

ILC - Tunnel Specification Sheet (DRAFT)

KEK&Slac, Apr 28, 2006 DRAFT

BDS (Beam Delivery System)

1. BEAM TUNNEL

(BASIS OF CURRENT BEAM TUNNEL CROSS SECTIONAL LAYOUT)

System/Component Description	Quantity	Dimensions (meters)	Weight (Kg)	Interface Point	Source of Information/Comments
(Electron Linac)					
Linac end to IR1 (20mrad line)	1	2750			
IR1 to beam dump	1	400			
Tune-up/emergency extraction line	1	400			
2mrad deviation to IR2	1	1860			
IR2 to beam dump	1	700			
(Positron Linac)					
Linac end to IR1 (20mrad line)	1	2750			
IR1 to beam dump	1	400			
Tune-up/emergency extraction line	1	400			
2mrad deviation to IR2	1	2140			
IR2 to beam dump	1	700			
(Low-energy Positron)					
Low-energy positron transport line	1	1650			

2. SERVICE TUNNEL

BDS service tunnel	2	500			
IR1 Beam dump service tunnel	2	400			
IR2 Beam dump service tunnel	2	700			

3. TUNNEL CROSS SECTIONS

Beam tunnel diameter		5			
Service tunnel diameter		5			
Wall-to-wall distance between two tunnels		7.5(America, Eurpe) / 5.0(Asia)			Depends on geology

4. TUNNEL CONNECTIONS

End connection path	6	5w x 2.0h, 7.5/5m			
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5. ACCESS POINTS

P1.0		IR2			
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P1.1		IR1			
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6. CAVERN

IR1 (Lxlxh)	1	62x33x30			
IR2 (Lxlxh)	1	62x33x30			
IR1 dump	2	28x28x24			
IR2 dump	2	28x28x24			
Tune-up/emergency extraction dump	2	15x5x5			

7. ACCESS SHAFTS

P1.01 (diaxdepth)	1	13 x 150			
P1.02 (diaxdepth)	1	17 x 150			
P1.11 (diaxdepth)	1	13 x 150			
P1.12 (diaxdepth)	1	17 x 150			

Subsystem Name	Magnet Type	quantity	length (z) m	width (x) m	height (y) m	Total	Cooling Requirements	Heat Load	Reference
EBSY1	BPM	35				35	Water		M. Woodley - Index of /~mdw/ILC/2006b
	DIPOLE	20	2.8	2	2	20	Water		http://www.linearcollider.org/wiki/doku.php?id=rdr:rdr_home
	ECOL	3	3.0			3			"
	INST	4				4			"
	QUAD 0.5	4	0.5	2	2	4	Water		"
	QUAD 1.0	19	1.0	2	2	19	Water		"
	QUAD 2.0	3	2.0	2	2	3	Water		"
	QUAD 3.0	8	3.0	2	2	8	Water		"
	RCOL	1				1			"
	WIRE	4				4			"
EBSY1 Total						101			
EBSY2	BPM	5				5	Water		"
	QUAD 1.5	2	1.5	2	2	2	Water		"
	QUAD 2.0	2	2.0	2	2	2	Water		"
	QUAD 3.0	1	3.0	2	2	1	Water		"
EBSY2 Total						10			
EDL1	DIPOLE 0.8	20	0.8	2	2	20	Water		"
	DIPOLE 1.0	6	1.0	2	2	6	Water		"
	DIPOLE 2.0	12	2.0	2	2	12	Water		"
	ECOL 0	1				1			"
	ECOL 0.3	3	0.3			3			"
	QUAD 1.618674	1	1.618674	2	2	1	Water		"
	QUAD 1.640664	2	1.640664	2	2	2	Water		"
	QUAD 1.944814	5	1.944814	2	2	5	Water		"
	QUAD 2.105826	5	2.105826	2	2	5	Water		"
	QUAD 2.143086	3	2.143086	2	2	3	Water		"
EDL1 Total						58			
EFF1	OCT 0.1	1		2	2	1	Water		"
	OCT 0.3	2		2	2	2	Water		"

