



dry facts

...from Arctic India Sales

January - February - March 1982

Vol. 2 No. 1

THE BUDGET..... for the energy savers.

The budget presented on the 27th of Feb. for the year 1982-83 will be a big boon to energy savers. The Government has rightly classified energy saving equipment and their production as high priority areas and proposed to allow depreciation at 30% on devices and systems for energy saving, or for minimising environmental pollution.

This along-with investment allowance and the normal depreciation already allowed will permit user of such equipment to write off a major part of the cost of the equipment in the very first year. Arctic India Sales offers full range of heat recovery devices and systems for energy saving incorporating the heat pipe concept for recovering waste heat from air conditioning exhausts, dryer exhausts, kilns, furnaces etc.

Desiccant Quality—a breakthrough

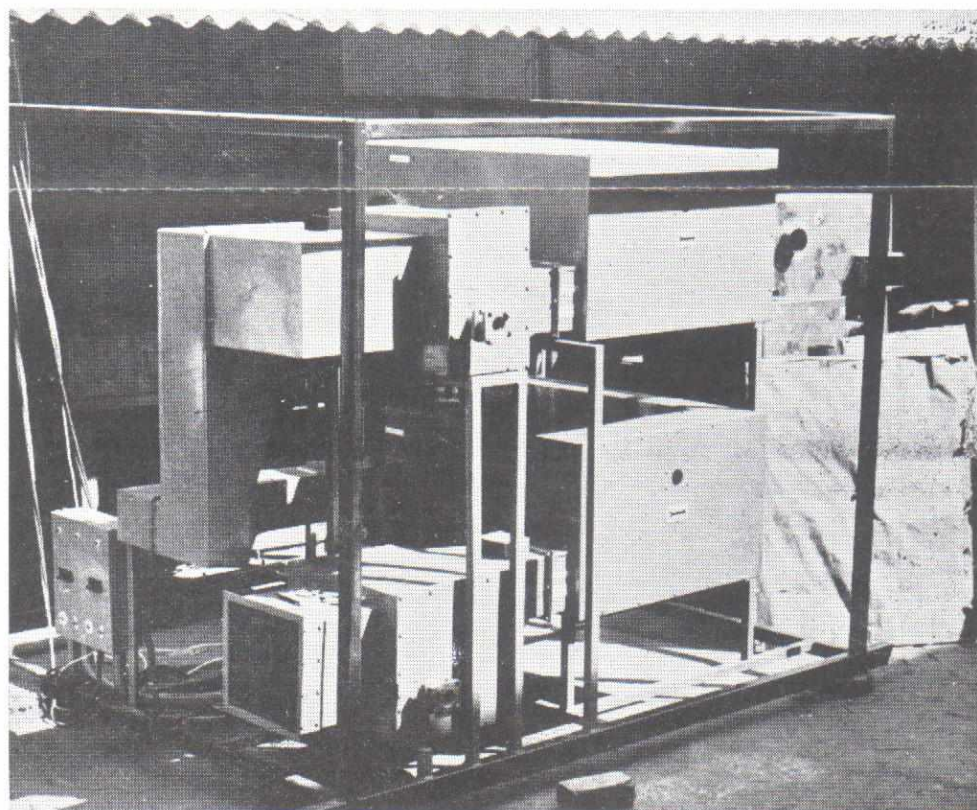
Our R & D section with the technical assistance of BRY-AIR INC. and their critical evaluation has perfected a specially graded high quality desiccant. This desiccant is designed to perform at optimal usage in our tropical climate where the outside moisture content is considerably higher than experienced in the western world.

Our humidity conditions are considerably higher thereby effecting the ability of the regeneration air in the dehumidifier to remove moisture from the desiccant. Hence the need for a totally new desiccant. The desiccant which we have now to offer, if changed your system can substantially improve the performance. At a minimal additional cost your existing investment will result in substantial increase in moisture removal, in some cases as high as 50%.

