

# **PIPE TUBE BARREL MEASUREMENT & LASER INSPECTION**

**LEICA BORE TRACKER  
BORE STRAIGHTNESS  
CHROME COATING GAUGE  
DIAMETERS 15 MM TO 300 MM**

**SUITABLE FOR:-**

**PIPES, STATORS, EXTRUDERS INCL. TWINS, TUBES, DRAINS, ETC**



**BCS**  
**BORESCOPE & INSPECTION**



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## About

BCS has been designing and manufacturing The Large Bore Series of portable video systems for Industrial Inspection, Military, Tactical Surveillance, Physical Security, and Collapse Rescue.

## High Resolution

BCS Optical Bore-scopes features reliable technology that combine visual inspection with high resolution and accurate diameter measurements. This complies with standards provided by the barrel.

## Adaptable Solutions

Our inspection devices are designed to measure inner geometrical dimensions of:-  
 2D/3D Laser Profile Scanner  
 Fast, Non-Contact 3D Optical Profiling  
 Any material, any form, any type, and any surface.  
 Bores, Tubes, Stators, Barrels, Siphons and Smooth & Rifled Pipes.

## Custom Made Inspection Systems

Order a custom-built borescope for your applications.  
 We can customize a solution for your most challenging, and inaccessible viewing areas.

## Diameters

From 15 mm to 300 mm



**One Man Visual Inspection**

**High Resolution**

**Conditioning Monitoring**

**Bore Straightness Laser**

**Chrome Thickness Gauge**

**Automatic Report Generation**

**Multi Calibers**

**Safety**

**Cost Efficiency**

**Custom Made**

**Manufacturing Facility**

**Optimised Company**

**Safety**

**Multi Calibers**

**Cost Efficiency**

**High Resolution**

**Strong Hardware**

**Intelligent Imaging**

**Customised Options**

**3.9 mm & 6 mm Camera**

**One Man Visual Inspection**

**Display Resolution 1280\*960**

**Flexible Articulation Control 360°**

**Interchangeable Monitor & Tube**

## **Military Small Arms Borescope 5.56 mm to 15.2 mm**

### **Military Small Arms Borescope**

A Slim wireless rifle videoscope, This gun bore scope is design for all military firearm barrels 5.56 mm to 15.2 mm. A helpful firearms maintenance tool, save your time and money.

### **Military Small Arms Borescope**

BCS Military Small Arms Borescope are used to inspect for pistol and barrel cleanliness, throat erosion, tool marks, rifling wear, chamber damage, and fouling. All calibers from 5.56 mm to 15.2 mm.

### **Joystick Controls**

Get full and intuitive control of the video-probe with this easy-to-use and precise joystick. With a full 360° articulation and a 190° degree bending angle.

**F3000 Small Arms 3D Borescope**  
5.56 mm to 15.2 mm



**F5000 Small Arms 2D Borescope**  
6.5 mm to 15.2 mm





## Mini Pipe Inspection System (MPIS) 15 mm to 40 mm

The BCS Mini Pipe Inspection System (MPIS) is a set of optical measurements heads, fixtures and supporting rings which allows to scan a profile of internal surface of small and extra small pipes, stators, cylinders, etc. This miniature optical inspection system comes in handy for smaller pipework. For diameters 15 mm to 40 mm.

The wireless system is designed for video inspection of inner surface and measuring of profile, inner diameter and ovality of pipes, stators, cylinders, etc.

The high-performance sensor is matched to display and capture hardware operated from a notebook type PC with auxiliary monitor for ease of viewing. The head contains one camera for forward down bore view and one camera for right angle viewing view.

### Specifications BCS Mini Pipe Inspection System (MPIS)

Inner Barrel or Bore Diameter:	± 0.01 mm
Deviation From Roundness:	± 0.01 mm
Deviation Of Shape Of The Profile:	± 0.03 mm
Width Of The Elements Of A Profile:	± 0.05 mm
Barrel or Bore Length:	± 2 mm
Max Length of Barrel or Bore:	Up to 5 mtrs
Weight System:	8 kgs
Weight Probe:	1 kgs

### Optional Extras

- Barrel or Bore Straightness  
Will check non-straightness of all barrels and bores.
- Chromium Coating  
The sensor measures the barrel and bore coating thickness.
- Self Moving Option  
Converts system to automatic mode.



