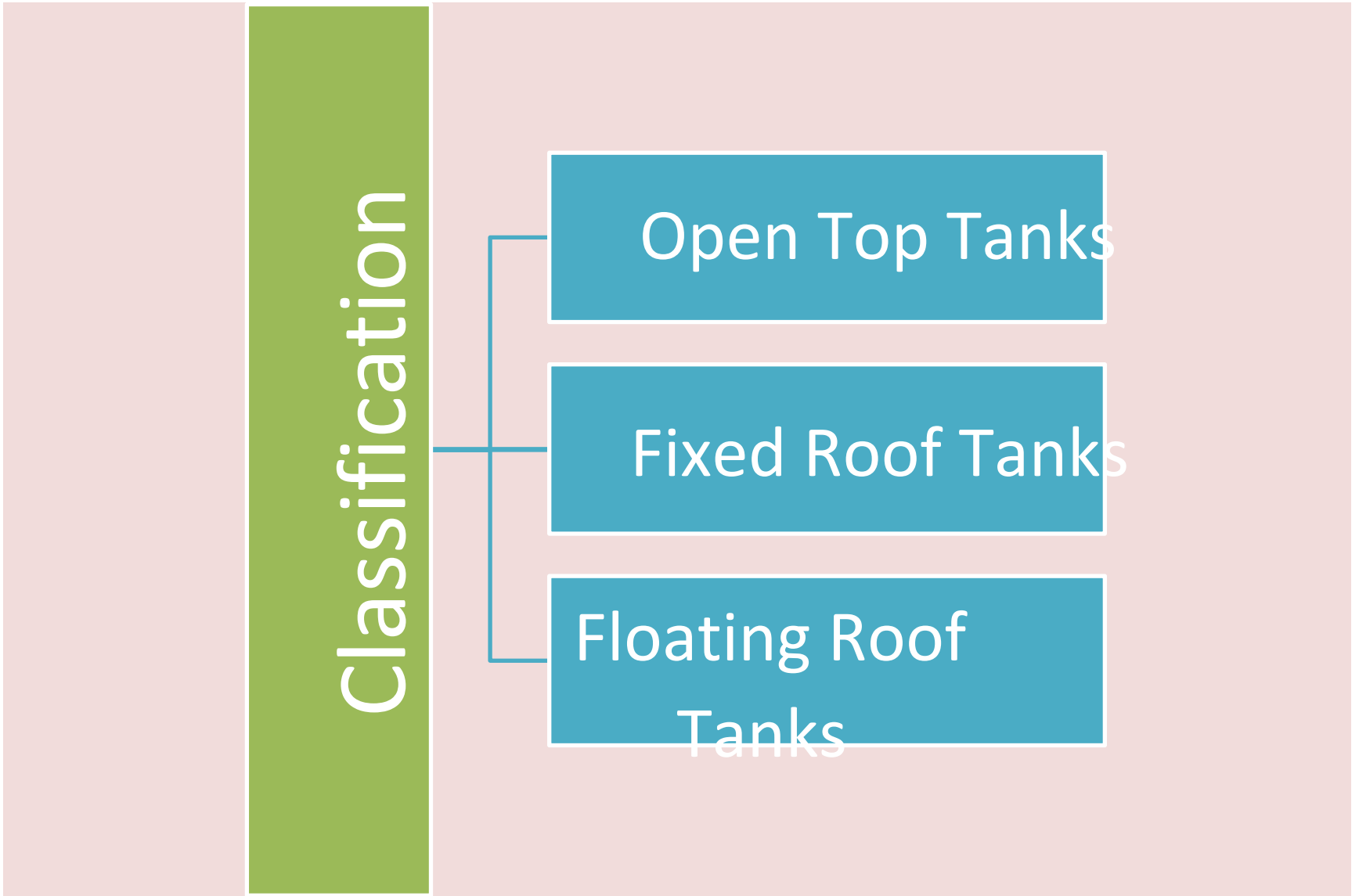
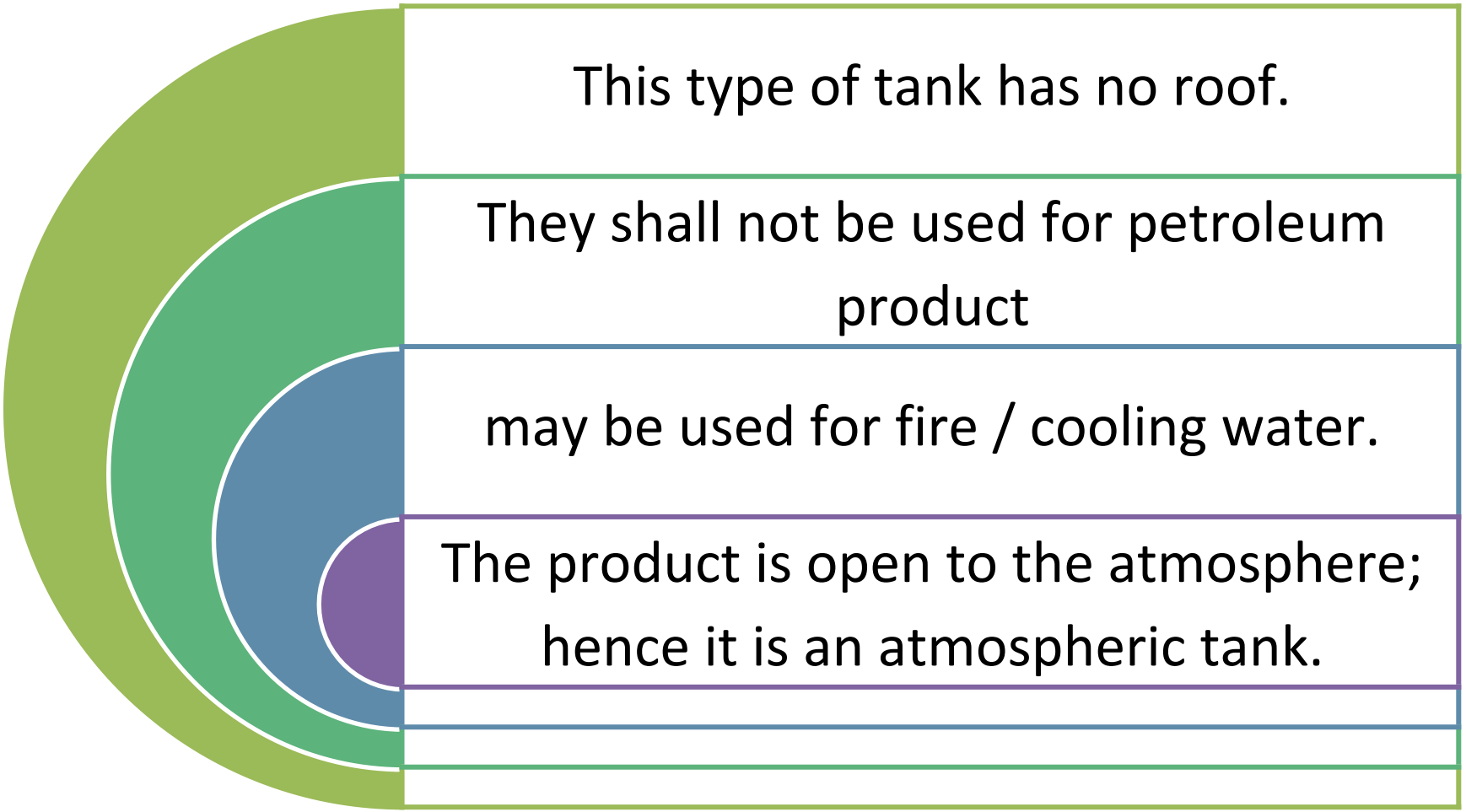
Storage Tanks Types In Petroleum Refineries

