



DewPoint 6110

DewPoint 6210

Implementation & Operation Guide

Revised March 2016

The following instructions will help you unpack, set up, start up and operate the DewPoint Machine


Please review all sections to be sure all preparations are made correctly.

All information for a successful set-up and start-up is included in this document.

Information regarding Field Operation and Crop Management is also included.

If you have questions please call your Dealer



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1 - Online Portal Access

1.1 Customer Portal

1.1.1 Create Account

- To Set Up a Customer Portal Account

Go to: www.staheliwest.com

Click: "Customer Login"

- Follow Instructions to set up account
- After account is set up you can access the portal online at any time by going to the "Customer Login" tab at www.staheliwest.com

1.1.2 What You Get

The Online Customer Portal contains the latest information of value for your access.

- Set-up instructions
- Implementation and Operation Guides
- Diagnostic Tools
- Learning Center
- Other Useful Tools

2 - Prerequisite Procedures:

2.1 Supply Water Requirements

Water Quality is one of the most important considerations to achieve successful implementation of DewPoint Technology in your operation.

The following information will assist you in setting up the necessary Water Treatment Equipment and Boiler Chemical Treatment to maintain efficient operation of the DewPoint Machine.

2.1.1 Water Source Selection and Analysis

- An appropriate water analysis is required
 - OBTAIN a Water Sample Kit from your Dealer
 - SELECT the Location(s) you want to analyze as possible supply water sources for your DewPoint Machine. Select the best water sources possible in your area and where possible avoid poor water sources that cause iron stains, heavy scale deposits or smell bad.
 - Most sources of water will require a Water Softening System to be installed. This will require:
 - A culinary or other water source where there is a continuous pressurized supply of water available – 40 PSI minimum.
 - A 120 VAC electrical outlet to operate the Softener control system
 - An enclosed, insulated area which is protected from freezing
 - An area or drain where bypass water consumed in the Softener re-charge process can be discharged
 - Some areas with poor water quality may require a Reverse Osmosis (RO) System to remove impurities from the water. This type of system will require:
 - A culinary or other water source where there is a continuous pressurized supply of water available – 40 PSI minimum.
 - 240 VAC electrical service to operate the RO control and pumping system
 - An Enclosed, insulated area which is protected from freezing
 - An area or drain where bypass water consumed in the RO Flush process can be discharged

- COLLECT the water sample(s) from your selected location(s) and SHIP the sample to the Test Lab
 - Turn on the water and let the water run for a moment to be sure fresh water is coming from the source
 - Fill the Sample Bottle and replace the cap
 - Fill out the Identification Tag on the Sample Bottle
 - Place Sample Bottle in shipping box
 - Apply the enclosed UPS shipping Label
 - Seal the box
 - Ship the box through UPS

2.1.2 Water Treatment Equipment Specification

- The Test Lab will analyze your water sample(s) and send a report to Staheli West.
- Staheli West will recommend the necessary water treatment equipment and send that recommendation to your Dealer
- Your Dealer will contact you with the recommendation for your approval
- Upon your approval your dealer will order the Water Softener or RO Unit or other recommended equipment from Staheli West

2.1.3 Water System Equipment Set-up

- Set up Bulk Water Storage Tank
 - You will need 2500-3000 gallons of water storage for each DewPoint Machine that you plan to service from your water source
 - Select a Black Plastic or other light restricting tank(s) which will eliminate light infiltration. This will prevent algae growth. Black plastic will also help absorb heat from the sun into the water in the tank
 - Add necessary fittings and valves to Bulk Water Storage Tank
 - Install valve and hose fittings to the bottom outlet fitting on the Tank necessary to feed your Water Transfer Pump
 - Install a float valve near the top of the tank with the necessary fittings to attach the Discharge Hose from your Softener or RO Unit
- Set up Water Transfer Pump
 - A 2 inch engine driven transfer pump is normally used to transfer water from the Bulk Water Storage Tank into the DewPoint Machine or a Water Transport Vehicle
 - Install 2 inch Camlock fittings to inlet and discharge ports of the pump
 - Attach Chemical Inductor TEE to the inlet port of the pump. This is used to induct Boiler water treatment chemical into the water as it is pumped from the Bulk Water Storage Tank into the DewPoint Machine or a Water Transport Vehicle
 - Connect 2 inch suction hose between the Bulk Water Storage Tank and the Pump Inlet/Chemical Inductor TEE
 - Connect 2 inch discharge hose to Pump discharge fitting

- Set up Water Softener or RO Unit
 - Set up in an enclosed, insulated area which is protected from freezing
 - Connect Softener or RO “inlet hose” to a continuous culinary water supply
 - Connect the Softener or RO “by-pass/flush hose” to a drain or other suitable drainage system
 - Connect the Softener or RO “treated water discharge hose” to the Float Valve Inlet fitting on the Bulk Water Storage Tank
 - Connect to electrical service (See Unit Requirements in Unit Manual)
 - A Softener requires a 120 VAC electrical outlet to operate the control system
 - An RO Unit requires a 240 VAC electrical service to operate the control and pumping system
 - Follow all instructions in Softener or RO Unit Owner/Operator Manual to start and calibrate the system
 - Be sure valves on Softener or RO unit are set to discharge Softened or RO treated water. See Unit Owner/Operator Manual.
- Fill Bulk Water Storage Tank(s)
 - Turn water supply ON to the Softener or RO Unit
 - LEAVE THIS WATER SUPPLY ON ALWAYS to supply the water pressure necessary to flush/regenerate the Softener or RO Unit
 - Be sure that the treated water from your Softener or RO Unit is flowing through the Treated Water Discharge Hose to the Float Valve mounted in the Bulk Water Storage Tank
 - Test the operation of the Float Valve to be sure it will stop the water flow when the Bulk Water Storage Tank is FULL
- You should leave your water system active during the season to keep the Bulk Water Storage Tank(s) full and ready for harvest operations

2.1.4 Water Transportation

- It is a good idea to consider your water logistics well ahead of the harvest season
 - DECIDE whether you will need to employ a Water Truck or Trailer to transport water to the fields where the DewPoint Machine(s) is(are) working.
 - Remember that a DewPoint Machine will operate from 3-6 hours on one load (1000 gallons) of water
 - Consider the distance to the field from the water source
 - Remember that you can typically bale about an average of 60 tons/hour with a Large Rectangular Baler and that road transport time to fill with water will affect your overall baler productivity
- Use a tank made of either a Black Plastic, steel or other light blocking material which will eliminate light infiltration to prevent algae growth
- Set up Water Transfer Pump
 - A 2 inch engine driven transfer pump is normally used to transfer water from the Water Transport Vehicle into the DewPoint Machine
- Tailor your Water/Service Transport Vehicle to your own needs

2 - Prerequisite Procedures:

2.2 Water Quality Principles

2.2.1 Water Quality/Blow-down Principles

- Boiler Blow-Down
 - When steam is consumed from a boiler system, all contaminants in the boiler water are left behind and will become more and more concentrated over time.
 - The “Blow-down” process removes some of the contaminated water in a controlled manner and allows new clean supply water to replace the old.
 - Boiler water quality maintenance is critical in maintaining the health and longevity of your Boiler system. Proper Blow-down settings and procedures are a critical element in maintaining Boiler water quality
 - Blow-down Frequency and Volume
 - Frequency of blow down is dependent upon your water quality test
 - Water tests prior to the use of the DewPoint machine provide the information you need to enter in the Water Quality screen for an appropriate blow-down schedule.
 - If you notice water carryover or “foaming” during field operation you should check your supply water source to be sure your Water Treatment is working properly. You may also need change the settings in the Water Quality screen.
 - “Foaming” or water “carry-over” occurs because of high surface tension on the surface of the Boiler water. It is the same reaction that occurs when a pan of spaghetti noodles cooking on the stove boils over. Surface tension is increased because of high concentrations of contaminants left behind in the Boiler water as steam is produced and discharged from the Boiler during field operation.
- Automatic Field Operation “Surface Blow-down” Settings
 - Boiler surface blow-downs are done automatically during field operation based on the Water Quality Settings entered by the operator. An electronic blow-down valve and surface skimmer tube in the Boiler are controlled by the DewPoint Control System.
 - The DewPoint Control System will monitor water use and when the proper water quality settings have been entered into the system a Blow-Down request will pop up on the screen approximately every 250 gallons of water use.
 - Confirm the Blow-down request and continue baling while the Blow-down procedure is executed
 - The waste water from the automatic Surface Blow-down is discharged through the small RED Blow-down Hose behind the baler pickup

- Manual “Bottom Blow-down” at the Beginning of the Day
 - Drain 30–50 gallons of water from the boiler in a safe location using the 2 inch Boiler Drain Valve at the rear bottom end of the boiler. An on-screen reminder will appear at each start-up of the DewPoint Machine
 - Be careful to avoid burns from hot boiler water
 - Choose a location where the water will not run back on the operators feet from the boiler drain hose
 - Be sure that the hot boiler water will not damage persons or property in the vicinity.
 - Observe all local regulations regarding the discharge of boiler water

2.2.2 Water Quality Settings on the DewPoint Machine

It is critical that Water Quality Settings in the DewPoint control system are set up correctly. Failure to do so may result in poor water quality conditions in the Boiler. Poor Boiler water quality can cause water to carry-over from the boiler in the steam into the hay during the baling process which will damage the hay and may create a risk of stack fires.

- Obtain Water Test and Recommendations Report for your operation.
 - Your water samples should have been processed and the report should be available from your Dealer
- ENTER Water Quality settings based on Water Test and Recommendations Report
 - SWITCH DewPoint Touch Screen “ON” with lighted Rocker Switch on the lower right side of the Touchscreen Enclosure
 - When the computer has initialized follow on-screen instructions and PRESS “Continue” button
 - Select “Menu” → “Settings” → “Water Quality”
 - Enter Location Name and Water PPM for each tested water source
- SELECT the water source you will be using for the next operation
 - Whenever a different water supply source is used please select that water source from the “Water Quality” screen

2 - Prerequisite Procedures:

2.3 Tractor Hydraulic Trailer Brake Valve

DO NOT OPERATE THE DEWPOINT MACHINE WITHOUT PROPERLY INSTALLING A “HYDRAULIC TRAILER BRAKE VALVE” ON YOUR TRACTOR AND ENSURING THAT THE BRAKE SYSTEM IS ADJUSTED AND WORKING PROPERLY.

FAILURE TO PROPERLY INSTALL THE “HYDRAULIC TRAILER BRAKE VALVE” AND CONNECT IT TO THE BRAKE HOSE ON THE DEWPOINT MACHINE MAY RESULT IN SERIOUS INJURY OR DEATH AND/OR PROPERTY DAMAGE.

2.3.1 WHY TRAILER BRAKES ARE ESSENTIAL

- The weight of the DewPoint Machine empty is over 16,000 lbs. and when fully loaded with water and fuel the weight is about 29,000 lbs.
- Your baler will weigh between 20,000-25,000 lbs. with bales in the bale chamber.
- The combined weight of the two machines could be as high as 54,000 lbs.
- The DewPoint 6110 and 6210 is equipped with Hydraulic Brakes on both the front and rear axles. These brakes will operate properly only if your tractor is equipped with a “Hydraulic Trailer Brake Valve” which is automatically actuated when you depress your tractor brake pedals.
 - If you have not already done so, Please contact your Tractor Dealer and get a “Hydraulic Trailer Brake Valve” installed on your Tractor before you use your DewPoint Machine.
- The DewPoint Machine is shipped with a Male Pioneer hydraulic fitting on the Brake Hose to enable locking and unlocking the brakes during shipping/loading/unloading operations.
 - You will need to purchase and install the correct hydraulic fitting or adapter on this “BRAKE” hose to fit your Tractor “Hydraulic Trailer Brake Valve”. This should be available from your Tractor Dealer.
- Once your Tractor “Hydraulic Trailer Brake Valve” is installed please attach your DewPoint Machine and your Baler and test your brake system for proper operation.
- If you have any questions regarding installation of the “Hydraulic Trailer Brake Valve”, or connecting it to the DewPoint Machine Brake Hose, please contact your Dealer.
- The Brake Actuator Lever Setting on each wheel on each axle of the DewPoint Machine comes preset from the factory however you should confirm that you are getting adequate braking action at that setting.
 - If the Braking action is too aggressive move the cylinder pin to the next hole closer to the pivot shaft on the brake lever.
 - If the Braking action is not aggressive enough move the cylinder pin to the next hole further away from the pivot shaft on the brake lever.

2 - Prerequisite Procedures:

2.4 Boiler Inspection Requirements

Each State or “Jurisdiction” has different Boiler Inspection and Certification and/or Registration requirements. These regulations vary between jurisdictions. It is important that you understand and comply with the regulations for Boiler operation in your local area.

2.4.1 It is your responsibility

- To Contact your local or state Boiler Inspector’s office
- To learn the Boiler Inspection/Registration requirements
- To comply with all rules and regulations regarding boiler operation in your area

2.4.2 Contact the Boiler/Pressure Vessel Inspector for your area as follows:

- Search on the internet:
 - <http://www.nationalboard.org/PrintAllSynopsis.aspx?Jurisdiction=Select>
 - Once the link opens:
 - Scroll down through the alphabetical listing to your state
 - Use the Telephone numbers and/or email addresses listed to contact the State Boiler Inspector for your area
 - Alternative: Google Search “Boiler Inspector (your state)”
 - Follow the links to contact your State Boiler Inspector

2.4.3 Boiler Inspection, Compliance Documents

- Your Boiler Inspector will normally review your Boiler Compliance Documents to be sure the data matches the data plate on your Boiler
- Boiler Compliance Documents are located on the Tablet or Net Book Computer that came with your DewPoint Machine in the “Boiler Inspection Documents” folder. The following documents are included:
 - EDS (Burner Documentation)
 - OMM (Boiler Documentation)
 - Includes the “H2” Boiler Manufacturers Report
 - DewPoint “As Built”
 - Lists the serial numbers of the major components on your machine
 - CSD-1 Report
 - Lists all Primary Safety Devices and the factory test data for these devices

2.4.4 Boiler Inspection, Visual

- The Boiler Inspector will need a ladder or other safe means to inspect Safety Devices in the upper portion of the DewPoint Machine
- The Boiler Inspector will normally ask to visually inspect the following:
 - Connections and functionality of Primary Safety Devices and piping systems that relate to Boiler safety
 - **Lower Rear end of Boiler inside rear door**
 - Boiler Data Plate (Some Boiler Data Plates may be located on the front end of the Boiler)
 - Boiler Drain Valve
 - **Upper Rear End of Boiler**
 - Surface Blow-down Skimmer Tube
 - **Top Rear end of the Boiler**
 - Boiler Safety Pressure Relief Valve
 - **Top Center of Boiler**
 - Low Water Cut-off 1 & 2 Probes
 - **Upper Front End of the Boiler**
 - Operating Pressure Control Switch
 - High Pressure Limit Switch (with manual reset button on top)
 - Boiler Pressure Gauge
 - **Inside Left Burner Control Panel Box**
 - Low Water Cut-Off 1 Relay
 - Low Water Cut-Off 2 Relay
 - Honeywell Burner Control
- The Boiler Inspector may also ask you to remove one or more Boiler Hand Hole Covers to visually inspect the interior “water side” of the Boiler
- The Boiler Inspector may ask about the clearance between the Boiler/Burner and other on-board components such as the Supply Water Tanks and Fuel Tanks, etc.
 - Heat Shields have been incorporated into the design of the DewPoint machine to protect adjacent components from damage should an exhaust gas leak develop on the front or rear end of the Boiler assembly. These shields have been tested and are proven to be effective in their intended function.

