



## Dewatering Solutions for Mining Applications

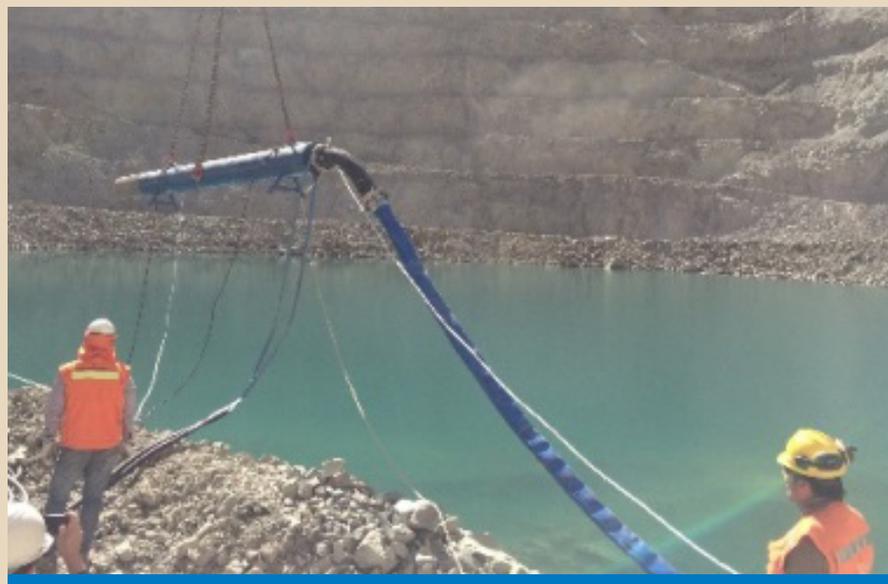
## Pumped Wells

In-pit and exterior bore holes equipped with electric submersible pumps lower ground water levels and contribute to pore water pressure reduction. This plays a big role in increasing the stability of slopes and underground openings.

The effectiveness of site water management can be greatly improved by the use of flexible rising mains with their ability to absorb shocks during blast operations.

If necessary flexible risers can easily be removed during major operations, which is a significant advantage over rigid risers for pumped well applications.

Rigid risers can be subject to significant internal bacterial growth and corrosion, which reduces flow rates and pump efficiency. Flexible risers do not suffer from internal scaling and therefore pump efficiency is maintained.



## Sump Dewatering

Water directed by drains and ditches to a point where it collects in a sump, is usually pumped up the pit wall using high pressure centrifugal pumps.

The use of hydraulically efficient, high quality layflat hose with low friction loss will reduce the number of pumps required to achieve the desired flow and head. This results in increased efficiency and cost savings for the mine.

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Layflat hoses are especially recommended for mining activity where the surface equipment and pumps are constantly being moved.

## Our experience is your solution

Angus Flexible Pipelines has extensive breadth and depth of experience in manufacturing flexible rising main systems to the world of mine dewatering operations.

Known as '**Steel on a Reel**', **Wellmaster** offers exceptional strength and hydraulic efficiency as well as major cost savings and performance advantages over conventional rigid polyethylene, glass fibre, galvanised and steel pipes.

In environments from the Chilean mountains to the Egyptian desert and the Australian outback **Wellmaster** has proved itself to be the flexible answer to ground water extraction problems.



# Challenges of Mine Water Management

Profitable mining requires fast, efficient and safe solutions to meet the diverse challenges miners face day to day. The products used in mining need to be of the highest quality and reliability, long lasting and easy to handle. Angus Flexible Pipelines manufactures a wide range of layflat hose and accessories to meet the rigorous demands of today's mining operations.



