AMS-02: TRDTN2

Straw Modules (328 FM)

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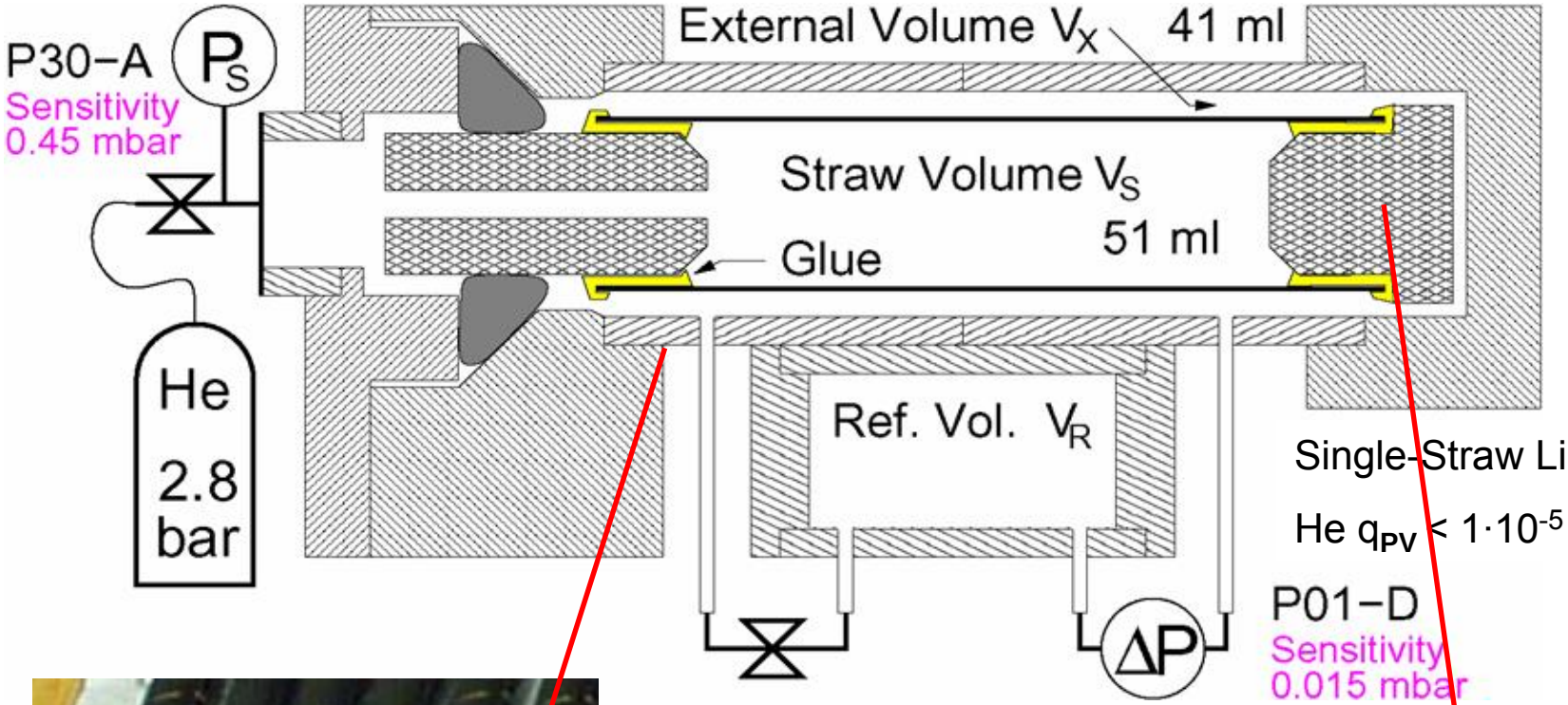
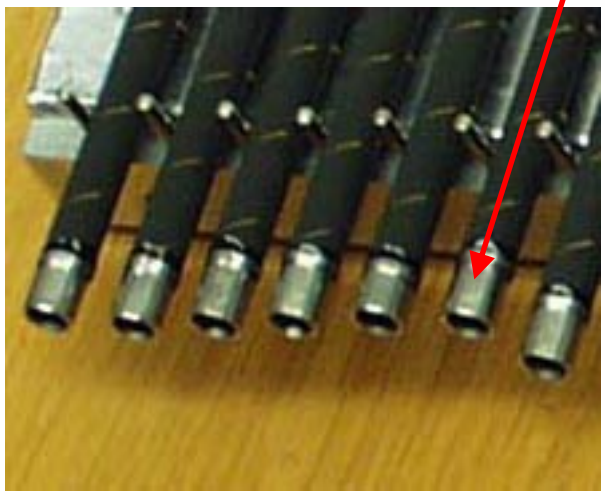
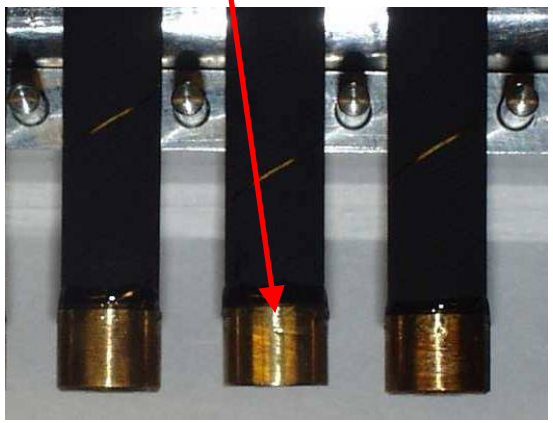
AMS-02 – TRD: Single Straw Test



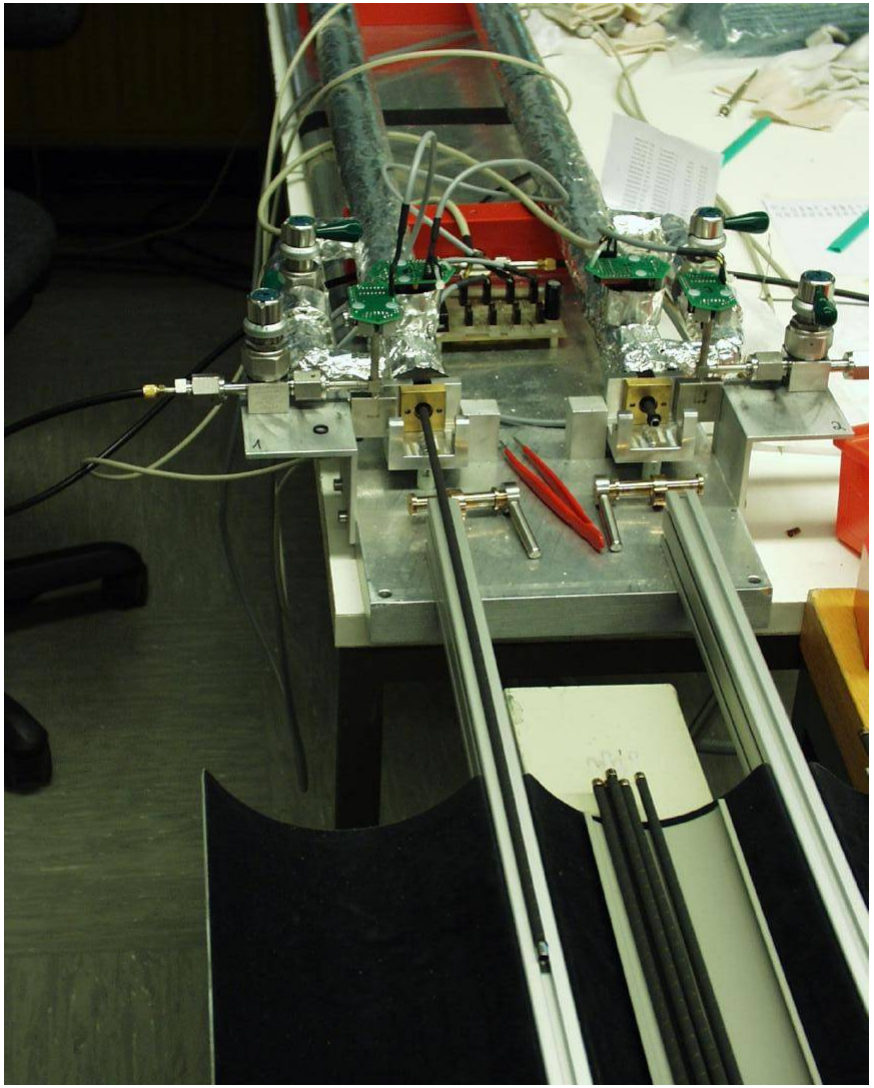
Single-Straw Limit: SF=4

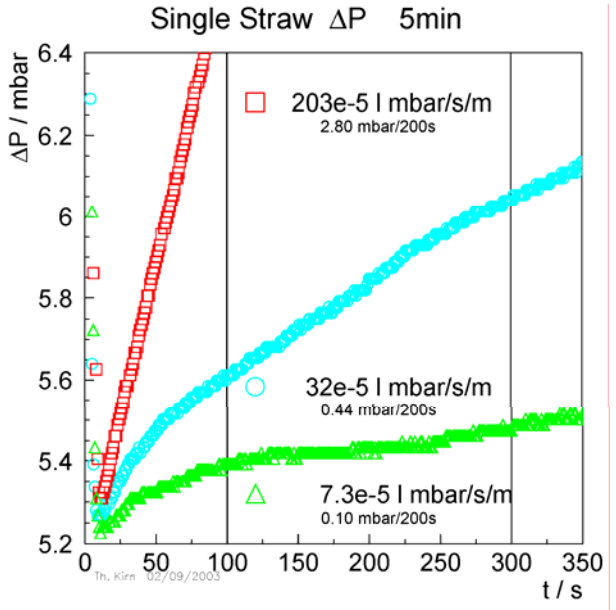
He $q_{PV} < 1 \cdot 10^{-5}$ l mbar/s/m



