

ET12-ITL-FOP-001

REVISION: H

EFFECTIVE DATE: September 29, 2005

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# ORGANIZATIONAL ISSUANCE

## EXPERIMENTAL FLUID DYNAMICS GROUP

### ET12

# INDUCER TEST LOOP FACILITY OPERATING PROCEDURE

**OPR**

ET12

**OPR Designee**

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**Approved**

ET12

**By**

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### DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
AS-IS	BASELINE	Oct/15/97	Baseline AS IS,  PTE-TA-001 Rev 1 Pump Test Equipment Test Procedure PTE-DA-001 Rev 1 PTE Deaeration Procedure PTE-FF-001 Rev 1 PTE Fluid Fill Procedure
AS-IS	A	7/19/99	Due to the reorg this Baseline supersedes the document OWI-ED34-PTE-001 by the same title.
DRAFT	B		SPLIT into three separate OWI's. This OWI is just the operational procedures
DRAFT	C	1/4/00	Incorporate Bypass Pump operations into procedures.
REVISION	D	9/12/00	Incorporated TD74-ITL-002 into TD74-ITL-001. Incorporated PPE requirements/use into Safety section and training statement for operators in Training section.
REVISION	E	9/04/01	Incorporated Appendix E, Test Article and Facility Build-up, Appendix F, Operational Guidelines for Facility Water Fill, and Appendix G, Facility/Test Article Integrated Checkouts.
REVISION	F	7/8/02	Incorporated configuration changes per TPS#ITL-0057-N
REVISION	G	11/02/04	Updated due to CAITS 04-DA01-0387. Document ID changed from TD74-ITL-001 to TD74-FOP-ITL. Added FOP to title. Re-named Appendixes to Tables.
REVISION	H	9/29/05	Updated to reflect new organization code and to update procedures.

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## Inducer Test Loop Facility Operating Procedure

### 1.0 PURPOSE

- 1.1 This issuance contains instructions for performing a model test following model change out or facility modification/repair at the Inducer Test Loop.

### 2.0 APPLICABILITY

- 2.1 This work instruction applies to the Test and Evaluation Department personnel and its contractors involved in operations at the Inducer Test Loop.

### 3.0 APPLICABLE DOCUMENTS

TD01	Test Project
ET10-OWI-003	Test Preparation Sheet Instructions
ET12-OWI-100	EXPERIMENTAL TEST PROJECT PROCESS
MPR 3410.1	Training

### 4.0 DEFINITIONS

- 4.1 Affected Personnel: All Experimental Fluid Dynamic Group personnel.
- 4.2 Data: Electronic or written information (obtained during test programs or analytic efforts) stored in any of several media (magnetic tapes, computer files, photographs, reports, etc.).
- 4.3 Data Acquisition Engineer: Individual responsible for a facility data acquisition system including transducers, data acquisition hardware and software, and on-site displays, printers, and data storage medium.
- 4.4 Facility: A group of mechanical, electrical, and control subsystems designed to prepare for, conduct, and acquire data for a test run of a test article.
- 4.5 Facility Engineer: Lead and point-of-contact for a specified facility. Responsible for the operation, maintenance, and development of that facility.
- 4.6 Facility Operator: Person authorized by the Group Lead to operate a specified facility.

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- 4.7 IDP: Individual Development Plans
- 4.8 PPE: Personal Protection Equipment
- 4.9 Records Custodian: Individual who is responsible for controlling, storing, retrieving, and dispositioning records.
- 4.10 Test Engineer: Person(s) responsible for the planning, conduction, and reporting for a specified test.
- 4.11 ULO: Using Line Organization -- the users of calibrated equipment.

## 5.0 OPERATIONAL INSTRUCTIONS

**-This instruction details via steps the procedure in operating and taking data on the ITL facility.**

**-All steps in this OI shall be performed in the order listed, as stated, unless deviation is permitted by the Facility Engineer.**

### 5.1 PREREQUISITES

The Facility Operator shall –

- 5.1.1 Use Table 5 to install the test article and build up the facility. After build-up use Table 6 to fill facility with water.
- 5.1.2 Valves are aligned in accordance with Table 1, Startup Valve Lineup.
- 5.1.3 Ensure Test Article power supplies located on east wall near exit door have been turned on.
- 5.1.4 Ensure deaeration of the test loop has been performed per Section 5.4.
- 5.1.5 Ensure supply water is hooked up and flowing to the Carbon Seal and the Bearing Box heat exchanger.
- 5.1.6 Energize Bearing Coolant Oil to lubricate bearing box. System has safety switch and loop cannot be run unless switch is ON.

