

LOVEJOY Tool Company, Inc.

Catalog No.

07^{Gi}
LOVEJOY

Gray Iron Group



High Efficiency System for Machining

Gray Iron



1-800-843-8376

Gi group

STEPDEX Face Mills

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Series in order of stock removal requirements

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STEPDEX Face Mill Information

Stepdex is a face mill that is unique, acting as a flycutter with a multi-tooth, rotary broach effect. This type of cutter is commonly used on low horsepower machines, extended reach applications and difficult machining operations. Stepdex face mills obtain faster speeds than conventional face mills and combine Rough and Finish passes with heavy stock removal. The feed relates to the **number of finish stations** in the cutter as shown below.

Single Set of Inserts: (1) Finish Station
feed per revolution = feed per tooth

Double Set of Inserts: (2) Finish Stations
feed per revolution = feed per tooth x 2

Triple Set of Inserts: (3) Finish Stations
feed per revolution = feed per tooth x 3

- LTC-1000 Silicon Nitride used for High production machining of gray cast iron.
- LTC-1200 is the newest generation of Silicon Nitride for machining gray cast iron with optimum performance.

Quick Cutter Selection Guide

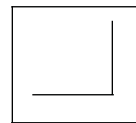
Application	NBX	175	SX	170	185	180
Roughing						
8 Cutting Edges	•					
.250-.350 stock removal						
Roughing/Good Finish						
4 Cutting Edges		•	•			
.150-.250 stock removal						
Roughing/Finishing						
4 Cutting Edges					•	
.080-.150 stock removal						
Finishing or Light DOC						
4 Cutting Edges						•
.010-.100 stock removal						
Faster feed than 170 series						
Finishing or Light DOC						
4 Cutting Edges						•
.010-.100 stock removal						
Fastest feed						

Standard vs. Stepdex Cut Forms

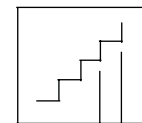
Standard Style



Stepdex Style



Cut Forms



OD OVER → ← .010 RADIAL

Inserts in one plane Inserts in stepped plane

Stepdex Advantages

Rough and Finish in One Pass

Limited Horsepower

Light Duty Machines


Fragile Parts

Weak Holding Fixtures

Extended Spindles or Bars

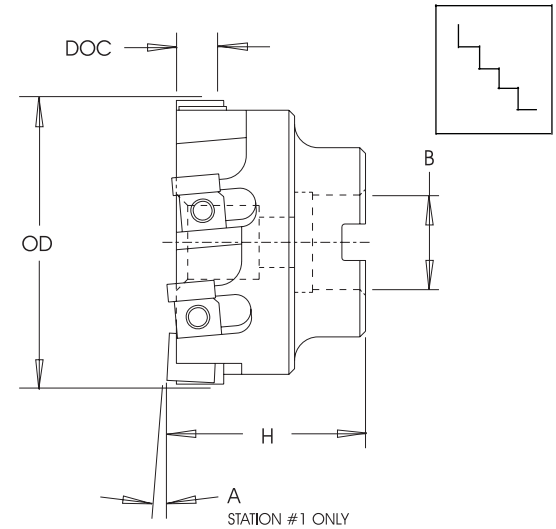
Encountering Chatter

Up to 2 inch³ per minute per unit of horsepower




Insert Lock
3502-0935-0018 RH
3502-0935-0019 LH

Lock Screw
1573

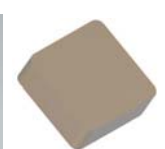


NBX Series



• **NBX Series** - Heavy Roughing applications
.200-.350 stock

Insert
SNC Type



NBX Series Dimensional Specifications									
Order Number	OD	A	B	H	DOC	Insert Number	Inserts per Set	Effective Sets	Total Inserts
4NBX24R6	4.00	3°	1.50	2.10	.200-.350	SNC-433W820	4	2	8
5NBX24R6	5.00	3°	1.50	2.10	.200-.350	SNC-433W820	4	2	8
5NBX34R6	5.00	3°	1.50	2.10	.200-.350	SNC-433W820	4	3	12
6NBX34R6	6.00	3°	1.50	2.10	.200-.350	SNC-433W820	4	3	12
8NBX44R8	8.00	3°	2.00	2.10	.200-.350	SNC-433W820	4	4	16

