

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 1 of 22 Revision 1 Date of Issue 29 Dec 2021
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รายการวัสดุอุปกรณ์ เพื่องานวางระบบจำหน่ายก๊าซธรรมชาติ
และสถานีควบคุมความดันและวัดปริมาตรก๊าซธรรมชาติ
สายงานระบบท่อจัดจำหน่ายก๊าซธรรมชาติ
บริษัท ปตท. จำกัด (มหาชน)
Natural Gas Distribution Approved Equipment and Material List
(NGR AEML)
PTT Public Company Limited

ลงนาม

(นายสรรวิศ อุยวัฒน์นา)

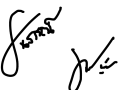
ผู้จัดการฝ่ายวิศวกรรมและบริหารโครงการท่อจัดจำหน่ายก๊าซธรรมชาติ
ประธานคณะทำงาน

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 2 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

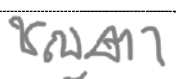
As a result of natural gas market expansion in terms of demand and competition, it is required to improve capability of Natural Gas Distribution (NGR) to be more competitive. Natural Gas Distribution Approved Equipment and Material List (NGR AEML) committee realized that by developing NGR AEML, this will help in material selection and construction of NGR system for metering and regulating station.

NGR AEML is a tool developed in order to strictly control all NGR projects to meet standard requirement and to maximize efficiency of natural gas delivery. It will also enhance spare part preparation during operation and maintenance to be easily accessible and convenient for use.

To sum up, the NGR AEML shall be used starting from January 2018 for all projects developed by NGR department.



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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 3 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

Conditions for NGR AEML Approval

1. For Changing, relocating or adding new plant-based, vendor must request PTT for new plant-based approval at all cases
2. PTT reserve the rights, at its sole discretion, to remove the equipment or material which found problems and has poor performance during operation from NGR AEML. Vendor can dispute this removal within 2 months after the announcement in PTT web page. No further disputes or complaints can be made after this due date
3. PTT reserve the rights, at its sole discretion, to remove the equipment or material which vendor cannot be contacted, or manufacturer is out-of-date from NGR AEML Vendor can dispute this removal within 2 months after the announcement in PTT web page. No further disputes or complaints can be made after this due date.
4. During approval process, if vendor does not respond inquiry from PTT for more than 2 months, the request for NGR AEML approval will be automatically cancelled
5. All equipment and material lists required for the NGR AEML approval must have at least one authorized representative in Thailand

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 4 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

Content

	Page
1. Valve	
1.1. Ball Valve	6
1.2. Butterfly Valve	7
1.3. Plug Valve	7
1.4. Check Valve	7
1.5. Globe Valve	7
2. Line Pipe	
2.1 Line Pipe	8
3. Pipeline Fitting	
3.1. Split Tee	9
4. Coating	
4.1. Underground Pipe Coating	10
4.2. Aboveground Pipe Coating	12
4.3. Underground Valve Wrapping	14
4.4. Coating Plant	15
5. Vessels and Mechanical Equipment	
5.1 Filter	16
6. Pressure Control Equipment	
6.1. Pressure Regulator	17
6.2. Safety Shut off Valve	17
6.3. Pressure Safety Relief Valve	17
7. Gas Measurement Equipment	
7.1 Turbine Meter	18
7.2 Volume Corrector	18

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 5 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

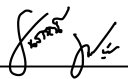
7.3 Ultrasonic Meter (for custody transfer)	18
8. Instrument & Control Equipment	
8.1 Instrument Valve/Fitting	19
8.2 Manifold Valves for Pressure Gauge	19
8.3 Manifold Valves for Pressure Transmitter	19
8.4 Pressure and Temperature Indicator	19
8.5 Pressure Transmitter and Temperature Transmitter	19
9. Electrical System	
9.1 Explosion Protected Equipment	20
10. CP System	
10.1 Rectifier	21
10.2 Signal Converter	21
10.3 DC De-coupler	21
11. HDPE Line Pipe and Equipment	
11.1 HDPE Line Pipe	22
11.2 HDPE Valve	22
11.3 HDPE Fitting	22

