

**DRAFT
AIR MONITORING PLAN
ROCK-TENN SITE
OTSEGO, ALLEGAN COUNTY, MICHIGAN**

Prepared for:

U.S. Environmental Protection Agency
Emergency Response Branch, Region 5
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1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) and its Superfund Technical Assessment and Response Team (START) contractor performed a Removal Assessment (RS) of the Rock-Tenn Site (Site) on April 2, 2018. During this assessment, the presence of asbestos containing material (ACM) was confirmed within the Site. EPA will perform a time-critical Removal Action (RV) to address all threats posed to human health and the environment by on-site contaminants.

The Site is a vacant former paper mill located at 431 Helen Avenue in Otsego, Michigan (see Figure 1 in Appendix A). The geographical coordinates are 42.46444444 North latitude and -85.70527778 West longitude. The Site occupies an area of 17 acres and consists of over 40 buildings and structures in a fenced area. The building of interest for the RV is the Power House building located in the east central portion of the property. The Site is bounded to the north by W. River Street, to the south by the Kalamazoo River, to the west by vacant land, and to the east by John Street and N. North Street. Nearby land uses include industrial, commercial, residential, and agricultural (SRS, 2018).

During the RS, six bulk ACM samples were collected from inside the Power House and a neighboring building. Two samples were collected on the main level of the Power House and three samples were collected along the northern portion of the basement. The sixth sample was collected from the adjacent building to the west of the Power House which was connected by a basement corridor. ACM is defined by 15 USC 2642 as any material containing more than 1 percent (%) asbestos by weight. Asbestos is the name of a group of six fibrous minerals (amosite, chrysotile, crocidolite, tremolite, actinolite, and anthophyllite) that naturally occur in the environment. Analytical results confirmed the presence of asbestos in five samples with results ranging from 1% to 40% amosite. All five ACM samples collected were friable based on the definition in 40 CFR Part 61.141 (SRS, 2018).

This Air Monitoring Plan (AMP) is applicable during RV activities at the Site. The plan is developed to monitor airborne ACM contaminants at the Site perimeter. The air monitoring plan design will provide protection of public health by monitoring perimeter air quality and by implementing engineering controls based on real-time monitoring results.

2.0 PROJECT OBJECTIVES

The overall air monitoring objectives are as follows:

- Minimize risk of off-site exposure to contaminants resulting from removal action work performed at the Site;
- Provide an early warning of site conditions allowing site managers to proactively manage potential off-site ambient air impacts; and
- Create a comprehensive database of real-time air quality measurements, meteorological conditions, laboratory analytical data, equipment calibration and daily observations collected during the project.

This AMP covers monitoring and documentation of routine removal operations. In the event of an emergency incident at the Site, additional air monitoring and sampling that are outside of the scope of this plan may be conducted.

2.1 AIR MONITORING OBJECTIVES

Air monitoring will be performed along the perimeter of the Site during removal activities. The air monitoring system is designed to accomplish the objectives presented above as well as the following:

- Monitor and document perimeter ambient air levels of general and target compounds during removal activities;
- Provide an early warning system for potential elevated off-site exposures to allow for aggressive responses to exceedances of action levels ensuring that longer-term exposures at the Site are below acceptable levels;
- Evaluate ongoing effectiveness of, and need for, additional dust suppression controls and/or alteration of work activities, to reduce airborne compounds to below acceptable risk levels;
- Use real-time air monitoring results to ensure that no significant human health exposures are caused by work activities; and
- Establish Data Quality Objectives (DQO) to define the quality of the data gathered in relation to the methods used to collect the data and the data's anticipated end use.

2.2 DATA QUALITY OBJECTIVES

Real-time air quality data and laboratory analytical data will be collected to evaluate contaminant levels in ambient air. The following DQO levels will be utilized during the performance of removal actions:

Real-time air quality data: Site air quality will be monitored at upwind and downwind locations of the Site perimeter. Air quality monitoring at the Site will be performed using portable equipment. Portable monitors will be calibrated according to manufacturer's specifications. No additional Quality Assurance and Quality Control (QA/QC) tasks will be performed on data generated by air monitoring instruments. The real-time data will be used to document conditions occurring on the Site during removal activities and determine the need for more aggressive particulate matter (PM) suppression activities or alteration of work activities. In addition, the real-time data will be used to demonstrate compliance with the health-protective action levels.

