Meat Application

InfraLab Series 9

Best Practice Guidelines

Publication Reference : 126/17138-01

Issue A

Nordson
Measurement and Control Solutions
Bates Road,
Maldon, Essex CM9 5FA, UK

Phone +44 (0)1621 852244
Fax +44 (0)1621 856180
www.ndc.com

Intelligence that transforms the world.

Proprietary Notice

InfraLab Series 9 Meat Application – Best Practice Guidelines

Part Number: 126/17138-01

Issue: A

Date of Release: April 11, 2023

Last Revised: April 11, 2023

Contact NDC

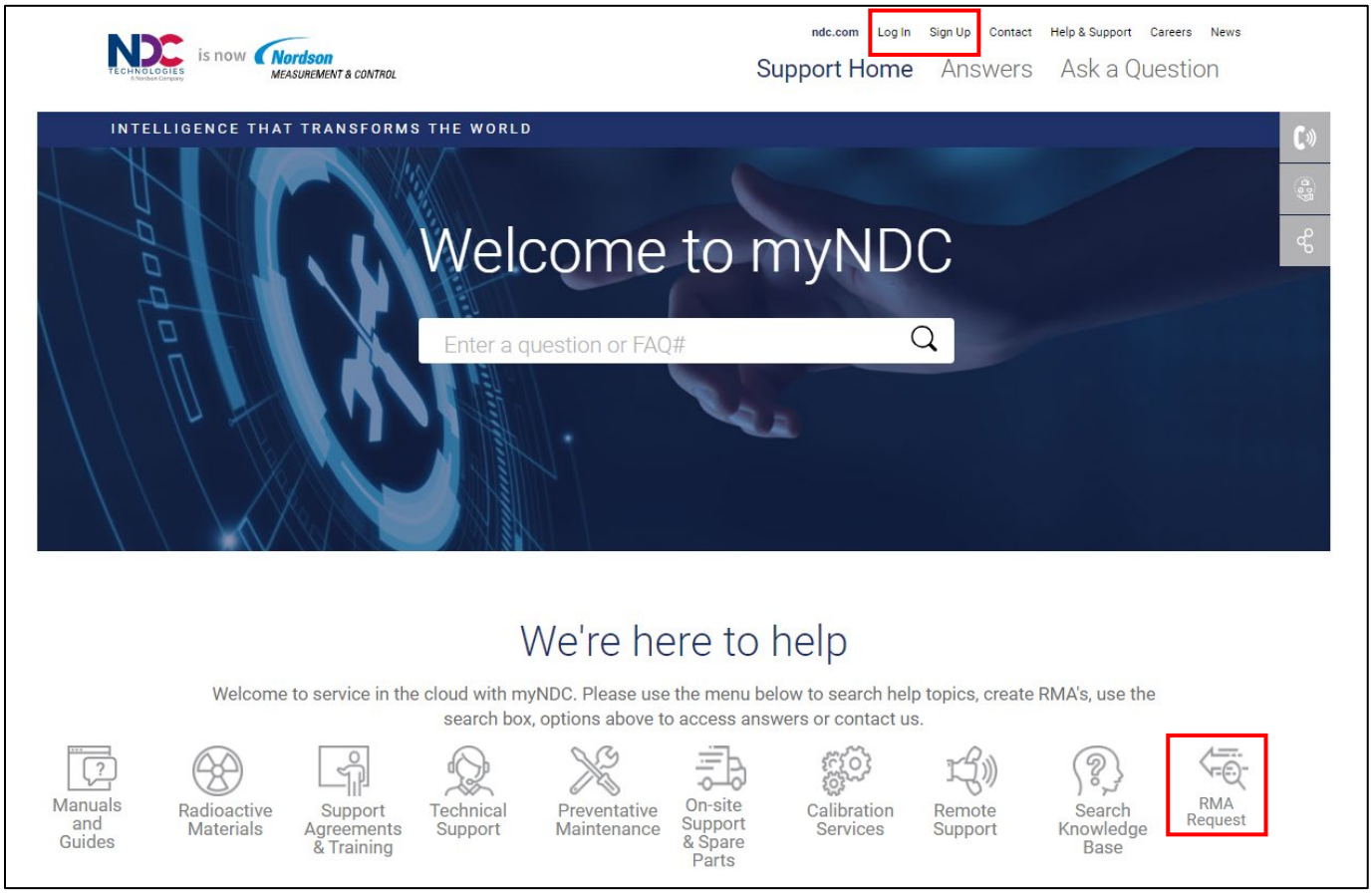
Online Support

You can access the NDC Customer Support portal, my**NDC** at https://ndc.custhelp.com.

myNDC is a cloud-based portal that allows you to get product support by phone, ask a question, provide feedback, submit an RMA request or access information in our on-line knowledge database. You can browse the myNDC site or create a myNDC account.

- To create a myNDC account, click **Log In** or **Sign Up**. After creating the account, you will be immediately logged in. To log in on subsequent visits to myNDC, click **Log In**, enter your user name and password, and then click **LOG IN**.

- To submit an RMA, click on **RMA Request** and follow the on-screen instructions.



NDC Contact Numbers

Please have your sales order number at hand before contacting NDC.

Americas	+1 626 939 3855
Asia Pacific	NDC Asia Pacific Customer Service Toll-free contact numbers: • Thailand: 1800 012 048 • Indonesia: 00 1803 016 4969 • Korea: 00 7981 420 30749 • Malaysia: 1800 81 9290 • Taiwan: 00 801 128 027 • India: 000 800 0402 514 Singapore non toll-free number: +65 6579 2411 Email ID: osc-apac@ndc.com
Japan	+81 (0)3 3255 8157
China	+86 21 61133609
EMEA (Europe, Middle East, Africa)	Germany: 0800 1123194
	Italy: +39 0331 454 207
	All other countries (English speaking): +44 1621 852244 Please select option 2 to be connected to the service team

Table of Contents

CHAPTER 1

1 Overview

NDC's InfraLab Series 9 At-Line Meat Analyser is delivered **pre-calibrated** to measure Fat, Moisture and Protein (and Collagen) in homogenised raw:

- Beef
- Lamb
- Pork
- Chicken and Turkey

It is aimed at the further meat processing sector, where the need for rapid measurements of fat content is well-established to reduce manufacturing costs.

The InfraLab reports Fat, Moisture and Protein values close to the actual constituent content in raw unprocessed meat (without added ingredients). The algorithms and internal calibration adjustments are based upon a full study carried out on many 100's of samples, with data provided by our accredited external Laboratory testing house, Campden BRI.

Significant changes to the Span and Trim are not anticipated unless the Raw Meat product is highly processed or contains significant concentrations of added ingredients. In such cases, please consult with Applications TSG as they can advise the best initial settings and correct algorithms (for Deli Meats).

The measurement methodology in the InfraLab is based on near-infrared (NIR) spectroscopy, which is a secondary correlative technique to predict the concentration of various components. Therefore, measurement results must be validated against the customer's chosen external reference laboratory chemical analysis methods to determine the degree of agreement between the different methods.

This page intentionally left blank

CHAPTER 2

2 Calibration Adjustment

As stated previously, NIR is a secondary correlative technique to predict the concentration of various components and the measurements must be validated against the customer's chosen external reference laboratory chemical analysis methods to establish the degree of agreement between the different methods.

Note: There is no single international standard method for the determination of Fat and Moisture in Raw Meat, and different labs will return slightly different results, often with a systematic bias between labs for the various components to be measured. This will be a result of different operator practices and equipment used.

