

## Specification DENEX 300TN

(Status: November 2007)

Line	Parameter	Value	Comments
1	Active area	300 x 300 mm <sup>2</sup>	Size of the free space of electrode frames; Neutron sensitive area: ~ 280mm x 280mm
2	Depth of detect. volume	20mm	Limited by drift electrodes
3	Detection gas	<sup>3</sup> He: ~4,8bar CF <sub>4</sub> : ~1,2bar	Maximal total detection gas pressure: 6 bar
4	Position resolution (FWHM):	2 mm x 3 mm	
5	Efficiency for thermal neutrons	0.9 Å: > 46 % 2 Å: > 75 % 4 Å: > 93 % 8 Å: > 99 % 16 Å: 100 %	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 Si alloy 10 mm 0.9 Å: > 91 % 2 Å: > 97 % 4 Å: > 95 % 8 Å: > 91 % 16 Å: > 84 %	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 <sub>γ</sub>	ε <sub>γ</sub> < 10 <sup>-5</sup> (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 <sub>4</sub> .
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	----- Ø ~ 30 μm	Metallic-coatings on isolating layers on window. Bottom.
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: <sup>3</sup> He <sup>4</sup> 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	150 ~2.7 ns ~ 400 ns 100 MHz	
18	Anode capacity	~ 470 pF	A <sub>C</sub>
19	Drift capacity	~ 3097 pF	
20	Anode work voltage	+2850 V	Plateau regime
21	Anode work current	+0,008 μA	Plateau regime
22	Anode work resistor	470 kΩ	R <sub>A</sub>
23	Drift work voltage	-1000 V	Plateau regime
24	Detektor dead time	~ 150 ns	
25	Detektor restoration time	T = 4.7 μs	R <sub>A</sub> x A <sub>C</sub>
26	Dead zones	70 cm min. 78 cm max. around the active area	
27	Pressure sensor DRUCK type	PTX660	
28	Gaskets	Metallic. Indium wire	
29	Gas loss	10 <sup>-9</sup> mbar/s	
30	Dimensions: • height • width • depth • weight	~ 447 mm ~ 447 mm ~ 115 mm ~ 50 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 6 bar gauge pressure according to AD 200, Bulletins 5D and W7.