



ICT EQUIPMENT CATALOG

INTRODUCTION

Innovative Combustion Technologies, Inc. (ICT), founded in 1993, is an established, result-oriented company that provides boiler testing, combustion troubleshooting, consulting, inspection, specialized test equipment and training services to fossil fired power plants. Combustion problems or opportunities for improvement often develop unexpectedly and most plants do not have combustion experts or the testing equipment on hand to quickly troubleshoot combustion challenges. Our company can provide results oriented expertise and testing equipment when it is needed. We specialize in addressing "combustion side" parameters to identify and address opportunities for improved unit heat rate, emissions, performance, availability, capacity and operability. We are practical "coveralls, tape measure and flashlight" engineers and technicians that concentrate on identifying and correcting the problem with existing equipment using proven and practical field solutions rather than peddling the "newest and greatest" novelties that are marketed to solve the ills of poor combustion.



When addressing the performance of coal-fired units, electric utilities typically concentrate on factors related to the turbine, condenser, feed water heaters and steam cycle. Numerous opportunities for improved performance are also available at the boiler. Optimizing boiler side or "combustion" side parameters will address performance penalties incurred by "non-optimum" combustion. In recent years major modifications to combustion equipment, operating practices and fuel selection have been commonplace to reduce NO_x emissions and/or to endeavor to be low cost producers. More often than not, these modifications to equipment, operating practices or the fuel being burned results in a boiler that is less forgiving to non-optimum performance factors.

As a result, challenges related to stack opacity, furnace and convection pass slagging and fouling, fly ash Carbon content or unit capacity often develop. Optimization of the combustion side parameters such as pulverizer performance, management of primary air and secondary air flow, unit air in-leakage, fan performance and operating practices have renewed importance to mitigate challenges that develop when attempting to operate at the absolute lowest NOx emissions, lowest generation cost and with maximum flexibility in the types and number of fuels to be fired.

ICT can provide the expertise, training and specialized testing equipment to improve performance by achieving optimum combustion as well as achieving the lowest possible NOx emissions without slagging problems, high fly ash

LOI, high stack opacity and/or reduced unit capacity. Addressing these opportunities for improvement is centered on optimizing the inputs into a boiler (fuel and air). This always requires specialized testing and equipment to quantify the inputs followed by inspection, repair and/or modification of fuel burning equipment by qualified and experienced persons to rectify non-optimum "inputs". Our testing equipment has been field proven through many years of service and we offer this equipment alone so our clients can pursue optimum combustion or our service engineers can work with you as a part of your team to achieve results. Our reputation in the power generation industry has been built on our results. Contact us today to see how we can assist you; we look forward to working as part of your team.

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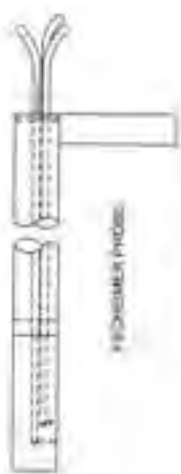
THIRTEEN PREREQUISITES OF OPTIMUM COMBUSTION FOR LOW NO_x BURNERS:

1. Furnace exit must be oxidizing, preferably an average of 3.0% with no single point below 2.0%.
2. Individual fuel lines balanced by "Clean Air" test to within $\pm 2\%$ or better.
3. Fuel lines balanced by "Dirty Air" test, using a Dirty Air Velocity Probe, to $\pm 5\%$ or better.
4. Fuel lines balanced in fuel flow to $\pm 10\%$ or better.
5. Fuel line fineness shall be 75% or more passing a 200 mesh screen. Particles remaining on 50 mesh shall be less than 0.3%.
6. Primary airflow shall be accurately measured and controlled to $\pm 3\%$ accuracy.
7. Overfire air shall be accurately measured and controlled to $\pm 3\%$ accuracy. Overfire airflow should not exceed 20% of total airflow.
8. Primary air/fuel ratio shall be accurately controlled when above minimum line velocity. Optimum PA flow is usually optimum at 1.8 pounds of air per pound of coal on Raymond, EL, E and MPS pulverizers. Ball Tube and Attrition mills are typically optimized at lower air to fuel ratios of 1.1-1.4 pounds of air per pound of coal.
9. Fuel line minimum velocities should average 3,300 fpm or higher, which allows for some air imbalance between burner lines. Under no circumstances should the burner line velocity fall below 3,000 fpm.
10. Mechanical tolerances of burners and dampers shall be $\pm 1/4"$ or better.
11. Secondary air distribution to burners should be within $\pm 5\%$ to $\pm 10\%$.
12. Fuel feed to the pulverizers should be smooth during load changes and measured and controlled as accurately as possible. Load cell equipped gravimetric feeders are preferred.
13. Fuel feed quality and size should be consistent. Consistent raw coal sizing of feed to pulverizers is a good start. Raw coal sizing of $1/4"$ to $1"$ is usually considered optimum.

