

Blower-driven solutions that increase production efficiencies and save significant running costs.



Overview:

If you are removing moisture, swarf or static charge from conveyed materials, or looking to evenly distribute coatings onto a product, ACI Air Knife Systems are the Total Solution. Powered by a centrifugal blower, an ACI Air Knife System is a low pressure, high volume air-delivery tool that is designed specifically to blow-off all surface liquid/moisture; clean web materials; and thoroughly dry all components and produce. Their ease of installation, and low energy consumption makes them an efficient, cost effective solution providing significant savings over alternative thermal and compressed-air systems.

Comparisons to Compressed-Air:

Blower-driven air produced by an air knife system will be:

- More cost effective to operate reducing running costs by up to 90%
- Quieter due to lower pressure operation, the expansion ratio and turbulence of the air produced is reduced significantly
- Cleaner blower-driven air is both dry and oil free, no additional filtration is required
- Safer compressed air operates at high pressures and always has the potential of being a danger to employee safety
- Compressed air is at its least efficient when used for discharging into free air. Blower-driven air can reduce energy usage by 50-75% for the most applications

Benefits of Air Knife Technology

By installing an ACI Air Knife System, companies will instantly:

- · Increase productivity
- Increase product quality
- Improve the working environment
- Reduce running and maintenance costs
- Give fast payback returns on the initial investment









Blower-driven solutions that increase production efficiencies and save significant running costs.



System Solutions

Customers' applications, their products and environments will naturally vary. Because of this ACI has developed a number of System Solutions that will cater for the removal of most surface moisture/debris demands.

Air Knives:

- Available in anodised aluminium alloy AA25 or in either stainless steel 304 or 316
- Can all be customised for customer-specific requirements
- All stainless steel options can be supplied in a variety of shapes including chevrons, squares and multiple angles
- Various Air Knife mounting options are available

Reciprocating Nozzle Systems

- Recommended for applications/products that demand a more rigorous air-flow to remove surface water or debris.
- Reciprocating (up/down action) of the nozzles combined with a high volume air flow results in this more aggressive attack on the product
- Nozzles used are fabricated from a robust, hard-wearing but flexible material

Static Neutralisation Systems

- Fixing a de-ionisation bar to an air knife has the effect of creating an anti-static system which can be utlised in an assortment of surface cleaning and static neutralisation applications
- These systems are ideal for the removal of dust and static charges for cleaning components such as plastic mouldings, glass, and a variety of automotive parts.



Before providing a detailed quotation for an Air Knife System, a vital part of the process is to fully understand the customer's application. Information such as production line speed, product/conveyor sizes, product proximity and the level of drying, cooling or cleaning required helps us to determine the size, position and number of Air Knives and blowers required, as well as determining whether we need to provide a turnkey system tailored to your specific requirements. To assist this process, ACI offers (UK mainland only) free on-site demonstrations.

Alternatively, ACI also has a full product testing facility at our main Axminster factory. This service is offered to all customers, for all parts of the World. If you would like to take advantage of either, please contact us now and we can arrange this testing to take place.

If you require a visit, please call ACI on 01297 529 242, or email sales@aircontrolindustries.com

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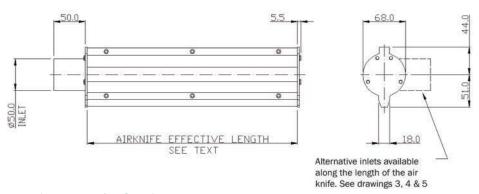
Anodised Aluminium - AK05 / AK08

ACI air knives are a precision engineered plenum chamber. They are designed to produce an efficient, effective, clean, high-velocity air curtain that remove surface debris, dust, water and any other liquids that can form or pool during manufacturing processes.

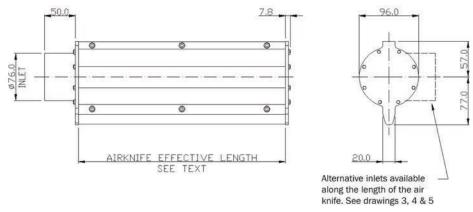
Powered by a centrifugal blower, ACI air knives are ideal production tools for all surface 'blow'-off' and cleaning applications. They are well suited to even the toughest of industrial environments and are available in many configurations and materials.



