

**TECHNE**

## Techne Industrial Fluidised Baths

How to use an Industrial Fluidised Bath to quickly and cost effectively clean extrusion tooling without the risk of damage to the tools





# Industrial fluidised baths

## About

After years of demonstrated success, plastic manufacturers have come to depend on Techne fluidized baths for safe, efficient and cost effective cleaning of tooling, components, systems and parts (dies, breaker plates, nozzles, tools, tips, spinnerets, extruder screws, manifolds, etc.) Fluidized baths will remove almost all polymers, including plastic, paint, epoxy, rubber and adhesives, as well as other hydrocarbon-based products such as oils, fluids, grease, lubricants and coatings. Parts immersed into a fluidized bath are cleaned by the high temperature (up to 600°C/1112°F) environment within a bath media of fluidized aluminum oxide that instantly starts to degrade plastic to carbon, which then leaves the bath as CO<sub>2</sub>. This instant heating and minimized quenching results in shorter cleaning times than those of ovens, and when paired with the even and consistent heat of the bath, results in greatly reduced metal fatigue and tool damage.

A fluidized bath consists of a loosely packed mass of solid particles through which an upward flow of air is passed. In the fluidized state, the aluminum oxide particles become mobile and the bath as a whole, displays many of the properties of a liquid. However, since the bath is composed of tiny, inert aluminum oxide particles, freezing, boiling and evaporation are totally eliminated. Heaters on the outside wall of the bath inner container radiate heat into the aluminum oxide; Fluidization acts as the stirring mechanism to evenly distribute heat throughout the bath, resulting in excellent thermal stability and uniformity. These advantages make fluidized baths a cost effective and environmentally friendly safe alternative to oil, salt, ultrasonic and molten metal baths, ovens and furnaces.



IFB-51

## Details & Facts

The following pages give complete specifications on the seven models we offer in the Industrial Fluidized (IFB) bath product range. The basic differences are dimensions, capacity, heater power, air supply and power required. For burnoff applications, a gas fired AB-100 Afterburner is offered for incineration, to further reduce exhaust particulate and VOC's. To assist in cleaning the exhaust when PVC's and other halogenated polymers are burned off, the SR-100 Scrubber can be employed.

The baths can be fluidized with either compressed house air or an inert gas such as nitrogen or argon. It should be noted that fluidized baths and the action created in the aluminum oxide is not abrasive to items immersed for normal cleaning or heat treatment times. Typical cleaning times range from 30 minutes to 2 hours depending on bath temperature and amount of material to be cleaned. The specific heat of aluminum oxide is 0.21. Typical heat transfer rates for fluidized baths range between 60 to 120 Btu/hr/sq ft/deg F.



IFB-101

## Other Applications

The excellent thermal performance of Techne Industrial Fluidized Baths make them a good choice for basic heat treatment, test and calibration as well as reactive analysis. Some of these applications include tempering, shape setting, annealing, Nitriding, distillation, curing, exothermic and endothermic reactions, and thermal analysis of devices, components and materials.

# Industrial fluidised baths



## IFB-51 & IFB-52

Models IFB51 and IFB52 Industrial Fluidized Baths are our most popular units due to their economical price and smaller size. They offer a front panel mounted Rotameter for adjustment of the fluidizing air flow and are ready for use out of the box with the included charge of aluminum oxide.

Models IFB101 and IFB111 step up in diameter and depth from the IFB51 and 52. These baths also have a 3 phase voltage supply requirement to handle the large power capacity of the heaters. All larger baths on the following pages also run on 3 phase power.

## IFB-201

Model IFB201 offers a rectangular opening for oblong or non-typical parts cleaning and heat treatment.



IFB-201

### Technical Specification

	IFB-51	IFB-52	IFB-101	IFB-111	IFB-201
Temperature range	50 to 600°C (122 to 1112°F)	50 to 600°C (122 to 1112°F)			
Overall size (H x W x D), mm.	686 x 609 x 533	1041 x 609 x 533	915 x 795 x 625	1670 x 795 x 1025	930 x 1155 x 660
Working volume (diam. x depth*)	259 x 305	259 x 660	310 x 350	310 x 1000	500 x 220 x 395dp
Maximum work load (lbs)	25	50	16	36	18
Heat up time ( to 450°C) min	105	210	100	165	180
Heat up time ( to 600°C) min	195	240	210	270	350
Display accuracy **	±10°C	±10°C	±10°C	±10°C	±10°C
Typical stability **	±1.0°C	±1.0°C	±5.0°C	±5.0°C	±5.0°C
Max Airflow 30-psi (l/min)	40	40	160	120	220
Aluminum oxide required (kg.)	40	72	50	120	60
Aluminum oxide supplied (kg.)	50	75	50	125	75
Voltage supply required (50/60hz)	230V 1ph	230v 1 Ph	230v 1 Ph, 380v 3 Ph	380V 3 Ph, 415v 3 Ph 480V 3Ph	380V 3Ph, 415v 3Ph, 480v 3Ph
Power requirements	4kW	6kW	6kW	9kW	9kW
Unit weight (aluminum oxide excluded)	42	84	75	260	270
Shipping weight (skid & aluminum oxide)	120	200	167	435	390
Product code	FIFB51D	FIFB52D	F952-	F956-	FIFB20-

