General Information on
Hyundai Heavy Industries Turbomachinery
(HHI-TMC)
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1. HHI CORPORATE INFORMATION

HHI at a Glance

- **More than 20,000 Numbers of Employees and 10 Million m² of Spaces and Shops**
- **Hyundai Heavy Industries Group** which is composed of more than 25 companies (Including HHI, excluding overseas corporations) including 3 World Class Shipbuilding Companies (HHI, Hyundai Samho and Hyundai Mipo), HI Security, etc.
- Hyundai Heavy Industries Group has 15 Oversea Branches and 28 Overseas Affiliated companies in its own global network.
1. HHI CORPORATE INFORMATION

HHI Corporate Organization

- Before Apr. 1, 2017, seven (7) divisions were managed under Hyundai Heavy Industries (HHI).
- After Apr. 1, 2017, Hyundai Robotics is the Holding Company.
- HHI-TMC was spun-off from HHI on Apr. 1, 2016 and the business for turbo-machinery system was separated from Engine & Machinery division.
2. HHI-TMC COMPANY OVERVIEW

Company Location

SITE AREA: 29,095 m² (HHI-TMC)
2. HHI-TMC COMPANY OVERVIEW

Company Overview

1) Major History

- 1978
  - Hyundai Engine Co.Ltd Industrial equipment plant construction (1978.03)
- 1979
  - Manufacturing 1st Hyundai pump (1979.08)
- 1988
  - Manufacturing the Large pump for Desalination plan (1988.06)
- 1997
  - Manufacturing the Gas Compressor with Mitsubishi by share technology (2011.02)
- 1997
  - Manufacturing the Boiler feed water pump (1997.03)
- 2013
  - Manufacturing the Steam Turbine (2015.10)
- 2014
  - Manufacturing own model of Air Compressor (2014.02)
- 2016
  - Establishing Hyundai Heavy Industry Turbo Machinery Corporation (2016.02)

2) Operation Period

- 2016.02 Establishing of Hyundai Heavy Industry Turbo Machinery Corporation (HHI-TMC)
- 2016.03 HHI Investing and transferring of business, Transferring and hiring employees
- 2016.04 Starting operation of HHI-TMC as a

  “Specialized company for turbo-machinery, industrial pump, compressor and small steam turbine”
2. HHI-TMC COMPANY OVERVIEW

Company Organization

CEO
J. H. Chung

General Management
Executive Director / W.G. Jang

Management Group
HR & General Affairs Team
Account Team
Information Operation Team

Sales Group
Global Sales Group
Domestic Sales Group
Technical Sales Team

Project Group
Business Planning Team
Purchasing Team
Nuclear Team

Project Administration
Executive Director / S.G. Lee

Engineering Group
R&D Center
Technical 1 Team (Design & Dwg.)
Technical 2 Team (Design & Dwg.)
Technical 3 Team (Elec. & Control)

Manufacturing Group
Manufacturing 1 Team (Vertical Pump)
Manufacturing 2 Team (Horizontal Pump)
Manufacturing Support Team

Quality Assurance Group
Quality Assurance Team
Technical Warranty Center
## 3. MAJOR BUSINESS AREA - GENERAL

### 1. Industrial Pump

<table>
<thead>
<tr>
<th>Status</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Focusing business of Large water supply and intake pumps for Nuclear &amp; Thermal Power plants</td>
</tr>
<tr>
<td></td>
<td>• Water, Crude oil and other liquids transport, and pressurization</td>
</tr>
<tr>
<td></td>
<td>• Local &amp; Overseas EPC companies: HYUNDAI E&amp;C, DAEWOO E&amp;C, POSCO E&amp;C, DAEILM Industry, SAMSUNG ENG., DOOSAN, HHI, Alstom, etc.</td>
</tr>
<tr>
<td></td>
<td>• Local and Overseas Power company: KHNP, KEPCO, Westinghouse, Rosatom etc.</td>
</tr>
</tbody>
</table>

### 2. Compressor

<table>
<thead>
<tr>
<th>Status</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Air and Gas transport, and pressurization.</td>
</tr>
<tr>
<td></td>
<td>• Focusing on Industrial utility equipment and gas pressurization business.</td>
</tr>
<tr>
<td></td>
<td>• Local &amp; Overseas Industrial equipment users and EPC companies: HYUNDAI E&amp;C, POSCO E&amp;C, Korea Iron, KCC, SK E&amp;C, DAEILM Industry, MHPS, MCO, etc.</td>
</tr>
<tr>
<td></td>
<td>• Local &amp; Overseas utility supply comp.: KOGAS, STR, etc.</td>
</tr>
</tbody>
</table>

