

Acme Coke
11236 S. Torrence Ave.
Chicago IL 60617



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Coke Oven Door Test Program

Dated: 1991



ENPROTECH CORP.
3221 WEST BIG BEAVER, SUITE 301
TROY, MICHIGAN 48064
TEL: 313-643-4920 FAX: 313-643-6835

*Dick
Lanczy*

July 24, 1991

Mr. Jack Garzella
Superintendent, Coke Plant
ACME STEEL COMPANY
11236 S. Torrence Avenue
Chicago, IL 60617

Re: Acme's Coke Oven Door Test Program

Dear Jack:

The opportunity to have met with you and your people on July 3, 1991 is greatly appreciated. It was interesting to learn of the program you are initiating for testing of coke oven doors as a part of your overall program toward meeting the requirements of the 1990 Clean Air Act Amendments. This appears to be a very good approach.

As you requested during that meeting, enclosed is our proposal, three copies, for the supply of 2 pusher side and 2 coke side Ikio Model II Coke Oven Doors for trial on the Acme coke oven batteries. Please call if there are any questions about this proposal, or if you should wish to discuss any points in greater detail.

As the second step of your program involving doors, we look forward to quoting your complete needs. In this regard, we wish to be advised as to the date you wish to receive that proposal so that we can be timely with respect to your needs, and as current and competitive as possible in our pricing for each section of that Proposal. Our intent is to address your needs by quoting as follows:

A. Five Year Lease Program for:

110 pusher side doors.
110 coke side doors.

Acme may wish to consider 108 of each of the doors, allowing the trial doors to make up the 10 % spares required.

B. Services of a Trainer/Advisor:

Price for one year, full time, with possible extension.

Mr. Jack Garzella
Acme Steel Company, Coke Plant
July 22, 1991
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Purpose: To train and advise Acme personnel on all aspects of a successful door emission control program using the Ikio doors.

C. Reuse of Existing Latches:

We will plan to provide a take out price if it is determined possible to use the existing door latches of Acme on the new Ikio doors.

D. Door Maintenance Projection:

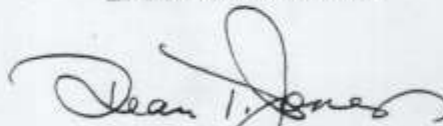
We will provide Acme with an estimate of manpower to be required for the maintenance of the Ikio doors during the 60 month leasing period.

In addition to identifying the most effective coke oven doors, Acme is interested in exploring various other pieces of coke oven equipment. We will intend to handle these items separate of the door trial and replacement program. This equipment includes oven machinery spotting device, coke oven door cleaners, smoke sleeve seals, and door extractors. On those items where we have exceptionally good equipment, and references available, we will arrange to meet and discuss these with you collectively or individually depending upon the information we have available at a particular time.

We will appreciate being notified of your desired timing for receipt of our quotation for the full compliment of doors. Regarding the attached Proposal for trial doors, please contact me if there are any questions. We look forward to receipt of Acme's order for these doors, and working with you in your programs to meet the door emission limits of the CAAA.

Very truly yours,

ENPROTECH CORP.



Dean T. Jones
Director, Market Development
Coke, Iron & Steel

DTJ/jd

Enclosed: Proposal: Trial Doors (3 copies)
BDJ72212

PROPOSAL

**TO ACME STEEL COMPANY
CHICAGO, ILLINOIS**

**FOR THE SUPPLY OF
IKIO MODEL II COKE OVEN DOORS**

Enprotech Corp.
3221 W. Big Beaver Rd.
Suite 301
Troy, MI 48084
(313) 643-4920
July 24, 1991



ENPROTECH CORP.
3221 WEST BIG BEAVER, SUITE 301
TROY, MICHIGAN 48064
TEL: 313-643-4920 FAX: 313-643-6835

July 24, 1991

ACME STEEL COMPANY
Coke Plant
11236 S. Torrence Ave.
Chicago, IL 60617

Attention: Mr. Jack Garzella, Superintendent

Re: Proposal for the Supply of
Ikio Model II Coke Oven Doors
For Trial

Gentlemen:

We are pleased to quote the supply of 2 pusher side and 2 coke side Ikio Model II Coke Oven Doors for trial on the coke oven batteries at Acme Steel Company's Chicago Coke Plant.

