ELECTRICAL CALCULATION SHEET

Doc. No:	240-0214-EMEL-CS00-0008

Job No.	**: 240**
Client	**: BANGLADESH PETROLEUM EXPLORATION & PRODUCTION CO. LTD.**
Location	**: SRIKAIL GAS FIELD, BANGLADESH**
Item No.	**: -**
Description	**: FAULT LEVEL CALCULATION**
Project Title.	**: 60 MMSCFD GLYCOL DEHYDRATION TYPE GAS PROCESS PLANT**
Year Built	**: 2015**

Rev.	Date	Page	Description of Revision	Prepared	Checked	Approved
A	*12-May-15*	*4*	*ISSUED FOR APPROVAL*	*AS*	*MH*	*VG*

				CONSORTIUM OF	
BAPEX BANGLADESH PETROLEUM EXPLORATION & PRODUCTION CO. LTD.	**Electrical Calculation Sheet**	**ZICOM**		ZICOM EQUIPMENT PTE LTD. AND SINOPEC PETROLEUM ENGINEERING CORPORATION	**Sinopec**

USER	**BANGLADESH PETROLEUM EXPLORATION & PRODUCTION CO. LTD.**	DOC NO	**240-0214-EMEL-CS00-0008**
LOCATION	**SRIKAIL GAS FIELD, BANGLADESH**	SERVICE	**FAULT LEVEL CALCULATION**
PROJECT	**60 MMSCFD SILICA GEL DEHYDRATION TYPE NATURAL GAS PLANT**	TAG NO	
JOB NO	**240**	QUANTITY	

Generator KVA Rating	345	kVA			
Line to Line Voltage	400	V			
Line to Neutral Voltage	230	V			
Full Load Ampere	497.98	A			
Genset Alternator Percentage Impedance	12.5	%			

Fault at zero distance/terminal				**Fault at zero distance/terminal**		
Full Load Ampreres	498	A		Full Load Ampreres	498	A
Multiplier,M1	8			Multiplier,M1	8	
Fault at Generator terminal	**3984**	A		Fault at Generator terminal	**5976**	A
L-L Fault	**3.98**	kA		**L-N Fault**	**5.98**	kA
L-L-L Fault(AFC)	**4.58**	kA				

For BUSBAR GROUP B

Fault at some distance from terminal				**Fault at some distance from terminal**		
Distance from terminal, L	10	ft		Distance from terminal, L	10	ft
No. of Conductor,N	1			No. of Conductor,N	1	
Conductor factor,C	129900			Conductor factor,C	129900	
Factor,f	0.0013			Factor,f	0.004	
Multiplier,M2	0.9987			Multiplier,M2	0.996	
Fault after 1st distance	**3979**	A		Fault after 1st distance	**5952.1**	A
L-L Fault	**3.98**	kA		**L-N Fault**	**5.95**	kA
L-L-L Fault(AFC)	**4.57**	kA				

Note

Reff. Drawing: 240-0214-EMEL-DW00-0008 POWER DISTRIBUTION SYSTEM

For conductor factor, C reff. document is attached

FLA=Full Load Ampere

AFC=Available Fault Current

L-L Fault=Approx. 87% L-L-L Fault

Sub-transient Reactance Per Unit,Xd''=0.125

For low resistance Percent Impedance≈12.5%

Percent Reactance data is found from Generator datasheet of Model No: PG345B3

Formula

For L-L Fault

$$FLA_{L-L} = \frac{KVA\,Rating * 1000}{L-L\,Voltage}$$

$$Multiplier,\ M1 = \frac{100}{\%\,Percent\,Impedance}$$

$$Factor,\ f = \frac{1.732 * L * I(SCA)}{N * C * E(L-L)}$$

For L-N Fault

$$FLA_{L-N} = \frac{KVA\,Rating * 1000}{L-N\,Voltage}$$

$$Multiplier,\ M2 = \frac{1}{1+f}$$

$$Factor,\ f = \frac{1.732 * L * I(SCA)}{N * C * E(L-N)}$$

I(SCA)= Short Circuit Current at the beginning of the circuit

L=Length of Cable

N=No. of Conductor Per Phase

C=Conductor factor(One over the impedance per foot)

E(L-L)=Phase to Phase Voltage or L-L Voltage

E(L-N)=Phase to Neutral Voltage or L-N Voltage

				CONSORTIUM OF	
BAPEX BANGLADESH PETROLEUM EXPLORATION & PRODUCTION CO. LTD.	**Electrical Calculation Sheet**	**ZICOM**	**ZICOM EQUIPMENT PTE LTD. AND**		**SINOPEC**
			SINOPEC PETROLEUM ENGINEERING CORPORATION		

USER	**BANGLADESH PETROLEUM EXPLORATION & PRODUCTION CO. LTD.**		DOC NO	**240-0214-EMEL-CS00-0008**
LOCATION	**SRIKAIL GAS FIELD, BANGLADESH**		SERVICE	**FAULT LEVEL CALCULATION**
PROJECT	**60 MMSCFD SILICA GEL DEHYDRATION TYPE NATURAL GAS PLANT**		TAG NO	
JOB NO	**240**		QUANTITY	