Drawing I: AK05 Outline



Drawing I: AK05 Outline



Air knife type	Recommended dia. / max length for 1mm slot								
	I end inlet (mm)	2 end inlets (mm)	multiple inlets						
AK05	Ø50mm, up to 450mm long	Ø50mm, up to 900mm long	Ø50mm, up to 3500mm long						
AK08	Ø76mm, up to 1200mm long	Ø76mm, up to 2400mm long	Ø76 mm, up to 6000mm long						
Please note - air knife lengths in increments of 10 mm									

Please note - air knife lengths in increments of 10 mr

Other features:

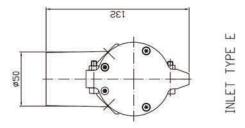
- Materials anodised aluminium alloy AA25 with stainless steel fittings
- Available in two diameters 50mm (AK05) and 76mm (AK08)
- Lengths available in 10mm increments
- Various mounting options available, including studs/spigots and tapped holes see Drawings 3, 4 and 5 for options
- Longer inlets available. (Note multiple inlets may be required for longer air knives)
- Weights: AK05 = 0.11 Kg, plus 2kg per metre / AK08 is 0.5 Kg, plus 3Kg per metre

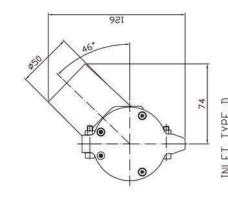


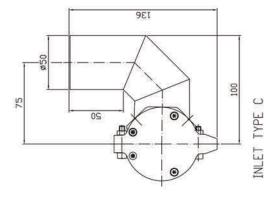


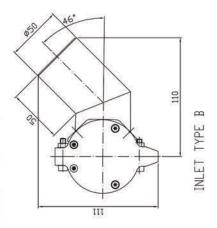
Anodised Aluminium - AK05 / AK08

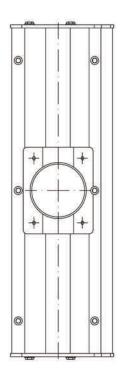
Drawing 3: AK05 Inlet Options

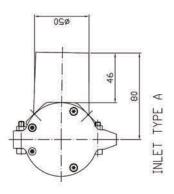








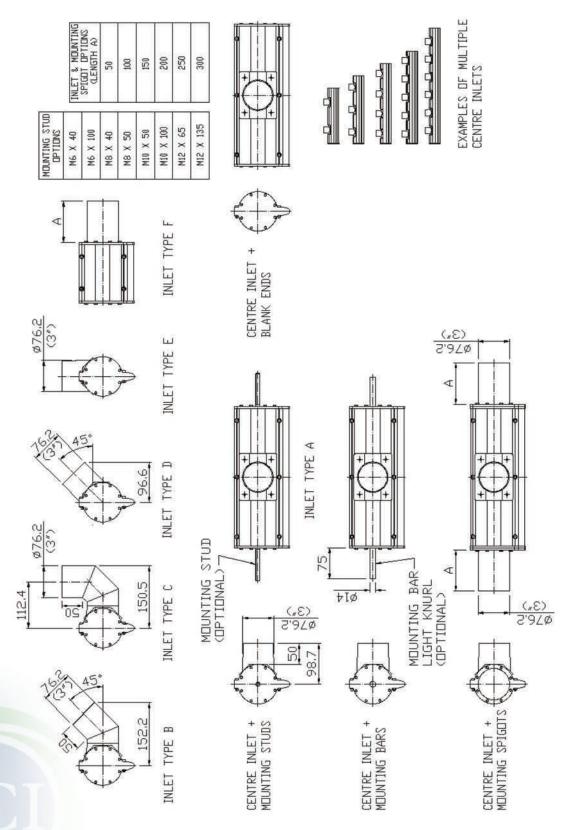






Anodised Aluminium - AK05 / AK08

Drawing 4: AK08 Inlet Options



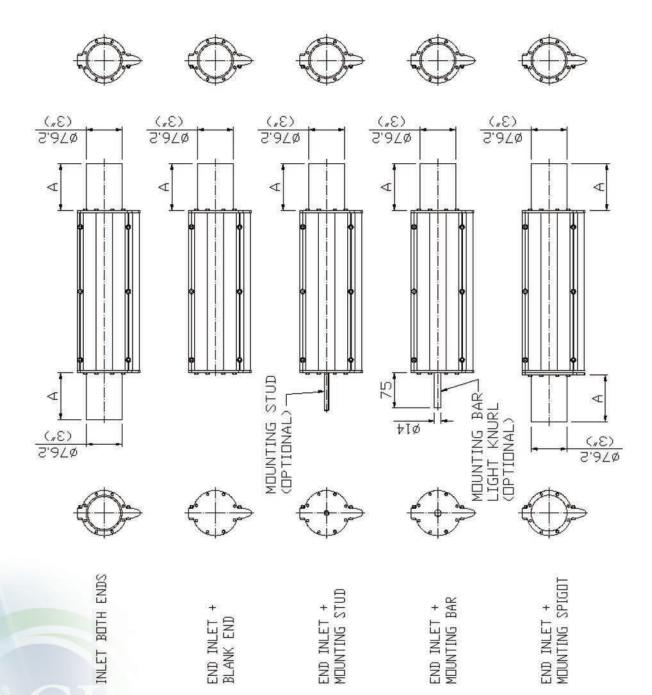


Anodised Aluminium - AK05 / AK08

Drawing 5: AK08 Inlet / Mounting Options

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MDUNTING OPTION	M6)	M6 >	₩ ₩	- SH	MIO	M10	M12	MIZ

