

# **LWD 1**

## **Pulse Generator Assembly Introduction Superslim and Slimhole**

# Pulse Generator Assembly Objectives

**At the completion of this presentation you should be able to:**

- 1. Describe the functions of the pulse generator assembly.**
- 2. Name the parts required to build the pulse generator assembly.**
- 3. Describe the main difference in the assembly of the 1200/650 systems versus the Slimhole/Superslim systems.**

# Superslim and Slimhole

- **Superslim Pulse Generator Assembly**



# **What does a Pulse Generator Assembly do?**

- A mechanical assembly that uses the drilling fluid flow through the drillpipe to generate both electrical and hydraulic power and also to create pressure changes, or pulses, in that fluid.**

# What makes a Pulse Generator Assembly

- **The Pulsar**
- **The Flowgear (the parts that are installed on the pulsar to build a turbine, valve, and to resist erosion)**

# What makes a Pulse Generator Assembly

- **The Pulsar**
  - The central component of all four systems
  - The same pulser can be used on all four systems

# The Pulsar



# The Pulsar

- **Generates electrical and hydraulic power**
- **Extends poppet into orifice to create a positive pressure pulse**



# The Flowgear

- **Most of the flowgear comes in four sizes, related to the flow rate, and is used on one of the four systems.**
  - **1200 System**
  - **650 System**
  - **Slimhole System**
  - **Superslim System**
- **Some of the flowgear is common to two or more systems**

# Pulse Generator Assembly

- **The four systems can be divided into two groups that have similar assembly procedures**
  - **1200 and 650 Systems**
  - **Slimhole and Superslim Systems**

# Pulse Generator Assembly

- **1200 and 650 Systems**
- **Parts are fixed to the pulser on a Stator Support Tube Assembly**
  
- **Superslim and Slimhole Systems**
- **Parts are fixed to the pulser with a stator locator pin and split ring**

