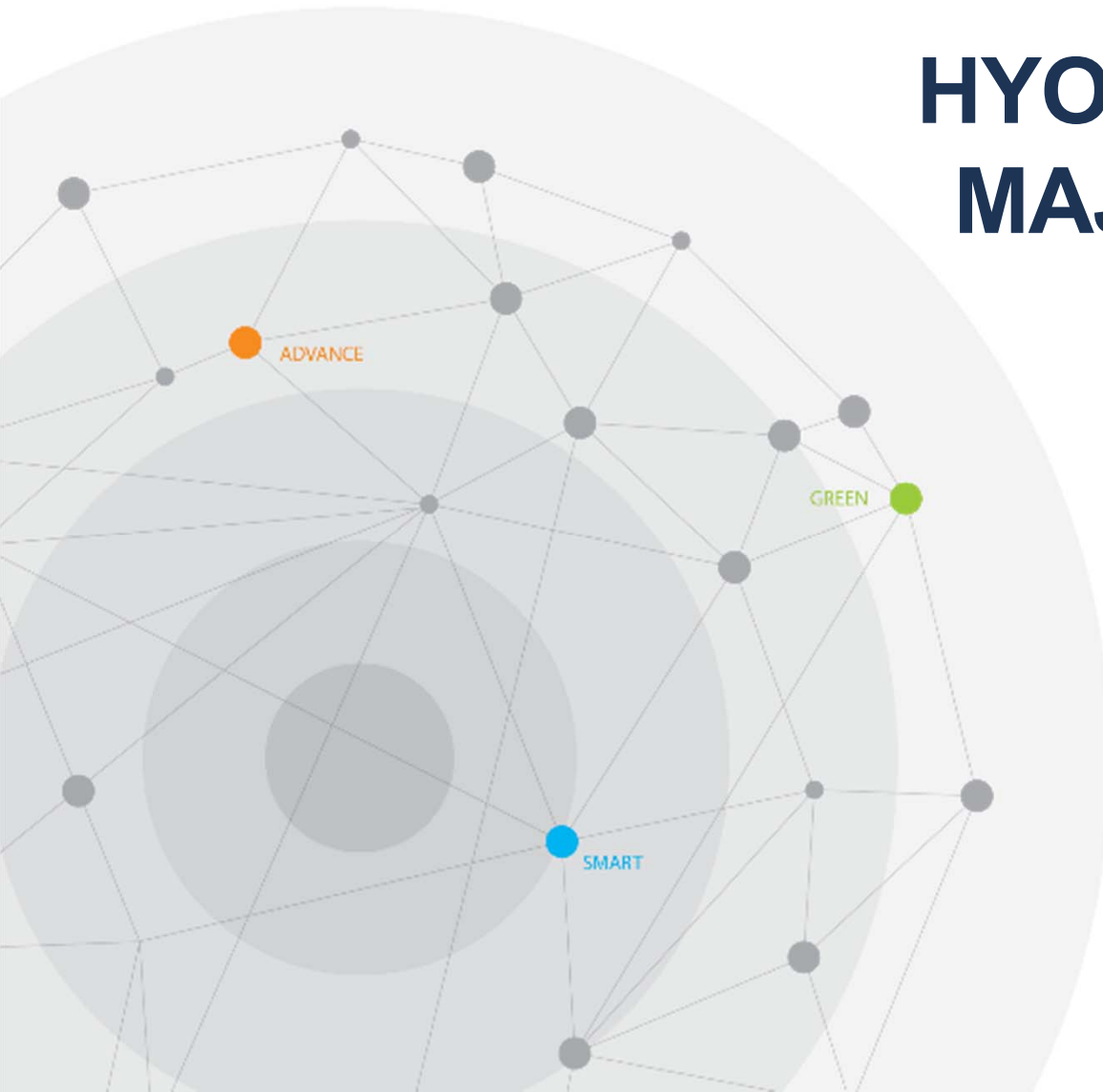


Global Top Pump Solutions Provider
HYOSUNG GOODSPRINGS

HYOSUNG GOODSPRINGS MAJOR REFERENCE LIST



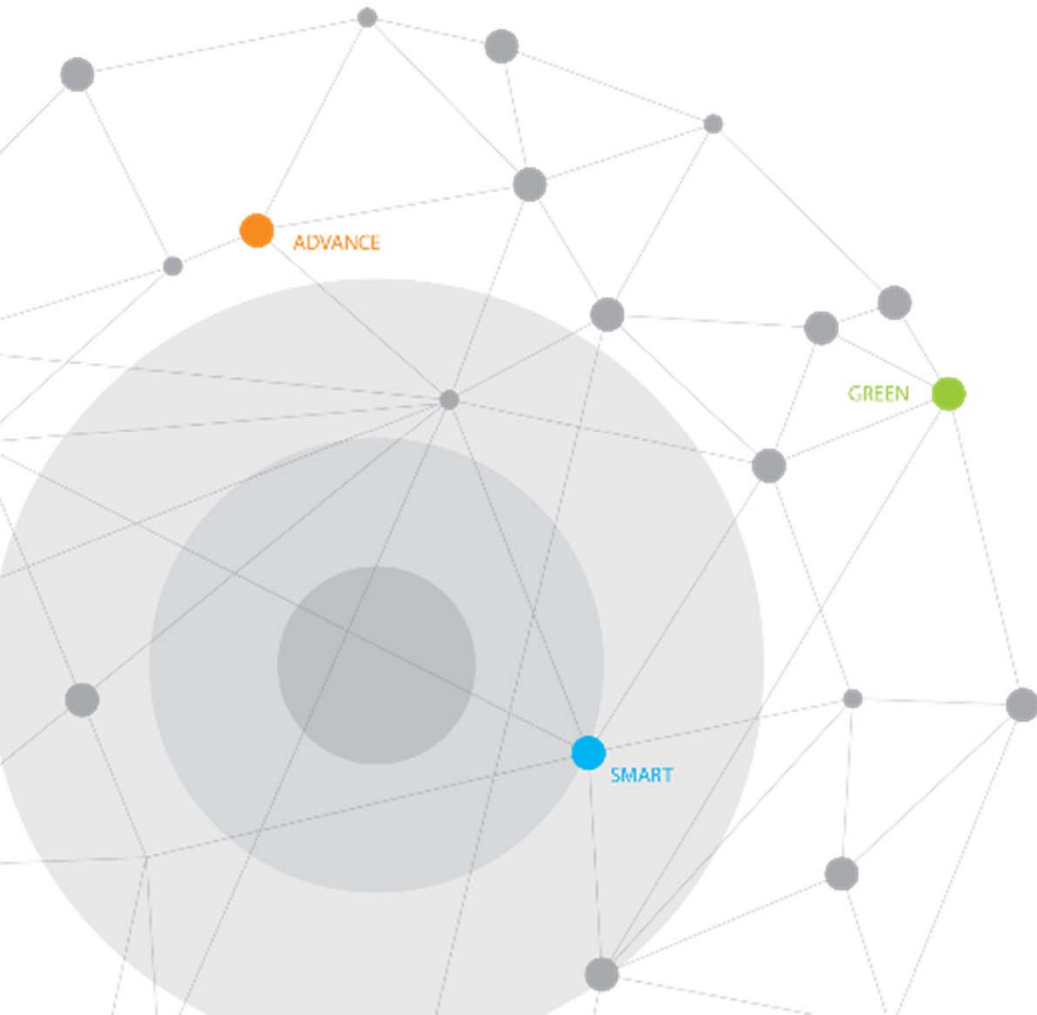
Apr, 2018



II

Products & Services

- Pumps for Oil & Gas Plant
- Pumps for Thermal & Combined Cycle Power Plant
- Pumps for Nuclear Power Plant
- Pumps for Water
- Pumps for Desalination Plant
- Pumps for Offshore
- Pumps for Cryogenic



Worldwide Reference of API 610 Pumps

KNPC / Clean Fuels Project



EPC : See below table

End User : KNPC

Site Location : Kuwait

Delivery : 2016



Package	EPC	Q'ty
MAA	JGC (Japan)	32
	SK E&C (Korea)	126
	GS E&C (Korea)	29
	Sub Total	219
MAB-1	Petrofac (UAE)	16
	CB&I (Netherlands)	3
	Samsung Engineering (Korea)	8
	Sub Total	42
Total		261

Service	Process	Type	Flow (m3/hr)	Head (m)	Temp. (°C)	RPM
KERO Charge Pump	DHT	BB5	324	1,182	150	2970
FEED Charge Pump	DHT	BB5	586	1,208	142	2970
Wash Oil Pump	DHT	BB5	557	1,191	65	2970
Crude Feed Pump	CDU	BB2	1,980	373	20	1470
Middle Around Pump	CDU	BB2	3,239	173	219	1480
Bottom Around Pump	CDU	BB2	2,990	198	315	980
HVGO Pump	VRU	BB2	1,079	344	302	1480 ₃

Worldwide Reference of API 610 Pumps

ExxonMobil / Baytown Ethane Cracker Project

EPC : Linde, Germany
End User : ExxonMobil
Site Location : Baytown, TX
Total Q'ty : 8 item / 15 sets

Total Q'ty : 8 item / 15 sets
 with OH2, BB1, BB2, BB5 & VS1 pumps



Spec	:	72.9m ³ /h X 515m X 185kW
Model	:	SBR 80 / 7 stages
Remark	:	Steam Turbine Driven



Spec	:	1,377m ³ /h X 63.1m X 350kW
Model	:	KDR 250-530 (BB2)
Remark	:	Steam Turbine Driven

Worldwide Reference of API 610 Pumps

Chevron Phillips NCP Polymer Project

EPC : Daelim Industry
End User : Chevron Phillips
Job Site : Saudi Arabia
Delivery : June 2009

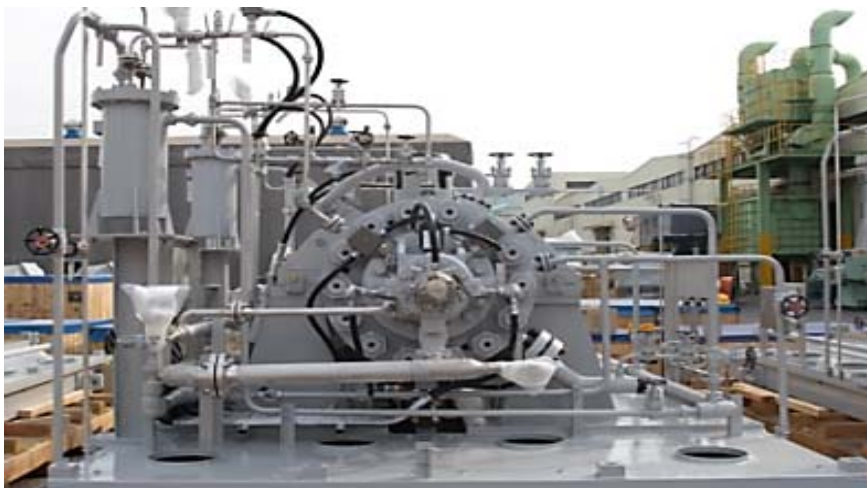


<Pump Description>

- Supplied 44 sets of API 610 including
- * **Reactor Feed Pumps (BB5, 4 stages)**
- * API VS6 / 2 Items 4 Sets
- * API BB1 / 4 Items 8 Sets

<Notable Facts>

- Major service (Reactor Feed Pump) for Chevron Phillips



Spec	:	152m ³ /h X 806m X 325kW
Service	:	Reactor Feed Pump
Model	:	SBRD / 4 Stages (BB5)



Spec	:	150m ³ /h X 892.2m X 380kW
Service	:	Ethylene Recycle Pumps
Model	:	VPHB150 / 5 stages (VS6)
Remark	:	<i>Specific Gravity : 0.5</i>

Worldwide Reference of API 610 Pumps

SKIKDA Project

EPC	: Samsung Engineering
End User	: Sonatrach, Algeria
Package	: API Package
Delivery	: OCT 2010
Site	: Skikda, Algeria

Supplied Pump Description

- Totally 246 sets of API 610 including
 - * MP Boiler Feed Pumps (BB5, 4 stages)
 - * Crude Charge Pumps (BB2)
 - * Feed Charge Pumps (BB2)
 - * API 610 BB2 / 4 Items 11 Sets



Spec	: 180m ³ /h X 536m X 440kW
Service	: MP Boiler Feed Pump
Model	: SBRD / 4 Stages



Spec	: 1,548m ³ /h X 223.5m X 1,350kW
Service	: Crude Charge Pump
Model	: KDR300-900 (BB2)

Worldwide Reference of API 610 Pumps

Borouge 3 PE/PP Project

EPC : Tecnimont, Italy
End User : Borouge
Package : API Heavy Duty PKG
Delivery : SEP 2012
Site : Abu-Dhabi, U.A.E



Supplied Pump Description

- Totally 45 sets of API 610 including
- * **Reactor Feed Pump (BB5, 7 stages, SS316L)**
- * API 610 BB2 / 7 Items 9 sets
- * API 610 BB5 / 2 Items 4 sets
- * API BB1 / 3 Items 3 sets / OH2 16 Items 30 sets



Spec	: 198m³/h X 960m X 560kW
Service	: Propylene Reactor Feed Pump
Model	: SBRD 150 / 7 stages (BB5)
Remark	: SS316L / Specific Gravity 0.445



Spec	: 4,765m³/h X 23.1m X 410kW
Service	: CW Circulation Pump
Model	: KDR 750-1010 (BB2)

Worldwide Reference of API 610 Pumps

West Qurna Field 2nd Phase Project

EPC	: Samsung Engineering
End User	: LUKOIL, Russia
Package	: API Big Pump
Delivery	: June 2013
Site	: West Qurna, Iraq



Spec	: 1,200m ³ /h X 329m X 1,700kW
Service	: Export Oil Booster Pumps
Model	: VPLB 350 / 4 stage (VS6)



Supplied Pump Description

- Totally 37 sets of API 610 including
 - * Desalter PKG Feed Pump (BB2) / **Super Duplex**
 - * Water Disposal Pump (BB3, 7 Stage) / Duplex
 - * Export Oil / Booster Pump (BB2 / VS6)



Spec	: 295m ³ /h X 700m X 2,000kW
Service	: Export Oil Pumps
Model	: KDR 250-530 (BB2)

Worldwide Reference of API 610 Pumps

Saudi Aramco Project

EPC	: JGC
End User	: Saudi Aramco
Package	: Rehabilitation PKG
Delivery	: June 2015
Site	: Saudi Arabia



Spec	: 102.2m³/h X 934.5m X 280kW
Service	: C5+ Injection Pumps
Model	: SBR80 / 10 stages

Supplied Pump Description

أرامكو السعودية
Saudi Aramco



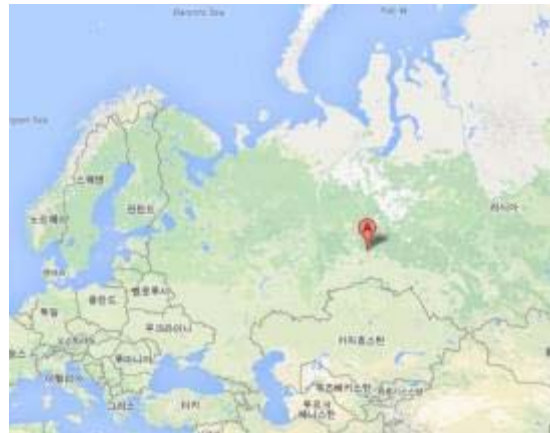
- Totally 3 sets of API 610 including
- * C5+ **Injection Pumps** (BB5 / 10 stages)

Other Aramco references	Type	Delivery
Jubail Export Refinery #5B	OH2 BB1	2012
KAPSARC Project	BB1	2011
	OH1	2011
	BB1	2011
Shaybah Project	OH2	2011
Manifa Project	OH2	2011
	OH2	2011
Jubail Export Refinery	VS1	2011
	VS1	2011
Jazan Refinery and Terminal Project	VS6	2014
RAM Terminal	BB5	2015
Jazan North & South Tank Farm	VS6	on hand
Jazan Refinery and Terminal	VS1	on hand

Worldwide Reference of API 610 Pumps

Sibur / Tobolsk Ethylene Cracker Unit

EPC : Linde, Germany
End User : Sibur
Site Location : Tobolsk, Russia
Total Q'ty : 2 item / 4 sets



<Cooling Water Pump Package>

Type	Q'Ty	Service Name	Description
VS1	2	Cooling Water Pump (Turbine Driven)	10,688m ³ /hr x 77m x 3,000kw x 600rpm
	2	Cooling Water Pump (Motor Driven)	

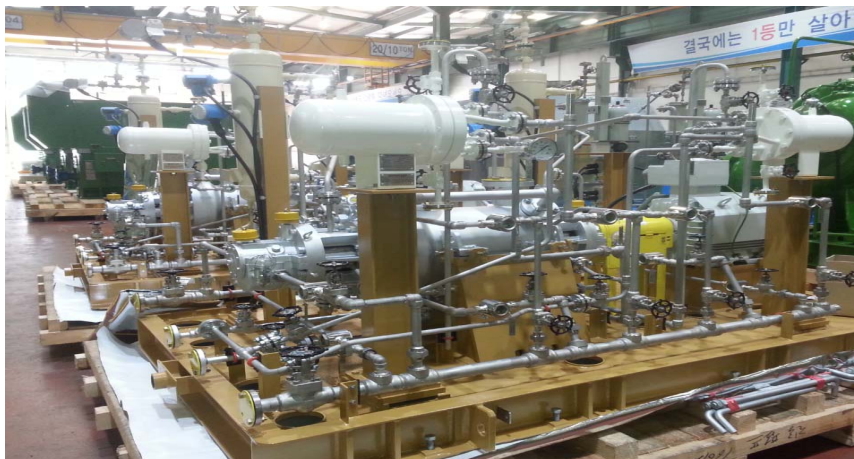
Worldwide Reference of API 610 Pumps

Esfahan Refinery Upgrading & Revamping Project (URP, ME-550)

EPC : Dorriz Engineering Company
 End User : Esfahan Oil Refinery Company
 Feed Company : Technip (France)
 Package : CDU Upgrading & Revamping
 Delivery : Nov. 2017

Supplied Pump Description

Totally 44 sets of API 610 including
 * Lean Oil Still BTM Product Pump (BB5, 2sets)
 * HGO Product Pump (BB5, 2sets)
 * Recontacted Naphtha Pump (BB5, 2sets)
 * OH2 (25sets) , BB2(12sets) , VS6(1set)



Spec	: 48.4m ³ /h X 315.8m X 45kW
Service	: Lean Oil Still BTM Product Pump
Model	: SBR80/6 stage (BB5)
Temp. :	290 °C



Spec	: 34.8m ³ /h X 221.1m X 37kW
Service	: HGO Product Pump
Model	: SBR50/5 stage (BB5)
Temp. :	327 °C

Worldwide Reference of API 610 Pumps

GazpromNeft / CORU Project (Moscow Refinery)



EPC : Tecnimont, Italy

End User : GazpromNeft

Site Location : Moscow, Russia

Delivery : 2017

<Pump Description>

- Total 51 Items, **100** sets of API 610

<Notable Facts>

- Low Ambient Temp. (-48°C)

- Russian Certificates (TR-CU, GOST, Technical Passport)

- High Pressure pumps with high temp. (over 200°C)

	Service	Type	Liquid	Flow (m3/h)	Head (m)	Power (kW)	Temp. (°C)	Q'ty
High Pressure API 610	Separator Pumps	BB3	Hydrocarbon	147	394	260	41	2
	Cracked Naphtha Charge Pumps	BB3		114	668	260	45	2
	SR Naphtha Charge Pumps	BB3		110	706	260	40	2
	Treating Reactor Charge Pumps	BB5		317	1,064	1,200	62	2
	Dewaxing Reactor Charge Pumps	BB5		362	254	300	203	2
	HP Lean Amine Pumps	BB3	Lean Amine	126	741	440	20	2
								12
API 610	Rich Amine Pumps, etc	BB2	Hydrocarbon,	145~945	56~239	75~260	40~ 350	16
	Heavy Naphtha Pumps, etc	OH2	Rich Amine, etc	3~206	23~249	3.7~160	20~249	70
	Blowdown Drum Pumps	VS6	Hydrocarbon	100	210	110	62	2
								88
Total								100

