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ADAMS
ARMATUREN

APPLICATION REPORT

Ultrasonic Durometer PCE-5000



supplied by

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1 Company Profile of ADAMS Armaturen GmbH



ADAMS Armaturen is a family owned medium sized company. It produces butterfly valves, check valves and combined non-return and tight shut-off valves for industrial plants, refineries, offshore platforms, district heating, nuclear power plants, hydroelectric power plants and several other applications. Sizes range from 80mm to 4500mm diameter. Adams headquarters and production site is located in Herne (Germany). ADAMS owns more than 10.000 square meters of manufacturing space, assembly and testing space. The big depth of production is linked to a continuous need for testing and measuring equipment as ADAMS production staff is involved in welding, plane cutting, CNC machining, drilling as well as different NDE testing as liquid penetrant testing, hardness testing and others.

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2 Introduction

ADAMS uses the Ultrasonic Durometer PCE-5000 since one year now. It was bought after a trial of around 4 weeks in our workshop. It is mainly needed for

- Hardness testing of welds
- Hardness testing of machined and raw material as income check
- Hardness testing of hard faced areas on final machined parts

Therefore ADAMS was searching a hardness testing device which fulfils the following requirements:

- Simple to use
- Robust as it will be used in workshop
- Good accuracy
- Lightweight and handy
- Wide measuring range and of different values HRC, HB,....
- Fast measurement
- Measurement in areas which are difficult to reach or which offer limited space only.

Presently the Durometer is used by our NDE testing staff to verify hardness during welding, income check of material and check of hard faced areas.

3 Equipment in use

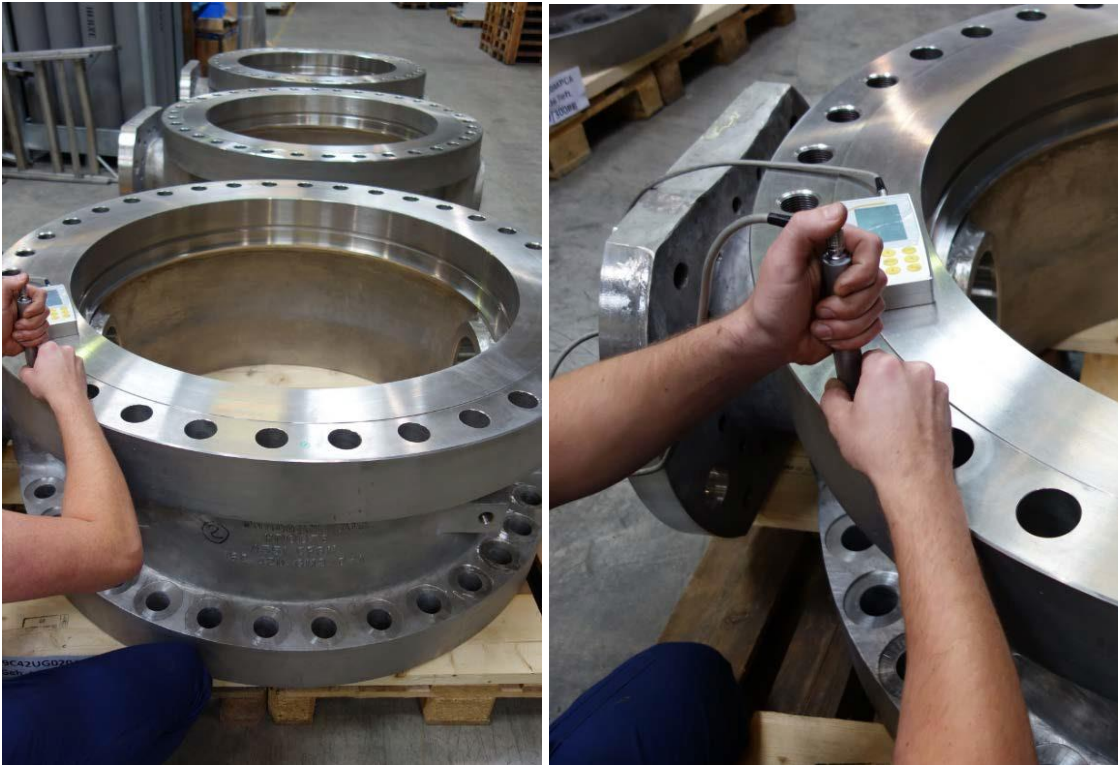
In the following some examples where the Ultrasonic Durometer PCE-5000 is used at ADAMS Armaturen.