I Scope of Work:

A. Enprotech Corp. will:

- (1) Have service engineer visit Acme Steel to make representative determination of existing door jamb distortions, and to confirm other necessary dimensions.
- (2) Perform all engineering and prepare drawings.
- (3) Provide drawings for approval to Acme Steel.
- (4) Advise Acme Steel concerning refractory plug requirements.
- (5) Provide 2 pusher side and 2 coke side doors for trial. Refractory plugs will not be included with these doors.
- (6) Provide service engineer for up to one week to supervise initial installation of the Ikio doors, and to provide instruction to Acme Steel employees.
- (7) Provide Maintenance Manual.
- (8) Follow up with Acme Steel concerning the use and testing of the Ikio doors, and provide assistance if required.

I Scope of Work (Continued):

B. Acme Steel will:

- (1) Provide required existing drawings to enable Enprotech to design the doors for retrofit to the batteries.
- (2) Review and approve assembly and section drawings provided by Enprotech.
- (3) Receive and unload the doors when delivered.
- (4) Install refractory plugs per instructions from Enprotech.
- (5) Advise Enprotech when ready to place the doors into operation.
- (6) Install doors into warming racks for a period of no less than 24 hours prior to placement of the doors into service.
- (7) Install the doors on selected ovens with Enprotech's representative present.
- (8) Make employees available for instruction by Enprotech.
- (9) Monitor results of doors and share the data with Enprotech.

II. Description of the Ikio Model II Coke Oven Doors:

Please see Appendix 1.

III. Price:

Enprotech's price for the 2 pusher side and 2 coke side Ikio Model II Coke Oven Doors is as follows:

Pricing is lump sum, fixed, FOB Acme Steel Coke Plant.

- A. Two pusher side doors, without door plugs.....\$33,800.
- B. Two coke side doors, without door plugs.....\$30,400.
- C. Door adjusting tools, 2 sets.....included

III. Price (Continued):

- D. Spare Parts, none required..... *
- E. Installation/Training Supervisor.....included

TOTAL PRICE FOR TRIAL DOORS \$64,200.

- * Due to the rugged construction of the Ikio doors, for a trial period of six months, Enprotech's experience is that no spare parts are required. If Acme Steel is not comfortable with this, we will suggest spares and submit our price.

The price offered to Acme Steel is significantly below the actual cost to design and construct 2 pusher side and 2 coke side doors. Costs of engineering to retrofit the two different doors to Acme's coke batteries, and the costs of patterns for the castings both elevate the total costs per door since only two doors of each design are involved. Enprotech, however, offers this favored price to Acme Steel in order to share in the cost aspects of this trial along with Acme Steel Company.

IV Payment Terms:

Payment for the trial doors will be net 30 days based upon invoice submitted on the date of delivery of the doors.

V Schedule:

It is anticipated that the 4 trial doors will be delivered to Acme Steel's Coke Plant in approximately 35 weeks following the receipt of Acme's order.

VI Performance:

The Ikio Coke Oven Doors are expected to meet Acme Steel's door emission target of 5 % or less. Please see Appendix 2.

Proposal: ACME Steel Company
Ikio Coke Oven Doors, Trial
July 24, 1991
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VII Acme's Interest in Leasing of Future Doors:

In so far as Acme Steel has indicated the desire for an offer of a 60 month lease arrangement for the full compliment of approximately 110 pusher side and 110 coke side doors, Enprotech Corp. confirms that we have both the capability and the interest to structure such an arrangement for Acme Steel Company.

At this point in time exact lease payment amounts cannot be calculated without the benefit of knowing specific quantities, scope of work, and effective dates of such an agreement. We can offer that such a typical lease arrangement would involve semi-annual payments calculated on a unit basis for the quantity of pusher side and coke side doors involved, and the costs to provide them at the time of entering into such an agreement.

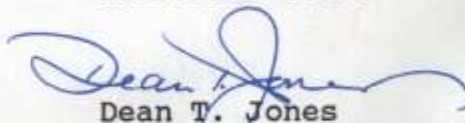
VIII Validity:

This Proposal for the supply of trial doors is valid for a period of 60 days from the date it is submitted to Acme Steel. Thereafter, it will be subject to review of prices and other terms and conditions.

Enprotech Corp. looks forward to working with Acme Steel Company during this trial of the Ikio Model II Coke Oven Doors, and we are confident that during the trial period Acme will gain a full appreciation for the rugged construction, emission control capability, and the low maintenance requirements of the Ikio doors.

