

# Recoil Tapped Hole and Fitted Size Data

## BSW, BA Thread and 8TPI UN Series

### BSW

SIZE	T.P.I.	DRILL SIZE		TAPPED HOLE						E	INSERTS	
		BSW		A		B	C		C			
		MM	INCH	MINOR DIA		MAJ DIA	CLASS 2B		CLASS 3B			
				MIN	MAX	MIN	MIN	MAX	MIN	MAX		
3/16	24	5	13/64	0.1960	0.2020	0.2365	0.2141*	0.2166*	RECOM-	RECOM-	0.1341	
1/4	20	6.7	17/64	0.2610	0.2670	0.3087	0.2820*	0.2849*	END-	END-	0.1860	
5/16	18	8.3	21/64	0.3280	0.3340	0.3777	0.3480*	0.3512*	ED	ED	0.2413	
3/8	16	9.9	25/64	0.3900	0.3980	0.4483	0.4150	0.4185	0.4150*	0.4170*	0.2950	
7/16	14	11.5	29/64	0.4530	0.4630	0.5212	0.4833	0.4871	0.4833*	0.4855*	0.3461	
1/2	12	13	17/32	0.5150	0.5250	0.5973	0.5533	0.5575	0.5533*	0.5557*	0.3932	
9/16	12	15	19/32	0.5780	0.5880	0.6600	0.6158	0.6201	0.6158*	0.6184*	0.4557	
5/8	11	16.5	21/32	0.6530	0.6630	0.7312	0.6832	0.6873	0.6832*	0.6859*	0.5086	
3/4	10	19.8	25/32	0.7810	0.7910	0.8669	0.8141	0.8191	0.8141*	0.8171*	0.6220	
7/8	9	23	29/32	0.9060	0.9160	1.0048	0.9462	0.9516	0.9462*	0.9495*	0.7328	
1	8	26	1 1/32	1.0310	1.0440	1.1457	1.0801	1.0859	1.0801*	1.0836*	0.8400	
1 1/8	7	29.5	1 5/32	1.1710	1.1860	1.2912	1.2165	1.2227	1.2165*	1.2203*	0.9420	
1 1/4	7	33	1 9/32	1.2960	1.3110	1.4163	1.3415	1.3479	1.3415*	1.3454*	1.0670	
1 1/2	6	39	1 17/32	1.5460	1.5710	1.6936	1.6067	1.6137	1.6067*	1.6110*	1.2866	

\* These tapped hole dimensions are recommended for Recoil Locking applications.

### BA

SIZE	DRILL SIZE		TAPPED HOLE				E	
	BA		A		B	C		
	MM	INCH	MINOR DIA		MAJ DIA	CLASS 2B		
			MIN	MAX	MIN	MIN	MAX	INSERTS FITTED
0	6.2		0.2410	0.2460	0.2805	0.2598	0.2645	0.1890
1	5.5		0.2130	0.2200	0.2485	0.2299	0.2342	0.1661
2	4.9		0.1910	0.1960	0.2208	0.2042	0.2079	0.1468
4	3.8		0.1470	0.1520	0.1711	0.1574	0.1605	0.1106
6	2.9		0.1130	0.1160	0.1339	0.1226	0.1252	0.0850

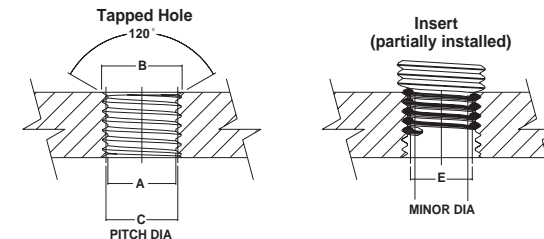
### 8TPI UN Series

INSERT SPECIFICATION DATA							
8TPI UN	DRILLED HOLE DIA**		PITCH DIA		TAP MAJOR DIA	ASSEMBLED INSERT PITCH DIA	
SIZE	MIN	MAX	MIN	MAX	MAX	MIN	MAX
1 1/8-8	1.130	1.155	1.1688	1.1757	1.261	1.0438	1.0528
1 1/4-8	1.255	1.280	1.2938	1.3008	1.386	1.1688	1.1780
1 3/8-8	1.380	1.405	1.4188	1.4259	1.511	1.2938	1.3031
1 1/2-8	1.505	1.530	1.5438	1.5510	1.636	1.4188	1.4283
1 5/8-8	1.630	1.655	1.6688	1.6762	1.761	1.5438	1.5535
1 3/4-8	1.755	1.780	1.7938	1.8013	1.886	1.6688	1.6786
1 7/8-8	1.880	1.905	1.9188	1.9264	2.011	1.7938	1.8038
2-8	2.005	2.030	2.0438	2.0515	2.136	1.9188	1.9289

\*Minimum bolt projection "N" applies to locking inserts only. It is the minimum distance that the first full thread of the bolt must project to ensure accurate thread engagement with the lower locking coils when the assembly is completed.