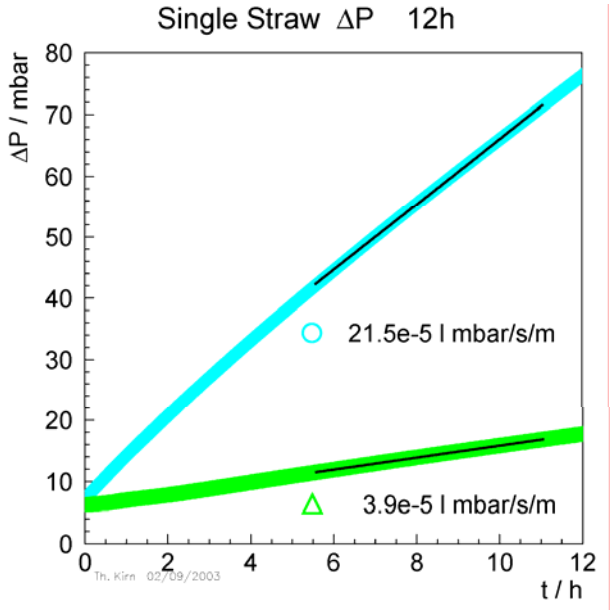


AMS-02 – TRD: Single Straw Test

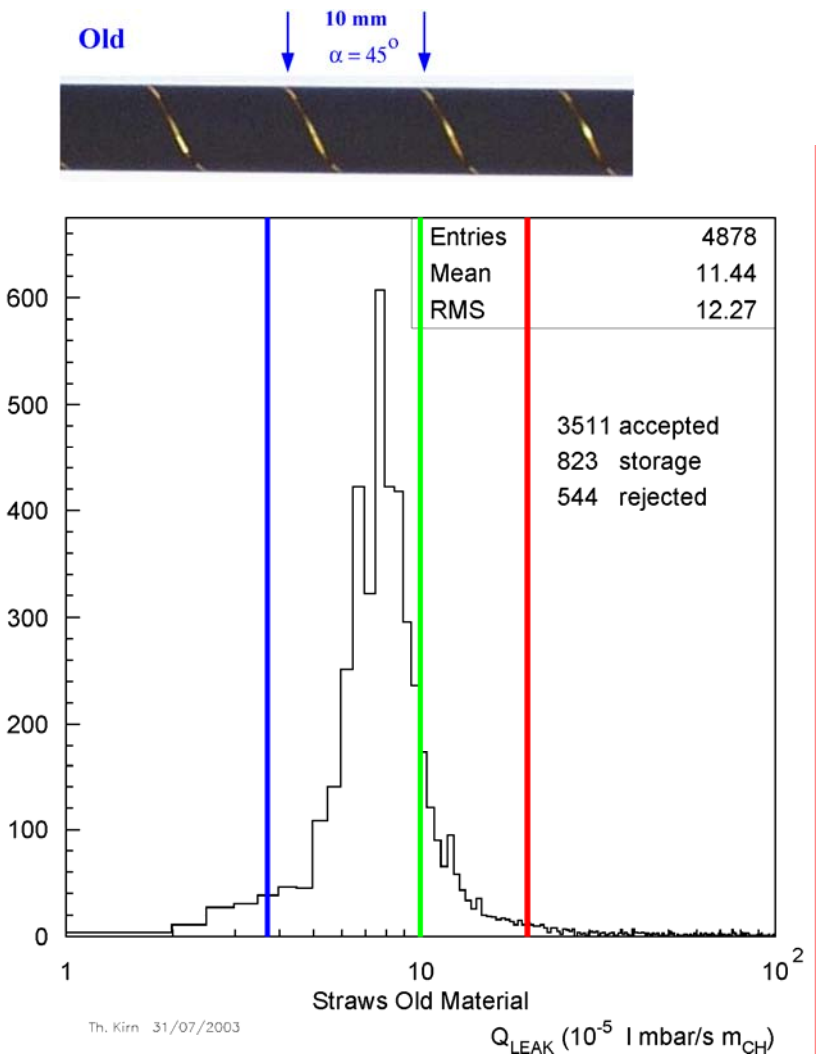




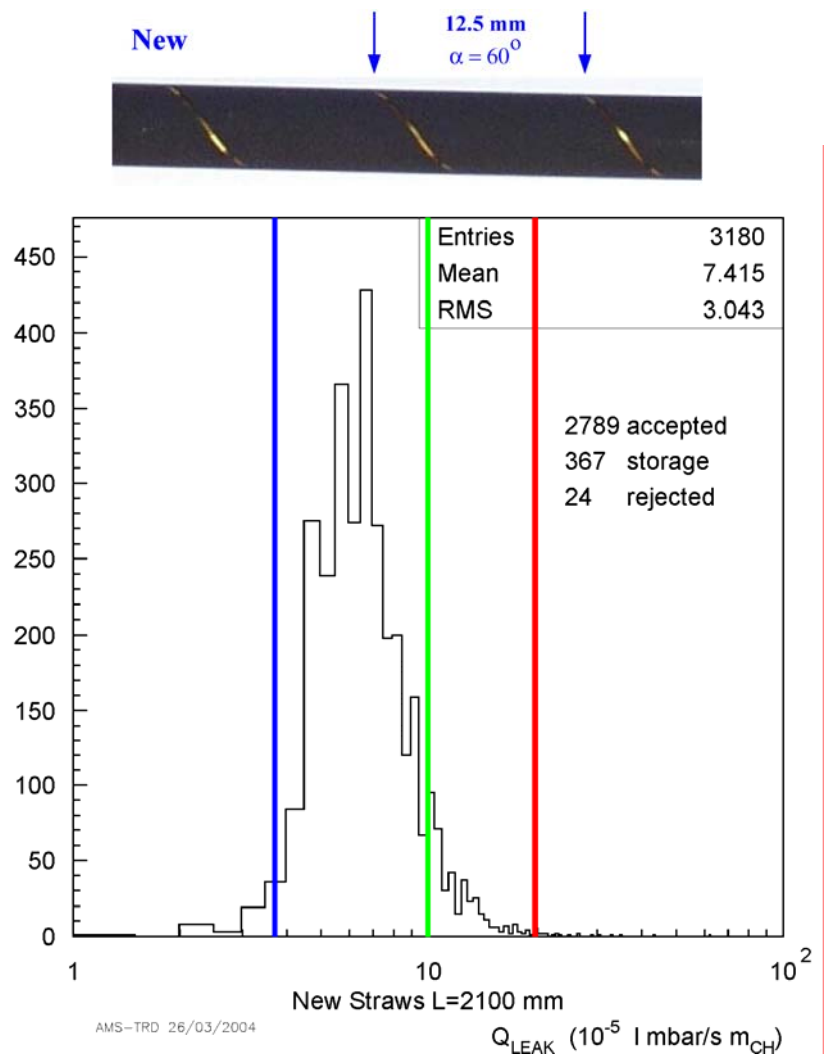
12 h reference measurement over night →Δp increase



AMS-02 – TRD: Single Straw Test: 16 Straws/Module x 328 Modules = 5248 Straws

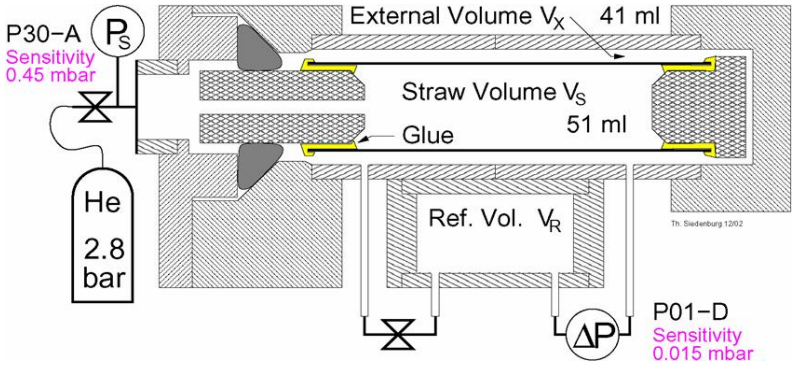


He-Leakrate



He-Leakrate

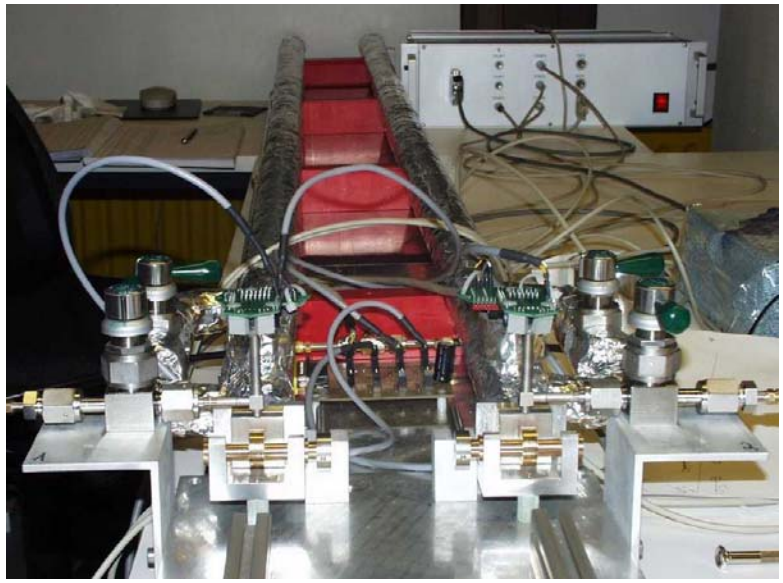
AMS-02 – TRD: Single Straw Test Result

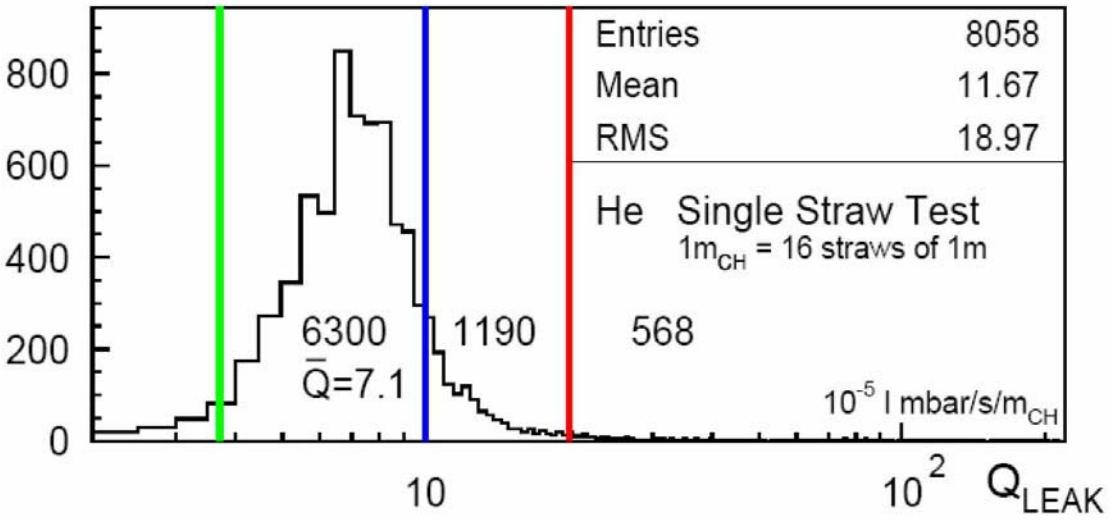


The gastightness of each individual straw tube was measured with the single straw teststand. 5248 straws out of 6300 gastight straws have been selected for the 328 flight straw modules after the results of QM MOD04!

Single-Straw Limit: SF=4

He $q_{PV} < 1 \cdot 10^{-5}$ l mbar/s/m

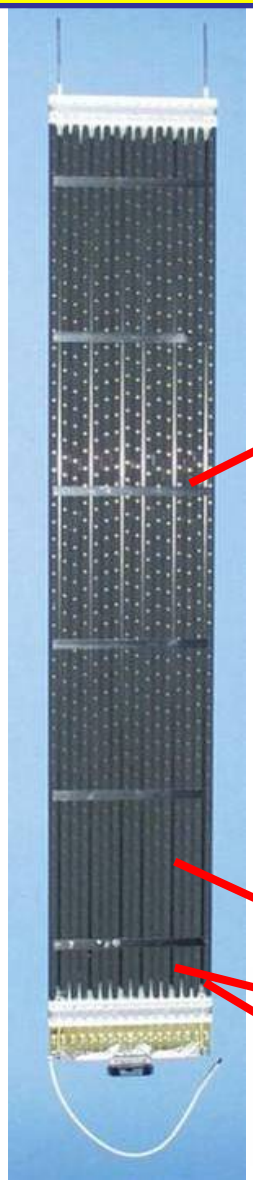


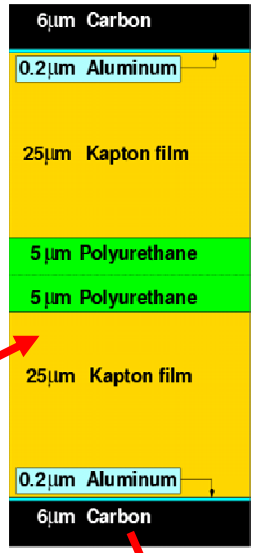


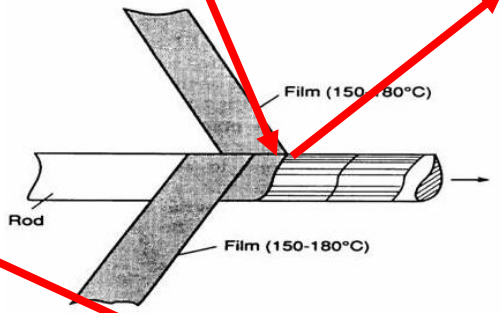
He-Leakrate

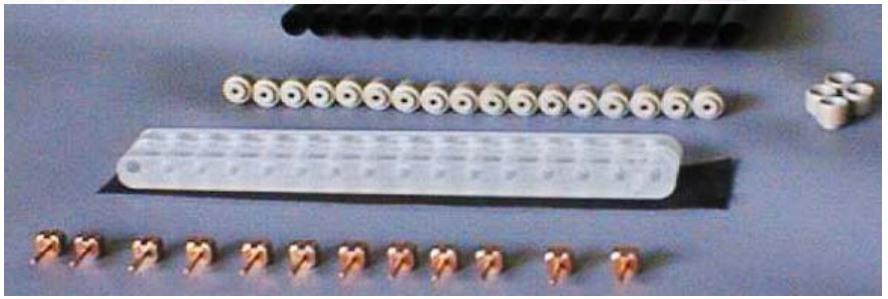
Production and Quality Control of Straw Modules (328 FM) before Octagon Integration

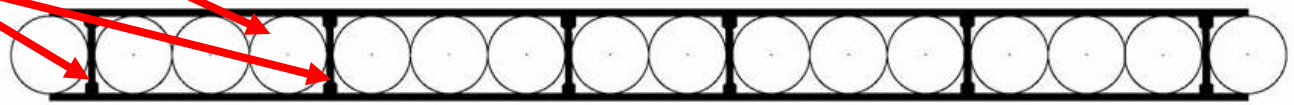
AMS-02 – TRD: Straw Modules







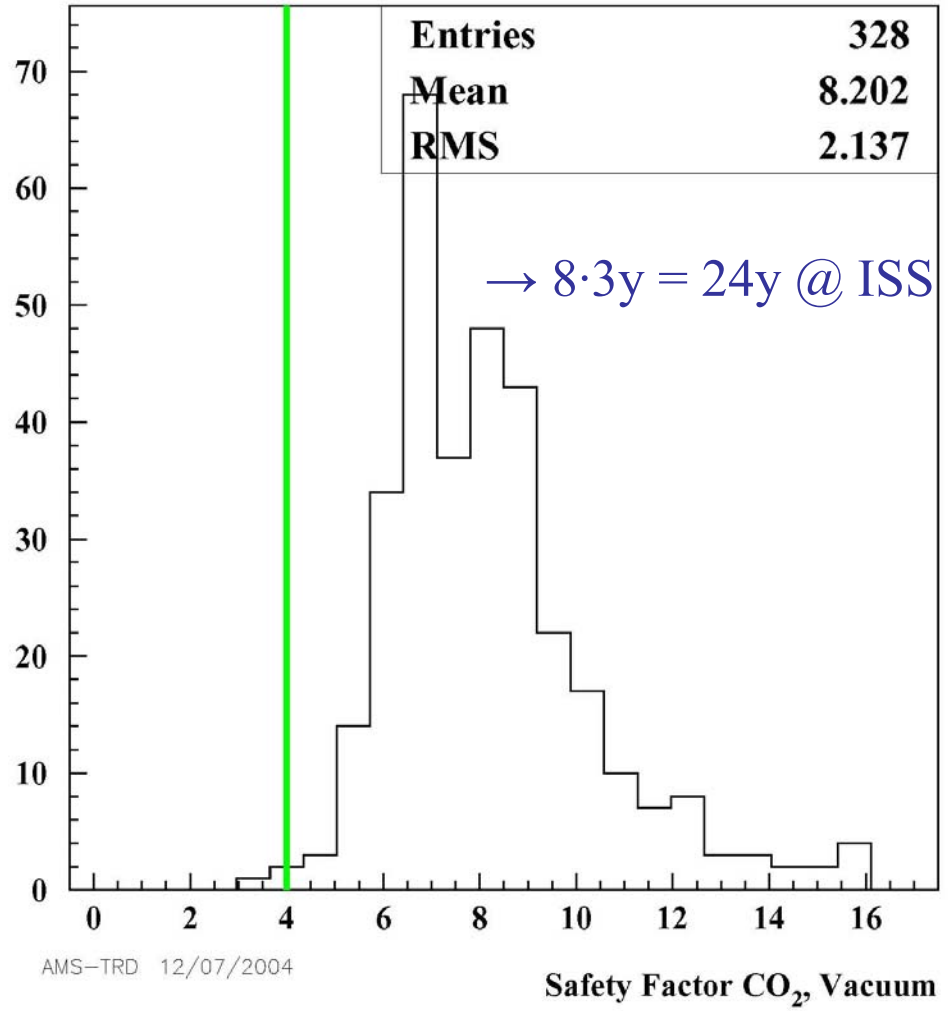




6 longitudinal stiffeners Strips across every 10 cm

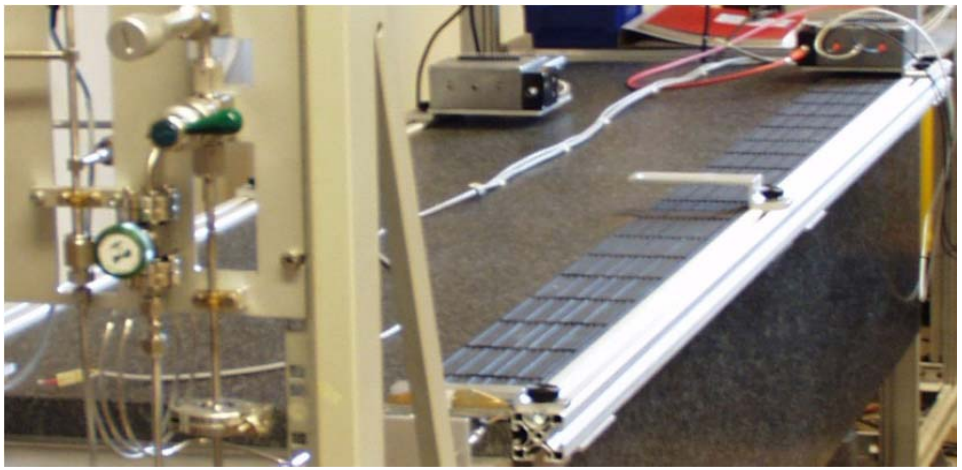
- Straw tubes: 72 μm multilayer aluminium kapton foil, Ø 6 mm , 0.8 ÷ 2.0 m length
- Wire: tungsten anode wire, 30 μm Ø, tension ≈ 100 g
- Gas mixture: Xe / CO_2 (80% / 20%)
- Operating HV ~ 1460 V → Gasgain of ~ 3000
- 1 Module → 16 Straws, 100 μm mechanical accuracy
- 328 Modules → 5248 Straws