OCT 1.0	1		2	2	1	Water		"
OCT 2.0	2		2	2	2	Water		"
OCT 3.0	2		2	2	2	Water		"
BPM	78				78	Water		"
DIPOLE 3.0	2	3.0	2	2	2	Water		"
DIPOLE 6.0	2	6.0	2	2	2	Water		"
DIPOLE 12.0	57	12.0	2	2	57	Water		"
ECOL 0.105	1	0.1050			1			"
ECOL 0.2145	12	0.2145			12			"
HKIC	7				7	Air		"
INST	2				2			"
QUAD 0.3	1	0.3	2	2	1	Water		"
QUAD 2.0	44	2.0			44	Water		"
QUAD 2.2	1	2.2			1	Water		"
RCOL 0.0086	5	0.0086			5			"
RCOL 0.0356	1	0.0356			1			"
RCOL 0.105	6	0.1050			6			"
RCOL 0.429	4	0.4290			4			"
SEXT 0.3	1	0.3	2	2	1	Water		"
SEXT 0.6	1	0.6			1	Water		"
SEXT 1.0	3	1.0			3	Water		"
VKIC	8				8	Air		"
WIRE	2				2			"
EFF1 Total					246			
EIRT1	BPM	25			25	Water		"
	DIPOLE 3.0	2	3.0	2	2	2	Water	"
	DIPOLE 6.000001	2	6.000001	2	2	2	Water	"
	QUAD 1.0	12	1.0	2	2	12	Water	"
	QUAD 2.0	10	2.0	2	2	10	Water	"
EIRT1 Total					51			
Grand Total		466			466			

EBDS2

4/27/2006

Subsystem Name	Magnet Type	quantity	length (z)	width (x)	height (y)	Total	Cooling Requirements	Heat Load	Reference
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EDL2	DIPOLE 0.8	20	0.8	2	2	20	Water		M. Woodley - Index of /~mdw/ILC/2006b
	DIPOLE 2.0	50	2.0	2	2	50	Water		http://www.linearcollider.org/wiki/doku.php?id=rdr:rdr_home
	ECOL 0.3	5	0.3			5			"
	QUAD 3.0	14	3.0	2	2	14	Water		"
	RCOL 0.3	5	0.3			5			"
	SEXT 2.0	4	2.0	2	2	4	Water		"
EDL2 Total						98			"
EFF2	OCT 0.1	1	0.1	2	2	1	Water		"
	OCT 0.3	2	0.3	2	2	2	Water		"
	OCT 1.0	2	1.0	2	2	2	Water		"
	OCT 2.0	2	2.0	2	2	2	Water		"
	OCT 3.0	2	3.0	2	2	2	Water		"
	BPM	78				78	Water		"
	DIPOLE 3.0	2	3.0	2	2	2	Water		"
	DIPOLE 6.0	2	6.0	2	2	2	Water		"
	DIPOLE 11	1	11.0	2	2	1	Water		"
	DIPOLE 11.747927	1	11.747927	2	2	1	Water		"
	DIPOLE 11.926138	1	11.926138	2	2	1	Water		"
	DIPOLE 12	51	12.0	2	2	51	Water		"
	DIPOLE 12.073862	1	12.073862	2	2	1	Water		"
	DIPOLE 12.252073	1	12.252073	2	2	1	Water		"
	DIPOLE 13	1	13.0	2	2	1	Water		"
	ECOL 0.105	1	0.105	2	2	1			"
	ECOL 0.2145	12	0.2145	2	2	12			"
	HKIC	7				7	Air		"
	INST	2				2			"
	QUAD 0.3	1	0.3	2	2	1	Water		"
	QUAD 2.0	44	2	2	2	44	Water		"
QUAD 2.5	1	2.5	2	2	1	Water		"	
RCOL 0.0086	5	0.0086			5			"	
RCOL 0.0356	1	0.0356			1			"	
RCOL 0.105	6	0.105			6			"	
RCOL 0.429	4	0.429			4			"	
SEXT 1.0	3	1	2	2	3	Water		"	

	SEXT 3.8	2	3.8	2	2	2	Water		"
	VKIC	7				7	Air		"
	WIRE	2				2			"
EFF2 Total						246			
EIRT2	BPM	21				21	Water		"
	DIPOLE 3.0	2	3	2	2	2	Water		"
	DIPOLE 6.000001	2	6.000001	2	2	2	Water		"
	GradDIPOLE 2.0	48	2	2	2	48	Water		"
	QUAD 1.0	4	1	2	2	4	Water		"
	QUAD 2.0	14	2	2	2	14	Water		"
EIRT2 Total						91			
Grand Total						435			"

