SLN12X PRODUCTIVE TANGENTIAL SHOULDER MILLING

INTRODUCTION

A new assortment of LNEX 12 negative tangential inserts, with four cutting edges, provides a highly productive solution for a wide range of applications. The Pramet LNEX 12 insert has been designed for square shoulder milling, with a maximum depth of cut up to 10 mm, offering stable clamping and a strong cutting edge. Its robust cutter body provides long tool life and excellent breakage resistance, while also reducing chatter.

PRAMET

LNEX-F

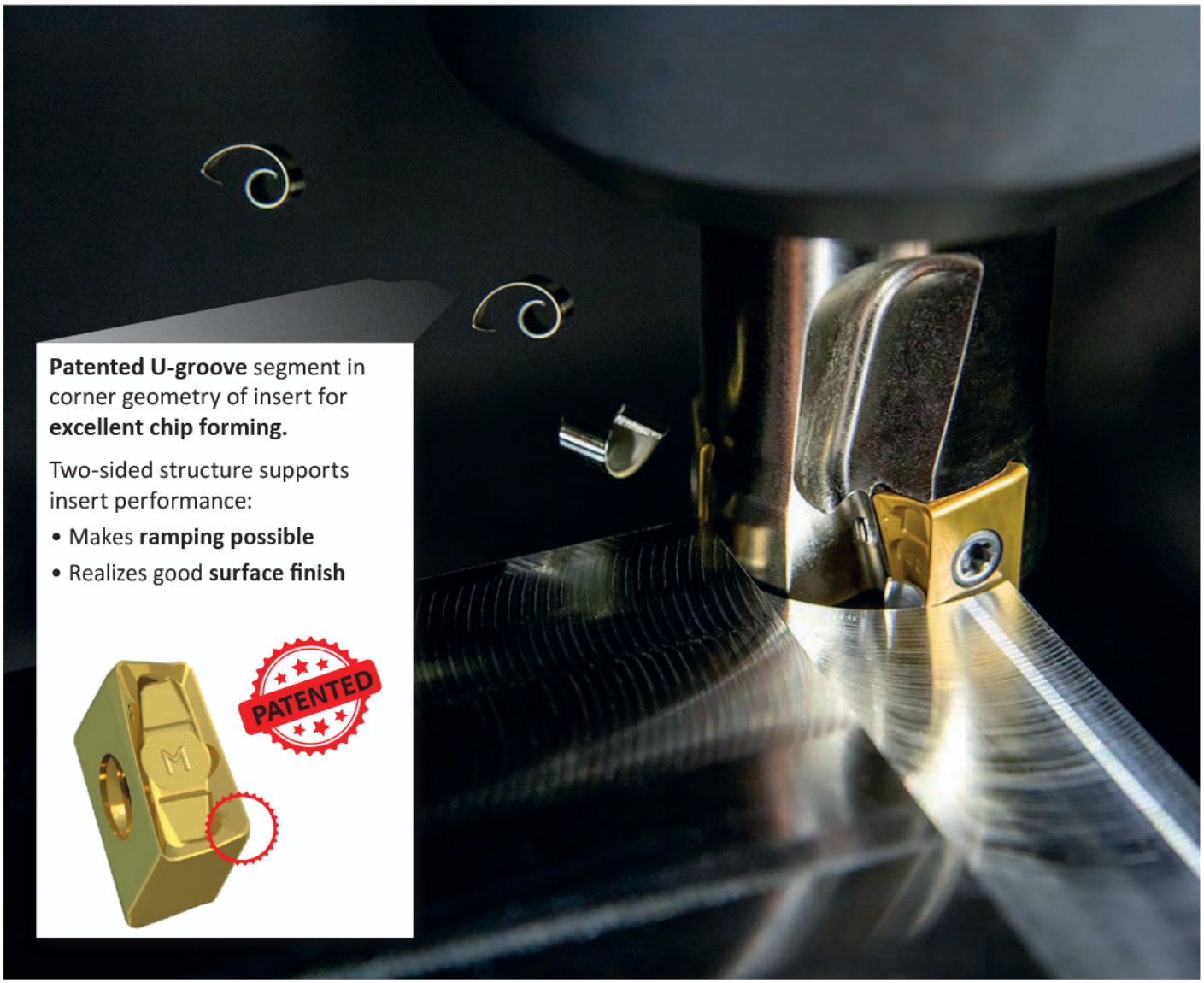
- Productive 4-edged ground insert
- Low carbon steels, soft stainless steels
- Light to medium cuts

