EQUIPMENT SUMMARY SHEET

S.No.	UNIT No.	No. Req.	DESIGNATION	OPERATING CONDITIONS		CAPACITY			HEAT TRANSFER AREA	MAJOR DIMENSIONS	M.O.C.	RATING HP	INSULATION HCI/CCI/PPI	REMARKS	R	
				TEMP. °C	PRESSURE kg/ sq.cm	VESSELS Lit.	PUMPS lpm	BLOWERS	EXCHANGERS sq. cm.	D x L (mm) Shell /Jacket	Shell/Jacket Shell/Tubes					
01	BI–101	1	Blender	25–70	Atm.	120 kg	–	–	–	800 DIA x 500	SS 304	–	–	5h Capcity		1
02	Cy–101	1	Nitrogen Cylinder	25–70	Atm.	400 LPD	–	–	–	–	CS	–	–	–		2
03	Gr–101	1	Microfine Grinder	25–30	Atm.	50 kg	–	–	–	–	CS/SS 304	–	–	Particle size to be below 150 microns		3
04	PH–101	1	Preheater	500–600	Atm.	–	–	–	–	–	–	–	–	Electrical Heat Tracing Element on 100 NB Pipe of 5 m Length.		4
05	RK–101	1	Rotary Furnace	1000–1100	Atm.	–	–	–	–	500 DIA x 6000	Inconel	–	–	Ceramic Fiber Blanket insulation to be provided		5
06	RK–102	1	Rotary Cooler	1000–500	Atm.	–	–	–	–	500 DIA x 3000 600 DIA x 3000	Inconel/CS	–	–	Ceramic Fiber Blanket insulation to be provided		6
07	SB–101	1	A Storage Bin	25–30	Atm.	12 kg	–	–	–	300 DIA x 150	SS304	–	–	24h Capacity		7
08	SB–102	1	B Storage Bin	25–30	Atm.	72 kg	–	–	–	500 DIA x 200	SS304	–	–	12h Capacity		8
09	SB–103	1	C Storage Bin	25–30	Atm.	220 kg	–	–	–	700 DIA x 420	SS304	–	–	12h Capacity		9
10	SB–104	1	Feed Storage Bin	25–30	Atm.	300 kg	–	–	–	700 DIA x 420	SS304	–	–	12h Capacity		10
11	SB–105	1	B Collection Bin	500–600	Atm.	350 kg	–	–	–	800 DIA X 530	SS304	–	–	12h Capacity		11
12	ST–101	1	Blowdown Tank	500–600	Atm.	250 Lit.	–	–	–	500 DIA X1200	SS304	–	–	–		12
13	Tray–101	5	B Collection Tray	500–600	Atm.	160 kg	–	–	–	500 x 500 x 600	SS304	–	–	Tray with wheels and handles Chargeble battery with load cell and indicator for each tray		13
14																14
15																15
16																16
17																17
18																18
19																19
20																20

Notes : 1. VTS = Vendor to Specify

NOTES : HCI = HEAT CONSERVATIVE INSULATION ; CCI = COLD CONSERVATIVE INSULATION ; PPI = PERSONEL PROTECTION INSULATION ;
VTS = Vendor to Specify

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE

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DESIGN & ENGINEERING DIVISION
CSIR–INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS–SOLID OPERATION | CLIENT :
LOCATION : IICT Hyderabad | CAPACITY : 0.125 TPD | CODE : –
TITLE: EQUIPMENT LIST – NITROGENATION (SECTION 100)

MR/SAK	–	–			
DESIGN		PREPARED		VER/CHD	APPROVED

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

								R	
GEN.	1	Unit No. : BI-101		Dwg. No.:		Code : ASME Sec. VIII Div. I			1
	2	Title : Blender		Nos. required : One		Type : Vertical, Cylindrical			2
	3	Service : To Blend B, C and A Products.							3
	4	Nominal Capacity : Kg/h. :24 Kg/hr		Nominal Capacity : Kg. : 120 Kg (5 h Capacity)					4
	5								5
PROCESS DATA	6								6
	1	Fluid		B, C and A					7
	2	Operating Temperature :	°C	Normal : 30		Maximum : 40			8
	3	Operating Pressure :	kg/sq.cm.–~~g~~/a	Normal : Atm.		Maximum : 1.1			9
	4	Density : at 20°C	kg/L	1.1					10
	5	Hazard Condition :							11
									12
CONSTRUCTION DATA									13
	1	Temperature :	°C	Design : 50		Test : Amb.			14
	2	Pressure :	kg/sq.cm.–~~g~~/a	Design : 1.1		Test : Full with Water			15
	3	Corrosion Allowance		-					16
	4	Shell		~~OD~~/ID : -		St. Length : -			17
				Thk. : -					18
	5	Ends	Top	Type : -		Thk. : -			19
			Bottom	Type : -		Thk. : -			20
	6	Supports		Type : -		Nos. : -			21
	7	Material Of Construction		Shell : SA 240 SS 304		Heads : SA 240 SS 304			22
				Supports : CS to IS 226		Bolting : SS 304			23
				Gaskets : PTFE		Jacket / Internals : CS to IS 1364			24
				Shell Flanges : NA		Other wetted parts : SS 304			25
	8	Heat Treatment		Stress Relieving : SS 304		Others : SS 304			26
	9	Tests		Hydraulic / Pneumatic : Yes		Dye-Penetrant :			27
				Radiographic : –		Others : –			28
	10	Insulation		Type : HCl / CCl / PPI -		Thk. : –			29
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer					30
	12	Weight :	kg	Empty : -		Full of water : -			31
	13	Inspection By		IICT / Client / Third Party		Others :			32
									33
NOTES	1	Nozzles marked "spare" shall be provided with matching blind flange, gaskets, bolts, nuts and washers.							34
	2	All other nozzles shall be provided with companion flange, gaskets, bolts, nuts and washers and shall be suitably							35
		blanked off before despatch.							36
	3	All nozzles – Top, Side and Bottom shall be 150 mm in length unless otherwise specified.							37
	4	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.							38
	5	Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should							39
		be designed and get approved from IICT design team.							40
	6								41
	7								42
	8								43
		VTS – Vendor to Specify							

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

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All dimensions in mm, unless specified — DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
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STTANK101

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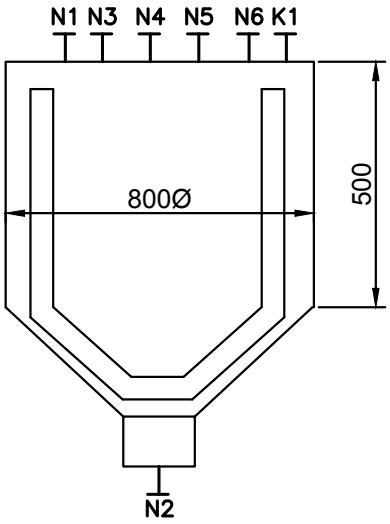
INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

1 | Unit No. : BI-101 | Title : Blender



Blender Details:

60 deg. conical

MOC : SS 304

All Dimensions are in mm

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R
		SIZE NB(mm)	Sch.	Length	M.O.C.	STANDARD	RATING	TYPE	M.O.C.		
N1	Inlet from SB–101	50	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
N2	Outlet to SB–104	250	10s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
N3	Vent	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
N4	Inlet from SB–102	250	10s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
N5	Inlet from SB–103	250	10s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
N6	Nitrogen Inlet	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304		
K1	Pressure Gauge	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	

NOTES

11

12

13

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

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STTANK1012

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

GEN.

					R	
1	Unit No. : RK-101	Dwg. No.: –	Code : ASME Sec. VIII Div. I			1
2	Title : Rotary Furnace	Nos. required : One	Type : Horizontal, Cylindrical & Flanged			2
3	Service : To Carry out Nirogenation Reaction					3
4	Nominal Capacity : lit. : -					4
						5

PROCESS DATA

1	OPERATION :		Batch / ~~Continuous~~	Batch Time : hrs :–	Working Hours/Day : –		6
			SHELL	JACKET	DOUBLE COIL		7
2	Material Handled :		CaC2 +CaCN2	-			8
3	Operation :		Continuous	-			9
4	Feed Quantity Total :	kg/hr	33	-			10
5	Solid/Liquid/Gas:	kg/hr	24/-/9	-/-/-			11
6	Discharge Quantity Total :	kg/hr	32	-			12
7	Solid/Liquid/Gas:	kg/hr	2/-/5	-/-/-			13
8	Operating Temp.:Nor./Max.:	°C	1000	-/-			14
9	Operating Press.:Nor./Max.:	kg/sq.cm.–g/c	1.0	-			15
10	Density : at 30 °C	kg/cu.m.	1100	-			16
11	Viscosity : at 25 °C	cP	-	-			17
12	pH :		-	-			18
13	Pressure Drop :	kg/sq.cm.	-	-			19
14	Hazard Condition :		-				20
							21

INTERNALS

1	Agitator Type :		-		Shaft Dia : -		22
2		mm	Impeller Dia. : -		No. of Impellers : -		23
3		mm	Height from bottom: -		Speed : RPM : -		24
4	Coil : 2 Nos.	mm	Tube Dia. : -		BWG / Sch. : -		25
5		mm	Pitch : -		No. of Turns : -		26
6		mm	Coil Helix Dia. : -		Height from bottom : -		27
7	Baffles :	mm	Nos. : -		Type : -		28
8		mm	Height : -		Width : -		29
9		mm	Thk. : -				30
10	Feed Arrangement :		Type : -	Dia. : -	Length : -		31
			Spray Nozzle Dia. : -	Pitch : -	Others : -		32
11	Shaft :		Dia. : -	Length : -			33
12	Others :		-				34

CONSTRUCTION

			SHELL		JACKET		COIL			35
1	Temperature :	°C	Dgn: 1100	Test: Amb.	Dgn: -	Test: -	Dgn:	Test:		36
2	Pressure :	kg/sq.cm.–g/c	Dgn: 1.1	Test: 1.2	Dgn: -	Test: -	Dgn:	Test:		37
3	Diameter :	mm	O.D.: –	I.D.: 500	O.D.: –	I.D.: -	O.D.:	H.Dia.:		38
4	Straight Length :	mm	6000		-		-			39
5	Thk. :	mm	VTS		-					40
6	Shell Ends :	Top	Type : Refer dwg.	Thk. : -	K.R. : -	SF : -				41
		Bottom	Type : Refer dwg.	Thk. : -	K.R. : -	SF : -				42
7	Jacket end :	Bottom	Type : -	Thk. : -	K.R. : -	SF : -				43

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE	DATE	TR. No.	1	2	3	4	5	6	7	8
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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

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MR		MR	06.09.19	TPK/MR/SAK		TPK/MR/SAK	
DESIGN		PREPARED		VER/CHD		APPROVED	

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

CONSTRUCTION DATA

									R	
1	Unit No. : RK-101			Title : Rotary Furnace						1
										2
		SHELL		JACKET		COIL				3
8	Corrosion Allowance :	-		-						4
9	Supports :	Type: -	No.: -	Type: -	No.: -	Type:	No.:			5
10	Material Of Construction	Shell : INCONEL		Jacket :-						6
		Shell Ends : INCONEL		Jacket Ends :-						7
		Contact Parts: INCONEL		Supports : -						8
		Shaft : -		Feed Arrangement : INCONEL						9
		Agitator :-		External Bolting : CS to IS 1364						10
		Baffle :-		Internal Bolting : INCONEL						11
		Dip Pipe : -		Gaskets : -						12
		Shell Flanges :-		Sparger : -						13
		Insulation : ~~HCl / CCl / PPI~~ HCl		MOC : Ceramic Fiber Blanket						14
11	Heat Treatment :	Stress Relieving : -		Others : -						15
12	Tests :	Hydraulic / ~~Pneumatic~~ : Yes		Dye–Penetrant : -						16
		Radiograph : -		Others : -						17
13	Insulation :	Type : Ceramic Fiber Blanket		Thk. : Note 2						18
14	Painting / Finish :	All CS parts to be painted with two coats of red oxide primer								19
15	Weight : kg	Empty : VTS		Full of Water : VTS						20
16	Drive Details :	Motor : -								21
		Power Supply : -		H.P. : -						22
		R.P.M. : -								23
17	Shaft Seal :	-								24
18	Inspection By :	IICT / ~~CLIENT / Third Party~~ -		Others : -						25
										26
										27
										28
										29

