

# enerPLUS

ERF: TSX & NYSE

Lockdown Hatches

9/12/17



# Problem

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- A hatch has to perform 3 main functions. Pressure and vacuum as well as sealing.
- Typical hatches that have been used will vent at a set point of ~60% of max set.
  - This set point issue is independent of vendor and is more a function of how the hatches are designed but issues are also amplified with how the hatch is made.
- This means that a 16 oz. tank only holds ~10 oz. of pressure.
- New “enhanced seal” hatches promise to hold up to 90%, giving 14.4 oz., but we have still seen venting prior to this 90% mark on these “enhanced seal” versions due to what we believe are issues in manufacturing tolerances.
- We were having to increase our vent system sizing on the assumption that we would vent to atmosphere earlier.
- There were also issues with ongoing operations and leaking pressure out of the vacuum due to alignment issues in the hatch.



# Solution

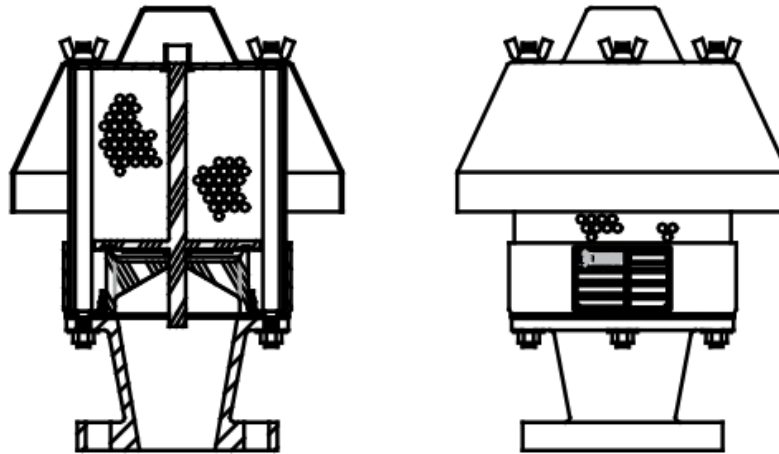
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- Stop asking one piece of your control system to perform 3 tasks.
  - Pressure Venting: Now done by a vent in line (Enardo 951)
  - Vacuum: Now done by a vent in line (Enardo 952)
  - Seal: Now done with a lockdown hatch (Enardo 1000)
- Due to the way that these valves work (pressure load set vs. spring set) we believe that we will have much better control over our vent system.
- We looked at utilizing an all in one PVRV on the vent system, but opted to spread out the duty on the header in order to allow the system to better regulate itself prior to needing a pressure or vacuum correction.
- We also increased the pressure rating of our tanks to be able to account for the loss of useable nameplate rating.

# Pressure

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- Pressure Venting: Now done by a vent in line (Enardo 951)