The primary accredited reference methods used to develop the measurement algorithms are:

%Fat	ISO 1443:1973. Total fat (acid hydrolysis) method for Beef, Pork and Lamb
%Moisture	ISO 1442:1997. Gravimetric Oven (sample mixed with sand to ensure effective loss in moisture
%Protein	ISO 937:1986. Total Protein by Kjeldahl
%Collagen	ISO 3496:1994. Total Collagen by Measuring Hydroxyproline amino acid content and multiply result by 8

2.1 Reference Methods

2.2 Fat

Common methods for Measuring **%Fat** content include:

- **Total Fat**: Weibull-Stoldt (measures Crude and bound Fat in Meat with generally consistent results). Werner Schmidt is a similar method.
- **Crude Fat**: Soxhlet (more variable than Weibull-Stoldt but can be quite close if performed correctly)
- **Crude Fat**: NMR (nuclear magnetic resonance)
- **Crude Fat**: Microwave calculation of Moisture content which is then used to infer %Fat

For Soxhlet, the uncertainty in the measurement can be 6-10% of the target value, whereas uncertainties in the Weibull-Stoldt method are typically lower, 5%-8% of the target value.

Furthermore, the size of the sample used for the reference methods is very small (< 5g) when compared to the amount analysed on the InfraLab (~250g). In any comparative study, therefore, consistency in analysing multiple (duplicate) sub-samples taken from the InfraLab Bowl is important in reducing uncertainties in the primary method.

(Recommended reference method: Total Fat. ISO 1443:1973)

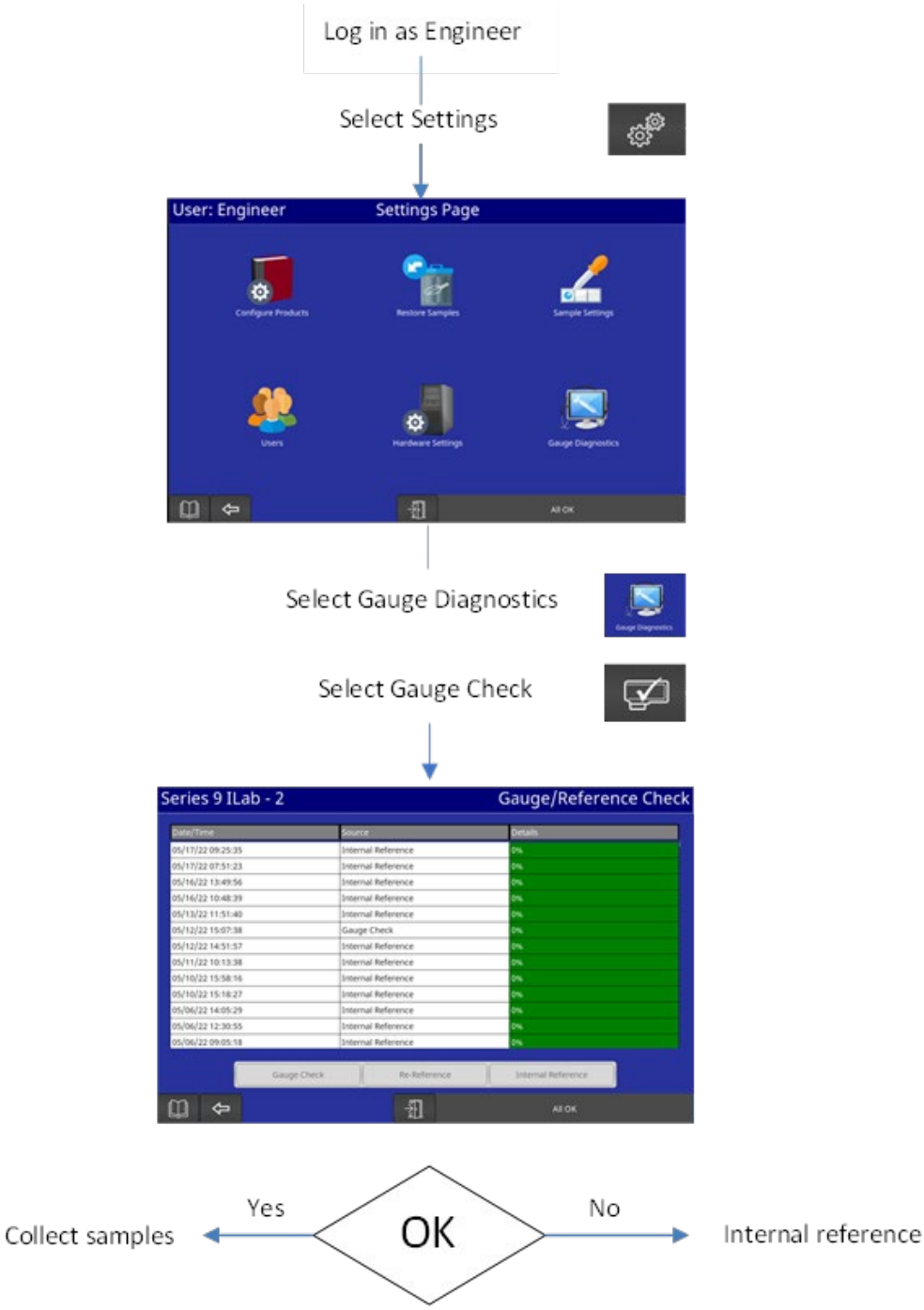
Note: The InfraLab is calibrated to Total Fat. The above primary techniques can differ by up to 1%. InfraLab adjustments for fat should only be exclusively with one method – **do not combine results from different methods.**

