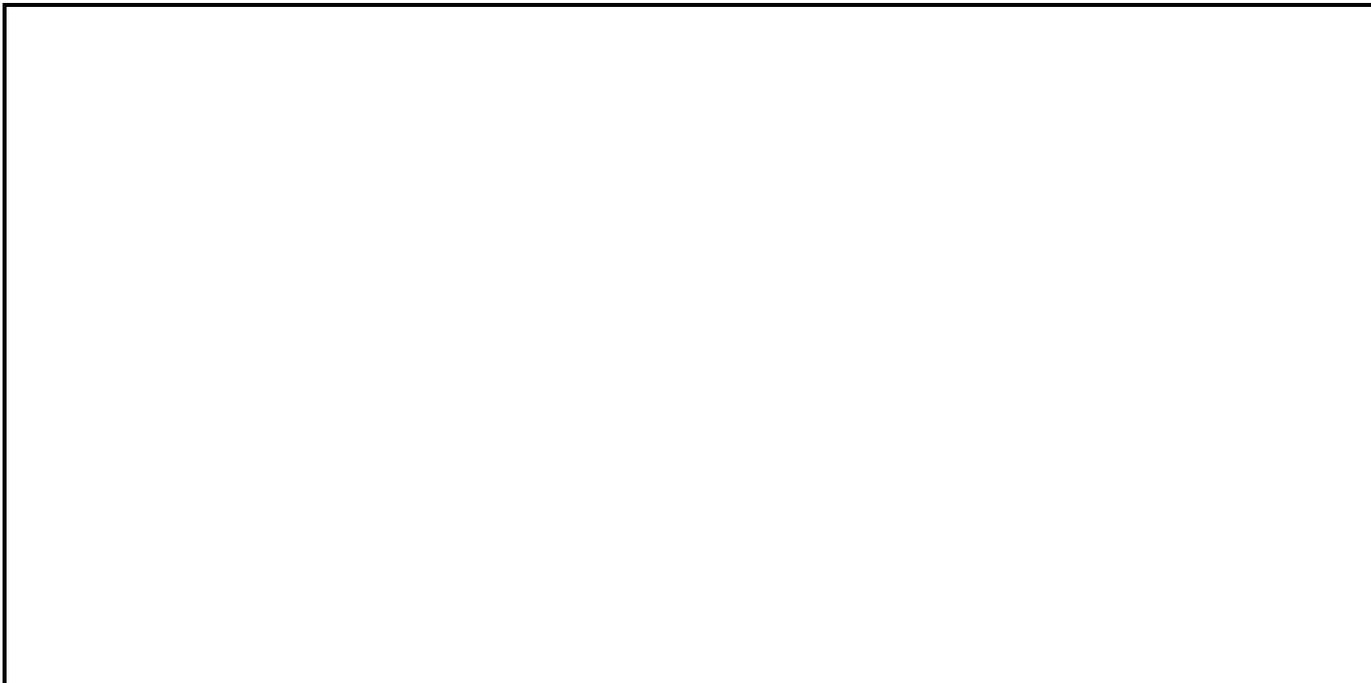




Doode Sanati Pars Company
Carbon Black Hard Reactor Revamping



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PROCESS EQUIPMENT DATA SHEET FOR REACTOR



00	22-Dec.-2020	IFR	I.S.	F.SH.	I.S.
Rev.	Date	Description	Prepared By	Checked By	Approved By



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Sheet	Revisions						Sheet	Revisions					
	00	01	02	03	04	05		00	01	02	03	04	05
1	X						41						
2	X						42						
3	X						43						
4	X						44						
5	X						45						
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 <p>شرکت مهندسی مشاور سازه سروش</p>	Doode Sanati Pars Company Carbon Black Hard Reactor Revamping	 TARH O FARAYAND KIMIA Eng. CONSULTANT	
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PROCESS DATA SHEET

