



Precision Turning Heads, Inserts & Chamfering Tools



LMT-FETTE Precision Turning Heads turn blanks to thread rolling tolerances, providing an excellent finish even when turning speeds are high and feed rates are heavy! The simple design requires minimal service and allows for extended tool life.

- Heavy duty hollow milling tool
- Indexable inserts
- Economically reduces diameters on round bar stock and profile formed materials
- Significantly reduces cycle time
- Compact design permits applications with many different machine tools

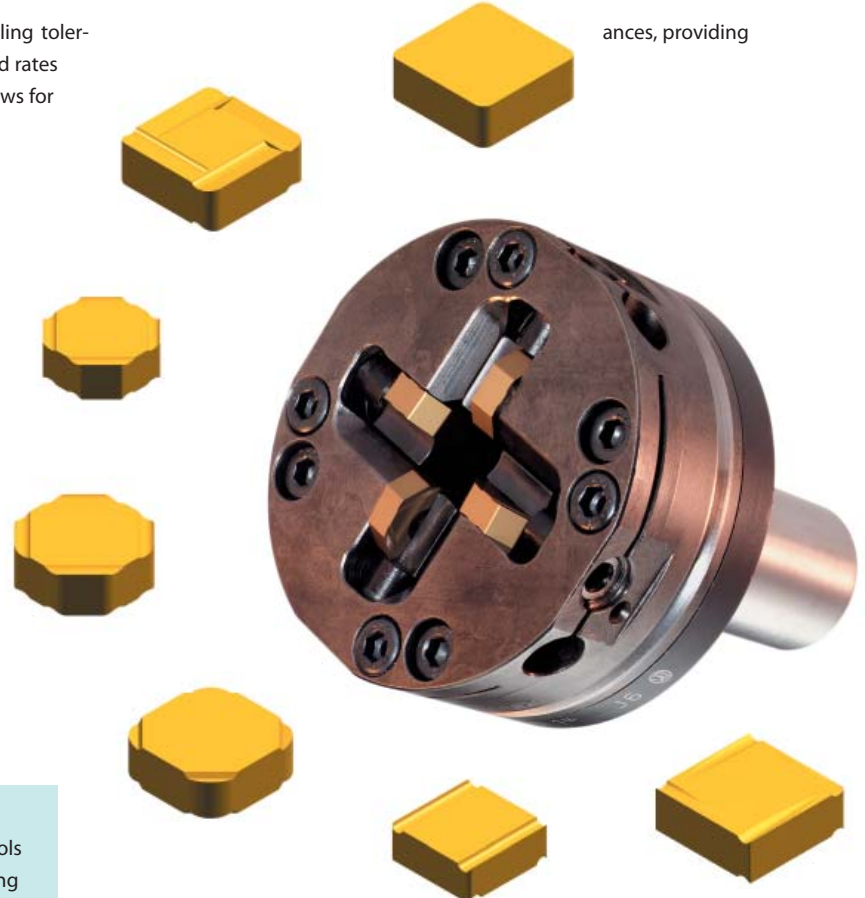
FS Heads are designed to turn blank diameters for LMT-FETTE cold forming applications. It is possible to produce turned diameters on shaft ends with a turning length of approximately 6 times the turning diameter. Extended turning lengths are possible depending upon application.

FS Turning Heads can be used:

- Stationary
- Rotating



Our Precision Turning Program also includes LMT-FETTE Chamfering Tools with indexable inserts for chamfering component part ends. They may be used separately or mounted inside a FS Turning Head.



See page 8 for insert ordering information.

Applications

Dimensions in (mm)	Blank diameter inch (mm)	Turned diameter inch (mm)	Turned length inch (mm)	Actual turning time (sec)
	Hexagonal across flats 1.259 (32)	1.142 (29.00)	4.33 (110)	14
	.591 (18)	0.472 (12.00)	2.205 (56)	5.4
	.827 (21)	0.629 (16.00)	2.677 (68)	6.5
	Hexagonal across flats .669 (17)	0.354 (9.00)	.6692 (17)	2.5
	.6299 (16)	0.579 (14.70)	1.968 (50)	8.5

FETTE

Turning Accuracy

No radial deflection of the inserts, even when heavy cuts are made. This is a result of the rigid design of the head and of the unique clamping system.

