# Raw Mix Proportioning: Two Components to a Target LSF

Parts of limestone per part of clay (or two raw materials) for a target Kind's lime factor or lime saturation factor, with mix moduli and clinker factor.

**Method:** Duda; Cement Data Book; ...

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Target factor | Kind's lime saturation factor | |
| Target value | 0.92000 | |
| $SiO_2$ in material 1 (lime component) | 1.4200 | % |
| $Al_2O_3$ in material 1 (lime component) | 0.48000 | % |
| $Fe_2O_3$ in material 1 (lime component) | 0.38000 | % |
| CaO in material 1 (lime component) | 52.600 | % |
| Loss on ignition of material 1 | 41.000 | % |
| $SiO_2$ in material 2 (clay component) | 62.950 | % |
| $Al_2O_3$ in material 2 (clay component) | 18.980 | % |
| $Fe_2O_3$ in material 2 (clay component) | 7.3700 | % |
| CaO in material 2 (clay component) | 1.4000 | % |
| Loss on ignition of material 2 | 7.0000 | % |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Parts of material 1 per part of material 2 | 4.0539 | |
| Material 1 in the raw mix | 80.213 | % |
| Material 2 in the raw mix | 19.787 | % |
| Silica ratio of the mix | 2.3028 | |
| Alumina ratio of the mix | 2.3485 | |
| Loss on ignition of the mix | 34.273 | % |
| Raw mix per unit clinker (loss on ignition only) | 1.5214 | |

**Notes for this case**

• Dry-basis analyses. With two materials only the lime level can be set; silica and alumina ratios follow from the materials (use three components to fix the silica ratio too). Coal ash absorbed in the kiln shifts the clinker toward lower lime.

## Formula and method

$$x = \frac{(2.8\,KS\,S_2 + 1.65A_2 + 0.35F_2) - C_2}{C_1 - (2.8\,KS\,S_1 + 1.65A_1 + 0.35F_1)}$$

### Variables

| | | |
|---|---|---|
| $\mathrm{target}$ | Target factor | - |
| $KS$ | Target value | - |
| $S_1$ | $SiO_2$ in material 1 (lime component) | - |
| $A_1$ | $Al_2O_3$ in material 1 (lime component) | - |

| | | |
|---|---|---|
| $F_1$ | $Fe_2O_3$ in material 1 (lime component) | - |
| $C_1$ | CaO in material 1 (lime component) | - |
| $LOI_1$ | Loss on ignition of material 1 | - |
| $S_2$ | $SiO_2$ in material 2 (clay component) | - |
| $A_2$ | $Al_2O_3$ in material 2 (clay component) | - |
| $F_2$ | $Fe_2O_3$ in material 2 (clay component) | - |
| $C_2$ | CaO in material 2 (clay component) | - |
| $LOI_2$ | Loss on ignition of material 2 | - |
| $x$ | Parts of material 1 per part of material 2 | - |
| $w_1$ | Material 1 in the raw mix | - |
| $w_2$ | Material 2 in the raw mix | - |
| $SR$ | Silica ratio of the mix | - |
| $AR$ | Alumina ratio of the mix | - |
| $LOI$ | Loss on ignition of the mix | - |
| $f_k$ | Raw mix per unit clinker (loss on ignition only) | - |

### Method and standards

Lime balance between two materials.

### Assumptions and limits

- Dry, ignited basis consistent for both.

### References

- Duda
- Cement Data Book
- Vol. 1
- 3rd ed. (Bauverlag / Macdonald and Evans, 1985)
- sec. 2.3 and Example 2.3

## Report details

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|---|---|
| Report reference | FCC-3CYZ-997W (the same inputs always give the same reference) |
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| Calculator | Raw Mix Proportioning: Two Components to a Target LSF |
| Method last reviewed | 17 November 2026 |
| Software release | FireCAD Calc, release of 17 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/chemical/cement/raw-mix-two-component

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.