NOTE: If your Boiler Inspector has any other questions related to the Boiler design, function or safety please ask him to contact Staheli West, Inc. during regular business hours at 435-586-8002

2.4.5 Boiler Inspection, Safety Test

- Become familiar with the Boiler Safety Test function on your machine
- To perform the Boiler Safety Test:
 - GATHER tools needed:
 - Ladder or other safe means to access upper components on the DewPoint Machine
 - Flat Blade Screw Driver
 - Phillips Screw Driver (to adjust Operating Control Switch and High Pressure Limit Switch)
 - 7/8" Open End Wrench (to adjust Operating Control Switch and High Pressure Limit Switch)
 - INSTALL a Male Air Hose Fitting on the Boiler Test Hose which is coiled up beneath the Burner
 - CONNECT an Air Hose from an Air Compressor to the Boiler Test Hose
 - BE PREPARED with adequate drainage to drain 20-50 gallons of cool Boiler water during the test process
- Be Sure you have at least 1/8th tank of fuel to perform Boiler Safety Test
- FILL the Supply Water Tanks to at least ½ full (500 gallons). Water treatment is not necessary for the boiler safety test unless you plan to operate the machine with this water after the test is completed.
- Start DewPoint Machine and fill the Boiler with water
 - SWITCH DewPoint Touch Screen "ON" with lighted rocker switch on the lower right side of the Touchscreen enclosure
 - When the computer has initialized
 - Follow instructions and PRESS "Continue" button
 - PRESS "Start Fill" button when it appears to fill Boiler
 - PRESS "Confirm" button on pop up window to start all systems
 - Generator will start
 - Boiler will automatically fill to the proper level
 - When Boiler has filled:
 - PRESS "Menu"
 - PRESS "Maintenance"
 - PRESS "Boiler Safety Test"
- FOLLOW the instructions on the screen to perform Boiler Safety Test
 - TEST each device and/or function by pressing each corresponding button on the right side of the screen and following the instruction set for each device
 - PRESS "Exit " Button when Boiler Safety Test is completed

3 - Machine Preparation:

3.1 Baler Preparation



3.1.1 Install Baler Hardware

- Follow Instructions to install Baler Steam Hardware
 - Case IH and New Holland Balers require installation of an auxiliary Tongue Jack included in the hardware package
 - MOUNT all Steam Manifolds
 - Top Front Manifold on top of Wind Guard
 - Bottom Front Manifold under Baler Pickup
 - Top Rear Manifold above Feeder/Packer area
 - Bottom Rear Manifold under Feeder/Packer area
 - MOUNT Steam Distribution Manifold to Tongue of Baler
 - MOUNT Hose Connection/Retainer Brackets
 - ROUTE all Steam Hoses
 - ROUTE small Blow-down hose through baler
 - CONNECT all hose retaining hardware to hold hoses in their proper positions during operation
 - CHECK for interference between baler components and Baler Steam Hardware by cycling the baler through all functions by hand and observing the movement of baler components in relation to the Baler Steam Hardware. Make corrections as needed.



3.1.2 Install Cameras on Baler

- CHOOSE mounting locations for each Camera.
 - Mount one Camera to provide a good view of the Knotter area or Knotter Flags
 - Mount one Camera to provide a good view of the Bale Chute or Bale Accumulator
- CONNECT the short Camera Cable to each Camera
- INSTALL Camera Extension Cables in the Baler so they can connect to the 2 Camera Cables that are mounted in the rear panel of the DewPoint Machine and extend to each of the Baler mounted Cameras
- ROUTE and SECURE the Camera Cables with Cable Zip Ties to prevent damage from mechanical components on the Baler
- CONNECT the end of each Camera Cable to each Camera Extension Cable

3.1.3 Install Bale Moisture Monitor on Baler

There are a variety of Moisture Sensors or Gauges on the market. Be sure that your moisture measurement method is installed correctly, properly calibrated, well understood and working properly before baling hay.

All methods of moisture measurement should be confirmed by measuring with a hand held moisture probe a few days after the hay has been baled.

3.1.3.1 PREFERRED METHOD: Gazeeka Moisture Gauge

- We highly recommend the GAZEKA Moisture Gauge which is a non-contact, microwave moisture measuring instrument.
 - Method of action
 - The instrument measures the speed of microwave energy as it passes through the bale of hay
 - Effectiveness and accuracy of the GAZEKA Moisture Gauge in DewPoint steam baled hay
 - The speed of microwaves through air is very close to the speed of light through space, and the speed of microwaves through dry hay is a little slower than through air
 - However, the speed of microwaves through water is considerably slower than that in dry hay. The difference in this speed is attributed to a value known as the dielectric constant (sometimes called relative permittivity). The dielectric constant for air is close to 1, for dry fibrous material it is closer to 2 while for pure water it is approximately 80. Similarly, the amount of microwave energy absorbed in air is less than dry hay and in dry hay is much less than in water. Thus if measured correctly, these measurements can be a very sensitive method of measuring moisture in a bale of hay.
 - Whether the moisture detected in hay is from Steam, Natural Dew or Stem Moisture, the GAZEKA Moisture Gauge provides an accurate moisture reading when properly calibrated.
 - INSTALL GAZEKA Moisture Gauge as instructed in Gazeeka Instruction Manual.
 - CALIBRATE prior to putting hay in the baler the first time. Follow all directions with the GAZEKA instrument to calibrate and establish proper settings for safe and reliable operation.

3.1.3.2 Other Bale Moisture Monitoring Methods

- ALTERNATIVE 1: Bale Chamber Pressure as bale moisture indicator
 - Method of action
 - In automated Plunger Load Pressure Regulating System on today's Large Rectangular Balers the Bale Chamber Pressure will adjust automatically to maintain the Plunger Load Pressure Target set by the operator.
 - As bale moisture increases, friction between the Bale and the Bale Chamber also increases
 - This causes the Plunger Load Pressure to also increase which then causes the Bale Chamber Pressure to decrease to maintain the Plunger Load Pressure Target
 - Higher moisture hay results in lower Bale Chamber Pressure
 - As bale moisture decreases, friction between the Bale and the Bale Chamber also decreases
 - This causes the Plunger Load Pressure to also decrease which then causes the Bale Chamber Pressure to increase to maintain the Plunger Load Pressure Target
 - Lower moisture hay results in higher Bale Chamber Pressure
 - Effectiveness and accuracy in DewPoint steam baled hay
 - During the cooler hours of the day and at night, Bale Chamber Pressure is fairly accurate in DewPoint steam baled hay. During these hours an operator who is accustomed to judging bale moisture conventionally by the Bale Chamber Pressure reading should be able to keep within reasonable bale moisture tolerances using similar readings as he would use while baling fully cured hay with natural dew.
 - If baling with stem moisture combined with either Steam or Natural Dew the Bale Chamber Pressure method of judging moisture is not accurate and is risky.
 - When baling with Steam in the hot part of the day, Bale Chamber Pressure will nearly double to maintain the friction necessary to reach Plunger Load Target settings even though the bale moisture is sufficient.
 - An operator using this method of moisture judging would do well to become very familiar with the characteristics of this method before becoming dependent upon this method.

Other Bale Moisture Monitoring Methods (continued)

- ALTERNATIVE 2: Hand Held Moisture/Temperature Probe
 - Method of action
 - Measures Bale Moisture by measuring the conductivity of crop material between to metallic points on the probe when it is inserted into the bale
 - Measures Bale Temperature with thermocouples in the probe when inserted into the bale
 - Effectiveness and accuracy in steam treated hay
 - The accuracy of this type of moisture probe in steamed hay is not suitable for a true reading of bale moisture immediately after baling. The surface moisture on the steamed crop material causes the moisture probe to read several points higher than the actual moisture.
 - If an operator becomes very familiar with the typical “off-set” of the moisture reading compared to the actual moisture in the Bale he can learn to use a Hand Held Moisture Probe with reasonable effectiveness when baling fully cured hay using Steam
 - When baling hay with stem moisture, whether using Steam, Natural Dew or no added moisture at all, a Hand Held Moisture Probe is not accurate immediately after baling and will normally read much lower than the actual moisture content of the hay. It will be more accurate after a few days when moisture from green stems migrates more fully throughout the bale.
 - This type of moisture probe is effective several hours after the hay has been baled as the applied moisture diffuses through the plant tissue more completely
 - The temperature measurement function of this type of probe is accurate and can be valuable in determining safe bale temperatures for baling and stacking steam baled hay

Other Bale Moisture Monitoring Methods (continued)

- ALTERNATIVE 3: Baler Mounted “contact type” Moisture Sensors. Some of these sensors are used in conjunction with Propionic Acid or other preservative application systems.
 - Method of action
 - Measures Bale Moisture by measuring the conductivity of crop material between to metallic points on a plastic block or two metallic “Star Wheels”, which contact hay as it is pushed through the Bale Chamber in a Hay Baler
 - Effectiveness and accuracy in steam treated hay
 - The accuracy of this type of moisture sensor in steamed hay is not suitable for a true reading of bale moisture during the baling process. The surface moisture on the steamed crop material causes the moisture to read several points higher than the actual moisture.
 - If an operator becomes very familiar with the typical “off-set” of the moisture reading of this instrument compared to the actual moisture in the Bale he can learn to use a Baler Mounted “contact type” Moisture Sensor with reasonable effectiveness when baling fully cured hay using Steam. Various conditions at the time of baling can affect the performance of this type of sensor.
 - When baling hay with stem moisture, whether using Steam, Natural Dew or no added moisture at all, a Baler Mounted “contact type” Moisture Sensor is not accurate when baling and will normally read much lower than the actual moisture content of the hay.

3 - Machine Preparation:

3.2 DewPoint Machine Preparation

3.2.1 Install Optional/Custom Equipment

- Install custom Wire Harnesses
 - Gazeeka, accumulator, preservative applicator, etc.
- Install custom Hydraulic Lines
- Install any other custom equipment

3.2.2 Prep/Check Boiler System

Use a safe ladder or other means to access upper areas of machine

- REMOVE Tie-down Straps from Flue Flapper Rain Caps and check for free operation
- INSTALL Pressure Relief Valve (if not performing “New Boiler Clean-out”)
 - APPLY Dope, Tape and Dope to Threads
 - TIGHTEN to the position so the discharge port is directed toward the rear of the machine
 - TIGHTEN securely but there is no need to tighten excessively
 - CHECK valve for free operation by lifting the hand lever
- INSTALL any Boiler Hand Hole Plugs that are not in place
 - Two 3x4” Oval Hand Hole Plugs on the upper, front end of the Boiler
 - Two 3x4” Oval Hand Hole Plugs on the upper, rear end of the Boiler
 - Two 3x4” Oval Hand Hole Plugs on the lower, rear end of the Boiler
- CLOSE all 5 Pigtail Steam Siphon Tube Drain Valves at the top front end of the Boiler
 - FAILURE TO CLOSE ALL 5 OF THESE VALVES WILL CAUSE THE PRESSURE SAFETY SYSTEMS TO MALFUNCTION AND WILL PREVENT THE DEWPOINT MACHINE FROM OPERATING CORRECTLY
- RE-INSTALL the two “-15 to 30psi” Pressure Transducers (Steam Pressure Sensors) at the top front end of the Boiler
- RE-INSTALL “0-100 in”. Pressure Transducer (Water Level Sensor) underneath front right water tank

- OPEN Rear Door
 - CONNECT Feed Water Valve union to Feed Water System pipe
 - INSTALL Drain Plugs in Circulation Pump and Feed Water Pump
 - INSTALL Supply Water line Strainer
 - OPEN Supply Water Feed Valve
 - OPEN Boiler Water Circulation Valves
 - Circulation Pump Inlet Valve
 - Circulation Pump Discharge Valve
 - INSTALL Boiler Drain Assembly
 - CHECK gasket
 - INSTALL Boiler Drain Assembly on Boiler Drain Camlock fitting
 - LOCK Camlock Levers
 - INSTALL lock pins on Camlock Levers
 - ORIENT the Drain Hose so the boiler water is discharged forward, (away from the person who will open the Boiler Drain Valve)
 - CLOSE 2” Boiler Drain Valve
 - CLOSE Feed Water Drain Valve at the rear end of the right hand Circulation Pipe near the lower rear right side of the Boiler
 - CLOSE Supply Water Load Valve to the right of the Rear Door
- CLOSE Rear Door
- OPEN Front Hood
 - CLOSE Feed Water Drain Valve at the front of the right hand (if facing forward) Circulation Pipe located at the lower right corner of the Boiler
 - CLOSE Feed Water Circulation “Y” Strainer Flush Valve at the front left side of Boiler above Burner Motor
- CLOSE Front Hood

3.2.3 Install Cameras on DewPoint Machine

- OPEN Rear Door
 - ATTACH 2 magnetic base Cameras just below the hole to the inside each Tail/Work Light Assembly on each side of the DewPoint Machine
 - CONNECT the short Camera Cable to each Camera and route each cable through the grommets mounted in each fender and in the inner fender walls.
 - FOLLOW the routing of the wire harnesses that run to the Tail/Work Light Assemblies so the end of each cable is inside the Pump Enclosure area inside the Rear Door of the machine
 - CONNECT the end of each Camera Cable to the Camera Extension Cables which are just inside and below the Rear Door.
 - Use Cable Zip Ties to secure all camera cables to the wire harnesses that run to the Tail/Work Light Assemblies
- CLOSE Rear Door

3.2.4 Prep/Check Engine

- With Front Hood Opened
 - OPEN Main Fuel Valve located under the deck of the machine below the Burner
 - CHECK Engine Radiator Coolant
 - Check Engine Oil
 - OPEN Fuel Valve on the Water Separator mounted on the side of the engine
 - ATTACH Battery Cables

3.2.5 Prep/Check Generator/Electrical

- With Front Hood Opened
 - OPEN Generator Control Circuit Breaker Panel Door
 - CHECK to see that the Main Circuit Breaker is turned ON
 - CLOSE Circuit Breaker Panel Door
 - PRESS the green AUTO Button on the Generator Control



