

PLAINTIFF'S EXHIBIT

CHV-724

105-59 Fourth Compressor
EST-1901 Order File

Chevron BB
013258

JEH-AVV

MATERIAL REQUISITION

Re Route File

TO EL PASO PURCHASING DIVISION

Order No. _____

FOR
PURCHASING
DIVISION
USE

CLARK BEAS CO.

Requisition No. _____

Date _____

Place _____

QUANTITY	DESCRIPTION OF MATERIAL	ITEM NO.
1	only mechanical balance tachometer and all material required for mounting on Clark HRA-4 compressor mounted on SETEN EVER EST-9109	1
5	copies of installation and operating instructions, parts dissection drawing & parts list	

Chevron BB
013260

Price _____ FOB _____

Charge to Account # R-11-1

Ship To Source - El Paso

Attention of L. McClellan Department Mfg.

Ship Via _____

Collect
Prepaid

Date Required at Destination October 4, 1954 (Source if possible)

Requisition Prepared By M. McClellan Date 7/30/54 Approved By _____

TO _____

APPROVE		REMARKS
COMMENT		
FILE		
HANDLE		
NOTE		
RETURN FILE		
SEE ME		
TRACE		

FROM _____

GO-24 (3,000M 11-83)

Chevron BB
013261

DOMESTIC SERVICE	
Check the class of service desired; otherwise this message will be sent as a full rate telegram	
FULL RATE TELEGRAM	SERIAL
DAY LETTER	NIGHT LETTER

WESTERN UNION

1211

INTERNATIONAL SERVICE	
Check the class of service desired; otherwise this message will be sent at the full rate	
FULL RATE	LETTER TELEGRAM
VICTORY LETTER	SHIP RADIOGRAM

W. P. MARSHALL, PRESIDENT

NO. WDS.-CL. OF SVC.	PD. OR COLL.	CASH NO.	CHARGE TO THE ACCOUNT OF	TIME FILED
			CHG: 1870	

Send the following message, subject to the terms on back hereof, which are hereby agreed to

EL PASO, TEXAS
AUGUST 3, 1954
3:20 PM

CLARK BROTHERS COMPANY
HOUSTON, TEXAS

REFER YOUR QUOTATION NY311 DATED 2/19/54. YOU INCLUDED ELECTRIC
TACHOMETER \$300.00 ADVISE DELIVERY. ALSO ADVISE PRICE AND DELIVERY
MECHANICAL TACHOMETER FOR MOUNTING ON NEW COMPRESSOR FURNISHED ON
ORDER NYT-9101 YOUR INVOICE NY953-1.

STANDARD OIL COMPANY OF TEXAS

AQ VQ WINTER

JES:MM

TO Don O'Neill

APPROVE		REMARKS
COMMENT		
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RETURN FILE		
SEE ME		
TRACE		

FROM _____

GO-24 (3,000M 11-53)

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or preceding the address.

WESTERN UNION

FX-1201

W. P. MARSHALL, PRESIDENT

SYMBOLS

DL=Day Letter
NL=Night Letter
LT=Int'l Letter Telegram
VLT=Int'l Victory Ltr.

The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

HOUSTON, TEX. AUG 19

STD OIL

ATTN MR. A. V. WINTHER

RE TACHOMETER EQUIPMENT. ELECTRIC TACHOMETER AND EQUIPMENT \$300.00

NET FOB RACTORY. MECHANICAL RELIANCE TACHOMETER AND EQUIPMENT

\$150.00 NET FOB FACTORY. BEST SHIPMENT FOUR TO FIVE WEEKS.

CLAKR BROS. CO. G. D. SMALE

Refer - Purchasing Dept. Quotation File.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

Chevron BB
013264

SEND D. O'Hill
 TO Engr Dept

APPROVE		REMARKS
COMMENT		
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RETURN FILE		
SEE ME		
TRACE		

FROM _____

GO-24 (967M 7-46)

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or preceding the address.

WESTERN UNION

W. P. MARSHALL, PRESIDENT

FX-1201

SYMBOLS

DL=Day Letter

NL=Night Letter

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The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

**F. H. HAYES, DISTRICT MANAGER
CLARK BROTHERS COMPANY
HOUSTON, TEXAS**

**EL PASO, TEXAS
AUGUST 18, 1954
9:00 AM**

**REFER TO OUR TELEGRAMS OF AUGUST THIRD AND ELEVENTH. WHEN ARE YOU GOING TO
FORWARD A REPLY.**

STANDARD OIL COMPANY OF TEXAS

A. V. WINTHER

**JES:RM
CHG: MFG.**

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

SERVICE INVOICE

COPY

CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.
OLEAN, NEW YORK

NO. S- 2351

BILL TO

INVOICE DATE 7/31/54

Standard Oil Company of Texas
Purchasing Division
P. O. Box 862
El Paso, Texas

YOUR ORDER NO. EST-9101

YOUR REQ. NO.

OUR ORDER NO.

INSTALLED AT

OUR CONTRACT NO. 5953

Same

TERMS: NET CASH

FORM ACCT. NO. 56 7N 4-25 CB CO.

INSTALLATION ☒

SERVICE ☐

DAY	DATE	HOURS			MILE- AGE OR FARE	LIVING EXP.
		REG- ULAR TIME	OVER- TIME	SUN. OR HOLI- DAY		
	1954					
SUN.	6-27	*4			46.65	6.50
MON.	6-28	8			1.00	12.50
TUES.	6-29	8			1.50	10.50
WED.	6-30	8			1.50	10.50
THU	7-1	*4			44.50	5.00
FRI.						
SAT.						
SUN.						
MON.						
TUES.						
WED.						
THU						
FRI.						
SAT.						
SUN.						
MON.						
TUES.						
WED.						
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FRI.						
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SUN.						
MON.						
TUES.						
WED.						
THU						
FRI.						
SAT.						

CHARGES FOR SERVICES R. H. Wells

ON UNIT NUMBERS

1 HRA 4 : 19879

SUMMARY

			RATE	AMOUNT
REGULAR TIME	4	Days	40.00	160.00
OVERTIME				
SUN. OR HOLIDAY				
*Allowed	4	Days	40.00	160.00
MILEAGE		MILES		
FARE				95.25
LIVING EXPENSE				44.00

BASING POINT Tyler, Texas

*Travel time - 4 hours

**Allowed time per C/T 4 days
Allowed above 4 days

TOTAL AMOUNT OF INVOICE

(\$259.25)

MEMORANDUM GO-144

TO

FROM

SUBJECT:

7/31/1954

TACHOMETER FOR HRA-4 Clark Compressor

YOUR FILE:

We have a price for an electric tachometer per Clark Bros. quote of 2/10/54.

Please wire them for price and delivery of a mechanical tachometer to be mounted on the new compressor furnished on EST-9/01. Also request delivery quotation for electric. tach. quoted @ \$300 per their original bid.

ERECTING SUPT. TIME

& EXPENSE ACCT

FOR MR. R. H. WELLS WAS

FORWARDED TO

ACCT ON - JUNE 30, 1954.

[Signature]

3 days used

1 more day expenses only

then \$40/day + exp.

Ball here approx 1 1/2
days checking temps, etc

This note becomes payable in three instalments as follows:

IMPORTANT: Please sign all three copies of the enclosed promissory note and return them to us by return mail in the enclosed envelope which requires no postage. You will be notified by this office approximately ten days before each instalment becomes due and provided with a self-addressed envelope for your convenience in forwarding your remittance. Please be sure to forward your remittance in this envelope furnished you, to insure credit to the proper account when your remittance is received in this office.

The sum of \$ _____ will be accepted in full payment of this invoice if paid before _____.

Yours very truly,


L. W. Mallory
Credit Manager

J. E. Daff

APPROVE		REMARKS
COMMENT		
FILE		
HANDLE		
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RETURN FILE		
SEE ME		
TRACE		

FROM 10-10-98 PM

GO-24 (3,000M 11-53)

Chevron BB
013271

DOMESTIC SERVICE	
Check the class of service desired; otherwise this message will be sent as a full rate telegram	
FULL RATE TELEGRAM	
DAY LETTER	
NIGHT LETTER	

WESTERN UNION

1206 10-51

W. F. MARSHALL, PRESIDENT

INTERNATIONAL SERVICE	
Check the class of service desired; otherwise the message will be sent at the full rate	
FULL RATE	
LETTER TELEGRAM	
SHIP RADIOGRAM	

NO. WDS.-CL. OF SVC.	PD. OR COLL.	CASH NO.	CHARGE TO THE ACCOUNT OF	TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

(COPY)

HOUSTON, TEXAS
JUNE 22, 1974

STANDARD OIL CO. OF TEXAS
EL PASO, TEXAS

ATTENTION: MR. A. V. WINTER

RE YOUR MFT 5161

IN ACCORDANCE WITH YOUR MESSAGE NO. 1 OF JUNE 21, WE PLAN TO HAVE
OUR MR. WILLIAM M. HARRIS ON THE JOB AT 8-00 AM, MORNING OF JUNE 28.

CLARK HENRY CO.

CC: IT HARRIS

GROUTING

After all of the compressor assemblies are in place, recheck the engine and all of the compressor sections to make certain the entire unit is level.

Concrete foundations for engines and compressors are usually poured rather wet in order to facilitate the proper puddling of the concrete and as a result there is usually a considerable amount of pure cement and silt that comes to the top before the concrete sets. This pure cement and silt has very little if any strength and naturally should be removed before the engine is set on the block.

We recommend chipping off the top of the new block until all of the above material is removed which will also leave the top of the block rough and insure a good bond between the grouting and the main block. This should be done a day or so after the block is poured as it will be much easier and less expensive to do this chipping before the concrete gets too hard.

In the case of engines with oil pans that extend down into the block, as most Clark engines have, that portion of the block directly under the pan should have a thin finished top poured on it and should be troweled smooth before the engine is set on.

Care should be taken to see that the finished portion of the block under the oil pan is not brought up higher than one inch below the oil pan and preferably one and one half inch below.

If the above procedure is followed, before the engines are set on the block, a great deal of money can be saved in setting the engines and a good job insured.

All compressor bed section cap bolts should be thoroughly tightened. (This tightening must be done before grouting.) In checking the level of the crosshead guides it may be found that there are slight variations. (Do not attempt to level compressor bed sections individually by tightening up on jack screws or pulling down the anchor bolt nuts on the bed sections.)

If the main frame of the engine is level crosswise, the crosshead guides of the bed section will be level or nearly so and if any one of them runs out any noticeable amount, it should be removed and the gasket surfaces checked for burrs.

Do not install scavenging cylinders until engine and compressor bed sections have been grouted in.

After completing the above procedure, the engine should be ready for grouting forms. Before installing forms the portion of the foundation directly under the oil pan should be blanked off to prevent grouting running under the oil pan. This can be accomplished in any one of several different ways. The most satisfactory however, is either by filling under the pan with sand, which can later be washed out, or by the use of a piece of fire hose. The fire hose is the most satisfactory as the sand usually washes out of place when the block is being wet before grouting.

To use the fire hose, it is necessary to have a piece of about three inch soft canvas hose about three times the length of the engine. By flattening the hose, it can be pulled through under the engine near one side of the oil pan and then doubled back and pulled through the opposite side. After the hose is in place, one end should

be plugged. The open end of the hose should then be carried up along the end of the engine and supported about three or four feet above the top of the power cylinders. The hose should then be poured full of water. The static head, which will be some ten to twelve feet, will have sufficient pressure to force the hose up tight against the oil pan and down against the block and make a good seal. After the grouting has had a chance to set, the water can be drained out and the hose removed with no difficulty.

When forming an engine for grouting, the top of the form should come up to about one fourth inch below the bottom of the main frame, unless the block is going to be plastered, in which case, the top of the forms should be approximately three-fourths inch below the bottom of the main frame. After the forms have been placed around the engine as above and properly braced, an additional form board should be nailed around the outside of the main form extending up at least two inches above the bottom of the main frame. The purpose of this additional form board is to provide an adequate head on the grouting to make it possible to force it in place.

After the form has been completed the block should be thoroughly wet at least two hours before grouting and kept wet until the grouting is started.

A very thin mixture of one part sand and one part cement should first be run under the engine and completely cover the top of the block to insure a good bond.

The grouting proper should be of a mixture of one and one half to one or two to one sand and cement, depending on the quality of the sand. It should be mixed thin enough to flow easily, but not thin enough to settle out. Grouting should be started at the compressor side of the engine near the center. The grouting should be poured under the main frame first, and forced towards both ends of the engine by puddling rods. Vent tubes should be run under the bed sections to let the air out as the grouting is forced in. The back side of the engine should be grouted immediately following the completion of the compressor side.

After the forms have been completely filled with the grouting and as much forced under the engine as possible, a dry mixture of one part sand and one part cement should be sprinkled on top of the grouting and tamped in until the moisture is taken up. This is commonly called dry packing and is necessary to eliminate the possibility of the grouting shrinking away from the engine due to excess water.

After dry packing, the auxiliary form boards should be removed and the grouting cut down so that the outside is level with the main form boards and the inside level with the bottom of the main frame and finished. In cases where the block is to be plastered, the inside, of course, will have to be cut down about one quarter inch below the bottom of the main frame.

Main grouting forms can be removed any time after twenty-four hours without damage to the grouting, however, if possible they should be left on longer to avoid getting the edge of the blocks chipped off before they are completely set.

In cases where engines are grouted during extremely hot weather and especially when they are not under cover, the grouting should be kept wet for two or three days to keep it from setting up too fast and cracking.

Leveling screws can be backed off twenty-four hours to forty hours after grouting is poured but nuts on anchor bolts must not be tightened until grouting has set at least five days and preferably longer unless quick setting cement is used.

If the surface is to be plastered, trim the grout below the bottom of the engine frame and slant downward toward the outside of the foundation, as shown in sketch. Trim out under the engine to a depth of one-quarter of an inch. The plaster seam will then be hidden under the engine and any oil will run away from the engine rather than seep into the grout. Leave the surface of the grout rough to obtain a better bond for the plaster. Immediately before plastering, go over the entire foundation with a wire brush to remove all loose or lumpy matter, and apply a thin, neat cement wash. Note: all workmen should be cautioned against spilling oil or greasy washing fluid on any cement work which has not been finished completely.

The entire foundation should be finished extremely smooth or painted to make it as impervious to oil as possible. Note: The assembly and grouting of the engine should be done under the supervision of a Clark erector. No pipes or compressor cylinders should be assembled to the engine before grouting.

While the grout is "seasoning" the details may be mounted on the engine and the pipe work completed.

DON'T'S FOR GROUTING

Don't use anything but clean sharp sand in grout.

Don't use gravel or crushed stone in grout mixture.

Don't start to grout an engine unless you have time to finish without interruption.

Don't grout engine if there is less than three-fourths inch grouting space at any point. (Jack up engine and chip block down).

Don't grout engine in freezing weather unless heat is provided to keep grouting from freezing for at least twenty-four hours.

TO Mr Hayden

APPROVE		REMARKS
COMMENT		
FILE		
HANDLE		
NOTE		
RETURN FILE		
SEE ME		
TRACE		

FROM [Signature]

60-24 (3,000M 11-52)

TELETYPE WRITER MESSAGE

DATE 6/21/54 TIME 9:15 AM

TO CLARK BROTHERS (MO 40)

CITY HOUSTON

STATE TEXAS

ATTENTION: C. L. SIDMS

REFER OUR RPT 9101 REPHONE J. K. OLSEN, A. V. WINTNER.

MUST HAVE SOMEONE HERE DEFINITELY ON JUNE 28TH. PLEASE ARRANGE

ACCORDINGLY. CONFIRM AND IF POSSIBLE GIVE REPRESENTATIVE'S NAME

AND ARRIVAL TIME. WE WILL BE READY AT 8:00 A.M. THE MORNING OF

JUNE 28th.

STANDARD OIL COMPANY OF TEXAS

A. V. WINTNER

FROM R-17

BY JEB

DATE AVW

SIGNATURE

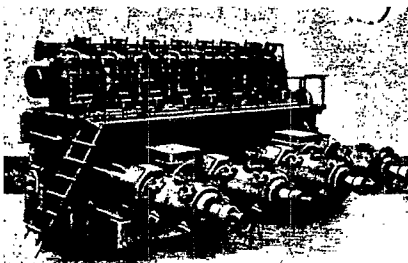
NEXT SCHEDULED CALL

IMMEDIATELY

BEFORE

ANY TIME TODAY

CC: J. E. Hayden
J. M. Evans



CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

CLARK

GLENN · NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

June 18, 1954

RECEIVED

JUN 21 1954

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention Mr. A. V. Winther

Gentlemen:

Your Order No. EST-9181
Fourth Compressor Gas
Recovery Plant
Our Contract No. 5953

Reference is made to your letter of June 9, your teletype of June 16 and our telephone conversation of the same date, all in connection with the grouting of the Clark Model HMA-4, 440 HHP gas engine driven compressor covered by your order above.

In this connection, we wish to advise that we will have our Erection Superintendent, Mr. J. H. Hall, at your plant on June 20 to install bed sections and grout the engine.

If you require additional information, or if we can be of further service to you, please do not hesitate to get in touch with us.

Very truly yours,

CLARK BROS. CO.

E. J. Simms
Chief Service Engineer
Houston District

ES:smm/mb
Sup

*J. K. O. [unclear]
has letter but already
been written. we
we talk to Simms.
am*

TO J E Hayder

APPROVE		REMARKS
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FROM Purchasing Div.

GO-24 (3,000M 11-53)

DATE _____

TIME

WISCONSIN

CITY ██████████

STATE ~~SECRET~~

10-10-68

OUR NEW-OLDS ENTHUSIAST HAVE DECIDED TO WAIT FOR MR. JACK BAIL. THEREFORE,

EXPECT HIM ON JUNE 29TH. CONFIRM.

STANDARD OIL COMPANY OF TEXAS

ATTENTION

CHARGE TO **2-17** **MS** SCHEDULED CALLS

SENT BY AW HOUSTON.....10:30 AM
 2:30 PM
 COPY TO AW SAN FRANCISCO..10:30 AM
 3:00 PM
 SNYDER.....10:30 AM
 2:15 PM
 ALL OTHERS.....10:45 AM
 2:45 PM

SIGNATURE

NEXT SCHEDULED CALL

IMMEDIATELY

BEFORE

ANY TIME TODAY

TELETYPEWRITER MESSAGE

DATE 6-13-54

TIME 2010 A.M.

TO CLARK BROTHERS COMPANY

(22-14)

CITY

HOUSTON

STATE

TEXAS

RECEIVED

JUN 15 1954

A.V. WINTER

Attention: Mr. E. L. Stone

OUR LATEST JUNE 1954 (22-1422) ADVISE IF WE MAY EXPECT YOUR REPLY

REPLYMENT ON JUNE 15TH.

STANDARD OIL COMPANY OF TEXAS

THE

20 TO WINTER

CHARGE TO

SCHEDULED CALLS

SIGNATURE

SENT BY

AW

HOUSTON.....10:30 AM

NEXT SCHEDULED CALL

2:30 PM

COPY TO

AW

SAN FRANCISCO..10:30 AM

IMMEDIATELY

AW

3:00 PM

SNYDER.....10:30 AM

BEFORE

2:15 PM

ALL OTHERS.....10:45 AM

ANY TIME TODAY

2:45 PM

June 9, 1954

EST-9101, Fourth Compressor
Gas Recovery Plant
El Paso Refinery

Clark Bros. Co.
P. O. Box 4563
Houston 13, Texas

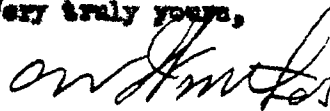
Attention: Mr. C. L. Simms

Gentlemen:

Please refer to our order EST-9101, covering one Clark Model MRA-4 Gas Engine Driven Reciprocating Compressor.

In accordance with your letter of April 23, 1954, we wish to advise you that we plan on setting this engine on June 21, 1954, and would like the services of your Erection Superintendent at that time. Please advise us immediately if this date is satisfactory.

Very truly yours,



A. V. Winther

JKO:dp

cc: Mr. J. H. Ball
P. O. Box 1745
Midland, Texas

J. M. Evans
Attn: W. L. Cawyer

SEND JE HAYDEN
TO ATTN: OLSEN

APPROVE		REMARKS
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SEE ME		
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FROM 

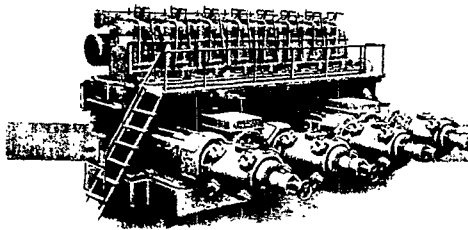
GO-24 (967M 7-46)

SEND J. E. HAYDEN
TO ATTN: OLS

APPROVE		REMARKS
COMMENT		
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HANDLE		FOR DSR
NOTE		INFO
RETURN FILE		
SEE ME		
TRACE		

FROM J. E. Hayden

GO-24 (967M 7-46)



CLARK
®

CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINE S and COMPRESSORS

OLEAN · NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

May 17, 1954

RECEIVED
MAY 18 1954
A. V. WINTHER

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention Mr. A. V. Winther

Gentlemen: Your Estimate #9101
 Our Contract #5953

Reference is made to your order above covering one Clark Model HRA-4, 440 BHP gas engine driven compressor.

In this connection, we are attaching hereto three copies of progress report covering this equipment as of May 14, 1954.

We believe this will give you the information you require but if we can assist you further, please let us know.

Very truly yours

CLARK BROS. CO.

David P. Allen
David P. Allen

1j
dup.
encl.

May 14, 1954

STANDARD OIL CO. OF TEXAS
Contract 5953

1st: Delivery

Engine, Shipped April 21, 1954

Compressor cylinders. week of May 17, 1954

2nd: Test Dates

Engine test date. - Tested & data forwarded

Cylinder test date - Tested week of May 10, 1954

3rd: Status of Castings

All castings are available.

4th: Machining

Complete

5th: Fabrication

90% complete

6th: Purchase Items

Received complete.

J. K. Olsen

CLARK BROS. CO.
DIVISION OF DEESSER OPERATIONS, INC.
Olean, New York
April 22, 1954

SOLD TO- Standard Oil Co. of Texas
Purchasing Div.
Box 862
El Paso, Texas

CONSIGNEE TO- Standard Oil Co. of Texas
Refinery Storehouse
El Paso, Texas

SOLD BY- Clark Bros. Co.
Div. of Deesser Operations, Inc.
Olean, N.Y.

SHIPPED FROM- Dallas, Texas

ROUTE VIA- T&P Transport- Ppd.

SHOP ORDER	ORDER NO.	CONTRACT NO.	WEIGHTS
306500	EST-9101	5953	700#

-----PACKING LIST-----

- 1- EDS-10 Burgess-Manning exhaust muffler with 10" bottom connection for HRA-4 engine

MEMORANDUM GO-144

TO: Mr J E Hayden
FROM: G J Winters

April 29 1954

SUBJECT: Invoice Clark Compressor. OUR FILE: EST-9101
Invoice # E-5953-1 \$43,344.20 YOUR FILE:

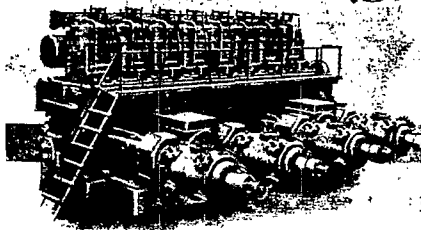
attached is invoice in the amount of \$40,849.20. The 90% Engine Compressor Unit total cost \$40,849.20. also \$2,495.00 aux Equip.

also Memo Invoice for a loaned Tarpaulin Invoice Contract 1953

Before paying the Invoice I believe you should look over the Equipment. If it looks OK please initial OK and invoice and return them to me.

We can not hold up payment until units are working. anything wrong then will be taken up with Clark Bros Co.

Equipment is due in El Paso in a few days.



CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

CLARK

OLEAN - NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

RECEIVED

April 28, 1954

APR 30 1954

A.V. WINTHER

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winther

Gentlemen:

Your Estimate No. 9101
Our Contract No. 5953

We refer to the Clark Model ERA-4, 440 BHP gas engine driven compressor being supplied on the contract above.

In accordance with Revision #1 of your order dated March 17th regarding inspection and testing, we are enclosing eight copies of our Test Report for this engine.

If you have any questions relative to the above, please let us know.

Yours very truly,

CLARK BROS. CO.

David P. Allen

David P. Allen

BPA:pmp
Enc.
Encl.

MEMORANDUM GO-144

TO W. L. Cuyler. 4-30 1954
FROM J. K. Olson
SUBJECT: Load Test Report OUR FILE
Fourth Compressor YOUR FILE
El Paso Refinery

Attached are 7 copies of
Clark Bros Load Test Report
for the fourth compressor.
Please assign F.P. No. and
return.

Order No EST-9101.

M E M O R A N D U M

San Francisco, California
April 22, 1954

Jacket Water and Lub Oil Coolers
Fourth Compressor
Gas Recovery Plant
El Paso Refinery

MR. M. P. PARET, JR.:
ATTENTION: MR. J. E. HAYDEN

Attached is six prints each of the following drawings:

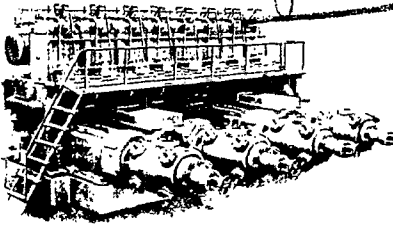
F-EST-K-9101-4 (Rev. 1) - Outline of JW Cooler
F-EST-K-9101-3 (Rev. 1) - Outline of Oil Cooler

These drawings have been revised to show two new support legs added to the oil cooler and one support leg relocated on the JW cooler. We assume that the material required for the two new legs will be secured in the field.

J. M. EVANS



WLC:JES
Attachments



CLARK

J. Hayden
CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

April 23, 1954

*RECEIVED
APR 24 1954*

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention Mr. A. V. Winther

Gentlemen:

Your Order EST-9101
Our Contract No. 5953

Reference is made to your order above covering one
Clark Model HRA-4, 440 BHP gas engine driven compressor.

In this connection, we now wish to confirm our teletype
of April 22 to the effect that our factory in Olean, New
York, shipped on April 21 to your company, Refinery Store-
house, El Paso, Texas, one Clark Model HRA-4 engine, serial
No. 19879, with various equipment.

This shipment was routed via PRR, SLSW, T&NO, prepaid, in
car PRR 474155.

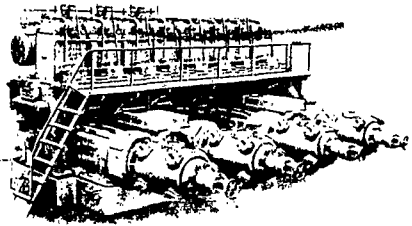
Very truly yours

CLARK BROS. CO.

David P. Allen

David P. Allen

1j
dup.



CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

CLARK
®

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

April 23, 1954

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention Mr. A. V. Winther

Gentlemen:

Your Order No. EST-9101
Our Contract No. 5953

As you know, the Clark Model HRA-4 engine covered by your order above has now been shipped to your company at El Paso.

It would be our suggestion that you take advantage of the services of our Erection Superintendent in connection with the setting and starting of this unit in accordance with our sales agreement covering this order. If you do avail yourselves of this Erection Superintendent, it would be our suggestion that you advise this office as quickly as possible or at least a week or ten days before such services are required.

If you do take advantage of the services of our Erection Superintendent, it would also be our suggestion that you do not assemble the bed sections or scavenging cylinders on this engine until our Erection Superintendent arrives. It is also suggested that no fitting up of this engine be done, which of necessity means that no boxes are to be opened, until the arrival of our Erection Superintendent.

In the construction and erection of equipment of this kind, it is a relatively easy matter to accumulate foreign material in oil, water, scavenging air, starting air, fuel gas and compressor gas lines and it is, therefore, suggested that all of these lines be thoroughly cleaned and/or blown out before the machine is started up. It is also suggested that these lines be so purged when our Erection Superintendent is present.

We would also like to call your attention to the fact that an extra charge has been made for the tarpaulin which

Standard Oil Company of Texas

-2-

April 23, 1954

covers this unit during shipment. When this tarpaulin is returned to our main office in Olean, New York, in good condition, the amount of this charge will be credited to your account. It is, therefore, suggested that this tarpaulin be kept in good condition and returned to our Olean Office as quickly as possible after it has served its purpose.

Very truly yours,

CLARK BROS. CO.

C. J. Simms
Chief Service Engineer
Houston District

CISimms/mb
Dup

MEMORANDUM GO-144

TO

J.M. Baker

4-27

1954

FROM

J. M. Baker

SUBJECT

Packing List

OUR FILE

EST-9101

YOUR FILE

Fourth Compressor - Gas Rec'y.

El Paso Refining.

Attached for your information is one copy of the Packing List concerning the Fourth Compressor, K509 ordered on EST-9101.

The major portion of this list was shipped 4-21 from Olean, NY, and should arrive in approx 10 to 14 days.

Check what ever items that can be done so without opening crates. We do not want to open any crates without having Check Pkgs. Crustion kept present.

DOMESTIC SERVICE	
Check the class of service desired; otherwise this message will be sent at the full rate	
FULL RATE TELEGRAM	
DAY LETTER	
NIGHT LETTER	

WESTERN UNION

1206 10-51

W. P. MARSHALL, PRESIDENT

INTERNATIONAL SERVICE	
Check the class of service desired; otherwise the message will be sent at the full rate	
FULL RATE	
LETTER TELEGRAM	
SHIP RADIOGRAM	

NO. WDS.-CL. OF SVC.	PD. OR COLL.	CASH NO.	CHARGE TO THE ACCOUNT OF	TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

HOUSTON, TEXAS
APRIL 22, 1954

STANDARD OIL CO. OF TEXAS
EL PASO, TEXAS

ATTN: A V WINTHER

REFERENCE YOUR TELETYPE MESSAGE THIS MORNING. YOUR ORDER EST-9101, OUR CONTRACT 5953. OUR FACTORY NOW ADVISES THAT THIS HRA-4 ENGINE, SERIAL NO. 19879, WAS SHIPPED APRIL 21 FROM OLEAN, NEW YORK, CONSIGNED TO YOUR COMPANY, REFINERY STOREHOUSE, EL PASO, TEXAS. THIS SHIPMENT WAS ROUTED VIA PRR, SLSW, T&NO, PREPAID, IN CAR PRR 474155.

CLARK BROS. CO.

DAVID P. ALLEN

MEMORANDUM

San Francisco, California
April 22, 1954

Jacket Water and Lub Oil Coolers
Fourth Compressor
Gas Recovery Plant
El Paso Refinery

MR. M. P. PARET, JR.:
ATTENTION: MR. J. E. HAYDEN

Attached is six prints each of the following drawings:

F-EST-K-9101-4 (Rev. 1) - Outline of JW Cooler
F-EST-K-9101-3 (Rev. 1) - Outline of Oil Cooler

These drawings have been revised to show two new support legs added to the oil cooler and one support leg relocated on the JW cooler. We assume that the material required for the two new legs will be secured in the field.

J. M. EVANS

WLC:JES
Attachments
cc: JKO
WLC

CLASS OF SERVICE DESIRED	
DOMESTIC	CABLE
TELEGRAM ☒	ORDINARY
DAY LETTER	URGENT RATE
SERIAL	DEFERRED
NIGHT LETTER	NIGHT LETTER

Patrons should check class of service desired; otherwise the message will be transmitted as a telegram or ordinary cablegram.

WESTERN UNION

A. N. WILLIAMS
PRESIDENT

1207

\$	CHECK
S	ACCOUNTING INFORMATION
F	TIME FILED

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

To **CLARK BROS. COMPANY**

Care of or Apt. No. **ATTEN: DAVID P. ALLEN**

Street and No. **P. O. BOX 4563**

Place **HOUSTON 13, TEXAS**

4/22/54

19

FOR VICTORY
BUY
WAR BONDS
TODAY

RE OUR ORDER EST-9101 AND YOUR LETTER OF APRIL 19, RELATIVE TO DELIVERY

STATUS CLARK 440 HP COMPRESSOR. CAN DELIVERY OF ENGINE BE DEFERRED UNTIL

MAY 10, TO PERMIT COMPLETION OF FOUNDATION. PLEASE ADVISE.

A. V. WINTHER
STANDARD OIL COMPANY OF TEXAS

CHK: R-11

JKO

cc: A. V. WINTHER

Sender's name and address
(For reference only)

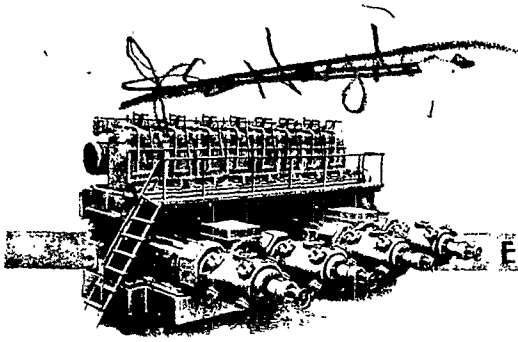
Sender's telephone
number

MEMORANDUM GO-144

TO W. L. Conger 4-21 1954
FROM J. K. Olsen
SUBJECT: Status Report - Compressor K504 OUR FILE EST-9101
Fourth Compressor - Gas Rec'y. YOUR FILE
El Paso Refining.

Attached for your information is one print of the latest Compressor Status report. You will note that the compressor engine is apparently complete and ready for shipment. The compressor cylinder will be ready by May 20 as scheduled. In light of this information please advise when we may expect spool drawings.

JCO



CLARK
®

DMD
CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

April 19, 1954

**Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas**

Attention: Mr. A. V. Winther

Gentlemen:

**Your Estimate #9101
Our Contract #5953**

Reference is made to the Clark Model HRA-4, 440 BHP gas engine driven compressor covered by the contract above.

Further reference is made to your letter of March 29, 1954 wherein you requested we provide you with a status report on this job as of April 1st.

In this connection, we are enclosing three copies of this report as prepared by our Olean Production Department.

If you have any questions relative to the above, please let us know.

Yours very truly,

CLARK BROS. CO.

David P. Allen
David . Allen

**DPA:pmp
Dup.
Encl.**

STANDARD OIL CO. OF TEXAS

Contract 5017

1st: Delivery

Engine, week of April 19, 1954

Compressor cylinders, week of May 17, 1954

2nd: Test Dates

Engine test date, April 15

Cylinder test date, week of May 10.

