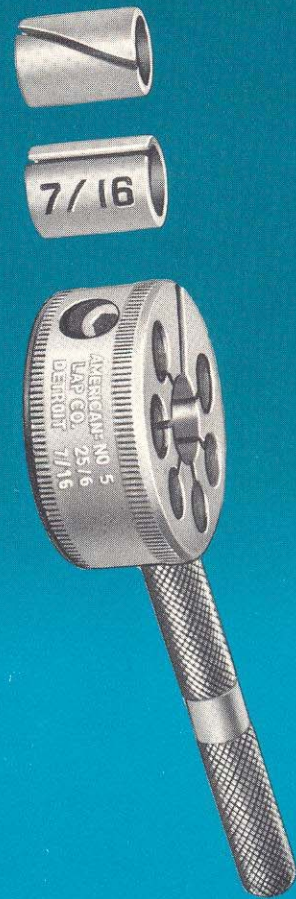


INTERNAL HELICAL SLOT EXPANDING LAPS AND TAPERED ARBORS

- LAPPING MACHINES
- EXPANDING ARBORS
- LAP EXPANDERS
- LAP PULLERS
- LAPPING PLATES
- LAPPING COMPOUND
- LAP and TAPERED ARBOR SETS



External Laps and
Contractable Lap Holders



AMERICAN LAP COMPANY

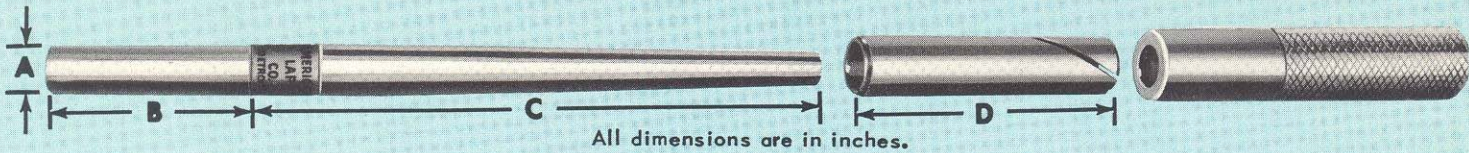
220 Franklin Park—Harbor Springs, MI 49740

231-526-7121

800-245-7121

Fax: 231-526-7151

STANDARD AMERICAN HELICAL SLOT EXPANSION LAPS AND ARBORS



DECIMAL EQUIVALENTS

1/16	0.0625
1/8	0.125
3/16	0.1875
1/4	0.25
5/16	0.3125
3/8	0.375
7/16	0.4375
1/2	0.5
9/16	0.5625
5/8	0.625
11/16	0.6875
3/4	0.75
7/8	0.875
1	1.0
1 1/16	1.0625
1 1/8	1.125
1 1/4	1.25
1 3/8	1.375
1 1/2	1.5
1 5/8	1.625
1 3/4	1.75
1 7/8	1.875
2	2.0
2 1/16	2.0625
2 1/8	2.125
2 1/4	2.25
2 3/8	2.375
2 1/2	2.5
2 5/8	2.625
2 3/4	2.75
2 7/8	2.875
3	3.0
3 1/16	3.0625
3 1/8	3.125
3 1/4	3.25
3 3/8	3.375
3 1/2	3.5
3 5/8	3.625
3 3/4	3.75
3 7/8	3.875
4	4.0
4 1/16	4.0625
4 1/8	4.125
4 1/4	4.25
4 3/8	4.375
4 1/2	4.5
4 5/8	4.625
4 3/4	4.75
4 7/8	4.875
5	5.0
5 1/16	5.0625
5 1/8	5.125
5 1/4	5.25
5 3/8	5.375
5 1/2	5.5
5 5/8	5.625
5 3/4	5.75
5 7/8	5.875
6	6.0
6 1/16	6.0625
6 1/8	6.125
6 1/4	6.25
6 3/8	6.375
6 1/2	6.5
6 5/8	6.625
6 3/4	6.75
6 7/8	6.875
7	7.0
7 1/16	7.0625
7 1/8	7.125
7 1/4	7.25
7 3/8	7.375
7 1/2	7.5
7 5/8	7.625
7 3/4	7.75
7 7/8	7.875
8	8.0
8 1/16	8.0625
8 1/8	8.125
8 1/4	8.25
8 3/8	8.375
8 1/2	8.5
8 5/8	8.625
8 3/4	8.75
8 7/8	8.875
9	9.0
9 1/16	9.0625
9 1/8	9.125
9 1/4	9.25
9 3/8	9.375
9 1/2	9.5
9 5/8	9.625
9 3/4	9.75
9 7/8	9.875
10	10.0
10 1/16	10.0625
10 1/8	10.125
10 1/4	10.25
10 3/8	10.375
10 1/2	10.5
10 5/8	10.625
10 3/4	10.75
10 7/8	10.875
11	11.0
11 1/16	11.0625
11 1/8	11.125
11 1/4	11.25
11 3/8	11.375
11 1/2	11.5
11 5/8	11.625
11 3/4	11.75
11 7/8	11.875
12	12.0
12 1/16	12.0625
12 1/8	12.125
12 1/4	12.25
12 3/8	12.375
12 1/2	12.5
12 5/8	12.625
12 3/4	12.75
12 7/8	12.875
13	13.0
13 1/16	13.0625
13 1/8	13.125
13 1/4	13.25
13 3/8	13.375
13 1/2	13.5
13 5/8	13.625
13 3/4	13.75
13 7/8	13.875
14	14.0
14 1/16	14.0625
14 1/8	14.125
14 1/4	14.25
14 3/8	14.375
14 1/2	14.5
14 5/8	14.625
14 3/4	14.75
14 7/8	14.875
15	15.0
15 1/16	15.0625
15 1/8	15.125
15 1/4	15.25
15 3/8	15.375
15 1/2	15.5
15 5/8	15.625
15 3/4	15.75
15 7/8	15.875
16	16.0
16 1/16	16.0625
16 1/8	16.125
16 1/4	16.25
16 3/8	16.375
16 1/2	16.5
16 5/8	16.625
16 3/4	16.75
16 7/8	16.875
17	17.0
17 1/16	17.0625
17 1/8	17.125
17 1/4	17.25
17 3/8	17.375
17 1/2	17.5
17 5/8	17.625
17 3/4	17.75
17 7/8	17.875
18	18.0
18 1/16	18.0625
18 1/8	18.125
18 1/4	18.25
18 3/8	18.375
18 1/2	18.5
18 5/8	18.625
18 3/4	18.75
18 7/8	18.875
19	19.0
19 1/16	19.0625
19 1/8	19.125
19 1/4	19.25
19 3/8	19.375
19 1/2	19.5
19 5/8	19.625
19 3/4	19.75
19 7/8	19.875
20	20.0
20 1/16	20.0625
20 1/8	20.125
20 1/4	20.25
20 3/8	20.375
20 1/2	20.5
20 5/8	20.625
20 3/4	20.75
20 7/8	20.875