### Features:

Portable Design  
Field & Depot Use

### Suitable For:

Smooth Bore And Rifled Barrels

### Measurements:

Displayed In Real Time  
Also Download To PC

### Adaptable:

Different Calibers 15 mm – 40 mm  
Smooth Bore & Rifled Barrels  
Max Bore Length 5 mtrs  
(Any Longer Call BCS)

### Disassembly:

Not Required

### Inspect For:

Barrel Wear, Chrome Loss, Erosion,  
Cracks And Other Defects

### Suitable For:

Military Gun Barrels 15 mm-40 mm.  
Smooth Profiled Pipes 15 mm-40 mm.  
Bores, Barrels, Stators And Cylinders  
For All Pipes Tubes 15 mm-40 mm.  
Quality And Geometric Dimensions  
Check During Barrel Maintenance.  
After Long Term Storage, As Well As  
Periodic Inspections.

### Note:

All solutions are unified, any box can be upgraded in the future to cover more measurement tasks.





**Features:**

Portable Design  
Field / Depot / Naval Use

**Adaptable:**

Different Calibers 30 – 80 mm  
Smooth Bore & Rifled Barrels  
Bore Length 10 to 30 mtrs as standard

**Measurements:**

Non-contact 3d Scanning  
Laser Alignment  
Displayed In Real Time  
Also Download To PC

**Disassembly:**

Not Required

**Optional Extras:**

Barrel or Bore Straightness  
Non-straightness of all barrels and bores.  
Chromium Coating  
Measures bore coating thickness  
Self Moving Option  
Converts system to automatic mode

**Inspect For:**

Barrel Wear, Chrome Loss, Erosion, Cracks  
And Other Defects

**Suitable For Military :**

Naval /Air Force /Army Weapons

**30 mm**

Bushmaster II Mk 44 30mm  
A-10 Warthog 30mm Cannon

**40 mm**

Bofors 40 mm Gun  
40 Mk4 Naval Gun

**50 mm**

Bushmaster III  
50mm XM913 Chain Gun

## Small Pipe Inspection System (SPIS) 30 mm to 80 mm

The wireless system is designed for video inspection of inner surface and measuring of profile, inner diameter and ovality of pipes, stators, cylinders, etc.

The BCS Small Pipe Inspection System (SPIS) includes a camera head with both forward looking camera that presents an overview of the bore's general condition, and a side looking camera for close-up inspection of the inside of all small diameter tubes, pipes and bores.

Both cameras are long-life, LED illuminated, and the side camera can be remotely focused. Complete optical measurement system for all small tubes, pipes and bores 30 mm to 80 mm.

### Specifications BCS Small Pipe Inspection System (SPIS)

Inner Barrel Bore Diameter:	$\pm 0.01$ mm
Deviation From Roundness:	$\pm 0.01$ mm
Straightness:	$\pm 0.01$ mm
Deviation Of Shape Of The Profile:	$\pm 0.03$ mm
Width Of The Elements Of A Profile:	$\pm 0.05$ mm
Barrel or Bore Length:	$\pm 2$ mm
Max Bore Tube Length:	30 mtr
Weight System:	Depends on Caliber
Weight Probe:	Depends on Caliber

**Suitable For**

Measurable Parameters Include:-

Ovality.

Inner Diameter.

Non-Straightness.

For All Smooth Bore And Rifled Barrels, 30 mm To 80 mm.

Geometrical Dimensions Of Profile (Heights, Widths, Pitch / Step, Angles, Radiuses, Welding Seam).





## Contactless Inner Diameter Measurement System (CIMS) 80 mm to 175 mm

This device is used for contactless scanning and geometrical parameter measurement of the inner diameter of pipes, bushes, holes and tubes among others. Contactless measurement of objects with two through-holes of different diameter, and accuracy up to  $\pm 0,005$   $\mu\text{m}$ .