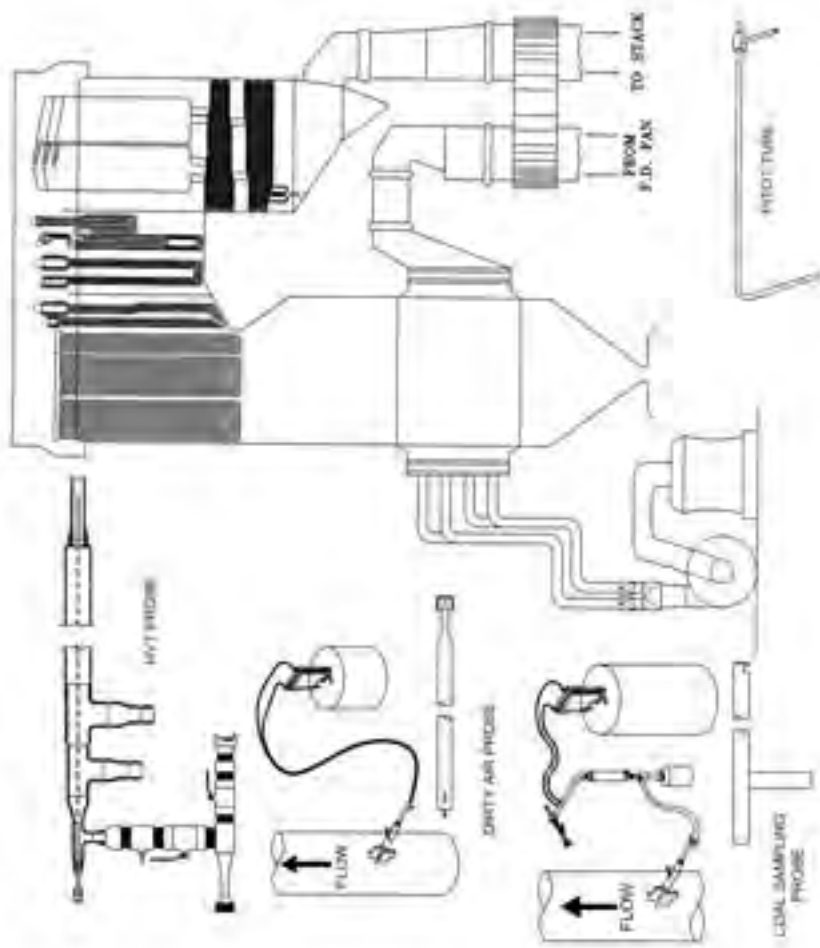
FORWARD REVERSE PROBE



FEEDER PROBE



VOLUMETRIC FLOW PROBE



HVT/GAS SAMPLING

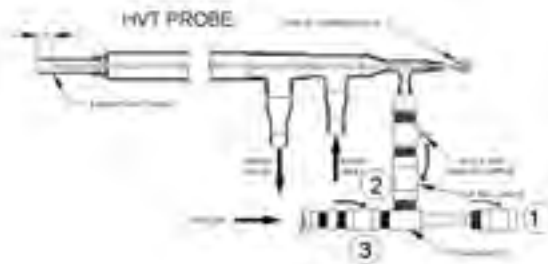


FIGURE 1 –
HVT PROBE DRAWING

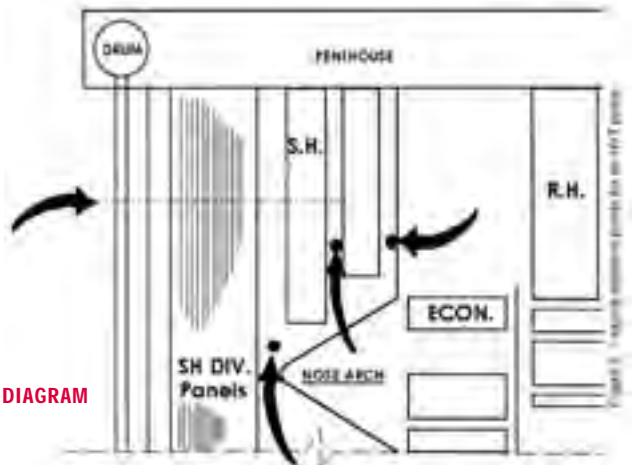


FIGURE 2 –
BOILER SIDE DIAGRAM

HVT/GAS SAMPLING

FURNACE EXIT TRAVERSE

FURNACE HIGH VELOCITY THERMOCOUPLE TRAVERSES ARE PERFORMED TO ACCOMPLISH THE FOLLOWING:

1. Quantify furnace exit gas temperatures.
2. Ascertain furnace temperature profile.
3. Quantify furnace Oxygen level.
4. Ascertain furnace Oxygen profile.
5. Furnace CO and NO_x profile can also be determined.

The HVT probe is typically inserted into the furnace cavity at the furnace exit (nose arch apex area). Temperatures at these locations can range between 1500°F and 2800°F requiring the HVT probe to be water-cooled. Figure 1 (page 6) illustrates the HVT probe design and Figure 2 (page 6) illustrates typical HVT traverse locations on a 500 Mw coal fired boiler.

