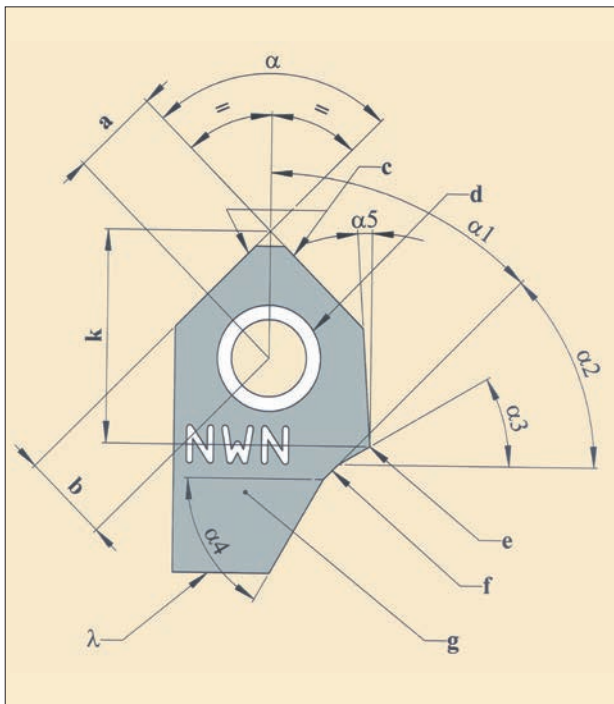


This catalog allows you to select the perfect tip for your needs.

Simply click on the NEWEN reference or tip drawing and you will automatically be taken to the item page where you can choose to add it to your newendirect.com cart



NEWEN® carbide form tips are cut one at a time guaranteeing maximum precision.

$a, b, c, \alpha$  \_\_\_\_\_  
 precision positioning of the tip seat angle and proper tightening of the tip result directly from parameters  $a$ ,  $b$ ,  $c$  and  $\alpha$ . Both the positioning of the seat angle of the tip and proper tightening of the tip **are critical** to ensure adequate rigidity of the tool and to eliminate chattering. The tolerances on NEWEN® High-Performance Tips are the strictest of any tips available on the market.

$d$  \_\_\_\_\_  
 the seat angle of the screw hole is designed to ensure maximum pressure on the tips in their housing. NEWEN® T8 torx screws guarantee optimum tightening of the tips.

$e$  \_\_\_\_\_  
 this small radius, made while the tips are being machined, reinforces the tips significantly at this delicate place and allow for longer use of the tips.

$f$  \_\_\_\_\_  
 the machining of the profile is done with a special concave shape which, in turn, allows for the machining of more valve seats between sharpenings. This concave shape also allows the customers who wish to sharpen their tips to do so more times since the above mentioned shape let them remove less material during any given sharpening operation.

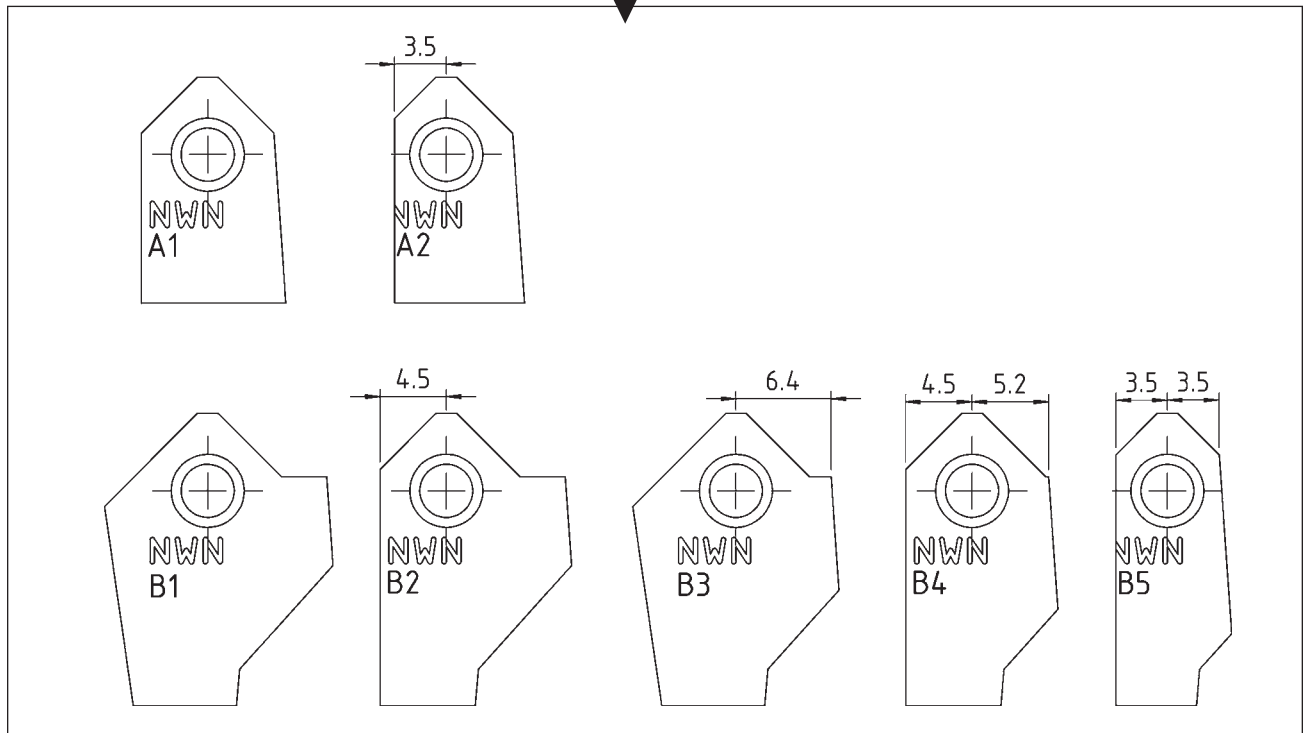
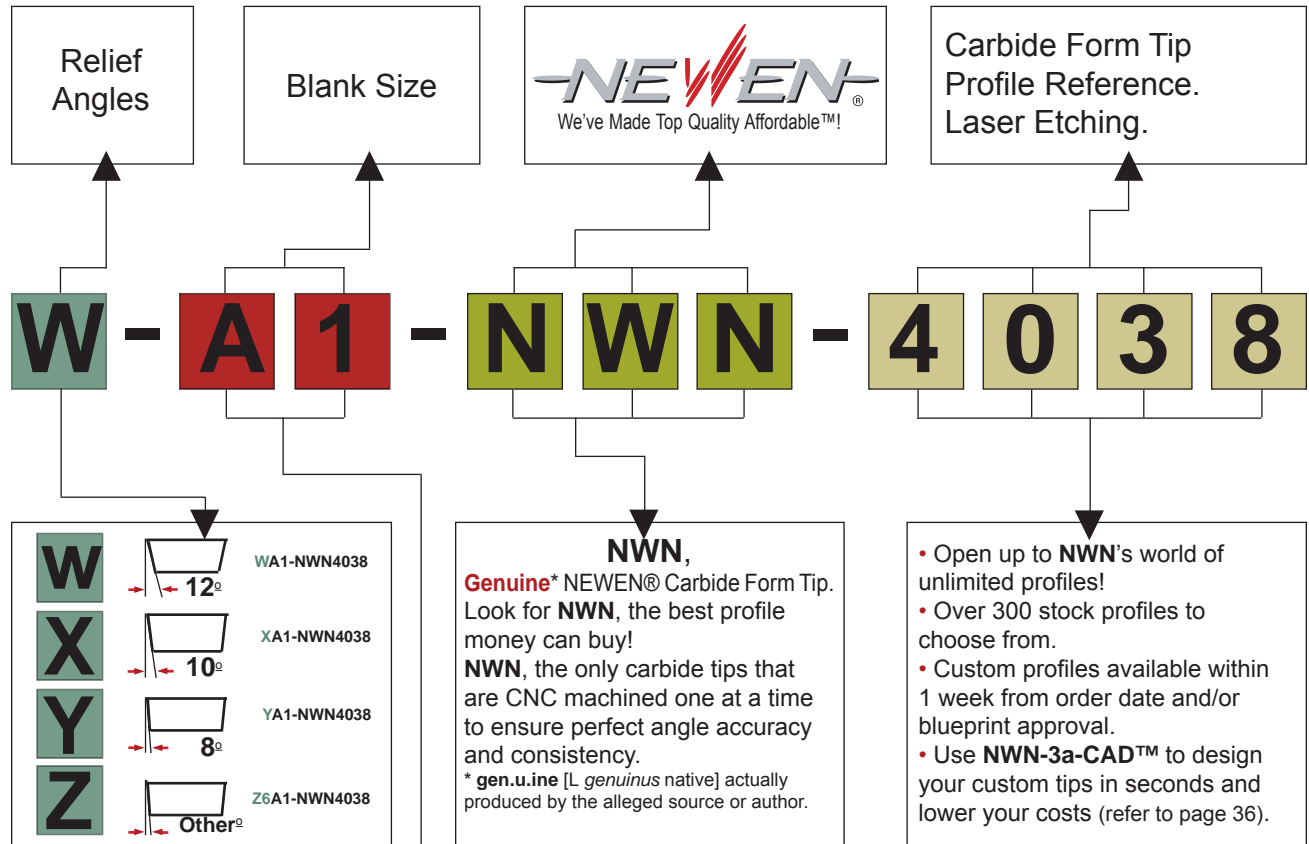
$g$  \_\_\_\_\_  
 the carbide used to manufacture NEWEN® tips is of the finest quality and is specially treated to make the cutting edges of the tips as strong as possible.

$\lambda$  \_\_\_\_\_  
 the base of the tip has a relief angle in order to avoid heeling.

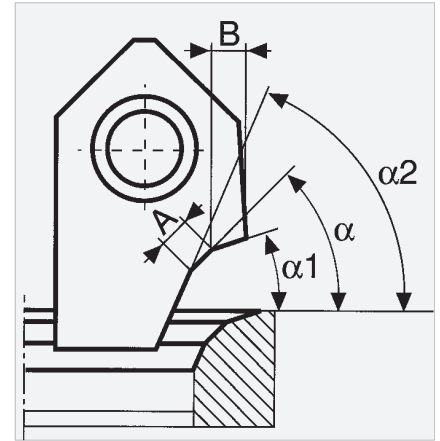
$k$  \_\_\_\_\_  
 this dimension has very close tolerance in order to make the tips completely interchangeable without adjustment of the tool holder and for added precision and considerable time saving.

$\alpha 1, \alpha 2, \alpha 3, \alpha 4, \alpha 5$  \_\_\_\_\_  
 all the angles are executed with a precision unequaled to date and are controlled automatically while each tip is being machined. NEWEN® tips are machined one at a time to ensure perfect angle accuracy and consistency.

