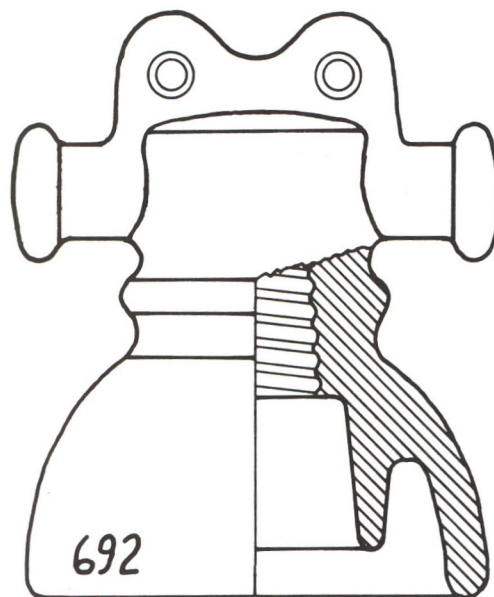


GLASS INSULATORS

FROM

OUTSIDE NORTH AMERICA



SECOND REVISION

**Authors: Marilyn Albers
N.R. Woodward**

Privately Published

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To Jack H. Tod
(1927-1990)

His brilliant work is of immeasurable worth
to everyone involved with insulator collecting.

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Cover: The color photograph of CD 692 was taken by Ray Klingensmith of Orwell, Ohio. This French style is so unique that we wanted to display it in the most prominent place we could think of - the front cover!

PREFACE

For too long, foreign insulators took a back seat in the collecting hobby because no one knew much about them. With no books written on the subject, there was nowhere to turn for answers. The language barrier and the miles of ocean between continents made research very difficult. On the contrary, much historical information on North American insulators was readily available, and for this reason, collectors seemed to prefer them.

Your authors, who share a common interest in foreign glass insulators, decided to give them some dignity. In 1981, we gathered together all the information we had at that time and published the first edition of *Glass Insulators from Outside North America*. It filled only 19 pages, but it was a start. We fondly referred to it as the "Place Mat". By 1986, we had accumulated enough additional material to put together a *First Revision* of the book, which boasted 67 pages. Collectors took note and the interest in foreign glass began to grow. With so many desirable North American pieces locked in collections, insulators from other countries offered a fresh approach. Foreign styles had a different look to them and the possibility of endless new discoveries was exciting!

Now, after 7 additional years of research, we are proud to offer you the *Second Revision* of *Glass Insulators from Outside North America*. This book contains the original text, which has been corrected, rearranged and updated, as well as all the new information we have accumulated since the 1986 publication. It is our most complete available listing of insulators manufactured in Central and South America, Europe, Asia, Africa and Australia. We have presented all the data we have at hand regarding insulator factories in foreign countries, and have shown the markings that appear on insulator specimens.

The Consolidated Design Chart includes scale drawings of CD variations, wherever possible. Readers will also find a cross-reference to former CD numbers used in Milholland publications. Measurements are given with all photos, as it seemed an insurmountable task to maintain any sort of proper relationship among them in regard to size. They were taken over a long period of time, under many different circumstances, and negatives did not always accompany the photos sent by other collectors.

There are still many unanswered questions, but we feel we have come a long way in 12 years. If this book enables the insulator enthusiast to learn enough about foreign glass insulators to enjoy collecting them, we will have realized our goal. Additional information from our readers is most welcome.

Please send all correspondence to: Marilyn Albers
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THE AUTHORS, MARILYN

Marilyn Albers of Houston, Texas, has always been fascinated by colored glass of any kind. She grew up in Libertyville, Illinois, where her mother owned a shop offering gifts and antiques. As a child, Marilyn remembers being impressed by the beautiful Hemingray blue of some "antique" insulators on display in that shop, and the mental picture stayed with her. She met her husband Bill at the University of Colorado in Boulder, and both are graduates of that school. Bill took a job in the oil exploration business and they were married. Many moves throughout the United States and Canada and 6 fine children later, they made their home in Houston.



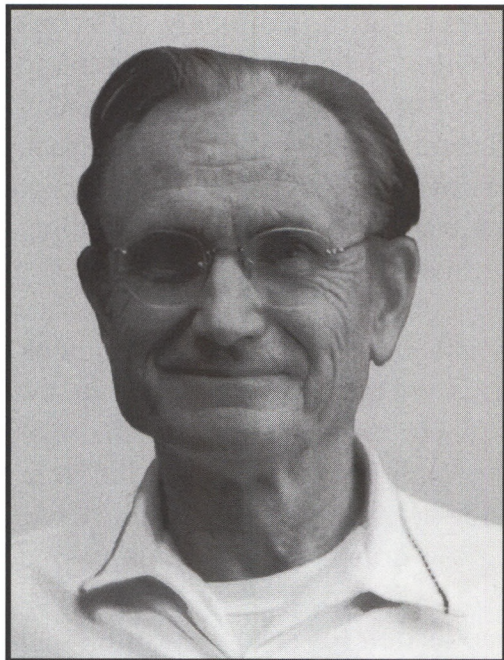
Marilyn began a collection of North American glass insulators in 1973. After several trips to Europe as a chaperone for student groups, including the Albers children, her interest shifted to foreign insulators of glass and porcelain. Since 1979, she has been the Foreign Insulator Editor of *Crown Jewels of the Wire*, a magazine devoted to the hobby of insulator collecting. Her informative articles have kept readers up to date on insulators found in other lands.

In 1981, with the help of N.R. Woodward, Marilyn compiled the book *Glass Insulators from Outside North America*, a companion book to *Worldwide Porcelain Insulators*, which she co-authored with Jack H. Tod the following year. 1986 saw the publication of *Glass Insulators from Outside North America, First Revision* (Albers/Woodward) and *Worldwide Porcelain Insulators, 1986 Supplement* (Albers/Tod).

Marilyn has been an active member of the National Insulator Association (NIA) since 1974, serving as Show Standards Chairman (1980-1982), President (1982-1984), and Central Regional Vice-President (1991-1994). She received the NIA Outstanding Service Award (1981) and together with Bill, NIA Life Time Membership (1987). The Albers hosted the 1987 NIA Central Regional Show in Pearland, Texas, and in 1988, Marilyn was one of three hosts for the 19th NIA National Convention, Show and Sale in Houston.

After 45 years in the oil patch, Bill is enjoying retirement. He and Marilyn are blessed with 15 grandchildren, who love to spend time on the family's 300 acres of ranch land near La Grange, Texas, where Bill was born and raised. While all of this keeps them very busy, they still manage to attend many insulator shows a year, take an active part in the Lone Star Insulator Club of Houston, and publish the Club's monthly newsletter.

.... AND WOODY



N.R. Woodward, of Houston, Texas, does not remember a time when he was not intrigued by the sight of glass insulators. Prior to age 6, there was only a two-wire magneto telephone system in the rural valley in Oregon where his family lived. He used to admire the colored insulators and the neat rows of drip points around their skirts, as seen through the sharp eyes of a young child. Occasionally they would visit the nearby town of Gaston, and on the way, they would follow a toll line for a distance. It had a single ten-pin arm with rolling transpositions, which included 2 aqua Hemingray - 42 and 8 purple Whitall Tatum No. 1. A sunny summer day, with abundant flowers in bloom and meadowlarks singing on the wires created a scene of total perfection.

Woody's first insulators were acquired at age 8. An older boy at school learned of his interest, and he had located in a large tree in front of their home 2 insulators left over from a previous telephone connection. They were a CD 102 Star in mint condition and a CD 106 McLaughlin No.9 with part of the skirt broken away. He brought them to school and Woody's joy knew no bounds. As he grew a little older, he mastered the art of climbing the poles for a closer look at the insulators. It had to be done on a moonlit night, since the man responsible for line maintenance had decided that Woody was a potential insulator thief. And if he saw him even looking at a pole, he would stop his Model A Ford in the middle of the road and deliver a scolding.

Woody's interest continued during his Army days. In 1951, when he returned to Fort Sam Houston, San Antonio, Texas, he began collecting in earnest. At that time he realized the need for a system of cataloging insulator styles. In 1952, he developed the Consolidated Design Number System, which has been universally accepted by glass insulator collectors as the standard of the hobby. Upon his return to civilian life in 1955, Woody began intensive research. This continued for the next ten years, until he published his first *Report of the Glass Insulator in America*, in commemoration of the 100th anniversary of the Cauvet Patent of 1865. Successive *Report* revisions were published in 1967, 1969, 1973 and 1988.

He is the "Ask Woody" Editor of *Crown Jewels* magazine, a solid supporter of the Lone Star Insulator Club, and a familiar face at many of the local insulator shows. He willingly shares his knowledge of insulator history with anyone who stops by his table.

ACKNOWLEDGEMENTS

Although this book names two authors, it actually includes the efforts of many collectors in America and Canada, as well as in other parts of the world, who brought insulators to shows for us to see and photograph, made shadow profiles or allowed us to make them, sent photos, loaned insulators by mail or simply shared information. We have also been fortunate to have the cooperation of some individuals involved in the manufacture or distribution of glass insulators in Europe, South America and Australia, who were willing to answer questions, send catalogs, and sometimes a few insulator samples.

Special thanks go to the late Jack H. Tod, who strongly encouraged us to write this book on foreign glass insulators. Not only did he make most of the scale drawings in the Consolidated Design Style Chart, but he was always ready with any kind of help or advice we needed. When Jack worked long into the night on our behalf, his wife Caroline was most supportive. And there's a special reward in heaven for Elton Gish, who took out his pen and ink and continued on with those drawings, after Jack passed away. He never missed a step! Lu Farin, our most enthusiastic fan, was the first to open her home and make available her tremendous insulator collection for shadow profiles and photos. We would also like to express our appreciation to several others who went the extra mile in making this book possible; to Bernie Warren and Laura Monckton, for sharing with us their extensive knowledge of Australian insulators; to the late W. Keith Neal of Guernsey, Channel Islands, for introducing us to three very rare glass insulators used on early telegraph lines in England, and for allowing us to get shadow profiles and photographs of the specimens in his collection; to Don Fiene, for bringing back from the USSR several insulator variations, previously unknown to us, and for translating their embossings; to Caleb Thimell, for unlocking the mystery of ZICME insulators while on assignment in Colombia, S.A., putting in many hours of research and scouring the countryside for "live" samples, and for sharing all of this with us; to Ray Klingensmith, for adding a number of new French styles to the CD Chart following his 1991 trip to Europe; to Eugene Cole for loaning us his entire collection of Italian insulators so we could record color and embossing variations; to Joe Maurath, for giving us all his past correspondence with foreign insulator manufacturers; to Carol McDougald and Mike Guthrie for their faithfulness in mailing us photos and shadow profiles of their new insulator acquisitions; to John McDougald for taking back-up photos of foreign insulators at shows when our camera was ailing; to Bob Stahr, for all the time he spent in the library at Iowa State University, searching through old trade journals for ads of early French insulator manufacturers; to Gil Daoust for using his extraordinary talents with the computer in making the photographs beautiful; to Margaret Albers for the many translations, and for help with grammar and punctuation; to Tom Albers for computer lessons and patience; and most of all to Bill Albers for his understanding, encouragement and support, for proof reading page after page of the text, and for taking over many errands and household chores at the Albers house so this book could be completed.

We are most grateful to all those who have contributed to this book in any way, and we have sincerely tried not to exclude anyone.

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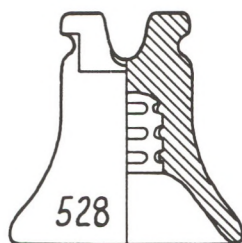
COUNTRIES AND MANUFACTURERS

ALGERIA

Algeria is an independent republic in North Africa, which was controlled and strongly influenced by France from the time it was conquered by that country in 1830 until it declared its independence in 1962. Because the inland sands of the Sahara Desert cover seven-eighths of Algeria and the remaining narrow strip of land along the Mediterranean coast is devoted largely to agriculture, import trade is heavy. Nearly four-fifths of that comes from France. With French insulators so readily accessible, and knowing for a fact that *L'Electro Verre* CD 379's were in service there, we assume that several styles were imported and used in Algeria. This makes it highly unlikely that insulators were ever made locally. But we mention this country because, to our knowledge, it is the only place where one particular telephone style has been found. We refer to CD 528, a small unmarked insulator that has all the characteristics of French made glass. It has an interesting story.

In 1973, an American engineer, who was employed by a large construction company, found himself working on an assignment in the Sahara Desert near Bechar, in Algeria. Not far from the construction site was an old French Foreign Legion Post, long since abandoned, with a line of telephone poles leading up to it. The wires were down, but several of the glass insulators were still on the ground, so, being somewhat of a collector, the engineer gathered up about a dozen of these jewels and took them back to camp. When the assignment was over and it was time to return to the States, the insulators were packed along with all of this man's other belongings and shipped back to his home in the State of Washington. They lay in his back yard for nearly 20 years, until the spring of 1992, when he decided to take one of them to a National Insulator Association Western Regional Show in Enumclaw near his home, just to see what it might be worth. Nothing like it had ever been seen before and it caused such a stir that he went home to find the rest of them. But he discovered that only five of the twelve had survived. He held back one for himself, and the other four quickly went into collections, where they are being very much appreciated today.

One might speculate that perhaps these insulators were part of a special order imported from a glass manufacturer in France and that this particular style was designed specifically for telecommunication service to the French military outposts in the desert. (See FRANCE)



ARGENTINA

A few examples of CD 128 and CD 154 have been attributed to *Cristalerias Rigolleau S.A.*, a glass insulator manufacturer located in the city of Buenos Aires. There was some correspondence with this company back in 1979, but we were given very little information. We were told that at one time, two types of glass insulators were made by *Rigolleau* and that these were for use on antennas as well as for telephone lines. There was no mention of ever having produced other styles, no dates were given, etc. We were further advised that only those used on antennas were still being manufactured and that these could be ordered through their supplier *Casa Galli*. Requests for further information went unanswered, so this company may or may not still be in business. We know of no other glass insulator manufacturer in Argentina at this time.

These telephone insulators from Argentina are copies of American styles and appear to be of fairly recent manufacture, in that they are well made and free from bubbles and other defects common in older insulators. All known specimens have smooth bases. Glass colors are clear, ice green, and light to medium sky blue. Since the embossing on both styles is basically the same, a typical example is shown below. One exception to this is a CD 128 showing an embossed number only.

One half-mold

CD #154

CRISTALERIAS
VIDRART SA ENT A17
13

Opp. half-mold

INDUSTRIA ARGENTINA

AUSTRALIA

Prior to 1925, Australia relied solely on insulators imported from other countries. Most of these came from New Zealand, England, France, and the United States.

Australian Glass Manufacturers was established in 1915 as a conglomerate, which included the *Melbourne Glass Bottle Works* (1872-1915) and *Vance & Ross* of Sydney (1904-1915). In 1926, this company became the first to manufacture glass insulators in Australia. Their factory was, and still is, located on South Dowling Road in Sydney. During the 1926-1942 period, many fruit jars, insulators, pie dishes and other glass items were manufactured with the trade name *AGEE*, pronounced A.G. for Australian Glass. With the exception of insulators, many of the above items were made of borosilicate glass, a toughened type of glass similar to Pyrex. Borax was not available in Australia, and while the higher selling price of certain products, such as heat-resistant cookware, probably justified the cost of importing this mineral, it was simply too expensive for the manufacture of insulators.

During these years, the company produced seven styles of glass telephone insulators including CD's 121, 154, 420, 421, 421.1, 422 and 490 (Type I, II, and III). With the exception of the very early runs of CD 121, which are not marked at all, all seven of these styles are embossed *AGEE*.

The Sydney plant began production of CD 121 tolls in about 1926. Most of these insulators are made in aqua, charcoal gray, or various shades of greens and purples. According to one reliable source, the purple colors are the result of either the glass formula or the minerals in the cullet used for a particular batch of insulators. A few rare examples of unembossed 121's have been found in clear, dark amber and emerald green. CD 490 Type I bells were also introduced at this time. Glass colors are medium to royal purple, pure gray, and two-tone light amethyst with green. We refer to these earliest *AGEE* bells as Type I because of their narrow, straight sided domes, rounded wire groove rims and nearly flush inner skirts. A rare variety exists with four sharp drip points rather than a completely smooth base. Although the wire groove rims on both styles were less than perfect for holding the wire down, these were the major Sub (CD 121) and Trunk (CD 490) insulators in use during the mid to late 1920's.

Sometime between 1929 and 1930, *Australian Glass Manufacturers* received a special order for CD 154's from the South Australian government. As far as we know, most of these were produced during that time period and were used only in that state. These insulators have mold numbers and round drip points. Glass colors are sage green, gray or medium to dark purple. With its American threaded pin hole, the *AGEE* 154 is a copy of our familiar *Hemingray 42* insulator, which was being used in South Australia at that

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time. While both units could be, and probably were used side by side on the same line, the *AGEE* 154 was designed to replace its American twin.

CD's 420, 421 and 421.1 made their appearance in the mid to late 1920's as well. Glass colors are limited to aqua for 420 and amethyst for 421 and 421.1. We believe that these three styles were the result of sequential experimentation, which eventually led to the development of CD 422 as the Sub (Subscriber) insulator of the 1930 to 1942 period. None of the 420's, 421's, 421.1's or Type I 490's have mold numbers, which leads us to believe that these were all made prior to 1930, since mold numbers on *AGEE* insulators were well established by 1930. All of the *AGEE* 422's have mold numbers, and while most are dated, many are not. They were produced in a rainbow of colors, including greens, grays, blue grays, and several shades of purple, from light to dark until 1937, when straw colored 422's were introduced for the first time. The only dates we have seen on these later specimens are (19)37 and (19)38, but it is likely that production of this particular style continued until 1942, when *Crown Crystal Glass Company Ltd.* assumed responsibility for the manufacture of glass insulators.

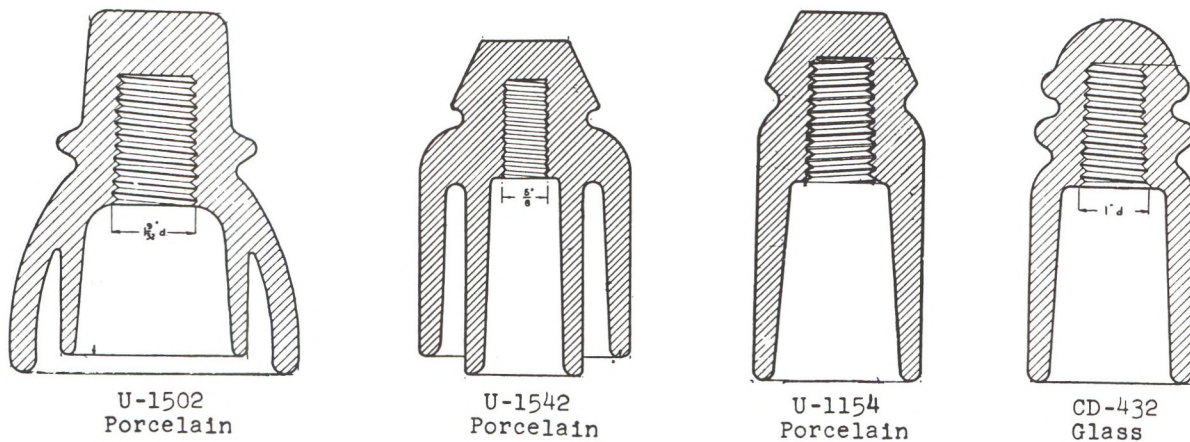
CD 490 Type I *AGEE* bells began having problems almost from the beginning of production. Because the glass was thin from the wire groove up, the insulators were subject to fractures in the neck area. And, as stated above, the shallow wire groove rims were nearly useless. So, somewhere between 1928 and 1930, *Australian Glass Manufacturers* introduced an improved version which we refer to as Type II. The dome remained straight and narrow (and fragile), but the inner skirt was raised a bit and the new wire groove rim was sharp and angular. Glass colors range from light to medium to rich deep amethyst. Mold numbers are embossed on all of these Type II bells.

But there was still room for improvement, so Type III 490's were introduced in 1930 as the glass Trunk insulator of the 1930 to 1942 period. While maintaining the raised inner skirt of the Type II bells, this new style proved to be more structurally sound with its wide angular dome and thick angular wire groove rim. All of the Type III bells have mold numbers and dates of (19)30, (19)37 or (19)38. Those units carrying the 30 date were all medium to dark purple. This 30 did not necessarily mean the insulator was manufactured in 1930, but rather from 1930 to 1937. Type III 490's of straw colored glass were produced for the first time in 1937. Specimens are dated either (19)37 or (19)38. These insulators, however, saw limited production because of some fairly stiff competition from a local pottery. In the mid to late 1930's, a company known as *Robert Fowler Ltd.* of Sydney had begun turning out thousands of the large porcelain bells (U-1502) and as a result, demand for the *AGEE* glass equivalent dropped considerably.

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While the U-1502's seem to have been preferred to *AGEE* Type III glass bells for use on trunk lines, they were far from perfect. By their very design, the flared out skirts allowed dirt to accumulate easily. In wet weather, this increased the surface leakage between wire and pin. The resulting low insulation resistance created a lot of static on the lines. Something had to be done, so in 1936 a decision was made to redesign the insulator.

By March, 1938, four types of insulators (three porcelain and one glass) were chosen for testing purposes on certain trunk lines between Melbourne and Dromana in the State of Victoria. These styles included U-1502, U-1542, U-1154 and CD 432. U-1502, of course, was currently the standard porcelain Trunk Insulator of Australia, U-1542 was the standard B.P.O. (British Post Office) Trunk Insulator, U-1154 was the "new" design combining the best features of the first two, and CD 432 was included as a modified glass version of U-1154 in order to examine the value of this material for the particular purpose. *Australian Glass Manufacturers* agreed to produce a sufficient number of the 432's to equip the lines being tested. These unembossed units were all made of the same greenish gray glass.



After examining four months of test results, belief in the single skirt design of U-1154 was confirmed. It became the new porcelain Departmental (P.O.) Standard, known as "Insulator, Trunk, L.S." (Long Skirt), which distinguished it from the previously accepted Trunk Insulator.

The CD 432's proved to be inferior for the test. Many were found to have cracks in the glass, even during installation, and a great number actually broke while in service. Obviously, further testing was needed. To our knowledge, only three specimens of this insulator remain in existence today.

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In 1942, *Crown Crystal Glass Company Ltd. (C.C.G.)*, another Sydney glass manufacturer, merged with *Australian Glass Manufacturers*. *C.C.G.* took over glass insulator production at this time and, in some cases, previously used molds as well. Though their catalog offered many other glass items, such as *AGEE* Pyrexware, bowls, vases, lamp bases, hurricane lanterns, fly traps, inks and other sundries, all insulators produced during this 1942-1950 period are attributed to the *C.C.G.* plant in Sydney. Several smaller glass factories joined this amalgamation during the 1940's and the resulting parent firm was known as *Australian Consolidated Industries (A.C.I.)*. However, certain items, including insulators, continued to be produced under the old tradenames.

The three telephone styles manufactured at the *Crown Crystal Glass* plant in Sydney included CD's 422, 423 and 430. All of these insulators are embossed with the company initials *C.C.G.*, followed by mold numbers and dates. Some are dated directly, i.e. (19)42, 43, 49, 50, etc., but most of these units have coded dates with double dots (:) to represent the years. For example, 4: is for 1945, and strangely enough, 4: indicates 1950. By extending the rows of dots, molds could be up-dated without having to make new ones. CD 422's saw very limited production. The only dates appearing on these insulators are (19)42 and (19)43, likely indicating the first and the last year this style was produced by *C.C.G.* Glass colors are limited to light straw and smokey clear.

In 1942, CD 423 was introduced as the new Sub insulator. Because it was so well accepted, it was produced in great numbers. This style proved to be the most common and widely used of all Australian glass insulators. Embossed specimens exist in clear, very light peach, light green, medium to dark amber, and pale amethyst. Specimens in amethyst are extremely rare, with only a small number having been found in the western part of Victoria.

Perhaps *Australian Glass Manufacturers* were still smarting from the enthusiastic acceptance of U-1154 as the new porcelain Trunk insulator of 1938, and remembered only too well that its own glass equivalent, CD 432, had fallen far behind in test results. This ever present threat of competition must have kept designers busy with further testing at the Sydney plant., because in 1942, when *Crown Crystal Glass* took over insulator production, they proudly presented their answer in glass. CD 430 was dubbed the new Trunk insulator. Like its forerunner, CD 432, it was tall and narrow and maintained the same single skirt design, but it had only one wire groove instead of two. Overall, it was a sturdier insulator and it was a success! *C.C.G.* 430's exist in a wide range of beautiful colors including clear, straw, smoke, light green, peach, chartreuse, medium to dark amber and several shades of amethyst.

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In 1951, *Australian Glass Manufacturers* moved insulator production to their plant in Hobart, Tasmania, where three styles were manufactured with the *A.G.M.* embossing, including CD's 423, 430, and 590. Here again, all units have mold numbers and dates. While a few are dated directly, i.e. (19)59, 61, 62, etc., most carry the familiar coded dates with numbers and dots.

CD 423's were produced in straw, light greens and several shades of medium to dark amber. A handful of specimens are known to exist in bright yellow. A few in straw were found in West Australia with the letters *SUB* embossed on the back side of the skirt below the coded date 58::

On some *A.G.M.* 423's, one can see the imprint of an unknown trademark at the top of the pin hole inside the glass. It can best be described as a circle enclosing the letter L and an "arrow". We believe these figures were engraved on the end of the threaded plunger made by some specialty steel firm.

A.G.M. 430's were not nearly as colorful as those made by *C.C.G.* Specimens exist only in light greens, peach and straw. The latest date observed on one of these insulators is 61: for 1962. On one example, the Roman numerals VVI were used to indicate the date of manufacture. Regardless of the mold maker's intentions, this combination of numerals is incorrect, and does not indicate any particular number.

In 1951, *A.G.M.* introduced CD 590, a low voltage cable-top insulator known as "Pin Type PI-3". This style was made in very limited quantities and only during that one year. The first ones were of dark amber glass, and those that followed were produced in straw or shades of light green. While all CD 590's are scarce, those in straw and amber are considered to be even more so. Because this insulator was unsuccessful, it was discontinued.

In the early 1960's, the change from overhead lines to underground cables lessened the need for insulators, thus creating a surplus. As a result, the *A.G.M.* plant in Tasmania ceased insulator production in 1962.

The following is a direct quote from Bernard L. Warren, a leading authority on Australian glass insulators: "*Australian Glass Manufacturers*, and later *Crown Crystal Glass*, had absolutely no competition for their glass insulator production and, because there were no private telephone or power companies in Australia, they sold only to the Government Entities. Australian TELECOM was it. Being a branch of the Post Office Department under the Postmaster General, it was 100% government owned. The seven State Electricity Commissions (SEC) controlled all power production and distribution. Two or

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more states would sometimes cooperate in giant projects, such as the Snowy River Hydro-Electric Project.

All this resulted in single government buyers, and reinforces my theory that only the best *AGEE*, *C.C.G.* and *A.G.M.* Sub and Trunk insulators were produced and marketed at any one time. If TELECOM, or in some cases, the State Railroad Agency, didn't like the current Sub and Trunk insulators of glass, they could go to the Australian porcelain insulator manufacturers or to foreign suppliers".

Generally speaking, porcelain insulators came to be preferred in Australia, because glass had a higher percentage of breakage and lower insulation, especially under wet conditions. Glass was also more costly to produce. But in time, it proved to be even less expensive to import porcelain insulators than to manufacture them locally. Consequently, one can find specimens in Australia that were made in New Zealand, Japan, China, France, Czechoslovakia, England and India.

France, however, did supply Australia with glass insulators for both high and low voltage use. One can see units embossed *EIV*, *L'ELECTRO VERRE*, and *ISOREX* still in use on working lines. Examples are CD's 378, 378.6, 378.8, 390, 530, 560, 601.1, 1065, 1067.1, glass suspension insulators, etc.

CD 494 is one French made telegraph style which deserves special mention because examples are extremely rare. Units are embossed *ISOREX 1030*. The color of glass is dark green. This insulator is nearly identical to its porcelain counterpart, U-1502, and since the 494 has been found only in New South Wales and Victoria, the two styles were likely used side by side on Trunk lines in those states. The small number of CD 494's still in existence suggests that TELECOM, in one of its efforts to find the perfect Trunk insulator, may have turned to France and requested a special order of this style in glass.

CD's 343.2 and 344.2 are probably British imports. These insulators are not embossed but, with their copper-clad crowns, they very closely resemble units made by *Pilkington Brothers* in St. Helens, a firm which merged with *SEDIVER* of France in 1971. (See ENGLAND)

The authors owe a debt of gratitude to Bernard L "Bernie" Warren, of Anchorage, Alaska, for supplying much of this information on Australian insulators. In recent years, Bernie has made several extended trips "Down Under", and spent hours walking the lines, collecting and studying insulator specimens and talking with people knowledgeable about

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the telecommunication system and the manufacture of glass insulators in Australia. His research efforts were greatly aided by one collector in particular, Laura Monckton of Sydney.

The story behind CD 432 and its use as a test insulator on Trunk lines between Melbourne and Dromana was taken from R.M. Osborne's article "The New Trunk Insulator", which appeared in a 1939 issue of The Telecommunication Journal of Australia.

One half-mold

CD #420

AGEE

One half-mold

Opp. half-mold

CD #430

C.C.G.

4:.....

00

One half-mold

Opp. half-mold

CD #430

A.G.M.

6I:

12

One half-mold

Opp. half-mold

CD #423

A.G.M.

58::

5

SUB

One half-mold

Opp. half-mold

CD #494

ISOREX

1030

BELGIUM

Verlica Belgium was the name of a glass factory located in Ghlin, a small town five miles west of the city of Mons, near the French border. Until 1990, we knew almost nothing about this manufacturer, but through a European research trip in April of that year, we learned that the original factory is still active and remains in the same location. Its current line of products is limited to glass containers for food, medicine, wine, beer and soft drinks. The main office of the company is in Erpe-Mere. (This address represents two separate towns near Brussels, but because they are so small and so close together, they share the same post office). According to the company's Public Relations Manager, *Verlica Belgium* was established about 1940. In 1970 the name was changed to *Verlipack*. She seemed to recall that insulators were once made at the factory, but could not give us any production dates. She assured us that none had been manufactured since 1970.

Many insulators produced by *Verlica Belgium* are still on working lines in Belgium and, even though we had embossed specimens in hand, we were not able to learn any more about them at that time. Our contact at *Verlipack* promised to search through some of the old company files and send us more information, but repeated attempts to correspond with her were met with silence.

There are fifteen known styles of glass insulators for low voltage use that are embossed either *VERLICA BELGIUM* or *VERHAM BELGIUM*. Glass colors are clear, aqua, light blue, and various shades of green from light sage to deep emerald. Since we know almost nothing about the company prior to 1970, *VERHAM* might possibly represent an interim name change before the company became known as *VERLIPACK*. *VERHAM* could also indicate one of several other things, including the location of a second plant owned by *Verlica Belgium*, the name of another glass manufacturer altogether, or the town where the insulators were used. This name remains unattributed, as well as the word *ELAF* embossed on a "twist lock" insulator classified as CD 585. Neither are we able to identify the *B* in an "oval" trademark found on CD 450 or the letters *V P L C* on CD 563.1

With France just across the border, it is not surprising that Belgium also made use of many French insulators.

One half-mold

VERLICA BELGIUM

Opp. half-mold

BT 16/TT

CD #450

One half-mold

VERHAM BELGIUM

Opp. half-mold

BT 32

CD #685

BELGIUM

One half-mold
VERLICA-ELAF

Opp. half-mold
BT 61

CD #585

One half-mold



Opp. half-mold
VERLICA

CD #450

One half-mold

V P L C

Opp. half-mold

B T 3

CD #563.1

BRAZIL

Vidreria Industria Figueras Oliveiras S.A. or *VIFOSA*, was the name of a glass manufacturer located near the outskirts of Sao Paulo. The year of establishment is unknown. The company produced insulators, bottles, and other glass containers.

The *VIFOSA* trademark, which appears as the letters *vFo*, can be found on examples of CD's 149.5, 221.2, 221.3 and 1056. It is possible that the factory produced other insulator styles, but at the time of this writing, we have seen only these four. They are of light aqua or light green glass and appear to be of fairly recent production. The three pin types have standard American threads. CD's 221.2 and 221.3 were designed for use on 13.5 KV lines.

In recent years, *SEDIVER* of France acquired *VIFOSA* as a subsidiary. At that time, the company name was changed to *ELECTROVIDRO*. The factory remains in the same location as a currently active business, engaged in the manufacture of toughened glass insulators for overhead transmission lines. Their line of products may still include low voltage styles, but we are unable to confirm this. (See FRANCE)

BRAZIL

CD 113.4, a small lime green double groove pony insulator with sharp drips, has also been attributed to Brazil. It was made by an unknown manufacturer for use on a telephone line along the coast, running from Rio de Janeiro to Montevideo. The insulator is embossed *C.T.R.G. No. 9*, indicating the user, *Compania Telefonica Nacional de Rio Grande do Sul*. This is "National Telephone Company of (the State of) South Rio Grande", Brazil's nationally owned telephone company. Rio Grande do Sul is the southernmost state of Brazil, and borders on Uruguay. (We make note here that because Brazil was first colonized by the Portuguese in the 16th century, the Portuguese language has been retained).

One of the world's richest deposits of iron ore is mined in the state of Minas Gerais, located in the eastern part of Brazil. A rather unique example of CD 154, which was found in that area, deserves special mention. This insulator is made of dark green glass with standard American threads and round drip points. Embossed on the skirt are the letters *RMV*. This is for *Rede Mineira de Viacao* or "Minas Gerais State Railroad Company". Minas Gerais translates to "general mines". Headquartered in the city of Belo Horizonte, this railroad is a subsidiary of Brazilian National Railroad Company. *Rede Mineira de Viacao* is the railroad that serves the mines and the insulators used on this particular line are embossed accordingly. We do not know the glass manufacturer.

Some back ground information on Brazil's railroad system is included here for the benefit of our readers. A large part of the country is served by a railroad network of only about 23,000 miles, which is distributed among some forty lines. Many of these are inadequately connected, poorly built, badly maintained and inefficiently operated. Because the railroad system has not expanded with the growth of Brazilian economy, it is placed under quite a strain. Nearly one half of the railroads, with approximately four fifths of the traffic, are owned by the Federal government. The states, private companies, and mixed state and private companies account for the rest.

Brazilian National Railroad Company is still in operation, but doing well only in Minas Gerais because of the mines.

One half-mold

Opp. half-mold

CD #149.5

vFo

TR-01
10

BRAZIL

One half-mold

C. T. R. G.

Opp. half-mold

CD #113.4

Nº 9

One half-mold

CD #154

RMV

CHILE

During the years 1945 to 1968, the Santiago firm *Cristalerias de Chile S.A.* produced several styles of low voltage insulators for communication use and primary power distribution. Units are nearly identical to those used in the United States. The company considered these designs to be "conventional international types". Its line of products also included bottles and other glass items.

Through some correspondence with the General Manager of *Cristalerias de Chile*, we learned that this company is believed to be the first and only manufacturer of glass insulators in Chile. While most of the styles were made of common soda-lime glass, some were produced in borosilicate opal glass. One of the letters received from Santiago explained that "insulators were made in a hand operated press with four molds installed on a rotating table. After the pressing station, a device was fitted for the purpose of unscrewing the inner plunger. Production speeds varied between three and four per minute, depending on the (insulator) size and wall thickness".

Seven styles have actually been located at the time of this writing. These are embossed *CRISTALERIAS DE CHILE*, followed by their style numbers. All have one inch pin holes with standard American threads. With the exception of one CD 202 in a beautiful shade of pink and a CD 299.5 in creamy borosilicate opal glass, common colors are clear, straw, shades of light green or aqua..

CHILE

One specimen of CD 154 in golden straw is embossed with two stylized "C's" back to back. This trademark was used by *Cristalerias de Chile* at some point during the years the company manufactured insulators, but the exact dates are unknown. It is also found on bottles made by the firm at that particular time and, while no examples have been seen by the authors, it makes sense that their other glass products would have been identified in the same manner. The "double C" trademark appears to be the more recent of the two embossing variations found on insulators.

Even though insulator production ceased in 1968 and all the pressing and mold equipment was sold, it is likely that the company is still in business, making other types of glass.

One half-mold

Opp. half-mold

CD #202

CRISTALERIAS DE CHILE N.53

One half-mold

Opp. half-mold

CD #113

CRISTALERIAS CHILE N.12

One half-mold

CD #154

⌘ N^o 42

COLOMBIA

In 1924, at the age of twenty, Salomon Zundel, along with his wife and two brothers, immigrated to Colombia, S.A. from Lithuania. In 1930, Salomon began work as a contractor for Bogota's large government-owned electric company, *Energia Electrica de Bogota (EEB)*. After twenty-five years with this organization, he retired and established his own business in Bogota. With an initial investment of 191,770 pesos, he and his wife Sofia Friedman were able to purchase a factory site, some equipment, a few pieces of furniture, and a supply of electrical merchandise. On December 29, 1955, they opened the doors of their new company, which was called *Zundel y Cia. Ltda.*, or "Zundel and Company, Limited".