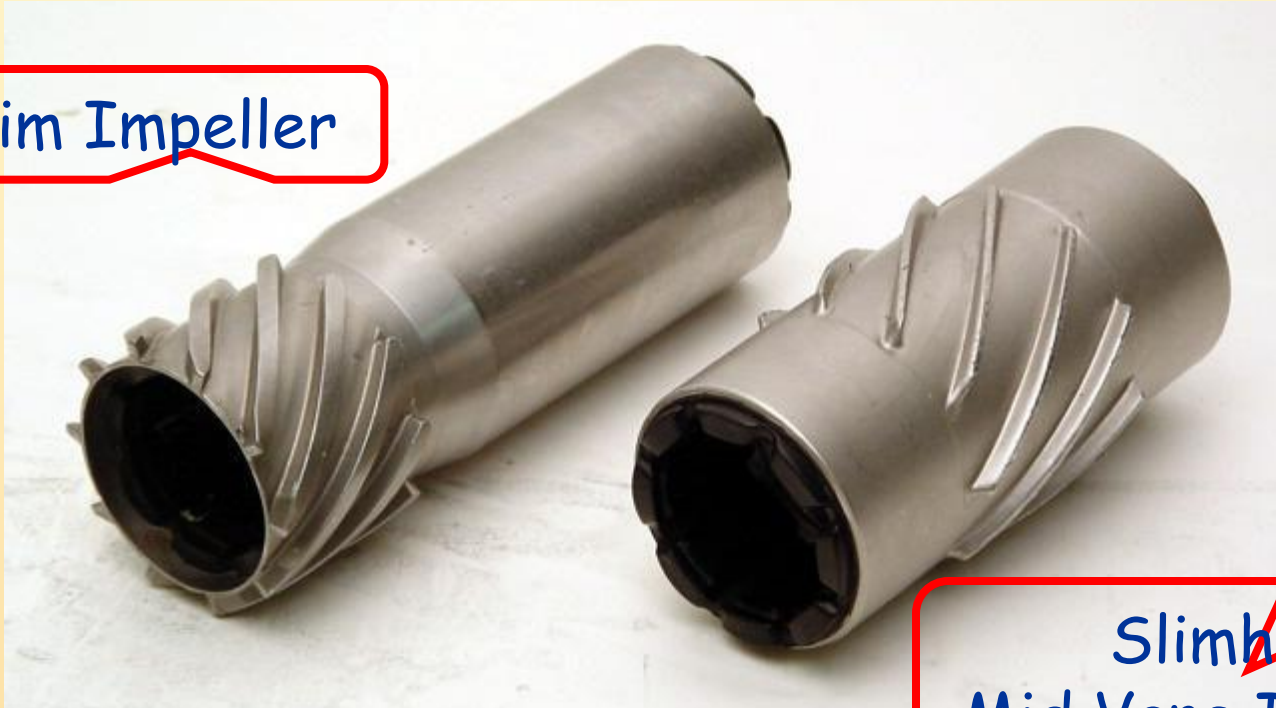
# Superslim System



# Superslim and Slimhole

- The Impeller Assembly

Superslim Impeller

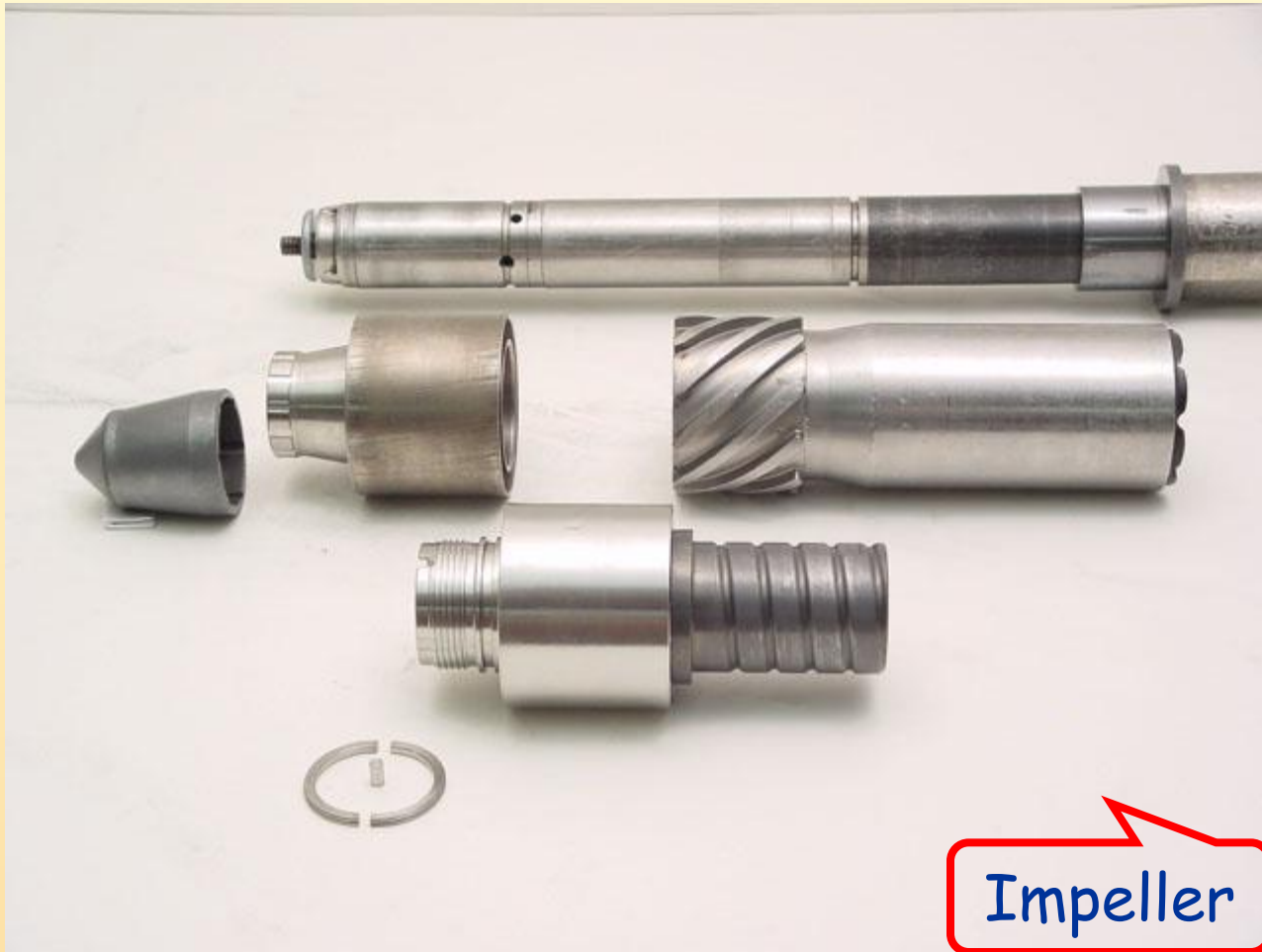


Slimhole  
Mid Vane Impeller

# Superslim and Slimhole

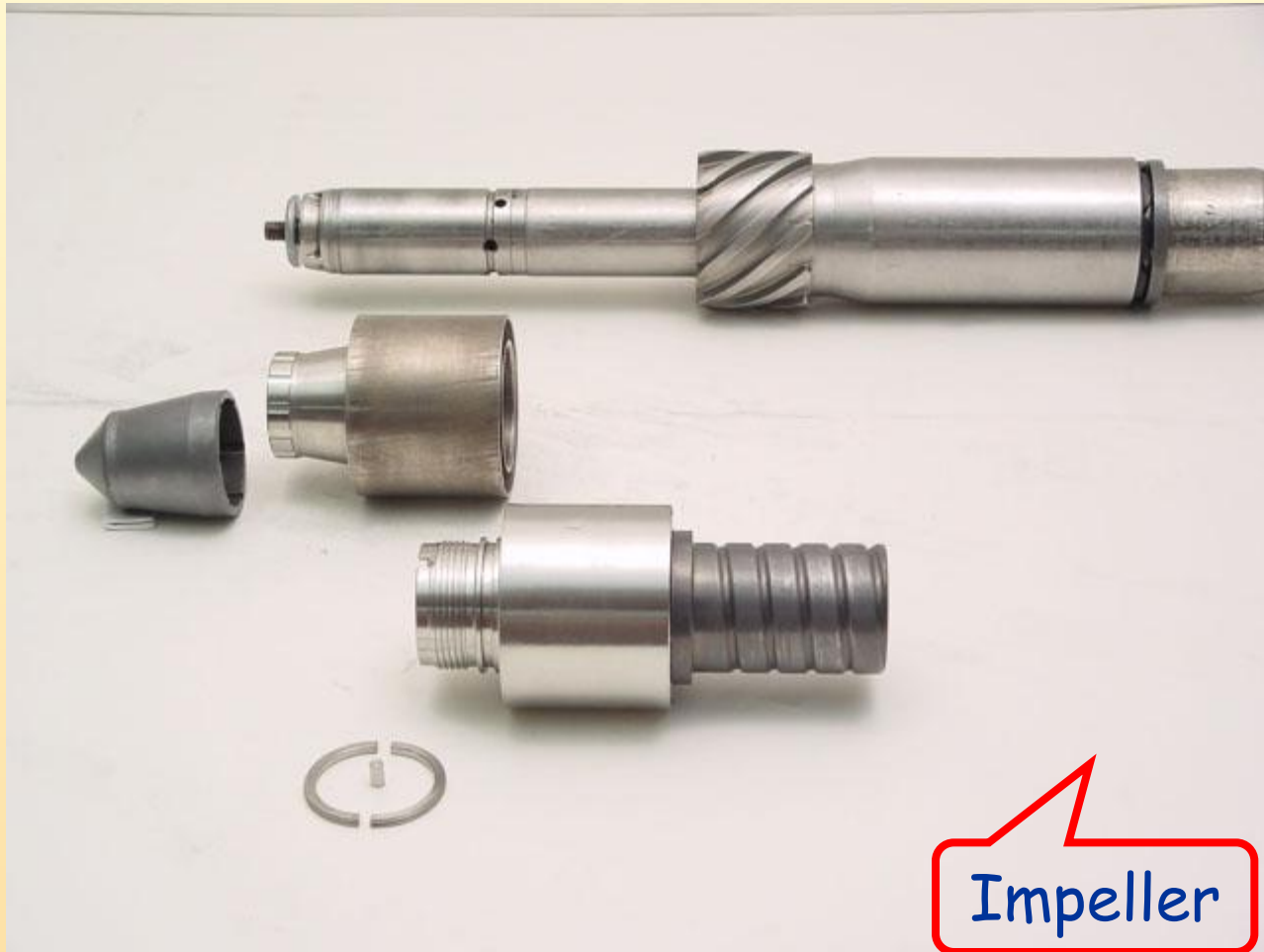
- **The Impeller Assembly**
  - Rotates due to mud flow
  - Magnetically coupled to pulser's main shaft.
  - Vane angle related to flow rate
    - Slimhole System - 35°, 30° vane angles
    - Superslim System 45° vane angle
  - Two marine bearings