TRD: 328 Flight Module Gastightness



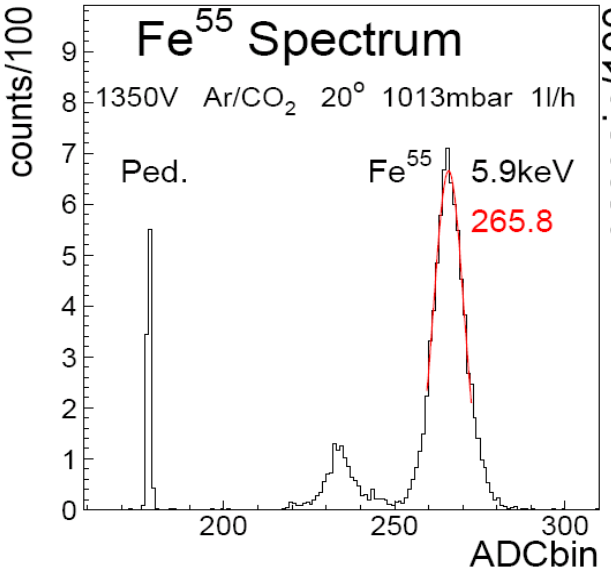
CO_2 Leaktest in Vacuum	Straws @ 1bar:	$1.85 \cdot 10^{-5}$ l mbar/s/m_{CH} ≡ SF 13.7
$1m_{CH}$ = 16 straws of 1m [+2 endpcs]	Typ. Module [1.5m] :	$3.1 \cdot 10^{-5}$ l mbar/s/m_{CH} ≡ SF 8.2

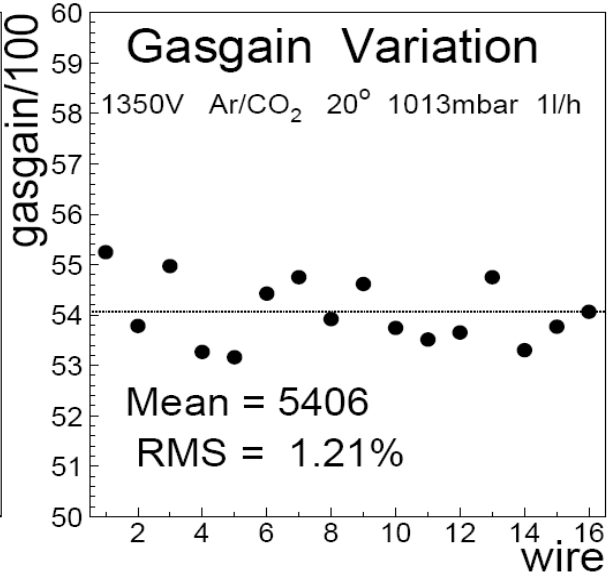
AMS-02 – TRD: Fe^{55} – Measurements of Gasgain of 328 Flight Modules



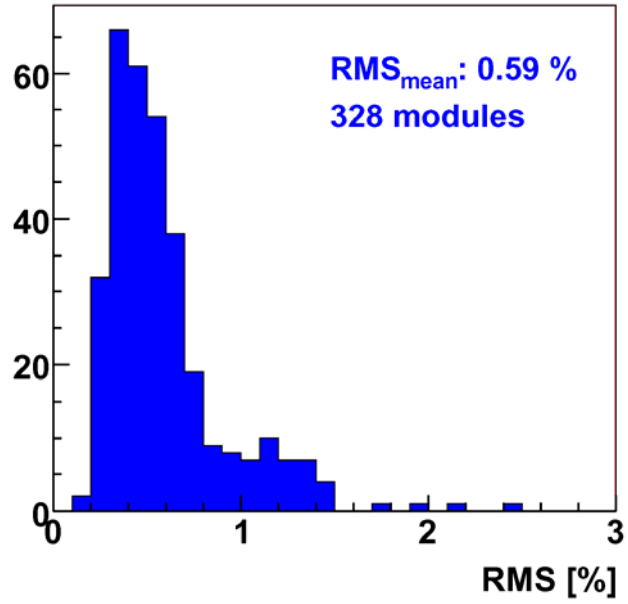
Ch160 on Nomex Shim 0.6mm Gain 6098 RMS 150

0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9m	Straw
3.2	1.5	4.2	1.8	5.7	7.1	5.2	4.2	0.2	-0.9	1
0.1	-0.1	0.2	1.0	4.1	3.8	2.9	1.8	-1.2	-2.4	2
-2.0	-0.7	0.2	0.5	0.1	3.2	4.2	-0.6	-2.9	-3.8	3
-2.6	-1.3	-2.1	0.4	0.6	2.5	2.8	-0.6	-2.8	-4.6	4
-2.9	-3.3	-1.4	-1.1	0.8	3.2	1.7	0.7	-3.0	-3.7	5
-3.7	-1.4	-4.0	-1.2	-0.9	1.4	2.8	-0.6	-1.9	-4.7	6
-1.9	-2.6	-1.1	-2.1	0.7	2.7	1.9	0.6	-2.9	-3.0	7
-2.4	-0.5	-1.0	0.8	1.1	2.3	2.1	-0.6	-2.0	-3.6	8
0.6	-1.0	1.0	0.4	5.8	5.6	1.6	2.8	-1.1	-1.1	9
-0.1	-1.2	0.3	0.5	2.8	3.6	0.9	0.8	-1.4	-2.7	10
-2.1	-0.6	-1.4	-1.0	0.4	1.6	2.1	-1.7	-3.6	-4.4	11
-2.3	-1.7	-0.5	-1.5	1.3	2.0	-0.1	-0.3	-4.8	-5.0	12
-2.1	-0.3	-0.6	0.7	2.2	1.9	3.4	0.4	-3.1	-5.1	13
-0.7	-1.4	0.8	-1.1	1.9	4.2	1.7	0.5	-3.0	-3.1	14
-1.6	-0.1	-2.1	1.8	2.6	2.2	2.7	1.0	-0.7	-2.9	15
-1.9	1.3	-0.7	2.4	1.6	3.1	4.5	1.6	-0.6	-4.2	16





RMS gasgain



Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
001	911.2	030702 (3L)	✓	✓	✓	6.57	9.74	6.04	6.00	0.5	6090.2	1.78
002	945.1	221002 (3L)	✓	✓	✓	8.97	16.31	7.95	4.72	0.3	6078.6	1.05
003	979.1	231002 (3L)	✓	✓	✓	6.24	11.24	6.99	5.56	0.4	5813.2	0.80
004a	1013.1	310303 (1Kc)	✓	✓	✓	7.10	9.46	8.83	5.17	0.4	5966.9	0.93
005a	1096.2	180203 (2KKc)	✓	✓	✓	6.29	8.13	6.57	7.61	0.5	5986.6	0.95
006a	1130.1	150103 (3Lc)	✓	✓	✓	7.30	10.14	6.30	7.12	0.3	5972.4	1.66
007a	1164.1	190203 (2KKc)	✓	✓	✓	8.44	10.50	7.95	6.68	0.5	5973.3	0.90
008a	1198.1	200203 (2KKc)	✓	✓	✓	6.46	8.10	6.93	7.88	0.4	6122.6	0.68
009a	1315.1	200203 (2KKc)	✓	✓	✓	7.70	9.86	7.38	8.12	0.5	5914.2	1.06
010a	1349.1	260203 (9Kc)	✓	✓	✓	7.51	10.28	8.04	7.65	0.5	5733.6	0.87
011	1383.1	061102 (4K)	✓	✓	✓	15.74	17.56	11.0	5.00	0.4	5843.5	2.15
012a	1417.1	050303 (9Kc)	✓	✓	✓	8.33	11.06	8.44	7.66	0.5	5851.3	0.74
013	1500.2	250602 (3K)	✓	✓	✓	19.52	21.72	14.36	4.15	0.7	5934.1	1.43
014b	1534.1	060303 (9Kc)	✓	✓	✓	8.26	10.43	7.77	9.00	0.6	5847.7	0.86
015a	1568.1	070303 (9Kc)	✓	✓	✓	10.31	14.42	9.18	7.79	0.6	5767.5	0.83
016a	1602.1	170303 (L7c)	✓	✓	✓	9.83	11.84	10.32	7.08	0.6	5999.5	0.96
017	1552.4	040602 (3K)	✓	✓	✓	9.76	9.24	13.64	5.19	1.4	5863.5	0.85
018	1576.4	050602 (3K)	✓	✓	✓	9.35	9.07	13.65	5.27	0.8	6032.1	1.05
019a	1600.4	140303 (mixc)	✓	✓	✓	8.12	12.79	12.13	6.02	0.7	5813.5	0.77
020	1624.5	170602 (3K)	✓	✓	✓	11.58	16.43	8.57	7.53	0.7	5806.4	1.39
021	1540.4	180602 (3K)	✓	✓	✓	7.96	11.59	10.83	6.49	0.9	6013.7	1.11
022	1564.4	190602 (3K)	✓	✓	✓	11.55	16.09	8.44	7.36	0.6	5696.9	1.89
023	1588.4	210602 (3K)	✓	✓	✓	28.00	14.03	12.04	5.24	0.7	6007.4	1.02
024a	1612.4	150303 (mixc)	✓	✓	✓	9.76	12.72	10.64	6.91	0.6	6171.3	0.97
025a	1552.4	270303 (7Lc)	✓	✓	✓	8.64	9.98	8.48	8.39	1.0	5751.2	1.26
026a	1576.4	170303 (mixc)	✓	✓	✓	7.87	12.68	11.77	6.11	0.6	5845.3	0.98
027	1600.4	130502 (3K)	✓	✓	✓	9.18	10.88	7.25	8.77	1.1	5849.4	1.12
028	1624.5	080502 (3K)	✓	✓	✓	9.19	12.66	7.87	9.41	0.7	5927.8	1.15
029b	1540.4	070303 (9Kc)	✓	✓	✓	9.76	14.44	9.52	7.38	0.3	5866.3	0.66
030a	1564.4	110303 (mixc)	✓	✓	✓	15.38	19.78	15.48	4.61	0.6	5966.6	0.73
031a	1588.4	120303 (mixc)	✓	✓	✓	9.11	14.38	11.19	6.47	0.7	5860.8	0.77
032	1612.4	250302 (3K)	✓	✓	✓	9.23	10.39	6.85	9.35	0.8	5681.9	1.47

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
033	1552.4	160202 (3K)	✓	✓	✓	9.59	13.22	8.21	8.62	0.8	5770.7	1.14
034	1576.4	220502 (3K)	✓	✓	✓	10.89	14.20	7.14	8.77	0.6	6007.8	1.16
035a	1600.4	130303 (mixc)	✓	✓	✓	8.02	11.02	10.55	6.92	0.5	6085.3	0.69
036b	1624.5	020403 (7Lc)	✓	✓	✓	9.78	10.84	9.41	7.87	0.9	5620.3	0.98
037	1540.4	270502 (3K)	✓	✓	✓	11.20	14.29	7.10	8.62	0.5	5640.2	1.01
038	1564.4	280502 (3K)	✓	✓	✓	9.77	12.41	8.60	7.22	0.5	5638.6	1.73
039	1588.4	290502 (3K)	✓	✓	✓	10.40	13.66	12.38	5.85	0.8	5888.9	1.14
040	1612.4	030602 (3K)	✓	✓	✓	10.60	13.07	9.32	6.87	0.7	5927.1	1.58
041	1517.1	050303 (9Kc)	✓	✓	✓	8.54	9.95	7.16	9.66	1.1	5758.6	0.88
042	1551.1	060303 (9Kc)	✓	✓	✓	8.23	10.85	7.90	8.95	0.6	6087.6	0.73
043	1585.1	100303 (9Kc)	✓	✓	✓	11.35	14.79	9.99	7.23	0.7	6005.0	0.82
044	1619.1	130303 (mixc)	✓	✓	✓	10.30	13.60	7.88	8.16	0.4	5775.9	1.03
045	1298.2	260203 (9Kc)	✓	✓	✓	8.51	10.28	7.17	8.25	0.7	5742.2	0.81
046	1332.1	270203 (9Kc)	✓	✓	✓	10.45	14.73	10.44	5.82	0.6	5895.4	0.73
047b	1366.1	290303 (1Kc)	✓	✓	✓	8.85	12.12	10.25	6.07	0.4	5879.5	1.07
048	1400.1	010303 (9Kc)	✓	✓	✓	6.66	8.95	7.88	8.10	0.7	5851.9	0.81
049a	1113.1	210203 (2KKc)	✓	✓	✓	6.12	7.40	7.01	7.24	0.4	5997.7	1.03
050a	1147.1	210203 (2KKc)	✓	✓	✓	6.55	8.34	7.24	7.22	0.4	5807.1	1.00
051a	1181.1	200203 (2KKc)	✓	✓	✓	7.66	8.46	7.19	7.49	0.4	5988.3	0.96
052b	1215.1	250203 (2KKc)	✓	✓	✓	7.52	9.48	7.68	7.21	0.6	5920.1	0.94
053	894.2	281002 (3L)	✓	✓	✓	5.08	6.66	7.55	5.40	0.6	6170.7	1.07
054	928.1	291002 (3L)	✓	✓	✓	6.69	8.91	8.27	5.12	0.5	6078.9	1.12
055	962.1	301002 (3L)	✓	✓	✓	6.32	8.58	4.69	8.15	0.5	5953.0	1.32
056	996.1	301002 (3L)	✓	✓	✓	6.76	7.95	7.42	5.33	0.6	5823.9	1.18
057a	843.7	010403 (1Kc)	✓	✓	✓	4.56	6.07	6.34	6.07	0.5	5861.9	1.03
058	877.7	<091002 (3L)	✓	✓	✓	6.15	8.50	8.36	4.79	0.8	6287.3	1.44
059	911.6	<101002 (3L)	✓	✓	✓	20.0	27.78	13.02	3.19	0.7	6118.6	1.46
060	945.6	<101002 (3L)	✓	✓	✓	14.69	21.05	12.35	3.49	0.3	5997.1	1.41
061	1062.7	200303 (7Lc)	✓	✓	✓	6.55	8.42	8.09	5.99	0.6	5979.6	0.93
062	1096.7	210303 (7Lc)	✓	✓	✓	7.01	9.74	8.15	6.13	0.4	5991.8	1.03
063	1130.7	230303 (1Kc)	✓	✓	✓	8.71	9.70	11.40	4.52	0.4	5872.1	1.01
064	1164.6	250303 (1Kc)	✓	✓	✓	7.02	8.75	8.72	6.09	0.4	6051.1	0.71

