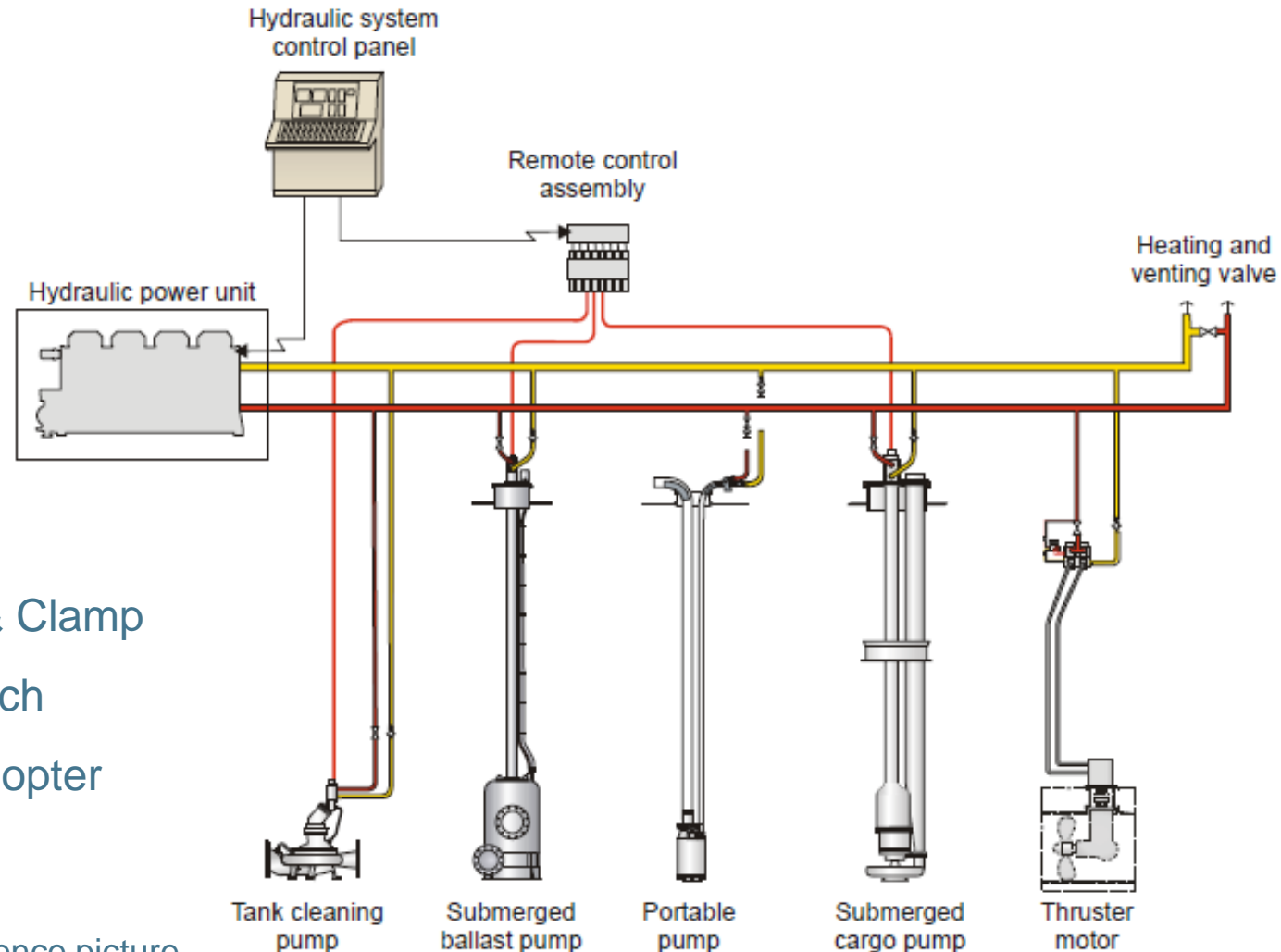


02 Technical Description

Cargo Pump System



Accessory

- ❖ Pipe fitting & Clamp
- ❖ Portable winch
- ❖ Bulkhead adopter

* Cited Framo's reference picture

02 Technical Description

Cargo Pump

The hydraulic cargo pump system is closely connected to each other, piping, casting, machining, hydraulic and electric technology. And each component has a decisive effect to each other to show the performance.



