
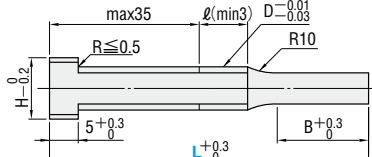



# KEY FLAT SHANK SHOULDER PUNCHES

—RW COATING · DLC COATING—

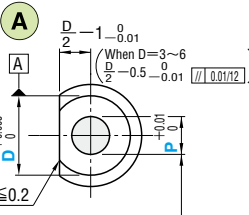
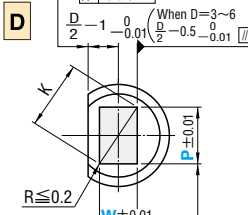
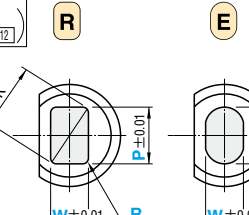
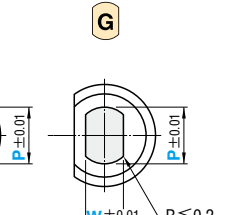

PRODUCTS DATA

P.1605~1609

Type	Shank diameter D tolerance	M H	Catalog No.		Tip shape	B Tip length	The tip shape can be selected from Tip shape A~G in the figure below.
			RW coating surface 3100HV	DLC coating surface 3000HV			
—RW coating— 	D+0.005 0	Equivalent to SKH51 61~64HRC	GRW-SH	GN-SH —Foundation WPC®— GNW-SH	A D R E G	S L X	
—DLC coating— 			Powdered high-speed steel 64~67HRC	GRW-PH	GN-PH —Foundation WPC®— GNW-PH	A D R E G	

tip edges of a RW coating or DLC foundation WPC® are very slightly rounded.  
The tip end is ground before the coating is applied.

Tip shape	Tip shape	Tip shape	Tip shape	Tip shape
A	D	R	E	G
 <p>When D=3~6 W/2 -0.5 -0.01 D -1 -0.01 A +0.005 D 0 R ≤ 0.2 φ 0.01</p>	 <p>When D=3~6 W/2 -0.5 -0.01 D -1 -0.01 A 0.01/12 k</p>	 <p>W ± 0.01 R</p>	 <p>W ± 0.01 R</p>	 <p>W ± 0.01 R ≤ 0.2</p>
<ul style="list-style-type: none"> <li>P ≥ W</li> <li>R=0 can be selected. (However, RW coating + foundation WPC® cannot be used.)</li> <li>K = √(P² + W²)</li> </ul>	<ul style="list-style-type: none"> <li>P ≥ W</li> <li>0.15 ≤ R &lt; W/2</li> <li>K = √(P - 2R)² + (W - 2R)² + 2R</li> </ul>	<ul style="list-style-type: none"> <li>P &gt; W</li> </ul>	<ul style="list-style-type: none"> <li>P &gt; W</li> </ul>	<ul style="list-style-type: none"> <li>P &gt; W</li> </ul>

Type	Tip shape	B Tip length	D	L					0.01mm increments				B	H							
				3	4	5	6	7	8	9	10	A min. P			D R	E G	F R				
—RW coating— GRW-SH GRW-PH	S L X	8	3	40	50	60	70	80	90	100	1.00	1.80	3.97	2.80	1.00	0.15 ≤ R < W/2 (R only)	5 7 8 9 11 13 16 19 23 28				
			4	40	50	60	70	80	90	100	1.00	1.80	3.97	2.80	2.00						
			5	40	50	60	70	80	90	100	2.00	3.80	4.97	3.80	1.20						
			6	40	50	60	70	80	90	100	2.00	4.80	5.97	4.80	1.50						
			8	(40)	50	60	70	80	90	100	3.00	5.80	7.97	5.80	2.00						
			10	(40)	50	60	70	80	90	100	3.00	7.80	9.97	7.80	2.50						
			13	(40)	50	60	70	80	90	100	6.00	10.80	12.97	10.80	3.00						
			16	(40)	50	60	70	80	90	100	10.00	13.80	15.97	13.80	4.00						
			20	(40)	50	60	70	80	90	100	13.00	17.80	19.97	17.80	5.00						
			25	(40)	50	60	70	80	90	100	18.00	22.80	24.97	22.80	6.00						
			—DLC coating— GN-SH GN-PH	A D R E G	13	3	50	60	70	80	90	100	1.00	1.80	3.97			2.80	2.00	0.15 ≤ R < W/2 (R only)	7 8 9 11 13 16 19 23 28
						4	50	60	70	80	90	100	1.00	1.80	3.97			2.80	2.00		
						5	50	60	70	80	90	100	2.00	3.80	4.97			3.80	2.00		
						6	50	60	70	80	90	100	2.00	4.80	5.97			4.80	2.00		
						8	50	60	70	80	90	100	3.00	5.80	7.97			5.80	2.50		
						10	50	60	70	80	90	100	3.00	7.80	9.97			7.80	2.50		
						13	50	60	70	80	90	100	6.00	10.80	12.97			10.80	3.00		
						16	60	70	80	90	100	10.00	13.80	15.97	13.80			4.00			
						20	60	70	80	90	100	13.00	17.80	19.97	17.80			5.00			
						25	60	70	80	90	100	18.00	22.80	24.97	22.80			6.00			
—DLC coating— foundation WPC® GNW-SH GNW-PH	A D R E G	19				3	50	60	70	80	90	100	1.20	1.80	3.97	2.80	2.00	0.15 ≤ R < W/2 (R only)	5 7 8 9 11 13 16 19 23 28		
						4	50	60	70	80	90	100	1.20	1.80	3.97	2.80	2.00				
						5	60	70	80	90	100	2.00	3.80	4.97	3.80	3.50					
						6	60	70	80	90	100	2.00	4.80	5.97	4.80	3.50					
						8	60	70	80	90	100	3.00	5.80	7.97	5.80	5.00					
						10	60	70	80	90	100	3.00	7.80	9.97	7.80	5.00					
						13	60	70	80	90	100	6.00	10.80	12.97	10.80	5.00					
						16	70	80	90	100	10.00	13.80	15.97	13.80	5.00						
						20	70	80	90	100	13.00	17.80	19.97	17.80	5.00						
						25	70	80	90	100	18.00	22.80	24.97	22.80	6.00						