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Using his years of experience with *EEB*, Salomon Zundel began manufacturing various electrical items, such as iron lightning rods, electric irons, metal drawers for cash registers, circuit breakers, switches, fuses, resistors, etc. In 1960, he learned of a need for insulators at *EEB*. About this time, he met an Italian living in Colombia who had the knowledge and experience of glass manufacturing. By using the exact specifications for the American *Hemingray 42*, as found in Salomon's copy of The International Standard Electric Corporation's Communication and Supply Catalog, this gentleman provided the company with its first insulator molds, which were for unembossed CD 154's. Later, Salomon used these original molds as a model and crafted others to include the ZICME trademark, taken from *Zundel Industria Colombiana Materiales Electricos* or "Zundel Electric Materials Company of Colombia". For six months during 1961, the firm made use of newspaper advertising to solicit client contracts for glass insulators.

Apparently, the Italian's knowledge of insulator production was limited and, in order to learn the principles of electrical resistance and develop a suitable glass recipe, Salomon asked for assistance from the chemists at Colombia National University. In 1961, with the help of six employees, a small stone oven, an equally small furnace, some hand presses and a supply of molds, the company began the production of insulators. The first orders were from *EEB* and *Ferrocarriles Nacionales de Colombia (FCN)*, Colombia's government-owned railroad. The nationalization of Colombia's railroad system in 1954, combined with the political climate at that time, had stimulated economic self-sufficiency. This, at least indirectly, encouraged *ZICME* to manufacture insulators.

Salomon Zundel's business with *EEB* was significant. His prior connections with this giant company enabled him to tailor his production of electrical supplies to meet their requirements, which had come to include glass insulators. In late 1961, *EEB* presented Salomon Zundel, his family, and all employees with a large bronze plaque, thanking them for services rendered. They were congratulated for their record of success during the five year period 1956-1961.

By 1962, the manufacture of insulators had become a very large part of the business, totalling 50,000 units per year for four of the next five years. (At some point during that time, there had been a one year halt in production, probably due to a low demand for insulators.) Sometimes, after all orders had been filled, surplus insulators were sold to other contractors and electrical supply shops. From 1962-1966, the company produced large quantities of CD's 106, 154 and 203 in a rainbow of beautiful colors, made possible by the extensive use of glass cullet. All three of these telecommunication styles have the standard American pin hole, which makes them nearly identical to those used in the United States. Insulators can be found with or without the *ZICME* embossing.

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Of the total number of CD 106's produced at *Zundel y Cia.*, only a small percent carry the *ZICME* trademark. All examples have round drip points. Glass colors include off clear, light green, aqua, lavender, light purple and sky blue. A few of these insulators exist in a dark teal blue with heavy streaks of red cullet.

The fact that all *ZICME* insulators were made by hand helps to explain why there is more than a little variation among examples of CD 154, the first style to be produced at the factory. Both embossed and unembossed units exist with either round or sharp drip points. In many cases, an underpour of glass or improper cooling during the manufacturing process would create drip points half way in between round and sharp. The crowns of some 154's are rounded, while others are flat. Insulators are squatty and crude or tall and straight. Glass is clean or full of bubbles. There was not much consistency from mold to mold or from glass batch to glass batch, but it did not seem to matter. Generally, specimens made in the older molds are short and tend to have flat crowns. The glass is very bubbly and crude and drip points are short and sharp. If an improved mold was used, insulator crowns are rounded, units stand taller, and drip points are either round or sharp. All of the earlier insulators are skirt embossed using medium to large letters. Examples from the final production of *ZICME* 154's are a bit taller still, drip points are round and the glass is clean. All are crown embossed using tiny letters. Only a few of these later units are known to exist. Of the three *ZICME* pin types, CD 154 exhibits the greatest range of colors, including off clear, smoke, shades of aqua and green, turquoise, yellow, light purple to purple blackglass, sapphire blue and cobalt blue.

The company produced a smaller number of CD 203's, because their use was limited to a small region in Colombia. As a result, only a few examples have been recovered. All units were made with smooth bases and carry the *ZICME* trademark. Glass colors include off clear, light green, light aqua, pale lavender, medium purple, and violet.

The company also manufactured small aerial insulators and rack spools for use on buildings. Neither type is embossed. Production of the rack spool, classified as CD 1050, was limited to 10,000 pieces. These were available only to electrical contractors. Obviously the glass batch contained a great deal of cullet, because these spools can be found in a beautiful array of colors, including greens, ambers, peacock blue, cobalt blue, violet, cranberry and royal purple. Most of the aerial insulators are made of bubbly light green glass.

By 1966, *ZICME* ceased insulator production altogether. Molds had been wearing out continually and those that remained were recycled into other electrical equipment manufactured by the company. During 1968 and 1969, Salomon Zundel leased the oven and other equipment to his Italian contact who for a time, produced decorative glass

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vases, lamps and animal figures. In 1970, the oven and everything else related to the manufacture of insulators were sold to another glass manufacturer in Colombia. We have no information about this transaction.

In 1983, Salomon Zundel died and the ownership of the business was passed on to his wife and children. Although the factory land and property were liquidated, the original office of *Zundel y Cia.* in downtown Bogota was maintained, as the company itself had not been dissolved. In early February of 1983, Ita Perla Majerowicz (Salomon Zundel's daughter-in-law) and Liza Zundel de Farine (Salomon's daughter) formed a new company, which eventually entered into partnership with *Zundel y Cia.* The new business, known as *PELICME Ltda.*, or *Perla Liza Industria Colombiana Materiales Electricos Limitada*, was moved to a Bogota suburb called Fontibon. At the new location, manufacturing was carried on by *Zundel y Cia.*, along with the same employees who had been at the original factory. Salomon's oldest son Manuel and his younger brother Jaime were appointed as manager and co-manager. *PELICME Ltda.*, as managing partner, took charge of marketing. Today, the two companies, though separate, are still joined together in business as a family, producing and marketing a complete line of electrical products under the *ZICME* trademark.



Productos "ZICME"

A few of the old insulators can still be seen on working lines in Colombia, but it is extremely risky business to try and retrieve any that remain on abandoned poles without wires. The "policia" are quick to apprehend such efforts. All *ZICME* insulators are considered to be rare.

COOVINAL S.A. is another Colombian glass manufacturer that has supplied insulators for local use. The name is taken from *Cooperativa Integral de Vidriera de Colombia*, or "National Glass Cooperative". This currently active company is located in the city of Villavicencio, not far from Bogota. In addition to several types of glassware, their catalog offers two telecommunication styles (CD's 116.6 and 122.2) with standard American pinholes, and one Case Transposition (CD 1049). All three styles are unembossed. They were made in the company's "natural" glass colors of smoke or slate blue. A rare "peaked crown" variation of CD 122.2 exists in smokey pink.

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The following information, taken from one of the company's brochures, has been loosely translated from Spanish. "*COOVINAL* was founded in 1944 by a group of glass industry pioneers who took into account a basic need in the economic, social and industrial environment of the country. With traditional European technology and Colombian capital and workmanship, the company very quickly came to occupy a privileged place on a national level, and eventually became one of the largest factories of its kind in Latin America. After several years, with a reputation for classic designs, high quality glass, and attractive prices, they entered the ever widening competition of the international market. Today they export a large percent of their total production". Caleb Thimell, our best authority on Colombian insulators, tells us that insulators are still being produced at *COOVINAL*, but are for local use only. To his knowledge, they have never been exported to any other country. The company is best known for its decorative glassware, and the brochure refers to this product as being exported.

Other insulators of interest have been recovered in Colombia. The letters *VI-BO* are embossed on three examples of CD 106 and one of CD 154. To our knowledge, no others remain in existence. *VI-BO* insulators have standard American pinholes and sharp drip points. Glass color is olive green. A 1989 Bogota telephone book included a listing for *VI-BO*, as well as for a company called *Vidrios Bogota*. While this is a possible connection, it has not been verified. If, indeed, the insulators were made by *Vidrios Bogota*, they may have been part of a one-time contract with the telephone company, as they were found on Telecom poles.

Colombia has also made use of CD 447's in dark olive green glass. This unembossed telephone style may be the product of a local glass maker or it could well have been imported from another country. Here again, we see the standard American pinhole, and even though we cannot attribute these units to any certain manufacturer, they were definitely tailored for use in Colombia.

Other telecommunication insulators are marked with the name of the user. Many examples of CD's 155 and 203 are embossed *TELECOM*, for Colombia's government-owned long distance telephone company. An equal number of both styles were made with no embossing at all. While most examples of CD 155 have smooth bases, a few have been found with round drip points, Some units have a row of "Braille" dots around the skirt, which appear either alone, or in addition to the *TELECOM* embossing. Nearly all CD 203's have smooth bases, though four specimens have been found with sharp drip points. These styles can be found in colors of straw, yellow green, smokey pink, amethyst, and slate blue. There is conflicting information about the manufacturer of these beautiful pieces. Managers at *TELECOM* say that a glassmaker known as *Abengoa S.A.* and an associate company of *I.T.T.* supply them with insulators, while an electrical parts distributor in Bogota is certain that at least the newer pieces are

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being produced by *COOVINAL*. Perhaps they are both right, but without further information, nothing can be confirmed.

CD 247.5's were imported from the *USSR* for use on Bogota's trolley lines. Several embossed units have been recovered, which show an unattributed trademark and letters that translate to "Made in USSR". The glass color is light green. These insulators screwed directly onto large metal pins. (See USSR)

At one time, Colombia imported porcelain insulators from other countries. Examples from Brazil, England, Belgium, Switzerland, Germany, Italy, Japan, and Russia can still be seen on working lines.

All the information on Colombian insulators has been supplied by Caleb Thimell of Oak Harbor, Washington. For two years (1990-1992), he was assigned by the U.S. Navy to the American Embassy in Bogota. His tireless research during those two years is greatly appreciated by collectors everywhere.

One half-mold

CD #203

Zicme

One half-mold

CD #154

VI-BO

One half-mold

CD #203

TELECOM

One half-mold

CD #247.5

Ш С С-10  1971

Opp. half-mold

СДЕЛАНО В СССР

9

EL SALVADOR

The 1986 publication of this book reported in error that *ZICME* insulators originated in El Salvador. This information was based on the fact that an embossed CD 106 had been found in that country and brought back to a collector in the United States. We know now that these insulators were manufactured by *Zundel y Cia Ltda.* of Bogota, Colombia under contract to EEB and FNC for local use. From time to time, however, the factory did sell surplus units to other contractors, so it is entirely possible that some of the *ZICME* insulators found their way to El Salvador. (See COLOMBIA)

ENGLAND

Pilkington Brothers Ltd., one of the most highly respected firms in the world, engaged in the manufacture and distribution of high voltage insulators. The factory and head office were located in St. Helens, Lancashire, England. The company was established in 1826 by William Pilkington, who began a small glassmaking business in St. Helens. It was known as the *St. Helens Crown Glass Company*.

In 1845, William was joined by his brother Richard. Later, when the two brothers brought their sons into the business, the name of the company was changed to *Pilkington Brothers*. Through the years, as succeeding generations joined in, the firm improved its methods and expanded its operations, thus making it possible to offer new glass products. *Pilkington* remained a family business.

At its height, the company boasted sales organizations in nearly every country of the world. Overseas, they had manufacturing plants in Canada and South Africa. Their processing plants were located in Australia, South Africa, New Zealand and Brazil. Many types of glass for a wide variety of uses were exported to all corners of the world.

In 1935, *Pilkington Brothers* began offering a complete line of suspension insulators as well as four styles of high voltage pin type units, including CD's 334, 343, 344 and 370. The crowns of these insulators are covered with a copper or aluminum cap and pin holes are fitted with zinc thimbles. The insulators themselves are of pale green toughened glass, made by a special process which guarantees that the glass will not crack and fall apart. In the event of failure due to severe mechanical shock, the glass shatters, but 80% of its failing load remains in sound condition. In this way, damaged units are spotted immediately for replacement.

Pilkington's trademark *ARMOURLIGHT* is sandblasted on the insulators along with the style number and date of manufacture.

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On January 4, 1961, the United States Patent Office issued Patent No. 3,141,063 to Derrick Robert Edwards of *Pilkington Brothers* for his special design of toughened glass pintype insulator. This style is classified as CD 624. The only known specimen, owned by a collector in the United States, is unmarked and has no copper cap on the crown. The insulator design was covered by a U.S. patent so it could be used in the United States without fear of being copied by some other company.

CD's 343.2 and 344.2 were probably *Pilkington* products, made especially for use on lines in Australia. CD 370's have been located there as well. Copper caps appear on the crowns of all three styles, but none of the examples are embossed.

In 1971, *Pilkington Brothers* merged with *SEDIVER* of France. Both companies benefited greatly from this relationship. A few years later, the St. Helens plant discontinued the manufacture of high voltage insulators. For a few years, their Spring factory in the province of Transvaal, South Africa continued the production and assembly of toughened glass insulators under the *SEDIVER* name, but in 1989, *Pilkington* ceased insulator production altogether and broke ties with *SEDIVER*.

CD's 435, 630, and 631 are three styles of British glass telegraph insulators which saw limited production and use. CD 630 is the original Bright's Insulator. Mr. C. T. Bright was issued a patent for his design on November 18, 1858. This style was made to carry a heavy gauge wire through the deep slot at the top. The skirt of the insulator is embossed *BRIGHT'S INSULATOR* followed by *REID 1858*, indicating the glass maker and the date of manufacture. The color of glass is dark aqua. An 1858 publication describing this patent states that "these insulators for overground wires have covers or protectors combined with them. This cover, composed of any suitable material, such as papier mache, wood, leather, iron, gutta percha or any mixture thereof, is screwed on the neck of the glass insulator". The drawing, which accompanied this article, showed the outer skirt to be entirely covered, leaving the crown free. To our knowledge, none of these covers still exist.

CD 631, a simplified and perhaps later version of the Bright's Patent, has a rounded crown. There is no embossing. The insulator is made of olive green glass. There are only two surviving specimens of each of the Bright's Patent insulators, including one pair in the British TELECOM Museum of London and the other set in a collection in Guernsey, Channel Islands. All four insulators are cemented to metal pins.

CD 435 was used on the London, Midland and Scottish Railway. It is very similar in style to U-1452, which was the standard Cordeaux Pattern line insulator in porcelain. Both insulators were designed to screw directly onto metal pins. There are only five specimens of CD 435 known to exist. All are made of light straw colored glass. None are

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embossed, so it is just about impossible to determine where, when and by whom they were produced.

W. Keith Neal, the late author of "Searching for Railway Telegraph Insulators", had this to say in regard to CD 435: "These insulators were tried out on one section but never adopted, the condensation of the damp climate rendering them unsatisfactory. Their only advantage was that no spiders would go near them, as they did not like the light and never spun their webs inside".

Glass insulators, other than those designed for high tension lines, never became standard in England. Porcelain has always been the preferred material.

ARMOURLIGHT

← Sandblast

United States Patent Office

3,141,063
Patented July 14, 1964

3,141,063
TOUGHENED GLASS, PIN TYPE INSULATOR
Derrick Robert Edwards, Eccleston, St. Helens, England,
assignor to Pilkington Brothers Limited, Liverpool,
England, a corporation of Great Britain
Filed Jan. 4, 1961, Ser. No. 80,573
Claims priority, application Great Britain Jan. 5, 1960
10 Claims. (Cl. 174—212)

ENGLAND

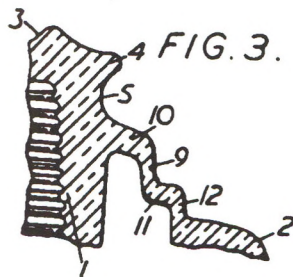
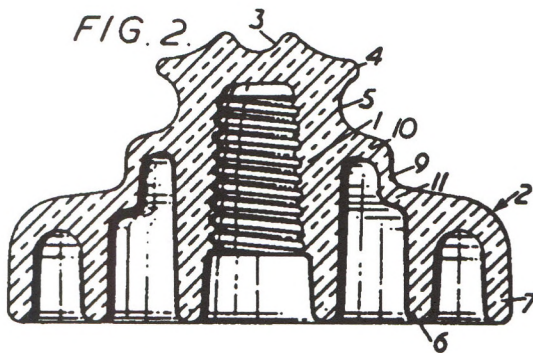
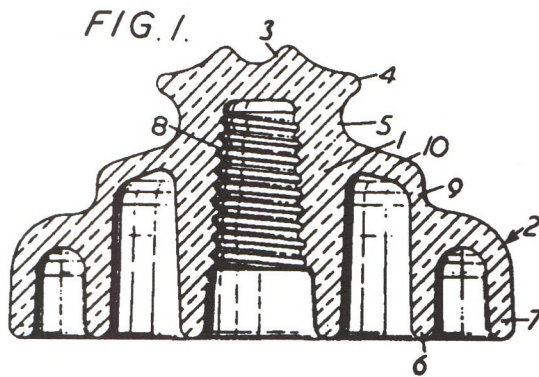
July 14, 1964

D. R. EDWARDS

3,141,063

TOUGHENED GLASS, PIN TYPE INSULATOR

Filed Jan. 4, 1961



Inventor

Derrick Robert Edwards

By

Morrison, Kennedy & Campbell
Attorneys

ETHIOPIA

At the time of this writing, we know almost nothing about the use of insulators in Ethiopia. One rather crude specimen in gray green glass has been classified as CD 508. Recess-embossed on the skirt is a circle enclosing the letters *P & T* and the name *ERITREA*. *P & T* identifies the user as the Government owned Post and Telegraph. The original owner of the insulator told us that it was found in Asmara, the capital of the province of Eritrea, which at that time was still part of Ethiopia. However, since 1991, Eritrea has been an independent nation.

One half-mold - Recessed

CD #508



FINLAND

Finland has extensive need for insulators, both glass and porcelain, because of its vast hydro-electric system and the thousands of miles of railroads. Almost without exception, every home has electric lights and a telephone.

Porcelain insulators are made locally at two well-known factories: *Turku Potteries*, in the city of Turku, and *Arabia Porcelain Company* of Helsinki. Both firms make other porcelain products as well. Arabia is the largest manufacturer of its kind in Europe.

Several of Finland's cities are internationally famous for glass making, but only two companies have produced insulators for local use. They are *Karhulan Lasitehdas* and *Iittala Lasitehdas*, each named for the city in which it is located. *Lasitehdas* translates to "glass factory". Both firms are part of the larger *A. Ahlstrom Company*.

Glass insulator production has been fairly standard in Finland since about 1940. CD's 128, 453 and 541 are three basic telephone styles still used in this country. Three sets of segmented threads give the small pinholes a triangular look. This arrangement gives the cement almost an unbreakable grip in holding the insulator to its steel pin. Though most insulators are made of clear or pale green glass, some CD 541's have been found in a deep red amber.

FINLAND

CD 453 is embossed *KARHULA HEL 2*. It is the only one of the three styles we have seen with an identifying mark. As stated above, *Karhula* is the name of the glassmaker. Telephone insulators are usually embossed *HEL* for *Heikkovirta Eristin Lasi*, or "small current insulator of glass". The number 2 indicates not only the size of the insulator, but the thickness in millimeters of the wire used. Numbers go up to sizes 3 and 4 for the two larger styles, but obviously not all units are identified as such.

One half-mold

CD #453

KARHULA HEL- 2

FRANCE

The company known as *Saint-Gobain* was founded in 1665 by private entrepreneurs as part of the French economic revival program planned by Louis XIV and his minister Colbert. From the beginning, *Saint-Gobain* has manufactured flat glass on an industrial basis. Since the 19th century, it has been the company's intent to set up a European organization for the manufacture of glass products. This policy led to the acquisition of plants in Germany (1857), Spain and Belgium (1904), and Italy (1989). During the same time frame, the company also began to diversify into other glass-based products. Today the *Saint-Gobain Group* has production units in twenty-one countries, with more than two thirds of its sales coming from outside France.

Charbonneaux & Co. of Reims, France, was an early subsidiary of *Saint-Gobain*. The company was engaged primarily in the manufacture of mirrors, but in 1906, it established an insulator factory in Reims, called *Nord-Verre*. (Our sources indicate that champagne bottles were also made at this plant). *Charbonneaux & Co.* placed an ad in the *Gazette de L'Electrician* offering a complete line of glass insulators for high and low tension to "Posts and Telegraphs, Railroads, and large Electric Companies". These could be obtained from the company's agent in Paris. In a 1925 trade journal, *Verreries Charbonneaux* ("Charbonneaux Glassworks") advertised glass insulators, including suspension types, under the *ISOREX* trademark. It is the authors' opinion that *ISOREX* is taken, at least in part, from the words *isolatueurs* ("insulators") and *Reims*.

FRANCE

Insulators which carry the *ISOREX* trademark have been found only in shades of green glass, including light green, green aqua, lime, teal, and dark olive. *VERRERIES DE REIMS*, found on a few examples of CD 640 and CD 642, was an embossing variation used before 1925. The letters *SNCF* and *EST* appear on certain units used along railway lines. This stands for *Societe Nationale de Chemin de fer Francais* or "French National Railway Company". *EST* is the French word for "east" and most likely indicates the branch of the *SNCF* network where the insulators were found. The letters *C.G.B.A* on CD 552.4 may be the initials of the particular user, but are unattributed at this time.

In 1959, *Saint-Gobain* established a glass factory in Saint-Yorre, Allier (a French Department), for the production of glass jars. In 1928, a new company, known as *Societe L'Electro Verre*, was set up by *Saint-Gobain* and *La Compagnie General d'Electricite* to manufacture glass insulators at the same factory location. The head office of this new business was in Paris. In 1931, *L'Electro Verre* became a wholly owned subsidiary of *Saint-Gobain*.

The two old-established companies of *Nord-Verre (Charbonneaux)* and *L'Electro Verre* were contemporaries in the manufacture of glass insulators. They were the first producers of overhead line insulators in annealed glass.

At least by 1932, and on into the 1950's, *L'Electro Verre* offered a complete line of high and low voltage insulators for telecommunication use and power distribution, including suspension insulators and large fog bowls. Units are embossed *L'ELECTRO VERRE*. Glass colors are limited to medium shades of aqua and green. A 1945 ad in the *Revue Generale de L'Electricite* boasted that the total number of insulators produced by the company was enough to circle the earth four times!

Certain insulators were sold to the railroads, as evidenced by the letters *SNCF* on CD 699. The name of the distributor, *H. POUYET*, is sandblasted in large letters on the skirt of this insulator. The initials *LEV* found on CD 390 are an abbreviation for *L'Electro Verre*.

In the beginning of 1959, *L'Electro Verre* and *Nord-Verre* were joined together under *Saint-Gobain* to form a new company known as *SEDIVER*, which continued to manufacture insulators at the Saint-Yorre plant, and maintained headquarters in Paris. *SEDIVER* is taken from *Societe Europeenne d'Isolateurs en Verre* or, "European Glass Insulator Association". The merger brought an end to the use of the *L'ELECTRO VERRE* trademark, and *SEDIVER* insulators were embossed *EIV*, for *Europeenne d'Isolateurs en Verre*. Aqua and green are the principal colors of glass.

VERRERIES CHARBONNEAUX REIMS

SEPT MILLIONS
d'isolateurs Haute Tension
VENDUS DEPUIS 25 ANS

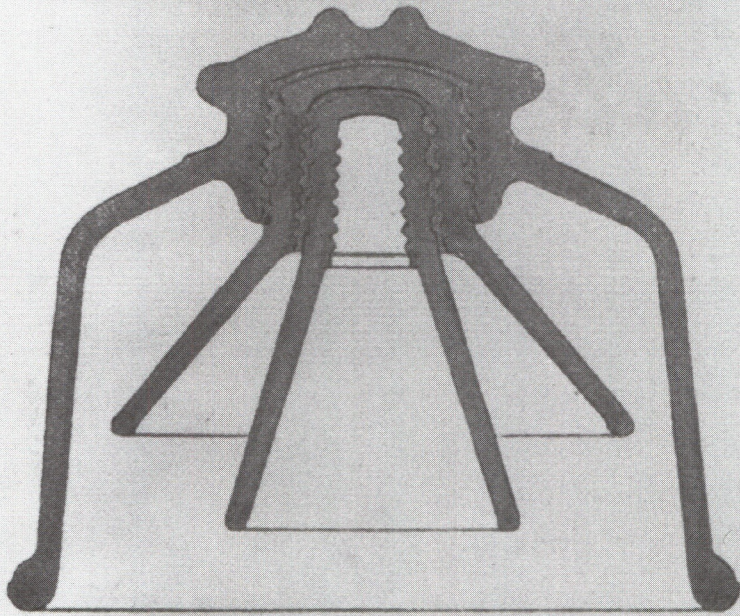


IMP. RUTHER-MHERRY

Envoi du catalogue
et des références sur demande

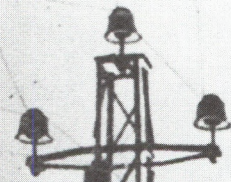
ISOLATEURS EN VERRE

NOUVEL ISOLATEUR
"BORD DE MER"



BREVETÉ N° 335

LIGNE DE MONTAGNAC A
RACHEGOUN.
S.I.C.A.E.R.T. A TLEMÇEN



14 RUE LINCOLN . PARIS .
L'ELECTRO-VERRE

FRANCE

In the early years, each of the two companies had drawn glass from the furnace manually and formed insulators on hand presses, but later, as partners, they developed assembly line production methods for insulators and soon dominated local markets. The company had grown into the largest sales organization of its kind in the world, marketing a complete line of French-made insulators to all corners of the globe. It was known as *SEDIVER International*.

In an effort to satisfy the needs of its customers all over the world, *SEDIVER* eventually became involved in another technical field related to electrical insulation - porcelain for the manufacture of hollow type and very large insulators. In 1970, *SEDIVER* merged with *La Compagnie Generale d'Electroceramique* to form the the new company *CERAVER S.A.*, taken from the words *ceramique* ("ceramic") and *verre* ("glass"). The *SEDIVER* trade name was retained for glass insulators.

In 1971, *SEDIVER* merged with *Pilkington Brothers* of Great Britain, the other pioneer in toughened glass insulator technology. The union effectively supplemented the expertise of the Saint Yorre plant. The new company, *SEDIVER Pilkington International*, was a "division" of *CERAVER S.A.*

A few years later, *Pilkington Brothers* ceased their activity in the field of insulators and *SEDIVER* was taken into *La Compagnie Generale d'Electricite (CGE)*, one of the largest electrical engineering, equipment and construction organizations in the world. Saint-Gobain's one remaining connection with the production of glass insulators was its subsidiary company in Segovia, Spain, known as *VICASA* (formerly *Esperanza S.A.*)

In 1988, the union with *CGE* and *La Compagnie Generale d'Electroceramique* was dissolved and *SEDIVER* became (and is presently) a subsidiary of the large Italian-based *FIDENZA Group*. (See ITALY) From that time on, the name *CERAVER* was no longer used in connection with insulators, and the EIV trademark were dropped. French made insulators manufactured today are embossed *SEDIVER*. A small division of *CERAVER* has continued independently in the manufacture of artificial hip replacements.

SEDIVER continues to furnish both communication and power units according to international specifications. For HV and EHV overhead transmission lines, the company exports "toughened glass" insulators to at least sixty-three countries. Its processes are also applied, under license, in seven countries for local assembly of insulators. There are manufacturing facilities in three other countries outside France, and many sales agents all over the world. *SEDIVER's raison social* (company name) now expands into *Societe Europeenne d'isolateurs en Verre et Composite*, to indicate its involvement in the manufacture of insulators made of composite materials.



ANC^{NS} ÉTAB^{TS} PARVILLÉE FR^{ES} & C^{IE}

SOCIÉTÉ ANONYME AU CAPITAL DE 6.000.000 DE FRANCS

SIÈGE SOCIAL:

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USINES: A

CRAMOISY (OISE) SAINT-GENOU (INDRE) LE DAUMAIL (HTE VIENNE)

ISOLATEURS HAUTE TENSION

PLUS D'UN MILLION EN SERVICE

FERRURES GALVANISÉES

5.000 TONNES PAR AN

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ACCESSOIRES ET FERRURES GALVANISÉS

PORCELAINERIE ÉLECTROTECHNIQUE
ET LABORATOIRE à CRAMOISY (Oise)



FRANCE

Anciens Etablissements Parvillee Freres & Cie. or, "Long Established Plants of Parvillee Brothers & Co.", was a French company that owned and operated three factories for the manufacture of glass and porcelain insulators, as well as galvanized iron fittings and electrical heating apparatus. The factories were located in Cramoisy, in the French Department of Oise, Saint-Genou in Indre, and Le Daumail in Haute Vienne. The head office was in Paris. The company began advertising in trade journals as early as 1906 and continued at least through 1941. *Nord-Verre* and *L'Electro Verre* were competitors in the industry.

A "circle" trademark with the company's initials *P.F.C.* was used to identify all of its products. The "electrotechnical" porcelain insulator factory and laboratory were at Cramoisy. One of the other two plants produced glass insulators, enabling the company to offer a complete line of high and low voltage insulators in both materials. Glass colors of *P.F.C.* insulators are limited to medium and dark green.

A 1934 trade journal included a listing for *Verreries de Folembay*, an insulator manufacturer located in the town of Folembay, Aisne (a Department in northern France). Although many insulator styles have been found with the *FOLEMBRAY* embossing, we know very little about this company, except that it was the earliest factory to produce glass insulators cemented onto rigid metal pins. In 1952, *Folembay* was purchased by *Nord-Verre*.

The predominant glass color of *Folembay* insulators is yellow green, although a few examples have been recovered in aqua. Our only specimen of CD 529 was found in Italy. It is embossed *FOLEMBRAY No 194 TELEFONI . DELLO . STATO*, indicating that the user was the State (or Government) Telephone Company. Another interesting embossing is found on CD 692. Here we see *HENNON FOLEMBRAY DEPOSE 288*. This one is a mystery.

Certain samples of CD 640 and 642 carry the *VM* trademark of *Cartel Vidriera Monterrey* of Mexico. One wonders how these insulators found their way to France. Other embossings found on French insulators are unattributed: four low voltage styles are embossed *VA*; a "diamond" trademark with the letters *CL* appears on one example of CD 640; on the crown of another 640 we find an *SAV* logo; and our only specimen of CD 573 is embossed *IsoFerm R.M.2*. Clearly, our research efforts must continue.

We wish to thank *SEDIVER* (Paris, France) and *SEDIVER Inc.* (York, South Carolina) for the information they supplied on the history of their company, and the current status of the organization. We are also grateful to Miroslav Immer of Prague, Czech Republic, who, through his many years of service as an international supplier of insulators and other technical ceramics, was able to add many more facets to the story.

FRANCE

One half-mold	Opp. half-mold	CD #576
E I V	⁰⁴ DC 3	
One half-mold	Opp. half-mold	CD #470
E I V	⁰⁶ N 95	
One half-mold	Opp. half-mold	CD #640
FOLEMBRAY	N° 35/3	
One half-mold	Opp. half-mold	CD #529
FOLEMBRAY	N° 194 TELEFONI.DELLO.STATO	
One half-mold	Opp. half-mold	CD #692
HENNON FOLEMBRAY DEPOSE	288	
One half-mold		CD #573
Isoferm R. M.2		
One half-mold	Opp. half-mold	CD #451
ISOREX	1042	
One half-mold	Opp. half-mold	CD #551
^{IV} ISOREX 35/4	DC 2	

FRANCE

One half-mold

ISOREX

Opp. half-mold

MT 14

CD #610

One half-mold

ISOREX
SNCF

Opp. half-mold

EST

CD #642

Crown - One side of groove

LEV

Opp. side of groove

2220

CD #390

One half-mold

L'ELECTRO VERRE

Opp. half-mold

DC 1

CD #574

One half-mold

H. POUYET
L'ELECTRO VERRE SNCF

← Sandblast

Opp. half-mold

CD #699

One half-mold



Opp. half-mold

DC 2

CD #551

One half-mold



Opp. half-mold

8C-31

CD #654

FRANCE

Crown

CD #666.2



I.B.II

Crown

CD #676



2129

One half-mold

Opp. half-mold

CD #535

S
E
D
I
V
E
R

VHC 63

20

One half-mold

CD #640

.VERRERIES DE REIMS

Crown - Raised

CD #640



FRANCE

One half-mold

Crown

CD #640



5

One half-mold

CD #640



Crown

CD #640



GERMANY

Four German glass manufacturers joined together in 1936 to form *Vereinigte Glaswerke*, or "United Glassworks". Among them were factories at Mannheim, established in 1853, and Stolberg, dating from 1856. The new company was known as *VEGLA*. Plants were located in the towns of Stolberg, Herzogenrath, Mannheim, and Sindorf. From the beginning, the main products were flat glass and mirrors. The formation of *VEGLA* had been initiated by the German Group of *Compagnie de Saint-Gobain*, a large French organization devoted to glass manufacturing in Europe and South America. Thus, *VEGLA* became the German subsidiary of *Saint-Gobain*.

The company's head office, located in Aachen, is called *VEGLA HAUS* or "(the)*VEGLA* Building". Plants in Cologne-Porz and Bietigheim have been added within the past several years. There are also subsidiaries and holdings in Belgium, Sweden, France, Netherlands, Yugoslavia and Finland. The present line of products is limited to glass for building and automobile industries.

In regard to insulator production at *VEGLA*, we were able to get only a small bit of information from the company's Public Relations Manager. Apparently, the factory in Sindorf no longer exists, but for a short time, probably about 1949-50, insulators were produced at this location. She told us that most of the people who knew about this production are no longer employed at *VEGLA* or else have passed away since that time. However, one of the oldest colleagues did remember the insulators. He said "the procedure of production was called *Keien-Verfahren*, and the insulators were made in old round tanks (ovens), which do not exist any more. It was very difficult to get the thread into the glass insulator". *Keien-Verfahren* translates to "Keien Method", named for the man who devised the procedure. We were given no further details.

GERMANY

Seven styles for telecommunication and low voltage use have been located with the *VEGLA* embossing. Most units also carry the style number. Glass colors include clear, light aqua and dark green aqua. The letters *BP* found on one example of CD 448 are unattributed. The company also produced protective glass covers for conduits that carried electrical wiring into buildings.

Another unique but unembossed insulator was found in Germany. CD 405 is a two-piece unit with a separate skirt, held in place by a rubber seal. This insert was designed to hold a wire going to ground, thus serving as a lightning arrester. It is doubtful that the insulator originated in Germany. Its yellow green color closely resembles that of *Folembray* glass made in France.

One half-mold	Opp. half-mold	CD #448
² VEGLA	BP	

One half-mold	Opp. half-mold	In saddle	CD #600
VEGLA	N 95	⤴ ⤵	

GUERNSEY, CHANNEL ISLANDS

One rather oddly embossed CD 550 was found in Guernsey, Channel Islands. A large letter *G* appears on one side of the skirt and a backwards number 5 on the other. The color of glass is light green. Though Guernsey is a British owned island, it is doubtful that the insulator originated in England, as low voltage insulators of glass were never popular there. With just ten miles between Guernsey and the French coastline, it is most likely that this particular specimen was manufactured in France. It does closely resemble styles used in that country. One wonders if the embossed *G* indicates that the insulator was destined for Guernsey. There is no proof one way or the other, but to our knowledge, this insulator has never been seen anywhere else.

One half-mold	Opp half-mold	CD #550
G	5	

IRAN

Before World War II, when Iran was about to undertake the expansion of its railway system, it became evident that insulators for the new telegraph lines would be needed. A small family-owned and operated business, known as the *Mehr Glass Factory*, was chosen to make them. These small telegraph insulators have been designated as CD 505. The color of glass is sage or yellow green. Units are embossed with the family name in Farsi, the native language of Iran. The following information, obtained through an Iranian interpreter, was made available to us by Grant Salzman of Sacramento, California:

"The insulator was made in a hand-operated iron mold that produced only one insulator at a time. The molten glass was placed in the mold by an assistant (usually a child) and the master molder determined when the glass was ready to come out. Some of the insulators are tilted or lopsided due to being removed from the mold too soon by an overanxious master molder.

It is also normal for small defects to occur at the bottom of the skirt and on the seam ends. These were sometimes made when the mold was opened in order to remove the insulator. This would also happen at the rim around the pinhole.

When the insulator was used, a handmade metal pin was inserted into the pinhole and molten sulphur was poured around it. Once the sulphur cooled, the pin was held securely. It could be removed by tapping on it, which caused the sulphur to fall away as chips and dust".

Less than two hundred had been made at the time the war came along and railway expansion was halted. As a result, the insulator order was canceled and production ceased. The unused units were stored away and were discovered some thirty years later. Needless to say, these insulators are in short supply and are highly collectible.

The embossing resembles an *M* in script, but actually represents three letters of the Farsi language. Reading from right to left, the letters are *MHR*. According to the interpreter, the *E* is implied.

One half-mold



Opp. half-mold



CD #505

ISRAEL

One unembossed example of CD 598 in amber blackglass was recovered from Israel. We know nothing of either the glassmaker or the user.

ITALY

For centuries, Italy has been known for its glass industry. Therefore, it is not surprising that most, if not all of the glass insulators used in this country can be attributed to local manufacturers.

A 1949 *ANIE* Directory (*Associazione Industrie Elettrotecniche* or "National Association of Electrotechnical Industries") listed *Fidenza S.A.* as an associated firm, located in the city of Fidenza, northern Italy, with headquarters in Milan. The date of establishment is unknown. The CD Index attributes fourteen styles of glass insulators for high and low voltage to this company. Some units are embossed *FIDENZA*, followed by the style number, while others are identified by their style number alone. Colors of glass include clear, straw, light green, pink to light purple and dark green.

