

Product Selection Guide

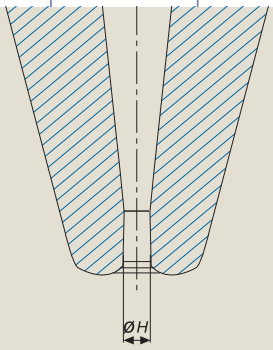


Capillary Dimension Recommendations

This section recommends the most critical capillary dimensions (H, CD, T) according to the main dictating process factors (wire diameter, ball diameter, bond pad pitch).

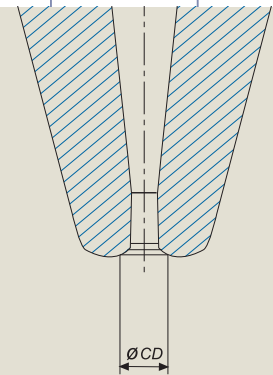
Capillary Hole Diameter (H)

Capillary Dimension	Dimension Symbol	Main Dictating Factor	Dimension Contribution	Recommended Dimensions (fit most standard industry process specifications)					
				Wire Diameter		Hole Diameter			
Hole Diameter	H	Wire Diameter	<ul style="list-style-type: none"> • Convenient Wire clearance • Looping consistency • Ball diameter control • Tail bond strength 	[mil]	[μm]	Nominal		Minimal	
						[mil]	[μm]	[mil]	[μm]
				3.00	76	4.00	102	3.80	97
				2.50	64	3.50	89	3.10	79
				2.00	51	2.80	71	2.60	66
				1.50	38	2.20	56	1.80	46
				1.30	33	1.80	46	1.50	38
				1.20	30	1.70	43	1.40	36
				1.10	28	1.60	41	1.30	33
				1.00	25	1.50	38	1.20	30
				0.90	23	1.20	30	1.10	28
				0.80	20	1.00	25	0.95	24
				0.70	18	0.90	23	0.85	22
				0.60	15	0.75	19	0.70	18



Capillary Chamfer Diameter (CD)

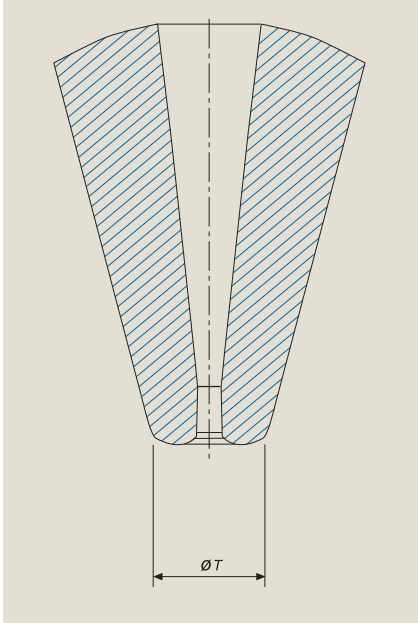
Capillary Dimension	Dimension Symbol	Main Dictating Factor	Dimension Contribution	Recommended Range (fits most standard industry process specifications)			
				Ball diameter range		Chamfer Diameter	
Chamfer Diameter	CD	Average Ball Diameter & min B.P.O	<ul style="list-style-type: none"> • Accurate ball diameter control • Ball-on-pad placement control • Tail bond strength 	[mil]	[μm]	[mil]	[μm]
				2.91-3.27	74-83	2.36-2.72	60-69
				2.80-3.11	71-79	2.28-2.60	58-66
				2.64-2.95	67-75	2.13-2.44	54-62
				2.52-2.83	64-72	2.05-2.36	52-60
				2.40-2.68	61-68	1.97-2.24	50-57
				2.32-2.56	59-65	1.93-2.17	49-55
				2.28-2.48	58-63	1.93-2.13	49-54
				2.20-2.36	56-60	1.89-2.05	48-52
				2.13-2.28	54-58	1.81-1.97	46-50
				2.01-2.17	51-55	1.69-1.85	43-47
				1.89-2.05	48-52	1.61-1.77	41-45
				1.77-1.93	45-49	1.50-1.65	38-42
				1.57-1.73	40-44	1.30-1.46	33-37
				1.42-1.54	36-39	1.18-1.30	30-33
				1.30-1.42	33-36	1.10-1.22	28-31
				1.20-1.26	30-32	1.02-1.10	26-28



For smaller ball diameter range, please refer to the relevant family pages into UFP section.

