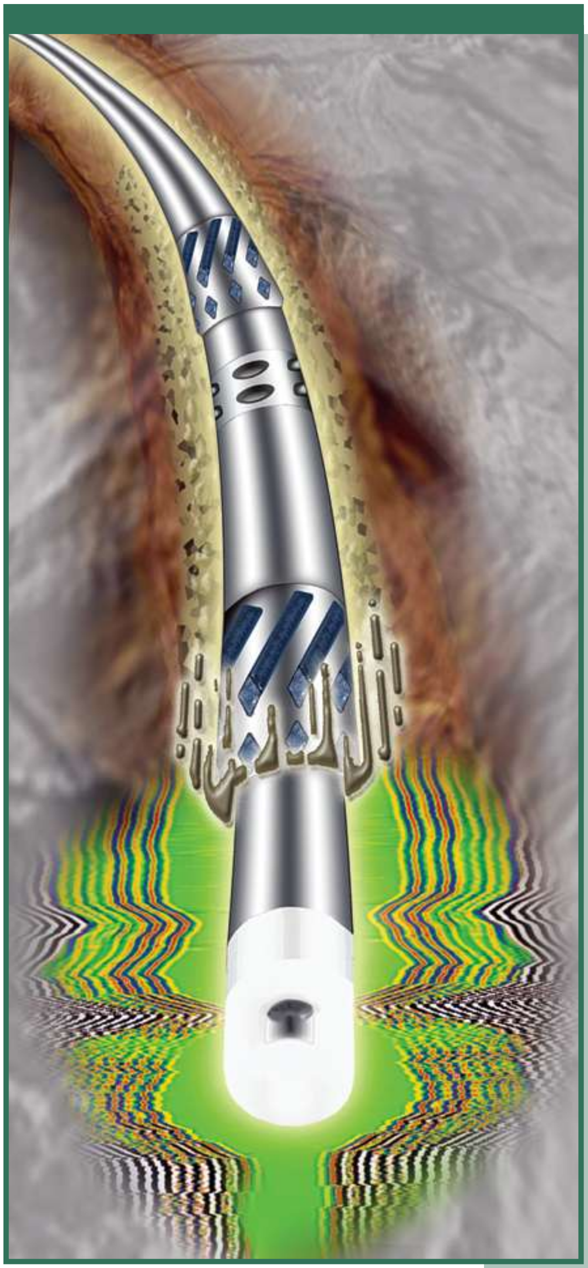
Weatherford®

Log Interpretation Charts Compact™ Tool Series



Contents

Borehole Environment and Formation Parameters

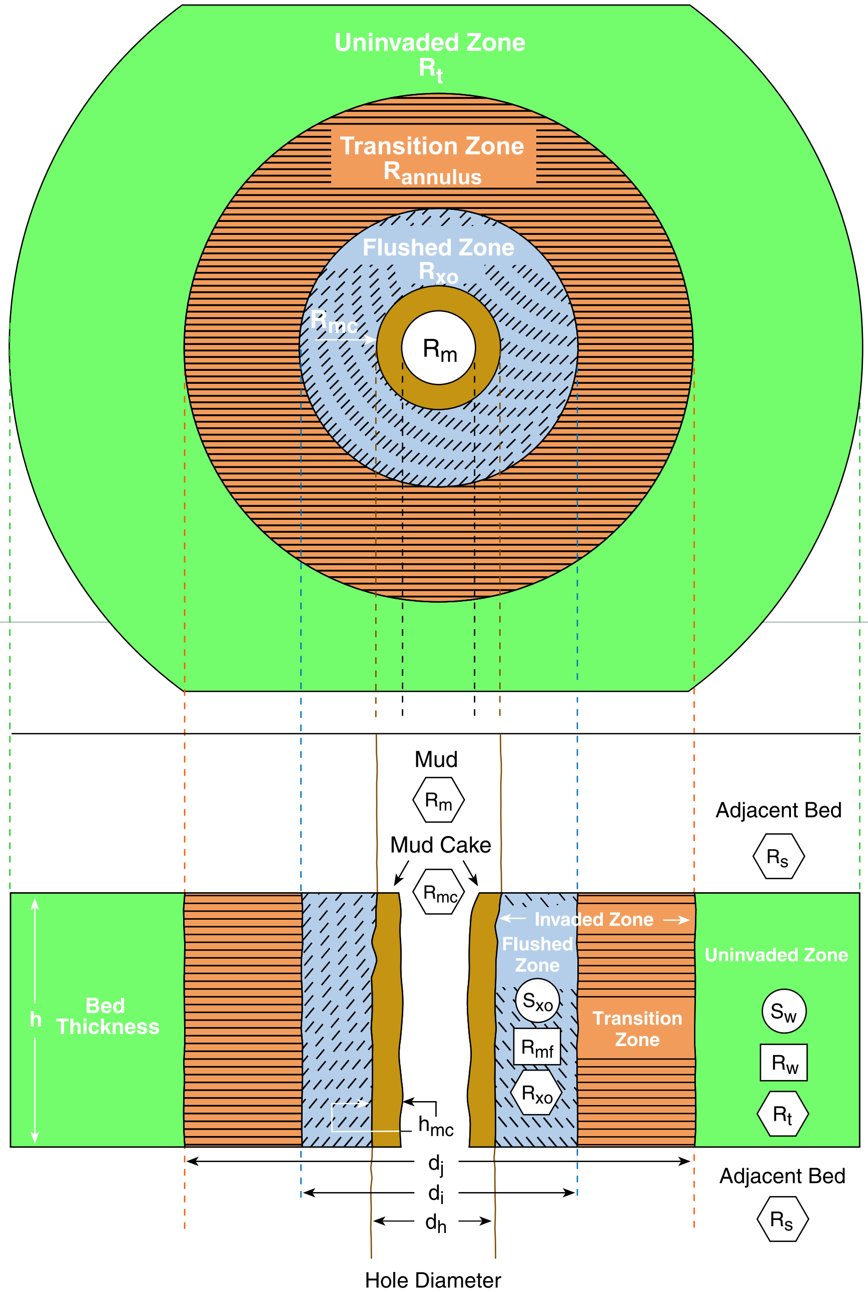
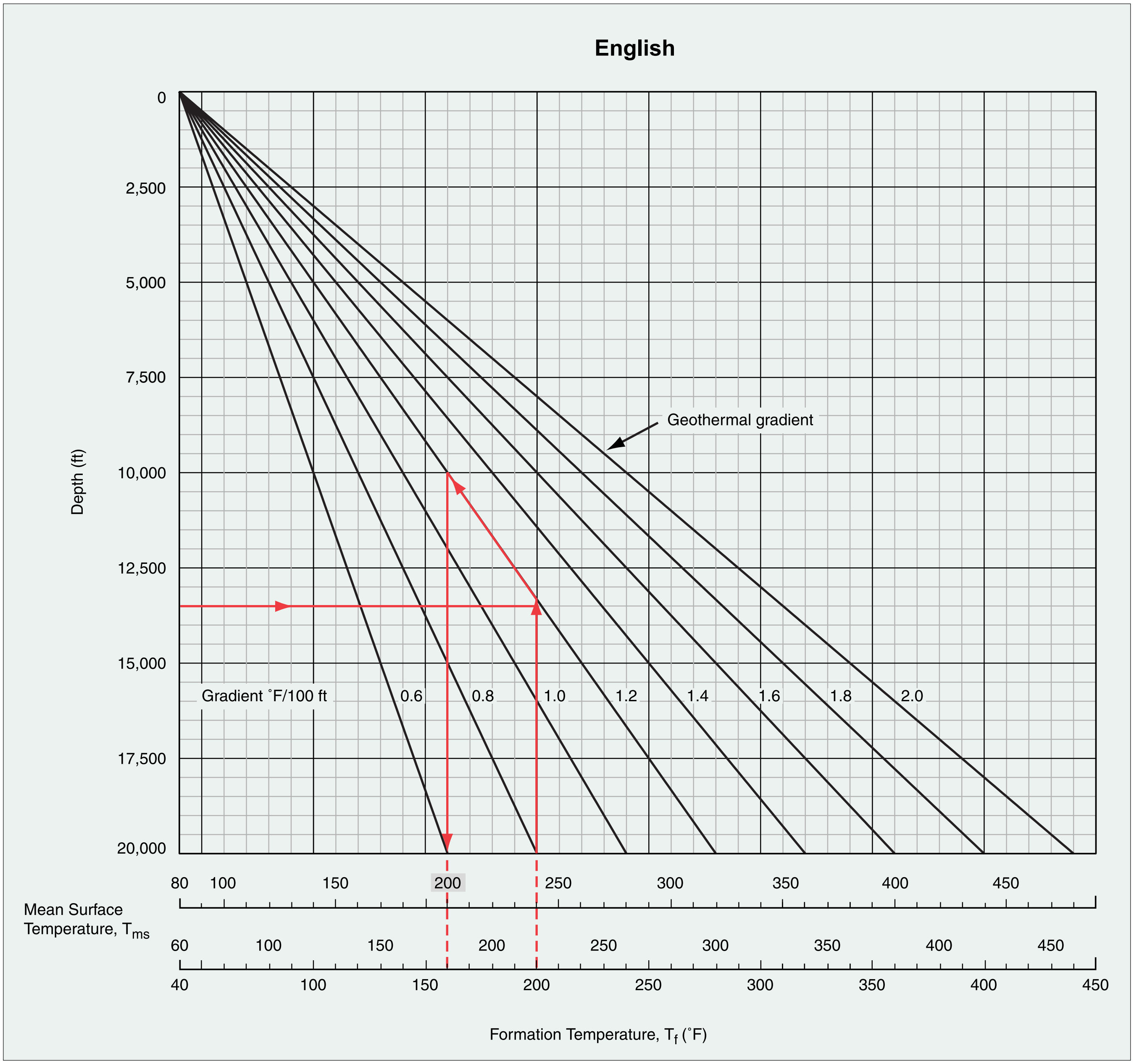


Chart Gen-1

Estimation of Formation Temperature



Example : Given the following conditions: formation temperature = 220˚F, mean surface temperature = 60˚F, total well depth = 13,500 ft.

What is the geothermal gradient and formation temperature at 10,000 ft?

Enter y-axis at 13,500 ft, draw horizontal line.

Enter the x-axis at 220˚F (T_{ms} = 60), and draw a vertical line and intersect the horizontal line at 1.2˚F/100 ft.

Follow the 1.2˚F/100 ft geothermal gradient line to 10,000 ft, and draw a vertical line down to intersect at 180˚F.

Chart Gen-2

Estimation of Formation Temperature

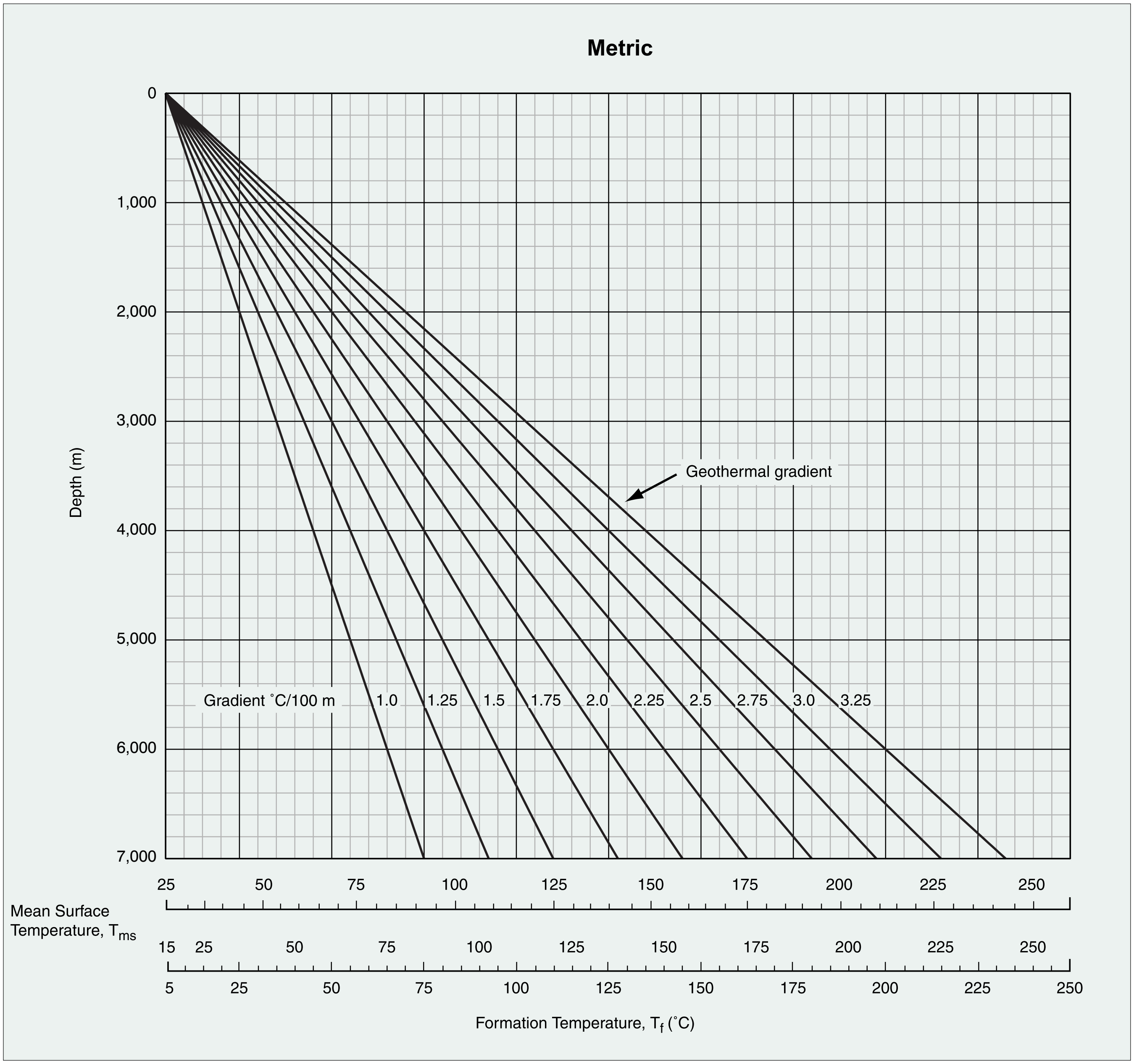
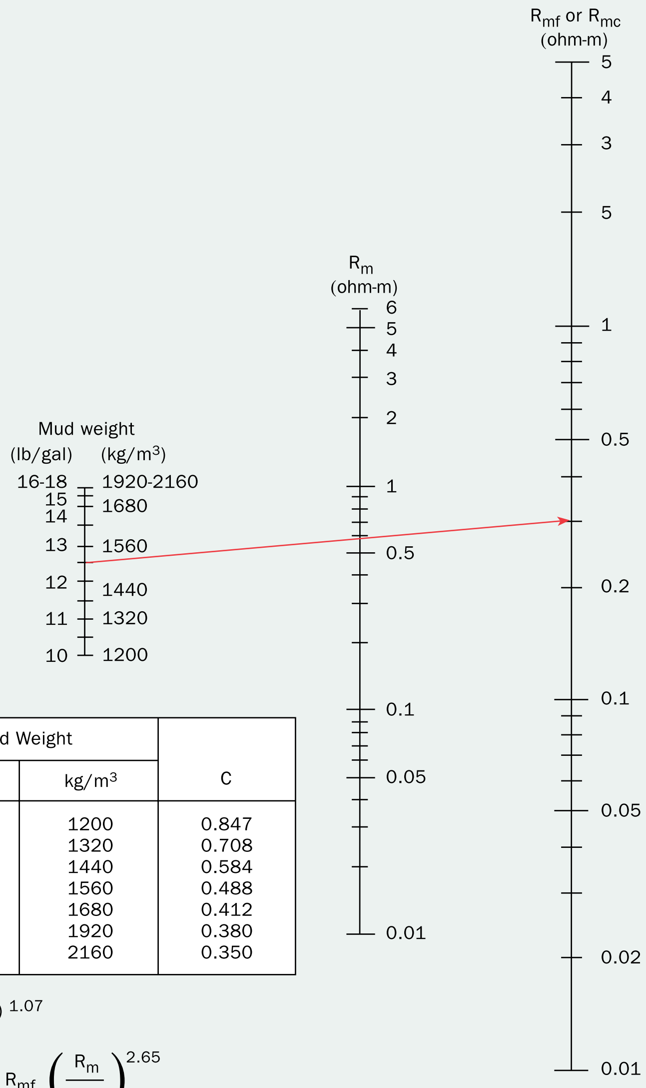


Chart Gen-2(m)

Estimation of R_{mf} and R_{mfe}



Mud Weight		C
lb/gal	kg/m³	
10	1200	0.847
11	1320	0.708
12	1440	0.584
12	1560	0.488
14	1680	0.412
16	1920	0.380
18	2160	0.350

$$R_{mf} = C(R_m)^{1.07}$$

$$R_{mc} = 0.69\, R_{mf} \left(\frac{R_m}{R_{mf}} \right)^{2.65}$$

Example

Given: R_m = 0.6 ohm-m at 180˚F mud

Mud weight = 12.5 lb/gal

Determine: R_{mf} and R_{mc}

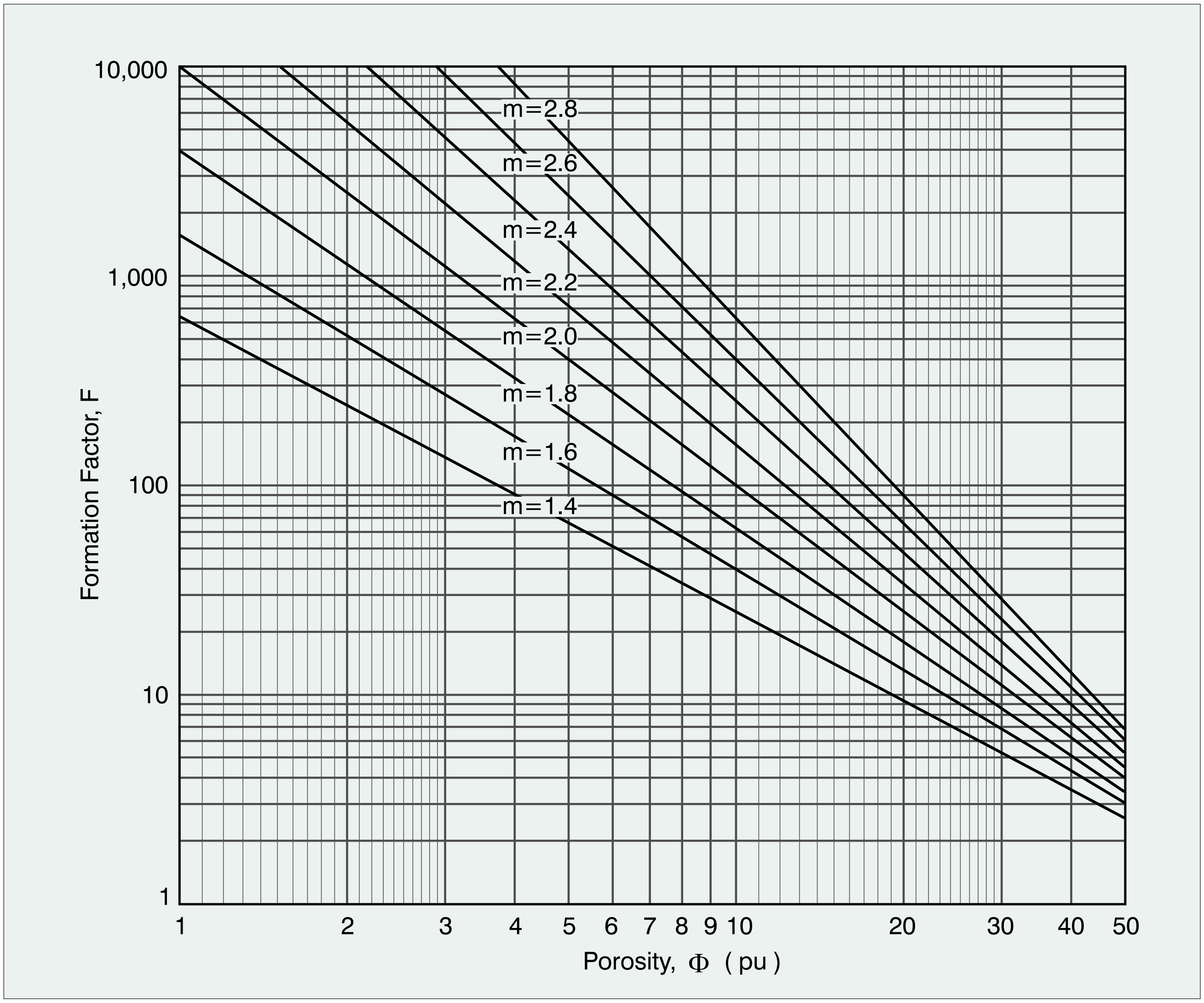
R_{mf} = 0.31 ohm-m at 180˚F

R_{mc} = 1.23 ohm-m at 180˚F (from equation)

Note: This chart may be used when the measured values of R_{mf} and R_{mc} are not available but does not apply to lignosulfonate muds.

Chart Gen-3

Porosity and Formation Factor



Formation factor, F, is defined as R_o/R_w, where R_o is the resistivity of a formation fully saturated with water of resistivity Rw. It is related to formation porosity Φ via a number of empirical relationships of the form

$$F = \frac{a}{\Phi^m}$$

where m is the cementation exponent and **a** is sometimes called the Archie constant. F is used to compute water saturation in the Archie equation: $S_w{}^n = FR_w/R_t$

The chart allows F to be generated from porosity for values of m between 1.4 and 2.8 assuming **a** to be 1.0. For soft formations, the Humble formula is sometimes used, in which **a** is 0.62 and m is 2.15.

Chart Gen-5

Chart Gen-7 is used to estimate the resistivity of NaCl equivalent solutions when the solids concentration is known, and also to convert resistivity from one temperature to another.

It is based on the Hilchie equation:

$$R(T) = R(1)\ [T(1) + x] / (T+x)$$

where $$x = 10^{-(0.340396 \log_{10} R(1)\ -\ 0.641427)}$$

and R(T) is the water resistivity at temperature T in degrees F and R(1) is the initial water resistivity at initial temperature T(1) degrees F.

For solutions other than NaCl use the multipliers in **Gen-6** to obtain equivalent concentrations. Then:

$$\text{Total NaCl equivalent} = \sum_{i=n}^{i=1} K_i\,(\text{solids concentration})$$