LAPS								CORRESPONDING ARBORS								LAP EXPANDERS	
E LAP SIZES		SHORT LAPS			LONG LAPS			ARBOR NO.	A Shank Dia.	B Shank Lgth.	SHORT ARBORS		LONG ARBORS		EXPANDER NO.	Part No.	
		D Length	Part No.		D Length	Part No.					C Taper Length	Part No.	C Taper Length	Part No.			
1/16"	5/64"		-	-	5/8"	116L	564L	000	1/8"	3/4"	-	-	1 1/2"	A 000	000	LE000	
3/32	7/64		-	-	3/4	332L	764L	00	1/8	3/4	-	-	1 5/8	A00	00	LE00	
1/8	5/32		-	-	7/8	18L	532L	0	1/8	3/4	-	-	1 3/4	A0	0	LE0	
9/64	11/64					964L	1164L										
3/16	13/64	1"	316S	1364S	1 3/8	316L	1364L	1	3/16	1	2"	A1S	2 3/4	A1L	1	LE1	
7/32	15/64	1 1/4	732S	1564S	1 3/4	732L	1564L	2	3/16	1	2 1/2	A2S	3	A2L	2	LE2	
1/4	9/32	1 1/2	14S	932S	2	14L	932L	3	3/16	1	3	A3S	4	A3L	3	LE3	
17/64	19/64		1764S	1964S		1764L	1964L										
5/16	11/32	1 1/2	516S	1132S	2	516L	1132L	4	7/32	1	3	A4S	4	A4L	4	LE4	
21/64	23/64		2164S	2364S		2164L	2364L										
3/8	13/32	1 3/4	38S	1332S	2 1/2	38L	1332L	5	9/32	1 1/2	3 3/4	A5S	5	A5L	5	LE5	
25/64	27/64		2564S	2764S		2564L	2764L										
7/16	15/32	1 3/4	716S	1532S	2 1/2	716L	1532L	6	9/32	1 1/2	3 3/4	A6S	5	A6L	6	LE6	
29/64	31/64		2964S	3164S		2964L	3164L										
1/2	33/64	2 1/4	12S	3364S	3 1/4	12L	3364L	7	3/8	1 1/2	4 1/2	A7S	6	A7L	7	LE7	
17/32	35/64		1732S	3564S		1732L	3564L										
9/16	37/64		916S	3764S		916L	3764L										
19/32	39/64		1932S	3964S		1932L	3964L										
5/8	41/64	2 1/4	58S	4164S	3 1/4	58L	4164L	8	13/32	1 1/2	4 1/2	A8S	6	A8L	8	LE8	
21/32	43/64		2132S	4364S		2132L	4364L										
11/16	45/64		1116S	4564S		1116L	4564L										
23/32	47/64		2332S	4764S		2332L	4764L										
3/4	49/64	2 1/2	34S	4964S	3 1/2	34L	4964L	9	1/2	2	5	A9S	7	A9L	9	LE9	
25/32	51/64		2532S	5164S		2532L	5164L										
13/16	53/64		1316S	5364S		1316L	5364L										
27/32	55/64		2732S	5564S		2732L	5564L										
7/8	57/64	2 1/2	78S	5764S	3 1/2	78L	5764L	10	9/16	2	5	A10S	7	A10L	10	LE10	
29/32	59/64		2932S	5964S		2932L	5964L										
15/16	61/64		1516S	6164S		1516L	6164L										
31/32	63/64		3132S	6364S		3132L	6364L										
1	1 1/64	3	1NS	1N164S	4	1NL	1N164L	11	3/4	2	6	A11S	8	A11L	11	LE11	
1 1/32	13/64		1N132S	1N364S		1N132L	1N364L										
1 1/16	15/64		1N116S	1N564S		1N116L	1N564L										
1 3/32	17/64		1N332S	1N764S		1N332L	1N764L										
1 1/8	19/64		1N18S	1N1964S		1N18L	1N964L										
1 5/32	1 11/64		1N532S	1N1164S		1N532L	1N1164L										
1 3/16	1 13/64		1N316S	1N1364S		1N316L	1N1364L										
1 7/32	1 15/64		1N732S	1N1564S		1N732L	1N1564L										
1 1/4			1N14S		1N14L												