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
065	1247.7	010403 (1Kc)	✓	✓	✓	8.69	11.38	9.72	5.85	0.4	5958.2	0.83
066	1281.7	110403 (7Lc)	✓	✓	✓	8.15	10.01	9.73	6.01	0.5	5865.5	1.18
067	1315.7	090403 (7Lc)	✓	✓	✓	7.27	9.48	8.72	6.88	0.6	5836.0	0.84
068	1349.7	020403 (1Kc)	✓	✓	✓	8.51	11.31	9.97	6.17	0.4	5887.6	0.82
069	1466.7	290403 (5Lc)	✓	✓	✓	8.96	12.52	11.35	5.89	0.4	5654.2	1.50
070	1500.7	050503 (5Lc)	✓	✓	✓	8.99	14.08	9.54	7.17	0.8	5697.1	2.41
071	1534.7	220403 (8Lc)	✓	✓	✓	9.65	12.57	10.23	6.84	0.7	5316.6	2.65
072a	1568.6	130803 (19Lc)	✓	✓	✓	9.87	11.88	9.84	6.33	0.3	5750.2	1.85
073	1636.5	290403 (5Lc)	✓	✓	✓	8.66	11.27	12.69	5.88	0.4	5552.2	1.94
074	1660.5	130503 (10Lc)	✓	✓	✓	7.91	6.99	8.78	8.62	0.4	5753.3	1.25
075	1684.6	120403 (8Lc)	✓	✓	✓	9.21	13.42	10.44	7.36	1.1	5251.7	2.3
076	1708.6	250303 (7Lc)	✓	✓	✓	11.46	15.20	8.53	7.96	0.6	5624.1	0.97
077	1648.5	080503 (10Lc)	✓	✓	✓	8.13	7.31	9.41	7.99	0.5	5427.2	1.61
078	1672.5	220403 (8Lc)	✓	✓	✓	10.01	12.01	13.70	5.57	0.4	5716.8	2.63
079	1696.6	080403 (7Lc)	✓	✓	✓	10.51	16.46	11.39	6.79	0.9	5748.6	1.18
080a	1720.6	140403 (8Lc)	✓	✓	✓	9.03	12.33	12.93	6.07	0.4	5603.5	1.53
081	1636.5	020503 (5Lc)	✓	✓	✓	10.25	13.60	9.96	7.49	0.3	5381.7	2.41
082	1660.5	120503 (10Lc)	✓	✓	✓	7.25	10.04	10.64	7.11	0.5	5422.6	2.33
083	1684.6	150403 (8Lc)	✓	✓	✓	8.50	13.80	13.30	5.78	0.6	5623.8	2.09
084	1708.6	260303 (1Kc)	✓	✓	✓	9.47	14.09	8.46	8.02	0.7	5779.4	0.81
085	1648.5	100503 (10Lc)	✓	✓	✓	7.74	8.53	10.88	6.91	0.6	5896.4	1.71
086	1672.5	230403 (5Lc)	✓	✓	✓	9.56	12.71	12.92	5.90	0.6	5660.1	1.84
087	1696.6	050403 (7Lc)	✓	✓	✓	9.42	14.54	12.46	6.21	0.4	5502.7	1.38
088	1720.6	200303 (7Lc)	✓	✓	✓	11.62	15.00	11.40	6.88	0.9	5718.8	1.28
089	1636.5	030503 (5Lc)	✓	✓	✓	9.38	14.96	9.95	7.50	0.3	5508.5	1.78
090	1660.5	140503 (10Lc)	✓	✓	✓	8.87	8.76	10.80	7.01	0.5	5790.2	2.66
091	1684.6	160403 (8Lc)	✓	✓	✓	8.89	12.24	11.76	6.53	0.3	5641.2	1.69
092	1708.6	030403 (7Lc)	✓	✓	✓	9.69	11.98	13.26	5.87	0.5	5448.5	1.35
093	1648.5	120503 (10Lc)	✓	✓	✓	7.44	8.54	10.60	7.09	1.0	5782.2	2.62
094	1672.5	280403 (5Lc)	✓	✓	✓	9.35	14.71	12.24	6.23	0.2	5434.5	2.33
095	1696.6	100403 (7Lc)	✓	✓	✓	9.68	13.66	13.24	5.84	0.5	5312.8	2.02
096	1720.6	210303 (7Lc)	✓	✓	✓	11.21	13.82	10.92	7.18	0.8	5567.1	0.98

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
097	1636.5	050503 (10Lc)	✓	✓	✓	7.69	10.97	10.01	7.45	0.4	6019.4	2.95
098	1660.5	130503 (10Lc)	✓	✓	✓	7.45	16.93	11.73	6.45	0.5	5823.8	2.05
099	1684.6	170403 (8Lc)	✓	✓	✓	8.47	11.68	9.82	7.82	0.9	5217.0	2.18
100	1708.6	040403 (7Lc)	✓	✓	✓	10.00	11.78	11.11	7.01	0.5	5612.1	2.14
101	1648.5	080503 (10Lc)	✓	✓	✓	6.57	9.13	11.17	6.73	0.5	5628.5	1.91
102	1672.5	240403 (5Lc)	✓	✓	✓	11.17	16.55	11.69	6.52	0.4	5751.0	2.34
103	1696.6	090403 (7Lc)	✓	✓	✓	10.63	14.63	12.58	6.15	0.5	5646.4	1.57
104	1720.6	240303 (7Lc)	✓	✓	✓	9.18	14.08	8.45	8.09	1.0	5745.7	1.04
105	1449.7	170403 (8Lc)	✓	✓	✓	8.98	11.63	9.45	6.99	0.5	5813.1	1.65
106	1483.7	070503 (10Lc)	✓	✓	✓	6.46	8.80	11.12	6.08	0.4	5793.6	2.13
107	1517.7	060503 (10Lc)	✓	✓	✓	6.83	8.92	11.50	6.02	0.5	5880.6	2.35
108a	1551.7	231103 (13N)	✓	✓	✓	8.30	10.07	7.29	9.70	0.5	5861.6	0.95
109	1264.7	070403 (7Lc)	✓	✓	✓	8.25	10.83	8.78	6.57	0.4	5767.8	1.30
110	1298.7	050403 (8Lc)	✓	✓	✓	9.08	11.27	8.24	7.19	0.4	5744.8	0.98
111	1332.7	030403 (1Kc)	✓	✓	✓	8.92	10.93	11.19	5.43	0.5	5930.8	1.25
112a	1366.6	170703 (18Lc)	✓	✓	✓	8.37	12.06	9.80	5.53	0.3	5808.1	1.71
113	1045.7	190303 (7Lc)	✓	✓	✓	6.75	8.19	8.31	5.73	1.4	6157.1	1.04
114	1079.7	310303 (1Kc)	✓	✓	✓	6.94	8.07	8.79	5.60	0.5	5898.2	0.85
115	1113.7	270303 (1Kc)	✓	✓	✓	6.92	10.48	9.27	5.48	0.5	6096.5	0.95
116	1147.7	260303 (1Kc)	✓	✓	✓	7.82	9.76	9.82	5.33	0.7	6000.9	1.07
117	860.7	250902 (3L)	✓	✓	✓	5.13	6.94	6.86	5.72	0.6	6013.6	1.13
118a	894.6	041102 (3L)	✓	✓	✓	5.67	7.27	6.67	6.11	0.4	5824.2	1.18
119a	928.7	160403 (8Lc)	✓	✓	✓	5.94	6.47	7.49	5.65	0.3	5937.7	1.09
120b	962.6	150403 (8Lc)	✓	✓	✓	6.30	7.39	7.18	6.11	0.6	5926.5	1.11
121	979,6	150503 (10Lc)	✓	✓	✓	4.18	6.33	7.80	5.68	0.4	6086.2	1.91
122	1013,5	230503 (11Lc)	✓	✓	✓	4.68	5.04	6.99	6.56	0.8	5935.3	2.49
123	1047,5	230503 (11Lc)	✓	✓	✓	4.96	5.19	7.84	6.05	0.4	5861.6	1.25
124	1081,5	130603 (12Lc)	✓	✓	✓	5.25	7.33	9.05	5.41	0.4	5674.0	1.61
125	1198,6	120603 (12Lc)	✓	✓	✓	5.11	6.81	9.28	5.85	0.3	5499.1	2.85
126	1232,5	250603 (6Kc)	✓	✓	✓	7.57	13.03	10.00	5.58	0.3	5695.3	1.24
127a	1266,5	130803 (19Lc)	✓	✓	✓	9.16	12.59	11.65	4.96	0.2	5679.6	2.35
128	1300,5	270603 (6Kc)	✓	✓	✓	10.80	16.69	11.92	4.94	0.3	5837.4	2.26

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
129	1383,6	010703 (6Kc)	✓	✓	✓	9.58	14.67	10.78	5.82	0.3	5773.3	1.98
130	1417,6	030703 (6Kc-7Kc)	✓	✓	✓	14.64	19.63	10.85	5.16	0.2	5671.1	2.14
131	1451,5	070703 (7Kc-15Lc)	✓	✓	✓	8.59	10.37	7.49	7.66	0.2	5730.8	1.56
132	1485,5	210603 (12Lc)	✓	✓	✓	4.61	8.55	11.01	6.12	0.3	5846.0	2.04
133	1602,6	180503 (10Lc)	✓	✓	✓	8.75	9.32	11.18	6.50	0.6	5458.7	2.57
134	1636,5	150503 (10Lc)	✓	✓	✓	6.98	-	12.16	6.11	0.02	5806.6	1.89
135	1670,5	090703 (15Lc)	✓	✓	✓	8.12	11.40	11.65	5.59	0.2	5590.1	1.06
136	1704,5	080703 (15Lc)	✓	✓	✓	9.78	11.62	7.83	8.61	0.3	5628.3	1.79
137	1732,6	110703 (17Lc)	✓	✓	✓	13.62	16.00	11.41	6.89	1.0	5733.8	2.33
138	1756,6	120703 (18Lc)	✓	✓	✓	9.25	10.90	9.68	8.24	0.7	5488.0	2.67
139a	1780,6	130803 (17Lc)	✓	✓	✓	11.23	15.58	15.20	5.34	0.5	5608.4	1.67
140	1804,6	250803 (17Lc)	✓	✓	✓	9.79	12.71	13.79	5.97	0.4	5602.7	2.60
141	1744,6	230703 (18Lc)	✓	✓	✓	11.06	17.41	10.53	6.58	0.4	5537.5	1.50
142a	1768,6	130803 (19Lc)	✓	✓	✓	12.06	17.84	16.29	4.31	0.3	5597.6	1.24
143a	1792,6	271103 (11N)	✓	✓	✓	6.78	8.03	7.12	11.48	0.26	5679.0	1.37
144	1816,6	030903 (16Lc)	✓	✓	✓	9.42	14.57	9.46	7.62	0.3	5582.0	1.77
145a	1732,6	200803 (17Lc)	✓	✓	✓	9.67	15.05	14.64	5.40	0.4	5380.9	1.16
146	1756,6	140703 (18Lc)	✓	✓	✓	11.69	16.95	11.36	6.12	0.2	5380.9	1.93
147	1780,6	270803 (6Lc)	✓	✓	✓	16.52	24.99	15.39	5.27	0.2	5382.6	2.21
148	1804,6	270803 (6Lc)	✓	✓	✓	16.26	23.24	14.71	5.59	0.4	5507.7	1.94
149	1744,6	050703 (15Lc)	✓	✓	✓	7.55	9.30	7.22	9.55	0.1	5848.1	2.22
150a	1768,6	281103 (11N)	✓	✓	✓	6.13	7.32	6.13	13.15	0.3	5701.0	0.82
151	1792,6	240803 (17Lc)	✓	✓	✓	9.15	11.88	13.73	5.95	0.3	5682.7	2.42
152a	1816,6	200803 (17Lc)	✓	✓	✓	11.71	15.21	15.23	4.73	0.2	5633.1	1.82
153	1732,6	050903 (16Lc)	✓	✓	✓	9.28	13.14	8.78	9.00	0.2	5722.6	1.36
154	1756,6	150703 (18Lc)	✓	✓	✓	13.65	19.91	11.73	5.91	0.3	5535.3	2.27
155	1780,6	280803 (6Lc)	✓	✓	✓	15.25	22.98	14.21	5.71	0.2	5555.4	1.92
156	1804,6	260803 (17Lc)	✓	✓	✓	8.87	10.39	14.12	5.83	0.3	5607.5	1.92
157a	1744.6	291103 (11N)	✓	✓	✓	5.87	6.64	6.36	12.51	0.4	5751.8	0.76
158a	1768,6	130803 (19Lc)	✓	✓	✓	11.81	17.82	10.85	6.47	0.2	5386.4	1.57
159	1792,6	200803 (17Lc)	✓	✓	✓	11.47	14.88	14.65	4.86	0.3	5654.5	1.71
160a	1816,6	011203 (11N)	✓	✓	✓	6.00	6.18	6.52	12.70	0.4	5691.1	0.88

