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Appendix A – Schematic diagram of TRI-CCC FBD

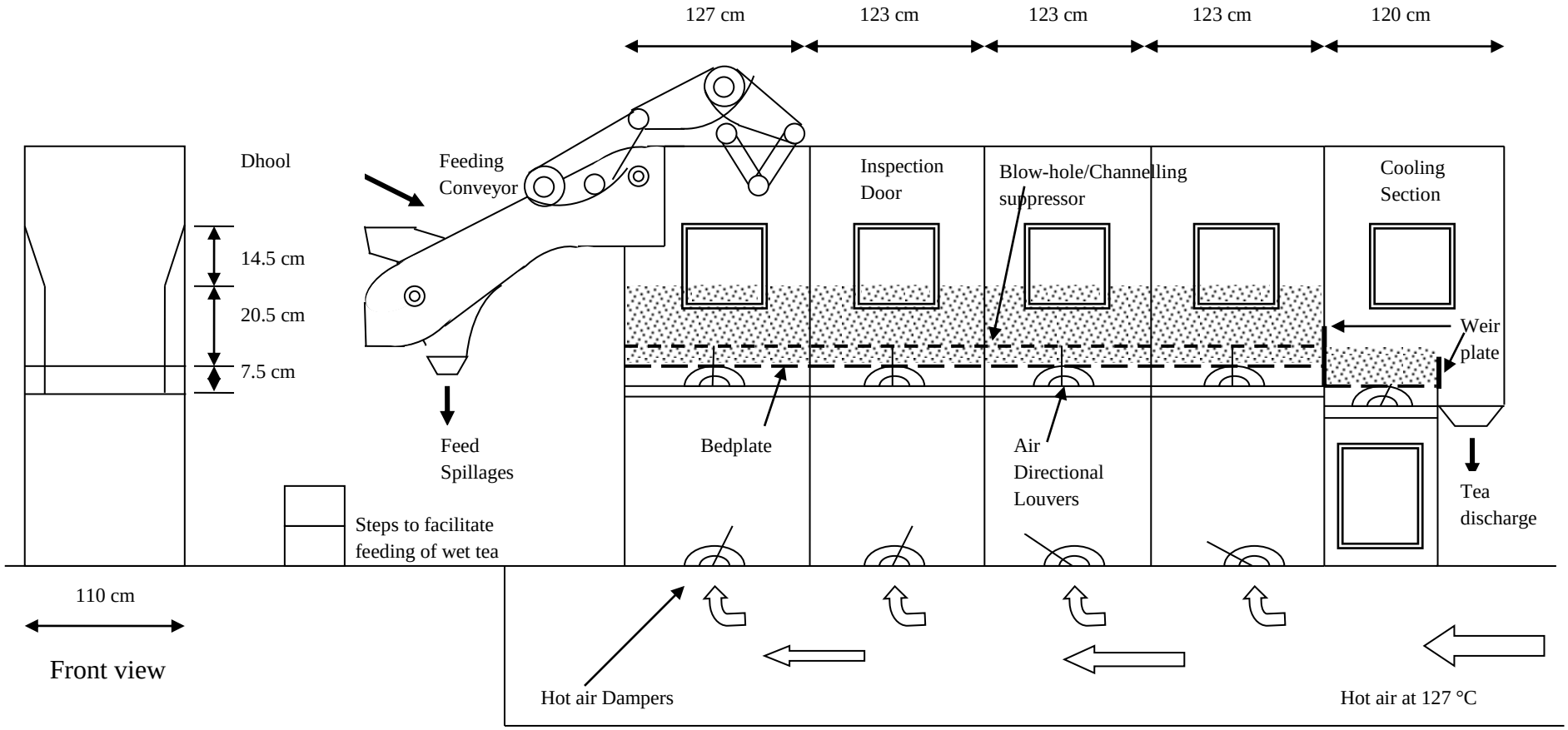

Figure A1: Schematic Diagram of TRI-CCC FBD

Appendix B

Specifications of Power Controller

Power/(current ratings): 27kW (38A) @ a typical supply of 415V RMS

Input voltage: 400V RMS +/- 10%

Frequency: 50/60Hz

Control input options: Signal: (using SW4**):** 0 to 10V dc (set as standard) / 0 to 5V OR **Manual:** using 5K Potentiometer

Alarms relay circuit rating: 2A @ 125V ac Max.

Fan 'switch-on' Temp.: Typically 55 ºC

Status indicator: (Tracking control signal) LED indicator changes intensity

Over temperature: Trip in temperature @ 90 ºC, +/- 1 ºC (LED indicator 'flashes' continuous fast pulsing), Trip out temperature @ 85 ºC, +/- 1 ºC

SW1 = OFF - Relay is continuously energized (normally closed); trips in fault condition.