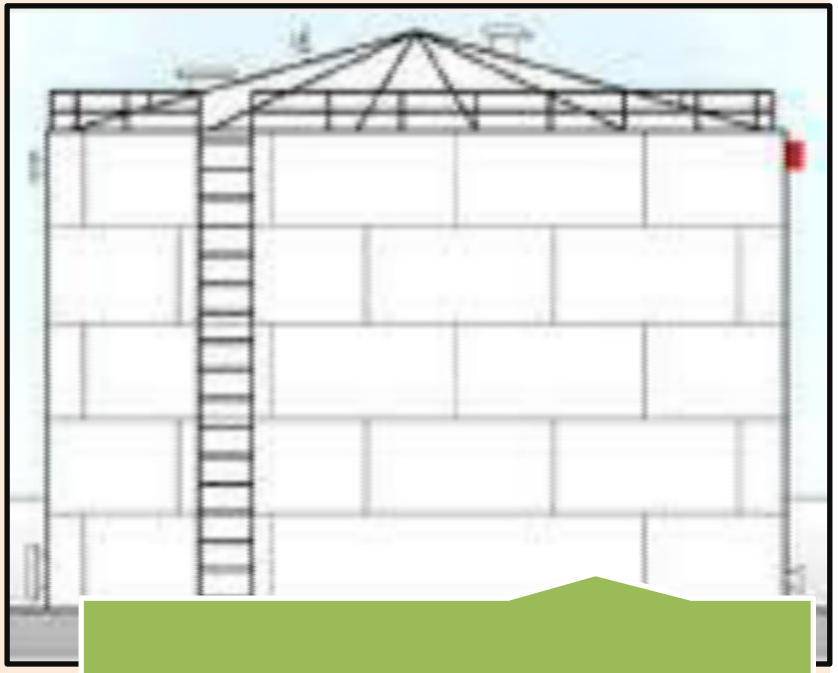

Classification
Open Top Tanks
Fixed Roof Tanks
Floating Roof Tanks

Open Top Tanks



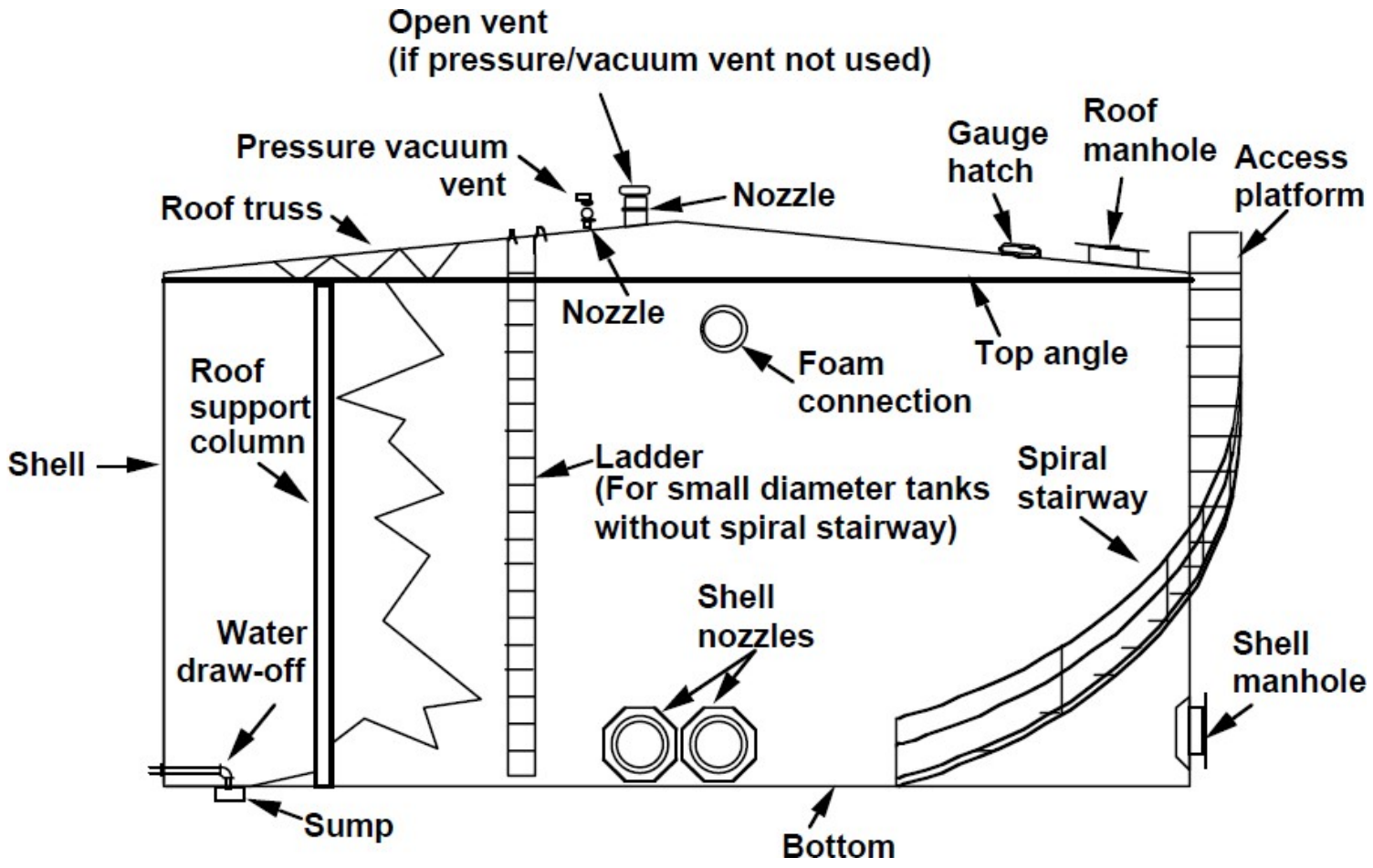
Fixed Roof

Dome

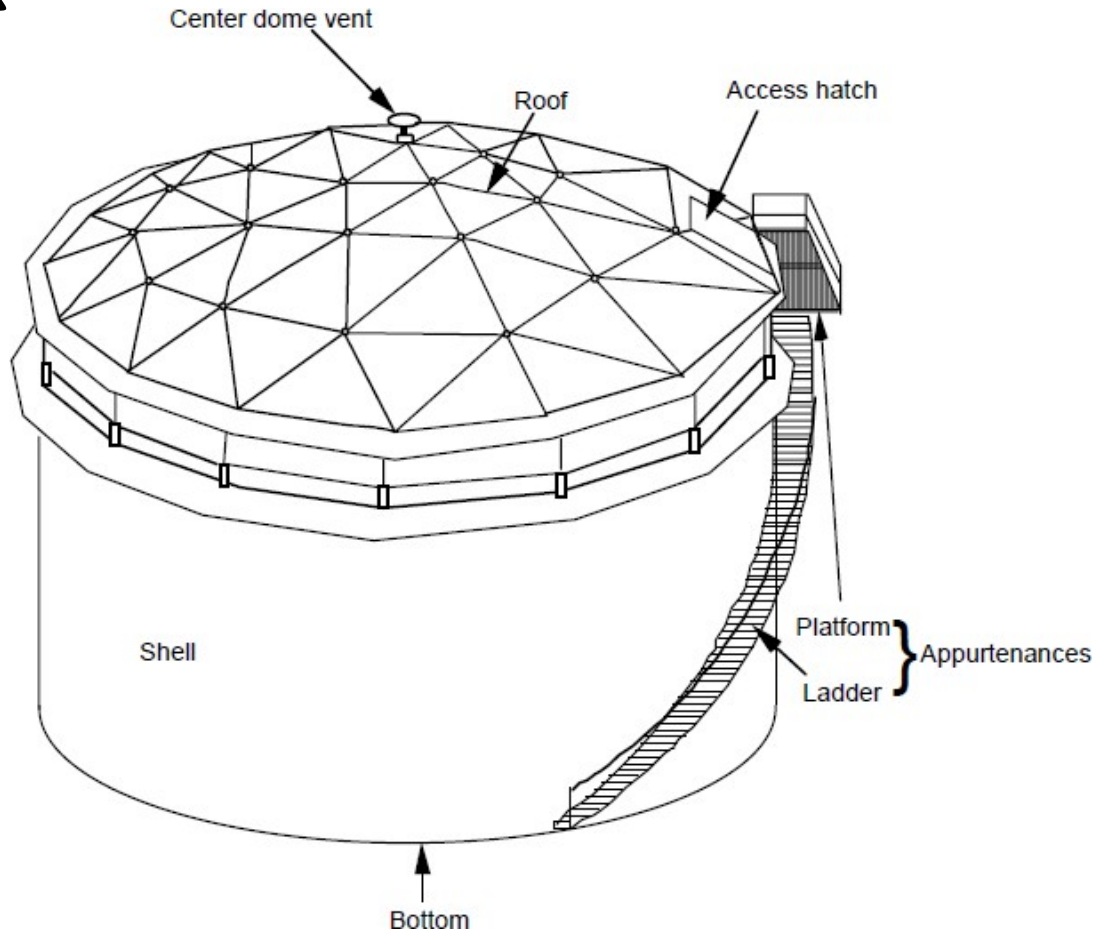


cone

Supported cone



Self-Supporting Fixed Roof Tank



The roof of a self-supporting, fixed roof tank is supported completely from the shell without supplementary structural members.

The roof may be either conical or dome.

A dome-shaped roof can support itself at a larger diameter than a cone-shaped roof.

Self-supporting, fixed roof tanks are practical only where relatively small fixed roof tanks are required.

