



"A trusted service partner for the environment- and economy-conscious service company or ship owner"

Turbine blade and nozzle ring repairs

PJ Diesel is often able to repair damaged turbine blades. This is done by a specialized procedure carried out by highly qualified technicians operating in accordance with class approval.

The turbine blades are dismantled, cleaned ultrasonically and accurately measured. An UV inspection is then carried out to detect possible fractures. Fractured blades are replaced with new ones.

Under certain strictly controlled conditions, our welding is based on a procedure developed through extensive research by metallurgists, and PJD engineers can repair the turbine blades.

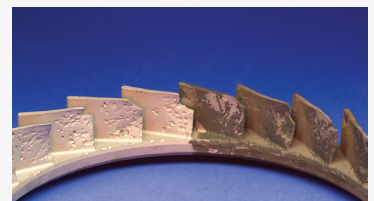
The method used is TIG (Tungsten Inert Gas) welding: a technique using a non-

fusing electrode at low amperage shielded by an inert gas.

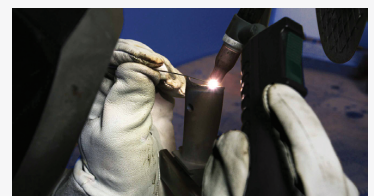
Only a small zone may be exposed to heating, and the operation must be carried out in a closed welding chamber, free from dirt particles and air turbulence, as any draught would disperse the shielding gas, resulting in poor welding.

Afterwards the welded blade is machined, and ground back into its original shape and inspected for cracks using UV/penetrant inspection, and the weight is then checked.

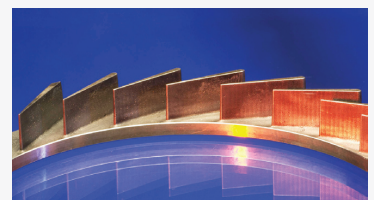
In order to achieve the correct weight distribution, a computer is used to determine the sequence, in which the blades should be mounted on the rotor, which is then ready for balancing.



Damaged radial flow nozzle ring



Welding of turbine blades and nozzle ring



Repaired radial flow nozzle ring

Balancing

Working with high-speed rotating parts, one of the most important things is balancing.

Correct balancing, is first of all important for personal safety, as break-downs of high speed machinery can harm personnel.

Next, correct balancing, will increase lifetime of all machinery parts.

At PJ Diesel all turbocharger parts will be balanced separately and corrected for static/couple unbalance. In order to check the balance after assembly, the complete unit will finally be checked for dynamic unbalance.

PJ Diesel engineering have the latest equipment for balancing rotors in two planes from the smallest size up to 3000 mm length/1200 mm diameter.

- All balancing in accordance with ISO, API® and MIL specifications
- Certification of proving rotors and test masses
- Vertical balancing machines for disc type rotors
- Full documentation for rotors with Certificate of Conformance available
- Precision scales and measuring equipment calibrated to NIST standards



All balancing in accordance with ISO, API® and MIL specifications



Turbocharger division

With more than 15 years experience within turbocharger repairs and service - our staff of trained field service engineers has gained high respect for their professional approach towards programmed maintenance and emergency response - And so has our workshop facility with full reconditioning services.

- Trained field service engineers with 24-hour response world-wide
- Three Schenck balancing machines securing correct balancing and redundancy
- Full reconditioning workshop facilities - turbine blade, nozzle ring and shaft repairs by metal spraying and CNC machining to meet standards as designed
- Extensive exchange program enabling rapid turbocharger response regarding parts as well as service
- Service facility authorized by Mitsubishi MET Japan, Napier and Kompressoren Bau Bannewitz (KBB)
- MAN certified engineers



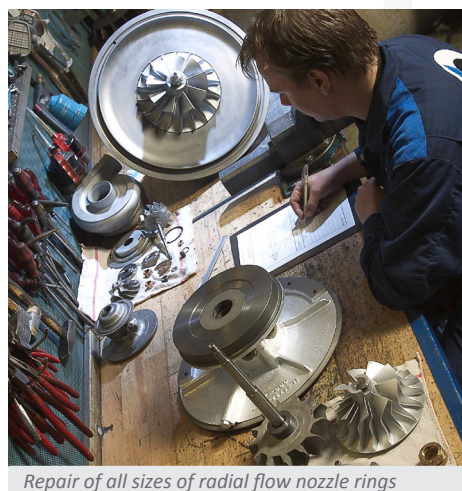
Radial flow nozzle ring



Service exchange kit - all in a box



"We focus on our clients requirements and make our system adopt and adapt"



Repair of all sizes of radial flow nozzle rings

Our activities:

Fieldservice
Spare parts (all turbochargers)
Full workshop facilities based in Copenhagen
Global network

Our area of operation:

Dredging, fishing vessels, Inland shipping, merchant vessels, offshore installations, power plants and trains

Response time:

24-hour phone service - enabling our clients to get fast response from our trained staff



Machining of radial flow nozzle ring