3rd: Status of Castings

All engine parts have been cast out.

All cylinder parts will be cast out by April 16.

4th: Machining

Engine parts, complete

Cylinder parts, approximately 10% complete

5th: Fabrication

Engine, 95% complete

Cylinders, not started

6th: Purchase Items

Ordered - 100%

Received - 60%

The only purchase item open on the engine is the McCord lubricator which is now in transit to Olean. The remaining open purchase items are on compressor cylinder parts and will be received at Clark Bros. as requested. Therefore, we do not anticipate any hold up in meeting delivery schedule as originally given - that is, engine by April 20 and the compressor cylinders by May 20, 1954.

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

April 16, 1954

Clark Bros. Company
P. O. Box 4563
Houston 13, Texas

Our EST-9101
Your Contract 5953
Compressor Unit

Attn: Mr. David P. Allen

Gentlemen:

This is a reply to your letter dated April 13, 1954 pertaining to freight negotiations.

The delivery of engine and compressor via FRR-SUL-TEK Railroad is O.K.

The Burgess-Manning muffler out of Dallas, Texas via Sunset Motor Lines is O.K.

The Vortex Air Filter out of Claremont, California via Western Truck Lines is O.K.

We are agreeable to all of the articles being shipped freight prepaid. Our reason for marking our order "collect" was that in some cases shipper deducts or allows buyer to deduct freight from commodity invoice. In the case of this shipment we prefer prepaid shipments.

Please keep us informed as to progress being made on compressor.

Very truly yours,

A. V. WINTHER

V:me

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

April 14, 1950

Clark Bros. Co.
P. O. Box 4566
Houston 11, Texas

Our Order EWT 9101
Your Contract 5952

Gentlemen:

Attached are one copy each of the following
approved Certified Drawings:

F-EWT-9101-13 BFL-10-Subber
F-EWT-9101-14 Vortex Air Cleaner

Very truly yours,

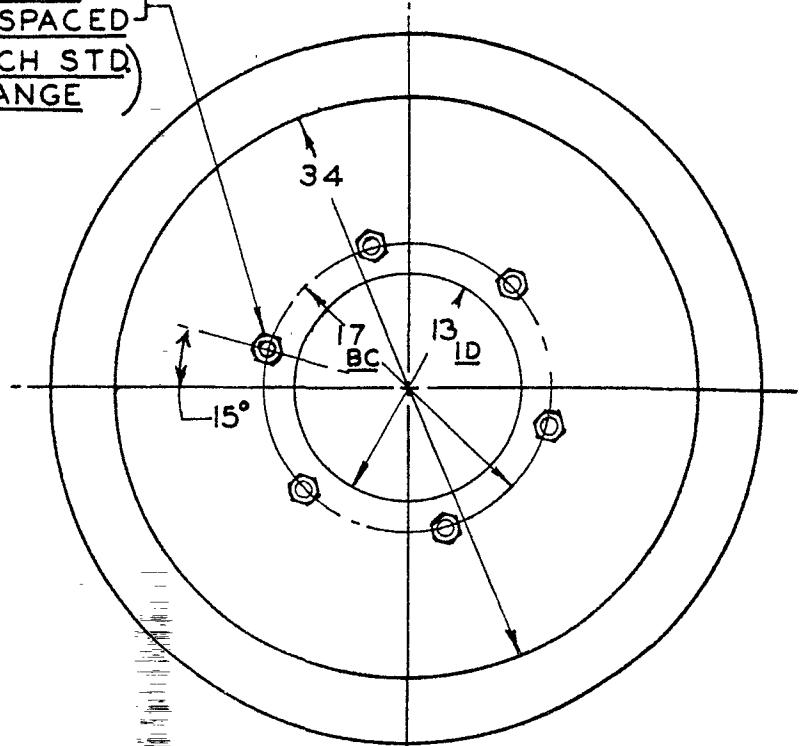

A. V. WINTHER

AV:sa.
Encs.

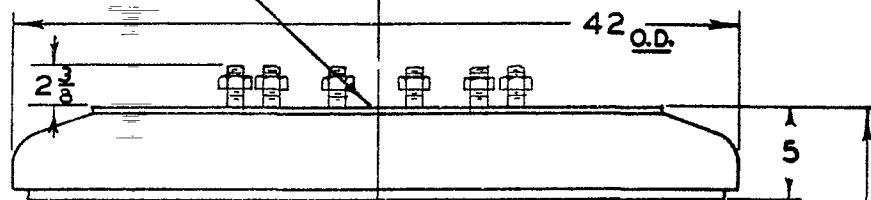
cc: J. H. Frank
J. H. Ray, Jr.

TRANS. NO.	CHG. LET.	WAS	DATE	BY	APP.	TRANS. NO.	CHG. LET.	WAS	DATE	BY	APP.	PATTOR DIE NO.	DR. NAME	DATE
						3100							EG	8-27-48
						3100	A	REV. & RED.	8/27/48				CK.	
								REL	8/22/46				CH	
													ENG.	
													CH	
													APPR.	
VORTOX AIR CLEANER														
VORTOX COMPANY														
CLAREMONT, CALIFORNIA, U.S.A.														
PART NO.														
LB33-12														
SCALE 3/32" = 1"														
MATERIAL														

7-9 NC 6 BOLTS
EQUALLY SPACED
(FOR 12 INCH STD
PIPE FLANGE)



OUTLET



INLET

OIL FILLER

3/4" DRAIN PLUG

ALLOWANCE FOR CUP REMOVAL 21 1/2

OIL CAPACITY APPROX. 16 GAL.
GASKET NO. 4576 SUPPLIED

LB33-12

Chevron BB
013307

ALL PAYMENTS TO BE MADE
CASH ONLY

FOR: 11/11/71

Q1 5253

L.C. 5-5507

FOR: 544, 542, 541, 540, 539, 538, 537, 536, 535, 534, 533, 532, 531, 530, 529, 528, 527, 526, 525, 524, 523, 522, 521, 520, 519, 518, 517, 516, 515, 514, 513, 512, 511, 510, 509, 508, 507, 506, 505, 504, 503, 502, 501, 500, 499, 498, 497, 496, 495, 494, 493, 492, 491, 490, 489, 488, 487, 486, 485, 484, 483, 482, 481, 480, 479, 478, 477, 476, 475, 474, 473, 472, 471, 470, 469, 468, 467, 466, 465, 464, 463, 462, 461, 460, 459, 458, 457, 456, 455, 454, 453, 452, 451, 450, 449, 448, 447, 446, 445, 444, 443, 442, 441, 440, 439, 438, 437, 436, 435, 434, 433, 432, 431, 430, 429, 428, 427, 426, 425, 424, 423, 422, 421, 420, 419, 418, 417, 416, 415, 414, 413, 412, 411, 410, 409, 408, 407, 406, 405, 404, 403, 402, 401, 400, 399, 398, 397, 396, 395, 394, 393, 392, 391, 390, 389, 388, 387, 386, 385, 384, 383, 382, 381, 380, 379, 378, 377, 376, 375, 374, 373, 372, 371, 370, 369, 368, 367, 366, 365, 364, 363, 362, 361, 360, 359, 358, 357, 356, 355, 354, 353, 352, 351, 350, 349, 348, 347, 346, 345, 344, 343, 342, 341, 340, 339, 338, 337, 336, 335, 334, 333, 332, 331, 330, 329, 328, 327, 326, 325, 324, 323, 322, 321, 320, 319, 318, 317, 316, 315, 314, 313, 312, 311, 310, 309, 308, 307, 306, 305, 304, 303, 302, 301, 300, 299, 298, 297, 296, 295, 294, 293, 292, 291, 290, 289, 288, 287, 286, 285, 284, 283, 282, 281, 280, 279, 278, 277, 276, 275, 274, 273, 272, 271, 270, 269, 268, 267, 266, 265, 264, 263, 262, 261, 260, 259, 258, 257, 256, 255, 254, 253, 252, 251, 250, 249, 248, 247, 246, 245, 244, 243, 242, 241, 240, 239, 238, 237, 236, 235, 234, 233, 232, 231, 230, 229, 228, 227, 226, 225, 224, 223, 222, 221, 220, 219, 218, 217, 216, 215, 214, 213, 212, 211, 210, 209, 208, 207, 206, 205, 204, 203, 202, 201, 200, 199, 198, 197, 196, 195, 194, 193, 192, 191, 190, 189, 188, 187, 186, 185, 184, 183, 182, 181, 180, 179, 178, 177, 176, 175, 174, 173, 172, 171, 170, 169, 168, 167, 166, 165, 164, 163, 162, 161, 160, 159, 158, 157, 156, 155, 154, 153, 152, 151, 150, 149, 148, 147, 146, 145, 144, 143, 142, 141, 140, 139, 138, 137, 136, 135, 134, 133, 132, 131, 130, 129, 128, 127, 126, 125, 124, 123, 122, 121, 120, 119, 118, 117, 116, 115, 114, 113, 112, 111, 110, 109, 108, 107, 106, 105, 104, 103, 102, 101, 100, 99, 98, 97, 96, 95, 94, 93, 92, 91, 90, 89, 88, 87, 86, 85, 84, 83, 82, 81, 80, 79, 78, 77, 76, 75, 74, 73, 72, 71, 70, 69, 68, 67, 66, 65, 64, 63, 62, 61, 60, 59, 58, 57, 56, 55, 54, 53, 52, 51, 50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0

CUST. ORDER 877-7101

BURGESS-MANNING COMPANY

DALLAS

ENGINEERING

TEXAS

BES-10 SNUBBER

5100-1178-0

10-13-53

W. H. H. H.

53

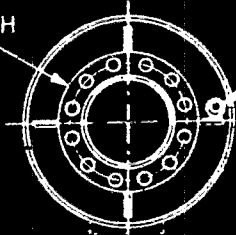
NONE

RED

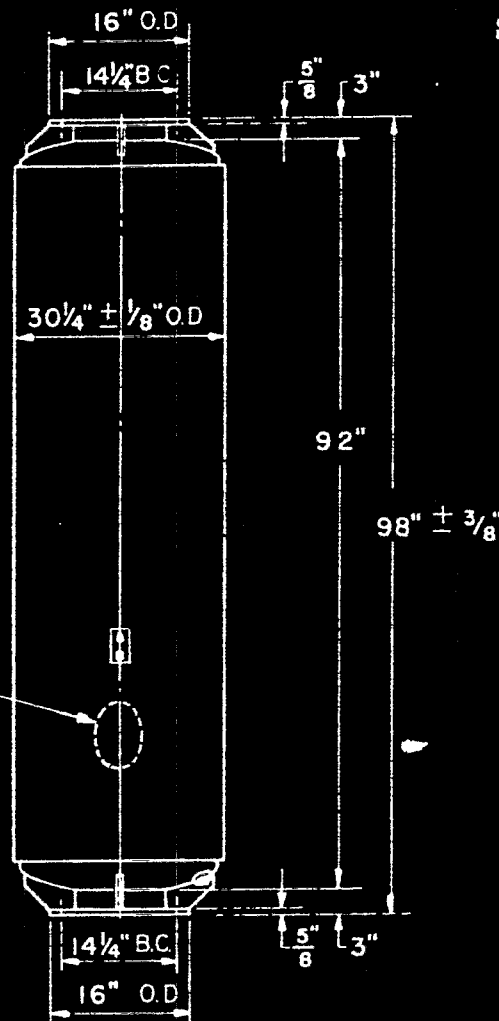
5165-1178

10" F.F. FLANGE WITH
12 HOLES 1" DIA.

1 1/2" IPS DRAIN
CONNECTION



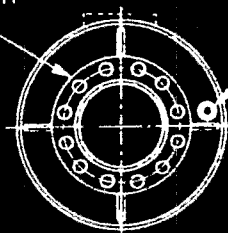
Clark Bros. Co.
C-5385 Ct. 5953
Standard Oil Co. of Texas
EST 9101



6" x 8"
INSPECTION PORT
FURNISHED AT
EXTRA CHARGE
WHEN SPECIFIED

10" F.F. FLANGE WITH
12 HOLES 1" DIA.

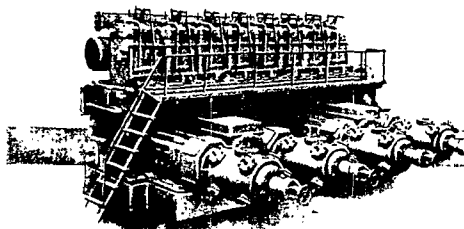
1 1/2" IPS. DRAIN
CONNECTION



INLET

MAY BE INSTALLED IN VERTICAL
OR HORIZONTAL POSITION.
FINISH IRON OXIDE PAINT
APPROX. WT. 710 LBS.

5100-1178-0



CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

ADDRESS REPLY TO P.O. BOX 4563, HOUSTON 13, TEXAS

April 13, 1954

CLARK

Standard Oil Co. of Texas
P. O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winther

Gentlemen:

Your Estimate No. 9101
Our Contract No. 5953

We refer to the Clark Model HRA-4, 440 BHP gas engine driven compressor being furnished on the contract above.

Further reference is made to your request that we advise the routing for the equipment which is to be furnished. We have been advised by our Olean office that the engine and compressor cylinders will be shipped by rail and will be routed PRR-SLSW-T&NO; the Burgess-Manning muffler is to be shipped direct from Dallas via Sunset Motor Lines or through-rate motor freight, and the Vortex air filter is to be shipped direct from Claremont, California via Western Truck Lines or other through-rate motor freight if available.

We note on the bottom of the first page of your order, you advise that these are to be shipped collect; however, the terms which were quoted and which also appear on the first page of your order are f.o.b. Olean, New York with freight allowed to El Paso, Texas on the engine and compressor cylinders and f.o.b. point of manufacturer with freight allowed to El Paso, Texas on the extra items. We believe it is your intention that these items be shipped prepaid; however, if there is any question relative to the above, please let us know.

Yours very truly,

CLARK BROS. CO.

David P. Allen
David P. Allen

DPA:pmp
Dup.

MEMORANDUM

San Francisco, California
April 13, 1954

Order EST-9101
Fourth Compressor
Gas Recovery Plant
El Paso Refinery

MR. M. P. PARET, JR.:
ATTENTION: MR. A. V. WINTHER

We are attaching three approved copies of each of the following Clark certified drawings for the subject order:

F-EST-9101-13	BES-10 Snubber
F-EST-9101-14	Vortex Air Cleaner.

WLC:bjq
Attachments
cc: Mr. J. K. Olsen ✓

J. M. EVANS

M E M O R A N D U M

San Francisco, California
April 1, 1954

Flush Oil Injection Pump
Fourth Compressor
Vapor Recovery Plant
El Paso Refinery

MR. M. P. PARET, JR.:
ATTENTION: MR. J. E. HAYDEN

In compliance with Mr. J. K. Olsen's request, we have investigated the availability of a suitable surplus flush oil injection pump at the Richmond Refinery TCC Plant.

The pumps at Richmond have been out of service for some time and a large portion of the equipment has been removed from the compressors for use elsewhere. The only parts available for a Clark HRA compressor are: one cast iron bracket for the lubricator, and one drive gear for connecting the pump to the engine lubricator drive shaft. The original pump consisted of a three-feed McCord lubricator.

The transfer price for the cast iron bracket and gear drive is \$10. Richmond plans a compressor shutdown in about 10 days at which time these items could be removed and boxed for shipment. Please advise whether or not you want us to make the transfer.

J. M. EVANS

WLC:JES

SEND J. E. Hayden
TO

APPROVE		REMARKS
COMMENT		
FILE		
HANDLE		
NOTE		
RETURN FILE		
SEE ME		
TRACE		

FROM Purchasing

GO-24 (J67M 7-46)

MEMORANDUM

El Paso, Texas
April 5, 1954

Our Order EBT 9101
Clark Bros. Compressor

J. M. Evans
San Francisco

Attention: W. L. Cowger

Attached is a copy of a letter received from
Clark Bros. Company, and nine copies each of the follow-
ing certified drawings:

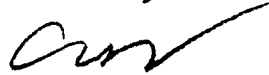
Burgess-Manning Co.

5100-1178-0 - MB-10 Bomber

Vortex Company

LB-33-12 - Vortex Air Cleaner

M. P. PARET, JR.



AVW:jmm

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

March 29, 1954

AIR MAIL

Clark Bros, Co.
P. O. Box 4563
Houston 13, Texas

Our Order EST-9101
Your Contract 5953
ERA-4 Engine - Compressor

Attention: Mr. David P. Allen

Gentlemen:

In reply to your letter dated March 25, 1954.

Please arrange for shipment of compressor assembly
with delivering carrier being T. & N. O. Railroad.

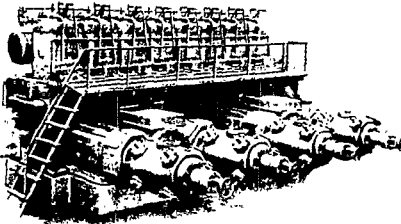
Please advise as to status of order.

Yours very truly,



AVW:jmm

cc: J. E. Hayden
J. M. Evans



CLARK

CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

March 25, 1954

RECEIVED
MAR 29 1954
A. V. WINTHER

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winther

Gentlemen:

Your Estimate #9101
Our Contract No. 5953

We refer to your order above covering one Clark Model HRA-4, 440 BHP gas engine driven compressor.

We would appreciate your advising if you have a preferred delivering carrier at El Paso. As soon as this information is received, we will be able to complete our routing for the shipment of the compressor.

If you have any questions in the meantime, or if we can assist you in any way, please let us know.

Yours very truly,

CLARK BROS. CO.

David P. Allen

David P. Allen

DPA:pmp
Dup.

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

March 29, 1954

AIR MAIL

CLARK BROTHERS COMPANY
P. O. Box 4563
Houston 13, Texas

SOTex Order NST-9101 El Paso
Clark Contract 5953 Houston
Project All Compressor for
Gas Recovery Plant

Attention: Mr. David P. Allen

Gentlemen:

Please refer to your letter dated March 9, 1954 pertaining to certified drawings.

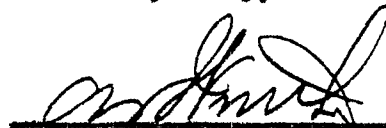
Attached is one copy each of approved certified drawings as mentioned in the following description:

<u>SOTex No.</u>	<u>Clark No.</u>	<u>Description</u>
F-EST-K-9101-1	8-1691	Foundation Plan
F-EST-K-9101-2	847759	3" x 4" Water Pump
F-EST-K-9101-3	116-1299A	Oil Cooler
F-EST-K-9101-4	116-1225B	J-W Cooler
F-EST-K-9101-5	842663-C	Support for 20" Pipe
F-EST-K-9101-6	842631-E	Support for 12" Pipe
F-EST-K-9101-7	847858	Railing and Ladder
F-EST-K-9101-8	847771	Flywheel Guard
F-EST-K-9101-9	847030	Distance Piece Vent
F-EST-K-9101-10	M-7284-1	Haco 1061 Regulator
F-EST-K-9101-11	847740	Gas & Air Starting
F-EST-K-9101-12	V-2422	Piping Plan for HRA-4

Please forward the drawings to your Olean, New York, Factory promptly in order to avoid manufacturing delay.

It will be appreciated if you will please give us a status report as of April 1, 1954.

Yours very truly,



AVW:mms

MEMORANDUM

San Francisco, California
March 23, 1954

Order EST-9101
Fourth Compressor
Gas Recovery Plant
El Paso Refinery

MR. M. P. PARRY, JR.
ATTENTION: MR. A. V. WINTER

We are attaching three approved copies each of the following Clark certified drawings for the subject order:

P-EST-E-9101-1	Foundation Plan
P-EST-E-9101-2	3" x 4" Water Pump
P-ESW-E-9101-3	Oil Cooler
P-ESW-E-9101-4	J-W Cooler
P-ESW-E-9101-5	Support for 20" Pipe
P-ESW-E-9101-6	Support for 12" Pipe
P-ESW-E-9101-7	Railing and Ladder
P-ESW-E-9101-8	Flywheel Guard
P-ESW-E-9101-9	Distance Piece Vent
P-ESW-E-9101-10	Blow 1001 Regulator
P-ESW-E-9101-11	Gas & Air Starting
P-ESW-E-9101-12	Piping Plan for NRA-4

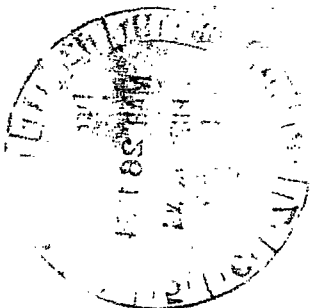
These are for your files and for the Inspector's use.

WLC:SS
Attachments

cc: JEO ✓
WLC

J. M. EVANS

Copies filed

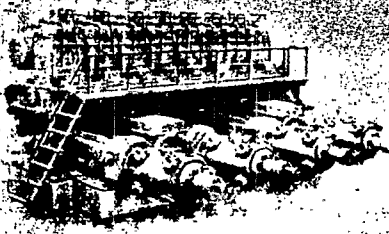


SEND 11.11
TO 11.11.11

APPROVE		REMARKS
COMMENT		
FILE		
HANDLE		
NOTE		
RETURN FILE		
SEE ME		
TRACE		

FROM 11.11.11

GO-24 (967M 7-46)



CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN - NEW YORK

ADDRESS REPLY TO P. O. BOX 4553 - HOUSTON 13, TEXAS

March 9, 1954

CLARK

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winther

Your EST-9101
Our Contract No. 5953
Fourth Compressor-Gas Rec'y Plt.

Gentlemen:

We refer to your order above covering one Clark Model NRA-4, 440 BHP gas engine driven compressor.

In accordance with your letter of March 5, 1954, we are enclosing nine certified copies of each of the following drawings:

- F-EST-K-9101-12-2422 - Piping Plan for NRA-4 Angle Engine with two 24" lined to 23" and one 14-1/2" lined to 13-1/2" Compressor Cylinders
- / C-1691 - Foundation Plan for NRA-4 Angle Engine
 - 2847769 - Gardner-Denver 3" x 4" Pump Installation
 - 3116-1299-A - Outline of Oil Cooler
 - 4116-1225-B - Outline of J. W. Cooler
 - 5842563-C - Support for 20" Header
 - 6842631-E - Support for 12" Discharge Header
 - 7847858 - Railing & Ladder for NRA-4
 - 8847771 - Flywheel Guard - Calif. Code
 - 9847030 - Venting of Distance Piece & Pressure Packing
 - 11847740 - Gas & Air Starting Piping for NRA
 - 104-7284-1 - Emco 1001 Regulator

We believe these drawings will provide you with the information you require; however, if you have any questions, or if we can assist you in any way, please let us know.

Yours very truly,

CLARK BROS. CO.

David P. Allen

DPA: pmp
Dup.
Encl.

Original with 8 prints 3 each drawn & given to B.B. - 3/11 - Sk to file back to S.F. JED

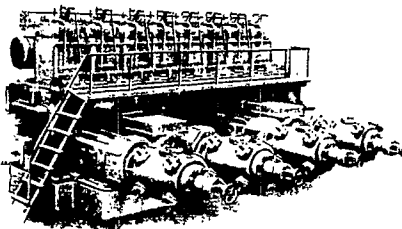
APPROVED 3/29/54 JED

ND ~~J. CLAYDEN~~
o ATTN J. OLSEN

APPROVE		REMARKS
COMMENT		
FILE		
HANDLE		
NOTE		
RETURN FILE		
SEE ME		
TRACE		

FROM

GO-24 (967M 7-46)



CLARK
®

CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

E N G I N E S a n d C O M P R E S S O R S

OLEAN · NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

March 22, 1954

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winther

Gentlemen:

Your Order No. 9101
Revision No. 1
Contract No. 5953

We wish to acknowledge receipt of your Revision #1 to you order above.

This revision is being forwarded to our factory in Olean, New York and if they have any comments, we will advise you.

If you have any questions, or if we can assist you in any way, please let us know.

Yours very truly,

CLARK BROS. CO.

L. H. Hayes

District Manager

FHHayes
DPA:pmp
Dup.

SEND ~~Hepler~~
 TO Attn: Olee

APPROVE		REMARKS
COMMENT		
FILE		
HANDLE		
NOTE		
RETURN FILE		
SEE ME		
TRACE		

FROM B. Olee

GO-24 (967M 7-48)

Chevron BB
 013323

extra copy of request for adjustment

STANDARD OIL COMPANY OF TEXAS

EL PASO, TEXAS

TO BE RETAINED BY PARTY DRAWING ORDER

PRINT BY ORIGIN

USE ALL

☐ POST OFFICE BOX 543 EL PASO, TEXAS

CORRESPONDENCE

☐ POST OFFICE BOX 1335 EL PASO, TEXAS

IN FORWARDING

ORDER DEPARTMENT

ORDER NUMBER WITH PREFIX MUST APPEAR ON ALL PACKAGES, SHIPPING ORDERS AND INVOICES

EST 9101

ORDER OR CONTRACT NO. Revision #1

BILL OF MATERIAL NO. YOUR CONTRACT #5953

CLARK BROS. CO.

P. O. BOX 4563

ISSUING POINT EL PASO, TEXAS

HOUSTON 13, TEXAS

DATE MARCH 17, 1954

REASON FOR REQUEST

REFER TO OUR ORDER EST 9101 COVERING ONE 440 BHP CLARK COMPRESSOR AND REVISE AS FOLLOWS:

TESTING

A COMPLETE SHOP RUNNING TEST IS TO BE MADE BY CLARK ENGINEERS. THIS TEST SHALL CONSIST OF FULL LOAD OPERATION FOR A CONTINUOUS PERIOD OF NOT LESS THAN 12 HOURS. THE RESULTS OF THIS TEST SHALL BE REPORTED TO THE COMPANY IN WRITING WITHIN 10 DAYS FOLLOWING THE TEST.

INSPECTION

DELETE IN ITS ENTIRETY.

YOUR ACKNOWLEDGMENT OF THIS REVISION IS REQUESTED.

A. V. WINTER

BY: JED

IF REPLY IS REQUIRED ATTACHED COPY MAY BE USED

SIGNATURE

FIELD NOTATION

SHIPMENT MADE AS ORDERED

DATE

HANDLER

☐ DELIVER

☐ PREPARE

REMARKS

YOU ARE REQUESTED TO RETURN MATERIAL TO

MATERIAL HANDLER

ADDRESS

NO.

☐ PREPAID ☐ DELIVER F. O. B.

PERSON'S SIGNATURE (THIS LINE WILL BE

☐ MAIL & CARRIER

☐ OPEN EXCHANGE

☐ CREDIT

☐ CASH/STOCK/STOCK

REPLACEMENT SHIPMENT WILL BE F. O. B.

DATE

SIGNATURE

DATE SHIP

SHIP NO.

DATE SHIP

DATE SHIP

REMARKS

STANDARD OIL COMPANY OF TEXAS (17-55) PRINTED IN U. S. A.

MEMORANDUM GO-144

TO

FROM

SUBJECT:

3-16

1954

OUR FILE

YOUR FILE

EST-9101

Inspection Clark 440HP.

Compressor -

Fourth Compressor - GAS RECOVERY

In accordance with Mr. M. P. Parrot's request of 3-16-54 I am revising order EST-9101 to eliminate Company Inspection of the new Clark Compressor.

This matter was discussed briefly in the hall today. Mr. L. T. Vice, Mr. Parrot and Ron O'Neil were present in addition to myself.

Both Mr. Parrot and Mr. Vice expressed the opinion that Company inspection was unnecessary and should not be included in the order.

S.K.O.,

Sincerely O.K. to

me

JLD 3/16

MEMORANDUM GO-144

TO MR. A.V. WINTHER 3-16 1954
FROM J.E. HAYDEN
SUBJECT: ORDER EST-9101 - REVISION #1 OUR FILE EST-9101
FOURTH COMPRESSOR - GAS REC'Y. YOUR FILE
EL PASO REFINERY.

Please refer to order EST-9101
covering one - 440 BHP Clark Compressor.

Phase revise as follows:

TESTING

A complete shop running test
is to be made by Clark Engineers. This
test shall consist of full load operation
for a continuous period of not less than
12 hours. The results of this test shall
be reported to the Company in writing
within 10 days following the test.

INSPECTION "DELETE IN ITS ENTIRETY"

3/16

MEMORANDUM GO-144

TO

J. E. Hayden

3-16

1954

FROM

J. K. Olsen.

SUBJECT:

Inspection Clark 440 HP
Compressor -

OUR FILE

EST-9101

YOUR FILE

~~For~~ COMPRESSOR - GAS RECOVERY

In accordance with Mr. M. P. Paré's request of 3-16-54 I am reversing order EST-9101 to eliminate Company Inspection of the new Clark Compressor.

This matter was discussed briefly in the hall today. Mr. L. T. Vice, Mr. Paré and Ron O'Neil were present in addition to myself.

Both Mr. Paré and Mr. Vice expressed the opinion that Company inspection was unnecessary and should not be included in the order.

JKO
16

MEMORANDUM GO-144

TO J. K. Olsen March 15 1954
FROM W. Bowyer
SUBJECT: Inspection Instructions OUR FILE
from P & S. Dept. YOUR FILE

Received your memo requesting any available info regarding inspection instructions for gas engine driven compressors.

I talked with Devlin and Phil Brooks and Phil dug out their only standard. Before I could get copies of this and mail to you, I came down with a bad cold and lost 4 days of last week.

Enclosed are 2 copies of P & S standard "Inspection Instructions" which I hope will give you what you want. We have lost some time here, but will try to get 2 draftsmen started today on piping and fuds.

WUE9 PD

HL SANFRANCISCO CALIF MAR 15 1954 503PM

M P PARET JR

ATTN J E HAYDEN

REURTEL REGARDING INSPECTION OF CLARK COMPRESSORS, TWO COPIES
PLS INSPECTION INSTRUCTIONS AIR MAILED TO YOU MARCH 15 A.M.

J M EVANS.

821A

RECEIVED
MAR 15 1954
MAIL ROOM

3/15/54

J. M. EVANS
Attn: W. L. CONGER
SAN FRANCISCO,
CALIFORNIA

RE OUR MEMO MARCH 5, RELATIVE TO INSPECTION - CLARK 440 HP COMPRESSORS. WHEN
MAY WE EXPECT AN ANSWER.

R-11-9

J. K. Olsen

J. E. Hayden

M. P. PARET, JR.

X

MEMORANDUM GO-144

TO W. L. COWGER 3/5 1954
FROM J. K. OLSEN

SUBJECT: INSPECTION - CLARK 440 HP. COMPRESSOR OUR FILE
FOURTH COMPRESSOR - GAS RECOVERY YOUR FILE
EL PASO REFINERY.

WE HAVE SPECIFIED THE FOLLOWING TEST AND INSPECTION FOR THE FOURTH COMPRESSOR.

TESTING: A COMPLETE SHOP RUNNING TEST IS TO BE MADE BY CLARK ENGINEERS AND THE SAME SUBJECT TO BE WITNESSED BY COMPANY INSPECTORS. THIS TEST MUST CONSIST OF FULL LOAD OPERATION FOR A CONTINUOUS PERIOD OF NOT LESS THAN 12 HOURS. PLEASE ADVISE TEN DAYS BEFORE TEST.

INSPECTION: THIS GAS ENGINE DRIVEN COMPRESSOR AND ITS AUXILIARY EQUIPMENT IS SUBJECT TO COMPANY'S INSPECTION AND APPROVAL BEFORE SHIPMENT. PLEASE ADVISE TEN DAYS BEFORE SHIPMENT.

SOTEX PURCHASING DEPT. HAS ASKED ME TO SPELL OUT AS NEAR AS POSSIBLE JUST WHAT THE INSPECTORS SHOULD BE LOOKING FOR AND AT. SINCE I AM SOMEWHAT

MEMORANDUM GO-144

TO _____ 195

FROM _____

SUBJECT: _____ OUR FILE

YOUR FILE

IN EXPERIENCED ALONG THIS LINE I
THOUGHT THAT YOU COULD PERHAPS CHECK
WITH SOCIAL PURCHASING, H.C. DEULIN TO
DETERMINE JUST WHAT INFORMATION
IN ADDITION TO THE ORDER & SPECIFICATIONS
THAT THEY NORMALLY GIVE THEIR INSPECTORS
FOR SUCH EQUIPMENT. PLEASE ADVISE
AS SOON AS POSSIBLE.

NO 3/5

Clark Bros &
P.O. Box 4563
Huntsville, Ala.

Mr. F. H. Hayes
Huntsville, Ala.

Order EST 9101
your proposal H-5311
Sales File 13700

Cong. for Clark
Olean, N. Y.

from the desk of _____
A. V. WINTHER

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

March 5, 1954

**EST-9101
440 Hp. Clark Compressor
Fourth Compressor-Gas Rec'y Plt.
El Paso Refinery**

Clark Brothers Co.
P. O. Box 4563
Houston 13, Texas

Attention: Mr. F. H. Hayes

Gentlemen:

Please refer to our order EST-9101, your sales file No. 13700, covering one 440 Hp. HRA-4 Clark Gas Engine Driven Compressor.

We require a certified foundation Bolt Layout for this unit as soon as possible. Please advise immediately when we may expect the same.

Very truly yours,

A. V. WINTHER

By _____

JKO:dp

cc: Clark Brothers Co.
Cleen New York

J. M. Evans-Atten: WLC

MEMORANDUM GO-144

J.K.O.

TO ~~Ben E. Hayden~~
FROM ~~A. V. Winter~~

Feb 25

1954

SUBJECT: Clark Compressor

OUR FILE EST 9101

YOUR FILE

Order is to have the following attachments
2 copies Print EF 18 Exchanger Data
1 copy " EF 177 Compressor-Engine Data

also decision is to be made as to whether
Inspection by out side Inspection
company is to be made of unit at
factory Oleum N.Y.

OKV

DN SF PLS T OK VSF SF 1141 PLS OK
SF 1141 STD OIL GA PLS

~~0993~~
J.K.O.

MSG 1 858 AM

STD OF TEX EP291, EL PASO, TEXAS 2-25/// 2-24--54

J. M. EVANS

ATTENTION- J. K. OLSEN

SAN FRANCISCO, CALIFORNIA

COMPRESSOR ORDER PLACED TODAY WITH CLARK FOR 12 WEEKS DELIVERY.