\*\*Maximum bolt projection "K" applies when the tang is not removed. When the tang is removed in a blind hole, the maximum bolt projection must not exceed the minimum drill depth.

**Countersinking:** It is recommended that a 120° countersink is provided before tapping to prevent a 'feather edge' at the start of the lead thread. When design prevents the use of a countersink, any feather edges or deformed material at the thread lead should be removed before tapping. This will facilitate insert installation and reduce the effects of removing the countersinking operation.



# Recoil Tapped Hole and Fitted Size Data

## BSP and BSF Thread Series

### BSP

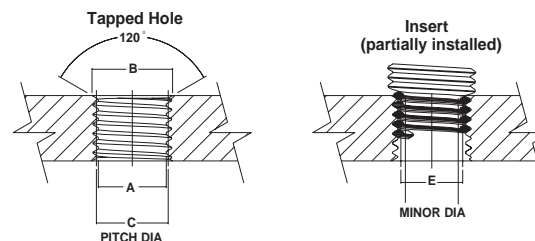
SIZE	T.P.I.	DRILL SIZE		TAPPED HOLE							
		BSP		A		B	C		C		E
		MM	INCH	MINOR DIA	MAJ DIA	CLASS 2B	CLASS 3B		INSERTS FITTED		
				MIN	MAX	MIN	MIN	MAX	MIN	MAX	
1/8	28	9.9	3/8	0.3900	0.4000	0.4258	0.4058	0.4090	NOT	NOT	0.3372
1/4	19	13.5	33/64	0.5300	0.5400	0.5803	0.5517	0.5556	RECOM-	RECOM-	0.4506
3/8	19	17	21/32	0.6700	0.6800	0.7184	0.6897	0.6937	END-	END-	0.5886
1/2	14	21.5	13/16	0.8400	0.8500	0.9092	0.8708	0.8754	ED	ED	0.7336
5/8	14	23.5	59/64	0.9150	0.9270	0.9863	0.9478	0.9524	0.9478	0.9506	0.8106
3/4	14	27	1 1/64	1.0530	1.0660	1.1255	1.0868	1.0918	1.0868	1.0898	0.9496
7/8	14		1 13/69	1.2000	1.2130	1.2735	1.2348	1.2399	1.2348	1.2378	1.0976
1	11	33.5	1 9/32	1.3200	1.3350	1.4158	1.3673	1.3727	1.3673	1.3705	1.1926
1 1/4	11		1 43/64	1.6650	1.6800	1.7571	1.7083	1.7141	1.7083	1.7118	1.5336
1 1/2	11		1 29/32	1.9060	1.9210	1.9893	1.9403	1.9464	1.9403	1.9440	1.7656