ANY SIZE LAP OR ARBOR OTHER THAN STANDARD WILL BE QUOTED ON UPON REQUEST
WE HAVE A COMPLETE ASSORTMENT OF SPECIAL SIZE AND LENGTH LAPS AND ARBORS IN STOCK

© AMERICAN LAP COMPANY

Prices F.O.B. Detroit

STANDARD LARGE AMERICAN HELICAL SLOT LAPS

LAP SIZE	Length	Part No.	ARBOR	Shank Dia.	Shank Length	Taper Length	Part No.	Lap Exp.
1 5/16"	4"	1N516	No. 12	7/8"	2 1/2"	7 1/2"	A12	LE12
1 3/8"	4"	1N38						
1 7/16"	4"	1N716						
1 1/2"	4"	1N12						
1 9/16"	4"	1N916						
1 5/8"	4"	1N58						
1 11/16"	4"	1N1116	No. 13	1	2 1/2"	7 1/2"	A13	LE13
1 3/4"	4"	1N34						
1 13/16"	4"	1N1316						
1 7/8"	4"	1N78						
1 15/16"	4"	1N1516						
2"	4"	2N0						
2 1/16"	4"	2N116	No. 14	1 1/4"	2 1/2"	7 1/2"	A14	LE14
2 1/8"	4"	2N18						
2 3/16"	4"	2N316						
2 1/4"	4"	2N14						
2 5/16"	4"	2N516						
2 3/8"	4"	2N38						
2 7/16"	4"	2N716	No. 15	1 1/2"	2 1/2"	7 1/2"	A15	LE15
2 1/2"	4"	2N12						
2 9/16"	4"	2N916						
2 5/8"	4"	2N58						
2 11/16"	4"	2N1116						
2 3/4"	4"	2N34						
2 13/16"	4"	2N1316	No. 16	1 3/4"	2 1/2"	7 1/2"	A16	LE16
2 7/8"	4"	2N78						
2 15/16"	4"	2N1516						
3"	4"	3N0						

All dimensions are in inches.

AMERICAN HELICAL SLOT EXPANDING LAPS can hold tolerances of 5 millionths on semi-production work.

The Lap should be kept as tight as possible in the hole to be lapped. If the Lap is kept tight it will correct out-of-roundness, taper, bell-mouth, and bowed-conditions. The Lap should be kept moist with compound or oil to prevent seizing or burnishing, but it should never be permitted to collect compound near the ends or it will produce a bell-mouth condition.

THE INTERNAL AMERICAN HELICAL SLOT EXPANDING LAP can be dressed with an EXTERNAL LAP to keep either Lap true if it is impossible to reciprocate the Lap evenly for uniform wear.

Also using an EXTERNAL LAP is an excellent way to charge the Internal Lap and vice versa. The two Laps crush or impregnate the compound in each other to produce a uniform charge when very close tolerances are to be held. When EXTERNAL LAPS are used to dress or charge the INTERNAL HELICAL SLOT LAPS the straight slot option should be used for the EXTERNAL LAP to prevent any chance of the two helical slots engaging. Thusly, EXTERNAL LAPS with the helical slot should be used for lapping outside diameters with keyways, etc.

If at all possible the INTERNAL HELICAL SLOT LAP should be expanded in the part to be lapped to prevent over-expansion. This method of expanding the Lap requires the use of the Lap Expander and permits the Lap to be kept tight in the part without checking the size of the Lap each time it is expanded.

THE SPEED OF LAPPING can actually remove more stock faster than grinding or honing if the proper compound is used and the Lap is expanded often. For example, a 1/4" Lap will remove .0001 in 2-3 seconds with a 600 grit compound. After the 2 or 3 second time the part is sliding on the Lap and is not cutting which means the Lap should be expanded again. If the Lap is expanded often enough and a sufficient (not excess) supply of compound is used, holes under 3/4" diameter can be lapped faster than grinding or honing with far more accuracy and less initial investment.