KIRLOSKAR PNEUMATIC Co. opts for

the technologically advanced Arctic India cascade dehumidifying system. Kirloskar, for a project handled by them for R & DE (ENGRS), DIGHI, PUNE for a very low humidity job have taken delivery of a unique dehumidification system from us as pictured below: Requirement was for atmospheric air of 500 cu. metre per hour at a temperature of 85°F and at a dew point of normally minus 30°F. For this a system was designed around two standard rotary desiccant type dehumidifiers in cascade, each capable of handling 500 m³/hr air flow. A refrigerant fed pre-cooling coil has been provided at the immediate air in-

take whereafter through the dehumidifier it is lowered to a dew point 25°F and going through the intermediate collar and the second unit in cascade the final desired condition of minus 30°F dew point is achieved. All this is achieved in a single pass using our shallow rotary desiccant beds which are nearly 1½" thick; and no recirculation of dried air is envisaged. Such unique capability to design and engineer systems as a state-of-the-art for very low humidity conditions very clearly sets us apart as the number one dehumidification company in the country and at par with any western technology.



THE DABUR EXPERIENCE

M/s. Dabur (Dr. S. K. Burman) Pvt. Ltd. the renowned manufacturers of medicines, toiletries and other varied items have been using three 300 cfm Arctic India Dehumidifiers for over a year. Their factory Manager, Dr. G. S. Bhandari talks to our editor about their plant, products, and their experience with our dehumidification equipments.

Ed. : What are the products being Manufactured by you ?

G.S.B. : Ayurvedic & Allopathic Medicines, toiletries, patent & proprietary medicines and pharmaceuticals.

Ed. : Are these products new or have they been in the market for long ?

G.S.B. : Factory started in 1884 and the products are in the market for about 100 years.

Ed. : What are the constraints and for what products manufactured did you feel the need for dehumidification ?

G.S.B. : Some of the products which are highly sensitive and can only be manufactured under very Controlled Environmental conditions are ;

- (a) Hajmola tablets
- (b) Sarbyna tablets
- (c) Shilajeet capsules, etc.

The problems are aggravated during the Monsoon or when the humidity is above 40%.

Ed. : Why did you choose Arctic India dehumidifiers ?

G.S.B. : We chose Arctic India dehumidifiers on account of their excellent quality, compactibility, and better workmanship and after sales service.

Ed. : What has been the direct outcome in terms of quality improvement, and continuous production ?

G.S.B. : We are now in a position to manufacture our Hazmola tablets and products throughout the year, after installing Arctic India dehumidifiers.

Ed. : Do you require the systems only during certain parts of the year or is controlled

environmental necessary throughout the year ?

G.S.B. : The system is proving very useful and we are in a position to manufacture our products throughout the year without any interruptions.

Ed. : What in your opinion, is the payback period in relation to the initial cost of the equipment ?

G.S.B. : In our opinion, the cost of the equipments required for dehumidification is recovered within 2 years.

Ed. : Any comments on the service rendered to you before & after sale ?

G.S.B. : M/s. Arctic India has rendered us good after sales service and we are not finding any problems with their service.

WHEN MOISTURE IS TORTURE !!!!

In this column we will share with you regularly our experience on major application areas where usage of dehumidification equipment is both extensive and essential.

Fertilizer Storage

One of the most important considerations for fertilizer storage is relative humidity. Almost all types of fertilizers are essentially stored at ambient temperature conditions but the relative humidity is required to be critically controlled and not allowed to go beyond 40%. BRY-AIR Inc. in the United States have done pioneering work in providing environmental control in the form of dehumidification for several fertilizer storages throughout the world. With the experience accumulated by BRY-AIR in the last decade it is found that there are certain points necessary for consideration for successful storage and bagging of prills. If the humidity goes above 40%, the prills, being very hygroscopic will absorb moisture, causing them to stick to each other and if this happens the product becomes useless. Another side effect of high humidity is that in contact with hydrocarbon the ammonium nitrate will become explosive in nature. Hence it is of prime importance that for successful storage/bagging of

ammonium nitrate the humidity be controlled to below 40% and temperature be kept stable, at prevailing ambient conditions.