Generator KVA Rating	345	kVA				
Line to Line Voltage	400	V				
Line to Neutral Voltage	230	V				
Full Load Ampere	497.98	A				
Genset Alternator Percentage Impedance	12.5	%				
Fault at zero distance/terminal				**Fault at zero distance/terminal**		
Full Load Ampreres	498	A		Full Load Ampreres	498	A
Multiplier,M1	8			Multiplier,M1	8	
Fault at Generator terminal	**3984**	A		Fault at Generator terminal	**5976**	A
L-L Fault	**3.98**	kA		**L-N Fault**	**5.98**	kA
L-L-L Fault(AFC)	**4.58**	kA				
For BUSBAR GROUP C&D						
Fault at some distance from terminal				**Fault at some distance from terminal**		
Distance from terminal, L	820	ft		Distance from terminal, L	820	ft
No. of Conductor,N	1			No. of Conductor,N	1	
Conductor factor,C	799			Conductor factor,C	799	
Factor,f	17.7041			Factor,f	53.331	
Multiplier,M2	0.0535			Multiplier,M2	0.0184	
Fault after 1st distance	**214**	A		Fault after 1st distance	**109.96**	A
L-L Fault	**0.21**	kA		**L-N Fault**	**0.11**	kA
L-L-L Fault(AFC)	**0.25**	kA				

Note

Reff. Drawing: 240-0214-EMEL-DW00-0008 POWER DISTRIBUTION SYSTEM

For conductor factor, C reff. document is attached

FLA=Full Load Ampere

AFC=Available Fault Current

L-L Fault=Approx. 87% L-L-L Fault

Sub-transient Reactance Per Unit,Xd''=0.125

For low resistance Percent Impedance≈12.5%

Percent Reactance data is found from Generator

datasheet of Model No: PG345B3

Formula

For L-L Fault

$$FLA_{L-L} = \frac{KVA\,Rating*1000}{L-L\,Voltage}$$

$$Multiplier,\,M1 = \frac{100}{\%\,Percent\,Impedance}$$

$$Factor,\,f = \frac{1.732*L*I(SCA)}{N*C*E(L-L)}$$

For L-N Fault

$$FLA_{L-N} = \frac{KVA\,Rating*1000}{L-N\,Voltage}$$

$$Multiplier,\,M2 = \frac{1}{1+f}$$

$$Factor,\,f = \frac{1.732*L*I(SCA)}{N*C*E(L-N)}$$

I(SCA)= Short Circuit Current at the beginning of the circuit

L=Length of Cable

N=No. of Conductor Per Phase

C=Conductor factor(One over the impedance per foot)

E(L-L)=Phase to Phase Voltage or L-L Voltage

E(L-N)=Phase to Neutral Voltage or L-N Voltage

BAPEX BANGLADESH PETROLEUM EXPLORATION & PRODUCTION CO. LTD.	Electrical Calculation Sheet	ZICOM	CONSORTIUM OF ZICOM EQUIPMENT PTE LTD. AND SINOPEC PETROLEUM ENGINEERING CORPORATION	SINOPEC

USER	BANGLADESH PETROLEUM EXPLORATION & PRODUCTION CO. LTD.			DOC NO	240-0214-EMEL-CS00-0008
LOCATION	SRIKAIL GAS FIELD, BANGLADESH			SERVICE	**FAULT LEVEL CALCULATION**
PROJECT	60 MMSCFD SILICA GEL DEHYDRATION TYPE NATURAL GAS PLANT			TAG NO	
JOB NO	240			QUANTITY	

Generator KVA Rating	345	kVA			
Line to Line Voltage	400	V			
Line to Neutral Voltage	230	V			
Full Load Ampere	497.98	A			
Genset Alternator Percentage Impedance	12.5	%			

Fault at zero distance/terminal | | | | **Fault at zero distance/terminal**

Full Load Ampreres	498	A	**Full Load Ampreres**	498	A
Multiplier,M1	8		**Multiplier,M1**	8	
Fault at Generator terminal	**3984**	A	**Fault at Generator terminal**	**5976**	A
L-L Fault	**3.98**	kA	**L-N Fault**	**5.98**	kA
L-L-L Fault(AFC)	**4.58**	kA			

For BUSBAR GROUP E

Fault at some distance from terminal | | | | **Fault at some distance from terminal**

Distance from terminal, L	20	ft	**Distance from terminal, L**	20	ft
No. of Conductor,N	1		**No. of Conductor,N**	1	
Conductor factor,C	981		**Conductor factor,C**	981	
Factor,f	0.3517		**Factor,f**	1.0594	
Multiplier,M2	0.7398		**Multiplier,M2**	0.4856	
Fault after 1st distance	**2948**	A	**Fault after 1st distance**	**2901.95**	A
L-L Fault	**2.95**	kA	**L-N Fault**	**2.9**	kA
L-L-L Fault(AFC)	**3.39**	kA			

Note

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L-L Fault=Approx. 87% L-L-L Fault

Sub-transient Reactance Per Unit,Xd''=0.125

For low resistance Percent Impedance≈12.5%

Percent Reactance data is found from Generator

datasheet of Model No: PG345B3

Formula

For L-L Fault

$$FLA_{L-L} = \frac{KVA\,Rating*1000}{L-L\,Voltage}$$

$$Multiplier,\,M1 = \frac{100}{\%\,Percent\,Impedance}$$

$$Factor,\,f = \frac{1.732*L*I(SCA)}{N*C*E(L-L)}$$

For L-N Fault

$$FLA_{L-N} = \frac{KVA\,Rating*1000}{L-N\,Voltage}$$

$$Multiplier,\,M2 = \frac{1}{1+f}$$

$$Factor,\,f = \frac{1.732*L*I(SCA)}{N*C*E(L-N)}$$

I(SCA)= Short Circuit Current at the beginning of the circuit

L=Length of Cable

N=No. of Conductor Per Phase

C=Conductor factor(One over the impedance per foot)

E(L-L)=Phase to Phase Voltage or L-L Voltage

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