

NAPGLADU

Delivering Productivity

Technical Information



	Inches	mm
	1/64	0.015625 0.3969
	1/32	0.031250 0.7938
	3/64	0.046875 1.1906
1/16		0.062500 1.5875
	5/64	0.078125 1.9844
	3/32	0.093750 2.3812
	7/64	0.109375 2.7781
1/8		0.125000 3.1750
	9/64	0.140625 3.5719
	5/32	0.156250 3.9688
	11/64	0.171875 4.3656
3/16		0.187500 4.7625
	13/64	0.203125 5.1594
	7/32	0.218750 5.5562
	15/64	0.234375 5.9531
1/4		0.250000 6.3500
	17/64	0.265625 6.7469
	9/32	0.281250 7.1438
	19/64	0.296875 7.5406
5/16		0.312500 7.9375
	21/64	0.328125 8.3344
	11/32	0.343750 8.7312
	23/64	0.359375 9.1281
3/8		0.375000 9.5250
	25/64	0.390625 9.9219
	13/32	0.406250 10.3188
	27/64	0.421875 10.7156
7/16		0.437500 11.1125
	29/64	0.453125 11.5094
	15/32	0.468750 11.9062
	31/64	0.484375 12.3031
1/2		0.500000 12.7000

	Inches	mm
	33/64	0.515625 13.0969
	17/32	0.531250 13.4938
	35/64	0.546875 13.8906
9/16		0.562500 14.2875
	37/64	0.578125 14.6844
	19/32	0.593750 15.0812
	39/64	0.609375 15.4781
5/8		0.625000 15.8750
	41/64	0.640625 16.2719
	21/32	0.656250 16.6688
	43/64	0.671875 17.0656
11/16		0.687500 17.4625
	45/64	0.703125 17.8594
	23/32	0.718750 18.2562
	47/64	0.734375 18.6531
3/4		0.750000 19.0500
	49/64	0.765625 19.4469
	25/32	0.781250 19.8438
	51/64	0.796875 20.2406
13/16		0.812500 20.6375
	53/64	0.828125 21.0344
	27/32	0.843750 21.4312
	55/64	0.859375 21.8281
7/8		0.875000 22.2250
	57/64	0.890625 22.6219
	29/32	0.906250 23.0188
	59/64	0.921875 23.4156
15/16		0.937500 23.8125
	61/64	0.953125 24.2094
	31/32	0.968750 24.6062
	63/64	0.984375 25.0031
1		1.000000 25.4000

SFM - SURFACE FEET PER MINUTE

$$.262 \times D \times \text{RPM}$$

RPM - REVOLUTION PER MINUTE

$$\frac{3.82 \times \text{SFM}}{D}$$

FEED RATE

$$\text{C/L} \times T \times \text{RPM}$$

÷ RT

CHIP LOAD

$$\frac{\text{IN./MIN.}}{T \times \text{RPM}}$$

x RT

DETERMINING THE NUMBER OF TEETH

$$\frac{\text{IN./MIN.}}{\text{C/L} \times \text{RPM}}$$

x RT

T	Number of teeth in the tool.
D	Diameter of the tool.
RT	Required number of teeth to make a complete kerf cut.
C/L	The recommended Chip Load for the material.
SFM	Recommended Surface Feet Per Minute.
RPM	The RPM of the spindle rotating the tool.
In./Min.	The Feed Rate in Inches Per Minute.

CARBON AND ALLOY STEELS

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
C1010	215-255	.005"	.007"	350
C1020	Up To 215	.007"	.009"	440
C1025	Up To 215	.007"	.009"	440
C1040	215-255	.005"	.007"	350
C1045	215-255	.005"	.007"	350
C1050	215-255	.005"	.007"	350
C1095	250-300	.004"	.006"	260
B112	Under 215	.007"	.009"	440
1212	200	.007"	.009"	440
1518	200	.007"	.009"	440
1548	200	.005"	.007"	400
A2515	300	.004"	.006"	180
3135	215-255	.005"	.007"	350
3140	250-300	.004"	.006"	260
E3310	300-340	.004"	.006"	180
E3316	250-300	.004"	.006"	260
4140	215-255	.005"	.006"	350
4150	250-300	.004"	.007"	260
4340	250-300	.004"	.006"	260
5145	215-255	.004"	.006"	300
E6150	215-255	.004"	.006"	300
8620	215-255	.005"	.006"	350
8745	300-340	.004"	.006"	180
E9315	300-340	.004"	.006"	180
E9317	250-300	.004"	.006"	260
E52100	250-300	.004"	.006"	260