LAPPING COMPOUND may be applied with a small flat paint brush or anything similar. The part to be lapped should be reciprocated over the Lap before expanding the Lap tight. This assures that the compound is distributed evenly, so the part to be lapped (which is usually harder than annealed lap iron) will impregnate the Lap with the compound when the Lap is expanded tight and reciprocated.

THE HELICAL SLOT produces uniform Lap expansion, giving faster lapping action and longer Lap life because of the entire area of the Lap being in contact with the work.

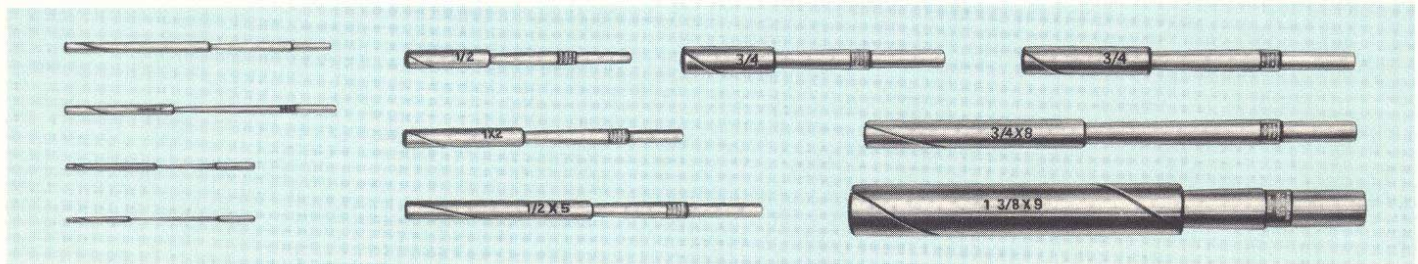
THE INTERNAL TAPER of the Lap with the Helical Slot fitting on the mated TAPERED ARBOR permits true expansion of the Lap. The Lap uncoils like a spring, due to the Helical Slot, and remains round. The LAP is EXPANDED by driving it up the Tapered Arbor with a Lap Expander and by tapping the Expander with a hammer. The Lap may be expanded by SPLIT-TENTHS with a light blow.

STANDARD AMERICAN HELICAL SLOT LAPS will expand at least 10% of their original size, the larger Laps expanding more, and will contract from 30% to 75% of the original expansion, again the larger Laps contracting more.

Holes with keyways, cross holes, or any interruptions are lapped geometrically true without relieving sharp edges or small lands.

AMERICAN HELICAL SLOT EXPANDING LAPS are made of annealed fine grain Lap Iron and are ground on mating Standard American Tapered Arbors. The TAPERED ARBORS are made of tool steel, hardened, and ground on center.

AMERICAN HELICAL SLOT LAPS are ground .001 under fractional size and can be ground to any decimal size.



WE HAVE A COMPLETE ASSORTMENT OF SPECIAL SIZE AND LENGTH LAPS AND ARBORS IN STOCK

LAP PULLERS

LAP PULLERS are used to retract the Lap on the Tapered Arbor when it is over-expanded, or to remove the Lap from the Tapered Arbor. The LAP PULLERS have a set of interchangeable discs to accommodate each individual Tapered Arbor in its range. The LAP PULLERS can be used while the Lap and Tapered Arbor are

in the chuck or drive. This saves time by allowing the operator to continue working instead of removing the Lap and Tapered Arbor from the drive to retract the Lap. The different size discs are held in place by a screw and can be changed to accommodate different sizes in 15 seconds.



Extra Small Lap Puller ... Part No. ESLP
Retracts laps from 1/16" to 1/64"

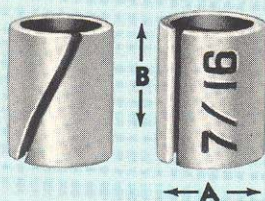
Small Lap Puller Part No. SLP
Retracts laps from 3/16" to 3/64"

Large Lap Puller Part No. LLP
Retracts laps from 5/8" to 1 1/4"

STANDARD AMERICAN EXTERNAL

**CONTRACTING LAPS ARE MADE WITH
HELICAL OR STRAIGHT SLOTS**

STANDARD AMERICAN EXTERNAL LAP HOLDERS are used to hold an inexpensive Lap Insert and provide uniform round contraction. The Lap Insert is held from rotating by a cone-point set screw. A socket cap screw is used for contracting the Holder, which provides fast opening and closing and can be used as a second handle. THE EXTERNAL



All dimensions are in inches.