where n is the number of components. The multiplier for NaCl is 1.0

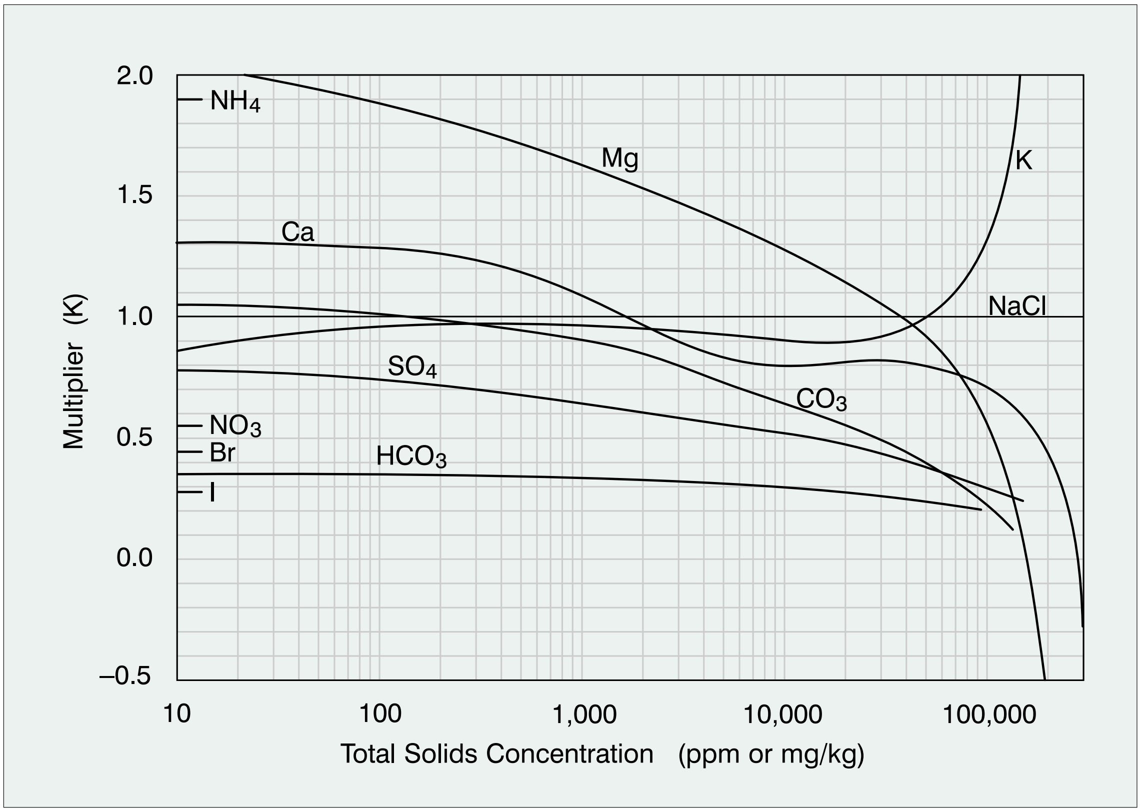


Chart Gen-6

Resistivity of NaCl Solutions

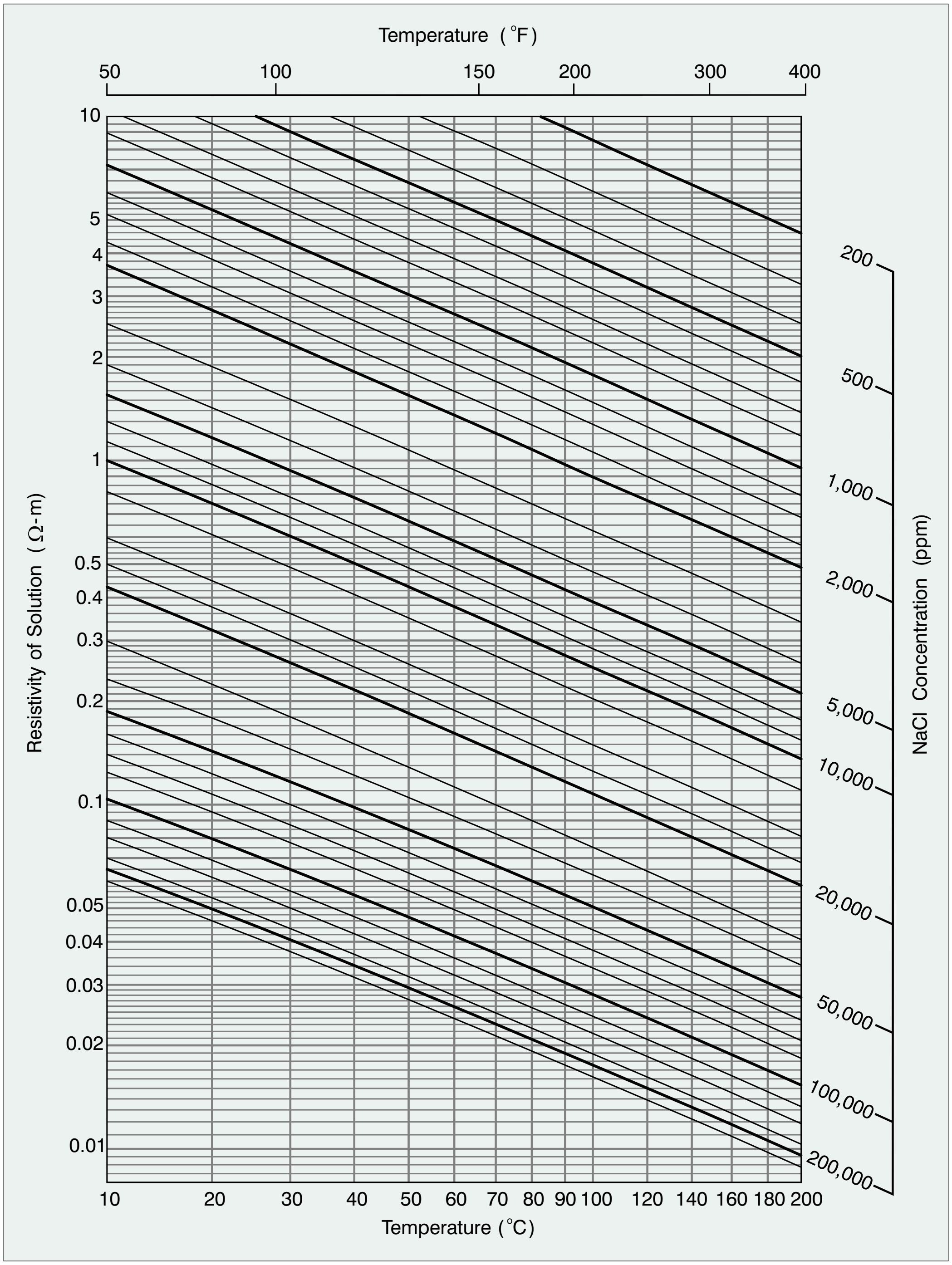
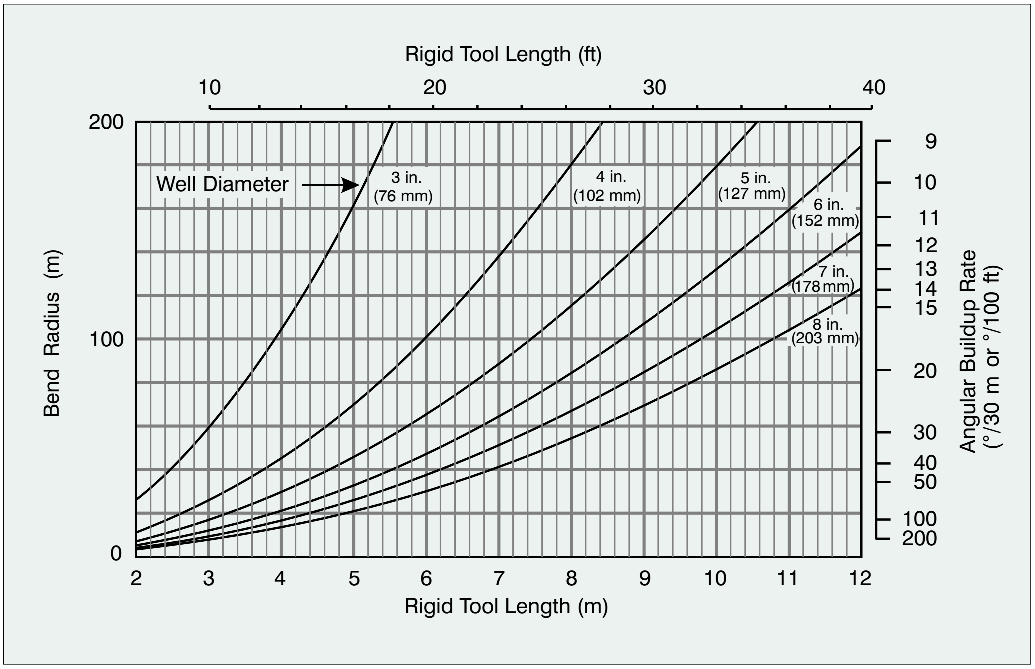
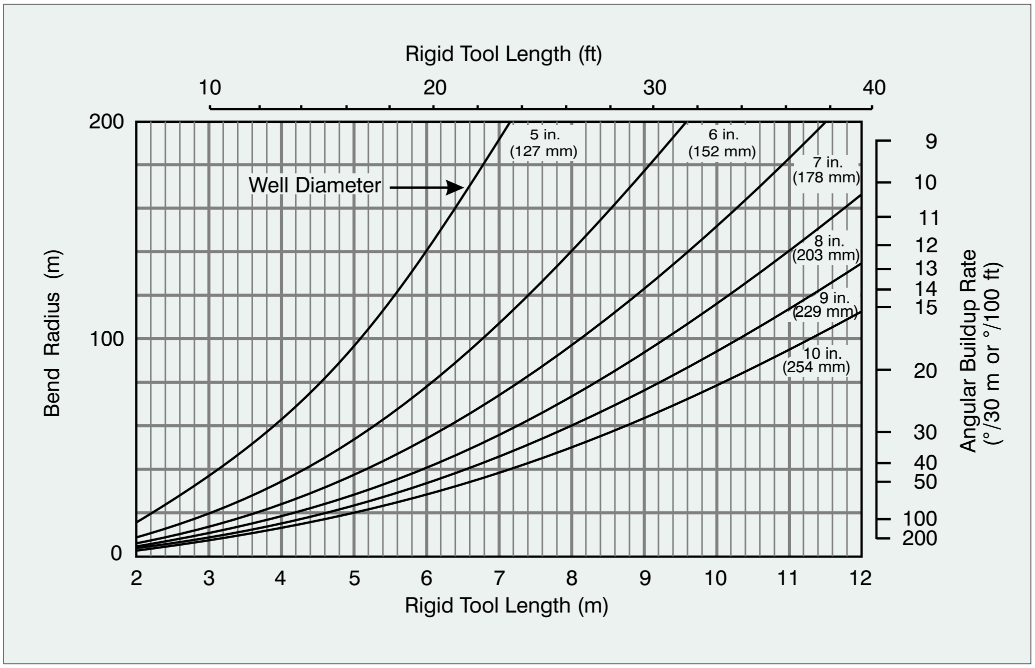


Chart Gen-7

Compact™ 2 1/4-in. (57-mm) Tools



Conventional 3 3/4-in. (95-mm) Tools



For a given tool diameter t, the maximum rigid tool length L that will traverse a well of diameter d and bend radius R is given by:

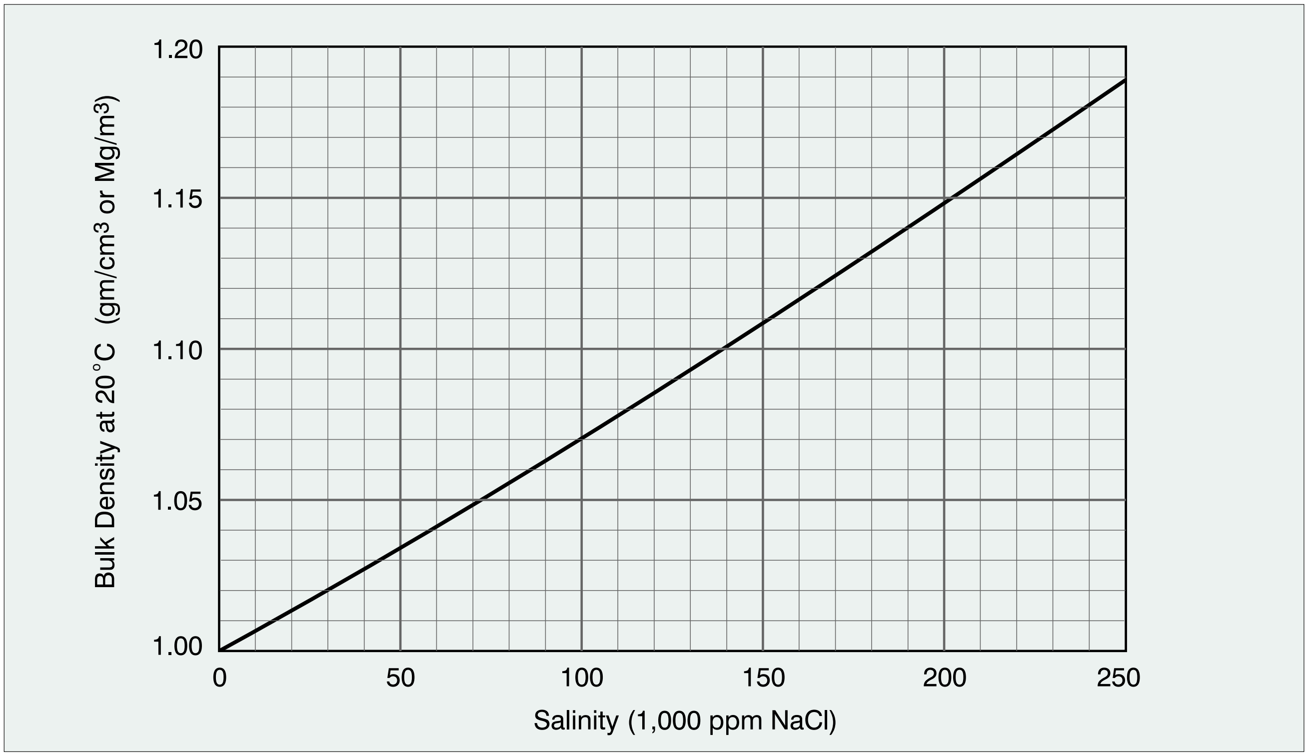
$$L = 2\{(R+d)^2 - (R+t)^2\}^{1/2}$$

Angular build rate (° / 30 m) = 1,718/R   R in meters)

Chart Gen-8

Density and Pe Values of Saltwater Solutions

Applicability: NaCl solutions at 68°F (20°C).



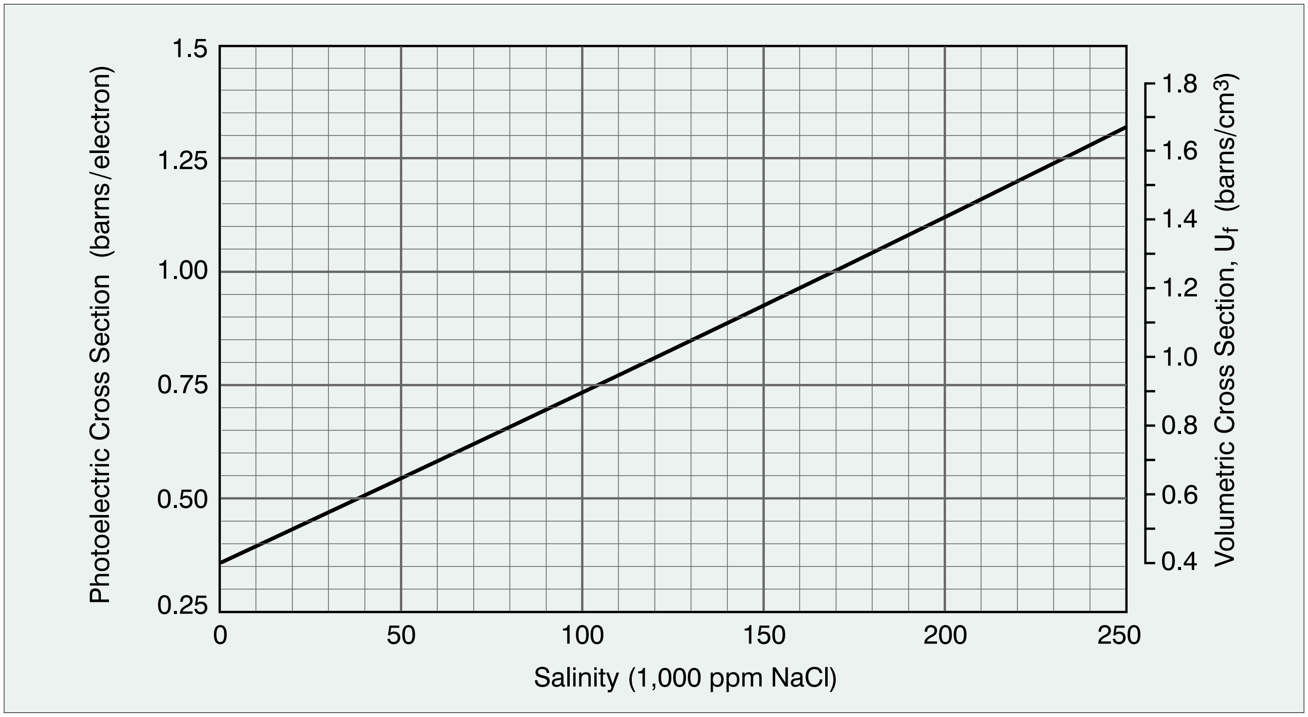


Chart Gen-9

Capture Cross Sections for Water and Hydrocarbons

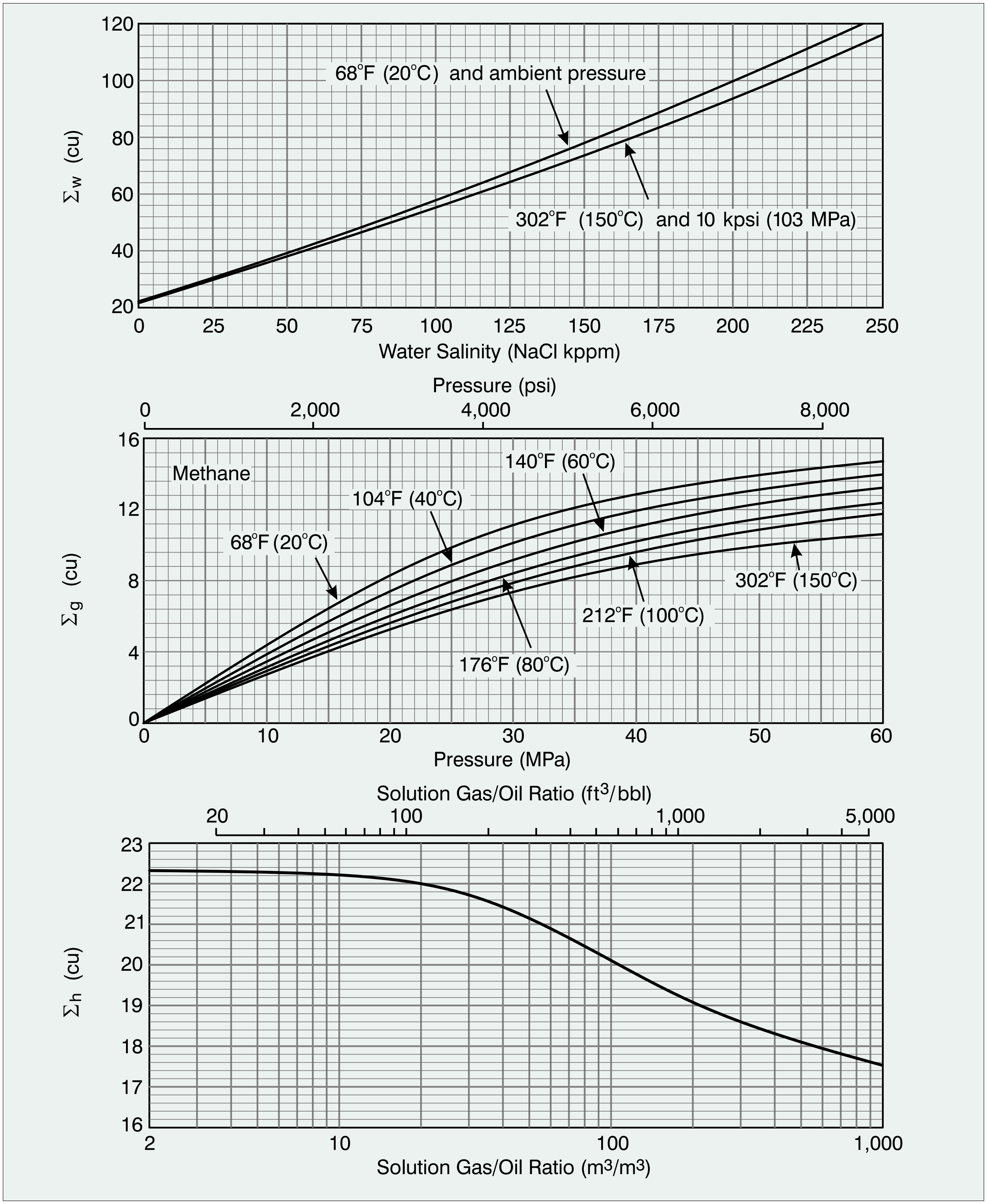
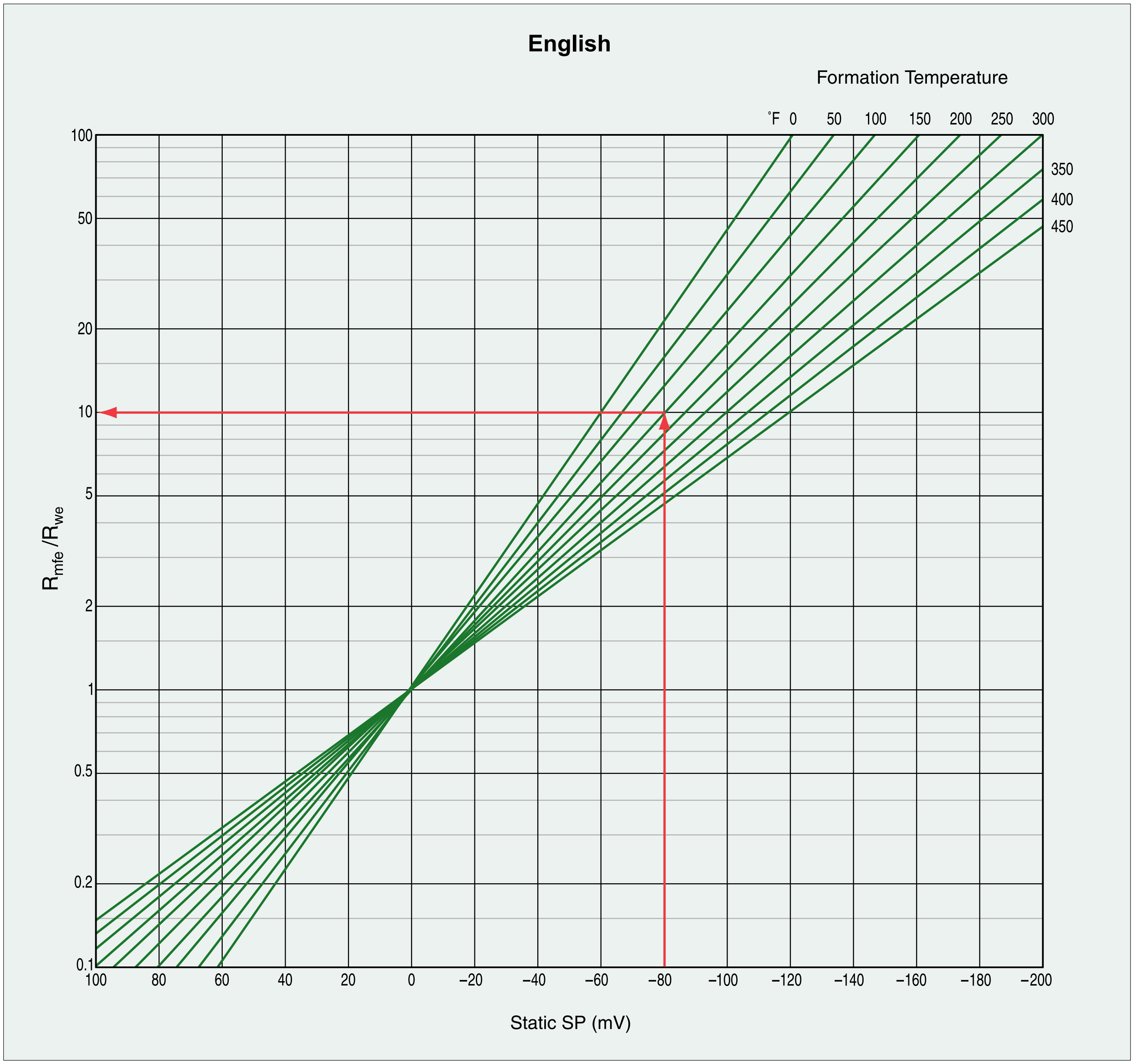


Chart Gen-10

R_{we} Determination From Static SP



Given: SSP = −80 mV, T_f = 150˚F, R_{mf} = 0.6 ohm-m

Determine: R_{we}

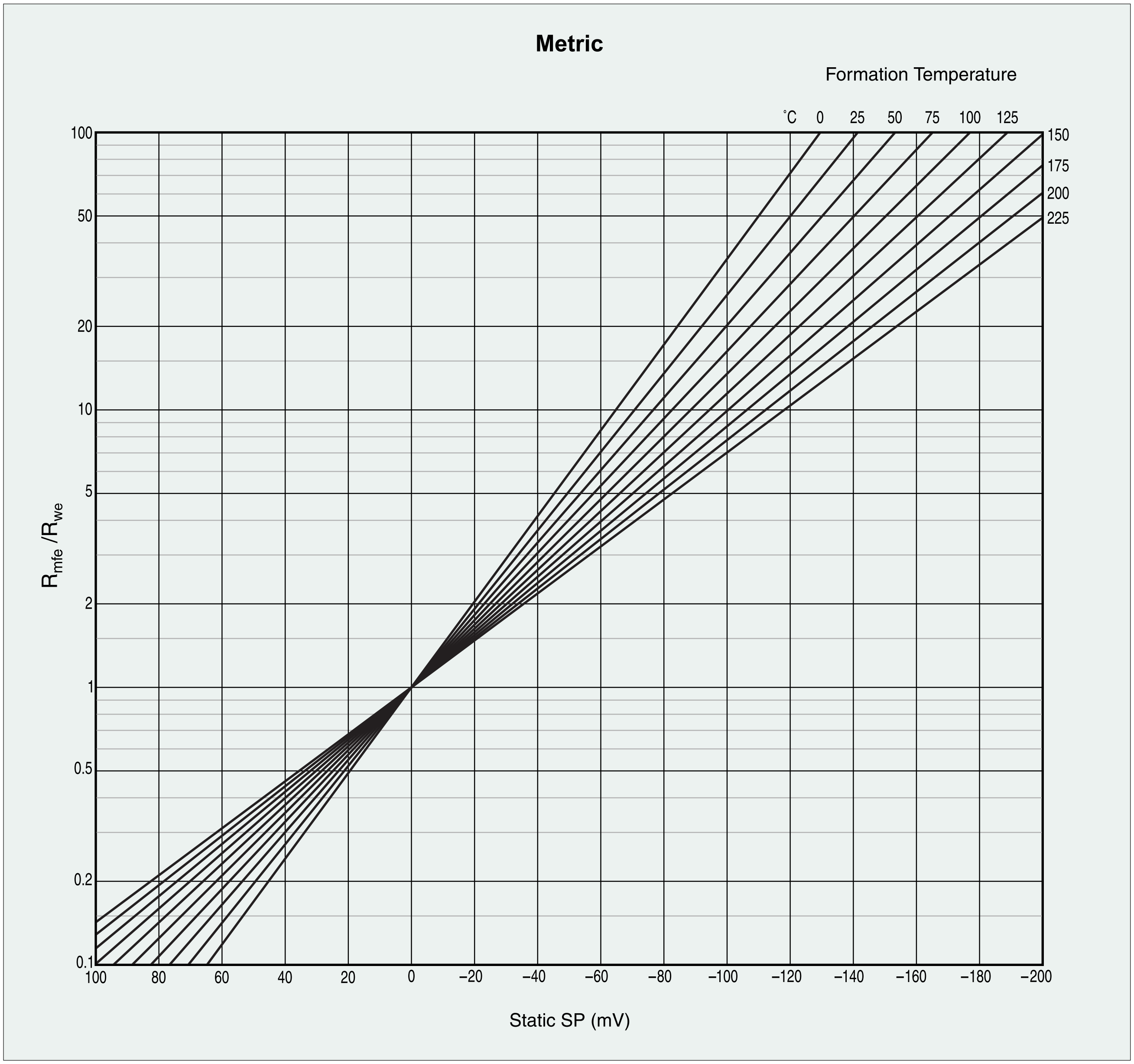
(Note: If $R_{mf} > 0.1$ at 77˚F (25˚C), use $R_{mfe} = 0.85\ R_{mf}$

Solution: R_{mfe}/R_{we} = 10.0, R_{we} = 0.06 ohm-m

$$SP = -70.7 \left(\frac{460 + ˚F}{537}\right) \log \frac{R_{mfe}}{R_{we}}$$

Chart Sp-2

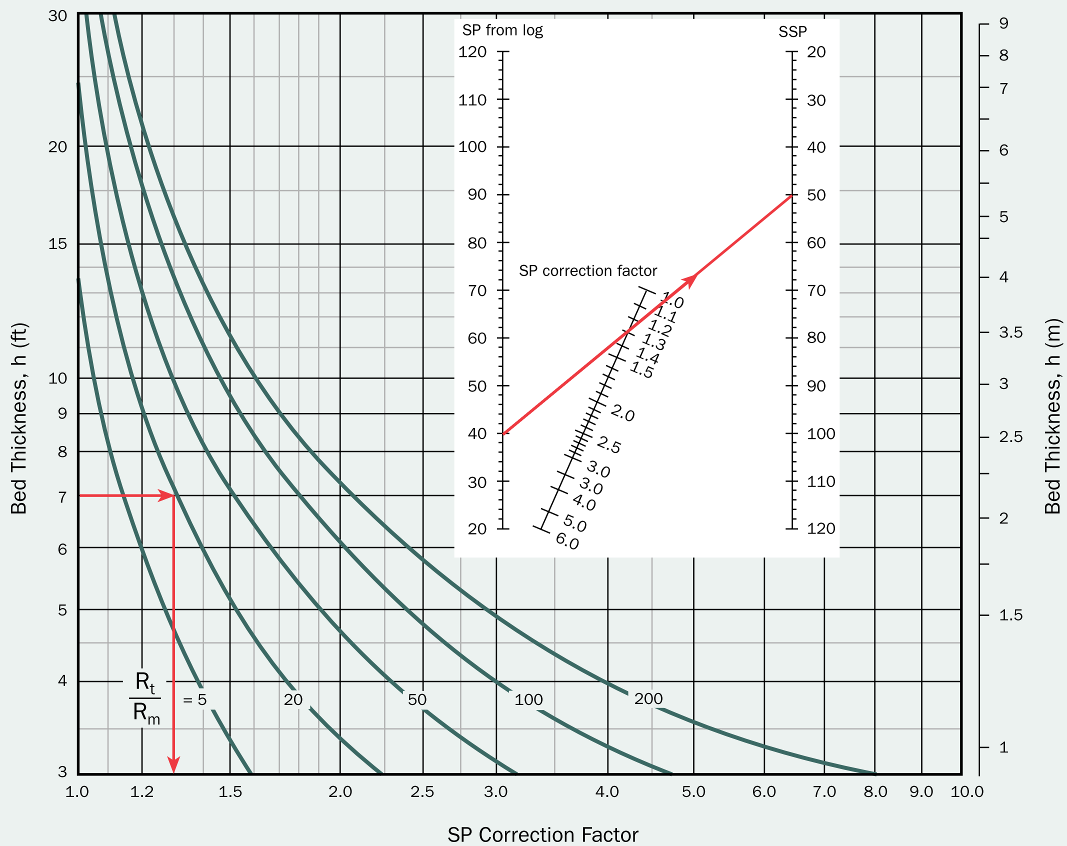
R_{we} Determination From Static SP



$$SP = -70.7\left(\frac{273 + ˚C}{298}\right)\log\frac{R_{mfe}}{R_{we}}$$

Chart Sp-2(m)

