



the secret to
sigma



pools

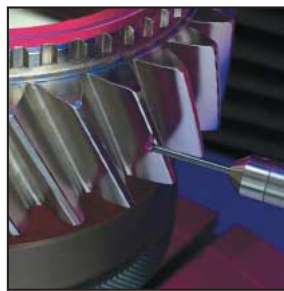
SUCCESS

For more than a decade, the **Sigma Pool**—a collaboration between the industry giants **Klingelberg, Liebherr, and Oerlikon**—has worked to develop new equipment and technologies for gear manufacturers worldwide.

Introduction by Klaus Singler
Contributing writers: Andreas Montag, Gerd Sulzer,
and Claus Kobialka.

The Sigma Pool was formed in 1991 to be a market-focused, single-source supplier for gear manufacturers around the world. Alone, each company served a specific niche of the overall gearing field. Together, they were able to expand their offerings to every corner of the globe, while simultaneously cutting costs and sharing technology. Liebherr brought expertise in all areas of gear hobbing, Lorenz handled shaping, Oerlikon knew high-volume hypoid gear production, and Klingelberg rounded out the group with their gear inspection, worm and rotor grinding, and jobbing systems for bevel gears.

The Sigma Pool consistently continues to develop and improve the equipment that has made it a leading force in the global gear industry. The following is just a sampling of the many innovations that have resulted from this collaborative effort.



The "P Series" Gear Measuring Centers—These centers have been in successful use for many years. Each is suitable for workpieces up to 400 mm outer diameter. In addition to cylindrical gears with external and internal teeth, worms, and wormgears, spiral bevel gears, rotors, camshafts, and other curved workpieces can also be checked. The inspection machine itself has an extremely compact design, and thanks

to the optimal arrangement of all control elements and user-friendly software operator guidance, any operator can perform quick and reliable measurements after brief introductory training.



Worm and Rotor Grinding Machine H10—With the H10, Klingelberg presents its newly developed worm-, rotor-, and thread-grinding machine to a wide audience for the first time. It is designed for the



CNC CURVIC/CLUTCH GRINDER

SPECIALIZING IN GLEASON • 19 CONVERSIONS TO CNC
DIAMOND ROLL DRESSING • REDUCE YOUR SETUP TIMES, NO INDEX PLATES
EASY MENU PROGRAMMING • FULLY ENCLOSED MACHINE

MACHINE TOOL RETROFITS

NEW AND USED EQUIPMENT

CNC Machinery Sales, Inc.

2430 EAST MONROE, PHOENIX, AZ 85034
PHONE 602/244-1507 • FAX 602/244-1567
WWW.CNCMACH.COM • SALES@CNCMACH.COM

Yesterday's Reliability Tomorrow's Technology



Fifty years of VARI-ROLL applications provide:

- Production Composite Inspection
- Custom Design & Build Part Gear Mounting Fixtures
- Standard Mounting Fixtures — Spurs, Helicals, Pinion Shafts, Worms, Throated Worms, Bevels, Internals

When coupled with the VARI-PC Composite Gear Analysis System will provide:

- Reduced Inspection Cost
- Improved Accuracy
- Historical Record Keeping
- Serialization of Parts
- Interface to SPC programs

Experience the difference. See why customers worldwide have chosen the VARI-ROLL/VARI-PC. For further information, please contact us.

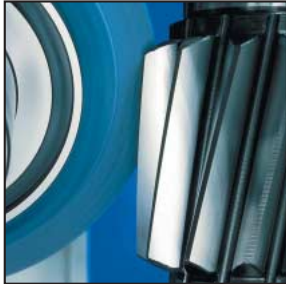


VARI-ROLL

Precision Gage Co., Inc.
100 Shorn Drive Burr Ridge, IL 60527
630-655-2121 Fax 630-655-3073
www.precisiongageco.com



grinding of workpieces up to a diameter of 100 mm. The H10 and its software packages are integrated in a comprehensive software system for the design, calculation, and production of worms, compressor rotors, pump spindles, and other thread-type components.



