

ZANELLI COMMERCIALE S.r.L.

Via Banaffa 55, IT-48018, Faenza, Italy – ph. +39.0546.634037 – fx -.634031 – E-mail: zanellisrl@mbox.dinamica.it

(Promotional document)

THE HEAT SHRINKABLE SLEEVE

1 – The composition & the rules.

The heat shrinkable sleeve used for the coating of the weld joints in the pipelines, is composed by two layers:

- the outside layer (backing) made by elongated, electron-beam irradiated, shrinkable H.D.P.E., black colour.
- The inner layer (adhesive) composed by heat sensitive polyolephines. The formulation of the adhesives varies from type to type and from manufacturers. Adhesives can be classified as “soft” (composed primarily by butyl rubber, asphalt, carbon black), “hard” and “hot melt”.
- When the sleeve is shrunk over the cleaned (or grit-blasted) and pre-heated steel surface, assure perfect bonding to the pipe by the joint action of the shrinking backing working together with the melting adhesive which flows beneath.

2 – Adhesion and shear.

The adhesion (peel force) and the shear (tear force), associated with the softening point reflects the behaviour and the performance of the sleeve during its life after installation.

- The peel force make the installed sleeve to bond to the pipe and resist against mechanical stresses (stones, vibrations, clay etc.).
- The shear make the sleeve stay in its position without sliding out of place under mechanical stresses.

3 – The “Three-layer” system

The good chemical and mechanical bonding of the BI-component epoxy resin to the steel and to the adhesive is origin of the “three-layer” system (or “HTLP – High Temperature Low Preheating as named by their promoter Raychem). The use of primer decreases the required preheating temperature so that high grade adhesives which could not be practically used in the field because of the extreme high preheating temperature required (200°C and over) can be used with the intermediary of the epoxy resin. Additionally, the “three-layer” system assure the protection of the steel (by epoxy paint) in case of disbonding of the sleeve. Such performances make this method recommended in case of high grade, high operating temperature, large diameter pipelines buried in un-friendly or critical environment (as long distance high operating pressure gas transmission lines crossing densely inhabited territories).

4 – Compatibility of the sleeve to the mill coating of the pipe

For its nature, the sleeve is totally compatible with any type of polyethylene mill coating (side extruded, sock-type, fusion bonded). Its adhesion is also excellent with Fusion Bonded Epoxy (F.B.E.). When installed on Coal-Tar enamel, some surface roughening on the overlap area is required. Most critical is the compatibility with polypropylene pipe coating: roughening is also required but adhesion value are still quite low.

NOTICE TO THE READER: These considerations do not pretend to set the technical background of the h.s. sleeves nor they represent a commercial proposal. The intention is to give some practical guidelines to the operators for the selection of the suitable type of sleeve in function of the pipeline performances.

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