



SmartPlug Technical Questions & Answers

<u>Question</u>	<u>Answer</u>																																																			
What is the product range of Smartplugs.	6-20mm (0.236" - 0.787") with M6x0.75 thread fitting. 15-280mm (0.590"-11.025") with M10x1 thread fitting.																																																			
What is the working range of each SmartPlug, in other words the measuring range of the anvils.	0.15mm for the 6-20mm range 0.20mm for the 15-280mm range																																																			
How far do the anvils extend past the working range.	0.05 to 0.15mm																																																			
What diameter is the plug body manufactured to.	The following diametrical clearances to the bore being measured are allowed:- -0.02/-0.04mm (-.0007"/-.0016") 6-20mm M6 range -0.02/-0.05mm (-.0007"/-.0020") 15-37.1mm M10 range -0.03/-0.06mm (-.0011"/-.0024") 37.1-70.1mm M10 range -0.04/-0.07mm (-.0015"/-.0028") 70.1-280mm M10 range																																																			
What criteria will ensure SmartPlug performance.	The outside diameter of the plug sets the positions of the measuring anvils in the bore and ensures repeatability. A shallow guide depth in the bore or a large difference between the plug outside diameter and the bore diameter will impair repeatability.																																																			
Accuracy specification of SmartPlugs.	Repeatability: ≤ 1 micron Linearity: nominal ± 1%																																																			
Accuracy specification of indicators	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 20%; text-align: center;">Max Error</th> <th style="width: 20%; text-align: center;">Repeatability</th> </tr> </thead> <tbody> <tr> <td>Type A (mini indicator)</td> <td style="text-align: center;">5 μm</td> <td style="text-align: center;">2μm</td> </tr> <tr> <td>Type B (mechanical)</td> <td style="text-align: center;">1.2μm</td> <td style="text-align: center;">0.5μm</td> </tr> <tr> <td>Type C (std. Indicator)</td> <td style="text-align: center;">5μm</td> <td style="text-align: center;">2μm</td> </tr> <tr> <td>Type D (probe)</td> <td style="text-align: center;">1μm</td> <td style="text-align: center;">0.2μm</td> </tr> </tbody> </table>		Max Error	Repeatability	Type A (mini indicator)	5 μm	2μm	Type B (mechanical)	1.2μm	0.5μm	Type C (std. Indicator)	5μm	2μm	Type D (probe)	1μm	0.2μm																																				
	Max Error	Repeatability																																																		
Type A (mini indicator)	5 μm	2μm																																																		
Type B (mechanical)	1.2μm	0.5μm																																																		
Type C (std. Indicator)	5μm	2μm																																																		
Type D (probe)	1μm	0.2μm																																																		
Accuracy specification of Ansi rings	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 30%; text-align: center;">ANSI X</th> <th style="width: 30%; text-align: center;">ANSI XX</th> </tr> </thead> <tbody> <tr> <td>Ring Size mm</td> <td></td> <td></td> </tr> <tr> <td>6– 20.96</td> <td style="text-align: center;">0.0010mm</td> <td style="text-align: center;">0.00051mm</td> </tr> <tr> <td>20.96-38.35</td> <td style="text-align: center;">0.0015mm</td> <td style="text-align: center;">0.00076mm</td> </tr> <tr> <td>38.35-63.75</td> <td style="text-align: center;">0.0020mm</td> <td style="text-align: center;">0.0010mm</td> </tr> <tr> <td>63.75-114.55</td> <td style="text-align: center;">0.0025mm</td> <td style="text-align: center;">0.0013mm</td> </tr> <tr> <td>114.55-165.35</td> <td style="text-align: center;">0.0033mm</td> <td style="text-align: center;">0.0017mm</td> </tr> <tr> <td>165.35-228.85</td> <td style="text-align: center;">0.0041mm</td> <td style="text-align: center;">0.0020mm</td> </tr> <tr> <td>228.85-280.00</td> <td style="text-align: center;">0.0051mm</td> <td style="text-align: center;">0.0025mm</td> </tr> <tr> <td>Ring Size (inch)</td> <td></td> <td></td> </tr> <tr> <td>0.236"– 0.825"</td> <td style="text-align: center;">0.00004"</td> <td style="text-align: center;">0.00002"</td> </tr> <tr> <td>0.825"-1.510"</td> <td style="text-align: center;">0.00006"</td> <td style="text-align: center;">0.00003"</td> </tr> <tr> <td>1.510"-2.510"</td> <td style="text-align: center;">0.00008"</td> <td style="text-align: center;">0.00004"</td> </tr> <tr> <td>2.510"-4.510"</td> <td style="text-align: center;">0.00010"</td> <td style="text-align: center;">0.00005"</td> </tr> <tr> <td>4.510"-6.510"</td> <td style="text-align: center;">0.00013"</td> <td style="text-align: center;">0.000065"</td> </tr> <tr> <td>6.510"-9.010"</td> <td style="text-align: center;">0.00016"</td> <td style="text-align: center;">0.00008"</td> </tr> <tr> <td>9.010"-11.025"</td> <td style="text-align: center;">0.00020"</td> <td style="text-align: center;">0.00010"</td> </tr> </tbody> </table> <p>In all cases the total tolerance shown is applied bilaterally.</p>		ANSI X	ANSI XX	Ring Size mm			6– 20.96	0.0010mm	0.00051mm	20.96-38.35	0.0015mm	0.00076mm	38.35-63.75	0.0020mm	0.0010mm	63.75-114.55	0.0025mm	0.0013mm	114.55-165.35	0.0033mm	0.0017mm	165.35-228.85	0.0041mm	0.0020mm	228.85-280.00	0.0051mm	0.0025mm	Ring Size (inch)			0.236"– 0.825"	0.00004"	0.00002"	0.825"-1.510"	0.00006"	0.00003"	1.510"-2.510"	0.00008"	0.00004"	2.510"-4.510"	0.00010"	0.00005"	4.510"-6.510"	0.00013"	0.000065"	6.510"-9.010"	0.00016"	0.00008"	9.010"-11.025"	0.00020"	0.00010"
	ANSI X	ANSI XX																																																		
Ring Size mm																																																				
6– 20.96	0.0010mm	0.00051mm																																																		
20.96-38.35	0.0015mm	0.00076mm																																																		
38.35-63.75	0.0020mm	0.0010mm																																																		
63.75-114.55	0.0025mm	0.0013mm																																																		
114.55-165.35	0.0033mm	0.0017mm																																																		
165.35-228.85	0.0041mm	0.0020mm																																																		
228.85-280.00	0.0051mm	0.0025mm																																																		
Ring Size (inch)																																																				
0.236"– 0.825"	0.00004"	0.00002"																																																		
0.825"-1.510"	0.00006"	0.00003"																																																		
1.510"-2.510"	0.00008"	0.00004"																																																		
2.510"-4.510"	0.00010"	0.00005"																																																		
4.510"-6.510"	0.00013"	0.000065"																																																		
6.510"-9.010"	0.00016"	0.00008"																																																		
9.010"-11.025"	0.00020"	0.00010"																																																		

