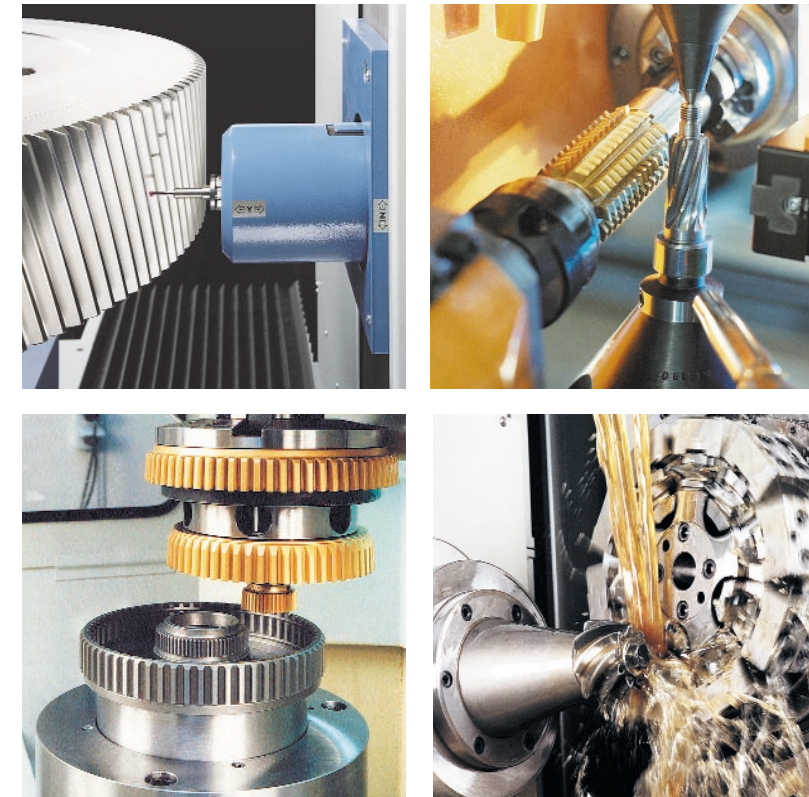


Program of Gear Machinery.



SIGMA POOL



KLINGELNBERG

LIEBHERR
GEAR TECHNOLOGY

DERLIKON
GEAR
TECHNOLOGY

The Evolution Continues • Call Liebherr Gear Technology Co. • 1465 Woodland Drive • Saline, MI 48176
Tel: 734-429-7225 • Fax: 734-429-2294 • email: info@lgt.liebherr.com

TAC/2-01/1M



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TECHNOLOGY

Liebherr Gear Technology Co. Saline

Liebherr

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SIGMA Pool Next Door

As the Sigma Pool representative company in North America, Liebherr Gear Technology Co. is your access point to our application engineering, service, and customer support. At Liebherr's Saline, Michigan, facility, Sigma Pool machines are built to U.S. specifications on a modern plant floor.

From this plant also, Liebherr factory automation and material handling systems are designed, serviced and installed. System integration and simultaneous engineering capabilities make Liebherr a strong partner to U.S. manufacturers.

The SIGMA Pool commitment to supporting North American industry with world-class gear manufacturing technology and automation expertise continues.



CNC Gear Hobbing and Gear Grinding Machines

The Liebherr line includes a graduated family of CNC gear hobbing machines for workpieces from 3.2"/80 mm to 177.2"/4500 mm diameter. The LC82/122, forerunner of a new generation of gear hobbing machines, was the first to make dry hobbing economical. Using carbide and cermet cutting tools, these machines can achieve speeds up to 5 times faster than that possible with conventional technology. Both wet and dry hobbing are practical with this series.

For high-production situations, Liebherr machines can be equipped with automatic workpiece loading/unloading, and can be integrated into an automated material handling system.

All Liebherr machines are delivered production-ready, and can be equipped with options including: quick-change tool systems, quick-change fixture systems, DNC interface, and automatic meshing for skive hobbing.