A LAP SIZES	B LAP LENGTHS AND PRICES					
	Length	Part No.	Length	Part No.	Length	Part No.
1/16"		1EX116		2EX116		3EX116
5/64	1/2"	1EX564	3/4"	2EX564	1 1/2"	3EX564
3/32		1EX332		2EX332		3EX332
7/64		1EX764		2EX764		3EX764
1/8		1EX18		2EX18		3EX18
9/64	1/2	1EX964	3/4	2EX964	1 1/2	3EX964
5/32		1EX532		2EX532		3EX532
11/64		1EX1164		2EX1164		3EX1164
3/16		1EX316		2EX316		3EX316
13/64		1EX1364		2EX1364		3EX1364
7/32	1/2	1EX732	3/4	2EX732	1 1/2	3EX732
15/64		1EX1564		2EX1564		3EX1564
1/4		1EX14		2EX14		3EX14
17/64		1EX1764		2EX1764		3EX1764
9/32	1/2	1EX932	3/4	2EX932	1 1/2	3EX932
19/64		1EX1964		2EX1964		3EX1964
5/16		1EX516		2EX516		3EX516
21/64		1EX2164		2EX2164		3EX2164
11/32	1/2	1EX1132	3/4	2EX1132	1 1/2	3EX1132
23/64		1EX2364		2EX2364		3EX2364
3/8		1EX38		2EX38		3EX38
25/64		1EX2564		2EX2564		3EX2564
13/32	1/2	1EX1332	3/4	2EX1332	1 1/2	3EX1332
27/64		1EX2764		2EX2764		3EX2764
7/16		1EX716		2EX716		3EX716
29/64		1EX2964		2EX2964		3EX2964
15/32	1/2	1EX1532	3/4	2EX1532	1 1/2	3EX1532
31/64		1EX3164		2EX3164		3EX3164
1/2		1EX12		2EX12		3EX12
17/32		1EX1732		2EX1732		3EX1732
9/16	1/2	1EX916	1	2EX916	2	3EX916
19/32		1EX1932		2EX1932		3EX1932
5/8		1EX58		2EX58		3EX58

(See A Lap Sizes)	C LAP HOLDER LENGTHS AND PRICES					
Holder No.	Length	Part No.	Length	Part No.	Length	Part No.
0	1/2"	LH012	3/4"	LH034	1 1/2"	LH01N12
1	1/2	LH112	3/4	LH134	1 1/2	LH11N12
2	1/2	LH212	3/4	LH234	1 1/2	LH21N12
3	1/2	LH312	3/4	LH334	1 1/2	LH31N12
4	1/2	LH412	3/4	LH434	1 1/2	LH41N12
5	1/2	LH512	3/4	LH534	1 1/2	LH51N12
6	1/2	LH612	3/4	LH634	1 1/2	LH61N12
7	1/2	LH712	1	LH71N	2	LH72N

LAPS AND LAP HOLDERS

LAP HOLDERS are made of hardened steel and are I.D. ground. When ordering please specify LENGTH of Holder and Lap and HELICAL or STRAIGHT SLOT. The straight slot should be used when dressing helical slot internal Laps to prevent any engagement of the slots. The helical slot should be used when lapping parts with keyways or interruptions.

All dimensions are in inches.

**CONTRACTING LAPS ARE MADE WITH
HELICAL OR STRAIGHT SLOTS**

A LAP SIZES	B LAP LENGTHS AND PRICES					
	Lgth.	Part No.	Lgth.	Part No.	Lgth.	Part No.
21/32" 11/16" 23/32" 3/4"	1/2"	1EX2132 1EX1116 1EX2332 1EX34	1"	2EX2132 2EX1116 2EX2332 2EX34	2"	3EX2132 3EX1116 3EX2332 3EX34
25/32" 13/16" 27/32" 7/8"	1/2"	1EX2532 1EX1316 1EX2732 1EX78	1"	2EX2532 2EX1316 2EX2732 2EX78	2"	3EX2532 3EX1316 3EX2732 3EX78
29/32" 15/16" 31/32" 1"	1/2"	1EX2932 1EX1516 1EX3132 1EX1N	1"	2EX2932 2EX1516 2EX3132 2EX1N	2"	3EX2932 3EX1516 3EX3132 3EX1N
11/16" 11/8" 13/16" 11/4"	3/4"	1EX1N116 1EX1N18 1EX1N316 1EX1N14	11/2"	2EX1N116 2EX1N18 2EX1N316 2EX1N14	21/2"	3EX1N116 3EX1N18 3EX1N316 3EX1N14
15/16" 13/8" 17/16" 11/2"	3/4"	1EX1N516 1EX1N38 1EX1N716 1EX1N12	11/2"	2EX1N516 2EX1N38 2EX1N716 2EX1N12	21/2"	3EX1N516 3EX1N38 3EX1N716 3EX1N12
19/16" 15/8" 111/16" 13/4" 113/16" 17/8" 115/16" 2"	3/4"	1EX1N916 1EX1N58 1EX1N1116 1EX1N34 1EX1N1316 1EX1N78 1EX1N1516 1EX2N0	11/2"	2EX1N916 2EX1N58 2EX1N1116 2EX1N34 2EX1N1316 2EX1N78 2EX1N1516 2EX2N0	21/2"	3EX1N916 3EX1N58 3EX1N1116 3EX1N34 3EX1N1316 3EX1N78 3EX1N1516 3EX2N0
21/8" 21/4" 23/8" 21/2"	1"	1EX2N18 1EX2N14 1EX2N38 1EX2N12	2"	2EX2N18 2EX2N14 2EX2N38 2EX2N12	3"	3EX2N18 3EX2N14 3EX2N38 3EX2N12
25/8" 23/4" 27/8" 3"	1"	1EX2N58 1EX2N34 1EX2N78 1EX3N0	2"	2EX2N58 2EX2N34 2EX2N78 2EX3N0	3"	3EX2N58 3EX2N34 3EX2N78 3EX3N0
31/2" 33/4" 4" 41/4"	1"	1EX3N12 1EX3N34 1EX4N0 1EX4N14	2"	2EX3N12 2EX3N34 2EX4N0 2EX4N14	3"	3EX3N12 3EX3N34 3EX4N0 3EX4N14