Capillary Dimension Recommendations

Capillary Tip Diameter (T)

Capillary Dimension	Dimension Symbol	Main Dictating Factor	Dimension Contribution	Recommended Range (fits most standard industry process specifications)				
				B.P.P range [mil]	B.P.P range [μm]	Tip diameter [mil]	Tip diameter [μm]	Corresponding K&S family
Tip Diameter	T	B.P.P	<ul style="list-style-type: none"> • 2nd bond strength • Controlable 1st bond • Capillary reasonable life span 					
				5.91	150+	6.50-20.0	165-508	LW
				4.72	120+	5.00-10.0	127-254	STD
				4.30	110	4.50-7.50	114-191	BTNK
				3.94	100	5.00-5.50	127-140	FA
				3.54	90	4.20-4.50	107-114	FB
				3.35	85	4.10-4.20	104-107	FB
				3.15	80	3.90-4.10	99-104	FC
				2.95	75	3.80-3.90	97-99	FC
				2.76	70	3.60-3.80	91-97	FD
				2.56	65	3.30-3.60	84-91	FD
				2.36	60	3.10-3.30	79-84	FE
				2.17	55	2.80-3.00	71-76	FE
				1.97	50	2.60-2.80	66-71	FF
				1.77	45	2.10-2.30	53-58	FG
				1.57	40	1.93-2.05	49-52	FH
				1.38	35	1.73-1.80	44-46	CJ
1.18	30	1.50-1.57	38-40	CK				
1.00	25	1.22-1.30	31-33	CL				

Comments:

1. The above recommendations are provided for the three most important capillary dimensions, which enable direct control of wire bonding process responses.
2. All other capillary dimensions or features are recommended within each series section of this catalog, respectively.
3. These recommendations fit most requirements as found in the worldwide assembly industry. Other requirements can be addressed through further customized dimensions.

Product Selection Guide

K&S Capillary Family Selection Matrix

The below matrix enables to select first a suitable capillary family within the catalog, according to the application requirements (B.P.P, Wire Diameter and 1st Bond Diameter), before selecting one specific capillary model.

B.P.P	[µm]	≥/ > 150	≥/ > 120	110-119	100-109	90-99	80-89	70-79	60-69	50-59	45-49	40-44	35-39	30-34	25-29
Wire	[mil]	1.5-3.0	1.0-1.3	1.0-1.3	1.0-1.3	0.9-1.3	0.9-1.1	0.8-1.1	0.7-1.1	0.7-0.8	0.7-0.8	0.6-0.7	0.6	0.5	0.45
Diameter	[µm]	38-76	25-33	25-33	25-33	23-33	23-28	20-28	18-28	18-20	18-20	15-18	15	13	11.5
1 st Bond Range	[µm]	[mil]	Corresponding Capillary Family and Page Number												
19-20	0.75-0.80														
21-24	0.83-0.94														
25-27	0.98-1.06														
27-29	1.06-1.14														
30-32	1.18-1.26														
34-37	1.34-1.46														
37-39	1.46-1.54														
39-45	1.54-1.77														
46-49	1.80-1.93														
50-56	1.97-2.20														
56-66	2.20-2.60														
66-76	2.60-3.00														
76-86	3.00-3.40														
86-94	3.40-3.70														
94-101	3.70-3.98														
102-114	4.02-4.50														
114-122	4.50-4.80														
122-147	4.80-5.80														
147-160	5.80-6.30														
160-196	6.30-7.72														

Notes:

- The above matrix is based on the most common wire bonding specifications as known throughout the assembly industry
- For abbreviations and measuring units definitions, please refer to page no. 2.

