JACKSON OVEN SUPPLY, INC.

***Jackson Oven** also offers ISO-Dynamic Ovens, a proven technology that utilizes up to 50% less floor space and requires approximately half the drying/curing time in comparison to conventional pass thru ovens.*

Standard Features

- **Structural Modular Steel Framing**
- **Exterior Casing (16 gal)**
- **Interior Aluminized Skin (18 gal.)**
- **Steel Headers and Jet Pipes**
- **Blower(s)**
- **Exhaust Fan(s)**
- **Control Panel (NEMA 12)**
- **Temperature Instruments**
- **Combustion Safeguards (FM/IRI)**
- **Gas Train (FM/IRI)**
- **Ignition System**
- **Burner**
- **Burner Box**
- **Prime and Finished Paint**

"Great technology for heavy parts, the heat transfer to the substrate is twice as fast!"

Typical Curing/Drying Times

Application	Temp (deg F)	Conventionnel (Min)	ISO-Dynamic (Min)	Time Savings (Min)
Powder Coating	375-450	30-45	8-20	>22
E-Coat	350	30	15	15
Liquid (water)	180-250	20-30	10-15	>10
Liquid (solvent)	180-350	20-30	6-12	>14
Autophorectic (ACC 800)	230	20-30	10-15	>10
Dry-Off (water)	250-300	10	4-5	>10

ISO-DYNAMIC TECHNOLOGY
TECHNICAL REVIEW

The Iso-Dynamic Cure Oven incorporates a proprietary heat transfer technology that reduces cycle times thus reducing the floor space required for the oven. The Iso-Dynamic process can be defined as a gas convection turbulent air-flow system that results in rapid heat transfer.

HEAT TRANSFER

Physics refers to heat transfer as the process by which heat energy is exchanged between bodies, or parts of the same bodies, at different temperatures. This transfer of heat is accomplished by means of convection, conduction and (or) radiation; although all three processes can occur concurrently, usually one form of heat transfer is predominant.

CONVECTION

Convection is the process of heat transfer that occurs within fluids, such as gasses and liquids. Natural convection is caused by density changes when a gas or liquid is heated. The hotter molecules rise to the top and are replaced by cooler, more dense molecules. In a tank of water or a room full of air, a circulating effect is created as well as a constant mixing of the hot and cold molecules. The use of blowers and fans in industrial ovens enhances the mixing of hot and cold molecules due to increased air movement and as a result, minimizes the gravitational effects of natural convection. This process is generally referred to as forced convection.

CONDUCTION

Conduction is the method of heat transfer in opaque fields and is believed to be a form of energy changed between free electrons. This theory is supported by the fact that the best heat conductors are also the best electrical conductors. The rate at which heat transfers through a given material is influenced by the temperature gradient that exists at the extremities of the product (Delta T), as well as the cross sectional area of the exposed surface.

Forced convection and conduction are the basic physics used in the Iso-Dynamic Process. Developments in air movement have dramatically increased heat transfer rates over conventional re-circulating ovens.

Conventional re-circulating ovens are generally designed to provide about three (3) to five (5) air changes per minute which relates to about 80 to 100 feet per minute impact velocity. The corresponding increase in the rate of heat transfer is approximately three (3) times that of a dormant atmosphere. By comparison the Iso-Dynamic Process delivers an impact velocity of 600 to 800 feet per minute, this rate is typical for most industrial finishing applications. The heat transfer rate has been increased by a factor of nine (9) times over a dormant atmosphere and approximately three (3) times that of a conventional re-circulating oven. This relationship can best be seen under actual industrial operating conditions where heat processing times are 25 to 30 percent of generally accepted standards.

Examples of Iso-Dynamic performance would be raising the temperature of 12 gauge steel plate to 400 ^{o}F in under one minute. Coatings such as powder, high solids and water based formulations can be cured in a few minutes with substantial savings in factory floor space and operating fuel costs.

ISO-DYNAMIC PROCESS

The process consists of two (2) basic components, a heat source and an air distribution system. The heat source is an air heater complete with a gas fired burner. The burner operates under pressure and is connected to a blower which provides filtered air to the air heater. The heated air is then transferred to the process area through an air distribution system which is a network of ducting and jet pipes.