Total Protein: Kjeldahl (recommended reference method ISO 937:1986)

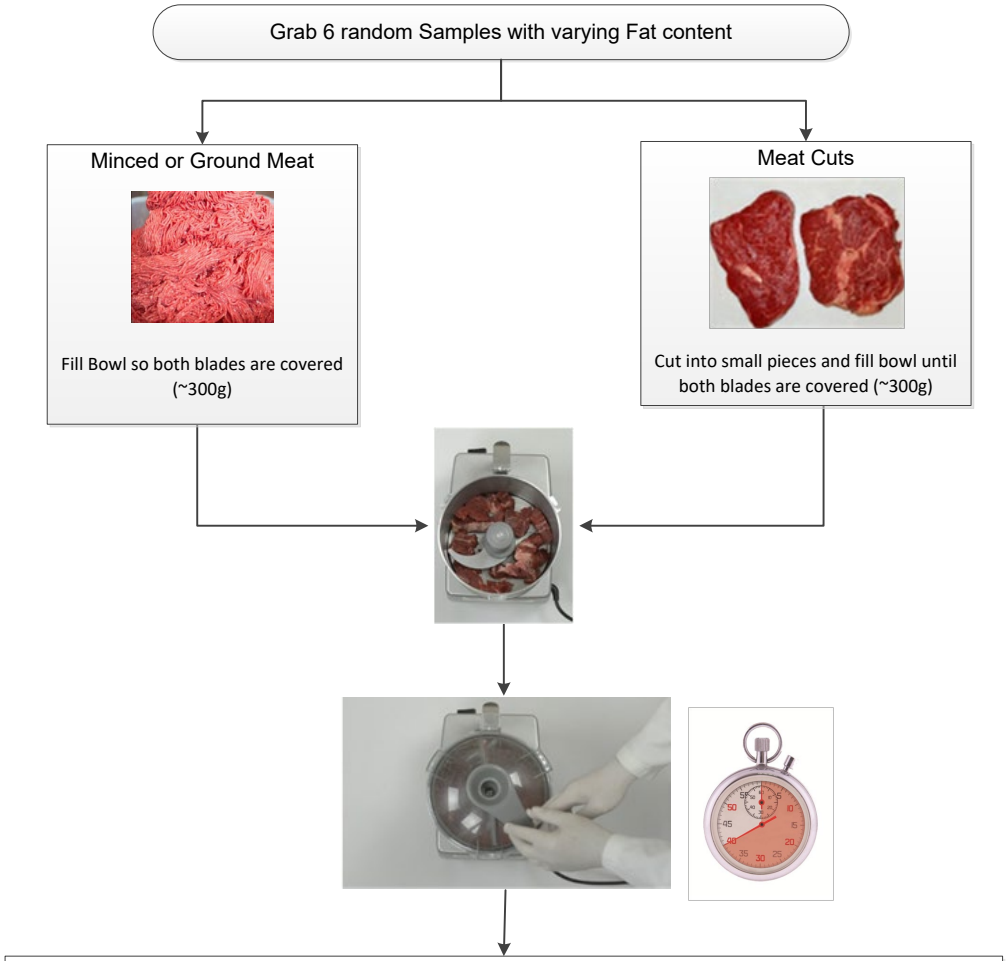
Total Moisture Content: Gravimetric Oven (recommended reference method ISO 1442:1997)