Gear Form Grinding Machine Sigma Opal F75—The Sigma Opal F75 is a CNC controlled gear form grinding machine for fast and efficient grinding of

spur and helical gears and forming grinding wheels, as well as special gears with other profile shapes. It is designed to directly implant conventional grinding wheels. For special applications, vitrified dressable and non-dressable CBN grinding wheels and electroplated CBN wheels can be applied.



Klingelnberg-Oerlikon C27 Spiral Bevel Gear Generator—Greater productivity in the automotive industry has

required improvements in machine design. The C27 was specially developed for the interests of the automotive industry. On the C27, instead of fitting the tool and workpiece spindles with high-precision gear trains and related spindle motors, direct drives have been employed. This technological leap in drive engineering became possible through a special spindle design that permits the control system setup necessary for this drive to be adjusted once for all practical conditions. The C27 also provides a considerable reduction in processing time. Acceleration of the spindles to working speed occurs in less than one second so that non-productive time can be reduced to an absolute minimum. The freedom from maintenance of these drives, and their very high positioning

accuracy, guarantee high-quality bevel gears during the entire service life of the machine.



LC120 Hobbing Machine—Based on the existing platform design of the successful hobbing machine, with the further development of individual components, Liebherr exhibited a new generation of this series of machines. A redesigned cutting head represents the core of the machine evolution. Here,

DULL HOBS

Equals Serious Downtime (period)

But We Can Help...

You are well aware that Hobs are assets that need to be maintained.

The investment your company makes on precision hobs can be wasted by incorrect sharpening resulting in *Non-Conformance of gear quality requirements and poor tool life.*



We know you need your tools back **Fast** eliminating downtime and tuned to meet or surpass original design specifications, and that's where we come in....period.

*Stripping & re-coating service also available.



PHONE: 440.895.4627 (HOBS) • FAX: 440.331.0516
21135 LORAIN ROAD • FAIRVIEW PARK, OHIO 44126
WWW.GALLENCO.COM

- Custom Cut Gears to AGMA Class 12
- Complete Line of CNC Gear Manufacturing Equipment
- Hobbed or Shaped Gears
- Shaved Gears
- Straight and Spiral Bevel Gear Manufacturing
- Custom and Standard Sprocket Manufacturing
- Splined Shaft Manufacturing
- Turning, Milling, Drilling, Honing & Broaching Equipment
- In House Grinding, Heat Treat & Welding
- CNC "M & M" Gear analyzer
 - AGMA, JIS & DIN Capabilities
 - Spiral Bevel Gear Cutting Process Development Software

Our modern manufacturing facility is equipped to process a wide variety of medium & fine pitch gear & sprocket products. Our reputation and our ability to provide superior quality, cost effective pricing & on-time delivery gives us a significant advantage over the competition.

Let Us Quote Your Next Job!

MEMBER OF THE AMERICAN GEAR MANUFACTURERS ASSOCIATION

ST. LOUIS GEAR COMPANY

Royal Road - P.O. Box 880 • Keokuk, Iowa 52632 • www.stlouisgear.com
Toll Free: 800 / 437-0514 • Phone: 319 / 524-5042 • Fax: 319 / 524-1959

speed and torque of up to 6000 rpm at 18 kW required power have been realized by means of new direct drives, enabling the use of both HSS and hard-metal tools in dry and wet processes.



Profile Grinding and Generating Grinding Machines LCS200 and LCS300—Based on its successful profile grinding and generating grinding machines using CBN-coated grinding

tools, Liebherr has introduced an interesting expansion with an optional dressing facility for SG (Sintered Gel corundum) tools, considerably increasing both the flexibility and economy of gear grinding.



LFS200e Gear Shaping Machine—This gear shaping machine was conceived for the universal production of prototypes and small lots. For this, the machine has



Outstanding Quality Price & Service

Cut Metal or Powder Metal

Spiral Bevel
Straight Bevel
Hypoid
Helical
Face
Spur

Loose Gearing
or
Fully Assembled Gearboxes
Specializing in High Volumes

mG miniGears
mG miniGears N.A., Virginia Beach, VA +(757) 233-7000
mG miniGears s.p.a., Padova, Italy +39 049 8700430
mG miniGears Trading Co., Ltd., Shanghai, China +021 5869-7305
www.minigears.com

RPI

Repair Parts, Inc.
2415 Kishwaukee St. • Rockford IL, 61104

Barber-Colman Gear Cutting
& Hob Sharpening Equipment
Used, Reconditioned or Rebuilt

New and Used Parts
For Sundstrand Lathes
Mills—Omnimils
Barber Colman
Sundstrand Toolholders
Van Norman & Atlantic
Jig Bore Lines
Hob Sharpening Service

Call us NOW for your needs!

815-968-4499
Fax 815-968-4694
rpi@repair-parts-inc.com
www.repair-parts-inc.com



been equipped with an NC-controlled tilting column and a corresponding side adjusting mechanism. This makes possible the production of cylindrical and conical gears using a convenient set-up procedure.

In the past, advances in general machining technology often took decades to migrate into the gear industry. Today, the lag still exists between when a technical improvement occurs in turning or milling, for example, and when that technology becomes successfully applied to gear manufacturing. However, through the work of the Sigma Pool and other industry leaders, that gap is narrowing.

At the EMO Machine Tool Exhibition this year, the Sigma Pool exhibited many of the new machines described above. The EMO showcased the wide variety of technological improvements that are changing the gear industry today: increased use of direct drives and linear motors, higher levels of tool stiffness and accuracy, and reduced auxiliary times through improved CNC, to name just a few.

The Sigma Pool is constantly working to develop and implement improvements such as these, which promise to make the future of gear manufacturing every bit as exciting as its past!

For more information, contact Klaus Singler at (734) 429-7225, or via e-mail at klaus.singler@lgt.liebherr.com, or Andreas Montag at +49-2192-81-370. Send e-mail at a.montag@klingsberg.com. The Sigma Pool's Web site is [www.sigma-pool.com].

Parts for your FELLOWS® Gear Machines

FELLOWS®

Specializing in
10-2, 10-4, 20-4, 20-8, 50-8,
FS-180, FS-400, FS-630

*With over 25 years in the
Gear Industry, I have
created an exclusive
network that can supply
both new and used parts.
Obsolete parts can be done
faster and less expensive
than our competitors.
Give us a call and
find out for yourself!*

Jim Kirkland

P.O. Box 1019 • Elyria, OH 44036-1019

216-389-5041 (cell)

Office: 440-365-6045 • Fax: 440-365-6059
E-mail: kirk12043@aol.com

Quality Workholding Solutions

Arbors Mandrels Chucks

Expanding Mandrels

*Extreme Accuracy - .0001" T.I.R. or better
Great Expansion Range - 1/4" to 7" with just twelve mandrels
Fast, Easy Loading - tap it's on - tap it's off*

Hydraulic Arbors

*Inspection or manufacturing
T.I.R. to .00005"
Rupture proof design*

Spline Mandrels

*Pitch Diameter Contact
Parallel Expanding Jaws
Accuracy - .0001" T.I.R.*



Expanding Mandrels

Hydraulic Chuck System

*Interchangeable Tooling
Extreme Accuracy - .00005" T.I.R.
Fast, Easy Set-ups*

Call or e-mail
for product
information



LeCOUNT
Incorporated

180 Dewitt Drive White River Jct. Vermont 05001
tel: (800) 642-6713 fax: (802) 296-6843 e-mail: sales@lecount.com

Website: www.lecount.com