

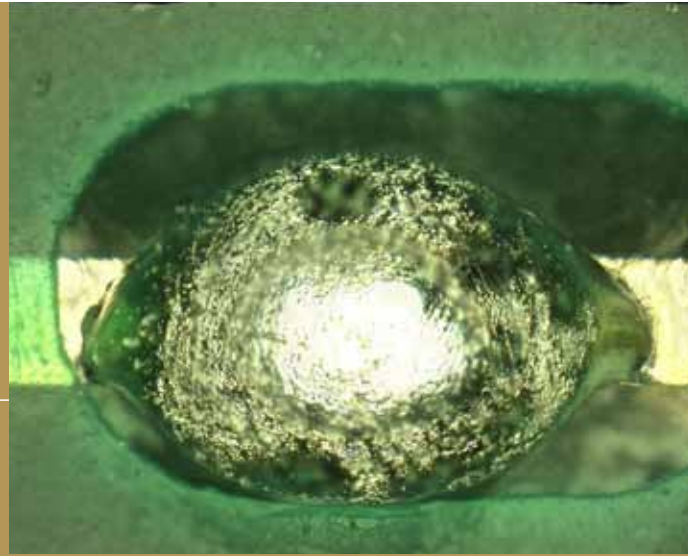
ingun[®]

Test Probes · Test Fixtures

IN TESTING SOLUTIONS
No.1
IN DER PRÜFTECHNIK

Bead Probe Contacting

Best contacting reliability



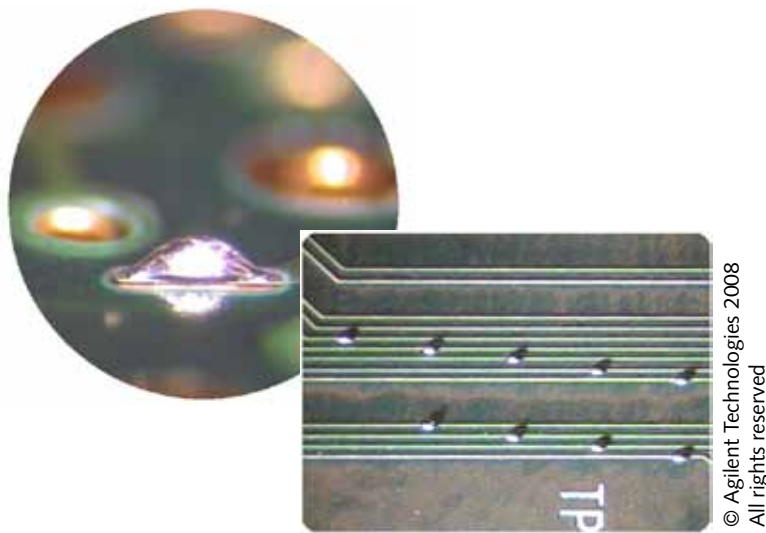
Bead Probe Technology

INGUN: The matching tip style for your bead

For bead probe technology - where small beads of solder are directly applied onto conductors or onto μ -vias - INGUN has developed special tip styles in close cooperation with global customers to be able to provide the ideal solution for the applicable bead.

Experience has shown that there are numerous different bead geometries, compositions and surfaces, which need to be contacted. For this reason, apart from the flat tip style (02), which was designed for contacting solder-resin-free and/or small beads, the fine-serrated tip (60) is also available. The fine, aggressive points of the tip style 60 enable reliable penetration of the surface of those beads that are suitably large enough and are covered with flux deposits. Due to the small distance/pitch between the individual points of the tip style 60, contacting of the beads is guaranteed without hitting/touching the solder-resin-lacquer.

The INGUN bead probes are 100% compatible with the standard series GKS-050/075/100/135/550. Therefore all the related receptacles and tools of these series can be used without exception.



Comment from a leading manufacturer in the field of consumer electronics on the subject of the INGUN tip style 60 when contacting „hard“ bead probe solder:

„I never got a PC board to pass contact-test with the flat style probes, whereas the PC board with the serrated style probes (2.0 N) passed contact-test on several PC boards. I never had this happen before.“

ICT Development Engineer, USA

Bead Probe Technology

INGUN recommendations for tip styles

INGUN offers tip styles with a number of variants for bead probe contacting, i.e. the flat tip style 02 with various tip diameters as well as the fine-serrated tip style 60 with various tip diameters and serrated tip pitches from 0,15 to 0,25 mm.


The **tip style 02** – flat tip – is preferably used for flux-free and/or small beads.



