

Fire Behavior (FB)

Sampling Method



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SUMMARY

The Fire Behavior (FB) method is used to describe the behavior of the fire and the ambient weather and fuel conditions that influence fire behavior. Unlike the plot-based sampling methods described in FIREMON, FB methods are collected by event and time-date. The FB data consist of documented observations taken over the course of a fire event. In general, the fire behavior data are used to interpret the fire effects documented in other plot-level sampling methods. The FireID field in the PD method ties data stored in the Fire Behavior table to plot data. If descriptions of fire behavior are needed for a specific macroplot rather than an event, these are best recorded using methods described in the Fire Behavior and Fire Fuels section of the Plot Description (PD) method.

INTRODUCTION

Fire managers achieve desired fire effects by burning under narrow environmental conditions that promote desired fire behavior. In other words, fire managers must account for weather conditions, such as temperature, humidity, and wind, plus fuel moistures and topography to prescribe a fire that will produce the desired fire effects. The only way a fire manager can successfully assess the complex interaction of factors is to get extensive experience burning across the wide range of environmental conditions *and* to review the results of others who burn under the same conditions. Fire managers who document their burn experience by recording environmental conditions and resultant fire behavior in a database help other managers to link burning conditions with associated fire effects. For example, a fire manager may want to achieve a desired fire effect, such as constraining mortality to 50 percent or achieving 60 percent fuel reduction. Knowing the environmental conditions under which these effects have been obtained in other burns helps him to achieve similar results in his management area.

The FIREMON Fire Behavior (FB) methods were designed to document the weather and fuel conditions at the time of the fire and the fire behavior that resulted from those conditions. The data are linked to the plot level sampling by a common field so that they can then be used to interpret the effects of that burn. For example, it is informative to know that the 50 percent fuel consumption measured using the FL method was achieved at 70 degrees F temperature, 30 percent relative humidity, and 12 percent 1000-hour fuel moistures.

The Fire Behavior methods are unlike other FIREMON methods because the FB methods are recorded during the fire event rather than when the plot-level data were collected. At any time during a burn, data can be collected on the FB form to document changes in environmental conditions and/or changes in fire behavior. If data are collected multiple times during a fire event, then multiple FB event records are created for each sample by using different dates and times for the records. The FB events are directly linked to plot sample data in the PD form using the FireID field. For example, if 50 FIREMON macroplots are all located in a 500-acre prescribed fire unit and all are burned with the same fire, then all will be linked to the same information in the FB table. Each macroplot is linked to this fire behavior information via the Fire ID in the PD form. The fire manager can query the Fire Behavior data to determine the burning conditions, fire behavior, and resultant fire effects on each of the burned plots.

The project objectives will determine which fields on the FB form need to be completed.

SAMPLING PROCEDURE

The sampling procedures for collecting FB data are documented in many other publications, such as the Fire-Weather Observer's Handbook (Fischer and Hardy 1976), so they will not be described here. The field descriptions for this method are presented in the order the fields are displayed on in the FB data table.

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Fire Information

Field 1: Fire ID (Required field) – Enter a Fire ID of up to 15 characters. The ID number or name will relate the fire to the plot data in the PD table when the same number is used in the FireID fields of both data tables.

Fire Behavior Info

The following set of fields identifies a specific sample during a fire event. During the course of a fire, observers may want to record data at a number of different times to track fire behavior during different weather conditions or different stages of burning. This set of fields ties each specific sampling event during the fire with the fire behavior data collected during it.

Field 2: FBData (Required field) – This field retrieves records for each sequential measurement of conditions that are taken during a fire event. If conditions were measured five times during a burn, then each condition can be accessed individually by selecting the desired record from this field. No user entry can be done in this field. To begin data entry for a new Fire Behavior record click, the right-most button on the record selector (right-facing triangle with asterisk next to it).

Field 3: Date (Required field) – Enter the date of fire as a 6-digit number in the MM/DD/YYYY format where MM is the month number, DD is the day of the month, and YY is the last two digits of the year. For example, April 01, 2007 would be entered 04/01/2007. (Only the last two digits of the year will be seen on the data entry screen but all four digits are stored in the database.)

Field 4: Time (Required field) – Enter the time of day that these observations were recorded. Use 24-hour time. For example, if the sampling is done at 8 a.m., enter 08:00; if it is 8 p.m., enter 20:00.

