

Specification DENEX 500TN

(Status: July 2008)

Line	Parameter	Value	Comments
1	Active area	500 x 500 mm ²	Size of the free space of electrode frames Neutron sensitive area: ~ 490 x 490mm
2	Depth of detect. volume	20mm	Limited by drift electrodes
3	Detection gas	³ He: ~1,6 bar CF ₄ : ~1,4 bar	Maximal total detection gas pressure: 3 bar
4	Position resolution (FWHM):	2 mm x 3 mm	
5	Efficiency for neutrons	0.9 Å: > 18 % 2 Å: > 37 % 4 Å: > 60 % 8 Å: > 84 % 10 Å: > 90 % 16 Å: > 97 % 20 Å: > 99 %	i) nominal neutron capture probability inside the detection volume (depth: 20mm). ii) absorption in neutron window not taken into account iii) electronic detection of every captured neutron assumed iv) No dead volume losses between initial window and first drift electrode
6	Window material Window thickness Transmission	Al Mg 4,5 Mn alloy 12 mm 0.9 Å: > 89 % 2Å: > 77 % 4 Å: > 60 % 8 Å: > 36 % 10 Å: > 28 % 16 Å: > 13 % 20 Å: > 8 %	Material and thickness is optimized
7	Uncorrected differential non-linearity of position detection	< 3 %	Measurement: Starting from the centre of an uncorrected spectrum and assuming a constant ratio "change in x- or y-position per channel" the relative distortion will not exceed 3%, that is less than 4.5 mm at the border.
8a	Background rate without neutrons	<< 1/s	Depends on the surrounding, the analogue electronics and its adjustment.
8b	γ-efficiency ε _γ	ε _γ < 10 ⁻⁵ (E ~ 1 MeV)	Basis are efficiencies as measured recently at GKSS for the case of a DENEX-500-CN and DENEX-200CN detectors filled with 1, 1.5 and 3 bar CF ₄ .
9	Electronic components inside the detector	50 Ω Delay lines	
10	Anode wire	Ø ~ 8 μm	Au-coated Tungsten/Rhenium wire
11	Cathode wire	Ø ~ 30 μm	Au-coated Tungsten/Rhenium wire
12	Drift electrodes Window. Bottom of the detector	----- Ø ~ 30 μm	Metallic-coatings on isolating layers Au-coated Tungsten/Rhenium wire
13	Connector for HV supply	50 Ω SHV	
14	Connector for delay lines signal	50 Ω SMA	
15	Valve for pumping and gas filling • Manufacturer • Type	Swagelok 6L-ELD8-DDXX	
16	Gas quality: ³ He ⁴ He	99,988 0,0067	The detector housing is heated to ~ 60°C and evacuated for more than 100h before the detection gas is filled in.
17	delay lines • number of steps • delay per step • total delay • Bandwidth	250 ~1.7 ns ~ 425 ns ~ 100 MHz	
18	Anode capacity	~ ---- pF	A _C Not measured yet
19	Drift capacity	~ --- pF	Not measured yet
20	Anode work voltage	+2650V	Plateau regime
21	Anode work current	+---- μA	Not measured yet
22	Anode work resistor	1MΩ	R _A
23	Drift work voltage	-1000 V	Plateau regime
24	Detektor dead time	~ 150 ns	
25	Detektor restoration time	T = --- μs	R _A x A _C Not measured yet
26	Dead zones	70 cm min. around the active area	
27	Pressure sensor Type Range	DRUCK XT1510 6 bar/4 to 20 mA	
28	Gaskets	Metallic. Indium wire	
29	Gas loss	10 ⁻⁹ mbar/ls	
30	Dimensions: • height • width • depth • weight	~ 707 mm ~ 707 mm ~ 115 mm ~180 kg	
31	EU-Declaration of Conformity	CE	The directives covered by this declaration: 97/23/EEC Pressure Equipment directive (PED) Section EEC No. L18158.1 from 09.07.1997 Test pressure 3,9 bar gauge pressure according to AD 200, Bulletins 5D and W7