

>----- Original Message -----

>From: <R1JRS@aol.com>

>To: <colinpounder@btinternet.com>

>Cc: <fuelstat@earthlink.net>

>Sent: 27 December 1999 23:24

>Subject: Electrostatic Charge Buildup in Fossil Fuel During Flow

Happy holidays Doctor Pounder, Can you tell me what you know about static charge in fossil fuel, gasoline and diesel during flow and if you know of any ways to reduce or nuetralize it? thank you...Mike Please email me at fuelstat@earthlink.net

>>>>

Hello Mike,

(I HAVE JUST RE-READ YOUR e-mail TO REALIZE YOU WISHED MY REPLY TO GO TO THIS ADDRESS. NOT KNOWING THESE PC GADGETS TOO WELL I WILL SEND IT AGAIN. YOU MAY THEREFORE GET TWO OR INDEED AN INFINITY OF REPLIES - AFTER ALL IT IS CHRISTMAS C.P.)

Earth everything is the short answer.

This was first investigated by Dolezelak and Holde in 1913. With the advent of motor cars several cases of sparking and ignition were reported - `A chauffeur hung a 5 gallon pail on the spout of a pump and began drawing gasoline. After he pumped two gallons a spark jumped around the wooden handle on the pail and ignited the vapor. Not understanding the cause of the trouble at first, the chauffeur put out the fire and resumed pumping...`

Transfer of fuel say from a tanker to a tank at a petrol station, or to an aircraft, or

simply putting a spare gallon into a container - will involve flow-charging. The more pure the fuel the greater the charge.

There have been various experiments to prevent charging - making the liquid run over earthed (grounded) plates, hanging metal chains through the liquid - but none have proved satisfactory. The fuel is in effect a moving insulator frictionally charging in contact with pipe work. Another approach has been, where practical, to put conducting additives into the fuel - water being one! This needless to say introduces other problems.

The most effective approach seems to have been to accept that the charging will occur but to take preventative measures to either reduce or remove any build up of charge by ensuring that all pipe work, tanks and containers are earthed (grounded).

In the case of flexible pipes e.g. from a fuel transporter/tanker to the storage tank a heavy wire is incorporated into the structure of the flexible pipe. I did hear of one case in which a tanker did ignite during offloading of petrol. Forensics found that the wire had in fact snapped about an inch short of the metal connector. The flow of petrol had built up charge until a spark leapt the gap and ignited surrounding air petrol vapor.

You do not get ignition in the actual fuel but in certain experiments - Rolls Royce did these during the war - they introduced a transparent section in the pipe and watched long sparks drawn out as the fuel streamed through the pipe work. Similarly in a part full tanker the fuel sloshes around and some charging takes place but a spark in the air vapor mixture is unlikely to ignite it because the mix is too heavy. (NOTE THE WORD - UNLIKELY!!!)

The tanker of course could gradually build up charge hence the need for

conducting rubber tyres - drag chains or some means to earth the thing as it travels the motorways.

Two, rather old but informative, publications may interest you if you can get copies, *Static Electrification* by Leonard B. Loeb, Springer Verlag, 1958; and *Static Electricity in Nature and Industry* by Paul G. Guest, Bulletin 368, U.S. Department of Commerce, United States Government printing Office Washington 1939. This latter is a treasure and was brought to my notice after my concocting my web site.

I hope this of some help.

Colin Pounder.