M. P. PARET, JR.

859 AM END

EMD

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

El Paso, Texas

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

February 25, 1954

QR - Spec. EP-103-K
Your Proposal Feb. 20, 1954
Engine - Compressor Unit

The Cooper-Bessmer Corporation
P. O. Box 1926
Odessa, Texas

Attention: Mr. C. L. McDougal

Gentlemen:

We wish to thank you for the quotation submitted for an engine-compressor assembly.

After careful analysis of your quotation from an overall viewpoint, taking into consideration cost, delivery and adaptation to existing equipment, it was decided to be to our advantage to purchase a similar unit to those now in use. Therefore, we have ordered a Clark Compressor Unit.

The time and effort you gave to our inquiry is appreciated. Should an occasion again be presented for equipment in the same category, we shall include you in our bid requests.

Very truly yours,

AVW:cm

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

El Paso, Texas

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

February 25, 1954

QR - Spec. EP 103-K
Your Proposal EP-6149
Engine-Compressor Unit

Ingersoll-Rand Company
2100 Wyoming Street
El Paso, Texas

Attention: Mr. R. J. Benson

Gentlemen:

We wish to thank you for the quotation submitted for an Engine-Compressor Assembly.

After careful analysis of your quotation from an overall view point, taking into consideration cost, delivery and adaption to existing equipment, it was decided to be to our advantage to purchase a unit similar to those now in use. Therefore, we have ordered a Clark Compressor Unit.

The time and effort you gave to our inquiry is appreciated, and should an occasion again be presented for equipment in the same category, we shall include you in our bid requests.

Very truly yours,

AVW:cm

~~SECRET~~
OK [signature]

RECEIVED
FEB 24 1954
M.F. PARET, JR.

J. K. O

SOT VO 158 2-24-54 MSG 381

M. P. PARET, JR.

APPROPRIATION R-11 COMPRESSOR APPROVED. OKEH TO PLACE ORDER.

P. L. SMITH

END MG 427 PM

.IS THAT OKAY TO PLACE ORDER YES

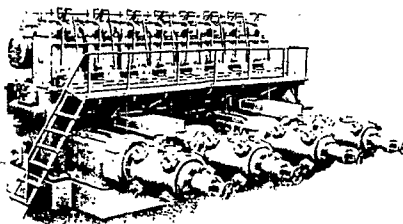
OK TNX U END

ZC

RECEIVED

FEB 24 1954

J.W. KITCHEN



CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

CLARK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

February 25, 1954

RECEIVED

MAR - 1 1954

ADV. DIVISION

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winther

Your No. QR-Specification EP-103-K

Our Proposal Number H-5311

Gentlemen:

Our Sales File Number 13700

We refer to our proposal above covering one Clark Model HRA-4, 440 BHP gas engine driven compressor.

In this connection, we are now enclosing four copies of each of the following specification sheets:

1. Design and data sheet for jacket water heat exchanger
2. Design and data sheet for lubricating oil cooler

In addition to the above, we are also enclosing your specification sheet PD-10092-0 which has been filled out in accordance with your request. We would like to point out that the delivery on this specification sheet has been changed and should now read "Engine delivery - 8 weeks and Cylinder delivery - 12 weeks after receipt of your order and final engineering information".

If there are any questions relative to the above, we will be pleased to discuss them with you.

Yours very truly,

CLARK BROS. CO.

David P. Allen

David P. Allen

DPA:pmp
Dup.
Encl.

CC: Mr. J. K. Olsen
Standard Oil of California
San Francisco, California
W/1 Copy of Specification Sheets

EL PASO, TEXAS

PREPARED BY

195

NET 9101

ISSUING POINT

DATE

CLARK MODEL 99

7/24/53

HOUSTON 13, TEXAS

SHOW FULL NAME AND ADDRESS ABOVE.



PREFIX AND ORDER NUMBER

IMPORTANT Show above prefix and order number on all invoices, shipping papers and correspondence

RENDER INVOICES IN QUADRUPPLICATE

FORWARD ALL DOCUMENTS TO

PURCHASING DIVISION

P.O. BOX 862

EL PASO, TEXAS

QUANTITY	DESCRIPTION OF MATERIAL	ITEM NO	QUANTITY RECEIVED	INVOICE	FREIGHT	TOTAL
1 ONLY	CLARK MODEL 99-4, 440 HP, 300 RPM, SUPER TWO CYCLE, FIRST AND ONE ENGINE DRIVE COMPONENT, IN ACCORDANCE WITH CLARK MODEL PROPOSAL ST-13700, FILE NO. 1011, DATED FEBRUARY 29, 1954. THE COMPONENTS IN ACCORDANCE TO THE STANDARD APPROVED LISTED IN CLARK'S MODEL 99-4 WILL BE FURNISHED WITH THE FOLLOWING ADDITIONAL EQUIPMENT:	1		\$45,395.00		
1 ONLY	BURGESS MODEL 500-10 REPTER	2	1	363.00		
1 ONLY	FLYING OIL CO. (SPECIAL TO DUPLICATE THREE FURNISHED BY BURGESS MODEL 500-10) CHRYSLER CORPORATION COMPANY	3		244.00		
1 ONLY	WORTH OIL BATH TYPE ENGINE AIR FILTER, MODEL 10-33-12	4		275.00		
1 ONLY	COCKPIT COMPASSION FILTER RING	5		493.00		
1 ONLY	ENGINE AIR FILTER WITH FRAME	6		363.00		
1 ONLY	FURNISHING OIL MOTOR (RECORD)	7		600.00		

QTY: 1-1-2

PRICE

\$40,395.00 (FIRM PRICE)

F.O.B.

CLARK, ST. YORK - FULL PRICE
SHIPPED TO EL PASO, TEXAS

SHIP TO
AND MARK
ALL PACKAGES

STANDARD OIL COMPANY OF TEXAS

PREFIX AND ORDER NUMBER

ATTENTION OF

J. E. BARNETT

DEPARTMENT

REVENUE DEPT.

DESTINATION

EL PASO, TEXAS

SHIP VIA

TRUCKS OR RAIL
ADVISE BY DESTINATION

PREPAID
COLLECT

DATE REQUIRED AT DESTINATION

DATE REQUIRED AT DESTINATION

APPROVED

MATERIAL TO BE USED FOR

DATE RECEIVED	INVOICE DATE
RECEIVED VIA	INVOICE OR TRANSFER NO.
TALLIED BY	REGISTER NO.
INSPECTED BY	FRT. BILL DATE
INSPECTION NO.	FRT. BILL NO.
CHECKED WITH REQUISITION BY	VOUCHER NO.
POSTED TO STOCK RECORDS	CAR NO.

BILL OF MATERIAL NO.

DEPARTMENT

ACCOUNT

LIST SHEET

CLARK MFG. CO.
P. O. BOX 4963
HOUSTON 13, TEXAS

NO. **REF-3021**
AMERICAN OIL COMPANY OF TEXAS
P. O. BOX 862, EL PASO, TEXAS

SHEET **2** OF **3** SHEETS

QUANTITY	UNIT	DESCRIPTION	Item No.	PRICE
1 ONLY		LOW FINE HAZARD IGNITION AND SHUT DOWN CONTROLS	8	125.00
1 ONLY		JACKET WATER COOLER	9	1,125.00
TESTING A COMPLETE NEW RUNNING TEST IS TO BE MADE BY CLARK ENGINEERS AND SAME SUBJECT TO BE WITNESSED BY COMPANY INSPECTORS. THIS TEST MUST CONSIST OF FULL LOAD OPERATION FOR A CONTINUOUS PERIOD OF NOT LESS THAN 12 HOURS. PLEASE ADVISE THE DATE BEFORE TEST. INSPECTION THE GAS ENGINE DRIVER COMPRESSOR AND ITS AUXILIARY EQUIPMENT IS SUBJECT TO COMPANY'S INSPECTION AND APPROVAL BEFORE SHIPMENT. PLEASE ADVISE THE DATE BEFORE SHIPMENT. PRINTS CLARK MFG. CO., INC. IS TO SUPPLY COMPANY WITH THREE (3) COMPLETE SETS OF PRINTS ON APPROVAL ONE WEEK AFTER THE DATE OF THIS ORDER. CLARK MFG. CO., INC. IS TO SUPPLY COMPANY WITH THE (10) COMPLETE SETS OF APPROVED PRINTS, BOOKS OF INSTRUCTIONS, DATA SHEETS, WIRING DIAGRAM, PIPING DIAGRAM, ETC., ON ALL PARTS. UNIT SHALL BE TAGGED 1954 WHEN SHIPPED. FREIGHT ALLOWED ON UNIT TO EL PASO, TEXAS, AS SPECIFIED IN CLARK MFG. PROPOSAL. UNIT TO CONSIST OF COMPRESSOR AND ALL AUXILIARIES. DELIVERY ON THE COMPLETE UNIT TO BE MADE ON OR BEFORE MAY 27, 1954. THE V-BELTS ON WATER PUMP TO BE ANTI-STATIC AND EXPLOSION PROOF. ATTACHED IS A BLACK DATA SHEET (REF-177) ON GAS COMPRESSOR AND INTERNAL COMBUSTION ENGINE TO BE COMPLETELY FILLED OUT BY CLARK MFG. AND RETURNED. ATTACHED IS ENGINEER DATA SHEET (REF-18) TO BE FILLED OUT COMPLETELY BY CLARK MFG. FOR THEIR OIL AND JACKET WATER COOLERS.				

CLARK BROS. CO.
P. O. BOX 4563
HOUSTON 13, TEXAS

EST 9101
STANDARD OIL COMPANY OF TEXAS
P. O. BOX 862, EL PASO, TEXAS

SHEET 3 OF 3 SHEETS

QUANTITY	UNIT	DESCRIPTION	Item No.	PRICE
		ATTACHED: MP-16 (2) MP-177 (1) IN ACCORDANCE WITH REQUEST MADE BY MR. W. A. ROYER, SHIPMENT OF ENGINE SHALL BE MADE WITHIN EIGHT (8) WEEKS FROM DATE OF ORDER AND COMPRESSION, INCLUDING ALL APPURTENANCES, SHALL BE SHIPPED WITHIN TWELVE (12) WEEKS FROM DATE OF ORDER. COMPLETE ENGINE-COMPRESSOR ASSEMBLY MUST BE IN EL PASO TEXAS BY MAY 27, 1994. WARRANTY AS PER SELLER'S QUOTATION AND STANDARD OIL COMPANY OF TEXAS CLAUSE ATTACHED.		

GO-5-2 (100M 5-52) PRINTED IN U.S.A.

SUMMARY OF BIDS
(ATTACH TO REQUISITION)SUBJECT 4th COMPRESSOR - GAS RECOVERY PLANT DATE 2-23-54 FILE NO. QR-SPEC EP-103K

ITEM NO.	QUANTITY	DESCRIPTION	NAME OF SUPPLIER DATE OF PROPOSAL	CLARK BROS.	INGERSOLL-RAND	COOPER BEESSEMER			
1	1	440 HP GAS COMPRESSOR		FEB. 19, '54	FEB. 22, 1954	FEB. 20, 1954			
		MUFFLER		363.00	INCL.	INCL.			
		FLYWHEEL GUARD		244.00	"	"			
		AIR FILTER		255.00	"	"			
		ELECTRICAL TACH.		300.00	E 300.00	300.00			
		COOKMET COMP. RINGS		493.00	INCL.	E 493.00			
		LOW FIRE 1/2" SHUT DOWN		325.00	INCL.	INCL.			
		GOVERNOR AIR MOTOR		365.00	INCL.	INCL.			
		WATER SARGE TANK		215.60	INCL.	INCL.			
		J.W. COOLER		182.60	INCL.	INCL.			
		H.J.W. TEMP AL. SW.		35.00	INCL.	INCL.			
		BACKFIRE RELIEF VALVE		Not Req'd	"	Not Req'd			
		ERECTION SUPT. (4 DAYS)		INCL.	INCL.	INCL.			
		ADDED TIME		40.00/DAY	36.00/DAY	40.00/DAY			
		TOTAL EXTRAS		3921.60	300.00	793.00			
		GROSS PRICE		45,388.00	4708.00	48,843.00			
		CASH DISCOUNTS		—	—	—			
		NET QUOTED PRICE		45,388.00	4708.00	48,843.00			
		ESCALATION		FIRM	FIRM	FIRM			
		ADDITIONS, AS ITEMIZED ABOVE, (INDICATE BY "E" OR "B" TO MAKE BIDS COMPARABLE (WHETHER ESTIMATED OR BID)							
		NET COMPARATIVE COST AT SOURCE		B 3921.60	E 300.00	F 793.00			
		SHIPPING POINT		OLEARY, N.Y.	PRINTED ART, N.Y.	MT. VERNON, OHIO			
		SHIPPING WEIGHT		80,750	55,000/LB	68,925			
		TRANSPORTATION COST		FRT ALLOWED	FRT ALLOWED	FRT ALLOWED			
		NET COMPARATIVE FOB COST AT DESTINATION ()		49,309.60	47,380.00	49,636.00			
		DELIVERY (WEEKS AFTER PLACEMENT OF ORDER)		ENGINE 10 TO 12	ENGINE 10 TO 12	ENGINE 10 TO 12			

RECOMMEND CLARK BROS. (SECOND LOW BIDDER)

REASON ALTHOUGH IFR IS LOW BIDDER BY 1929.00 - EXTRA COST FOR ADDED SPARE PARTS, ESTIMATED AT \$2060 WOULD MORE THAN MAKE-UP DIFF.

IN ADDITION TO THIS - ENGINE & DRAFT TIME WILL NOTE: ENCIRCLED ITEMS ARE UNDESIRABLE BE SAVED BY PURCHASING CLARK UNIT.

APPROVALS: 49,309.00

RECOMMENDED SUPPLIER'S NET ACTUAL FOB COST AT DESTINATION

EF-135 (200-CD-2-52)

JD
2/23/54
①

EQUIPMENT DESCRIPTION	ORIGINAL ORDER	PRESENT QUOTE	DIFFERENCE
BURGESS MODEL SDG-10 MUFFLER	300 ⁰⁰	363 ²⁰	+ 63 ²⁰
FLY WHEEL GUARD	210 ⁰⁰	244 ⁰⁰	+ 34 ⁰⁰
VORTEX AIR FILTER	210 ⁰⁰	255 ⁰⁰	+ 45 ⁰⁰
ELECTRICAL TACHOMETER	300 ⁰⁰	300 ⁰⁰	—
COOKMET COMP. PISTON RINGS	330 ⁰⁰	493 ⁰⁰	+ 163 ⁰⁰
LOW FIRE HAZ. 10. 6' SH. DW. CON.	280 ⁰⁰	325 ⁰⁰	+ 45 ⁰⁰
GOVERNOR AIR MOTOR W/ PRECISION	335 ⁰⁰	365 ⁰⁰	+ 30 ⁰⁰
FLUSHING OIL SYSTEM.	540 ⁰⁰	600 ⁰⁰	+ 60 ⁰⁰
WATER SURGE TANK	NOT ORDERED	215 ⁶⁰	—
J.W. COOLER	1010 ⁰⁰	1326 ⁰⁰	+ 316 ⁰⁰
HIGH J.W. TEMP. ALARM SW.	—	35 ⁰⁰	—
BACKFIRE RELIEF VALVE	—	69 ⁰⁰	—
BENJAMIN HOWLER	—	75 ⁰⁰	—
		TOTAL	756 ²⁰
BASE PRICE	41,193 ⁰⁰	45,388 ⁰⁰	* 4195 ⁰⁰ *
* THIS DIFF. MAY NOT BE AS GREAT AS SHOWN SINCE ORIG. ORDER IS NOT CLEAR ON MATTERS RELATING TO FRT. THE PRICE 41,193 ⁰⁰ PROBABLY DOES NOT INCL. FRT. TO EL PASO WHEREAS THE 45,388 ⁰⁰ DOES.			* 4951.20 *

960
4/23/54
②

INGERSOLL
RAND

COOPER -
BEISEMER.

INCL.

INCL.

INCL.

INCL.

INCL.

INCL.

NOT STATED

\$300⁰⁰

INCL.

NOT STATED

INCL.

INCL.

NOT STATED

INCL.

?

?

INCL.

INCL.

INCL.

INCL.

INCL.

INCL.

INCL.

NOT RECOMMENDED
PRICE ON REQUEST

No.

No.

47,080⁰⁰

48,843⁰⁰

JKO
2/23/54
③

SIZE 5' FOUNDATION REQUIREMENTS:

CLARK

INTERROLL-RAND

COOPER DESIGNER:

MINI FOUND - 32 yds.

25 yds.

32 yds.

OVERALL LENGTH 12'-5 1/8"

10'-7"

15'-6"

" WIDTH, ≈ 17'-0"

14'-9"

NOT SHOWN -

J/O
2/23/54
(4)

CLARK Bros. 49,309.60

ING. RAND. 47,380.00

1,929.60

DIFF

SPARE PARTS ON ORIG. ORDER = 5,548.27

FOR 3 COMP.

ASSUME ONLY 1/3 REQ'D FOR ONE COMP.

1849.4

SAY \$1850.00

3 15,548.27

3
25
24
14
12
28
27
12

RATIO UP BY INCR COST INDEX FOR COMPRESSORS.

$$1850 \times \frac{217}{195} = 2060.00$$

ADDED COST FOR ADDITIONAL SPARE PARTS

WOULD UNDOUBTEDLY EAT OF DIFF. IN

FIRST COST.

PROPOSAL

SUBMITTED BY

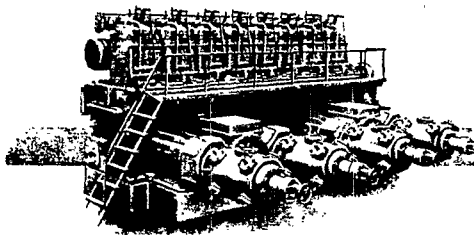
CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

OLEAN, NEW YORK

SALES FILE

DATE



CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

ADDRESS REPLY TO P. O. BOX 4563, HOUSTON 13, TEXAS

February 19, 1954

CLARK

M-5311
SF-13700

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention Mr. A. V. Winther

Gentlemen:-

Your Specification EP-103-X
Compressor Gas Recovery Plant

We wish to acknowledge and thank you for your inquiry of February 5, 1954 and are now pleased to quote on the following equipment for the plant above:

- 1 - Clark Model MRA-4, 440BHP, 300 RPM, Super 2-cycle, right angle, gas engine driven gas compressor having four 14" x 14" vertical power cylinders, two 24" lined to 23" first stage, double acting, cast iron compressor cylinders, one 14-1/2" lined to 13-1/2" second stage, double acting, cast iron compressor cylinder, and to be complete with standard appurtenances as shown on the attached sheet, and in accordance with the attached specifications and Contract Conditions.

Price of each complete unit as above f.o.b.
Olean, New York\$45,388.00,
with freight allowed to El Paso, Texas,
based on present day carload freight
rate and subject to any increase or decrease
in this rate at time of shipment.

Weight of complete unit - 80,750 lbs.

Shipment of the engine can be made in 2-1/2 to 3 months and of the compressor cylinders in 3-1/2 to 4 months, after receipt of your order and complete information.

Standard Oil Company of Texas
-2- M-5311
February 19, 1954

Deliveries herein specified are in effect as of this date and are subject to prior sale. Also, these deliveries are subject to change during the period of national emergency if government priorities interfere with the usual production of our own factory or with the output of our suppliers.

Standard appurtenances, per unit, included in price shown on the first page, as follows:

Lubricating oil pump	Clark mechanical governor
Lubricating oil filter	4 - Cooling water outlet thermometers in piping above each power cylinder head
Lubricating oil cooler, single-pass, suitable for 123°F. cooling water	2 - Thermometers for oil inlet and outlet
Full force feed lubrication with mechanical lubricator for power cylinders and compressor cylinders	Water cooled exhaust manifold
Oil cooled pistons	Air starting cock
Spark plugs	Automatic shutdown device for:
Foundation bolts	(a) high cooling water temperature
Special wrenches	(b) low oil pressure
Bendix-Scintilla low tension magneto ignition	(c) engine overspeed
Platform, rails & steps	Gauge board complete with oil pressure gauge, starting switch, exhaust pyrometer (& tachometer if purchased)
Parts book	Metallic packing for compressor cylinder piston rods
Instruction manual	Barring device
Foundation plans	Fuel gas regulator
Piping plans	Exhaust pyrometer
Alemite fittings for fuel injection valve stem lubrication	

1/2" Belt driven water circulating pump
HTK

We will provide one set of wrenches and manual flywheel barring over device for any number of units up to three; two sets for four to six units; three sets for seven or more units. This holds if all machines are in the same building.

If any of the following extra equipment is desired, please add to the price of each unit shown on the first page. All prices shown are f.o.b. point of shipment with freight allowed to El Paso, Texas:

Standard Oil Company of Texas

-3- M-5311

February 19, 1954

Burgess Model SDG-10 muffler	\$ 363.20
Flywheel guard (special to duplicate those previously furnished)	\$ 244.00
Vortex air filter, Model LB-33-12	\$ 255.00
Electrical tachometer	\$ 300.00
Cookmet compressor piston rings for all compressor cylinders	\$ 493.00
Low fire hazard ignition and shutdown controls	\$ 325.00
Governor air motor with precisor	\$ 365.00 ✓
Flushing oil system	\$ 600.00
(McCord)	
Surge tank for cooling water system (50 gallon)	\$ 215.60 ✓
Jacket water cooler	\$ 1,326.00 ✓
High jacket water temperature alarm switch	\$ 35.00 ✓
Backfire relief valve to be mounted on air inlet line adjacent to engine air filter	\$ 69.00
Benjamin howler Model ETH-2703	\$ 75.00

We believe our quotation is complete with the exception of the sepia transparency specification EP-103-K and the data sheet EP-177, FD-10092-0. We will complete these forms just as quickly as possible and forward them to you.

Prices indicated for Clark products are firm, provided shipment takes place within 12 months from the date of order. Clark products shipped later than 12 months after date of order (excluding delivery delays caused by Clark Bros. Co.) shall be subject to any price increases made effective between date of order and date of shipment of each main unit, but in no case

Standard Oil Company of Texas

-4- H-5311

February 19, 1954

shall such increase exceed 10%. On auxiliary equipment, such as motors, mufflers, coolers, etc. not made by Clark Bros. Co., it is understood that the prices in effect at the time of shipment will apply.

If we may furnish you with any additional information, please let us hear from you.

Very truly yours

CLARK BROS. CO.

FMHayes
dpa/rw
trip.
encls.


District Manager

CONTRACT CONDITIONS • GAS ENGINES AND COMPRESSORSDate: **8-19-54**File No.: **H-5311****TERMS OF PAYMENT**

Ninety percent (90%) of the price of each complete unit shall be due and payable upon shipment of each main engine. The balance of ten percent (10%) of the price of each complete unit shall be due and payable thirty (30) days after shipment of each main engine.

ERECTION SUPERINTENDENT

At the original installation of CLARK units, an Erection Superintendent will be supplied without extra charge by CLARK Bros. Co., for a period of four (4) eight-hour days per unit, if required; however, the Purchaser is to pay traveling and living expenses during this period. If additional time is required, the Purchaser shall pay for such services at the rate of forty dollars (\$40.00) for each eight-hour day, time and one-half for Saturdays and all time over eight hours per day, double time for Sundays and holidays, plus all traveling and living expenses. Time and expense shall be computed from the time the Erection Superintendent leaves the nearest basing point until he returns to such point.

GUARANTEE

CLARK Bros. Co. will repair f.o.b. its works where made, or furnish without charge f.o.b. its works, a similar part to replace any material of its own manufacture, which within one year after shipment, is proven to have been defective at the time it was shipped, provided the Purchaser gives CLARK Bros. Co. immediate written notice of such defects. CLARK Bros. Co. shall not be liable for damages caused by defective material, and no allowance will be made for repairs or alterations, unless with its written consent. CLARK Bros. Co. only warranties are that the machinery of its make is well made, of good material and is in accordance with the specifications of this contract; and the only warranties of machinery included in this contract but made by other than CLARK Bros. Co., and not an integral part of CLARK machinery, are the warranties of the makers of such machinery, which warranties whatever they may be are hereby assigned to the Purchaser without recourse to CLARK Bros. Co.

Capacity of air compressors shall be guaranteed with the understanding there will be an allowable variation of plus or minus 3%.

Capacity of gas compressors where the intake pressure is above 5 psig shall be guaranteed with the understanding that there will be an allowable variation of plus or minus 3%.

Capacity of gas compressors where the intake pressure is 5 psig or less, shall be guaranteed with the understanding there will be an allowable variation of plus or minus 6%.

Horsepower and fuel consumption shall be guaranteed with the understanding there will be an allowable variation of plus or minus 3%.

SPECIAL WRENCHES AND TOOLS

CLARK Bros. Co. will provide one set of wrenches and a manual flywheel barring-over device, for any number of units up to three to be installed in the same building, two sets for four to six units; three sets for seven or more units.

ACCEPTANCE AND TAX

This quotation is subject to immediate acceptance. Any order resulting therefrom does not constitute a contract until approved by CLARK Bros. Co. at its executive offices, and the proposal is subject to change or withdrawal without notice until so approved.

Sales, Use and Excise Taxes imposed by Federal, State or Municipal Governments are for the Purchaser's account and are in addition to the prices quoted herein.

CANCELLATION

This contract may be cancelled only by mutual agreement between the Purchaser and CLARK Bros. Co., and if such cancellation is agreed upon, the Purchaser assumes responsibility for the immediate payment of all cancellation charges.

PRICE ADJUSTMENT (SEE QUOTATION)

~~Prices quoted on CLARK products are intended to be firm, but if price increases are made effective between date of order and date of shipment of the main unit (or each main unit in the case of multiple sales), it is understood that the percentage of such increase shall be added to prices shown herein.~~

~~In no case shall such percentage increase exceed ten percent (10%). On material not made by Clark Bros. Co. it is understood that the price in effect at the time of shipment will apply.~~

FREIGHT RATES

Any freight charge shown is based on the existing freight rate, and any increase or decrease up to the date of any shipment is for the customer's account.

DELIVERY

Deliveries specified herein are in effect as of this date and are subject to prior sale. The time for delivery given herein is approximate and is contingent upon receipt of the order and final engineering information from the Purchaser.

CLARK Bros. Co. shall not be liable for any loss or damages for delay in delivery by reason of the operation of any Governmental priorities system, strikes, or any cause whatsoever not within the reasonable control of CLARK Bros. Co., including but not limited to war, fires, delays of carriers and delays by other persons or firms under contract for materials. In the event of such delay, the date for delivery by CLARK Bros. Co. shall be extended proportionately.

DAMAGES

In no event, shall Clark Bros. Co. be liable for any special, indirect or consequential damages arising out of this contract.

CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

OLEAN, N. Y., U. S. A.

BY: **F. H. Hayes**TITLE: **District Manager**

SPECIFICATIONS

FOR CLARK SUPER TWO-CYCLE
RIGHT ANGLE GAS ENGINE DRIVEN COMPRESSORS

H-5311

1. Number of Units Required **One**

Model **HRA-4**

BHP rating at sea level **440**

BHP rating at **3740'** elevation -
barometric pressure - **12.8** **398**

Speed, RPM **300**

2. Capacity and Performance
of Each Unit:

	<u>First Stage</u>	<u>Second Stage</u>	<u>Third Stage</u>	<u>Fourth Stage</u>
Type of gas to be compressed	Hydrocarbon Gas Mixture			
Molecular Weight	40.1	33.1		
"N" Value	1.13	1.15		
Suction pressure, PSIA	13	49.8		
Suction temperature, °F.	100	100		
Discharge pressure, PSIA	54.8	212.8		
Discharge temperature, °F. ... Approximate	202	215		
Unit capacity - Million CFD - Measured at 14.7 PSIA and 60 °F. under the above conditions	2.550	1.770		

SPECIFICATIONS

FOR CLARK SUPER TWO CYCLE RIGHT ANGLE GAS ENGINE DRIVEN COMPRESSORS (continued)

H-5311

3. Power Cylinders:

Number on each unit ~~Four~~
Bore ~~14"~~
Stroke ~~14"~~

4. Compressor Cylinders

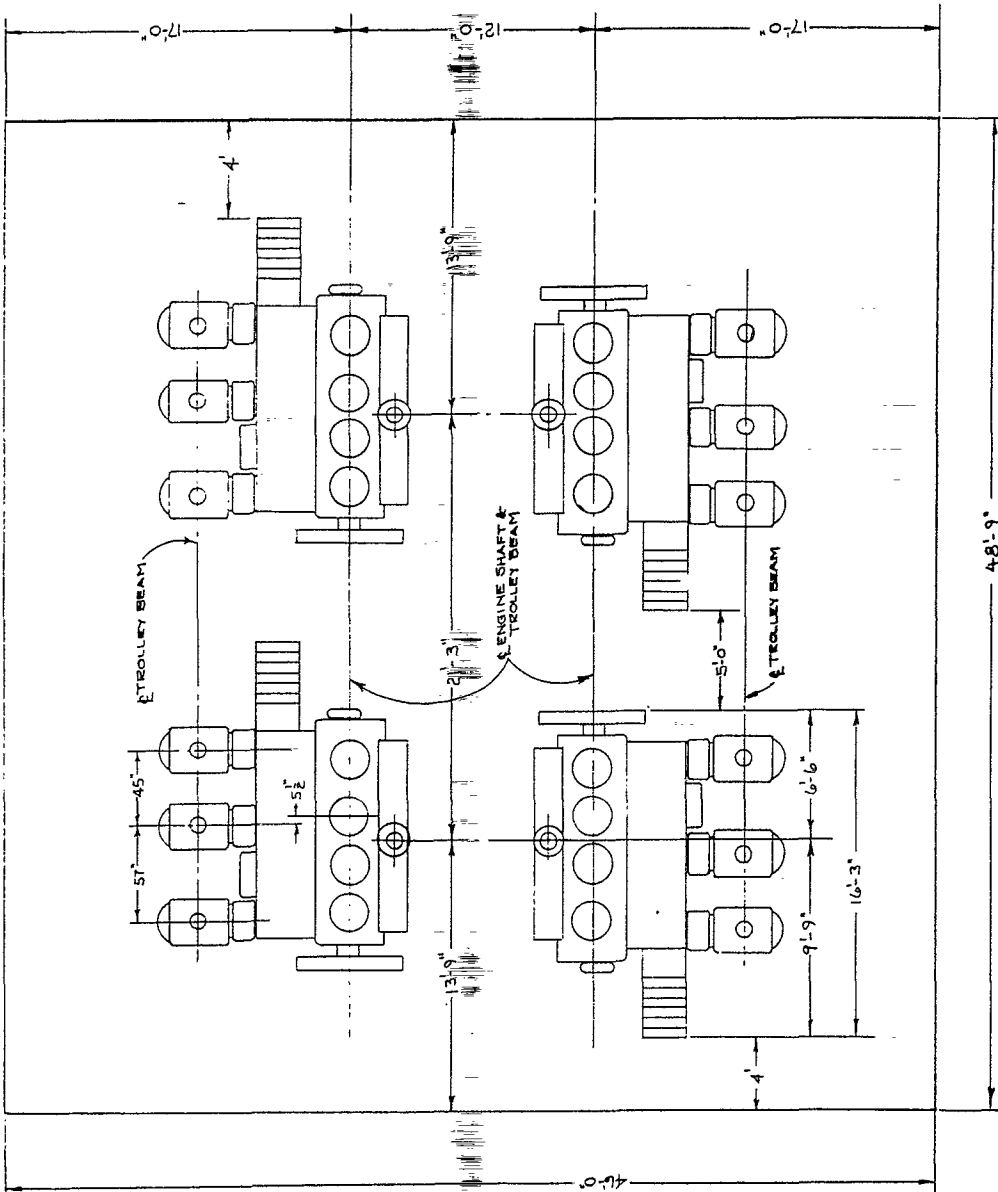
	First Stage	Second Stage	Third Stage	Fourth Stage
Number on each unit.....	Two	One		
Bore	24" lined to 23"	14-1/2" lined to 13-1/2"		
Stroke	14"	14"		
Type	CI	CI		

5. Cooling Water Requirements for Each Unit:

	Engine Jackets and Exhaust Manifold	Compressor Cylinders	Oil Cooler
Gallons per minute, based on actual heat removal, no safety factor included for overload, fouling, etc.	238	52	238
Incoming temperature, °F.....	124.5	123	123
Temperature rise, °F.....	8.5	10	1.5
Pressure drop, PSI	7	4 to 7	1.4
Type of water system.....	Closed	Closed	Closed
Type of oil cooler.....			Single Pass

6. Fuel Consumption:

8,000 BTU per BHP per Hour under full load conditions.



NOTE--
DISTANCE FROM FLOOR LINE
TO BOTTOM CHORD OF
BUILDING TRUSS TO BE 18'-0"

GENERAL COMPRESSOR LAYOUT FOR			
4 CYLINDER 14" BORE x 14" STROKE ENGINE			
TYPE	DATE	SCALE	
DRAWN BY: J.M.A.	8-9-50	CLARK PROS. CO.	
THICK BY:		OLCAN	
CHECKED BY: J.M.A.	5-2-52	N. Y.	U. S. A.

191736 A

Super 2-cycle Right Angle Gas-Engine-Driven Compressor

[illegible]

High compression engines with higher compression ratios, better thermal efficiencies, and greater fuel economy, develop more horsepower without encroaching upon the overload capacity. This is possible because more heat energy of the fuel gas is converted to useful work, and less is rejected to the jacket water and oil cooler.

Medium compression heads can be furnished for these units when the fuel gas contains some heavy ends, such as propane and butane. Fuel consumption for these medium compression engines is 9000 BTU/GHP/HR. at rated load.

1. Ignition, Power and Scavenging (10-180°)
 - a. Just ahead of top dead center the spark plug ignites the gas-air charge and the piston moves downward on the power stroke.
 - b. As the piston nears the end of the stroke it uncovers the exhaust ports and the scavenging ports in that order. After the spent exhaust gases are released to the exhaust manifold at near atmospheric pressure the scavenging ports are uncovered. Then air flows into the cylinder flushing out all of the burnt gases and recharging the chamber with fresh air. Air, previously charged into the scavenging air passage at 3½ pounds pressure, does a thorough job of scavenging.