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- 5.1.7 Verify oil flow is approximately 1.25 gpm.
- 5.1.8 Ensure the model data acquisition systems are aligned and calibrated by the Test Engineer.
- 5.1.9 Ensure loop cooling water is connected and the isolation valve is open.
- 5.1.10 Ensure shaft seal cooling water loop is open.
- 5.1.11 Ensure all instrumentation lines have been bled.
- 5.1.12 Verify Valves are aligned in accordance with Table 1, Startup Valve Lineup.

## 5.2 FACILITY OPERATIONAL INSTRUCTIONS

<p><b>NOTE</b></p> <p>If testing requires the use of the Bypass Pump, start with Step 5.2.1. If not, proceed to Step 5.2.5.</p>
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### Facility Operator shall:

- 5.2.1 SET the Bypass Pump Speed Pot to 0%.
- 5.2.2 START the Bypass Pump by depressing green button HS-102 located on ITL Control Panel.
- 5.2.3 SET the Bypass Pump Speed at approximately 60% using the speed pot on the control panel.
- 5.2.4 ADJUST V-103, Test Article Throttle Valve, to obtain 275 gpm on FI-100, Test Article Flow Indicator.
- 5.2.5 SET the Test Article Pump Speed Pot to 0%.
- 5.2.6 START the Test Article Pump by depressing green button HS-101 on ITL control panel.

<p><b>NOTE</b></p> <p>If Bypass Pump is in use, do not Adjust V-103, Test Article Throttle Valve. If Bypass Pump is</p>
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not in use, Insure V-103 is closed while Test Article speed is <15%.

- 5.2.7 ADJUST the Test Article Pump Speed to approximately 1200 rpm as indicated on SI-100, Test Article Pump Speed.
- 5.2.8 OPEN V-103, Test Article Throttle Valve, 10% if Bypass Pump is not is use. If Bypass Pump is in use, skip this step.
- 5.2.9 VERIFY flow in the forward direction in the Test Article.
- 5.2.10 ADJUST the Test Article Speed to approximately 1800 rpm as indicated on SI-100, Test Article Speed.
- 5.2.11 ADJUST V-103 to obtain the starting flow rate, defined by the Test Engineer (normally 250 to 290 gpm), as indicated on FI-100, Test Article Flow Indicator.
- 5.2.12 As necessary, ADJUST the Test Article Pump to the desired test speed using the Test Article Pump Speed Pot.
- 5.2.13 ADJUST TCV-100 Controller to obtain the desired water temperature as indicated on TI-101, Model Inlet Temperature.

When the Test Engineer requirements have been met and direction to operate the loop has been given, perform the following:

- 5.2.14 Slowly bring the Test Article speed up to the setpoint.
- 5.2.15 Perform One of the following to reach set point:
  - 5.2.15.1 To operate the loop at conditions below Atmospheric pressure, proceed to step 5.2.16 of these instructions.
- OR
- 5.2.15.2 To operate the loop at conditions above atmospheric pressure, proceed to step 5.2.17 of these instructions.
- 5.2.16 Perform the following as necessary:
  - 5.2.16.1 CLOSE V-120, Pressure Source Valve.

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- 5.2.16.2 CLOSE PRV-100, Gas Supply Regulating Valve.
- 5.2.16.3 CLOSE V-124, Vacuum/Pressure Vent valve.
- 5.2.16.4 OPEN V-122, Shutoff Valve.
- 5.2.16.5 OPEN V-123, Vacuum Source Valve.
- 5.2.16.6 START VP-123, Vacuum Pump using hand switch HS-103.

**NOTE**  
DO NOT EXCEED 24 IN. Hg AS INDICATED ON VG-100, VACUUM GAGE. IF EXCEEDED OPEN V-124, VACUUM/PRESSURE VENT VALVE AND CLOSE V-123, VACUUM SOURCE VALVE.

