

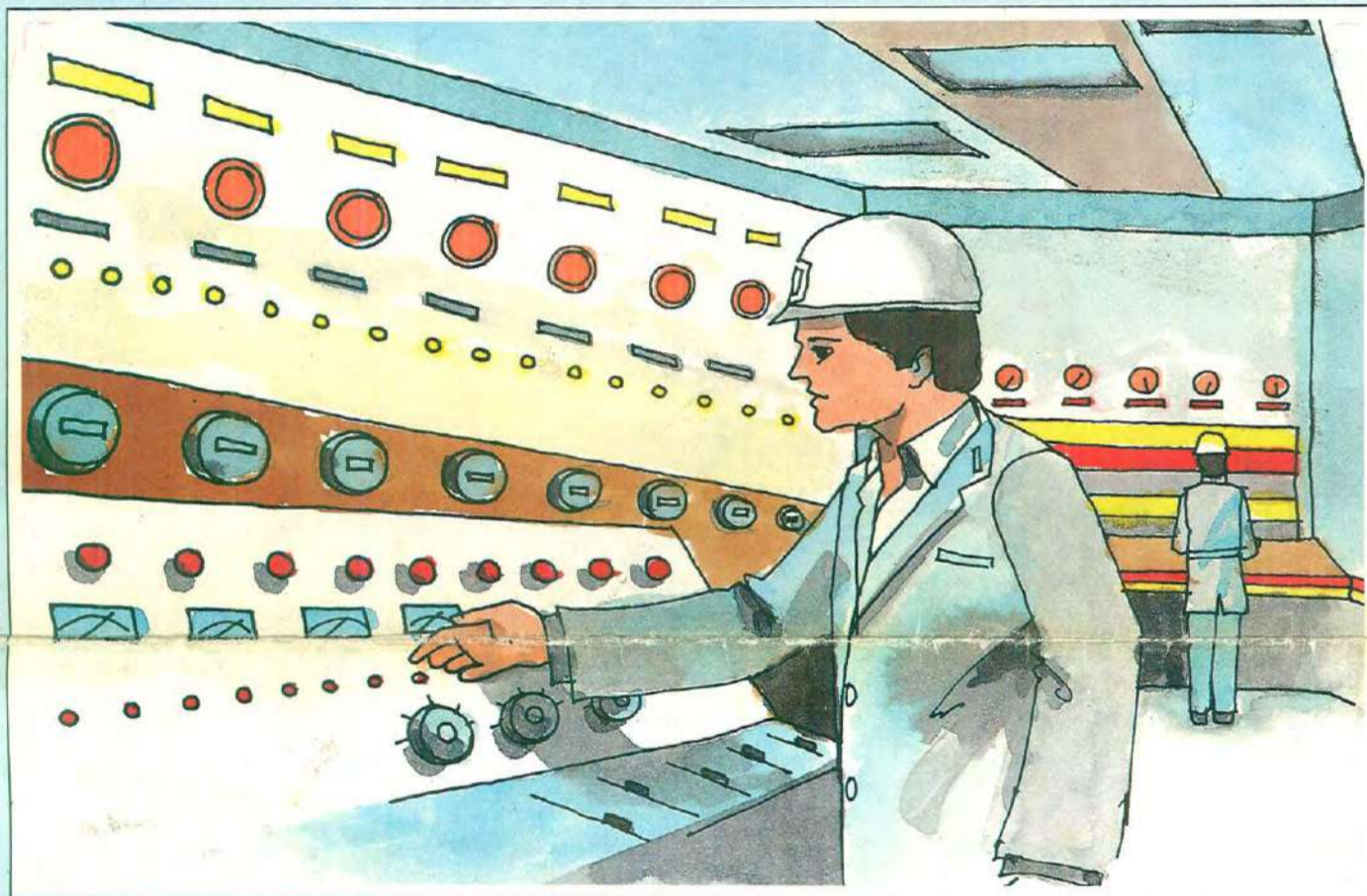
BRY WORLD

BRY-AIR International Newsletter

U.S.A. The Netherlands India

1

Nuclear plants successfully mothballed!



Migration takes place between material moisture and air moisture until equilibrium is reached.

The Bry-Air dehumidifier introduces dry air to the extent that when equilibrium is reached, all the air inside the dehumidified equipment will be less than 35% RH. The dehumidification equipment will then operate intermittently to ensure that these conditions are continually maintained.

The Bry-Air Dehumidifier

A long list of successfully deactivated power plants throughout the world bear testimony to the accumulated experience of Bry-Air in this application area.

Bry-Air is the first name on the list wherever power plant dehumidification is required.

Arizona Power & Light, Arizona, is one of several nuclear plants successfully deactivated using Bry-Air dehumidifiers.

Others include Bell Fonte Nuclear Plant (TVA), Hollywood, AL; Phipps Bend Nuclear Plant (TVA), Sturgessville, TVA; and Wattsbar Nuclear Plant (TVA), Spring City, TN.

There are several reasons why a power plant (nuclear or otherwise) may need to be deactivated for a while: hold until start-up, temporary lay-up, and "Extended Cold Standby" (ECS).

All power plants, when not in operation, must be economically maintained in the "as left" condition for an indefinite period, and, when needed, should be capable of being put back into service immediately. Corrosion, mildew and mold are all problems related to moisture or humidity, and have devastating effects on stored products.

The only effective solution lies in continually filling the equipment with dry air which will prevent these conditions from occurring.

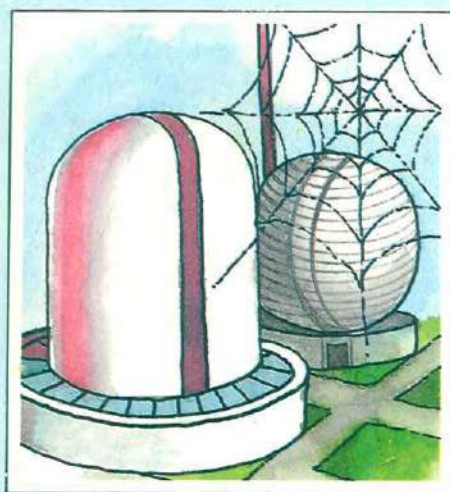
A dehumidifying system is thus required. The system must be capable of removing internal moisture and preventing the harmful effects of new moisture or unwanted contaminants in the internal space of the power plant.

equipment and material inside will be retained in good condition. Corrosion of ferrous metals is arrested and the low humidity prevents the growth of mold and mildew. The Bry-Air dehumidifier is capable of producing air at conditions less than 1% RH. Therefore, it is very easy for the Bry-Air unit to produce air at 25 to 30% RH which ensures that the required conditions will be maintained.

The effectiveness of dehumidification depends on maintaining a low relative humidity condition. In the initial dehumidification period, material moisture and air moisture content are in constant exchange with each other.

A partial list of power plants using Bry-Air Dehumidifiers

- Duke Power
- Gulf State Utilities
- Jacksonville Electric Authority
- Louisiana Power & Light
- Duquesne Light
- Westinghouse Nuclear
- Pacific Gas & Electric
- Metropolitan Edison
- Long Island Lighting Co.
- Georgia Power & Light
- Bechtel Power
- Hope Creek Generating Station
- Iowa Power & Light
- Southern California Edison
- Washington Public Power
- Mid South Utilities
- Detroit Edison
- Virginia Electric & Power
- Tennessee Valley Authority
- Houston Power & Light



Desiccant drying

Bry-Air, a pioneer in the field of dehumidification has had considerable experience in the deactivation of power plants, using their desiccant dryers. The desiccant drying medium removes the moisture from the air, and is the only practical means of preserving materials during storage. (The same principle has been used by U.S. Navy to 'mothball' ships up to 20 years.)

It is an established fact that if an enclosure (not of wood) is kept at a relative humidity of less than 35% under any ambient temperature, the



Seed storage, seed drying, moisture is your hidden enemy

(Story on page 6)



Attention! We put you at ease!

The year: 1979. The locale: An ammunition store in the Netherlands. A silent invasion was taking place. The foe was deadly! No guns or tanks could destroy it! When discovered, extensive damage had already been done. Emergency meetings were called! A strategy was evolved and implemented! At once the advance of the enemy was thwarted. The situation was saved before the damage was irreparable.

Moisture: the hidden enemy

The foe? Moisture! The secret weapon it employed? Corrosion! A weapon which eats away the toughest steel. In this instance, it had corroded the guns and tanks in storage! The defence strategy? Dehumidifiers were installed by Delair to supply dry air to counterattack the hidden enemy.

This is not an isolated instance confined to a particular location. Similar problems are faced by military warehouses all over the world where arms and ammunition are stored. All military equipment is high valued and must be available for operation at any given time, hence the importance of maintaining it in a 'ready' condition.

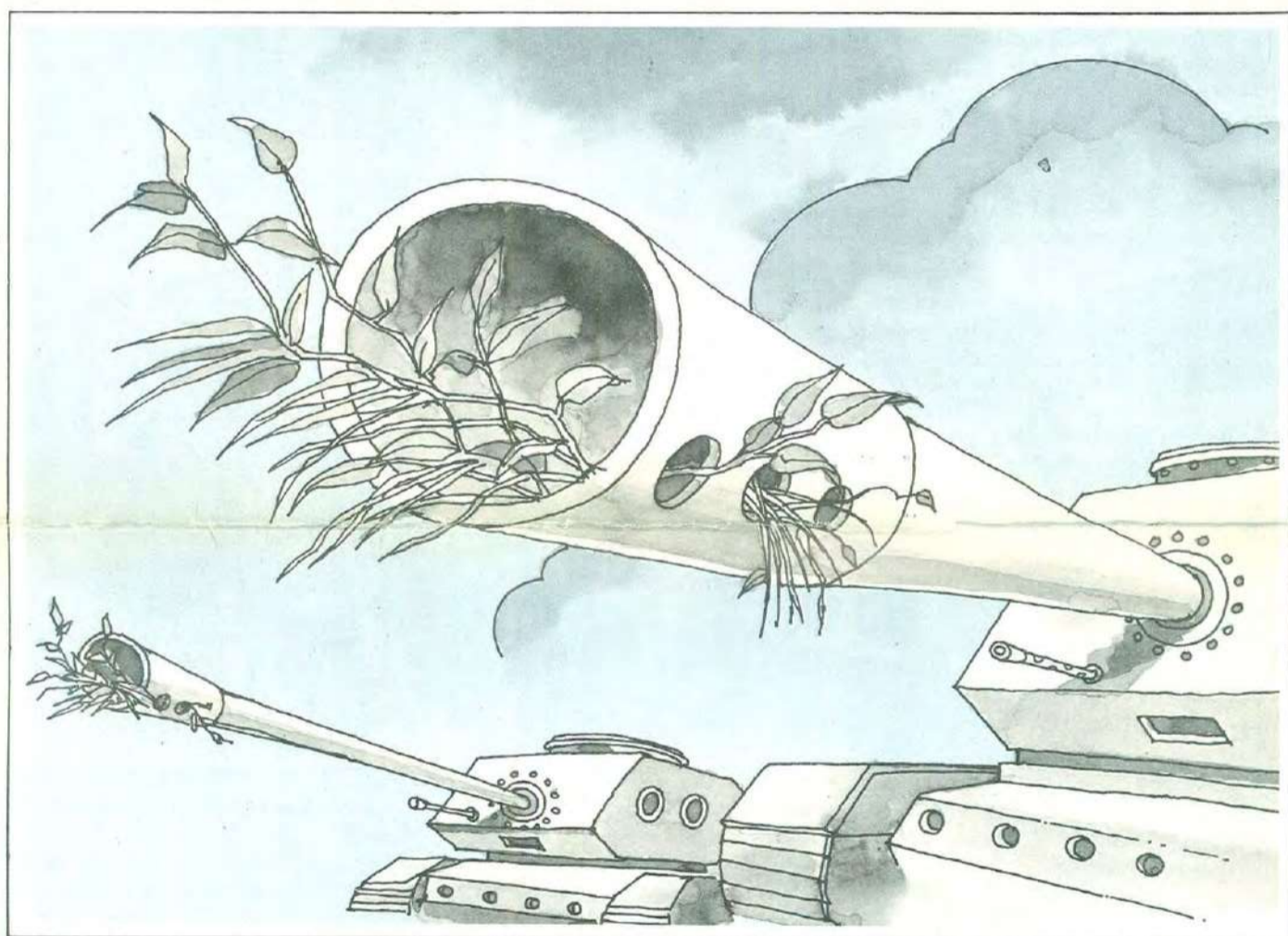
Storage of steel or metal products presents major problems where air is humid and there is wide variation of temperature during the 24-hour day, causing condensation at times on the cold surface of the metal. This "dew" works in combination with oxygen in the surrounding air to attack steel and severely corrodes the surface.

But there is a way to effectively defend steel against this silent attacker!

The strategy

The defence strategy is based on the fact that, if a relative humidity of 45% to 40% or lower is maintained, steel does not corrode. If this RH level is maintained, water vapour is not able to condense even at the lowest temperature in any given 24-hour period.

To execute this strategy, that is, to obtain these ideal circumstances, the material to be protected needs to be sheltered in warehouses which are as nearly airtight as possible. These warehouses are of special construction and are either concrete or made of steel and brick. The moisture content



in the warehouses must then be brought to the required RH level and kept at that level.

To achieve this, only a desiccant dehumidifier offers the most economical solution.

Delair has made a significant contribution to the defence forces in Europe, by supplying state-of-the-art MVB dehumidifiers to maintain the military preparedness of stored materials. "So long as they are working you may rest easy!"

Some of the army installations which have been put at ease by Delair dehumidifier protective forces are in Belgium, Luxembourg, West Germany, Italy, Holland and Norway.

Dryers show new use

A \$ 30,000 saving deal at Cap, Snap & Seal

Cap, Snap & Seal Inc., a large manufacturer of plastic moulded parts, were operating 24 injection moulding machines in a room.

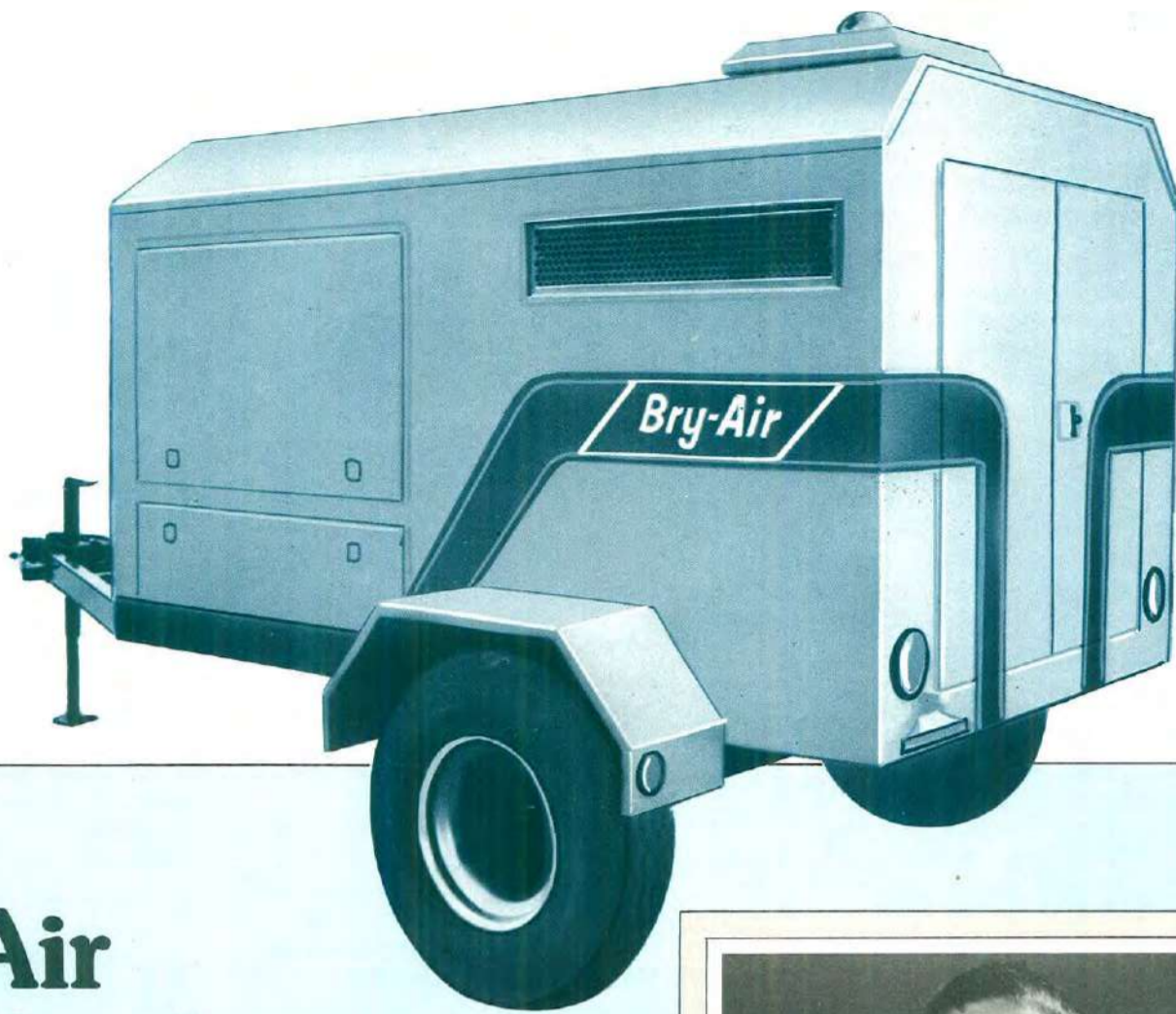
The hot moulds had to be chilled before the moulded parts could be released. The cold mould, upon opening, would be covered with water: a common enough phenomenon, known as 'mould sweating'. This is nothing but condensation of water due to sudden changes in temperature which eventually results in rusting and corrosion of the costly moulds.

The obvious answer lay in controlling room humidity, or surrounding the mould with dry air. They tried to do the job with refrigeration using two 30 ton units. Bry-Air, the specialists in the field of dehumidification, supplied a MVB-60-D and fitted the dehumidifier in the return air stream, thus maintaining a dewpoint of 40°F at temperatures between 75° and 80°F.

The use of 'central mould dehumidification' had several advantages over the conventional methods. The central room dehumidifier eliminated the need to isolate individual moulding machines. It would have cost \$ 2300 per machine to do the job individually — 24 machines × \$ 2300, or an investment of \$ 55,200. The MVB-60-D was supplied for \$ 20,000.

The operating cost of the dehumidifier was much less.

Further processing benefits resulted from being able to run the moulds at lower temperatures, decreasing cycle times and improving machine productivity. Moreover, part quality was enhanced by eliminating bubbling and streaking.



Bry-Air on wheels

Bry-Air on wheels — Why not?

Portability is often a boon when dehumidification is needed where permanent installation is impractical. Some of the applications:

1. Electrical splicing galleries.
2. Remote steel tanks that need refinishing and sand blasting.
3. Buildings that have been flooded and need quick drying.
4. Electronic installations that need immediate attention.
5. Ship building, ship maintenance and ship equipment installation.

There are a host of other applications, limited only by the imagination.

Does Bry-Air have an answer to such requirements. But, of course!

Bry-Air has built portable units in an extremely wide range of sizes: from 50 cfm to 10,000 cfm. These units have been mounted on everything from portable hand trucks to larger 40 foot enclosed work trailers.

Several of the large trailer-dehumidifiers have been so powerful, that they have dehumidified not only the designated area but also the work space of the trailer itself!

With such a wide range of possibilities, the design of the portable units is a made-to-measure affair.

Several things must be considered when designing custom-made portable units.

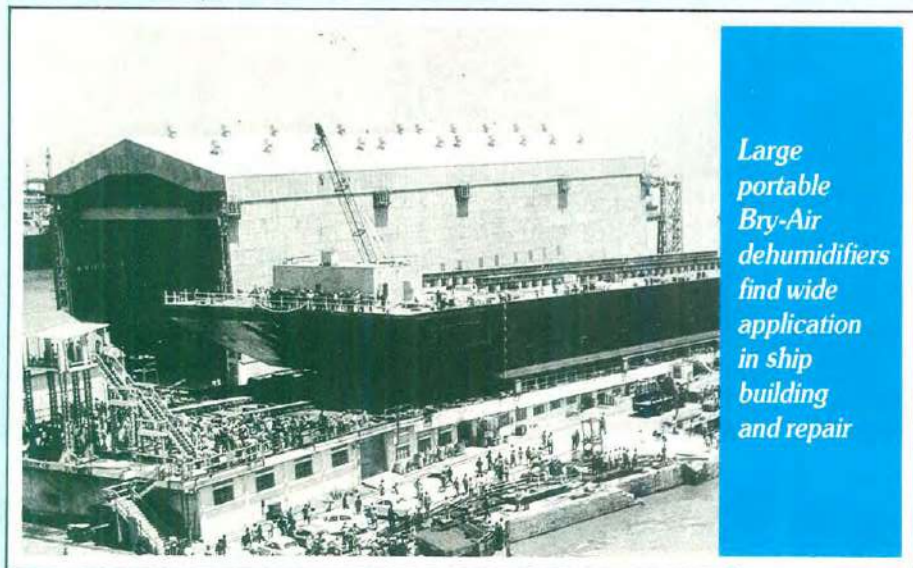
The type of application: This will determine the relative cfm. With a portable unit, too big is better than too small!

The power requirement: This must be calculated after the size is determined. Small units can be handled with a single electric generator. Larger units require a generator for the fans and the controls. Propane is a good source for reactivation energy.

The degree of portability required: Will this unit travel over-the-road? Is it for in-yard use only? Should the running apparatus be part of the unit? Should it be a temporary mount on a semi-trailer?

Whatever the application, power, or degree of portability required, Bry-Air has the technology to build it. In fact, Bry-Air can provide, not only portable dehumidification, but all the elements of total-environmental package units, to meet the total needs of the customer.

So, the next time you are constrained for space, put 'Bry-Air on wheels' and watch it work!



Large portable Bry-Air dehumidifiers find wide application in ship building and repair



Sugar n' candy? Dry is dandy!

Open, Pop, Roll and Chew, to feel that flavour come right through!

That was all Bry-Air knew about candy eating until the day they happened upon the inside story. They could not resist letting you on to the 'stickiest' one.

The inside story

The production of hard candies, with or without centre fills, is an intricate process. The material is in a plastic state during the manufacturing process. It must flow and be shaped by a stamping machine. The natural foe which inhibits the free flow is the ever-present moisture in the air. Sugar, being hygroscopic by nature, becomes sticky when exposed to highly humid conditions. The moisture also interferes with the operation of the processing machine.

The only solution to the problem lies in surrounding the processing and manufacturing area with dry air.

The M&M story

Take this interesting case study of sugar-coated candies with centre fills, manufactured by the famous M&M candy makers of U.S. How did Bry-Air engineers cope with the users' requirements?

Manufacturing this sugar candy involved taking preformed candy bits, on which the hard shell was applied through a tumbling process. Firstly, the

centre bit needed to keep its shape. Secondly, the sticky shell material had to be deposited and dried during the tumbling action.

This required large amounts of cold dry air to be delivered to the tumblers in a number of machines. The machines were installed in an area where the ambient air was very humid.

Bry-Air supplied dry air with one unit to all these machines. The unit was so designed that the air delivered to the tumblers would spill out into the room and the same air from the room was recirculated through the dehumidifier for reprocessing. This also helped maintain a low humidity in the entire process room.

Recirculation of the room air, even though quite moist, was less humid than ambient and thus saved considerable energy.

Special filtration was the only additional requirement which was specified by the user to meet USFDA requirements.