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2021

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 6 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

Appendix

	Page
Appendix 1 Pipeline Classification	A-1
Appendix 2 Country Code (ISO 3166-1 alpha-2)	A-2

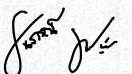


1. Valve

Item	Product	Brand	Plant Base	Year Qualified	Remark
1.1	Ball Valve				
		Bohmer	DE	2021	
		Bohmer	CN	2021	For ANSI Class 150 only
		Cameron	US IT	2021	
		Dafram	IT	2021	
		Dela Foglia	IT	2021	
		Kitz	JP	2021	
		Kuka	KR	2021	For ANSI Class 150 only
		LVF	IT	2021	
		MIR Valve	MY	2021	
		MSA	CZ	2021	Split Body Only
		Perar	IT	2021	
		Pibiviesse	IT	2021	
		RMA	DE	2021	
		SCHUCK	DE	2021	
		Sferova	IT	2021	
		Valbart	IT	2021	
		Valvitalia	IT	2021	

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 8 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

Item	Product	Brand	Plant Base	Year Qualified	Remark
1.2	Butterfly Valve				
		Crane	AU	2021	
		Ebro	TH	2021	
		Pietro Fiorentini	IT CN	2021	
1.3	Plug Valve				
		Cameron	IT US	2021	
		Galli & Cassina	IT	2021	
		Nordstrom	US	2021	
		Serck Audco	GB	2021	
		Valvitalia	IT	2021	
1.4	Check Valve				
		Crane	US	2021	
		Mokveld	ND	2021	
		Tom Wheatley	US	2021	
		Valvosider	IT	2021	
		Valvitalia	IT	2021	
1.5	Globe Valve				
		Cameron	IT US	2021	
		Crane	US	2021	
		Kitz	JP	2021	
		Petrol Valve	IT	2021	
		Valvosider	IT	2021	
		Valvitalia	IT	2021	



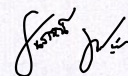
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8/22/21

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 9 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

2. Line Pipe

Item	Product	Brand / Manufacturer	Plant Base	Year Qualified	Remark
2.1	Line Pipe				
		Bao Steel	CN	2021	
		EEW	MY	2021	
		HI Steel	KR	2021	
		Husteel	KR	2021	ERW only
		JFE / Marubeni Itochu	JP	2021	
		Nippon Steel and Sumitomo Metal	JP	2021	
		Panyu Chu Kong	CN	2021	
		Seah	KR	2021	
		Vallourec (Anhui Tianda)	CN	2021	Seamless, up to 12" only
		Welspun	IN	2021	
		Man Industries	IN	2021	SAW, DSAW
		Jiangsu Yulong	CN	2021	Non-Sour Service Only
		Seah Steel Vina	VN	2021	ERW, Non-Sour Service, Up to API5L X52 only
		Hyundai Steel	KR	2021	Manufactured by 265, Yeompo-dong-Buk-ku, Ulsan, Korea only



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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 10 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

3. Pipeline Fitting

Item	Product	Brand	Plant Base	Year Qualified	Remark
3.1	Split Tee & Completion Plug (Lock-O-Ring)				
		RMA	DE	2021	
		TDW	US	2021	
		WELDFIT	US	2021	

4. Coating

Item	Type of Coating	Brand	Model	Plant Base	Application		REMARK
					Applied to	Type of Work	
4.1	Underground Pipe Coating						
4.1.1	Liquid Epoxy (For application on condensed surface)						
		3M	Scotchkote 323	US	Pipe/ Field Joint	New Construction, Repair, Repair for FBE.	Plural spray application.
			Scotchkote 151UW*	US	Pipe	Repair for condensed pipe, underwater pipe, splash zone area.	-
			Scotchkote 328	US	Pipe/ Field Joint	New Construction, Repair, Repair for FBE.	Plural spray application.
		Canusa	Canusa HBE95	US	Pipe/ Field Joint	New Construction, Repair, Repair for FBE.	Plural spray application.
		International	Enviroline 376- F30	US	Pipe/ Field Joint	New Construction, Repair, Repair for FBE.	Plural spray application.
			Interzone 954*	US	Pipe/ Field Joint	Repair for condensed pipe.	-