Worldwide Reference of API 610 Pumps

PEDEC(Affiliated with NIOC) / Azar Oil Field Development Project

EPC : Jahan Pars Engineering and Construction Co.
End User : Petroleum Engineering and Development Co. (PEDEC)
Project : Azar Oil Field Development (Treated Water Injection)
Delivery(Expected) : March 2019 (on hand)
Site : Azar Oil field, Mehran



Spec : 77.5m³/h X 3,164.3m X 1,850kW / 70.1°C / **7,200 RPM**

Service : **Water Injection Pumps**

Model : SBR80 / 10 stages(BB5)

Remark : **Inconel 625** Material



Spec : 77.5m³/h X 50m X 30kW / 70.1°C / 1,450 RPM

Service : Booster Pumps

Model : USP100-470 (OH2)

Remark : **Inconel 625** Material

▶ Worldwide Reference of API 610 Pumps

KOC(Kuwait Oil Company) / FEED Pipelines for New Refinery Project

EPC	: Saipem S.p.A
End User	: KOC (Kuwait Oil Company)
Project	: FEED Pipelines for New Refinery Project
Delivery(Expected)	: March 2019
Site	: Al Zour, Kuwait



Spec	: 1,223m ³ /h X 296m X 1,330kW (with Inverter)
Service	: Crude Oil Transfer Pumps
Model	: HDRP300-550A (BB1)

<Pipeline application – BB1>



<Pipeline application – BB3>



Worldwide Reference of API 610 Pumps Lordegan Ammonia & Urea complex

EPC : Hampa Engineering
End User : Lordegan Petrochemical
Site Location : Iran, Lordegan
Delivery : 2017
Licensors : Ammonia - Casale
 Urea - Stamicarbon

Supplied Pump Description

- Total **73** sets of API 610

<Notable Facts>

- **High pressure carbamate pump**
(BB5, Diffuser / Critical liquid / 8stages / 5200rpm)
- **High pressure ammonia pump**
(BB5, Volute / Critical liquid / 10stages / 6500rpm)
- **HPTR (Recovery turbine) Lean solution pump (Recovery power : 1950kw)**
(BB3, Volute / Motor+Hydraulic turbine driven with clutch)



<3sets of Lean solution pumps test with HPRT test>



Pump	HP Carbamate Pump	HP Ammonia Pump
Spec	: 84m³/h X 1287m X 1200kW X 5200 rpm	139m³/h X 2890m X 1200kW X 6500rpm
Model	: SBR80/8 stage (BB5)	SBV100/10 stage (BB5)
Remark:	Carbamate liquid	High speed / head

Worldwide Reference of API 610 Pumps

KIMA PJT

EPC : Tecnimont
End User : KIMA
Site Location : Egypt
Delivery : 2017
Licensors : Ammonia - Kellogg
 Urea - Stamicarbon

<Pump Description>

- Refer to below table

<Notable Facts>

- High pressure BB3 pump and big capacity vertical CWP



No.	Service Name	Type	Pump Model	Rated Flow m ³ /h	Rated Head m	Driver	
						Rating kW	Speed rpm
1	BFW CIRCULATING PUMPS	BB3	SAVD150/7(S)	214.5	666.2	600	2975
2	TREATED WATER PUMP	OH2	USP250-600	1,150	60.2	270	1450
3	RECOVERY UREA SOLUTION PUMP	OH2	USP25-160G	3.2	33	3.7	2950
4	COOLING WATER CIRCULATION	VS1	VMF1100-1080	12,859	39.5	1,750	591
5	COOLING WATER CIRCULATION	VS1	VMF350-420K	861	42.5	160	1450

Spec : 215m³/h X 666m X 600kW

Model : SAVD 150 / 7 stages (BB3)

Remark : Including steam turbine driven



Worldwide Reference of API 610 Pumps

Kermanshah Ammonia & Urea complex

EPC : NDEC
End User : Kermanshah P.C.
Site Location : Iran
Delivery : To be 2018
Licensors : Ammonia - Kellogg
 Urea - Stamicarbon

<Pump Description>

- 26 sets of API610 pumps including HPRT

<Notable Facts>

- High pressure BB5 pump with steam turbine
 - **HPRT (Hydraulic Power Recovery Turbine)** is designed for Lean solution pump's power recovery.



Spec	:	309m ³ /h X 1,416m X 1,890kW
Model	:	SBRD 150 / 9 stages (BB5)
Remark	:	Steam turbine driven

No.	Service Name	Type	Pump Model	Rated Flow m ³ /h	Rated Head m	Driver	
						Rating kW	Speed rpm
1	BOILER FEED WATER PUMP (Turbine)	BB5	SBRD150/9(B)	309.20	1,416.50	1,890.0	2970
2	BOILER FEED WATER PUMP	BB5	SBRD150/9(B)	309.20	1,416.50	1,700.0	2970
3	LEAN SOLUTION PUMPS	BB2	RTPD200-450	892.80	371.10	1,300.0	2950
4	LEAN SOLUTION PUMPS	BB2	RTPD200-450	892.80	371.10	1,300.0	2950
5	HPRT FOR LEAN SOLUTION PUMPS	BB1	HDR100-400T	703.60	264.80	Recovery 920kw	
6	SEMI-LEAN SOLUTION PUMPS	OH2	USP200-650	914.10	90.80	330.0	1450
7	AMDEA TRANSFER PUMP	OH2	USP40-160N	22.00	23.50	3.7	2950
8	WARM AMMONIA PRODUCT PUMPS	OH2	USP80-400	108.20	212.40	90.0	2970
9	aMDEA TRANSFER SUMP PUMP	VS1	VPL50/3	10.00	19.00	3.7	1470
10	Co2 STRIPPER QUENCH PUMPS	OH2	USP100-320N	151.70	29.70	22.0	1450
11	PROCESS CONDENSATE PUMPS	OH2	USP50-380	66.00	153.00	75.0	2950
12	COLD AMMONIA PRODUCT PUMPS	OH2	USP40-250N	41.20	80.50	15.0	2950
13	COLD AMMONIA PRODUCT PUMPS	OH2	USP40-250N	41.20	80.50	15.0	2950
14	PURGE GAS SCRUBBER PUMPS	OH3	VLA50-265G	6.40	103.20	22.0	2950
15	LOW PRESSURE CONDENSATE PUMP	OH3	VLA25-160G	2.60	32.10	3.7	2950
16	LOW PRESSURE CONDENSATE PUMP	OH2	USP40-285	15.00	81.60	15.0	2970
17	AMMONIA AQUEOUS PUMP	VS1	VPL100/4	60.00	121.20	45.0	2950

Worldwide Reference of API 610 Pumps Socar Ammonia & Urea complex

EPC : Samsung Engineering
End User : SOCAR
Site Location : Azerbaijan
Delivery : 2015
Licensors : Ammonia – Haldor Topsoe
 Urea - Stamicarbon

<Pump Description>

- 28 sets of API610 pumps including HPRT

<Notable Facts>

- High pressure BB5 pump with steam turbine has been supplied
 - CWP

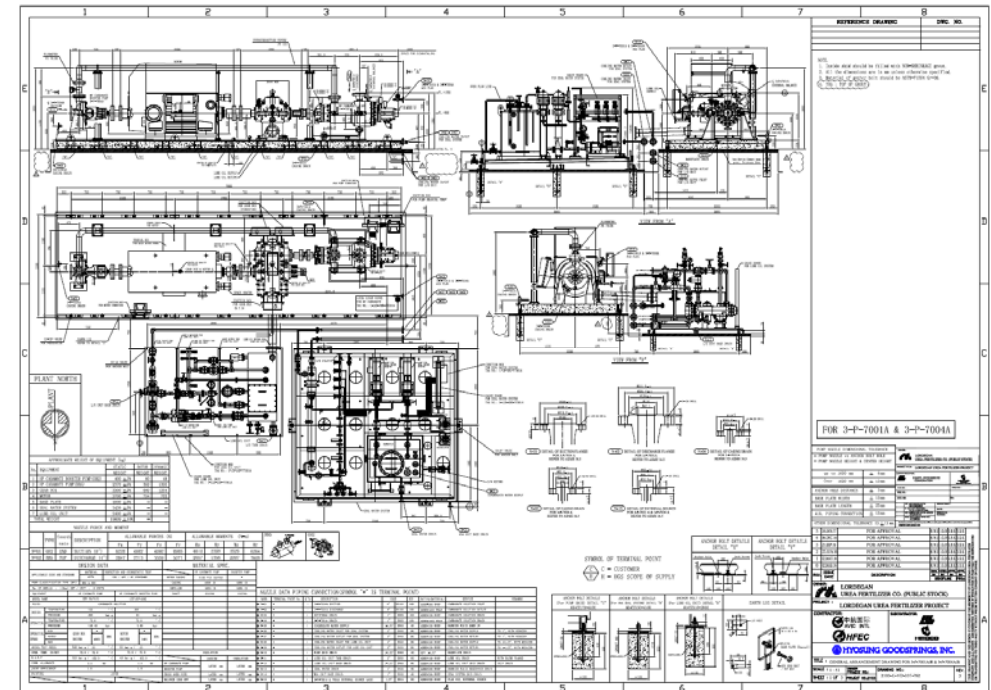
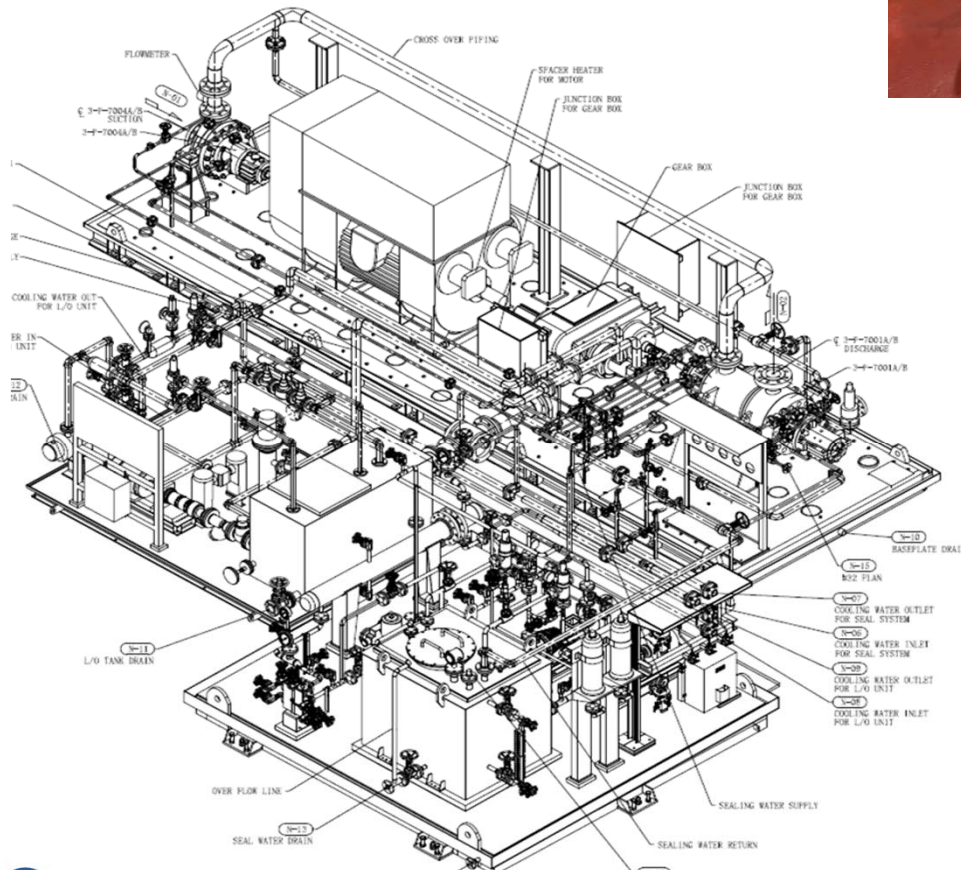


No.	Service Name	Type	Pump Model	Rated Flow m ³ /h	Rated Head m	Driver	
						Rating kW	Speed rpm
1	Cooling Water Pump	BB1	HDR800-970A	7800	51	1400	725
2	Cooling Water Pump	BB1	HDR250-400A	680	51	150	1450
3	PROCESS CONDENSATE PUMP NO.1	OH2	USP50-350	57	148	55	2950
4	PROCESS CONDENSATE PUMP NO.2	OH2	USP25-190	3	29.8	3.7	2950
5	Circulation Water Pump for Reflux Condenser	OH2	USP250-250	670	22.5	75	1450
6	PURIFIED CONDENSATE PUMP	OH2	USP50-160N	63	28.2	11	2950
7	MP FLUSH WATER PUMP	OH2	USPN40-430R	14	265.5	75	2950
8	BOILER FEED WATER CIRCULATION PUMP	OH2	USP150-320Y	300	28.3	37	1450
9	LEAN SOLUTION PUMPS	BB2	RTP100-500	366	411.2	750	2950
10	HP BOILER FEED WATER PUMPS	BB5	SBRD150/10	293	1527.5	1800	2970
11	MP BOILER FEED WATER PUMPS	BB3	SAVD150/6	288.5	657	710	2983
12	HYDROLYZER FEED PUMP	BB2	RTP50-380	69	261	90	2970

Spec	:	295.2m ³ /h X 1,538.4m X 1,800kW
Service	:	HP Boiler Feed Pumps
Model	:	SBRD 150 / 10 stages (BB5)
Remark	:	Steam Turbine Driven

Worldwide Reference of Fertilizer Pumps - Carbamate Pump

Spec	: 84m³/h X 1,257m X 650kW x 5000 rpm
Service	: HP Carbamate pumps
Model	: SBR80/8(X) 8 stages (BB5)
Remark	: <i>Double end shaft / Gear / Self interconnection pipe between booster pump to Main pump / #54 seal water supply system / Forced Lubrication</i>



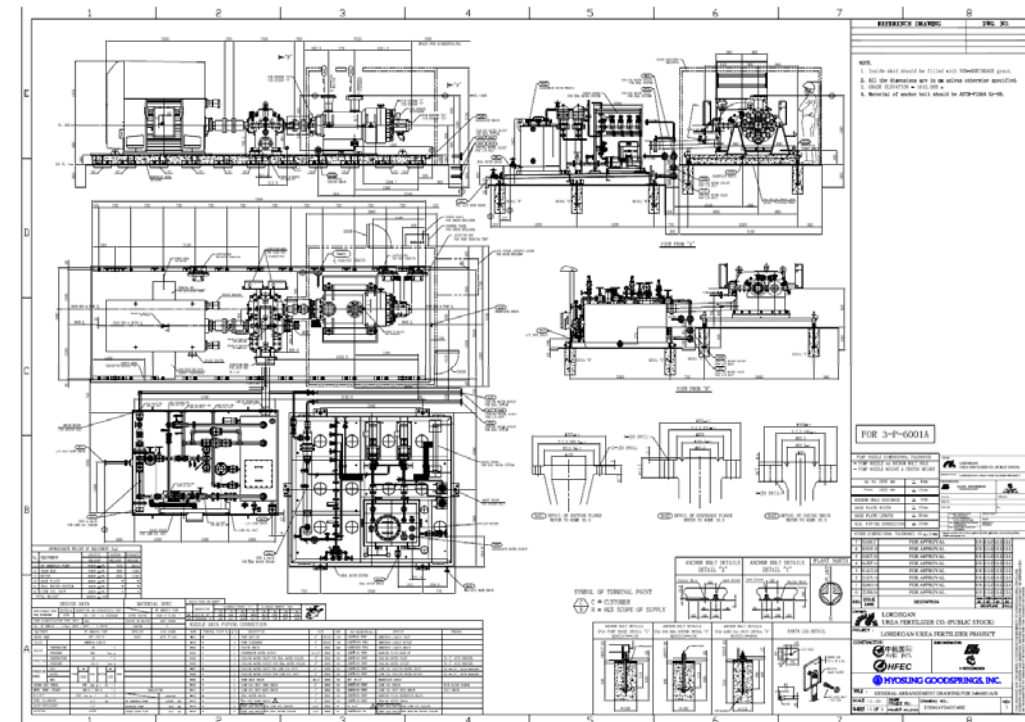
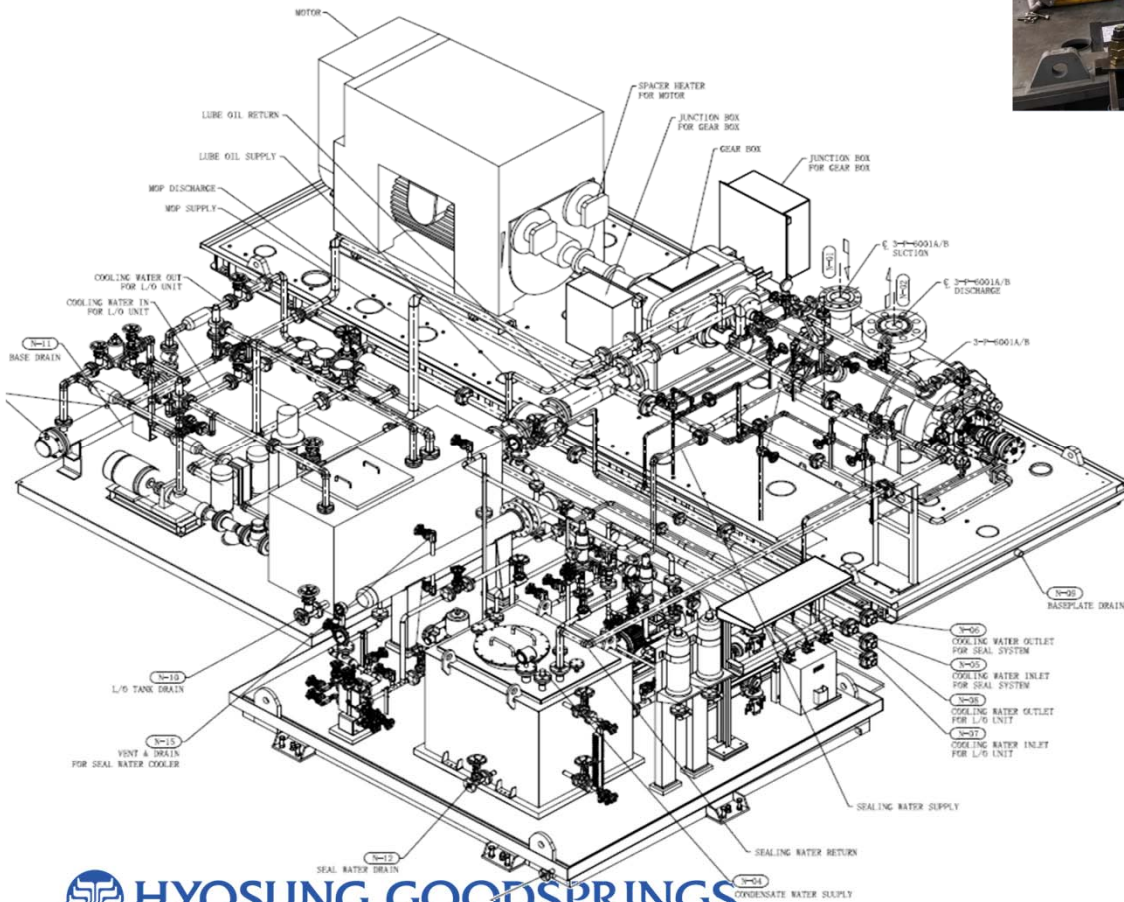
Worldwide Reference of Fertilizer Pumps – HP Ammonia Pump

Spec : 139m³/h X 2,890m X 1,200kW x 6,700 rpm

Service : **HP Ammonia pumps**

Model : SBV100/10 10 stages (BB5, Axial split)