At some point, the company became known as *Fidenza Vetraria S.A.*, or "Fidenza Glassworks, Inc.", indicating that there had been a merger with one or more firms. An advertisement appearing in a 1956 trade journal of *Industria Italiana Elettrotecnica* ("Italian Electrotechnical Industry"), offered various *Fidenza* products: *BORAL* was the tradename given to glass insulators containing aluminum borate; lighting fixtures, glass covers for headlights, and special glass in general were referred to as *HOLOPHANE*; glass building blocks and other glass for diffused light were identified by the name *IPERFAN*. During the 1960's, and perhaps over a longer period of time, the company also manufactured bottles and other glass containers with a "star" trademark, which is similar to one found on at least three of their insulator styles. Today, *Fidenza Vetraria* has become a very large company known as the *Fidenza Group*. In 1989, *SEDIVER* of France joined this group as a subsidiary. (See FRANCE)

Glass insulators were also manufactured by a company known as *Manifattura Isolatori Vetro Acqui Terme S.p.A.* or "(The) Manufacture (of) Glass Insulators (at) Acqui Hot Springs". This popular resort city was often referred to simply as Acqui. At least twenty-five styles were produced at this factory, including those for both telecommunication and power use. Glass colors are clear, straw, light green, light aqua and dark green. Units are embossed *MIVA* or *MIVA ACQUI*, followed by the style

FIDENZA S.A. VETRARIA

ISOLATORI IN **BORAL**
VETRO

HOLOPHANE APPARECCHI DI
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VETRI PER FARI D'AUTO E VETRI SPECIALI IN GENERE

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ITALY

number. *TIPO* is the Italian word for "type" or "style". *UNEL* is not an Italian word in itself, but is probably an acronym identifying the user. The embossings on CD's 402, 539, 542, and 558.5 include the word *PYREX*, verifying that, at some point, *MIVA* was granted permission by the *Corning Glassworks* of New York to produce *PYREX* glass. And, while we cannot give exact dates of production, we know that eventually *MIVA*, as well as the insulator division of the *Fidenza Group*, known as *Fidenza Isolatori*, added suspension insulators of "toughened" glass to their line of products. A 1970 catalog indicated that these two companies had at some point become licensees of *SEDIVER*, enabling this large French firm to offer Italian suspension insulators of toughened glass to a worldwide market. Today, *Fidenza Isolatori* is a wholly owned subsidiary of *SEDIVER* under the *Fidenza Group*. (See FRANCE)

MIVA eventually broke ties with *SEDIVER* and merged with another Italian insulator manufacturer. The new company, known as *Vetrarie Riunite Bordoni MIVA* or "United Glassworks of Bordoni MIVA", continued to use virtually the same molds and style numbers. Embossed insulators reflect the newer trademark using the letters *B* and *M* within a *V*. Today, this firm is a competitor of *SEDIVER*. The word *BORMAVI*, which appears on certain specimens of CD 1055.2, may or may not have any connection with *Bordoni MIVA*.

Four low voltage and one two-part high voltage distribution style are embossed *BORGO*. Since Borgo ("village") is a city in northern Italy, it is a possible location for the factory.

Two embossing variations appear on CD 444. One example, dated 1959, shows an embossed "star" along with the word *PYREX*. On the other insulator we see *FLAMREX 1962*. CD 539, which is also a *PYREX* unit, carries a production date of 1950 and the letters *T E T I*. Though all three specimens were recovered from Italy, we have been unable to attribute any of the embossings to a particular manufacturer or user.

There is reason to believe that some CD 122's with the embossing *VMR NAPOLI* ("Naples") were made by an Italian firm. These insulators, used occasionally on telephone lines in the central part of the United States, have a standard American wood pin thread. Examples exist in either pale green or aqua.

One half-mold

CD #122

VMR
NAPOLI

ITALY

One half-mold

FT 92 • PYREX
1 9 5 9

One half-mold

FLAMREX
1 9 6 2

One half-mold

TET I
1 - 9 2 0 - L

Crown - One half-mold



Opp. half-mold

CD #444



Opp. half-mold

CD #444

F. T. 9 2

Opp. half-mold

CD #539

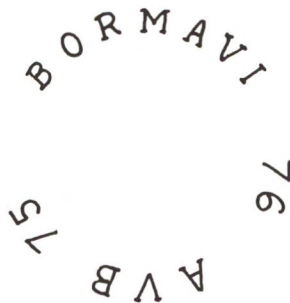
P Y R E X
1 9 5 0

Opp. half-mold

CD #377.2

A.320

CD #1055.2



KENYA

Kenya imported at least two telephone styles from Spain. CD's 407 and 417 are embossed *E.S.A.* followed by the letters *NEXO*. These insulators are products of a Spanish company known as *Esperanza S.A.* of Segovia. We feel that the insulators were made to specification for Kenya, as the catalog of the company's distributor in Madrid did not list them as current items. Both styles have small pin holes and fine threads. The glass color is deep green aqua. (See SPAIN)

One half-mold

Opp. half-mold

CD #417

6

E.S.A.

NEXO 6

LUXEMBOURG

CD's 563.5 and 577.5 are the only two insulator styles that have been attributed to Luxembourg. Most of the few known examples carry the word *STAR*, which is probably the name of a glass manufacturer. Though two samples of CD 563.5 are completely unmarked, they obviously came from the same source. All are made of a deep yellow olive green glass. Since Luxembourg is such a tiny country, the insulators could have originated from either of its two close neighbors, Belgium or France. There would have been no need, and probably no way, to manufacture insulators locally. We have no further information.

One half-mold

CD #563.5

STAR

MOROCCO

Separated from Europe by only the nine-mile-wide Strait of Gibraltar, Morocco makes use of glass insulators imported from its close neighbors, France and Spain. It is doubtful that any insulators were made locally.

MOROCCO

In Casablanca and on the lines in the surrounding area, one can see literally miles and miles of CD 640's in colors of green and straw. It is difficult to distinguish insulator embossings from a distance, but this telephone style, popularly known as the "gingerbread man", is typically French. CD 658, a fuse holder with the French embossing *ISOREX 282*, was also found in Morocco. This unit is dark olive green.

Two other telephone styles in dark green are embossed *E.S.A.* CD's 400 and 407 are products of *Esperanza S.A.*, a prominent glass manufacturer of Segovia, Spain. The word *NEXO* and the letters *T.Q.S.A.* are unattributed, but they probably indicate the name of the particular user, such as the telephone company. It is very likely that both insulator styles were made to specification for use on lines in Morocco. (See FRANCE and SPAIN)

One half-mold

E . S . A . .

Opp. half-mold

T . Q . S . A . .
3

CD #400

One half-mold

E . S . A . .

Opp. half-mold

NEXO 5

CD #407

NICARAGUA

Nicaragua is the source of one interesting example of CD 154 in dark emerald green. This insulator has a standard American pin hole and round drip points. The embossing is *C C DE NICARAGUA*. Since Nicaragua is a Spanish speaking country, this is probably for *Cristalerias C----- de Nicaragua*, or "(Factory name) Glass Products of Nicaragua". However, since we know nothing about insulator manufacturers in this country, we are unable to identify this marking.

One half-mold

C . C
D E
NICARAGUA

CD #154

POLAND

Poland uses glass and porcelain insulators equally. There are local manufacturers for both products, though almost nothing is known about them at this time. The six styles of glass insulators which have been recovered and attributed to this country are CD's 440, 441, 443, 470.1, 472, and 579. Insulator embossings include Polish letters, which makes them difficult to understand. With the help of an interpreter, an American collector was able to speak with a Polish lineman, who explained their meaning. The following information came from that conversation.

Take a look at the embossing on CD 443, which is shown below. The *IT* is for *izolatory telefoniczne* or "telephone insulator". The *S* is for *szkto* or "glass", which is the material used. *N* is for *numer*, the Polish word for "number", and the number *1* is the size. Thus, the embossing translates to "glass telephone insulator size 1". CD's 440 and 441 embossed with numbers 2 and 3 are smaller sizes of the same type.

CD's 470.1 and 472 are low voltage insulators in two different sizes. They are embossed similarly. The *N* is for *napięcie*, which means "voltage", and again, the *S* is for *szkto* or "glass". The number *80* (or *95*) indicates the size. This would be "glass power insulator size 80 (or 95)". The word *CENA* embossed on CD 472 means "price" or "value" in Polish. Since it would not make sense to put the actual price on an insulator, *CENA* may refer to electrical value or strength. With the exception of one sample of CD 443 and one of CD 470.1 in deep amber, these five styles can be found in straw, light green or light blue.

CD 579 is also a low voltage style, but this one appears to have been manufactured at two different plants. *HUTA*, common to both embossing variations, is the Polish word for "glass mill". But *ROGOW* and *FALENICA* are the names of two cities near Warsaw, so it is possible that each manufacturer was named for its location, or perhaps one company owned plants in two different cities and insulators were embossed accordingly. This insulator has been found in one color only - brilliant blue aqua.

Crown

CD #443

I Ł. ITSN-1

Crown

CD #470.1

I Ł. NS-95 CENA-S-80

POLAND

Crown - One half-mold

HUTA ROGOW

Opp. half-mold CD #579

N.I.T-I-S

Crown - One half-mold

HUTA FALENICA

Opp. half-mold CD #579

I

PORTUGAL

Three telephone styles in light green glass have been attributed to a company known as *Ricardo Dos Santos Gallo, Fo., Lda.* in the city of Marinha, (region of) Estremadura, Portugal. CD's 425, 427 and 428 are embossed with the manufacturer's initials *RG*. Though we have no exact dates of insulator production, we do know that the embossing with plain letters was being used about 1965. The stylized version of *RG* along with an embossed rooster probably came at a later date. The rooster is the national symbol of Portugal.

At least two telephone and two low voltage styles are the products of *Santos Barosa & Co., Lda.*, also of Marinha, Estremadura. The company used the letters *SB* on CD's 425, 428, 504.5 and 681. An embossed lion alongside the word *NAPo*, found on three of these styles, probably represents a company trademark. Without further information, including dates of insulator production, we can only wonder if there was any relationship between these two companies located in the same city.

At least one style was made by *Centro Vidreiro Do Norte Du Portugal, Lda.* in the city of Oliveira de Azemeis, Beira Litoral, another region of Portugal. One example of CD 428 has been recovered in a beautiful shade of lavender milk glass. Embossed on the skirt is the company trademark fashioned from the letters *CV*. We do not know the present status of any of these three companies.

The *CE* trademark, which appears on one sample of CD 425 found in Portugal, remains unattributed. An unembossed CD 598 in emerald blackglass was also recovered from this country, but its origin is unknown.

PORTUGAL

One half-mold

CTT
952VB2-1

Opp. half-mold



CD #425

One half-mold

CTT
950VB1-1

Opp. half-mold



CD #425

One half-mold

CTT
951VA1-1

Opp. half-mold



CD #428

One half-mold

C.T.T.
VB2-1

Opp. half-mold



VII

← Sandblast

CD #425

ROMANIA

Three styles of telecommunication insulators were produced by *Stickla Turda*, a glass manufacturer located in the city of Turda, in the central part of Romania. CD's 408, 445 and 446 are embossed with variations of the company trademark using the initials *ST*. *Sticla* means "glassworks". Insulators are found in colors of peach, light blue, and dark aqua. This only information we have about this company is that it ceased insulator production approximately 25 years ago.

ROMANIA

We cannot give you complete translations of the insulator embossings, but we been told that *S.A.R. DE TURDA*, as it appears on certain examples of CD 408, is for *Societe A. Rumania de Turda*. *A* is the first letter of a Romanian word for "independent". This then translates to "Independent Society of Romania in Turda". *STAS* means "type". Some of the insulators from Turda are embossed with the date of manufacture, such as (19)52 and (19)59.

Several samples of CD 408 in emerald green were recovered from *Intrepinderea de Sticlaire*, in the city of Tirgulest, south of Turda. Translated loosely, this is "Glassware Industry", which is likely the name of the factory or its supplier. Though we cannot identify the TV trademark, the insulator carries a production date of 1973.

The *VM* trademark on one unit of CD 408 is identical to that used by *Cartel Vidriera Monterrey*, a glassmaker in Monterrey, Mexico. This embossing also appears on two telecommunication styles used in France. We wonder what connection, if any, there might have been between a Mexican insulator manufacturer and the needs of faraway countries such as Romania and France. (See France)

One half-mold



S.L.2

Opp. half-mold

CD #408

STAS 810-73

One half-mold



Opp. half-mold

CD #445

S.O.2.
STAS 810-59

One half-mold



Opp. half-mold

CD #408

S.L.2.
STAS 810-52

ROMANIA

One half-mold

Opp. half-mold

CD #408

TURDA

1

C.W.
S.A.R. DE T.
424

One half-mold

Opp. half-mold

CD #408



C.W.
S.A.R. DE T.
I.14

SPAIN

Esperanza S.A., of Segovia, offered a complete line of telecommunication and power *Aisladores de Vidrio*, or "glass insulators," for use both at home and abroad. The CD Index attributes no fewer than 30 styles to this Spanish company. At one time, *SOCOVI S.A.* of Madrid was the factory distributor. A 1970 catalog of *SEDIVER International* offered *Esperanza* insulators to an international market, indicating that the company had become a licensee of this large French organization. (See FRANCE)

Insulators are embossed either *ESPERANZA S.A.* or *E.S.A.* This is for *Esperanza Sociedad Anonima*, or "Esperanza, Inc". (*Esperanza*, which is the Spanish word for "hope", was the name of the family that established the factory). *C.T.N. DE E.* is *Compania Telefonica Nacional de Espana*, or "National Telephone Company of Spain". Insulators embossed *C.T.N. DE E.* were made prior to 1936. Later units are marked simply *C.T.N.E.* Glass colors include clear, light green, aqua and dark green aqua.

R.E.N.F.E. is *Red Nacional de los Ferrocarriles Espanoles*, or "Spanish National Railway System". During the Spanish Civil War, which began in 1936, there was massive destruction of railroads and rolling stock. Following the war, the government took over the devastated lines, which had been privately owned. *RENFE* was officially formed in 1943. Therefore, it must be assumed that insulators so embossed were made after that date.

SPAIN

Both the telephone and railroad systems were important customers of *Esperanza*. CD's 106 and 154 were made to their specifications. These styles have the standard American wood pin thread. As far as we know, Spain is the only European country to adopt the American pin hole into general use. It is not unusual to find French, German and American insulators in use on the lines alongside those embossed *E.S.A.* It is believed that many of these "foreign" insulators found their way into the country during reconstruction following the Civil War. In Spain, one can find one of the world's most varied and interesting accumulation of glass insulators in service.

Certain *Esperanza* styles were made to specifications for Africa. CD's 407 and 400 were found in Morocco. Kenya made use of CD's 407 and CD 417. None of these three insulators were advertised in *Esperanza* catalogs. Units are embossed *E.S.A.*, but the letters *T.Q.S.A.* and the word *NEXO* probably relate to local utilities in the countries where they were used. (See KENYA and MOROCCO).

One tiny unmarked style with two arms has never been found anywhere else but on the Island of Majorca. (Majorca is one of several Balearic Islands which together form a province of Spain). A few unembossed specimens of CD 680 exist in colors of straw or deep red amber. They are said to be very old and very scarce. At one time, they were used on lines bringing telephone service into homes and other buildings, but have long since been replaced by modern installations of *E.S.A.* insulators. The manufacturer of these insulators is unknown.

The marking *JTE-F 60103* on one sample of CD 154 is unattributed, but since the insulator was found in Spain, it is probably an *Esperanza* product.

Today, *Esperanza S.A.* is known as *VICASA*. It is no longer a licensee of *SEDIVER*, but now, as a subsidiary of *Saint-Gobain*, *VICASA* has become a *SEDIVER* competitor. The Segovia factory still manufactures glass insulators, but we have not seen the new trademark.

One half-mold

CD #154

C . T . N . D E E .

One half-mold

Opp. half-mold CD #154

ESPERANZA . S . A .

C . T . N . E .

SPAIN

One half-mold

2
E . S . A .

Opp. half-mold

C . T . N . E

CD #154

One half-mold

E . S . A .

Opp. half-mold

R . E . N . F . E .

CD #154

One half-mold

2.
E . S . A .

Opp. half-mold

A D V . 1 .

CD #251.5

One half-mold

J T E - F 60103

CD #154

SWITZERLAND

Our one example of CD 578.5 was found in Switzerland. This beautiful insulator of olive green glass has no embossing. To our knowledge, no other glass pintypes were used in this country, so the insulator likely originated in France or Italy, where the manufacture of glass insulators was well established.

SYRIA

Syria became a French mandate at the end of World War I and remained so until 1946, when the country became fully independent. Through her years of control, France brought many western ideas and developments to the Syrian people. We know that *L'ELECTRO VERRE* CD 379's were used on high power lines in Syria, and it naturally follows that other French styles might be found there as well. (See FRANCE)

We lack information about the manufacturers of glass insulators, or *isolyatory*, in this section, but we can identify certain insulator samples that were produced somewhere in the Union of Soviet Socialist Republics before it ceased to exist as a political entity. Therefore, until we have seen units dated later than 1991, and can state exactly which companies made them and specify the independent state or country in which they were found, we will continue to refer to the *USSR* as the country of origin.

The Master CD Index lists eight insulator designs which were found in the *USSR*. Embossed on four of these styles is what appears to be an artist's conception of a high voltage insulator with the bottom shell divided to form two legs. Though unattributed, this trademark probably identifies the manufacturer or the utility for which the insulators were made. Known examples are dated from the mid 1970's to as late as 1991, so we assume insulator production is current. Glass colors are light to medium yellow green. We cannot tell you what is indicated by the numbers 20,162, 254, etc. found on CD's 540 and 541. Some of them are too high to be mold numbers. The embossing *WC10*, which appears on CD's 247.5, 304.5, 638 and 638.5, seems to be a manufacturer's identification number. The *W* translates to the Russian combination of letters *SH*. The Russian letter (for *A*, *B*, *D* or *G*) which follows this number may indicate a particular plant. One example of CD 638.5 dated 1979 carries the letters *JT* in a triangle, rather than the "insulator logo". Don Fiene, a noted authority on the Russian language, tells us that this is a combination of both Cyrillic and Latin letters. Although he does not know the meaning, he says "A factory located in a republic using the Latin alphabet (such as Estonia) might well identify itself with Latin letters, that is, the same as ours".

Four unattributed embossing variations are found among examples of CD 247.5, which is a very popular design for primary power distribution in the *USSR*. Two of these variations show an embossed insulator enclosed within the letter *C*, which is used here as an abbreviation of the Russian word for "system". The letters which follow translate to *SDELANO V SSSR*, or "Made in (the) USSR". All known samples with this embossing were manufactured during the 1970's. The color of glass is light green. A few of these insulators have been found on lines in Colombia, S.A.

The third embossing variation is a 1964 "diamond" logo, which includes the letters *AH* followed by a letter resembling the number 3. These are actually the Russian letters *ANZ*. The first two letters indicate the factory name, while the *Z* is probably the first letter of the word *Zavod*, or "factory". Insulators with this embossing are of a beautiful deep amber glass. They are not plentiful. The "circle" *M* trademark is found on two examples in olive green glass. These are also scarce. The letter *M* is common to both the English and the Russian language.

USSR

One specimen of CD 540 carries the Russian letters for *T* and *F* inside the letter *C*. Together these letters are an abbreviation for "Telephone System".

CD 579.5 is embossed with the Two-headed Eagle of Imperialist Russia, dating the insulator to sometime before the onset of the Russian Revolution in 1917. The letters under the crest do not comprise a word with any particular meaning, but probably indicate the name of a small town. The first half of the name appears to be derived from the Russian word for "calcium". The town may have been a place where a calcium-based mineral was mined. This insulator is made in a deep lime green.

CD 506 was found on Russian soil, but the letters scratched onto the glass are not Russian. Because the insulator itself is crudely made, the letters may represent the name of some small family-owned glass factory, where pieces were made by hand, one at a time. Although its origin is unknown, it closely resembles those made by the factory in Iran called *Mehr*. (See IRAN).

Many thanks to Don Fiene of Knoxville, Tennessee for his translation of Russian embossings. Don is a professor in the Department of Germanic and Slavic Languages at the University of Tennessee. He has brought back several insulator samples from his numerous trips to the USSR and has shared them with other collectors.

We have copied as much as possible of the imperfect embossing shown below. The design is that of the Russian Imperial Two-headed Eagle, shown at right as taken from an old coin.

One half-mold

CD #579.5



Inside skirt

CD #247.5



One half-mold

CD #247.5

19  64

One half-mold

Opp. half-mold

CD #540


1968

771

One half-mold

Opp. half-mold

CD #247.5

ШС 10 А  1974

СДЕЛАНО В СССР 10

One half-mold

CD #247.5

ШС 10 А  1976

Opp. half-mold

СДЕЛАНО В СССР.. 10

One half-mold

Opp. half-mold

CD #304.5

56 ШС10-В 1976



Inside skirt

CD #638.5

ШС-10Г  79

One half-mold

CD #506

А С Ч Ф О Ж Е

VIETNAM

Vietnam was controlled by the French government from the late 1800's until an armed struggle in 1954 led to independence. During this time of rule, many styles of glass insulators were imported from France. A few examples are CD's 376.5, 377, 640, 642, 676, 690, 1057.1, etc. Eventually, local manufacturers were able to copy some of the French designs at a lower price by making them of porcelain. These came to be used side by side on lines in Vietnam and can still be seen in service today. (See FRANCE)

One half-mold

Opp. half-mold

CD #690

E | V



One half-mold

Opp. half-mold

CD #690

L ' ELECTRO VERRE



UNATTRIBUTED

At the time of this writing, one example of CD 128 is the only insulator known by the authors to carry the embossing shown below. It has been suggested that his marking may be an Arabic symbol of some kind. We have no information about the country of origin, the manufacturer or the user. This insulator is made of sage green glass and, judging from its style and condition, appears to be of fairly recent production. We welcome help from our readers.

One half-mold

CD #128



GLASS INSULATOR STYLES

The Consolidated Design Number system was developed as a means of identifying various styles of glass insulators. It was first applied to North American styles only, but was later expanded to include insulators from all parts of the world.

An attempt has been made to group generally similar insulator styles together to facilitate the search for a specific item. The North American styles fall within the numbering sequence 100 to 371. Higher numbers belong to styles from other continents. However, items that are the same or similar to North American styles are given numbers in that sequence regardless of their origin. Thus, many insulators listed in this work carry CD numbers within the North American sequence even though they originated elsewhere.

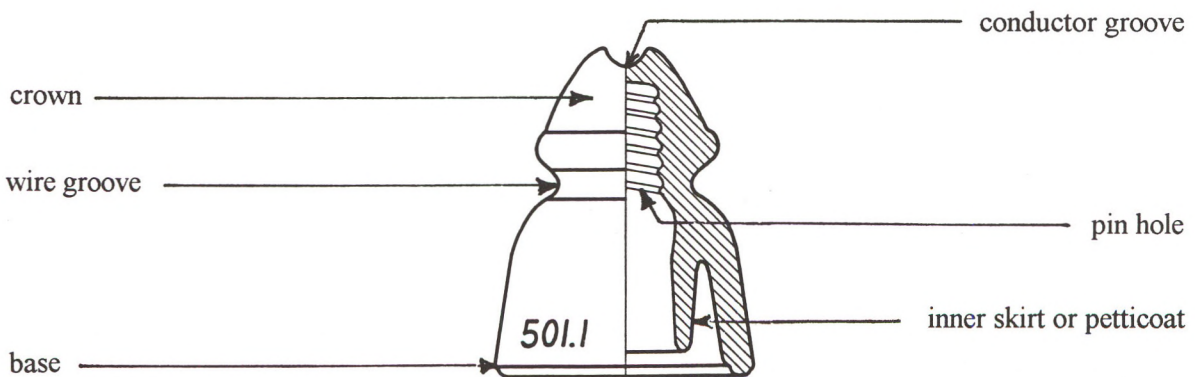
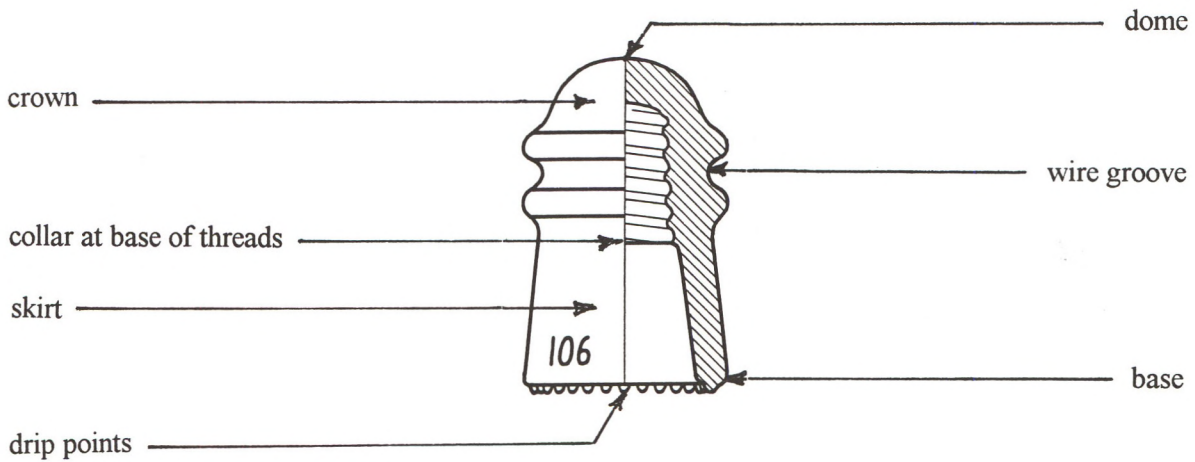
In using the CD number listings and accompanying drawings, it must be kept in mind that they are not intended to describe any insulator precisely, but rather to represent an approximate identification. In cases where an insulator style was made over a period of years by several manufacturers, some variation between units must be anticipated. All drawings in the CD Style chart are reduced uniformly to one-fourth size.

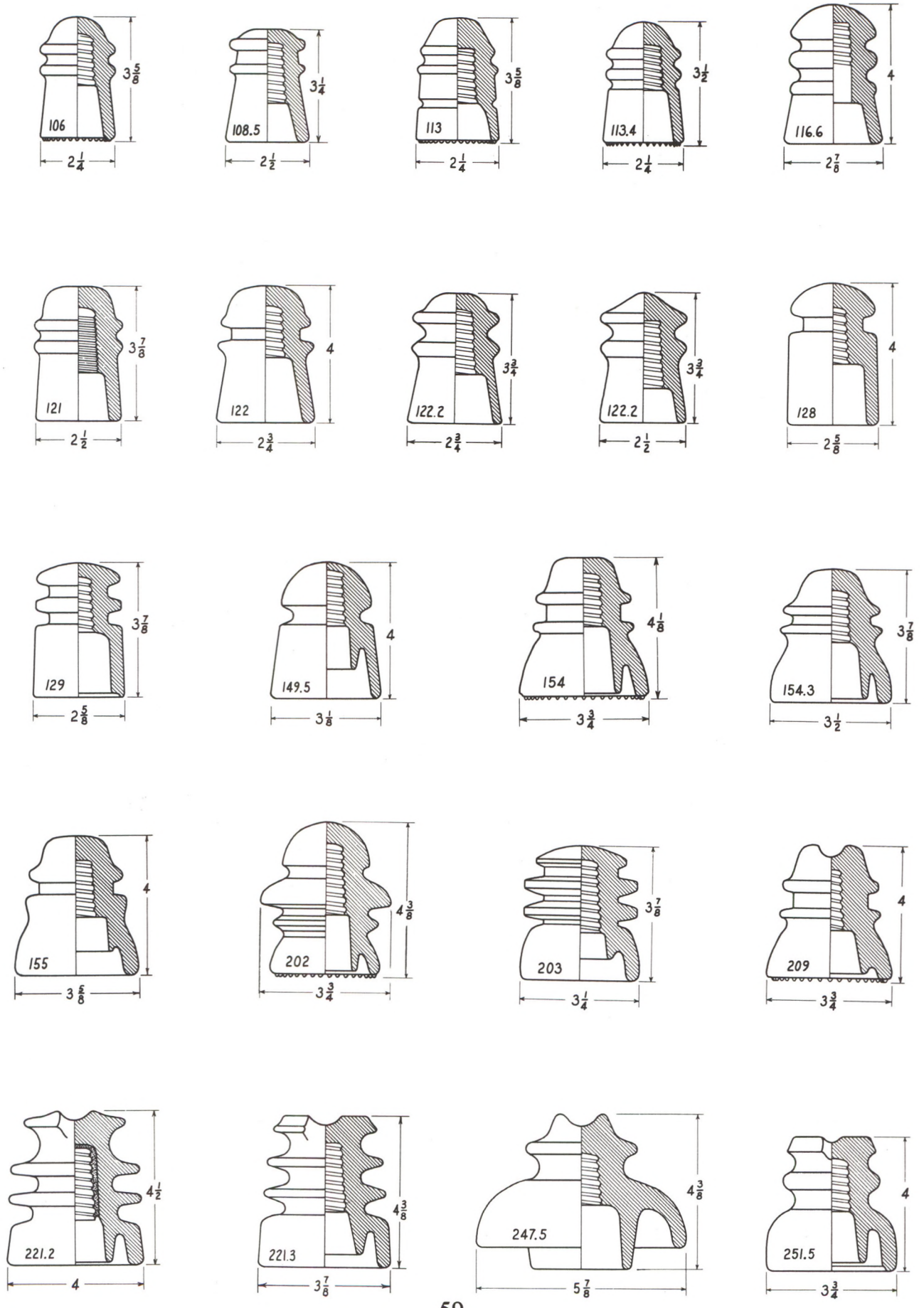
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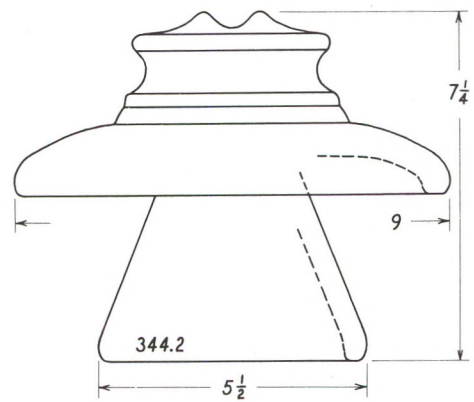
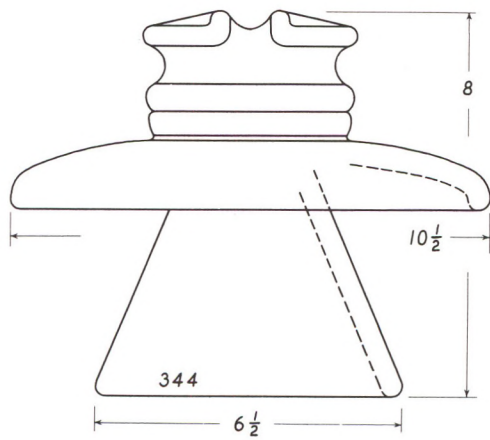
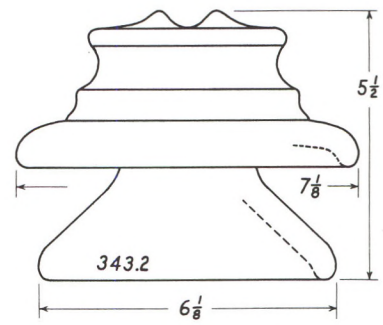
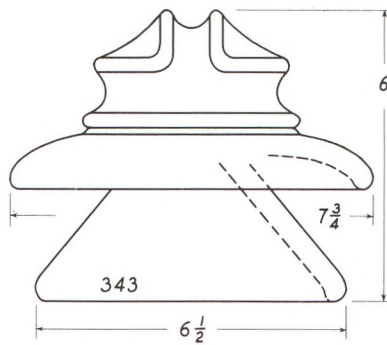
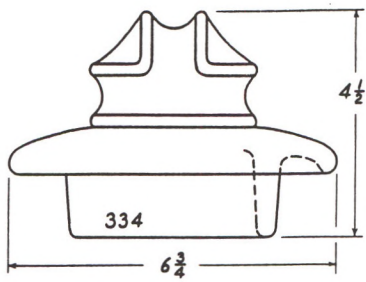
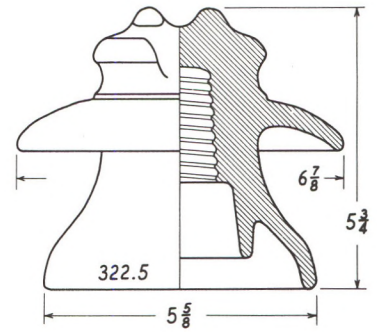
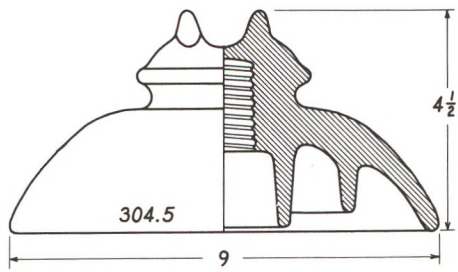
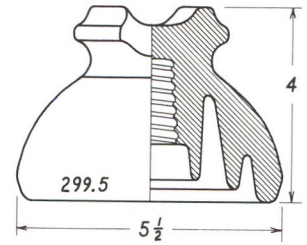
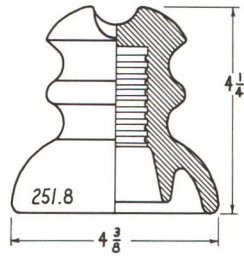
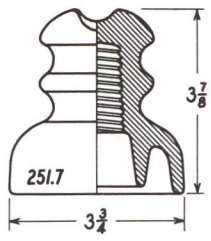
- Numbers 100 to 144: single petticoat side groove
- Numbers 145 to 184: double petticoat side groove
- Numbers 185 to 205: through pin hole and transposition
- Numbers 206 to 249: double petticoat saddle groove
- Numbers 250 to 279: cable, single or double petticoat
- Numbers 280 to 289: triple petticoat side groove
- Numbers 290 to 309: triple petticoat saddle groove
- Numbers 310 to 314: sleeves (used to protect pins in conjunction with some high tension styles)
- Numbers 315 to 334: umbrella type high tension (one-piece)
- Numbers 335 to 399: two and three-part high tension styles (cemented)

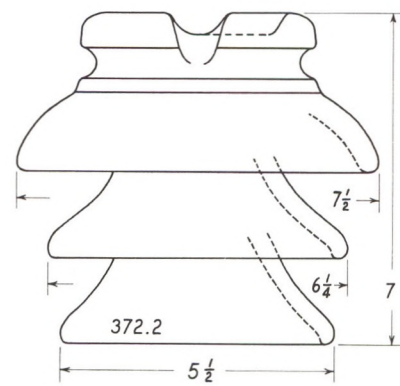
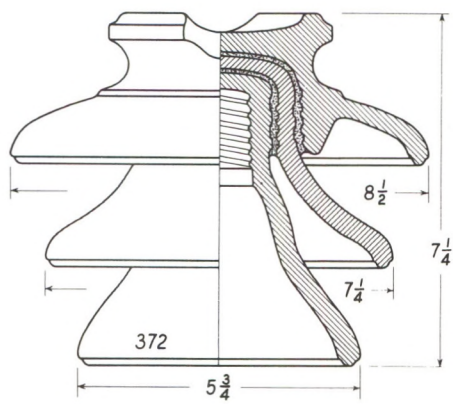
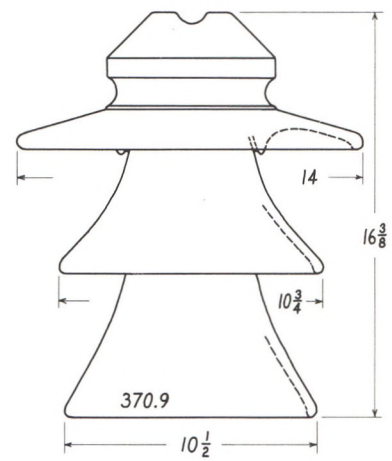
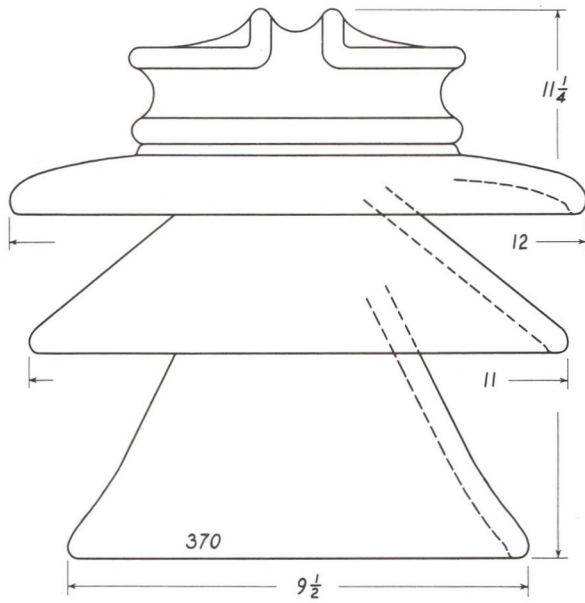
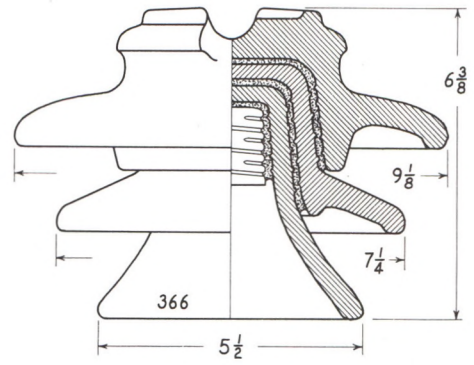
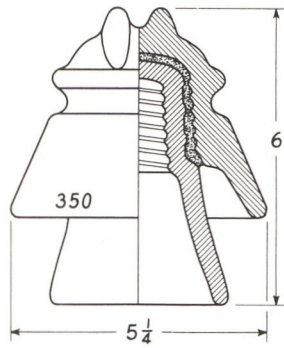
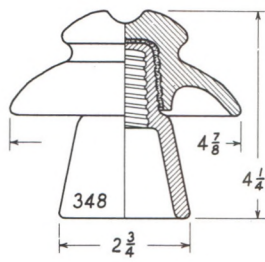
- Numbers 400 to 499: side groove, single or double petticoat
- Numbers 500 to 599: saddle groove, single or double petticoat (low voltage and communication)
- Numbers 600 to 639: flared skirt, double or triple petticoat
- Numbers 640 to 649: side groove with support arms, single or double petticoat
- Numbers 650 to 659: cutout or fuse holder styles
- Numbers 660 to 685: one or two arms for securing low voltage pairs or drop lines
- Numbers 686 to 699: unique styles for applications involving two or more special features
- Numbers 1000 to 1099: glass knobs, service rack and dead end shackle styles