### Major Customers

## Photos for HHI-TMC’s product

- CWP (Power Plant Intake water / Circulation pump)
- BFP (Boiler feed water pump)
- Vertical Cable Free Crude Oil Pump
- Gas Compressor (Barrel type)
- Air Compressor (Integrally geared type)
HHI-TMC is Korean largest pump company, HHI-TMC has played as a key maker in the industrial pump market over than 40 years. Based on it commitment to R&D and better experiences, HHI-TMC has supplied numerous pump models such as nuclear & power plants, petrochemical, marine pump, commercial & industrial pump in the world.

**Strength in NPP**

HHI-TMC established in 1979, the company provided pumps for nuclear power plant from 1986.

We have provided total 24 unit (approximately 300 pump) in domestic and foreign nuclear power plants.
3. MAJOR BUSINESS AREA - **BENEFIT**

Benefits of HHI-TMC’s Pumps

- Provide Pump & Motor as One Package with same brand as HHI.
  1) **SAVE DELIVERY TIME & EASY ADJUSTMENT** of manufacturing schedule!
  2) **GIVE BETTER PRICE** than other pump maker!
  3) **TOTAL GUARANTEE** for Pump & Motor together!
  4) **EASY & CONVENIENT STRING TEST FOR PUMP + MOTOR** at HHI-TMC Shop!
  5) **TIMELY MANNERABLE MOBILIZATION** of technical supervision for both equipment!

- Plenty of Experiences in Industrial Pumps, Korea and/or Overseas!
3. MAJOR BUSINESS AREA FOR PUMP

FOR NUCLEAR POWER PLANT
- MAIN FEED WATER PUMP (MFWP)
- START-UP FEED WATER PUMP (SBFP)
- FEED WATER BOOSTER PUMP (FWBP)
- AUXILIARY FEED WATER PUMP (AFWP)
- CIRCULATION WATER PUMP (CWP)
- CONDENSATE PUMP (COP)
- ESSENTIAL SERVICE WATER PUMP (ESWP)
- SCREEN WASH PUMP

FOR THERMAL POWER PLANT
- BOILER FEED WATER PUMP (BFP)
- BOILER FEED BOOSTER PUMP (BFBP)
- CIRCULATION WATER PUMP (CWP)
- SEA WATER SUPPLY PUMP (SWSP)
- CONDENSATE EXTRACTION PUMP (CEP)
- CONDENSATE BOOSTER PUMP (CBP)
- CLOSED COOLING WATER PUMP (CCWP)

FOR DESALINATION PLANT
- BRINE RECIRCULATION PUMP (BRP)
- BRINE BLOW DOWN PUMP (BBDP)
- SEA WATER SUPPLY PUMP (SWSP)
- CONDENSATE PUMP (COP)
- DISTILLATE PUMP (DP)
- PUBLIC WATER SUPPLY PUMP (PWSP)

FOR GAS & OIL INDUSTRIES
- COOLING WATER PUMP (CWP)
- CLOSED CIRCULATION COOLING WATER PUMP (CCCWP)
- SEAWATER INTAKE PUMP (SWP)
- VAPORIZER SEA WATER PUMP (VSWP)
- CRUDE OIL TRANSFER PUMP (COTP)
- ELEC. CABLE FREE SUBMERSIBLE PUMP
## Brief History

