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Installation of "RO" down stream of BlowDown Valvs

Saeed Abdollahi
Process Engineer at Wood Group - CCC Ltd (Oman)

Dears,

Does anybody have information regarding the installation of "RO" down stream of "BDV's"?
Is there any criteria for distance between "BDV" and "RO"?

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Mojtaba

Mojtaba Habibi
Process Engineer at Wood Group

I have seen values like 600 mm, 700 mm and 1000 mm as minimum distance at different projects.

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Learn Syan

Learn Syan Lee
Process Design Engineer

http://www.chemwork.org/PDF/board/Is%20600%20mm%20sufficient%20to%20keep%20BDV%20functional.pdf

I supposed the article in above link would clarify your query.

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Jianfeng Li likes this

Wilfredo

Wilfredo Garcia
Process Specialist at Ecopetrol

Dear Saeed,

Regarding this topic, there is no requirement for minimum distance between items, if the RO is located at the BDV flange, it's better, you minimise sonic velocity effects in the line.

Cheers,

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Amir

Amir Farokh
Chemical Process Engineer (MIEAust, AMIChemE), Looking For New Job Opportunities

There should be a distance between the BDV outlet flange and the RO to avoid back wave or backward distortion effects of the dissipated gas. The distance can be a percentage of the pipe diameter e.g. 100% of it (actually I am not aware of the exact value, but theoretically the exact value can be determined by fluid dynamic modelling and determination of back wave extension). However it should not be so high in order to avoid the use of excess high class material at the upstream of RO.

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Saeid Rahimi Mofrad
Senior Specialty Process Engineer at Fluor
Top Contributor

The orifice plate is the main element in the depressuring facilities where the pressure is reduced from the upstream process equipment pressure to the flare system back pressure. This results in a considerable temperature drop due to Joule Thomson (JT) effect in high pressure applications. The resultant temperature creeps towards the upstream system (BDV, BDV inlet line and process equipment) through pipe metal conduction which can create some operation and design problems:

>> formation of ice (due to atmosphere moisture) which may prevent system or operator from closing the BDV after completing the depressurization. This may cause re-pressurization of process as a result of back flow from other BDVs/PSVs. Therefore, 600 mm spool piece between BDV and RO is believed to be long enough to increase the piping temperature (by heat gain from atmosphere) from flare temperature to above zero temperature.

>> the need for an exotic material upstream of BDV. During depressuring, flare system usually reaches very low temperature which needs special material, however upstream process system does not experiences such a low temperatures. Therefore, 600 mm spool piece between BDV and RO is provided in order to ensure that the pipe body temperature (by heat gain from atmosphere) falls to the process piping class design temperature. This reduces the piping cost because the flare piping material is only extended to the BDV inlet flange. In other words, the material of piping upstream of BDV can be specified with respect to process system minimum temperature during depressuring.

Refer to
http://www.chemwork.org/PDF/board/Is%20600%20mm%20sufficient%20to%20keep%20BDV%20functional.pdf and let me know your comments.

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Mohamed Gad likes this

Mojtaba

Mojtaba Habibi
Process Engineer at Wood Group

Dear Saeid,

At this paper you mentioned that:

"Depressuring study results should be reviewed to identify the pressure at which process gas reaches subzero temperature. If this pressure is much lower than process design pressure (say below 70% of design pressure) no extra provision is required. This is because BDV's actuator sized for design differential pressure (process design pressure minus zero) should be able to close the valve at lower differential pressure even in presence of ice."

I could not fully understand the point regarding to actuator size(based on full differential pressure) as a protection against icing. Could you please clarify this issue?

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Damoon

Damoon Nasseri
Lead Process Engineer at Foster Wheeler Energy Ltd

This is called "Cold Creep". After RO, there is a significant temperature drop due to JT effect. This may course to change pipe spec to low temperature material. in that case low temperature pipe shall be used for about 600 mm (some companies used 1000 mm) upstream of RO as pipe conduction may transfer cold temperature to upstream of RO.

If you want your BDV not to be in low temperature specification, consider 1000 mm low temperature pipe between RO and BDV. If you don't need to have spec break, there is no minimum distance required.

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Ahmad

Ahmad Ehsani
Management Consultant at Oil and Energy Industries Development co. OEID/ Senior Technical Consultant at LUKOIL

I agree with Saeed. But I like to add one point. Based onnthe size of the line the length of the spool piece changes . Usually the lengthof this distance Piece is presented as a function of line diameer,5D ,6D or something like that.

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Saeed

Saeed Abdollahi

Process Engineer at Wood Group - CCC Ltd (Oman)

Dears,

Thank you all for providing information in this regard.

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Mohamed

Mohamed Gad

Process Engineer at KPC

I agree with Saeid and i need no highlight that during dynamic depressurizing (adiabatic scenario) if we reach deformation temperature of carbon steel (-29 C) we shall use Low temperature carbon steel (Killed C.S),or optional solution heat tracing of this part of piping in case of temperature increase by mixing with other streams, but the only benefit of the distance between BDV and R.O is decrease the metal conduction temperature to avoid icing on BDV, i see it about 2 meter in some reference.

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