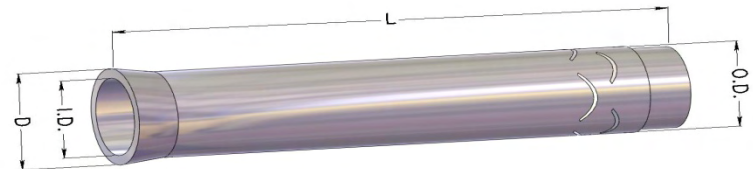
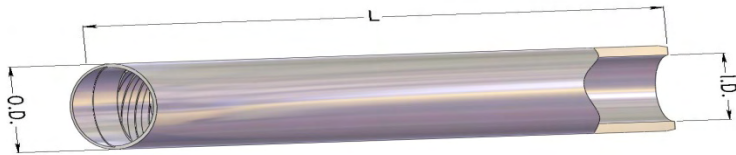


Double tube drilling system

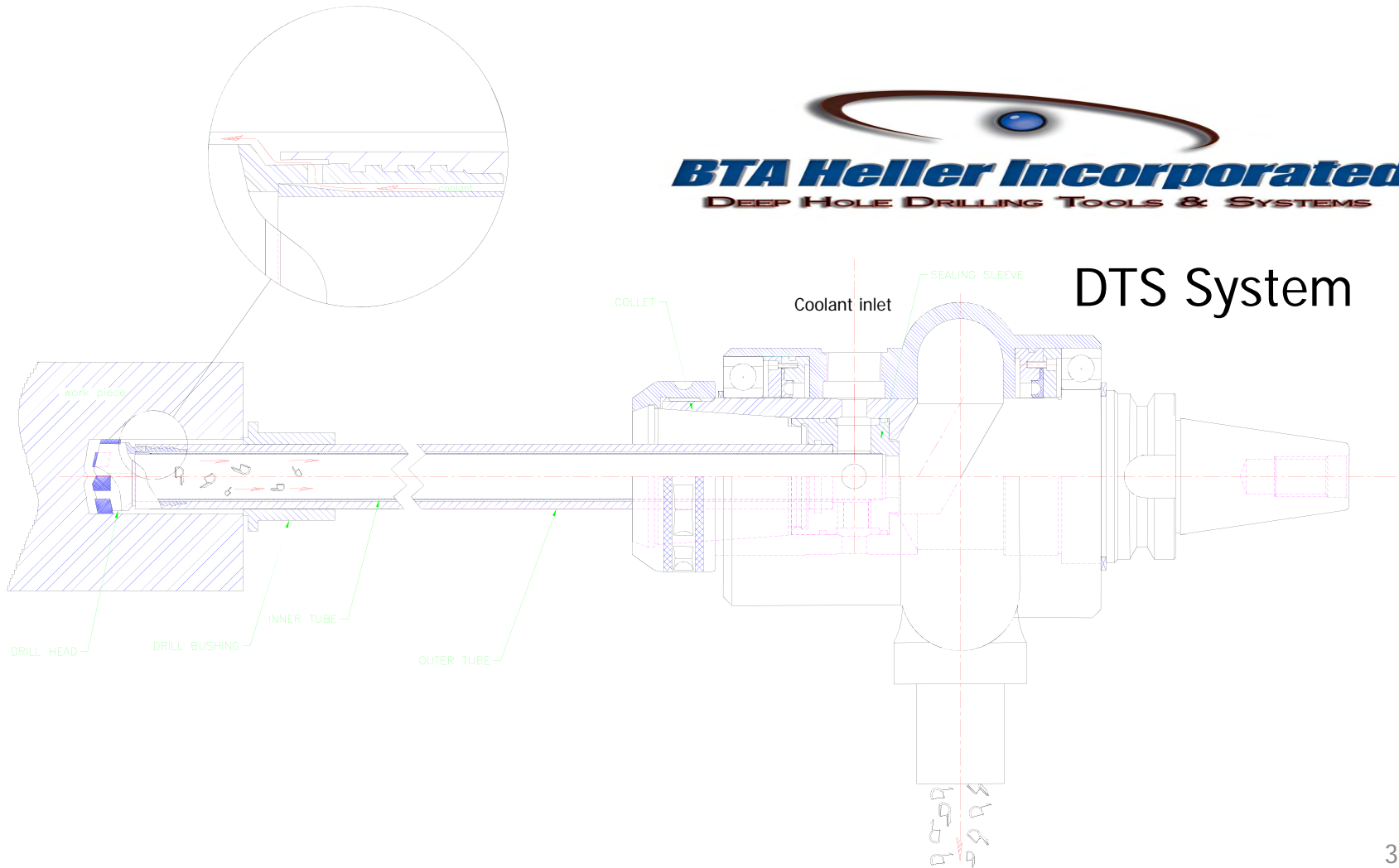


The Double Tube System (DTS)



- DTS features
 - Coolant forced between inner and outer drill tube
 - Brazed or indexable tool styles available from .724” – 7.240” diameters
 - Consists of drill head, outer & inner drill tube, coolant connector, collet & sealing sleeve
 - The drill head is screwed onto the outer drill tube. The inner tube is 1.181” longer than the outer tube, up to drill diameter 2.559”. The drill tubes are attached to the connector by mean of a collet & sealing sleeve.