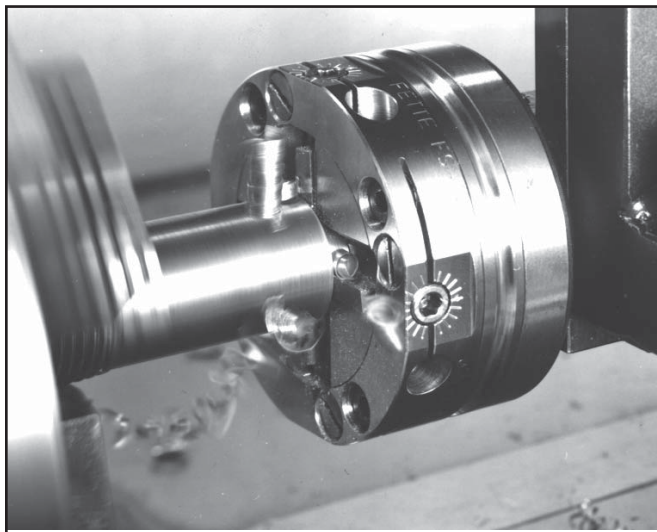
Inserts Positioned Accurately—Produce Optimum Machining Conditions

Adjustment for true running directly at the cutting edges is made simple and quick by using the Setting Gauge with Dial Indicator. See picture 3.

A Complete Program of Indexable Inserts for Several Component Shapes and Materials

LMT-FETTE Precision Turning Heads produce turned diameters between .0787"–1.97" with appropriate Chamfering Tools. Also available are various attachments for mounting the Turning Head and Chamfering Tool as required for different machine spindles.

Easy Adjustment—Simple Operation



Picture 1: Work spindle must be in perfect alignment with turning head to ensure accurate turned diameters.

Set-ups are simple, as is adjusting for wear on cutting edges, because there is an adjusting screw for each insert marked in increments of .0004". Adjustment instructions appear on page 11.

Simultaneous Turning and Chamfering

By using built-in Chamfering Tools with Turning Heads FS 10-FS 90 with the appropriate attachments, many components can be turned and chamfered at the same time. No extra operations are involved, and no time is spent on change of set-up or reclamping.

The Chamfering Tool mounts three indexable inserts and has been proven to be very efficient when used either in conjunction with the FS Turning Head, or separately for chamfering journals, shafts, rods and similar components. The chamfering tool is furnished with a 20° chamfering angle. See picture 2.



Picture 2: Chamfering Tool with Indexable Inserts

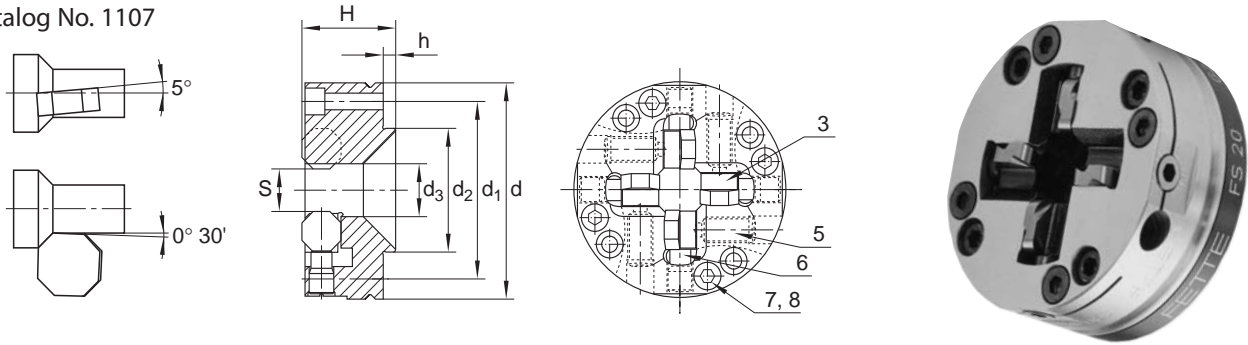


Picture 3: Setting Gauge on FS Turning Head

Extensive Range Of Indexable Inserts For Turning

All Turning Heads and Chamfering Tools are designed to take different types of indexable inserts with a standard size .5" edge length .1874" thick. The standard LMT-FETTE range of precision-ground indexable inserts for turning, designed for a wide variety of applications, comprises inserts of LC215V and LC225S grades, ground to various forms. The table on page 8 of this leaflet summarizes the details of the inserts available.