### BSF

SIZE	T.P.I.	DRILL SIZE		TAPPED HOLE							
		BSF		A		B	C		C		E
		MM	INCH	MINOR DIA	MAJ DIA	CLASS 2B	CLASS 3B		INSERTS FITTED		
				MIN	MAX	MIN	MIN	MAX	MIN	MAX	
3/16	32	5	13/64	0.1920	0.1980	0.2247	.2075*	.2098*	NOT	NOT	0.1475
1/4	26	6.6	17/64	0.2570	0.2640	0.2957	.2747*	.2774*	RECOM-	RECOM-	0.2008
5/16	22	8.2	21/64	0.3230	0.3300	0.3662	.3416*	.3447*	END-	END-	0.2543
3/8	20	9.8	25/64	0.3850	0.3920	0.4340	.4070*	.4104*	ED	ED	0.3110
7/16	18	11.5	29/64	0.4500	0.4580	0.5030	0.4730	0.4767	.4730*	.4751*	0.3663
1/2	16	13	33/64	0.5130	0.5220	0.5736	0.5400	0.5440	.5400*	.5423*	0.4200
9/16	16	14.5	37/64	0.5770	0.5860	0.6362	0.6025	0.6067	.6025*	.6049*	0.4825
5/8	14	16.2	41/64	0.6400	0.6490	0.7091	0.6708	0.6752	.6708*	.6734*	0.5336
3/4	12	19.5	49/64	0.7650	0.7750	0.8478	0.8033	0.8082	.8033*	.8062*	0.6432
7/8	11	22.5	57/64	0.8900	0.9000	0.9817	0.9332	0.9384	.9332*	.9364*	0.7586
1	10	26	1 1/32	1.0310	1.0440	1.1173	1.0641	1.0697	1.0641*	1.0675*	0.8720
1 1/8	9		1 5/32	1.1560	1.1700	1.2551	1.1962	1.2021	1.1962*	1.1998*	0.9828
1 1/4	9	32.5	1 9/32	1.2810	1.2950	1.3803	1.3212	1.3274	1.3212*	1.3250*	1.1078
1 3/8	8		1 13/32	1.4060	1.4200	1.5212	1.4551	1.4616	1.4551*	1.4591*	1.2150
1 1/2	8		1 17/32	1.5310	1.5450	1.6464	1.5801	1.5868	1.5801*	1.5843*	1.3400

\* These tapped hole dimensions are recommended for Recoil Screw Lock Insert applications.

**Countersinking:** It is recommended that a 120° counter-sink is provided before tapping to prevent a 'feather edge' at the start of the lead thread. When design prevents the use of a countersink, any feather edges or deformed material at the thread lead should be removed before tapping. This will facilitate insert installation and reduce the effects of removing the countersinking operation.



# Drill, Tapping and Installation Depths

## BSP and BSF Thread Series

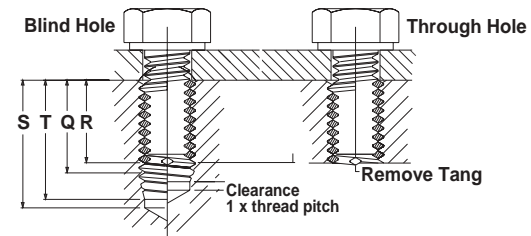
### Specifications for Drilling, Tapping and Installation depths

BASIC LENGTH OF INSERT IN TERMS OF NOMINAL DIAMETER OF SCREW "D"																				
BSP THREAD SIZE	1D				1 1/2 D				2D				2 1/2 D				3D			
	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T
1/8-28	0.125	0.089	0.287	0.251	0.187	0.151	0.349	0.313	0.250	0.214	0.412	0.376	0.312	0.276	0.474	0.438	0.375	0.339	0.537	0.501
1/4-19	0.250	0.197	0.488	0.435	0.375	0.322	0.613	0.560	0.500	0.447	0.738	0.685	0.625	0.572	0.863	0.810	0.750	0.697	0.988	0.935
3/8-19	0.375	0.322	0.613	0.560	0.562	0.509	0.800	0.747	0.750	0.697	0.988	0.935	0.937	0.884	1.175	1.122	1.125	1.072	1.363	1.310
1/2-14	0.500	0.429	0.820	0.749	0.750	0.679	1.070	0.999	1.000	0.929	1.320	1.249	1.250	1.179	1.570	1.499	1.500	1.429	1.820	1.749
5/8-14	0.625	0.554	0.945	0.874	0.937	0.866	1.257	1.186	1.250	1.179	1.570	1.499	1.562	1.491	1.882	1.811	1.875	1.804	2.195	2.124
3/4-14	0.750	0.679	1.070	0.999	1.125	1.054	1.445	1.374	1.500	1.429	1.820	1.749	1.875	1.804	2.195	2.124	2.250	2.179	2.570	2.499
7/8-14	0.875	0.804	1.195	1.124	1.312	1.241	1.632	1.561	1.750	1.679	2.070	1.999	2.187	2.116	2.507	2.436	2.625	2.554	2.945	2.874
1-11	1.000	0.909	1.410	1.319	1.500	1.409	1.910	1.819	2.000	1.909	2.410	2.319	2.500	2.409	2.910	2.819	3.000	2.909	3.410	3.319
1 1/4-11	1.250	1.159	1.660	1.569	1.875	1.784	2.285	2.194	2.500	2.409	2.910	2.819	3.125	3.034	3.535	3.440	3.750	3.659	4.160	4.069
1 1/2-11	1.500	1.409	1.910	1.819	2.250	2.159	2.660	2.569	3.000	2.909	3.410	3.319	3.750	3.659	4.160	4.069	4.500	4.409	4.910	4.819