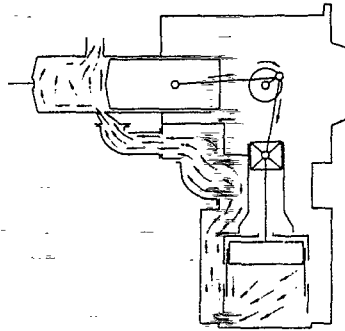
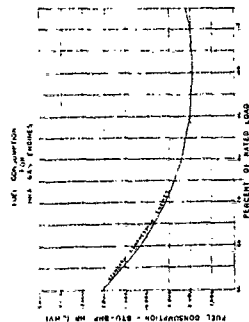
- As the piston reverses its travel and starts upward it closes first the scavenging and then the exhaust ports.

c. Compression of the fuel gas/air mixture continues until the spark plug ignites the charge.

Note that the entire sequence takes only one revolution, every downward stroke, then, is a power stroke. It is obvious that highest power per unit weight at lower Mean Effective Pressure results from this cycle. Further, complicated, troublesome valve gear is eliminated.

Air Starting Cock
Low Tension Magneto Ignition
Spark Plug
Mechanical Governor
Water-Cooled Exhaust
Manifold
Metallic Compressor Rod Packing
Over-speed Stop
Gauge Board with Oil
Pressure Gauge, Starting
Switch, Exhaust Pyrometer
Fuel Force Feed Lubrication
Stem Lubrication
Oil-Cooled Pistons
Lubricator
Oil-Cooled Compressor Rod Packing
Aluminum Fittings for Valve
Stem Lubrication
Full Force Feed Lubrication
Fuel Gas Regulator

and Opening for Torch-
 eter (if purchased)
 and Fitters for Oil Inlet
 and Outlet
 Temperature High Water Tem-
 perature Shutdown
 Automatic Low Oil Pressure
 Failure Shutdown
 Filling Water Outlet
 Thermometer



Precision bearings, resplendent bronze
regrooved, ballbearing, requires hand
turning.

Massive Cast Irons are pieces forged
steel, precision ground.

Parco-Lubized power cylinders and
pistons for protected break-in, no oil;
lubrication or scoring.

Complete Scavenging—perfected port

• Superior Performance
• Low Power Consumption
• Long Life Span
• High Reliability
• Easy Installation
• Low "Down-Time"
• Accessability

LONGITUDINAL
CROSS-SECTION

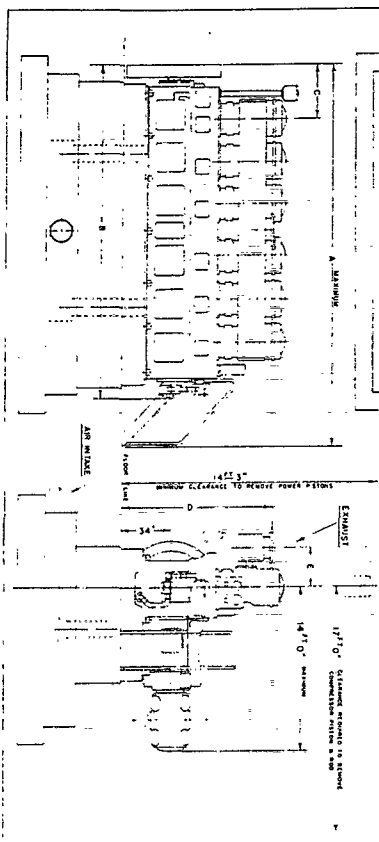


CLARK MODEL HRA COMPRE

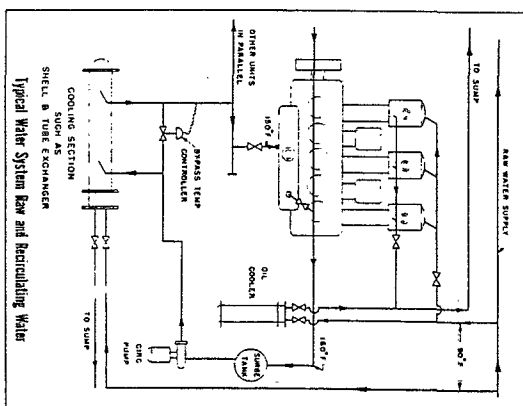
	HA-1,2	HA-4	HA-5	HA-6	HA-8
A	10.5%	10.5%	12.0%	12.0%	12.0%
B	10.5%	10.5%	12.0%	12.0%	12.0%
C	10.5%	10.5%	12.0%	12.0%	12.0%
D	10.5%	10.5%	12.0%	12.0%	12.0%
E	10.5%	10.5%	12.0%	12.0%	12.0%
HA-1,2	12.1	12.2	14.2	14.3	14.3
HA-4	12.1	12.2	14.2	14.3	14.3
HA-5	12.1	12.2	14.2	14.3	14.3
HA-6	12.1	12.2	14.2	14.3	14.3
HA-8	12.1	12.2	14.2	14.3	14.3

NOT TO BE USED FOR CONSTRUCTION

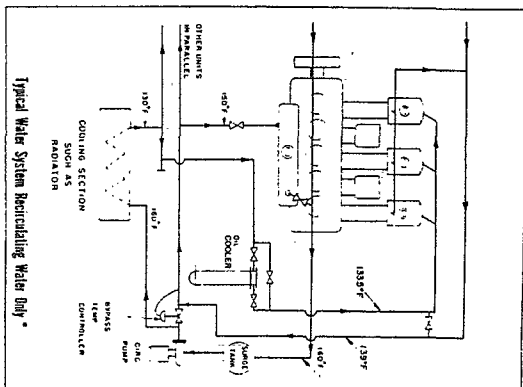
NOT TO BE USED FOR CONSTRUCTION



FOOD SYSTEMS • WATER REGULATION



Typical Water System Draw and Recirculating Water



Typical Water System Recirculating Water Only

COOLING WATER REQUIREMENTS

Model	ENGINE				COMP. CYCLES				FOR 100° F. MAX.				FOR 110° F. MAX.				FOR 130° F. MAX.			
	GPM	Press.	GPM	Req. Drop	Press.	Surface		Water Press.	GPM	Press.	Surface		Water Press.	GPM	Press.	Surface		Water Press.	GPM	
						5q. Ft.	Req. Drop				5q. Ft.	Req. Drop				5q. Ft.	Req. Drop			
																				psi
HRA-31.1	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.2	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.3	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.4	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.5	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.6	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.7	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.8	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.9	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.10	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.11	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.12	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.13	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.14	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.15	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.16	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.17	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.18	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.19	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.20	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.21	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.22	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.23	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.24	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.25	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.26	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.27	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.28	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.29	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.30	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.31	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.32	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.33	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.34	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.35	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.36	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.37	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.38	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.39	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.40	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.41	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.42	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.43	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.44	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.45	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.46	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.47	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.48	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.49	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.50	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.51	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.52	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.53	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.54	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.55	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.56	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.57	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.58	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.59	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.60	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.61	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.62	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.63	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.64	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.65	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.66	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.67	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.68	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.69	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.70	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.71	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.72	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.73	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.74	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.75	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.76	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.77	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.78	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.79	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.80	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5	5	206	5	60	5	
HRA-31.81	205	5.7	40	210.5	62	30	5	74	45	5	206	5	60	5						

* When this system is used, water flow through oil cooler and compressor cylinders differs from rates shown. Exci rates depend on job conditions.

∴ At exit cost

All water rates given above are actual requirements for overhead and emergency conditions increase water rates 10% and pressure drops 20%

Water temperature rise through engine, 10 F through compressor cylinders, 10 F.

All water quantities shown are for engines operating at two levels loading.

Water temperature in engine, 150 °F.; in compressor cylinder, 170 °F.; in condenser, 86 °F.; in evaporator, 40 °F.; in cooling coil, as possible to 75 °F., min.

Cool compressor cylinders with raw water. If clean, if suitable raw water is not available or if heavy or corrosive gas is being handled, put compressor cylinders on recirculating system in parallel with engine. Compressor cylinder water requirements vary depending on application.

are proposed, specifications

DESIGN DATA FOR SHELL AND TUBE HEAT TRANSFER EQUIPMENT											
SERVICE		Lube Oil Cooler				ORDER NO.					
DUTY BTU/HR.		176,000		MFR. Clark Bros. Co.		F.P. NO.					
PERFORMANCE DATA											
		SHELL				TUBES					
FLUID		Lube Oil				Water					
QUANTITIES		50 GPM				238 GPM					
DENSITY OR GRAVITY AT 60°F.		7.5 Lb./Gal.									
AVERAGE MOLECULAR WEIGHT											
VISCOSITY		41 CP									
VISCOSITY											
LIQUID EVAPORATED											
VAPOR CONDENSED											
TEMPERATURE OF.		IN 160		OUT 145		IN 123		OUT 124.5			
DESIGN TEMPERATURE OF.		400				300					
INLET PRESSURE LBS./SQ. IN. GA.											
DESIGN PRESSURE LBS./SQ. IN. GA.		75				75					
COMPUTED PRESSURE DROP LBS./SQ. IN.		7.5				1.0					
MAX. ALLOWABLE PRESSURE DROP LBS./SQ. IN.		10				5					
NOZZLE SIZES, INCHES		IN 2		OUT 2		IN 6		OUT 6			
NOZZLE RATINGS AND FACINGS		150# ASA-B16a-R.F.				125# ASA-B16a1 PF(250#)					
CONFINED GASKETS REQUIRED		1				3					
STRESS RELIEF REQUIRED											
TOTAL OUTSIDE TUBE SURFACE FT.		113		h _i 875		h _o 88		ALL BASED ON OUTSIDE TUBE SURFACE			
CORRECTED LMTD		28		r _f (1) .005		U _f 55.5					
CONSTRUCTION											
SETTING		NO. OF UNITS		PARALLEL		SERIES					
TUBES In. Adm. OD 3/4" 16 BWG.				INCHES LONG 84		LAYOUT 15/16" TRI					
BUNDLE WEIGHT EMPTY		UNIT WEIGHT EMPTY		960		CROSS BAFFLE SPACING, IN. 2					
NO. SHELL PASSES 1		NO. TUBE PASSES 1				CROSS BAFFLE AREA, IN.					
LENGTH OF UNIT 8' 10-3/4"		NO. OF TUBES 82				SHELL I.D., IN. 10.19					
PART		MATERIAL		TK. IN.		CORR. ALL.		PART			
SHELL		Seamless steel		.280		1/8"		TUBES			
SHELL COVER		Cast Iron						Inch. Adm.			
CHANNEL		Cast Iron						SPEC ASTM A-193 GRB			
CHAN. COVER		Cast Iron						SPEC Compress'd Asb			
FLOAT. HEAD		-----						Cast Iron			
FLOAT. T.S.		Naval rolled brass						CHAN-FIXED T.S.			
FIXED T.S.		Naval rolled brass						SHELL FIXED T.S.			
BAFFLES		Rolled steel		.065				SHELL COVER			
								Cast Iron			
								FLOATING HEAD			

NOTES		(1) UNITS <u>1</u> BTU/SQ. FT. x HR. x °F. (2) MAX. ALLOW. SALT WATER VELOCITY IN TUBES _____ FT/SEC (3) HOLES IN BAFFLES SHALL BE _____ INCHES LARGER IN DIAMETER THAN TUBE O.D.						SHOP TEST PRESSURE*			
								SHELL 115			
								TUBES 115			
								* Must be 1 1/2 times the maximum allowable pressure (new code) including the corrosion allowance			
DESIGN DATA FOR		FLOW DIAGRAM NO. E-									
FOR		AT									

DESIGN DATA FOR SHELL AND TUBE HEAT TRANSFER EQUIPMENT									
		SERVICE Jacket Water Heat Exchanger				ORDER NO.			
		DUTY BTU/HR. 1,450,000		MFR. Clark Bros. Co.		P. NO.			
PERFORMANCE DATA									
		SHELL			TUBES				
FLUID		Jacket water			Raw Water				
QUANTITIES		290 GPM			145 GPM				
DENSITY OR GRAVITY AT 60°F.									
AVERAGE MOLECULAR WEIGHT									
VISCOSITY		.5 CP							
VISCOSITY									
LIQUID EVAPORATED									
VAPOR CONDENSED									
TEMPERATURE °F.		IN 123°F. OUT 123°F.			IN 80°F.		OUT 100°F.		
DESIGN TEMPERATURE °F.		400°F.			300°F.				
INLET PRESSURE LBS./SQ. IN. GA.									
DESIGN PRESSURE LBS./SQ. IN. GA.		75			75				
COMPUTED PRESSURE DROP LBS./SQ. IN.		5.0			1.0				
MAX. ALLOWABLE PRESSURE DROP LBS./SQ. IN.		5			5				
NOZZLE SIZES, INCHES		IN 4 OUT 4			IN 4		OUT 4		
NOZZLE RATINGS AND FACINGS		150# ASA-B16e, R.F.			125# ASA-B16.1-FP(2		lb.Th		
CONFINED GASKETS REQUIRED		1			2		1b.Th		
STRESS-RELIEF REQUIRED									
TOTAL OUTSIDE TUBE SURFACE FT.		185		h_i	640	h_o	1430	ALL BASED ON OUTSIDE TUBE SURFACE	
CORRECTED LMTD		370		$r_f(1)$	.0025	U_f	212		
CONSTRUCTION									
SETTING		NO. OF UNITS		PARALLEL		SERIES			
TUBES Inh. Adm		3/4" BWG. 16		INCHES LONG 96"		LAYOUT 15/16" Tr1.			
BUNDLE WEIGHT EMPTY		UNIT WEIGHT EMPTY		1450		CROSS BAFFLE SPACING, IN. 7-3/4"			
NO. SHELL PASSES 1		NO. TUBE PASSES 2				CROSS BAFFLE AREA, IN.			
LENGTH OF UNIT 9'2-1/4"		NO. OF TUBES 118				SHELL I.D., IN. 12.09"			
PART		MATERIAL		TK. IN.	CORR. ALL.	PART		MATERIAL	
SHELL		Seamless steel		.280	1/8"	TUBES		Inh. Adm.	
SHELL COVER		Cast Iron				BOLTING		SPEC ASTM A-193, GRB	
CHANNEL		Cast Iron				GASKETS		SPEC Compressed Air	
CHAN. COVER		Cast Iron				CHAN. COVER		Cast Iron	
FLOAT. HEAD		-----				CHAN-FIXED T.S.		-----	
FLOAT. T.S.		Naval rolled brass				SHELL FIXED T.S.		-----	
FIXED T.S.		Naval rolled brass				SHELL COVER		Cast Iron	
BAFFLES		Rolled steel		109		FLOATING HEAD		-----	
NOTES (1) UNITS $\frac{\text{BTU}}{\text{SQ. FT.} \times \text{HR.} \times \text{°F.}}$ (2) MAX. ALLOW. SALT WATER VELOCITY IN TUBES _____ FT/SEC (3) HOLES IN BAFFLES SHALL BE _____ INCHES LARGER IN DIAMETER THAN TUBE O.D.						SHOP TEST PRESSURE*			
						SHELL 115			
						TUBES 115			
						*Based on 1.5 times the maximum allowable pressure (new, cold) including the corrosion allowance.			
DESIGN DATA FOR						FLOW DIAGRAM NO. E-			
FOR						AT			

THIS SHEET IS PART OF SPECIFICATION
FILE NC.
FOR OPERATING CONDITIONS SEE DWG. N

FILE NO.
FOR OPERATING CONDITIONS SEE DWG. NO. SPEC EP-103-K

INSTRUCTION MANUAL NO.

DD-504 2-7-63



PROPOSAL

TO

STANDARD OIL COMPANY OF TEXAS

EL PASO, TEXAS

ON

TIPS "EVC" GAS-ENGINE-DRIVEN COMPRESSOR

FOR

GAS ENGINE PLANT

Proposal No.... EP-6149

Date..... FEBRUARY 22, 1954.

Submitted by

INGERSOLL-RAND COMPANY

11 Broadway, New York 4, N. Y.

Ingersoll-Rand Company

ESTABLISHED 1871



POST OFFICE BOX 941

2100 WYOMING STREET

EL PASO, TEXAS

February 22, 1954

Standard Oil Company Of Texas
P. O. Box No. 862
El Paso, Texas

ATT: MR. A. V. WINTHER

SUB: QM-SPECIFICATION EP-103K
COMPRESSOR GAS RECOVERY
PLANT
OUR REFERENCE EP-6149

Gentlemen:

In response to your request dated February 4, 1954, we are pleased to submit herewith, in triplicate, our quotation on a Size 8SVG-2 Natural-Gas-Engine-Driven Compressor to meet your specifications.

In accordance with Section 7.0, we are attaching copies of Data Sheet EP-177 covering the gas compressor and engine, as well as copies of Heat Exchanger Data Sheet EP-18, for both the oil cooler and jacket water cooler. We are also attaching complete descriptive literature on both our unit and the Kewanee-Ross Heat Exchangers which we are offering.

Unfortunately, we do not have any preliminary prints which are made up for the particular compressing cylinder combination which we are offering, but we believe that General & Foundation Plan L-4801 attached for a 21" & 21" & 11" & 11" X 12" 8SVG2 will serve for your preliminary needs. This drawing is preliminary and should be used only for estimates.

Regarding Section 5.0, we must take exception to the inspection and testing as called for in your specification. This unit will be given our standard test, which consists of running the engine without compressor cylinders for a suitable length of time under no load to assure mechanical acceptability. The compressor cylinders will be given a standard hydrostatic test.

We thank you for the opportunity of submitting this quotation and hope we may have the pleasure of receiving your order for this compressor unit.

Yours very truly,

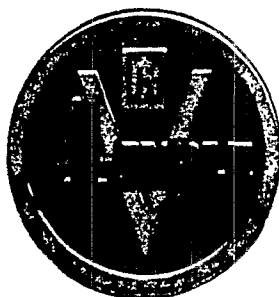
INGERSOLL-RAND COMPANY

R.J. Benson
RM
Encls.

ALL AGREEMENTS CONTINGENT UPON STRIKES, ACCIDENTS AND OTHER CONDITIONS BEYOND OUR CONTROL.
ALL CONTRACTS ARE SUBJECT TO APPROVAL BY AN OFFICER OF THE COMPANY. QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

PRINTED IN U. S. A.

Chevron BB
013364



PROPOSAL FOR

TYPE SVG COMPRESSOR

GAS-ENGINE-DRIVEN

INGERSOLL-RAND COMPANY, 11 BROADWAY, N. Y. 4, N. Y.

Our Number... **EP-6149** Your Ref... **EP-101K** **EL PASO, TEXAS**
FEBRUARY 22 19 **54** .

To... **STANDARD OIL COMPANY OF TEXAS**

..... **EL PASO, TEXAS** (hereinafter called the Purchaser).
Ingersoll-Rand Company (hereinafter called the Company) proposes to sell the Purchaser the following machinery:

ITEM

ONE (1) Ingersoll-Rand Type **1** . SVG **2** . Heavy-Duty, Direct-Connected, 4-Cycle, Gas-Engine-Driven, **Two** Stage Gas ~~engine~~ Compressor(s) as described in the accompanying Bulletin No. 3128 and with equipment specified below:

REGULATION

AUTOMATIC SPEED & PRESSURE REGULATION, LEAS INSTRUMENT

CYLINDER DIMENSIONS

Power Cylinders..... Number **1** . Diameter **11 3/4** Inches, Stroke **12 3/4** Inches

Compressing Cylinder(s), 1st Stage..... Number **2** . Diameter **11** . Inches, Stroke **12** Inches

Compressing Cylinder(s), 2nd Stage..... Number **2** . Diameter **11** . Inches, Stroke **12** Inches

Compressing Cylinder(s), 3rd Stage..... Number **2** . Diameter **11** . Inches, Stroke **12** Inches

STANDARD EQUIPMENT

Hand Adjustable Governor
Adjustable Constant Quality Mixing Valve
Low-Pressure Fuel Pressure Regulator
Two ~~High Tension~~ Weather Proof Magnetos with Impulse Starters - **Low Tension**
Spark Plugs and Wiring
Built-in Recirculating Water Pump
Hand Oil Pump for Starting
Force Feed Lubrication with Oil Pump, ~~Oil~~ **Strainer**, and Oil Filter
Automatic Shut-down Devices for Low Lubricating Oil Pressure, High Circulating Water Temperature and Overspeed
Force Feed Lubricator and Piping for Compressor Cylinders and Packing Glands

One-Shot Lubricator for Power Valve Stems
C. Lee Cook Metallic Packing in Compressor Cylinders
Air Starting Distributor with Piping and Quick-Opening Valve
Pressure Gauge for Lubricating Oil System
Three Thermometers—one each for oil inlet, oil outlet, and engine-cooling-water outlet
Barring Fulcrum and Bar
All necessary Special Wrenches
Complete Set of Foundation Bolts and Nuts
Manifold-Vacuum Gauge
Foundation Plans
Instruction Books
Duplicate Parts List

SPECIAL EQUIPMENT

See Page 1-A

This Proposal consists of... **7** . pages

Forming part of proposal submitted, **FEBRUARY 22** 195...
To **STANDARD OIL COMPANY OF TEXAS**
EL PASO, TEXAS

YOUR REFERENCE EP-103K - OUR REFERENCE EP-6149 - PAGE 1-A

SPECIAL EQUIPMENT:

ONE(1)- Fluor Type CEA-8 Air Cooler Muffler.

ONE(1)- Vertex Engine Air Intake Filter with Backfire Relief Valve.

ONE(1)- Flywheel Guard.

ONE(1)- Kewanee-Ross Type 605CP Oil Cooler with 3/4" - 16 KWG Admiralty Tubes.

ONE(1)- Kewanee-Ross Type 1007CP Jacket Water Cooler with 3/4" - 16BWG Admiralty Tubes.

TWO(2)- Extra Feeds on Force Feed Lubricator to permit injection of cylinder lubricating oil into suction line ahead of the two first-stage cylinders.

ONE(1)- Switch for high jacket water temperature alarm. Suitable for 115 volt, single phase, 60 cycle current. Klaxon alarm not included. This switch will be set for some temperature between normal operating temperature of 170° F. and engine high jacket water temperature shut down setting of 190° F.

ONE(1)- Jacket Water Surge Tank.

Low Tension, Low Fire Hazard Ignition.

Compressor Frame Yoke Covers.

Our Number **EP-6149**Dated **FEBRUARY 22**, 195**4**FOR SIZE **21 & 21 & 8 & 8 & 1 12**INGERSOLL-RAND TYPE **85V12**

DIRECT-CONNECTED, GAS-ENGINE-DRIVEN COMPRESSOR(S)

PERFORMANCE TABLE

Service		GAS RECOVERY	
Number and Diameter of Cylinders	Inches 2 - 21"		2 - 8"
Speed	Revolutions per Minute	400	
Piston Displacement	Cubic Feet per Minute	3930	541.2
Altitude Above Sea Level	Feet	3742	
Compressing	Air or Gas	Gas	
	Type of Gas	Refinery	
	Dry or Wet	Wet	
	"N" Value of Gas	1.13	1.15
	Specific Gravity of Gas		
Intercooling Required?	Yes or No	Yes	
Intake Pressure	Lb per sq in. (Gauge) (Absolute)	13.0	49.8
	Vacuum, Inches Hg.		
Intake Temperature	Degrees F.	100	100
Discharge Pressure	Lb per sq in. (Gauge) (Absolute)	54.8	212.8
*(Actual Delivery at Intake Conditions. Cu. Ft. per Min.		2180	393
*(Actual Delivery, referred to 14.7 lbs per sq. in. absolute and 60 temperature (Not corrected for Supercompressibility)	Cu. Ft. per Min. Cu. Ft. per Hr. Cu. Ft. per Day		
		2525 MSCFD	1725 MSCFD
*(Brake Horsepower		398	
†Fuel, Lower Heat Value	Btu per Cu. Ft.	1050	
†Fuel Consumption, Btu. per Bhp-Hr.	Full load	8580	

*(Note:—The Actual Delivery and Brake Horsepower can be seriously affected by the manifolding and piping to and from the compressor cylinders and between stages of compression. The above performance guarantee is, therefore, subject to the customer installing piping connections of a size and type and in arrangement approved by the Company.

†Gas-engine fuel consumption is based on the Low Heating Value of the gas which is found by subtracting the heat of vaporization of the water products of combustion from the high heating value as found by calorimeter.

Our Number **EP-6149**Dated **FEBRUARY 22** 19 **54**Form No. 2060,
Page 3D, Jan., 1950
PRINTED IN U. S. A.FOR SIZE **21 & 21 & 8 & 8 I 12** **INGERSOLL-RAND TYPE SVG**
DIRECT-CONNECTED, GAS-ENGINE-DRIVEN COMPRESSOR(S).**PRINCIPAL DIMENSIONS**

Mixing Valve Inlets.....	{	Fuel	2½	Inches
		Air	6..	Inches
Power Exhaust.....			8..	Inches
Starting Air Inlet.....			1..	Inches
Engine Cooling Water Inlet and Outlet.....			3..	Inches
Compressor Cooling Water Inlet and Outlet Each Cylinder.....			¾	Inches
		No.	Dia. x Length	
Main Bearings.....		8	6¾ x 6¼	Inches
Crank Pin Bearings.....		4	6¾ x 7	Inches
Crosshead Pin Bearings.....		4	4 x 4½	Inches
Upper and Lower Power Connecting Rod Bearings.....		16	4¼ x 3⅛	Inches
Compressor Piston Rod Diameter.....			2	Inches
Compressor 1st-Stage Intake and Discharge.....			12	Inches
Compressor 2nd-Stage Intake and Discharge.....			4	Inches
Compressor 3rd-Stage Intake and Discharge.....			-	Inches
Approximate Dimensions.....	{	Length... 10	7	Inches
		Width... 14	9-¾	Inches
		Height... 8	2	Inches
Approximate Shipping Weight.....			55,000	Pounds
Weight of Heaviest Piece Usually Shipped.....			34,850	Pounds
Minimum Amount of Concrete Foundation per Unit for Firm Ground.....			25	Cu. Yds.

Our Number **EP-6149**Dated **FEBRUARY 22** 195 **4**Form No. 3060
Page 4, October, 1952
Cancels Oct. 1950 edit.FOR SIZE **21 & 21 & 8 & 8 X 12**INGERSOLL-RAND TYPE **ASVQ2**

DIRECT-CONNECTED, GAS-ENGINE-DRIVEN COMPRESSOR(S)

LUBRICATING OIL SPECIFICATIONS

In accordance with Company's experience, the lubricating oil for use in the crankcase shall be a well refined, straight mineral oil, containing no moisture, sulphonates, soaps, acids, resin, or tarry constituents, and shall be non-corrosive, meeting the following specifications:

	Napthene or Asphalt Base Oils	Paraffin Base Oils
Flash Point (Open Cup).....Min.	380°F	430°F
Viscosity at 100°F (S.U.V.).....Max.	780"	600"
Viscosity at 210°F (S.U.V.).....Min.	60"	60"
Pour Point.....Max.	5°F	30°F
Carbon Residue (Conradson).....Max.	.10%	.60%
Ash.....Max.	.01%	.01%
Neutralization Number.....Max.	.10	.10
Compounding (fixed oils or fatty acids).....	None	None

COOLING SYSTEM

A proper cooling system is of major importance for satisfactory operation of any internal combustion engine. Since raw water will ordinarily form scale, to avoid trouble and costly maintenance, the Company strongly recommends the use of a closed cooling system with soft treated water or condensate circulating through the engine jackets. If, for any reason, such a system cannot be used, full particulars of the proposed arrangement should be submitted for consideration by the Company.

CIRCULATING WATER REQUIRED BY ENGINE.....	196gpm
Temperature rise at rated load (with water cooled exhaust manifold).....	15°F
Recommended water temperature leaving engine.....	122 —170°F
Pressure drop through jackets.....	6 lb Pounds
WATER REQUIRED BY OIL COOLER.....	25gpm
Temperature rise.....	15°F
Maximum permissible water temperature to cooler.....	110°F
Pressure drop through oil cooler.....	1.0 lb Pounds
WATER REQUIRED FOR COMPRESSOR CYLINDERS.....	25gpm
Temperature rise at rated load.....	15°F
Pressure drop through compressor cylinders.....	.432 lb Pounds
Recommended water temperature to compressor cylinders will depend on the operating conditions and type of gas being handled.	

Our Number... **EP-6149**

Dated... **FEBRUARY 22** 195 **4**

FOR SIZE... **21 & 21 & 8 & 8 X 12** **INGERSOLL-RAND TYPE 41702**
DIRECT-CONNECTED, GAS-ENGINE-DRIVEN COMPRESSOR(S)

PRICE

ONE (**1**.....) Compressor(s) complete with equipment as described in this Proposal
FORTY-SEVEN THOUSAND EIGHTY AND NO/100
..... Dollars (\$ **47,080.00**)

PRICE CLAUSE:

FIEM PRICE - Not subject to increase above price in effect on date order is placed except:

- (1) Following purchased material which is subject to the same price change as made effective by our suppliers prior to date of shipment:

Coalers, Muffler, Filter and Freight.

- (2) If work on equipment is held up or shipment delayed by the Purchaser for his convenience, the price and price policy with respect to escalation becomes that in effect on date work is released.

- (3) Price in no case will exceed applicable ceiling price in effect on date of shipment.

The Company will furnish the services of a Supervisor of Erection for a period of... **Four(4)** days Purchaser to pay man's travelling and living expenses from time he leaves our shops until he returns. Additional time for this Supervisor will be furnished at the rate of \$36.00 per day plus expenses. Purchaser is to provide necessary common labor and rigging without expense to the Company.

All prices quoted are "delivered F. O. B. Cars," Point(s) of Manufacture... **Painted Post, New York,**
with freight allowed to El Paso, Texas.
All quotations subject to change without notice.

TERMS OF PAYMENT

Net Cash. **Thirty(30) days from date of shipment.**

All payments to be made in U. S. A. payable in New York Exchange. Pro rata payments to apply as shipments are made.

SHIPMENT

Shipment will be made... **Twelve(12) Weeks**
from receipt of complete information and acceptance of order by an Executive Officer of the Company at its New York Office.

Form No. 6589 June 8, 1933
Cancels Dec., 1961 Edition**CONTRACT PROVISIONS (For Centrifugal Turbo-blowers)**

I. **DELIVERY:** The Company shall not be liable for loss, damage, detention or delay due to war, riots, civil insurrection or acts of the common enemy, strikes, fires, accidents, acts of civil or military authority including Federal Government laws, orders or regulations, delay in transportation, delay by suppliers of materials, or other causes beyond the reasonable control of the Company. Acceptance of delivery from the carrier shall constitute a waiver of all claims for damages by reason of delay in deliveries or for damage or loss in transit. Delivered prices quoted herein are not guaranteed unless shipment is routed by the Company. Increased cost of freight due to Purchaser's specification of routing shall be paid by the Purchaser. Pro rata payments shall become due as shipments are made. If shipment or any other act or condition affecting payment for the apparatus or any part thereof shall be delayed on account of the Purchaser, payment shall become due when Purchaser is notified that the apparatus is ready for shipment, and the apparatus shall be held at Purchaser's risk and expense. Shipment at the time herein agreed upon is contingent upon Purchaser's financial condition being at all times satisfactory to the Company.

II. **TITLE:** The Title and right to possession to all apparatus sold hereunder, wherever situated and whatever its mode of attachment to either realty or personalty, shall remain in the Company, and Purchaser agrees to do all things and acts necessary to perfect and maintain Company's right and title therein until full payment in cash has been made therefor. Upon failure to make any payment as herein specified, the Company may retain as liquidated damages all payments received, and shall be free to enter the premises where said apparatus may be located and remove the same without notice and without legal process and without prejudice to any further claims on account of damage which the Company may suffer from any cause. The Purchaser shall bear all risk of loss of, or damage to, the apparatus sold hereunder until full payment in cash has been made therefor, and shall provide and maintain for the benefit of the Company adequate insurance for said apparatus. The foregoing provisions do not apply to sales consummated in Massachusetts, but in that state the Purchaser, upon request, shall execute a formal Conditional Sales Contract.

III. **INSTALLATION:** Upon request the Company will provide a competent Supervisor of Erection for the setting up or starting of the apparatus. The Purchaser shall pay the Company for the services of said supervisor at the rate of Thirty-six Dollars (\$36.00) per day, beginning the day he leaves the Company's shop or equivalent starting point and continuing until his return thereto, and shall pay for his meals and lodging, and transportation both ways for himself and his tools, including Pullman fares. The Company will furnish outline drawings of equipment to be supplied, but will not furnish the drawings nor assume responsibility for foundations. The Company accepts no responsibility for material and equipment or for the acts of men furnished by the Purchaser, nor will it be responsible for the performance of apparatus not set up or started under the supervision of its supervisor unless deficient performance is caused by defects independent of the installation.

IV. **GUARANTEE AND LIABILITY:** The Company warrants that the apparatus delivered hereunder shall be of the kind and quality described herein, and no other warranty, except of title, shall be implied. The Company shall repair at factory or replace without charge, F.O.B. Factory, any part or parts which, within three months from date of starting and not more than one year after date of shipment, shall be proved to have been defective when shipped, provided the Purchaser promptly notifies the Company in writing of such defect and promptly delivers the defective part to the factory where made, delivery prepaid. No allowance will be granted for any repairs or alterations made by the Purchaser without the Company's written consent. The Company reserves the right to make, at any time, such changes in detail of design, construction, arrangement, or equipment as shall in its judgement, constitute an improvement over former practice. Upon payment of an extra charge the Company will make tests for economy and performance. The Company shall not be responsible for corrosion or erosion due to the presence of acids, alkalies, liquids, or solids in the gases passing through the apparatus. Because of varying conditions of installation and operation, all guarantees of performance are subject to a variation of 4%. Equipment and accessories furnished by third parties are guaranteed only to the extent of the original manufacturer's guarantee to the Company. In case of failure of the Company to fulfill any performance guarantee, it is agreed that the Company may remove and reclaim apparatus covered by this contract at its own expense and discharge all liability by repayment to the Purchaser of all sums received on account of the purchase price. The liability of the Company (except as to the warranty of title and on the liability respecting any performance guarantee) arising out of the manufacture or sale of said apparatus, or its use, whether on warranties or otherwise, shall not in any case exceed the cost of repairing or replacing defective parts as aforesaid, and, upon the expiration of the said one year, all such liability shall terminate. The Company shall not be held liable for any special indirect or consequential damages arising out of this contract of any breach thereof.