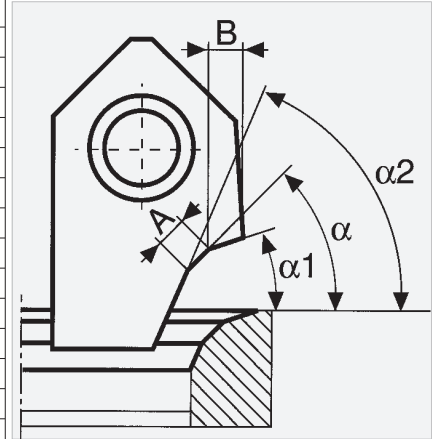
## NEWEN® CARBIDE FORM TIP REFERENCING SYSTEM

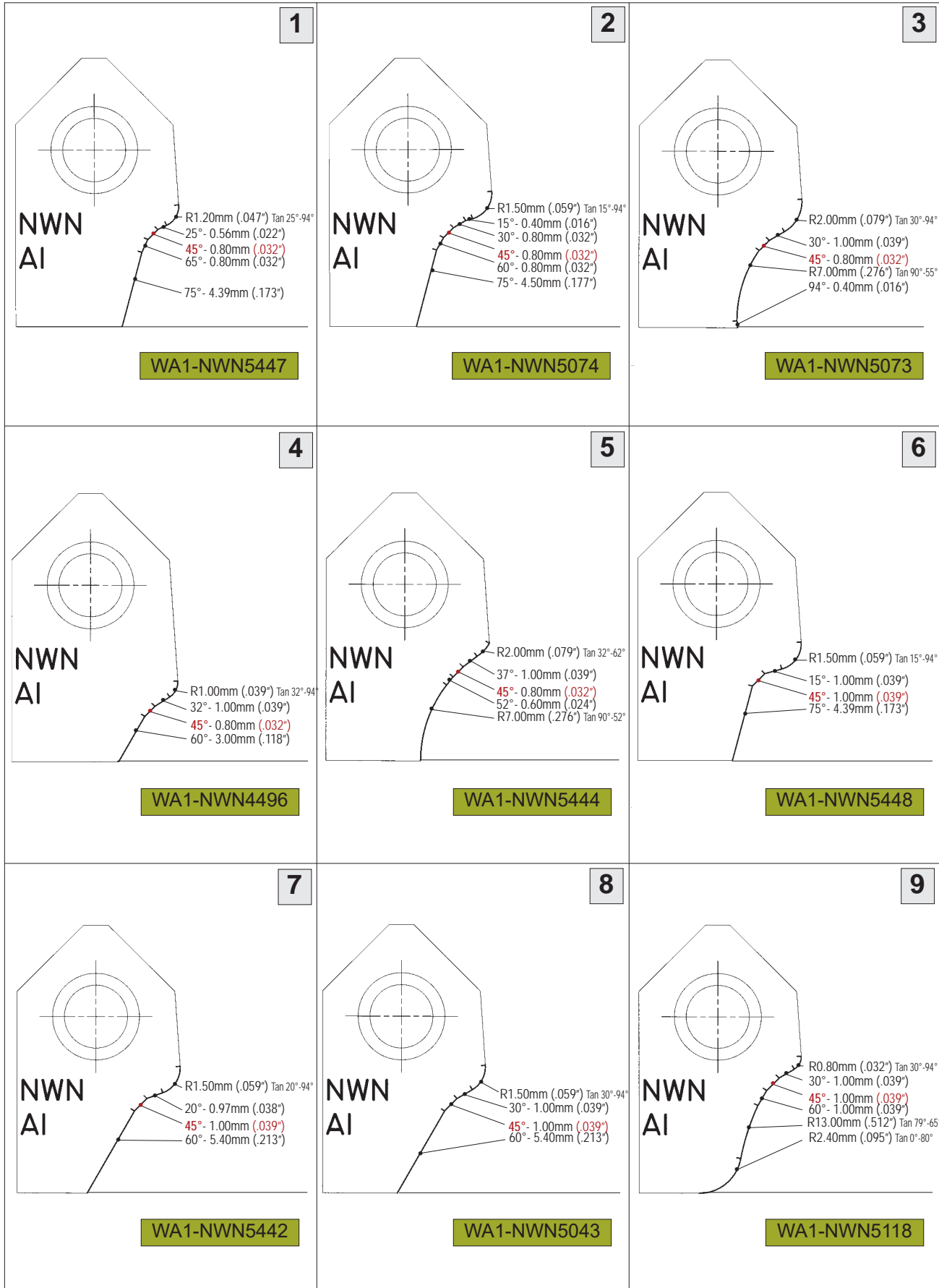


NEWEN REFERENCE	A = Seat Width		B = Top Width		$\alpha$	$\alpha 1$	$\alpha 2$
	mm	in	mm	in	Seat Angle	Top Angle	Throat Angle
In 1 WA1-NWN4183	0.8	.031	1.0	.039	45	32	60
In 2 WA1-NWN4445	1.0	.039	1.0	.039	45	15	60
In 3 WA1-NWN1101	1.0	.039	1.0	.039	45	25	60
In 4 WA1-NWN4028	1.0	.039	1.2	.047	45	30	60
In 5 WA1-NWN4984	1.0	.039	1.2	.047	45	38	52
In 6 WA1-NWN4983	1.0	.039	1.3	.051	45	30	75
In 7 WA1-NWN1102	1.0	.039	1.4	.055	45	25	60
In 8 WA1-NWN4588	1.0	.039	1.6	.063	45	25	52
In 9 WA1-NWN4029	1.0	.039	1.6	.063	45	35	52
In 10 WA1-NWN4030	1.0	.039	1.6	.063	45	35	55
In 11 WA1-NWN4031	1.0	.039	1.6	.063	45	35	60
In 12 WA1-NWN4980	1.0	.039	1.6	.063	45	38	65
In 13 WA1-NWN4017	1.0	.039	1.8	.071	45	15	60
In 14 WA1-NWN4981	1.0	.039	1.8	.071	45	20	75
In 15 WA1-NWN1103	1.0	.039	1.8	.071	45	25	60
In 16 WA1-NWN4090	1.0	.039	1.8	.071	45	30	60
In 17 WA1-NWN4303	1.0	.039	2.0	.079	45	30	60
In 18 WA1-NWN4087	1.0	.039	2.0	.079	45	37	52
In 19 WA1-NWN4903	1.0	.039	2.54	.100	45	37	58
In 20 WA1-NWN4904	1.0	.039	2.54	.100	45	37	64
In 21 WA1-NWN1105	1.0	.039	3.0	.118	45	25	60
In 22 WA1-NWN4451	1.0	.039	3.0	.118	45	30	60
In 23 WA1-NWN4182	1.2	.047	1.2	.047	45	30	60
In 24 WA1-NWN1122	1.2	.047	1.4	.055	45	25	60
In 25 WA1-NWN4016	1.2	.047	1.8	.071	45	15	60
In 26 WA1-NWN4032	1.3	.051	1.0	.039	45	30	60
In 27 WA1-NWN4221	1.3	.051	1.2	.047	45	30	60
In 28 WA1-NWN4480	1.3	.051	1.6	.063	45	30	60
In 29 WA1-NWN4091	1.3	.051	1.8	.071	45	30	60
In 30 WA1-NWN4034	1.3	.051	2.0	.079	45	30	52
In 31 WA1-NWN4035	1.3	.051	2.0	.079	45	30	60
In 32 WA1-NWN4975	1.3	.051	2.0	.079	45	35R1	56
In 33 WA1-NWN4033	1.3	.051	2.0	.079	45	37	52
In 34 WA1-NWN1141	1.4	.055	1.0	.039	45	25	60
In 35 WA1-NWN4036	1.4	.055	1.0	.039	45	30	60
In 36 WA1-NWN1142	1.4	.055	1.4	.055	45	25	60
In 37 WA1-NWN4093	1.4	.055	2.0	.079	45	30	60
In 38 WA1-NWN4109	1.5	.059	1.0	.039	45	15	60
In 39 WA1-NWN4094	1.5	.059	1.0	.039	45	30	60
In 40 WA1-NWN4982	1.5	.059	1.2	.047	45	38	52
In 41 WA1-NWN4978	1.5	.059	1.3	.051	45	30	75
In 42 WA1-NWN4261	1.5	.059	1.4	.055	45	15	60
In 43 WA1-NWN4993	1.5	.059	1.4	.055	45	20	75
In 44 WA1-NWN4241	1.5	.059	1.4	.055	45	25	52
In 45 WA1-NWN4003	1.5	.059	1.4	.055	45	25	60
In 46 WA1-NWN4216	1.5	.059	1.4	.055	45	30	60
In 47 WA1-NWN4025	1.5	.059	1.8	.071	45	15	60
In 48 WA1-NWN4077	1.5	.059	1.8	.071	45	30	52
In 49 WA1-NWN4038	1.5	.059	1.8	.071	45	30	60
In 50 WA1-NWN4037	1.5	.059	1.8	.071	45	37	52
In 51 WA1-NWN4015	1.5	.059	2.0	.079	45	15	60
In 52 WA1-NWN4177	1.5	.059	2.0	.079	45	30	60
In 53 WA1-NWN4986	1.5	.059	3.0	.118	45	30	60
In 54 WA1-NWN1161	1.6	.063	1.0	.039	45	25	60
In 55 WA1-NWN4039	1.6	.063	1.0	.039	45	30	60
In 56 WA1-NWN4135	1.6	.063	1.2	.047	45	30	52



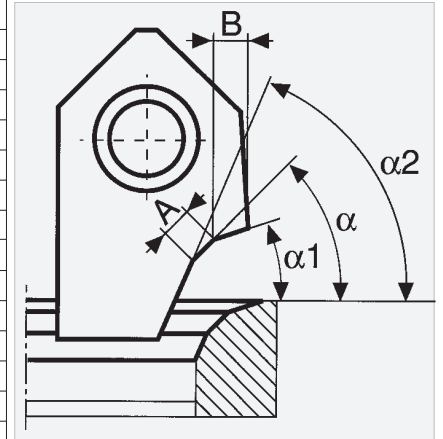
NEWEN REFERENCE	A = Seat Width		B = Top Width		$\alpha$	$\alpha 1$	$\alpha 2$
	mm	in	mm	in	Seat Angle	Top Angle	Throat Angle
In 1 WA1-NWN4136	1.6	.063	1.2	.047	45	30	60
In 2 WA1-NWN4391	1.6	.063	1.4	.055	45	30	60
In 3 WA1-NWN1162	1.6	.063	1.4	.055	45	25	60
In 4 WA1-NWN4481	1.6	.063	1.6	.063	45	15	60
In 5 WA1-NWN4482	1.6	.063	1.6	.063	45	30	52
In 6 WA1-NWN1163	1.6	.063	1.8	.071	45	25	60
In 7 WA1-NWN4361	1.6	.063	1.8	.071	45	30	52
In 8 WA1-NWN4117	1.6	.063	2.0	.079	45	15	60
In 9 WA1-NWN4266	1.6	.063	2.0	.079	45	30	52
In 10 WA1-NWN4040	1.6	.063	2.0	.079	45	30	60
In 11 WA1-NWN4258	1.6	.063	3.0	.055	45	30	60
In 12 WA1-NWN4479	1.7	.067	1.8	.071	45	32	55
In 13 WA1-NWN4007	1.8	.071	1.0	.039	45	30	60
In 14 WA1-NWN4041	1.8	.071	1.6	.063	45	30	60
In 15 WA1-NWN4483	1.8	.071	3.0	.118	45	30	60
In 16 WA1-NWN4145	1.9	.075	0.8	.032	45	30	52
In 17 WA1-NWN4299	1.9	.075	1.2	.047	45	30	52
In 18 WA1-NWN4306	1.9	.075	1.2	.047	45	30	60
In 19 WA1-NWN4169	1.9	.075	1.4	.055	45	30	60
In 20 WA1-NWN4339	1.9	.075	1.6	.063	45	30	60
In 21 WA1-NWN4271	1.9	.075	1.8	.071	45	25	52
In 22 WA1-NWN4146	1.9	.075	1.8	.071	45	30	52
In 23 WA1-NWN4484	1.9	.075	2.0	.079	45	30	52
In 24 WA1-NWN4042	1.9	.075	2.0	.079	45	30	60
In 25 WA1-NWN4012	2.0	.079	1.0	.039	45	15	60
In 26 WA1-NWN1201	2.0	.079	1.0	.039	45	25	60
In 27 WA1-NWN4043	2.0	.079	1.2	.047	45	30	60
In 28 WA1-NWN4987	2.0	.079	1.2	.047	45	38	52
In 29 WA1-NWN4988	2.0	.079	1.2	.047	45	38	65
In 30 WA1-NWN4989	2.0	.079	1.4	.055	45	15	60
In 31 WA1-NWN4990	2.0	.079	1.4	.055	45	20	75
In 32 WA1-NWN1202	2.0	.079	1.4	.055	45	25	60
In 33 WA1-NWN4328	2.0	.079	1.4	.055	45	30	60
In 34 WA1-NWN4006	2.0	.079	1.5	.059	45	30	60
In 35 WA1-NWN4991	2.0	.079	1.6	.063	45	30	60
In 36 WA1-NWN4236	2.0	.079	1.6	.063	45	30	70
In 37 WA1-NWN4485	2.0	.079	1.6	.063	45	30	75
In 38 WA1-NWN4338	2.0	.079	1.78	.070	45	30	55
In 39 WA1-NWN1203	2.0	.079	1.8	.071	45	25	60
In 40 WA1-NWN4097	2.0	.079	2.0	.079	45	30	60
In 41 WA1-NWN4486	2.2	.087	0.6	.024	45	30	60
In 42 WA1-NWN4343	2.2	.087	2.0	.079	45	30	60
In 43 WA1-NWN4021	2.3	.091	1.0	.039	45	15	60
In 44 WA1-NWN4022	2.3	.091	1.8	.071	45	15	60
In 45 WA1-NWN4348	2.3	.091	2.0	.079	45	30	60
In 46 WA1-NWN4992	2.4	.094	1.3	.051	45	30	75
In 47 WA1-NWN1252	2.5	.098	1.4	.055	45	25	60
In 48 WA1-NWN1253	2.5	.098	1.8	.071	45	25	60
In 49 WA1-NWN4487	2.5	.098	2.0	.079	45	30	60
In 50 WA1-NWN1302	3.0	.118	1.4	.055	45	25	60
In 51 WA1-NWN1303	3.0	.118	1.8	.071	45	25	60
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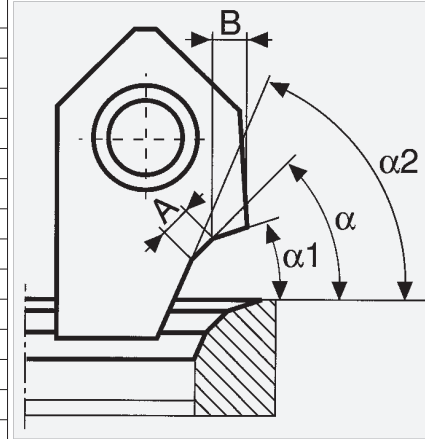


