

## RAISING THE STANDARD IN CHINA: PE100 COMPOUNDS FOR WATER PIPELINES

Water for the World initiative brings 24/7 supply to a village in Morocco

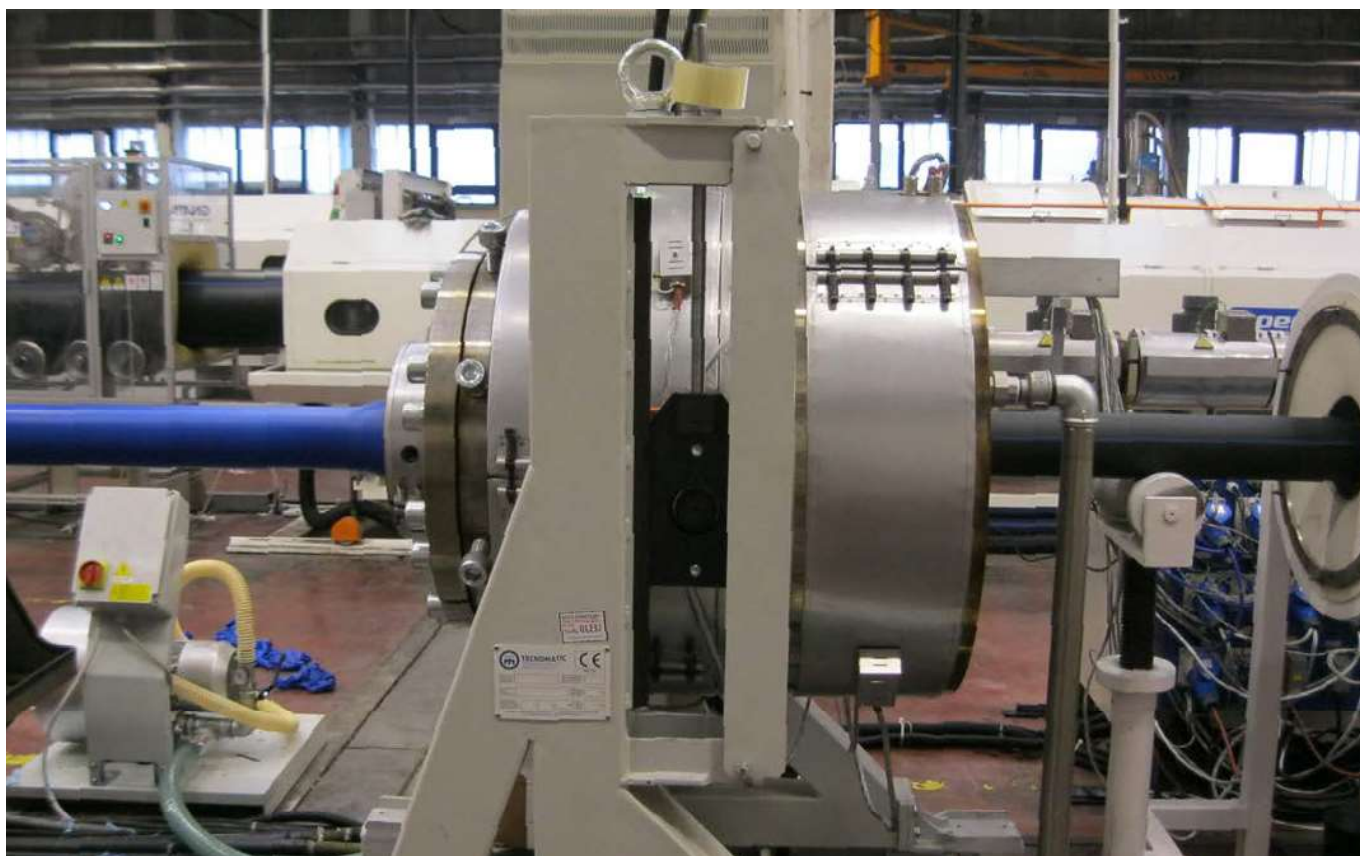
World's longest tow of long length large diameter (LLLD) PE100 pipes to Malaysia

Lifetime assessment of ZADCO subsea PE100 effluent pipeline



# Innovation and enhanced performance in the production of multilayer pipes

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Co-extrusion of HSCR PE100 using a coating die head on a standard PE100 pipe.



VENUS 630 die-head spiral distributor.

