

# PUV3402 LED and PIR3502

## Multiwave photometers



Industry applications for PUV3402 LED and PIR3502 measurements.

**Measurement made easy**

— Photometers provide catalyst protection for the refining and petrochemical industries.

## Applications

### Introduction

ABB PUV3402 LED, PIR3502, PFO3372 process photometers provide on-line measurements of gas or liquid components, in simple or complex process streams for:

- Process efficiency
- Catalyst protection
- Product quality
- Environmental concerns
- Safety
- Process control

ABB process photometers provide reliable performance in the petrochemical, chemical, refining, gas processing and product pipeline industries.

These lists provide a general reference for determining potential Multiwave photometer applications. Other considerations will be the remaining stream matrix, stream temperature, stream pressure, and stream phase. The sample must be homogeneous, single phase in order to apply the method. Please provide the detailed information on your application to our ABB sales group so that application engineers can determine the feasibility of your application.

## Field proven PUV3402LED and PIR3502 applications

This table is a partial listing of field-proven applications. These applications are grouped by process. Measured components and key benefits are indexed by each applications.

### PUV3402 and PIR3502

Process	Measurement	Benefits	IR/UV
Acid gas scrubbers	Sodium hydroxide 0 to 15 %	Improved scrubber efficiency and reduced cost	IR
Acetic acid	CO 80 to 100 % in reactor feed	Maximize process yield	IR
	Water 0 to 20 % in reactor outlet	Distillation tower control	IR
		2nd half of distillation tower control and determining expected life of drying column	IR
	Water 0 to 1500 ppm in drying column outlet	Drying column efficiency	IR
Ammonia	Methyl iodide 0 to 1000 ppm	Scrubber efficiency and safety	UV
	CO 0 to 500 ppm	Catalyst protection	IR
	CH <sub>4</sub> 0 to 0.5 %	Safety	IR
Area monitoring	Ethyl benzene 0 to 200 ppm,	Safety, leak detection	IR
	Styrene 0 to 100 ppm,		IR
	Isooctane 0 to 2500 ppm,		IR
	Divinylbenzene 0 to 300 ppm		IR
Crude unit	ASTM color 0 to 8	Product quality	IR
Ethylene	Acetylene 0 to 2 %	Hydrogenation reactor inlet continuous control	IR
	Acetylene 0 to 0.5%	Hydrogenation reactor mid-bed continuous control	IR
Ethylene dichloride	CO 0 to 10 %, CO <sub>2</sub> 0 to 5 %, and ethylene 0 to 5 %	Process efficiency and safety	IR
	Chlorine 0 to 2000 ppm in EDC with sparger system	Process efficiency	UV
Maleic anhydride	CO 0 to 2.5 %, CO <sub>2</sub> 0 to 2.5 %, butane 0 to 0.5 %, and maleic anhydride 0 to 2 %	Reactor outlet – process efficiency	IR
	Butane 0 to 2% and water vapor 0 to 5 %	Reactor inlet – LEL control	IR
Phosgene	CO 0 to 2.5 %, CO <sub>2</sub> 0 to 2.5 %, Butane CO 0 to 10 %	Process control	IR
	Chlorine 0 to 200 ppm	Process control	UV
	Phosgene 0 to 100 ppm	Safety	IR
Product pipeline	CO <sub>2</sub> 0 to 1000 ppm	Prevent freezing of natural gas lines	IR
Sulfur recovery	H <sub>2</sub> S 0 to 100 %, CO <sub>2</sub> 0 to 100 %,	Acid gas feed forward control	IR
	H <sub>2</sub> S 0 to 100 %, NH <sub>3</sub> 0 to 50 %,	Sour gas feed	IR
Vinyl chloride	Water 0 to 50 ppm in EDC	Catalyst protection, corrosion protection of reactors	IR
	Vinyl chloride 0 to 200 ppm, 0 to 2 % in HCl	Condenser efficiency	IR