Model:	Workpiece Diameter		DP	Module	Axial Travel	
	(in.)	(mm)			(in.)	(mm)
Gear Hobbing						
LC 82	3.2	80	8.5	3	9.8/15.7	250/400
LC 122	4.9	125	8.5	3	9.8/15.7	250/400
LC 153	5.9	150	8.5	3	9.8/15.7	250/400
LC 183	7.1	180	8.5	3	9.8/15.7	250/400
LC 223	8.6	220	8.5	3	9.8/15.7	250/400
LC 182	7.1	180	3.6	7	13.7/23.6	350/600
LC 282	11.0	280	3.6	7	13.7/23.6	350/600
LC 382	14.9	380	3.6	7	13.7/23.6	350/600
LC 482	18.8	480	2.1	12	15.7/23.6	400/600
LC 582	22.8	580	2.1	12	15.7/23.6	400/600
LC 682	26.7	680	2.1	12	15.7/23.6	400/600
LC 802	31.4	800	2.1/15	12/16	15.7/23.6	400/600
LC 1002	39.3	1000	1.5	16	31.4/39.3	800/1000
LC 1202	47.2	1200	1.3	20	23.6/35.4/47.2	600/900/1200
LC 1502	59.0	1500	1.3	20	23.6/35.4/47.2	600/900/1200
LC 1802	70.8	1800	1.3/8	20/30	35.4/47.2/59.0/70.8	900/1200/1500/1800
LC 2002	78.7	2000	1.3/8	20/30	35.4/47.2/59.0/70.8	900/1200/1500/1800
LC 2502	98.4	2500	.8	30	35.4/47.2/59.0/70.8	900/1200/1500/1800
LC 3002	118.1	3000	.8	30	35.4/47.2/59.0/70.8	900/1200/1500/1800
LC 3502	137.8	3500	.8	30	35.4/47.2/59.0	900/1200/1500
LC 4002	157.5	4000	.8	30	35.4/47.2/59.0	900/1200/1500
LC 4502	177.2	4500	.8	30	35.4/47.2	900/1200

Gear Hobbing with Vertical-Pickupspindle

LCV 40	1.5	40	12.7	2	6.2	160
LCV 180	7.1	180	8.5	3	7.8	200

Gear Grinding Generating/Form Grinding

LCS 182	7.1	180	5.0	5	13.7/23.6	350/600
LCS 282	11.0	280	5.0	5	13.7/23.6	350/600

Combination Gear Hobbing/Gear Shaping

LCC 150	5.9	150	8.5	3	13.7/15.7	350/400
LCC 220	8.6	220	8.5	3	13.7/23.6	350/600
LCC 280	11.0	280	3.6	7	13.7/23.6	350/600

Finishing Machine

LCF 180	7.1	180	5.0	5		
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Klingelnberg

Bevel Gear Cutting Machines Cyclo-Paloid Spiral Bevel Gears Universal Application

Model:	Workpiece Diameter	
	(in.)	(mm)
FK 41B	5.5	140
C 28P	11.0	280
C 40U	18.0	450
C 60U	24.0	600
C 100U	40.0	1000 (1150)
AMK 1604	63.0	1600 (2000)
AMK 1605	80.0	2000 (2300)

CNC Gear Inspection

Model:	Workpiece Diameter		DP	Module	Max. Face Width	
	(in.)	(mm)			(in.)	(mm)
P 26	10.3	260	50-2.1	(0.1) 0.5-12	15.7	400
P 40	15.7	400	50-1.7	0.5-15	15.7	400
P 65	25.6	650	50-1.27	(0.2) 0.5-20	21.6	550
P 100	39.4	1000	50-1.27	(0.2) 0.5-20	29.5	750
P 150	59.0	1500	25.4-0.8	1-32		
P 200	78.7	2000	25.4-0.8	1-32		
P 260	102.3	2600	25.4-0.8	1-32		