Precision Turning Heads Catalog No. 1107



Dimensions

Type	Turning Range (S)	d	d ₁	d ₂	d ₃	No. Teeth	EDP No.
FS-00	0.08-0.20	2.36	1.89	1.81	0.24	2	75000
FS-10	0.20-0.39	2.56	2.09	1.38	0.47	4	75023
FS-20	0.39-0.59	2.76	2.28	1.58	0.67	4	75047
FS-30	0.59-0.79	2.95	2.48	1.77	0.87	4	75068
FS-40	0.79-0.98	3.15	2.68	1.97	1.06	4	75089
FS-50	0.98-1.18	3.35	2.87	2.17	1.26	4	75110
FS-60	1.18-1.38	3.62	3.11	2.76	1.46	4	75131
FS-70	1.38-1.57	3.82	3.30	2.95	1.65	4	75152
FS-80	1.57-1.77	4.02	3.50	3.15	1.85	4	75173
FS-90	1.77-1.97	4.22	3.70	3.35	2.05	4	75194

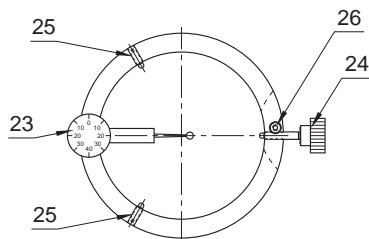
Spare Parts

Part	Qty.	Designation	FS10 EDP No.	FS00-90 EDP No.
3	4 ¹	Clamping Piece ²	75607	75601
5	4 ¹	Thrust Screw	75610	75610
6	4 ¹	Adjusting Screw	75586	75586
7	4 ¹	Screw	75949	13058
8	4 ¹	Washer	75655	75655

Inserts must be ordered separately. See page 8 for available inserts. Larger dimensions, special designs, and left-hand turning heads available on request.

Spare Parts Identifying Chart located on page 11.
1) 2 piece for the FS-00. 2) Shorter version for FS-10.

Setting Gauge Catalog No. 8807



Dimensions

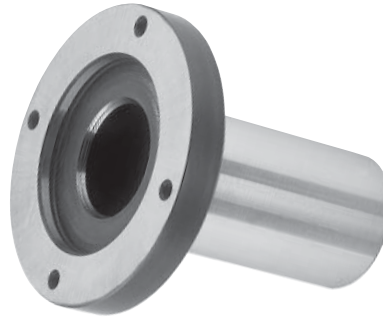
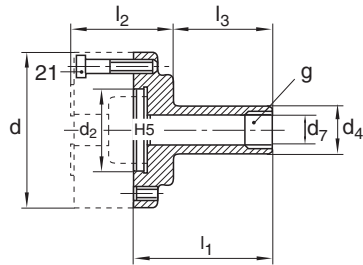
Type	Turning Range	EDP No.
FS-00	0.08-0.20	75012
FS-10	0.20-0.39	75035
FS-20	0.39-0.59	75056
FS-30	0.59-0.79	75077
FS-40	0.79-0.98	75098
FS-50	0.98-1.18	75119
FS-60	1.18-1.38	75140
FS-70	1.38-1.57	75161
FS-80	1.57-1.77	75182
FS-90	1.77-1.97	75203

Spare Parts

Part	Qty.	Designation	EDP No.
23	1	Dial Indicator with Feeler*75652	
24	1	Knurled Screw	75592
25	2	Set Screw	75595
26	1	Cap Screw	75778

Spare Parts Identifying Chart located on page 11.
*Dial indicator and feeler not sold separately.

