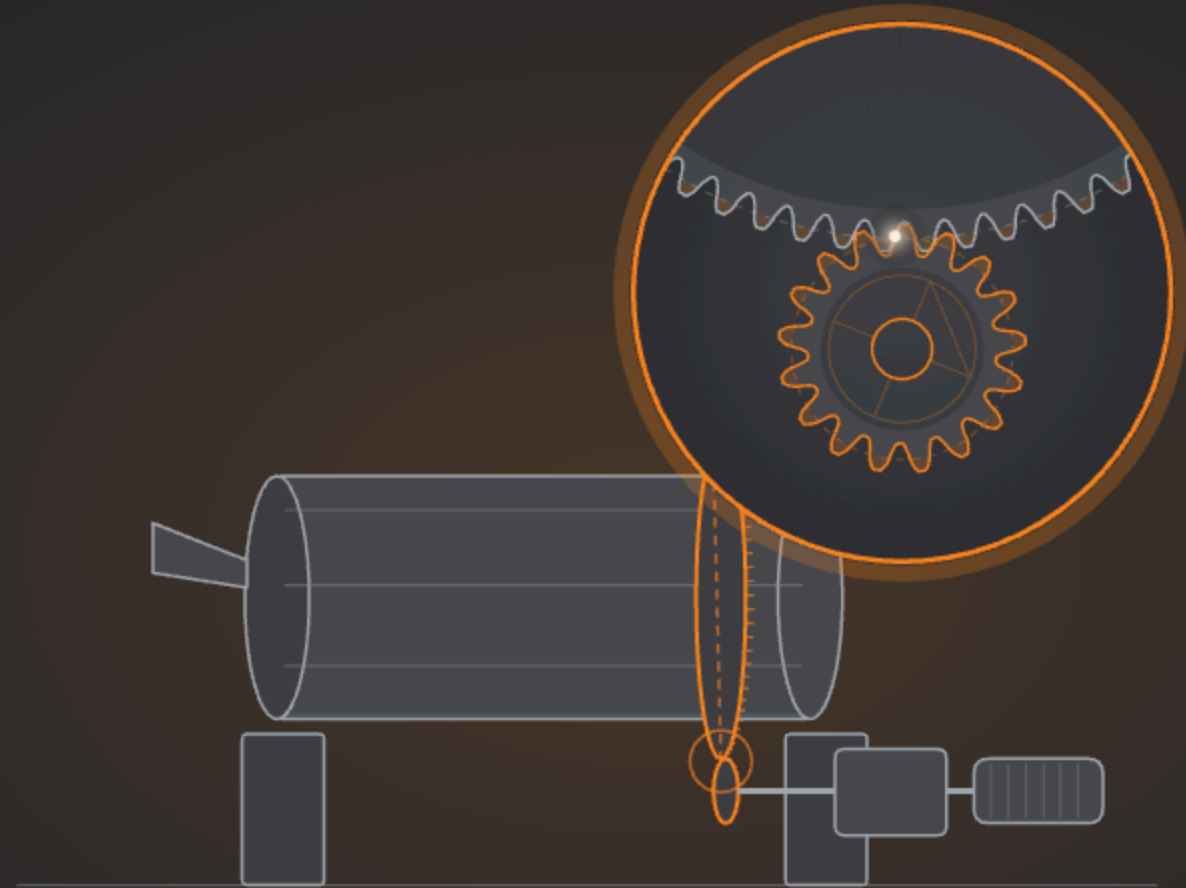




CONVOLOID® GEARING TECHNOLOGY

Built for the Load. Built to Last.

Mining & Heavy Industry briefing



What holds mining & heavy industry back

01

Downtime is the real cost

When a mill or conveyor drive stops, the whole circuit behind it stops too. Gear life is a production number, not a maintenance number.

02

Capacity is frozen by metallurgy

Large cast girth gears cannot simply be case-hardened, and center distance and face width are fixed by the installation. More capacity has to come from somewhere else.