NBX Series Setting Specifications for Stepped Configuration Tooling						
Tool	Station 1 (H)	Station 2 (H)	Station 3 (H)	Station 4 (H)	Station 5 (H)	Station 6 (H)
4NBX24R6	2.100	2.050	2.000	1.950	N/A	N/A
5NBX24R6	2.100	2.050	2.000	1.950	N/A	N/A
5NBX34R6	2.100	2.050	2.000	1.950	N/A	N/A
6NBX34R6	2.100	2.050	2.000	1.950	N/A	N/A
8NBX44R8	2.100	2.050	2.000	1.950	N/A	N/A

- ### NBX Advantages
- Stable negative geometry provides superior edge strength during heavy metal removal applications
 - Stepdex configuration generates metal removal rates up to 2 inch³ per minute per unit of horsepower
 - Stepdex provides excellent force and load management during overextended or weak setups
 - **LOVEJOY'S** LTC-1000 Si₃N₄ (silicon nitride) material provides extraordinary tool life
 - **LOVEJOY'S** LTC-1000 Si₃N₄ material operates in the advanced range machining parameters
 - A possible 8 Cutting edges can be obtained

For Customer Service call 1-800-843-8376 LOVEJOY Tool Co., Inc.

Gray Iron Group

175 Series

• **175 Series** - Rough and Finish in one pass
.150-.250 stock

Insert SPC Type

175 Series Dimensional Specifications									
Order Number	OD	A	B	H	DOC	Insert Number	Inserts per Set	Effective Sets	Total Inserts
175F0300ASP4-100R	3.00	1°	1.00	1.875	.150-.250	SPC-43	3	2	6
175F0400ASP4-150R	4.00	1°	1.50	1.875	.150-.250	SPC-43	4	2	8
175F0500ASP4-150R	5.00	1°	1.50	1.875	.150-.250	SPC-43	5	2	10
175F0600ASP4-150R	6.00	1°	1.50	1.875	.150-.250	SPC-43	6	2	12
175F0800ASP4-200R	8.00	1°	2.00	1.875	.150-.250	SPC-43	5	3	15
175F0800BSP4-200R	8.00	1°	2.00	1.875	.150-.250	SPC-43	4	4	16

175 Series Setting Specifications for Stepped Configuration Tooling						
Tool	Station 1 (H)	Station 2 (H)	Station 3 (H)	Station 4 (H)	Station 5 (H)	Station 6 (H)
175F0300ASP4-100R	1.875	1.855	1.805	N/A	N/A	N/A
175F0400ASP4-150R	1.875	1.860	1.805	1.745	N/A	N/A
175F0500ASP4-150R	1.875	1.860	1.810	1.765	1.720	N/A
175F0600ASP4-150R	1.875	1.860	1.830	1.795	1.760	1.725
175F0800ASP4-200R	1.875	1.860	1.810	1.765	1.720	N/A
175F0800BSP4-200R	1.875	1.860	1.805	1.745	N/A	N/A

175 Advantages

- Free cutting positive geometry is ideally suited for all gray cast iron materials
- Stepdex configuration generates metal removal rates up to 2 inch³ per minute per unit of horsepower
- Stepdex provides excellent force and load management during overextended or weak setups
- Adjustable Anvoc allows for fine tuning the insert setting
- **LOVEJOY'S** LTC-1200 Si₃N₄ material operates in the advanced range machining parameters

(SX)

