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| \\Beuk\project\mtoa\projects\marcok\MT\NIKHEFlogo.jpg | Cryolinks for Advanced Virgo  Quality assurance procedure | | |
| Nikhef number: | Item number: | Date: May 5, 2011 | Page: 1 of 12 |
| NIK-VIR-002 | - | Status: - | Revision: A (Preliminary) |
| Project: **Cryolinks for Advanced Virgo** | | | |
| Department: Gravitational Physics | | Top folder: **-** | |

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| Abstract:  The current Virgo vacuum level needs to be improved by about a factor of hundred in order to be compliant with the required Advanced Virgo sensitivity. Such an improvement requires baking out the interferometer arms. To separate these arms from the towers that hold the mirrors and allow the bake-out, four cryogenic vacuum links will be installed. This note describes the quality assurance plan for the realization of these cryolinks. | | |
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| History of Changes | | | |
| Rev. No. | Date | Pages | Description of changes |
| A | 05-05-2011 | All | Inital version |

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# introduction

The Virgo project is a physics experiment for detection of gravitational waves. The enhancement of the Virgo sensitivity by a factor 10 requires an improvement of the present vacuum level. This will lower the phase noise for YAG light scattering from the residual gas inside the 3 km long interferometer (ITF) arms. The present system operates at about 10-7 mbar (dominated by water) although it has been designed and tested to reach a base pressure below 10-9 mbar (dominated by hydrogen) after an overall bake out.

The residual pressure in the ITF arms has to be reduced by a factor of 100 to reach an enhancement in sensitivity by a factor of 10. By means of cryogenic links the migration of water from unbaked towers to the ITF arms can be stopped and a base pressure below 10-9 mbar can be reached.

Cryolinks will be installed between the mirror towers and the existing DN1000 valves of the Virgo experiment. The vacuum vessels of the cryolinks will have different lengths (links at the end-towers are 6000 mm long, and at the input-tower 5400 mm). Aspired are four identical cold vessels in the cryolinks, since the optical design is not completed at this point, it may be that the dimensions of the prototype will slightly deviate from that of the other links.

# Scope

This document provides a description of the quality assurance measures taken in the production of the cryolinks for Advanced Virgo. The document has been realized through discussion with Demaco, a company with expertise in cryogenic systems.

# quality assurance for cryolink