<p style="text-align: right;"><b>10</b></p> <p>NWN AI</p> <p>WA1-NWN5439</p>	<p style="text-align: right;"><b>11</b></p> <p>NWN AI</p> <p>WA1-NWN5120</p>	<p style="text-align: right;"><b>12</b></p> <p>NWN AI</p> <p>WA1-NWN5122</p>
<p style="text-align: right;"><b>13</b></p> <p>NWN AI</p> <p>WA1-NWN4498</p>	<p style="text-align: right;"><b>14</b></p> <p>NWN AI</p> <p>WA1-NWN4497</p>	<p style="text-align: right;"><b>15</b></p> <p>NWN AI</p> <p>WA1-NWN4247</p>
<p style="text-align: right;"><b>16</b></p> <p>NWN AI</p> <p>WA1-NWN5449</p>	<p style="text-align: right;"><b>17</b></p> <p>NWN AI</p> <p>WA1-NWN5436</p>	<p style="text-align: right;"><b>18</b></p> <p>NWN AI</p> <p>WA1-NWN5119</p>

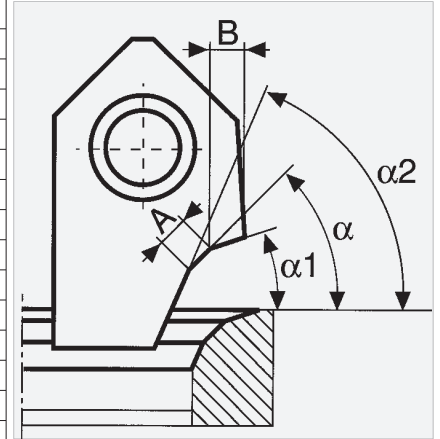
NEWEN REFERENCE	A = Seat Width		B = Top Width		$\alpha$	$\alpha 1$	$\alpha 2$
	mm	in	mm	in	Seat Angle	Top Angle	Throat Angle
In 1 WA1-NWN5185	1.5	.059	1.5	.059	45.5	2	75
In 2							
In 3							
In 4							
In 5 WA1-NWN4603	1.2	.047	1.2	.047	46	30	55
In 6 WA1-NWN4601	1.6	.063	0.8	.031	46	35	55
In 7 WA1-NWN4604	1.9	.075	1.2	.047	46	30	52
In 8 WA1-NWN4602	2.2	.087	0.8	.031	46	30	55
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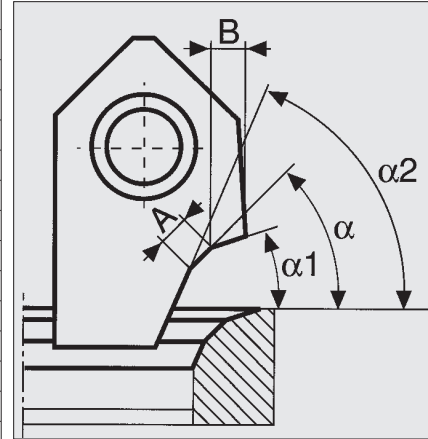
NEWEN REFERENCE	A = Seat Width		B = Top Width		$\alpha$	$\alpha 1$	$\alpha 2$
	mm	in	mm	in	Seat Angle	Top Angle	Throat Angle
In 1 Z6A1-NWN5183	2.0	.079	1.8	.071	20	00	60
In 2 Z6A1-NWN2133	2.0	.079	2.0	.079	20	00	75
In 3 Z6A1-NWN2327	2.0	.079	2.0	.079	20	05	45
In 4 Z6A1-NWN2266	2.3	.091	2.0	.079	20	10	75
In 5 Z6A1-NWN5022	2.5	.098	1.8	.071	20	00	60
In 6 Z6A1-NWN2200	2.5	.098	2.0	.079	20	05	75
In 7 Z6A1-NWN4599	2.5	.098	3.0	.118	20.25	15	60
In 8 Z6A1-NWN5116	2.66	.105	2.8	.110	20.15	15	60
In 9 Z6B1-NWN60182	3.0	.118	1.5	.059	20	15	60
In 10 Z6A1-NWN5205	3.2	.126	N/A	N/A	20	N/A	60
In 11 Z6A1-NWN2402	3.2	.126	2.0	.079	20	05	45
In 12 Z6A1-NWN2091	3.8	.150	1.8	.071	20	11	45
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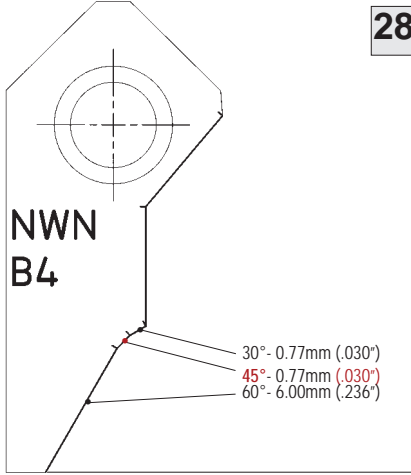
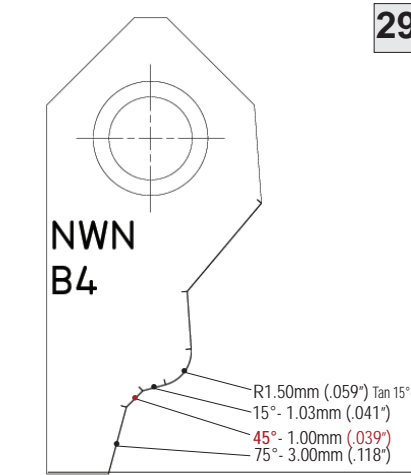
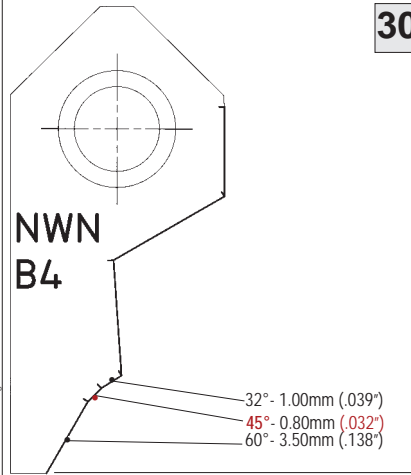
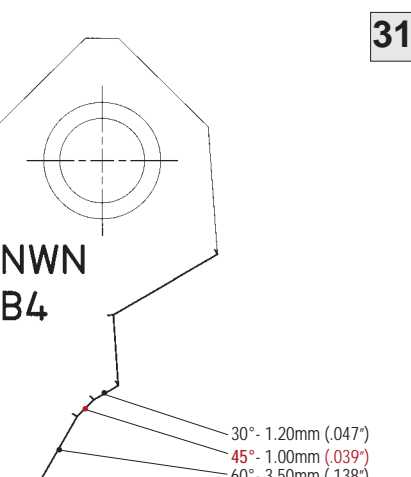
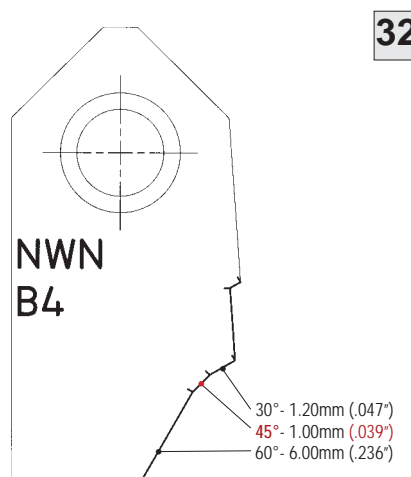
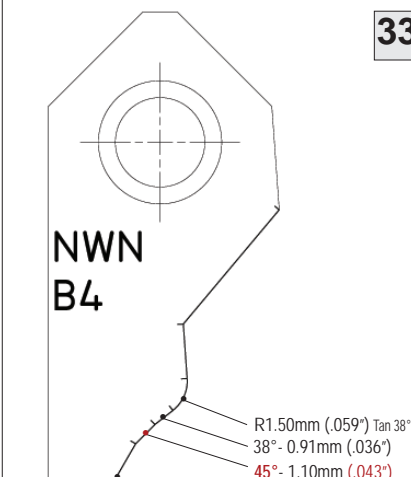
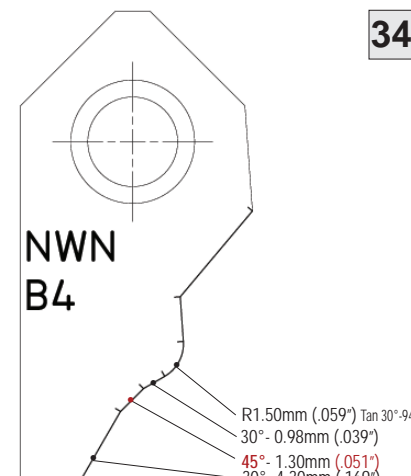
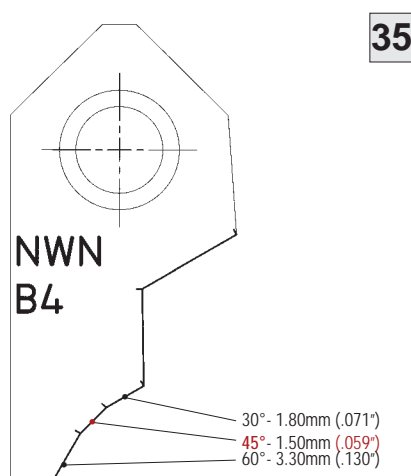
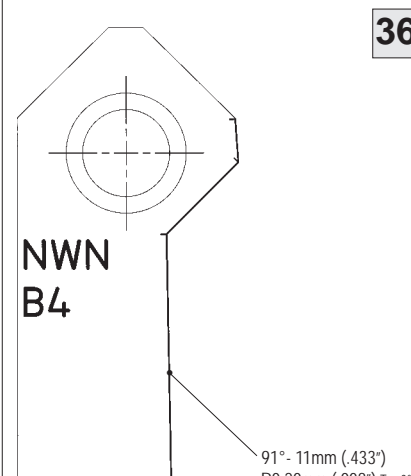
NEWEN REFERENCE	A = Seat Width		B = Top Width		$\alpha$ Seat Angle	$\alpha 1$ Top Angle	$\alpha 2$ Throat Angle	
	mm	in	mm	in				
In 1	WA1-NWN2102	1.0	.039	1.4	.055	30	15	60
In 2	WA1-NWN4999	1.0	.039	1.4	.055	30	23	52
In 3	WA1-NWN3062	1.0	.039	1.6	.063	30	20	52
In 4	WA1-NWN2103	1.0	.039	1.8	.071	30	15	60
In 5	WA1-NWN2000	1.0	.039	2.5	.098	30	15	60
In 6	WA1-NWN3245	1.2	.047	1.0	.039	30	15	60
In 7	WA1-NWN3023	1.3	.051	1.0	.039	30	15	45
In 8	WA1-NWN3065	1.3	.051	2.0	.079	30	15	45
In 9	WA1-NWN3061	1.3	.051	2.0	.079	30	15	60
In 10	WA1-NWN3068	1.5	.059	1.4	.055	30	15	45
In 11	WA1-NWN2152	1.5	.059	1.4	.055	30	15	60
In 12	WA1-NWN4998	1.5	.059	1.4	.055	30	23	52
In 13	WA1-NWN3064	1.5	.059	1.8	.071	30	15	45
In 14	WA1-NWN3016	1.5	.059	1.8	.071	30	15	52
In 15	WA1-NWN2153	1.5	.059	1.8	.071	30	15	60
In 16	WA1-NWN3024	1.5	.059	2.0	.079	30	0	60
In 17	WA1-NWN3200	1.5	.059	2.0	.079	30	15	60
In 18	WA1-NWN3025	1.5	.059	3.0	.118	30	20	60
In 19	WA1-NWN3078	1.6	.063	1.2	.047	30	15	45
In 20	WA1-NWN3194	1.6	.063	1.8	.071	30	15	45
In 21	WA1-NWN3195	1.6	.063	1.8	.071	30	15	52
In 22	WA1-NWN3026	1.6	.063	2.0	.079	30	15	45
In 23	WA1-NWN3067	1.6	.063	2.0	.079	30	15	60
In 24	WA1-NWN4997	1.6	.063	2.2	.087	30	15	60
In 25	WA1-NWN3027	1.8	.071	1.4	.055	30	15	60
In 26	WA1-NWN3146	1.8	.071	2.0	.079	30	15	45
In 27	WA1-NWN3072	1.9	.075	1.0	.039	30	15	45
In 28	WA1-NWN3010	1.9	.075	1.8	.071	30	15	60
In 29	WA1-NWN3029	1.9	.075	2.0	.079	30	15	60
In 30	WA1-NWN3196	2.0	.079	1.2	.047	30	15	45
In 31	WA1-NWN2202	2.0	.079	1.4	.055	30	15	60
In 32	WA1-NWN4995	2.0	.079	1.4	.055	30	23	52
In 33	WA1-NWN2203	2.0	.079	1.8	.071	30	15	60
In 34	WA1-NWN4996	2.0	.079	1.9	.075	30	15	60
In 35	WA1-NWN3084	2.0	.079	2.0	.079	30	15	45
In 36	WA1-NWN3198	2.2	.087	2.0	.079	30	15	60
In 37	WA1-NWN3226	2.4	.095	1.4	.055	30	15	70
In 38	WA1-NWN2252	2.5	.098	1.4	.055	30	15	60
In 39	WA1-NWN2253	2.5	.098	1.8	.071	30	15	60
In 40	WA1-NWN3032	2.5	.098	2.0	.079	30	15	60
In 41	WA1-NWN2254	2.5	.098	2.2	.087	30	15	60
In 42	WA1-NWN3031	2.8	.110	2.0	.079	30	0	60
In 43	WA1-NWN2302	3.0	.118	1.4	.055	30	15	60
In 44	WA1-NWN3199	3.8	.150	3.0	.118	30	20	45
In 45								
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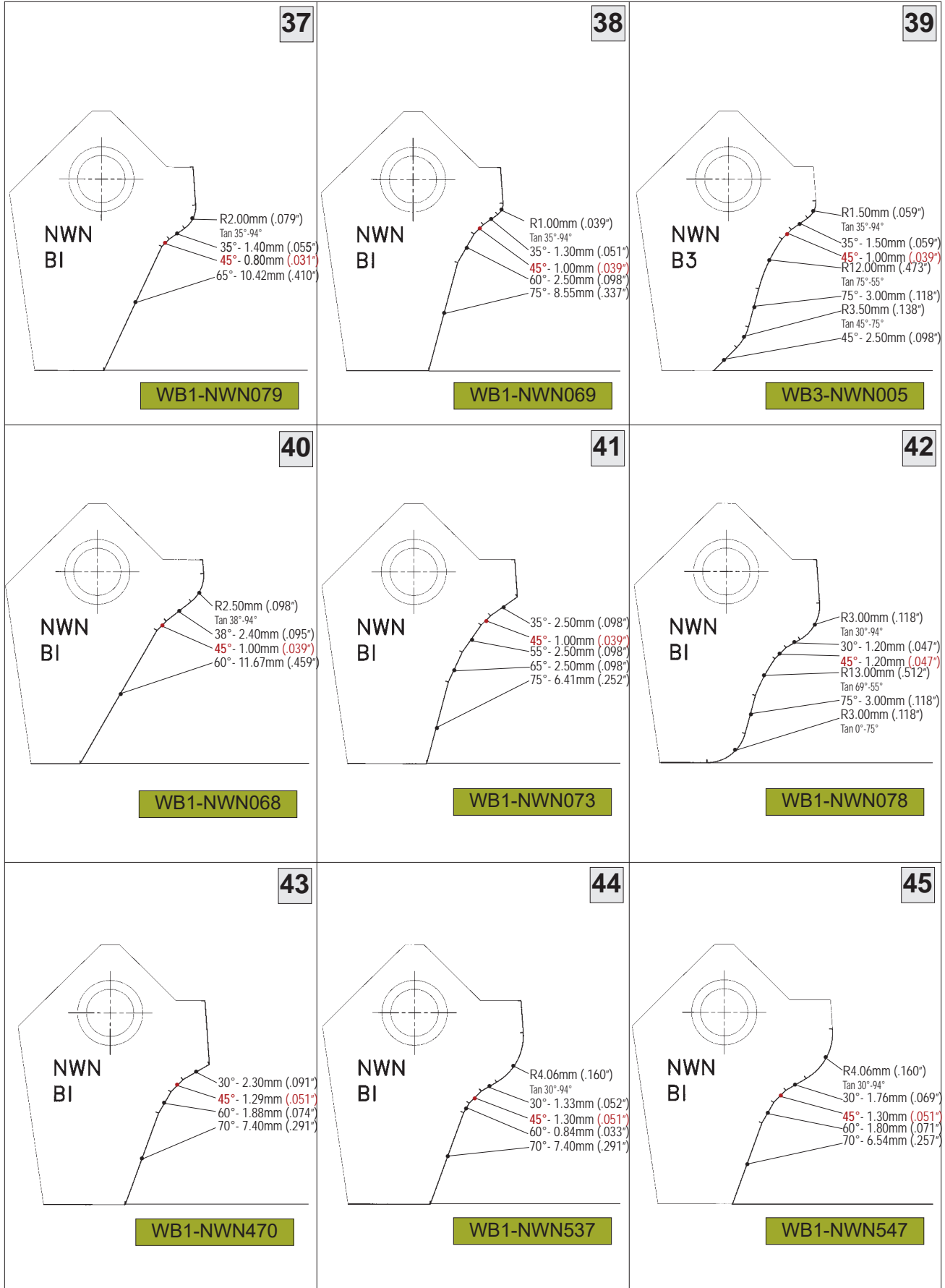