Single Flank Roll Testers

Model:	
PSE 600	worm gears
PSKE 900	cylindrical and bevel gears

CNC Worm and Thread Grinding Machines

Model:	Workpiece Diameter	
	(in.)	(mm)
H 35	13.8	350
H 50	19.7	500

CNC Hob Sharpening Machines

Model:	Workpiece Diameter	
	(in.)	(mm)
S 31	11.8	300
S 50	19.7	500

CNC Spiral Bevel Gear Grinding Machines

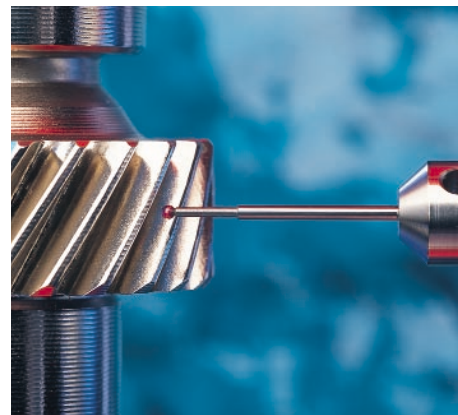
Model:	Workpiece Diameter	
	(in.)	(mm)
G 30 Double-spindle	12.0	300
G 50 Double-spindle	19.7	500

Hydraulic Quenching Presses

Model:	Workpiece Diameter	
	(in.)	(mm)
AH 650	26.0	650
AH 1200	48.0	1200

Double Flank Roll Testers

Model:	Workpiece Diameter	
	(in.)	(mm)
ZW 301	11.8	300
ZW 401	15.8	400



Oerlikon Gear Technology

CNC Spiral Bevel Gear Cutting, Grinding and Lapping.

Oerlikon offers CNC bevel gear cutting systems for dry and wet cutting with capacities up to 23.6"/600 mm for production applications. Single-spindle CNC spiral bevel gear grinding machines for workpieces up to 19.7"/500 mm and bevel gear lappers and running testers accommodating parts up to 19.7"/500 mm, and CNC form grinding machines for parallel axis gears up to 149.6"/3800 mm — the Opal range — provide gear manufacturers high-productivity and high-precision with optimum reliability. Other Oerlikon products include CNC blade and tool grinders especially suitable for the automobile and axle manufacturer.

Bevel Gear Cutting Machines Volume Production

Model:	Workpiece Diameter	
	(in.)	(mm)
C 22	8.6	220
C 28	11.8	300
C 60	23.6	600
C 100	39.4	1000

Bevel Gear Testers Single Flank Vibration

Model:	Workpiece Diameter	
	(in.)	(mm)
T 50	19.7	500

CNC Blade and Tool Grinding Centers

Model:	
B 5	Solid body cutters, Form-relieved cutter heads, Coniflex type, Bar blades, Hobs
B 24	Fully automatic grinding cell. Blade cross-section up to .75" to 1.125" for carbide and HHS

CNC Gear Form Grinding Machines Parallel Axis

Model:	Module	Workpiece Diameter	
		(in.)	(mm)
Opal 50	16	20.5	520
Opal 80	16	39.4	1000
Opal 120	16	47.2	1200
Sigma Opal 50	25	19.7	500
Sigma Opal 80	25	31.4	800
Sigma Opal 120	25	47.2	1200
Sigma Opal 160	25	63.0	1600
Sigma Opal 220	25	86.6	2200
Sigma Opal 300	35	118.1	3000
Sigma Opal 380	35	149.6	3800



CNC Gear Inspection and Testing. CNC Spiral Bevel Gear Cutting and Grinding. CNC Worm and Thread Grinding

Klingelnberg's family of precision CNC gear machinery includes an economical system of worm and thread grinders accommodating parts up to 19.7"/500 mm diameter. CNC hob sharpeners maintain cutting tools to 19.7"/500 mm diameter. Klingelnberg-Hoefler CNC precision gear inspection equipment provide rapid, reliable checking of a range of part types up to 102.3"/2600 mm. Fully automatic measuring and operator friendliness with state-of-the-art software assure system productivity. Inspection systems may be combined with gear manufacturing equipment in fully integrated cells.

Klingelnberg is also a world leader in the design and build of CNC spiral bevel gear machines with capacities up to 78.7"/2000 mm, and double-spindle spiral bevel gear grinding machines. Single flank roll testers round out Klingelnberg's product line.

