



AT - PIPE UMBRELLA SYSTEM SAFE AND FAST PRE-SUPPORT



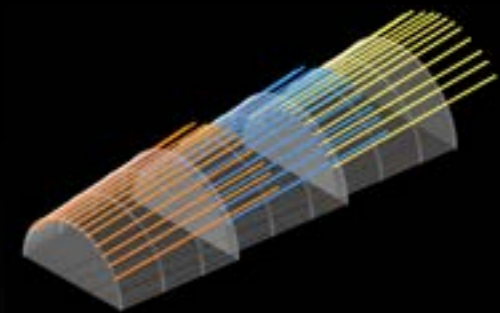
SAFE AND FAST SUPPORT IN TUNNELING

The AT - Pipe Umbrella System developed by DSI Underground, a Sandvik Company, is available as an optional kit to be installed on selected underground drills. This kit is used for the installation of the AT – Pipe Umbrella System, it consists of pipes installed into the ground prior to excavation to create an umbrella/canopy.

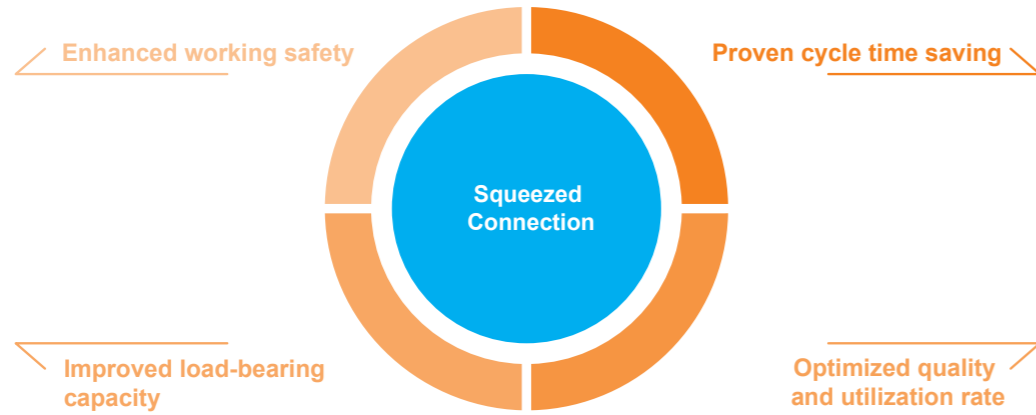
Pipe umbrella systems are a pre-support measure used in weak ground conditions in conventional as well as mechanized Tunneling. Designed to increase the stability, they ensure safety and efficiency when reliable support is needed in the working area of tunnel drives, portals, and for re-excavating collapsed sections.

BENEFITS

- Safety improved as workers are away from the boom area during all installation steps
- Faster connection process than for standard threads
- Efficient self-drilling installation : the casing provides an immediate support compared to other systems requiring additional working steps
- Robust system and high-strength pipe connection
- Improved load bearing capacity
- Elimination of delays due to jammed or damaged pipes
- Lower weight of the single umbrella pipes: easier handling for workers loading the tubes and drill steel manually
- Lower logistics costs: carbon footprint reduction



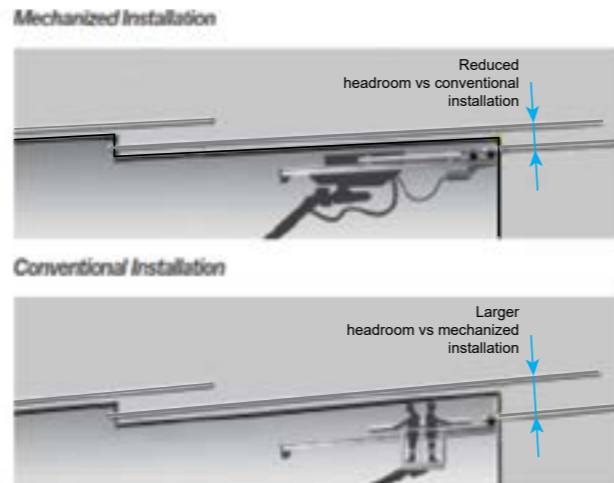
GROUNDBREAKING TECHNOLOGY



The Groundbreaking squeezed connection technology allows an optimized excavation profile as less headroom is required compared to conventional/manual installation.

This mechanized solution avoids manual connection/disconnection of pipes, it reduces significantly the direct exposure of workers to hazardous working areas.

The squeezed connection is not only the fastest process in the market, it also eliminates delays due to jammed or damaged pipes.

