Pump Energy Saving

EBARA Pump Saudi Arabia LLC

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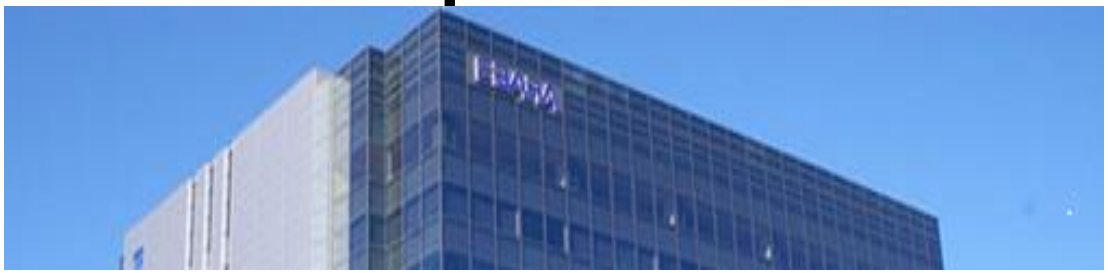
Looking ahead, going beyond expectations

Ahead Beyond

Introduction of EBARA Corporation



Founded in 1912 as a pioneer of pump manufacturer in Japan.

One of the world largest pump manufacturer.

Producing more than 900,000 pumps a year through 16 manufacturing facilities worldwide.

Supplying full range pumps product line

USD 4.3 Billion In Sales Volume (2017) (Consolidated)

4,014 employees (2017) (EBARA Corp. only)

16,317 employees in group (2017)

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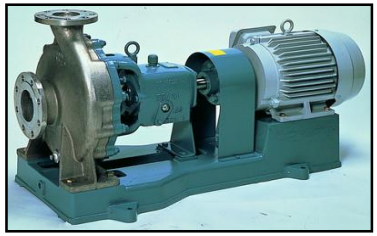
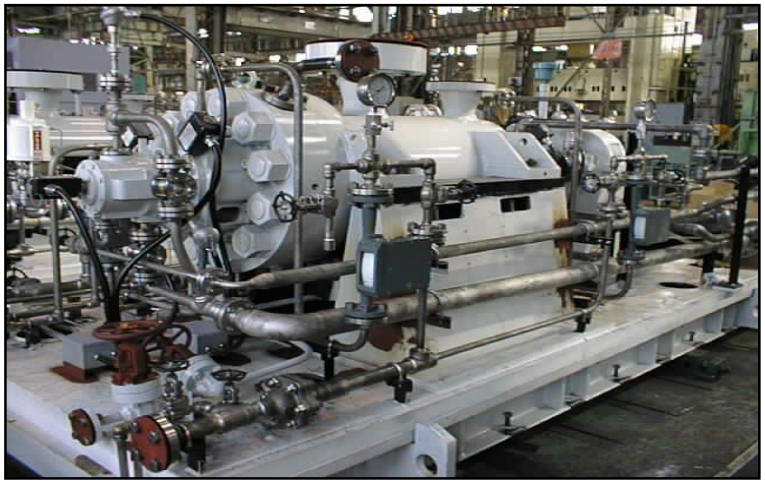
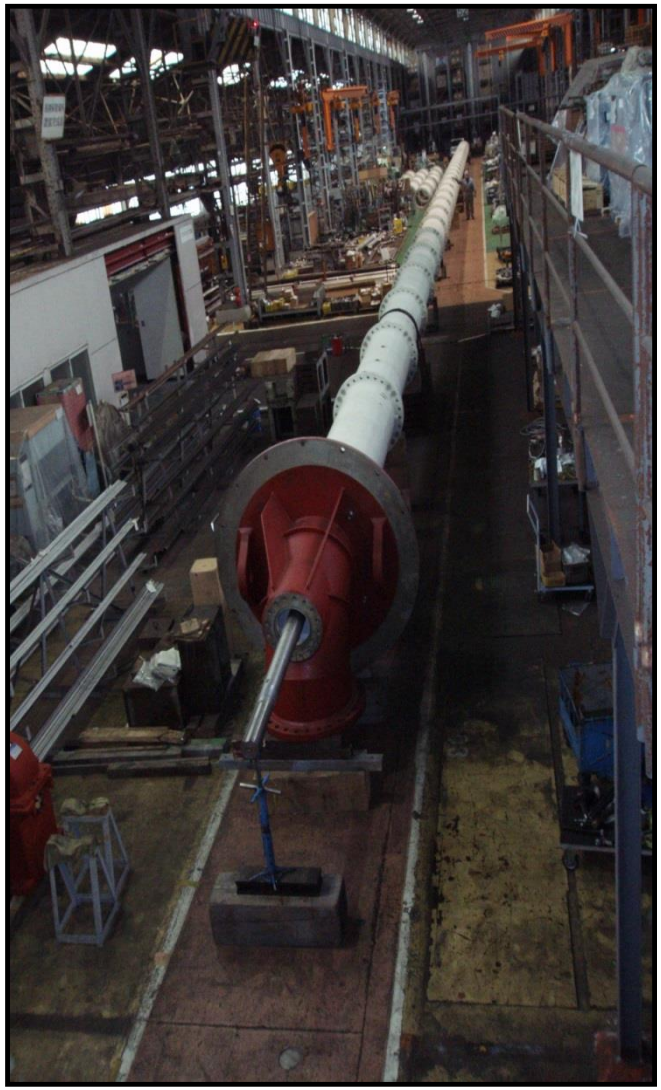
EBARA Product