This was an interesting job to engineer. However, Bry-Air has done hundreds of food applications. Each one presents its own set of problems and opportunities. Each one must be engineered to its own set of criteria. Bry-Air's great engineering capability combined with the flexibility of the MVB industrial dehumidifier makes it easily possible.

The Bry-Air saga

All corporate stories read alike. A small beginning, similar goals and achievements, its course shaped by an individual. What sets one apart from the other is the company ideology.

So it is with the story of a once small U.S. company called Bry-Air. It has all the ingredients to make a good company story — plus a lot more.



The pioneering spirit

It was in the year 1964, that Bry-Air was incorporated in the heart of America, in the state of Ohio. A.G. Harms with a small group of investors purchased the patented industrial dehumidifier line from Bryant Manufacturing Company of Indianapolis in 1963. The manufacturing facility was put into operation in November 1964, initially in a 20,000 sq. ft. covered space on 16 acres of land in Sunbury, Ohio, with A.G. Harms as the corporation President.

Harms, being a marketing man, had many visionary ideas. He set about consolidating Bry-Air products in the U.S. market.

How the West was won!

Company sales right from the beginning were handled through representatives. Apart from the pharmaceutical and food industries, where the application of dehumidification was direct, Bry-Air identified and developed several new application areas and appointed representatives to cover the entire gamut of industries throughout the U.S. New concepts in sales and marketing were developed, the most important being the 'package' concept. The concept was to supply a complete system rather than a single component (dehumidifier) for any given application. The success of the idea became apparent when imitated by the other three manufacturers of similar equipment.

A system which could be custom-designed to customers' needs was a feature with all Bry-Air dehumidifiers.

Annual sales volume more than doubled in the initial five years. Thereafter, the manufacturing facility had to be regularly expanded to meet the tremendous increase in production requirements.

Looking Eastward

Having consolidated the U.S. market, the company began thinking globally and established an international selling agency in the Netherlands to market dehumidification equipment in Western Europe.

Delair had decades of experience in the field of drying. They were manufacturing specialized equipment for drying of gas, compressed air dryers and other compatible lines of

equipment. It was their extensive knowledge and experience in the field which helped create strongholds in the field of dehumidification in the strongly competitive Western European markets.

This mutually beneficial relationship over the years matured into manufacturing the Bry-Air dehumidification product line under a licensee agreement for the European and African markets.

Growth through expansion

There was something else going on within the U.S. company which needed to be watched! It was the progress of a young man named Paul Griesse. He had joined the company in 1966, had helped the company in the consolidation of the U.S. markets. Soon he became a direct participant in the company's interests and was a 50% shareholder in the company by 1971. Paul Griesse, at this time, set about turning founder Arthur Harms' visionary ideas into concrete reality.

It was at this time that product development activity was initiated.

The company diversified into the upcoming and compatible field of plastic drying, by purchasing a division of the Van Dorn Plastics Company. This operating division manufactured accessory equipment for the plastic injection moulding industry. A key product in the plastic accessory line is the dehumidifying dryer and material handling equipment. Bry-Air successfully transferred its engineering know-how in dehumidification to this entirely new market. This division came to be known as Bry-Air Systems.

The Bry-Air Systems division today represents approximately 30% of total annual Bry-Air sales volume.

Research and development

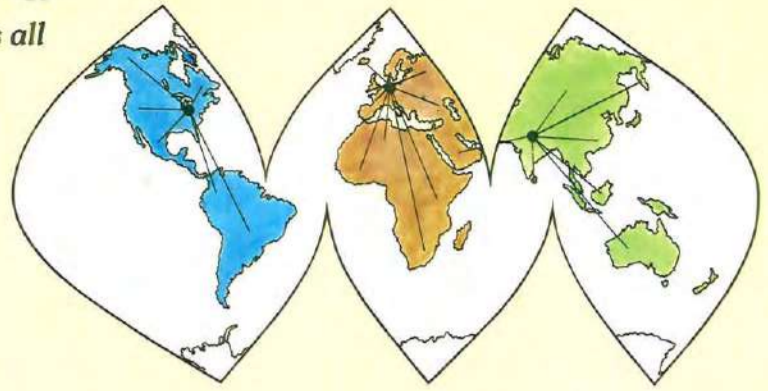
At Bry-Air, research and development was always given an important role. Ongoing efforts to improve designs, layouts, machinery and production methods were integrated into the everyday work pattern. However, in 1981, substantial research and development activities were initiated to improve existing products and to develop new products. A unique laboratory was designed and constructed to serve two purposes: to continue state-of-the-art product development in dehumidification, and to provide a market and sales tool to physically test application and design criteria for specific product applications.

Today Bry-Air can boast of the most comprehensive R & D lab in the air drying industry.

Ticking with the times

As a pioneer in the field of dehumidification, Bry-Air has maintained the initiative, searching for new ways to bring the benefits of research to satisfy customer needs in the field of plastic drying and energy conservation.

When the world focus shifted to devising technologies to conserve energy, the Bry-Air engineers, in keeping with the times, developed a 60% more energy-efficient dehumidifier with superior performance capabilities, which could



outperform any competitive product in the market. Significantly, Delair, which by now had expanded to include the additional products of the Bry-Air dehumidifier range, was able to capture a \$ 2,000,000 NATO defence contract, which they were unable to bid earlier, due to energy requirements.

A concurrent development programme also resulted in an unique and superior plastic dryer.

Both products, when introduced in the market, were instantly capitalized by the expanding international network.

Partners in progress

What had started in 1963 as the Bryant Manufacturing Company of Indianapolis (incorporated later as Bry-Air of Ohio) had become by 1980 a global operation in association with a Dutch licensee named Delair and an Indian partner named Bry-Air (India). Today Bry-Air is a multi-product, multi-location company with over 125 active agents all over the world.

Together, they service the world: Bry-Air U.S.A. serving the two American continents and Australia, Delair serving the European and African markets and Bry-Air (India) selling in the Indian subcontinent, South East Asia and the Russian market. Together, they have diffused the 'Bry-Air for Dry Air' concept around the world.

The Bry-Air commitment

All this spells the company's commitment in manpower,

technology, plant and machinery and R&D.

At Bry-Air, the biggest asset is the company's trained and dedicated manpower. Bry-Air believes training is to skill-formation what R&D is to product development. In fact, skill formation goes beyond the training of its own personnel and extends to cover dealers and agents as well as service staff.

Most important of all is the company's commitment to its customers. When Bry-Air sells, the customer does not get a product but a profitable solution to a problem.

The company's philosophy has been simply, 'No orphans in the field'.

The company's concern for the customer extends from basic design, manufacture and quality control to service and availability of spares.

An unfinished story

Bry-Air stands poised today for unchecked growth inspite of challenges placed by the fiercely competitive climate that exists worldwide.

The same pioneering spirit that has guided the company in the past will steer it to innovate and set new records.

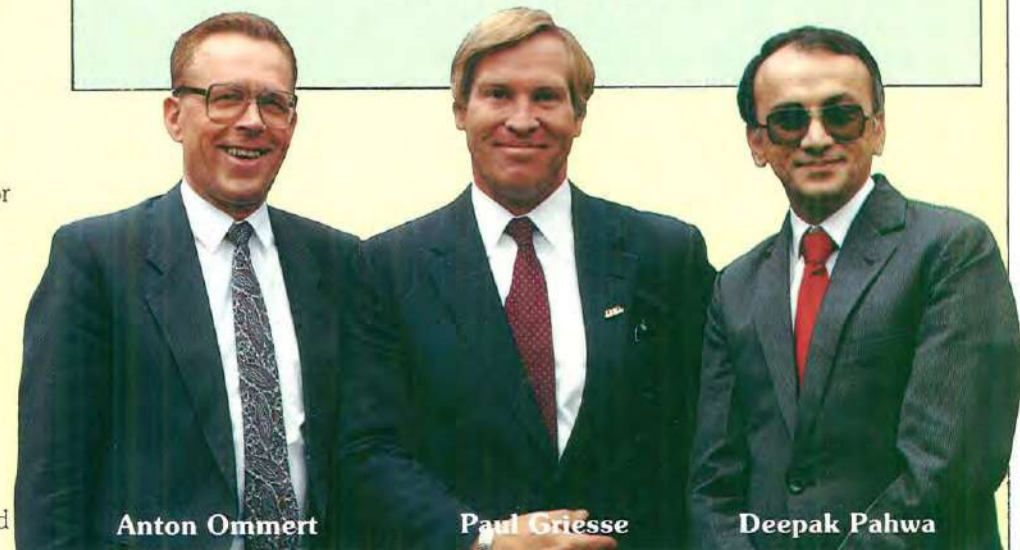
The saga remains unconcluded because ... the commitment continues.

