Summary

3 test samples of a conveyor belt are used to perform a standard troughability test. The troughability is: "The property of a belt that permits it to conform to the contour of troughing idlers". A literature research was done to find different method to quantify the troughability. It turned out that only the test method from ISO-standard 703 is used for this. In this test the sample is supported by both short sides after which it is dropped to its natural curve. The test samples are 150 mm wide and 1800 mm long, which is the width of the real belt. Using the deflection from the horizontal position and the sample length, the troughability is calculated. For the test a new test rig was used in which factors like friction in the supports were eliminated. Because the samples turned out to be of a bad quality, showing inconsistent curves and curving of the sample in flat position, the test results did not match the results from the manufacturer (difference of about 1% to 5%). However, because of so many influencing factors the difference between the different samples was negligible.

To see whether a simple test could be used to judge the belt for the use in a pipe conveyor, a simple test rig was designed which represented an idler frame. The results will also be used to check/compare to results of other tests on a full size test rig in South Africa.
12 force sensors were incorporated in the test rig to be able to measure the force on each of the six idlers. The same test samples as in the troughability tests were used. Using an amplifier, A/D converter and Labview software the tests were performed.
The results showed a distinct load distribution pattern with the upper, lower left and lower right idler having a peak in load compared to the others. Reasons for this are that the top idler supports the force of the overlap of the pipe, and the lower side idlers support most of the weight. This distribution would vary with the troughability of the belt.
When comparing to the South Africa results, no direct link can be seen. There is however a number of differences between the test rigs which have a significant influence on the distribution. The most probable cause is the weight of the piece of the belt between the idler frames, deforming the belt.
In the end the tests are successful, but the scope of the tests is to narrow for a general conclusion on the force distribution. More research with different belts and in combination with the South Africa test rig is recommended to get a better image of the relation between the troughability and the force distribution.