FORMATE FIELD PROCEDURES AND APPLICATIONS

SECTION C2
FLUID TESTING AND PROPERTY MAINTENANCE

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CABOT

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C2.1 Fluid testing procedures

C2.1.1 Introduction

Most of the standard API 13J 'Testing of Heavy Brines' recommended practices (API, 2014) and API 13B-1 'Recommended Practice for Field Testing Water-Based Drilling Fluids' (API, 2017) are valid for formate-based fluids. There are, however, some tests that should not be used for formate brines and alternative, formate-specific methods have been developed by Cabot Specialty Fluids. Table 1 lists the standard API tests, specifying those recommended for formate fluids and those that are not. Full descriptions of the methods that are unique for formate fluids or modified for use with formate fluids are given below.

C2.1.2 pH

The pH of formate drilling fluid filtrate or completion brine should **always be measured on a sample diluted with nine parts deionized water** as undiluted samples give erroneous results (see Section A6 pH and Buffering). pH of this diluted brine is best measured with a glass electrode pH meter (see Section A6 pH and Buffering). pH paper can be used, but generally gives a less accurate pH reading. A handheld pH meter (Hanna Instruments – Waterproof Handheld pH / Temp Probe – HI 98128) is used by Cabot and gives very reliable pH measurements in diluted (1:9) formate brines. If the pH reading is used to calculate buffer concentration (see C2.1.7), it is important that a reliable, suitably calibrated pH meter is used.

C2.1.3 Density

The density of formate fluids can be measured using one of three devices: pressurized mud balance, hydrometer, or digital density meter. The pressurized mud balance should be used for formate drilling fluids and preferably the digital density meter, or alternatively the hydrometer, for formate brines and filtrates. When measuring density with a mud balance, adhere to the procedure described in API Recommended Practice 13B-1 (2017). Make sure to use the 2017 version of the procedure, as it is more comprehensive than previous versions. Use the density and the temperature measured to calculate the corrected density (at 15.6°C / 60°F), adhering to the procedure described on page 3.

Table 1 API tests in formate brines and fluids.

Test	Method	Comments
pH	Cabot method	On sample diluted (1:9) with deionized water
Density (drilling fluid)	API-13B-1	Use Cabot temperature correction method
Density (brine)	API-13J	Use density meter or hydrometer and Cabot temperature correction method
Solids analysis	Cabot method	DO NOT run retort with formate fluids. Use alternative Cabot method
Chlorides	API-13B-1	No change. Presence of bromide ions results in overestimated chloride levels
Total hardness (Ca^{2+} + Mg^{2+})	API-13B-1	Test is not required for buffered formate fluids. If the test is used on formate fluids without buffer present, the sodium hypochlorite treatment should be avoided
Calcium	API-13B-1	Test is not required for buffered formate fluids. If the test is used on formate fluids without buffer present, the sodium hypochlorite treatment should be avoided
Turbidity	API-13J	No change
API fluid loss	API-13B-1	No change. Advisable to run two cells to obtain enough clear filtrate for chemical analyses
HPHT fluid loss	API-13B-1	No change
Rheology	API-13B-1	No change
Alkalinity and lime content (P_f, M_f)	API-13B-1	M_f cannot be measured in formate brines. See alternative Cabot method for buffer concentration
Buffer concentration (CO_3^{2-} and HCO_3^-)	Cabot method	Replaces API alkalinity test (P_f, M_f)
Cation exchange capacity (Methylene Blue Test – MBT)	API-13B-1	Sodium hypochlorite treatment should be avoided

Hydrometer – for brine and filtrate

- Take a 250 mL volumetric cylinder and fill close to the rim with the test fluid.
- Measure the temperature using a 7 cm immersion thermometer or another temperature measuring device with 0–105°C / 32–221°F temperature range. This is the 'actual temperature' of the sample.
- Use a hydrometer that covers the sample's density range.
- Spin hydrometer and measure density at the base of the meniscus once it stops and has balanced.
- The corrected density (at 15.6°C / 60°F) can be calculated using the procedure described in the next column.

Digital density meter (Densito 30PX portable density meter) – for clean brine and filtrate

- Switch the instrument on by pressing and holding the ESC key.
- The instrument measures both specific gravity (SG) and density (g/cm^3 or lb/gal).
- Test the instrument daily.
- Test the instrument using deionized water (or the standard provided if deionized water is unavailable).
- For the instrument test, preferably choose SG (t/t). Alternatively, choose g/cm^3 and compare against Table 13.1 in the equipment manual.
- If deionized water is available, rinse the instrument by filling the measuring cell with deionized water and draining it three times.
- Fill the measuring cell with deionized water.
- If deionized water is unavailable, rinse the instrument by filling the measuring cell with bottled or tap water, drain it three times, and fill the measuring cell with the standard using a syringe.
- Press the OK / MEAS button to start the measurement.
- When SG (t/t) is used, if the displayed result is less than 0.999 or greater than 1.001, adjust the instrument using the instructions in the equipment manual. Retest the instrument.
- When density (g/cm^3) is used, compare the measured value against Table 13.1 in the equipment manual (do not use DensiCalc™ to correct water density). If the difference is more than 0.001, repeat the instrument test using SG (t/t) and follow the adjustment instructions in the equipment manual. Retest the instrument.
- Before carrying out the measurement, set the digital density meter to the appropriate unit.
- To air purge the measuring cell, press the drain button. If the measuring solution is dirty, rinse with deionized water and air purge the measuring cell three times.
- Rinse and air purge the measuring cell three times with the same brine before carrying out the measurement. Ensure there are no bubbles in the measuring cell.
- Fill the measuring cell with the brine. Record the density / SG and the temperature.
- Switch the instrument off by pressing and holding the ESC key for two seconds.
- The corrected density (at 15.6°C / 60°F) can be calculated using the method described below.

Calculation of corrected density

Once the density and 'actual temperature' have been measured, the corrected density at standard conditions (15.6°C / 60°F) can be calculated. Complete temperature correction data exist for diluted single-salt potassium formate brines, and for potassium / cesium formate brine blends. There are three ways of utilizing these data for calculating density at standard conditions:

1. Use **DensiCalc** software, available free from Cabot (cabotcorp.com/densicalc). DensiCalc provides the most accurate corrected density for a wide range of reference temperatures (10–70°C / 50–158°F)
2. Use Table 3 to Table 14 for corrected density at 15.6°C / 60°F. The corrected fluid density can be found in the cell where the measured density and measured temperature intercept.
3. Use the following formulae to calculate the density at 15.6°C / 60°F:

If $\rho_M < 1.57$

$$\rho_{ST} = -0.0309 + 1.0388 \times \rho_M - 4.998 \times 10^{-5} \times T_M - 0.0163 \times \rho_M^2 + 6.695 \times 10^{-7} \times T_M^2 + 4.402 \times 10^{-4} \times \rho_M \times T_M \quad (1)$$

If $\rho_M \geq 1.57$

$$\rho_{ST} = 0.01525 + 0.9785 \times \rho_M - 1.918 \times 10^{-4} \times T_M + 3.402 \times 10^{-3} \times \rho_M^2 + 4.194 \times 10^{-7} \times T_M^2 + 5.392 \times 10^{-4} \times \rho_M \times T_M \quad (2)$$

where

ρ_{ST} = density at 15.6°C / 60°F
ρ_M = measured density
T_M = measured temperature in °C

Example:

$\rho_M = 2.095$
$T_M = 37°C$
$\rho_{ST} = 0.01525 + 0.9785 \times 2.095 - 1.918 \times 10^{-4} \times 37 + 3.402 \times 10^{-3} \times 2.095^2 + 4.194 \times 10^{-7} \times 37^2 + 5.392 \times 10^{-4} \times 2.095 \times 37 = 2.115$

Calculation of effective density
The effect of temperature and pressure on the density of the fluid in the well must be calculated to provide the required equivalent static density (ESD). This is best achieved using DensiCalc software, freely available from Cabot (cabotcorp.com/densicalc). It is not advised to use the method recommended by API to calculate the effective density manually as it is too generic and simplified.

For formate brines, the temperature effect on density is much greater than the pressure effect. As a rule of thumb, Table 2 can be used for estimating bottom-hole density from the corrected density. Remember this is a rough guide only and is affected by well type, such as deepwater wells where the temperature profile is influenced by seawater cooling the riser.

Table 2 Rough estimate of density correction in formate brines as a function of bottom-hole temperature.

Bottom-hole temperature		Reduction in density from density at standard conditions	
[°C]	[°F]	g/cm³	lb/gal
100	212	0.014	0.12
150	302	0.035	0.29
200	392	0.056	0.47

C2.1.4 Solids analysis of formate fluids

Warning – never run a retort test on a formate fluid!

The standard API retort test should never be used with formate fluids or other concentrated brines because the condensation chamber of the standard retort could become plugged with salt crystals causing the retort to burst. Even if the retort test could be performed safely, results are invalid since most solids are formed from formate salts crystallizing out of the highly concentrated brines. Solids in a formate mud generally comprise of drilled solids and calcium carbonate bridging solids (no weighting material is required in formate muds). Based on this, an alternative solids analysis procedure is detailed here.

Calcium carbonate determination
A method has been developed to test for calcium carbonate bridging material in formate fluids. The method, which is based on the standard API total hardness (Ca^{2+}, Mg^{2+}) test, involves removing the carbonate component as carbon dioxide by lowering the pH. The method determines the combined calcium carbonate and magnesium carbonate concentrations, which means that any dolomite-type weighting material is also determined. The method is as follows:

- Add 1 mL formate drilling fluid to a 100 mL volumetric flask.
- Add 9 mL 2N (or 3.5 mL 5N) hydrochloric acid.
- Agitate gently to ensure all the calcium carbonate has dissolved.
- Fill the volumetric flask to the 100 mL line with deionized water and shake.
- Take a 10 mL sample from the volumetric flask and place in a smaller glass vessel.
- Add 0.5 mL 8N potassium hydroxide (KOH).
- Check that the pH is at 14 with pH paper and add more potassium hydroxide, if required.
- Add Calver 2 Indicator and titrate with EDTA (0.01 M), recording the volume of EDTA required to change from red to blue.

The calcium carbonate concentration can be calculated as:

$$C_{CaCO_3}\ (g/L \text{ or } kg/m^3) = 10 \times V_{EDTA}\ (mL) \qquad (3)$$

where
C_{CaCO_3} = $CaCO_3$ concentration (kg/m^3 or g/L)
V_{EDTA} = Volume 0.01M EDTA (mL)

Example:
If EDTA titration = 5 mL, then the calcium carbonate concentration would be 50 g/L (since the chemical analysis was performed using 10 mL of the 100 mL prepared sample).

Drill solids determination
The amount of drill solids in the mud is calculated by determining the total solids in the mud (low-gravity solids (LGS) comprising drill solids and calcium carbonate) and then subtracting the calcium carbonate portion. Low-gravity solids in the mud can be calculated by measuring the mud and filtrate densities, using the following equation:

$$LGS\ (vol\%) = \frac{\rho_{mud} - \rho_{filtrate}}{\rho_{LGS} - \rho_{filtrate}} \times 100 \qquad (4)$$

where
ρ_{mud} = density or specific gravity of mud
$\rho_{filtrate}$ = density or specific gravity of filtrate
ρ_{LGS} = density or specific gravity of low-gravity solids

Density of the mud is measured using a pressurized mud balance (see C2.1.3) and density of mud HPHT

filtrate is measured using either the density meter or a 5 mL gravity bottle. Please note that the same unit should be used for all densities in Equation 4. If a density bottle is used, the bottle is first weighed empty, then filled with filtrate and re-weighed. The density is calculated from the difference between the two weights divided by the filtrate volume, which is inscribed on the gravity bottle. The temperatures are also measured and the densities are corrected to standard temperature (15.6°C / 60°F) using DensiCalc. By assuming that the density of the low-gravity solids is 2.60 g/cm^3 / 21.70 lb/gal, LGS concentration in the fluid can be calculated as:

METRIC UNITS

$$C_{LGS}\,(g/L) = 26 \times LGS\,(vol\%) \quad (5)$$

FIELD UNITS

$$C_{LGS}\,(lb/bbl) = 9.11 \times LGS\,(vol\%) \quad (6)$$

and the drill solids concentration is calculated as follows:

$$C_{DS} = C_{LGS} - C_{CaCO_3} \quad (7)$$

where C_{DS}, C_{LGS}, and C_{CaCO_3} are concentrations of drill solids, low-gravity solids, and calcium carbonate respectively. This equation is valid for all density units. It should be noted that this method can give inaccurate results in the following situations:

- Contamination with hydrocarbons and / or surfactants. This can result in a significant underestimation of solids concentration.
- Slow filtration, resulting in absorption of water by the hygroscopic formate filtrate. This can result in a significant overestimation of solids concentration.
- Inaccurate mud-density measurement with pressurized mud balance.

Slow filtration can be addressed by elevating the pH of the mud to 12.5–13.0 using concentrated *KOH* or *NaOH* or by adding diatomaceous earth (DE) to the mud. To measure mud density as accurately as possible, API guidelines should be adhered to and the mud-balance calibration record checked to ensure it is up to date.

C2.1.5 Total hardness ($Ca^{2+} + Mg^{2+}$)

In formate fluid containing carbonate / bicarbonate pH buffer, it is unnecessary to check calcium or magnesium levels as these ions cannot be present in any significant amounts as they precipitate out with the carbonate buffer component.

If total hardness is measured in unbuffered formate fluid or in a formate fluid where the buffer could have been consumed, then the standard API method cannot be used directly because the oxidizing agent hypochlorite, which is added to remove certain organic components that obscure the titration endpoint, rapidly oxidizes the formate. If such a test is required, the API method should be modified to omit this step. Cabot recommends the following modified method for determining hardness in formate brine or filtrate:

- Pipette 1 mL formate brine or filtrate to a 100–200 mL glass vessel.
- Fill the glass vessel up to 50 mL with deionized water and shake.
- Add about 2 mL buffer solution (67.5 g ammonium chloride and 570 mL ammonium hydroxide diluted to 1,000 mL with distilled water) and swirl to mix.
- Add sufficient hardness indicator, e.g. two to six drops of Calmagite® or equivalent, and mix. A wine-red color develops if calcium and / or magnesium is / are present.
- Titrate with 0.01 M EDTA and record the volume of EDTA required to change from red to blue.

The concentration of Ca^{2+} and Mg^{2+} can be calculated as:

$$C_{Ca^{2+}} + C_{Mg^{2+}}\,(mol/L) = \frac{V_{EDTA}\,(mL)}{100} \quad (8)$$

The equivalent weight of calcium that this corresponds to ('total hardness as calcium') is:

$$C_{Ca^{2+}}\,(mg/L) = 400 \times V_{EDTA}\,(mL) \quad (9)$$

where:

V_{EDTA} = Volume 0.01M EDTA (mL)

C2.1.6 Calcium (Ca^{2+})

In formate fluid containing carbonate / bicarbonate pH buffer, it is unnecessary to check for calcium levels as calcium cannot be present. If the calcium concentration needs to be measured in unbuffered formate fluid or in a formate fluid where the buffer could have been consumed, then the standard API method cannot be used directly because the oxidizing agent, hypochlorite, rapidly oxidizes the formate. Cabot recommends the following modified method for determining hardness in a formate brine or filtrate:

- Pipette 1 mL formate brine or filtrate to a 100–200ml glass vessel.
- Fill the glass vessel up to 50 mL with deionized water and shake.
- Add sodium or potassium hydroxide solution to bring the pH to 14.
- Check that the pH is at 14 with pH paper and add

more sodium or potassium hydroxide, if required.
- Add enough calcium indicator, e.g. Calver® II Indicator, and mix. A wine-red color develops if calcium is present.
- Titrate with 0.01 M EDTA and record the volume of EDTA required to change from red to blue.

The molar concentration of calcium can be calculated as:

$$C_{Ca^{2+}}\,(mol/L) = \frac{V_{EDTA}\,(mL)}{100} \quad (10)$$

and the concentration of calcium on a weight basis is:

$$C_{Ca^{2+}}\,(mg/L) = 400 \times V_{EDTA}\,(mL) \quad (11)$$

where:

V_{EDTA} = Volume 0.01M EDTA (mL)

C2.1.7 Dissolved carbonate and bicarbonate (pH buffer) content

For standard water-based mud filtrates, API RP 13B-1 (2017) recommends that carbonate and bicarbonate content are measured by pH titrations. Alkalinity in the form of carbonate content, bicarbonate content, and hydroxide content is determined by the combination of a phenolphthalein titration with an endpoint (P_f) of pH = 8.2, and a methyl orange titration to an endpoint (M_f) of pH = 3.1.

In formate brines, the determination of the methyl orange titration endpoint is complicated by the formate / formic acid equilibrium present at pH = 3.75 (explained in Section A6 pH and Buffering). The fact that only one of the two standard titration endpoints can be determined in a formate brine means that the standard API alkalinity test method is unsuitable for determining carbonate and bicarbonate concentrations in formate fluids.

Laboratory testing of formate brines with known additions of carbonate and bicarbonate have shown that pH of buffered formate brines is dependent on the carbonate-to-bicarbonate ratio (see Section A6 pH and Buffering). The following relationship, R, has been found between the carbonate and bicarbonate molar ratio and the brine fluid pH:

$$R = \frac{[CO_3^{2-}](mol/L)}{[HCO_3^{-}](mol/L)} = A \times exp\,(B \times pH) \quad (12)$$

where

$A = 3.894 \times 10^{-10}$

$B = 2.193$

and $[CO_3^{2-}]$ and $[HCO^{3-}]$ are the molar concentrations of carbonate and bicarbonate. This relationship, shown in Figure 1, is valid for pH measured with a glass electrode in formate brine diluted with nine parts deionized water.

This relationship can be used to determine the molar ratio of the buffering components, carbonate and bicarbonate. This means that both carbonate and bicarbonate concentrations can be determined just by measuring pH and performing the standard phenolphthalein titration to determine the carbonate concentration. The method is as follows:

1. Prepare a sample consisting of 5 mL fluid (brine or mud filtrate) and 45 mL deionized water.
2. Measure pH of the sample using a calibrated glass electrode.
3. Perform a titration to pH = 8.2 with 0.02 N *HCl* or H_2SO_4 and report the phenolphthalein alkalinity p_f as the volume, V (mL), titrant required per mL of fluid sample (brine or mud filtrate):

$$Pf = V(mL) / 5 \quad (13)$$

Depending on pH, four situations exist:

1. pH > 11.1

$$[CO_3^{2-}](mol/L) + OH^{-}(mol/L) = 0.02 \times P_f \quad (14)$$

$$[HCO_3^{-}] = 0 \quad (15)$$

Assuming that large amounts of OH^- have not been added to this fluid, one can assume that most of this alkalinity is from carbonate.

2. pH = 11.1

$$[OH^{-}] = 0 \quad (16)$$

$$[CO_3^{2-}]\,(mol/L) = 0.02 \times P_f \quad (17)$$

$$[HCO_3^{-}] = 0 \quad (18)$$

3. 10.0 < pH < 11.1

$$[OH^{-}] = 0 \quad (19)$$

$$[CO_3^{2-}]\,(mol/L) = 0.02 \times P_f \quad (20)$$

From the carbonate / bicarbonate pH relationship in Equation 12 and Figure 1, determine the carbonate / bicarbonate molar ratio, R. Calculate the bicarbonate concentration as:

$$[HCO_3^{-}]\,(mol/L) = [CO_3^{2-}]\,(mol/L) / R \quad (21)$$

4. pH < = 10.0

$$[OH^{-}] = 0 \quad (22)$$

$[CO_3^{2-}]$ = difficult to determine

$[HCO_3^{-}]$ = difficult to determine

pH needs to be raised to above 10.0 with OH^- before the bicarbonate level can be determined.

Carbonate and bicarbonate levels can also be determined on a weight / volume basis:

$$C_{CO_3^{2-}}\,(mg/L) = 60{,}000 \times [CO_3^{2-}]\,(mol/L) \quad (23)$$

$$C_{CO_3^{2-}}\,(kg/m^3) = 60 \times [CO_3^{2-}]\,(mol/L) \quad (24)$$

$$C_{CO_3^{2-}}\,(lb/bbl) = 21.03 \times [CO_3^{2-}]\,(mol/L) \quad (25)$$

$$C_{HCO_3^-}\,(mg/L) = 61{,}000 \times [HCO_3^-]\,(mol/L) \quad (26)$$

$$C_{HCO_3^-}\,(kg/m^3) = 61 \times [HCO_3^-]\,(mol/L) \quad (27)$$

$$C_{HCO_3^-}\,(lb/bbl) = 21.38 \times [HCO_3^-]\,(mol/L) \quad (28)$$

where

$C_{CO_3^{2-}} = CO_3^{2-}$ concentration $C_{HCO_3^-} = HCO_3^-$ concentration

or as sodium or potassium carbonate and bicarbonate (valid for any weight / volume unit, e.g. kg/m³, g/L, lb/bbl):

$$C_{K_2CO_3}\,(w/vol) = 2.30 \times C_{CO_3^{2-}}\,(w/vol) \quad (29)$$

$$C_{KHCO_3}\,(w/vol) = 1.64 \times C_{HCO_3^-}\,(w/vol) \quad (30)$$

$$C_{Na_2CO_3}\,(w/vol) = 1.77 \times C_{CO_3^{2-}}\,(w/vol) \quad (31)$$

$$C_{NaHCO_3}\,(w/vol) = 1.38 \times C_{HCO_3^-}\,(w/vol) \quad (32)$$

where

$C_{K_2CO_3} = K_2CO_3$ concentration $C_{KHCO_3} = KHCO_3$ concentration

$C_{Na_2CO_3} = Na_2CO_3$ concentration $C_{NaHCO_3} = NaHCO_3$ concentration

It should be noted that performing a titration to pH = 8.2 gives a much more accurate result than using the phenolphthalein indicator. Equation 12 can be used to calculate the bicarbonate concentration directly in a spreadsheet, rather than determining R from Figure 1. A spreadsheet calculator can be obtained from Cabot.

C2.2 Property maintenance and adjustment

C2.2.1 Introduction

The essential properties of formate drilling fluids that need monitoring and maintaining during use are density, rheology, fluid-loss control, solids content, and buffer concentrations.

C2.2.2 Density

Rigsite density monitoring

The method of measuring density and converting to corrected density is described in C2.1.3. The corrected fluid density should be maintained during use to provide the required hydrostatic pressure in the wellbore.

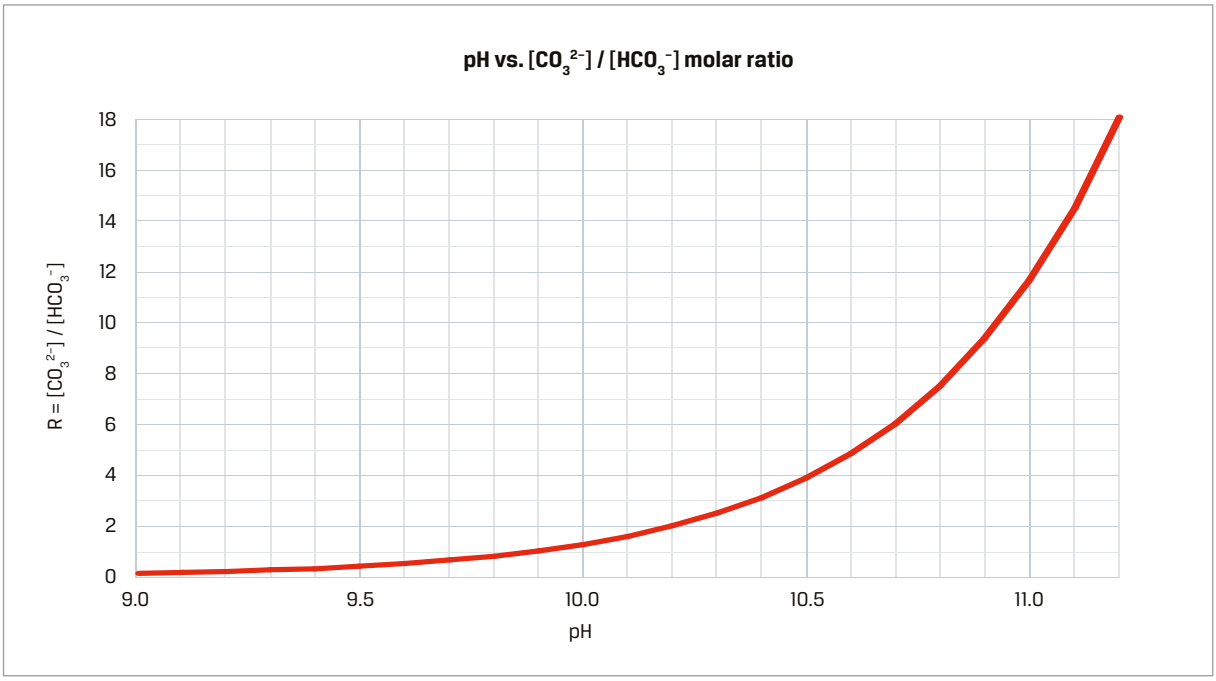

Figure 1 Relationship between pH and carbonate-to-bicarbonate molar ratio in buffered formate brine.

Density increase

The weighting agent used for density increases should be determined according to the following guidelines:

- To **increase** density due to operational requirements (no water contamination), use spike fluid from the heaviest formate salt being used or a blend with significantly higher density.
- To **restore** density from water contamination, powdered formate salt should be used if available. For cesium / potassium blends it is economically beneficial to restore the density using both the salts in the same ratio as in the original blend rather than just using cesium formate powder. If powder is not available, spike fluid can be used.

The volume of water contamination is difficult to calculate exactly due to volume contractions taking place when water is added to concentrated formate brines. It can be estimated as follows:

METRIC UNITS

$$V_w = (\rho_{before} - \rho_{after}) \times \frac{V_c}{\rho_{before} \text{-} 1} \quad (33)$$

where

V_w = water contamination volume
V_c = fluid volume after contamination
ρ_{before} = density before contamination
ρ_{after} = density after contamination

FIELD UNITS

$$V_w = (\rho_{before} - \rho_{after}) \times \frac{V_c}{\rho_{before} - 8.33} \quad (34)$$

where

V_w = water contamination volume
V_c = fluid volume after contamination
ρ_{before} = density before contamination, lb/gal
ρ_{after} = density after contamination, lb/gal

For both metric and field units, the equations are independent of volume units as long as they are consistent. The output unit is the same as the input unit. Volume contraction means that the calculated water volume is underestimated.

Example:

Formate brine with an original density of 2.00 g/cm³ is contaminated with water. Density reduces to 1.95 g/cm³ and total volume after contamination is 100 bbl.
The volume of water contamination in bbls can be calculated as:

$$V_w \text{ (bbl)} = (2.0 - 1.95) \times \frac{100}{2.0 - 1.0} = 0.05 \times 100 = 5 \text{ bbl}$$

The actual amount is 5.44 bbl, showing for this case a 0.44 bbl underestimation due to volume contraction. For all single-salt brines, the amount of salt required to adjust density should be calculated using Table 15 to Table 20. To calculate the quantity of salt required, convert the volume of water contamination to weight:

METRIC UNITS

$$W_{water} \text{ (kg)} = V_{water} \text{ (m}^3\text{)} \times 999 \quad (35)$$

where

W_{water} = weight of water contamination in kg
V_{water} = volume of water contamination in m³

FIELD UNITS

$$W_{water} \text{ (lb)} = V_{water} \text{ (bbl)} \times 350 \quad (36)$$

where

W_{water} = weight of water contamination in lb
V_{water} = volume of water contamination in bbl

Example:

In the example above, the 5 bbl of water has a weight of:

$$W_{water} \text{ (lb)} = 5 \times 350 = 1{,}750 \text{ lb}$$

In the appropriate table (Table 15 to Table 20), find the density required in the first column and read off the wt% salt from the second column. The weight of salt required can be calculated as:

METRIC AND FIELD UNITS

$$W_{salt} = W_{water} \times \frac{wt\%_{salt}}{100 - wt\%_{salt}} \quad (37)$$

where

W_{salt} = weight of salt required
W_{water} = weight of water contamination

The equation is independent of weight units as long as they are consistent. The output unit is the same as the input unit.

To weight up blended cesium and potassium formate brines with powder (if available), use either pure cesium formate powder or a blend of cesium and potassium formate powder. If pure cesium formate powder is used the single-salt cesium formate brine table should be applied (Tables 19 and 20). If a blend of cesium and potassium formate powder is used the cesium / potassium formate

blending tables (Tables 21 to 26) should be applied to determine the wt% potassium, wt% cesium, and wt% water required. The weight of each salt required is:

$$W_{CsCOOH} = W_{water} \times \frac{wt\%CsCOOH}{wt\%water} \quad (38)$$

$$W_{KCOOH} = W_{water} \times \frac{wt\%KCOOH}{wt\%water} \quad (39)$$

Example:
For the example used earlier, 5 bbl of water contamination requires salt to restore the density to 2.00 g/cm³. From Table 21, the amount of cesium formate powder required for a 2.00 g/cm³ blend is 60.0 wt%, the amount of potassium formate powder is 18.7 wt%, and the amount of water is 21.3 wt%.

The amount of cesium formate salt required can be calculated as:

$$W_{CsCOOH} = 1{,}750\ lb \times \frac{60.0}{21.3} = 4{,}930\ lb$$

And the amount of potassium formate salt required as:

$$W_{KCOOH} = 1{,}750\ lb \times \frac{18.7}{21.3} = 1{,}536\ lb$$

Density reduction
The choice of fluid for density reduction is quite complex. For single-salt brines, density reduction should be made using water. Lower density formate brines can be used, but for pure cesium formate brine the addition of potassium formate has a significant negative impact on the value of the brine returned.

For formate blends, density reduction should preferably be made by adding the spike fluid of the lower density component. For example, potassium formate spike fluid should be used to reduce the density of a cesium / potassium formate blend. For logistical reasons, it might be necessary to use water to dilute blended brines. To calculate the quantity of lower density fluid (diluent) required, use the following formula:

$$V_{diluent} = \frac{V_{start} \times (\rho_{start} - \rho_{required})}{(\rho_{required} - \rho_{diluent})} \quad (40)$$

where
$V_{diluent}$ = diluent volume
V_{start} = start volume
ρ_{start} = start density
$\rho_{required}$ = required density
$\rho_{diluent}$ = diluent density

The equations are independent of units as long as they are consistent. The output unit is the same as the input unit. Be aware that if the diluent is water, then calculated diluent volume is underestimated due to volume contraction.

Solids
Solid-weighting agents can be used to increase the density of formate drilling fluids, but in emergency situations only. The presence of solid-weighting material not only reduces the value of the returned brine, but it also has a negative impact on the fluid's properties.

C2.2.3 Contamination

Like all well construction and intervention fluids, formate brines can become contaminated with various soluble and insoluble substances during use. These contaminants should be treated as follows.

Calcium and magnesium
Formate fluid containing a carbonate / bicarbonate pH buffer system does not hold any significant concentration of soluble calcium or magnesium ions. This is because these ions precipitate out with the buffer and form calcium or magnesium carbonate as soon as they enter the buffered brine. If at any time the buffer is consumed, then free calcium or magnesium ions may be present in the fluid. If significant calcium or magnesium levels are measured in a buffered formate fluid, then this is a sure sign that the buffer has been consumed.

Calcium or magnesium contaminants should be removed and buffer level restored with the addition of new buffer. The addition of potassium or sodium carbonate precipitates out calcium or magnesium as calcium or magnesium carbonate and buffer levels are restored.

Cement contamination
If a formate fluid becomes contaminated with cement, the buffer might be consumed by precipitation of calcium carbonate. As cement contamination also causes pH to rise, cement contamination is best treated with potassium or sodium bicarbonate. This precipitates out calcium as calcium carbonate and at the same time restores pH.

Solids contamination
Over time, formate fluids can pick up solid contaminants. For brine operations, solids should be removed using conventional filtration.

Formate drilling fluids normally provide excellent hole cleaning, efficiently removing drilled cuttings from the hole. The low solids and shear-thinning properties of

formate drilling fluids enable solids control equipment to run very efficiently. Very fine shaker screens should be run, once the mud has warmed and the polymers are fully hydrated. However, fine shaker screens usually have relatively low life expectancy so they need to be monitored very closely to enable tears to be detected and repaired. It is recommended that heavily worn screens be changed before they tear.

Centrifuges are not suited for heavy formate fluids as the density difference between the drilled solids and the fluid is too small. The 'dump and dilute' method can also be used to control drill solids, but any cesium formate-based fluids and possibly potassium formate-based fluids should be returned to the plant for reclamation. They should not be discharged.

C2.2.4 pH maintenance

In a formate fluid buffered with carbonate / bicarbonate, pH is dependent on the state of the buffer. More specifically, pH is dependent on the carbonate-to-bicarbonate ratio as shown in Figure 1. Therefore, an alteration in fluid pH is a sign that the carbonate and bicarbonate concentrations are changing, so levels of carbonate and bicarbonate need to be measured.

Treatment with acid or hydroxide to adjust pH should not be conducted unless this is the treatment recommended to maintain carbonate / bicarbonate concentrations (see C2.2.5).

C2.2.5 Carbonate / bicarbonate (buffer) maintenance

Carbonate and bicarbonate are the preferred buffering components for formate fluids and should always be present in significant quantities if influxes of acid gas are expected, while the formate brine is static in the hole for extended periods. (See Section A6 pH and Buffering and C2.1.7.)

In the field, one normally experiences that the carbonate concentration (buffer capacity) reduces during use, whilst the bicarbonate concentration either increases or decreases. The following downhole events can impact buffer concentrations:

- **Influx of CO_2 gas**
  The consequences of CO_2-gas influx are that the carbonate concentration decreases, whilst the bicarbonate concentration increases (the increase in bicarbonate concentration equals twice the decrease of the carbonate concentration). The first sign of this is a drop in pH. Another sign is that a relatively large amount of treatment with carbonate or hydroxide is required to restore pH.
- **Influx of divalent ions, e.g. Ca^{2+} or Mg^{2+}**
  The consequences of this divalent-ion influx are that both carbonate and bicarbonate levels decrease. The whole buffer can be consumed. The first sign of such influx is a fast fall in pH after it has been restored with carbonate.
- **Barite contamination**
  If a buffered concentrated formate brine becomes contaminated with barite weighting material from other fluid systems, carbonate can precipitate out with the divalent Ba^{2+} ion. The extent of this precipitation depends on the brine composition, temperature, and contact time (Howard et al., 2016).

To restore buffer capacity and pH after such events, Cabot normally recommends adding more potassium or sodium carbonate. However, the addition of carbonate to restore buffer capacity after significant influxes of acid gas can lead to a build-up of the bicarbonate concentration over time, which might have an adverse effect on certain polymers, e.g. PAC and xanthan, resulting in high fluid loss and gelling problems. If this is encountered, potassium or sodium carbonate additions should be replaced with potassium or sodium hydroxide. Such hydroxide addition restores the carbonate level (buffer capacity) by converting bicarbonate to carbonate, simultaneously as bicarbonate concentration lowers. It is imperative that potassium or sodium hydroxide is added gradually as excessive amounts of hydroxide can have an adverse effect on polymers in the fluid.

The plot shown in Figure 2 can be useful in determining the amount of carbonate and bicarbonate additions required to maintain programmed buffer levels and pH in buffered formate brines.