Laboratory Analysis: Air samples will be collected concurrently with air monitoring instruments at the air monitoring stations (see Figure 2 in Appendix A) over an 8-hour period or longer during work activities for asbestos. Sample collection frequency is presented in Section 5. Samples will be collected in accordance with the SRS Standard Operation Procedures (SOPs). Field blank and duplicate samples are anticipated to be collected during the RV as part of the QA/QC requirements. Real-time instrument data may be compared against the laboratory analytical results to correlate airborne asbestos to total dust. This information will be used to update the action levels to reflect this ratio.

2.3 SELECTION OF TARGET COMPOUNDS

The presence of ACM has been documented at the Site during RS activities (SRS, 2018). Anticipated removal activities may generate airborne PM that may potentially contain asbestos. Therefore, this AMP will address PM to be protective of public health. The target compound for the Site is asbestos in the air. Air samples will be collected and submitted to the laboratory for asbestos analysis.

2.4 PARTICULATE MATTER (PM) ACTION LEVEL

To the extent practicable, engineering controls will be used to control, reduce, or eliminate exposure to airborne contaminants. However, the following action level will apply to air monitoring results, choices of engineering controls, and decisions to continue or halt work.

The Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) provided in 29 CFR 1910 establishes the total dust (respirable fraction) of 5 milligrams per cubic meter (mg/m³) averaged over an 8-hour period (OSHA, 2017). The total dust action level selected for the Site is a one-hour time-weighted average (TWA) of 2.5 mg/m³. Real-time monitoring for total dust will be performed using a DustTrak dust monitor. Monitoring will only be performed during work activities that may generate airborne PM.

OSHA established a PEL for asbestos of 0.1 fiber per cubic centimeter (f/cc) of air as an 8-hour TWA in Title 29 CFR 1910.1001. The asbestos action level selected for the Site is 0.1 f/cc. Airborne asbestos will be monitored through the submission of air samples to an analytical laboratory for asbestos analysis. See Section 5, Air Sample Collection, for sample submission frequency.

Table 1 summarizes the selected action level to be used for the real-time monitoring system and the supplemental confirmatory sampling.

Table 1. PM Action Levels

Compound	Action Level
Total Dust (Respirable Fraction)	2.5 mg/m ³
Asbestos	0.1 f/cc

Notes

mg/m³

milligram per cubic meter

cc

cubic centimeters

NA

Not Applicable

3.0 AIR MONITORING STRATEGY

Air monitoring will be conducted using real-time air monitoring equipment for PM coupled with high and low volume air sampling and laboratory analysis for asbestos. Real-time air monitoring is designed to provide an immediate means to evaluate appropriate measures of control of short-term exposure levels so that acceptable risks for acute and sub-chronic exposures are not exceeded. The laboratory analytical data provided by air sampling may be used to determine a ratio of airborne asbestos fibers in total dust. Real-time air monitoring will be used to determine the appropriate control actions. Measuring and controlling the disturbance of, and exposure to, target analytes at the Site perimeter results in reduction of risk for off-site contaminant migration, and therefore is protective of the surrounding community from removal activities.

4.0 REAL-TIME AIR MONITORING

This plan implements established methods to continuously monitor for PM at the perimeter of the Site during work hours. Three monitoring stations consisting of one DustTrak II 8533EP and one AirCon or Gilian sampling pump per station will be deployed at locations along the Site perimeter. In addition, a DustTrak 8534 (handheld) may be used in addition to the stationary DustTrak II monitor(s). The perimeter monitoring stations will be adjusted for wind direction to establish at least one upwind and two downwind locations (see potential air monitor locations on Figure 2 in Appendix A). The selection of the locations each day may also be based on anticipated work activities. Each monitoring instrument will communicate in real-time to a central host computer relaying instant PM data. Work activities that warrant air monitoring include those that may generate particulates, such as asbestos debris removal, demolition activities, and the handling, loading and/or transferring of ACM wastes.

4.1 PARTICULATE (DUSTTRAK) MONITORING

The DustTrak II 8533EP (DustTrak) is manufactured by TSI Incorporated and is used to continuously monitor and log the real-time concentration and median particle size of airborne dust, smoke, mist and fumes.