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979. 12</td>
<td>License Agreement on Industrial Pumps with EBARA, Japan</td>
</tr>
<tr>
<td>1986. 08</td>
<td>Delivery of COP for Ul-chin 1,2 NPP in Korea</td>
</tr>
<tr>
<td>1991. 06</td>
<td>Delivery of Feed Water Booster Pump for Yong-gwang 3,4 NPP in Korea</td>
</tr>
<tr>
<td>1997. 01</td>
<td>Delivery of Feed Water Booster Pump for Yong-gwang 5,6 NPP in Korea</td>
</tr>
<tr>
<td>2000. 06</td>
<td>Delivery of Feed Water Pump &amp; CWP, ESWP, SWP,ST-up FWP for Ul-Chin 5,6 NPP in Korea</td>
</tr>
<tr>
<td>2004.06</td>
<td>Delivery of Seawater Cooling Pump for India KUDANKULAM 1,2 NPP through Atomstroy Export in Russia</td>
</tr>
<tr>
<td>2009.04</td>
<td>Delivery of Feedwater Pumps &amp; Aux. Feedwater Pump for Shin-Wolsong 1,2 NPP in KOREA</td>
</tr>
<tr>
<td>2013. 09</td>
<td>Delivery of Condensate Pump &amp; Feedwater Booster Pumps &amp; Feed Water Pump &amp; Aux. Feedwater Pump for Shin-Kori 3,4 NPP in Korea</td>
</tr>
<tr>
<td>2012. 05</td>
<td>Delivery of Feedwater Pumps &amp; Booster Pumps for Vogtle 3 / V.C. Summer 2,3 NPP in USA (WESTINGHOUSE)</td>
</tr>
<tr>
<td>2014. 05</td>
<td></td>
</tr>
<tr>
<td>2013~</td>
<td>Delivery of Condensate Pump &amp; Feedwater Booster Pumps &amp; Seawater Bypass Pumps &amp; Aux. Feedwater Pump for BRAKA 1,2 NPP in UAE</td>
</tr>
</tbody>
</table>
### 5. EXPERIENCE FOR NPP PUMP INSTALLATION (KOREA)

<table>
<thead>
<tr>
<th>No.</th>
<th>Installation Site</th>
<th>Pumps Installed</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>YONG-GWANG Unit 3,4 (1000 MW)</td>
<td>- Feedwater Booster Pump</td>
<td>1991.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Condensate Pump</td>
<td>1991.12</td>
</tr>
<tr>
<td>2</td>
<td>WOLSONG Unit 2,3,4 (700 MW)</td>
<td>- Concrete Volute Pump</td>
<td>1994.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Condensate Extraction Pump</td>
<td>1996.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Raw Service Water Pump</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ULCHIN Unit 3,4 (1000 MW)</td>
<td>- Condensate Pump</td>
<td>1995.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Feedwater Booster Pump</td>
<td>1995.12</td>
</tr>
<tr>
<td>4</td>
<td>YONG-GWANG Unit 5,6 (1000 MW)</td>
<td>- Main Feedwater Pump</td>
<td>1997.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Start-up Feedwater Pump</td>
<td>2000.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Feedwater Booster Pump</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Condensate Pump</td>
<td></td>
</tr>
</tbody>
</table>
### 5. EXPERIENCE FOR NPP PUMP INSTALLATION (KOREA)

<table>
<thead>
<tr>
<th>No.</th>
<th>Installation Site</th>
<th>Pumps Installed</th>
<th>Year</th>
</tr>
</thead>
</table>
| 5   | ULCHIN Unit 5,6 (1000 MW)               | - Main Feedwater Pump  
- Circulation Water Pump  
- Condensate Pump  
- Feedwater Booster Pump  
- Essential Service Water Pump | 2009.04    |
|     |                                         |                                                                                | 2010.02    |
| 6   | SHINWOLSIONG Unit 1,2 (1000MW)          | - Main Feedwater Pump  
- Auxiliary Feedwater Pump                                                      | 2009.04    |
|     |                                         |                                                                                | 2010.02    |
| 7   | SHINKORI Unit 1,2 (1000MW)              | - Main Feedwater Pump  
- Essential Service Water Pump                                                    | 2008.02    |
|     |                                         |                                                                                | 2009.02    |
| 8   | SHINKORI Unit 3,4 (1400MW)              | - Main/Aux Feedwater Pump  
- Condensate Pump  
- Feedwater Booster Pump  
- Essential Service Water Pump                                                   | 2010.06    |
|     |                                         |                                                                                | 2011.06    |
| 9   | SHINULCHIN Unit 1,2 (1400 MW)           | - Main Feedwater Pump  
- Condensate Pump  
- Feedwater Booster Pump                                                           | (2013.07   |
|     |                                         |                                                                                | ~2014.06)  |
### 5. EXPERIENCE FOR NPP PUMP INSTALLATION (OVERSEA)

