

**DRAUGEN - SUMMARY OF MAJOR CUTS**

|                                    | Whole<br>Crude | Light<br>Naphtha | Medium<br>Naphtha | Heavy<br>Naphtha | Kero    | Atm<br>Gas Oil | Light<br>VGO | Heavy<br>VGO | Vacuum<br>Resid | Atm<br>Resid |
|------------------------------------|----------------|------------------|-------------------|------------------|---------|----------------|--------------|--------------|-----------------|--------------|
| TBP Temp At Start, °C              | Start          | 10               | 80                | 150              | 200     | 260            | 340          | 450          | 570             | 340          |
| TBP Temp At End, °C                | End            | 80               | 150               | 200              | 260     | 340            | 450          | 570          | End             | End          |
| TBP Temp At Start, °F              | Start          | 55               | 175               | 300              | 400     | 500            | 650          | 850          | 1050            | 650          |
| TBP Temp At End, °F                | End            | 175              | 300               | 400              | 500     | 650            | 850          | 1050         | End             | End          |
| Yield at Start, vol%               |                | 4.0              | 14.1              | 32.3             | 40.6    | 50.4           | 67.8         | 83.4         | 94.5            | 67.8         |
| Yield at End, vol%                 |                | 14.1             | 32.3              | 40.6             | 50.4    | 67.8           | 83.4         | 94.5         | 100.0           | 100.0        |
| Yield of Cut (wt% of Crude)        |                | 8.1              | 16.7              | 8.1              | 10.0    | 18.3           | 17.1         | 12.3         | 6.5             | 36.0         |
| Yield of Cut (vol% of Crude)       |                | 10.2             | 18.1              | 8.3              | 9.8     | 17.4           | 15.7         | 11.0         | 5.5             | 32.2         |
| Gravity, °API                      | 40.8           | 83.1             | 55.2              | 46.0             | 37.6    | 32.0           | 26.0         | 22.2         | 14.7            | 22.7         |
| Specific Gravity                   | 0.8213         | 0.6594           | 0.7578            | 0.7974           | 0.8370  | 0.8656         | 0.8983       | 0.9205       | 0.9680          | 0.9179       |
| Sulfur, wt%                        | 0.14           | 0.00             | 0.00              | 0.04             | 0.05    | 0.10           | 0.22         | 0.31         | 0.60            | 0.32         |
| Mercaptan Sulfur, ppm              | 5              | 3                | 3                 | 9                | 14      | 10             | 4            | 1            |                 | 2            |
| Nitrogen, ppm                      | 646            |                  | 105               | 111              | 115     | 149            | 596          | 1400         | 4741            | 1624         |
| Hydrogen, wt%                      | 13.7           | 16.2             | 14.6              | 14.1             | 13.7    | 13.4           | 12.9         | 12.3         | 11.4            | 12.4         |
| Viscosity @ 40 °C (104 °F), cSt    | 2.49           |                  |                   | 1.05             | 1.95    | 4.76           | 25.5         | 179          | 1.28E+05        | 128          |
| Viscosity @ 50 °C (122 °F), cSt    | 2.03           |                  |                   | 0.936            | 1.64    | 3.72           | 17.3         | 96.3         | 32200           | 74.1         |
| Viscosity @ 100 °C (212 °F), cSt   | 0.946          |                  |                   | 0.603            | 0.868   | 1.52           | 4.52         | 12.7         | 540             | 11.9         |
| Viscosity @ 135 °C (275 °F), cSt   | 0.672          |                  |                   | 0.483            | 0.637   | 1.01           | 2.49         | 5.45         | 99.6            | 5.37         |
| Freeze Point, °C                   |                |                  |                   | -75.000          | -45.000 | -6.000         | 31.0         |              |                 |              |
| Freeze Point, °F                   |                |                  |                   | -103             | -49     | 22             | 88           |              |                 |              |
| Pour Point, °C                     | -15            |                  |                   | -74              | -46     | -11            | 28           | 42           | 46              | 42           |
| Pour Point, °F                     | 5              |                  |                   | -102             | -50     | 13             | 83           | 107          | 114             | 107          |
| Smoke Point, mm (ASTM)             |                |                  |                   | 23               | 20      | 16             | 12           |              |                 |              |
| Aniline Point, °C                  |                |                  |                   | 51               | 59      | 69             | 84           | 93           | 96              | 89           |
| Aniline Point, °F                  |                |                  |                   | 124              | 138     | 157            | 183          | 200          | 205             | 193          |
| Total Acid Number, mg KOH/g        | 0.09           | 0.0              | 0.0               | 0.0              | 0.0     | 0.0            | 0.1          | 0.2          | 0.1             | 0.1          |
| Cetane Index, ASTM D976            |                |                  |                   | 35               | 41      | 47             |              |              |                 |              |
| Diesel Index                       |                |                  |                   | 57               | 52      | 50             | 48           | 44           | 30              | 44           |
| Characterization Factor (K Factor) | 11.9           | 12.8             | 11.6              | 11.7             | 11.6    | 11.7           | 11.8         | 12.1         | 12.1            | 12.0         |
| Research Octane Number, Clear      |                | 66.9             | 60.7              | 40.8             |         |                |              |              |                 |              |
| Motor Octane Number, Clear         |                | 65.5             | 58.7              |                  |         |                |              |              |                 |              |
| Paraffins, vol%                    |                | 86.9             | 40.0              | 42.9             | 32.0    | 30.2           | 35.5         |              |                 |              |
| Naphthenes, vol%                   |                | 13.1             | 53.2              | 38.3             | 45.3    | 41.7           | 35.3         |              |                 |              |
| Aromatics, vol%                    |                | 0.0              | 6.8               | 18.0             | 19.5    | 27.5           | 27.7         |              |                 |              |
| Thiophenes, vol%                   |                |                  |                   | 0.8              | 3.2     | 0.6            | 1.4          |              |                 |              |
| Molecular Weight                   | 197            | 102              | 111               | 145              | 173     | 221            | 310          | 459          | 755             | 394          |
| Gross Heating Value, MM BTU/bbl    | 5.70           | 4.82             | 5.35              | 5.57             | 5.77    | 5.92           | 6.08         | 6.20         | 6.40            | 6.18         |
| Gross Heating Value, kcal/kg       | 11030          | 11580            | 11210             | 11080            | 10930   | 10850          | 10750        | 10690        | 10480           | 10690        |
| Gross Heating Value, MJ/kg         | 46.2           | 48.5             | 46.9              | 46.4             | 45.7    | 45.4           | 45.0         | 44.7         | 43.9            | 44.7         |
| Heptane Asphaltenes, wt%           | 0.1            |                  |                   |                  |         |                |              |              | 1.1             | 0.2          |
| Micro Carbon Residue, wt%          | 1.0            |                  |                   |                  |         |                |              |              | 15.8            | 2.9          |
| Ramsbottom Carbon, wt%             | 1.0            |                  |                   |                  |         |                |              |              | 15.3            | 2.8          |
| Vanadium, ppm                      | 1              |                  |                   |                  |         |                |              |              | 15              | 3            |
| Nickel, ppm                        | 1              |                  |                   |                  |         |                |              |              | 16              | 3            |
| Iron, ppm                          | 0              |                  |                   |                  |         |                |              |              | 1               | 0            |