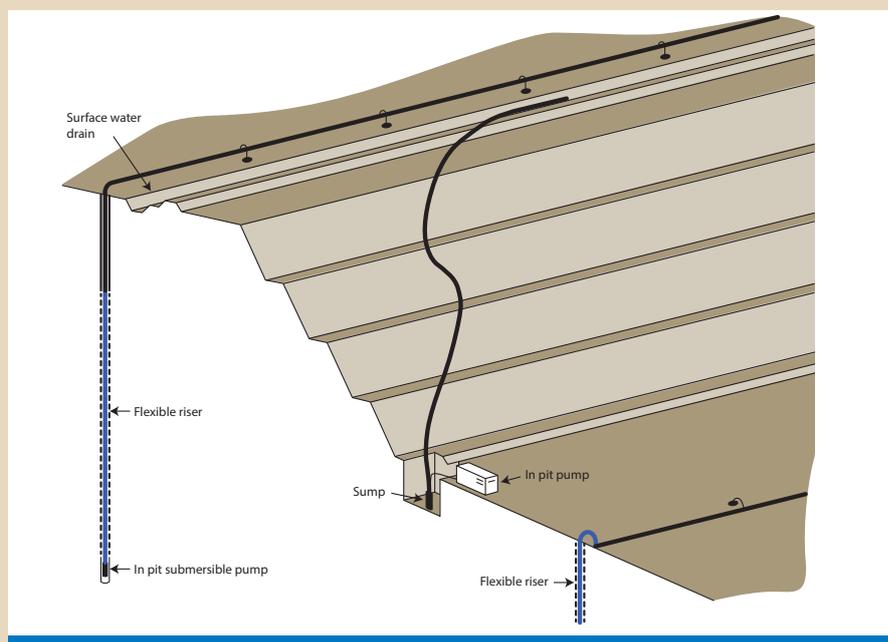
## It is all about dewatering

Dewatering is a crucial part of the mining process, and its efficient management leads to major cost savings.

Accurate control of surface and ground water is essential as poorly managed water could have an impact on the safety of the miners, the performance of the mine, and conservation of the environment.

Dewatering applications are:

- Pumped wells or deep sumps inside the pit
- Pumped wells outside the pit
- Free flowing drill holes inside the pit, the inflow being collected and pumped from one or more sumps.



## Wellmaster – Flexible Rising Main System

**Wellmaster** is the Industry Standard Flexible Rising Main designed for use with electric submersible pumps in all types of ground water borehole extraction and well monitoring operations.

Over the past 30 years the **Wellmaster** system has proven its performance in more than 70,000 installations worldwide.

**Wellmaster** is made from high tenacity yarns with a tough polyurethane lining and cover. This manufacturing process gives **Wellmaster** maximum flexibility and tensile strength together with high operating pressures and exceptional end tensile load capabilities. The built in "swell" of up to 15% delivers improved hydraulics performance.

**Wellmaster** layflat hose is available as WM150 - WM250 - WM400 in a wide range of diameters (32mm - 208mm) to cover all possible pressure needs and performance ranges..

**Wellmaster** Flexible Rising Main is the only flexible system to come with a software programme, which enables users to validate hydraulic performance in advance of installation.

By using **WellCalc** miners can select the correct diameter hose for boreholes, and thereby minimise operational delays, increase efficiency and save money.

Further information on the installation and use of **Wellmaster** can be obtained from the **Wellmaster** installation manual, technical manual and **WellCalc** software.

Installation courses are also available from Angus Flexible Pipelines, leading to certified installer status.

### WellCalc



### Key features & benefits

- Lightweight for ease of use
- Rapid installation & retrieval
- Single long length installation
- Easy to store and transport
- Low operating costs
- Non maintenance
- Long service life
- Elimination of overhead hazards and working under suspending loads during installation.
- Integral rib for easy fitting of the power cable strapping system
- 100% testing of performance features



### Key advantages over steel risers

- Improved hydraulics due to built in "swell"
- The performance of steel risers can be achieved by a size smaller layflat risers, which results in cost savings.
- Total corrosion resistance
- Immune to iron bacteria, dissolved gases SRB and NORMS
- No scaling

## Installation Methods

One of the key benefits of using **Wellmaster** is the ability to rapidly install and retrieve the hose from boreholes. This can be achieved using a number of methods depending upon operating conditions and technical requirements.

### Crane Installation

Installation by crane is the usual method of delivering **Wellmaster** to the borehole where access is limited.



