One Source

Milling of metal samples

PAL-MIL

FLSmidth

Fully automated milling machine for metal samples

The PAL-MIL prepares stainless steel, pig iron, steel and nonferrous metal samples for X-ray and OE-analysis. The milling preparation procedure drastically and effectively reduces the contamination influence and the memory effect.

Preparation of plain and reproducible sample surfaces in one milling step

The clamping devices of the PAL-MIL are designed to handle a wide variety of sample sizes and shapes, for example cylinders, mushrooms or squares. Material can be milled from the sample surface until the homogeneous area of the sample is reached.

Using a manual, automatic or robot handling system the sample is inserted into the machine and clamped. The milling machine is standard equipped with a second milling spindle with separate drive

Depending on which sample is introduced to the PAL-MIL the first or second milling head is used. The major advantage of PAL-MIL is the one milling step preparation of the analytical surface and the air cooling of the samples. Liquid cooling is not necessary. No dedusting system is required.

The milling cuts are collected in an easily-removable box within the machine. The cutting speed and the sample feed are stored as parameters in a preparation program, ensuring optimum setting for each sample type.

Preparation of production sample.

Where milling is the only answer

Low and ultra low carbon analysis

This is because there is no contamination from milling media into the sample as is the case with a belt grinder

Low nitrogen

Because of the milling procedure, the analytical surface is absolutely flat to air tighten the sparking stand.

Ca or Al soluble and insoluble

No contamination from the cutting plates into the sample surface is possible as seen from grinding media.

Reproducible and plain sample surface

Creating technologies for the future

With the 16 processing programs the milling parameters such as feed rate, cutting speed etc. can be adjusted to perfectly fit the analytical task, which is 20 micron surface roughness for carbon analysis.

FLSmidth is a reliable partner in continuous quality assurance and improvement. We offer complete solutions for preparing samples, and these are tailored to provide a perfect match for your product and samples.

Optimized sample preparation for pig iron & steel

Steel production, in particular, requires a high degree of precision during analysis in short time and at low cost. The only reliable basis for spectrometry analysis by X-ray fluorescence or optical emission is to ensure a repeatable sample quality. FLSmidth recommends milling for the preparation of pig iron, steel, as well as stainless steel and non-ferrous metal samples. With regard to reproducibility, evenness and cost effectiveness, milled samples produce significantly better results than ground samples.

PAL-MIL

For manual or semi-automatic operation which can be easily extended to a fully automated laboratory system

PAL-MIL_H

With handling system for linear arrangements

PAL-MIL_R

With automation interface and operated by industrial robot for fully automated sample preparation and analysis systems

Second milling spindle with separate drive

PAL-MIL benefits at a glance

- Sample preparation in one milling step
- Preparation of production, calibration and monitoring of samples
- Fast sample preparation
- Reproducible and plain sample surface
- Quick release function for fast exchange of milling head
- Second milling spindle with separate drive
- No dedusting system required
- The milling cuts are collected in a waste box inside the machine
- Liquid sample cooling not required
- Optimized working processes reduce costs and maintenance time
- Reduction of preparation costs per sample

Durable components

All components chosen for our PAL-MIL represent state-of-the-art machinery for endurable operation under all industrial conditions.

Graphical user interface

For routine operation of the machine, change of parameters and maintenance procedures, a large human-machine interface gives the operator access to the machine control.

Integrated easily accessible box for collecting milling cuts

Safety door is open for the sample to be inserted.

Preparation of calibration and monitor samples

Preparation of calibration and monitor samples

Selection of typical samples for milling by PAL-MIL

Stand-alone, linear arrangement & robot arrangement...

The PAL-MIL, PAL-MIL_H and PAL-MIL_R address the most common sample preparation requirements for X-ray and OE-analysis.

PAL-MIL_R operated by industrial robot in a Nucleus-C system

PAL-MIL_H integrated in a linear sample processing system

Technical data

Please ask your local representative for options to customize your PAL-MIL in order to optimize your benefits from milling-based sample preparation.

Dedicated clamping device for round samples

Multi-purpose clamping device for different kinds of samples

Dimensions and weight
Machine: W x L x H: 1204 x 1152 x 2243 mm
Weight: 1900 kg
Electrical cabinet: W x L x H: 800 x 400 x 1600 mm
Weight: 250 kg
Electrical power supply
3 x 400 V, 50 Hz, PE, 12 kW; other voltages on request
Compressed air
Pressure: 6-8 bar, max. 1100 Ndm³/ sample
Electronic controller
PLC: S7; Control voltage: 24 V DC
Preparation programs: 16
Milling head
Quick release milling head: variable number of cutting blades, each with variable cutting edges
Sample clamping device
Clamping range: 32 - 50 mm

Processable samples
Shape: Round (cylindrical or conical), oval, rectangular, double thickness
Dimensions: Width or Ø: min. 32 mm to max. 50 mm
Height: min. 8 mm, max. 45 mm,
Material: iron, carbon steel, high-grade steel, non-ferrous metal
Hardness: max. 58 HRC
Temperature: 0° - 300° C

Experience values for preparing samples
Carbon steel samples for OE-analysis: preparation time: max. 30 sec.
Iron samples for XRF-analysis: preparation time: max. 35 sec.
Up to 600 carbon steel samples or 200 iron samples were prepared with one set of cutting blades, using only one cutting edge.

One Source

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