



# Fluidized Bath Thermal Systems



## How Do They Work

Aluminum oxide particles serve as the heat transfer medium that is continually agitated by a vertical flow of air or inert gas. In the fluidized state, the aluminum oxide particles become mobile, and the bath displays many of the properties of a liquid. Visually, when fluidized, the aluminum oxide looks like a boiling liquid, or a bubbling molten material. The bed of levitated particles presents a large surface area through which heat is efficiently transferred to immersed objects.

## Typical Applications

When a wide temperature range, and good stability and uniformity is required, there are many potential applications for fluidized baths. Specifically, the laboratory scale SBS 4 is designed for calibration of temperature sensors, thermal switches, environmental test of electronic components and PCB's, and other testing and quality control applications. Because aluminum oxide has a high electrical insulation value, live electrical circuits can be placed directly into baths for thermal analysis. The industrial IFB models, with a larger working volume, are primarily designed for heat treating processes such as stress relieving, annealing and tempering of metals, burning off paints, fluids and oils, burning off residual plastics from components, as well as other heat treating and cleaning processes.

## Fluidized Baths

Carbolite is pleased to add to our standard product offering, Fluidized Bath Thermal Systems. Fluidized baths are typically used for cleaning metal components, heat treating processes, and temperature calibration and testing requirements. A key benefit of fluidized baths is the rapid heat transfer to immersed materials, and the precise temperature control and uniform heating of those materials. Fluidized baths offer advantages of being dry, inert, and non-corrosive, as well as being non-abrasive to anything placed in them.

## Fluidized Bath Thermal Systems

Carbolite offers the Model SBS 4, a laboratory scale fluidized bath, and two larger industrial fluidized bath Models IFB 51 and IFB 52. The size and mechanical design is different between the laboratory and industrial models, but the conceptual process of flowing air through a porous plate that diffuses air upward through the aluminum oxide medium, is the same. Both the SBS and IFB series fluidized baths have an operating temperature range of 50°C to 600°C.



SBS 4

## 600°C Fluidized Bath Thermal Systems

Fluidized Bath Model Number	Temp Range (°C)	Working Chamber Inches		Fixed Air Requirement (psi)	Maximum Air Flow (cfm)	Maximum Work Wt. (lb.)	External Dimensions Inches			Aluminum Oxide Req. (lb.)	TC Type	Maximum Power (kW)	Operating Voltage	Shipping Weight (lb.)
		Diameter	Depth				Height	Width	Depth					
SBS 4	50-600	7.0	5.5	30	3	-	18.25	13.25 Diam.		20	K	1.5	120/240	53
IFB 51	50-600	10.0	16.0	30	5	30	27.00	21.00	21.00	85	K	4.0	240	110
IFB 52	50-600	10.0	26.0	30	5	60	41.00	24.00	21.00	160	K	6.0	240	153



## Features and Benefits

- Temperature Range of 50°C - 600°C.
- Fast and uniform heating.
- Aluminum oxide provides a safe, dry, inert medium.
- Fluidized bath action is very effective, fast and efficient in cleaning of parts.
- The non-abrasive, non-corrosive medium eliminates wear and damage to expensive parts, that can occur from manual cleaning.
- Fluidized baths eliminate other labor intensive cleaning methods.
- Heater designs provide long continuous service.
- IFB models incorporate heavy gauge case work and stainless steel for a long-life design.
- All industrial models are available with peripheral fume extraction systems to assure safe removal of combustion products while maintaining access to the bath.
- Optional accessories listed on page 46.

## Temperature Controls

The SBS 4 laboratory scale fluidized bath is provided with an analog temperature control. This basic temperature control is suitable for processes that do not require setting to an exact temperature and controlling very near that temperature. If such control of temperature is required, the optional Model TC-8D external PID temperature control should be purchased for use with the SBS 4 fluidized bath. The IFB industrial fluidized bath models incorporate a precise PID digital temperature control and over-temperature protection as standard.



TC-8D

## Air Flow Controls

The IFB 51 and IFB 52 fluidized bath models are fitted with a precise flowmeter that allows exact setting of air flow between 0 - 5 CFM. A table is provided next to the flowmeter that indicates the recommended CFM setting for different temperature ranges. Air flow on the laboratory fluidized bath is made via a manual adjustment valve on the outside of unit. A flowmeter is not provided as standard on the SBS 4.



## Cleaning Components for Plastic Manufacturing

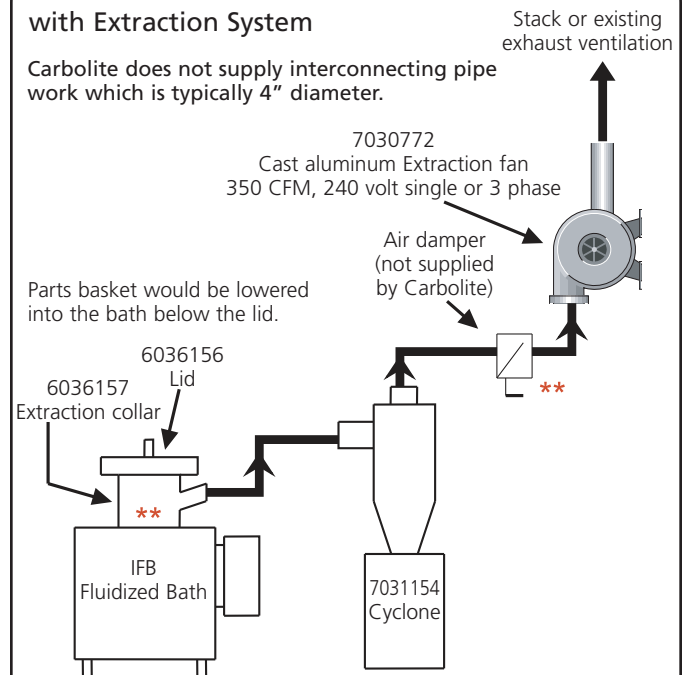
One of the most common applications for IFB Industrial Fluidized Baths is to burn-off plastic residual on parts and tooling used in the plastics manufacturing process. Such parts may include extruder dies, injector nozzles, screws, screens, manifolds, breaker plates, and other parts. See photo below of extruder parts before and after cleaning.



The cleaning process is very simple, using the heat transferred from the fluidized bath medium to the tools to degrade the plastic residue. Components to be cleaned are supported in a wire basket immersed in the medium. Operating temperature and time can vary depending on the polymer, amount of residue, and size and design of part. Typically the operating temperature will be between 450°C - 550°C and cleaning times between 30 minutes - 60 minutes. It should be noted that fluidization is not abrasive to any tools or parts you put into the bath. During such cleaning, it is important that proper venting be connected to the extraction collar. Please contact Carbolite for specific recommendations regarding a complete extraction system. See diagram below.

## Industrial Fluidized Bath with Extraction System

Carbolite does not supply interconnecting pipe work which is typically 4" diameter.



\*\*With parts in the bath and lid on, the damper would be adjusted so fumes and smoke are pulled away from the bath and into the exhaust system. If the damper is open too much it would create a negative pressure in the bath working area resulting in significant heat and sand loss. The purpose of the Cyclone is to recover any sand pulled out and heavier deposits which can be sieved and reused.