

THE VERSATILE MICROROLLING® MILL FOR COLD AND HOT PROCESSES

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Continuus-Properzi pursued, with its high precision Microrolling® mill process, an important objective: to provide a valid alternative to the conventional breakdown (cold drawing) machines. This technology is very well proven for producing wire in both hot and cold conditions.

The Microrolling® mill process really excels with those materials where the conventional breakdown drawing process must be divided into several steps with intermediate annealing. The major advantage of the Microrolling® mill is the reduction, and in most cases the elimination, of intermediate annealing steps thereby providing more flexibility and shorter time from one phase of the process to the next. Compared to the Microrolling® mill, the standard breakdown drawing machine with capstans and traditional drawing dies or with roller dies requires a much larger space for the break-down phase of the process and it cannot process hot materials.

This patented system, with its compact rolling stands and ability to process hot material, performs the rolling process without subjecting the material to any axial tension or compression thereby reducing the work hardening to an absolute minimum.

The advantages of Microrolling® mill over a traditional system are:

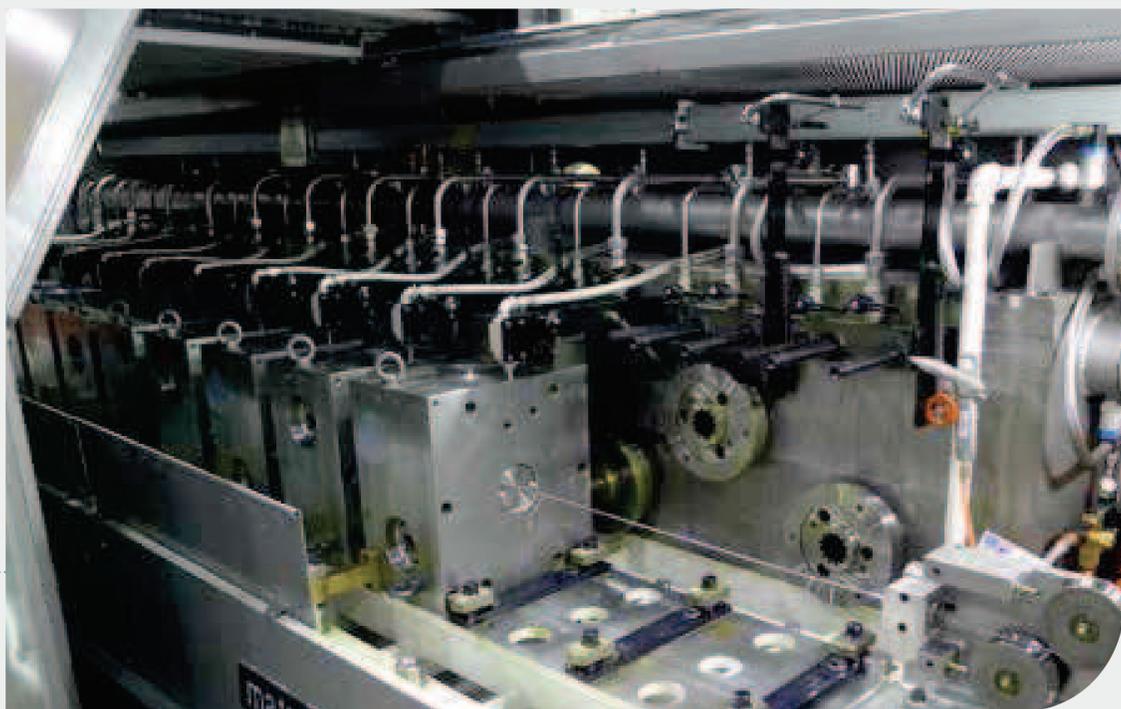
- >> Energy savings
- >> Low maintenance
- >> Self-threading (extremely user-friendly)
- >> Increased safety (self-threading eliminates potential pinch points)
- >> No pointing required
- >> No rod pickling required
- >> Reduced work hardening of the material
- >> Improved wire surface smoothness
- >> Absence of residual lubricant on wire surface
- >> Possibility of hot rolling without loss in output and efficiency
- >> Greater reduction between anneals on hard material
- >> All together: lower production costs

Presently, around the world, we have Microrolling® mills processing numerous types of materials including: low, medium and high carbon steels, steel cord wires, CO₂ welding wire, strong mechanical Aluminium Alloys (welding wire), Brass and Bronze Alloys (Cu based), Ni-Ti Alloys, Copper-Phosphorus, Copper-Zinc, Tantalum, etc. Some of these materials are heated to a specific temperature, depending upon the characteristics of the material being processed, before entering the Microrolling® mill in order to render them more easily workable.