NOTES

1	6 Nos. of thermcouples with 1 m apart along the length of the rotary furnace heating element to be provided.	30
2	Vendor to design HCl thickness and specify the same.	31
3	The whole assembly including blender, bin, two rotary furnace and bin should be packed with ceramic fiber blanket to avoid	32
	contact of air (refer PFD or P&ID drawings).	33
4	Ensure that noise level should be minimum during the operation of furnace.	34
5	Rotary furnce assembly should be properly earthed.	35
6	Supports for rotary furnce to be designed and get approved in consultation with IICT design team.	36
7	Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should be	37
	designed and get approved from IICT design team.	38
8	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.	39
		40
		41
		42
	VTS – Vendor to Specify	43

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE	DATE	TR. No.	1	2	3	4	5	6	7	8
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CLEARANCES

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DESIGN		PREPARED		VER/CHD		APPROVED	

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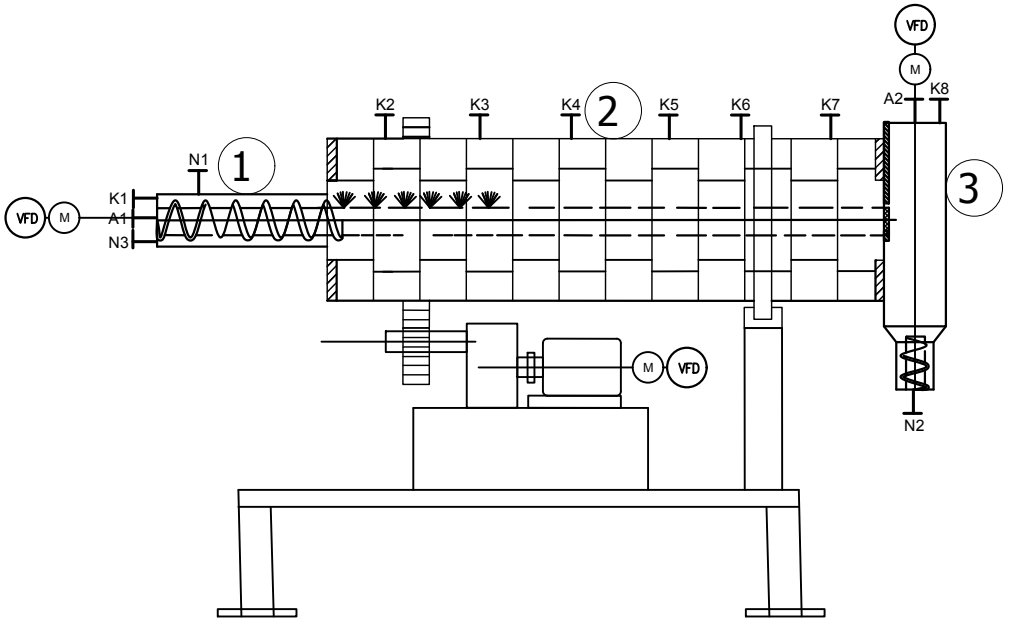
HYDERABAD – 500 007

ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : RK-101	Title : Rotary Furnace



NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R	
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.			
N1	Hopper Inlet	250	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		1
N2	Bottom Outlet	250	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		2
N3	Nitrogen Inlet	100	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		3
												4
K1	Flow Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		5
K2	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		6
K3	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		7
K4	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		8
K5	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		9
K6	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		10
K7	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		11
K8	Pressure Guage	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		12
												13
A1	Stirrer	VTS	-	-	-	-	-	-	-	-		14
A2	Stirrer	VTS	-	-	-	-	-	-	-	-		15
												16
												17
												18
												19

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE

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CLEARANCES

DESIGN	PREPARED	VER/CHD	APPROVED
MR	MR 06.09.19	TPK/MR/SAK	TPK/MR/SAK

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ROTARY KILN SPECIFICATION DATA SHEET

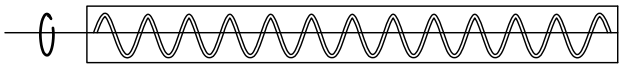
PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	– 1

1 | Unit No. : RK-101 | Title : Rotary Furnace

Rotary Furnace Consists of three parts:

(1) Screw Conveyor
(2) Rotary Furnace and
(3) Collection and Discharging Bins

(1) Screw Conveyor Part 1 Details:



Screw Conveyor Details

Screw Conveyor Details:

Design of screw conveyor vendor scope flow rate will be 25 kg/hr. Hollow shaft of the screw conveyor should be used for purging nitrogen gas of 100 mm diameter.

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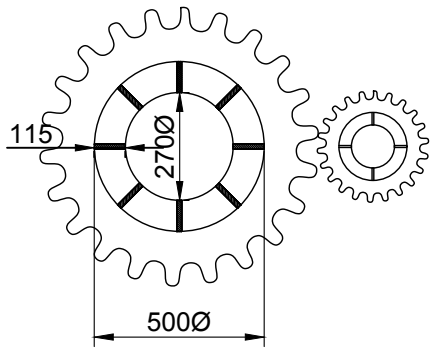
ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : RK-101	Title : Rotary Furnace

2 Rotary Furnace part 2 Details:



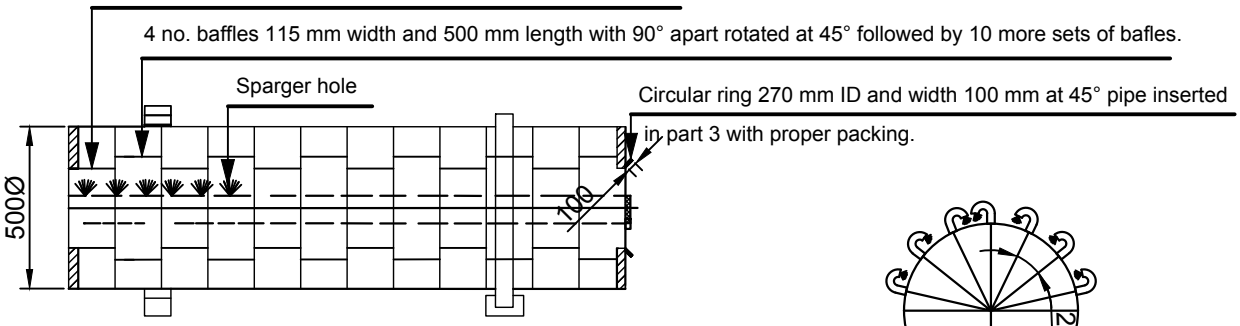
Inside Baffle Details:

- Four baffles 90° apart 500 mm length, next series of baffle should be offset by 45°. Similarly this series should be continued for 10 more sets of blaffles. Total 12 sets of baffles.

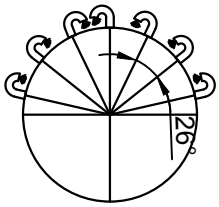
Heating System:

- Electrical heating to be provided to get temperature around 1100 °C suitable heating element to be designed by the vendor.

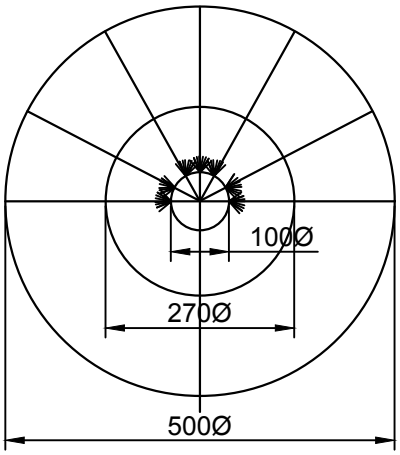
- Rotary furnace can be flexible to incline 1 to 3 ° with display unit.
- Rotary furnace can be run at 1 to 3 rpm with display indicator.



Rotary Furnace Details



Sparger Nozzle Configuration



Sparger Details

Sparger Details:

- 350 nos. of sparger holes with 5 mm dia. to be drilled on 100 mm NB with schedule 10s of inconel pipe as shown in the sketch along the length of 2 m and also one end of the pipe closed with standard pipe cap or flange that is supported by part 3.

- Vendor to consult for designing of sparger through screw conveyor with IICT design team and obtain approve before fabricating.

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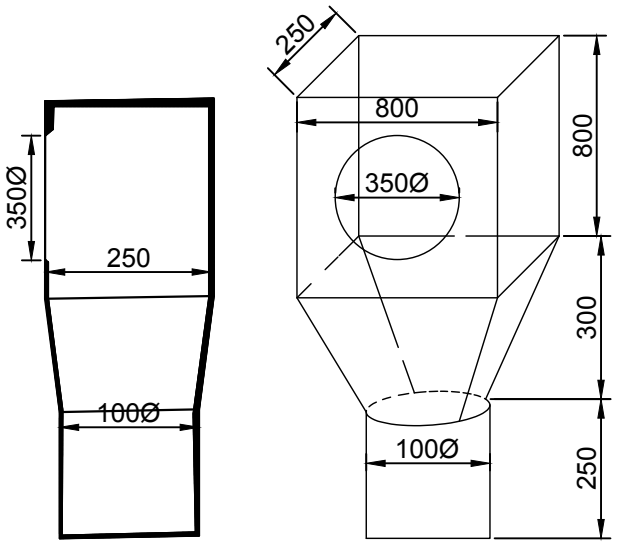
ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : RK-101	Title : Rotary Furnace

3 Collection and Discharging Bin part 3 Details:

- The bin shold be properly insulated to maintain ambient temperature.



Collection and Discharging Bin Details

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DESIGN		PREPARED		VER/CHD		APPROVED	

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HYDERABAD – 500 007

ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

GEN.

					R	
1	Unit No. : RK-102	Dwg. No.: –	Code : ASME Sec. VIII Div. I			1
2	Title : Rotary Cooler	Nos. required : One	Type : Horizontal, Cylindrical & Flanged			2
3	Service : To Carry out Cooling with nitrogen.					3
4	Nominal Capacity : lit. : -					4
						5

PROCESS DATA

1	OPERATION :		Batch / ~~Continuous~~	Batch Time : hrs :–	Working Hours/Day : –		6
			SHELL	JACKET	DOUBLE COIL		7
2	Material Handled :		CaC2 +CaCN2	Nitrogen			8
3	Operation :		Continuous	-			9
4	Feed Quantity Total :	kg/hr	33	-			10
5	Solid/Liquid/Gas:	kg/hr	24/-/9	-/-/-			11
6	Discharge Quantity Total :	kg/hr	32	-			12
7	Solid/Liquid/Gas:	kg/hr	2/-/5	-/-/-			13
8	Operating Temp.:Nor./Max.:	°C	1000	-/-			14
9	Operating Press.:Nor./Max.:	kg/sq.cm.–g/a	1.0	-			15
10	Density : at 30 °C	kg/cu.m.	1100	-			16
11	Viscosity : at 25 °C	cP	-	-			17
12	pH :		-	-			18
13	Pressure Drop :	kg/sq.cm.	-	-			19
14	Hazard Condition :		-				20
							21

INTERNALS

1	Agitator Type :		-		Shaft Dia : -		22
2		mm	Impeller Dia. : -		No. of Impellers : -		23
3		mm	Height from bottom: -		Speed : RPM : -		24
4	Coil : 2 Nos.	mm	Tube Dia. : -		BWG / Sch. : -		25
5		mm	Pitch : -		No. of Turns : -		26
6		mm	Coil Helix Dia. : -		Height from bottom : -		27
7	Baffles :	mm	Nos. : -		Type : -		28
8		mm	Height : -		Width : -		29
9		mm	Thk. : -				30
10	Feed Arrangement :		Type : -	Dia. : -	Length : -		31
			Spray Nozzle Dia. : -	Pitch : -	Others : -		32
11	Shaft :		Dia. : -	Length : -			33
12	Others :		-				34

CONSTRUCTION

			SHELL		JACKET		COIL		
1	Temperature :	°C	Dgn: 1100	Test: Amb.	Dgn: -	Test: -	Dgn:	Test:	36
2	Pressure :	kg/sq.cm.–g/a	Dgn: 1.1	Test: 1.2	Dgn: -	Test: -	Dgn:	Test:	37
3	Diameter :	mm	O.D.: –	I.D.: 500	O.D.: –	I.D.: -	O.D.:	H.Dia.:	38
4	Straight Length :	mm	3000		-		-		39
5	Thk. :	mm	VTS		-				40
6	Shell Ends :	Top	Type : Refer dwg.	Thk. : -	K.R. : -	SF : -			41
		Bottom	Type : Refer dwg.	Thk. : -	K.R. : -	SF : -			42
7	Jacket end :	Bottom	Type : -	Thk. : -	K.R. : -	SF : -			43