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
161	1732,6	220703 (18Lc)	✓	✓	✓	11.09	14.80	11.72	6.72	OVC	5482.6	2.74
162a	1756,6	200803 (17Lc)	✓	✓	✓	12.10	17.66	15.78	4.42	0.2	5576.9	1.91
163	1780,6	300803 (6Lc)	✓	✓	✓	15.34	24.23	14.74	5.51	0.4	5567.2	1.73
164	1804,6	260803 (6Lc)	✓	✓	✓	15.56	23.16	14.66	5.61	0.3	5376.7	1.62
165	1744,6	250703 (19Lc)	✓	✓	✓	9.28	17.35	10.62	6.52	0.9	5571.4	1.77
166b	1768,6	240903 (B4)	✓	✓	✓	9.87	11.02	9.44	8.54	0.4	5884.7	0.96
167	1792,6	240803 (17Lc)	✓	✓	✓	11.50	15.68	14.66	5.58	0.3	5619.3	1.50
168	1816,6	290603 (11Lc)	✓	✓	✓	8.32	9.63	10.94	6.57	0.3	5721.4	2.58
169	1585,6	170503 (10Lc)	✓	✓	✓	7.05	8.95	11.83	6.08	0.5	5776.0	2.29
170	1619,6	150603 (12Lc)	✓	✓	✓	6.63	7.61	8.63	7.41	0.2	5609.3	2.29
171	1653,5	150603 (12Lc)	✓	✓	✓	5.86	6.92	11.20	6.69	0.3	5613.1	2.50
172a	1687,5	200803 (17Lc)	✓	✓	✓	10.82	14.43	14.19	4.72	0.1	5678.4	1.57
173	1400,6	020703 (6Kc)	✓	✓	✓	11.03	16.28	10.47	5.28	0.2	5806.7	2.25
174	1434,5	040703 (7Kc)	✓	✓	✓	11.65	17.14	9.88	5.73	0.3	5877.9	2.10
175	1468,5	080903 (16Lc)	✓	✓	✓	7.72	11.52	8.68	7.71	0.2	5836.5	0.98
176	1502,5	200603 (12Lc)	✓	✓	✓	5.95	7.89	8.69	6.82	0.2	5467.7	0.95
177	1181,6	110603 (11-12Lc)	✓	✓	✓	4.49	5.82	7.67	6.98	0.3	5774.5	2.00
178	1215,6	230603 (12Lc)	✓	✓	✓	4.62	6.53	8.30	5.77	0.2	5694.7	0.96
179a	1249,5	301103 (11N)	✓	✓	✓	5.36	4.04	4.07	14.00	24.2	5933.9	1.11
180	1283,5	280803 (6Lc)	✓	✓	✓	10.83	16.98	11.62	5.04	0.2	5581.3	1.87
181	996,6	160503 (10Lc)	✓	✓	✓	5.11	5.77	7.70	5.85	0.4	6005.0	1.67
182	1030,5	060603 (11Lc)	✓	✓	✓	4.39	5.86	7.75	6.02	0.2	5631.1	1.67
183	1064,5	100603 (11Lc)	✓	✓	✓	4.97	6.81	8.07	5.97	0.3	6070.0	2.35
184	1098,5	160603 (12Lc)	✓	✓	✓	4.97	6.94	7.29	5.94	0.2	5588.4	0.79
185	930.5	230903 (B3)	✓	✓	✓	2.75	4.44	5.61	7.56	0.2	5896.1	1.30
186	964.5	230903 (B3)	✓	✓	✓	4.20	4.30	5.78	7.61	0.2	5944.8	1.29
187	998.5	290903 (B4)	✓	✓	✓	5.92	6.48	6.29	7.23	0.2	5865.4	1.29
188	1032.4	031003 (B4)	✓	✓	✓	6.17	7.07	6.89	6.83	0.1	5956.9	1.38
189	1115.5	150903 (B2)	✓	✓	✓	6.24	9.33	9.47	5.37	0.2	6089.5	2.02
190	1149.5	160903 (B1)	✓	✓	✓	8.63	11.00	7.83	6.70	0.2	5575.4	1.07
191	1183.5	170903 (B1)	✓	✓	✓	8.39	10.38	7.97	6.77	0.1	5881.0	2.23
192	1217.5	180903 (B1)	✓	✓	✓	9.21	11.85	8.49	6.53	0.1	5765.2	1.32

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
193a	1334.5	101103 (8N)	✓	✓	✓	5.19	6.05	5.44	11.19	3.5	5682.9	0.71
194	1368.5	010903 (6L)	✓	✓	✓	11.94	18.65	11.65	5.35	0.2	5722.8	2.22
195	1402.5	020903 (6L)	✓	✓	✓	12.45	18.19	12.20	5.24	0.2	5574.8	2.06
196	1436.4	090903 (10L)	✓	✓	✓	8.50	9.61	10.66	6.14	0.3	5464.3	1.19
197	1519.5	151003 (10N)	✓	✓	✓	5.66	7.52	6.58	10.53	0.2	5945.4	0.97
198	1553.5	061003 (10L)	✓	✓	✓	9.39	12.60	9.81	7.22	0.3	5992.8	1.25
199	1587.5	071003 (10L)	✓	✓	✓	9.28	11.38	10.08	7.18	0.2	5876.8	1.14
200	1621.5	141003 (10L)	✓	✓	✓	8.76	11.01	8.04	9.20	0.5	5878.1	1.11
201	1738.5	080903 (16,10L)	✓	✓	✓	9.20	11.47	8.90	8.91	0.5	5581.5	1.39
202	1772.5	090903 (10L)	✓	✓	✓	11.36	13.07	10.75	7.52	0.2	5669.1	2.02
203	1806.5	100903 (B2)	✓	✓	✓	7.42	8.99	8.22	10.02	0.2	5731.8	1.74
204	1840.4	061003 (10L)	✓	✓	✓	10.44	13.19	12.79	6.56	0.3	5822.0	1.35
205a	1828.7	011203 (11N)	✓	✓	✓	5.73	4.12	5.26	13.81	0.2	5862.6	1.55
206	1852.7	071003 (10L)	✓	✓	✓	12.91	14.07	14.48	5.83	0.3	5616.3	0.96
207	1876.8	091203 (7N)	✓	✓	✓	11.38	11.43	8.19	9.10	0.2	5680.8	1.04
208	1900.8	081103 (8N)	✓	✓	✓	8.42	8.96	8.10	10.69	0.3	5756.7	0.91
209	1840.7	210903 (B3)	✓	✓	✓	13.32	13.31	12.45	6.74	0.4	5632.7	2.14
210	1864.7	071003 (10L)	✓	✓	✓	10.74	16.43	12.80	6.64	0.2	5732.4	1.01
211	1888.8	190304 (28N)	✓	✓	✓	17.05	21.65	14.55	5.92	0.2	6415.5	2.05
212	1912.8	301003 (3N)	✓	✓	✓	16.47	21.18	12.96	6.73	1.1	5762.0	1.45
213	1828.7	141003 (10L)	✓	✓	✓	9.26	10.06	9.01	9.26	0.3	5705.3	1.03
214	1852.7	151003 (2N)	✓	✓	✓	9.13	17.07	10.70	7.89	0.3	5708.3	1.33
215	1876.8	101203 (7N)	✓	✓	✓	19.18	23.13	15.55	5.50	0.3	5895.2	1.41
216a	1900.8	021203 (16N)	✓	✓	✓	7.65	6.74	6.29	12.00	0.2	5865.4	1.49
217	1840.7	200903 (B1)	✓	✓	✓	8.59	9.08	8.34	10.06	0.2	5691.7	1.55
218	1864.7	111003 (10L)	✓	✓	✓	12.78	11.88	8.91	9.55	0.2	5575.0	1.84
219	1888.8	131203 (14N)	✓	✓	✓	6.44	7.31	7.09	12.14	0.5	5844.9	1.39
220	1912.8	031103 (3N)	✓	✓	✓	6.99	8.67	7.85	11.11	0.4	5702.9	0.76
221	1828.7	271003 (1N)	✓	✓	✓	15.57	20.36	12.58	6.63	0.9	5603.4	0.67
222	1852.7	171203 (14N)	✓	✓	✓	5.10	5.56	6.06	13.93	5.6	6813.1	2.61
223	1876.8	111203 (7N)	✓	✓	✓	12.48	14.43	10.90	7.85	0.8	5573.6	1.30
224a	1900.8	031203 (16N)	✓	✓	✓	12.12	11.00	7.96	9.49	0.2	5785.7	1.73

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
225	1840.7	190903 (B3)	✓	✓	✓	11.51	16.45	13.95	6.02	0.2	5740.9	0.99
226	1864.7	291003 (1N)	✓	✓	✓	18.54	23.57	13.71	6.20	0.2	5721.7	1.07
227	1888.8	161203 (14N)	✓	✓	✓	9.09	10.80	8.22	10.47	0.4	5903.1	1.24
228	1912.8	041103 (3N)	✓	✓	✓	12.36	13.14	9.35	9.32	0.2	5704.6	1.96
229	1828.7	181003 (1N)	✓	✓	✓	8.46	11.48	8.14	10.24	0.3	5728.1	1.05
230	1852.7	281003 (1N)	✓	✓	✓	15.16	20.67	11.87	7.11	0.3	5695.2	1.02
231	1876.8	141203 (7N)	✓	✓	✓	12.28	13.46	10.27	8.33	0.3	5637.8	1.04
232	1900.8	121103 (5N)	✓	✓	✓	10.32	11.41	8.91	9.72	0.3	5725.5	1.00
233	1840.7	180903 (B1)	✓	✓	✓	9.77	14.35	11.18	7.50	0.1	5407.3	1.54
234	1864.7	131003 (10L)	✓	✓	✓	13.89	16.78	10.80	7.87	0.2	5771.8	1.05
235	1888.8	171203 (14N)	✓	✓	✓	5.69	5.94	6.28	13.72	0.5	5883.6	2.09
236	1912.8	051103 (8N)	✓	✓	✓	8.30	10.59	7.71	11.32	0.4	5663.8	0.92
237	1721.5	051003 (5L)	✓	✓	✓	10.05	13.21	10.88	7.22	0.2	5924.1	1.41
238	1755.5	220903 (B3)	✓	✓	✓	5.83	9.79	10.33	7.75	0.2	5782.2	2.01
239	1789.5	150903 (B2)	✓	✓	✓	8.87	11.74	12.30	6.64	0.2	5729.5	2.30
240	1823.5	170903 (B1)	✓	✓	✓	10.08	15.26	10.63	7.82	0.1	5583.1	1.20
241	1536.5	131003 (10L)	✓	✓	✓	5.97	11.40	7.94	8.53	0.5	5925.6	1.19
242	1570.5	091003 (10L)	✓	✓	✓	10.35	11.45	11.79	6.07	0.3	5788.6	0.90
243	1604.5	101003 (10L)	✓	✓	✓	7.21	13.79	10.70	6.84	0.3	5921.9	1.97
244	1638.4	161003 (2N)	✓	✓	✓	8.10	9.76	8.72	8.56	0.5	5653.6	1.21
245	1317.5	050903 (16L)	✓	✓	✓	7.66	11.28	11.09	5.42	0.2	5747.6	1.85
246	1351.5	040903 (16L)	✓	✓	✓	6.34	8.65	10.28	5.99	0.4	5770.8	2.07
247	1385.5	030903 (6L,16L)	✓	✓	✓	11.83	18.98	8.57	6.29	0.2	5751.2	1.65
248	1419.5	070903 (16L)	✓	✓	✓	7.54	11.61	7.37	7.65	0.2	5641.2	1.14
249	1132.5	100903 (10L)	✓	✓	✓	6.36	9.11	6.35	7.08	0.1	5969.0	1.72
250a	1166.5	161203 (14N)	✓	✓	✓	4.19	3.86	4.31	10.75	0.1	5879.9	1.20
251	1200.5	120903 (B2)	✓	✓	✓	6.32	9.83	6.32	7.55	0.2	5743.9	1.60
252	1234.4	190903 (B1,B3)	✓	✓	✓	6.98	8.89	7.56	7.44	0.2	5839.20	1.10
253	913.5	021003 (B4)	✓	✓	✓	5.70	5.89	5.85	7.11	0.2	6008.45	1.40
254	947.5	300903 (B4)	✓	✓	✓	6.05	6.98	6.28	6.88	0.2	5918.8	1.29
255	981.5	270903 (B4)	✓	✓	✓	7.17	7.99	7.03	6.36	0.1	6063.3	1.46
256	1015.5	011003 (B4)	✓	✓	✓	8.71	9.22	7.49	6.18	0.1	6057.3	1.38