Field 5: Name - The name of the fire is entered in this 25-character field. This is a nonstandardized field so anything can be entered here; but we suggest the name follow the convention used by fire management, which derives the name from the drainage or major landmark where the fire starts.

Field 6: Ref ID – Enter a unique 20-character fire code that is taken from the database of other fire management agencies. Record the source of this reference ID in the FIREMON metadata table.

Field 7: Units (E/M) (Required field) – Enter the units of measure. E - English or M - Metric.

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Location

The next set of fields pinpoints the location of the fire behavior assessment and describes the geophysical setting and general fuel conditions leading to the observed fire behavior. Note that the location fields (Field 9 through Field 16) record the location of the observer. Field 17 through Field 55 record attributes related to where the fire is burning (these are attributes that lead to the behavior and effects of the fire). In some cases the observer can be close enough to the fire that the two can be considered to be the same. In the case of high intensity fires, the observer and fire may be a long distance apart, which may affect the ability of the observer to collect accurate data. For example, how reliable is an assessment of canopy cover made 1000 meters from a fire? When necessary, make liberal use of the Comments field to describe the precision of your assessments. For instance, you might record Fuel Model 2 in Field 17 then record in the Comments, "I cannot assess the Fire Behavior Fuel Model from my current position but recall from a pre-burn walk through that the fire is currently burning in an area described as a Fuel Model 2."

Field 8: Location Description – Enter a user-defined text description for the site where the fire observer is located in this 20-character field. If needed, use the Comments field to describe the geographical relationship between the observer's location and the location of the fire being observed.

Location is pinpointed using geographic coordinates. Geographic coordinates are nearly always obtained from a Geographic Positioning System (GPS). A discussion of how GPS technology works, how it is measured, and how to obtain GPS training is located in the PD section and will not be covered here.

Users can use either latitude-longitude (lat-long) or the UTM (Universal Transverse Mercator) coordinate systems. If using lat-long coordinates, enter data in Fields 9, 10 and 13. If using UTM, enter data in Fields 11 to 14. Enter the GPS error and error units in Fields 15 and 16 no matter which coordinate system you are using.

Field 9: Latitude – If using the lat-long system, enter the latitude in decimal degrees to six decimal places.

Field 10: Longitude - If using the lat-long system, enter the longitude in decimal degrees to six decimal places.

Field 11: Northing –enter the UTM northing to the nearest whole meter.

Field 12: Easting - enter the UTM easting to the nearest whole meter.

Field 13: Datum - Enter the datum you are using.

Field 14: Zone - If using the UTM system, enter the UTM zone of the plot center.

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Field 15: GPS Error - Enter the position error value provided by the GPS unit. This should be entered regardless of whether you are using lat-long or UTM coordinates.

Field 16: Error Units (E/M) - Enter the English or metric units associated with the GPS error. These units may be different than the units listed in Field 7.

Field 17: FBFM Number - Enter the Fire Behavior Fuel Model (integer) for the site where the fire is burning. FBFM numbers are described in Table 1 of Scott and Burgan. See Scott and Burgan, 2005, *Standard Fire Behavior Fuel Models: A comprehensive set for use with Rothermal's surface fire spread model*.

Field 18: FBFM Code - Enter the Fire Behavior Fuel Model (alpha numeric code) for the site where the fire is burning. See Scott and Burgan, 2005, *Standard Fire Behavior Fuel Models: A comprehensive set for use with Rothermal's surface fire spread model*.

Field 19: Primary Fire Carrier - Enter the 2-letter code for the fuel type leading to the observed fire behavior.

Primary Fire Carrier Code	Fire Carrier Description
GR	Grass
GS	Grass/shrub
SH	Shrub
TU	Timber understory
TL	Timber litter
SB	Slash/blowdown
NB	Non-burnable
X	Not assessed
UA	Unable to assess

From: Scott and Burgan, 2005, *Standard Fire Behavior Fuel Models: A comprehensive set for use with Rothermal's surface fire spread model*.

Field 20: Fuel Continuity – Fuel continuity is described at multiple scales and in both horizontal and vertical directions. Because there is no universally accepted definition, in FIREMON, we do not provide a procedure for assessing fuel continuity. In this 20-character field enter the description or code suggested by your agency or organization to describe the observed fuel continuity on site.

Field 21: Slope – Estimate the slope for the site where the fire is burning to the nearest 5 percent. The slope is measured as an average of the uphill and downhill slope from plot center. See **How To Measure Slope** in the **How-To Guide** chapter for more information. Be sure the recorded slope represents the site where the fire behavior is being observed. Slope values should always be positive.