Adapter Shank Catalog No. 9701



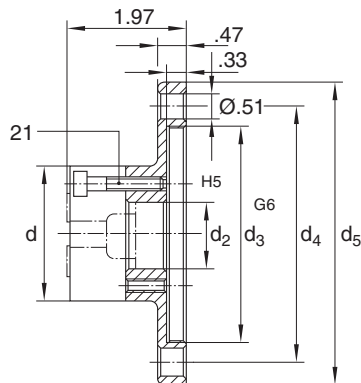
Dimensions

Spare Parts

Type	Turning Range (S)	d ₄	d	d ₂	d ₇	g	l ₁	l ₂	l ₃	EDP No.	Part	Qty.	Designation	00-50 EDP #	60-90 EDP #
FS-00	0.08-0.20	0.625	2.3622	1.8110	0.4133	M12x1.5	1.97	1.57	1.42	75003	21	4	Cap Screw M5 x 30 DIN 912	18503	75793
FS-00	0.08-0.20	0.750	2.3622	1.8110	0.4133	M12x1.5	1.97	1.57	1.42	75006					
FS-10	0.20-0.39	0.750	2.5590	1.3780	0.4921	M14x1.5	2.20	1.65	1.57	75029					
FS-20	0.39-0.59	1.000	2.7559	1.5748	0.7283	M20x1.5	2.60	1.65	1.97	75050					
FS-30	0.59-0.79	1.250	2.953	1.7717	0.8858	M24x1.5	2.87	1.73	2.16	75071					
FS-40	0.79-0.98	1.500	3.1496	1.9685	1.1220	M30x1.5	3.07	1.73	2.36	75092					
FS-50	0.98-1.18	1.500	3.3465	2.1654	1.2401	M33x1.5	3.46	1.73	2.76	75113					
FS-60	1.18-1.38	2.000	3.6620	2.7559	1.4370	Ø 36	3.93	1.97	3.15	75134					
FS-70	1.38-1.57	2.125	3.8188	2.9526	1.5551	Ø 41	3.93	1.97	3.15	75155					
FS-80	1.57-1.77	2.250	4.0157	3.1496	1.6732	Ø 46	4.33	1.97	3.54	75176					
FS-90	1.77-1.97	2.500	4.2125	3.3465	1.9881	Ø 51	4.33	1.97	3.54	75197					

Spare Parts Identifying Chart located on page 11.

Mounting Flange Catalog No. 9702



Dimensions

Spare Parts

Type	Turning Range	d	d ₂	d ₃	d ₄	d ₅	EDP No.	Part	Qty.	Designation	00-50 EDP No.	60-90 EDP No.
FS-00	0.08-0.20	2.36	1.1811	3.622	4.331	5.512	75009	21	4	Cap Screw M5x30 DIN 912	18503	75793
FS-10	0.20-0.39	2.56	1.3780	3.622	4.331	5.512	75032					
FS-20	0.39-0.59	2.76	1.5748	3.622	4.331	5.512	75053					
FS-30	0.59-0.79	2.95	1.7717	3.622	4.331	5.512	75074					
FS-40	0.79-0.98	3.15	1.9685	3.622	4.331	5.512	75095					
FS-50	0.98-1.18	3.35	2.1654	3.622	4.331	5.512	75116					
FS-60	1.18-1.38	3.62	2.7559	3.622	4.331	5.512	75137					
FS-70	1.38-1.57	3.82	2.9527	5.512	6.693	7.874	75158					
FS-80	1.57-1.77	4.02	3.1496	5.512	6.693	7.874	75179					
FS-90	1.77-1.97	4.21	3.3454	5.512	6.693	7.874	75200					

Spare Parts Identifying Chart located on page 11.

Chamfering Tool Shank Catalog No. 9703

Dimensions

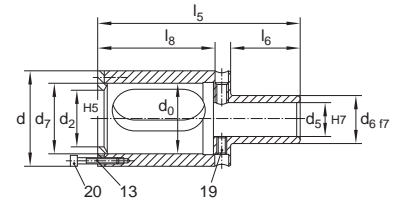
Type	Turning Range (S)	d	d ₂	d ₅	d ₆	d ₇	l ₅	l ₆	l ₈	EDP No.
FS-10	0.20-0.39	2.56	1.37	0.78	1.18	1.77	5.11	1.96	2.55	75041
FS-20	0.39-0.59	2.75	1.57	0.98	2.75	1.96	5.94	2.36	2.99	75062
FS-30	0.59-0.79	2.95	1.77	0.98	2.75	2.16	6.34	2.75	2.99	75083
FS-40	0.79-0.98	3.15	1.96	0.98	2.75	2.36	6.46	2.75	3.11	75104
FS-50	0.98-1.18	3.35	2.16	0.98	2.75	2.55	7.09	2.75	3.74	75125
FS-60	1.18-1.38	3.62	-	1.37	1.96	2.75	7.87	3.14	4.13	75146
FS-70	1.38-1.57	3.82	-	1.57	2.20	2.95	8.26	3.14	4.52	75167
FS-80	1.57-1.77	4.01	-	1.77	2.36	3.14	9.05	3.54	4.92	75188
FS-90	1.77-1.97	4.21	-	1.96	2.48	3.34	9.44	3.54	5.31	75209

*Special version available upon request.

