

OPEN CHANNEL FLOW METERING

INTRODUCTION

Performance monitoring of pumps is a useful tool to optimize pump efficiency and schedule maintenance activities. For smaller pumps the capacity can be measured by metering the pipe ultrasonically.

For large pumps this is often not possible due to buried pipe, concrete or other non-sonic conductive pipe, or lack of straight pipe run for uniform velocity distribution.

Pump services that typically don't have accessible pipe include:

- ***Circulating Water Pumps***
 - Once through systems
 - Concrete pipe
 - Inaccessible risers
- ***Flood Control Pumps***
 - Lack of access

These large pumps can now be tested using open channel flow metering. This instrumentation has been in use for years for river studies and water usage metering, it is now more practical with the use of magnetic flow meters.

Magnetic flow meters have no moving parts. They are more accurate, easier to use, and are not subject to debris issues as are other testing methods previously used.



Measuring Velocities at Pump Intake Structure



Once Through Circulating Water Pumps



Magnetic Velocity Probe and Meter

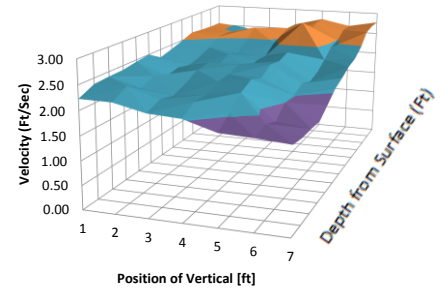
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TEST PROCEDURE:

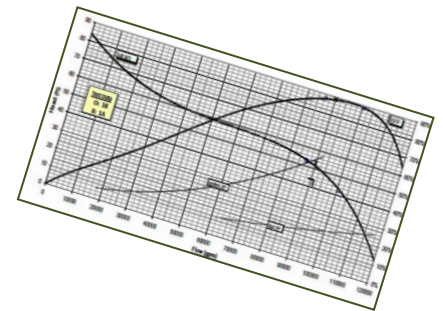
Open channel metering requires access to a relatively uniform channel cross section. The velocities are obtained in a grid pattern. These velocities are collected, averaged, and used with the measured cross section to determine pump capacity.

Other pump variables can readily be measured to determine pump performance including:

- *Total Developed Head*
- *Brake Horsepower*
- *Efficiency*
- *Net Positive Suction Head Available*
- *Vibration Levels*



Velocity Profile Measured at Intake Structure Inlet



BENEFITS OF OPEN CHANNEL FLOW METERING

- Obtain pump capacity data
 - For pump efficiency optimization
 - For EPA and water use verification
 - For maintenance planning
- Improved reliability
 - Reduced unscheduled outages
 - Reduced maintenance costs
- Establish baseline for future trending