# Superslim System



Impeller

# Superslim System





# Superslim System

- **The Upper Bearing Sleeve**

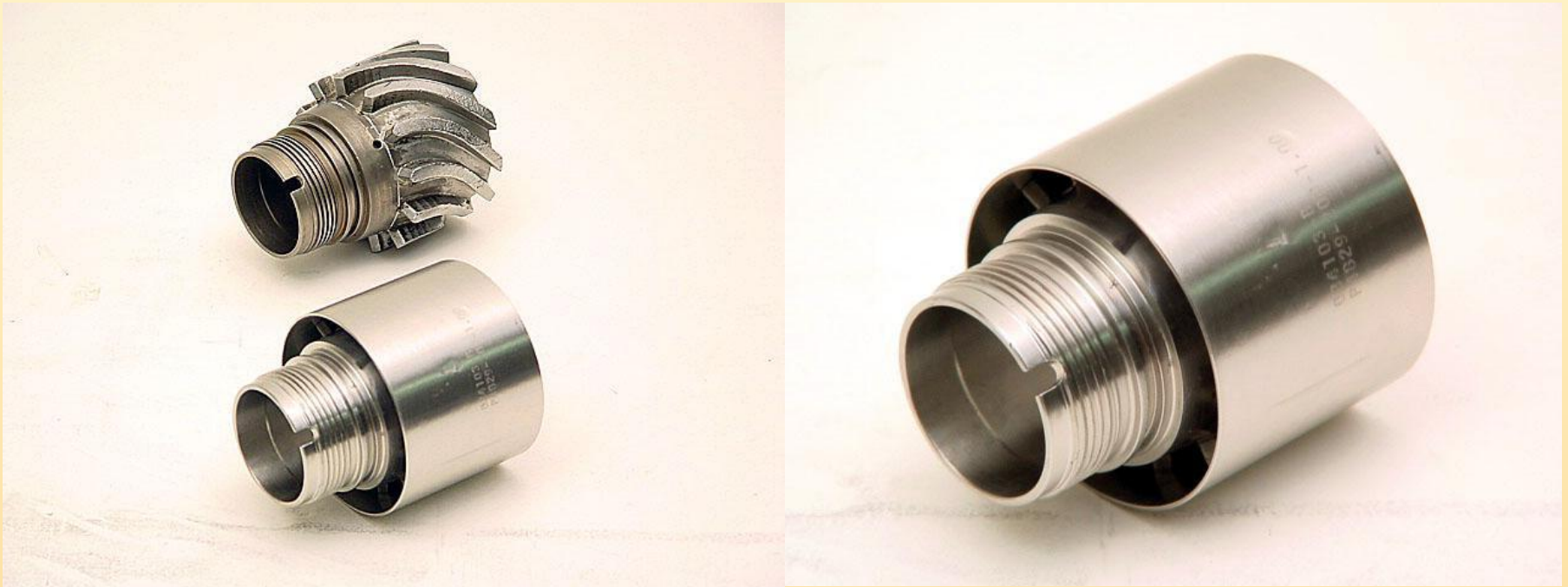


# Superslim System

- **The Upper Bearing Sleeve**
  - Supports the impeller's upper bearing
  - Threaded onto the shrouded stator

# Superslim and Slimhole

- **The Shrouded Stator**



# Superslim and Slimhole

- **The Shrouded Stator**
  - Pinned to the pulser poppet shaft housing
  - Angled vanes deflect fluid flow
  - Different vane exit angles dependent on flow rate
  - Shroud centralizes assembly in flowtube or flow sub
  - Shroud limits erosion in flowtube or flow sub

# Superslim and Slimhole

- **The Shrouded Stator Assembly**



# Superslim and Slimhole

- **The Shrouded Stator Assembly**



# Slimhole System

- The Upper Bearing Sleeve



# Slimhole System

- **The Upper Bearing Sleeve**
  - Supports the impeller's upper bearing
  - Threaded onto the shrouded stator