Field 22: Aspect – Estimate the aspect of the site where the fire is burning to the nearest 5 degrees. Aspect is the direction the slope is facing. For example, a slope that faces exactly west would have an aspect of 270 degrees true north. Be sure you verify your

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compass reading with your knowledge of the area to be sure that the aspect indicated is correct. Often, metal parts on sampling equipment, or an iron rebar plot center, can influence the estimation of aspect. For information about using a compass see **How to Use a Compass - Sighting and Setting Declination** in the **How-To Guide** chapter.

Field 23: Elevation (ft/m) – Enter the elevation above mean sea level (MSL) of the area where the fire is burning in feet (or meters) to the nearest 100 feet (30 m). Elevation can be estimated from three sources, including a GPS unit, an altimeter, or a topographic map. GPS readings include an estimate of elevation and these estimates are usually fairly accurate. Altimeters estimate elevation based on atmospheric pressure and are notoriously fickle. They need calibration nearly every day. When there are frequent weather systems passing the area, altimeters should be calibrated every 4 hours. Elevation estimates based on USGS topographic maps are fairly accurate if users are skilled in reading maps.

Field 24: Overstory Canopy Cover - Enter the code that best represents the canopy cover of the area where the fire is burning.

Field 25: Days Since Wetting Rain - Enter the number of days since last wetting rain.

Burning Conditions

The next set of fields allows the fire manager to record the weather conditions at the date and time recorded in Field 3 and Field 4. These weather data can be measured onsite or downloaded from a RAWS station or other weather station near the burn. The source of these data should be recorded in the Fire Behavior Comments field. There is little variability in temperature, humidity, dew point and relative humidity across the extent of most fires so it usually doesn't matter that the observer is recording them at the observers location rather than the location of the fire. The remainder of the fields in this section, however, should represent, as much as possible, conditions at the fire.

Field 26: Dry Bulb (temp) (degrees F/degrees C) – Enter the temperature.

Field 27: Wet Bulb (degrees F/degrees C) – Enter the wet-bulb temperature.

Field 28: Dew Point (degrees F/degrees C) – Enter the dew-point temperature.

Field 29: Relative Humidity (percent) – Enter the relative humidity.

Field 30: Wind Direction (degrees) – Enter the typical wind direction at the fire in degrees from true north.

Field 31: Wind speed (miles/hour or km/hour) – Enter the typical wind speed at the fire.

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Field 32: Gusting Speed (miles/hour or km/hour) – Enter the typical wind speed of gusts at the fire.

Field 33: Stability Index – Enter an index, such as Haines Index, that describes the atmospheric stability. Up to 5 characters.

Field 34: Percent Cloudy (percent) – Enter the percent cloud cover seen over the fire.

Field 35: Fine Fuel Shading (percent) – Enter the percent of the fine dead fuels shaded by cloud cover and/or canopy cover.

Fuel Moistures

The next set of fields describes the measured fuel moistures collected as near as possible to the date and time of burn. Standard fuel moisture measurement techniques should be employed. There are two common methods of measuring fuel moistures. The oven-dry method requires that multiple samples of all the fuels class sizes be collected in the field, stored in airtight containers (zip-close bags work well), and brought back promptly to be weighed and dried. The mass of the individual samples is measured first, and then the samples are put in an oven at 100 degrees C. The 1- and 10-hour fuels, and litter and duff should be dry in 24 hours. Weigh a few selected samples of the larger fuels every 24 hours until they reach equilibrium. When the piece weights of a class (for example the 100-hour fuel class) reach equilibrium; then you can make a final weight of all of the pieces in the class. Calculate the percent moisture (gravimetric) for each piece using equation FB-1 then average the moistures for each class.

Equation FB-1:

$$M = \left(\frac{WW - DW}{DW} \right) * 100$$

Where, M = gravimetric moisture content of the class, in percent, WW = wet weight of all pieces in the class and
 DW = dry weight of all pieces in the class.

The fuel moisture for a class is the average moisture measured across all of the samples. When cutting pieces off logs for fuel samples, you do not need to cut them thicker than 3 inches (7.6 cm). Thicker pieces will unnecessarily extend the drying time. If you use the oven-dry method, you will not be able to enter the fuel moisture data the day of the fire.

The second method involves indirect measurements of fuel moisture using probes or other instrumentation. The moisture estimates using these methods are generally not as accurate as the oven-dry method but they allow quick moisture estimates and, depending on the project objectives, may be sufficiently accurate.

