Reduced Extraction Corrected for Sugar Content

Reduced mill extraction corrected for both fibre and sugar in cane: Ugale (eqn 20.8), Rein (20.9), and Deerr and Mittal with Rein's correction (20.15–20.16).

Method: Hugot; Handbook of Cane Sugar Engineering; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Actual pol extraction	95.000	%
Fibre % cane	15.500	%
Pol % cane	13.000	%
Sucrose % cane	13.000	%

Calculated results

Parameter	Value	Unit
Ugale (Deerr × 7.125/(7 + P))	96.039	%
Rein, standard 15.5 % fibre and 13 % pol	95.001	%
Deerr with Rein's sugar correction	96.013	%
Mittal with Rein's sugar correction	95.872	%

Notes for this case

- Rich cane extracts more easily; these forms put rich and poor cane on a common footing. Rein's correction is much larger than Ugale's.

Formula and method

$$E_{Ugale} = \left[1 - \frac{(1-e)(1-f)}{7f}\right]\frac{7.125}{7+P}, \quad E_{Rein} = 1 - 0.1834\frac{(1-e)(1-f)}{f}\left(\frac{P}{13}\right)^{0.6}$$

$$E_{D,R} = 1 - \frac{(1-e)(1-f)}{7f}\left(\frac{r}{12.5}\right)^{0.6}, \quad E_{M,R} = 1 - \frac{0.125(1-e)}{f}\left(\frac{r}{12.5}\right)^{0.6}$$

Variables

e	Actual pol extraction	-
f	Fibre % cane	-
P	Pol % cane	-
r	Sucrose % cane	-
E_{Ugale}	Ugale (Deerr × 7.125/(7 + P))	-
E_{Rein}	Rein, standard 15.5 % fibre and 13 % pol	-
$E_{D,R}$	Deerr with Rein's sugar correction	-
$E_{M,R}$	Mittal with Rein's sugar correction	-

Method and standards

Formulae as given by Hugot (P per unit cane in Ugale's form; P and r in percent in the Rein forms).

Assumptions and limits

- Corrections are empirical; for very low extraction and fibre they can come out negative, which is flagged.

References

- Hugot

- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 20
- eqns 20.8–20.10 and 20.15–20.16
- pp. 318–321

Report details

Report reference	FCC-X4CQ-2X60 (the same inputs always give the same reference)
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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/sugar-ethanol/milling/sugar-adjusted-reduced-extraction

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.