# Slimhole System

- **The Flow Diverter**



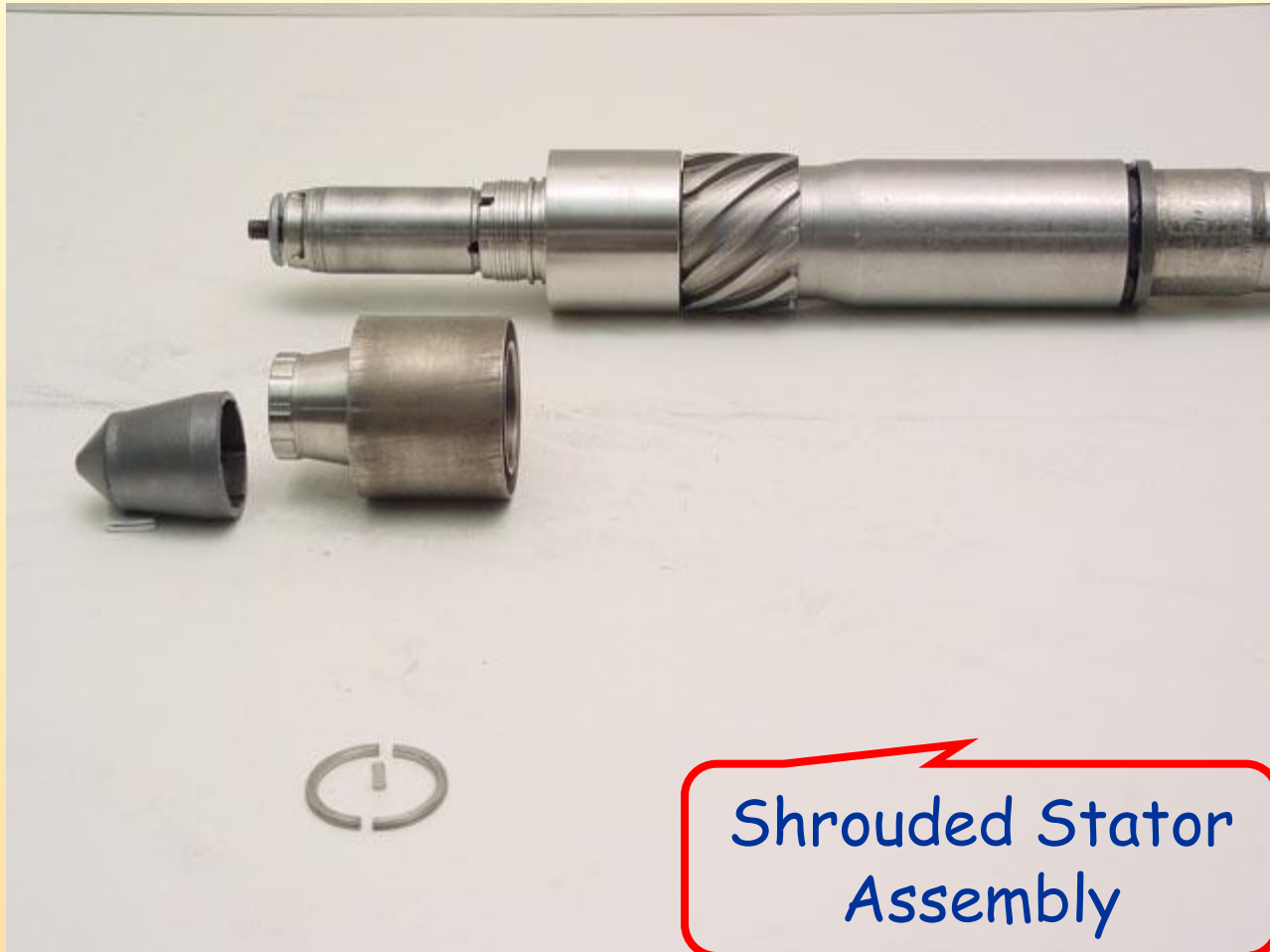
# Slimhole System

- **The Flow Diverter**
  - Directs flow toward the impeller vanes
  - Installed between the upper bearing sleeve and the shrouded stator

