Guided Wave INCORPORATED

*Process Analytical Systems*

# Sample Conditioning System To Remove Haze in Fuel

Guided Wave has been installing SpectrOn® systems in refineries for measurement of octane and other fuel chemistry measurement for well over a decade. Similarly, our ClearView db® photometers have been installed worldwide to measure fuel color, such as ASTM color in diesel and gas oil.

As optically-based measurements, they are adversely affected by the presence of too much water in fuel especially distillates. Water has extremely low solubility (~ 150 ppm) in fuel and forms an immiscible phase. These water droplets make the fuel turbid, referred to as “haze” in the petroleum industry. The ASTM D4176 standard for visually measuring haze is shown bottom right in 100 mm diameter glass jars against a laminated card having lines of various thicknesses. The haze scale ranges from 1 (upper left—no haze) to 6 (lower right—difficult to see the lines). Haze attenuates the optical beam through the sample thus making spectral measurement difficult.

To eliminate measurement problems caused by hazy samples, Guided Wave developed the SCS (Sample Conditioning System), shown above right. The SCS is designed to:

- Cool the sample using a Vortec cooler
- Fitler out water and particles >5 mic. with a coalescing filter
- Heat the sample to ensure clarity
- Present the clarified fuel to a Guided Wave Flow Cell for NIR measurement of octane or VIS measurement of color

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Literature: 1032-11-06

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# Sample Conditioning System To Remove Haze in Fuel

## Specifications

| | |
|---|---|
| Enclosure | 36x40x14" (hxwxd)<br>(91.4x76.2x35,6cm) 165 lbs (75 kg)<br>NEMA 12X (SP54/55) |
| Hazard Classifications | ATEX Zone 1, IIB/IIC T4<br>Class 1, Division 1, Groups C-D |
| Ambient Temperature | -0 to 50 ºC |
| Flow Cell | Guided Wave P/N 12497-010 10 mm optical path, 1/2" O.D. tubing |
| Air Supply | Clean, dry plant air, xxx p.s.i. |
| Power | Not required |
| Sample Requirements | • Minimum incoming temperature: 15°C<br>• Density: 0.82 - 0.95 sp. gr. @ 15.6°C<br>• Viscosity: 1.9-6.0 centistokes @ 37.8°C<br>• Cloud Point: 10°C Max<br>• Flow Rate through Cell: Either fully laminar or fully turbulent (avoid 2000 to 4000 Reynolds number). Recommended: 0.25 l/min<br>• Fast Loop Flow Rate: TBD<br>• Maximum water concentration: 3%, multiphase<br>• Maximum Lag Time: 1 min max, run length of 50 m |
| Materials of Construction | • 304 or 316 Stainless Steel<br>• Viton O-ring seals<br>• Swagleok or Parker Fittings |

## Let Us be Your Guide

Partner with Guided Wave. We are experts in understanding your measurement needs and providing you with the most cost effective, integrated, turn-key system for a successful on-line analytical solution. For more information visit us at www.guided-wave.com.

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