**DRAUGEN - DISTILLATION SUMMARY**

|                              | Whole<br>Crude | Light<br>Naphtha | Medium<br>Naphtha | Heavy<br>Naphtha | Kero | Atm<br>Gas Oil | Light<br>VGO | Heavy<br>VGO | Vacuum<br>Resid | Atm<br>Resid |
|------------------------------|----------------|------------------|-------------------|------------------|------|----------------|--------------|--------------|-----------------|--------------|
| TBP Temp At Start, °C        |                | 10               | 80                | 150              | 200  | 260            | 340          | 450          | 570             | 340          |
| TBP Temp At End, °C          |                | 80               | 150               | 200              | 260  | 340            | 450          | 570          | End             | End          |
| TBP Temp At Start, °F        |                | 55               | 175               | 300              | 400  | 500            | 650          | 850          | 1050            | 650          |
| TBP Temp At End, °F          |                | 175              | 300               | 400              | 500  | 650            | 850          | 1050         | End             | End          |
| Yield at Start, vol%         |                | 4.0              | 14.1              | 32.3             | 40.6 | 50.4           | 67.8         | 83.4         | 94.5            | 67.8         |
| Yield at End, vol%           |                | 14.1             | 32.3              | 40.6             | 50.4 | 67.8           | 83.4         | 94.5         | 100.0           | 100.0        |
| Yield of Cut (wt% of Crude)  |                | 8.1              | 16.7              | 8.1              | 10.0 | 18.3           | 17.1         | 12.3         | 6.5             | 36.0         |
| Yield of Cut (vol% of Crude) |                | 10.2             | 18.1              | 8.3              | 9.8  | 17.4           | 15.7         | 11.0         | 5.5             | 32.2         |
| TBP Distillation, vol%       | °C Start       | 10               | 80                | 140              | 200  | 260            | 340          | 450          | 570             | 340          |
|                              | °C 5%          | 24               | 81                | 150              | 207  | 264            | 348          | 459          | 572             | 352          |
|                              | °C 10%         | 28               | 90                | 154              | 211  | 268            | 352          | 463          | 577             | 362          |
|                              | °C 30%         | 36               | 99                | 172              | 223  | 284            | 371          | 479          | 604             | 407          |
|                              | °C 50%         | 59               | 109               | 180              | 234  | 301            | 393          | 496          | 638             | 458          |
|                              | °C 70%         | 66               | 121               | 189              | 245  | 317            | 418          | 517          | 679             | 509          |
|                              | °C 90%         | 71               | 138               | 199              | 255  | 334            | 443          | 546          | 743             | 623          |
|                              | °C 95%         | 72               | 139               | 202              | 258  | 338            | 449          | 554          | 751             | 693          |
|                              | °C End         | 80               | 150               | 210              | 260  | 340            | 450          | 570          | End             | End          |
| TBP Distillation, vol%       | °F Start       | 50               | 175               | 280              | 400  | 500            | 650          | 850          | 1050            | 650          |
|                              | °F 5%          | 75               | 177               | 302              | 405  | 508            | 658          | 858          | 1061            | 665          |
|                              | °F 10%         | 83               | 194               | 310              | 411  | 515            | 666          | 865          | 1071            | 683          |
|                              | °F 30%         | 96               | 210               | 341              | 433  | 544            | 700          | 894          | 1120            | 765          |
|                              | °F 50%         | 138              | 228               | 356              | 454  | 573            | 739          | 925          | 1180            | 856          |
|                              | °F 70%         | 150              | 250               | 373              | 473  | 602            | 784          | 962          | 1254            | 948          |
|                              | °F 90%         | 159              | 280               | 391              | 491  | 633            | 829          | 1014         | 1370            | 1154         |
|                              | °F 95%         | 162              | 283               | 395              | 496  | 641            | 841          | 1029         | 1384            | 1280         |
|                              | °F End         | 175              | 300               | 410              | 500  | 650            | 850          | 1050         | End             | End          |