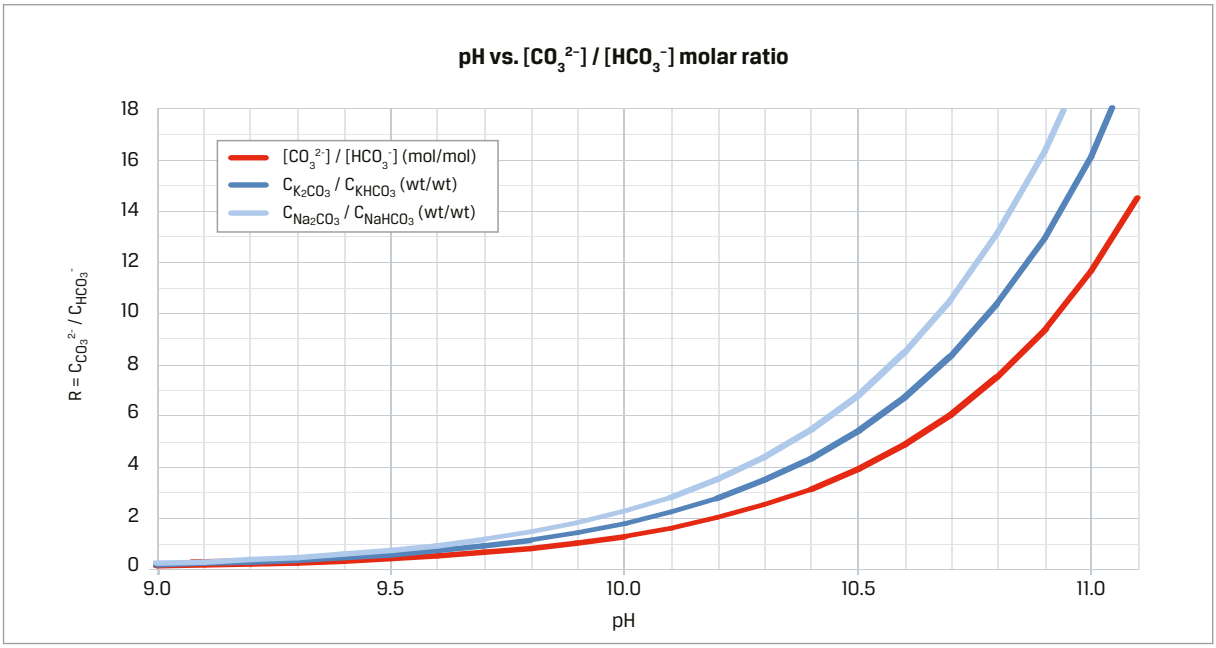

Figure 2 Relationship between pH and carbonate-to-bicarbonate molar ratio (red line), potassium carbonate-to-potassium bicarbonate weight ratio (dark blue line) and sodium carbonate-to-sodium bicarbonate weight ratio (light blue line) in buffered formate brines.

C2.2.6 Calcium carbonate maintenance

In formate drilling fluids, graded $CaCO_3$ is often added to help improve filter-cake quality and control fluid loss. Due to the low solids content, formate fluid systems have much-improved rheology and reduced ECD compared to solids-weighted systems. The carefully sized calcium carbonate bridging particles are designed to seal permeable formations, providing a means to reduce or even eliminate seepage losses to the reservoir. Lower ECDs reduce seepage losses without having to reduce pump rate or ROP.

However, the product also acts as a weighting agent and this must be allowed for and included in density adjustment calculations for the circulating system and for pre-mixes whenever these additions are made. The level of $CaCO_3$ may also require adjustment after shearing, once the properties have stabilized. Screens as fine as 250 mesh are likely run during formate drilling operations, so regular monitoring of $CaCO_3$ levels is required and additions have to be made to the system, via suitably treated active mud or premix additions, to replace larger $CaCO_3$ particles screened out at the shakers.

C2.2.7 Polymer maintenance

Due to the extra temperature and shear conditions required to provide effective yield of polymers in formate brines, formate fluids delivered to the rig site can be thinner and exhibit higher initial fluid loss than programmed. The system must be allowed to circulate for several hours before assessing the true level of viscosity and fluid loss, prior to making adjustments.

Remember, there is a significant time delay between adding polymers and realizing the full effect on fluid properties.

1. Polymers should be slowly added to the formate fluids through a high shear hopper to facilitate mixing and to prevent the formation of 'fisheyes'.
2. It is recommended that a reduced quantity of polymers is added to the initial mix to prevent blinding of the shakers on the initial circulation. The additional polymers can then be added gradually over the first few circulations.
3. Fine shaker screens should not be used before the polymers are properly hydrated.

C2.3 Performance enhancement and problem solving

C2.3.1 ROP enhancement

In HPHT wells, ROP is normally limited by well control procedures that have typically been established based on performance issues with oil-based mud, e.g. Jøntvedt, 2018. ROPs achieved with formate drilling fluids are substantially higher than with conventional mud systems, also when drilling through shale (van Oort, 2017). The reasons for this are the low level

of solids and the low water activity of the system. Maintaining a low-solids level has two main effects.

1. The higher spurt loss of the low-solids system equalizes the pressure around cutting, effectively reducing the chip hold-down pressure.

2. Lower ECD is beneficial for reducing risk of losses and improving flow rates for turbine power and hole cleaning. This reduced overbalance reduces rock strength and improves ROP.

Low water activity promotes chemical osmosis, which is an important contributor to high ROP when drilling through shale.

To maximize ROP, maintain a high formate brine concentration and low solids content. Water-diluted formate brines may not have low enough water activity to support the required chemical osmosis in shale. Keep the solids content low by adding the minimum amount of calcium carbonate bridging solids, and keep the LGS low using fine shaker screens. As long as the filtercake remains thin, it is acceptable to run a higher spurt loss than in solids-laden fluid systems.

C2.3.2 Hole cleaning and hydraulics

Formate drilling fluids usually exhibit lower ECDs and gel strengths than conventional drilling fluids. Low ECDs mean that higher pump rates are possible, which is critical for effective hole cleaning. Field experience has confirmed this. If hole-cleaning problems are suspected, a high-vis pill should be pumped and the shakers monitored for increased cuttings returns.

C2.3.3 Fluid loss, rheology, and gelling problems

In the past, fluid loss, rheology, and gelling problems were occasionally experienced after extensive treatments with potassium carbonate to restore pH after influx of CO_2 gas, resulting in build-up of carbonate and bicarbonate (Berg et al., 2007). Use of the buffer determination method, described in C2.2.5, should prevent this issue from recurring.

If these problems are encountered, additions of potassium or sodium carbonate should be replaced with potassium or sodium hydroxide. Such a hydroxide addition restores the carbonate level (buffer capacity) by converting bicarbonate to carbonate and simultaneously lowers bicarbonate concentration.

It is imperative that potassium or sodium hydroxide is added gradually as excessive hydroxide addition can cause damage to polymers in the fluid.

C2.3.4 Foaming

Foaming should not be a problem with formate fluids as they do not contain any surface-active additives. However, a supply of defoamer should be stocked in the unlikely event of foaming in the pits. For suitable defoamer, see Section B5 Compatibility with Additives.

Foaming has frequently been reported when calcium carbonate is used to weight up potassium formate drilling fluids. Severe performance problems have been reported with such fluids, which have been said to have "the consistency of toothpaste".

To avoid such problems, and to also improve drilling performance, limit carbonate concentration to approximately 45 kg/m^3 / 15 lb/bbl. To fully benefit from low-solids properties of formate fluids, density should come from the formate brine itself, rather than from added solids. This means that a slightly heavier cesium / potassium formate blend should be used, rather than single-salt potassium formate brine.

C2.3.5 Erratic gas readings

Electronic gas detectors are often installed on the rig to monitor hydrogen sulfide (H_2S) and carbon monoxide (CO). In several cases, false alarms have been reported on this kind of equipment with formate use.

In very high temperature wells or after extended exposure to formate fluid, a small amount of hydrogen gas might be produced as a product of the formate / bicarbonate equilibrium. This is normal and not a concern in itself. One should be aware, however, that hydrogen gas might set off the alarm on both H_2S detectors and CO detectors. Before relying on such detectors to measure H_2S and CO, it is important to check with the manufacturer of the instruments whether or not they are sensitive to hydrogen gas.

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Table 3 Metric density correction table for temperatures 10 to 25°C and density 1.00 to 1.40 g/cm³. The corrections are valid for diluted potassium formate brine and can also be used for temperature correction of specific gravity (SG).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 15.6°C																
Measured g/cm³ / SG	Measured fluid temperature [°C]															
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.000	0.996	0.996	0.996	0.997	0.997	0.998	0.998	0.998	0.999	0.999	1.000	1.000	1.001	1.001	1.001	1.002
1.005	1.001	1.001	1.001	1.002	1.002	1.003	1.003	1.003	1.004	1.004	1.005	1.005	1.006	1.006	1.006	1.007
1.010	1.006	1.006	1.006	1.007	1.007	1.008	1.008	1.009	1.009	1.009	1.010	1.010	1.011	1.011	1.012	1.012
1.015	1.011	1.011	1.012	1.012	1.012	1.013	1.013	1.014	1.014	1.014	1.015	1.015	1.016	1.016	1.017	1.017
1.020	1.016	1.016	1.017	1.017	1.017	1.018	1.018	1.019	1.019	1.020	1.020	1.020	1.021	1.021	1.022	1.022
1.025	1.021	1.021	1.022	1.022	1.022	1.023	1.023	1.024	1.024	1.025	1.025	1.025	1.026	1.026	1.027	1.027
1.030	1.026	1.026	1.027	1.027	1.028	1.028	1.028	1.029	1.029	1.030	1.030	1.031	1.031	1.031	1.032	1.032
1.035	1.031	1.031	1.032	1.032	1.033	1.033	1.033	1.034	1.034	1.035	1.035	1.036	1.036	1.036	1.037	1.037
1.040	1.036	1.036	1.037	1.037	1.038	1.038	1.039	1.039	1.039	1.040	1.040	1.041	1.041	1.042	1.042	1.042
1.045	1.041	1.041	1.042	1.042	1.043	1.043	1.044	1.044	1.044	1.045	1.045	1.046	1.046	1.047	1.047	1.048
1.050	1.046	1.046	1.047	1.047	1.048	1.048	1.049	1.049	1.049	1.050	1.050	1.051	1.051	1.052	1.052	1.053
1.055	1.051	1.052	1.052	1.052	1.053	1.053	1.054	1.054	1.055	1.055	1.055	1.056	1.056	1.057	1.057	1.058
1.060	1.056	1.057	1.057	1.057	1.058	1.058	1.059	1.059	1.060	1.060	1.061	1.061	1.061	1.062	1.062	1.063
1.065	1.061	1.062	1.062	1.062	1.063	1.063	1.064	1.064	1.065	1.065	1.066	1.066	1.066	1.067	1.067	1.068
1.070	1.066	1.067	1.067	1.068	1.068	1.068	1.069	1.069	1.070	1.070	1.071	1.071	1.072	1.072	1.072	1.073
1.075	1.071	1.072	1.072	1.073	1.073	1.073	1.074	1.074	1.075	1.075	1.076	1.076	1.077	1.077	1.078	1.078
1.080	1.076	1.077	1.077	1.078	1.078	1.079	1.079	1.079	1.080	1.080	1.081	1.081	1.082	1.082	1.083	1.083
1.085	1.081	1.082	1.082	1.083	1.083	1.084	1.084	1.084	1.085	1.085	1.086	1.086	1.087	1.087	1.088	1.088
1.090	1.086	1.087	1.087	1.088	1.088	1.089	1.089	1.090	1.090	1.090	1.091	1.091	1.092	1.092	1.093	1.093
1.095	1.091	1.092	1.092	1.093	1.093	1.094	1.094	1.095	1.095	1.095	1.096	1.096	1.097	1.097	1.098	1.098
1.100	1.096	1.097	1.097	1.098	1.098	1.099	1.099	1.100	1.100	1.101	1.101	1.101	1.102	1.102	1.103	1.103
1.105	1.101	1.102	1.102	1.103	1.103	1.104	1.104	1.105	1.105	1.106	1.106	1.107	1.107	1.107	1.108	1.108
1.110	1.107	1.107	1.107	1.108	1.108	1.109	1.109	1.110	1.110	1.111	1.111	1.112	1.112	1.113	1.113	1.113
1.115	1.112	1.112	1.112	1.113	1.113	1.114	1.114	1.115	1.115	1.116	1.116	1.117	1.117	1.118	1.118	1.119
1.120	1.117	1.117	1.118	1.118	1.118	1.119	1.119	1.120	1.120	1.121	1.121	1.122	1.122	1.123	1.123	1.124
1.125	1.122	1.122	1.123	1.123	1.123	1.124	1.124	1.125	1.125	1.126	1.126	1.127	1.127	1.128	1.128	1.129
1.130	1.127	1.127	1.128	1.128	1.129	1.129	1.129	1.130	1.130	1.131	1.131	1.132	1.132	1.133	1.133	1.134
1.135	1.132	1.132	1.133	1.133	1.134	1.134	1.134	1.135	1.135	1.136	1.136	1.137	1.137	1.138	1.138	1.139
1.140	1.137	1.137	1.138	1.138	1.139	1.139	1.140	1.140	1.140	1.141	1.141	1.142	1.142	1.143	1.143	1.144
1.145	1.142	1.142	1.143	1.143	1.144	1.144	1.145	1.145	1.146	1.146	1.146	1.147	1.147	1.148	1.148	1.149
1.150	1.147	1.147	1.148	1.148	1.149	1.149	1.150	1.150	1.151	1.151	1.152	1.152	1.153	1.153	1.153	1.154
1.155	1.152	1.152	1.153	1.153	1.154	1.154	1.155	1.155	1.156	1.156	1.157	1.157	1.158	1.158	1.159	1.159
1.160	1.157	1.157	1.158	1.158	1.159	1.159	1.160	1.160	1.161	1.161	1.162	1.162	1.163	1.163	1.164	1.164
1.165	1.162	1.162	1.163	1.163	1.164	1.164	1.165	1.165	1.166	1.166	1.167	1.167	1.168	1.168	1.169	1.169
1.170	1.167	1.167	1.168	1.168	1.169	1.169	1.170	1.170	1.171	1.171	1.172	1.172	1.173	1.173	1.174	1.174
1.175	1.172	1.172	1.173	1.173	1.174	1.174	1.175	1.175	1.176	1.176	1.177	1.177	1.178	1.178	1.179	1.179
1.180	1.177	1.177	1.178	1.178	1.179	1.179	1.180	1.180	1.181	1.181	1.182	1.182	1.183	1.183	1.184	1.184
1.185	1.182	1.182	1.183	1.183	1.184	1.184	1.185	1.185	1.186	1.186	1.187	1.187	1.188	1.188	1.189	1.189
1.190	1.187	1.187	1.188	1.188	1.189	1.189	1.190	1.190	1.191	1.191	1.192	1.192	1.193	1.193	1.194	1.194
1.195	1.192	1.192	1.193	1.193	1.194	1.194	1.195	1.195	1.196	1.196	1.197	1.197	1.198	1.198	1.199	1.199
1.200	1.197	1.198	1.198	1.199	1.199	1.199	1.200	1.200	1.201	1.202	1.202	1.203	1.203	1.204	1.204	1.205
1.205	1.202	1.203	1.203	1.204	1.204	1.205	1.205	1.206	1.206	1.207	1.207	1.208	1.208	1.209	1.209	1.210
1.210	1.207	1.208	1.208	1.209	1.209	1.210	1.210	1.211	1.211	1.212	1.212	1.213	1.213	1.214	1.214	1.215
1.215	1.212	1.213	1.213	1.214	1.214	1.215	1.215	1.216	1.216	1.217	1.217	1.218	1.218	1.219	1.219	1.220
1.220	1.217	1.218	1.218	1.219	1.219	1.220	1.220	1.221	1.221	1.222	1.222	1.223	1.223	1.224	1.224	1.225
1.225	1.222	1.223	1.223	1.224	1.224	1.225	1.225	1.226	1.226	1.227	1.227	1.228	1.228	1.229	1.229	1.230
1.230	1.227	1.228	1.228	1.229	1.229	1.230	1.230	1.231	1.231	1.232	1.232	1.233	1.233	1.234	1.234	1.235
1.235	1.232	1.233	1.233	1.234	1.234	1.235	1.235	1.236	1.236	1.237	1.237	1.238	1.238	1.239	1.239	1.240
1.240	1.237	1.238	1.238	1.239	1.239	1.240	1.240	1.241	1.241	1.242	1.242	1.243	1.243	1.244	1.244	1.245
1.245	1.242	1.243	1.243	1.244	1.244	1.245	1.245	1.246	1.246	1.247	1.247	1.248	1.248	1.249	1.249	1.250
1.250	1.247	1.248	1.248	1.249	1.249	1.250	1.250	1.251	1.251	1.252	1.252	1.253	1.253	1.254	1.255	1.255
1.255	1.252	1.253	1.253	1.254	1.254	1.255	1.255	1.256	1.256	1.257	1.257	1.258	1.258	1.259	1.260	1.260
1.260	1.257	1.258	1.258	1.259	1.259	1.260	1.260	1.261	1.261	1.262	1.262	1.263	1.264	1.264	1.265	1.265
1.265	1.262	1.263	1.263	1.264	1.264	1.265	1.265	1.266	1.266	1.267	1.267	1.268	1.269	1.269	1.270	1.270
1.270	1.267	1.268	1.268	1.269	1.269	1.270	1.270	1.271	1.271	1.272	1.273	1.273	1.274	1.274	1.275	1.275
1.275	1.272	1.273	1.273	1.274	1.274	1.275	1.275	1.276	1.276	1.277	1.278	1.278	1.279	1.279	1.280	1.280
1.280	1.277	1.278	1.278	1.279	1.279	1.280	1.280	1.281	1.281	1.282	1.283	1.283	1.284	1.284	1.285	1.285
1.285	1.282	1.283	1.283	1.284	1.284	1.285	1.285	1.286	1.287	1.287	1.288	1.288	1.289	1.289	1.290	1.290
1.290	1.287	1.288	1.288	1.289	1.289	1.290	1.290	1.291	1.292	1.292	1.293	1.293	1.294	1.294	1.295	1.295
1.295	1.292	1.293	1.293	1.294	1.294	1.295	1.295	1.296	1.297	1.297	1.298	1.298	1.299	1.299	1.300	1.300
1.300	1.297	1.298	1.298	1.299	1.299	1.300	1.301	1.301	1.302	1.302	1.303	1.303	1.304	1.304	1.305	1.305
1.305	1.302	1.303	1.303	1.304	1.304	1.305	1.306	1.306	1.307	1.307	1.308	1.308	1.309	1.309	1.310	1.310
1.310	1.307	1.308	1.308	1.309	1.309	1.310	1.311	1.311	1.312	1.312	1.313	1.313	1.314	1.314	1.315	1.316
1.315	1.312	1.313	1.313	1.314	1.314	1.315	1.316	1.316	1.317	1.317	1.318	1.318	1.319	1.319	1.320	1.321
1.320	1.317	1.318	1.318	1.319	1.319	1.320	1.321	1.321	1.322	1.322	1.323	1.323	1.324	1.324	1.325	1.326
1.325	1.322	1.323	1.323	1.324	1.324	1.325	1.326	1.326	1.327	1.327	1.328	1.328	1.329	1.329	1.330	1.331
1.330	1.327	1.328	1.328	1.329	1.329	1.330	1.331	1.331	1.332	1.332	1.333	1.333	1.334	1.335	1.335	1.336
1.335	1.332	1.333	1.333	1.334	1.334	1.335	1.336	1.336	1.337	1.337	1.338	1.338	1.339	1.340	1.340	1.341
1.340	1.337	1.338	1.338	1.339	1.339	1.340	1.341	1.341	1.342	1.342	1.343	1.343	1.344	1.345	1.345	1.346
1.345	1.342	1.343	1.343	1.344	1.344	1.345	1.346	1.346	1.347	1.347	1.348	1.348	1.349	1.350	1.350	1.351
1.350	1.347	1.348	1.348	1.349	1.350	1.350	1.351	1.351	1.352	1.352	1.353	1.353	1.354	1.355	1.355	1.356
1.355	1.352	1.353	1.353	1.354	1.355	1.355	1.356	1.356	1.357	1.357	1.358	1.358	1.359	1.360	1.360	1.361
1.360	1.357	1.358	1.358	1.359	1.360	1.360	1.361	1.361	1.362	1.362	1.363	1.364	1.364	1.365	1.365	1.366
1.365	1.362	1.363	1.363	1.364	1.365	1.365	1.366	1.366	1.367	1.367	1.368	1.369	1.369	1.370	1.370	1.371
1.370	1.367	1.368	1.368	1.369	1.370	1.370	1.371	1.371	1.372	1.372	1.373	1.374	1.374	1.375	1.375	1.376
1.375	1.372	1.373	1.373	1.374	1.375	1.375	1.376	1.376	1.377	1.377	1.378	1.379	1.379	1.380	1.380	1.381
1.380	1.377	1.378	1.378	1.379	1.380	1.380	1.381	1.381	1.382	1.382	1.383	1.384	1.384	1.385	1.385	1.386
1.385	1.382	1.383	1.383	1.384	1.385	1.385	1.386	1.386	1.387	1.387	1.388	1.389	1.389	1.390	1.390	1.391
1.390	1.387	1.388	1.388	1.389	1.390	1.390	1.391	1.391	1.392	1.392	1.393	1.394	1.394	1.395	1.395	1.396
1.395	1.392	1.393	1.393	1.394	1.395	1.395	1.396	1.396	1.397	1.397	1.398	1.399	1.399	1.400	1.400	1.401
1.400	1.397	1.398	1.398	1.399	1.400	1.400	1.401	1.401	1.402	1.402	1.403	1.404	1.404	1.405	1.405	1.406

Table 4 Metric density correction table for temperatures 25 to 40°C and density 1.00 to 1.40 g/cm³. The corrections are valid for diluted potassium formate brine and can also be used for temperature correction of specific gravity (SG).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 15.6°C																
Measured g/cm³ / SG	Measured fluid temperature [°C]															
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1.000	1.002	1.002	1.003	1.003	1.003	1.004	1.004	1.005	1.005	1.006	1.006	1.007	1.007	1.007	1.008	1.008
1.005	1.007	1.007	1.008	1.008	1.009	1.009	1.009	1.010	1.010	1.011	1.011	1.012	1.012	1.013	1.013	1.013
1.010	1.012	1.012	1.013	1.013	1.014	1.014	1.015	1.015	1.015	1.016	1.016	1.017	1.017	1.018	1.018	1.019
1.015	1.017	1.017	1.018	1.018	1.019	1.019	1.020	1.020	1.021	1.021	1.021	1.022	1.022	1.023	1.023	1.024
1.020	1.022	1.023	1.023	1.023	1.024	1.024	1.025	1.025	1.026	1.026	1.026	1.027	1.027	1.028	1.028	1.029
1.025	1.027	1.028	1.028	1.028	1.029	1.029	1.030	1.030	1.031	1.031	1.032	1.032	1.032	1.033	1.033	1.034
1.030	1.032	1.033	1.033	1.034	1.034	1.034	1.035	1.035	1.036	1.036	1.037	1.037	1.038	1.038	1.039	1.039
1.035	1.037	1.038	1.038	1.039	1.039	1.040	1.040	1.040	1.041	1.041	1.042	1.042	1.043	1.043	1.044	1.044
1.040	1.042	1.043	1.043	1.044	1.044	1.045	1.045	1.046	1.046	1.046	1.047	1.047	1.048	1.048	1.049	1.049
1.045	1.048	1.048	1.048	1.049	1.049	1.050	1.050	1.051	1.051	1.052	1.052	1.052	1.053	1.053	1.054	1.054
1.050	1.053	1.053	1.053	1.054	1.054	1.055	1.055	1.056	1.056	1.057	1.057	1.058	1.058	1.058	1.059	1.059
1.055	1.058	1.058	1.059	1.059	1.059	1.060	1.060	1.061	1.061	1.062	1.062	1.063	1.063	1.064	1.064	1.065
1.060	1.063	1.063	1.064	1.064	1.065	1.065	1.065	1.066	1.066	1.067	1.067	1.068	1.068	1.069	1.069	1.070
1.065	1.068	1.068	1.069	1.069	1.070	1.070	1.071	1.071	1.071	1.072	1.072	1.073	1.073	1.074	1.074	1.075
1.070	1.073	1.073	1.074	1.074	1.075	1.075	1.076	1.076	1.077	1.077	1.078	1.078	1.078	1.079	1.079	1.080
1.075	1.078	1.078	1.079	1.079	1.080	1.080	1.081	1.081	1.082	1.082	1.083	1.083	1.084	1.084	1.084	1.085
1.080	1.083	1.083	1.084	1.084	1.085	1.085	1.086	1.086	1.087	1.087	1.088	1.088	1.089	1.089	1.090	1.090
1.085	1.088	1.089	1.089	1.089	1.090	1.090	1.091	1.091	1.092	1.092	1.093	1.093	1.094	1.094	1.095	1.095
1.090	1.093	1.094	1.094	1.095	1.095	1.096	1.096	1.096	1.097	1.097	1.098	1.098	1.099	1.099	1.100	1.100
1.095	1.098	1.099	1.099	1.100	1.100	1.101	1.101	1.102	1.102	1.102	1.103	1.103	1.104	1.104	1.105	1.105
1.100	1.103	1.104	1.104	1.105	1.105	1.106	1.106	1.107	1.107	1.108	1.108	1.109	1.109	1.110	1.110	1.110
1.105	1.108	1.109	1.109	1.110	1.110	1.111	1.111	1.112	1.112	1.113	1.113	1.114	1.114	1.115	1.115	1.116
1.110	1.113	1.114	1.114	1.115	1.115	1.116	1.116	1.117	1.117	1.118	1.118	1.119	1.119	1.120	1.120	1.121
1.115	1.119	1.119	1.119	1.120	1.120	1.121	1.121	1.122	1.122	1.123	1.123	1.124	1.124	1.125	1.125	1.126
1.120	1.124	1.124	1.125	1.125	1.126	1.126	1.126	1.127	1.127	1.128	1.128	1.129	1.129	1.130	1.130	1.131
1.125	1.129	1.129	1.130	1.130	1.131	1.131	1.132	1.132	1.133	1.133	1.134	1.134	1.134	1.135	1.135	1.136
1.130	1.134	1.134	1.135	1.135	1.136	1.136	1.137	1.137	1.138	1.138	1.139	1.139	1.140	1.140	1.141	1.141
1.135	1.139	1.139	1.140	1.140	1.141	1.141	1.142	1.142	1.143	1.143	1.144	1.144	1.145	1.145	1.146	1.146
1.140	1.144	1.144	1.145	1.145	1.146	1.146	1.147	1.147	1.148	1.148	1.149	1.149	1.150	1.150	1.151	1.151
1.145	1.149	1.149	1.150	1.150	1.151	1.151	1.152	1.152	1.153	1.153	1.154	1.154	1.155	1.155	1.156	1.156
1.150	1.154	1.154	1.155	1.155	1.156	1.156	1.157	1.157	1.158	1.158	1.159	1.159	1.160	1.160	1.161	1.161
1.155	1.159	1.160	1.160	1.161	1.161	1.162	1.162	1.163	1.163	1.164	1.164	1.165	1.165	1.166	1.166	1.167
1.160	1.164	1.165	1.165	1.166	1.166	1.167	1.167	1.168	1.168	1.169	1.169	1.170	1.170	1.171	1.171	1.172
1.165	1.169	1.170	1.170	1.171	1.171	1.172	1.172	1.173	1.173	1.174	1.174	1.175	1.175	1.176	1.176	1.177
1.170	1.174	1.175	1.175	1.176	1.176	1.177	1.177	1.178	1.178	1.179	1.179	1.180	1.180	1.181	1.181	1.182
1.175	1.179	1.180	1.180	1.181	1.181	1.182	1.182	1.183	1.183	1.184	1.184	1.185	1.185	1.186	1.186	1.187
1.180	1.184	1.185	1.185	1.186	1.186	1.187	1.187	1.188	1.188	1.189	1.189	1.190	1.190	1.191	1.192	1.192
1.185	1.189	1.190	1.190	1.191	1.191	1.192	1.192	1.193	1.193	1.194	1.195	1.195	1.196	1.196	1.197	1.197
1.190	1.194	1.195	1.195	1.196	1.196	1.197	1.198	1.198	1.199	1.199	1.200	1.200	1.201	1.201	1.202	1.202
1.195	1.199	1.200	1.201	1.201	1.202	1.202	1.203	1.203	1.204	1.204	1.205	1.205	1.206	1.206	1.207	1.207
1.200	1.205	1.205	1.206	1.206	1.207	1.207	1.208	1.208	1.209	1.209	1.210	1.210	1.211	1.211	1.212	1.212
1.205	1.210	1.210	1.211	1.211	1.212	1.212	1.213	1.213	1.214	1.214	1.215	1.215	1.216	1.216	1.217	1.217
1.210	1.215	1.215	1.216	1.216	1.217	1.217	1.218	1.218	1.219	1.219	1.220	1.220	1.221	1.221	1.222	1.223
1.215	1.220	1.220	1.221	1.221	1.222	1.222	1.223	1.223	1.224	1.224	1.225	1.225	1.226	1.227	1.227	1.228
1.220	1.225	1.225	1.226	1.226	1.227	1.227	1.228	1.228	1.229	1.229	1.230	1.231	1.231	1.232	1.232	1.233
1.225	1.230	1.230	1.231	1.231	1.232	1.232	1.233	1.233	1.234	1.235	1.235	1.236	1.236	1.237	1.237	1.238
1.230	1.235	1.235	1.236	1.236	1.237	1.237	1.238	1.239	1.239	1.240	1.240	1.241	1.241	1.242	1.242	1.243
1.235	1.240	1.240	1.241	1.241	1.242	1.243	1.243	1.244	1.244	1.245	1.245	1.246	1.246	1.247	1.247	1.248
1.240	1.245	1.245	1.246	1.247	1.247	1.248	1.248	1.249	1.249	1.250	1.250	1.251	1.251	1.252	1.252	1.253
1.245	1.250	1.251	1.251	1.252	1.252	1.253	1.253	1.254	1.254	1.255	1.255	1.256	1.256	1.257	1.258	1.258
1.250	1.255	1.256	1.256	1.257	1.257	1.258	1.258	1.259	1.259	1.260	1.260	1.261	1.262	1.262	1.263	1.263
1.255	1.260	1.261	1.261	1.262	1.262	1.263	1.263	1.264	1.264	1.265	1.266	1.266	1.267	1.267	1.268	1.268
1.260	1.265	1.266	1.266	1.267	1.267	1.268	1.268	1.269	1.269	1.270	1.271	1.271	1.272	1.272	1.273	1.273
1.265	1.270	1.271	1.271	1.272	1.272	1.273	1.273	1.274	1.275	1.275	1.276	1.276	1.277	1.277	1.278	1.278
1.270	1.275	1.276	1.276	1.277	1.277	1.278	1.278	1.279	1.280	1.280	1.281	1.281	1.282	1.282	1.283	1.284
1.275	1.280	1.281	1.281	1.282	1.282	1.283	1.284	1.284	1.285	1.285	1.286	1.286	1.287	1.287	1.288	1.289
1.280	1.285	1.286	1.286	1.287	1.287	1.288	1.289	1.289	1.290	1.290	1.291	1.291	1.292	1.293	1.293	1.294
1.285	1.290	1.291	1.291	1.292	1.293	1.293	1.294	1.294	1.295	1.295	1.296	1.296	1.297	1.298	1.298	1.299
1.290	1.295	1.296	1.296	1.297	1.298	1.298	1.299	1.299	1.300	1.300	1.301	1.302	1.302	1.303	1.303	1.304
1.295	1.300	1.301	1.302	1.302	1.303	1.303	1.304	1.304	1.305	1.305	1.306	1.307	1.307	1.308	1.308	1.309
1.300	1.305	1.306	1.307	1.307	1.308	1.308	1.309	1.309	1.310	1.311	1.311	1.312	1.312	1.313	1.313	1.314
1.305	1.310	1.311	1.312	1.312	1.313	1.313	1.314	1.314	1.315	1.316	1.316	1.317	1.317	1.318	1.318	1.319
1.310	1.316	1.316	1.317	1.317	1.318	1.318	1.319	1.319	1.320	1.321	1.321	1.322	1.322	1.323	1.323	1.324
1.315	1.321	1.321	1.322	1.322	1.323	1.323	1.324	1.325	1.325	1.326	1.326	1.327	1.327	1.328	1.329	1.329
1.320	1.326	1.326	1.327	1.327	1.328	1.328	1.329	1.330	1.330	1.331	1.331	1.332	1.332	1.333	1.334	1.334
1.325	1.331	1.331	1.332	1.332	1.333	1.333	1.334	1.335	1.335	1.336	1.336	1.337	1.338	1.338	1.339	1.339
1.330	1.336	1.336	1.337	1.337	1.338	1.339	1.339	1.340	1.340	1.341	1.341	1.342	1.343	1.343	1.344	1.344
1.335	1.341	1.341	1.342	1.342	1.343	1.344	1.344	1.345	1.345	1.346	1.346	1.347	1.348	1.348	1.349	1.349
1.340	1.346	1.346	1.347	1.347	1.348	1.349	1.349	1.350	1.350	1.351	1.352	1.352	1.353	1.353	1.354	1.354
1.345	1.351	1.351	1.352	1.352	1.353	1.354	1.354	1.355	1.355	1.356	1.357	1.357	1.358	1.358	1.359	1.360
1.350	1.356	1.356	1.357	1.358	1.358	1.359	1.359	1.360	1.360	1.361	1.362	1.362	1.363	1.363	1.364	1.365
1.355	1.361	1.361	1.362	1.363	1.363	1.364	1.364	1.365	1.365	1.366	1.367	1.367	1.368	1.368	1.369	1.370
1.360	1.366	1.366	1.367	1.368	1.368	1.369	1.369	1.370	1.371	1.371	1.372	1.372	1.373	1.374	1.374	1.375
1.365	1.371	1.371	1.372	1.373	1.373	1.374	1.374	1.375	1.376	1.376	1.377	1.377	1.378	1.379	1.379	1.380
1.370	1.376	1.376	1.377	1.378	1.378	1.379	1.379	1.380	1.381	1.381	1.382	1.382	1.383	1.384	1.384	1.385
1.375	1.381	1.381	1.382	1.383	1.383	1.384	1.384	1.385	1.386	1.386	1.387	1.387	1.388	1.389	1.389	1.390
1.380	1.386	1.387	1.387	1.388	1.388	1.389	1.390	1.390	1.391	1.391	1.392	1.393	1.393	1.394	1.394	1.395
1.385	1.391	1.392	1.392	1.393	1.393	1.394	1.395	1.395	1.396	1.396	1.397	1.398	1.398	1.399	1.399	1.400
1.390	1.396	1.397	1.397	1.398	1.398	1.399	1.400	1.400	1.401	1.401	1.402	1.403	1.403	1.404	1.404	1.405
1.395	1.401	1.402	1.402	1.403	1.403	1.404	1.405	1.405	1.406	1.406	1.407	1.408	1.408	1.409	1.410	1.410
1.400	1.406	1.407	1.407	1.408	1.408	1.409	1.410	1.410	1.411	1.411	1.412	1.413	1.413	1.414	1.415	1.415