Hydraulic power pack



Remote control block



Control console



Cargo pump



Ballast pump

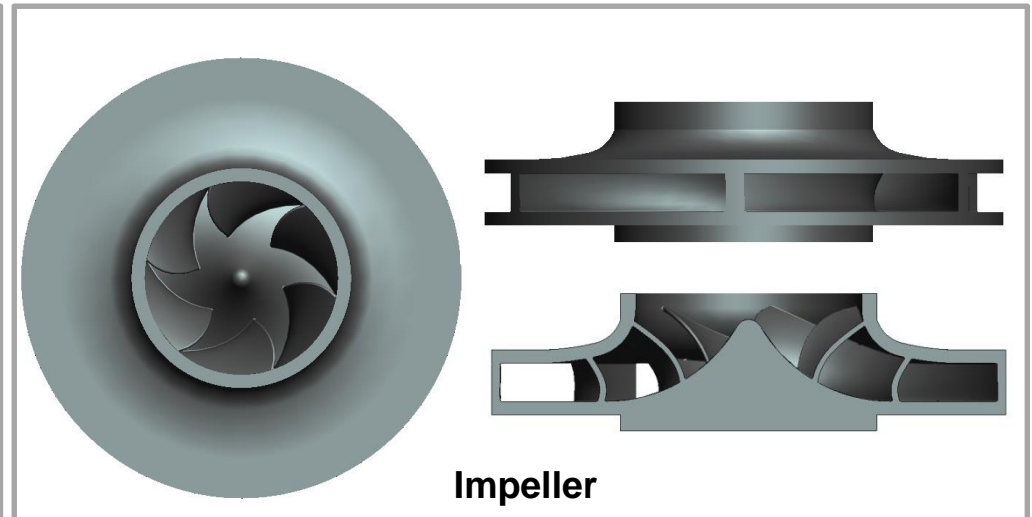
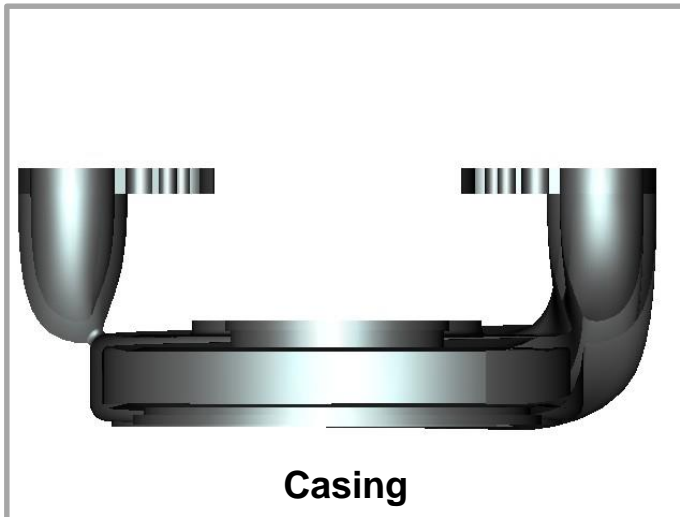
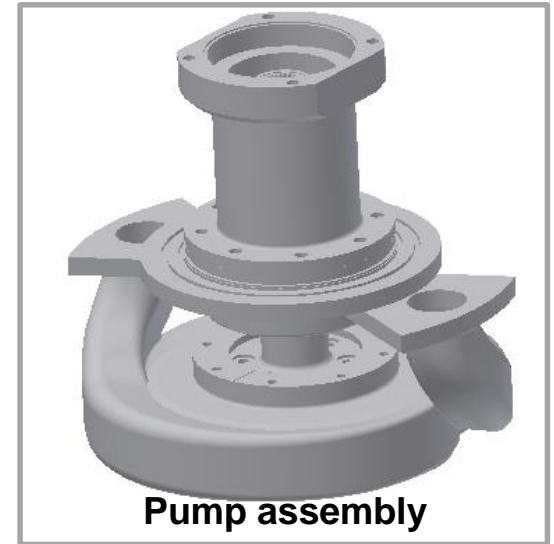
* Cited KOSAKA's reference picture

