October 18, 2018

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California Air Resources Board
9528 Telstar Avenue
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Submitted electronically to Jason.gordon@arb.ca.gov

Re: Comments to CARB Proposed 2018 Improvements to Vehicle Fill Pipe Specifications

Dear Mr. Gordon:

Toyoda Gosei is extremely grateful for the support that we have received from California Air Resources Board in our efforts to improve refueling emissions. We look forward to continuing our work with you in the future.

This comment letter is based on conversations held within the SAE Refueling Task Force committee to help further improve the CARB Fill Pipe and Opening Specification. Our proposal and comments are as follows:

Section III.A Recommended Changes

a. "Fill pipe sealing surface" means portion of the fill pipe face which would contact the vapor recovery nozzle boot face. ~~For purposes of this specification, this is the portion of the fill pipe face which would contact the 40 degree tapered zone in Figure A.~~

b. Diameter of the sealing surface of the fill pipe shall have a maximum diameter of 57.~~5~~9 mm~~,~~ ~~and the convex portion shall have a maximum radius of 6 mm~~.

c. Fill Pipe surfaces outside of the 57.~~5~~9 mm diameter of the sealing surface are allowable so long as it does not infringe into the 40 degree tapered access zone, which extends to a maximum depth of 12 mm back from the sealing surface of the fill pipe as described in Figure A ~~access zone below.~~

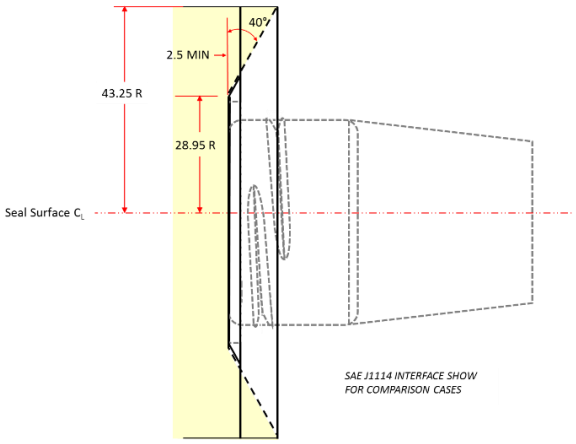
Section III.D Recommended Changes

This section is not necessary if the seal surface diameter is 57.9 mm max in previous sections and matches proposed drafts from the SAE Refueling Taskforce

Figure A Recommended Changes:

- Figure A needs clarity on the definition of the zone.
    - With the current figure if tapered zone starts at, for example 52.0mm seal surface, the 40° clearance zone would end before reaching the 86mm outer range, and is not defined.

- TG proposes replacing Figure A with the proposed SAE J1140 Filler Pipe Face Clearance.
    - This establishes a fixed zone for the nozzle bellows referenced in CARB TP-206.
    - Fixing the zone allows for the clearance and relevance to Spherical, conical, and planar nozzle boots.



Proposed SAE J1140 Filler Pipe Face Clearance
(Yellow Area is not to be encroached for proper boot sealing)

Section VIII Recommended Changes:

F. Latch a~~n assist type~~ Healy 900 EOR vapor recovery nozzle into the fill pipe using a natural motion as you would when filling up your own car at a gas station.

G. ~~Hose should form a "U" shape, and be within 6-12 inches from the ground at its lowest point~~ Hang a 3Kg (30N) weight from inside the nozzle handle shown in Figure B.

Figure B Recommended Changes:

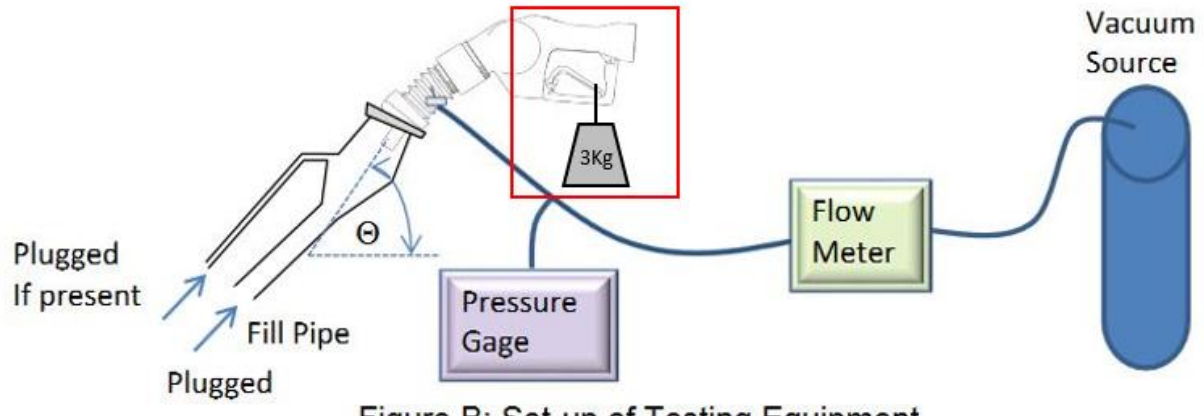
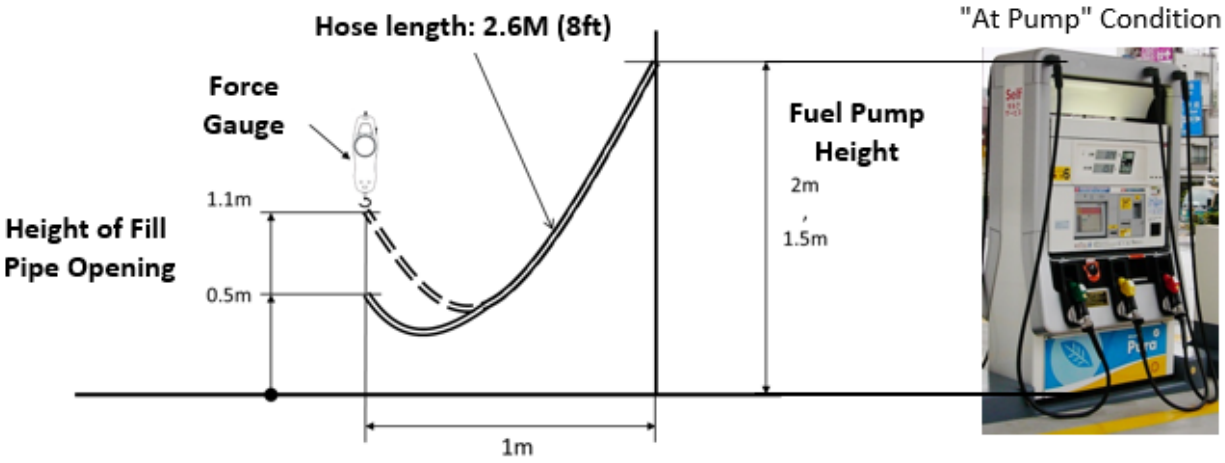


Figure B: Set-up of Testing Equipment

The purpose for the proposed changes above in Section VIII and Figure B is to help standardize the leak rate bench test and eliminate any testing variation across OEMs and Suppliers. The clarification of using the Healy 900 makes sure that all parties conducting this test use the same nozzle and also helps provide similar results to previous CARB testing done that also used the Healy 900 nozzle. Additionally, it is also specified to use the most recent Healy 900 EOR nozzle to make sure that all parties are using the most up to date nozzle.

Lastly, we would like to propose the elimination of using a hose to simulate the "at pump" condition and use a specified weight instead. The purpose of this is to eliminate any variation in testing between different parties and also make it more clear and concise on how to simulate this "at pump" weight. Our proposal comes from a study that we did that shows the difference in weight on the end of the nozzle depending on hose length and how the hose was setup. Please see Hose Study below in Table 1.



		Hose Hanging Weight Study (N)			
Fuel Pump Height		2.0m	1.5m		
Hose Length		2.6m (8ft)		2.0m	1.5m
Height of Fill Pipe Opening	1.1m	6.86	**9.02***	8.82	6.86
	0.9m	5.88	7.85	8.04	6.37
	0.7m	4.9	6.86	6.08	5.88
	0.5m	3.92	5.59	5.1	4.12

Table 1

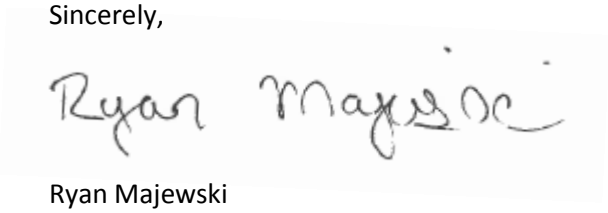
Proposal Calculation (N)	
Initial	9*
Estimated 2ft hose and Breakaway (50% extra)	4.5
Gasoline Weight (1in ID w/ 10ft hose)	10.5
Plus 25% Safety Factor	6
Total	30N

Table 2

Our 3Kg (30N) proposal is based on a max weight of approximately 9N* seen when using an 8ft long hose. Based on info provided by Jason Gordon, California typically uses an approximate 10ft long hose with a breakaway connection. Considering extra weight from the additional 2ft of hose and breakaway feature, added weight from fuel, and additional safety factor, we propose 3Kg (30N) based on Table 2.

Thank you again to everyone at CARB and the SAE Task Force for putting in the time and working together as a team to help improve these specifications. We look forward to continuing this activity with everyone and providing as much support as we can.

Sincerely,



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