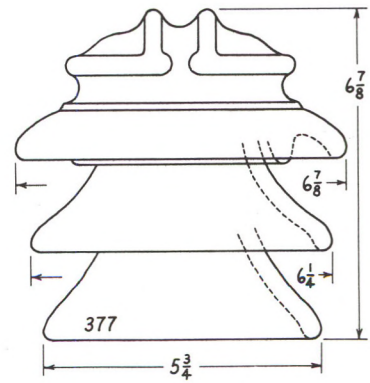
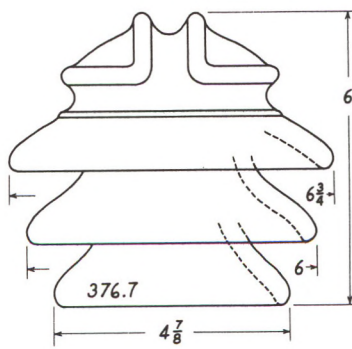
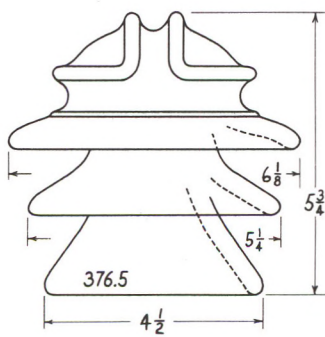
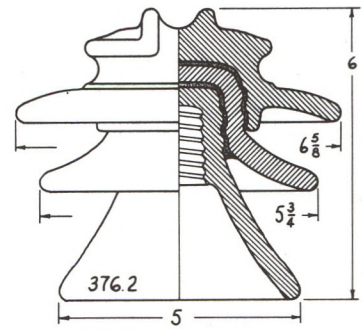
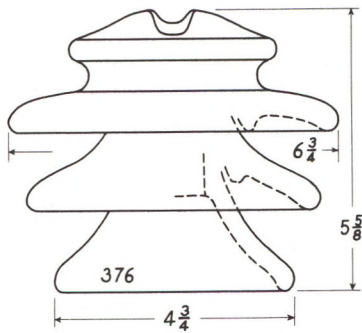
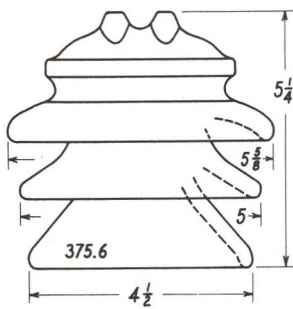
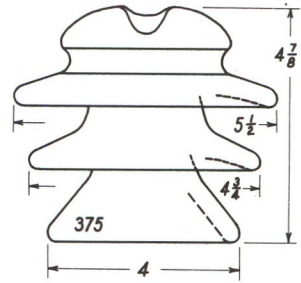
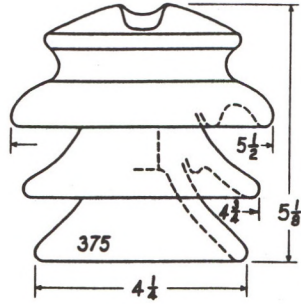
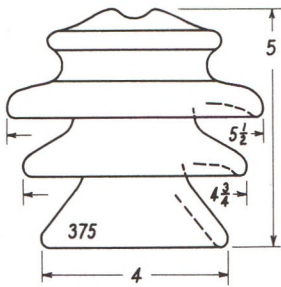
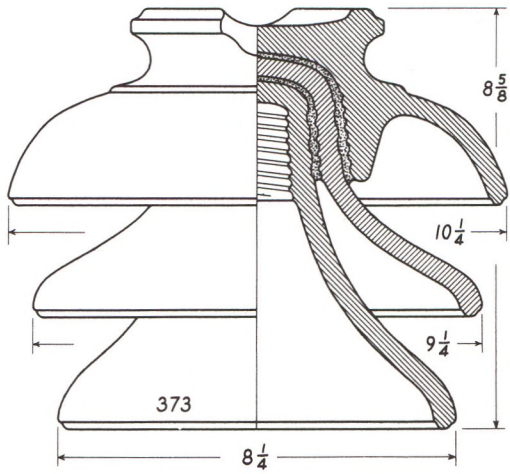
INSULATOR NOMENCLATURE

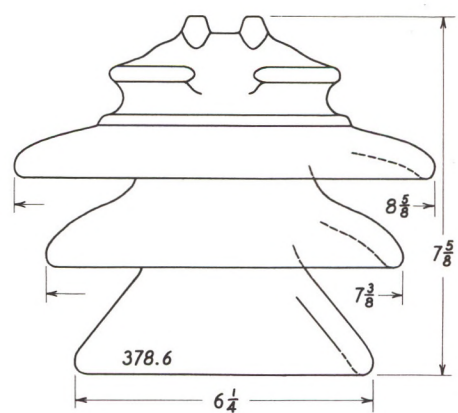
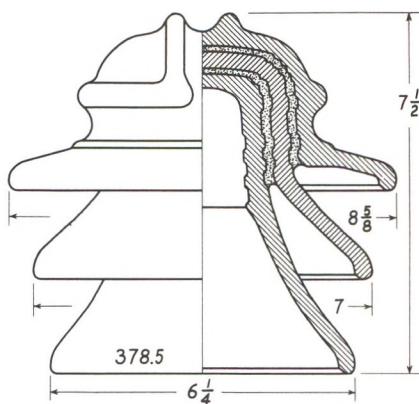
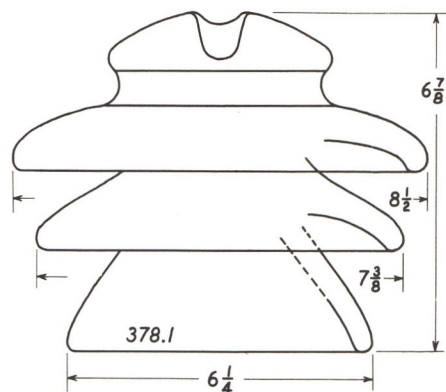
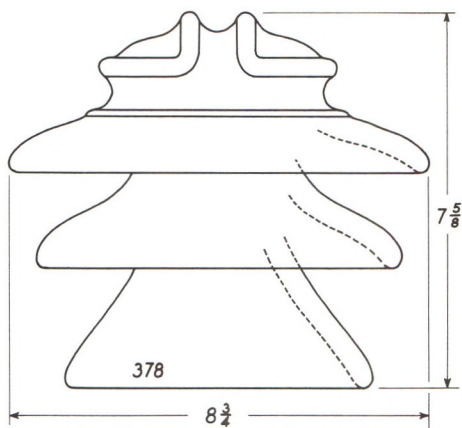
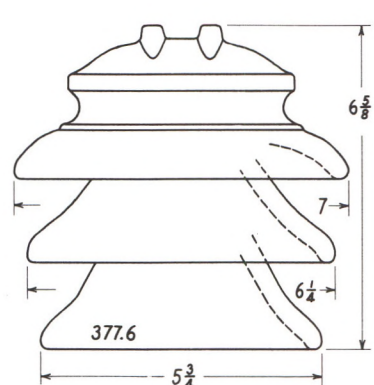
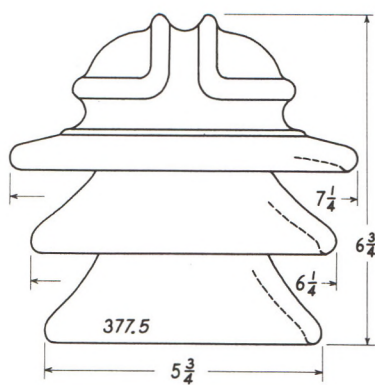
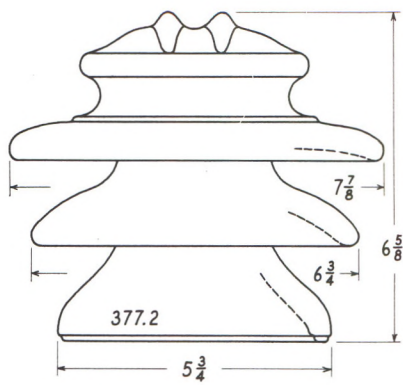


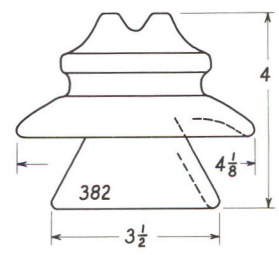
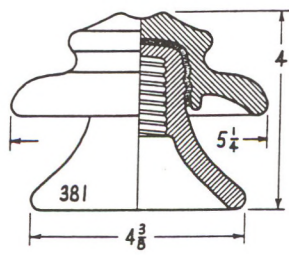
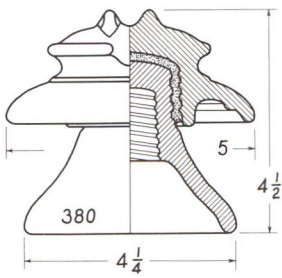
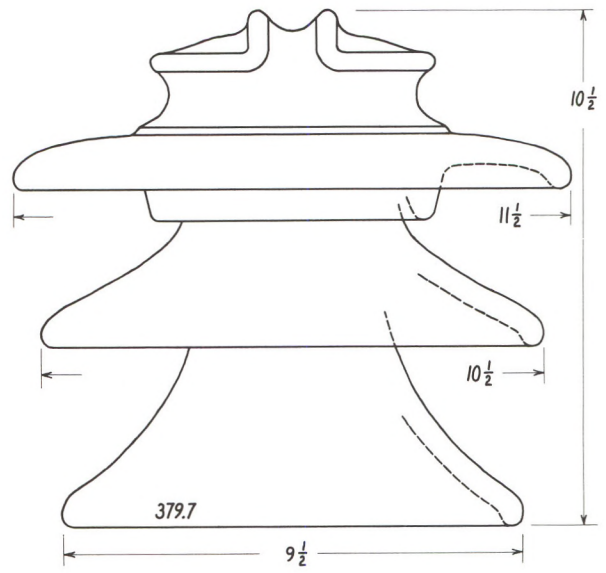
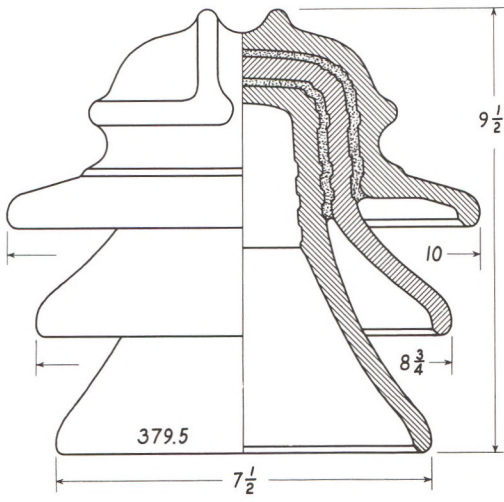
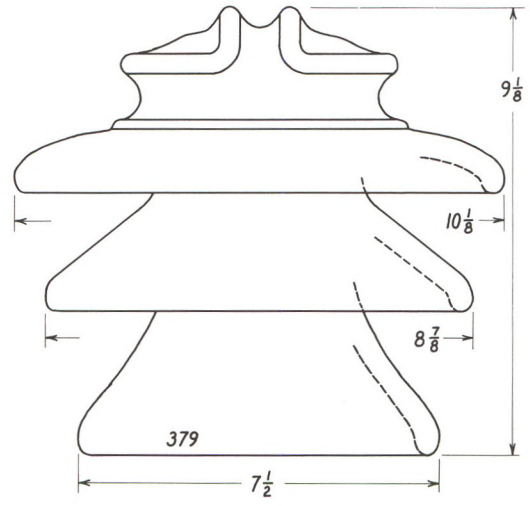
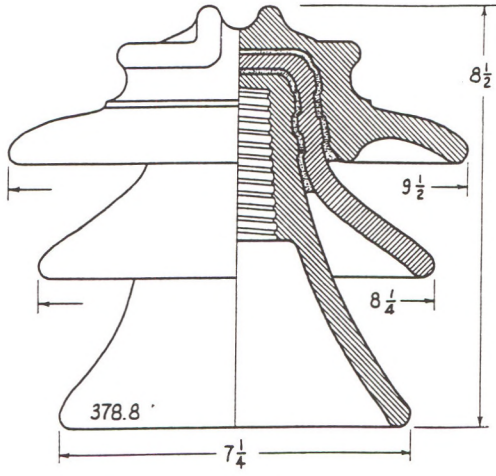


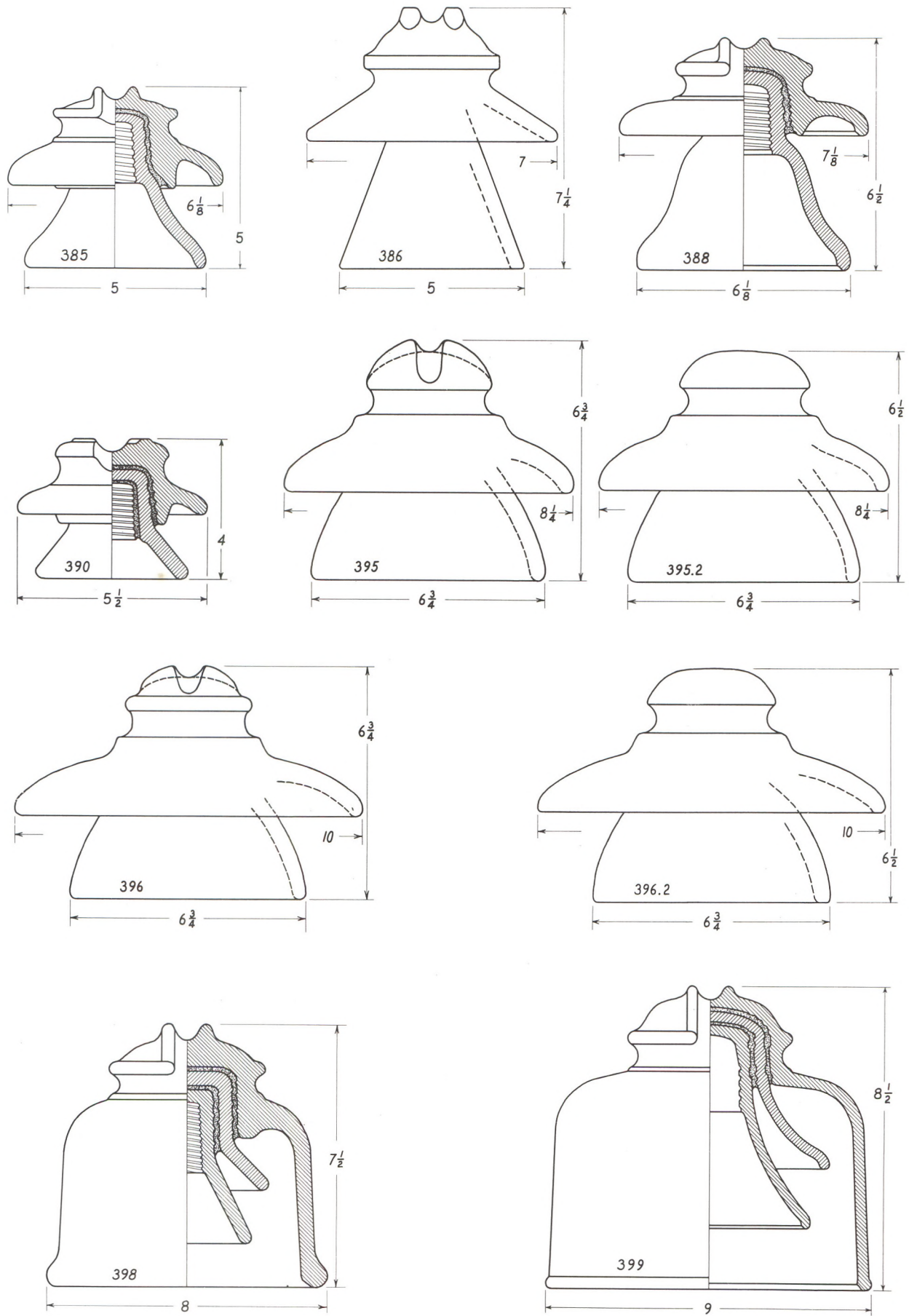


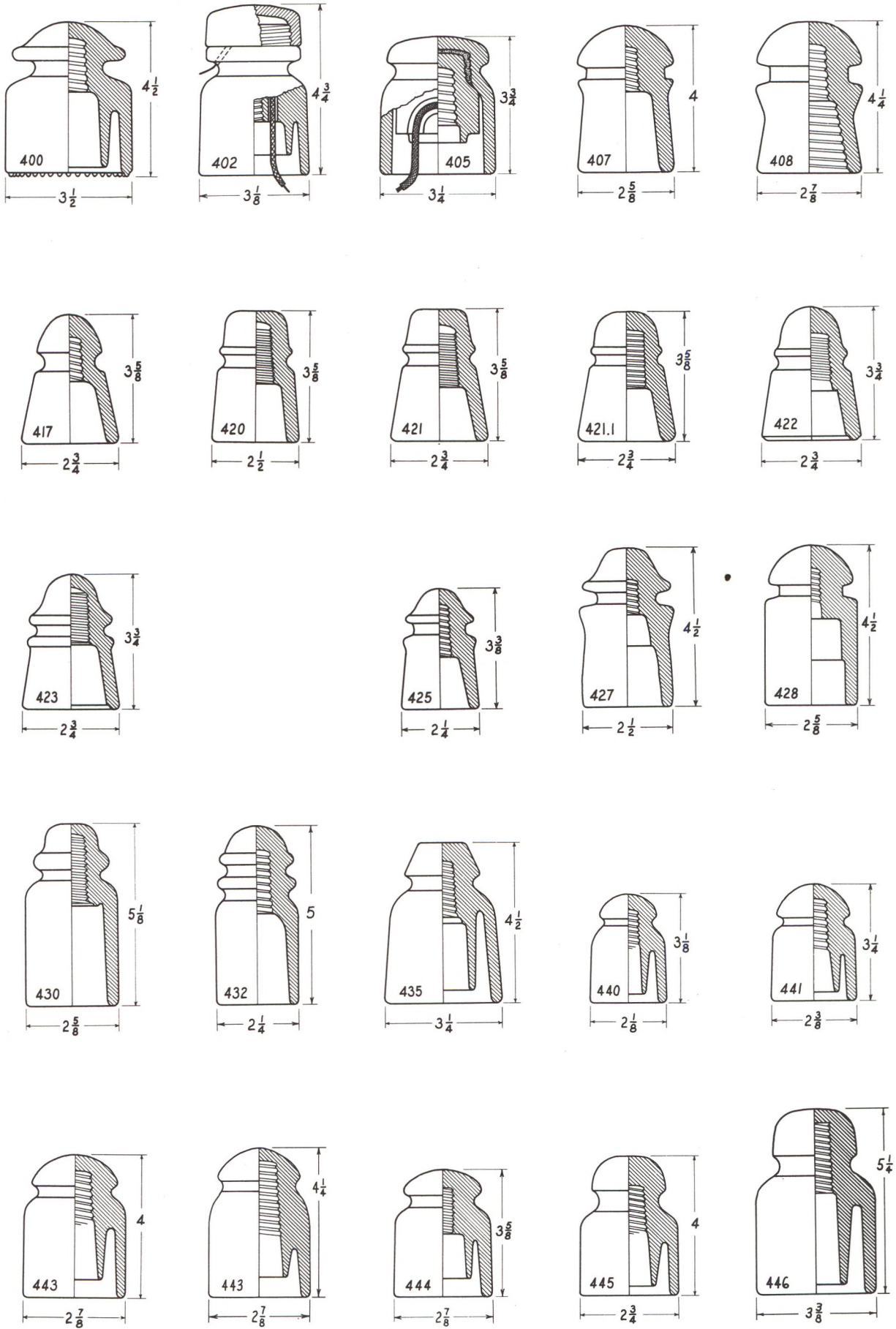


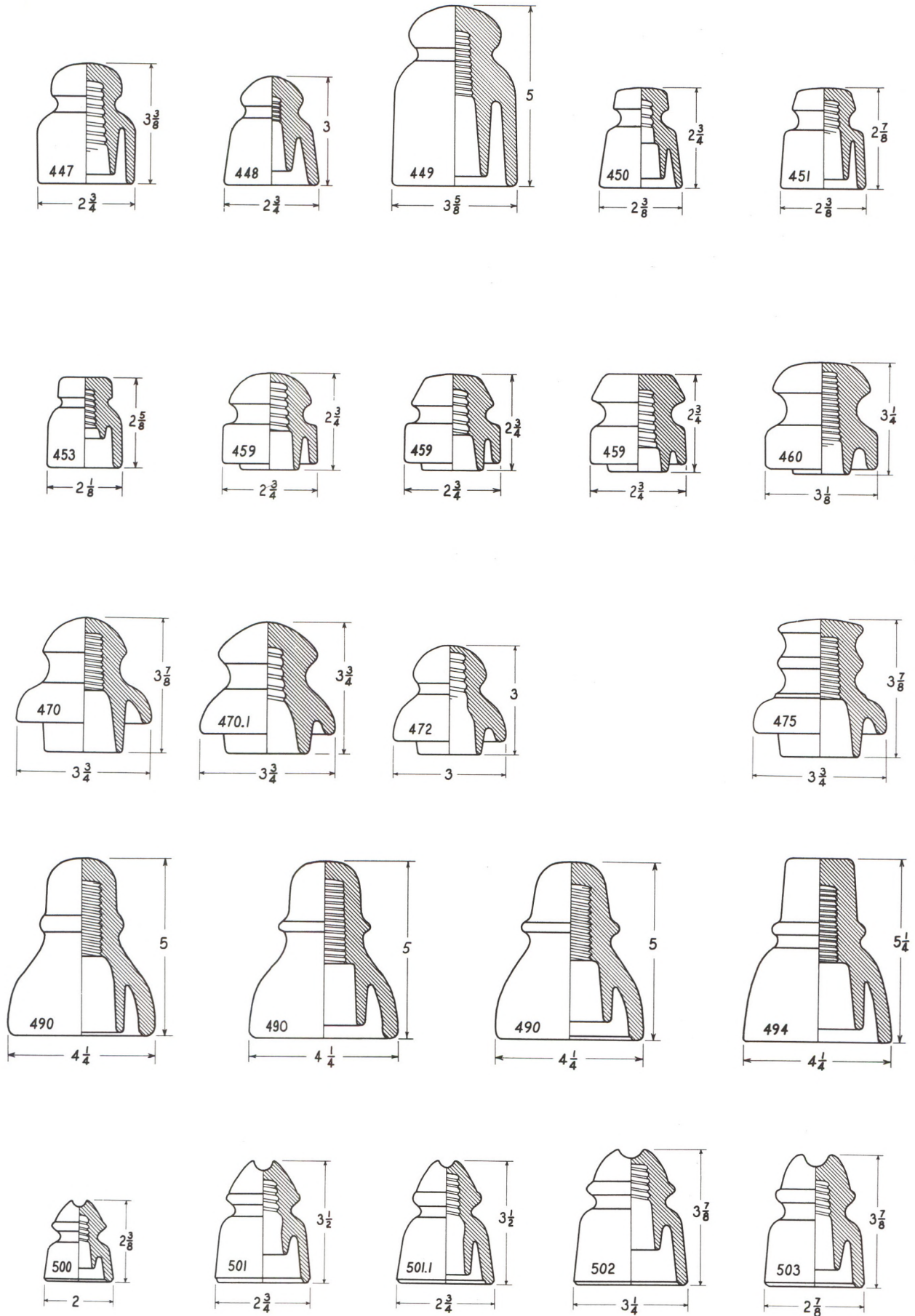


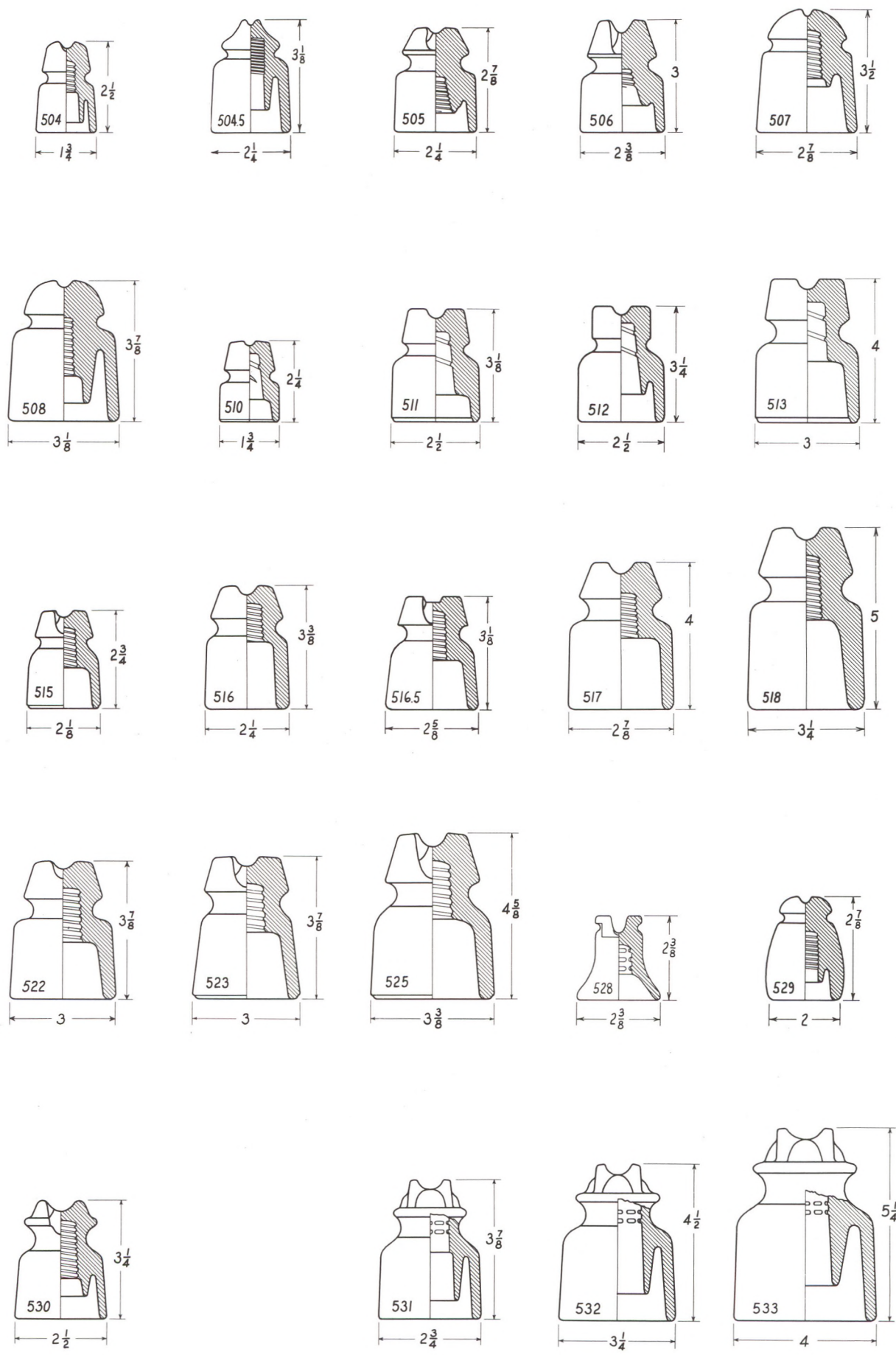


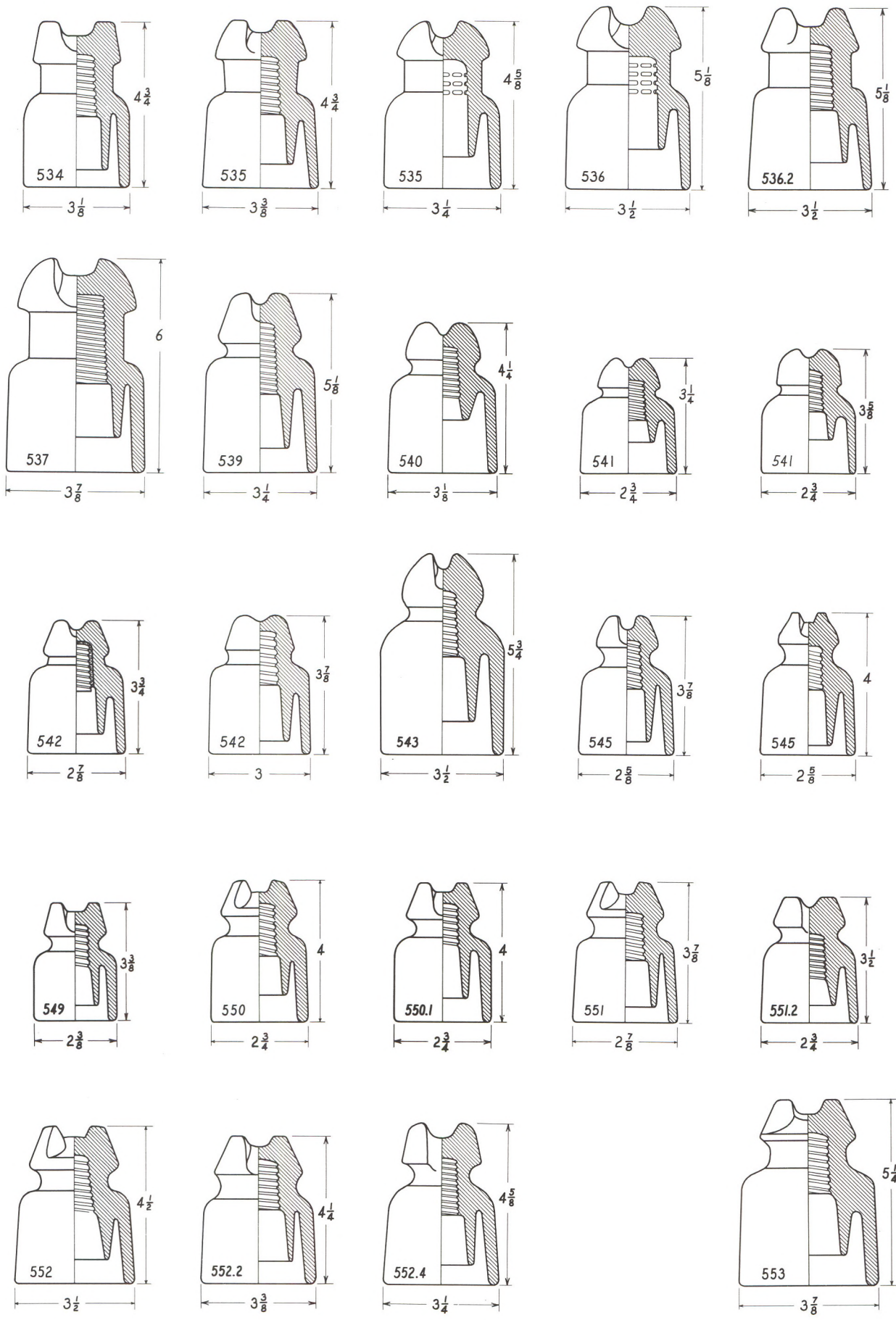


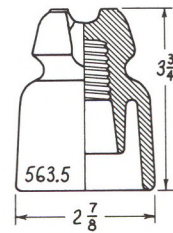
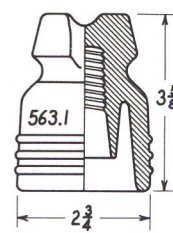
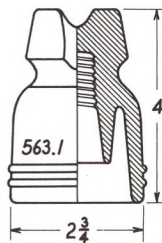
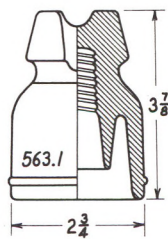
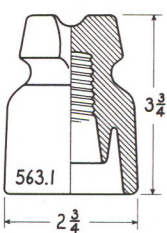
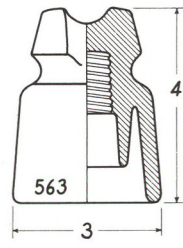
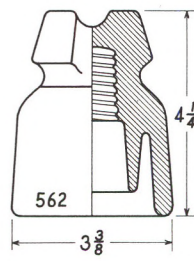
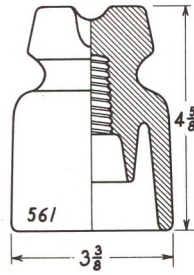
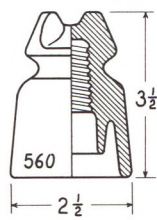
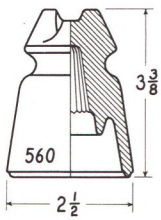
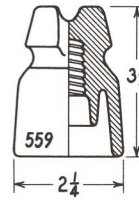
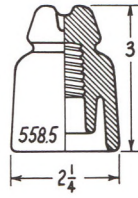
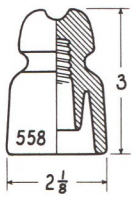
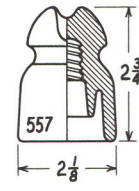
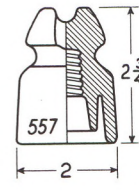
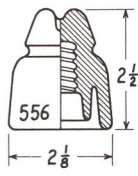
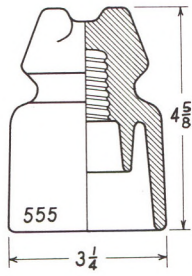
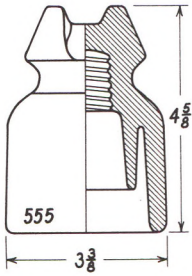
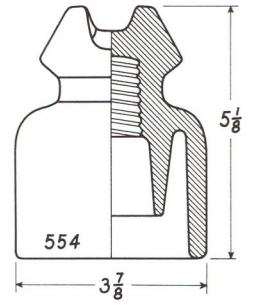
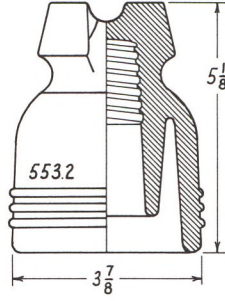
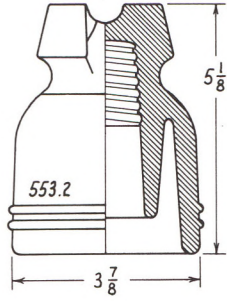
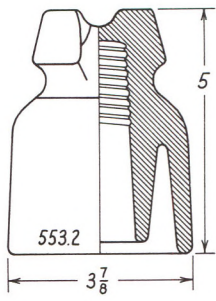


