

# Water Tank

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Goal of Task Group: Delivery and Installation of Water Tank & water recirculation system.

	Achieved	Date	Depend from Implications on
Definitive project	✓	09/05	
Tendering	✓	28/12/2005	
WT tender awarded to company	✓	13/3/2006 23/6/2006 (INFN)	
Contract signed	X	by end july 2006 Maybe better sep07	
Executive project	X	2 month end september 2006	

# Water Tank

	Achieved	Date	Depend from or Implications on
Installation	<b>X</b>	Start 02/2007 ? TBD	Cryostat delivery (work onsite cannot be stopped for many months)
Mounting procedure	<b>X</b> <b>X</b>	28/12/2005 07/2006	Cryostat and Cu- shield insertion proc WT executive project
Integrated risk assessment analysis	<b>X</b> ongoing	10/09/2006	
End of installation	<b>X</b>	?	WT construction & Cryostat delivery
Water system	<b>X</b>	12/06 project 03/07 ordered	

# WT specs in tender

Table 1: GERDA Water Tank main features

Reference regulation for structural project:	API650
Further verification for seismic hazards:	Eurocodice 8
Quality certification of construction process:	ISO9001
Quality certification required for company:	ISO14001
Tank height / external diameter:	8.9 m / Ø 10.0 m
Height of the water level:	8.4 m
Effective capacity (m <sup>3</sup> ):	633 m <sup>3</sup>
Water tank bottom:	flat, plates head welded
Water tank roof:	conical from the shell, (Ø 4.5 m)
Water tank shell:	cylindrical, plates head welded
Water tank sheet-metal plates:	≈2 m
Angle between shell and roof:	≈6°
Bottom reinforcement:	yes, at 1 feet level
Reinforcement rings along the shell:	yes, 1 or 2
Water tank Material:	stainless steel AISI 304 L or 304 LN, or carbon steel plus appropriate coating
Thickness of the shell:	12 to 9 mm
Connections between plates:	welded
Welding type:	external MIG, internal TIG without filler metal
Welding certification:	certified by the executing company fully X-ray tested
Approximative length of welds:	400 m
Flanges	
1 600 x 1400	elliptical manhole in the shell
1 DN 1200	in roof for cryostat neck equipped with custom flange
2 DN 500	manhole in roof for level,
2 DN 200	pressure and depressure safety devices
1 DN 50	net fit connection for N inlet
1 DN 300	for total drain compensation
2 DN 250	in roof for photomultiplier cables
2 DN 300	to drain tank completely in 20 h
2 DN 80	lateral for water recirculation
Weight of water tank (tons):	<20 tons
Weight of filled water tank:	650 tons
Operational over/underpressure:	±20-30 mbar
Safety device:	pressure/depressure ±20-30 mbar
Water recirculation:	yes, 2-3 m <sup>3</sup> /h
Water recirculation plant:	deionization, Radon stripping, particulate removal

# Timing of WT and Structure

(presented at GERDA Dubna meeting june 2005)

Month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Tank</b>	<b>Tendering</b>															
<b>Tank</b>	<b>Engineering</b>															
<b>Tank</b>	<b>Material Shipping</b>															
<b>Tank</b>	<b>Work Shop Fab.</b>															
<b>Tank</b>	<b>Site Fab.</b>															
<b>Structure</b>	<b>Tendering</b>															
<b>Structure</b>	<b>Workshop Fab. and Shipm.</b>															
<b>Structure</b>	<b>Construction (on site)</b>															
<b>Cryost.</b>	<b>Crystat Insertion</b>															
<b>Structure</b>	<b>Construction (on site)</b>															
<b>Tank</b>	<b>Construction (on site)</b>															
<b>Tank</b>	<b>Test and Approval</b>															

## Items To Be Defined

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- Request on steel and steel certification, electrode etc.  
→no.
- Constructional details of the WT bottom plate (because of cryostat skirt interface)
- WT constructional procedure.
  - Tendered: Big aperture (4.5 m diam x 7 m h) in the WT mantle to insert the cryostat after WT completion.
  - What we need: Cryostat delivery and installed after WT bottom plate construction.

How long it will take realistically to install Cryostat, test it on-site, insert Cu, test again. Estimate  $\geq 2$  months.
- Positions of anchorage for PMs.
- Number, type and position of flanges for PM cables. Why not adopt Borexino solution

# Possible problems

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- Delay of cryostat delivery
- Constructional problems induced by presence of cryostat
- Protection of cryostat during WT construction
- Water availability to fill for cleaning and filling
- Permits to discharge water in LNGS draining pipe