SP Bed Thickness Correction



Given: SP(log) = −40 mV, h = 7 ft, R_t = 16 ohm-m, R_m = 0.8 ohm-m

Solution: Bed thickness = 7 ft, R_t/R_m = 20, SP correction factor = 1.3

Nomograph: SP(log) = −40 mV, SP correction factor = 1.3; SSP = −52 mV

Chart Sp-3b

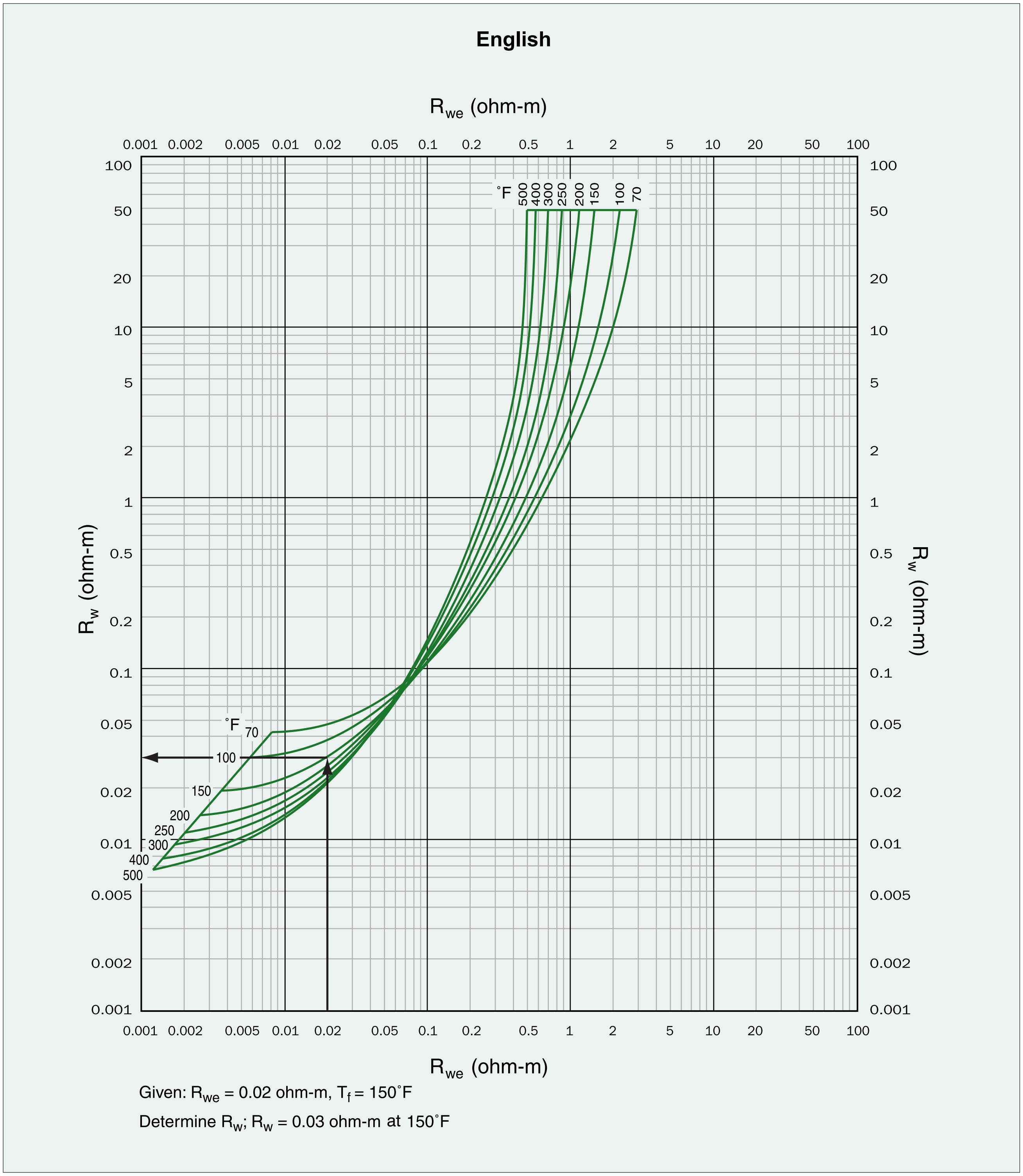

English
Rwe (ohm-m)
0.001 0.002 0.005 0.01 0.02 0.05 0.1 0.2 0.5 1 2 5 10 20 50 100
Rw (ohm-m)
100 50 20 10 5 2 1 0.5 0.2 0.1 0.05 0.02 0.01 0.005 0.002 0.001
˚F
500 400 300 250 200 150 100 70
˚F
70
100
150
200
250
300
400
500
Given: Rwe = 0.02 ohm-m, Tf = 150˚F
Determine Rw; Rw = 0.03 ohm-m at 150˚F

Chart Sp-3

R_w vs. R_{we}

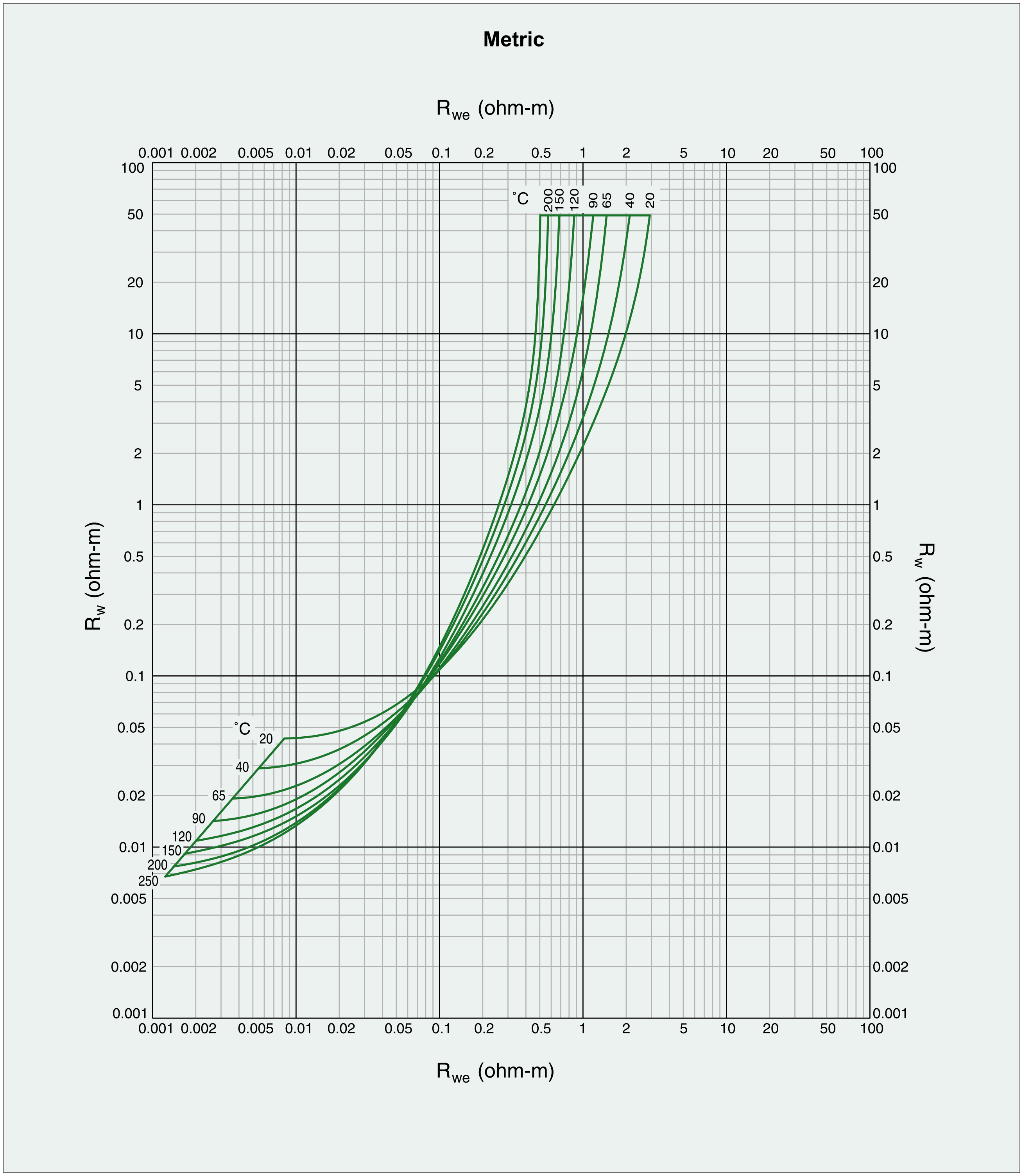
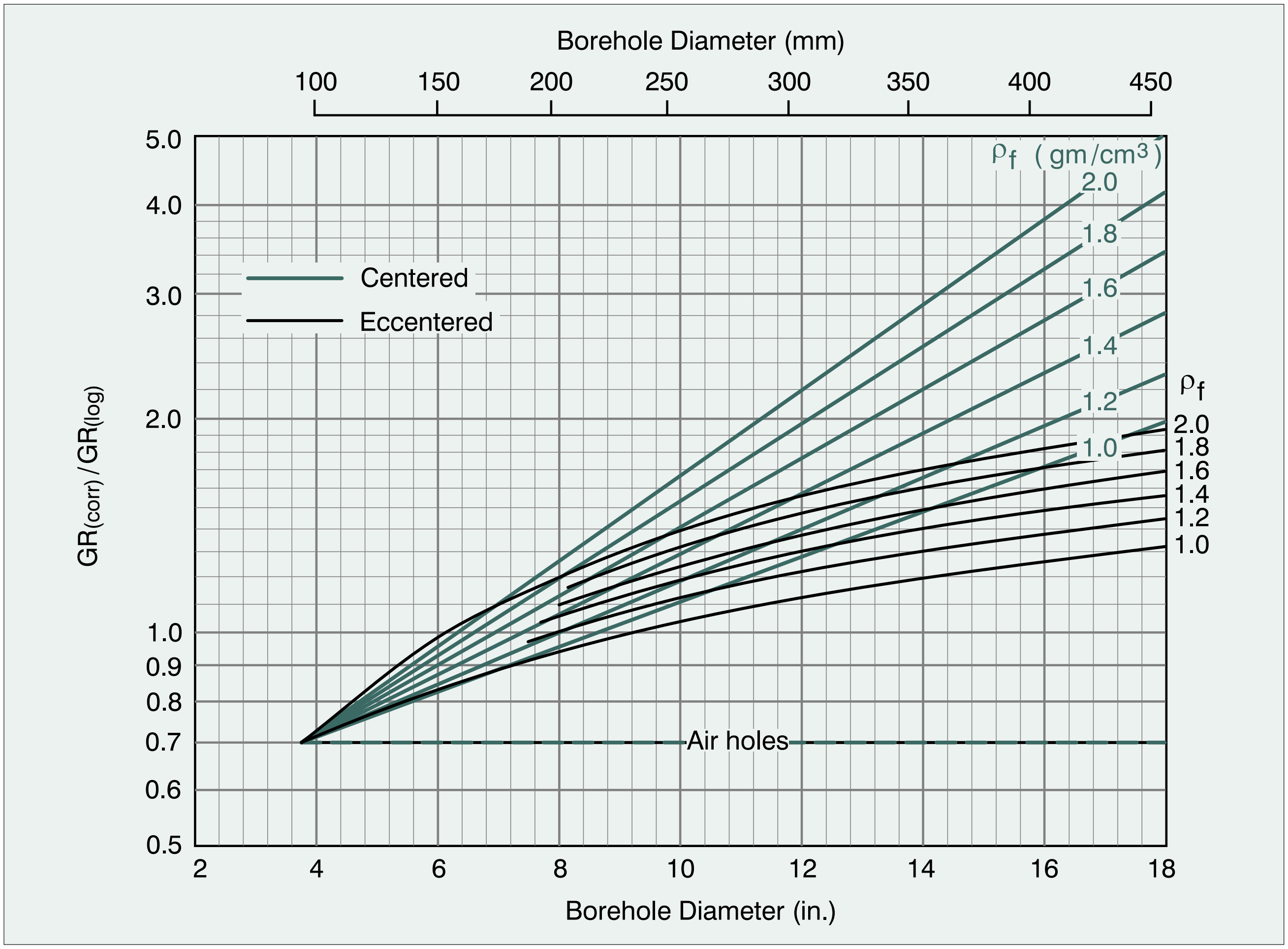


Chart Sp-3(m)

Compact™ Spectral Gamma Ray Borehole Correction

Applicability: *Compact* spectral gamma (MSG) tools. KCl-free muds.



Use this chart to correct the gamma ray response from MSG series tools for the effects of borehole size and mud weight.

Standard conditions are for eccentered tools in 8-in. (203-mm) diameter wells with KCl-free mud of density 1.2gm/cm³. Corrections for non-standard conditions are approximated by:

$$GR_{(corr)}/GR_{(log)} = 0.7\,e^{0.06978\,d\,\rho_f} \quad \text{for centered tools}$$

$$GR_{(corr)}/GR_{(log)} = \rho_f\,(1-e^{-0.06753\,d}) + 0.7 \quad \text{for eccentered tools}$$

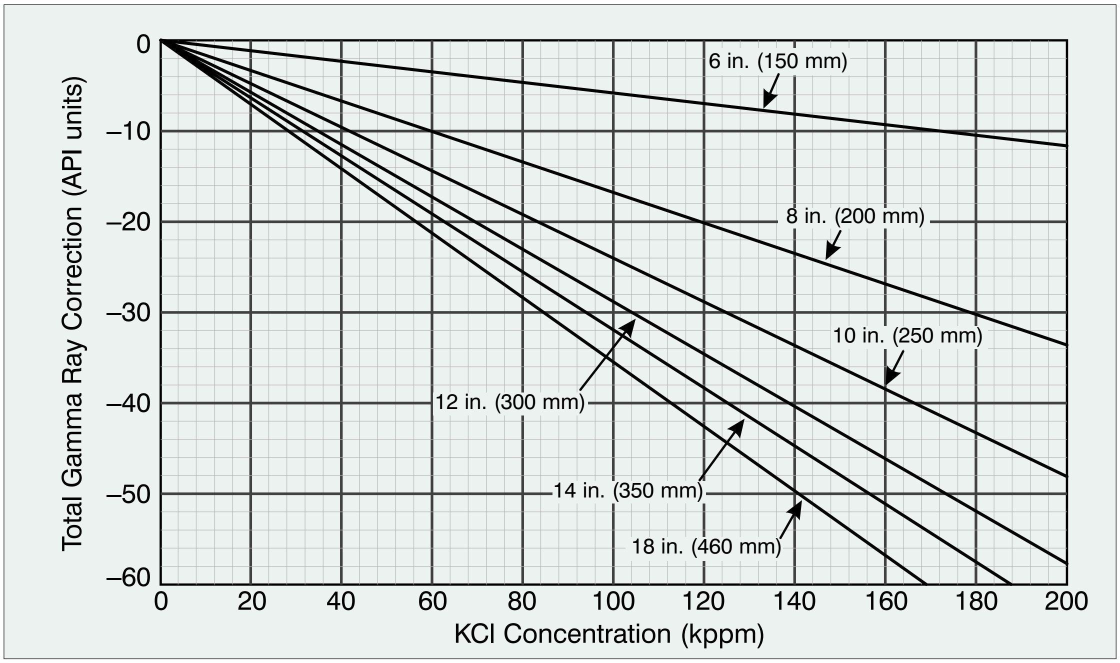
where d = (caliper in inches – 3.74)

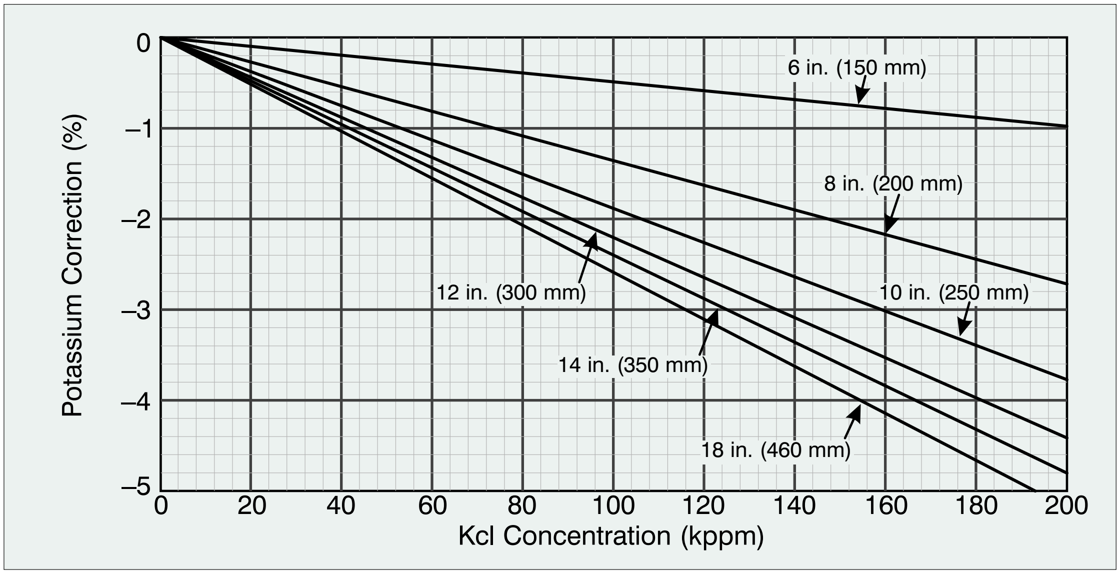
ρ_f = mud density in g/cm³

Chart Gam-1

Compact™ Spectral Gamma Ray KCl Mud Correction

Applicability: *Compact* spectral gamma (MSG) tools, eccentered.





Use this chart to correct spectral gamma ray logs for the effects of KCl drilling muds.

KCl increases the measured total gamma ray and potassium concentration curves. The corrections are given by:

$$Gr_{corr} = GR_{log} - 0.382K\left(1 - e^{-0.207d}\right)$$

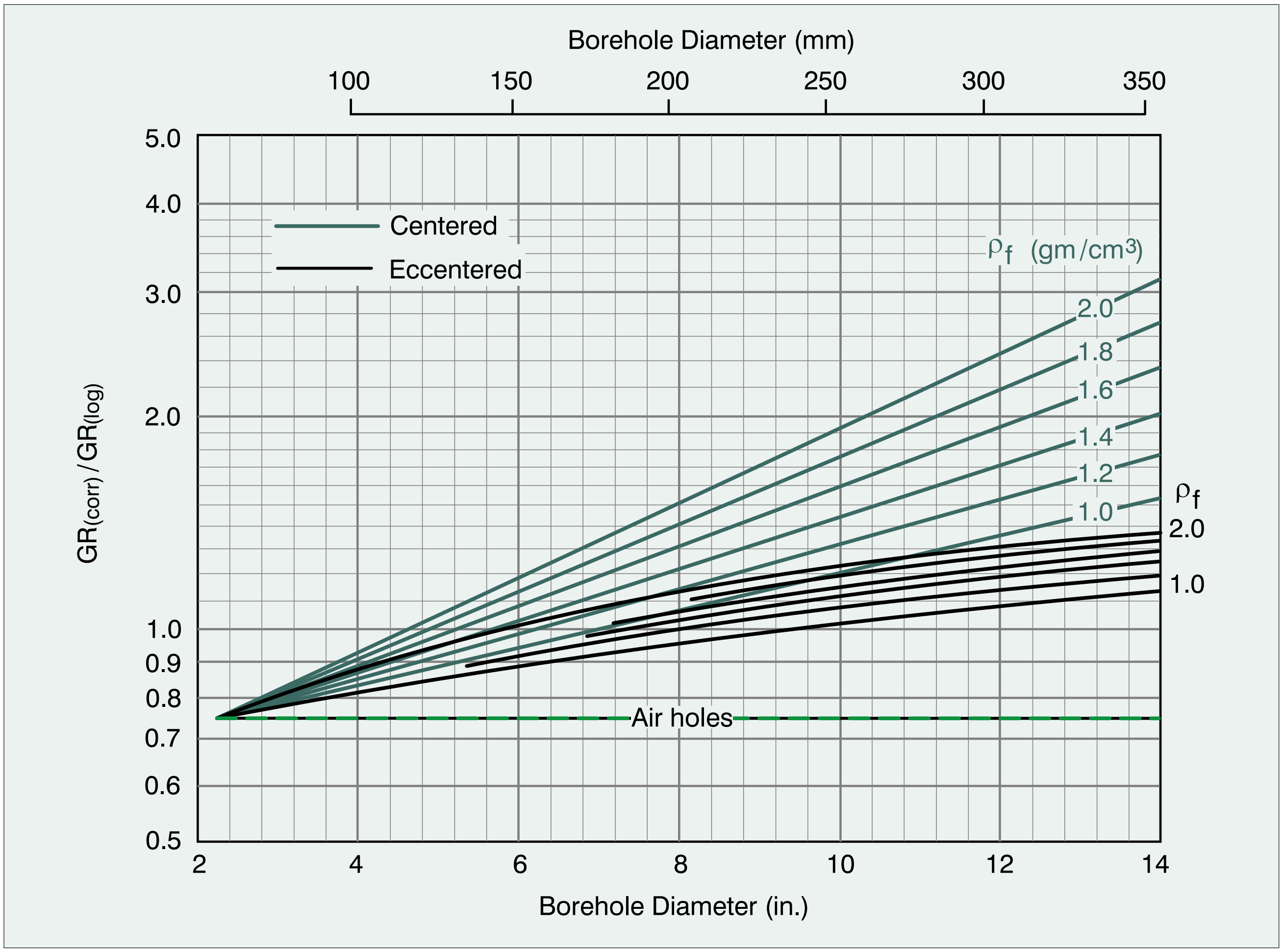
and $$K\%_{corr} = K\%_{log} - 0.027K\left(1 - e^{-0.25d}\right)$$

where K is the KCl concentration in kppm, and d = (caliper in inches – 5.2)

Chart Gam-2a

Compact™ Gamma Ray Borehole Correction

Applicability: *Compact* series (MCG and MGS) tools. KCl-free muds.



Use this chart to correct gamma ray logs from *Compact* series tools for the effects of borehole size and mud weight.

The standard condition is an eccentered tool in an 8-in. (203-mm) diameter well with KCl-free mud of density 1.2gm/cm³. Corrections for non-standard conditions are approximated by:

$$GR_{(corr)}/GR_{(log)} = 0.75 \exp\left[0.35\,\rho_f\left(\frac{d-2.25}{5.75}\right)\right] \text{ for centered tools}$$

$$GR_{(corr)}/GR_{(log)} = 1.75 - \exp\left[-0.24\,\rho_f\left(\frac{d-2.25}{5.75}\right)\right] \text{ for eccentered tools}$$

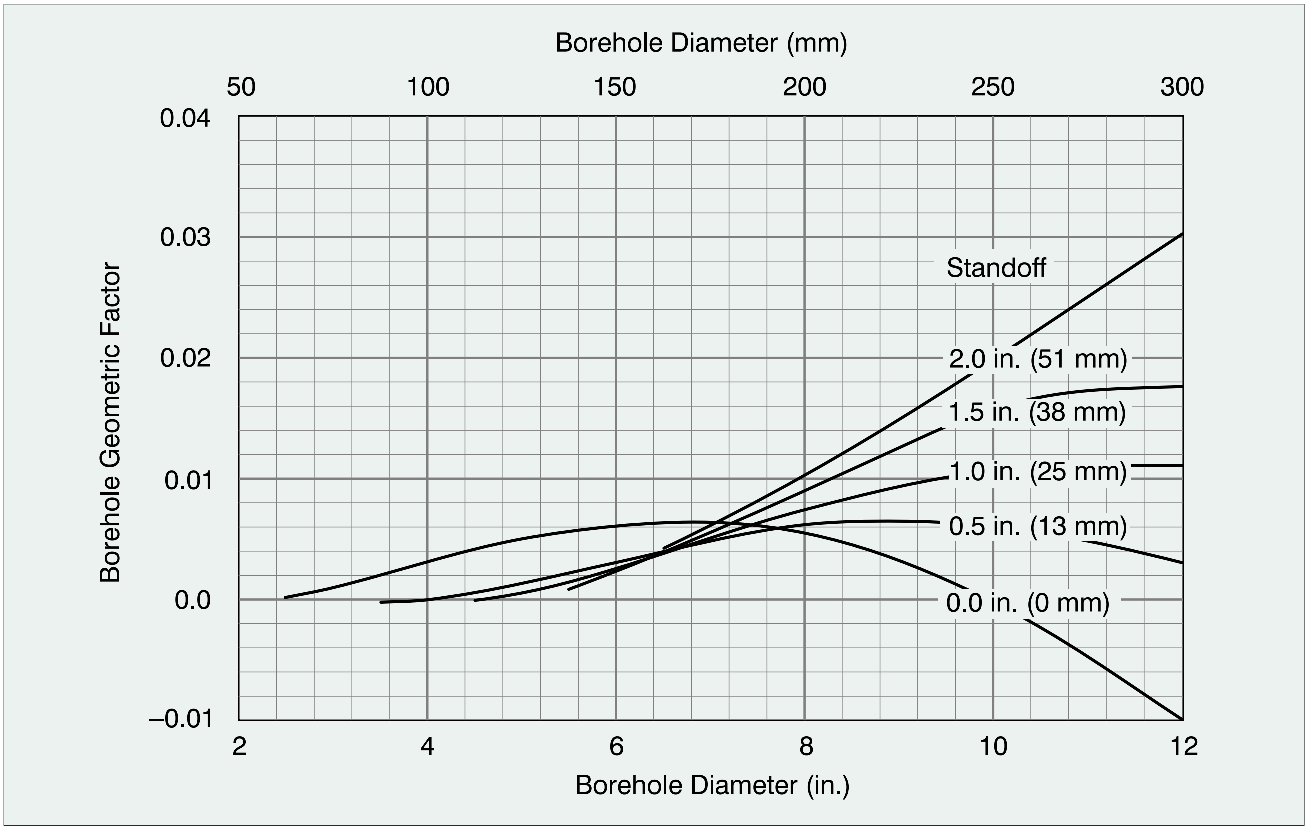
where d = caliper in inches

ρ_f = mud density in g/cm³

Chart Gam-3

Compact™ Array Induction Borehole Correction—Shallow

Applicability: *Compact* series (MAI) tools.



Field logs are corrected for bit size, nominal standoff, and borehole fluid salinity.

Corrections are applied to each sub-array. The chart shows the composite correction after construction of the shallow output curve.

If borehole conditions depart significantly from nominal, new borehole corrections may be computed and applied to the processed logs after first removing the field corrections.

Borehole corrected conductivities are given by:

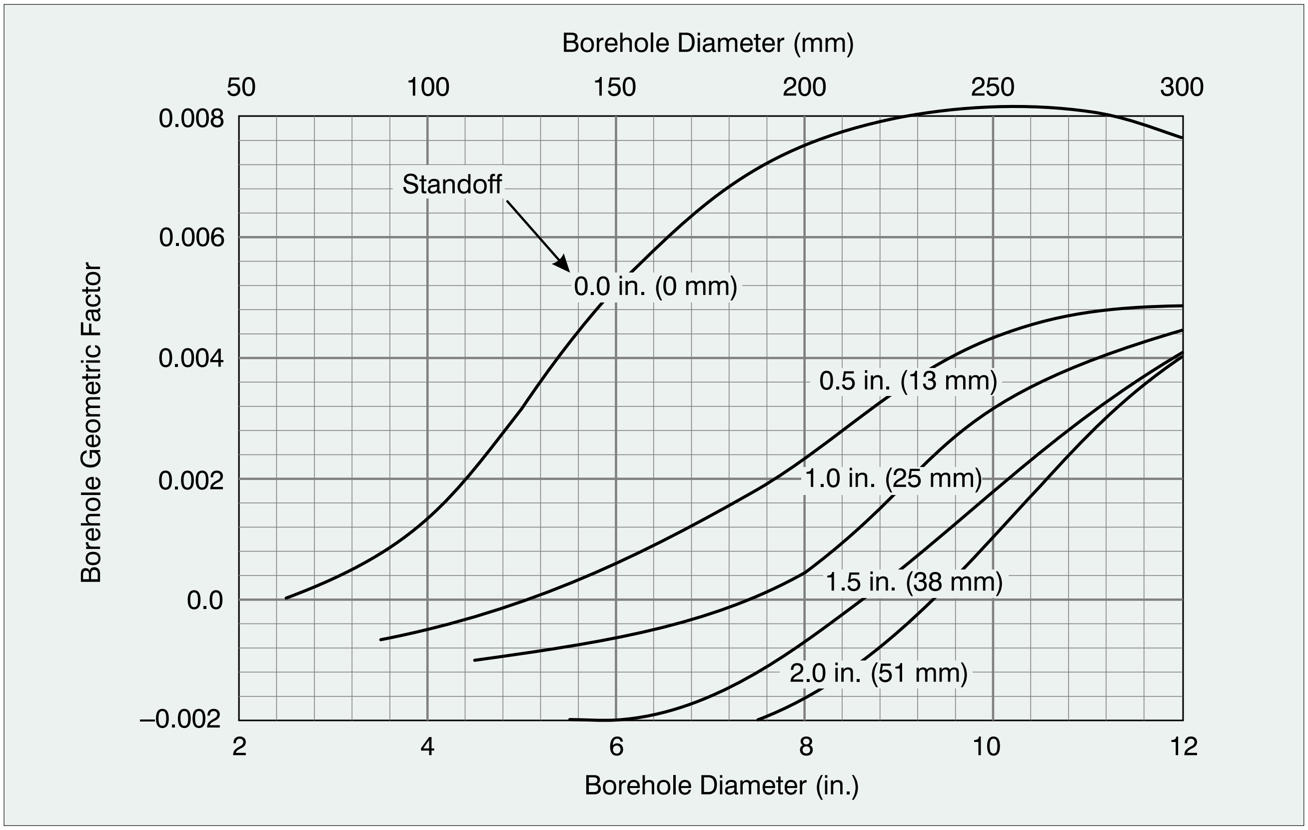
$$\sigma_{corr} = \frac{\sigma_{app} - g_b \sigma_m}{1 - g_b}$$

where σ_{app} is the apparent conductivity, σ_m the borehole fluid conductivity, and g_b the borehole geometric factor.

