# Data Needed for Selection and Design of AMD Treatment Systems[1]

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**Abstract:** Proper characterization of mine drainage is essential to every design process and often begins during initial monitoring associated with permit requirements or stream assessment. It is imperative that a sufficient dataset be developed in order to select the treatment process needed to adequately address the discharge and achieve effluent requirements needed for permit compliance, restoration of aquatic resources, or other project goals. Parameters typically used in the selection and sizing of both active and passive treatment components include flow, pH, acidity (Standard Methods 2310 B, "hot peroxide" method that reports both positive and negative acidity as $CaCO_3$ equivalents), alkalinity, conductivity, iron, aluminum, manganese, sulfates, total suspended solids, and temperature. Depending on the treatment needs and process selected, other parameters may prove critical or otherwise useful. These may include but are not limited to total inorganic carbon, calcium, magnesium, potassium, chloride, sodium, and other metals when known or expected to be of concern such as copper, lead, nickel.

In addition to flow and pH, other field tests may be needed to evaluate alkalinity, dissolved oxygen, and dissolved carbon dioxide. These additional parameters can change dramatically between field collection and laboratory testing even with properly collected and stored samples transported to the laboratory in a timely manner. The location of the sample point is also critical as collecting water samples at the most convenient location can lead to a gross mischaracterization of the drainage and result in an ineffective or otherwise inappropriate design. Care to avoid upstream contamination or interference of the sample point is also vital. It is stressed that flow is the first parameter listed due to the important role that the quantity of water to be treated plays in all aspects of the treatment process including sizing the collection and conveyance systems and calculating component residence time and pollutant load. Evaluating the projected improvements to a receiving stream cannot be done without flow data. In the experience of the authors, absence of sufficient flow information is the most often problematic segment of a dataset. It is hoped that a review of the basics of AMD science will assist all parties involved in working to address the impacts of mine drainage.

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