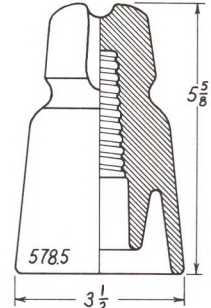
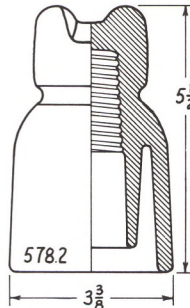
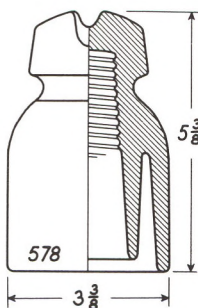
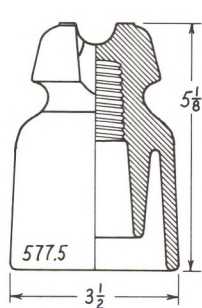
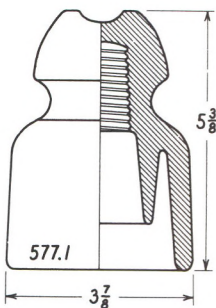
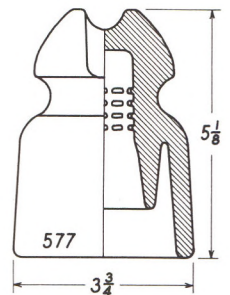
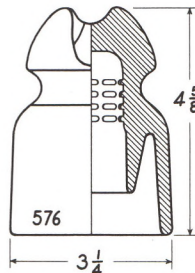
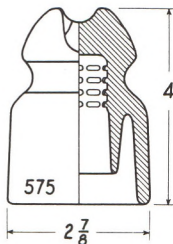
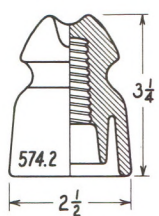
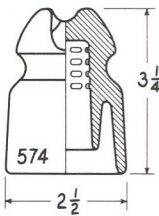
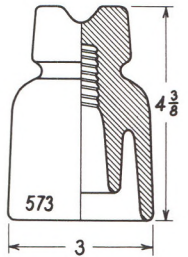
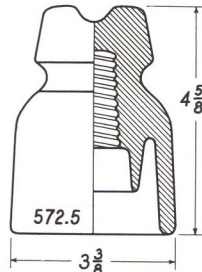
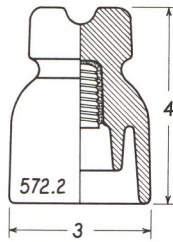
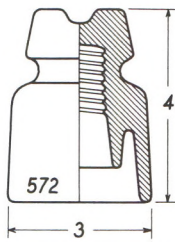
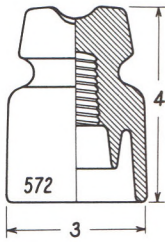
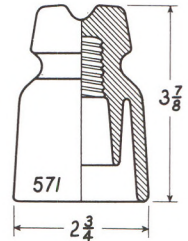
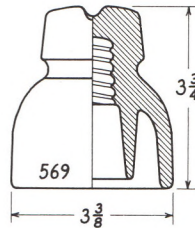
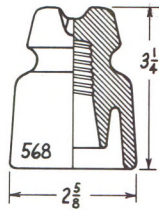
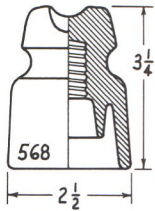
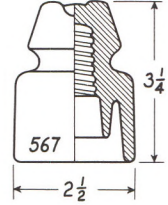
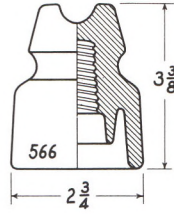
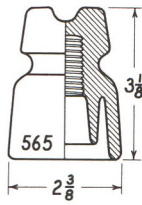
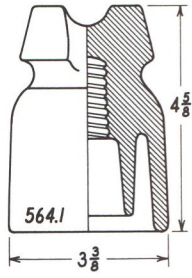


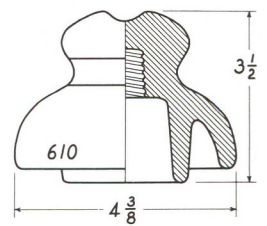
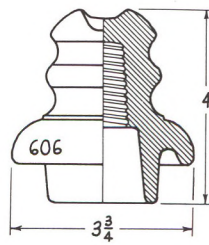
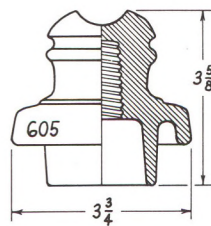
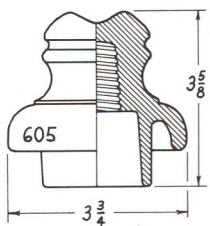
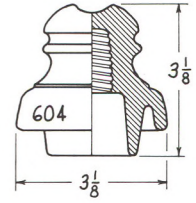
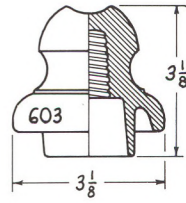
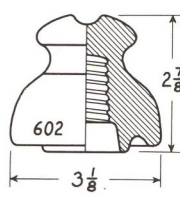
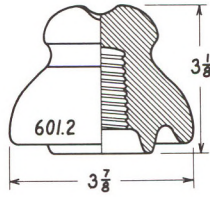
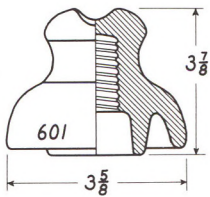
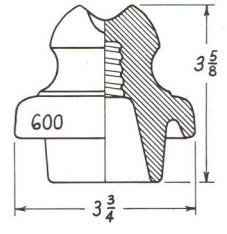
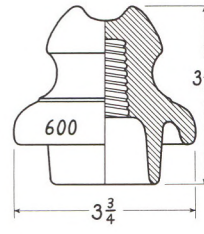
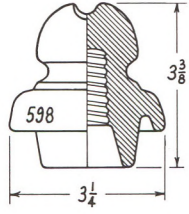
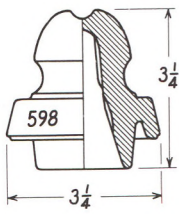
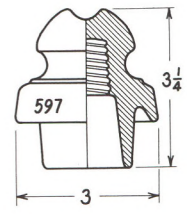
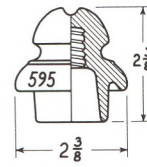
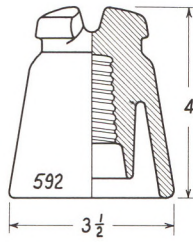
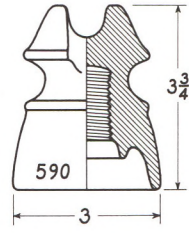
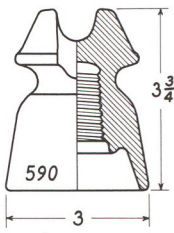
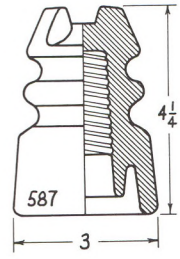
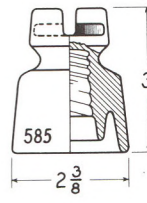
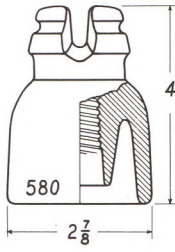
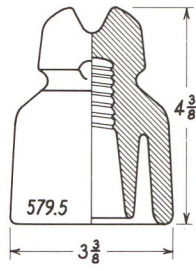
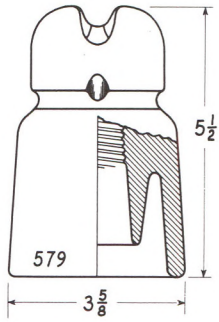


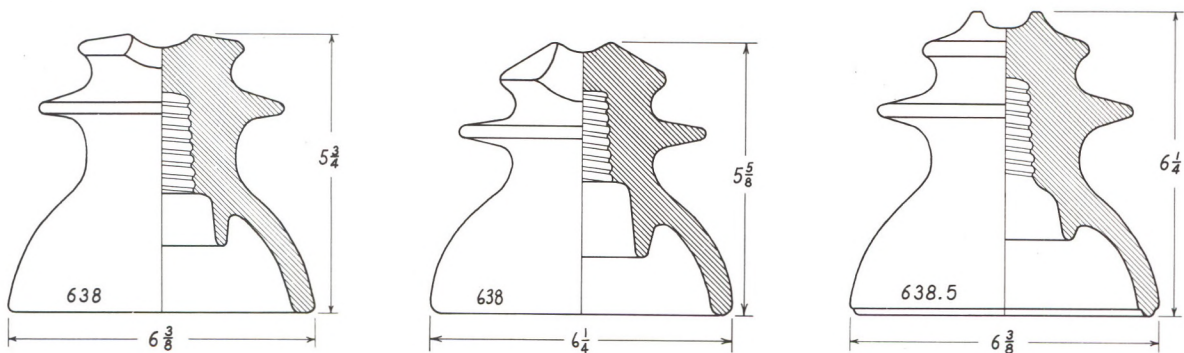
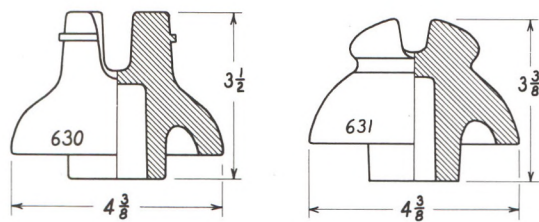
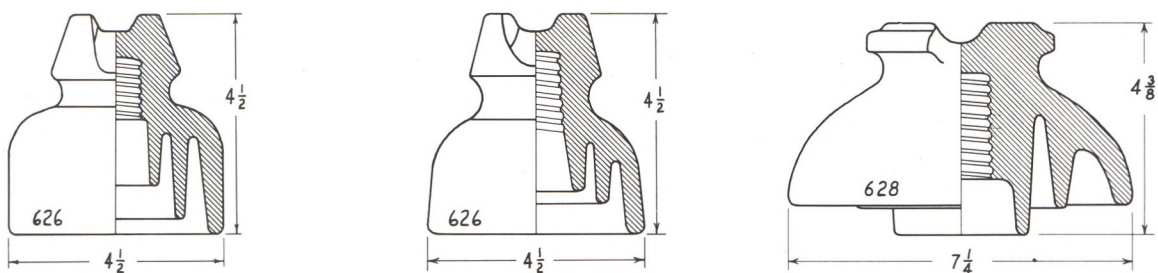
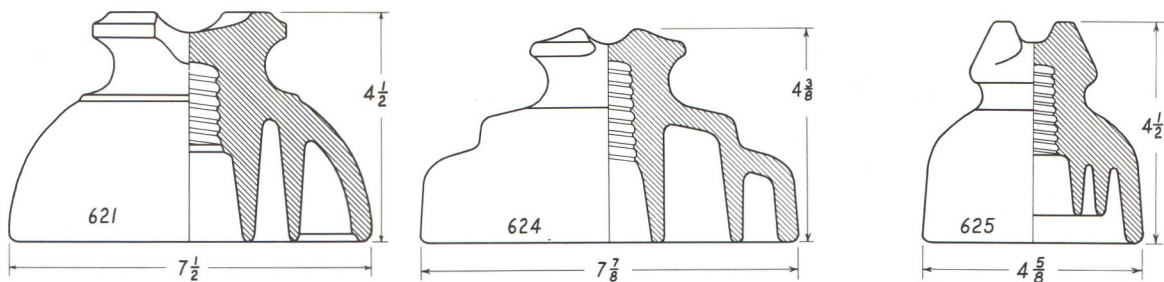
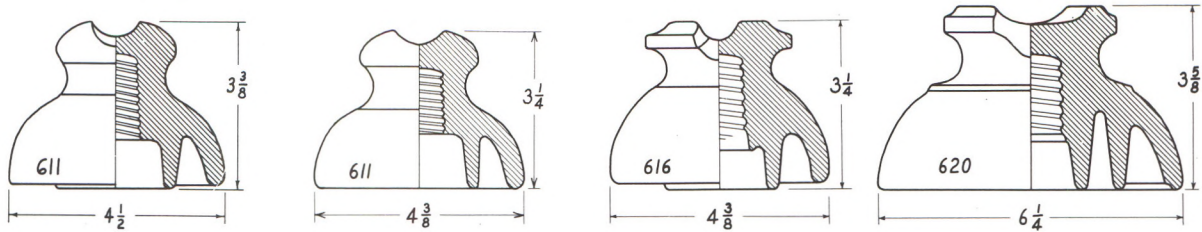


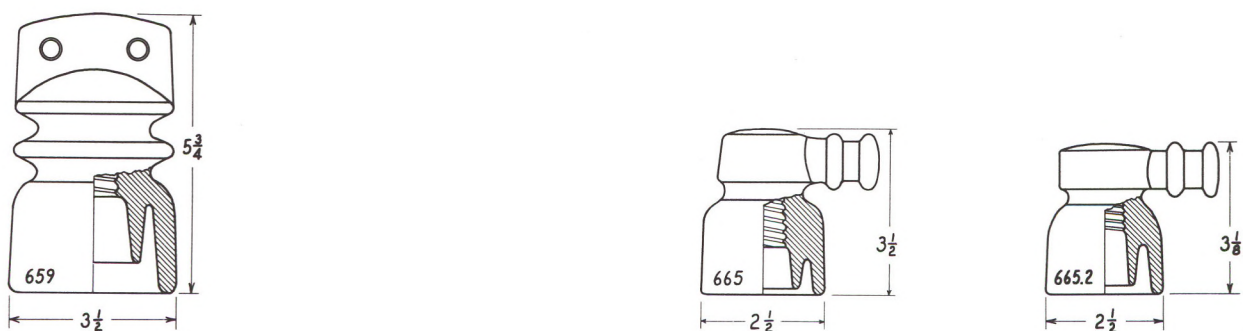
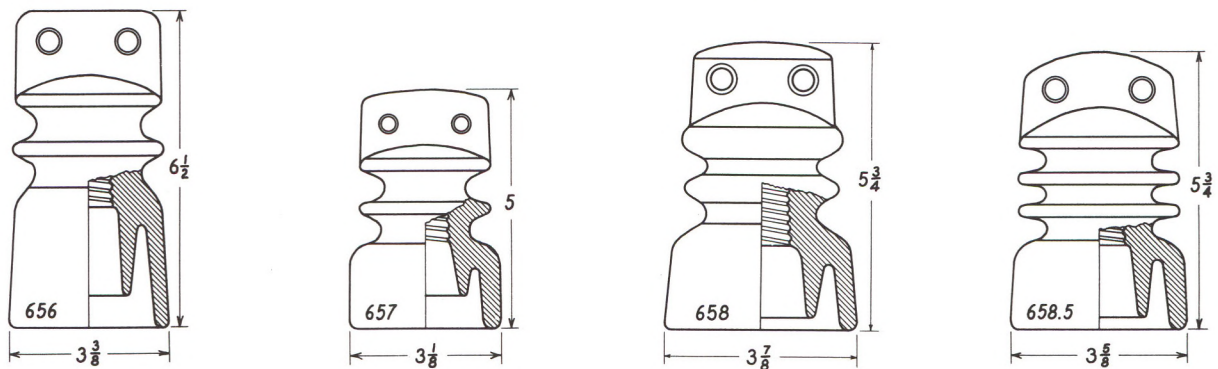
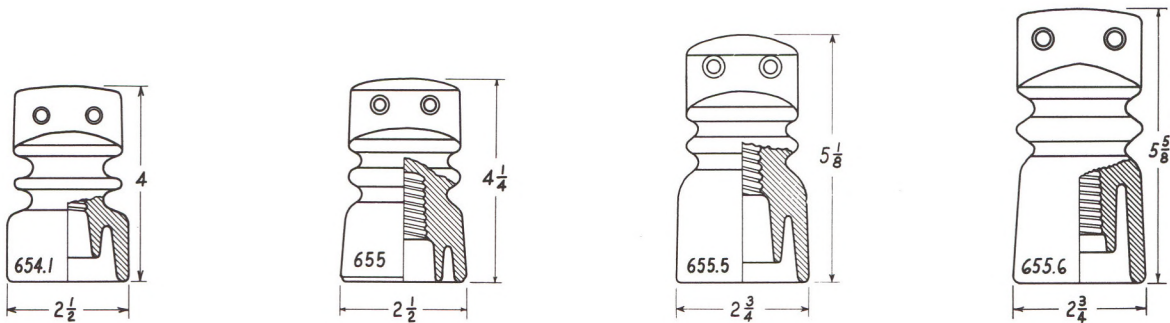
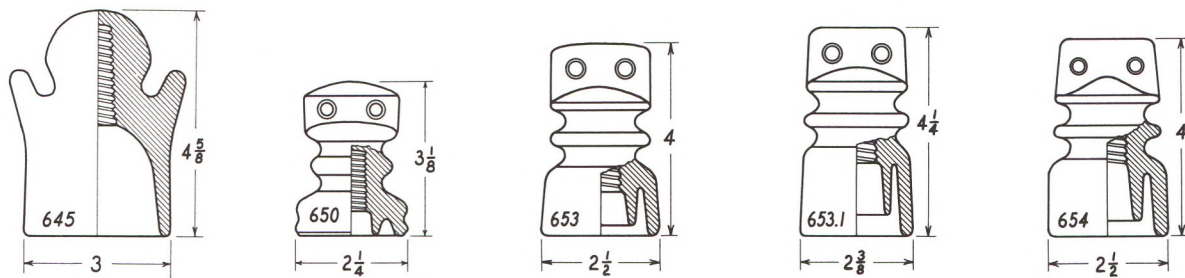
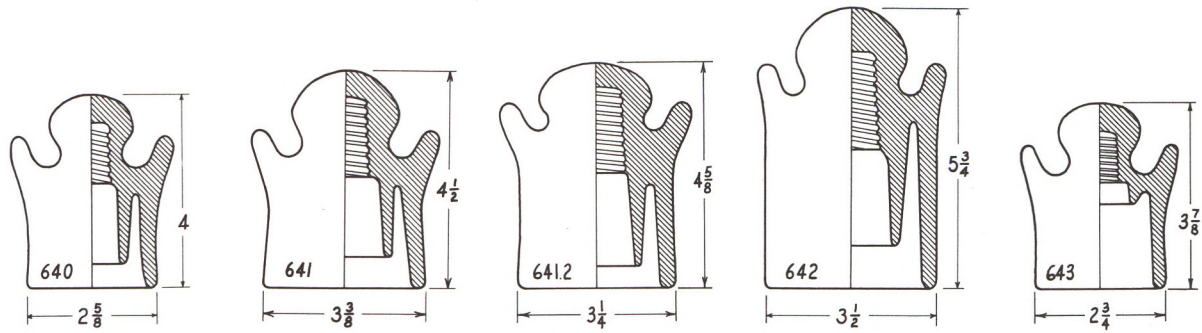


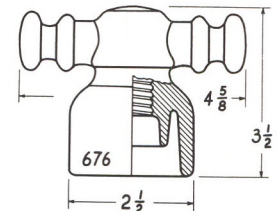
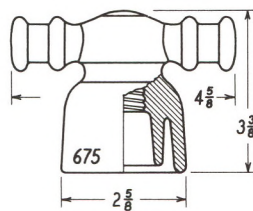
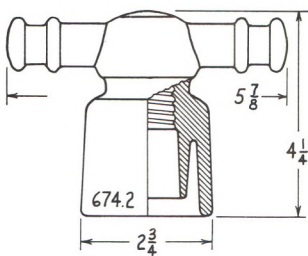
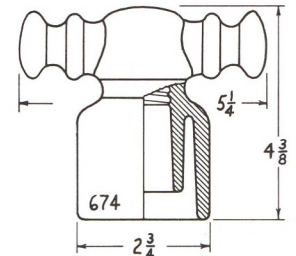
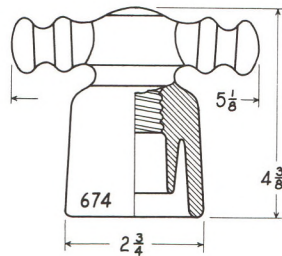
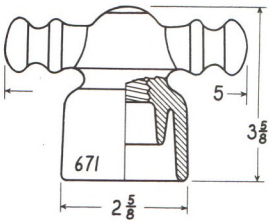
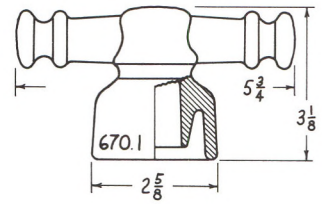
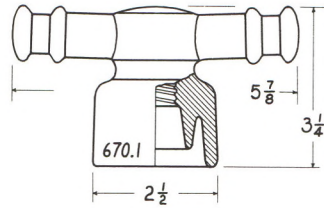
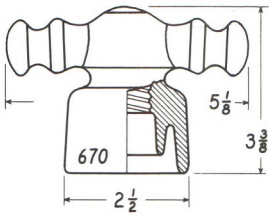
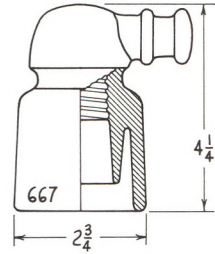
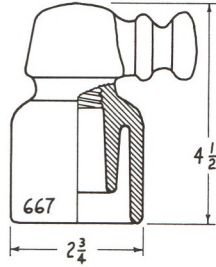
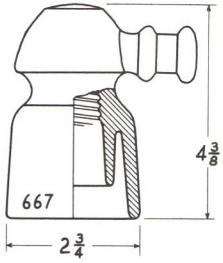
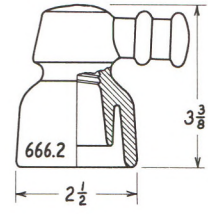
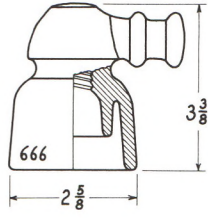
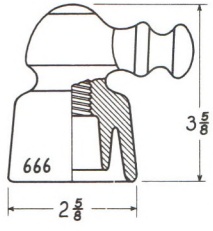


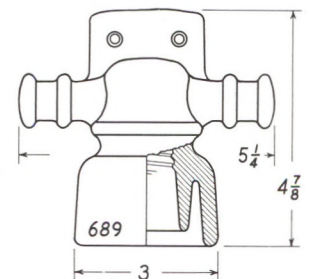
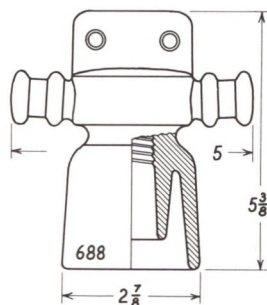
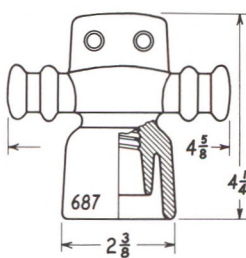
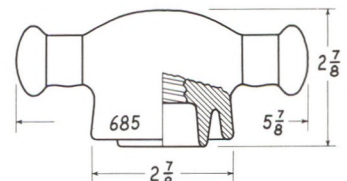
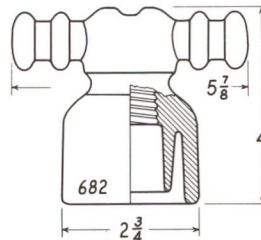
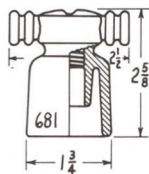
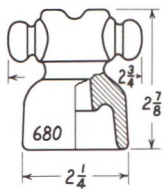
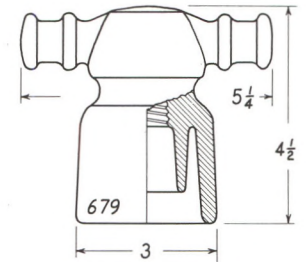
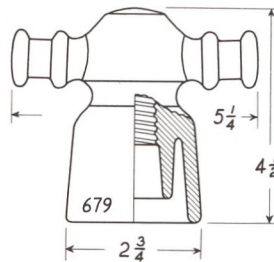
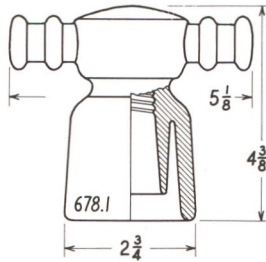
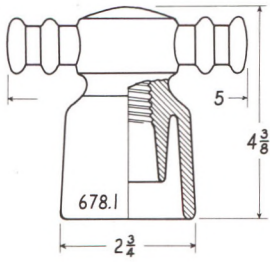
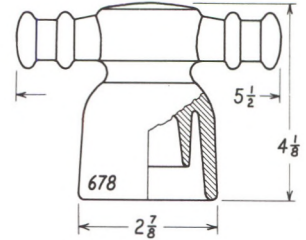
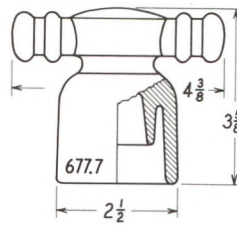
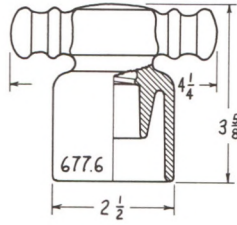
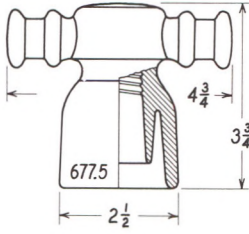
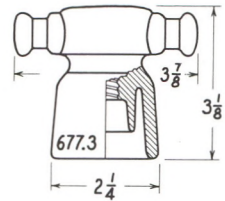
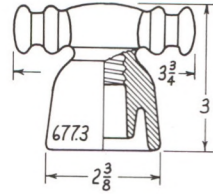
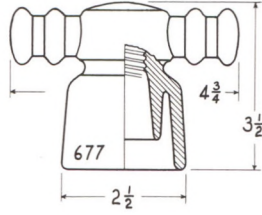
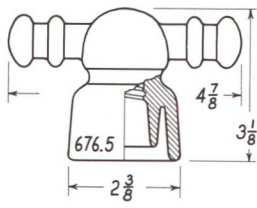


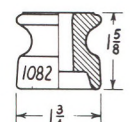
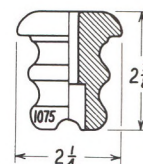
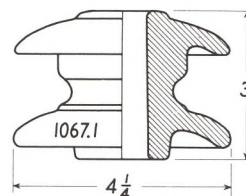
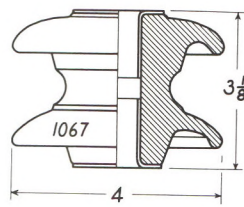
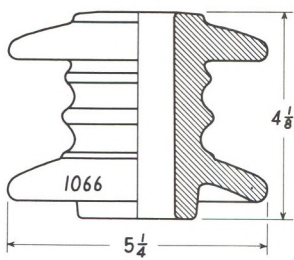
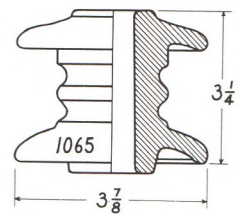
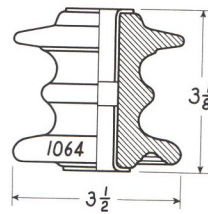
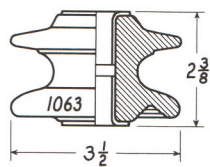
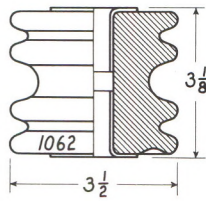
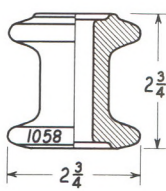
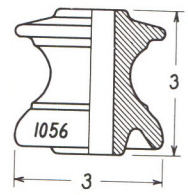
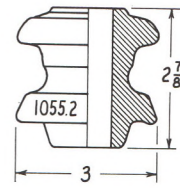
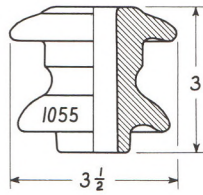
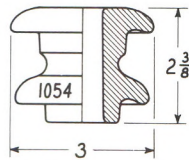
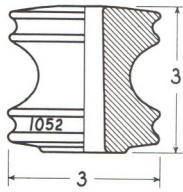
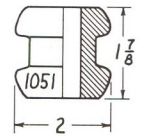
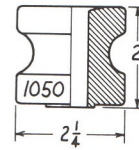
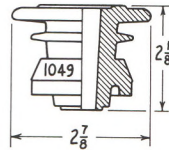
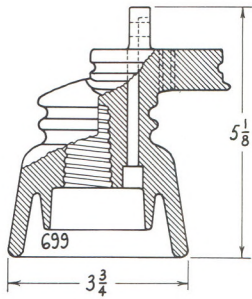
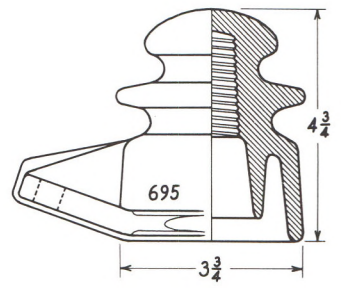
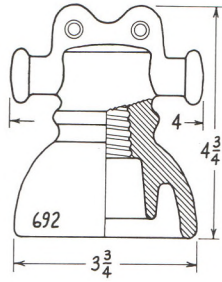
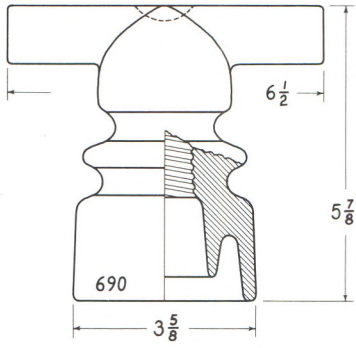






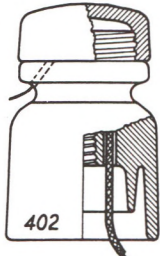




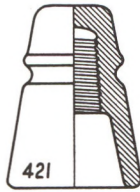


INSULATOR NICKNAMES

Nicknames have become a convenient way of describing particular insulator shapes to other collectors. We understand that some of these names are standard in the insulator industry, as well. Several of the more unique styles of foreign glass insulators are shown below along with their nicknames. Perhaps our readers can think of others, as they look through the pages of the Consolidated Design Chart.



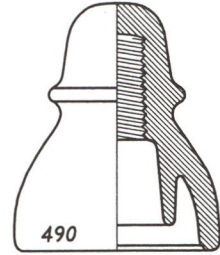
"Pothead"



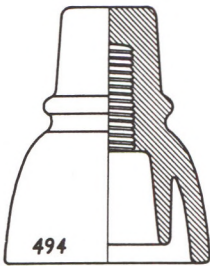
"Haystack"



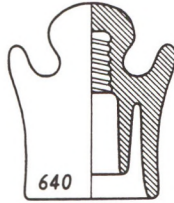
"Bottle"



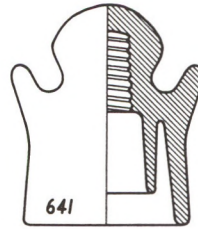
"Bell"



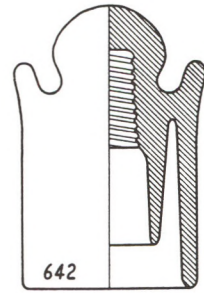
"Stovepipe Hat"



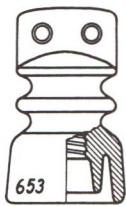
"Gingerbread Boy"



"Gingerbread Mama"



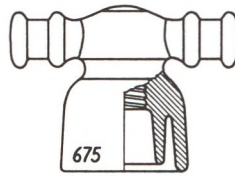
"Gingerbread Man"



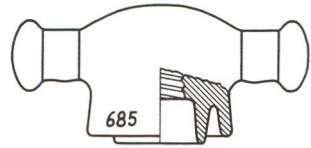
"Spook"



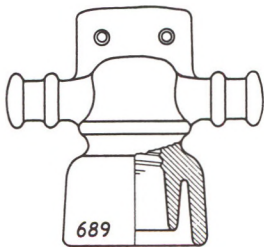
"Noser"



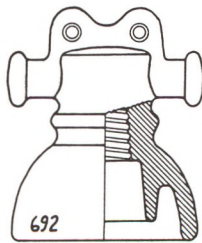
"T-Bar"



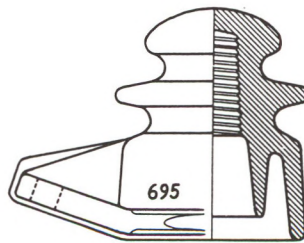
"Hunchback T"



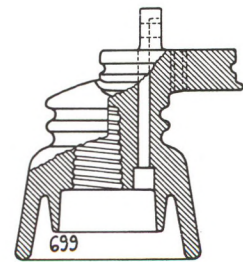
"Robot"



"Lady Robot"



"Bustle"



"Frog"



CD 106
2 1/4 x 3 5/8



CD 108.5
2 1/2 x 3 1/4



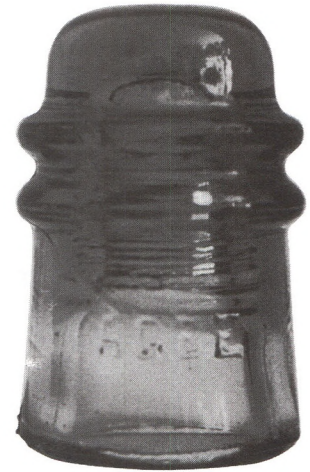
CD 113
2 1/4 x 3 5/8



CD 113.4
2 1/4 x 3 1/2



CD 116.6
2 7/8 x 4



CD 121
2 1/2 x 3 7/8



CD 122
2 3/4 x 4



CD 122.2
2 3/4 x 3 3/4



CD 122.2 Variation



CD 128
2 5/8 x 4



CD 128 Variations



CD 129
2 5/8 x 3 7/8



CD 149.5
3 1/8 x 4



CD 154
3 3/4 x 4 1/8



CD 154 Variations



CD 154.3
3 1/2 x 3 7/8



CD 155
3 5/8 x 4



CD 202
3 3/4 x 4 3/8



CD 203
3 1/4 x 3 7/8



CD 209
3 3/4 x 4



CD 221.2
4 x 4 1/2



CD 221.3
3 7/8 x 4 3/8



CD 247.5
5 7/8 x 4 3/8



CD 251.5
3 3/4 x 4



CD 251.7
3 3/4 x 3 7/8



CD 251.8
4 3/8 x 4 1/4



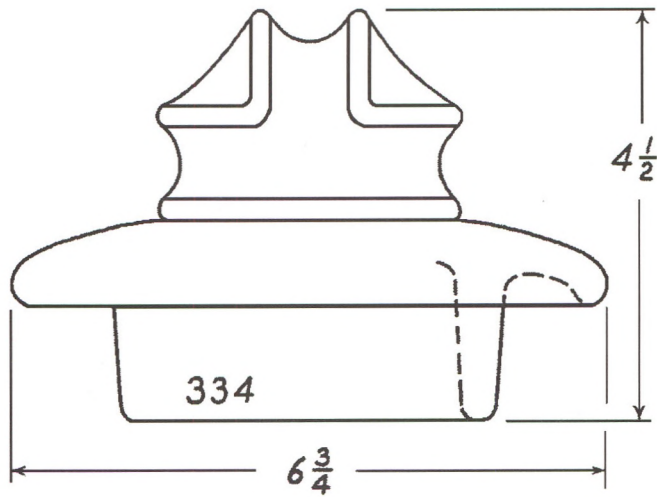
CD 299.5
5 1/2 x 4



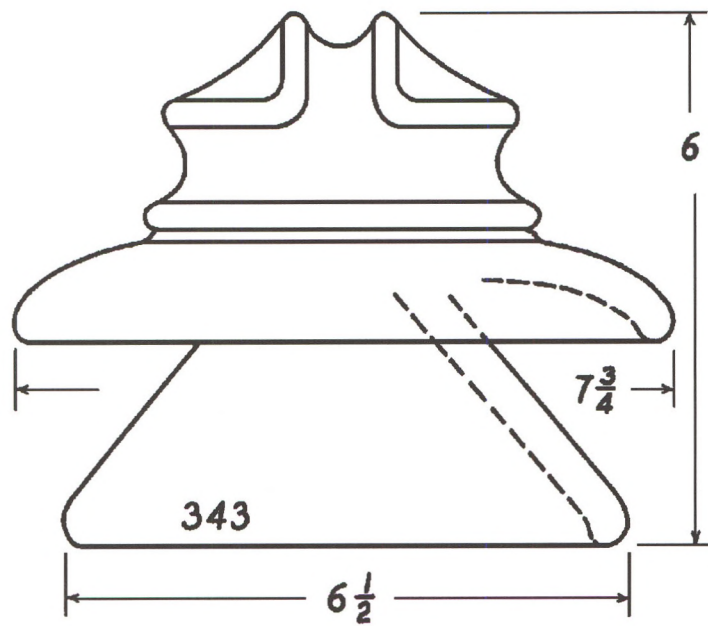
CD 304.5
9 x 4 1/2



CD 322.5
6 7/8 x 5 5/8 x 5 3/4



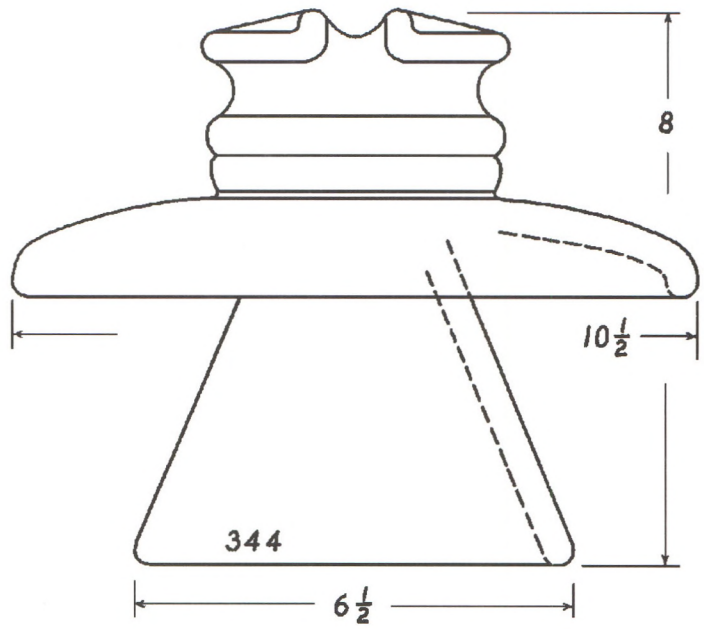
CD 334
(No photo available)



CD 343
(No photo available)



CD 343.2
7 1/8 x 6 1/8 x 5 1/2



CD 344
(No photo available)