(See A Lap Sizes)	C LAP HOLDER LENGTHS AND PRICES					
Holder No.	Lgth.	Part No.	Lgth.	Part No.	Lgth.	Part No.
8	1/2"	LH812	1"	LH81N	2"	LH82N
9	1/2"	LH912	1"	LH91N	2"	LH92N
10	1/2"	LH1012	1"	LH101N	2"	LH102N
11	3/4"	LH1134	11/2"	LH111N12	21/2"	LH112N12
12	3/4"	LH1234	11/2"	LH121N12	21/2"	LH122N12
13	3/4"	LH1334	11/2"	LH131N12	21/2"	LH132N12
14	1"	LH141N	2"	LH142N	3"	LH143N
15	1"	LH151N	2"	LH152N	3"	LH153N
16	1"	LH161N	2"	LH162N	3"	LH163N



LAPPING PLATES

Our fine grain annealed lap iron LAPPING PLATES are heavily ribbed to retain accuracy and are flat within .0002". The trough is integrally cast around the outside edge to catch excess lapping compound and prevent sloppiness and the loss of expensive diamond dust. Shipments are immediate from stock.

STOCK SIZES

6" x 9" — 1/4" Squares.....	LP 6 x 9
9" x 12" — 3/8" Squares.....	LP 9 x 12
12" x 15" — 3/8" Squares.....	LP 12 x 15
15" x 18" — 3/8" Squares.....	LP 15 x 18

LAPPING ABRASIVE

ALUMINUM OXIDE COMPOUND OR POWDERS

Grades	320	500	600	700	900	1000
Part No. 1/2 lb. Can	AL3212	AL5012	AL6012	AL7012	AL9012	AL10012
Part No. 1 lb. Can	AL321N	AL501N	AL601N	AL701N	AL901N	AL1001N

SILICON CARBIDE COMPOUND OR POWDERS

Grades	320	500	600
Part No. 1/2 lb. Can	SC3212	SC5012	SC6012
Part No. 1 lb. Can	SC321N	SC501N	SC601N

BORON CARBIDE COMPOUND OR POWDERS

Grades	400	500	600	800
Part No. 1/2 lb. Can	BC4012	BC5012	BC6012	BC8012
Part No. 1 lb. Can	BC401N	BC501N	BC601N	BC801N

LAPPING ABRASIVES AND THEIR USES

ALUMINUM OXIDE: Aluminum oxide should be used on soft metals because of its unusual grain structure, relatively high degree of hardness and malleability. This compound is also adapted to the lapping of: machine spindles, bearings, dies, precision tools and gages of hardened steel, and non-ferrous castings.

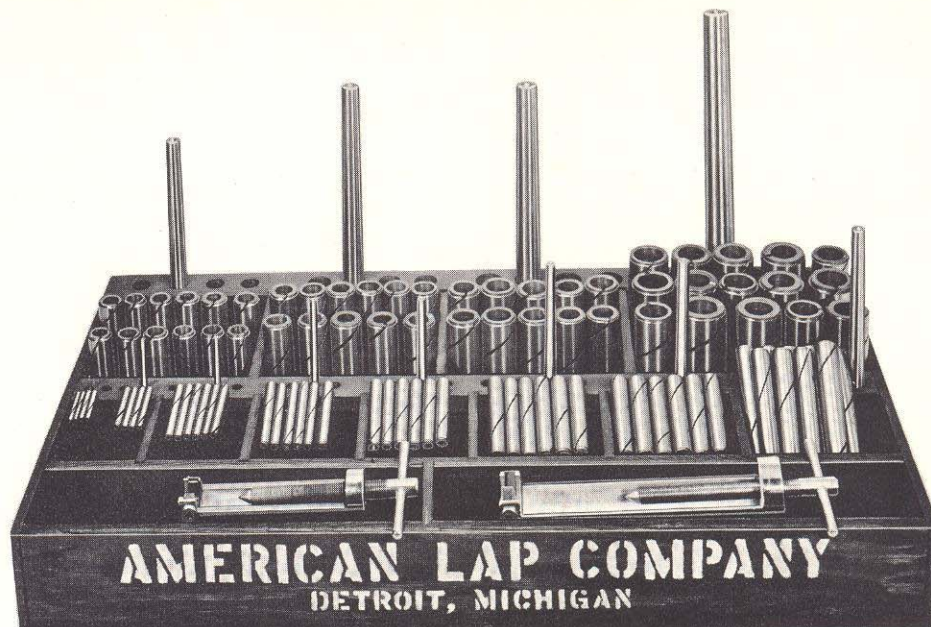
SILICON CARBIDE: Silicon carbide is only suited for the lapping of hardened metals due to its characteristics of extreme hardness and sharpness. But because of its brittleness and tendency to break-down into very sharp pieces thus producing scratches, its use is restricted to the lapping of most gears and large valves.