Mod. No.	Length [mm]	Production Date (DDMMYY) (Lot)	Wire Tension (100±5)g OK	Previewtest N/100s<1000 @U≈1515V OK	Signal Feedthr. Test OK	Air q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum q_{He} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 q_{CO_2} 10^{-5} $[\frac{l \cdot mbar}{s}]$	Vacuum CO_2 Safety-factor CO_2	Σ_{max} Dark Current [nA] U=1500 V	Gas Gain $ArCO_2$ U=1350V Mean	Gas Gain $ArCO_2$ U=1350V RMS
257	1050.8	171003 (2N)	✓	✓	✓	6.43	6.22	5.82	8.23	0.2	5927.2	0.91
258	1084.8	271003 (13L)	✓	✓	✓	6.28	9.05	8.28	5.97	0.2	5943.7	0.81
259	1118.8	241003 (13L)	✓	✓	✓	6.77	8.34	9.26	5.51	0.2	6029.9	1.22
260	1152.7	221003 (2N/13L)	✓	✓	✓	6.38	9.24	6.70	7.84	0.1	6035.5	0.84
261	1235.8	291003 (1N)	✓	✓	✓	12.20	15.46	8.82	6.39	0.2	5643.8	0.62
262	1269.8	311003 (3N)	✓	✓	✓	6.96	8.33	7.36	7.87	0.2	5920.8	0.97
263	1303.8	071103 (8N)	✓	✓	✓	4.98	6.29	5.46	10.89	0.2	5879.0	1.13
264	1337.8	031103 (3N)	✓	✓	✓	8.43	9.68	8.17	7.46	0.4	5912.2	1.16
265	1454.8	121103 (5N)	✓	✓	✓	7.86	8.17	7.67	8.64	0.4	5908.0	0.97
266	1488.8	140104 (17N)	✓	✓	✓	8.78	9.77	6.73	8.79	0.2	5787.1	1.16
267	1522.8	201103 (13N)	✓	✓	✓	9.53	10.59	8.52	8.15	0.3	5797.9	0.94
268	1556.7	151103 (13N)	✓	✓	✓	8.25	8.20	6.95	10.21	0.2	5763.7	1.11
269	1639.8	041203 (16N)	✓	✓	✓	11.61	12.66	8.59	8.70	0.4	5781.6	1.35
270	1673.8	050104 (9N)	✓	✓	✓	11.01	20.38	11.73	6.50	0.3	5810.6	1.38
271	1707.8	021203 (16N)	✓	✓	✓	10.84	12.97	10.43	7.46	0.2	5804.0	2.66
272	1741.8	031203 (13L)	✓	✓	✓	12.01	13.38	10.94	7.26	0.2	5837.8	1.41
273	1858.8	010404 (25N)	✓	✓	✓	12.03	14.51	11.58	7.32	0.3	7072.3	2.81
274	1892.8	310304 (25N)	✓	✓	✓	12.75	20.57	12.19	7.08	0.2	6828.4	2.34
275	1926.8	030204 (17N)	✓	✓	✓	10.58	13.24	8.68	8.81	0.3	5825.2	1.96
276a	1960.7	240304 (24N)	✓	✓	✓	17.06	21.26	13.10	5.95	0.4	6667.0	2.31
277	1924.8	160204 (15/12N)	✓	✓	✓	12.28	13.78	8.94	8.55	0.2	5858.3	2.12
278a	1948.8	250304 (30N)	✓	✓	✓	17.98	24.30	14.91	5.96	0.4	5784.7	2.16
279	1972.9	110204 (15N)	✓	✓	✓	11.99	13.71	9.84	9.15	0.3	6991.6	1.13
280	1996.9	160204 (12N)	✓	✓	✓	15.70	18.95	11.69	7.79	0.1	6837.3	1.94
281	1936.8	030304 (4N)	✓	✓	✓	15.35	17.87	11.40	7.74	0.3	6443.3	2.42
282	1960.8	061203 (7N)	✓	✓	✓	9.33	9.05	8.84	10.11	0.3	5752.7	1.85
283a	1984.9	220304 (28N)	✓	✓	✓	21.59	25.54	14.91	6.07	0.3	6649.9	1.24
284a	2008.9	041203 (16N)	✓	✓	✓	13.77	15.94	11.69	7.83	0.4	5698.5	1.78
285	1924.8	170204 (12N)	✓	✓	✓	6.01	6.73	7.14	12.29	0.3	6734.2	2.27
286a	1948.8	080704 (L26)	✓	✓	✓	15.69	27.95	15.76	5.64	0.3	6806.6	2.31
287a	1972.9	240304 (24N)	✓	✓	✓	16.35	20.79	13.29	5.89	0.3	6739.9	2.93
288	1996.9	250204 (12N)	✓	✓	✓	13.68	17.33	11.83	7.70	0.3	6709.4	1.76

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289a	1936.8	120704 (L26)	✓	✓	✓	15.78	21.45	13.78	6.41	1.1	-	-
290	1960.8	230304 (24N)	✓	✓	✓	18.66	23.32	15.73	5.68	0.5	6353.3	2.34
291a	1984.9	240804 (L26)	✓	✓	✓	20.05	26.52	15.30	5.92	0.3	-	-
292	2008.9	151103 (13N)	✓	✓	✓	8.79	10.43	8.79	10.42	OVC	5755.9	1.03
293b	1924.8	080704 (26L)	✓	✓	✓	17.43	24.33	14.79	5.93	1.7	6863.4	2.65
294	1948.8	270204 (4N)	✓	✓	✓	18.29	22.08	13.38	6.64	0.5	6912.4	1.65
295	1972.9	130204 (15N)	✓	✓	✓	11.31	14.02	10.05	8.95	0.3	6955.4	2.25
296	1996.9	250204 (12N)	✓	✓	✓	14.83	17.52	11.65	7.82	0.2	6920.1	1.21
297	1936.8	050304 (4/6N)	✓	✓	✓	12.79	15.18	10.36	8.52	0.4	6941.3	1.61
298	1960.8	230304 (24N)	✓	✓	✓	17.65	23.30	15.17	5.89	0.1	6751.5	1.04
299	1984.9	150104 (17N)	✓	✓	✓	8.35	8.13	8.48	10.67	0.2	5996.1	1.24
300	2008.9	161103 (13N)	✓	✓	✓	11.92	14.90	11.01	8.32	0.6	5662.7	1.18
301	1924.8	180204 (12N)	✓	✓	✓	12.37	16.26	10.87	8.07	0.5	6073.3	2.08
302	1948.8	270204 (4N)	✓	✓	✓	17.20	21.16	14.18	6.26	0.2	6610.4	1.37
303a	1972.9	070704 (?)	✓	✓	✓	10.58	18.42	12.88	6.98	0.5	-	-
304a	1996.9	090704 (L26)	✓	✓	✓	16.75	23.02	15.42	5.90	0.3	6957.9	1.74
305	1936.8	260304 (30N)	✓	✓	✓	24.01	31.11	19.18	4.60	0.3	6962.2	2.42
306a	1960.8	220304 (28N)	✓	✓	✓	17.18	26.91	14.61	6.12	0.2	6872.9	3.09
307a	1984.9	060704 (L25)	✓	✓	✓	8.07	15.56	13.19	6.86	0.2	6686.0	1.37
308	2008.9	171103 (13N)	✓	✓	✓	13.95	11.95	9.16	8.71	0.3	5614.9	2.14
309	1841.8	181203 (9N)	✓	✓	✓	12.12	14.35	9.32	9.01	0.5	6795.6	2.31
310	1875.8	010404 (25N)	✓	✓	✓	11.21	12.37	10.39	8.23	0.4	6298.3	1.18
311	1909.8	310304 (22N)	✓	✓	✓	14.71	18.11	12.60	6.91	0.1	7143.5	2.03
312	1943.8	290304 (30N)	✓	✓	✓	22.39	29.56	18.27	4.85	0.3	6889.3	2.00
313	1656.8	061203 (7N)	✓	✓	✓	10.98	12.00	8.96	8.43	0.2	5716.6	1.27
314	1690.8	181203 (9N)	✓	✓	✓	5.08	5.77	5.79	13.32	0.2	5847.5	1.01
315b	1724.8	030404 (25N)	✓	✓	✓	10.59	13.24	10.94	7.19	0.2	7108.7	1.88
316a	1758.7	180304 (27N)	✓	✓	✓	10.58	11.97	10.08	7.95	0.3	7222.5	2.71
317	1437.8	111103 (8/5N)	✓	✓	✓	7.06	6.71	6.20	10.57	0.3	5892.7	0.99
318	1471.8	070104 (9N)	✓	✓	✓	10.70	12.90	8.10	7.22	0.1	5850.0	1.41
319	1505.8	060104 (9N)	✓	✓	✓	11.46	13.38	8.32	7.19	0.2	5839.18	1.11
320	1539.8	241103 (13N)	✓	✓	✓	8.30	8.87	7.22	9.72	0.4	5845.8	1.37

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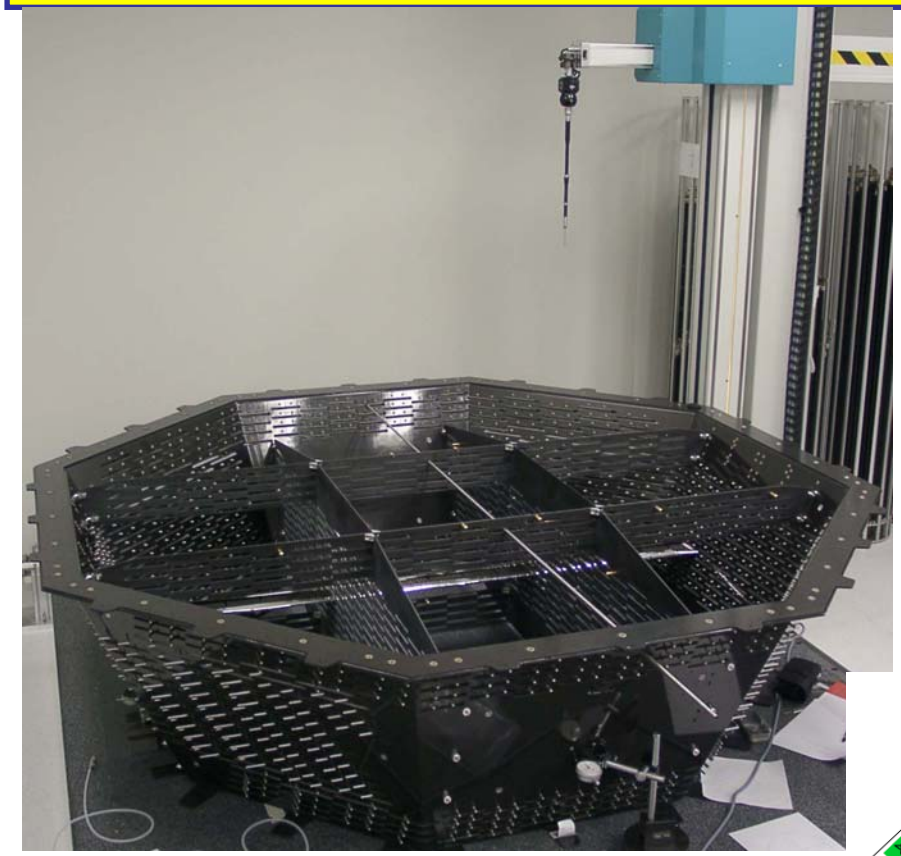
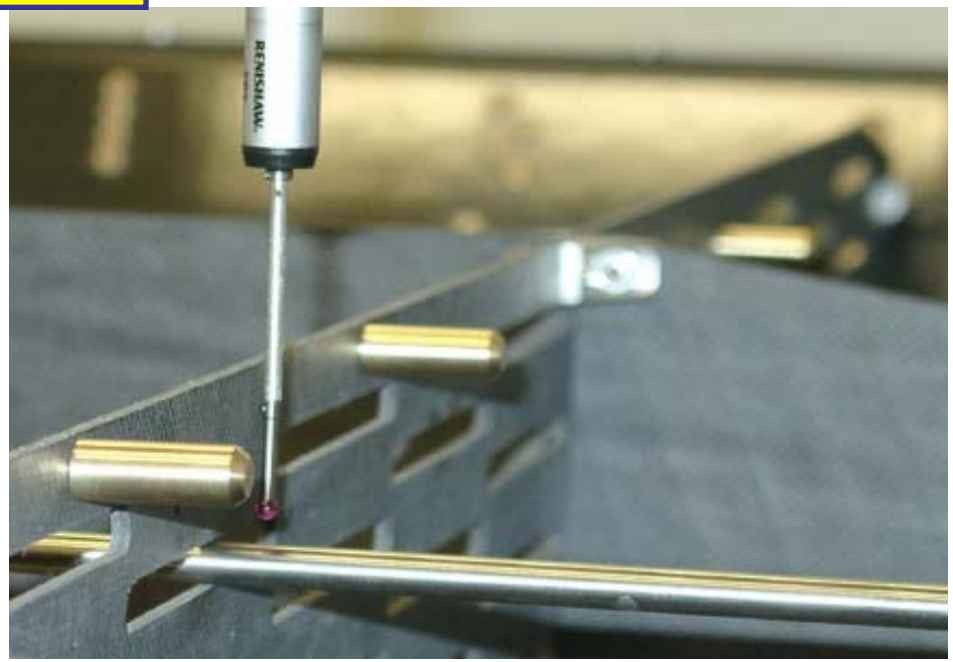
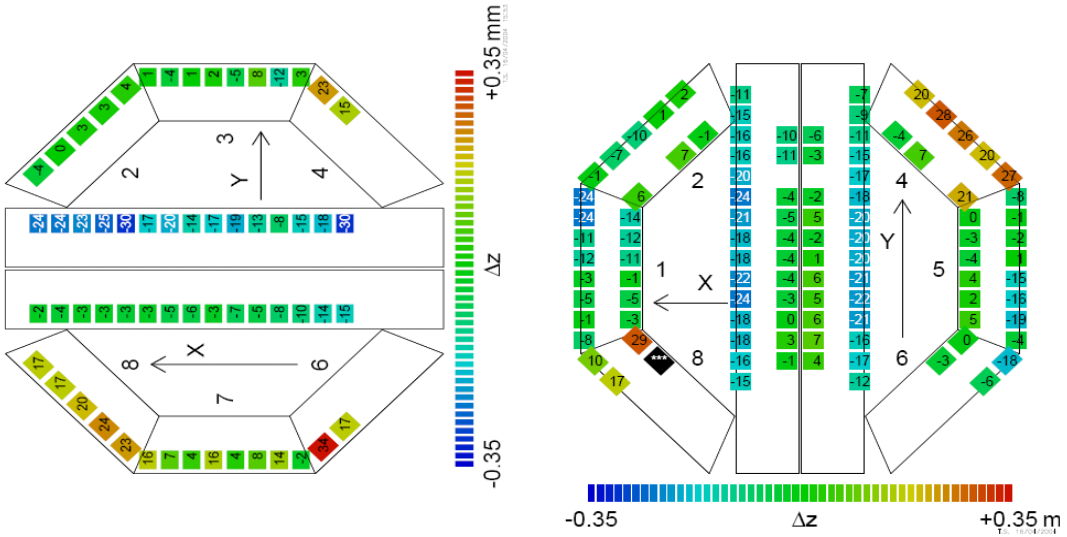
321	1252.8	301003 (1N)	✓	✓	✓	10.96	14.07	9.28	6.16	0.2	5999.9	1.04
322	1286.8	061103 (8N)	✓	✓	✓	4.97	5.32	5.40	10.86	0.2	5858.9	0.67
323	1320.8	051103 (3N)	✓	✓	✓	8.26	11.37	8.48	7.10	0.3	5893.8	1.47
324	1354.7	041103 (3N)	✓	✓	✓	8.51	11.24	8.31	7.43	0.2	5815.7	1.23
325	1033.8	201003 (2N)	✓	✓	✓	8.44	5.80	5.96	7.90	0.3	5961.6	1.01
326	1067.8	211003 (2N)	✓	✓	✓	8.08	5.62	5.48	8.89	0.3	6069.7	0.72
327	1101.8	281003 (1N)	✓	✓	✓	10.58	12.60	9.60	5.23	0.2	6011.0	0.84
328	1135.8	231003 (13L)	✓	✓	✓	7.60	9.96	8.21	6.31	0.2	5987.5	0.82