03

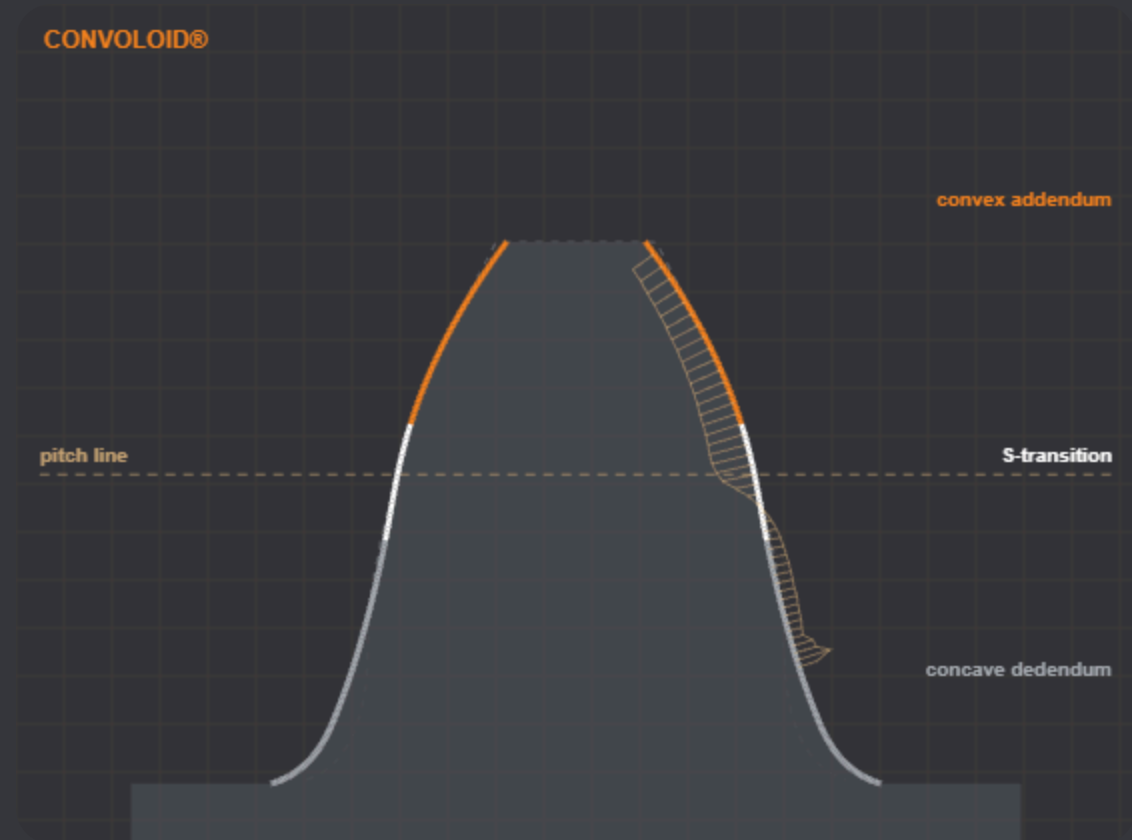
Lead times are long

Large gears and gearboxes can take months to replace. Every year of added life defers a major spend.

MEET CONVOLOID®

A different tooth, cut on the same machines

- ⚙️ **Convex addendum, concave dedendum.** Mating flanks nest instead of touching at a sharp point.
- ⚙️ **Conjugate through the flank.** Smooth rolling with a contact ratio above 1.0.
- ⚙️ **Digital tooth definition.** Hobbed, ground and inspected on existing CNC equipment.



WHAT IT MEANS FOR MINING

240%

of rated load, DOE/NREL
gearbox test

12.8 dB

quieter (audio) at 200–
240% load

19.2 dB

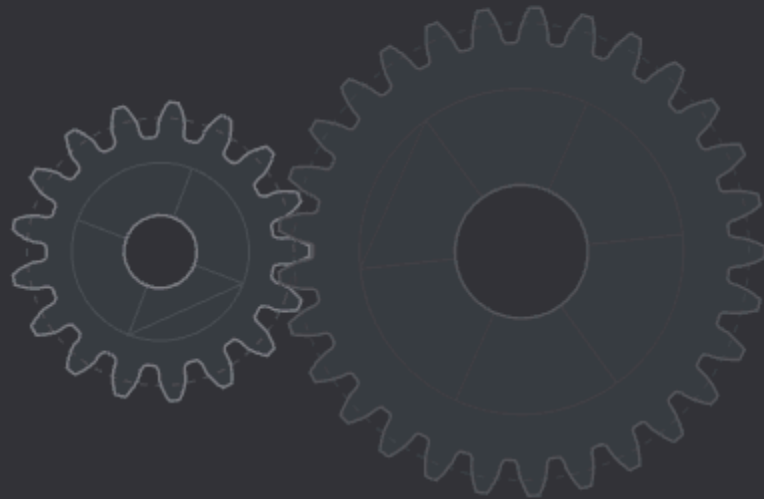
lower vibration at the
high-speed mesh

Same machines. Same materials. Same standards.

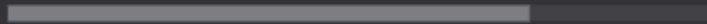
SIDE BY SIDE

More Capacity From the Same Footprint

INVOLUTE



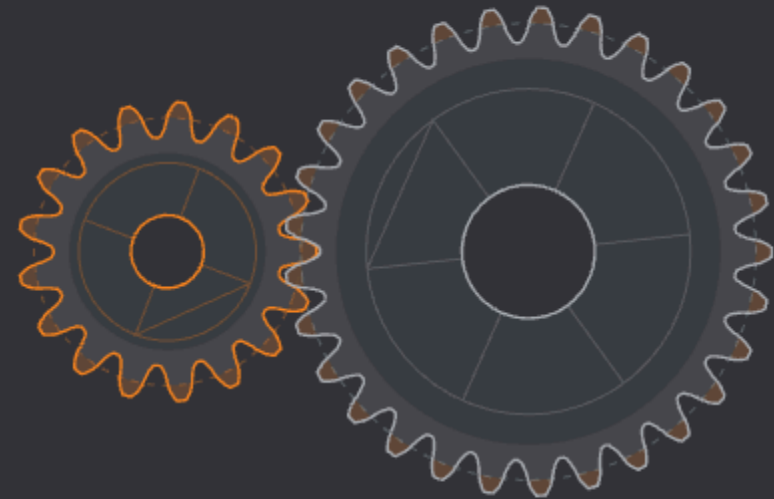
TORQUE CAPABILITY



100%

equivalent involute

CONVOLOID®



TORQUE CAPABILITY



120–135%

same size & material - AGMA 11FTM19

The comparison

	INVOLUTE	CONVOLOID®
DOE/NREL test load	Same load, back-to-back	200–240% of rated load
Noise at 200–240% load (audio)	Baseline	12.8 dB quieter
Vibration, high-speed mesh fundamental	Baseline	19.2 dB lower
Tooth surfaces in test	Micro-pitting progressed	Early micro-pitting self-arrested
Efficiency (measured)	98.9% per gearset	98.9% per gearset (parity)
 Convoloid® for Mining & Heavy Industry Torque capability (AGMA 11FTM19)	Equivalent involute	20–35% higher

IN YOUR DRIVETRAIN

Why It Lasts: Conformal Contact

A convex addendum nests into a concave dedendum. The load spreads over a wider band than two convex involute flanks can offer, lowering contact stress.