<p>Accuracy specification of nominal rings</p> <p>Manufactured and marked to within 10 microns of size to accuracy's shown.</p> <p>Accuracy's shown exceed DIN specifications.</p>	<table border="0"> <tr> <td>Ring Size (mm)</td> <td>NOMINAL</td> </tr> <tr> <td>6– 25</td> <td>0.0016mm</td> </tr> <tr> <td>25-64</td> <td>0.0020mm</td> </tr> <tr> <td>64-100</td> <td>0.0030mm</td> </tr> <tr> <td>100-150</td> <td>0.0040mm</td> </tr> <tr> <td>150-280</td> <td>0.0050mm</td> </tr> <tr> <td>Ring Size (inch)</td> <td>NOMINAL</td> </tr> <tr> <td>0.236"-0.984"</td> <td>0.000063"</td> </tr> <tr> <td>0.984"-2.520"</td> <td>0.00008"</td> </tr> <tr> <td>2.520"-3.937"</td> <td>0.00012"</td> </tr> <tr> <td>3.937"-5.906"</td> <td>0.00016"</td> </tr> <tr> <td>5.906"-11.025"</td> <td>0.00020"</td> </tr> </table> <p>In all cases the total tolerance shown is applied bilaterally.</p>	Ring Size (mm)	NOMINAL	6– 25	0.0016mm	25-64	0.0020mm	64-100	0.0030mm	100-150	0.0040mm	150-280	0.0050mm	Ring Size (inch)	NOMINAL	0.236"-0.984"	0.000063"	0.984"-2.520"	0.00008"	2.520"-3.937"	0.00012"	3.937"-5.906"	0.00016"	5.906"-11.025"	0.00020"
Ring Size (mm)	NOMINAL																								
6– 25	0.0016mm																								
25-64	0.0020mm																								
64-100	0.0030mm																								
100-150	0.0040mm																								
150-280	0.0050mm																								
Ring Size (inch)	NOMINAL																								
0.236"-0.984"	0.000063"																								
0.984"-2.520"	0.00008"																								
2.520"-3.937"	0.00012"																								
3.937"-5.906"	0.00016"																								
5.906"-11.025"	0.00020"																								
<p>What contact tips are available.</p>	<p>Carbide – standard</p> <p>Ruby and ceramic are alternative options at an additional cost.</p>																								
<p>Are plugs interchangeable with Diatest</p>	<p>Yes</p>																								