Gray Iron Group



Anvil
1357R/LA



Insert Lock
1570



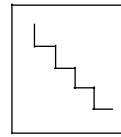
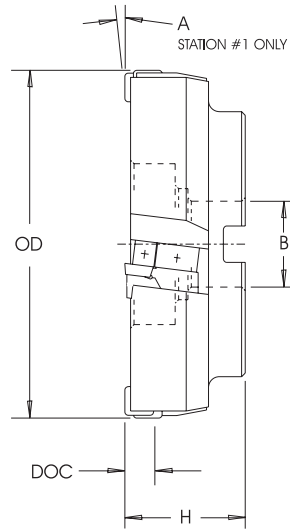
Lock Screw
1573



Anvil Lock
1571



Lock Screw
#10-32 x 1/2
BHCS



SX Series



Insert
SPC Type



- **SX Series** - Rough and Finish in one pass
.150-.250 stock

SX Series Dimensional Specifications

Order Number	OD	A	B	H	DOC	Insert Number	Inserts per Set	Effective Sets	Total Inserts
3SX23R4	3.00	1°	1.00	2.10	.150-.250	SPC-43	3	2	6
4SX24R6	4.00	1°	1.50	2.10	.150-.250	SPC-43	4	2	8
5SX25R6	5.00	1°	1.50	2.10	.150-.250	SPC-43	5	2	10
6SX26R6	6.00	1°	1.50	2.10	.150-.250	SPC-43	6	2	12
8SX35R8	8.00	1°	2.00	2.10	.150-.250	SPC-43	5	3	15
8SX44R8	8.00	1°	2.00	2.10	.150-.250	SPC-43	4	4	16


SX Series Setting Specifications for Stepped Configuration Tooling

Tool	Station 1 (H)	Station 2 (H)	Station 3 (H)	Station 4 (H)	Station 5 (H)	Station 6 (H)
3SX23R4	2.100	2.080	2.030	N/A	N/A	N/A
4SX24R6	2.100	2.085	2.030	1.970	N/A	N/A
5SX25R6	2.100	2.085	2.035	1.990	1.945	N/A
6SX26R6	2.100	2.085	2.055	2.020	1.985	1.950
8SX35R8	2.100	2.085	2.035	1.990	1.945	N/A
8SX44R8	2.100	2.085	2.030	1.970	N/A	N/A


SX Advantages

- Free cutting positive geometry is ideally suited for all gray cast iron materials
- Stepdex configuration generates metal removal rates up to 2 inch³ per minute per unit of horsepower
- Stepdex provides excellent force and load management during overextended or weak setups
- Self-locating precision anvils ensure quick accurate indexes and little down time
- **LOVEJOY'S** LTC-1200 Si₃N₄ material operates in the advanced range machining parameters


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Insert Lock
1313R



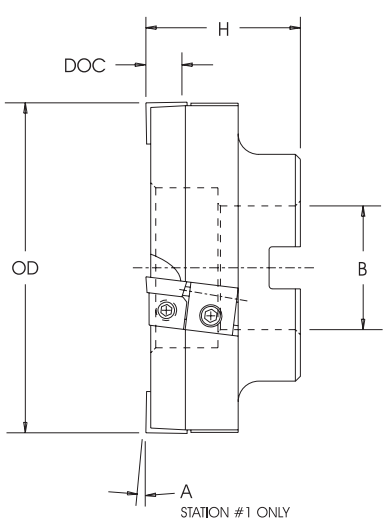
Lock Screw
1319




Anvoc
1314R




Lock Screw
#8-32 x 5/8
SHCS



170 Series



Insert
SPC Type



**• 170 Series - Light duty Rough and Finish
.080-.150 stock**

170 Series Dimensional Specifications									
Order Number	OD	A	B	H	DOC	Insert Number	Inserts per Set	Effective Sets	Total Inserts
170F0300ASP4-100R	3.00	1°	1.00	1.875	.080-.150	SPC-43	3	3	9
170F0400ASP4-150R	4.00	1°	1.50	1.875	.080-.150	SPC-43	3	4	12
170F0500ASP4-150R	5.00	1°	1.50	1.875	.080-.150	SPC-43	3	5	15
170F0600ASP4-200R	6.00	1°	2.00	1.875	.080-.150	SPC-43	3	6	18