- 5.2.16.7 As necessary, ADJUST V-123 and V-124 to obtain desired vacuum as indicated on VG-100, Vacuum Gage.
- 5.2.16.8 Signal the test engineer that set point has been achieved and wait for TE to signal back that data has been acquired.
- 5.2.17 Perform the following as necessary:
  - 5.2.17.1 CLOSE V-123, Vacuum Source Valve.
  - 5.2.17.2 STOP VP-123, Vacuum Pump using HS-103.
  - 5.2.17.3 CLOSE V-122, Shutoff Valve.
  - 5.2.17.4 If loop/tank is at sub-atmospheric conditions, OPEN V-124, Vent Valve, and vent tank to 0 psig.
  - 5.2.17.5 CLOSE V-124, Vent Valve.
  - 5.2.17.6 OPEN V-120, Pressure Source Valve.
  - 5.2.17.7 ADJUST PRV-100, Gas Supply Regulating Valve, to obtain desired pressure as indicated on PG-100, Pressure Gage.

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5.2.17.8 Signal the test engineer that set point has been achieved and wait for TE to signal back that data has been acquired.

5.2.18 If testing is complete, proceed to Section 5.3 of these instructions. If not go to step 5.2.15.

### 5.3 SHUTDOWN

#### 5.3.1 PREREQUISITES

5.3.1.1 The need for the test system no longer exists (i.e., test cancellation, test completion or facility modification/repair).

#### 5.3.2 OPERATIONAL INSTRUCTIONS

##### **Facility Operator shall:**

5.3.2.1 OPEN V-124, Vent Valve, to relieve any vacuum/pressure on the system.

5.3.2.2 ADJUST the Test Article Pump Speed to approximately 1200 rpm as indicated on SI-100, Test Article Pump Speed.

5.3.2.3 CLOSE V-103, Test Article Throttle Valve.

5.3.2.4 SET the Test Article Pump Speed Pot to 0%.

5.3.2.5 STOP the Test Article Pump using hand switch HS-101 located on the control panel.

5.3.2.6 Deenergize the Test Article.

5.3.2.7 PERFORM one of the following:

5.3.2.7.1 If testing was concluded under sub-atmospheric conditions, proceed to step 5.3.2.8 of these instructions.

OR

5.3.2.7.2 If testing was concluded above atmospheric conditions,

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proceed to 5.3.2.9 of these instructions.

OR

5.3.2.7.3 If testing was concluded in sub or above atmospheric conditions and the loop has a requirement to be drained, proceed to step 5.3.2.10 of these instructions.