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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 11 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

	Powercrete	Powercrete R-65/F1	US MX BE	Field Joint	New Construction, Repair, Repair for FBE.	Applied only by man. Cannot be applied by plural spray.
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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 12 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

Item	Type of Coating	Brand	Model	Plant Base	Application		REMARK
					Applied to	Type of Work	
4.1.3	Mastic Coating						
		Stopaq	All	US	Pipe/ Field Joint	New Construction, Repair.	Only for top-up filling at the connection of two different types of coating.
		Viscotag	Viscowrap-HT, Viscosleeve, ViscotagPE	US NL	Pipe/ Field Joint	New Construction, Repair.	
4.1.4	Heat Shrinkable Sleeve with epoxy as 1st layer						
		Canusa-CPS	GTS Series	CA	Field Joint	New Construction, Repair.	Use with Canusa E primer.
			TBK Series	CA	Field Joint	Horizontal Directional Drilling (HDD).	
		Covalence	HTLP60	US MX BE	Field Joint	New Construction, Repair.	Use with S1301M epoxy primer, S1137 mastic filler.
			Dirax	US MX BE	Field Joint	Horizontal Directional Drilling (HDD).	
4.1.5	PE Repair Stick						
		Canusa-CPS	Melt Stick : MS-1F 25-300	CA	Pipe		
		Covalence	PERP80	US MX BE	Pipe	For Open Trench.	Use with S1137 mastic filler.
			PERP60E	US MX BE	Pipe	For HDD, Trenchless.	

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 13 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

Item	Brand	System detail	Coating system		Repair system	
			Model	Dry Film Thickness (micron)	Model	Dry Film Thickness (micron)
4.2	Aboveground Pipe Coating					
4.2.1	3-layer coating					
	JBP	Primer	PTT-1696	60-75	PTT-1696	60-75
		Intermediate	PTT-5532	125-135	PTT-5532	125-135
		Final coat	PTT-41-245	50-75	PTT-41-245	50-75
	Jotun	Primer	Resist 78	75	Resist 78	75
		Intermediate	Penguard Express	125	Penguard Express	125
		Final coat	Hard Top as Aluminium	50	Hard Top as Aluminium	50
	TOA Chukoku	Primer	Galbon S HB100	75	Epicon Zinc HB-2	75
		Intermediate	Epicon F H-S	165	Epicon F H-S	165
		Final coat	Uny Marine HS Silver	50	Uny Marine HS Silver	50

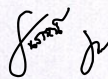
Item	Brand	System detail	Coating system		Repair system	
			Model	Dry Film Thickness (micron)	Model	Dry Film Thickness (micron)
4.2.2	4-layer coating					
	International Coatings	Primer	Interzinc 22	60	Interzinc 52	60
		Tie-coat	Intergard 269	30	Intergard 269	40
		Intermediate	Intergard 475 HS	150	Intergard 475 HS	150
		Final coat	Interthane 990	50	Interthane 990	50
	Jotun	Primer	Resist 86	60	Barrier	50
		Tie-coat	Penguard Tie coat 100	30	Penguard Tie coat 100	50
		Intermediate	Jotamastic 87	150	Jotamastic 87	150
		Final coat	Hardtop AS	50	Hardtop AS	50
	TOA Chugoku	Primer	Galbon S-HB	60	Epicon Zinc HB-2	60
		Tie-coat	Epicon Tie Coat B	30	Epicon Tie Coat B	40
		Intermediate	Epicon F-HS	150	Epicon F-HS	150
		Final coat	Uny Marine HS Silver	50	Uny Marine HS Silver	50

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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 14 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