It has same characteristics and usages as the supported cone roof tank

Floating Roof Tanks

External Floating roof

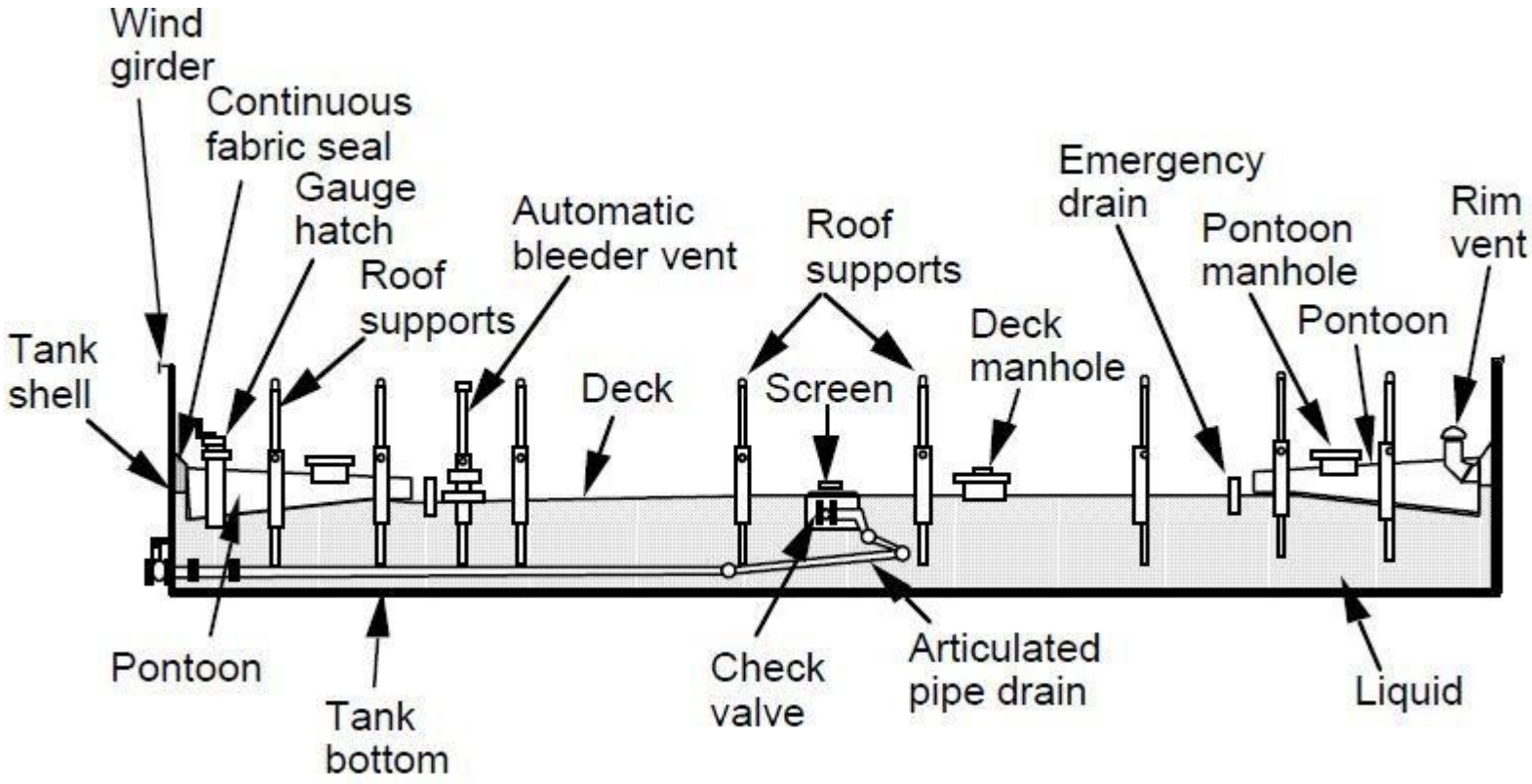
usage

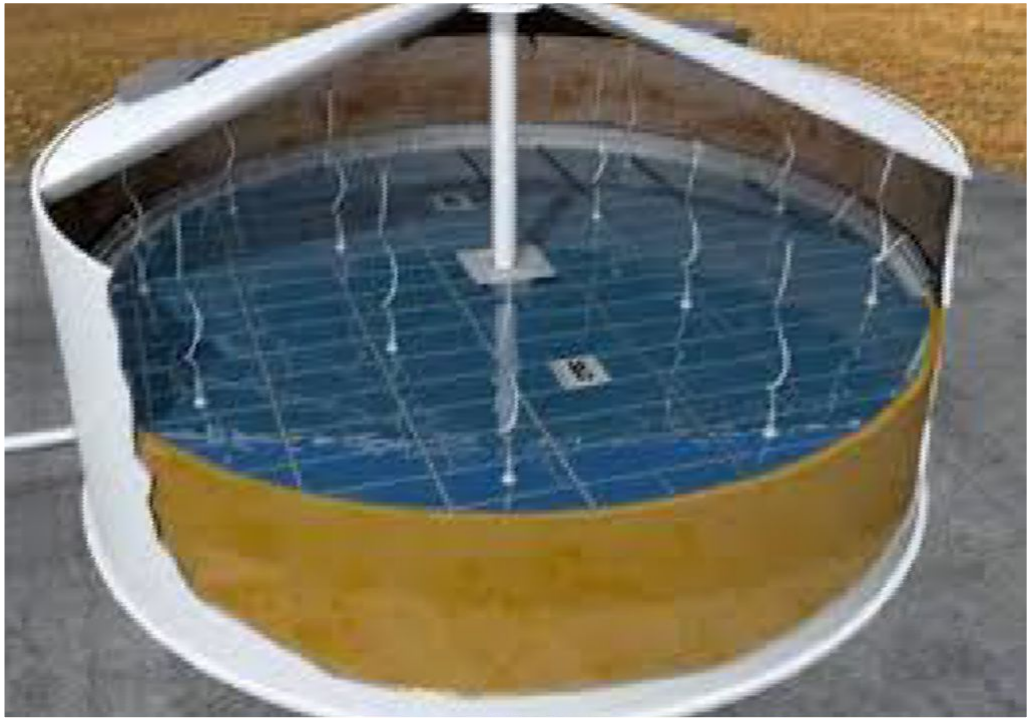
floating roof tanks must be used to store petroleum products with flash points below 54°C (130°F) or if the flash point is less .than 8°C (15°F) higher than the storage temperature

.Examples of these products are gasoline and naphtha

floating roof tanks should not to be used to store products .that tend to boil under atmospheric conditions

Single deck floating





Internal floating roof

where the roof floats on the product in a fixed roof tank.

Fixed Roof with Internal Floating Roof

This type of tank is used when the service of an existing fixed roof tank is changed and a floating roof tank should be used for the new service. The tank is prepared for the new service by adding the internal floating roof inside the existing tank.

This type of tank also may be required when a floating roof tank needs a fixed roof for environmental protection or product quality. In this case, a fixed roof is often added to an existing floating roof tank.

A fixed roof with internal floating roof tank has the same usage as a floating roof tank.

Why floating roof

floats directly on the

there is no vapour space and thus eliminating any possibility of flammable .atmosphere

It reduces evaporation losses and hence

reduction in air

Support leg

Support leg is the supporting element for the floating roof when the tank is empty where the roof fall to its lowest position.

