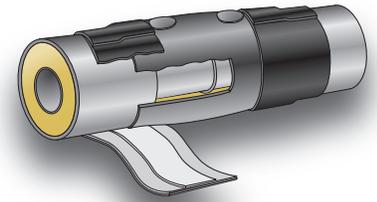


### RJS-E LONG TERM WATER RESISTANCE TESTING RESULTS



#### Overview

The demands of district heating require reliable sealing products with high resistance to moisture ingress. To provide empirical evidence of performance for the RJS-E, the RJS-E product was subjected to hot water emersion testing, one of the most rigorous testing methods for coatings.

The test results demonstrate that the RJS-E exhibited virtually no derogation in product performance making RJS-E a preferred choice for sealing where long-term, multi-year performance is desired.

#### Test Method

The Covalence RJS-E product was installed on a 110mm diameter HDPE pipe as per the product’s application guideline. Once applied the master pipe was cut into multiple 25mm segments. The cuts were made through the heat-shrink material of the RJS-E as well as through the pipe, hotmelt adhesive and the butyl adhesive. The purpose of cutting the pipe into 25mm segments was to provide three samples per data point and to allow the effects of hot water attack on the adhesive bond line to be measured by peel strength value.

Each of the peel samples were immersed in 50°C tap water(see fig.1) The first sample was tested at 14 days. Additional samples were tested at 1, 2, 3, 6, 9 and 12 months. Each sample that was tested was allowed to cool for a minimum 6 hours at 23°C. Within 24 hours of extraction each sample was subjected to a rolling drum peel test at 23°C using a pulling speed of 50 mm/min. Peel samples which did not go into the immersion test, were kept in 23°C air environment and served as the reference.

#### Conclusion

Even under these very difficult test conditions the two adhesives of RJS-E exhibit a very good long term resistance against water (see fig.2). As shown on the graph, the hotmelt adhesive shows a small decrease in adhesion over the first half year, but the evolution in the second half year is remarkably stable. The butyl adhesive follows in essence a straight line over the total period.

Peel strength as function of immersion time

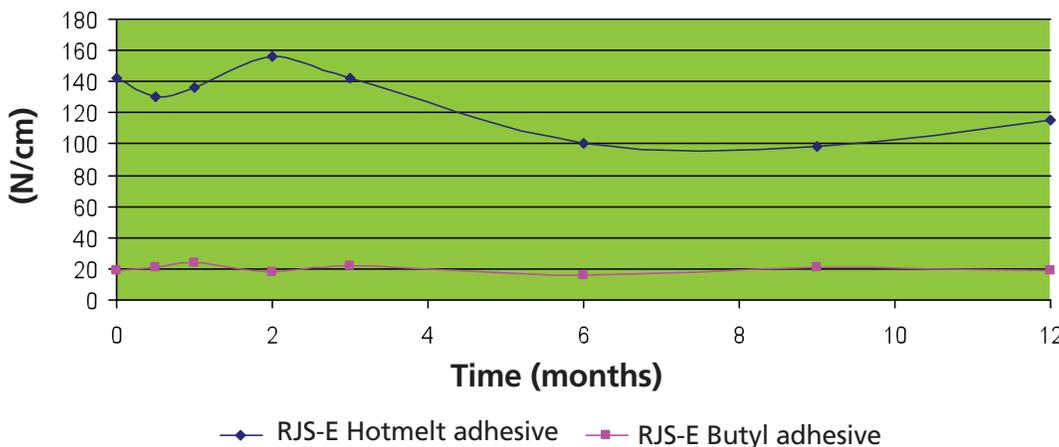


Fig.2



Fig.1