HVT/GAS SAMPLING

The HVT traverse is, without a doubt, the single most important test in diagnosing combustion related problems. The HVT probe, by design, is intended to accurately measure gas temperature but its greatest importance is the measurement of excess Oxygen. Steam generators over ten years old have a common tendency toward high air in-leakage. Air in-leakage through the penthouse, nose arch dead air space, bottom ash hopper dead air spaces, expansion joints and the boiler setting are commonly assigned very low maintenance priority. These items are much more critical to unit performance than most realize. Further complication sometimes includes the lowering of excess air to reduce free Oxygen and subsequently reduce the formation of thermal NO_x to comply with emission levels stipulated by the Clean Air Amendment. Typically, excess Oxygen is controlled by an indication of Oxygen level at the economizer exit. High levels of air in-leakage through the areas previously mentioned dilute the flue gas with Oxygen prior to its measurement at the economizer exit. It is not uncommon to find total leakages between the furnace exit and the economizer exit in the 20% to 30% range. This results in indicated Oxygen of 3% to 4% at the economizer exit and 0% (reducing or sub-stoichiometric atmosphere) at the furnace exit. Temperature is rapidly depressed due to the high density of heating surface following the furnace exit. After the furnace exit, temperatures usually fall below the ignition point of Carbon very quickly. Without available free Oxygen, the Carbon fails to combust prior to its quenching below ignition temperature, resulting in high Carbon in ash and high Carbon Monoxide levels.

Performing a HVT traverse to determine the presence of Oxygen at the furnace exit is a simple, cost effective and efficient method of ascertaining the magnitude of air in-leakage. The absence of an oxidizing atmosphere at the furnace exit is usually the result of high air in-leakage. High air in-leakage will result in increased dry gas loss due to the heat absorption of tramp air which did not pass across the air heaters. If the excess air level is raised to obtain an oxidizing atmosphere in the furnace without reducing air in-leakage, higher than design draft losses will be incurred.

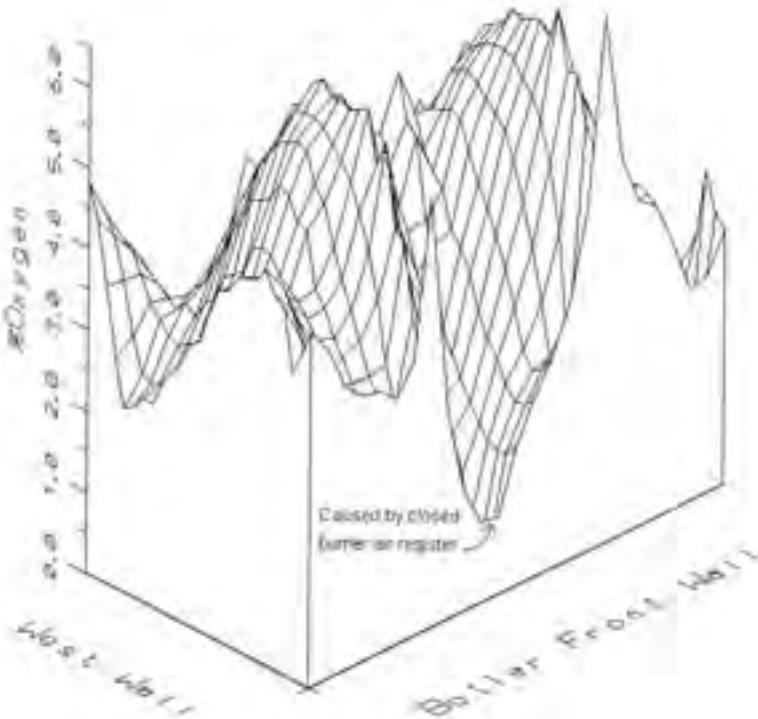
HVT/GAS SAMPLING

FURNACE EXIT TRAVERSE, cont.

The "tempering" effect of the cool ambient air in-leakage will lower indicated boiler exit gas temperature, when in fact, if corrected for leakage, exit gas temperature would be much higher. Numerous other complications also result from this condition.

Temperature and Oxygen profiles obtained by the HVT traverse can also be an indication of imbalances in air and fuel originating in the burner belt zone. Pulverizer fuel imbalances, combustion (secondary) air imbalances, closed air registers, plugged fuel lines, etc. are easily reinforced by the temperature and Oxygen profiles determined by a HVT traverse. It is also useful to compare side to side flyash Loss On Ignition (L.O.I.) and slagging tendencies with HVT Oxygen profiles. As an example, Figure 3 illustrates the Oxygen profile on a 500 Mw wall fired unit. The dip or cavity in the Oxygen level correlates with an air register which was frozen in the closed position.

OXYGEN PROFILE ON
500 Mw BOILER



HVT/GAS SAMPLING EQUIPMENT

HVT/GAS SAMPLING

Innovative Combustion Technologies Inc. offers two kits that can be purchased to augment your plant's testing program. The HVT Test Kit comes complete with all equipment and supplies needed to perform a HVT test. The HVT Supply Pack comes with the necessary expendable supplies that will be consumed during the testing. Whether you are considering implementing your own HVT testing program or you already have a HVT Test Kit with components that need to be replaced (broken thermocouples, corroded radiation shields, etc.), these kits provide an excellent value and are highly recommended.