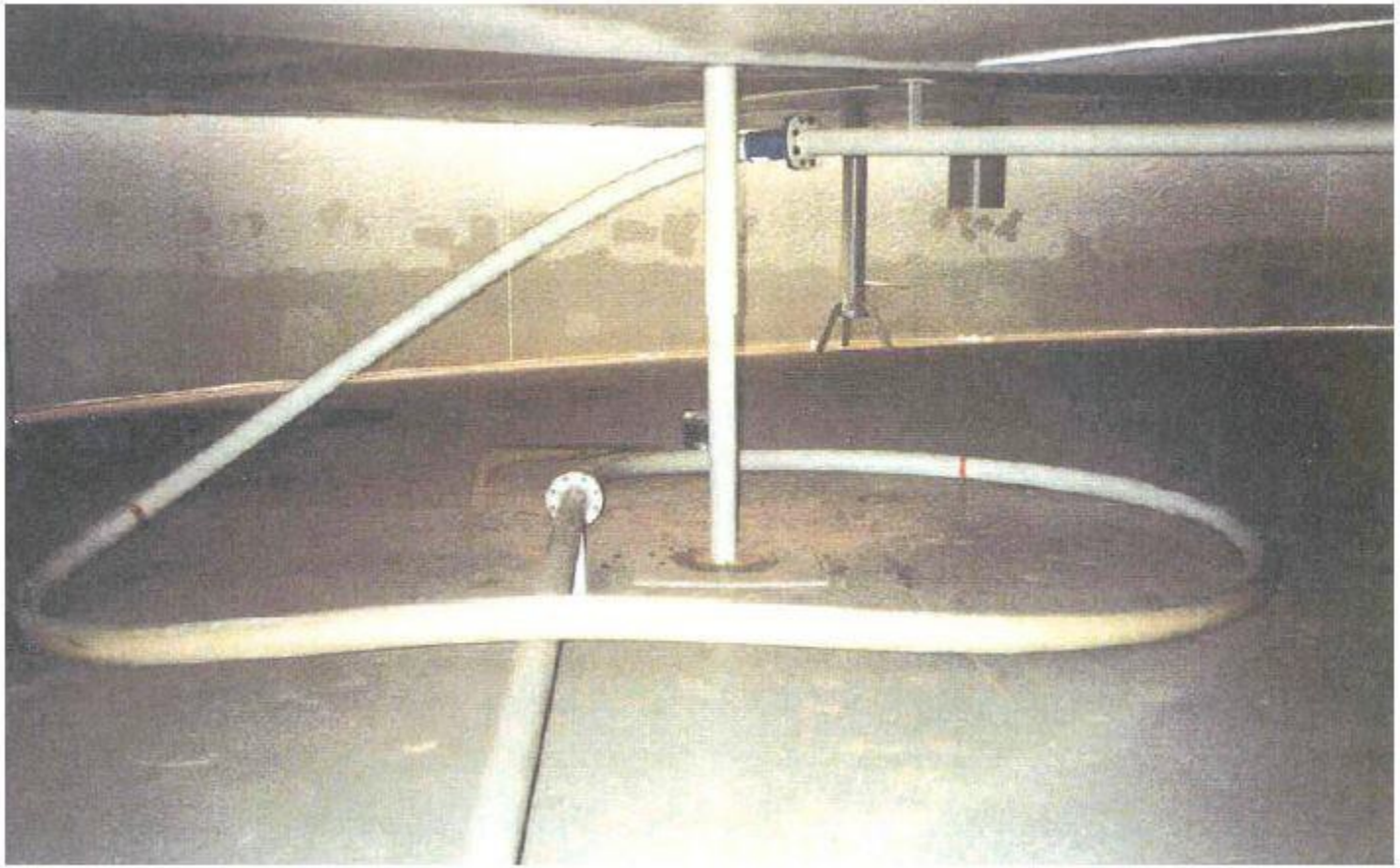
The roof needed to be supported at a certain height above the floor

not only that the roof will not foul with any internal accessories that installed at the lowest shell such as heating coil, mixing propeller, it also provide access room for maintenance personnel.

Roof Drain

the roof drains shall be sized and positioned to accommodate the rainfall rate while preventing the roof from accumulate a water level greater then design, without allowing the roof to tilt excessively or interfere with its operation.