LNEX-M

- Productive 4-edged ground insert
- Steels and cast irons, possibly hard steels
- Medium to rough cuts

INSERTS FEATURES & BENEFITS

Robust four-edged insert with two geometries M and F.	**PRODUCTIVE SOLUTION** for a wide range of applications, with increased feed per tooth and depth of cut.
Positive rake angle on a tough tangential insert for low cutting forces.	**SMOOTH CUTTING ACTION** reduced spindle load, excellent chip evacuation and process stability.
Peripherally ground and a highly precise square shoulder insert.	**TRUE 90° CORNER** with improved wall accuracy and straightness.
Patented U-groove segment in corner geometry of insert for excellent chip forming.	**IMPROVED CHIP EVACUATION** expands application range for low-power machines and small depths of cut.
Wide range of applications, with possibility for ramping, helical interpolation and plunge milling.	**OPERATIONAL VERSATILITY** offering an economic solution.



SLN12X PRODUCTIVE TANGENTIAL SHOULDER MILLING

CUTTERS SLN12X – FEATURES & BENEFITS

Improved body strength and thick cutter core for enhanced rigidity.

RELIABLE CUTTING PROCESS
with low vibrations and long tool life for both insert and cutter.

Easily accessible large clamping screws.

SIMPLE INDEXING
and handling of insert.

SLN12X

- Cylindrical shank
- DC range
  25 – 40 mm
  1.00 – 1.50 inch

SLN12X

- Weldon shank
- DC range
  25 – 40 mm
  1.00 – 1.50 inch

SLN12X

- Shell body
- DC range
  40 – 125 mm
  1.50 – 5.00 inch

SHOULDER MILLING EXAMPLES

Workpiece: Structural steel forging – Door hinge (220 HB)
Material: 1.0553 / 345A / S355JO
Cutter: 50A05R-S90LN12X-C
Coolant: Soluble oil emulsion (~ 8%)

Cutting conditions				
v_c (m/min)	f_z (mm)	a_p (mm)	a_e (mm)	TOH (mm)
212	0.09	7	30	58

Insert geometry	Tool life (pcs)
LNEX 121008SR-**F**:M8340	2200

Geometry F is very effective, lowest power consumption.
Perfect surface finishing, better that all the competitors.
Stable cutting edge wear, very homogeneous flank wear.
No burrs all along the tool life => possible to skip deburring.

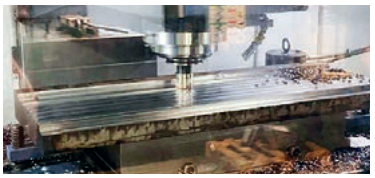
WMG P2.1

Workpiece: Carbon steel plate (220 HB)
Material: 1.1186 / 1040 / C40
Cutter: 50A05R-S90LN12X-C
Coolant: No

Cutting conditions				
v_c (m/min)	f_z (mm)	a_p (mm)	a_e (mm)	TOH (mm)
113	0.18	5	3.5	138
118	0.28	3	30	84

Insert geometry	Tool life (min)
LNEX 121008SR-**F**:M8340	48+

Excelent surface quality in roughing contouring operations.
Good accuracy of 90° wall even with overhang of 138 mm.
No vibrations with overhang of 85 mm and f_z = 0.28 mm.
Perfect chip evaquation. After 48 min no evident wear.



WMG P2.2

Workpiece: Carbon steel forging – Axle yoke (~ 210 HB)
Material: EN8D / 1045 / CK45
Cutter: 32A3R042B32-SLN12X-C
Coolant: Soluble oil emulsion (~ 6%)

Cutting conditions				
v_c (m/min)	f_z (mm)	a_p (mm)	a_e (mm)	TOH (mm)
221	0.23	10	10	61

Insert geometry	Tool life (pcs)
LNEX 121008SR-**M**:M8310	127

Cycle time reduction with LNEX12-M is 48 %.
Tool life improvement with LNEX12-M is 59 %.
We observe only little wear after 18 min in cut.