Very truly yours,

ENPROTECH CORP.



Dean T. Jones
Director, Market Development
Coke, Iron and Steel

APPENDIX 1

July 24, 1991

DESCRIPTION OF THE IKIO COKE OVEN DOOR

A. Description of the Ikio Model II Coke Oven Doors:

The Ikio Coke Oven Doors were initially developed in 1975, and have since come into use world wide as a result of their proven capability to control emissions, their rugged construction designed to accommodate inherent coke plant conditions, and their long service life. Approximately 5000 of the Ikio doors have been placed in service since their inception. The Ikio door is patented in the United States and other countries. In the United States there are two active patents which cover the unique aspects of the Ikio design. These patents are as follows:

United States Patent No. 4,086,231

United States Patent No. 4,198,274

The Model II Ikio Doors, developed in the early 1980's, consist of the same basic design of the original Ikio door with differences involving improvement of material used in one component of the door, and one minor design improvement.

The Ikio door consists of a heavy rigid cast iron door body which includes latching mechanisms consistent with the coke oven battery and door extractors for which it is designed. This main door body includes housings for springs and plungers which are utilized in the application of spring forces to the knife edge, or sealing strip, to the jamb sealing surface.

This knife edge is mounted on the peripheral edge of the diaphragm which is separated from the main door body by an air space, the unique feature of the Ikio doors. The air gap enables the main door body to be kept cooler, thus minimizing heat distortion; permits the diaphragm to flex independent of the door body, thus conforming to the jamb profile; and allows the diaphragm to expand or contract during thermal cycling without restrictions from the heavy main door body.

The diaphragm assembly includes a slide plate for the purpose of maintaining the spacial relationship with the door body, and a castable plate, or brick boxes, for holding of the castable, or brick, door plugs to the assembled door. The door plug material is generally specified by the user, but should be selected to withstand temperatures of up to 2732^oF (1500^oC).

APPENDIX 1

Description of the Ikio Model II Coke Oven Doors

July 24, 1991

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B. Materials of Construction:

Materials of construction for the basic components of the Ikio doors are as follows:

Main Door Body	Cast Iron
Slide Plate	Carbon Steel
Diaphragm	Carbon Steel
Knife Edge	Ducol
Castable Plate	Carbon Steel
Latch Bar	Cast Steel
Latch Spring Housing	Cast Steel
Latch Spring	Spring Steel
Plunger Housings	Cast Iron
Plunger Springs	Spring Steel, and
Plunger Springs(top)	Stainless Spring Steel

C. Flexibility of the Ikio Doors:

Prior to the design phase of the doors, Enprotech will visit the Acme Steel Coke plant and make representative measurement of jamb distortion on the coke oven batteries, and will consider the amount and type of distortion detected in the design of the spring plungers for the test doors. The Ikio doors are capable of accommodating simple and compound jamb distortions while maintaining an effective seal.

D. Cleaning Requirements:

Cleaning requirements of the Ikio doors are that the gas space (the area between the door plug and the knife edge) be cleaned after each oven push, removing tar, pitch, any coal particles and carbon formations down to the point that the cross sectional area of the gas space is essentially 100% of the designed area. The sealing surface of the knife edge which makes contact with the jamb surface, should not be cleaned due to potential damage. This edge, kept in proper adjustment with relation to the jamb surface, will not accumulate any significant deposits. Door jambs should be cleaned down to metal after each oven push. Door plugs (tops, bottoms and sides) should be cleaned with sufficient frequency to prevent carbon formations impairing replacement of doors into the oven after pushes, and preferably after each push.

APPENDIX 1

Description of the Ikio Model II Coke Oven Doors

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D. Maintenance of Doors:

Maintenance requirements of the Ikio doors is generally quite low unless the doors are damaged through mishandling or improper cleaning. Preventive maintenance should be performed as follows:

- (1) The gap between the plunger plug and lock nut, as well as between the adjusting screw and lock nut should be visually checked occasionally (1 to 2 months).
- (2) Loosen and re-tighten bolts in each section every 3 to 6 months.
- (3) Inspect knife edge and diaphragm for corrosion or damage every 6 months.
- (4) Inspect door plug lining every 6 months.
- (5) Inspect a representative sample of plunger springs for possible heat damage (free height) every 6 - 12 months.
- (6) Inspect latch springs for free standing height to detect heat damage, every 2 - 3 years.
- (7) Check door jamb and door body for warpage every 2 - 3 years.
- (8) Under normal wear and proper cleaning, expected renewal of diaphragm and door plug is about every 7 years.