Table 5 Metric density correction table for temperatures 10 to 25°C and density 1.40 to 1.80 g/cm³. The corrections are valid for diluted potassium formate brine in the lower density range (<1.57 g/cm³) and for potassium cesium formate blends in the higher density range (>1.57 g/cm³), and can also be used for temperature correction of specific gravity (SG).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 15.6°C																
Measured g/cm³ / SG	Measured fluid temperature [°C]															
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.400	1.397	1.398	1.398	1.399	1.400	1.400	1.401	1.401	1.402	1.402	1.403	1.404	1.404	1.405	1.405	1.406
1.405	1.402	1.403	1.403	1.404	1.405	1.405	1.406	1.406	1.407	1.407	1.408	1.409	1.409	1.410	1.410	1.411
1.410	1.407	1.408	1.408	1.409	1.409	1.410	1.411	1.411	1.412	1.412	1.413	1.414	1.414	1.415	1.415	1.416
1.415	1.412	1.413	1.413	1.414	1.414	1.415	1.416	1.416	1.417	1.417	1.418	1.419	1.419	1.420	1.420	1.421
1.420	1.417	1.418	1.418	1.419	1.419	1.420	1.421	1.421	1.422	1.422	1.423	1.424	1.424	1.425	1.425	1.426
1.425	1.422	1.423	1.423	1.424	1.424	1.425	1.426	1.426	1.427	1.427	1.428	1.429	1.429	1.430	1.431	1.431
1.430	1.427	1.428	1.428	1.429	1.429	1.430	1.431	1.431	1.432	1.432	1.433	1.434	1.434	1.435	1.436	1.436
1.435	1.432	1.433	1.433	1.434	1.434	1.435	1.436	1.436	1.437	1.437	1.438	1.439	1.439	1.440	1.441	1.441
1.440	1.437	1.438	1.438	1.439	1.439	1.440	1.441	1.441	1.442	1.442	1.443	1.444	1.444	1.445	1.446	1.446
1.445	1.442	1.443	1.443	1.444	1.444	1.445	1.446	1.446	1.447	1.447	1.448	1.449	1.449	1.450	1.451	1.451
1.450	1.447	1.448	1.448	1.449	1.449	1.450	1.451	1.451	1.452	1.452	1.453	1.454	1.454	1.455	1.456	1.456
1.455	1.452	1.453	1.453	1.454	1.454	1.455	1.456	1.456	1.457	1.457	1.458	1.459	1.459	1.460	1.461	1.461
1.460	1.457	1.458	1.458	1.459	1.459	1.460	1.461	1.461	1.462	1.462	1.463	1.464	1.464	1.465	1.466	1.466
1.465	1.462	1.463	1.463	1.464	1.464	1.465	1.466	1.466	1.467	1.467	1.468	1.469	1.469	1.470	1.471	1.471
1.470	1.467	1.468	1.468	1.469	1.469	1.470	1.471	1.471	1.472	1.472	1.473	1.474	1.474	1.475	1.476	1.476
1.475	1.472	1.473	1.473	1.474	1.474	1.475	1.476	1.476	1.477	1.477	1.478	1.479	1.479	1.480	1.481	1.481
1.480	1.477	1.477	1.478	1.479	1.479	1.480	1.481	1.481	1.482	1.482	1.483	1.484	1.484	1.485	1.486	1.486
1.485	1.482	1.482	1.483	1.484	1.484	1.485	1.486	1.486	1.487	1.487	1.488	1.489	1.489	1.490	1.491	1.491
1.490	1.487	1.487	1.488	1.489	1.489	1.490	1.491	1.491	1.492	1.492	1.493	1.494	1.494	1.495	1.496	1.496
1.495	1.492	1.492	1.493	1.494	1.494	1.495	1.496	1.496	1.497	1.497	1.498	1.499	1.499	1.500	1.501	1.501
1.500	1.497	1.497	1.498	1.499	1.499	1.500	1.501	1.501	1.502	1.502	1.503	1.504	1.504	1.505	1.506	1.506
1.505	1.502	1.502	1.503	1.504	1.504	1.505	1.506	1.506	1.507	1.507	1.508	1.509	1.509	1.510	1.511	1.511
1.510	1.507	1.507	1.508	1.509	1.509	1.510	1.510	1.511	1.512	1.512	1.513	1.514	1.514	1.515	1.516	1.516
1.515	1.512	1.512	1.513	1.514	1.514	1.515	1.515	1.516	1.517	1.517	1.518	1.519	1.519	1.520	1.521	1.521
1.520	1.517	1.517	1.518	1.519	1.519	1.520	1.520	1.521	1.522	1.522	1.523	1.524	1.524	1.525	1.526	1.526
1.525	1.522	1.522	1.523	1.524	1.524	1.525	1.525	1.526	1.527	1.527	1.528	1.529	1.529	1.530	1.531	1.531
1.530	1.527	1.527	1.528	1.528	1.529	1.530	1.530	1.531	1.532	1.532	1.533	1.534	1.534	1.535	1.536	1.536
1.535	1.532	1.532	1.533	1.533	1.534	1.535	1.535	1.536	1.537	1.537	1.538	1.539	1.539	1.540	1.541	1.541
1.540	1.537	1.537	1.538	1.538	1.539	1.540	1.540	1.541	1.542	1.542	1.543	1.544	1.544	1.545	1.546	1.546
1.545	1.541	1.542	1.543	1.543	1.544	1.545	1.545	1.546	1.547	1.547	1.548	1.549	1.549	1.550	1.551	1.551
1.550	1.546	1.547	1.548	1.548	1.549	1.550	1.550	1.551	1.552	1.552	1.553	1.554	1.554	1.555	1.556	1.556
1.555	1.551	1.552	1.553	1.553	1.554	1.555	1.555	1.556	1.557	1.557	1.558	1.559	1.559	1.560	1.561	1.561
1.560	1.556	1.557	1.558	1.558	1.559	1.560	1.560	1.561	1.562	1.562	1.563	1.564	1.564	1.565	1.566	1.566
1.565	1.561	1.562	1.563	1.563	1.564	1.565	1.565	1.566	1.567	1.567	1.568	1.569	1.569	1.570	1.571	1.571
1.570	1.566	1.567	1.568	1.568	1.569	1.570	1.570	1.571	1.572	1.572	1.573	1.574	1.574	1.575	1.576	1.576
1.575	1.571	1.572	1.573	1.573	1.574	1.575	1.575	1.576	1.577	1.577	1.578	1.579	1.579	1.580	1.581	1.582
1.580	1.576	1.577	1.578	1.578	1.579	1.580	1.580	1.581	1.582	1.582	1.583	1.584	1.584	1.585	1.586	1.587
1.585	1.581	1.582	1.583	1.583	1.584	1.585	1.585	1.586	1.587	1.587	1.588	1.589	1.589	1.590	1.591	1.592
1.590	1.586	1.587	1.588	1.588	1.589	1.590	1.590	1.591	1.592	1.592	1.593	1.594	1.594	1.595	1.596	1.597
1.595	1.591	1.592	1.593	1.593	1.594	1.595	1.595	1.596	1.597	1.597	1.598	1.599	1.599	1.600	1.601	1.602
1.600	1.596	1.597	1.598	1.598	1.599	1.600	1.600	1.601	1.602	1.602	1.603	1.604	1.605	1.605	1.606	1.607
1.605	1.601	1.602	1.603	1.603	1.604	1.605	1.605	1.606	1.607	1.607	1.608	1.609	1.610	1.610	1.611	1.612
1.610	1.606	1.607	1.608	1.608	1.609	1.610	1.610	1.611	1.612	1.612	1.613	1.614	1.615	1.615	1.616	1.617
1.615	1.611	1.612	1.613	1.613	1.614	1.615	1.615	1.616	1.617	1.617	1.618	1.619	1.620	1.620	1.621	1.622
1.620	1.616	1.617	1.618	1.618	1.619	1.620	1.620	1.621	1.622	1.622	1.623	1.624	1.625	1.625	1.626	1.627
1.625	1.621	1.622	1.623	1.623	1.624	1.625	1.625	1.626	1.627	1.627	1.628	1.629	1.630	1.630	1.631	1.632
1.630	1.626	1.627	1.628	1.628	1.629	1.630	1.630	1.631	1.632	1.632	1.633	1.634	1.635	1.635	1.636	1.637
1.635	1.631	1.632	1.633	1.633	1.634	1.635	1.635	1.636	1.637	1.637	1.638	1.639	1.640	1.640	1.641	1.642
1.640	1.636	1.637	1.637	1.638	1.639	1.640	1.640	1.641	1.642	1.642	1.643	1.644	1.645	1.645	1.646	1.647
1.645	1.641	1.642	1.642	1.643	1.644	1.645	1.645	1.646	1.647	1.647	1.648	1.649	1.650	1.650	1.651	1.652
1.650	1.646	1.647	1.647	1.648	1.649	1.650	1.650	1.651	1.652	1.652	1.653	1.654	1.655	1.655	1.656	1.657
1.655	1.651	1.652	1.652	1.653	1.654	1.655	1.655	1.656	1.657	1.657	1.658	1.659	1.660	1.660	1.661	1.662
1.660	1.656	1.657	1.657	1.658	1.659	1.660	1.660	1.661	1.662	1.662	1.663	1.664	1.665	1.665	1.666	1.667
1.665	1.661	1.662	1.662	1.663	1.664	1.665	1.665	1.666	1.667	1.667	1.668	1.669	1.670	1.670	1.671	1.672
1.670	1.666	1.667	1.667	1.668	1.669	1.670	1.670	1.671	1.672	1.672	1.673	1.674	1.675	1.675	1.676	1.677
1.675	1.671	1.672	1.672	1.673	1.674	1.675	1.675	1.676	1.677	1.677	1.678	1.679	1.680	1.680	1.681	1.682
1.680	1.676	1.677	1.677	1.678	1.679	1.680	1.680	1.681	1.682	1.682	1.683	1.684	1.685	1.685	1.686	1.687
1.685	1.681	1.682	1.682	1.683	1.684	1.685	1.685	1.686	1.687	1.687	1.688	1.689	1.690	1.690	1.691	1.692
1.690	1.686	1.687	1.687	1.688	1.689	1.689	1.690	1.691	1.692	1.692	1.693	1.694	1.695	1.695	1.696	1.697
1.695	1.691	1.692	1.692	1.693	1.694	1.694	1.695	1.696	1.697	1.697	1.698	1.699	1.700	1.700	1.701	1.702
1.700	1.696	1.697	1.697	1.698	1.699	1.699	1.700	1.701	1.702	1.702	1.703	1.704	1.705	1.705	1.706	1.707
1.705	1.701	1.702	1.702	1.703	1.704	1.704	1.705	1.706	1.707	1.707	1.708	1.709	1.710	1.710	1.711	1.712
1.710	1.706	1.706	1.707	1.708	1.709	1.709	1.710	1.711	1.712	1.712	1.713	1.714	1.715	1.715	1.716	1.717
1.715	1.711	1.711	1.712	1.713	1.714	1.714	1.715	1.716	1.717	1.717	1.718	1.719	1.720	1.720	1.721	1.722
1.720	1.716	1.716	1.717	1.718	1.719	1.719	1.720	1.721	1.722	1.722	1.723	1.724	1.725	1.725	1.726	1.727
1.725	1.721	1.721	1.722	1.723	1.724	1.724	1.725	1.726	1.727	1.727	1.728	1.729	1.730	1.730	1.731	1.732
1.730	1.726	1.726	1.727	1.728	1.729	1.729	1.730	1.731	1.732	1.732	1.733	1.734	1.735	1.735	1.736	1.737
1.735	1.731	1.731	1.732	1.733	1.734	1.734	1.735	1.736	1.737	1.737	1.738	1.739	1.740	1.740	1.741	1.742
1.740	1.736	1.736	1.737	1.738	1.739	1.739	1.740	1.741	1.742	1.742	1.743	1.744	1.745	1.746	1.746	1.747
1.745	1.741	1.741	1.742	1.743	1.744	1.744	1.745	1.746	1.747	1.747	1.748	1.749	1.750	1.751	1.751	1.752
1.750	1.746	1.746	1.747	1.748	1.749	1.749	1.750	1.751	1.752	1.752	1.753	1.754	1.755	1.756	1.756	1.757
1.755	1.751	1.751	1.752	1.753	1.754	1.754	1.755	1.756	1.757	1.757	1.758	1.759	1.760	1.761	1.761	1.762
1.760	1.756	1.756	1.757	1.758	1.759	1.759	1.760	1.761	1.762	1.762	1.763	1.764	1.765	1.766	1.766	1.767
1.765	1.761	1.761	1.762	1.763	1.764	1.764	1.765	1.766	1.767	1.767	1.768	1.769	1.770	1.771	1.771	1.772
1.770	1.766	1.766	1.767	1.768	1.769	1.769	1.770	1.771	1.772	1.772	1.773	1.774	1.775	1.776	1.776	1.777
1.775	1.770	1.771	1.772	1.773	1.774	1.774	1.775	1.776	1.777	1.777	1.778	1.779	1.780	1.781	1.781	1.782
1.780	1.775	1.776	1.777	1.778	1.779	1.779	1.780	1.781	1.782	1.782	1.783	1.784	1.785	1.786	1.786	1.787
1.785	1.780	1.781	1.782	1.783	1.784	1.784	1.785	1.786	1.787	1.787	1.788	1.789	1.790	1.791	1.791	1.792
1.790	1.785	1.786	1.787	1.788	1.789	1.789	1.790	1.791	1.792	1.792	1.793	1.794	1.795	1.796	1.796	1.797
1.795	1.790	1.791	1.792	1.793	1.794	1.794	1.795	1.796	1.797	1.797	1.798	1.799	1.800	1.801	1.801	1.802
1.800	1.795	1.796	1.797	1.798	1.799	1.799	1.800	1.801	1.802	1.802	1.803	1.804	1.805	1.806	1.806	1.807

Table 6 Metric density correction table for temperatures 25 to 40°C and density 1.40 to 1.80 g/cm³. The corrections are valid for diluted potassium formate brine in the lower density range (<1.57 g/cm³) and for potassium cesium formate blends in the higher density range (>1.57 g/cm³), and can also be used for temperature correction of specific gravity (SG).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 15.6°C																
Measured g/cm³ / SG	Measured fluid temperature [°C]															
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1.400	1.406	1.407	1.407	1.408	1.408	1.409	1.410	1.410	1.411	1.411	1.412	1.413	1.413	1.414	1.415	1.415
1.405	1.411	1.412	1.412	1.413	1.413	1.414	1.415	1.415	1.416	1.417	1.417	1.418	1.418	1.419	1.420	1.420
1.410	1.416	1.417	1.417	1.418	1.418	1.419	1.420	1.420	1.421	1.422	1.422	1.423	1.423	1.424	1.425	1.425
1.415	1.421	1.422	1.422	1.423	1.424	1.424	1.425	1.425	1.426	1.427	1.427	1.428	1.428	1.429	1.430	1.430
1.420	1.426	1.427	1.427	1.428	1.429	1.429	1.430	1.430	1.431	1.432	1.432	1.433	1.433	1.434	1.435	1.435
1.425	1.431	1.432	1.432	1.433	1.434	1.434	1.435	1.435	1.436	1.437	1.437	1.438	1.439	1.439	1.440	1.440
1.430	1.436	1.437	1.437	1.438	1.439	1.439	1.440	1.440	1.441	1.442	1.442	1.443	1.444	1.444	1.445	1.445
1.435	1.441	1.442	1.442	1.443	1.444	1.444	1.445	1.445	1.446	1.447	1.447	1.448	1.449	1.449	1.450	1.451
1.440	1.446	1.447	1.447	1.448	1.449	1.449	1.450	1.451	1.451	1.452	1.452	1.453	1.454	1.454	1.455	1.456
1.445	1.451	1.452	1.452	1.453	1.454	1.454	1.455	1.456	1.456	1.457	1.457	1.458	1.459	1.459	1.460	1.461
1.450	1.456	1.457	1.457	1.458	1.459	1.459	1.460	1.461	1.461	1.462	1.462	1.463	1.464	1.464	1.465	1.466
1.455	1.461	1.462	1.462	1.463	1.464	1.464	1.465	1.466	1.466	1.467	1.468	1.468	1.469	1.469	1.470	1.471
1.460	1.466	1.467	1.467	1.468	1.469	1.469	1.470	1.471	1.471	1.472	1.473	1.473	1.474	1.474	1.475	1.476
1.465	1.471	1.472	1.472	1.473	1.474	1.474	1.475	1.476	1.476	1.477	1.478	1.478	1.479	1.480	1.480	1.481
1.470	1.476	1.477	1.477	1.478	1.479	1.479	1.480	1.481	1.481	1.482	1.483	1.483	1.484	1.485	1.485	1.486
1.475	1.481	1.482	1.483	1.483	1.484	1.484	1.485	1.486	1.486	1.487	1.488	1.488	1.489	1.490	1.490	1.491
1.480	1.486	1.487	1.488	1.488	1.489	1.489	1.490	1.491	1.491	1.492	1.493	1.493	1.494	1.495	1.495	1.496
1.485	1.491	1.492	1.493	1.493	1.494	1.494	1.495	1.496	1.496	1.497	1.498	1.498	1.499	1.500	1.500	1.501
1.490	1.496	1.497	1.498	1.498	1.499	1.499	1.500	1.501	1.501	1.502	1.503	1.503	1.504	1.505	1.505	1.506
1.495	1.501	1.502	1.503	1.503	1.504	1.504	1.505	1.506	1.506	1.507	1.508	1.508	1.509	1.510	1.510	1.511
1.500	1.506	1.507	1.508	1.508	1.509	1.510	1.510	1.511	1.511	1.512	1.513	1.513	1.514	1.515	1.515	1.516
1.505	1.511	1.512	1.513	1.513	1.514	1.515	1.515	1.516	1.516	1.517	1.518	1.518	1.519	1.520	1.520	1.521
1.510	1.516	1.517	1.518	1.518	1.519	1.520	1.520	1.521	1.522	1.522	1.523	1.523	1.524	1.525	1.525	1.526
1.515	1.521	1.522	1.523	1.523	1.524	1.525	1.525	1.526	1.527	1.527	1.528	1.529	1.529	1.530	1.531	1.531
1.520	1.526	1.527	1.528	1.528	1.529	1.530	1.530	1.531	1.532	1.532	1.533	1.534	1.534	1.535	1.536	1.536
1.525	1.531	1.532	1.533	1.533	1.534	1.535	1.535	1.536	1.537	1.537	1.538	1.539	1.539	1.540	1.541	1.541
1.530	1.536	1.537	1.538	1.538	1.539	1.540	1.540	1.541	1.542	1.542	1.543	1.544	1.544	1.545	1.546	1.546
1.535	1.541	1.542	1.543	1.543	1.544	1.545	1.545	1.546	1.547	1.547	1.548	1.549	1.549	1.550	1.551	1.551
1.540	1.546	1.547	1.548	1.548	1.549	1.550	1.550	1.551	1.552	1.552	1.553	1.554	1.554	1.555	1.556	1.556
1.545	1.551	1.552	1.553	1.553	1.554	1.555	1.555	1.556	1.557	1.557	1.558	1.559	1.559	1.560	1.561	1.561
1.550	1.556	1.557	1.558	1.558	1.559	1.560	1.560	1.561	1.562	1.562	1.563	1.564	1.564	1.565	1.566	1.566
1.555	1.561	1.562	1.563	1.563	1.564	1.565	1.565	1.566	1.567	1.567	1.568	1.569	1.569	1.570	1.571	1.572
1.560	1.566	1.567	1.568	1.568	1.569	1.570	1.571	1.571	1.572	1.573	1.573	1.574	1.575	1.575	1.576	1.577
1.565	1.571	1.572	1.573	1.574	1.574	1.575	1.576	1.576	1.577	1.578	1.578	1.579	1.580	1.580	1.581	1.582
1.570	1.576	1.577	1.578	1.579	1.579	1.580	1.581	1.581	1.582	1.583	1.583	1.584	1.585	1.585	1.586	1.587
1.575	1.582	1.582	1.583	1.584	1.584	1.585	1.586	1.586	1.587	1.588	1.588	1.589	1.590	1.590	1.591	1.592
1.580	1.587	1.587	1.588	1.589	1.589	1.590	1.591	1.591	1.592	1.593	1.593	1.594	1.595	1.595	1.596	1.597
1.585	1.592	1.592	1.593	1.594	1.594	1.595	1.596	1.596	1.597	1.598	1.598	1.599	1.600	1.600	1.601	1.602
1.590	1.597	1.597	1.598	1.599	1.599	1.600	1.601	1.601	1.602	1.603	1.603	1.604	1.605	1.606	1.606	1.607
1.595	1.602	1.602	1.603	1.604	1.604	1.605	1.606	1.606	1.607	1.608	1.608	1.609	1.610	1.611	1.611	1.612
1.600	1.607	1.607	1.608	1.609	1.609	1.610	1.611	1.611	1.612	1.613	1.614	1.614	1.615	1.616	1.616	1.617
1.605	1.612	1.612	1.613	1.614	1.614	1.615	1.616	1.616	1.617	1.618	1.619	1.619	1.620	1.621	1.621	1.622
1.610	1.617	1.617	1.618	1.619	1.619	1.620	1.621	1.622	1.622	1.623	1.624	1.624	1.625	1.626	1.626	1.627
1.615	1.622	1.622	1.623	1.624	1.624	1.625	1.626	1.627	1.627	1.628	1.629	1.629	1.630	1.631	1.632	1.632
1.620	1.627	1.627	1.628	1.629	1.629	1.630	1.631	1.632	1.632	1.633	1.634	1.634	1.635	1.636	1.637	1.637
1.625	1.632	1.632	1.633	1.634	1.634	1.635	1.636	1.637	1.637	1.638	1.639	1.639	1.640	1.641	1.642	1.642
1.630	1.637	1.637	1.638	1.639	1.640	1.640	1.641	1.642	1.642	1.643	1.644	1.645	1.645	1.646	1.647	1.647
1.635	1.642	1.642	1.643	1.644	1.645	1.645	1.646	1.647	1.647	1.648	1.649	1.650	1.650	1.651	1.652	1.652
1.640	1.647	1.647	1.648	1.649	1.650	1.650	1.651	1.652	1.652	1.653	1.654	1.655	1.655	1.656	1.657	1.657
1.645	1.652	1.652	1.653	1.654	1.655	1.655	1.656	1.657	1.657	1.658	1.659	1.660	1.660	1.661	1.662	1.663
1.650	1.657	1.657	1.658	1.659	1.660	1.660	1.661	1.662	1.663	1.663	1.664	1.665	1.665	1.666	1.667	1.668
1.655	1.662	1.662	1.663	1.664	1.665	1.665	1.666	1.667	1.668	1.668	1.669	1.670	1.670	1.671	1.672	1.673
1.660	1.667	1.667	1.668	1.669	1.670	1.670	1.671	1.672	1.673	1.673	1.674	1.675	1.676	1.676	1.677	1.678
1.665	1.672	1.673	1.673	1.674	1.675	1.675	1.676	1.677	1.678	1.678	1.679	1.680	1.681	1.681	1.682	1.683
1.670	1.677	1.678	1.678	1.679	1.680	1.680	1.681	1.682	1.683	1.683	1.684	1.685	1.686	1.686	1.687	1.688
1.675	1.682	1.683	1.683	1.684	1.685	1.685	1.686	1.687	1.688	1.688	1.689	1.690	1.691	1.691	1.692	1.693
1.680	1.687	1.688	1.688	1.689	1.690	1.691	1.691	1.692	1.693	1.693	1.694	1.695	1.696	1.696	1.697	1.698
1.685	1.692	1.693	1.693	1.694	1.695	1.696	1.696	1.697	1.698	1.699	1.699	1.700	1.701	1.702	1.702	1.703
1.690	1.697	1.698	1.698	1.699	1.700	1.701	1.701	1.702	1.703	1.704	1.704	1.705	1.706	1.707	1.707	1.708
1.695	1.702	1.703	1.703	1.704	1.705	1.706	1.706	1.707	1.708	1.709	1.709	1.710	1.711	1.712	1.712	1.713
1.700	1.707	1.708	1.708	1.709	1.710	1.711	1.711	1.712	1.713	1.714	1.714	1.715	1.716	1.717	1.717	1.718
1.705	1.712	1.713	1.713	1.714	1.715	1.716	1.716	1.717	1.718	1.719	1.719	1.720	1.721	1.722	1.722	1.723
1.710	1.717	1.718	1.718	1.719	1.720	1.721	1.721	1.722	1.723	1.724	1.724	1.725	1.726	1.727	1.728	1.728
1.715	1.722	1.723	1.723	1.724	1.725	1.726	1.726	1.727	1.728	1.729	1.730	1.730	1.731	1.732	1.733	1.733
1.720	1.727	1.728	1.728	1.729	1.730	1.731	1.732	1.732	1.733	1.734	1.735	1.735	1.736	1.737	1.738	1.738
1.725	1.732	1.733	1.734	1.734	1.735	1.736	1.737	1.737	1.738	1.739	1.740	1.740	1.741	1.742	1.743	1.743
1.730	1.737	1.738	1.739	1.739	1.740	1.741	1.742	1.742	1.743	1.744	1.745	1.745	1.746	1.747	1.748	1.749
1.735	1.742	1.743	1.744	1.744	1.745	1.746	1.747	1.747	1.748	1.749	1.750	1.750	1.751	1.752	1.753	1.754
1.740	1.747	1.748	1.749	1.749	1.750	1.751	1.752	1.752	1.753	1.754	1.755	1.756	1.756	1.757	1.758	1.759
1.745	1.752	1.753	1.754	1.754	1.755	1.756	1.757	1.757	1.758	1.759	1.760	1.761	1.761	1.762	1.763	1.764
1.750	1.757	1.758	1.759	1.759	1.760	1.761	1.762	1.763	1.763	1.764	1.765	1.766	1.766	1.767	1.768	1.769
1.755	1.762	1.763	1.764	1.764	1.765	1.766	1.767	1.768	1.768	1.769	1.770	1.771	1.771	1.772	1.773	1.774
1.760	1.767	1.768	1.769	1.769	1.770	1.771	1.772	1.773	1.773	1.774	1.775	1.776	1.777	1.777	1.778	1.779
1.765	1.772	1.773	1.774	1.774	1.775	1.776	1.777	1.778	1.778	1.779	1.780	1.781	1.782	1.782	1.783	1.784
1.770	1.777	1.778	1.779	1.780	1.780	1.781	1.782	1.783	1.783	1.784	1.785	1.786	1.787	1.787	1.788	1.789
1.775	1.782	1.783	1.784	1.785	1.785	1.786	1.787	1.788	1.788	1.789	1.790	1.791	1.792	1.792	1.793	1.794
1.780	1.787	1.788	1.789	1.790	1.790	1.791	1.792	1.793	1.794	1.794	1.795	1.796	1.797	1.798	1.798	1.799
1.785	1.792	1.793	1.794	1.795	1.795	1.796	1.797	1.798	1.799	1.799	1.800	1.801	1.802	1.803	1.803	1.804
1.790	1.797	1.798	1.799	1.800	1.800	1.801	1.802	1.803	1.804	1.804	1.805	1.806	1.807	1.808	1.808	1.809
1.795	1.802	1.803	1.804	1.805	1.805	1.806	1.807	1.808	1.809	1.809	1.810	1.811	1.812	1.813	1.814	1.814
1.800	1.807	1.808	1.809	1.810	1.810	1.811	1.812	1.813	1.814	1.815	1.815	1.816	1.817	1.818	1.819	1.819

Table 7 Metric density correction table for temperatures 10 to 25°C and density 1.80 to 2.20 g/cm³. The corrections are valid for potassium cesium formate blends, and can also be used for temperature correction of specific gravity (SG).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 15.6°C																
Measured g/cm³ / SG	Measured fluid temperature [°C]															
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.800	1.795	1.796	1.797	1.798	1.799	1.799	1.800	1.801	1.802	1.802	1.803	1.804	1.805	1.806	1.806	1.807
1.805	1.800	1.801	1.802	1.803	1.804	1.804	1.805	1.806	1.807	1.808	1.808	1.809	1.810	1.811	1.812	1.812
1.810	1.805	1.806	1.807	1.808	1.809	1.809	1.810	1.811	1.812	1.813	1.813	1.814	1.815	1.816	1.817	1.817
1.815	1.810	1.811	1.812	1.813	1.814	1.814	1.815	1.816	1.817	1.818	1.818	1.819	1.820	1.821	1.822	1.822
1.820	1.815	1.816	1.817	1.818	1.819	1.819	1.820	1.821	1.822	1.823	1.823	1.824	1.825	1.826	1.827	1.827
1.825	1.820	1.821	1.822	1.823	1.823	1.824	1.825	1.826	1.827	1.828	1.828	1.829	1.830	1.831	1.832	1.832
1.830	1.825	1.826	1.827	1.828	1.828	1.829	1.830	1.831	1.832	1.833	1.833	1.834	1.835	1.836	1.837	1.837
1.835	1.830	1.831	1.832	1.833	1.833	1.834	1.835	1.836	1.837	1.838	1.838	1.839	1.840	1.841	1.842	1.842
1.840	1.835	1.836	1.837	1.838	1.838	1.839	1.840	1.841	1.842	1.843	1.843	1.844	1.845	1.846	1.847	1.847
1.845	1.840	1.841	1.842	1.843	1.843	1.844	1.845	1.846	1.847	1.848	1.848	1.849	1.850	1.851	1.852	1.852
1.850	1.845	1.846	1.847	1.848	1.848	1.849	1.850	1.851	1.852	1.853	1.853	1.854	1.855	1.856	1.857	1.858
1.855	1.850	1.851	1.852	1.853	1.853	1.854	1.855	1.856	1.857	1.858	1.858	1.859	1.860	1.861	1.862	1.863
1.860	1.855	1.856	1.857	1.858	1.858	1.859	1.860	1.861	1.862	1.863	1.863	1.864	1.865	1.866	1.867	1.868
1.865	1.860	1.861	1.862	1.863	1.863	1.864	1.865	1.866	1.867	1.868	1.868	1.869	1.870	1.871	1.872	1.873
1.870	1.865	1.866	1.867	1.868	1.868	1.869	1.870	1.871	1.872	1.873	1.873	1.874	1.875	1.876	1.877	1.878
1.875	1.870	1.871	1.872	1.873	1.873	1.874	1.875	1.876	1.877	1.878	1.878	1.879	1.880	1.881	1.882	1.883
1.880	1.875	1.876	1.877	1.878	1.878	1.879	1.880	1.881	1.882	1.883	1.883	1.884	1.885	1.886	1.887	1.888
1.885	1.880	1.881	1.882	1.883	1.883	1.884	1.885	1.886	1.887	1.888	1.888	1.889	1.890	1.891	1.892	1.893
1.890	1.885	1.886	1.887	1.888	1.888	1.889	1.890	1.891	1.892	1.893	1.893	1.894	1.895	1.896	1.897	1.898
1.895	1.890	1.891	1.892	1.893	1.893	1.894	1.895	1.896	1.897	1.898	1.898	1.899	1.900	1.901	1.902	1.903
1.900	1.895	1.896	1.897	1.898	1.898	1.899	1.900	1.901	1.902	1.903	1.903	1.904	1.905	1.906	1.907	1.908
1.905	1.900	1.901	1.902	1.903	1.903	1.904	1.905	1.906	1.907	1.908	1.908	1.909	1.910	1.911	1.912	1.913
1.910	1.905	1.906	1.907	1.908	1.908	1.909	1.910	1.911	1.912	1.913	1.914	1.914	1.915	1.916	1.917	1.918
1.915	1.910	1.911	1.912	1.913	1.913	1.914	1.915	1.916	1.917	1.918	1.919	1.919	1.920	1.921	1.922	1.923
1.920	1.915	1.916	1.917	1.918	1.918	1.919	1.920	1.921	1.922	1.923	1.924	1.924	1.925	1.926	1.927	1.928
1.925	1.920	1.921	1.922	1.923	1.923	1.924	1.925	1.926	1.927	1.928	1.929	1.929	1.930	1.931	1.932	1.933
1.930	1.925	1.926	1.927	1.928	1.928	1.929	1.930	1.931	1.932	1.933	1.934	1.934	1.935	1.936	1.937	1.938
1.935	1.930	1.931	1.932	1.933	1.933	1.934	1.935	1.936	1.937	1.938	1.939	1.939	1.940	1.941	1.942	1.943
1.940	1.935	1.936	1.937	1.937	1.938	1.939	1.940	1.941	1.942	1.943	1.944	1.944	1.945	1.946	1.947	1.948
1.945	1.940	1.941	1.942	1.942	1.943	1.944	1.945	1.946	1.947	1.948	1.949	1.949	1.950	1.951	1.952	1.953
1.950	1.945	1.946	1.947	1.947	1.948	1.949	1.950	1.951	1.952	1.953	1.954	1.954	1.955	1.956	1.957	1.958
1.955	1.950	1.951	1.952	1.952	1.953	1.954	1.955	1.956	1.957	1.958	1.959	1.959	1.960	1.961	1.962	1.963
1.960	1.955	1.956	1.957	1.957	1.958	1.959	1.960	1.961	1.962	1.963	1.964	1.965	1.965	1.966	1.967	1.968
1.965	1.960	1.961	1.962	1.962	1.963	1.964	1.965	1.966	1.967	1.968	1.969	1.970	1.970	1.971	1.972	1.973
1.970	1.965	1.966	1.967	1.967	1.968	1.969	1.970	1.971	1.972	1.973	1.974	1.975	1.975	1.976	1.977	1.978
1.975	1.970	1.971	1.972	1.972	1.973	1.974	1.975	1.976	1.977	1.978	1.979	1.980	1.980	1.981	1.982	1.983
1.980	1.975	1.976	1.977	1.977	1.978	1.979	1.980	1.981	1.982	1.983	1.984	1.985	1.985	1.986	1.987	1.988
1.985	1.980	1.981	1.982	1.982	1.983	1.984	1.985	1.986	1.987	1.988	1.989	1.990	1.990	1.991	1.992	1.993
1.990	1.985	1.986	1.987	1.987	1.988	1.989	1.990	1.991	1.992	1.993	1.994	1.995	1.996	1.996	1.997	1.998
1.995	1.990	1.991	1.992	1.992	1.993	1.994	1.995	1.996	1.997	1.998	1.999	2.000	2.001	2.001	2.002	2.003
2.000	1.995	1.996	1.997	1.997	1.998	1.999	2.000	2.001	2.002	2.003	2.004	2.005	2.006	2.006	2.007	2.008
2.005	2.000	2.001	2.002	2.002	2.003	2.004	2.005	2.006	2.007	2.008	2.009	2.010	2.011	2.011	2.012	2.013
2.010	2.005	2.006	2.007	2.007	2.008	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.016	2.017	2.018
2.015	2.010	2.011	2.012	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019	2.020	2.021	2.022	2.022	2.023
2.020	2.015	2.016	2.017	2.017	2.018	2.019	2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.027	2.028
2.025	2.020	2.021	2.022	2.022	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.032	2.033
2.030	2.025	2.026	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033	2.034	2.035	2.036	2.037	2.038	2.038
2.035	2.030	2.031	2.031	2.032	2.033	2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041	2.042	2.043	2.043
2.040	2.035	2.036	2.036	2.037	2.038	2.039	2.040	2.041	2.042	2.043	2.044	2.045	2.046	2.047	2.048	2.048
2.045	2.040	2.041	2.041	2.042	2.043	2.044	2.045	2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054
2.050	2.045	2.046	2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058	2.059
2.055	2.050	2.051	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058	2.059	2.060	2.061	2.062	2.063	2.064
2.060	2.055	2.056	2.056	2.057	2.058	2.059	2.060	2.061	2.062	2.063	2.064	2.065	2.066	2.067	2.068	2.069
2.065	2.060	2.061	2.061	2.062	2.063	2.064	2.065	2.066	2.067	2.068	2.069	2.070	2.071	2.072	2.073	2.074
2.070	2.065	2.066	2.066	2.067	2.068	2.069	2.070	2.071	2.072	2.073	2.074	2.075	2.076	2.077	2.078	2.079
2.075	2.070	2.071	2.071	2.072	2.073	2.074	2.075	2.076	2.077	2.078	2.079	2.080	2.081	2.082	2.083	2.084
2.080	2.075	2.076	2.076	2.077	2.078	2.079	2.080	2.081	2.082	2.083	2.084	2.085	2.086	2.087	2.088	2.089
2.085	2.080	2.080	2.081	2.082	2.083	2.084	2.085	2.086	2.087	2.088	2.089	2.090	2.091	2.092	2.093	2.094
2.090	2.085	2.085	2.086	2.087	2.088	2.089	2.090	2.091	2.092	2.093	2.094	2.095	2.096	2.097	2.098	2.099
2.095	2.090	2.090	2.091	2.092	2.093	2.094	2.095	2.096	2.097	2.098	2.099	2.100	2.101	2.102	2.103	2.104
2.100	2.095	2.095	2.096	2.097	2.098	2.099	2.100	2.101	2.102	2.103	2.104	2.105	2.106	2.107	2.108	2.109
2.105	2.100	2.100	2.101	2.102	2.103	2.104	2.105	2.106	2.107	2.108	2.109	2.110	2.111	2.112	2.113	2.114
2.110	2.105	2.105	2.106	2.107	2.108	2.109	2.110	2.111	2.112	2.113	2.114	2.115	2.116	2.117	2.118	2.119
2.115	2.109	2.110	2.111	2.112	2.113	2.114	2.115	2.116	2.117	2.118	2.119	2.120	2.121	2.122	2.123	2.124
2.120	2.114	2.115	2.116	2.117	2.118	2.119	2.120	2.121	2.122	2.123	2.124	2.125	2.126	2.127	2.128	2.129
2.125	2.119	2.120	2.121	2.122	2.123	2.124	2.125	2.126	2.127	2.128	2.129	2.130	2.131	2.132	2.133	2.134
2.130	2.124	2.125	2.126	2.127	2.128	2.129	2.130	2.131	2.132	2.133	2.134	2.135	2.136	2.137	2.138	2.139
2.135	2.129	2.130	2.131	2.132	2.133	2.134	2.135	2.136	2.137	2.138	2.139	2.140	2.141	2.142	2.143	2.144
2.140	2.134	2.135	2.136	2.137	2.138	2.139	2.140	2.141	2.142	2.143	2.144	2.145	2.146	2.147	2.148	2.149
2.145	2.139	2.140	2.141	2.142	2.143	2.144	2.145	2.146	2.147	2.148	2.149	2.150	2.151	2.152	2.153	2.154
2.150	2.144	2.145	2.146	2.147	2.148	2.149	2.150	2.151	2.152	2.153	2.154	2.155	2.156	2.157	2.158	2.159
2.155	2.149	2.150	2.151	2.152	2.153	2.154	2.155	2.156	2.157	2.158	2.159	2.160	2.161	2.162	2.163	2.164
2.160	2.154	2.155	2.156	2.157	2.158	2.159	2.160	2.161	2.162	2.163	2.164	2.165	2.166	2.167	2.168	2.169
2.165	2.159	2.160	2.161	2.162	2.163	2.164	2.165	2.166	2.167	2.168	2.169	2.170	2.171	2.172	2.173	2.174
2.170	2.164	2.165	2.166	2.167	2.168	2.169	2.170	2.171	2.172	2.173	2.174	2.175	2.176	2.177	2.178	2.179
2.175	2.169	2.170	2.171	2.172	2.173	2.174	2.175	2.176	2.177	2.178	2.179	2.180	2.181	2.182	2.183	2.184
2.180	2.174	2.175	2.176	2.177	2.178	2.179	2.180	2.181	2.182	2.183	2.184	2.185	2.186	2.187	2.188	2.189
2.185	2.179	2.180	2.181	2.182	2.183	2.184	2.185	2.186	2.187	2.188	2.189	2.190	2.191	2.192	2.193	2.194
2.190	2.184	2.185	2.186	2.187	2.188	2.189	2.190	2.191	2.192	2.193	2.194	2.195	2.196	2.197	2.198	2.199
2.195	2.189	2.190	2.191	2.192	2.193	2.194	2.195	2.196	2.197	2.198	2.199	2.200	2.201	2.202	2.203	2.204
2.200	2.194	2.195	2.196	2.197	2.198	2.199	2.200	2.201	2.202	2.203	2.204	2.205	2.206	2.207	2.208	2.210