The BCS Contactless Inner Diameter Measurement System (CIMS), suitable for all howitzer smooth bore's and artillery tubes. Inspect & measure all calibers 80 mm to 175 mm. This is the system with the most precise sensors available.

Fully Automatic, once the probe is inserted into the Smooth Bore. All the other processes are handled automatically after pushing "Start Button". Status of measurement is displayed on the laptop screen. The final report can be printed or stored in a database or on a memory card.

### Specifications Contactless Inner Diameter System (CIMS)

Measurement principle – an array of triangulation sensors – usually six sensors arranged in a circle every 60 degrees. The system approximates the cross-section of the pipe by the six points, which makes it possible to calculate the diameter and ovality. Not suitable for profile analysis.

Profile Measurement Accuracy:	+/- 0.01 mm
Non-Straightness Measurement:	+/- 0.01 mm
Probe Position:	Standard +/- 1 mm Optional +/- 0.5 mm
Tube Length:	10 mtrs Standard Optional: 30 mtrs
Weight System:	10 kg
Weight Probe:	1.5 kg

### Specifications:

Bore-Straightness Measurement:  
Accuracy +/- 0.01 mm  
Custom-made solutions are available.

### Suitable For:

Mortar Tubes.  
Bushes, Holes and Tubes.  
Cylindrical and Taper Pipes.  
Smooth Bore's and Artillery Tube's.  
Maximum Tube or Bore Length 30 mtrs.  
Production Line Quality Control Tool.

### Adaptable:

Different Inner Diameters: 80 - 175mm  
Maximum Length 10 mtrs to 30 mtrs.

### Suitable For :

Smooth Bore & Artillery Tube's ONLY

### Movement Method:

Fully Automatic Self-Crawling  
6 Point Sensors

### Connection:

Probe Computer, Wired, Wireless WiFi

### Battery Life:

For Wireless Devices, Up to 8 hours

### Power:

220 V 50 Hz 200 W via Power Supply





**Features:**

Portable Design  
Field & Depot Use

**Measurements:**

Displayed In Real Time  
Also Download To PC

**Adaptable:**

Smooth Bore & Rifled Barrels  
Max Bore Length 30 mtrs

**System Configuration:**

PS – 80 to 120 mm  
PS – 105 to 155 mm  
PS – 120 to 180 mm  
PS – 160 to 300 mm

**Probe Sizes Available:**

50 mm – Body  
70 mm – Body  
90 mm – Body

**Inspect For:**

Wear, Chrome Loss, Erosion, Cracks

**Specifications:**

Probe Speed: 2 mtr per min  
Weight System: 10 kg.  
Weight Probe: 1.5 kg.  
Operating Temp: -20°C + 65°C  
Humidity: Up To 98%

**Suitable For Military:**

OTO Melara 76 mm  
L118 Light Gun & M119 Howitzer  
Abrams / Leclerc / Leopard 120mm  
T-90 125mm / ZTZ-99 125mm  
D-20 Howitzer / AS-90 155mm  
Any other caliber 76 to 240 mm

## Pipe Inspection & Measurement System (PIMS) 76 mm to 240 mm

Complete Pipe Inspection & Measurement System (PIMS). The system measures various parameters of smooth and profiled pipes. The system is able to measure pipes with inner diameters from 76 mm to 240 mm. Pipe length is up to 100 mtrs.

Ideal Replacement If you are using the old M3 Borescope, this is cost effective replacement borescope.

The system provides a forward view camera and a side view colour (white LED) camera, the camera heads can be switched between views to identify Damage / Verdigris / Copper Deposits / Firing Residue on the rifling of the barrel. The monitor can also provide picture-in-picture for precise location of damage in a barrel.

**Suitable For**

Our devices are designed to measure Inner geometrical dimensions of:-

Any material of any form – any type and quality of surface.