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CLEARANCES

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

CONSTRUCTION DATA

									R	
1	Unit No. : RK-102			Title : Rotary Cooler						1
										2
		SHELL		JACKET		COIL				3
8	Corrosion Allowance :	-		-						4
9	Supports :	Type: -	No.: -	Type: -	No.: -	Type:	No.:			5
10	Material Of Construction	Shell : INCONEL		Jacket : CS A 285 Gr. C						6
		Shell Ends : INCONEL		Jacket Ends : CS A 285 Gr. C						7
		Contact Parts: INCONEL		Supports : -						8
		Shaft : -		Feed Arrangement : INCONEL						9
		Agitator :-		External Bolting : CS to IS 1364						10
		Baffle :-		Internal Bolting : INCONEL						11
		Dip Pipe : -		Gaskets : -						12
		Shell Flanges :-		Sparger : -						13
		Insulation : ~~HCl / CCl / PPI~~ HCl		MOC : Ceramic Fiber Blanket						14
11	Heat Treatment :	Stress Relieving : -		Others : -						15
12	Tests :	Hydraulic / ~~Pneumatic~~ : Yes		Dye–Penetrant : -						16
		Radiograph : -		Others : -						17
13	Insulation :	Type : Ceramic Fiber Blanket		Thk. : Note 2						18
14	Painting / Finish :	All CS parts to be painted with two coats of red oxide primer								19
15	Weight : kg	Empty : VTS		Full of Water : VTS						20
16	Drive Details :	Motor : -								21
		Power Supply : -		H.P. : -						22
		R.P.M. : -								23
17	Shaft Seal :	-								24
18	Inspection By :	IICT / ~~CLIENT / Third Party~~ -		Others : -						25
										26
										27
										28
										29

NOTES

1. 3 Nos. of thermcouples with 1 m apart along the length of the rotary furnace heating element to be provided.
2. Vendor to design HCl thickness and specify the same.
3. The whole assembly including blender, bin, two rotary furnace and bin should be packed with ceramic fiber blanket to avoid contact of air (refer PFD or P&ID drawings).
4. Ensure that noise level should be minimum during the operation of furnace.
5. Rotary Cooler assembly should be properly earthed.
6. Supports for rotary cooler to be designed and get approved in consultation with IICT design team.
7. Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should be designed and get approved from IICT design team.
8. Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.

VTS – Vendor to Specify

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ROTARY KILN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

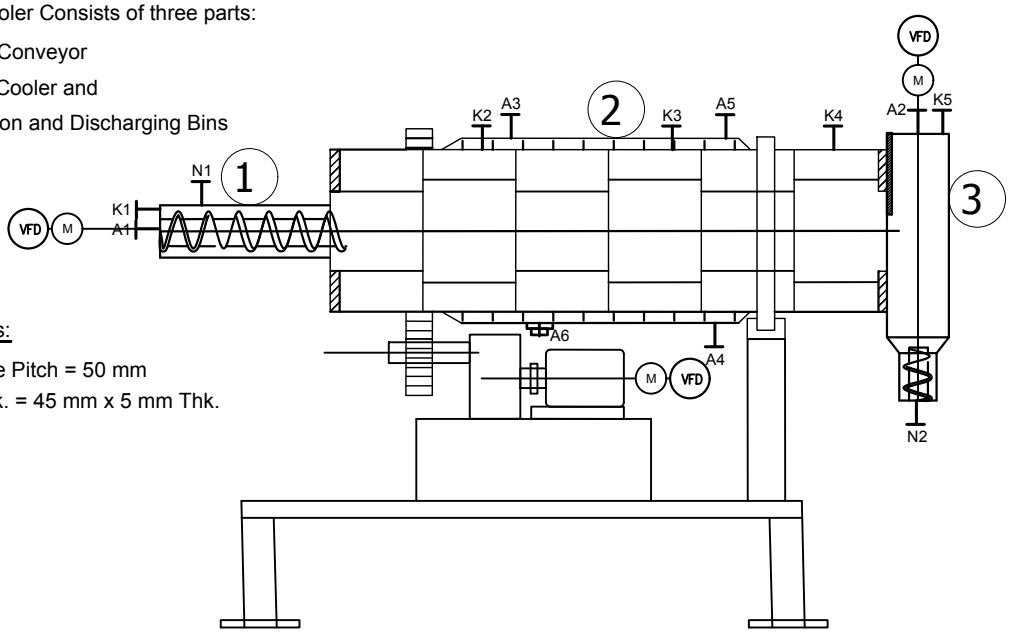
1 | Unit No. : RK-102 | Title : Rotary Cooler

Rotary Cooler Consists of three parts:

(1) Screw Conveyor

(2) Rotary Cooler and

(3) Collection and Discharging Bins



Spiral Details:

Spiral Baffle Pitch = 50 mm

Width x Thk. = 45 mm x 5 mm Thk.

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R	
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.			
N1	Hopper Inlet	250	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		1
N2	Bottom Outlet	250	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		2
												3
K1	Flow Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		4
K2	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		5
K3	Temperature Indicator	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		6
K4	Temperature Indicator	15			INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL			7
K5	Pressure Guage	15	-	-	INCONEL	ANSI, B16.5	#150	SO,RF	INCONEL	-		8
												9
A1	Stirrer	VTS	-	-	-	-	-	-	-	-		10
A2	Stirrer	VTS	-	-	-	-	-	-	-	-		11
												12
A3	Jacket Inlet	100	10	150	CS	ANSI, B16.5	#150	SO,RF	CS	-		13
A4	Jacket Outlet	100	40	100	CS	ANSI, B16.5	#150	SO,RF	CS	-		14
A5	Jacket Vent	15	40	100	CS	ANSI, B16.5	#150	SO,RF	CS	-		15
A6	Jacket Drain (Plug)	3/4"	-	-	CS	-	#3000	-	-	Plug		16
												17
												18
												19

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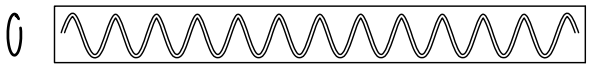
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

1	Unit No. : RK-102	Title : Rotary Cooler

(1) Screw Conveyor Part 1 Details:



Screw Conveyor Details

Screw Conveyor Details:

Design of screw conveyor vendor scope flow rate will be 20 kg/hr.
Hollow shaft of the screw conveyor should be used for purging nitrogen gas of 100 mm diameter.

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MR		MR	06.09.19	TPK/MR/SAK		TPK/MR/SAK	

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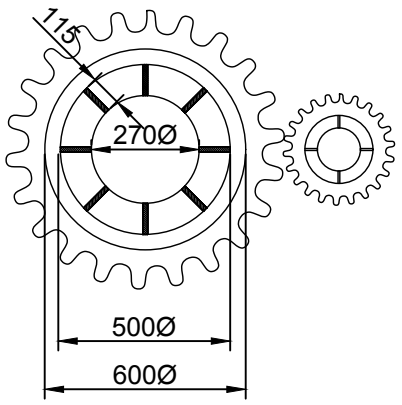
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : RK-102	Title : Rotary Cooler



2 Rotary Cooler part 2 Details:

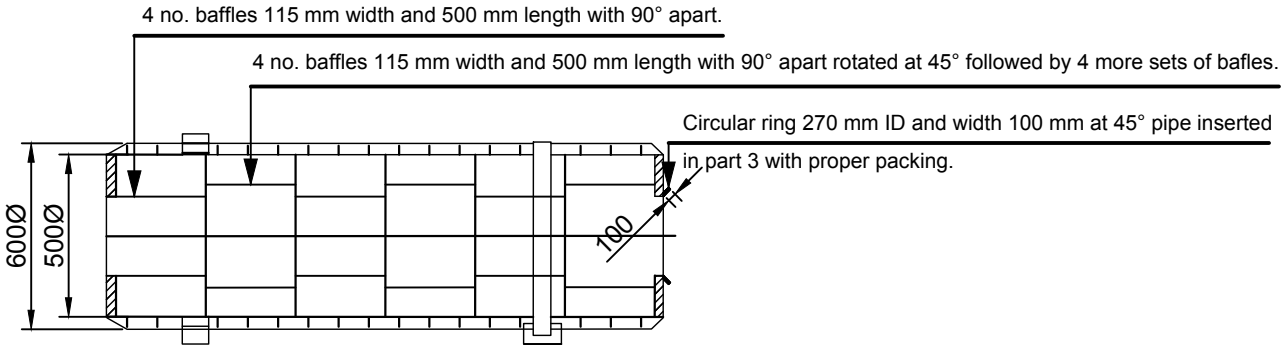
Inside Baffle Details:

- Four baffles 90° apart 500 mm length, next series of baffle should be offset by 45°. Similarly this series should be continued for 4 more sets of blaffles. Total 6 sets of baffles.

Cooling System:

Cooling will be carried out by using nitrogen in jacket from nitrogen cylinder and transfer to RK-101.

- Rotary Cooler can be flexible to incline 1 to 3 ° with display unit.
- Rotary Cooler can be run at 1 to 3 rpm with display indicator.



Rotary Cooler Details

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CLEARANCES

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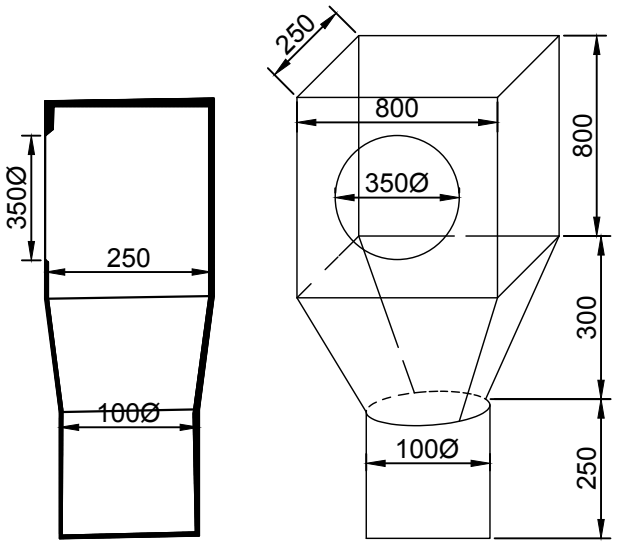
PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : RK-102	Title : Rotary Cooler

3 Collection and Discharging Bin part 3 Details:

- The bin shold be properly insulated to maintain ambient temperature.



Collection and Discharging Bin Details

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CLEARANCES

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DESIGN		PREPARED		VER/CHD		APPROVED	

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STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

								R	
GEN.	1	Unit No. : SB-101		Dwg. No.:		Code : ASME Sec. VIII Div. I			1
	2	Title : A Storage Bin		Nos. required : One		Type : Vertical, Cylindrical			2
	3	Service : To Store A							3
	4	Nominal Capacity : Kg/h. : 0.5 Kg/hr		Nominal Capacity : Kg. : 12 Kg (24 h Capacity)					4
									5
PROCESS DATA									6
	1	Fluid		A					7
	2	Operating Temperature :	°C	Normal : 30		Maximum : 40			8
	3	Operating Pressure :	kg/sq.cm.–~~g~~/a	Normal : Atm.		Maximum : 1.1			9
	4	Density : at 20°C	kg/L	3.18					10
	5	Hazard Condition :							11
									12
CONSTRUCTION DATA									13
	1	Temperature :	°C	Design : 50		Test : Amb.			14
	2	Pressure :	kg/sq.cm.–~~g~~/a	Design : 1.1		Test : Full with Water			15
	3	Corrosion Allowance		-					16
	4	Shell		~~OD~~/ID : 300 mm		St. Length : 150 mm			17
				Thk. : 6 MM					18
	5	Ends	Top	Type : Flat		Thk. : 10 MM			19
			Bottom	Type : Conical		Thk. : 6 MM			20
	6	Supports		Type : LUG		Nos. : 4 Nos.			21
	7	Material Of Construction		Shell : SA 240 SS 304		Heads : SA 240 SS 304			22
				Supports : CS to IS 226		Bolting : SS 304			23
				Gaskets : PTFE		Jacket / Internals : CS to IS 1364			24
				Shell Flanges : NA		Other wetted parts : SS 304			25
	8	Heat Treatment		Stress Relieving : SS 304		Others : SS 304			26
	9	Tests		Hydraulic / Pneumatic : Yes		Dye–Penet~~r~~ant :			27
				Radiographic : –		Others : –			28
	10	Insulation		Type : HCl / CCl / PPI -		Thk. : –			29
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer					30
	12	Weight :	kg	Empty : VTS		Full of water : VTS			31
	13	Inspection By		IICT / Client / Third Party		Others :			32
									33
NOTES	1	Nozzles marked "spare" shall be provided with matching blind flange, gaskets, bolts, nuts and washers.							34
	2	All other nozzles shall be provided with companion flange, gaskets, bolts, nuts and washers and shall be suitably							35
		blanked off before despatch.							36
	3	All nozzles – Top, Side and Bottom shall be 150 mm in length unless otherwise specified.							37
	4	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.							38
	5	Materials from Bin transferred through conveyors to Blenders Bl–101 under closed condition (ensure no contact of air).							39
	6	Supply of conveyors will be under the scope of vendor.							40
	7	Lifting lugs, Nameplate and Earthing boss shall be provided conforming to good engineering practices.							41
	8	MOC : SA312 TP 304							42
	9	Flanges 50 mm NB and below shall be of SA182 F 304 and above 50 mm NB shall be IS:2062 Gr.A plus							43
		3 mm thick SA240 Gr. 304 liner.							