Chart Ind-10

Compact™ Array Induction Borehole Correction—Medium

Applicability: *Compact* series (MAI) tools.



Field logs are corrected for bit size, nominal standoff, and borehole fluid salinity.

Corrections are applied to each sub-array. The chart shows the composite correction after construction of the medium output curve.

If borehole conditions depart significantly from nominal, new borehole corrections may be computed and applied to the processed logs after first removing the field corrections.

Borehole corrected conductivities are given by:

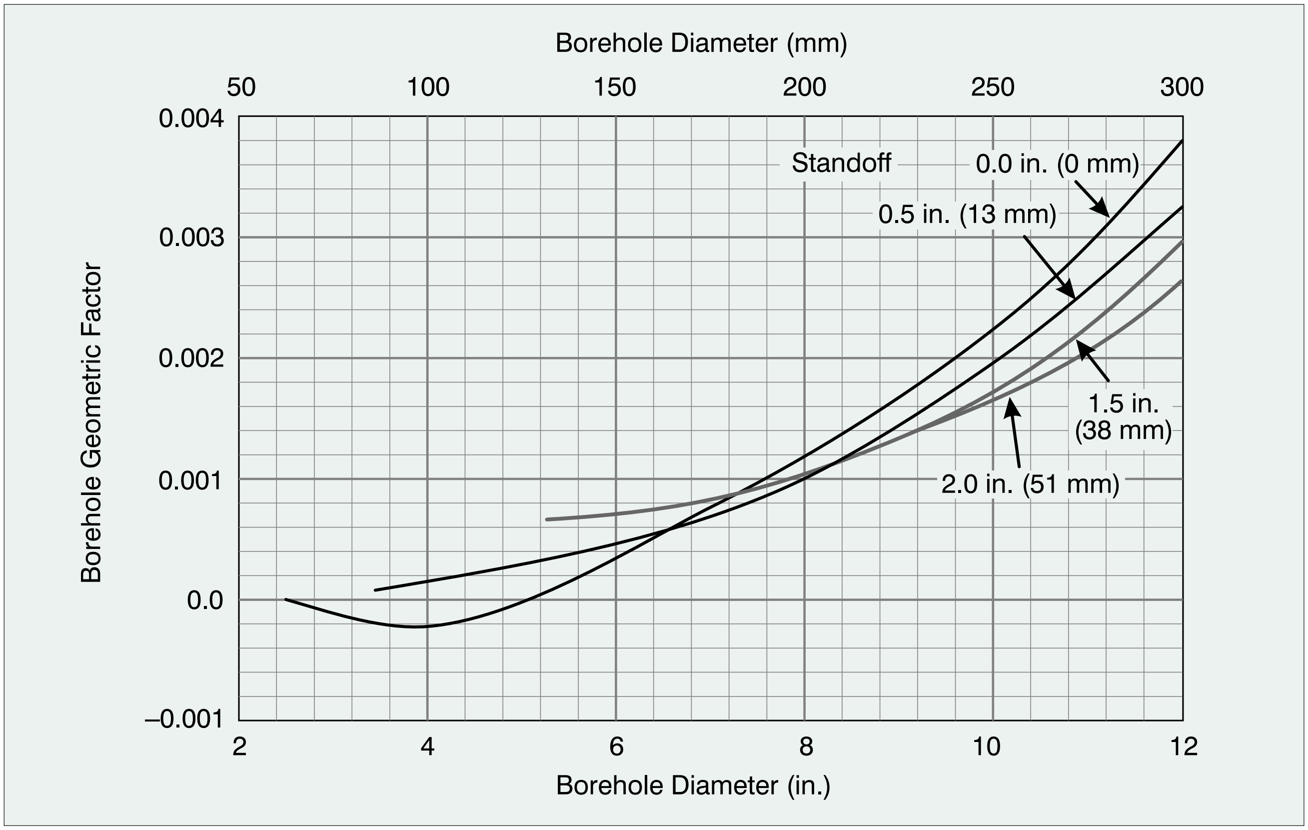
$$\sigma_{corr} = \frac{\sigma_{app} - g_b \sigma_m}{1 - g_b}$$

where σ_{app} is the apparent conductivity, σ_m the borehole fluid conductivity, and g_b the borehole geometric factor.

Chart Ind-11

Compact™ Array Induction Borehole Correction—Deep

Applicability: *Compact* series (MAI) tools.



Field logs are corrected for bit size, nominal standoff, and borehole fluid salinity.

Corrections are applied to each sub-array. The chart shows the composite correction after construction of the deep output curve.

If borehole conditions depart significantly from nominal, new borehole corrections may be computed and applied to the processed logs after first removing the field corrections.

Borehole corrected conductivities are given by:

$$\sigma_{corr} = \frac{\sigma_{app} - g_b \sigma_m}{1 - g_b}$$

where σ_{app} is the apparent conductivity, σ_m the borehole fluid conductivity, and g_b the borehole geometric factor.

Chart Ind-12

Applicability: *Compact* series (MAI) tools.
Thick beds. Use borehole corrected data.

$R_{xo} = 10\ \Omega m$

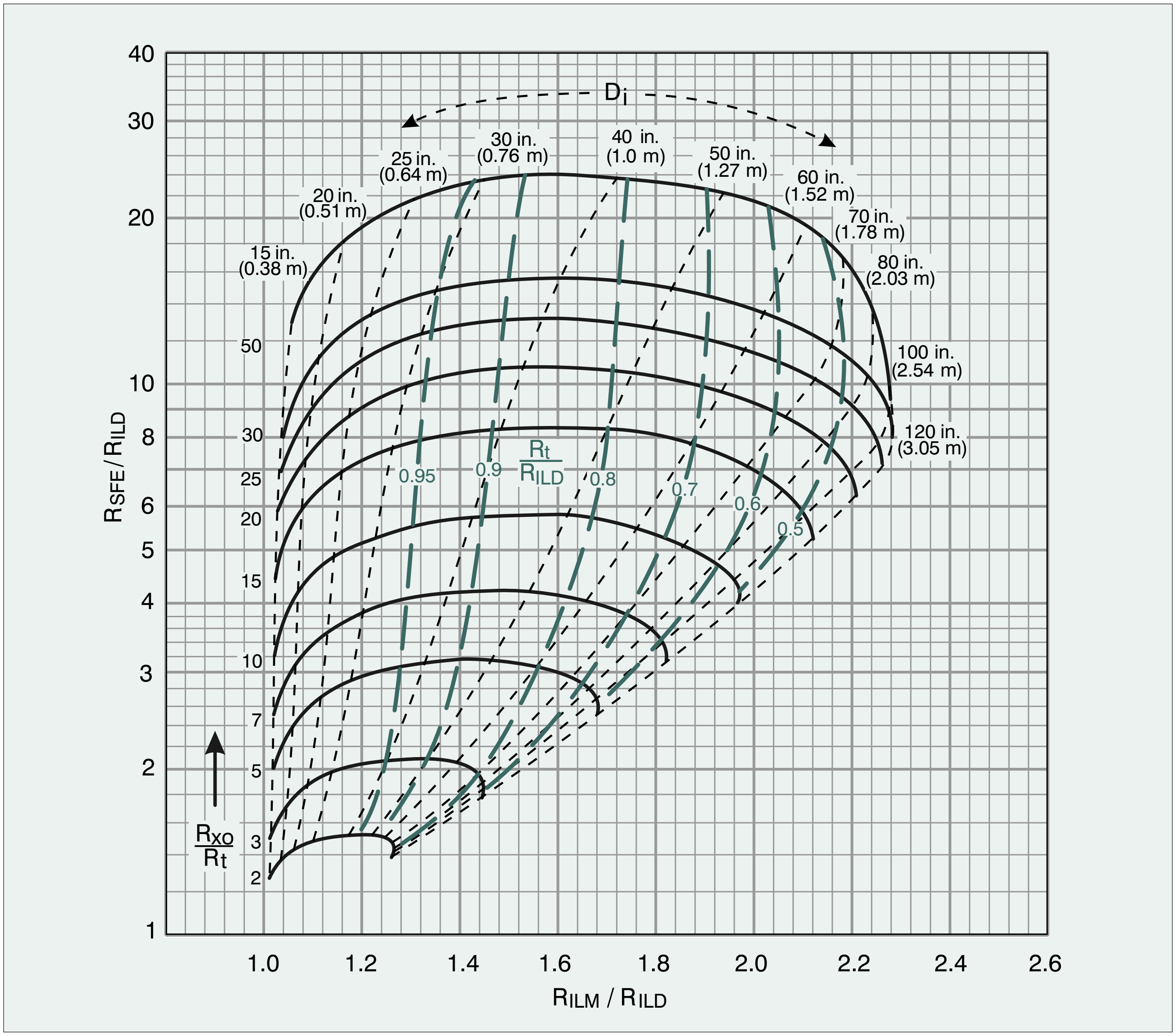


Chart Ind-5

Compact™ Array Induction Tornado Chart

Applicability: Compact series (MAI) tools.

Thick beds. Use borehole corrected data.

$R_{xo} = 20\ \Omega m$

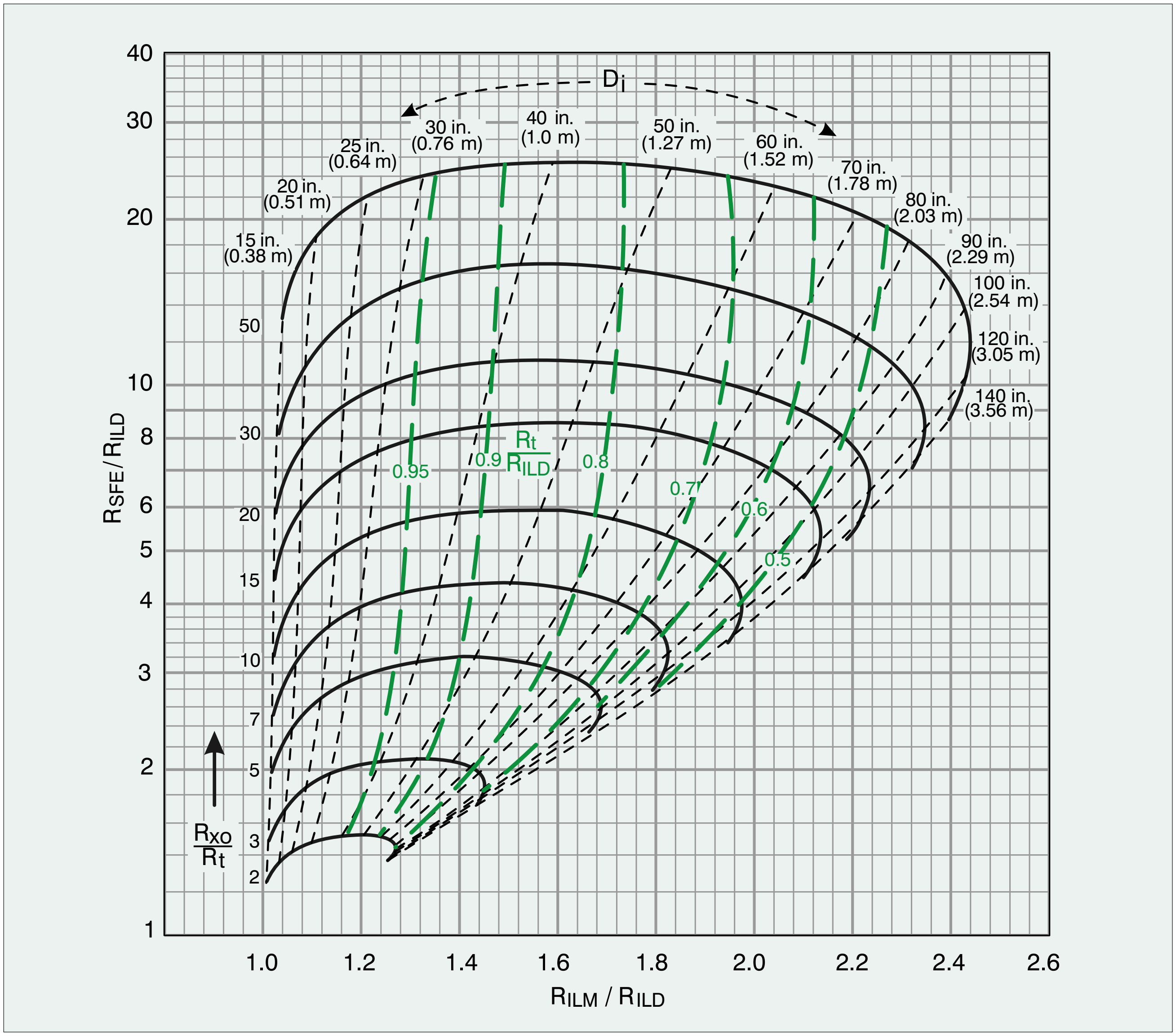


Chart Ind-6

Applicability: *Compact* series (MAI) tools.
Thick beds. Use borehole corrected data.

R_{xo} = 100 Ωm

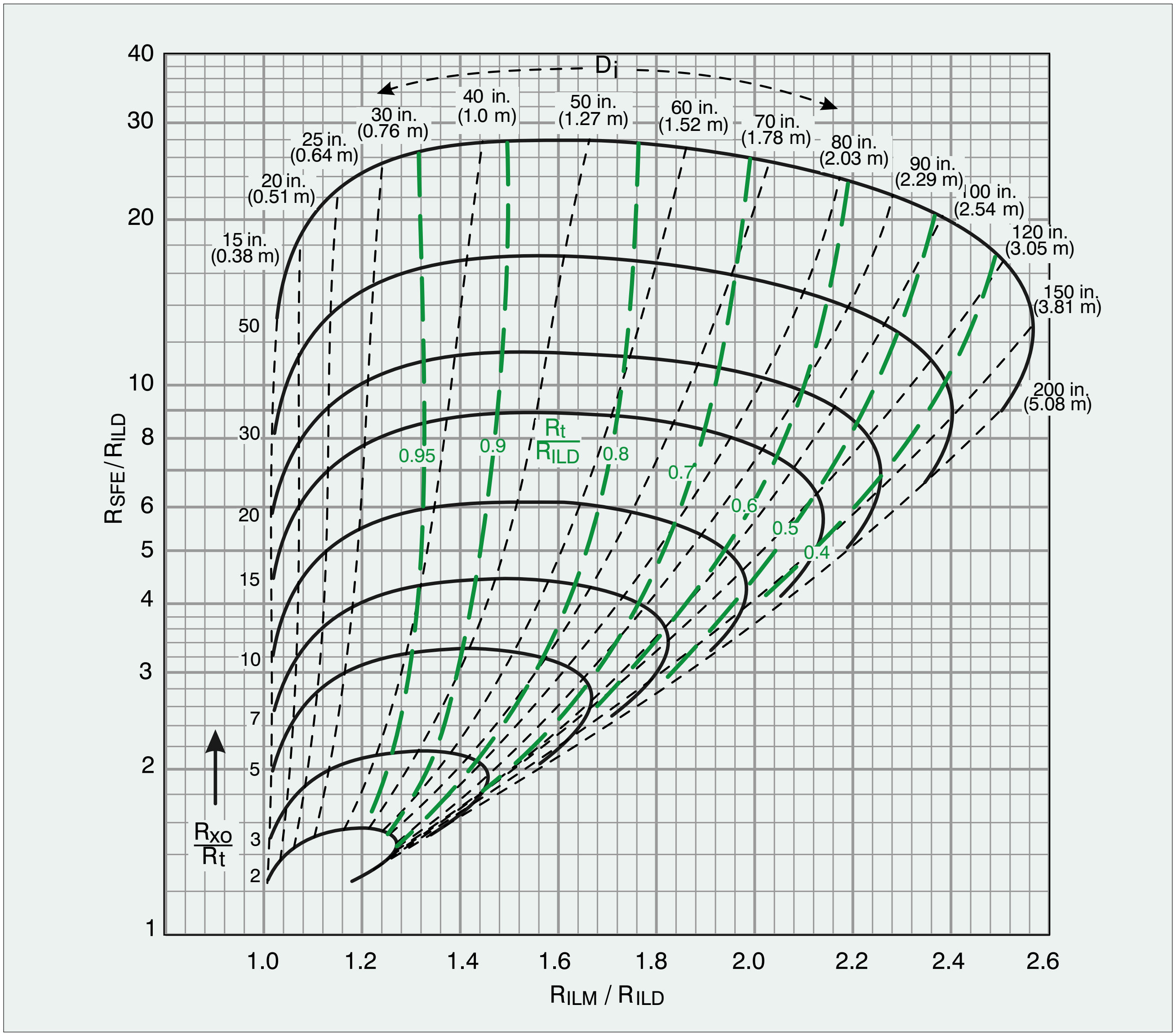


Chart Ind-7

Compact™ Array Induction Tornado Chart

Applicability: *Compact* series (MAI) tools.
Thick beds. Use borehole corrected data.

$R_{xo} < R_t$

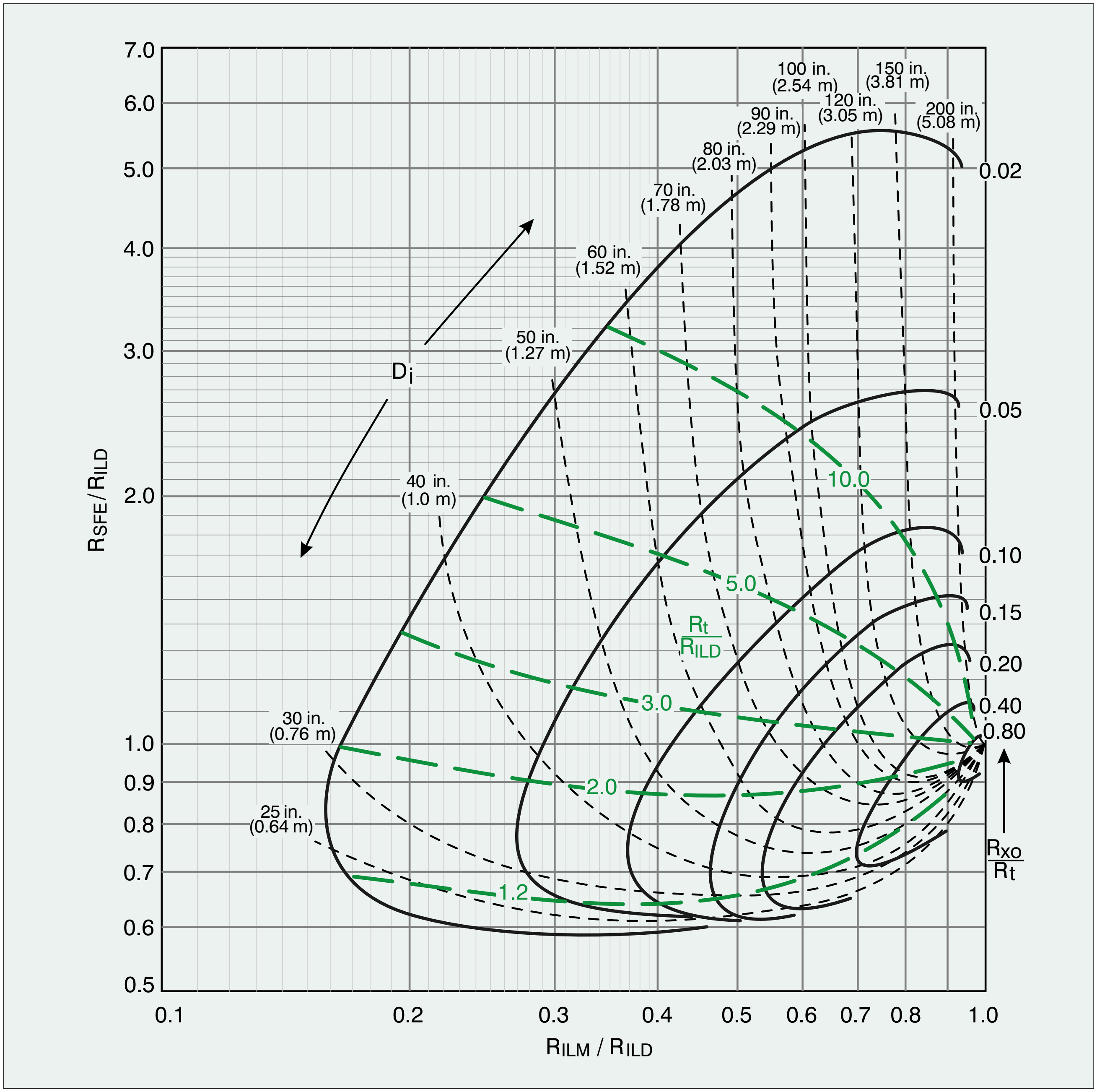
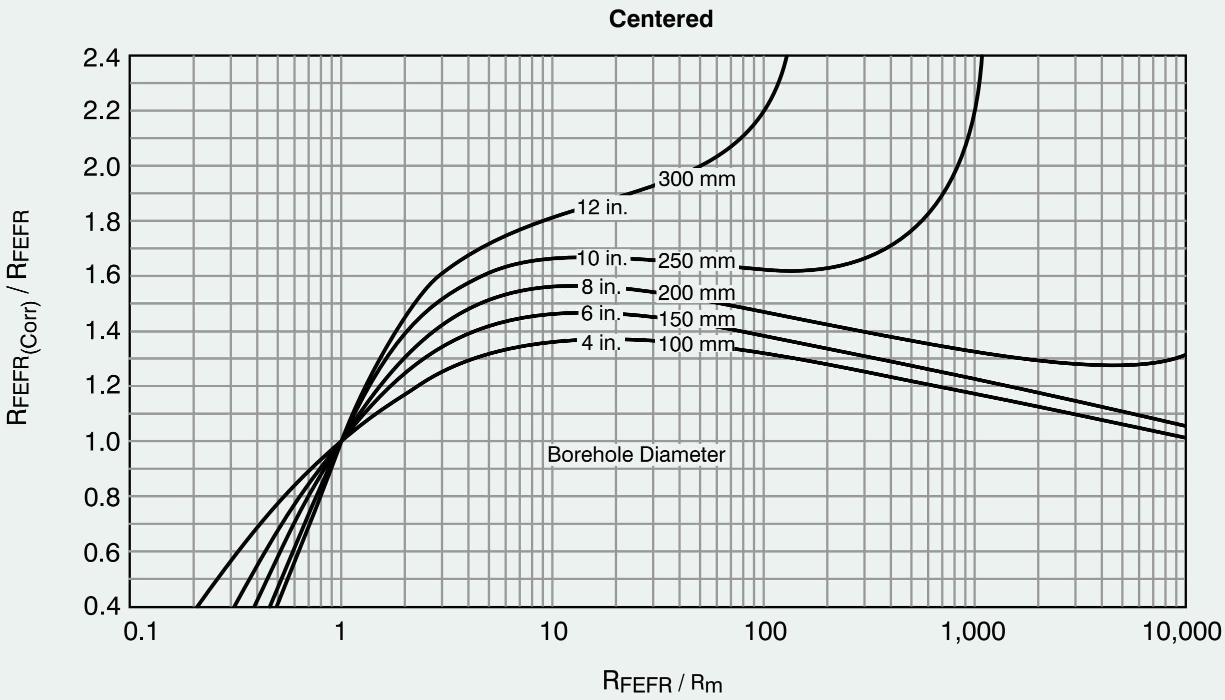


Chart Ind-8

Compact™ Focused Electric Borehole Correction

Applicability: *Compact* series (MFE) tools.



The corrected shallow resistivity curve FEFE has been corrected for bit size and Rm. To apply an alternative correction, enter the chart using the raw shallow resistivity curve FEFR.

Corrections are approximated by: $R_{FEFR(Corr)} / R_{FEFR} = a_0 + a_1x + a_2x^2 + a_3x^3 + ...$
where $x = \ln(R_{FEFR}/R_m)$. Coefficients for 4-, 6-, 8-, 10- and 12-in. wells are (left to right):

Centered					
a_0	1.0000000	1.0000000	1.0000000	1.0000000	1.0000000
a_1	0.3515411	0.5245657	0.6591658	0.7950933	0.9368961
a_2	–0.1259589	–0.2158732	–0.2848466	–0.4006034	–0.4659671
a_3	0.0209587	0.0404045	0.0570030	0.1119412	0.1453734
a_4	–0.0018341	–0.0037254	–0.0056788	–0.0172275	–0.0286625
a_5	0.0000652	0.0001324	0.0002223	0.0010960	0.0026412

Chart SFE-2

Compact™ Deep Laterolog Borehole Correction

Applicability: *Compact* series (MDL) tools, wireline operating mode A (voltage reference at 94 ft/29 m).

Standard condition is 5-in. (13-mm) standoff in an 8-in. (200-mm) well, Ra/Rm = 20

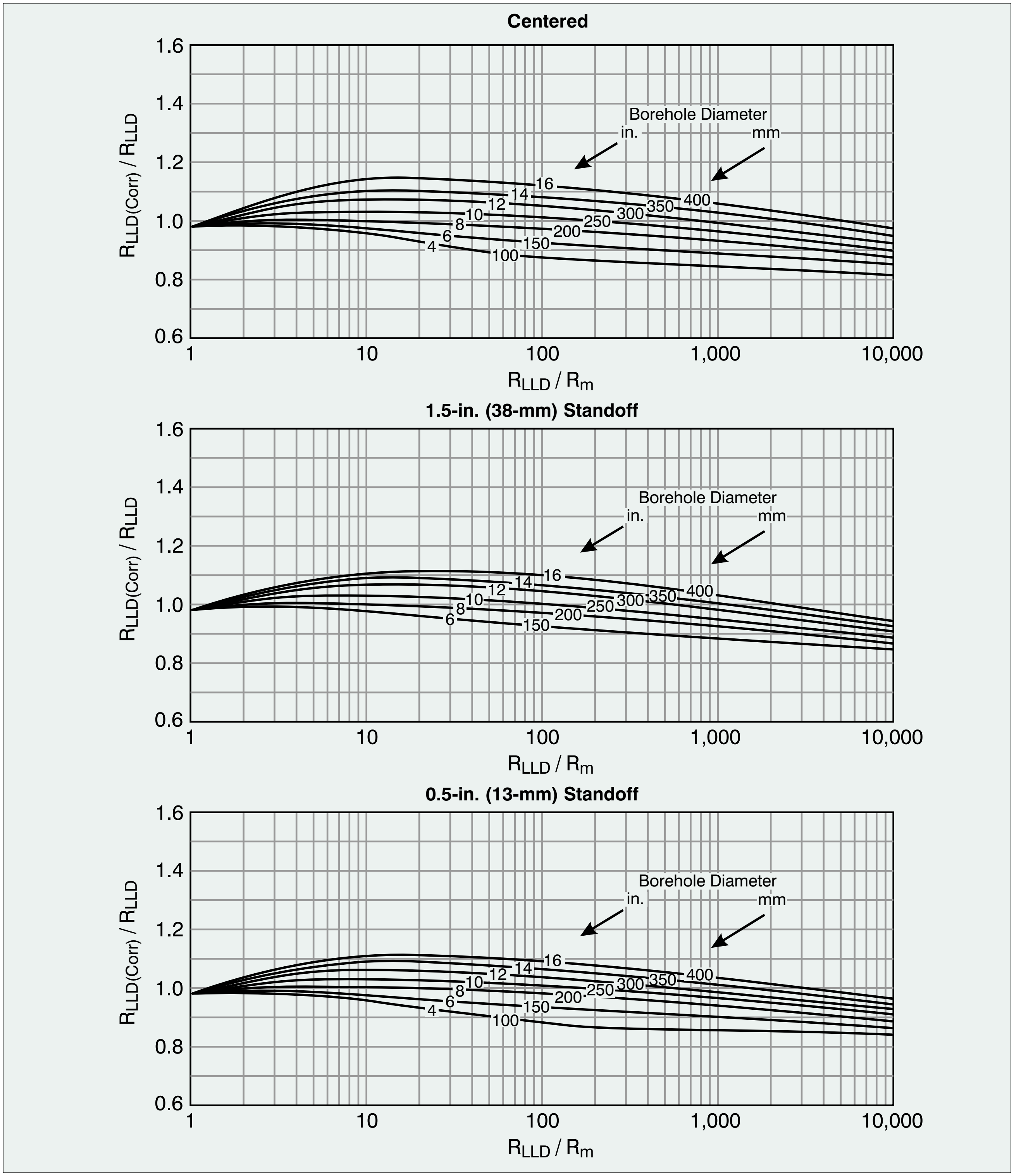


Chart Lat-4

Compact™ Shallow Laterolog Borehole Correction

Applicability: *Compact* series (MDL) tools, wireline operating mode A (voltage reference at 94 ft/29 m).