3.2.6 Prep/Check Burner

- With Front Hood Opened
 - CHECK all Fuel, Air and Propane (if equipped) hoses:
 - CHECK to be sure hoses are securely fastened to fittings
 - CHECK Propane Pilot Tanks (if equipped) on the rear left side of the machine:
 - CHECK to be sure hose is securely fastened to the Right tank
 - CHECK to be sure regulator on hose is in a vertical orientation
 - OPEN Propane Tank Valve
 - CHECK around Propane Tanks and Burner Area to ensure that there are no Propane leaks.
 - OPEN the two Control Panel Doors on the Burner
 - REMOVE all documentation and/or other loose items from both panel boxes
 - In left hand panel Box
 - CHECK to be sure all Relays are securely plugged in
 - CHECK to see that all Circuit Breakers are turned ON
 - CHECK to see that “RUN-TEST” switch on Honeywell Control is in the “RUN” mode
 - In right hand panel Box
 - CHECK to be sure all Relays are securely plugged in
 - CHECK to see that all Circuit Breakers are turned ON
 - CHECK to see that all Fuse Blocks are Closed
 - CHECK to be sure the small Toggle Switch on the PLC is in the “RUN” position
 - CLOSE the two Control Panel Doors on the Burner
 - CLOSE the Front Hood



3.2.7 Check operation of Valve Actuators and Burner Air Louver Actuator

- CHECK valve and louver actuator function
 - With Lighted Rocker Switch on Touchscreen enclosure “ON” and Generator “OFF”
 - From the “Home Screen” select “Menu” >> “Operations” >> “Manual Mode”
 - Turn “Manual Mode ON” and cycle each actuator one by one
 - If you cannot hear an actuator cycle, check the position indicator on top of the actuator to make sure it is turning



3.2.8 Check Wheels and Tires

- CHECK that all lug nuts are tight
- CHECK tire inflation
 - BKT Bias Ply 52 PSI,
 - Alliance Radial 36 PSI

4 Machine Set-Up:

4.1 DewPoint Machine Hook-Up to Tractor

4.1.1 Attach DewPoint Machine to Tractor

- Attach DewPoint Machine to Tractor Drawbar
 - SELECT and INSTALL the correct Bull Pull Hitch Bushing to fit your Tractor Drawbar Pin size
 - ADJUST BullPull Hitch height to the proper vertical position to allow DewPoint machine to run level in the field
 - ADJUST Tractor Drawbar to proper length setting, 20" from end of PTO Shaft to the center line of the hitch pin hole.
 - ATTACH DewPoint Machine using suitable Hitch/Clevis Hammer Strap and Pin hardware supplied with Tractor.
 - ROTATE Jack to storage position
- ATTACH Safety Chains
 - Criss-Cross the two Safety Chains over the drawbar and be sure the hooks are attached securely
 - Leave enough slack in chains to allow turning without the chains binding.
- ATTACH PTO Shaft from DewPoint Machine to Tractor 1.75"/1000 RPM PTO output shaft
 - To avoid excessive wear of PTO components it is important that the DewPoint Machine run in approximately the same level plane as the tractor so that PTO Yoke angles are equal during operation.
 - The PTO Shaft angles should be correct if the BullPull Hitch height was previously set to the proper vertical position to allow the DewPoint machine to run level in the field
- ATTACH Hydraulic Brake hose to Tractor Brake Port
 - You must use a Hydraulic Brake system which must be installed on the Tractor. You will need an adaptor to connect this hose to Tractor Hydraulic Brake Port.

- ATTACH Hydraulic Steering hose to a Tractor Hydraulic SCV
 - One SCV must be dedicated to the Steering hose even though only one hose is used. Do not attach another hose to the unused port on that SCV
 - It is recommended that you select the hydraulic port that is pressurized when the corresponding hydraulic lever or switch is pulled back.
 - When you back up the machinery, travel on roadways, or operate on hillsides, you will move the lever or switch back to lock the Steering Axle in the straight position.
 - **(to avoid equipment or property damage, verify that the steering is locked before backing up machinery)**
 - When you operate in normal field conditions you will move the corresponding hydraulic lever or switch to the “float” position
- ATTACH Hydraulic hoses to Tractor Hydraulic SCV's.
 - Attach hoses in pairs
 - 1&2 are used for the Baler Pickup
 - 3&4 (if equipped) are used for balers requiring tractor hydraulics for the baler pressure system
 - 5&6 (if equipped) are used for auxiliary hydraulics
- CONNECT Work/Safety Lighting Harness into Tractor Lighting Outlet
 - Check all Work and safety lighting for proper operation
- Mount DewPoint Touchscreen and attach Touchscreen Control Harness
 - MOUNT DewPoint Touchscreen in tractor cab
 - Select a location and a mounting angle which will minimize glare on the screen during field operation. It is generally best to tilt the screen upward so the natural reflection comes from the ceiling of the tractor cab.
 - ROUTE DewPoint Touchscreen Control Harness appropriately to avoid damage during transport or field operation
 - CONNECT Touchscreen Control Harness into Touchscreen Receptacle.
- Mount your Baler Controller and attach Baler Control Harnesses
 - MOUNT Baler Controller in tractor cab
 - Select a location and a mounting angle which will minimize glare on the screen during field operation. It is generally best to tilt the screen upward so the natural reflection comes from the ceiling of the tractor cab.
 - ROUTE Baler Control Harness appropriately to avoid damage during transport or field operation
 - CONNECT Baler Controller Harness into Baler Controller Receptacle.
 - REPEAT this process for other baler accessories as equipped such as:
 - Moisture Sensor, Accumulator, Preservative Applicator, Bale Scale

4 Machine Set-Up:

4.2 Baler Hook-Up to DewPoint Machine



4.2.1 Attach Baler to the rear of the DewPoint Machine

- Connect Baler to the DewPoint Drawbar
 - ADJUST Baler Hitch to the proper vertical position to allow the baler to run level in the field
 - ADJUST Baler Hitch to longest position so the PTO geometry will be equal between DewPoint 6210 and Baler (See Baler Operation Manual)
 - ADJUST DewPoint 6210 Drawbar to proper length setting, 20" from end of PTO Shaft to the center line of the hitch pin hole.
 - ATTACH Baler using suitable Hitch/Clevis hardware.
 - RAISE Jack to storage position
- Attach Safety Chain
 - ROUTE the Safety Chain through the "keyholes" in the drawbar frame of the DewPoint 6110
 - It is best to route the chain over the top of the DewPoint Drawbar in front of the Hitch Clevis Hardware so the chain does not drag in the windrow of hay during operation.
 - CHECK to be sure the hook is attached securely
 - Leave enough slack in the chain to allow turning in both directions without the chain binding.
- ATTACH PTO Shaft from Baler to the DewPoint machine
 - To avoid excessive wear of PTO components, it is important that the Front PTO Yokes on both the Baler and the DewPoint machine be attached at the identical rotational angle.
 - To avoid excessive wear of PTO components, it is important that the Baler PTO Pedestal Height be properly adjusted so that PTO Yoke angles between the DewPoint and baler are equal during operation. (See Baler Operation Manual)
 - To avoid excessive wear of PTO components it is important that the Baler and the DewPoint machine run in approximately the same level plane as each other and the tractor so that PTO Yoke angles are equal during operation. (See Baler Operation Manual)
- If your Baler is equipped with Hydraulic Brakes, ATTACH Hydraulic Brake hose to DewPoint 6210 Brake Port (an adaptor may be necessary)

- If your Baler is equipped with tandem axles including a rear steerable axle, ATTACH Hydraulic Steering hose to the DewPoint “Steer” Port
 - When you back up the machinery, travel on roadways, or operate on hillsides, you will first move the lever or switch back to lock the Steering Axle in the straight position. Failure to do this may result in loss of control.
 - **(to avoid equipment or property damage, verify that the steering is locked before backing up machinery)**
 - When you operate in normal field conditions you will move the lever or switch to the “float” position
- ATTACH Baler Hydraulic hoses to DewPoint Hydraulic Ports.
 - Attach hoses in pairs
 - 1&2 are used for the Baler Pickup
 - 3&4 (if equipped) are used for balers requiring tractor hydraulics for the baler pressure system
 - 5&6 (if equipped) are used for auxiliary hydraulics
- ATTACH Baler Lighting Harness into DewPoint Lighting Outlet
- ATTACH Boiler Blowdown Discharge Hose from Baler to Blowdown port on DewPoint machine
- MOUNT your Baler Controller and ATTACH Baler Control Harnesses
 - MOUNT Baler Controller in tractor cab
 - Select a location and a mounting angle which will minimize glare on the screen during field operation. It is generally best to tilt the screen upward so the natural reflection comes from the ceiling of the tractor cab.
 - ROUTE Baler Control Harness appropriately to avoid damage during transport or field operation
 - ATTACH Baler Controller Harness into Baler Controller Receptacle at the rear of the DewPoint machine
 - REPEAT this process for other baler accessories as equipped, such as:
 - Moisture Sensor
 - Accumulator
 - Preservative Applicator
 - Bale Weight Scale



4.2.2 Check for Interference with DewPoint Machine and Baler Attached.

- MOVE Steering Hydraulic Control Lever or Switch in Tractor Cab in the “Float” position. Some tractor hydraulic systems require that you cycle this lever or switch a few times to initiate proper operation
- DRIVE the tractor through several turning maneuvers to check for interferences and turn angle limits between the Tractor, the DewPoint machine and the Baler including:
 - Rear Tractor Tires/Duals and the DewPoint machine frame
 - PTO
 - 3-Pont Hitch
 - Hydraulic Hoses
 - Brake and Steering Hoses
 - All Wire Harnesses
- LEARN your turning radius and clearance limits with all machinery attached (including accumulators if used)

TURNING ANGLE NOTES:

- In a turn, the angle between the Baler and DewPoint machine will be sharper than the angle between the Tractor and the DewPoint machine
- When coming out of a sharp turn quickly, the angle between the DewPoint machine and the Baler can increase dramatically. It is best to come out of sharp turns gently.
- Turning too sharp will cause major damage to the DewPoint machine and the Baler.
- **LEARN THE BEHAVIOR OF YOUR ENTIRE MACHINE DURING VARIOUS TURNING CONDITIONS**

LEARN YOUR LIMITS!

4 Machine Set-Up:

4.3 Water Quality Maintenance Settings and Procedures for DewPoint Machines

Water Quality is one of the most important components to successful implementation of DewPoint Technology in your operation.

See [Prerequisite: Water Requirements for DewPoint Machines](#)

4.3.1 Water Analysis

You should have already had an appropriate water analysis on your water source(s) performed to determine the necessary Water Treatment Equipment and Boiler Chemical Treatment to maintain efficient operation of the DewPoint machine.

4.3.2 Boiler Water Quality/Blow-down Principles

- Boiler Blow-Down
 - Boiler water quality maintenance is critical in maintaining the health and longevity of your Boiler system. Proper Blow-down settings and procedures are a critical element in maintaining Boiler water quality
 - Blow-down Frequency and Volume
 - Frequency of blow down is dependent upon your water quality test
 - Water tests prior to the use of the DewPoint machine provide the information you need to enter in the Water Quality screen for an appropriate blow-down schedule.
 - If you notice water carryover or “foaming” during field operation you should check your supply water source to be sure your Water Treatment is working properly. You may also need change the settings in the Water Quality screen.
 - “Foaming” or water “carry-over” occurs because of high surface tension on the surface of the Boiler water. It is the same reaction that occurs when a pan of spaghetti noodles cooking on the stove boils over. Surface tension is increased because of high concentrations of contaminants left behind in the Boiler water as steam is produced and discharged from the Boiler during field operation.
 - The “Blow-down” process removes some of the contaminated water in a controlled manner and allows new clean supply water to replace the old.

- Automatic Field Operation “Surface Blow-down” Settings
 - Boiler surface blow-downs are done automatically during field operation based on the Water Quality Settings entered by the operator. An electronic blow-down valve and surface skimmer tube in the Boiler are controlled by the DewPoint Control System.
 - The DewPoint Control System will monitor water use and when the proper water quality settings have been entered into the system a Blow-Down request will pop up on the screen approximately every 250 gallons of water use.
 - Confirm the Blow-down request and continue baling while the Blow-down procedure is executed
 - The waste water from the automatic Surface Blow-down is discharged through the small RED Blow-down Hose behind the baler pickup
- Manual “Bottom Blow-down” at the Beginning of the Day
 - Drain 30–50 gallons of water from the boiler in a safe location using the 2 inch Boiler Drain Valve at the rear bottom end of the boiler. An on-screen reminder will appear at each start-up of the DewPoint Machine
 - Be careful to avoid burns from hot boiler water
 - Choose a location where the water will not run back on the operators feet from the boiler drain hose
 - Be sure that the hot boiler water will not damage persons or property in the vicinity.
 - Observe all local regulations regarding the discharge of boiler water

4.3.3 Water Quality Settings on the DewPoint Machine

It is critical that Water Quality Settings in the DewPoint control system are set up correctly. Failure to do so may result in poor water quality conditions in the Boiler. Poor Boiler water quality can cause water carry-over into hay during the baling process which will damage the hay and create a risk of stack fires.

- OBTAIN Water Test and Recommendations Report for your operation.
 - Your water samples should have been processed and the report should be available from your Dealer
- ENTER Water Quality settings based on Water Test and Recommendations Report
 - SWITCH DewPoint Touch Screen “ON” with lighted Rocker Switch on the lower right side of the Touchscreen Enclosure
 - When the computer has initialized follow on-screen instructions and PRESS “Continue” button
 - Select “Menu” → “Settings” → “Water Quality”
 - Enter Location Name and Water PPM for each tested water source
- SELECT the water source you will be using for the next operation

- Whenever a different water supply source is used please select that water source from the “Water Quality” screen

4 Machine Set-Up:

4.4 1st Start-up of NEW DewPoint Machines

4.4.1 NEW BOILER CLEANOUT: If the DewPoint Machine is new it will be necessary to perform a “New Boiler Cleanout” to strip mill scale from the interior of the Boiler in preparation for field operation.

THE NEW BOILER CLEANOUT MUST BE DONE OUTSIDE IN OPEN AIR

DO NOT RUN THE DewPoint Machine INSIDE A BUILDING OF ANY KIND OR IN ANY LOCATION WHERE EXHAUST COULD BE A FIRE OR AIR QUALITY HAZARD!!!

Note: DO NOT perform “New Boiler Cleanout” until you will be able to refill Boiler with treated water mixed with Boiler Water Operating Treatment Chemical within two days of performing “New Boiler Cleanout.” The New Boiler Cleanout chemical will leave the Boiler prone to rust if not immediately refilled with water containing Boiler Water Operating Treatment Chemical to recoat the steel with protective chemicals.