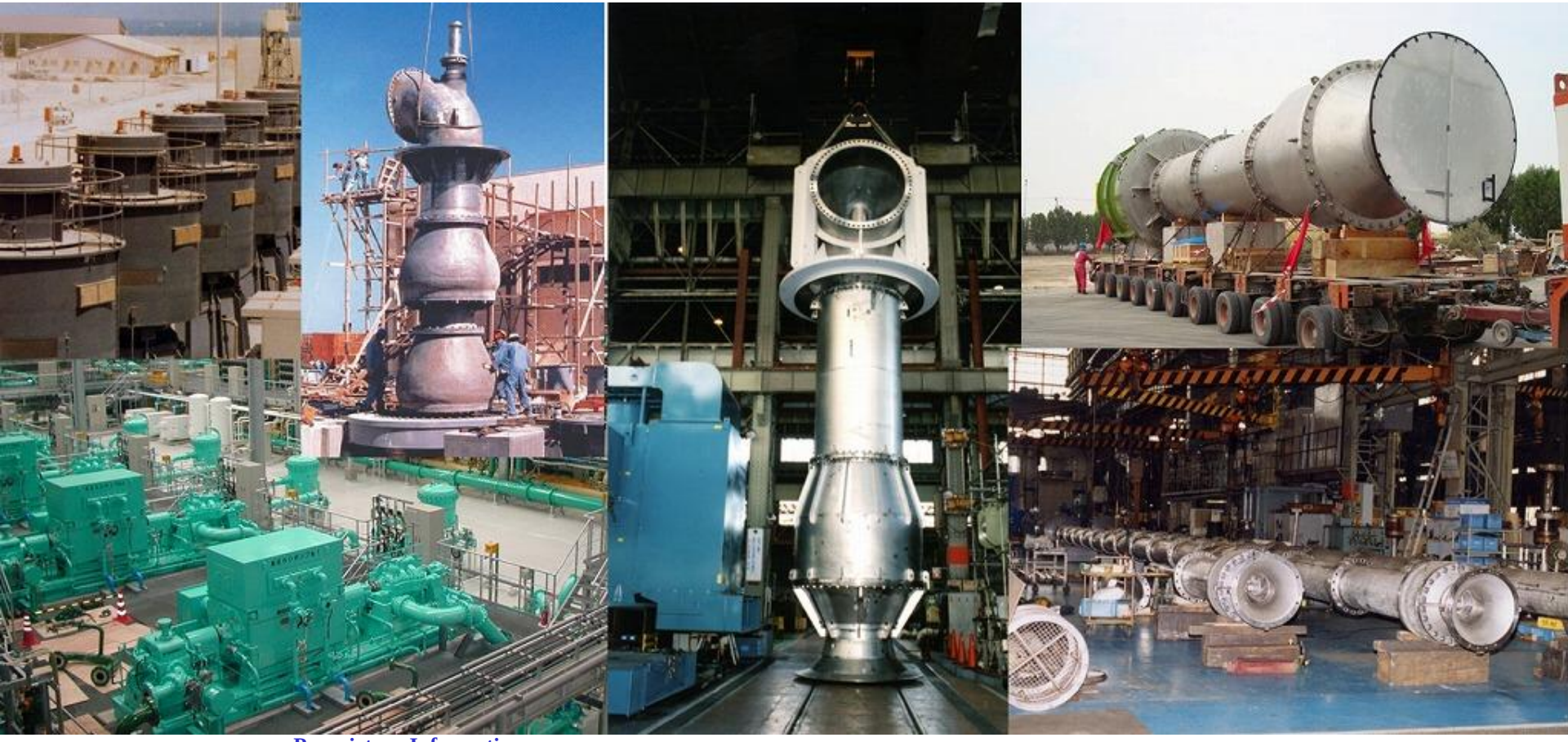






Seawater Pumps

For over 50 years, Ebara Corporation has supplied many seawater and brine pumps to desalination, power, oil & gas, chemical and other plants to Saudi Arabia, and provided remarkable performance and high customer satisfaction.



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Water Arabia 2017

Pump Consumption Energy

$$L = K \frac{QH}{\eta_p . \eta_m}$$

L: Pump consumption Energy

K: Constant

Q: Pump Discharge

H: Pump Head

η_p : Pump efficienecy

η_m : Pump efficienecy

Specific gravity and viscosity must be take in account

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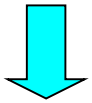
L：How to reduce total Energy

