Overview

- HVLD Theory
- Products: Can and Cannot Be Inspected
- HVLD Design Scope
- Equipment Specifications and Uses
- Our Products
- Questions?
Principle of Inspection

**Fig. 1**
- **V** = High voltage source
- **R** = Electric resistance of the product
- **C<sub>1</sub>** = Volume of static electricity between the inspection electrode and the product
- **C<sub>2</sub>** = Volume of static electricity between the detection electrode and the product
- **I<sub>1</sub>** = Electric current which is produced when the container is sealed
- **I<sub>2</sub>** = Electric current which is produced when the container seal is defective

**Fig. 2** Good

**Fig. 3** Bad
Good Product Test

Slight purple Corona discharge
Low level spark
Testing at 20KV
Figure 3 Representation
Faulty Container

Discharge Voltage to Product
Types of Products That CAN Be Inspected by the HVLD

- Aqueous solutions with a conductivity value of over $1.2\mu S \ cm^2$
- Protein Solutions
- Suspensions / Emulsions
- Vaccines
- Biological products
- Solution with live cells
- Higher viscosity solutions (greater than water)
- IV Bag Solutions
- Respiratory Products
- Ophthalmic Products

Note: Container must be of a non-conductive material
Types of Products that **CANNOT** be Inspected by the HVLD

- **Products**
  - Oil Based Products
  - Flammable Products
  - Products with > 25% Alcohol Content
  - Many Gel Products

- **Containers**
  - Metallic Containers
  - Aluminum Induction Sealed Bottles
  - Metalized Film Material
**HVLD – Design Scope**

- **Equipment Design – Leak Detection**
  - Inspection for Missing Stoppers
  - Defective Closure Seal / Glass Defects (Closure)
  - Cracks in Neck or Near Cap Closure
  - Shoulder Cracks
  - Vial Body Cracks
  - Base and Heal Cracks

- **HVLD Will Not Detect** the Following:
  - Scratches on the Surface of the Container
  - Imperfections in the Glass (Fissures, Mold Lines)
  - Not Detect Particles Inside or Outside of the Container
  - Container Height Differences
**Inspection Zones**

- All containers are inspected at specific areas referred to Channels (CH).

- Each CH has a different electrode configuration.

- Each CH will produce an individual Inspection Signal Value (data point).

- A product is considered “defective” if found out of the preset range for each CH.
Graphic Display

LEVEL INDICATOR

CH1
- Lower V: 01.34V
- Upper: 0.23V
- High Voltage: 01 kV
- Sensitivity: Adj. 01

CH2
- Lower V: 01.34V
- Upper: 0.23V
- High Voltage: 01 kV
- Sensitivity: Adj. 01

CH3
- Lower V: 01.34V
- Upper: 0.23V
- High Voltage: 01 kV
- Sensitivity: Adj. 01

CH4
- Lower V: 01.34V
- Upper: 0.23V
- High Voltage: 01 kV
- Sensitivity: Adj. 01

Password Rank: 0

Capacity: 012.4 (PCS/MIN)
HDB Series
For Glass Vials and Ampoules

• **HDB-II-AST**
  - Glass vials up to 25mm in diameter (2ml to 10ml)
  - Glass ampoules up to 30ml
  - Flat infeed accumulation conveyor
    - Direct connection to upstream machine
  - Discharge to tray or downstream equipment
  - Data Logger and Printer
  - Inspection Speed:
    - 2 ~ 3ml vials 400 vials / min.
    - 5 ~ 10ml vials 300 vials / min.
HDB-204 Series

- **HDB-204V**
  - Glass Vials Up to 27mm diameter
  - Single line infeed conveyor
  - Discharge to tray or downstream equipment
  - Data Logger

<table>
<thead>
<tr>
<th>Line Speed</th>
<th>Vials per min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 ~ 3ml</td>
<td>400</td>
</tr>
<tr>
<td>5 ~ 10ml</td>
<td>300</td>
</tr>
<tr>
<td>20 ~ 30ml</td>
<td>150</td>
</tr>
<tr>
<td>50ml</td>
<td>100</td>
</tr>
</tbody>
</table>
**HDV-AT6**

- **Vial Inspection**
  - Full body surface, closure and base inspection
  - Six Inspection Stations
  - Rotation of vial under the inspection electrodes
  - Inspection of vials from 2ml to 50ml with size change parts
  - Allen Bradley controls with Nikka Densok Inspection Electronics

**Line Speed**

- 2ml to 10ml: 400 vials per min.
- 20ml to 30ml: 200 vials per min.
- 50ml: 100 ~ 150 vials per min.
• **Vial Inspection**
  
  – The vials travel over the Inspection Electrodes located on the bottom side of the vial where liquid is in constant contact with the vial inner surface allowing for positive inspection signals and increased inspection performance.

  – A belt drive system spins the vial during the inspection to ensure a 360° inspection of the vial surface.

  – The ACE-trac™ (Articulating Carrier Element) provides a smooth transition of the vial to the inspection areas.
HDT Series Pinhole Inspector
Seal Container Closure Testing

QA Statistical Checks
Laboratory Use
Product Development
Same HVLD Electronic System as Production Units
HDI Series
Plastic Vial Strip Inspection (BFS)

HDI Series Pinhole Inspector
In-line Inspection of BFS Vial Strips
IV Bag Inspection

Full Body Inspection
- Robust Flexible container leak detection
- Direct connection to upstream machine
  - Discharge to tray or downstream equipment
  - Data Logger and Printer options available

Port and Bag Weldment Inspection

Up to 12 Inspection Stations
HDG-2 Pinhole Inspector for Bags
HDK-7 Pinhole Inspector for Bags

All of our IV bag inspection machines are tailored to inspect the desired areas of the IV bag. Robust, high speed, Inline IV bag Inspection Available!
HDK-7 Inspection Area

CH 1 - Blue Cap
CH 2 - Lower Seal (Top Side)
CH 3 - Lower Seal (Bottom Side)
CH 4 - Lower Body (Both Sides)
CH 5 - Upper Body (Both Sides)
CH 6 - Upper Seal (Top Side)
CH 7 - Upper Seal (Bottom Side)
Hospital - Nutrition
Questions?

• Thank you for your attention!!