E. Weight of Doors:

The weight of each Ikio Door for Acme Steel coke oven batteries , with door plugs, is approximately:

Pusher side: 7,860 pounds.

Coke Side: 8,370 pounds.

IKIO DIAPHRAGM TYPE

OVEN DOOR

IKIO IRON WORKS CO., LTD.
IKIO ENGINEERING CO., LTD.

IKIO DIAPHRAGM TYPE
COKE OVEN DOOR
MODEL — II

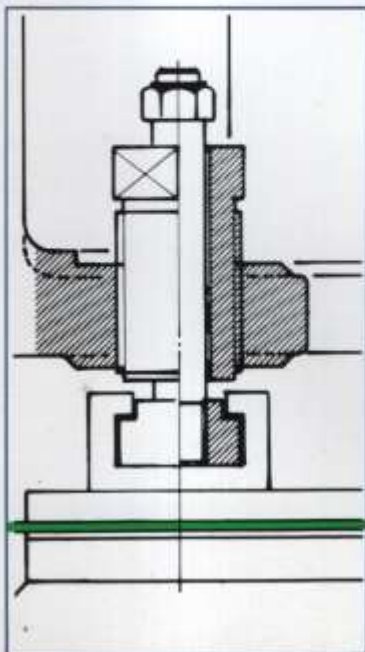
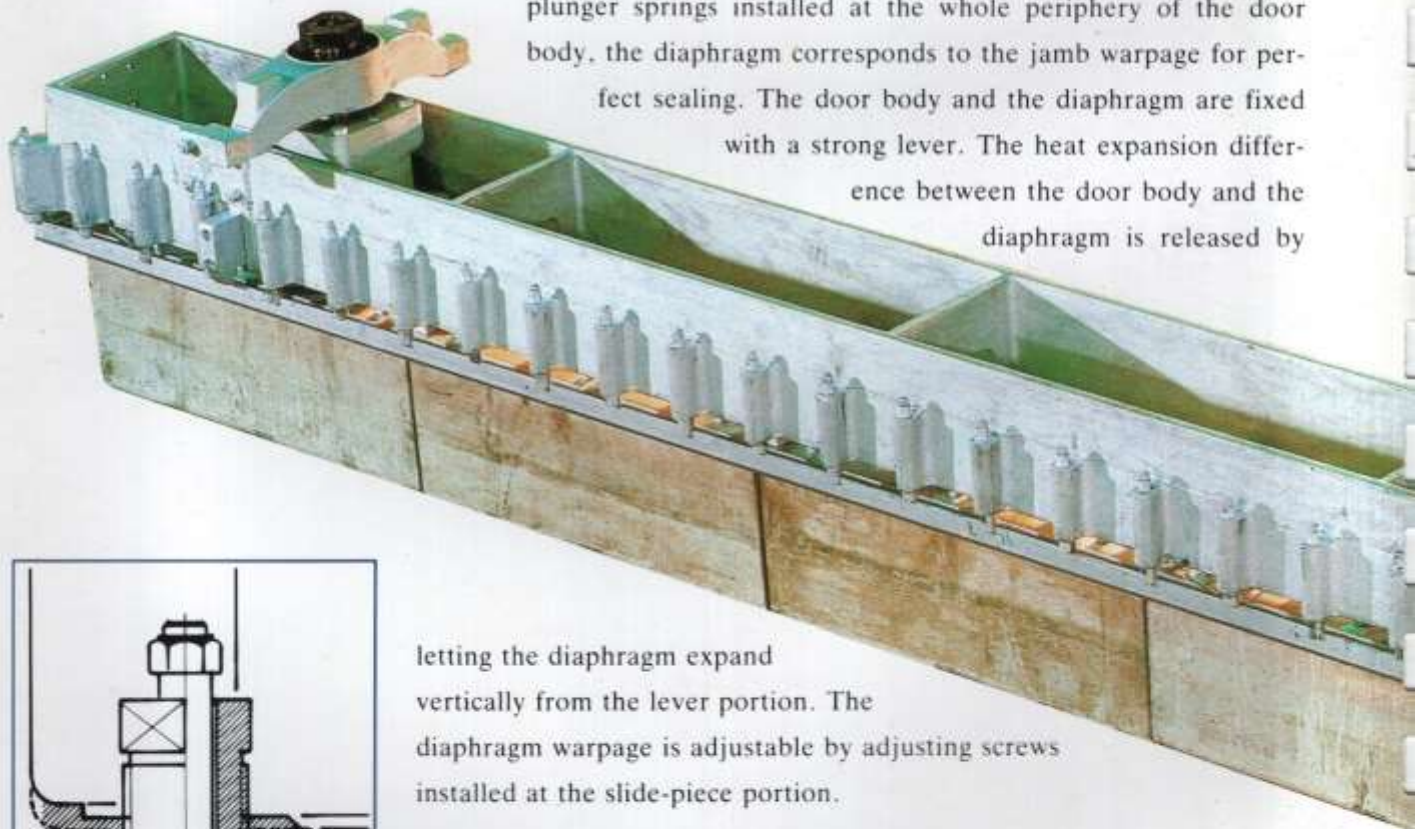
IKIO DIAPHRAGM TYPE COKE OVEN DOOR MODEL-II

