NONMANDATORY APPENDIX DD
CONDUCTIVITY SENSOR SELECTION GUIDE

DD-1 PURPOSE

The purpose of this Appendix is to provide guidance for the selection of conductivity sensor technologies based on general process conditions and owner/user requirements. This document is a supplement to the applicable sections of Part PI.

DD-2 GENERAL CONSIDERATIONS OF COMMON SENSE TECHNOLOGIES

The following are important aspects for the owner/user to consider when selecting a conductivity sensor.

DD-2.1 Measurement Range and Accuracy

DD-2.1.1 Range. Identifying the range of measurement helps the owner/user select the proper type of sensor technology and appropriate cell constant, when applicable. See Figure DD-2.1.1-1 for general applications and where they might fall on a conductivity scale.

(a) Two-electrode technologies are well suited for low conductivity applications with a narrow conductivity range.

(b) Multielectrode technologies are well suited for medium conductivity applications with relatively wide conductivity ranges.

(c) Electrodeless technologies are well suited for medium to high conductivity applications with wide conductivity ranges.

DD-2.1.2 Accuracy. The accuracy of the conductivity measurement is dependent on the combined accuracy of the individual components in the measurement loop.

DD-2.2 Temperature Compensation

DD-2.2.1 Sensors. Most conductivity sensors incorporate an integrated temperature sensor to compensate for the effects of temperature on raw conductivity measurements. Integrated temperature sensors are not intended to replace external temperature sensors dedicated to process monitoring.

DD-2.2.2 Response Times. Integrated temperature sensor response times may lag changes in the process fluid temperature, resulting in longer conductivity stabilization times. To improve temperature sensor response time, an external temperature sensor can be used as long as the external temperature sensor is compatible with the conductivity sensor electronics.

DD-2.3 Installation

DD-2.3.1 Interferences. Consideration should be given to reducing or eliminating installation-induced interferences. Installation-induced interferences include but are not limited to siphoning, cavitation, flashing, non-full process line, field effects (i.e., proximity to pipe or vessel walls), incomplete mixing, and EMI and RFI interference. Installation-induced interferences may result in measurement errors.

DD-2.3.2 Other Considerations. Other installation considerations include ensuring that the sensor is accessible and does not interfere with other process components.

DD-2.4 Process

Consideration should be given to reducing or eliminating process-induced interferences. Process-induced interferences include but are not limited to entrained air and rapid temperature changes. Process-induced interferences may result in measurement errors.

DD-2.5 Maintenance

Ensure that sensor maintenance requirements can be performed (e.g., gasket or seal replacement).

DD-2.6 Pros vs. Cons of Common Sensor Technologies

See Table DD-2.6-1.