Standard condition is 5-in. (13-mm) standoff in an 8-in. (200-mm) well, Ra/Rm = 20

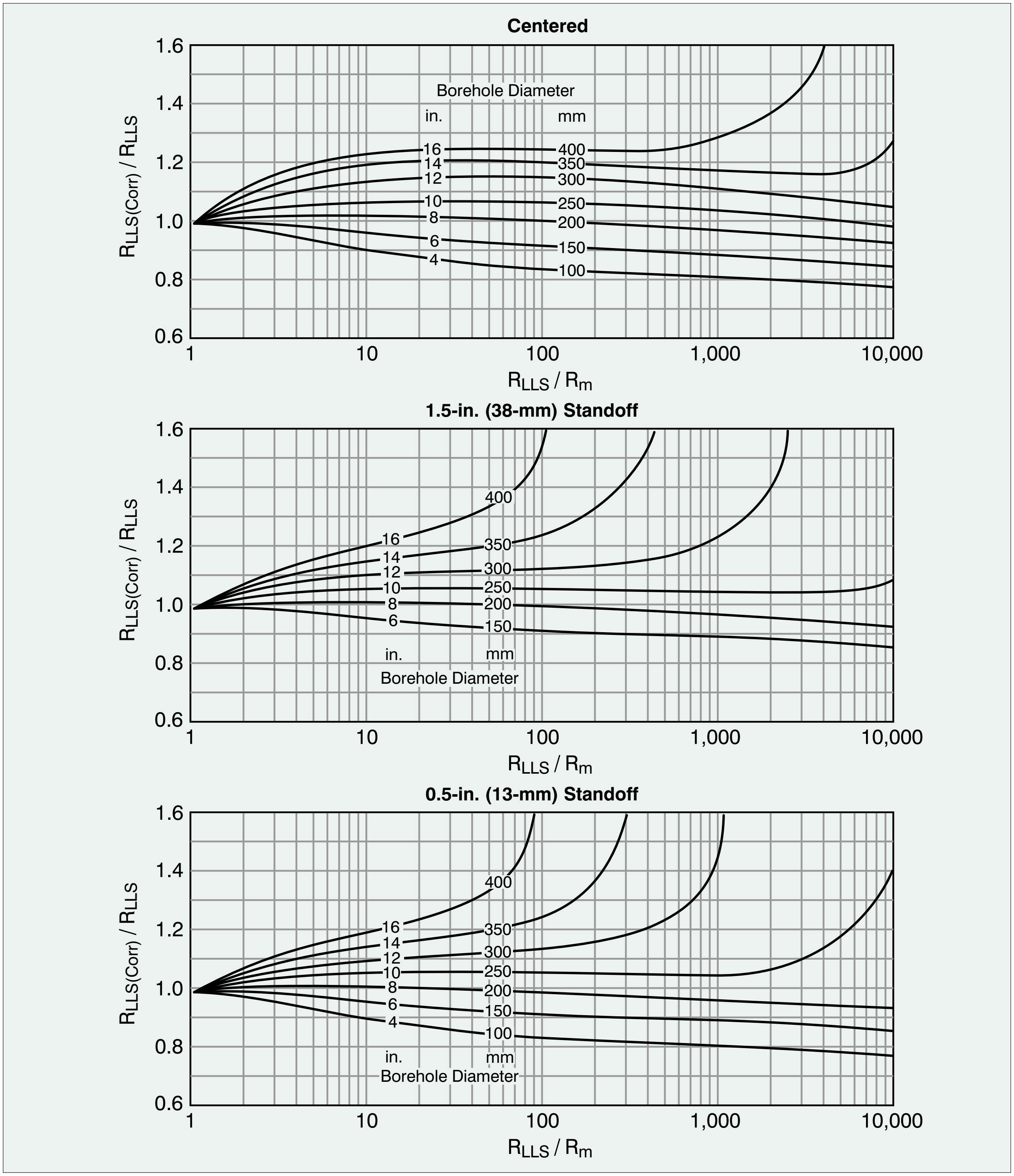


Chart Lat-5

Compact™ Laterolog Tornado Chart

Applicability: *Compact* series (MDL) tools, wireline operating mode A (voltage reference at 94 ft/29 m).
Thick beds, 8-in. (203-mm) hole, step invasion profile, Rxo/Rm = 50
Use borehole corrected data.

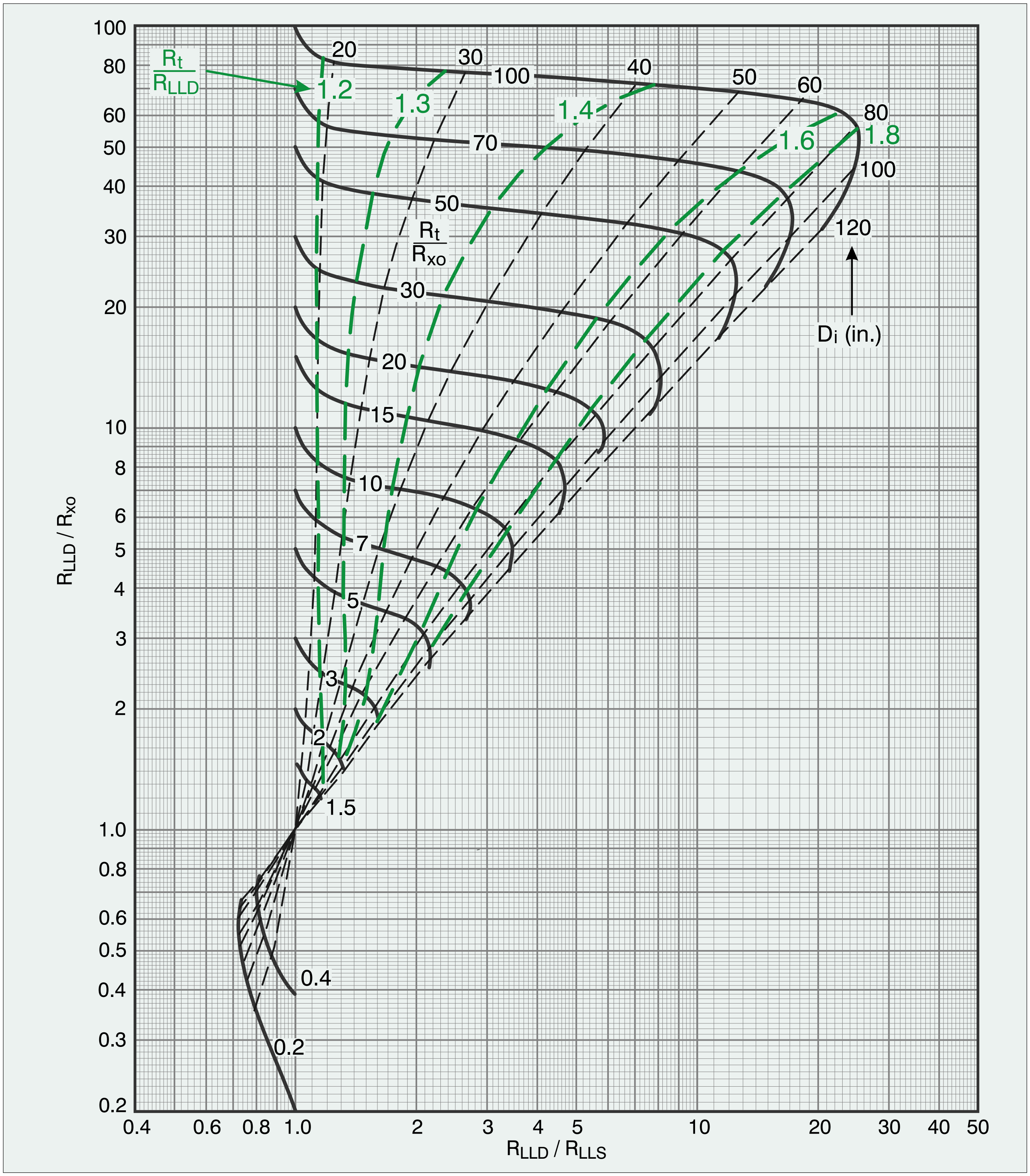


Chart Lat-6

Compact™ Deep Laterolog Borehole Correlation—Shuttle Deployed

Applicability: *Compact* series (MDL) tools, shuttle deployed.

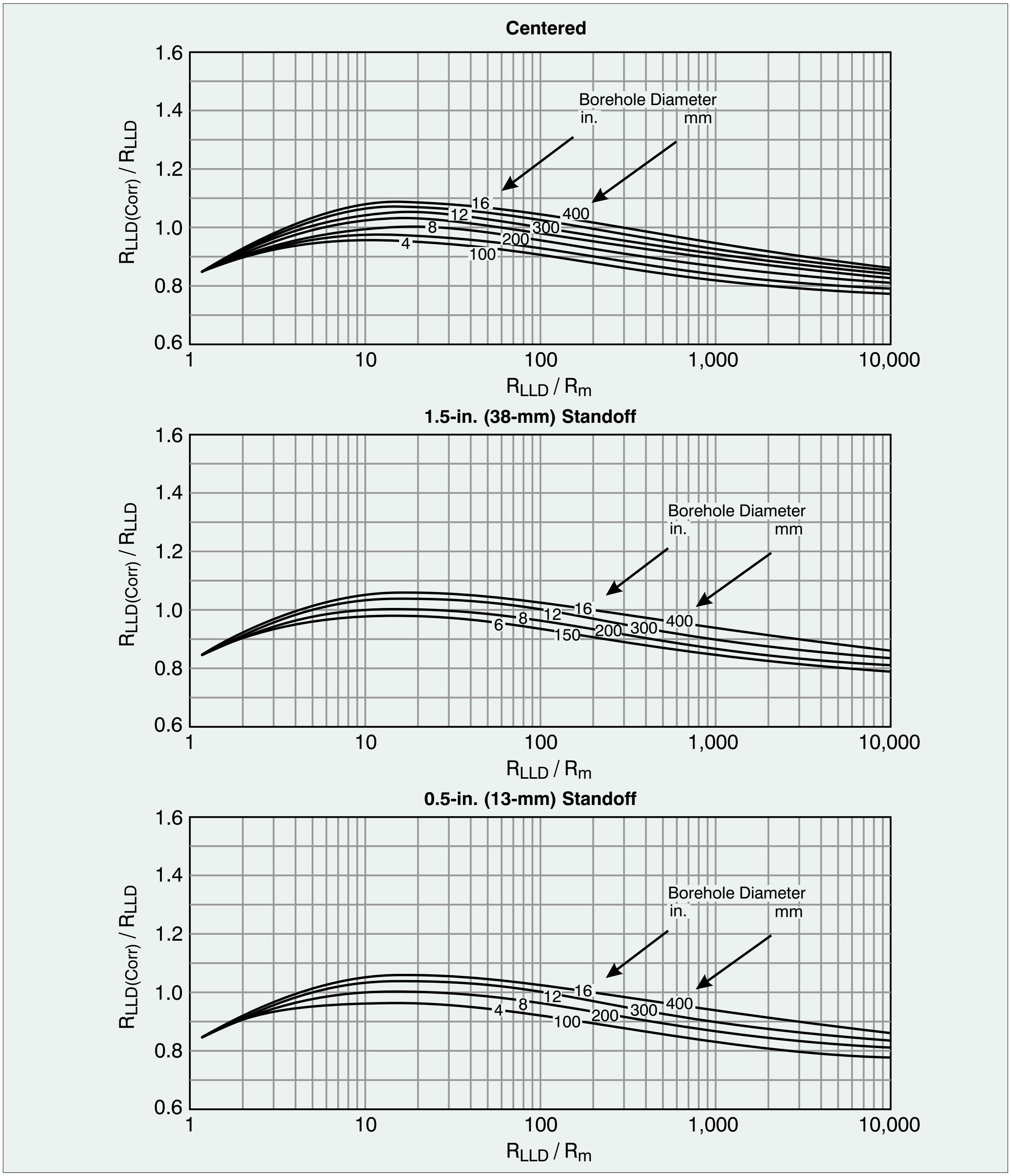


Chart Lat-10

Compact™ Shallow Laterolog Borehole Correction—Shuttle Deployed

Applicability: *Compact* series (MDL) tools, shuttle deployed.

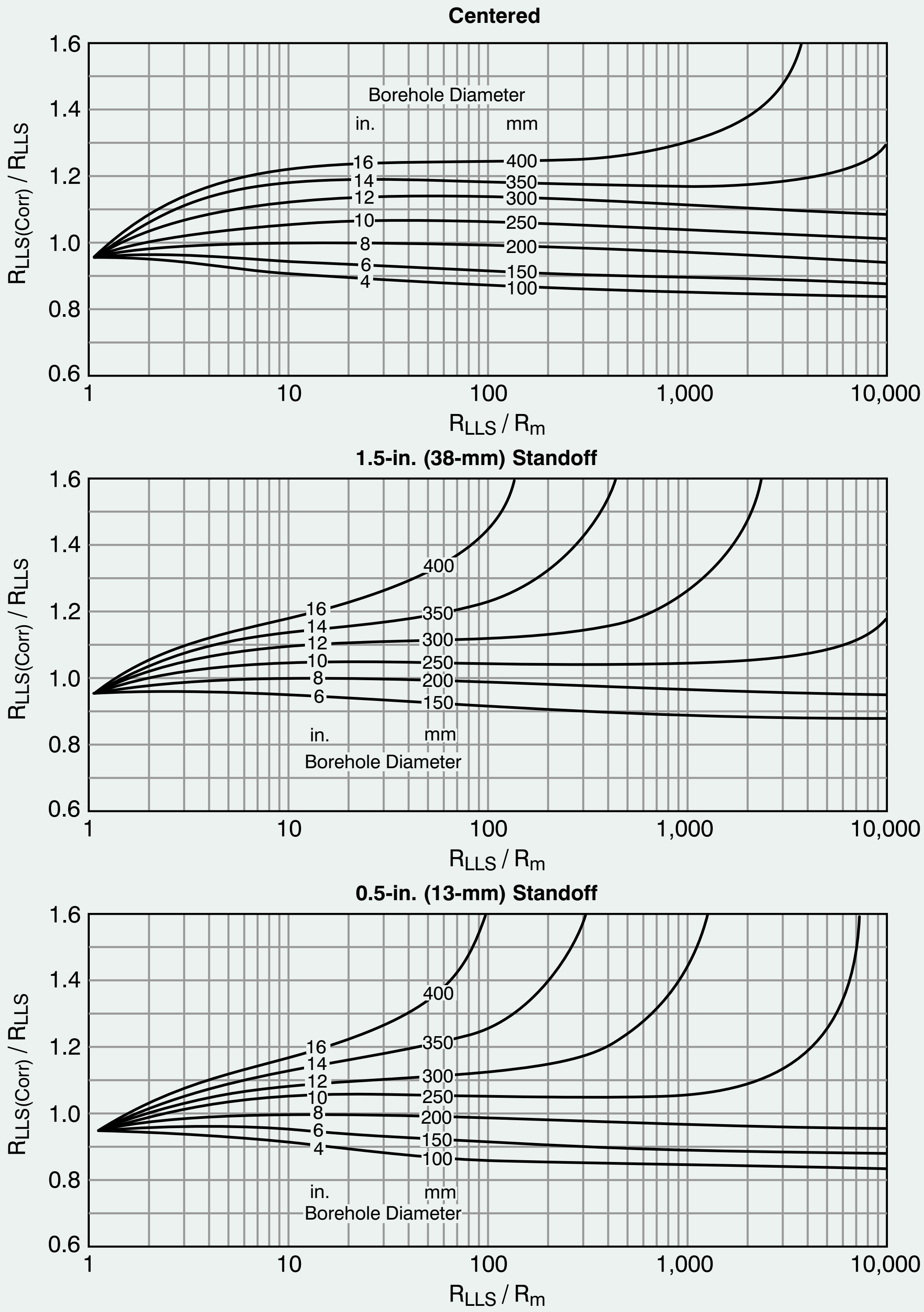


Chart Lat-11

Compact™ Laterolog Tornado Chart—Shuttle Deployed

Applicability: *Compact* series (MDL) tools, shuttle deployed.
Thick beds, 8-in. (203-mm) hole, step invasion profile, Rxo/Rm = 50
Use borehole corrected data.

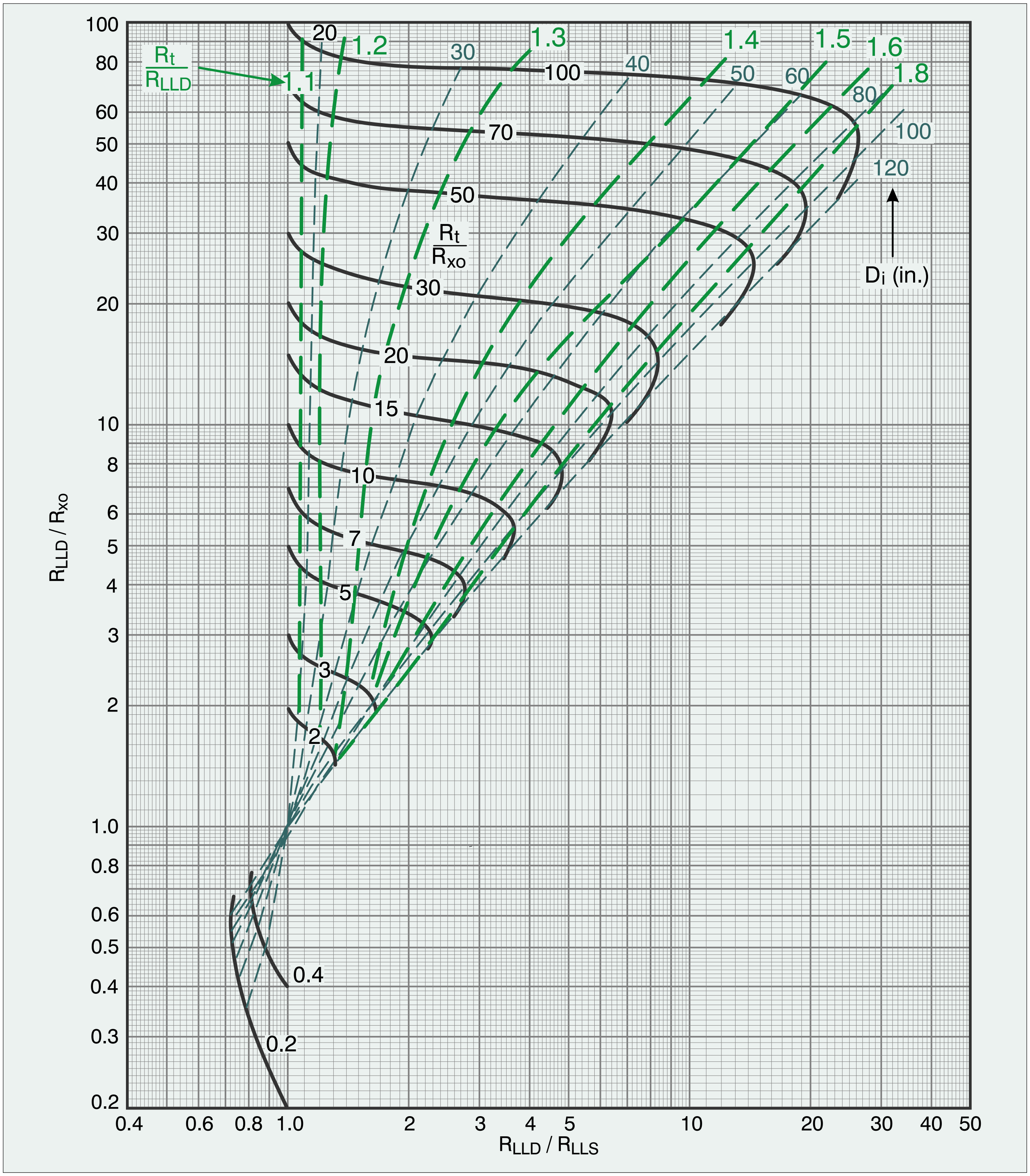


Chart Lat-12

Compact™ MicroLaterolog Mudcake Correction

Applicability: MMR series with 4-, 6-, and 8-in. (102-, 152-, and 203-mm) profile pads in matching hole sizes.

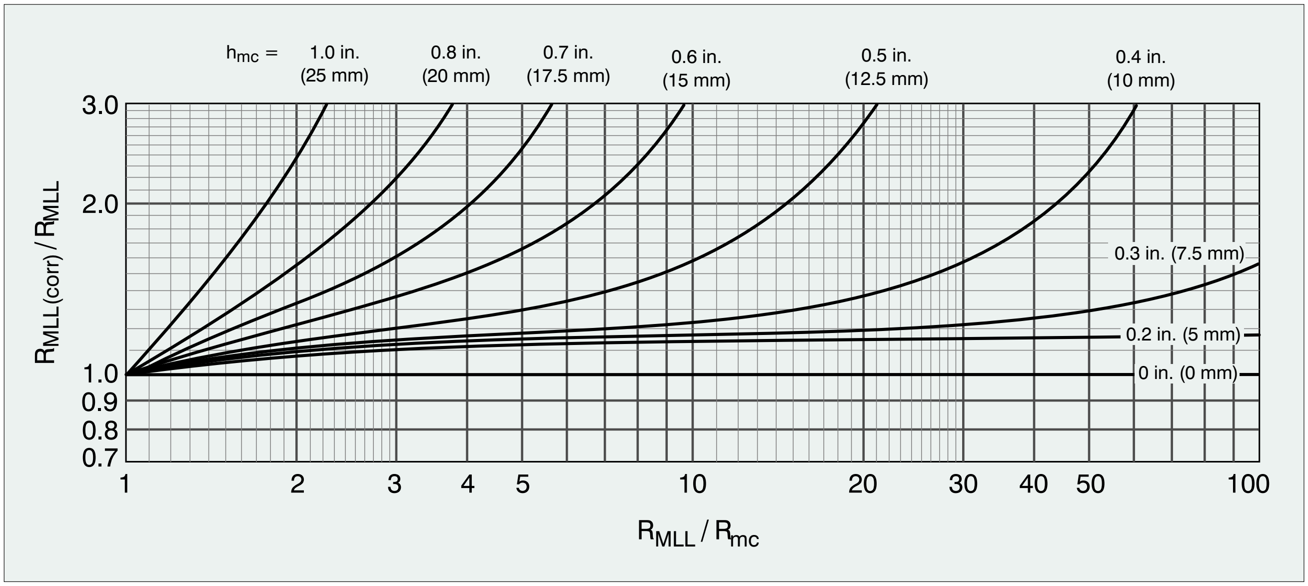


Chart Micro-3

Compact™ Neutron Porosity Charts—Explanatory Note

Applicability: *Compact* series (MDN) tools.

Neutron porosity logs are calibrated in limestone units (curve mnemonic NPRL) and may be displayed also in apparent sandstone units (mnemonic NPRS) or apparent dolomite units (NPRD). Chart Npor-5 shows the magnitude of the transforms.

Use Charts Npor-6a to Npor-8 to determine the magnitude of open-hole environmental corrections. Chart Npor-9a details the cased-hole corrections. *Compact* tool field logs are corrected automatically for any or all environmental perturbations. Refer to the Neutron Constants table part of the log tail to determine whether a particular correction has been applied (indicated by departure from standard conditions).

Standard Conditions

Limestone matrix:	$CaCO_3$ with 7.10 cu capture cross section
Borehole size:	8.0 in. (203 mm)
Borehole fluid:	Fresh water
Tool standoff:	0.0 in. (0.0 mm)
Mud weight:	8.345 lb/US gal (1,000 kg/m^3)
Borehole temperature:	68°F (20°C)
Formation pressure:	0 kpsi (0 MPa)
Formation fluid:	Fresh water with 22.2 cu capture cross section

Standard sandstone matrix is SiO_2 with 4.26 cu capture cross section.
Standard dolomite matrix is $CaMg(CO_3)$ with 4.70 cu capture cross section.

If a correction was not applied during acquisition, or if alternative parameter values are established, the charts allow a new net correction to be computed. The uncorrected apparent limestone porosity curve NPOR is provided for this purpose.

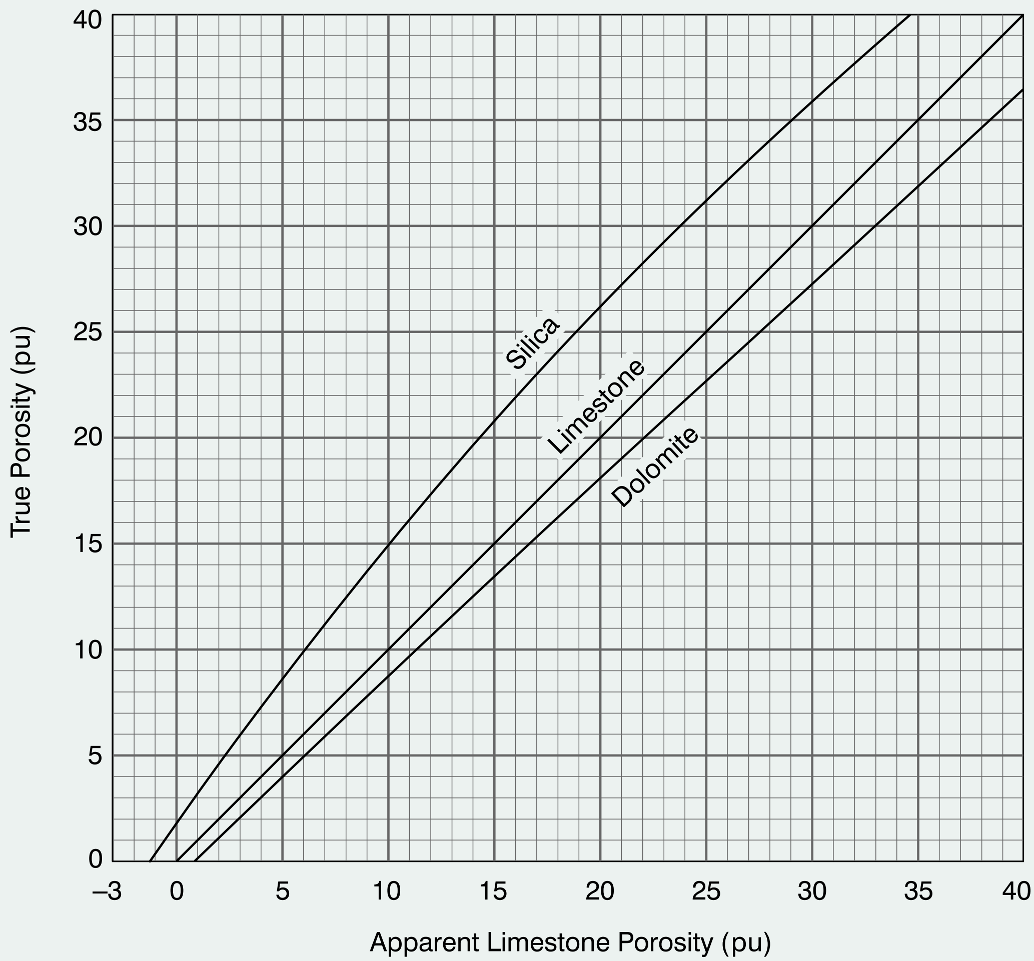
Corrections are applied in a specific order. For open-hole corrections, enter Chart Npor-6a with the value of NPOR, and draw a line vertically through the first four nomograms from the uppermost porosity entry point through to the second porosity scale. A correction is computed from each nomogram by following the correction curves from the actual condition to the standard condition. A multiplier is applied to the corrections for borehole fluid salinity and standoff if the hole size is not 8 in. The total correction is the arithmetic sum of the individual corrections. Next, transform the resulting porosity into the appropriate matrix units, using Chart Npor-5, before applying Σ_{ma} and formation fluid salinity corrections in Charts Npor-7 and Npor-8. Finally, return to Chart Npor-6a to perform formation temperature and pressure corrections.

The procedure for applying cased-hole corrections is detailed within Npor-9a.

Compact™ Neutron Porosity Matrix Transforms

Applicability: *Compact* series (MDN) tools. Σ_{fl} value: 22.2 cu.

Σ_{ma} values: Silica 4.26 cu Limestone 7.10 cu Dolomite 4.70 cu



Use this chart to transform *Compact* series neutron porosity logs recorded in apparent limestone units into true sandstone and dolomite porosities.