Record the method of fuel moisture measurement in the FB Comments field.

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Field 36: 1-Hour (percent) – Enter the fuel moisture of the 1-hour downed dead woody fuel class (less than 0.25 inch or 1 cm in diameter).

Field 37: 10-Hour (percent) – Enter the fuel moisture of the 10-hour downed dead woody fuel class (0.25 to 1.0 inch or 1 to 2.5 cm in diameter).

Field 38: 100-Hour (percent) – Enter the fuel moisture of the 100-hour downed dead woody fuel class (1.0 to 3.0 inches or 2.5 to 8 cm in diameter).

Field 39: 1000-Hour Sound (percent) – Enter the fuel moisture of the sound 1000-hour and 10,000-hour downed dead woody fuel class (3.0 inches or 7.6 cm and greater in diameter). Sound fuels are decay class 1, 2, and 3 pieces. See the **Fuel Load (FL)** sampling method for more information.

Field 40: 1000-Hour Rotten (percent) – Enter the fuel moisture in percent of the rotten 1000-hour and 10,000-hour downed dead woody fuel class (3.0 inches or 7.6 cm and greater in diameter). Rotten fuels are decay class 4 and 5 pieces. See the **Fuel Load (FL)** sampling method for more information.

Field 41: Litter (percent) – Enter the moisture of the litter layer. This is the layer that contains recognizable material such as cone scales, and dead leaves and needles not attached to the plant where they grew.

Field 42: Duff (percent) – Enter the moisture of the duff layer. This is the layer that contains unrecognizable decomposing organic material. Try to get a moisture estimate for the entire duff profile.

Field 43: Soil (percent) – Enter the moisture of the uppermost soil layer. This is the top 4 inches (10 cm) of mineral soil just below the duff layer.

Field 44: Shrub (percent) – Enter the moisture of the live shrubs.

Field 45: Herb (percent) – Enter the moisture of the live herbaceous plants.

Field 46: Crown (percent) – Enter the moisture of the live tree crown foliage. Collect samples from as many parts of the tree crown as possible.

Fire Behavior

The last set of fields describes the measured or observed fire behavior of the fire at the specified time and date in Fields 3 and 4. Fire behavior is often observed rather than measured. Follow the directions in the Fire Observers Handbook (Fischer and Hardy 1976) or other agency/organization approved guide when estimating these standard fire behavior characteristics.

Field 47: Fire Activity – Enter the observations for Fields 23 through 27 first. Then, using those observations, enter one of the following codes that best describes the fire activity.

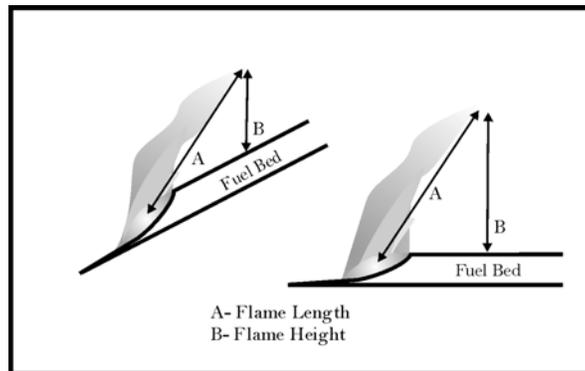
- F** – Flanking: Fire spreading roughly parallel to the direction of highest rate of fire spread, across slope and/or 90 degrees to the wind.
- B** – Backing: Fire spreading in the opposite direction of highest rate of fire spread, downslope and/or 180 degrees to the wind.
- H** – Head: The area of the flaming front with great spread rate, spreading with the wind and/or burning upslope
- C** – Crown: A fire advancing from top to top of the trees or shrub crowns generally independent of the surface fire spread.

Field 48: Spread Rate (ft/min. or m/min.) – Estimate the average speed of the fire. To estimate this parameter, use a watch and note the time it takes for the flame front to go 30 feet (10 m) and then divide 30 by the number of minutes (or fraction of) to get spread rate in ft/min, or divide 10 by the number of minutes (or fraction of) to get spread rate in m/min.

Field 49: Fire Spread Direction (degrees) – Enter the direction of the main spread of the fire (direction of the head fire) to the nearest 45 degrees.

Field 50: Flame Length (ft/m) – Estimate flame length to within ± 20 percent of the length. This is the distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface). On flat surfaces in no wind this will be the same as Flame Height, otherwise is will be greater.

