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Mat's & Prod's – Water Pipes
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Longevity of SINTAJOINT pipe

Tyco Water SINTAJOINT pipeline system, comprises SINTAKOTE fusion bonded medium density polyethylene coating, with Tyco Water's rubber ring jointing system, using an EPDM rubber sealing ring.

SINTAKOTE has been supplied by Tyco Water (and its antecedents) since 1972 as a fusion bonded polyethylene coating. The coating was improved with the change from low density polyethylene to medium density polyethylene in 1993. This change provided increased material strength, improved impact, and improved creep resistance (see Reference 1.

The service history of SINTAKOTE has been excellent, with every indication that a service life in excess of 150 years will be achieved. Reference 2 details in-service assessments of the performance of SINTAKOTE from pipelines that have been in operation for up to 26 years. Reference 3 is a report on the longevity of SINTAKOTE, and reference 4 details key properties of SINTAKOTE.

In addition the performance of SINTAKOTE has been demonstrated in some severe applications including:-

1. Conveying hot oil at 100°C in Bass Strait in a 30km pipeline operating since 1981.
2. Operation of the 193km SINTAJOINT pipeline system buried in Central Australia conveying hot water at 60°C (since 1996).

SINTAKOTE is used by all the major Water Agencies in Australia as their recommended/preferred pipeline coating. It has been used on such major projects as the 100+km DN 1400 Southern Trunk Main south of Perth.

The rubber jointing system used by Tyco Water has its origin in its antecedent "Humes Ltd" with the first supply of the joint in 1959. Now in its 47th year of service the use of the rubber ring joint (RRJ) has spread from NSW/Queensland, where it was prevalent until the mid 1980's, when it became widely used across all of Australia. The development in 1984 was the SINTAJOINT pipeline system which encompassed the extension of

SINTAKOTE around the socket and spigot ends, and combined with a cement mortar lining, provides total corrosion protection to the joint, at a level that cannot be achieved by the application of field applied coatings and linings.

The performance of the Tyco Water rubber ring joint has been proven in 47 years of service, and has undergone substantial improvement in coatings and rubber ring seals.

With regard to the rubber ring seal the history of such seals goes back 140 years. References 5 & 6 details the performance of a seal that had been in service for 100 years. An early Australian Iron and Steel publication indicates that rubber ring seals were introduced to cast iron pipes in Australia in the mid 1930's. Overseas practice indicates that rubber rings have been used in cast iron pipelines since the 1930's (Reference 7).

Despite the exceptional record with rubber rings in pipe jointing, there have been a small number of deterioration issues with poorly formulated Natural Rubber rings, especially in service in the UK. No such deterioration has been reported on steel pipelines in Australia. The better performance of synthetic rubbers, especially with regard to resistance to atmospheric attack (ozone and UV), and biological deterioration, has led to a change in the rubber used in the by Tyco Water SINTAJOINT pipeline system to Ethylene Propylene Diene Monomer (EPDM) in 1999. Information on the improved performance of EPDM is given in Reference 8.

The SINTAJOINT pipeline system comprising steel, whose properties do not change over time in service, SINTAKOTE with a demonstrated service life in excess of 30 years, and with an expectation well in excess of 150 years, and a rubber ring joint that has been used in Australian service for 47 years, that utilises a rubber sealing ring where local and overseas experience indicate a life in excess of 150 years, combine to prove the lowest cost, highest performance steel pipeline system available.

Whilst we do not have many examples of studies on exhumed rubber rings from steel pipelines in Australia, the reports from customers on performance indicates to us a life well in excess of 150 years can be expected.

Ashley Fletcher
General Manager Technical

References:

1. Fletcher, A. & Thomas, R., "A new fusion bonded medium density polyethylene pipe coating", Presented at the Australasian Corrosion Association Conference 1993.
2. Tyco Water Pipelines Research report no: PR 14378, 25/2/2005, entitled "Examination of SINTAKOTE in service".
3. Tyco Water Pipelines Research report no: PR 12399, 10/2/2006, entitled "Longevity of Sintakote".

4. Tyco Water Pipelines Research report no: PR 13353C, 10/2/2006, entitled “SINTAKOTE - Properties and performance”.
5. Smee, A. R., “century old rubber joint rings exposed at west Ham”, Rubber Developments, 1963, 16, no.4
6. Dunkley, W. E., “The longevity of rubber in pipes and pipelines”, Rubber developments, 1964, 17, no.4
7. Cast Iron Pipe Research Association Handbook, “Ductile Iron Pipe”, 1/1/1978, pp 8-11.
8. Tyco Water Pipelines Research report no: PR 13794, 25/9/01, entitled “The performance of elastomeric pipe seals”.