

SGS 7 – 09

**Proposal on Drafting Hydrogen
Storage System Part of the HFCV-gtr**

21 SEP, 2009

JASIC

Proposal for the 5.1.2.2.1 Verification Test for Performance Durability (sequential hydraulic tests)

JASIC propose to change the 5.1.2.2.1

1) Hydraulic Cycle Sequential Test (5,500cy)
with extreme temperature condition

2) Add static pressure test of 1000hr and 85C.

5.1.1 Material Requirements	
5.1.2.1 Verification Tests for Baseline Metrics	
5.1.2.1 Verification Tests for Baseline Metrics	
5.1.2.2 Performance Test Requirements for New Systems	5.1.2.3 Performance Test Requirements for Criteria-Qualified Systems
5.1.2.2.1 Verification Test for Performance Durability (sequential hydraulic tests)	5.1.2.3.2 Expected Service and Durability Performance Test (sequential hydraulic tests)
5.1.2.2.2 Verification Test for Expected On-road Performance (sequential pneumatic tests)	5.1.2.3.3 Permeation Test

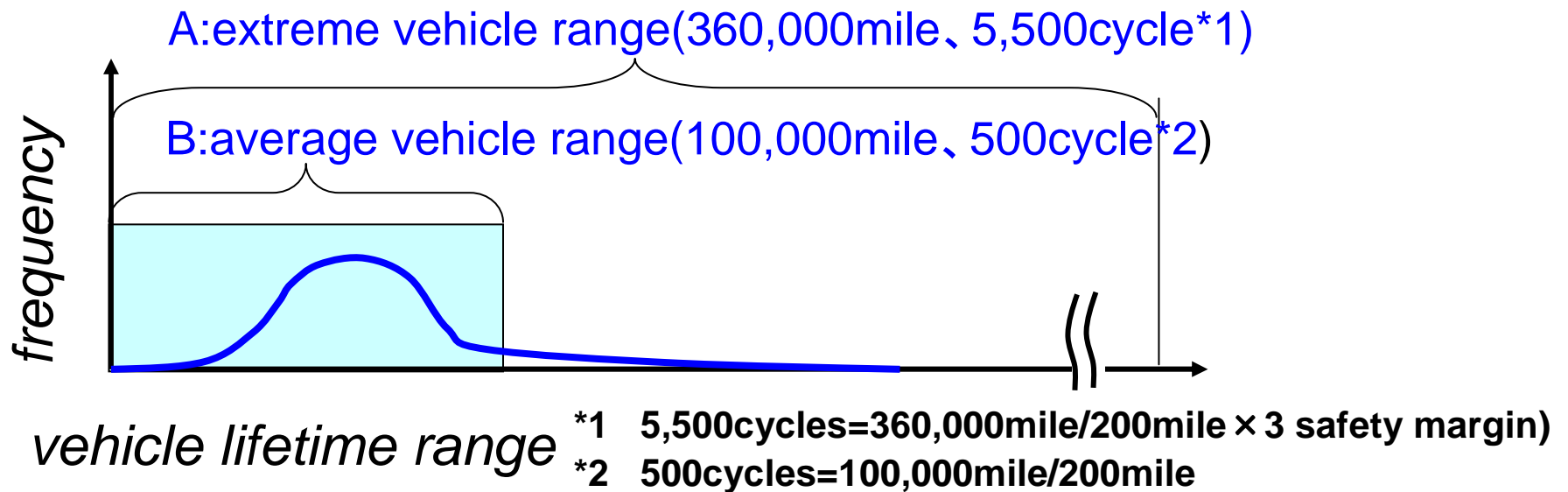
Proposal for the 5.1.2.2.1 Verification Test for Performance Durability (sequential hydraulic tests)

/JASIC propose to change the 5.1.2.2.1

/ JASIC think hydraulic test(5,500cy) with extreme temperature and static pressure test of 1000hr and 85C is appropriate to validate the safety at end of life(15 years, extreme vehicle range).

/JASIC think the purpose of pneumatic cycle test (500cy) is not to validate the end of life safety.