Field 51: Flame Height (ft/m) – Estimate flame height to within ± 20 percent. This is the maximum vertical extension of continuous flame at the leading edge of the fire.



Field 52: Flame Depth (ft/m) – Estimate flame depth to within ± 20 percent. This is the depth of the fire front.

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Field 53: Spotting– Describe the spotting behavior using one of the following codes:

- SD** – Spotting downslope or downwind
- SU** – Spotting upslope or upwind
- SE** – Spotting is erratic and random
- NS** – No spotting observed
- NA** – Difficult to determine spotting due to smoke or obstruction

Field 54: Plume – Describe the dynamics of the plume using one of the following codes:

- WV** – Plume well ventilated, rising, and dispersing high above burn
- US** – Plume unstable and its behavior is erratic.
- PD** – Plume is dropping and going downhill into the valleys

Field 55: Plume Direction (degrees) – Describe the direction of the plume in degrees from true north measured to the nearest 45 degrees.

Local Codes and Comments

These fields allow users to enter specific information about the fire. These are used for information that can not be entered elsewhere on the form or additional information that must be added to clarify some of the data that was collected. Remember, the fire behavior data maybe used in future years so add any extra information that will assist in interpreting the data at that time.

Field 56: Local Code 1 – Enter a user-designed code that is up to 20 characters in length and uniquely describes some condition on the FIREMON plot. Avoid using spaces in your codes to avoid confusion and database problems. Document your coding method in the Comments field.

Field 57: Local Code 2 – Enter a user-designed code that is up to 20 characters in length, and uniquely describes some condition on the FIREMON plot. Avoid using spaces in your codes to avoid confusion and database problems. Document your coding method in the Comments field.

Field 58: Comments – Memo field. 60,000+ characters used to record any information pertinent to the FB information. Text information can be pasted from word documents, Access databases, Excel spreadsheets, or any other software that can copy text to the windows clipboard.

FIRE BEHAVIOR (FB) FIELD DESCRIPTIONS

Required Field

Field 1: FireID. Up to 15-character code determined by you or assigned to you used to name the fire event. Once entered on the FB form, the FireID will be available for selection on the PD form.

Fire Behavior Info

Field 2: FBData. This field retrieves records for each sequential measurement of conditions that were taken during a fire event. No user entry is allowed in this field .

Field 3: Date. 8-digit number in the MM/DD/YYYY format where MM is the month number, DD is the day of the month and YYYY is the current year. Precision: No error. (Only the last two digits of the year will be seen on the data entry screen but all four digits are stored in the database.)

Field 4: Time. 4-digit number in the 24-hour or military-time format, where 1:00 pm is 13:00. Precision: ± 5 minutes

Field 5: Name – Up to 25 characters of unstandardized text to name the fire.

Field 6: Ref ID – Reference ID used by your agency or organization to track the fire. 20-character unstandardized text.

Field 7: Units – Estimate or measurement units. 1-character text code (E/M).

Location information

Field 8: Location Description – Description of site where the fire observations were taken. Up to 20 characters of unstandardized text.

Field 9: Latitude – Latitude. Precision: ± 0.000001 (six decimal places).

Field 10: Longitude - Longitude. Precision: ± 0.000001 (six decimal places).

Field 11: Northing – UTM northing. Precision: ± 1 meter.

Field 12: Easting - UTM easting. Precision: ± 1 meter.

Field 13: Datum – Datum used in conjunction with UTM coordinates. Maximum 10-character text. Precision: No error.

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Field 14: Zone – UTM zone. Maximum 5-character text code. Precision: No error.

Field 15: GPS Error – Integer value of position error provided by the GPS unit.
Precision: No error.

Field 16: Error Units (E/M) – Enter the units associated with the GPS error. May be different than the units listed in Field 7. Precision: No error.

Field 17: FBFM Number – Integer describing Fire Behavior Fuel Model number describing the fuels the fire is burning. Precision: No error.

Field 18: FBFM Code – Maximum 10-character text code for Fuel Behavior Fire Model describing the fuels the fire is burning. Precision: No error.

Field 19: Primary Fire Carrier (GR/GS/SH/TU/TL/SBNB/UA/X) – 1- or 2-character text code to describe a fire's primary carrying fuel type of the area that is burning.
Precision: No error.

Field 20: Fuel Continuity – Up to 20-character unstandardized text.