WMG P2.3

Workpiece: Stainless steel forging – 3-way valve (~ 190 HB)
Material: 1.4401 / 316 / X5CrNiMo17-12-2
Cutter: 25A2R042B25-SLN12X-C
Coolant: No

Cutting conditions				
v_c (m/min)	f_z (mm)	a_p (mm)	a_e (mm)	TOH (mm)
100	0.2	3	6	45

Insert geometry	Tool life (min)
LNEX 121008SR-**F**:M8340	82

Cycle time reduction with LNEX12-F is 20 %.
Tool life improvement with LNEX12-F is 30 %.
Only slight flank wear after 16 min in cut.

WMG M3.1

v_c = cutting speed, f_z = feed per tooth, a_p = axial depth of cut, a_e = radial depth of cut, TOH = tool overhang

SLN12X

P K H M

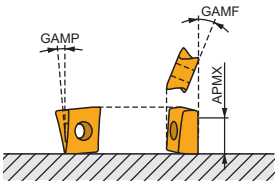
PRAMET

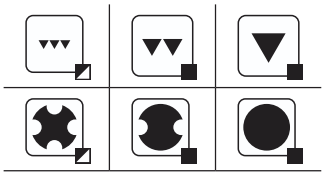
S

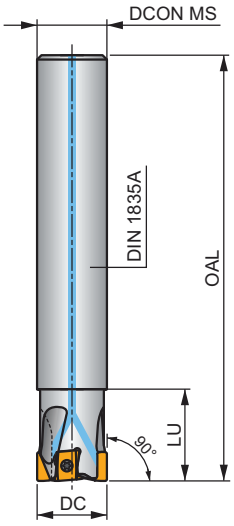
PROD LN12 90° Tangential Square Shoulder Mill with Internal Coolant

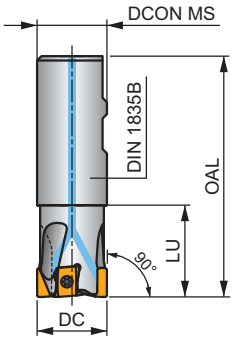
Highly productive 90° shoulder mills utilising tangential LNEX 12 insert with 4 cutting edges and APMX of 10 mm. Suited for a wide range of applications. Available in cylindrical, weldon and arbor style. Robust cutter body supports long tool life and excellent breakage resistance.