No.	ITEM	DESCRIPTION	REMARK																																												
1	EQUIPMENT TAG NO.	R-101N	REACTOR																																												
2	PRODUCTION CAPACITY	2500-2800 kg/hr	AS FLUFFY CARBON BLACK																																												
3	ANNUAL WORKING TIME	8000 hr/year																																													
2	CARBON BLACK GRADES	Hard grade N-300 & N-200 SERIES	N330, N326, N339, N375 N220, N234																																												
3	FEEDSTOCK OIL TARGETS BMCI SULFUR ASPHALTENE WATER ASH SODIUM POTASSIUM VISCOSITY @ 100 °C	BMCI= 120 (MAX.), 90 (MIN.) 4 % (wt. MAX.) 8 % (wt. MAX.) 1 PPM (MAX.) 0.1 % (wt. MAX.) 30 PPM (MAX.) 5 PPM (MAX.) 5 (MIN.)	SEE NOTE 11																																												
4	REACTOR PERFORMANCE N300 SERIES N200 SERIES	1.8 KG OIL / FLUFFY CARBON BLACK 1.9 KG OIL / FLUFFY CARBON BLACK	BASED ON THE OIL WITH BMCI=110																																												
5	PROCESS AIR FLOW TEMPERATRE AIR TEMPERATURE FOR COOLING PRESSURE BAROMETRIC PRESSURE	12000 NM3/HR 800- 850 °C 80 °C 150 kpa ABSULUT 83.2 kpa ABSULUT	PROCESS AIR WILL BE SUPPLIED BY AN AIR BLOWER AND HEATED BY AN AIR PREHEATER EXCHANGER BE REACTOR OUTLET SMOCKY GAS																																												
6	QUENCH WATER FLOW TEMPERATRE PRESSURE TDS CHLORIDE pH	MAX 4000 KG/HR PRIMARY 35°C, Secondary, 80°C 7 BARG 250 PPM 5 PPM 5-8	THIS IS A TREATED WATER KNOWN AS PROCESS WATER LP STEAM (3.5 BARG) MP STEAM (10 BARG) ARE AVAILABLE																																												
9	FUEL GAS COMPOSITION: PRESSURE TEMPERATURE	NATURAL GAS <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2"></th> <th style="text-align: center;">Species</th> <th style="text-align: center;">Vol %</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: right;">Methane</td> <td style="text-align: center;">CH₄</td> <td style="text-align: center;">90.20%</td> </tr> <tr> <td></td> <td style="text-align: right;">Ethene</td> <td style="text-align: center;">C₂H₄</td> <td style="text-align: center;">0.00%</td> </tr> <tr> <td></td> <td style="text-align: right;">Ethane</td> <td style="text-align: center;">C₂H₆</td> <td style="text-align: center;">3.20%</td> </tr> <tr> <td></td> <td style="text-align: right;">Propane</td> <td style="text-align: center;">C₃H₈</td> <td style="text-align: center;">1.02%</td> </tr> <tr> <td></td> <td style="text-align: right;">Butanes & higher</td> <td style="text-align: center;">C₄H₁₀ +</td> <td style="text-align: center;">0.83%</td> </tr> <tr> <td></td> <td style="text-align: right;">Hydrogen</td> <td style="text-align: center;">H₂</td> <td style="text-align: center;">0.00%</td> </tr> <tr> <td></td> <td style="text-align: right;">Carbon monoxide</td> <td style="text-align: center;">CO</td> <td style="text-align: center;">0.00%</td> </tr> <tr> <td></td> <td style="text-align: right;">Carbon dioxide</td> <td style="text-align: center;">CO₂</td> <td style="text-align: center;">1.21%</td> </tr> <tr> <td></td> <td style="text-align: right;">Water vapor</td> <td style="text-align: center;">H₂O</td> <td style="text-align: center;">0.10%</td> </tr> <tr> <td></td> <td style="text-align: right;">Nitrogen</td> <td style="text-align: center;">N₂</td> <td style="text-align: center;">3.40%</td> </tr> </tbody> </table> 100 KPA GAUGE 10-30 °C			Species	Vol %		Methane	CH ₄	90.20%		Ethene	C ₂ H ₄	0.00%		Ethane	C ₂ H ₆	3.20%		Propane	C ₃ H ₈	1.02%		Butanes & higher	C ₄ H ₁₀ +	0.83%		Hydrogen	H ₂	0.00%		Carbon monoxide	CO	0.00%		Carbon dioxide	CO ₂	1.21%		Water vapor	H ₂ O	0.10%		Nitrogen	N ₂	3.40%	NATURAL GAS FROM NIGC PIPE LINE IS AVAILABLE AS 60 PSI PRESSURE AT THE SITE BATTERY LIMIT
		Species	Vol %																																												
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DESIGN DATA FOR REACTOR SHELL			
DESIGN CODE		ASME SEC. VIII DIV. 1	
REACTOR ORIENTATION		HORIZONTAL	
WORKING PRESSURE	Bar g	0.2 / 0.5	
DESIGN PRESSURE (MAWP)	Bar g	0.7	
TEST PRESSURE @ TOP	Bar g	FULL OF WATER	
WORKING STATIC HEAD	Bar g	-	
WORKING TEMPERATURE	°C	220 / 250	
DESIGN TEMPERATURE	°C	350	
MDMT	°C @ Barg	-12 @ 0.7	
EXT. INSULATION	mm	N/A	
CORROSION ALLOWANCE	SHELL	mm	VTA
	SADDLE	mm	VTA
FLUID	NATURE (NOTE 10)		CARBON BLACK SMOKE+WATER VAPOR
	PHYSICAL STATE		GAS/SOLID
	SPECIFIC GRAVITY	kg/m ³	<1
OUT OF ROUNDNESS	%	VTA	
WELDED JOINT EFFICIENCY		VTA	
RADIOGRAPHIC TEST	HEADS	PER CODE	
	SHELL	PER CODE	
HEAT TREATMENT		PER CODE	
WELDING TEST COPUNS		YES	
SEISMIC FACTOR / WIND VELOCITY		ZONE III / 120 km/h (note 17)	
FIXED POINT OF REACTOR		DIRECT CONNECTIN TO AIR PREHEATER SIDE	
AIR PREHEATER ORIENTATION		VERTICAL	
CONNECTION SIZE TO AIR PREHEATER		VTA (1375 MM IS RECOMMENDED)	
NO. OF COMPARTMENT IN COMBUSTION SECTION		2	
NO. OF COMPARTMENT IN THROAT SECTION		1	
NO. OF COMPARTMENT IN REACTION SECTION		1	
NO. OF COMPARTMENT IN QUENCH SECTION		VTA (4 IS RECOMMENDED)	
NO. OF COMPARTMENT IN EVAPORATION SECTION		VTA (6 IS RECOMMENDED)	
CAPACITY	m ³	BY VENDOR	
TOTAL WEIGHT (ESTIMATION)	OPERATION	kg	BY VENDOR
	HYDROTEST	kg	BY VENDOR
	ERECTION	kg	BY VENDOR
	INTERNALS	kg	BY VENDOR
DESIGN DATA FOR REACTOR REFRACTORY			
DESIGN CODE		MANUFACTURER STANDARD	
MAX. TEMP AT COMBUSTION SECTION	°C	1950	
MAX TEMP. AT THROUT SECTION	°C	1950	
MAX. TEMP. AT REACTION SECTION	°C	1850	
TYPE OF REFRACTORY		MULTI -LAYER	
TYPE OF REFRACTORY AT THROUT		BY MANUFACTURER	
REFRACTORY MANUFACTURER		---	
DESIGN DATA FOR REACTOR SUPPORT			
DESIGN CODE		ASME SEC. VIII DIV. 1	
MAX. LONGITUDINAL THERMAL EXPASION		VTA (250 mm RECOMMENDED)	
TYPE OF GUIDING SUPPORT		VTA (BASE PLATE ON SLIDING WITH PTFE, OR WHEEL/RAIL UNDER SUPPORT)	