Grinding mill drives

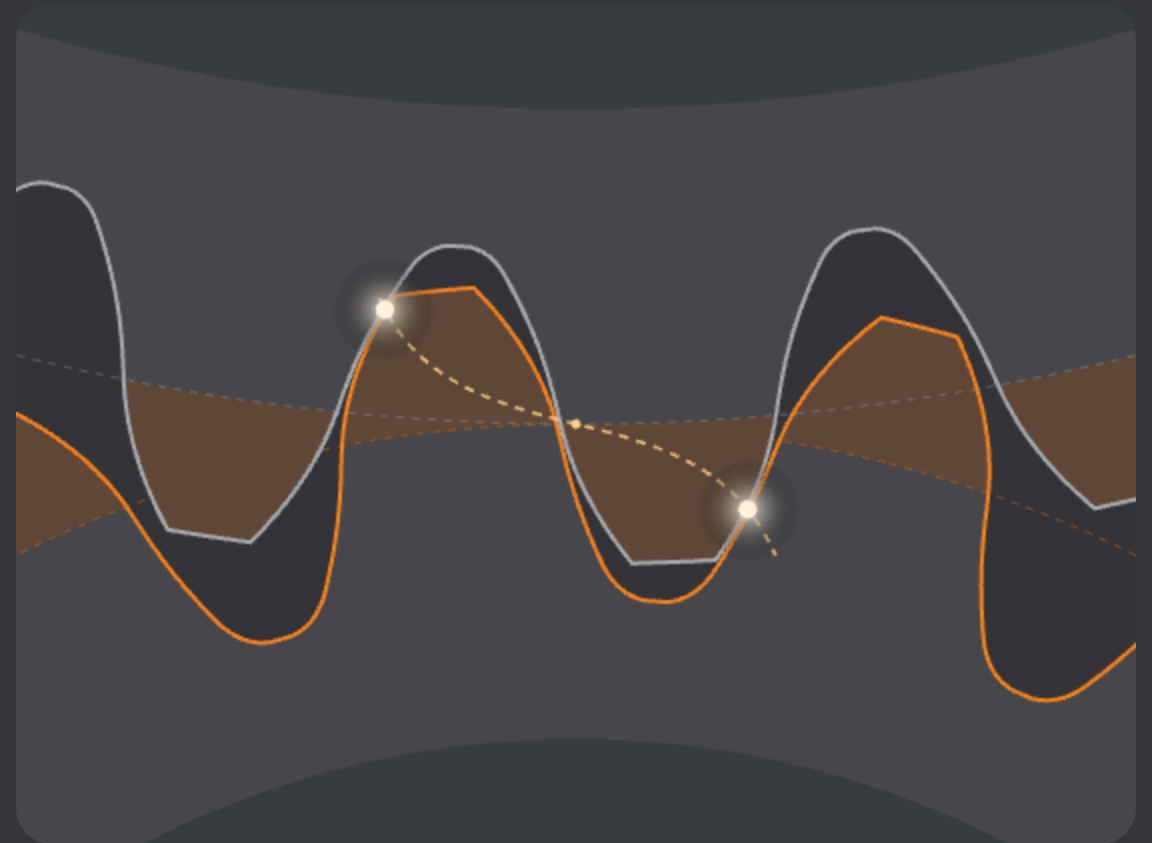
Cement kiln drives

Crusher drives

Conveyor reducers

Draglines and shovels

Steel mill gearing



Tested, published, patented

240%

DOE/NREL wind gearbox test

Under a U.S. DOE/NREL wind-energy research contract (2005–2008), a Convoloid retrofit of a 108 kW two-stage gearbox ran back-to-back against an optimized involute at up to 240% of rated load. Convoloid surfaces stayed stable; the involute's micro-pitting progressed.

20–35%

AGMA 11FTM19

Published: 20–35% higher torque capability than equivalent involute designs, rated per AGMA/ISO with the same derating factors applied to both (Berlinger & Colbourne, 2011).

US · EP

Patent position

US 10,527,149 in force to ~2036.
European patent EP 3 387 294 granted, with Unitary Patent and UK validation, to 2036.



NEXT STEP

License Convoloid[®]

- 1 **Technical introduction.** Confirm the gear-type fit for your application.
- 2 **Application modeling and design support.** Quantify the advantage at your ratios, loads and materials.
- 3 **License.** A per-unit royalty on gears you already make.

Gear Innovations LLC · 215-680-0052 · gearinnovations.net

Watch the inventor explain Convoloid: youtube.com/watch?v=y4P3Qi9Uq9s

