

Example 54/7 – Utilize n-Butane and i-Pentane

Input Data to Implementation Procedure T54

Density (kg/m³) @ 15°C (Den15) . 599.37

Observed temperature Tf, °C 43.360

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 599.4

Tf, °C, rounded to 0.05 43.35

T54/2

Tx, Kelvin 316.50

T54/3

Tx and Den15 are within range, continue

T54/4

Den15 relative to 60°F water ... 0.599990390544

T54/5, Call Table 23 procedure to obtain relative density at 60°F

RD60 from Table 23 0.599396660576

T54/6

RD60 is within range, continue

T54/7, Call Table 24 Procedure with Tx and RD60

Reference Fluid 1 n-Butane

Reference Fluid 2 i-Pentane

CTL1, Tx to 60°F 0.948276855780

T54/8, Call Table 24 Procedure with 15°C and RD60

Reference Fluid 1 n-Butane

Reference Fluid 2 i-Pentane

CTL2, 15°C to 60°F 1.000990546173

T54/9 CTL = CTL1/CTL2

CTL, Tx to 15°C 0.947338473281

T54/10

CTL is positive, continue

T54/11 CTL rounded

CTL (rounded) 0.94734

Example 54/8 – Utilize i-Pentane and n-Pentane

Input Data to Implementation Procedure T54

Density (kg/m³) @ 15°C (Den15) . 624.42

Observed temperature Tf, °C 76.650

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 624.4

Tf, °C, rounded to 0.05 76.65

T54/2

Tx, Kelvin 349.80

T54/3

Tx and Den15 are within range, continue

T54/4

Den15 relative to 60°F water ... 0.625015014775

T54/5, Call Table 23 procedure to obtain relative density at 60°F

RD60 from Table 23 0.624458073820

T54/6

RD60 is within range, continue

T54/7, Call Table 24 Procedure with Tx and RD60

Reference Fluid 1 i - Pentane

Reference Fluid 2 n - Pentane

CTL1, Tx to 60°F 0.893460003018

T54/8, Call Table 24 Procedure with 15°C and RD60

Reference Fluid 1 i - Pentane

Reference Fluid 2 n - Pentane

CTL2, 15°C to 60°F 1.000891878859

T54/9 CTL = CTL1/CTL2

CTL, Tx to 15°C 0.892663854998

T54/10

CTL is positive, continue

T54/11 CTL rounded

CTL (rounded) 0.89266

Example 54/9 – Utilize n-Pentane and i-Hexane

Input Data to Implementation Procedure T54
 Density (kg/m^3) @ 15°C (Den15) . 639.41
 Observed temperature T_f , $^\circ\text{C}$ -24.460
 Computed Data – last digit is rounded
 T54/1
 Input Data – rounded
 Den15, rounded to 0.1 639.4
 T_f , $^\circ\text{C}$, rounded to 0.05 -24.45
 T54/2
 T_x , Kelvin 248.70
 T54/3
 T_x and Den15 are within range, continue
 T54/4
 Den15 relative to 60°F water ... 0.640029789313
 T54/5, Call Table 23 procedure to obtain relative density at 60°F
 RD60 from Table 23 0.639504496457
 T54/6
 RD60 is within range, continue
 T54/7, Call Table 24 Procedure with T_x and RD60
 Reference Fluid 1 n-Pentane
 Reference Fluid 2 i-Hexane
 CTL1, T_x to 60°F 1.057426821739
 T54/8, Call Table 24 Procedure with 15°C and RD60
 Reference Fluid 1 n-Pentane
 Reference Fluid 2 i-Hexane
 CTL2, 15°C to 60°F 1.000821406041
 T54/9 CTL = CTL1/CTL2
 CTL, T_x to 15°C 1.056558957827
 T54/10
 CTL is positive, continue
 T54/11 CTL rounded
 CTL (rounded) 1.05656

Example 54/10 – Utilize i-Hexane and n-Hexane

Input Data to Implementation Procedure T54
 Density (kg/m^3) @ 15°C (Den15) . 659.38
 Observed temperature T_f , $^\circ\text{C}$ 80.580
 Computed Data – last digit is rounded
 T54/1
 Input Data – rounded
 Den15, rounded to 0.1 659.4
 T_f , $^\circ\text{C}$, rounded to 0.05 80.60
 T54/2
 T_x , Kelvin 353.75
 T54/3
 T_x and Den15 are within range, continue
 T54/4
 Den15 relative to 60°F water ... 0.660049488697
 T54/5, Call Table 23 procedure to obtain relative density at 60°F
 RD60 from Table 23 0.659551831579
 T54/6
 RD60 is within range, continue
 T54/7, Call Table 24 Procedure with T_x and RD60
 Reference Fluid 1 i-Hexane
 Reference Fluid 2 n-Hexane
 CTL1, T_x to 60°F 0.905892081483
 T54/8, Call Table 24 Procedure with 15°C and RD60
 Reference Fluid 1 i-Hexane
 Reference Fluid 2 n-Hexane
 CTL2, 15°C to 60°F 1.000754538301
 T54/9 CTL = CTL1/CTL2
 CTL, T_x to 15°C 0.905209066572
 T54/10
 CTL is positive, continue
 T54/11 CTL rounded
 CTL (rounded) 0.90521