Spare Parts

Part	Qty.	Designation	FS 10 EDP No.	FS 20 EDP No.	FS 30 EDP No.	FS 40 EDP No.	FS 50 EDP No.	FS 60-90 EDP No.	
13	1	Spacer	75661	75598	75583	75580	75664	-	
19	2	Set Screw	75853						
20	4	Cap Screw M5x35 DIN 912	75790						75796

Spare Parts Identifying Chart located on page 11.



d₀ see 9704

Chamfering Tool Flanges Catalog No. 9704

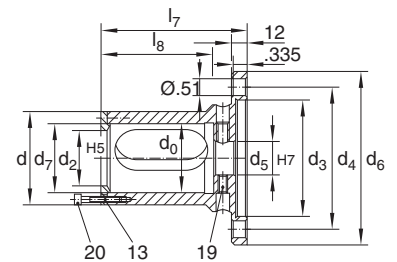
Dimensions

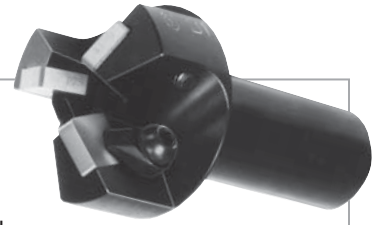
Type	Turning Range (S)	d	d ₀	d ₂	d ₅	d ₇	l ₇	l ₈	EDP No.
FS-10	0.20-0.39	2.56	-	1.37	0.78	1.77	3.66	2.36	75044
FS-20	0.39-0.59	2.75	-	1.57	0.98	1.96	4.09	2.79	50471
FS-30	0.59-0.79	2.95	-	1.77	0.98	2.16	4.09	2.79	75107
FS-40	0.79-0.98	3.15	-	1.96	0.98	2.36	4.21	2.91	10450
FS-50	0.98-1.18	3.35	-	2.16	0.98	2.55	4.84	3.54	75128
FS-60	1.18-1.38	3.62	1.37	-	1.37	2.75	5.43	4.13	18248
FS-70	1.38-1.57	3.82	1.57	-	1.57	2.95	5.82	4.52	75170
FS-80	1.57-1.77	4.01	1.77	-	1.77	3.14	5.82	4.92	50473
FS-90	1.77-1.97	4.21	1.96	-	1.96	3.34	6.61	5.31	50475

Spare Parts

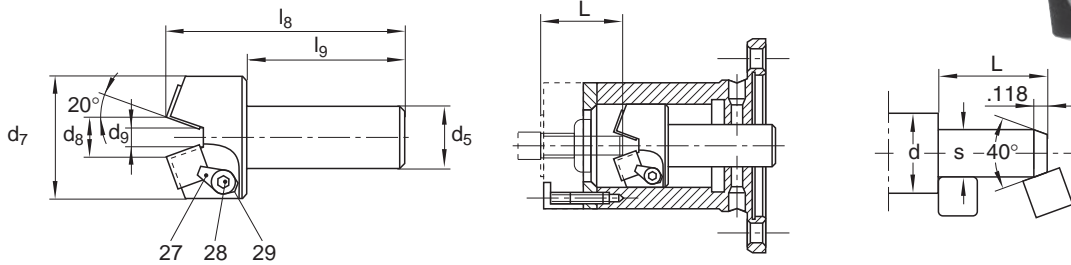
Part	Qty.	Designation	FS 10 EDP No.	FS 20 EDP No.	FS 30 EDP No.	FS 40 EDP No.	FS 50 EDP No.	FS 60-90 EDP No.	
13	1	Spacer	75661	75598	75583	75580	75664	-	
19	2	Set Screw	75853						
20	4	Cap Screw M5x35 DIN 912	75790						75796

Spare Parts Identifying Chart located on page 11.





Chamfering Tool Catalog No. 1108



Dimensions

Type	Turning Range (S)	d ₅	d ₇	d ₈	d ₉	l ₈	l ₉	EDP No.
FS-10	0.20-0.39	0.7874	1.7717	0.413	0.086	3.144	1.968	75038
FS-20	0.39-0.59	0.9843	1.9685	0.610	0.283	3.622	2.440	75059
FS-30	0.59-0.79	0.9843	2.1654	0.807	0.480	3.622	2.440	75080
FS-40	0.79-0.98	0.9843	2.3622	1.003	0.677	3.818	2.637	75101
FS-50	0.98-1.18	0.9843	2.5591	1.200	0.874	4.409	3.228	75122
FS-60	1.18-1.37	1.3779	2.7165	1.397	1.070	4.499	3.740	75143
FS-70	1.37-1.57	1.5748	2.9133	1.594	1.267	5.393	4.133	75164
FS-80	1.57-1.77	1.7716	3.1102	1.791	1.464	6.181	4.921	75185
FS-90	1.77-1.96	1.9685	3.3070	1.988	1.661	6.181	4.921	75206

Spare Parts

Part	Qty.	Designation	EDP No.
27	3	Clamping Finger	75571
28	3	Locking Screw	75574
29	3	Lock Washer	75577

Spare Parts Identifying Chart located on page 11.

Inserts must be ordered separately. See page 8 for available inserts.