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE	TR. No.	1	2	3	4	5	6	7	8
ISSUES / DISTRIBUTION / COPIES									

All dimensions in mm, unless specified — DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE			
—	–				DE-SP-172-06-11009	1 OF 2	0

STTANK101

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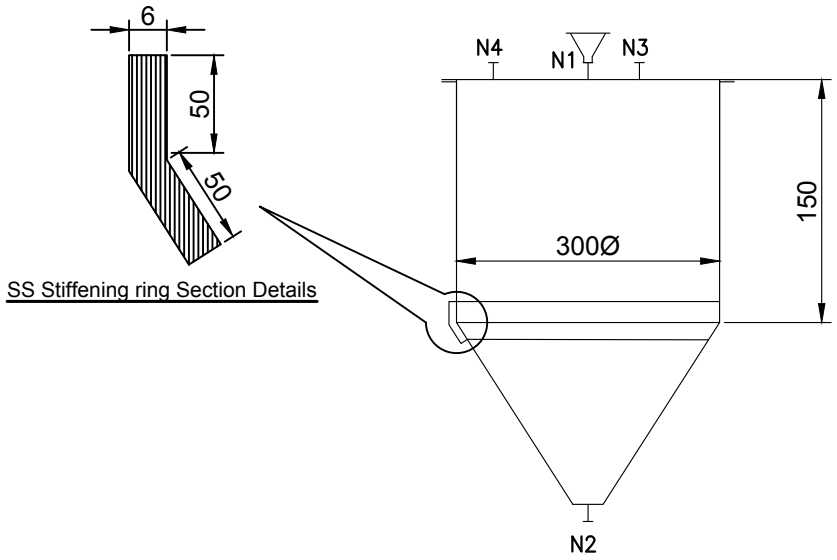
DISTRIBUTION : 1= D & E ; 2= PROCESS ENGR ; 3= INST ENGR ; 4= ELECT ENGR ; 5=CIVIL ENGR ; 6= CLIENT ; 7= CONSULTANT ; 8= CONTRACTOR ;

INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : SB-101	Title : A Storage Bin



Storage Blin Details:

60 deg. conical

MOC : SS 304

All Dimensions are in mm

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.		
N1	Inlet	100	10s	100	Note 8	ANSI B16.5	150#	SO/RF	Note 9	Hopper with top flapper	
N2, N4	Outlet	50	40s	150	Note 8	ANSI B16.5	150#	SO/RF	Note 9		
N3	Vent	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	

NOTES

11 Transfer of material from bin to blender (from top or bottom of the bin) to be finalised by vendor in consultation with IICT design team.

12 Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should be designed and get approved from IICT design team.

VTS – Vendor to Specify

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 — ISSUES / DISTRIBUTION / COPIES

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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

						R		
GEN.	1	Unit No. : SB-102		Dwg. No.:	Code : ASME Sec. VIII Div. I		1	
	2	Title : B Storage Bin		Nos. required : One	Type : Vertical, Cylindrical		2	
	3	Service : To Store B					3	
	4	Nominal Capacity : Kg/h. : 6 Kg/hr		Nominal Capacity : Kg. : 72 Kg (12 h Capacity)			4	
							5	
PROCESS DATA							6	
	1	Fluid		B			7	
	2	Operating Temperature :	°C	Normal : 30	Maximum : 40		8	
	3	Operating Pressure :	kg/sq.cm.–~~g~~/a	Normal : Atm.	Maximum : 1.1		9	
	4	Density : at 20°C	kg/L	1.1			10	
	5	Hazard Condition :					11	
							12	
CONSTRUCTION DATA							13	
	1	Temperature :	°C	Design : 50	Test : Amb.		14	
	2	Pressure :	kg/sq.cm.–~~g~~/a	Design : 1.1	Test : Full with Water		15	
	3	Corrosion Allowance		-			16	
	4	Shell		~~OD~~/ID : 500 mm	St. Length : 200 mm		17	
				Thk. : 6 MM			18	
	5	Ends	Top	Type : Flat	Thk. : 10 MM		19	
			Bottom	Type : Conical	Thk. : 6 MM		20	
	6	Supports		Type : LUG	Nos. : 4 Nos.		21	
	7	Material Of Construction		Shell : SA 240 SS 304	Heads : SA 240 SS 304		22	
				Supports : CS to IS 226	Bolting : SS 304		23	
				Gaskets : PTFE	Jacket / Internals : CS to IS 1364		24	
				Shell Flanges : NA	Other wetted parts : SS 304		25	
	8	Heat Treatment		Stress Relieving : SS 304	Others : SS 304		26	
	9	Tests		Hydraulic / Pneumatic : Yes	Dye–Penet~~r~~ant :		27	
				Radiographic : –	Others : –		28	
	10	Insulation		Type : HCl / CCl / PPI -	Thk. : –		29	
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer			30	
	12	Weight :	kg	Empty : VTS	Full of water : VTS		31	
	13	Inspection By		IICT / Client / Third Party	Others :		32	
							33	
NOTES	1	Nozzles marked "spare" shall be provided with matching blind flange, gaskets, bolts, nuts and washers.					34	
	2	All other nozzles shall be provided with companion flange, gaskets, bolts, nuts and washers and shall be suitably					35	
		blanked off before despatch.					36	
	3	All nozzles – Top, Side and Bottom shall be 150 mm in length unless otherwise specified.					37	
	4	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.					38	
	5	Materials from Bin transferred through conveyors to Blenders Bl–101 under closed condition (ensure no contact of air).					39	
	6	Supply of conveyors will be under the scope of vendor.					40	
	7	Lifting lugs, Nameplate and Earthing boss shall be provided conforming to good engineering practices.					41	
	8	MOC : SA312 TP 304					42	
	9	Flanges 50 mm NB and below shall be of SA182 F 304 and above 50 mm NB shall be IS:2062 Gr.A plus					43	
		3 mm thick SA240 Gr. 304 liner.						

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE	TR. No.	1	2	3	4	5	6	7	8
ISSUES / DISTRIBUTION / COPIES									

All dimensions in mm, unless specified — DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
DESIGN		PREPARED		VER/CHD		APPROVED	

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		CD/FP	FOLDER	FILE			
—	–				DE-SP-172-06-11009	1 OF 2	0

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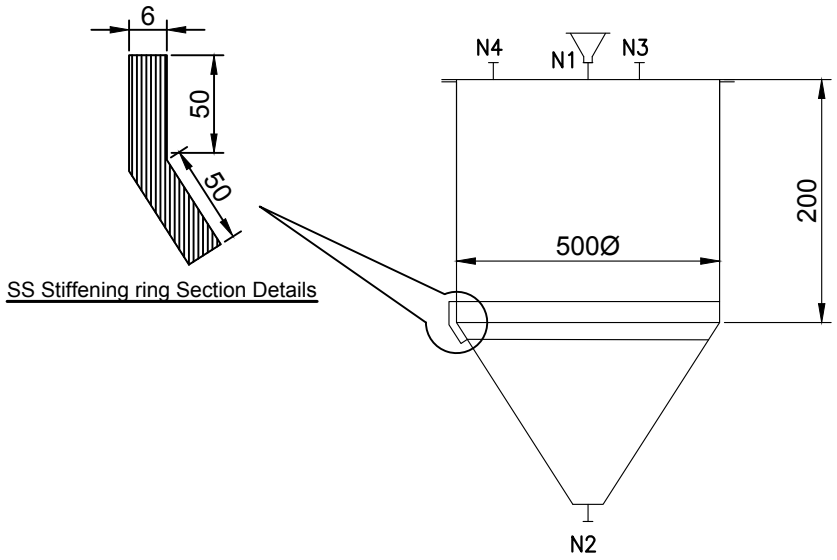
INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : SB-102	Title : B Storage Bin



Storage Blin Details:

60 deg. conical

MOC : SS 304

All Dimensions are in mm

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.		
N1	Inlet	250	10s	100	Note 8	ANSI B16.5	150#	SO/RF	Note 9	Hopper with top flapper	
N2, N4	Outlet	250	10s	150	Note 8	ANSI B16.5	150#	SO/RF	Note 9		
N3	Vent	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	

NOTES

11 Transfer of material from bin to blender (from top or bottom of the bin) to be finalised by vendor in consultation with IICT design team.

12 Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should be designed and get approved from IICT design team.

VTS – Vendor to Specify

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 — ISSUES / DISTRIBUTION / COPIES

All dimensions in mm, unless specified — DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

DESIGN		PREPARED		VER/CHD		APPROVED	
MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE	DE-SP-172-06-11009	2 OF 2	0
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STTANK1012

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

							R	
GEN.	1	Unit No. : SB-103		Dwg. No.:		Code : ASME Sec. VIII Div. I		1
	2	Title : C Storage Bin		Nos. required : One		Type : Vertical, Cylindrical		2
	3	Service : To Store C						3
	4	Nominal Capacity : Kg/h. : 18 Kg/hr		Nominal Capacity : Kg. : 220 Kg (12 h Capacity)				4
								5
PROCESS DATA								6
	1	Fluid		C				7
	2	Operating Temperature :	°C	Normal : 30		Maximum : 40		8
	3	Operating Pressure :	kg/sq.cm.–~~g~~/a	Normal : Atm.		Maximum : 1.1		9
	4	Density : at 20°C	kg/L	2.22				10
	5	Hazard Condition :						11
								12
CONSTRUCTION DATA								13
	1	Temperature :	°C	Design : 50		Test : Amb.		14
	2	Pressure :	kg/sq.cm.–~~g~~/a	Design : 1.1		Test : Full with Water		15
	3	Corrosion Allowance		-				16
	4	Shell		~~OD~~/ID : 700 mm		St. Length : 420 mm		17
				Thk. : 6 MM				18
	5	Ends	Top	Type : Flat		Thk. : 10 MM		19
			Bottom	Type : Conical		Thk. : 6 MM		20
	6	Supports		Type : LUG		Nos. : 4 Nos.		21
	7	Material Of Construction		Shell : SA 240 SS 304		Heads : SA 240 SS 304		22
				Supports : CS to IS 226		Bolting : SS 304		23
				Gaskets : PTFE		Jacket / Internals : CS to IS 1364		24
				Shell Flanges : NA		Other wetted parts : SS 304		25
	8	Heat Treatment		Stress Relieving : SS 304		Others : SS 304		26
	9	Tests		Hydraulic / Pneumatic : Yes		Dye–Penet~~r~~ant :		27
				Radiographic : –		Others : –		28
	10	Insulation		Type : HCl / CCl / PPI -		Thk. : –		29
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer				30
	12	Weight :	kg	Empty : VTS		Full of water : VTS		31
	13	Inspection By		IICT / Client / Third Party		Others :		32
								33
NOTES	1	Nozzles marked "spare" shall be provided with matching blind flange, gaskets, bolts, nuts and washers.						34
	2	All other nozzles shall be provided with companion flange, gaskets, bolts, nuts and washers and shall be suitably						35
		blanked off before despatch.						36
	3	All nozzles – Top, Side and Bottom shall be 150 mm in length unless otherwise specified.						37
	4	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.						38
	5	Materials from Bin transferred through conveyors to Blenders Bl–101 under closed condition (ensure no contact of air).						39
	6	Supply of conveyors will be under the scope of vendor.						40
	7	Lifting lugs, Nameplate and Earthing boss shall be provided conforming to good engineering practices.						41
	8	MOC : SA312 TP 304						42
	9	Flanges 50 mm NB and below shall be of SA182 F 304 and above 50 mm NB shall be IS:2062 Gr.A plus						43
		3 mm thick SA240 Gr. 304 liner.						