BASIC LENGTH OF INSERT IN TERMS OF NOMINAL DIAMETER OF SCREW "D"																				
BSF THREAD SIZE	1D				1 1/2 D				2D				2 1/2 D				3D			
	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T
3/16-32	0.187	0.156	0.327	0.296	0.281	0.250	0.421	0.390	0.375	0.344	0.515	0.484	0.468	0.437	0.608	0.577	0.562	0.531	0.702	0.671
1/4-26	0.250	0.212	0.423	0.385	0.375	0.337	0.548	0.510	0.500	0.462	0.673	0.635	0.625	0.587	0.798	0.760	0.750	0.712	0.923	0.885
5/16-22	0.312	0.267	0.516	0.471	0.469	0.424	0.673	0.628	0.625	0.580	0.829	0.784	0.781	0.736	0.985	0.940	0.937	0.892	1.141	1.096
3/8-20	0.375	0.325	0.600	0.550	0.562	0.512	0.787	0.737	0.750	0.700	0.975	0.925	0.937	0.887	1.162	1.112	1.125	1.075	1.350	1.300
7/16-18	0.437	0.381	0.687	0.631	0.656	0.600	0.906	0.850	0.875	0.819	1.125	1.069	1.093	1.037	1.343	1.287	1.312	1.256	1.562	1.506
1/2-16	0.500	0.437	0.781	0.719	0.750	0.688	1.031	0.969	1.000	0.938	1.281	1.219	1.250	1.188	1.531	1.469	1.500	1.438	1.781	1.719
9/16-16	0.562	0.500	0.843	0.781	0.844	0.782	1.125	1.063	1.125	1.062	1.406	1.344	1.406	1.344	1.687	1.625	1.687	1.625	1.968	1.906
5/8-14	0.625	0.554	0.946	0.875	0.937	0.866	1.258	1.187	1.250	1.179	1.571	1.500	1.562	1.491	1.883	1.812	1.875	1.804	2.196	2.125
3/4-12	0.750	0.667	1.125	1.042	1.125	1.042	1.500	1.417	1.500	1.417	1.875	1.792	1.875	1.792	2.250	2.167	2.250	2.167	2.625	2.542
7/8-11	0.875	0.784	1.284	1.193	1.312	1.221	1.721	1.630	1.750	1.659	2.159	2.068	2.187	2.096	2.596	2.505	2.625	2.534	3.034	2.943
1-10	1.000	0.900	1.450	1.350	1.500	1.400	1.950	1.850	2.000	1.900	2.450	2.350	2.500	2.400	2.950	2.850	3.000	2.900	3.450	3.350
1 1/8-9	1.125	1.014	1.625	1.514	1.687	1.576	2.187	2.076	2.250	2.139	2.750	2.639	2.812	2.701	3.312	3.201	3.375	3.264	3.875	3.764
1 1/4-9	1.250	1.139	1.750	1.639	1.875	1.764	2.375	2.264	2.500	2.389	3.000	2.889	3.125	3.014	3.625	3.514	3.750	3.639	4.250	4.139
1 3/8-8	1.375	1.250	1.938	1.813	2.062	1.937	2.625	2.500	2.750	2.625	3.312	3.188	3.437	3.312	4.000	3.875	4.125	4.000	4.688	4.563
1 1/2-8	1.500	1.375	2.063	1.938	2.250	2.125	2.813	2.688	3.000	2.875	3.563	3.438	3.750	3.625	4.313	4.188	4.500	4.375	5.063	4.938

**Drilling Depth:** The minimum drilling depth "S" allows for one pitch chip clearance between the tip of the tap and the bottom of the drilled hole. "S" minimum allows for tap clearance, the maximum amount of insert set-down and the countersink. Where a spiral point tap is used, the drill depths shown should be increased to allow for chip clearance.

**Fitted Insert:** R = Maximum length of engaged portion of screw when tang is removed. Q = Minimum full tapped thread length. T = Minimum tapping depth – including 3 1/2 thread of plus tap. S = Minimum drill depth – excluding point.



