Nordson
MEASUREMENT & CONTROL

Degree of Roast

InfraLab Series 9

Supplemental Guidelines

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Issue A

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InfraLab Series 9 Degree of Roast – Supplemental Guidelines

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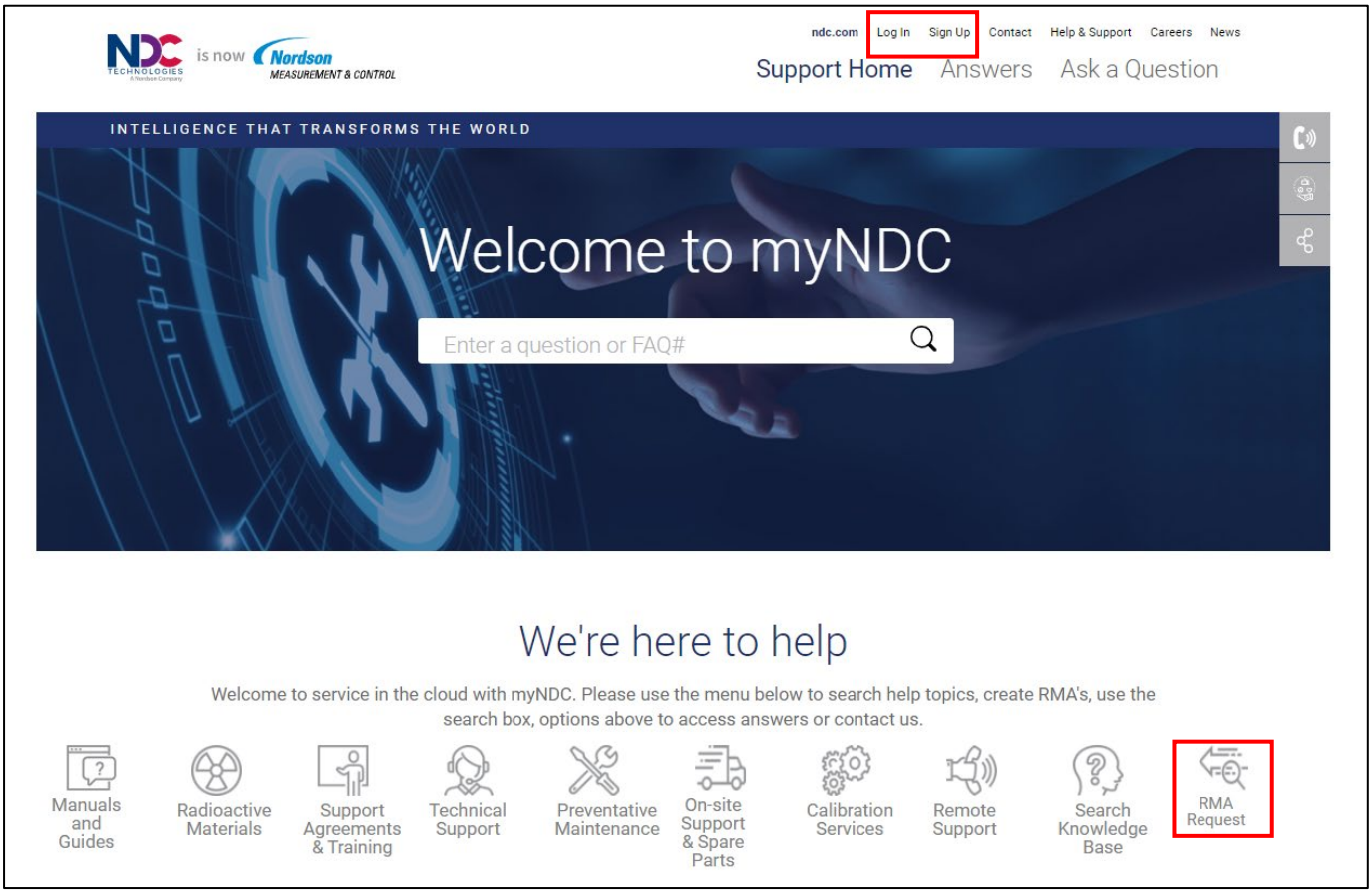

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InfraLab Degree of Roast Supplemental Guidelines

Introduction

This supplement details the changes in operation required for using the Degree of Roast (DOR) InfraLab which has additional measurement hardware installed that enables the simultaneous measurement of Moisture and Degree of Roast in Coffee products.

Please follow the instructions of the main InfraLab User Guide and use this supplement guide for features specific to the DOR InfraLab.