Table 8 Metric density correction table for temperatures 25 to 40°C and density 1.80 to 2.20 g/cm³. The corrections are valid for potassium cesium formate blends, and can also be used for temperature correction of specific gravity (SG).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 15.6°C																
Measured g/cm³ / SG	Measured fluid temperature [°C]															
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1.800	1.807	1.808	1.809	1.810	1.810	1.811	1.812	1.813	1.814	1.815	1.815	1.816	1.817	1.818	1.819	1.819
1.805	1.812	1.813	1.814	1.815	1.816	1.816	1.817	1.818	1.819	1.820	1.820	1.821	1.822	1.823	1.824	1.824
1.810	1.817	1.818	1.819	1.820	1.821	1.821	1.822	1.823	1.824	1.825	1.825	1.826	1.827	1.828	1.829	1.829
1.815	1.822	1.823	1.824	1.825	1.826	1.826	1.827	1.828	1.829	1.830	1.830	1.831	1.832	1.833	1.834	1.835
1.820	1.827	1.828	1.829	1.830	1.831	1.831	1.832	1.833	1.834	1.835	1.836	1.836	1.837	1.838	1.839	1.840
1.825	1.832	1.833	1.834	1.835	1.836	1.836	1.837	1.838	1.839	1.840	1.841	1.841	1.842	1.843	1.844	1.845
1.830	1.837	1.838	1.839	1.840	1.841	1.842	1.842	1.843	1.844	1.845	1.846	1.846	1.847	1.848	1.849	1.850
1.835	1.842	1.843	1.844	1.845	1.846	1.847	1.847	1.848	1.849	1.850	1.851	1.851	1.852	1.853	1.854	1.855
1.840	1.847	1.848	1.849	1.850	1.851	1.852	1.852	1.853	1.854	1.855	1.856	1.857	1.857	1.858	1.859	1.860
1.845	1.852	1.853	1.854	1.855	1.856	1.857	1.857	1.858	1.859	1.860	1.861	1.862	1.862	1.863	1.864	1.865
1.850	1.858	1.858	1.859	1.860	1.861	1.862	1.862	1.863	1.864	1.865	1.866	1.867	1.867	1.868	1.869	1.870
1.855	1.863	1.863	1.864	1.865	1.866	1.867	1.868	1.868	1.869	1.870	1.871	1.872	1.873	1.873	1.874	1.875
1.860	1.868	1.868	1.869	1.870	1.871	1.872	1.873	1.873	1.874	1.875	1.876	1.877	1.878	1.878	1.879	1.880
1.865	1.873	1.873	1.874	1.875	1.876	1.877	1.878	1.878	1.879	1.880	1.881	1.882	1.883	1.883	1.884	1.885
1.870	1.878	1.878	1.879	1.880	1.881	1.882	1.883	1.883	1.884	1.885	1.886	1.887	1.888	1.889	1.889	1.890
1.875	1.883	1.883	1.884	1.885	1.886	1.887	1.888	1.889	1.889	1.890	1.891	1.892	1.893	1.894	1.894	1.895
1.880	1.888	1.888	1.889	1.890	1.891	1.892	1.893	1.894	1.894	1.895	1.896	1.897	1.898	1.899	1.900	1.900
1.885	1.893	1.894	1.894	1.895	1.896	1.897	1.898	1.899	1.899	1.900	1.901	1.902	1.903	1.904	1.905	1.905
1.890	1.898	1.899	1.899	1.900	1.901	1.902	1.903	1.904	1.905	1.905	1.906	1.907	1.908	1.909	1.910	1.911
1.895	1.903	1.904	1.904	1.905	1.906	1.907	1.908	1.909	1.910	1.910	1.911	1.912	1.913	1.914	1.915	1.916
1.900	1.908	1.909	1.909	1.910	1.911	1.912	1.913	1.914	1.915	1.915	1.916	1.917	1.918	1.919	1.920	1.921
1.905	1.913	1.914	1.914	1.915	1.916	1.917	1.918	1.919	1.920	1.921	1.921	1.922	1.923	1.924	1.925	1.926
1.910	1.918	1.919	1.920	1.920	1.921	1.922	1.923	1.924	1.925	1.926	1.926	1.927	1.928	1.929	1.930	1.931
1.915	1.923	1.924	1.925	1.925	1.926	1.927	1.928	1.929	1.930	1.931	1.931	1.932	1.933	1.934	1.935	1.936
1.920	1.928	1.929	1.930	1.930	1.931	1.932	1.933	1.934	1.935	1.936	1.937	1.937	1.938	1.939	1.940	1.941
1.925	1.933	1.934	1.935	1.935	1.936	1.937	1.938	1.939	1.940	1.941	1.942	1.942	1.943	1.944	1.945	1.946
1.930	1.938	1.939	1.940	1.941	1.941	1.942	1.943	1.944	1.945	1.946	1.947	1.948	1.948	1.949	1.950	1.951
1.935	1.943	1.944	1.945	1.946	1.946	1.947	1.948	1.949	1.950	1.951	1.952	1.953	1.953	1.954	1.955	1.956
1.940	1.948	1.949	1.950	1.951	1.951	1.952	1.953	1.954	1.955	1.956	1.957	1.958	1.959	1.959	1.960	1.961
1.945	1.953	1.954	1.955	1.956	1.956	1.957	1.958	1.959	1.960	1.961	1.962	1.963	1.964	1.964	1.965	1.966
1.950	1.958	1.959	1.960	1.961	1.962	1.962	1.963	1.964	1.965	1.966	1.967	1.968	1.969	1.970	1.970	1.971
1.955	1.963	1.964	1.965	1.966	1.967	1.967	1.968	1.969	1.970	1.971	1.972	1.973	1.974	1.975	1.975	1.976
1.960	1.968	1.969	1.970	1.971	1.972	1.972	1.973	1.974	1.975	1.976	1.977	1.978	1.979	1.980	1.981	1.981
1.965	1.973	1.974	1.975	1.976	1.977	1.978	1.978	1.979	1.980	1.981	1.982	1.983	1.984	1.985	1.986	1.986
1.970	1.978	1.979	1.980	1.981	1.982	1.983	1.983	1.984	1.985	1.986	1.987	1.988	1.989	1.990	1.991	1.992
1.975	1.983	1.984	1.985	1.986	1.987	1.988	1.989	1.989	1.990	1.991	1.992	1.993	1.994	1.995	1.996	1.997
1.980	1.988	1.989	1.990	1.991	1.992	1.993	1.994	1.994	1.995	1.996	1.997	1.998	1.999	2.000	2.001	2.002
1.985	1.993	1.994	1.995	1.996	1.997	1.998	1.999	1.999	2.000	2.001	2.002	2.003	2.004	2.005	2.006	2.007
1.990	1.998	1.999	2.000	2.001	2.002	2.003	2.004	2.005	2.005	2.006	2.007	2.008	2.009	2.010	2.011	2.012
1.995	2.003	2.004	2.005	2.006	2.007	2.008	2.009	2.010	2.011	2.011	2.012	2.013	2.014	2.015	2.016	2.017
2.000	2.008	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.016	2.017	2.018	2.019	2.020	2.021	2.022
2.005	2.013	2.014	2.015	2.016	2.017	2.018	2.019	2.020	2.021	2.022	2.022	2.023	2.024	2.025	2.026	2.027
2.010	2.018	2.019	2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.027	2.028	2.029	2.030	2.031	2.032
2.015	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033	2.033	2.034	2.035	2.036	2.037
2.020	2.028	2.029	2.030	2.031	2.032	2.033	2.034	2.035	2.036	2.037	2.038	2.039	2.039	2.040	2.041	2.042
2.025	2.033	2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041	2.042	2.043	2.044	2.045	2.045	2.046	2.047
2.030	2.038	2.039	2.040	2.041	2.042	2.043	2.044	2.045	2.046	2.047	2.048	2.049	2.050	2.051	2.051	2.052
2.035	2.043	2.044	2.045	2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.057
2.040	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058	2.059	2.060	2.061	2.062	2.063
2.045	2.054	2.054	2.055	2.056	2.057	2.058	2.059	2.060	2.061	2.062	2.063	2.064	2.065	2.066	2.067	2.068
2.050	2.059	2.059	2.060	2.061	2.062	2.063	2.064	2.065	2.066	2.067	2.068	2.069	2.070	2.071	2.072	2.073
2.055	2.064	2.065	2.065	2.066	2.067	2.068	2.069	2.070	2.071	2.072	2.073	2.074	2.075	2.076	2.077	2.078
2.060	2.069	2.070	2.070	2.071	2.072	2.073	2.074	2.075	2.076	2.077	2.078	2.079	2.080	2.081	2.082	2.083
2.065	2.074	2.075	2.076	2.076	2.077	2.078	2.079	2.080	2.081	2.082	2.083	2.084	2.085	2.086	2.087	2.088
2.070	2.079	2.080	2.081	2.082	2.082	2.083	2.084	2.085	2.086	2.087	2.088	2.089	2.090	2.091	2.092	2.093
2.075	2.084	2.085	2.086	2.087	2.087	2.088	2.089	2.090	2.091	2.092	2.093	2.094	2.095	2.096	2.097	2.098
2.080	2.089	2.090	2.091	2.092	2.093	2.093	2.094	2.095	2.096	2.097	2.098	2.099	2.100	2.101	2.102	2.103
2.085	2.094	2.095	2.096	2.097	2.098	2.099	2.099	2.100	2.101	2.102	2.103	2.104	2.105	2.106	2.107	2.108
2.090	2.099	2.100	2.101	2.102	2.103	2.104	2.105	2.106	2.106	2.107	2.108	2.109	2.110	2.111	2.112	2.113
2.095	2.104	2.105	2.106	2.107	2.108	2.109	2.110	2.111	2.112	2.112	2.113	2.114	2.115	2.116	2.117	2.118
2.100	2.109	2.110	2.111	2.112	2.113	2.114	2.115	2.116	2.117	2.118	2.119	2.119	2.120	2.121	2.122	2.123
2.105	2.114	2.115	2.116	2.117	2.118	2.119	2.120	2.121	2.122	2.123	2.124	2.125	2.126	2.126	2.127	2.128
2.110	2.119	2.120	2.121	2.122	2.123	2.124	2.125	2.126	2.127	2.128	2.129	2.130	2.131	2.132	2.133	2.134
2.115	2.124	2.125	2.126	2.127	2.128	2.129	2.130	2.131	2.132	2.133	2.134	2.135	2.136	2.137	2.138	2.139
2.120	2.129	2.130	2.131	2.132	2.133	2.134	2.135	2.136	2.137	2.138	2.139	2.140	2.141	2.142	2.143	2.144
2.125	2.134	2.135	2.136	2.137	2.138	2.139	2.140	2.141	2.142	2.143	2.144	2.145	2.146	2.147	2.148	2.149
2.130	2.139	2.140	2.141	2.142	2.143	2.144	2.145	2.146	2.147	2.148	2.149	2.150	2.151	2.152	2.153	2.154
2.135	2.144	2.145	2.146	2.147	2.148	2.149	2.150	2.151	2.152	2.153	2.154	2.155	2.156	2.157	2.158	2.159
2.140	2.149	2.150	2.151	2.152	2.153	2.154	2.155	2.156	2.157	2.158	2.159	2.160	2.161	2.162	2.163	2.164
2.145	2.154	2.155	2.156	2.157	2.158	2.159	2.160	2.161	2.162	2.163	2.164	2.165	2.166	2.167	2.168	2.169
2.150	2.159	2.160	2.161	2.162	2.163	2.164	2.165	2.166	2.167	2.168	2.169	2.170	2.171	2.172	2.173	2.174
2.155	2.164	2.165	2.166	2.167	2.168	2.169	2.170	2.171	2.172	2.173	2.174	2.175	2.176	2.177	2.178	2.179
2.160	2.169	2.170	2.171	2.172	2.173	2.174	2.175	2.176	2.177	2.178	2.179	2.180	2.181	2.182	2.183	2.184
2.165	2.174	2.175	2.176	2.177	2.178	2.179	2.180	2.181	2.182	2.183	2.184	2.185	2.186	2.187	2.188	2.189
2.170	2.179	2.180	2.181	2.182	2.183	2.184	2.185	2.186	2.187	2.188	2.189	2.190	2.191	2.192	2.193	2.194
2.175	2.184	2.185	2.186	2.187	2.188	2.189	2.190	2.191	2.192	2.193	2.194	2.195	2.196	2.197	2.198	2.199
2.180	2.189	2.190	2.191	2.192	2.193	2.194	2.195	2.196	2.197	2.198	2.199	2.200	2.201	2.203	2.204	2.205
2.185	2.194	2.195	2.196	2.197	2.198	2.199	2.200	2.201	2.202	2.204	2.205	2.206	2.207	2.208	2.209	2.210
2.190	2.199	2.200	2.201	2.202	2.203	2.205	2.206	2.207	2.208	2.209	2.210	2.211	2.212	2.213	2.214	2.215
2.195	2.204	2.205	2.207	2.208	2.209	2.210	2.211	2.212	2.213	2.214	2.215	2.216	2.217	2.218	2.219	2.220
2.200	2.210	2.211	2.212	2.213	2.214	2.215	2.216	2.217	2.218	2.219	2.220	2.221	2.222	2.223	2.224	2.225

Table 9 Field unit density correction table for temperatures 50 to 80°F and density 8.4 to 11.8 lb/gal. The corrections are valid for diluted potassium formate brine.

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 60°F																
Measured density [lb/gal]	Measured fluid temperature [°F]															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
8.400	8.364	8.368	8.371	8.375	8.379	8.383	8.387	8.390	8.394	8.398	8.402	8.406	8.410	8.414	8.418	8.422
8.440	8.404	8.408	8.412	8.416	8.419	8.423	8.427	8.431	8.435	8.439	8.443	8.447	8.451	8.455	8.459	8.463
8.480	8.445	8.448	8.452	8.456	8.460	8.464	8.468	8.472	8.475	8.479	8.483	8.487	8.491	8.495	8.499	8.503
8.520	8.485	8.489	8.493	8.497	8.500	8.504	8.508	8.512	8.516	8.520	8.524	8.528	8.532	8.536	8.540	8.544
8.560	8.525	8.529	8.533	8.537	8.541	8.545	8.549	8.553	8.557	8.561	8.565	8.569	8.573	8.577	8.581	8.585
8.600	8.566	8.570	8.573	8.577	8.581	8.585	8.589	8.593	8.597	8.601	8.605	8.609	8.613	8.617	8.621	8.625
8.640	8.606	8.610	8.614	8.618	8.622	8.626	8.630	8.634	8.638	8.642	8.646	8.650	8.654	8.658	8.662	8.666
8.680	8.646	8.650	8.654	8.658	8.662	8.666	8.670	8.674	8.678	8.682	8.686	8.690	8.694	8.698	8.703	8.707
8.720	8.687	8.691	8.695	8.699	8.703	8.707	8.711	8.715	8.719	8.723	8.727	8.731	8.735	8.739	8.743	8.747
8.760	8.727	8.731	8.735	8.739	8.743	8.747	8.751	8.755	8.759	8.763	8.767	8.771	8.776	8.780	8.784	8.788
8.800	8.768	8.772	8.776	8.780	8.784	8.788	8.792	8.796	8.800	8.804	8.808	8.812	8.816	8.820	8.824	8.829
8.840	8.808	8.812	8.816	8.820	8.824	8.828	8.832	8.836	8.840	8.844	8.848	8.853	8.857	8.861	8.865	8.869
8.880	8.848	8.852	8.856	8.860	8.864	8.868	8.873	8.877	8.881	8.885	8.889	8.893	8.897	8.901	8.906	8.910
8.920	8.889	8.893	8.897	8.901	8.905	8.909	8.913	8.917	8.921	8.925	8.930	8.934	8.938	8.942	8.946	8.950
8.960	8.929	8.933	8.937	8.941	8.945	8.949	8.953	8.958	8.962	8.966	8.970	8.974	8.978	8.983	8.987	8.991
9.000	8.969	8.973	8.977	8.981	8.986	8.990	8.994	8.998	9.002	9.006	9.011	9.015	9.019	9.023	9.027	9.032
9.040	9.010	9.014	9.018	9.022	9.026	9.030	9.034	9.038	9.043	9.047	9.051	9.055	9.060	9.064	9.068	9.072
9.080	9.050	9.054	9.058	9.062	9.066	9.071	9.075	9.079	9.083	9.087	9.092	9.096	9.100	9.104	9.109	9.113
9.120	9.090	9.094	9.098	9.103	9.107	9.111	9.115	9.119	9.124	9.128	9.132	9.136	9.141	9.145	9.149	9.154
9.160	9.130	9.135	9.139	9.143	9.147	9.151	9.156	9.160	9.164	9.168	9.173	9.177	9.181	9.185	9.190	9.194
9.200	9.171	9.175	9.179	9.183	9.187	9.192	9.196	9.200	9.204	9.209	9.213	9.217	9.222	9.226	9.230	9.235
9.240	9.211	9.215	9.219	9.224	9.228	9.232	9.236	9.241	9.245	9.249	9.254	9.258	9.262	9.267	9.271	9.275
9.280	9.251	9.255	9.260	9.264	9.268	9.272	9.277	9.281	9.285	9.290	9.294	9.298	9.303	9.307	9.311	9.316
9.320	9.292	9.296	9.300	9.304	9.309	9.313	9.317	9.321	9.326	9.330	9.334	9.339	9.343	9.348	9.352	9.356
9.360	9.332	9.336	9.340	9.345	9.349	9.353	9.358	9.362	9.366	9.371	9.375	9.379	9.384	9.388	9.393	9.397
9.400	9.372	9.376	9.381	9.385	9.389	9.394	9.398	9.402	9.407	9.411	9.415	9.420	9.424	9.429	9.433	9.438
9.440	9.412	9.417	9.421	9.425	9.430	9.434	9.438	9.443	9.447	9.451	9.456	9.460	9.465	9.469	9.474	9.478
9.480	9.453	9.457	9.461	9.466	9.470	9.474	9.479	9.483	9.487	9.492	9.496	9.501	9.505	9.510	9.514	9.519
9.520	9.493	9.497	9.501	9.506	9.510	9.515	9.519	9.523	9.528	9.532	9.537	9.541	9.546	9.550	9.555	9.559
9.560	9.533	9.537	9.542	9.546	9.551	9.555	9.559	9.564	9.568	9.573	9.577	9.582	9.586	9.591	9.595	9.600
9.600	9.573	9.578	9.582	9.586	9.591	9.595	9.600	9.604	9.609	9.613	9.618	9.622	9.627	9.631	9.636	9.640
9.640	9.614	9.618	9.622	9.627	9.631	9.636	9.640	9.644	9.649	9.653	9.658	9.662	9.667	9.672	9.676	9.681
9.680	9.654	9.658	9.663	9.667	9.671	9.676	9.680	9.685	9.689	9.694	9.698	9.703	9.707	9.712	9.717	9.721
9.720	9.694	9.698	9.703	9.707	9.712	9.716	9.721	9.725	9.730	9.734	9.739	9.743	9.748	9.752	9.757	9.762
9.760	9.734	9.739	9.743	9.747	9.752	9.756	9.761	9.766	9.770	9.775	9.779	9.784	9.788	9.793	9.798	9.802
9.800	9.774	9.779	9.783	9.788	9.792	9.797	9.801	9.806	9.810	9.815	9.820	9.824	9.829	9.833	9.838	9.843
9.840	9.815	9.819	9.823	9.828	9.833	9.837	9.842	9.846	9.851	9.855	9.860	9.865	9.869	9.874	9.879	9.883
9.880	9.855	9.859	9.864	9.868	9.873	9.877	9.882	9.886	9.891	9.896	9.900	9.905	9.910	9.914	9.919	9.924
9.920	9.895	9.899	9.904	9.908	9.913	9.918	9.922	9.927	9.931	9.936	9.941	9.945	9.950	9.955	9.959	9.964
9.960	9.935	9.940	9.944	9.949	9.953	9.958	9.962	9.967	9.972	9.976	9.981	9.986	9.990	9.995	10.000	10.005
10.000	9.975	9.980	9.984	9.989	9.994	9.998	10.003	10.007	10.012	10.017	10.021	10.026	10.031	10.036	10.040	10.045
10.040	10.015	10.020	10.025	10.029	10.034	10.038	10.043	10.048	10.052	10.057	10.062	10.066	10.071	10.076	10.081	10.085
10.080	10.056	10.060	10.065	10.069	10.074	10.079	10.083	10.088	10.093	10.097	10.102	10.107	10.112	10.116	10.121	10.126
10.120	10.096	10.100	10.105	10.110	10.114	10.119	10.124	10.128	10.133	10.138	10.142	10.147	10.152	10.157	10.162	10.166
10.160	10.136	10.140	10.145	10.150	10.154	10.159	10.164	10.169	10.173	10.178	10.183	10.188	10.192	10.197	10.202	10.207
10.200	10.176	10.181	10.185	10.190	10.195	10.199	10.204	10.209	10.214	10.218	10.223	10.228	10.233	10.238	10.242	10.247
10.240	10.216	10.221	10.225	10.230	10.235	10.240	10.244	10.249	10.254	10.259	10.263	10.268	10.273	10.278	10.283	10.288
10.280	10.256	10.261	10.266	10.270	10.275	10.280	10.285	10.289	10.294	10.299	10.304	10.309	10.313	10.318	10.323	10.328
10.320	10.296	10.301	10.306	10.310	10.315	10.320	10.325	10.330	10.334	10.339	10.344	10.349	10.354	10.359	10.364	10.368
10.360	10.336	10.341	10.346	10.351	10.355	10.360	10.365	10.370	10.375	10.380	10.384	10.389	10.394	10.399	10.404	10.409
10.400	10.376	10.381	10.386	10.391	10.396	10.400	10.405	10.410	10.415	10.420	10.425	10.430	10.434	10.439	10.444	10.449
10.440	10.417	10.421	10.426	10.431	10.436	10.441	10.445	10.450	10.455	10.460	10.465	10.470	10.475	10.480	10.485	10.490
10.480	10.457	10.461	10.466	10.471	10.476	10.481	10.486	10.491	10.495	10.500	10.505	10.510	10.515	10.520	10.525	10.530
10.520	10.497	10.502	10.506	10.511	10.516	10.521	10.526	10.531	10.536	10.541	10.546	10.550	10.555	10.560	10.565	10.570
10.560	10.537	10.542	10.547	10.551	10.556	10.561	10.566	10.571	10.576	10.581	10.586	10.591	10.596	10.601	10.606	10.611
10.600	10.577	10.582	10.587	10.592	10.596	10.601	10.606	10.611	10.616	10.621	10.626	10.631	10.636	10.641	10.646	10.651
10.640	10.617	10.622	10.627	10.632	10.637	10.641	10.646	10.651	10.656	10.661	10.666	10.671	10.676	10.681	10.686	10.692
10.680	10.657	10.662	10.667	10.672	10.677	10.682	10.687	10.692	10.697	10.702	10.707	10.712	10.717	10.722	10.727	10.732
10.720	10.697	10.702	10.707	10.712	10.717	10.722	10.727	10.732	10.737	10.742	10.747	10.752	10.757	10.762	10.767	10.772
10.760	10.737	10.742	10.747	10.752	10.757	10.762	10.767	10.772	10.777	10.782	10.787	10.792	10.797	10.802	10.807	10.813
10.800	10.777	10.782	10.787	10.792	10.797	10.802	10.807	10.812	10.817	10.822	10.827	10.832	10.837	10.843	10.848	10.853
10.840	10.817	10.822	10.827	10.832	10.837	10.842	10.847	10.852	10.857	10.862	10.868	10.873	10.878	10.883	10.888	10.893
10.880	10.857	10.862	10.867	10.872	10.877	10.882	10.887	10.892	10.898	10.903	10.908	10.913	10.918	10.923	10.928	10.934
10.920	10.897	10.902	10.907	10.912	10.917	10.922	10.928	10.933	10.938	10.943	10.948	10.953	10.958	10.963	10.969	10.974
10.960	10.937	10.942	10.947	10.952	10.957	10.963	10.968	10.973	10.978	10.983	10.988	10.993	10.999	11.004	11.009	11.014
11.000	10.977	10.982	10.987	10.992	10.998	11.003	11.008	11.013	11.018	11.023	11.028	11.034	11.039	11.044	11.049	11.054
11.040	11.017	11.022	11.027	11.033	11.038	11.043	11.048	11.053	11.058	11.063	11.069	11.074	11.079	11.084	11.089	11.095
11.080	11.057	11.062	11.067	11.073	11.078	11.083	11.088	11.093	11.098	11.104	11.109	11.114	11.119	11.124	11.130	11.135
11.120	11.097	11.102	11.107	11.113	11.118	11.123	11.128	11.133	11.138	11.144	11.149	11.154	11.159	11.165	11.170	11.175
11.160	11.137	11.142	11.148	11.153	11.158	11.163	11.168	11.173	11.179	11.184	11.189	11.194	11.200	11.205	11.210	11.216
11.200	11.177	11.182	11.188	11.193	11.198	11.203	11.208	11.214	11.219	11.224	11.229	11.235	11.240	11.245	11.251	11.256
11.240	11.217	11.222	11.228	11.233	11.238	11.243	11.248	11.254	11.259	11.264	11.269	11.275	11.280	11.285	11.291	11.296
11.280	11.257	11.262	11.268	11.273	11.278	11.283	11.288	11.294	11.299	11.304	11.310	11.315	11.320	11.326	11.331	11.336
11.320	11.297	11.302	11.308	11.313	11.318	11.323	11.329	11.334	11.339	11.344	11.350	11.355	11.360	11.366	11.371	11.377
11.360	11.337	11.342	11.348	11.353	11.358	11.363	11.369	11.374	11.379	11.385	11.390	11.395	11.401	11.406	11.411	11.417
11.400	11.377	11.382	11.387	11.393	11.398	11.403	11.409	11.414	11.419	11.425	11.430	11.435	11.441	11.446	11.452	11.457
11.440	11.417	11.422	11.427	11.433	11.438	11.443	11.449	11.454	11.459	11.465	11.470	11.476	11.481	11.486	11.492	11.497
11.480	11.457	11.462	11.467	11.473	11.478	11.483	11.489	11.494	11.500	11.505	11.510	11.516	11.521	11.527	11.532	11.538
11.520	11.497	11.502	11.507	11.513	11.518	11.523	11.529	11.534	11.540	11.545	11.550	11.556	11.561	11.567	11.572	11.578
11.560	11.537	11.542	11.547	11.553	11.558	11.563	11.569	11.574	11.580	11.585	11.591	11.596	11.601	11.607	11.612	11.618
11.600	11.577	11.582	11.587	11.593	11.598	11.603	11.609	11.614	11.620	11.625	11.631	11.636	11.642	11.647	11.653	11.658
11.640	11.617	11.622	11.627	11.633	11.638	11.643	11.649	11.654	11.660	11.665	11.671	11.676	11.682	11.687	11.693	11.698
11.680	11.656	11.662	11.667	11.673	11.678	11.683	11.689	11.694	11.700	11.705	11.711	11.716	11.722	11.727	11.733	11.739
11.720	11.696	11.702	11.707	11.713	11.718	11.723	11.729	11.734	11.740	11.745	11.751	11.756	11.762	11.768	11.773	11.779
11.760	11.736	11.742	11.747	11.753	11.758	11.763	11.769	11.774	11.780	11.785	11.791	11.797	11.802	11.808	11.813	11.819
11.800	11.776	11.782	11.787	11.792	11.798	11.803	11.809	11.814	11.820	11.826	11.831	11.837	11.842	11.848	11.854	11.859

Table 10 Field unit density correction table for temperatures 80 to 110°F and density 8.4 to 11.8 lb/gal. The corrections are valid for diluted potassium formate brine.