Minimum and Maximum Turning Lengths with Built-In Chamfering Tool

Type	Turning Range (S)	S	L-min	L-max
FS-10	0.20-0.39	0.20	1.50	2.79
		0.39	1.25	2.51
FS-20	0.39-0.59	0.39	1.50	3.22
		0.59	1.25	2.95
FS-30	0.59-0.79	0.59	1.50	3.25
		0.79	1.25	2.95
FS-40	0.79-0.98	0.79	1.50	3.34
		0.98	1.25	3.07
FS-50	0.98-1.18	0.98	1.50	3.97
		1.18	1.25	3.70
FS-60	1.18-1.37	1.18	1.61	4.40
		1.37	1.37	4.15
FS-70	1.37-1.57	1.37	1.61	4.80
		1.57	1.37	4.54
FS-80	1.57-1.79	1.57	1.61	5.19
		1.79	1.37	4.94
FS-90	1.79-1.96	1.79	1.61	5.59
		1.96	1.37	5.53

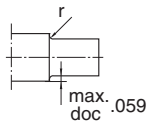
The Chamfering Tool is fitted to the Chamfering Tool Shank or Flange before mounting the Turning Head. The position of the Chamfering Tool can be determined by means of a sample component.

N = Number of Cutting Edges	Dimensions (inch)			Edges	Description	ISO Description	LC215V EDP No.	LC225S EDP No.
	l	s	r					
	0.500	0.187	0.047	8	Negative radius insert	-	-	75233
			0.015					75236
			0.063					75239
	0.500	0.187	0.047	8	Negative insert with ground-in chip breaker	SNEF 102412R	75215	75242
	0.500	0.187	0.047	8	Negative radius insert with pressed-in chip breaker	SNMG 120412	75218	75245
	0.500	0.187	0.118	8	Negative radius insert with ground-in chip breaker	SNKX 120430	75221	75248
	0.500	0.187	0.020	8	45° negative insert with ground-in chip breaker	SNKX 1204AN	75224	-
	0.500	0.187	0.008 max	4	90° negative insert with ground-in chip breaker	SNKX 120400 (1181-99)	-	75254
	0.500	0.187	0.008 max	4	90° negative insert with ground-in chip breaker	-	-	75257
								SNHX 120405
	0.500	0.187	0.020	4	30° negative chamfer insert with ground-in chip breaker	SNHX 120420	-	75263
	0.500	0.187	0.008 max	8	Negative radius insert with ground-in chip breaker	-	-	75266
			0.020 max					75269
	0.500	0.187	0.063	8	Negative radius insert with ground-in chip breaker	SNKX 120416	-	75272

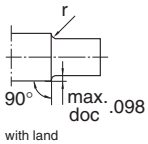
Indexable Inserts for Turning Heads

The selection of inserts is determined by the depth of cut and the required shape of the transition between the blank and the finish turn. Transition shapes and depths of cut are shown in the tables on page 8.

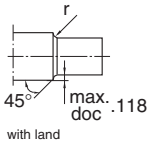
The following standard shapes are recommended:



for rounded transition
Indexable Inserts
No. SNHN 120416

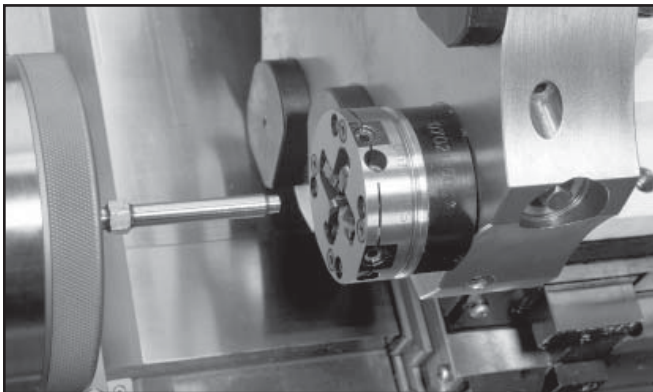


for 90° transition
Indexable Inserts
No. SNKX 120400 (1181-99)



for 45° transition
Indexable Inserts
No. SNKX 1204AN

For difficult jobs, test machining operations should be carried out on the machine to be used. This will help you decide which insert performs best under the existing circumstances. An important factor for optimum results is the condition of the machine, i.e., exact alignment of the turning head component.



Indexable Inserts for Chamfering Tools

Standard Chamfering Tool Inserts are SNEN 120412 made of carbide grade LC225S. If the material is soft and produces long continuous chips, hollow ground inserts SNEF 102412R may be used.

For special applications, call LMT-FETTE Customer Service.