SW1 = ON - Relay is de-energized (normally open); closes in fault condition.

Phase loss detection: LED indicator 'flashes' continuous slow pulsing.

Sensor loss detection: LED indicator 'flashes' on/off fast pulsing.

Cable terminations: Phase power - 10mm² rising clamp terminal block

Earth - 10mm² rising clamp terminal block

Remote supply Auxiliary alarm (relay) 2.5mm² rising clamp terminal block

Control signal - 2.5 mm² rising clamp terminal block

Terminal torque settings: 1.2 Nm (10 mm²) Power terminals only.

Fusing: 40A High-Speed Semiconductor type, ferrule fuse (14 mm ø x 51 mm long)

Working temperature: 65 °C (maximum operational)

Dimensions: 150 mm (D) x 240 mm (W) x 100 mm (H)

Fixing centres: 4 x 5.5 mm ø holes on centres 220 mm (W) x 130 mm (D)

Weight: 2.6 kg

Appendix C

Table C1: Specifications of PID Temperature controller

Type	Temperature PID
Digits	4
Allowable Voltage Range	90 ~ 110% of power supply
Power Consumption	5 VA
Display Method	7 Segment LED Display [Process value (PV) : Red, Setting value (SV) : Green]
Character Size	PV: W7.8 x H11 mm
	SV: W5.8 x H8 mm
Thermocouple Input	E (CR)
	J (IC)
	K (CA)
	N (NN)
	R (PR)
	S (PR)
	T (CC)
	W (TT)
RTD Input	Pt 100Ω
	JIS Pt 100Ω
Analog Input	0 - 10 VDC
	1 - 5 VDC
	4-20 mADC
Output	12 VDC ±3 V 30 mA Max. SSR
	250 VAC 3 A 1c Relay
	4 - 20 mA DC Load 600Ω Max. Current
Control Type	ON/OFF, P, PI, PD, PIDF, PIDS control
Display Accuracy	3 °C (Higher one)
	F•S ±0.3%
Sampling Time	0.5 sec
LBA Setting Time	1 ~ 999 sec
RAMP Setting Time	Ramp Down at 1 ~ 99 min.
	Ramp UP
PID Controller	Nema 4 Digital
Voltage	100-240 VAC
Dimensions	DIN W48 x H48mm (Terminal Type)
Power Supply	100 - 240 VAC
Control Output	Relay
Sub Output	Event 1

Appendix D

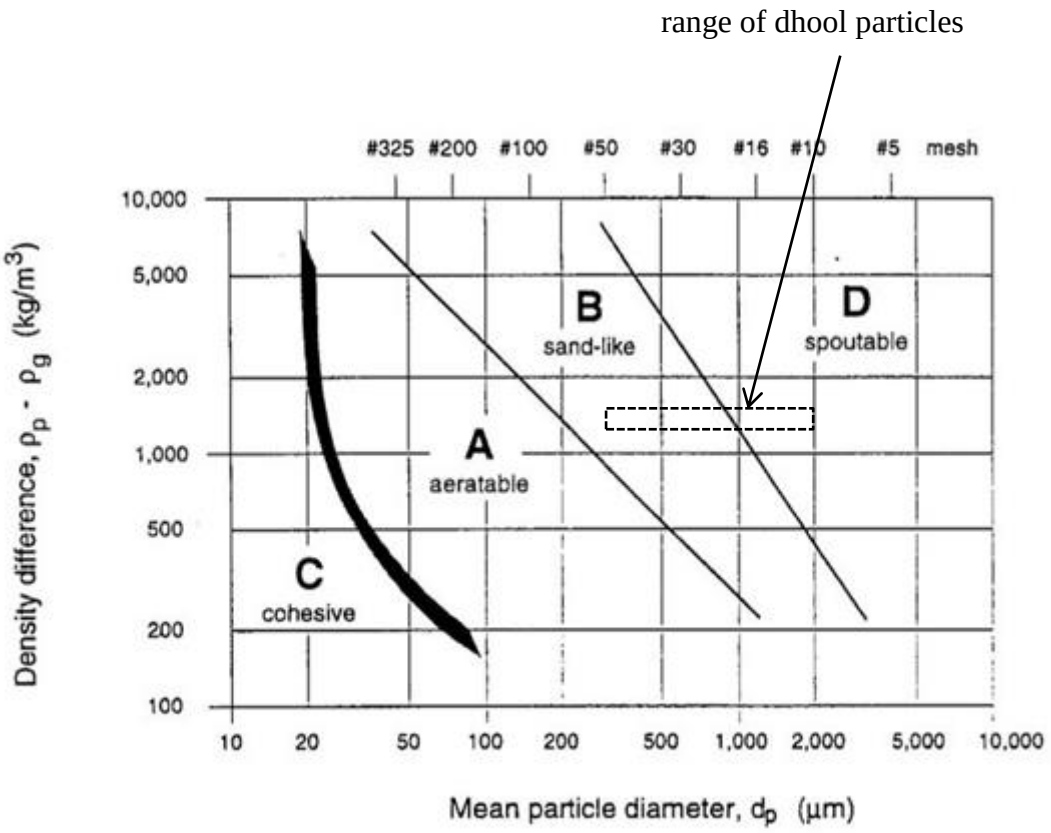

Figure D1: Mean particle sizes in Geldart groups (Richardson et al., 2002)

Appendix E

Table E1: Variation of jet velocity with time for drying dhool on bedplates at different loadings.