Reducing Q･H

and increasing η_p･η_m



Improving Pump Motor & System makes reducing consumption Energy

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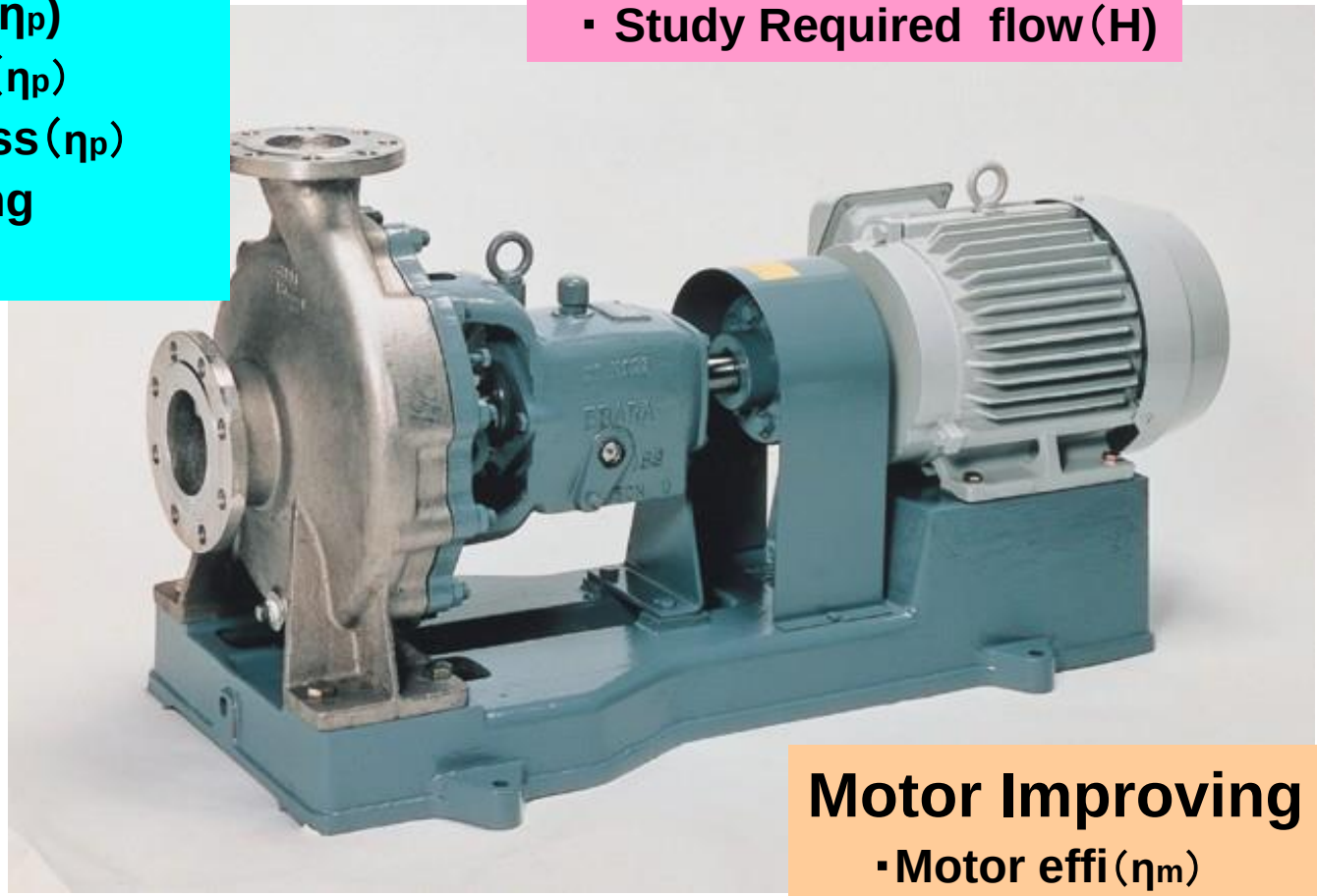
Pump Improving

- Hydraulic Effi(η_p)
- Shaft leakage(η_p)
- Mechanical loss(η_p)
- Parallel running
- Pump Flow

System Improving

- Study Required flow(Q)
- Study Required flow(H)



Motor Improving

- Motor effi(η_m)
- Motor speed(η_m)

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Improving Existing pump Consumption Energy

<1> Review system

<2> Review design and actual operation point

<3> Improving Pump efficiency

<4> Improving Motor efficiency

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<1> Review system

① Review Pipe size

Liquid velocity is 5～6m/s at discharge pipe and 3m/s at suction pipe

Pipe loss is increased based on pipe size to the fifth power

Pipe loss = K(1/D)^5

②Reduce piping inner surface roughness

Erosion/Corrosion and rust increase roughness and pipe loss.

Stainless steel or pipe coating prevent from increasing pipe loss

③ Valve opening

Valve close direction makes pipe loss increasing. It is recommended Valve position is full open

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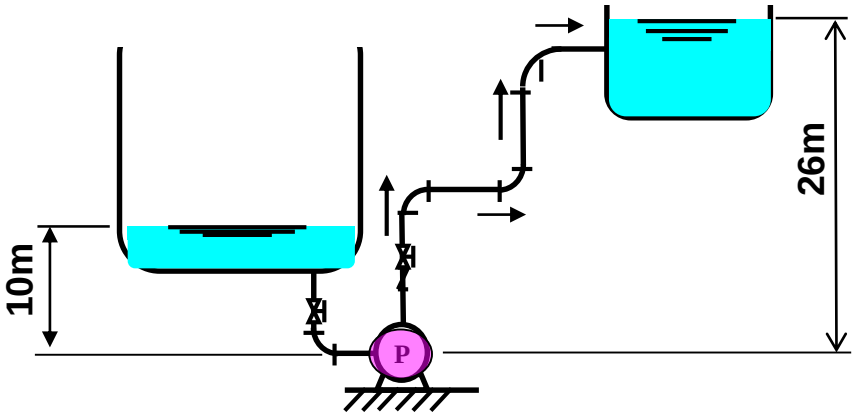
④ Increasing Suction head

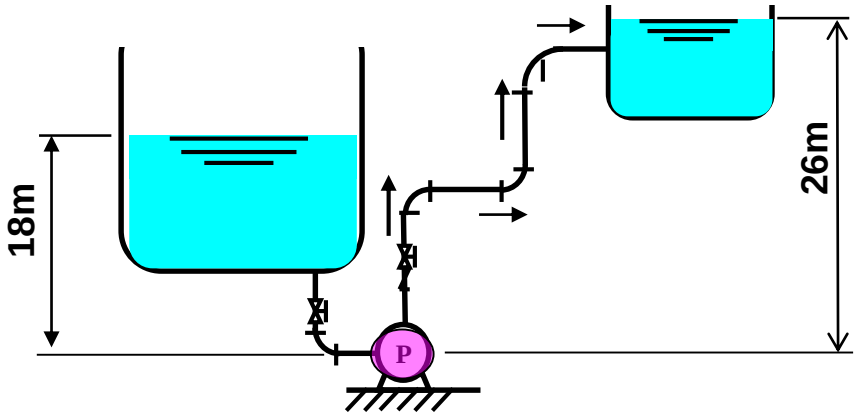
Pump head is determined difference between discharge head and suction head.

Higher suction head make lower pump consumption energy.

