

Appendix 7B-5

RIPRAP DESIGN WORK SHEET
FOR OTHER THAN VDOT STANDARD RIPRAP SIZES

CHANNEL DATA

Q = _____(cfs) P = _____(ft.) n = _____

S₀ = _____(ft/ft) R = _____(ft.)

d_n = _____(ft.) V_n = _____(fps)

A = _____(ft²) Side Slope = _____ :1

ASSUMED RIPRAP SIZE - D₅₀ = _____

VERIFY ASSUMED RIPRAP SIZE

φ = _____° (Appendix 7E-1)

Side Slope = _____ : 1 θ = _____°

K₁ = [1 - (sin² θ / sin² φ)]^{0.5}

K₁ = [1 - (sin² _____° / sin² _____°)]^{0.5} = _____

For Specific Gravity = 2.65 and Stability Factor = 1.2

D₅₀ = 0.001 • V_a³ / (d_{avg}^{0.5} • K₁^{1.5})

D₅₀ = 0.001 • _____³ / (_____^{0.5} • _____^{1.5}) = _____

D₅₀ Computed (_____) (<) (=) (>) D₅₀ Assumed (_____)

Assumed D₅₀ is (correct) (incorrect)

Note: The above process of assuming a D₅₀ size, determining the natural angle of repose (φ) and computing a D₅₀ size should be repeated until the Assumed D₅₀ size equals the Computed D₅₀ size. Once the D₅₀ size determination has been made, it should be adjusted for the Specific Gravity Correction Factor C_{sg} (if any) and the Stability Correction Factor (C_{SF}) (if any) to derive a Final D₅₀.

Correction Factor For Riprap Specific Gravity (S_s) other than 2.65 (Default = 1.0)

C_{sg} = 2.12 / (S_s - 1)^{1.5} = 2.12 / (_____ - 1)^{1.5} = _____

Correction Factor For Stability Factor (SF) other than 1.2 (Default = 1.0)

C_{SF} = (SF / 1.2)^{1.5} = (_____ / 1.2)^{1.5} = _____

Final Correction Factor = C = C_{sg} • C_{SF} = _____ • _____ = _____

Final D₅₀ = C • Computed D₅₀ = _____ • _____ = _____

RIPRAP RECOMMENDATION: _____

Thickness (T) = _____" (2 • D₅₀ MSD minimum)

Source: VDOT