Total Collagen: Measure Hydroxyproline amino acid content and multiply results by 8 (recommended reference method ISO 3496:1994)

2.3 Essential Configuration



2.4 Procedure to Ensure the InfraLab Correlates with the Customer's Chosen External Testing Laboratory



- Avoid Frozen Meat as it will be difficult to prepare and residual ice can affect measurement. If frozen, defrost before sample preparation (ideally ~4-10°C)
- Blix samples for 30 – 40 seconds whilst rotating Lid scraper to prevent balling of the meat
- If a ball forms keep rotating the lid scraper and it should eventually break up again during the 30-40 sec. If you find it does not break up in time, break the ball up into pieces and repeat the blixing process for a further 30 seconds to ensure ideal homogenization.
- For high fat samples (>40%) blix for 20-30 seconds to prevent fatting out
- For Meat pieces and very cold meat scrape walls of the bowl and repeat Blixing process for another 30-40 seconds

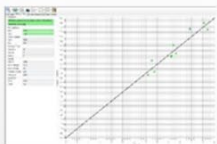
Fill the Bowl and Make a Measurement immediately after homogenisation

Fill the bowl making sure all the edges are covered.

Immediately Seal the Sample in a Bag (refrigerate or freeze to avoid decomposition and loss of moisture)

Perform Laboratory Analysis of 2 sub-samples (Duplicate sub sample Analysis) within 5 days

Determine if Trim Adjustments are required



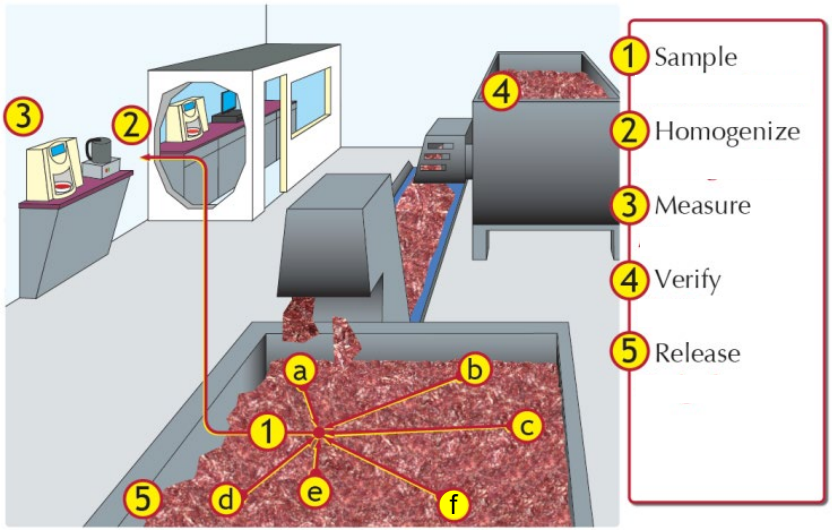
This page intentionally left blank

CHAPTER 3

3 Sample Preparation and Measurement

The steps for making a measurement on the InfraLab are summarized below.