① L(40) → B=6 If full length is (40), tip length is 8 mm in all cases.  
 ② D R E G : P · K > D - 0.05 → ℓ = 0 If P · K > D - 0.05 for a shaped punch, D 0.01 0.03 (press-in lead) is not included.  
 ③ D = 3~6 → a = 0.5 When D dimension is 3~6, dimension a is 0.5mm.  
 D = 8~25 → a = 1 When D dimension is 8~25, dimension a is 1mm.

Order  Catalog No. —  L —  P —  W —  R (R only)

RW—PHD 13 — 80 — P10.50 — W7.34

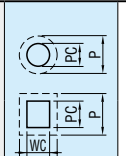
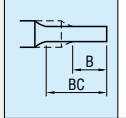
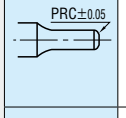
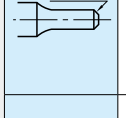
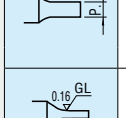

Days to Ship **Quotation**

**Effects of RW coating**  
 Effective for press processing of ultra-high-tensile material and thick plate high-tensile material thanks to its superior wear resistance, peeling resistance and heat resistance. See the product data for details. **P.1607**

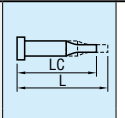
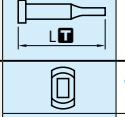
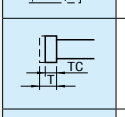
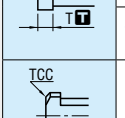
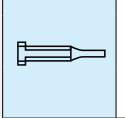
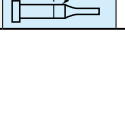




**Effects of DLC coating**  
 Effective for preventing adhesion during aluminum or copper blanking thanks to its low affinity for nonferrous metal. See the product data for details. **P.1609**

Alterations  Catalog No. —  L(LC-LCT-LMT) —  P(PC) —  W(WC) —  R — (BC·HC·TC...etc.)