CNC Gear Shaping Machines

Liebherr offers a technically advanced line of CNC gear shaping machines unparalleled in range and performance, from machines designed for the highest productivity to highly flexible multi-cutting systems for economical batch production. All Liebherr machines are built for long-term quality and reliability.

Liebherr produces both machines and cutting tools, so customers get economical single-source solutions to standard applications, as well as applications requiring special or combined tooling. For example, Liebherr has developed tooling for machining face gears, noncircular gears, and steering gear segments.

All standard Liebherr machines are delivered production-ready. Options include: additional CNC-controlled axes, tiltable column and/or machine table, quick-change tool systems, workpiece transport with auto-loading, CNC chamfering and tooth pointing, centrifuge and deburr stations.



Model:	Workpiece Diameter		DP	Module	Axial Travel		Stroke Length	
	(in.)	(mm)			(in.)	(mm)	(in.)	(mm)

Gear Shaping without Sliding Cutter Head

LS 82	3.2	80	8.5/5.0	3/5			1.2/2.1	30/55
LS 122	4.9	125	8.5/5.0	3/5			1.2/2.1	30/55
LS 153	5.9	150	8.5/5.0	3/5			1.2/2.1	30/55
LS 183	7.1	180	8.5/5.0	3/5			1.2/2.1	30/55
LS 223	8.6	220	8.5/5.0	3/5			1.2/2.1	30/55

Gear Shaping with Sliding Cutter Head

LFS 223	8.6	220	8.5	3		250	2.7	70
LFS 182	7.1	180	3.6	7		250	3.9/8.4	100/215
LFS 282	11.0	280	3.6	7		250	3.9/8.4	100/215
LFS 382	14.9	380	3.6	7		250	3.9/8.4	100/215
LFS 482	18.8	480	2.1	12		600/1000	3.9/8.4	100/215
LFS 582	22.8	580	2.1	12		600/1000	3.9/8.4	100/215
LFS 682	26.7	680	2.1	12		600/1000	3.9/8.4	100/215
LFS 802	31.5	800	2.1	12		600/1000	3.9/8.4	100/215
LFS 1002	39.4	1000	2.1	12		600/1000	3.9/8.4	100/215
WSC 1202	47.2	1200	1.3	20	23.6/35.4/47.2/59.0	600/900/1200/1500	13.0/23.6	330/600
WSC 1502	59.0	1500	1.3	20	23.6/35.4/47.2/59.0	600/900/1200/1500	13.0/23.6	330/600
WSC 1802	70.8	1800	1.3	20	35.4/47.2/59.0/70.8	900/1200/1500/1800	13.0/23.6	330/600
WSC 2002	78.7	2000	1.3	20	35.4/47.2/59.0/70.8	900/1200/1500/1800	13.0/23.6	330/600
WSC 2502	98.4	2500	1.3	20	35.4/47.2/59.0/70.8	900/1200/1500/1800	13.0/23.6	330/600
WSC 3002	118.1	3000	1.3	20	35.4/47.2/59.0/70.8	900/1200/1500/1800	13.0/23.6	330/600
WSC 3502	137.8	3500	1.3	20	35.4/47.2/59.0/70.8	900/1200/1500/1800	13.0/23.6	330/600
WSC 4002	157.5	4000	1.3	20	35.4/47.2/59.0/70.8	900/1200/1500/1800	13.0/23.6	330/600
WSC 4502	177.1	4500	1.3	20	35.4/47.2/59.0/70.8	900/1200/1500/1800	13.0/23.6	330/600

- Check for a representative of Liebherr Gear Technology to contact you

Process:

- Hobbing
 Shaping
 Shaving
 Grinding
 Other

Automation:

- Manual Load
 Auto Load

Maximum Pitch: _____

or Module: _____

Maximum Outside Diameter: _____

Maximum Face Width: _____

Please print, fill in and fax back to:
Liebherr Gear Technology Co., Saline, MI
Fax: 734.429.2294.

Today's Date: _____

Quotation requested by (date): _____

Company _____

Address _____

City _____

State/Zip _____

Contact _____

Title _____

e-mail _____

Telephone _____

Fax _____

Please note any special requirements or tolerances:
