1905/11
PWD

D

(Formerly)

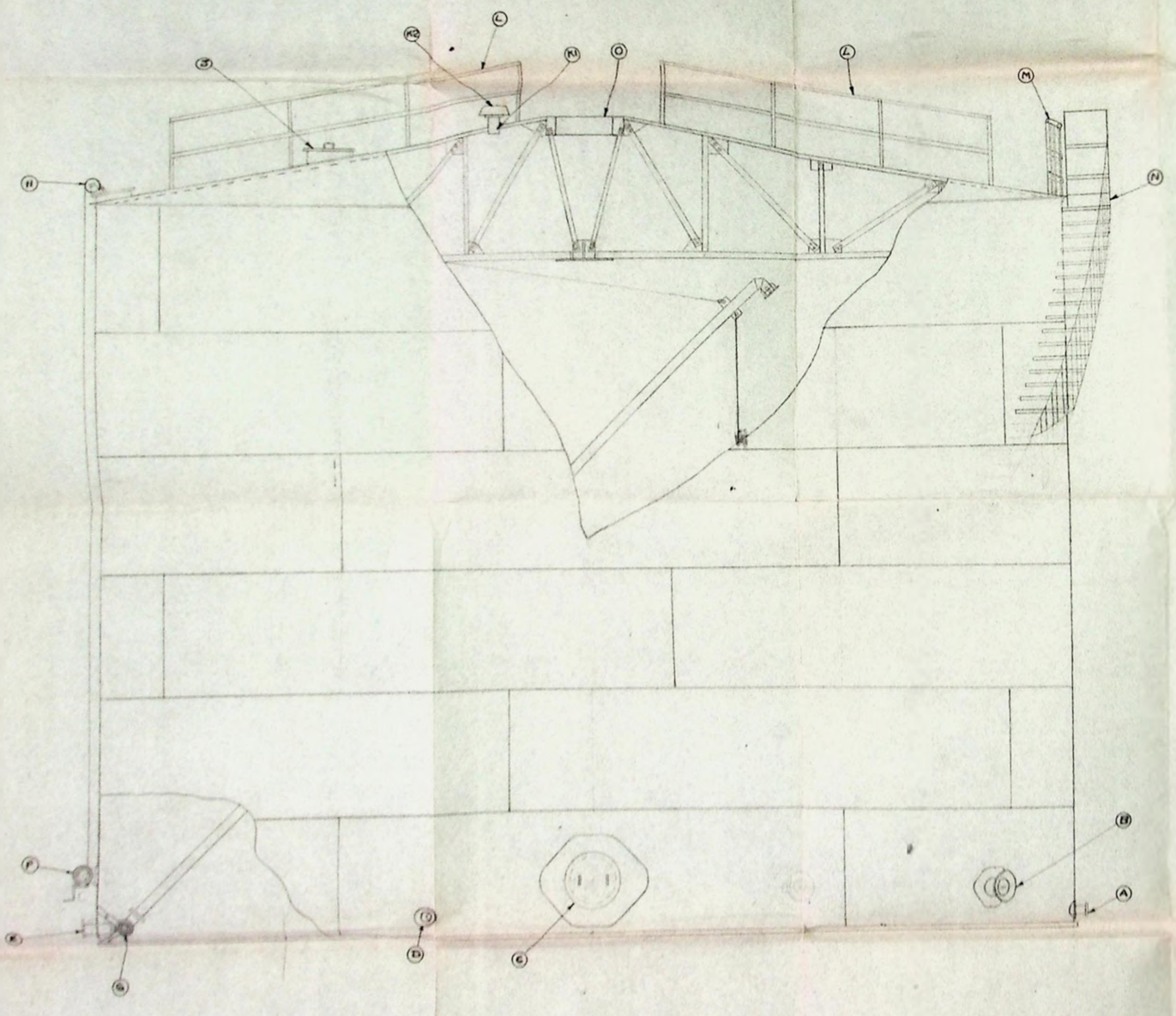
1905/11	1905/11

CONSTRUCTION OF ADDITIONAL OIL STORAGE TANK STANLEY.

CONNECTED FILES.

NUMBER	
1905/A	Site for new Storage Tank
1905/B	Oil Tanks - Agreement for Construction.
1905/C	" " Passage for welder.
1905/D	" " Invoices
1905/E	" " Delivery arrangements.
0014	Supply of Petrol, Paraffin, oil etc.

ON HER MAJESTY'S SERVICE.



MARK	N° OFF	DESCRIPTION	DRG N°	ELEVATION ABOVE TANK BOTTOM
A	1	4" DIA. DRAW OFF AND SUMP	AP2/2, AP3/2, AP4/2	3"
B	2	12" DIA. SHELL NOZZLES	AP9/1	1'-6"
C	1	24" DIA. SHELL MANHOLE	AP23/1A	2'-6"
D	1	6" DIA. SHELL NOZZLE	AP6/1	11"
E	1	6" DIA. DOUBLE FLANGED STOOL		11"
F	1	2,500# STANDARD CUT GEAR TYPE WINCH	26472	3'-6"
G	1	SWING JOINT	26473	
H	1	TOP SHEAVE ASSEMBLY		
J	1	24" DIA. ROOF MANHOLE	AP27/1	
K1	1	6" DIA. ROOF NOZZLE	AP26/2	
K2	1	COMBINED DIP & VENT	S/25324	
L	1	HANDRAILING ACROSS ROOF	26476	
M	1	HANDRAILING AROUND ROOF	26477	
N	1	SPIRAL STAIRWAY	26471	
O		FIXED TRUSSED ROOF	26474	

Note

ORIENTATION OF TANK FITTINGS TO BE DETERMINED BY THE PURCHASER

WEIGHT OF TANK EMPTY = 49 TONS (Approx)

WEIGHT OF TANK FULL (WATER) = 1817 TONS (Approx)

THE MOTHERWELL BRIDGE & ENG. COY. LTD.

PURCHASER	CROWN AGENTS
CONTRACT	2-MS. TANKS 48'-0" DIA x 36'-0" HIGH WITH FIXED TRUSSED ROOFS
TITLE	GENERAL ARRANGEMENT OF TANK
PURCHASERS ORDER No.	

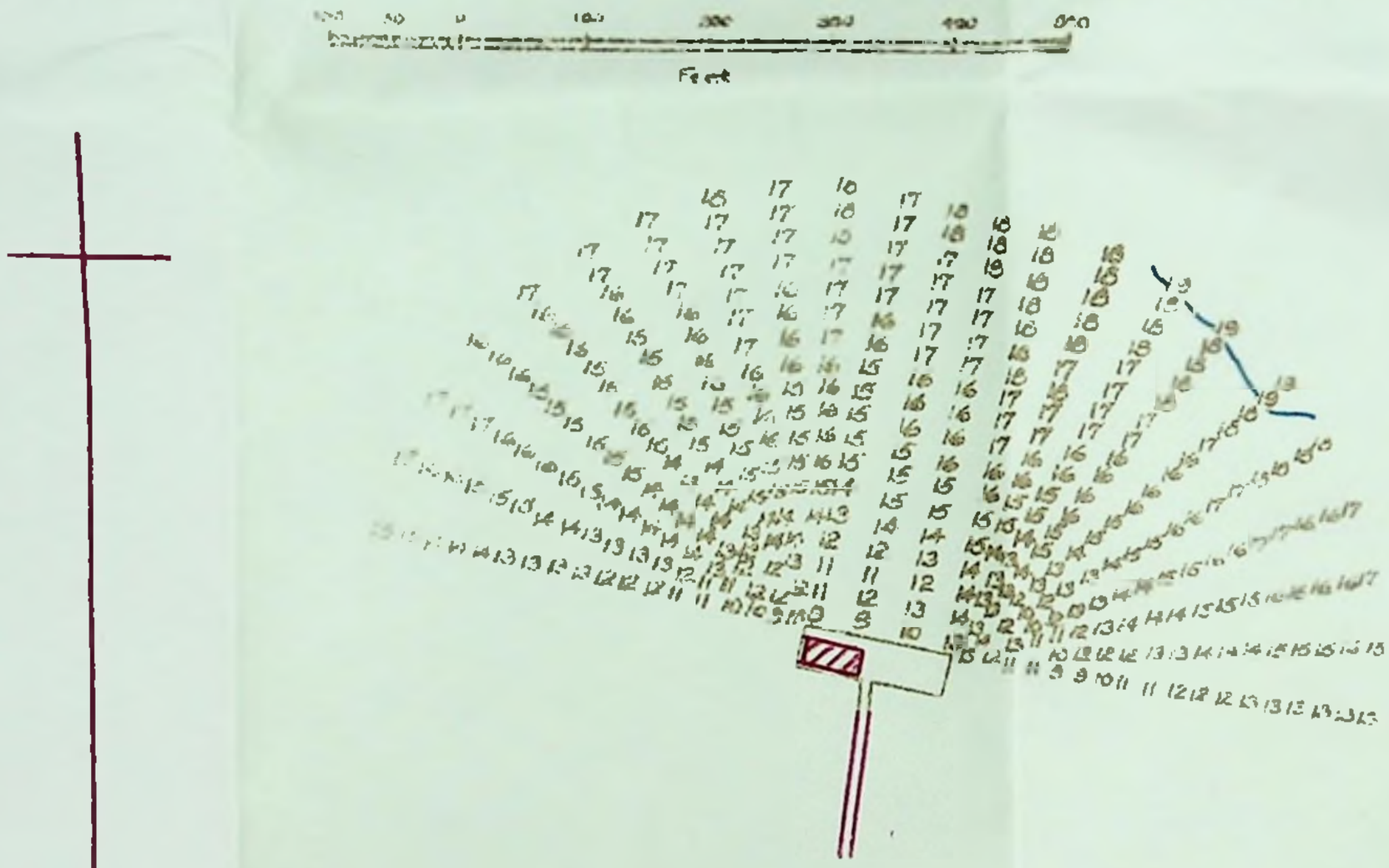
JOB No.	A2050	DRAWING No.	26494
DRAWN BY	T. Wilson	20-3-62	
CHECKED BY			
HLE No.			
SCALE	1/4" = 1 Foot		
REVISIONS			

REVISION	
DATE	
ALTERED BY	
CHECKED BY	

ON HER MAJESTY'S SERVICE.

Govt. Tetty.

Tracing showing Soundings obtained at the request of the Governor.



Port Stanley

GOVERNMENT JETTY

Tracing showing soundings obtained at the request of the Governor of the Falkland Islands

R.R.S. JOHN BISCOE

23rd and 30th April, 1963

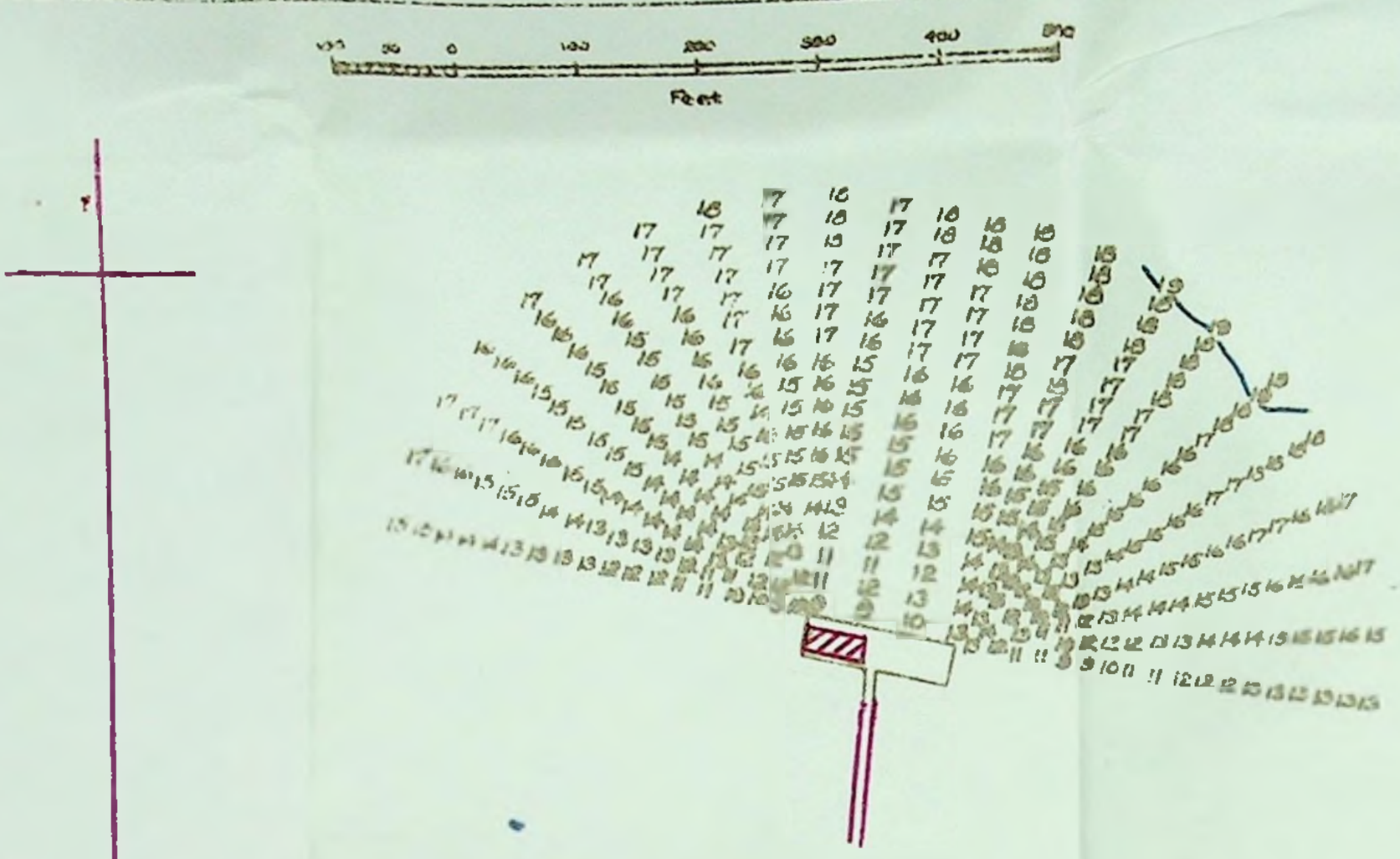
Soundings in Feet

Reduced to 22·20 feet below a benchmark on the north west corner of the P.W.D. carpenters shop

Natural Scale $\frac{1}{2,500}$

J. B. [illegible]

Lieut.-Cmdr. R.N.



