

Please note: All information contained in these pages is accurate to the best of our knowledge. Materials and conditions can vary, causing differences over which we have no control. Therefore, we cannot accept responsibility for your particular situation.

Reamer & Drill Selection Procedures

Selecting the correct reamer diameter is not quite as simple as one might think. Selecting the correct drill size is also important as doing so will prolong the life of your reamer and ensure proper size and finish.

There are 3 steps involved in selecting the correct Yankee reamer and drill size for your application:

- 1) Determine the correct Yankee reamer diameter based on total hole tolerance and the machineability of your material. (Machineability table is on page 3 of this document).
- 2) Calculate the correct hole diameter needed prior to reaming,
- 3) Select the proper drill diameter to make that hole.

An example follows each step.

Step #1: To calculate the correct Yankee reamer diameter, based on the machineability of the material to be reamed, deduct the allowances in the following table from the maximum finished hole size:

Total Hole Tol.	Machineability Rating	
	30 or Less or Above 100	31-100
.0005"	.0003-.0004	.0004-.0005
.0010	.0004-.0006	.0006-.0008
.0015	.0005-.0008	.0008-.0010
.0020	.0006-.0010	.0010-.0014
.0030	.0009-.0020	.0009-.0020
.0040	.0012-.0026	.0012-.0026
.0050	.0014-.0032	.0014-.0032
.0060	.0017-.0038	.0017-.0038
.0070	.0019-.0044	.0019-.0044
.0080	.0022-.0050	.0022-.0050
.0090	.0024-.0056	.0024-.0056
.0100	.0027-.0062	.0027-.0062

For example: If your finished hole size is .5000 with a -.0005 +.0000 tolerance, and the material is 302 Stainless (which has a machineability rating of 50) the chart shows that the range to deduct is. 0004-.0005.

$$.5000 - .0004 = .4996$$

$$.5000 - .0005 = .4995$$

Therefore, the best Yankee reamer size is .4995

Step #2: Based on the Yankee reamer selected in step # 1, the following table shows the amount of stock that should be removed by the reamer (leaving the recommended amount will ensure the best finish and tolerance):

Total Hole Tol.	Machineability Rating	
	30 or Less	31 and Up
.0000-.0625	.006-.010	.003-.005
.0626-.1250	.006-.010	.004-.007
.1251-.2500	.006-.010	.005-.010
.2501-.5000	.012-.020	.007-.015
.5001-1.0000	.012-.020	.010-.020

Using the same example (finished hole size is .5000 with a -.0005 +.0000 tolerance, and the material is 302 Stainless (which has a machineability rating of 50): the chart shows that the amount to deduct from the Yankee reamer size is .007-.015.

$$.4995 - .015 = .4845$$

$$.4995 - .007 = .4925$$

Therefore, the best hole size before reaming is between .4845 and .4925

Step #3: Based on the pre-reaming hole diameter selected in step # 2, the following table shows the oversize allowance that should be deducted from the hole size to arrive at the correct drill size:

Diameter Range	Machineability Rating	
	30 or Less or Above 100	31-100
.0000-.0625	.0005	.0015
.0626-.1250	.0006	.0028
.1251-.1875	.0008	.0036
.1876-.2500	.0008	.0042
.2501-.5000	.0010	.0048
.5001-.7500	.0012	.0052
.7501-1.0000	.0020	.0065

Using the same example (pre-reaming hole size is .between .4845 and .4925 and the material is 302 Stainless (which has a machineability rating of 50): the chart shows that the amount to deduct from the Yankee reamer size is .0048.

$$.4845 - .0048 = .4797$$

$$.4925 - .0048 = .4877$$

Therefore, the best practical drill size is 31/64 (.4844) because it is between .4797 and .4877

To recap: in this example you should use a 31/64 drill and a .4995 Yankee reamer.

Safety

Even though all products manufactured by The Yankee Corporation are designed for safe operation under normal use, cutting tools may break and/or shatter. We stress the importance of safety in your tool usage.

1. Always use safety glasses/goggles when performing any reaming operation.
 2. Never exceed recommended speeds or feeds for your application.
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MACHINEABILITY RATINGS