Enter the apparent limestone porosity, and move vertically to the appropriate matrix line. Read the true porosity from the vertical axis.

The transforms are described by the following equations:

$$\Phi_{sand} = 0.000075\,\Phi_{lim}^3 - 0.012\,\Phi_{lim}^2 + 1.43\,\Phi_{lim} + 1.76$$

$$\Phi_{dol} = 0.000025\,\Phi_{lim}^3 - 0.0022\,\Phi_{lim}^2 + 0.982\,\Phi_{lim} - 0.88$$

When formation Σ_{ma} values depart significantly from standard conditions, use Chart Npor-7 to make additional corrections.

Chart Npor-5

Compact™ Neutron Porosity Environmental Corrections

Applicability: Open-hole logs from *Compact* series (MDN) tools.

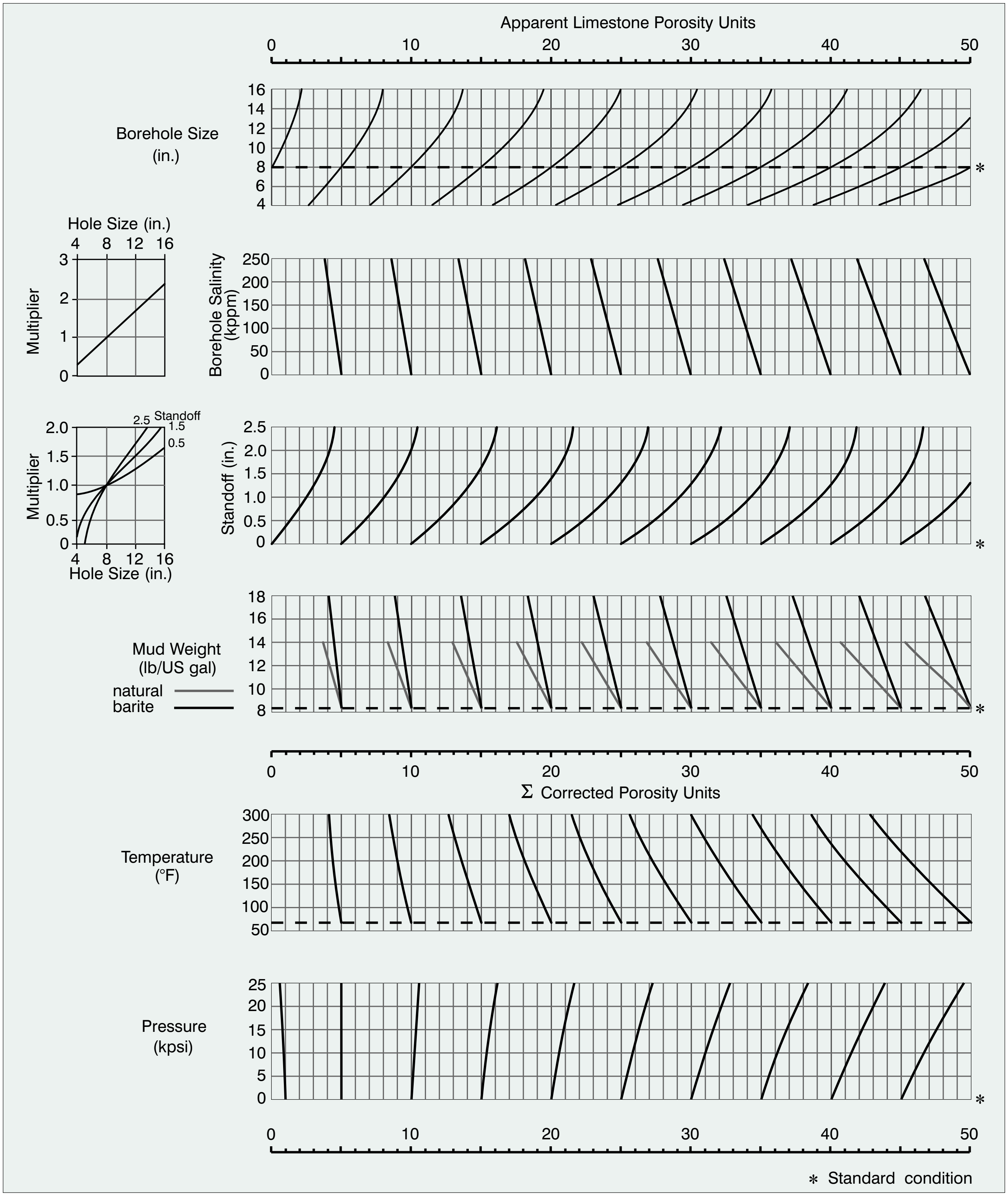
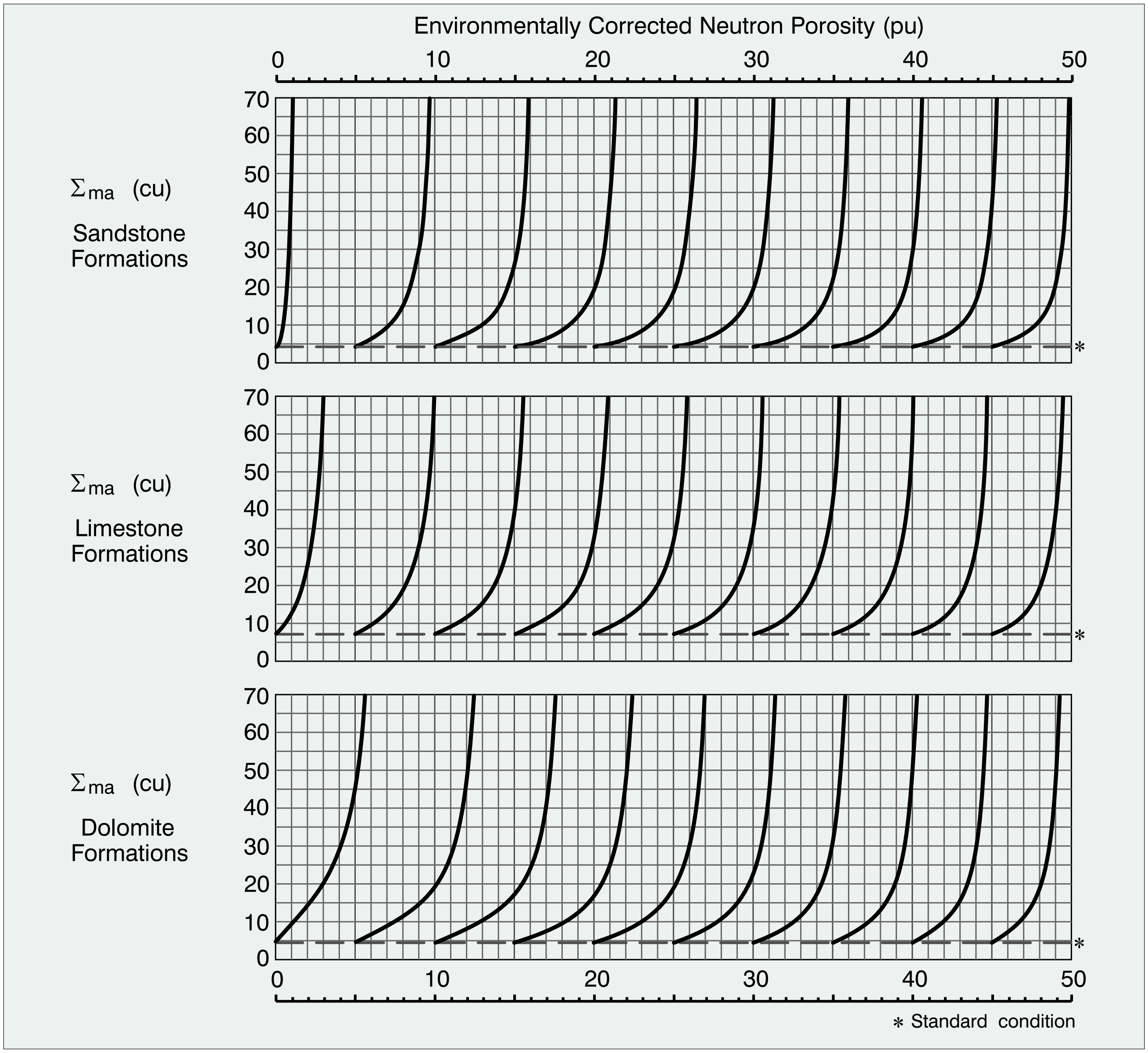


Chart Npor-6a

Compact™ Neutron Porosity Matrix Cross Section Corrections

Applicability: Open-hole logs from *Compact* series (MDN) tools.



Use the appropriate nomogram to deduce corrections for variations in matrix sigma values. Sigma corrections associated with variations in formation fluid salinity are specified in Chart Npor-8. Matrix sigma corrections are given by:

sand $\Delta\Phi = (-2.51a^2 + 11.34a - 8.83)\cdot(0.08\Phi \exp(-0.04\Phi) + 0.05)$

lime $\Delta\Phi = (-1.37a^2 + 8.78a - 7.41)\cdot(0.08\Phi \exp(-0.045\Phi) + 0.25)$

dolomite $\Delta\Phi = (-7.09a^2 + 16.98a - 9.89)\cdot(0.11\Phi \exp(-0.06\Phi) + 0.20)$

where: Φ = borehole corrected neutron porosity in appropriate matrix units

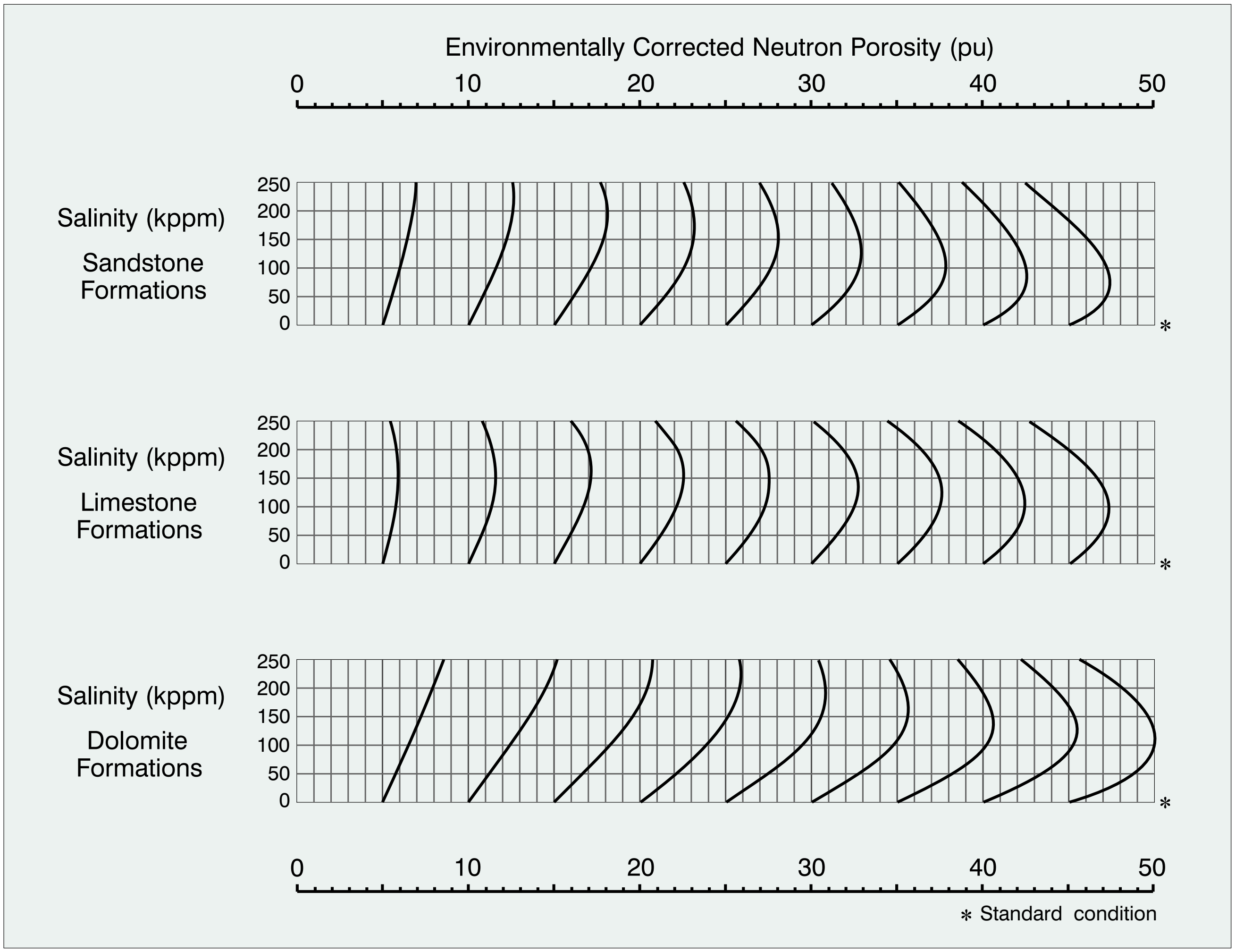
and $a = \Sigma_{ma(std)} / \Sigma_{ma}$

and $\Sigma_{ma(std)}$ = 4.26, 7.10, and 4.70 cu, respectively, for standard sand, lime, and dolomite.

Chart Npor-7

Compact™ Neutron Porosity Formation Salinity Corrections

Applicability: Open-hole logs from *Compact* series (MDN) tools.



Use the appropriate nomogram to deduce corrections for variations in formation salinity.
If the matrix cross section is known, a correction should first be made using Chart Npor-7.
Salinity corrections are approximated by:

sand $$\Delta\Phi = (-0.07\Phi^2 + 2.0\Phi - 3.0)\cdot kppm^3\cdot 10^{-8} + (0.031\Phi^2 - 0.4\Phi + 1.0)\cdot kppm^2\cdot 10^{-5} - (1.4\Phi + 2.0)\cdot kppm\cdot 10^{-3}$$

lime $$\Delta\Phi = (-0.066\Phi^2 + 3.0\Phi - 1.0)\cdot kppm^3\cdot 10^{-8} + (0.024\Phi^2 - 0.6\Phi + 1.2)\cdot kppm^2\cdot 10^{-5} - (\Phi + 1.0)\cdot kppm\cdot 10^{-3}$$

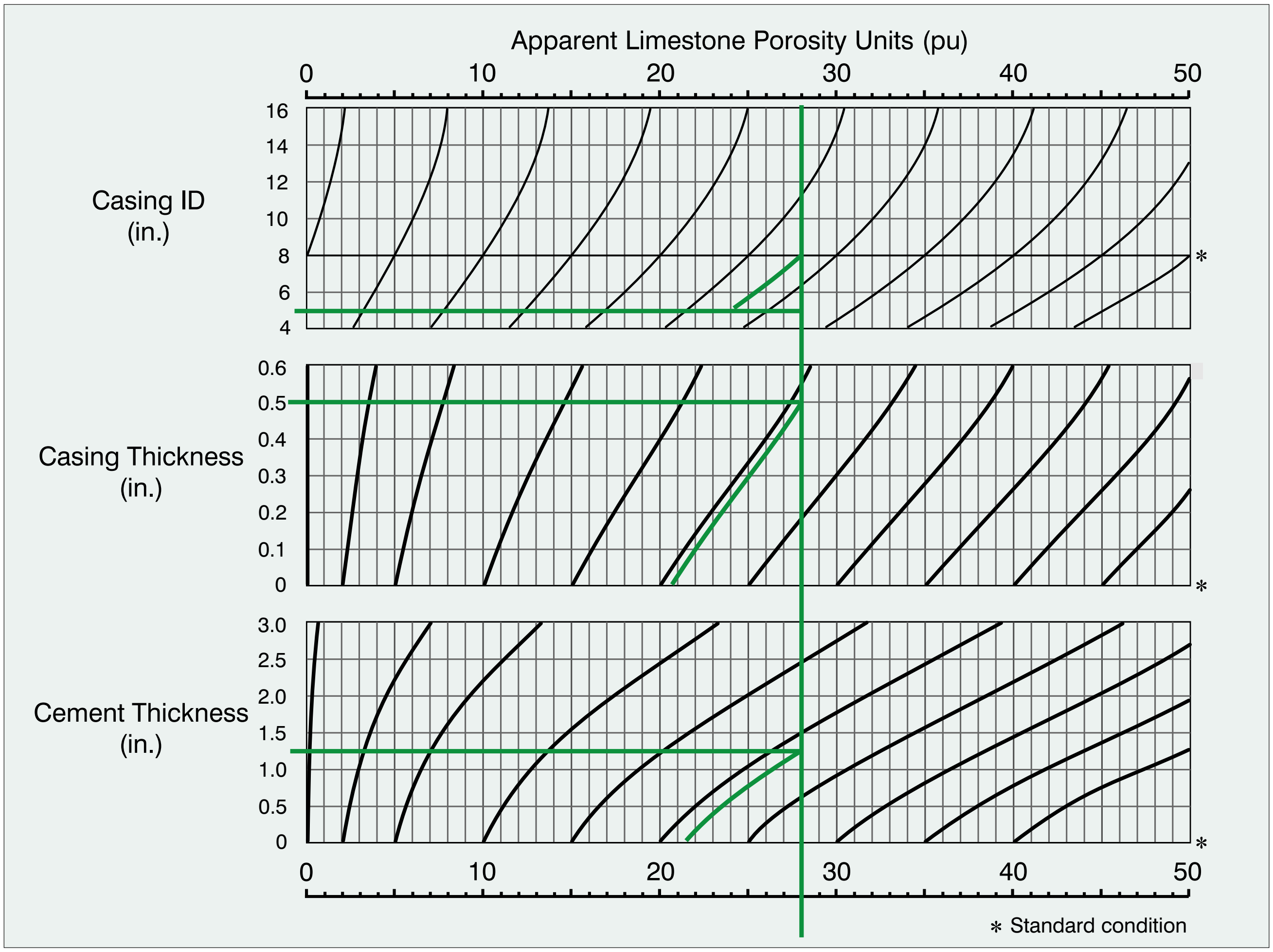
dolomite $$\Delta\Phi = (-0.02\Phi^2 + 0.4\Phi - 1.0)\cdot kppm^3\cdot 10^{-8} + (0.022\Phi^2 - 0.1\Phi + 1.0)\cdot kppm^2\cdot 10^{-5} - (2.0\Phi + 2.0)\cdot kppm\cdot 10^{-3}$$

where: Φ = borehole corrected neutron porosity in appropriate matrix units

Chart Npor-8

Compact™ Neutron Porosity Cased-Hole Corrections

Applicability: Cased-hole logs from *Compact* series (MDN) tools.



In cased holes substitute this chart for the open-hole borehole size correction. Enter the chart with uncorrected porosity in apparent limestone units (NPOR or uncorrected NPRL), and draw a vertical line through each nomogram. Derive $\Delta\Phi$ values from each nomogram by marking the intersection with the given casing ID, casing thickness and cement thickness values; then move parallel to the nearest curve to the standard condition. Sum the $\Delta\Phi$ values to find the total correction. Apply any remaining environmental corrections at this point.

Example: casing ID = 5 in., casing thickness = 0.5 in., cement thickness = 1.25 in.
For NPOR = 28 pu, corrected porosity = 28 + (3.9 – 7.5 – 6.6) = 17.8 pu.

Casing ID $\Delta\Phi = f(\Phi) \cdot f(c)$

where $f(\Phi) = 0.0000027\,\Phi^3 - 0.00137\Phi^2 + 0.1484\Phi + 1.6$

$f(c) = -0.00017c^3 + 0.0131c^2 - 0.232c$

$c = (\text{caliper} - 8.0)$ in.

Casing Thickness $\Delta\Phi = (0.00004\,\Phi^3 - 0.0135\Phi^2 + 1.0877\Phi) \cdot (0.59t^3 - 0.235t^2 - 0.75t)$

t = casing thickness in inches

Cement Thickness $\Delta\Phi = (-0.0009\Phi^2 + 0.13\Phi + 0.05) \cdot (0.087h^3 - 0.33h^2 - 1.5h)$

h = cement thickness in in.

Chart Npor-9a

Compact™ Neutron Porosity Environmental Correction Equations

Applicability: Open-hole logs from *Compact* series (MDN) tools.

Porosity (Φ) in pu. Range: as Chart Npor-6a.

General

To determine whether a particular environmental correction was applied during acquisition, refer to the correction parameter value recorded on the log tail; if it is equal to the standard condition value, then no correction was applied. Corrections are additive.

To compute corrections for borehole size, borehole fluid salinity, standoff, and mud weight based on alternative parameter values, use the relevant equations applied to the raw Apparent Limestone Porosity curve (mnemonic NPOR). Temperature and pressure corrections should be applied after matrix and formation fluid salinity corrections have been made.

Borehole Size

$$\Delta\Phi = f(\Phi) \cdot f(c)$$

where

$$c = (\text{caliper} - 8.0) \text{ in.}$$

$$f(\Phi) = -0.0000027\Phi^3 - 0.00137\Phi^2 + 0.1484\Phi + 1.61$$

$$f(c) = -0.00017c^3 + 0.0131c^2 - 0.232c$$

Borehole Fluid Salinity

$$\Delta\Phi = k \cdot (0.05\Phi + 1.0)\ \text{MDNACL} / 250$$

where

$$k = (\text{caliper} - 2.25)/5.75 \text{ in.}$$

MDNACL = NaCl equivalent salinity in kppm

Standoff

$$\Delta\Phi = f(\text{standoff}) \cdot f(\Phi) \cdot (\text{caliper}^3/2{,}048 + \text{caliper}^2/256 + \text{caliper}/16)$$

where

$$f(\text{standoff}) = 0.8s^2 - 4.4s$$

$$f(\Phi) = -0.0005\Phi^2 + 0.034\Phi + 0.6$$

$$s = \text{standoff} / k \text{ in.}$$

$$k = (\text{caliper} - 2.25)/5.75 \text{ in.}$$

Mud Weight

Natural Muds

$$\Delta\Phi = (0.0143\Phi + 0.1786) \cdot (w - 8.345)$$

Barite Muds

$$\Delta\Phi = (0.0057\Phi + 0.0714) \cdot (w - 8.345)$$

where

w = mud weight in lb/US gal

Borehole Temperature

$$\Delta\Phi = (0.0007\Phi + 0.001) \cdot (^\circ F - 68)$$

Pressure

$$\Delta\Phi = (0.02 - 0.004\Phi) \cdot \text{kpsi}$$

Lithology-Porosity from Density-Neutron Crossplot

Applicability: MPD and MDN tools, environmentally corrected.
Formation fluid density = 1.0 g/cm3 (Mg/m3).

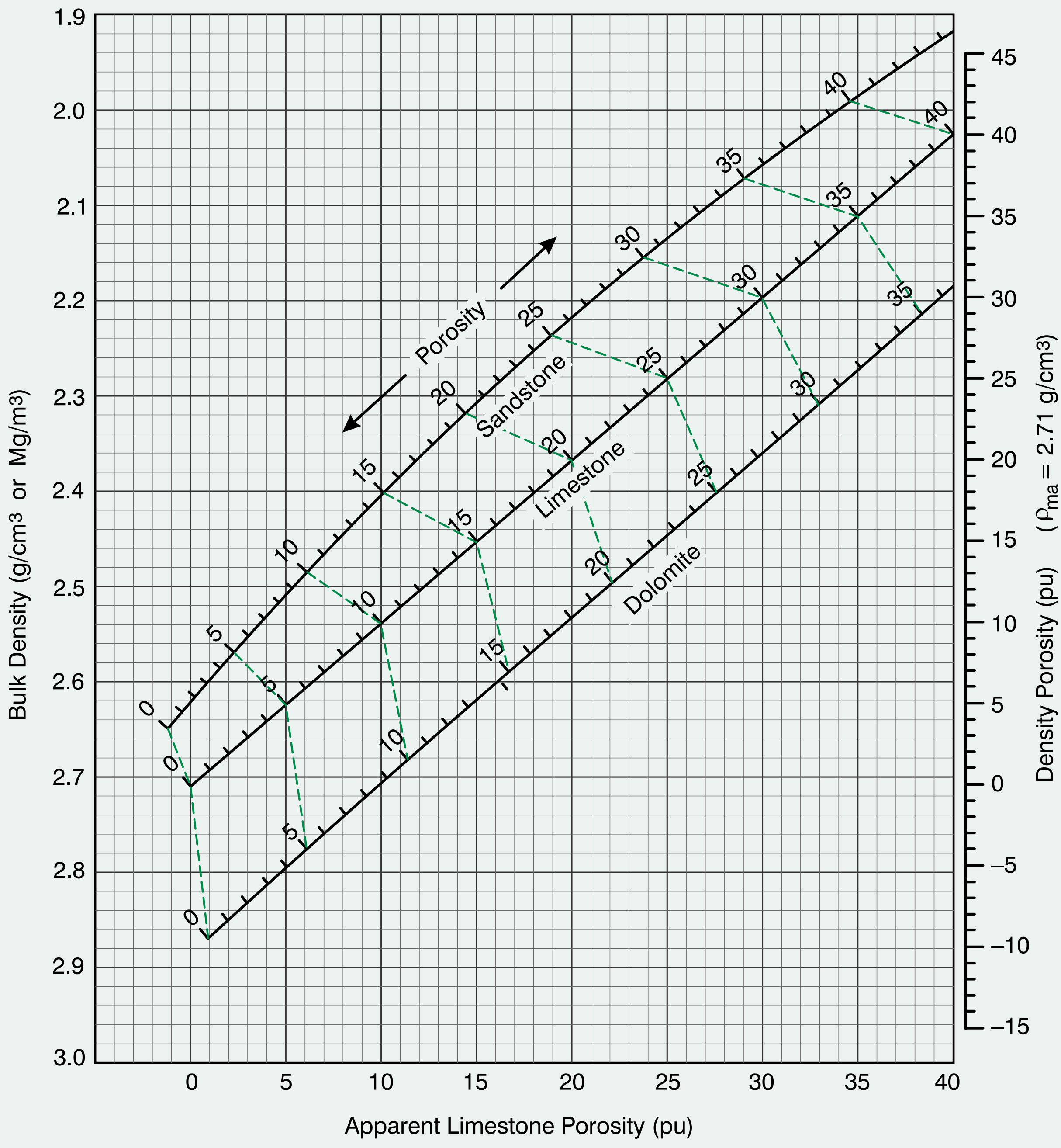


Chart LPC-1

Lithology-Porosity from Density-Neutron Crossplot

Applicability: MPD and MDN tools, environmentally corrected.
Formation fluid density = 1.19 g/cm3 (Mg/m3).