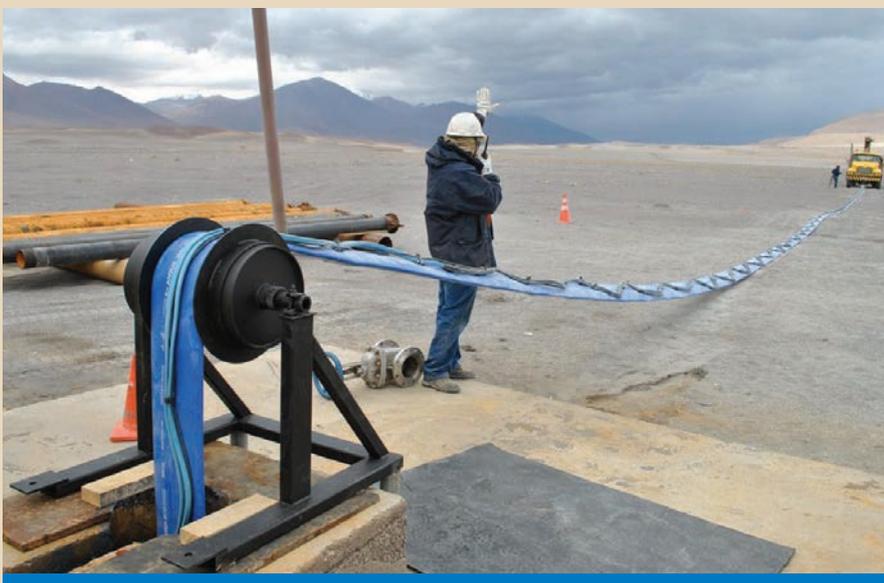
### Specialist Trailer Installation

The use of a specialist installation trailer removes the danger of overhead hazards and working under suspending loads during installation and retrieval of **Wellmaster**.



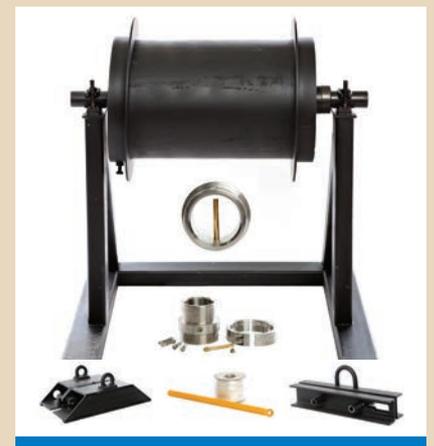
### Vehicle Installation

Vehicle installation allows deployment to take place at ground level using the Angus wellhead roller. **Wellmaster** can be completely installed at ground level without the need for operators to work under suspended loads.



### Wellmaster Fittings

Wellmaster is available with a range of unique, custom designed, high security couplings. They are reusable, field-fittable and manufactured from 316 stainless steel. A full range of installation accessories is also available.



## Mine Water Disposal

Angus Flexible Pipelines manufactures a wide range of waste water disposal hose and ancillaries ideally suited to provide high performance and long life in mine pit dewatering. These layflat hoses are easily stored, transported and deployed. They provide quick and efficient water transfer from the wellhead to the tailings dam or disposal point.

The mine pit dewatering hoses from Angus Flexible Pipelines include **Armourline**, **Super Aquaduct**, **Flowmaster** and **Wellmaster** in diameters from 51mm (2") to 305mm (12").



## Mine Water Transfer and Drinking Water Supply

Water management is a critical aspect in the planning and development of a mining project, particularly in extreme environments that feature prolonged wet or dry seasons.

Angus Flexible Pipelines manufactures **Super Aquaduct**, a superior quality layflat pipeline which can be used to meet process water requirements as well as to provide potable water for the mining community. Uniquely **Super Aquaduct** has numerous drinking water approvals.

**Super Aquaduct** is available in large diameters and lengths and can transfer water long distances to arid locations. Likewise it can be quickly deployed in an emergency to dispose of large quantities of floodwater due to heavy rainfall.

**Super Aquaduct** can be used as a large diameter ring main for connecting submersible or sump pumps; either as a permanent feature or for temporary use while traditional hard pipe systems are being installed using a range of purpose designed manifolds.

## About Angus Flexible Pipelines

Angus Flexible Pipelines has been at the forefront of hose technology for over 40 years. Formed in 1970 as a division of Angus Fire, Angus Flexible Pipelines pioneered the development of Irrigation hose, a high tensile, long length hose for use with travelling irrigators. This was followed by **Chemicoil** for delivering fuel and chemicals, **Super Aquaduct** for delivering potable drinking water, and **Wellmaster**, which is now the world's premier flexible rising main. Angus Flexible Pipelines continues to invest in hose technology development, which is carried at the hose centre of excellence in the UK. The company's breadth and depth of experience is unsurpassed in the industry.