After completing all of the steps to prepare the Machine for start-up, follow these steps to complete the “New Boiler Cleanout”

FILL DewPoint Machine

- FILL DewPoint Machine Fuel Tanks with #2 Diesel Fuel
 - Make sure main fuel supply valve is open
- FILL DewPoint Machine Supply Water Tanks completely full of Water (Softened or RO water from your normal Supply Water source is best if available)
 - Do not use Boiler Water Operating Treatment Chemical when performing the “New Boiler Cleanout”

FILL Boiler with Water

- CHECK all valves in the Feed Water and Boiler water circulation system to be sure they are in the operating position.
 - See: “[DewPoint Machine Preparation](#)” section
 - “[Prep/Check Boiler](#)” section
- SWITCH the lighted rocker switch on Touch Screen enclosure to “ON”
- PRESS “Continue” button
- PRESS “Start Fill” button On the Touch Screen and “Confirm” start-up
- This will start all systems except the Burner
- CONFIRM that Feed Water Pump is running by visually checking the right hand pump inside the rear door

- CONFIRM that the Feed Water Pump is pumping water into the Boiler by opening the Boiler Drain Valve for a second or two and confirming that water flows out of the valve
- SHUT DOWN machine when Boiler water is at normal operating level,
- SWITCH lighted rocker switch on Touch Screen enclosure to “OFF”

ADD “Boiler Cleaner”

- Use a safe ladder or other suitable means to gain access to the top, rear end of the boiler
- REMOVE the Boiler Safety Pressure Relief Valve from the top, rear end of the Boiler (if it has been installed)
 - Using a funnel, POUR 2.5 gallons of “Boiler Cleaner” into the fitting from which the Boiler Safety Pressure Relief Valve was removed
 - CAUTION: “Boiler Cleaner” is a strong alkaline chemical. Avoid contact with skin or clothing. Use appropriate eye protection. Refer to MSDS for complete safety information
 - Concentrated “Boiler Cleaner” will damage the paint on the DewPoint as well as other equipment it comes in contact with. Rinse any “Boiler Cleaner” off from all equipment immediately if spilled onto the paint.

INSTALL 15 PSI Safety Pressure Relief Valve

- Use a safe ladder or other suitable means to gain access to the top rear end of the boiler
 - APPLY thread sealant and Teflon tape on Valve threads
 - INSTALL the Valve in the Boiler
 - TIGHTEN the Valve so the discharge port on the valve is facing toward the rear of the machine

START Burner in “Keep Hot” mode

- SWITCH lighted rocker switch on Touch Screen enclosure to “ON”
- After Initiation of the Touch Screen
 - PRESS the “Continue” button
 - PRESS the “Keep Hot” button on the Left side of the Screen
 - Burner will start automatically
 - Boiler/Burner will function automatically to keep the Boiler hot

Tune Burner

- Tune Burner only if it is smoking on start-up
- You will fine tune the Burner later in preparation for Field Work

Leave machine in “Keep Hot” mode for 24 hrs.

- Machine will automatically start and stop as needed to maintain Boiler pressure
- Touch Screen will go dark at certain stages of operation but can be reactivated at any time by touching the Screen
- LEAVE the machine in “Keep Hot” for 24 hrs.
- Machine may be left unattended while in “Keep Hot” mode (outdoors only)

Depressurize Boiler

- After 24 hours, TOUCH the Screen to reactivate it
 - PRESS Keep Hot “On” button to “Off” in information box to exit the Keep Hot mode
 - PRESS “Menu” → “Operations” → “Manual Mode”
 - PRESS “Manual Mode” button to “ON”
 - OPEN the four (4) Steam Valves to 100% to depressurize Boiler
 - CAUTION: DO NOT OPEN BLOW DOWN VALVE as there is a risk of BURN INJURY or PROPERTY DAMAGE
 - WAIT for all pressure to be relieved from Boiler
 - PRESS “Manual Mode” button to “OFF”

Drain Boiler 1st Time

- OBSERVE regulations relating to disposal of waste water in your area
- OPEN the “Boiler Drain Valve” inside the rear door to drain water from the Boiler
 - CAUTION: Boiler water will be hot. Drain in an area that will not cause property damage or personal injury
- COOL DOWN Boiler:
 - ALLOW Boiler to cool for 6 hours

Refill to Rinse Boiler 2nd Time

- From the “Home Screen” PRESS “Start Fill”
 - Boiler will fill within 8-10 min.
- Once boiler is filled PRESS “Menu” → “Operations” → “Home” → “Wet Layup”
 - Boiler will fill completely and water will begin coming out of the Safety Pressure Relief Valve
- When water comes out of the Safety Pressure Relief Valve follow instructions on the Touch Screen to “Shut Down” the DewPoint machine

Drain Boiler 2nd Time

- OBSERVE regulations relating to disposal of waste water in your area
- OPEN the “Boiler Drain Valve” inside the rear door to drain water from the Boiler

Refill to Rinse Boiler 3rd Time (for best results)

- From the “Home Screen” PRESS “Start Fill”

- Boiler will fill within 8-10 min.
- Once boiler is filled PRESS “Menu” → “Operations” → “Home” → “Wet Layup”
 - Boiler will fill completely and water will begin coming out of the Safety Pressure Relief Valve
- When water comes out of the Safety Pressure Relief Valve follow instructions on the Touch Screen to “Shut Down” the DewPoint machine

Drain Boiler 3rd Time (for best results)

- OBSERVE regulations relating to disposal of waste water in your area
- OPEN the “Boiler Drain Valve” inside the rear door to drain water from the Boiler

After Cleaning the Boiler

- DO NOT leave freshly cleaned Boiler empty for any extended time at this point as steel is prone to rust after boiler cleaning
 - FILL DewPoint machine Supply Water Tanks with Softened or RO water from your normal Supply Water source MIXED with Boiler Water Operating Treatment Chemical at normal suggested rate for field operation
 - REFILL Boiler for Field Operation, or for “Wet Lay Up” if the DewPoint machine will not be used immediately
 - From the “Home Screen” PRESS “Start Fill”
 - Boiler will fill within 8-10 min.
 - If you are ready to proceed to Field Work please proceed with “Start DewPoint Machine for Field Work” section below
 - If you will not be using the DewPoint machine immediately put the machine in “Wet Lay Up” mode
 - Once Boiler is filled PRESS “Menu” → “Operations” → “Home” → “Wet Layup”
 - Boiler will fill completely and water will begin coming out of the Safety Pressure Relief Valve
 - When water comes out of the Safety Pressure Relief Valve follow instructions on the Touch Screen to “Shut Down” the DewPoint machine

5 - Field Operation:

5.1 Start DewPoint Machine for Field Work

5.1.1 Fill the DewPoint Machine with Fuel

- FILL DewPoint machine Fuel Tanks with #2 Diesel Fuel
 - Fuel will flow between the two tanks through a 1-1/2" crossover hose however equalization of the fuel level between tanks will take a few minutes

5.1.2 Fill the DewPoint Machine with Water

- FILL DewPoint machine with Supply Water
 - CONNECT the Transfer Pump Suction Hose to Bulk Storage Tank
 - CONNECT the Chemical Feed Tee in suction hose at Transfer Pump inlet
 - CONNECT the 2" Transfer Pump Discharge Hose to Pump Discharge Fitting
 - ATTACH the 2" Transfer Pump Discharge Hose to DewPoint machine Supply Water Fill Fitting
 - INSERT the Chemical Feed Suction Hose in Boiler Water Chemical drum
 - OPEN the Bulk Storage Tank Valve
 - OPEN the DewPoint machine Supply Water Load Valve
 - START the Transfer Pump
 - NOTE chemical level in drum
 - When water is flowing, OPEN the Chemical Suction Valve about 1/2 open
 - ALLOW chemical to flow into the Suction Hose until the proper amount of chemical has been added. Then CLOSE the Chemical Suction Valve
 - CONTINUE to fill the DewPoint machine with Supply Water until it reaches the desired level. As the tank level reaches about 2/3 full the water level may be monitored in the sight tube on the right, rear water tank above the Supply Water Fill Fitting
 - When tank is about 3/4 full it is helpful to REDUCE the flow rate into the tanks with the Supply Water Fill Valve to allow all 6 tanks to equalize their levels as the filling process finishes
 - When tanks are full, CLOSE the Supply Water Fill Valve
 - STOP the Transfer Pump
 - CLOSE the Bulk Storage Tank Valve
 - DETACH the Transfer Pump Discharge Hose from the DewPoint Machine

NOTE: If the boiler is empty when the Supply Water Tanks are filled, you will need to fill the boiler with water at this point and then top-off the Supply Water Tanks again, (including the appropriate amount of Boiler Water Chemical) before going to the field to work. The Boiler will hold about 300 gallons of water.

5.1.3 Start DewPoint Machine

- Start DewPoint Machine
 - SWITCH DewPoint Touch Screen “ON” with lighted rocker switch on the lower right side of the Touchscreen enclosure
 - When the computer has initialized
 - Follow maintenance instructions
 - CLEAN Supply Water Filter
 - DRAIN 30-40 gallons of water from the Boiler
 - PRESS “Continue” button
 - PRESS “Start All” button when it appears to fill and heat up boiler
 - PRESS “Confirm” button on pop up window to start all systems
 - Generator will start
 - Boiler will automatically fill to the proper level
 - When Boiler has filled the Burner will start automatically.

5.1.4 Tune Burner as Needed

Burner Fan and inside of Burner MUST BE CLEAN before tuning the Burner

It is best to tune your Burner during the warm part of the day when the air density is lower

- When is Burner Tuning necessary?
 - Tune your Burner the first time you put your machine into field service and at the beginning of each harvest season
 - Tune your Burner anytime you change locations where the elevation changes more than 1000 feet
 - Tune your Burner when there are substantial seasonal temperature changes
 - Spring
 - Summer
 - Fall
 - Tune your Burner if you ever notice continuous dark smoke from the Flue
 - Even slight smoking will cause soot accumulations in the fire tubes in your Boiler
 - You may need to tune your burner in hot afternoon temperatures when the air is thinner if you notice even slight continuous smoking
 - SEE INSTRUCTIONS BELOW FOR MACHINE SPECIFIC BURNER TUNING INSTRUCTIONS FOR:
 - [DewPoint 6210](#)
 - [DewPoint 6110](#)

5.1.5 DewPoint 6210 Burner Tuning

- With Burner Running
 - Check/Set Fuel Pump Pressure
 - Set to 125 psi for 12.0/19.5 nozzle arrangement
 - Set to 155 psi for 8.5/19.5 nozzle arrangement
 - Read Fuel Pump pressure on the gauge next to the Fuel Pump or on the Touch Screen
 - Fuel Pump Pressure is set by turning Pressure Regulating Screw in the Fuel Pump
 - Clockwise to raise pressure
 - Counter-clockwise to lower pressure
 - PRESS “Burner Tune” button on the left hand side of the “Systems Start” screen and follow the instructions
 - TUNE the “Low Fire” air adjustment
 - PRESS “Low Tune” button in information box
 - Follow Instructions in information box
 - TUNE High Fire air adjustment when Burner reaches “High Fire,”
 - PRESS “High Tune” button in information box
 - Follow Instructions in information box
 - PRESS “Finish” Button in information box
 - PRESS “Systems Start” Button on left side of screen to return to startup and normal operation process

5.1.6 DewPoint 6110 Burner Tuning

- With Burner running on Low Fire
 - Check/Set Initial Fuel Pump pressure
 - Set to 300 psi for 19.0 or 19.5 nozzle
 - Set to 280 psi for 20.0 or 21.5 nozzle
 - Read Fuel Pump pressure on the LOWER gauge next to the Fuel Pump or on the Touch Screen
 - Fuel Pump Pressure is set by turning Pressure Regulating Screw in the Fuel Pump
 - Clockwise to raise pressure
 - Counter-clockwise to lower pressure
 - Set Low Fire Fuel Nozzle Pressure
 - Set to 80-90 psi
 - READ Fuel Nozzle pressure on the UPPER gauge next to the Burner Sight Glass or on the Touch Screen
 - Fuel Nozzle Pressure is set by turning Pressure Regulating Screw in the Low Fire Pressure Regulator as follows:
 - REMOVE Cap
 - Use a back-up wrench to support the regulator to prevent damage to the lines attached to the Regulator
 - REMOVE plastic washer
 - LOOSEN thin Locknut
 - Use a back-up wrench to support the regulator to prevent damage to the lines attached to the Regulator
 - TURN slotted screw to adjust pressure to 80-90 psi
 - Clockwise to raise pressure
 - Counter-clockwise to lower pressure
 - TIGHTEN thin Locknut
 - Use a back-up wrench to support the regulator to prevent damage to the lines attached to the Regulator
 - REPLACE plastic washer
 - REPLACE Cap
 - Use a back-up wrench to support the regulator to prevent damage to the lines attached to the Regulator
 - Adjust Air Louver “Low Fire” Setting
 - With Burner Running on Low Fire
 - LOOSEN Locknut on Low Fire Air Louver Adjustment Screw above the upper Air Louver
 - ADJUST this Adjustment Screw toward the “CLOSED” position until some dark smoke appears from the Flue

- ADJUST this Adjustment Screw toward the “OPEN” position just until dark smoke from the Flue disappears
 - ADJUST this Adjustment Screw toward the “OPEN” position one additional turn after smoke disappears
- Adjust Air Louver “Low Fire” Setting (continued)
 - Turn Burner OFF and re-fire the Burner to be sure it lights off smoothly
 - If the Burner lights off smoothly when the Fuel Nozzle pressure jumps up to operating pressure, you are ready to proceed to next step
 - If the Burner hesitates to light off for a second or two or fails to light off when the Fuel Nozzle pressure jumps up to operating pressure the air fuel ratio is likely too lean
 - Adjust the Low Fire Air Louver Adjustment Screw slightly toward the “Closed” position and re-fire the burner.
 - Repeat this procedure until a smooth light off is achieved and the fire is burning clean
 - Allow Burner to run through the warm-up process until it goes to “High Fire”
- Check/Adjust “High Fire” Air/Fuel Ratio

This adjustment must be done while the Burner is in “High Fire”. If the Boiler builds steam pressure up to the operating level and you are not using steam it will switch to “Low Fire” and you will need to relieve some steam pressure by opening one or more of the Steam Valves to the Baler to get the Burner back to the “High Fire” state to finish tuning “High Fire”

 - When Burner advances to “High Fire” (It is normal to see a puff of dark smoke)
 - CHECK to be sure the Air Louvers are fully open
 - CHECK to be sure there is no dark smoke from the Flue
 - If there **IS** dark smoke:
 - ADJUST the Fuel Pump Pressure downward just until dark smoke disappears
 - ADJUST the Fuel Pump Pressure downward an additional 5 psi
 - If there **IS NOT** dark smoke:
 - ADJUST Fuel Pump Pressure Upward until dark smoke appears (do not exceed 300 psi)
 - ADJUST Fuel Pump Pressure Downward until dark smoke disappears
 - ADJUST Fuel Pump Pressure Downward an additional 5 psi

- Re-fire the Burner to confirm that it has a smooth light-off and is burning clean at both “Low Fire” and “High Fire”
 - It is normal to see a puff of dark smoke when the Burner switches from “Low Fire” to “High Fire”

5.1.7 Complete the Boiler Warm-up Process

- Allow Burner to run until it builds steam pressure to operating level
 - The Burner will automatically fire on “Low” until boiler reaches a temperature of 180 deg. F.
 - When the Boiler temperature reaches 180 deg. F, the Burner will switch to pressure control and will automatically fluctuate between “Hi” and “Low” based on Boiler steam pressure.
 - When Boiler reaches operating steam pressure the Steam Purge Valve will open for 30 seconds to discharge any oxygen in the steam. This will also signal the operator that the machine is ready for Field Operation.
- The screen will automatically change to the “Disclaimer and Agreement” screen.
 - PRESS “I Agree” button to accept the terms of operation
- Screen will change to Field Wok screen and the machine will be in the “Hold” mode

5.1.8 Water Quality Settings on the DewPoint Machine

It is critical that Water Quality Settings in the DewPoint control system are set up correctly. Failure to do so may result in poor water quality conditions in the Boiler. Poor Boiler water quality can cause water carry-over into hay during the baling process which will damage the hay and create a risk of stack fires.