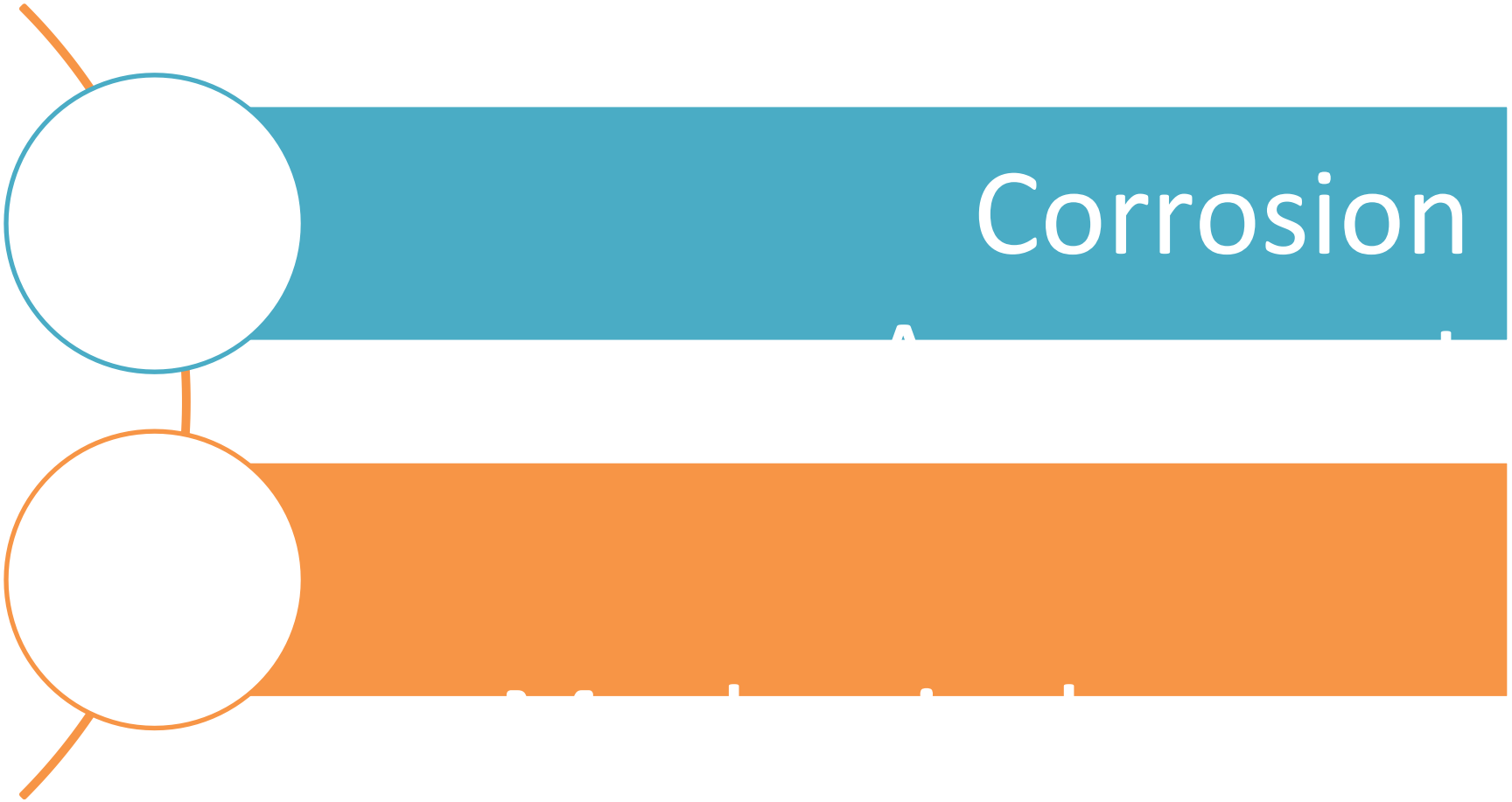
Roof Drain



Fire Fighting

- Fire on the floating roof tanks are common and it usually happened in the rim space where the vapour escaped, this was called as the floating roof rim fires. The main cause of rim fires is lighting. Most lighting ignited rim fires result from induced charges on the roof and not direct strikes. Fire fighting system is to be designed and installed on the floating roof to fight over and extinguishes the rim fire.

Material



CO_2 Corrosion

Carbon dioxide dissolves in water and dissociates to form weak carbonic acid which causes corrosion on carbon steels . Higher temperatures and . pressure increase the corrosion rate

Corrosion resistant alloys (CRA) are used to avoid corrosion at high CO2 contents, but it would be more economical to use carbon steel with a corrosion allowance and/or chemical inhibitor .treatment

The presence of CO2 infers that carbon steel will have finite life due to the wall thinning, a corrosion .allowance is practical to accommodate up to 6mm

Mercury

Mercury (Hg) is a trace component of all fossil fuels. It is therefore present in liquid hydrocarbon and natural gas deposits.

may transfer into air, water and soil.

Materials unsuitable for hydrocarbon streams in presence of mercury which will result in crack are:

- Aluminum and Aluminum Alloys
- Titanium and Titanium Alloys
- Copper and Copper Alloys
- Zinc and Zinc Alloys

Foundation

In the early phases of tank foundation engineering, several types of information should be considered and evaluated:

- Site conditions like pore water pressures and dewatering quantities.
- Condition and settlement of similar equipment in nearby areas.

Soil

Although many tanks have been built without the soils reports, .the advantages of having these reports available are substantial

Foundation design usually begins with specifications provided in the soils report. The soils report addresses subsurface conditions, .soil bearing capacity, and potential settlement

These are determined from soil borings, load tests and laboratory .testing

In addition, one of the most important bits of information available to the tank foundation designer is the experience with similar .structures available from a soils engineer familiar with the area

Important Elements to Consider in Foundation Design

The final elevation of the tank bottom is important because the tank shell may sit in moist conditions

This results in accelerated corrosion or pitting and a reduced tank bottom life.