5.3.2.8 For sub-atmospheric shutdown, perform the following as necessary:

5.3.2.8.1 OPEN V-130, Test Article Vent Valve.

5.3.2.8.2 When water level in the tank is 80%, CLOSE V-130.

5.3.2.8.3 If loop tank will not fill to 80% per step 5.3.2.8.2, perform the following as necessary:

5.3.2.8.3.1 CLOSE V-130, Vent Valve.

5.3.2.8.3.2 OPEN V-122, Shutoff Valve.

5.3.2.8.3.3 Start VP-123, Vacuum Pump, using hand switch HS-103.

5.3.2.8.3.4 OPEN V-123, Vacuum Source Valve.

5.3.2.8.3.5 When loop tank is at 80%, CLOSE V-122, Shutoff Valve.

5.3.2.8.3.6 STOP VP-123, Vacuum Pump, using hand switch HS-103.

5.3.2.8.3.7 CLOSE V-123, Vacuum Source Valve.

5.3.2.9 For above atmospheric shutdown, perform the following as necessary:

5.3.2.9.1 CLOSE V-120, Pressure Source Valve.

5.3.2.9.2 CLOSE PRV-120, Gas Supply Regulating Valve.

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- 5.3.2.9.3 OPEN V-124, Vent Valve.
- 5.3.2.9.4 When loop is vented, CLOSE V-124, Vent Valve.
- 5.3.2.9.5 OPEN V-122, Shutoff Valve.
- 5.3.2.9.6 START VP-123, Vacuum Pump, using hand switchHS-103.
- 5.3.2.9.7 OPEN V-123, Vacuum Source Valve.
- 5.3.2.9.8 When the loop is at 80%, CLOSE V-122, Shutoff Valve.
- 5.3.2.9.9 STOP VP-123, Vacuum Pump, using handswitchHS-103.
- 5.3.2.9.10 Close V-123, Vacuum Source Valve.
- 5.3.2.9.11 Close V-107, Test Article Inlet Isolation Valve.
- 5.3.2.9.12 OPEN V-124, Vent Valve.
- 5.3.2.10 If the loop has to be drained, perform the following:
  - 5.3.2.10.1 OPEN V-124, Vent Valve.
  - 5.3.2.10.2 Remove bolts from inlet piping.
  - 5.3.2.10.3 Allow water to begin draining.
  - 5.3.2.10.4 Continue break down of facility.
  - 5.3.2.10.5 ALIGN valves in accordance with Table 2, Shutdown Valve Lineup.

#### 5.4 DEAREATION INSTRUCTIONS

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These instructions describe the steps to deaerate the water in the test facility using PMP-002, Slave Pump,

#### 5.4.1 PREREQUISITES

#### 5.4.2

#### **Facility Operator shall:**

5.4.1.1 Align valves in accordance with Table 2, Startup Valve Lineup.

5.4.1.2 Ensure Active throttle valve located on east wall near exit door has been turned on.

5.4.1.3 Verify Active throttle valve speed pot is set at 0%.

5.4.1.4 Ensure heater is deenergized.

### 5.5 OPERATIONAL INSTRUCTIONS

#### **Facility Operator shall:**

5.5.1 START the Active throttle valve using hand switch HS-101 located on Control Panel.

5.5.2 CLOSE the vent valve, V-124.

5.5.3 SET the Active throttle valve speed pot to achieve speed determined by test requestor.

5.5.4 OPEN V-122, Shutoff Valve.

5.5.5 START VP-103, Vacuum Pump, using HS-103.

5.5.6 OPEN V-123, Vacuum Source Valve.

5.5.7 As necessary, ADJUST V-124, Vent Valve, to maintain loop pressure greater than 4 psi on VG-100, Vacuum Gage.

#### **NOTE**

Consult Table 4 to check oxygen Content level.

5.5.8 Continue deaeration until directed to stop by

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the Test Engineer or water oxygen content has been met.

5.5.9 If deaeration is complete, proceed to Section 5.6 of these instructions.

## 5.6 SHUTDOWN

### 5.6.1 PREREQUISITES

The need for deaeration no longer exists.

### 5.6.2 OPERATIONAL INSTRUCTIONS

#### **Facility Operator shall:**

5.6.2.1 SET the Active throttle valve speed pot to 0%.

5.6.2.2 STOP the Active throttle valve by depressing red button HS-101 located on control panel.

5.6.2.3 STOP VP-103, Vacuum Pump, using HS-103.

5.6.2.4 CLOSE V-122, Vacuum Shutoff valve.

5.6.2.5 OPEN vent valve, V-124.

5.6.2.6 Ensure Active throttle valve breaker located on East wall near exit door has been turned off.

5.6.2.7 ALIGN valves in accordance with Table 3.

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**Table 1**

OPERATIONAL START-UP

VALVE LINEUP

VALVE NUMBER	VALVE NAME	POSITION REQUIRED
V-103	TEST ARTICLE THROTTLE VALVE	OPEN
V-104	BYPASS PUMP SUCTION VALVE	CLOSED/OPEN See note
V-105	BYPASS PUMP DISCHARGE VALVE	OPEN/CLOSED See note
V-106	BYPASS PUMP THROTTLE VALVE	CLOSED/OPEN See note
V-107	TEST ARTICLE INLET ISOLATION VALVE	OPEN
V-114	SYSTEM FILL/DRAIN ISO. VALVE	CLOSED
V-115	DISCHARGE LOOP/HEAT EXCHANGER INLET PIPE	OPEN
V-116	FILTER INLET ISOLATION VALVE	CLOSED
V-117	FILTER OUTLET ISOLATION VALVE	CLOSED
V-118	COOLING SYSTEM RETURN VALVE	OPEN
V-119	EXPANSION TANK / DEAERATION INLET VALVE	CLOSED
V-120	PRESSURE SOURCE VALVE	CLOSED
V-122	SHUTOFF VALVE	CLOSED
V-123	VACUUM SOURCE VALVE	CLOSED
V-124	VENT VALVE	CLOSED
V-125	HEAT EXCHANGER INLET ISOLATION VALVE	OPEN