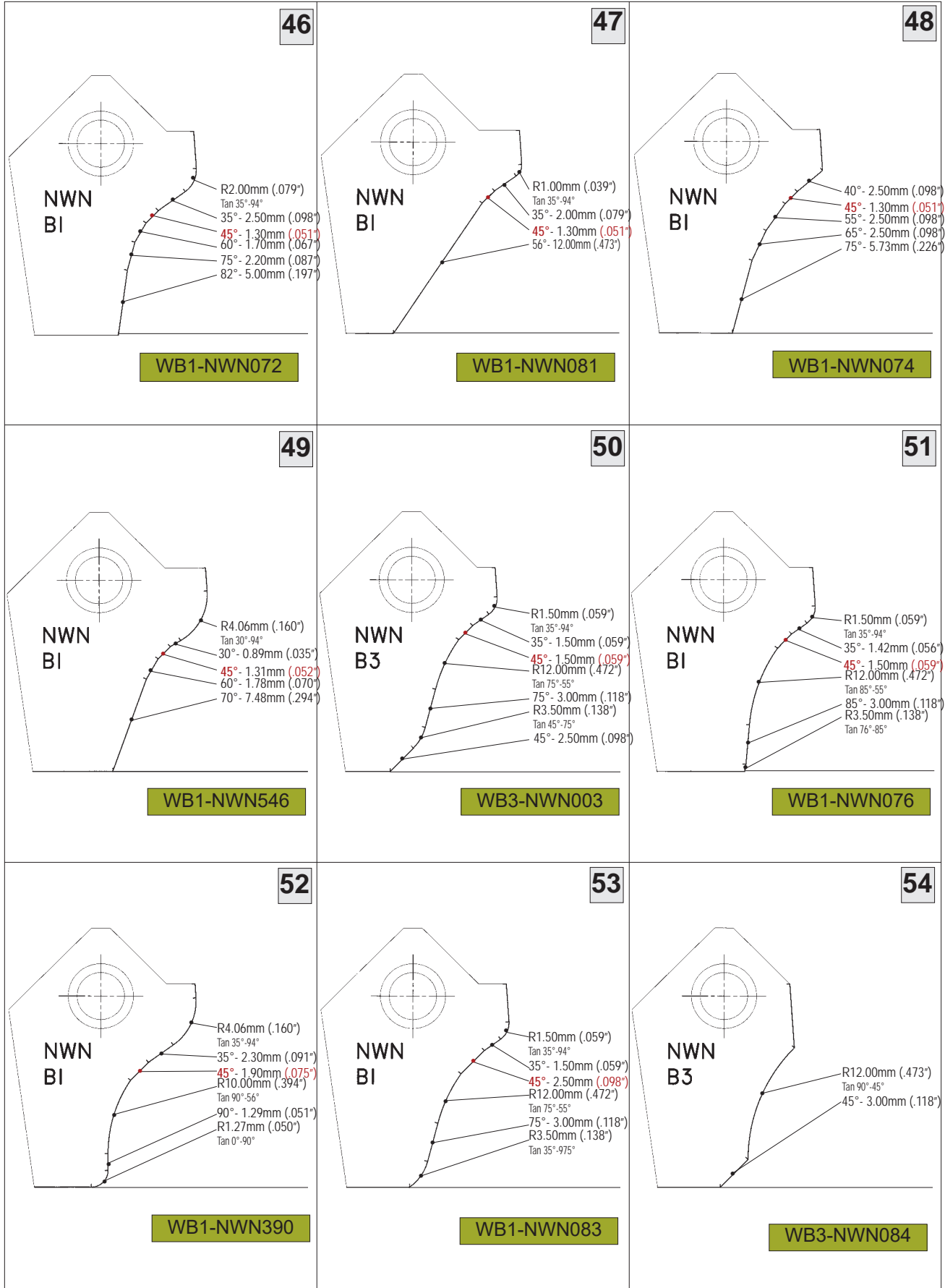
	NEWEN REFERENCE	A = Seat Width		B = Top Width		$\alpha$	$\alpha 1$	$\alpha 2$
		mm	in	mm	in	Seat Angle	Top Angle	Throat Angle
In 1	WA1-NWN5457			2.5	.098	30.5		75
In 2	WA1-NWN5364	1.5	.059	1.5	.059	30.5	2	75
In 3								
In 4								
In 5	WA1-NWN5362	1.2	.047	1.4	.055	31	15	60
In 6	WA1-NWN5280	1.5	.059	1.4	.055	31	11	60
In 7	WA1-NWN5158	1.5	.059	1.5	.059	31	2	75
In 8	WA1-NWN5363	2.1	.083	2.0	.079	31	2	60
In 9								
In 10								
In 11								
In 12	WA1-NWN4994	1.5	.059	1.4	.055	37.5	25	75
In 13	WA1-NWN5414	1.6	.063	1.4	.055	37.5	30	60
In 14	WA1-NWN5415	1.6	.063	2.0	.079	37.5	30	60
In 15	WA1-NWN5006	1.8	.071	1.2	.047	37.5	20	52
In 16	WA1-NWN5416	1.9	.075	1.4	.055	37.5	30	60
In 17	WA1-NWN5417	2.0	.079	2.0	.079	37.5	30	60
In 18	WA1-NWN5251			2.0	.079	37.5		75
In 19	WA1-NWN5418	2.1	.083	0.6	.024	37.5	18	52
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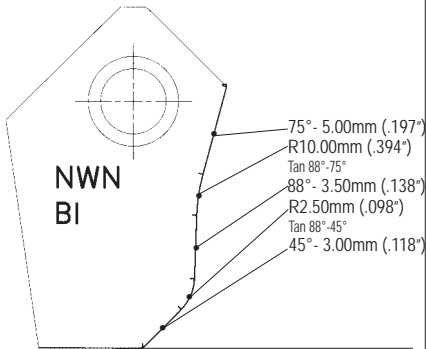
<p style="text-align: right;"><b>19</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 32°-94°</li> <li>32° - 0.70mm (.028")</li> <li>45° - 0.80mm (.032")</li> <li>60° - 3.00mm (.118")</li> </ul> <p style="text-align: center;"><b>WA2-NWN4496</b></p>	<p style="text-align: right;"><b>20</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 15°-94°</li> <li>15° - 1.03mm (.041")</li> <li>45° - 1.00mm (.039")</li> <li>75° - 3.00mm (.118")</li> </ul> <p style="text-align: center;"><b>WA2-NWN5448</b></p>	<p style="text-align: right;"><b>21</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 20°-94°</li> <li>20° - 0.97mm (.038")</li> <li>45° - 1.00mm (.039")</li> <li>60° - 4.10mm (.162")</li> </ul> <p style="text-align: center;"><b>WA2-NWN5442</b></p>
<p style="text-align: right;"><b>22</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 32°-94°</li> <li>32° - 1.05mm (.041")</li> <li>45° - 1.20mm (.047")</li> <li>60° - 2.40mm (.095")</li> </ul> <p style="text-align: center;"><b>WA2-NWN4497</b></p>	<p style="text-align: right;"><b>23</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 30°-94°</li> <li>30° - 0.98mm (.038")</li> <li>45° - 1.00mm (.039")</li> <li>75° - 3.39mm (.133")</li> </ul> <p style="text-align: center;"><b>WA2-NWN5439</b></p>	<p style="text-align: right;"><b>24</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>30° - 1.20mm (.047")</li> <li>45° - 1.00mm (.039")</li> <li>60° - 4.50mm (.177")</li> </ul> <p style="text-align: center;"><b>WA2-NWN4028</b></p>
<p style="text-align: right;"><b>25</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 38°-94°</li> <li>38° - 0.91mm (.036")</li> <li>45° - 1.10mm (.043")</li> <li>60° - 2.80mm (.110")</li> </ul> <p style="text-align: center;"><b>WA2-NWN4498</b></p>	<p style="text-align: right;"><b>26</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 30°-94°</li> <li>30° - 0.98mm (.038")</li> <li>45° - 1.30mm (.051")</li> <li>60° - 2.40mm (.095")</li> </ul> <p style="text-align: center;"><b>WA2-NWN5449</b></p>	<p style="text-align: right;"><b>27</b></p> <p><b>NWN A2</b></p> <ul style="list-style-type: none"> <li>R1.50mm (.059") Tan 30°-94°</li> <li>30° - 0.98mm (.038")</li> <li>45° - 1.50mm (.059")</li> <li>60° - 3.40mm (.134")</li> </ul> <p style="text-align: center;"><b>WA2-NWN5436</b></p>