- 1) How much is gas leakage from coke oven doors at your plant?
- 2) How do you think about energy loss and pollution problem due to gas leakage from doors?
- 3) We are a special-purposed company for engineering and manufacturing of coke oven doors, and are making various coke oven doors by our original technologies. Succeeding to IKIO DIAPHRAGM TYPE MODEL-I, we have developed MODEL-II.

4) Features of MODEL-II

4-1) An air-gap is provided between the door body and the diaphragm. Due to low heat conductivity to the door body, heat radiation from the door body is decreased. Door body warpage is minimized, door handling is easy, ambient temperature in front of ovens is lowered, and circumstantial conditions in front of ovens are improved.

4-2) A thick plate is used to the diaphragm for sufficient strength. By means of plunger springs installed at the whole periphery of the door body, the diaphragm corresponds to the jamb warpage for perfect sealing. The door body and the diaphragm are fixed with a strong lever. The heat expansion difference between the door body and the diaphragm is released by



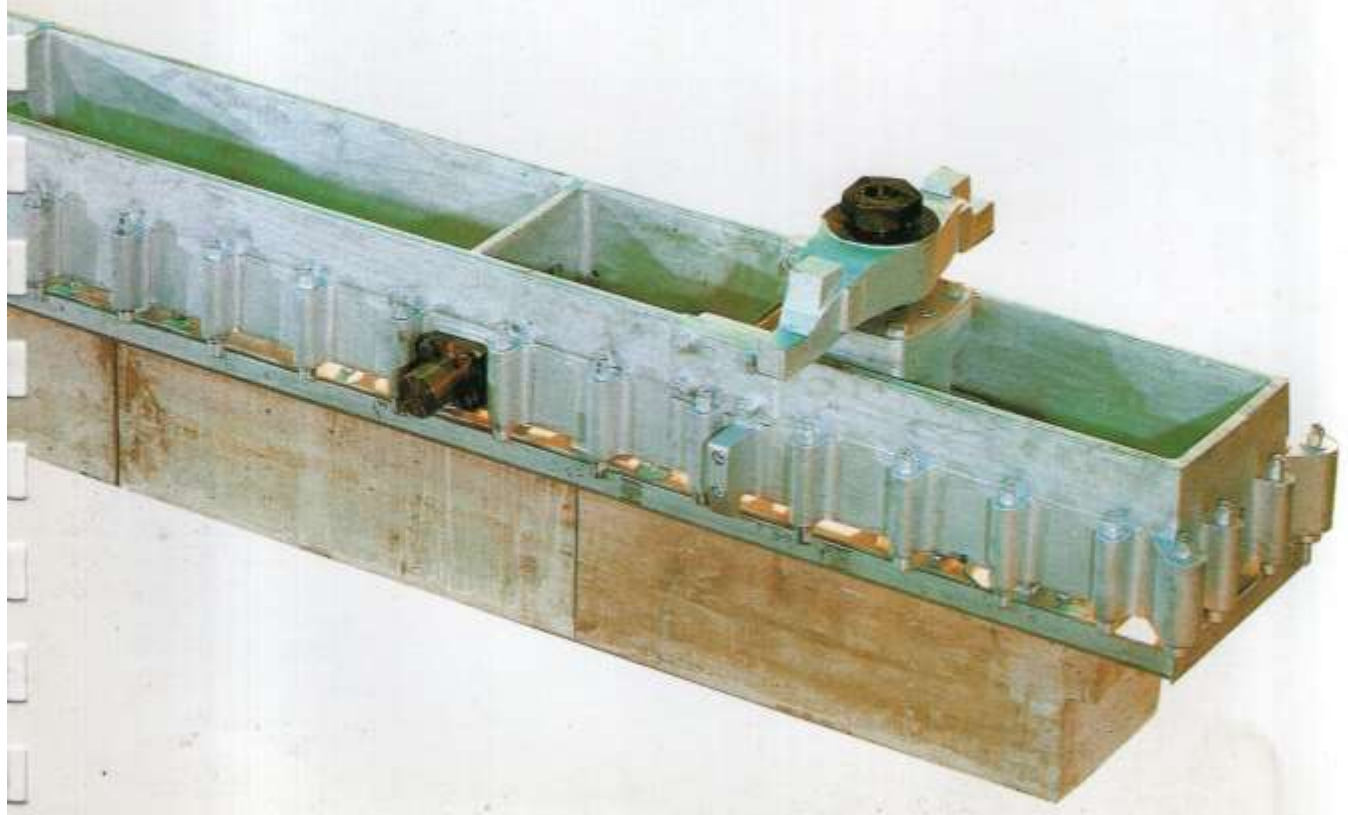
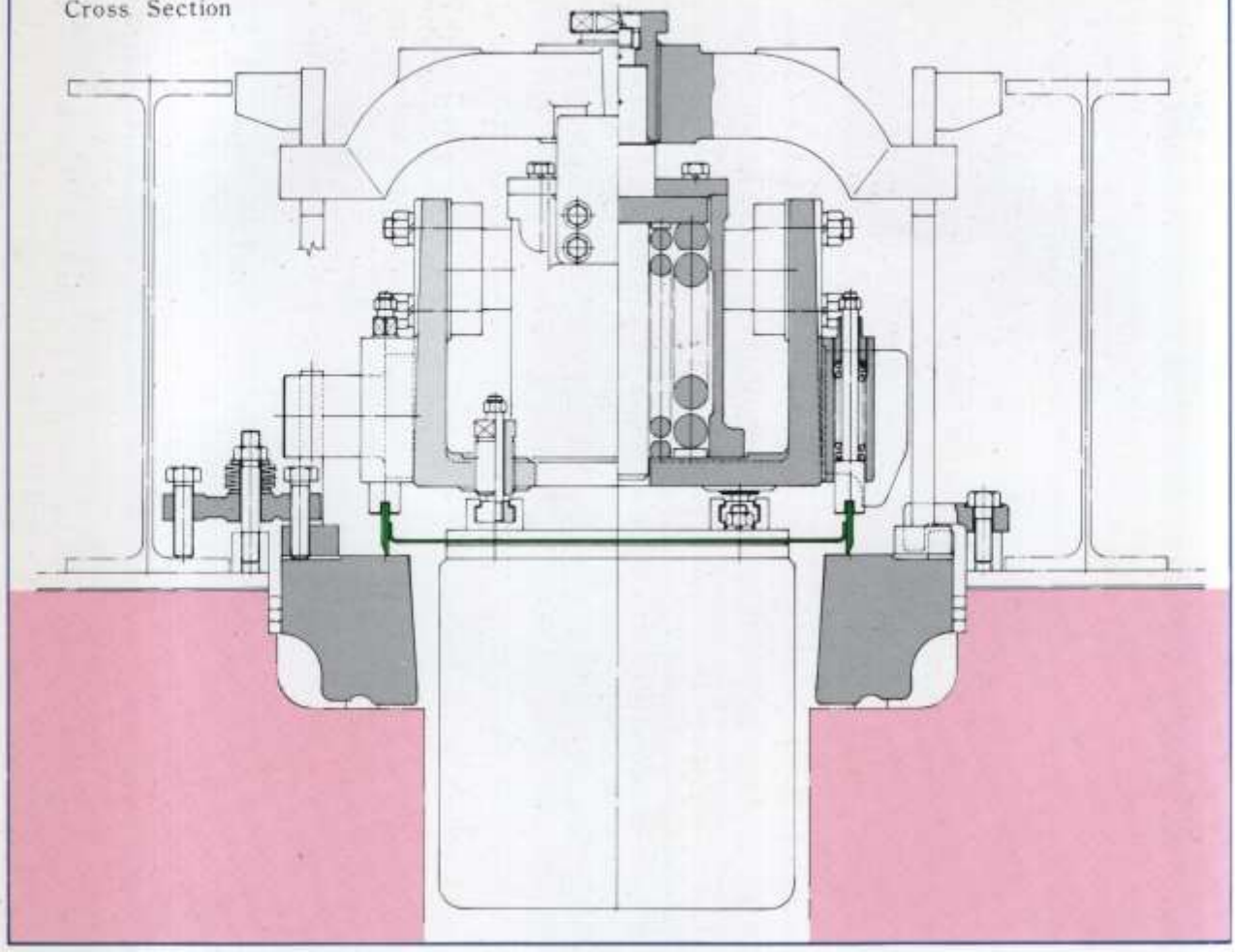
letting the diaphragm expand vertically from the lever portion. The diaphragm warpage is adjustable by adjusting screws installed at the slide-piece portion.

