Uranium Ore, U3O8 and Mill Recovery

Ore tonnage and U3O8 mass needed to supply an amount of natural uranium from the ore grade and mill recovery, with uranium per tonne of ore.

Method: Uranium front-end mass balance

Input parameters

Unit system: SI

Parameter	Value	Unit
Natural uranium needed	180.00	t
Ore grade (U_3O_8 by mass)	0.20000	%
Mill recovery	90.000	%

Calculated results

Parameter	Value	Unit
U_3O_8 to uranium mass ratio	1.1792	
U_3O_8 produced	212.26	t
Ore mined and milled	117,924	t
Uranium recovered per tonne of ore (kg)	1.5264	

Notes for this case

- U_3O_8 contains 84.8 % uranium by mass (natural uranium 238.029 g/mol); ore = U_3O_8/(grade × recovery). Grades range from under 0.05 % to over 10 % in Canadian deposits; in-situ leach mines report differently.

Formula and method

$$\frac{m_{U_3O_8}}{m_U} = \frac{3M_U + 8M_O}{3M_U}, \quad m_{ore} = \frac{m_{U_3O_8}}{gR}$$

Variables

m_U	Natural uranium needed	kg
g	Ore grade (U_3O_8 by mass)	-
R	Mill recovery	-
$m_{U_3O_8}/m_U$	U_3O_8 to uranium mass ratio	-
$m_{U_3O_8}$	U_3O_8 produced	kg
m_{ore}	Ore mined and milled	kg
m_U/m_{ore}	Uranium recovered per tonne of ore (kg)	-

Method and standards

Ore balance.

Assumptions and limits

- Natural uranium; mass basis.

References

Uranium front-end mass balance

Report details

Report reference	FCC-8R9Q-0XH3 (the same inputs always give the same reference)
Generated	23 November 2026, 17:34 UTC
Calculator	Uranium Ore, U3O8 and Mill Recovery
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
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/boilers-power-plant/nuclear-power/uranium-ore-requirement

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.