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 60°F																
Measured density [lb/gal]	Measured fluid temperature [°F]															
	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
8.400	8.422	8.426	8.430	8.434	8.438	8.442	8.446	8.450	8.454	8.458	8.462	8.466	8.471	8.475	8.479	8.483
8.440	8.463	8.467	8.471	8.475	8.479	8.483	8.487	8.491	8.495	8.499	8.503	8.507	8.512	8.516	8.520	8.524
8.480	8.503	8.507	8.511	8.515	8.519	8.524	8.528	8.532	8.536	8.540	8.544	8.548	8.552	8.557	8.561	8.565
8.520	8.544	8.548	8.552	8.556	8.560	8.564	8.568	8.573	8.577	8.581	8.585	8.589	8.593	8.598	8.602	8.606
8.560	8.585	8.589	8.593	8.597	8.601	8.605	8.609	8.613	8.618	8.622	8.626	8.630	8.634	8.639	8.643	8.647
8.600	8.625	8.629	8.633	8.638	8.642	8.646	8.650	8.654	8.658	8.663	8.667	8.671	8.675	8.679	8.684	8.688
8.640	8.666	8.670	8.674	8.678	8.682	8.687	8.691	8.695	8.699	8.703	8.708	8.712	8.716	8.720	8.725	8.729
8.680	8.707	8.711	8.715	8.719	8.723	8.727	8.732	8.736	8.740	8.744	8.748	8.753	8.757	8.761	8.766	8.770
8.720	8.747	8.751	8.756	8.760	8.764	8.768	8.772	8.777	8.781	8.785	8.789	8.794	8.798	8.802	8.807	8.811
8.760	8.788	8.792	8.796	8.800	8.805	8.809	8.813	8.817	8.822	8.826	8.830	8.834	8.839	8.843	8.847	8.852
8.800	8.829	8.833	8.837	8.841	8.845	8.850	8.854	8.858	8.862	8.867	8.871	8.875	8.880	8.884	8.888	8.893
8.840	8.869	8.873	8.878	8.882	8.886	8.890	8.895	8.899	8.903	8.908	8.912	8.916	8.921	8.925	8.929	8.934
8.880	8.910	8.914	8.918	8.923	8.927	8.931	8.935	8.940	8.944	8.948	8.953	8.957	8.961	8.966	8.970	8.975
8.920	8.950	8.955	8.959	8.963	8.968	8.972	8.976	8.980	8.985	8.989	8.993	8.998	9.002	9.007	9.011	9.016
8.960	8.991	8.995	9.000	9.004	9.008	9.013	9.017	9.021	9.026	9.030	9.034	9.039	9.043	9.048	9.052	9.056
9.000	9.032	9.036	9.040	9.045	9.049	9.053	9.058	9.062	9.066	9.071	9.075	9.080	9.084	9.088	9.093	9.097
9.040	9.072	9.077	9.081	9.085	9.090	9.094	9.098	9.103	9.107	9.112	9.116	9.120	9.125	9.129	9.134	9.138
9.080	9.113	9.117	9.122	9.126	9.130	9.135	9.139	9.143	9.148	9.152	9.157	9.161	9.166	9.170	9.175	9.179
9.120	9.154	9.158	9.162	9.167	9.171	9.175	9.180	9.184	9.189	9.193	9.198	9.202	9.206	9.211	9.215	9.220
9.160	9.194	9.198	9.203	9.207	9.212	9.216	9.220	9.225	9.229	9.234	9.238	9.243	9.247	9.252	9.256	9.261
9.200	9.235	9.239	9.243	9.248	9.252	9.257	9.261	9.266	9.270	9.275	9.279	9.284	9.288	9.293	9.297	9.302
9.240	9.275	9.280	9.284	9.289	9.293	9.297	9.302	9.306	9.311	9.315	9.320	9.324	9.329	9.333	9.338	9.343
9.280	9.316	9.320	9.325	9.329	9.334	9.338	9.343	9.347	9.352	9.356	9.361	9.365	9.370	9.374	9.379	9.384
9.320	9.356	9.361	9.365	9.370	9.374	9.379	9.383	9.388	9.392	9.397	9.401	9.406	9.411	9.415	9.420	9.424
9.360	9.397	9.401	9.406	9.410	9.415	9.419	9.424	9.428	9.433	9.438	9.442	9.447	9.451	9.456	9.461	9.465
9.400	9.438	9.442	9.446	9.451	9.455	9.460	9.465	9.469	9.474	9.478	9.483	9.487	9.492	9.497	9.501	9.506
9.440	9.478	9.483	9.487	9.492	9.496	9.501	9.505	9.510	9.514	9.519	9.524	9.528	9.533	9.538	9.542	9.547
9.480	9.519	9.523	9.528	9.532	9.537	9.541	9.546	9.550	9.555	9.560	9.564	9.569	9.574	9.578	9.583	9.588
9.520	9.559	9.564	9.568	9.573	9.577	9.582	9.587	9.591	9.596	9.600	9.605	9.610	9.614	9.619	9.624	9.629
9.560	9.600	9.604	9.609	9.613	9.618	9.623	9.627	9.632	9.636	9.641	9.646	9.650	9.655	9.660	9.665	9.669
9.600	9.640	9.645	9.649	9.654	9.659	9.663	9.668	9.672	9.677	9.682	9.687	9.691	9.696	9.701	9.705	9.710
9.640	9.681	9.685	9.690	9.695	9.699	9.704	9.708	9.713	9.718	9.723	9.727	9.732	9.737	9.741	9.746	9.751
9.680	9.721	9.726	9.730	9.735	9.740	9.744	9.749	9.754	9.758	9.763	9.768	9.773	9.777	9.782	9.787	9.792
9.720	9.762	9.766	9.771	9.776	9.780	9.785	9.790	9.794	9.799	9.804	9.809	9.813	9.818	9.823	9.828	9.833
9.760	9.802	9.807	9.812	9.816	9.821	9.826	9.830	9.835	9.840	9.845	9.849	9.854	9.859	9.864	9.869	9.873
9.800	9.843	9.847	9.852	9.857	9.861	9.866	9.871	9.876	9.880	9.885	9.890	9.895	9.900	9.904	9.909	9.914
9.840	9.883	9.888	9.893	9.897	9.902	9.907	9.912	9.916	9.921	9.926	9.931	9.936	9.940	9.945	9.950	9.955
9.880	9.924	9.928	9.933	9.938	9.943	9.947	9.952	9.957	9.962	9.967	9.971	9.976	9.981	9.986	9.991	9.996
9.920	9.964	9.969	9.974	9.978	9.983	9.988	9.993	9.998	10.002	10.007	10.012	10.017	10.022	10.027	10.032	10.036
9.960	10.005	10.009	10.014	10.019	10.024	10.028	10.033	10.038	10.043	10.048	10.053	10.058	10.062	10.067	10.072	10.077
10.000	10.045	10.050	10.055	10.059	10.064	10.069	10.074	10.079	10.084	10.088	10.093	10.098	10.103	10.108	10.113	10.118
10.040	10.085	10.090	10.095	10.100	10.105	10.110	10.114	10.119	10.124	10.129	10.134	10.139	10.144	10.149	10.154	10.159
10.080	10.126	10.131	10.136	10.140	10.145	10.150	10.155	10.160	10.165	10.170	10.175	10.180	10.185	10.189	10.194	10.199
10.120	10.166	10.171	10.176	10.181	10.186	10.191	10.196	10.200	10.205	10.210	10.215	10.220	10.225	10.230	10.235	10.240
10.160	10.207	10.212	10.217	10.221	10.226	10.231	10.236	10.241	10.246	10.251	10.256	10.261	10.266	10.271	10.276	10.281
10.200	10.247	10.252	10.257	10.262	10.267	10.272	10.277	10.282	10.287	10.292	10.297	10.302	10.307	10.312	10.317	10.322
10.240	10.288	10.293	10.297	10.302	10.307	10.312	10.317	10.322	10.327	10.332	10.337	10.342	10.347	10.352	10.357	10.362
10.280	10.328	10.333	10.338	10.343	10.348	10.353	10.358	10.363	10.368	10.373	10.378	10.383	10.388	10.393	10.398	10.403
10.320	10.368	10.373	10.378	10.383	10.388	10.393	10.398	10.403	10.408	10.413	10.418	10.423	10.428	10.434	10.439	10.444
10.360	10.409	10.414	10.419	10.424	10.429	10.434	10.439	10.444	10.449	10.454	10.459	10.464	10.469	10.474	10.479	10.484
10.400	10.449	10.454	10.459	10.464	10.469	10.474	10.479	10.484	10.489	10.494	10.500	10.505	10.510	10.515	10.520	10.525
10.440	10.490	10.495	10.500	10.505	10.510	10.515	10.520	10.525	10.530	10.535	10.540	10.545	10.550	10.556	10.561	10.566
10.480	10.530	10.535	10.540	10.545	10.550	10.555	10.560	10.565	10.570	10.576	10.581	10.586	10.591	10.596	10.601	10.607
10.520	10.570	10.575	10.580	10.586	10.591	10.596	10.601	10.606	10.611	10.616	10.621	10.626	10.632	10.637	10.642	10.647
10.560	10.611	10.616	10.621	10.626	10.631	10.636	10.641	10.646	10.652	10.657	10.662	10.667	10.672	10.677	10.683	10.688
10.600	10.651	10.656	10.661	10.666	10.671	10.677	10.682	10.687	10.692	10.697	10.702	10.708	10.713	10.718	10.723	10.729
10.640	10.692	10.697	10.702	10.707	10.712	10.717	10.722	10.727	10.733	10.738	10.743	10.748	10.753	10.759	10.764	10.769
10.680	10.732	10.737	10.742	10.747	10.752	10.757	10.763	10.768	10.773	10.778	10.783	10.789	10.794	10.799	10.805	10.810
10.720	10.772	10.777	10.782	10.788	10.793	10.798	10.803	10.808	10.814	10.819	10.824	10.829	10.835	10.840	10.845	10.850
10.760	10.813	10.818	10.823	10.828	10.833	10.838	10.844	10.849	10.854	10.859	10.865	10.870	10.875	10.880	10.886	10.891
10.800	10.853	10.858	10.863	10.868	10.874	10.879	10.884	10.889	10.895	10.900	10.905	10.910	10.916	10.921	10.926	10.932
10.840	10.893	10.898	10.904	10.909	10.914	10.919	10.924	10.930	10.935	10.940	10.946	10.951	10.956	10.962	10.967	10.972
10.880	10.934	10.939	10.944	10.949	10.954	10.960	10.965	10.970	10.975	10.981	10.986	10.991	10.997	11.002	11.008	11.013
10.920	10.974	10.979	10.984	10.990	10.995	11.000	11.005	11.011	11.016	11.021	11.027	11.032	11.037	11.043	11.048	11.054
10.960	11.014	11.019	11.025	11.030	11.035	11.040	11.046	11.051	11.056	11.062	11.067	11.073	11.078	11.083	11.089	11.094
11.000	11.054	11.060	11.065	11.070	11.076	11.081	11.086	11.092	11.097	11.102	11.108	11.113	11.118	11.124	11.129	11.135
11.040	11.095	11.100	11.105	11.111	11.116	11.121	11.127	11.132	11.137	11.143	11.148	11.154	11.159	11.164	11.170	11.175
11.080	11.135	11.140	11.146	11.151	11.156	11.162	11.167	11.172	11.178	11.183	11.189	11.194	11.199	11.205	11.210	11.216
11.120	11.175	11.181	11.186	11.191	11.197	11.202	11.207	11.213	11.218	11.224	11.229	11.235	11.240	11.245	11.251	11.256
11.160	11.216	11.221	11.226	11.232	11.237	11.242	11.248	11.253	11.259	11.264	11.270	11.275	11.281	11.286	11.292	11.297
11.200	11.256	11.261	11.267	11.272	11.277	11.283	11.288	11.294	11.299	11.305	11.310	11.316	11.321	11.327	11.332	11.338
11.240	11.296	11.301	11.307	11.312	11.318	11.323	11.329	11.334	11.339	11.345	11.350	11.356	11.362	11.367	11.373	11.378
11.280	11.336	11.342	11.347	11.353	11.358	11.363	11.369	11.374	11.380	11.385	11.391	11.396	11.402	11.408	11.413	11.419
11.320	11.377	11.382	11.387	11.393	11.398	11.404	11.409	11.415	11.420	11.426	11.431	11.437	11.442	11.448	11.454	11.459
11.360	11.417	11.422	11.428	11.433	11.439	11.444	11.450	11.455	11.461	11.466	11.472	11.477	11.483	11.489	11.494	11.500
11.400	11.457	11.463	11.468	11.474	11.479	11.485	11.490	11.496	11.501	11.507	11.512	11.518	11.523	11.529	11.535	11.540
11.440	11.497	11.503	11.508	11.514	11.519	11.525	11.530	11.536	11.541	11.547	11.553	11.558	11.564	11.570	11.575	11.581
11.480	11.538	11.543	11.549	11.554	11.560	11.565	11.571	11.576	11.582	11.587	11.593	11.599	11.604	11.610	11.616	11.621
11.520	11.578	11.583	11.589	11.594	11.600	11.605	11.611	11.617	11.622	11.628	11.634	11.639	11.645	11.650	11.656	11.662
11.560	11.618	11.624	11.629	11.635	11.640	11.646	11.651	11.657	11.663	11.668	11.674	11.680	11.685	11.691	11.697	11.702
11.600	11.658	11.664	11.669	11.675	11.680	11.686	11.692	11.697	11.703	11.709	11.714	11.720	11.726	11.731	11.737	11.743
11.640	11.698	11.704	11.710	11.715	11.721	11.726	11.732	11.738	11.743	11.749	11.755	11.760	11.766	11.772	11.778	11.783
11.680	11.739	11.744	11.750	11.755	11.761	11.767	11.772	11.778	11.784	11.789	11.795	11.801	11.807	11.812	11.818	11.824
11.720	11.779	11.784	11.790	11.796	11.801	11.807	11.813	11.818	11.824	11.830	11.835	11.841	11.847	11.853	11.859	11.864
11.760	11.819	11.825	11.830	11.836	11.842	11.847	11.853	11.859	11.864	11.870	11.876	11.882	11.887	11.893	11.899	11.905
11.800	11.859	11.865	11.870	11.876	11.882	11.888	11.893	11.899	11.905	11.910	11.916	11.922	11.928	11.934	11.939	11.945

Table 11 Field unit density correction table for temperatures 50 to 80°F and density 11.8 to 15.0 lb/gal. The corrections are valid for diluted potassium formate brine in the lower density range (<13.1 lb/gal) and for potassium cesium formate blends in the higher density range (>13.1 lb/gal).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 60°F																
Measured density [lb/gal]	Measured fluid temperature [°F]															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
11.800	11.776	11.782	11.787	11.792	11.798	11.803	11.809	11.814	11.820	11.826	11.831	11.837	11.842	11.848	11.854	11.859
11.840	11.816	11.821	11.827	11.832	11.838	11.843	11.849	11.854	11.860	11.866	11.871	11.877	11.882	11.888	11.894	11.899
11.880	11.856	11.861	11.867	11.872	11.878	11.883	11.889	11.894	11.900	11.906	11.911	11.917	11.923	11.928	11.934	11.939
11.920	11.896	11.901	11.907	11.912	11.918	11.923	11.929	11.934	11.940	11.946	11.951	11.957	11.963	11.968	11.974	11.980
11.960	11.936	11.941	11.947	11.952	11.958	11.963	11.969	11.974	11.980	11.986	11.991	11.997	12.003	12.008	12.014	12.020
12.000	11.975	11.981	11.987	11.992	11.998	12.003	12.009	12.014	12.020	12.026	12.031	12.037	12.043	12.048	12.054	12.060
12.040	12.015	12.021	12.026	12.032	12.038	12.043	12.049	12.054	12.060	12.066	12.071	12.077	12.083	12.089	12.094	12.100
12.080	12.055	12.061	12.066	12.072	12.077	12.083	12.089	12.094	12.100	12.106	12.111	12.117	12.123	12.129	12.134	12.140
12.120	12.095	12.101	12.106	12.112	12.117	12.123	12.129	12.134	12.140	12.146	12.152	12.157	12.163	12.169	12.175	12.180
12.160	12.135	12.140	12.146	12.152	12.157	12.163	12.169	12.174	12.180	12.186	12.192	12.197	12.203	12.209	12.215	12.220
12.200	12.175	12.180	12.186	12.192	12.197	12.203	12.209	12.214	12.220	12.226	12.232	12.237	12.243	12.249	12.255	12.261
12.240	12.214	12.220	12.226	12.231	12.237	12.243	12.249	12.254	12.260	12.266	12.272	12.277	12.283	12.289	12.295	12.301
12.280	12.254	12.260	12.266	12.271	12.277	12.283	12.288	12.294	12.300	12.306	12.312	12.317	12.323	12.329	12.335	12.341
12.320	12.294	12.300	12.305	12.311	12.317	12.323	12.328	12.334	12.340	12.346	12.352	12.357	12.363	12.369	12.375	12.381
12.360	12.334	12.340	12.345	12.351	12.357	12.362	12.368	12.374	12.380	12.386	12.392	12.397	12.403	12.409	12.415	12.421
12.400	12.374	12.379	12.385	12.391	12.397	12.402	12.408	12.414	12.420	12.426	12.432	12.437	12.443	12.449	12.455	12.461
12.440	12.413	12.419	12.425	12.431	12.436	12.442	12.448	12.454	12.460	12.466	12.472	12.477	12.483	12.489	12.495	12.501
12.480	12.453	12.459	12.465	12.470	12.476	12.482	12.488	12.494	12.500	12.506	12.511	12.517	12.523	12.529	12.535	12.541
12.520	12.493	12.499	12.505	12.510	12.516	12.522	12.528	12.534	12.540	12.546	12.551	12.557	12.563	12.569	12.575	12.581
12.560	12.533	12.538	12.544	12.550	12.556	12.562	12.568	12.574	12.580	12.585	12.591	12.597	12.603	12.609	12.615	12.621
12.600	12.572	12.578	12.584	12.590	12.596	12.602	12.608	12.614	12.619	12.625	12.631	12.637	12.643	12.649	12.655	12.661
12.640	12.612	12.618	12.624	12.630	12.636	12.642	12.647	12.653	12.659	12.665	12.671	12.677	12.683	12.689	12.695	12.701
12.680	12.652	12.658	12.664	12.670	12.675	12.681	12.687	12.693	12.699	12.705	12.711	12.717	12.723	12.729	12.735	12.741
12.720	12.692	12.698	12.703	12.709	12.715	12.721	12.727	12.733	12.739	12.745	12.751	12.757	12.763	12.769	12.775	12.781
12.760	12.731	12.737	12.743	12.749	12.755	12.761	12.767	12.773	12.779	12.785	12.791	12.797	12.803	12.809	12.815	12.821
12.800	12.771	12.777	12.783	12.789	12.795	12.801	12.807	12.813	12.819	12.825	12.831	12.837	12.843	12.849	12.855	12.862
12.840	12.811	12.817	12.823	12.829	12.835	12.841	12.847	12.853	12.859	12.865	12.871	12.877	12.883	12.889	12.895	12.902
12.880	12.851	12.857	12.862	12.868	12.875	12.881	12.887	12.893	12.899	12.905	12.911	12.917	12.923	12.929	12.935	12.942
12.920	12.890	12.896	12.902	12.908	12.914	12.920	12.926	12.932	12.939	12.945	12.951	12.957	12.963	12.969	12.975	12.982
12.960	12.930	12.936	12.942	12.948	12.954	12.960	12.966	12.972	12.978	12.985	12.991	12.997	13.003	13.009	13.015	13.022
13.000	12.970	12.976	12.982	12.988	12.994	13.000	13.006	13.012	13.018	13.024	13.031	13.037	13.043	13.049	13.055	13.062
13.040	13.009	13.015	13.021	13.028	13.034	13.040	13.046	13.052	13.058	13.064	13.070	13.077	13.085	13.091	13.097	13.103
13.080	13.049	13.055	13.061	13.067	13.073	13.081	13.087	13.094	13.100	13.106	13.112	13.118	13.125	13.131	13.137	13.143
13.120	13.090	13.096	13.103	13.109	13.115	13.121	13.127	13.134	13.140	13.146	13.152	13.159	13.165	13.171	13.177	13.184
13.160	13.130	13.136	13.142	13.149	13.155	13.161	13.167	13.174	13.180	13.186	13.192	13.199	13.205	13.211	13.217	13.224
13.200	13.170	13.176	13.182	13.188	13.195	13.201	13.207	13.213	13.220	13.226	13.232	13.239	13.245	13.251	13.258	13.264
13.240	13.210	13.216	13.222	13.228	13.235	13.241	13.247	13.253	13.260	13.266	13.272	13.279	13.285	13.291	13.298	13.304
13.280	13.249	13.256	13.262	13.268	13.274	13.281	13.287	13.293	13.300	13.306	13.312	13.319	13.325	13.331	13.338	13.344
13.320	13.289	13.295	13.302	13.308	13.314	13.321	13.327	13.333	13.340	13.346	13.352	13.359	13.365	13.372	13.378	13.384
13.360	13.329	13.335	13.342	13.348	13.354	13.361	13.367	13.373	13.380	13.386	13.392	13.399	13.405	13.412	13.418	13.425
13.400	13.369	13.375	13.381	13.388	13.394	13.400	13.407	13.413	13.420	13.426	13.432	13.439	13.445	13.452	13.458	13.465
13.440	13.409	13.415	13.421	13.428	13.434	13.440	13.447	13.453	13.460	13.466	13.473	13.479	13.485	13.492	13.498	13.505
13.480	13.448	13.455	13.461	13.467	13.474	13.480	13.487	13.493	13.500	13.506	13.513	13.519	13.525	13.532	13.538	13.545
13.520	13.488	13.495	13.501	13.507	13.514	13.520	13.527	13.533	13.540	13.546	13.553	13.559	13.566	13.572	13.579	13.585
13.560	13.528	13.534	13.541	13.547	13.554	13.560	13.567	13.573	13.580	13.586	13.593	13.599	13.606	13.612	13.619	13.625
13.600	13.568	13.574	13.581	13.587	13.594	13.600	13.607	13.613	13.620	13.626	13.633	13.639	13.646	13.652	13.659	13.665
13.640	13.608	13.614	13.620	13.627	13.633	13.640	13.647	13.653	13.660	13.666	13.673	13.679	13.686	13.692	13.699	13.706
13.680	13.647	13.654	13.660	13.667	13.673	13.680	13.686	13.693	13.700	13.706	13.713	13.719	13.726	13.733	13.739	13.746
13.720	13.687	13.694	13.700	13.707	13.713	13.720	13.726	13.733	13.740	13.746	13.753	13.759	13.766	13.773	13.779	13.786
13.760	13.727	13.733	13.740	13.747	13.753	13.760	13.766	13.773	13.780	13.786	13.793	13.799	13.806	13.813	13.819	13.826
13.800	13.767	13.773	13.780	13.786	13.793	13.800	13.806	13.813	13.820	13.826	13.833	13.840	13.846	13.853	13.860	13.866
13.840	13.807	13.813	13.820	13.826	13.833	13.840	13.846	13.853	13.860	13.866	13.873	13.880	13.886	13.893	13.900	13.906
13.880	13.846	13.853	13.860	13.866	13.873	13.880	13.886	13.893	13.900	13.906	13.913	13.920	13.926	13.933	13.940	13.947
13.920	13.886	13.893	13.899	13.906	13.913	13.919	13.926	13.933	13.940	13.946	13.953	13.960	13.966	13.973	13.980	13.987
13.960	13.926	13.933	13.939	13.946	13.953	13.959	13.966	13.973	13.980	13.986	13.993	14.000	14.007	14.013	14.020	14.027
14.000	13.966	13.972	13.979	13.986	13.993	13.999	14.006	14.013	14.020	14.026	14.033	14.040	14.047	14.053	14.060	14.067
14.040	14.006	14.012	14.019	14.026	14.033	14.039	14.046	14.053	14.060	14.066	14.073	14.080	14.087	14.094	14.100	14.107
14.080	14.045	14.052	14.059	14.066	14.072	14.079	14.086	14.093	14.100	14.106	14.113	14.120	14.127	14.134	14.141	14.147
14.120	14.085	14.092	14.099	14.106	14.112	14.119	14.126	14.133	14.140	14.146	14.153	14.160	14.167	14.174	14.181	14.188
14.160	14.125	14.132	14.139	14.145	14.152	14.159	14.166	14.173	14.180	14.186	14.193	14.200	14.207	14.214	14.221	14.228
14.200	14.165	14.172	14.178	14.185	14.192	14.199	14.206	14.213	14.220	14.226	14.233	14.240	14.247	14.254	14.261	14.268
14.240	14.205	14.212	14.218	14.225	14.232	14.239	14.246	14.253	14.260	14.267	14.273	14.280	14.287	14.294	14.301	14.308
14.280	14.244	14.251	14.258	14.265	14.272	14.279	14.286	14.293	14.300	14.307	14.314	14.320	14.327	14.334	14.341	14.348
14.320	14.284	14.291	14.298	14.305	14.312	14.319	14.326	14.333	14.340	14.347	14.354	14.361	14.368	14.375	14.382	14.389
14.360	14.324	14.331	14.338	14.345	14.352	14.359	14.366	14.373	14.380	14.387	14.394	14.401	14.408	14.415	14.422	14.429
14.400	14.364	14.371	14.378	14.385	14.392	14.399	14.406	14.413	14.420	14.427	14.434	14.441	14.448	14.455	14.462	14.469
14.440	14.404	14.411	14.418	14.425	14.432	14.439	14.446	14.453	14.460	14.467	14.474	14.481	14.488	14.495	14.502	14.509
14.480	14.444	14.451	14.458	14.465	14.472	14.479	14.486	14.493	14.500	14.507	14.514	14.521	14.528	14.535	14.542	14.549
14.520	14.483	14.490	14.497	14.504	14.512	14.519	14.526	14.533	14.540	14.547	14.554	14.561	14.568	14.575	14.582	14.589
14.560	14.523	14.530	14.537	14.544	14.551	14.559	14.566	14.573	14.580	14.587	14.594	14.601	14.608	14.615	14.622	14.630
14.600	14.563	14.570	14.577	14.584	14.591	14.598	14.606	14.613	14.620	14.627	14.634	14.641	14.648	14.655	14.663	14.670
14.640	14.603	14.610	14.617	14.624	14.631	14.638	14.646	14.653	14.660	14.667	14.674	14.681	14.688	14.696	14.703	14.710
14.680	14.643	14.650	14.657	14.664	14.671	14.678	14.686	14.693	14.700	14.707	14.714	14.721	14.729	14.736	14.743	14.750
14.720	14.683	14.690	14.697	14.704	14.711	14.718	14.725	14.733	14.740	14.747	14.754	14.761	14.769	14.776	14.783	14.790
14.760	14.722	14.730	14.737	14.744	14.751	14.758	14.765	14.773	14.780	14.787	14.794	14.802	14.809	14.816	14.823	14.831
14.800	14.762	14.769	14.777	14.784	14.791	14.798	14.805	14.813	14.820	14.827	14.834	14.842	14.849	14.856	14.864	14.871
14.840	14.802	14.809	14.817	14.824	14.831	14.838	14.845	14.853	14.860	14.867	14.874	14.882	14.889	14.896	14.904	14.911
14.880	14.842	14.849	14.856	14.864	14.871	14.878	14.885	14.893	14.900	14.907	14.915	14.922	14.929	14.937	14.944	14.951
14.920	14.882	14.889	14.896	14.904	14.911	14.918	14.925	14.933	14.940	14.947	14.955	14.962	14.969	14.977	14.984	14.991
14.960	14.922	14.929	14.936	14.943	14.951	14.958	14.965	14.973	14.980	14.987	14.995	15.002	15.009	15.017	15.024	15.032
15.000	14.962	14.969	14.976	14.983	14.991	14.998	15.005	15.013	15.020	15.027	15.035	15.042	15.050	15.057	15.064	15.072

Table 12 Field unit density correction table for temperatures 80 to 110°F and density 11.8 to 15.0 lb/gal. The corrections are valid for diluted potassium formate brine in the lower density range (<13.1 lb/gal) and for potassium cesium formate blends in the higher density range (>13.1 lb/gal).

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 60°F																
Measured density [lb/gal]	Measured fluid temperature [°F]															
	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
11.800	11.859	11.865	11.870	11.876	11.882	11.888	11.893	11.899	11.905	11.910	11.916	11.922	11.928	11.934	11.939	11.945
11.840	11.899	11.905	11.911	11.916	11.922	11.928	11.934	11.939	11.945	11.951	11.957	11.962	11.968	11.974	11.980	11.986
11.880	11.939	11.945	11.951	11.957	11.962	11.968	11.974	11.980	11.985	11.991	11.997	12.003	12.009	12.014	12.020	12.026
11.920	11.980	11.985	11.991	11.997	12.003	12.008	12.014	12.020	12.026	12.031	12.037	12.043	12.049	12.055	12.061	12.067
11.960	12.020	12.026	12.031	12.037	12.043	12.049	12.054	12.060	12.066	12.072	12.078	12.084	12.089	12.095	12.101	12.107
12.000	12.060	12.066	12.071	12.077	12.083	12.089	12.095	12.100	12.106	12.112	12.118	12.124	12.130	12.136	12.142	12.148
12.040	12.100	12.106	12.112	12.117	12.123	12.129	12.135	12.141	12.147	12.152	12.158	12.164	12.170	12.176	12.182	12.188
12.080	12.140	12.146	12.152	12.158	12.163	12.169	12.175	12.181	12.187	12.193	12.199	12.205	12.211	12.216	12.222	12.228
12.120	12.180	12.186	12.192	12.198	12.204	12.209	12.215	12.221	12.227	12.233	12.239	12.245	12.251	12.257	12.263	12.269
12.160	12.220	12.226	12.232	12.238	12.244	12.250	12.256	12.261	12.267	12.273	12.279	12.285	12.291	12.297	12.303	12.309
12.200	12.261	12.266	12.272	12.278	12.284	12.290	12.296	12.302	12.308	12.314	12.320	12.326	12.332	12.338	12.344	12.350
12.240	12.301	12.307	12.312	12.318	12.324	12.330	12.336	12.342	12.348	12.354	12.360	12.366	12.372	12.378	12.384	12.390
12.280	12.341	12.347	12.353	12.358	12.364	12.370	12.376	12.382	12.388	12.394	12.400	12.406	12.412	12.418	12.424	12.430
12.320	12.381	12.387	12.393	12.399	12.405	12.411	12.416	12.422	12.428	12.434	12.440	12.447	12.453	12.459	12.465	12.471
12.360	12.421	12.427	12.433	12.439	12.445	12.451	12.457	12.463	12.469	12.475	12.481	12.487	12.493	12.499	12.505	12.511
12.400	12.461	12.467	12.473	12.479	12.485	12.491	12.497	12.503	12.509	12.515	12.521	12.527	12.533	12.539	12.545	12.552
12.440	12.501	12.507	12.513	12.519	12.525	12.531	12.537	12.543	12.549	12.555	12.561	12.567	12.574	12.580	12.586	12.592
12.480	12.541	12.547	12.553	12.559	12.565	12.571	12.577	12.583	12.589	12.595	12.602	12.608	12.614	12.620	12.626	12.632
12.520	12.581	12.587	12.593	12.599	12.605	12.611	12.617	12.624	12.630	12.636	12.642	12.648	12.654	12.660	12.666	12.673
12.560	12.621	12.627	12.633	12.639	12.645	12.652	12.658	12.664	12.670	12.676	12.682	12.688	12.694	12.701	12.707	12.713
12.600	12.661	12.667	12.673	12.679	12.686	12.692	12.698	12.704	12.710	12.716	12.722	12.729	12.735	12.741	12.747	12.753
12.640	12.701	12.707	12.714	12.720	12.726	12.732	12.738	12.744	12.750	12.756	12.763	12.769	12.775	12.781	12.787	12.794
12.680	12.741	12.748	12.754	12.760	12.766	12.772	12.778	12.784	12.790	12.797	12.803	12.809	12.815	12.822	12.828	12.834
12.720	12.781	12.788	12.794	12.800	12.806	12.812	12.818	12.824	12.831	12.837	12.843	12.849	12.856	12.862	12.868	12.874
12.760	12.821	12.828	12.834	12.840	12.846	12.852	12.858	12.865	12.871	12.877	12.883	12.890	12.896	12.902	12.908	12.915
12.800	12.862	12.868	12.874	12.880	12.886	12.892	12.899	12.905	12.911	12.917	12.923	12.930	12.936	12.942	12.949	12.955
12.840	12.902	12.908	12.914	12.920	12.926	12.932	12.939	12.945	12.951	12.957	12.964	12.970	12.976	12.983	12.989	12.995
12.880	12.942	12.948	12.954	12.960	12.966	12.973	12.979	12.985	12.991	12.998	13.004	13.010	13.017	13.023	13.029	13.036
12.920	12.982	12.988	12.994	13.000	13.006	13.013	13.019	13.025	13.031	13.038	13.044	13.050	13.057	13.063	13.070	13.076
12.960	13.022	13.028	13.034	13.040	13.046	13.053	13.059	13.065	13.072	13.078	13.085	13.092	13.098	13.104	13.111	13.117
13.000	13.062	13.068	13.074	13.082	13.088	13.094	13.101	13.107	13.113	13.120	13.126	13.132	13.138	13.145	13.151	13.157
13.040	13.103	13.110	13.116	13.122	13.128	13.135	13.141	13.147	13.154	13.160	13.166	13.173	13.179	13.185	13.192	13.198
13.080	13.143	13.150	13.156	13.162	13.169	13.175	13.181	13.188	13.194	13.200	13.207	13.213	13.219	13.226	13.232	13.238
13.120	13.184	13.190	13.196	13.203	13.209	13.215	13.222	13.228	13.234	13.241	13.247	13.253	13.260	13.266	13.273	13.279
13.160	13.224	13.230	13.236	13.243	13.249	13.255	13.262	13.268	13.275	13.281	13.287	13.294	13.300	13.307	13.313	13.319
13.200	13.264	13.270	13.277	13.283	13.289	13.296	13.302	13.309	13.315	13.321	13.328	13.334	13.341	13.347	13.354	13.360
13.240	13.304	13.310	13.317	13.323	13.330	13.336	13.342	13.349	13.355	13.362	13.368	13.375	13.381	13.388	13.394	13.400
13.280	13.344	13.351	13.357	13.363	13.370	13.376	13.383	13.389	13.396	13.402	13.409	13.415	13.421	13.428	13.434	13.441
13.320	13.384	13.391	13.397	13.404	13.410	13.417	13.423	13.429	13.436	13.442	13.449	13.455	13.462	13.468	13.475	13.482
13.360	13.425	13.431	13.437	13.444	13.450	13.457	13.463	13.470	13.476	13.483	13.489	13.496	13.502	13.509	13.515	13.522
13.400	13.465	13.471	13.478	13.484	13.491	13.497	13.504	13.510	13.517	13.523	13.530	13.536	13.543	13.549	13.556	13.563
13.440	13.505	13.511	13.518	13.524	13.531	13.537	13.544	13.550	13.557	13.564	13.570	13.577	13.583	13.590	13.596	13.603
13.480	13.545	13.551	13.558	13.565	13.571	13.578	13.584	13.591	13.597	13.604	13.610	13.617	13.624	13.630	13.637	13.644
13.520	13.585	13.592	13.598	13.605	13.611	13.618	13.624	13.631	13.638	13.644	13.651	13.657	13.664	13.671	13.677	13.684
13.560	13.625	13.632	13.638	13.645	13.652	13.658	13.665	13.671	13.678	13.685	13.691	13.698	13.705	13.711	13.718	13.725
13.600	13.665	13.672	13.679	13.685	13.692	13.698	13.705	13.712	13.718	13.725	13.732	13.738	13.745	13.752	13.758	13.765
13.640	13.706	13.712	13.719	13.725	13.732	13.739	13.745	13.752	13.759	13.765	13.772	13.779	13.785	13.792	13.799	13.806
13.680	13.746	13.752	13.759	13.766	13.772	13.779	13.786	13.792	13.799	13.806	13.812	13.819	13.826	13.833	13.839	13.846
13.720	13.786	13.793	13.799	13.806	13.813	13.819	13.826	13.833	13.839	13.846	13.853	13.860	13.866	13.873	13.880	13.887
13.760	13.826	13.833	13.839	13.846	13.853	13.860	13.866	13.873	13.880	13.887	13.893	13.900	13.907	13.914	13.920	13.927
13.800	13.866	13.873	13.880	13.886	13.893	13.900	13.907	13.913	13.920	13.927	13.934	13.940	13.947	13.954	13.961	13.968
13.840	13.906	13.913	13.920	13.927	13.933	13.940	13.947	13.954	13.960	13.967	13.974	13.981	13.988	13.995	14.001	14.008
13.880	13.947	13.953	13.960	13.967	13.974	13.980	13.987	13.994	14.001	14.008	14.014	14.021	14.028	14.035	14.042	14.049
13.920	13.987	13.994	14.000	14.007	14.014	14.021	14.028	14.034	14.041	14.048	14.055	14.062	14.069	14.076	14.082	14.089
13.960	14.027	14.034	14.041	14.047	14.054	14.061	14.068	14.075	14.082	14.088	14.095	14.102	14.109	14.116	14.123	14.130
14.000	14.067	14.074	14.081	14.088	14.094	14.101	14.108	14.115	14.122	14.129	14.136	14.143	14.150	14.156	14.163	14.170
14.040	14.107	14.114	14.121	14.128	14.135	14.142	14.148	14.155	14.162	14.169	14.176	14.183	14.190	14.197	14.204	14.211
14.080	14.147	14.154	14.161	14.168	14.175	14.182	14.189	14.196	14.203	14.210	14.217	14.224	14.230	14.237	14.244	14.251
14.120	14.188	14.195	14.201	14.208	14.215	14.222	14.229	14.236	14.243	14.250	14.257	14.264	14.271	14.278	14.285	14.292
14.160	14.228	14.235	14.242	14.249	14.256	14.262	14.269	14.276	14.283	14.290	14.297	14.304	14.311	14.318	14.325	14.332
14.200	14.268	14.275	14.282	14.289	14.296	14.303	14.310	14.317	14.324	14.331	14.338	14.345	14.352	14.359	14.366	14.373
14.240	14.308	14.315	14.322	14.329	14.336	14.343	14.350	14.357	14.364	14.371	14.378	14.385	14.392	14.399	14.406	14.414
14.280	14.348	14.355	14.362	14.369	14.376	14.383	14.390	14.397	14.405	14.412	14.419	14.426	14.433	14.440	14.447	14.454
14.320	14.389	14.396	14.403	14.410	14.417	14.424	14.431	14.438	14.445	14.452	14.459	14.466	14.473	14.480	14.488	14.495
14.360	14.429	14.436	14.443	14.450	14.457	14.464	14.471	14.478	14.485	14.492	14.499	14.507	14.514	14.521	14.528	14.535
14.400	14.469	14.476	14.483	14.490	14.497	14.504	14.511	14.519	14.526	14.533	14.540	14.547	14.554	14.561	14.569	14.576
14.440	14.509	14.516	14.523	14.530	14.537	14.545	14.552	14.559	14.566	14.573	14.580	14.588	14.595	14.602	14.609	14.616
14.480	14.549	14.556	14.563	14.571	14.578	14.585	14.592	14.599	14.606	14.614	14.621	14.628	14.635	14.642	14.650	14.657
14.520	14.589	14.597	14.604	14.611	14.618	14.625	14.632	14.640	14.647	14.654	14.661	14.668	14.676	14.683	14.690	14.697
14.560	14.630	14.637	14.644	14.651	14.658	14.666	14.673	14.680	14.687	14.694	14.702	14.709	14.716	14.723	14.731	14.738
14.600	14.670	14.677	14.684	14.691	14.699	14.706	14.713	14.720	14.728	14.735	14.742	14.749	14.757	14.764	14.771	14.778
14.640	14.710	14.717	14.724	14.732	14.739	14.746	14.753	14.761	14.768	14.775	14.782	14.790	14.797	14.804	14.812	14.819
14.680	14.750	14.757	14.765	14.772	14.779	14.786	14.794	14.801	14.808	14.816	14.823	14.830	14.838	14.845	14.852	14.860
14.720	14.790	14.798	14.805	14.812	14.819	14.827	14.834	14.841	14.849	14.856	14.863	14.871	14.878	14.885	14.893	14.900
14.760	14.831	14.838	14.845	14.852	14.860	14.867	14.874	14.882	14.889	14.896	14.904	14.911	14.919	14.926	14.933	14.941
14.800	14.871	14.878	14.885	14.893	14.900	14.907	14.915	14.922	14.929	14.937	14.944	14.952	14.959	14.966	14.974	14.981
14.840	14.911	14.918	14.926	14.933	14.940	14.948	14.955	14.962	14.970	14.977	14.985	14.992	14.999	15.007	15.014	15.022
14.880	14.951	14.959	14.966	14.973	14.981	14.988	14.995	15.003	15.010	15.018	15.025	15.033	15.040	15.047	15.055	15.062
14.920	14.991	14.999	15.006	15.014	15.021	15.028	15.036	15.043	15.051	15.058	15.066	15.073	15.080	15.088	15.095	15.103
14.960	15.032	15.039	15.046	15.054	15.061	15.069	15.076	15.084	15.091	15.099	15.106	15.113	15.121	15.128	15.136	15.143
15.000	15.072	15.079	15.087	15.094	15.102	15.109	15.116	15.124	15.131	15.139	15.146	15.154	15.161	15.169	15.177	15.184

Table 13 Field unit density correction table for temperatures 50 to 80°F and density 15.0 to 18.2 lb/gal. The corrections are valid for potassium cesium formate blends.

