

Methods of Heat Exchanger Testing

Presented By
Accusense Systems & APV

Who We Are

- Tom Werner (ASL)
- Richard Rossiter (ASL)
- John Hughes (ASL)

- John Shaw (APV)



Why Test Heat Exchangers ???

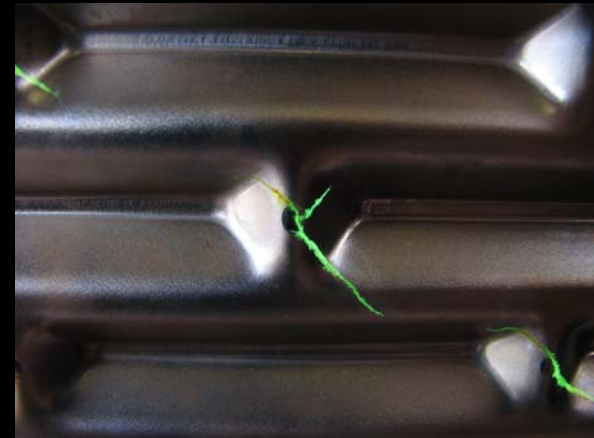
- HACCP/Due Diligence (GMP)
- To Locate potential or actual contamination points.
- Company image and customer perception
- Reduce Insurance costs
- Reduce breakdown risk
- Increase Product safety

Current Known Methods of Testing

- Liquid Penetrant Inspection of individual plates
- Pressure Testing (Various)
- Circulating Tracer dye
- (APV) Testex
- Gas Testing Accusense – Helium

Dye & Liquid Penetrant Inspection

- Liquid Penetrant Inspection
- Hydrodynamic Food Colorant Dye
- Accusense Hydrodynamic Food Grade Fluorescent Liquid Penetrant Inspection (At final development stage)



Liquid Penetrant

- PENETRANT-Physical Properties

- Capillary action

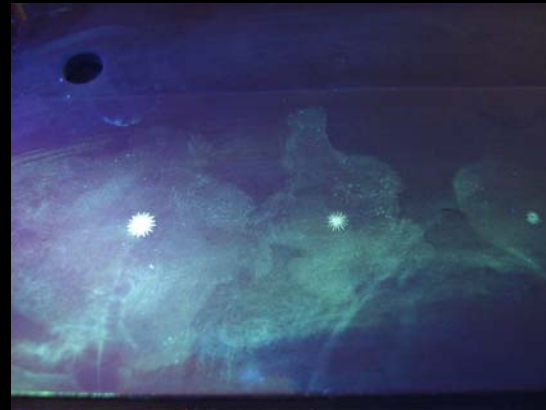
- PENETRANT TECHNIQUES -

- Fluorescent

- Colour Contrast

- PENETRANT APPROVALS-

- AMS 2644/Mil Std L251135



- SENSITIVITY LEVELS

- Fluorescent

- Food Grade Penetrant (FL)

- Colour Contrast

- Food Grade Dye

Hydrodynamic Food Grade Dye

■ METHOD

- Heat Exchanger opened
- Heat Exchanger closed
- Water circulated on one side of plates at fairly high pressure
- Food grade dye added and allowed to circulate for a specified period of time
- Heat Exchanger opened
- Plates viewed for pin holes and cracks

■ ADVANTAGES-

- Visual examination of plates and gaskets
- Can locate pin holes and cracks
- Food safe dye is used

■ DISADVANTAGES

- Expensive due to lengthy down time
- Potential Damage to gaskets & plates
- Not as sensitive as fluorescent penetrant
- 1 wipe technique not suitable
- Reliant on fairly high pressures to force the dye through any holes or cracks
- Only suitable for Plate type heat exchangers.