<p><b>28</b></p>  <p>NWN B4</p> <p>30° - 0.77mm (.030°) 45° - 0.77mm (.030°) 60° - 6.00mm (.236°)</p> <p><b>WB4-NWN268</b></p>	<p><b>29</b></p>  <p>NWN B4</p> <p>R1.50mm (.059°) Tan 15°-94° 15° - 1.03mm (.041°) 45° - 1.00mm (.039°) 75° - 3.00mm (.118°)</p> <p><b>WB4-NWN60252</b></p>	<p><b>30</b></p>  <p>NWN B4</p> <p>32° - 1.00mm (.039°) 45° - 0.80mm (.032°) 60° - 3.50mm (.138°)</p> <p><b>WB4-NWN215</b></p>
<p><b>31</b></p>  <p>NWN B4</p> <p>30° - 1.20mm (.047°) 45° - 1.00mm (.039°) 60° - 3.50mm (.138°)</p> <p><b>WB4-NWN4028</b></p>	<p><b>32</b></p>  <p>NWN B4</p> <p>30° - 1.20mm (.047°) 45° - 1.00mm (.039°) 60° - 6.00mm (.236°)</p> <p><b>WB4-NWN536</b></p>	<p><b>33</b></p>  <p>NWN B4</p> <p>R1.50mm (.059°) Tan 38°-94° 38° - 0.91mm (.036°) 45° - 1.10mm (.043°) 60° - 2.80mm (.110°)</p> <p><b>WB4-NWN60253</b></p>
<p><b>34</b></p>  <p>NWN B4</p> <p>R1.50mm (.059°) Tan 30°-94° 30° - 0.98mm (.039°) 45° - 1.30mm (.051°) 30° - 4.30mm (.169°)</p> <p><b>WB4-NWN60251</b></p>	<p><b>35</b></p>  <p>NWN B4</p> <p>30° - 1.80mm (.071°) 45° - 1.50mm (.059°) 60° - 3.30mm (.130°)</p> <p><b>WB4-NWN4038</b></p>	<p><b>36</b></p>  <p>NWN B4</p> <p>91° - 11mm (.433°) R0.20mm (.008°) Tan 0°-91°</p> <p><b>WB4-NWN90-20</b></p>



