IOSR Journal of Engineering (IOSR JEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719,
|| Special Issue || June-2019, || PP 63-66 ||

Special Purpose Machine for Pressure testing of hydraulic valve

Prof.M.C.Patil[1], Rajkumar.M.Suryawanshi[2], Akshay.D.Morale[3], Gaurav.I. Sapriya[4], Ganesh.S.Dhanorkar[5]

[1](*Asst.Prof., department of mechanical engineering, JSPM narhe technical campus pune, India)*
[2,3,4,5](*U G students, department of mechanical engineering, JSPM narhe technical campus pune, India)*

Abstract: *Technical standards define operational limits for hydraulic parameters such as velocity or pressure. On this way, pressure control is a fundamental component for safe operation at water supply systems, mainly to reduce leakage, risk of disruptions and maintenance costs.*

All valves are inspected and tested by the manufacturer to ensure that they conform to the required valve leakage standards. In addition, optional testing can be requested by the purchaser, and regular testing is critical for ongoing valve maintenance and safety. In many cases it is recommended that valves are tested at an interval of no longer than 12 months. However, the specific interval may vary based on the valve condition, the service condition, and the desired level of performance.

Valve leakage is tested using either a hydrostatic test (i.e., the test medium is a liquid, such as water or kerosene) or a pneumatic test (the test medium is a gas, such as air or nitrogen). Zero leakage is rarely if ever possible, so the standards define the maximum allowable leakage (MAL) for valves under the specified testing conditions.

For both hydrostatic and pneumatic tests, the MAL is usually defined by valve size—a small amount of leakage through a valve with a small effective orifice poses much more risk than would the same amount of leakage through a valve with a large effective orifice. MAL may also be a function of the valve class and pressure category.

Valve leakage test results can vary based on the technique of the tester, so it's essential to have your valves tested by trained, highly qualified technicians.

Keywords: *pressure gauge , PLC Cabinet , high pressure pump, high flow pump, hydraulic gate valve*

I. Introduction

1.Problem statement

The requirement of Adams Company Pvt. Ltd. To check hydraulic pressure test of valve which is going to manufacture in company. The requirement of pressure is between 20bar to 240bar.

A hydrostatic test is a way in which pressure vessels such as hydraulic valves, pipelines, plumbing, gas cylinders, boilers and fuel tanks can be tested for strength and leaks. The test involves filling the vessel or pipe system with a liquid, usually water, for visual leak detection, and pressurization of the vessel to the specified test pressure. Pressure tightness can be tested by shutting off the supply valve and observing whether there is a pressure loss. The location of a leak can be visually identified more easily if the water contains a colorant. Strength is usually tested by measuring permanent deformation of the container. Hydrostatic testing is the most common method employed for testing pipes and pressure vessels. Using this test helps maintain safety standards and durability of a vessel over time. Newly manufactured pieces are initially qualified using the hydrostatic test. They are then re-qualified at regular intervals using the proof pressure test which is also called the modified hydrostatic test. Testing of pressure vessels for transport and storage of gases is very important because such containers can explode if they fail under pressure.

2. Objectives

The purpose of these procedures is to ensure that pressure tests are conducted safely and effectively. They cover pressure testing of new and existing pressure systems or components at a test pressure less 300 bar. They apply to mechanics, supervisors, inspectors, custodians, and subcontractors responsible for pressure tests.

3. Types of valve leakage tests

The tests that must be conducted depend on the type of valve and, therefore, the valve elements. Below are some of the most commonly performed tests of valve leakage.

- Valve seat leakage tests are required for pressure relief valves.
- Backseat tests are required for valves with a backseat element, including gate and globe valves.
- Closure tests are required to test the closure mechanism of several types of valves, including gate, globe, plug, check, and ball valves.

- Shell leakage tests are required for valves that are used in "full open" and "full closed" service, such as check, stop, and isolation valves.

4. Scope

i) If more time more effort would have been put into the model, the more complexity could have been brought out.

ii) Moreover inserted of manual operation on syringes could have been replaced by pre-defined computer program or nearly by pressing switch operated.

iii) Furthermore varieties and more flexibility to add or replace any part according to the requirement to the can be done to improve its use and increase field of uses and to make it more universal or flexible.