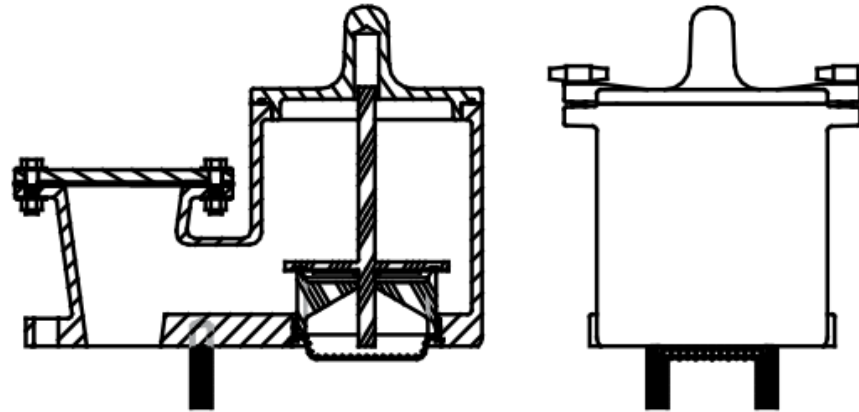


**MODEL 951**

# Vacuum

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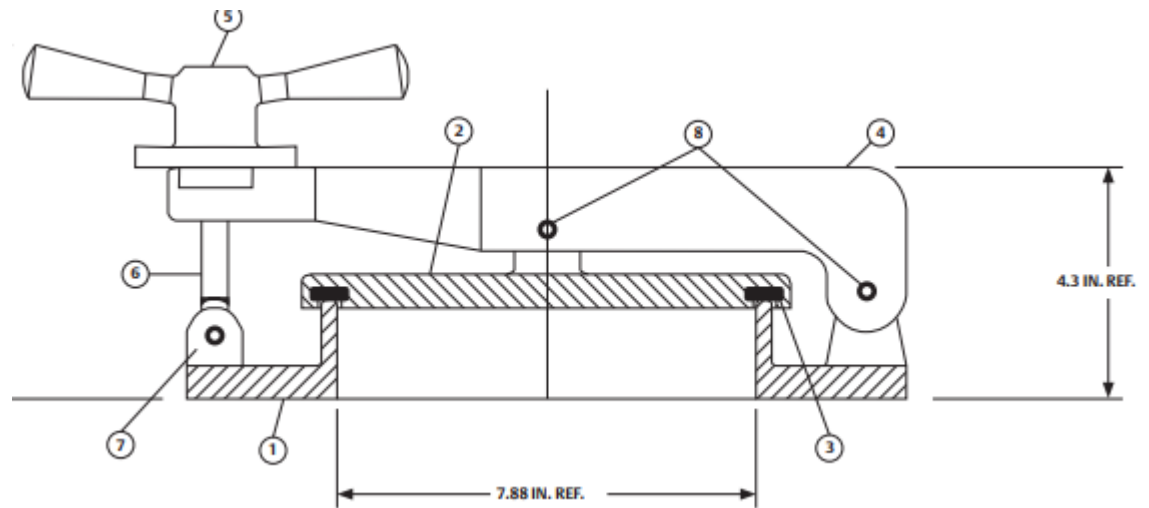
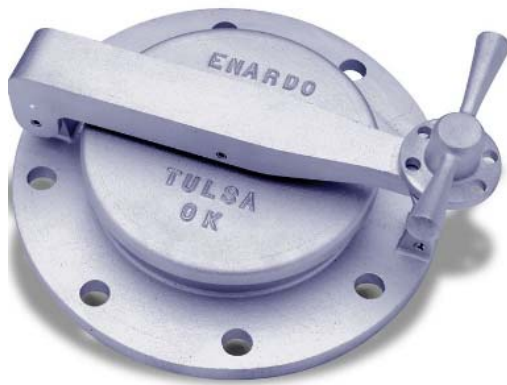
- Vacuum: Now done by a vent in line (Enardo 952)