Background

It is common practice for Coffee roast masters to measure the moisture and “color” (which ranges from light to dark) of roasted coffee beans to monitor the quality of the roasting process and ensure that the product is within target specification prior to further processing. The color roast value or degree of roast (DOR) is normally measured in the ground state as the beans are generally not uniform in color.

To date, these measurements require the use of multiple analytical technologies (instruments) with different sample handling and operating requirements. NDC Technologies has recently upgraded its proven and trustworthy InfraLab at-line moisture analyser to provide a **simultaneous** measurement of Moisture and Degree of Roast in seconds.

Starting Up InfraLab After Shipping

When you have unpacked your InfraLab, install it on a suitable workbench as described in the User guide. Switch the unit on and leave it for 2 hours to warm up. After a few hours warm up, perform a forced re-ref from the Gauge/Reference Check page to set up the internal reference tile.

Starting Up InfraLab from Cold

It is recommended to leave the InfraLab powered 24/7 but if it has been switched off, then for best results, after powering on, it should be left for approximately 45 mins to 1 hour to warm up before use. The internal reference standard has been programmed to periodically re-reference the InfraLab, so there is no need to carry out periodic reference checking. However, performing an Auto Reference operation after the InfraLab has warmed up is recommended.

Sample Preparation and Use

Moisture only measurements – the InfraLab can be used as documented in the user manual using the turntable and regular sample bowls.

Degree of roast combined with moisture measurements – remove the turntable and fit the supplied static sample holder (Figure 1).

Figure 1 Static sample holder

Historically, to differentiate between different degrees of roast, a narrow band of visible light wavelengths reflected from a ground sample of the roasted bean is measured.

For consistency, samples should be ground to the desired particle size (ideally soon after quenching) and analysed close to room temperature. As the DOR is an absolute reflectivity measurement, the sample bowl should be completely filled and the surface level with the edge of the dish.

To simplify this for ground and soluble coffee, a sample levelling device is provided. The operator simply overfills the sample dish, which is then pushed under the levelling bar to create a flat surface as shown in Figure 2.

Figure 2 Sample levelling device

The sample cup should be located on the static sample holder, and the measurement will automatically be taken (Figure 3).

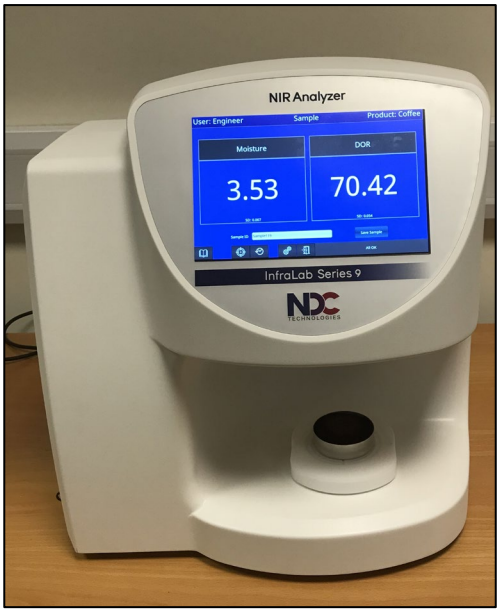

Figure 3 Sample bowl location on the InfraLab

For roasted coffee beans, the sample dish should be packed to form a flat surface that is level with the edge of the dish. Use a straight edge to pat the surface until it is flat (the shallow rotating sample bowl can also be used, provided a flat surface can be achieved).

InfraLab Degree of Roast Measurement Scale

The InfraLab degree of roast measurement is factory set up to report values on a scale similar to the visual coffee roast standards created by the SCAA – Specialty Coffee Association of America. Unlike the visual scale where there is a degree of human subjectivity, the InfraLab DOR measurement is designed to be highly repeatable and reproducible.

If required, this scale can be adjusted to agree more closely with your current degree of roast color measurement scale (such as those used output by Dr Lange, Probat, Neotech or Agtron, etc.). To adjust the DOR measurement, measure a series of samples on both the InfraLab and your current color measurement system and use the calibration adjustment tools in InfraLab Manager to determine the new Span and Trim values to adjust the InfraLab DOR output.

DOR Measurement Verification

The InfraLab periodically performs an auto reference operation without any user interaction. If the user wishes to make a measurement when the unit is performing this operation, the measure button will be greyed out for a short period (in most circumstances, this operation will also be reported on the HMI).

Periodic measurement verification can be achieved by comparing ground coffee samples against your QC color meter or using the external ARS reflectivity standard. The reading on the external ARS should be repeatable to within +/- 0.4 DOR units.

If any adjustments to the DOR measurement are required, then calculate the new Span and Trim settings in InfraLab Manager.