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- 1- AS A MINIMUM 6 mm THICKNESS IS REQUIRED AS PER IPS CODE FOR SHEEL PLATE
- 2- LP / MP STEAM IS AVAILABLE FOR BIFLUID WATER SPRAYING INTO THE REACTOR IF NECESSARY.
- 3- SCHEMATIC DIARAM OF THE REACTOR AND CONNECTED AIR PREHEATER IS ATTACHED.
- 4- 70% TURN DOWN RATIO SHALL BE COSIDERED.
- 5- 10% OVERDESIGN CAPACITY SHALL BE CONSIDERED.
- 6- ALL INSTALLATION MANUALS SHALL BE SUBMITTED.
- 7- ALL COMPARTMENTS OF REACTOR SHELL SHALL BE REMOVABLE WITH LIFTING LUG.
- 8- ALL REFRACTORY AND LININGS AHALL BE CARIED OUT AT SITE.
- 9- ALL REACTOR BURNERS, SPRAY NOZZLES FOR OIL INJECTION AND QUENCH WATER SPRAYING NOZZLES INTO THE QUENCH SETIONS, ARE IN THE SCOPE OF THE SUPPLY OF MANUFACTURER.
- 10- MANUFACTURER SHALL CONSIDER EXTRA CONNECTIONS FOR QUENCH WATER INJECTION AT VARIOUS LOCATIONS OF QUENCH SECTION.
- 11- FEEDSTOCK OIL HAS 21 BARG PRESSURE AND TEMPERATURE BETWEEN 160-220 °C.
- 12- MANUFACTURER SHALL CONSIDER TWO SETS OF 6 NOZZLE CONENTION AROUD OF CHOCK ZONE AT TWO SEPARATE LOCATIONS. MANUFACTURE ADVISE THE PROPER LOCATION.
- 13- THE CONTROL SYSTEM OF THE REACTOR IS NOT IN THE SCOPE OF SUPPLY OF MANUFACTURER.
- 14- THE PORTABLE OR FIXED IGNITION SYSTEM FOR STARING OF THE COMBUSTION CHAMBER IS IN THE SCOPE OF SUPPLE OF MANUFACTURER.
- 15- THE MINIMUM DESIGN AMBIENT TEMPERATURE IS -5 °C.
- 16- THE RECOMMENDED CONNECTION OF REACTOR END TO AIR PREHEATER IS PLATE FLANGE WITH SIZE OF 1375 MM (OD OF REACTOR SHELL).
- 17- MENTIONED DATA WILL BE FINALIZED BY CLIENT.