Bores

Tubes

Stators

Barrels

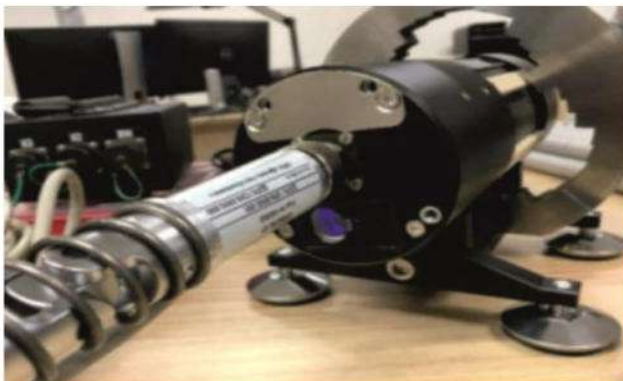
Siphons

Smooth & Rifles Pipes

For all Smooth Bore and Rifled Barrels, 76 mm to 240 mm

**Specifications Pipe Inspection & Measurement System**

Diameter:	+/- 0.01 mm
Profile Measurement Accuracy:	+/- 0.01 mm
Non-Straightness Measurement:	+/- 0.01 mm
Probe Position:	+/- 1 mm Standard +/- 0.5 mm Optional
Weight System Approx:	12 kg Depends on Dia
Weight Probe Approx:	1.6 kg Depends on Dia





## Large Borescope Inspection System (LBIS) 80 mm to 300 mm

The BCS Large Borescope Inspection System (LBIS) is equipped to handle a wide variety of remote visual inspection needs. Ideally suited for all Large Artillery and Armoured Vehicles, Specialty Pipes & Tubes from 80 mm to 300 mm. The Pipe length is up to 100 mtrs.

Measuring principle – rotating laser scanner – usually from one to four sensors (the price depends in the number of sensors (channels) inside that have overlapped measuring ranges. The system can scan the cross-section (thousands of points for a cross-section). Suitable for profile analysis. Centering is made in the form of expanding legs.

The Large Borescope Inspection System (LBIS Borescope) is the most advanced unit available. It measures a range of parameters (inner diameter, ovality, out-of-roundness, non-straightness, barrel threading, rifling/profiling width/height and rifling angle).

### Suitable For

Smooth Bore Or Rifled Barrels.  
All Calibers From 80 mm To 300 mm.  
Specialty Pipes & Tubes From 80 mm To 300 mm.  
Ideally Suited For All Large Artillery And Armoured Vehicles.

### Specifications Large Borescope Inspection System (LBIS)

Diameter:	+/- 0.01 mm
Profile Measurement Accuracy:	+/- 0.01 mm
Non-Straightness Measurement:	+/- 0.01 mm
Probe Position:	+/- 1 mm Standard +/- 0.5 mm Optional
Weight System Approx:	15 kg Depends on Dia
Weight Probe Approx:	1.7 kg Depends on Dia



### Features:

Portable Design  
Field & Depot Use

### Measurements:

Displayed In Real Time  
Also Download To PC

### Adaptable:

Smooth Bore & Rifled Barrels  
Max Bore Length 30 mtrs

### Inspect For:

Wear, Chrome Loss, Erosion, Cracks

### Specifications: Depends on System

Probe Speed:	2 mtr per min
Weight System:	10 kg.
Weight Probe:	1.5 kg.
Operating Temp:	-20°C + 65°C
Humidity:	Up To 98%
Max Tube Length:	100 mtrs

### NanoTech Circuit Coating

Using BCS NanoTech circuit board protection, you can protect the borescopes circuits, PCBs, and other electrical components from damaging elements.

Ongoing protection of electrical and electronic equipment from exposure to all forms of water; steam, humidity, condensation, fog, rain, flooding, chlorinated and salt water

**Features:**

Portable Design  
Field & Depot Use  
All Artillery Mortar Tube's

**Measurements:**

Displayed In Real Time  
Also Download To PC

**Adaptable:**

Different Calibers 60 – 120 mm  
Up-gradable In The Future

**Disassembly:**

Not Required

**Inspect For:**

Barrel Wear, Chrome Loss, Erosion, Cracks  
And Other Defects, Barrel Straightness Etc.