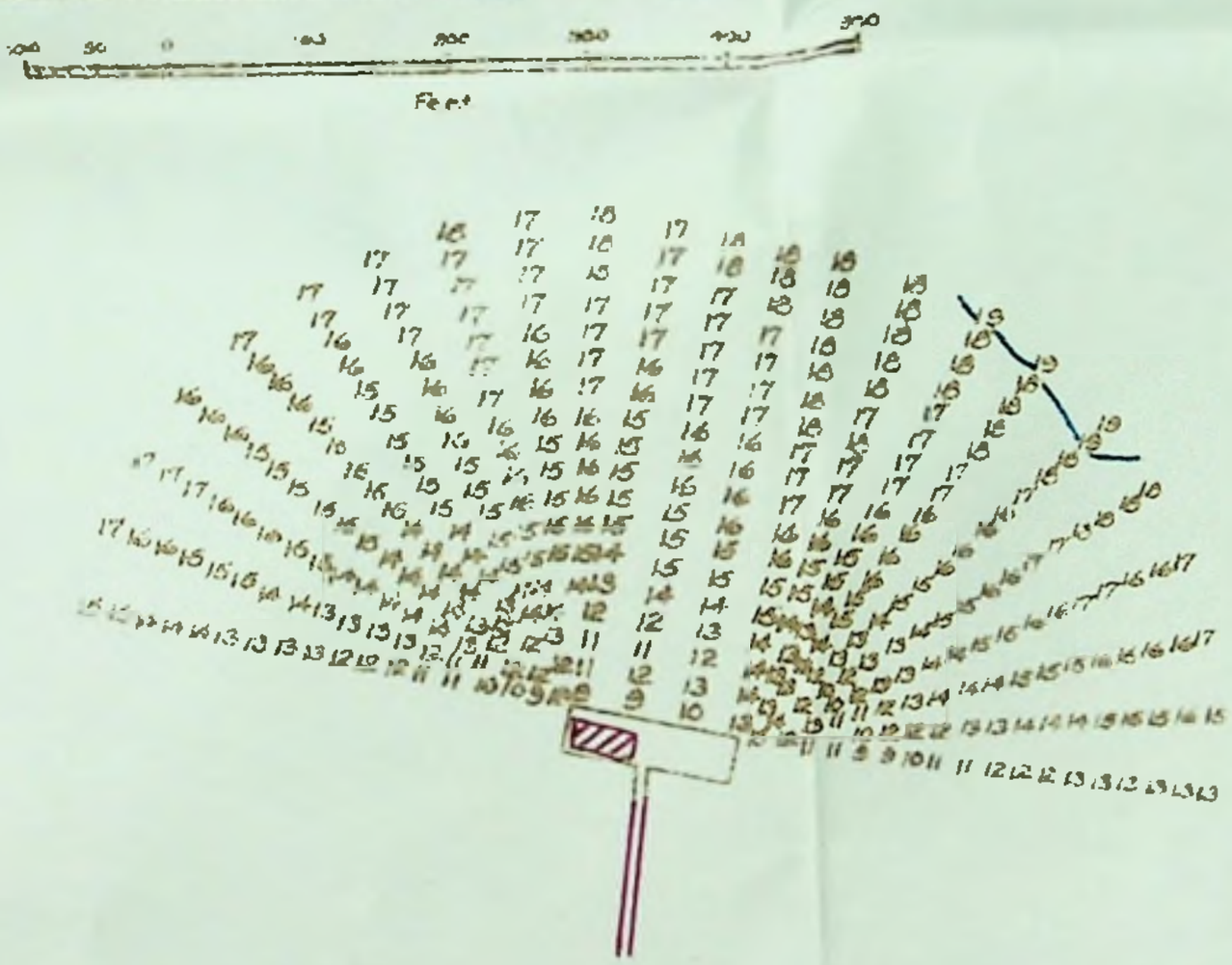
Port Stanley

GOVERNMENT JETTY

Tracing showing soundings obtained at the request of
the Governor of the Falkland Islands
R.R.S. JOHN BISCOE
29th and 30th April, 1963
Soundings in Feet
Reduced to 22·20 feet below a benchmark on the
north west corner of the P.W.D. carpenters shop
Natural Scale $\frac{1}{2,500}$

J. B. Bunbury

Lieut - Cmdr, R.N.



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Lieut-Cmdr, R.N.

167

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS

[redacted] extension 324
McClure " 525

Abbey 7730

4, MILLBANK,
WESTMINSTER,
LONDON, S.W.1.

2nd Oct. 1962

Dear Sir Edwin,

I enclose a record I made (for our office use) of the meeting yesterday and should be very grateful if you would let me know whether there is anything I have got wrong or missed out. I attach a second copy in case you want to keep one, perhaps the simplest thing would be to ask you to return a corrected copy.

I take it that given agreement with the Admiralty, you prefer the site at Camber to that alongside the existing Power Station Tanks? We reason I ask is that the C.R. Sec's letter specifically asks for our comment on the relative merits of these two alternatives. Are the houses at Stanley subject to any special hazards, eg built of wood, or with thatch or shingle roofs?

I understand that there isn't much fire risk with fuel oil but there is always some risk whereas at Camber there is none at all. On the other hand there are the extra lightering costs across the harbour.

You may like to speak on the telephone if you have time. I shall be in office tomorrow but McClure will be (if he can get here!)

Yours sincerely,

H. P. Hawtrey

Note on Meeting at Admiralty Building, West Brompton on 1st October, 1962 attended by Sir Edwin Arrowsmith, Governor of Falkland Islands and myself.

In the Chair - Mr. A. Fairley, Senior Surveyor of Lands, Admiralty.
About 6 other representatives of Admiralty were present.

