

Reference: USAN23X  
Crude: Usan



## Crude Summary Report

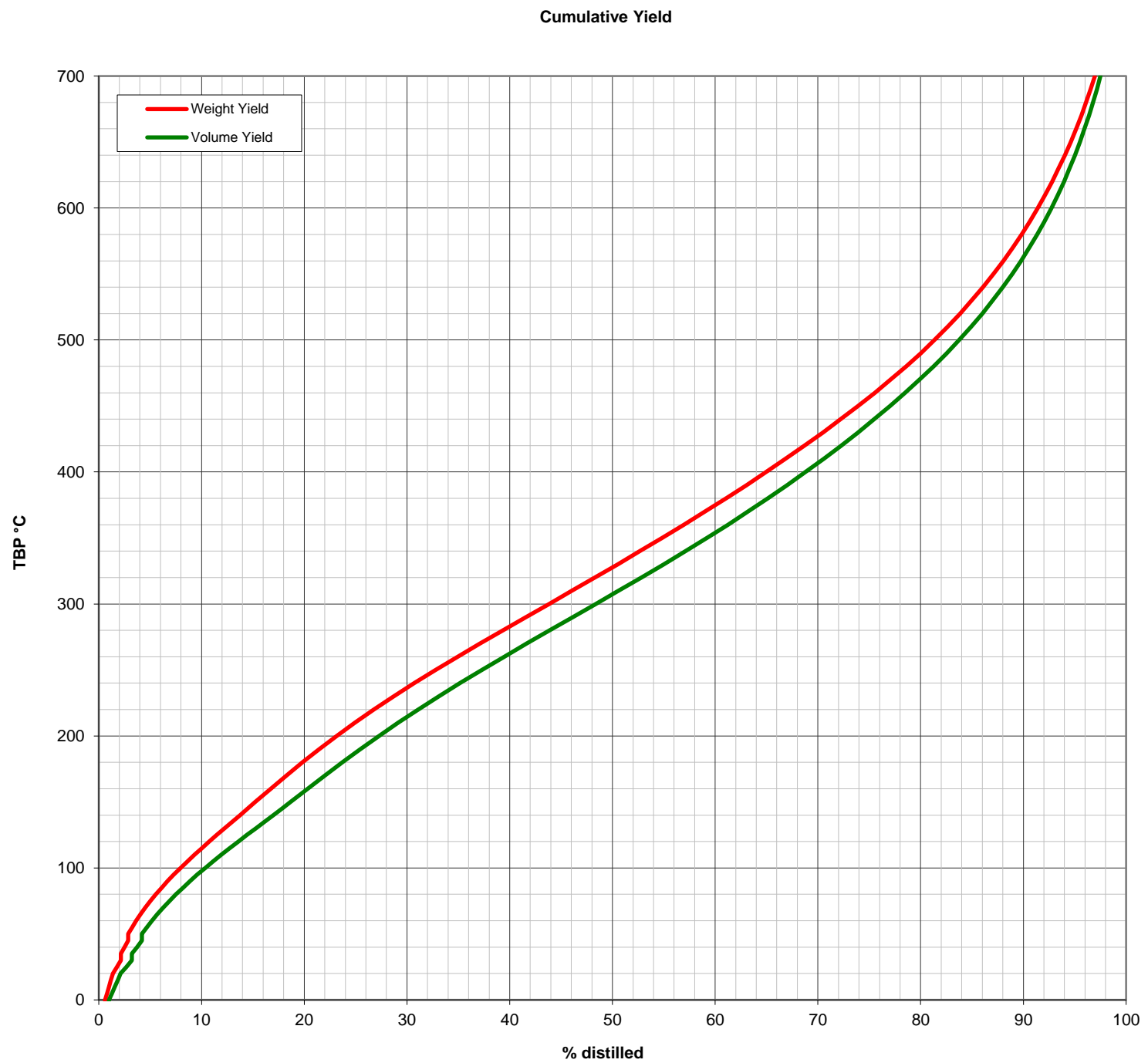
| General Information |           | Molecules (%wt on crude) |      |                             |             | Whole Crude Properties |  |  |  |
|---------------------|-----------|--------------------------|------|-----------------------------|-------------|------------------------|--|--|--|
| Reference:          | USAN23X   | methane + ethane         | 0.02 | Density @ 15°C (g/cc)       | 0.8806      |                        |  |  |  |
| Name:               | Usan      | propane                  | 0.30 | <b>API Gravity</b>          | <b>29.1</b> |                        |  |  |  |
| Origin:             | Nigeria   | isobutane                | 0.33 | Total Sulfur (% wt)         | 0.27        |                        |  |  |  |
| Assay Date:         | 5/12/2023 | n-butane                 | 0.77 | Pour Point (°C)             | -77         |                        |  |  |  |
| Comments:           |           | isopentane               | 0.84 | Viscosity @ 20°C (cSt)      | 13.5        |                        |  |  |  |
|                     |           | n-pentane                | 0.74 | Viscosity @ 40°C (cSt)      | 7.2         |                        |  |  |  |
|                     |           | cyclopentane             | 0.14 | Nickel (ppm)                | 14.9        |                        |  |  |  |
|                     |           | C6 paraffins             | 1.51 | Vanadium (ppm)              | 3.5         |                        |  |  |  |
|                     |           | C6 naphthenes            | 1.25 | Total Nitrogen (ppm)        | 2015        |                        |  |  |  |
|                     |           | benzene                  | 0.09 | Total Acid Number (mgKOH/g) | 1.51        |                        |  |  |  |
|                     |           | C7 paraffins             | 1.26 | Mercaptan Sulfur (ppm)      | 18.0        |                        |  |  |  |
|                     |           | C7 naphthenes            | 2.14 | Hydrogen Sulfide (ppm)      | 0.0         |                        |  |  |  |
|                     |           | toluene                  | 0.28 | Reid Vapor Pressure (kPa)   | 45.2        |                        |  |  |  |