**Specification:**

Probe Speed:	1- 2 mtrs per Min
Weight System:	Depends on Caliber
Weight Probe:	Depends on Caliber
Operating Temp:	-20°C + 65°C
Humidity:	Up To 98%
Probe Position:	Standard +/- 1 mm Optional +/- 0.5 mm

## Mortar Tube Video Borescope 60 mm - 120 mm

The BCS Mortar Tube Video Borescope inspection system. Will measure and inspect all mortar tubes from caliber 60 mm to 120 mm.

Manual or Self moving systems available. You have a choice of a rigid vertical system or a horizontal system.

**Configuration**

The device can be fitted with a frontal video camera for quick searches and check of possible bore pitting or corrosion. A side camera that allows you to check any bore defects in fine close-up detail.

**Video Inspection**

With our state-of-the-art video inspection capabilities, you can see and every detail of the tube or bore inner surface. Illuminates mortar tube walls and firing pin areas of blind bores. Inspect mortar tubes for defects of manufacture and damage caused by firing, or workplace accidents.

**Results**

The results are also exported to computer for analysis at later date. Measurements displayed in real time with location and bore information.

**Suitable For**

Spear Mk Iii.  
Alkar 81/120 mm.  
L41 Mortar Tubes.  
Patria Nemo 120 mm.  
Cardom Is A 120 mm.  
Recoiling Mortar System.  
Autonomous Self-Propelled.  
Portable / Short-Barreled / Muzzle-Loading Artillery.  
Medium and Heavy Mortars / Self-Propelled Recoiling Mortar.





## Straightness / Warpage

There are several methods used to check the straightness of small and large bores, tubes and barrels. A laser optical system designed and manufactured by BCS optical provides a simple but accurate solution to the difficulties associated with checking the straightness of all Large Bores, Tubes and Barrels.

### Small Barrel and Bores: 7.5 mm to 20 mm.

Accuracy 10 Microns.

The system can determine straightness on parts of the bore or, along the entire length of the barrel.

### Large Diameter & Bores: 20 mm to 240 mm.

Accuracy +/- 0.01 mm.

The system can determine straightness on parts of the bore or, along the entire length of the barrel.



### System Contains:

Non straightness (warpage) PSD sensor  
the non-straightness (warpage) channel consists of a PSD matrix and stabilized laser source.

### How It Works:

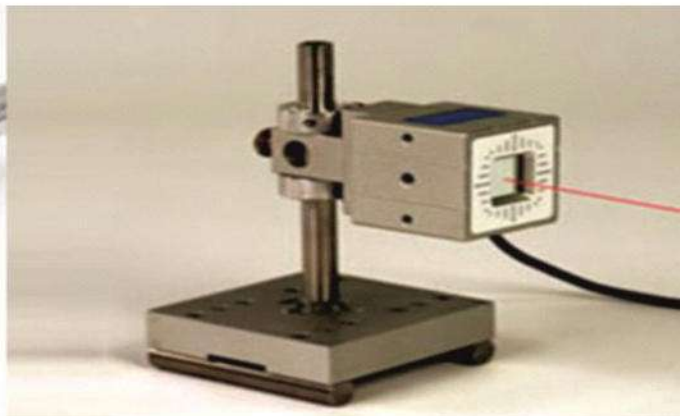
Measurement of straightness is performed by a PSD sensor placed on the front cap of the borescope.

The PSD sensor determines a probe rotating axis deviation from the reference beam. Simultaneously, the laser rotating scanner defines the center of radial bore cross-section. Thereby, a deviation of cross-section center from the reference beam is calculated.

### Temperature Sensor:

The temperature sensor is designed to compensate for the distortion of the system readings relating to changes in ambient temperature.

This makes it possible to achieve high accuracy over a wide temperature range.