Grades of Carbide

LC225S Premium PVD coated P25 grade, with our NEW TiCN-PLUS coating for optimum wear resistance and lubricity. First choice for general purpose applications of steel and stainless at high cutting speeds. Recommended to run dry, but can run with coolant.

LC215V A CVD coated P15 grade with a thick multi-layer coating, suitable for abrasive materials. May be run wet or dry.

Cutting Speeds and Feeds

The turning speed (V) must be selected in accordance with the available spindle speeds. It is dependent on the component material and the chip cross-section.

The feed rate (S) depends on the depth of cut and the required surface finish. Recommended values for (V) and (S) are given in the adjoining table. These values may need to be increased or reduced.

Material	Rockwell Hardness	Turning Speed f/min (m/min)	Feed S per rev. inch/rev. (mm/rev.)
Non-alloyed structural steels less than	165-394 20 RC	.008-.024 (50-120)	(.2-.6)
Case hardening and heat treatable steels	20-32 RC	130-260 (40-80)	.008-.020 (.2-.5)
Tool and heat-treatable steels	32-44 RC	115-230 (35-70)	.004-.016 (.1-.4)
High-speed and stainless steels	-	130-394 (40-60)	.008-.020 (.2-.5)
Grey cast iron and non-ferrous metals	-	60-120 (198-394)	.008-.032 (.2-.8)

The following formulas are used to determine the turning time:

$$\text{Speed } n = \frac{1000 \cdot v}{d \cdot 3.146} \quad [\text{min}^{-1} (\text{rpm})]$$

n = speed [min^{-1} (rpm)] d = turned diameter [mm]

t_s = turned time [min] L = turned length [mm]

$$\text{Turning time } t_s = \frac{L}{n \cdot s} \quad [\text{min}]$$

s = feed/rev. [mm] v = turning speed [m/min]

Turned Diameter		Turning Speed [f/min(m/mm)]									
inch	mm	Component Rev. [min^{-1} (rpm)]									
		115 (35)	130 (40)	165 (50)	198 (60)	230 (70)	260 (80)	295 (90)	330 (100)	361 (110)	394 (120)
0.08	2	5579	6307	8005	9606	11158	12614	14312	16010	17514	19115
0.12	3	3719	4205	5337	6404	7439	8409	9541	10673	11676	12743
0.16	4	2790	3153	4002	4803	5579	6307	7156	8005	8757	9557
0.20	5	2232	2523	3202	3842	4463	5045	5725	6404	7005	7646
0.24	6	1860	2102	2668	3202	3719	4205	4771	5337	5838	6372
0.28	7	1594	1802	2287	2745	3188	3604	4089	4574	5004	5461
0.31	8	1395	1577	2001	2401	2790	3153	3578	4002	4378	4779
0.35	9	1240	1402	1779	2135	2480	2803	3180	3558	3892	4248
0.39	10	1116	1261	1601	1921	2232	2523	2862	3202	3503	3823
0.47	12	930	1051	1334	1601	1860	2102	2385	2668	2919	3186
0.55	14	797	901	1144	1372	1594	1802	2045	2287	2502	2731
0.63	16	697	788	1001	1201	1395	1577	1789	2001	2189	2389
0.71	18	620	701	889	1067	1240	1402	1590	1779	1946	2124
0.79	20	558	631	800	961	1116	1261	1431	1601	1751	1911
0.87	22	507	573	728	873	1014	1147	1301	1455	1592	1738
0.94	24	465	526	667	800	930	1051	1193	1334	1459	1593
1.02	26	429	485	616	739	858	970	1101	1232	1347	1470
1.10	28	399	450	572	686	797	901	1022	1144	1251	1365
1.18	30	372	420	534	640	744	841	954	1067	1168	1274
1.38	35	319	360	457	549	638	721	818	914	1001	1092
1.57	40	279	315	400	480	558	631	716	800	876	956
1.77	45	248	280	356	427	496	561	636	712	778	850
1.97	50	223	252	320	384	446	505	572	640	701	765

Coolants

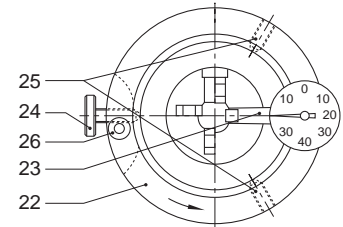
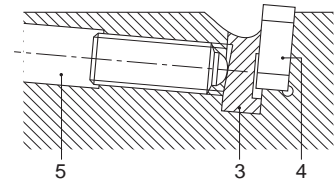
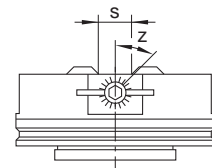
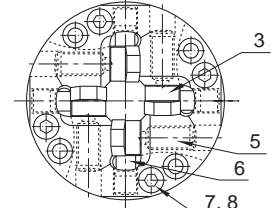
The widely well-known coolants and lubricants used in metal cutting operations, such as soluble oil emulsions and thin cutting oils, are also suitable for turning. An adequate coolant supply assists breaking of the chips and uninterrupted chip disposal. When turning head rotates, the coolant should be passed through the drive spindle and the turning head shank, provided the machine and attachments are suitable. In special cases it is possible to work without cooling.