BORON CARBIDE: Boron carbide is the hardest manufactured material ever produced for industrial use. This material can be used for the lapping of extremely hard metals like tungsten and tantalum carbide and other lapping jobs that previously required the use of diamond.

Grits from 400-800 are generally recommended for tool, die and gage work. Grits up to 1000 are used for ultra finish surfaces and high polishing.

LAP AND ARBOR SETS

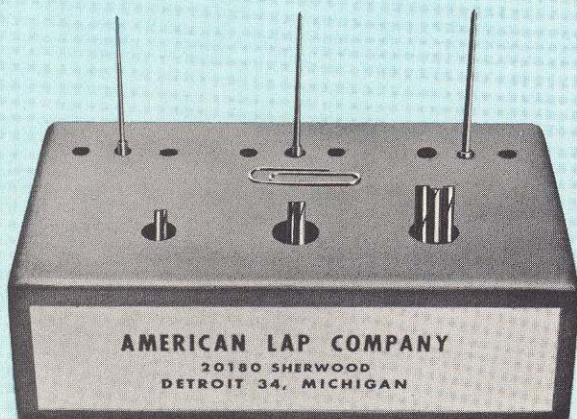
CASE ILLUSTRATED IS
FURNISHED WITH SET



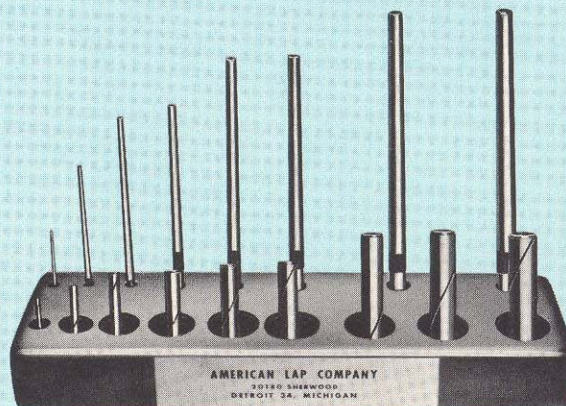
Long Set, Short Set, Long Arbors and Short Laps Set, Long Bench Set, Short Bench Set
or Long Arbors and Short Laps Bench Set.

PART NO.

Long Set: From $\frac{3}{16}$ " to $1\frac{1}{4}$ " by 64ths.—69 Laps and 11 Arbors—Without Expanders.....	LSWO
— With Expanders.....	LSWE
Short Set: From $\frac{3}{16}$ " to $1\frac{1}{4}$ " by 64ths.—69 Laps and 11 Arbors—Without Expanders.....	SSWO
— With Expanders.....	SSWE
Long Arbors and Short Laps: From $\frac{3}{16}$ " to $1\frac{1}{4}$ " by 64ths.—69 Laps and 11 Arbors—Without Expanders....	LASLWO
— With Expanders.....	LASLWE
Long Bench Set: From $\frac{1}{16}$ " to $\frac{5}{8}$ " by 64ths.—37 Laps and 11 Arbors—Without Expanders.....	LBSWO
— With Expanders.....	LBSWE
Short Bench Set: From $\frac{1}{16}$ " to $\frac{5}{8}$ " by 64ths.—37 Laps and 11 Arbors—Without Expanders.....	SBSWO
— With Expanders.....	SBSWE
Long Arbors and Short Laps Bench Set: From $\frac{1}{16}$ " to $\frac{5}{8}$ " by 64ths—	
37 Laps and 11 Arbors—Without Expanders.....	LSBSWO
— With Expanders.....	LSBSWE
Extra Small Set: From $\frac{1}{16}$ " to $1\frac{1}{4}$ " by 64ths.—8 Laps and 3 Arbors—Without Expanders.....	ESSWO
— With Expanders.....	ESSWE
Small Set—Short Series: From $\frac{1}{8}$ " to $\frac{5}{8}$ " by 16ths.—9 Laps and 8 Arbors—Without Expanders.....	SSSWO
— With Expanders.....	SSSWE
Small Set—Long Series: From $\frac{1}{8}$ " to $\frac{5}{8}$ " by 16ths.—9 Laps and 8 Arbors—Without Expanders.....	SSLWO
— With Expanders.....	SSLWE