CD 344.2
9 x 5 1/2 x 7 1/4



CD 348
4 7/8 x 2 3/4 x 4 1/4



CD 350
5 1/4 x 3 5/8 x 6



CD 366
9 1/8 x 7 1/4 x 5 1/2 x 6 3/8



CD 370
12 x 11 x 9 1/2 x 11 1/4



CD 370.9
14 x 10 3/4 x 10 1/2 x 16 3/8



CD 372
8 1/2 x 7 1/4 x 5 3/4 x 7 1/4



CD 372.2
7 1/2 x 6 1/4 x 5 1/2 x 7



CD 373
10 1/4 x 9 1/4 x 8 1/4 x 8 5/8



CD 375
5 1/2 x 4 3/4 x 4 x 5



CD 375 Variations



CD 375.6
5 5/8 x 5 x 4 1/2 x 5 1/4



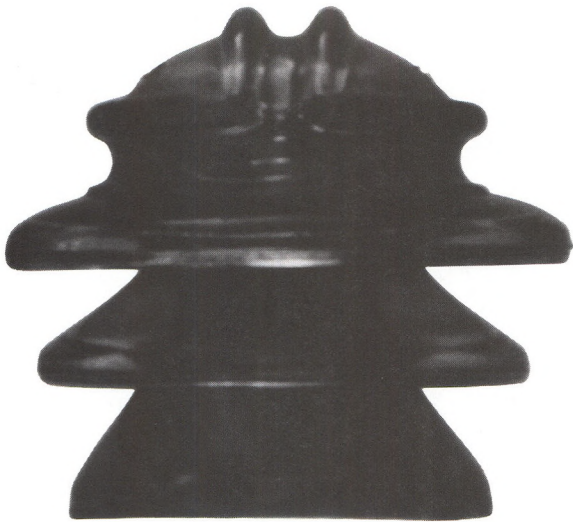
CD 376
6 3/4 x 6 x 4 3/4 x 5 5/8



CD 376.2
6 5/8 x 5 3/4 x 5 x 6



CD 376.5
6 1/8 x 5 1/4 x 4 1/2 x 5 3/4



CD 376.5 Variation



CD 376.7
6 3/4 x 6 x 4 7/8 x 6



CD 377
6 7/8 x 6 1/4 x 5 3/4 x 6 7/8



CD 377.2
7 7/8 x 6 3/4 x 5 3/4 x 6 5/8



CD 377.5
7 1/4 x 6 1/4 x 5 3/4 x 6 3/4



CD 377.6
7 x 6 1/4 x 5 3/4 x 6 5/8



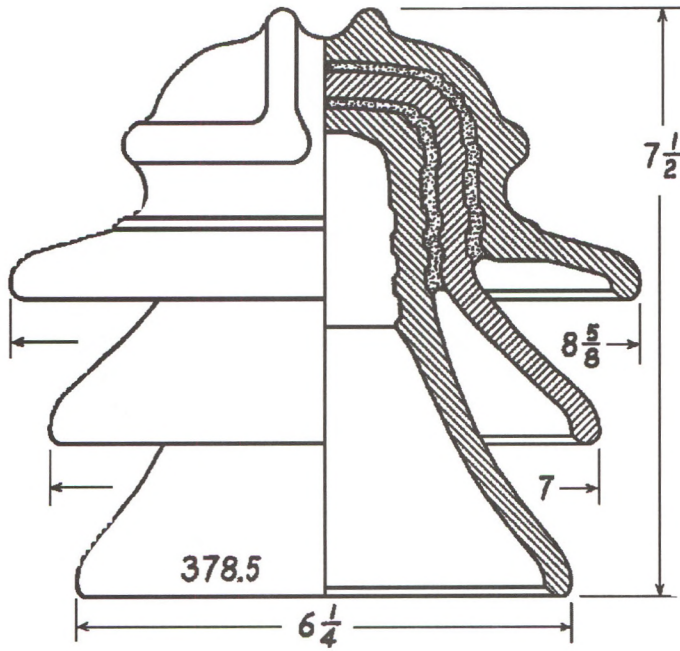
CD 378
8 3/4 x 7 1/2 x 6 1/2 x 7 5/8



CD 378.1
8 1/2 x 7 3/8 x 6 1/4 x 6 7/8



CD 378.1 Variations



CD 378.5
(No photo available)

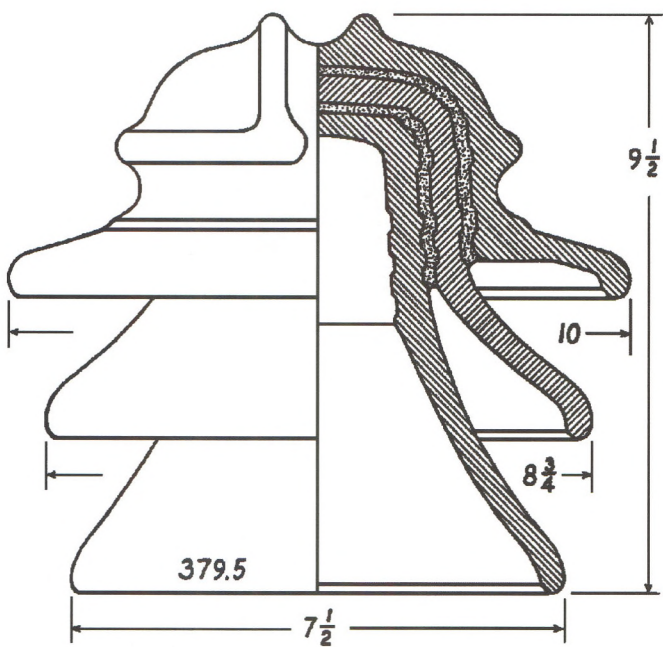


CD 378.6
 $8\frac{5}{8} \times 7\frac{3}{8} \times 6\frac{1}{4} \times 7\frac{5}{8}$



CD 378.8
 $9\frac{1}{2} \times 8\frac{1}{4} \times 7\frac{1}{4} \times 8\frac{1}{2}$

CD 379
10 1/8 x 8 7/8 x 7 1/2 x 9 1/8



CD 379.5
(No photo available)



CD 379.7
11 1/2 x 10 1/2 x 9 1/2 x 10 1/2



CD 380
5 x 4 1/4 x 4 1/2



CD 381
5 1/4 x 4 3/8 x 4



CD 382
4 1/8 x 3 1/2 x 4



CD 386
7 x 5 x 7 1/4



CD 385
6 1/8 x 5 x 5



CD 388
7 1/8 x 6 1/8 x 6 1/2



CD 390
5 1/2 x 4 1/4 x 4



CD 395
8 1/4 x 6 3/4 x 6 3/4



CD 395.2
8 1/4 x 6 3/4 x 6 1/2



CD 396
10 x 6 3/4 x 6 3/4



CD 396.2
10 x 6 3/4 x 6 1/2



CD 398
8 x 7 1/2



CD 399
9 x 8 1/2



CD 400
3 1/2 X 4 1/2



CD 402
3 1/8 X 4 1/4



CD 405
3 1/4 X 3 3/4



CD 407
2 5/8 X 4



CD 408
2 7/8 X 4 1/4



CD 417
2 3/4 X 3 5/8



CD 420
2 1/2 X 3 5/8



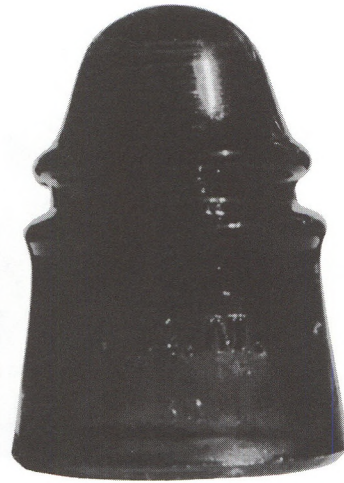
CD 421
2 3/4 X 3 5/8



CD 421.1
2 3/4 X 3 5/8



CD 422
2 3/4 X 3 3/4



CD 423
2 3/4 X 3 3/4



CD 425
2 1/4 X 3 3/8



CD 427
2 1/2 X 4 1/2



CD 428
2 5/8 X 4 1/2



CD 430
2 5/8 x 5 1/8



CD 432
2 1/4 x 5



CD 435
3 1/4 x 4 1/2



CD 440
2 1/8 x 3 1/8



CD 441
2 3/8 x 3 1/4



CD 443
2 7/8 X 4



CD 443 Variations



CD 444
2 7/8 x 3 5/8



CD 445
2 3/4 x 4



CD 446
3 3/8 x 5 1/4



CD 447
2 3/4 x 3 3/8



CD 448
2 3/4 x 3



CD 449
3 5/8 x 5



CD 450
2 3/8 x 2 3/4



CD 451
2 3/8 x 2 7/8



CD 453
2 1/8 x 2 5/8



CD 459
2 3/4 x 2 3/4



CD 460
3 1/8 x 3 1/4



CD 459 Variations



CD 470
3 3/4 x 3 7/8



CD 470.1
3 3/4 x 3 3/4



CD 472
3 x 3



CD 475
3 3/4 x 4 1/2



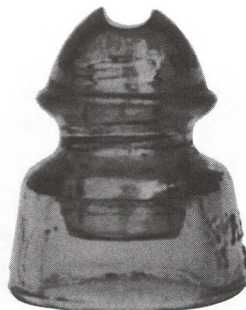
CD 490
4 1/4 x 5



CD 490 Variations
From left - Type I, II, III



CD 494
4 1/4 x 5 1/4



CD 500
2 x 2 3/8



CD 501
2 3/4 x 3 1/2



CD 501.1
2 3/4 x 3 1/2



CD 502
3 1/4 x 3 7/8



CD 503
2 7/8 x 3 7/8



CD 504
1 3/4 x 2 1/2



CD 504.5
2 1/4 x 3 1/8



CD 505
2 1/4 x 2 7/8



CD 506
2 3/8 x 3



CD 506 Variations



CD 507
2 7/8 x 3 1/2



CD 508
3 1/8 x 3 7/8



CD 510
1 3/4 x 2 1/4



CD 511
2 1/2 x 3 1/8



CD 512
2 1/2 x 3 1/4



CD 513
3 x 4



CD 515
2 1/8 x 2 3/4



CD 516
2 1/4 x 3 3/8



CD 516.5
2 5/8 x 3 1/8



CD 517
2 7/8 x 4



CD 522
3 x 3 7/8



CD 518
3 1/4 x 5



CD 523
3 x 3 7/8



CD 525
3 3/8 x 4 5/8



CD 529
2 x 2 7/8



CD 528
2 3/8 x 2 3/8

CD 530
2 1/2 x 3 1/4

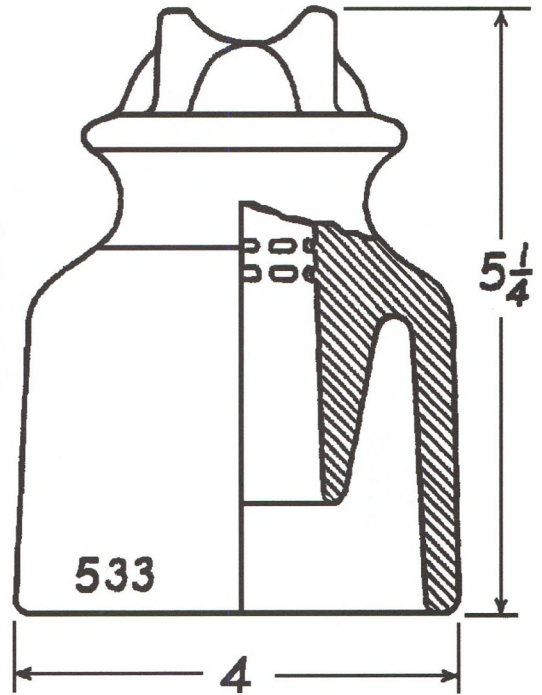




CD 531
2 3/4 x 3 7/8



CD 532
3 1/4 x 4 1/2



CD 533
(No photo available)



CD 534
3 1/8 x 4 3/4



CD 535
3 3/8 x 4 3/4



CD 536
3 1/2 x 5 1/8



CD 536.2
3 1/2 x 5 1/8



CD 537
3 7/8 x 6



CD 539
3 1/4 x 5 1/8



CD 540
3 1/8 x 4 1/4



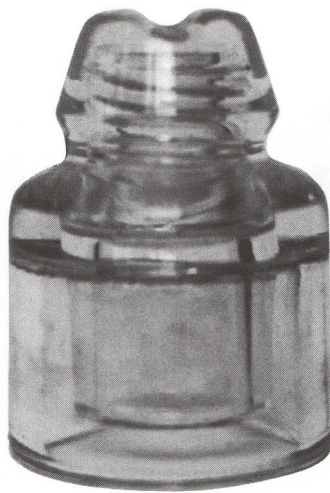
CD 541
2 3/4 x 3 1/4



CD 541 Variations



CD 542
2 7/8 x 3 3/4



CD 542 Variation



CD 543
3 1/2 x 5 3/4



CD 545
2 5/8 x 3 7/8



CD 545 Variations



CD 549
2 3/8 x 3 3/8



CD 550
2 3/4 x 4



CD 550.1
2 3/4 x 4



CD 551
2 7/8 x 3 7/8



CD 551.2
2 3/4 x 3 1/2



CD 552
3 1/2 x 4 1/2



CD 552.2
3 3/8 x 4 1/4



CD 552.4
3 1/4 x 4 5/8



CD 553
3 7/8 x 5 1/4



CD 553.2
3 7/8 x 5 1/8



CD 553.2 Variations



CD 554
3 7/8 x 5 1/8



CD 555
3 3/8 x 4 5/8



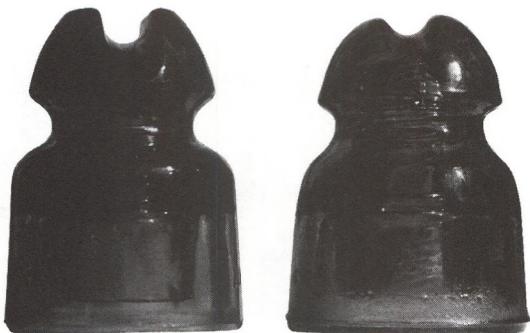
CD 555 Variations



CD 556
2 1/8 x 2 1/2



CD 557
2 x 2 3/4



CD 557 Variations



CD 558
2 1/8 x 3



CD 558.5
2 1/4 x 3



CD 559
2 1/4 x 3 1/8



CD 559.2
2 1/4 x 3



CD 560
2 1/2 x 3 3/8



CD 560 Variations



CD 561
3 3/8 x 4 5/8



CD 562
3 3/8 x 4 1/4



CD 563
3 x 4



CD 563.1
2 3/4 x 3 3/4



CD 563.1 Variations



CD 563.5
2 7/8 x 3 3/4



CD 564.1
3 3/8 x 4 5/8



CD 565
2 3/8 x 3 1/8



CD 566
2 3/4 x 3 3/8



CD 567
2 1/2 x 3 1/4



CD 568
2 1/2 x 3 1/4



CD 568 Variation



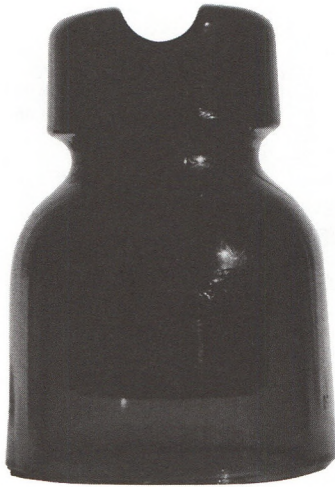
CD 569
3 3/8 x 3 3/4



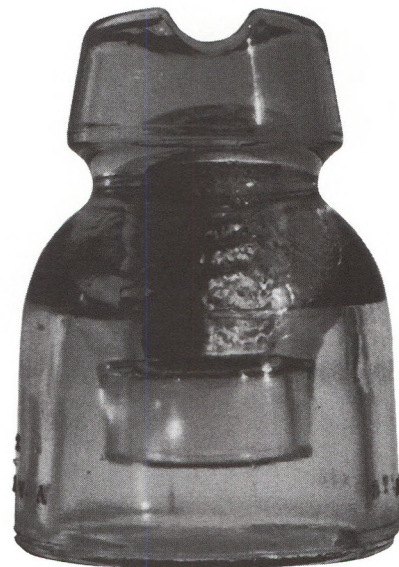
CD 571
2 3/4 x 3 7/8



CD 572
3 x 4



CD 572.2
3 x 4



CD 572.5
3 3/8 x 4 5/8



CD 573
3 x 4 3/8



CD 574
2 1/2 x 3 1/4



CD 574.2
2 1/2 x 3 1/4



CD 575
2 7/8 x 4



CD 576
3 1/4 x 4 5/8



CD 577
3 3/4 x 5 1/8



CD 577.1
3 7/8 x 5 3/8



CD 577.5
3 1/2 x 5 1/8



CD 578
3 3/8 x 5 3/8



CD 578.2
3 3/8 x 5 1/2



CD 578.5
3 1/2 x 5 5/8



CD 579
3 5/8 x 5 1/2



CD 579.5
3 3/8 X 4 3/8



CD 580
2 7/8 X 4



CD 585
2 3/8 X 3



CD 587
3 X 4 1/4



CD 590
3 x 3 3/4

CD 590 Variations





CD 592
3 1/2 X 4



CD 595
2 3/8 X 2 3/8



CD 597
3 X 3 1/4



CD 598
3 1/4 X 3 1/4



CD 598 Variation



CD 600
3 3/4 x 3 5/8



CD 600 Variation



CD 601
3 5/8 x 3 7/8



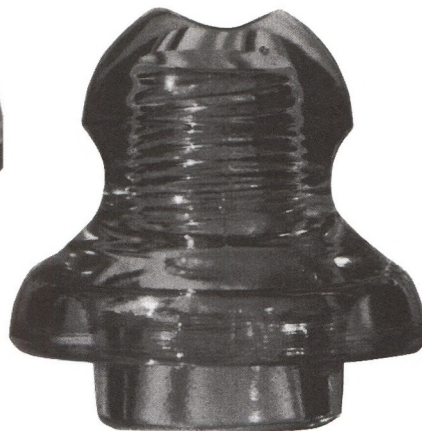
CD 601.2
3 7/8 x 3 1/8



CD 601.2 Variations



CD 602
3 1/8 x 2 7/8



CD 603
3 1/8 x 3 1/8



CD 604
3 1/8 x 3 1/8



CD 605
3 3/4 x 3 5/8



CD 606
3 3/4 x 4



CD 605 Variations



CD 610
4 3/8 x 3 1/2



CD 611
4 1/2 x 3 3/8



CD 616
4 3/8 x 3 1/4



CD 620
6 1/4 x 3 5/8



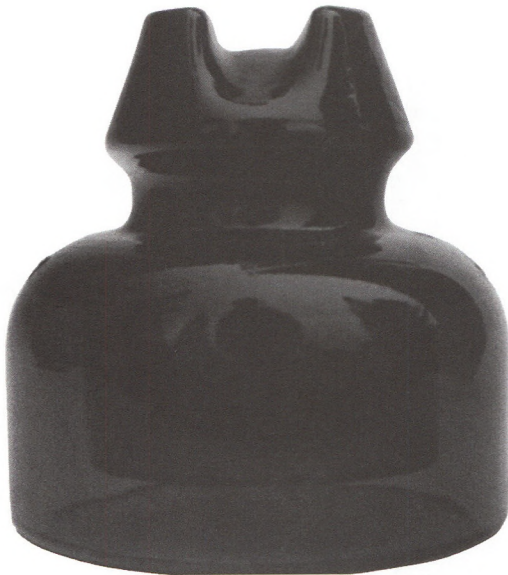
CD 621
7 1/2 x 4 1/2



CD 624
7 7/8 x 4 3/8



CD 625
4 5/8 x 4 1/2



CD 626
4 1/2 x 4 1/2



CD 626 Variation



CD 628
7 1/4 x 4 3/8



CD 630
4 3/8 x 3 1/2



CD 631
4 3/8 x 3 3/8



CD 638
6 3/8 x 5 3/4



CD 638.5
6 3/8 x 6 1/4



CD 638 Variations



CD 640
2 5/8 x 4



CD 641
3 3/8 x 4 1/2



CD 641.2
3 1/4 x 4 5/8



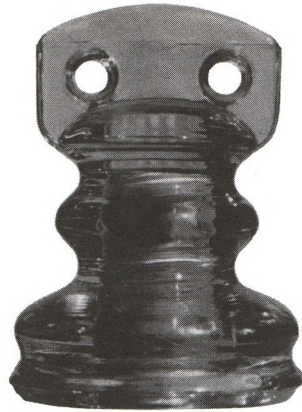
CD 642
3 1/2 x 5 3/4



CD 643
2 3/4 x 3 7/8



CD 645
3 x 4 5/8



CD 650
2 1/4 x 3 1/8



CD 653
2 1/2 x 4



CD 653.1
2 3/8 x 4 1/4



CD 654
2 1/2 x 4



CD 654.1
2 1/2 x 4



CD 655
2 1/2 x 4 1/4



CD 655.5
2 3/4 x 5 1/8



CD 655.6
2 3/4 x 5 5/8



CD 656
3 3/8 x 6 1/2



CD 657
3 1/8 x 5



CD 658
3 7/8 x 5 3/4



CD 658.5
3 5/8 x 5 3/4



CD 659
3 1/2 x 5 3/4



CD 665
2 1/2 x 3 1/2



CD 665.2
2 1/2 x 3 1/8



CD 666
2 5/8 x 3 5/8



CD 666 Variations



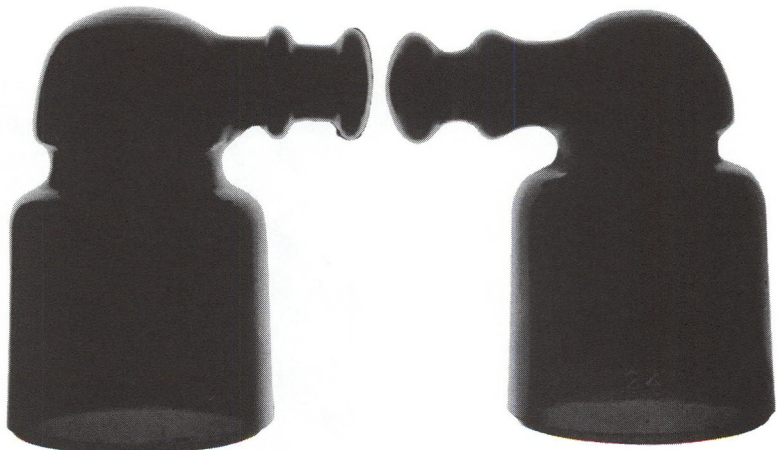
CD 666.2
2 1/2 x 3 3/8



CD 667
2 3/4 x 4 3/8



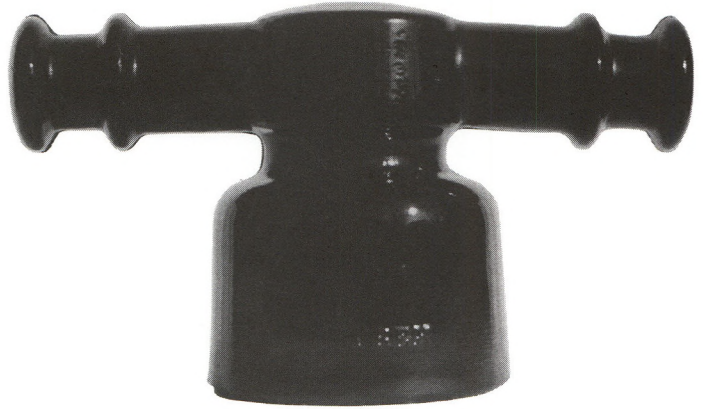
CD 667 Variation



CD 667 Variations



CD 670
5 1/8 x 2 1/2 x 3 3/8



CD 670.1
5 7/8 x 2 1/2 x 3 1/4



CD 670.1 Variations



CD 671
5 x 2 5/8 x 3 5/8



CD 674
5 1/8 x 2 3/4 x 4 3/8



CD 674 Variation



CD 674.2
5 7/8 x 2 3/4 x 4 1/4



CD 675
4 5/8 x 2 5/8 x 3 3/8



CD 676
4 5/8 x 2 1/2 x 3 1/2



CD 676.5
4 7/8 x 2 3/8 x 3 1/8



CD 677
4 3/4 x 2 1/2 x 3 1/2



CD 677.3
3 3/4 x 2 3/8 x 3



CD 677.3 Variation



CD 677.5
4 3/4 x 2 1/2 x 3 3/4



CD 677.6
4 1/4 x 2 1/2 x 3 5/8



CD 677.7
4 3/8 x 2 1/2 x 3 5/8



CD 678
5 1/2 x 2 7/8 x 4 1/8



CD 678.1 Variations



CD 678.1
5 x 2 3/4 x 4 3/8



CD 679
5 1/4 x 2 3/4 x 4 1/2



CD 680
2 3/4 x 2 1/4 x 2 7/8



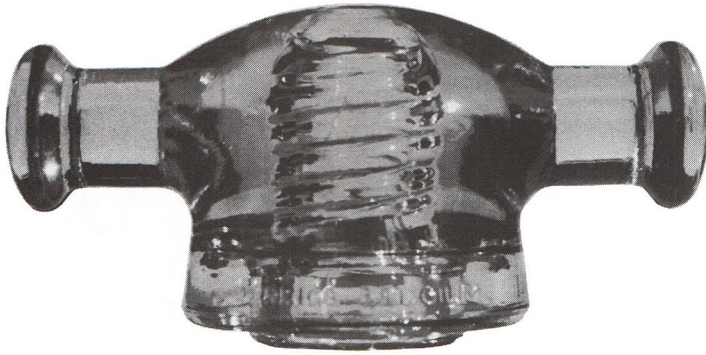
CD 679 Variations



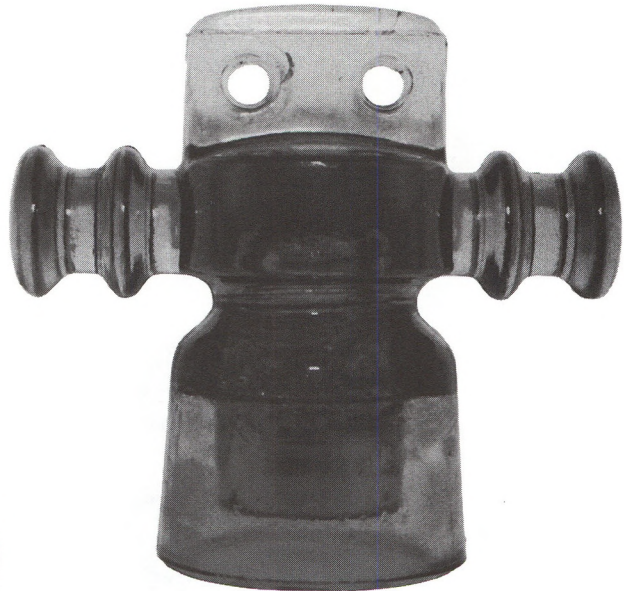
CD 681
2 1/2 x 1 3/4 x 2 5/8



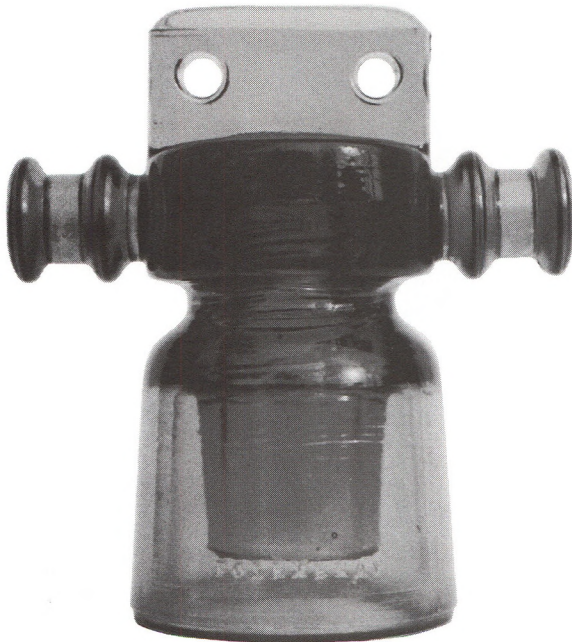
CD 682
5 7/8 x 2 3/4 x 4



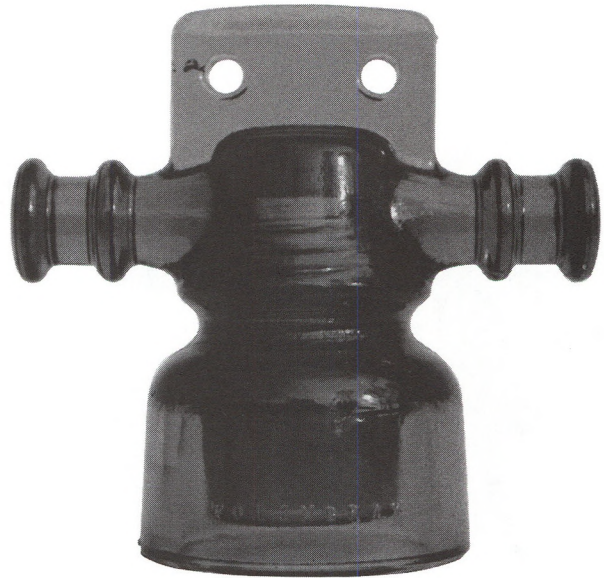
CD 685
5 7/8 x 2 7/8 x 2 7/8



CD 687
4 5/8 x 2 3/8 x 4 1/4



CD 688
5 x 2 7/8 x 5 3/8



CD 689
5 1/4 x 3 x 4 7/8



CD 690
6 1/2 x 3 5/8 x 5 7/8



CD 692
4 x 3 3/4 x 4 3/4



CD 695 (Side View)
3 3/4 x 4 3/4



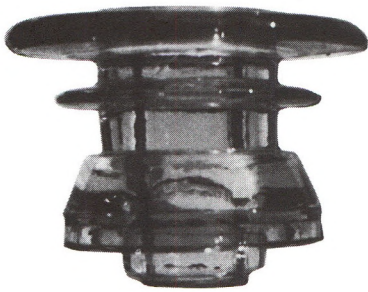
CD 695 (Front View)



CD 699 (Side View)
3 3/4 x 5 1/8



CD 699 (Front View)



CD 1049
2 7/8 x 2 1/8



CD 1050
2 1/4 x 2



CD 1051
2 x 1 7/8



CD 1052
3 x 3



CD 1054
3 x 2 3/8



CD 1055
3 1/2 x 3



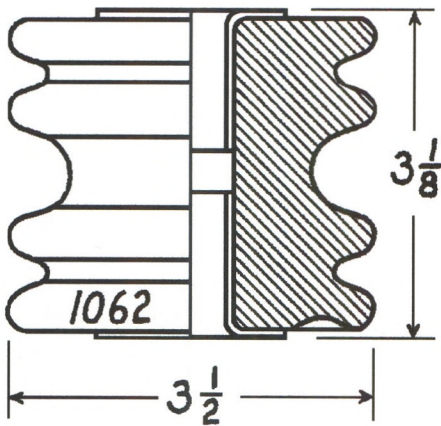
CD 1055.2
3 1/2 X 2 7/8



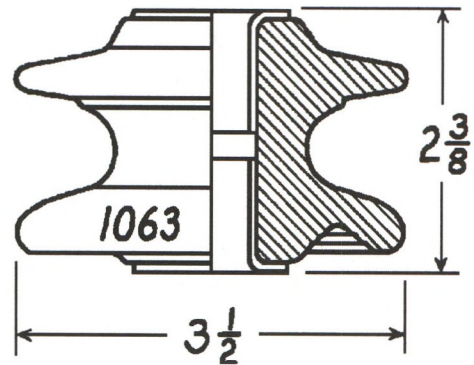
CD 1056
3 x 3



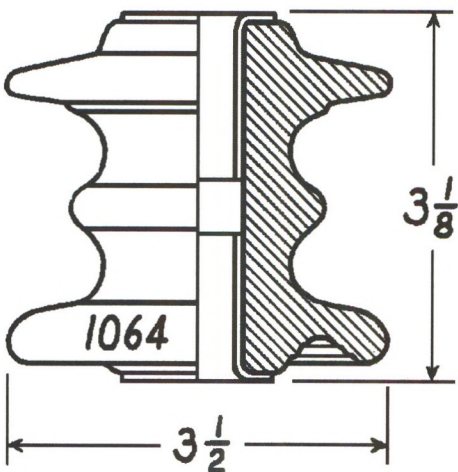
CD 1058
2 3/4 X 2 3/4



CD 1062
(No photo available)



CD 1063
(No photo available)



CD 1064
(No photo available)



CD 1065
3 7/8 X 3 1/4



CD 1066
5 1/4 x 4 1/8



CD 1067
4 x 3 1/8



CD 1067.1
4 1/4 X 3



CD 1075
2 1/4 X 2 3/8



CD 1082
1 3/4 x 1 5/8

MASTER CD NUMBER INDEX

'CD No.' refers to the Consolidated Design Numbering system, which was developed by N.R. Woodward to designate and classify all known styles of glass insulators.

Under 'Description' in the CD Index which follows, bold letters and numbers are used to indicate the actual embossing as it appears on the insulator. () brackets are used to give additional information about the embossing, to indicate the presence of a variable mold number or date, or to attribute the insulator to a certain manufacturer or user, if the unit is unembossed. Examples are (Unembossed ZICME), ('M' within a circle), (Embossed 'Star'), (Number), or (Letters reversed). [] brackets point out unusual physical features of the insulator, such as [Vertical ribs in pin hole], [Two ridges around skirt] or [Copper cap on crown].

When certain parts of the embossing are separated by a slanted line / without a space between, this means the first part appears over the second one, but on the same side of the insulator.

Example: **B.100/UNEL 38112**

However, if spaces are used on either side of the slanted line / it indicates that these two parts of the embossing appear on opposite sides of the insulator.

Example: **VEGLA / BP**

The @ symbol means that we have not seen a sample of the insulator for exact embossing reference.

The following letters describe the various types of insulator bases: SB (Smooth Base), CB (Corrugated Base), SDP (Sharp Drip Points) and RDP (Round Drip Points).

Colors other than those listed under the various CD numbers may exist, but only the colors actually known by the authors are included.

A country name appearing in { } brackets to the left of the 'Country of Origin' indicates that the insulator was found in that country and was probably made to specifications for use there.

In an effort to avoid styles duplications in the Consolidated Design Chart, CD numbers 509 and 570, which appeared in the 1986 Revision of this book, have been dropped. Insulators formerly listed under these numbers have been reclassified as CD's 541 and 563.1, respectively.