# Drill, Tapping and Installation Depths

## BSW, BA Thread and 8TPI UN Series

### Specifications for Drilling, Tapping and Installation depths

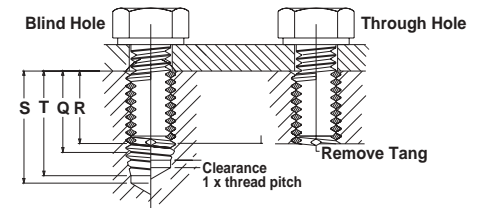
BSW THREAD SIZE	BASIC LENGTH OF INSERT IN TERMS OF NOMINAL DIAMETER OF SCREW "D"																			
	1D				1 1/2 D				2D				2 1/2 D				3D			
	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T
3/16-24	0.187	0.146	0.375	0.332	0.281	0.240	0.468	0.426	0.375	0.334	0.562	0.520	0.468	0.427	0.656	0.612	0.562	0.521	0.750	0.708
1/4-20	0.250	0.200	0.475	0.425	0.375	0.325	0.600	0.550	0.500	0.450	0.725	0.675	0.625	0.575	0.850	0.800	0.750	0.700	0.975	0.925
5/16-18	0.312	0.257	0.562	0.507	0.469	0.413	0.719	0.663	0.625	0.569	0.875	0.819	0.781	0.726	1.031	0.976	0.937	0.882	1.187	1.132
3/8-16	0.375	0.312	0.656	0.594	0.562	0.500	0.844	0.781	0.750	0.687	1.031	0.969	0.937	0.875	1.219	1.156	1.125	1.062	1.406	1.344
7/16-14	0.437	0.366	0.759	0.687	0.656	0.585	0.978	0.906	0.875	0.804	1.196	1.125	1.093	1.022	1.415	1.343	1.312	1.241	1.634	1.562
1/2-12	0.500	0.417	0.875	0.792	0.750	0.667	1.125	1.042	1.000	0.917	1.375	1.292	1.250	1.167	1.625	1.542	1.500	1.417	1.875	1.792
9/16-12	0.562	0.479	0.937	0.854	0.844	0.760	1.219	1.135	1.125	1.042	1.500	1.417	1.406	1.323	1.781	1.698	1.687	1.604	2.062	1.979
5/8-11	0.625	0.534	1.034	0.943	0.937	0.846	1.347	1.256	1.250	1.159	1.659	1.568	1.562	1.471	1.972	1.881	1.875	1.784	2.284	2.193
11/16-11	0.687	0.596	1.097	1.006	1.031	0.940	1.441	1.350	1.375	1.284	1.785	1.694	1.718	1.627	2.128	2.037	2.062	1.971	2.472	2.381
3/4-10	0.750	0.650	1.200	1.100	1.125	1.025	1.575	1.475	1.500	1.400	1.950	1.850	1.875	1.775	2.325	2.225	2.250	2.150	2.700	2.600
7/8-9	0.875	0.764	1.375	1.264	1.312	1.201	1.812	1.701	1.750	1.639	2.250	2.139	2.187	2.076	2.687	2.576	2.625	2.514	3.125	3.014
1-8	1.000	0.875	1.563	1.437	1.500	1.375	2.062	1.937	2.000	1.875	2.562	2.437	2.500	2.375	3.062	2.937	3.000	2.875	3.562	3.437
1 1/8-7	1.125	0.982	1.768	1.625	1.687	1.545	2.330	2.187	2.250	2.107	2.893	2.750	2.812	2.670	3.455	3.312	3.375	3.232	4.018	3.875
1 1/4-7	1.250	1.107	1.893	1.750	1.875	1.732	2.518	2.375	2.500	2.357	3.143	3.000	3.125	2.982	3.768	3.625	3.750	3.607	4.393	4.250
1 1/2-6	1.500	1.333	2.250	2.083	2.250	2.083	3.000	2.833	3.000	2.833	3.750	3.583	3.750	3.583	4.500	4.333	4.500	4.333	5.250	5.083

