

Manual Section 7	Issue Date 11/14/07	Revision Date 01/01/24	Policy Number LLCP-084
	Hydrostatic Pressure Testing		

Purpose

Establish minimum guidelines for Hydro-Testing.

Scope

All LLC Companies including, Blanchard Industrial, LLC, GIS Engineering, LLC, Grand Isle Shipyard, Inc., and GWIS, Mack Steel, NuWave, Sun Industries, Valvemax, Discovery Industries, Inc.; hereafter identified as “Company”.

General

- An experienced or qualified person will be put in charge of hydro and should meet with the supervisor in charge of the job prior to test. However all personnel involved in system testing shall be trained and competent in their role including understanding the hazards involved, the control steps and the Personal Protective Equipment required.
- An effective means of communication (2-way radio, hand signals, etc.) and/or alarm system that allows any crew member to quickly alert others of system failures or emergencies shall be in place prior to performing testing. Emergency response equipment/personnel are on standby and available.
- Customer expectations should be clarified prior to beginning work.
- Hydro Test checklist shall be signed and followed by all.
- Area shall be barricaded and flagged off with signage.
- Use designated Hydro area when available.
- No non-essential personnel are to be allowed in the area. During simultaneous operations, non-essential personnel may be allowed in the test area if their work is not associated with the pressurized system and if it can be performed without presenting a hazard to themselves or others; and only with prior approval from the customer representative, company supervisor, and company management. It is, however, never acceptable for any personnel to be in the test area during the pressure-up phase. Pressure-up phase includes a minimum of a 5-minute period after pressure-up, which allows pressure to stabilize. However, 15 minutes or more may be required for deck skids or entire systems already in place. The key factor is that the pressure has stabilized and clearly shows no signs of increase.
- Pump and recorder shall be set up outside of the test area out from the line of fire.
- All personnel shall remain clear during pressure-up stages, including hydro crew.
- All equipment and connections (i.e., pumps, hoses, bleed-off valves, valves flange, gauges, and fittings) shall meet Pressure rating and should be inspected prior to each use.
- All areas shall have bleed-off points prior to pressure-up. All high points should have valves to bleed air.
- Proper PPE shall be used when chemicals are in the system.
- Never stand near, tamper with and/or tighten any bolts, fittings, hoses or piping while under pressure or during pressure-up stages. (Thaxton Pressure test plugs may require tightening while under pressure, but can only be done so when a safety gag is utilized and once the test crew has reviewed and signed the related MINIMUM REQUIREMENT.
- Inspection for leaks shall be performed after pressure-up and only by designated personnel.
- Ensure entire system has been bled down upon completion.
- Once tests have been completed and the area is verified safe, barriers and signage can be removed.

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**ATTACHMENT A
HYDRO TEST INFORMATION AND SAFETY CHECKLIST**

Test No. _____ Customer _____

Date _____ Location _____

Job No. _____ Line No./Iso No. _____ (See Attachment "D")

Person in Charge _____

PERSON IN CHARGE SHALL INITIAL ALL ITEMS BELOW, INDICATING THAT THEY HAVE BEEN REVIEWED WITH THE ENTIRE CREW.

_____ An experienced or qualified person shall remain in charge throughout hydro test operations.

_____ Customer expectations clarified prior to beginning work.

_____ Use designated hydro area when available.

_____ Area Flagged/No non-essential Personnel allowed in area. During simultaneous operations, non-essential personnel may be allowed in the test area if their work is not associated with the pressurized system and if it can be performed without presenting hazard to themselves or others; and only with prior approval from the customer representative, company supervisor, and company management. It is, however, never acceptable for any personnel to be in the test area during the pressure-up phase. The pressure-up phase includes a minimum of a 5-minute period after pressure-up, which allows pressure to stabilize. However, 15 minutes or more may be required for decks, skids or entire systems already in place. The key factor is that the pressure has stabilized and clearly shows no signs of increase.

_____ Skillet sizes shall be in accordance with the skillet chart provided in the Hydro-Test MINIMUM REQUIREMENT.

_____ All connections inspected. All equipment (i.e., pumps, hoses, bleed-off valves, gauges, fittings) shall meet and/or exceed pressure rating and has been inspected.