**Features:**

Portable Design  
Field & Depot Use  
All Artillery Mortar Tube's

**Measurements:**

Displayed In Real Time  
Also Download To PC

**Adaptable:**

Different Calibers 60 – 120 mm  
Up-gradable In The Future

**Disassembly:**

Not Required

**Inspect For:**

Barrel Wear, Chrome Loss, Erosion, Cracks  
And Other Defects, Barrel Straightness Etc.

**Specification:**

Probe Speed:	1- 2 mtrs per Min
Weight System:	Depends on Caliber
Weight Probe:	Depends on Caliber
Operating Temp:	-20°C + 65°C
Humidity:	Up To 98%
Probe Position:	Standard +/- 1 mm Optional +/- 0.5 mm

**Description Barrel & Bore Chrome Thickness**

Borescopes can be equipped with a special measuring sensor that allows to inspect the quality of the barrel and bore chrome lining.

The sensor measures coating thickness of products made from Ferromagnetic and from nonferromagnetic allows.

The sensor is built inside the laser scanner.

During measuring the sensor protrudes from the inside of the borescope towards the inspected surface and touches it then retracts back.

**Captured Images and Movies.**

Measured bore dimensions including coating thickness are stored in a local data base with binding to the exact position of the borescope.

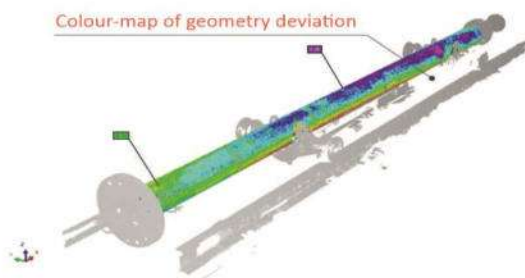
**Leica Bore Tracker**

The Scanning Absolute Distance Meter (ADM)

The first ever Scanning ADM allows the Leica Absolute Tracker ATS600 to accurately locate a point in 3D coordinate space either with or without a reflector, allowing for standard laser tracker single-point measurements alongside the unique ability to digitise a surface from up to 60 meters distance with no target in place at the point of measurement

**Combined Measurement**

The ATS600 is particularly powerful when using both direct scanning and reflector measurement within the same process, whether that's quality inspection of large parts using scanning for surfaces and a reflector for features, or build and adjust procedures where scanning provides a complete picture of the assembly and reflector measurement delivers a more accurate position reference





**Windows Software  
Free With All Systems**

**Allows The Following**

- See the values of calculated geometric parameters.
- Enter manually the location of the check section relative to the bore edge.
- Configure the system.
- Generate a data log of scanned bore.

**Cross-Section Profile**

Depending on a controlled diameter, rotating laser scanner may contain from 1 to 2 sensors to cover a full measurement range.

In this case, each sensor has a measurement range which overlaps the range of adjacent sensors.

**Windows or Unix**

The software is compatible with Windows 7 and higher and can be installed on any PC with an Ethernet connector (version for UNIX is also available).

**Operating Design**

The design of the main window changes depending on the options chosen. This is confirmed on ordering the system. (Company logo, Name, Language etc).

