Blast Design by Energy Factor (Blast Dynamics Method)

Charge per hole, charge energy and the burden and spacing that deliver a target energy factor in kcal per short ton, with stemming and subdrill (Floyd).

Input parameters

Unit system: SI

Parameter	Value	Unit
Explosive diameter	6.5000	in
Explosive loading density (g/cc)	0.85000	
Absolute weight strength (ANFO 912 cal/g)	912.00	kcal/kg
Desired energy factor	190.00	kcal/sh ton
Rock density	165.43	lb/ft³
Bench height	30.000	ft

Calculated results

Parameter	Value	Unit
Stemming	11.917	ft
Subdrill	3.7917	ft
Charge per length of hole	12.228	lb/ft
Charge per hole	267.49	lb
Charge energy per hole	110,652	kcal
Burden	14.286	ft
Spacing (1.15B)	16.428	ft
Relative weight strength (ANFO = 1)	1.0000	
Relative bulk strength (ANFO = 1)	1.0490	

Notes for this case

- Floyd's guide: aim for about 190 kcal/sh ton (100 very weak rock to 250 blocky hard rock), a hole diameter near L/10 and L/B between 2 and 3.5 or more.

Formula and method

$$T = 22D_e \ (\rho_e < 0.9) \text{ or } 24D_e, \quad J = 7D_e, \quad C_w = (L + J - T)\rho_e{}', \quad C_e = C_w\, AWS$$

$$B = \sqrt{\frac{C_e}{1.15\, CE_d\, \rho_r L}}, \quad S = 1.15B, \quad RWS = \frac{AWS}{912}, \quad RBS = \frac{AWS\, \rho_e}{739}$$

Variables

D_e	Explosive diameter	m
ρ_e	Explosive loading density (g/cc)	-
AWS	Absolute weight strength (ANFO 912 cal/g)	J/kg
CE_d	Desired energy factor	J/kg
ρ_r	Rock density	kg/m³
L	Bench height	m
T	Stemming	m
J	Subdrill	m

$\rho_e{}'$	Charge per length of hole	kg/m
C_w	Charge per hole	kg
C_e	Charge energy per hole	J
B	Burden	m
S	Spacing (1.15B)	m
RWS	Relative weight strength (ANFO = 1)	-
RBS	Relative bulk strength (ANFO = 1)	-

Method and standards

Floyd's Blast Dynamics energy-factor method.

Assumptions and limits

- Empirical guide values; adjust in the field.

Report details

Report reference	FCC-SSBK-046P (the same inputs always give the same reference)
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Calculator	Blast Design by Energy Factor (Blast Dynamics Method)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/mine-design/blast-energy-factor-floyd

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.