GRW-SHAS 10 — LC72.0 — PC2.80 — BC8

Alterations	Code	A	D R E G	1Code																						
	PC	Tip dimension change $PC \geq \frac{Pmin.}{2} \geq 1.00$ 0.01 mm increments (If combined with PKC, 0.001 mm increments can be selected.)	Tip dimension change $PC \geq \frac{P-Wmin.}{2} \geq 1.00$ 0.01 mm increments ⊗ Cannot be used for tip X.	<b>Quotation</b>																						
	WC	<table border="1"> <tr><td>P(PC)</td><td>Bmax</td></tr> <tr><td>1.000~1.999</td><td>20</td></tr> <tr><td>2.000~3.999</td><td>35</td></tr> <tr><td>4.000~4.999</td><td>45</td></tr> <tr><td>5.000~5.999</td><td>50</td></tr> <tr><td>6.000~</td><td>60</td></tr> </table>	P(PC)		Bmax	1.000~1.999	20	2.000~3.999	35	4.000~4.999	45	5.000~5.999	50	6.000~	60	<table border="1"> <tr><td>P(PC)-W(WC)</td><td>Bmax</td></tr> <tr><td>1.00~1.49</td><td>8</td></tr> <tr><td>1.50~1.99</td><td>13</td></tr> <tr><td>2.00~3.49</td><td>19</td></tr> <tr><td>3.50~4.99</td><td>25</td></tr> <tr><td>5.00~</td><td>30</td></tr> </table>	P(PC)-W(WC)	Bmax	1.00~1.49	8	1.50~1.99	13	2.00~3.49	19	3.50~4.99	25
P(PC)	Bmax																									
1.000~1.999	20																									
2.000~3.999	35																									
4.000~4.999	45																									
5.000~5.999	50																									
6.000~	60																									
P(PC)-W(WC)	Bmax																									
1.00~1.49	8																									
1.50~1.99	13																									
2.00~3.49	19																									
3.50~4.99	25																									
5.00~	30																									
	BC	Tip length change $2 \leq BC \leq Bmax$ 0.1 mm increments ⊗ Full length must be at least 25mm longer than tip length BC.	Tip length change $2 \leq BC \leq Bmax$ 0.1 mm increments ⊗ Full length must be at least 30mm longer than tip length BC.	<b>Quotation</b>																						
	PRC	Rounding of tip side edge $0.3 \leq PRC \leq 1$ 0.1 mm increments ⊗ $PRC \leq \frac{(P-d)-0.5}{2}$ ⊗ Cannot be combined with PCC.		<b>Quotation</b>																						
	PCC	Chamfering to tip side edge $0.3 \leq PCC \leq 1$ 0.1 mm increments ⊗ $PCC \leq \frac{(P-0.2)}{2}$ ⊗ Cannot be combined with PRC.		<b>Quotation</b>																						
	PKC	Tip tolerance change $P + 0.01 \rightarrow +0.005$ 0 0 ⊗ (P dimension can be selected in 0.001 mm increments.)	Tip tolerance change $P \cdot W \pm 0.01 \rightarrow +0.01$ 0 0	<b>Quotation</b>																						
	SC	Lapping of tip ⊗ P dimension tolerance and increment are the same. ⊗ Cannot be combined with RW coating and DLC foundation WPC®. ⊗ R=0 cannot be selected for the tip shape + corners.		<b>Quotation</b>																						

P Price **Quotation**

Alterations	Code	A	D R E G	1Code
	LC	Full length change $25 + B(BC) \leq LC < L$ 0.1 mm increments ⊗ If difference between full length and tip length is 25mm or less, tip length is adjusted to (full length - 25mm). (If combined with LKC-LKZ, 0.01 mm increments can be selected.)	Full length change $30 + B(BC) \leq LC < L$ 0.1 mm increments ⊗ If difference between full length and tip length is 30mm or less, tip length is adjusted to (full length - 30mm).	<b>Quotation</b>
	LCT	Changes to head thickness tolerance and full length are processed using a single code. The allowable range of change, increment, ordering process, and notes ① are the same as for LC.	Full length tolerance change $LC \rightarrow \pm 0.1$ + Full length change + $L + 0.3 \rightarrow +0.1$ 0 0	
	LMT	Changes to head thickness tolerance and full length are processed using a single code. The allowable range of change, increment, ordering process, and notes ① are the same as for LC.	Full length tolerance change $LC \rightarrow \pm 0.1$ + Full length change + $L + 0.3 \rightarrow +0.1$ 0 0	
	LKC	Full length tolerance change	$L + 0.3 \rightarrow +0.05$ 0 0	<b>Quotation</b>
	WKC	Ⓜ Addition of double key flats in parallel		<b>Quotation</b>
	HC	Head diameter change $D \leq HC < H$ 0.1 mm increments		<b>Quotation</b>
	TC	Head thickness change $2 \leq TC < 5$ 0.1 mm increments (If combined with TKC-TKM-LCT-LMT, 0.01 mm increments can be selected.) ⊗ Full length L is shortened by (5-TC). If combined with LC-LCT-LMT, full length remains as specified.		<b>Quotation</b>
	TKC	Head thickness tolerance change	$\pm 0.3 \rightarrow +0.02$ 0 0	<b>Quotation</b>
	TKM	Head thickness tolerance change	$\pm 0.3 \rightarrow -0.02$ 0 0	<b>Quotation</b>
	TCC	Chamfering of head This improves the strength of the punch head. <b>SKF P.1611</b> 0.1 mm increments $0.5 \leq TCC \leq (H-D)/2$ ⊗ If $H \leq 5$ , then TCC is 0.5.		<b>Quotation</b>
	SKF	Single key flat on shank, configurable size $SKF - 0.01$ Ⓜ $P \geq 2 (SKF - 0.1)$   $D \leq 2 (SKF - 0.1)$ 0.1mm increments   0.1mm increments D4~6 D/2 - 0.5 ≤ SKF ≤ D/2 - 0.1 D8~25 D/2 - 1.0 ≤ SKF ≤ D/2 - 0.1 ⊗ Cannot be combined with WKC.		<b>Quotation</b>
	NDC	No press-in lead $\ell \geq 3 \rightarrow \ell = 0$		<b>Quotation</b>