II. Principle of Operation:

Methodology

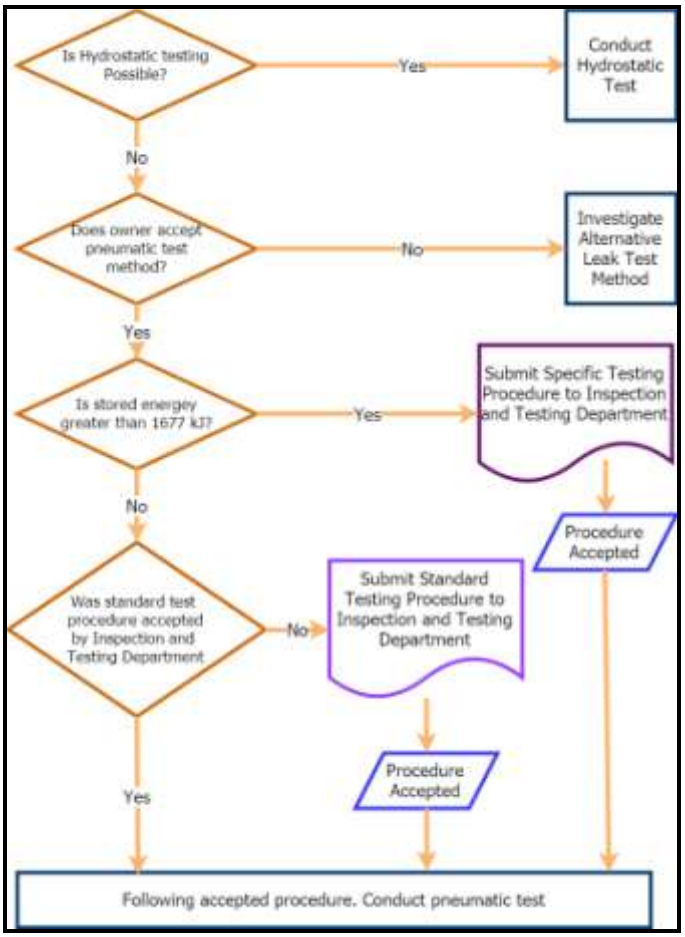
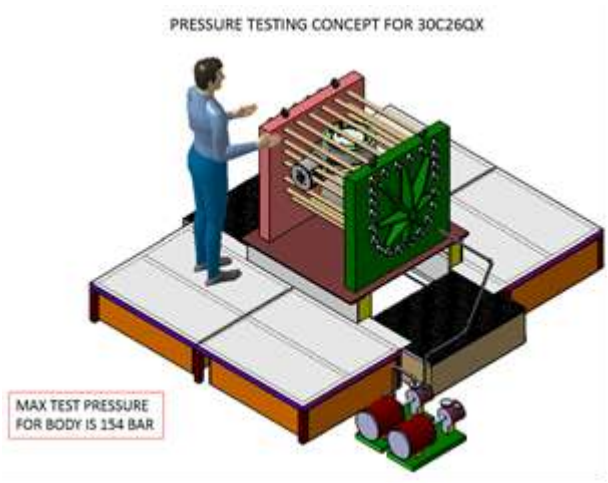


Figure no.1 methodology



Specification of machine

Sr. No.	Item	Sr. No.	Item
01	Bare Pump	**12**	High Pressure Hose
02	Electric Motor	**13**	Low Pressure Suction Hose
03	Skid (Base Frame / Trolley / Trailer)	**14**	Booster Pump
04	Coupling / Belt Pulley	**15**	Suction Stabilizer
05	Coupling Guard / Belt Guard	**16**	Ball Valve (Low Pressure)
06	Strainer (Suction Filter)	**17**	Over Head Water Tank
07	Non Return Valve	**18A**	Starter / Control Panel
08	Pressure Regulating Valve	**18B**	Auto Pressure Controller
09	Safety Valve / Rupture Dis	**19**	PLC / SCADA System
10	Pressure Gauge – Glycerine Filled		Pressure Transducer
11	High Pressure Ball Valve		

Hydrostatic testing procedures:

A. Each valve shall be tested on both sides at its rated pressure. During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall any part of the valve be permanently deformed.

B. The testing medium shall be water. Under no circumstances is a gas to be used as the Test medium.

C. The test duration on each side of the valve is 15 minutes. The test equipment will be disconnecting during this time.

D. Valves require careful handling when turning them over. The district representative shall stop the testing activity if the manner used by the tester to handle the valves is unsafe or will result in damage to the valve. The flange faces are especially susceptible to damage if the valve is not properly handled.

E. Valves exhibiting no visible leakage, no decrease in the initial test pressure or no deformation shall be considered passed.

F. Valves exhibiting visible leakage, a decrease in the initial test pressure, or deformation shall be considered rejected. Valves which fail the hydrostatic test shall be repaired or replaced at the district's discretion.

G. Only personnel authorized by the valve manufacturer shall repair valves when repairs are permitted by the District Engineer. Unless the valve manufacturer has provided authorization, supplier or contractor personnel shall not perform repairs

III. Conclusion

At the end of this project the concluded remark is, the apparatus HYDROTESTING MACHINE is very useful for industrial purpose for hydro testing application The main outputs and conclusions remarks are as below;-

1. Hydro testing machine operates successfully and It meets the all parameters of test rig as per ISO/ IS / API standards for valve / centrifugal pump/ pipeline.
2. Hydrostatic test is safer as compared to Pneumatic Test, It is observed that Water or liquid used for pressure test are not compressible compared to air or gases. Energy stored is very less. Small leak will reduce gauge pressure immediately which does not happen when Air is the test medium. It has less potential energy hence damages are mostly limited to nearby area. There is a possibility that you can take remedial action once minor leakages are noticed before total failure occurs. Leakages are easy to detect in case of hydrostatic test.
3. Test time required minimized and standard procedure adopted for testing.
4. Chances of equipment failures are less.

5. Test media can be reused and transferred to other place after testing.
6. Skilled and semi-skilled personnel can carry out test.

References

[1]. Gudrun Mikota, BernhardManhartsgruber, HelmutKogler, FranzHammerle. Modal testing of hydraulic pipeline systems Institute of Machine Design and Hydraulic Drives, Johannes Kepler University Linz, Altenbergerstrasse 69, A-4040 Linz, Austria.

[2]. Gustavo Meirelles Lima*, Edevar Luvizotto Junior, Bruno Melo Brentan Selection of Pumps as Turbines Substituting Pressure Reducing Valves University of Campinas, Albert Einstein Avenue, 951, Campinas/SP, Brazil.

[3]. S.V. Golovin⋆, A.N. Baykin: Influence of pore pressure on the development of a hydraulic fracture in poroelastic medium Lavrentyev Institute of Hydrodynamics, pr. Lavrentyeva 15, Novosibirsk 630090, and Russia.

[4]. Jesse Hampton, Marte Gutierrez*, Luis Matzar, Dandan Hu, and Luke Frash: Acoustic emission characterization of microcracking in laboratory-scale hydraulic fracturing tests. Department of Civil & Environmental Engineering, Colorado School of Mines, Golden, CO 80401, USA.