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE	TR. No.	1	2	3	4	5	6	7	8
ISSUES / DISTRIBUTION / COPIES									

All dimensions in mm, unless specified — DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE			
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STTANK101

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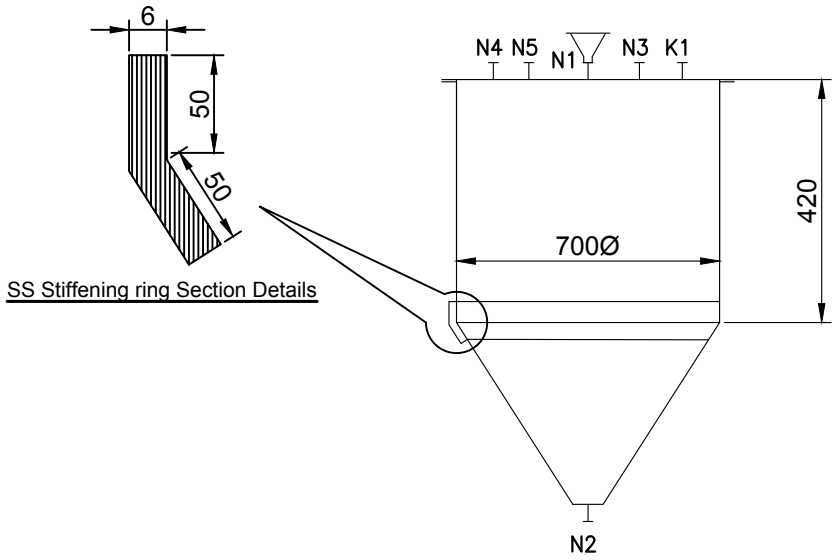
INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : SB-103	Title : C Storage Bin



Storage Blin Details:

60 deg. conical

MOC : SS 304

All Dimensions are in mm

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.		
N1	Inlet	250	10s	100	Note 8	ANSI B16.5	150#	SO/RF	Note 9	Hopper with top flapper	
N2, N4	Outlet	250	10s	150	Note 8	ANSI B16.5	150#	SO/RF	Note 9		
N3	Vent	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
N5	Nitrogen Inlet	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
K1	Pressure Gauge	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	

NOTES

11 Transfer of material from bin to blender (from top or bottom of the bin) to be finalised by vendor in consultation with IICT design team.

12 Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should be designed and get approved from IICT design team.

VTS – Vendor to Specify

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE	DE-SP-172-06-11009	2 OF 2	0
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STTANK1012

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

						R		
GEN.	1	Unit No. : SB-104		Dwg. No.:	Code : ASME Sec. VIII Div. I		1	
	2	Title : Feed Storage Bin		Nos. required : One	Type : Vertical, Cylindrical		2	
	3	Service : To Store C					3	
	4	Nominal Capacity : Kg/h. : 25 Kg/hr		Nominal Capacity : Kg. : 300 Kg (12 h Capacity)			4	
							5	
							6	
PROCESS DATA	1	Fluid		C			7	
	2	Operating Temperature :	°C	Normal : 30	Maximum : 40		8	
	3	Operating Pressure :	kg/sq.cm.–~~g~~/a	Normal : Atm.	Maximum : 1.1		9	
	4	Density : at 20°C	kg/L	2.02			10	
	5	Hazard Condition :					11	
							12	
							13	
CONSTRUCTION DATA	1	Temperature :	°C	Design : 50	Test : Amb.		14	
	2	Pressure :	kg/sq.cm.–~~g~~/a	Design : 1.1	Test : Full with Water		15	
	3	Corrosion Allowance		-			16	
	4	Shell		~~OD~~/ID : 700 mm	St. Length : 420 mm		17	
				Thk. : 6 MM			18	
	5	Ends	Top	Type : Flat	Thk. : 10 MM		19	
			Bottom	Type : Conical	Thk. : 6 MM		20	
	6	Supports		Type : LUG	Nos. : 4 Nos.		21	
	7	Material Of Construction		Shell : SA 240 SS 304	Heads : SA 240 SS 304		22	
				Supports : CS to IS 226	Bolting : SS 304		23	
				Gaskets : PTFE	Jacket / Internals : CS to IS 1364		24	
				Shell Flanges : NA	Other wetted parts : SS 304		25	
	8	Heat Treatment		Stress Relieving : SS 304	Others : SS 304		26	
	9	Tests		Hydraulic / Pneumatic : Yes	Dye–Penet~~r~~ant :		27	
				Radiographic : –	Others : –		28	
	10	Insulation		Type : HCl / CCl / PPI -	Thk. : –		29	
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer			30	
	12	Weight :	kg	Empty : VTS	Full of water : VTS		31	
	13	Inspection By		IICT / Client / Third Party	Others :		32	
							33	
NOTES	1	Nozzles marked "spare" shall be provided with matching blind flange, gaskets, bolts, nuts and washers.					34	
	2	All other nozzles shall be provided with companion flange, gaskets, bolts, nuts and washers and shall be suitably					35	
		blanked off before despatch.					36	
	3	All nozzles – Top, Side and Bottom shall be 150 mm in length unless otherwise specified.					37	
	4	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.					38	
	5	Materials from Bin transferred through screw conveyors to Rotary Kiln RK–101 under closed condition (ensure no contact of air).					39	
	6	Supply of conveyors will be under the scope of vendor.					40	
	7	Lifting lugs, Nameplate and Earthing boss shall be provided conforming to good engineering practices.					41	
	8	MOC : SA312 TP 304					42	
	9	Flanges 50 mm NB and below shall be of SA182 F 304 and above 50 mm NB shall be IS:2062 Gr.A plus					43	
		3 mm thick SA240 Gr. 304 liner.						

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE	TR. No.	1	2	3	4	5	6	7	8
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All dimensions in mm, unless specified — DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

DESIGN		PREPARED		VER/CHD		APPROVED	
MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015

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		CD/FP	FOLDER	FILE			
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STTANK101

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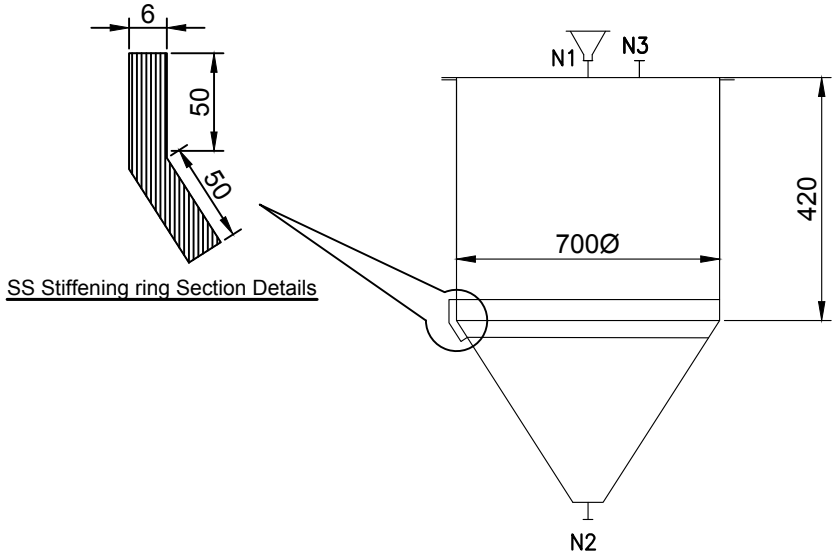
INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : SB-104	Title : Feed Storage Bin



Storage Blin Details:

60 deg. conical

MOC : SS 304

All Dimensions are in mm

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.		
N1	Inlet	250	10s	100	Note 8	ANSI B16.5	150#	SO/RF	Note 9	Hopper with top flapper	
N2	Outlet	250	10s	150	Note 8	ANSI B16.5	150#	SO/RF	Note 9		
N3	Vent	25	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	

NOTES

11 Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should be designed and get approved from IICT design team.

12 VTS – Vendor to Specify

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 — ISSUES / DISTRIBUTION / COPIES

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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

DESIGN		PREPARED		VER/CHD		APPROVED	
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		CD/FP	FOLDER	FILE	DE-SP-172-06-11009	2 OF 2	0
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STTANK1012

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

								R	
GEN.	1	Unit No. : SB-105		Dwg. No.:		Code : ASME Sec. VIII Div. I			1
	2	Title : B Collection Bin		Nos. required : One		Type : Vertical, Cylindrical			2
	3	Service : To Collect B Product							3
	4	Nominal Capacity : Kg/h. :25 Kg/hr		Nominal Capacity : Kg. : 350 Kg (12 h Capacity)					4
									5
PROCESS DATA									6
	1	Fluid		B					7
	2	Operating Temperature :	°C	Normal : 500		Maximum : 550			8
	3	Operating Pressure :	kg/sq.cm.–~~g~~/a	Normal : Atm.		Maximum : 1.1			9
	4	Density : at 20°C	kg/L	1.1					10
	5	Hazard Condition :							11
									12
CONSTRUCTION DATA									13
	1	Temperature :	°C	Design : 600		Test : Amb.			14
	2	Pressure :	kg/sq.cm.–~~g~~/a	Design : 1.1		Test : Full with Water			15
	3	Corrosion Allowance		-					16
	4	Shell		~~OD~~/ID : 800 mm		St. Length : 530 mm			17
				Thk. : 6 MM					18
	5	Ends	Top	Type : Flat		Thk. : 10 MM			19
			Bottom	Type : Conical		Thk. : 6 MM			20
	6	Supports		Type : LUG		Nos. : 4 Nos.			21
	7	Material Of Construction		Shell : SA 240 SS 304		Heads : SA 240 SS 304			22
				Supports : CS to IS 226		Bolting : SS 304			23
				Gaskets : PTFE		Jacket / Internals : CS to IS 1364			24
				Shell Flanges : NA		Other wetted parts : SS 304			25
	8	Heat Treatment		Stress Relieving : SS 304		Others : SS 304			26
	9	Tests		Hydraulic / Pneumatic : Yes		Dye–Penetrant :			27
				Radiographic : –		Others : –			28
	10	Insulation		Type : HCl / CCl / PPI -		Thk. : –			29
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer					30
	12	Weight :	kg	Empty : VTS		Full of water : VTS			31
	13	Inspection By		IICT / Client / Third Party		Others :			32
									33
NOTES	1	Nozzles marked "spare" shall be provided with matching blind flange, gaskets, bolts, nuts and washers.							34
	2	All other nozzles shall be provided with companion flange, gaskets, bolts, nuts and washers and shall be suitably							35
		blanked off before despatch.							36
	3	All nozzles – Top, Side and Bottom shall be 150 mm in length unless otherwise specified.							37
	4	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.							38
	5	Materials from Bin transferred through conveyors to Blenders Bl–101 under closed condition (ensure no contact of air).							39
	6	Supply of conveyors will be under the scope of vendor.							40
	7	Lifting lugs, Nameplate and Earthing boss shall be provided conforming to good engineering practices.							41
	8	MOC : SA312 TP 304							42
	9	Flanges 50 mm NB and below shall be of SA182 F 304 and above 50 mm NB shall be IS:2062 Gr.A plus							43
		3 mm thick SA240 Gr. 304 liner.							

