

## The Complete Grout Injection System

**MultiGrout®** - an innovative development - a high performance cementitious-based injection grouting system for ground strengthening and control of water inflows in underground construction.

The MultiGrout® System has been developed during the last 10 years in close co-operation with the industry, predominantly in Norway. Today it is a specialized business activity marketed and supported technically worldwide.



### What makes MultiGrout superior?

The MultiGrout System varies in many ways from the traditional ordinary Portland cement or microfine Portland cement grouts in common usage today.

#### From an applications perspective:

- ☞ Predictable and achievable results - unprecedented in very low water inflow specification
- ☞ Efficiency - results achieved consistently in a single grouting round
- ☞ Minimization of waste - time and materials
- ☞ Ability to control grout flow / set time - without detriment to penetration
- ☞ Long-term durability
- ☞ Environmentally inert and safe to use
- ☞ Flexibility - one grouting system, no special equipment
- ☞ Proven success over a wide range of conditions

#### From a materials perspective:

- ☞ Choice of OPC, Microfine or Ultrafine Portland cement grout - determined at the outset by the outcomes required
- ☞ Fluid-stable grouts at any water/cement ratio - less than 2% bleed
- ☞ Volume-stable grouts at any water/cement ratio - no volume loss from fluid to solid state
- ☞ High resistance to pressure filtration - grouting up to 100 bar
- ☞ Set-controlled "Blocker" grout - the troubleshooting tool!

## MultiGrout material components

The MultiGrout System consists of four core material components and uses typical colloidal mixers and grout pumps; no special equipment requirements.

### a) Portland Cements

Either ordinary or purpose-manufactured Microfine or Ultrafine cements.

### b) Dispersing Agent

Specifically selected for compatibility and to give optimum performance,

plus two essential new components:

### c) Penetrator / Stabilizer

GroutAid® - a special grade of microsilica, processed into a stable aqueous slurry. Improves grout stability, penetration, strength and durability.

### d) Blocker

A two-component mineral-based microfine cement material with controlled set time, early strength development and an affinity with Portland cement.

## Economic considerations

The overall costs of an injection grouting program are influenced by a wide range of factors, particularly the rock mass conditions, pre- or post-grouting and the outcome required. These are very site specific and should not be generalized.

From a grouting materials perspective, there are several important economic factors (compared to the use of traditional Portland cement grouts) that should be considered:

#### DISCLAIMER:

*The information given on this data sheet is based on many years of research and field experience and is accurate to the best knowledge of Multigrout Personnel. However, due to the numerous factors that can affect the performance of injection grouts, with or without our products, Multigrout offers this information without guarantee and accepts no liability for any direct or indirect damages from its use.*

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- ☞ Cost of materials makes up only 15 - 25% of the total cost of a grouting program. So efficiency is of primary concern where time-related costs are 75 - 85% of total cost. The MultiGrout System is developed to achieve required outcomes in one grouting round, no repeat rounds!
- ☞ Increase in grout volume per kg of cement by some 50% - 80%, when primary grout mix used is at water/cement ratio of 1.2. This is achieved with the MultiGrout System because grout stability, penetration and strength properties can be maintained at higher water/cement ratios.
- ☞ Up to 25% improvement in grout volume. The volume stability of MultiGrout grouts ensures that plastic volume of grout translates directly to solid volume of grout.
- ☞ The ability to control grout placement and limit uncontrolled grout flow via the use of set-controlled "Blocker" grout minimizes waste of grout, but more importantly, minimises waste of valuable time.

## The MultiGrout Team

The MultiGrout activities extend well beyond materials supply.

These activities also involve a core group of technical specialists providing four key service elements to MultiGrout clients:

- ☞ Materials supply
- ☞ Application methodology
- ☞ Education / on-the-job training
- ☞ Engineering / design support



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