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3-09	42 102 125	7.7 9.5.2.4.2.3	

Question

Question: **Opening in dished end, close to discontinuity line (0.8xDe).**

$W_{min} = 0$ acc. 9.7.2.4. When approaching discontinuity line, then $w \approx w_{min} = 0$.

Acc. 9.7.3 a): $l_s = w = 0$

This means that eq. 9.5-38: $l_s' = \min(l_{so}; l_s) = 0$, and eq. 9.5-43: $A_{fs} = 0$ (because $l_s' = 0$).

This means that it is impossible to have an opening (greater than d_{min}) close to the discontinuity line, no matter how thick the dished end is.

On the other hand, it may be possible to have an opening within the knuckle area acc. Sec. 7.7. So you can end in a situation where it is impossible to have an opening within the spherical part of the dished end, but it is possible to have the opening within the knuckle area, ie:

$0 \leq \text{Radius} \leq R_x \Leftrightarrow \text{OK}$

$R_x < \text{Radius} \leq 0.4xDe \Leftrightarrow \text{NOT OK}$

$\text{Radius} > 0.4xDe \Leftrightarrow \text{OK}$ (in certain cases)

R_x is the radius where it becomes difficult to have an opening of a given size within the spherical part.

The same thing goes for openings with nozzles, where you can end up with a nozzle thickness that is very high when you are within the spherical part, being close to the discontinuity line.

Sec. 7.7 does not cover thicknesses of nozzles within the knuckle area, but if you use shell calculations acc. Sec 7.4.2, you will in many cases end up with a smaller nozzle thickness within the knuckle area when compared to nozzles within the spherical part, but being very close to the discontinuity line.

(This is in some way not a question, but something I have wondered about for a long time)

Answer(s)

EN 13445/MHD answer – Meeting of 8 July 2010

The following proposal to be discussed by CEN/TC 54/WG C:

Some sort of agreement between Sec. 7.7 and Sec. 9 regarding openings close to the discontinuity line. Maybe by accepting that “w” and “ l_s ” somehow can approach into the knuckle area, but “w” and “ l_s ” has to be based upon the max. opening which can be calculated acc. Sec. 7.7. If it is not possible to have an opening within the knuckle area, then “w” and “ l_s ” is, of course, 0

CEN/TC 54/WG C answer – Meeting of 16 February 2011

If the nozzle edge is close to the knuckle zone, then the calculation can be made as follows:

- calculate the reinforcement with the proper w; if the reinforcement is not sufficient, then take into account the most severe of the results coming out from the following two calculations:

1. calculate the opening reinforcement according to clause 9 as if there were the whole length l_s available for reinforcing
2. calculate the head according to clause 7.7 as if the nozzle were fully located on the knuckle zone.

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