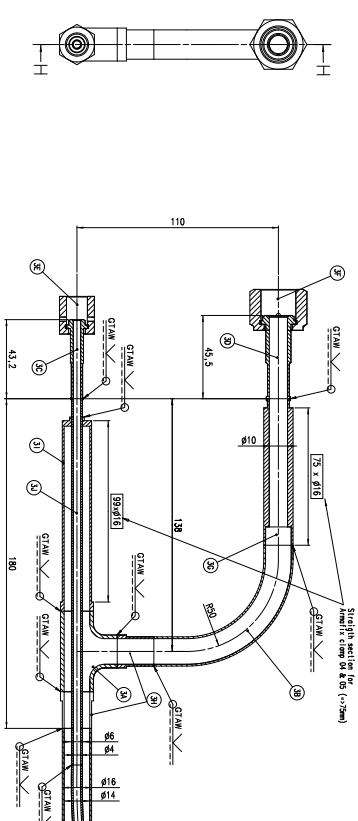
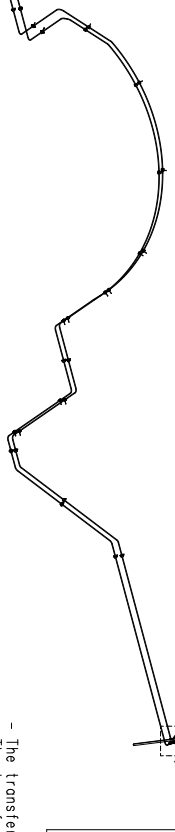


Detector side

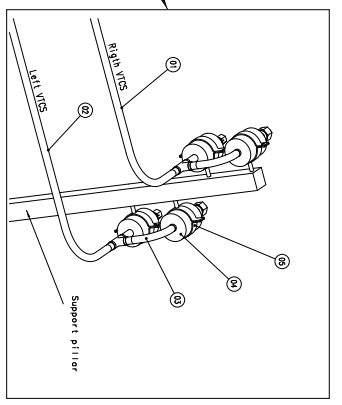
Section H-H:



Left VTCS Transfer tube concentric length: 47.8 meter  
Right VTCS Transfer tube concentric length: 46.7 meter



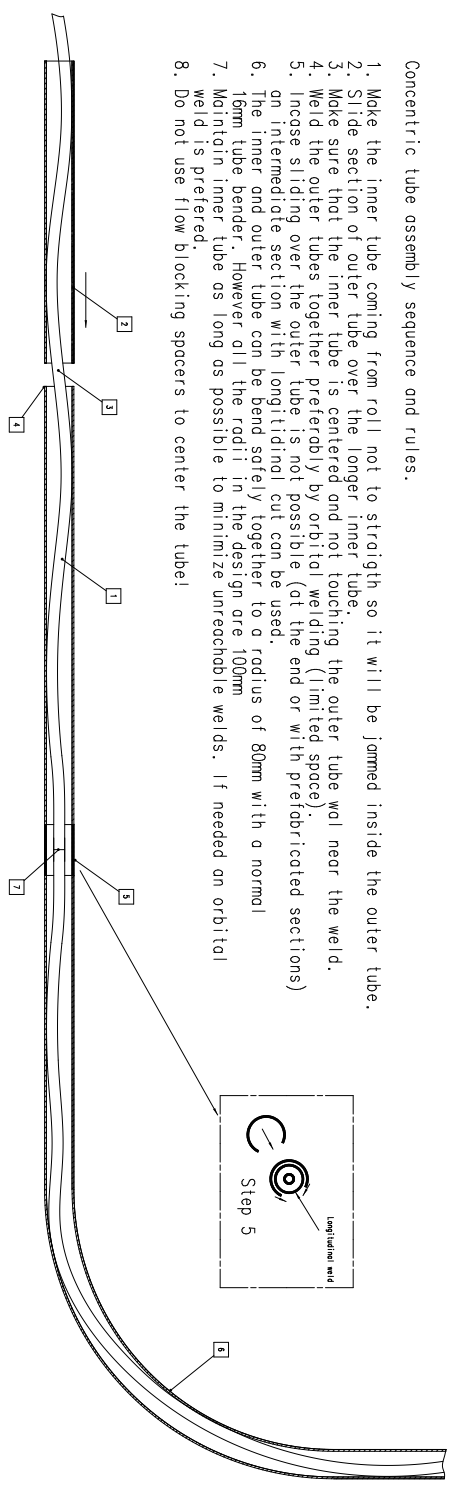
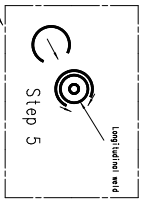
Cooling Tower side