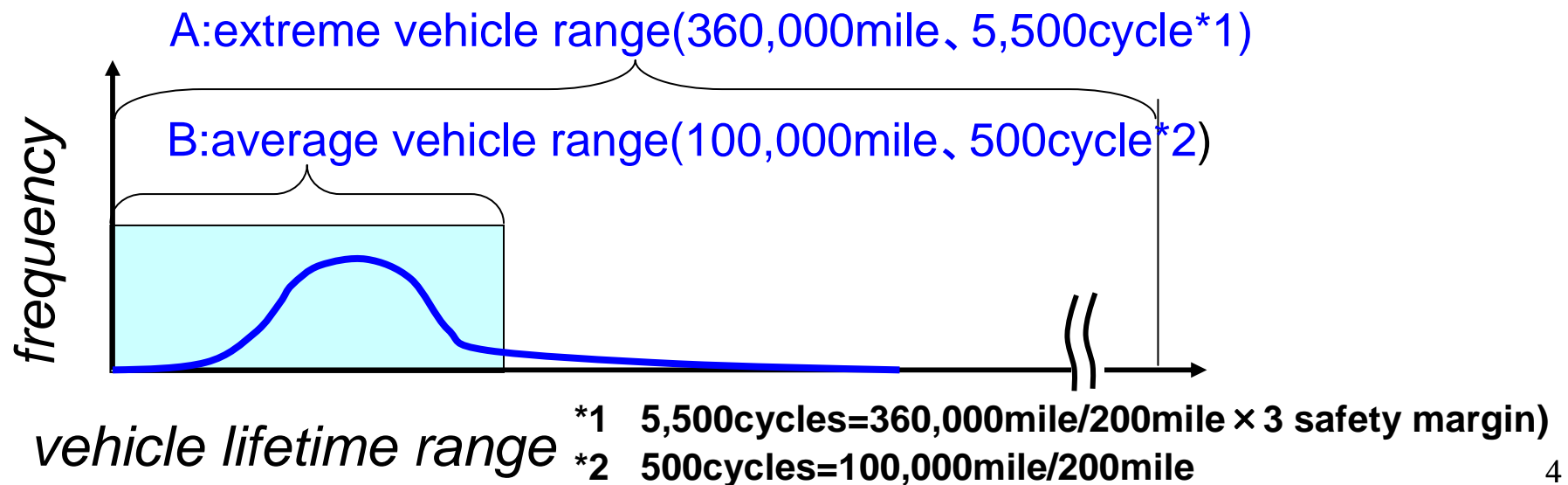
/Pneumatic cycle test(100,000mile=500cycle) is appropriate to validate the fails which could not be validated by hydraulic test.



Proposal for the 5.1.2.2.1 Verification Test for Performance Durability (sequential hydraulic tests)