Figure 1. DustTrak air monitor

The DustTrak simultaneously monitors the mass and size fraction of fine particulates in ambient air using a 90° light scattering (laser photometer) method. Specifications for the unit can be found in Appendix B. The monitor can measure size-segregated mass fraction concentrations corresponding to

PM1, PM2.5, respirable, PM10 and PM Total size fractions. Concentrations can be measured over a range of 0.001 to 150 mg/m³.

The data from the DustTrak unit will be recorded by digital data loggers using the analog signal outputs of the monitors. The DustTrak air monitoring unit will be operated in accordance with manufacturers' specifications (see Appendix B).

4.2 METEOROLOGICAL SYSTEM

Meteorological data will be collected from weather authorities such as the National Weather Service in order to determine upwind and downwind locations. The meteorological data will consist of wind speed, wind direction, and temperature. A windsock will also be used to confirm local wind direction. Due to instrument limitations, air monitoring will not be conducted during times of inclement weather such as rain.

4.3 ALARM SYSTEM

The DustTrak instruments will be remotely monitored using a Linc and Gateway System that will communicate to EPA's VIPER Data Management System (VIPER). The VIPER system transmits data via internet communication. Data is sent in real time to a host computer monitored by site personnel. Based on pre-assigned warning and action levels, this system gives audible and visual alarms, and email or text message notifications, to ensure alarms are received and addressed in a timely manner. Alerts are generated for action level exceedances. If an action level is exceeded based on particulate concentrations, audible and visual alarms will alert site personnel.

4.4 ALARM RESPONSE ACTIONS

In the event of any alarm notification, proper responses by on-site personnel will be undertaken. The responses will include; investigating the cause of the alarm (loss of power, loss of communication, humidity), notifying the EPA On Scene Coordinator (OSC), and potential implementation of mitigative actions such as modifying the work activity causing this exceedance or instituting further engineering controls such as water misting. These responses will also be executed if the laboratory analytical results from air samples indicate exceedances of the OSHA PELs and action levels.

4.5 EQUIPMENT CALIBRATION

DustTrak equipment calibration will be performed in accordance with the manufacturer's instructions. A daily log of DustTrak calibration information will be maintained. If monitoring or sampling equipment is determined not to be in proper working order, it will be removed from service, replaced with other

equipment and sent to the appropriate manufacturer or supplier for service and calibration. In the event of frequent equipment malfunction, additional spare monitoring equipment will be maintained on the Site and available for use as needed to minimize air monitoring system downtime.

5.0 AIR SAMPLE COLLECTION

A baseline evaluation of site conditions will be completed by the collection of air samples over a 3-day period and submitting it to the laboratory for asbestos analysis during the first week of Site RV activities. Each air monitoring station will consist of one high-flow air pump (Aircon 2 or equivalent) and potentially one low-flow air pump (GilAir 5 or equivalent) collocated with a DustTrak. Specifications for both units are found in Appendix B. See photos below of both pumps.



Figure 2. Gilian-5 Air pumps



Figure 3. Aircon-2 air pump

Air samples will be collected over an eight to ten-hour work period using a conductive cowl on cassette filter for asbestos. After the first week of activity at the Site (Baseline Evaluation), further air samples will be collected during the middle and final stages of the removal action.

Air samples will be submitted to an analytical laboratory for asbestos analysis. Samples will be analyzed for asbestos fibers via NIOSH 7400 Phase Contrast Microscopy (PCM). PCM provides total fiber count, including asbestos and non-asbestos fibers. Samples analyzed by PCM with fiber detection results of 0.005 f/cc or greater will go on to be further analyzed by NIOSH 7402 Transmission Electron Microscopy (TEM). TEM is used in conjunction with PCM to determine the quantity of asbestos fibers among all fibers counted by PCM.

Air samples may also be collected during any change of major work activity. Samples will be collected and prepared for shipment to the laboratory in accordance with SRS SOPs. Removal contractors' personal air sampling is not covered under this AMP but will be covered by the EPA Emergency and Rapid Response Services (ERRS) contractor's site-specific Health and Safety Plan (HASP).

6.0 DATA EVALUATION

Summary reports will be prepared weekly and will summarize the previous weeks' data, any exceedances, who was notified of the exceedance, and any response actions taken, if appropriate. At the conclusion of the project, a summary of the air monitoring data will be prepared. All air monitoring data generated from the real time monitoring system, analytical results, and exceedances of action levels, including the response to them will be provided in the summary. All data will be provided in an Excel spreadsheet and included on a recordable compact disk at the completion of the project.