HVT TEST KIT

- (1) HVT Probe
- (1) Gas Analyzer
(configurable from 4-6 gasses)
- (1) Gas Conditioning System
- (1) Digital thermometer
- (1) Type "K" 20' insulated thermocouple lead wire
- (1) HVT Supply Pack

PART #: ICT-HVT-60



HVT SUPPLY PACK

- (4) Thermocouples for the HVT probe
- (4) Thermocouple compression fittings
- (4) Radiation shields
- (1) 100' of heavy wall flexible tubing
- (5) Replacement filters for gas sampling conditioner
- (1) Calibration bag

PART #: ICT-HVT-50



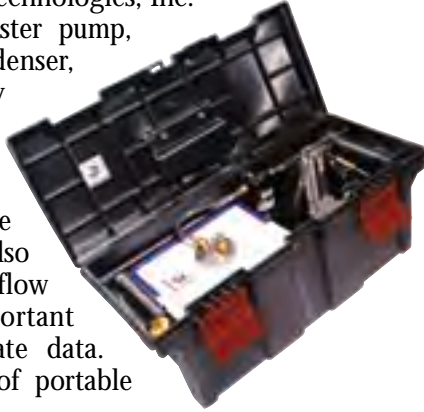
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HVT/GAS SAMPLING

HVT/GAS SAMPLING EQUIPMENT

GAS SAMPLE CONDITIONER SYSTEM (GSC)

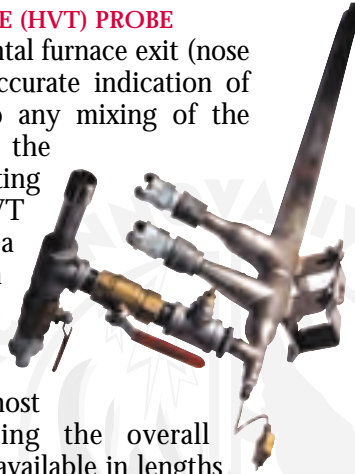
The Innovative Combustion Technologies, Inc. GSC is comprised of a booster pump, filter assembly, bubbler/condenser, and a flow meter. Use is highly recommended for filtering dust/ash particulate prior to entering gas analyzers in order to prolong service intervals on the analyzer. Also allows for precise metering of flow into the analyzer, an important criteria for obtaining accurate data. Compatible with all brands of portable gas analyzers.



PART #: ICT-HVT-35

HIGH VELOCITY THERMOCOUPLE (HVT) PROBE

Analysis of flue gas at the horizontal furnace exit (nose arch apex) provides the most accurate indication of combustion conditions, prior to any mixing of the gases that may take place in the convection backpass. Using existing furnace observation ports, the HVT Probe can be used to develop a profile of furnace exit combustion characteristics, namely excess oxygen levels and flue gas temperature. We have found this to be the quickest and most efficient means of documenting the overall combustion process. Probes are available in lengths from 8-20 feet.



PART #: ICT-HVT-(*PROBE LENGTH)

**Specify 8', 12', 14', 15', 16', or 20' (custom lengths available upon request)*

HVT/GAS SAMPLING EQUIPMENT

ECOM A/C PORTABLE GAS ANALYZER

Many configurations are available to choose from. The most common configurations for testing of coal and oil fired boilers are found on Model (4), which is configured for O₂,

CO, SO_x and NO_x and Model (5), which is configurable for O₂, low range CO, high range CO, NO_x, NO and SO₂. Ideally suited for a variety of applications including: Furnace Exit Gas Analysis, Boiler/Air Heater Leakage Testing, and validation of CEM stack gas parameters.

PART #: ICT-HVT-34(4) & PART #: ICT-HVT-34(5)



Specifications:

Dimensions: 19" x 16" x 6.5"

Weight: 28 lbs.

Case: Aluminum With Locks

Electrical Requirements: 110v 60 Hz/220v 50 Hz Standard.

User selectable on panel. 1 Amp.

Service: Low maintenance design allows for calibration and most service functions can be performed in the field.

Operating Temperature: 20°F to 122°F

COAL SAMPLING

ISOKINETIC COAL SAMPLING

Many OEM boiler designs of the 1960's were based on the single stage combustion theory and in such, were designed with a very conservative furnace. Very little emphasis was placed on mill performance since it was assumed that the turbulent nature of the furnace would be sufficient to adequately mix and combust the coal particles. Many boilers now require strict attention to mill performance in order to meet Nitrous Oxide and particulate emissions levels while still maintaining acceptable combustion efficiency. As a result, a higher degree of precision in delivery of the fuel and air to the furnace is required.

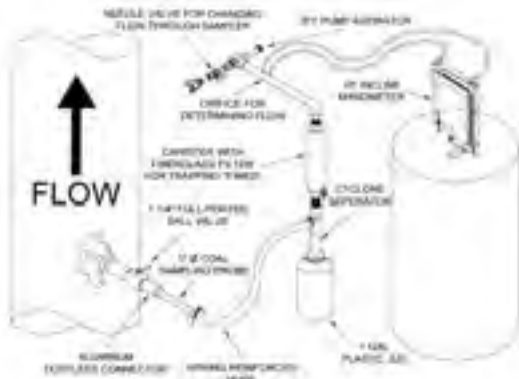
In order to quantify mill performance, we use several pieces of equipment that allow us to measure individual burner line airflows and extract an isokinetic coal sample from each pipe. With this data we are able to accomplish the following:

- 1) Ascertain relative pipe to pipe fuel balance.
- 2) Quantify individual fuel line air to fuel ratios.
- 3) Quantify pulverizer air to fuel ratio.
- 4) Quantify individual fuel line velocity and air flow.
- 5) Ascertain pipe to pipe air flow balance.
- 6) Quantify fuel line temperature and static pressure.
- 7) Obtain representative fuel samples for coal fineness analysis.