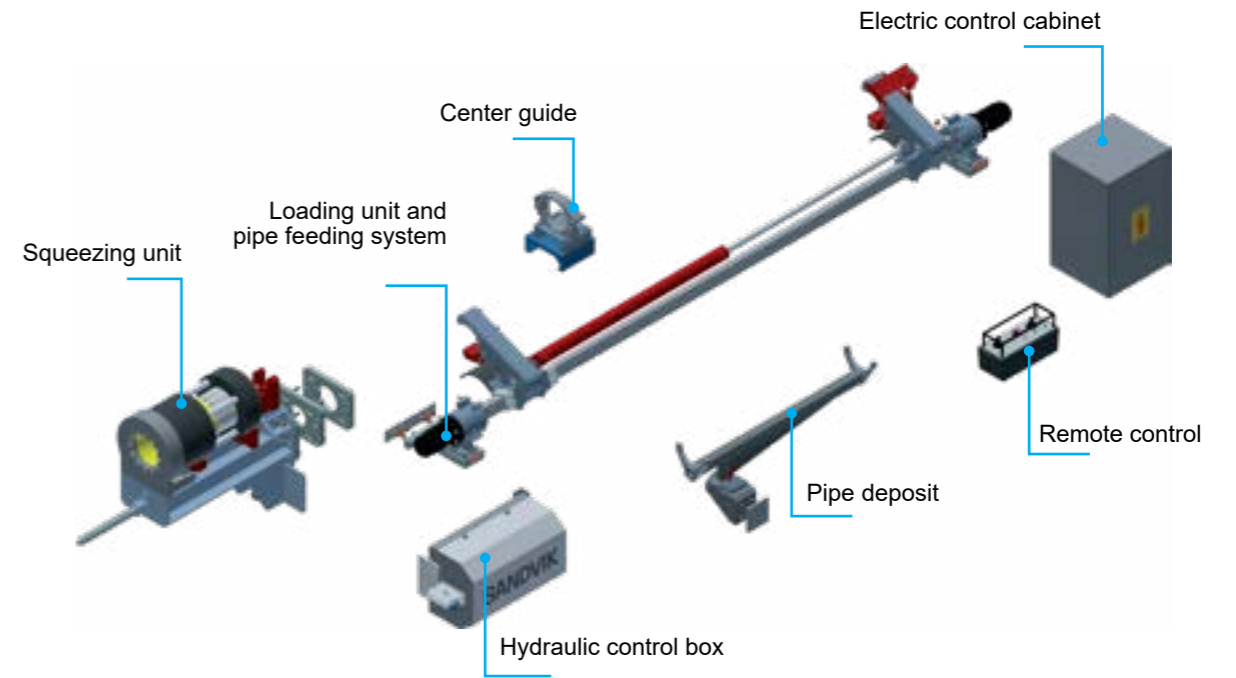


SQUEEZING UNIT

The squeezing unit, hydraulically driven, is mounted on a console installed on the drill feed of the jumbo. Pipe umbrella pipes are quickly and securely connected to each other.



AT - AUTOMATION UNIT - FULL KIT



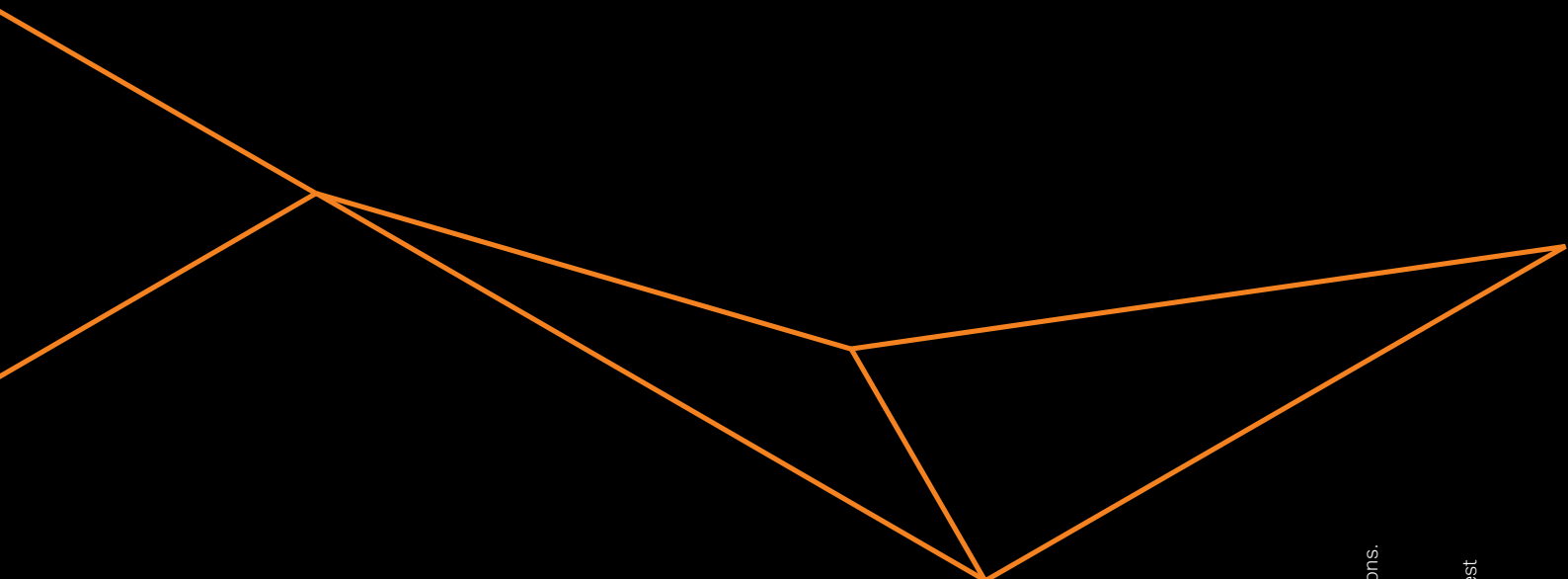
MECHANIZED INSTALLATION - SELECTION OF THE REQUIRED DEGREE

INSTALLATION MODE CHARACTERISTICS	PIPE CONNECTION TYPE	DEGREE OF MECHANIZATION	MECHANIZED WORKING STEPS
Connection unit	Threaded	50 %	Pipe connection, drill steel clamping (wrench)
Connection unit	Squeezed	50 %	Pipe connection, drill steel clamping (wrench)
AT - Automation unit	Threaded or Squeezed	100 %	Pipe connection, drill steel clamping (wrench) drill steel connection, pipe, and drill steel feeding



AT-PIPE UMBRELLA CONSUMABLES: POWERED BY DSI UNDERGROUND





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