



APPLICATION NOTE: In-Line Ultrasonic Flow Meter Ensures Efficient Operation of LINAC System

A linear accelerator (LINAC) is a type of particle accelerator that is used to increase the kinetic energy of particles, a series of relatively small increases in energy to subatomic particles as they pass through a sequence of alternating electric fields set up in a linear beamline. The small accelerations add together to give the particles a greater energy than could be achieved by the voltage used in one section alone.

LINACs have many applications. For example, in the medical industry to generate X-rays and provide localized radiation therapy for cancer treatment. The biomedical and drug development industry uses LINACs to decipher the structure of proteins for more effective drug production. Studying particle acceleration has led to many improvements to existing, and potentially new, applications in power generation, transportation, security and sterilization.

In discovery science, LINACs are typically part of a large system that includes: linear accelerator, booster, injector, recycle and delivery rings to experimental facilities. In order to keep this large and complex system operating correctly, an efficiently proper temperature needs to be maintained. Most facilities control and monitor the temperature and flow of cooling water at various points in the system. This is a critical measurement as changes in temperature can lead to expansion or contraction of the metals used to generate particles which can greatly reduce the efficiency of the system.

A research facility needed to upgrade an aging cooling system for their LINAC. The current system used turbine flow meters that required frequent maintenance and replacement due to the hours of operation and high purity deionized (DI) water used in the cooling circuit. The customer had tested a few all-plastic variable area and vortex flow meters but could not get the accuracy, repeatability or turn-down needed to appropriately monitor their system.

Flow Technology recommended the QCT Series in-line ultrasonic flow meter to provide the high accuracy and repeatability that the customer needed. The QCT flow meter is also a durable, low maintenance device compatible with the DI water. The 100:1 turndown allowed for monitoring the full flow range throughout the operation. And the meter's multiple outputs (4-20mA, frequency and Modbus) provided options for the upgrade of their system.

HIGHLIGHTS

Industry: Industrial
Service: Flow Rate/Total
Fluid: DI water

Application

Monitor DI water flow for cooling circuit to particle accelerator cavities

Problem

- Monitor flow and temperature at various circuits throughout the system
- Need an accurate, durable, and low maintenance low flow measurement solution
- Upgrading an old system and need options on meter output.

Solution

- QCT Series in-line ultrasonic flow meter