Remark : *Axial split high pressure double casing #54 Seal water supply system with Forced lubrication*

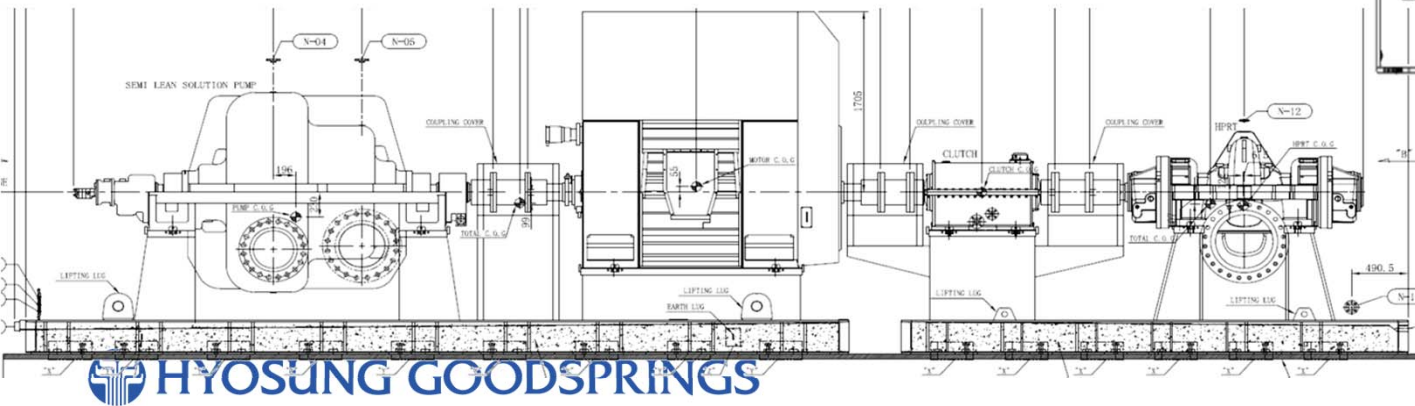
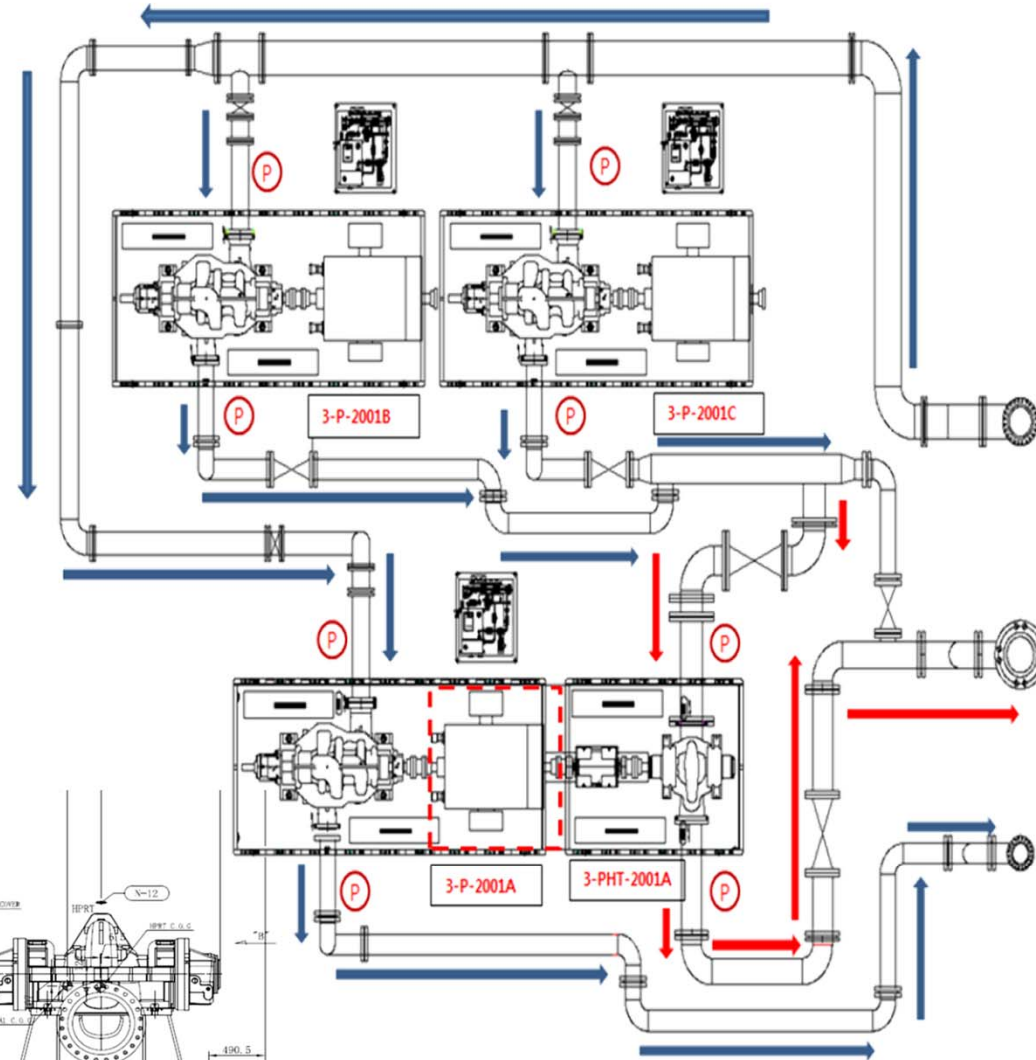


Worldwide Reference of Fertilizer Pumps - Lordegan PJT

Semi Lean solution Pump (BB3) with Hydraulic Recovery Turbine

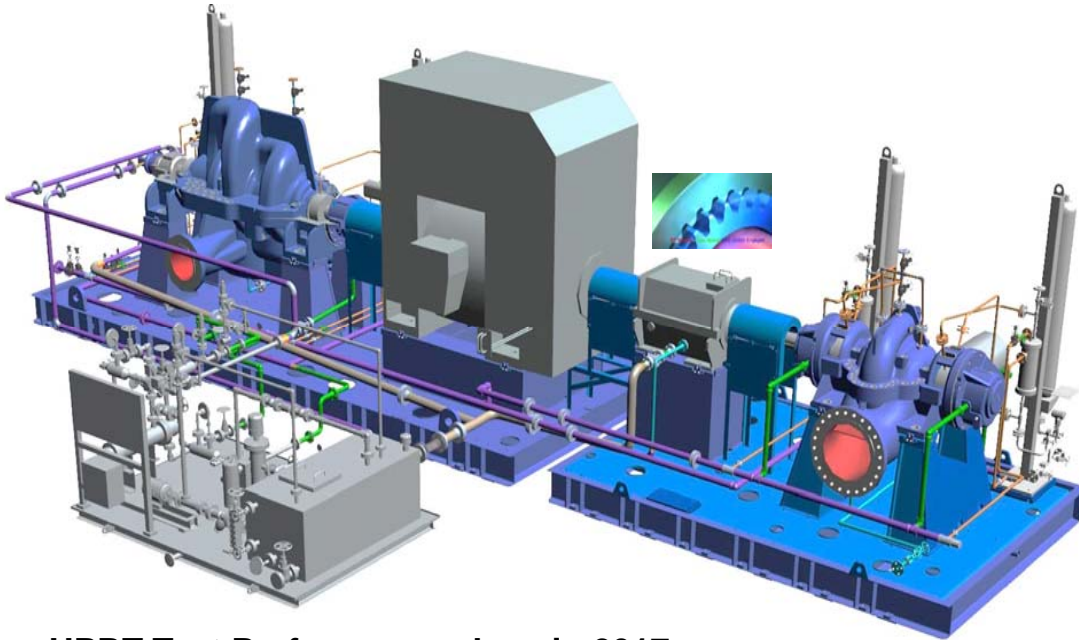
3 pumps trains will be run together to check HPRT. It is scheduled at coming March, 2017 in world largest HGS's P3 shop

Spec	: 1,450m³/h X 333m X 2,100kW
Service	: Semi-Lean solution pumps
Model	: SAVD300/3 3stages (BB3)
Remark	: <i>Driven by Motor and HPRT</i>
Spec	: 830m³/h X 403m X 1,500kW
Service	: Lean solution pumps
Model	: SAVD250/5 5stages (BB3)
Remark	:
Spec	: 2,235m³/h X 154m X Recovery Power 1,941kw
Service	: Hydraulic Turbine
Model	: HDRC350-620A
Remark	: <i>Automatic speed synchronization to motor by SSS Clutch system</i>



▶ Hydraulic Power Recovery Turbine (HPRT)

To increase your overall process efficiency, Hyosung's HPRT can be the solution in a Refining hydrotreaters, Gas processing and Nitrogenous fertilizer plants



<HPRT Test Performance show in 2017>



Product

Pump : SAVD 350/3
Motor : 2,100kW
HPRT : HDRT 450-620

CUSTOMER BENEFITS

- HPRT converts the excess pressure into 1,941kW shaft energy and increases overall process efficiency

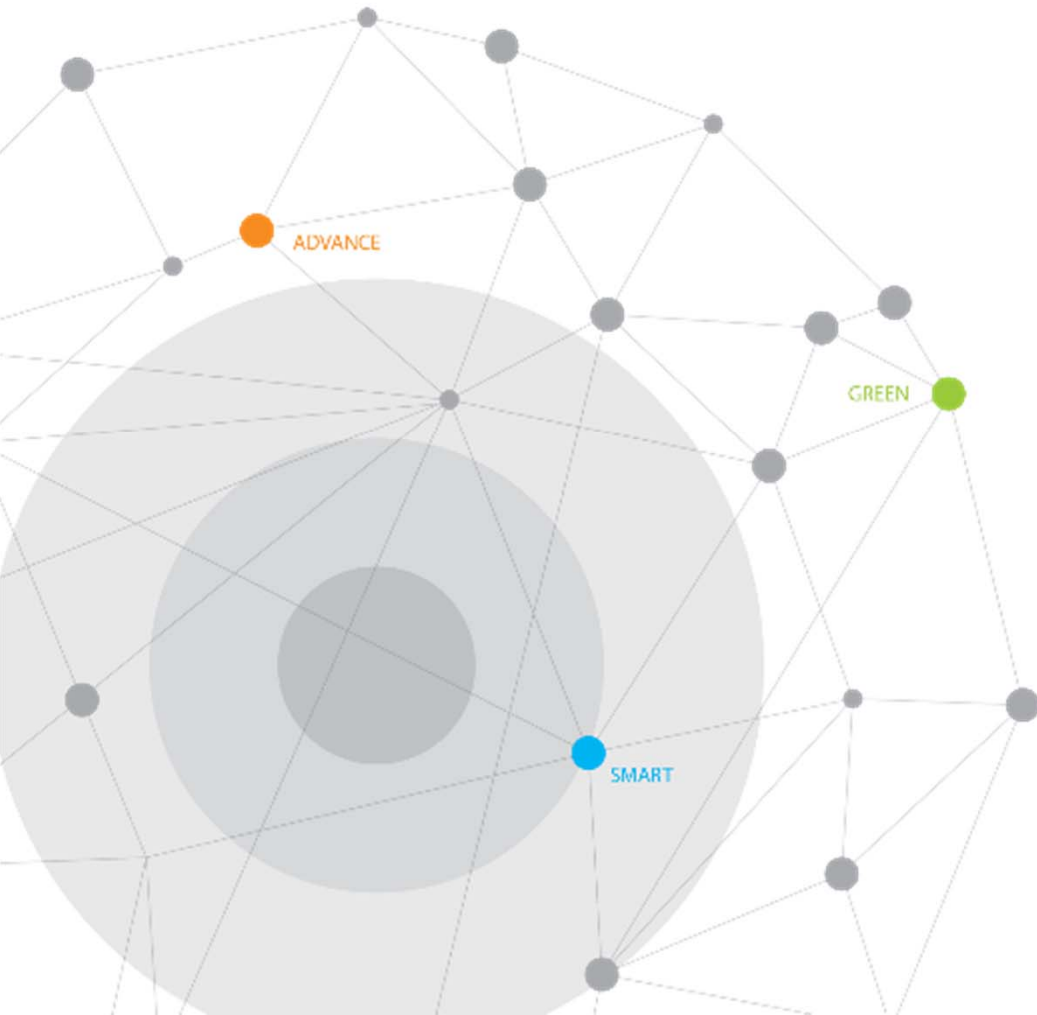
Reference summary for Fertilizer (Ammonia & Urea) plant

EPC	End-User	Fertilizer Licensor	Site	Project Name	Pump Type	Qty.
Samsung Eng	SOCAR Petrochemical	Ammonia : Haldor Topsoe Urea : Stamicarbon	Azerbaijan	Socar Ammonia & Urea Complex / CWP package	BB1	7
				Socar Ammonia & Urea Complex / Process package	OH2	11
				Socar Ammonia & Urea Complex / BB package	BB2, BB3, BB5	8
Tecnimont	KIMA	Ammonia : Kellogg Urea : Stamicarbon	Egypt	Kima Fertilizer Project / CWP package	VS1	5
			Egypt	Kima Fertilizer Project / Medium duty package	BB5, OH2	6
NDEC	Kermanshah Petrochemical	Ammonia : Kellogg Urea : Stamicarbon	Iran	Kermanshah 2nd Urea & Ammonia fertilizer project / API PKG	OH2, OH3, HPRT, BB5(T), BB2, BB5, VS1	25
Hampa / Falcon Energy	Lordegan Petrochemical Co.	Ammonia : Casale Urea : Stamicarbon	Iran	Lordegan fertilizer project / Carbamate & Ammonia PKG	BB5, OH2	6
				Lordegan fertilizer project / Heavy Duty - Utility PKG	BB5	5
				Lordegan fertilizer project / HPRT & Lean solution PKG	BB5, BB3, HPRT	6
				Lordegan fertilizer project / Process Pump Packages	BB2, BB3, OH2, VS4, VS6	44

II

Products & Services

- Pumps for Oil & Gas Plant
- **Pumps for Thermal & Combined Cycle Power Plant**
- Pumps for Nuclear Power Plant
- Pumps for Water
- Pumps for Desalination Plant
- Pumps for Offshore
- Pumps for Cryogenic



▶ Boiler Feedwater Pump

Boiler Feedwater Pump



Tangjin TPP #1~4 PJT (500MW)

- Customer : Korea East West Power
- Service : Main Boiler Feedwater Pump
- Model : SBVD350/5
- Spec : 1077m³/h, 3554m, Turbine Driven
- Delivery : 1997

Boiler Feedwater Pump



Young Heung TPP #5,6PJT (870MW)

- Customer : Korea South East Power
- Service : Main Boiler Feedwater Pump
- Model : SBVD400/5
- Spec : 1680m³/h, 3300m, Turbine Driven
- Delivery : 1997

Boiler Feedwater Pump



Shinboryeong TPP #1,2 (1,000MW)

- Customer : Korea Midland Power
- Service : Main Boiler Feedwater Pump
- Model : SBVD400/5
- Spec : 1919m³/h × 3516m, Turbine Driven
- Delivery : 2014

► Boiler Feedwater Pump

Boiler Feedwater Pump



Morocco / Safi TPP (2x700MW)

- Customer : Safi Energy Company
- Service : Boiler Feedwater Pump
- Model : SBV350/6
- Spec : 1,160m³/h × 3,800m × 15,500KW
- Delivery : 2016

Boiler Feedwater Pump



Madagascar/ Ambatovy TPP

- Customer : Ambatovy Dynatec Madagascar
- Service : Boiler Feedwater Pump
- Model : SBRD150/8
- Spec : 255m³/h × 1,179m × 1,180KW
- Delivery : 2008

Boiler Feedwater Pump



Saudi / MARAFIQ STG 5&6 TPP

- Customer : Marafiq
- Service : Boiler Feed water Pump
- Model : SBV250/5
- Spec : 584m³/h × 2,200m × 5,000KW
- Delivery : 2010

► Boiler Feedwater Pump

Boiler Feedwater Pump



USA / Panda Hummel CCPP

- Customer : Panda Energy
- Service : Boiler Feedwater Pump
- Model : SRH150/11A (6 Sets)
- Spec : 587m³/h × 1,975m × 2,800KW
- Delivery : 2016

Boiler Feedwater Pump



Saudi / PP13 & PP14 CCPP

- Customer : Saudi Electricity Company
- Service : Boiler Feedwater Pump
- Model : SRH125/10 (24 Sets)
- Spec : 360m³/h × 1,724m × 2,200KW
- Delivery : 2015

Boiler Feedwater Pump



Egypt / Al Shabab & West Damietta CCPP

- Customer : EDEPC
- Service : Boiler Feed water Pump
- Model : SBHD125/14D (18 Sets)
- Spec : 268m³/h × 1,712m × 1,560KW
- Delivery : 2016

▶ Circulating Water Pump

Circulating Water Pump



Bo Ryeong TPP #1~4 PJT (500MW)

- Customer : Korea Midland Power
- Service : Seawater Lifting Pump
- Model : 84x60 VMF
- Spec : 22,440m³/h × 12.37m × 950kW
- Delivery : 1993

Circulating Water Pump



Shin Bo Ryeong TPP #1,2 PJT(1000MW)

- Customer : Korea Midland Power
- Service : Circulating Water Pump
- Model : VMF2100-1820C
- Spec : 40,250m³/h × 26.5m × 3,800kW
- Delivery : 2014

▶ Circulating Water Pump

Circulating Water Pump



Hyundai Green Power PJT #1~4

- Customer : Hyundai E&C
- Service : CWP (Variable Pitch Vane)
- Model : VMF1650-1400
- Spec : 19,150m³/h × 19.5m × 1,500kW
- Delivery : 2008

Circulating Water Pump



Hyundai Green Power Project #5~8

- Customer : Hyundai E&C
- Service : CWP(Variable Pitch Vane)
- Model : VMF1500-1330C
- Spec : 19,150m³/h, × 22.5m × 1,700kW
- Delivery : 2012

► Circulating Water Pump

Circulating Water Pump



UAE/ Shuweihat S3 IPP Project

- Customer : Shuweihat Asia Power Company
- Service : Circulating Water Pump
- Model : VMF2400-1790C
- Spec : 42,220m³/h × 22.4m × 3,400kW
- Delivery : 2012

Circulating Water Pump



Malaysia/ Prai CCGT Project

- Customer : Tenaga Nasional Berhad (TNB)
- Service : Circulating Water Pump
- Model : VMF2250-1830
- Spec : 46,050m³/h × 16m × 2,700kW
- Delivery : 2014

► Condensate Pump

Condensate Pump



USA / Panda Hummel CCPP

- Customer : Panda Energy
- Service : Condensate Pump
- Model : VCP250/7G
- Spec : 530m³/h × 525m × 500kW
- Delivery : 2016

Condensate Pump



Egypt / Al Shabab & West Damietta CCPP

- Customer : East Delta Electricity Production Co
- Service : Condensate Pump
- Model : VCP250/7E
- Spec : 495m³/h × 200m × 400kW
- Delivery : 2016

► Condensate Pump

Condensate Pump



Saudi / Qurayyah CCPP

- Customer : Saudi Electricity Company
- Service : Condensate Pump
- Model : VCP350/5
- Spec : 1,010m³/h × 330m × 1,290kW
- Delivery : 2013

Condensate Pump



Jordan / Rehab CCPP

- Customer : Central Electricity Generating Co.
- Service : Condensate Pump
- Model : VCP300/4
- Spec : 542m³/h × 122m × 270kW
- Delivery : 2004

► Condensate Pump

Condensate Pump



UAE / Jebel Ali M CCPP

- Customer : DEWA
- Service : Condensate Pump
- Model : VCP250/7
- Spec : 380m³/h × 160m × 230kW
- Delivery : 2008

