Metric drilling calculation reference

Remote Operations Professionals (ROP) / Drivers Seat

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Results display up to seven significant digits; calculations retain full precision unless a stated well-control rounding rule applies. All inputs, formulas and results use the stated metric/SI units. Hydrostatic pressure uses 0.00981 with density in kg/m^3, depth in m and pressure in kPa. The linked IADC SI sheet directs kill density UP to two decimal places, LOT equivalent density DOWN to two decimal places, and pressure reduction DOWN to whole kPa per 100 strokes. Rounded densities carry into dependent results. The source examples contain inconsistent density notation and a conflicting pressure-reduction example; this library applies the written rules to the labelled kg/m^3 and kPa units. A pressure schedule is a linear reference, not an operating instruction.

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Pipe internal capacity / volume

Internal area, capacity and fluid volume in metric units.

Formula: A(mm^2) = pi x ID^2 / 4; C(m^3/m) = A / 10^6; V(m^3) = C x L(m).

Assumptions and limits: Circular measured diameters in mm and uniform lengths in m. Account separately for restrictions, variable geometry and actual tool dimensions.

SI example inputs: Inside diameter = 100 mm; Measured length = 300 m

SI example results: Internal area: 7853.982 mm^2; Internal capacity: 0.007853982 m^3/m; Internal volume: 2.356194 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Annular capacity / volume

Fluid space between the outer bore and tubular.

Formula: C(m^3/m) = pi(D^2 - d^2)/(4 x 10^6); V = C x L.

Assumptions and limits: Circular measured diameters in mm and uniform lengths in m. Account separately for restrictions, variable geometry and actual tool dimensions.

SI example inputs: Hole / casing inside diameter = 216 mm; Tubular outside diameter = 127 mm; Measured interval = 300 m

SI example results: Annular capacity: 0.02397585 m^3/m; Annular volume: 7.192755 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Steel pipe displacement: open / closed

Flooded steel displacement and sealed full-envelope volume.

Formula: Open volume = C(OD, ID) x L; closed volume = C(OD) x L.

Assumptions and limits: Circular measured diameters in mm and uniform lengths in m. Account separately for restrictions, variable geometry and actual tool dimensions. Open-ended assumes a flooded bore; closed-ended includes the sealed internal space.

SI example inputs: Outside diameter = 127 mm; Inside diameter = 100 mm; Measured length = 300 m

SI example results: Open-ended displacement: 1.444112 m^3; Closed-ended displacement: 3.800306 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Drillstring / BHA internal volume

Combined fluid volume of two independently measured sections.

Formula: V = C(IDpipe) x Lpipe + C(IDBHA) x LBHA.

Assumptions and limits: Circular measured diameters in mm and uniform lengths in m. Account separately for restrictions, variable geometry and actual tool dimensions. Add further sections separately using the metric tally.

SI example inputs: Drillpipe inside diameter = 100 mm; Drillpipe length = 2700 m; BHA effective inside diameter = 60 mm; BHA length = 150 m

SI example results: Drillpipe volume: 21.20575 m^3; BHA volume: 0.424115 m^3; Combined volume: 21.62987 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Total system / circulating volume

Independent active-system volumes without double counting.

Formula: Circulating = string + annulus + lines; system = circulating + active surface volume.

Assumptions and limits: Exclude isolated equipment and reserve tanks unless connected to the active system.

SI example inputs: String volume = 25 m^3; Annular volume = 60 m^3; Connected line volume = 2 m^3; Active surface volume = 80 m^3

SI example results: Circulating volume: 87 m^3; Total active volume: 167 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Circulation / bottoms-up time and strokes

Selected circulation volume converted to strokes and minutes.

Formula: Strokes = V(m^3) x 1000 / output(L/stroke); minutes = strokes / speed.

Assumptions and limits: Use annular volume for bottoms-up. Constant calibrated pump output; no losses, influx or compressibility.

