Degassed Cation Conductivity

THORNTON
Leading Pure Water Analytics

DCC1000 System

- All conductivity measurements
- Calculated pH and CO_2
- Trend graphs
- Faster plant startups

Degassed Cation Conductivity Measurement

Reliable Cycle Chemistry Monitoring

METTLER TOLEDO

DCC1000 System for
Precise detection of Corrosive Contaminants

The METTLER TOLEDO Thornton DCC1000 System offers a new design for conductivity measurement for power cycle chemistry monitoring. By providing conductivity measurement in compliance with ASTM D4519, this system provides assurance of water purity to maximize power production and minimize corrosion. Unambiguous measurement of trace levels of corrosion-causing contaminants is enabled with minimal operator supervision.

Features

- Precise detection of corrosive contaminants
- Multi-parameter M800 transmitter with single-screen display of all measurements
- Integrated flow sensor with automatic heater shut-off if flow stops
- Trend graphs for all measurements

Benefits

- Faster plant start-ups and simpler turbine warranty compliance
- Easy displaying and monitoring of sample conditions
- Protect the DCC1000 system from thermal damage and maintenance
- Understand plant characteristics better and plan maintenance, avoiding unplanned shutdowns

Applications

Feed water and steam monitoring during plant startup enable the best decisions to be made on increasing load. By monitoring specific, cation and degassed conductivity, the technician can ensure the water quality is adequate to bring the plant online.

Power steam quality monitoring ensures contaminant limits specified in turbine warranties are met. By eliminating interference from CO_2 and ammonia, the degassed cation conductivity measures the level of contaminants that turbine manufacturers are concerned about.

Power condensate monitoring can help distinguish air in-leakage from cooling water leaks. Any CO_2 leakage into the condensate will be detected by comparing the cation conductivity to the degassed cation conductivity on the DCC1000 Analyzer.

The M800 even includes the option for CO_2 concentration readout based on this difference, according to ASTM D4519.

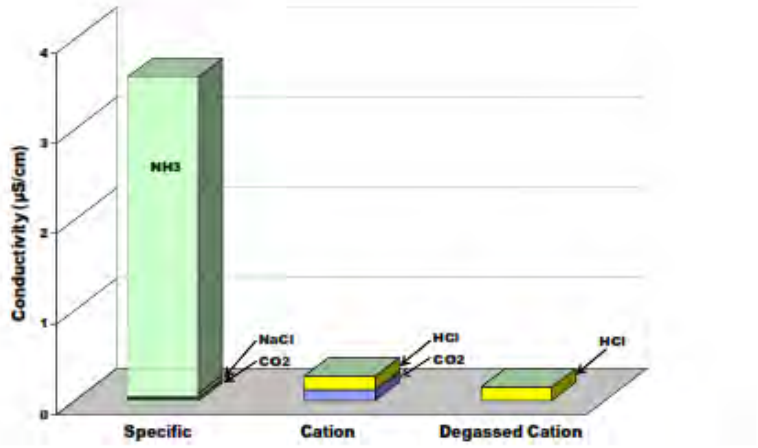
DCC1000 System for
Conductivity and Contamination Detection

With accurate and reliable conductivity measurements using UniCond sensors with ISM, the DCC1000 System confirms water purity to maximize power production and minimize corrosion.

Conductivity – a key measurement
Conductivity measurement is the method for determining the concentration of dissolved ionic species present in sample water. Ultrapure water is very poorly ionized with conductivity as low as of 0.055 uS/cm. Even if a small amount of contaminant (for example, NaCl) is added, the conductivity increases substantially. Such salts are corrosive and their levels need to be monitored to ensure minimal corrosion.