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
106	ESPERANZA S.A. / C.T.N.E. RDP Green Aqua	Spain
	E.S.A. / C.T.N.E. RDP Green Aqua, Clear	Spain
	E.S.A. RDP Green Aqua	Spain
	ZICME RDP Off Clear, Sky Blue, Green Tint, Pale Lavender, Light Purple	Colombia
	(Unembossed ZICME) RDP Clear, Off Clear, Straw, Green Tint, Light Olive Green, Ice Aqua, Light Green Aqua, Lavender Tint, Smokey Rose, Light Purple, Teal Blue, Teal Blue with streaks of Red Cullet.	Colombia
	VI-BO SDP Light Sage Green	Colombia
	(Unembossed VI-BO) SDP Light Sage Green	Colombia
108.5	CRISTALERIAS/DE/CHILE / No 10/ ART_o 44 SB Light Yellow Green	Chile
113	CRISTALERIAS/DE CHILE / No. 12 RDP Green, Light Yellow Green	Chile
113.4	C.T.R.G. / No 9 SDP Lime Green	Brazil
116.6	(Unembossed COOVINAL) SB Slate Blue, Smokey Straw	Colombia

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
121	AGEE SB Light Green, Sage Green, Smokey Sage Green, Mauve, Smokey Mauve, Light Amethyst, Burgandy/Amethyst, Charcoal Gray, Deep Violet	Australia
121	(Unembossed AGEE) SB Light Green, Sage Green, Smokey Sage Green, Sage Green with milk, Light Emerald Green, Brilliant Emerald Green, Charcoal Gray, Smokey Mauve, Rose Tint, Light Amethyst, Amethyst, Rich Burgandy Rose, Clear, Dark Amber	Australia
122	CRISTALERIAS/DE/CHILE / CTC/ No 16/ARTo.4233 CB Green	Chile
	NAPOLI SB Light Sage Green	{U.S.A.} Italy
	VMR/NAPOLI SB Light Green Aqua, Aqua, Light Green	{U.S.A.} Italy
122.2	(Unembossed COOVINAL)[Flat dome] SB Slate Blue	Colombia
	(Unembossed COOVINAL)[Peak dome] SB Smokey Straw, Smokey Pink	Colombia
128	(Unattributed symbol, possibly Arabic) SB Sage Green	Unknown
	CRISTALERIAS/VIDRART S.A. / TE A123/INDUSTRIA ARGENTINA SB Sky Blue	Argentina

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
128 (cont.)	(Mold number only) SB Clear, Ice Green	Argentina
	S.A.F.N.V./CSC / 1 SB Green	Uruguay
	(Unembossed)[Segmented ridges in triangular pin hole] SB Clear	Finland
	(Unembossed)[Threads come down into skirt] SB Clear, Light Lime Green,	Unknown
129	T.S. 23 / Y SB Ice Blue Aqua	Chile
149.5	vFo / DCT-TW/(Number) SB Light Aqua	Brazil
	vFo / TR-0/(Number) SB Aqua	Brazil
154	AGEE/(Number) RDP Gray, Gray with Amethyst Tint, Sage Green, Sage Green with Green Side, Light Mauve, Amethyst, Dark Amethyst	Australia
	C.C/DE/NICARAGUA RDP Dark Green	Nicaragua
	C.T.N. DE E. RDP Dark Blue Aqua, Dark Green	Spain
	CRISTALERIAS / DE CHILE RDP Green Aqua	Chile
	CRISTALERIAS/VIDRART S.A./ (Number)/ENtel A17 / AISLATRON/ INDUSTRIA ARGENTINA SB Light Sky Blue	Argentina

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
154 (cont.)	CRISTALERIAS/VIDRART S.A. ENT A-17 / (Number)/INDUSTRIA ARGENTINA SB Sage Green Tint	Argentina
	CRISTALERIAS/VIDRART S.A./T.E.-A1.7 / INDUSTRIA ARGENTINA CB Clear	Argentina
	CC (Letters back to back) N-42 RDP Golden Straw	Chile
	ESPERANZA S.A. / C.T.N.E. RDP Dark Green Aqua	Spain
	E.S.A. / C.T.N.E. RDP Dark Green Aqua	Spain
	A.S.E. (Letters reversed) / C.T.N.E. RDP Dark Green Aqua	Spain
	E.S.A./ (Number) / C.T.N.E. RDP Clear, Ice Green	Spain
	E.S.A./ (Number) / (Number) RDP Clear	{Colombia}Spain
	E.S.A. / R.E.N.F.E. RDP Dark Green Aqua, Clear	Spain
	JTE F60103 RDP Dark Green	Spain
	(Mold number only) SB Straw	Unknown
	RMV ('RMV' within an oval) RDP Dark Green	Brazil

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
154 (cont.)	(Unembossed ZICME) RDP or SDP Sage, Light Blue Aqua, Blue Aqua, Light Green Aqua, Celery Green, Yellow, Lavender, Blue Lavender, Blue Lavender with Milk, Light Purple, Purple, Dark Purple, Violet, Wild Berry, Light Sky Blue, Dark Sky Blue, Sapphire Blue (See Note below)	Colombia
	VI-BO RDP Olive Green	Colombia
	ZICME (Skirt embossed, medium-large letters) RDP or SDP (See Note below) Off Clear, Light Smoke, Green Tint, Ice Aqua, Green Aqua, Turquoise, Sage Green, Sage Blue, Yellow Green, Celery Green, Celery Green with Milk, Lime Green, Two Tone Lavender/Smoke, Smokey Lavender, Lavender, Blue Lavender, Violet, Purple Violet, Deep Violet, Wild Berry, Plum, Light Purple, Purple, Royal Purple, Purple Blackglass, Steel Blue, Milky Blue Opal, Dark Sky Blue, Sapphire Blue, Brilliant Cobalt with milk	Colombia
	<u>Note:</u> All early ZICME 154's were handmade. Due to mold variations and the extensive use of glass cullet, it is very difficult to associate a certain type of drip point or size of embossing with any given color.	
	ZICME (Dome embossed, tiny letters) RDP Peach, Smoke, Light Grayish Sage Green	Colombia
154.3	(Number)/ E.S.A. / T.1. SB Light Aqua	Spain
	E.S.A. / T-1 SB Clear	Spain

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
155	TELECOM SB Clear, Slate Blue, Dark Peach	Colombia
	TELECOM [Braille dots around skirt] SB Straw, Dark Straw, Yellow Green	Colombia
	TELECOM SDP Light Yellow, Pink Tint	Colombia
	TELECOM [Braille dots around skirt] SDP Light Yellow, Pink Tint	Colombia
	(TELECOM product)[Braille dots around Skirt] SB Light Yellow	Colombia
	(Unembossed TELECOM) SB Vibrant Straw	Colombia
202	CRISTALERIAS / DE CHILE N. 53 RDP Yellow Tint, Pink	Chile
203	TELECOM SB Pink, Smokey Pink, Smokey Amethyst	Colombia
	TELECOM SDP Yellow, Pink Tint	Colombia
	TELECOM [Braille dots around skirt] SDP Pink Tint, Blue Tint	Colombia
	(Unembossed TELECOM) SB Yellow, Light Peach, Smokey Pink	Colombia
	ZICME SB Clear, Milky Off Clear with Cullet, Light Green, Sage Green, Celery Green, Light Aqua, Green Aqua, Blue Gray, Blue Aqua, Pale Lavender, Purple, Royal Purple, Dark Purple Violet	Colombia

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
209	N. 42 CRISTALERIAS / DE CHILE RDP Light Straw	Chile
221.2	vFo/80 / 1 SB Light Aqua	Brazil
221.3	vFo/ 6 SB Light Green	Brazil
247.5	WCC-10 (High voltage 'Insulator' symbol) (Date) / (Russian words for "Made in USSR") SB Light Yellow Green	{Colombia} USSR
	WC 10 A (High voltage 'Insulator' symbol) (Date) / (Russian words for "Made in USSR")(Number) SB Light Mint Green	USSR
	M ('M' within a circle)[Embossing inside skirt] SB Olive Green	USSR
	19 AH3 64 (Russian letters for 'A', 'N' and 'Z' are within a triangle) SB Golden amber, Deep Golden Amber	USSR
251.5	(Number)/ E.S.A. / A D V.1. SB Light Aqua	Spain
251.7	L'ELECTRO VERRE / 34 SB Green	France
251.8	L'ELECTRO VERRE / DC 22 SB Green Aqua, Dark Green	France
299.5	CRISTALERIAS DE CHILE / No. 6510 SB Citron, Creamy Opal Glass	Chile

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
304.5	(Number)WC10-B(Date) / (High voltage 'Insulator' symbol) SB Lime Green	USSR
322.5	(Unembossed) SB Light Yellow	Unknown
334	ARMOURLIGHT 321(PILKINGTON Catalog) @	England
343	ARMOURLIGHT 542(PILKINGTON Catalog) @	England
343.2	(Unembossed ARMOURLIGHT) [Copper cap on crown] SB Light Yellow Green	{Australia} England
344	ARMOURLIGHT 742 (PILKINGTON Catalog) @	England
344.2	(Unembossed ARMOURLIGHT) [Copper cap on crown] SB Light Yellow Green	{Australia} England
348	BORGO / N ₀ 424 SB Dark Emerald Green	Italy
350	ESPERANZA S.A. / 208 SB Emerald Green, Lime Green	Spain
	L'ELECTRO VERRE / 208 SB Green	France
366	E.I.V. / HT2223 CB Green	France
370	(Unembossed ARMOURLIGHT) [Copper cap on crown] SB Light Yellow Green	{Australia} England
	(Unembossed ARMOURLIGHT) [Aluminum cap on crown] SB Light Yellow Green	{Australia} England

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
370.9	FOLEMBRAY / No 416 SB Vibrant Yellow Green	France
372	E.S.A. / ARVI-32 SB Light Aqua	Spain
372.2	E.I.V. SB Green	Spain
373	E.S.A. / ARVI-42 [Segmented depressions in pin hole, top shell only] SB Ice Green	Spain
375	FIDENZA / No 10-B SB Ice Green	Italy
	FIDENZA / 6310 SB Clear	Italy
	MIVA ACQUI / M 312 SB Yellow Olive Green	Italy
	MIVA / M312CA SB Dark Emerald Green	Italy
375.6	ISOREX / 610 SB Dark Emerald Green	France
	ISOREX / 610 /(Bottom shell only) XEROSI (Embossing spelled backwards) SB Dark Emerald Green	France
376	MIVA / M 315 CA SB Light Sage Green, Light Blue Aqua Emerald Green	Italy
376.2	E.S.A. / 320 [Segmented depressions in pin hole, top shell only] SB Clear	Spain

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
376.5	E.S.A. / 320 SB Green Aqua	Spain
	L'ELECTRO VERRE / 310 BIS SB Green	France
376.7	E.S.A. / 325 SB Green Aqua	Spain
377	E I V / HT-30 SB Green Aqua	France
	ISOREX / HT30 SB Dark Green	France
	L'ELECTRO VERRE / HT30 SB Emerald Green	France
377.2	M.I.V.A. / A.320 SB Light Blue Aqua	Italy
	B ('B' within a square) / A.320 SB Light Blue Aqua	Italy
377.5	E I V / HT 30 [Segmented depressions in pin hole, top shell only] CB Green Aqua	Italy
377.6	P/F.C('PF.C' within a circle) / IHT-30 SB Dark Emerald Green	France
378	E I V / HT32 [Segmented depressions in pin hole, top shell only] CB Light Green, Aqua	France
	E.S.A. / 330 [Segmented depressions in pin hole, top shell only] SB Ice Green	Spain
	ISOREX / HT 32 SB Dark Emerald Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
378 (cont.)	L'ELECTRO VERRE / HT32 SB Deep Emerald Green	France
378.1	FOLEMBRAY / N_o 3325 SB Emerald Green	France
	(Embossed 'Star')/ MIVA / A 325 CA SB Ice Blue Aqua	Italy
	(Sandblasted 'Star')/ MIVA / A 325CA SB Light Blue Aqua	Italy
378.5	HT-32 (SEDIVER Catalog) @	France
378.6	P/F.C ('PF.C' within a circle) / 2142 SB Deep Emerald Green	France
	ISOREX / HT32 SB Green Blackglass	France
378.8	ISOREX / HT34 SB Deep Olive Green	France
379	E I V / HT-36 SB Green Aqua	France
	L'ELECTRO VERRE / 335 SB Emerald Green	France
379.5	HT-36 (SEDIVER Catalog) @	France
379.7	E I V / HT38 SB Green Aqua	France
380	E.S.A. / 212 SB Green Aqua	Spain
	E.S.A. ('E' is backwards) / 212 SB Green Aqua	Spain

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
380 (cont.)	FOLEMBRAY / N^o 2205 SB Light Green	France
	L'ELECTRO VERRE / 205 SB Green Aqua	France
381	FIDENZA / 6205 / (Base of second shell) SP ('SP' within a star) / 1965 SB Clear	Italy
382	ISOREX / HT.6KV 316 SB Deep Olive Green	France
385	E.S.A. / 2.1.5. SB Green Aqua	Spain
	E.S.A. / 207 SB Green	Spain
386	ISOREX / 478 SB Dark Olive Green	France
388	CODARVI-PANAMCO H.T.21 / IND. URUGUAYA SB Clear	Uruguay
	HT-21 (SEDIVER Catalog) @	France
390	LEV / 2220 SB Green Aqua	France
395	E I V / VHT20T SB Aqua	France
395.2	VHT20T (E I V product) SB Green Aqua	France
396	E I V / VHT22T SB Green Aqua	France
396.2	(Unembossed E I V) SB Green Aqua	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
398	E I V / 315AT SB Green Aqua	France
399	E I V / 325AT SB Green Aqua	France
400	E.S.A. / T.Q.S.A. /(Number) RDP Dark Lime Green	{Morocco} Spain
402	MIVA-ACQUI / PYREX SB Light Yellow	Italy
	MIVA / PYREX SB Light Citron	Italy
405	(Unembossed) SB Yellow Green	{Germany} Unknown
407	(Number)/ E.S.A. / NEXO 5 SB Dark Green Aqua	{Morocco} Spain
408	TS('T' superimposed on 'S') (Number) / S.L.2./STAS 810-59 SB Light Aqua	Romania
	TS('T' superimposed on 'S' within a square)/ (Number) / S.L.2./STAS 810-52 SB Aqua	Romania
	TV('T' within 'V')/S.L.2. / STAS 810-73 SB Dark Emerald Green	Romania
	TURDA (Number) / C.W./S.A.R. DE T./ 424 SB Aqua	Romania
	VM('V' superimposed on 'M' within a circle) / C.W./ S.A.R. DE T./1.14 SB Peach	Romania

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
417	(Number)/ E.S.A. / NEXO 6 SB Dark Green	{Kenya} Spain
420	AGEE SB Light Green Aqua	Australia
421	AGEE SB Amethyst	Australia
421.1	AGEE SB Amethyst	Australia
422	AGEE /(Date on most units) / (Mold Number) SB Straw, Gray with Amber Swirls, Blue Gray, Light Green Aqua, Light Green, Aqua with Emerald Green Side, Medium Green, Emerald Green, Light Amethyst, Amethyst, Royal Purple	Australia
	C.C.G. /(Mold Number) / (Date) SB Clear	Australia
423	A.G.M. /(Mold Number) / (Direct or coded date) SB Straw, Golden Straw, Ice Green, Light Green Light Yellow Green, Bright Yellow, Honey Amber, Amber, Dark Amber, Deep Amber	Australia
	A.G.M. (Mold number) / (Coded date)/ SUB SB Straw	Australia
	C.C.G. /(Mold number on mosts units) / (Direct or coded date) SB Clear, Off Clear, Straw, Rose Tint, Light Green, Lavender Tint, Light Amethyst, Dark Amber, Deep Amber	Australia
425	NAPo (Embossed 'Lion')/ AR SB / CTT 950VB1-1 SB Ice Green Aqua	Portugal

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
425 (cont.)	RG (Embossed 'Rooster') / CTT / 952VB2-1 SB Green Aqua Tint	Portugal
	CE ('CE' superimposed within a diamond)/ VII (Sandblasted) / C.T.T./VB2-1 SB Ice Lemon	Portugal
427	RG / CTT VA 3-1 SB Ice Green	Portugal
	SB / CTT 952VA 1-1 SB Ice Green	Portugal
428	CV ('C' within 'V') / CTT/951VA1-1 SB Lavender Milk	Portugal
	SB / CTT/951 VA1-1 SB Light Green	Portugal
430	A.G.M. /(Mold number) / (Direct or coded date) SB Straw, Light Peach, Light Green, Light Yellow Green, Light Olive Green	Australia
	A.G.M. (Mold number) / (Bar/Date) SB Light Yellow Green	Australia
	A.G.M. (Mold number) / (Roman numerals) SB Ice Green	Australia
	C.C.G. /(Mold number on most units) / (Direct or coded date) SB Clear, Bubbly Clear, Greenish Clear, Straw, Smoke, Light Green, Light Peach, Dark Peach, Rose Tint, Light Amethyst, Amethyst, Dark Amethyst, Medium Amber, Dark Amber, Chartreuse	Australia

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
432	(Unembossed AGEE) SB Light Gray Green	Australia
435	(Unembossed) SB Straw	England
440	IL ITS-3 SB Ice Green, Light Aqua	Poland
	(Number only) SB Ice Green	Poland
441	IL ITSN-2 SB Ice Green, Light Aqua	Poland
443	IL ITSN-1 SB Light Blue Aqua, Blue Aqua, Amber Blackglass	Poland
	(Unembossed) SB Ice Green	Poland
444	(Embossed 'Star')/TS / FT 92 (Tiny embossed 'Diamond') PYREX/1959 SB Off Clear	Italy
	FLAMREX/1962 / F.T. 92 SB Off Clear	Italy
	FLAMREX/1967 / SIPTEL/ FT 92 SB Off Clear	Italy
445	TS('T' superimposed on 'S')/(Number) / S.O.2./STAS 810-59 SB Blue Aqua	Romania
	TS('T' superimposed on 'S' within a square)/ (Number) / S.O.2./STAS 810-59 SB Light Blue Aqua	Romania

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
446	TS (T' superimposed on 'S' within a square)/ (Number) / S.O.3 STAS 810-59 SB Vibrant Blue Aqua	Romania
447	(Unembossed) SB Dark Olive Green	Colombia
448	(Number)/ VEGLA / BP SB Light Blue Aqua	Germany
	(Number)/ VEGLA SB Ice Green	Germany
449	(Number)/ VEGLA SB Light Green Aqua	Germany
	IL ITS-1 SB Aqua	Poland
450	VERHAM BELGIUM / BT 16/TT SB Ice Green Aqua, Dark Lime Green	Belgium
	VERLICA BELGIUM / BT 16/TT SB Light Blue Aqua	Belgium
	B ('B' within an oval) / VERLICA SB Light Blue Aqua	Belgium
451	FOLEMBRAY / N_o 217 SB Light Green	France
	ISOREX / 1042 SB Dark Yellow Green	France
	(Unembossed) SB Dark Lime Green	Belgium
453	KARHULA HEL-2 [Segmented ridges in triangular pin hole] SB Clear	Finland

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
459	VERLICA BELGIUM / BT 31 SB Clear, Light Green Aqua, Light Sage Green, Light Green, Light Blue Aqua, Deep Yellow Green, Deep Emerald Green	Belgium
	VERHAM BELGIUM / BT 31 SB Light Green	Belgium
460	VERLICA BELGIUM / BT 48 SB Light Green Aqua, Light Blue Aqua, Dark Lime Green	Belgium
	VERHAM BELGIUM / BT 48 SB Celery Green	Belgium
470	E I V / (Number)/N 95 SB Green Aqua	France
	E.S.A. / (Number)N. 95. SB Clear, Ice Aqua	Spain
470.1	IL.NS-95 SB Aqua, Blue Aqua	Poland
	IL.NS-95 CENA S-80 SB Amber Blackglass	Poland
	NS-95 N-KO SB Aqua	Poland
	NS-95 NT SB Light Green	Poland
	(Unembossed) SB Light Green	Poland
472	IL NS-80 SB Aqua	Poland
	NS-80 SB Yellow Green Tint	Poland

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
472 (cont.)	IL NS 80 CENA 2,10 SB Aqua (Unembossed) SB Aqua, Light Green	Poland Poland
475	E I V / N 95-2 SB Green Aqua E.S.A. / N.95/2. SB Ice Aqua	France Spain
490	AGEE SB [Type I] Gray, Grayish Mauve, Gray with Green Side, Amethyst, Amethyst with Green Side, Dark Amethyst, Royal Purple AGEE SDP(4 only) [Type I] Gray, Light Amethyst with Green Side, Royal Purple AGEE / (Mold number) SB [Type II] Very Light Amethyst, Light Amethyst, Medium Amethyst AGEE /(Direct date) / (Mold number) SB [Type III] Straw, Straw with Rose Tint, Dark Purple	Australia Australia Australia Australia
494	ISOREX / 1030 SB Dark Yellow Olive Green	{Australia}France
500	S.A.F.N.V./23 / (Number) SB Green, Lime Green	Uruguay
501	S.A.F.N.V./22 / (Number) SB Green, Deep 7-up Green	Uruguay
501.1	S.A.F.N.V./22 / (Number) SB Green, Deep Amber	Uruguay

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
502	S.A.F.N.V./21 / (Number) SB Green	Uruguay
503	S.A.F.N.V./21 / (Number) SB Deep Amber	Uruguay
504	VERLICA BELGIUM / BT 11 SB Ice Aqua	Belgium
504.5	NAPo BN-80 (Embossed 'Lion') / SB SB Ice Aqua	Portugal
505	(Farsi letters for the name <i>Mehr</i> , which together resemble script letter 'M') SB Sage Green, Yellow Green, Green	Iran
	(Unembossed) SB Straw	Iran
506	Α ς ∨ √ 0 J Ε (Unidentified) SB Golden Straw	{USSR} Unknown
	(Unembossed) SB Teal Green, Lime Green	Unknown
507	(Number)/ E.S.A. / T.2 SB Ice Aqua	Spain
508	P. & T. ERITREA (Recess-embossed within a circle) SB Dark Sage Green	{Ethiopia} Eritrea
510	CODARVI.PANAMCO /(Number) / IND. URUGUAYA SB Clear	Uruguay
	(Unembossed CODARVI) SB Clear	Uruguay

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
511	CODARVI-PANAMCO/(Number) / IND. URUGUAYA SB Clear	Uruguay
	(Unembossed CODARVI) SB Clear	Uruguay
512	(Unembossed CODARVI) SB Clear	Uruguay
513	CODARVI / (Number)/IND. URUGUAYA SB Clear	Uruguay
	CODARVI-PANAMCO/(Number) / IND. URUGUAYA SB Clear	Uruguay
515	E.S.A. / 20 SB Ice Blue Aqua	Spain
516	MIVA / TIPO 85/UNEL PR 71 SB Sage Green Tint	Italy
	(Number)/ MIVA / B 85/UNEL 38112 SB Ice Blue	Italy
	MIVA / B 85/UNEL 38112 SB Sage Green Tint	Italy
	6117(FIDENZA product) SB Clear, Light Straw	Italy
	6117(FIDENZA product) / (Base)SP (‘SP’ within a star) / 1966 SB Clear	Italy
	6117(FIDENZA product) / (Base)SP (‘SP’ within a star) / 1966 [Segmented ridges in triangular pin hole] SB Clear	Italy

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
516.5	E.S.A. / 21 SB Clear	Spain
517	MIVA / UNEL PR 71 SB Sage Green Tint	Italy
	(Number)/ MIVA / .B.100/UNEL 38112 SB Ice Blue, Sage Green Tint	Italy
	(Number)/(Number) BMV ('BM' within 'V') / B-100/UNEL-38112 SB Ice Blue	Italy
518	(Number)/ MIVA / B 130/UNEL 38112 SB Light Blue	Italy
	6119 (FIDENZA product) / (Base) SP ('SP' within a star) / 1966 SB Clear	Italy
522	6118 (FIDENZA product) SB Ice Green, Straw, Light Purple	Italy
	6118 (Numbers upside down) (Fidenza product) SB Straw	Italy
523	(Number)/ E.S.A. / 22 SB Ice Green, Ice Lemon	Spain
	(Number)/ E.S.A. / A.V.1 SB Clear, Ice Green, Ice Lemon, Ice Blue	Spain
525	(Number)/ E.S.A. / 24 SB Ice Lemon, Ice Green, Light Green	Spain
528	(Unembossed)[Segmented depressions in pin hole] SB Green Aqua	{Algeria} France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
529	FOLEMBRAY / N_o 194/ TELEFONI.DELLO.STATO SB Yellow Green	{Italy} France
530	ISOREX/(Number) / DC 1 SB Green	{Australia} France
531	E I V / (Number)/DC 2[Segmented depressions in pin hole] CB Aqua, Green Aqua	France
532	E I V / (Number)/DC 3 [Segmented depressions in pin hole] SB Light Green, Green Aqua	France
	SEDIVER 10 (Vertically embossed on skirt) / VDC 3 [Segmented depressions in pin hole] CB Light Green Aqua	France
533	DC 4(SEDIVER Catalog) @	France
534	P/F.C('PF.C' within a circle) / 2111.b SB Dark Emerald Green	France
535	E I V / (Number)/HC 63[Segmented depressions in pin hole] SB Green Aqua	France
	FOLEMBRAY / N_o 233 SB Yellow Green	France
	L'ELECTRO VERRE / HC. 63 [Segmented depressions in pin hole] SB Aqua, Dark Yellow Green	France
	L'ELECTRO VERRE / 43 SB Lime Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
535 (cont.)	SEDIVER 20 (Vertically embossed on skirt) / VHC 63 [Segmented depressions in pin hole] CB Light Green	France
536	E I V / (Number)/ HC 64 [Segmented depressions in pin hole] CB Green Aqua	France
	VERLICA BELGIUM / BT26 SB Blue Aqua	Belgium
536.2	ISOREX / HC64 SB Deep Olive Green	France
	ISOREX / HC64 BIS SB Deep Olive Green	France
537	E I V / HC.65 SB Green Aqua	France
539	PYREX/1950 / TETI/1-1920-L SB Light Yellow	Italy
	PYREX / 1-920-L/1940 SB Straw	Italy
540	TFC ('TF' superimposed within 'C')/ (Date) / Number) SB Green	USSR
	(High voltage 'Insulator' symbol)/(Date) / (Number) SB Ice Green, Light Yellow Green	USSR
541	(High voltage 'Insulator' symbol)/Date) / (Number) SB Ice Green	USSR

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
541 (cont.)	(Unembossed)[Segmented ridges in triangular pin hole] SB Clear, Red Amber	Finland
542	FIDENZA / No 2-D SB Ice Blue	Italy
	2-920-L / 1943 SB Dark Emerald Green	Unknown
	2-920- / 1945 SB Dark Emerald Green	Unknown
	PYREX/1951 / MOD 2 1920 TS SB Light Straw	Italy
	PYREX/1951 / MOD 2 TETI SB Light Straw	Italy
	T S/2-920-L / 1943 SB Dark Emerald Green	Unknown
543	(Unembossed) SB Vibrant Yellow Green	Unknown
545	E I V / (Number)/35.3 SB Green Aqua	France
	ISOREX / 35/3 SB Ice Green, Light Green Aqua, Dark Olive Green	France
	ISOREX/(Roman numeral) / 35/5 SB Emerald Green	France
	L'ELECTRO VERRE / 35.3 SB Green Aqua	France
	V A SB Olive Green, Dark Olive Green, Dark Yellow Olive Green, Light Purple, Purple	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
549	P/F.C('PF.C' within a circle) / 2103 SB Dark Olive Green	France
550	G / 5 ('5' is backwards) SB Light Green	{Guernsey}Unknown
	ISOREX / 233 SB Dark Olive Green	France
	P/F.C('PF.C' within a circle) / 2102 SB Dark Emerald Green, Dark Olive Green	France
550.1	P/F.C('PF.C' within a circle) / 2102 SB Dark Olive Green	France
551	ISOREX / 2 SB Dark Emerald Green, Dark Teal Green	France
	ISOREX / DC 2 SB Dark Yellow Olive Green, Dark Olive Green	France
	ISOREX - / DC 2 SB Dark Olive Green	France
	(Roman numeral)/ ISOREX/35/4 / DC 2 SB Emerald Green, Dark Emerald Green, Dark Teal Green	France
	P/F.C('PF.C' within a circle) / DC 2 SB Dark Emerald Green	France
	V A SB Purple	France
551.2	BORGO / N_o 262 SB Dark Green	Italy

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
552	FOLEMBRAY / DC 3 SB Yellow Green	France
	ISOREX / 234 SB Dark Olive Green	France
	ISOREX/(Roman numeral) / DC 3 SB Dark Green Aqua, Dark Yellow Olive Green	France
	P/F.C('PF.C' within a circle) / DC 3 SB Dark 7-up Green	France
552.2	..ISOREX../(Number) / DC 3/(Number) SB Lime Green	France
552.4	ISOREX / 234 SB Dark Olive Green	France
	ISOREX / C.G.B.A./5.8.10 SB Dark Olive Green	France
553	ISOREX / 235 SB Deep Yellow Green	France
	P/F.C('PF.C' within a circle) / DC 4 SB Dark Emerald Green	France
553.2	BORGO / N_o 264 SB Deep Emerald Green	Italy
	FOLEMBRAY / N_o 264 [Two ridges around skirt] SB Yellow Green	France
	N_o264 [Three ridges around skirt] SB Yellow Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
554	P/F.C('PF.C' within a circle) / 2042 SB Dark Yellow Green, Deep Olive Green	France
555	FIDENZA / 6115 SB Straw, Light Peach	Italy
	P/F.C('PF.C' within a circle) / 2043.b SB Dark Olive Green	France
556	MIVA / 65-920 SB Dark Green	Italy
557	E.S.A. / 20 SB Green Aqua	Spain
	L'ELECTRO VERRE / 20 SB Green	France
558	FOLEMBRAY / N_o 275 SB Yellow Green	France
558.5	MIVA / 396-920 SB Straw	Italy
	PIREX (Misspelled)/MIVA / OGM/3-920L SB Straw	Italy
559	FOLEMBRAY / N_o 261 SB Yellow Green	France
559.2	BORGO / N_o 261 SB Dark Green	Italy
560	ISOREX / 232 SB Dark Olive Green	France
	ISOREX/(Roman numeral) / DC 1 SB Emerald Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
560 (cont.)	ISOREX / DC 1 SB Dark Olive Green	France
	S.A.F.N.DE V / 92176 [Vertical ribs in pin hole] SB Deep Violet Cobalt	Uruguay
	(Unembossed S.A.F.N.V.) [Vertical ribs in pin hole] SB Green	Uruguay
561	MIVA / BT 1 CA SB Light Sage Green	Italy
	MIVA / BT 1-CA SB Straw, Dark Emerald Green	Italy
562	FIDENZA / N₀ 263-B SB Dark Green	Italy
563	FOLEMBRAY / DC 2 SB Yellow Green	France
	FOLEMBRAY / N₀ 268 SB Yellow Green	France
563.1	FIDENZA / N₀ 262 SB Teal Green	Italy
	FOLEMBRAY / N₀ 204 [Two ridges around skirt] SB Yellow Green	France
	FOLEMBRAY / N₀ 262 SB Light Yellow Green, Yellow Green, Teal Green	France
	FOLEMBRAY AL1 / N₀ 262 SB Yellow Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
563.1 (cont.)	VERLICA BELGIUM / BT 1 SB Light Green Aqua	Belgium
	V P L C / BT 3 [One ridge around skirt] SB Ice Green	{Belgium} Unknown
	V P L C / BT 4 [Two ridges around skirt] SB Ice Green	{Belgium} Unknown
	(Unembossed) [Three ridges around skirt] SB Yellow Green	{France} Unknown
563.5	STAR SB Deep Yellow Olive Green	{Luxembourg} Unknown
	(Unembossed STAR) SB Deep Yellow Olive Green	{Luxembourg} Unknown
564.1	FOLEMBRAY / No 263 SB Dark Emerald Green	France
	P/F.C ('PF.C' within a circle) / 2047 SB Dark Olive Green	France
565	VERLICA BELGIUM / BT 10 SB Light Green Aqua	Belgium
566	MIVA SB Dark Olive Green	Italy
567	6112 (FIDENZA product) SB Clear	Italy
568	MIVA / BT 3 CA SB Straw, Dark Green	Italy
569	VERLICA BELGIUM / BT 18/TT SB Blue Aqua	Belgium

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
571	VERLICA BELGIUM / BT 100 SB Light Blue Aqua, Dark Emerald Green	Belgium
	VERHAM BELGIUM / BT 100 SB Green Aqua	Belgium
572	MIVA / BT 2-CA SB Off Clear, Sage Green Tint, Dark Emerald Green, Dark Olive Green	Italy
572.2	MIVA / BT 2 SB Dark Olive Green, Dark Green	Italy
572.5	MIVA-ACQUI / BT 1 SB Light Blue Aqua	Italy
	(Number)/ MIVA / BT 1 HCA SB Light Blue Aqua	Italy
573	IsoFerm/R.M.2 SB Dark Yellow Olive Green	{France} Unknown
574	L'ELECTRO VERRE / DC 1 [Segmented depressions in pin hole] SB Emerald Green, Yellow Green	France
574.2	E.S.A. / 21 SB Green Aqua	Spain
575	E I V / (Number)/DC 2 [Segmented depressions in pin hole] SB Light Green Aqua, Green Aqua	France
	E I V / DC 2 [Segmented depressions in pin hole] SB Yellow Green	France
	E.S.A. / 22 SB Green Aqua	Spain

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
575 (cont.)	ESPERANZA S.A. / 22 EV. SB Green Aqua	Spain
	L'ELECTRO VERRE / DC.2 [Segmented depressions in pin hole] SB Emerald Green	France
576	E I V / (Number)/DC 3 [Segmented depressions in pin hole] SB Green	France
	E I V / (Number)/DC 3 [Segmented depressions in pin hole] CB Green Aqua	France
	E.S.A. / 24 SB Dark Green Aqua	Spain
	L'ELECTRO VERRE / DC 3 [Segmented depressions in pin hole] SB Dark Emerald Green	France
577	E I V / DC.4 [Segmented depressions in pin hole] SB Dark Green Aqua	France
	L'ELECTRO VERRE / 25 SB Green Aqua	France
577.1	L'ELECTRO VERRE / DC 4 SB Dark Emerald Green	France
577.5	STAR / 4 SB Deep Yellow Olive Green	{Luxembourg} Unknown
578	VERLICA BELGIUM / BT 17/TT SB Light Sage Green, Light Green Aqua, Green, Light Blue Aqua	Belgium
578.2	ISOREX / 1048 SB Dark Olive Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
578.5	(Unembossed) SB Deep Yellow Olive Green	{Switzerland} Unknown
579	HUTA FALENICA / 1 SB Dark Green Aqua	Poland
	HUTA ROGOW / N.I.T-I-S SB Dark Blue Aqua	Poland
	H L SB Dark Blue Aqua	Poland
579.5	(Embossed 'Imperial Two-headed Eagle')/(Russian letters) SB Lime Green	USSR
580	FOLEMBRAY / 5554 SB Yellow Green	France
585	VERHAM-ELAF / BT 61 SB Light Green Aqua	Belgium
	VERLICA-ELAF / BT 61 SB Light Aqua, Dark Emerald Green	Belgium
587	ISOREX / 234.2 SB Deep Green	France
590	A.G.M./PI-3 /(Mold number) / (Coded date) SB Light Straw, Straw, Ice Green, Light Green, Yellow Green, Dark Amber	Australia
592	ISOREX / 1000 SB Deep Olive Green	France
595	VERLICA BELGIUM / BT 45 SB Light Aqua	Belgium
597	N80 VEGLA SB Light Green Aqua, Dark Teal Green	Germany

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
597 (cont.)	(Unembossed) SB Amber Blackglass	{Israel} Unknown
598	(Unembossed) SB Emerald Blackglass	{Portugal} Unknown
	(Unembossed) [Vertical ribs in pin hole] SB Greenish Straw	Unknown
600	N95 VEGLA SB Ice Blue Aqua, Dark Aqua	Germany
	VEGLA / N 95 SB Dark Green Aqua	Germany
601	L'ELECTRO VERRE / 32 SB Green	France
601.2	FIDENZA / No 222 SB Light Purple	Italy
	FOLEMBRAY / No 222 SB Yellow Green	France
	MIVA / (Style number unreadable) SB Light Yellow	Italy
602	MIVA / (Style number unreadable) SB Light Straw	Italy
603	N80 VEGLA SB Ice Blue Aqua	Germany
604	N880 VEGLA SB Ice Blue Aqua	Germany
605	VEGLA NO95 SB Straw Tint, Ice Blue Aqua, Light Blue Aqua	Germany

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
606	N95A VEGLA SB Ice Blue Aqua, Dark Green Aqua	Germany
610	FIDENZA / No 223 SB Light Yellow Green	Italy
	ISOREX / MT 14 SB Emerald Green	France
611	E.S.A. / 33 SB Dark Green Aqua	Spain
	(Letter/Number)/ L'ELECTRO VERRE / 33 SB Dark Green Aqua	France
616	(Number)/ E.S.A. / 106 SB Blue Aqua	Spain
620	(Number)/ E.S.A. / ARVI-12 SB Light Green Aqua	Spain
621	(Number)/ E.S.A. / ARVI-22 SB Light Aqua	Spain
624	(Unembossed) SB Light Citron Green	{U.S.A.} England
625	ISOREX / 310 SB Dark Emerald Green	France
626	FOLEMBRAY / No 1306 SB Yellow Green	France
	P/F.C('PF.C' within a circle) / 2031 SB Dark Emerald Green	France
628	(Unembossed) SB Dark Green	Unknown