Item	Type of Coating	Brand	Model	Plant Base	Application		REMARK
					Applied to	Type of Work	
4.3	Underground Valve Wrapping						
4.3.1	Mastic Coating						
		Stopaq	All	US	Pipeline, Valve	New construction, Repair	-
		Viscotaq	Viscopaste- ST, Viscopaste- HT, ViscotaqPE Visosealant	US NL	Pipeline, Valve	New construction, Repair	Use Viscotaq PE or Viscotaq PVC for Top coat.
		Polyguard	RD-6	US	Pipeline, Valve	New construction, Repair	
		Canusa	Wrapid Bond (WB), Wraprid Bond FST (WB-FST)	CA	Pipeline, Valve	New construction, Repair	


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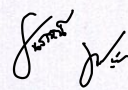
Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 15 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

Item	Product	Brand	Plant Base	Year Qualified	Remark
4.4	Coating Plant for Pipeline				
		Bao Steel	CN	2021	
		Dareyuk	KR	2021	Distribution only
		EEW	MY	2021	
		Jindal	IN	2021	
		NCPSPC	CN	2021	
		Nippon Steel and Sumitomo Metal	JP	2021	Up to 24" pipe only
		Panyu Chu Kong	CN	2021	
		PCI	ID	2021	
		Welspun	IN	2021	
		Wistco	KR	2021	
		Man Industries	IN	2021	
		Jiangsu Yulong	CN	2021	

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 16 of 22 Revision 1 Date of Issue 29 Dec 2021
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5. Vessels and Mechanical Equipment

Item	Product	Brand	Plant Base	Year Qualified	Remark
5.1	Filter				
		Forain	IT	2021	
		Jord	MY AU KR	2021	
		Peerless	US	2021	
		Perry (PECO)	US	2021	
		Pietro Fiorentini	IT	2021	For inlet and outlet pipe 12" and smaller, ANSI Class 600 and higher
			CN (Shang hai)	2021	For inlet and outlet pipe 12" and smaller, ANSI Class 300 and lower
		Scan Inter	TH	2021	For inlet and outlet pipe 12" and smaller, ANSI Class 600 and higher
		Tartarini	IT	2021	For inlet and outlet pipe 12" and smaller, ANSI Class 600 and higher
		Tormene Americana	AR	2021	For inlet and outlet pipe 12" and smaller, ANSI Class 300 and lower
		Valvitalia	IT	2021	



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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 17 of 22 Revision 1 Date of Issue 29 Dec 2021
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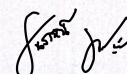
6. Pressure Control Equipment

Item	Product	Brand	Plant Base	Year Qualified	Remark
6.1	Pressure Regulator				
		Fisher	US JP	2021	
		Honeywell (RMG)	DE GB	2021	
		Pietro Fiorentini	IT	2021	
		Tartarini	IT	2021	On hold model 971 and similar models of bodies and/or silencers design
		Tormene Americana	AR	2021	
6.2	Safety Shut Off Valve				
		Honeywell (RMG)	DE GB	2021	
		Pietro Fiorentini	IT	2021	
		Tartarini	IT	2021	
		Tormene Americana	AR	2021	
6.3	Pressure Safety Relief Valve				
		Anderson Greenwood	US	2021	
		Consolidated	US	2021	
		Crosby	US	2021	
		Farris	US	2021	
		Mercer	US	2021	
		Leser	DE	2021	

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 18 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

7. Gas Measurement Equipment

Item	Product	Brand	Plant Base	Year Qualified	Remark
7.1	Turbine Meter				
		Elster-Instromet	DE	2021	
		FMG	NL	2021	
		Vemm Tec	DE	2021	
		Pietro Fiorentini	IT	2021	
7.2	Volume Corrector				
		Elster-Instromet	DE	2021	Model EK280.
		Itron	FR	2021	Model Corus PTZ
			DE		
7.3	Ultrasonic Meter (for custody transfer)				
		Cameron	US	2021	Model CALDON 380Ci or better
		Elster-Instromet	NL	2021	Model Qmax Series or better
		Krohne	DE	2021	Model Altosonic V12 or better
		SICK	DE	2021	Model FLOWSIC600-XT Forte or better
		Daniel	US	2021	Model 3418 or better



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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 19 of 22 Revision 1 Date of Issue 29 Dec 2021
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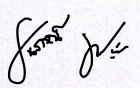
8. Instrument & Control Equipment

