

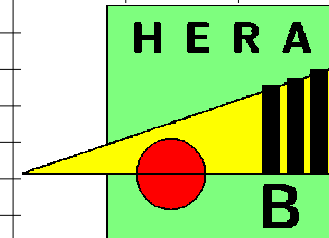
## Dimensions of Al proton spare beam-pipe 2000

Beam-pipe segments start at Z0, have a length of  $\Delta Z$ , inner diameter of  $D_i$  and outer diameter  $D_o$ . All segments are made from Al.

Welding joints are positioned at Z0, width of joint =  $\pm 2.5$  mm. Welding joint at  $Z_0 + \Delta Z$  has diameter  $D_w$ .

Stiffener rings are positioned at Z1,2,3, width =  $\pm 1.5$  mm, outer diameter =  $D_s$ .

Vertex vessel shifted backwards by 2 mm.



**Version:** 17.02.2000 Positions of MS10 - MS13 updated

Seg.	$D_i$	$D_o$	Z0	$\Delta Z$	# of rings	$D_s$	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	$D_w$	Weight (g)
<b>0</b>	38	41	1927	96	0											48
<b>1*</b>	38	44	2023	5	0											5
<b>1</b>	38	42	2028	25	0											17
	38	39	2053	516	0										48,4	87
<i>MS01</i>	65		2091	85												
<b>2</b>	40	41	2569	432	0										55,4	81
<b>3</b>	45	46	3001	307	0										60,4	67
<i>MS03</i>	65		3098	42												
<b>4</b>	50	51	3308	290,5	0										58	66
<b>4*</b>	50	51	3598,5	293,5	0										65,4	72
<b>5</b>	55	56	3892	532	2	63,4	4069	4247							75,4	148
<i>MS05</i>	65		4153	42												
<b>6</b>	65	66	4424	420	1	74,2	4634								80,4	135
<b>7</b>	70	71	4844	200,5	0										79,8	48
<b>7*</b>	70	71	5044,5	197,5	0										85,4	71
<b>8</b>	75	76	5242	179,5	0										85,0	67
<i>MS06</i>	91		5318	42												
<b>8*</b>	75	76	5421,5	362,5	1	85,0	5603								95,4	140
<b>9</b>	85	86	5784	467	2	95,8	5940	6095							100,6	200

10	90	91	6251	437	2	101,2	6397	6542									105,8	208
11	95	96	6688	407	2	106,6	6824	6959									111,0	208
MS10	116		6839	171														
12*	100	101	7095	458,5	3	112,0	7210	7325	7439								112,0	254
MS11	116		7327	85														
12	100	101	7553,5	113,5	0												111,0	23
13	100	101	7667	365	2	112,0	7789	7910									111,0	200
MS12	116		7683	85														
14	100	101,2	8032	339,5	1	112,0	8223,5										128,0	215
MS13	116		8044	171														
15	136,4	140	8371,5	5845,5	0												132,0	12317
MS14	206		11779	128														
MS15	206		12916	128														
Ecal	209x209		13310	400														
16	139,5	147,5	14217	20	0													
17	143,5	147,5	14237	10	0													
17*	143,5	202,4	14247	23														
			14270															
																	Pipe 1 - 25:	14677
Support rings start at Z0, have a width of $\Delta Z$ , inner and outer diameter Di and Do. The rings are made from Aluminium.																		
Support	Di	Do	Z0	$\Delta Z$														
1	51	61	3400	10														
2	92	108	6630	2														
3	122	138	8515	2														