<table>
<thead>
<tr>
<th>No.</th>
<th>Customer</th>
<th>Installation Site</th>
<th>Pumps Installed</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ATOMSTROY-EXPORT</td>
<td>KUDANKULAM NPP Unit 1,2 (India / 1000 MW)</td>
<td>- Cooling Water Pump</td>
<td>2004.06</td>
</tr>
<tr>
<td></td>
<td>(Russia)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>EMCO</td>
<td>KALININ NPP (Russia)</td>
<td>- Cooling Water Pump</td>
<td>2010.05</td>
</tr>
<tr>
<td></td>
<td>(Russia)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>WEC</td>
<td>VOGTLE NPP UNIT3,4 (U.S.A.)</td>
<td>- Main Feedwater Pump</td>
<td>2012.01</td>
</tr>
<tr>
<td></td>
<td>(U.S.A.)</td>
<td></td>
<td>- FW Booster Pump</td>
<td>(2013.06)</td>
</tr>
<tr>
<td>4</td>
<td>WEC</td>
<td>SUMMER NPP UNIT 2,3 (U.S.A.)</td>
<td>- Main Feedwater Pump</td>
<td>2012.05</td>
</tr>
<tr>
<td></td>
<td>(U.S.A.)</td>
<td></td>
<td>- FW Booster Pump</td>
<td>(2014.06)</td>
</tr>
<tr>
<td>5</td>
<td>KEPCO</td>
<td>BARAKA UNIT 1,2,3,4 (UAE) (1400MW)</td>
<td>- Aux. Feedwater Pump</td>
<td>2013.03</td>
</tr>
<tr>
<td></td>
<td>(KOREA)</td>
<td></td>
<td>- Condensate Pump</td>
<td>(2016.03)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- FW Booster Pump</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Bypass Pump</td>
<td></td>
</tr>
</tbody>
</table>
6. PRODUCT (Vertical Type)

**Vertical Mixed / Axial Flow Pump**

<table>
<thead>
<tr>
<th>Model</th>
<th>VK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>400 ~ 3,500mm (15 ~ 138 inch)</td>
</tr>
<tr>
<td>Capacity</td>
<td>1,500 ~ 93,000 m³/hr (6,600 ~ 410,000 gpm)</td>
</tr>
<tr>
<td>Head</td>
<td>Max. 160 m (Max. 525 ft)</td>
</tr>
</tbody>
</table>

**Applications**

- **Nuclear & Power Plant:**
  - Circulation Water Pump
  - Essential Service Water Pump
  - Cooling Water Pump
  - Seawater Lift Pump
- **Desalination Plant:**
  - Brine Recirculation Pump
  - Brine Blow-down Pump
  - Seawater Intake Pump
- **Other Water Works:**
  - Influent / Effluent Pump
  - Intake / Transfer Pump

Variable Pitch Vane Type
Circulation Water Pump for Yong-hung TPP #1,2,3,4
6. PRODUCT (Vertical Type)

**Vertical Multi-stage (Barrel) Pump**

<table>
<thead>
<tr>
<th>Model</th>
<th>VW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>200 ~ 1,500 mm (8 ~ 59 inch)</td>
</tr>
<tr>
<td>Capacity</td>
<td>200 ~ 28,000 m³/hr (880 ~ 123,000 gpm)</td>
</tr>
<tr>
<td>Head</td>
<td>Max. 600m (Max. 1,970 ft)</td>
</tr>
<tr>
<td>Applications</td>
<td>Nuclear &amp; Power Plant:</td>
</tr>
<tr>
<td></td>
<td>. Condensate Pump</td>
</tr>
<tr>
<td></td>
<td>. Hotwell Pump</td>
</tr>
<tr>
<td>Desalination Plant:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>. Brine Recirculation Pump</td>
</tr>
<tr>
<td></td>
<td>. Brine Blow-down Pump</td>
</tr>
<tr>
<td></td>
<td>. Distillate Pump</td>
</tr>
<tr>
<td>Oil, Refinery &amp; Petrochemical:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>. Crude Oil Booster Pump</td>
</tr>
<tr>
<td></td>
<td>. Crude Oil Transfer Pump</td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

Condensate Pump
For Yong-Gwang NPP # 3,4,5,6
### Horizontal High Pressure Pump

<table>
<thead>
<tr>
<th>Model</th>
<th>HMB, HMR, HMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>100 ~ 600 mm (4 ~ 24 inch)</td>
</tr>
<tr>
<td>Capacity</td>
<td>150 ~ 6,000 m³/hr (660 ~ 264,000 gpm)</td>
</tr>
<tr>
<td>Head</td>
<td>Max. 4,000m (Max. 13,125 ft)</td>
</tr>
</tbody>
</table>

**Applications**

- Nuclear & Power Plant:
  - Aux. feed water pump
  - Start-up feed water pump
- Boiler Feedwater Pump
- HRSG Feedwater Pump
- Crude Oil Transfer Pump
- Water Injection Pump
- Process Pump
- Pipeline Pump