Together they help create the 'DRY WORLD'

Paul Griesse — President of the parent company Bry-Air, Inc., believes, 'Companies are good, but friends are better'. Bry-Air internationally will grow from strength to strength because of the co-operation the three companies share together.

Anton Ommert — President Delair
The association with Bry-Air dates back fifteen years but association with dry air is fifty years old. When put together, you can only have 'Bry-Air for Dry Air'.

Deepak Pahwa — President Bry-Air (India)
There is no short cut to success. The only road is paved with dedication and perseverance.



Anton Ommert

Paul Griesse

Deepak Pahwa

From experience comes trust in quality...

Delair — 50 years young

Delair — Droogtechniek en Luchtbehandeling B.V. — recently celebrated its fiftieth year (1936-1986) of Endeavour, Dedication and Achievement. It was indeed a cause for celebration — a golden opportunity to remember all things past, its quota of trials and tribulations, its quantum of triumphs and its glittering firsts.

The name Droogtechniek en Luchtbehandeling interestingly and aptly described the activities of the company as drying of air gases and air treatment. The company was renamed 'Delair' by the board as a more pronounceable name with growing international contacts.

The golden past

Delair was founded in 1936 by a young university graduate who wanted to exploit the results of his studies in the field of desiccants. The company began by producing 'Silica Gel' for inhouse use which was incorporated in a rotary dryer called the 'Rotadryer'. This proved to be a major breakthrough in achieving constant outlet dewpoint which could not be realized by refrigerant dryers



which used the principle of cooling the gas stream and condensing the moisture.

A large number of Rotadryers were sold in the Netherlands.

The line of refrigerant dryers were manufactured for compressed air application. This activity resulted in a close co-operation with Atlas Copco Airpower, a leading manufacturer of

air compressors. To date, over 30,000 compressed air dryers for Atlas Copco have been manufactured and sold worldwide.

Delair drying expertise extends to equipment for drying of instrument air, natural gas, inert gas, nitrogen and other gases. Wave guide dryers manufactured by Delair for use in the telecommunication field find

worldwide application. As specialists in the field of drying, extending this expertise to the dehumidification field was an easy job and today Delair are specialists in the field of dehumidification.

The present

That's a lot to handle under one roof. Delair shifted into their new and modern facility the opening of which coincided with the golden jubilee celebrations. The Dutch enjoy cycling, but cycling within the plant would not be only a hobby! It is indicative of the size of the area of the plant that the use of bicycles is necessary for inter department commuting.

The covered area of 40,000 sq.m. under one roof houses the most modern sheet metal facility backed by highly qualified manpower to realize products of the finest quality.

The plant situation is at a vantage point with road, rail and air connections close by, to effectively cover the European and African markets.

At age 50, Delair can only progress one hundredfold!

Passage to India



The passage to India was rediscovered by Paul Griesse in 1979, when he visited the country for the first time at the invitation of Arctic India Sales', Deepak Pahwa (agents for Bry-Air products). At an international show where Bry-Air products were on display, he was amazed to see for himself the potential and scope for dehumidification that existed in the country. With the rapid industrialisation that had started in the country in the late '70s, a strong latent demand for dehumidification was being felt. Latent because, imports being prohibitively expensive, users were either foregoing dehumidification or opting for alternate refrigeration-based drying systems.

Hence a manufacturing plant was set up in collaboration with the Indian partner to manufacture the complete range of Bry-Air products. In February '83, the Bry-Air (India) plant was inaugurated by the then U.S. Ambassador to India, Harry G. Barnes.

Bry-Air (India) can claim today to have brought dehumidification of age in India. Within a year it was serving as an exporting base to southeast and southwest Asia.

... a passage to progress

"Bry-Air (India) is indeed a 'Crown Jewel' of the Haryana Industrial Park of Udyog Vihar" remarked Governor Celeste of Ohio, U.S.A., on his visit to the India plant of Bry-Air situated just outside Delhi. Bry-Air (India) also made news when it was inaugurated by the then U.S. Ambassador, Harry Barnes, as it had the distinction of being the first Indo-U.S. small-scale joint venture in the hi-tech field, in India.

Bridging the quality gap

India has been likened to an awakening giant. With more and more sophisticated technologies coming into the country, the focus has shifted to producing quality products to international standards. Dehumidification as an integral part of the environmental control so necessary for the manufacture of some of these quality goods, specially in a sub-tropical climate like India's, was a missing link in the total upgradation in manufacturing standards.

Today Bry-Air (India) can claim with pride that it has been instrumental in bringing dehumidification of age in India. Unlike the mature markets of U.S. and Western Europe, the Indian market had to be first matured and then satisfied.

This marketing-led approach has been very successful in the country and the name Bry-Air has become synonymous with dehumidification.

With the ability and experience to mature fresh markets and the back-up support of a sound engineering and manufacturing facility, Bry-Air was inspired to set up its export cell.

Bry-Air equipment sells today in Thailand, Philippines, Indonesia,



Singapore and Bangladesh, and now Malaysia. Sound application engineering, energy-efficient equipment, trouble-free maintenance and excellent follow-up by way of service and start-up helped to create confidence in the product in these markets, which have traditionally looked to the West for quality and reliability.

Another first for the Indian company was the introduction of waste heat recovery systems which were not given any importance hitherto in the Indian environmental industry. Waste heat recovery is a boon for the energy-starved industry in India. Indigenous production of the heat-pipe-based heat recovery systems gives an additional price advantage which provides tremendous savings for the consumer.

In the wake of the rapid rise in the automotive industry, engineering plastics have come in a big way in India. Plastics drying, an inherent process towards good quality moulding has been another first with the India plant with the range of Bry-Air plastic dryers and material handling equipment.

With so many firsts to its credit, the India plant has yet further plans to expand into related product lines in the near future, to capitalize on all the accumulated experience of its partners in the field of drying and to bring to the country the latest and best of the needed technologies.

In doing so, the corporate philosophy of innovating, teaching and growing together, has been the prime mover.

the international way.

A paan-tastic new idea

In India, 'paan' chewing is a centuries old habit that is still as popular as 'gum' chewing in the U.S.A.

Encouraging a popular habit

To the 200 million paan chewers in India, Katha needs no introduction. To the rest of us, it is the oily, pasty ingredient used in the green-leaved, red-staining 'Betel leaf' or 'paan' Katha is derived from the bark of the catechu tree, found in abundance in the forests of the 4 Indian States of Uttar Pradesh, Madhya Pradesh, Himachal Pradesh and Bihar.

The all-India output of Katha rose from 2,500 to 4,000 metric tonnes in the last ten years. Currently, Katha sells for about \$ 18 per kg. The price is determined by the colour of the dry Katha cake. If the Katha shows no colour deterioration while drying, then the lighter-coloured Katha sells at nearly double the price.

The process of converting raw catechu bark into edible Katha is a long and tedious one and involves boiling, filtering, pressing the slurry between filters to form tablets, and then drying. The most important phase of the process is drying the Katha tablets. Conventionally, Katha tablets are dried by passing air over them.

The change in colour takes place due to oxidation; and this results from the moisture present in the air used for drying the Katha. In 15 years' of experience of Katha manufacturers it has been observed that, to preserve colour, drying is recommended at 40-45°F. At this temperature, however, the drying potential is limited. Hence, to preserve the best balance between

drying and colour retention, dry air at 40-45°F is needed for the job.

Katha drying

Experiments by Bry-Air (India), in response to a Katha manufacturer's enquiry, showed that the optimum conditions for drying Katha is at a temperature of 45°F and RH of around 55%. The Bry-Air dehumidifier made this easily possible.

The dual advantage was demonstrated at the installation in a large Katha factory.

Katha tablets at an initial moisture content of 45% were exposed to dry air at 50°F till the moisture content dropped to 32%. At this level, "colour fixation" occurred after which an increase of temperature to 65°F helped reduce drying time.

The colour was thus retained (enabling the manufacturers to sell at a premium) and the drying time reduced from 21 days to about 7 days, thus increasing output, substantially.

Low temperature drying

A fine example in low-temperature drying as applied to a non-conventional product.

Bry-Air specializes in product-drying at temperature below 75°F. Product-drying can be hastened by elevating temperatures, but certain products are temperature-sensitive, and using elevated temperatures impairs the quality of the product.

The solution, in such instances, lies in surrounding the product with dry air, so that moisture within the product is released to the surrounding air. At temperatures below 120°F, a desiccant dehumidifier, by maintaining the air at a lower moisture level, can increase the drying potential, and thereby increase the drying rate. More importantly, it can remove the variable of weather as a factor in drying operation.

Application

The application areas extend to drying a myriad of products like seeds, soft gelatine-capsules, gelatine, yeast, tobacco, tea, coffee, milk, foods, cocoa, grapes, cardamom, craft paper shells, photographic film drying during manufacture, leather, furs and hides, wood, glue, paper, etc.



Saving for a rainy day

Safe storage of seeds is important for many reasons. They need to be preserved for eating... and for planting. They need to be kept for studying by the plant scientist... and for seed stock in seed banks. In times of drought, there may not be seed enough left for the next year's crops. This is when seeds literally "saved for a rainy day" come into their own.

Hence conservation of seed through efficient processing and storage become factors of prime importance. Loss in viability, discoloration and toxin production are all harmful effects due to improper conditions during storage.

Seed drying

The amount of moisture present in the seeds affects both the quality and the storability of the seeds during long-term storage. The purpose of drying seeds is to limit the subsequent rate of seed deterioration during long term storage.

All fungi have a definite moisture level below which they will not grow. If the seed is dried prior to storage to about 5% moisture content, then fungi will not develop.

Seed drying using the dehumidification principle

Seeds cannot be dried by exposing them to heated air, as elevated temperatures will destroy their germination potential. The alternative is to release the moisture from the product to the surrounding air. The dryer, by maintaining the air at a lower moisture level, can increase the drying potential, and thereby increase the drying rate. Moreover, this means that the variability of weather ceases to be a factor in the drying operation.

Bry-Air Seed Dryer

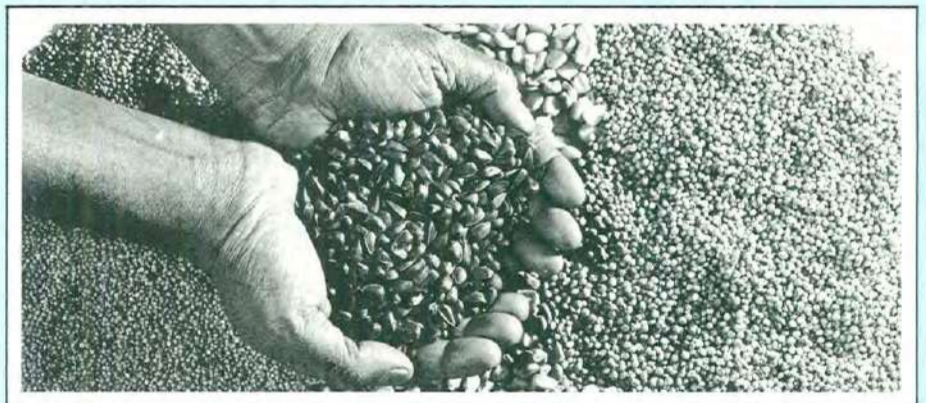
The dehumidifying seed dryer uses the above principle. The seed dryer essentially consists of two parts: The first is a chamber fitted with trays where the seed to be dried is placed. The number of trays vary with the quantity of seeds to be dried and also the size of the equipment.

On top is housed the second part, the dehumidifying dryer, which continuously feeds dry air through the chambers.

The removal of moisture is based on the principle of physical adsorption. Through experience, it is found that to optimise drying capacity with minimum power consumption, and to retain germination potential in the seed, the air coming out from the drying chamber should be at a temperature of 100°F ± 5% at about 5% RH.

These seed dryers are based on state-of-the-art technology and incorporate a unique air distribution pattern through the trays to optimize drying capacity and time.

The seed dryers can handle 50 kg to 900 kg of seed per 8 hrs depending upon the model used.

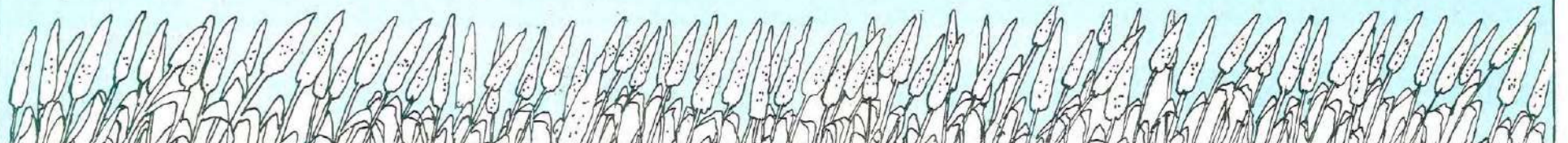


Seed storage

After the seed is dried, the next phase is their safe storage. The key criterion in safe storage is the maintenance of seed and grain quality. The two most important factors in determining the life of seeds in storage are relative humidity and storage temperature. The two are interrelated. Interestingly, the relationship can be expressed by a simple, rule of thumb. Storage temperature Fahrenheit plus relative humidity should total 100. For instance, 60°F at 40% RH, or 55°F at 45% RH, or 65°F at 35% RH. However, in most cases, the dewpoint to be maintained inside corresponds to nearly 35°F. This is a fairly good design criterion. (However, when seed is to be stored over very long periods,

the temperature and humidity considerations are slightly different.) To achieve the controlled air requirements indicated above, refrigeration equipment alone is uneconomical, impractical and cumbersome to design, operate and maintain. On the other hand, desiccant type dehumidifiers in combination with refrigeration offer a direct, simple and economic solution to control both temperature and humidity to the specified level.

Bry-Air Dehumidifiers are being used extensively worldwide in seed storage and seed drying to preserve the basic element of nature, the perpetuator of life — seed.



Which is more critical? Plastic quality thro' proper drying? Or, proper drying thro' a quality dryer?

Both!

One of the most universal advantages of plastics is their virtual freedom from attack by ambient moisture, or from surface attacks in any way comparable to the rusting of steel or the atmospheric corrosion of copper and aluminium.

However, plastic in the resin state is hygroscopic and absorbs moisture from the atmosphere during storage, which adversely affects the final quality of the moulded part.

Problems of moisture in plastic pellets

The proper drying of many plastic resins is the first critical step towards obtaining optimum performance of moulded parts and minimizing possibilities of degradation. Without exception, the longer and hotter a given forming operation is, the drier the pellets must be.

Common problems of many resins (including ABS, polyetherimide, polysulphone, polycarbonate and nylon) due to improper drying are splash-type defects (splay), silver streaking, internal bubbles and surface defects (craters).

Another common problem associated with improper drying is loss of impact strength. For resins such as polycarbonate and polyester, where impact strength is a critical property, dry resin is a must.

Improper drying may also lead to loss of tensile strength and elongation, and poor melt flow (particularly true of

polyester). This can result in overpacking, parts and runners sticking, and flash. Therefore, proper drying can result in tougher parts and more stability during moulding.

The drying of the most demanding thermoplastic material can be handled by a dehumidifying dryer where dry air to the dewpoint of 40°F or lower is constantly fed to the hopper containing the material, which ensures that the polymer can reach a critically low moisture level.

Better than the best — Bry-Air's RM Series Plastic Dryers

Bry-Air's RM series dehumidifying dryers provide a constant -40°F dewpoint (or lower) year round regardless of ambient air conditions.