The proposal is to transfer oil from tanker with R.N. lighter, which would pump the oil into the tankage. The Navy have two tanks at Camber, on a site some distance west of the jetty, and at this site there is space left for two additional tanks within the protective bund. They offered this space to the Governor as an alternative to the site NE of the root of the mole as shown on Drawing enclosed with Colonial Secretary's letter. The Navy receive oil once a year.

The Governor said that their requirements amount to about 600 tons/year. They would have two tanks, one for the Colony's use (Power Station) and one for the John Biscoe, though both tanks would contain the same oil and they would probably draw for both uses from one tank, keeping the other as a year's reserve. Additionally there could be 500 to 600 tons reserve at the Power Station tankage at Stanley.

The Navy showed themselves agreeable to come to terms though when the Governor talked of free storage they reminded him that any agreement would have to be approved by Treasury who would expect to see a 'quid pro quo' in the form of concessions by Government. Fairley said that these should be equated to the value of what the Navy would be giving Colony, e.g. use of jetty say 1/10 of economic rent plus amortisation, plus say 1/10 maintenance cost which might be put at £200 - £300 per year, cost of water supplied if any, share of cost of caretaker etc.

Governor said that the Colony had hitherto relied on drawing supplies in South Georgia but Salvesen and Albion Star have both notified that Colony should not rely on supply from there in future. Direct supply to Falkland would save transport mileage.

(a) First thing was to decide whether tanks should be sited at Camber (Navy agree to Colony using any site at Camber). Governor hopes to get (a) agreed by Legco in November.

(b) Next, as Colony would use Admiralty facilities free of charge, the former would concede to the Admiralty the right to draw on Colony oil in emergency.

Once this was agreed with a formal document, Colony hope to erect tanks in March or April with Norwegian labour.

Governor and Admiralty decided that as correspondence via C.O. would be too slow, they would correspond via Crown Agents.

Other Departments being asked whether they had any observation, Mr. Pollock, Oil adviser to Admiralty said he had prepared some notes regarding construction of tanks which he gave me for typing.

Answering a question by Mr. Fairley, H.E. said delivery to fuelling point at Camber would include lighter charge. As for subsequent lightering across to Stanley, the Falkland Islands Company were due to submit proposals. Present cost of oil delivered Falklands is about £15 per ton.

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

EC.36/25

TELEGRAMS (INLAND: "CROWN, SOWEST, LONDON."
OVERSEA: "CROWN, LONDON."
TELEPHONE: ABBEY 7730
TELEX NO. 24209

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS

4. MILLBANK.
LONDON. S.W.1.

10th October, 1962

Dear Sir,

Oil Storage Tanks and Pipeline, Stanley

With reference to your letter No. 1905 dated 18th August, 1962, the siting of the new oil storage tanks has been discussed with the Admiralty and with H.E. the Governor who attended a meeting at the Admiralty on 1st October.

A report with our recommendations will be sent to you shortly, but in the meantime we enclose for your information :-

(a) some notes on oil storage tanks by Mr. Pollock, Oil Adviser to the Admiralty,

(b) a copy of each of Parts 1 and 2 of B.S.2654: Welded Storage Tanks,

(c) a General Arrangement Drawing of the tanks as proposed by the Motherwell Bridge & Engineering Co. Ltd.

It will be seen from (a) and (b) that it is recommended that some changes be made in the tank draw-off and clean-out sump, and this matter is being taken up with the manufacturers. The chief reason, however, why we are sending you these notes, etc. is that if you accept Mr. Pollock's recommendations and set the tanks on the bitumen-sand foundation, you will possibly wish to order suitable bitumen now.

The cost of the British Standard, 27/6d., is being debited to your account.

Yours faithfully,

for the Crown Agents

The Colonial Secretary,
Stanley,
Falkland Islands,
South Atlantic.

ALM/EB

Note by Mr.Pollock, Oil Adviser to Admiralty.

Referring to Falkland Islands Savingram No.124 and accompanying drawings, there are some technical points on which I would comment, these being

(i) It is stated that a flowmeter is necessary to measure the volume of oil received and discharged. An accurate flowmeter would be a convenience but it is by no means necessary in this instance as tanks of 1500 tons capacity can be dipped with sufficient accuracy for this purpose provided that the tanks are properly calibrated on erection.

(ii) The tank layout drawing appears to show a 6" concrete slab foundation enclosed by a 12" x 24" retaining wall apparently touching the tank shell plates. It is recommended that a standard foundation with a bitumen-sand carpet be used instead, as this provides best protection against corrosion of the bottom plates. This type of foundation is recommended in B.S.2654: Part 1:1956 and illustrated in Fig.18. It is suggested that Colonial Office should forward a copy of this publication to Falklands for guidance.

(iii) The same publication shows, in Fig.10, a combined water draw-off and clean-out sump and it is recommended that this be fitted to facilitate tank cleaning and drainage, and that a 4" sluice valve be fitted to its cover plate instead of the standard plug in order to facilitate emptying the tank below loss of swing arm suction for tank cleaning purposes; a 4" valved branch on the 6" main between the tanks would enable a portable pump and flexible hoses to be used for transferring bottoms to the other tank.

(iv) The tank drain should not discharge direct to sea, where it could cause oil pollution but to the tank area drain leading to an oil-water separator preferably located immediately outside the tank bund and discharging to sea; a valve fitted to the drain pipe passing through the bund would be fitted to close the outlet in case of oil flooding due to tank damage.

(v) A retaining wall 12" x 24" is shown surrounding the tanks. Its volumetric capacity, including that of the tanks up to the 2 ft. level, is of the order of 256 tons, which is inadequate. The minimum requirement in U.K. would be the capacity of one tank + 10%, i.e. 1650 tons, equal to 64,500 cubic feet. The enclosed area, with a 5 ft high bund, therefore would be 200 ft. 65 ft. equivalent. The bund itself may be of earth construction (as for Tanks Nos. land 2) or a concrete wall. Details of a suitable API oil/water separator can be provided on request.

The area within the bunds and around the tanks need not be surfaced or paved but a concrete drain channel surrounding each tank mound should continue to a small sump at the inlet of the drain through the bund, the purpose of which is to intercept sand gravel etc. which otherwise would choke the drain pipe or foul the separator.

BRITISH STANDARD 2654 : Part 1 : 1956

VERTICAL MILD STEEL WELDED STORAGE TANKS WITH BUTT-WELDED SHELLS FOR THE PETROLEUM INDUSTRY

PART 1
DESIGN AND FABRICATION

BRITISH STANDARDS INSTITUTION

BRITISH STANDARD SPECIFICATION

VERTICAL MILD STEEL WELDED STORAGE TANKS WITH BUTT-WELDED SHELLS FOR THE PETROLEUM INDUSTRY

PART 1. DESIGN AND FABRICATION

B.S. 2654 : Part 1 : 1956

Price 15/- net

BRITISH STANDARDS INSTITUTION

INCORPORATED BY ROYAL CHARTER

BRITISH STANDARDS HOUSE, 2 PARK ST., LONDON, W.1

TELEGRAMS: STANDARDS, AUDLEY, LONDON TELEPHONE: MAYFAIR 9000

THIS BRITISH STANDARD, having been approved by the Petroleum Equipment Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 20th February, 1956.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 2500, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook, price 12s. 6d.