SPIGOT OPTIONS (LENGTH A) 50 100 150 200
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Stainless Steel - AKSS05 / AKSS08 / AKSS10

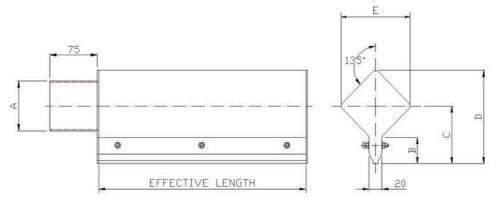
Fabricated from 304, the stainless steel range of air knives are perfectly suited for harsh or corrosive environments, in particular the food and beverage industries where cleanliness is of paramount importance.

ACI stainless steel air knives are readily supplied to suit precise individual customer needs:

- Materials plenum chamber stainless steel 304 STT 1-4307 BSI449 / Fittings to the same specification (A2)
- Various mounting options available, including studs/spigots, tapped holes and brackets
- Longer inlets available note, multiple inlets may be required for longer air knives
- Air knife lengths available in 10mm increments, up to 4 metres for AKSS10 - see table below
- Available as chevrons, square and multiple angle designs
- Stainless Steel 316 and adjustable designs available



Drawing 6: AKSS05 / AKSS08 / AKSS10 Outlines



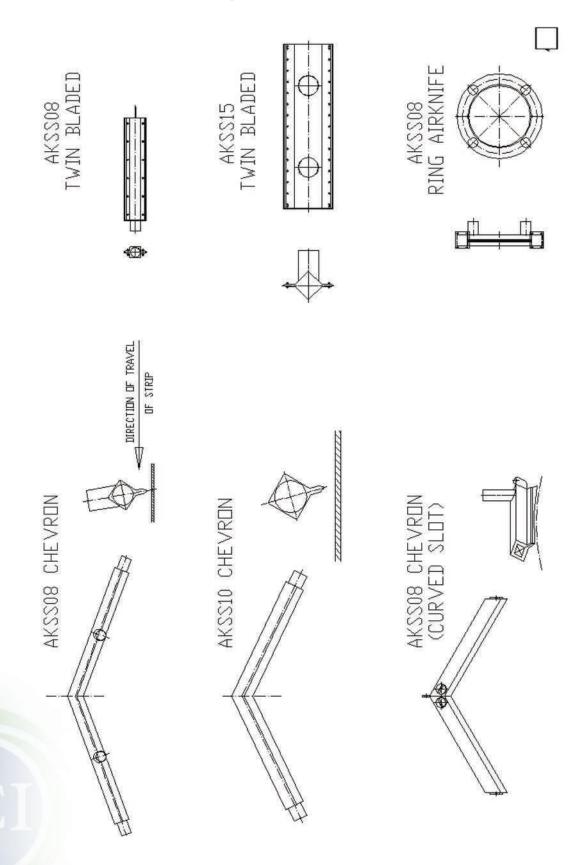
						Recommended dia. / max length for 1mm slot			
Air knife type	A	В	С	D	E	1 end inlet (mm)	2 end inlets (mm)	Multiple inlets	
AKSS05	50	36	66	103	74	Ø50mm, up to 450mm long	Ø50mm, up to 900mm long	Ø50mm, up to 3500mm long	
AKSS08	76	40	88	142	109	Ø76mm, up to 1200mm long	Ø76mm, up to 2400mm long	Ø76mm, up to 3000mm long	
AKSS10	100	40	106	178	144	Ø100mm, up to 2000mm long	Ø100mm, up to 4000mm long	Ø100mm, up to 4000mm long	





Anodised Aluminium - AK05 / AK08

Drawing 7: Examples of different AKSS design options





Reciprocating Air Nozzle Systems

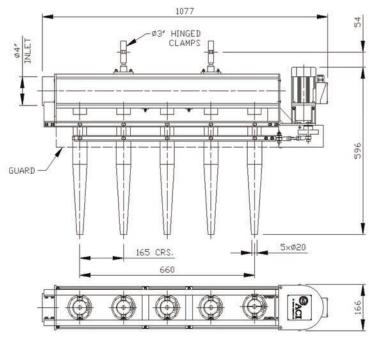
Where products demand a more vigorous air movement action, and particularly when products might be vulnerable to contact or surface damage, ACI's Reciprocating Air Nozzle Systems are ideal for surface drying operations.