SI example inputs: Volume to circulate = 60 m^3; Effective pump output = 16 L/stroke; Pump speed = 100 strokes/min

SI example results: Required strokes: 3750 strokes; Circulation time: 37.5 min

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Trip fill / slug volume

Flooded open-ended trip fill and static slug balance.

Formula: Trip fill = steel displacement; slug = dry length x internal capacity / (densityslug/densitymud - 1).

Assumptions and limits: Static uniform liquid densities. Closed or plugged pipe needs closed-ended displacement. Excludes mixing and compressibility.

SI example inputs: Outside diameter = 127 mm; Inside diameter = 100 mm; Measured length = 300 m; Mud density = 1200 kg/m^3; Slug density = 1600 kg/m^3; Desired dry internal length = 30 m

SI example results: Trip fill: 1.444112 m^3; Slug volume: 0.7068583 m^3; Additional returns: 0.2356194 m^3; Total returns including slug displacement: 0.9424778 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Duplex / triplex pump output and strokes

Pump geometry with explicit volumetric efficiency.

Formula: Triplex L/stroke = 3piD^2S/(4 x 10^6); duplex = 2pi(2D^2 - d^2)S/(4 x 10^6); multiply by efficiency.

Assumptions and limits: Diameters and stroke length use mm. One stroke means one crank revolution. Triplex single-acting; duplex double-acting. Calibrate actual output.

SI example inputs: Liner diameter = 150 mm; Stroke length = 300 mm; Duplex rod diameter = 60 mm; Volumetric efficiency = 95 %; Pump speed = 100 strokes/min; Required volume = 20 m^3

SI example results: Triplex output: 15.1091 L/stroke; Duplex output: 18.53383 L/stroke; Triplex flow: 1510.91 L/min; Duplex flow: 1853.383 L/min; Triplex strokes: 1323.706 strokes; Duplex strokes: 1079.108 strokes

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Hydrostatic pressure / gradient

Uniform liquid-column pressure at true vertical depth.

Formula: P(kPa) = 0.00981 x density(kg/m^3) x TVD(m); gradient = P / TVD.

Assumptions and limits: Use TVD, not measured depth. No gas, circulation losses, temperature or compressibility correction.

SI example inputs: Fluid density = 1200 kg/m^3; True vertical depth = 3000 m

SI example results: Hydrostatic pressure: 35316 kPa; Hydrostatic gradient: 11.772 kPa/m

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Formation pressure from SIDPP

Stabilized SIDPP plus drillstring hydrostatic pressure.

Formula: Formation pressure(kPa) = 0.00981 x density x TVD + SIDPP.

Assumptions and limits: Requires valid stabilized SIDPP and a known liquid column. Float valves, trapped pressure and unequal densities need qualified interpretation.

SI example inputs: Fluid density = 1200 kg/m^3; True vertical depth = 3000 m; Stabilized SIDPP = 3000 kPa

SI example results: Estimated formation pressure: 38316 kPa

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Kill fluid density

Static kill density with upward SI rounding.

Formula: Kill density = original density + SIDPP/(0.00981 x TVD); round UP to 2 decimals in kg/m^3.

Assumptions and limits: Apply the linked SI sheet's written rounding rule. Verify stabilized pressures, density measurements and the approved well-control procedure.

SI example inputs: Fluid density = 1200 kg/m^3; True vertical depth = 3000 m; Stabilized SIDPP = 3000 kPa

SI example results: Kill density — rounded up: 1301.94 kg/m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Initial / final pressure and reduction schedule

Linear reference schedule using rounded kill density.

Formula: ICP = SCR + SIDPP; FCP = SCR x rounded kill density / original density; reduction/100 strokes = (ICP - FCP) x 100 / strokes, rounded DOWN to whole kPa.

Assumptions and limits: Constant slow rate and uniform drillstring. Tapered strings and changing friction require an engineered schedule. The last row equals FCP. This is a reference, not an operating instruction.