STRUCTURAL STEELS

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
50	200	.006"	.008"	410
100	250	.004"	.006"	280
110	280	.004"	.006"	240
145	360	.004"	.006"	150
150	320	.004"	.006"	160
160	360	.004"	.006"	150
165	360	.004"	.006"	140
185	400	.004"	.006"	120

TOOL STEELS

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
T1	300-340	.004"	.006"	150
M2	240	.004"	.006"	245
M2	300-340	.004"	.006"	150
M3	300-340	.004"	.006"	150
H13	190	.004"	.006"	180
H13	300-340	.004"	.006"	150
A2	230	.004"	.006"	245
D2	250	.004"	.006"	180
O1	210	.006"	.008"	350
O6	Under 215	.006"	.008"	350
P20	200	.006"	.008"	375
L6	230	.004"	.006"	245
W1	250-300	.004"	.006"	260
W2	190	.006"	.008"	375

STAINLESS STEEL

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
316	150	.004"	.006"	220

ALUMINUM ALLOYS

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
	60-500KG	.010"	.012"	12,000-15,000
	150-500KG	.005"	.007"	9,000-10,000
Extrusions (All)		.001" - .003"		9,000-10,000
Precision (P Finishes, All)		.001" - .008"		9,000-10,000

MAGNESIUM ALLOYS

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
	60-500KG	.010"	.012"	12,000-15,000
	150-500	.005"	.007"	9,000-10,000

COPPER

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
	20-60RB	.007"	.009"	1,150-10,000

BRASS - BRONZE

Material Group	Brinell Hardness	1/4" - 2" Thick Material Chip Load	2" & Up Thick Material Chip Load	Recommended SFM of Tool
	60-10RB	.007"	.009"	2,500-10,000

Material	Surface Footage	Number of Flutes Rough / Finish	1/8" CLPT* Rough Finish	1/2" CLPT* Rough Finish
ALUMINUM				
2024	Max RPM	2 / 3	.004" / .002"	.016" / .008"
6061-(T1-T3)	Max RPM	2 / 3	.002" / .001"	.008" / .004"
6061-(T4-T6)	Max RPM	2 / 3	.004" / .002"	.016" / .008"
7075	Max RPM	2 / 3	.004" / .002"	.016" / .008"
BRASS	750	2 / 3	.002" / .001"	.008" / .004"
COPPER	600	2 / 3	.002" / .001"	.008" / .004"
COMPOSITES				
G10 Fiberglass	1000	2 / 3	.003" / .0015"	.009" / .0045"
Graphite	1000	2 / 3	.004" / .002"	.016" / .008"
Graphite/Epoxy	800	2 / 3	.0015" / .00075"	.0045" / .00225"
Plastics	1300	2 / 3	.004" / .002"	.016" / .008"
MAGNESIUM	Max RPM	2 / 3	.004" / .002"	.016" / .008"
CAST IRON				
Ductile	350	3 / 6	.0015" / .007"	.006" / .003"
Gray	500	3 / 6	.002" / .001"	.008" / .004"
INCONEL				
625/718	100	4 / 6	.005" / .00025"	.001" / .0005"
STEEL				
1018/1020	350	3 / 4	.001" / .0007"	.004" / .003"
4130	260	3 / 6	.0005" / .00025"	.001" / .0005"
4140	220	3 / 6	.0005" / .00025"	.001" / .0005"
4340	280	3 / 6	.0005" / .00025"	.001" / .0005"
STAINLESS STEEL				
303	500	3 / 6	.001" / .0005"	.003" / .0015"
304	225	4 / 6	.0007" / .00035"	.002" / .001"
316	240	3 / 6	.0007" / .00035"	.002" / .001"
15-5/17-4 PH	200	4 / 6	.0005" / .00025"	.0015" / .0007"
440C	200	4 / 6	.0005" / .00025"	.0015" / .0007"
TOOL STEEL				
A2	350	4 / 6	.0005" / .00025"	.002" / .001"
D2	260	4 / 6	.0005" / .00025"	.002" / .001"
H13	230	4 / 6	.0005" / .00025"	.002" / .001"
P20	350	4 / 6	.0005" / .00025"	.003" / .002"
TITANIUM				
Commercially Pure	700	3 / 6	.0007" / .00035"	.003" / .002"
6AL-4V	400	3 / 6	.0005" / .00025"	.003" / .002"
6AL-6V	230	4 / 6	.0003" / .00015"	.001" / .0005"