Diagram -- The DTS System



The Double Tube System (DTS)

- Advantages

- Can be used on a wide range of machines
- Internal chip exhaust
- 35-40% less coolant volume and pressure than STS (medium GPM – medium PSI)
- 5 times faster than Gun Drilling

- Disadvantages

- Requires rigid setup, sufficient HP, mechanical feed .004-.014 IPR
- Relatively high coolant volume 20-25 GPM Per 1” dia.
- Short chips required to function correctly
- Machine requires special sensors (i.e. overload)

Deep Hole Drilling Requirements

- Proper tooling
 - Brazed or indexable style drills
- Machine requirements
 - Dedicated or converted conventional machines
 - Proper Accessories for machine
- Coolant system requirements
 - Includes equipment and coolant

Machine Requirements

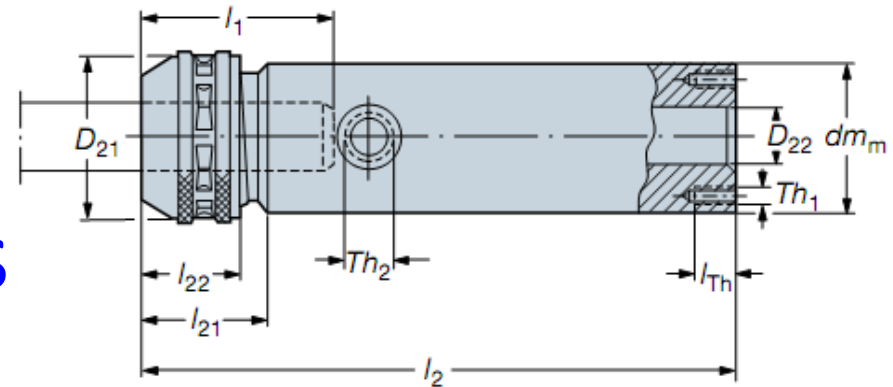
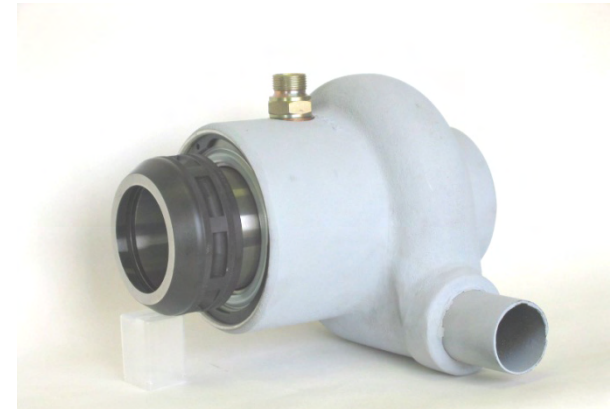
- Old machines may be converted to deep hole drilling machines – easily accomplished with the DTS system
- Equipment that can tell you what the tool is doing is **REQUIRED** to have a successful operation “load meter, GPM gauge, ect.

Machine Requirements (Continued)

- Sufficient RPM to cover speed range of 150-1000 SFPM
- Sufficient torque and thrust
- Mechanical feed for chip control
- Proper alignment of machine spindle, tube, drill, bushing & hole being drilled “per Schlesinger Test”
- Feed rate independent of speeds
- Sensors for monitoring
 - Overload protection
 - Thrust
 - GPM
- 10 HP / inch of drill diameter not including 20-30% safety

Accessories for machine

- DTS accessories
 - Coolant connectors
 - Collets
 - Sealing sleeves
 - Bushings



Stationary Coolant Inducer

Coolant System Requirements

- The coolant system includes
 - Positive Displacement Pumps & Motors, tanks and filtration
 - Coolant & chip conveyor or chip cart.
- Its' purpose is to
 - Properly exhaust chips
 - Lubricate cutter & guide pads
 - Dissipate heat
 - Improve tool life

Coolant Systems Equipment Info

- Coolant volume to be supplied depends on the system being used
 - DTS => 25 GPM / inch of size @ 150-350 PSI
- Filter to 10 micron
- Tanks – 10X pump capacity unless heat exchangers used
- Coolant should never exceed 110°F

Coolant Info

- Most materials are best drilled using straight mineral oil. 70 SUS @ 100 deg F, w/ Sulfur & Chlorine additives.
- Water soluble and synthetics will reduce tool life by 30-50 percent
- Oils provide more lubricity and less tool wear as well as improved part surface finish
- Oils lose viscosity above 110⁰F – requires additives

Coolant Info (Continued)

- Results of low or improper coolant
 - Material buildup on cutting edges
 - Thermal cracking of carbide (most often with water soluble coolant)
 - Flaking and loss of tool life
 - Poor chip control
- Using oils results in less cleaning of coolant tanks than water soluble but more cleaning of drilled parts

Coolant Quantity and Pressure

- Small diameter tools
 - Lower coolant volume
 - Higher coolant pressure
 - Example: .750”, 19 GPM @ 350 PSI
- Large diameter tools
 - High coolant volume
 - Low coolant pressure
 - Example: 4.000”, 100 GPM @ 150 PSI

Starter Holes & Bushings

- Regardless of the system chosen, starter holes or bushing are required
- Carbide bushings are preferred for high production parts
- Oversize bushings results in
 - Belmouthed holes
 - Reduced tool life or breakage

Graph -- Boring Bushing Tolerances (G6)