SAMPLING PROBE



ISOKINETIC COAL SAMPLING KIT



COAL SAMPLING

For representative coal fineness results or accurate fuel distribution documentation, the isokinetic method of collecting coal samples from individual pulverizer burner lines is strongly recommended. The Innovative Combustion Technologies, Inc. Isokinetic Coal Sampling Kit provides a dirty air probe which measures typically 20 or 24 individual velocity heads across a minimum of two axes (that are 90° apart) within the burner line. The coal sampler is used to extract a timed sample from the line, using the same traverse points as used with the dirty air probe. An in-line orifice in the sampler allows the user to adjust the aspirating airflow in order to maintain the velocities entering the coal sampling tip at levels identical to those in the burner line. A temperature/static probe assembly also accompanies the kit for calculation of airflow quantities (mass and volumetric flow). This method is useful in determining pulverizer air to fuel ratio, relative pipe-to-pipe fuel balance, individual fuel line velocity and air flow, pipe-to-pipe air flow balance, fuel line temperature and static pressure and coal fineness.

Although we still recommend and prefer the use of the Isokinetic Sampler in instances where precise accuracy is needed, an alternative method is offered using the ASME/ASTM Sampler. This method can provide a representative composite coal sample to quantify pulverizer fineness, but it does not allow for determination of relative pipe-to-pipe fuel and air flow balance or individual burner line air to fuel ratios.



PART #: ICT-ICK-32
CYCLONE SEPARATOR

COAL SAMPLING

ASME AND ISOKINETIC
COAL SAMPLING EQUIPMENT

ISOKINETIC COAL SAMPLING KIT

Includes everything needed to obtain an Isokinetic coal sample for measurement of representative coal fineness and accurate air/fuel distribution.

- (1) Coal line static/temperature probe with thermocouple
- (1) Calibrated dirty air probe
- (1) Coal sampling probe
- (1) 10' section of spring reinforced hose with clamps
- (1) 100' section of $\frac{3}{16}$ " I.D. heavy wall tubing
- (1) 10" vertically inclined Manometer kit with 18" pitot tube
- (1) Aluminum dustless connector
- (4) Replacement seals for dustless connector
- (1) 1 gallon plastic jar for coal sampling collection
- (1) Needle valve and aspirator assembly
- (1) Cyclone separator, orifice assembly and filter canister
- (1) 24" U-tube Manometer
- (1) Box of fiberglass filter paper (50+ sheets)
- (1) 8' thermocouple lead
- (1) Digital thermometer
- (1) Isokinetic coal sampling procedures manual

PART #: ICT-ICK-00

PART #: ICT-STP-24

STATIC/TEMPERATURE PROBE



ASME AND ISOKINETIC COAL SAMPLING EQUIPMENT

COAL SAMPLING

ISOKINETIC COAL SAMPLER



ASME/ASTM COAL SAMPLING KIT

Includes everything needed to extract a coal sample by the ASME/ASTM method. The design of our ASME Sampler has been adapted from our field proven Iso-kinetic Coal Sampler. We still recommend and prefer the use of the Iso-kinetic Sampler in instances where precise accuracy and determination of air/fuel distribution is needed, but this sampling kit provides a reliable way to test for coal fineness.

ASME/ASTM Coal Sampling Kit includes:

- (1) Coal sampling probe
- (1) 10' section of spring reinforced hose with clamps
- (1) 1 gallon plastic jar for coal sampling collection
- (1) Needle valve and aspirator assembly with gauge
- (1) Cyclone separator, orifice assembly and filter canister
- (2) Synthetic dustless connectors
- (4) Replacement seals for dustless connector
- (1) Box of fiberglass filter paper (50+ sheets)
- (1) ASME/ASTM coal sampling procedures manual

PART #: ICT-ASME-01

COAL SAMPLER SUPPLY PACK

Replacement for consumable items used with the Isokinetic coal sampler.

- (2) Packages of fiberglass filter paper (50+ sheets)
- (1) 100' section of $\frac{3}{16}$ " I.D. heavy wall tubing
- (1) 1 gallon plastic sample jar
- (1) Package of sample bags (approximately 60)
- (2) $\frac{3}{4}$ oz. bottles of red gage oil
- (2) Paintsticks
- (4) Replacement seals for dustless connectors

PART #: ICT-ICK-20



AIRFLOW MEASUREMENT

**SAMPLING PROBES
and TEST KITS**

CLEAN AIR BALANCING OF FUEL LINES

Balancing system resistance of fuel lines on clean air is the first phase of a comprehensive fuel and air balancing program. It is important to remember that clean air balancing is an important factor in optimizing pulverizer fuel and air balance, however, it is only one of the many critical parameters which must be addressed. Optimum fuel balance is achieved through a combined effort aimed at improving pulverizer grinding efficiency (improved fineness), raffle distributor condition (if applicable), and classifier timing and condition.

Clean air balancing is performed to establish similar system resistance for each coal line on a balanced air flow basis; provide a correlation between fuel line "dirty air" and clean air velocities; be an integral part of fuel line air to fuel ratio balancing which incorporates air, as well as fuel balancing; and to ensure the minimum fuel line velocity is maintained after optimization of primary air flow to improve flame stability at lower loads and reduce fuel line stoppages.