V. **TAXES:** The Purchaser shall pay to the Company in addition to the purchase price, the amount of any excise, sales, privilege, or use tax, local, state or Federal, which are payable by the Company because of the execution of this contract, or sale or delivery of the apparatus covered hereby.

VI. **EXECUTION:** The Company is not bound by the provisions hereof until this instrument has been approved in writing by an executive officer. Upon request, a copy hereof upon which such approval is endorsed will be furnished to the Purchaser. The foregoing, when duly signed, accepted, and approved, constitutes the entire agreement between the parties hereto and supplants all previous communications, either oral or written. No modification hereof shall be binding upon the parties hereto, or either of them, unless such modification shall be in writing duly executed by the Purchaser and approved by an executive officer of the Company.

INGERSOLL-RAND COMPANY, By *[Signature]*

To Ingersoll-Rand Company: The above proposal is hereby accepted this day of 195..

..... (Witness) (Purchaser) By (Title)

New York, N. Y.

Approved 19... ININGERSOLL-RAND COMPANY, By Title

Chevron BB
013371

DESIGN DATA FOR SHELL AND TUBE HEAT TRANSFER EQUIPMENT

SERVICE ENGINE OIL COOLER ORDER NO. _____
 DUTY BTU/HR. 94,600 MFR. KEWANEE ROSS F.P. NO. SIZE 605CP

PERFORMANCE DATA

	SHELL	TUBES
FLUID	<u>OIL</u>	<u>WATER</u>
QUANTITIES	<u>60 GPM</u>	<u>25 GPM</u>
DENSITY OR GRAVITY AT 60°F.	<u>.9</u>	
AVERAGE MOLECULAR WEIGHT		
VISCOSITY	<u>500 SSU AT 100°F</u>	
VISCOSITY		
LIQUID EVAPORATED		
VAPOR CONDENSED		
TEMPERATURE °F.	IN <u>160</u> OUT <u>152.4</u>	IN <u>80</u> OUT <u>87.6</u>
DESIGN TEMPERATURE °F.	<u>200</u>	<u>200</u>
INLET PRESSURE LBS./SQ. IN. GA.		
DESIGN PRESSURE LBS./SQ. IN. GA.	<u>75</u>	<u>75</u>
COMPUTED PRESSURE DROP LBS./SQ. IN.	<u>5.5</u>	<u>1.0</u>
MAX. ALLOWABLE PRESSURE DROP LBS./SQ. IN.		
NOZZLE SIZES, INCHES	IN <u>2"</u> OUT <u>2"</u>	IN <u>2"</u> OUT <u>2"</u>
NOZZLE RATINGS AND FACINGS	<u>PIPE TAP</u>	<u>PIPE TAP</u>
CONFINED GASKETS REQUIRED		
STRESS RELIEF REQUIRED		
TOTAL OUTSIDE TUBE SURFACE-FT.	<u>24.0 SERT. h_i</u>	<u>h_o</u>
CORRECTED LMTD	<u>72.4</u>	<u>r_f(1)</u>
	<u>U_f SERVICE 54.5</u>	<u>U_f CLEAN 68</u>
		ALL BASED ON OUTSIDE TUBE SURFACE

REVISIONS

CONSTRUCTION

SETTING <u>HORIZONTAL</u>	NO. OF UNITS <u>1</u>	PARALLEL	SERIES
TUBES <u>34"</u> OD	<u>16</u> BWG. <u>5'-0"</u>	INCHES LONG	LAYOUT
BUNDLE WEIGHT EMPTY	UNIT WEIGHT EMPTY	<u>280</u>	CROSS BAFFLE SPACING, IN.
NO. SHELL PASSES <u>1</u>	NO. TUBE PASSES <u>1</u>		CROSS BAFFLE AREA, IN.
LENGTH OF UNIT	NO. OF TUBES <u>24</u>	SHELL I.D., IN.	<u>6"</u>

PART	MATERIAL	TK. IN.	CORR. ALL.	PART	MATERIAL
SHELL	<u>CAST IRON</u>			TUBES	<u>ADMIRALTY</u>
SHELL COVER				BOLTING	<u>SPEC</u>
CHANNEL	<u>CAST IRON</u>			GASKETS	<u>SPEC</u>
CHAN. COVER	<u>CAST IRON</u>			CHAN. COVER	
FLOAT. HEAD				CHAN-FIXED T.S.	
FLOAT. T.S.	<u>MUNTZ</u>			SHELL FIXED T.S.	
FIXED T.S.	<u>MUNTZ</u>			SHELL COVER	
BAFFLES	<u>BRASS</u>			FLOATING HEAD	

NOTES

- (1) UNITS 1
BTU/SQ. FT. x HR. x °F.
- (2) MAX. ALLOW. SALT WATER VELOCITY IN TUBES _____ FT/SEC
- (3) HOLES IN BAFFLES SHALL BE _____ INCHES LARGER IN DIAMETER THAN TUBE O.D.

SHOP TEST PRESSURE*

SHELL	<u>115 PSI</u>
TUBES	<u>115 PSI</u>

*Must be 1 1/2 times the maximum allowable pressure (new, cold) including the corrosion allowance.

APPROVED

DESIGN DATA FOR

FLOW DIAGRAM NO. E-

FOR STANDARD OIL CO

AT EL PASO REFINERY

DESIGN DATA FOR SHELL AND TUBE HEAT TRANSFER EQUIPMENT

SERVICE ENGINE JACKET WATER COOLER ORDER NO. _____
 DUTY BTU/HR. 1,485,000 MFR. KEWANEE-ROSS ~~ED.~~ SIZE 1007CP

PERFORMANCE DATA

	SHELL	TUBES
FLUID	JACKET WATER	WATER
QUANTITIES	198 GPM	100 GPM
DENSITY OR GRAVITY AT 60°F.		
AVERAGE MOLECULAR WEIGHT		
VISCOSITY		
VISCOSITY		
LIQUID EVAPORATED		
VAPOR CONDENSED		
TEMPERATURE °F.	IN 170 OUT 155	IN 80 OUT 110
DESIGN TEMPERATURE °F.	200	200
INLET PRESSURE LBS./SQ. IN. GA.		
DESIGN PRESSURE LBS./SQ. IN. GA.	75	75
COMPUTED PRESSURE DROP LBS./SQ. IN.	6.0	2.0
MAX. ALLOWABLE PRESSURE DROP LBS./SQ. IN.		
NOZZLE SIZES, INCHES	IN 3 OUT 3	IN 3 OUT 3
NOZZLE RATINGS AND FACINGS	125#ASA	125#ASA
CONFINED GASKETS REQUIRED		
STRESS RELIEF REQUIRED		
TOTAL OUTSIDE TUBE SURFACE FT. <u>101.58</u>	h_i	h_o
CORRECTED LMTD <u>67.3</u>	$r_f(1)$	U_c SERVICE 218 CLEAN 406

ALL BASED ON OUTSIDE
TUBE SURFACE

REVISIONS

CONSTRUCTION

SETTING <u>HORIZ</u>	NO. OF UNITS <u>1</u>	PARALLEL	SERIES
TUBES <u>3/4" OD</u>	<u>16</u> BWG. <u>7'-0"</u>	INCHES LONG	LAYOUT
BUNDLE WEIGHT EMPTY	UNIT WEIGHT EMPTY	<u>830</u>	CROSS BAFFLE SPACING, IN.
NO. SHELL PASSES <u>1</u>	NO. TUBE PASSES <u>1</u>		CROSS BAFFLE AREA, IN.
LENGTH OF UNIT	NO. OF TUBES <u>74</u>	SHELL I.D., IN. <u>10"</u>	

PART	MATERIAL	TK. IN.	CORR. ALL.	PART	MATERIAL
SHELL	CAST IRON			TUBES	ADMIRALTY
SHELL COVER				BOLTING	SPEC
CHANNEL	CAST IRON			GASKETS	SPEC
CHAN. COVER	CAST IRON			CHAN. COVER	
FLOAT. HEAD				CHAN-FIXED T.S.	
FLOAT. T.S.	MUNTZ			SHELL FIXED T.S.	
FIXED T.S.	MUNTZ			SHELL COVER	
BAFFLES	BRASS			FLOATING HEAD	

NOTES

- (1) UNITS 1
BTU/SQ. FT. x HR. x °F.
- (2) MAX. ALLOW. SALT WATER VELOCITY IN TUBES _____ FT/SEC
- (3) HOLES IN BAFFLES SHALL BE _____ INCHES LARGER IN DIAMETER THAN TUBE O.D.

SHOP TEST PRESSURE*

SHELL 115 PSI
TUBES 115 PSI

*Must be 1 1/2 times the maximum allowable pressure (new, cold) including the corrosion allowance.

APPROVED

DESIGN DATA FOR

FLOW DIAGRAM NO. E-

FOR STANDARD OIL CO

AT EL PASO REFINERY

GAS COMPRESSOR & INTERNAL COMBUSTION ENGINE DATA SHEET

FOR STARTING AIR EQUIPMENT SEE DWG. NO. _____

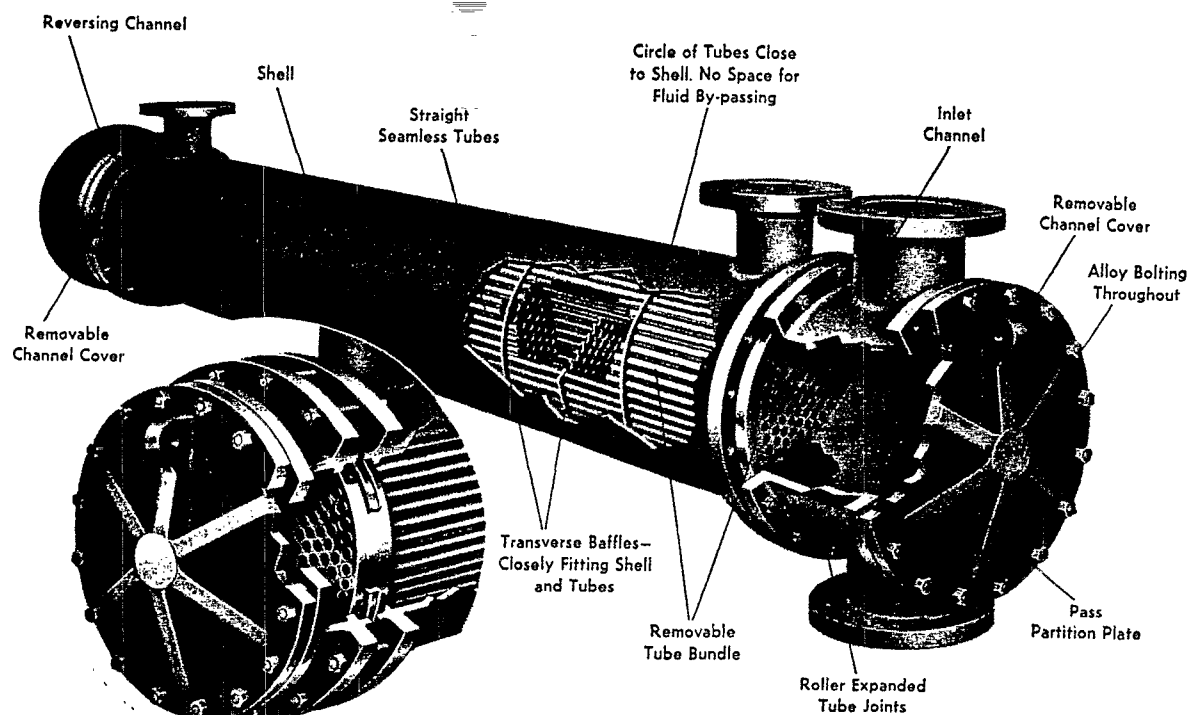
THIS SHEET IS PART OF SPECIFICATION EP-103-A
FILE NO. _____

FOR OPERATING CONDITIONS, SEE DWG. NO. _____

DESIGNATION & SERVICE GAS COMPRESSOR FOR GAS RECOVERY PLANT MANUFACTURER WILCOX MODEL 8-SV-2 FOUNDATION _____ YEAR BUILT _____ INSTRUCTION MANUAL NO. _____
DRAWINGS: OUTLINE

A. COMPRESSOR DETAILS		EQUIPMENT NO.	PIPING LAYOUT	
1. REQUIRED HORSEPOWER	398	K504		
2. SPEED	400			
3. 1ST STAGE - NO. OF CYLINDERS & BORE	2-2 1/4			
4. PISTON DISPLACEMENT	3930			
5. CAPACITY AT INTAKE CONDITIONS	2180			
6. VOLUMETRIC EFFICIENCY	85.5			
7. CLEARANCE	45.9			
8. 2ND STAGE - NO. OF CYLINDERS & BORE	2-8 1/4			
9. PISTON DISPLACEMENT	541.2			
10. CAPACITY AT INTAKE CONDITIONS	343			
11. VOLUMETRIC EFFICIENCY	56.7			
12. CLEARANCE	16.3			
13. 3RD STAGE - NO. OF CYLINDERS & BORE				
14. PISTON DISPLACEMENT				
15. CAPACITY AT INTAKE CONDITIONS				
16. VOLUMETRIC EFFICIENCY				
17. CLEARANCE				
18. STROKE	12			
19. REVERSIBLE CYL. LINER MAT'L. IF ANY	C.I.			
20. STUFFING BOX VENTED - (YES - NO)	YES			
21. STUFFING BOX WATER COOLED (YES - NO)	YES			
22. TYPE AND PACKING	METALLIC MECHANICAL			
23. TYPE CYLINDER LUBRICATION	2ND STAGE 2-48K			
24. TYPE VALVES	1ST STAGE 2-104K			
25. MAX. ALLOWABLE DISCHARGE PRESSURE	60			
26. MAX. ALLOWABLE DIFFERENTIAL PRESSURE	350			
B. ENGINE DETAILS				
1. TYPE	8SV4			
2. HORSEPOWER	400			
3. SPEED	400			
4. CYCLES	4			
5. ROTATION, FACING END OPPOSITE FLYWHEEL (CW - CCW)	C.W.			
6. CYLINDER ARRANGEMENT	V			
7. NO. OF CYLINDERS & BORE	8-11 3/4 x 12 3/4			
8. STROKE	12 3/4			
9. BHP	18.8			
10. REVERSIBLE CYLINDER LINER MATERIAL, IF ANY	NONE			
11. TYPE CYLINDER LUBRICATION	SPRAYS			
12. FUEL CONSUMPTION, FULL LOAD (lb/hr) (1050 BTU STD. CUB. FT.)	85.50			
13. TYPE GOVERNOR	HYDRAULIC			
14. RANGE OF SPEED VARIATION - % RATED SPEED	100% TO 60% RATED			
15. HIGH - LOW TENSION LOW FIRE HAZARD (EMISSION SYSTEM) (YES-NO)	LOW-YES			
16. WATER COOLED EXHAUST MANIFOLD (YES-NO)	YES			
17. SPEED AT WHICH SHUT OFF OCCURS	500			
18. OIL PRESSURE AT WHICH SHUT OFF OCCURS	20			
C. COOLING SYSTEM DETAILS		EQUIPMENT NO.	K504	
1. OIL COOLER FURNISHED BY (PURCHASER-SUPPLIER)	SUPP.			
2. SUITABLE FOR (SALT WATER - FRESH WATER)	FRESH			
3. WATER INLET TEMPERATURE	80			
4. WATER OUTLET TEMPERATURE	87.6			
5. CIRCULATION RATE	2.5			
6. PRESSURE DROP	1.0			
7. ENGINE COOLING WATER	1.5			
8. WATER TEMPERATURE FROM ENGINE	170			
9. CIRCULATION RATE	198			
10. PRESSURE DROP	6.0			
11. WATER TEMPERATURE TO CYCL.	106			
12. WATER TEMPERATURE FROM CYCL.	114			
13. CIRCULATION RATE	2.8			
14. PRESSURE DROP	4.32			
15. WATER CIRCULATING PUMP FURNISHED BY (PURCHASER - SUPPLIER)	SUPP.			
16. COOLING WATER COOLANT (SALT WATER - FRESH WATER)	FRESH			
17. COOLANT TEMP. TO HEAT EXCHANGER	80			
18. COOLANT TEMP. FROM HEAT EXCHANGER	100			
19. WATER TEMPERATURE AT WHICH SHUT OFF OCCURS	190			
20. WATER COOLER - 1063-314 16 BWP AMERICAN	YES			
21. WATER SUCKET TANK	YES			
D. AUXILIARY EQUIPMENT				
1. LOW PRESSURE REL. PRESS. REGULATOR (PURCHASER - SUPPLIER)	SUPP.			
2. HIGH COOLING WATER TEMP. ALARM SWITCH (PURCHASER - SUPPLIER)	SUPP.			
3. EXHAUSTION PUMPS & MITS. (PURCHASER - SUPPLIER)	SUPP.			
4. STARTING AIR EQUIPMENT (PURCHASER - SUPPLIER)	SUPP.			
5. DISCHARGE MOTOR WITH POSITIONER ON GOVERNOR (PURCH. - SUPPL.)	SUPP.			
6. SPEED CONTROL INSTR. ACTUATED BY (PURCHASER - SUPPLIER)	POUCH			
E. MISCELLANEOUS				
1. PRICE EACH FOR PARTS KIT, N.Y. WITH FERTILIZER ALLOWANCE TO EP-103-A	54,080.00			
2. TOTAL WEIGHT NET, EACH UNIT	55000			
3. TOTAL WEIGHT GROSS, EACH UNIT				
4. TOTAL BOXED WEIGHT, EACH UNIT				
5. WEIGHT OF HEAVIEST PIECE WHICH MUST BE LIFTED BY OVERHEAD CRANE	900			
6. SHIPMENT - MEANS AFTER RECEIPT OF ORDER	12			
*OPERATING LIMITATION - DO NOT CHANGE BEFORE CONSULTING DESIGNS ENGINEER				
APPROVALS	PLANT	STANDARD DR. CO		
		EP-103-A		

SIZES, DIMENSIONS AND WEIGHTS



DETAIL OF PACKED END
Showing Floating Tube Sheet, Packing Rings
and Lantern Gland with Tell-Tale Holes

Fig. 1 TWO-PASS CHANNEL DESIGN

ROSS[®]

TYPE

CP EXCHANGERS

SHEET 2.1A48



KEWANEE-ROSS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

1407 WEST AVENUE

BUFFALO, 13, N. Y.

In Canada, Kewanee-Ross of Canada Limited, Toronto 5, Ont.

SIZES AND DIMENSIONS

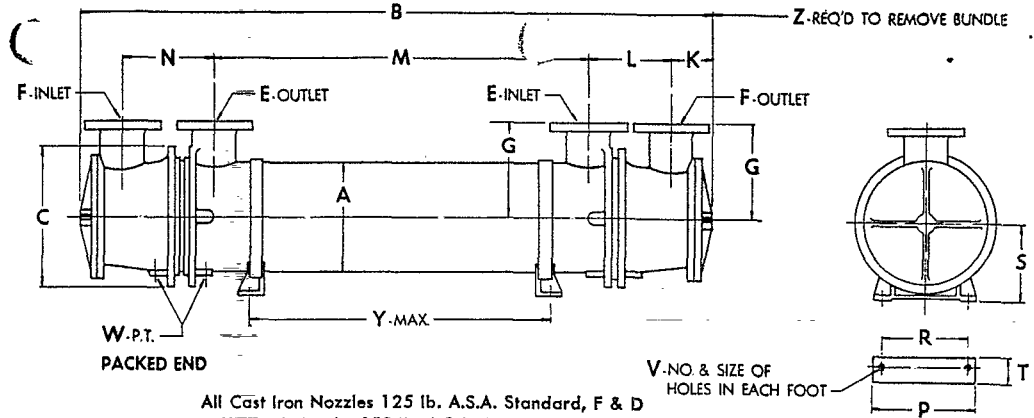


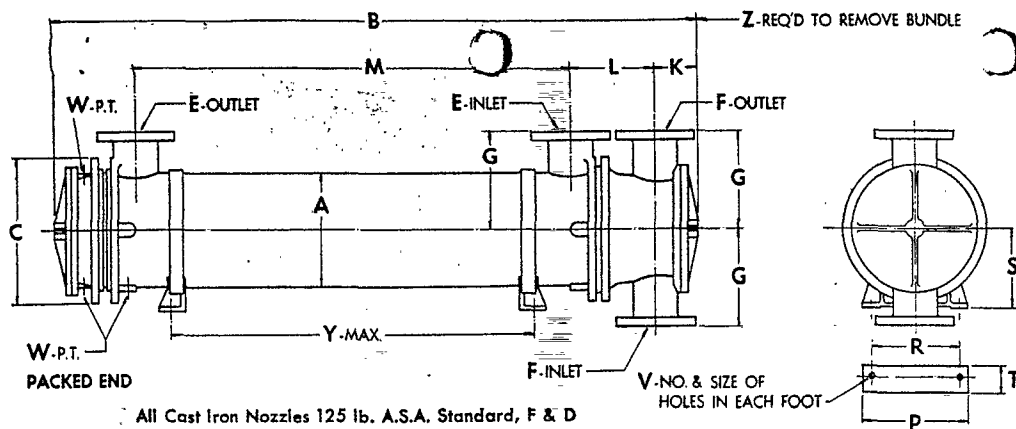
Fig. 17

All Cast Iron Nozzles 125 lb. A.S.A. Standard, F & D
All Steel Nozzles 150 lb. A.S.A. Standard, F & D
Pipe Tapped Connections marked P. T.

All dimensions are in inches unless otherwise indicated.

SIZE	A	B	C	E	F	G	K	L	M	N	P	R	S	T	V	W	Y	Z	WGT. LBS.
602	6 3/8	3' 3 1/8"	10 1/8	2 P.T.	3 P.T.	3 1/8	4	6 1/8	1' 6 1/4"	6 1/4	6	4 1/4	5 1/2	2 1/4	(2) 5/8	3/8	1' 2"	1' 7 1/2"	165
603		4' 3 1/8"							2' 6 3/4"								2' 7 1/2"	195	
604		5' 3 1/8"							3' 6 1/4"								3' 7 1/2"	225	
605		6' 3 1/8"							4' 6 1/4"								4' 7 1/2"	255	
606		7' 3 1/8"							5' 6 1/4"								5' 7 1/2"	285	
608		9' 3 1/8"							7' 6 1/4"								7' 7 1/2"	345	
802	8 5/8	3' 6 1/8"	12 1/8	3 P.T.	4 P.T.	5 1/8	4 7/8	7 1/2	1' 5 1/4"	7 5/8	7 1/2	6 1/4	6 1/2	2 1/2	(2) 5/8	3/8	0' 11 3/8"	1' 6"	270
803		4' 6 1/8"							2' 5 1/4"								1' 11 3/8"	2' 6"	330
804		5' 6 1/8"							3' 5 1/4"								2' 11 3/8"	3' 6"	390
806		7' 6 1/8"							5' 5 1/4"								4' 11 3/8"	5' 6"	510
808		9' 6 1/8"							7' 5 1/4"								6' 11 3/8"	7' 6"	630
810		11' 6 1/8"							9' 5 1/4"								8' 11 3/8"	9' 6"	750
802	8 5/8	3' 8 1/8"	12 1/8	3	4	8 1/4	4 1/4	8 5/8	1' 6 1/4"	8 3/4	7 1/2	6 1/4	6 1/2	2 1/2	(2) 5/8	3/8	1' 1 3/8"	1' 4 1/2"	270
803		4' 8 1/8"							2' 6 1/4"								2' 1 3/8"	2' 4 1/2"	330
804		5' 8 1/8"							3' 6 1/4"								3' 1 3/8"	3' 4 1/2"	390
806		7' 8 1/8"							5' 6 1/4"								5' 1 3/8"	5' 4 1/2"	510
808		9' 8 1/8"							7' 6 1/4"								7' 1 3/8"	7' 4 1/2"	630
810		11' 8 1/8"							9' 6 1/4"								9' 1 3/8"	9' 4 1/2"	750
1003	10 1/4	5' 1 1/8"	14 1/4	3	6	9 3/4	5 1/2	9 7/8	2' 5 7/8"	10 3/8	9 1/2	8	7 1/2	3	(2) 3/4	3/4	2' 0 7/8"	2' 2 1/4"	530
1004		6' 1 1/8"							3' 5 7/8"								3' 0 7/8"	3' 2 1/4"	615
1005		7' 1 1/8"							4' 5 7/8"								4' 0 7/8"	4' 2 1/4"	700
1006		8' 1 1/8"							5' 5 7/8"								5' 0 7/8"	5' 2 1/4"	785
1008		10' 1 1/8"							7' 5 7/8"								7' 0 7/8"	7' 2 1/4"	955
1010		12' 1 1/8"							9' 5 7/8"								9' 0 7/8"	9' 2 1/4"	1,125
1012		14' 1 1/8"							11' 5 7/8"								11' 0 7/8"	11' 2 1/4"	1,295
1204	12 1/4	6' 1 1/2"	16 1/4	4	6	11	5 3/4	10 1/2	3' 4 5/8"	10 7/8	12	10	9	3	(2) 3/4	3/4	2' 10"	3' 2 1/4"	865
1205		7' 1 1/2"							4' 4 5/8"								3' 10"	4' 2 1/4"	980
1206		8' 1 1/2"							5' 4 5/8"								4' 10"	5' 2 1/4"	1,095
1208		10' 1 1/2"							7' 4 5/8"								6' 10"	7' 2 1/4"	1,325
1210		12' 1 1/2"							9' 4 5/8"								8' 10"	9' 2 1/4"	1,555
1212		14' 1 1/2"							11' 4 5/8"								10' 10"	11' 2 1/4"	1,785
1306	14	8' 5 1/4"	17	6	8	11 3/4	8 3/4	13 1/4	4' 9 3/4"	13 1/4	10 1/2	7 1/2	10 1/2	4	(2) 3/4	3/4	4' 9 3/4"	5' 2"	1,260
1307		9' 5 1/4"							5' 9 3/4"								5' 9 3/4"	6' 2"	1,380
1308		10' 5 1/4"							6' 9 3/4"								6' 9 3/4"	7' 2"	1,500
1309		11' 5 1/4"							7' 9 3/4"								7' 9 3/4"	8' 2"	1,620
1310		12' 5 1/4"							8' 9 3/4"								8' 9 3/4"	9' 2"	1,740
1312		14' 5 1/4"							10' 9 3/4"								10' 9 3/4"	11' 2"	1,980
1316		18' 5 1/4"							14' 9 3/4"								14' 9 3/4"	15' 2"	2,460
1506	16	8' 1"	19 1/2	6	8	12 3/4	7 1/2	13 1/4	4' 7 1/2"	13 3/4	11 1/2	8 1/2	11 1/2	4	(2) 3/4	3/4	4' 7 1/2"	5' 2 1/2"	1,720
1507		9' 1"							5' 7 1/2"								5' 7 1/2"	6' 2 1/2"	1,920
1508		10' 1"							6' 7 1/2"								6' 7 1/2"	7' 2 1/2"	2,120
1509		11' 1"							7' 7 1/2"								7' 7 1/2"	8' 2 1/2"	2,320
1510		12' 1"							8' 7 1/2"								8' 7 1/2"	9' 2 1/2"	2,520
1512		14' 1"							10' 7 1/2"								10' 7 1/2"	11' 2 1/2"	2,920
1516		18' 1"							14' 7 1/2"								14' 7 1/2"	15' 2 1/2"	3,720
1708	18	10' 3 1/4"	21 5/8	6	8	13 3/4	7 7/8	14	6' 7 3/4"	14	12 1/2	9 1/2	12	4	(2) 3/4	3/4	6' 7 3/4"	7' 2"	2,600
1710		12' 3 1/4"							8' 7 3/4"								8' 7 3/4"	9' 2"	3,080
1712		14' 3 1/4"							10' 7 3/4"								10' 7 3/4"	11' 2"	3,560
1716		18' 3 1/4"							14' 7 3/4"								14' 7 3/4"	15' 2"	4,520
1720		22' 3 1/2"							18' 7 3/4"								18' 7 3/4"	19' 2"	5,480
1908	20	10' 2 3/4"	23 5/8	8	8	14 3/4	8 1/8	14 1/2	6' 5 1/4"	14 1/2	13 1/2	10 1/2	13	4	(2) 3/4	3/4	6' 5 1/4"	7' 1 1/2"	3,210
1910		12' 2 3/4"							8' 5 1/4"								8' 5 1/4"	9' 1 1/2"	3,800
1912		14' 2 3/4"							10' 5 1/4"								10' 5 1/4"	11' 1 1/2"	4,390
1916		18' 2 3/4"							14' 5 1/4"								14' 5 1/4"	15' 1 1/2"	5,570
1920		22' 2 3/4"							18' 5 1/4"								18' 5 1/4"	19' 1 1/2"	6,750
2308	24	10' 8 1/2"	27 3/4	8	10	17	9 3/4	15 1/4	6' 5 1/2"	15 3/4	15 1/2	13 1/2	15	5	(4) 7/8	3/4	6' 5 1/2"	6' 10 1/2"	4,380
2312		14' 8 1/2"							10' 5 1/2"								10' 5 1/2"	10' 10 1/2"	5,980
2316		18' 8 1/2"							14' 5 1/2"								14' 5 1/2"	14' 10 1/2"	7,580
2320		22' 8 1/2"							18' 5 1/2"								18' 5 1/2"	18' 10 1/2"	9,180
2324		26' 8 1/2"							22' 5 1/2"								22' 5 1/2"	22' 10 1/2"	10,780
2710	27 1/4	13' 2 1/2"	31 3/8	10	12	19 1/4	11 1/2	18 1/2	8' 2 1/2"	18 1/2	17	15	17	5	(4) 3/8	3/4	8' 2 1/2"	8' 7 3/4"	6,725
2712		15' 2 1/2"							10' 2 1/2"								10' 2 1/2"	10' 7 3/4"	7,705
2716		19' 2 1/2"							14' 2 1/2"								14' 2 1/2"	14' 7 3/4"	9,665
2720		23' 2 1/2"							18' 2 1/2"								18' 2 1/2"	18' 7 3/4"	11,625
2724		27' 2 1/2"							22' 2 1/2"								22' 2 1/2"	22' 7 3/4"	13,585
3110	31 1/4	13' 4 1/4"	35 5/8	10	12	21 1/4	12 1/8	19 1/2	8' 1 1/2"	19 1/2	19	17	19	5	(4) 7/8	3/4	8' 1 1/2"	8' 6 3/4"	9,215
3112		15' 4 1/4"							10' 1 1/2"								10' 1 1/2"	10' 6 3/4"	10,565
3116		19' 4 1/4"							14' 1 1/2"								14' 1 1/2"	14' 6 3/4"	13,265
3120		23' 4 1/4"							18' 1 1/2"								18' 1 1/2"	18' 6 3/4"	15,965
3124		27' 4 1/4"							22' 1 1/2"								22' 1 1/2"	22' 6 3/4"	18,665

Catalog dimensions are subject to variation. Use only certified drawings for construction purposes.



SIZES AND DIMENSIONS

Fig. 18

All Cast Iron Nozzles 125 lb. A.S.A. Standard, F & D
All Steel Nozzles 150 lb. A.S.A. Standard, F & D
Pipe Tapped Connections marked P. T.

All dimensions are in inches unless otherwise indicated.

