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Booster Pump Capacity

[Leila Hassanzadeh](#)
Oil & Gas Process Engineer

Dears,
In some cases, centrifugal pump is used in series into reciprocating pumps to increase suction NPSHA to the reciprocating pump and the capacity of centrifugal pump is more than reciprocating pump capacity. What is the basis for capacity of centrifugal pump?

And is it possible that a positive displacement pump operates as booster pump for main positive displacement pump? What is the basis for capacity of pump?

regards,

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Wilfredo

[Wilfredo Garcia](#)
Process Specialist at Ecopetrol

Dear Leila,

I was working in an LNG production project and we have this case in the MEG injection system, well, when dealing with the reciprocating pump vendor, he let us know that for a good reciprocating pump performance, the booster pump needed to give 120% capacity. In our case we had given a 110% capacity to the booster pump system and we needed to increase the system in an additional 10% in order to comply with the vendor recommendation. There were no basis, there were a vendor recommendation, so it would be good for you to have a chat with the reciprocating pump supplier for this.

In response to your 2nd question, what is required is to guarantee a positive NPSH to the reciprocating pump, so a pump that delivers low pressure will be enough and the best way to do it is using a centrifugal pump.

I hope this helps.

Cheers,

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Leila

[Leila Hassanzadeh](#)
Oil & Gas Process Engineer

Dear Wilfred,
Thank you for your response.

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[Olaleye Adio \(MICHEM\)](#)
Oil & Gas Processing Consultant

Leila,

Olaleye

As my good friend Wilfrdo mentioned, there is no real basis for having a slightly higher capacity on your booster pump, what is most important is to ensure your booster pump can deliver what you process (and hence you positive displacement pump) requires.

As to why this booster pump is always centrifugal. Firstly this configuration is most common on MEG & TEG units in hydrate inhibition and gas dehydration, it is also used in Amine Sweetening.

The injection pumps always have very high head requirement and these are positive displacement, where the issue arises is that positive displacement pumps have high NPSH requirement (relative to centrifugal pumps). You can usually meet the NPSH required for a centrifugal pump by raising your suction vessel a couple of meters or so, but the NPSHa you will get from this will not be sufficient for a positive displacement pump, hence you install a centrifugal pump to boost the pressure of your fluid just enough to provide the required NPSH for your positive displacement pump.

Hope this helps

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Kamal Youssef
Mechanical Field Engineer at Melrose Resources Plc

Kamal

I think the basis of this issue may be dependent on the number of the plungers or pistons of the main reciprocating pump.

for example ,If you have a simplex single acting pump with flow rate 100 gpm you will need a centrifugal booster pump with flow rate 200 gpm due to 50% of the time the piston is moving backwards not producing flow which mean that the reciprocating pump need to be feeded instantaneously with 200% of it's rated capacity otherwise you starve the pump during the forward stroke which will cause cavitation, and for the same principle will need to have booster pump rated for 150% if you have a Duplex pump.

2nd question,it's not possible that a positive displacement pump operates as booster pump for main positive displacement pump if the main is a reciprocating pump,because during the backwards strokes(discharge stroke) of the main pump, booster pump will produce a growing pressure on the piston pump inlet and will not have any inrush which may cause damage to the main pump or to booster pump due to pressure build- up.

But in case of centrifugal booster pump The addition flow will recycle around the impeller inside the casing of the centrifugal booster pump without significantly raising of pressure, which Giving advantage to centrifugal pumps in rapid response to change in pressure and flow than the positive displacement as a booster pump .

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