Condensate Pump



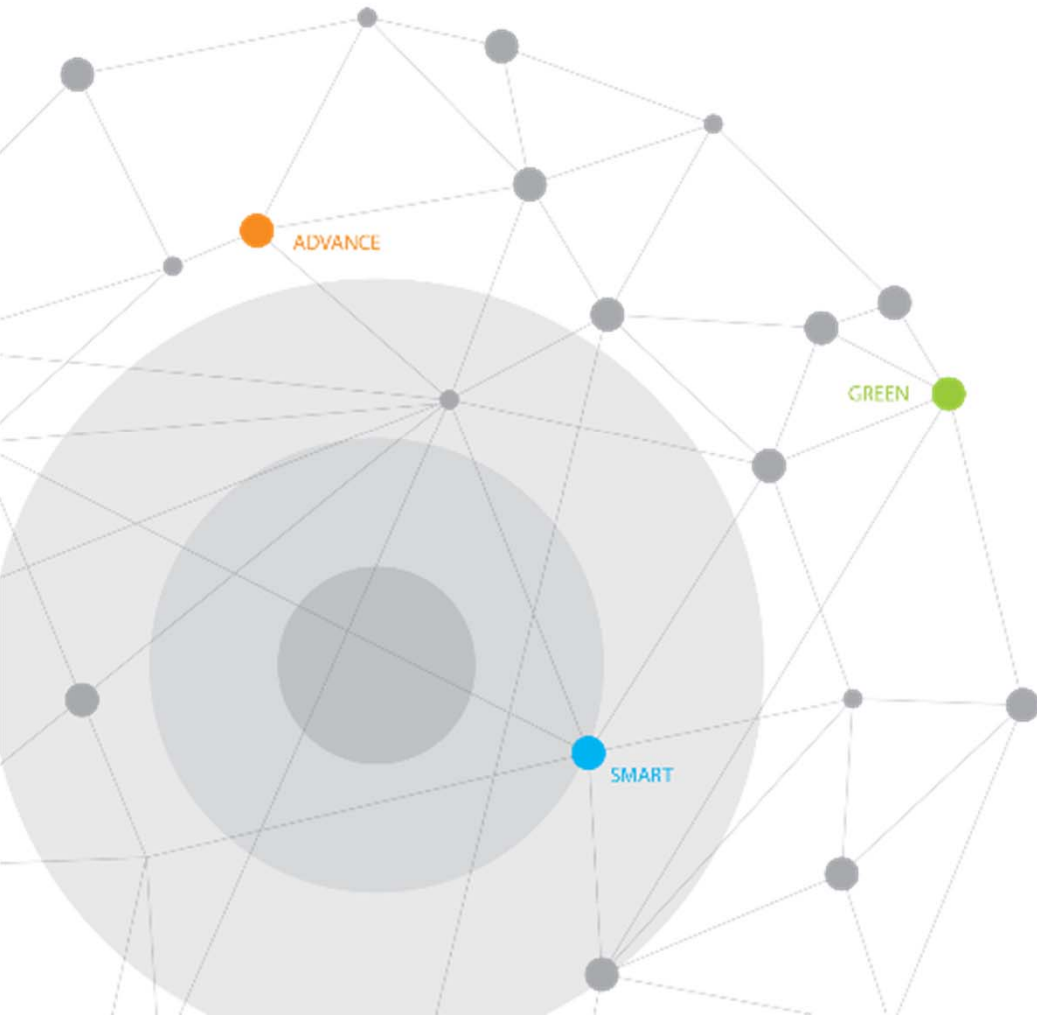
UAE / Shuweihat S2 IWPP

- Customer : Shuweihat Asia Power Company
- Service : Condensate Pump
- Model : VCP250/6
- Spec : 498m³/h × 208m × 405kW
- Delivery : 2009

II

Products & Services

- Pumps for Oil & Gas Plant
- Pumps for Thermal & Combined Cycle Power Plant
- **Pumps for Nuclear Power Plant**
- Pumps for Water
- Pumps for Desalination Plant
- Pumps for Offshore
- Pumps for Cryogenic



➤ Safety-class Pumps

Safety Injection Pump



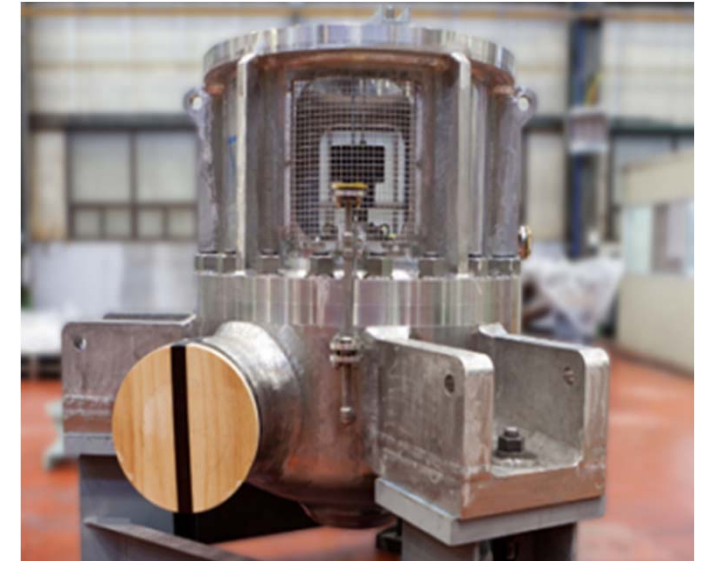
- Spec : 205m³/h × 870m × 750kW

Shutdown Cooling Pump



- Spec : 1,230m³/h × 140m × 750kW

Containment Spray Pump



- Spec : 1,230m³/h × 140m × 750kW

▶ Non-Safety-class Pumps

Circulating Water Pump



- Spec : 62,000m³/h × 12m × 3,100kW

Condensate Pump



- Spec : 2,880m³/h × 308m × 3,300kW

Main Feedwater Pump

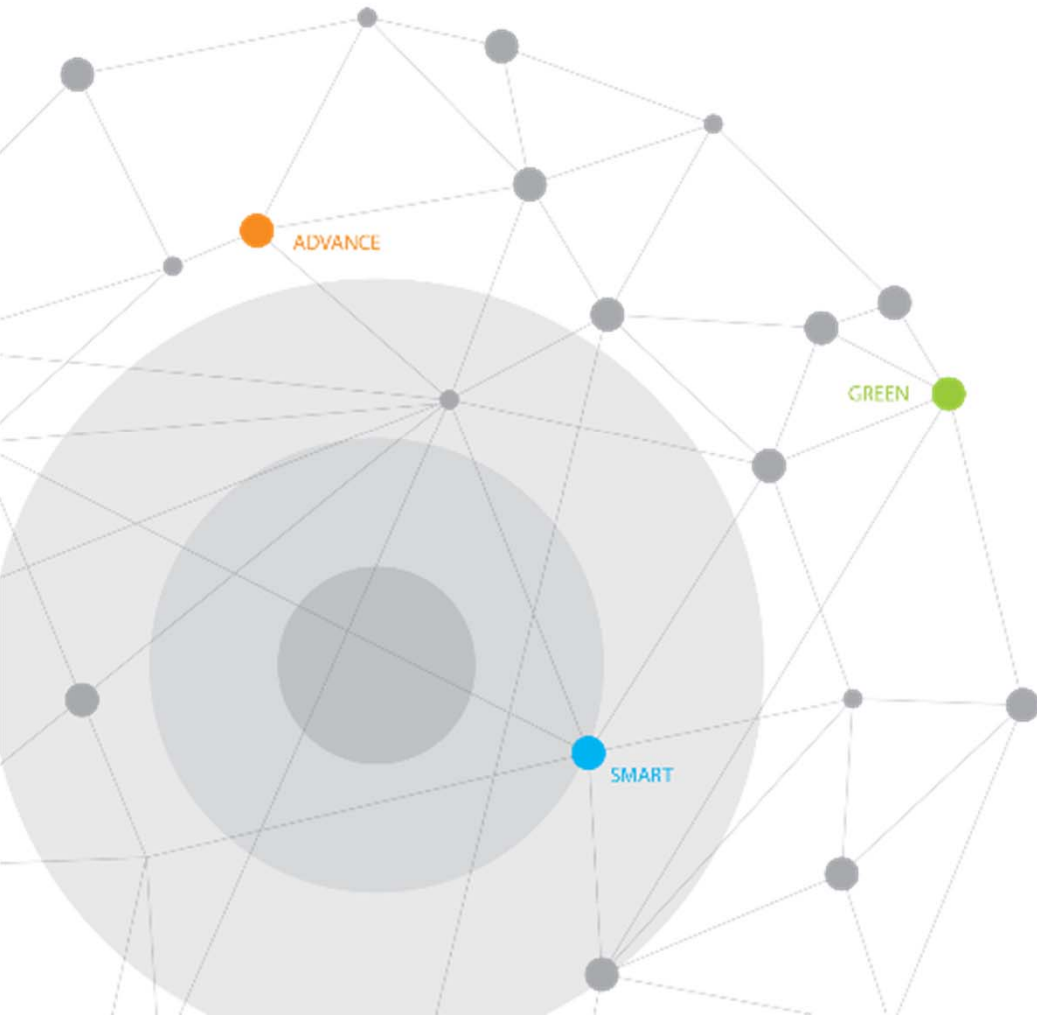


- Spec : 3,250m³/h × 610m / Turbine Driven

II

Products & Services

- Pumps for Oil & Gas Plant
- Pumps for Thermal & Combined Cycle Power Plant
- Pumps for Nuclear Power Plant
- **Pumps for Water**
- Pumps for Desalination Plant
- Pumps for Offshore
- Pumps for Cryogenic



3) Major Reference



Customer : K-Water
**Project : Metropolitan Water Supply
(Pal-Dang)**
Service : Main Intake Pump
Model : HDR1100-1270A
Spec : 13,800m³/h, 80m, 3,900kW
Number of Pump : 20 sets



Customer : K-Water
Project : Dae-chung Dam
Service : Main Intake Pump
Model : HDR800-960
Spec : 7,200m³/h, 96m, 2,500kW
Number of Pump : 4 sets

3) Major Reference



Customer : Seoul Metro City
Project : Metropolitan Water Supply
(Gang-Buk)
Service : Main Supply Pump
Model : HDR800-970
Spec : 6,960m³/h, 58m, 1,800kW
Number of Pump : 7 sets



Customer : Busan Metro City
Project : Metropolitan Water Supply
(Sa-sang)
Service : Main Supply Pump
Model : HDR700-820
Spec : 7,920m³/h, 60m, 1,700kW
Number of Pump : 2 sets

3) Major Reference



**Customer : Central Project Office
under Minis**
**Project : Nghi Xuyen
(Drainage & Irrigation)**
Service : Water Supply Pump
Model : VMF1350-1140
Spec : 18,000m³/h, 7.8m, 560kW
Number of Pump : 11 sets



Customer : Hung Yen PMU
**Project : Lien Nghia
(Drainage)**
Service : Water Supply Pump
Model : VMF1350-1380
Spec : 18,000m³/h, 9.7m, 700W
Number of Pump : 5 sets



Customer : DARD Hanoi
**Project : Ngoai Do 2
(Drainage)**
Service : Drainage Pump
Model : VMF1650-1520
Spec : 20,000m³/h, 6m, 500kW
Number of Pump : 5 sets

3) Major Reference

Noksan Drainage Pumping Station



- Capacity : 324,000 m³/h
- Process : Drainage & Irrigation
- Period : 2004 ~ 2008

Gu Eui - Jayang Pumping Station



- Capacity : 52,000 m³/h
- Process : Water Supply
- Period : 2009 ~ 2010

Intake Pumping Station for Circulating Water System of Boryeong TPP #7,8



- Capacity : 348,200 m³/h
- Process : Intake pump for Cooling Water supply
- Period : 2005~2007

Intake Pumping station for Circulating water system of Kori Nuclear Power Plant 3&4

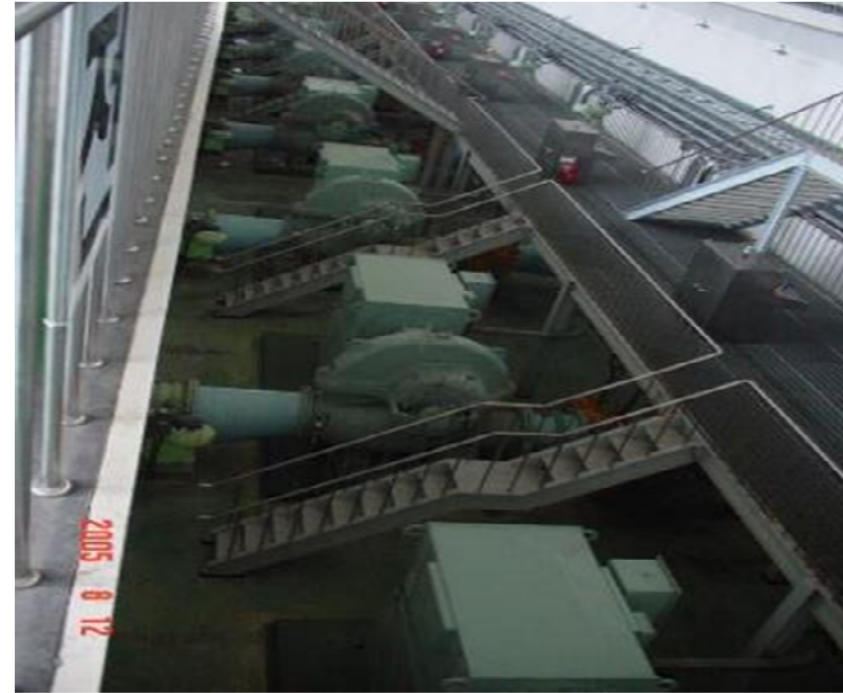


- Capacity : 429,000 m³/h
- Process : Intake pump for Cooling Water supply
- Period : 2008 ~ 2011

3) Major Reference



Customer ; K-Water
Project ; Metropolitan Water Supply
(Mi-Geum)
Service ; Main Booster Pump
Model ; HDR800-870
Spec ; 6,900m³/h, 81m, 1,900kW
Number of Pump : 4 sets



Customer ; Busan Metro City
Project ; Pumping Station of Deokcheon
Service ; Main Booster Pump
Model ; HDR600-710
Spec ; 5,700m³/h, 88m, 1,900kW
Number of Pump : 6 sets

3) Major Reference - Big Size Pump



Customer ; KEPCO ENEC
Project ; UAE BNPP Unit 1, 2, 3 &4
Service ; Circulating Water Pump
Model ; VMF2400-2120
Spec ; 61,320m³/h, 12.2m, 3,100kW
Number of Pump : 24 sets

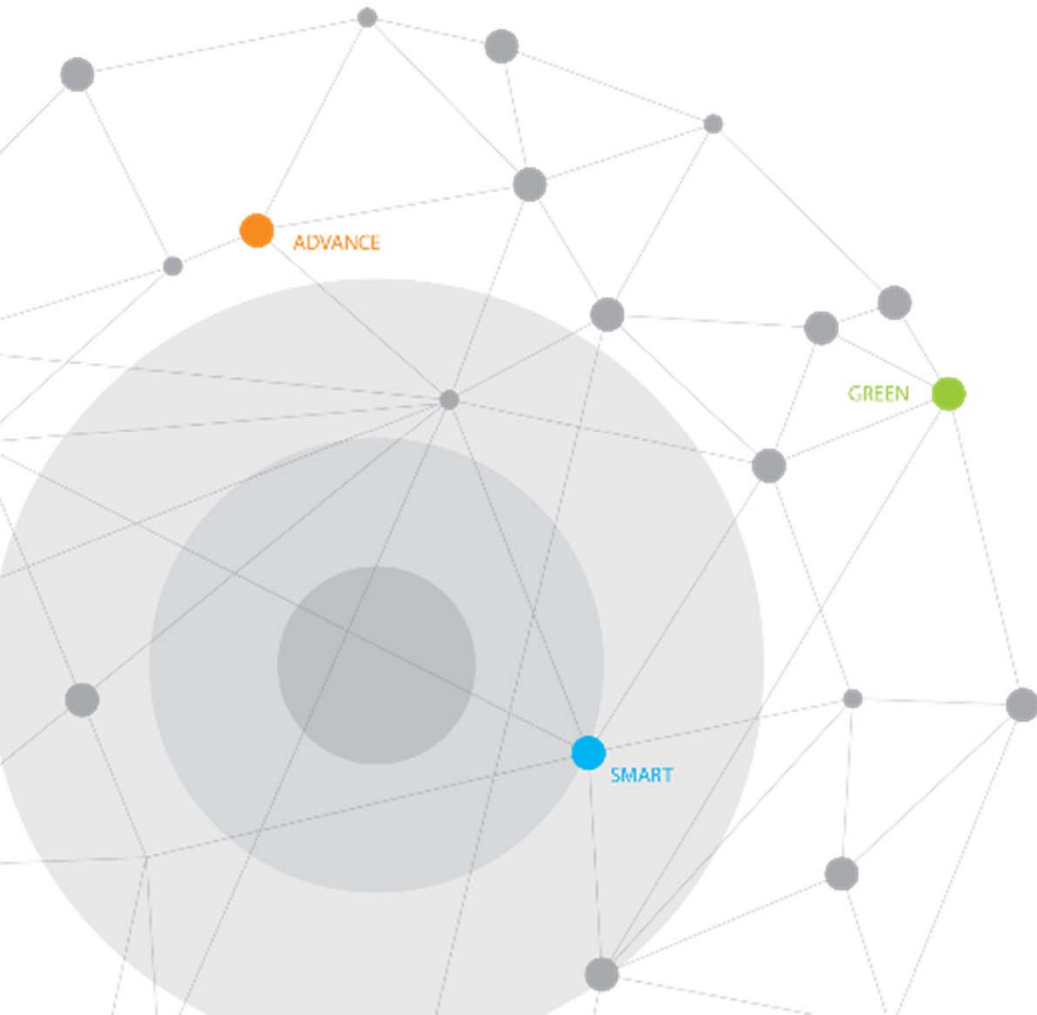


Customer ; Acwa Power
Project ; Kirikkale IPP
Service ; Cooling Water Pump
Model ; HDR1500-1280C
Spec ; 25,000m³/h, 25m, 2,300kW
Number of Pump : 3 sets

II

Products & Services

- Pumps for Oil & Gas Plant
- Pumps for Thermal & Combined Cycle Power Plant
- Pumps for Nuclear Power Plant
- Pumps for Water
- **Pump for Desalination Plant**
- Pumps for Offshore
- Pumps for Cryogenic



3) Major Reference

Sohar Power & Desalination Project



EPC : Doosan Heavy Industry
End User : Sohar Power Company
Site Location : Oman
Plant Type/Capacity : MSF / 33 MIGD



Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
Sea Water Supply Pump	16,800	30	1,900	10	4	VMF1350	2005
Auxiliary Seawater Cooling Pump	3,550	24	330	6	1	VMF600-550	
Condenser Cooling Water Feed Pump	15,300	24	1,400	10	1	VMF1350	
Brine Recirculation Pump	8,510	70	2,200	10	8	VMFB1400x900	
Distillate Pump	1,750	34	230	6	8	700x450VYBM	
Brine Blow Down Pump	3,600	15	190	10	4	900x600VYBM	
Cooling Water Recirculation Pump	6,110	15	280	10	4	800x600CFNM	
The Others					16		

3) Major Reference

Sabiya Desalination Phase #2 & 3



EPC : Doosan Heavy Industry
End User : Ministry of Energy
Site Location : Kuwait
Plant Type/Capacity : MSF / 50 MIGD



Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
Sea Water Recirculation Pump	11,480	15	620	14	4	HDR1100-1040A	2005
Heater Drain Pump	290	146	180	4	8	250x200 SRHD3M	
Cooling Water Pump	55	40	18.5	4	4	150x100IFW4015X	
Degasified Extraction Pump	1,930	120	900	4	3	400x300CJNM	
The Others					14		

3) Major Reference

Shuaibah 3 IWPP(MSF) & RO

EPC : Doosan Heavy Industry
End User : SWEC
Site Location : KSA
Plant Type/Capacity : MSF / 197 MIGD
 RO / 33 MIGD



Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
Condensate Extraction Pump	390	155	270	4	24	250x200KS56	2007 ~ 2008
Degasifier Extraction Pump	5,000	30	540	8	3	700x600CEUM	
Distillate Booster Pump	5,000	20	400	8	3	700x600CELM	
Backwash Water Pump	3,284	20	260	8	2	600x500CFN	
Emergency Flushing Pump	272	25	134HP Engine	-	3	150x100IFW-3215Y	
The Others					23		

3) Major Reference

Shuweihat S2 IWPP

EPC : Doosan Heavy Industry
End User : ADWEA
Site Location : UAE
Plant Type/Capacity : MSF / 100 MIGD



Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
Sea Water Supply Pump	27,700	27	2,600	14	7	VMF1650-1380	2009
Cooling Water Pump	25,700	19	1,720	14	2	VMF1650-1260	
Cooling Water Recycle Pump	13,100	15	710	14	6	HES1100-1030	
Degasifier Extraction Pump	2,600	28	290	6	4	HDR500-510	
The Others					25		

3) Major Reference

Shuwaikh RO Plant

EPC : Doosan Heavy Industry
End User : Ministry of Energy
Site Location : Kuwait
Plant Type/Capacity : RO / 30 MIGD



Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
Sea Water Supply Pump	10,663	23	930	10	3	VMF1000-890	2009
Sea Water Line Filling Pump	500	20	55	4	1	VMF300-370L	
Traveling Screen Wash Pump	500	75	180	4	2	VMF300-370L3S	

3) Major Reference

Doha RO

EPC : Doosan Heavy Industry
End User : MEW
Site Location : Kuwait
Plant Type/Capacity : RO / 60 MIGD

دولة الكويت
 STATE OF KUWAIT



Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
Daf Recycle Pump	740	73	220	4	6	CFP1650-1380	2017
UF Feed Pump	5,049	57	1,100	6	7	HDR500-710C	
UF Back Wash Pump	812	37	110	4	4	CFP200-320	
ERD Booster Pump	1,724	50	330	4	8	USP250-460C	
2 nd Pass Up Pump	851	15	640	4	8	SAV250/2	
Ro Cip/ Back Flow Pump	1,403	68	330	4	3	CFP300-500C	
Emergency Back Flow Pump	462	36	75	4	1	CFP150-400	
Permeate Water Pump	1,473	32	185	4	4	CFP350-430C	
Degasifier Extraction Pump	2,188	19	148	6	3	CFP400-470C	
Lp Product Water Pump	6,251	64	1,400	6	3	HDR700-820L	
Hp Product Water Pump	4,167	189	2,850	4	4	HDRP400-880C	
Service Water Pump	21	50	7.5	4	3	HTM65/4	
Cooling Water Pump	159	35	37	4	4	CFP100-400Y	
Recovery Pump	25	32	7.5	4	2	CFP50-320	

3) Major Reference

Qurayyah Add-on MSF

EPC : Doosan Heavy Industry
End User : SEC
Site Location : KSA
Plant Type/Capacity : MSF / 1.3 MIGD



الشركة السعودية للكهرباء
 Saudi Electricity Company



Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
Distillate Pump	97	44	22	4	3	150x100IFW3215X	2011
Brine Blowdown Pump	184	20	19	4	3	150CFP-2515Y	
Cooling Water Recirculation Pump	758	18	75	4	3	HDR250-280B	
Condensate Extraction Pump	14	90	15	2	3	50x40USP-23	
The Others					3		

3) Major Reference

Busan Gijang SWRO Plant

EPC : Doosan Heavy Industry
End User : Ministry of Oceans
Site Location : KOREA
Plant Type/Capacity : RO / 10 MIGD

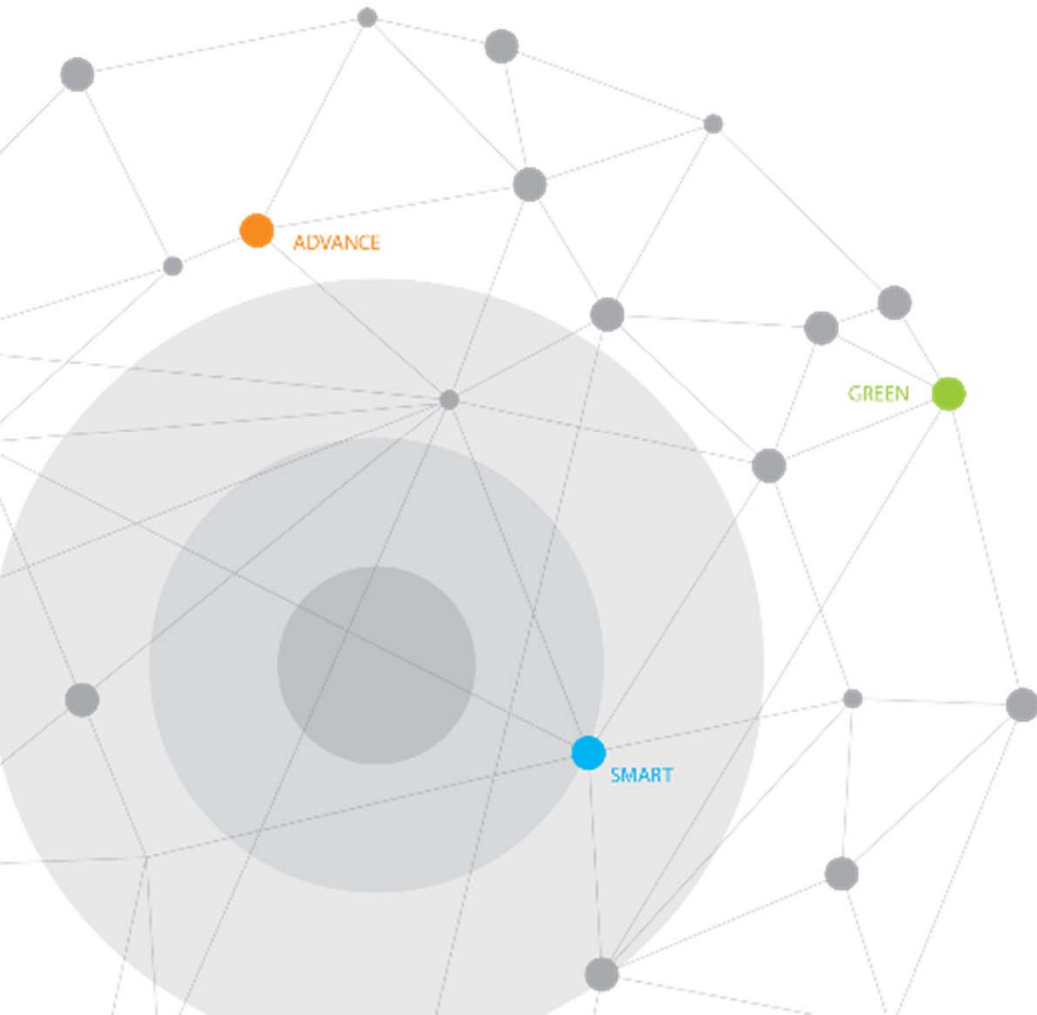


Pump Service	Cap. (m ³ /h)	TDH (m)	Motor Power (kW)	Motor Speed (Pole)	Number of Pump	Pump Model	Delivery Year
1 st High Pressure Pump (8MIGD)	1,611.7	619	3,600	2	1	DM3S450x300	2012
1 st High Pressure Pump (2MIGD)	835	400	1,350	2	1	300x250RN	
ERD Booster Pump (with VFD)	1,725	65	400	6	1	400x350KSN-63	
Back Wash Pump	1,000	20	84	4	2	HDR250-280	
Flush & CIP Pump	852	55	185	4	1	250x200IFW3216	

II

Products & Services

- Pumps for Oil & Gas Plant
- Pumps for Thermal & Combined Cycle Power Plant
- Pumps for Nuclear Power Plant
- Pumps for Water
- Pump for Desalination Plant
- **Pumps for Offshore**
- Pumps for Cryogenic



Worldwide Reference for Offshore plant

EGINA FPSO PJT

EPC	: Samsung Heavy Industries, Korea
End User	: TOTAL Upstream Nigeria Limited
Site Location	: Nigeria
Certification	: BV (Bureau Veritas, France)
Delivery	: December 2015



Supplied Pump Description

- Totally 16 sets of API 610 Pumps
 - * API 610 OH3 / 3 Items 6 Sets
 - * API 610 BB1(Vertical) / 3 Items 6 Sets
 - * API 610 OH2 / 2 Items 4 Sets



Worldwide Reference for Offshore plant

EGINA FPSO PJT

< ISO5199 Pump Package for Hull Service >

Type	Q'Ty	Service Name	Description
BB1 (Vertical)	4	BALLAST PUMP (1250m3/hr,50m) 250kW 6P TE-V 400V	-Seal Plan #52 -Self Priming Unit -Material: Super Duplex(D2)
BB1 (Vertical)	2	Hull Service C.W. Circ. Pump(1100m3/hr,30m) 150kW 4P TE-V 400V	-Seal Plan #11 -Material : API S-6
OH3	2	Large Bilge Pump (342m3/hr,50m) 110kW 4P TE-V 400V	-Seal Plan #52 -Self Priming Unit -Material: API S-6
OH3	2	Hull Em'cy C.W Circ. Pump (320m3/hr,25m) 37kW 4P TE-V 400V	-Seal Plan #11 -Material : API S-6
OH2	2	Potable Water Pump (50m3/hr,40m) 11kW 2P TE 440V	-Seal Plan #11 -Material : A-7(Stainless)
OH3	2	Hull Em'cy Sevice Water pump (450m3/hr,60m) 120kW 4P TE-V 440V	-Seal Plan #62 -Material: Super Duplex(D2)
OH2	2	Potable Water Pump (50m3/hr,40m) 11kW 2P TE 440V	-Seal Plan #11 -Material : A-7(Stainless)



(BB1 Vertical)



(OH3)



(OH2)

Worldwide Reference for Offshore plant

PETRONAS FLOATING LNG2 PJT

EPC : Samsung Heavy Ind., Korea

End User : PETRONAS, Malaysia

Site Location : Malaysia

Certification : ABS (American Bureau of Shipping)

Delivery : December 2015



<Hull_Fire Pump Package>

Type	Q'Ty	Service Name	Description
BB1	1	Fire water pump in AFT machinery space (2000m ³ /hr, 130m) 1120kW 4P TE 6600V	<ul style="list-style-type: none"> - Design Code : API 610 10TH, NFPA20 - Seal Plan : #11/61 - Material : All STS 316
OH2	2	Fire line pressurizing jockey pump (50m ³ /hr, 130m) 45kW 2P TE 400V	<ul style="list-style-type: none"> - Design Code : API 610 10TH, NFPA20 - Seal Plan : #11/61 - Material : All STS 316



▶ Worldwide Reference for Offshore plant

800,000 barrel Petrojarl Knarr FPSO

EPC : Samsung Heavy Industries, Korea

End User : TEEKAY (Canada)

Site Location : North Sea

Certification : DNV (Det Norske Veritas, Norway)

Delivery : Match 2012



Supplied Pump Description

- Totally 41 sets of Centrifugal Pumps for Engine Room



▶ Worldwide Reference for Offshore plant

SHWE Project

EPC : Hyundai Heavy Industries, Korea

End User : Myanmar E&P / Daewoo International

Site Location : Myanmar

Delivery : September 2011



Supplied Pump Description

- Package : API Pump Package for Top Side
- Totally 23 sets of API 610 Pumps
 - * API 610 BB2 / 1 Items 2 Sets
 - * API 610 OH2 / 10 Items 21 Sets



▶ Worldwide Reference for Offshore plant

Umm Shaif Gas Injection Project

EPC	: Hyundai Heavy Industries.
End User	: AMDA-OPCO
Package	: API Pump Package for Top Side
Delivery	: November 2008
Site	: Abu Dhabi



Supplied Pump Description

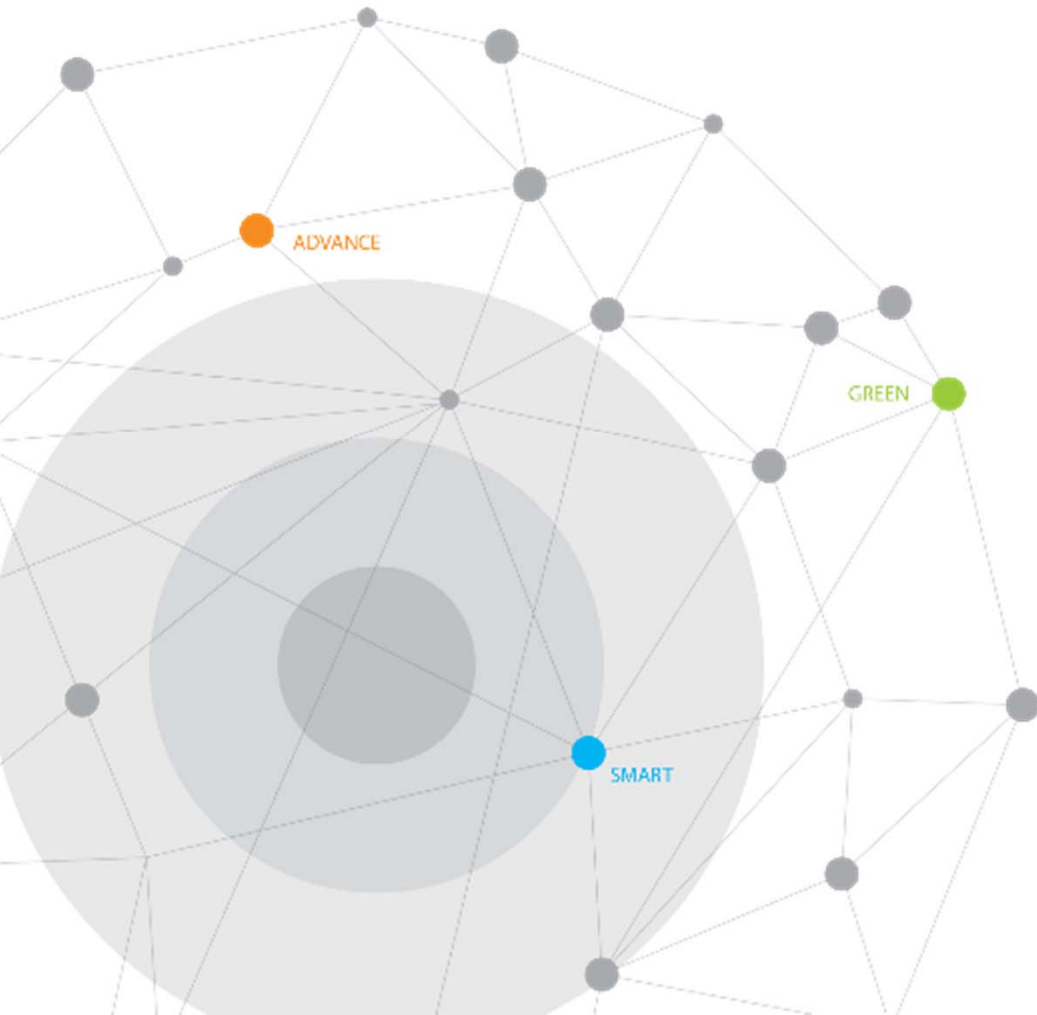
- Totally 21 sets of API 610 Pumps
 - * API 610 BB2 / 2 Items 5 Sets
 - * API 610 OH2 / 6 Items 16 Sets



II

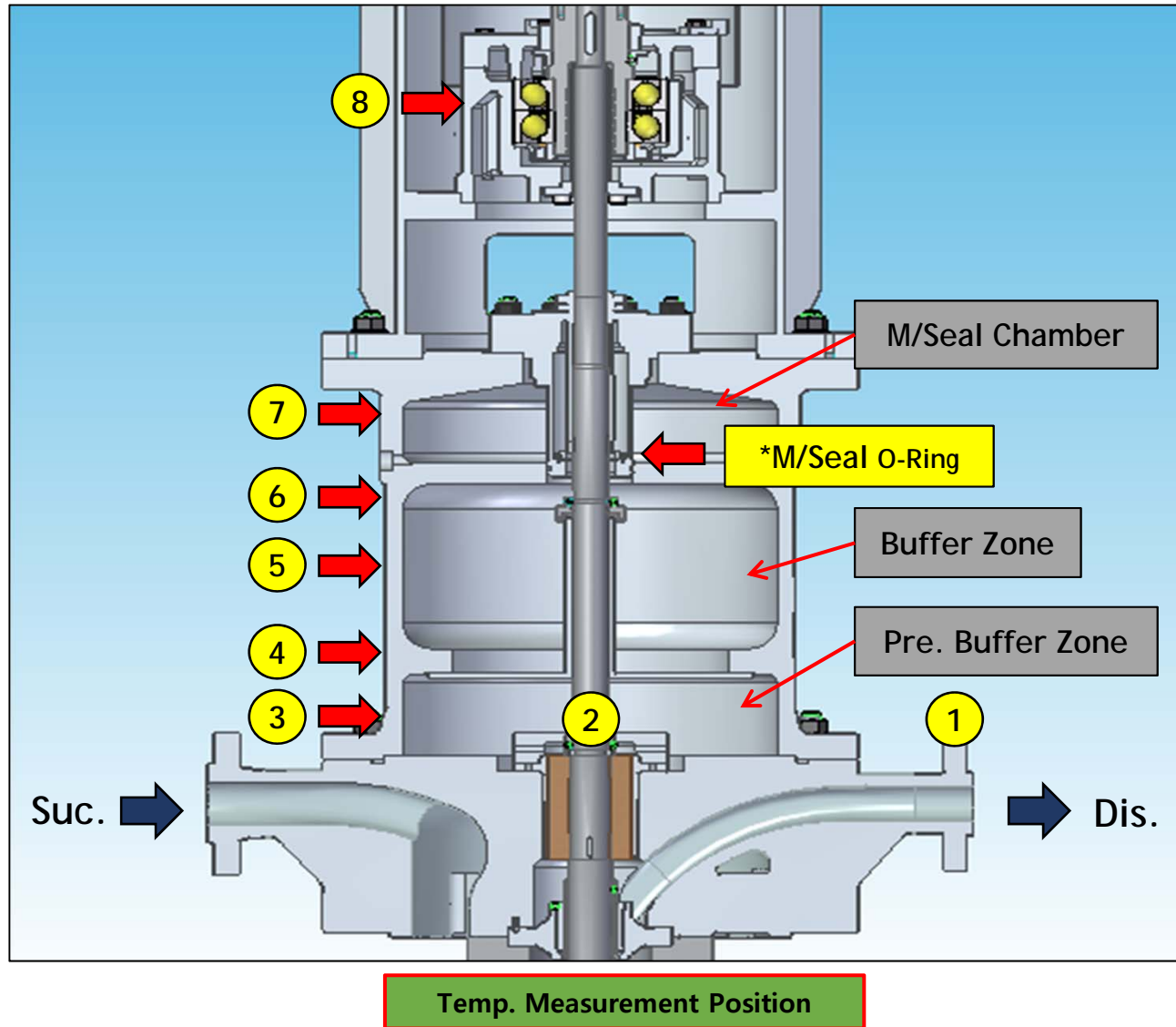
Products & Services

- Pumps for Oil & Gas Plant
- Pumps for Thermal & Combined Cycle Power Plant
- Pumps for Nuclear Power Plant
- Pumps for Water
- Pump for Desalination Plant
- Pumps for Offshore
- **Pumps for Cryogenic**



CRYOGENIC ENVIRONMENTAL 1st TEST

- Installed 1 to 8 wire type thermocouples 8 point in the product structure and RTD type thermometer 1 point in the mechanical Seal oil part



TEST PLAN - Established safety device for cryogenic environmental test

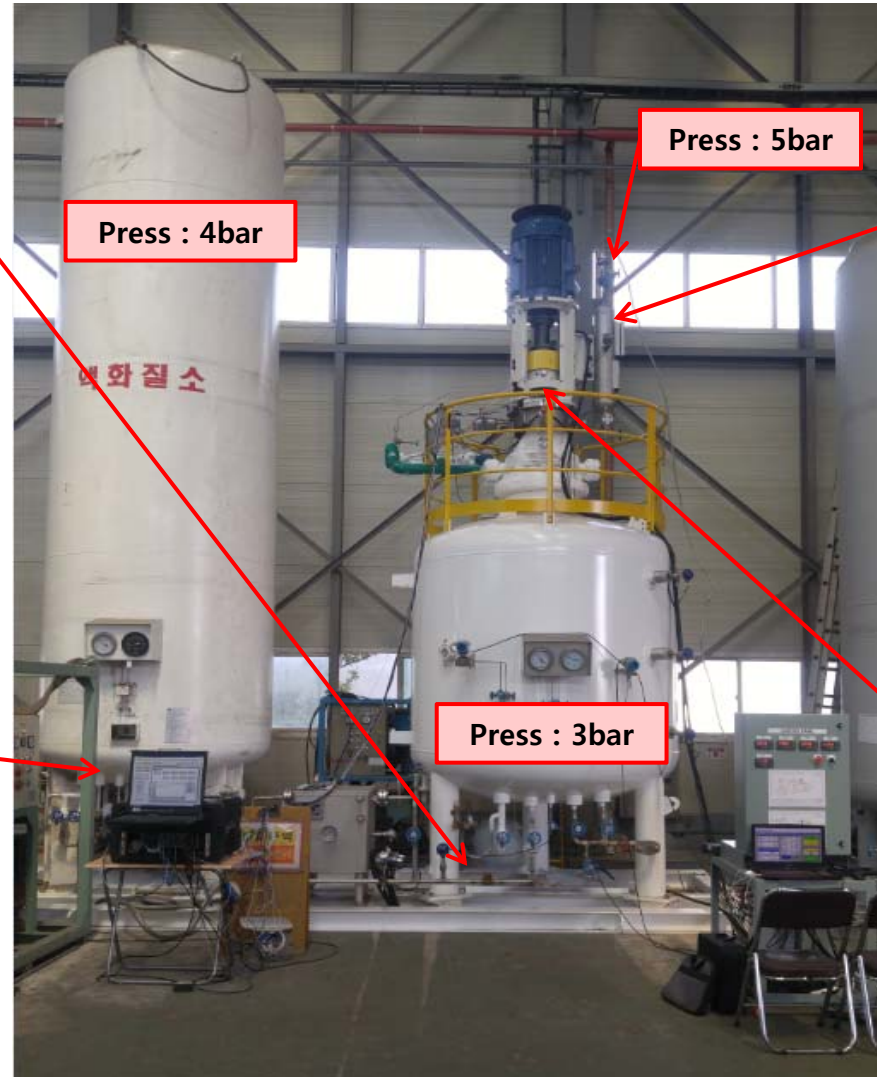
- The pressure rise in the tank due to the vaporization of LN2, 3 safety valves installed to control the sudden rise of pressure
- A leveler and pressure transmitter is installed on the reservoir to ensure that the pump monitoring system displays a critical alarm when the mechanical Seal is damaged.