02 Technical Description

Cargo Pump

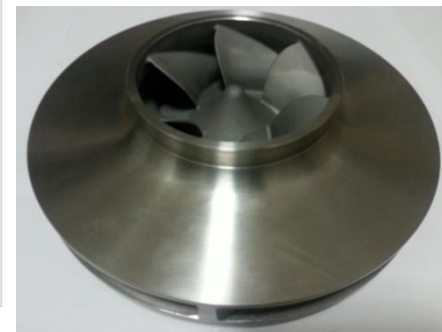
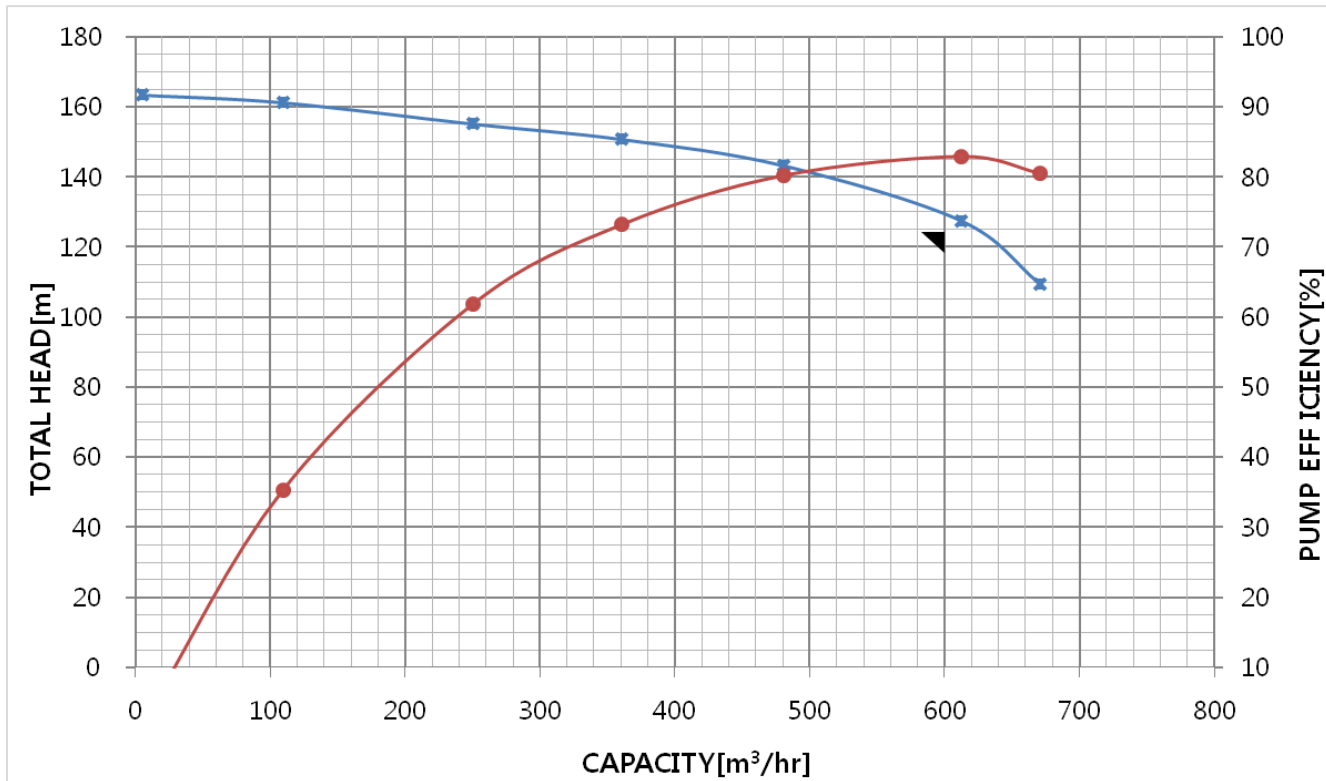
Core components