- OBTAIN Water Test and Recommendations Report for your operation.
 - Your water samples should have been processed and the report should be available from your Dealer
- ENTER Water Quality settings based on Water Test and Recommendations Report
 - SWITCH DewPoint Touch Screen “ON” with lighted Rocker Switch on the lower right side of the Touchscreen Enclosure
 - When the computer has initialized follow on-screen instructions and PRESS “Continue” button
 - Select “Menu” → “Settings” → “Water Quality”
 - Enter Location Name and Water PPM for each tested water source
- SELECT the water source you will be using for the next operation
 - Whenever a different water supply source is used please select that water source from the “Water Quality” screen

Machine is now ready for Field Operation

5 - Field Operation:

5.2 Condition of Hay before Baling

5.2.1 Alfalfa Hay

DewPoint Steam application is very effective in improving baling conditions for Alfalfa Hay in a variety of ambient conditions

- The use of steam when baling Alfalfa hay will:
 - Decrease crop dust during the baling process and when feeding this hay to livestock
 - Increase bale density by increasing leaf retention and by softening the stems which will causes the stems to collapse and flatten when each flake of the bale is pressed into place by the baler plunger.
 - Expand the baling window by allowing the operator to add moisture with steam to keep bale moisture at acceptable, consistent levels through a variety of ambient conditions
 - Increase the consistency of bale weight, conformation and shape
 - Improve processing characteristics when Alfalfa hay is processed through TMR equipment and hay press machinery

- Condition of Alfalfa hay Prior to Baling
 - Fully Cured Alfalfa Hay
 - We highly recommend when and where possible that hay be fully cured prior to baling with Steam.
 - Fully cured hay allows the operator to apply more steam to the hay while it is being baled which greatly improves bale quality and leaf retention.
 - Using steam to bale “fully cured hay” will not require the use of a hay preservative
 - If there is no natural dew in the windrow, fully cured hay will generally be from 6-10% starting moisture in the windrow (depending on your climatic conditions). It is wise to check the moisture in the hay by pressing a handful of the hay tightly around the end of a hand held moisture probe to obtain a reading
 - You should check hay in the late afternoon or early evening prior to the setting of any natural dew to determine how well cured it may be prior to baling later in the evening or the following morning when natural dew may be present

- When there is natural dew in a windrow of fully cured hay it is wise to check the moisture in the hay by pressing a handful of the hay tightly around the end of a hand held moisture probe to obtain a reading
 - Be aware of the difference in windrow moisture in high and low areas of a field. You should become familiar with your field characteristics with relation to how moisture typically sets into windrows of hay throughout the field, particularly in evening, night time and morning hours.
 - You can add steam to augment a “less than perfect” natural dew in well cured hay by checking the windrows to see where the additional steam moisture is needed.
 - When dew is coming on in the evening the bottom of the windrow is generally still dry and subject to leaf loss.
 - In this case you can adjust the Steam Valves on the DewPoint Machine to apply more moisture to the bottom of the windrow and less to the top.
 - When dew is coming off later in the morning the top of the windrow is generally drier than the bottom.
 - In this case you can adjust the Steam Valves on the DewPoint Machine to apply more moisture to the top of the windrow and less to the bottom.
 - Be aware of changing conditions in windrow moisture throughout the operating period and make adjustments to the steam application proportioning as needed to keep windrow moisture consistent. You have good flexibility in the way you proportion the steam application to the top and bottom of the windrow as you bale.
- Alfalfa Hay with Stem Moisture
 - Some producers have successfully baled with some stem moisture in the daytime while adding a proven hay preservative and a moderate amount of steam to hold leaves. This practice is more common in more humid climates and during monsoon conditions
 - We do not recommend baling with “Stem Moisture” whether using steam or not, UNLESS:
 - You are using a proven hay preservative product
 - You have tested the preservative product on a small scale and you know your limits!



5.2.2 Cereal Grain Hay

DewPoint Steam application is very effective in improving baling conditions for Cereal Grain crops which are cut green and cured for baling as forage. These crops can include Oat (Oaten) Hay, Wheat Hay, Mixed Grains which use Triticale, Beardless Barley, Oats, Wheat, etc., and other Cereal Grain crops.

- The use of steam on Cereal Grain crops will:
 - Decrease crop dust during the baling process and when feeding this hay to livestock
 - Increase bale density by softening the stems which will causes the stems to collapse and flatten when each flake of the bale is pressed into place by the baler plunger.
 - Reduce the “springy” characteristics of baled Cereal Grain Forages by softening the stems which will causes the stems to collapse and flatten when each flake of the bale is pressed into place by the baler plunger.
 - Expand the baling window by allowing the operator to add moisture with steam to keep bale moisture at acceptable, consistent levels through a variety of ambient conditions
 - Increase the consistency of bale weight, conformation and shape
 - Improve processing characteristics when Cereal Hay is processed through hay press machinery

- Condition of Cereal Grain Hay Prior to Baling
 - Fully Cured Cereal Grain Hay
 - We highly recommend when and where possible that Cereal Grain hay be fully cured prior to baling with Steam.
 - Fully cured hay allows the operator to apply more steam to the hay while it is being baled which greatly improves bale quality.
 - Using steam to bale “fully cured hay” will not require the use of a hay preservative
 - If there is no natural dew in the windrow, fully cured hay will generally be from 6-10% starting moisture in the windrow (depending on your climatic conditions). It is wise to check the moisture in the hay by pressing a handful of the hay tightly around the end of a hand held moisture probe to obtain a reading
 - You should check hay in the late afternoon or early evening prior to the setting of any natural dew to determine how well cured it may be prior to baling later in the evening or the following morning when natural dew may be present

- When there is natural dew in a windrow of fully cured hay it is wise to check the moisture in the hay by pressing a handful of the hay tightly around the end of a hand held moisture probe to obtain a reading
 - Be aware of the difference in windrow moisture in high and low areas of a field. You should become familiar with your field characteristics with relation to how moisture typically sets into windrows of hay throughout the field, particularly in evening, night time and morning hours.
 - You can add steam to augment a “less than perfect” natural dew in well cured hay by checking the windrows to see where the additional steam moisture is needed.
 - When dew is coming on in the evening the bottom of the windrow is generally still dry. In this case you can adjust the Steam Valves on the DewPoint Machine to apply more moisture to the bottom of the windrow and less to the top.
 - When dew is coming off later in the morning the top of the windrow is generally drier than the bottom. In this case you can adjust the Steam Valves on the DewPoint Machine to apply more moisture to the top of the windrow and less to the bottom.
 - Be aware of changing conditions in windrow moisture throughout the operating period and make adjustments to the steam application proportioning as needed to keep windrow moisture consistent. You have good flexibility in the way you proportion the steam application to the top and bottom of the windrow as you bale.
- Cereal Grain Hay with Stem Moisture
 - We do not recommend baling Cereal Grain hay with “Stem Moisture” whether using steam or not. Be sure you know your limits!
 - Cereal Grain hay can be difficult to dry down because of:
 - Very heavy crop yields
 - Inadequate conditioning
 - Poor windrow formation
 - Please be sure all necessary steps are taken to assure a complete dry down of your Cereal Grain hay prior to baling
- Don't be tricked!!!
 - The nodes of Cereal Grain stalks can still be green and contain substantial moisture even when the rest of the plant appears dry. Proper conditioner settings on your windrower should crack the nodes to allow even dry-down.
 - If the heads of the Cereal Grain crop have not fully emerged from the boot they will retain significant amounts of moisture even when

the rest of the plant appears dry. This condition can cause spoilage and a risk of stack fires. Be sure the crop is fully dry before baling.

5.2.3 Grass and Mixed Grass/Alfalfa Hay

DewPoint Steam application is effective in improving baling conditions for Grass and Mixed Grass/Alfalfa crops. These crops can include Timothy and other Grass and Mixed Grass/Alfalfa forages.

Lower steam rates are generally used in Grass and Mixed Grass/Alfalfa hay because the large leaf surface area of this hay absorbs steam at a higher ratio in the overall crop profile than other types of hay. Moisture readings on the Gazeeka Moisture Gauge should be followed as with any other type of hay.

- The use of steam on Grass and Mixed Grass/Alfalfa crops will:
 - Decrease crop dust during the baling process and when feeding this hay to livestock
 - Increase bale density by softening the stems which will causes the stems to collapse and flatten when each flake of the bale is pressed into place by the baler plunger.
 - Reduce the “springy” characteristics of baled Grass and Mixed Grass/Alfalfa forages by softening the stems which will causes the stems to collapse and flatten when each flake of the bale is pressed into place by the baler plunger.
 - Expand the baling window by allowing the operator to add moisture with steam to keep bale moisture at acceptable, consistent levels through a variety of ambient conditions
 - Increase the consistency of bale weight, conformation and shape
 - Improve processing characteristics when Grass and Mixed Grass/Alfalfa forage is processed through hay press machinery
- Condition of Grass and Mixed Grass/Alfalfa hay Prior to Baling
 - Fully Cured Grass and Mixed Grass/Alfalfa Hay
 - We highly recommend when and where possible that Grass and Mixed Grass/Alfalfa hay be fully cured prior to baling with Steam.
 - Fully cured hay allows the operator to apply more steam to the hay while it is being baled which greatly improves bale quality.
 - Using steam to bale “fully cured hay” will not require the use of a hay preservative
 - If there is no natural dew in the windrow, fully cured hay will generally be from 6-10% starting moisture in the windrow (depending on your climatic conditions). It is wise to check the

moisture in the hay by pressing a handful of the hay tightly around the end of a hand held moisture probe to obtain a reading

- You should check hay in the late afternoon or early evening prior to the setting of any natural dew to determine how well cured it may be prior to baling later in the evening or the following morning when natural dew may be present
- When there is natural dew in a windrow of fully cured hay it is wise to check the moisture in the hay by pressing a handful of the hay tightly around the end of a hand held moisture probe to obtain a reading
- Be aware of the difference in windrow moisture in high and low areas of a field. You should become familiar with your field characteristics with relation to how moisture typically sets into windrows of hay throughout the field, particularly in evening, night time and morning hours.
- You can add steam to augment a “less than perfect” natural dew in well cured hay by checking the windrows to see where the additional steam moisture is needed.
 - When dew is coming on in the evening the bottom of the windrow is generally still dry. In this case you can adjust the Steam Valves on the DewPoint Machine to apply more moisture to the bottom of the windrow and less to the top.
 - When dew is coming off later in the morning the top of the windrow is generally drier than the bottom. In this case you can adjust the Steam Valves on the DewPoint Machine to apply more moisture to the top of the windrow and less to the bottom.
- Be aware of changing conditions in windrow moisture throughout the operating period and make adjustments to the steam application proportioning as needed to keep windrow moisture consistent. You have good flexibility in the way you proportion the steam application to the top and bottom of the windrow as you bale.
- Grass and Mixed Grass/Alfalfa hay with Stem Moisture
 - We do not recommend baling Grass and Mixed Grass/Alfalfa hay with “Stem Moisture” whether using steam or not. Be sure you know your limits!
 - Please be sure all necessary steps are taken to assure a complete dry down of your Grass and Mixed Grass/Alfalfa hay prior to baling

5 - Field Operation:

5.3 Baling Hay with the DewPoint Machine



5.3.1 When you arrive at the field

- EXAMINE the windrows to determine your initial steam injection rate.
 - If there is any question regarding the ambient moisture condition of the windrows of hay, you should verify that the hay is dry enough to bale. There are a few ways you can do this. You should use 2 or more of the following methods:
 - Using a hand-held moisture probe
 - Take a handful of hay from the windrow that represents the average moisture of the windrow and squeeze the hay tightly around the end of the probe to obtain a moisture reading.
 - If there is no natural dew the reading should be below 10%. In climates with higher humidity this reading may be higher.
 - Learn your limits!
 - Using your GAZEEKA Moisture Gauge
 - Start your baler and bale 1 or 2 bales of hay WITHOUT STEAM and observe the reading on your GAZEEKA Moisture Gauge
 - If there is no natural dew the reading should be below 10%. In climates with higher humidity this reading may be higher.
 - Learn your limits!
 - Other Observations
 - Take a handful of hay and twist it of between your two hands. Fully cured hay without natural dew should break in one twist. In very fine stemmed hay this test may not provide enough information on its own as the fine stems may break easily even when the hay is not dry enough.
 - Scrape the skin of the stems with your thumbnail.
 - If the skin peels off there is still stem moisture and the hay is not fully cured
 - If the skin does not peel the hay is likely fully cured
 - If there are some stems that are dry and others that are not, you will have to judge whether the hay should be baled or whether you should wait longer

5.3.2 Start Baling

- SET your initial steam distribution rates
 - If the top or bottom of the windrow has a higher moisture content you will ADJUST the proportions of the Steam Valves feeding the top and bottom manifolds to match those conditions as follows:
 - ADJUST slide switches for the Steam Valves feeding the manifolds on the “drier side” of the windrow to “fully open”
 - ADJUST slide switches for the Steam Valves feeding the manifolds on the “more moist side” of the windrow to a lower level, perhaps 50-75% of their range, depending on windrow conditions
 - MAKE ADJUSTMENTS to these proportions throughout the operating period as conditions change always leaving the valves on the drier side of the windrow at “fully open”
- ENABLE the Steam Valves you want to use for initial start-up by pressing the button associated with each valve to turn the button “Green”
 - Top Front Valve = Top Pickup Manifold
 - Top Rear Valve = Top Packer Manifold
 - Bottom Front Valve = Bottom Pickup Manifold
 - Bottom Rear Valve = Bottom Packer Manifold
- SET the main steam rate slide-switch on the right side of the Field Work screen to an appropriate starting level. This slide-switch will adjust all steam valves in the proportions you have set on the individual valve slide-switches.
 - You should start with a conservative steam application rate and work up to an acceptable level over the first several bales
 - In windrows that are dry we recommend starting the main steam rate slide-switch at around 60%
 - Then increase the steam rate a little at a time over the first 4-5 bales until you reach the desired bale moisture level
 - It is better to have a few starting bales a bit on the dry side as you work up to your desired bale moisture level, than to start out too wet
- SELECT “Field” Mode

- PURGE water from Steam Manifolds
 - PRESS the master Steam button in the upper right corner of the screen to “ON” for 15-30 seconds to purge condensation from steam manifolds on baler
 - CHECK to see that all selected Steam Manifolds are discharging steam properly and that all nozzles are open
 - CLEAR any plugged nozzles before proceeding to bale hay. This can be done with compressed air or by wearing heat resistant gloves and using a screwdriver to remove any debris from the nozzle.
 - PRESS Master Steam button to “OFF”

- START Baler
 - START Tractor PTO to operate baler
 - VERIFY that Baler is running properly
 - LOWER Baler Pick-up

- START into first windrow of hay with baler operating as normal
 - PRESS master Steam button to “ON” when baler begins picking up windrow
 - PRESS master Steam button to “OFF” when you come to the end of a windrow. (do not press the HOLD button for turning at the end of the windrow)
 - While turning from one windrow to another at the end of the field the Steam Purge Valve may turn ON automatically to vent excess steam pressure to the atmosphere to allow the Burner to continue to fire.
 - This feature prevents the Burner from shutting down and having to re-fire after turns or other very short cycles when the steam discharge to the Baler is turned OFF. This allows the steam pressure to remain more constant during Field Operation.