SIZE	A	B	C	E	F	G	K	L	M	P	R	S	T	V	W	Y	Z	WGT. LBS.
602	6 5/8	2' 9 5/8"	10 1/8	2 P.T.	2 P.T.	3 1 1/8	3 3/8	5 1/4	1' 6 3/4"	6	4 3/4	5 1/2	2 1/4	(2) 3/8	3/4	1' 2"	1' 9"	165
603		3' 9 5/8"							2' 6 3/4"							2' 2"	2' 9"	195
604		4' 9 5/8"							3' 6 3/4"							3' 2"	3' 9"	225
605		5' 9 5/8"							4' 6 3/4"							4' 2"	4' 9"	255
606		6' 9 5/8"							5' 6 3/4"							5' 2"	5' 9"	285
608		8' 9 5/8"							7' 6 3/4"							7' 2"	7' 9"	345
802	8 5/8	2' 11 1/8"	12 1/8	3 P.T.	3 P.T.	5 1 1/8	4 3/8	6 3/4	1' 5 1/4"	7 1/2	6 1/4	6 1/2	2 1/2	(2) 3/8	3/4	0' 11 3/8"	1' 7 1/4"	270
803		3' 11 1/8"							2' 5 1/4"							1' 11 3/8"	2' 7 1/4"	330
804		4' 11 1/8"							3' 5 1/4"							2' 11 3/8"	3' 7 1/4"	390
806		6' 11 1/8"							5' 5 1/4"							4' 11 3/8"	5' 7 1/4"	510
808		8' 11 1/8"							7' 5 1/4"							6' 11 3/8"	7' 7 1/4"	630
810		10' 11 1/8"							9' 5 1/4"							8' 11 3/8"	9' 7 1/4"	750
802	8 5/8	3' 1"	12 1/8	3	3	8 1/4	3 3/4	7 7/8	1' 6 1/2"	7 1/2	6 1/4	6 1/2	2 1/2	(2) 3/8	3/4	1' 13 1/8"	1' 6"	270
803		4' 1"							2' 6 1/2"							2' 13 1/8"	2' 6"	330
804		5' 1"							3' 6 1/2"							3' 13 1/8"	3' 6"	390
806		7' 1"							5' 6 1/2"							5' 13 1/8"	5' 6"	510
808		9' 1"							7' 6 1/2"							7' 13 1/8"	7' 6"	630
810		11' 1"							9' 6 1/2"							9' 13 1/8"	9' 6"	750
1003	10 1/4	4' 1 1/8"	14 1/4	3	3	9 1/4	4	7 7/8	2' 5 7/8"	9 1/2	8	7 1/2	3	(2) 3/4	3/4	2' 0 3/8"	2' 6"	530
1004		5' 1 1/8"							3' 5 7/8"							3' 0 3/8"	3' 6"	615
1005		6' 1 1/8"							4' 5 7/8"							4' 0 3/8"	4' 6"	700
1006		7' 1 1/8"							5' 5 7/8"							5' 0 3/8"	5' 6"	785
1008		9' 1 1/8"							7' 5 7/8"							7' 0 3/8"	7' 6"	955
1010		11' 1 1/8"							9' 5 7/8"							9' 0 3/8"	9' 6"	1,125
1012		13' 1 1/8"							11' 5 7/8"							11' 0 3/8"	11' 6"	1,295
1204	12 3/4	5' 3 3/8"	16 1/4	4	4	11	4 3/4	9 1/2	3' 4 5/8"	12	10	9	3	(2) 3/4	3/4	2' 10"	3' 4 1/4"	865
1205		6' 3 3/8"							4' 4 5/8"							3' 10"	4' 4 1/4"	980
1206		7' 3 3/8"							5' 4 5/8"							4' 10"	5' 4 1/4"	1,095
1208		9' 3 3/8"							7' 4 5/8"							6' 10"	7' 4 1/4"	1,325
1210		11' 3 3/8"							9' 4 5/8"							8' 10"	9' 4 1/4"	1,555
1212		13' 3 3/8"							11' 4 5/8"							10' 10"	11' 4 1/4"	1,785
1305	14	7' 7"	17	6	6	11 1/4	7 1/4	12 1/4	4' 9 3/4"	10 1/2	7 1/2	10 1/2	4	(2) 3/4	3/4	4' 9 3/4"	5' 2"	1,260
1307		8' 7"							5' 9 3/4"							5' 9 3/4"	6' 2"	1,380
1308		9' 7"							6' 9 3/4"							6' 9 3/4"	7' 2"	1,500
1309		10' 7"							7' 9 3/4"							7' 9 3/4"	8' 2"	1,620
1310		11' 7"							8' 9 3/4"							8' 9 3/4"	9' 2"	1,740
1312		13' 7"							10' 9 3/4"							10' 9 3/4"	11' 2"	1,980
1316		17' 7"							14' 9 3/4"							14' 9 3/4"	15' 2"	2,460
1506	16	7' 4 1/4"	19 1/2	6	6	12 1/4	6 1/2	12 1/4	4' 7 1/2"	11 1/2	8 1/2	11 1/2	4	(2) 3/4	3/4	4' 7 1/2"	5' 4 1/2"	1,720
1507		8' 4 1/4"							5' 7 1/2"							5' 7 1/2"	6' 4 1/2"	1,920
1508		9' 4 1/4"							6' 7 1/2"							6' 7 1/2"	7' 4 1/2"	2,120
1509		10' 4 1/4"							7' 7 1/2"							7' 7 1/2"	8' 4 1/2"	2,320
1510		11' 4 1/4"							8' 7 1/2"							8' 7 1/2"	9' 4 1/2"	2,520
1512		13' 4 1/4"							10' 7 1/2"							10' 7 1/2"	11' 4 1/2"	2,920
1516		17' 4 1/4"							14' 7 1/2"							14' 7 1/2"	15' 4 1/2"	3,720
1708	18	9' 6 1/8"	21 5/8	6	6	13 1/4	6 3/8	12 1/4	6' 7 3/4"	12 1/2	9 1/2	12	4	(2) 3/4	3/4	6' 7 3/4"	7' 4"	2,600
1710		11' 6 1/8"							8' 7 3/4"							8' 7 3/4"	9' 4"	3,080
1712		13' 6 1/8"							10' 7 3/4"							10' 7 3/4"	11' 4"	3,560
1716		17' 6 1/8"							14' 7 3/4"							14' 7 3/4"	15' 4"	4,520
1720		21' 6 1/8"							18' 7 3/4"							18' 7 3/4"	19' 4"	5,480
1908	20	9' 7 1/4"	23 5/8	8	6	14 1/4	7 1/8	14	6' 5 1/2"	13 1/2	10 1/2	13	4	(2) 3/4	3/4	6' 5 1/2"	7' 3"	3,210
1910		11' 7 1/4"							8' 5 1/2"							8' 5 1/2"	9' 3"	3,800
1912		13' 7 1/4"							10' 5 1/2"							10' 5 1/2"	11' 3"	4,390
1916		17' 7 1/4"							14' 5 1/2"							14' 5 1/2"	15' 3"	5,570
1920		21' 7 1/4"							18' 5 1/2"							18' 5 1/2"	19' 3"	6,750
2308	24	9' 11 1/2"	27 3/4	8	8	17	8 3/4	14 1/4	6' 5 1/2"	15 1/2	13 1/2	15	5	(4) 7/8	3/4	6' 5 1/2"	7' 0 1/2"	4,380
2312		13' 11 1/2"							10' 5 1/2"							10' 5 1/2"	11' 0 1/2"	5,980
2316		17' 11 1/2"							14' 5 1/2"							14' 5 1/2"	15' 0 1/2"	7,580
2320		21' 11 1/2"							18' 5 1/2"							18' 5 1/2"	19' 0 1/2"	9,180
2324		24' 11 1/2"							22' 5 1/2"							22' 5 1/2"	23' 0 1/2"	10,780
2710	27 3/4	12' 3 1/4"	31 5/8	10	10	19 1/4	10 1/2	17 1/2	8' 2 1/2"	17	15	17	5	(4) 7/8	3/4	8' 2 1/2"	8' 11 1/2"	6,725
2712		14' 3 1/4"							10' 2 1/2"							10' 2 1/2"	10' 11 1/2"	7,705
2716		18' 3 1/4"							14' 2 1/2"							14' 2 1/2"	14' 11 1/2"	9,665
2720		22' 3 1/4"							18' 2 1/2"							18' 2 1/2"	18' 11 1/2"	11,625
2724		26' 3 1/4"							22' 2 1/2"							22' 2 1/2"	22' 11 1/2"	13,585
3110	31 3/4	12' 5 1/4"	35 5/8	10	10	21 1/4	11 1/8	18 1/2	8' 1 1/2"	19	17	19	5	(4) 7/8	3/4	8' 1 1/2"	8' 8 1/2"	9,215
3112		14' 5 1/4"							10' 1 1/2"							10' 1 1/2"	10' 8 1/2"	10,565
3116		18' 5 1/4"							14' 1 1/2"							14' 1 1/2"	14' 8 1/2"	13,265
3120		22' 5 1/4"							18' 1 1/2"							18' 1 1/2"	18' 8 1/2"	15,965
3124		26' 5 1/4"							22' 1 1/2"							22' 1 1/2"	22' 8 1/2"	18,665

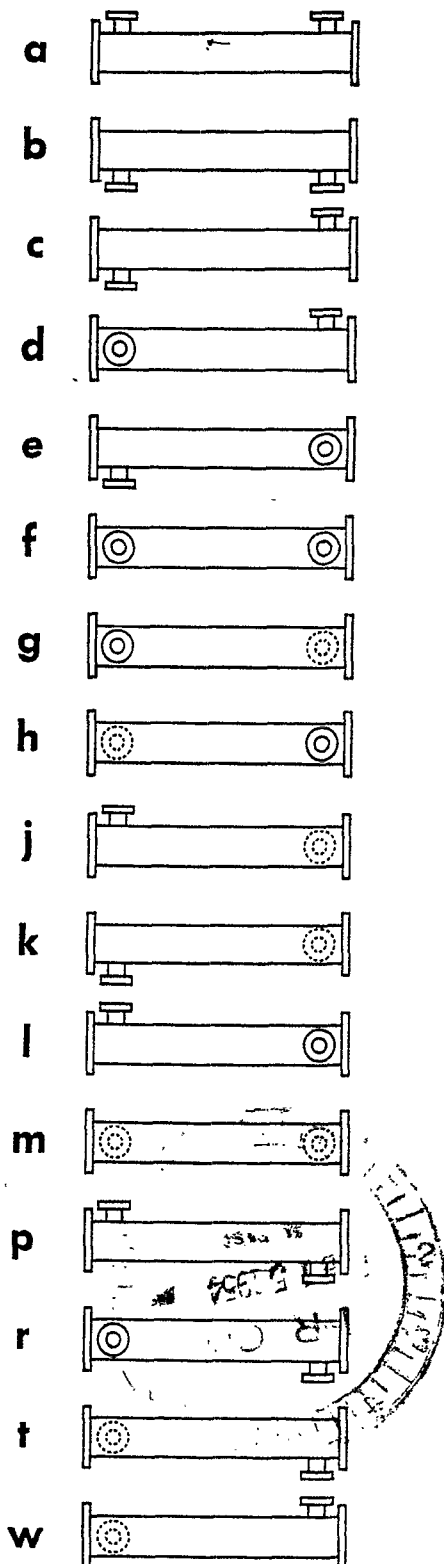
Catalog dimensions are subject to variation. Use only certified drawings for construction purposes.

Broad latitude in nozzle locations

SHELLS

Packed End

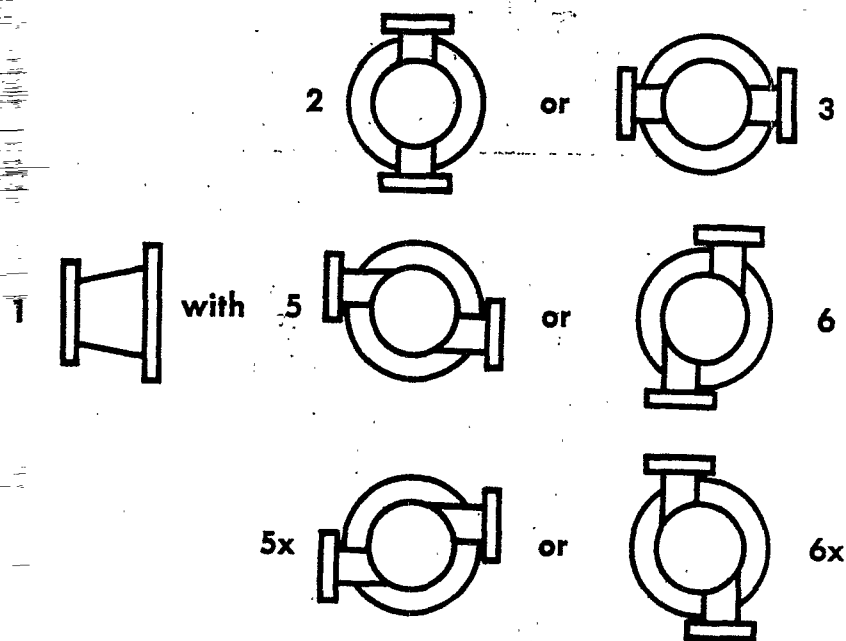
Stationary End



TWO-PASS CHANNELS

Packed End

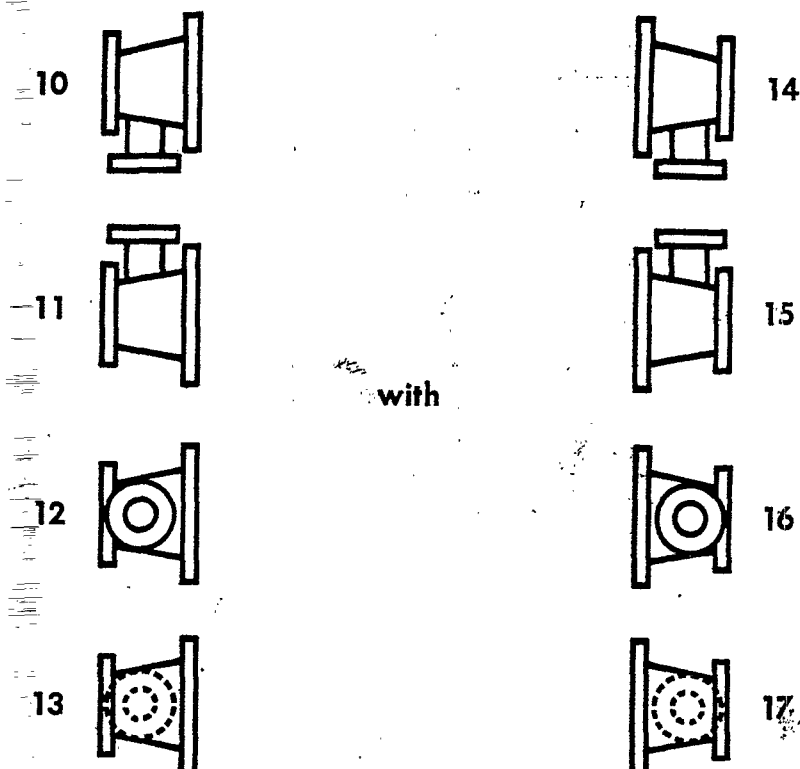
Stationary End



SINGLE-PASS CHANNELS

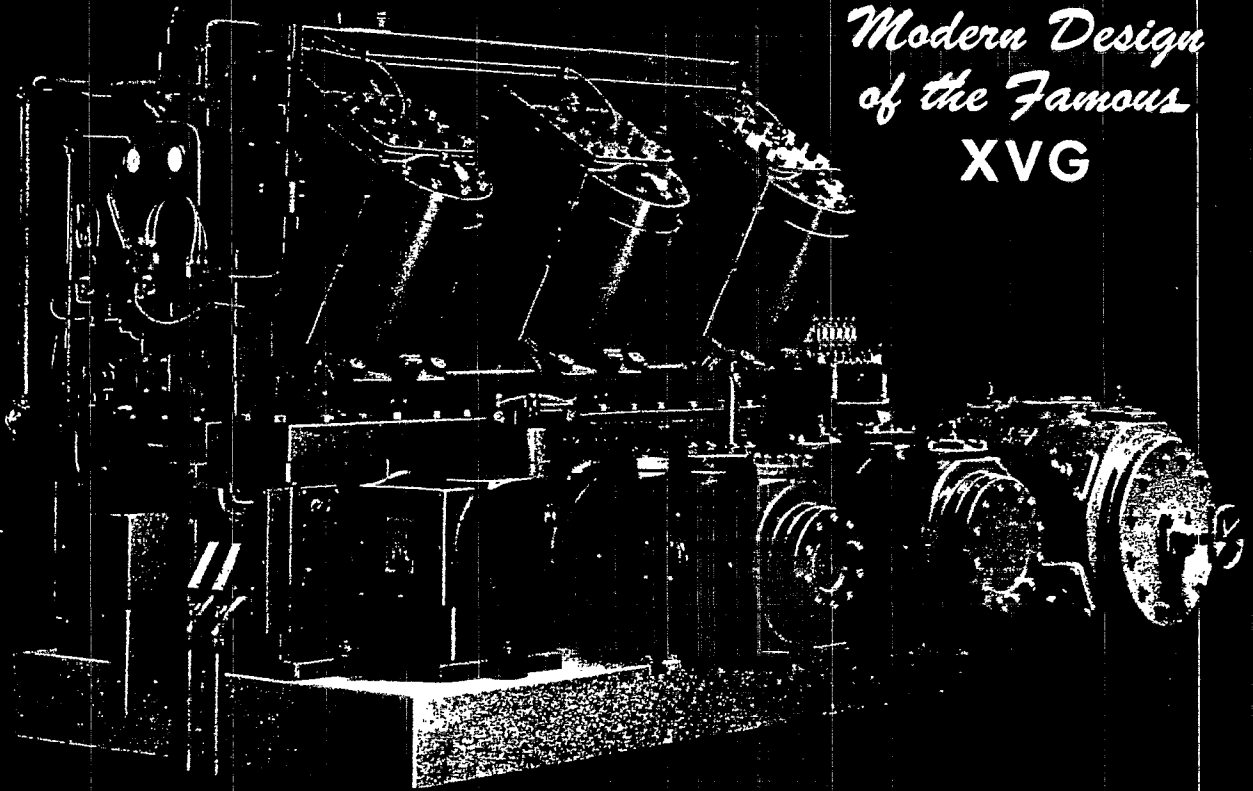
Packed End

Stationary End



EXAMPLE: Shell (g) with Channels (1) and (3), or Shell (e) with Channels (10) and (16).

*The
Modern Design
of the Famous
XVG*



SVG GAS-ENGINE DRIVEN COMPRESSORS



SIZES 330 and 440 Horsepower

Ingersoll-Rand

Copyright, 1950
by Ingersoll-Rand Co.

Form 3128

Chevron BB
013379

developed for

BETTER FUEL ECONOMY

LOWER OIL CONSUMPTION

ECONOMY OF OPERATION & MAINTENANCE

LOW-COST INSTALLATION

FLEXIBILITY IN LOADING & OPERATION

MAXIMUM DEPENDABILITY

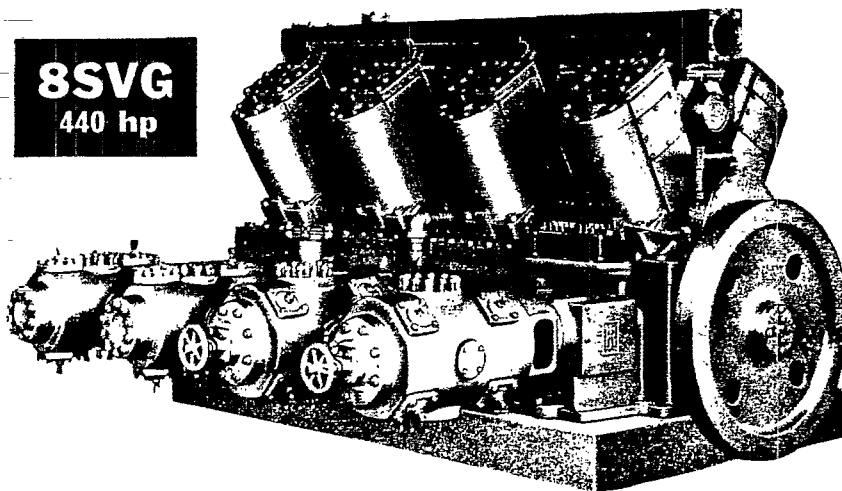
QUIET PERFORMANCE

COMPACTNESS

EASE OF OPERATION

EASY RELOCATION

8SVG
440 hp



SIMPLER EXHAUST PIPING

LIGHTER WEIGHT

BETTER BALANCE

The 4-Cycle SVG is a Better

The SVG gas-engine-driven compressor is essentially the well-known XVG compressor . . . improved and modernized by a complete redesign from the ground up and from the inside out. It's the basic 4-cycle V-angle design which Ingersoll-Rand originated and introduced as a multi-cylinder XVG compressor in 1932.

Older engineers and operating men remember how the XVG compressor began a new era in gas-engine compressors. For nearly 20 years this machine has maintained its position as a standard of comparison and as a leader in its field. It became famous for its adaptability, outstanding performance, and low maintenance costs in oil fields, refineries, and industries wherever gas is available for power.

Several thousand units of the XVG family are now scattered over all continents of the world, operating under all kinds of climatic conditions from the Arctic to the Tropics, and running on natural, refinery, and manufactured gases—even on fuel oil when equipped with diesel cylinders.

Time after time new developments and improvements were incorporated into XVG construction, but there are limits to improving an existing model. There comes a time when a departure from even such a successful model is necessary.

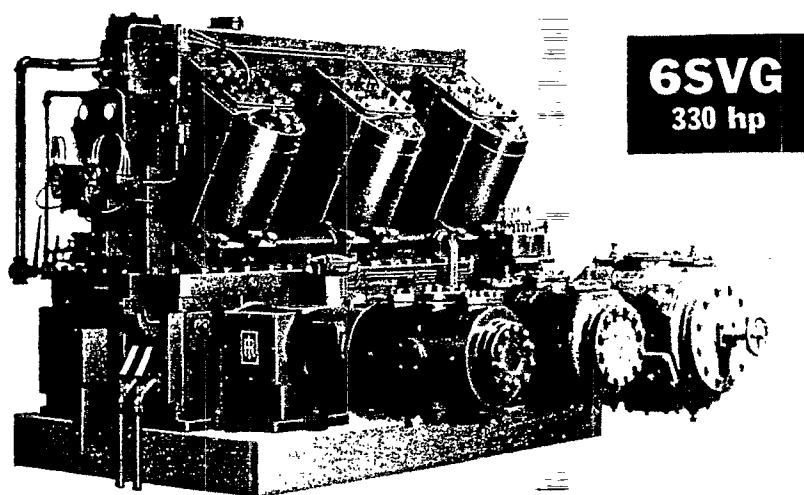
Our designers put into the SVG all of those features that have been so successful in the XVG, and took advantage of new materials, modern rotative speeds, up-to-date manufacturing methods, and "know how" based upon many years of experience in building both compressors and engines. Because of the excellent reputation of its predecessor, the modern-design SVG with its numerous refinements is being given a ready acceptance by the industry. A large number of units are already in operation, and many more are being built on order. There is every indication that the record established by the XVG will be more than equalled by the SVG compressor.

MORE RUGGED CONSTRUCTION

EASIER MAINTENANCE

Choose an SVG for

- *Field-Gas Gathering for Pressure Maintenance and Repressuring*
- *Pipe-Line Feeder and Distribution Stations*
- *Gas and Air Lift*
- *Refinery and Chemical Processes*
- *Industrial Air, Gas, or Refrigeration Service*
- *Liquid-Gas Plants*
- *Isolated Locations with Infrequent Attendance*
- *Services requiring Accurate and Economical Variable-Speed and -Load Operation*



**6SVG
330 hp**

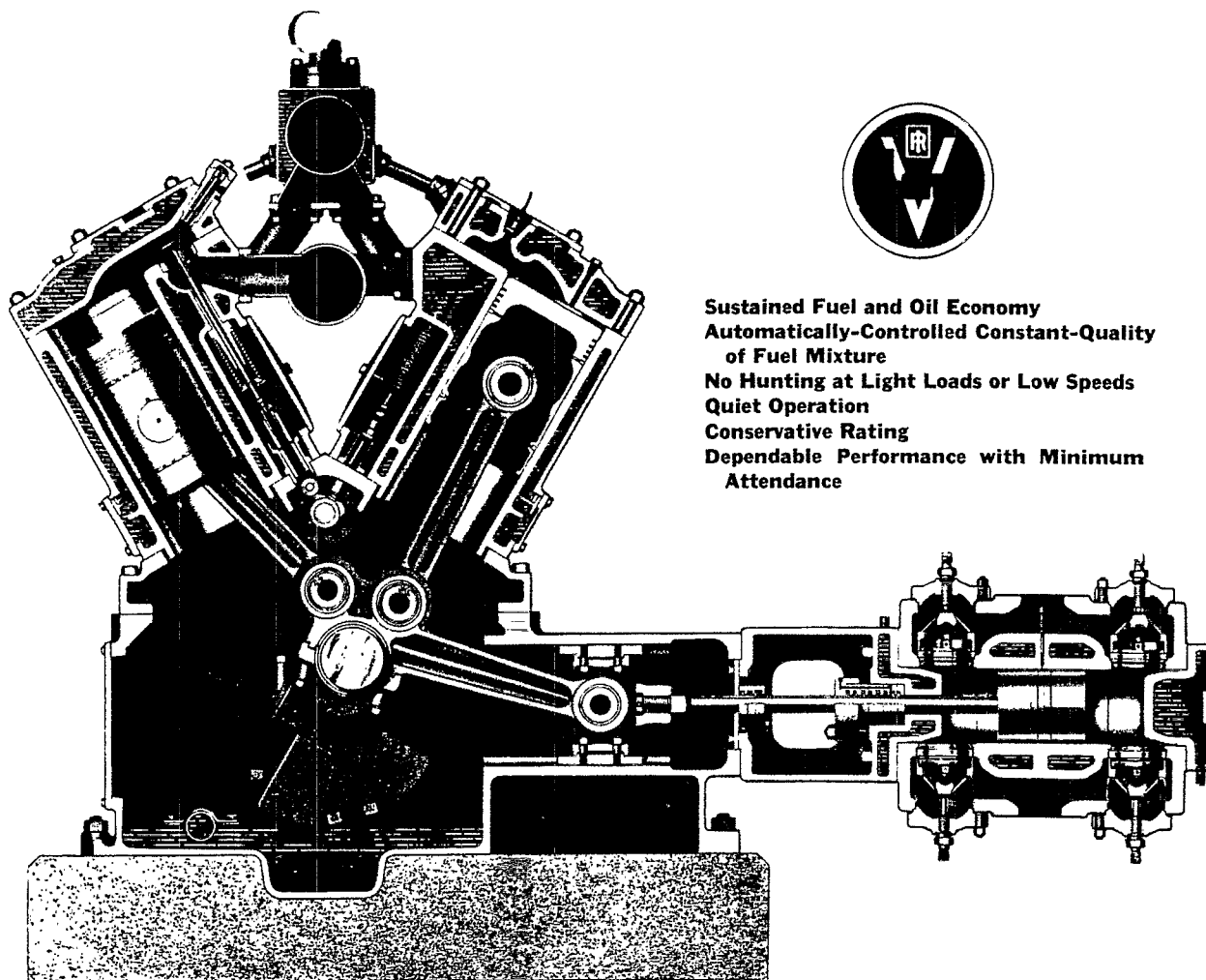
SMALLER FOUNDATION

LESS FLOOR SPACE

Compressor All Around

Adds the Following Improvements and Retains the Advantages of the XVG

- 1. Smaller Foundation, Less Floor Space, and Lighter Weight per BHP . . .** Both sizes of the SVG weigh about 20% less per bhp than the XVG, with no sacrifice in ruggedness or dependability. Foundations are even smaller due to the better balance. These features reduce the installation and relocation costs of the SVG compressor.
- 2. Excellent Running Balance . . .** Crank angles of 120° on the 6SVG and 90° on the 8SVG, two power cylinders per compressor frame, lightweight aluminum power pistons with low inertia forces, and shaft counterweighting make the SVG a smoother running machine. Because the gas flow is smoother with these crank angles, there is less piping vibration, and piping costs of the SVG compressor are less because smaller pipe sizes can be used.
- 3. Better Economy of Fuel and Oil . . .** A 10% saving in fuel has been secured by increasing the compression ratio. Compression and firing pressures, however, are still materially lower than in 2-cycle units, resulting in longer life of bearings, spark plugs, and cylinder parts. Oil consumption is lower because of cool-running aluminum pistons, narrow piston rings, and chrome-plated top rings. Sustained, good fuel economy at reduced speeds and part loads as well as at full loads, and low lubricating-oil consumption are characteristics of all I-R 4-cycle V-angle compressors. No oil is spent in scavenging cylinders or wasted through exhaust ports.
- 4. Neater Appearance and Simplified Piping . . .** In designing the SVG a great deal of attention was paid to appearance, and simplification of piping and other details. The machine is easier to keep clean, because there are no dirt-catching pockets.
- 5. Smoother and Quieter . . .** Runs like a steam engine . . . the result of better crank spacing, 4-cycle L-head construction, small cylinders, aluminum pistons, low inertia forces, and well-balanced performance.
- 6. Instrument Panel and Grouped Controls . . .** Ignition, governor-speed adjustment, and air and gas starting valves are conveniently grouped at the operating end. The instrument panel allows direct reading of the oil-cooler and main-bearing oil pressures. An added feature is the manifold depression gauge which provides an easy means for checking load and load variations, an arrangement possible only with 4-cycle engines. Thermometers give the temperature of the oil before and after the cooler.
- 7. Better Governor and Improved Shut-Down Devices** give control with greater operating safety. Protection against excessive water temperature and low oil pressure is provided by a proven, ignition short-circuiting switch. A centrifugal switch cuts out the ignition in case of overspeeding. The governor can be hand-adjusted, while the compressor is running, for control down to 50% of rated speed. Automatic speed and pressure control can be applied.



Sustained Fuel and Oil Economy
Automatically-Controlled Constant-Quality
of Fuel Mixture
No Hunting at Light Loads or Low Speeds
Quiet Operation
Conservative Rating
Dependable Performance with Minimum
Attendance

8. **Stiffer Frame and Frame Top** with improved ribbing and stronger bolting result in a much more rigid construction. As the rugged box frame combines both compressor and power ends, it assures permanent alignment. Larger foundations bolts give 25% more clamping force.
9. **Larger Frame Openings** give greater accessibility for inspecting or adjusting the main and crankpin bearings.
10. **Larger-Diameter Crankshaft** improves bearing proportions and increases stiffness. Each crank of this forged-steel shaft is supported by two rigidly held main bearings. The shaft is counterweighted for the best running balance.
11. **All Main Bearing Shells Are Interchangeable** reducing the number of spares. The shells, of the precision type with babbitt-lined steel backs, are retained by mortise-fit caps and laminated shims. Shim adjustable bronze shoes on one of the main bearing caps carry any crankshaft end thrust.
12. **Light-Weight, Cool-Running Power Pistons** are made of aluminum for lower inertia forces and better transfer of heat. Long skirts and correct fit of pistons in the honed cylinders result in less wear.
13. **Top Piston Rings are Chrome Plated.** All piston rings are both narrower and deeper. The rate of cylinder and ring wear is cut to a fraction of the previous values accepted as satis-

factory. With low wear rates and efficient oil-scraper rings, excellent oil economy is maintained.

14. **Better, Hardened Valve Seats are Renewable.** These alloy-steel valve seats are heat-resisting, assuring long life of both valves and seats and reducing maintenance costs.
15. **Simpler Valve-Tappet Adjustment** can be made with one hand instead of using two wrenches simultaneously.
16. **Enclosed Power Valve Gear . . .** Newly designed covers on the power cylinders provide flat, easy-to-clean surfaces. The covers form a tighter seal against dust and dirt, and prevent any oil leakage.
17. **Air Starting on All Cylinders** operated by a simple control valve means less barring, easier starting. An air distributor connects in proper sequence to check valves in all power cylinders.
18. **Rifle-Drilled Connecting Rods** avoid the use of separate oil tubes for leading lubricating oil to piston pins and crossheads. New and extensive tooling provides superior, precision machining of these die-forged rods, giving perfect seating of the bearing shells in the rods.
19. **Full-Floating Crosshead Pins . . .** Because of the success of the full-floating power-rod pins proven in the XVG, the

20.

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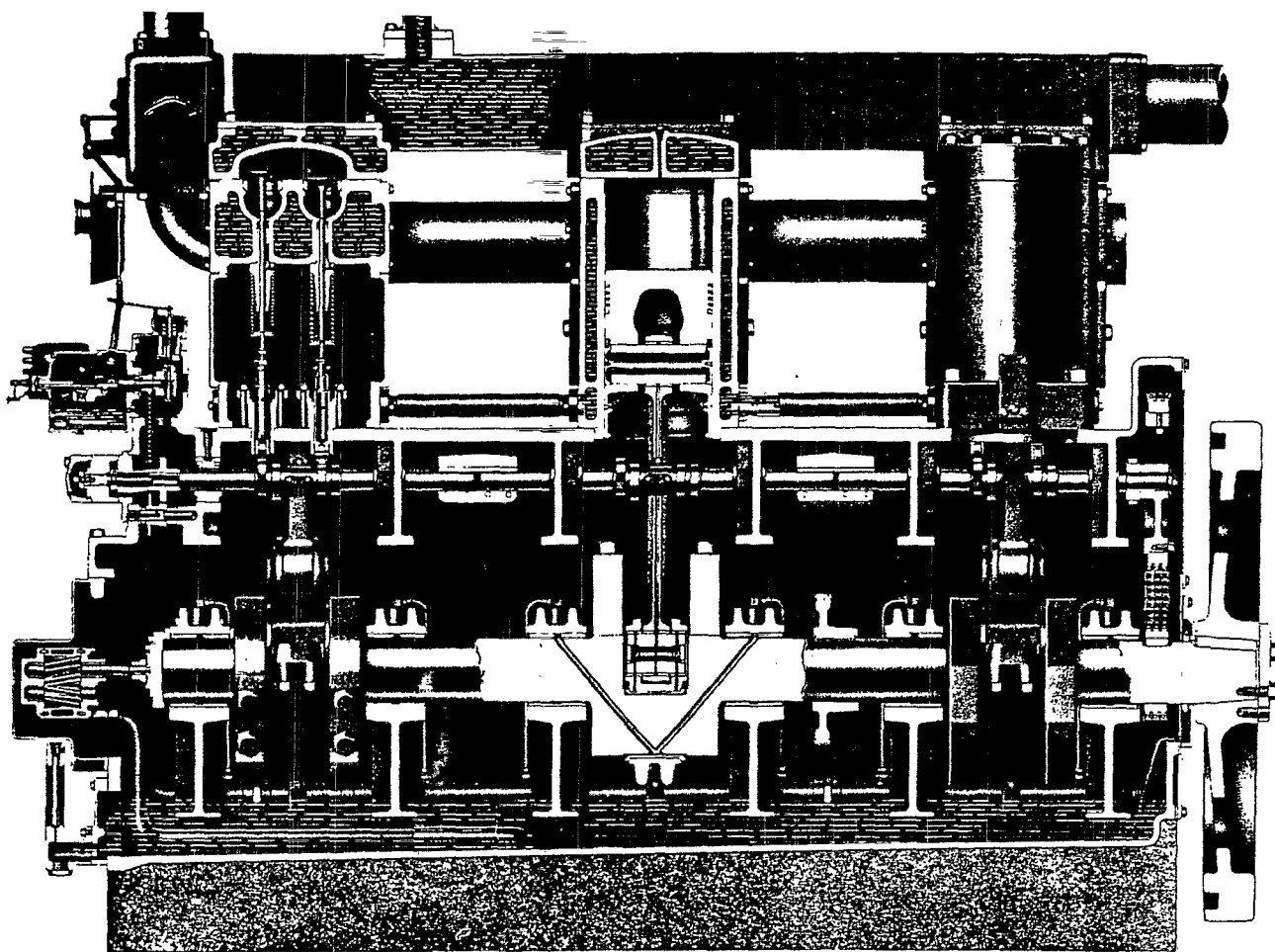
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The SVG is a Superior Compressor built for a high deg



crosshead pins in the SVG are also full-floating and force-feed lubricated for reduced wear and increased life. The crossheads, running in bored guides, have shim-adjusted babbitted shoes at top and bottom for maintaining alignment.

20. **Solid-Hub, Taper-Fitted Flywheel** provides greater strength and safety. It is a more secure arrangement, yet is easy to remove.
21. **Camshaft Drive at Flywheel End** by heavy-duty chain drive assures trouble-free operation. The camshaft sprocket is adjustable for accurate timing.
22. **Roller-Chain Drive to Governor and Magnetos** gives dependable, trouble-free service . . . avoids the use of bevel gears.
23. **Improved Water Pump Drive** . . . Because the built-in water pump is driven from the crankshaft near the flywheel end, it is not subject to any torsional irregularities associated with a drive from the free end of the shaft.
24. **Full Length Water Jackets** on the power cylinders for better cooling and improved performance. The jackets have large hand-hole openings which give easy access for inspection and cleaning.
25. **Improved Water Flow through Engine** . . . Better flow and distribution with decreased water-pressure drop provides more uniform temperatures and less chance for vapor-locking.