SI example inputs: Fluid density = 1200 kg/m^3; True vertical depth = 3000 m; Stabilized SIDPP = 3000 kPa; Slow circulating pressure = 3000 kPa; Surface-to-bit strokes = 1000 strokes

SI example results: Rounded kill density: 1301.94 kg/m^3; Initial circulating pressure: 6000 kPa; Final circulating pressure: 3254.85 kPa; Reduction per 100 strokes: 274 kPa; At 0 strokes: 6000 kPa; At 100 strokes: 5726 kPa; At 200 strokes: 5452 kPa; At 300 strokes: 5178 kPa; At 400 strokes: 4904 kPa; At 500 strokes: 4630 kPa; At 600 strokes: 4356 kPa; At 700 strokes: 4082 kPa; At 800 strokes: 3808 kPa; At 900 strokes: 3534 kPa; At 1000 strokes (FCP): 3254.85 kPa

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

MAASP / LOT-FIT equivalent density

Test equivalent density and static shoe pressure margin.

Formula: Test density = test fluid density + test pressure/(0.00981 x shoe TVD), rounded DOWN to 2 decimals; MAASP = (test density - current density) x 0.00981 x shoe TVD.

Assumptions and limits: A FIT establishes a tested integrity level, not fracture pressure. Equipment limits and the well-control program also govern MAASP.

SI example inputs: Test fluid density = 1200 kg/m^3; Surface test pressure = 6000 kPa; Shoe TVD = 1500 m; Current fluid density = 1300 kg/m^3

SI example results: Test equivalent density — rounded down: 1607.74 kg/m^3; Static shoe-based MAASP: 4528.394 kPa

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Kick-tolerance planning helper

Restricted vertical, uniform-annulus gas sensitivity check.

Formula: Gas height = usable margin/(mud gradient - gas gradient); Vshoe = height x annular capacity; Vbottom = Vshoe x Pshoe(abs)/Pbottom(abs).

Assumptions and limits: PLANNING ONLY — not an operational kick tolerance or kick-handling limit. Vertical uniform annulus, constant gas gradient and isothermal ideal gas only. Excludes real-gas PVT, friction, migration, temperature, geometry changes and dynamic choke response. Independently established absolute pressures and qualified modelling are required.

SI example inputs: Uniform hole inside diameter = 216 mm; Tubular outside diameter = 127 mm; Mud density = 1200 kg/m^3; Assumed gas gradient = 2 kPa/m; Usable shoe pressure margin = 3000 kPa; Shoe absolute pressure = 20000 kPa; Bottom absolute pressure = 40000 kPa; Available gas-column height = 1500 m

SI example results: Gas-column height at shoe: 306.9996 m; Simplified shoe gas volume: 7.360576 m^3; Ideal-gas bottom volume sensitivity: 3.680288 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Cement slurry volume / yield / sacks / excess

Slurry requirement using laboratory yield in m^3 per sack.

Formula: V = C x L x (1 + excess/100); sacks = V(m^3)/yield(m^3/sack), rounded UP.

Assumptions and limits: Sack mass and yield come from the approved cement design. Excludes chemistry, losses, displacement efficiency and placement-pressure modelling.

SI example inputs: Hole / casing inside diameter = 216 mm; Tubular outside diameter = 127 mm; Measured interval = 300 m; Volume excess = 20 %; Laboratory slurry yield = 0.03 m^3/sack

SI example results: Theoretical slurry volume: 7.192755 m^3; Volume with excess: 8.631306 m^3; Whole sacks required: 288 count

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Balanced plug placement / displacement

Ideal equal-height balance around a stinger.

Formula: Height = slurry volume/(annular + internal capacity); displacement = internal capacity x (base MD - height).

Assumptions and limits: Uniform vertical geometry, equal slurry density and preflush/spacer hydrostatic balance. No losses or contamination. Stinger base equals plug base; surface lines and pull-out effects need review.