_____ All required personal protective equipment in use (i.e., chemical gloves, goggles, apron, face shield, etc.) when chemicals are used and/or as required (i.e., safety glasses, hard hats, safety shoes).

_____ All areas have operable bleed-off points prior to pressure-up.

_____ Pump and Recorder set up outside of test area, out of the line of fire.

_____ All personnel remain out of the test area during pressure-up stage, including Hydro Crew.

_____ Inspection for leaks shall be performed only after pressure-up stages and only by designated personnel.

_____ Never tamper with or tighten any bolts, fittings, hoses or piping while under pressure or during pressure-up stages.

_____ Entire Hydro Crew has reviewed and discussed all items above and signifies by signing below.

_____ Thaxton Test Plug Minimum Requirement thoroughly reviewed and complied with. (When utilized)

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**ATTACHMENT B
PRESSURE TEST DATA**

HYDRO TEST LINE AND SPOOL LISTING

Test No. _____ Sheet No. _____ of _____

_____ **Visual Test Only (No Recorders or Dead Wt. Used)**

Temperature Recorder Serial No. _____

Gauge Serial No. _____ PSI. Range _____

PSI. Recorder Serial No. _____ PSI. Range _____

Dead Wt. Serial No. _____ PSI. Range _____

NOTE: A copy of the calibration certificate of each of the above shall be attached to this document.

Test Pressure _____ PSI.

Test Range Min. _____ PSI.

Max. _____ PSI.

Start Pressure: Date _____ Time _____ A.M. _____ P.M. _____

End Pressure: Date _____ Time _____ A.M. _____ P.M. _____

Weather Conditions: _____ Ambient Temperature: _____

Comments: _____

Customer Rep. _____

Date: _____

COMPANY Rep. _____

Date: _____

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HYDRO TESTING WITH THE THAXTON PRESSURE TEST PLUG

- A complete review of the Hydro Test Minimum Requirement shall be performed.
- Only Thaxton Pressure Test Plugs shall be utilized. These plugs are to be utilized in designated hydro test areas only and shall be used on sections of pipe prior to mounting. Such plugs shall not be used on Hydro test of decks or large hydro test projects, since employees are required in the test area on a more frequent basis. Shall only be used under controlled circumstances approved by management and safety.
- Thaxton Pressure Test Plugs shall not be used without approved safety gags designed to prevent accidental discharge of the plug. **SAFETY GAGS SHALL BE UTILIZED AT ALL TIMES.**
- The pipe end and the plug shall be cleared of burrs, sharp edges, dirt, sand, rust, scale, etc. that may damage the seal cup or interfere with the proper operation of the stopper.
- The seal cup and o-rings shall be kept lubricated with an o-ring sealant at all times.
- Install stopper. Holding stopper at a slight angle, place edge of seal cup on lip of pipe and insert plug evenly.
- Insert stopper insuring that grips are flush with pipe end.
- Tighten hex nut until grips are firmly seated.
- Install safety gag. Loosen clamp nuts and slide unit over end of pipe.
- Place ring over end of stopper insuring that it rests against the stopper. Insure that the ring is not allowed to remain in contact with the valve or hose.
- Slide clamp back until the chain is slightly tight. Always leave room to tighten stopper hex nut.
- Tighten clamp nuts insuring that the safety gag is secured and will not move.
- Connect desired valves to hoses insuring plug remains secure. Inspect all valve plugs and hoses for damage and insure each exceeds the pressure rating required for the test intended.
- Fill piping with water allowing all air to be vented before pressurizing.
- Close vent line, inspect all lines, gags, plugs, and hoses insuring they are in good condition, appropriately tightened and secured, and facing in directions in which they would least likely injure personnel should they accidentally discharge.
- **Never stand in front of any test plug, hose, valve, etc. during any phase of the test.**
- Area shall be flagged to prevent unintended access and all personnel shall be removed from test area, during the pressure up phase including the test crew. Test pump shall be set up outside the test area.
- Begin testing by slowly increasing pressure.
- The hex nut shall be tightened in stages in between pressure up phases as needed due to leaks and or to prevent leakage.
 - Accessing hex nuts for tightening shall only be performed by designated individuals with the test supervisor's approval and knowledge.
 - At no time during the test shall any one step in the line of fire. Never stand in front of the plug or hose.
 - Only the stopper can be tightened under pressure. At no time under any circumstance shall other fittings or hoses be tightened under pressure.