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PRV-100	GAS SUPPLY REGULATING VALVE	CLOSED
V-131	LOOP COOLING WATER ISO. VALVE	OPEN
V-132	ITL TANK DRAIN LINE VALVE	CLOSED
V-133	ITL TANK LINE FILL VALVE (WEST)	CLOSED
V-134	PUMP/FACILITY ISOLATION VALVE	CLOSED
V-135	PTE TANK FILL LINE VALVE	CLOSED
V-140	HIGH POINT DRAIN VALVE	CLOSED
V-141	EXPANSION TANK OVERFLOW/VENT VALVE	CLOSED

\*NOTE: For valves V-104, V-105, V-106 two different valve positions are possible.

- Possible positions:
1. Standard motor operating
  2. By-pass motor use operation.

Position required:

In standard operation V-104 is CLOSED. In bypass motor operation V-104 is OPEN.

In standard operation V-105 is OPEN. In bypass motor operation V-105 is CLOSED.

In standard operation V-106 is CLOSED. In bypass motor operation V-106 is OPEN.

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**Table 2**

DEAERATION START-UP

VALVE LINEUP

VALVE NUMBER	VALVE NAME	POSITION REQUIRED
V-103	TEST ARTICLE THROTTLE VALVE	OPEN
V-104	BYPASS PUMP SUCTION VALVE	OPEN
V-105	BYPASS PUMP DISCHARGE VALVE	CLOSED
V-106	BYPASS PUMP THROTTLE VALVE	OPEN
V-107	TEST ARTICLE INLET ISOLATION VALVE	OPEN
V-114	SYSTEM FILL/DRAIN ISO. VALVE	CLOSED
V-115	DISCHARGE LOOP/HEAT EXCHANGER INLET PIPE	OPEN
V-116	FILTER INLET ISOLATION VALVE	CLOSED
V-117	FILTER OUTLET ISOLATION VALVE	CLOSED
V-118	COOLING SYSTEM RETURN VALVE	CLOSED
V-119	EXPANSION TANK/DEAERATION INLET VALVE	OPEN
V-120	PRESSURE SOURCE VALVE	CLOSED
V-122	SHUTOFF VALVE	CLOSED
V-123	VACUUM SOURCE VALVE	CLOSED
V-124	VENT VALVE	CLOSED
V-125	HEAT EXCHANGER INLET ISOLATION VALVE	OPEN

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PRV-100	GAS SUPPLY REGULATING VALVE	CLOSED
V-131	LOOP COOLING WATER ISO. VALVE	OPEN

V-132	ITL TANK DRAIN LINE VALVE	CLOSED
V-133	ITL TANK FILL LINE VALVE (WEST)	CLOSED
V-134	PUMP/FACILITY ISOLATION VALVE	CLOSED
V-135	PTE TANK FILL LINE VALVE	CLOSED
V-140	HIGH POINT DRAIN VALVE	CLOSED
V-141	EXPANSION TANK OVERFLOW/VENT VALVE	CLOSED

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**Table 3**

SHUTDOWN

VALVE LINEUP

VALVE NUMBER	VALVE NAME	POSITION REQUIRED
V-103	TEST ARTICLE THROTTLE VALVE	OPEN
V-104	BYPASS PUMP SUCTION VALVE	CLOSED
V-105	BYPASS PUMP DISCHARGE VALVE	OPEN
V-106	BYPASS PUMP THROTTLE VALVE	OPEN
V-107	TEST ARTICLE INLET ISOLATION VALVE	OPEN
V-114	SYSTEM FILL/DRAIN ISO. VALVE	CLOSED
V-115	DISCHARGE LOOP/HEAT EXCHANGER INLET PIPE	OPEN
V-116	FILTER INLET ISOLATION VALVE	CLOSED
V-117	FILTER OUTLET ISOLATION VALVE	CLOSED
V-118	COOLING SYSTEM RETURN VALVE	OPEN
V-119	EXPANSION TANK/DEAIRATION INLET VALVE	CLOSED
V-120	PRESSURE SOURCE VALVE	CLOSED
V-122	SHUTOFF VALVE	CLOSED
V-123	VACUUM SOURCE VALVE	CLOSED
V-124	VENT VALVE	OPEN
V-125	HEAT EXCHANGER INLET ISOLATION VALVE	OPEN