**Features:**

- Portable Design
- Field & Depot Use
- All Artillery Mortar Tube's

**Measurements:**

- Displayed In Real Time
- Also Download To PC

**Adaptable:**

- Different Calibers 60 – 120 mm
- Up-gradable In The Future

**Disassembly:**

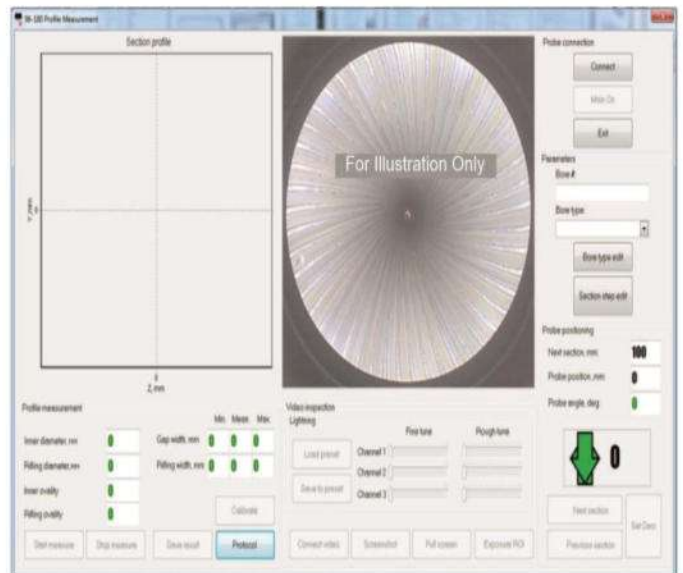
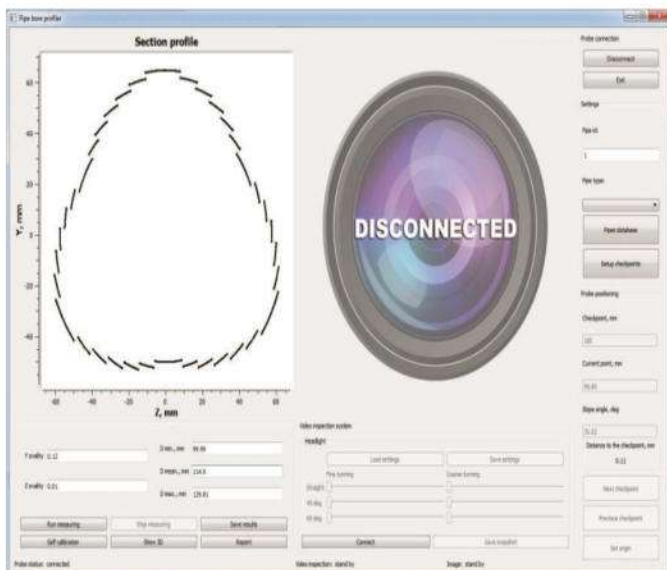
- Not Required

**Inspect For:**

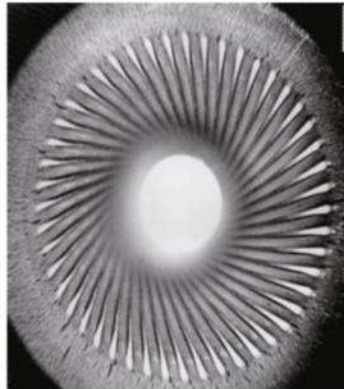
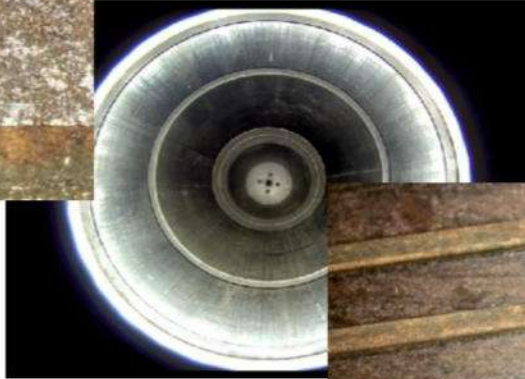
- Barrel Wear, Chrome Loss, Erosion, Cracks
- And Other Defects, Barrel Straightness Etc.

**Specification:**

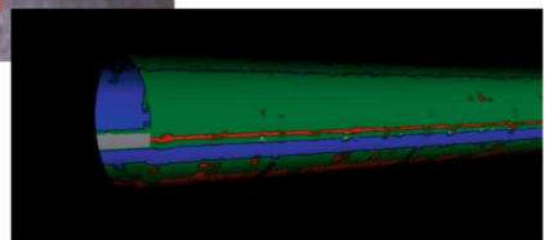
Probe Speed:	1- 2 mtrs per Min
Weight System:	Depends on Caliber
Weight Probe:	Depends on Caliber
Operating Temp:	-20°C + 65°C
Humidity:	Up To 98%
Probe Position:	Standard +/- 1 mm Optional +/- 0.5 mm



Examples



Military Bore  
New Barrel & Worn Barrel Rifling







# BCS

## BORESCOPE & INSPECTION



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All Bore-Scopes Built To Order  
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