# Superslim System



# Superslim System



Shrouded Stator  
Assembly

# Superslim and Slimhole

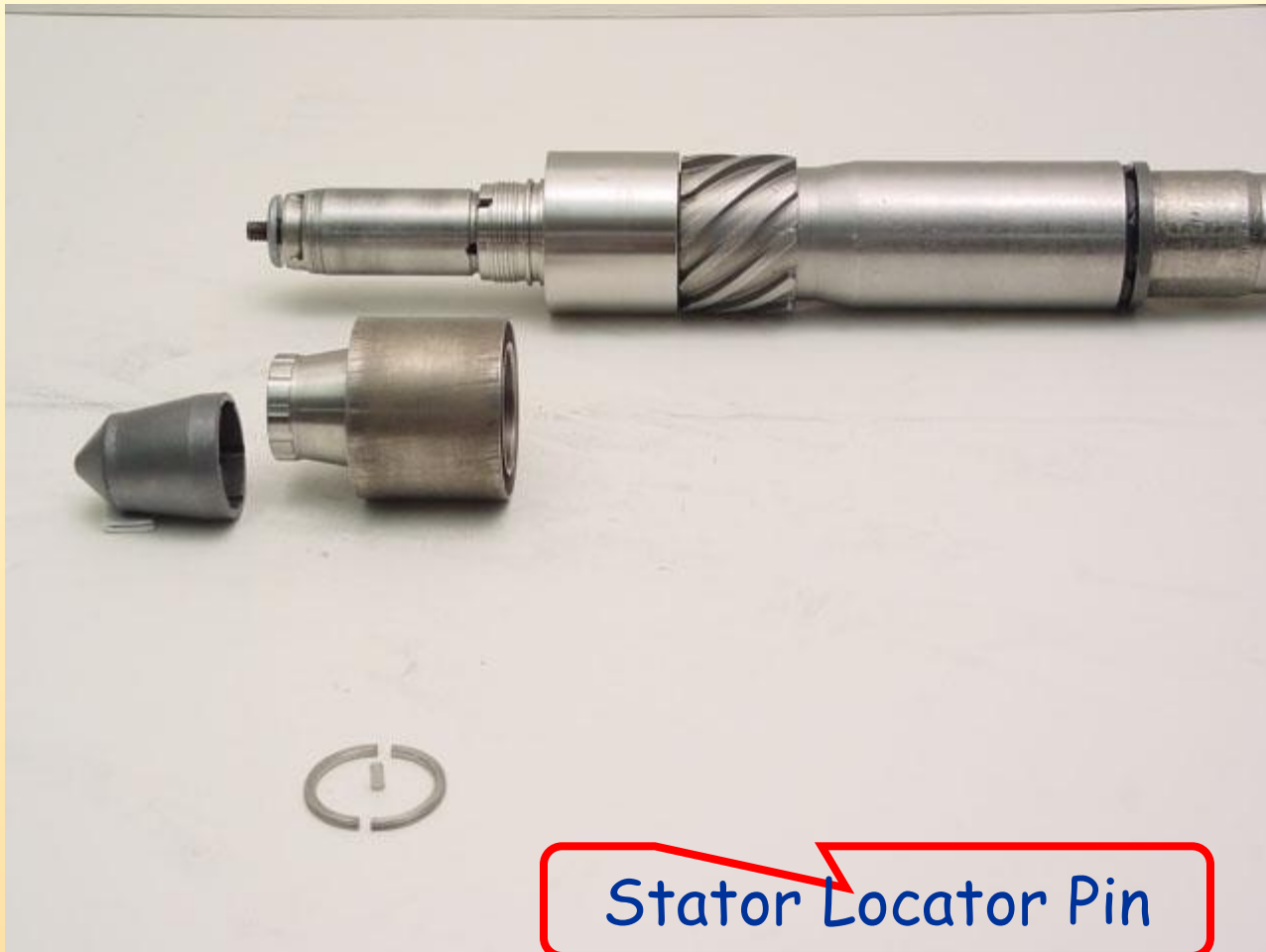
- **The Stator Locator Pin**



# Superslim and Slimhole

- **The Stator Locator Pin**
  - Fits in pin hole on the pulser poppet shaft housing
  - Prevents the shrouded stator from rotating on the pulser
  - Captured between shrouded stator and shroud/nose cap (nose cap-Slimhole)