Importance of identifying corrosive contaminants
An increase in conductivity also occurs with the addition of water treatment chemicals, such as ammonia or amines, which are not corrosive. These chemicals, and therefore their conductivity effects, are removed using a cation resin column. Along with corrosive contaminants and ammonia, the sample water may also contain carbon dioxide, which is far less corrosive. This adds to the conductivity measurement and obscures the actual conductivity from key corrosion-causing contaminants such as chlorides and sulfates. By using de-gassed cation conductivity to remove carbon dioxide interference a more accurate picture of the levels of chlorides and sulfates is provided (figure 1).

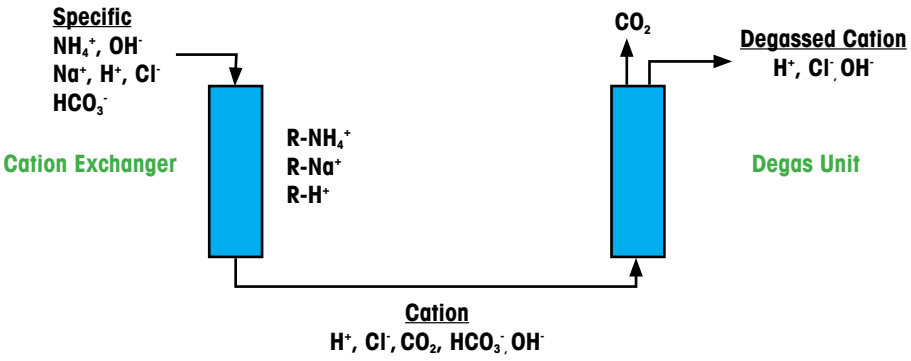
Figure 1: Typical Specific, Cation and Degassed Cation Conductivity Response



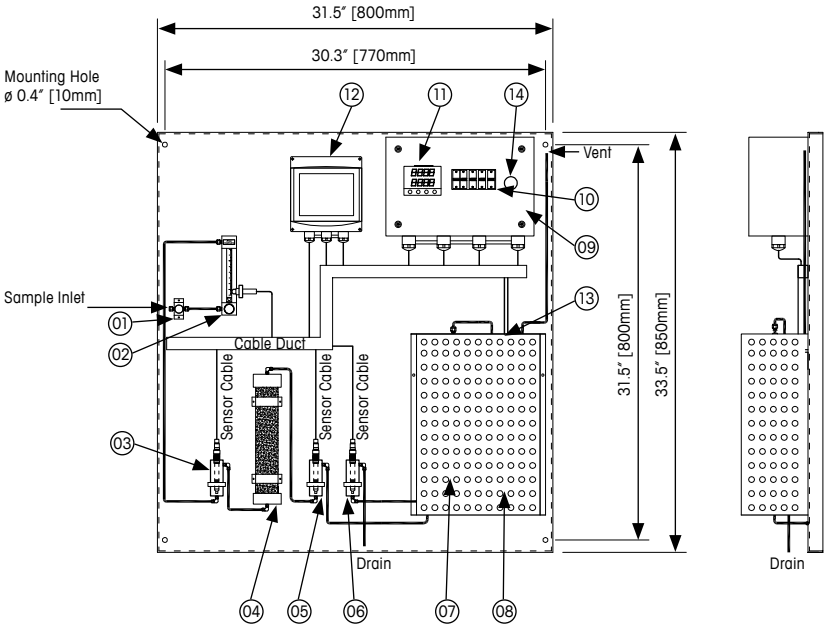
Optimized design to meet the challenge

The DCC1000 System uses the latest technology in conductivity measurement to accurately and reliably measure conductivity at each stage of sample conditioning to give insight into the cycle chemistry (figure 2). UniCond sensors used in the DCC1000 are the best available for the measurement of conductivity in pure waters, giving the greatest accuracy at the lowest levels of detection. With ISM features such as having the measurement circuit close and inseparable from the sensor elements, the UniCond sensor can deliver enhanced accuracy and greater range of measurement. The DCC1000 System measures the conductivity after the cation resin column as well as after degassing to provide comprehensive information on various contaminants in the water. The degassing is accomplished by raising the sample water temperature to near boiling which releases the CO_2 from the water (the CO_2 is released through the unit's vent tube). The sample water is then cooled and the conductivity measurement of that sample water measures the actual levels of corrosion-causing contaminants such as chlorides and sulfates remaining.

