Milling of metal samples





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.

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.

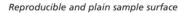
Ca or Al soluble and insoluble

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



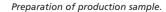
















Creating technologies for the future

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

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

PAL-MIL R

per sample

Second milling spindle with separate drive

PAL-MIL benefits

• Sample preparation in one

• Preparation of production,

• Fast sample preparation

• Reproducible and plain

sample surface

separate drive

calibration and monitoring

• Quick release function for fast

exchange of milling head

• Second milling spindle with

• No dedusting system required

• The milling cuts are collected in a

• Liquid sample cooling not required

reduce costs and maintenance time

waste box inside the machine

Optimized working processes

• Reduction of preparation costs

at a glance

milling step

of samples

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





























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

7

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

Copyright © 2011 FLSmidth A/S. ALL RIGHTS RESERVED. FLSmidth is a (registered) trademark of FLSmidth A/S. This brochure makes no offers, representations or warranties (express or implied), and information and data contained in this brochure are for general reference only and may change at any time.

www.flsmidth.com/qcx