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE	TR. No.	1	2	3	4	5	6	7	8
ISSUES / DISTRIBUTION / COPIES									

All dimensions in mm, unless specified | DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
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—	–				DE-SP-172-06-11009	1 OF 2	0

STTANK101

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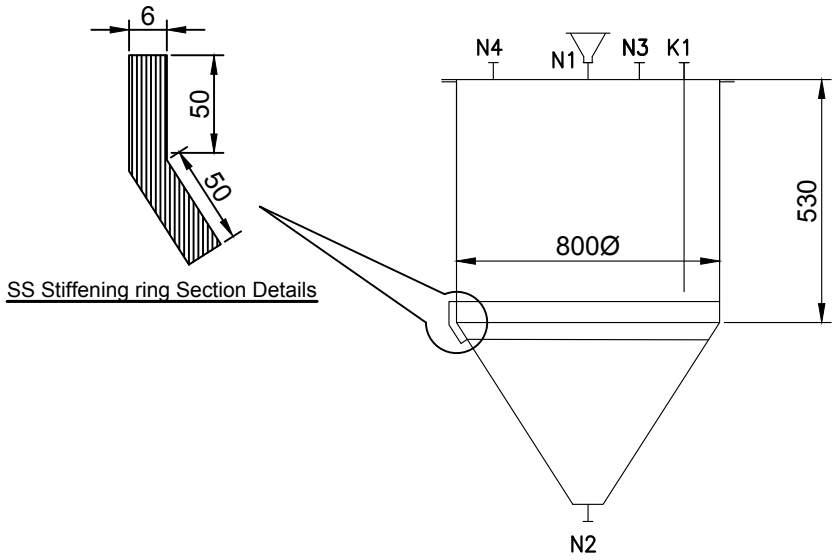
HYDERABAD – 500 007

STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–
1 Unit No. : SB-105	Title : B Collection Bin



Storage Blin Details:

60 deg. conical

MOC : SS 304

All Dimensions are in mm

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.		
N1	Inlet	250	10s	100	Note 8	ANSI B16.5	150#	SO/RF	Note 9	Hopper with top flapper	
N2, N4	Outlet	250	10s	150	Note 8	ANSI B16.5	150#	SO/RF	Note 9		
N3	Vent to Blowdown Tank	50	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	–	
K1	Temperature Indicator	15	40s	150	SS 304	ANSI B16.5	150#	SO/RF	SS 304	Dipleg	

NOTES

11 Screw conveyor outlet nozzle of Bins,, Blender, Rotary furnce (RK–101), Rotary Cooler (RK–102) and Stogage Bin (SB–105) should be designed and get approved from IICT design team.

12 Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement.

VTS – Vendor to Specify

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 — ISSUES / DISTRIBUTION / COPIES

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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

DESIGN		PREPARED		VER/CHD		APPROVED	
MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE	DE-SP-172-06-11009	2 OF 2	0
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STTANK1012

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HYDERABAD – 500 007

STORAGE SPECIFICATION DATA SHEET

Page – OF –

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

								R	
GEN.	1	Unit No. : ST-101		Dwg. No.:		Code : ASME Sec. VIII Div. I			1
	2	Title : `Blowdown Tank		Nos. required : One		Type : Vertical, Cylindrical			2
	3	Service : To vent out N2 gas							3
	4	Nominal Capacity : lit. : 250 lit.							4
									5
PROCESS DATA									6
	1	Fluid		Nitrogen gas with fine particles					7
	2	Operating Temperature :	°C	Normal : 400		Maximum : 500			8
	3	Operating Pressure :	kg/sq.cm.–g/~~a~~	Normal : Atm.		Maximum : 1.1			9
	4	Density : at 30 °C	kg/cu.m.	1048					10
	5	Hazard Condition : –		-					11
									12
CONSTRUCTION DATA									13
	1	Temperature :	°C	Design : 600		Test : Amb.			14
	2	Pressure :	kg/sq.cm.–g/~~a~~	Design : 1.2		Test : Full with Water			15
	3	Corrosion Allowance							16
	4	Shell		~~OD~~/ID : 500 mm		St. Length : 1200 mm			17
				Thk. : 6 MM					18
	5	Ends	Top	Type : Dish, Torispherical		KR : 10%	Thk. : 6 MM	SF : 50 mm	19
			Bottom	Type : Dish, Torispherical		KR : 10%	Thk. : 6 MM	SF : 50 mm	20
	6	Supports		Type : LEG		Nos. : 4 Nos.			21
	7	Material Of Construction		Shell : SA 240 SS 304		Heads : SA 240 SS 304			22
				Supports : CS to IS 226		Internal Bolting : SS 304			23
				Gaskets : PTFE		External Bolting : CS to IS 1364			24
				Shell Flanges : NA		~~Jacket~~ / Internals : SS 304			25
				Nozzles : SS 304		Other wetted parts : SS 304			26
				Flanges : -		Others : –			27
	8	Heat Treatment		Stress Relieving : –		Others : –			28
	9	Tests		Hydraulic / ~~Pneumatic~~ : Yes		Dye–Penetrant : –			29
				Radiographic : –		Others : –			30
	10	Insulation		Type : HCl / CCl / PPI –		Thk. : –			31
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer					32
	12	Weight :	kg	Empty : VTS		Full of water : VTS			33
	13	Inspection By		IICT / Client / Third Party –		Others : -			34
NOTES	1	All dimensions are in mm							35
	2	Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch.							36
	3	All nozzle – top, side and bottom shall be 150 mm in length unless otherwise specified.							37
	4	Nozzle orientation and support height shall be provided by vendor							38
	5	Vendor shall provide detailed drawing for approval from IICT and shall gaurantee the mechanical performance.							39
	6	Suitable stiffeners to be provided for all the nozzles.							40
	7	Dimensions are based on IS 4179. Vendor to specify the equivalent.							41
	8	Lifting lugs, earthing boss(SS 304) and name plate are to be provided.							42
	9	Dished ends shall conform to IS 4179.							43

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE

DATE	TR. No.	1	2	3	4	5	6	7	8

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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	–	MR	06.09.19	AK/MR/SAK	–	TPK/MR/SAK	
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG/~~DOC/SK~~No~~.	SHEET	REV
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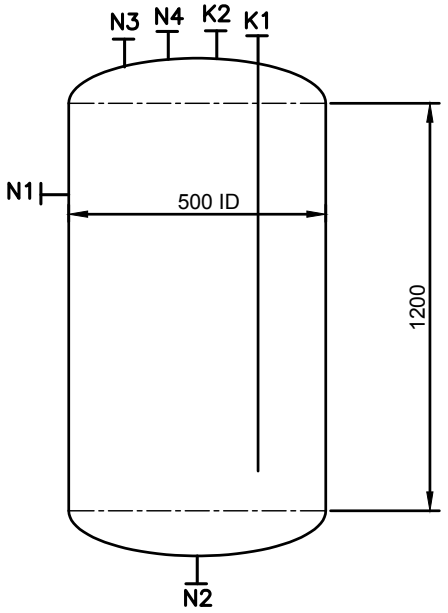
INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007

STORAGE SPECIFICATION DATA SHEET

Page – OF –

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

1 | Unit No. : ST-101 | Title : `Blowdown Tank



NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R	
		SIZE NB(mm)	Sch.	Length mm	M.O.C.	STANDARD	RATING	TYPE	M.O.C.			
N1	Inlet from SB-105	50	40s	150	SS 304	ANSI,B16.5	#150	SO,RF	SS 304	Tangential entry		1
N2	Outlet	50	40s	150	SS 304	ANSI,B16.5	#150	SO,RF	SS 304	-		2
N3	Vent	50	40s	150	SS 304	ANSI,B16.5	#150	SO,RF	SS 304	-		3
N4	Spare	50	40s	150	SS 304	ANSI,B16.5	#150	SO,RF	SS 304	-		4
												5
K1	Temperature Indicator	15	40s	150	SS 304	ANSI,B16.5	#150	SO,RF	SS 304	Dipleg		6
K2	Pressure Gauge	15	40s	150	SS 304	ANSI,B16.5	#150	SO,RF	SS 304	-		7
												8
												9
												10
												11
												12

NOTES

10 Dip leg to be provided with 3ø antisiphon holes and suitable supporting arrangement. 13

11 14

12

VTS – Vendor to Specify

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE

DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 — ISSUES / DISTRIBUTION / COPIES

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MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR		MR	06.09.19	AK/MR/SAK	–	TPK/MR/SAK	
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE	DE-XXX-XXX-ED-01-01 00 XXX	2 OF 2	–

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HYDERABAD – 500 007

TRAY SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

								R	
GEN.	1	Unit No. : Tray-101		Dwg. No.:		Code : ASME Sec. VIII Div. I			1
	2	Title :B Collection Tray		Nos. required : FIVE		Type : Vertical, Cylindrical			2
	3	Service : To Collect B Product							3
	4	Nominal Capacity : Kg/h. :160 Kg							4
									5
									6
PROCESS DATA	1	Fluid		B					7
	2	Operating Temperature :	°C	Normal : 500		Maximum : 550			8
	3	Operating Pressure :	kg/sq.cm.–~~g~~/a	Normal : Atm.		Maximum : 1.1			9
	4	Density : at 20°C	kg/L	1.1					10
	5	Hazard Condition :							11
									12
									13
CONSTRUCTION DATA	1	Temperature :	°C	Design : 600		Test : Amb.			14
	2	Pressure :	kg/sq.cm.–~~g~~/a	Design : 1.1		Test : Full with Water			15
	3	Corrosion Allowance		-					16
	4	Shell		~~OD~~/ID : -		St. Length : -			17
				Thk. : -					18
	5	Ends	Top	Type : -		Thk. : -			19
			Bottom	Type : -		Thk. : -			20
	6	Supports		Type : -		Nos. : -			21
	7	Material Of Construction		Shell : SA 240 SS 304		Heads : SA 240 SS 304			22
				Supports : CS to IS 226		Bolting : SS 304			23
				Gaskets : PTFE		Jacket / Internals : CS to IS 1364			24
				Shell Flanges : NA		Other wetted parts : SS 304			25
	8	Heat Treatment		Stress Relieving : SS 316		Others : SS 304			26
	9	Tests		Hydraulic / Pneumatic : Yes		Dye-Penetrant :			27
				Radiographic : –		Others : –			28
	10	Insulation		Type : HCl / CCl / PPI -		Thk. : –			29
	11	Painting / Finish		All CS parts to be painted with two coats of red oxide primer					30
	12	Weight :	kg	Empty : -		Full of water : -			31
	13	Inspection By		IICT / Client / Third Party		Others :			32
									33
NOTES	1	Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment.							34
	2	160 kg Capacity Tray of 5 Nos. with Wheels and handles to be supply by the vendor.							35
									36
	3								37
	4								38
	5								39
	6								40
	7								41
	8								42
	9								43
		VTS – Vendor to Specify							

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE	TR. No.	1	2	3	4	5	6	7	8
ISSUES / DISTRIBUTION / COPIES									

All dimensions in mm, unless specified — DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE			
—	–				DE-SP-172-06-11009	1 OF 2	0

STTANK101

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
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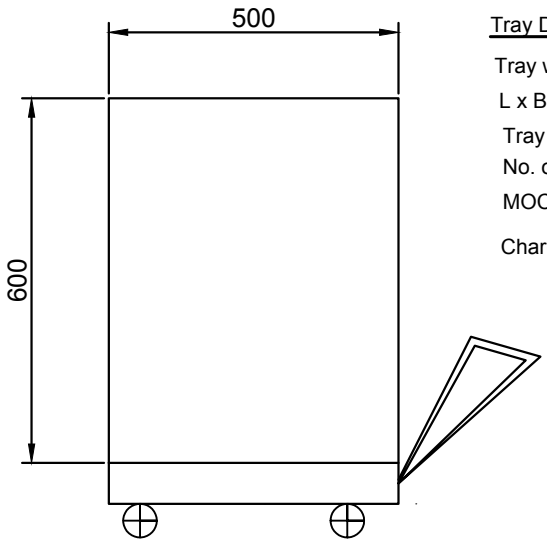
TRAY SPECIFICATION DATA SHEET

PROJECT : CONTINUOUS ROTARY KILN REACTOR SYSTEM OF 25 kg/hr FOR GAS-SOLID OPERATION	PROJECT CODE : -
CLIENT : -	CAPACITY : 0.125 TPD
LOCATION : -	–

1 | Unit No. : Tray-101 | Title : B Collection Tray



Tray Details:

Tray with wheels and handles as per the givien dimensions.

L x B x H = 500 mm x 500 mm x 600 mm

Tray Thickness : 5 MM

No. of trays : 5 Nos.

MOC : SS 304

Chargeble battery wih load cell and indicator for each tray.

