

Acid and Metalliferous Drainage



ChemCentre offers comprehensive Acid and Metalliferous Drainage services to help you avoid major environmental damage, reduce remediation costs and achieve mine planning and closure targets.

Our key point of difference is our in-house expertise. Our team is committed to helping you translate your data into understandable results and reveal valuable information about potential mine and industrial sites.

ChemCentre's extensive research and development program means we can apply the most up-to-date knowledge and techniques to your samples. We will work with you to create a testing program best suited to answering your questions and minimising your risk.

What is Acid and Metalliferous Drainage?

Acid and metalliferous drainage, also known as Acid Mine Drainage or AMD, is the outflow of acidic and/or metalliferous water into the environment.

This occurs when rock containing sulphides, such as pyrite, is exposed to water and atmospheric oxygen. This causes a chemical reaction which results in the production of sulphuric acid. This process occurs when earth is disturbed and rock containing pyrite is brought to the surface. Problems arise under mine site conditions, when high pyrite content and the smaller grain size of crushed waste rock and tailings produce more acid than the natural environment can neutralise.



This creates two major problems – the release of acid into surrounding water systems, which can in turn dissolve rock and leach metals and acid into the environment. These issues can cause long-term damage and be costly to rectify. Therefore, a key component of mine site planning is characterising the potential of acid mine drainage across the lifespan of a mine.

Static and Kinetic Testing

ChemCentre offers a multitude of tests, both static and kinetic, to predict the potential for a sample to produce acid drainage.

Static testing gives an initial assessment of potential sources of AMD and includes Acid-Base Accounting (ABA) analysis. ABA is based on the calculation of acid production from sulphur content compared to the Acid Neutralisation Capacity (ANC) of the rock. These tests have a fast turn over period and are ideal preliminary measures to quantify acid generating potential.

Kinetic testing simulates field conditions to provide insight into the longer-term AMD behaviour of soils, rock and waste materials.

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Popular AMD analysis suites

Suite code	Analysis	Description
AMD Suite 1	Total sulphur (S), Acid neutralising capacity (ANC)	Indicates potential acidity but may overestimate acidity if sulphate is present
AMD Suite 2	Total S, sulphate, ANC	Indicates potential acidity AND corrects for presence of sulphate
AMD Suite 3	Total S, sulphate, ANC (siderite) corrected	Indicates potential acidity AND corrects for the presence of sulphate AND siderite (FeCO_3) (If siderite is present and not corrected for, it can give an overestimation of ANC)
AMD Suite 4	Total S, sulphate, ANC (siderite) corrected, net acid generating (NAG)	Indicates potential acidity AND corrects for the presence of sulphate AND siderite (FeCO_3) Includes Net Acid Generation as confirmation of acid base accounting (ABA)

Tailor your analysis with specific, in-depth testing

Test code	Analysis	Description
5.1	Acid Buffering Characteristic Curve (ABCC)	Indicates how much of the measured ANC is readily available for neutralisation
5.2	Sequential NAG	Provides a better estimate of Net Acid Generation determination and overcomes issues with peroxide decomposition in single peroxide addition NAG tests
5.3	Kinetic NAG	Single addition Net Acid Generation test in which the pH and temperature are monitored; gives insight into reaction speed and lag times
5.4	Column leaching	Water is added to the crushed sample and leachate is analysed; heat lamps mimic environmental drying cycles; determines long term behaviour of soil and rock
5.5	Humidity cells	Similar to leaching columns, but a humid environment is maintained and heat lamps are not applied; determines long term behaviour of soil and rock
5.6	Mineralogy by XRD	Insight into siderite content and other minerals that may impact on the acid generating potential of soil and rock
5.7	Australian Standard Leaching Procedure (ASLP)	Australian Standard Leaching Procedure (ASLP) (Australian Standards AS4439.2 and 44396.3) — extraction and analysis of leachable metals and non volatile compounds
5.8	Inorganic carbon (TIC)	Measures total inorganic carbon in soil — normally carbonates and bicarbonates, including siderite

How can we help?

Our expert advice sets us apart from others. To find out more and discuss your specific requirements please contact our acid and metalliferous drainage team at amd@chemcentre.wa.gov.au

For a comprehensive list of our AMD and mine site closure planning tools visit, www.chemcentre.wa.gov.au/Files/ChemCentre_AMD_Services.aspx



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