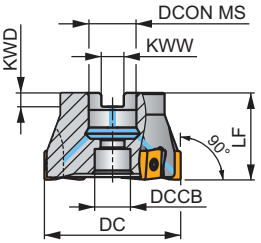
KAPR	90°
APMX	10.0 mm











h_m	0.06 – 0.20 mm
h_m	0.06 – 0.18 mm

	Product	DC (mm)	OAL (mm)	DCON MS (mm)	DCCB (mm)	LU (mm)	LF (mm)	KWW (mm)	KWD (mm)	GAMF (°)	GAMP (°)			max.		kg		
DIN 1835A	**25A2R042A25-SLN12X-C**	25	170	25	–	42	–	–	–	-30	-5	2	–	17300	✓	0.55	GI206	C0382
	25A2R080A25-SLN12X-C	25	170	25	–	80	–	–	–	-30	-5	2	–	17300	✓	0.50	GI206	C0382
	32A3R042A32-SLN12X-C	32	195	32	–	42	–	–	–	-22.5	-5	3	–	15300	✓	1.01	GI206	SQ340
	32A3R090A32-SLN12X-C	32	195	32	–	90	–	–	–	-22.5	-5	3	–	15300	✓	0.99	GI206	SQ340
	40A4R050A32-SLN12X-C	40	195	32	–	50	–	–	–	-22.5	-5	4	–	13700	✓	1.17	GI206	SQ340
DIN 1835B	**25A2R042B25-SLN12X-C**	25	100	25	–	42	–	–	–	-30	-5	2	–	17300	✓	0.29	GI206	C0382
	32A3R042B32-SLN12X-C	32	110	32	–	42	–	–	–	-22.5	-5	3	–	15300	✓	0.55	GI206	SQ340
	40A4R050B32-SLN12X-C	40	120	32	–	50	–	–	–	-22.5	-5	4	–	13700	✓	0.73	GI206	SQ340
ISO 6462 DIN 8030	**40A03R-S90LN12X-C**	40	–	16	12.4	–	40	8.4	5.6	-22.5	-5	3	–	13700	✓	0.15	GI206	SQ345
	40A04R-S90LN12X-C	40	–	16	12.4	–	40	8.4	5.6	-22.5	-5	4	✓	13700	✓	0.23	GI206	SQ345
	50A05R-S90LN12X-C	50	–	22	16.5	–	40	10.4	6.3	-19.5	-5	5	–	12300	✓	0.34	GI206	SQ343
	50A06R-S90LN12X-C	50	–	22	16.5	–	40	10.4	6.3	-19.5	-5	6	–	12300	✓	0.34	GI206	SQ343
	52A05R-S90LN12X-C	52	–	22	16.5	–	40	10.4	6.3	-19.5	-5	5	–	12300	✓	0.37	GI206	SQ343
	63A06R-S90LN12X-C	63	–	22	16.5	–	40	10.4	6.3	-19.5	-5	6	✓	10900	✓	0.52	GI206	SQ343
	63A08R-S90LN12X-C	63	–	22	16.5	–	40	10.4	6.3	-19.5	-5	8	–	10900	✓	0.50	GI206	SQ343
	66A06R-S90LN12X-C	66	–	22	16.5	–	40	10.4	6.3	-19.5	-5	6	✓	10900	✓	0.54	GI206	SQ343
	80A07R-S90LN12X-C	80	–	27	38.1	–	50	12.4	7	-19.5	-5	7	✓	9700	✓	1.00	GI206	SQ341
	80A10R-S90LN12X-C	80	–	27	38.1	–	50	12.4	7	-19.5	-5	10	–	9700	✓	0.98	GI206	SQ341
	100A08R-S90LN12X-C	100	–	32	45.1	–	50	14.4	8	-17.5	-5	8	✓	8700	✓	1.91	GI206	SQ341
	100A11R-S90LN12X-C	100	–	32	45.1	–	50	14.4	8	-17.5	-5	11	–	8700	✓	1.88	GI206	SQ341
	125A12R-S90LN12X-C	125	–	40	56.1	–	63	16.4	9	-17.5	-5	12	✓	7800	✓	3.39	GI206	SQ341

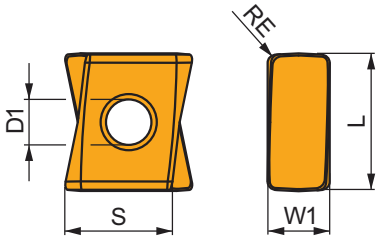
GI206	LNEX 1210..

		Nm						
C0382	US 44010-T15P	3.5	M 4	10	–	–	Flag T15P	–
SQ340	US 44012-T15P	3.5	M 4	12	–	–	Flag T15P	–
SQ341	US 44012-T15P	3.5	M 4	12	D-T08P/T15P	FG-15	–	–
SQ343	US 44012-T15P	3.5	M 4	12	D-T08P/T15P	FG-15	–	HS 1030C
SQ345	US 44012-T15P	3.5	M 4	12	D-T08P/T15P	FG-15	–	HS 90835

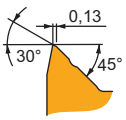
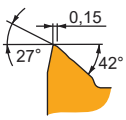
LNEX 12