Item	Product	Brand	Plant Base	Year Qualified	Remark
8.1	Instrument Valve / Fitting				
		Swagelok	US	2021	
		Parker	US	2021	
8.2	Manifold Valves for Pressure Gauge				
		Ashcroft	US	2021	
		Anderson Greenwood	US	2021	
		Parker	US	2021	
		Swagelok	US	2021	
		HOKE	US	2021	
8.3	Manifold Valves for Pressure Transmitter				
		Parker	US	2021	
		Rosemount	US	2021	
		Swagelok	US	2021	
		HOKE	US	2021	
8.4	Pressure and Temperature Indicator				
		Ashcroft	US	2021	
		ITEC	IT	2021	
		Rueger SA	CH	2021	
		Wika	DE	2021	
		Baumer	FR CH	2021	
8.5	Pressure and Temperature Transmitter				
		Rosemount	US	2021	
		Yokogawa	International	2021	

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 20 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

9. Electrical System

Item	Product	Brand	Plant Base	Year Qualified	Remark
9.1	Explosion Protected Equipment				
9.1.1	Explosion proof Electric Equipment (Power Receptacle, Plugs, Switch, EX Lighting, Junction box, Control station)				
		Alloy	TH	2021	
		Bartec	DE	2021	
		Bosston	TH	2021	
		Crouse-Hinds	US	2021	
		Hawke	US	2021	
		Weidmuller (Klippon)	DE	2021	
		Warom	CN	2021	
		Appleton	US FR CN	2021	Junction Box Only
9.1.2	Explosion proof cable fitting and accessories				
		Crouse-Hinds	US	2021	
		Hawke	USA	2021	
		STAHL	DE	2021	
		CCG	ZA	2021	


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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page 21 of 22 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	---

10. CP System

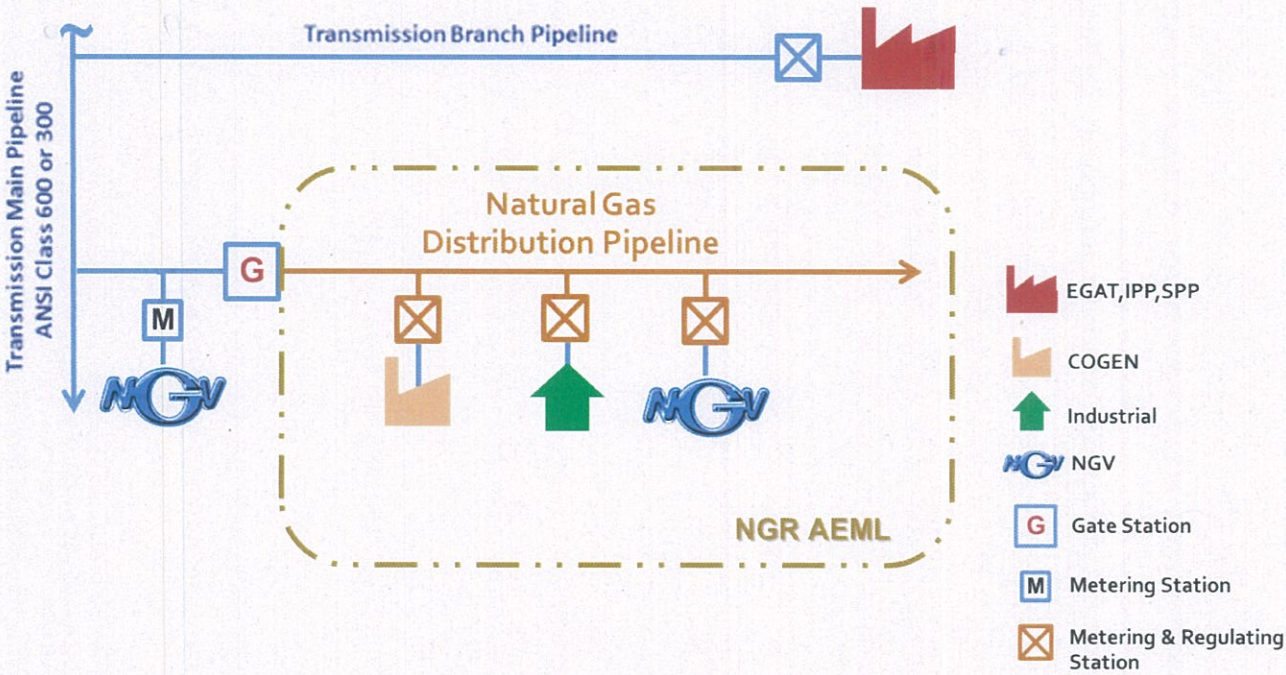
Item	Product	Brand	Plant Base	Year Qualified	Remark
10.1	Rectifier				
		Corpro	US	2021	
		Universal	US	2021	
10.2	DC De-coupler				
10.2.1	Solid state type				
		Dairy Land Electrical Industries	US	2021	Model PCR series: For installation in hazardous area such as across isolating flange/joint. Model SSD: For underground installation such as to isolate the ground mat.
10.2.2	Liquid state type				
		Kirkcell	US	2021	For installation in hazardous area such as across isolating flange/joint.