Remarks:

If you have any question on coke oven doors, please do not hesitate to contact us. We have many engineers and are capable of furnishing coke oven doors that ensure satisfactory operation.

Structural Specifications

Cross Section





IKIO IRON WORKS CO., LTD.

1712-36, OZAKI, ONGAMACHI-ONGAGUN, FUKUOKA, JAPAN.

PHONE : (093) 293-1971

FAX : (093) 293-1970

TELEX : 712538 IKIO J

ACME STEEL COMPANY
Chicago, Illinois
NO. 1 & 2 Batteries
July 22, 1991

APPENDIX 2

Guarantees of Ikio Coke Oven Doors, Model II

I Emission Guarantee

Enprotech Corp. and Ikio Iron Works Co., Ltd. will guarantee control of gas leakage from the Ikio Coke Oven Doors to 5 % or less visible emissions, as tested by the standard E.P.A. regulatory test methods, and under the following conditions.

1. Deposits of tar and carbon material shall be removed from the sealing surfaces of the door jamb, gas space area of the diaphragm, and from the door plug by manual cleaning, under normal operation methods, each time the doors are removed.
2. Initial adjustments are to be performed at the time the new Ikio doors are placed in service. Proper adjustment of the plunger springs will be maintained. With the proper adjustments and cleaning the door will seal the gas automatically.
3. Sealing surfaces of door jambs and knife edges, and diaphragms of doors should not be damaged. It is absolutely necessary to repair any damage to those areas if damage occurs.
4. At the time of any test, the conditions of refractory linings, door components and jamb surfaces must be found satisfactory to Enprotech/Ikio.
5. If the performance tests are not performed within four months after installation on the battery, or within one year following delivery of the doors, for any reason other than the fault of Ikio or Enprotech, then all doors shall, for the purposes of this guarantee, be deemed to have satisfied the performance test.
6. Periodic inspection of doors will be made at the repair station.
7. There will be proper operation and maintenance of the door extractors, door and jamb cleaners.

II Other Performance

In case any problem arises due to faulty design or workmanship, replacement will be supplied within one year of the start-up of use of the doors or no longer than 15 months after delivery of the doors. It is expected, but not guaranteed, that the diaphragms, knife edges, and knife edge plunger assemblies will last seven years or longer in service, and that the main door bodies and latching mechanisms will last for the life of the coke battery, providing that there has been no damage to the doors by fire or other causes.

III Failure to Meet Performance Guarantee

If, due to reasons within the responsibility of Enprotech Corp. or Ikio Iron Works Co., Ltd., Performance Test has not been successfully executed within the time limits agreed, Enprotech and Ikio will take all possible measures to remedy and improve the performance, at Enprotech's and Ikio's expense, including but not limited to redesign and replacement of the critical parts of the doors to attain the performance guarantees.

In the event that it is determined that it is not possible to correct problems which have prevented a successful performance test, ACME Steel Company will be repaid for the defective doors up to a maximum of 5 % of the total contract price, and there will be no further obligation under the contract by Enprotech Corp. or Ikio Iron Works Co., Ltd.