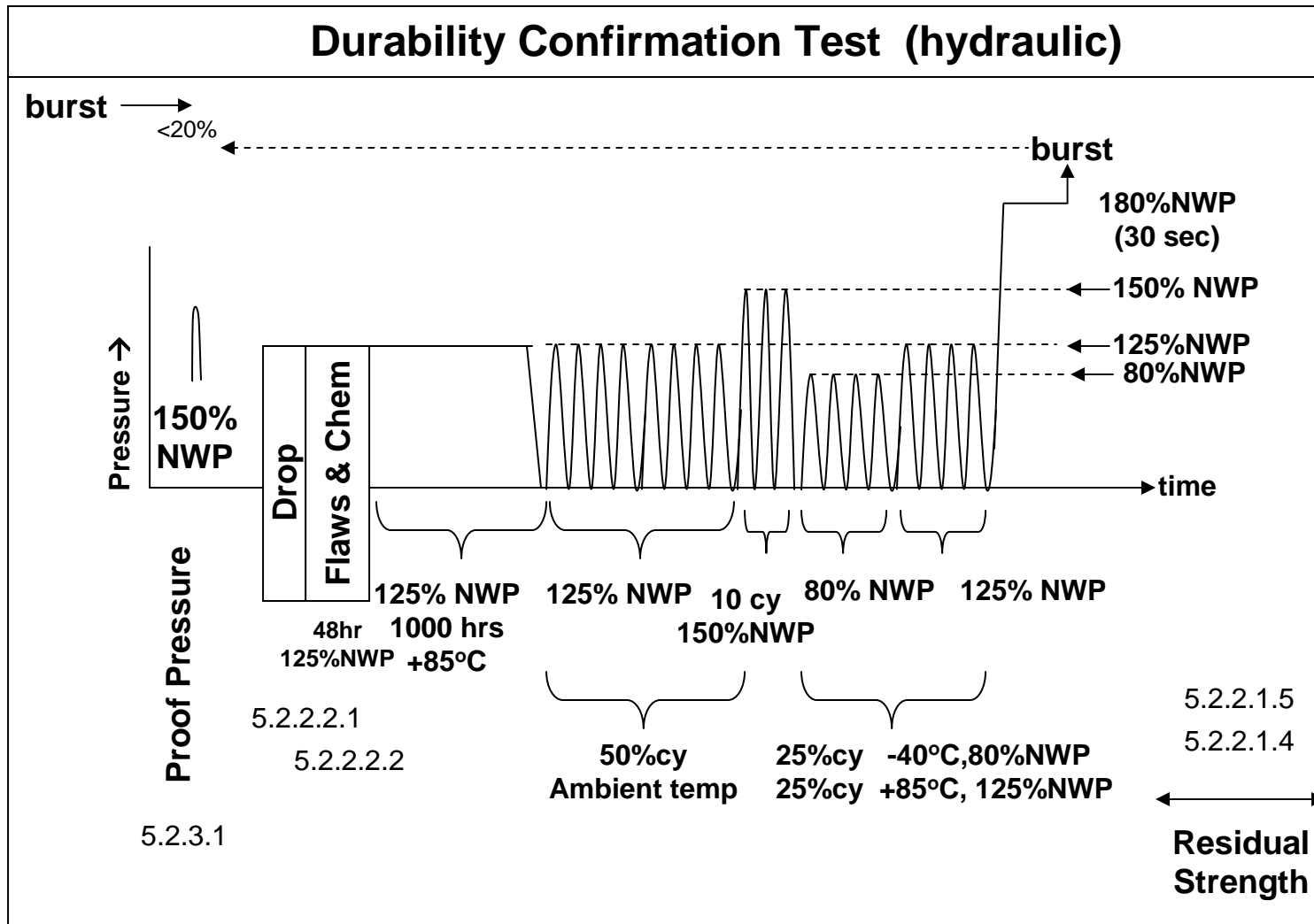
/JASIC propose to change the 5.1.2.2.1

	SGS-6-1 draft	proposal	comment
5.1.2.2.1	Hydraulic Cycle Sequential Test (5,500cy) -ambient temperature	1)Hydraulic Cycle Sequential Test (5,500cy) -extreme temperature 2) Add static pressure test of 1000hr and 85C.	Hydraulic test(5,500cy) with extreme temperature and static pressure test of 1000hr and 85C is appropriate to validate the safety at end of life(15 years, extreme vehicle range).



Proposal for the 5.1.2.2.1 Verification Test for Performance Durability (sequential hydraulic tests)

detailed condition should be discussed



Proposal for the 5.1.2.2.1 Verification Test for Performance Durability (sequential hydraulic tests)

As a result, 5.1.2.2.1 Verification Test for Performance Durability is same as 5.1.2.3.2 Expected Service and Durability Performance Test.

5.1.2.2 Performance Test Requirements for New Systems	5.1.2.3 Performance Test Requirements for Criteria-Qualified Systems
5.1.2.2.1 Verification Test for Performance Durability (sequential hydraulic tests)	5.1.2.3.2 Expected Service and Durability Performance Test (sequential hydraulic tests)
<div data-bbox="640 646 1493 1268" data-label="Figure"> <p>The graph illustrates a hydraulic durability test profile. The y-axis represents 'Pressure' and 'Proof Pressure', while the x-axis represents 'time'. The test sequence includes: <ul style="list-style-type: none"> Initial Burst: A pressure spike labeled 'burst' with a note '<20%'. Drop & Flaws & Chem: A period of pressure drop and chemical exposure. 125% NWP 48hr 1000 hrs 125% NWP +85°C: A sustained pressure cycle at 125% NWP for 1000 hours at 85°C. 50% cy Ambient temp: A cycle of 50% pressure at ambient temperature. 25% cy - 40°C, 80% NWP / 25% cy +85°C, 125% NWP: Two cycles of 25% pressure, one at 40°C with 80% NWP and one at 85°C with 125% NWP. 150% NWP 10 cy: A cycle of 150% NWP for 10 cycles. 80% NWP 125% NWP: A cycle of 80% NWP followed by 125% NWP. Final Burst: A final pressure spike labeled 'burst' with levels for 180% NWP (30 sec), 150% NWP, 125% NWP, and 80% NWP. </p> </div>	
5.1.2.2.2 Verification Test for Expected On-road Performance (sequential pneumatic tests)	5.1.2.3.3 Permeation Test

Proposal to add Maximum Defect Size Inspection Test(New paragraph)

/JASIC propose to add Maximum Defect Size Inspection Test in Design Qualification Test because the pneumatic cycle test(5,500cy) is impossible for too long test period. This test is same as NGV(ANCI/CSA)

/The maximum defect size shall be calculated which does not lead to any damage from fatigue or burst during the use of the container for a period of 15 years in hydrogen atmosphere.

Comment for 5.1.2.1.2 (Ambient cycling test in design qualification test)

Failure mode of 150%NWP PCL may be different from 125%NWP PCL .(JASIC will confirm these data and introduce you.)

5.1.2.1.2

Baseline Pressure Cycle Life (Leak Before Break) Test. At least 3 new storage containers will undergo ambient hydraulic pressure cycling from <2MPa to 150%NWP without rupture for 11,000 cycles (2 times the number of cycles required for 5.1.2.2.1.4) or until leak occurs. The pressure cycle life, PCL, of a storage container is the number of cycles until leak. If no leak occurs, then PCL is equated to 11,000. All 3 storage containers must have a pressure cycle life, PCL, within 25% of PCL₀. PCL₀, the average of the measured PCLs, is the baseline pressure cycle life for 5.1.3.2.

END