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PRV-100	GAS SUPPLY REGULATING VALVE	CLOSED
V-131	LOOP COOLING WATER ISO. VALVE	OPEN

V-132	ITL TANK DRAIN LINE VALVE	CLOSED
V-133	ITL TANK FILL LINE VALVE (WEST)	CLOSED
V-134	PUMP/FACILITY ISOLATION VALVE	CLOSED
V-135	PTE TANK FILL LINE VALVE	CLOSED
V-140	HIGH POINT DRAIN VALVE	CLOSED
V-141	EXPANSION TANK OVERFLOW/VENT VALVE	CLOSED

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**Table 4**

OXYGEN CONTENT METERING PROCEDURE

**Facility Operator shall:**

1.0	Use key switch to turn instrument on.* (One quarter turn clockwise from off position)
2.0	Establish water flow to the sensor by OPENING V-301, O2 Sensor Source Valve. OPEN V-302, O2 Sensor Isolation Valve. Flow rate should be 180 ml/min. May need to pressurize system to 20.0 psia.
3.0	Wait several minutes as the "old" water in the line is flushed out with the "new" water to be sampled.
4.0	Wait for temperature reading to stabilize.
5.0	Wait 10 seconds, then record dissolved oxygen level.
	(10 seconds is the sensors response time. A normal reading should be = 8ppm or less. If the level is unstable and /or unusually high, the sensor may need replacing. If so contact the ET12 ITL facility engineer.)
6.0	Turn sensor water flow OFF by CLOSING V-301, O2 Sensor Source Valve and V-302, O2 Sensor Isolation Valve.
7.0	Repeat steps 2-6 for additional measurements.

**\*Note:** Leaving the sensor on without water flow shortens the life of the sensor, but will not effect performance. As long as consecutive readings are required, leave the unit powered on for convenience, remembering to turn it off at the end of the day or test sequence.

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Table 5 Test Article Installation and Facility Build-up

**Facility Technician shall:**

**NOTE:** Steps 1 thru 12 apply if TA assembly consists of TA, housing, and bearing box. The assembly is attached to the engine stand using eye bolts, hoist and crane.

1	Transport the TA assembly to bldg. 4777, Bay C.
2	While TA assembly is still attached to engine stand, use engine stand handle to rotate TA inlet to face south.
3	Attach one set of tri-lifting straps to eye bolts on bearing boxes' west side.
4	Attach second set of tri-lifting straps to eye bolts on bearing boxes' top side.
5	Couple crane to tri-lifting straps located on west side of box.
6	Couple hoist to tri-lifting straps located on top side of box.
7	Using hoist to carry weight of TA assembly, remove hold down bolts from bearing box to engine stand and remove TA assembly from engine stand.
8	Put spacer blocks on shelf of engine stand.
9	Slowly using both the hoist and crane rotate box so that bottom of bearing box is facing floor.
10	Rotate TA assembly so that the inlet is facing south.
11	Rotate TA so that inlet is facing south and use the crane to translate TA assembly to test stand.
12	Place bearing box footprint so that the front face is flush to the gear box mounting plate face.
13	Secure bearing box in place using 4 bolts and washers.
14	Depending on operation may need to attach inlet support brace to TA inlet flange and test article platform.
15	Remove both of the tri-lifting straps from the bearing box.
16	Remove straps from hoist and crane.
17	Store straps in cabinet.
18	Move crane and hoist to stored position.
19	Attach exhaust spool to exit flange of TA's housing. Place a gasket between mating flanges.
20	Using 39" straight edge/ruler align 4" pulley to motor pulley.
21	Secure 4" pulley in place.
22	Torque the pulley sleeve bolts to 15 ft lbs.
23	Secure the speed target collar to the bearing box shaft. Verify collar has been keyed in place.
24	Torque the magnetic sensor bolts to 22 in lbs.
25	Attach the 6 belts to the pulleys.