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- Only utilize hand pressure to tighten hex nut. Never strike nut or wrench to tighten or utilize cheatas.

Removal

- Shut off the pressure source.
- Slowly open valve to release stored pressure. Rapid release of pressure could cause plug to accidentally discharge.
- Completely drain the pipe assembly.
- Loosen hex nut two or three turns.
- Using a rubber mallet, tap the mandrel forward and the hex nut on both sides. This will break the seal and release any friction.
- Slide stopper out of pipe.

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150# RATING / 428# MAX TEST PRESSURE				
PIPE SIZE	SKILLET THICK.	SKILLET DIAM.	GASKET	
			OD	ID
1/2"	1/4"	1-3/8"	1-1/4"	3/4"
3/4"	1/4"	1-11/16"	1-9/16"	1"
1"	1/4"	2"	1-7/8"	1-1/4"
1-1/2"	1/4"	2-7/8"	2-3/4"	2-1/8"
2"	1/4"	3-5/8"	3-3/8"	2-3/4"
3"	1/4"	5"	4-3/4"	4"
4"	3/8"	6-3/16"	5-7/8"	5"
6"	1/2"	8-1/2"	8-1/4"	7-3/16"
8"	1/2"	10-5/8"	10-3/8"	9-3/16"
10"	5/8"	12-3/4"	12-1/2"	11-5/16"
12"	3/4"	15"	14-3/4"	13-3/8"
14"	7/8"	16-1/4"	16"	14-5/8"
16"	1"	18-1/2"	18-1/4"	16-5/8"
18"	1"	21"	20-3/4"	18-11/16"
20"	1-1/8"	23"	22-3/4"	20-11/16"
24"	1-3/8"	27-1/4"	27"	24-3/4"
600# RATING/2220# MAX TEST PRESSURE				
PIPE SIZE	SKILLET THICK.	SKILLET DIAM.	GASKET	
			OD	ID
1/2"	1/4"	1-3/8"	1-1/4"	3/4"
3/4"	1/4"	1-11/16"	1-9/16"	1"
1"	1/4"	2"	1-7/8"	1-1/4"
1-1/2"	3/8"	2-7/8"	2-3/4"	2-1/8"
2"	3/8"	3-5/8"	3-3/8"	2-3/4"
3"	1/2"	5"	4-3/4"	4"
4"	5/8"	6-3/16"	5-7/8"	4-3/4"
6"	7/8"	8-1/2"	8-1/4"	6-7/8"
8"	1-1/8"	10-5/8"	10-3/8"	8-7/8"
10"	1-3/8"	12-3/4"	12-1/2"	10-13/16"
12"	1-5/8"	15"	14-3/4"	12-7/8"
14"	1-7/8"	16-1/4"	16"	14-1/4"
16"	2-1/8"	18-1/2"	18-1/4"	16-1/4"
18"	2-3/8"	21"	20-3/4"	18-1/2"
20"	2-5/8"	23"	22-3/4"	20-1/2"
24"	3-1/8"	27-1/4"	27"	24-3/4"