Innovative design

The RM dryers incorporate deep desiccant beds filled with molecular sieves to provide low dewpoint air consistently. The unique closed-loop, cool-down cycle increases the adsorption capacity of the desiccant by cooling it without introduction of moisture-laden air.

The countercurrent air flow design reduces the energy needed to reactivate the desiccant and extends desiccant life.

Lastly, the innovative multiple bed design ensures that constant low dewpoints are maintained throughout each cycle, thus eliminating the severe

dewpoint spiking that is inherent with twin-tower designs.

Advanced automation ensures zero defects

The solid state temperature control, an advanced warning system and an

A fine example in turn key capability

Bry-Air pneumatic conveying systems are designed to serve the plastic industry, no matter what size the operation. From railcar, to storage, to machine, a Bry-Air system can store and handle all of the dry products in dust-free conditions, moving at the exact rate of flow that the process demands, totally controlled throughout transit to point-of-use.

The Medex installation

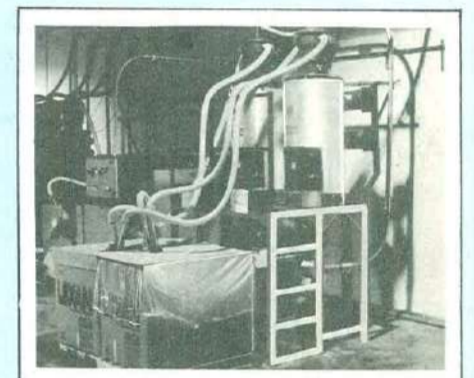
Bry-Air systems' central vacuum-loading system for multi-location sequencing of resins from bins and silos to several moulding machines provided an efficient solution for plantwide distribution requirement at Medex Inc. Columbus-Ohio. The system involves central drying and conveying in a separate material-handling room, remote from the moulding-machines rooms.

The central vacuum loading system utilizes a five-horsepower vacuum pump to convey six different materials

optional microprocessor-based dewpoint control system promotes energy savings and confirms the desired dewpoint quality of the process air stream.

Outsells other models

All of which goes a long way towards explaining why Bry-Air dryers outperform other models and why sales of Bry-Air's RM series dryers quadrupled last year.



from gaylords (bins for plastic pellets) to six 300-lb drying hoppers. A Bry-Air systems model RM-300 centrally feeds -40 degrees F or lower dewpoint air to the six separate insulated drying Hoppers containing clear lexan with 30-70% regrind mixes. Once the material is thoroughly dried, it is conveyed (with the same vacuum pump described above) through six material lines to twenty injection moulding machines in the adjacent room. These material lines are arranged in such a way that any one machine can receive material from any of the six lines, thereby providing greater flexibility to the user.

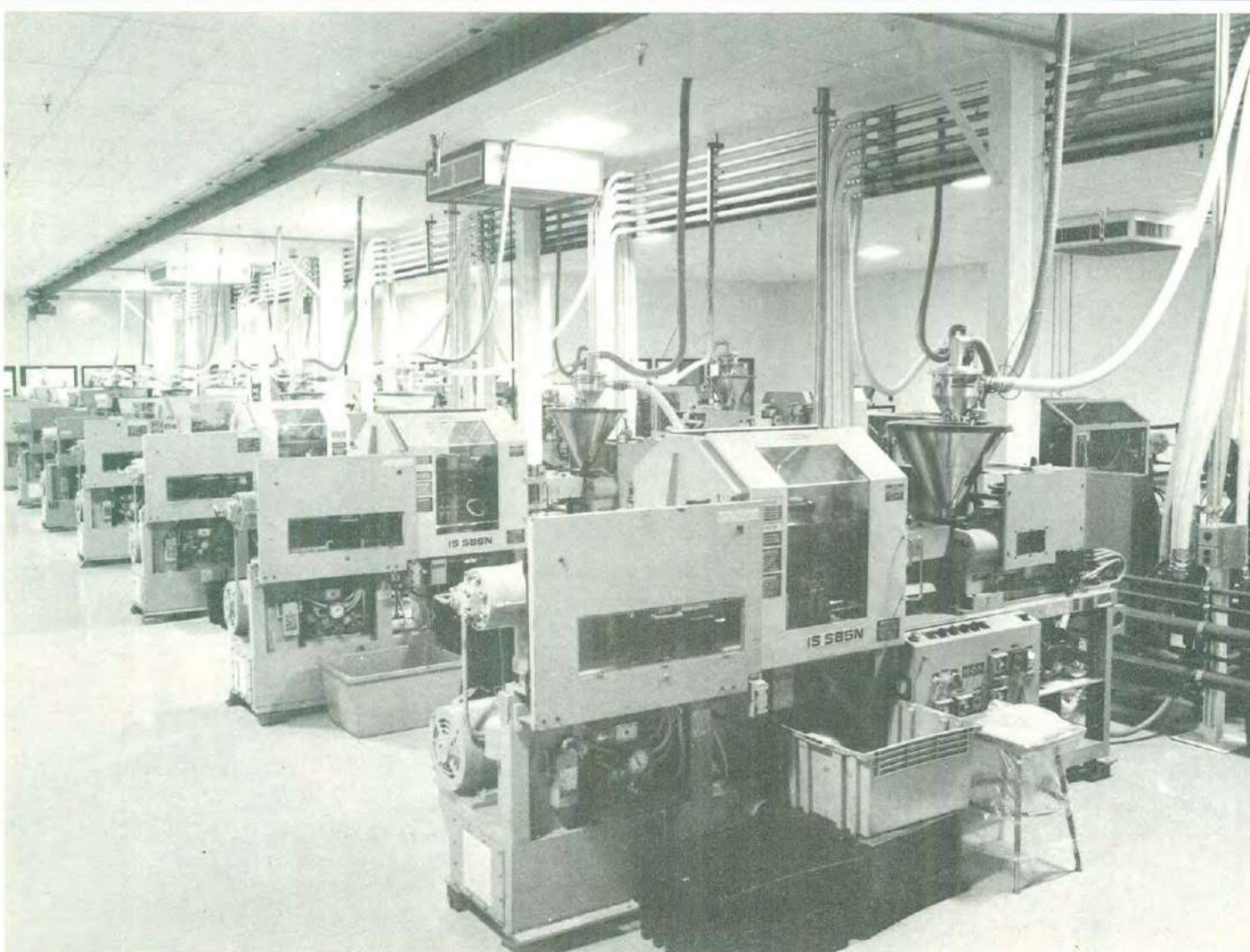
Apart from flexibility and reliability, the additional benefits which led Medex to decide for Bry-Air systems were threefold.

1. Both the initial equipment cost and the operating costs per pound of material dried and conveyed are substantially less than that compared to dedicated units for each moulding machine.
2. Being a fully automated system, there was substantial reduction in maintenance, supervision and man hours, required.
3. In handling, contamination due to spills or carelessness is eliminated.