[Safety V/V] Pump test Chamber (4bar)



[Safety V/V] Liquefied nitrogen Tank (10bar)



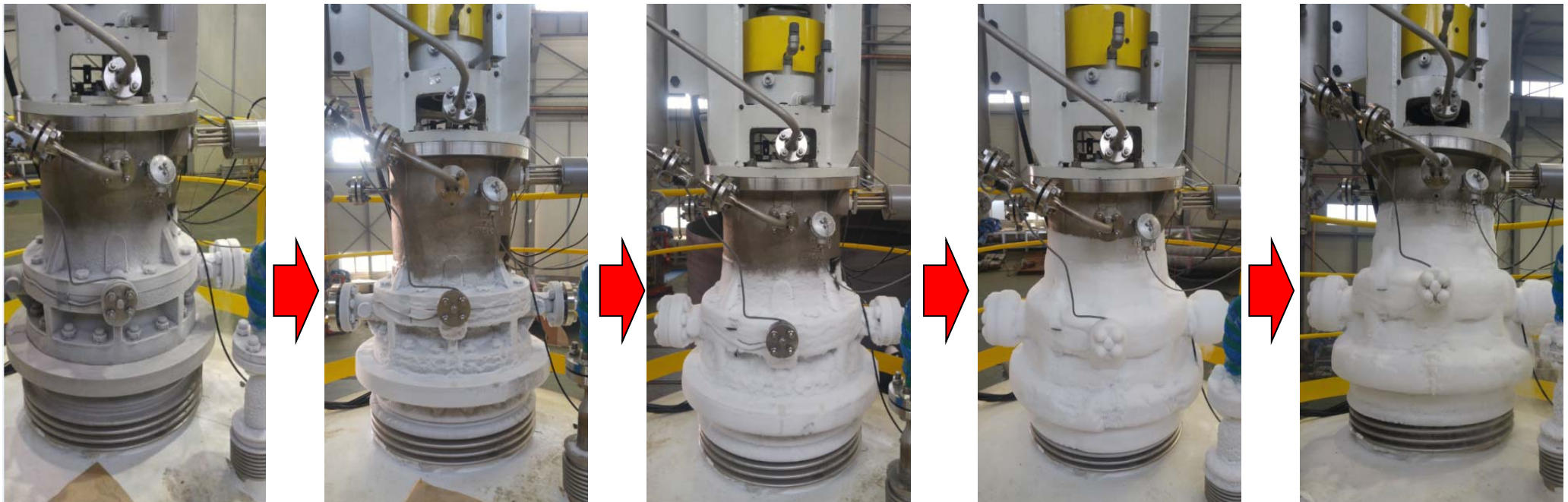
[Press/Level of Reservoir] Alarm display for mechanical Seal is damaged



[Safety V/V] Pre. Buffer Zone (4.5bar)

CRYOGENIC ENVIRONMENTAL 1st TEST - Pump safety verification in cryogenic environment

- Verification of performance of VS6 cryogenic pump in test chamber filled with LN2 (-196 °C) for 5 days from March 14 (Mon.) to 18 (Fri.)
- Variable pressure changes from 10Hz (600rpm) to 60Hz (3600rpm) via inverter control and change of flow rate through discharge valve operation
- Verification of stability through cryogenic pump start test over 6 hours a day within the test period (performance test for more than 30 hours in total)
- Verification of various evaluation items such as hydraulic performance, external leakage, abnormal vibration, mechanical Seal temperature, bearing temperature change



Day 1

Day 2

Day 3

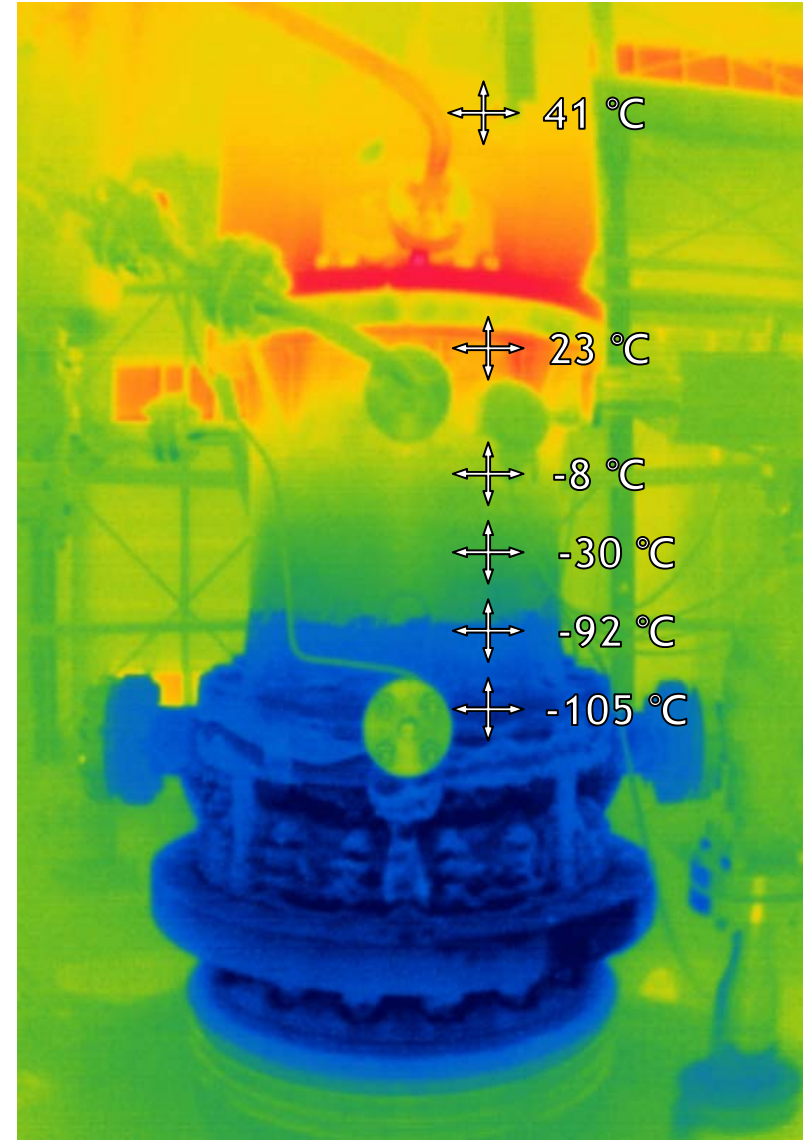
Day 4

Day 5

CRYOGENIC ENVIRONMENTAL 1st TEST



Temperature Measurement Position



Thermo-Graphic Camera

Latest References

1. Lotte Chemical NCC Project

- Methanol Pump / Service Temp : **-132°C** / API 610 VS6 Type / Delivered in April. 2018



2. Hyosung Yong-yeon Tank Terminal

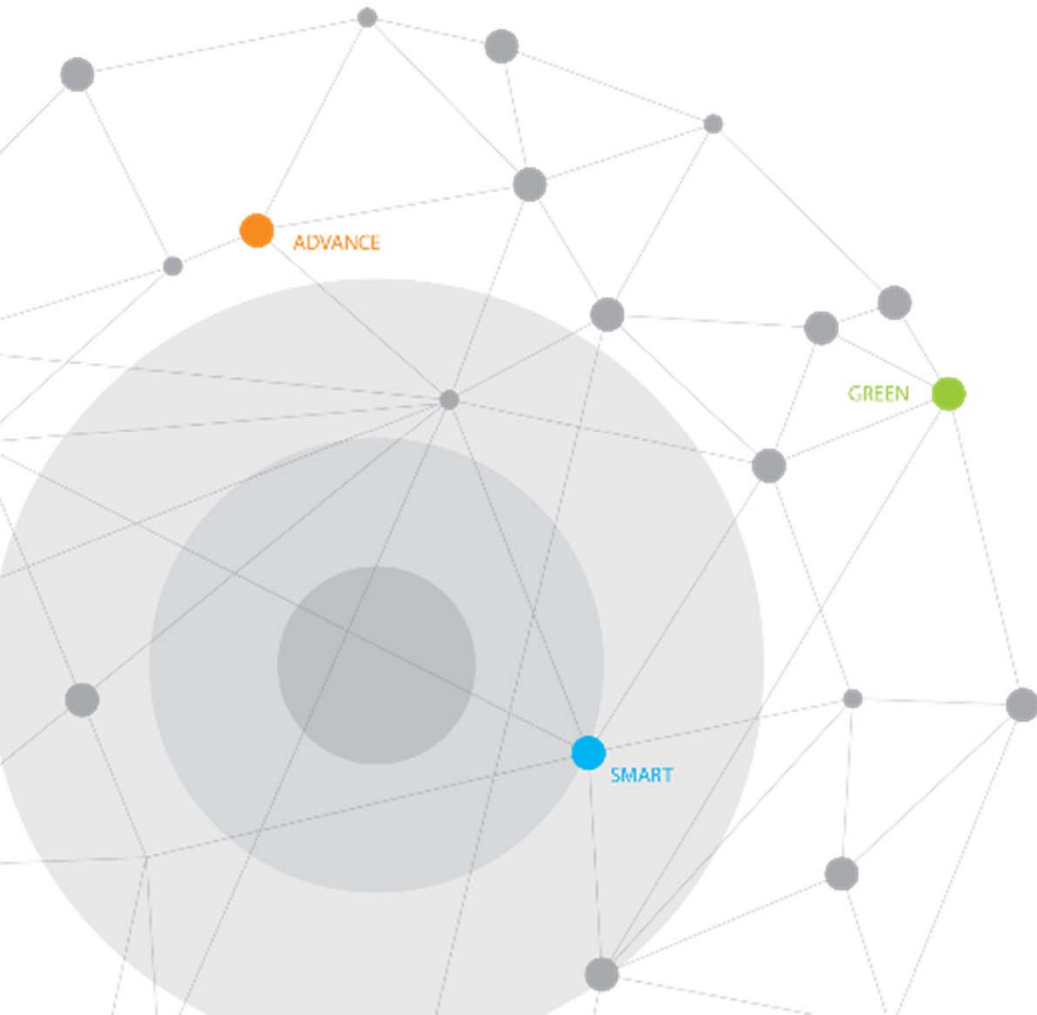
- Ethylene Pump / Service Temp : **-104°C** / API 610 VS6 Type / Delivered in Feb. 2018



III

Global References

- **Excellent Performance**
- Worldwide References of Oil & Gas Plant
- Worldwide References of Power Plant



Head & Power

- Horizontal / BFP 1,909m³/h, **3,554m**, 22,000kW
- Vertical / COP 2,164m³/h, **338m**, 2,700kW

Flow rate

- Horizontal / Intake **13,781m³/h**, 80m, 3,920kW
- Vertical / CWP **61,317m³/h**, 12.2m, 3,100kW

Temperature

- Vertical / Lube Oil 67.2m³/h, 236m, **366°C**
- Vertical / Methanol 7m³/h, 175m, **-132°C**

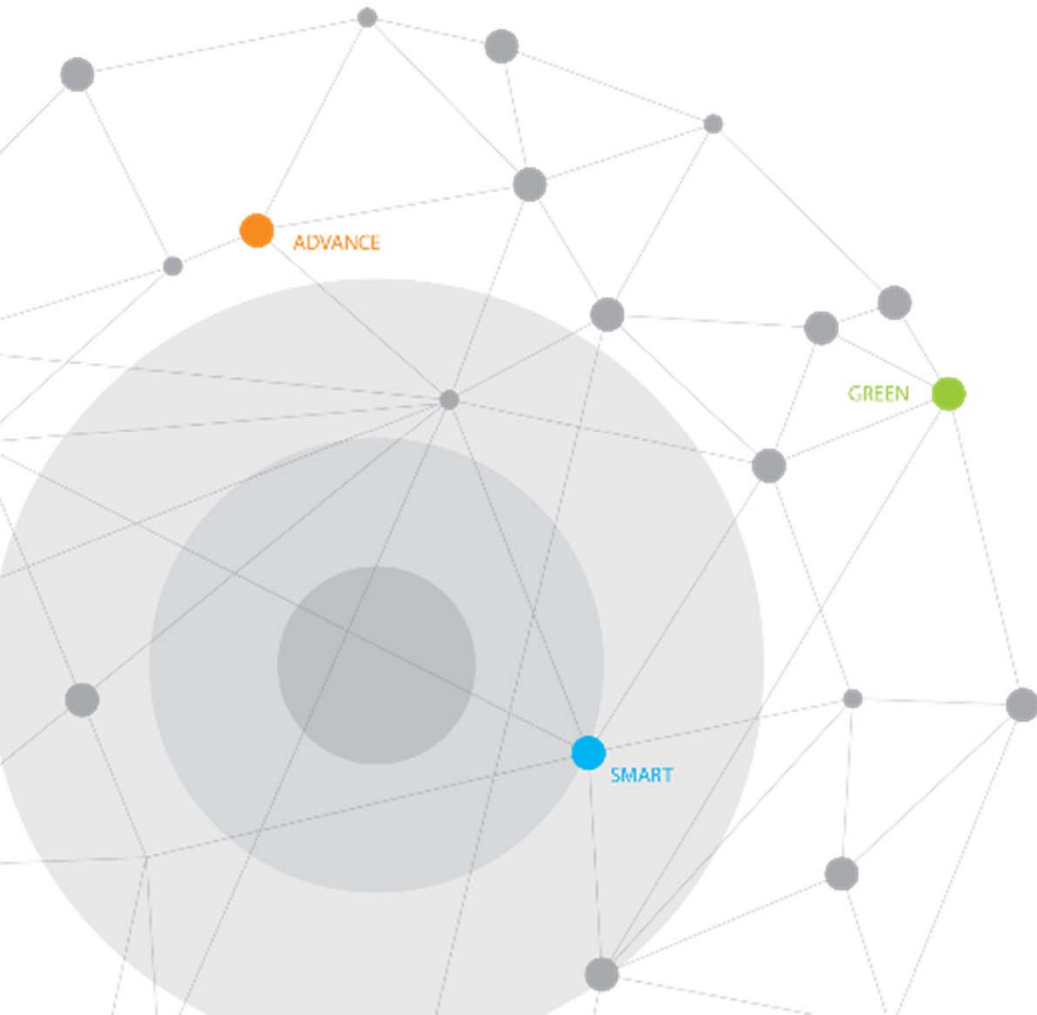
Lightest Specific Gravity

- Horizontal / Propane 33.8m³/h, 64m, **S.G. 0.335**
- Vertical / Propane 240m³/h, 190m, **S.G. 0.4**

III

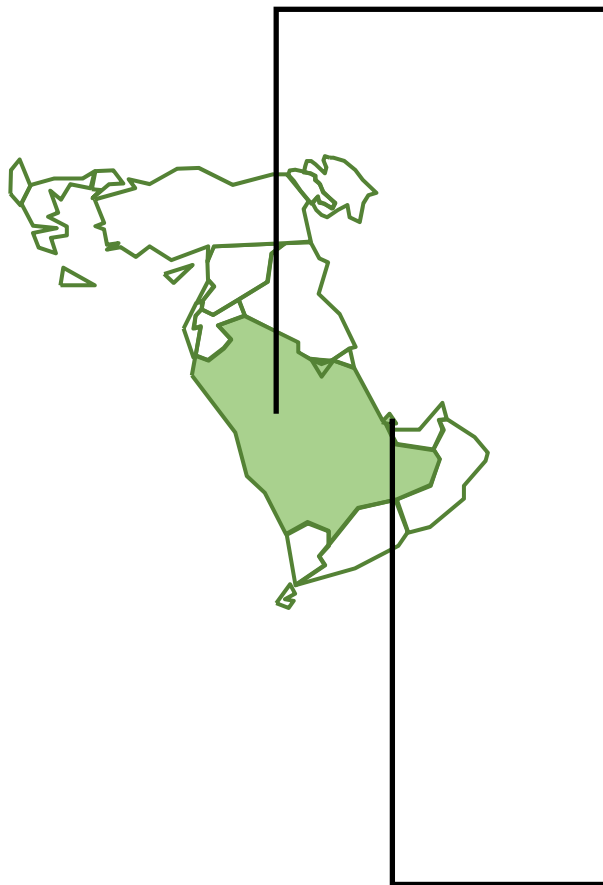
Global References

- Excellent Performance
- **Worldwide References of Oil & Gas Plant**
- Worldwide References of Power Plant



