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### Provision of Spare Nozzle for Vessels and Storage Tanks

**Mojtaba Habibi**

Process Engineer at Petroleum Engineering and Development Company (PEDEC)  
Top Contributor

Dears,

I have seen in some projects, "spare nozzle" is considered for vessels, storage tanks, heater treater and other equipment.

I have following queries about provision of this "spare nozzle":

1. What is the application of such a spare nozzle? What is this spare nozzle reserved for?
2. What is the criteria of selection and sizing?
3. Where to put this spare nozzle?

Let me know your idea and experiences.

Thanks for your time.  
Mojtaba

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9 comments



Sampath

**Sampath Kumar R**

Upstream Process Engineer at Technip

Dear Mojtaba,

My response for all your queries is:

Generally spare nozzles are for future requirement. The requirement of spare nozzle on equipments is purely a client's requirement. If any spare nozzle is to be provided on vessels, the sizing criteria or size of nozzle shall be spelt out by Client.

Kind Regards  
Sampath Kumar R

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Mojtaba

**Mojtaba Habibi**

Process Engineer at Petroleum Engineering and Development Company (PEDEC)  
Top Contributor

Dear Sampath Kumar R,

What do you mean by "future requirement" ?

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**ASHOK KUMAR**

Process Engineer at MODEC International INC

ASHOK

Dear Mojtaba,

the spare nozzle on the vessels serves several purpose as listed below,

1. can be used as a utility connection(UC).in general vessel will have a UC at the bottom.
2. can be used to check the o2 level inside the vessel before introducing hydrocarbon fluids.
3. to check the hydrocarbon , h2s level inside the vessel.

hence this spare nozzle size will be 2" and it has to be at the top of the vessel. it is better to have at the opposite side of the bottom UC.

kind regards

PR Ashokkumar

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**Mojtaba Habibi**Process Engineer at Petroleum Engineering and Development Company (PEDEC)  
Top Contributor

Mojtaba

Dear ASHOK KUMAR,

You have mentioned that spare nozzle "can be used as a utility connection(UC)" and " it has to be at the top of the vessel".

Do you think this spare nozzle at the top, can properly be used as UC?

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**Saeid R. Mofrad**Principal Process Engineer at Petrofac (P.E.)  
Top Contributor

I am of the same opinion as Sampah on the requirement and size of spare nozzles. Everything about spare nozzle should be clearly specified by client otherwise design companies won't provide any extra flange. For instance, 6" nozzle was provided on the top of production separator for installing future phase profiler (interface level measurement device) according to Client requirement. Nozzles for UC (on bottom) and vent (on top – used for sampling gas as mentioned by Ashok) should not be mixed up with spare nozzle.

If you see a nozzle marked as spare on PID or datasheet and you don't have any clue for that, I guess you have to explore the history of design development. Sometimes, a nozzle is blinded and called "Spare" because of the status of project (i.e. vessel has been already ordered, shipped or installed at site). Sometimes, late studies (dynamic simulation, 90% model review, design review) reveal that there is no need for a particular nozzle. For example, dynamic simulation result shows that relocating temperature controller from column to reboiler return results in more stable control where the column has been already fabricated. What is the best way of doing it with minimum cost and design implication?

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**Sue Chin Lim**

Principal Process Engineer at SBM Malaysia Sdn Bhd, CEng PEng MIChemE MIEM

Sue Chin

I agree with Saeid. Spare nozzles should not be mixed up with utility connections. Nozzle that is meant as utility connection will be clearly noted on the P&ID, for example for nitrogen purging/water flushing. Spare nozzles are obviously for future provision. An example I can give is that for future installation of sand jetting system. Perhaps no sand production is predicted by the flow assurance study during the design/project development but in case sand does produce in actual operation, you have the spare nozzles to install the sand jetting system.

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**Jimmy Lee**

Senior Process Engineer at SBM Malaysia, CEng MIChemE

Jimmy

Unless it is clearly specified the requirement for future, else spare nozzle will not be provided. For pressure vessel, we will provide two 2" nozzles on top of the vessel for eductor connection during maintenance.

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**Mojtaba Habibi**Process Engineer at Petroleum Engineering and Development Company (PEDEC)  
Top Contributor

Mojtaba

I have received following explanations about advantageous of provision of spare nozzle from one of my friends:

"In the event a nozzle has to be required and installed on pressure vessels or tanks with internal coating in the future would require re-certification and significant downtime hence a spare nozzle is a good choice.

For example the plant decided to install a guided wave radar on a storage tank using a spare nozzle located on the tank roof. Had this nozzle not been available, the tank has to be taken out of service to install a nozzle and would have required the following:

- A. Re-coating and recertification of the tank,
- B. Tank cleaning including hazardous waste disposal and management.
- C. Extended downtime etc. These items are either additional Capital or O&M costs which could be saved with the availability of a spare nozzle.

In similar fashion, a heater treater vessel needs modification to improve the quality of crude oil. A water in crude analyzer was installed using a spare nozzle. Had this spare nozzle not been available, the heater treater would need to be recertified and recoated requiring extended downtime and additional project costs."

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**Amarnath S**

Senior Process Engineer

Amarnath

In my view, spare nozzles on vessels needs to be avoided, unless and until a specific reqt is there as discussed like UC, future instrument mounting etc. Unnecessary spare nozzles usually increase the stress on the vessel and nozzles with blind flange is the source of leakage.

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