Stop at suction pump 10m



Stop at suction pump 18m



Actual Head Ha＝26-10＝13m

energy ＞

Actual Ha＝26-18＝8m

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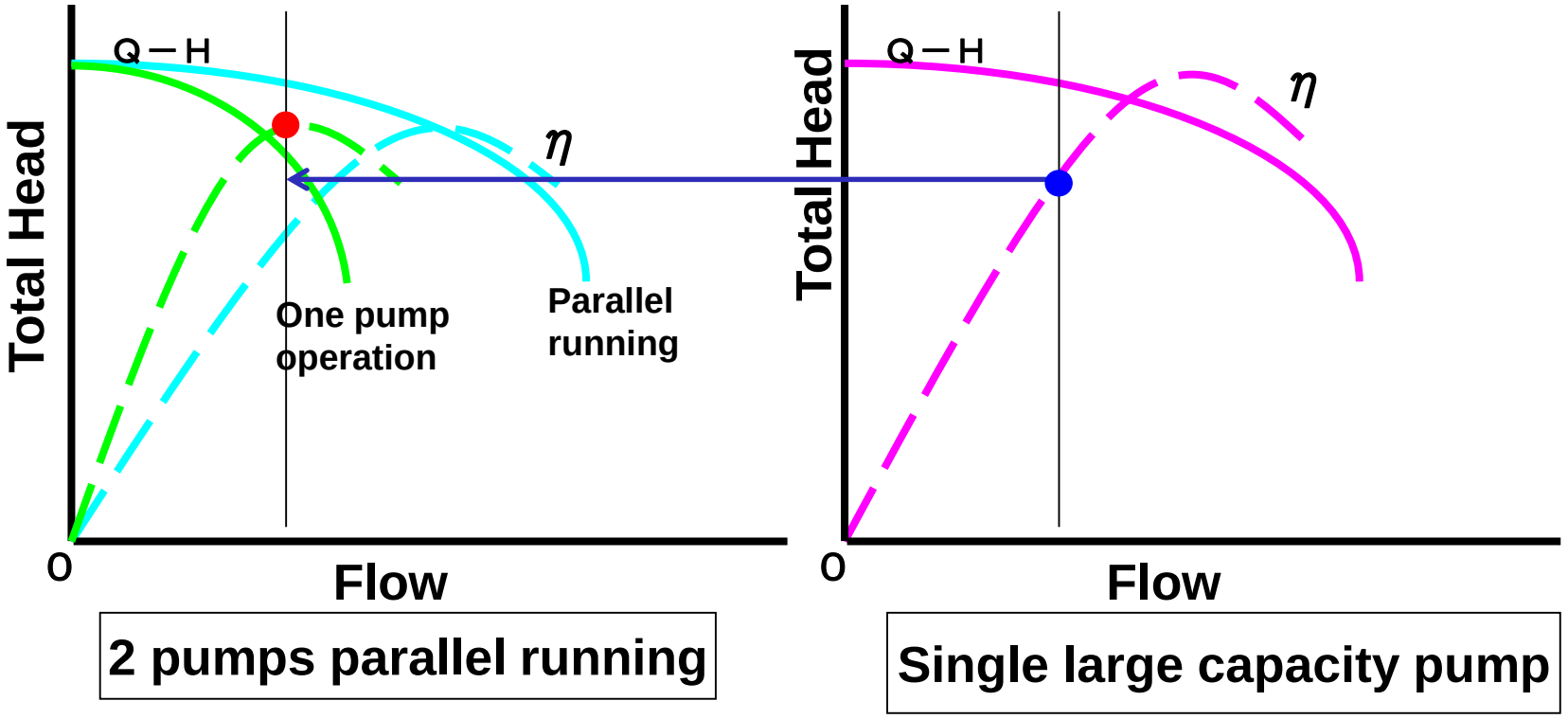
⑤ Multiple pumps operation

In case of large flow variation, efficiency of multiple pumps operation is better than single pump operation at low flow.



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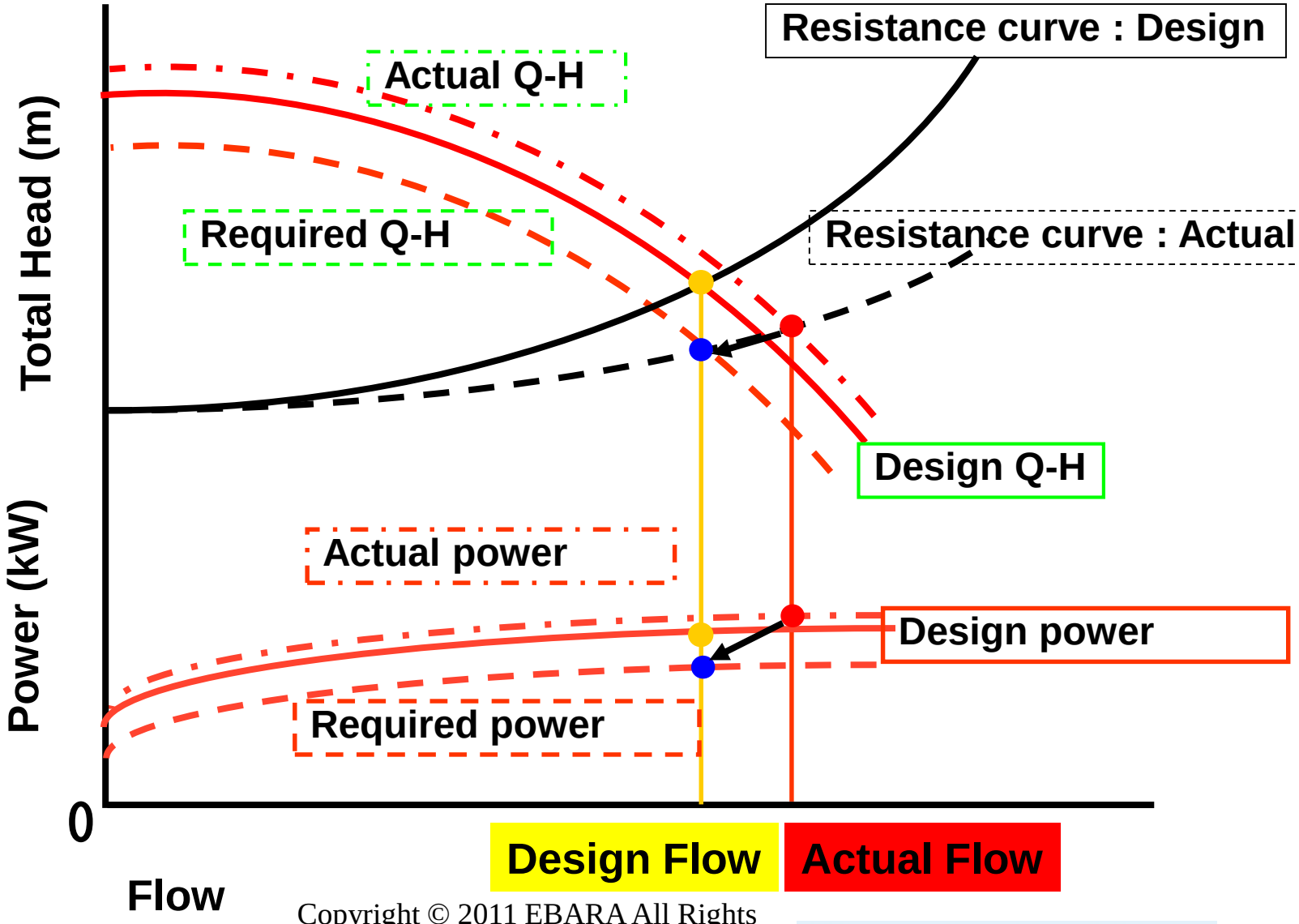
＜2＞Difference between actual and design operation point