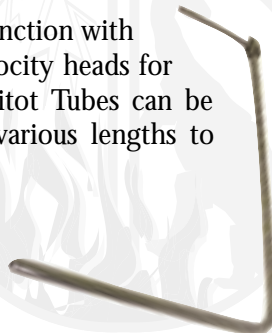
The clean air velocity traverse is very similar to a dirty air traverse. The difference between these two tests is the absence of coal flow during the "clean air" test. This permits the use of an industry accepted standard 90° Pitot instead of a dirty air probe.

PITOT TUBE

A standard 90° Pitot Tube is used in conjunction with an incline Manometer to measure the velocity heads for calculation of airflow velocity. These Pitot Tubes can be purchased individually through ICT in various lengths to accommodate any size burner line.

PART #: ICT-PTT-(*PROBE LENGTH)

**Specify 12", 18", 24", 36", 48", 60" or 96" Pitot Tube*



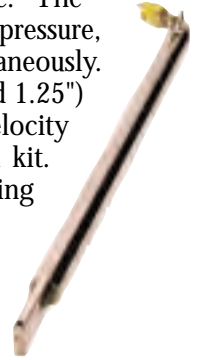
AIRFLOW MEASUREMENT

FORWARD-REVERSE VELOCITY PROBE

The most commonly used airflow measuring probe. The 304 stainless steel probe is designed so that static pressure, temperature and velocity head can be taken simultaneously. The probe comes in two standard diameters (1" and 1.25") and lengths from 6-15 ft. The Forward-Reverse velocity probe can be ordered individually or as part of a kit. The kit includes all equipment necessary for measuring velocity head, temperature and static pressure.

PART #: ICT-FW-(*PROBE LENGTH)

**Specify 6', 8', 10', 12' or 15'*



AIR FLOW CALIBRATION KIT (WITH FORWARD-REVERSE PROBE)

- (1) Forward-Reverse Probe with integrated thermocouple
- (2) 10" incline Manometer kit
- (1) Digital thermometer
- (1) 24" U-tube Manometer
- (1) Thermocouple lead for probe
- (1) 60" Slack tube Manometer
- (1) 10' section of $\frac{3}{16}$ " I.D. heavy wall double tubing
- (1) 25' section of $\frac{3}{16}$ " I.D. heavy wall triple tubing
- (1) Pair of hot gloves
- (1) Clipboard with data sheets/procedures
- (1) Floppy disk with generic spreadsheets

PART #: ICT-FW-40

AIRFLOW MEASUREMENT

SAMPLING PROBES
and TEST KITS

FECHEIMER PROBE

An industry accepted three hole probe capable of determining the direction of maximum velocity head. When combined with a protractor, an angular component of the velocity head parallel to the ductwork being traversed can be calculated. The Fecheimer Probe is well suited for such applications as fan acceptance tests or use near transitional duct work (i.e. bends or reducers). Probe comes complete with type "K" thermocouple. The 304 stainless steel probes are available in three diameters (1.25", 1.5" & 2") and lengths from 6-14 ft. The Fecheimer Probe can be ordered individually or as part of a kit. The kit includes all equipment necessary to determine direction of flow, air flow velocity head, static pressure and temperature.

PART #: ICT-FECH-(*PROBE LENGTH)

**Specify 6', 8', 10', 12' or 14'*

AIR FLOW CALIBRATION KIT (WITH FECHEIMER PROBE)

Kit includes everything listed with the Forward-Reverse Air Flow Calibration Kit except one Fecheimer Probe with integrated thermocouple and protractor is substituted for the Forward-Reverse Probe.

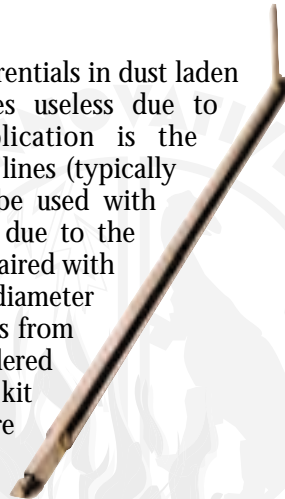
PART #: ICT-FECH-40

DIRTY AIR PROBE

Capable of measuring velocity head differentials in dust laden environments that render other probes useless due to pluggage. The most common application is the measurement of airflow in coal transport lines (typically using a 3'-4' probe). This probe can be used with various types of Manometers, however, due to the potential for dust carry-over it is usually paired with an oil filled incline Manometer. The 1" diameter 304 stainless steel probe comes in lengths from 2-14 ft. The Dirty Air Probe can be ordered individually or as part of a kit. The kit includes all equipment necessary to measure air flow velocities and/or total flow.