### IR absorbing compounds

#### Potential measurements – partial list

Butadiene (1,3)	Ethyl alcohol	Nitric acid
Butane (n)	Ethyl chloride	Nitric oxide
Carbon dioxide	Freon-13B	Nitroethane
Carbon monoxide	Freon-14	Nitrogen dioxide
Carbon tetrachloride	Freon-C-318	Nitrogen pentoxide
Chloroform	Hydrazine	Nitromethane
Cyanogen	Hydrogen bromide	Nitropropane (1&2)
Cyclopropane	Hydrogen chloride	Nitrosyl chloride
Diazomethane	Hydrogen cyanide	Nitrous oxide
Dichloroethane (1,1 and 1,2)	Hydrogen sulfide	Phosgene
Dichloromethane	Isobutane	Propane
Dimethyl amine	Methane	Propylene
Dimethyl ether	Methyl alcohol	Trimethylhydrazine
Dimethyl hydrazine	Methyl azide	Trimethylamine
Ethane	Methyl chloride	Vinyl chloride
	Methyl mercaptan	Water

### UV absorbing compounds

#### Potential measurements – partial list

Acetic acid	Ferric chloride	Pyridine
Acetone	Fluorine	Sodium sulfide
Ammonia	Hydrogen sulfide	Styrene
Aniline	Iodine	Sulfur
Anthracene	Mercury	Sulfur dioxide
Benzene	Methyl mercaptan	Furfural
Bromine	Naphthalene	Toluene
Carbon disulfide	Nickel carbonyl	Hydrogen peroxide
Carbon tetrachloride	Nitrobenzene	Xylene (o, m, p)
Chlorine	Ozone	Hydrogen sulfide
Chlorine dioxide	Perchloroethane	Toluene
Chlorophenol (o,m,p)	Phenol	Iodine
Dioxane	Phosgene	Xylene (o, m, p)
Ethylbenzene		

## Specification

### Field-proven multicomponent measurements

0 to 1.2 % toluene; 0 to 2 % tetrahydrofuran and 0 to 100 % LEL of gas mix (3 components)  
 0 to 20 % CO<sub>2</sub>; 0 to 20 % CO<sub>2</sub>; and 0 to 5 % CH<sub>4</sub> (3 components)  
 0 to 55 % propane and 0 to 20 % propylene (2 components)  
 0 to 1000 ppm CH<sub>4</sub> and 0 to 250 ppm ethane in ethylene @ 100 psig (2 components)  
 0 to 100 ppm CO and 0 to 100 ppm CO<sub>2</sub> in H<sub>2</sub> @ 200 psig (2 components)  
 0 to 5 % CO<sub>2</sub>; 0 to 5 % CO; 0 to 1 % toluene and 0 to 1 % benzene in air oxidation vent (4 components)  
 0 to 50 ppm acrylonitrile and 0 to 50 ppm styrene in air (2 components)  
 0 to 50 ppm ethylene oxide and 0 to 50 ppm propylene oxide in air (2 components)  
 0 to 70 % methyl chloride and 30 to 55 % methylene chloride (2 components)  
 0 to 5000 ppm SO<sub>2</sub>; 0 to 2000 ppm NO;  
 0 to 2000 ppm NO<sub>2</sub> and 0 to 2000 ppm NO<sub>x</sub> (4 components)  
 0 to 5000 ppm ethane; 0 to 5000 ppm ethylene and 0 to 80 % methane (3 components)  
 0 to 40 % CO<sub>2</sub>; 0 to 40 % CO and 0 to 25 % water vapor in air (3 components)  
 0 to 80 % ethylene and 0 to 15 % CO<sub>2</sub> in mixed HC stream as a vapor (2 components)  
 0 to 100 % CO; 0 to 60 % ethylene; 0 to 20 % CO<sub>2</sub>; and 0 to 5 % ethyl chloride @ 70 psig (4 components)  
 0 to 1000 ppm water and 0 to 5 % DMSO in monochlorobenzene (2 components)  
 0 to 100 % ethylene; 0 to 10 % EDC; 0 to 50 % HCl; and 0 to 20 % ethyl chloride (4 components)  
 0 to 20 % propadiene; 0 to 40 % methyl acetylene and 0 to 60 % MAPD (3 components)