This standard makes reference to the following British Standards:—

B.S. 13. Structural steel for shipbuilding.
B.S. 15. Structural steel.
B.S. 639. Covered electrodes for the metal-arc welding of mild steel.
B.S. 1133. Packaging Code.
B.S. 1501–6. Steels for use in the chemical, petroleum and allied industries.
B.S. 1560. Steel pipe flanges and flanged fittings for the petroleum industry.
B.S. 1750. Bolting for the petroleum industry.
*B.S. - - - - . Notch ductile steel plates and sections (suitable for welded construction).

and to the following specifications of the American Petroleum Institute (obtainable through the British Standards Institution):—

API Std. 5–L. Line pipe.
API Std. 12–C. Welded oil storage tanks.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

* In course of preparation.

The following B.S.I. references relate to the work on this standard:
Committee reference PEE/12. Draft for comment CO(PEE) 8960.

CONTENTS

CO-OPERATING ORGANIZATIONS

The Petroleum Equipment Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government department and scientific and industrial organizations:—

*Council of British Manufacturers of Petroleum Equipment

*Engineering Equipment Users' Association

Institute of Petroleum

Ministry of Fuel and Power

*Oil Companies' Materials Committee.

The industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the Committee entrusted with the preparation of this British Standard:—

Association of British Chemical Manufacturers

British Chemical Plant Manufacturers' Association

British Electrical and Allied Manufacturers' Association

British Iron and Steel Federation

Institute of Welding

Tank and Industrial Plant Association.

BRITISH STANDARD SPECIFICATION FOR

VERTICAL MILD STEEL WELDED STORAGE TANKS, WITH BUTT-WELDED SHELLS, FOR THE PETROLEUM INDUSTRY

PART 1. DESIGN AND FABRICATION

FOREWORD

This British Standard, prepared under the authority of the Petroleum Equipment Industry Standards Committee, is designed to provide the petroleum industry with tanks of adequate safety, reasonable economy and in a range of suitable capacities.

In the further interests of economy, supply and uniformity of practice it is strongly recommended that the sizes of plates used for tanks of all capacities shall be limited to three (Clause 4). The standard tank sizes which result from the adoption of this proposal are given in Tables 1 to 8.

This part of the standard deals with design and fabrication of tanks; Part 2 will deal with site erection, inspection and testing.

SPECIFICATION

SECTION ONE : GENERAL

SCOPE

1. This British Standard relates to the materials, design and fabrication of vertical mild steel cylindrical welded tanks for the petroleum industry, for erection above ground, of the following designs:—

a. Non-pressure fixed roof tanks (all sizes).

b. Pressure fixed roof tanks (up to 128 ft diameter only).

c. Open-top tanks (all sizes).

This standard specifies the use only of butt-welded shells and includes reference to mountings, stairways and handrailings.

This standard does not include the design and construction of floating roofs.

NOTE. Attention is drawn to Appendix F which tabulates the information to be supplied by the purchaser on alternatives permitted by this British Standard.

DESIGN CONDITIONS

2. *a. Non-pressure tanks* shall be suitable for working at atmospheric pressure, but designed for an internal pressure of 3 in. water gauge and a vacuum as specified for shells in Clause 14 *f* and for roofs in Clause 26 (see also Clause 15).

b. Pressure tanks shall be designed for an internal pressure of 8 in. water gauge and 2½ in. water gauge vacuum (see Clauses 15 and 26).

c. Tanks may be designed in accordance with this specification to withstand higher pressure and/or vacuum conditions, provided the allowable stresses given in this standard are not exceeded.

STANDARD TANK SIZES

3. Standard ranges of tank sizes based on the plate sizes specified in Clause 4 are given in the following tables:—

Type A (Maximum plate width 6·00 ft)
- Table 1 Capacity in cubic feet
- Table 2 Capacity in cubic metres
- Table 3 Shell plate thicknesses
- Table 4 Heights in feet.

Type B (Maximum plate width 7·25 ft)
- Table 5 Capacity in cubic feet
- Table 6 Capacity in cubic metres
- Table 7 Shell plate thicknesses
- Table 8 Heights in feet.

NOTE. Tables of equivalent capacity in U.S. barrels and imperial gallons are given in Appendices A, B, C and D.

In Tables 1 to 8 a maximum diameter of 200 ft and a maximum height of nine courses are given. These values may be exceeded provided the maximum shell plate thickness does not exceed 1½ in.

STANDARD PLATE SIZES

4. *a. General.* The standard plate sizes, which form the basis of the standard tank sizes and heights in Tables 1 to 8, are given below:

Thickness	Length	Width	
		Type A	Type B
Inches	Feet	Feet	Feet
3/16 or ¼	15·7 (5 π ft)	5·00	5·00
¼ up to but excluding ⅜	25·13 (8 π ft)	6·00	6·00
⅜ and over	25·13 (8 π ft)	6·00	7·25

The above plate sizes may be modified by agreement between the purchaser and the manufacturer.

b. Rolling margins. Unless otherwise agreed between purchaser and manufacturer, no plate shall be under the specified thickness at any part, nor shall it exceed the calculated weight by more than the appropriate rolling weight tolerance as shown in the following table:—

SCHEDULE OF PERCENTAGE ROLLING WEIGHT TOLERANCES FOR SHELL PLATES

Ordered thickness	Widths								
	Under 48 in.	48 in. to under 60 in.	60 in. to under 72 in.	72 in. to under 84 in.	84 in. to under 96 in.	96 in. to under 108 in.	108 in. to under 120 in.	120 in. to under 132 in.	132 in. and over
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
3/16 in. to under 1/4 in.	10	10	10	10	10	—	—	—	
1/4 in. to under 5/16 in.	5	5	5	7	9	12	12	—	
5/16 in. to under 3/8 in.	5	5	5	6	7·5	10	11	12	
3/8 in. to under 7/16 in.	5	5	5	6	6	8	9	11	15
7/16 in. to under 1/2 in.	5	5	5	5	6	7·5	8	9	12
1/2 in. to under 5/8 in.	5	5	5	5	6	6	7·5	9	10
5/8 in. to under 3/4 in.	5	5	5	5	5	5	7	8	9
3/4 in. to under 1 in.	5	5	5	5	5	5	6	7	8
1 in. to 1 1/2 in.	5	5	5	5	5	5	5	6	7

CODING

5. For easy reference to tank sizes and types in cables and correspondence, etc., a coding system for each size of tank is given below.

The code system consists of a letter prefix denoting the three designs of tanks as listed below:

a. Prefix.