3.1 Income control of raw and machined parts

Check of swing check valve raw casting made of carbon steel to verify values given on material certificates:



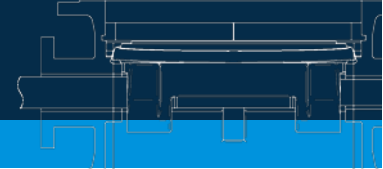
Check on final machined butterfly valve body castings made of stainless steel:



3.2 Check on production welds

Check of welding seams if complying with hardness requirements:



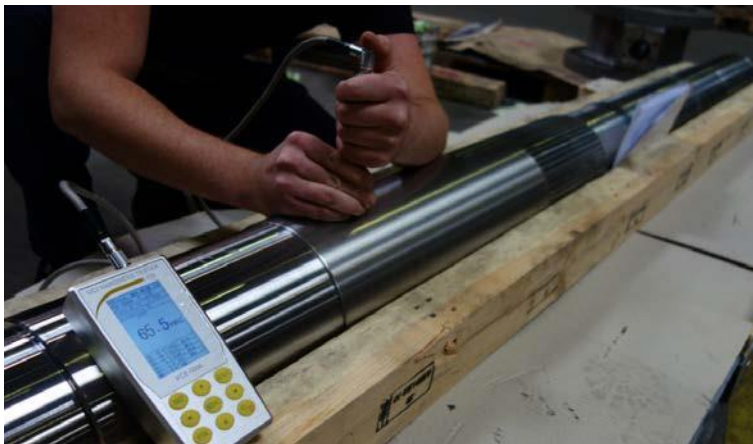


3.3 Control of hard faced areas

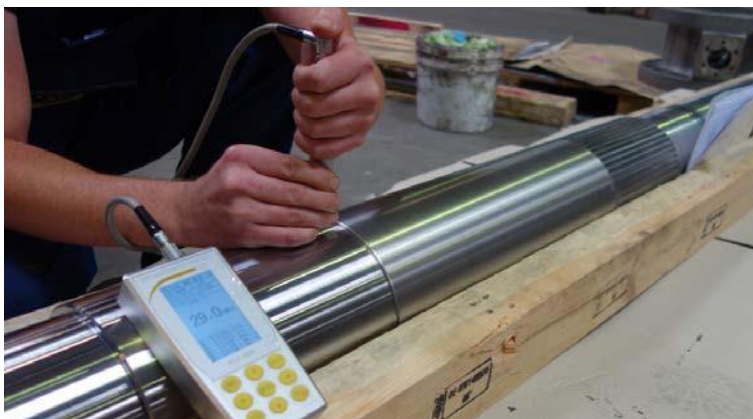
Check of hardness on disc seat surfaces which got a hard facing with Stellite 21:



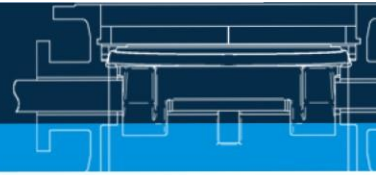
Check of hardness on valve shaft which is partially hard faced in bearing area and used in high temperature service above 750°C:



Measurement on hard faced area.



Measurement on untreated area.



3.4 Check of final products

Hardness measurement on but welding end before delivery:



4 Conclusion

Advantages:

- Simple to use but some training needed
- Good visibility of display
- Good accuracy if used correctly
- Lightweight and handy
- Wide measuring range and of different values HRC, HB,....
- Fast measurement
- Measurement in areas which are difficult to reach or which offer limited space only

Disadvantages:

- It is necessary to practice probably around 1 to 2 hours until the measurement is accurate as the “pen” need to be pressed on the material very accurate.
- We recommend making at least 5 measurements and only using the 4 most accurate ones to calculate the average. Sometimes one of five measurements is wrong or far away from other four measurements due to wrong handling as it is not that easy to put the “pen” always in the correct way.
- The optional available support rings for the measurement are not necessary. We experienced that they did not increase the accuracy but make testing more difficult. The available test rig was not tested by ADAMS.

The Ultrasonic Durometer PCE-5000 is perfect for ADAMS use in workshop for fast and easy measurements during the normal production process as well as for income control of materials. The accuracy is fully sufficient but time is needed to be able to use it correctly. It should not be used by unexperienced people because results will not be reliable.