

PROJECT	BIO REFINERY PROJECT		CLIENT	ABRPL			
UNIT	RECIRCULATING COOLING WATER SYSTEM		JOB NO.	B215	UNIT NO. 167		
ITEM NO.	167-AE/AT/AI/AAH-1116		SERVICE	Measurement of conductivity in cooling water make up			
FLUID HANDLED	RAW WATER MAKE UP						
FLUID STATE	LIQUID						
LOCATION	16"-WR-167-1101-A39A						
OPERATING CONDITIONS							
PRESSURE	KG/CM2 G	3.5					
TEMPERATURE	DEG C	AMB					
DESIGN CONDITIONS							
PRESSURE	KG/CM2 G	8					
TEMPERATURE	DEG C	65					
FLUID PROPERTIES @ P & T							
LIQUID DENSITY	KG/M3	994					
LIQUID VISCOSITY	CP	0.75					
VAPOUR MW							
VAPOUR VISCOSITY	CP						
FLUID COMPOSITION	REFER NOTE-2						
OPERATING RANGE, MICRO MHO/CM							
270-345 (NOTE-3)							
ALARM SETTING							
LOW							
LOW LOW							
HIGH							
HIGH HIGH							
NOTES:							
1. REFER P&ID B215-79-41-167-1111							
2. RAW WATER CHARACTERISTICS :							
CONSTITUENTS			SPECIFICATIONS				
			DESIGN				
	pH		7.0-7.5				
	Turbidity, NTU		<2				
	Total dissolved solids, ppm		180-230				
	MO ALKALINITY as CaCO3, ppm		52-90				
	Ca hardness, ppm as CaCO3		27-46				
	Total hardness, ppm as CaCO3		62-98				
	Chloride, ppm as Cl		10-15				
	Sulphate, ppm as SO4		20-25				
	Silica, ppm		7.6				
	Mg hardness as CaCO3, ppm		35-52				
	KMnO4 Value at 100 Deg C, ppm		<5				
	Total suspended solids (TSS), ppm		3.5				
	Oil, ppm		NIL				
	Total iron, as Fe.		<0.1				
3. TO BE FINALISED BY VENDOR.							
1	22.04.19	RE-ISSUED FOR PACKAGE			SK	AK	AK
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Rev. No.	Date	Purpose			Prepared By	Reviewed By	Approved By

PROJECT	BIO REFINERY PROJECT		CLIENT	ABRPL		
UNIT	RECIRCULATING COOLING WATER SYSTEM		JOB NO.	B215	UNIT NO. 167	
ITEM NO.	167-AE/AT/AI-1118		SERVICE	Measurement of oxidation reduction potential (ORP) at CWR header		
FLUID HANDLED	COOLING WATER RETURN					
FLUID STATE	LIQUID					
LOCATION	68"-WCR-167-1101-A91A					
OPERATING CONDITIONS						
PRESSURE	KG/CM2 G	1.5				
TEMPERATURE	DEG C	45				
DESIGN CONDITIONS						
PRESSURE	KG/CM2 G	9				
TEMPERATURE	DEG C	65				
FLUID PROPERTIES @ P & T						
LIQUID DENSITY	KG/M3	990				
LIQUID VISCOSITY	CP	0.75				
VAPOUR MW						
VAPOUR VISCOSITY	CP					
FLUID COMPOSITION	REFER NOTE-2					
OPERATING RANGE, MILLIVOLT (-) 1400 TO (+) 1400 (NOTE-3)						
ALARM SETTING						
LOW						
LOW LOW						
HIGH						
HIGH HIGH						
NOTES:						
1. REFER P&ID B215-79-41-167-1111						
2. COOLING WATER CHARACTERISTICS : (TO BE CONFIRMED DURING DETAIL ENGINEERING)						
CONSTITUENTS		SPECIFICATIONS				
		NORMAL	DESIGN			
pH		7.0-7.5	7.5			
Turbidity, NTU		<5	10			
Total dissolved solids, ppm		720-920	1150			
MO ALKALINITY as CaCO3, ppm		NOTE-4				
Ca hardness, ppm as CaCO3		108-184	230			
Total hardness, ppm as CaCO3		248-392	490			
Chloride, ppm as Cl		40-60	75			
Sulphate, ppm as SO4		188-340	360			
Silica, ppm		30	38			
Organophosphate as PO4, ppm		-	-			
Zinc sulphate as Zn, ppm		-	-			
Polimeric dispersant, ppm		-	-			
Mg hardness as CaCO3, ppm		140-208	260			
Free Residual chlorine		-	-			
Total suspended solids (TSS), ppm		<5	10			
Oil, ppm		BDL	BDL			
Total iron, as Fe.		0.5	1.0			
Total Alkalinity, ppm		100	120			
3. TO BE FINALISED BY VENDOR.						
4. MO ALKALINITY WILL FIND ITS OWN LEVEL BASED ON pH MAINTAINED AT pH 7-7.5. MO ALKALINITY AS CaCO3 WILL BE ABOUT 80 mg/l.						
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PROJECT	BIO REFINERY PROJECT		CLIENT	ABRPL	
UNIT	RECIRCULATING COOLING WATER SYSTEM		JOB NO.	B215	UNIT NO. 167
ITEM NO.	167-AE/AT/AI-1119		SERVICE	Measurement of Turbidity in cooling water supply.	
FLUID HANDLED	COOLING WATER SUPPLY				
FLUID STATE	LIQUID				
LOCATION	68"-WCS-167-1113-A91A				
OPERATING CONDITIONS					
PRESSURE	KG/CM2 G	6.9			
TEMPERATURE	DEG C	33			
DESIGN CONDITIONS					
PRESSURE	KG/CM2 G	9			
TEMPERATURE	DEG C	65			
FLUID PROPERTIES @ P & T					
LIQUID DENSITY	KG/M3	995			
LIQUID VISCOSITY	CP	0.75			
VAPOUR MW					
VAPOUR VISCOSITY	CP				
FLUID COMPOSITION	REFER NOTE-2				
OPERATING RANGE, NTU					
	5-10				
	LOW				
	LOW LOW				
	HIGH				
	HIGH HIGH				
NOTES:					
1. REFER P&ID B215-79-41-167-1111					
2. COOLING WATER CHARACTERISTICS : (TO BE CONFIRMED DURING DETAIL ENGINEERING)					
CONSTITUENTS			SPECIFICATIONS		
		NORMAL		DESIGN	
pH		7.0-7.5		7..5	
Turbidity, NTU		<5		10	
Total dissolved solids, ppm		720-920		1150	
MO ALKALINITY as CaCO3, ppm		NOTE-4			
Ca hardness, ppm as CaCO3		108-184		230	
Total hardness , ppm as CaCO3		248-392		490	
Chloride , ppm as Cl		40-60		75	
Sulphate , ppm as SO4		188-340		360	
Silica , ppm		30		38	
Organophosphate as PO4, ppm		-		-	
Zinc sulphate as Zn, ppm		-		-	
Polimeric dispersant, ppm		-		-	
Mg hardness as CaCO3, ppm		140-208		260	
Free Residual chlorine		-		-	
Total suspended solids (TSS), ppm		<5		10	
Oil, ppm		BDL		BDL	
Total iron, as Fe.		0.5		1.0	
Total Alkalinity, ppm		100		120	
3. TO BE FINALISED BY VENDOR.					
4. MO ALKALINITY WILL FIND ITS OWN LEVEL BASED ON PH MAINTAINED AT PH 7-7.5. MO ALKALINITY AS CACO3 WILL BE ABOUT 80 mg/l.					
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