Grab samples from random heights in the Meat collection bin and combine to a single sample of approximately 350g (12 oz) that will provide a true average of the process.

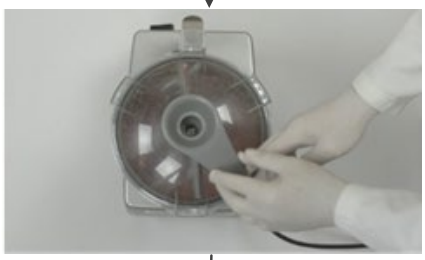


Minced or Ground Meat

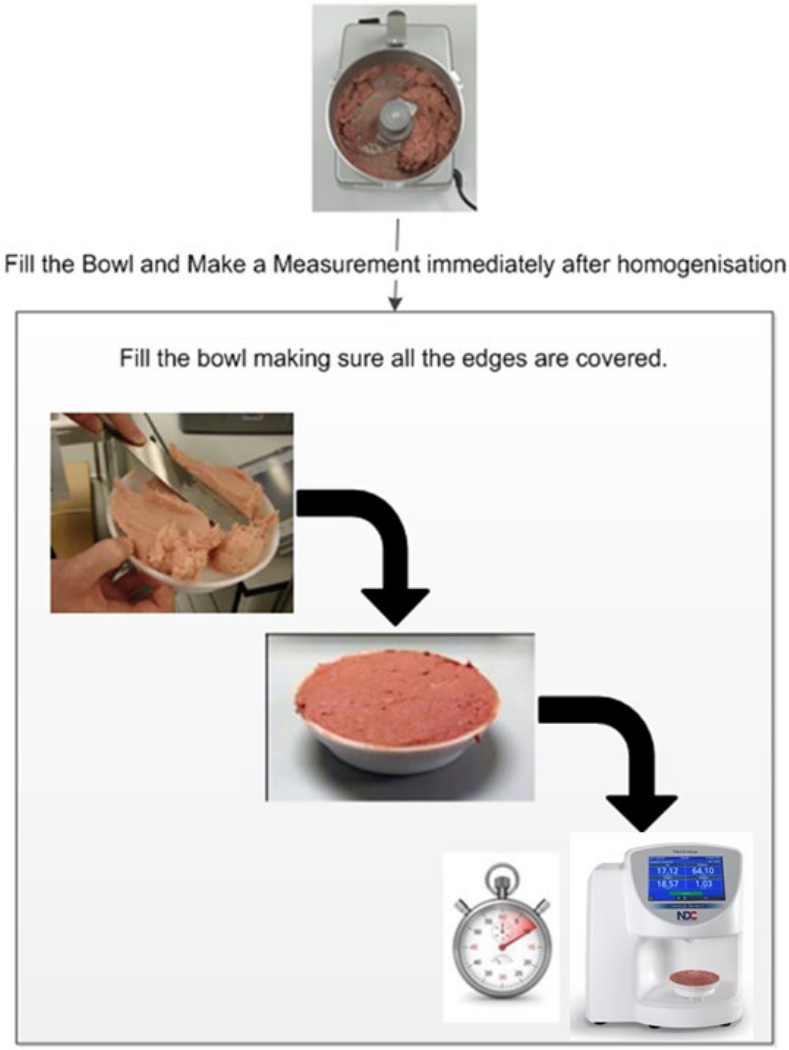
Fill Bowl so both blades are covered (~300g)

Meat Cuts

Cut into small pieces and fill bowl until both blades are covered (~300g)



- Blix samples for 30 – 40 seconds whilst rotating Lid scraper to prevent balling of the meat
- If a ball forms keep rotating the lid scraper and it should eventually break up again during the 30-40 sec. If you find it does not break up in time, break the ball up into pieces and repeat the blixing process for a further 30 seconds to ensure ideal homogenization.
- For high fat samples (>40%) blix for 20-30 seconds to prevent fatting out
- For Meat pieces and very cold meat (< 3°C), scrape walls of the bowl and repeat Blixing process for another 30-40 seconds
- Avoid Frozen Meat as Ice formation can affect the measurement


Fill the Bowl and Make a Measurement immediately after homogenisation
Fill the bowl making sure all the edges are covered.