How to Select a Suitable Capillary Family

- step 1 → Select the requested Bond Pad Pitch (B.P.P) range
- step 2 → Select the Wire Diameter range
- step 3 → Select the desired 1st Bond range
- step 4 → Search in the matrix for the corresponding family type and page number
- step 5 → Proceed to the corresponding page number

Fine Pitch

Ultra Fine Pitch

Matrix Legend

Customized design, contact your local K&S representative

Example:

How to select a suitable capillary family:

- B.P.P - 80 µm
 - Wire Diameter - 23 µm
 - 1st Bond Diameter - 2.2 mil
- Selection results:**
 Capillary family - FC for 80 µm B.P.P
 Page number - 38

B.P.P	[µm]	≥/ > 150	≥/ > 120	110-119	100-109	90-99	80-89	70-79	60-69	50-59	45-49	40-44	35-39	30-34	25-29
Wire	[mil]	1.5-3.0	1.0-1.3	1.0-1.3	1.0-1.3	0.9-1.3	0.9-1.1	0.8-1.1	0.7-1.1	0.7-0.8	0.7-0.8	0.6-0.7	0.6	0.5	0.45
Diameter	[µm]	38-76	25-33	25-33	25-33	23-33	23-28	20-28	18-28	18-20	18-20	15-18	15	13	11.5
1 st Bond Range	[µm]	[mil]	Corresponding Capillary Family and Page Number												
19-20	0.75-0.80														
21-24	0.83-0.94														
25-27	0.98-1.06														
27-29	1.06-1.14														
30-32	1.18-1.26														
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37-39	1.46-1.54														
39-45	1.54-1.77														
46-49	1.80-1.93														
50-56	1.97-2.20														
56-66	2.20-2.60														
66-76	2.60-3.00														
76-86	3.00-3.40														
86-94	3.40-3.70														
94-101	3.70-3.98														
102-114	4.02-4.50														
114-122	4.50-4.80														
122-147	4.80-5.80														
147-160	5.80-6.30														
160-196	6.30-7.72														

How to Select a Suitable Capillary Model

The catalog enables you to search for the capillary Part Number (P/N) best suited to your application requirements. Please, follow these steps to find the P/N you seek.

- step 1** → Go to the section reflecting the Bond Pad Pitch of your application
- step 2** → Select your required Wire Diameter range
- step 3** → Choose the appropriate 1st Bond Diameter range
- step 4** → Select the largest Tip Diameter available for your combination
- step 5** → The generic P/N corresponding to your combination is listed at the most right column
- step 6** → Refer to the respective family features table to obtain final part number for your selection
- step 7** → Use the P/N structure (in the bottom of the page) to complete and validate your choice

Example:

This example shows, step by step, the selection process of a catalog capillary model and P/N suitable for:

B.P.P - 80 μ m
 Wire Diameter - 23 μ m
 1st Bond Diameter - 2.05 mil

→ **step 1**

FC 80 μ m		414FC Fine Pitch Capillary Model for 80 μ m Pad Pitch							
Capillary Dimensions									
Wire Diameter	Average 1st bond Diameter	Capillaries Tip Group	T - Tip Diameter	H - Hole Diameter	CD - Chamfer Diameter	FA - Face Angle	OR - Outer Radius	BTNK Height	Generic Part Number
0.9 mil 23 μ m	1.8-2.1 mil 46-53 μ m	S	3.9 mil 99 μ m	1.2 mil 30 μ m	1.6 mil 41 μ m	8°	0.8 mil 20 μ m	10.0 mil 254 μ m	414FC-S109-R□□
0.9 mil 23 μ m	2.0-2.3 mil 51-58 μ m		3.9 mil 99 μ m	1.2 mil 30 μ m	1.8 mil 46 μ m	11°	0.5 mil 13 μ m	10.0 mil 254 μ m	414FC-S209-R□□
1.1 mil 28 μ m	2.1-2.4 mil 53-61 μ m		3.9 mil 99 μ m	1.4 mil 36 μ m	1.9 mil 48 μ m	8°	0.8 mil 20 μ m	10.0 mil 254 μ m	414FC-S311-R□□

→ **step 2** (Wire Diameter) → **step 3** (Average 1st bond Diameter) → **step 4** (T - Tip Diameter) → **step 5** (Generic Part Number)

Selection results:
 Capillary family - FC for 80 μ m B.P. P
 Capillary generic P/N - 414FC-S109-R□□