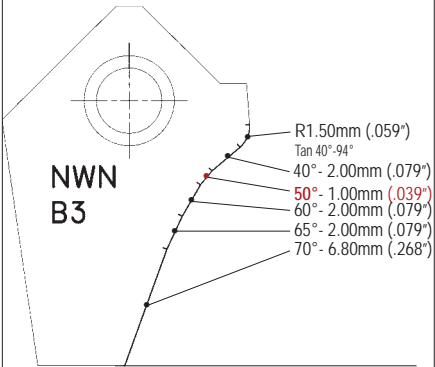


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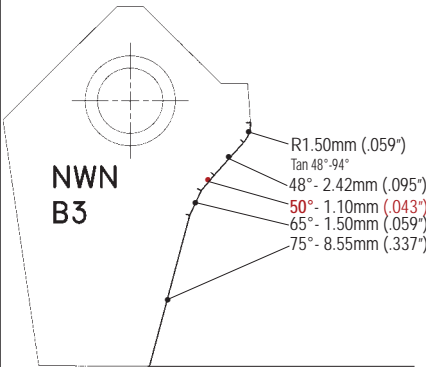
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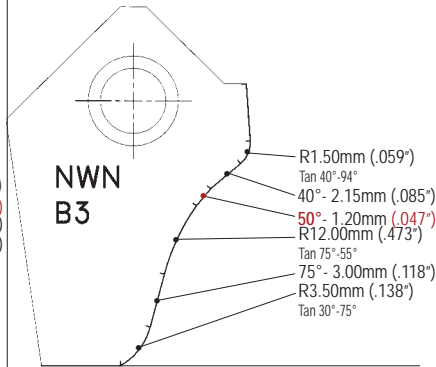
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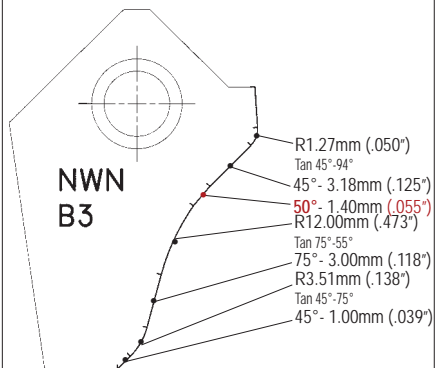
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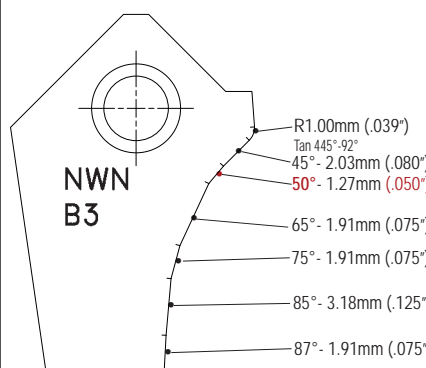
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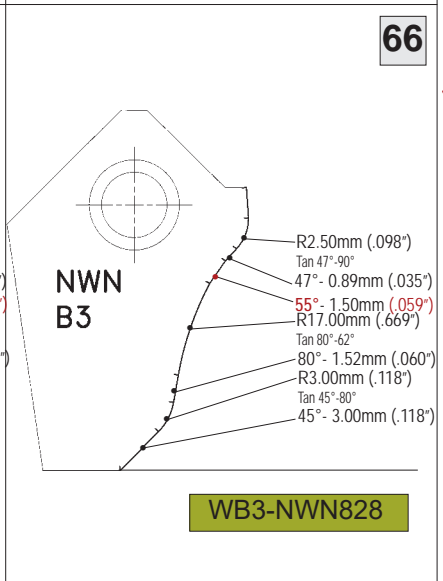
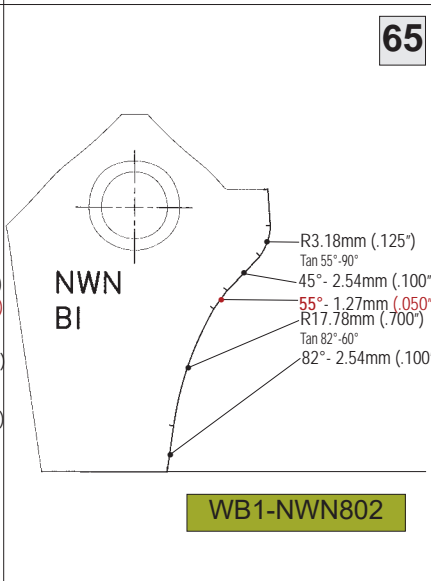
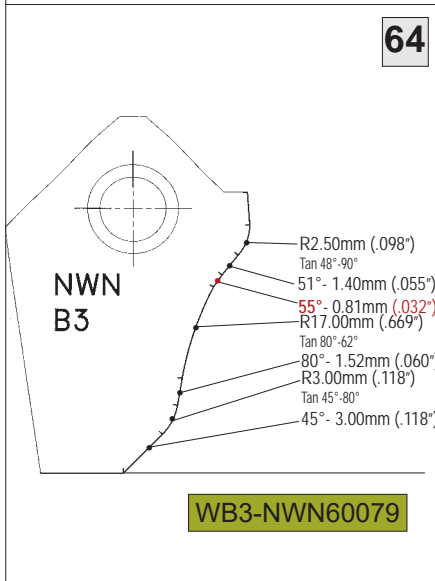
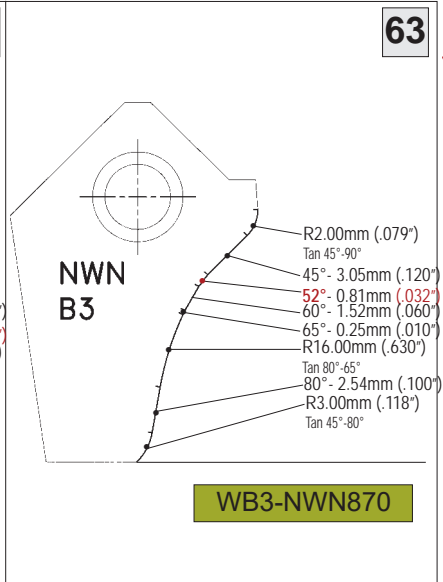
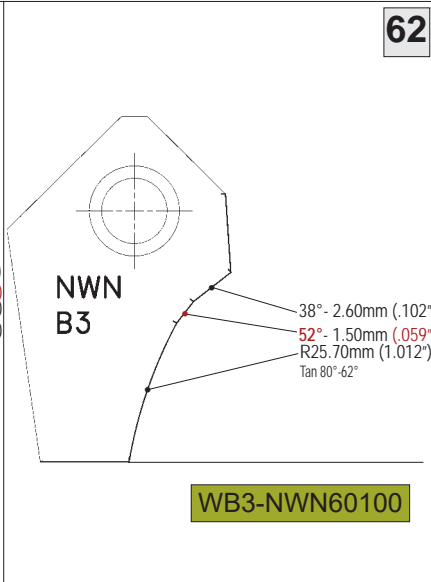
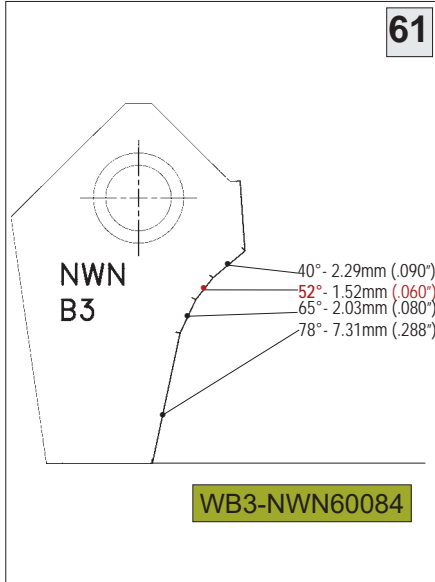
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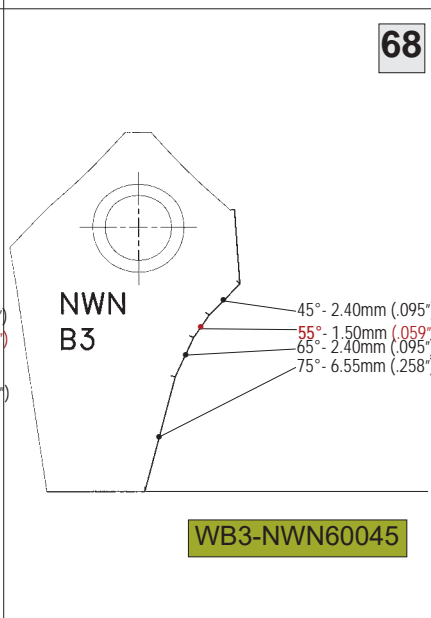
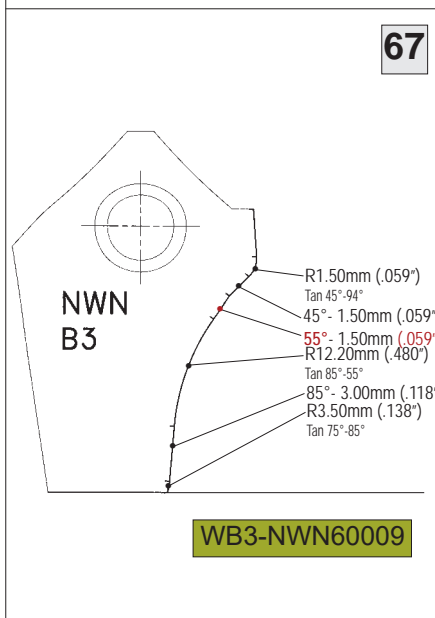
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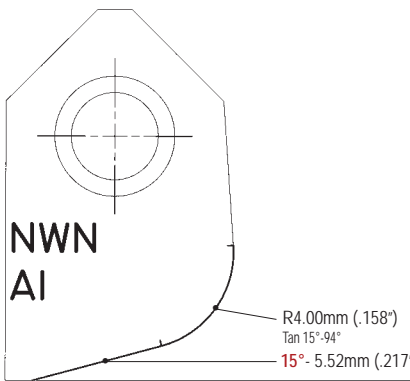
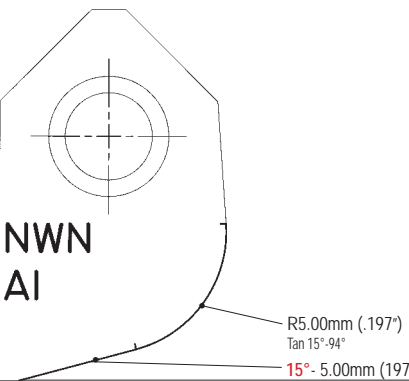
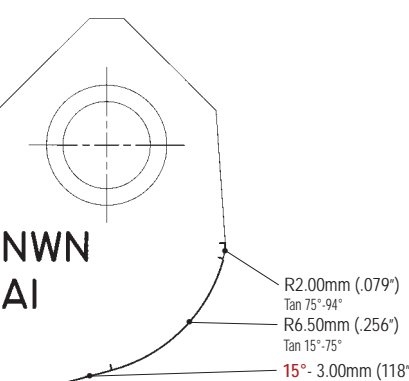
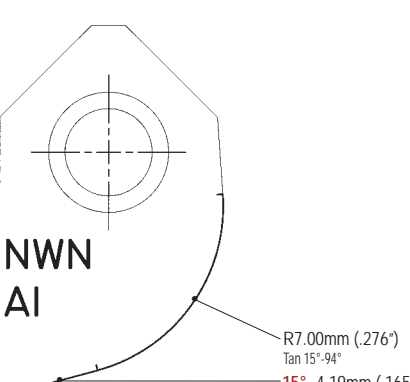
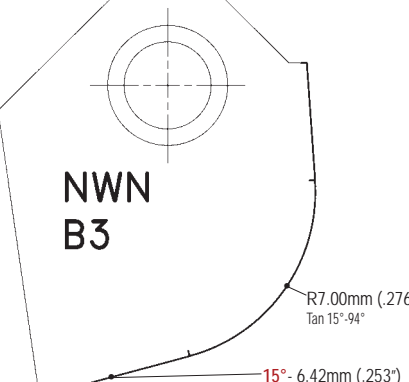
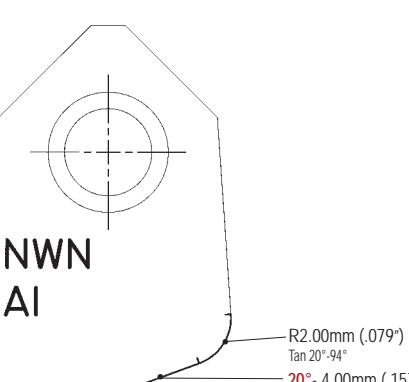
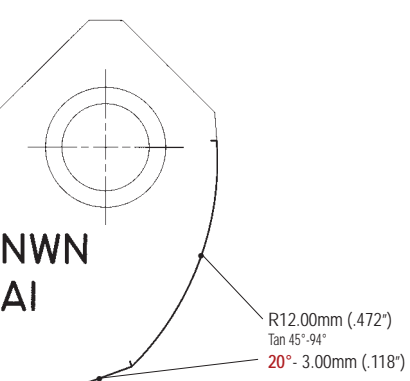
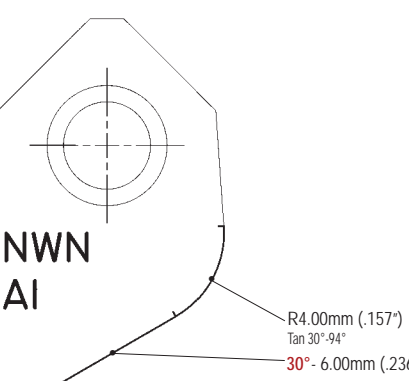
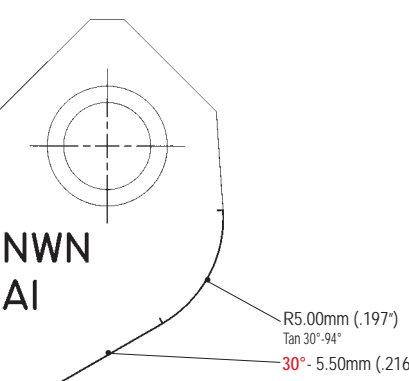
50°

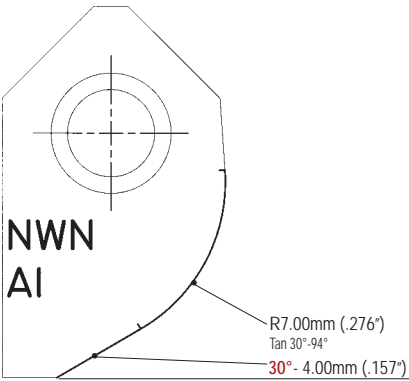
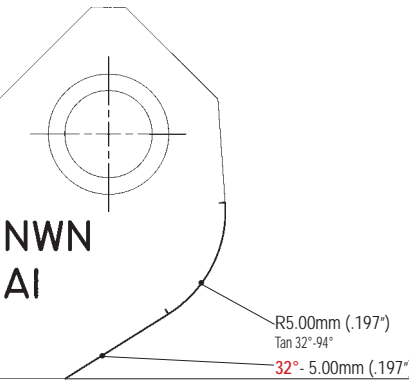
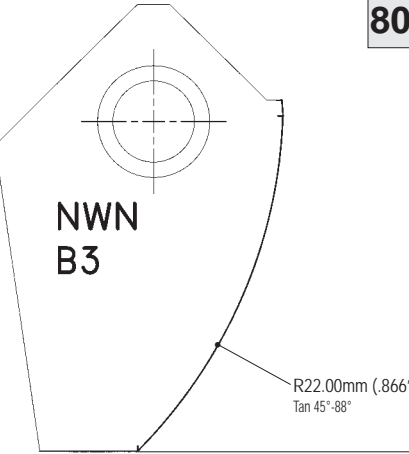