Reciprocators employ a bank(s) of flexible nozzles that move back and forth across the product whilst delivering high volumes of air at low pressure. This simple reciprocating action combined with a powerful airflow is capable of dislodging moisture and debris trapped in the most awkward of places - even blind holes.

The nozzles themselves are fabricated from material that is both flexible and hardwearing. They are also simple to fit and adjust. In fact, the flexibility of the material allows the nozzles to be hit or deflected by travelling product without risk of damage to either the product or the reciprocating nozzles. This last feature permits air to be delivered close to the product for further enhancement of drying/cleaning functions.



Drawing II: Outline Dimensions (Ref: RN5)



General Characteristics:

Nozzles: Nozzle assemblies are generally made from

Polyurethane Encapsulated Woven Nylon. Also available are flexible nozzles made from Dip Moulded PDM:100. Fixed nozzle assemblies used in high temp. applications flexible nozzles made from Kevlar

Plenum Chamber: Aluminium as standard, stainless steel options

Motor: A wide selection of motors including electric and

compressed air types

Brackets: Stainless steel 304 as standard

Nozzles: Each nozzle orifice = 20mm dia. as standard.

Minimum number of 2 nozzles, maximum of 15

nozzles

Mounting: ACI design and manufacture a wide variety of

mounting assemblies depending on the customer application, including the support frames

Ducting: As well as flexible ducting, a modular ducting system

has been designed specifically for use with ACI's Drying products. Available in both stainless steel and galvanised mild steel, this system uses a flange system and clamp arrangement for connection of mating sections which allow for ease of installation and readjustment without the need to cut, rivet or

seal joints



sub-assemblies, drive-shafts and interior trim

 Large and/or intricate components such as filing cabinet carcasses, and aerospace parts

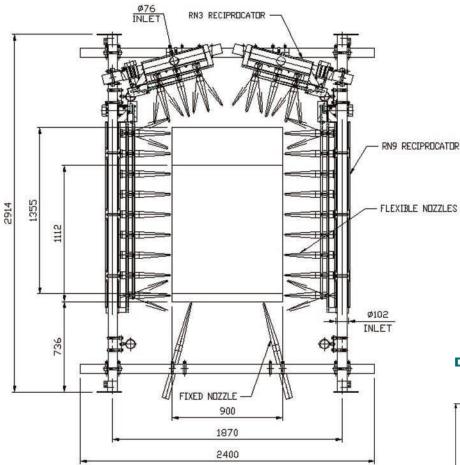


Drying full Jaguar car bodies



Reciprocating Air Nozzle Systems

Drawing 12: Example Reciprocating Nozzle System Outline





Drying truck cabs

Drawing 12: Example Reciprocating Nozzle System Outline



Please note (1) - all drawings measurements are in millimeters (mm) Please note (2) - above technical specifications are subject to change

RN15 RECIPROCATOR
FLEXIBLE NOZZLES



Blower-driven de-ionisation systems

Blower-powered de-ionisation air knives produce fastmoving ionised air which has the effect of neutralising static electricity and removing contaminants. These systems can be applied to cleaning plastic parts, mouldings, glass, automobiles and other large objects removing the dust and eliminating the static electricity to prevent re-attraction.



- Powerful ionisation kills the static charge holding the dust, allowing the fast blade of air to remove it for thorough cleaning
- The laminar airflow limits the recombination of ions in the air and so maximizes the static neutralisation performance
- Available in a wide range of lengths, de-ionisation air knives are simple to install, operate and maintain
- 'EX' bars available for applications in hazardous environments

Benefits and Advantages:

A de-ionization system typically consists of one or more ionized air knives connected to an external centrifugal blower.

- Cost effective these systems will reduce running costs by up to 90% when compared to compressed air alternatives
- Quiet lower pressure operation results in reduced expansion ratio and less turbulence
- Clean & Hygienic blower produced air is clean and oil free. Filtered blower inlets prevent further particle contamination
- Safe de-ionisation air knife systems generally generate less than 0.25psi and are more userfriendly than compressed air equivalents

Eliminating Dust Contamination:

Dust contamination is a huge problem in many areas of industry, especially where the product needs to be painted, decorated or laminated. Rectifying dust problems can have very large associated costs, as is shown in the following example:

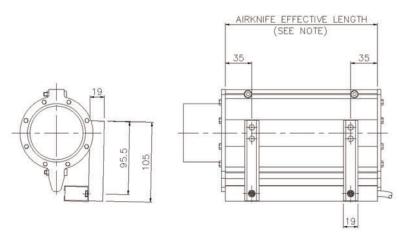
- A large automotive manufacturer calculated the cost of repainting a car at over £3000.00
- A dust contaminated bumper cost over £150.00 to repaint.
- A company who makes aircraft cockpits calculated the cost of dust included in the lamination could be as high as £35,000.00