All Dimensions are in mm

NOZZLE SCHEDULE

NOZZLE MARK	SERVICE	NOZZLE DETAILS				FLANGE DETAILS				REMARKS	R
		SIZE NB(mm)	Sch.	Length	M.O.C.	STANDARD	RATING	TYPE	M.O.C.		
											10
											11

NOTES

11

12

13

S.No.	STATUS	DESCRIPTION	BY	CHD	APD	DATE
1	E	For Engineering				
0	C	Preliminary	–	–	–	–

DATE	TR. No.	1	2	3	4	5	6	7	8
ISSUES / DISTRIBUTION / COPIES									

All dimensions in mm, unless specified | DO NOT SCALE

MECH ENGR	PRCS ENGR	INST ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT	CONTRACTOR

CLEARANCES

MR	04.08.2015	SAK/TPK	04.08.2015			MR/TPK	04.08.2015
DESIGN		PREPARED		VER/CHD		APPROVED	

SCALE	REFERENCES	SOFT COPY REF			~~DWG~~/DOC/~~SK~~ No.	SHEET	REV
		CD/FP	FOLDER	FILE	DE-SP-172-06-11009	2 OF 2	0

STTANK1012

ISSUE STATUS KEY : P= PRELIMINARY ; R= REVISION ; I= INFORMATION ; C= COMMENTS ; CH= CHECKING ; A= APPROVAL ; E= ENGINEERING ;
DISTRIBUTION : 1= D & E ; 2= PROCESS ENGR ; 3= INST ENGR ; 4= ELECT ENGR ; 5=CIVIL ENGR ; 6= CLIENT ; 7= CONSULTANT ; 8= CONTRACTOR ;

Project:	Instrument Index	Date:	
Client:		Doc. No.:	
Location:		Revision No.: Rev. 0	
Unit: Section-100	Prepared By: Checked By: Approved By:		

S.No	Tag No.	Equipment Name	Service	Location	Range	Units	Description	Type	Remarks
1	TE-101	PH-101	PH-101 Temp	PH-101	0-1000	deg. C	Temp. elemnt	RTD	
	TI-101	PH-101	Temp. Indicator	PH-101		deg. C	Indicator	Ctrl. Panel	
2	TE-102	PH-101	From RK-102 To RK-101 Inlet Line Temp	PH-101 Inlet	0-1000	deg. C	Temp. elemnt	RTD	
	TI-102	PH-101	Temp. Indicator	PH-101		deg. C	Indicator	Ctrl. Panel	
3	TE-103	RK-101	RK-101 Temp.	RK-101	0-1000	deg. C	Temp. element	RTD	
	TI-103	RK-101	Temp. Indicator	RK-101		deg. C	Indicator	Ctrl. Panel	
4	TE-104	RK-101	RK-101 Temp.	RK-101	0-1000	deg. C	Temp. element	RTD	
	TI-104	RK-101	Temp. Indicator	RK-101		deg. C	Indicator	Ctrl. Panel	
5	TE-105	RK-101	RK-101 Temp.	RK-101	0-1000	deg. C	Temp. element	RTD	
	TI-105	RK-101	Temp. Indicator	RK-101		deg. C	Indicator	Ctrl. Panel	
6	TE-106	RK-101	RK-101 Temp.	RK-101	0-1000	deg. C	Temp. element	RTD	
	TI-106	RK-101	Temp. Indicator	RK-101		deg. C	Indicator	Ctrl. Panel	
7	TE-107	RK-101	RK-101 Temp.	RK-101	0-1000	deg. C	Temp. element	RTD	
	TI-107	RK-101	Temp. Indicator	RK-101		deg. C	Indicator	Ctrl. Panel	
8	TE-108	RK-101	RK-101 Temp.	RK-101	0-1000	deg. C	Temp. element	RTD	
	TI-108	RK-101	Temp. Indicator	RK-101		deg. C	Indicator	Ctrl. Panel	
9	TE-109	RK-102	RK-102 Temp.	RK-102	0-1000	deg. C	Temp. element	RTD	
	TI-109	RK-102	Temp. Indicator	RK-102		deg. C	Indicator	Ctrl. Panel	
10	TE-110	RK-102	RK-102 Temp.	RK-102	0-1000	deg. C	Temp. element	RTD	
	TI-110	RK-102	Temp. Indicator	RK-102		deg. C	Indicator	Ctrl. Panel	
11	TE-111	RK-102	RK-102 Temp.	RK-102	0-1000	deg. C	Temp. element	RTD	
	TI-111	RK-102	Temp. Indicator	RK-102		deg. C	Indicator	Ctrl. Panel	
12	TE-112	RK-102	Cy-101 to RK-102 Jacket	N2 Line Temp	0-1000	deg. C	Temp. element	RTD	
	TI-112	RK-102	Temp. Indicator	R-201		deg. C	Indicator	Ctrl. Panel	

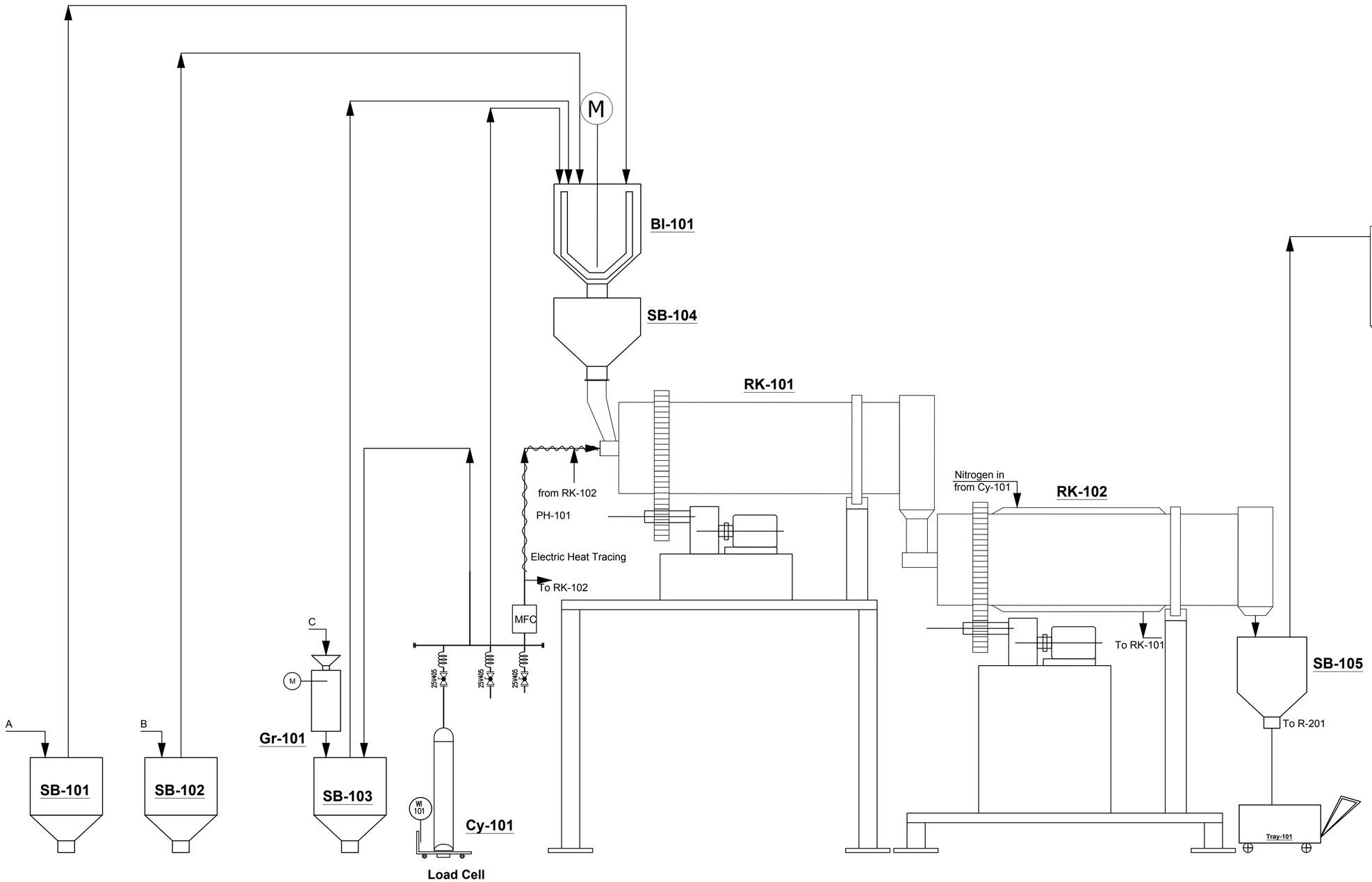
Project:	# Instrument Index		Date:
Client:			Doc. No.:
Location:			Revision No.: Rev. 0
Unit: Section-100	Prepared By:	Checked By: Approved By:	

S.No	Tag No.	Equipment Name	Service	Location	Range	Units	Description	Type	Remarks
13	TE-113	RK-102	RK-102 Jacket to RK-101 Line Temp.	RK-102 Outlet	0-1000	deg. C	Temp. element	RTD	
	TI-113	RK-102	Temp. Indicator	RK-102		deg. C	Indicator	Ctrl. Panel	
14	TE-114	SB-105	SB-105 Temp.	SB-105	0-1000	deg. C	Temp. element	RTD	
	TI-114	SB-105	Temp. Indicator	SB-105		deg. C	Indicator	Ctrl. Panel	
15	TE-115	ST-101	ST-101 Temp.	ST-101	0-1000	deg. C	Temp. element	RTD	
	TI-115	ST-101	Temp. Indicator	ST-101		deg. C	Indicator	Ctrl. Panel	
1	PG-101	SB-103	SB-103 pressure	SB-103	0-6	Bar	Pressure Gauge	Bourdon	
2	PG-102	Cy-101	Cy-101 Header pressure	Cy-101 Header	0-6	Bar	Pressure Gauge	Bourdon	
3	PG-103	BI-101	BI-101 Pressure	BI-101	0-6	Bar	Pressure Gauge	Bourdon	
4	PG-104	RK-101	RK-101 Pressure	RK-101	0-6	Bar	Pressure Gauge	Bourdon	
5	PG-105	RK-102	RK-102 Pressure	RK-102	0-6	Bar	Pressure Gauge	Bourdon	
6	PG-106	ST-101	ST-101 Pressure	ST-101	0-6	Bar	Pressure Gauge	Bourdon	
1	FT-101	Cy-101	Flow Transmitter From Cy-101 Header to PH-101 Line	CY-101 Header	0 - 200	Kg/Hr	Mass flow transmitter		
	FIC-101	Cy-101	Flow Indicating Controller for CY-101 Header	CY-101 Header	0 - 200	Kg/Hr	flow Ind. controller	Ctrl. Panel	
	FCV-101	Cy-101	Flow Control Valve to PH-101	CY-101 Header	0 - 100	%	Control Valve	pneumatic	
1	VFD-101	Gr-101	Gr-101 RPM controller	Gr-101	0-100	%	Variable freq. Drive	Electronic	*Note-2
2	VFD-102	Bl-101	Bl-101 RPM controller	Bl-101	0-100	%	Variable freq. Drive	Electronic	*Note-2
3	VFD-103	SB-104	SB-104 RPM Controller	SB-104	0-100	%	Variable freq. Drive	Electronic	*Note-2
4	VFD-104	RK-101	RK-101 RPM controller	RK-101	0-100	%	Variable freq. Drive	Electronic	*Note-2
5	VFD-105	RK-101	RK-101 RPM controller (RK-101 Bottom Side)	RK-101	0-100	%	Variable freq. Drive	Electronic	*Note-2
6	VFD-106	RK-101	RK-101 RPM Controller	RK-101	0-100	%	Variable freq. Drive	Electronic	*Note-2
7	VFD-107	RK-102	RK-102 RPM controller	RK-102	0-100	%	Variable freq. Drive	Electronic	*Note-2
8	VFD-108	RK-102	RK-102 RPM controller (RK-102 Bottom Side)	RK-102	0-100	%	Variable freq. Drive	Electronic	*Note-2
9	VFD-109	RK-102	RK-102 RPM controller	RK-102	0-100	%	Variable freq. Drive	Electronic	*Note-2
1	WT-101	SB-101	Weight Transmitter for SB-101	SB-101	0 - 20	Kgs	Weight Transmitter	Ele.Load Cell	*Note-3
	WI-101	SB-101	Weight Indicator	SB-101		Kgs	Indicator	Ctrl. Panel	
2	WT-102	SB-102	Weight Transmitter for SB-102	SB-102	0 - 100	Kgs	Weight Transmitter	Ele.Load Cell	*Note-3
	WI-102	SB-102	Weight Indicator	SB-102		Kgs	Indicator	Ctrl. Panel	

Project:	Instrument Index	Date:	
Client:		Doc. No.:	
Location:		Revision No.: Rev. 0	
Unit: Section-100	Prepared By: Checked By: Approved By:		