170 Series Setting Specifications for Stepped Configuration Tooling							
Tool	Station 1 (H)	Station 2 (H)	Station 3 (H)	Station 4 (H)	Station 5 (H)	Station 6 (H)	
170F0300ASP4-100R	1.875	1.855	1.795	N/A	N/A	N/A	
170F0400ASP4-150R	1.875	1.855	1.795	N/A	N/A	N/A	
170F0500ASP4-150R	1.875	1.855	1.795	N/A	N/A	N/A	
170F0600ASP4-200R	1.875	1.855	1.795	N/A	N/A	N/A	

170 Advantages

- Double positive geometry accommodates a broad range of workpiece materials
- Dense (fine) pitch insert count makes 170 ideal for all gray cast iron machining applications
- Adjustable self-locating anvils provide quick and easy general purpose insert location
- Adjustable ANVOC anvils can fine tune axial runout to tenths (.0001") type tolerances
- Engineered for balance and stability even during extreme application conditions

(GAX Light)

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Insert Lock
1313R



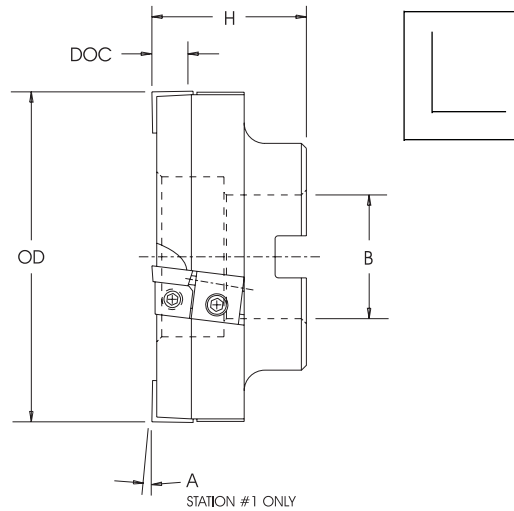
Lock Screw
1319



Anvoc
1314R



Lock Screw
#8-32 x 5/8
SHCS



185 Series



Insert
SPC Type



- **185 Series** - Medium Pitch for finishing lighter depths of cut .020-.250 stock

185 Series Dimensional Specifications

Order Number	OD	D	A	B	H	DOC	Insert Number	Total Inserts
185F0300ASP4-100R	3.03	3.00	1°	1.00	1.875	.010-.250	SPC-43	6
185F0400ASP4-150R	4.03	4.00	1°	1.50	1.875	.010-.250	SPC-43	8
185F0500ASP4-150R	5.03	5.00	1°	1.50	1.875	.010-.250	SPC-43	10
185F0600ASP4-200R	6.03	6.00	1°	2.00	1.875	.010-.250	SPC-43	12
185F0800ASP4-FBR	8.03	8.00	1°	2.50	1.875	.010-.250	SPC-43	16



SMOKE'N

LOVEJOY Tool Co., Inc.
133 Main Street
Springfield, VT 05156

High Efficiency System for Machining

Gray Iron

185 Advantages

- Free cutting positive geometry accommodates a variety of workpiece materials
- Precision hardware components ensure quick accurate insert indexing
- Hardened hardware components provide body protection for superior tool durability
- 1° lead angle generates a near square 90° utilizing the standard SPC-43 insert
- Engineered for balance and stability over a broad spectrum of applications

(GTA)

180 Series

Insert
SPC Type

• **180 Series** - Fine Pitch for finish machining with Maximum Feed Rates .020-.100 stock

180 Series Dimensional Specifications								
Order Number	OD	D	A	B	H	DOC	Insert Number	Total Inserts
180F0300ASP4-100R	3.03	3.00	1°	1.00	1.875	.010-.100	SPC-43	9
180F0400ASP4-150R	4.03	4.00	1°	1.50	1.875	.010-.100	SPC-43	12
180F0500ASP4-150R	5.03	5.00	1°	1.50	1.875	.010-.100	SPC-43	15
180F0600ASP4-200R	6.03	6.00	1°	2.00	1.875	.010-.100	SPC-43	18