PRAMET

	W1	D1	L	S
	(mm)	(mm)	(mm)	(mm)
1210	6.000	4.40	13.30	10.26

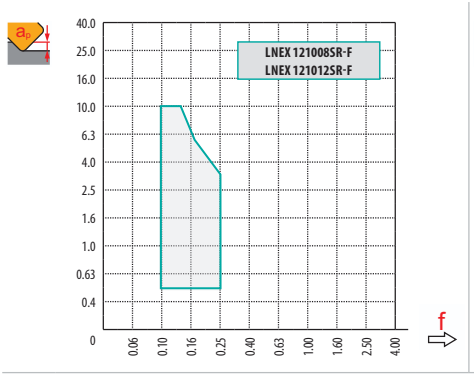


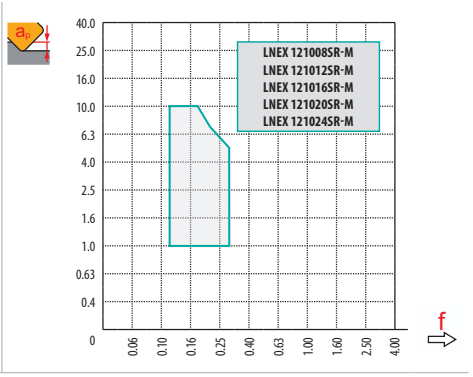
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H		
			vc (m/min)	f (mm/tooth)	ap (mm)	vc (m/min)	f (mm/tooth)	ap (mm)	vc (m/min)	f (mm/tooth)	ap (mm)	vc (m/min)	f (mm/tooth)	ap (mm)	vc (m/min)	f (mm/tooth)	ap (mm)	vc (m/min)	f (mm/tooth)	ap (mm)
																				
F geometry is sharp and used for light and medium machining, suitable for large overhang applications. Designed with highly positive rake, narrow T-land and rounding of cutting edge for light to medium machining.																				
LNEX 121008SR-F	**M6330**	0.8	220	0.17	3.0	155	0.15	3.0	–	–	–	–	–	–	–	–	–	–	–	–
	M8310	0.8	280	0.17	3.0	140	0.15	3.0	265	0.17	3.0	–	–	–	–	–	–	55	0.11	1.0
	M8330	0.8	260	0.17	3.0	155	0.15	3.0	245	0.17	3.0	–	–	–	–	–	–	50	0.11	1.0
	M8340	0.8	235	0.17	3.0	140	0.15	3.0	220	0.17	3.0	–	–	–	–	–	–	–	–	–
LNEX 121012SR-F	**M6330**	1.2	230	0.17	3.0	165	0.15	3.0	–	–	–	–	–	–	–	–	–	–	–	–
	M8310	1.2	295	0.17	3.0	150	0.15	3.0	280	0.17	3.0	–	–	–	–	–	–	55	0.11	1.0
	M8330	1.2	270	0.17	3.0	160	0.15	3.0	255	0.17	3.0	–	–	–	–	–	–	50	0.11	1.0
																				
M geometry is versatile and the first choice for a wide range of working conditions. Designed with positive rake, medium T-land and rounding of cutting edge for medium up to semi-roughing machining.																				
LNEX 121008SR-M	**M6330**	0.8	210	0.20	3.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	M8310	0.8	265	0.20	3.5	–	–	–	250	0.20	3.5	–	–	–	–	–	–	50	0.16	1.0
	M8330	0.8	245	0.20	3.5	–	–	–	230	0.20	3.5	–	–	–	–	–	–	45	0.16	1.0
	M8340	0.8	220	0.20	3.5	–	–	–	205	0.20	3.5	–	–	–	–	–	–	–	–	–
	M9315	0.8	320	0.20	3.5	–	–	–	300	0.20	3.5	–	–	–	–	–	–	60	0.16	1.0
	M9325	0.8	300	0.20	3.5	–	–	–	285	0.20	3.5	–	–	–	–	–	–	60	0.16	1.0
	M9340	0.8	270	0.20	3.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
LNEX 121012SR-M	**M8310**	1.2	280	0.20	3.5	–	–	–	265	0.20	3.5	–	–	–	–	–	–	55	0.16	1.0
	M8330	1.2	255	0.20	3.5	–	–	–	240	0.20	3.5	–	–	–	–	–	–	50	0.16	1.0
	M8340	1.2	235	0.20	3.5	–	–	–	220	0.20	3.5	–	–	–	–	–	–	–	–	–
LNEX 121016SR-M	**M8310**	1.6	295	0.20	3.5	–	–	–	280	0.20	3.5	–	–	–	–	–	–	55	0.16	1.0
	M8330	1.6	270	0.20	3.5	–	–	–	255	0.20	3.5	–	–	–	–	–	–	50	0.16	1.0
	M8340	1.6	245	0.20	3.5	–	–	–	230	0.20	3.5	–	–	–	–	–	–	–	–	–
LNEX 121020SR-M	**M8330**	2.0	285	0.20	3.5	–	–	–	270	0.20	3.5	–	–	–	–	–	–	55	0.16	1.0
	M8340	2.0	255	0.20	3.5	–	–	–	240	0.20	3.5	–	–	–	–	–	–	–	–	–
LNEX 121024SR-M	**M8330**	2.4	285	0.20	3.5	–	–	–	270	0.20	3.5	–	–	–	–	–	–	55	0.16	1.0
	M8340	2.4	255	0.20	3.5	–	–	–	240	0.20	3.5	–	–	–	–	–	–	–	–	–