# Superslim System



# Superslim System

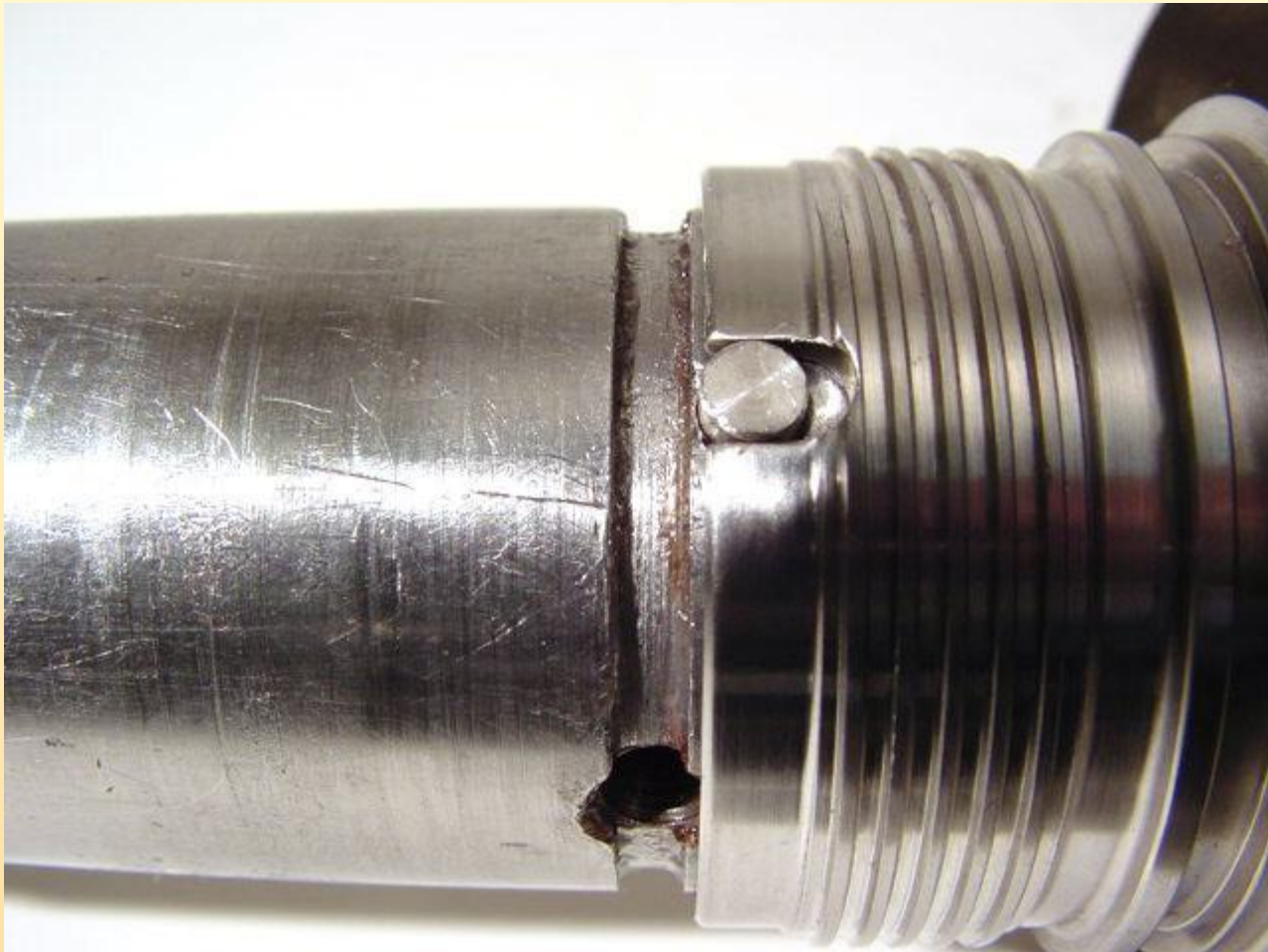




# Superslim and Slimhole



# Superslim and Slimhole



# Superslim and Slimhole

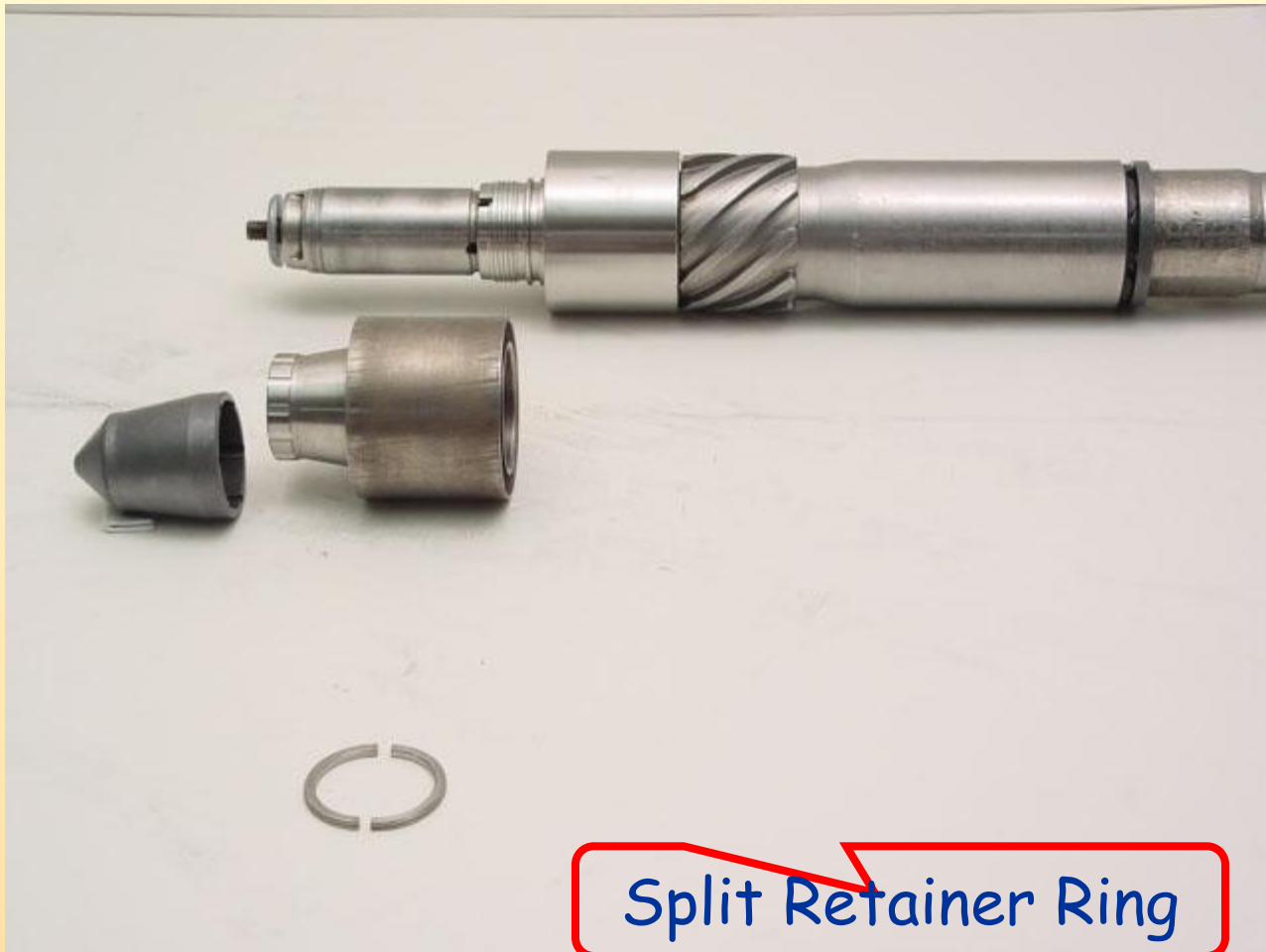
- **The Split Retainer Ring**



# Superslim and Slimhole

- **The Split Retainer Ring**
  - Fits in ring groove on the pulser poppet shaft housing
  - Fastens shrouded stator and shroud/nose cap (nose cap-Slimhole) on pulser to prevent vertical movement