**MODEL 952**

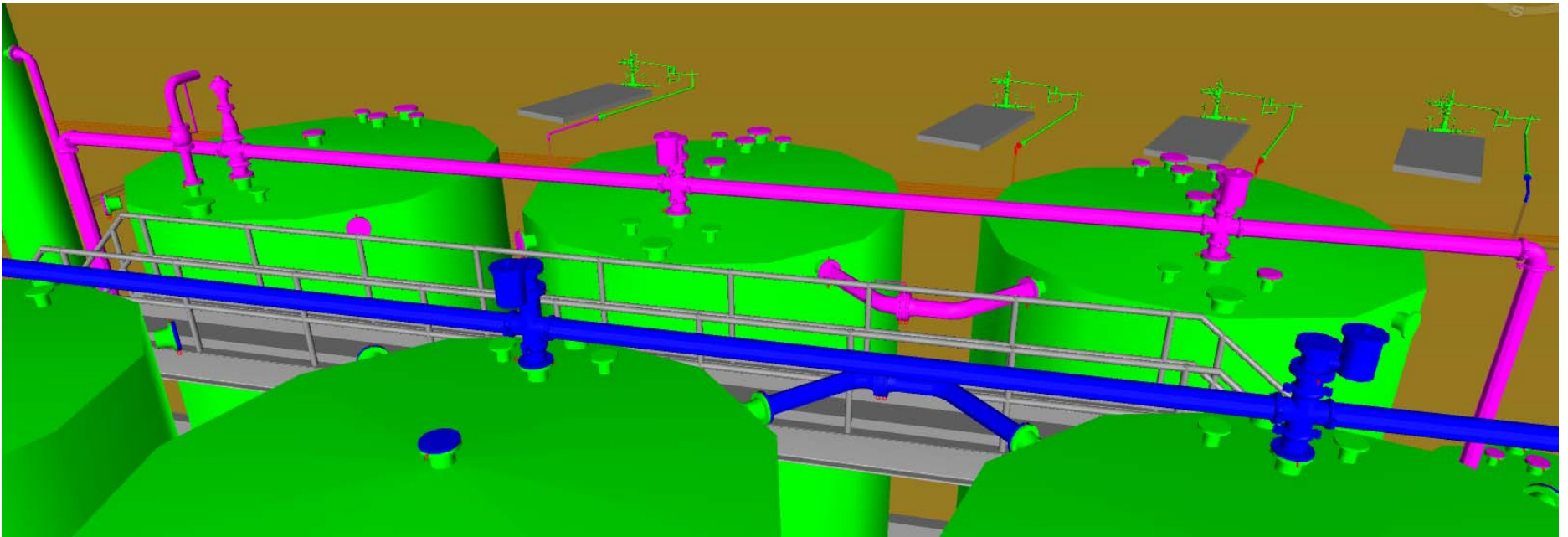
# Seal

- Seal: Now done with a lockdown hatch (Enardo 1000)



# Model

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# Installed Picture (VRV and Lockdown)

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# Battery

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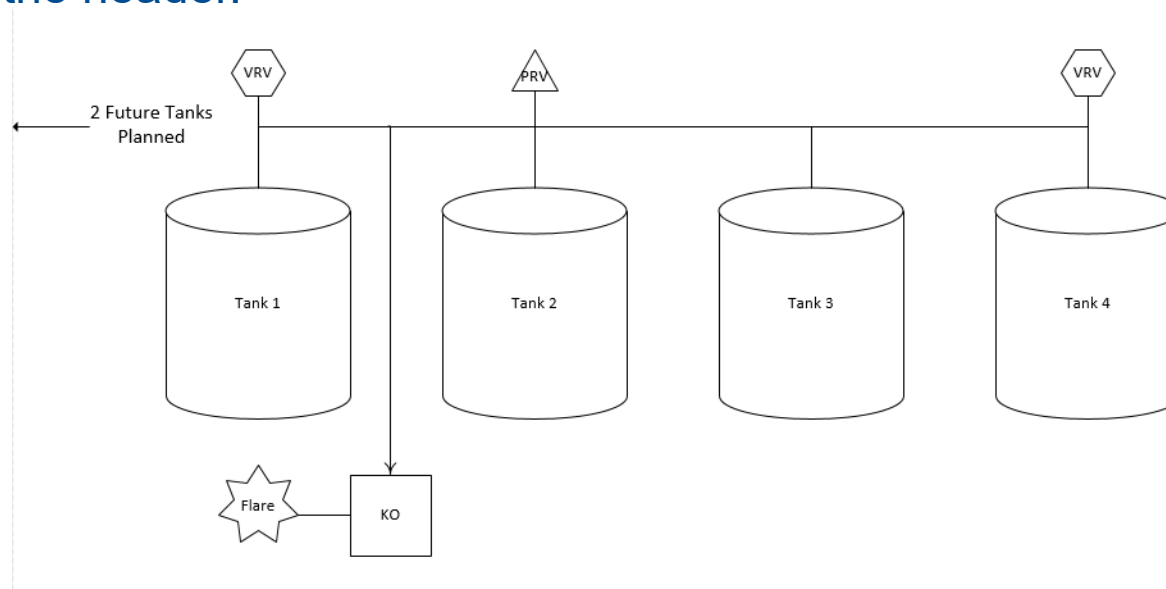
# Issues and Lessons Learned

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- Spring loaded hatches have been the norm for so long that when unfamiliar haulers offload they have no idea what our lockdown is for.
- A common issue is that truck drivers will “wrench” on the wing screw because they are unsure of how tight to set the hatches and this is breaking pin bolts.
- Hatches only need to be hand tightened until you can no longer hear the audible “hissing” sound.
- We will need to work to make haulers and operators more familiar with the equipment and how to (and not to) use it.
- We are also working on creating a new operating procedure to share with trucking companies as well as making signage explaining the new hatches.

# Issues and Lessons Learned

- With how our header is designed in one application, we found that we were actually venting out of the vacuum valve on the left (near the future tanks).
- This stopped once flare volumes decreased and we believe it was because of high velocities causing the VRV to flutter.
- Placing the line to the KO in a different place may have helped avoid this as we have not seen this on configurations with the flare line coming out of the end of the header.



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Questions?