The market for polyolefin pipes is constantly evolving with more demanding customer and application requirements. Despite the constant improvement in polyolefin properties, single-layer solid wall pipes are still not able to always fulfill certain customer or application requirements. For such situations, multilayer pipes may be a solution. The key to producing a good multilayer pipe is the die-head. In this article, we showcase how Tecnomatic, a leading manufacturer of processing equipment for polyolefin and PVC pipes based in Bergamo, Italy continues to improve the technology and performance for the production of complex multilayer pipes with functional layers.

Developed on the basis of the VENUS monolayer concept, Tecnomatic currently has a full range of die-heads with multi helical spirals, for the production of two, three or four layer polyolefin pipes. This technology has been extended to large diameters, thanks to the years of experience supplying reliable and high performing lines for multilayer pipes. A recent delivery of a line to Authentic Production in Myanmar for the production of multi-layer pipes up to 630mm diameter shows that the Asia Pacific market is embracing innovations that may provide higher levels of performance.

Authentic Production, part of the Authentic Group of Companies, which started its PE pipe production several years ago, has rapidly gained market share and reputation because of its focus on quality. They benefitted from running Tecnomatic lines capable of producing pipes up to 1,200mm that offered production efficiency, reliability and reduced scrap rates when producing their recently launched multilayer product. The new product featured the BorSafe™ HE3494-LS-H PE100 High Stress Crack Resistant (HSCR) material in the outer layer to offer their clients maximum security against point loads and surface damage that may occur during installation.

Such multilayer pipes have been used extensively in Europe for installations either using trenchless techniques or where no imported backfill is used. By using the same material dug from the trench, the installers were able to reduce the costs and environmental impact of bringing sand or other backfill materials to the site. HSCR PE100 pipes can now offer contractors and installers such options in Asia as well.

The wall of the multilayer pipe produced by Authentic Production is made up of two layers equal to 10% and 90% of the total thickness. The outer layer is produced from HSCR PE100 material and the core from standard PE100. This requires two separate extruders, which was achieved by a main extruder from the ZEPHYR series in L/D 40 which offers extreme output performance and lower melt temperature and energy consumption, while the inner layer is produced from an ATLAS series in L/D 30. Both extruders are synchronised using gravimetric feed on each extruder to maintain a continuous raw material feed and to record variations in mass throughput, thereby ensuring perfect control of the weight per metre and wall thickness distribution.

The VENUS MULTI pipe heads series have been designed to achieve excellent processing using a wide range of materials at very high output. The spiral geometry has been optimised for the latest generation of PE and PP raw materials, while achieving improvements in reducing its overall length, volume and operating pressure. The heart of the VENUS MULTI heads consist of an innovative flow channel geometry, which has been calculated to take into consideration the current raw materials. This geometry ensures the same pressure and melt distribution in all the pipe extrusion heads in the range even at very high output rates. This new design of feeding system operates at a reduced working pressure throughout the complete size range. This reduces the energy consumption during extrusion since up to 10% of the extruder power is usually required for pumping capacity. Lower pressure results in a lower melt temperature and together with lower residence times ensures improved pipe characteristics such as its OIT (oxidation resistance) and reduction of thermal and shear stresses.

Authentic Production has expressed a high degree of satisfaction for the quality of the multilayer line since its commissioning. The new product will offer project owners additional security for pipelines that are installed in demanding conditions. Additional features can be added to the pipe such as a peelable outer skin which provides further economic and environmental benefits for



Multilayer 1,200mm OD PE100 with HSCR outer layer pipes being welded in Myanmar.



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water and gas distribution pipelines. This peelable outer jacket, frequently made from specially modified polypropylene, further protects the pipe surface against potential notches and cracks when using installation methods such as pipe bursting or wash-boring. Potentially deep scores in the protective jacket will not be transferred to the inner pipe when it is eventually exposed to service-related stresses.

The peelable jacket that is adhered to the outer wall of the core PE pipe is typically 0.6-0.7mm thick for all current dimensions of this new multi-layered pipe and the skin is added by a cross-head positioned before the last cooling bath. Tecnomatic has a full range of die-heads, based on spiral or radial technology suitable for plastic or metal pipes coating ranging from 5-800mm diameter and up to 4 layers. The die-heads are based on a typical spiral technology for large and single layer co-extrusion or a mixed solution with radial distributors or short path spiral alternative depending on material characteristics such as PA, EVOH, PVDF or adhesive bonds.