

New measuring device

Accurate cleanliness evaluation of blasted surfaces

Purely visual assessment of the blast cleaning grades of steel surfaces can result in errors. A new measuring device enables an objective surface cleanliness assessment during going production - independent of the user, the location or the light conditions.

ISO 8501 describes the preparation of steel substrates before the application of coating materials and the visual assessment of surface cleanliness. The surface cleanliness is only assessed in terms of appearance. According to the standard "in many cases [...] this is sufficient, but in the case of coatings which are subject to special conditions such as constant immersion in water and continuous condensation, the surface should be checked for soluble salts and other invisible impurities."/1/

The preparation of surfaces through abrasive blasting is designated by the blast cleaning grade Sa. There is differentiation between light blast - cleaning Sa 1, thorough blast - - cleaning Sa 2, very thorough blast - - cleaning Sa 2 ½, and blast – cleaning to visually clean steel Sa 3. In this case, abrasive blasting is performed until no more impurities can be detected visually on the steel. In most cases, blast -cleaning Sa 2 ½ grade is required.

There are also specifications for the visual assessment of the steel surfaces: "The surface must - when viewed without magnification - be free of visible oil, grease and dirt and free of cinders, rust, coatings and foreign impurities to the extent that remaining traces can only be detected as light, spotty or streaked traces."/2/

ISO 8501 uses reference samples to describe the procedure for visual assessment of steel surfaces. "The steel surface should be inspected in bright, diffuse daylight or corresponding artificial lighting and should be compared with each reference sample without magnification."/3/. The problems with visual inspection are well-known: Many factors can influence the assessment and thereby distort the result.

Different results despite a trained eye

The first factor is the observer, who can find different results despite having a trained eye. Using comparison images and texts, the observer must decide whether the assessed surface fulfils the requirements. It is obvious that a subjective assessment can often be made in this case. If multiple persons are making the assessment - for example in shift work - the dispersion of the assessments becomes even broader.

The surrounding conditions also play an important role in the assessment: Light and visibility conditions, production-related or in the quality lab - to name just a few.

Operating principle

The newly measuring device WA Clean developed by Winoa prevents the described sources of error. With this device it is possible to objectively assess the cleanliness of freshly blasted steel surfaces in a production environment. A measuring device calibrated to the blasted surface is used instead of a reference sample or text description.



A newly developed measuring device enables objective assessment of blasted surfaces.

Working of the new measuring device. The measured results are independent of the user, time of day, location and light conditions.

For this purpose, the measuring device is initially calibrated on customer's blasted surface references: Different blast – cleaning grades are determined in order to set-up the minimum threshold values of each one. The measurement is performed using light beams sent out by the measuring device. The reflected light of the blasted surfaces will be converted in a numerical value, a cleanliness index in the range of 0 - 100. For example, if a value of 65 is displayed for a clean surface, all components with an even higher measured value will be even cleaner.

Thus it is now possible to measure the blast – leaning grades and determine measured values during ongoing production, independently of the observer, the location or even light and visibility conditions. The calibration can be performed either by the manufacturer or together with the final customer.

Simplified operation

The measuring device WA Clean is convenient, easy to operate, precise and delivers very fast measured results - the measurement time is only 2 seconds. The measured values are stored and can subsequently be transferred to an Excel file via USB.

Functions and benefits of the new WA Clean measuring device

- Objective assessment of the blast – cleaning grades
- Independent of light conditions, time of day, user and location
- Less discussions with inspectors or final customer, since the threshold values can be established in advance
- Optimisation of blasting time in order to prevent the over - blasting
- Reduced blasting costs
- Internal data storage and easy transfer to computer via USB
- Simple documentation for internal and external audits
- Magnetic adapter for adjustment to round surfaces (pipes, rotor blades, pylons, etc.)
- Up to 20 different references can be set up

The following values are saved:

- Sequential number of the measurement
- Date
- Time
- Blast – cleaning grade

After pressing the start button, the measurement process is started and the determined values can be read directly from the colour display. Measurement in combine mode is also an option. For example, this allows assessment according to known blast –cleaning grades by using a threshold value on the cleanliness scale.

Possible areas of application

Optimisation of blasting times is an important factor in series production. Large surfaces such as those in pipeline production can thereby be blasted faster and with more process reliability. Sufficient coverage during the abrasive blasting process generally ensures a good surface cleanliness. In some circumstances, a coverage level of more than 100 percent provides a blast quality improvement that is no longer required. This would result in unnecessary costs which can be avoided with the simple measurement.

The world's leading gas producer, the Russian company Gazprom, has also introduced the WA CLEAN measuring device in their working specifications process in addition to visual monitoring by inspectors. With large quantities, for example in the production of brake disks with high standards for surface purity, the required minimum cleanliness is easily determined and documented, thus preventing defect claims.

Areas of application for the new measuring device are primarily production and quality control fields. However, external monitoring or testing during an audit can also be performed with the mobile, battery-powered system.



Practical use of the measurement device enables optimised blasting times by preventing the over - blasting

Improved process reliability

In summary, the use of the new WA CLEAN can help to optimise abrasive blasting process costs. It greatly simplifies the application of working specifications. The time-savings as well as the increased process reliability during abrasive blasting makes this device indispensable for all areas of application that must fulfil high surface cleanliness standards.

At the same time, the measuring device offers a practical solution that significantly increases the safety and efficiency in quality processes and also develops a pathway to reducing costs. The selection of the proper abrasive blasting media and the use of the right tools and resources helps the customer to significantly improve his industrial competitiveness


References

/1/ ISO 8501-1 : 2007. Vorbereitung von Stahloberflächen vor dem Auftragen von Beschichtungsstoffen – Visuelle Beurteilung der Oberflächenreinheit [Preparation of steel surfaces before the application of coating materials - Visual assessment of the surface purity]

/2/ ISO 8501-1 : 2007 Vorbereitung von Stahloberflächen vor dem Auftragen von Beschichtungsstoffen – Visuelle Beurteilung der Oberflächenreinheit [Preparation of steel surfaces before the application of coating materials - Visual assessment of the surface purity]

/3/ ISO 8501-1 : 2007 Vorbereitung von Stahloberflächen vor dem Auftragen von Beschichtungsstoffen – Visuelle Beurteilung der Oberflächenreinheit [Preparation of steel surfaces before the application of coating materials - Visual assessment of the surface purity]

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WA CLEAN an exclusive measuring device proposed by W'Abrasives and developed to facilitate the application of working specifications related to steel surface preparation projects by abrasive blast cleaning process.

This electronic optical instrument enables:

- **Objective and reliable quality controls of the blast – cleaning grades**
- **Immediate identification of the abrasive blast cleaning process deviations**
- **Blasting cost optimization through a fine tuned cleanliness level monitoring**