\*2.5" below top of bath to 25mm above porous plate

\*\*2 hours after setpoint is reached, 200mm immersion depth IFB51 & 380mm immersion depth IFB52

Model(s)	Description	Catalog #
IFB51	Basket for use without collar	FA624
IFB51	Basket for use with collar	FA625
IFB52	Basket for use without collar	7031658
IFB52	Basket for use with collar	7031659
IFB51 & 52	Lid	F6156
IFB51 & 52	Extraction Collar	F6157
IFB101	Lid*	F5967
IFB101	Basket	F5976
IFB111	Lid	F5998
IFB111	Basket	F6224
IFB101, 111 & 201	Filter/Regulator	F7915
IFB51, 52, 101, 111 & 201	Extraction fan	F5243
IFB51, 52, 101, 111 & 201	Cyclone CN-100	F5CN1
IFB201	Basket	FB201

\*included with bath for IFB-201



# Industrial fluidised baths

## IFB-121 & IFB-131

Models IFB121 and IFB131 are our largest capacity fluidized baths. Typical applications include cleaning large dies and breaker plates as well as long extruder screws and manifolds. A customer sourced hoist or lift would be used to retrieve the basket with parts from the unit.



IFB-131

	IFB-121	IFB-131
Temperature range	50 to 600°C (122 to 1112°F) - both models	
Overall size (H x W x D), mm.	1335 x 850 x 1125	1835 x 850 x 1125
Working volume (diam. x depth*), mm	450 x 700	450 x 1200
Maximum work load (kg)	60	90
Heat up time (to 450°C) min	195	165
(to 600°C) min	330	195
Display accuracy **	±10°C	±10°C
Typical stability **	±5.0°C	±5.0°C
Max Airflow 30 psi (l/min)	300	300
Aluminum oxide required (kg)	200	300
Aluminum oxide supplied (kg)	200	300
Voltage supply required (50/60hz)	380V 3Ph	380V 3Ph
	415V 3Ph	415V 3Ph
	480v 3Ph	480v 3Ph
Power requirements	12kW	18kW
Unit weight (aluminum oxide excluded)	226	330
Shipping weight (skid & aluminum oxide)	500	700
Product code	F957-	F958

Model(s)	Description	Product code
IFB121	Basket	F6426
IFB131	Basket	F6427
IFB121 & 131	Lid	F6425
IFB121 & 131	Extraction fan	F5148
IFB121 & 131	Filter/regulator	F5915
IFB121 & 131	Cyclone CN-500	F5C5N5

## Industrial Fluidised Bath Power Usage

Industrial Fluidized bath power usage - includes time to heat up and 1 hour for the bath to stabilize and clean a part. Power usage will be 1/2 during stabilization and cleaning time. Voltage under load measures between 220 and 240VAC. Multiply the kilowatt hours by your local utility rate to obtain an estimate of electric usage cost for a single run or click here to see the typical rates for your area.

Model(s)	Heater power	Heat up time to 1000°F (538°C) hours	Typical single run power usage - Kilowatt hours
IFB51	4KW	2.5	13
IFB52	6KW	3.5	24
IFB101	6KW	3	22
IFB111	9KW	3.4	37
IFB201	9KW	4.5	46
IFB121	12KW	3.75	52
IFB131	18KW	3	64



## AB100 Afterburner

Model AB100 is designed to reduce smoke emission from the exhaust gas flue of most all Techne fluidized bath cleaning systems. The Afterburner consists of a burner plate mounted within a thermally insulated combustion chamber. The input to the combustion chamber is designed to mate directly to a standard Techne extraction fan, while the output is suitable for connection to an exhaust stack. The AB100 will not remove hydrogen chloride from exhaust gases. The SR100 fume scrubber should be placed before the afterburner whenever considerable quantities of HCL will be generated.

### Technical Specification

	AB100
Overall size (H x W x D) mm.	2000 x 555 x 590
Burner rating	58.5kW (200,000 BTU/hr)
Fuel consumption range	
Natural gas	5.66m <sup>3</sup> /hr (200ft <sup>3</sup> /hr)
Butane	2.27m <sup>3</sup> /hr (90 ft <sup>3</sup> /hr)
Propane	1.77m <sup>3</sup> /hr (62.5 ft <sup>3</sup> /hr)
Gas supply pressure	
Natural gas	1.5 to 2.5kPa (6" to 10" WG)
Butane	2.5 to 3.5kPa (10" to 14" WG)
Propane	2.5 to 3.5kPa (10" to 14" WG)
Voltage supply required	220/240V 1Ph 50/60Hz
Exhaust gas temperature	Typically 450°C/842°F
Inlet spigot	Ø100mm
Outlet spigot	Ø200mm
Shipping weight (kg)	245
Product Code	FSAB1



AB100

## SR100 Scrubber

The Techne Venturi Fume Scrubber removes water soluble constituents in the effluent gasses from the Techne Industrial Fluidized Baths which would not be removed in the optional Afterburner. The unit is designed to reduce concentrations of Hydrogen Halides (Chloride and Fluoride) produced by the decomposition of Halogenated polymers such as PVC and PTFE.

