Title (en)

METHOD FOR THE REAL-TIME DETERMINATION OF THE FILLING LEVEL OF A CRYOGENIC TANK

Title (de)

VERFAHREN ZUR ECHTZEITBESTIMMUNG DES FÜLLSTANDES EINES KRYOGENEN TANKS

Title (fr)

PROCEDE DE DETERMINATION EN TEMPS REEL DU NIVEAU DE REMPLISSAGE D'UN RESERVOIR CRYOGENIQUE

Publication

EP 2205899 A2 20100714 (FR)

Application

EP 08840893 A 20081016

Priority

- FR 2008051868 W 20081016
- FR 0758609 A 20071026

Abstract (en)

[origin: US2010241371A1] The invention relates to a method for the real-time determination of the filling level of a cryogenic tank (1) intended to house a two-phase liquid/gas mixture, in which at least one of the following variables is calculated for the liquid and optionally for the gas at each time step (t, t+ ?t . . .), namely: the level, volume or mass contained in the tank (1), whereby, at each time step, the method includes the measurement of the pressure differential (DP=PB−PH) (in Pa) between the upper and lower parts of the tank and at least one of the pressures (PH, PI) of said differential. The invention is characterised in that the method includes the following steps: use of a thermal model at each time step (t, t + ?t . . .) to calculate the average temperatures of the liquid (TI) and the gas (Tg) in the tank (1) on the basis of the measured pressure differential (PB−PH) and at least one of the pressures (PH, PI) of said differential; calculation of the change over time (t, t+ ?t . . .) in at least the density of the liquid (pl) (in kg/m3) on the basis of the average temperature of the liquid (TI) and the pressures (PH) (PB) in the tank; calculation of the liquid level (hl) (in m) in the tank (1) by applying the general law of hydrostatics to the liquid, of type dP=−pl·g·dhl, on the basis of the calculated liquid density (pl) (wherein dP is the liquid pressure variation, pl is the density of the liquid, g is ground acceleration and dhl is the variation in the height of the liquid).

IPC 8 full level

F17C 13/02 (2006.01)

CPC (source: EP US)

F17C 5/02 (2013.01 - EP); **F17C 13/02** (2013.01 - EP); **F17C 13/021** (2013.01 - EP US); **F17C 13/023** (2013.01 - EP US); **F17C 13/025** (2013.01 - EP US); **F17C 13/028** (2013.01 - EP US); **G01F 23/14** (2013.01 - EP US); **G01F 23/80** (2022.01 - EP US); F17C 2221/011 (2013.01 - EP US); F17C 2221/014 (2013.01 - EP US); F17C 2221/016 (2013.01 - EP US); F17C 2221/017 (2013.01 - EP US); F17C 2223/0161 (2013.01 - EP US); F17C 2223/035 (2013.01 - EP US); F17C 2250/032 (2013.01 - EP US); F17C 2250/0408 (2013.01 - EP US); F17C 2250/0421 (2013.01 - EP US); F17C 2250/0426 (2013.01 - EP US); F17C 2250/043 (2013.01 - EP US); F17C 2250/0434 (2013.01 - EP US); F17C 2260/024 (2013.01 - EP US); F17C 2270/01 (2013.01 - EP US)

Citation (search report)

See references of WO 2009053648A2

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

DOCDB simple family (publication)

US 2010241371 A1 20100923; **US 8370088 B2 20130205**; EP 2205899 A2 20100714; FR 2922992 A1 20090501; FR 2922992 B1 20100430; WO 2009053648 A2 20090430; WO 2009053648 A3 20090827

DOCDB simple family (application)

US 73827108 A 20081016; EP 08840893 A 20081016; FR 0758609 A 20071026; FR 2008051868 W 20081016