REFERENCES

Sustainment and Restoration Services (SRS), 2018. Removal Assessment Report, Rock-Tenn Site.

Occupational Safety and Health Administration (OSHA), 2017. Permissible Exposure Limits, Annotated Table Z-1 (<https://www.osha.gov/dsg/annotated-pels/tablez-1.html>).

APPENDIX A
SITE FIGURES



Legend



Proposed Air Monitoring Stations



Site (Power House Building)



0 112.5 225 450 675 900 Feet

Note: One upwind and two downwind monitoring stations will be selected dependant upon daily wind direction.

Dustrak and Aircon monitoring equipment set up at each selected monitoring station



United States Environmental Protection Agency

Rock - Tenn Site - RV

Ostego, Allegan County, Michigan

TDD No. 0001/S05-0001-19-02-300

Air Monitoring Plan

Figure 2

Proposed Air Monitoring Stations



APPENDIX B
MONITORING EQUIPMENT SPECIFICATION SHEETS

AIRCON-2 HIGH VOLUME AIR SAMPLER

Extended Flow Range

2-30 LPM flow range designed for collecting particulates in a given plant area.

Fully Programmable

Can be programmed with up to three custom timing routines for unattended sampling up to 99 hours.

Touchpad & LCD Display

Allows easy programming of sampling starts and stops, delays, holds, and number of cycles.

Instant Fault Function

When in fault mode unit stops sampling run and locks in time. "FAULT" appears on display to alert operator.

Instant Pressure Check

Back pressure load can be checked on LCD display by pressing a single button.



PRODUCT SPECIFICATIONS

PERFORMANCE

Flow Range.....	2-30 LPM
Constant Flow.....	2-30 LPM @ pressures up to 7 psi
Run Time.....	8 hour minimum

ENVIRONMENTAL

Temperature Ranges	
Operating	-4°F to 113°F (-20°C to 45°C)
Storage	-40°F to 113°F (-40°C to 45°C)
Humidity Range	
Humidity Range	0-95 %RH, non-condensing

GENERAL

Display	Electronic Pressure Display, Full-Function Timing Program, Instant-Fault Function, Programmable Memory (up to 3 custom programs)
Keypad	ACCEPT, PROG, TIME/PRESS, RUN/HOLD
Controls.....	Flow Adjust
Indicators	LCD Display, External Rotameter, Instant Fault, Low Battery
Dimensions	4.3W x 0.3H x 7.5D inches 10.8W x 26.0H x 19.1D cm
Weight.....	Main Unit: 12 lbs (5.4 kg), 4-Hour Battery Pack: 11.5 lbs (5.2 kg) Power Module: 2 lbs (0.9 kg)

ELECTRICAL

Main Unit Input	12 VDC @ 3.4 A
Power Module Input	115-230 VAC @ 800/600 mA, 50-63 Hz
Power Module Output	14 VDC @ 4.6 A (51 watts)
Battery Pack Output	12 VDC, 13 AH
Fuses.....	250 VAC, 3 amp, fast acting, 250 VAC, 1.6 amp, fast acting
Charging Time	14 hours (operational), 8 hours (non-operational)

ORDERING INFORMATION

Description	Part Number
Aircon-2 DC-Programmable, High Volume Sampler	801012-100
Power Module 120VAC/230VAC/DC [without plug]	801000-1
Power Module 120VAC/230VAC/DC [with 120VAC U.S. plug]	801000-2
Power Module 120VAC/230VAC/DC [with Euro plug]	801000-3
Battery Pack (4-hour).....	801001
Hose Coil.....	200456
Hose Support Tip	200457
Sampling Mast.....	401036
Hose for 72" Sampling Mast.....	202046-72
A.C. Plug, U.S.	401562
Carrying Case (22" x 16" x 8")	801171
Battery Charging Jack Cover	202783

For complete information on this pump and other Gilian products, please call 800-451-9444, ext 782 and ask for our full product catalog.