5.3.3 Field Speed

- FIELD SPEED should be as fast as necessary to feed the baler to full or nearly full capacity with the stuffer cycling on every plunger stroke
 - PREREQUISIT: Verify that the Flake Density setting is properly adjusted on your Baler
 - Normally the Flake Density setting should allow no more than a maximum of 45 flakes per bale at low feeding rates.
 - Adjust per Baler Operator Manual.
 - When using steam during Field operation Bale Flake Counts can be reduced below the Flake Density setting by increasing field travel speed
 - Conventional Bale Flake Counts of 40 flakes/bale can typically be reduced to around 30 flakes/bale when using steam while maintaining excellent bale conformation and higher bale density because the crop is softened by the steam and packs more easily
 - When baling with steam, Plunger load targets can also be reduced somewhat while achieving similar or higher bale weights compared to conventional baling
 - As a general rule, baling with steam will allow you to increase your field speed 15-25% higher than conventional baling

5.3.4 Monitor Bale Moisture

- MONITOR BALE MOISTURE and adjust steam rate to meet your bale moisture target. It is your responsibility to determine the desired moisture level you want to maintain in your bales. For more complete information on “Bale Moisture” principles and practices, Please See [“Managing/Judging Bale Moisture”](#) below.

5.3.5 Using Hold Mode

- Using the “HOLD” mode during Field Operation
 - When you finish baling a field and need to move to another field nearby or when you need to stop in the field for repairs or any other reason:
 - Push the “HOLD” button
 - This feature will disable the following:
 - Steam Valves to the Baler
 - Steam Purge Valve
 - The following systems will remain active:
 - The Feed Water System will keep the Boiler water at the normal operating level
 - The Burner will cycle automatically ON and OFF to keep the Steam Pressure at the normal operating pressure setting
 - Push the “FIELD” mode button when you are ready to start baling again and proceed as normal.

5.3.6 Using Shut Down Mode

- Using “Shut Down” Mode
 - When you finish baling for the day:
 - REDUCE steam injection rates over the last 3-5 bales of the day
 - If you do not plan to eject the bales from the chamber of your Baler it is best to leave a drier, cooler bale in the bale chamber during idle time to avoid forming rust in the bale chamber.
 - PRESS “SHUT DOWN” mode button
 - Follow the on-screen instruction to confirm Shut Down
 - Follow the on-screen instruction to FLUSH the “Y Strainer”
 - SWITCH Lighted Rocker Switch on the bottom of the Touch Screen Enclosure to “OFF”
 - If the machine will sit idle for more than a day or two, RAISE the hood and DISCONNECT the Negative Battery Cable from the Battery

5 - Field Operation:

5.4 Baling Management

5.4.1 General Baling Considerations

- Become familiar with the ALL methods of steam application listed in this “**Baling**” section so you will understand how to use DewPoint technology efficiently in the various ambient conditions you will operate in. Nearly all DewPoint operators will encounter all of the conditions listed in this section at one time or another
 - Baling conditions will change throughout the harvest season due to changes in weather patterns from dry seasons to monsoon seasons, etc.
 - Baling conditions will also change considerably throughout a 24 hour day with changes in humidity, temperature and wind patterns
- If the top or bottom of the windrow has a higher moisture content you will ADJUST the proportions of the 4 Steam Valves feeding the top and bottom manifolds to match those conditions as follows:
 - ADJUST slide switches for the Steam Valves feeding the manifolds on the “drier side” of the windrow to “fully open”
 - ADJUST slide switches for the Steam Valves feeding the manifolds on the “more moist side” of the windrow to a lower level, perhaps 50-75% of their range, depending on windrow conditions
 - MAKE ADJUSTMENTS to these proportions throughout the operating period as conditions change, always leaving the valves on the drier side of the windrow at “fully open”
- SET the main steam rate slide-switch on the right side of the Field Work screen to an appropriate starting level. This slide-switch will adjust all steam valves in the proportions you have set on the individual valve slide-switches.
 - You should start with a conservative steam application rate and work up to an acceptable level over the first several bales
 - In windrows that are dry we recommend starting the main steam rate slide-switch at around 60% and in windrows where there is some natural dew you should start at a lower steam rate
 - Then increase the steam rate a little at a time over the first 4-5 bales until you reach the desired bale moisture level
 - It is better to have a few starting bales a bit on the dry side as you work up to your desired bale moisture level, than to start out too wet

- Monitor Moisture with the GAZEEKA Moisture Gauge and make steam rate adjustments to keep your bale moisture at an acceptable level throughout the operating period

5.4.2 Baling in Very Dry Conditions

- REVIEW: “Managing/Judging Bale Temperature during Field Operation” for information regarding Bale Temperature.
 - Bale temperature should be checked periodically while baling with high rates of steam during hot afternoons to keep bale temperatures below 135 deg.F
- In very dry conditions where there is no natural dew and where wind, high temperatures or other factors contribute to adverse baling conditions, it is best to bale with steam in the cooler parts of the 24 hour day.
- Many operators like to bale sometime between 7:00pm in the evening after the air starts to cool, and NOON the next day, before the afternoon sun, temperatures and winds combine to create more adverse conditions.
- However, there may be times when you will need to bale in adverse daytime conditions because of impending rainstorms or other threatening weather events.
- When you do have to bale during very dry and/or windy conditions you can still make good hay with acceptable bale moisture using the following techniques.
 - Adjust Steam Distribution to concentrate more steam into the “packer” area of the baler feed system. This is usually the 1st and only adjustment you will need to make to get good bale moisture in adverse baling conditions.
 - Use the 4 steam manifold slide-switches to:
 - Reduce the steam rate to 65-70% on both the:
 - TOP FRONT Steam Manifold
 - BOTTOM FRONT Steam Manifold
 - Increase the steam rate to 100% on both the:
 - TOP REAR Steam Manifold
 - BOTTOM REAR Steam Manifold
 - Then run the Master Steam Rate slide-switch up to as high as 100% if needed to achieve good bale moisture.
- You can also raise the Boiler Steam Pressure Target setting if extra steam capacity is needed.
- In very adverse conditions you can raise the Boiler Water Level to draw more humidity into the steam flow.
 - The Boiler Water Level should be raised only 0.5 inches at a time.
 - Raising the Boiler Water Level too far can cause water carryover into the hay being baled.

- You should not change the Boiler Water Level default setting of 5 inches except in unusual conditions.

5.4.3 Baling in Relatively “Normal” Conditions

- In relatively normal conditions where dry-down conditions are good and there is a light to moderate amount of dew at night you will have options regarding when you bale
 - To conserve fuel and water, many DewPoint operators choose to start baling in the early evening and continue into the night time hours until they are finished with their baling for the day
 - Other operators will start baling very early in the morning and run into the middle of the day or until they have completed their baling for the day
 - Steam rate adjustments are made by simply watching the GAZEKA Moisture Gauge and making adjustments as needed

5.4.4 Baling in Moderate Humidity Conditions

- In moderate conditions where the moisture from natural dew is too high at night, many DewPoint operators will wait until the night time dew is gone in the late morning or early afternoon and then start baling.
- In these conditions most baling will be done in the afternoon and early evening hours before the natural dew sets in too heavily.
 - Normally you will be able to bale hay with steam throughout the day and maintain good moisture in these higher humidity conditions.
 - Use of the GAZEKA Moisture Gauge is very helpful to be sure your bales are within a tolerable moisture range.

5.4.5 Baling in High Humidity Conditions/with Stem Moisture

- In high humidity conditions when you are unable to cure the hay completely and stem moisture is present the use of a hay preservative along with steam treatment to maintain leaves can be effective.
 - In these conditions it is advisable to bale during the daytime hours when the hay is as dry as possible.
 - Steam can be applied at moderate rates to hold the leaves during the baling process.
 - Hay Preservative is also added at appropriate rates to meet the overall moisture level of the hay being baled
 - Use of the GAZEEKA Moisture Gauge is very helpful to be sure your bales are within a tolerable moisture range.
- We do not recommend baling with “Stem Moisture” whether using steam or not, unless:
 - You are using a proven preservative product
 - You have tested the preservative product along with the use of steam, and you know your limits!
 - Some producers have successfully baled with some stem moisture in the daytime while adding a proven preservative and a moderate amount of steam to hold leaves
 - REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.

6- Managing/Judging Bale Moisture:

6.1 Managing/Judging Bale Moisture During Field Work

6.1.1 Managing and Judging Bale Moisture is Your Responsibility

LEARN YOUR OWN LIMITS AND THE DEMANDS AND DESIRES OF YOUR HAY MARKET

There is an acceptable range of bale moisture where bale density, flake wafering, and other characteristics can be manipulated and controlled according to the demands of your hay market. We recommend that you and your hay buyers and consumers become familiar with the characteristics of hay baled with steam at different moisture levels to determine what best suits the needs of all concerned parties.

The beauty of DewPoint Technology is that you can choose the way you want to bale your hay and the bale formation characteristics you and you market want in the finished product.

- **REMEMBER:** Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
 - **FOR EXAMPLE:** Hay that is 8% moisture in the windrow can be baled at around 12% using steam from the DewPoint Machine but will look like it was baled at 16-18% with natural dew.
 - This moisture effect allows a producer to bale hay that has superior leaf retention characteristics and high bale density with a relatively low bale moisture level.

The next few pages contain information regarding different ways to judge bale moisture.

We highly recommend the GAZEEKA Moisture Gauge as your primary moisture measuring instrument while baling hay using the DewPoint system.

We also recommend that you watch Bale Chamber Pressure readings and visually observe the bales you are making as you pass by them on the next

windrow. These redundant observations will help assure that you are making the best hay possible.

6.1.2 Judging Bale Moisture: with the GAZEEKA Moisture Gauge

- Use a Baler mounted GAZEEKA Moisture Gauge, on the Baler
 - Effectiveness and accuracy of the GAZEEKA Moisture Gauge in DewPoint steam baled hay
 - The speed of microwaves through air is very close to the speed of light through space, and the speed of microwaves through dry hay is a little slower than through air
 - However, the speed of microwaves through water is considerably slower than in dry hay. The difference in this speed is attributed to a value known as the dielectric constant (sometimes called relative permittivity). The dielectric constant for air is close to 1, for dry fibrous material it is closer to 2 while for pure water it is approximately 80. Similarly, the amount of microwave energy absorbed in air is less than dry hay and in dry hay is much less than in water. Thus if measured correctly, these measurements can be a very sensitive method of measuring moisture in a bale of hay.
 - Whether the moisture detected in hay is from Steam, Natural Dew or Stem Moisture, the GAZEEKA Moisture Gauge provides an accurate moisture reading when properly calibrated.
 - Calibration should be done prior to putting hay in the baler the first time. Follow all directions with the GAZEEKA instrument to calibrate and establish proper settings for safe and reliable operation.
- MONITOR Bale moisture using the GAZEEKA Moisture Gauge and adjust steam rate to meet your bale moisture target
 - It is your responsibility determine acceptable bale moisture parameters
 - As a general rule you will add from 1%-4% moisture to the hay you are baling, depending on the ambient conditions and the steam rates used to meet the existing conditions
 - **In climates with low humidity** fully cured hay that has no natural dew will normally range from 8-10% moisture depending on ambient humidity.
 - In these climates you will normally be able to make bales with very good leaf retention and density by applying enough steam to bring the bale moisture up to 12-14%

- REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
 - FOR EXAMPLE: Hay that is 8% moisture in the windrow can be baled at around 12% using steam from the DewPoint Machine but will look like it was baled at 16-18% with natural dew.

- **In Climates with moderate humidity** fully cured hay that has no natural dew will normally range from 10-12% moisture depending on ambient humidity.
 - In these climates you will normally be able to make bales with very good leaf retention and density by applying enough steam to bring the bale moisture up to 13-15%
 - REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
 - FOR EXAMPLE: Hay that is 10-12% moisture in the windrow can be baled at around 13-15% using steam from the DewPoint Machine but will look like it was baled at 16-18% with natural dew.

- **In climates or seasons of high humidity** where hay cannot be fully cured (no stem moisture), you may choose to use hay preservative along with steam application. The steam application will reduce leaf loss and the preservative will prevent hay spoilage.
 - We do not recommend baling with “Stem Moisture” whether using steam or not, unless:
 - You are using a proven preservative product
 - You have tested the preservative product along with the use of steam, and you know your limits!
 - Some producers have successfully baled with some stem moisture in the daytime while adding a proven preservative and a moderate amount of steam to hold leaves. This practice is more common in more humid climates and during monsoon conditions
 - REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.
 - Adding just 1-3% more moisture with steam will reduce leaf loss and improve bale quality while keeping the bale moisture within an acceptable range where a proven hay preservative will prevent spoilage.
 - IN ALL OPERATING CONDITIONS YOU MUST FIND YOU OWN LIMITS
 - WATCH the moisture reading on the GAZEEKA monitor

- ADJUST the steam injection rate over the first 5 to 10 bales using the Master Steam Rate slide switch and/or the individual valve proportioning slide switches to achieve the desired moisture level in your bales
- MONITOR and make adjustments throughout the operating time to keep the bale moisture at the desired level.