# Superslim System



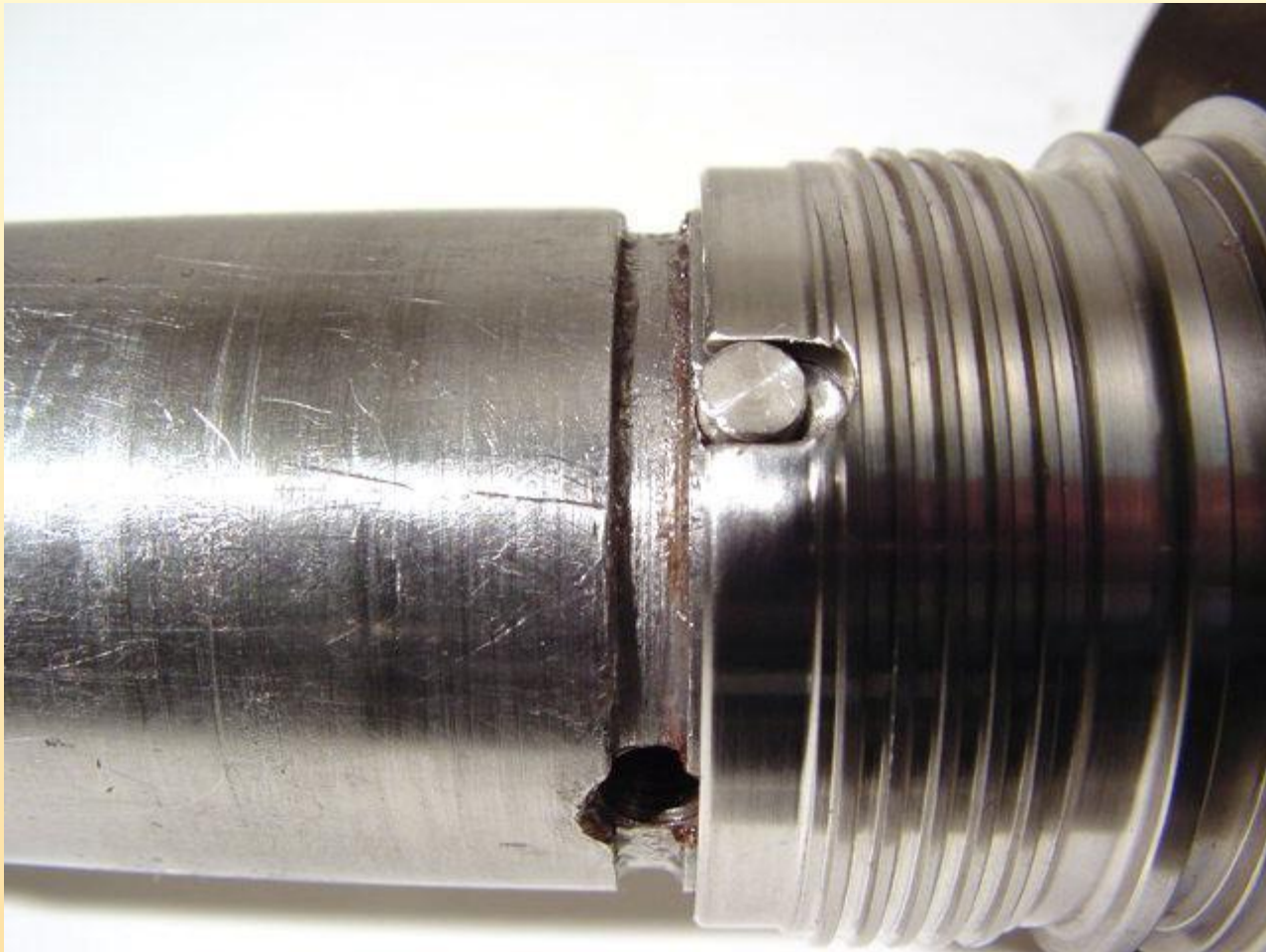
# Superslim System



# Superslim and Slimhole



# Superslim and Slimhole





# Superslim and Slimhole



# Superslim System

- **The Shroud/Nose Cap**



# Superslim System

- **The Shroud/Nose Cap (Superslim)**
  - Threads onto shrouded stator
  - Captures split retainer ring and stator locator pin
  - Acts as transition from poppet outer diameter to outer diameter over pulser
  - Centralizes assembly in flow sub
  - Acts as support for Superslim orifice retainer

# Slimhole System

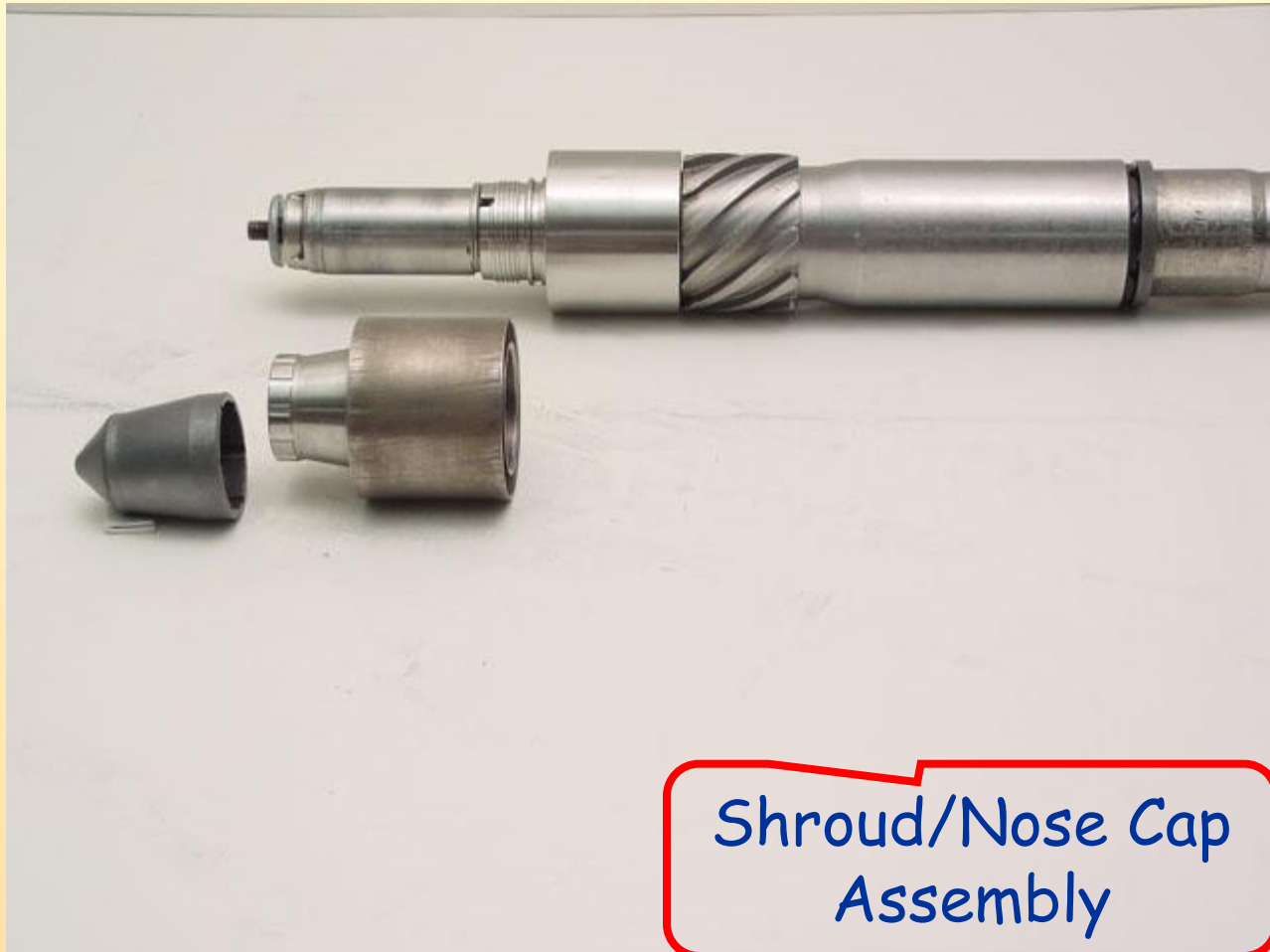
- The Slimhole Nose Cap



# Slimhole System

- **The Slimhole Nose Cap**
  - Threads onto shrouded stator
  - Traps stator locator pin and split ring to lock shrouded stator assembly onto pulser
  - Acts as transition from poppet outer diameter shrouded stator body outer diameter