Accusense Hydrodynamic Food Grade Penetrant

■ METHOD

- Heat exchanger opened
- Water circulated on one side of the plates
- Accusense food safe fluorescent penetrant added to water and allowed to circulate for 10 minutes at fairly low pressure
- The feed and return connections reversed and the penetrant allowed to circulate for a further 10 minutes
- Penetrant allowed to settle for 10 minutes
- Heat exchanger opened and plates viewed using an ultraviolet light for pin holes and cracks

■ ADVANTAGES

- Visual examination of plates and gaskets
- Locates very small pin holes and cracks
- 1 wipe technique is suitable
- Fluorescent penetrant most sensitive.
- Food safe penetrant

■ DISADVANTAGES

- Costly due to down time- approximately 2-3 hours to test a typical 3 section heat exchanger
- Only suitable for Plate type Heat Exchangers..

Hydrostatic Pressure Testing

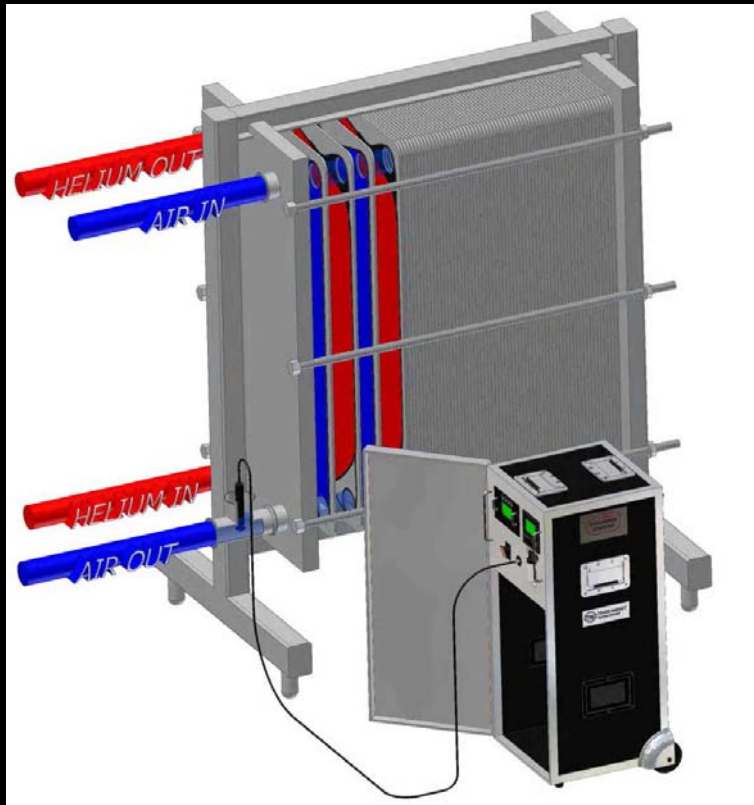


- Hydrostatic Pressure Testing Analogue Gauge
- Hydrostatic Pressure Testing (Ultrasonic.)

APV Testex

- Advantages
- Used on all types of heat exchanger.
- In Situe
- Disadvantages
- High pressure
- Possible False Indications.
- Time Taken
- Saline discharge issues.

Universal Helium Gas Testing (Accusense)



Accusense

■ Advantages

- In-Situ
- High Sensitivity
- Quick
- Clean
- No Residue
- Environmentally Friendly & Safe to Humans.
- No Stress on Equipment (Low Pressure)
- Monitor pressure for loss to establish gasket integrity.

■ Disadvantages

- Possible world shortage of Helium.
- Through Defects Only

Accusense Food Grade Liquid Penetrant Inspection. (Hydrodynamic)



- Liquid Penetrant Inspection
- Food Grade (Plant & Mineral Based Product)
- UV Fluorescent very easy to distinguish leaks

Questions



- Tom Werner (ASL)
- Richard Rossiter (ASL)
- John Hughes (ASL)

Demo of Accusense Helium Test at 5pm in this room

All information contained within this presentation has been compiled from readily available sources no liability
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