Density Meter Application Note, Concentrations

Density Meter Application Report

Concentration Determinations using the Rudolph Research Analytical DDM 2911 Density Meter

Introduction

From purely an intuitive approach, it is easy to understand how a density meter can determine concent pure water sample, you would find its density to be 0.9982 g/cm 3 at 20ºC.

Now if you were to take 1g of NaCl (salt) and add this to the same pure water to make a 100 g solution, have a density of 1.0053 g/cm³ at 20ºC. Add yet another gram of NaCl and the 2% solution now will hav were to continue this process, you would soon have a complete table of % NaCl vs. density at 20ºC. Su concentration of an unknown NaCl solution.

The example above only discusses the concentration determination of NaCl. However, this same type c solutions and many such tables already exist in the literature. But it is not too difficult to make new table a “two component” or binary solution; whereas chemical “A” is dissolved into chemical “B”. These chem liquid or a liquid dissolved into a second liquid. An example of the latter is the %Toluene in nHeptane. U extremely user friendly.

Rudolph Research Analytical DDM 2911 Density Meter

The DDM 2911 most often provides the fastest, most accurate, and easiest means for determining the the determination of the Normality of a NaOH solution. The common quantitative chemical analysis prac HCl solution until a pink end point is reached. But, consider all the various sources of error inherent to calibrated at 20 ºC, but the room temperature is 22 ºC, resulting in error #1. Then a standardized HCl s buret is filled to the “zero” line, error #3. Then the titration takes place to the pink end point, error #4. T the titrant used, error #5. This titration method is very tedious, labor intensive, and time consuming, an This is why it is common practice for all titrations to be done three times and then the average of those

Now consider the numerous advantages to doing this same quantitative analysis by using the DDM 291 need for the HCl standard solution. Nor is there a need for the phenolphthalein indicator solution. Huma the pink end point is eliminated. The time required for the complete analysis is only 2 to 3 minutes and repeatable. Operator training is minimal as there are only two possible sources of error; contamination

bubbles in the sample. Both of these possible errors are completely eliminated because of the exclusiv

The DDM 2911 permits the use of a 3 point adjustment calibration. The first calibration point would be c
Subsequently, even the smallest amount of any contamination in the U-tube would be detected by the c
calibration/adjustment points would bracket around the density ranges of the samples to be measured
second source of error, bubbles in the sample, is also completely eliminated by the DDM 2911 exclusiv
bubbles can be easily detected by the operator ensuring precise, accurate measurements every time.

Application Report

Density Meter, Common Applications for the DDM 2911

Density is an important quality control parameter since it is a measure of purity, consistency and also a
component or binary solutions.

Concentrations may be determined in the units of %wt, %vol, Proof, Molarity, Normality, ppm, ºBrix, API
required by the user.

The following industries rely heavily upon these measurements:

Breweries

Solubility of incoming malts, ºBalling, ºPlato, OG, Specific Gravity, Apparent Extract, consistency of final
easily using the Rudolph Research Analytical DDM 2911 Automatic Density Meter.

Chemical Plants

Density is used for a large variety of reasons for both the common bulk chemicals and the specialty an
polymers, elastomers, resins, slurries, and more are all measured using Rudolph's DDM 2911 Automat
are measured. Dilutions and
blending operations are monitored and controlled through the use of density. Density may be used to c
Normality, Molarity, percent by weight or volume, PPM, API, and many other related density values.

Distilleries

Density is used as an officially recognized method for the determination of alcohol concentration for qu
labeling for declaration of alcohol content for the payment of tax.

Flavor & Fragrances

Density is used to check the blended and/or diluted oils to the desired concentration and customer spe as alcohol, sugar (ºBrix), % solids, and many other parameters. Specific Gravity is always checked on f consistency.

Petroleum

The DDM 2911 complies with all the requirements of ASTM D4052, D5002, D5931, D1250, DIN 51757 Gravity, API Numbers are all determined at various temperatures using the DDM 2911 for QC in Refine

Pharmaceuticals

USP29 <841> Specific Gravity Method II and USP29-NF24 approves the use of the DDM 2911 Automat Pharmacopoeia 5.0 (2005), pp. 27-28; Pharmeuropa , Vol. 15, 1, January 2003, pp. 174-175 approves Meter. Uses include the checking of incoming raw
materials and for final testing of product to be released. The DDM 2911 is compliant with 21CFR Part 1

Soft Drinks – Beverage

The DDM 2911 is used primarily to measure the sugar (ºBrix) of the final product to check for proper bl Consistency of product is essential to this industry and the measurement of density using the DDM 291 this end.

Tags: alcohol, API, ASTM D1250, ASTM D4052, ASTM D5002, ASTM D5931, Automatic, benchtop, Brix, calibration, concer DIN 51 757, essential oils, European Pharmacopoeia 5.0, Molarity, Normality, percent by weight or volume, petro chemic USP29, USP29-NF24, ºBalling, ºPlato
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