Another important aspect which has to be taken into consideration is the building must be as far as possible air tight and vapour proof. This involves applying special treatment to the walls roof and floor. Usually the walls and/or roof are of aluminium stainless steel however for concrete/masonry walls vapour proofing must be given with the help of epoxy paint, or simply put the concrete/masonry walls are to be given on the inside as well as outside. At this stage care must be exercised to apply such kind of vapour sealing of concrete slabs/flooring it is recommended that a 10 mm thick polythylene continuous sheet be laid on two or three inches of sand, upon which the slab is poured. This provides a very good vapour proof slab. All wall and/or roof joints should be properly chalked and sealed and the doors be gasketed. No exhaust fans are to be used. And also the corrosive nature of the products prohibits

the use of certain metals such as zinc and copper. Therefore all steel metal surfaces must be painted with special protective epoxy paints. Also all conduit and duct work etc. must be aluminium. Precaution is exercised in ensuring that all motors, starters and switches are totally enclosed or housed in a dust tight enclosure. All outside air is used to put the building under a slight pressure. Through experience it is found that the air to be supplied should be equal to 1½ air change.

Keeping all the above considered points in mind it is therefore seen that there are two alternatives in which the above problem can be tackled :

- a) by controlling the relative humidity and temperature with the help of refrigeration;
- b) by controlling the relative humidity and temperature by means of a desiccant type chemical dehumidifier.

Alternative (a) employing refrigeration involves first removing of moisture
(Continued on next page)

When Moisture is Torture !!!!

through condensation over the refrigerant fed cooling coil and subsequently providing substantial pre-heat to bring the air back to the temperature of ambient and supplying to the fertilizer storage area. As air cannot be recirculated in fertilizer storage this involves an extremely large installed capacity in terms of refrigeration and also energy for running the refrigeration plant which has to be essentially electric. On the other hand, alternative (b) provides an extremely economical arrangement both in terms of first cost and operating cost with no re-heat to be given and the moisture being removed through the process of adsorption in the chemical dehumidifier. The operating economy is further enhanced as the energy source for operating the dehumidifier can be either steam, electric or gas as may be cheaply available at the fertilizer complex. Thus, desiccant type dehumidification equipment for fertilizer storage cannot be matched by any other systems in lower first cost, operating cost, reliability and simplicity.

For calculation of dehumidifier size our special rule of thumb can be applied which is essential as follows :-

1. Ascertain the volume of the building;
2. Take $1\frac{1}{4}$ air changes per hour as the total outside air to be circulated/supplied to the area;
3. Quantity of air corresponding $1\frac{1}{4}$ air changes directly gives you the size/capacity of the dehumidifier in cfm.

Typically our dehumidification system for fertilizer industry consists of bank of pre-filters and absolute filters, static pressure regulators, static pressure dampers, completely pre-wired ready to start-up dehumidifier mounted on skids along-with necessary fans required for air distribution within the room.

Arctic India dehumidification system (9000 cfm dehumidifier) has been in successful operation for past few years at FACT Cochin for their fertilizer storage. World-wide some of the clients using our dehumidification systems are :

Cherokee Nitrogen, Pryor
Cominco America Corp., Nebraska
Dawood Hercules, Lahore
E. I. Dupont Chemical Co.
Hercules Inc., Donora
AMOCO International
St. Paul Ammonia Products, Pine Bend
Cynamid of Canada Ltd.
Golf Oil Chemicals Co.

THERE'S TROUBLE IN THE AIR

This year we bring you an interesting serial on humidity : Its origin in industry, how to achieve dry air, factors which affect the selection of a dehumidifier and industries to benefit by dehumidification. The first of the four part serial is presented below.