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Gilian® GilAir-5

Constant Flow Air Sampling Pump



- External Filter Housing**
Clear External filter housing allows an immediate visual inspection of filter's condition.
- Flow Fault & Test Indicators**
Flow Fault indicator lights up if unit operates outside $\pm 5\%$ of set flow rate. Battery Test indicator lights up when battery can provide a minimum of 8 hours of operation over operating range.
- Basic, Clock, & Program Models**
Basic model is easy to use. Clock model provides elapsed-time clock display. Program model provides auto start-stop and delayed start times up to 9999 mins.
- Optional Low Flow Modules**
Constant Low Flow module allows sampling from 20-500 cc/min. Constant Pressure (Multiflow) Module allows sampling from 1-750 cc/min.

Description	Part Number
GilAir-5 R Sampling Pump, Basic	800883-171
GilAir-5 RC Sampling Pump, Clock	800885-171
GilAir-5 RP Sampling Pump, Program	800884-171
GilAir-5 R Sampling Pump, Basic, Starter Kit, 120V	800883-171-1201
GilAir-5 RC Sampling Pump, Clock, Starter Kit, 120V	800885-171-1201
GilAir-5 RP Sampling Pump, Program, Starter Kit, 120V	800884-171-1201
GilAir-5 R Sampling Pump, Basic, Starter Kit, 230V	800883-171-2301
GilAir-5 RC Sampling Pump, Clock, Starter Kit, 230V	800885-171-2301
GilAir-5 RP Sampling Pump, Program, Starter Kit, 230V	800884-171-2301
Single Unit Charger w/ Power Adapter, USB GilAir-3/5-Euro cord	911-9901-EU-R
Single Unit Charger w/ Power Adapter, USB GilAir-3/5-US cord	911-9901-US-R
GilAir-3/5 BDx-2-US Five Unit Charger, Universal, 120V, US Cord	811-9919-US
GilAir-3/5 BDx-2-Euro Five Unit Charger, Universal, 230V, Euro Cord	811-9919-EU
Replacement Battery Pack	783-0009-02
Low Flow Module, Constant Flow, Blue	800518
Low Flow Module, Multi-Flow, Blue	800519

Product Specifications

PERFORMANCE

Flow Range	1- 5000 cc/min (Total), 850 - 5000 cc/min (High Flow); 20-500 cc/min (Constant Low Flow); 1-750 cc/min (Constant Pressure)
Constant Flow Control	$\pm 5\%$ of set flow at 1000-5000 cc/min
Flow Compensation	5000cc up to 8" H2O back pressure 4000cc up to 18" H2O back pressure 3000cc up to 23" H2O back pressure 850cc up to 29" H2O back pressure
Run Time	8 hour minimum
Flow Fault	If flow changes exceed 5%, fault icon appears. If fault exceeds 30 seconds, pump shuts down. Pump attempts to restart every 3 minutes for up to 1 hour

ENVIRONMENTAL

Temperature Ranges	
Operating	32°F to 104°F (0°C to 40°C)
Storage	-49°F to 113°F (-45°C to 45°C)
Charging	41°F to 104°F (5°C to 40°C)
Humidity Ranges	
Operating	0-85 %RH, non-condensing
Storage	0-100 %RH, non-condensing

GENERAL

Display Messages	LAST, CAL, SHUT/OFF (Clock, Program); E, PC, P1-P6, OLD (Program)
Controls	Power Switch, Flow Control Screw & Buttons (Clock, Program), Programming (PROG) Button (Program)
Indicators	Elapsed Time (Clock, Program)
Icons (LCD)	Low Battery, Flow Fault, Clock (Clock & Program)
Dimensions	3.9W x 4.1H x 2.0D inches 10.0W x 9.0H x 5.1D cm
Weight	22.5 oz. (638 g)

ELECTRICAL

Battery Pack	NiMH
Interface Connectors	Charging Jack
Charging Time	14-18 hours

APPROVALS/PERFORMANCE

Intrinsic Safety - UL	Class 1, Div 1, Groups A, B, C, D; Class 2, E, F, G; Class 3
EMC: Emissions Standards	EN 55011:2009/A1:2010 Group 1, Class A ICES-003 - Issue 2 Class A FCC Part 15 (per ANSI C63.4:2015) Class A Verification
EMI: Immunity Standards	EN 61326-1:2013; IEC 61000-4-2:2006 / EN 61000-4-2:2009; IEC 61000-4-3:2006 / EN 61000-4-3:2006/A1:2008/ A2:2010