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Adjusting pump performance

①Impeller diameter cut

②Variable Speed

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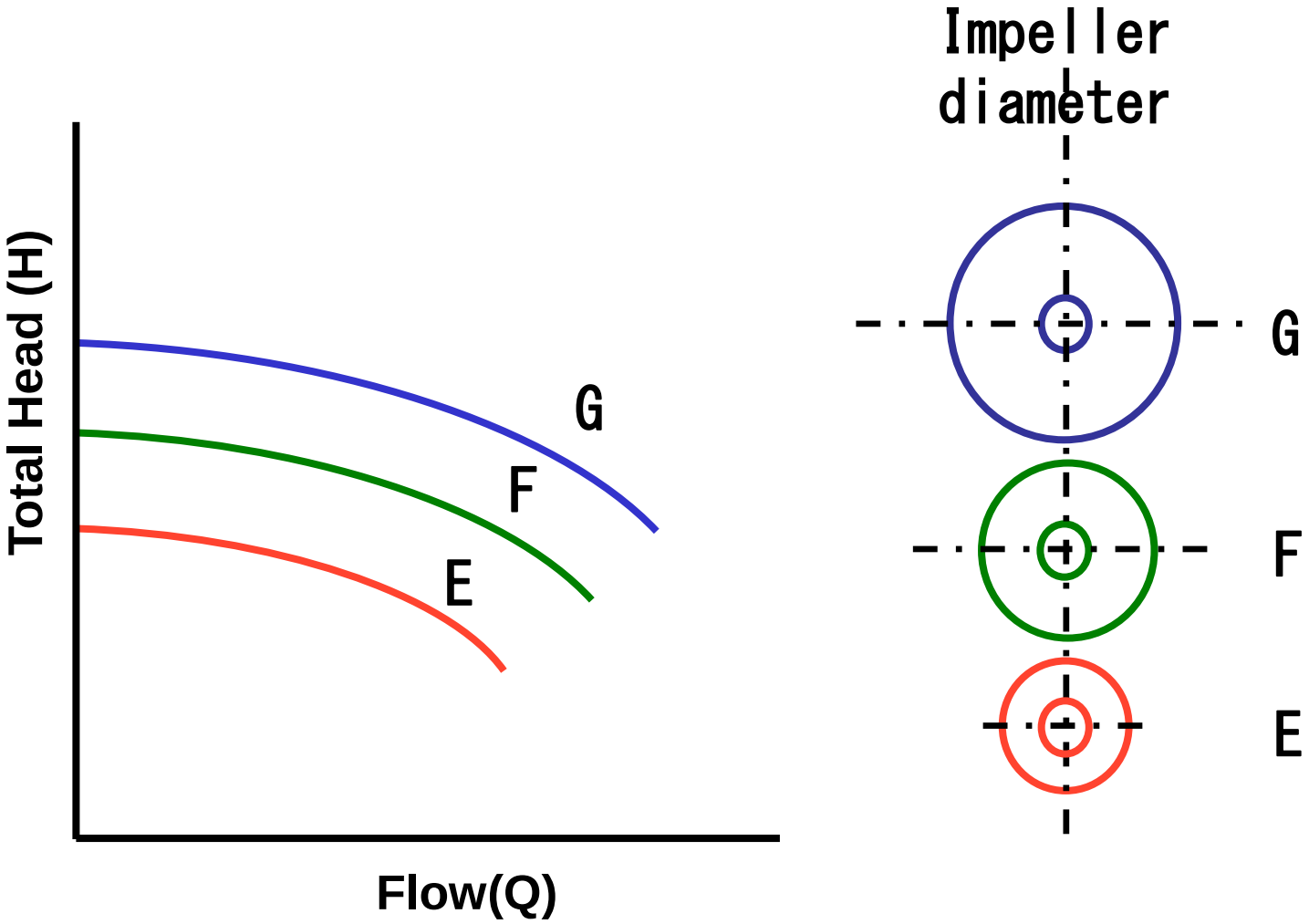
Pump performance difference by changing impeller diameter