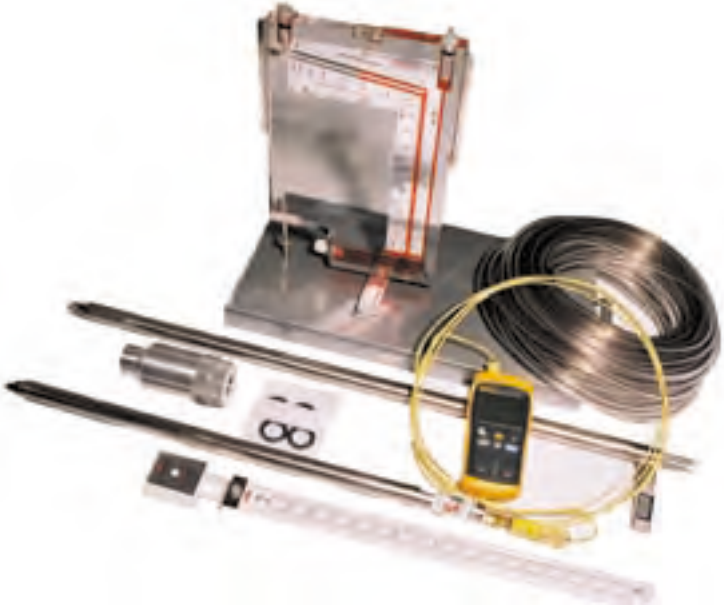
PART #: ICT-DAP-(*PROBE LENGTH)

**Specify 31", 35" or 41"*



**SAMPLING PROBES
and TEST KITS**

AIRFLOW MEASUREMENT



**DIRTY AIR SAMPLING KIT
(WITH DIRTY AIR PROBE)**

- (1) 10" Incline Manometer with case
- (1) 24" U-tube Manometer
- (1) Digital thermometer
- (2) 24" stainless steel probe with type "K" thermocouple and static
- (1) Aluminum dustless connector with seal (4 replacement seals)
- (1) 8' thermocouple lead
- (1) 36' of 3/16" I.D. heavy wall tubing
- (1) Impact resistant carrying case
- (1) Instruction manual

PART #: ICT-DA-(PROBE LENGTH*)**

**Specify 31", 41", 47" or 59"*

FLYASH SAMPLING

VOLUMETRIC FLYASH SAMPLER KIT

Innovative Combustion Technologies, Inc. offers a Volumetric Flyash Sampler Kit that includes almost all necessary test equipment required to collect representative flyash samples for unburned Carbon analysis. (A 1 1/4" pipe of sufficient length to connect the sampler head to the aspirator assembly is not included. This pipe is not included due to the fact that it can be purchased locally for less than the associated shipping costs).

Flyash Loss on Ignition (L.O.I.) or unburned Carbon is often indicative of combustion efficiency. Therefore, a flyash sample should be collected frequently for either diagnostic or quantitative reasons. The fact that our flyash sampler pulls an "in-situ" duct sample guarantees that the results are more accurate than hopper samples. Flyash L.O.I. determined by burning hopper samples is inherently lower than the true value because some of the Carbon in ash is not collected by the precipitator due to the low collection efficiency of Carbonaceous particles. ICT prefers to use the High Volume Flyash Sampler to monitor flyash L.O.I. because it is expedient, easy to use and collects a larger bulk sample than the isokinetic sampling. This allows shorter collection times and very little training of personnel performing the test.

HIGH VOLUME FLYASH SAMPLING KIT

- (1) Package of standard filter paper (50 sheets)
- (1) Box of high temperature filter paper (50 sheets)
- (1) Aspirator assembly (jet pump, reducer, pressure gauge and gate valve)
- (1) 3" diameter sampler head (nozzle tip, end plate, perforated cylinder, outer canister and wing nut)
- (1) Positioner with "locking" T-bar

PART #: ICT-VFS-10



**HIGH VOLUME
ASPIRATOR**



**HIGH VOLUME
SAMPLING HEAD**

ISOKINETIC FLYASH SAMPLER

FLYASH SAMPLING

Flyash Loss on Ignition (L.O.I) usually can be accurately monitored with a high volume sampler. In some cases, a more accurate sample must be collected for contractual specification or similar situations. For these instances ICT offers our Isokinetic Flyash Sampler. This probe uses a three-hole "fecheimer" head to measure velocity head and an in-line calibrated square-edged orifice to maintain the required sampling velocities. This probe has a 3" diameter sampler head and requires a 4" diameter port for access. The Isokinetic Flyash Sampling Kit provides all necessary equipment to collect an isokinetic flyash sample.

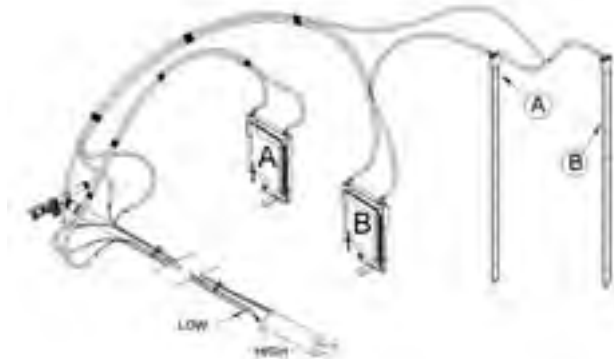
ISOKINETIC FLYASH SAMPLING KIT

- (1) Isokinetic flyash sampler head (perforated cylinder, outer canister and nozzle)
- (1) Aspirator assembly
- (2) 10" Incline Manometers
- (1) 24" U-tube Manometer
- (1) 35" U-tube Manometer
- (1) Tubing of sufficient length and T's
- (1) Package of standard filter paper (50 sheets)
- (1) Package of high temp filter paper (50 sheets)

PART #: ICT-IFS-00

PERFORATED CYLINDER AND NOZZLE

PART #: ICT-IFS-01



ACCESSORIES

THERMOCOUPLE ACCESSORIES

TYPE "K" INSULATED THERMOCOUPLE WITH FEMALE JACK AND MALE PLUG

Innovative Combustion Technologies, Inc. offers several types of testing equipment. Not only do we offer the probes and equipment to implement your own boiler testing program, we also offer some of the accessories that are needed to either increase productivity during testing or to service the test equipment. One of these products is our Insulated Thermocouple Leads. These leads are much more resistant to heat damage than a normal type "K" lead. We also have the male plug or female jacks to repair a damaged thermocouple lead. Several lengths of thermocouple leads are kept in stock.