S.No	Tag No.	Equipment Name	Service	Location	Range	Units	Description	Type	Remarks
3	WT-103	SB-103	Weight Transmitter for SB-103	SB-103	0 - 300	Kgs	Weight Transmitter	Ele.Load Cell	*Note-3
	WI-103	SB-103	Weight Indicator	SB-103		Kgs	Indicator	Ctrl. Panel	
4	WT-104	Cy-101	Weight Transmitter for Cy-101	Cy-101	0 - 300 #	Kgs	Weight Transmitter	Ele.Load Cell	*Note-3
	WI-104	Cy-101	Weight Indicator	Cy-101		Kgs	Indicator	Ctrl. Panel	
5	WT-105	SB-104	Weight Transmitter for SB-104	SB-104	0 - 400 #	Kgs	Weight Transmitter	Ele.Load Cell	*Note-3
	WI-105	SB-104	Weight Indicator	SB-104		Kgs	Indicator	Ctrl. Panel	
6	WT-106	Tray-101	Weight Transmitter for Tray-101	Tray-101	0 - 300 #	Kgs	Weight Transmitter	Ele.Load Cell	*Note-3
	WI-106	Tray-101	Weight Indicator	Tray-101		Kgs	Indicator	Ctrl. Panel	

*Note-1: The vendor has to verify with equipment fabrication drawing.
*Note-2: Required RPM Display at Control Panel for VFDs.
*Note-3: Excluding Bin/Vessel Weight (Vendor to Check with Process Team).
(VTS): Vendor To Specify



LEGEND

S.No.	EQPT.No.	Description	S.No.	EQPT.No	Description	S.No.	EQPT.No	Description	S.No.	EQPT.No.
01.	BI-101	Solids Blender(Feed Preparation Vessel)	13.			25.			37.	
02.	Cy-101	Nitrogen Cylinder	14.			26.			38.	
03.	Gr-101	Microfine Grinder	15.			27.			39.	
04.	PH-101	Pre-Heater	16.			28.			40.	
05.	RK-101	Rotary Kiln	17.			29.			41.	
06.	RK-102	Rotary Kiln	18.			30.			42.	
07.	SB-101	A Storage Bin	19.			31.			43.	
08.	SB-102	B Storage Bin	20.			32.			44.	
09.	SB-103	C Storage Bin	21.			33.			45.	
10.	SB-104	Feed Storage Bin	22.			34.			46.	
11.	SB-105	Product Collection Bin	23.			35.			47.	
12.	ST-101	Blow down Tank	24.			36.			48.	

DO NOT SCALE

DESIGN & ENGINEERING DIVISION
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD - 500 007

PROJECT : Continuous Rotary Kiln Reactor System of 25kg/hr for gas-solid operation	PROJECT CODE : -
CLIENT : In-House	CAPACITY : 125 Kg/day
LOCATION : IICT Hyderabad	- -

All dimensions in mm unless specified

PROCESS FLOW DIAGRAM
NITROGENATION (Section - 100)

DESIGN	PREPARED	VER/CHD	APPROVED
- -	- -	- -	- -

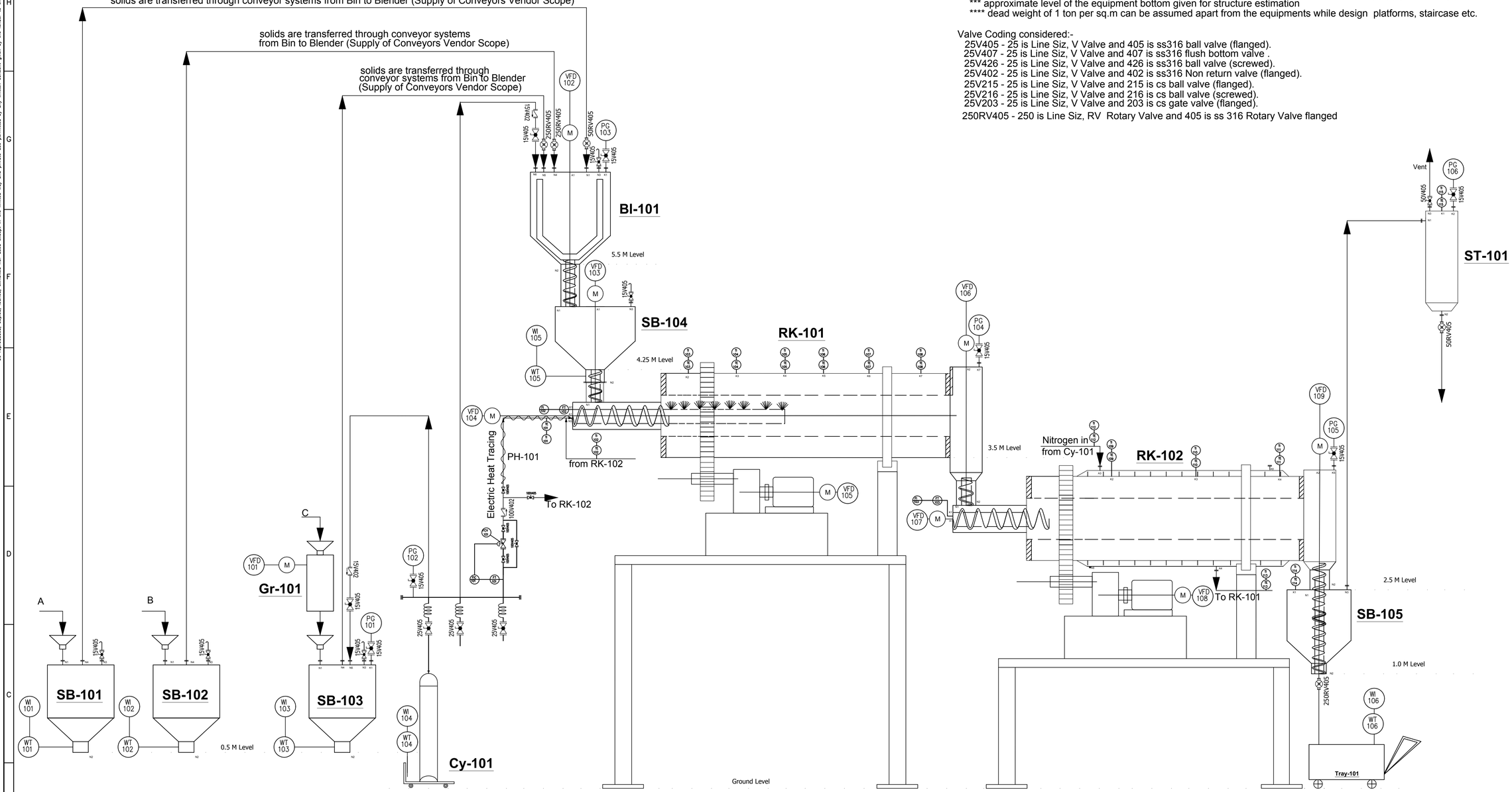
SCALE	REFERENCES	SOFT COPY REF			DWG/DOC/SK No.	SHEET	REV
		CD/FP	FOLDER	FILE			
NTS		-			-	1 OF 1	0

DRG. No. : –

Note:-

* all solids dischaging to be provided with motorised Rotary valves system
** all solids are transferred through conveyor systems from inlet material to product material (Supply of Conveyors Vendor Scope)
*** approximate level of the equipment bottom given for structure estimation
**** dead weight of 1 ton per sq.m can be assumed apart from the equipments while design platforms, staircase etc.

Valve Coding considered:-
25V405 - 25 is Line Siz, V Valve and 405 is ss316 ball valve (flanged).
25V407 - 25 is Line Siz, V Valve and 407 is ss316 flush bottom valve .
25V426 - 25 is Line Siz, V Valve and 426 is ss316 ball valve (screwed).
25V402 - 25 is Line Siz, V Valve and 402 is ss316 Non return valve (flanged).
25V215 - 25 is Line Siz, V Valve and 215 is cs ball valve (flanged).
25V216 - 25 is Line Siz, V Valve and 216 is cs ball valve (screwed).
25V203 - 25 is Line Siz, V Valve and 203 is cs gate valve (flanged).
250RV405 - 250 is Line Siz, RV Rotary Valve and 405 is ss 316 Rotary Valve flanged



Start/Stop Push Button Station

RELIEF VALVE
PSV 102 – Relief Valve
Serial No. in that section
Section 100

INSTRUMENT
TI 102 – Temp. Indicator
Serial No. in that section
Section 100

VALVE
25 V 204 – Valve Specification
Valve
Nominal Size in Inch

Process Line
CHW & CW
Instrument Air line
Hot Oil
Electrical line

ITEM LEGEND LINE

CHWS	WC Supply
CHWR	WC Return
CWS	Cooling Water Supply
CWR	Cooling Water Return
D	Floor Drain
P	Process

INSULATION

HCI	Heat Conservative Insulation
CCI	Cold Conservative Insulation

INSTRUMENTS

FC	Flow Controller	FI	Flow Indicator
FT	Flow Transmitter	FQI	Flow Quantity Indicator
FQAH	Flow Quantity Alarm High		
LG	Level Gauge	LT	Level Transmitter
LIC	Level Indicating Controller		
LAL	Low Level Alaram	HAL	High Level Alaram
PIC	Pressure Indicating Controller		
PAH	Pressure Alaram High	PG	Pressure Gauge
PI	Pressure Indicator	PT	Pressure Transmitter
TE	Temperature Element	TI	Temperature Indicator
TG	Temperature Gauge		
TIC	Temperature Indicating Controller		
WI	Weight Indicator	WT	Weight Transmitter
WIC	Weight Indicating Controller		
SFI	Side Flow Indicator		
VFD	Variable Frequency Drive		

PIPING SYMBOLS (VALVES)

BALL VALVE (SCREWED)	BALL VALVE (FLANGED)
FLUSH BOTTOM VALVE (FLANGED)	FOOT VALVE / ROTARY VALVE
GLOBE VALVE (SCREWED)	GLOBE VALVE (FLANGED)
NEEDLE VALVE (SCREWED)	NEEDLE VALVE (FLANGED)
NON RETURN VALVE (SCREWED)	NON RETURN VALVE (FLANGED)
STRAINER (SCREWED)	STRAINER (FLANGED)
PRESSURE SAFETY VALVE (SCREWED)	PRESSURE SAFETY VALVE (FLANGED)

CONTROL VALVES
FCV 103 – CONTROL VALVE (FLANGED)
LCV LEVEL CONTROL VALVE
PCV PRESSURE CONTROL VALVE
TCV TEMP. CONTROL VALVE
HCV 101 – HAND CONTROL VALVE
SOV 101 – ON/OFF VALVE

INSTRUMENT SYMBOL
PI 110 – PANNEL MOUNTED
PI 110 – LOCAL MOUNTED
CONVERTOR
DRAIN FUNNEL
INSULATION

LEGEND

S.No.	Equipment No.	Description	S.No.	Equipment No.	Description
01.	Bl-101	Solids Blender(Feed Preparation Vessel)	14.		
02.	Cy-101	Nitrogen Cylinder	15.		
03.	Gr-101	Microfine Grinder	16.		
04.	PH-101	Pre-Heater	17.		
05.	RK-101	Rotary Kiln	18.		
06.	RK-102	Rotary Kiln	19.		
07.	SB-101	A Storage Bin	20.		
08.	SB-102	B Storage Bin	21.		
09.	SB-103	C Storage Bin			
10.	SB-104	Feed Storage BIn			
11.	SB-105	Product Collection Bin			
12.	ST-101	Blow down Tank			
13.					

MECH ENGR	PRCS ENGR	ELECT ENGR	CIVIL ENGR	CLIENT	CONSULTANT CONTRACTOR
CLEARANCES					

ISSUE STATUS KEY : P= PRELIMINARY ; R= REVISION ; I= INFORMATION ; C= COMMENTS ; CH= CHECKING ; A= APPROVAL ; E= ENGINEERING ;
DISTRIBUTION : 1= D & E ; 2= PROCESS ENGR ; 3= INST ENGR ; 4= ELECT ENGR ; 5=CIVIL ENGR ; 6= CLIENT ; 7= CONSULTANT ; 8= CONTRACTOR ;

DO NOT SCALE

DESIGN & ENGINEERING DIVISION
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD - 500 007

PROJECT :	Continuous Rotary Kiln Reactor System of 25kg/hr for gas-solid operation	PROJECT CODE :	–
CLIENT :	In-House	CAPACITY :	125 Kg/Day
LOCATION :	IICT Hyderabad	–	–

All dimensions in mm unless specified

P & I DIAGRAM
NITROGENATION (Section - 100)

DESIGN	PREPARED	VER/CHD	APPROVED
–	–	–	–

SCALE	REFERENCES	SOFT COPY REF			DWG/DOC/SK No.	SHEET	REV
		CD/FP	FOLDER	FILE			
NTS	–				–	1 OF 1	0