### 52°



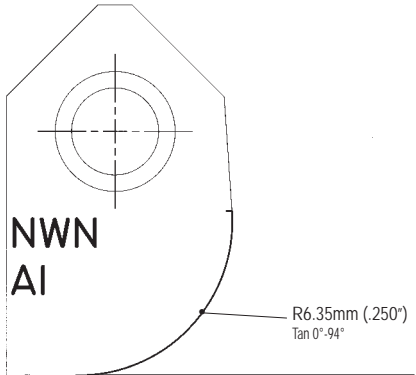
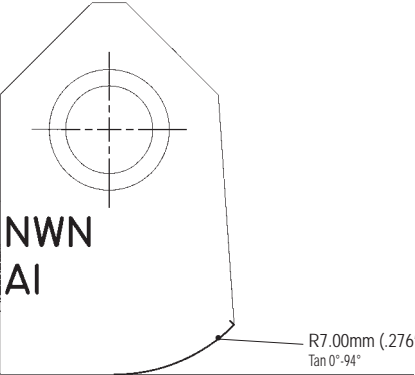
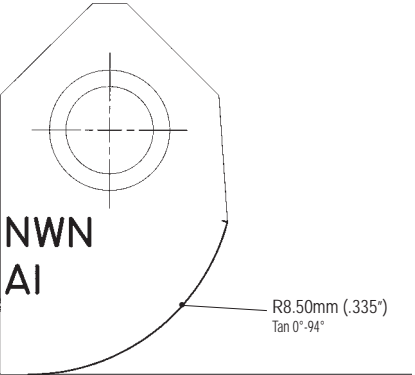
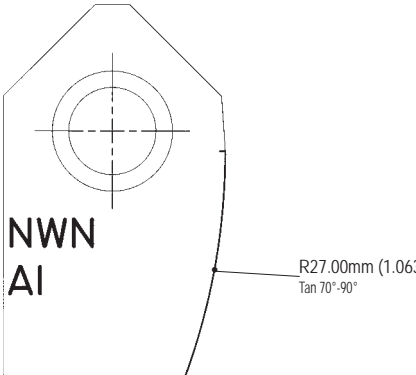
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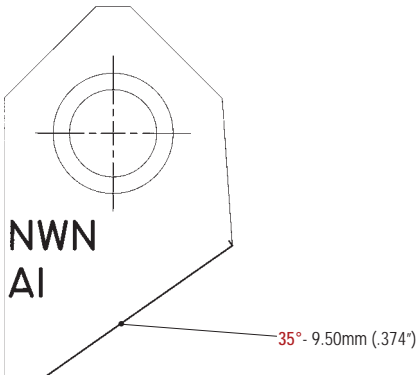
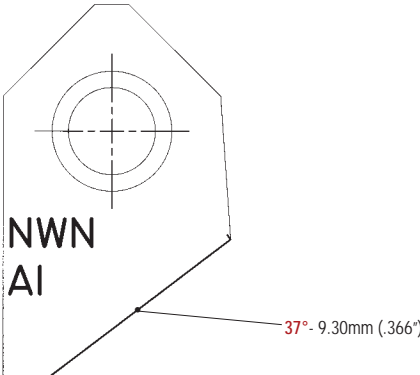
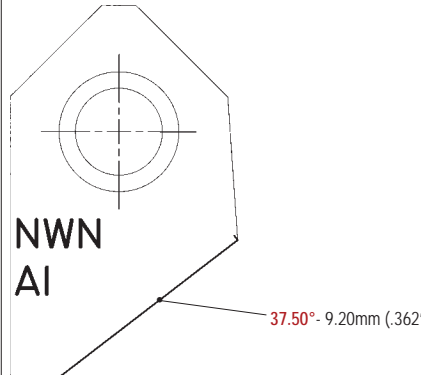
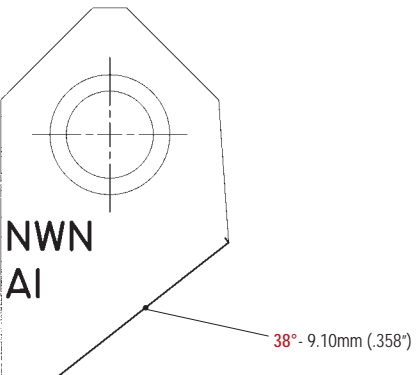
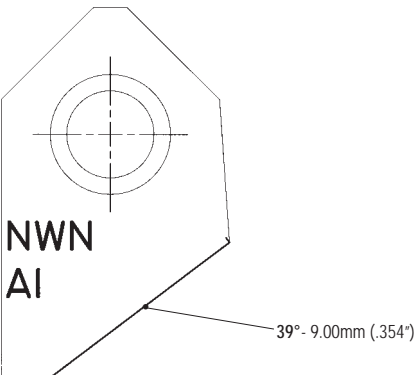
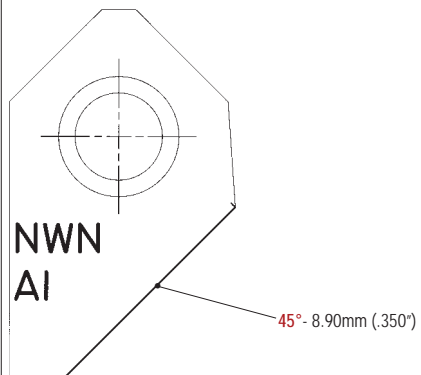
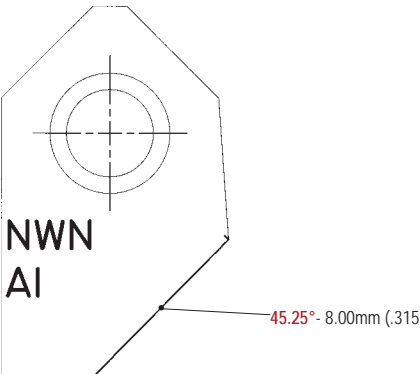
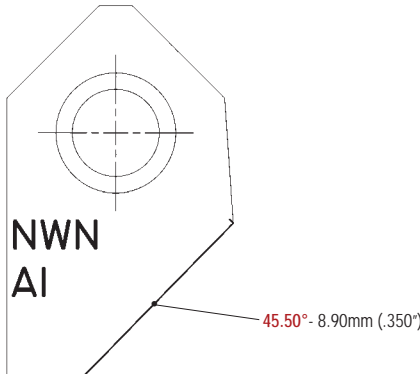
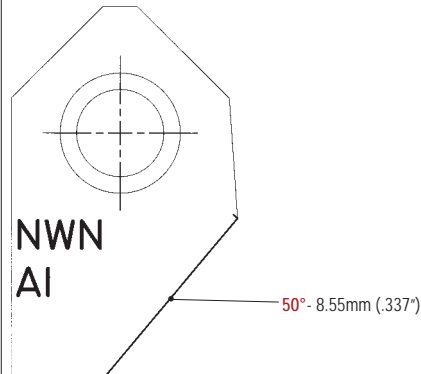
<p style="text-align: right;"><b>69</b></p>  <p>NWN AI</p> <p>R4.00mm (.158") Tan 15°-94° 15°- 5.52mm (.217")</p> <p style="text-align: center;"><b>WA1-NWN5121</b></p>	<p style="text-align: right;"><b>70</b></p>  <p>NWN AI</p> <p>R5.00mm (.197") Tan 15°-94° 15°- 5.00mm (.197")</p> <p style="text-align: center;"><b>WA1-NWN5428</b></p>	<p style="text-align: right;"><b>71</b></p>  <p>NWN AI</p> <p>R2.00mm (.079") Tan 75°-94° R6.50mm (.256") Tan 15°-75° 15°- 3.00mm (.118")</p> <p style="text-align: center;"><b>WA1-NWN2002</b></p>
<p style="text-align: right;"><b>72</b></p>  <p>NWN AI</p> <p>R7.00mm (.276") Tan 15°-94° 15°- 4.19mm (.165")</p> <p style="text-align: center;"><b>WA1-NWN5429</b></p>	<p style="text-align: right;"><b>73</b></p>  <p>NWN B3</p> <p>R7.00mm (.276") Tan 15°-94° 15°- 6.42mm (.253")</p> <p style="text-align: center;"><b>WB1-NWN077</b></p>	<p style="text-align: right;"><b>74</b></p>  <p>NWN AI</p> <p>R2.00mm (.079") Tan 20°-94° 20°- 4.00mm (.157")</p> <p style="text-align: center;"><b>WA1-NWN2003</b></p>
<p style="text-align: right;"><b>75</b></p>  <p>NWN AI</p> <p>R12.00mm (.472") Tan 45°-94° 20°- 3.00mm (.118")</p> <p style="text-align: center;"><b>WA1-NWN2004</b></p>	<p style="text-align: right;"><b>76</b></p>  <p>NWN AI</p> <p>R4.00mm (.157") Tan 30°-94° 30°- 6.00mm (.236")</p> <p style="text-align: center;"><b>WA1-NWN5168</b></p>	<p style="text-align: right;"><b>77</b></p>  <p>NWN AI</p> <p>R5.00mm (.197") Tan 30°-94° 30°- 5.50mm (.216")</p> <p style="text-align: center;"><b>WA1-NWN5079</b></p>