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 60°F																
Measured density [lb/gal]	Measured fluid temperature [°F]															
	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
15.000	14.962	14.969	14.976	14.983	14.991	14.998	15.005	15.013	15.020	15.027	15.035	15.042	15.050	15.057	15.064	15.072
15.040	15.001	15.009	15.016	15.023	15.031	15.038	15.045	15.053	15.060	15.068	15.075	15.082	15.090	15.097	15.105	15.112
15.080	15.041	15.049	15.056	15.063	15.071	15.078	15.085	15.093	15.100	15.108	15.115	15.122	15.130	15.137	15.145	15.152
15.120	15.081	15.088	15.096	15.103	15.111	15.118	15.125	15.133	15.140	15.148	15.155	15.163	15.170	15.177	15.185	15.192
15.160	15.121	15.128	15.136	15.143	15.151	15.158	15.165	15.173	15.180	15.188	15.195	15.203	15.210	15.218	15.225	15.233
15.200	15.161	15.168	15.176	15.183	15.190	15.198	15.205	15.213	15.220	15.228	15.235	15.243	15.250	15.258	15.265	15.273
15.240	15.201	15.208	15.215	15.223	15.230	15.238	15.245	15.253	15.260	15.268	15.275	15.283	15.290	15.298	15.306	15.313
15.280	15.240	15.248	15.255	15.263	15.270	15.278	15.285	15.293	15.300	15.308	15.315	15.323	15.331	15.338	15.346	15.353
15.320	15.280	15.288	15.295	15.303	15.310	15.318	15.325	15.333	15.340	15.348	15.356	15.363	15.371	15.378	15.386	15.393
15.360	15.320	15.328	15.335	15.343	15.350	15.358	15.365	15.373	15.380	15.388	15.396	15.403	15.411	15.418	15.426	15.434
15.400	15.360	15.368	15.375	15.383	15.390	15.398	15.405	15.413	15.421	15.428	15.436	15.443	15.451	15.459	15.466	15.474
15.440	15.400	15.407	15.415	15.423	15.430	15.438	15.445	15.453	15.461	15.468	15.476	15.483	15.491	15.499	15.506	15.514
15.480	15.440	15.447	15.455	15.463	15.470	15.478	15.485	15.493	15.501	15.508	15.516	15.524	15.531	15.539	15.547	15.554
15.520	15.480	15.487	15.495	15.502	15.510	15.518	15.525	15.533	15.541	15.548	15.556	15.564	15.571	15.579	15.587	15.595
15.560	15.519	15.527	15.535	15.542	15.550	15.558	15.565	15.573	15.581	15.588	15.596	15.604	15.612	15.619	15.627	15.635
15.600	15.559	15.567	15.575	15.582	15.590	15.598	15.605	15.613	15.621	15.629	15.636	15.644	15.652	15.659	15.667	15.675
15.640	15.599	15.607	15.615	15.622	15.630	15.638	15.645	15.653	15.661	15.669	15.676	15.684	15.692	15.700	15.707	15.715
15.680	15.639	15.647	15.654	15.662	15.670	15.678	15.685	15.693	15.701	15.709	15.716	15.724	15.732	15.740	15.748	15.755
15.720	15.679	15.687	15.694	15.702	15.710	15.718	15.725	15.733	15.741	15.749	15.757	15.764	15.772	15.780	15.788	15.796
15.760	15.719	15.727	15.734	15.742	15.750	15.758	15.765	15.773	15.781	15.789	15.797	15.805	15.812	15.820	15.828	15.836
15.800	15.759	15.766	15.774	15.782	15.790	15.798	15.805	15.813	15.821	15.829	15.837	15.845	15.853	15.860	15.868	15.876
15.840	15.799	15.806	15.814	15.822	15.830	15.838	15.845	15.853	15.861	15.869	15.877	15.885	15.893	15.901	15.908	15.916
15.880	15.838	15.846	15.854	15.862	15.870	15.878	15.885	15.893	15.901	15.909	15.917	15.925	15.933	15.941	15.949	15.957
15.920	15.878	15.886	15.894	15.902	15.910	15.918	15.925	15.933	15.941	15.949	15.957	15.965	15.973	15.981	15.989	15.997
15.960	15.918	15.926	15.934	15.942	15.950	15.958	15.966	15.973	15.981	15.989	15.997	16.005	16.013	16.021	16.029	16.037
16.000	15.958	15.966	15.974	15.982	15.990	15.998	16.006	16.013	16.021	16.029	16.037	16.045	16.053	16.061	16.069	16.077
16.040	15.998	16.006	16.014	16.022	16.030	16.038	16.046	16.054	16.061	16.069	16.077	16.085	16.093	16.102	16.110	16.118
16.080	16.038	16.046	16.054	16.062	16.070	16.078	16.086	16.094	16.102	16.110	16.118	16.126	16.134	16.142	16.150	16.158
16.120	16.078	16.086	16.094	16.102	16.110	16.118	16.126	16.134	16.142	16.150	16.158	16.166	16.174	16.182	16.190	16.198
16.160	16.118	16.126	16.134	16.142	16.150	16.158	16.166	16.174	16.182	16.190	16.198	16.206	16.214	16.222	16.230	16.238
16.200	16.157	16.165	16.173	16.182	16.190	16.198	16.206	16.214	16.222	16.230	16.238	16.246	16.254	16.262	16.270	16.279
16.240	16.197	16.205	16.213	16.221	16.230	16.238	16.246	16.254	16.262	16.270	16.278	16.286	16.294	16.302	16.311	16.319
16.280	16.237	16.245	16.253	16.261	16.270	16.278	16.286	16.294	16.302	16.310	16.318	16.326	16.335	16.343	16.351	16.359
16.320	16.277	16.285	16.293	16.301	16.309	16.318	16.326	16.334	16.342	16.350	16.358	16.367	16.375	16.383	16.391	16.399
16.360	16.317	16.325	16.333	16.341	16.349	16.358	16.366	16.374	16.382	16.390	16.398	16.407	16.415	16.423	16.431	16.440
16.400	16.357	16.365	16.373	16.381	16.389	16.398	16.406	16.414	16.422	16.430	16.439	16.447	16.455	16.463	16.472	16.480
16.440	16.397	16.405	16.413	16.421	16.429	16.438	16.446	16.454	16.462	16.470	16.479	16.487	16.495	16.503	16.512	16.520
16.480	16.437	16.445	16.453	16.461	16.469	16.478	16.486	16.494	16.502	16.511	16.519	16.527	16.535	16.544	16.552	16.560
16.520	16.477	16.485	16.493	16.501	16.509	16.518	16.526	16.534	16.542	16.551	16.559	16.567	16.576	16.584	16.592	16.601
16.560	16.516	16.525	16.533	16.541	16.549	16.558	16.566	16.574	16.583	16.591	16.599	16.607	16.616	16.624	16.632	16.641
16.600	16.556	16.565	16.573	16.581	16.589	16.598	16.606	16.614	16.623	16.631	16.639	16.648	16.656	16.664	16.673	16.681
16.640	16.596	16.605	16.613	16.621	16.629	16.638	16.646	16.654	16.663	16.671	16.679	16.688	16.696	16.705	16.713	16.721
16.680	16.636	16.644	16.653	16.661	16.669	16.678	16.686	16.694	16.703	16.711	16.720	16.728	16.736	16.745	16.753	16.762
16.720	16.676	16.684	16.693	16.701	16.709	16.718	16.726	16.735	16.743	16.751	16.760	16.768	16.777	16.785	16.793	16.802
16.760	16.716	16.724	16.733	16.741	16.749	16.758	16.766	16.775	16.783	16.791	16.800	16.808	16.817	16.825	16.834	16.842
16.800	16.756	16.764	16.773	16.781	16.789	16.798	16.806	16.815	16.823	16.832	16.840	16.848	16.857	16.865	16.874	16.882
16.840	16.796	16.804	16.813	16.821	16.829	16.838	16.846	16.855	16.863	16.872	16.880	16.889	16.897	16.906	16.914	16.923
16.880	16.836	16.844	16.853	16.861	16.869	16.878	16.886	16.895	16.903	16.912	16.920	16.929	16.937	16.946	16.954	16.963
16.920	16.876	16.884	16.892	16.901	16.909	16.918	16.926	16.935	16.943	16.952	16.960	16.969	16.977	16.986	16.995	17.003
16.960	16.915	16.924	16.932	16.941	16.949	16.958	16.966	16.975	16.983	16.992	17.001	17.009	17.018	17.026	17.035	17.043
17.000	16.955	16.964	16.972	16.981	16.989	16.998	17.006	17.015	17.024	17.032	17.041	17.049	17.058	17.066	17.075	17.084
17.040	16.995	17.004	17.012	17.021	17.029	17.038	17.047	17.055	17.064	17.072	17.081	17.089	17.098	17.107	17.115	17.124
17.080	17.035	17.044	17.052	17.061	17.069	17.078	17.087	17.095	17.104	17.112	17.121	17.130	17.138	17.147	17.156	17.164
17.120	17.075	17.084	17.092	17.101	17.109	17.118	17.127	17.135	17.144	17.153	17.161	17.170	17.178	17.187	17.196	17.204
17.160	17.115	17.124	17.132	17.141	17.149	17.158	17.167	17.175	17.184	17.193	17.201	17.210	17.219	17.227	17.236	17.245
17.200	17.155	17.164	17.172	17.181	17.189	17.198	17.207	17.215	17.224	17.233	17.241	17.250	17.259	17.268	17.276	17.285
17.240	17.195	17.204	17.212	17.221	17.229	17.238	17.247	17.256	17.264	17.273	17.282	17.290	17.299	17.308	17.317	17.325
17.280	17.235	17.243	17.252	17.261	17.269	17.278	17.287	17.296	17.304	17.313	17.322	17.331	17.339	17.348	17.357	17.366
17.320	17.275	17.283	17.292	17.301	17.310	17.318	17.327	17.336	17.344	17.353	17.362	17.371	17.379	17.388	17.397	17.406
17.360	17.315	17.323	17.332	17.341	17.350	17.358	17.367	17.376	17.385	17.393	17.402	17.411	17.420	17.429	17.437	17.446
17.400	17.355	17.363	17.372	17.381	17.390	17.398	17.407	17.416	17.425	17.433	17.442	17.451	17.460	17.469	17.478	17.486
17.440	17.394	17.403	17.412	17.421	17.430	17.438	17.447	17.456	17.465	17.474	17.482	17.491	17.500	17.509	17.518	17.527
17.480	17.434	17.443	17.452	17.461	17.470	17.478	17.487	17.496	17.505	17.514	17.523	17.531	17.540	17.549	17.558	17.567
17.520	17.474	17.483	17.492	17.501	17.510	17.518	17.527	17.536	17.545	17.554	17.563	17.572	17.581	17.589	17.598	17.607
17.560	17.514	17.523	17.532	17.541	17.550	17.558	17.567	17.576	17.585	17.594	17.603	17.612	17.621	17.630	17.639	17.648
17.600	17.554	17.563	17.572	17.581	17.590	17.599	17.607	17.616	17.625	17.634	17.643	17.652	17.661	17.670	17.679	17.688
17.640	17.594	17.603	17.612	17.621	17.630	17.639	17.648	17.656	17.665	17.674	17.683	17.692	17.701	17.710	17.719	17.728
17.680	17.634	17.643	17.652	17.661	17.670	17.679	17.688	17.697	17.706	17.714	17.723	17.732	17.741	17.750	17.759	17.768
17.720	17.674	17.683	17.692	17.701	17.710	17.719	17.728	17.737	17.746	17.755	17.764	17.773	17.782	17.791	17.800	17.809
17.760	17.714	17.723	17.732	17.741	17.750	17.759	17.768	17.777	17.786	17.795	17.804	17.813	17.822	17.831	17.840	17.849
17.800	17.754	17.763	17.772	17.781	17.790	17.799	17.808	17.817	17.826	17.835	17.844	17.853	17.862	17.871	17.880	17.889
17.840	17.794	17.803	17.812	17.821	17.830	17.839	17.848	17.857	17.866	17.875	17.884	17.893	17.902	17.911	17.921	17.930
17.880	17.834	17.843	17.852	17.861	17.870	17.879	17.888	17.897	17.906	17.915	17.924	17.933	17.943	17.952	17.961	17.970
17.920	17.874	17.883	17.892	17.901	17.910	17.919	17.928	17.937	17.946	17.955	17.965	17.974	17.983	17.992	18.001	18.010
17.960	17.914	17.923	17.932	17.941	17.950	17.959	17.968	17.977	17.986	17.996	18.005	18.014	18.023	18.032	18.041	18.051
18.000	17.954	17.963	17.972	17.981	17.990	17.999	18.008	18.017	18.027	18.036	18.045	18.054	18.063	18.072	18.082	18.091
18.040	17.994	18.003	18.012	18.021	18.030	18.039	18.048	18.058	18.067	18.076	18.085	18.094	18.103	18.113	18.122	18.131
18.080	18.033	18.043	18.052	18.061	18.070	18.079	18.088	18.098	18.107	18.116	18.125	18.134	18.144	18.153	18.162	18.171
18.120	18.073	18.083	18.092	18.101	18.110	18.119	18.129	18.138	18.147	18.156	18.165	18.175	18.184	18.193	18.202	18.212
18.160	18.113	18.123	18.132	18.141	18.150	18.159	18.169	18.178	18.187	18.196	18.206	18.215	18.224	18.233	18.243	18.252
18.200	18.153	18.163	18.172	18.181	18.190	18.199	18.209	18.218	18.227	18.237	18.246	18.255	18.264	18.274	18.283	18.292

Table 14 Field unit density correction table for temperatures 80 to 110°F and density 15.0 to 18.2 lb/gal. The corrections are valid for potassium cesium formate blends.

Temperature correction table – cesium / potassium formate brine blend showing corrected temperature at 60°F																
Measured density [lb/gal]	Measured fluid temperature [°F]															
	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
15.000	15.072	15.079	15.087	15.094	15.102	15.109	15.116	15.124	15.131	15.139	15.146	15.154	15.161	15.169	15.177	15.184
15.040	15.112	15.119	15.127	15.134	15.142	15.149	15.157	15.164	15.172	15.179	15.187	15.194	15.202	15.209	15.217	15.225
15.080	15.152	15.160	15.167	15.175	15.182	15.190	15.197	15.205	15.212	15.220	15.227	15.235	15.242	15.250	15.258	15.265
15.120	15.192	15.200	15.207	15.215	15.222	15.230	15.238	15.245	15.253	15.260	15.268	15.275	15.283	15.291	15.298	15.306
15.160	15.233	15.240	15.248	15.255	15.263	15.270	15.278	15.285	15.293	15.301	15.308	15.316	15.323	15.331	15.339	15.346
15.200	15.273	15.280	15.288	15.296	15.303	15.311	15.318	15.326	15.333	15.341	15.349	15.356	15.364	15.372	15.379	15.387
15.240	15.313	15.321	15.328	15.336	15.343	15.351	15.359	15.366	15.374	15.381	15.389	15.397	15.404	15.412	15.420	15.427
15.280	15.353	15.361	15.368	15.376	15.384	15.391	15.399	15.407	15.414	15.422	15.430	15.437	15.445	15.453	15.460	15.468
15.320	15.393	15.401	15.409	15.416	15.424	15.432	15.439	15.447	15.455	15.462	15.470	15.478	15.485	15.493	15.501	15.509
15.360	15.434	15.441	15.449	15.457	15.464	15.472	15.480	15.487	15.495	15.503	15.510	15.518	15.526	15.534	15.541	15.549
15.400	15.474	15.482	15.489	15.497	15.505	15.512	15.520	15.528	15.535	15.543	15.551	15.559	15.566	15.574	15.582	15.590
15.440	15.514	15.522	15.530	15.537	15.545	15.553	15.560	15.568	15.576	15.584	15.591	15.599	15.607	15.615	15.623	15.630
15.480	15.554	15.562	15.570	15.578	15.585	15.593	15.601	15.609	15.616	15.624	15.632	15.640	15.647	15.655	15.663	15.671
15.520	15.595	15.602	15.610	15.618	15.626	15.633	15.641	15.649	15.657	15.665	15.672	15.680	15.688	15.696	15.704	15.712
15.560	15.635	15.643	15.650	15.658	15.666	15.674	15.681	15.689	15.697	15.705	15.713	15.721	15.728	15.736	15.744	15.752
15.600	15.675	15.683	15.691	15.698	15.706	15.714	15.722	15.730	15.738	15.745	15.753	15.761	15.769	15.777	15.785	15.793
15.640	15.715	15.723	15.731	15.739	15.747	15.754	15.762	15.770	15.778	15.786	15.794	15.802	15.809	15.817	15.825	15.833
15.680	15.755	15.763	15.771	15.779	15.787	15.795	15.803	15.810	15.818	15.826	15.834	15.842	15.850	15.858	15.866	15.874
15.720	15.796	15.804	15.811	15.819	15.827	15.835	15.843	15.851	15.859	15.867	15.875	15.883	15.891	15.898	15.906	15.914
15.760	15.836	15.844	15.852	15.860	15.868	15.875	15.883	15.891	15.899	15.907	15.915	15.923	15.931	15.939	15.947	15.955
15.800	15.876	15.884	15.892	15.900	15.908	15.916	15.924	15.932	15.940	15.948	15.956	15.964	15.972	15.980	15.988	15.996
15.840	15.916	15.924	15.932	15.940	15.948	15.956	15.964	15.972	15.980	15.988	15.996	16.004	16.012	16.020	16.028	16.036
15.880	15.957	15.965	15.973	15.981	15.988	15.996	16.004	16.012	16.020	16.028	16.037	16.045	16.053	16.061	16.069	16.077
15.920	15.997	16.005	16.013	16.021	16.029	16.037	16.045	16.053	16.061	16.069	16.077	16.085	16.093	16.101	16.109	16.117
15.960	16.037	16.045	16.053	16.061	16.069	16.077	16.085	16.093	16.101	16.109	16.117	16.126	16.134	16.142	16.150	16.158
16.000	16.077	16.085	16.093	16.101	16.109	16.118	16.126	16.134	16.142	16.150	16.158	16.166	16.174	16.182	16.190	16.199
16.040	16.118	16.126	16.134	16.142	16.150	16.158	16.166	16.174	16.182	16.190	16.198	16.207	16.215	16.223	16.231	16.239
16.080	16.158	16.166	16.174	16.182	16.190	16.198	16.206	16.214	16.223	16.231	16.239	16.247	16.255	16.263	16.272	16.280
16.120	16.198	16.206	16.214	16.222	16.230	16.239	16.247	16.255	16.263	16.271	16.279	16.288	16.296	16.304	16.312	16.320
16.160	16.238	16.246	16.255	16.263	16.271	16.279	16.287	16.295	16.303	16.312	16.320	16.328	16.336	16.345	16.353	16.361
16.200	16.279	16.287	16.295	16.303	16.311	16.319	16.328	16.336	16.344	16.352	16.360	16.369	16.377	16.385	16.393	16.402
16.240	16.319	16.327	16.335	16.343	16.352	16.360	16.368	16.376	16.384	16.393	16.401	16.409	16.417	16.426	16.434	16.442
16.280	16.359	16.367	16.375	16.384	16.392	16.400	16.408	16.417	16.425	16.433	16.441	16.450	16.458	16.466	16.474	16.483
16.320	16.399	16.407	16.416	16.424	16.432	16.440	16.449	16.457	16.465	16.474	16.482	16.490	16.498	16.507	16.515	16.523
16.360	16.440	16.448	16.456	16.464	16.473	16.481	16.489	16.497	16.506	16.514	16.522	16.531	16.539	16.547	16.556	16.564
16.400	16.480	16.488	16.496	16.505	16.513	16.521	16.529	16.538	16.546	16.554	16.563	16.571	16.579	16.588	16.596	16.605
16.440	16.520	16.528	16.537	16.545	16.553	16.562	16.570	16.578	16.587	16.595	16.603	16.612	16.620	16.628	16.637	16.645
16.480	16.560	16.569	16.577	16.585	16.594	16.602	16.610	16.619	16.627	16.635	16.644	16.652	16.661	16.669	16.677	16.686
16.520	16.601	16.609	16.617	16.626	16.634	16.642	16.651	16.659	16.667	16.676	16.684	16.693	16.701	16.710	16.718	16.726
16.560	16.641	16.649	16.658	16.666	16.674	16.683	16.691	16.699	16.708	16.716	16.725	16.733	16.742	16.750	16.759	16.767
16.600	16.681	16.689	16.698	16.706	16.715	16.723	16.731	16.740	16.748	16.757	16.765	16.774	16.782	16.791	16.799	16.808
16.640	16.721	16.730	16.738	16.747	16.755	16.763	16.772	16.780	16.789	16.797	16.806	16.814	16.823	16.831	16.840	16.848
16.680	16.762	16.770	16.778	16.787	16.795	16.804	16.812	16.821	16.829	16.838	16.846	16.855	16.863	16.872	16.880	16.889
16.720	16.802	16.810	16.819	16.827	16.836	16.844	16.853	16.861	16.870	16.878	16.887	16.895	16.904	16.912	16.921	16.930
16.760	16.842	16.851	16.859	16.868	16.876	16.885	16.893	16.902	16.910	16.919	16.927	16.936	16.944	16.953	16.962	16.970
16.800	16.882	16.891	16.899	16.908	16.916	16.925	16.933	16.942	16.951	16.959	16.968	16.976	16.985	16.994	17.002	17.011
16.840	16.923	16.931	16.940	16.948	16.957	16.965	16.974	16.982	16.991	17.000	17.008	17.017	17.025	17.034	17.043	17.051
16.880	16.963	16.971	16.980	16.989	16.997	17.006	17.014	17.023	17.032	17.040	17.049	17.057	17.066	17.075	17.083	17.092
16.920	17.003	17.012	17.020	17.029	17.037	17.046	17.055	17.063	17.072	17.081	17.089	17.098	17.107	17.115	17.124	17.133
16.960	17.043	17.052	17.061	17.069	17.078	17.086	17.095	17.104	17.112	17.121	17.130	17.138	17.147	17.156	17.165	17.173
17.000	17.084	17.092	17.101	17.110	17.118	17.127	17.136	17.144	17.153	17.162	17.170	17.179	17.188	17.196	17.205	17.214
17.040	17.124	17.133	17.141	17.150	17.159	17.167	17.176	17.185	17.193	17.202	17.211	17.220	17.228	17.237	17.246	17.255
17.080	17.164	17.173	17.182	17.190	17.199	17.208	17.216	17.225	17.234	17.243	17.251	17.260	17.269	17.278	17.286	17.295
17.120	17.204	17.213	17.222	17.231	17.239	17.248	17.257	17.266	17.274	17.283	17.292	17.301	17.309	17.318	17.327	17.336
17.160	17.245	17.253	17.262	17.271	17.280	17.288	17.297	17.306	17.315	17.324	17.332	17.341	17.350	17.359	17.368	17.376
17.200	17.285	17.294	17.303	17.311	17.320	17.329	17.338	17.346	17.355	17.364	17.373	17.382	17.391	17.399	17.408	17.417
17.240	17.325	17.334	17.343	17.352	17.360	17.369	17.378	17.387	17.396	17.405	17.413	17.422	17.431	17.440	17.449	17.458
17.280	17.366	17.374	17.383	17.392	17.401	17.410	17.418	17.427	17.436	17.445	17.454	17.463	17.472	17.481	17.489	17.498
17.320	17.406	17.415	17.424	17.432	17.441	17.450	17.459	17.468	17.477	17.486	17.494	17.503	17.512	17.521	17.530	17.539
17.360	17.446	17.455	17.464	17.473	17.482	17.490	17.499	17.508	17.517	17.526	17.535	17.544	17.553	17.562	17.571	17.580
17.400	17.486	17.495	17.504	17.513	17.522	17.531	17.540	17.549	17.558	17.567	17.575	17.584	17.593	17.602	17.611	17.620
17.440	17.527	17.536	17.545	17.553	17.562	17.571	17.580	17.589	17.598	17.607	17.616	17.625	17.634	17.643	17.652	17.661
17.480	17.567	17.576	17.585	17.594	17.603	17.612	17.621	17.630	17.639	17.648	17.656	17.665	17.674	17.684	17.693	17.702
17.520	17.607	17.616	17.625	17.634	17.643	17.652	17.661	17.670	17.679	17.688	17.697	17.706	17.715	17.724	17.733	17.742
17.560	17.648	17.657	17.666	17.674	17.683	17.692	17.701	17.710	17.719	17.729	17.738	17.747	17.756	17.765	17.774	17.783
17.600	17.688	17.697	17.706	17.715	17.724	17.733	17.742	17.751	17.760	17.769	17.778	17.787	17.796	17.805	17.814	17.823
17.640	17.728	17.737	17.746	17.755	17.764	17.773	17.782	17.791	17.800	17.810	17.819	17.828	17.837	17.846	17.855	17.864
17.680	17.768	17.777	17.787	17.796	17.805	17.814	17.823	17.832	17.841	17.850	17.859	17.868	17.877	17.887	17.896	17.905
17.720	17.809	17.818	17.827	17.836	17.845	17.854	17.863	17.872	17.881	17.891	17.900	17.909	17.918	17.927	17.936	17.945
17.760	17.849	17.858	17.867	17.876	17.885	17.895	17.904	17.913	17.922	17.931	17.940	17.949	17.959	17.968	17.977	17.986
17.800	17.889	17.898	17.908	17.917	17.926	17.935	17.944	17.953	17.962	17.972	17.981	17.990	17.999	18.008	18.018	18.027
17.840	17.930	17.939	17.948	17.957	17.966	17.975	17.985	17.994	18.003	18.012	18.021	18.030	18.040	18.049	18.058	18.067
17.880	17.970	17.979	17.988	17.997	18.007	18.016	18.025	18.034	18.043	18.053	18.062	18.071	18.080	18.090	18.099	18.108
17.920	18.010	18.019	18.029	18.038	18.047	18.056	18.065	18.075	18.084	18.093	18.102	18.112	18.121	18.130	18.139	18.149
17.960	18.051	18.060	18.069	18.078	18.087	18.097	18.106	18.115	18.124	18.134	18.143	18.152	18.161	18.171	18.180	18.189
18.000	18.091	18.100	18.109	18.119	18.128	18.137	18.146	18.156	18.165	18.174	18.183	18.193	18.202	18.211	18.221	18.230
18.040	18.131	18.140	18.150	18.159	18.168	18.177	18.187	18.196	18.205	18.215	18.224	18.233	18.243	18.252	18.261	18.271
18.080	18.171	18.181	18.190	18.199	18.209	18.218	18.227	18.237	18.246	18.255	18.265	18.274	18.283	18.293	18.302	18.311
18.120	18.212	18.221	18.230	18.240	18.249	18.258	18.268	18.277	18.286	18.296	18.305	18.314	18.324	18.333	18.343	18.352
18.160	18.252	18.261	18.271	18.280	18.289	18.299	18.308	18.317	18.327	18.336	18.346	18.355	18.364	18.374	18.383	18.393
18.200	18.292	18.302	18.311	18.320	18.330	18.339	18.349	18.358	18.367	18.377	18.386	18.396	18.405	18.414	18.424	18.433

Table 15 Metric mixing table for sodium formate from sodium formate powder with moisture content of 0.3%.

METRIC

Density [g/cm³]	NaCOOH [wt%]	NaCOOH [mol/L]	NaCOOH [mol%]	Quantities for 1 m³ from powder (0.3 wt% H_2O)	
				Powder [kg]	Water [liter]
0.999	0.0	0.00	0.0	0.0	1,000.0
1.000	0.1	0.02	0.0	1.4	999.6
1.010	1.8	0.26	0.5	17.8	993.2
1.020	3.3	0.50	0.9	34.3	986.7
1.030	4.9	0.75	1.4	51.0	980.0
1.040	6.5	0.99	1.8	67.9	973.1
1.050	8.1	1.25	2.3	84.9	966.0
1.060	9.6	1.50	2.7	102.2	958.8
1.070	11.1	1.75	3.2	119.6	951.3
1.080	12.7	2.01	3.7	137.2	943.7
1.090	14.2	2.27	4.2	155.0	936.0
1.100	15.7	2.53	4.7	172.9	928.0
1.110	17.2	2.80	5.2	191.0	919.9
1.120	18.6	3.07	5.7	209.2	911.7
1.130	20.1	3.34	6.2	227.6	903.3
1.140	21.5	3.61	6.8	246.2	894.7
1.150	23.0	3.88	7.3	264.8	886.0
1.160	24.4	4.16	7.9	283.7	877.2
1.170	25.8	4.44	8.4	302.6	868.2
1.180	27.2	4.72	9.0	321.7	859.1
1.190	28.6	5.00	9.6	340.9	849.9
1.200	29.9	5.28	10.2	360.3	840.6
1.210	31.3	5.57	10.8	379.7	831.1
1.220	32.6	5.85	11.4	399.3	821.5
1.230	34.0	6.14	12.0	419.0	811.8
1.240	35.3	6.43	12.6	438.8	802.0
1.250	36.6	6.73	13.3	458.7	792.1
1.260	37.9	7.02	13.9	478.8	782.0
1.270	39.2	7.31	14.6	498.9	771.9
1.280	40.4	7.61	15.2	519.1	761.7
1.290	41.7	7.91	15.9	539.4	751.4
1.300	42.9	8.21	16.6	559.7	741.0
1.310	44.2	8.51	17.3	580.2	730.5
1.320	45.4	8.81	18.0	600.8	720.0
1.330	46.6	9.11	18.8	621.4	709.3
1.340	47.8	9.41	19.5	642.1	698.6
1.350	49.0	9.72	20.3	662.8	687.9
1.360	50.1	10.02	21.0	683.7	677.0

Table 16 Field unit mixing table for sodium formate from sodium formate powder with moisture content of 0.3%.

FIELD					
Density [lb/gal]	NaCOOH [wt%]	NaCOOH [mol/L]	NaCOOH [mol%]	Quantities for 1 bbl from powder (0.3 wt% H_2O)	
				Powder [lbs]	Water [bbl]
8.34	0.0	0.0	0.0	0.0	1.000
8.40	1.2	0.2	0.3	4.2	0.995
8.50	3.1	0.5	0.8	11.2	0.988
8.60	5.0	0.8	1.4	18.2	0.980
8.70	6.9	1.1	1.9	25.3	0.971
8.80	8.8	1.4	2.5	32.5	0.963
8.90	10.6	1.7	3.0	39.8	0.954
9.00	12.4	2.0	3.6	47.1	0.945
9.10	14.2	2.3	4.2	54.6	0.936
9.20	16.0	2.6	4.8	62.1	0.926
9.30	17.8	2.9	5.4	69.7	0.916
9.40	19.6	3.2	6.0	77.4	0.906
9.50	21.3	3.6	6.7	85.2	0.896
9.60	23.0	3.9	7.3	93.0	0.886
9.70	24.7	4.2	8.0	101.0	0.875
9.80	26.4	4.6	8.7	108.9	0.864
9.90	28.1	4.9	9.4	117.0	0.853
10.00	29.7	5.2	10.1	125.1	0.842
10.10	31.3	5.6	10.8	133.3	0.831
10.20	32.9	5.9	11.5	141.5	0.819
10.30	34.5	6.3	12.3	149.8	0.808
10.40	36.1	6.6	13.0	158.1	0.796
10.50	37.6	7.0	13.8	166.5	0.784
10.60	39.2	7.3	14.6	175.0	0.772
10.70	40.7	7.7	15.4	183.5	0.759
10.80	42.2	8.0	16.2	192.0	0.747
10.90	43.7	8.4	17.0	200.6	0.735
11.00	45.1	8.7	17.9	209.2	0.722
11.10	46.6	9.1	18.8	217.9	0.709
11.20	48.0	9.5	19.7	226.5	0.696
11.30	49.4	9.8	20.6	235.3	0.683
11.40	50.8	10.2	21.5	244.0	0.670

Table 17 Metric mixing table for potassium formate from standard brine stock (1.57 g/cm³), a diluted potassium formate brine stock (1.54 g/cm³), and potassium formate powder with water content of 0.3%.

METRIC

Density [g/cm³]	KCOOH [wt%]	Conc. [mol/L]	KCOOH [mol%]	Quantities for 1 m³ from 1.57 g/cm³ stock		Quantities for 1 m³ from 1.54 g/cm³ stock		Quantities for 1 m³ from powder (0.3 wt% H_2O)	
				Brine [liter]	Water [liter]	Brine [liter]	Water [liter]	Powder [kg]	Water [liter]
0.999	0.0	0.0	0.0	0.0	1,000.0	0.0	1,000.0	0.0	1,000.0
1.000	0.3	0.0	0.1	3.0	996.3	3.1	996.2	3.5	997.5
1.010	2.0	0.2	0.4	17.4	983.6	18.5	982.5	20.6	990.4
1.020	3.7	0.4	0.8	32.1	970.6	34.0	968.6	37.9	983.1
1.030	5.4	0.7	1.2	46.9	957.4	49.7	954.5	55.4	975.6
1.040	7.0	0.9	1.6	61.8	943.8	65.5	940.0	73.1	967.9
1.050	8.6	1.1	2.0	77.0	930.1	81.6	925.3	90.9	960.0
1.060	10.3	1.3	2.4	92.3	916.1	97.8	910.3	109.0	952.0
1.070	11.9	1.5	2.8	107.7	901.8	114.1	895.1	127.2	943.7
1.080	13.4	1.7	3.2	123.3	887.3	130.7	879.7	145.6	935.3
1.090	15.0	1.9	3.6	139.0	872.6	147.3	864.0	164.2	926.7
1.100	16.6	2.2	4.1	154.9	857.6	164.2	848.0	183.0	917.9
1.110	18.1	2.4	4.5	170.9	842.5	181.1	831.9	201.9	909.0
1.120	19.7	2.6	5.0	187.1	827.1	198.3	815.5	221.0	899.9
1.130	21.2	2.8	5.4	203.4	811.5	215.5	798.9	240.2	890.6
1.140	22.7	3.1	5.9	219.8	795.7	232.9	782.1	259.6	881.2
1.150	24.2	3.3	6.4	236.3	779.7	250.4	765.1	279.2	871.7
1.160	25.7	3.5	6.9	253.0	763.5	268.1	747.9	298.9	862.0
1.170	27.2	3.8	7.4	269.8	747.2	285.9	730.4	318.7	852.2
1.180	28.6	4.0	7.9	286.7	730.6	303.8	712.8	338.7	842.2
1.190	30.1	4.3	8.4	303.7	713.9	321.8	695.1	358.8	832.1
1.200	31.5	4.5	9.0	320.8	697.0	340.0	677.1	379.0	821.8
1.210	32.9	4.7	9.5	338.1	679.9	358.2	659.0	399.3	811.5
1.220	34.3	5.0	10.1	355.4	662.7	376.6	640.7	419.8	801.0
1.230	35.7	5.2	10.6	372.8	645.3	395.1	622.2	440.4	790.4
1.240	37.1	5.5	11.2	390.3	627.8	413.7	603.6	461.1	779.7
1.250	38.4	5.7	11.8	408.0	610.1	432.3	584.8	481.9	768.8
1.260	39.8	6.0	12.4	425.7	592.3	451.1	565.9	502.8	757.9
1.270	41.1	6.2	13.0	443.5	574.3	469.9	546.8	523.9	746.9
1.280	42.4	6.5	13.6	461.3	556.3	488.9	527.6	545.0	735.8
1.290	43.8	6.7	14.3	479.3	538.1	507.9	508.3	566.2	724.5
1.300	45.1	7.0	14.9	497.3	519.7	527.0	488.9	587.5	713.2
1.310	46.3	7.2	15.6	515.4	501.3	546.2	469.3	608.9	701.8
1.320	47.6	7.5	16.3	533.6	482.8	565.4	449.7	630.3	690.4
1.330	48.9	7.7	17.0	551.8	464.1	584.8	429.9	651.9	678.8
1.340	50.1	8.0	17.7	570.1	445.4	604.2	410.0	673.5	667.2
1.350	51.3	8.2	18.4	588.5	426.6	623.6	390.0	695.1	655.5
1.360	52.6	8.5	19.2	606.9	407.6	643.1	370.0	716.9	643.8
1.370	53.8	8.8	19.9	625.3	388.6	662.7	349.8	738.7	631.9
1.380	54.9	9.0	20.7	643.8	369.6	682.3	329.6	760.6	620.1
1.390	56.1	9.3	21.5	662.4	350.4	701.9	309.3	782.5	608.1
1.400	57.3	9.5	22.3	681.0	331.2	721.6	289.0	804.4	596.2
1.410	58.4	9.8	23.1	699.6	311.9	741.4	268.6	826.4	584.1
1.420	59.6	10.1	24.0	718.3	292.6	761.2	248.1	848.5	572.1
1.430	60.7	10.3	24.9	737.0	273.3	781.0	227.5	870.6	560.0
1.440	61.8	10.6	25.7	755.7	253.8	800.8	207.0	892.7	547.9
1.450	62.9	10.8	26.6	774.4	234.4	820.7	186.4	914.8	535.7
1.460	64.0	11.1	27.6	793.2	214.9	840.6	165.7	937.0	523.5
1.470	65.1	11.4	28.5	812.0	195.4	860.5	145.0	959.2	511.3
1.480	66.1	11.6	29.5	830.8	175.9	880.4	124.3	981.4	499.1
1.490	67.2	11.9	30.5	849.6	156.3	900.3	103.6	1,003.6	486.9
1.500	68.2	12.2	31.5	868.4	136.8	920.2	82.9	1,025.8	474.6
1.510	69.2	12.4	32.5	887.2	117.2	940.2	62.2	1,048.1	462.4
1.520	70.2	12.7	33.5	906.0	97.6	960.1	41.4	1,070.3	450.2
1.530	71.2	12.9	34.6	924.8	78.1	980.1	20.7	1,092.5	437.9
1.540	72.2	13.2	35.7	943.6	58.5	1,000.0	0.0	1,114.7	425.7
1.550	73.1	13.5	36.8	962.4	39.0			1,136.9	413.5
1.560	74.1	13.7	38.0	981.2	19.5			1,159.1	401.3
1.570	75.0	14.0	39.1	1,000.0	0.0			1,181.3	389.1
1.580	75.9	14.3	40.3					1,203.5	376.9
1.590	76.8	14.5	41.6					1,225.6	364.8
1.600	77.7	14.8	42.8					1,247.7	352.7

Table 18 Field unit mixing table for potassium formate from standard brine stock (13.10 lb/gal), a diluted brine stock (12.85 lb/gal), and potassium formate powder with water content of 0.3%.