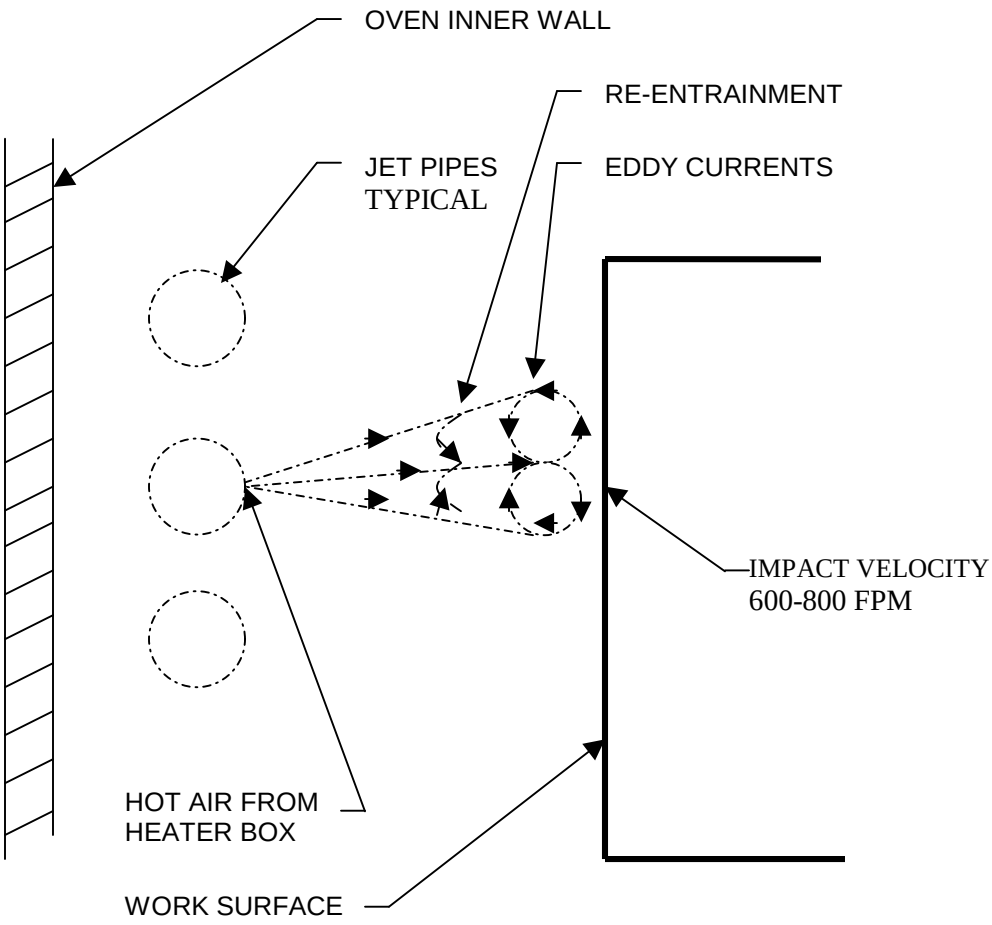
The Iso-Dynamic Process uses a high pressure, low volume air flow system, no mechanical recirculation of air is required. Recirculation is achieved through the internal entrainment. As heated air is ejected through orifices in the jet pipes, a consistent turbulence is created in the process area. The impact velocity of the mixed air to the work surface is approximately 600 to 800 feet per minute. Also consider that the heated air has expanded through the heater box and is at a higher volume and lower density. This is referred to as "soft air".

An important factor in the process performances is the entrainment ratio. When air is ejected from the jet pipe orifices, air within the process area is drawn into the jet air stream. The amount of air drawn into the jet stream in relation to the amount of air ejected from the jet pipe is known as the entrainment ratio. At 400 ^{o}F , the entrainment ratio is calculated to be 77.0, which means that for every cubic foot of air discharged or ejected into the process area, 77 more are re-circulated within the process area. Figure no. 1 on the following page provides a graphic illustration of re-entrainment and air-flow eddy currents in relationship to the jet pipes and work surface in the process area.

The Iso-Dynamic Process provides consistent temperatures and air flows throughout the process work area. Operating temperature range is 100 ^{o}F to 500 ^{o}F for standard construction and modular design allows for independent zone control. Multi-pass conveyor arrangements and work opening profiles can be provided to meet customer requirements. Iso-Dynamic ovens are factory assembled and test fired prior to shipment.

SUMMARY OF ADVANTAGES

- Shorter curing times
- Reduced floor space
- Substantial fuel savings
- Fast heat-up times
- Consistent temperatures
- Modular design
- Shop tested
- Less installation cost



ISO-DYNAMIC AIR FLOW CONCEPT

Figure No. 1

JACKSON OVEN SUPPLY, INC.

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