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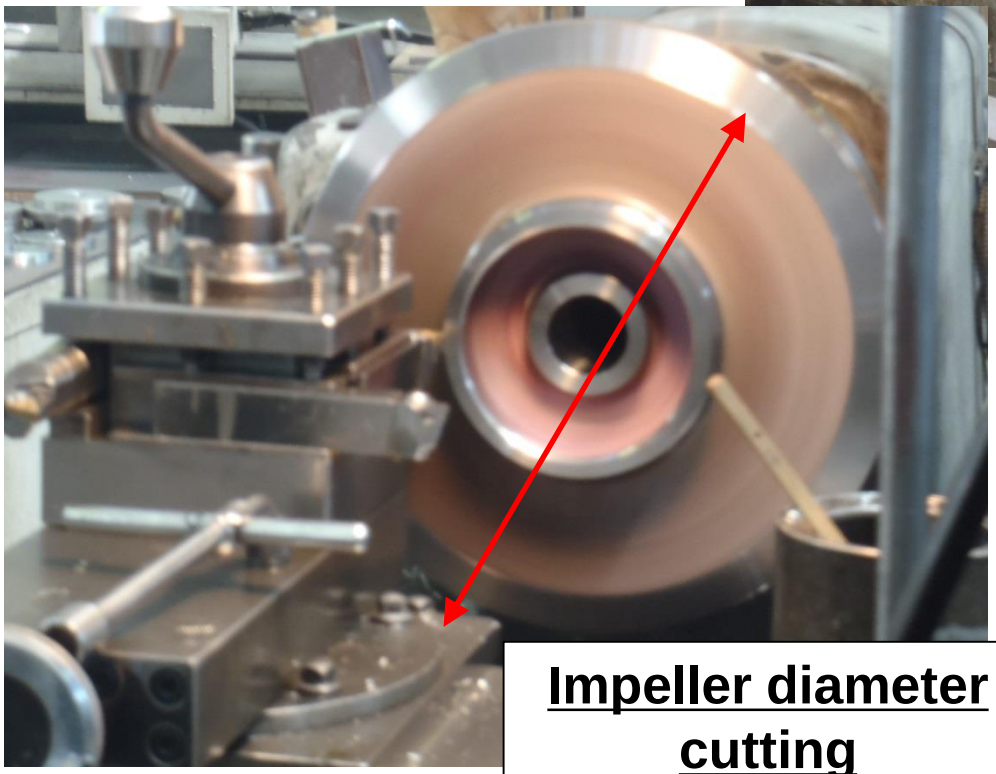
Impeller diameter cut



Impeller diameter cutting

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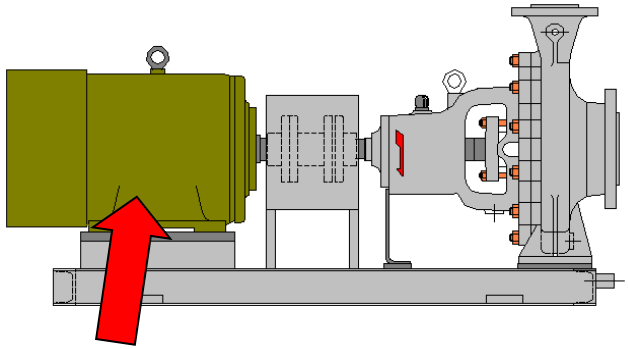
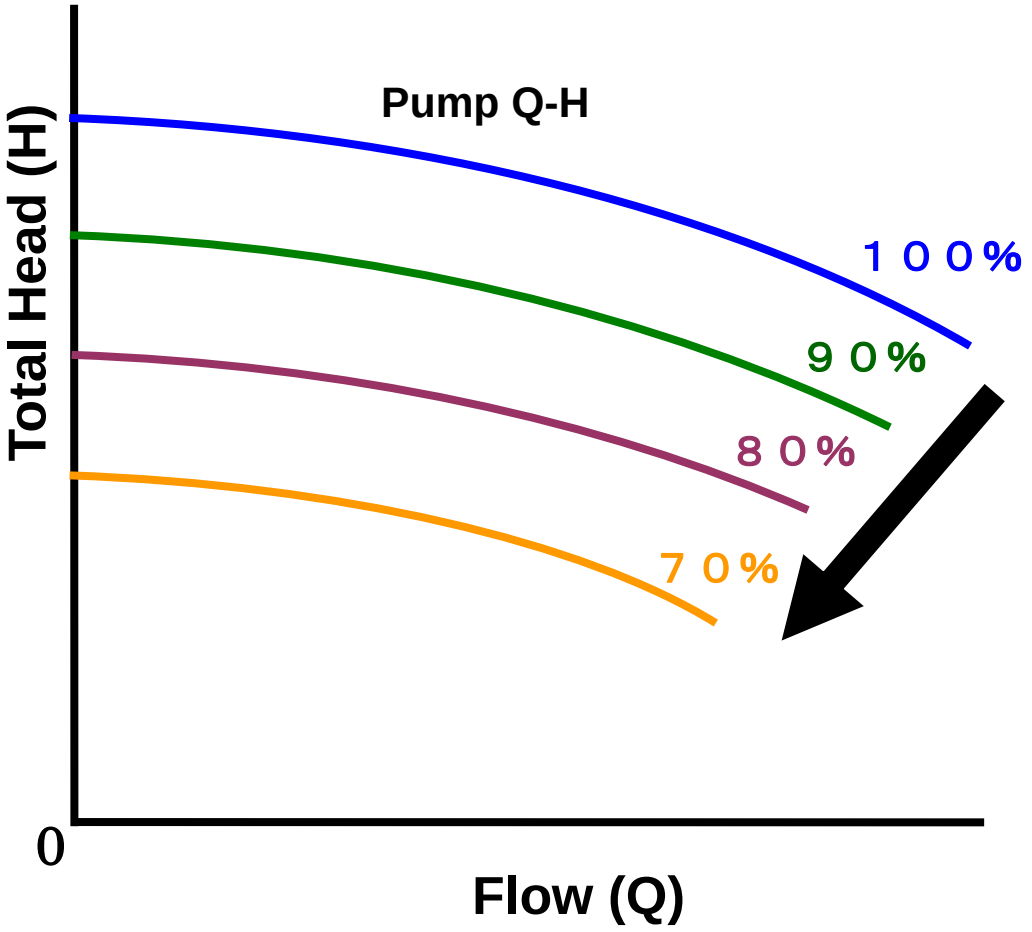
Pump performance changing by Speeds