SI example inputs: Hole / casing inside diameter = 216 mm; Stinger outside diameter = 127 mm; Stinger inside diameter = 100 mm; Stinger base MD = 1500 m; Slurry volume = 5 m^3

SI example results: Balanced height: 157.0853 m; Outside cement volume: 3.766255 m^3; Inside cement volume: 1.233745 m^3; Ideal displacement: 10.54723 m^3; Plug height after removal: 136.4497 m

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Top-of-cement volume

Annular fill height, top depth and target volume.

Formula: Height = volume/capacity; TOC MD = base MD - height; target volume = capacity x (base - target).

Assumptions and limits: Circular measured diameters in mm and uniform lengths in m. Account separately for restrictions, variable geometry and actual tool dimensions. No losses, contamination or excess allowance; calculated depth does not verify cement placement.

SI example inputs: Outer bore diameter = 216 mm; Inner tubular outside diameter = 140 mm; Cement base MD = 3000 m; Placed volume = 20 m^3; Target top MD = 1500 m

SI example results: Fill height: 941.1883 m; Calculated top MD: 2058.812 m; Target volume: 31.8746 m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Annular velocity

Bulk average velocity through a uniform annulus.

Formula: AV(m/min) = Q(L/min) / [1000 x C(m^3/m)].

Assumptions and limits: Circular measured diameters in mm and uniform lengths in m. Account separately for restrictions, variable geometry and actual tool dimensions. Bulk velocity alone does not determine hole-cleaning adequacy; consider eccentricity, rheology, rotation and flow regime.

SI example inputs: Hole inside diameter = 216 mm; Pipe outside diameter = 127 mm; Circulating flow = 1800 L/min

SI example results: Average annular velocity: 75.07555 m/min

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

ECD from annular pressure loss

Equivalent circulating density at the selected TVD.

Formula: ECD(kg/m^3) = density + annular loss(kPa)/(0.00981 x TVD(m)).

Assumptions and limits: Use measured or independently modelled annular loss above the point, not total standpipe pressure. This calculator does not predict friction.

SI example inputs: Fluid density = 1200 kg/m^3; True vertical depth = 3000 m; Annular pressure loss = 3000 kPa

SI example results: Equivalent circulating density: 1301.937 kg/m^3

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Bit nozzle total flow area

Total area from up to three measured nozzle groups.

Formula: TFA(mm^2) = sum count x pi x diameter(mm)^2 / 4.

Assumptions and limits: Circular bores. Unused groups have zero count. Verify installed nozzles, erosion and current OEM specifications.

SI example inputs: Group 1 diameter = 12 mm; Group 1 count = 3 count; Group 2 diameter = 10 mm; Group 2 count = 0 count; Group 3 diameter = 8 mm; Group 3 count = 0 count

SI example results: Total flow area: 339.292 mm^2

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Nozzle velocity / hydraulic power / intensity

SI jet velocity and hydraulic power from supplied bit pressure loss.

Formula: Velocity(m/s) = Q(L/min) x 10^6/(60000 x TFA(mm^2)); power(kW) = Q x delta P(kPa)/60000; intensity(kW/cm^2) = power/(bit area(mm^2)/100).

Assumptions and limits: All entered flow passes through the stated TFA. Pressure drop is across the bit only. No discharge-coefficient, erosion or full-system pressure-loss model.

SI example inputs: Nozzle flow = 1800 L/min; Total flow area = 350 mm^2; Bit pressure drop = 7000 kPa; Bit diameter = 216 mm

SI example results: Average jet velocity: 85.71429 m/s; Bit hydraulic power: 210 kW; Power per bit area: 0.5730888 kW/cm^2

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Minimum-curvature survey interval

Interval TVD, north/east, closure, azimuth and dogleg severity.