BA THREAD SIZE	BASIC LENGTH OF INSERT IN TERMS OF NOMINAL DIAMETER OF SCREW "D"																			
	1D				1 1/2 D				2D				2 1/2 D				3D			
	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T
OBA	0.236	0.197	0.413	0.374	0.354	0.315	0.531	0.492	0.472	0.433	0.649	0.610	0.591	0.552	0.768	0.729	0.709	0.670	0.886	0.847
1BA	0.209	0.174	0.368	0.333	0.313	0.278	0.472	0.437	0.417	0.382	0.576	0.541	0.522	0.487	0.681	0.646	0.626	0.591	0.785	0.750
2BA	0.185	0.153	0.329	0.297	0.278	0.246	0.422	0.390	0.370	0.338	0.514	0.482	0.463	0.431	0.607	0.575	0.555	0.523	0.699	0.667
4BA	0.142	0.116	0.259	0.233	0.213	0.187	0.330	0.304	0.283	0.257	0.400	0.374	0.354	0.328	0.471	0.445	0.425	0.399	0.542	0.516
6BA	0.110	0.089	0.204	0.183	0.165	0.144	0.259	0.238	0.220	0.199	0.314	0.293	0.276	0.255	0.370	0.349	0.331	0.310	0.425	0.404

NOMINAL THREAD SIZE	BOLT THREAD PROJECTION MINIMUM AND MAXIMUM																			
	DIAMETER	MIN DRILL DEPTH			N*						K**									
		INSERT LENGTH	INTERMEDIATE TAP	BOTTOMING TAP	NOMINAL LENGTH			NOMINAL LENGTH												
					1 DIA	1.5 DIA	2 DIA	1 DIA	1.5 DIA	2 DIA										
1 1/8-8	1D	1.125	1.813	1.438																
	1.5D	1.688	2.376	2.001	0.96	1.24	1.52	1.06												
	2D	2.250	2.938	2.563																
1 1/4-8	1D	1.250	1.938	1.563																
	1.5D	1.875	2.563	2.188	1.02	1.34	1.65	1.19												
	2D	2.500	3.188	2.813																
1 3/8-8	1D	1.375	2.063	1.688																
	1.5D	2.062	2.750	2.375	1.09	1.43	1.77	1.31												
	2D	2.750	3.438	3.063																
1 1/2-8	1D	1.500	2.188	1.813																
	1.5D	2.250	2.938	2.563	1.15	1.52	1.90	1.44												
	2D	3.000	3.688	3.313																
1 5/8-8	1D	1.625	2.313	1.938																
	1.5D	2.438	3.126	2.751	1.27	1.68	2.09	1.56												
	2D	3.250	3.938	3.563																
1 3/4-8	1D	1.750	2.438	2.063																
	1.5D	2.625	3.313	2.938	1.52	1.96	2.40	1.69												
	2D	3.500	4.188	3.813																
1 7/8-8	1D	1.875	2.563	2.188																
	1.5D	2.812	3.500	3.125	1.59	2.05	2.52	1.81												
	2D	3.750	4.438	4.063																
2-8	1D	2.000	2.688	2.313																
	1.5D	3.000	3.688	3.313	1.65	2.15	2.65	1.94												
	2D	4.000	4.688	4.313																

**Drilling Depth:** The minimum drilling depth "S" allows for one pitch chip clearance between the tip of the tap and the bottom of the drilled hole. "S" minimum allows for tap clearance, the maximum amount of insert set-down and the countersink. Where a spiral point tap is used, the drill depths shown should be increased to allow for chip clearance.

**Fitted Insert:** R = Maximum length of engaged portion of screw when tang is removed. Q = Minimum full tapped thread length. T = Minimum tapping depth - including 3 1/2 thread of plus tap. S = Minimum drill depth - excluding point.



\*Minimum drill depth for a bottoming tap equals .313 plus the insert nominal length; for intermediate taps it equals .688 plus the insert nominal length. These drilling depths allow approximately 1/2 pitch tap end clearance. Minimum full thread tapping depth equals insert nominal length. The tapped hole will accommodate an insert installed 1/4 to 1/2 pitch below the surface of the tapped hole. When holes are to be countersunk, the drilling and tapping depths and insert installation depth should be increased 1/2 pitch. The recommended countersink is 120° included angle to the tap major diameter.

\*\*The minimum and maximum drilled hole diameters listed are larger than standard to allow clearance for the major diameter of the mating threaded member. A drill size equal to the nominal thread diameter is suggested because it will generally produce an oversize hole within the tabulated drilled hole limits.