Speed : 1500min^{-1} (4P 50Hz)

	Speed
100%	1500min^{-1}
90%	1350min^{-1}
80%	1200min^{-1}
70%	1050min^{-1}



Variable speed by VFD



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Difference between impellers and Variable speed

Impeller cut

Merit

・In case of decreasing Q-H , only impeller cut is enough, no other cost is required.
⇒Low initial cost

In case of fixed Q-H operation condition

Demerit

・ In case of increasing Q-H, impeller replacement (large size impeller) is required,
・Q-H margin is required for piping loss increasing by aging

Variable speed

In case of variable Q-H operation condition

Merit

・Q-H can be changed by variable speed, no pump modification is required
・Q-H can be adjusted in case of piping loss increasing

Demerit

・VFD(Variable frequency drive) is required ⇒High initial cost
・Efficiency is down due to additional VFD efficiency

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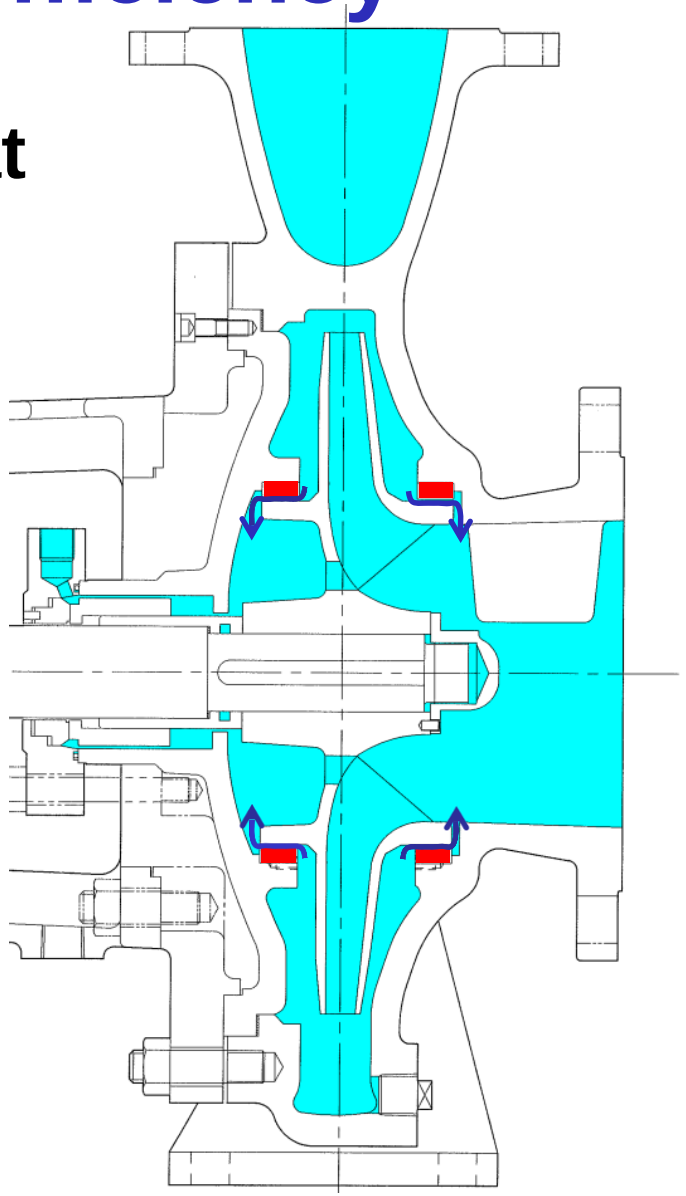
＜3＞Recover pump efficiency

①Put back design clearance at impeller ring

Pump efficiency is lower in case of clearance between impeller ring and casing ring is increasing because discharge side water leak to suction side.

After long operation clearance increasing occurs.

It is recommended to take periodical maintenance and ensure clearance by replacing impeller ring and casing ring



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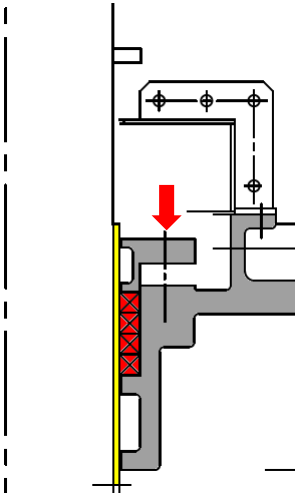
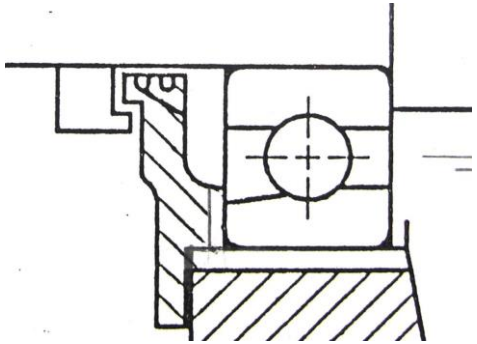
②Decreasing mechanical losses

1) Excessive tight gland packing caused mechanical loss.