Tip Style 02		Series				
		050	075	100	135	550
Tip-Ø	Ø 0,60 mm	x				x
	Ø 0,90 mm		x	x	x	
	Ø 1,50 mm			x		

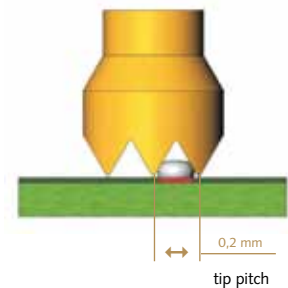
x = standard tip styles

The **tip style 60** – fine-serrated – is recommended for beads, which are bad to contact due to flux deposits and suitably large enough beads. Decisive for the choice of the tip style is the matching up of the tip pitch in relation to the size of the bead.



Tip Style 60			Series					
			050	075	100	135	550	
Tip-Ø	Tip Pitches	Ø 0,50 mm	0,15 mm	x				x
		Ø 0,60 mm	0,20 mm	x				x
		Ø 0,64 mm	0,20 mm		x	x		
		Ø 0,90 mm	0,20 mm		x	x	x	
		Ø 0,90 mm	0,25 mm	x				x

x = standard tip styles

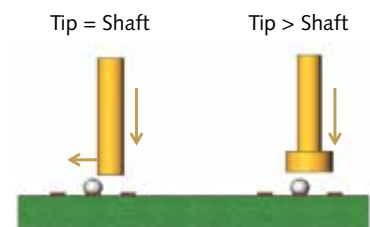


INGUN recommendations for the geometry of the tip style

Tip styles with **tip diameter = shaft diameter** are suitable both for test fixture customizing with a guide plate as well as in the case of beads that need to be contacted close to components and subsequent damage of the components must be avoided. Tip styles with **tip diameter > shaft diameter**, however, are to be recommended for test fixture customizing without a guide plate and/or for larger PC board and test fixture tolerances, e.g. when contacting from the top-side. The larger tip diameter ensures reliable contacting of the beads and subsequently reduces the risk of the bead being sheared off when contacted sidewise.

Recommended Tip Style and Tip Geometry		Tip Style 02		Tip Style 60	
		tip = shaft	tip > shaft	tip = shaft	tip > shaft
Applications	small beads (< 0,15 mm)	+	+	-	-
	large beads (> 0,15 mm)	o	o	+	+
	close to components	+	-	+	-
	test fixture with guide plate	+	-	+	-
	large tolerances on PC board	-	+	-	+
	large tolerances on test fixture	-	+	-	+

+ = good / o = middle / - = bad



The problem of beads being sheared off

Bead Probe Technology

INGUN recommendation for spring forces

The choice of the ideal spring force in combination with the tip style, which has already been chosen, is dependent on the composition of the beads (i.e. contamination / solder hardness) and the intended deformation of the bead. Spring forces from 1,0 N to 3,0 N are available – which are chosen depending on the composition of the beads.

Choice of spring force and tip style depending on the type of contamination and flux deposits:

Recommended Tip Style		Tip Style 02	Tip Style 60
		contamination	contamination
Spring Forces	1,0 N	1	1
	1,5 N	1	1
	2,0 N	1	1 / 2
	2,8 N	1	1 / 2 / 3
	3,0 N	1	1 / 2 / 3

Examples:

No contamination / flux deposits:
Soft, fluid-type flux deposits:
Hard, wax-type flux deposits:

Contamination 1 (good)
Contamination 2 (middle)
Contamination 3 (bad)

Choice of spring force and tip style depending on the hardness of the solder:

Recommended Tip Style and Spring Force		Tip Style 02	Tip Style 60
		solder	solder
Spring Forces	1,0 N	1	1
	1,5 N	1 / 2	1 / 2
	2,0 N	2	2 / 3
	2,8 N	-	3
	3,0 N	-	3

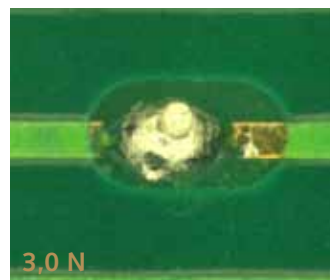
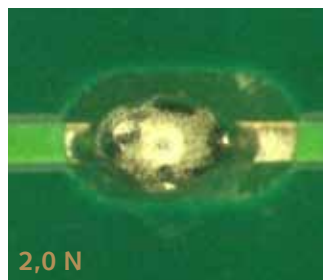
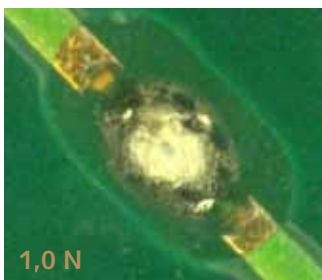
Examples:

Sn 63 = 12.8 HV:
SAC 305 = 17.7 HV:
Innolot = 33.6 HV:

Hardness 1 (soft)
Hardness 2 (middle)
Hardness 3 (hard)



Example: Contacting SAC solder with **tip style 02** and various spring forces



Example: Contacting SAC solder with **tip style 60** and various spring forces

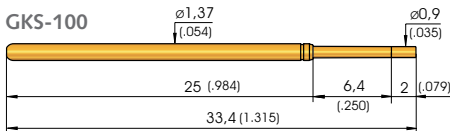
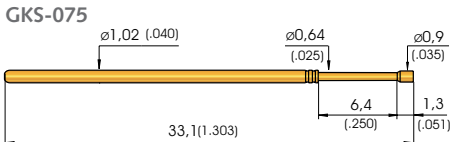
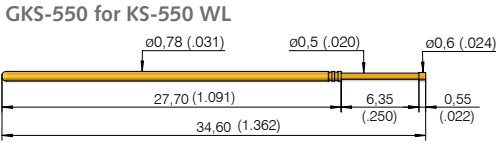
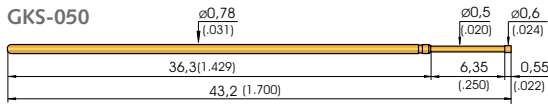
GKS 050/075/100/135/550

Test Probes for Bead Probe Contacting

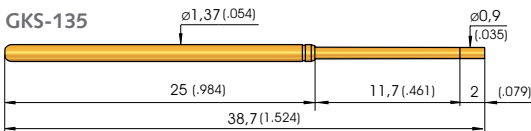
Grid:

≥ 1,27 / 1,91 / 2,54 mm
≥ 50 / 75 / 100 Mil

ICT-/FCT test probes



Long-stroke test probe for dual-stage test fixtures



Available Tip Styles GKS-050/550			
Material	Tip Style	Ø (inch)	Plating
3	02	Ø 0,60 (.024)	A
3	60	Ø 0,50 (.020)	A

Available Tip Styles GKS-050/550			
Material	Tip Style	Ø (inch)	Plating
3	60	Ø 0,60 (.024)	A
3	60	Ø 0,90 (.035)	A
3	79	Ø 0,50 (.020)	A

Available Tip Styles GKS-075			
Material	Tip Style	Ø (inch)	Plating
3	02	Ø 0,90 (.035)	A
3	60	Ø 0,64 (.025)	A

Available Tip Styles GKS-075			
Material	Tip Style	Ø (inch)	Plating
3	60	Ø 0,90 (.035)	A
3	79	Ø 0,64 (.025)	A

Available Tip Styles GKS-100			
Material	Tip Style	Ø (inch)	Plating
3	02	Ø 0,90 (.035)	A
3	02	Ø 1,50 (.060)	A
3	60	Ø 0,64 (.025)	A

Available Tip Styles GKS-100			
Material	Tip Style	Ø (inch)	Plating
3	60	Ø 0,90 (.035)	A
3	79	Ø 0,64 (.025)	A
3	79	Ø 0,90 (.035)	A

Available Tip Styles GKS-135			
Material	Tip Style	Ø (inch)	Plating
3	02	Ø 0,90 (.035)	A
3	60	Ø 0,90 (.035)	A

Mechanical Data

Work. stroke 050/075/100/550: 4,3 mm (.169)
Max. stroke 050/075/100/550: 6,35 mm (.250)
Work. stroke GKS-135: 9,3 mm (.366)
Max. stroke GKS-135: 11,35 mm (.448)
Spring force of GKS-050/550:
Spring force at work. stroke: 1,5 N (5.4oz)
Alternative: 1,0 N (3.6oz); 2,0 N (7.2oz) (not for GKS-550)
Spring force of GKS-075:
Spring force at work. stroke: 1,5 N (5.4oz)
Alternative: 1,0 N (3.6oz); 2,0 N (7.2oz); 2,8 N (10.1oz)

Materials

Plunger: BeCu, gold-plated
Barrel: nickel-silver or bronze, gold-plated
Spring: steel, gold-plated
Receptacle: nickel-silver or brass, gold-plated
Spring force of GKS-100:
Spring force at work. stroke: 1,5 N (3.6oz)
Alternative: 2,0 N (7.2oz); 3,0 N (10.8oz)
Spring force of GKS-135:
Spring force at work. stroke: 1,5 N (5.4oz)
Alternative: 2,0 N (7.2oz); 3,0 N (10.8oz)

Operating Temperature

Standard: -40° up to +80° C

Note:

Collar height and installation height, receptacles, electrical data, mounting hole size: see compatible standard probe series in our latest Test Probe Catalogue.

