



Chemwork

Discussions Members Search Manage



PSV sizing

Rupalkumar Buch

Principal Process Engineer at Jacobs Engineering India Pvt.Ltd.,

PSV : The sizing sheet of PSV for any client mentions 10/13 rule applicable for tube rupture case, but not choosing corrected hydrotest pressure criteria as mentioned in API 521 for sizing psv eventhough the corrected hydrotest criteria seems appropriate ?

[Unfollow Rupalkumar](#)

[Like](#) • [Comment \(6\)](#) • [Share](#) • [Follow](#) • [Reply Privately](#) • 11 months ago

[Add to Manager's Choice](#) • [Close Discussion](#)

Comments

6 comments



Learn Syan Lee

Process Design Engineer

Perhaps post from link below helps:

[Learn Syan](#)

<http://process-eng.blogspot.com/2012/04/causes-of-overpressure-tube-rupture.html>

[Like](#) • [Reply privately](#) • [Delete](#) • 11 months ago



S M Kumar

Process Design Consultant

Interesting point Rupalkumar. Thanks for raising it.

S M

In short: The temperature correction is minor in most HX application and is usually ignored.

In length: To be technically correct, the corrected hydrotest pressure criteria is mentioned in other relieving cases also - for blocked outlet (4.3.2), Single check valve failure (4.3.4.2), Control valve failure (5.10.3), Heat exchanger tube rupture (5.19.1).

As I interpret, this criteria is decide whether a PSV is required or not. If you read the wording as given in 5.10.3, QUOTE If the pressure can exceed the corrected hydrotest pressure (see 3.21 and 4.3.2), reliance on administrative controls as the sole means to prevent overpressure might not be appropriate. In these cases, limiting the overpressure to the normally allowable overpressure can be more appropriate. UNQUOTE.

CF= Correction Factor > 1.0

As I interpret it, first check if the LP side design pressure*1.3/CF is < HP side maximum operating pressure. If so, no PSV. Otherwise provide a RD (Relief Device) and "limit the overpressure to the normally allowable overpressure", that is 10%.

The temperature correction is low in the common range of temperature in heat exchanger application. As indicated in API RP 521 para 4.3.2, CF= 138/130= 6% only for temperature changing from ambient to 343C (650F). The correction could be more in high temperature application; but here the LP side also is likely to at higher temperature.

CF should be based on, allowable stress of the shell plate at LP design temperature/allowable stress at HP side maximum operating temperature. So far, I have seen CF ignored. For temperatures to 350C, with LP side design temp as low as blackbody temperature as a minimum, the CF is likely to be within the variation expected and allowed for steel plates made in different

steel mill or between different batches in the same mill. Above 350C, usually the allowable stress falls off and CF will be significant.

We can take it as a warning to check properly at high temp applications. We should consider LP side system design pressure = HP maximum operating pressure/1.3*CF instead of ignoring it - to be technically correct in all cases where we don't provide a PSV or more correctly a Rupture Disk (RD).

One unsaid interesting aspect is, even if we provide RD, unless the LP side design temperature is equal to HP side maximum operating temperature, the shell side is going to be subjected to marginally higher than intended stress due to higher relieving temperature > design temperature. Again this is strictly technically correct interpretation. But if you consider that allowable stress is a fraction of UTS (Ultimate Tensile Stress) and that flange selection has margins ... could explain why CF is ignored in most of the applications.

Let us hear from others how they interpret it.

Like (4) • Reply privately • Delete • 11 months ago

👍 [Alireza Tabatabaei](#), [Bala subramaniam](#) and 2 others like this



Bala subramaniam

Senior Process Engineer at WorleyParsons

Bala

Hi all,

can anyone tell me help me in posting new discussions, because all of my new discussions are saying "Pending Approval"

<http://www.linkedin.com/groups?displayMySubmitted=&gid=3822450>

thank you

Like • Reply privately • Delete • 11 months ago



Rupalkumar Buch

Principal Process Engineer at Jacobs Engineering India Pvt.Ltd.,

Rupalkumar

Thanks Mr. kumar sir, for the explanation, I agree with your reply for corrected hydrotest pressure viz a viz uncorrected hydrotest pressure.

If I be more specific, why client does not use the term "Hydrotest pressure criteria or corrected hydrotest criteria" in their PSV sizing sheet instead of mentioning "10/13 rule", though the hydrotest word is more relevant/specific..?!

Like • Reply privately • Delete • 11 months ago



S M Kumar

Process Design Consultant

S M

Either ignorance as in my case - I was not aware of the qualification or did not register it until you pointed out OR awareness "no big deal". Most of the datasheets may reflect 10 year old knowledge until some bright spark like you comes along and questions Why, Why not. Be the first one to change it!

Like • Reply privately • Delete • 11 months ago



Rupalkumar Buch

Principal Process Engineer at Jacobs Engineering India Pvt.Ltd.,

Rupalkumar

Thanks, sir.

Like • Reply privately • Delete • 11 months ago

Add a comment...

Send me an email for each new comment.

Add Comment