EBDS0

Subsystem Nam	Magnet Type	quantity	length (z)	width (x)	height (y)	Total	Cooling Requirements	Heat Load	Reference
EBSYD	BPM	9				9	Water		M. Woodley - Index of /~mdw/ILC/2006b
	DIPOLE 0.8	20	0.8	2	2	54	Water		http://www.linearcollider.org/wiki/doku.php?id=rdr:rdr_home
	DIPOLE 2.0	34	2.0	2	2	34	Water		"
	QUAD	7	3.0	2	2	7	Water		"
	SEXT	2	1.0	2	2	2	Water		"
EBSYD Total		72				72			"
Grand Total		72				72			"

PBDS1

4/27/2006

Subsystem Nam	Magnet Type	quantity	length (z)	width (x)	height (y)	Total	Cooling Requirements	Heat Load	Reference
PBSY1	BPM	35				35	Water		M. Woodley - Index of /~mdw/ILC/2006b
	DIPOLE	20	2.8	2	2	20	Water		http://www.linearcollider.org/wiki/doku.php?id=rdr:rdr_home
	ECOL	3	3.0			3			"
	INST	4				4			"

	QUAD 0.5	4	0.5	2	2	4	Water		"
	QUAD 1.0	19	1.0	2	2	19	Water		"
	QUAD 2.0	3	2.0	2	2	3	Water		"
	QUAD 3.0	8	3.0	2	2	8	Water		"
	RCOL	1				1			"
	WIRE	4				4			"
PBSY1 Total						101			
PBSY2	BPM	5				5	Water		"
	QUAD 1.5	2	1.5	2	2	2	Water		"
	QUAD 2.0	2	2.0	2	2	2	Water		"
	QUAD 3.0	1	3.0	2	2	1	Water		"
PBSY2 Total						10			
PDL1	DIPOLE 0.8	20	0.8	2	2	20	Water		"
	DIPOLE 1.0	6	1.0	2	2	6	Water		"
	DIPOLE 2.0	12	2.0	2	2	12	Water		"
	ECOL 0	1				1			"
	ECOL 0.3	3	0.3			3			"
	QUAD 1.618674	1	1.618674	2	2	1	Water		"
	QUAD 1.640664	2	1.640664	2	2	2	Water		"
	QUAD 1.944814	5	1.944814	2	2	5	Water		"
	QUAD 2.105826	5	2.105826	2	2	5	Water		"
	QUAD 2.143086	3	2.143086	2	2	3	Water		"
PDL1 Total						58			
PFF1	OCT 0.1	1		2	2	1	Water		"
	OCT 0.3	2		2	2	2	Water		"
	OCT 1.0	1		2	2	1	Water		"
	OCT 2.0	2		2	2	2	Water		"
	OCT 3.0	2		2	2	2	Water		"
	BPM	78				78	Water		"
	DIPOLE 3.0	2	3.0	2	2	2	Water		"
	DIPOLE 6.0	2	6.0	2	2	2	Water		"
	DIPOLE 12.0	57	12.0	2	2	57	Water		"
	ECOL 0.105	1	0.1050			1			"
	ECOL 0.2145	12	0.2145			12			"
	HKIC	7				7	Air		"
	INST	2				2			"

QUAD 0.3	1	0.3	2	2	1	Water		"
QUAD 2.0	44	2.0			44	Water		"
QUAD 2.2	1	2.2			1	Water		"
RCOL 0.0086	5	0.0086			5			"
RCOL 0.0356	1	0.0356			1			"
RCOL 0.105	6	0.1050			6			"
RCOL 0.429	4	0.4290			4			"
SEXT 0.3	1	0.3	2	2	1	Water		"
SEXT 0.6	1	0.6			1	Water		"
SEXT 1.0	3	1.0			3	Water		"
VKIC	8				8	Air		"
WIRE	2				2			"
PFF1 Total					246			
PIRT1	BPM	25			25	Water		"
	DIPOLE 3.0	2	3.0	2	2	Water		"
	DIPOLE 6.000001	2	6.000001	2	2	Water		"
	QUAD 1.0	12	1.0	2	2	Water		"
	QUAD 2.0	10	2.0	2	2	Water		"
PIRT1 Total					51			
Grand Total		466			466			