The SR100 removes 95% of HCL in the exhaust gas so that as long as the scrubber is not overloaded by burning off too large a quantity of PVC the emerging gasses will contain a quantity of HCL low enough to be safely vented to the atmosphere.

It is recommended that a Techne Cyclone be fitted before the scrubber to avoid unnecessary loss of medium and loading of the scrubber with particulates.

	SR100
Overall size (H x W x D) mm.	1850 x 450 x 450
Scrubbing capacity	HCL from 8kg/hr of PVC
Make up water requirements	45l/hr (10 gallons/hr)
Discharge limits HCL	450mg/m <sup>3</sup> (0.2 grains/ft <sup>3</sup> )
Air flow	2.8 to 7.0 m <sup>3</sup> /min
Exhaust gas temperature	Typically 450°C/842°F
Inlet spigot	Ø100mm
Outlet spigot	Ø100mm
Water inlet	1/2" BSP
Voltage supply required	220/240V 1Ph 50/60Hz
Shipping weight (kg)	127
Product code	FSSR1



SR100



# Industrial fluidised baths

## CN-100 Cyclone and Collection Bin



**CN-100 Cyclone and collection bin**

The CN-100 is an efficient wall mounted unit which can extract more than 99% of any fluidising medium that may be carried over into the bath exhaust system when the extraction fan is in operation. The cyclone includes a collection bin which allows alundum carried over to be collected and returned to the bath for re-use. An extraction fan and cyclone are recommended unless a suitable extraction hood or fume extraction system is already in place.

The cyclone has no moving parts and requires no power and is simply connector via the ductwork to the extraction fan. This efficient unit is specially designed to give the optimum combination of air flow and pressure drop.

The CN-100 is compatible with most Techne fluidised baths (apart from the IFB-121 and IFB-131) and fume cleaning equipment. We can supply a CN-500 cyclone which has a rectangular mounting flange suitable for connection to the IFB-121 and IFB-131. A connecting duct with dilution tee is available for this option. We recommended that a Techne Cyclone is fitted before the scrubber to avoid unnecessary loss of medium and loading of the scrubber with particulates.

## Lids

Lids are a vital part of the IFB process to contain the alundum and retain heat within the bath. They are designed to allow airflow into the top of the bath and allow clean air to be drawn into the bath and through the exhaust duct when connected to an extraction system.

The IFB-51 and IFB-101 models have an insulated lid.

The IFB-201 is supplied with a lid/duct as part of the system.

All other larger IFB units have a robust stainless steel lid which supports the load of the basket and tooling. These also form part of the fume extraction system.



**IFB-51 Basket (without collar)**

## Basket

There are a range of baskets suitable for loading and retrieving tooling from each bath.

Larger baskets used with the IFB-111, IFB-121 and IFB-131 require a hoist to load into the bath.

## Extraction Fan

Extraction fans can be supplied to suit all IFB units. These are powerful 380/415V or 480v 3 phase fans delivering an extraction rate of 250CFM (425m<sup>3</sup>/hr) for the smaller baths. Larger baths or systems with an AB-100 require a 1000CFM (1700m<sup>3</sup>/hr) Fan available in either 380/415V or 480v 3 phase

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IFB101	Basket	F5976
IFB111	Lid	F5998
IFB101, 111 & 201	Filter/Regulator	F7915
IFB51, 52, 101, 111 & 201	Extraction fan	F5243
IFB51, 52, 101, 111 & 201	Cyclone CN-100	FSCN1
IFB121	Parts basket	F6426
IFB131	Parts basket	F6427
IFB121 & 131	Lid	F6425
IFB121 & 131	Extraction fan	F5148
IFB121 & 131	Filter/regulator	F5915
IFB121 & 131	Cyclone CN-500	FSCN5
IFB201	Basket	FB201

# Industrial fluidised baths



## Before and after

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1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

1. Cleaning parts in the IFB bath
2. Part before cleaning
3. Insert part to be cleaned into the basket
4. View of the part in the basket
5. IFB51 setup with fume extraction accessories
6. View inside the extraction collar.
7. Insert the basket with part into the bath at temperature
8. Immerse the basket into the bath and cover with the lid
9. Small amount of fumes and smoke are exhausted out to the right
10. Typically 25 minutes at burn-off temperature will work well
11. Exhaust extraction out the roof stack
12. IFB51 at temperature in Celsius
13. Remove the hot basket with cleaned part, safety first
14. Close up of clean part though still hot
15. Cleaned part being quenched in a bucket of water
16. Part disassembled to show how well it was cleaned



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