a_e / DC	5 %	10 %	15 %	20 %	25 %	30 %	40 %	50 %	60 %	70 %	75 %	80 %	90 %	100 %
X.V	1.48	1.35	1.27	1.22	1.19	1.16	1.11	1.08	1.05	1.03	1.00	1.00	1.00	1.00
⇨ x.f	2.20	1.60	1.35	1.20	1.10	0.95	0.85	0.75	0.85	0.95	1.00	1.00	1.00	1.00
⇨ x.f	0.64	0.64	0.64	0.64	0.64	0.65	0.65	0.67	0.68	0.71	0.72	0.74	0.79	1.00

	LNEX 12-F		LNEX 12-M				
RE	0.8	1.2	0.8	1.2	1.6	2.0	2.4
BS	2.25	1.73	2.25	1.73	1.33	1.15	0.79





max

2.5

a_p	2.0	3.0	4.0	5.0
f	0.30	0.20	0.20	0.15

DC	RPMX	APMX/l
25	0.80°	1.40/100
32	0.60°	1.00/100
40	0.35°	0.60/100
50	0.30°	0.50/100
52	0.30°	0.50/100
63	0.20°	0.35/100

DC	DMIN	DMAX	SMAX DMIN	SMAX DMAX
25	44.0	48.0	0.6	0.7
32	58.0	62.0	0.8	1.0
40	74.0	78.0	0.7	0.8
50	94.0	98.0	0.7	0.8
52	98.0	102.0	0.7	0.8
63	120.0	124.0	0.3	0.4

DC	µm	3	5	10	15	20	30	40	50	60	80	100
25	FE	0.548	0.707	1.000	1.225	1.414	1.732	2.000	2.236	2.449	2.828	3.162
32		0.620	0.800	1.131	1.386	1.600	1.960	2.263	2.530	2.771	3.200	3.578
40		0.693	0.894	1.265	1.549	1.789	2.191	2.530	2.828	3.098	3.578	4.000
50		0.775	1.000	1.414	1.732	2.000	2.449	2.828	3.162	3.464	4.000	4.472
52		0.869	1.122	1.587	1.944	2.245	2.750	3.175	3.550	3.888	4.490	5.020
63		0.980	1.265	1.789	2.191	2.530	3.098	3.578	4.000	4.382	5.060	5.657

RE	µm	3	5	10	15	20	30	40	50	60	80	100
0.8	FE	0.155	0.200	0.283	0.346	0.400	0.490	0.566	0.632	0.693	0.800	0.894
1.2		0.170	0.219	0.310	0.379	0.438	0.537	0.620	0.693	0.759	0.876	0.980
1.6		0.196	0.253	0.358	0.438	0.506	0.620	0.716	0.800	0.876	1.012	1.131
2.0		0.219	0.283	0.400	0.490	0.566	0.693	0.800	0.894	0.980	1.131	1.265
2.4		0.245	0.316	0.447	0.548	0.632	0.775	0.894	1.000	1.095	1.265	1.414