Drawing 8: AK08 fitted with de-ionisation bar



Notes for outline drawing:

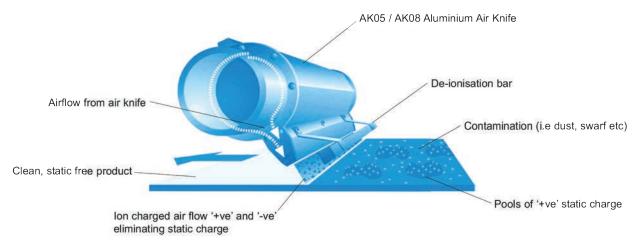
1. Air knife effective length up to 990, require 2 x mounting brackets 2. Air knife effective lengths from 1000mm to 1990mm require 3 x mounting brackets, plus a third placed at the centre 3. Air knife effective lengths from 2000mm to 3000mm require 4 x mounting brackets



Blower-driven de-ionisation systems

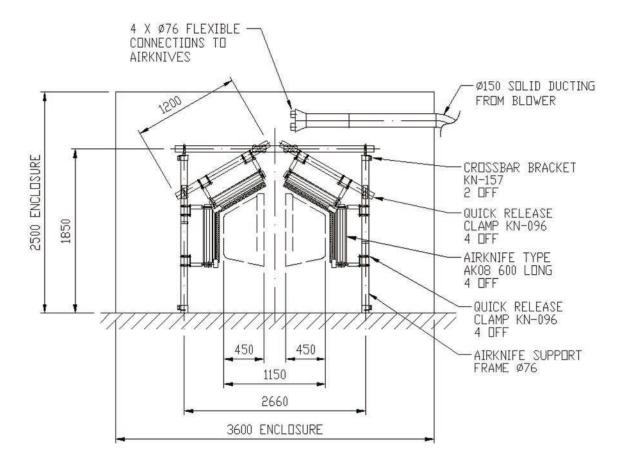
How they work

ACI de-ionisation air knife systems work by producing an electrical field that causes air molecules in the vicinity of the de-ionisation bar to break into positive and negative air ions. These ions are then picked up by the air stream produced by the air knife system and propelled into the work area where they are attracted to and neutralise charged surfaces and materials.



Note - air knives can be positioned above and below conveyed product if required

Drawing 10: De-ionisation system example





System Solutions Accessories

ACI Air Knife Systems will vary in size, shape and complexity from application to application. For this reason, ACI is able to offer a variety of accessories that will greatly assist customers with smooth installation, running and maintenance operations.

Acoustic Enclosures for Blowers

To reduce any unwelcome noise emissions ,ACI offer a range of acoustic enclosures that are modular in design and construction. They are generally fabricated from powder-coated mild steel or stainless steel panels which are lined with sound absorbing acoustic foam.

ACI acoustic enclosures are normally free-standing units which allow for easy access. Additionally they are robust enough to be located outside if required. Enclosures can be fitted with built-in filters, optional ducted inlets with side entry filters (for re-circulated systems); and pressure differential gauges. The standard colour is RAL5010, but they can be supplied to a customer's specified colour if required.

Support Framework

These are typically stainless steel structures that perform as a complete fixing structure for ACI System Solutions. They are simple to install and enable customers to fit them into often restricted spaces and small footprints. Modifications to existing conveyor lines are kept to an absolute minimum as frameworks simply straddle existing conveyor lines.

- Maintenance accessibility all of the Air Knife System components are housed within the framework, making maintenance and running adjustments easy
- These systems need not be fixed and can be easily re-sited if required

Starter Boxes

Custom built electrical starter boxes are offered.













System Solutions Accessories

Modular Ducting System

This is available in both stainless steel or galvanised mild steel. This uses a flange and clamp arrangement for connection of mating sections. This method of ducting allows for ease of installation and readjustment without having to cut, rivet and seal joints. Available in diameters of 75mm to 300mm, it is easy to install and maintain.

Ducting between the Blower and Air Knife configuration needs careful consideration as significant losses in pressure and performance can easily occur if the following simple rules are not followed.

A few useful pointers are as follows:

<u>Distance</u> - the distance between the blower and the method of air delivery should be kept to a minimum. Ducting runs should be kept ideally below 6 metres.

<u>Bends</u> - the number of bends should be kept to a minimum. Bends should be generous and sweeping.

<u>Rigid Duct Work</u> - this should be used wherever possible. Flexible ducting runs should be kept to a minimum.