- ❖ Impeller
- ❖ Casing
- ❖ Seal & Bearing Box



02 Technical Description

Actual test report by Vulkhan EnS Co.,Ltd



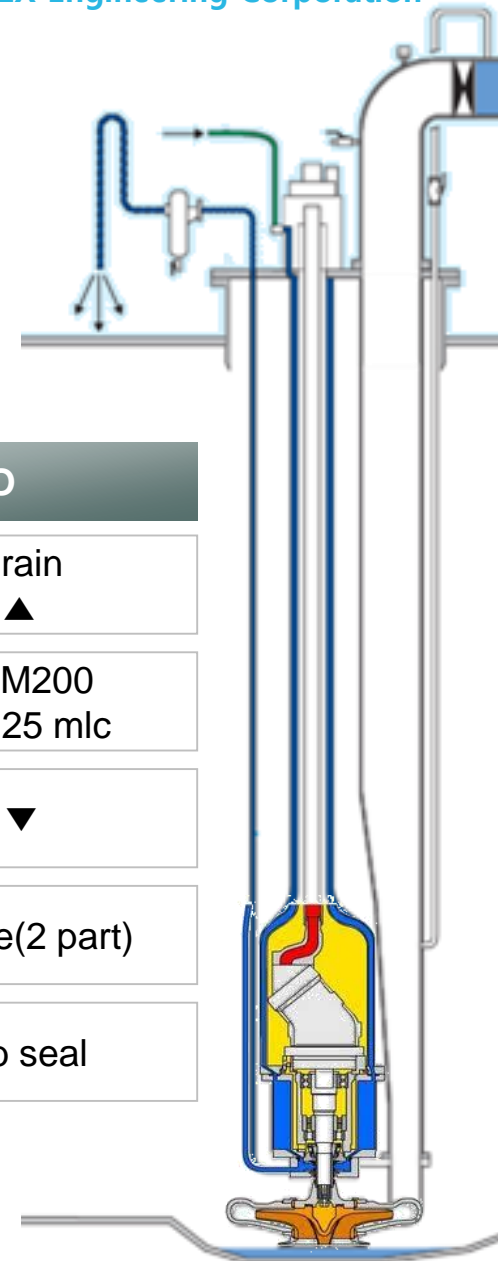
❖ Performance curve - Impeller (600m³/h – 125mlc – 82.5%) TOTAL 효율 90% 일 경우

→ 동 사양 타 maker 효율 : 76.0% 이하

03 Technical Competitiveness

03 Technical Competitiveness

50K Cargo pump 개발 방안



No	Items		FRAMO
1	Mecha-Seal Repair	Hydro oil drain 30 liter ▼	Hydro oil drain 150 liter ▲
2	Cargo oil motor	Model : A2FM180 600 m3/h – 125 mlc	Model : A2FM200 600 m3/h – 125 mlc
3	Pump Efficiency	81.5% ▲	77% ▼
4	Pipe Stack Ass'y	Combined type(1 part) Separated type(2 part)	Separated type(2 part)
5	Sealing	Double M / seal	M/seal + Lib seal

• Cited Framo's reference picture

03 Technical Competitiveness

50K Cargo pump 개발 방안

No	Items		Competitor
6	Ballast Oil-motor	Model : A2FM200 850 m3/h – 35 mlc	Model : A2FM250 800 m3/h – 35 mlc
7	Control Panel	Digital (System monitoring & record) - Malfunction consulting based on recorded data	Analog
8	Standard	JIS & ASTM	DIN
9	Hydraulic Item	RCV, FCV design optimizing	-

03 Technical Competitiveness

50K Cargo pump system

Based on 50,000 DWT tanker ship

High efficiency system

How to
High efficiency system
Differentiate system

* 45K(MR) Standard HPU Composition
 420 kW x 2 Electric motor + 450 kW x 2 Diesel Engine



* **45K(MR) New HPU Composition**
420 kW x 2 Electric motor + 350 kW x 2 Diesel Engine

200 kW power saving

By maximizing efficiency (RCV, FCV, Pump matching)

Differentiate system

- * Easy Maintenance
Low hydro-oil drain
- * High durability
Rigid double mechanical seal
- * User friendly
Additional pump supply

By system improvement

03 Technical Competitiveness

13K Cargo pump system

Based on 13,000 DWT tanker ship

High efficiency system

* Standard HPU Composition

Standard

-. Simultaneous operation condition : 300 m³/h_110mlc x 6 cargo pumps

NEW

-. Simultaneous operation condition : 350 m³/h_110mlc x 6 cargo pumps

Discharging capacity : 50m³/h up
By maximizing efficiency (RCV, FCV, Pump matching)