Tools:

Insertion and extraction tools for GKS and KS see page 118 in our latest Test Probe Catalogue.

Ordering Example

Test Probes:

Series	Tip Material 3 = BeCu	Tip Style	Tip Diameter (1/100 mm)	Plating A = Gold N = Nickel	Spring Force (dN)	Collar Height (mm)
G K S	0 5 0	3	6 0	0 6 0	A	1 5
G K S	5 5 0	3	6 0	0 6 0	A	1 5
G K S	0 7 5	3	6 0	0 9 0	A	2 0
G K S	1 0 0	3	6 0	0 9 0	A	2 0
G K S	1 3 5	3	6 0	0 9 0	A	2 0

Bead Probe Technology

NEW

INGUN Recommendations for Tip Styles

The **tip style 79 - Star** is recommended (due to the self-cleaning, horizontal arrangement of the knife-type edges) for elongated/small and large beads with flux deposits, that can stick to the tip. Decisive for the choice of the tip style # 79 is the matching up of the bead geometry and the angle of the knife-shaped edges as well as the most suitable contacting area.

Tip Style 79		Series			
		050	075	100	550
Tip-Ø	Ø 0,50 mm	x			x
	Ø 0,64 mm		x	x	
	Ø 0,90 mm			x	

Good matching up of contacting area and length of bead

ingunfi innovation

Available Tip Style GKS-050			
Material	Tip Style	Versions	Plating
3	79 	0,50 (.020)	A

Available Tip Styles GKS-075			
Material	Tip Style	Versions	Plating
3	79 	0,64 (.025)	A

Available Tip Styles GKS-100			
Material	Tip Style	Versions	Plating
3	79 	0,64 (.025)	A
3	79 	0,90 (.035)	A

Poor matching up of contacting area and angle of knife-edges too large for length of bead.

NEU

INGUN Recommendations for Spring Forces

The choice of the ideal spring force in combination with the tip style, which has already been chosen, is dependent on the composition of the beads (i.e. contamination / solder hardness) and the intended deformation of the bead. Spring forces from 1,0 N to 3,0 N are available - which are chosen depending on the composition of the beads.

Choice of spring force depending on the type of contamination and flux deposits:

Spring Forces	Recommended Spring Force	Tip Style 79 contamination
	1,0 N	1
1,5 N	1 / 2	
2,0 N	1 / 2	
2,8 N	1 / 2 / 3	
3,0 N	1 / 2 / 3	

Examples:

No contamination / flux deposits: Contamination 1 (good)
 Soft, fluid-type flux deposits: Contamination 2 (middle)
 Hard, wax-type flux deposits: Contamination 3 (bad)

Choice of spring force depending on the hardness of the solder:

Spring Forces	Recommended Spring Force	Tip Style 79 solder
	1,0 N	1
1,5 N	1 / 2	
2,0 N	2 / 3	
2,8 N	3	
3,0 N	3	

Examples:

Sn 63 = 12.8 HV: Hardness 1 (soft)
 SAC 305 = 17.7 HV: Hardness 2 (middle)
 Innot = 33.6 HV: Hardness 3 (hard)

1,0 N

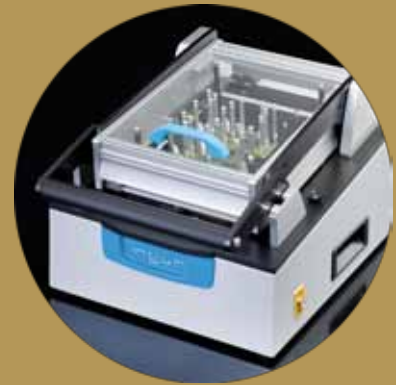
2,0 N

3,0 N

Example: Contacting SAC-solder with **tip style 79** and various spring forces



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and
Test Fixtures
by
INGUN



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The addresses of the international agencies can be found under www.ingun.com

ingun[®]

INGUN Prüfmittelbau GmbH
Max-Stromeyer-Straße 162
78467 Konstanz
Germany
Tel. +49 7531 8105-0
Fax +49 7531 8105-65
info@ingun.com
www.ingun.com