Quality Control of Straw Modules (328 FM) after Octagon Integration

TRD: Octagon Structure: 3D-Measurement



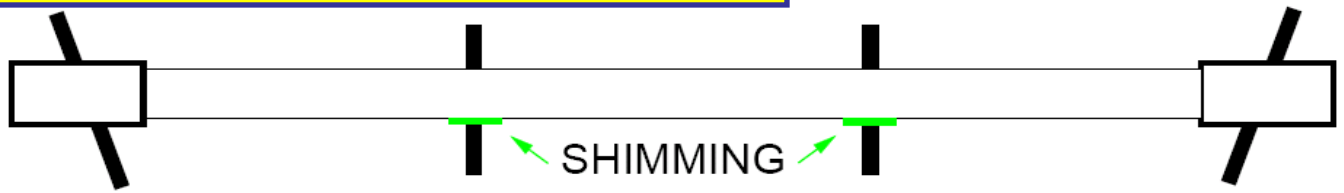


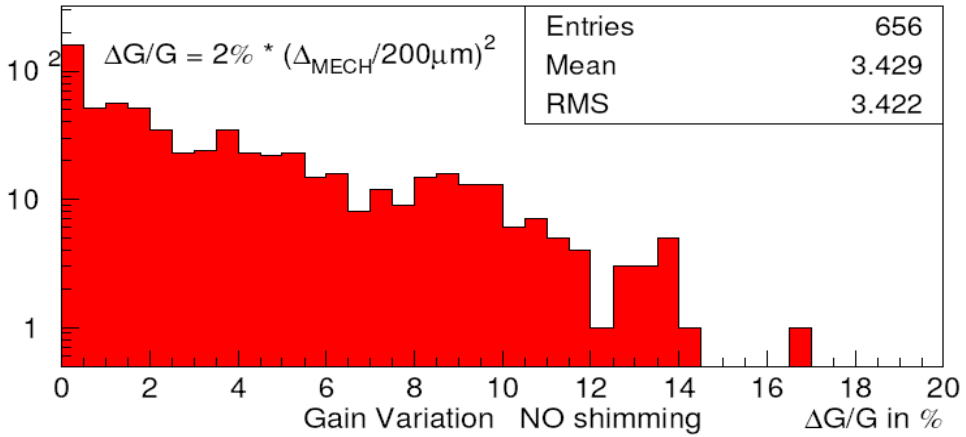


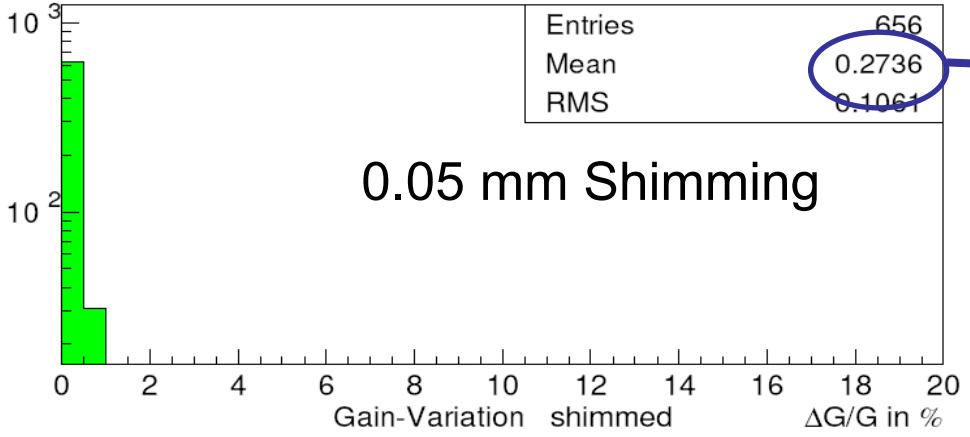
Upper and lower 4 layers ∥ B

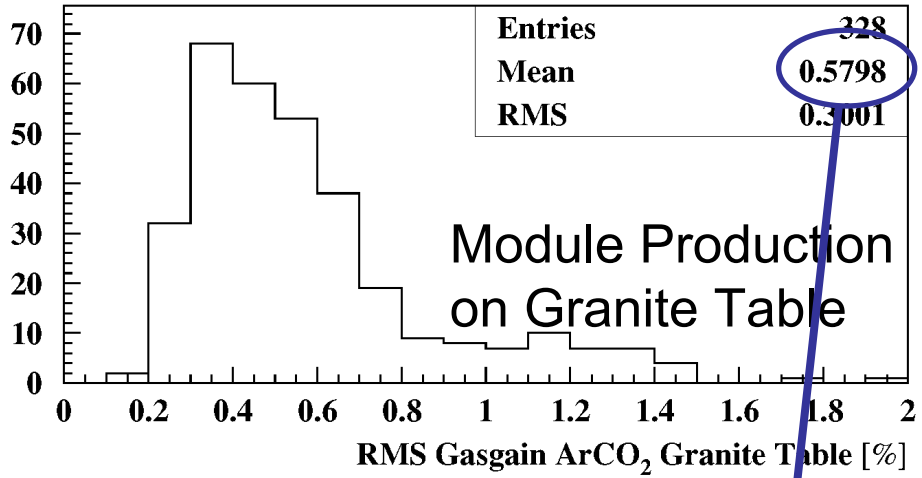
Middle 12 layers ⊥ B

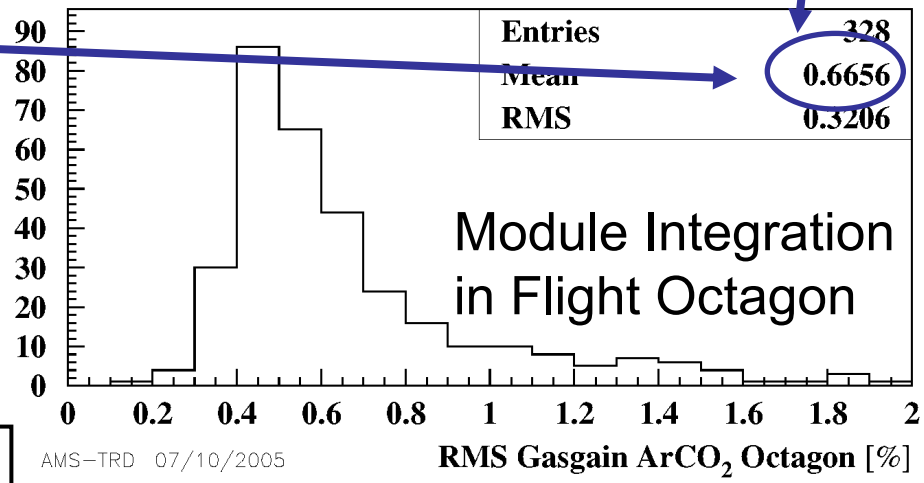
TRD: Flight Modules Gasgain Homogenity







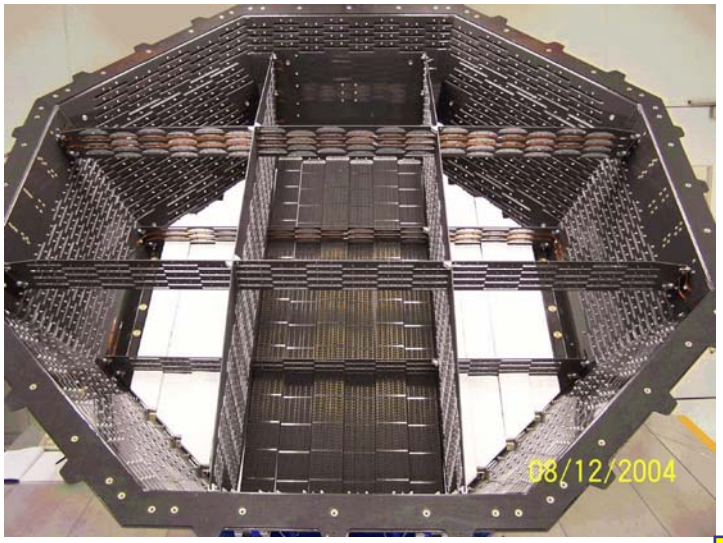




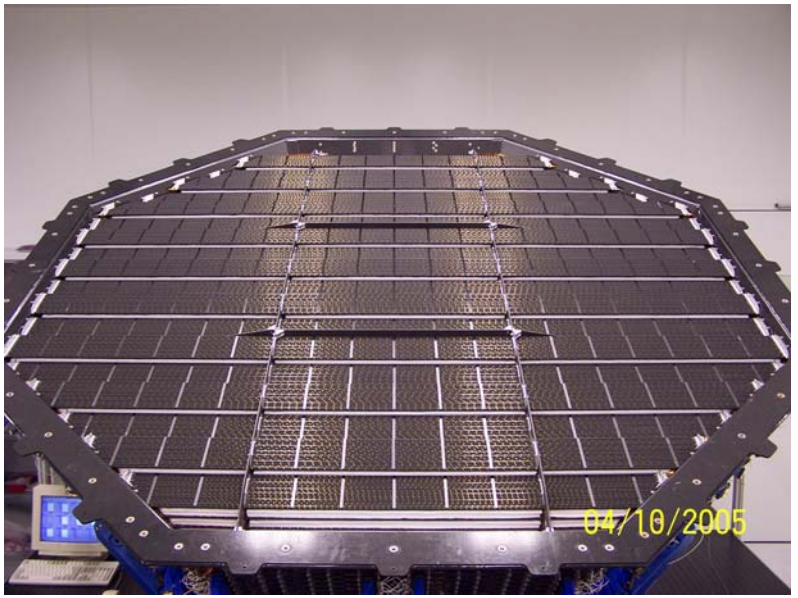
$$Grms^2_{OCT} = Grms^2_{GRT} + Grms^2_{SHM}$$

TRD: Flight Module Integration

Straw Modules in layer 1 and 2

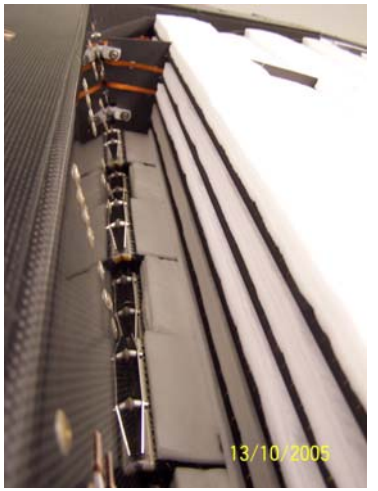


Straw Modules in layer 20



Straw Modules in layer 20 with radiator on top

Inside view: Straw Modules interleaved with radiator



Flight Module Integration: Layer 1

Area	45				90						45			
Position	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7
Ch.No.	1	5	9	13	17	21	25	29	33	37	41	45	49	53
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.47	0.58	0.58	0.56	0.37	0.41	0.35	0.43	0.22	0.55	0.60	0.37	0.29	0.30
Shimming	0/200/0/0	0/200/0/200	0/0/100/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/300/300/0	0/0/200/0	0/200/0/0	0/0/0/0
RMS-erste Mess.	0.43	1.39	1.22	1.49	0.75	0.57	1.1	0.71	2.0	0.7	2.33	0.43	1.27	1.28
RMS-zweite Mess.				0.71				0.6	0.6	0.5	0.4		1.15	0.83
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 2

Area	45				90						45			
Position	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7
Ch.No.	2	6	10	14	18	22	26	30	34	38	42	46	50	54
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.45	0.76	0.35	0.29	0.48	0.47	0.51	0.33	0.82	1.18	0.25	0.51	0.4	0.79
Shimming	0/0/0/100	0/200/0/0	0/0/200/0	0/0/200/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/300/0	0/200/300/0	0/200/200/0	0/200/100/0
RMS-erste Mess.	0.41	0.55	0.33	0.84	0.63	0.41	0.51	0.44	0.81	0.39	0.57	0.62	0.54	0.75
RMS-zweite Mess.														
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 3

Area	45				90						45			
Position	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7
Ch.No.	3	7	11	15	19	23	27	31	35	39	43	47	51	55
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.44	0.44	0.70	0.43	0.40	0.39	0.40	0.40	0.64	0.95	0.61	0.25	0.43	0.41
Shimming	0/0/0/0	0/200/0/0	0/0/0/0	0/0/200/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/200/0	0/100/300/0	0/100/0/0	0/0/100/0
RMS-erste Mess.	0.48	0.53	1.09	0.63	0.42	0.72	0.43	0.46	0.40	0.54	0.62	0.49	0.62	0.46
RMS-zweite Mess.														
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 4