Fixed roof tank, non-pressure = BNP
Fixed roof tank, pressure = BLP
Open-top tank = BOT

b. The above prefixes to be followed by a type symbol A or B denoting the maximum plate width adopted, see Clause 4 *a*, together with a number consisting of the diameter of the tank in feet and number of courses.

c. Examples.

Pressure roof, maximum plate width 6·00 ft 96 ft diameter four courses deep = BLPA 964.

Non-pressure roof, maximum plate width 7·25 ft 160 ft diameter eight courses deep = BNPB 1608.

Open-top, maximum plate width 6·00 ft 80 ft diameter six courses deep = BOTA 806.

SECTION TWO : MATERIALS

PLATES AND SECTIONS

6. The minimum requirements for the quality of the steel to be used for the bottom and shell plates, the roof plates and the rolled sections shall be as given below:

Roof plates:

B.S. 13*
or
B.S. 1501‡ — 101

Rolled sections:

B.S. 13
or
B.S. 15†

Shell and bottom plates:

Where service conditions exist in which special consideration must be given to the notch toughness of plates, agreement shall be reached between the purchaser and the manufacturer.

Recommended minimum requirements are given below:

Working conditions	Plate thickness	
For tanks built in *temperate§ and warm climates*	¾ inch and less	B.S. 13
	Over ¾ inch	B.S. . . . . ‖ Grade N.D. I
For tanks built in *very cold§ climates*	Less than ½ inch	B.S. 13
	½ inch up to and including ¾ inch	B.S. . . . . ‖ Grade N.D. I
	Over ¾ inch	B.S. . . . . ‖ Grade N.D. II

* B.S. 13. ' Structural steel for shipbuilding '.
† B.S. 15. ' Structural steel '.
‡ B.S. 1501–6. ' Steels for use in the chemical, petroleum and allied industries '.
§ In this context, the definition of ' temperate and warm climates ' and ' very cold climates ' are shown in Fig. 17.
‖ B.S. ....., ' Notch ductile steel plates and sections (suitable for welded construction) '. (In course of preparation.)

PIPING

7. All pipe used for the fabrication of mountings shall be in accordance with API Std. 5–L¶ except that the grades shall be limited to A or B and the steel shall be made by the open hearth process.

CAST STEEL MOUNTINGS

8. Where cast steel mountings are used they shall be in accordance with B.S. 1504–101‡ Grade A, suitable for welding.

STRUCTURAL BOLTS

9. Structural bolts shall be in accordance with B.S. 1750**, Part 3.

WELDING ELECTRODES

10. Welding electrodes shall be in accordance with B.S. 639††, Parts 1 and 2.

¶ API Std. 5–L. American Petroleum Institute Standard 5–L ' Line pipe ' (obtainable through the British Standards Institution).
** B.S. 1750. ' Bolting for the petroleum industry '.
†† B.S. 639. ' Covered electrodes for the metal-arc welding of mild steel '.

SECTION THREE : BOTTOM DESIGN

PLATE SIZES

11. Tanks up to and including 40 ft diameter shall be constructed from rectangular plates with sketch plates to the perimeter or may have an annular ring of segmental plates if so specified by the purchaser. The minimum thickness of the rectangular plates, the sketch plates and the segmental plates shall be ¼in. or 6·5 mm and the rectangular plates shall be the same size as shell plates of equal thickness.

All tanks greater than 40 ft diameter shall have an annular ring of segmental plates the minimum thickness of which is 5/16 in. or 8 mm. The minimum thickness of both the rectangular plates and the sketch plates shall be ¼ in. or 6·5 mm and the former shall be the same size as shell plates of equal thickness.

The overall diameter of tank bottoms shall be constant for the full range of tank heights for each diameter of tank. The minimum distance from the centre line of the shell plates to the outer edge of the bottom plates shall be in accordance with Fig. 1, details D–D and E–E.

DESIGN

12. All joints in rectangular and sketch plates shall be lapped. They shall be welded on the top side only with a full fillet weld, and with a minimum lap of five times the thickness of the plate, see Fig. 1, details C–C.

The rectangular plates and the sketch plates shall be lapped over the annular ring of segmental plates where these are used. They shall be welded on the top side only with a full fillet weld and the minimum lap shall be 2½ in. or 65 mm. See Fig. 1, details E–E.

At the ends of cross joints in rectangular plates and sketch plates where three thicknesses occur, the upper plate shall be hammered down and welded as indicated in Figs. 2a or 2b as a corrective measure if the upper plate overlaps the lower plate.

For tanks of 40 ft diameter and under, the ends of the joints in the sketch plates under the bottom course of shell plates shall be welded for a minimum distance of 6 in. or 150 mm as shown in Fig. 3a or 3b.

For tanks exceeding 40 ft diameter the radial seams

connecting the ends of the annular segmental plates shall be butt-welded with a backing strip the minimum thickness of which shall be 3⁄16 in. or 4·8 mm. An acceptable form of joint is shown in detail F–F on Fig. 4.

The attachment between the bottom edge of the lowest course of shell plates and the bottom sketch plate or annular plate shall be fillet welded continuously on both sides of the shell plate. The leg length of both fillet welds shall be equal to the thickness of the bottom plates (see Fig. 1, Sections D–D and E–E), except that they shall not exceed the sizes given below when the shell plate thickness is less than the bottom plate thickness:

Shell plate thickness	Size of fillet weld
in.	in.
3⁄16	1⁄4
1⁄4 and over	5⁄16

Where tanks are designed in accordance with Clause 2 *c*, special consideration shall be given to the limitation of uplift in the tank bottom.

Typical layouts for tank bottom plates are shown in Fig. 1, Sections A–A and B–B.

SECTION FOUR : SHELL DESIGN

WORKING STRESSES

13. The maximum allowable working stress, before applying the factor ' E ' for efficiency of joint, shall be 21 000 lb/sq.in.

In calculating the thickness of plate required the joint efficiency factor ' E ' shall be taken as 0·85 provided that no relaxation is permitted to the requirements of this specification with regard to the qualifications of procedures and operators, and the site inspection of shell joints as required by Part 2 of this standard (in course of preparation).

The thickness of shell plates shall not be less than 3⁄16 in. for tanks of 40 ft diameter or less and not less than 1⁄4 in. for tanks over 40 ft diameter. The maximum thickness of shell plates shall be 1 1⁄2 in.

INTERNAL LOADING

14. *a*. The forces in the tank shell shall be computed on the assumption that the tank is filled to the full height with water (specific gravity 1·00) weighing 62·288 lb per cubic foot at 62°F. The tension force in each course shall be computed at 1 ft above the centre line of the lower horizontal joint in question.

b. The following formula shall be used in calculating the minimum thickness of shell plates:—

$$t = 0{\cdot}0001456D\,(H-1).$$

where:

t = Calculated minimum thickness in inches.

H = Height, in feet, from bottom of course under consideration to the top of the roof curb angle.

D = Diameter of tank in feet.

