

# TELEDYNE ANALYTICAL INSTRUMENTS

## Measuring Water in Alcohol by On-Line NIR Photometric Transmitter

Teledyne offers a low cost, fiber optic based, NIR photometric transmitter and sample interface for monitoring the amount of water in alcohol. The system incorporates state-of-the-art electronics connected to fiber optic based in-situ probes or extractive flow cells. The transmitter operates continuously with no moving parts and can be packaged with products such as flow, temperature, and pressure transmitters.

### Defining the Problem

If, during the process of making alcohols (ethanol, methanol, etc.), water enters the process it can have significant impacts on final product quality and value. Laboratory analysis utilizing Carl Fisher titration is time consuming and not performed on a real time basis. Production facilities need a means of continuously monitoring the quality of the produced alcohol to meet specifications and maintain process control.

### The Teledyne Solution

Teledyne offers a low cost, customized solution to the potential problem of excessive water in alcohol production plants. The Photo-X is a fiber optic based, NIR photometric transmitter that produces a signal proportional to water concentrations in alcohol. The unit can be supplied in a NEMA 4X enclosure and can be packaged to meet either C1D2 or C1D1 area classifications.

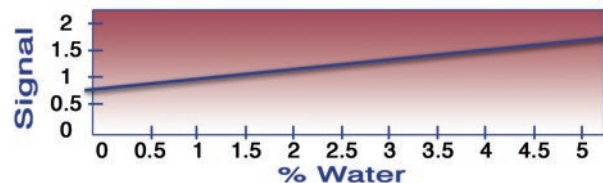
Teledyne offers both in-situ probes and extractive flow cell for this measurement. Both the in-situ and extractive fiber optic accessory separates the sample from the electronics via safe, nonconductive fiber optic cables. All components in contact with the sample are Hastelloy, Sapphire, and Chem-Raz o-ring materials. Temperature control of the extractive flow cells are offered as an option if the sample displays significant temperature swings.

### The NIR Water unit can be used in

- Industrial labs
- Final product specification
- Dryer efficiency
- Grain alcohol plants
- After coalescing filters
- Water contamination

### Photo-X Calibration

Water in Alcohol as measured by Photo-X NIR



### Photometric Transmitter

The photometric transmitter displays engineering units (AU, ppm, g/l, % etc.) and re-transmits a 4-20mA signal that is proportional to the amount of optical density in the sample being measured. This reading is based on the amount of optical attenuation from the absorbed sample as compared to a reference signal.

The unit is supplied with a window fouling circuit and a calibration span filter which provides the user with important diagnostic information about the transmitter's health. The optional calibration span filter allows the user to (either manually or automatically) employ a referenced optical filter to the measuring beam.

Calibration by standard addition is a proven technique that allows a reference check of the flow cell or probe and transmitter without mixing solutions or running samples to a lab. In addition, this technique can be performed without shutting down the process. All span / calibration filters are calibrated against a primary reference filter.



Model 58T fiber optic  
NIR Photo-X transmitter

# Measuring Water in Alcohol by On-Line NIR Photometric Transmitter

## PRODUCT SPECIFICATIONS

### 58T Series Photometric Transmitter

#### Transmitter

Measured parameter:	Water
Temperature range:	-40 to +50° F
Response time:	< 1 sec
Maximum Zero shift:	0.005AU (over +20 to +40° C)
Long term output drift:	< 2 % / month
Repeatability:	1% of range
Range:	Pathlength and wavelength dependent
Source:	Tungsten halogen
Wavelength range:	NIR
Detectors:	NIR
Calibration:	Manual or automatic

#### User Display & Control

Type of display:	LED display
Display:	3-1/2 digits in user defined engineering units

#### Electrical

Power requirement:	24 VDC (9-32 VDC)
Power consumption:	0.48 Watts
Analog outputs:	4-20mA isolated
Analog loop resistance:	500 Ohms, maximum @ 24V
Certification:	CE

#### Mechanical

Analyzer weight:	1.5 lbs
Enclosure:	Extruded aluminum, NEMA 4X optional 8" H x 3-7/8" W x 1.5" D

#### Front Surface Fluorescence Probe

Materials:	316 SS, other material available, please consult factory
Temperature rating:	315.5° C (600° F)
Pressure rating:	5,000 psig
Expected probe life:	25 years

### Probe Options

- 6, 12, or 24" length
- Automatic retractor for cleaning
- Temperature measurement
- Welded flange for standard sight glass configuration

### Transmitter Options

- Industrial packaging (NEMA or Ex-proof enclosure)
- NBS traceable span filter; manual or automatic 9remote trigger)
- 110 / 220 to 24 VDC power supply



Automatic span filter motor

## TELEDYNE ANALYTICAL INSTRUMENTS

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## Warranty

Instrument is warranted for 1 year against defects in material or workmanship. NOTE: Specifications and features will vary with application. The above are established and validated during design, but are not to be construed as test criteria for every product. All specifications and features are subject to change without notice.