Bedplate	**No.2**	**No.3**	**No.3**	**No.5**	**No.5**	**No.6**	**No.6**	**No.6**
Perforation size (mm x mm)	36 x 0.5	36 x 0.5	36 x 0.5	36 x 0.6	36 x 0.6	36 x 0.6	36 x 0.6	36 x 0.6
Number of perforations/ m^2	2,177	2,748	2,748	1,820	1,820	2,266	2,266	2,266
Opening area (%)	4	5	5	4	4	5	5	5
Loading (kgm^{-2})	38.5	41.5	44.5	38.5	41.5	44.5	47.5	50.5
Time	**Jet velocity (ms^{-1})**							
0	33.8	26.5	24.1	38.5	42.4	29.6	29.6	32.8
30	33.8	25.8	22.7	38.4	42.2	28.8	28.8	32.6
60	33.3	25.5	22.0	38.4	40.8	28.8	27.9	30.4
90	32.9	25.5	21.6	37.2	40.9	28.3	27.1	28.3
120	32.9	25.1	21.3	36.6	40.9	27.9	26.6	26.6
150	32.0	24.4	21.3	36.0	40.3	27.1	26.2	26.2
180	32.0	24.1	21.3	34.7	39.7	26.6	26.2	24.9
210	31.6	23.7	20.9	34.7	39.1	26.2	25.4	24.5
240	31.1	23.4	20.6	34.1	38.4	26.2	24.9	24.5
270	31.1	23.0	20.2	32.9	38.4	26.2	24.5	24.5
300	30.7	23.0	19.9	32.9	38.4	26.2	24.5	24.1
330	30.2	22.7	19.5	32.2	38.1	25.4	24.1	23.7
360	29.8	22.3	19.5	32.2	37.5	24.9	24.1	23.3
390	29.4	22.0	19.5	31.6	37.5	24.5	24.1	23.3
420	28.9	22.0	19.2	31.0	37.8	24.1	23.7	22.4
450	28.5	22.0	18.8	31.0	37.8	24.1	23.3	22.8
480	28.5	22.0	18.8	31.0	38.4	24.1	22.8	22.4
510	28.1	22.0	18.5	30.4	37.8	23.7	22.4	22.4
540	27.6	21.6	18.5	30.4	37.8	23.7	22.4	22.0
570	27.6	21.6	18.5	30.4	37.2	23.7	22.0	22.0
600	27.2	21.6	18.1	30.4	37.2	23.7	21.6	21.6
630	27.2	21.6	18.1	29.8	36.6	23.7	21.6	21.6
660	26.3	21.3	17.8	29.8	36.6	23.7	21.6	20.7
690	26.3	21.3	17.8	29.8	36.0	23.7	21.6	20.7
720	26.3	21.3	17.4	29.1	36.0	23.7	21.6	20.3

750	25.9	20.9	17.1	29.1	34.7	23.3	21.6	20.3
780	25.4	20.6	16.4	29.1	34.7	22.8	21.1	19.9
810	25.4	20.6	16.0	29.1	34.7	22.8	21.1	19.9
840	25.4	20.2	16.4	28.5	34.7	22.4	20.7	19.9
870	25.0	20.2	16.0	28.5	34.7	22.4	20.7	19.9
900	25.0	19.5	16.0	28.5	34.1	22.0	20.3	19.9
930	25.0	19.5	16.0	27.9	34.1	22.0	20.3	19.5
960	24.5	19.5	16.0	27.9	32.9	21.6	20.3	19.5
990	24.5	19.2	15.7	27.9		21.6	20.3	19.5
1020	24.5	19.2	15.7	27.9		21.1	19.9	19.5
1050	24.1	19.2	15.7	27.9		21.1	19.9	19.0
1080			15.7	27.3		20.7	19.9	19.0
1110			15.4	27.3		20.7	19.9	19.0
1140			15.4	27.3		20.7	19.9	19.0
1170			15.0	26.7			19.9	18.2
1200			14.7	26.0			19.9	18.2
1230			14.7	26.0			19.5	17.8
1260							19.5	18.2
1290							19.5	18.2
1320							19.5	