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133 Main Street
Springfield, VT 05156



High Efficiency System for Machining
Gray Iron

180 Advantages

- Double positive geometry accommodates a broad range of workpiece materials
- Dense (fine) pitch insert count makes 180 ideal for all gray cast iron machining applications
- Adjustable self-locating anvils provide quick and easy general purpose insert location
- Adjustable ANVOC anvils can fine tune axial runout to tenths (.0001") type tolerances
- Engineered for balance and stability even during extreme application conditions

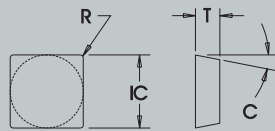
(GAX)

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Gray Iron Group inserts



Insert
SPC Type



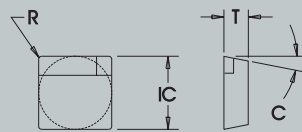
- High production Silicon Nitride SPC-433Z style Finishing 60 RMS or Better

SPC Insert Dimensional and Grade Specifications

Insert Number	IC	T	R	C	Silicon Nitride Grades	
					LTC-1000	LTC-1200
SPC-433W630	.500	.187	.045	11°	•	•
SPC-433ZW630	.500	.187	.045	11°	•	
SPC-434W630	.500	.187	.062	11°	•	•
SPC-433W820	.500	.187	.045	11°		•
SPC-434W820	.500	.187	.062	11°		•



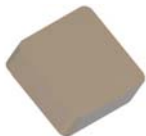
Insert
Crown Type



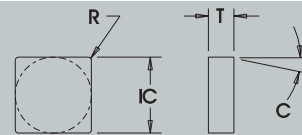
- Finishing 35 RMS or Better

Insert Dimensional and Grade Specifications

Insert Number	IC	T	R	C	CBN Grades	
					LTC-200S	
0502-2802-0001	.500	.188	.040	11°	•	



Insert
SNC Type



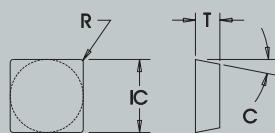
- High production Inserts

SNC Insert Dimensional and Grade Specifications

Insert Number	IC	T	R	C	Silicon Nitride Grades	
					LTC-1000	LTC-1200
SNC-433W820	.500	.187	.045	0°	•	



Insert
SPE Type



- Precision ground for fine finishes

SPE Insert Dimensional and Grade Specification

Insert Number	IC	T	R	C	Carbide Grades			
					Coated Grades		Uncoated Grades	
					586XRm	606jRm	LTC-21	LTC-14
SPE-432	.500	.187	.031	11°	•	•	•	•
SPE-43Z	.500	.187	1° FLAT	11°			•	

Stepdex Success

Part Machined: Compressor Block
Material Machined: Gray Cast Iron
Width of Cut: 5.50 inches
SFM: 2500

Lovejoy Cutter: SX - 6.50 diameter
Lovejoy Insert: SPC-433W630 LTC-1000
Depth of Cut: .200 inches
Feed Rate IPM: 25

Results: Eliminated spindle problems, increased production by 25%, rough and finished in a single pass maintaining .001 flatness over the entire surface.

Part Machined: Housing
Material Machined: Gray Cast Iron

Width of Cut: 3.50 inches
SFM: 2500

Lovejoy Cutter: 170 Series
Lovejoy Insert: SPC-433W630 LTC-1200
0502-2802-0001 LTC-200S CBN
Crown Sweep Insert
Depth of Cut: .125 inches
Feed Rate IPM: 75

Results: Customer needed 35 RMS or better and achieved between 10 and 20 RMS. Also increased production from 25 IPM to 75 IPM.

Part Machined: Printing Machine Base
Material Machined: Gray Cast Iron
Width of Cut: 8.00 inches
SFM: 1800

Lovejoy Cutter: NBX - 8.00 diameter
Lovejoy Insert: SNC-433W820 LTC-1000
Depth of Cut: .350 inches
Feed Rate IPM: 40

Results: Increased production over 25% and customer reported saving over \$100,000 in spindle replacements the first year, due to less cutting forces using the NBX style cutter.