The ordered thickness may be less than the calculated minimum thickness (t) by not more than 0·01 in. provided that no negative mill rolling tolerance is permitted (see Clause 4 *b*).

c. Where a tank is to contain a liquid of a specific gravity greater than 1·00, the thickness t obtained from the formula in *b*. above shall be multiplied by the specific gravity of the liquid.

d. Where a tank is to contain liquid having a specific gravity of less than 1·00, no diminution in plate thickness shall be allowed.

e. The formula given in Sub-clause *b*. above shall be deemed to include for an internal pressure up to 8 in. water gauge.

f. The formula given in Sub-clause *b*. above shall be deemed to include for a vacuum of 2 1⁄2 in. water gauge for all tanks up to and including 128 ft diameter and 1 in. water gauge vacuum for tanks over 128 ft diameter.

g. Where operating pressures and vacuum exceed those given in Sub-clauses *e*. and *f*. above the tank shell shall be specially designed for the stresses occasioned therefrom.

EXTERNAL LOADING

15. Where tanks are to be erected in areas known to be subject to high wind velocities, these tanks shall be specially considered by the purchaser and the manufacturer and, if required, appropriate stiffening agreed, to prevent failure by buckling when empty.

SHELL PLATE ARRANGEMENT

16. *a*. The tank shall be designed to have all courses truly vertical and the diameter on the centre line of each course shall be equal to the nominal diameter of the tank.

b. The distance between vertical joints in adjacent courses generally shall be not less than one-third of the plate length.

SHELL JOINTS

17. *a. General.* All seams shall be butt joints, welded from both sides of the plate. Acceptable forms of joints are shown in Fig. 5. Welding procedure which includes the form of joint employed shall be qualified in accordance with the requirements of Part 2 of this standard (in course of preparation).

b. Vertical joints. (i) All vertical butt joints shall have complete penetration through the full thickness of the parent plate.

(ii) Open gap square butt joints (see Fig. 5, detail 'A'), shall not be used for plate thicknesses exceeding 1⁄4 in. or 6·5 mm.

(iii) Single vee butt joints (see Fig. 5, detail ' B '), may be used for plate thicknesses 1⁄4 in. or 6·5 mm or over but shall not be used for plate thicknesses exceeding 1⁄2 in. or 12·7 mm.

(iv) Double vee butt joints (see Fig. 5, detail ' C '), or similar joints may be used for plate thicknesses exceeding 5/16 in. or 8 mm and shall be used for plate thicknesses exceeding ½ in. or 12·7 mm.

c. Horizontal joints. (i) Open gap square butt joints, which shall have full penetration throughout the thickness of the parent metal (see Fig. 5, detail ' E '), shall not be used where the thickness of the thinner plate exceeds 5/16 in. or 8·0 mm.

(ii) Single bevel butt joints, which shall have full penetration throughout the thickness of the parent metal (see Fig. 5, detail ' F ' or ' G '), may be used for plate thicknesses up to and including 5/16 in. or 8·0 mm and shall be used where the thickness of the thinner plate exceeds 5/16 in. or 8·0 mm and does not exceed ½ in. or 12·7 mm.

(iii) Double bevel butt joints (see Fig. 5, details ' H ', ' J ', ' K ' or ' L '), or similar joints may be used for plate thicknesses exceeding ¼ in. or 6·5 mm and shall be used for plate thicknesses exceeding ½ in. or 12·7 mm.

These joints may have either partial or full penetration at option of the purchaser who shall state his requirements clearly in this respect in his enquiry for tender. Where partial penetration is adopted the unwelded portion shall not exceed one-third of the thickness of the thinner plate, and shall be located at the centre of the thinner plate (see Fig. 5, detail ' K ').

ROOF CURB ANGLE

18. Tank shells shall be provided with top curb angles of suitable dimensions as specified in Section Five, Clause 30, and shall be attached to the upper edge of the shell plate by a continuous double welded square butt joint or continuous double fillet lap joint. The horizontal leg of the top angle may extend inside or outside the tank shell at the purchaser's option.

CIRCULAR SHELL OPENINGS

19. Openings in the shell of the tank over 2½ in. in diameter shall be compensated. The minimum cross-sectional area of the compensation shall be not less than the product of the vertical diameter of the hole cut in the tank shell and the thickness of the shell plate (100 per cent compensation). The cross-sectional area of the compensation shall be measured on the vertical axis coincident with the centre of the opening.

a. The compensation may be provided by any one, or by any combination of the following:—

(i) The attachment flange of the fitting.

(ii) The compensating plate.

(iii) The portion of the neck of the fitting which may be considered as compensation according to Sub-clause 19 *b* below.

b. The neck of a fitting may be considered as part of the area of compensation, as follows:—

(i) If the fitting is installed so that no part of it extends inward beyond the inner surface of the tank shell plate, that part of the neck lying within a length equal to four times the neck-wall thickness, measured outward from the outside surface of the shell plate, plus that part of the neck lying within the shell plate thickness, may be included as compensation.

(ii) If the fitting extends both outward and inward from the tank shell, that portion of the neck covered by (i) above may be included as compensation, and in addition, a corresponding length of neck measured inward from the inner surface of the shell plate may be included.

c. The aggregate strength of the weld attaching a fitting to the shell plate, or to an intervening compensating plate, or to both, shall equal at least the proportion of the forces, passing through the entire compensation, which is computed to pass through the fitting considered.

d. The aggregate strength of the welding attaching any intervening compensating plate to the shell plate shall at least equal the proportion of the forces passing through the entire compensation, that is computed to pass through the compensating plate considered.

e. The linear strength of fillet welds shall be computed on the product of their throat thickness (0·7 × leg length) and the working stresses given below:

(i) Side or shear fillets—5 tons/sq.in.

(ii) End or tension fillets—7 tons/sq.in.

Fillet welds inclined to the direction of principal loading shall be treated as side or shear fillets. The leg length of external fillets shall be not less than 75 per cent of the thinner plate joined and the leg length of internal fillets shall be not less than 5/16 in. or the thickness of the thinner plate joined, whichever is the less.

f. When two or more openings are located so close that their normal compensating plates would interfere, i.e. the toes of the fillet welds attaching the compensating plates will be closer than twice the thickness of the shell plate, they shall be treated and compensated as follows:—

(i) All such openings shall be included in a single compensating plate, which shall be proportioned for the largest opening in the group.

(ii) If the normal compensating plates for the smaller openings in the group considered separately would fall within the area limits of the solid portion of a normal plate for the largest opening, the smaller openings may be included in a normal plate for the largest opening without increase in size of that plate, provided, however, that if any opening intersects the vertical centre line of another, the total width of the final compensating plate along the vertical centre line of either opening shall be not less than the sum of the widths of the normal plates for the openings involved.

