Concentrated Spent Wash: As-Fired Gross and Net Value

As-fired gross and net calorific value of concentrated spent wash from its dry-solids GCV, solids content and hydrogen, with IF97 latent heat at 25 °C.

Method: Net value = gross − latent heat × (moisture + water formed from hydrogen) at 25 °C (the latent-heat term of ISO 1928; its constant-volume to constant-pressure corrections for oxygen and nitrogen are omitted); latent heat from IAPWS-IF97; GCV of dry solids by bomb calorimeter

Input parameters

Unit system: SI

Parameter	Value	Unit
GCV of dry solids (lab)	13,500	kJ/kg
Solids in concentrate	55.000	%
Hydrogen % dry solids	4.5000	%

Calculated results

Parameter	Value	Unit
As-fired GCV	7,425.0	kJ/kg
As-fired NCV	5,786.2	kJ/kg
Latent heat of water at 25 °C	2,441.7	kJ/kg

Formula and method

$$GCV = x\,GCV_d, \quad NCV = GCV - h_{fg,25}\left[(1-x) + x\,H\,\frac{M_{H_2O}}{M_{H_2}}\right]$$

Variables

GCV_d	GCV of dry solids (lab)	J/kg
x	Solids in concentrate	-
H	Hydrogen % dry solids	-
GCV	As-fired GCV	J/kg
NCV	As-fired NCV	J/kg
$h_{fg,25}$	Latent heat of water at 25 °C	J/kg

Method and standards

Gross-to-net conversion.

Assumptions and limits

- 25 °C reference.
- Only the latent-heat term of the gross-to-net conversion is applied; the small constant-volume to constant-pressure terms of ISO 1928 (oxygen, nitrogen) are left out.

References

• Net value = gross − latent heat × (moisture + water formed from hydrogen) at 25 °C (the latent-heat term of ISO 1928; its constant-volume to constant-pressure corrections for oxygen and nitrogen are omitted); latent heat from IAPWS-IF97; GCV of dry solids by bomb calorimeter

Report details

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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/spent-wash-zld/slop-concentrate-net-value

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.