6.1.3 Judging Bale Moisture by Bale Chamber Pressure

- Use Bale Chamber Pressure Readings in a similar fashion as you would use them to judge natural dew conditions as a redundant method of bale moisture measurement
 - Effectiveness and accuracy in DewPoint steam baled hay
 - During the cooler hours of the day and at night, Bale Chamber Pressure is fairly accurate in DewPoint steam baled hay. During these hours an operator who is accustomed to judging bale moisture conventionally by the Bale Chamber Pressure reading should be able to keep within reasonable bale moisture tolerances using similar readings as he would use while baling fully cured hay with natural dew.
 - If baling with stem moisture combined with either Steam or Natural Dew the Bale Chamber Pressure method of judging moisture is not accurate and is risky.
 - When baling with Steam in the hot part of the day, Bale Chamber Pressure will nearly double to maintain the friction necessary to reach Plunger Load Target settings even though the bale moisture is sufficient.
 - An operator using this method of moisture judging would do well to become very familiar with the characteristics of this method before becoming dependent upon this method.
 - If you use the Bale Chamber Pressure reading to monitor bale moisture during operation:
 - You must DETERMINE the acceptable bale moisture parameters you are comfortable with
 - As a general rule you will add from 1%-4% moisture to the hay you are baling, depending on the ambient conditions and the steam rates used to meet the existing conditions
 - WATCH Bale Chamber pressure readings on baler monitor
 - ADJUST the steam injection rate over the first 5 to 10 bales using the Master Steam rate slide switch and/or the individual valve proportioning slide switches
 - INCREASE Steam Injection Rate to lower Bale Chamber Pressure readings

- DECREASE Steam Injection Rate to raise Bale Chamber Pressure readings

6.1.4 Judging Bale Moisture Visually

You should always observe the bales within a field while you are baling

- Bales with proper moisture levels will exhibit the following characteristics:
 - Leaf Pattern
 - Leaves should be attached to stem and/or somewhat “wafered” into the flakes in the bale
 - The front (plunger end) of the bale represents the top of the windrow of hay and will normally not look as good as the rear end of the bale simply because of the action of the Plunger against the front face of the bale on each Plunger/Stuffer stroke. When observing the front of the bale you should expect a little surface damage from the Plunger, however if you brush away the surface you should see a good leaf pattern.
 - The rear end of the bale represents the bottom of the windrow of hay and will normally show less mechanical damage since the Plunger does not come in direct contact with it. When observing the rear end of a bale with the correct moisture level you should expect an excellent leaf pattern. Leaves should be attached to stem and/or somewhat “wafered” into the flakes in the bale.
 - Bale Conformation
 - The sides of bales with a good moisture level should be compressed, smooth, and may be slick but of good color
 - Bale shape should be consistent, with firm corners and ends
 - Bale Color
 - The sides of bales with a good moisture level should be compressed, smooth, and may be slick but of good color
- Bales that are too dry will exhibit one or more of the following characteristics:
 - Appear ragged and shattered along the sides.
 - Leaves will be detached from stems
 - Corners and ends will be soft

- Bale weights will be low.
- Bales that are too high in moisture will exhibit one or more of the following characteristics:
 - Sides of bale may be dark or slightly discolored, and slick or smeared
 - Leaf retention will be good but the flakes in the bale may be caked too tightly

NOTE: There is an acceptable range of moisture where bale density, flake wafering and other characteristics can be manipulated and controlled according to the demands of your hay market. You should become familiar with these characteristics.



6.1.5 Judging Bale Moisture with a Hand Held Moisture Probe

- If you use a hand-held moisture probe to monitor bale moisture during operation:
 - You must DETERMINE acceptable bale moisture parameters
 - BE AWARE that the accuracy of this type of moisture sensor in steamed hay is not suitable for a true real time reading of bale moisture during the baling process. The surface moisture on the steamed hay causes the moisture to read several points higher than the actual moisture because the sensor depends on electrical conductivity between two points. This conductivity always looks for the path of least resistance and any type of surface moisture will carry conductivity more readily than the entire profile of the crop being baled.
 - Fully Cured Hay: If an operator becomes very familiar with the typical “off-set” of the moisture reading of this instrument compared to the actual moisture in the bale he can learn to use a Hand Held “contact type” Moisture Sensor with reasonable effectiveness when baling fully cured hay using Steam. Various conditions at the time of baling can affect the performance of this type of sensor. The “off-set” reading will vary depending on ambient conditions in the windrow.
 - If the windrow of hay has some degree of natural dew and a small amount of steam is added to the hay to bring it up to an optimum moisture level there will be only a small “off-set” in the moisture reading compared to the actual moisture in the bale
 - If the windrow is very dry, requiring a higher rate of steam to bring the bale moisture to an optimum level there will be a much larger “off-set” in the moisture reading compared to the actual moisture in the bale
 - Hay with Stem Moisture: When baling hay with stem moisture, a Hand Held “contact type” Moisture Sensor is not accurate when baling and will normally read lower than the actual moisture content of the hay.

- A stem of hay that is not fully cured may be relatively dry on the outside but green on the inside. Therefore while the inside of the stem may be very conductive, the conductivity between stems is typically much lower which insulates the signal between the measuring points on the sensor resulting in a lower overall reading at the time of baling. Moisture readings with a Hand Held Probe a few days after baling will be higher when the moisture from the stems migrates more fully throughout the bale profile.
- This type of moisture probe is effective several hours after the hay has been baled as the applied moisture diffuses throughout the plant tissue more completely.

6.1.6 Judging Bale Moisture using a Baler Mounted “contact type” Moisture Sensor

- If you use a conventional Baler Mounted Moisture Sensor such as a “star wheel” sensor or other “contact type” sensor mounted in the bale chamber to monitor bale moisture during operation:
 - You must DETERMINE acceptable bale moisture parameters
 - BE AWARE that the accuracy of this type of moisture sensor in steamed hay is not suitable for a true real time reading of bale moisture during the baling process. The surface moisture on the steamed hay causes the moisture to read several points higher than the actual moisture because the sensor depends on electrical conductivity between two points. This conductivity always looks for the path of least resistance and any type of surface moisture will carry conductivity more readily than the entire profile of the crop being baled.
 - Fully Cured Hay: If an operator becomes very familiar with the typical “off-set” of the moisture reading of this instrument compared to the actual moisture in the bale he can learn to use a Baler Mounted “contact type” Moisture Sensor with reasonable effectiveness when baling fully cured hay using Steam. Various conditions at the time of baling can affect the performance of this type of sensor. The “off-set” reading will vary depending on ambient conditions in the windrow.
 - If the windrow of hay has some degree of natural dew and a small amount of steam is added to the hay to bring it up to an optimum moisture level there will be only a small “off-set” in the moisture reading compared to the actual moisture in the bale
 - If the windrow is very dry, requiring a higher rate of steam to bring the bale moisture to an optimum level there will be a much larger “off-set” in the moisture reading compared to the actual moisture in the bale

- Hay with Stem Moisture: When baling hay with stem moisture, a Baler Mounted “contact type” Moisture Sensor is not accurate when baling and will normally read lower than the actual moisture content of the hay.
 - A stem of hay that is not fully cured may be relatively dry on the outside but green on the inside. Therefore while the inside of the stem may be very conductive, the conductivity between stems is typically much lower which insulates the signal between the measuring points on the sensor resulting in a lower overall reading at the time of baling. Moisture readings with a Hand Held Probe a few days after baling will be higher when the moisture from the stems migrates more fully throughout the bale profile.
 - When baling hay with stem moisture, whether using Steam, Natural Dew or no added moisture at all, a Baler Mounted “contact type” Moisture Sensor is not accurate when baling and will normally read lower than the actual moisture content of the hay.
- As a general rule you will add from 1%-4% actual moisture to the hay you are baling, depending on the ambient conditions and the steam rates used to meet the existing conditions
- WATCH Moisture Sensor readings
- ADJUST the steam injection rate over the first 5 to 10 bales using the Master Steam Rate slide switch and/or the individual valve proportioning slide switches to achieve the desired moisture level in your bale

6.1.7 Judging Bale Moisture After Baling

- Regardless of the method you use to judge moisture during the baling operation:
 - ALWAYS RE-CHECK BALE MOISTURE with a hand-held moisture probe a day or two after hay is baled to be sure the moisture reading has “settled”
 - If hay is dried completely with no stem moisture before baling with steam, the moisture level reading on a hand-held moisture probe will normally begin to drop within a few hours after baling. Learn your limits and bale moisture characteristics on your own operation.
 - If hay is baled with stem moisture (whether you use steam or not) the moisture reading will generally increase significantly over the first 24-48 hours as the stem moisture migrates from the stems into the overall bale profile.
 - If you notice rising bale moisture readings over several days after baling you should monitor the bale moisture and temperature daily until these readings peak and begin to fall.
 - If bale temperature and moisture readings continue to rise to dangerous levels you should consult your local hay association and/or Fire Department to avoid a stack fire. In this case you should find a reliable source of information to guide your actions.
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Judging Bale Moisture is Your Responsibility

LEARN YOUR OWN LIMITS AND THE DEMANDS AND DESIRES OF YOUR HAY MARKET

There is an acceptable range of bale moisture where bale density, flake wafering, and other characteristics can be manipulated and controlled according to the demands of your hay market. We recommend that you and your hay buyers and consumers become familiar with the characteristics of hay baled with steam at different moisture levels to determine what best suits the needs of all concerned parties.

The beauty of DewPoint Technology is that you can choose the way you want to bale your hay and the bale formation characteristics you and your market want in the finished product.

7 - Managing/Judging Bale Temperature:

7.1 Managing/Judging Bale Temperature during Field Operation

Bale Temperature

- Bale Temperature
 - When using steam, heat is added to the hay
 - Bale temperatures can become excessive during high ambient temperatures when a high rate of steam is used to bale hay.
 - Excessive bale temperatures will deteriorate bale color in the center of 3x3, 3x4 and 4x4 bales.
 - Do not raise bale temperatures above 135 deg. F when baling with steam.
 - When bale temperatures approach 135 deg. F, either reduce steam injection rates or wait until a cooler time of day to bale.
- How to Judge Bale Temperature
 - Use a combination Hand Held Bale Moisture/Temperature probe
 - Use a Probe Type Dial Thermometer 18-24" long with a 0-200 deg. F range of measurement
 - See Compost Thermometer at www.reotemp.com/compost
 - 0-200 deg. F Range
 - Insert thermometer into bale and allow to equalize for at least 5 minutes to get accurate bale temperature reading

- When baling with high rates of steam in high ambient temperatures, take regular bale temperature readings to be sure you are baling within a safe temperature range below 135 deg. F
-

Judging Bale Temperature is Your Responsibility

LEARN YOUR OWN LIMITS

Some types of hay may be more sensitive to heat than others. We recommend that you define temperature levels that are acceptable on your operation.

8 - Hay Stacking and Storage:

8.1 Stacking Steam Treated Hay

8.1.1 Stacking Steamed Hay during Normal Harvest Operations

- To avoid discoloration of the hay in the stack you should not stack hay that is above 120 deg. F inside the bale
 - As a general rule please observe the following:
 - Hay baled in the evening or night time can be hauled and stacked the next morning
 - Hay baled in the early morning to mid-morning before high steam rates are used can be hauled and stacked later the same day
 - Hay baled from mid-morning through the early evening at high steam rates should not be hauled and stacked until the next morning

8.1.2 Stacking High Temperature Steamed Hay when Weather is a threat

- If bales of hay must be moved off the field immediately after baling to avoid weather damage but they are too hot to stack conventionally you can consider the following procedure:
 - Pick up and haul the bales from the field using your normal method
 - DO NOT leave bales on a Truck, Bale Mover etc. for more than the time it takes you to drive a short distance from the field to the stack yard or field side. Long distance hauling or stopping for more than a few minutes will cause bale discoloration.
 - Dump hay in stack location and immediately re-stack the hay in a configuration that allows heat dissipation from all four sides of the bales.

- Use a Tele-Handler or other suitable machine to stack hay in a pyramid fashion with 18-24” of space between each bale on each layer.
 - Start the first layer with 18-24” between the sides of each bale
 - Add each layer with each bale straddling the spaces between the bales in the layer below
 - This allows heat dissipation through all four sides of each bale
 - Allow the stack to remain in this configuration for a few days to cool
 - Re-stack the hay in a tight stack when bales have cooled enough to stack conventionally (below 120 deg. F)

9 - Crop Management:

General Considerations

When using the DewPoint Steam technology to bale your hay you should update your crop management practices to increase efficiency in your overall operation. Baling is no longer the limiting factor in your operation since you are generally able to open the baling window up to 12-24 hours per day if needed. You can bale anytime the hay is dry with the exception of very hot afternoon hours in some climates.

9.1 Irrigation

- **COMMON PRACTICE: Irrigation Timing**
 - In arid climates many hay producers using conventional balers leave their irrigation water on very close to the time they cut their hay in order to draw some ground moisture into windrows of hay for baling after it is cured.
 - This practice causes excessive machine tracking and crop damage when cutting, raking, baling and hauling hay. It also slows the hay curing process, causes inconsistencies in dry-down, and increases bleaching and the possibility of wet slugs in windrows of hay.
- **CONSIDER THIS CHANGE: Irrigation Timing**
 - When using DewPoint technology you are able to re-hydrate very dry hay for baling with no problem.

- We recommend shutting off your irrigation water several days ahead of your hay harvest to allow the ground to dry more thoroughly before cutting
- This will reduce hay curing time, reduce tracking during harvest operations, improve dry-down consistency and decrease bleaching
- **CONSIDER THIS CHANGE: Pivot Rotation**
 - You should also consider the rotation of Pivot Irrigation systems leading up to your hay harvest.
 - Since Natural Dew tends to form more heavily in low areas of a field it is a good practice to water the low side of the field first and the high side last during the final rotation before your hay harvest. This will make your dry-down more consistent across the entire field.

9.2 Cutting

- **COMMON PRACTICE: How Many Acres to Cut**
 - Hay producers often limit the acres of hay they cut each day because they are not sure how much baling they can actually get done each day with unpredictable natural dew conditions.
- **CONSIDER THIS CHANGE: How Many Acres to Cut**
 - Since DewPoint technology allows operators to bale 12-24 hours per day, (almost anytime the hay is dry) hay producers can “schedule” their harvest
 - Simply decide how many acres you want to bale each day and go ahead and cut that many acres each day
 - Each DewPoint/Baler combo can typically bale 200-250 acres in 8-10 hours, depending on yield

9.3 Raking

Proper Raking is one of the most critical elements in maintaining the value of your harvested hay crop. Poor Raking practices can cause substantial crop loss.