Regional Major References

< Middle East >



Saudi Arabia

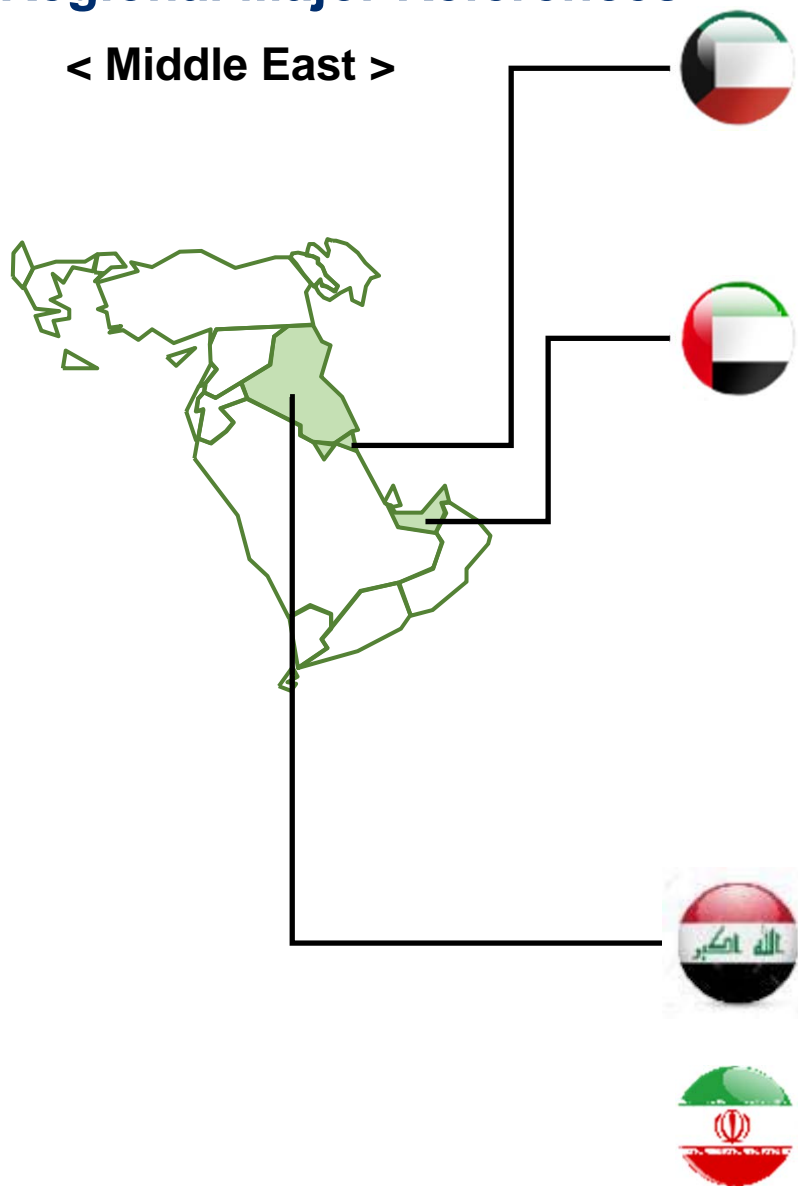
PDH/PP	NIC	Process pumps 16sets	2002
MTPA	APPC	API & Non-API pumps 21sets	2006
Jubail Acetyles	Saudi Int'l Petrochemical	API pumps 14sets	2006
PDH/PP	Sahara Petrochemical	API & Non-API pumps 43sets	2007
PP & OCU	Sabic (Ibn Zhar)	API & Non-API pumps 47sets	2007
Poly Carbonate	Sabic (Kayan)	API pumps 22sets	2008
NCP Polymer	Chevron Phillips	API pumps 44sets (BB5, VS6, BB1)	2009
Karan Gas	Saudi Aramco	OH1 6sets	2010
JERP #5	Aramco + Total JV	Process pumps 15sets	2011
Butanol	SABUCO	API pumps 71sets (OH2, BB2, BB5)	2014
IBN SINA Polyoxymethylene	SABIC	API Pumps 15sets (BB1, BB3, OH2)	2015
Ammonia Plant	Ma'aden	API pumps 37sets (OH2, VS1, VS6, BB2)	2015
Jazan Refinery and Terminal	Saudi Aramco	API Pump 16 sets (VS4)	2016

Qatar

Ras Laffan Refinery	Ras Girtas	Utility pumps 15sets	2007
II Ethylene	Qatar Chemical	API & Non-API pumps 33sets	2007
PMP	Qatargas	Utility pumps 2sets	2011
Laffan Refinery Phase 2	Laffan Refinery Co.	API Pumps 22 sets (BB1, OH1)	2014

Regional Major References

< Middle East >



Kuwait

Acid Gas Removal	KNPC	API pumps 12sets (VS4, VS6)	2012
FCC Revamp	KNPC	API pumps 19sets (OH2, BB1)	2014
Clean Fuels	KNPC	API pumps 261sets (BB5, BB2, VS)	2016
Al-Zour	KNPC	API pumps 80sets (BB2)	2017

U.A.E.

Umm Shaif Gas Injection (Offshore)	ADMA OPCO	Offshore Platform pumps 27sets (BB2, OH2, OH1)	2008
Ruwais NGL #4	GASCO	API pumps 28 sets (BB2, BB3, BB5)	2011
Ruwais Refinery Expansion	TAKREER	API pumps 103sets (OH2, BB2)	2011
Inter Refinery Pipeline-2	TAKREER	API pumps 48sets (OH2, VS6)	2012
Shah Gas Development Package #4	GASCO	API pumps 15sets (BB2, BB3)	2012
Borouge 3 (PE/PP)	Borouge	API pumps 45sets (OH2, BB2, BB5)	2012
SARB (Offshore)	ADMA OPCO	API Pumps 47sets (VS1, BB1, BB2, OH2)	2015

Iraq

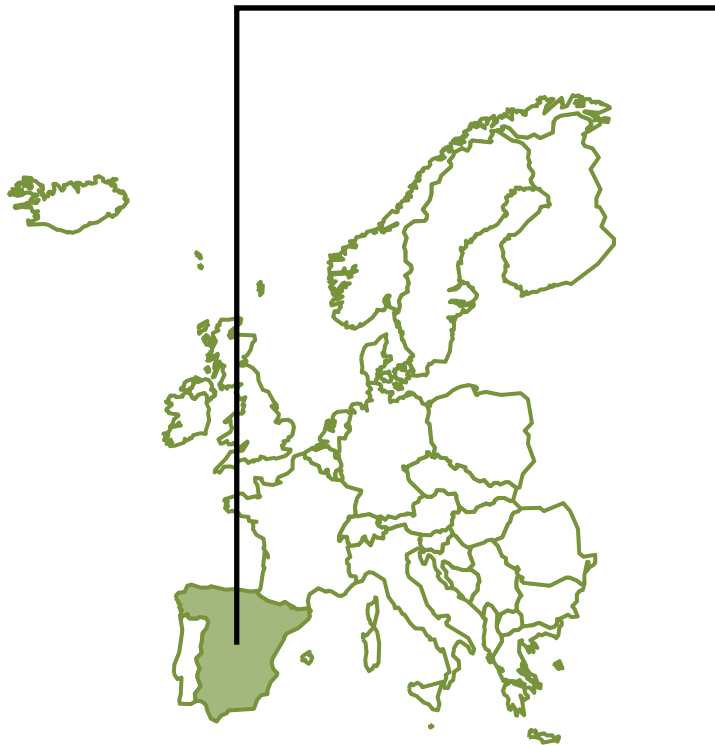
West Qurna Field 2 nd Phase	LUKOIL	API pumps 37sets (BB2, VS6)	2013
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Iran

SPGD #12	NIOC	API pumps 11sets (OH2, VS6, VS1, BB2, BB5)	2013
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Regional Major References

< Europe >



Spain

LBO	Repsol+SK JV	API pumps 52sets (OH2, BB2)	2013
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Russia

Ethyl Benzene	SIBUR Gazprom	API pumps 21sets	2009
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SLAVNEFT YANOS	Slavneft Yanos	API Pumps 2sets (BB5)	2012
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Tobolsk Ethylene Cracker Unit	Sibur	API Pumps 4sets (VS1)	2016
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Combined Oil Refinery Unit	Gazpromneft	API Pumps 88sets, High-pressure Pumps 12sets	2016
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Azerbaijan

SOCAR (Fertilizer)	SOCAR	API Pumps (BB5, BB3, BB2, BB1, OH2)	2015
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Regional Major References

< Asia >



Thailand

BST C4	BST	API pumps 25sets	1994
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Singapore

Jurong Aromatic Complex	Jurong Aromatics Corporation	API pumps 21sets (BB2)	2012
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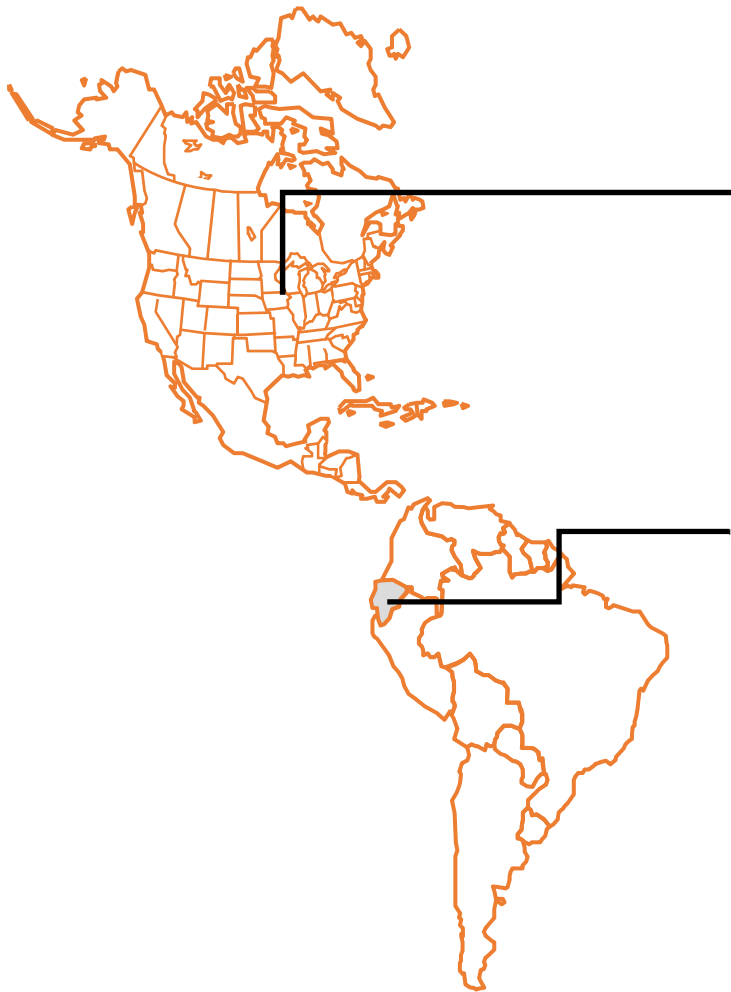


Indonesia

LBO	SK Energy	API pumps 40sets	2007
South Sumatra NGL	PT. PERTAMINA SAMTAN GAS	API pumps 12sets (OH2, VS6)	2012
Senoro Gas Development	Pertamina-Medco E&P Tomori Sulawesi	API pumps 78sets (BB5, BB2, OH2, VS6)	2014

▶ Regional Major References

< North & South America >



USA

Baytown Ethane Cracker	ExxonMobile	API pumps 15sets (OH2, BB1, BB2, BB5 & VS1)	2015
LA Griffin PJT	Lotte Axiall Chemical Corp. J/V	BB1 4sets	2017

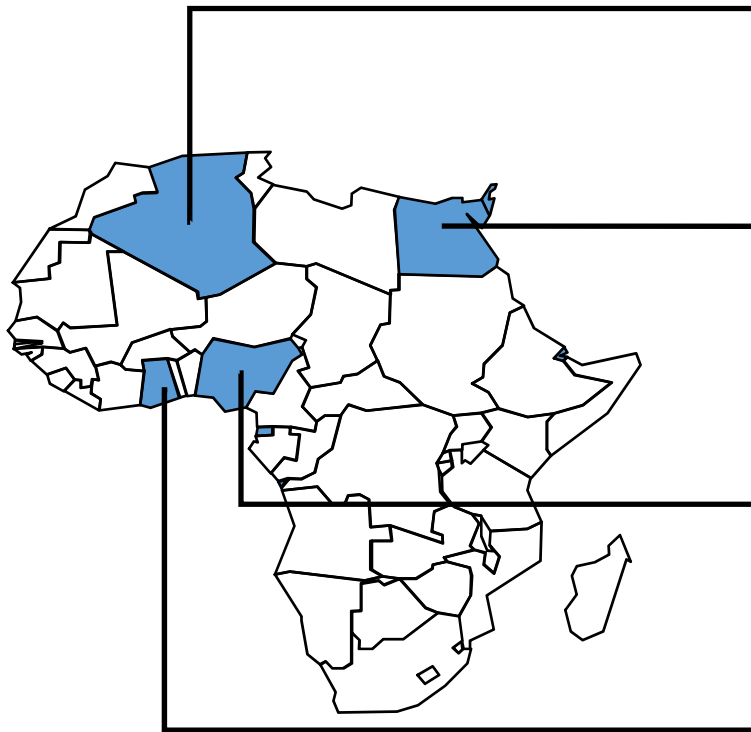






Ecuador

Guayaquil Gas Development	Petro Ecuador	API pumps 96sets (VS6, OH2)	2013
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Regional Major References

< Africa >

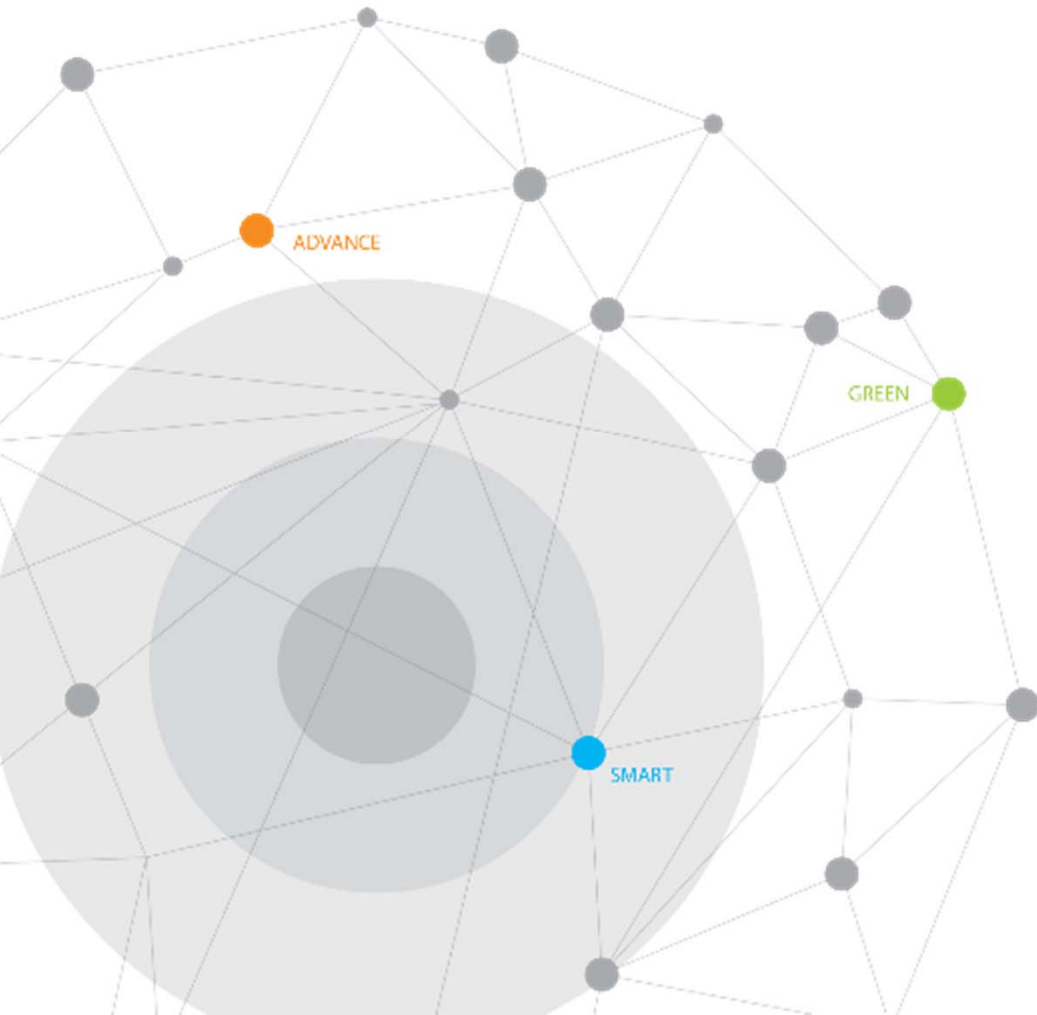


	Algeria	SKIKDA Refinery	SONATRACH	API pumps 213sets (BB5, BB2)	2010
	Egypt	ERC	Egyptian Refining Company	API pumps 31sets (OH2, VS4, BB5)	2015
		KIMA (Fertilizer)	KIMA	API pumps (BB5, OH2, VS1)	2017
	Nigeria	Dangote	Dangote	API pumps 14sets (BB5)	2013
	Ghana	RFCC	TOR	API pumps 35sets	2000

III

Global References

- Excellent Performance
- Worldwide References of Oil & Gas Plant
- **Worldwide References of Power Plant**



References

< Total >

Pump	ME	ER	Asia (w/o KO)	KO	NA	SA	AF	Total
Boiler Feedwater Pump	169	25	51	145	10	20	105	522
Condensate Pump	148	15	62	215	13	37	44	534
Circulating water Pump	49	9	52	242	3	24	4	383
Total	366	49	165	599	26	81	153	1,439

< Combined Cycle >

Pump	ME	ER	Asia (w/o KO)	KO	NA	SA	AF	Total
Boiler Feedwater Pump	157	16	38	86	10	16	95	418
Condensate Pump	144	9	32	78	13	13	38	345
Circulating water Pump	46	7	12	59	0	16	4	144
Total	293	28	82	223	23	63	137	907

ME : Middle East
 ER : Europe
 KO : Korea
 NA : North America
 SA : South America
 AF : Africa

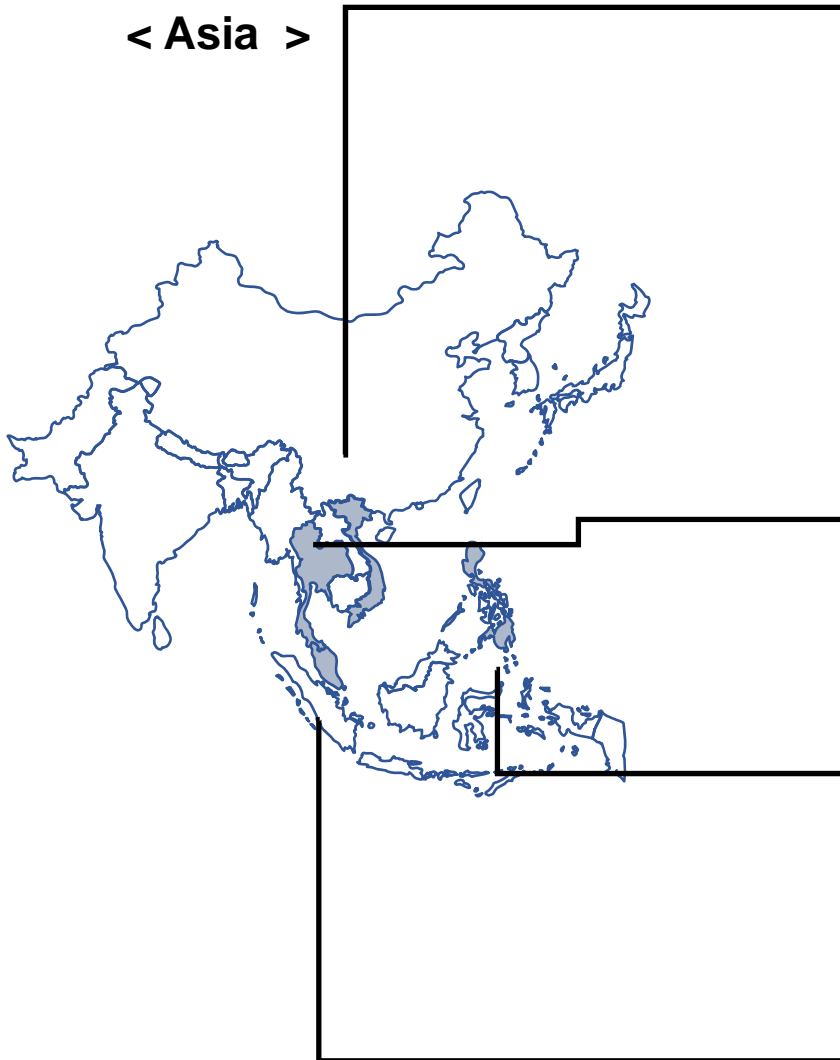


< Thermal >

Pump	ME	ER	Asia (w/o KO)	KO	NA	SA	AF	Total
Boiler Feedwater Pump	12	9	13	56	0	4	10	104
Condensate Pump	4	6	30	137	0	6	6	189
Circulating water Pump	3	2	40	183	3	8	0	239
Total	73	21	83	376	3	18	16	532