Field 21: Slope (percent)–Average plot slope of the area that is burning. Integer.
Precision: ± 5 percent.

Field 22: Aspect (degrees)–Aspect measured in degrees true north of the area that is burning. Precision: ± 5 degrees. Integer between 0 and 360.

Field 23: Elevation (ft/m) – Plot elevation of the area that is burning. Integer. Precision: ± 100 feet (30 m).

Field 24: Overstory Canopy Cover (percent) – Cover class code that describes overstory cover of the area that is burning. Precision: ± 1 cover class.

Field 25: Days Since Wetting Rain – On the area that is burning. Integer. Precision: ± 1 day.

Burning Conditions

Field 26: Dry Bulb (temp) (degrees F/degrees C) – Integer. Precision: No error.

Field 27: Wet Bulb (degrees F/degrees C) – Integer. Precision: No error.

Field 28: Dew Point (degrees F/degrees C) – Integer. Precision: No error.

Field 29: Relative Humidity (percent) – Integer. Precision: No error.

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Field 30: Wind Direction (degrees) – At the fire. Integer between 0 to 360. Precision: \pm 45 degrees.

Field 31: Wind speed (miles/hour or km/hour) – At the fire. Integer. Precision: \pm 10 percent of wind speed, round to nearest whole number.

Field 32: Gusting Speed (miles/hour or km/hour) – At the fire. Integer. Precision: \pm 10 percent of wind speed, round to nearest whole number.

Field 33: Stability Index – Maximum 5-character text. Precision: No error.

Field 34: Percent Cloudy (percent) – At the fire. Integer. Precision: \pm 25 percent.

Field 35: Fine Fuel Shading (percent) – At the fire. Integer. Precision: \pm 25 percent.

Fuel Moistures

Field 36: 1 Hr (percent) – Integer. Precision: No error.

Field 37: 10 Hr (percent) – Integer. Precision: No error.

Field 38: 100 Hr (percent) – Integer. Precision: No error.

Field 39: 1000Hr Snd (percent) – Integer. Precision: No error.

Field 40: 1000Hr Rot (percent) – Integer. Precision: No error.

Field 41: Litter (percent) – Integer. Precision: No error.

Field 42: Duff (percent) – Integer. Precision: No error.

Field 43: Soil (percent) – Integer. Precision: No error.

Field 44: Shrub (percent) – Integer. Precision: No error.

Field 45: Herb (percent) – Integer. Precision: No error.

Field 46: Crown (percent) – Integer. Precision: No error.

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Field 47: Fire Activity (F/B/H/C) – 1-character text code that describes the general type of fire. Precision: No error.

Field 48: Spread Rate (ft/min. or m/min.) – Integer that describes fire spread rate. Precision: ± 10 percent of spread rate, round to nearest whole number.

Field 49: Fire Spread Direction (degrees) – Integer between 0 and 360 that describes the fire's spread direction off of true north. Precision: ± 45 degrees

Field 50: Flame Length (ft/m) – Integer that describes flame length. Precision: ± 20 percent of flame length, round to nearest whole number.

Field 51: Flame Height (ft/m) – Integer that describes flame height. Precision: ± 20 percent of flame height, round to nearest whole number.

Field 52: Flame Depth (ft/m) – Integer that describes flame depth. Precision: ± 20 percent of flame depth, round to nearest whole number.

Field 53: Spotting (SD/SU/SE/NS/NA) – 2-character text code. Precision: No error.

Field 54: Plume (WV/US/PD) – 2-character text code. Precision: No error.

Field 55: Plume Direction (degrees) – Integer between 0 and 360. Precision: ± 45 degrees.

Local Codes and Comments

Field 56: Local Code 1 – Up to 20 characters in length, unstandardized text.

Field 57: Local Code 2 – Up to 20 characters in length, unstandardized text.

Field 58: Comments – Memo field. 60,000+ characters of unstandardized used to record any information pertinent to the FB information.

FIRE BEHAVIOR (FB) EQUIPMENT LIST

Camera with film
Compass
Clipboard
FB field forms
Field notebook
Flagging
Hammer (2)
Hatchet (1)
Chain saw or hand saw
Labels
Lead pencils with lead refills
Maps, charts, and directions
Map protector or plastic bag
Masking tape
Pocket calculator
Plot sheet protector or plastic bag
Plot sheets for plots that will be burned (to fill in Fire ID)
Watch with second hand
Weather kit
Zip-close bags or other plastic containers