For complete information on this and other Gilian products, please visit our website at www.sensidyne.com
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DUSTTRAK™ DRX AEROSOL MONITORS MODELS 8533, 8533EP AND 8534

REAL-TIME DUST AND AEROSOL
MONITORING FOR ANY ENVIRONMENT,
ANY APPLICATION



Only DustTrak™ DRX Aerosol Monitors can simultaneously measure both mass and size fraction—no other monitor can do both. DustTrak DRX monitors are battery-operated, data-logging, light-scattering laser photometers that give you real-time aerosol mass readings. They use a sheath air system that isolates the aerosol in the optics chamber to keep the optics clean for improved reliability and low maintenance. From desktop with external pump models to a handheld model, the DustTrak DRX offers a suitable solution for harsh industrial workplaces, construction and environmental sites and other outdoor applications, as well as clean office settings. DustTrak DRX monitors measure aerosol contaminants such as dust, smoke, fumes and mists.

Features and Benefits

All Models

- + Real-time mass concentration and size fraction readings, as well as data-logging allow for data analysis during and after sampling.
- + Simultaneously measure size-segregated mass fraction concentrations corresponding to PM1, PM2.5, Respirable, PM10, and Total PM size fractions
- + Easy-to-use graphical user interface with color touch-screen for effortless operation

Handheld Model (8534)

- + Long life internal pump for continuous sampling
- + Single-point data collection for walk through surveys
- + Lightweight design with ergonomic handle for portable applications

Desktop Models (8533 and 8533EP)

- + Energy-efficient, long lasting external pump for continuous, unattended, 24/7, outdoor monitoring applications (Model 8533EP only)
- + Long life internal pump for shorter work-shift or IAQ sampling applications (Model 8533)
- + Gravimetric reference sampling capability for custom reference calibrations
- + Automatic zeroing (with optional zero module) to minimize the effect of zero drift
- + STEL alarm setpoint for tracking 15-minute average mass concentrations
- + Standard and advanced calibration capabilities for consistent accuracy
- + Environmental protected and tamper-proof secure (with an optional environmental enclosure)
- + Inlet sample conditioning (with optional heated inlet sample conditioner) to reduce the effect of humidity on photometric mass measurements (for use with an environmental enclosure)
- + Cloud Data Management System hosted by Netronix™



UNDERSTANDING, ACCELERATED



Unsurpassed Technology and Performance

DustTrak DRX monitors are laser photometers that simultaneously measure five size segregated mass fraction concentrations at once—something no other monitor can do. The desktop, desktop with external pump and handheld monitors are continuous, real-time, 90°, light-scattering laser photometers that simultaneously measure size-segregated mass fraction concentrations corresponding to PM1, PM2.5, Respirable, PM10, and Total PM fractions. They combine both particle cloud (total area of scattered light) and single particle detection to achieve mass fraction measurements.

This size-segregated mass fraction measurement technique is superior to either a basic photometer or optical particle counter (OPC). It delivers the mass concentration of a photometer and the size resolution of an OPC. Typically, photometers can be used at high mass concentration, but they do not give any size information (unless used with size selective inlet conditioners) and significantly underestimate large particle mass concentrations. OPC's provide size and count information; however, they do not provide any mass concentration information and cannot be used in high mass concentration environments. The DustTrak DRX can do both.

Handheld Models: Perfect for Walk-Through Surveys and Single-Point Data Collection Applications

The DustTrak DRX handheld Model 8534 is lightweight and portable. It is perfect for industrial hygiene surveys, point source location monitoring, indoor air quality investigations, engineering control evaluations/validation, and for baseline trending and screening. Like the desktop models, it has manual and programmable data logging functions. In addition, the handheld model also has a single-point data logging capability for walk-through industrial hygiene surveys and indoor air quality investigations.

Desktop Models: Ideal for Long-Term Surveys and Remote Monitoring Applications

The DustTrak DRX is also offered as a standard desktop (Model 8533), as well as a desktop with external pump (Model 8533EP.) Both models have manual and programmable data logging functions, making them ideal for unattended applications. The standard desktop model is most suitable for indoor, continuous monitoring, while the desktop with external pump is designed for 24/7 unattended, remote monitoring outdoors.

