CASE STUDY
CUP-BB1 DESIGN UPGRADE

Design modification LH 1050 for rotor interchangeability

Industry: Oil + Gas - petrochemical
Region: Europe
Territory: France
Category: Design upgrade
API Type: BB1

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 design upgrade of the LH 1050 pumps for the oil and gas 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.

Image left: Complete pump

Situation

The customer possessed three LH 1050.100 pumps for a steam cracking process, two pumps on the process and one spare. They had to reject one of the pumps and decided to replace it with an unused LH 1050.100 available on site. This LH pump was supplied at a different period and for another duty than the three others. The LH 1050.100 had the same hydraulic characteristics, but different design of rotor (shaft), bearings housing and slight difference to pump casing. The customer request was to modify this pump to guarantee the interchangeability of the rotor between all the pumps.

Challenge

To guarantee complete interchangeability of the rotors, major design modifications had to be carried out on the bearing housings. The main causes of the non interchangeability were the differences in shaft and ball bearings diameter. Another issue was to keep the sealing system of the unused LH, two sealing braids and CMS 2000 between the braids (CMS 2000 is a fibre reinforced sealant).

LH 1050.100 pump unused by the customer

The other challenge faced was the clearances between the impeller trimmed at the diameter that corresponds with the characteristics for steam cracking process and the pump casing of the unused LH pump. Indeed, the volute of the unused pump was tighter than on the other pumps.

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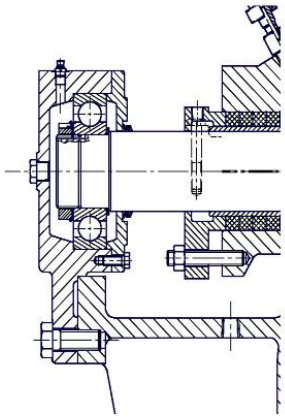
Solution

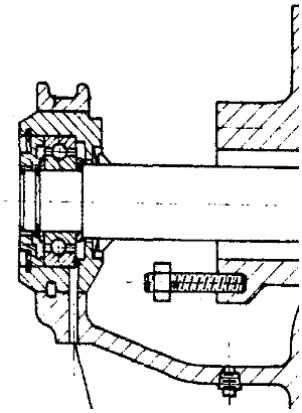
The solution was to completely redesign the bearing housings with an improvement of the sealing with the use of Inpro Seals instead of lip gaskets. The pump casing also had to be machined to suit the sealing components (CMS 2000 + braids) and to match the design clearances with the impeller.

- Re-design of bearing housings with standardisation of ball bearings size and improvement of sealing by use of Inpro Seals
- Machining of pump casing to increase the bore diameter for installation of the sealing system composed of braids and CMS 2000
- Machining of the volute to match design clearances between pump casing and maximum diameter of the impeller

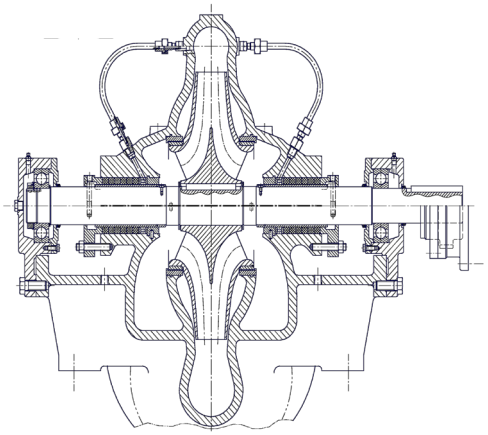
The pump is ready to be used on the steam cracking process according to the original characteristics required by the process.



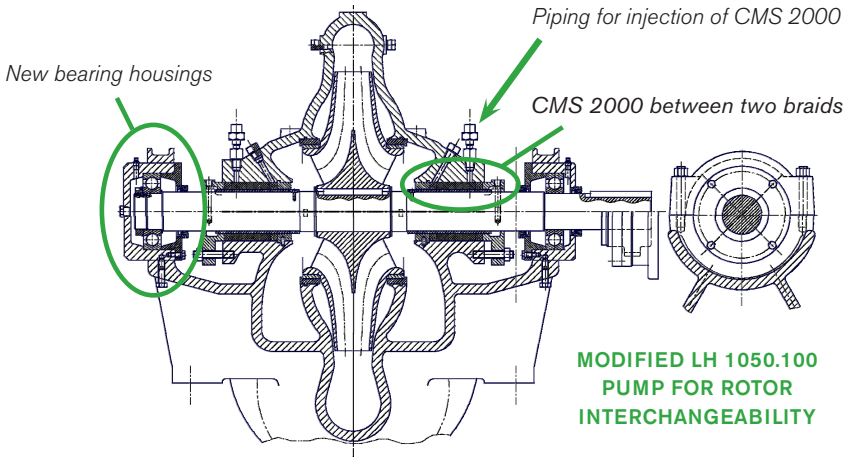
Design of bearing housings on the pumps originally supplied for steam cracking process



Design of bearing housings on unused LH pump



DESIGN OF THE PUMP AS ORIGINALLY SUPPLIED FOR STEAM CRACKING PROCESS



MODIFIED LH 1050.100 PUMP FOR ROTOR INTERCHANGEABILITY

Financial illustration

- **Investment cost of parts supplied**
  Including studies, new bearing housings and machining on pump casings: 27,000 Euros.

- **Cost savings**
  The customer has again a spare pump to avoid production losses linked to a failure of one of his pumps.

  Cost for supply of a new LH1050.100 pump: 90,000 Euros.

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