Example 54/11 – Utilize n-Hexane and n-Heptane

Input Data to Implementation Procedure T54

Density (kg/m^3) @ 15°C (Den15) . 669.38

Observed temperature T_f , $^\circ\text{C}$ 82.790

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 669.4

T_f , $^\circ\text{C}$, rounded to 0.05 82.80

T54/2

T_x , Kelvin 355.95

T54/3

T_x and Den15 are within range, continue

T54/4

Den15 relative to 60°F water ... 0.670059338389

T54/5, Call Table 23 procedure to obtain relative density at 60°F

RD60 from Table 23 0.669573371528

T54/6

RD60 is within range, continue

T54/7, Call Table 24 Procedure with T_x and RD60

Reference Fluid 1 n-Hexane

Reference Fluid 2 n-Heptane

CTL1, T_x to 60°F 0.907185481500

T54/8, Call Table 24 Procedure with 15°C and RD60

Reference Fluid 1 n-Hexane

Reference Fluid 2 n-Heptane

CTL2, 15°C to 60°F 1.000725785828

T54/9 CTL = CTL1/CTL2

CTL, T_x to 15°C 0.906527536662

T54/10

CTL is positive, continue

T54/11 CTL rounded

CTL (rounded) 0.90653

Example 54/12 – Reduced temperature $T_{r,x}$ greater than 1

Input Data to Implementation Procedure T54

Density (kg/m^3) @ 15°C (Den15) . 399.83

Observed temperature T_f , $^\circ\text{C}$ 90.570

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 399.8

T_f , $^\circ\text{C}$, rounded to 0.05 90.55

T54/2

T_x , Kelvin 363.70

T54/3

T_x and Den15 are within range, continue

T54/4

Den15 relative to 60°F water ... 0.400193790690

T54/5, Call Table 23 procedure to obtain relative density at 60°F

RD60 from Table 23 0.398881468881

T54/6

RD60 is within range, continue

T54/7, Call Table 24 Procedure with T_x and RD60

Reference Fluid 1 Ethane

Reference Fluid 2 EP (65/35)

Reduced temperature $T_{r,x}$ greater than 1.0, no solution

CTL1, T_x to 60°F -1.0

Value from Table 24 not valid, no solution

Example 54/13 – $T_f < \text{lower range limit}$

Input Data to Implementation Procedure T54

Density (kg/m^3) @ 15°C (Den15) . 449.56

Observed temperature T_f , $^\circ\text{C}$ -46.030

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 449.6

T_f , $^\circ\text{C}$, rounded to 0.05 -46.05

T54/2

T_x , Kelvin 227.10

T54/3

T_x less than 227.15, no solution

Example 54/14 – Den15 < lower range limit

Input Data to Implementation Procedure T54

Density (kg/m³) @ 15°C (Den15) . 349.59

Observed temperature Tf, °C 4.440

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 349.6

Tf, °C, rounded to 0.05 4.45

T54/2

Tx, Kelvin 277.60

T54/3

Density is less than 351.7, no solution

Example 54/15 – $T_f >$ upper range limit

Input Data to Implementation Procedure T54

Density (kg/m^3) @ 15°C (Den15) . 449.56

Observed temperature T_f , $^\circ\text{C}$ 93.030

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 449.6

T_f , $^\circ\text{C}$, rounded to 0.05 93.05

T54/2

T_x , Kelvin 366.20

T54/3

T_x greater than 366.15, no solution

Example 54/16 – Den15 > upper range limit

Input Data to Implementation Procedure T54

Density (kg/m^3) @ 15°C (Den15) . 687.85

Observed temperature Tf, °C -17.780

Computed Data – last digit is rounded

T54/1

Input Data – rounded

Den15, rounded to 0.1 687.9

Tf, °C, rounded to 0.05 -17.80

T54/2

Tx, Kelvin 255.35

T54/3

Den15 is greater than 687.8, no solution

Example 54/17 – Tf & Den15 = upper range limits

Input Data to Implementation Procedure T54
 Density (kg/m³) @ 15°C (Den15) . 687.84
 Observed temperature Tf, °C 93.020
 Computed Data – last digit is rounded
 T54/1
 Input Data – rounded
 Den15, rounded to 0.1 687.8
 Tf, °C, rounded to 0.05 93.00
 T54/2
 Tx, Kelvin 366.15
 T54/3
 Tx and Den15 are within range, continue
 T54/4
 Den15 relative to 60°F water ... 0.688477461822
 T54/5, Call Table 23 procedure to obtain relative density at 60°F
 RD60 from Table 23 0.688010661267
 T54/6
 RD60 is within range, continue
 T54/7, Call Table 24 Procedure with Tx and RD60
 Reference Fluid 1 n-Hexane
 Reference Fluid 2 n-Heptane
 CTL1, Tx to 60°F 0.900470590102
 T54/8, Call Table 24 Procedure with 15°C and RD60
 Reference Fluid 1 n-Hexane
 Reference Fluid 2 n-Heptane
 CTL2, 15°C to 60°F 1.000678478666
 T54/9 CTL = CTL1/CTL2
 CTL, Tx to 15°C 0.899860054252
 T54/10
 CTL is positive, continue
 T54/11 CTL rounded
 CTL (rounded) 0.89986