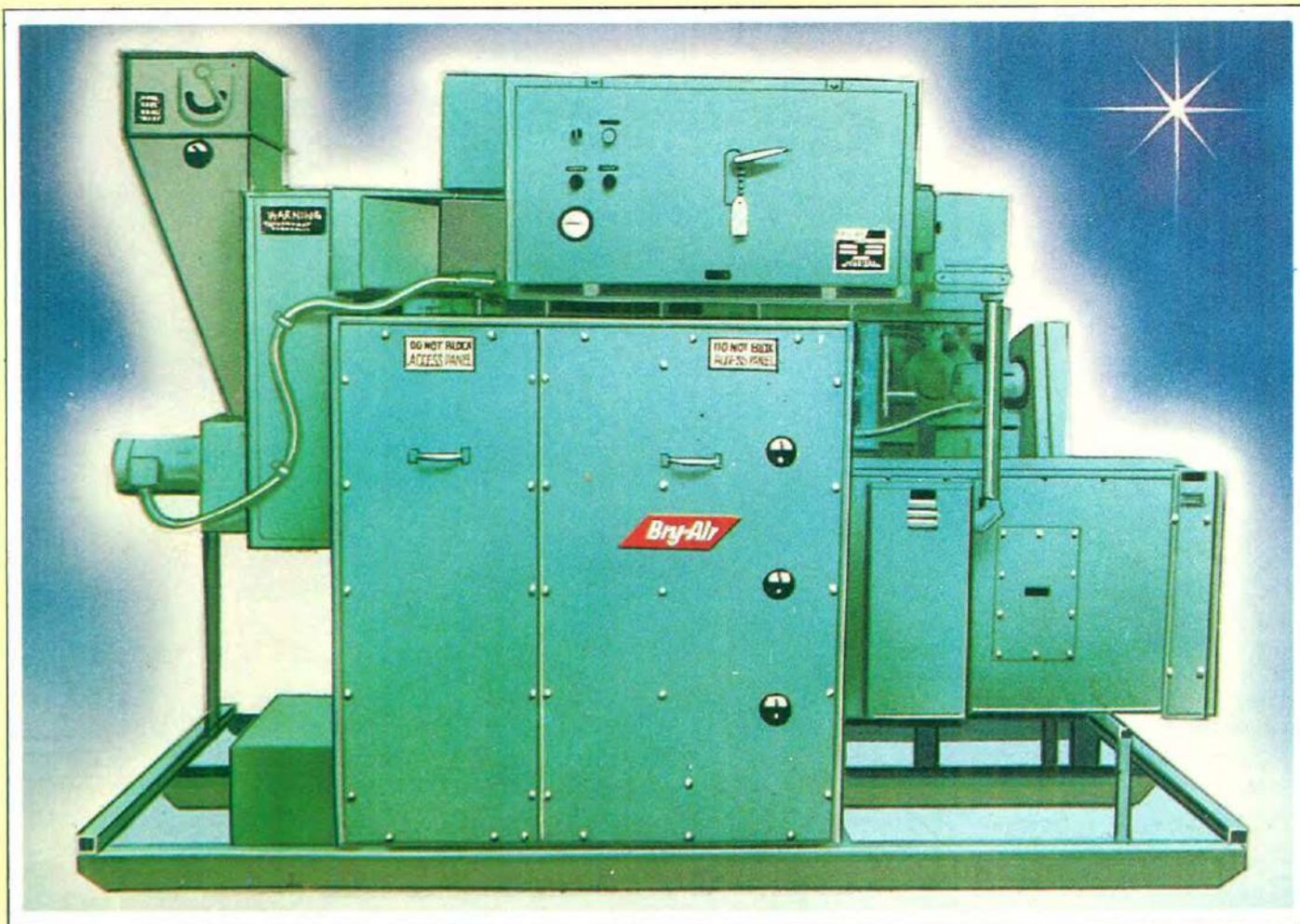
In addition to the automation advantages of a central loading system, an additional feature, 'INSPECTOR CONTROLS', improves process control through the use of a unique microprocessor-based alarm system.

This achievement stems from a recognition that the future of the plastics industry lies in plant automation and process control.

**Whatever Bry-Air makes,
makes plastics handling
easier.**



The 'MVB' generation



Even after 4 years of its launch, the Bry-Air 'MVB' still retains a little mystery. Acronyms like 'More Valuable Business' or 'More Value Per Btu Expended' have been used to describe the 'MVB'. Though the above may describe the equipment, the term has simply been derived from the phrase 'Modular Vertical Beds'.

The dehumidification equipment incorporates 'modular vertical beds' located on a rotating carousel, and is a revolutionary new concept in desiccant dehumidification.

The dehumidification concept simply means 'removal of moisture or humidity in the air'. It dates back to World War II when it was used by the Navy to 'mothball' ships to maintain them in the 'as is' condition. However, the advent of new technologies and new products widened the scope of this field to extensive industrial applications, and it was officially recognized as an important branch of the environment control industry.

Over the years, a handful of companies worldwide have manufactured dehumidification equipment and though the concept has been put to use in vast and varied applications, very little was done to refine the basic equipment.

Bry-Air — the pioneers

Bry-Air has been in the dehumidification business for 40 years. It has maintained a strong research and development programme,

acquiring a comprehensive knowledge of dehumidification requirements, drying processes and energy conservation. This knowledge was the key element in the ongoing effort to upgrade its product line.

Shifting focus on energy

In the late seventies, the world focus shifted to energy-conservation. Newer technologies were developed to make existing equipment energy efficient. In keeping with the needs of the times, Bry-Air engineers developed the state-of-the-art MVB.

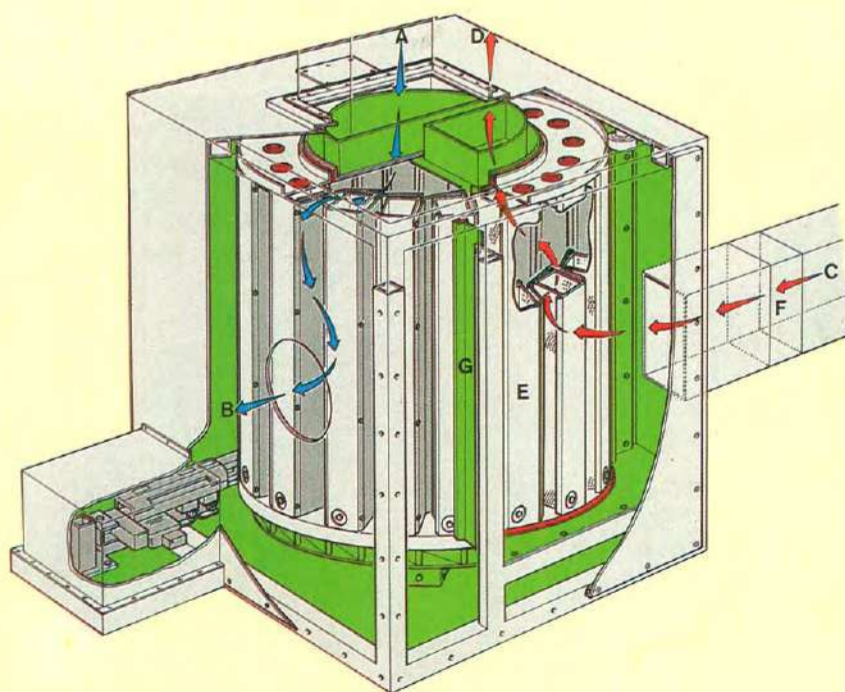
More value per Btu expended

MVB doubled the air drying capabilities at half the operating cost. The accurate timing of the MVB dehumidifier guaranteed maximum drying efficiency at tremendously reduced energy requirements.

The MVB is 60 per cent more energy efficient today.

Simplified operation

If you just follow the Red and Blue arrows in the figure below, you will see



how simply the air is dehumidified. Moisture laden air enters through the process inlets A, and moves through the desiccant beds B in that chamber. The desiccant in the beds adsorb the water vapour. The dehumidified air is then delivered through the process outlet directly into controlled space. A clockwise rotation of the carousel moves the beds one at a time into the reactivation sector E of the unit. The hot air entering through the reactivation inlet C moves through the desiccant to drive off the moisture and exhaust into the atmosphere through D.

MVB is matchless in...

Low operating costs — It allows the use of the most economical energy source, as steam, gas or electricity for regeneration is equally efficient.

Versatility — Can use any solid desiccant like silica gel, activated alumina or molecular sieve to tackle the toughest of drying tasks.

Serviceability — The desiccant in the MVB can be changed easily. The new concept of sealing makes seal replacement non-existent. Convenient access panels are located for easy inspection.

Reliability — Patented design guarantees years of maintenance-free operation.

Packageability — The extreme flexibility of this unit, when combined with precooling, preheating, aftercooling, afterheating, humidification etc., provides the equipment package for the total environmental control system necessary in many applications.

And this is not all that Bry-Air has to offer

The eight pages of this issue cannot cover the entire range of Bry-Air capability. The readers can look forward to more information on Bry-Air heat recovery systems in the next issue. The next edition will also offer notes on Tobacco storage ... and even answers to the intriguing question, 'What can embalming an Egyptian Mummy have in common with dehumidification?'

Till then Happy Drying!!!



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