The DustTrak DRX desktop models come with USB (device and host), Ethernet, and analog and alarm outputs allowing remote access to data. User adjustable alarm setpoints for instantaneous or 15-minute short-term excursion limit (STEL) are also available on desktop models. The alarm output with user-defined setpoint alerts you when upset or changing conditions occur.

The DustTrak DRX Desktop Monitors have several unique features:

- + External pump (Model 8533EP) with low power consumption for continuous, unattended monitoring in remote outdoor locations.

- + Gravimetric sampling capability using a 37-mm filter cassette which can be inserted in-line with the aerosol stream allowing you to perform an integral gravimetric analysis for custom reference calibrations.
- + Zeros automatically using the external zeroing module. This optional accessory is used when sampling over extended periods of time. By zeroing the monitor during sampling, the effect of zero drift is minimized.
- + STEL alarm feature for tracking 15-minute average mass concentrations when alarm setpoint has been reached for applications like monitoring fugitive emissions at hazardous waste sites.
- + Provide for environmental protection and tamper-proof security using an environmental enclosure. This optional accessory encloses the instrument within a waterproof, lockable, custom-designed case.
- + Condition the sample air stream before entering the instrument optics using a heated inlet sample conditioner (designed for use with the environmental enclosure.) This optional accessory is used in humid environments. By conditioning the sample, the humidity and water vapor are minimized.
- + Standard and advanced calibration capabilities. The DustTrak DRX Aerosol Monitor has two calibration factors: a photometric calibration factor (PCF) and a size calibration factor (SCF). The PCF accounts for the photometric response difference between A1 Test Dust and the aerosol under measurement, while the SCF accounts for the aerodynamic size difference.
 - The primary goal of the standard calibration is to obtain the SCF for the aerosol of interest. The standard calibration process is very easy and does not require comparison to gravimetric samples. Measure with and without a PM2.5 impactor, and the instrument takes the ratio of these two size distributions and compares this reading to the PM2.5 impactor transmission efficiency curve to calculate the SCF. However, the absolute mass concentration may not be as accurate as the advanced calibration.
 - The advanced calibration method yields high size segregated mass concentration accuracy. It involves two separate gravimetric measurements to obtain PCF and SCF in sequence. The advanced calibration will accurately measure size segregated mass concentrations.

Applications	Desktop	Handheld
Aerosol research studies	+	+
Baseline trending and screening	+	+
Engineering control evaluations		+
Engineering studies		+
Epidemiology studies	+	+
Indoor air quality investigations	+	+
Industrial/occupational hygiene surveys	+	+
Point source monitoring		+
Outdoor environmental monitoring	+	
Process monitoring	+	+
Remote monitoring	+	

DustTrak DRX Aerosol Monitor Features

All Models

- + Li-Ion rechargeable batteries
- + Internal and external battery charging capabilities
- + Outlet port for isokinetic sampling applications
- + User serviceable sheath flow and pump filters
- + Logged test pause and restart feature
- + Logged test programming
 - Color touch screen—either manual mode or program mode
 - TRAKPRO™ Data Analysis Software via a PC
- + User adjustable custom calibration settings
- + Instantaneous alarm settings with visual and audible warnings
- + Real-time graph display
- + View statistical information during and after sampling
- + On-screen instrument status indicators:
FLOW, LASER and FILTER
- + Filter service indicator for user preventative maintenance

Desktop Models (8533 and 8533EP)

- + Long life external pump (8533EP)
- + Internal pump (8533)
- + Hot swappable batteries
- + Gravimetric reference sample capability
- + STEL alarm setpoint

Optional Accessories

- + Auto zeroing module
- + Protective environmental enclosure (8535 and 8537)
- + Heated inlet sample conditioner (for use with an environmental enclosure)
- + Cloud Data Management System as hosted by Netronix™

Handheld Model (8534)

- + Long life internal pump
- + Single-point data collection
for walk through surveys

Easy to Program and Operate

The graphical user interface with color touch-screen puts everything at your fingertips. The easy-to-read display shows real-time mass concentration and graphical data, as well as other statistical information along with instrument pump, laser and flow status, and much more. Perform quick walk-through surveys or program the instrument's advanced logging modes for long-term sampling investigations. Program start times, total sampling times, logging intervals, alarm setpoints and many other parameters. You can even set up the instrument for continuous unattended operation.