The indexable inserts are accommodated in deep ground seats in the basic body of the FS Precision Turning Heads. Radial adjustment of the indexable inserts to obtain correct turning diameter (S) is accomplished by means of adjusting screws behind each insert. After correct size has been obtained, the adjusting screws are locked in place by tightening binding screws (#7). The inserts are further contained by thrust screws (#5) and clamping pieces (#3).



Setting

1. Release insert by loosening the thrust screw (#5).
2. Loosen binding screw (#7).
3. Move the adjustment screw so that its face will be flush with the dial surface and the mark is on zero. In this position, the head is set at the maximum of its diameter range.
4. Turn the adjusting screw until its face is flush with the body of the head, and it's mark is on zero. With inserts installed, the head is now adjusted to turn at its maximum capacity. In the case of an FS 20, this will be .591".
5. The dial scale on the body has 20 calibration marks, each mark moves the insert .001". Using an FS20 the diameter to be turned is .464": Therefore, subtract .464 from the current setting of .591 and the result is .127". Because you are turning a diameter, you must adjust the cutting inserts only one half of this distance or .0635". Turn the adjusting screw three revolutions and 3-1/2 marks and you will be on size.
6. Lock adjusting screw (#6) by tightening binding screw (#7). The above operation must be repeated for each insert.
7. Push indexable inserts in the seat against the adjusting screws and tighten thrust screw (#5).



Checking Radial Adjustment of Inserts

After adjusting the inserts to turn the required diameter, the radial position of each must be checked to make sure they are all cutting equally. This operation is accomplished by use of Setting Gauge #8807.

The Setting Gauge is inserted in the centering groove in the body of the head and is secured without play by tightening the knurled head screw (#24). This then may be locked in position with cap screw (#26). The dial indicator and probe are passed by the cutting edges. Otherwise the inserts must be re-set.

Replacing or Indexing Inserts

To change or index (turn) the inserts it is only necessary to loosen the thrust screws (#5). This does not affect the position of the inserts. It is important that all parts and pockets be kept clean. Any build up on the cutting edges must be removed.

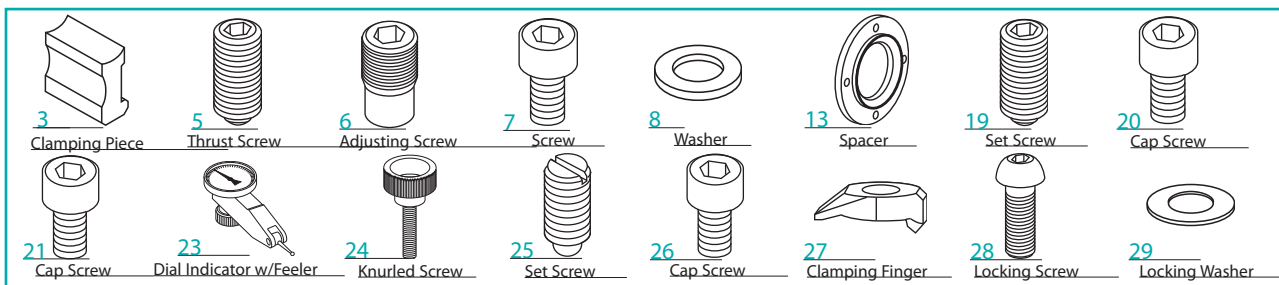
Setting the Turning Length

The maximum turned length is about six times the turned diameter; however, when conditions are favorable, much greater lengths can be turned.

Note:

The adjusting screws (6) are not interchangeable. When a replacement is fitted, the mark must be brought to the zero position and the face of the adjusting screw must be level with the dial face.

Spare Part Identifying Chart





LMT-FETTE, INC.
18013 Cleveland Parkway
Suite 180
Cleveland, Ohio 44135
Toll-Free 800-225-0852 or
Direct 216-377-6130
E-mail: lmfette@lmfette.com
Internet: www.lmfette.com