11. HDPE Line Pipe and Fitting

Item	Product	Brand	Plant Base	Year Qualified	Remark
11.1	HDPE Line Pipe				
		Agro	AT	2021	
		EGEPLAST	DE	2021	
		Georg Fischer	DE	2021	
11.2	HDPE Valve				
		Agro	AT	2021	
		FIRATEC	DE	2021	
		Georg Fischer	CH	2021	
11.3	HDPE Fitting				
		Agro	AT	2021	
		FIRATEC	DE	2021	
		Georg Fischer	CH	2021	

Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page A-1 Revision 1 Date of Issue 29 Dec 2021
--------------------------	---	--

Appendix 1: Pipeline Classification



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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page A-2 Revision 1 Date of Issue 29 Dec 2021
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Appendix 2: Country Code (ISO 3166-1 alpha-2)

Country Name	Code	Country Name	Code	Country Name	Code
Afghanistan	AF	Cyprus	CY	Kiribati	KI
Aland Islands	AX	Czech	CZ	Korea (North)	KP
Albania	AL	Denmark	DK	Korea (South)	KR
Algeria	DZ	Djibouti	DJ	Kuwait	KW
American Samoa	AS	Dominica	DM	Kyrgyzstan	KG
Andorra	AD	Dominican Republic	DO	Lao	LA
Angola	AO	Ecuador	EC	Latvia	LV
Anguilla	AI	Egypt	EG	Lebanon	LB
Antarctica	AQ	El Salvador	SV	Lesotho	LS
Antigua and Barbuda	AG	Equatorial Guinea	GQ	Liberia	LR
Argentina	AR	Eritrea	ER	Libya	LY
Armenia	AM	Estonia	EE	Liechtenstein	LI
Aruba	AW	Ethiopia	ET	Lithuania	LT
Australia	AU	Falkland Islands	FK	Luxembourg	LU
Austria	AT	Faroe Islands	FO	Macao	MO
Azerbaijan	AZ	Fiji	FJ	Macedonia	MK
Bahamas	BS	Finland	FI	Madagascar	MG
Bahrain	BH	France	FR	Malawi	MW
Bangladesh	BD	French Guiana	GF	Malaysia	MY
Barbados	BB	French Polynesia	PF	Maldives	MV
Belarus	BY	French Southern Territories	TF	Mali	ML
Belgium	BE	Gabon	GA	Malta	MT
Belize	BZ	Gambia	GM	Marshall Islands	MH
Benin	BJ	Georgia	GE	Martinique	MQ
Bermuda	BM	Germany	DE	Mauritania	MR
Bhutan	BT	Ghana	GH	Mauritius	MU
Bolivia	BO	Gibraltar	GI	Mayotte	YT
Bonaire	BQ	Greece	GR	Mexico	MX
Bosnia and Herzegovina	BA	Greenland	GL	Micronesia	FM
Botswana	BW	Grenada	GD	Moldova	MD
Bouvet Island	BV	Guadeloupe	GP	Monaco	MC
Brazil	BR	Guam	GU	Mongolia	MN
British Indian Ocean Territory	IO	Guatemala	GT	Morocco	MA
Brunei Darussalam	BN	Guernsey	GG	Mozambique	MZ
Bulgaria	BG	Guinea	GN	Myanmar	MM
Burkina Faso	BF	Guinea-Bissau	GW	Namibia	NA
Burundi	BI	Guyana	GY	Nauru	NR
Cabo Verde	CV	Haiti	HT	Nepal	NP
Canada	CA	Heard Island and McDonald Islands	HM	Netherlands	NL
Cayman Islands	KY	Holy See	VA	New Caledonia	NC
Central African Republic	CF	Hungary	HU	New Zealand	NZ
Chad	TD	Iceland	IS	Nicaragua	NI
Chile	CL	India	IN	Niger	NE
China	CN	Indonesia	ID	Nigeria	NG
Christmas Island	CX	Iran	IR	Niue	NU
Cocos Islands	CC	Iraq	IQ	Norfolk Island	NF
Colombia	CO	Ireland	IE	Northern Mariana Islands	MP
Comoros	KM	Isle of Man	IM	Norway	NO
Congo	CG	Israel	IL	Oman	OM
Congo (Democratic Republic of the)	CD	Italy	IT	Pakistan	PK
Cook Islands	CK	Jamaica	JM	Palau	PW
Costa Rica	CR	Japan	JP	Palestine, State of	PS
Cote d'Ivoire	CI	Jersey	JE	Panama	PA
Croatia	HR	Jordan	JO	Papua New Guinea	PG
Cuba	CU	Kazakhstan	KZ	Paraguay	PY
Curacao	CW	Kenya	KE	Peru	PE