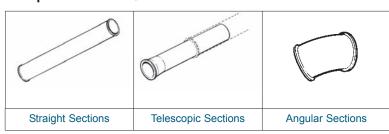
<u>Ducting Diameter</u> - this should either be the same as or larger than that of the blower discharge. Sharp changes in cross section of the ducting should also be avoided.

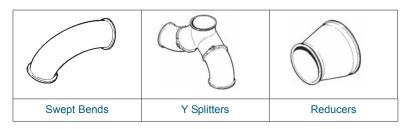
ACI's Sales Team will give their expert advice on all ducting layouts.

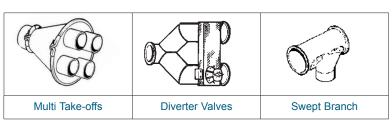
Flexible Hose

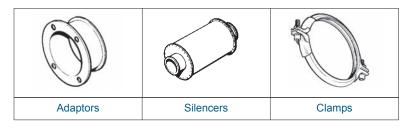
ACI keeps a variety of diameters and types of flexible hose in-stock. They are available in minimum lengths of 100mm and maximum lengths of 10 metres.

Examples of available duct sections:













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Turnkey Conveyor Systems



To compliment the range of Systems Solutions for product surface drying and cooling applications, ACI design and manufacture customised conveyors to transport product through the process. Air knife solutions with integrated conveyors are both compact and robust products which are reliable, easy to install, operate and maintain.

ACI's range of conveyors offered are predominantly straight, incorporating a box section baseframe and are suitable for use in most industrial and hygienesensitive environments common to the food and pharmaceutical industries. They are designed to ensure efficient operation and can be readily fitted with a range of different belt designs to suit exact customer needs.

Typically they feature an open construction with the belt being supported on polyethylene wear strips bolted onto the framework. PTFE strip or stainless steel rod supports are also available depending on application requirements.

Standard drive motors and controllers are supplied with IP65 enclosure protection and OS surface protection (drive motor only) to ensure suitability for intensive wash down processes. If required, customer specified drive systems can be fitted to suit each individual application.

Please note - all conveyors come complete with emergency stop buttons

Standard options include:

- Choice of belt materials including stainless steel or polymer
- Belt speeds up to 0.5m/sec
- Belt widths up to 1.5m wide, and 5m long
- Open and enclosed conveyors
- Extraction units
- Mild steel or stainless steel 304 frameworks
- Drip trays
- Pivoting infeed or discharge sections
- Guarding under and/or over conveyor
- Swivel lockable castors
- Alternative drive units
- Inclining / declining layout
- Flights profiles for product support









Turnkey Conveyor Systems

Integrating ACI's Air Knife Solutions

Integrated Conveyor / Air Knife Systems Options:



Air Knives:

- A range of lengths, configurations and materials including anodised alumnium or stainless steel 304
- Can be fitted above and below conveyor belt to suit drying requirements



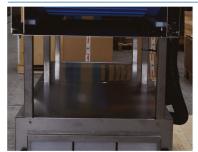
Belts

- A range of open belts available, including stainless steel wire and plastic mesh designs
- Can have features incorporated such as flights which help locate or help push the product through



Drives

- Geared motor drives linked to inverters for speed control



Framework:

- Conveyors can be manufactured in stainless steel or painted mild steel
- Longer conveyor lengths can be manufactured in a modular form allowing them to be split for transportation



Controls:

- Inverter motor speed controllers
- Adjustable ramped acceleration & deceleration
- Simple fault finding codes
- Easy to install and program
- 220V, 110V Single Phase or 3 Phase 220V and 400V



Further options:

- Blowers can be sited remotely or housed within the conveyor baseframe where overall dimensions allow
- Conveyors can be mounted on adjustable height mounting feet or robust castors



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LINE-Dry

Cable and Wire Drying Systems



ACI is a designer and supplier of industrial surface drying equipment for all types of industrial products including cable, wire and other continuous extrusions.

The problem:

The process of extruding insulating layers and jacketed covers over wires typically involves conveying product through a cold water trough in order to bring down extrusion temperatures. The removal of any residual moisture is essential because if left wet, significant issues will occur with processes such as product labelling and spark testing. Effectively and consistently drying cable and wire has proven difficult and expensive. Because of this, manufacturers have used a variety of configurations including homemade air knife systems; various compressed air nozzle systems; air wipes and even sponges. All with varying degrees of success but overridingly ineffective.



By working closely with cable and wire manufacturers, ACI has quickly earned a solid reputation for producing quality, engineered drying solutions suitable for the cable and wire markets. ACI's LINE-Dry Systems are a collection of blower-driven units that uses precisely controlled blower-driven air flow that reduces noise, improves drying efficiencies and dramatically cuts energy consumption. They operate by closely focusing powerful angled air jets against the flow of the product. These air jets are opposing, and aim at the top and bottom of the product to hold back the advancing residual moisture. This is achieved by breaking the surface tension of the water, allowing it to gather and puddle before the jets.