Listed below are several items that are ordered frequently. In addition to these items we also stock many more products. Specialty items can be ordered or designed upon request. We also stock standard and high temperature filter paper, Manometer gauge oil, heavy wall tubing, and Vardex spring reinforced hose.

TYPE OF ACCESSORY

8 foot Insulated Thermocouple Lead
20 foot Insulated Thermocouple Lead
Female Thermocouple Jack
Male Thermocouple Plug, mini
26 inch Thermocouple
6 foot Thermocouple
14 foot Thermocouple
17 foot Thermocouple
22 foot Thermocouple

PART NUMBER

ICT-TCPL-32
ICT-TCPL-35
ICT-TCPL-40
ICT-TCPL-41
ICT-TCPL-01
ICT-TCPL-06
ICT-TCPL-14
ICT-TCPL-17
ICT-TCPL-22

ACCESSORIES

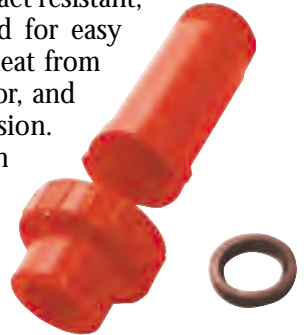
DUSTLESS CONNECTORS

Both the Synthetic and Aluminum Dustless Connectors are used in conjunction with our 1" O.D. test probes to perform dirty air testing or burner line fuel sampling. They were designed for use with a 1 1/4" fully ported ball valve and, with the addition of a proper bushing, can be used with any size ball valve (1 1/4" & up). The use of a wiper seal means compressed air is no longer needed to prevent coal dust leaks during the tests and the seal is easily replaced. These dustless connectors are ideal for the replacement of antiquated compressed air aspirator fittings that are common today in power plants. We have found the compressed air aspirators to be very unreliable and only slightly better than nothing at all for preventing coal dust from escaping the burner lines during testing.

SYNTHETIC DUSTLESS CONNECTOR

1 1/4" NPT thread, high temperature, impact resistant, injection molded ABS plastic. Designed for easy seal replacement, lower transference of heat from the burner line into the dustless connector, and a lower cost than the aluminum version. These new dustless connectors are sold in sets of twelve and were designed to be used as permanent fixtures on the burner line taps.

PART #: ICT-ICK-06



ACCESSORIES

DUSTLESS CONNECTORS

ALUMINUM DUSTLESS CONNECTOR

1 1/4" NPT thread, aluminum construction.
These are sold in sets of two.

PART #: ICT-ICK-07



REPLACEMENT SEALS FOR DUSTLESS CONNECTORS

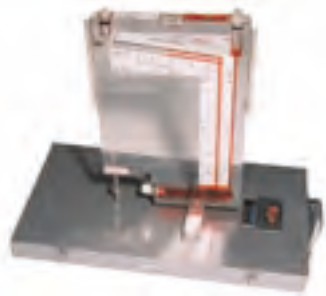
Extra seals come in a pack of (4).
Elastomer wiper seal and spring design eliminate coal dust from seeping through the orifice while performing dirty air testing or burner line fuel sampling. Can be used with either the synthetic or aluminum dustless connectors.

PART #: ICT-ICK-08



Innovative Combustion Technologies, Inc. currently uses several types of Manometers. These Manometers are used for boiler testing and tuning, velocity measurement, coal sampling, and generally all combustion improvement programs. All of the Manometers that we use during boiler testing are available to our customers. Our incline Manometers are available in kit form and come complete with a steel carrying case, 18" pitot tube, extra gage oil and information cards. In the event that you should damage your Manometer we offer repair parts such as the zero adjustment knob, shut off valve, replacement tubing and red gage oil.

ICT currently stocks two digital Manometer models, Series 475 Mk III (Model 15) and Series 477 (Model 20). Both can measure positive, negative and differential pressures in the 0-200" w.c. range. Series 477 comes with a point storage feature. They are rugged, lightweight, fast and easy to use. Simple operation and an easy to read digital display make these Manometers indispensable pieces of test equipment. Productivity can be greatly increased because no set-up or leveling is required.

10" INCLINE MANOMETER**PART #: ICT-MAN-25****23" INCLINE MANOMETER****PART #: ICT-MAN-30**

ACCESSORIES

MANOMETERS

U-TUBE MANOMETERS

24" PART #: ICT-MAN-12

36" PART #: ICT-MAN-60



60" SLACK TUBE MANOMETER

PART #: ICT-MAN-50

DIGITAL MANOMETERS



PART #: ICT-MAN-15



PART #: ICT-MAN-20

ICT EQUIPMENT CATALOG

VOL II



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