

SIPHON WATER LEAKAGE
AND
RECOMMENDATIONS FOR WATER PROOF
IN CONTAINER

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1. PURPOSE

The purpose of this paper is to verify the reason of water leakage in confined space such as container where installing the important products not allowed any water leakage from rain water during outside storage. Sometimes, we may be able to fail in water proof without any practice reason. And moreover, this problems happen at site even though it was verified with hydro test in an ambient condition. We may call this phenomenon as siphon water leakage.

2. ABOUT WATER SIPHON

The water siphon may not occur in an ambient condition as mentioned in previous reason because this is related to pressure difference between interior and exterior of container. And this also may occurs in a case of that water channel should be formed in a gasket sealing surface. On the contrary, if no water channel or pressure different in container. Water siphon will not be take placed regardless of any storage condition. So, from now on, let me explain this situation regarding how to happen during site storage.

For more derails regarding this phenomenon, Full vacuum condition inside of vessel or sealed container will be the same as standard ambient pressure ($1\text{atm}=1.0331\text{Kg/cm}^2=760\text{mmHg}=10336\text{mmHq}$). This ambient pressure is constant value because gravity acceleration of air also constant in a value of 980.665cm/s^2 regardless of ambient temperature. However, The contained air density inside of container is easily changed according to inside temperature. This is the reason why pressure difference happen between inside and outside of container.

3. WATER SIPHON CONDITION

Basically, container may be designed without vacuum pressure in this kind of storage of valuable products because inside there is nothing temperature difference due to fluid phase change. However, when we storage this container in a yard such as construction site And at the time of rain during high temperature, Before rain ,the air density of Inside of container is less than outside because of high temperature. Consequently, The pressure of Inside container is high than outside. However, at the time of rain, this status will be completely changed contrary, The pressure of inside container is less than outside. This

causes water siphon in the event of sufficient of water channel between inside and outside.

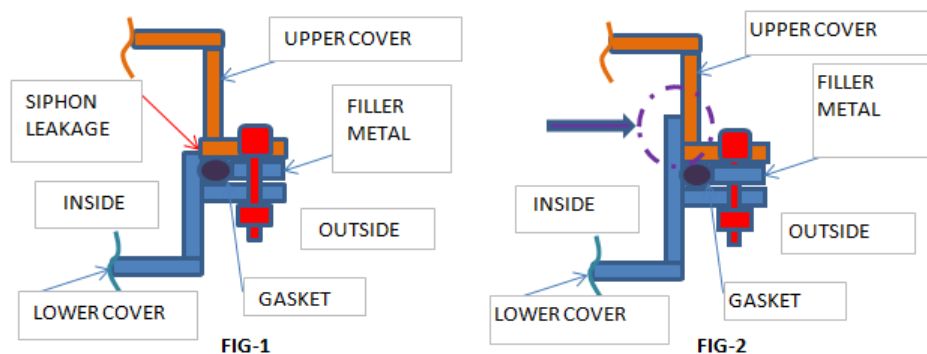
4. HOW TO CAUSE WATER SIPHON

Usually, gasket sealing design is sufficient for prevent water leakage during site storage because, engineer provide vacuum breaker in order to avoid this kind of leakage failure. The problems is that this vacuum breaker is not enough for water siphon but this is provided for only prevention of inside vacuum. And the most important thing is that inside vacuum happens in a short time. However, if there is water channel between inside and outside, The pressure difference may be lasting for a long time. And This make siphon(FIG-1) until pressure equivalent between two side. And water channel may be only one place because suction area may not be allowed in a gasket sealing status.

5. HOW TO PREVENT WATER SIPHON

Basically, the method of prevention of water siphon is the way to eliminate water channel rather than design of removing vacuum because this kind of vacuum occurs in a short time and also, potential energy is much greater than we supposed to do.

Therefore, engineer have to consider that how to avoid water channel and this is more easy. One of the way is to protrude inside wall over the gasket sealing surface(FIG-2) and provide drain water channel at down side to avoid water contamination on gasket area.



6. CONCLUDE

I believe that this kind of siphon problems will not be happen during fabrication shop because there is no pressure difference between

inside and outside during leakage test, And adhesion force also will not be greater in a new one status of manufacturing prior to surface contamination. However, after long storage in site condition, adhesion force will be increased gradually and Also, Temperature difference is high condition. This siphon water leakage may be able to happen through siphon channel between upper and lower cover.

--THE END--