Part Machined: Transmission Cover
Material Machined: Gray Cast Iron
Width of Cut: 1.50 inches
SFM: 2500

Lovejoy Cutter: 180 Series
Lovejoy Insert: SPC-433W820 LTC-1200
Depth of Cut: .100 inches
Feed Rate IPM: 125

Results: Reduced cycle time by 2 minutes per part, increased tool life to 300 minutes per index.

Cleaning and maintenance of *Silicon Nitride* milling cutters

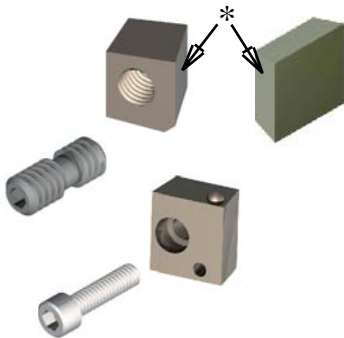
Special attention should be taken in the **cleaning** and maintenance of milling cutters designed to use silicon nitride inserts. Improper **cleaning**, contamination or damage in the insert seat, insert lock and pocket area can lead to insert breakage.

The following procedures should be used when indexing inserts in cutters:

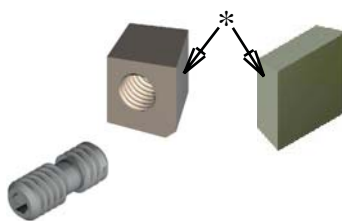
1. **Clean** cutter after removing from machine.
2. Remove all inserts from cutter.
3. If cutter body or parts are damaged, remove all parts, burr sharp corners, rolled over edges or burrs.
4. Any part or body surface not providing adequate support should be replaced or repaired. See figures below for high potential areas.
5. **Clean** pocket area thoroughly; use of automatic parts cleaner will aid in this process.
6. **Clean** both sides of the inserts to remove any contamination.
7. Index to new corner.
8. Use a **torque** wrench to insure proper and consistent locking pressure. See table below for proper torque specifications.
9. Complete dismantling of cutter and **thorough cleaning** should be scheduled periodically, regardless if damage has occurred or not.

SURFACES that are to be cleaned between with extreme care are shown below with an *

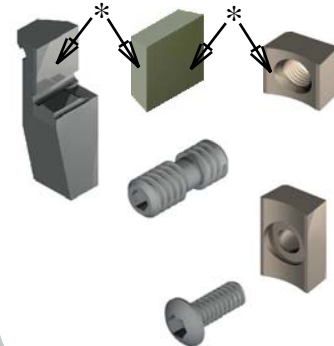
170 thru 185 Style



NBX Style



SX Style



Screw Torque Specifications

Series	Insert	Insert Lock	Insert Lock Screw	Torque (Inch-lbs)	Anvoc/Lock	Anvoc/Lock Screw	Torque (Inch-lbs)
NBX	SNC-43_	3502-0935-0018RH 3502-0935-0019LH	1573	35	-	-	-
175	SPC-43_	1313R	1319	35	1314R Anvoc	#8-32 x 5/8	28
SX	SPC-43_	1570	1573	35	1571 Lock	#10-32 x 1/2	40
170	SPC-43_	1313R	1319	35	1314R Anvoc	#8-32 x 5/8	28
185	SPC-43_	1313R	1319	35	1314R Anvoc	#8-32 x 5/8	28
180	SPC-43_	1313R	1319	35	1314R Anvoc	#8-32 x 5/8	28

*LOVEJOY Tool Co., Inc. 133 Main Street, Springfield, VT 05156
1-800-843-8376*

Gray Iron Group

A STEP ahead of
its time!

Rough and Finish
in ONE pass!

The *G_i* group is
SMOKE'N!

*Over 90 Years of Milling Products
Since 1917*



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