Note: If the sample cannot be measured immediately, steps should be taken to avoid moisture loss.

- Before blixing the sample should be stored in an airtight bag to prevent any moisture loss (good sample handling practice).

- After blixing then the sample should be stored in the robotcoupe with the lid closed or in a sealed bag and re-blixed for 5-10 seconds before the bowl is filled (again good sample handling practice),

- If the operator is called away after filling the sample bowl then the sample can be simply put under the InfraLab for measurement as usual (the bowl will automatically be detected and a measurement taken automatically) and left. (Dispose of the sample in the usual way – do not use this sample for external reference testing.)

CHAPTER
4

4 Servicing, Returns and Recycling

4.1 Servicing and Returning your Equipment

Your instrument was carefully inspected electrically and mechanically prior to shipment. It should be free of surface defects and scratches, and it should be in perfect working order upon receipt. If any indication of damage is found, file a claim with the carrier immediately, prior to using the instrument. If no damage is apparent, proceed by using this manual to install and setup this instrument.

Save the shipping carton and packing material for future storing or shipment of the instrument. If, at some future time, the instrument must be returned to the factory for service, include a full description of the instrument failure and the mode of operation the instrument was in at the time of failure. Also include a contact person to discuss the instrument failure.

When returning equipment for service, it is important to first obtain a Return Material Authorization (RMA) number. The RMA number is needed for proper handling of returned equipment.

- To obtain an RMA, go to https://ndc.custhelp.com/.
- To create a myNDC account, click the **Log in or Sign up** button. After creating the account, you will be immediately logged in. To log in on subsequent visits to myNDC, click the **Log in or Sign up** button, enter your username and password, and then click **Log in**.
- To submit an RMA, click on the **RMA Request** link and follow the on-screen instructions.

Ship the instrument in the original carton, or, if the original carton is unavailable, ship in a carton providing sufficient protection. Send the instrument to the Asia, Europe, or USA office, whichever is closest to you or to the office indicated by your sales engineer. Place the RMA number on the outside of the carton and include a purchase order number and any other information specific to your instrument. Field warranty service is available if the customer pays travel expenses by advance purchase order. All service operations should be performed by skilled electronics technicians, who have been trained by NDC Technologies.

4.2 Recycling, Disposal and Sustainability

NDC Technologies provides intelligent measurement and control solutions to help you focus on your unique mission in a more sustainable way. Better for your people. Better for your bottom line. Better for the planet. For this reason, NDC Technologies encourages its customers to recycle and dispose of equipment in a way which is responsible and encourages sustainability.

Please check the following before disposing of your equipment:

- Is the equipment worth repairing? If in doubt, contact NDC Service.
- If you are aware of any hazardous materials in your equipment, ensure qualified personnel take responsibility for its disposal. Some examples of hazardous substances include lead, mercury, cadmium, chromium VI, flame retardants, plasticizers, fluorescent tubes, monitors containing cathode ray tubes and products containing capacitors. NDC is compliant with the European WEEE and the most current RoHS Directive.
- Can you re-use or recycle any constituent parts? For example, if the housing/chassis is made of metal, it can be recycled by your local authority. Ensure qualified personnel take responsibility for dismantling the equipment.

If the equipment does need to be disposed of, please dispose of it in a way that does not harm the environment.

Warranty

1. All sales of NDC Technologies products are subject to the contractual terms and conditions of the Order pursuant to which they were sold to Buyer, including Warranty terms. The following terms are a general summary of the contractual Warranty terms, NOT a revision or alternative to the contractual terms, and are presented as merely a point of reference for your information. The contractual Warranty is the complete and exclusive statement of all NDC Technologies warranties to Buyer. In the event the following terms are in conflict with any of the contractual Warranty terms, the contractual Warranty terms shall be deemed to control.