Iron & Alloys (inc. Steel)					
Material	Rating	Material	Rating	Material	Rating
12% Chrome Stain. Iron	70	80840	35	81845	60
86845	35	98840	40	1020 (Castings)	60
1040 (Castings)	45	1330	60	3140	55
3250	45	3312	50	3340	45
3450	45	4130 (Castings)	35	4130	65
4140	55	4140 (Leaded)	70	4145	55
4340 (100% Pearlitic)	45	4340 (Spheroidized)	65	4340 (Castings)	25
4620	65	4640	55	4815	55
5120	65	6130	55	6135	55
6180	40	8030 (Castings)	45	8430 (Castings)	40
8620	60	8630	60	8630 (Castings)	30
8720	60	9255	45	9260	45
9262H	25	A-286	10	A-3115	65
A-3120	65	A-4023	70	A-4027	70
A-4032	70	A-4037	65	A-4042	60
A-4047	55	A-4150	50	A-4320	55
A-4340	50	A-4820	45	A-5140	60
A-5150	50	A-6120	50	A-6140	50
A-6145	50	A-6152	50	A-8640	55
A-8650	45	A-8750	40	AM 350	14
AM 355	10	AMS 6407	50	AMS 6418	50
AMS 6427	50	B-1112	100	B-1113	15
C-1008	55	C-1010	55	C-1015	60
X-1020	65	C-1025	65	C-1030	65
C-1040	60	C-1045	50	C-1050	50
C-1095	45	C-1117	90	C-1118	80
C-1120	80	C-1137	75	C-1141	50
Cast Iron (Soft)	60	Cast Iron (Med.)	40	Cast Iron (Hard)	20
Cast Iron (Chilled White)	10	Cast Iron (Grey Pearlitic)	70	Chromaloy	50
Columbia "Oildie"	40	Discaloy	40	E-3310	40
E-4137	60	E-52100	30	E-6150	50
E-9310	40	E-9315	40	Hastelloy B (Cast)	12
Hastelloy C	20	Hastelloy X	9	Haynes Stellite #21 (Cast)	6

Haynes Stellite #25	12	Haynes Stellite #31 (Cast)	6	High Speed Steel 18-4-1	35
High Speed Steel 8-2-1	40	Hyten B	60	Hyten 3	55
Inconel	30	Inconel X	15	Inconel 700	9
Inconel 702	11	Inconel 901	20	Ingot Iron	50
K-42-B	8	L-605	9	M-252	5
M-308	5	Malleable (Pearlitic)	90	Malleable (Standard)	110
Maxel 3	55	Molybdenum (Cast)	30	Monel K	35
Monel K-R	45	Monel R	45	Monel S (Cast)	25
ME-9261	50	NI-Hard	8	NI-Resist	45
Nimonic 75	17	Nimonic 90	10	Nitralloy (135)	45
Nodular Iron #1	60	Nodular Iron #2	50	Nodular Iron #3	40
Potomac M	45	Rene 41	15	Rycut 40	65
StressProof	50	Super Triscent	40	Thermold A	45
Timken "Graph-Mo"	50	Tinidure	30	Transparent Aluminum	400
Turbaloy	40	Udimet 500	9	V-57	8
Vasco X4	50	VascoJet 1000	45	Waspalloy	12
X-200	55	Tungsten	5		
Stainless Steel					
PH-15-7-Mo	20	17-4PH	28	17-7PH	20
301	55	302	50	303	65
304	40	310	30	316	35
317	35	403	55	405	60
410	55	416	90	418	40
420	45	430F	65	440C	35
446	50				
Titanium & Alloys					
A-55	30	A-70	27	A-110	23
C-120	20	C-130	18	C-140	15
MST	9				
Aluminum & Alloys					
A-132-T	110	A-214	200	A-356-T	140
B-113	180	D-132-T	130	108	140
112	180	122-T	140	195-T	190
212	160	218-T	240	220-T	230
319-T	160	333-T	130	355-T	160
750-T	180				
2011	200	2014-T	140	2017-T	140
2024-T	150	3003	180	3004	180
5052	190	5056	190	4032-T	110
6051-T	140	6061-T	190	6063-T	190
7075-T	120	Alum.-Bronze (5% Al)	60	Alum.-Bronze (8% Al)	60
Alum.-Bronze (9.25% Al)	60	Alum.-Silicon-Bronze	180		
Misc. Metals & Alloys					
Architectural Bronze	270	Beryllium-Copper	60	Chromium-Copper	60
Comm. Bronze (90% Cu)	60	Cupro-Nickel	60	Deoxidized Copper	60
Electolytic Tough Pitch Copper	60	Extruded Lead Ni-Silver (10% Ni)	240	Forging Brass	240
Free Cutting Brass	300	High Lead Brass	270	High Lead Brass (Tube)	240
High Silicon Bronze	90	Lead Common Bronze	240	Lead Copper	240
Lead Naval Brass	210	Lead Nickel-Silver (12% Ni)	130	Lead Nickel-Silver (18% Ni)	150

Leaded Phosphor-Bronze (5% Tin)	150	Leaded Silicon-Bronze	180	Low Brass (80% Cu)	90
Low Brass (Leaded)	180	Manganese Bronze	90	Medium Leaded Brass	210
Muntz Metal	120	Naval Brass	90	Navel Lint	400
Nickel	200	Nickel Silver (18% Ni)	60	Nickel Silver (20% Ni)	60
Phosphor-Bronze (5% Tin)	60	Phosphor-Bronze (8% Tin)	60	Rod Brass (85% Cu)	90
Selenium/Tellurium Copper	270	Special Free Cutting Phosphor Bronze	270	Zinc	200