TRAKPRO™ Software Makes Monitoring Easier than Ever

TrakPro™ Data Analysis Software allows you to set up and program directly from a PC. It even features the ability for remote programming and data acquisition from your PC via wireless communication options or over an Ethernet network. As always, you can print graphs, raw data tables, and statistical and comprehensive reports for recordkeeping purposes.

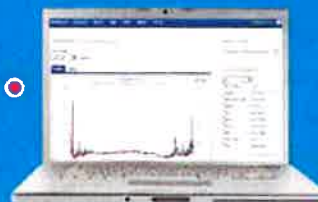
Battery Performance

Models 8533 and 8533EP (Typical) 6600 mAH Li-Ion Battery Pack (P/N 801680)	1 Battery	2 Batteries
Battery runtime (hours)	Up to 6	Up to 12
Charge time* (hours) in DustTrak	4	8
Charge time* (hours) in external battery charger (P/N 801685)	4	8

Model 8534 (Typical) 3600 mAH Li-Ion Battery Pack (P/N 801681)	Battery
Battery runtime (hours)	Up to 6
Charge time* (hours) in DustTrak	4
Charge time* (hours) in external battery charger (P/N 801686)	4

* Of a fully depleted battery

Cloud Data Management System for 24/7 remote dust monitoring



SPECIFICATIONS

DUSTTRAK™ DRX AEROSOL MONITORS MODELS 8533, 8533EP AND 8534

Sensor Type

90° light scattering

Particle Size Range

0.1 to 15 µm

Aerosol Concentration Range

8533 Desktop	0.001 to 150 mg/m³
8533EP Desktop with External Pump	0.001 to 150 mg/m³
8534 Handheld	0.001 to 150 mg/m³

Display

Size Segregated Mass Fractions for PM1, PM2.5, Respirable, PM10 and Total. All displayed

Resolution

±0.1% of reading or 0.001 mg/m³, whichever is greater

Zero Stability

±0.002 mg/m³ per 24 hours at 10 sec time constant

Flow Rate

3.0 L/min

Flow Accuracy

±5% of factory set point, internal flow controlled

Temperature Coefficient

+0.001 mg/m³ per °C

Operational Temp

32 to 120°F (0 to 50°C)

Storage Temp

-4 to 140°F (-20 to 60°C)

Operational Humidity

0 to 95% RH, non-condensing

Time Constant

User adjustable, 1 to 60 seconds

Data Logging

5 MB of on-board memory (>60,000 data points)
45 days at 1 minute logging interval

Log Interval

User adjustable, 1 second to 1 hour

Physical Size (H x W x D)

Handheld	4.9 x 4.8 x 12.5 in. (12.5 x 12.1 x 31.6 cm)
Desktop	5.3 x 8.5 x 8.8 in. (13.5 x 21.6 x 22.4 cm)
External Pump	4.0 x 7.0 x 3.5 in. (10.0 x 18.0 x 9.0 cm)

Weight

Handheld	2.9 lb (1.3 kg), 3.3 lb (1.5 kg) with battery
Desktop	3.5 lb (1.6 kg), 4.5 lb (2.0 kg) - 1 battery, 5.5 lb (2.5 kg) - 2 batteries
External Pump	3.0 lb (1.4 kg)

Communications

8533	USB (host and device) and Ethernet. Stored data accessible using flash memory drive
8533EP	USB (host and device) and Ethernet. Stored data accessible using flash memory drive plus, cable assembly for external pump
8534	USB (host and device). Stored data accessible using flash memory drive

Power-AC

Switching AC power adapter with universal line cord included, 115-240 VAC

Analog Out

8533/8533EP	User selectable output, 0 to 5 V or 4 to 20 mA. User selectable scaling range
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Alarm Out

8533/8533EP	Relay or audible buzzer Relay Non-latching MOSFET switch + User selectable set point + -5% deadband + Connector 4-pin, Mini-DIN connectors
8534	Audible buzzer

Screen

8533/8533EP	5.7 in. VGA color touchscreen
8534	3.5 in. VGA color touchscreen

Gravimetric Sampling

8533/8533EP	Removable 37 mm cartridge (user supplied)
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CE Rating

Immunity	EN61236-1:2006
Emissions	EN61236-1:2006

Specifications are subject to change without notice.

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UNDERSTANDING, ACCELERATED

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