26. **Common Water-Cooled Exhaust Manifold** with one exhaust connection simplifies and reduces the cost of piping . . . also eliminates hot surfaces of the exhaust manifold, lowers engine-room temperatures. An air-cooled exhaust manifold is available for applications where it is suitable, reducing the heat load to a minimum and effecting considerable savings in the initial cost of cooling equipment.
27. **Larger Oil-Cooler Surface** . . . Although the heat rejection to the oil is about the same, the oil cooler has nearly twice the area per bhp compared to the XVG. Continuous oil cooling and filtration reduce bearing and oil maintenance.
28. **Mechanical Seals Eliminate Leakage** on both water-pump and magneto drive shafts. No take-up or adjustment is required.
29. **Improved Trouble-Free Linkages** with ball-end self-aligning grease-lubricated connections, between the governor and the mixing valve, and in the force-feed lubricator drive, assure reduced wear and more reliable operation.
30. **Better Manufacturing Methods** . . . In building the many XVG, PVG, JVG, KVG, and now the SVG 4-cycle V-angle units, Ingersoll-Rand has steadily developed and acquired modern, accurate machine tools, jigs, and fixtures. These facilities and advanced manufacturing methods assure strict interchangeability of parts, superior quality of finish, and a long, dependable life.

degree of Flexibility, Reliability, and Overall Economy

SPECIFICATIONS of

GENERAL TYPE

The SVG is a compact four-cycle, single-acting trunk-piston, V-type gas engine with either 6 or 8, size $11\frac{3}{4}'' \times 12\frac{3}{4}''$ power cylinders, and a horizontal, crosshead type, double-acting compressor combined in a single frame. The two banks of power cylinders are at an angle of 60 degrees. The connecting rods of each pair of power cylinders are articulated to a main compressor connecting rod, giving two power cylinders for each compressor crosshead. The compressor frames are cast integral with the engine base.

Ratings . . . The six cylinder 6SVG is rated at 330 bhp and the eight cylinder 8SVG is rated at 440 bhp, both at the conservative speed of 400 rpm. These heavy-duty compressors are built for continuous full-load service.

Appearance . . . Modern design with a neat appearance and simplification of piping and other details. Absence of dirt-catching pockets means the machine is easier to keep clean.

Compactness . . . Modern speeds and advanced design result in a very compact and lightweight heavy-duty compressor.

Running Balance . . . The SVG has low inertia forces because crank angles are 120° on the 6SVG and 90° on the 8SVG, and because lightweight aluminum power pistons are used. There is less movement of foundation and piping, and less vibration is transmitted through the ground to other installations.

Foundation Requirements are only 20 cu yd min. for the 330-bhp unit and 25 cu yd for the 440-bhp unit because of compact lightweight construction and good running balance.

FRAME and RUNNING GEAR

Frame . . . Single-piece, rigid, box-girder-type base reinforced with heavy ribs and tie rods

on each side of the main bearings, and a separate single-piece frame top with ample reinforcements. The frame forms the engine crankcase and includes the crosshead guides for the compressor cylinders.

Accessibility . . . Large openings in the back of the frame (both opposite and between the cranks), at the top of the frame between the cylinders, and at the side of each crosshead, give easy access to all cranks, main bearings, crossheads, and camshaft.

Oil- and Dust-Tight . . . All covers are bolted in place against gaskets. The all-metal non-wearing oil seal for the crankshaft consists of an oil slinger clamped to the shaft between a baffle plate and the cover plate. The oil seal compartment drain extends below the surface of the oil in the crankcase to prevent blow-back of oil vapors.

Crankshaft is a large-diameter, single-piece, electric-furnace forged-steel shaft, heat-treated for strength and journal hardness, turned and polished. The shaft is carefully designed to eliminate torsional vibration and to secure the best running balance. Cranks are spaced at 120° on 6-cylinder units, 90° on 8-cylinder units. Two main bearings support each crank. Oil passages are drilled from main journals to adjacent crankpins. The solid-hub flywheel is taper-fitted and keyed to the shaft.

Interchangeable Main Bearings . . . Large, force-feed lubricated, precision-type, steel-backed babbitted bearing shells are shim adjustable. The shells are accurately ground to fit the bored saddles in the base, and the bored bolted-down caps are mortised in the frame. All of the main bearings are interchangeable. Striated finish of the babbitt permits the bearing to fit itself perfectly to the shaft for most efficient load distribution.

Thrust Bearing . . . Crankshaft end thrust is taken by removable and shim-adjustable bronze thrust shoes mounted on the cap of one of the main bearings.

Compressor Connecting Rods . . . Rifle-drilled, die-forged compressor rod serves as the master rod carrying the two power-rod pins and the compressor crosshead pin. Main crank-pin bearings are full-width, force-feed-lubricated precision babbitt-lined steel shells, split for easy shim adjustment without disturbing any other bearings.

Engine Connecting Rods . . . Rifle-drilled, die-forged power rods are fitted with identical, pressed-in bronze bushings at each end, working on full-floating pins in the master rods and in the engine piston.

Crossheads are steel castings and have shim-adjusted babbitt-coated cast-iron shoes top and bottom. The full-floating crosshead pins are carried in two bronze bushings. Shoes and pins are force-feed lubricated.

ENGINE END

L-Head Cylinders, cast separately of alloy cast iron, have honed bores. Full-length water jackets have large outside cover plates for easy cleaning. The shrink-fit, hardened alloy-steel valve seats are replaceable. Valve springs, tappets, and tappet guides are enclosed in dust-tight easily-removed covers.

Simple Valve Assembly . . . Valve tappet adjustments can be made with one hand. The direct-lift engine valves are made of heat-resisting alloy steel. All parts of valve mechanism are identical for both inlet and exhaust. Valve-stem and tappet guides are replaceable.

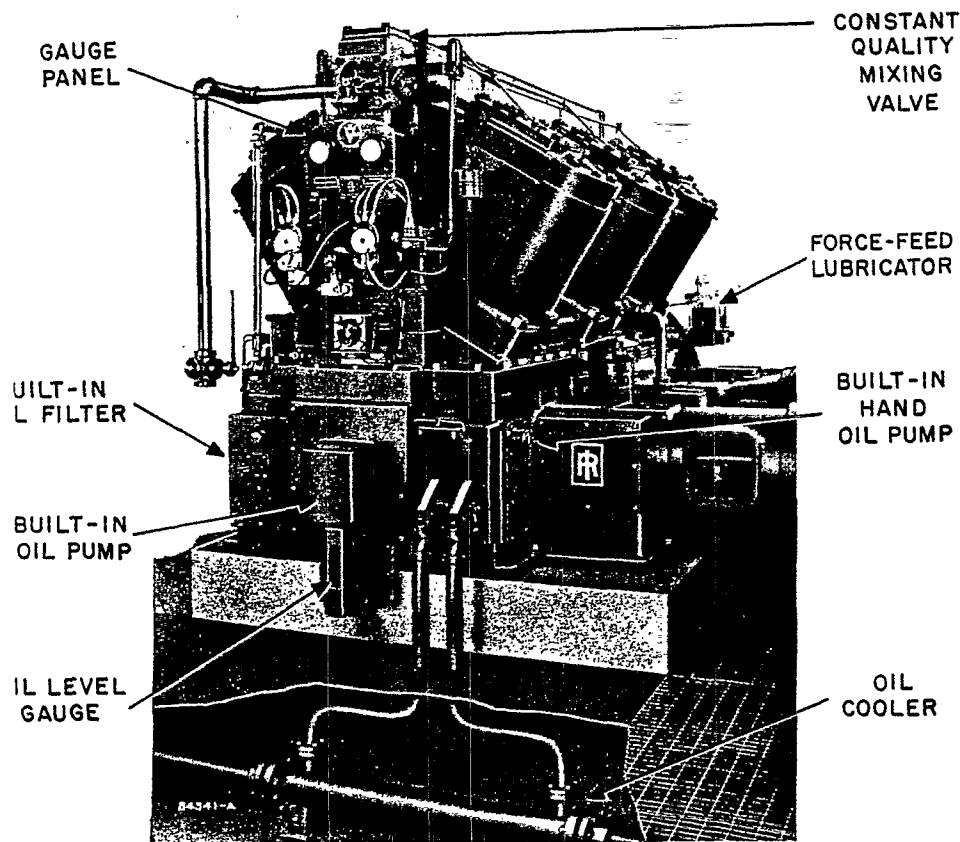
Cylinder Heads are of simple, detonation-quieting design with large covers for cleaning water jackets.

Aluminum Pistons each have four compression rings and two oil-control rings. All rings, riding in deep ring grooves, are narrow to reduce weight. Side wear in the ring grooves is lessened and scuffing of the rings and cylinder walls is minimized. Top rings are chrome-plated for less cylinder wear and lower oil consumption with longer life of all rings. The full-floating piston pin is lubricated from the connecting-rod bushing.

Camshaft is roller-chain driven from the crankshaft at the flywheel end with an adjustable idler provided for drive-chain take-up. The camshaft sprocket is clamped to an inner drum, providing a means of adjusting the camshaft setting for the proper timing. The camshaft is made in sections to reduce the floor space necessary for removal. It has a steel-backed babbitt-lined, split, precision insert bearing on each side of the cams for each pair of engine cylinders, plus a solid bronze thrust bearing. The governor, magnetos, and overspeed safety stop are chain-driven from the camshaft.

ENGINE FUEL, IGNITION, and STARTING SYSTEMS

Fuel System . . . A single mixing valve and inlet manifold is used for both banks of power cylinders. By regulating the flow of the gas mixture without changing the fuel-air ratio, the constant-quality mixing valve maintains perfect combustion and economy under all load and speed conditions . . . only one fuel adjustment for all cylinders. A sensitive low-pressure fuel regulator controls the admission of the fuel gas to the mixing valve. The manifold depression gauge gives an easy means for checking load and load variations. The common water-cooled exhaust manifold complements the inlet manifold to insure uniform and



the SVG Compressor

complete scavenging of exhaust gases. An air-cooled exhaust manifold is available for applications where it is suitable.

Ignition System . . . The standard ignition system consists of two high-tension induction-type magnetos with impulse starters. Each magneto serves one bank of power cylinders. Magneto drive shafts have mechanical oil seals. Heavy-duty ignition cables lead to the high-grade spark plugs. When required, low-fire-hazard ignition systems can be provided.

Air-Starting System . . . The air-starting mechanism consists of a revolving-disc-type distributor, direct-driven by the camshaft. It pneumatically controls operation of the air-starting valves in each engine cylinder head. For easy barring-over of the engine, all air-starting valves are opened pneumatically and simultaneously through a hand control valve. Compressed air at 200 psi is required for starting.

COMPRESSOR-END CONSTRUCTION

General . . . The compressor frame with cross-head guides is cast integral with the engine base, assuring permanent alignment between the engine and the compressor end.

Compressor Cylinders are made to suit each application. They may be cast iron, cast steel, or forged steel of various types and sizes, depending upon the service. Cylinders are thoroughly water-jacketed and adequately valved. Cylinder heads are easily removable.

Pistons are light-weight with large bearing surfaces. The number, material, and type of rings used depend upon pressure and service conditions.

Compressor Valves are either I-R cushioned stainless-steel plate or channel valves for quiet, efficient operation and low maintenance. They are selected from a wide range of types to meet the specific service requirements.

Stuffing Boxes . . . The full-floating, all-metallic packing in the stuffing boxes is force-fed lubricated and equipped with vent connections. Metallic oil-scraper rings seal the frame where the piston rods pass through it.

LUBRICATION

Full Force-Feed System . . . The built-in gear-type oil pump direct-connected to the crankshaft supplies oil under pressure to all main, crankpin, piston-pin, and crosshead-pin bearings, and to the crosshead shoes. This force-feed system also supplies oil to governor parts, the water-pump drive chain, gears and bearings of the magneto drive shafts, the camshaft thrust bearings, and other moving parts in the accessory case. A supplementary hand pump enables the operator to build up oil pressure before starting.

Cylinder walls, camshaft bearings, and valve tappets are lubricated by the throw-off spray.

Oil Cooler and Filters . . . Standard equipment includes a high-grade, large-surface shell-and-tube-type oil cooler, a built-in edge-type cleanable oil filter to remove impurities, and a waste-packed by-pass filter for continuous filtration to maintain the lubricating oil in proper condition. A valve permits cleaning the filter without stopping the engine.

Engine-Valve Lubrication . . . Engine valve stems (and the air-starting distributor) are lubricated by a manual "one-shot" force-feed system having a central pump located near the

gauge panel. An automatic lubricator is available for units in isolated locations.

Compressor-Cylinder Lubrication . . . A high-grade force-feed lubricator with individually adjustable sight-feeds supplies the proper amount of oil to each compressor cylinder and to the set of metallic packing in each cylinder stuffing box. The lubricator has a slow-speed, positive drive actuated by an eccentric on the engine camshaft.

COOLING SYSTEM

The cooling system is designed to maintain a desirable uniform temperature in the various parts of the engine. Full-length water jackets on the engine cylinders have large hand-hole openings for inspection and cleaning of water passages. The common exhaust manifold is water-jacketed to eliminate hot surfaces and keep engine-room temperature down. An air-cooled manifold can be supplied where conditions permit; the heat load is much less and considerable saving can be made on the investment in cooling equipment. Compressor cylinders are thoroughly water jacketed.

The built-in I-R centrifugal recirculating water pump is chain driven from the shaft near the flywheel end. The pump shaft is fitted with a long-life mechanical seal.

SAFETY DEVICES

The engine is equipped with an overspeed safety stop which consists of a centrifugal device that trips a plunger and short circuits the ignition system, thus preventing the engine from reaching dangerous speeds.

Automatic ignition switches stop the engine when the oil pressure drops to a certain limit in the force-feed lubrication system, or when

the cooling-water temperature reaches a certain predetermined maximum.

GOVERNOR and REGULATION

Centrifugal Governor controls the speed by varying the amount of air and gas mixture admitted to the power cylinders. The governor is driven by a roller chain. Linkage between the governor and mixing valve has ball-end, self-aligning, grease-lubricated connections.

Regulation . . . Standard is hand-control regulation down to 50% of rated speed. Speed-pressure element is available to provide automatic capacity control while maintaining a constant intake or discharge pressure by variation of engine speed. Compressor cylinders with valve lifters on inlet valves, fixed clearance pockets, or variable clearance pockets can be provided to meet various service conditions.

GROUPED CONTROLS

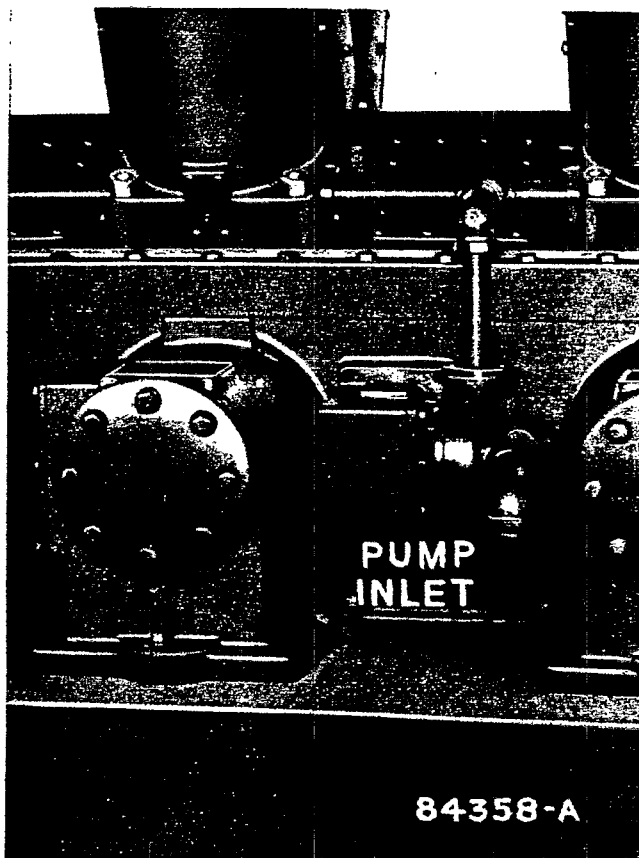
Gauge Panel contains manifold depression gauge and an oil gauge that will indicate oil pressure either to the oil cooler or to main bearings.

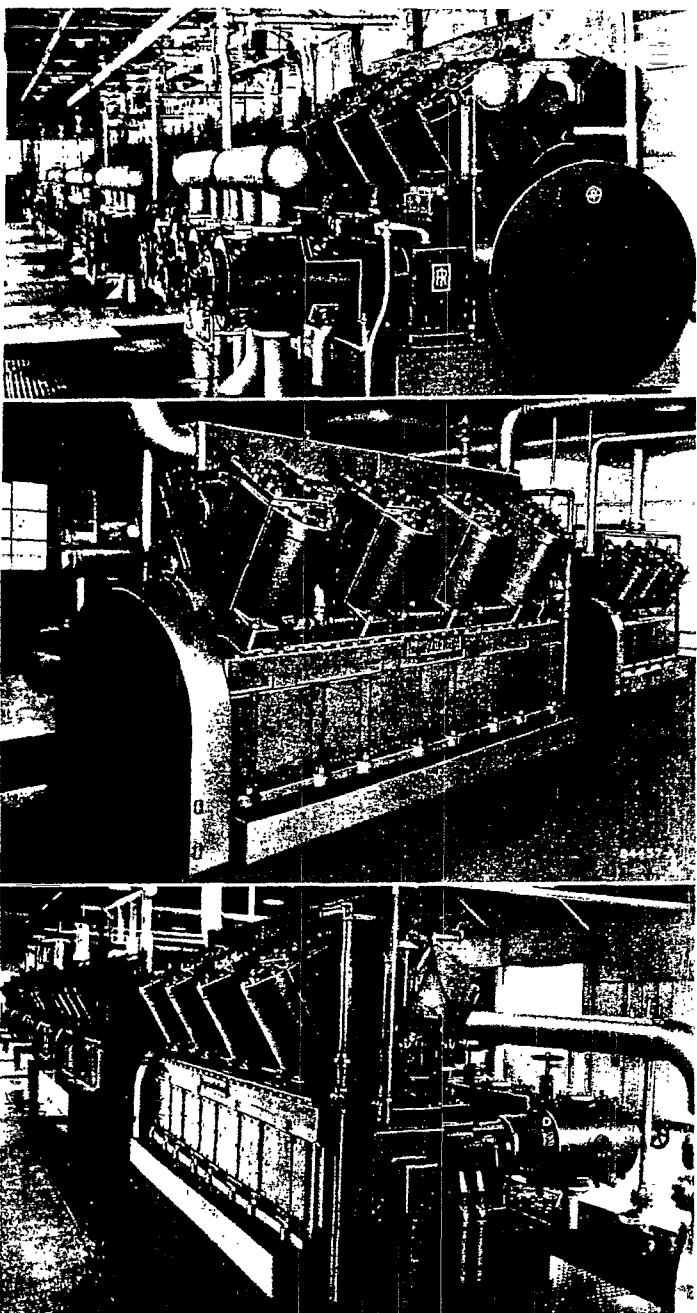
Other Controls grouped at the same end of the machine include: fuel shut-off cock, air-starting cock, "one-shot" lubricator, governor and mixing valve adjustments, hand pump for building up oil pressure before starting, oil-level gauge, edge-type oil filter, and oil-cooler thermometers.

COMPANION GAS ENGINES

Companion PSVG gas engines are available for pump, generator, and other drives. The PSVG is built with just the engine base (omitting the compressor frames), and practically all wearing parts are interchangeable between the PSVG engine and the SVG compressor.

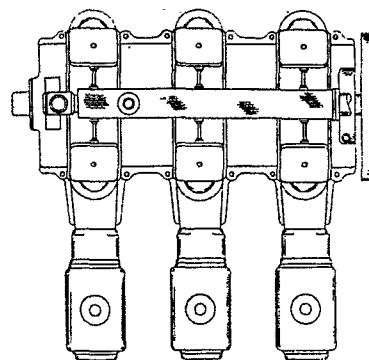
This built-in I-R centrifugal recirculating water pump is chain driven from the crankshaft.



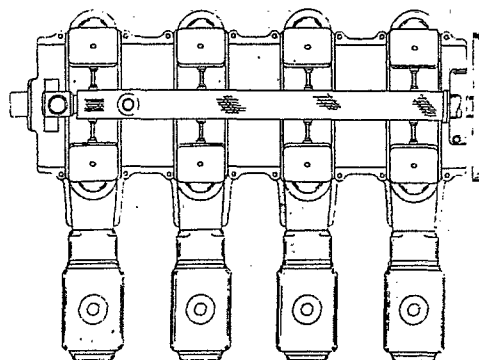


(Top) 8SVG and a number of XVG units on booster service in a California gas field.
(Center) The clean, modern design of I-R 4-cycle compressors is evident in both the 8SVG and the 6JVG.
(Bottom) A compact 8SVG alongside several XVG units in a Pennsylvania gas field.

DIMENSIONS AND DATA



6SVG



8SVG

SIZE UNIT	6-SVG	8-SVG
Horsepower rating.....	330	440
Revolutions per minute.....	400	400
Compressor cylinder stroke, in.....	12	12
No. of power cylinders.....	6	8
Bore of power cylinders, in.....	11 $\frac{1}{2}$	11 $\frac{3}{4}$
Stroke of power cyl., app. in.....	12 $\frac{3}{4}$	12 $\frac{3}{4}$
Length overall, ft-in.....	10-7	10-7
Width overall, ft-in.....	11-6	14-9
Height above floor overall, ft-in.....	8-11 $\frac{1}{2}$	8-11 $\frac{1}{2}$
Min. foundation, cu. yd.....	20	25
Approx. domestic shipping wt. (with average compressor cylinders), lb.....	36,000	47,000
Domestic shipping wt., heaviest piece usually shipped, lb.....	27,000	34,850
Export shipping weights.....	Add 15% to Domestic wts.	
Approx. cu. contents packed for export (with average compressor cylinders).....	845	1100

OTHER 4-CYCLE V-ANGLE UNITS



ALSO COMPANION GAS-ENGINES

INGERSOLL-RAND BRANCHES OR DISTRIBUTORS IN Principal Cities the World Over

ATLANTA . BIRMINGHAM . BOSTON . BUFFALO . BUTTE . CHICAGO . CINCINNATI . CLEVELAND . DALLAS . DETROIT
DENVER . DULUTH . EL PASO . HONOLULU . HOUSTON . KANSAS CITY . KNOXVILLE . LOS ANGELES . MINNEAPOLIS
NEWARK . NEW ORLEANS . NEW YORK . PHILADELPHIA . RICHMOND . PITTSBURGH . POTTSTOWN . SAN FRANCISCO
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Ingersoll-Rand

11 Broadway, New York 4, N. Y.

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COMPRESSORS TURBO-BLOWERS DIESELS CONDENSERS CENTRIFUGAL PUMPS AIR TOOLS ROCK DRILLS

Chevron BB
013386

THE COOPER-BESSEMER CORPORATION

MACHINERY BUILDERS

SINCE THE YEAR 1833

ENGINES AND



COMPRESSORS

MT. VERNON, OHIO

WRITTEN FROM

P.O. Box 198
Odessa, Texas
February 20, 1954

Standard Oil Company of Texas
P.O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winter

Subject: QR - Specifications EP-103-K
Compressor Gas Recovery Plant

Gentlemen:

We are enclosing in triplicate our quotation covering one or more Cooper-Bessemer type GMX-8-IF gas engine driven compressor units for your subject plant.

Our quotation covers equipment which meets your specifications with the following minor exceptions. You have requested net prices, F.O.B. El Paso. You will note that our contract is written "F.O.B. Mount Vernon, Ohio with freight allowed to El Paso". All prices are net and equipment of Cooper-Bessemer manufacture are firm. We trust this will be acceptable.

On sheet 2, item 2.4, you request that a backfire relief valve be furnished for the air filter. Due to the construction of the two cycle scavenging system we do not recommend that a backfire relief valve be installed. However we would be pleased to supply you with prices if you so desire. With the above exceptions it is the intent of this quotation that it cover your specifications EP-103-K.

On page three of our quotation we have stated the shipment to be nine weeks. Actually the engine can be shipped from factory stock and the nine weeks is required for the compressor cylinders and auxiliary equipment.

We appreciate very much this opportunity of quoting you and trust that you will find our equipment acceptable for this job.

Yours very truly,

THE COOPER-BESSEMER CORP.

C. L. McDougall

CLM:djh

CC: Standard Oil Company of Texas (3)
P.O. Box 862 El Paso, Texas

Chevron BB
013387

THE COOPER-BESSEMER CORPORATION

MACHINERY BUILDERS

SINCE THE YEAR 1833

ENGINES AND



COMPRESSORS

MOUNT VERNON, OHIO

WRITTEN FROM

TO: Standard Oil Company of Texas
P.O. Box 862
El Paso, Texas

P.O. Box 1928
Odessa, Texas
February 20, 1954

SUBJECT:

Gas Recovery Plant
Specification EP-103-K

The Cooper-Bessemer Corporation, hereinafter called the Company, proposes to furnish to the above company, hereinafter called the Purchaser, the following equipment: One or more Cooper-Bessemer Model GMX-8-Turboflow compressor unit equipped with two 21-1/2 inch first stage and one 13-1/2 inch second stage compressor cylinders.

All to be built according to the following specifications:

Rated Brake Horse Power @ Sea Level 440, 397 & 3750
Revolutions per Minute 400
Number of Power Cylinders 8
Diameter of Power Cylinders, In. 9-3/4
Length of Stroke, In. 10-1/2

Compressor Cylinders:

Number	Diameter	Class	Max. Working Pressure
<u>2</u>	<u>21-1/2</u>	<u>GH-105</u>	<u>100</u>
<u>1</u>	<u>13-1/2</u>	<u>GH-105</u>	<u>600</u>

Capacity* First Stg. - 2550 MSCFD Second Stg. - 1770 MSCFD

(*) Plus or Minus 6% for suction pressures 5 psig and below

(*) Plus or Minus 3% for suction pressures above 5 psig

Capacity Measured at 14.7 PSIA & 60° F.

With Suction Pressure 13 PSIA, Discharge Pressure 212.8 PSIA

C_p/C_v 1.13 & 1.15

Fuel Consumption Effective B.t.u. per B.Hp.Hr. at Full Load 8600 & S.L.

Shipping Weight with Compressor Cylinders 63,300

Overall Measurements See Drawing GMX-10-107

THE COOPER-BESSEMER CORPORATION

PRICE:

The price of the equipment and materials specified herein, f. o. b. point or points of manufacture, shall be —

FORTY EIGHT THOUSAND EIGHT HUNDRED FORTY THREE DOLLARS
AND NO/100 -----(\$48,843.00) PER UNIT

With freight allowed to El Paso on the nearest railroad siding
to installation site.

This price is subject to change at any time prior to approval of this proposal by the Company at its Home Office, except for operation of the "Price Adjustment" clause.

Unless otherwise specified, the price quoted is f.o.b. point of manufacture and includes only the items listed. Purchaser shall also pay all sales, use or transportation taxes or duties for which it may be liable or which the law requires the Company to collect.

TERMS OF PAYMENT:

The Purchaser shall make the payments of the foregoing purchase price as follows: 80% of the contract price to be paid upon receipt of bills of lading showing that equipment has been shipped; balance when equipment is in operation but not to exceed 60 days from the date upon which first payment falls due.

The terms of payment quoted are subject to approval of credit and continuance of acceptable credit. Payments shall be made in United States funds. If Purchaser delays shipment, payments are to be made as though shipment had been made as specified, and equipment shall be at Purchaser's risk and subject to reasonable storage charges.

PRICE ADJUSTMENT

~~The prices of any material or equipment manufactured by the Cooper-Bessemer Corporation and/or services to be rendered under the terms of this proposal are subject to adjustment upward or downward to the price in effect at the time of shipment, but in no case will the quoted prices be adjusted upward more than per cent.~~

The prices of any auxiliary equipment including electrical equipment obtained from suppliers shall be adjusted upward or downward to the price in effect at the time of shipment from the manufacturer.

SHIPMENT:

The equipment described above to be shipped in **Nine Weeks.**

from date of receipt of order and full information at the Company's factory.
All shipping promises are subject to sale prior to date of acceptance.

Shipping commitment is contingent upon prompt receipt by the Company of any required information from Purchaser. Shipment is subject to strikes, labor difficulties, casualties, accidents, governmental regulations, ability to obtain materials and qualified labor to the extent needed to fill the Company's orders, and causes beyond its control. The Company reserves the right to ship any portion of any unit of the equipment as soon as it is completed, and the Purchaser shall then make pro rata payments therefor in accordance with the terms of payment. The Purchaser agrees that the equipment shall be at the risk of Purchaser from and after the delivery by the Company on board cars at the point of shipment.

ERECTION:

The equipment shall be transported, installed on the foundation and connected at the Purchaser's expense. The Purchaser shall furnish all labor, supplies, and facilities for such installation and erection. The equipment being of intricate design and its erection requiring special technical skill, the Company agrees that upon request of the Purchaser the Company will furnish a supervising engineer to direct for the Purchaser the installation, erection and starting of the equipment for which the Purchaser will pay the following: \$5.00. regular rate per hour for each eight (8) hour day; one and one half times the regular hourly rate for any time in excess of eight (8) hours per day or forty (40) hours per week and for Sundays and holidays. Living and traveling expenses and traveling time will be charged from the time the supervising engineer leaves the Works of the Company until he returns thereto, or other equivalent starting point. Traveling time will be charged for eight (8) hours only during any one day and at the regular rate.

WARRANTY:

The Company warrants equipment of its manufacture for one year from date of shipment against defects in material or workmanship caused by the Company; its obligation to be limited to repair or replacement of defective parts upon return thereof f.o.b. the Company's factory within the period aforesaid. Equipment made by other manufacturers shall carry their standard warranty. There are no warranties, express or implied, other than as herein stated.

HORSEPOWER AND FUEL CONSUMPTION GUARANTEES:

All Company engines are sold on a definite horsepower and fuel consumption guarantee. All engines are factory tested. Since there are so many unknown values in any

test made in the field, the certified factory test will be considered by both the Purchaser and the Company as being conclusive. The Purchaser may have a representative present when this factory test is run if arranged at time the order is placed. The horsepower referred to in Specifications means the horsepower at the engine crankshaft.

IMPROVEMENTS:

While the Company reserves the right where possible to include changes in design or material which are improvements, it cannot be responsible for including improvements effected after beginning of production on Purchaser's equipment.

INSURANCE:

Whenever the Company deems such action advisable it may insure its interest in the equipment to the extent of the amount unpaid, against fire, tornado and other perils, and in that case Purchaser shall reimburse the Company for the premiums paid therefor.

TITLE:

Title to the equipment shall remain in the Company until the entire purchase price, whether represented by notes, open account, or otherwise, shall have been paid in cash. In the event of Purchaser's default in payment of any amount due hereunder, or its receivership or bankruptcy, or if Purchaser removes the equipment or transfers its interest in it, or if any lien be placed thereon or if it be seized on any writ or process of law, all deferred installments shall, at the Company's option, become immediately due and payable without notice, and without demand the Company may enter the premises wherein the equipment is located, take possession of and remove the same with or without legal process and retain all payments previously made as compensation for use or reduction in value thereof, or the Company may resell it at public or private sale, and in the case of public sale, the Company or any other person may purchase the same and from the proceeds pay the retaking, repairing, storing, selling expenses and attorney's fees and apply the remaining amount to the balance Purchaser owes the Company and the Company may recover any resulting deficiency from Purchaser as liquidated damages or otherwise, provided, however, that no remedy given herein shall be applicable where not permitted by law. So far as permitted by law, the rights and remedies given the Company hereunder are cumulative and not exclusive. However, in any state in which the retention of both the right to repossess the equipment and to collect any remaining balance will cause this contract to be construed as a chattel mortgage, the company shall have the right to elect one or the other of these remedies but not both.

On request of the Company (a) Purchaser will execute and deliver a supplemental contract to identify the equipment and its location and to set forth any changes in price or terms; (b) Purchaser will execute and deliver to the Company a chattel mortgage on the equipment, whereupon, on the filing of said mortgage, title to the equipment shall pass to the purchaser subject to the mortgage; (c) Purchaser will co-operate with

THE COOPER-BESSEMER CORPORATION

the Company in every reasonable way in order that the requirements of applicable conditional sale and chattel mortgage laws will be complied with.

In no event shall the Company be liable for anticipated profits, consequential damages or loss of use of the equipment or of any installation into which the equipment may be put.

This agreement constitutes all the understandings of the Company and of the Purchaser with respect to the equipment covered hereby and Purchaser acknowledges that no representations, warranties, or agreements have been made which are not expressly included herein. Substantial compliance with the Specifications shall be deemed sufficient. If Purchaser's orders contain provisions inconsistent with the Company's proposal, the proposal shall prevail. The contract shall be governed by the laws of the State of Ohio.

This quotation is subject to change or prior sale of equipment until approved by our Home Office at Mount Vernon, Ohio. If acceptable to you, please sign two copies of this quotation below and return them to us. Upon approval at our Home Office, the contract will be in effect. One copy will then be returned to you.

THE COOPER-BESSEMER CORPORATION

By

(COMPANY REPRESENTATIVE)

C. L. McDougall

February 20, 1954

This proposal is hereby accepted and agreed

to this day of 19

(PURCHASER)

By

(TITLE OF EXECUTIVE)

This proposal approved at

(CITY AND STATE)

This day of 19

THE COOPER-BESSEMER CORPORATION

By

(TITLE OF EXECUTIVE)

THE FOLLOWING STANDARD EQUIPMENT IS INCLUDED IN THE CONTRACT PRICE:

- (1) Full-flow lube oil filter in series with full-flow strainer.
- (2) Lube oil cooler.
- (3) Built-in lube oil pump.
- (4) Oil-cooled power pistons.
- (5) Full-force feed lubrication to power and compressor cylinders.
- (6) Governor — oil relay, hand adjustable, variable speed.
- (7) Ignition wiring for single ignition system.
- (8) Magneto or battery ignition.
- (9) Automatic air starting valves and quick opening main air valve.
- (10) Automatic fuel gas type shutdown for:
 - (a) High jacket water temperature
 - (b) Low lube oil pressure
 - (c) Overspeed
- (11) Gaugeboard for tachometer, (if ordered) pyrometer and pressure gauge mounting.
- (12) Pyrometer and individual cylinder thermocouples with complete wiring.
- (13) Dial-type fuel gas throttle valve.
- (14) Access stairs, platforms, and walkways on both sides of engine where required.
- (15) Spare parts books and operator's instruction manuals.
- (16) Special wrenches, foundation bolts and drawings.
- (17) Four (4) days erection supervision by Cooper-Bessemer erecting engineer. All living and traveling expenses extra.