TOOL COATING RECOMMENDATIONS

Cast Iron:	Ductile - TiAlN • Gray
Inconel:	625 - TiCN • 718 - TiAlN
Steel / Acier:	1018/1020 - TiCN • 4130 - < 40 Rc - TiCN, > 40 Rc - TiAlN • 4140 - < 40 Rc - TiCN, > 40 Rc - TiAlN • 4340 - < 40 Rc - TiCN, > 40 Rc - TiAlN
Stainless Steel:	303 - TiCN • 304 - TiCN • 316 - TiCN • 15-5/17-4 PH - < 40 Rc - TiCN, > 40 Rc - TiAlN • 440C - > 40 Rc - TiAlN
Tool Steel:	A2 - < 40 Rc - TiCN, > 40 Rc - TiAlN • D2 - < 40 Rc - TiCN, > 40 Rc - TiAlN • H13 - < 40 Rc - TiCN, > 40 Rc - TiAlN • P20 - < 40 Rc - TiCN, > 40 Rc - TiAlN
Titanium:	Commercially Pure - TiAlN • 6AL-4V - TiAlN • 6AL-6V - TiAlN

Tool coatings are recommended for improving performance in many ferrous material applications. Condition and/or hardness of the material should be considered when selecting a tool coating. Please refer to the chart as a general guideline for tool coating selection. The following recommendations are based on results from in-house tests and field applications. Individual results may vary based on actual applications.

Bur Diameter	RPM
1/8" or 3mm Solid Carbide	45,000-50,000
3/16" or 5mm Solid Carbide	35,000-40,000
3/16" or 5mm Carbide Head Brazed to 1/8" or 3mm Steel Shank	30,000-35,000
1/4" or 6mm Solid Carbide	30,000-35,000
1/4" or 6mm Carbide Head Brazed to 1/8" or 3mm Steel Shank	25,000-30,000
5/16" or 8mm Carbide Head Brazed to 1/4" or 6mm Steel Shank	25,000-30,000
3/8" or 10mm Carbide Head Brazed to 1/4" or 6mm Steel Shank	25,000-30,000
7/16" or 11mm Carbide Head Brazed to 1/4" or 6mm Steel Shank	20,000-25,000
1/2" or 12mm Carbide Head Brazed to 1/4" or 6mm Steel Shank	20,000-25,000
5/8" or 16mm Carbide Head Brazed to 1/4" or 6mm Steel Shank	15,000-20,000
3/4" or 18mm Carbide Head Brazed to 1/4" or 6mm Steel Shank	15,000-20,000
1" or 25mm Carbide Head Brazed to 1/4" or 6mm Steel Shank	15,000-20,000

Materials	Doublecut	Singlecut	Alumacut	Diamondcut	Chipbreaker
Aluminum			x	x	
Brass, Bronze, Copper	x	x			x
Fiberglass				x	
Cast Iron	x	x		x	
Plastics			x	x	
Steel: 40-55Rc	x	x		x	x
Steel: 55-60Rc	x	x		x	x
Steel: Carbon	x	x			x
Steel: Nickel, Chrome	x	x		x	x
Stainless Steel	x	x			x
Steel Weldments	x	x			x
Titanium	x	x			x
Zinc			x		



TITANIUM NITRIDE COATING (TiN)

Titanium Nitride Coating (TiN) is bright gold in color, has an ambient temperature hardness in the 2800 Vickers (low 80Rc) range, a coefficient of friction under 0.5, and a thermal stability up to about 1000° F TiN meets FDA requirements for surgical tools and food contract applications. Cutting speeds, feeds, wear resistance and tool life generally improve.