MICROROLLING® PROCESS CHART	
Material	Microrolling® can process all materials that can structurally bear the total required reduction: Al, Cu, Carbon Steel, Stainless Steel, CO ₂ wire, FC (Flux-cored) wire.
Diameters	Maximum entry diameter: 12.0 mm (.472") Minimum exit diameter: 1.80 mm (.070")
Production Speed	Referring to 1.80 mm dia.: 16 m/sec for hard materials 25 m/sec and higher for soft materials
Pointing / Threading	Rod pointing is not required and the threading of the rolling mill is automatic.
Tension	There is no axial tension on the material between rolling stands.
Capstans	There are no capstans or loop sensors to control synchronization. The material follows a straight path from feedstock coil to collecting device.
Work Hardening	The wire is not subjected to useless stresses such as tension, bending or localized heating that induces supplementary work hardening (compared to natural work hardening due to the simple area reduction of the wire).
Rod Pickling	Not required. A normal mechanical descaling device is sufficient to prepare steel rod for rolling.
Rod Temperature	The configuration of the rolling mill allows introduction of material that has been pre-heated up to 750 °C.
Productivity	Over 90% on the basis of continuous operation.

Microrolling® Mill in operation at Indalco –
By courtesy of Indalco (Canada)





Microrolling® Mill in operation at Indalco –
By courtesy of Indalco (Canada)

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VARIOUS APPLICATIONS WORLDWIDE

CO₂ WELDING WIRE INDUSTRY:

The Microrolling® process is easily utilized in very complicated continuous processes such as the production of small intermediate diameter wire which has already been Copper clad and ready for the final drawing pass. In some cases, mainly in Japan, the Microrolling® process is used to feed a continuous processing line of annealing, pickling and Copper cladding.

FC WELDING INDUSTRY:

The precise control of the rolled material is a basic characteristic of the Microrolling® process. This allows for deformation of very “tender” materials such as Flux Cored Wire which is basically a tube with very thin sidewalls, especially considering the sidewall to diameter ratio at the beginning of the reduction process.

STAINLESS STEEL INDUSTRY:

The low sliding friction between the material being rolled and the surface of each work roll provides a very small increase in wire temperature during its deformation and reductions within the Microrolling® process.

FLAT WIRE PRODUCTION:

Special two roll stands have been used for the production of flat wires. One or two of these special stands can be placed at the end of the rolling sequence to obtain the desired dimensions with high precision tolerances.

...the produced wire –
By courtesy of Indalco (Canada)

RAPID WORK HARDENING MATERIALS INDUSTRY:

The malleability of wire produced by the Microrolling® process, when compared to equal reductions by a conventional wire drawing machine, is greater than that of drawn wire. Therefore, in many applications, it is possible to reduce the number of previously necessary thermal treatments to obtain the required overall reduction.

TOOL STEEL MATERIAL INDUSTRY:

The Microrolling® process allows rolling of rod that has been pre-heated up to 750°C and higher. Therefore, these applications include materials which have a very high resistance to deformation.

NONFERROUS METALS AND RELATIVE ALLOYS:

Thanks to its characteristics, the Properzi Microrolling® Process is not only ideal for breakdown of nonferrous wire of Cu, Zn or Al, but also serves to resolve many of the problems associated with hot, warm or cold processing of their alloys. This advantage is made very clear when confronted with particularly difficult to draw materials such as Copper-Phosphorus, CopperZinc, mechanical alloys of Aluminium, composite or clad materials, Tantalum, Titanium or other “exotic” materials and alloys.

By M.N.