03

Technical Competitiveness

6.5K Cargo pump pump system

Based on 6,500 DWT tanker ship

High efficiency system

* Standard HPU Composition

Standard

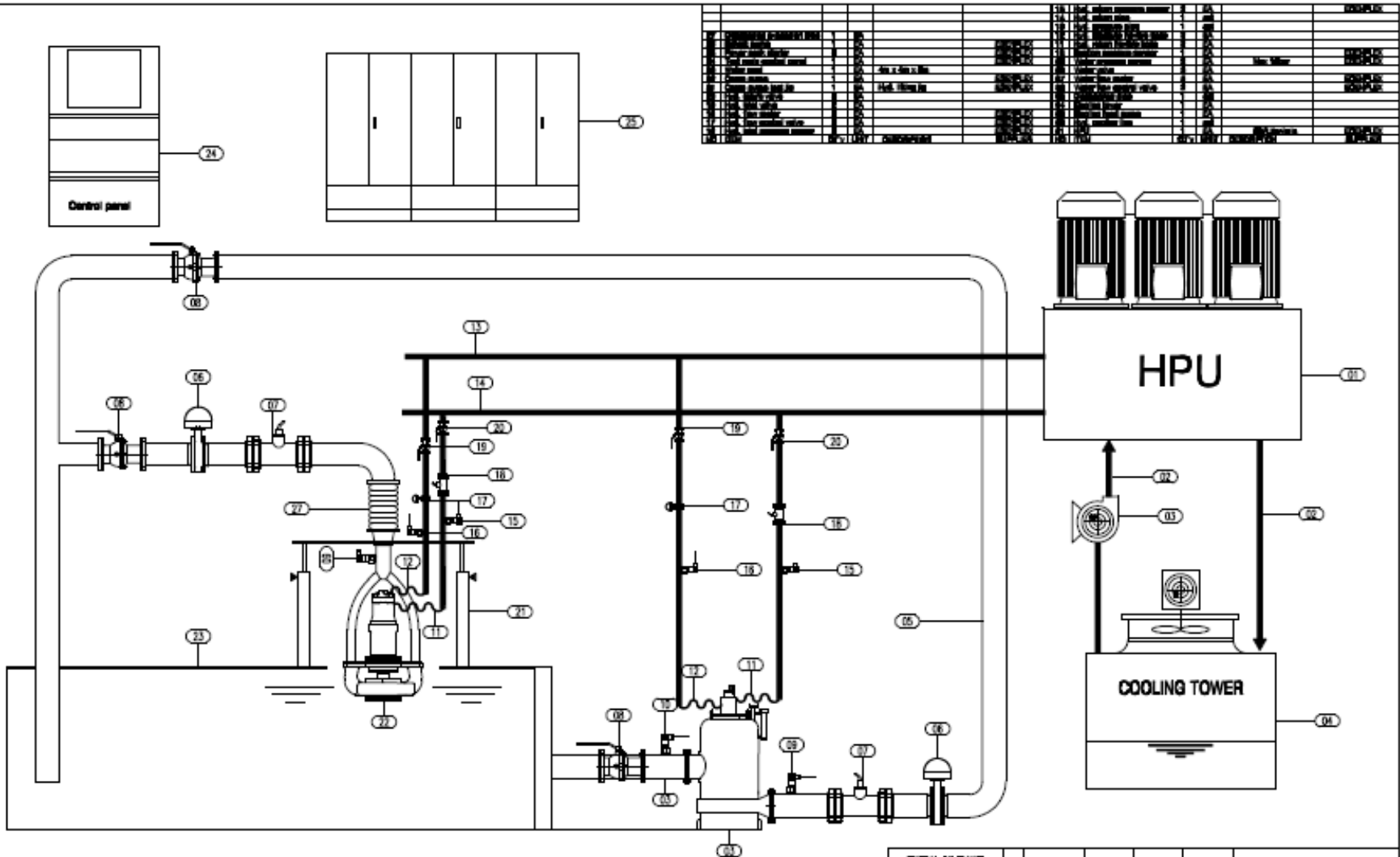
-. Simultaneous operation condition : 200 m³/h_110mlc x 6 cargo pumps

NEW

-. Simultaneous operation condition : 230 m³/h_110mlc x 6 cargo pumps

Discharging capacity : 30m³/h up
By maximizing efficiency (RCV, FCV, Pump matching)

03 향후 Test Facility



NO.	DESCRIPTION	DATE	BY	CHKD.	APPD.
1	DESIGN	2014-08-26	EDENPLEX		
2	DRAWING	2014-08-26	EDENPLEX		
3	REVISION				

GENERAL TOLERANCE FOR FACED FEATURES:					REV	DATE	BY	CHKD.	APPD.	NOTE		
NOMINAL DIMENSION	TOLERANCE	FINISH	PROJECTION	UNIT	MATERIAL	MIXED	SCALE	1:1	PROJECTION	CAD	WDRIT	UNIT
0-25	±0.1			mm	A3							mm
25-50	±0.15			mm								mm
50-100	±0.2			mm								mm
100-250	±0.3			mm								mm
250-500	±0.4			mm								mm
500-1000	±0.5			mm								mm