In case of increasing leakage, changing packing sleeve and gland packing is recommended

2) Periodical changing oil and bearings





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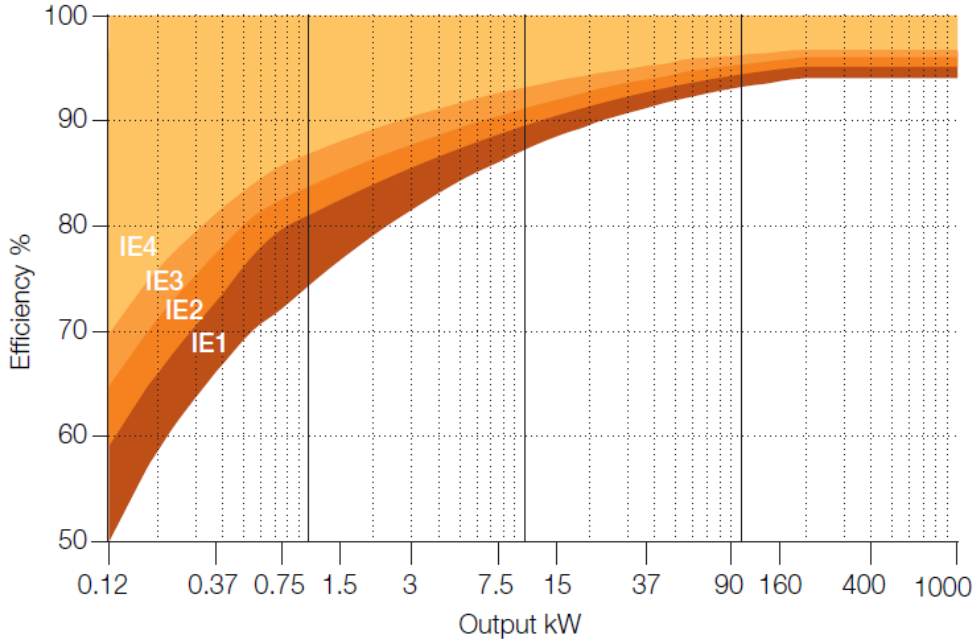
＜4＞High efficiency motor

High Efficiency Motor

High efficiency motor is same size as standard pump.

Due to improvement material and coil winding, Cupper loss and Core loss is decreased .

IEC 60034-30 defined as follows



Super premium Efficiency	**IE4**
Premium Efficiency	**IE3**
High Efficiency	**IE2**
Standard Efficiency	**IE1**

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Vision 2030

Establishment of Ebara Pumps Saudi Arabia

Relevant Vision 2030 Objectives

A THRIVING ECONOMY
- Investing for the Long-term:
"Launching Our Promising Sectors"

Toward Saudi Vision 2030

Ebara Corporation guarantees that the establishment of Ebara Pumps Saudi Arabia (EPS) helps to creating the environment depicted in Saudi Vision 2030 and actively contributes to Saudi Arabian society in a long run through our service.

Contribution to Saudi Arabia through EPS

EPS was officially established at Dammam Second Industrial Area in Aug 2016. EPS is functioned as a pump service center to handle overhaul, repairing, trouble shooting, and engineering service for centrifugal pumps including large vertical turbine pumps, horizontal split case pumps, high pressure pumps. EPS also has manufacturing capability for standard pumps and unit for the growing markets such as water infrastructure, general industries and building services.

High pressure pump

Booster pump unit

Duplex stainless steel vertical turbine pump

FACTS in Saudi Arabia

- First installed pump back in **1970**
- More than **5,000** Custom Pumps installed
- Standard Pumps penetrating **Industry** & **Building Service**

The main service that Ebara Pumps Saudi Arabia offers

Point 1 — Overhaul

EBARA provides high reliable overhaul, including the information such as required spare parts,special tool and overhaul schedule.

Point 2 — Reparing/Upgrading

For repairing or upgrading existing pump, EBARA can evaluate the performance through 3D scanner and numerical simulation and give best solution.

Point 3 — Trouble shooting

Based on high technology and much experiences, EBARA will make trouble shooting and ensure safety operation.

Point 4 — Engineering services

During pump operation, many items to be improved are come out, EBARA experienced engineer will submit best solution.

Contact Us

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VISION 2030 رؤية
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA

Water Arabia 2017

EBARA PUMPS SAUDI ARABIA LIMITED

✓ Establishment	August 2016
✓ Service	Activity start from August 2016
✓ Manufacturing	Activity start from July 2017
✓ Share Holders	100% owned by EBARA Group
✓ HQ & Workshop	Dammam 2nd Industrial City
✓ Branch	Riyadh, Jeddah (Plan)
✓ MD	Takafumi Maehara
✓ No of Employees	15 as of 2017 (Plan)
✓ Saudization Target	Over 30%, Premium

EBARA

Business Activities

1. Service & Support under Service license

Service for All EBARA pump Products and Non-EBARA pump products

-Repair, Modification, Upgrade, Overhaul, Replacement

-Supply spare parts

-Inventory management

-Relates, Engineered solution for Non-EBARA products

-Engineering Support and Field Services

-Education and Development

-Installation and Start up

-Route cause analysis for system, vibration and etc.

2. Manufacturing under Industrial license

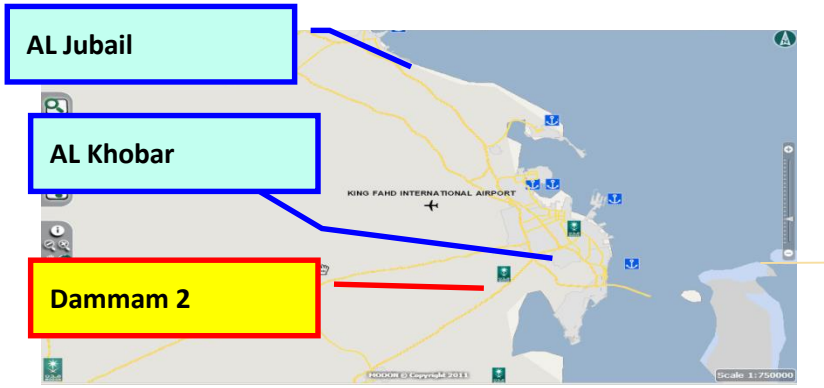
-Manufacturing of pump / booster Unit

-Manufacturing of pump parts

EBARA

WORKSHOP SUMMERY

- **Shop location in Dammam 2nd Industrial Area**
  Land Area - 12,000m^2;
  Built Area - 3,500m^2.
- **For service and support, overhauling, repair work and etc.**
- **Manufacturing parts**
- **Manufacturing of pump set & booster unit**



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Thank you very much for your kind attention.

Contact Addresses

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