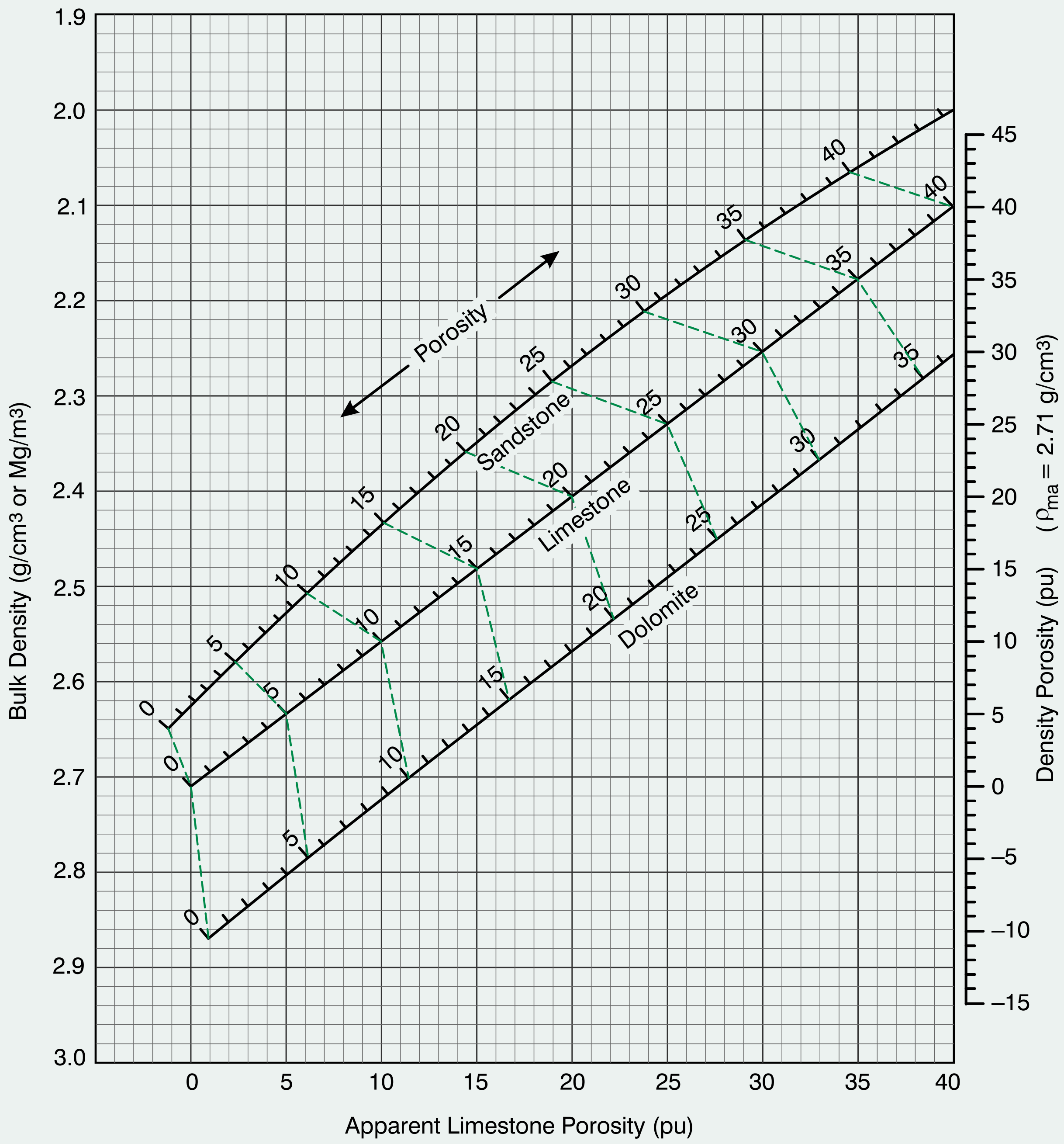


Chart LPC-2

Lithology-Porosity from Sonic-Neutron Crossplot

Applicability: MDN tools, environmentally corrected.
Formation fluid slowness = 189 ms/ft (620 ms/m).

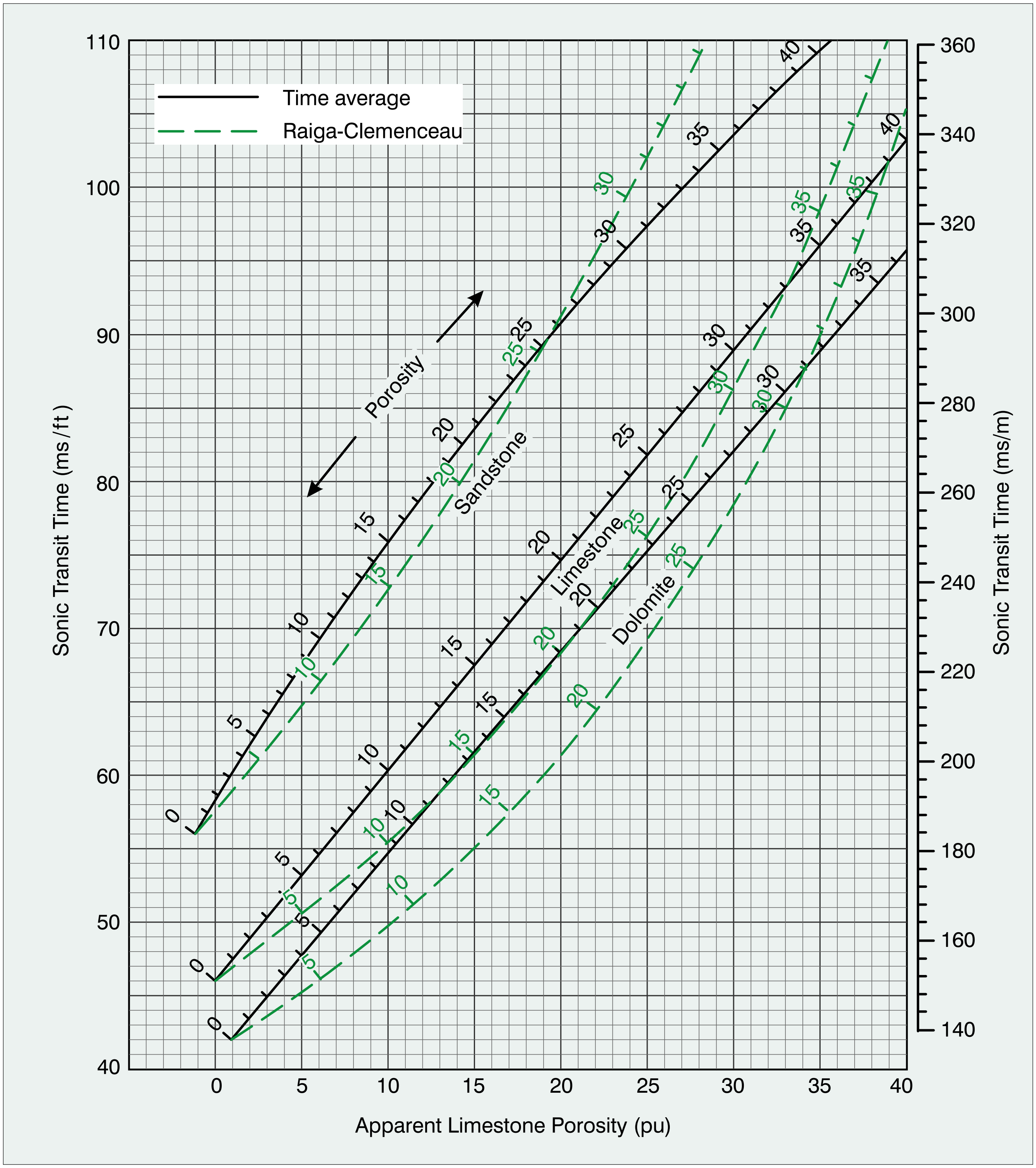
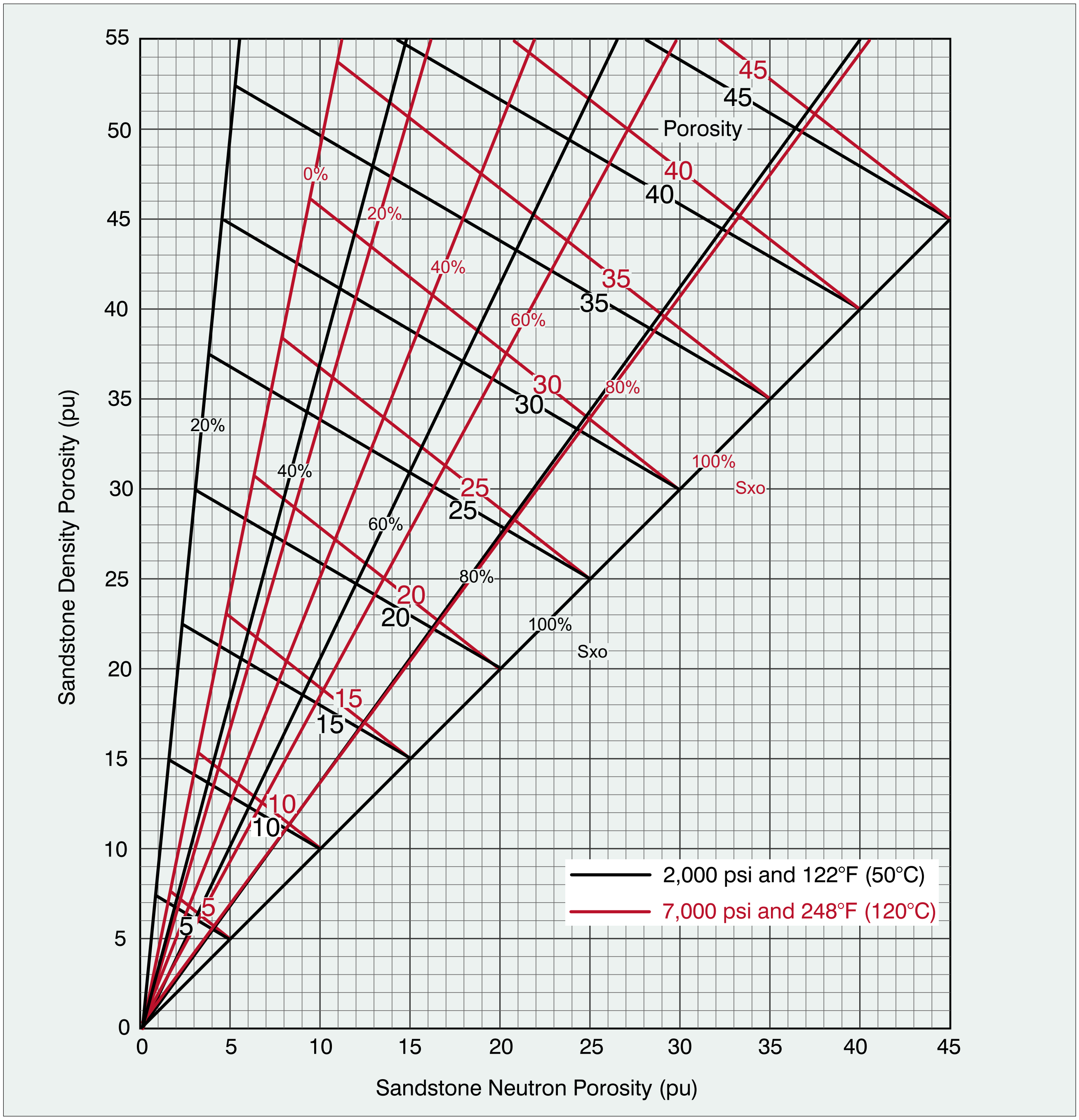


Chart LPC-5

Porosity and Saturation from Density-Neutron Porosity Plot

Applicability: MPD and MDN tools, borehole corrected.
Formation fluid salinity = 0 ppm, gas-bearing formations



Use this chart to compute porosity and gas saturation in gas-bearing formations. It assumes a mixture of methane, fresh water, and silica sand.

Enter with borehole corrected neutron porosity in apparent sandstone units and density porosity computed using an apparent filtrate density of 1.0 g/cc.

Chart Gas-1

Lithology-Porosity from Density-Pe Crossplot

Applicability: MPD series tools.
Fresh-water-filled formations, fluid density = 1.0 g/cm3 (Mg/m3).

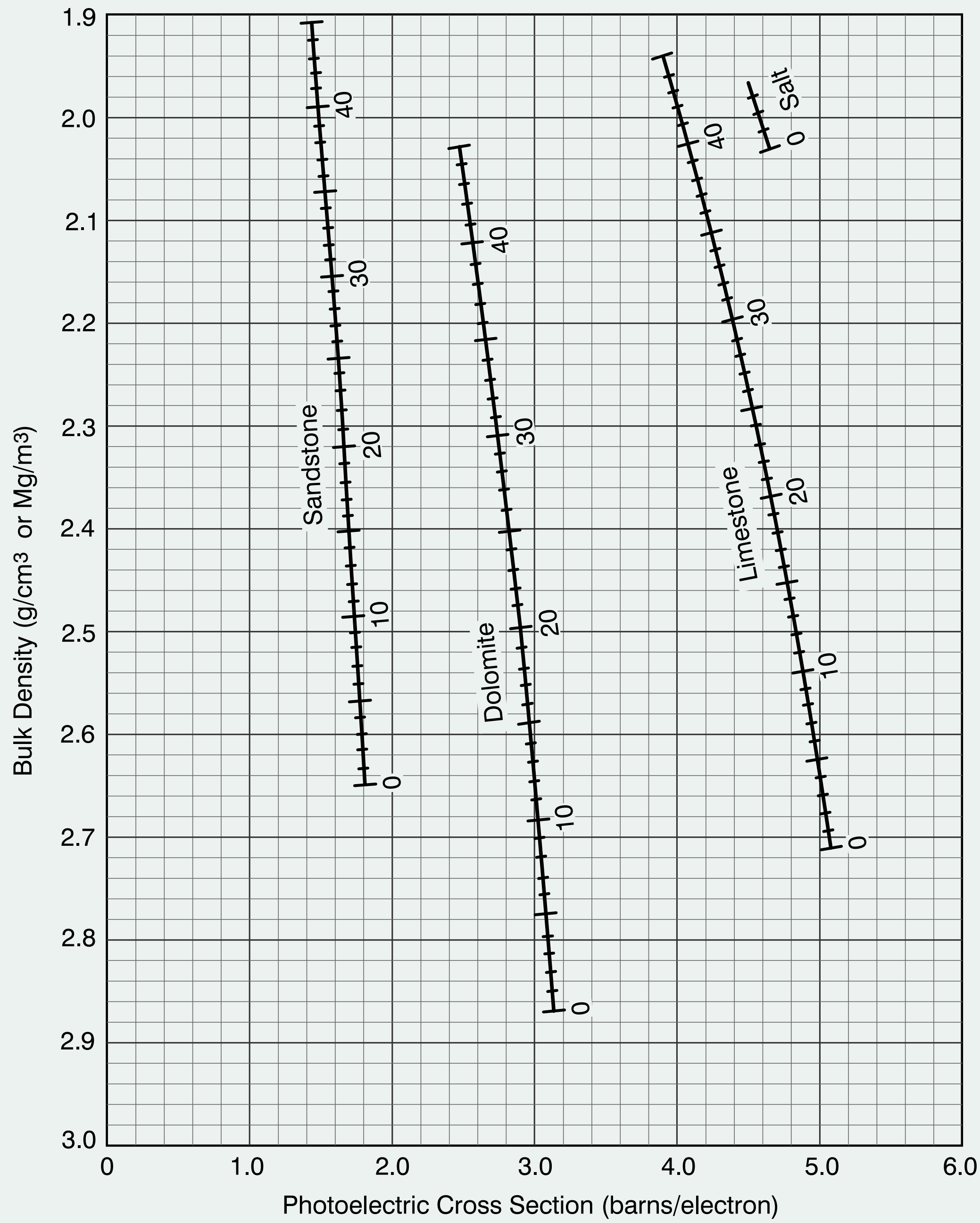


Chart Lpor-11

Lithology-Porosity from Density-Pe Crossplot

Applicability: MPD series tools.
Salt-water-filled formations, fluid density = 1.19 g/cm3 (Mg/m3)

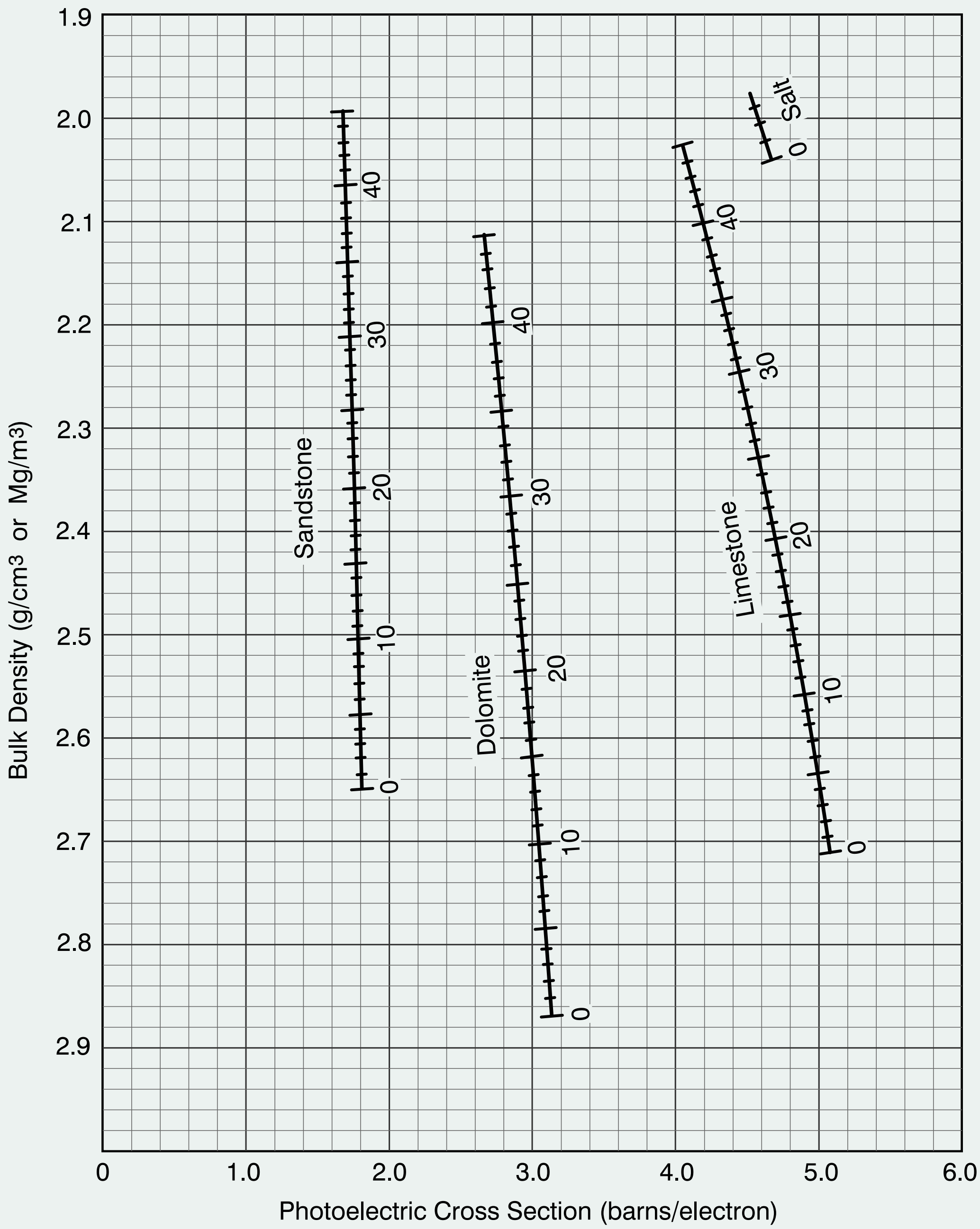
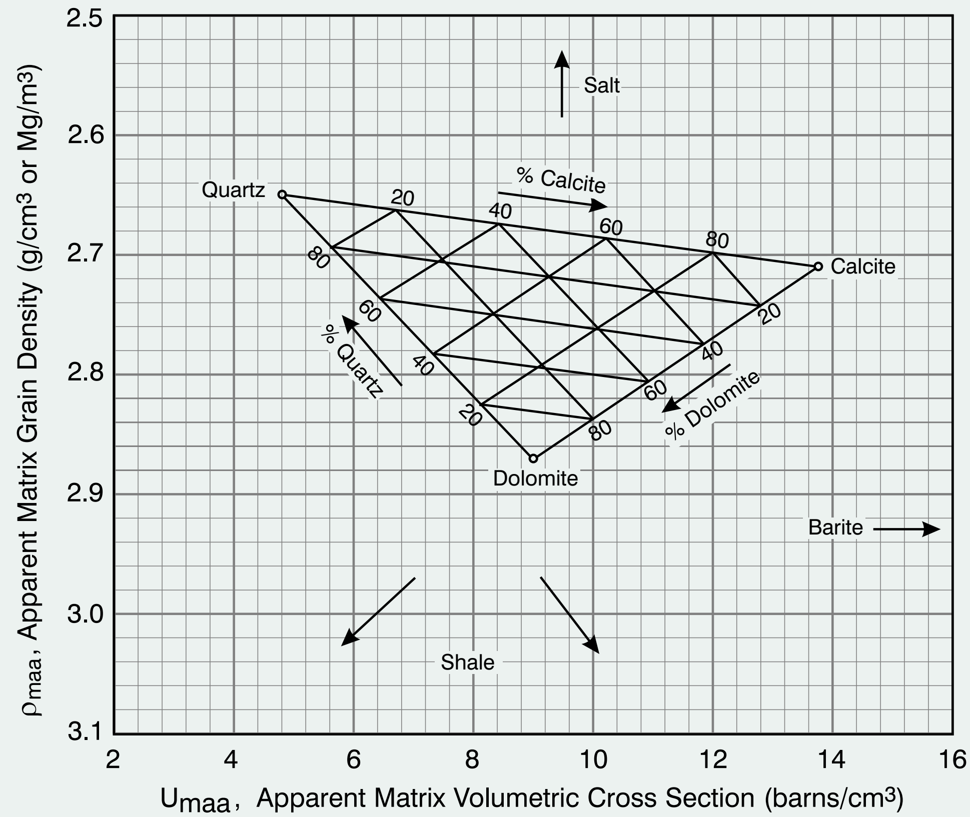


Chart Lpor-12

Matrix Identification from the PhotoDensity



This chart is used to identify matrix components in mixed-lithology formations. Input data are density, Pe, and total porosity computed, for example, from a density-neutron crossplot.

The apparent matrix grain density ρ_{maa} and the apparent matrix volumetric cross section U_{maa} are computed as:

$$\rho_{maa} = \frac{\rho_{log} - \Phi_t \rho_f}{1 - \Phi_t} \quad \text{and} \quad U_{maa} = \frac{P_e \rho_e - \Phi_t U_f}{1 - \Phi_t}$$

where Φ_t is total porosity, ρ_f is formation fluid density, U_f is formation fluid volumetric cross section, and ρ_e is the formation electron density given by:

$\rho_e = \rho_{log}$ ($\rho_{log} > 2.71$ g/cm3)

$\rho_e = (\rho_{log} + 0.187797)/1.07009$ ($1.687 \leq \rho_{log} \leq 2.71$ g/cm3)

$\rho_e = \rho_{log} + 0.065$ ($\rho_{log} < 1.687$ g/cm3)

Typical values for the fluid parameters ρ_f and U_f are:

	ρ_f	U_f
Water (fresh)	1.00	0.40
Water (200 kppm NaCl)	1.11	1.36
Oil	$1.22\,\rho_{oil} - 0.19$	$0.14\,\rho_{oil}$
Gas	$1.33\,\rho_{gas} - 0.19$	$0.12\,\rho_{gas}$

Chart Lith-2

Log Responses in Common Rocks and Minerals

Applicability: *Compact* series tools, standard conditions.

Name	Chemical Formula	$\frac{\Sigma Z}{M}$	ρ log (g/cm^3)	ρ log* (g/cm^3)	Pe (barn/electr.)	U (barn/cm^3)	Φ_{MDN} p.u.	Δtc µs/ft	Δts µs/ft
Quartz	SiO_2	0.499	2.65	2.65	1.81	4.8	–1.2	56	88
Calcite	$CaCO_3$	0.500	2.71	2.71	5.08	13.8	0.0	46	89
Dolomite	$CaMg(CO_3)_2$	0.498	2.87	2.86	3.14	9.0	0.9	42	77
Anhydrite	$CaSO_4$	0.499	2.98	2.96	5.05	14.9	–1.5	51	98
Barite	$BaSO_4$	0.446	4.08	3.99	265.56	1,060.6	–2.0	69	133
Gypsum	$CaSO_4.2H_2O$	0.511	2.35	2.35	3.99	9.5	58.0	52	
Halite	NaCl	0.479	2.03	2.03	4.65	9.6	–2.0	67	120
Sylvite	KCl	0.483	1.86	1.86	8.51	16.3	–2.0	74	140
Siderite	$FeCO_3$	0.483	3.91	3.83	14.62	56.0	12.0	44	85
Hematite	Fe_2O_3	0.476	5.16	5.00	21.48	107.3	11.0	44	74
Magnetite	Fe_3O_4	0.475	5.07	4.92	22.14	108.9	9.0	72	155
Goethite	FeO(OH)	0.484	4.23	4.13	18.90	78.1	60.0+		
Pyrite	FeS_2	0.483	4.99	4.84	16.89	81.8	–2.0	39	62
Orthoclase	$KAlSi_3O_8$	0.496	2.54	2.54	2.86	7.2	–2.0	69	
Anorthoclase	$(Na,K)AlSi_3O_8$	0.496	2.59	2.59	2.86	7.4	–1.0		
Albite	$NaAlSi_3O_8$	0.496	2.58	2.58	1.68	4.4	–1.0	47	98
Anorthite	$CaAl_2Si_2O_8$	0.496	2.74	2.74	3.13	8.6	–1.0	45	
Muscovite	$KAl_2(AlSi_3)O_{10}(OH)_2$	0.497	2.83	2.82	2.40	6.8	20.0	47	79
Biotite	$K(Mg,Fe)_3AlSi_3O_{10}(OH)_2$	0.493	3.19	3.16	6.27	19.2	21.0	49	82
Kaolinite	$Al_4Si_4O_{10}(OH)_8$	0.504	2.64	2.64	1.49	3.9	40.0	212	328
Montmorillonite	$Al_4(Si_4O_{10})_2.nH_2O$	0.502	2.63	2.63	1.63	4.3	47.0		
Illite	$K_yAl_4(Si_{8-y}Al_y)O_{20}(OH)_4$	0.499	2.76	2.76	3.45	9.5	35.0		
Bituminous Coal	$CH_nN_xO_y$	0.527	1.29	1.31	0.17	0.2	60.0+	120	
Anthracite	$CH_nN_xO_y$	0.513	1.55	1.54	0.16	0.3	40.0	105	
Lignite	$CH_nN_xO_y$	0.525	1.28	1.25	0.20	0.3	54.0	160	

* Z/A correction set to Advanced

Chart Lith-3c

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
AIAT	MAI Array Temperature	MAI	*Compact* Array Induction
AIBT	Borehole Temperature Raw		
AIIT	MAI Internal Temperature		
AIR1	Induction Receiver 1		
AIR2	Induction Receiver 2		
AIR3	Induction Receiver 3		
AIR4	Induction Receiver 4		
AIST	MAI Status		
AITC	MAI Transmitter Current		
AIX1	Induction VX1		
AIX2	Induction VX2		
AIX3	Induction VX3		
AIX4	Induction VX4		
APOR	Apparent Porosity		
CIL1	Conductivity Receiver 1		
CIL2	Conductivity Receiver 2		
CIL3	Conductivity Receiver 3		
CIL4	Conductivity Receiver 4		
CILD	Deep Conductivity		
CILM	Medium Conductivity		
CILS	Shallow Conductivity		
IHTD	Differential Temperature		
IHTF	Borehole Temperature		
RILD	Deep Induction		
RILM	Medium Induction		
SYM1	Symmetrised Receiver 1		
SYM2	Symmetrised Receiver 2		
SYM3	Symmetrised Receiver 3		
SYM4	Symmetrised Receiver 4		
VEC0	Shallow Induction		
VEC1	Near Induction		
VEC2	Near Medium Induction		
VEC3	Far Medium Induction		
VEC4	Far Induction		
VEC5	Deepest Induction		
ACCF	Acceleration Magnitude	MBN	*Compact* Borehole Navigation
BAZI	Borehole Azimuth (Mag.)		
BAZT	Borehole Azimuth (True)		
BNBT	MBN Bulkhead Temperature		
BNGR	Gamma Ray Raw		
BNIT	MBN Internal Temperature		
BNST	MBN Status		
BNXA	X Accelerometer		
BNXM	X Magnetometer		
BNYA	Y Accelerometer		
BNYM	Y Magnetometer		
BNZA	Z Accelerometer		
BNZM	Z Magnetometer		
BTLF	Filtered Borehole Tilt		
BTLT	Borehole Tilt		
BZAC	Z Accelerometer Counts		
BZAT	Z Accelerometer Time		
GBNE	Borehole Corrected Gamma		
GRBG	Gamma Ray		
HSBA	Relative Bearing (HS)		
MAGF	Field Magnitude		