TITANIUM ALUMINUM NITRIDE COATING (TiAlN)

Titanium Aluminum Nitride (TiAlN) has an ambient surface hardness in the 3000 Vickers (low, mid 80Rc) range. It's Main advantage is that the hardness is maintained under extreme cutting temperatures in excess of 1300° F. Friction, heat buildup, galling and edge breakdown are significantly reduced and tool life and cutting performance are improved. It is highly effective coating for machining tough-to-cut steels, stainless, cast iron and non-ferrous materials. It can also be used effectively for interrupted cuts. TiAlN coated carbide tools can be run at more aggressive speeds and feeds and can be used with out coolant in certain applications. It is the coating of choice for tough to cut material.



TITANIUM CARBON NITRIDE COATING (TiCN)

Titanium Carbon Nitride Coating (TiCN) has an ambient temperature hardness in the 4000 Vickers (low 90Rc) range. It's use is particularly advantageous when cutting cast iron, silicon aluminum, certain non-ferrous and other abrasive materials. Tool life can be extended using the right combination of speeds feeds and coolant.

Material to Machine	TiN	TiAlN	TiCN
Aluminum, Low Silicon < 10%		X	X
Aluminum, High Silicon > 10%		X	X
Copper, Copper Alloys	X	X	X
Ductile, Malleable Cast Iron	X	X	X
Carbon Steel, 1000 Series	X	X	X
Alloy Steel, 4 to 9000 Series	X	X	X
Tool Steel	X	X	X
SS Steel, 300 Series	X	X	X
SS Steel, 400 Series	X	X	X
SS PH Series	X	X	X
Titanium, Titanium Alloys	X	X	X
Nickel, Nickel Alloys, Cobalt	X	X	X
Wood, Paper	X	X	X
Composites, Plastics	X	X	X