Tanks should be designed to be at least 8 to 12 in above the surrounding grade level

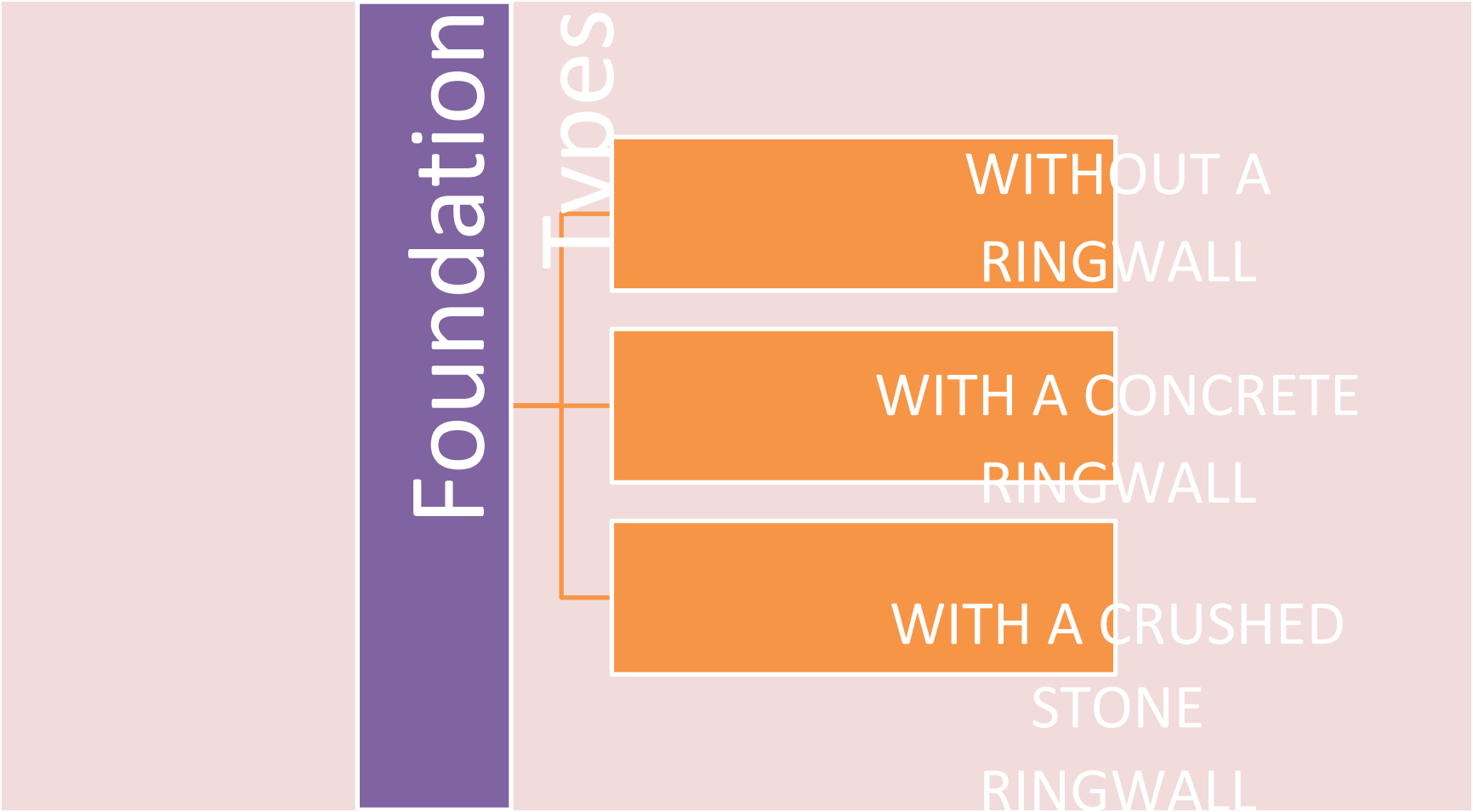
Use of a material which contains mineral salts or is contaminated with organic matter that can decompose, induce microbial corrosion, or turn acidic can accelerate underside corrosion.

The solution is to use appropriate backfill. When a granular material such as sand is used, it should be cleaned and washed to minimize the presence of salts and minerals.

Another consideration for setting tank foundations is the possibility of buoyancy of the tank due to submergence in water.

Since typical tanks require less than 1 ft of submergence to float off of the foundation. the most likely cause of this is the rainfall. the probability of this . happening while the tanks are empty

Foundation


Foundation
Types
WITHOUT A RINGWALL
WITH A CONCRETE RINGWALL
WITH A CRUSHED STONE RINGWALL

foundation should accomplish the

- .Provide a stable plane for the support of the tank
- imit overall settlement of the tank grade to values compatible with the allowances used in the design of the connecting piping
- .Provide adequate drainage
- Not settle excessively at the perimeter due to the weight of the shell