Curve Mnemonic	Curve Description	Tool	Tool Description
NDAA	Depth Difference	MBN	*Compact* Borehole Navigation
NDPT	Speed Corrected Depth		
NSPD	PROCESSED Speed		
RAZI	Azimuth of Reference		
SAAZ	Apparent Azimuth		
SRBA	Relative Bearing		
CCLG	Casing Collar Locator	MCG	*Compact* Comms Gamma
CGCL	CCL Raw		
CGDT	Downhole Tension		
CGFR	Fluid Resistance		
CGGR	Gamma Ray Raw		
CGIT	MCG Internal Temperature		
CGSP	SP Raw		
CGST	MCG Status		
CGVN	Line Voltage (–ve)		
CGVP	Line Voltage (+ve)		
CGVT	Line Voltage		
CGXT	MCG External Temperature		
GGCE	Borehole Corrected Gamma		
GRGC	Gamma Ray		
SPCG	Spontaneous Potential		
DNFD	Far Neutron Raw	MDN	*Compact* Dual Neutron
DNFT	Far Neutron Dead Time		
DNIT	MDN Internal Temperature		
DNND	Near Neutron Raw		
DNNT	Near Neutron Dead Time		
DNST	MDN Status		
NPOR	Base Neutron Porosity		
NPRD	Dolomite Neutron Por.		
NPRL	Limestone Neutron Por.		
NPRS	Sandstone Neutron Por.		
NRAT	Neutron Ratio (Near/Far)		
FEFC	Shallow FE (Phase Corr.)	MFE	*Compact* Focused Electric
FEFE	Shallow FE		
FEFR	Shallow FE (No Corr.)		
FEFV	MFE Fish Voltage		
FEIT	MFE Internal Temperature		
FEQC	Quadrature FE (Phase C.)		
FEQR	Quadrature FE (No Corr.)		
FEQS	Quadrature FE		
FERI	MFE Current		
FERV	MFE Voltage		
FESI	MFE Sense DC Current		
FEST	MFE Status		
FEXI	MFE Quadrature Current		
FEXV	MFE Quadrature Voltage		
BHUN	Paine P. (Abs) 100s	MFT	*Compact* Formation Tester
BONE	Paine P. (Abs) 1s		
BTEN	Paine P. (Abs) 10s		
BTHO	Paine P. (Abs) 1000s		
BTTH	Paine P. (Abs) 10000s		
FCCP	MFC Caliper		
FCIT	MFC Internal Temperature		
FCMC	MFC Motor Current		
FCMS	MFC Motor Speed		
FCMT	MFC Motor Temperature		

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
FCST	MFC Section Status	MFT	*Compact* Formation Tester
FPEX	MFP Extended Status		
FPGP	Paine Pressure Raw		
FPGT	Paine Gauge Temperature		
FPIT	MFP Internal Temperature		
FPMC	MFP Motor Current		
FPMS	MFP Motor Speed		
FPMT	MFP Motor Temperature		
FPNG	Paine Voltage (–ve)		
FPPP	Piston Position		
FPPS	Paine Voltage (+ve)		
FPPV	Paine Voltage		
FPQC	Quartzdyne Pressure (C)		
FPQH	Quartzdyne Temp. (C)		
FPQT	Quartzdyne Reference		
FPST	MFP Section Status		
PGAB	Paine Pressure (Abs)		
PGPF	Paine Pressure (Gauge)		
PHUN	Paine P. (Gge) 100s		
PKEY	Piston Control		
PONE	Paine P. (Gge) 1s		
PSVL	Piston Swept Volume		
PTEN	Paine P. (Gge) 10s		
PTHO	Paine P. (Gge) 1000s		
PTTH	Paine P. (Gge) 10000s		
QDPF	Quartzdyne Pressure		
QFRC	Quartzdyne Fraction		
QHUN	Quartzdyne 100s		
QONE	Quartzdyne 1s		
QTEM	Quartzdyne Temperature		
QTEN	Quartzdyne 10s		
QTHO	Quartzdyne 1000s		
QTTH	Quartzdyne 10000s		
TPRE	Pretest Time		
GDIT	MGD Internal Temperature	MGD	*Compact* Gas Detector
GDLO	Lower Gas Detector		
GDST	MGD Status		
GDUP	Upper Gas Detector		
GCSL	MCL C. Collar Locator		
GGME	Borehole Corr. MGS Gamma	MGS	*Compact* Gamma Sonde
GRGM	MGS Gamma Ray		
GSCL	MGS CCL Raw		
GSFR	MGS Fluid Resistance		
GSGR	MGS Gamma Ray Raw		
GSIT	MGS Internal Temperature		
GSSP	MGS SP Raw		
GSST	MGS Status		
GSVN	MGS Line Voltage (–ve)		
GSVP	MGS Line Voltage (+ve)		
GSVT	MGS Line Voltage		
GSXT	MGS External Temperature		
SPGS	MGS SP		
BHTD	Differential Temperature	MHT	*Compact* High-res Temp
BHTF	Borehole Temperature		
HTBT	Borehole Temperature Raw		
HTIT	MHT Internal Temperature		

Curve Mnemonic	Curve Description	Tool	Tool Description
HTST	MHT Status	MHT	*Compact* High-res Temp
AZII	Dip Azimuth From Imager	MIE	*Compact* Imager Electrodes
BT1L	Imager Pad 1 Lower Row		
BT1U	Imager Pad 1 Upper Row		
BT2L	Imager Pad 2 Lower Row		
BT2U	Imager Pad 2 Upper Row		
BT3L	Imager Pad 3 Lower Row		
BT3U	Imager Pad 3 Upper Row		
BT4L	Imager Pad 4 Lower Row		
BT4U	Imager Pad 4 Upper Row		
BT5L	Imager Pad 5 Lower Row		
BT5U	Imager Pad 5 Upper Row		
BT6L	Imager Pad 6 Lower Row		
BT6U	Imager Pad 6 Upper Row		
BT7L	Imager Pad 7 Lower Row		
BT7U	Imager Pad 7 Upper Row		
BT8L	Imager Pad 8 Lower Row		
BT8U	Imager Pad 8 Upper Row		
BTM1	Imager Pad 1 Md. Current		
BTM2	Imager Pad 2 Md. Current		
BTM3	Imager Pad 3 Md. Current		
BTM4	Imager Pad 4 Md. Current		
BTM5	Imager Pad 5 Md. Current		
BTM6	Imager Pad 6 Md. Current		
BTM7	Imager Pad 7 Md. Current		
BTM8	Imager Pad 8 Md. Current		
BTN1	Imager Pad 1		
BTN2	Imager Pad 2		
BTN3	Imager Pad 3		
BTN4	Imager Pad 4		
BTN5	Imager Pad 5		
BTN6	Imager Pad 6		
BTN7	Imager Pad 7		
BTN8	Imager Pad 8		
CORI	Dip Cor. From Imager		
DI26	Imager Diameter 2 – 6		
DI48	Imager Diameter 4 – 8		
DIPI	Dip Angle From Imager		
IAAZ	Apparent Azimuth		
IACF	Acceleration Magnitude		
IAP1	Azimuth of Reference		
IAZI	Borehole Azimuth (Mag.)		
IAZT	Borehole Azimuth (True)		
IEAT	MIE Acc. Temperature		
IEAX	MIE Accelerometer X		
IEAY	MIE Accelerometer Y		
IEB1	MIE Button 1		
IEB2	MIE Button 2		
IEB3	MIE Button 3		
IEB4	MIE Button 4		
IEB5	MIE Button 5		
IEB6	MIE Button 6		
IEB7	MIE Button 7		
IEB8	MIE Button 8		
IEBT	MIE Board Temperature		
IEC2	MIE Caliper 2		

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
IEC4	MIE Caliper 4	MIE	*Compact* Imager Electrodes
IEC6	MIE Caliper 6		
IEC8	MIE Caliper 8		
IECX	MIE Caliper X		
IECY	MIE Caliper Y		
IECZ	MIE Acc. Z Counts		
IEDA	MIE Drive Volts (Arm)		
IEDC	MIE Data Counter		
IEDD	MIE Drive Volts (Dref)		
IEDI	MIE Drive Current		
IEDZ	MIE Acc. Z Time		
IEMI	MIE Motor Current		
IEMP	MIE Motor Position		
IEMX	MIE Magnetometer X		
IEMY	MIE Magnetometer Y		
IEMZ	MIE Magnetometer Z		
IEOF	MIE A/D Offset		
IEP1	MIE Pad 1 Data		
IEP2	MIE Pad 2 Data		
IEP3	MIE Pad 3 Data		
IEP4	MIE Pad 4 Data		
IEP5	MIE Pad 5 Data		
IEP6	MIE Pad 6 Data		
IEP7	MIE Pad 7 Data		
IEP8	MIE Pad 8 Data		
IEPA	MIE Parity		
IEPT	MIE Pad Temperature		
IES0	MIE Status 0		
IES1	MIE Status 1		
IETT	MIE Accelerometer Temp.		
IETX	MIE Magnetometer X		
IETY	MIE Magnetometer Y		
IETZ	MIE Magnetometer Z		
IEVR	MIE Volt Reference		
IEXA	MIE Accelerometer X		
IEYA	MIE Accelerometer Y		
IEZC	MIE Acc. Z Counts		
IEZT	MIE Acc. Z Time		
IFTT	Filtered Borehole Tilt		
IMAX	MIE Accelerometer X		
IMAY	MIE Accelerometer Y		
IMGF	Field Magnitude		
IMGX	MIE Magnetometer X		
IMGY	MIE Magnetometer Y		
IMGZ	MIE Magnetometer Z		
IMT1	Imager Trace 1		
IMT3	Imager Trace 3		
IMT5	Imager Trace 5		
IMT7	Imager Trace 7		
IMZA	Z Accelerometer		
IRBR	Relative Bearing		
IRHS	Relative Bearing (HS)		
IRKT	Breakout Angle		
ITLT	Borehole Tilt		
NDCC	Depth Difference		
NDPI	Speed Corrected Depth		

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
NSPI	PROCESSED Speed	MIE	*Compact* Imager Electrodes
RAX1	Imager Pad 1 Radius		
RAX5	Imager Pad 5 Radius		
RAY3	Imager Pad 3 Radius		
RAY7	Imager Pad 7 Radius		
IMCB	MIM Current Block	MIM	*Compact* Imager Memory
IMCC	MIM Current Chip		
IMCF	MIM Current File Number		
IMCK	MIM Time/Date		
IMCP	MIM Current Page		
IMGR	MMI Image		
IMIT	MIM Internal Temperature		
IMMN	MMI Image Mean		
IMS0	MIM Status 0		
IMS1	MIM Status 1		
IMS2	MIM Status 2		
IMSD	MMI Image Standard Dev.		
DA1F	Filtered A1D Voltage	MLE	*Compact* Laterolog Electrode
DDIF	Filtered Deep Current		
DDLB	Corrected Deep Laterolog		
DDLL	Deep Laterolog		
DDMR	Deep App. Mud Res.		
DDVF	Filtered Deep Voltage		
DGLL	Groningen Laterolog		
DGVF	Filt. Groningen Voltage		
DLA1	A1D Electrode Voltage		
DLDC	Deep Current Check		
DLDG	Deep Guard Current		
DLDI	Deep Current		
DLDV	Deep Voltage		
DLGV	Groningen Voltage		
DLIT	MDL Internal Temperature		
DLSC	Shallow Current Check		
DLSF	MDL Status 2		
DLSG	Shallow Guard Current		
DLSI	Shallow Current		
DLSP	SP Voltage Raw		
DLST	MDL Status 1		
DLSV	Shallow Voltage		
DLV1	V1 Electrode Voltage		
DLVD	Deep Voltage Check		
DLVR	Voltage Reference		
DLVS	Shallow Voltage Check		
DLZS	A/D Zero Voltage		
DSGF	Filt Shal Guard Current		
DSIF	Filtered Shallow Current		
DSLB	Corr. Shallow Laterolog		
DSLL	Shallow Laterolog		
DSMR	Shallow App. Mud Res.		
DSVF	Filtered Shallow Voltage		
DV1F	Filtered V1 Voltage		
M333	Shallow Laterolog Cond.		
M33B	Corr. Shallow Lat. Cond.		
M444	Deep Laterolog Cond.		
M44B	Corr Deep Laterolog Cond		
M555	Groningen Laterolog Con.		

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
M66B	Corr. MicroRes (S) Cond.	MLE	*Compact* Laterolog Electrode
SPDL	Spontaneous Potential		
M111	Micro-normal Cond.	MML	*Compact* MicroLog
M222	Micro-Inverse Cond.		
MINV	Micro-inverse		
MLCP	MML Caliper Raw		
MLIT	MML Internal Temperature		
MLIV	Micro-inverse Voltage		
MLMC	MML Motor Current		
MLMV	MML Motor Voltage		
MLNV	Micro-normal Voltage		
MLST	MML Status		
MLTC	MML Caliper		
MMLI	Micro-normal Current		
MNRL	Micro-normal		
M666	MicroRes (S) Cond.	MMR	*Compact* MicroResistivity
M777	MicroRes (G) Cond.		
M888	MMR MicroLog Normal Con.		
M999	MMR MicroLog Inverse Con		
MACP	MMR Caliper Raw		
MAI1	MMR MicroRes Current 1		
MAI2	MMR MicroRes Current 2		
MAIT	MMR Internal Temperature		
MAMC	MMR Motor Current		
MAMV	MMR Motor Voltage		
MAST	MMR Status		
MATC	MMR Caliper		
MAV1	MMR MicroRes Voltage 1		
MBCP	MMR Caliper Raw		
MBIT	MMR Internal Temperature		
MBIV	MMR MicroLog Voltage (I)		
MBLI	MMR MicroLog Current		
MBMC	MMR Motor Current		
MBMV	MMR Motor Voltage		
MBNV	MMR MicroLog Voltage (N)		
MBST	MMR Status		
MBTC	MMR Caliper		
MINV	MMR MicroLog Inverse		
MNRL	MMR MicroLog Normal		
MRRG	MicroRes Resistance (G)		
MRRS	MicroRes Resistance (S)		
MRSB	Corr MicroRes Resis. (S)		
MMAD	MMS.C A/D Offset Voltage	MMS-C	*Compact* Memory Sonde
MMBT	MMS.C Borehole Temp.		
MMBV	MMS.C Battery Voltage		
MMCK	MMS.C Sonde Time		
MMDC	MMS.C DC+ DC–		
MMIT	MMS.C Board Temperature		
MMOV	MMS.C 0V Offset		
MMPD	MMS.C Paine Drive Volt.		
MMPP	MMS.C Paine Pressure		
MMSF	MMS.C Flash Mem. Status		
MMSN	MMS.C Sample Number		
MMST	MMS.C Status		
MMVR	MMS.C Reference Voltage		
CLDC	Density Caliper	MPD	*Compact* Photo Density

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
DCCP	Density Caliper Raw	MPD	*Compact* Photo Density
DCOR	Density Correction		
DEN	Compensated Density		
DENF	Far Spaced Density		
DENN	Near Spaced Density		
DPOR	Base Density Porosity		
DPRD	Dolomite Density Por.		
DPRL	Limestone Density Por.		
DPRS	Sandstone Density Por.		
FMDT	Far Mean Dead Time		
HDEN	Vectar Processed Density		
MTXD	Matrix density		
NMDT	Near Mean Dead Time		
PCIT	MPD Internal Temperature		
PCMC	MPD Motor Current		
PCST	MDC Status		
PDFC	Far Density Counts		
PDFE	MPD Far EHT		
PDFL	Far Lock Counts		
PDFS	Far Density Spectrum		
PDFT	Far Density Dead Time		
PDHD	MPD PE Hard Counts		
PDIT	MPD Internal Temperature		
PDNC	Near Density Counts		
PDNE	MPD Near EHT		
PDNL	Near Lock Counts		
PDNS	Near Density Spectrum		
PDNT	Near Density Dead Time		
PDPE	PE		
PDSF	MPD PE Soft Counts		
PDST	MPD Status		
PFSD	Far Density SDU		
PFTC	Far Total Counts, No D/T		
PNSD	Near Density SDU		
PNTC	Near Total Counts, No D/T		
XPOR	Crossplot Porosity		
AVOL	Annular Volume	MPD, MTC, MML, MMR, MIE	
DFCL	Differential Caliper	MPD, MTC, MML, MMR	
HVOL	Hole Volume	MPD, MTC, MML, MMR, MIE	
GCGR	SGS Corrected Gamma Ray	MSG	*Compact* Spectral Gamma
GR	SGS Gamma Ray		
GRPO	Potassium Gamma		
GRTH	Thorium Gamma		
GRUR	Uranium Gamma		
HTSG	SGS EHT 2		
RAKT	TH/K		
RAKU	U/K		
RAUT	TH/U		
SGD1	Disc. 1 (Gamma Ray Raw)		
SGD2	Disc. 2		
SGD3	Disc. 3		
SGD4	Disc. 4		
SGD5	Disc. 5		
SGD6	Disc. 6		
SGG1	Gate 1		
SGG2	Gate 2		

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
SGG3	Gate 3	MSG	*Compact* Spectral Gamma
SGG4	Gate 4		
SGG5	Gate 5		
SGHT	SGS EHT 1		
STSG	SGS Status		
DL11	4' Discriminator Level	MSS	*Compact* Sonic Sonde
DL12	6' Discriminator Level		
DL21	3' Discriminator Level		
DL22	5' Discriminator Level		
DT34	3–4' Compensated Sonic		
DT35	3–5' Compensated Sonic		
DT45	4–5' Compensated Sonic		
DT46	4–6' Compensated Sonic		
DT56	5–6' Compensated Sonic		
DTSM	Smeared 3–4' Sonic		
FGAP	Fixed Gate Peak Ampl.		
FGTR	Fixed Gate Peak Tr. Time		
FGTT	Fixed Gate Dsc. Tr. Time		
PK11	4' Peak Amplitude		
PK12	6' Peak Amplitude		
PK21	3' Peak Amplitude		
PK22	5' Peak Amplitude		
PT11	4' Time To Pk. Amplitude		
PT12	6' Time To Pk. Amplitude		
PT21	3' Time To Pk. Amplitude		
PT22	5' Time To Pk. Amplitude		
RN11	4' Road Noise Max. Defl.		
RN12	6' Road Noise Max. Defl.		
RN21	3' Road Noise Max. Defl.		
RN22	5' Road Noise Max. Defl.		
SEM1	Waveform-PROCESSED Semb. 1		
SEM2	Waveform-PROCESSED Semb. 2		
SHRD	Dolomite H-R Sonic Por.		
SHRL	Limestone H-R Sonic Por.		
SHRS	Sandstone H-R Sonic Por.		
SIV1	Waveform-PROCESSED Sonic 1		
SIV2	Waveform-PROCESSED Sonic 2		
SPRD	Dolomite Sonic Porosity		
SPRL	Limestone Sonic Porosity		
SPRS	Sandstone Sonic Porosity		
STGN	MSS Gain Status		
STIT	MSS Internal Temperature		
STPK	MSS Peak Status		
STSS	MSS Status		
STWS	MSS Waveform Seg. Status		
TR11	4' Transit Time		
TR12	6' Transit Time		
TR21	3' Transit Time		
TR22	5' Transit Time		
TS11	4' Transit Time Set		
TS12	6' Transit Time Set		
TS21	3' Transit Time Set		
TS22	5' Transit Time Set		
VL34	3–4' Compensated Sonic		
VL35	3–5' Compensated Sonic		
Vl45	4–5' Compensated Sonic		

Curve Mnemonic	Curve Description	Tool	Tool Description
VL46	4–6' Compensated Sonic	MSS	*Compact* Sonic Sonde
VL56	5–6' Compensated Sonic		
VLSM	Smeared 3–4' Sonic		
WF11	4' Waveform		
WF12	6' Waveform		
WF21	3' Waveform		
WF22	5' Waveform		
WL11	4' Peak Window Length		
WL12	6' Peak Window Length		
WL21	3' Peak Window Length		
WL22	5' Peak Window Length		
WS11	4' Peak Window Start		
WS12	6' Peak Window Start		
WS21	3' Peak Window Start		
WS22	5' Peak Window Start		
WSEG	Waveform Segment		
MSPD	Logging Speed	MSU	*Compact* Service Unit
SMDA	DST Analog Channel A		
SMDB	DST Analog Channel B		
SMM0	SMS Channel 0		
SMM1	SMS Channel 1		
SMM2	SMS Channel 2		
SMM3	SMS Channel 3		
SMM4	SMS Channel 4		
SMM5	SMS Channel 5		
SMM6	SMS Channel 6		
SMM7	SMS Channel 7 (temp.)		
SMST	SMS Status		
SMTD	DST Downhole Tension		
SMTU	DST Uphole Tension		
CLTC	Two-Arm Caliper	MTC	*Compact* Two-arm Caliper
CLXC	X Two-Arm Caliper		
CLYC	Y Two-Arm Caliper		
CLZC	Z Two-Arm Caliper		
TCCP	Two-Arm Caliper Raw		
TCIT	MTC Internal Temperature		
TCMC	MTC Motor Current		
TCMV	MTC Motor Voltage		
TCST	MTC Status		
XCCP	Two-Arm X caliper Raw		
XCIT	MTX Internal Temperature		
XCMC	MTX Motor Current		
XCMV	MTX Motor Voltage		
XCST	MTX Status		
YCCP	Two-Arm Y Caliper Raw		
YCIT	MTY Internal Temperature		
YCMC	MTY Motor Current		
YCMV	MTY Motor Voltage		
YCST	MTY Status		
ZCCP	Two-Arm Z Caliper Raw		
ZCIT	MTZ Internal Temperature		
ZCMC	MTZ Motor Current		
ZCMV	MTZ Motor Voltage		
ZCST	MTZ Status		
SBHN	SER Paine P. (A) 100s	SER	Shuttle Electric Release
SBNE	SER Paine P. (A) 1s		

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
SBTH	SER Paine P. (A) 10000s	SER	Shuttle Electric Release
SBTN	SER Paine P. (A) 10s		
SBTO	SER Paine P. (A) 1000s		
SPET	SER Paine Gauge Temp.		
SPEX	SER Extended Status		
SPGB	SER Paine Pressure (Abs)		
SPGF	SER Paine Pres. (Gauge)		
SPGP	SER Paine Pressure Raw		
SPHN	SER Paine P. (G) 100s		
SPIT	SER Internal Temperature		
SPMC	SER Motor Current		
SPMS	SER Motor Speed		
SPMT	SER Motor Temperature		
SPNG	SER Paine Voltage (–ve)		
SPOE	SER Paine P. (G) 1s		
SPPP	SER Piston Position		
SPPS	SER Paine Voltage (+ve)		
SPPV	SER Paine Voltage		
SPQC	SER Quartzdyne Pres. (C)		
SPQH	SER Quartzdyne Temp. (C)		
SPQT	SER Quartzdyne Reference		
SPSL	SER Piston Swept Volume		
SPST	SER Section Status		
SPTH	SER Paine P. (G) 10000s		
SPTN	SER Paine P. (G) 10s		
SPTO	SER Paine P. (G) 1000s		
SQDF	SER Quartzdyne Pressure		
SQFC	SER Quartzdyne Fraction		
SQHN	SER Quartzdyne 100s		
SQOE	SER Quartzdyne 1s		
SQTE	SER Quartzdyne 10s		
SQTH	SER Quartzdyne 10000s		
SQTM	SER Quartzdyne Temp.		
SQTO	SER Quartzdyne 1000s		
WBHN	WRT Paine P. (A) 100s	WRT	Wireline Release Tool
WBNE	WRT Paine P. (A) 1s		
WBTH	WRT Paine P. (A) 10000s		
WBTN	WRT Paine P. (A) 10s		
WBTO	WRT Paine P. (A) 1000s		
WQDF	WRT Quartzdyne Pressure		
WQFC	WRT Quartzdyne Fraction		
WQHN	WRT Quartzdyne 100s		
WQOE	WRT Quartzdyne 1s		
WQTE	WRT Quartzdyne 10s		
WQTH	WRT Quartzdyne 10000s		
WQTM	WRT Quartzdyne Temp.		
WQTO	WRT Quartzdyne 1000s		
WRET	WRT Paine Gauge Temp.		
WREX	WRT Extended Status		
WRGB	WRT Paine Pressure (Abs)		
WRGF	WRT Paine Pres. (Gauge)		
WRGP	WRT Paine Pressure Raw		
WRHN	WRT Paine P. (G) 100s		
WRIT	WRT Internal Temperature		
WRMC	WRT Motor Current		
WRMS	WRT Motor Speed		

Curve Mnemonic	Curve Description	Tool	Tool Description
WRMT	WRT Motor Temperature	WRT	Wireline Release Tool
WRNG	WRT Paine Voltage (–ve)		
WROE	WRT Paine P. (G) 1s		
WRPP	WRT Piston Position		
WRPS	WRT Paine Voltage (+ve)		
WRPV	WRT Paine Voltage		
WRQC	WRT Quartzdyne Pres. (C)		
WRQH	WRT Quartzdyne Temp. (C)		
WRQT	WRT Quartzdyne Reference		
WRSL	WRT Piston Swept Volume		
WRST	WRT Section Status		
WRTH	WRT Paine P. (G) 10000s		
WRTN	WRT Paine P. (G) 10s		
WRTO	WRT Paine P. (G) 1000s		
BCDC	Corr. Deep Conductivity	Analysis	Analysis
BCDL	Corrected Deep Laterolog		
BCMC	Corr. Micro Conductivity		
BCML	Corr. Micro Laterolog		
BCSC	Corr. Shallow Conduct.		
BCSL	Corr. Shallow Laterolog		
BMOD	Bulk Modulus		
CLPR	Closure Pressure		
COAL	Volume of Coal		
COMP	Bulk Compressibility		
DCAL	Differential Caliper		
DENA	Apparent Density		
DES1	Data Edit Shade One		
DES2	Data Edit Shade Two		
DILL	Invasion Depth		
DPHI	Density Porosity		
DTA	Apparent Delta T		
DTP1	Delta Pressure 1		
DTP2	Delta Pressure 2		
DTP3	Delta Pressure 3		
DTP4	Delta Pressure 4		
DTP5	Delta Pressure 5		
EDIT	Data Edit Curve		
ESTP	Estim. Poisson's Ratio		
FEDT	Data Edit Curve		
FF	Formation Factor		
FGAS	Gas Flag		
FHT0	Fracture Extent 0		
FP	Formation Pressure		
FPRF	Perforations		
FPSH	Closure Pressure Grad.		
FRPG	Fracture Pressure Grad.		
FT	Formation Temperature		
FWD1	Fracture Width 1		
FWD2	Fracture Width 2		
FWD3	Fracture Width 3		
FWD4	Fracture Width 4		
FWD5	Fracture Width 5		
GMOD	Shear Modulus		
HI	Hydrogen Index		
INVD	Invasion Depth		
INVM	Maximum Invasion Depth		

Compact™ Curve Mnemonics

Curve Mnemonic	Curve Description	Tool	Tool Description
LEDT	Data Edit Curve	Analysis	Analysis
NETP	Nett Pay		
NETR	Nett Reservoir		
NPHI	Neutron Porosity		
PERM	Permeability		
PHDN	Density/Neutron Porosity		
PHDS	Density/Sonic Porosity		
PHI1	Primary Porosity		
PHI2	Bad Hole Porosity		
PHIA	Apparent Neutron Por.		
PHID	Density Porosity		
PHIE	Effective Porosity		
PHIG	Gaymard Porosity		
PHIN	Neutron Porosity		
PHIS	Sonic Porosity		
PHIX	Crossplot Porosity		
PHSN	Sonic/Neutron Porosity		
POIR	Poisson's Ratio		
PORE	Pore Pressure		
RHOG	Apparent Matrix Density		
RO	RO		
RTLC	Rt Conductivity		
RTLL	Rt		
RWA	Apparent Water Res.		
RXOC	Rxo Conductivity		
RXOL	Rxo		
RXRT	RXO/RT		
SATD	Mean Saturation Depth		
SATP	Saturation Profile		
SGAS	Saturation of Gas		
SHYC	Saturation Hydrocarbons		
SOIL	Saturation of Oil		
SPVF	Delta T Compressional		
SSVF	Delta T Shear		
SW	Saturation of Water		
SWWW	Saturation of Water		
SXO	Sat Mud Filtrate + Water		
VANH	Volume of Anhydrite		
VCMB	Vw + Voil		
VDOL	Volume of Dolomite		
VGAS	Volume of Gas		
VHAL	Volume of Halite		
VHYC	Volume of Hydrocarbons		
VLME	Volume of Limestone		
VMA	Matrix Volume		
VOIL	Volume of Oil		
VOL1	Phie + Vlime + Vsand		
VOL2	Phie + Vsand		
VOL3	Vsh + Vanhy		
VP14	Enhanced Shallow Cond.		
VP15	VP15		
VP20	VP20		
VP25	Enhanced Medium Cond.		
VP30	VP30		
VP40	VP40		
VP60	VP60		

Curve Mnemonic	Curve Description	Tool	Tool Description
VP65	Enhanced Deep Cond.	Analysis	Analysis
VP85	VP85		
VPFE	Vivid Shallow FE		
VRAT	Velocity Ratio		
VSH	Volume of Shale		
VSND	Volume of Sandstone		
VW	Volume of Water		
VXO	Vol Mud Filtrate + Water		
WAV1	Invasion Profile		
YMOD	Young's Modulus		

Log Interpretation Charts
Compact™ Tool Series

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