Regional Major References

< Asia >



Vietnam

Ba Ria CCPP	EVN	BFP 4 sets	2001
Nhon Trach 2 CCPP	PVN	BFP 3 sets	2011
Vinh Tan 2 PP	EVN	CWP 3 sets	2012
Tai Bin2 CCPP	PVN	CEP 4 sets, CWP 4 sets	2015
Vinh Tan 4 PP	EVN	CEP 6 sets, CWP 4 sets	2016
Vinh Tan 4 Expansion	EVN	CEP 3 sets, CWP 2 sets	2017
Song Hau 1 PP	PVN	CWP 4 sets	2018



Thailand

GHECO One Power Plant	GHECO	ASP 4 sets, CEP 3 sets, CBP 3 sets	2010
TNP II Power Plant	TNP	CWP 2 sets	2011



Philippines

Batangas PP	Batangas	GSP 32 sets	2001
Petron	Petron	GSP 11sets	2008-2013
Masinloc	Masinloc	CEP 2 sets	2017

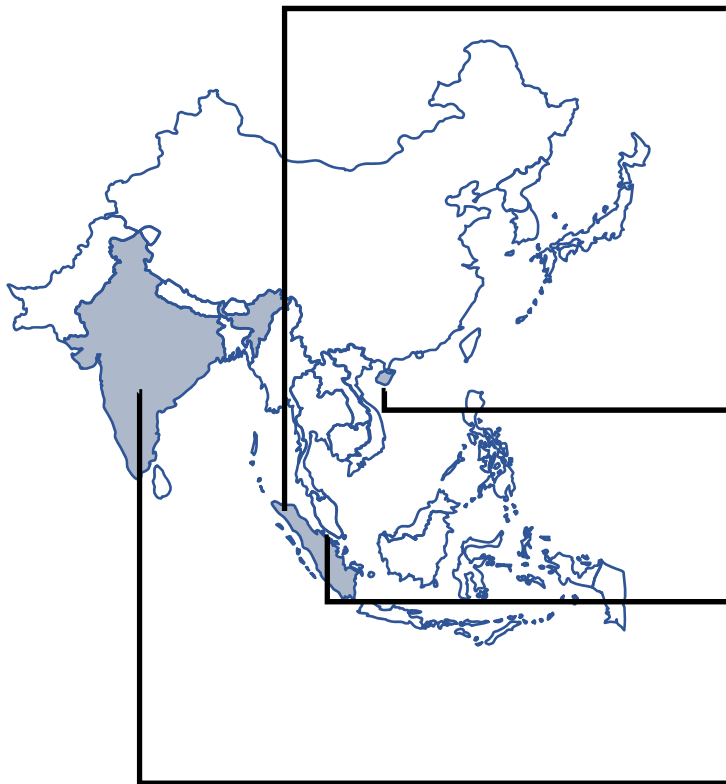


Malaysia

Prai CCGT	TNB	BFP 6sets, CEP 6sets, CWP 3sets	2014
Fast Track 3A Manjung	TNB	CEP 3sets, CCWP 2sets, LP Heater Drain Pump 4 sets	2015

Regional Major References

< Asia >



Indonesia

Muara Tawar GTPP	PT. PLN	OH2 3 sets	2003
Cirebon Power Plant 660MW	Cirebon Electric Power	CWP 6 sets CEP 6 sets	2007
Tonasa Coal Fired Power Plant	PT. Semen Tonasa	CWP 3 sets	2012
ISM Power Plant	PT Krakatau POSCO Energy	BFP 4 sets CEP 4 sets	2013
KALSEL-1 CFPP	Tanjung Power	BFP 6 sets	2017



Macao

Colone-B CAPP	CEM S.A.	CWP 2 sets	2002
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Singapore

Power Seraya Cogen	Power Seraya	BFP 4 sets CEP 4 sets DFP 4 sets	2008
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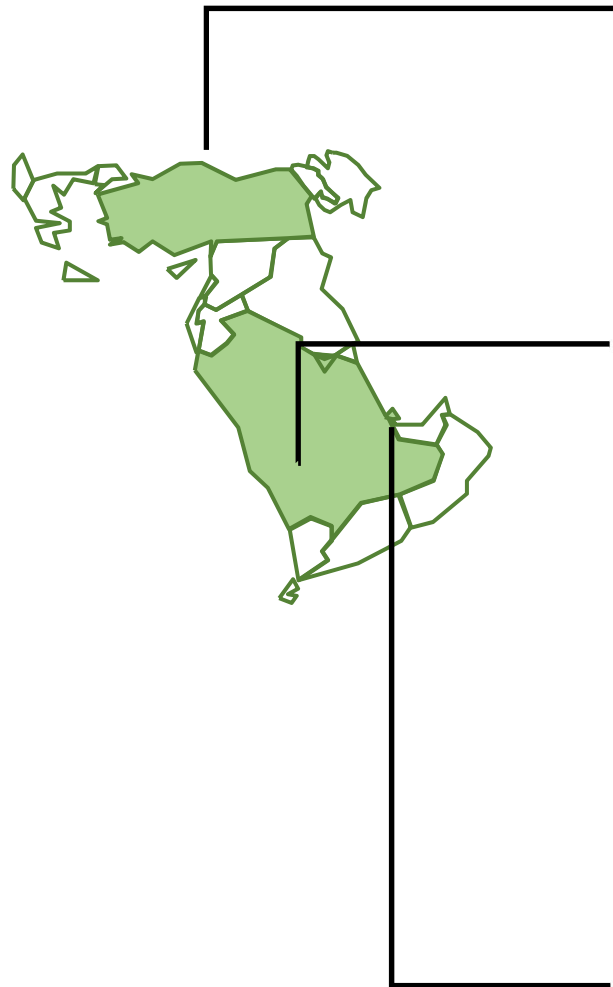


India

Ramagundam STPP	NTPC	CWP 3 sets	2003
Mauda STPP	NTPC	CWP 5 sets	2009
Aravali STPP	NTPC	CWP 6 sets	2009
Farakka STPP	NTPC	Lift pumps 5 sets	2009

Regional Major References

< Middle East & Turkey >



Turkey

Bekirli	ICDAS	CWP 4 sets	2010
Ambarli	EUAS	BFP (HP & LP) 4 sets CWP 2 sets	2011
Tufanbeyli LFPP	ENERJISA	BFP 9 sets, CEP 6 sets	2013
Bandirma II CCPP	ENERJISA	BFP 2 sets, CEP 3 sets	2015
Kirikkale IPP	ACWA	BFP 3 sets, CEP 3 sets	2016



Saudi Arabia

Marafiq IWPP 1	MARAFIQ	BFP 6 sets	2008
Yanbu I (STG 5 & 6)	MARAFIQ	BFP 6 sets, ASP 3 sets	2011
Yanbu II	MARAFIQ	ASP 4 sets	2012
Shoaibah II CCPP	SEC	CEP 6 sets, CWP 4 sets	2013
Qurayyah CCPP	SEC	CEP 12 sets, CWP 12 sets	2013
Rabigh II IPP	SEC & ACWA	BFP 9 sets, CEP 6 sets	2015
PP13 CCPP	SEC	BFP 12 sets	2015
PP14 CCPP	SEC	BFP 12 sets	2015

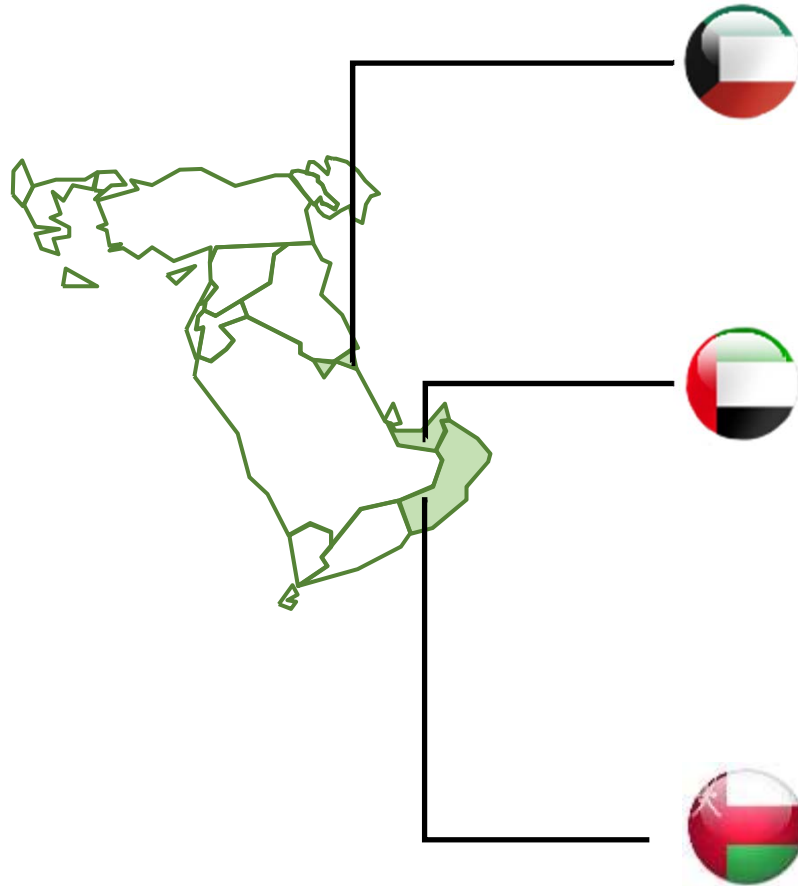


Qatar

Qatalum CCPP	Qatalum	BFP 8 sets, CEP 4 sets CWP 5 sets	2010
Ras Laffan C	RGPC	CWP 12 sets	2010

Regional Major References

< Middle East >



Kuwait

Sabiya #2	MEW	Heater Drain pump 8 sets	2004
Sabiya #3	MEW	Heater Drain pump 8 sets	2005
Shuaiba North	MEW	CWP 3 sets	2009

U.A.E.

M Station	DEWA	BFP 12 sets, CEP 9 Sets	2008
Shuweihat 3	SAPCO	BFP 6 sets, CEP 6 sets CWP 10 sets	2008
Shuweihat 2	Ruwais Power Company	BFP 6 sets. CEP 16 sets CWP 9 sets	2010
Barakah NPP	ENEC	SIP 4 sets. SCP 4 sets CWP 24 sets MFP 12 sets	2013

Oman

Sohar 1	Sohar Power Company	BFP 4 sets, CEP 2 sets Seawater supply pump 5 sets	2005
Barka	Al Batinah Power Company	BFP 5 sets, CEP 3 sets CWP 5 sets	2012
Sohar 2	Al Batinah Power Company	BFP 5 sets CEP 3 sets CWP 6 sets	2012

Regional Major References

< North America >



USA

Tuscarora Geothermal Power Plant	Ormat Nevada, Inc.	CWP 3 sets	2011
Panda Temple 1	Siemens	CEP 3 sets, CRP 2 sets	2013
Panda Sherman 1	Siemens	CEP 3 sets, CRP 2 sets	2013
Panda Temple 2	Siemens	CEP 3 sets, CRP 2 sets	2014
Panda Sunbury	Siemens	BFP 6 sets, CEP 4 sets	2016
Panda Mattawoman	Siemens	BFP 4 sets, CEP 4 sets	2017



Cuba

Boca de Jarucco CCPP	Sherritt International	CWP 2 sets	2012
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Mexico

CC Norte II	Techint & Samsung	BFP 4 sets	2012
Salamanca	Iberdrola	BFP 6 sets, CEP 6 Sets	2012
Afranrent	Sener	BFP 2 sets, CEP 2 Sets CWP 3 sets	2016



Panama

PACO Power Plant	SK E&C	CWP 4 sets	2014
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Regional Major References

< South America >



Ecuador

Thermogas Machala CAPP	JSC Machine	BFP 6 sets	2015
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Brazil

Maua III	Siemens	CEP 3 sets, CRP 2 sets	2014
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CSP Generation Power Plant	POSCO	BFP 4 sets, CEP 4 sets	2014
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Peru

Chilca Uno Power Station	POSCO/Enersur	CEP 2 sets	2011
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Argentina

Ensenada de Barragan	Siemens	CEP 3 sets	2014
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Brigadier Lopez	Siemens	CEP 2 sets	2014
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Chile

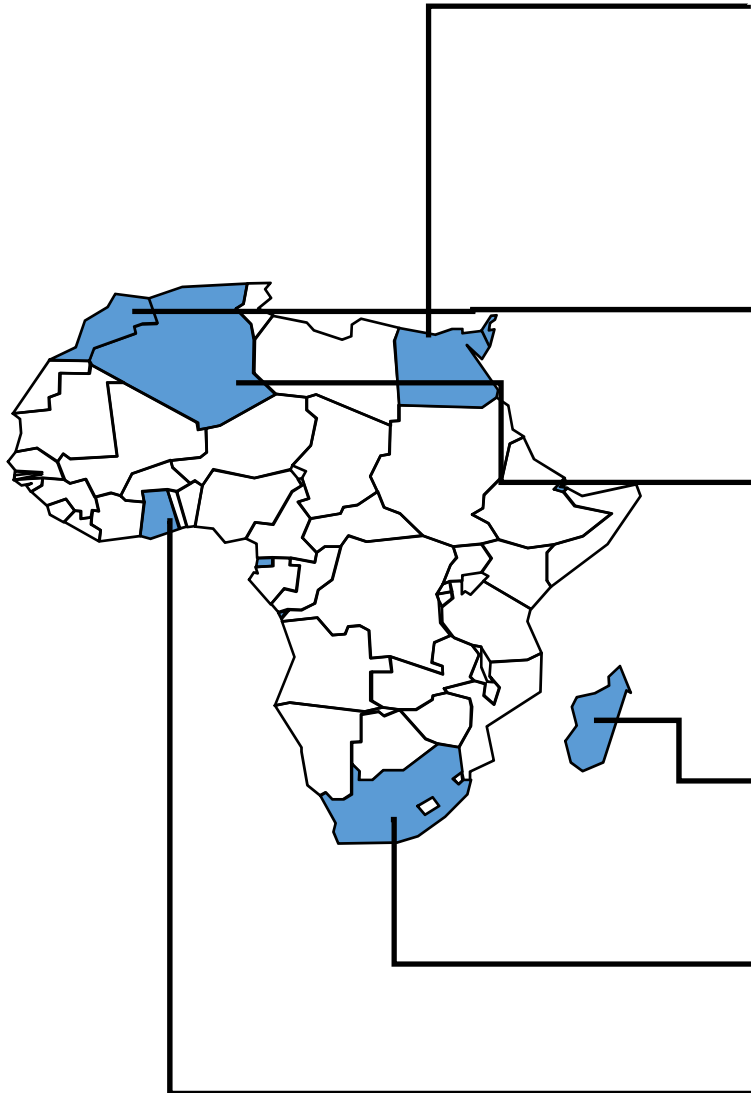
Red Dragon	E.CL SA	CEP 2 sets	2016
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Tocopilla Power Plant	E.CL SA	BFP 1 set	2010
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Nuevas Ventanas Power Plant	POSCO	BFP 4 sets	2008
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Regional Major References

< Africa >



Egypt

Al Shabab	EDEPC	BFP 12 sets, CEP 8 sets	2016
West Damietta #1	EDEPC	BFP 6 sets, CEP 4 sets	2016
New Assiut	UEEPC	BFP 16 sets, CEP 6 sets	2017
West Damietta #2	EDEPC	BFP 8 sets, CEP 3 sets	2017



Morocco

Safi TPP	SAFI Energy company	BFP 8 sets, CEP 6 sets	2016
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Algeria

Biskra	SPE	BFP 8 sets	2016
Jijel	SPE	BFP 8 sets	2016
Mostaghanem	SPE	CWP 4 sets	2017



Madagascar

Ambatovy	DEWA	BFP 12 sets, CEP 9 Sets	2008
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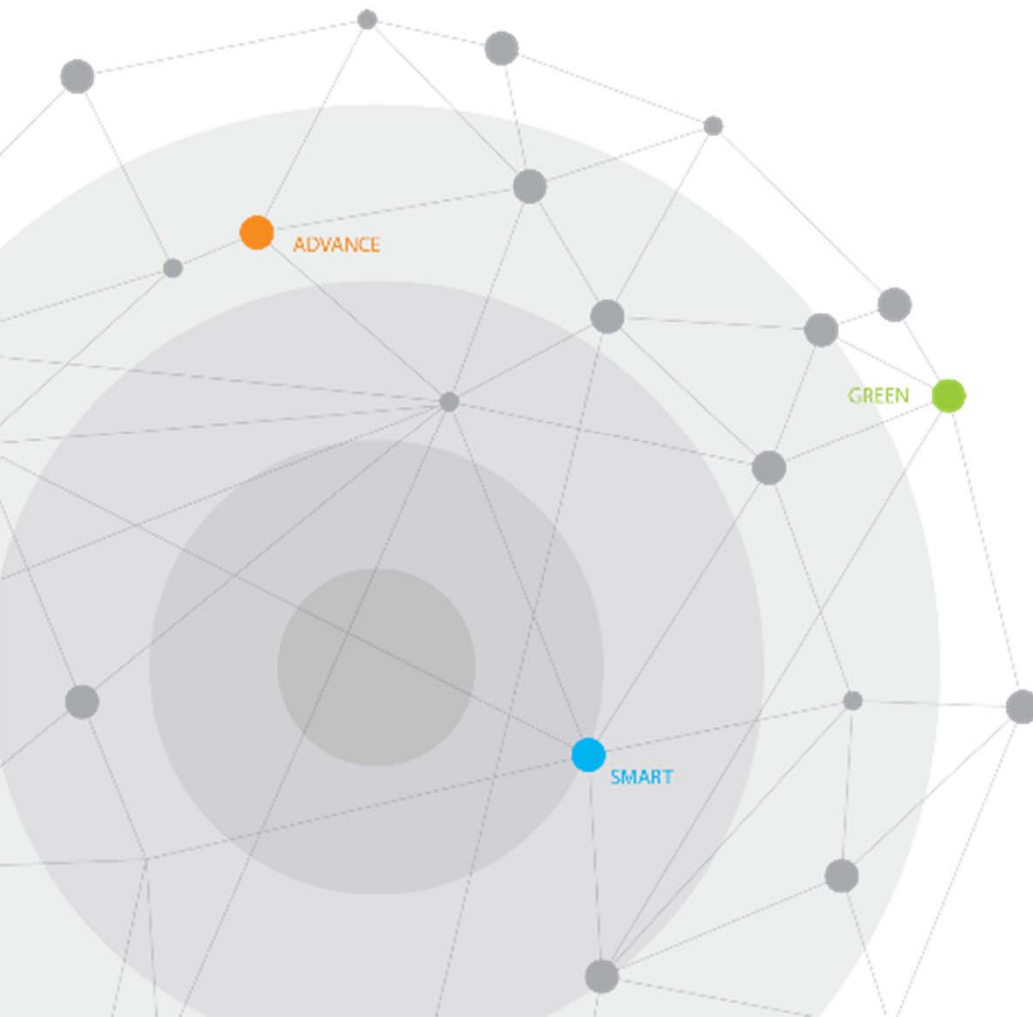
South Africa

Kathu	LICIASTAR (PTY) LTD	CEP 2 sets	2017
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Ghana

Takoradi	TICO	BFP 3 sets	2015
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