Leaky roofs and bad plumbing aside, you probably have water problems. The kind that dampen efficiency records and soak up profits. The trouble is, it's the kind of water you can't see, commonly known as humidity.

Humidity : Invisible water vapor in the air. Father of rusty bolts and industrial foe of product quality and storage.

We know that air is composed of gass such as Oxygen, Hydrogen, Nitrogen, Argon, and Carbon Dioxide but what we fail to realize sometimes is that water is present in all air in the form of humidity.

How did it get there ? Primarily as the result of the evaporation of water bodies and respiration processes of plants and animals. Consequently, humidity is as ever present and as much a part of our lives as are water and air themselves. And basically we accept it. And forget it. But the effects of humidity are felt by machine as well as man.

Because the manufacturing process takes place surrounded by air, and at times even uses air as an integral part of that process, industry must attempt to control humidity as it would any primary ingredient or component.

The effects of humidity are long term and can be devastating. They are felt in every kind of industry in every corner of the mechanized world. And what's worse, they can cost a business like yours thousands of annual rupees.

Humidity in Industry

Because humidity exists in the atmosphere, it is an ever-present factor in industry. And, in addition to the humidity from outside-air is the humidity emitted from people and production processes as well. This problem of humidity compounded and distributed as the result of infiltration through ceilings, walls and floors.

How Humidity Affects Industry

Humidity is a constant threat to both production efficiency and product quality.

Many companies discover that waste is extremely high during certain months of the year. These are usually the summer months when high temperatures creates humid conditions. The phenomenon occurs because as the temperature of the air increases so does its ability to hold water. Conversely, as air temperature is decrea-

sed, its moisture holding capabilities are thereby decreased. In the foods industry, dry foods such as potato chips and powders exhibit an affinity for water when exposed to relatively high humidity conditions. And although the product quality per se is not affected, these foods may become soggy and undesirable. Powdered foods tend to agglomerate or lump together. The result is that their movement through the manufacturing or packaging process is greatly inhibited. In addition, the presence of humidity may interfere with the operation of processing and packaging machinery as well.

The Pharmaceutical Industry

For similar reasons careful monitoring of humidity levels in the pharmaceutical industry is essential. Too much moisture in the air may retard the growth of certain organic cultures, and specific humidity levels may be necessary for the production of certain drugs.

Because many of the ingredients used in the manufacturing of medicines have a high affinity for moisture, humidity, if left unchecked, may cause the lumping or caking of powdered materials. In fact, many of the powders used depend upon dry conditions for adherence in the from of tablets and capsules. In some cases humidity will even cause a specific drug to decompose and its medicinal value to be lessened. At the very least, shelf life is particularly shortened by the presence of humidity during the manufacturing process.

The Electronic Industry

In the electronic industry humidity causes printed wirings to become subject to corrosion. Transistors may break down or suffer a decrease in longevity and the uniform growth of crystal is unachievable.

The List is Endless

Generally speaking wherever there is humidity there are humidity problems.

Humidity makes for mushy transfers in the printing industry and can cause irregular operation of packing machines. Seed loses its germinative power and dry fertilizers agglomerate. In pumping stations and high voltage rooms expensive installations may rust as a result of unchecked condensation.

The point is that humidity has, and will continue to, cost industry millions of rupees in product and efficiency waste if left unregulated.



Portable Thermometry

IMC Instruments, INC. is an established and well known manufacturer of portable digital thermometers and temperature monitoring panels. Their manufacturing plant and business office are located in Glendale, Wisconsin where they have a staff of well qualified technical, manufacturing and office personnel.

Their product line consists of portable digital thermometers, temperature monitoring panels and a wide range of temperature measuring probes and accessories.

ICM Digital Thermometer offers through Arctic India Sales technological and engineering advances previously unavailable in the field of hand held, portable thermometry. The instruments have a built in reference which allows you to calibrate-out all offsets introduced by ambient temperature variations or component drift. One universal, permanently attached sensor probe is capable of gas, liquid and surface penetration temperature measurements. They are designed for rugged use by field personnel. Each instrument is individually calibrated and standardized to provide exceptional accuracy and repeatability. The temperature measurement ranges from -40°F to $+250^{\circ}\text{F}$ or -40°C to $+140^{\circ}\text{C}$ with a basic accuracy of $\pm 0.1^{\circ}$.