- The transfer tube assembly is a PN100 pressure system.
- The transfer tube is part of the cold section of a cooling system.
- Operational temperature range: (-45 to 30°C). Inner tube and outer tube are always in the same temperature range.
- Pool pressureize inner and outer tube with 1500m inert gas.
- A helium leak testings to be performed to ensure a leaktightness of 10e-7 mbar.lvs.
- Parts have to be cleaned using acetone, and dried with Nitrogen flushing.
- Welds made in the experimental hall are preferably made by orbital welding because of the limited space.
- Welds shall be submitted to a CERN inspection (X-ray control).
- The installation of the tubes and brackets need to be coordinated with other installation procedures.
- Sharfing of bracket mounting bases is preferred.
- Installation of the ArmoFlex isolation must be performed according to the rules of ArmoFlex, to obtain a moisture free enclosure.
- Suggestions to modifications in the design are negotiable and need to be discussed with NIKHEF.

Use ArmoFlex protective layer

- Concentric tube assembly sequence and rules.
1. Make the inner tube coming from roll not to straight so it will be jammed inside the outer tube.
  2. Slide section of outer tube over the longer inner tube.
  3. Make sure that the inner tube is centered and not touching the outer tube wall near the weld.
  4. Weld the outer tubes together preferably by orbital welding (limited space).
  5. In case sliding over the outer tube is not possible (at the end or with prefabricated sections) on intermediate section with longitudinal cut can be used.
  6. The inner and outer tube can be bend safely together to a radius of 80mm with a normal 16mm tube bender. However all the radii in the design are 100mm
  7. Maintain inner tube as long as possible to minimize unreachable welds. If needed an orbital weld is preferred.
  8. Do not use flow blocking spacers to center the tube!



NO	DESCRIPTION	UNIT	QTY	REMARKS
21	1	Right transfer tube (200m)	200	see part list
21	1	Left 400 meter transfer tube	200	see part list
21	2	160-200 meter transfer tube	200	see part list
22	1	160-200 meter transfer tube	200	see part list
23	1	Support 1/2" x 1/2" steel rod	200	see part list
24	1	Support 1/2" x 1/2" steel rod	200	see part list
25	1	Support 1/2" x 1/2" steel rod	200	see part list
26	1	Support 1/2" x 1/2" steel rod	200	see part list
27	1	Support 1/2" x 1/2" steel rod	200	see part list
28	1	Support 1/2" x 1/2" steel rod	200	see part list
29	1	Support 1/2" x 1/2" steel rod	200	see part list
30	1	Support 1/2" x 1/2" steel rod	200	see part list
31	1	Support 1/2" x 1/2" steel rod	200	see part list
32	1	Support 1/2" x 1/2" steel rod	200	see part list
33	1	Support 1/2" x 1/2" steel rod	200	see part list
34	1	Support 1/2" x 1/2" steel rod	200	see part list
35	1	Support 1/2" x 1/2" steel rod	200	see part list
36	1	Support 1/2" x 1/2" steel rod	200	see part list
37	1	Support 1/2" x 1/2" steel rod	200	see part list
38	1	Support 1/2" x 1/2" steel rod	200	see part list
39	1	Support 1/2" x 1/2" steel rod	200	see part list

Project: LHCb Vertex Detector

Title: VCS Concentric Transfer Tube

Author: [Name]

Version: 1.0

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