

## CASE STUDY

# HYDRAULIC RE-RATE INCREASES CAPACITY AT DESALINATION PLANT

- 16% increase in pump capacity using existing motor
- 75% pump efficiency achieved
- Materials upgrade to extend operational lifetime



New re-rated impeller

## CHALLENGE

Our customer operates a desalination plant situated on a large island in the Caribbean. They wanted to increase the plant's overall capacity from 46,543 USgpm to 54,000USgpm – around 16 per cent – without changing the existing 600hp motors. This required an increase in flow rate from each of their six clearwell single stage pumps from 7,757 USgpm to 9,000 USgpm.

## SOLUTION

To achieve the desired increase in capacity, the ClydeUnion Pumps aftermarket team at Celeros Flow Technology changed the impeller from hydraulic type L to hydraulic type H. This change decreased the required NPSH and allows each pump to operate at the desired higher flow rate of 9,000 USgpm without changing the motor power.



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PUMPS

Industry: Desalination

Region: Americas

Category: Hydraulic re-rate

API Type: VP1

ClydeUnion Pumps Aftermarket Technical Services team has experience across a range of services on critical rotating and reciprocating equipment to improve operational safety, reliability and efficiency. The hydraulic re-rate of the F580-1850 for the desalination market is one of our success stories documented in our library of case studies. These case studies highlight the requirement from the customer, how we achieved the goal and the process we followed to deliver the improvements.

Several design modifications on the suction casing and wear rings were necessary to accommodate the change in impeller and optimise future pump performance. The seawater service of the pump also required a change in material to high corrosion resistant stainless steel.

All the modifications were designed and implemented by Celeros FT engineers, and the modified pumps were then reassembled and tested at our inhouse facilities to ensure they would perform as anticipated.



Former suction casing



Re-design suction casing



Reassembly and test of the pump

## OUTCOMES

The re-rated pumps are achieving flows of 9,588 USgpm at full power, exceeding the desired target of 9,000 USgpm, and delivering efficiencies of almost 75 per cent. Following the re-rate, our customer requested the supply of a seventh pump. This will bring the expected total capacity at the desalination plant to more than 65,000 USgpm.

## FINANCIAL ILLUSTRATION

At motor full power (600 hp) the increase in capacity is more than 20% (from 7,757 to 9,588 USgpm) for a cost on one pump:

- Supply of H type wheel = 27,000 Euros
- Supply of suction casing set (suction casing + suction bell + wear ring) = 20,000 Euros



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