FIELD

Density [lb/gal]	KCOOH [wt%]	KCOOH [mol/L]	KCOOH [mol%]	Quantities for 1 bbl from 13.10 lb/gal stock brine		Quantities for 1 bbl from 12.85 lb/gal stock brine		Quantities for 1 bbl from powder (0.3 wt% H_2O)	
				Stock brine [bbl]	Water [bbl]	Stock brine [bbl]	Water [bbl]	Powder [lb]	Water [bbl]
8.34	0.0	0.0	0.0	0.000	1.000	0.000	1.000	0.0	1,000
8.40	1.5	0.2	0.3	0.012	0.988	0.013	0.987	5.1	0.993
8.50	3.5	0.4	0.8	0.030	0.973	0.032	0.971	12.4	0.984
8.60	5.4	0.7	1.2	0.048	0.957	0.051	0.954	19.7	0.975
8.70	7.4	0.9	1.7	0.066	0.940	0.070	0.936	27.2	0.966
8.80	9.4	1.2	2.2	0.084	0.924	0.089	0.919	34.7	0.956
8.90	11.3	1.4	2.7	0.102	0.907	0.108	0.900	42.3	0.947
9.00	13.2	1.7	3.2	0.121	0.890	0.128	0.882	50.0	0.937
9.10	15.1	2.0	3.7	0.140	0.872	0.148	0.863	57.8	0.926
9.20	17.0	2.2	4.2	0.159	0.854	0.168	0.844	65.7	0.916
9.30	18.8	2.5	4.7	0.178	0.836	0.189	0.825	73.7	0.905
9.40	20.6	2.8	5.3	0.198	0.817	0.209	0.805	81.8	0.894
9.50	22.5	3.0	5.8	0.217	0.798	0.230	0.785	89.9	0.883
9.60	24.3	3.3	6.4	0.237	0.779	0.251	0.764	98.1	0.871
9.70	26.0	3.6	7.0	0.257	0.760	0.272	0.744	106.4	0.860
9.80	27.8	3.9	7.6	0.277	0.740	0.294	0.723	114.7	0.848
9.90	29.5	4.2	8.2	0.298	0.720	0.315	0.702	123.1	0.836
10.00	31.2	4.5	8.9	0.318	0.700	0.337	0.680	131.6	0.824
10.10	32.9	4.7	9.5	0.339	0.679	0.359	0.658	140.2	0.811
10.20	34.6	5.0	10.2	0.359	0.659	0.381	0.636	148.8	0.799
10.30	36.3	5.3	10.9	0.380	0.638	0.403	0.614	157.4	0.786
10.40	37.9	5.6	11.6	0.401	0.617	0.425	0.592	166.1	0.773
10.50	39.5	5.9	12.3	0.423	0.595	0.448	0.569	174.9	0.760
10.60	41.1	6.2	13.0	0.444	0.574	0.470	0.546	183.7	0.747
10.70	42.7	6.5	13.8	0.465	0.552	0.493	0.523	192.6	0.733
10.80	44.3	6.8	14.6	0.487	0.530	0.516	0.500	201.5	0.720
10.90	45.8	7.1	15.3	0.509	0.508	0.539	0.477	210.5	0.706
11.00	47.4	7.4	16.2	0.530	0.486	0.562	0.453	219.5	0.693
11.10	48.9	7.7	17.0	0.552	0.464	0.585	0.429	228.5	0.679
11.20	50.4	8.0	17.9	0.574	0.441	0.608	0.406	237.6	0.665
11.30	51.8	8.3	18.7	0.596	0.419	0.632	0.382	246.7	0.651
11.40	53.3	8.7	19.6	0.618	0.396	0.655	0.358	255.9	0.637
11.50	54.7	9.0	20.6	0.640	0.373	0.679	0.333	265.0	0.622
11.60	56.1	9.3	21.5	0.663	0.350	0.702	0.309	274.3	0.608
11.70	57.5	9.6	22.5	0.685	0.327	0.726	0.285	283.5	0.594
11.80	58.9	9.9	23.5	0.707	0.304	0.750	0.260	292.7	0.579
11.90	60.2	10.2	24.5	0.730	0.281	0.773	0.236	302.0	0.565
12.00	61.6	10.5	25.6	0.752	0.257	0.797	0.211	311.3	0.550
12.10	62.9	10.8	26.6	0.775	0.234	0.821	0.186	320.6	0.536
12.20	64.2	11.2	27.7	0.797	0.211	0.845	0.161	329.9	0.521
12.30	65.5	11.5	28.9	0.820	0.187	0.869	0.137	339.2	0.507
12.40	66.7	11.8	30.0	0.842	0.164	0.892	0.112	348.5	0.492
12.50	68.0	12.1	31.2	0.865	0.141	0.916	0.087	357.9	0.477
12.60	69.2	12.4	32.5	0.887	0.117	0.940	0.062	367.2	0.463
12.70	70.4	12.7	33.7	0.910	0.094	0.964	0.037	376.5	0.448
12.80	71.6	13.0	35.0	0.932	0.070	0.988	0.012	385.9	0.433
12.85	72.1	13.2	35.7	0.944	0.058	1.000	0.000	390.5	0.426
12.90	72.7	13.4	36.3	0.955	0.047			395.2	0.419
13.00	73.9	13.7	37.7	0.977	0.023			404.5	0.404
13.10	75.0	14.0	39.1	1.000	0.000			413.8	0.389
13.20	76.1	14.3	40.5					423.1	0.375
13.30	77.2	14.6	42.0					432.4	0.360
13.40	78.2	14.9	43.5					441.7	0.346
13.50	79.3	15.2	45.1					451.0	0.331

Table 19 Metric mixing table for cesium formate from 2.20 g/cm³ cesium formate brine stock and cesium formate powder with moisture content of 0.3%.

METRIC

Density [g/cm³]	CsCOOH [wt%]	CsCOOH [mol/L]	CsCOOH [mol%]	Quantities for 1 m³ from 2.20 g/cm³ stock brine		Quantities for 1 m³ from CsCOOH powder (0.3 wt% H_2O)	
				Brine [liter]	Water [liter]	Powder [kg]	Water [liter]
0.999	0.0	0.0	0.0	0.0	1,000.0	0.0	1,000.0
1.000	0.5	0.0	0.0	2.7	995.1	4.7	996.3
1.010	1.8	0.1	0.2	10.1	988.8	17.8	993.2
1.020	3.0	0.2	0.3	17.5	982.4	30.9	990.0
1.030	4.3	0.2	0.5	25.1	975.8	44.2	986.8
1.040	5.5	0.3	0.6	32.6	969.2	57.6	983.4
1.050	6.7	0.4	0.7	40.2	962.4	71.0	980.0
1.060	7.9	0.5	0.9	47.9	955.6	84.5	976.5
1.070	9.1	0.5	1.0	55.6	948.6	98.1	972.9
1.080	10.3	0.6	1.2	63.4	941.5	111.8	969.2
1.090	11.5	0.7	1.3	71.2	934.4	125.6	965.4
1.100	12.6	0.8	1.4	79.0	927.1	139.4	961.6
1.110	13.8	0.9	1.6	86.9	919.8	153.3	957.7
1.120	14.9	0.9	1.7	94.8	912.3	167.3	953.7
1.130	16.0	1.0	1.9	102.8	904.8	181.3	949.7
1.140	17.1	1.1	2.0	110.7	897.3	195.4	945.6
1.155	18.7	1.2	2.3	122.6	885.9	216.3	939.4
1.160	19.2	1.3	2.4	126.8	881.9	223.7	937.2
1.170	20.3	1.3	2.5	134.9	874.1	238.0	932.9
1.180	21.3	1.4	2.7	143.0	866.3	252.3	928.6
1.190	22.3	1.5	2.8	151.1	858.3	266.6	924.3
1.200	23.4	1.6	3.0	159.3	850.4	281.0	919.9
1.210	24.3	1.7	3.2	167.5	842.4	295.5	915.4
1.220	25.3	1.7	3.3	175.7	834.3	310.0	910.9
1.230	26.3	1.8	3.5	183.9	826.2	324.5	906.4
1.240	27.3	1.9	3.7	192.2	818.0	339.1	901.8
1.250	28.2	2.0	3.8	200.5	809.8	353.7	897.2
1.260	29.1	2.1	4.0	208.8	801.5	368.3	892.6
1.270	30.1	2.1	4.2	217.1	793.3	382.9	888.0
1.280	31.0	2.2	4.3	225.4	784.9	397.6	883.3
1.290	31.9	2.3	4.5	233.7	776.6	412.3	878.6
1.300	32.8	2.4	4.7	242.1	768.2	427.1	873.8
1.310	33.6	2.5	4.9	250.4	759.8	441.8	869.1
1.320	34.5	2.6	5.1	258.8	751.4	456.6	864.3
1.330	35.3	2.6	5.2	267.2	742.9	471.4	859.5
1.340	36.2	2.7	5.4	275.6	734.4	486.2	854.7
1.350	37.0	2.8	5.6	284.0	725.9	501.0	849.8
1.360	37.8	2.9	5.8	292.4	717.4	515.9	845.0
1.370	38.6	3.0	6.0	300.8	708.9	530.7	840.1
1.380	39.4	3.1	6.2	309.2	700.4	545.6	835.3
1.390	40.2	3.1	6.4	317.7	691.8	560.4	830.4
1.400	41.0	3.2	6.6	326.1	683.3	575.3	825.5
1.410	41.7	3.3	6.8	334.5	674.7	590.2	820.6
1.420	42.5	3.4	7.0	343.0	666.1	605.1	815.7
1.430	43.2	3.5	7.2	351.4	657.5	620.0	810.8
1.440	44.0	3.6	7.4	359.9	648.9	634.9	805.9
1.450	44.7	3.6	7.6	368.3	640.4	649.8	801.0
1.460	45.4	3.7	7.8	376.8	631.8	664.7	796.1
1.470	46.1	3.8	8.0	385.2	623.2	679.6	791.2
1.480	46.8	3.9	8.2	393.6	614.6	694.5	786.3
1.490	47.5	4.0	8.4	402.1	606.0	709.3	781.4
1.500	48.1	4.1	8.6	410.5	597.5	724.2	776.5
1.510	48.8	4.1	8.8	419.0	588.9	739.1	771.6
1.520	49.5	4.2	9.0	427.4	580.3	754.0	766.8
1.530	50.1	4.3	9.2	435.8	571.8	768.9	761.9
1.540	50.7	4.4	9.4	444.2	563.2	783.7	757.0
1.550	51.4	4.5	9.7	452.7	554.7	798.6	752.1
1.560	52.0	4.6	9.9	461.1	546.1	813.5	747.3
1.570	52.6	4.6	10.1	469.5	537.6	828.3	742.4
1.580	53.2	4.7	10.3	477.9	529.1	843.1	737.6
1.590	53.8	4.8	10.5	486.3	520.6	858.0	732.8
1.600	54.4	4.9	10.8	494.7	512.1	872.8	727.9
1.620	55.5	5.1	11.2	511.5	495.2	902.4	718.3
1.630	56.1	5.1	11.5	519.9	486.7	917.2	713.5
1.640	56.7	5.2	11.7	528.3	478.3	932.0	708.7

Table 19 continued

METRIC

Density [g/cm³]	CsCOOH [wt%]	CsCOOH [mol/L]	CsCOOH [mol%]	Quantities for 1 m³ from 2.20 g/cm³ stock brine		Quantities for 1 m³ from CsCOOH powder (0.3 wt% H_2O)	
				Brine [liter]	Water [liter]	Powder [kg]	Water [liter]
1.650	57.2	5.3	11.9	536.6	469.9	946.7	704.0
1.660	57.7	5.4	12.2	545.0	461.5	961.5	699.2
1.670	58.3	5.5	12.4	553.4	453.0	976.2	694.4
1.680	58.8	5.6	12.6	561.7	444.7	991.0	689.7
1.690	59.3	5.6	12.9	570.1	436.3	1,005.7	685.0
1.700	59.8	5.7	13.1	578.4	427.9	1,020.4	680.2
1.710	60.4	5.8	13.4	586.8	419.6	1,035.1	675.5
1.720	60.9	5.9	13.6	595.1	411.2	1,049.9	670.8
1.730	61.3	6.0	13.8	603.4	402.9	1,064.5	666.1
1.740	61.8	6.0	14.1	611.7	394.6	1,079.2	661.4
1.750	62.3	6.1	14.3	620.1	386.2	1,093.9	656.7
1.760	62.8	6.2	14.6	628.4	377.9	1,108.6	652.1
1.770	63.3	6.3	14.9	636.7	369.7	1,123.2	647.4
1.780	63.7	6.4	15.1	645.0	361.4	1,137.9	642.7
1.790	64.2	6.5	15.4	653.3	353.1	1,152.6	638.1
1.800	64.7	6.5	15.6	661.6	344.8	1,167.2	633.4
1.810	65.1	6.6	15.9	669.9	336.5	1,181.9	628.8
1.820	65.5	6.7	16.2	678.2	328.3	1,196.5	624.1
1.830	66.0	6.8	16.4	686.5	320.0	1,211.1	619.5
1.840	66.4	6.9	16.7	694.8	311.7	1,225.8	614.8
1.850	66.8	7.0	17.0	703.1	303.5	1,240.4	610.2
1.860	67.3	7.0	17.2	711.4	295.2	1,255.0	605.6
1.870	67.7	7.1	17.5	719.7	287.0	1,269.7	600.9
1.880	68.1	7.2	17.8	728.0	278.7	1,284.3	596.3
1.890	68.5	7.3	18.1	736.3	270.4	1,299.0	591.6
1.900	68.9	7.4	18.3	744.6	262.1	1,313.6	587.0
1.910	69.3	7.4	18.6	752.9	253.8	1,328.3	582.3
1.920	69.7	7.5	18.9	761.2	245.5	1,343.0	577.6
1.930	70.1	7.6	19.2	769.6	237.2	1,357.6	572.9
1.940	70.5	7.7	19.5	777.9	228.9	1,372.3	568.2
1.950	70.9	7.8	19.8	786.2	220.6	1,387.0	563.5
1.960	71.3	7.9	20.1	794.6	212.2	1,401.7	558.8
1.970	71.7	7.9	20.4	802.9	203.8	1,416.5	554.1
1.980	72.1	8.0	20.7	811.3	195.4	1,431.2	549.3
1.990	72.4	8.1	21.0	819.6	187.0	1,446.0	544.5
2.000	72.8	8.2	21.3	828.0	178.5	1,460.8	539.8
2.010	73.2	8.3	21.7	836.4	170.1	1,475.6	534.9
2.020	73.6	8.4	22.0	844.8	161.5	1,490.4	530.1
2.030	73.9	8.4	22.3	853.2	153.0	1,505.3	525.2
2.040	74.3	8.5	22.6	861.7	144.4	1,520.2	520.3
2.050	74.7	8.6	23.0	870.1	135.8	1,535.1	515.4
2.060	75.0	8.7	23.3	878.6	127.1	1,550.1	510.4
2.070	75.4	8.8	23.7	887.1	118.4	1,565.1	505.4
2.080	75.7	8.9	24.0	895.6	109.7	1,580.1	500.4
2.090	76.1	8.9	24.4	904.2	100.9	1,595.2	495.3
2.100	76.4	9.0	24.7	912.7	92.0	1,610.3	490.2
2.110	76.8	9.1	25.1	921.3	83.1	1,625.4	485.1
2.120	77.2	9.2	25.5	930.0	74.2	1,640.6	479.9
2.130	77.5	9.3	25.9	938.6	65.2	1,655.9	474.6
2.140	77.9	9.4	26.3	947.3	56.1	1,671.2	469.3
2.150	78.2	9.5	26.7	956.0	46.9	1,686.5	463.9
2.160	78.6	9.5	27.1	964.7	37.7	1,701.9	458.5
2.170	78.9	9.6	27.5	973.5	28.4	1,717.4	453.1
2.180	79.3	9.7	27.9	982.3	19.0	1,732.9	447.5
2.190	79.6	9.8	28.3	991.1	9.5	1,748.5	441.9
2.200	80.0	9.9	28.8	1,000.0	0.0	1,764.2	436.2
2.210	80.3	10.0	29.2			1,779.9	430.5
2.220	80.6	10.1	29.7			1,795.7	424.7
2.230	81.0	10.2	30.1			1,811.6	418.8
2.240	81.3	10.2	30.6			1,827.6	412.8
2.250	81.7	10.3	31.1			1,843.6	406.8
2.260	82.0	10.4	31.6			1,859.8	400.6
2.270	82.4	10.5	32.2			1,876.0	394.4
2.280	82.7	10.6	32.7			1,892.3	388.1
2.290	83.1	10.7	33.2			1,908.7	381.7
2.300	83.5	10.8	33.8			1,925.2	375.1

Table 20 Field unit mixing table for cesium formate from standard 18.36 lb/gal cesium formate brine stock and cesium formate powder with moisture content of 0.3%.

FIELD

Density [lb/gal]	CsCOOH [wt%]	CsCOOH [mol/L]	CsCOOH [mol%]	Quantities for 1 bbl from 18.36 lb/gal stock brine		Quantities for 1 bbl from powder (0.3 wt% H_2O)	
				Brine [bbl]	Water [bbl]	Powder [lbs]	Water [bbl]
8.337	0.0	0.0	0.0	0.000	1.000	0.0	1.000
8.400	1.3	0.1	0.1	0.008	0.991	4.6	0.994
8.500	2.8	0.2	0.3	0.016	0.983	10.2	0.990
8.600	4.3	0.3	0.5	0.025	0.975	15.7	0.987
8.700	5.8	0.3	0.6	0.035	0.968	21.3	0.983
8.800	7.3	0.4	0.8	0.044	0.959	27.0	0.978
8.900	8.7	0.5	1.0	0.053	0.951	32.7	0.974
9.000	10.1	0.6	1.1	0.062	0.943	38.4	0.970
9.100	11.5	0.7	1.3	0.071	0.934	44.2	0.965
9.200	12.9	0.8	1.5	0.081	0.925	50.0	0.961
9.300	14.3	0.9	1.7	0.090	0.917	55.9	0.956
9.400	15.6	1.0	1.8	0.100	0.908	61.8	0.951
9.500	16.9	1.1	2.0	0.109	0.898	67.7	0.946
9.600	18.2	1.2	2.2	0.119	0.889	73.6	0.941
9.700	19.5	1.3	2.4	0.129	0.880	79.6	0.936
9.800	20.7	1.4	2.6	0.138	0.871	85.6	0.931
9.900	22.0	1.5	2.8	0.148	0.861	91.6	0.926
10.000	23.2	1.6	3.0	0.158	0.852	97.6	0.921
10.100	24.4	1.7	3.2	0.168	0.842	103.7	0.915
10.200	25.5	1.8	3.4	0.178	0.832	109.8	0.910
10.300	26.7	1.9	3.6	0.187	0.823	115.9	0.904
10.400	27.8	2.0	3.8	0.197	0.813	122.0	0.899
10.500	29.0	2.0	4.0	0.207	0.803	128.1	0.893
10.600	30.1	2.1	4.2	0.217	0.793	134.3	0.888
10.700	31.2	2.2	4.4	0.227	0.783	140.5	0.882
10.800	32.2	2.3	4.6	0.237	0.773	146.7	0.877
10.900	33.3	2.4	4.8	0.247	0.763	152.8	0.871
11.000	34.3	2.5	5.0	0.257	0.753	159.0	0.865
11.100	35.3	2.6	5.2	0.267	0.743	165.3	0.859
11.200	36.3	2.7	5.5	0.277	0.733	171.5	0.854
11.300	37.3	2.8	5.7	0.287	0.723	177.7	0.848
11.400	38.3	2.9	5.9	0.297	0.712	183.9	0.842
11.500	39.3	3.0	6.1	0.308	0.702	190.2	0.836
11.600	40.2	3.1	6.4	0.318	0.692	196.4	0.830
11.700	41.1	3.2	6.6	0.328	0.682	202.7	0.825
11.800	42.0	3.3	6.8	0.338	0.671	208.9	0.819
11.900	42.9	3.4	7.1	0.348	0.661	215.2	0.813
12.000	43.8	3.5	7.3	0.358	0.651	221.4	0.807
12.100	44.7	3.6	7.6	0.368	0.640	227.7	0.801
12.200	45.5	3.7	7.8	0.378	0.630	234.0	0.795
12.300	46.4	3.8	8.0	0.388	0.620	240.2	0.789
12.400	47.2	3.9	8.3	0.399	0.610	246.5	0.783
12.500	48.0	4.0	8.5	0.409	0.599	252.7	0.778
12.600	48.8	4.1	8.8	0.419	0.589	259.0	0.772
12.700	49.6	4.2	9.1	0.429	0.579	265.2	0.766
12.800	50.3	4.3	9.3	0.439	0.569	271.5	0.760
12.900	51.1	4.4	9.6	0.449	0.558	277.7	0.754
13.000	51.8	4.5	9.8	0.459	0.548	283.9	0.748
13.100	52.6	4.6	10.1	0.469	0.538	290.2	0.743
13.200	53.3	4.7	10.4	0.479	0.528	296.4	0.737
13.300	54.0	4.8	10.6	0.489	0.517	302.6	0.731
13.400	54.7	4.9	10.9	0.499	0.507	308.9	0.725
13.500	55.4	5.0	11.2	0.510	0.497	315.1	0.719
13.600	56.1	5.1	11.4	0.520	0.487	321.3	0.714
13.700	56.7	5.2	11.7	0.530	0.477	327.5	0.708
13.800	57.4	5.3	12.0	0.540	0.467	333.7	0.702
13.900	58.0	5.4	12.3	0.550	0.457	339.9	0.697
14.000	58.7	5.5	12.6	0.560	0.447	346.1	0.691
14.100	59.3	5.6	12.9	0.570	0.437	352.3	0.685
14.200	59.9	5.7	13.1	0.580	0.427	358.5	0.680
14.300	60.5	5.8	13.4	0.590	0.417	364.6	0.674
14.400	61.1	5.9	13.7	0.600	0.407	370.8	0.668

Table 20 continued

FIELD

Density [lb/gal]	CsCOOH [wt%]	CsCOOH [mol/L]	CsCOOH [mol%]	Quantities for 1 bbl from 18.36 lb/gal stock brine		Quantities for 1 bbl from powder (0.3 wt% H_2O)	
				Brine [bbl]	Water [bbl]	Powder [lbs]	Water [bbl]
14.500	61.7	6.0	14.0	0.610	0.397	377.0	0.663
14.600	62.3	6.1	14.3	0.620	0.387	383.1	0.657
14.700	62.9	6.2	14.6	0.630	0.377	389.3	0.651
14.800	63.4	6.3	14.9	0.640	0.367	395.5	0.646
14.900	64.0	6.4	15.2	0.649	0.357	401.6	0.640
15.000	64.5	6.5	15.6	0.659	0.347	407.8	0.635
15.100	65.1	6.6	15.9	0.669	0.337	413.9	0.629
15.200	65.6	6.7	16.2	0.679	0.327	420.1	0.623
15.300	66.1	6.8	16.5	0.689	0.317	426.2	0.618
15.400	66.6	6.9	16.8	0.699	0.307	432.4	0.612
15.500	67.2	7.0	17.2	0.709	0.297	438.5	0.607
15.600	67.7	7.1	17.5	0.719	0.288	444.7	0.601
15.700	68.2	7.2	17.8	0.729	0.278	450.8	0.596
15.800	68.7	7.3	18.2	0.739	0.268	457.0	0.590
15.900	69.1	7.4	18.5	0.749	0.258	463.1	0.584
16.000	69.6	7.5	18.8	0.759	0.248	469.3	0.579
16.100	70.1	7.6	19.2	0.769	0.238	475.5	0.573
16.200	70.6	7.7	19.5	0.779	0.228	481.6	0.568
16.300	71.0	7.8	19.9	0.789	0.218	487.8	0.562
16.400	71.5	7.9	20.3	0.799	0.208	494.0	0.556
16.500	72.0	8.0	20.6	0.809	0.198	500.2	0.551
16.600	72.4	8.1	21.0	0.819	0.188	506.4	0.545
16.700	72.9	8.2	21.4	0.829	0.178	512.6	0.539
16.800	73.3	8.3	21.8	0.839	0.167	518.8	0.533
16.900	73.7	8.4	22.1	0.849	0.157	525.0	0.528
17.000	74.2	8.5	22.5	0.859	0.147	531.3	0.522
17.100	74.6	8.6	22.9	0.869	0.137	537.6	0.516
17.200	75.1	8.7	23.4	0.879	0.126	543.8	0.510
17.300	75.5	8.8	23.8	0.890	0.116	550.1	0.504
17.400	75.9	8.9	24.2	0.900	0.105	556.5	0.498
17.500	76.3	9.0	24.6	0.910	0.095	562.8	0.492
17.600	76.8	9.1	25.1	0.920	0.084	569.2	0.486
17.700	77.2	9.2	25.5	0.931	0.073	575.5	0.479
17.800	77.6	9.3	26.0	0.941	0.063	582.0	0.473
17.900	78.0	9.4	26.4	0.952	0.052	588.4	0.467
18.000	78.4	9.5	26.9	0.962	0.041	594.8	0.460
18.100	78.9	9.6	27.4	0.972	0.029	601.3	0.454
18.200	79.3	9.7	27.9	0.983	0.018	607.9	0.447
18.300	79.7	9.8	28.4	0.994	0.007	614.4	0.440
18.360	80.0	9.9	28.8	1.000	0.000	618.4	0.436
18.400	80.1	9.9	29.0			621.0	0.433
18.500	80.5	10.0	29.5			627.6	0.427
18.600	81.0	10.1	30.1			634.3	0.420
18.700	81.4	10.2	30.7			641.0	0.412
18.800	81.8	10.4	31.3			647.8	0.405
18.900	82.2	10.5	31.9			654.5	0.398
19.000	82.6	10.6	32.5			661.4	0.390
19.100	83.1	10.7	33.2			668.3	0.382
19.200	83.5	10.8	33.8			675.2	0.375
19.300	83.9	10.9	34.5			682.2	0.367
19.400	84.3	11.0	35.3			689.2	0.359
19.500	84.8	11.1	36.0			696.3	0.350

Table 21 Metric blending table for a standard potassium / cesium formate blend, composed of 1.57 g/cm³ potassium formate and 2.20 g/cm³ cesium formate.

METRIC

Density [g/cm³]	KCOOH brine [wt%]	CsCOOH brine [wt%]	KCOOH [wt%]	CsCOOH [wt%]	H_2O [wt%]	K^+ [mol/L]	Cs^+ [mol/L]	$HCOO^-$ [mol/L]	Quantities for 1 m³ brine	
									KCOOH [liter]	CsCOOH [liter]
1.57	100.00	0.00	75.0	0.0	25.0	14.0	0.0	14.0	1,000.0	0.0
1.58	97.79	2.21	73.4	1.8	24.9	13.8	0.2	13.9	984.1	15.9
1.59	95.61	4.39	71.7	3.5	24.8	13.6	0.3	13.9	968.3	31.7
1.60	93.45	6.55	70.1	5.2	24.7	13.3	0.5	13.8	952.4	47.6
1.61	91.32	8.68	68.5	6.9	24.6	13.1	0.6	13.7	936.5	63.5
1.62	89.22	10.78	66.9	8.6	24.5	12.9	0.8	13.7	920.6	79.4
1.63	87.15	12.85	65.4	10.3	24.3	12.7	0.9	13.6	904.8	95.2
1.64	85.09	14.91	63.8	11.9	24.2	12.4	1.1	13.5	888.9	111.1
1.65	83.07	16.93	62.3	13.5	24.1	12.2	1.3	13.5	873.0	127.0
1.66	81.07	18.93	60.8	15.1	24.0	12.0	1.4	13.4	857.1	142.9
1.67	79.09	20.91	59.3	16.7	24.0	11.8	1.6	13.3	841.3	158.7
1.68	77.14	22.86	57.9	18.3	23.9	11.6	1.7	13.3	825.4	174.6
1.69	75.20	24.80	56.4	19.8	23.8	11.3	1.9	13.2	809.5	190.5
1.70	73.30	26.70	55.0	21.3	23.7	11.1	2.0	13.2	793.7	206.3
1.71	71.41	28.59	53.6	22.9	23.6	10.9	2.2	13.1	777.8	222.2
1.72	69.55	30.45	52.2	24.3	23.5	10.7	2.4	13.0	761.9	238.1
1.73	67.70	32.30	50.8	25.8	23.4	10.4	2.5	13.0	746.0	254.0
1.74	65.88	34.12	49.4	27.3	23.3	10.2	2.7	12.9	730.2	269.8
1.75	64.08	35.92	48.1	28.7	23.2	10.0	2.8	12.8	714.3	285.7
1.76	62.30	37.70	46.7	30.1	23.1	9.8	3.0	12.8	698.4	301.6
1.77	60.54	39.46	45.4	31.5	23.0	9.6	3.1	12.7	682.5	317.5
1.78	58.80	41.20	44.1	32.9	23.0	9.3	3.3	12.6	666.7	333.3
1.79	57.08	42.92	42.8	34.3	22.9	9.1	3.5	12.6	650.8	349.2
1.80	55.38	44.62	41.5	35.7	22.8	8.9	3.6	12.5	634.9	365.1
1.81	53.70	46.30	40.3	37.0	22.7	8.7	3.8	12.4	619.0	381.0
1.82	52.03	47.97	39.0	38.4	22.6	8.4	3.9	12.4	603.2	396.8
1.83	50.39	49.61	37.8	39.7	22.5	8.2	4.1	12.3	587.3	412.7
1.84	48.76	51.24	36.6	41.0	22.5	8.0	4.2	12.2	571.4	428.6
1.85	47.15	52.85	35.4	42.3	22.4	7.8	4.4	12.2	555.6	444.4
1.86	45.55	54.45	34.2	43.5	22.3	7.6	4.6	12.1	539.7	460.3
1.87	43.98	56.02	33.0	44.8	22.2	7.3	4.7	12.0	523.8	476.2
1.88	42.42	57.58	31.8	46.0	22.1	7.1	4.9	12.0	507.9	492.1
1.89	40.88	59.12	30.7	47.3	22.1	6.9	5.0	11.9	492.1	507.9
1.90	39.35	60.65	29.5	48.5	22.0	6.7	5.2	11.8	476.2	523.8
1.91	37.84	62.16	28.4	49.7	21.9	6.4	5.3	11.8	460.3	539.7
1.92	36.34	63.66	27.3	50.9	21.8	6.2	5.5	11.7	444.4	555.6
1.93	34.86	65.14	26.2	52.1	21.8	6.0	5.6	11.6	428.6	571.4
1.94	33.40	66.60	25.1	53.2	21.7	5.8	5.8	11.6	412.7	587.3
1.95	31.95	68.05	24.0	54.4	21.6	5.6	6.0	11.5	396.8	603.2
1.96	30.52	69.48	22.9	55.6	21.6	5.3	6.1	11.5	381.0	619.0
1.97	29.10	70.90	21.8	56.7	21.5	5.1	6.3	11.4	365.1	634.9
1.98	27.69	72.31	20.8	57.8	21.4	4.9	6.4	11.3	349.2	650.8
1.99	26.30	73.70	19.7	58.9	21.3	4.7	6.6	11.3	333.3	666.7
2.00	24.92	75.08	18.7	60.0	21.3	4.4	6.7	11.2	317.5	682.5
2.01	23.56	76.44	17.7	61.1	21.2	4.2	6.9	11.1	301.6	698.4
2.02	22.21	77.79	16.7	62.2	21.1	4.0	7.1	11.1	285.7	714.3
2.03	20.87	79.13	15.7	63.3	21.1	3.8	7.2	11.0	269.8	730.2
2.04	19.55	80.45	14.7	64.3	21.0	3.6	7.4	10.9	254.0	746.0
2.05	18.23	81.77	13.7	65.4	20.9	3.3	7.5	10.9	238.1	761.9
2.06	16.94	83.06	12.7	66.4	20.9	3.1	7.7	10.8	222.2	777.8
2.07	15.65	84.35	11.7	67.4	20.8	2.9	7.8	10.7	206.3	793.7
2.08	14.38	85.62	10.8	68.5	20.8	2.7	8.0	10.7	190.5	809.5
2.09	13.12	86.88	9.8	69.5	20.7	2.4	8.2	10.6	174.6	825.4
2.10	11.87	88.13	8.9	70.5	20.6	2.2	8.3	10.5	158.7	841.3
2.11	10.63	89.37	8.0	71.5	20.6	2.0	8.5	10.5	142.9	857.1
2.12	9.40	90.60	7.1	72.4	20.5	1.8	8.6	10.4	127.0	873.0
2.13	8.19	91.81	6.1	73.4	20.5	1.6	8.8	10.3	111.1	888.9
2.14	6.99	93.01	5.2	74.4	20.4	1.3	8.9	10.3	95.2	904.8
2.15	5.80	94.20	4.3	75.3	20.3	1.1	9.1	10.2	79.4	920.6
2.16	4.61	95.39	3.5	76.3	20.3	0.9	9.3	10.1	63.5	936.5
2.17	3.45	96.55	2.6	77.2	20.2	0.7	9.4	10.1	47.6	952.4
2.18	2.29	97.71	1.7	78.1	20.2	0.4	9.6	10.0	31.7	968.3
2.19	1.14	98.86	0.9	79.0	20.1	0.2	9.7	10.0	15.9	984.1
2.20	0.00	100.00	0.0	80.0	20.0	0.0	9.9	9.9	0.0	1,000.0

Table 22 Field unit blending table for a standard potassium / cesium formate blend, composed of 13.10 lb/gal potassium formate and 18.36 lb/gal cesium formate.