   The warranty terms contained herein are expressly in lieu of any and all other warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose. In no event shall NDC Technologies be liable for any incidental, consequential or special damages, including but not limited to, any loss of business, income or profits, expenses incurred for time when the system is not in operation, and any labor costs relating to or arising out of the performance, functioning or use of the system.

   Purchaser assumes the risk for use of this product and agrees to indemnify and hold NDC Technologies harmless for any and all damage to person or to property resulting therefrom.

   NDC Technologies grants no license under any patent rights except the right, under only such patents as may be owned or acquired by NDC Technologies, to use the product sold hereby for the purpose for which it is sold. NDC Technologies does not warrant that the product or its use does not infringe any patent owned by persons other than NDC Technologies.

2. NDC Technologies guarantees all products to be free from defects in material and workmanship for the following periods[1]:

   - Product and peripherals – 2 years from shipment
   - Source lamp – 5 years from shipment
   - Filter wheel motor – 5 years from shipment
   - Spare parts – 1 year from shipment
   - Replacement lamps and motors supplied under warranty – 1 year or up to the original 5 year warranty from shipment of the sensor, whichever is longer

   [1] Refer to the contractual terms and conditions of the Order for usage of the warranty.

   During this period, NDC Technologies will repair or at its option replace, free of all charges for parts and labor, any NDC Technologies parts determined by it to have been broken or damaged due to causes other than improper application, abuse or negligence. NDC Technologies' obligation to repair or replace shall not extend to expendable parts which are subject to normal operating wear.

   Nothing in this paragraph 2 will require NDC Technologies to make repairs or replacements where:

A. The product has been repaired, other than by an authorized NDC Technologies dealer or an NDC Technologies employee, or altered in any way without the prior written consent of NDC Technologies; or

B. The product has not been properly maintained in accordance with any operating and maintenance manual supplied therewith; or

C. The product has been damaged as a result of fire, flood, war, insurrection, civil commotion, acts of God or any other cause beyond the control of NDC Technologies or Buyer.

3. NDC Technologies' liability shall be limited to the obligations set forth in Paragraph 2. These shall be the Buyer's sole and exclusive remedies, whether in contract, tort or otherwise, provided, however, that in lieu thereof, NDC Technologies at its option may replace the entire product on an exchange basis or refund the purchase price against the return of the defective product.

4. NDC Technologies will not be responsible for failure to provide service or parts due to shortage of materials, labor or transportation strikes or delays, or any causes beyond NDC Technologies' control.

5. Unless otherwise specified by NDC Technologies, all warranty repairs will be made at NDC Technologies' facility. The customer shall be responsible for all expenses of packing, freight and insurance in connection with the shipment of products to NDC Technologies for repair. NDC Technologies will pay the cost of returning the equipment to customer.

   If it is mutually determined by the buyer and NDC Technologies that the examination, replacement or repair takes place at the buyer's facility, then the buyer will be responsible for NDC Technologies' travel and living expenses incurred in traveling to and from the buyer's facility, and during the time of the visit, as well as the cost of field labor and replacement parts unless the parts being repaired or replaced are determined to have been defective, in which event the cost of said repaired or replacement parts shall be borne by NDC Technologies. These travel and living expenses will be billed to the buyer at actual cost to NDC Technologies.

6. No person, including any NDC Technologies distributor, agent or representative, is authorized to assume any liability on behalf or in the name of NDC Technologies, and NDC Technologies shall not be bound to any understandings, representations, or agreements with respect to warranties except as set forth in this policy.

7. NDC Technologies requests immediate notification of any claims arising from damage in transit in order to determine if carrier responsibility exists. If damaged equipment arrives, save the shipping container for inspection by the carrier and telephone NDC Technologies as soon as possible.