Other salient features are 3" high bright LED display, rechargeable nickel cadmium battery and special "Hold feature" to store the digital readout in digital memory.

The IMC digital thermometers are readily adaptable to many areas of applications like industrial, plant and operating engineering, Research and Development Labs., Quality Control, Heat, Food & Beverage Industry, Biomedical Labs., Mechanical contracting and servicing, Inspection Department and Agencies, Utilities, Refrigeration Industry, Institutional Physics/Chemistry Labs., Energy conservation and Solar Industry.

Arctic India Sales represents IMC exclusive in India and welcomes enquiries for IMC products.

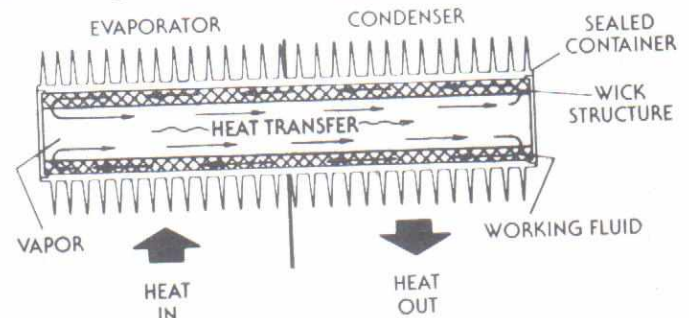


'The Heat Pipe Concept'

Howden Thermal Heat Pipe Products Division is a part of the world wide Howden organization and as such draws upon Howden's 125 years experience in air handling and heat recovery.

The Howden Thermal heat pipe is a self contained, passive energy recovery device capable of transferring 1000 times more energy than copper with a temperature drop of less than 3° per foot. The heat pipes have no moving parts, require no external energy (other than the heat they transfer) are reversible in operation and being rugged can withstand a lot of abuse.

The heat pipe consists of three elements, a sealed container, a capillary wick structure and a working fluid. Since the container is vacuum sealed, the working fluid is in equilibrium with its own vapour. Heating any part of the external surface causes the instantaneous evaporation of the working fluid near that surface.



The rapid generation of vapour creates a pressure gradient within the heat pipe which forces the excess vapor to a remote area of the heat pipe where because of low pressure & temperature condensation occurs on the tube wall & latent heat of vaporization is transfer Heat removed from the surface at the point of condensation by conduction, convection or radiation. This process is continuous. The transfer efficiency of the heat pipe is 99.3%.

Rows of finned heat pipes arranged horizontally passing through a sealed centre partition from a heat exchanger. The heat exchanger is installed across two parallel air ducts with separate counterflow air streams. In operation exhaust air is discharged across one section of the exchanger and supply air is ducted in a counter flow direction across the other section.

Heat is transferred from the hot air stream to the cold air stream by the heat pipes. Heat pipe heat exchangers can recover upto 90% of the exhausted energy under ideal conditions and are built to handle temperatures ranging from -50°C to $+600^{\circ}\text{C}$.

Arctic India industrial package heat recovery system using the Howden heat pipes are designed for versatility. These applications include all types of dryers, ovens furnaces, boiler exhausts & kilns.

FORM IV—STATEMENT OF OWNERSHIP & Other Particulars of 'Dry Facts' 1. Place of publication, 20, Rajpur Road Delhi-110 054
2. Periodicity of publication—Quarterly 3 Printer's Publisher's & Editor's Name & Address—Vanita Pahwa 20, Rajpur Road Delhi-110 054
4. Name and address of owner—Arctic India Sales. I, Vanita Pahwa, hereby declare that the particulars given above are true to the best of my knowledge and belief