Formula: beta = acos(cosI1cosI2 + sinI1sinI2cosdelta A); RF = 2tan(beta/2)/beta; delta TVD = L/2(cosI1+cosI2)RF; DLS = beta(degrees) x 30/L(m).

Assumptions and limits: Azimuth clockwise from a common north reference. Outputs are interval increments, not absolute coordinates. No survey uncertainty, magnetic correction or collision assessment.

SI example inputs: Survey interval = 30 m; Start inclination = 0 deg ; Start azimuth = 0 deg ; End inclination = 10 deg ; End azimuth = 0 deg

SI example results: TVD increment: 29.84792 m; North increment: 2.611355 m; East increment: 0 m; Horizontal closure: 2.611355 m; Closure azimuth (undefined at zero closure): 0 deg ; Dogleg severity: 10 deg /30 m

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Build / turn and projection-to-bit

Survey build/turn rates and straight tangent projection.

Formula: Build = delta I x 30/L; turn = wrapped delta A x 30/L; bit delta TVD = offset cosI; delta N/E = offset sinI x cos/sinA.

Assumptions and limits: Rates use deg /30 m. Tangent projection keeps the last inclination and azimuth constant; no predicted steering tendency or uncertainty. Turn rate is not DLS.

SI example inputs: Survey interval = 30 m; Prior inclination = 20 deg ; Prior azimuth = 350 deg ; Last inclination = 22 deg ; Last azimuth = 10 deg ; Survey-to-bit offset = 15 m

SI example results: Build rate: 2 deg /30 m; Wrapped turn rate: 20 deg /30 m; Projected TVD: 13.90776 m; Projected north: 5.533732 m; Projected east: 0.9757463 m

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Target closure / azimuth

Plan-view offset and azimuth using one coordinate reference.

Formula: delta N = Ntarget - Ncurrent; delta E = Etarget - Ecurrent; closure = sqrt(delta N^2 + delta E^2); azimuth = atan2(delta E, delta N).

Assumptions and limits: Use one datum, projection and north reference. No trajectory design, magnetic correction or collision-clearance calculation.

SI example inputs: Current northing = 0 m; Current easting = 0 m; Target northing = 300 m; Target easting = 400 m

SI example results: North offset: 300 m; East offset: 400 m; Target closure: 500 m; Target azimuth: 53.1301 deg

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Buoyancy factor / buoyed weight

Flooded tubular buoyancy from fluid and material densities.

Formula: BF = 1 - fluid density/material density; buoyed weight(kN) = air weight(kN) x BF.

Assumptions and limits: Uniform internal/external fluid and no pressure-end effects. Default material density is a planning value; verify actual material.

SI example inputs: Fluid density = 1200 kg/m^3; Material density = 7850 kg/m^3; Air weight force = 500 kN

SI example results: Buoyancy factor: 0.8471338 ratio; Buoyed weight: 423.5669 kN

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Pipe stretch / free-point estimate

Uniform elastic extension and free-length sensitivity.

Formula: Stretch(m) = pull(kN) x L(m)/(steel area(mm^2) x E(GPa)); free length = measured stretch x area x E/pull.

Assumptions and limits: Straight uniform elastic pipe only; excludes drag, temperature, buckling, tool-joint compliance and plastic strain. An estimated free length is not a verified free point. Specialist confirmation is required before back-off.

SI example inputs: Outside diameter = 127 mm; Inside diameter = 100 mm; Measured length = 300 m; Incremental pull = 50 kN; Young's modulus = 200 GPa; Measured incremental stretch = 0.01 m

SI example results: Predicted stretch: 0.01558051 m; Estimated free length: 192.5482 m

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Overpull / tension margin

Reviewed axial allowables compared with planned hookload.

Formula: Allowable = min(pipe, connection, rig); planned = hookload + overpull; margin = allowable - planned.

Assumptions and limits: Enter working allowables after safety factors, wear and combined-load derating. Static axial check only; dynamic, bending, torque and fatigue need separate review. Negative margins remain visible.

