3"(80 mm)
- Model: D2000-4-SS316-PANTO and Model: D2000-3-SS316-PANTO-TTMA
- Specially designed for Pantograph Assembly used in Aviation Refueling as per MIL Spec. 15051 and STS M145.
- 150 psig pressure rating (working pressure) for 360 deg. rotation.
- Material is Stainless Steel 316 and all other data are as per sketch.
- Fitted with FOUR rows of bearing; two rows of ball bearings and two needle roller bearings.
- Ball bearing raceways are hardened (345 BHN) using a special permanent FUSION metal hard facing process.
- Fitted with triple seal design; the Main Seal is PTFE (Teflon®) with Insert made of Viton®; the dust seals and 'O' ring of Viton®.
- Nipple (inner part) is specially dimensioned for the main seal to remain in the proper functioning position under both positive and negative pressures.
- Style 20 built-in Flanged Ends, so units can be easily changed.
- 'O' rings at the outer surfaces of the flanges, seal the companion flanges.
- Designed to withstand temperature variations from (minus) -20 deg. to +100 deg. Centigrade.
- Non-Lubricated unit, maintenance free.
- Electrically Conductive and dust proof unit.
- Three year warranty.
- Hydro-testing and Special Testing: All Swivel Joints are Internally Hydro-tested at shop before shipping. Air test, Vacuum test, Bending moment/Radial load test, Pull load test, electrical conductivity test and Life Cycle test (US Patented) has been conducted during the R&D (research and development) and these tests can be conducted upon special request at extra cost.



[www.gnyequipment.com](http://www.gnyequipment.com)



# **LIFE CYCLE TESTING FOR SWIVEL JOINTS**

## **(U.S. Patented)**

### **SUMMARY**

Current High Technology applications for swivel joints require that the maintenance-free life expectancy of the swivel joints be accurately known prior to deployment.

A method of establishing the operating life, including a test setup and a procedure for determining the anticipated operating life of the swivel joint in the field, without actually requiring the swivel joint to be used in the field for several years, has proven to be very useful. The primary purpose of this test setup and procedure is to qualify in advance the appropriate materials of construction and the proper seal material for a swivel joint given a specified operating life, for a particular application.

Based on information received from users in the field and working knowledge obtained from field engineers for more than 30 years, various data has been obtained as to the "average" number of swivel joint rotations/cycles/ operations per day, working loads on the swivel joints under various conditions, operating environments, etc. This data have allowed parameters to be established for testing and establishing the operating life of swivel joints in a controlled simulation test area (other than actually being in the field). A formal procedure has been established, using a special test apparatus (test set-up), to determine the operating life of swivel joints.

The user can maximize the use of a particular type of swivel joint, and the manufacturer can develop the optimum swivel joint (after performing tests) for a particular application. This information can also be used to establish a product warranty or guarantee period. We maintain a continuous life cycle analysis and laboratory testing program for various types of swivel joints.



# INTRODUCTION

This document provides a brief description of the life cycle test for a Pantograph Stainless Steel (SS316) Swivel Joint to certify that the Swivel Joint has a nominal operating life greater than 10 years or **20,000 cycles of maintenance free operation.**

## PURPOSE

The purpose of the life cycle test is to provide quantitative and qualitative validation of the life expectancy for our Pantograph Swivel Joints.

The product, a Pantograph Swivel Joint is used in a pantograph assembly for the fueling and refueling of conventional Aircraft, Jet Aircraft, and helicopters in the aviation industry.

Product:	Pantograph Swivel Joint
Size:	3" (80 mm) and 4" (100 mm)
Body Material:	Stainless Steel 316
Seals Material:	Main Seals of PTFE with Viton Insert/ Dust Seal of Viton, and Viton® `O' rings,
Bearings:	Two Ball Bearings and Two Roller Bearings

### Special feature:

Both ball races are hardened up to 345 BHN.

Non-Lubricated.

## LIFE CYCLE TEST PLAN

The plan for testing the swivel joints calls for continuous rotation of the swivel joint, in two directions, clockwise and counterclockwise. The direction of rotation is reversed periodically. Each 360 degree rotation of the Swivel joint (in either direction) is considered a complete cycle. The test is run continuously for a predetermined number of cycles.

## TEST PROCESS

The set-up for testing the pantograph swivel joint consists of mounting the joint under test horizontally and rotating the joint under simulated load conditions, with the swivel joint constantly under pressure. The pressurized swivel joint is constantly rotated, but the direction of rotation is reversed periodically.

The test configuration consists of a rigid test bench on which the test swivel joint is mounted. One end of the swivel joint is attached to a blind flange that contains pressurized fluid passing through the swivel joint. The pressure is monitored by a pressure gauge that constantly indicates the pressure in the swivel joint.

A calculated load is applied to the swivel joint through a load arm that simulates load conditions that would be typically found in the field for the particular application. The load is applied by a hydraulic jack, which is monitored by a pressure gauge that constantly indicates the load conditions.

The test is monitored by a stand-alone, self-contained, microprocessor-controlled instrumentation package that allows the test parameters to be easily modified at any time. Features incorporated in the test process accurately identify the occurrence of predetermined milestones. Integral safety features automatically terminated test if any test limits are approached. The test is performed without manual intervention and will automatically stop at the end of the pre-established test.

*Life Cycle Test Setup*