<p style="text-align: right;"><b>78</b></p>  <p><b>NWN AI</b></p> <p>R7.00mm (.276") Tan 30°-94° 30° - 4.00mm (.157")</p> <p style="text-align: center;"><b>WA1-NWN5430</b></p>	<p style="text-align: right;"><b>79</b></p>  <p><b>NWN AI</b></p> <p>R5.00mm (.197") Tan 32°-94° 32° - 5.00mm (.197")</p> <p style="text-align: center;"><b>WA1-NWN2005</b></p>	<p style="text-align: right;"><b>80</b></p>  <p><b>NWN B3</b></p> <p>R22.00mm (.866") Tan 45°-88°</p> <p style="text-align: center;"><b>WB3-NWN690</b></p>
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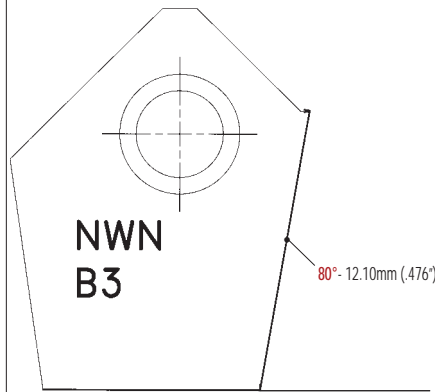
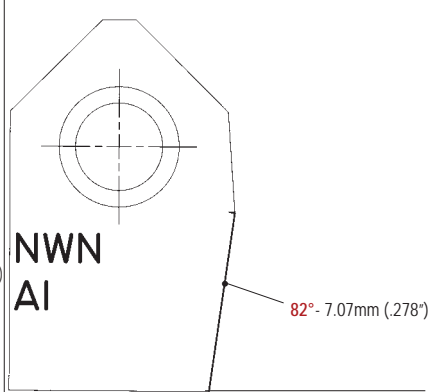
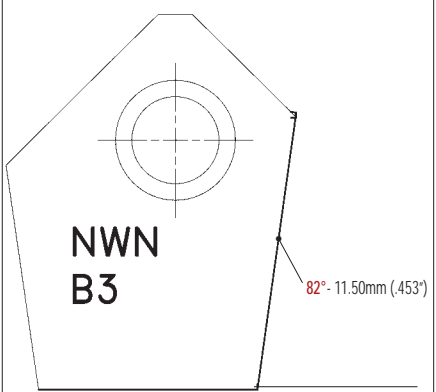
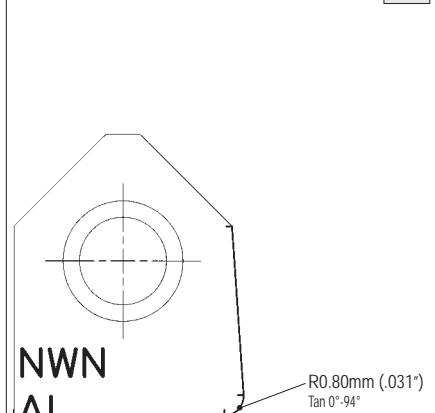
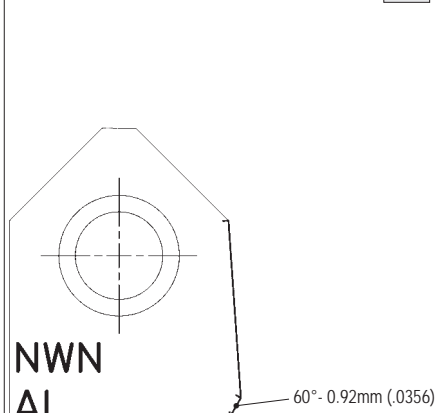
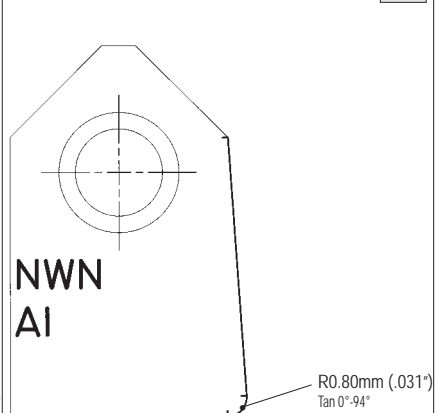
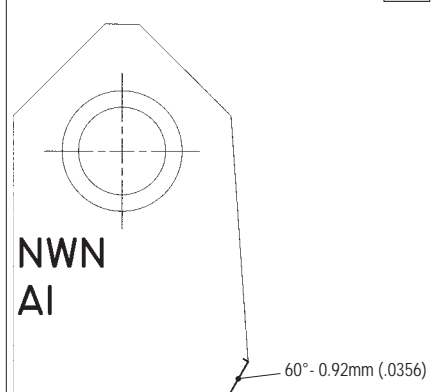
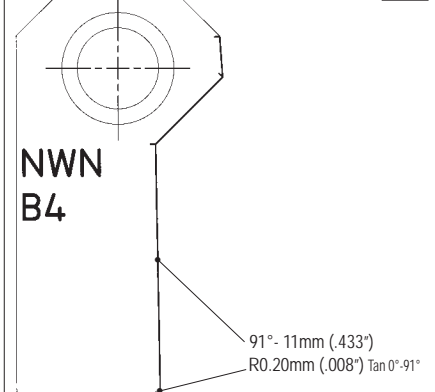
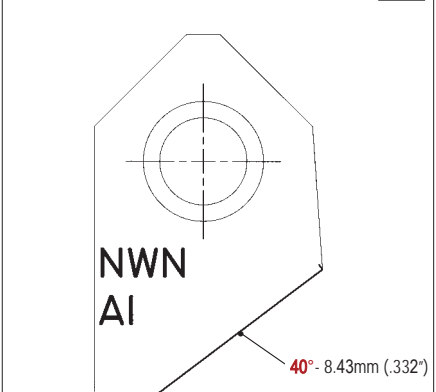
<p>81</p> <p>NWN AI</p> <p>45° - 3.00mm (.118°) R1.00mm (.039°) Tan 0°-45°</p> <p>WA1-NWN2007</p>	<p>82</p> <p>NWN B3</p> <p>75° - 10.69mm (.421°) R7.00mm (.276°) Tan 0°-75°</p> <p>WB3-NWN002</p>	<p>83</p> <p>NWN AI</p> <p>75° - 5.50mm (.216°) R12.00mm (.472°) Tan 55°-75°</p> <p>WA1-NWN2008</p>
<p>84</p> <p>NWN AI</p> <p>75° - 5.50mm (.217°) R12.00mm (.472°) Tan 60°-75°</p> <p>WA1-NWN2009</p>	<p>85</p> <p>NWN AI</p> <p>80° - 5.50mm (.216°) R3.00mm (.118°) Tan 0°-80°</p> <p>WA1-NWN2010</p>	<p>86</p> <p>NWN B3</p> <p>80° - 9.81mm (.386°) R7.00mm (.276°) Tan 0°-80°</p> <p>WB3-NWN033</p>
<p>87</p> <p>NWN AI</p> <p>R4.50mm (.177°) Tan 0°-94°</p> <p>WA1-NWN21045</p>	<p>88</p> <p>NWN AI</p> <p>R5.00mm (.197°) Tan 0°-94°</p> <p>WA1-NWN21050</p>	<p>89</p> <p>NWN AI</p> <p>R6.00mm (.236°) Tan 0°-94°</p> <p>WA1-NWN2011</p>

<p style="text-align: right;"><b>90</b></p>  <p><b>NWN AI</b></p> <p>R6.35mm (.250°) Tan 0°-94°</p> <p style="text-align: center;"><b>WA1-NWN2012</b></p>	<p style="text-align: right;"><b>91</b></p>  <p><b>NWN AI</b></p> <p>R7.00mm (.276°) Tan 0°-94°</p> <p style="text-align: center;"><b>WA1-NWN2013</b></p>	<p style="text-align: right;"><b>92</b></p>  <p><b>NWN AI</b></p> <p>R8.50mm (.335°) Tan 0°-94°</p> <p style="text-align: center;"><b>WA1-NWN2014</b></p>
<p style="text-align: right;"><b>93</b></p>  <p><b>NWN AI</b></p> <p>R27.00mm (1.063°) Tan 70°-90°</p> <p style="text-align: center;"><b>WA1-NWN2015</b></p>	<p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: center;"><b>WA1-NWN2016</b></p>	<p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: center;"><b>WA1-NWN2017</b></p>
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<p style="text-align: right;"><b>94</b></p> <p>NWN AI</p> <p style="text-align: right;">5° - 9.84mm (.387°)</p> <p style="text-align: center;"><b>WA1-NWN5</b></p>	<p style="text-align: right;"><b>95</b></p> <p>NWN AI</p> <p style="text-align: right;">10° - 9.80mm (.386°)</p> <p style="text-align: center;"><b>WA1-NWN10</b></p>	<p style="text-align: right;"><b>96</b></p> <p>NWN AI</p> <p style="text-align: right;">15° - 8.50mm (.335°)</p> <p style="text-align: center;"><b>WA1-NWN15</b></p>
<p style="text-align: right;"><b>97</b></p> <p>NWN AI</p> <p style="text-align: right;">20° - 8.20mm (.323°)</p> <p style="text-align: center;"><b>WA1-NWN20</b></p>	<p style="text-align: right;"><b>98</b></p> <p>NWN AI</p> <p style="text-align: right;">20.25° - 8.38mm (.330°)</p> <p style="text-align: center;"><b>WA1-NWN20C</b></p>	<p style="text-align: right;"><b>99</b></p> <p>NWN AI</p> <p style="text-align: right;">25° - 10.43mm (.411°)</p> <p style="text-align: center;"><b>WA1-NWN25</b></p>
<p style="text-align: right;"><b>100</b></p> <p>NWN AI</p> <p style="text-align: right;">30° - 9.00mm (.354°)</p> <p style="text-align: center;"><b>WA1-NWN30</b></p>	<p style="text-align: right;"><b>101</b></p> <p>NWN AI</p> <p style="text-align: right;">30.25° - 10.9mm (.429°)</p> <p style="text-align: center;"><b>WA1-NWN30C</b></p>	<p style="text-align: right;"><b>102</b></p> <p>NWN AI</p> <p style="text-align: right;">31° - 10.45mm (.412°)</p> <p style="text-align: center;"><b>WA1-NWN31</b></p>

<p>103</p>  <p>NWN AI</p> <p>35° - 9.50mm (.374")</p>	<p>104</p>  <p>NWN AI</p> <p>37° - 9.30mm (.366")</p>	<p>105</p>  <p>NWN AI</p> <p>37.50° - 9.20mm (.362")</p>
<p>WA1-NWN35</p>	<p>WA1-NWN37</p>	<p>WA1-NWN37D</p>
<p>106</p>  <p>NWN AI</p> <p>38° - 9.10mm (.358")</p>	<p>107</p>  <p>NWN AI</p> <p>39° - 9.00mm (.354")</p>	<p>108</p>  <p>NWN AI</p> <p>45° - 8.90mm (.350")</p>
<p>WA1-NWN38</p>	<p>WA1-NWN39</p>	<p>WA1-NWN45</p>
<p>109</p>  <p>NWN AI</p> <p>45.25° - 8.00mm (.315")</p>	<p>110</p>  <p>NWN AI</p> <p>45.50° - 8.90mm (.350")</p>	<p>111</p>  <p>NWN AI</p> <p>50° - 8.55mm (.337")</p>
<p>WA1-NWN4888</p>	<p>WA1-NWN45C</p>	<p>WA1-NWN50</p>

<p style="text-align: right;"><b>112</b></p> <p>NWN AI</p> <p>52° - 8.55mm (.337")</p> <p style="text-align: center;"><b>WA1-NWN52</b></p>	<p style="text-align: right;"><b>113</b></p> <p>NWN AI</p> <p>55° - 8.55mm (.337")</p> <p style="text-align: center;"><b>WA1-NWN55</b></p>	<p style="text-align: right;"><b>114</b></p> <p>NWN AI</p> <p>60° - 8.40mm (.331")</p> <p style="text-align: center;"><b>WA1-NWN60</b></p>
<p style="text-align: right;"><b>115</b></p> <p>NWN AI</p> <p>67° - 8.40mm (.331")</p> <p style="text-align: center;"><b>WA1-NWN67</b></p>	<p style="text-align: right;"><b>116</b></p> <p>NWN AI</p> <p>70° - 7.75mm (.305")</p> <p style="text-align: center;"><b>WA1-NWN70</b></p>	<p style="text-align: right;"><b>117</b></p> <p>NWN B3</p> <p>70° - 16.80mm (.661")</p> <p style="text-align: center;"><b>WB3-NWN070</b></p>
<p style="text-align: right;"><b>118</b></p> <p>NWN AI</p> <p>75° - 7.00mm (.276")</p> <p style="text-align: center;"><b>WA1-NWN75</b></p>	<p style="text-align: right;"><b>119</b></p> <p>NWN B3</p> <p>75° - 16.40mm (.646")</p> <p style="text-align: center;"><b>WB3-NWN085</b></p>	<p style="text-align: right;"><b>120</b></p> <p>NWN AI</p> <p>78° - 7.30mm (.287")</p> <p style="text-align: center;"><b>WA1-NWN78</b></p>

<p style="text-align: right;"><b>121</b></p>  <p><b>NWN B3</b></p> <p>80° - 12.10mm (.476")</p> <p style="text-align: center;"><b>WB3-NWN080</b></p>	<p style="text-align: right;"><b>122</b></p>  <p><b>NWN AI</b></p> <p>82° - 7.07mm (.278")</p> <p style="text-align: center;"><b>WA1-NWN82</b></p>	<p style="text-align: right;"><b>123</b></p>  <p><b>NWN B3</b></p> <p>82° - 11.50mm (.453")</p> <p style="text-align: center;"><b>WB3-NWN082</b></p>
<p style="text-align: right;"><b>124</b></p>  <p><b>NWN AI</b></p> <p>R0.80mm (.031") Tan 0°-94°</p> <p>• Nose Radius best for Aluminum applications</p> <p style="text-align: center;"><b>WA1-NWN90-12</b></p>	<p style="text-align: right;"><b>125</b></p>  <p><b>NWN AI</b></p> <p>60° - 0.92mm (.0356)</p> <p>• Chamfer best for Cast Iron applications</p> <p style="text-align: center;"><b>WA1-NWN91-12</b></p>	<p style="text-align: right;"><b>126</b></p>  <p><b>NWN AI</b></p> <p>R0.80mm (.031") Tan 0°-94°</p> <p>• Nose Radius best for Aluminum applications</p> <p style="text-align: center;"><b>WA1-NWN90-16</b></p>
<p style="text-align: right;"><b>127</b></p>  <p><b>NWN AI</b></p> <p>60° - 0.92mm (.0356)</p> <p>• Chamfer best for Cast Iron applications</p> <p style="text-align: center;"><b>WA1-NWN91-16</b></p>	<p style="text-align: right;"><b>128</b></p>  <p><b>NWN B4</b></p> <p>91° - 11mm (.433") R0.20mm (.008") Tan 0°-91°</p> <p style="text-align: center;"><b>WB4-NWN90-20</b></p>	<p style="text-align: right;"><b>129</b></p>  <p><b>NWN AI</b></p> <p>40° - 8.43mm (.332")</p> <p style="text-align: center;"><b>WA1-NWN040</b></p>