A general guide to help select the most appropriate product for cable and wire drying applications is illustrated in the following table:





Cable/Wire/Tube & Extrusion Product Guide							
Options	Max Line Speed (m/min)	Product Diameter (mm)	Product Profile	Motor Power (kW)			
Standard Cable	400	2 ≤ 25	Round/Flat	3.0			
High Speed Cable Dryer	1,000	0 ≤ 4	Round	5.5			
Profile Dryer	50	50 ≤ 200	Round	3.0+			
Ring Air Knives	10	200+	Round	5.5+			



LINE-Dry

Cable and Wire Drying Systems

Standard Cable /Wire Dryer (2 ≤ 25mm dia)

This standard drying system is fully enclosed and has a height adjustable stand which allows it to be easily positioned into most lines without any issues. Round or flat product profiles, with diameters between 2 and 25mm can be successfully dried at maximum line speeds of up to 400m/min.

POLYAMIDE **Outline Drawing: HINGE** CENTRE HEIGHT FINE **ADJUSTMENT** +/- 10MM USING CABLE DIRECTION SCALLOP KNOBS RH VERSION 240.0 500.0 **INSPECTION HATCH** 0 DRAW. LATCH 800 - 1200MM ADJ USTABLE CENTRE HEIGHT Ø 2" DRAIN SPIGOT BOTH ENDS RATCHET HANDLE Y SPLITTER FOR MAIN HEIGHT Ø 76 INLET

General Characteristics:

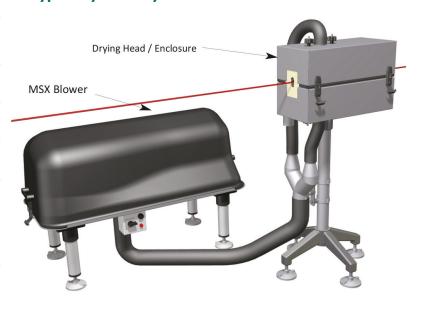
Discharge Figures	Pressures >80In.Swg (2.8PSI)Air Temperature: 80 Deg.C (176 Deg.F.)Air Speed: 8,800m/min (28,900ft/min)				
Product Capabilities	 2 ≤ 25mm diameter Running speeds of 400m/min 				
Noise Levels (Blower only)	• Below 76dB(A) for blower				
Standard Voltage	• 3Ph, 400/480V, 50/60Hz • Input to IP55 control box				
Materials	 Powerpack, drying head plenums, and optional spray enclosure: Stainless Steel 304 and fire retardant ABS Face plates and drying head end-caps: 				

Polyethylene PE1000; Connecting hose:

thermoplastic rubber

Typical System Layout:

ADJUSTMENT





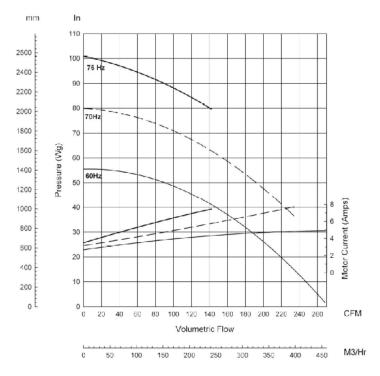
LINE-Dry

Cable and Wire Drying Systems

MSX Blower Performance Details:

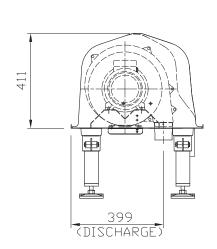


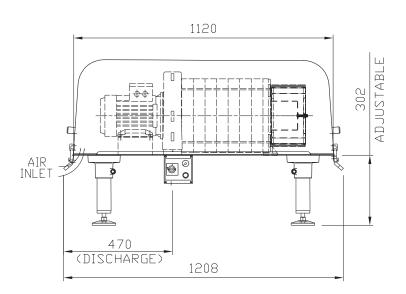
- Direct-driven blower offers quiet running (noise levels below 76dB(A)) and maintenance free operation
- Offers low motor speeds, but delivers air at high pressure
- Supplied with inverter as standard
- Further spray protection provided by ABS enclosure



MsX Blower Outline Drawing:









BASE VIEW SECTION F-F

350.0 250.0 82.1 SLOT

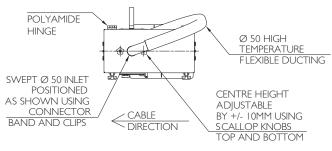
LINE-Dry

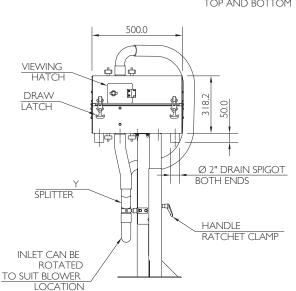
Cable and Wire Drying Systems

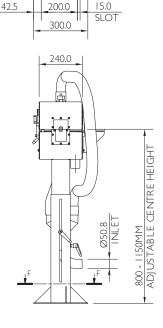
High Speed Cable /Wire Dryer (0 < 4mm dia)

ACI's high speed drying system is fully enclosed and has a height adjustable stand which allows it to be easily positioned into most lines without any issues. Round product profiles, with diameters between 0 and 4mm can be successfully dried at maximum line speeds of up to 1,000m/min.

Outline Drawing:







General Characteristics:

Discharge Figures

- Pressures >200In.Swg (7.2PSI)
- Air Temperature: 80 Deg.C (176 Deg.F.)
- Air Speed: 12,900m/min (42,300ft/min)

Product Capabilities

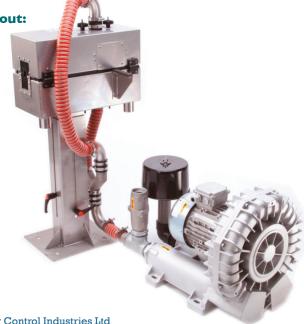
- Up to 4mm diameter
- Running speeds of 1,000m/min

Noise Levels (Blower only) • Below 74dB(A) for blower (unenclosed)

Motor Details

- Motor power 5.5/6.3kW
- 400VY/690VD, 50Hz
- 460VY/795VD,60Hz
- 3Ph, 400/480V, 50/60Hz
- Input to IP55 motors

Typical System Layout:



Air Control Industries Ltd

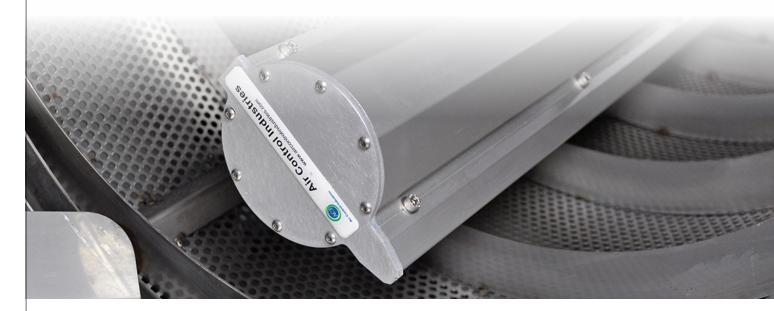
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Spiral Drum Component Dryer

Drying systems for small & light components



ACI's Spiral Drum Component Dryer is a compact and efficient drying system that allows for continuous in-line surface drying of small and/or light components.

Key Performance Figures:

- Variable throughput speeds
- Incorporates high-efficiency Air Knife System Technology
- Range of ACI blower performances to choose from
- Low power requirements
- Stainless steel drum and drip trays
- Reliable and robust construction
- Safe and simple to integrate into a production line





Spiral Drum Component Dryer

Drying systems for small & light components



Typical Drying Applications:

- Screws, Nuts & Bolts
- Machined parts
- Mouldings
- Pressings
- Castings
- Small assemblies
- Food products

How it works

ACI's Spiral Component Dryer comprises a single helix **Direction of** product feed rotating drum constructed from perforated stainless steel, mounted horizontally. Parts enter the drum via a simple chute whereupon they are exposed to a blower-driven air knife which is suspended in the centre of the drum.

The combination of the tumbling motion of the product, and the powerful, high velocity air stream produced by the air knife, means that emerging parts/components are dried both efficiently and effectively. Once parts/components have been dried they can simply be collected manually or passed onto another process.

Drum rotation

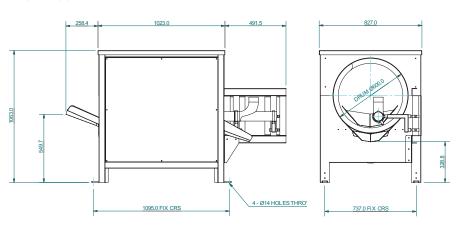
Air supply to air knife

The blower supplying the air knife system can be remotely sited or mounted directly on-top of the dryer itself.

ACI has extensive R&D facilities which enables us to invite clients to visit to fully evaluate the effectiveness and suitability of our products. Free Customer site visits to UK mainland customers can also be offered.

Contact our Technical Sales Team to discuss your application in detail.

Spiral Dryer dimensions can be tailored to customer's requirements depending on the size of product that needs drying.



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