Cold Saw Machine Cross Reference Chart

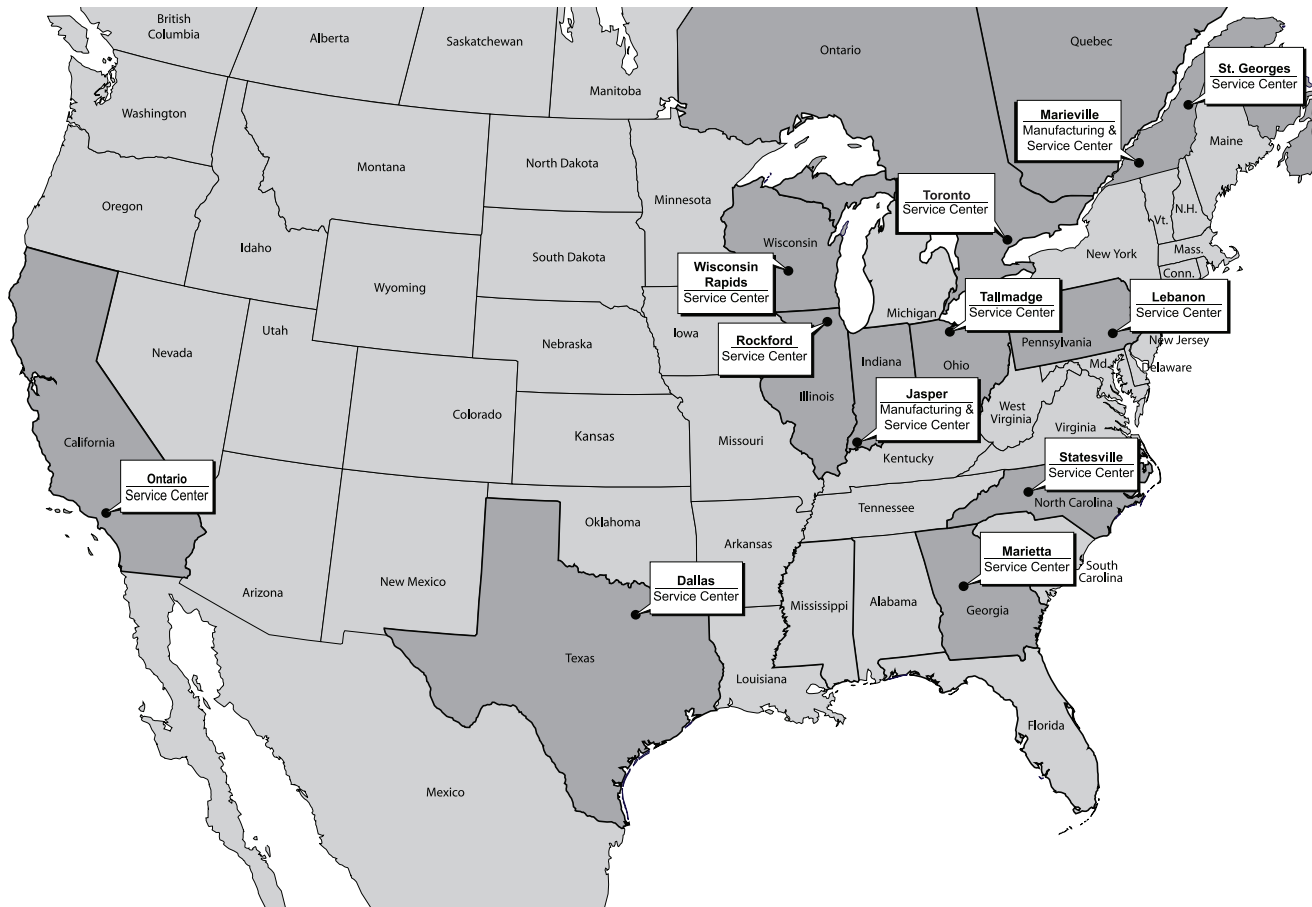
Machine Name	Diameter mm	Bore mm	Pinholes (mm) Qty/Dia./B.C.
Adige-Sala	200-250	32	4/9/50
	275-315	32	2/12/64
	350	40	4/12/64
	400-425	50	4/15/80
Bater	175-250	32	Keyways Required
Bewo	250-300	32	2/8.5/45
	315	40	2/9/55 Man.
	315	40	4/12/64 Auto.
	350	40	4/12/64 Man.
Bimax	100-300	32	2/8.5/45
Bonak	250-350	40	2/8.5/45, 4/12/64
Brobo-Waldown	250	32	2/8.5/45
	300	38	2/9/55
	300-400	40	2/8.5/45, 4/12/64
	500	40	2/8.5/45, 4/12/64, 2/12/80
Conni	400-425	40	4/12/64
	400-425	50	4/15/80
Dake	315-350	32	2/12/64, 2/12/75
	400-525	50	4/15/80
Demurger	160-300	25.4	
	200-250	32	2/8.5/45, 4/12/64
	225-300	40	2/8.5/45, 4/12/64
Dong-Jin	300-370	40	2/8.5/45, 4/12/64
Doringer	315-350	40	2/12/64
Eisele	210-225	40	2/8.5/45
	250-350	40	2/8.5/45, 4/12/64
	370-450	40	2/12/64, 2/15/80
	500	40	2/15/80, 2/15/100
Fabris	225-350	32	2/8.5/45, 4/12/64
Femi	225-315	32	2/8.5/45, 4/12/64
Fong-Ho	250-275	32	2/8.5/45, 2/9/50, 2/12/64
	300-400	32	4/12/64
	380	40	2/12/64, 3/11/65
Haeberle	225-315	40	2/9/55
IBP Pedrazolli	200-350	32	2/12/64
	425	50	4/15/80
IMET	250-350	32	2/8.5/45, 2/12/64
	315-350	40	2/8.5/45, 4/12/64
Kaltenbach	225-250	32	
	350-370	50	4/50/80
Kasto	425	50	4/50/80