FIELD										
Density [lb/gal]	KCOOH brine [wt%]	CsCOOH brine [wt%]	KCOOH [wt%]	CsCOOH [wt%]	H_2O [wt%]	K^+ [mol/L]	Cs^+ [mol/L]	$HCOO^-$ [mol/L]	Quantities for 1 bbl brine	
									KCOOH [bbl]	CsCOOH [bbl]
13.10	100.0	0.0	75.0	0.0	25.0	14.0	0.0	14.0	1.000	0.000
13.20	97.4	2.6	73.0	2.1	24.9	13.7	0.2	13.9	0.981	0.019
13.30	94.8	5.2	71.1	4.2	24.7	13.5	0.4	13.8	0.962	0.038
13.40	92.2	7.8	69.1	6.2	24.6	13.2	0.6	13.8	0.943	0.057
13.50	89.7	10.3	67.2	8.3	24.5	12.9	0.8	13.7	0.924	0.076
13.60	87.2	12.8	65.4	10.3	24.4	12.7	0.9	13.6	0.905	0.095
13.70	84.7	15.3	63.5	12.2	24.3	12.4	1.1	13.5	0.886	0.114
13.80	82.3	17.7	61.7	14.2	24.1	12.1	1.3	13.4	0.867	0.133
13.90	79.9	20.1	59.9	16.1	24.0	11.9	1.5	13.4	0.848	0.152
14.00	77.6	22.4	58.2	17.9	23.9	11.6	1.7	13.3	0.829	0.171
14.10	75.2	24.8	56.4	19.8	23.8	11.3	1.9	13.2	0.810	0.190
14.20	73.0	27.0	54.7	21.6	23.7	11.1	2.1	13.1	0.791	0.209
14.30	70.7	29.3	53.0	23.4	23.6	10.8	2.3	13.1	0.772	0.228
14.40	68.5	31.5	51.4	25.2	23.4	10.5	2.4	13.0	0.753	0.247
14.50	66.3	33.7	49.7	26.9	23.3	10.3	2.6	12.9	0.734	0.266
14.60	64.1	35.9	48.1	28.7	23.2	10.0	2.8	12.8	0.715	0.285
14.70	62.0	38.0	46.5	30.4	23.1	9.7	3.0	12.7	0.696	0.304
14.80	59.9	40.1	44.9	32.1	23.0	9.5	3.2	12.7	0.677	0.323
14.90	57.8	42.2	43.4	33.7	22.9	9.2	3.4	12.6	0.658	0.342
15.00	55.8	44.2	41.8	35.3	22.8	8.9	3.6	12.5	0.639	0.361
15.10	53.8	46.2	40.3	37.0	22.7	8.7	3.8	12.4	0.620	0.380
15.20	51.8	48.2	38.8	38.6	22.6	8.4	3.9	12.4	0.601	0.399
15.30	49.8	50.2	37.4	40.1	22.5	8.1	4.1	12.3	0.582	0.418
15.40	47.9	52.1	35.9	41.7	22.4	7.9	4.3	12.2	0.563	0.437
15.50	46.0	54.0	34.5	43.2	22.3	7.6	4.5	12.1	0.544	0.456
15.60	44.1	55.9	33.0	44.7	22.2	7.3	4.7	12.0	0.525	0.475
15.70	42.2	57.8	31.6	46.2	22.1	7.1	4.9	12.0	0.506	0.494
15.80	40.4	59.6	30.3	47.7	22.1	6.8	5.1	11.9	0.487	0.513
15.90	38.5	61.5	28.9	49.1	22.0	6.5	5.3	11.8	0.468	0.532
16.00	36.7	63.3	27.5	50.6	21.9	6.3	5.5	11.7	0.449	0.551
16.10	35.0	65.0	26.2	52.0	21.8	6.0	5.6	11.7	0.430	0.570
16.20	33.2	66.8	24.9	53.4	21.7	5.7	5.8	11.6	0.411	0.589
16.30	31.5	68.5	23.6	54.8	21.6	5.5	6.0	11.5	0.392	0.608
16.40	29.8	70.2	22.3	56.2	21.5	5.2	6.2	11.4	0.373	0.627
16.50	28.1	71.9	21.1	57.5	21.4	4.9	6.4	11.3	0.354	0.646
16.60	26.4	73.6	19.8	58.8	21.4	4.7	6.6	11.3	0.335	0.665
16.70	24.8	75.2	18.6	60.2	21.3	4.4	6.8	11.2	0.316	0.684
16.80	23.1	76.9	17.3	61.5	21.2	4.2	7.0	11.1	0.297	0.703
16.90	21.5	78.5	16.1	62.7	21.1	3.9	7.1	11.0	0.278	0.722
17.00	19.9	80.1	14.9	64.0	21.0	3.6	7.3	10.9	0.259	0.741
17.10	18.4	81.6	13.8	65.3	21.0	3.4	7.5	10.9	0.240	0.760
17.20	16.8	83.2	12.6	66.5	20.9	3.1	7.7	10.8	0.221	0.779
17.30	15.3	84.7	11.4	67.8	20.8	2.8	7.9	10.7	0.202	0.798
17.40	13.7	86.3	10.3	69.0	20.7	2.6	8.1	10.6	0.183	0.817
17.50	12.2	87.8	9.2	70.2	20.7	2.3	8.3	10.6	0.163	0.837
17.60	10.8	89.2	8.1	71.4	20.6	2.0	8.5	10.5	0.144	0.856
17.70	9.3	90.7	7.0	72.5	20.5	1.8	8.6	10.4	0.125	0.875
17.80	7.8	92.2	5.9	73.7	20.4	1.5	8.8	10.3	0.106	0.894
17.90	6.4	93.6	4.8	74.8	20.4	1.2	9.0	10.2	0.087	0.913
18.00	5.0	95.0	3.7	76.0	20.3	1.0	9.2	10.2	0.068	0.932
18.10	3.6	96.4	2.7	77.1	20.2	0.7	9.4	10.1	0.049	0.951
18.20	2.2	97.8	1.6	78.2	20.2	0.4	9.6	10.0	0.030	0.970
18.30	0.8	99.2	0.6	79.3	20.1	0.2	9.8	9.9	0.011	0.989
18.36	0.0	100.0	0.0	80.0	20.0	0.0	9.9	9.9	0.000	1.000

Table 23 Metric blending table for a diluted potassium / cesium formate blend, composed of 1.54 g/cm³ potassium formate and 2.20 g/cm³ cesium formate.

METRIC

Density [g/cm³]	KCOOH brine [wt%]	CsCOOH brine [wt%]	KCOOH [wt%]	CsCOOH [wt%]	H_2O [wt%]	K^+ [mol/L]	Cs^+ [mol/L]	$HCOO^-$ [mol/L]	Quantities for 1 bbl brine	
									KCOOH [liter]	CsCOOH [liter]
1.54	100.00	0.00	72.2	0.0	27.8	13.2	0.0	13.2	1,000.0	0.0
1.55	97.85	2.15	70.6	1.7	27.7	13.0	0.1	13.2	984.8	15.2
1.56	95.73	4.27	69.1	3.4	27.5	12.8	0.3	13.1	969.7	30.3
1.57	93.63	6.37	67.6	5.1	27.3	12.6	0.4	13.1	954.5	45.5
1.58	91.56	8.44	66.1	6.7	27.2	12.4	0.6	13.0	939.4	60.6
1.59	89.52	10.48	64.6	8.4	27.0	12.2	0.7	13.0	924.2	75.8
1.60	87.50	12.50	63.1	10.0	26.9	12.0	0.9	12.9	909.1	90.9
1.61	85.51	14.49	61.7	11.6	26.7	11.8	1.0	12.9	893.9	106.1
1.62	83.54	16.46	60.3	13.2	26.6	11.6	1.2	12.8	878.8	121.2
1.63	81.60	18.40	58.9	14.7	26.4	11.4	1.3	12.8	863.6	136.4
1.64	79.67	20.33	57.5	16.3	26.3	11.2	1.5	12.7	848.5	151.5
1.65	77.78	22.22	56.1	17.8	26.1	11.0	1.6	12.7	833.3	166.7
1.66	75.90	24.10	54.8	19.3	26.0	10.8	1.8	12.6	818.2	181.8
1.67	74.05	25.95	53.4	20.7	25.8	10.6	1.9	12.6	803.0	197.0
1.68	72.22	27.78	52.1	22.2	25.7	10.4	2.1	12.5	787.9	212.1
1.69	70.41	29.59	50.8	23.7	25.5	10.2	2.2	12.5	772.7	227.3
1.70	68.63	31.37	49.5	25.1	25.4	10.0	2.4	12.4	757.6	242.4
1.71	66.86	33.14	48.3	26.5	25.3	9.8	2.5	12.4	742.4	257.6
1.72	65.12	34.88	47.0	27.9	25.1	9.6	2.7	12.3	727.3	272.7
1.73	63.39	36.61	45.7	29.3	25.0	9.4	2.8	12.3	712.1	287.9
1.74	61.69	38.31	44.5	30.6	24.9	9.2	3.0	12.2	697.0	303.0
1.75	60.00	40.00	43.3	32.0	24.7	9.0	3.1	12.2	681.8	318.2
1.76	58.33	41.67	42.1	33.3	24.6	8.8	3.3	12.1	666.7	333.3
1.77	56.69	43.31	40.9	34.6	24.5	8.6	3.4	12.1	651.5	348.5
1.78	55.06	44.94	39.7	35.9	24.3	8.4	3.6	12.0	636.4	363.6
1.79	53.45	46.55	38.6	37.2	24.2	8.2	3.7	12.0	621.2	378.8
1.80	51.85	48.15	37.4	38.5	24.1	8.0	3.9	11.9	606.1	393.9
1.81	50.28	49.72	36.3	39.8	24.0	7.8	4.0	11.9	590.9	409.1
1.82	48.72	51.28	35.2	41.0	23.8	7.6	4.2	11.8	575.8	424.2
1.83	47.18	52.82	34.0	42.2	23.7	7.4	4.3	11.8	560.6	439.4
1.84	45.65	54.35	32.9	43.5	23.6	7.2	4.5	11.7	545.5	454.5
1.85	44.14	55.86	31.9	44.7	23.5	7.0	4.6	11.6	530.3	469.7
1.86	42.65	57.35	30.8	45.8	23.4	6.8	4.8	11.6	515.2	484.8
1.87	41.18	58.82	29.7	47.0	23.3	6.6	4.9	11.5	500.0	500.0
1.88	39.72	60.28	28.7	48.2	23.1	6.4	5.1	11.5	484.8	515.2
1.89	38.27	61.73	27.6	49.4	23.0	6.2	5.2	11.4	469.7	530.3
1.90	36.84	63.16	26.6	50.5	22.9	6.0	5.4	11.4	454.5	545.5
1.91	35.43	64.57	25.6	51.6	22.8	5.8	5.5	11.3	439.4	560.6
1.92	34.03	65.97	24.6	52.7	22.7	5.6	5.7	11.3	424.2	575.8
1.93	32.64	67.36	23.6	53.9	22.6	5.4	5.8	11.2	409.1	590.9
1.94	31.27	68.73	22.6	54.9	22.5	5.2	6.0	11.2	393.9	606.1
1.95	29.91	70.09	21.6	56.0	22.4	5.0	6.1	11.1	378.8	621.2
1.96	28.57	71.43	20.6	57.1	22.3	4.8	6.3	11.1	363.6	636.4
1.97	27.24	72.76	19.7	58.2	22.2	4.6	6.4	11.0	348.5	651.5
1.98	25.93	74.07	18.7	59.2	22.1	4.4	6.6	11.0	333.3	666.7
1.99	24.62	75.38	17.8	60.3	22.0	4.2	6.7	10.9	318.2	681.8
2.00	23.33	76.67	16.8	61.3	21.9	4.0	6.9	10.9	303.0	697.0
2.01	22.06	77.94	15.9	62.3	21.8	3.8	7.0	10.8	287.9	712.1
2.02	20.79	79.21	15.0	63.3	21.7	3.6	7.2	10.8	272.7	727.3
2.03	19.54	80.46	14.1	64.3	21.6	3.4	7.3	10.7	257.6	742.4
2.04	18.30	81.70	13.2	65.3	21.5	3.2	7.5	10.7	242.4	757.6
2.05	17.07	82.93	12.3	66.3	21.4	3.0	7.6	10.6	227.3	772.7
2.06	15.86	84.14	11.4	67.3	21.3	2.8	7.8	10.6	212.1	787.9
2.07	14.65	85.35	10.6	68.2	21.2	2.6	7.9	10.5	197.0	803.0
2.08	13.46	86.54	9.7	69.2	21.1	2.4	8.1	10.5	181.8	818.2
2.09	12.28	87.72	8.9	70.1	21.0	2.2	8.2	10.4	166.7	833.3
2.10	11.11	88.89	8.0	71.1	20.9	2.0	8.4	10.4	151.5	848.5
2.11	9.95	90.05	7.2	72.0	20.8	1.8	8.5	10.3	136.4	863.6
2.12	8.81	91.19	6.4	72.9	20.7	1.6	8.7	10.3	121.2	878.8
2.13	7.67	92.33	5.5	73.8	20.6	1.4	8.8	10.2	106.1	893.9
2.14	6.54	93.46	4.7	74.7	20.6	1.2	9.0	10.2	90.9	909.1
2.15	5.43	94.57	3.9	75.6	20.5	1.0	9.1	10.1	75.8	924.2
2.16	4.32	95.68	3.1	76.5	20.4	0.8	9.3	10.1	60.6	939.4
2.17	3.23	96.77	2.3	77.4	20.3	0.6	9.4	10.0	45.5	954.5
2.18	2.14	97.86	1.5	78.2	20.2	0.4	9.6	10.0	30.3	969.7
2.19	1.07	98.93	0.8	79.1	20.1	0.2	9.7	9.9	15.2	984.8
2.20	0.00	100.00	0.0	80.0	20.0	0.0	9.9	9.9	0.0	1,000.0

Table 24 Field unit blending table for a diluted potassium / cesium formate blend, composed of 12.85 lb/gal potassium formate and 18.36 lb/gal cesium formate.

FIELD										
Density [lb/gal]	KCOOH brine [wt%]	CsCOOH brine [wt%]	KCOOH [wt%]	CsCOOH [wt%]	H_2O [wt%]	K^+ [mol/L]	Cs^+ [mol/L]	$HCOO^-$ [mol/L]	Quantities for 1 bbl brine	
									KCOOH [bbl]	CsCOOH [bbl]
12.85	100.0	0.0	72.1	0.0	27.9	13.2	0.0	13.2	1.000	0.000
12.90	98.7	1.3	71.2	1.0	27.8	13.1	0.1	13.2	0.991	0.009
13.00	96.2	3.8	69.4	3.1	27.6	12.8	0.3	13.1	0.973	0.027
13.10	93.6	6.4	67.6	5.1	27.4	12.6	0.4	13.1	0.955	0.045
13.20	91.2	8.8	65.8	7.1	27.2	12.4	0.6	13.0	0.936	0.064
13.30	88.7	11.3	64.0	9.0	27.0	12.1	0.8	12.9	0.918	0.082
13.40	86.3	13.7	62.3	10.9	26.8	11.9	1.0	12.9	0.900	0.100
13.50	84.0	16.0	60.6	12.8	26.6	11.6	1.2	12.8	0.882	0.118
13.60	81.6	18.4	58.9	14.7	26.4	11.4	1.3	12.8	0.864	0.136
13.70	79.3	20.7	57.2	16.5	26.2	11.2	1.5	12.7	0.846	0.154
13.80	77.1	22.9	55.6	18.3	26.1	10.9	1.7	12.6	0.828	0.172
13.90	74.8	25.2	54.0	20.1	25.9	10.7	1.9	12.6	0.809	0.191
14.00	72.6	27.4	52.4	21.9	25.7	10.5	2.1	12.5	0.791	0.209
14.10	70.5	29.5	50.8	23.6	25.5	10.2	2.2	12.5	0.773	0.227
14.20	68.3	31.7	49.3	25.3	25.4	10.0	2.4	12.4	0.755	0.245
14.30	66.2	33.8	47.8	27.0	25.2	9.7	2.6	12.3	0.737	0.263
14.40	64.1	35.9	46.3	28.7	25.1	9.5	2.8	12.3	0.719	0.281
14.50	62.1	37.9	44.8	30.3	24.9	9.3	3.0	12.2	0.701	0.299
14.60	60.1	39.9	43.3	31.9	24.7	9.0	3.1	12.2	0.682	0.318
14.70	58.1	41.9	41.9	33.5	24.6	8.8	3.3	12.1	0.664	0.336
14.80	56.1	43.9	40.5	35.1	24.4	8.5	3.5	12.0	0.646	0.354
14.90	54.2	45.8	39.1	36.7	24.3	8.3	3.7	12.0	0.628	0.372
15.00	52.2	47.8	37.7	38.2	24.1	8.1	3.9	11.9	0.610	0.390
15.10	50.3	49.7	36.3	39.7	24.0	7.8	4.0	11.9	0.592	0.408
15.20	48.5	51.5	35.0	41.2	23.8	7.6	4.2	11.8	0.574	0.426
15.30	46.6	53.4	33.7	42.7	23.7	7.3	4.4	11.7	0.555	0.445
15.40	44.8	55.2	32.3	44.1	23.5	7.1	4.6	11.7	0.537	0.463
15.50	43.0	57.0	31.0	45.5	23.4	6.9	4.8	11.6	0.519	0.481
15.60	41.3	58.7	29.8	47.0	23.3	6.6	4.9	11.5	0.501	0.499
15.70	39.5	60.5	28.5	48.4	23.1	6.4	5.1	11.5	0.483	0.517
15.80	37.8	62.2	27.3	49.7	23.0	6.1	5.3	11.4	0.465	0.535
15.90	36.1	63.9	26.0	51.1	22.9	5.9	5.5	11.4	0.446	0.554
16.00	34.4	65.6	24.8	52.4	22.7	5.7	5.7	11.3	0.428	0.572
16.10	32.7	67.3	23.6	53.8	22.6	5.4	5.8	11.2	0.410	0.590
16.20	31.1	68.9	22.4	55.1	22.5	5.2	6.0	11.2	0.392	0.608
16.30	29.5	70.5	21.3	56.4	22.3	4.9	6.2	11.1	0.374	0.626
16.40	27.9	72.1	20.1	57.7	22.2	4.7	6.4	11.1	0.356	0.644
16.50	26.3	73.7	19.0	58.9	22.1	4.5	6.5	11.0	0.338	0.662
16.60	24.7	75.3	17.8	60.2	22.0	4.2	6.7	10.9	0.319	0.681
16.70	23.2	76.8	16.7	61.4	21.9	4.0	6.9	10.9	0.301	0.699
16.80	21.7	78.3	15.6	62.6	21.7	3.7	7.1	10.8	0.283	0.717
16.90	20.1	79.9	14.5	63.8	21.6	3.5	7.3	10.8	0.265	0.735
17.00	18.7	81.3	13.5	65.0	21.5	3.3	7.4	10.7	0.247	0.753
17.10	17.2	82.8	12.4	66.2	21.4	3.0	7.6	10.6	0.229	0.771
17.20	15.7	84.3	11.3	67.4	21.3	2.8	7.8	10.6	0.211	0.789
17.30	14.3	85.7	10.3	68.5	21.2	2.5	8.0	10.5	0.192	0.808
17.40	12.9	87.1	9.3	69.7	21.1	2.3	8.2	10.5	0.174	0.826
17.50	11.5	88.5	8.3	70.8	20.9	2.1	8.3	10.4	0.156	0.844
17.60	10.1	89.9	7.3	71.9	20.8	1.8	8.5	10.3	0.138	0.862
17.70	8.7	91.3	6.3	73.0	20.7	1.6	8.7	10.3	0.120	0.880
17.80	7.3	92.7	5.3	74.1	20.6	1.3	8.9	10.2	0.102	0.898
17.90	6.0	94.0	4.3	75.2	20.5	1.1	9.1	10.2	0.083	0.917
18.00	4.7	95.3	3.4	76.2	20.4	0.9	9.2	10.1	0.065	0.935
18.10	3.4	96.6	2.4	77.3	20.3	0.6	9.4	10.0	0.047	0.953
18.20	2.1	97.9	1.5	78.3	20.2	0.4	9.6	10.0	0.029	0.971
18.30	0.8	99.2	0.6	79.3	20.1	0.1	9.8	9.9	0.011	0.989
18.36	0.0	100.0	0.0	80.0	20.0	0.0	9.9	9.9	0.000	1.000

Table 25 Metric blending table for a concentrated potassium / cesium formate blend, composed of 1.57 g/cm³ potassium formate and 2.30 g/cm³ cesium formate.

METRIC

Density [g/cm³]	KCOOH brine [wt%]	CsCOOH brine [wt%]	KCOOH [wt%]	CsCOOH [wt%]	H_2O [wt%]	K^+ [mol/L]	Cs^+ [mol/L]	$HCOO^-$ [mol/L]	Quantities for 1 m³ brine	
									KCOOH [liter]	CsCOOH [liter]
1.57	100.00	0.00	75.0	0.0	25.0	14.0	0.0	14.0	1,000.0	0.0
1.58	98.01	1.99	73.5	1.7	24.8	13.8	0.1	14.0	986.3	13.7
1.59	96.04	3.96	72.0	3.3	24.6	13.6	0.3	13.9	972.6	27.4
1.60	94.09	5.91	70.6	4.9	24.5	13.4	0.4	13.9	958.9	41.1
1.61	92.17	7.83	69.1	6.5	24.3	13.2	0.6	13.8	945.2	54.8
1.62	90.28	9.72	67.7	8.1	24.2	13.0	0.7	13.8	931.5	68.5
1.63	88.40	11.60	66.3	9.7	24.0	12.9	0.9	13.7	917.8	82.2
1.64	86.55	13.45	64.9	11.2	23.8	12.7	1.0	13.7	904.1	95.9
1.65	84.72	15.28	63.6	12.7	23.7	12.5	1.2	13.6	890.4	109.6
1.66	82.92	17.08	62.2	14.3	23.5	12.3	1.3	13.6	876.7	123.3
1.67	81.13	18.87	60.9	15.7	23.4	12.1	1.5	13.6	863.0	137.0
1.68	79.37	20.63	59.5	17.2	23.2	11.9	1.6	13.5	849.3	150.7
1.69	77.63	22.37	58.2	18.7	23.1	11.7	1.8	13.5	835.6	164.4
1.70	75.91	24.09	56.9	20.1	23.0	11.5	1.9	13.4	821.9	178.1
1.71	74.20	25.80	55.7	21.5	22.8	11.3	2.1	13.4	808.2	191.8
1.72	72.52	27.48	54.4	22.9	22.7	11.1	2.2	13.3	794.5	205.5
1.73	70.86	29.14	53.2	24.3	22.5	10.9	2.4	13.3	780.8	219.2
1.74	69.22	30.78	51.9	25.7	22.4	10.7	2.5	13.3	767.1	232.9
1.75	67.59	32.41	50.7	27.0	22.2	10.5	2.7	13.2	753.4	246.6
1.76	65.99	34.01	49.5	28.4	22.1	10.4	2.8	13.2	739.7	260.3
1.77	64.40	35.60	48.3	29.7	22.0	10.2	3.0	13.1	726.0	274.0
1.78	62.83	37.17	47.1	31.0	21.8	10.0	3.1	13.1	712.3	287.7
1.79	61.28	38.72	46.0	32.3	21.7	9.8	3.3	13.0	698.6	301.4
1.80	59.74	40.26	44.8	33.6	21.6	9.6	3.4	13.0	684.9	315.1
1.81	58.22	41.78	43.7	34.9	21.5	9.4	3.5	12.9	671.2	328.8
1.82	56.72	43.28	42.6	36.1	21.3	9.2	3.7	12.9	657.5	342.5
1.83	55.24	44.76	41.4	37.4	21.2	9.0	3.8	12.9	643.8	356.2
1.84	53.77	46.23	40.3	38.6	21.1	8.8	4.0	12.8	630.1	369.9
1.85	52.31	47.69	39.2	39.8	21.0	8.6	4.1	12.8	616.4	383.6
1.86	50.88	49.12	38.2	41.0	20.8	8.4	4.3	12.7	602.7	397.3
1.87	49.45	50.55	37.1	42.2	20.7	8.2	4.4	12.7	589.0	411.0
1.88	48.05	51.95	36.0	43.4	20.6	8.1	4.6	12.6	575.3	424.7
1.89	46.66	53.34	35.0	44.5	20.5	7.9	4.7	12.6	561.6	438.4
1.90	45.28	54.72	34.0	45.7	20.4	7.7	4.9	12.5	547.9	452.1
1.91	43.91	56.09	32.9	46.8	20.3	7.5	5.0	12.5	534.2	465.8
1.92	42.57	57.43	31.9	47.9	20.1	7.3	5.2	12.5	520.5	479.5
1.93	41.23	58.77	30.9	49.0	20.0	7.1	5.3	12.4	506.8	493.2
1.94	39.91	60.09	29.9	50.1	19.9	6.9	5.5	12.4	493.2	506.8
1.95	38.60	61.40	29.0	51.2	19.8	6.7	5.6	12.3	479.5	520.5
1.96	37.31	62.69	28.0	52.3	19.7	6.5	5.8	12.3	465.8	534.2
1.97	36.03	63.97	27.0	53.4	19.6	6.3	5.9	12.2	452.1	547.9
1.98	34.76	65.24	26.1	54.4	19.5	6.1	6.1	12.2	438.4	561.6
1.99	33.50	66.50	25.1	55.5	19.4	5.9	6.2	12.2	424.7	575.3
2.00	32.26	67.74	24.2	56.5	19.3	5.8	6.4	12.1	411.0	589.0
2.01	31.03	68.97	23.3	57.6	19.2	5.6	6.5	12.1	397.3	602.7
2.02	29.81	70.19	22.4	58.6	19.1	5.4	6.7	12.0	383.6	616.4
2.03	28.61	71.39	21.5	59.6	19.0	5.2	6.8	12.0	369.9	630.1
2.04	27.41	72.59	20.6	60.6	18.9	5.0	6.9	11.9	356.2	643.8
2.05	26.23	73.77	19.7	61.6	18.8	4.8	7.1	11.9	342.5	657.5
2.06	25.06	74.94	18.8	62.5	18.7	4.6	7.2	11.8	328.8	671.2
2.07	23.90	76.10	17.9	63.5	18.6	4.4	7.4	11.8	315.1	684.9
2.08	22.75	77.25	17.1	64.5	18.5	4.2	7.5	11.8	301.4	698.6
2.09	21.61	78.39	16.2	65.4	18.4	4.0	7.7	11.7	287.7	712.3
2.10	20.48	79.52	15.4	66.4	18.3	3.8	7.8	11.7	274.0	726.0
2.11	19.37	80.63	14.5	67.3	18.2	3.6	8.0	11.6	260.3	739.7
2.12	18.26	81.74	13.7	68.2	18.1	3.5	8.1	11.6	246.6	753.4
2.13	17.17	82.83	12.9	69.1	18.0	3.3	8.3	11.5	232.9	767.1
2.14	16.08	83.92	12.1	70.0	17.9	3.1	8.4	11.5	219.2	780.8
2.15	15.00	85.00	11.3	70.9	17.8	2.9	8.6	11.4	205.5	794.5
2.16	13.94	86.06	10.5	71.8	17.7	2.7	8.7	11.4	191.8	808.2
2.17	12.88	87.12	9.7	72.7	17.6	2.5	8.9	11.4	178.1	821.9
2.18	11.84	88.16	8.9	73.6	17.5	2.3	9.0	11.3	164.4	835.6
2.19	10.80	89.20	8.1	74.4	17.5	2.1	9.2	11.3	150.7	849.3
2.20	9.78	90.22	7.3	75.3	17.4	1.9	9.3	11.2	137.0	863.0
2.21	8.76	91.24	6.6	76.1	17.3	1.7	9.5	11.2	123.3	876.7
2.22	7.75	92.25	5.8	77.0	17.2	1.5	9.6	11.1	109.6	890.4
2.23	6.75	93.25	5.1	77.8	17.1	1.3	9.8	11.1	95.9	904.1
2.24	5.76	94.24	4.3	78.6	17.0	1.2	9.9	11.1	82.2	917.8
2.25	4.78	95.22	3.6	79.5	16.9	1.0	10.0	11.0	68.5	931.5
2.26	3.81	96.19	2.9	80.3	16.9	0.8	10.2	11.0	54.8	945.2
2.27	2.84	97.16	2.1	81.1	16.8	0.6	10.3	10.9	41.1	958.9
2.28	1.89	98.11	1.4	81.9	16.7	0.4	10.5	10.9	27.4	972.6
2.29	0.94	99.06	0.7	82.7	16.6	0.2	10.6	10.8	13.7	986.3
2.30	0.00	100.00	0.0	83.5	16.5	0.0	10.8	10.8	0.0	1,000.0

Table 26 Field unit blending table for a concentrated potassium / cesium formate blend, composed of 13.10 lb/gal potassium formate and 19.22 lb/gal cesium formate.

FIELD										
Density [lb/gal]	KCOOH brine [wt%]	CsCOOH brine [wt%]	KCOOH [wt%]	CsCOOH [wt%]	H_2O [wt%]	Conc. K^+ [mol/L]	Conc. Cs^+ [mol/L]	$HCOO^-$ [mol/L]	Quantities for 1 bbl brine	
									KCOOH [bbl]	CsCOOH [bbl]
13.10	100.0	0.0	75.0	0.0	25.0	14.0	0.0	14.0	1.000	0.000
13.20	97.6	2.4	73.2	2.0	24.8	13.8	0.2	13.9	0.984	0.016
13.30	95.3	4.7	71.4	3.9	24.6	13.5	0.4	13.9	0.967	0.033
13.40	93.0	7.0	69.7	5.9	24.4	13.3	0.5	13.8	0.951	0.049
13.50	90.7	9.3	68.0	7.8	24.2	13.1	0.7	13.8	0.935	0.065
13.60	88.5	11.6	66.3	9.6	24.0	12.9	0.9	13.7	0.918	0.082
13.70	86.3	13.8	64.7	11.5	23.8	12.6	1.1	13.7	0.902	0.098
13.80	84.1	15.9	63.0	13.3	23.6	12.4	1.2	13.6	0.886	0.114
13.90	81.9	18.1	61.4	15.1	23.5	12.2	1.4	13.6	0.869	0.131
14.00	79.8	20.2	59.9	16.9	23.3	11.9	1.6	13.5	0.853	0.147
14.10	77.7	22.3	58.3	18.6	23.1	11.7	1.8	13.5	0.837	0.163
14.20	75.7	24.3	56.7	20.3	22.9	11.5	1.9	13.4	0.820	0.180
14.30	73.7	26.4	55.2	22.0	22.7	11.3	2.1	13.4	0.804	0.196
14.40	71.7	28.4	53.7	23.7	22.6	11.0	2.3	13.3	0.788	0.212
14.50	69.7	30.3	52.3	25.3	22.4	10.8	2.5	13.3	0.771	0.229
14.60	67.7	32.3	50.8	27.0	22.2	10.6	2.7	13.2	0.755	0.245
14.70	65.8	34.2	49.4	28.6	22.1	10.3	2.8	13.2	0.739	0.261
14.80	63.9	36.1	47.9	30.1	21.9	10.1	3.0	13.1	0.722	0.278
14.90	62.1	37.9	46.5	31.7	21.8	9.9	3.2	13.1	0.706	0.294
15.00	60.2	39.8	45.2	33.2	21.6	9.6	3.4	13.0	0.690	0.310
15.10	58.4	41.6	43.8	34.8	21.4	9.4	3.5	13.0	0.673	0.327
15.20	56.6	43.4	42.5	36.3	21.3	9.2	3.7	12.9	0.657	0.343
15.30	54.8	45.2	41.1	37.7	21.1	9.0	3.9	12.9	0.641	0.359
15.40	53.1	46.9	39.8	39.2	21.0	8.7	4.1	12.8	0.624	0.376
15.50	51.4	48.6	38.5	40.6	20.8	8.5	4.2	12.7	0.608	0.392
15.60	49.7	50.3	37.2	42.1	20.7	8.3	4.4	12.7	0.592	0.408
15.70	48.0	52.0	36.0	43.5	20.6	8.0	4.6	12.6	0.575	0.425
15.80	46.3	53.7	34.7	44.8	20.4	7.8	4.8	12.6	0.559	0.441
15.90	44.7	55.3	33.5	46.2	20.3	7.6	4.9	12.5	0.542	0.458
16.00	43.1	56.9	32.3	47.6	20.1	7.4	5.1	12.5	0.526	0.474
16.10	41.5	58.5	31.1	48.9	20.0	7.1	5.3	12.4	0.510	0.490
16.20	39.9	60.1	29.9	50.2	19.9	6.9	5.5	12.4	0.493	0.507
16.30	38.4	61.7	28.8	51.5	19.7	6.7	5.7	12.3	0.477	0.523
16.40	36.8	63.2	27.6	52.8	19.6	6.4	5.8	12.3	0.461	0.539
16.50	35.3	64.7	26.5	54.1	19.5	6.2	6.0	12.2	0.444	0.556
16.60	33.8	66.2	25.3	55.3	19.3	6.0	6.2	12.2	0.428	0.572
16.70	32.3	67.7	24.2	56.6	19.2	5.8	6.4	12.1	0.412	0.588
16.80	30.8	69.2	23.1	57.8	19.1	5.5	6.5	12.1	0.395	0.605
16.90	29.4	70.6	22.0	59.0	19.0	5.3	6.7	12.0	0.379	0.621
17.00	28.0	72.1	21.0	60.2	18.8	5.1	6.9	12.0	0.363	0.637
17.10	26.5	73.5	19.9	61.4	18.7	4.8	7.1	11.9	0.346	0.654
17.20	25.1	74.9	18.9	62.6	18.6	4.6	7.2	11.9	0.330	0.670
17.30	23.8	76.2	17.8	63.7	18.5	4.4	7.4	11.8	0.314	0.686
17.40	22.4	77.6	16.8	64.9	18.4	4.2	7.6	11.8	0.297	0.703
17.50	21.0	79.0	15.8	66.0	18.2	3.9	7.8	11.7	0.281	0.719
17.60	19.7	80.3	14.8	67.1	18.1	3.7	8.0	11.7	0.265	0.735
17.70	18.4	81.6	13.8	68.2	18.0	3.5	8.1	11.6	0.248	0.752
17.80	17.1	82.9	12.8	69.3	17.9	3.2	8.3	11.6	0.232	0.768
17.90	15.8	84.2	11.8	70.4	17.8	3.0	8.5	11.5	0.216	0.784
18.00	14.5	85.5	10.9	71.4	17.7	2.8	8.7	11.5	0.199	0.801
18.10	13.3	86.8	9.9	72.5	17.6	2.6	8.8	11.4	0.183	0.817
18.20	12.0	88.0	9.0	73.5	17.5	2.3	9.0	11.3	0.167	0.833
18.30	10.8	89.2	8.1	74.6	17.4	2.1	9.2	11.3	0.150	0.850
19.22	0.0	100.0	0.0	83.6	16.4	0.0	10.8	10.8	0.000	1.000