Area	45				90						45			
Position	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7
Ch.No.	4	8	12	16	20	24	28	32	36	40	44	48	52	56
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.52	0.55	0.48	0.58	0.43	0.76	0.27	0.41	0.53	0.68	0.33	0.51	0.38	0.55
Shimming	0/0/0/100	0/100/0/0	0/0/100/0	0/0/200/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/200/0	0/0/200/0	0/200/0/0	0/0/0/0
RMS-erste Mess.	0.71	0.40	0.59	0.44	0.47	0.34	0.45	0.40	0.37	0.44	0.49	0.50	0.54	0.86
RMS-zweite Mess.														
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 5

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	57	61	65	69	73	77	81	85	89	93	97	101	105	109	113	117
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	1.35	0.24	0.23	0.59	0.48	0.73	0.36	0.44	0.32	0.57	0.89	0.68	0.55	0.57	0.45	0.28
Shimming (100 μm)	0/2/2/0	0/3/4/0	0/3/2/0	0/3/3/0	0/0/2/0	0/0/0/0	0/2/0/0	0/2/0/0	0/0/3/0	0/0/3/0	0/2/0/0	0/4/2/0	0/0/3/0	0/2/4/0	0/4/1/0	0/3/2/0
RMS-erste Mess.	0.49	0.46	0.26	0.36	1.49	0.53	0.52	0.44	0.41	1.48	0.64	0.49	0.52	0.57	0.50	1.12
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 6

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	58	62	66	70	74	78	82	86	90	94	98	102	106	110	114	118
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.50	0.46	0.40	0.54	0.41	0.66	0.43	0.53	0.60	0.85	0.53	0.62	0.52	0.47	0.42	0.42
Shimming (100 μm)	0/2/3/0	0/3/4/0	0/3/2/0	0/3/3/0	0/0/2/0	0/0/0/0	0/2/0/0	0/2/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/3/0/0	0/0/4/0	0/3/4/0	0/4/2/0	0/3/3/0
RMS-erste Mess.	0.63	0.52	0.45	0.72	1.00	0.79	0.53	1.08	0.70	1.73	0.76	0.38	0.43	0.45	0.34	0.50
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 7

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	59	63	67	71	75	79	83	87	91	95	99	103	107	111	115	119
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.40	0.53	0.27	0.63	0.36	0.67	0.91	0.28	0.33	0.53	1.12	0.25	0.53	0.66	0.41	0.32
Shimming (100 μm)	0/3/3/0	0/3/4/0	0/3/3/0	0/3/3/0	0/1/3/0	0/0/0/0	0/2/0/0	0/1/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/4/2/0	0/2/4/0	0/3/4/0	0/4/2/0	0/3/2/0
RMS-erste Mess.	0.49	0.46	0.39	0.46	0.35	0.50	0.54	0.40	0.86	0.48	0.91	0.60	0.48	0.47	0.72	1.29
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 8

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	60	64	68	72	76	80	84	88	92	96	100	104	108	112	116	120
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.66	0.33	0.42	0.34	0.50	0.55	0.69	0.28	0.64	0.37	0.30	0.51	0.40	0.34	0.38	0.38
Shimming (100 μm)	0/3/3/0	0/3/4/0	0/4/3/0	0/3/3/0	0/0/2/0	0/0/0/0	0/2/0/0	0/1/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/3/0/0	0/2/4/0	0/3/5/0	0/5/3/0	0/5/3/0
RMS-erste Mess.	0.67	0.67	0.51	0.67	0.66	0.73	0.51	0.31	1.33	0.33	0.29	0.31	0.45	0.42	0.41	0.69
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 9

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	121	125	129	133	137	141	145	149	153	157	161	165	169	173	177	181
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.56	0.44	0.59	0.31	1.39	1.00	0.66	0.55	0.39	0.32	0.61	1.41	0.87	0.45	0.42	0.71
Shimming (100 μm)	0/3/4/0	0/3/4/0	0/3/3/0	0/3/3/0	0/2/3/0	0/0/0/0	0/2/0/0	0/2/0/0	0/0/2/0	0/0/2/0	0/3/0/0	0/3/1/0	0/2/4/0	0/2/5/0	0/4/2/0	0/5/3/0
RMS-erste Mess.	0.53	0.32	0.41	0.43	0.99	0.60	0.58	0.30	0.41	0.62	0.77	2.41	0.58	0.49	0.53	1.34
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 10

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	122	126	130	134	138	142	146	150	154	158	162	166	170	174	178	182
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	1.35	0.43	0.73	0.53	0.55	0.73	0.54	0.75	0.51	0.34	0.37	0.39	0.69	0.54	0.35	0.43
Shimming (100 μm)	0/3/4/0	0/4/5/0	0/4/3/0	0/4/4/0	0/2/2/0	0/0/0/0	0/2/0/0	0/2/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/3/1/0	0/1/4/0	0/2/4/0	0/5/0/0	0/4/2/0
RMS-erste Mess.	1.45	0.49	0.74	0.43	0.41	0.72	0.39	0.59	0.96	0.54	0.44	0.90	1.02	0.43	0.71	1.36
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 11

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	123	127	131	135	139	143	147	151	155	159	163	167	171	175	179	183
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.28	0.60	0.54	0.31	0.48	0.91	1.26	0.62	0.44	0.72	0.53	0.43	0.88	0.32	0.32	0.76
Shimming (100 μm)	0/3/5/0	0/3/4/0	0/4/3/0	0/4/3/0	0/2/3/0	0/0/0/0	0/2/0/0	0/1/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/3/0/0	0/3/4/0	0/3/4/0	0/4/2/0	0/4/2/0
RMS-erste Mess.	0.47	0.91	0.49	0.80	0.43	0.78	0.77	0.70	0.69	1.20	0.47	0.55	1.34	0.92	0.82	1.99
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 12

Area	45					90						45				
Position	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8
Ch.No.	124	128	132	136	140	144	148	152	156	160	164	168	172	176	180	184
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serienprod.	0.34	0.64	0.49	0.66	0.60	0.43	0.66	0.69	0.39	0.22	0.57	0.75	0.58	0.35	0.70	0.52
Shimming (100 μm)	0/3/4/0	0/3/4/0	0/5/3/0	0/4/3/0	0/1/2/0	0/0/0/0	0/1/0/0	0/2/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/2/0/0	0/3/5/0	0/2/5/0	0/5/3/0	0/5/3/0
RMS-erste Mess.	0.65	0.50	0.57	0.68	0.46	0.86	1.23	0.66	0.50	0.52	0.68	0.59	0.44	0.54	0.80	1.54
RMS-zweite Mess.																
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 13

Area	45						90						45					
Position	X-9	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8	X+9
Ch.No.	185	189	193	197	201	205	209	213	217	221	225	229	233	237	241	245	249	253
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.35	1.19	0.21	0.47	0.61	0.96	0.00	0.37	0.36	0.32	0.27	0.37	0.43	0.61	0.19	0.29	0.41	0.56
Shim (100 μm)	0/4/3/0	0/4/3/0	0/3/5/0	0/3/5/0	0/4/3/0	0/3/1/0	0/0/0/0	0/0/1/0	0/0/0/0	0/1/0/0	0/0/2/0	0/0/2/0	0/3/2/0	0/4/2/0	0/2/5/0	0/3/5/0	0/4/3/0	0/3/2/0
RMS-Oct.	0.99	1.88	0.68	0.47	1.18	1.37	0.55	0.58	0.44	0.36	0.54	0.46	0.67	0.52	0.48	0.59	1.49	1.56
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 14

Area	45						90						45					
Position	X-9	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8	X+9
Ch.No.	186	190	194	198	202	206	210	214	218	222	226	230	234	238	242	246	250	254
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.35	0.32	0.49	0.50	0.54	0.20	0.72	0.28	0.38	0.00	0.31	0.36	0.23	1.44	0.32	1.06	0.32	0.47
Shim (100 μm)	0/4/3/0	0/4/3/0	0/3/5/0	0/3/5/0	0/4/3/0	0/1/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/2/0/0	0/0/2/0	0/0/2/0	0/2/0/0	0/5/2/0	0/3/5/0	0/3/5/0	0/5/3/0	0/3/2/0
RMS-Oct.	1.09	0.93	1.25	0.65	0.40	0.62	0.38	0.58	0.41	0.57	0.50	0.51	0.45	2.05	0.37	0.89	0.40	1.18
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 15

Area	45						90						45					
Position	X-9	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8	X+9
Ch.No.	187	191	195	199	203	207	211	215	219	223	227	231	235	239	243	247	251	255
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.57	0.49	0.56	0.47	0.99	0.74	1.34	0.60	0.56	0.38	0.73	0.29	1.18	0.94	1.11	0.30	0.60	0.52
Shim ($_{100\ \mu m}$)	0/4/3/0	0/4/3/0	0/3/5/0	0/3/5/0	0/4/3/0	0/2/1/0	0/0/2/0	0/0/2/0	0/2/0/0	0/2/0/0	0/0/2/0	0/0/2/0	0/3/0/0	0/4/2/0	0/3/4/0	0/2/3/0	0/4/2/0	0/4/3/0
RMS-Oct.	0.44	1.47	0.52	0.35	0.57	0.37	0.90	0.68	0.57	0.46	0.43	0.29	0.71	1.09	0.85	0.40	0.60	0.64
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 16

Area	45						90						45					
Position	X-9	X-8	X-7	X-6	X-5	X-4	X-3	X-2	X-1	X+1	X+2	X+3	X+4	X+5	X+6	X+7	X+8	X+9
Ch.No.	188	192	196	200	204	208	212	216	220	224	228	232	236	240	244	248	252	256
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.59	0.30	0.27	0.63	0.24	0.25	0.31	1.13	0.45	0.42	0.70	0.60	0.25	0.32	0.50	0.32	0.19	0.28
Shim ($_{100\ \mu m}$)	0/3/3/0	0/4/3/0	0/3/3/0	0/3/5/0	0/4/3/0	0/2/0/0	0/0/2/0	0/0/1/0	0/2/0/0	0/2/0/0	0/0/2/0	0/0/2/0	0/3/1/0	0/4/0/0	0/2/4/0	0/2/5/0	0/4/2/0	0/4/2/0
RMS-Oct.	1.31	0.42	0.61	0.41	0.90	0.63	0.43	0.87	0.43	0.46	1.11	1.01	0.65	0.39	0.59	0.43	0.53	0.38
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 17

Area	45						90						45					
Position	Y-9	Y-8	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7	Y+8	Y+9
Ch.No.	257	261	265	269	273	277	281	285	289	293	297	301	305	309	313	317	321	325
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.29	0.75	0.55	0.36	1.71	0.82	0.30	0.33	0.93	0.44	0.42	0.47	0.88	1.11	1.28	0.30	0.48	0.31
Shim (100 μm)	0/2/3/0	0/3/4/0	0/4/4/0	0/5/3/0	0/3/4/0	0/2/3/0	0/2/1/0	0/1/2/0	0/2/2/0	0/2/2/0	0/2/2/0	0/0/0/0	0/0/0/0	0/4/5/0	0/5/5/0	0/3/4/0	0/4/4/0	0/4/3/0
RMS-Oct.	0.39	0.68	0.37	0.32	0.55	0.46	0.52	0.41	0.59	0.55	0.68	1.85	1.05	0.78	0.47	0.57	0.43	0.46
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 18

Area	45						90						45					
Position	Y-9	Y-8	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7	Y+8	Y+9
Ch.No.	258	262	266	270	274	278	282	286	290	294	298	302	306	310	314	318	322	326
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.36	0.41	0.40	0.39	0.85	1.43	1.22	0.70	1.37	0.82	0.31	0.67	2.46	0.34	0.40	0.56	0.36	0.29
Shim (100 μm)	0/3/4/0	0/3/3/0	0/4/3/0	0/5/3/0	0/3/4/0	0/2/3/0	0/2/1/0	0/0/0/0	0/2/2/0	0/0/2/0	0/2/2/0	0/1/0/0	0/0/0/0	0/4/4/0	0/4/4/0	0/3/4/0	0/4/3/0	0/4/4/0
RMS-Oct.	0.51	0.43	0.41	0.60	0.62	0.69	1.56	0.57	1.43	1.65	0.36	0.69	1.16	0.51	0.60	0.42	0.53	0.65
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 19

Area	45						90						45					
Position	Y-9	Y-8	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7	Y+8	Y+9
Ch.No.	259	263	267	271	275	279	283	287	291	295	299	303	307	311	315	319	323	327
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.33	1.23	0.48	1.04	1.14	0.78	0.77	1.06	1.30	1.14	0.71	1.92	0.92	1.41	1.34	0.31	1.16	0.43
Shim (100 μm)	0/3/3/0	0/3/4/0	0/6/4/0	0/4/3/0	0/3/4/0	0/2/3/0	0/2/2/0	0/1/1/0	0/2/2/0	0/1/2/0	0/3/3/0	0/1/1/0	0/0/0/0	0/4/4/0	0/4/5/0	0/3/4/0	0/5/4/0	0/4/3/0
RMS-Oct.	0.71	0.32	1.02	0.35	0.52	0.41	0.38	0.78	0.50	0.76	1.42	0.71	0.43	0.79	0.63	0.56	0.59	0.68
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Flight Module Integration: Layer 20

Area	45						90						45					
Position	Y-9	Y-8	Y-7	Y-6	Y-5	Y-4	Y-3	Y-2	Y-1	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7	Y+8	Y+9
Ch.No.	260	264	268	272	276	280	284	288	292	296	300	304	308	312	316	320	324	328
Gasdicht	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-Signal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS-Serie.	0.33	0.65	0.27	0.53	0.75	1.05	1.28	0.29	0.00	0.70	1.05	0.68	1.37	1.24	2.18	1.05	0.32	0.34
Shim (100 μm)	0/2/4/0	0/2/4/0	0/4/3/0	0/4/3/0	0/2/3/0	0/2/3/0	0/2/2/0	0/2/2/0	0/2/2/0	0/2/1/0	0/2/2/0	0/1/2/0	0/2/2/0	0/0/4/0	0/3/4/0	0/3/4/0	0/4/3/0	0/4/3/0
RMS-Oct.	0.47	1.09	0.95	1.00	0.56	1.51	0.55	0.45	0.35	0.48	0.49	0.48	0.88	0.94	1.88	1.11	0.61	0.98
OKAY	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