Machine Name	Diameter mm	Bore mm	Pinholes (mm) Qty/Dia./B.C.
MACC	225-350	32	2/8.5/45, 2/12/64
Maco	425	50	5/15/80
Mair	300-350	32	2/8.5/45, 2/12/64
	300-350	40	2/8.5/45, 4/12/64
MEP	225-350	32	2/8.5/45, 2/12/64
Metora	250-350	32	2+2 Universal Slots
Omes	250-300	32	2/8.5/45, 2/12/64
O.M.P.	250-370	32	2/8.5/45, 2/12/64
	400-525	50	4/15/80
R.G.A.	250	24.4	
	275-370	40	2/8.5/45, 2/12/64
Robjo	250-350	32	2/8.5/45, 2/12/64
Rohbi	175-250	32	2/8.5/45
Schotchman	250-275-300	32	2/8.5/45, 2/12/64
	275-315-350	40	2/9/55, 4/12/64
Simec	250-350	32	2/12/64
Sinco	350	32	2/8.5/45, 2/12/64
	370	32	2/8.5/45, 2/12/64
Soco	250-350	32	2/12/64
Starbrite	250	32	2/9/55
	300-315	32	2/12/80
Stayer	225	32	
Thomas	225-300	32	2/8.5/45, 2/12/64
	315-350	32	2/12/64, 2/12/75
Tomet	200-315	32	2/8.5/45, 2/12/64
Trennjaeger	250-275	40	4/12/64
	315-350	50	4/15/85
	400	50	4/15/85
Ulmia	180-250	32	
	250-400	40	4/12/64
Viemme	250-350	32	2/8.5/45, 2/12/64
Voucher	275	35	2/13.5/57.2
Wagner	200-315	32	4/9/50
	350	50	4/15/80
Whalen	250-400	40	2/8.5/45, 4/12/64
Weidmann	210-275	32	2/8.5/45
Winter	250-315	40	2/8.5/45, 4/12/64
Wunsch	210-250	32	2/8.5/45
	210-300	40	2/8.5/45
	315-400	40	2/8.5/45, 4/12/64

Saw Blade Diameter (mm)	Saw Blade Diameter (in.)	Standard Hub Diameter (mm)	Standard Hub Diameter (in.)
160mm (Hydromat)	6.29"	99mm	3.89"
200mm	7.87"	90mm	3.54"
200mm (Hydromat)	7.87"	140mm	5.51"
225mm	8.85"	90mm	3.54"
225mm (Hydromat)	8.85"	140mm	5.51"
250mm	9.84"	90mm	3.54"
250mm (Hydromat)	9.84"	140mm	5.51"
250mm (Wagner)	9.84"	110mm	4.33"
275mm	10.82"	100mm	3.93"
300mm	11.81"	100mm	3.93"
315mm	12.40"	100mm	3.93"
350mm	13.77"	120mm	4.72"
400mm	15.74"	120mm	4.72"
425mm	16.73"	120mm	4.72"
450mm	17.71"	130mm	5.11"
500mm	19.68"	140mm	5.51"

Note: All other Hub Diameters not listed above are by special quote only.

Bore Size	Pinhole Spacing Qty/Dia./B.C.	Notes:
32mm	2/8.5/45 + 2/12/64 2/8.5/45 + 2/12/64 + 4/9/50 2/8.5/45 + 2/12/64 + 2/12.5/75	Designed to fit the following machines: Amer Brown, Bewo, B rown, IBP, Kalamazoo, Pedrazolli, Soco, Startrite, Scotchman, Thomas, Wagner, Adige, Robejo, Rohbi, Sinico and Brobo
32mm Hydromat	1/8.5/50 + 1/9/60	
38mm	2/9/55	Designed to fit the Brobo machine.
40mm	2/9/55 + 4/12/64 2/9/55 + 4/12/64 + 2/15/80	Designed to fit the following machines: Brobo, Eisele, Emerson, Haberle, Scotchman, Bewo and Trennjaeger.
50mm	4/15/80 + 4/15/85	Designed to fit a variety of machines: Gerneti, Kaltenbach and Trennjaeger.



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**CORPORATE HEADQUARTERS
INDIANA MANUFACTURING
& SERVICE CENTER**
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Fax: 800-457-7458

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Toronto, Ontario M8Z 1J8 CANADA
Phone: 416-251-2236 / 888-251-2236
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SAINT - GEORGES SERVICE CENTER
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