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26	Verify the belts are tight. If not translate motor East.
27	Tighten the motor hold down bolts. Torque to 125 ft-lbs.

28	Secure the belt guard bottom half to platform stand using angle posts, bolts, and screws.
29	Connect the speed probe to belt guard. Distance from tip of speed probe to collar is ~ 1/8".
30	Secure the belt guard top half to bottom half of belt guard using nuts and screws.
31	Loosen PVC support stand bolts which secure facility straight inlet spool pieces. This will allow slight adjustment of PVC facility.
32	Secure inlet spool to TA inlet flange using all thread bolts. Place gasket between flanges.
33	Secure facility straight inlet spool pieces to TA inlet flange. Place gasket between flanges.
34	Tighten all thread bolts without cracking PVC.
35	Install the oil reservoir tubing to bearing box and volute.
36	Install instrumentation to facility and TA.
37	Go to Table 6 for guidelines for facility water fill.

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Table 6

Operational Instructions for Facility Water Fill

**Facility Operator shall:**

<u>1</u>	Ensure test article and instrumentation is in place in the facility.
<u>2</u>	Verify HOV-114, East system fill/drain isolation valve is OPEN.
<u>3</u>	OPEN V-116, Filter Inlet Isolation Valve.
<u>4</u>	OPEN V-117, Filter Out Isolation Valve.
<u>5</u>	CLOSE HOV-119, deaeration system return valve.
<u>6</u>	OPEN HOV-118, Facility inlet valve.
<u>7</u>	OPEN HOV-124, Vent valve.
<u>8</u>	OPEN Test Article Vent HOV.
<u>9</u>	OPEN HOV-140, Bypass Loop High Point.
<u>10</u>	OPEN HOV-104, Bypass Pump Suction Valve.
<u>11</u>	OPEN HOV-105, Bypass Pump Discharge Valve.
<u>12</u>	OPEN HOV-106, Bypass Pump Throttle Valve
<u>13</u>	OPEN HOV-107, Test Article Inlet Isolation Valve.
<u>14</u>	CLOSE Test Article Drain Valve
<u>15</u>	Verify HOV-131, loop cooling water isolation valve, is OPEN.
<u>16</u>	Verify HOV-132, ITL tank drain line CLOSED.
<u>17</u>	OPEN HOV-133, ITL tank fill line (west).
<u>18</u>	OPEN HOV-134, Pump/Facility isolation valve.
<u>19</u>	CLOSE HOV-135, PTE tank fill line.
<u>20</u>	Verify fire hose connected to ITL water fill line.
<u>21</u>	OPEN fire hose water valve on water truck.
<u>22</u>	Ensure sump pump is primed with water.
<u>23</u>	Raise lever to on electrical box above pump.
<u>24</u>	Hit START button.
<u>25</u>	CLOSE vent valve on test article and HOV-140 as they begin to spurt water.
<u>26</u>	Fill facility with water until water in sight glass is full (to the black magic marker line).
<u>27</u>	When facility is full hit stop button,
<u>28</u>	Lower lever on electrical box above pump.
<u>29</u>	CLOSE HOV-134 and HOV-133 and HOV-114.
<u>30</u>	CLOSE fire hose water valve.
<u>31</u>	CLOSE V-124, vent valve.
<u>32</u>	OPEN V-120, Pressure source valve.
<u>33</u>	Slowly increase PRV-100, Gas Supply Regulating Valve, until the tank water level decreases in sight tube.

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<u>34</u>	When water vents from model vent valve or vent valve on the facility piping, close the vents.
<u>35</u>	Shut pressure source valve, V-120.
<u>36</u>	Close PRV-100.
<u>37</u>	Close HOV-116 and HOV-117.
<u>38</u>	Open V-141. Verify V-140 is CLOSED.
<u>39</u>	Proceed to Table 7 if this is a first facility fill or TA change out.