9.3.1 Timing

- Hay should be Double Raked when it has enough moisture to hold the leaves during the raking process but not so much moisture that the double windrow is too dense to allow airflow through the windrow.
 - In dry climates or conditions when rapid dry-down conditions exist and natural dew is scarce or non-existent you should consider raking your hay while there is still a little green stem moisture. The evaporative effect of a windrow with some stem moisture will cool the air and raise the humidity level in the windrow, and will create a natural dew effect within the windrow for raking, even when the ambient air in the field is too dry to form natural dew.
 - In humid climates or conditions you should avoid double raking hay too early, perhaps even waiting until the morning you bale. Double raking a day or two ahead of baling in high humidity conditions when there are heavy dews at night causes the dew moisture to sink to the bottom of the windrow after sunrise. This moisture is very slow to migrate out of the windrow and sometimes makes it necessary to “flip” the double windrow to get sufficient dry-down for baling.
- Double Raking hay that is too dry will result in excessive leaf loss on the ground during the raking process resulting in crop loss

- Double Raking hay that is too green will cause serious increases in dry-down time and inconsistent dry-down characteristics in the windrow

9.3.2 Soil Moisture

- Some hay producers cut their hay too soon after the irrigation water is turned off (see "[Irrigation](#)" section)
- Double Raking on ground with excessive soil moisture will cause an increase in dry-down time and inconsistent dry-down characteristics in the windrow
 - Moisture from the soil will percolate up into the bottom of a double windrow particularly when yields are heavy
 - In this case it may be necessary to "flip" the double windrow to get sufficient dry-down for baling

9.3.3 Rake Adjustments and Maintenance

- Your Hay Rake should be set to sweep the crop from the ground without the rake teeth touching the soil. This requires careful daily attention to rake adjustment.
 - If rake teeth are set too low, dirt and/or dust will be raked into the hay. This increases the "ash" content in your hay which decreases the feed value numbers on your hay tests. This also decreases the monetary value of your crop. Just a \$10/ton decrease in value due to high "ash" content over 10,000 tons in a year is a \$100,000 decrease in your income.
 - If rake teeth are set too high you will leave valuable crop tonnage on the ground in the field
- Maintaining rake teeth and the rake in general, and careful daily adjustment are worth the effort

9.4 Baling



9.4.1 General Baling Considerations

- Become familiar with the ALL methods of steam application listed in this “**Baling**” section so you will understand how to use DewPoint technology efficiently in the various ambient conditions you will operate in. Nearly all DewPoint operators will encounter all of the conditions listed in this section at one time or another
 - Baling conditions will change throughout the harvest season due to changes in weather patterns from dry seasons to monsoon seasons, etc.
 - Baling conditions will also change considerably throughout a 24 hour day with changes in humidity, temperature and wind patterns
- If the top or bottom of the windrow has a higher moisture content you will ADJUST the proportions of the 4 Steam Valves feeding the top and bottom manifolds to match those conditions as follows:
 - ADJUST slide switches for the Steam Valves feeding the manifolds on the “drier side” of the windrow to “fully open”
 - ADJUST slide switches for the Steam Valves feeding the manifolds on the “more moist side” of the windrow to a lower level, perhaps 50-75% of their range, depending on windrow conditions
 - MAKE ADJUSTMENTS to these proportions throughout the operating period as conditions change, always leaving the valves on the drier side of the windrow at “fully open”
- SET the main steam rate slide-switch on the right side of the Field Work screen to an appropriate starting level. This slide-switch will adjust all

steam valves in the proportions you have set on the individual valve slide-switches.

- You should start with a conservative steam application rate and work up to an acceptable level over the first several bales
 - In windrows that are dry we recommend starting the main steam rate slide-switch at around 60% and in windrows where there is some natural dew you should start at a lower steam rate
 - Then increase the steam rate a little at a time over the first 4-5 bales until you reach the desired bale moisture level
 - It is better to have a few starting bales a bit on the dry side as you work up to your desired bale moisture level, than to start out too wet
- Monitor Moisture with the GAZEEKA Moisture Gauge and make steam rate adjustments to keep your bale moisture at an acceptable level throughout the operating period



9.4.2 Baling in Very Dry Conditions

- REVIEW: “Managing/Judging Bale Temperature during Field Operation” for information regarding Bale Temperature.
 - Bale temperature should be checked periodically while baling with high rates of steam during hot afternoons to keep bale temperatures below 135 deg.F
- In very dry conditions where there is no natural dew and where wind, high temperatures or other factors contribute to adverse baling conditions, it is best to bale with steam in the cooler parts of the 24 hour day.
- Many operators like to bale sometime between 7:00pm in the evening after the air starts to cool, and NOON the next day, before the afternoon sun, temperatures and winds combine to create more adverse conditions.
- However, there may be times when you will need to bale in adverse daytime conditions because of impending rainstorms or other threatening weather events.
- When you do have to bale during very dry and/or windy conditions you can still make good hay with acceptable bale moisture using the following techniques.
 - Adjust Steam Distribution to concentrate more steam into the “packer” area of the baler feed system. This is usually the 1st and only adjustment you will need to make to get good bale moisture in adverse baling conditions.
 - Use the 4 steam manifold slide-switches to:
 - Reduce the steam rate to 65-70% on both the:
 - TOP FRONT Steam Manifold
 - BOTTOM FRONT Steam Manifold

- Increase the steam rate to 100% on both the
 - TOP REAR Steam Manifold
 - BOTTOM REAR Steam Manifold
- Then run the Master Steam Rate slide-switch up to as high as 100% if needed to achieve good bale moisture.
- You can also raise the Boiler Steam Pressure Target setting if extra steam capacity is needed.
- In very adverse conditions you can raise the Boiler Water Level to draw more humidity into the steam flow.
 - The Boiler Water Level should be raised only 0.5 inches at a time.
 - Raising the Boiler Water Level too far can cause water carryover into the hay being baled.
 - You should not change the Boiler Water Level default setting of 5 inches except in unusual conditions.



9.4.3 Baling in Relatively “Normal” Conditions

- In relatively normal conditions where dry-down conditions are good and there is a light to moderate amount of dew at night you will have options regarding when you bale
 - To conserve fuel and water, many DewPoint operators choose to start baling in the early evening and continue into the night time hours until they are finished with their baling for the day
 - Other operators will start baling very early in the morning and run into the middle of the day or until they have completed their baling for the day
 - Steam rate adjustments are made by simply watching the GAZEEKA Moisture Gauge and making adjustments as needed



9.4.4 Baling in Moderate Humidity Conditions

- In moderate conditions where the moisture from natural dew is too high at night, many DewPoint operators will wait until the night time dew is gone in the late morning or early afternoon and then start baling.
- In these conditions most baling will be done in the afternoon and early evening hours before the natural dew sets in too heavily.
 - Normally you will be able to bale hay with steam throughout the day and maintain good moisture in these higher humidity conditions.
 - Use of the GAZEEKA Moisture Gauge is very helpful to be sure your bales are within a tolerable moisture range.



9.4.5 Baling in High Humidity Conditions/with Stem Moisture

- In high humidity conditions when you are unable to cure the hay completely and stem moisture is present the use of a hay preservative along with steam treatment to maintain leaves can be effective.
 - In these conditions it is advisable to bale during the daytime hours when the hay is as dry as possible.
 - Steam can be applied at moderate rates to hold the leaves during the baling process.
 - Hay Preservative is also added at appropriate rates to meet the overall moisture level of the hay being baled
 - Use of the GAZEEKA Moisture Gauge is very helpful to be sure your bales are within a tolerable moisture range.
- We do not recommend baling with “Stem Moisture” whether using steam or not, unless:
 - You are using a proven preservative product
 - You have tested the preservative product along with the use of steam, and you know your limits!
 - Some producers have successfully baled with some stem moisture in the daytime while adding a proven preservative and a moderate amount of steam to hold leaves
 - REMEMBER: Steam applied to hay using the DewPoint Machine will simulate a higher moisture effect than the actual moisture percentage that is applied.

9.5 Hauling/Stacking/Storage

9.5.1 Stacking Steamed Hay during Normal Harvest Operations

- To avoid discoloration of the hay in the stack you should not stack hay that is above 120 deg. F inside the bale
- As a general rule please observe the following:
 - Hay baled in the evening or night time can be hauled and stacked the next morning
 - Hay baled in the early morning to mid-morning before high steam rates are used can be hauled and stacked later the same day
 - Hay baled from mid-morning through the early evening at high steam rates should not be hauled and stacked until the next morning

9.5.2 Stacking High Temperature Steamed Hay when Weather is a threat

- If bales of hay must be moved off the field immediately after baling to avoid weather damage but they are too hot to stack conventionally you can consider the following procedure:
 - Pick up and haul the bales from the field using your normal method
 - DO NOT leave bales on a Truck, Bale Mover etc. for more than the time it takes you to drive a short distance from the field to the stack yard or field side. Long distance hauling or stopping for more than a few minutes will cause bale discoloration.

- Dump hay in stack location and immediately re-stack the hay in a configuration that allows heat dissipation from all four sides of the bales.
 - Use a Tele-Handler or other suitable machine to stack hay in a pyramid fashion with 18-24” of space between each bale on each layer.
 - Start the first layer with 18-24” between the sides of each bale
 - Add each layer with each bale straddling the spaces between the bales in the layer below
 - This allows heat dissipation through all four sides of each bale
 - Allow the stack to remain in this configuration for a few days to cool
 - Re-stack the hay in a tight stack when bales have cooled enough to stack conventionally (below 120 deg. F)

10 – Maintenance:

10.1 In-Crop Maintenance

10.1.1 Boiler Blow-Down

- Boiler water quality maintenance is critical in maintaining the health and longevity of your Boiler system. Proper Blow-down settings and procedures are an important element in maintaining Boiler water quality
 - The “Blow-down” process removes some of the contaminated water in a controlled manner and allows new clean supply water to replace the old.
- Automatic field operation “Surface Blow-down” Settings
 - The DewPoint Control System will monitor water use and when the proper water quality settings have been entered into the system a Blow-Down request will pop up on the screen approximately every 250 gallons of water use.
 - Confirm the Blow-down request and continue baling while the Blow-down procedure is executed
 - The waste water from the automatic Surface Blow-down is discharged through the small RED Blow-down Hose behind the baler pickup
- Manual “Bottom Blow-down” at the Beginning of the Day

- As prompted, drain 30–50 gallons of water from the boiler in a safe location using the 2 inch Boiler Drain Valve at the rear bottom end of the boiler. An on-screen reminder will appear at each start-up of the DewPoint Machine
 - Be careful to avoid burns from hot boiler water
 - Choose a location where the water will not run back on the operators feet from the boiler drain hose
 - Be sure that the hot boiler water will not damage persons or property in the vicinity.
 - Observe all local regulations regarding the discharge of boiler water



10.1.2 Burner Fan Cleaning (DewPoint 6110 Machines only)

- Clean Burner Fan daily or more often as needed
 - Attach compressed air hose to the fitting adjacent to the air louvers on the burner
 - Open the valve 3-4 times for 3-5 seconds each time
 - Close valve and detach hose

10.1.3 Burner Pilot Ignition Housing Cleaning (DewPoint 6210 Machines only)

- Clean Burner Pilot Ignition Housing each 100 hours of operation or more often as needed
 - Attach compressed air hose to the fitting on the air hose that connects to the Pilot Ignition Housing
 - Open the valve 3-4 times for 3-5 seconds each time
 - Close valve and detach hose

10.1.4 Internal Burner Cleaning

- Clean inside Burner Blast Tube area each 100 hours of operation or more often as needed
 - Remove Front/Top Cover from Burner
 - Use compressed air with an Air Wand/Nozzle to remove dust and crop residue from internal components of the Burner
 - On 6110 Machines it is a good practice to clean the Fan thoroughly each 50 hours of operation with compressed air with this Front Cover removed

- It will NOT normally be necessary to remove the Fuel Gun Assembly to clean this area. Careful use of an Air Wand with an angled discharge at the tip will usually make cleaning this area quite effective.
- If the Fuel Gun Assembly is removed for cleaning or other service, be sure that all fuel lines, ignition wires and Flame Sensor are re-connected properly

10.1.5 Clean Crop Residue Generally

- A high output commercial compressor (trailer) is a great investment for hay baling operations. Crop residue can be blown off the DewPoint Machine and Baler in just a few minutes each time you are loading with water.
 - Clean Baler by raising shields and blowing off hay leaves from all mechanical components including upper and lower knotter/twine handling components at least daily
 - Clean Burner/Generator area at least daily
 - Clean Pump Enclosure area at least daily
 - Clean Flue area daily

10.2 Lubrication

- SEE Lubrication section of Owner Manual for more detail
 - Grease PTO yokes and carrier bearings each 50 hours
 - Grease PTO Anti Rotating Shields Daily
 - Axle
 - Grease Steering grease fittings daily
 - Grease Spring Pivots daily
 - Grease Brake arms each 50 hours

10.3 Maintenance Between Crops

10.3.1 Wet Boiler Lay-up.

- This is the preferred lay-up method when the DewPoint Machine will not be subjected to freezing temperatures. The boiler is protected more effectively when the interior waterside surfaces are completely covered with water which has been treated with the DewGood water treatment product.
 - PRESS “Menu” → “Operations” → “Home” → “Wet Layup”
 - Follow on –screen instructions
 - Boiler will fill completely and water will begin coming out of the Safety Pressure Relief Valve
 - When water comes out of the Safety Pressure Relief Valve follow instructions on the Touch Screen to “Shut Down” the DewPoint Machine

10.4 Maintenance End of Season

10.4.1 Flue Temperature

- Take note of Flue Temperature on “High Fire” to determine if Firetubes will need cleaning during off-season

10.4.2 Dry Lay-up

- Drain-down while boiler is hot
 - Release Steam Pressure
 - Drain immediately and follow winterization procedures

10.4.3 Check Boiler interior for scale/corrosion

- With Boiler Drained:
 - Remove at least 1 Hand Hole Port
 - It is a good practice to photograph the interior of the boiler annually through a Hand Hole Port to document Boiler health
 - Remove Boiler Drain Valve Assembly
 - Inspect lower interior of the boiler

- Wash/Flush out if necessary
- Be sure the boiler is drained and dry before winter storage

10.4.4 Clean Machine

- Clean Burner inside and out with compressed air
- Clean Crop Residue
 - Burner/Generator Area
 - Pump Enclosure Area
 - Flue Area
 - Under Mainframe
- Clean Firetubes if necessary