# NOx from Fuel Nitrogen (Fuel NOx)

Fuel NOx formed from the nitrogen in a fuel, as $NO_2$ mass and concentration in the flue gas, for a conversion share of fuel nitrogen to NO.

**Method:** Mass balance N → NO; reported as $NO_2$ (IUPAC molar masses); conversion share as user input

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Fuel fired | 10.000 | t/h |
| Nitrogen in the fuel (as fired) | 1.0000 | % |
| Conversion of fuel N to NO | 25.000 | % |
| Flue gas flow (dry, normal) | 100,000 | Nm³/h |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Fuel NOx (as $NO_2$) | 82.111 | kg/h |
| Fuel NOx concentration (as $NO_2$, dry) | 821.11 | mg/Nm³ |

**Notes for this case**

- Thermal NOx from air nitrogen comes on top; staging and low excess air cut the fuel-N conversion.

## Formula and method

$$\dot{m}_{NO_x} = \dot{m}_f N f \frac{M_{NO_2}}{M_N}, \quad c = \frac{\dot{m}_{NO_x}}{\dot{V}_n}$$

### Variables

| | | |
|---|---|---|
| $\dot{m}_f$ | Fuel fired | kg/s |
| $N$ | Nitrogen in the fuel (as fired) | - |
| $f$ | Conversion of fuel N to NO | - |
| $\dot{V}_n$ | Flue gas flow (dry, normal) | Nm³/s |
| $\dot{m}_{NO_x}$ | Fuel NOx (as $NO_2$) | kg/s |
| $c_{NO_x}$ | Fuel NOx concentration (as $NO_2$, dry) | kg/m³ |

### Method and standards

Mass balance of fuel nitrogen: the share converted to NO is reported as $NO_2$ mass using IUPAC molar masses. The conversion share carries the whole prediction and is your input.

### Assumptions and limits

- Dry, normal basis, at the actual $O_2$: not corrected to a reference $O_2$. Correct it with the emission $O_2$ correction calculator before comparing with a limit.
- The flue gas flow is not checked against the fuel fired; take it from the combustion calculator for the same fuel and excess air.
- Thermal NOx is not included.

### References

- Mass balance N → NO
- reported as $NO_2$ (IUPAC molar masses); conversion share as user input

## Report details

| | |
|---|---|
| Report reference | FCC-2TY1-WV9P (the same inputs always give the same reference) |
| Generated | 17 November 2026, 19:49 UTC |
| Calculator | NOx from Fuel Nitrogen (Fuel NOx) |
| Method last reviewed | 13 November 2026 |
| Software release | FireCAD Calc, release of 17 November 2026 |
| Release checks | 2 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/emissions-stacks/nox-from-fuel-nitrogen

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.