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
630	BRIGHT'S INSULATOR REID 1858 SB Dark Aqua	England
631	(Unembossed BRIGHT'S Patent) SB Olive Green	England
638	(Number)(High voltage 'Insulator' symbol) / (Date) WC10 (Russian letter for 'G') SB Light Yellow Green	USSR
	(Date)(High voltage 'Insulator' symbol) WC10 (Russian letter for 'G') [Embossing inside skirt] SB Light Yellow Green	USSR
	(Date)(High voltage 'Insulator' symbol) WC10 (Russian letter for 'D') /(Number) [Embossing inside skirt] SB Light Lime Green	USSR
638.5	WC-10 (Russian letter for 'G') JT ('JT' within a triangle)(Number) [Embossing inside skirt] SB Light Yellow Green	USSR
640	CL ('CL' within a diamond) SB Deep Olive Green	France
	FOLEMBRAY / No 35/3 SB Yellow Green	France
	FOLEMBRAY / No 211 SB Light Green, Dark Yellow Green	France
	ISOREX / 35/3 SB light Green, Deep Green, Deep Olive Green, Deep Teal Green	France
	L'ELECTRO VERRE / 35/3 SB Aqua, Green Aqua	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
640 (cont.)	(Number only) SB Golden Straw	Unknown
	SAV('SAV' within a circle) SB Deep Emerald Green	France
	(Unembossed) SB Ice Green, Light Green, Green Aqua, Dark Emerald Green	France
	V A SB Yellow Olive Amber	France
	V.A SB Deep Yellow Olive Amber	France
	VM('V' superimposed on 'M' within a circle) SB Light Green, Green Aqua, Dark Emerald Green, Dark Olive Green	France
	VERRERIES DE REIMS SB Dark Olive Green	France
641	ISOREX / 221 SB Deep Olive Green	France
641.2	ISOREX / EST SB Dark Emerald Green, Deep Yellow Olive Green	France
642	(Embossed 'Diamond') SB Deep Emerald Green	Unknown
	(Embossed 'X') SB Deep Emerald Green	Unknown
	FOLEMBRAY SB Yellow Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
642 (cont.)	FOLEMBRAY / No 35/1 SB Green Aqua, Yellow Green	France
	FOLEMBRAY / No 214 SB Emerald Green	France
	ISOREX SB Dark Olive Green	France
	ISOREX / 35/1 SB Light Green, Deep Emerald Green	France
	ISOREX / 35/1/EST SB Deep Olive Green	France
	ISOREX/SNCF / 35/1/EST SB Deep Emerald Green, Deep Teal Green, Deep Teal Blue	France
	L'ELECTRO VERRE / 35/1 SB Emerald Green, Dark Emerald Green	France
	(Unembossed) SB Ice Green, Light Green, Emerald Green	{France} Unknown
	V.A SB Dark Yellow Olive Green, Dark Emerald Green, Dark Yellow Olive Amber	France
	VERRERIES DE REIMS SB Deep Olive Green	France
	VM ('V' superimposed on 'M' within a circle) SB Green Aqua, Green, Deep Emerald Green, Deep Olive Green	France
643	FOLEMBRAY SB Olive Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
645	ISOREX / 25/7 SB Dark Olive Green	France
	(Unembossed) SB Light Green Aqua	France
650	(Unembossed) SB Clear	Italy
653	FOLEMBRAY / N_o 294 SB Yellow Green, Emerald Green	France
	ISOREX / 248 SB Deep Yellow Olive Green	France
653.1	FOLEMBRAY / N_o 294 SB Yellow Green	France
654	P/F.C('PF.C' within a circle) / 8C-31 SB Dark Green	France
	P/F.C('PF.C' within a circle) / 2121 SB Emerald Green	France
654.1	L'ELECTRO VERRE / 93 SB Olive Green Blackglass	France
	(Unembossed) SB Emerald Green	France
655	E.S.A. / 93 SB Clear, Aqua	Spain
655.5	MIVA / BT 2V SB Light Blue Aqua	Italy
655.6	FOLEMBRAY / N_o 297 SB Dark Yellow Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
656	FOLEMBRAY / N_o 298 SB Dark Yellow Green	France
657	L'ELECTRO VERRE / 96 SB Dark Green	France
657	P/F.C('PF.C' within a circle) / 2120.b SB Dark Emerald Green	France
658	ISOREX / 282 SB Deep Olive Green	France
658.5	ISOREX / 285 SB Dark Olive Green	France
659	FOLEMBRAY / N_o 296 SB Dark Yellow Green	France
665	FOLEMBRAY / N_o 282 SB Green Aqua, Olive Green	France
	ISOREX / 243 SB Deep Olive Green	France
	243 (ISOREX product) SB Emerald Green	France
	N_o 282 (FOLEMBRAY product) SB Green Aqua	France
665.2	FOLEMBRAY / N_o 282 SB Light Green, Yellow Green	France
666	ISOREX / 243 SB Deep Emerald Green	France
	ISOREX / 245 SB Deep Olive Green, Deep Yellow Olive Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
666 (cont.)	L'ELECTRO VERRE / IB11 SB Green Aqua, Dark Green Aqua	France
	L'ELECTRO VERRE / 81 SB Green Aqua, Emerald Green,	France
	L'ELECTRO VERRE / 81 [Segmented depressions in pin hole] SB Olive Green	France
	(Unembossed ISOREX) SB Dark Olive Green	France
	(Unembossed L'ELECTRO VERRE) SB Dark Emerald Green	France
666.2	P/F.C('PF.C' within a circle) / I.B.11 SB Dark Emerald Green	France
	P/F.C('PF.C' within a circle) / 2123 SB Dark Yellow Olive Green, Dark Emerald Green	France
667	ISOREX / 12 SB Lime Green, Dark Emerald Green, Dark Teal Green	France
	ISOREX / 247 SB Dark Olive Green	France
	L'ELECTRO VERRE / 82 SB Emerald Green	France
	L'ELECTRO VERRE / IB12 SB Emerald Green	France
	P/F.C('PF.C' within a circle) / 2125 SB Dark Green	France
670	ISOREX / 244 SB Emerald Green, Deep Olive Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
670.1	ISOREX / 244 SB Emerald Green, Lime Green, Deep Olive Green	France
	P/F.C('PF.C' within a circle) / 2124 SB Dark Teal Green	France
671	ISOREX / 246 SB Deep Olive Green	France
674	ISOREX / 248 SB Deep Emerald Green	France
	P/F.C('PF.C' within a circle) / 2130 SB Dark Green	France
674.2	ISOREX / 248 SB Deep Olive Green	France
675	E I V / 83T SB Green Aqua	France
	L'ELECTRO VERRE / 83 SB Aqua, Light Green, Emerald Green	France
	L'ELECTRO VERRE / 83T SB Green Aqua	France
676	P/F.C('PF.C' within a circle) / 2129 SB Dark Olive Green	France
676.5	VERLICA BELGIUM / BT 14 SB Light Blue Aqua, Light Green Aqua	Belgium
677	FOLEMBRAY / N^o 285 SB Aqua, Yellow Green	France
	MIVA / BT 3 SB Ice Lemon, Light Straw, Light Aqua, Dark Green	Italy

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
677.3	BORGIO / No 287 SB Deep Emerald Green	Italy
	FIDENZA / No 287 SB Off Clear, Ice Green	Italy
	MIVA / BT 3M SB Ice Blue, Dark Green, Dark Emerald Green, Dark Teal Green	Italy
677.5	FOLEMBRAY / No 286 SB Emerald Green, Yellow Green	France
677.6	FIDENZA / No 6186 SB Light Straw	Italy
677.7	FIDENZA / No 286 SB Ice Green, Dark Teal Green	Italy
	FIDENZA / No 6186 SB Light Straw, Ice Green, Light Pink	Italy
	MIVA / BT 2 M SB Clear, Off Clear, Straw, Ice Green, Aqua, Emerald Green, Olive Green	Italy
678	MIVA / BT 2 SB Light Blue Aqua	Italy
678.1	FOLEMBRAY / No 286 SB Light Green, Yellow Green	France
	(Unembossed FOLEMBRAY) SB Yellow Green	France
679	L'ELECTRO VERRE / IB 22 SB Green Aqua, Yellow Green, Dark Emerald Green	France
	L'ELECTRO VERRE / 84 SB Green Aqua, Emerald Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
680	(Unembossed) SB Straw, Dark Red Amber	{Majorca} Spain
681	NAPo (Embossed 'Lion') ON-60 / SB SB Ice Green Aqua	Portugal
682	VERLICA BELGIUM / BT 15 SB Ice Green, Light Green, Light Aqua	Belgium
685	VERHAM BELGIUM / BT 32 SB Light Green	Belgium
	VERLICA BELGIUM / BT 32 SB Light Aqua	Belgium
687	FOLEMBRAY / N_o 287 SB Green	France
688	FOLEMBRAY / N_o 288 SB Yellow Green	France
689	FOLEMBRAY / N_o 289 SB Yellow Green	France
690	E I V / AG('A' within 'G') SB Green	France
	L'ELECTRO VERRE / AG('A' within 'G') SB Emerald Green	France
692	HENNON FOLEMBRAY DEPOSE / 288 SB Yellow Green	France
695	AG('A' within 'G') L'ELECTRO / VERRE (Letter/Numbers) SB Emerald Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
699	H. POUYET (Sandblasted)/ L'ELECTRO VERRE / SNCF SB Green Aqua	France
1049	(Unembossed COOVINAL) SB Light Slate Blue	Colombia
1050	(Unembossed ZICME) SB Clear, Green Aqua Tint, Yellow Green, Yellow Olive Green, Dark Red Amber, Dark Orange Amber, Amber Blackglass, Deep Lavender, Dark Lilac, Purple with Milk/Cullet, Royal Purple, Dark Violet, Cranberry Violet, Purple Violet, Magenta Blackglass, Peacock Blue, Cobalt Blue	Colombia
1051	(Unembossed) SB Amber Blackglass	Uruguay
1052	S.A.F.N.DE V. SB 7-up Green	Uruguay
1054	A.G.M. L.T.O.035 / (Coded date) SB Straw	Australia
1055	A.G.M. L.T.O.1 / (Coded date) SB Straw	Australia
	(Unembossed A.G.M.) SB Straw	Australia
1055.2	BORMAVI.76.AVB.75.12 SB Light Green Aqua	Italy
	MIVA.IIX.74.AVB.75.2 SB Light Blue Aqua	Italy
	X.76.AVB.75.6.B SB Light Green Aqua	Italy

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
1056	vFo / 78 SB Ice Green Aqua	Brazil
1058	(Unembossed) SB Light Straw	Australia
1062	PAV-1(E.S.A. Catalog) @	Spain
1063	PV-1(E.S.A. Catalog) @	Spain
1064	PVD-2(E.S.A. Catalog) @	Spain
1065	E I V / A 21 SB Green Aqua	France
	E I V / A 21 [Braille dots on base] Aqua	France
	ISOREX / A 21 SB Emerald Green	France
	L'ELECTRO VERRE / A 21 SB Emerald Green	France
	(Unembossed) SB Olive Green, Deep Olive Green	France
1066	E I V / A 22 SB Green Aqua	France
	E I V / A 22 [Braille dots on base] Green Aqua	France
	(Number)/.. ISOREX.. / (Number)/ A 22 [Braille dots on base] Lime Green	France
	L'ELECTRO VERRE / A 22 SB Dark Emerald Green	France

<u>CD No.</u>	<u>Description</u>	<u>Country of Origin</u>
1066 (cont.)	P/F.C ('PF.C' within a circle) / 2002 SB Deep Emerald Green	France
	SEDIVER / A 22 [Braille dots on base] Green Aqua	France
	(Unembossed) SB Deep Emerald Green	France
1067	L'ELECTRO VERRE / 171 SB Green Aqua	France
1067.1	L'ELECTRO VERRE / 171 SB Emerald Green	France
1075	MIVA / T 6 SB Clear, Dark Emerald Green	Italy
1082	E V / P.H. 40 SB Green	France

NOTES

CROSS REFERENCE - MILHOLLAND TO PRESENT CD NUMBERS

Following is a cross reference from numbers used in Milholland's *Most About Glass Insulators, 4th Revision*, to present CD numbers. Please note that reference is made to the photograph as it appears in the book. In some cases, not all insulators listed under the photograph apply to the same CD number.

<u>M No.</u>	<u>CD No.</u>	<u>M No.</u>	<u>CD No.</u>
121.2	420	822	545
124.6	421, 422	824	531
124.7	423	825	532
130.6	427	826	533
130.7	430	827	536.2
152.9	490	828 Same as 810	559
177	449	828.2	563.1
179	470	828.5	551
179.5	459	829	552
179.6	460	830	500
184	475	832 Same as 822	545
222.1	572	832.1	575
229.5	602	833	576
250.7	590	835	*
755	407	837	535
770	441	838	536
773	450	840	508
775	460	842	578
778	470.1	843	569
781	640	857	597
783	642	860	600
798	680	880	620
799	677.3	881	621
800	677.5	945	*
801	679	947	388
802	666	950	399
803	655	960	372
804	655.5	961	373
804.3	658	965	375
808	510	966	377.5
810	559	967	378.5
816	505	968	379.5
818	574		

* At this writing, a CD number is awaiting the availability of a sample insulator.

CROSS REFERENCE - MANUFACTURER NUMBER TO CD NUMBER

This cross reference is from manufacturer's style number to CD number, for several major European manufacturers. Not all insulators from the Master CD Index are included.

<u>Mfr. No.</u>	<u>CD No.</u>	<u>Mfr. No</u>	<u>CD No.</u>
<u>E I V</u>			
35.3	545	HT 30	377, 377.5
83T	675	HT 32	378
315 AT	398	HT 36	379
DC 2	531, 575	HT 38	379.7
DC 3	532, 576	HT 2223	366
DC 4	577	N 95	470
HC 63	535	N 95-2	475
HC 64	536	VHT20T	395, 395.2
HC 65	537	VHT22T	396
 <u>E.S.A.</u>			
20	515, 557	320	376.2
21	516.5, 574.2	330	378
22	523, 575	ADV.1	251.5
24	525, 576	ARVI. 12	620
33	611	ARVI. 42	373
93	655	A.V.1	523
106	616	N. 95	470
212	380	T.1	154.3
215	385	T.2	507
 <u>FIDENZA</u>			
10-B	375	286	677.7
222	601.2	6115	555
223	610	6186	677.6, 677.7
263-B	562	6310	375
 <u>FOLEMBRAY</u>			
35/1	642	261	559
35/3	640	262	563.1
204	563.1	263	564.1
211	640	264	553.2
217	451	275	558
222	601.2	282	665, 665.2

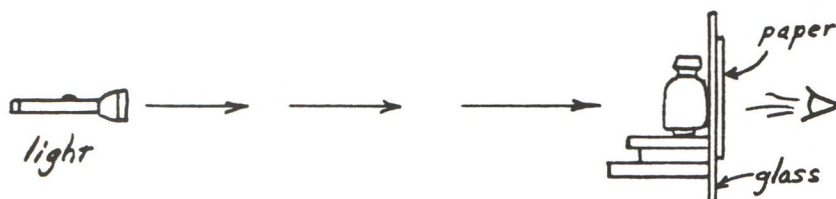
<u>Mfr. No.</u>	<u>CD No.</u>	<u>Mfr. No.</u>	<u>CD No.</u>
<u>FOLEMBRAY (cont.)</u>			
285	677	298	656
286	677.5, 678.1	416	370.9
287	687	2205	380
288	688, 692	3325	378, 378.1
289	689	5554	580
294	653, 653.1	DC-2	563
296	659	DC-3	552
297	655.6		
<u>ISOREX</u>			
2	551	261	653
35/1	642	282	658
35/3	545, 640	285	658.5
35/4	551	310	625
35/5	545	316	382
221	641	610	375.6
232	560	1000	635
233	550	1030	494
234	552, 552.4	1042	451
234.2	587	DC 1	530, 560
235	553	DC 2	551
243	665, 666	DC 3	552, 552.2
244	670, 670.1	HC 64	536.2
245	666	HT.6KV 316	382
246	671	HT 32	378
248	674, 674.2	MT 14	610
<u>L' ELECTRO VERRE</u>			
20	557	84	679
32	601	205	380
33	611	208	350
34	251.7	2220	390
35/1	642	DC 1	574
35/3	640	DC 2	575
35.3	545	DC 3	576
81	666	DC 4	577.1
82	667	HC.63	535
83	675	HT 30	377
83T	675	HT 32	378

<u>Mfr. No.</u>	<u>CD No.</u>	<u>Mfr. No.</u>	<u>CD No.</u>
<u>L' ELECTRO VERRE (cont.)</u>			
IB 11	666	IB 22	679
<u>MIVA</u>			
85	516	BT 2 CA	572
396-920	558	BT 2 M	677.7
A 320	377.2	BT 2 V	655.5
A 325 CA	378.1	BT 3	677
B 85	516	BT 3 CA	568
B 100	517	BT 3 M	677.3
B 130	518	M 312	375
BT 1 CA	561	M 312 CA	375
BT 1 HCA	572.5	M 315 CA	376
BT 2	572.2, 678	PR 71	517
<u>P.F.C</u>			
8C-31	654	2124	670.1
2042	554	2129	676
2043.b	555	2142	378.6
2047	564.1	DC 2	551
2102	550, 550.1	DC 3	552
2103	549	DC 4	553
2120.b	657	I.B.11	666.2
2121	654	IHT-30	377.6
2123	666.2		
<u>VERLICA BELGIUM</u>			
BT 1	563.1	BT 18/TT	569
BT 10	565	BT 31	459
BT 11	504	BT 32	685
BT 14	676.5	BT 45	595
BT 15	682	BT 48	460
BT 16/TT	450	BT 100	571
BT 17/TT	578		

INSULATOR DRAWINGS BY SHADOW PROFILE

We can make essentially perfect mechanical drawings of any insulators remotely, without needing to see the actual specimens. It is not necessary to loan them by mail. All we need is a "shadow profile" and a few measured dimensions of the interior which do not show in the profile. This is all very easy to do, and here is how to do it in very little time.

The making of accurate shadow profiles requires a crisp shadow that can be easily traced, and a light source far enough away from the insulator to nearly eliminate parallax size error.



As shown in the diagram, block up the insulator perfectly vertical and close against a window pane of the house. Place a light source up to 20' or more (the farther the more accurate) from the window. Tape tack a piece of ordinary (not heavy) paper to the window pane on the opposite side from the insulator, and trace the shadow onto the paper.

An ordinary spot flashlight with fresh batteries gives crisp shadows even from further distances than required. The flashlight must be placed vertically and horizontally so that the light beam is perpendicular to the window pane. Use a small box or any rectangular object placed against the window to sight along its edge in order to position the light correctly.

Before tracing the profile, turn on the light and rotate the insulator until its top groove is lined up with the light beam, as you will notice by its shadow as you turn it. You should see the widest curve of that top groove.

Trace the shadow with a sharp pencil. Do not work in a dark room. Ordinary room light will not wash out the shadow contrast on the tracing paper, and it allows you to see where the pencil tip is moving as you trace the profile.

We need the raw profile just as made. Do not work on it to heavy it up or take out the wiggles in your lines, and do not sketch in any other details or any dimension lines, etc. Just a bare profile itself! You may make a sketch or a second profile on separate paper for the purpose of sketching hidden details or to aid in showing various dimensions of the insulator's interior. (See sketches 1 and 2)

Essentially, we need no dimensions of the exterior of the insulator which shows in the shadow profile, providing your light source is far enough away to ensure minimum parallax error. However, it is still a good idea to record the width and height of the insulator just to be sure they are correct. It is a fact that the shadow "grows" as the light comes closer. This is why it is so important to keep the light source at least 20' away.

Measure and record the following dimensions: (See sketches 3, 4, and 5)

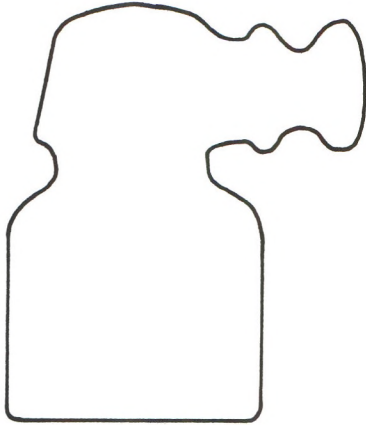
- A. Overall height of the insulator
- B. Overall diameter at base of the outer skirt
- C. Outside diameter of any interior petticoat(s)
- D. Amount petticoat extends below the skirt, or amount it is recessed above the skirt rim.
- E. Height of the "slot" between the outer skirt and petticoat(s)
- F. Height of the collar where the threads start.
- G. Height of the pin hole top
- H. Approximate diameter of the pin hole and thread "pitch"
- I. Thickness of skirt and petticoat(s) at their bottom ends

Make all vertical measurements from the very bottom surface of the insulator, whether that be an outer skirt or an interior petticoat. If you are measuring a slot depth between the outer skirt and an extended inner petticoat, measure it only to the bottom of that outer skirt, not the inner petticoat. The depths of pin holes, slots and collars can be determined easily by using a narrow strip of cardboard, or even a long pencil, to measure the penetration. The pin hole diameter is measured at the minor thread near the collar. If the pin hole is filled with cement, this measurement can be estimated.

Thread pitch, or number of threads per inch, is helpful in attributing foreign insulators, since a given country usually uses one thread size throughout. By taking a few simple steps, you can determine this measurement exactly. Smooth a 1/4" strip of new kitchen foil by rubbing it with your finger on a flat surface. For large pin holes, use a 1/2" strip. Insert the foil into the pin hole and press it against the thread with your finger. Using a ruler, count the threads per inch impressed on the foil. Since standard U.S. threads measure 4 per inch, a thread pitch higher than this indicates that your insulator is probably foreign.

Copy all the insulator markings the best you can, and indicate their exact location on the insulator.

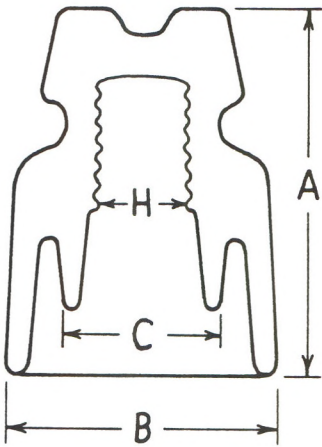
Shadow profiles can also be drawn completely indoors, by propping up a piece of glass vertically on the kitchen table and placing the flashlight down at the end of a long hallway. But remember, the distance must be at least 20'.



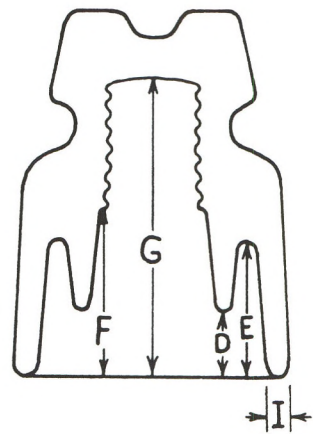
Sketch 1 - Raw Profile



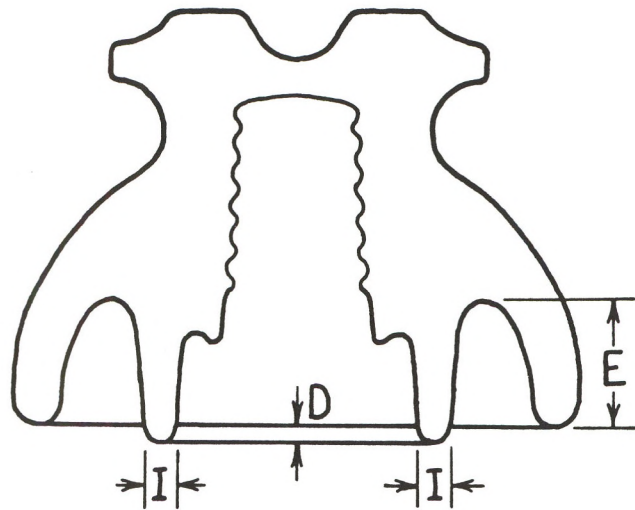
Sketch 2 - Crown Detail



Sketch 3



Sketch 4



Sketch 5

PREPARING GLASS INSULATORS FOR DISPLAY

Removing metal pins

Most all insulators manufactured in Europe, Asia and Africa will be secured onto rigid metal pins. Some of the materials used for this purpose are Portland cement, cement containing sulphur, plaster of Paris, or animal hair, string and strips of burlap that have been soaked in creosote. To provide a secure mounting between insulator and pin, whether the two are bonded together directly, or where a plastic threaded thimble is cemented in place, the pin hole of the insulator will be provided with one of the following: regular threads, segmented threads, annular projections, or a series of staggered depressions. The end of the pin that goes up inside the insulator may also add a bit of traction in the form of threads, notches in the metal or even a flattened out serpent's tail.

If you are the proud owner of a foreign insulator that is firmly attached to its pin, but you are at a loss as to how to display (and enjoy) it, you have several choices. (1) You can drill a hole in a chunk of cross arm or piece of wood and mount the insulator that way, or (2) you can use a hacksaw to saw the pin off even with the insulator base, so it will at least stand up, or (3) you can decide to remove the pin. If you choose the latter, read on.

Regardless of the material used to secure the pin to the insulator, it was never the manufacturer's intention that it should be removed, so it is not going to be easy. The key word is patience. You must not be in a hurry, because it may take several weeks, but it will be worth the wait. Just a few minutes a day devoted to this project will get the job done. It is not necessary that you stand and watch it.

You will need rubber gloves, old clothes and shoes, a long sharp ice pick, a pair of pliers, a plastic bucket with a lid, a source of water close by for rinsing, and a well ventilated place to work, preferably outside and away from the prettiest part of your lawn. Chances are you will be using hydrochloric (muriatic) acid at least some of the time, so your work area must also be away from pets and completely out of the reach of children.

The easiest pins to remove are those held in place with plaster of Paris. To hasten the process, soak the insulator in plain water for several hours, until the top layer of plaster is like thick paste. Scrape and poke and bore with the ice pick, then rinse, but go easy. It doesn't take much rough treatment to chip the threads or the inner skirt of the insulator. You may have to re-soak the plaster several times between sessions. After you have worked your way down into the pin hole and have removed a good bit of the material, start trying to move the pin back and forth. Place a pad under the insulator and hold it securely with one hand. Use the other hand to push and pull on the pin until you feel or hear some movement. This will tell you the bond of plaster is beginning to give way. At this point, tap gently on the end of the exposed pin with a pair of pliers, rotating the

insulator on the pad as you go. Resist the urge to hurry and don't tap too hard, or you may find yourself kneeling over a broken insulator!

Pins secured with Portland cement, cement with sulphur, or creosoted string, burlap and animal hair require the use of hydrochloric acid, which can be purchased in gallon jugs at the hardware store. Since the acid fumes are corrosive to anything metal, such as garden tools, a good place to set up your work area is against the far corner of the back fence. If you have just a few pins to remove, perhaps 2 or 3, set the insulators crown side down, pins up, in plastic cups. If the insulators do not have flat crowns, you can prop them up with wads of paper towel. Put on rubber gloves and, with a glass or plastic measuring cup, fill the area in and around the pin holes with acid straight from the jug. You will see an immediate reaction of bubbling and frothing, as the acid begins to work on both the cement and the metal. Keep your face turned away to avoid inhaling the fumes. Hydrochloric acid will dissolve the lime found in most cements, breaking up the top layer and allowing you to scrape it away after a few hours. Dump the used acid and loose cement into a separate plastic container and rinse the pin hole with fresh water. Then pour in fresh acid and let the insulator "cook" for a day. Some cements are not affected as quickly as others, but nearly all will dissolve eventually. Portland cement is the most satisfying material to work with because the acid actually turns the top layer to sludge, and you will be able to see progress daily. When you have removed a good bit of cement, begin again to use the tapping method to break the bond. Once you hear that knocking sound, you are on your way, but remember to go easy. Your life doesn't depend on getting the pin out on any certain day!

At some point, you may find yourself working with that squeaky yellowish cement laced with sulphur. This you must chip away because the acid will not touch it, and it is a long process. The acid will eventually dissolve the pin, however. At each work session, concentrate on removing the cement closest to the metal, and the pin will gradually shrink until it gives way.

Creosote, which is used along with hemp, string, burlap or hair to hold the pin in place, is particularly resistant to hydrochloric acid, but gasoline will dissolve it. Pour some in the pin hole and let it sit for a few days. The creosote will become gooey, allowing you wiggle the pin. Then you can use straight acid to eat up the particular fiber used.

If you have an insulator with just enough of the sawed off pin extending beyond the base to keep it from sitting flat on your shelf, you will be thinking unkind thoughts about the person who left it that way, and rightfully so. Proceed with your acid and ice pick and work your way down into the cement. Once the bond is broken, you won't be able to tap on the pin because there is danger of hitting the insulator instead. But if you can grasp the end of the pin with your pliers, hold it firmly and begin to work it back and forth. As it becomes looser, your fingers can take over.

If you have several pins to remove, little cups are not the answer. You will need something large enough to hold them all, such as a covered plastic garbage can. Always adding acid to water and not the other way around, soak the insulators for several days in a solution of 1 part of hydrochloric acid to 4 to 5 parts of water, enough to cover. Remove a few each day, scrape away what you can of the cement and return them to the bucket. Remember that as acid works, it creates heat, and if you have several insulators soaking at once, the solution gets very warm. Always wear rubber gloves when removing insulators from the bath and *never* take one that is still warm and rinse it with cold water. As many collectors have learned, glass can crack when subjected to rapid changes in temperature.

Cleaning insulators

Nearly all insulators that have seen service will have some soot or grease on the surface. The safest, surest and most popular cleaning agent is oxalic acid, which should be available through your local pharmacist. Here again, the acid is corrosive to metal, so use a covered plastic bucket. Using 2 ounces of the crystals for each gallon of water, mix enough to cover the insulators. It is safe to put your bare hands into the acid solution if you wash them with water quickly, but if you have scratches or cuts on your hands, it is best to use rubber gloves. Soak the insulators for at least 8 to 10 hours, then remove them and rinse with water. Any dirt that doesn't rub off easily will probably surrender to a few swipes with an SOS pad. If you are not satisfied with the results, return the insulators to the solution for a few more hours, and try again.

For really tough dirt and stains, we suggest using a solution of sodium hydroxide (caustic soda). It will not harm the surface of the insulator, nor is it corrosive to metal, but it is highly toxic, and can cause severe burns if it comes in contact with your skin or splashes into your eyes. The covered plastic bucket and rubber gloves are a must. This chemical is not always available in small amounts, but you will find it in a slightly weaker form in your grocery store under the name "Red Devil Lye", and it works just as well. Add 1 lb. of the crystals to each gallon of water, enough to cover the insulators. They can stay in the solution for up to 3 weeks without harm. At that point, they are as clean as they are ever going to be. This chemical makes the insulators very slippery, so take a firm hold when removing them from the bucket. One good feature of both oxalic acid and caustic soda is that, as long as these solutions are kept covered, they may be used over and over again without losing strength. They will become very dirty after a time and you may want to throw them away and start over, even though no cleaning power has been lost.

Silver wire stains and orange rust spots on insulators can be removed successfully by dipping an ordinary cotton swab in undiluted hydrochloric acid and dabbing it a few times over the affected area. Really tough spots may require additional treatments.

Good luck, be careful, and enjoy displaying those beautiful insulators!

YOUR INSULATOR LIBRARY

Listed below are a number of recommended publications in the field. We have made every effort to assure that ordering information is correct at the time of publication. However, we cannot guarantee prices and ordering information long-term, so it is wise to contact the seller before placing your order. This listing is by no means represented as being complete. At the end of the section, Book Dealer and Periodicals listings will assist in locating further material.

Albers, Marilyn and Tod, Jack H.

Worldwide Porcelain Insulators. 1982, softbound, 8 1/2 x 11", 84 pages. Universal (U) Style Chart of all known unipart styles of worldwide (except US) porcelain pin types, manufacturers' histories, all known markings and country attributions. \$8.75 plus \$1.25 shipping.

Worldwide Porcelain Insulators - 1986 Supplement. Softbound, 8 1/2 x 11", 42 pages. 160 styles added to the Universal Style Chart since the 1982 book plus much more information on manufacturers and insulator markings. Includes directions for making shadow profiles. \$9.50 plus \$1.25 shipping.

Order from: Marilyn Albers, 14715 Oak Bend Drive, Houston, TX 77079-6418

Cranfill, Gary G.

The Glass Insulator - a Comprehensive Reference. 1969, softbound, 144 pages. Insulators are listed by company, with excellent photographs and history. Numerous other illustrations complete this high quality work. \$10.00 plus \$1.00 shipping.

Order from: Gary Cranfill, 6353 Buckeye Lane, Granite Bay, CA 95661-9681

Gish, Elton N.

Multipart Porcelain Insulators. 1988, softbound, 132 pages. The first and only publication devoted to porcelain multipart pin insulators manufactured in the United States, this work contains photographs and/or drawings of every style used in high tension work in North America which has been located by the author. In addition, there are specification charts and numerous copies of catalog illustrations from past years. This book covers a once-common item which is fast disappearing from our landscape. \$16.00 plus \$1.25 shipping.

Order from: Elton N. Gish, P.O. Box 1317, Buna, TX 77612

Guthrie, Michael G.

Fake, Altered and Repaired Insulators. 1988, softbound, 18 pages. Unfortunately, wherever specific items acquire a value due to their age or rarity, there are attempts to imitate and sell to the unwary. Insulators are no exception. Guthrie outlines in detail the various ways in which this is accomplished. His booklet should be in the hands of every collector and most importantly the inexperienced, who are contemplating a substantial investment in rare pieces. \$6.00 mailed prepaid.

Order from: Michael G. Guthrie, 1209 Menlo, Fresno, CA 93711-1477

Lauckner, Mark

SPEC-TRUE - Color Reference for Transparent Glass, 1991. Enables the collector to describe up to 1.6 million color shades with a 9-digit number. Kit includes 16 pages of instructions, lighting correction filters, milk glass matching slide, and 110 color mixing slides. \$20.00 plus \$3.50 shipping (Request U.S. Postal Money Order only).

Order from: Mark Lauckner, Mayne Island, B.C., Canada VON 2JO

McDougald, John and Carol

A History and Guide to North American Glass Pintype Insulator. 1990, two volumes, softbound. Volume 1 - 180 pages. Volume 2 - 325 pages.

Volume 1 is devoted to history of the organizations and people who manufactured the insulators. An attempt has been made to give as complete an account as possible in each case. Numerous photographs of manufacturing plants and the people involved with them appear throughout, as well as copies of a number of relevant US patents and other items of interest. Copies of embossed markings on the insulators themselves plus 8 full-color plates complete the volume.

Volume 2 is devoted to alpha-numeric listings of every insulator style known to the authors, including markings and color variations. In nearly every case, a full-size photograph of the style is included, as well as smaller insets in some instances to show variations within the style designation.

Also available is a separate Price Guide (1991, 118 pages) covering all the insulators listed in Volume 2. \$48.50 postpaid for Volumes 1 and 2; \$16.00 postpaid for accompanying Price Guide; or order all three books for \$63.00 postpaid.

Order from: Carol McDougald, P.O. Box 1003, St. Charles, IL 60174-1003

Milholland, Marion and Evelyn

Most About Glass Insulators, 4th Revision. 1976, hardbound, 456 pages. One of two primary reference books on North American glass insulators. Features photographs of virtually every style of pin insulator known at the time of publication, as well as many other types of glass insulators. Includes detailed tabulation of markings, color variations for each listing, and much related text. \$28.00 postpaid.

Order from: C.D. Walsh, P.O. box 638, Freeland, WA 98249

Keating, Paul

1990 Milholland Price Guide. Softbound, 159 pages. Carefully detailed listings reference every insulator included in the Milholland book. \$15.00 postpaid.

Order from: Paul Keating, 1705 S. 41st Street, Tacoma, WA 98408-1610

Mills, Brent

Porcelain Insulators and How They Grew. 1970, hardbound, 228 pages. A detailed history of the US porcelain insulator industry, written by the retired president of Lapp Insulator Company. Covers major manufacturers of wet process pin types. Although not collector-oriented, this excellent work is a must for the library of serious porcelain collectors. \$10.00 postpaid.

Order from: Chris Hedges, 4525 Summit Street, Kansas City, MO 64111-0368

Neal, W. Keith

Searching for Railway Telegraph Insulators. 1982, hardbound, 92 pages. This book contains 135 illustrations, most of them photographs of insulators and telegraph poles throughout Britain, taken by the author over the past 60-plus years. The text gives the story of the author's insulator collecting, as well as much information concerning the insulators themselves. \$22.50 postpaid.

Railway and Other Rare Insulators. 1987, hardbound, 32 pages. A follow-up to "Searching for Railway Telegraph Insulators", contains more than 30 photographs, with additional data on some very rare insulators as well as on the author's early collecting experiences. \$15.00 postpaid.

Order from: N.R. Woodward, P.O. Box 171, Houston, TX 77001

Tod, Jack H.

Electrical Porcelain - a History of the Industry in the United States. 1977, softbound, 180 pages. The comprehensive reference book on all forms of electrical porcelain insulators other than pin types and high voltage insulators. Contains the history of electrical porcelain insulators from their inception to modern times, histories of all companies (over 100) known to have made electrical porcelain insulators, every known manufacturer's marking on electrical porcelain, illustrations and descriptions of all wiring insulator types, manufacturing processes, and all pertinent registered trade marks. Additionally, it has a listing along with brief data on every insulator patent (nearly 700), from 1880 to date, which is potentially of any interest to collectors, including hundreds of patents on porcelain and glass pin types. \$14.74 plus \$1.35 shipping.

Porcelain Insulators Guide Book for Collectors, Third Edition. 1988, softbound, 160 pages. The standard reference on unipart pin type insulator, including both dry and wet process. Evolution of insulator styles, the Universal Style Chart with scale drawings of every known US style manufactured (982), history of all manufacturers, every known marking on pin types, etc. The primary reference used by insulator collectors. \$24.94 plus shipping.

Order from: Caroline Tod, P.O. Box 20148, Wickenburg, AZ 85358

Tucker, Mike

In Search of Threadless - A source Guide for Threadless Diggers. 1990, softbound, 74 pages. Written primarily for those interested in digging for threadless insulators, it gives practical suggestions on how and where to find them. Includes 12 large maps which show the location of various old railway lines throughout the United States and Canada.

Order from: Mike Tucker, 508 West Cherry, Cherokee, IA 51012

Woodward, N.R.

The Glass Insulator in America, 1988 Report. Softbound, 99 pages. The history of threaded pin type glass insulator manufacture in North America. Condensed data on manufacturers and complete cross-reference lists between Consolidated Design Numbers (CD Numbers) and manufacturer numbers, as well as scale drawings of most known styles. This basic reference also includes a list of patents referred to on the older insulators, as well as others relating. The companion book to *Glass Insulators from Outside North America*, it completes the CD numbering system. \$15.00 postpaid.

Order from: N.R. Woodward, P.O. Box 171, Houston, TX 77001-0171

Book Dealer

Michael G. Guthrie, 1209 W. Menlo, Fresno, CA 93711-1477

"Your One-Stop Shopping Center". In addition to a number of the books listed above, Guthrie also offers a variety of others on related subjects. These include some out-of-print items, as well as used books as they become available.

It is suggested that you write for his list of items in stock, and make known any out-of-print works needed to complete your library.

Periodicals

Crown Jewels of the Wire, issued monthly. Carol McDougald, Editor. The only nationally circulated magazine devoted exclusively to the insulator collecting hobby. Features articles, research department, porcelain insulator column, foreign insulator column, letters from collectors, show reports, classified ad section, etc. In addition to the regular subscription, a separate issue published in October of each year, is devoted to a name-and-address directory of subscribers and National Insulator Association members. Softbound, 8 1/2 x 5 1/2". \$17.00 for 12 issues, mailed second class; \$25.00 for 12 issues, mailed first class; In addition to regular subscription price, Subscriber/NIA Member Directory issue is available for \$4.00, if mailed in October, but \$5.00 when mailed any other time.

Order from: Carol McDougald, P.O. Box 1003, St Charles, IL 60174

The Rainbow Riders' Trading Post - For Insulator Collectors, issued monthly. Published by Keith Auchter and Ron Norton, and edited by Patti Norton. This publication specializes in the trading of insulators and does not include ads which offer them for sale. However, educational items such as books, color guides, etc. may be purchased through the magazine. *Rainbow Riders* has one purpose - to provide an equal opportunity for all collectors, no matter what their income, to acquire desirable insulators through trading with others in the hobby. In addition to ads, the magazine includes letters to the Editor, informative articles, a show calendar, and follow-up show reports.. \$24.00 for 12 issues, mailed first class. \$1.00 for an up-to-date list of current subscribers.

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