# Superslim System



# Superslim System



# Superslim and Slimhole

- **The N6 Poppet**





# Superslim and Slimhole

Use the N6 poppet  
with a dovetail  
orifice

N6 Poppet

LW15 Poppet



# Superslim and Slimhole

- **The Poppet**
  - Threads onto poppet shaft
  - Cause fluid flow restriction when extended into the orifice

# Superslim System



# Superslim System



# Superslim System



# Superslim and Slimhole

- **The Flow Ring Key**



# Superslim and Slimhole

- **The Flow Ring Key**
  - Prevents pulser from rotating
  - Maintains highside alignment
  - Installed into notch in pulser bulkhead

# Superslim System



~~Flow Ring Key~~



# Superslim System



# Superslim System

- **Superslim Flow Ring/Straightener**



# Superslim System

- **The Flow Ring/Straightener**
  - Slides over key on pulser
  - Vanes change rotational fluid flow from impeller to linear
  - Centralizes assembly in flow sub
  - Keys to Superslim Collar for toolface alignment

# Slimhole System

- Slimhole Flow Ring/Straightener



# Slimhole System

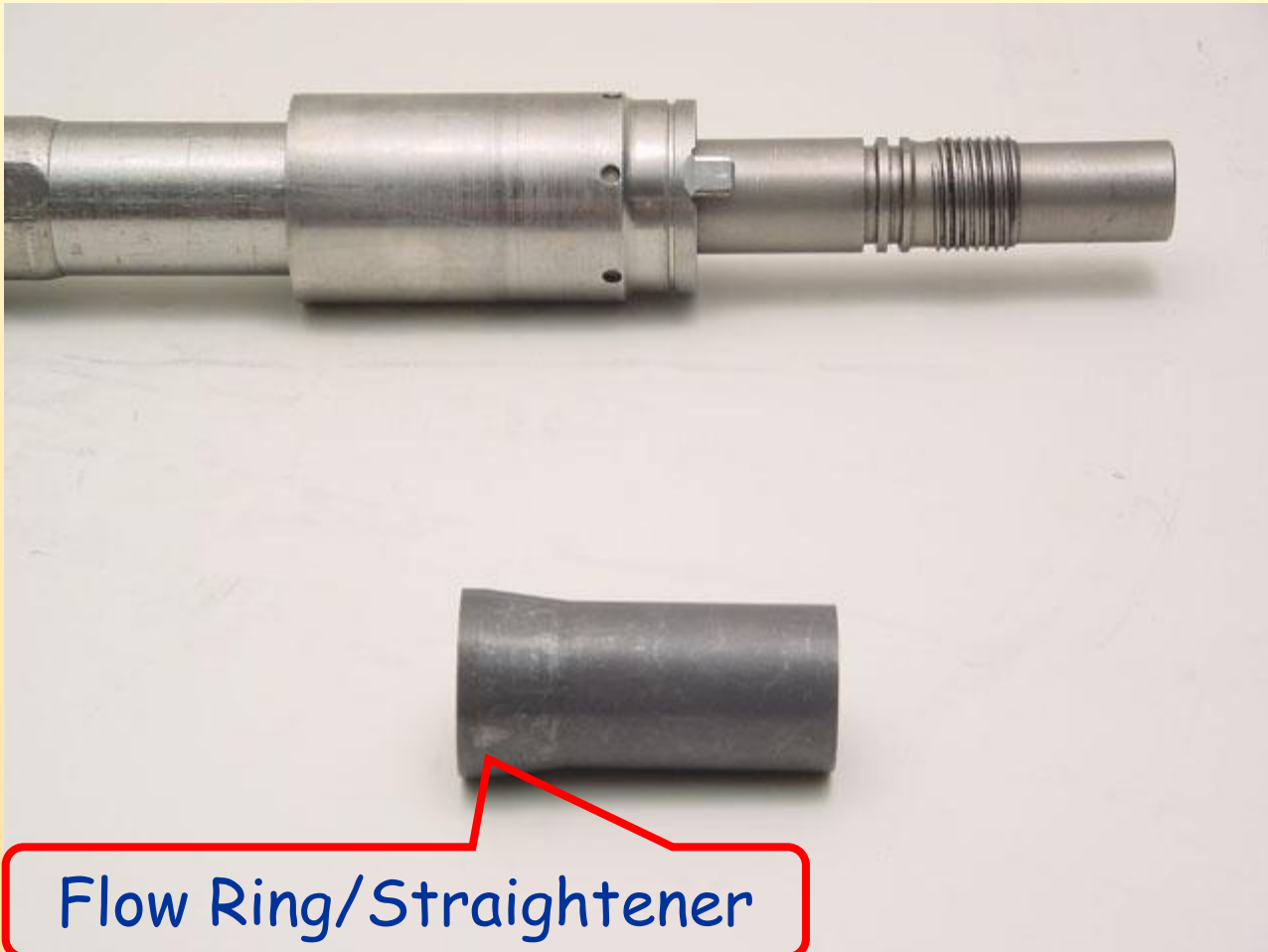
- **The Flow Ring/Straightener**
  - Slides over key on pulser
  - Vanes change rotational fluid flow from impeller to linear
  - Outer ring centralizes assembly in flowtube
  - Key on outer ring locks into groove in Slimhole flow tube

# Superslim System



Flow Ring/Straightener

# Superslim System



# Slimhole System

- **The Snap Ring**





# Slimhole System

- **The Snap Ring**
  - Holds flow ring straightener in place during assembly

# Superslim and Slimhole

- **The Spacer Sleeve**



# Superslim and Slimhole

- **The Spacer Sleeve**
  - Provides transition from large outer diameter on pulser to 1.75 inch outer diameter of pressure case below pulser

# Superslim System



Spacer Sleeve

# Superslim System



# Superslim and Slimhole

- **Superslim Pulse Generator Assembly**