| Cut Data                    | IBP    | Atmospheric Cuts |        |        |        |        |        |        |        |        | Vacuum Cuts |        |        |        |
|-----------------------------|--------|------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|--------|--------|--------|
|                             |        | C5               | 65     | 100    | 150    | 200    | 250    | 300    | 350    | 370    | 370         | 450    | 500    | 550    |
| Start (°C)                  | FBP    | 65               | 100    | 150    | 200    | 250    | 300    | 350    | 370    | FBP    | 450         | 500    | 550    | FBP    |
| End (°C)                    |        |                  |        |        |        |        |        |        |        |        |             |        |        |        |
| Yield (% wt)                |        | 2.9              | 3.9    | 7.3    | 7.9    | 9.6    | 11.0   | 11.0   | 4.2    | 41.0   | 14.9        | 7.5    | 5.7    | 12.9   |
| Yield (% vol)               |        | 3.9              | 4.6    | 8.3    | 8.6    | 10.0   | 11.1   | 10.8   | 4.0    | 36.8   | 13.8        | 6.8    | 5.1    | 11.1   |
| Cumulative Yield (% wt)     |        | 1.2              | 4.1    | 8.0    | 15.2   | 23.2   | 32.8   | 43.8   | 54.8   | 59.0   | 59.0        | 73.9   | 81.4   | 87.1   |
| Volume Average B.P. (°C)    | 320    | 41.0             | 83     | 125    | 175    | 226    | 275    | 325    | 360    | 507    | 408         | 474    | 524    | 643    |
| Density @ 15°C (g/cc)       | 0.8806 | 0.6539           | 0.7388 | 0.7703 | 0.8069 | 0.8457 | 0.8751 | 0.8952 | 0.9175 | 0.9791 | 0.9479      | 0.9712 | 0.9768 | 1.0240 |
| API Gravity                 | 29.1   | 84.9             | 60.0   | 52.1   | 43.8   | 35.7   | 30.1   | 26.5   | 22.6   | 12.9   | 17.7        | 14.1   | 13.3   | 6.6    |
| UOPK                        | 11.60  |                  |        | 11.62  | 11.54  | 11.40  | 11.37  | 11.44  | 11.38  | 11.43  | 11.29       | 11.36  | 11.54  | 11.53  |
| Molecular Weight (g/mol)    |        |                  |        | 109    | 136    | 167    | 202    | 245    | 276    | 458    | 321         | 411    | 522    | 919    |
| Total Sulfur (% wt)         | 0.27   | 0.000            | 0.002  | 0.009  | 0.026  | 0.068  | 0.160  | 0.264  | 0.317  | 0.492  | 0.328       | 0.423  | 0.55   | 0.69   |
| Mercaptan Sulfur (ppm)      | 18.0   |                  |        |        |        |        |        |        |        |        |             |        |        |        |
| Total Nitrogen (ppm)        | 2015   |                  |        |        |        | 21     | 72     | 291    | 613    | 4750   | 1216        | 2439   | 4144   | 10427  |
| Basic Nitrogen (ppm)        | 804    |                  |        |        |        | 20     | 69     | 204    | 412    | 1841   | 657         | 996    | 1992   | 3628   |
| Total Acid Number (mgKOH/g) | 1.51   | 0.00             | 0.01   | 0.06   | 0.17   | 0.52   | 1.24   | 2.15   | 2.53   | 2.35   | 2.83        | 3.06   | 2.94   | 1.14   |
| Viscosity @ 20°C (cSt)      | 13.5   |                  |        |        | 1.41   |        |        |        |        |        |             |        |        |        |
| Viscosity @ 40°C (cSt)      | 7.15   |                  |        |        | 1.07   | 1.76   | 3.49   | 9.13   | 23.5   |        |             |        |        |        |
| Viscosity @ 50°C (cSt)      | 5.52   |                  |        |        |        | 1.50   | 2.82   | 6.72   | 15.6   | 2442   | 71.2        | 773    | 3877   |        |
| Viscosity @ 60°C (cSt)      |        |                  |        |        |        |        |        |        |        | 982    | 42.1        | 348    | 1468   |        |
| Viscosity @ 100°C (cSt)     |        |                  |        |        |        |        |        |        |        | 76.1   | 9.52        | 37.3   | 96.8   | 15110  |
| Viscosity @ 130°C (cSt)     |        |                  |        |        |        |        |        |        |        |        |             |        |        | 1299   |
| Viscosity @ 150°C (cSt)     |        |                  |        |        |        |        |        |        |        |        |             |        |        | 388    |
| RON (Clear)                 |        | 78.7             | 55.7   | 66.4   | 46.7   |        |        |        |        |        |             |        |        |        |
