



Determination of the structural integrity of cable installation chambers by vacuum tests.

| Requested by: Vesimentor OÜ

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Order 15.12.2013, Olavi Ehrstein

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Task Determination of the structural integrity of cable installation chambers by vacuum tests.

Samples

1. Cable installation chamber KKS2, test weight 48.8 kg
2. Cable installation chamber KKS3 # I, test weight 69.5 kg
3. Cable installation chamber KKS3 # II, test weight 69.2 kg

Results All the openings of the cable installation chambers were closed. The pressure testing equipments were installed using quick connections. At first the underpressure of 0,05 bar was applied to all three chambers. Next day the vacuum was increased to 0,10 bar and from there on the vacuum was increased by 0,01 bar each working day.

The KKS2 chamber was tight until 0.11 bar vacuum. The long sides buckled in (picture 1) and the handles started leaking.

The KKS3 #1 chamber was tight until 0.16 bar vacuum. The long sides buckled in only slightly (picture 2). Both chambers were very stable until 0.15 bar vacuum.

The material of KKS3 #2 was a little bit tougher than the material of KKS3 #1. The KKS3 #2 kept its shape rather well until 0.20 bar vacuum.

The KKS3 #2 chamber was tight until 0.26 bar vacuum and when increased to 0.27 the chamber started leaking.

The buckling of KKS3 #2 chamber is shown in pictures 3...11.



Picture 1 (KKS2: 0,11 bar vacuum)



Picture 2 (KKS3 # I : 0,15 bar vacuum)



Picture 3 (KKS3 # II : 0,15 bar vacuum)

Picture 4 (KKS3 # II : 0,17 bar vacuum)



Picture 5 (KKS3 # II : 0,19 bar vacuum)

Picture 6 (KKS3 # II : 0,22 bar vacuum)



Picture 7 (KKS3 # II : 0,23 bar vacuum)

Picture 8 (KKS3 # II : 0,24 bar vacuum)



Picture 9 (KKS3 # II : 0,26 bar vacuum)

Picture 10 (KKS3 # II : 0,26 bar vacuum)

Summary

The tests were carried out on chamber bodies and do not take into account the telescopic applications on top of the manholes. The telescopic part of the manholes do not transfer vertical force on the manhole. The vacuum test simulates the multiaxial pressure generated by the ground water and the soil pressure.

The tested KKS3#II chambers can take 0.2 bar vacuum without collaps and are thereby in our opinion suitable as cable chambers in properly constructed traffic areas where the vehicle maximum weight do not exceed 12 tons. The KKS2 chamber should not be placed in traffic areas for heavier than 3,5 ton vehicles.

The tests were performed by Senior Laboratory Technician Sauli Tiainen in Espoo during 18.12.2013 – 20.01.2014



Picture 11 (KKS3 # II : 0,20 bar vacuum)

Espoo, January 30:th 2014



Karl Holmström
Product Manager



Sauli Tiainen
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APPENDICES

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