PBDS2

4/27/2006

Subsystem Name	Magnet Type	quantity	length (z)	width (x)	height (y)	Total	Cooling Requirements	Heat Load	Reference
PDL2	DIPOLE 0.8	20	0.8	2	2	20	Water		M. Woodley - Index of /~mdw/ILC/2006b
	DIPOLE 2.0	50	2.0	2	2	50	Water		http://www.linearcollider.org/wiki/doku.php?id=rdr:rdr_home
	ECOL 0.3	5	0.3			5			"
	QUAD 3.0	14	3.0	2	2	14	Water		"
	RCOL 0.3	5	0.3			5			"
	SEXT 2.0	4	2.0	2	2	4	Water		"
PDL2 Total						98			"
PF2	OCT 0.1	1	0.1	2	2	1	Water		"
	OCT 0.3	2	0.3	2	2	2	Water		"
	OCT 1.0	2	1.0	2	2	2	Water		"

OCT 2.0	2	2.0	2	2	2	Water		"
OCT 3.0	2	3.0	2	2	2	Water		"
BPM	78				78	Water		"
DIPOLE 3.0	2	3.0	2	2	2	Water		"
DIPOLE 6.0	2	6.0	2	2	2	Water		"
DIPOLE 11	1	11.0	2	2	1	Water		"
DIPOLE 11.747927	1	11.747927	2	2	1	Water		"
DIPOLE 11.926138	1	11.926138	2	2	1	Water		"
DIPOLE 12	51	12.0	2	2	51	Water		"
DIPOLE 12.073862	1	12.073862	2	2	1	Water		"
DIPOLE 12.252073	1	12.252073	2	2	1	Water		"
DIPOLE 13	1	13.0	2	2	1	Water		"
ECOL 0.105	1	0.105	2	2	1			"
ECOL 0.2145	12	0.2145	2	2	12			"
HKIC	7				7	Air		"
INST	2				2			"
QUAD 0.3	1	0.3	2	2	1	Water		"
QUAD 2.0	44	2	2	2	44	Water		"
QUAD 2.5	1	2.5	2	2	1	Water		"
RCOL 0.0086	5	0.0086			5			"
RCOL 0.0356	1	0.0356			1			"
RCOL 0.105	6	0.105			6			"
RCOL 0.429	4	0.429			4			"
SEXT 1.0	3	1	2	2	3	Water		"
SEXT 3.8	2	3.8	2	2	2	Water		"
VKIC	7				7	Air		"
WIRE	2				2			"
PFF2 Total					246			"
PIRT2								
BPM	37				37	Water		"
DIPOLE 3.0	2	3	2	2	2	Water		"
DIPOLE 6.000001	2	6.000001	2	2	2	Water		"
GradDIPOLE 2.0	48	2	2	2	48	Water		"
QUAD 1.0	4	1	2	2	4	Water		"
QUAD 2.0	30	2	2	2	30	Water		"
PIRT2 Total					123			"
Grand Total					467			"

PBDS0

Subsystem Nam Magnet Type	quantity	length (z)	width (x)	height (y)	Total	Cooling Requirements	Heat Load	Reference
PBSYD BPM	9				9	Water		M. Woodley - Index of /~mdw/ILC/2006b
DIPOLE 0.8	20	0.8	2	2	54	Water		http://www.linearcollider.org/wiki/doku.php?id=rdr:rdr_home
DIPOLE 2.0	34	2.0	2	2	34	Water		"
QUAD	7	3.0	2	2	7	Water		"
SEXT	2	1.0	2	2	2	Water		"
PBSYD Total	72				72			"
Grand Total	72				72			

BDS (July 11 2006)

BDS 2mrad	MW
e- Magnet Power System	24.45
e+ Magnet Power system	24.45
Subtotal	48.9

BDS 20 mrad	MW
e- Magnet Power System	4.61
e+ Magnet Power system	4.61
Subtotal	9.22

BDS common	MW
e- Magnet Power System	0.7
e+ Magnet Power system	0.7
Subtotal	1.4

BDS Dumps near Wye	MW
e- Water Dumps at Wye	18
e+ Water Dumps at Wye	18
Subtotal	36

BDS Dumps near IP	MW
Water Dumps near IP e-	18 (actual two but only use per set)
Water Dumps near IP e+	18 (actual two but only use per set)
Water Dumps near IP	3.2 MW dump not considered for surface plant
Subtotal	36