Prepared by: Secretary Team

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Natural Gas Distribution	Natural Gas Distribution Approved Equipment and Material List (NGR AEML)	Page A-3 Revision 1 Date of Issue 29 Dec 2021
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Appendix 2: Country Code (ISO 3166-1 alpha-2) (Continued)

Country Name	Code	Country Name	Code	Country Name	Code
Philippines	PH	Saint Maarten (Dutch part)	SX	Tonga	TO
Pitcairn	PN	Slovakia	SK	Trinidad and Tobago	TT
Poland	PL	Slovenia	SI	Tunisia	TN
Portugal	PT	Solomon Islands	SB	Turkey	TR
Puerto Rico	PR	Somalia	SO	Turkmenistan	TM
Qatar	QA	South Africa	ZA	Turks and Caicos Islands	TC
Reunion Réunion	RE	South Georgia and the South Sandwich Islands	GS	Tuvalu	TV
Romania	RO	South Sudan	SS	Uganda	UG
Russian Federation	RU	Spain	ES	Ukraine	UA
Rwanda	RW	Sri Lanka	LK	United Arab Emirates	AE
Saint Barthelemy	BL	Sudan	SD	United Kingdom of Great Britain and Northern Ireland	GB
Saint Helena, Ascension and Tristan da Cunha	SH	Suriname	SR	United States of America	US
Saint Kitts and Nevis	KN	Svalbard and Jan Mayen	SJ	United States Minor Outlying Islands	UM
Saint Lucia	LC	Swaziland	SZ	Uruguay	UY
Saint Martin	MF	Sweden	SE	Uzbekistan	UZ
Saint Pierre and Miquelon	PM	Switzerland	CH	Vanuatu	VU
Saint Vincent and the Grenadines	VC	Syrian Arab Republic	SY	Venezuela	VE
Samoa	WS	Taiwan	TW	Viet Nam	VN
San Marino	SM	Tajikistan	TJ	Virgin Islands (British)	VG
Sao Tome and Principe	ST	Tanzania	TZ	Virgin Islands (U.S.)	VI
Saudi Arabia	SA	Thailand	TH	Wallis and Futuna	WF
Senegal	SN	Timor-Leste	TL	Western Sahara	EH
Serbia	RS	Togo	TG	Yemen	YE
Seychelles	SC	Tokelau	TK		