**Hyundai Multi**

- **Hyundai Multi Barrel**
- **Hyundai Multi Radial**
- **Hyundai Multi Axial**

Auxiliary Feedwater Pump for Shin-Wolsong NPP #1,2
## Horizontal Double Suction Pump

<table>
<thead>
<tr>
<th>Model</th>
<th>HD(A), HDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (Discharge Nozzle)</td>
<td>200 ~ 1,400 mm (8 ~ 55 inch)</td>
</tr>
<tr>
<td>Capacity</td>
<td>300 ~ 20,000 m³/hr (1,320 ~ 880,000 gpm)</td>
</tr>
<tr>
<td>Head</td>
<td>Max. 800 m (Max. 2,625 ft)</td>
</tr>
</tbody>
</table>

### Applications

**Nuclear Power Plant:**
- Main Feedwater Pump
- Feedwater Booster Pump

**Industrial Plant:**
- Water Intake Pump
- Circulation Pump

**Building:**
- Water Supply/Drainage Pump
- Fire Fighting Pump

**Oil & Gas Industry:**
- Circulation Pump
- Crude oil Transfer Pump

*Hyundai Double Axial*  
*Hyundai Double Radial*  

Feedwater Booster Pump for Yong-gwang NPP #3,4,5,6
### FOUNDRY SHOP

**Production Capability**

- **Max unit weight**: 120 TON
- **Capacity**: 60,000 ton a year
- **Material**: Cast Iron, Ductile, Ni-Resist, Al Bronze

**Main Facilities**

- 30 ton coreless induction furnace (Max melting cap 120 ton)
- 150 ton Heat treatment furnace
MACHINERY SHOP

Main Facilities: Total 300 units of machine

- Plano Miller
- Horizontal Boring M/C
- Vertical Lathe
- Lathe
- Grinding M/C
- Deep Hole Drilling M/C
- Gear Hobbing M/C
## Test Facilities

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>FACILITIES</th>
<th>SPECIFICATION</th>
</tr>
</thead>
</table>
| Test Capacity | 1) Open Loop Test (Sump pit)  
- Weir  
- Magnetic flowmeter | Max. Flow Rate 93,240 m³/hr  
Max. Flow Rate 130,000 m³/hr |
| | 2) Closed Loop Test  
- Horizontal/ Vertical Type  
- Horizontal High Pressure | Max. Flow Rate 7,200 m³/hr  
Max. Flow Rate 5,100 m³/hr |
| Mechanical | Functional Test Equipment  
1) Ultra High Pressure Pump  
- Motor for Shop Test  
- Fluid Coupling for Shop Test  
2) High Pressure Pump  
3) Horizontal/ Vertical Pump  
4) Marine Pump  
6) Model Test Equipment | 5,100 m³/hr × 400 kg/cm²  
20,000 kW × 60Hz × 3P  
20,000 kW (3,200-7,200 rpm)  
7,200 m³/hr × 50 kg/cm²  
20 kg/cm²  
20 kg/cm²  
900 m³/hr × 150 kg/cm² |
| Electrical | Motor  
- Generator Set | 3,500 kVA x 6.6~3.3kV x 50Hz  
10,000 kVA x 11~6.6kV x 50Hz |
8. Opportunity for Czech-Korea Nuclear Industry

Preliminary Localization Strategy for Pump

- HHI-TMC will corporate with the eligible Czech Local companies for pump....

Czech Local Company (if Available)

If found, Eligible Company

Report & Search

If not, Own Resources

HHI-TMC

Pump for NPP
8. Opportunity for Czech-Korea Nuclear Industry

Preliminary Cooperation Plan for Czech Local Company

- We will cooperate with local companies on conditions stated below:

1) Sufficient resources (production capacity) and experiences for their proposed work
2) Comply with the project specification for the Quality and Safety aspects
3) The material and/or services should meet the delivery time without affecting the Project schedule
4) Reasonable and competent price for their work
9. Contact Details

Contact Details for HHI-TMC

If your company would like to collaborate with us, please contact below person in charge.

- **HHI-TMC / Nuclear Team**

  1) Person in Charge : Mr. Soungyouel Kim (S. Y. Kim)
  2) E-mail : soungyouel.kim@hhitmc.com
  3) Telephone No. : +82 52 204 5131
Thank You !!