

China Opinion of Initial Burst Pressure Reduction to 200%NWP for Carbon Fiber

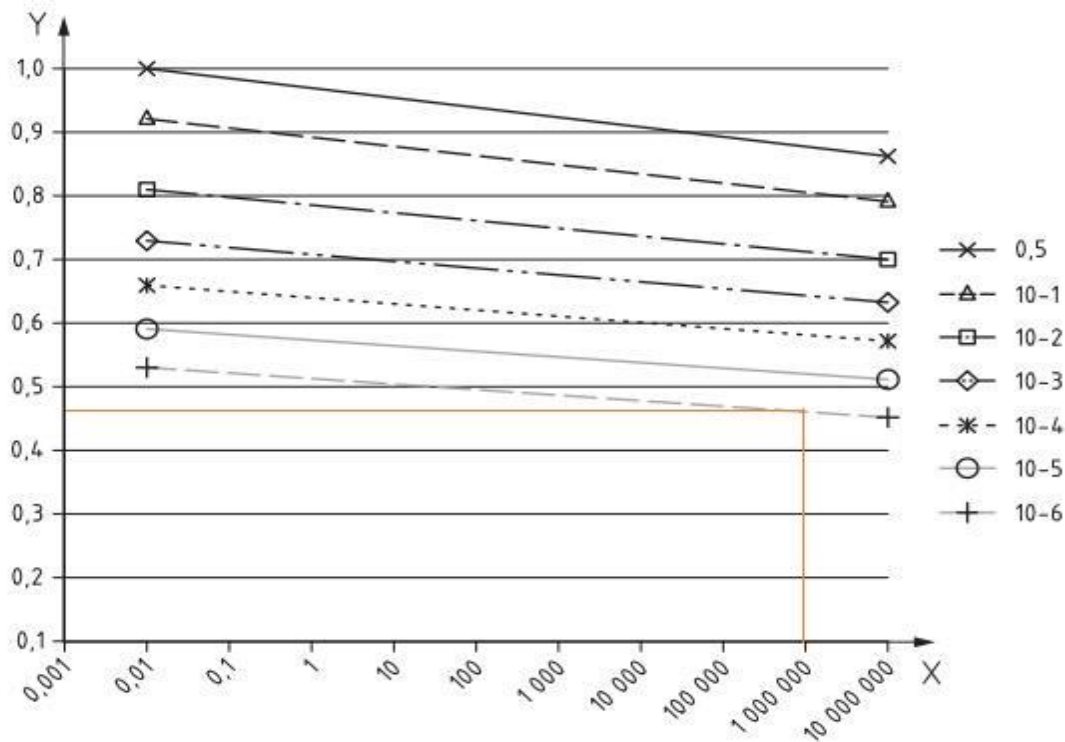
Opinion: Agree for 70MPa only

Rationale:

1、 National standard **GB/T35544-2017** “ Fully-wrapped carbon fiber reinforced cylinders with an aluminum liner for the on-board storage of compressed hydrogen as a fuel for land vehicles” and Group standard **T/CATSI 02 007-2020**” “Fully-wrapped carbon fiber reinforced cylinders with an a plastic liner for the on-board storage of compressed hydrogen as a fuel for land vehicles” require that the initial burst pressure should be equal or greater than 225%NWP.

2、 Data from 10 manufacturers of Type III cylinder shows that autofrettage pressure is about (1.6~1.8)NWP. The difference between burst pressure and autofrettage pressure is only (7~14)MPa for 35MPa cylinder when initial burst pressure reduces to 200%NWP. This increases the risk of burst during autofrettage.

3、 According to ISO13086 《Gas cylinders — Guidance for design of composite cylinders 》 . Stress ratio 2.25 is intended to provide a reliability of 0,999999 over the cylinder lifetime; that is, less than 1 failure in 1,000,000 cylinder lifetimes. More material data are required to prove the reliability can be reached after reduction of stress ratio to 2.0.



Key

X time, hours

Y load fraction of median strength

4、 The number of FCEV increases quickly in China. Currently there are more than 6400 FCEVs running. Safety is the first priority we concern. We would like to see more data and experience to verify its rationale of stress ratio reduction.

5、 As we know, There is no national standard of hydrogen cylinders in the world, which allows to use stress ratio 2.00 for carbon fiber. It is still too early to reduce stress ratio for all cylinders in GTR. More data on material and cylinder, more experience are still required.