### Water measurements

0 to 2 % water in phenol  
 0 to 500 ppm water in monochlorobenzene  
 0 to 50 ppm water in ethylene dichloride  
 0 to 250 ppm water in chlorine @ 75psig (vapor)  
 0 to 0.5 % water in ethylene diamine  
 0 to 100 ppm water in vinylidene chloride  
 0 to 500 ppm water in propylene glycol  
 0 to 200 ppm water in methyl ethyl ketone (MEK)  
 0 to 500 ppm water in dimethylacetamide  
 0 to 200 ppm water in allyl chloride  
 0 to 0.5 % water in acetone  
 0 to 1500 ppm water in methanol  
 0 to 100 ppm water in benzene  
 0 to 300 ppm water in toluene diamine  
 0 to 1000 ppm water in MEK & alcohols

### Various single component measurements

1,3 butadiene 0 to 50 %; in isobutene  
 1,3 butadiene 0 to 70 %  
 Acetic Acid 0 to 2 %; in acetic anhydride  
 Acetylene 0 to 1 %; in methane; ethane and ethylene acetylene 0 to 1.5 %  
 Ammonia 0 to 250 ppm; in air  
 cis-2-butene 0 to 10 %; in butadiene  
 CO<sub>2</sub> 0 to 1 %; in CH<sub>4</sub> and C<sub>2</sub>H<sub>6</sub>  
 CO<sub>2</sub> 0 to 1 %; in ethane  
 CO<sub>2</sub> 0 to 5000 ppm; in ethane  
 CO<sub>2</sub> 0 to 5000 ppm; in propane  
 Cyclohexane 0 to 30 %; in cyclohexanol  
 Cyclohexanone 0 to 500 ppm; in cyclohexane  
 Ethane 0 to 10 %; in methane and propane  
 Ethylene 0 to 2 %; in ethane  
 H<sub>2</sub>S 0 to 15 %; in sour fuel gas  
 Hexamethylene imine 0 to 400 ppm  
 Hydrogen cyanide 0 to 1 %  
 MEOH 0 to 20 %; in MTBE/TAME  
 Methane 0 to 6 %; in H<sub>2</sub> and water vapor  
 Methanol 0 to 40 %; in MTBE  
 Methyl bromide 0 to 100 ppm in air  
 Propane 0 to 6 %; in propylene propylene 80 to 100 %  
 Total hydrocarbons 0 to 10 %; in propylene  
 Total hydrocarbons 0 to 300 ppm;  
 as butene-1 vinyl acetate 0 to 10 %; in ethylene  
 Vinyl acetate 0 to 10 %; in ethylene  
 Vinyl acetate 0 to 20 %; in ethylene

### UV field-proven applications

APHA color 0 to 50  
 ASTM color 0 to 8 ASTM units benzene  
 0 to 100 ppm; in water Bisphenol A  
 0 to 25 ppm and 0 to 100 ppm; in water  
 Chlorine 0 to 30 %; in propane  
 Chlorine 0 to 10 %; in NaOH+H<sub>2</sub>O  
 Chlorine 0 to 2 %; in HCl  
 Chlorine 0 to 200 ppm; SO<sub>2</sub> 0 to 200 ppm; in vent gas (2 components)  
 Chlorine 0 to 30 %; in propylene  
 Dimethyl aniline 0 to 2000 ppm; in N<sub>2</sub> saturated with water  
 DMAC 0 to 1000 ppm; in water  
 H<sub>2</sub>S 0 to 10 %; in H<sub>2</sub>  
 H<sub>2</sub>SO<sub>4</sub> 0 to 4 %; in N<sub>2</sub>  
 Saybolt color to -30 to +15  
 SO<sub>2</sub> 0 to 500 ppm  
 SO<sub>2</sub> 0 to 5000 ppm; in stack gas  
 Styrene 0 to 20 ppm; butadiene in water total  
 aminobenzenes as aniline 0 to 50 ppm  
 Total phenols as 2-chlorophenol 0 to 25 ppm; in 33 % HCl  
 in H<sub>2</sub>O

Sales



Service



Software



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