SI example inputs: Pipe working limit = 1400 kN; Connection working limit = 1300 kN; Rig working limit = 1200 kN; Current hookload = 700 kN; Proposed overpull = 200 kN

SI example results: Governing allowable: 1200 kN; Current static margin: 500 kN; Planned hookload: 900 kN; Remaining static margin: 300 kN

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Stuck-pipe force / jar-delivery worksheet

Static force budget, not a dynamic jar-impact prediction.

Formula: Static overpull = surface tension - buoyed weight - friction; margin = allowable - tension.

Assumptions and limits: PLANNING ONLY. Does not calculate jar impact, impulse, energy, firing load or dynamic amplification. Use specialist modelling, OEM limits and qualified approval. No jarring or back-off instructions.

SI example inputs: Surface tension = 900 kN; Buoyed string weight = 550 kN; Estimated friction = 100 kN; Reviewed working tension = 1200 kN

SI example results: Static overpull after friction: 250 kN; Surface tension margin: 300 kN

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

d-exponent / corrected d-exponent

Empirical drilling-response index normalized for the stated SI inputs.

Formula: d = log10(ROP/(18.288 x RPM))/log10(0.068521765856792 x WOB/diameter); dc = d x normal density/effective density.

Assumptions and limits: ROP uses m/h, WOB kN and bit diameter mm. Empirical normalization is rewritten for these units. Use representative steady drilling data and local calibration; lithology, wear, hydraulics and operational changes affect the index. Not a pore-pressure or well-control decision.

SI example inputs: Rate of penetration = 20 m/h; Rotary speed = 100 rev/min; Weight on bit = 130 kN; Bit diameter = 216 mm; Normal gradient density = 1030 kg/m^3; Effective density = 1200 kg/m^3

SI example results: d-exponent: 1.416308 ratio; Corrected d-exponent: 1.215665 ratio

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

Metric unit converter

Metric scales only. 1 m^3 = 1000 L; 1 MPa = 1000 kPa; 1 m = 1000 mm; 1 kN = 1000 N; 1 tonne = 1000 kg; 1 kN*m = 1000 N*m. Absolute zero is -273.15 deg C.

Listed Sources | accessed November 25, 2026

IADC Well Control Committee

Well-control professional context.

https://iadc.org/committees/well-control/

IADC WellSharp SI Formula Sheet

Hydrostatics, capacities, well-control relationships and the written SI rounding rules. Revision 1, June 29, 2015.

https://iadc.org/wp-content/uploads/2018/10/WSP-FormulaSheet_SI_rev1.pdf

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API 5CT announcement

Tubular standards context; use licensed current editions.

https://www.api.org/products-and-services/standards/important-standards-announcements/standard-5ct

API drilling and tubular overview

General well construction context.

https://www.api.org/-/media/files/policy/hydraulic_fracturing/hydraulic-fracturing-best-practices.pdf

Professional use: field-reference and planning aids only. Verify inputs, units, current company procedures, equipment limits, licensed standards, and qualified engineering/well-control review before operational use. These tools do not confer API or IADC certification and are not equivalent to Landmark or WELLPLAN engineering software.

SLB: equivalent circulating density

Equivalent circulating density context. This resource uses ECD(kg/m^3) = density + annular loss(kPa)/(0.00981 x TVD(m)).

https://glossary.slb.com/en/Terms/e/ecd.aspx

SLB: hydrostatic pressure

Static fluid-column pressure context.

https://glossary.slb.com/en/Terms/h/hydrostatic_pressure.aspx

SLB: annular velocity

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https://www.slb.com/resource-library/oilfield-review/defining-series/defining-directional-drilling

ISCWSA: survey calculation methods

Minimum-curvature geometry and survey calculation context.

https://www.iscwsa.net/media/files/events-event/f588beee/9-survey-calculation-methods_yCf8NZV.pdf

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