300# RATING / 1110# MAX TEST PRESSURE				
PIPE SIZE	SKILLET THICK.	SKILLET DIAM.	GASKET	
			OD	ID
1/2"	1/4"	1-3/8"	1-1/4"	3/4"
3/4"	1/4"	1-11/16"	1-9/16"	1"
1"	1/4"	2"	1-7/8"	1-1/4"
1-1/2"	1/4"	2-7/8"	2-3/4"	2-1/8"
2"	1/4"	3-5/8"	3-3/8"	2-3/4"
3"	3/8"	5"	4-3/4"	4"
4"	1/2"	6-3/16"	5-7/8"	5"
6"	3/4"	8-1/2"	8-1/4"	7-3/16"
8"	7/8"	10-5/8"	10-3/8"	9-3/16"
10"	1"	12-3/4"	12-1/2"	11-5/16"
12"	1-1/4"	15"	14-3/4"	13-3/8"
14"	1-3/8"	16-1/4"	16"	14-5/8"
16"	1-1/2"	18-1/2"	18-1/4"	16-5/8"
18"	1-3/4"	21"	20-3/4"	18-11/16"
20"	2"	23"	22-3/4"	20-11/16"
24"	2-1/4"	27-1/4"	27"	24-3/4"
900# RATING/3330# MAX TEST PRESSURE				
PIPE SIZE	SKILLET THICK.	SKILLET DIAM.	GASKET	
			OD	ID
1/2"	1/4"	1-3/8"	1-1/4"	3/4"
3/4"	1/4"	1-11/16"	1-9/16"	1"
1"	1/4"	2"	1-7/8"	1-1/4"
1-1/2"	3/8"	2-7/8"	2-3/4"	1-7/8"
2"	3/8"	3-5/8"	3-3/8"	2-5/16"
3"	5/8"	5"	4-3/4"	3-3/4"
4"	3/4"	6-3/16"	5-7/8"	4-3/4"
6"	1-1/8"	8-1/2"	8-1/4"	6-7/8"
8"	1-3/8"	10-5/8"	10-1/8"	8-3/4"
10"	1-3/4"	12-3/4"	12-1/4"	10-7/8"
12"	2"	15"	14-1/2"	12-3/4"
14"	2-1/4"	16-1/4"	15-3/4"	14"
16"	2-1/2"	18-1/2"	18"	16-1/4"
18"	2-7/8"	21"	20-1/2"	18-1/4"
20"	3-1/4"	23"	22-1/2"	20-1/2"
24"	3-3/4"	27-1/4"	26-3/4"	24-3/4"

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SKILLET TABLE

1500# RATING/5558# MAX TEST PRESSURE				
PIPE SIZE	SKILLE T THICK.	SKILLE T DIAM.	GASKET	
			OD	ID
1/2"	1/4"	1-3/8"	1-1/4"	3/4"
3/4"	1/4"	1-11/16"	1-9/16"	1"
1"	1/4"	2"	1-7/8"	1-1/4"
1-1/2"	3/8"	2-7/8"	2-3/4"	1-7/8"
2"	1/2"	3-5/8"	3-3/8"	2-5/16"
3"	3/4"	5"	4-3/4"	3-5/8"
4"	1"	6-3/16"	5-7/8"	4-5/8"
6"	1-3/8"	8-1/2"	8-1/4"	6-3/4"
8"	1-3/4"	10-5/8"	10-1/8"	8-1/2"
10"	2-1/8"	12-3/4"	12-1/4"	10-1/2"
12"	2-5/8"	15"	14-1/2"	12-3/4"
14"	2-7/8"	16-1/4"	15-3/4"	14-1/4"
16"	3-1/4"	18-1/2"	18"	16"
18"	3-5/8"	21"	20-1/2"	18-1/4"
20"	4-1/8"	23"	22-1/2"	20-1/4"
24"	4-7/8"	27-1/4"	26-3/4"	24-1/4"

2500# RATING/9255# MAX TEST PRESSURE				
PIPE SIZE	SKILLE T THICK.	SKILLE T DIAM.	GASKET	
			OD	ID
1/2"	1/4"	1-3/8"	1-1/4"	3/4"
3/4"	3/8"	1-11/16"	1-9/16"	1"
1"	3/8"	2"	1-7/8"	1-1/4"
1-1/2"	1/2"	2-7/8"	2-3/4"	1-7/8"
2"	5/8"	3-5/8"	3-3/8"	2-5/16"
3"	1"	5"	4-3/4"	3-5/8"
4"	1-1/4"	6-3/16"	5-7/8"	4-5/8"
6"	1-3/4"	8-1/2"	8-1/4"	6-3/4"
8"	2-1/4"	10-5/8"	10-1/8"	8-1/2"
10"	2-3/4"	12-3/4"	12-1/4"	10-5/8"
12"	3-1/4"	15"	14-1/2"	12-1/2"
14"				
16"				
18"				
20"				
24"				

NOTES:

1. Gasket dimensions are based on Flexitallic gaskets.
2. All skillets are based upon A-36 plate.
3. Skillets not listed above requires verification by engineering company or designee.
4. Hydro test pressure is based on 100 degrees F. Higher temperatures reduce test pressure.
5. Ensure that hydrotest does not exceed flange test pressure