Description of Coal

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Analysis of Coal

- Ultimate Analysis
  - Carbon
  - Hydrogen
  - Nitrogen
  - Sulphur
  - Oxygen
  - Sulphur
  - Phosphorous

Analysis of Coal

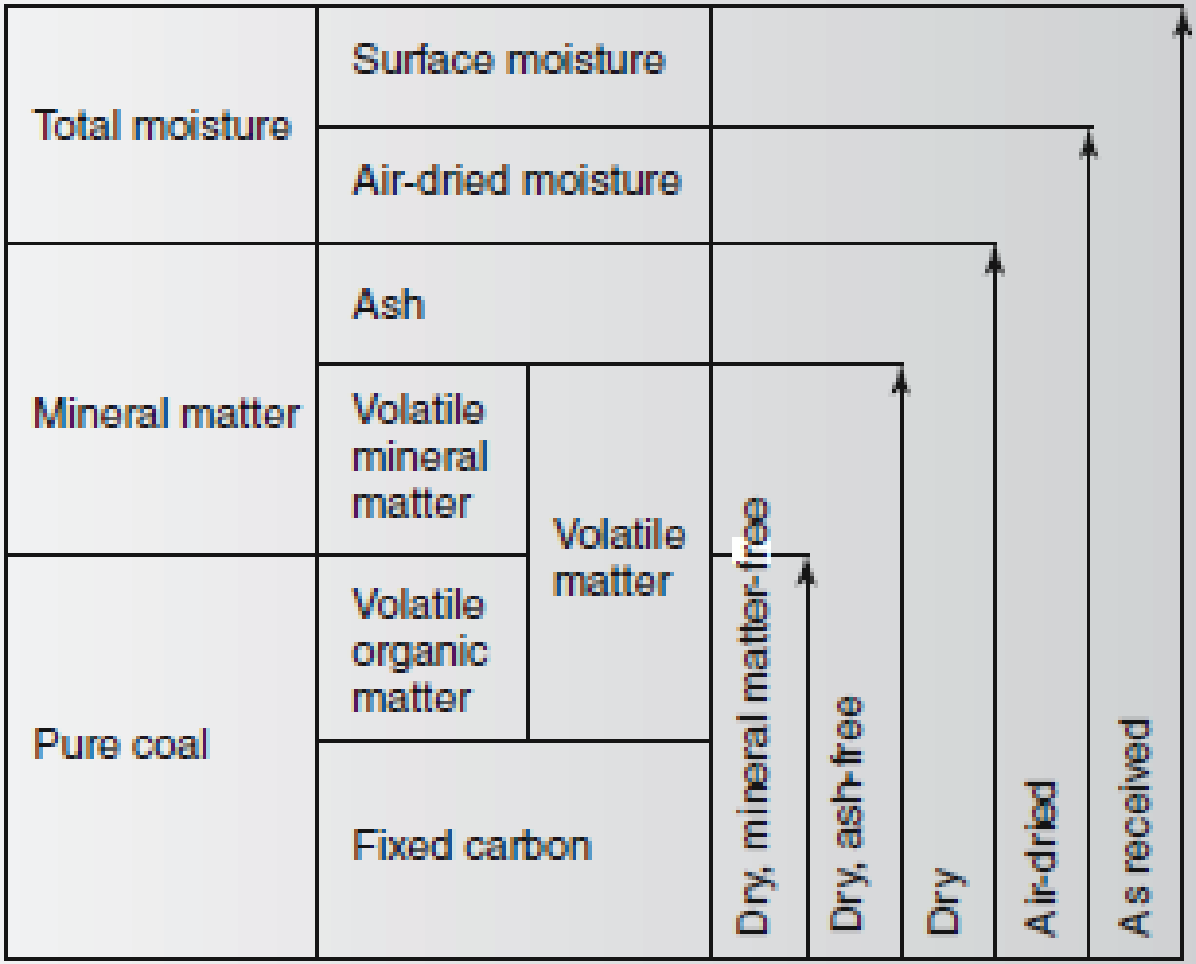
- Fuel Ratio
  - Fixed Carbon to Volatile Ratio
- Unit Coal
  - Dry Basis
  - Dry Mineral Free Basis

Table 4.18 Formulae for calculation of results to different bases.

Given result	Wanted result: As sampled (as received) (as despatched)	Air dried (as fired)	Dry	Dry, ash-free	Dry, mineral-matter-free
As sampled (as received) (as despatched) (as fired)	–	$\frac{100 - Mad}{100 - Mar}$	$\frac{100}{100 - Mar}$	$\frac{100}{100 - (Mar + Aar)}$	$\frac{100}{100 - (Mar + MMar)}$
Air dried (as analysed)	$\frac{100 - Mar}{100 - Mad}$	–	$\frac{100}{100 - Mad}$	$\frac{100}{100 - (Mad + Aad)}$	$\frac{100}{100 - (Mad + MMad)}$
Dry	$\frac{100 - Mar}{100}$	$\frac{100 - Mad}{100}$	–	$\frac{100}{100 - Ad}$	$\frac{100}{100 - MMd}$
Dry, ash-free	$\frac{100 - (Mar + Aar)}{100}$	$\frac{100 - (Mad + Aad)}{100}$	$\frac{100 - Ad}{100}$	–	$\frac{100 - Ad}{100 - MMd}$
Dry, mineral-matter-free	$\frac{100 - (Mar + MMar)}{100}$	$\frac{100 - (Mad + MMad)}{100}$	$\frac{100 - MMd}{100}$	$\frac{100 - MMd}{100 - Ad}$	–

M = moisture %; A = ash %; MM = mineral matter %; ar = as received basis; ad = air dried basis; d = dry basis.

Table 4.17 Components of coal reporting to different bases.



Source: Ward (1984) with permission of Blackwell Scientific Publications.

Varieties and Rank of Coal

Peat: 1st Distinct product in process of coal formation

Lignite

Sub Bituminous

Bituminous

Semi Anthracite

Anthracite

Visible components of Coal

- Vitrain
- Clarain
- Durain
- Fusain

Coal Petrography

The constituent of coal distinguished into macroscopic units called Rock Type or Litho-types and microscopic unit is called Macerals

Macerals derived from Wood

- Vitrinite
- Fusinite
- Semi-Fusinite

Coal Petrography

Macerals from plant material other than wood

- Exinite
- Resinite
- Scelrotinite
- Algitinite

Macerals from unknown sources

- Micrinite

Table 4.1 Lithotypes of humic and sapropelic coals.

Lithotype	Description	Composition
Vitrain	Black, very bright lustre; thin layers break cubically; thick layers have conchoidal fracture	Vitrinite macerals with 20% exinite macerals
Clarain	Finely stratified layers of vitrain, durain and, in some instances, fusain, medium lustre	Variable
Durain	Black or grey, dull, rough fracture surfaces	Mainly inertinite and exinite macerals
Fusain	Black, silky lustre, friable and soft	Mainly fusinite
Cannel coal	Black, dull, lustre 'greasy', breaks with conchoidal fracture	Fine maceral particles usually dominated by sporinite
Boghead coal	Black or brown, dull, homogeneous, breaks with conchoidal fracture, lustre may be 'greasy'	Dominated by alginite

Source: McCabe, 1984.

Any Questions??

Thank You !!!