| MON (Clear)                 |        | 77.0             | 67.6   | 62.8   | 42.6   |        |        |        |        |        |             |        |        |        |
| Paraffins (% wt)            | 17.1   | 94.7             | 47.0   | 23.8   | 29.8   |        |        |        |        |        |             |        |        |        |
| Naphthenes (%wt)            | 41.8   | 5.3              | 50.6   | 62.6   | 53.0   |        |        |        |        |        |             |        |        |        |
| Aromatics (% wt)            | 41.1   | 0.0              | 2.4    | 13.6   | 17.2   |        |        |        |        |        |             |        |        |        |
| Pour Point (°C)             | -77    |                  |        |        |        | -61    | -39    | -11    | 5      | 31     | 19          | 27     | 30     | 69     |
| Cloud Point (°C)            |        |                  |        |        |        | -58    | -37    | -8     |        |        |             |        |        |        |
| Freeze Point (°C)           |        |                  |        |        |        | -74    | -54    | -32    |        |        |             |        |        |        |
| Smoke Point (mm)            |        |                  |        |        |        | 23     | 18     | 13     |        |        |             |        |        |        |
| Cetane Index (D4737A)       |        |                  |        |        |        | 31     | 35     | 39     | 45     | 45     |             |        |        |        |
| Naphthalenes (% vol)        |        |                  |        |        |        | 0.1    | 3.4    | 8.5    | 10.5   |        |             |        |        |        |
| Aniline Point (°C)          |        |                  |        | 48.8   | 51.3   | 56.5   | 60.5   | 63.9   | 65.0   |        | 69.7        | 74.7   | 72.3   |        |
| Hydrogen (% wt)             | 12.8   | 16.5             | 15.1   | 14.0   | 13.8   | 13.1   | 13.0   | 12.7   | 12.3   |        | 11.9        | 11.6   | 11.8   |        |
| Total Wax (% wt)            | 4.0    |                  |        |        |        |        |        |        |        | 1.6    | 4.2         | 0.4    | 0.0    | 0.0    |
| C7 Asphaltene (% wt)        | 0.0    |                  |        |        |        |        |        |        |        | 0.1    | 0.0         | 0.0    | 0.4    |        |
| Micro Carbon Residue (% wt) | 2.9    |                  |        |        |        |        |        |        |        | 7.0    | 0.3         | 2.5    | 20.8   |        |
| Vanadium (ppm)              | 3.5    |                  |        |        |        |        |        |        |        | 8.5    | 0.0         | 0.0    | 27.0   |        |
| Nickel (ppm)                | 14.9   |                  |        |        |        |        |        |        |        | 36.4   | 0.0         | 0.0    | 115.5  |        |
| Iron (ppm)                  | 7.7    |                  |        |        |        |        |        |        |        | 18.7   | 0.0         | 0.0    | 59.5   |        |
| Sodium (ppm)                | 1.6    |                  |        |        |        |        |        |        |        |        |             |        |        |        |
| Mercury (ppb)               | 1.0    |                  |        |        |        |        |        |        |        |        |             |        |        |        |
| Arsenic (ppb)               | 134    |                  |        |        |        |        |        |        |        |        |             |        |        |        |

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## Yield Distribution



**Cumulative Volume % Distilled at 10 Degree C (TBP) Intervals**

|     | 0    | 10   | 20   | 30   | 40   | 50   | 60   | 70   | 80   | 90   |
|-----|------|------|------|------|------|------|------|------|------|------|
| 0   |      |      |      | 3.2  | 3.7  | 4.2  | 5.2  | 6.3  | 7.5  | 8.9  |
| 100 | 10.4 | 11.9 | 13.6 | 15.3 | 17.0 | 18.7 | 20.3 | 22.0 | 23.7 | 25.5 |
| 200 | 27.3 | 29.2 | 31.1 | 33.1 | 35.2 | 37.3 | 39.5 | 41.7 | 43.9 | 46.1 |
| 300 | 48.4 | 50.6 | 52.8 | 55.0 | 57.1 | 59.2 | 61.2 | 63.2 | 65.1 | 67.0 |
| 400 | 68.8 | 70.6 | 72.3 | 73.9 | 75.5 | 77.0 | 78.5 | 79.9 | 81.2 | 82.5 |
| 500 | 83.8 | 84.9 | 86.0 | 87.0 | 88.0 | 88.9 | 89.8 | 90.6 | 91.3 | 92.1 |