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**Table 7**

Facility/Test Article Integrated Checkouts

**Facility Operator shall:**

1	Verify test article, and test article instrumentation is integrated into facility.
2	Fill test article and test loop with DI water.
3	Close vent valve, V-124, and vacuum valve, V-122.
4	Open pressure source valve, V-120 and adjust PRV to obtain 30 psi.
5	Close V-120.
6	Record pressure in record book every 2 minutes for 10 minutes.
	NOTE: Pressure should not decrease by more than 1 psi in 10 minutes
7	If pressure decreases more than above note states, check all interfaces and instrumentation connections for leaks.
8	Repeat steps 3 thru 7 until system does not decrease by more than 1 psi in 10 minutes.
9	Pull a vacuum on the system by opening V-123, vacuum source valve and V-122. Start vacuum pump using HS-103.
10	When vacuum at a pressure of 5 psi, close V-122 and turn off vacuum pump using HS-103.
11	Record pressure in record book every 2 minutes for 10 minutes.
	NOTE: Pressure should not increase by more than 3 psi in 10 minutes.
12	If pressure increases more than above note states, vent to atmosphere and check all interfaces and instrumentation connections for leaks.
13	Repeat steps 9 through 12 until system vacuum does not increase by more than 3 psi in 10 minutes.
14	Open V-124, vent valve to atmosphere.

**6.0 NOTES**

Refer to appropriate or specific operation instruction in section 5.

**7.0 SAFETY PRECAUTIONS AND WARNING NOTES**

7.1 ALL prerequisites shall be completed, if possible, prior to commencing a section of a procedure.

7.2 Any conflicts encountered during the performance of this procedure should be resolved prior to completion of the procedure and anomalies recorded in the run

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log.

- 7.3 Exercise caution in the vicinity of electrical equipment.
- 7.4 Exercise caution in the vicinity of rotating equipment and high temperature systems.
- 7.5 Emergency telephone numbers are as follows:

Ambulance	911
Medical Center	4-2390
Fire	911
Security	4-4357
Utilities	4-3919
Communication Repair	4-1771

- 7.6 This facility shall have a PPE designated station where personnel can find the following: safety glasses, flashlight, and ear plugs.
- 7.7 While testing is in process all participants shall always wear ear protection.
- 7.8 When performing duties (i.e. build-up, modifications, repairs, or break-down) at the facility safety shoes must be worn.

## 8.0 APPENDICES, DATA, REPORTS, AND FORMS

- 8.1 Reports: The listed reports are necessary for each test request. Details concerning the reports can be found in ET12-OWI-100.
  - Test Plan (or pre-test report)
  - Test Completion report
- 8.2 Test Preparation Sheets (TPS) are written to serve as a work authorization document, a detailed work instruction, a control mechanism for test constraints, and a mechanism for configuration control. Details concerning a TPS can be found in ET10-OWI-003, Test Preparation Sheet Instructions.

## 9.0 RECORDS

- 9.1 Run Logs: Run logs are kept to maintain historical information on the use of ET12 Facilities and to assist in the analysis of data after the tests have been completed.

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Each facility's operation Run Log shall be maintained and retained by the assigned Facility Engineer for a period of 10 (ten) years, or as specified in ET12-OWI-100. Contents of run logs are specified in ET12-OWI-100. Test anomalies shall be recorded in the operator's run log per ET12-OWI-100.

9.2 Memo of Training (See section 11) shall be kept according to MPR 3410.1.

## **10.0 TOOLS, EQUIPMENT, AND MATERIALS**

What ever is needed or required per the testing procedure. For each individual instruction see section 5.

## **11.0 PERSONNEL TRAINING AND CERTIFICATION**

To become certified as an operator each employee shall always develop a working knowledge of the facility. A minimum of five weeks of study with a mentor shall be required. During this period, the trainee learns the operation of the facility, the location of the valves in the facility, location of electrical panels, and location of the vacuum pumps. The operator shall always have actual operation experience, "time in", on the facility prior to certification (80 hrs). The trainee shall have demonstrated specified proficiency by passing an oral exam given by the mentor. The Group Leader of ET12 shall then certify thru a memo that the trainee is now an operator of the ITL facility. (see MPR 3410.1)

## **12.0 FLOW DIAGRAM**

NONE.