THE FOLLOWING SPECIAL EQUIPMENT IS INCLUDED IN THE CONTRACT PRICE:

- (1) Built-in, on engine, jacket water pump.
- (2) Governor Motor with positioner (Woodward PG Type).
- (3) Ross Model 1012-CP Jacket Water Heat Exchanger.
- (4) Jacket Water Surge Tank.
- (5) Vortex Model LB27-12 oil bath type air filter.
- (6) Fluor Model DSBA Size 5-7 air cooled exhaust muffler without interconnecting piping between primary and secondary chambers or companion flanges.
- (7) Low fire hazard ignition.
- (8) Standard flywheel guard.
- (9) Combination fuel gas shut off vent valve.
- (10) Freight from Mount Vernon, Ohio to El Paso.

THE COOPER-BESSEMER CORPORATION

THE FOLLOWING SPECIAL EQUIPMENT IS NOT INCLUDED IN THE CONTRACT PRICE BUT CAN BE FURNISHED AT THE PRICES SHOWN:

TACHOMETERS

(a) Mechanical	-----	\$150.00
(b) Mechanical with clutch	-----	204.00
(c) Mechanical with clutch and revolution counter	-----	300.00
(d) Electrical	-----	300.00

UNLOADERS

Two - Hand operated, fixed volume unloaders - one on each first stage unloader @ \$200.00 each	-----	\$400.00
One - Hand operated, fixed volume unloader on second stage cylinder	-----	200.00

EXHAUST SILENCER PIPING

Interconnecting piping between primary and secondary chambers --\$11.00/Ft.

THE COOPER-BESSEMER CORPORATION

THE FOLLOWING SPECIFICATIONS COVER COMPRESSOR CYLINDERS
INCLUDED IN THE CONTRACT PRICE:

Class CH-105

Number Two

Diameter 21-1/2

Diameter range of class 19-1/2 in. to 23 in.

Design working pressure 100 PSI

Hydrostatic test pressure 150 PSI

Single acting or double acting Double Acting

Piston rod diameter 2-1/4 in.

Maximum rod load Compression 35000 lbs.
Tension 25000 lbs.

Number of valves Suction 4, Discharge 4

Size of valves Suction 6, Discharge 6

Flange connections Size 12, Type WN, Series 15

Weight of cylinder 6700 lbs.

Materials of construction Body Meehanite
Liner Meehanite
Heads Meehanite

Unloading facilities Clearance Pocket No
Suction valve lifters No

Remarks:

THE COOPER-BESSEMER CORPORATION

THE FOLLOWING SPECIFICATIONS COVER COMPRESSOR CYLINDERS
INCLUDED IN THE CONTRACT PRICE:

Class CE-105

Number One

Diameter 13-1/2

Diameter range of class 11 in. to 13-1/2 in.

Design working pressure 600 PSI

Hydrostatic test pressure 900 PSI

Single acting or double acting Double Acting

Piston rod diameter 2-1/4 in.

Maximum rod load Compression 35000 lbs.
Tension 25000 lbs.

Number of valves Suction 4, Discharge 4

Size of valves Suction 4, Discharge 4

Flange connections Size 8, Type WN, Series 40

Weight of cylinder 4900 lbs.

Materials of construction Body Meehanite
Liner Meehanite
Heads Meehanite

Unloading facilities Clearance Pocket No
Suction valve lifters No

Remarks:

ENGINEERING DATA

GENERAL:

	3750' Altitude	Sea Level
BHP	397	440
BMEP	63.0	69.6
RPM	400	400

COOLING SYSTEM:

Heat rejected to engine jackets, BTU/BHP/HR	2900
Heat rejected to compressor cylinder jackets, BTU/BHP/HR	130
Capacity of engine jackets — gallons	108
Pressure drop through engine jackets:	
GPM circulated	250
Press. Drop, ft. water	8.7
Recommended water inlet temperature	155
Maximum temperature differential across engine jackets	170
With radiator cooling, max. permissible outlet temp.	180
GPM jacket water to circulate	$\frac{\text{BHP} \times \text{BTU/BHP/HR.}}{500 \times \text{Temp. Differential}}$

LUBRICATING OIL SYSTEM:

Heat rejected to lube oil, BTU/BHP/HR	680
Capacity of sump — gallons	95
Capacity of pump — GPM @ rated engine speed	100
Oil pressure — PSI	25-30
Preferred oil outlet or sump temperature	160

Temperature of oil from engine should be at least 5°F. cooler than temperature of jacket water from engine.

FOUNDATION:

Minimum cu yds.	32
-------------------------	----

FUEL GAS SYSTEM:

Fuel consumption effective BTU/BHP/HR @ full load and sea level 6400

Fuel pressure, PSIG — approximately 10-15

Engine will start on fuel gas pressure of approximately 5 PSIG

It is recommended to have a fuel gas volume tank of about 8 cu. ft. minimum capacity in fuel gas line and near as possible to engine.

STARTING SYSTEM:

Normal starting air pressure 150

Cu. ft. free air/start (20 revolutions) 100

Tank Capacity, cu. ft./one start 12

PRINCIPAL DIMENSIONS:

Bore and stroke — inches 9-1/4 x 10-1/2

Main bearing — thrust — dia. x length, inches 8 x 3-7/8

Main bearing — all others — dia. x length, inches 7-1/2 x 5-1/4

Crank pin — compressor rod — dia. x length, inches 3-3/4 x 6

Crank pin — power rod — dia. x length, inches 3-3/4 x 7-1/2

Piston pin — engine — dia. x length, inches 4-1/2 x 10-7/8

Crosshead pin — dia. x length, inches 10-1/2

Compressor stroke — inches 16

Center to center, compressor cylinder throws — inches 16

PIPE CONNECTIONS, DIAMETER INCHES:

Starting Air	3-1/4	Water Inlet	3
Exhaust	10	Water Outlet	4
Fuel Gas	2	Water Pump Inlet	4
L. O. Inlet	3	Water Pump Outlet	3
L. O. Outlet	2	Scavenging Air Inlet	20

Above sizes are those on engine and should not necessarily be taken as recommended pipe size for respective systems.

DESIGN DATA FOR SHELL AND TUBE HEAT TRANSFER EQUIPMENT

SERVICE Jacket Water

ORDER NO.

DUTY BTU/HR. 1,637,000

MFR. Ross

T.P. NO.

PERFORMANCE DATA

	SHELL	TUBES
FLUID	Water	Water
QUANTITIES	73 GPM	164 GPM
DENSITY OR GRAVITY AT 60°F.	Treated	Raw
AVERAGE MOLECULAR WEIGHT		
VISCOSITY		
VISCOSITY		
LIQUID EVAPORATED		
VAPOR CONDENSED		
TEMPERATURE °F.	IN 170 OUT 125	IN 80 OUT 100
DESIGN TEMPERATURE °F.		
INLET PRESSURE LBS./SQ. IN. GA.		
DESIGN PRESSURE LBS./SQ. IN. GA.	75	75
COMPUTED PRESSURE DROP LBS./SQ. IN.	6	3-1/2
MAX. ALLOWABLE PRESSURE DROP LBS./SQ. IN.		
NOZZLE SIZES, INCHES	IN 3 OUT 3	IN 1/2 OUT 1/2
NOZZLE RATINGS AND FACINGS	ASA Flanged	ASA Flanged
CONFINED GASKETS REQUIRED		
STRESS RELIEF REQUIRED		
TOTAL OUTSIDE TUBE SURFACE FT.	774	
CORRECTED LMTD	53.9 F.	
	h_i $r_f(1)$	h_o U_f
		ALL BASED ON OUTSIDE TUBE SURFACE

REVISIONS

CONSTRUCTION

SETTING	NO. OF UNITS One	PARALLEL	SERIES
TUBES	OD 3 1/4" BWG. #16	INCHES LONG 12' - 0"	LAYOUT 15/16 Tri.
BUNDLE WEIGHT EMPTY	UNIT WEIGHT EMPTY	CROSS BAFFLE SPACING, IN.	
NO. SHELL PASSES One	NO. TUBE PASSES Two	CROSS BAFFLE AREA, IN.	
LENGTH OF UNIT 13' - 2-3/4"	NO. OF TUBES 74	SHELL I.D., IN.	

PART	MATERIAL	TK. IN.	CORR. ALL.	PART	MATERIAL
SHELL	Steel			TUBES	Admiralty
SHELL COVER				BOLTING	SPEC
CHANNEL	Cast Iron			GASKETS	SPEC
CHAN. COVER				CHAN. COVER	
FLOAT. HEAD				CHAN-FIXED T.S.	
FLOAT. T.S.	Muntz			SHELL FIXED T.S.	
FIXED T.S.	Muntz			SHELL COVER	
BAFFLES	Brass			FLOATING HEAD	

NOTES

- (1) UNITS 1
BTU/SQ. FT. x HR. x °F.
- (2) MAX. ALLOW. SALT WATER VELOCITY IN TUBES FT/SEC.
- (3) HOLES IN BAFFLES SHALL BE INCHES LARGER IN DIAMETER THAN TUBE O.D.

SHOP TEST PRESSURE*

SHELL 150
TUBES 150

*Max. test pressure the maximum
allowable pressure (new code)
including the corrosion
allowance

APPROVED

DESIGN DATA FOR

FLOW DIAGRAM NO. E-

FOR

AT

DESIGN DATA FOR SHELL AND TUBE HEAT TRANSFER EQUIPMENT

SERVICE Lube Oil Cooler

ORDER NO.

DUTY BTU/HR. 300,000

MFR. Ross

P. NO.

PERFORMANCE DATA

	SHELL	TUBES
FLUID	Lube Oil	Water
QUANTITIES	100	73
DENSITY OR GRAVITY AT 60°F.		
AVERAGE MOLECULAR WEIGHT	SAE 40	Treated
VISCOSITY		
VISCOSITY		
LIQUID EVAPORATED		
VAPOR CONDENSED		
TEMPERATURE °F.	IN 160 OUT 144	IN 125 OUT 133.2
DESIGN TEMPERATURE °F.		
INLET PRESSURE LBS./SQ. IN. GA.		
DESIGN PRESSURE LBS./SQ. IN. GA.	75	75
COMPUTED PRESSURE DROP LBS./SQ. IN.	9	1
MAX. ALLOWABLE PRESSURE DROP LBS./SQ. IN.		
NOZZLE SIZES, INCHES	IN 1/2 OUT 1/2	IN 1/2 OUT 1/2
NOZZLE RATINGS AND FACINGS	ASA Flanged	ASA Flanged
CONFINED GASKETS REQUIRED		
STRESS RELIEF REQUIRED		
TOTAL OUTSIDE TUBE SURFACE FT. 254	h_i	h_o
CORRECTED LMTD 22.9	$r_f(1)$	U_f
		ALL BASED ON OUTSIDE TUBE SURFACE

REVISIONS

CONSTRUCTION

SETTING	NO. OF UNITS One	PARALLEL	SERIES
TUBES	OD 3/4" BWG. #16	INCHES LONG 11	LAYOUT 15/16 Tri.
BUNDLE WEIGHT EMPTY	UNIT WEIGHT EMPTY	CROSS BAFFLE SPACING, IN.	
NO. SHELL PASSES One	NO. TUBE PASSES Two	CROSS BAFFLE AREA, IN.	
LENGTH OF UNIT 12' - 3-3/4"	NO. OF TUBES 118	SHELL I.D., IN.	

PART	MATERIAL	TK. IN.	CORR. ALL.	PART	MATERIAL
SHELL	Steel			TUBES	Admiralty
SHELL COVER				BOLTING	SPEC
CHANNEL	Cast Iron			GASKETS	SPEC
CHAN. COVER				CHAN. COVER	
FLOAT. HEAD				CHAN-FIXED T.S.	
FLOAT. T.S.	Muntz			SHELL FIXED T.S.	
FIXED T.S.	Muntz			SHELL COVER	
BAFFLES	Brass			FLOATING HEAD	

NOTES

- (1) UNITS $\frac{BTU}{SQ. FT. \times HR. \times ^\circ F.}$
- (2) MAX. ALLOW. SALT-WATER VELOCITY IN TUBES _____ FT/SEC
- (3) HOLES IN BAFFLES SHALL BE _____ INCHES LARGER IN DIAMETER THAN TUBE O.D.

SHOP TEST PRESSURE*

SHELL	150
TUBES	150

*Must be 1.5 times the maximum allowable pressure (new, cold) including the corrosion allowance.

APPROVED

DESIGN DATA FOR

FLOW DIAGRAM NO. E-

FOR

AT

GAS COMPRESSOR & INTERNAL COMBUSTION ENGINE DATA SHEET

THIS SHEET IS PART OF SPECIFICATION
FILE NO. EP 102-2
FOR OPERATING CONDITIONS SEE DWG. NO. 1250

FOR STARTING AIR EQUIPMENT SEE DWG. NO. 1250

DESIGNATION & SERVICE		MANUFACTURER		MODEL		MFR'S. SERIAL NOS.		YEAR BUILT		INSTRUCTION MANUAL NO.	
DRAWINGS: OUTLINE		FOUNDATION		PIPEING LAYOUT		C. COOLING SYSTEM DETAILS		EQUIPMENT NO.		K-504	
A. COMPRESSOR DETAILS 1. REQUIRED HORSEPOWER <u>1400</u> 2. SPEED <u>1750</u> 3. 1ST STAGE - NO. OF CYLINDERS & BORE <u>2-3 1/4</u> 4. PISTON DISPLACEMENT <u>17.55</u> 5. CAPACITY AT INTAKE CONDITIONS <u>2176</u> 6. VOLUMETRIC EFFICIENCY <u>1.62</u> 7. CLEARANCE <u>1.13</u> 8. 2ND STAGE - NO. OF CYLINDERS & BORE <u>1-1 1/2</u> 9. PISTON DISPLACEMENT <u>6.46</u> 10. CAPACITY AT INTAKE CONDITIONS <u>414</u> 11. VOLUMETRIC EFFICIENCY <u>1.50</u> 12. CLEARANCE <u>1.13</u> 13. 3RD STAGE - NO. OF CYLINDERS & BORE <u>1-1 1/2</u> 14. PISTON DISPLACEMENT <u>6.46</u> 15. CAPACITY AT INTAKE CONDITIONS <u>414</u> 16. VOLUMETRIC EFFICIENCY <u>1.50</u> 17. CLEARANCE <u>1.13</u> 18. STROKE <u>10</u> 19. RENEWABLE CYL. LINER MAT'L. IF ANY <u>Yes</u> 20. STUFFING BOX VENTED - (YES - NO) <u>Yes</u> 21. STUFFING BOX WATER COOLED (YES - NO) <u>Yes</u> 22. TYPE AND PACKING <u>Details in Appendix</u> 23. TYPE CYLINDER LUBRICATION <u>Details in Appendix</u> 24. TYPE VALVES <u>Details in Appendix</u> 25. MAX. ALLOWABLE DISCHARGE PRESSURE <u>PSIG</u> 26. MAX. ALLOWABLE DIFFERENTIAL PRESSURE <u>PSIG</u>											
B. ENGINE DETAILS 1. TYPE <u>CCW</u> 2. HORSEPOWER <u>1400</u> 3. SPEED <u>1750</u> 4. CYCLES <u>2</u> 5. ROTATION FACING END OPPOSITE FLYWHEEL (CW - CCW) <u>CCW</u> 6. CYLINDER ARRANGEMENT <u>2-3 1/4"</u> 7. NO. OF CYLINDERS & BORE <u>10"</u> 8. STROKE <u>10"</u> 9. BHP <u>PSI</u> 10. RENEWABLE CYLINDER LINER MATERIAL IF ANY <u>None</u> 11. TYPE CYLINDER LUBRICATION <u>None</u> 12. FUEL CONSUMPTION FULL LOAD <u>STD. GPH</u> 13. TYPE GOVERNOR <u>None</u> 14. RANGE OF SPEED VARIATION - % RATED SPEED <u>None</u> 15. HIGH - LOW TENSION LOW FIRE HAZARD (IGNITION SYSTEM (YES-NO) <u>None</u> 16. WATER COOLED EXHAUST MANIFOLD (YES-NO) <u>None</u> 17. SPEED AT WHICH SHUT OFF OCCURS <u>None</u> 18. OIL PRESSURE AT WHICH SHUT OFF OCCURS <u>None</u>											
E. MISCELLANEOUS 1. PRICE EACH FOB. FAS <u>\$</u> 2. TOTAL WEIGHT NET. EACH UNIT <u>LB.</u> 3. TOTAL WEIGHT GROSS. EACH UNIT <u>LB.</u> 4. TOTAL BOXED VOLUME. EACH UNIT <u>CU. FT.</u> 5. WEIGHT OF HEAVIEST PIECE WHICH MIGHT HAVE TO BE LIFTED BY OVERHEAD CRANE <u>LB.</u> 6. SHIPMENT - WEEKS AFTER RECEIPT OF ORDER <u>7 weeks</u>											
*OPERATING LIMITATION - DO NOT CHANGE BEFORE CONSULTING DESIGNS ENGINEER											

GAS COMPRESSOR & INTERNAL COMBUSTION ENGINE DATA SHEET

THIS SHEET IS PART OF SPECIFICATION FILE NO. E-619

FOR OPERATING CONDITIONS SEE DWG. NO.

FOR STARTING AIR EQUIPMENT SEE DWG. NO.

MANUFACTURER: COPPER-BESSEMER MODEL: CHX-9-TF

FR'S. SERIAL NOS.

INSTRUCTION MANUAL NO.

YEAR BUILT 1951

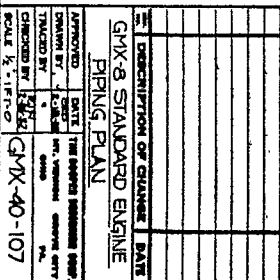
PIPING LAYOUT

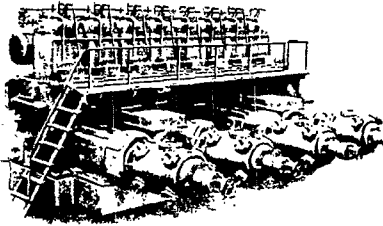
A. COMPRESSOR DETAILS		EQUIPMENT NO.	K501
1. REQUIRED HORSEPOWER			140
2. SPEED		RPM	100
3. 1ST STAGE - NO. OF CYLINDERS & BORE			2-2 1/2
4. PISTON DISPLACEMENT		CFH	1755
5. CAPACITY AT INTAKE CONDITIONS		CFH	2176
6. VOLUMETRIC EFFICIENCY		%	62
7. CLEARANCE			13.5
8. 2ND STAGE - NO. OF CYLINDERS & BORE			1-1 1/2
9. PISTON DISPLACEMENT		CFH	686
10. CAPACITY AT INTAKE CONDITIONS		CFH	1118
11. VOLUMETRIC EFFICIENCY		%	60.8
12. CLEARANCE			13.8
13. 3RD STAGE - NO. OF CYLINDERS & BORE			
14. PISTON DISPLACEMENT		CFH	
15. CAPACITY AT INTAKE CONDITIONS		CFH	
16. VOLUMETRIC EFFICIENCY		%	
17. CLEARANCE			
18. STROKE		IN.	10 1/2
19. RENEWABLE CYL. LINER MAT'L. IF ANY			C.I.
20. STUFFING BOX VENTED - (YES - NO)			Yes
21. STUFFING BOX WATER COOLED (YES - NO)			Yes
22. TYPE AND PACKING			Metallic
23. TYPE CYLINDER LUBRICATION			Mechanical
24. TYPE VALVES			Plate
25. MAX. ALLOWABLE DISCHARGE PRESSURE		PSIG	100
26. MAX. ALLOWABLE DIFFERENTIAL PRESSURE		PSIG	80
B. ENGINE DETAILS			
1. TYPE			CHX-9-TF
2. HORSEPOWER		BHP	140
3. SPEED		RPM	100
4. CYCLES			2
5. ROTATION FACING END OPPOSITE FLYWHEEL (CW - CCW)			CCW
6. CYLINDER ARRANGEMENT			8-2-1/4
7. NO. OF CYLINDERS & BORE			14, 10 1/2
8. STROKE		IN.	10 1/2
9. BHP		PSI	69.6
10. RENEWABLE CYLINDER LINER MATERIAL IF ANY			None
11. TYPE CYLINDER LUBRICATION			Mechanical
12. FUEL CONSUMPTION FULL LOAD		STD. CFH	3600
13. TYPE GOVERNOR			Mechanical
14. RANGE OF SPEED VARIATION - % RATED SPEED			100% to 60% Rated
15. (HIGH - LOW) TENSION LOW FIRE HAZARD (LIMITATION SYSTEM) (YES-NO)			Low-Yes
16. WATER COOLED EXHAUST MANIFOLD (YES-NO)			Yes
17. SPEED AT WHICH SHUT OFF OCCURS		RPM	As Desired
18. OIL PRESSURE AT WHICH SHUT OFF OCCURS		PSIG	10# approx.

*OPERATING LIMITATION - DO NOT CHANGE BEFORE CONSULTING DESIGNS ENGINEER

REVISIONS	APPROVALS	PLANT	GAS RECOVERY PLANT STANDARD OIL CO. OF TEXAS EL PASO, TEXAS	PD-10092-0

EF-177 (300-00 - F-44)





CLARK
®

CLARK BROS. CO.

DIVISION OF DRESSER OPERATIONS, INC.

ENGINES and COMPRESSORS

OLEAN · NEW YORK

ADDRESS REPLY TO P.O. BOX 4563, HOUSTON 13, TEXAS
February 9, 1954

Standard Oil Company of Texas
P. O. Box 862
El Paso, Texas

Attention: Mr. A. V. Winther

QR - Specification
EP-103-K
Compressor Gas Recovery
Plant

Gentlemen:

We wish to acknowledge and thank you for your inquiry of February 5, 1954 covering one gas engine driven compressor unit for your specification as above.

We wish to advise that we will prepare our quotation as promptly as possible and try to have it in your possession on or before February 23, 1954.

Should you have any requirements in the meantime, please let us know.

Yours very truly,

CLARK BROS. CO.

F. H. Hayes
District Manager

FHHayes
DPA:pmp
Dup.

Ingersoll-Rand Company

ESTABLISHED 1871



POST OFFICE BOX 941

2100 WYOMING STREET

EL PASO, TEXAS

February 9, 1954

ATT: Mr. A. V. Winther

SUB: QR - Specification KP-103K
Compressor Gas Recovery Plant
Our Reference KP-6149

Standard Oil Company of Texas
P. O. Box No. 862
El Paso, Texas

Gentlemen:

We wish to acknowledge and thank you for your letter of February 5, requesting a quotation on a Natural-Gas-Engine-Driven Compressor for the above service.

We will submit quotation on or before February 23, 1954, as requested.

Yours very truly,

INGERSOLL-RAND COMPANY

R.J.Benson
HH

ALL AGREEMENTS CONTINGENT UPON STRIKES, ACCIDENTS AND OTHER CONDITIONS BEYOND OUR CONTROL.
ALL CONTRACTS ARE SUBJECT TO APPROVAL BY AN OFFICER OF THE COMPANY. QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

PRINTED IN U. S. A.

Chevron BB
013406

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

February 11, 1954

The Cooper-Bessemer Corporation
Box 1928
Odessa, Texas

Attention: Mr. C. L. McDougall

CR - Specification EP-103-K
Compressor Gas Recovery Plant

Gentlemen:

In compliance with your telephone call to our
Mr. Olson today, we enclose herewith one copy of our Form
EP-177, Engine Data Sheet, blank.

Very truly yours,

A. V. WINTHER

By _____

/s/

Attachment:
EP-177

Joe Evidently Hunter has
failed to send the Blank
Odessa, for I attached it
with Hunter letter

MEMORANDUM GO-144

TO

J. Olsen c/o J. E. Hayden

7/1/4

195

FROM

Ref Eng Dept

SUBJECT:

On. Clarke Compressor

OUR FILE

H. S. Recovery Plant

YOUR FILE

Letter does not show 2F18 Tube Heat
Transfer Equipment data sheet being sent.
How ever these were included and 2
copies were ~~included~~ sent to Clarke
attached to letter.

J. E. Hagler
J. Olson
Ref my last

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

February 5, 1954

**The Cooper-Bessmer Corporation
8705 Danville Street
Houston, Texas**

**QR - Specification IP-103-K
Compressor Gas Recovery Plant**

Gentlemen:

Please furnish us with a quotation and supporting descriptive and engineering data, all in triplicate, covering one (1) compressor assembly, as per attached Specifications and Data Sheets.

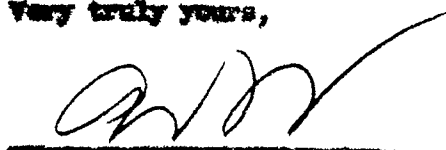
Be sure to answer, complete, Paragraph 7 of Specification IP-103-K.

Delivery date is of paramount importance; therefore, you should quote the best possible delivery in El Paso, Texas, and have quotation in our possession by February 23, 1954.

In the event further information is required, contact us by telephone and we will arrange for our engineer, Mr. J. Olson, to provide any additional information required.

Please acknowledge receipt of this quotation request letter, giving indication that you are processing.

Very truly yours,



AVW:sm

Attachments:

- 1 - copy Specification IP-103-K, (Ditto Form)
- 2 - copy NF18 Data for Heat Transfer Equipment (Sepia Transparency)
- 1 - copy Engine Data Sheet PD-10092-9 (Blue Line)
- 1 - copy NF177 - Blank - Engine Data Sheet (White Transparency)

**SAME LETTER TO:
Ingersoll Rand Company
P.O. Box 941
El Paso, Texas**

STANDARD OIL COMPANY OF TEXAS

P. O. BOX 862

EL PASO, TEXAS

cc: J. E. Hayden -2

PURCHASING DIVISION

A. V. WINTHER
ASSISTANT TO THE VICE PRESIDENT

February 5, 1954

Clark Bros. Company
P. O. Box 4563
Houston 13, Texas

Attention: Mr. F. E. Hayes, District Manager

QR - Specification HP-103-K
Compressor Gas Recovery Plant

Gentlemen:

Please furnish us with a quotation and supporting descriptive and engineering data all in triplicate covering one (1) compressor assembly, as per attached Specifications and Data Sheets.

Paragraph 7 of Specification HP-103-K shall be answered in full.

Delivery date is of paramount importance; therefore, you should quote the best possible delivery in El Paso, Texas.

Quotation shall be in our possession by February 23, 1954.

As of possible assistance to you, the assembly is similar to existing equipment and is to be come a part thereof. Existing units were furnished us as part of an entire Recovery Plant Assembly by Catalytic Construction Company, Philadelphia, Pennsylvania, their purchase order SOTEX-1405-1 in either 1951 or 1952.

In the event further information is required, either telegraph or telephone and we will arrange for our engineer, Mr. J. Olsen, to provide any additional information required.

Please acknowledge receipt of this quotation request letter, giving indication that you are processing.

Very truly yours,



AVW:sm

Attachments:

2 copies Specification HP-103-K, Sepia Transparency
2 copies Data Sheet HP-103-K-2, Blue Line
1 copy Data Sheet HP-177-Blank, White Transparency

Chevron BB
013410

MEMORANDUM

February 5, 1954

Compressor Plant Expansion
1954
Gas Recovery Plant
El Paso Refinery

MR. A. V. WINTHER:

Attached are six copies each of Specification No. EP-103-K, Compressor Data Sheet, PD 10092, EP-177 and EP-18, which gives the requirements for the new gas compressor to be installed in the Gas Recovery Plant.

Please obtain quotations for this compressor in accordance with the attached specification and drawings described above. We suggest that the following be included among those invited to quote:

Clark Brothers Co., Inc.
Ingersoll-Rand Co.
Cooper-Bessmer Corp.

Please ask that quotations be in our hands not later than February 23, 1954. They should include all the information requested in Paragraph 7 of the attached specification.

J. E. HAYDEN

JKO:dp
attachments as listed

SPECIFICATION NO. EP-103-K

INTERNAL COMBUSTION ENGINE DRIVEN

RECIPROCATING GAS COMPRESSOR, K504

EL PASO REFINERY

STANDARD OIL COMPANY OF TEXAS

1.0 SCOPE

- 1.1 This specification covers furnishing one internal combustion engine driven two stage reciprocating gas compressor, K504, to meet the requirements and operating conditions set forth herein, including the attached Data Sheet, FD-10092, which also forms a part of this specification. A blank data sheet, EP-177, is also attached which shall be completely filled out by the Supplier and prints returned with Supplier's bid.
- 1.2 When the order is placed, a blank Data Sheet will accompany the order which shall be filled out completely describing the engine as actually furnished, and the tracing returned to the Purchaser. This is known as the FINAL DATA SHEET and is kept in the permanent equipment records.
- 1.3 Primarily, quotations are desired on the Manufacturer's standard engines and accessories. If the material or features requested by the Purchaser are not standard, the Supplier shall enter as an extra item the cost of furnishing them.
- 1.4 If an extra is shown for an item it shall mean the extra cost for this feature over the cost shown by Item E-1 of the Data Sheet. If no extras are shown, the cost under Item E-1 will be considered as the final or total cost of the engine with all the features and material as requested by the Purchaser.
- 1.5 Where there is insufficient room on the Data Sheet for the required Data, a reference number may be entered and the corresponding data presented in full on a separate sheet.

2.0 GENERAL DESIGN & SPECIAL EQUIPMENT

- 2.1 Compressors shall be designed in accordance with the latest practice and for use over extended periods of continuous full load service. The gas engines shall be of the vertical or vee type, two or four cycle, heavy duty type, with completely enclosed running gear, directly connected to the gas compressor cylinders. Units shall be furnished with standard equipment, unless specifically excepted herein. Cylinder arrangement and sizes will be approved by the Purchaser.
- 2.2 When more than one stage of compression is required the arrangement of the compressor cylinders shall be such that each compressor

2.2 (cont'd)

carries a proportionate part of the load of each stage so that in the event of failure of any engine the quantities in each stage will be reduced by approximately the same percentage.

- 2.3 All exposed moving parts which might be considered as hazards to personnel safety shall be equipped with suitable safety guards.
- 2.4 Each engine shall be equipped with one oil bath type air filter, Vortex or equal, one backfire relief valve, and one exhaust silencer, Fluor Air Cooled type or equal.
- 2.5 Dust tight covers shall be provided to protect any exposed moving part where an accumulation of sand or dust would be harmful.
- 2.6 The Supplier shall furnish one set of all special tools that are necessary to install or service the unit.
- 2.7 All V-belts operating auxiliary equipment such as the jacket water circulating pump, shall be anti-static and explosion proof.

3.0 LUBRICATION

- 3.1 All bearings shall be lubricated by oil under pressure, the oil being picked up in the crank case by a positive displacement pump and forced through an oil cooler and filter to remove all particles of dust, dirt, and foreign matter before being distributed to the bearings. Provision shall also be made for positive lubrication of the cam shaft driving gears and valve tappets. Separate forced feed Lubricators shall be provided for the compressor cylinders and rods. Compressors shall be complete with all necessary oil lubricating piping.
- 3.2 Unless otherwise stated on the Data Sheet, separate forced feed lubricators complete with piping shall be provided to inject lubricating oil directly into the gas streams at a point in the suction lines just ahead of the valve chambers.

4.0 AUTOMATIC SHUT DOWN DEVICES

- 4.1 The lubrication system shall be protected by a shut-down device which shall cut out the ignition system to stop the engine in case of low oil pressure.
- 4.2 An overspeed safety stop shall be provided to insure against overspeeding the engine.
- 4.3 An automatic shut-down device shall also be provided to stop the engine in case of excessive jacket water temperatures.
- 4.4 Unless otherwise stated on the Data Sheet, an automatic device shall also be provided which will sound an alarm before stopping the engine in case of excessive jacket water temperatures.

5.0 INSPECTION & TESTING

5.1 The engines and compressors shall be given a performance test before shipment. This test shall consist of operating units at full load for a continuous period of not less than 12 hours. Fuel to the engines during test shall be gas of any composition available at the manufacturer's plant.

The Purchaser's inspector will follow the progress of the work through the manufacturer's shops, expedite work where required and make sure that the machines are completed as scheduled. In addition, the compressors shall be operated at least one hour to the satisfaction of the Purchaser's inspector.

6.0 OPERATING CONDITIONS AND PERFORMANCE

The design of the compressor shall be such that it will operate and perform efficiently under the conditions listed below:

	<u>1st Stage</u>	<u>2nd Stage</u>
Capacity - MSCFD	2550	1770
Suction Pressure, PSIA	13	49.8
Suction Temperature °F.	100	100
Discharge Pressure, PSIA	54.8	212.8
Discharge Temperature, °F.	205	215
Compression Ratio	4.22	4.27
"N" Valve, Ratio C_p/C_v	1.15	1.15
Composition - lbs./hr. - Hydrocarbon	12,510	7325
- Steam	390	75
Molecular Weight - Hydrocarbon	41.7	33.4
Molecular Weight - Steam	18.0	18.0
Total	40.1	33.1

Barometric Pressure - 12.8 psia

7.0 INFORMATION REQUIRED FROM BIDDERS

Quotations shall be submitted in triplicate to be in our hands not later than February 23, 1954, including the following:

- 7.1 Net Prices, f.o.b. El Paso, Texas for compressor and auxiliary equipment.
- 7.2 Earliest possible delivery stated in weeks after receipt of order.
- 7.3 Three prints of Data Sheet, MFL77, covering Gas Compressor and Internal Combustion Engine completely filled out by Bidder.

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Engineering Department
February 3, 1954
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- 7.4 Three prints of heat exchanger Data Sheet, DF 18, covering jacket water and oil coolers, completely filled out by Bidder.
- 7.5 Three prints of preliminary outline dimension drawings for all equipment and foundation bolt locations, if possible.
- 7.6 Manufacturer's catalogue number and descriptive literature for all major components.