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RESEARCH ARTICLE

DESIGN & ANALYSIS OF THE PRESSURE VESSEL MANHOLE NOZZLE METALLIC FLANGEGUARD AS PER ASME SEC VIII DIV. 1, EDITION 2010

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ABSTRACT

The main area of focus is to design by analyze which is a powerful software technology for simulating physical behavior on the computer, because design by analysis can minimize or even eliminate the need for physical prototyping and testing. Manhole is used in pressure vessels, tanks etc for the frequent interaction between personnel inside the pressure vessel. In most industries maintenance work of the pressure vessels, tanks & piping elements is carried during the shut-off conditions of the plant; since during the service periods it is being not possible to do inspection, cleaning & regular maintenance operations. Standard size Manhole is used (24"NB /500NB), and Flange carries almost 20 numbers of holes & Stud-bolt & nuts assemblies. The bolted joint is often regarded as the weak link in the plant's pressure envelope. Whether a pipe flanges, heat exchanger, reactor manway, or valve bonnet, the joint integrity relies not only on the mechanical design of the flange and its components, but also on precautions taken while maintenance, and assembly. After the maintenance work is done if the bolting at the joint may loosely tightened, or due to frequent opening the gasket in the joint may get weak. All in all during these sorts, failures may lead to disasters or explosions in case of Storage fluid is flammable in nature. Safety Spray Shields are designed to prevent and reduce catastrophic damage and injury to workers, property, and equipment by temporarily containing hazardous leaks and sprays. If in case leakage occurs across the Manhole flange; there was no personal protection nor was recovery of fluid can be taken into an account. They are used to prevent injury to personnel or damage to equipment in the event of a leak or spray-out of acids, caustics, chlorine, and other dangerous liquids at piping connections (such as flanges, valves, or expansion joints) found in chemical, pulp/paper, petrochemical and wastewater treatment plants. These Safety Shields are commonly referred to as flange guards, flange covers, flange diapers, or flange protectors. Our Safety Spray Shields are constructed from PTFE, polypropylene, PVC, polyethylene, and stainless steel. In this report the focus is to design a Metallic Flangeguard which will not only protect the personal but also will help us in recovery of the leaked Fluid without any contamination.

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INTRODUCTION

In this report the Main focus is on the Flangeguard designing & analyzing for a Pressure vessel which is handling Ethylene oxide. The various parameters are taken into a consideration as per ASME SEC VIII DIV. 1, EDITION 2010 guidelines. Ethylene oxide, properly called oxirane by IUPAC (International Union of Pure and Applied Chemistry), is the organic compound with the formula C₂H₄O.

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It is cyclic ether also colorless flammable gas at room temperature. The Design pressure & temperature for the Pressure Vessel is 7.2 Kg/cm² & 55°C. All the pressure vessels for use with compressed air and those subject to internal corrosion or having parts subject to erosion or mechanical abrasion, shall be provided with the suitable manhole, handhole or other inspection openings for examination and cleaning. These openings are opened & closed so many times during the inspection period & always needs to riveted again for the process to start. Sometimes during the testing also it is being observed that if the Flange joints are not properly sealed then the test fluid comes out & shows the point of leak.

Flanges, the most common trouble area, need to be sealed properly to prevent leakage and must also be cathodically isolated to prevent stray currents which cause undo corrosion and eventual breakdown of the metal. Advance Products & Systems manufactures and maintains a supply of quality products and materials which help solve most flange sealing problems, therefore preventing subsequent corrosion and saving the integrity of the pipeline.



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