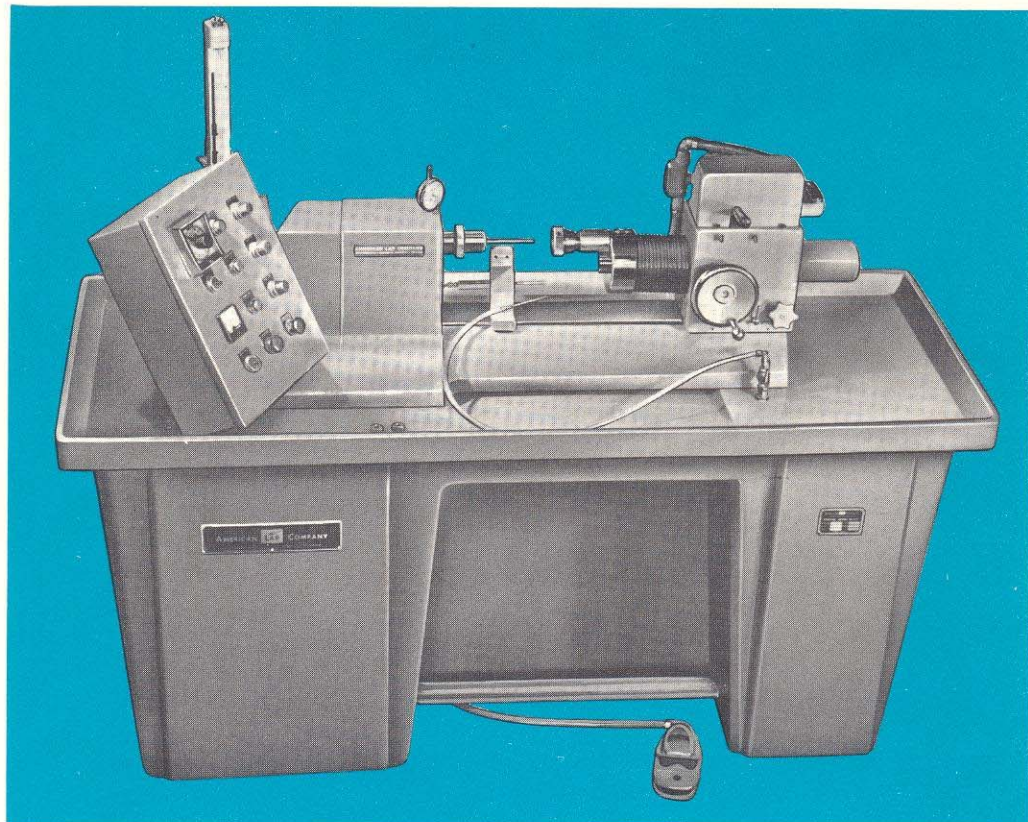
Extra Small Set.



Small Set — Short Series and Long Series.

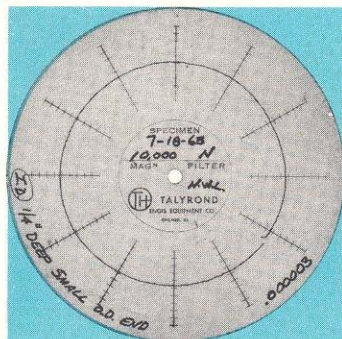
UNIVERSAL INTERNAL & EXTERNAL LAPPING MACHINE

This machine was developed to remove .001" to .00001 of stock in seconds and obtain millionth dimensions in straightness and roundness thruout.

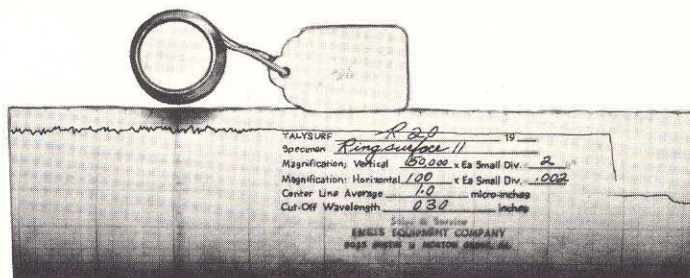


SPECIFICATIONS

- Mechanized and indicated lap expansion and contraction by as small as .000010".
- Automatic Cycle
- Power Reciprocation
- Parts are lapped, cleaned, and gaged without removal from the machine.
- Fully adjustable stroke length 0 - 4" infinitely without steps.
- Adjustable reciprocation stroke speed infinitely: 0-200 strokes /Min. Optional 0-400 spm
- Reciprocation speed adjustable instantly in one-half second.
- Variable spindle speed: 120-1200 RPM
- Tailstock moveable on separate way for taper, bellmouth, and camber correction, quick adjusting.
- Lapping action measured with spindle motor ammeter.
- Two position turret and hardened steel dovetail way.
- Pre-loaded and sealed ball bearing spindle.
- Filtered solvent system for cleaning parts while held in machine.
- Magnetic electric control panel with transformer providing 110 volt for pushbutton control circuit.
- Machine painted Horizon Gray. (7-B)
- Machine completely wired and assembled when delivered.



Talyrond graph shows .000003" roundness produced on a fuel injector bushing.



Talysurf chart shows a 1 microinch surface on a tungsten carbide flame plated bore.

Talysurf chart shows bore of a gas bearing to be straight within .000005" for entire length including ends.