Figure 2: Specific, Cation and Degassed Cation Conductivity Measurements



DCC1000 System
Product Specifications



Front View **Side View**

Item No	DESCRIPTION
01	SAMPLE ISOLATION VALVE
02	ROTAMETER WITH PROXIMITY SWITCH
03	SPECIFIC CONDUCTIVITY SENSOR
04	CATION RESIN COLUMN
05	CATION CONDUCTIVITY SENSOR
06	DE-GAS CONDUCTIVITY SENSOR
07	SAMPLE COOLER
08	ELECTRICAL HEATER – 1000W
09	JUNCTION BOX
10	CIRCUIT BREAKER
11	TEMPERATURE CONTROLLER
12	M800 TRANSMITTER
13	RTD – PT100
14	'HEATER ON' INDICATOR

NOTE:
1. All dimensions are in inches (mm) unless otherwise noted.
2. Sample tubing: 1/4″ OD
3. Sample inlet connection: 1/4″ OD SS-316 bulkhead union

Sensor: UniCond® with ISM®

Specifications	
Accuracy	± 1% for 0.02-5,000 µS/cm; ± 3% > 5,000 µS/cm
Repeatability	± 0.25%
Temperature sensor	Pt 1000 RTD, IEC 60751, Class A, with NIST-traceable calibration
Temperature accuracy	± 0.1 °C at 25 °C
Wetted materials	Titanium, PEEK
Response time	90% of value in <5 s
Signal to transmitter	Digital (modified RS485)

Transmitter: Multi-parameter M800 transmitter with ISM®

Electrical Specifications	
Current (analog) outputs	8 X 0/4 to 20 mA, 22 mA alarm, galvanically isolated from input and from earth/ground
Analog output accuracy	± 0.05 mA over 1 to 20 mA range
Analog output configuration	Linear, Bi-linear, Logarithmic, Autoranging
Analog output load	500 Ω max.
Digital communication	USB, Type B connector
User interface	Color touchscreen 5.7″ Resolution 320 X 240 px 256 colors
Update time (meas. update rate)	1 per second
Hold input	Selectable
Alarm control delay	Selectable, 0 to 999 s
Connection terminal	Spring cage terminals appropriate for AWG 16-24/0.2 mm^2 wires
Relays	4-SPST mechanical rated at 250VAC, 3 Amps (Relay 1 NC, Relay 2 to 4 NO); 4-SPST Type Reed 250 VAC or DC, 0.5 Amps (Relay 5 to 8)
Digital input	6 with switching limits 0.00 VDC to 1.00 VDC for low level 2.30 VDC to 30.00 VDC for high level
Main fuse	2.0 A slow blow type FC, not replaceable

System Specifications	
Power supply	100-140 VAC and 200-240 VAC, 975 W typical
AC frequency	50 to 60 Hz
Sample flow rate	100-250 mL/min
Sample temperature	<100 °C (212 °F)
Sample pressure	0.3-7 bar (5-100 psig)
Cation resin	1 L
Ambient operating temperature	5-50 °C (41-122 °F)
Humidity	10 - 90% non-condensing
Dimensions (HxWxD)	850 x 800 x 170 mm (33.5 x 31.5 x 6.7″)
Weight	20 kg (44.1 lb)
Rating / approvals	CE

DCC1000 System
Ordering Information

Description	Order No.
DCC1000 System, 100-140 VAC	**58 084 150**
DCC1000 System, 200-240 VAC	**58 084 151**

Consumables	
Cation resin, 1L	**58 084 021**

www.mt.com/thornton

Visit for more information

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