(iii) If the normal compensating plates for the smaller openings considered separately would not fall within the area limits of the solid portion of a normal plate for the largest opening, the group compensating plate size and shape shall be such as to include the outer limits of the normal compensating plates for all of the openings in the group. Change of size from the outer limits of the normal plate for the largest opening to the outer limits of that for the smaller opening farthest therefrom shall be by uniform straight taper unless the normal plate for any intermediate opening would extend beyond the limits so fixed, in which case uniform straight tapers shall join the outer limits of the several normal plates. Provisions of Sub-clause *f* (ii)

above with respect to openings on the same or adjacent vertical centre lines shall also apply in this case.

g. Compensation for non-circular openings shall be given special consideration.

WIND GIRDERS FOR OPEN-TOP TANKS

20. *a*. Open-top tanks shall be provided with stiffening rings to maintain roundness when the tank is subjected to wind loads. Stiffening rings shall be located at or near the top of the top course, and preferably on the outside of the tank shell.

b. The required minimum section modulus of the stiffening ring shall be determined by the equation:

$$Z = 0{\cdot}0001\ D^2H_2.$$

where Z = section modulus in inches.
D = nominal diameter of tank in feet.
H_2 = height of tank shell in feet, including any 'freeboard' provided above the maximum filling height as a guide for a floating roof.

c. The section modulus of the stiffening ring shall be based upon the properties of the applied members and may include a portion of the tank shell for a distance of 16 plate thicknesses below and, where applicable, above the ring shell attachment. When curb angles are attached to the top edge of the shell ring by butt welding, this distance shall be reduced by the width of the vertical leg of the angle.

Section moduli values for typical ring members are given in Fig. 6.

d. Stiffening rings may be made of either structural sections or formed plate sections, or sections built up by welding, or of combinations of such types of sections assembled by welding. The outer periphery of stiffening rings may be circular or polygonal.

e. The minimum size of angle for use alone, or as a component in a built-up stiffening ring, shall be 2½ in. × 2½ in. × ¼ in. The minimum nominal thickness of plate for use in formed or built-up stiffening rings shall be ¼ in.

f. When stiffening rings are located more than 2 ft below the top of the shell, the tank shall be provided with a 2½ in. × 2½ in. × $\frac{3}{16}$ in. top curb angle for $\frac{3}{16}$ in. shells and 3 in. × 3 in. × ¼ in. angle for ¼ in. shells, or other members of equivalent section modulus.

g. Rings which may trap liquids shall be provided with adequate drain holes.

h. Stiffening rings or portions thereof which are regularly used as a walkway, shall have a width of not less than 24 in. clear of the projecting curb angle on the top of the tank shell, shall be located preferably 3 ft 6 in. below the top of the curb angle, and shall be provided with handrailing on the otherwise unprotected side and at the ends of the section so used.

j. When a stair opening is installed through a stiffening ring, adequate compensation shall be provided to ensure that the section modulus at any section through the opening conforms to the requirements of Sub-clause *b*. above.

The shell adjacent to such opening shall be stiffened with an angle or bar placed horizontally. The other sides of the opening shall be stiffened with an angle or bar placed vertically. The cross-sectional area of these edge stiffeners shall be at least equivalent to the cross-sectional area of that portion of shell included in the section modulus calculation of the stiffening ring, Sub-clause *c*. above. These stiffeners, or additional members, shall furnish a suitable toe board around the opening. The stiffening members shall extend beyond the end of the opening for a distance equal to, or greater than, the minimum depth of the regular ring sections. The end stiffening members shall frame into the side stiffening members and shall be connected to them in such a manner as to develop their full strength.

k. Brackets shall be provided for all stiffening rings when the dimension of the horizontal leg or web exceeds 16 times the leg or web thickness. Such brackets shall be placed at intervals as required for the dead load and vertical live load that may be placed upon the ring. However, the spacing shall not exceed 24 times the width of the outside compression flange.

l. Isolated radial loads on tank shell, such as caused by heavy loads from platforms and elevated walkways between tanks, shall be distributed by rolled structural sections, plate ribs or built-up members.

m. Continuous welds shall be used for all joints which, because of their location might be subjected to corrosion from entrapped moisture. Full penetration butt welds shall be used for end-to-end joints in ring sections.

SECTION FIVE : FIXED ROOF DESIGN

FIXED ROOFS

21. Fixed roofs may be one of either of the following types at purchasers' option:—

a. *Self-supporting roof*. A roof structure such that the entire load is supported at the tank periphery. This type is recommended for both pressure and non-pressure tanks.

b. *Column-supported roof*. A roof having a column or columns transmitting the roof load to the tank bottom. This type of roof is not recommended for pressure tanks, and should not be used under conditions where subsidence may occur.

NOTE. When column-supported roofs are required they shall be designed in accordance with the appropriate clauses for roof design in API Std. 12–C*.

* API Std. 12–C. American Petroleum Institute Standard 12–C. 'Welded oil storage tanks' (obtainable through the British Standards Institution).

ROOF SHAPE

22. The shape of roof may be, at the purchaser's option, in either of the following forms:—

a. *Cone roof*, i.e. a roof formed to the surface of a right cone.

b. *Dome roof*, i.e. a roof formed to a spherical surface.

ROOF SLOPE

23. *a. Cone roof.* The roof slope shall be to the purchaser's requirements, but in the interests of standardization it is recommended that a roof slope of 1 in 5 or 1 in 6 is used.

b. Dome roof. The radius of curvature of the dome shall be the subject of agreement between the purchaser and the manufacturer.

SPACING OF ROOF PURLINS

24. Spacing of roof purlins shall be such that the span between them shall not exceed 5·5 ft except where one edge of the panel is supported by the top curb of the tank or other roof sheet supporting members, when the maximum span may be increased to 2 π feet.

ROOF PLATES

25. *a.* The minimum thickness of roof plates shall be 3⁄16 in. or 4·8 mm.

b. Where rectangular roof plates 3⁄16 in. thick are used, they shall be 5 ft wide by 5 π ft long.

c. Roof plates are to be lapped and continuously fillet welded on the outside with a minimum lap of 1 in. They may be lapped so that the lower edge of the uppermost plate is underneath the upper edge of the lower plate in order to minimize the possibility of condensed moisture entering the lap joint.

d. Roof plates shall be continuously fillet welded to the top curb angle as shown in Fig. 5. They shall not be attached to the roof-supporting structure.

LOADS

26. Roofs shall be designed to support the following loads and pressures:—

a. A superimposed load (based on a snow load of approximately 12 lb/sq.ft and a vacuum of 2½ in. water gauge) of not less than 25 lb/sq.ft measured on the horizontal plane, in addition to the dead load of the roof sheets and supporting structure.

An internal pressure equivalent to 3 in. water gauge for non-pressure tanks and 8 in. water gauge for pressure tanks.

Where allowance must be made for a higher snow load and/or a higher vacuum setting and/or a higher internal pressure, the purchaser shall state these conditions in his enquiry or order.

DESIGN AND PERMISSIBLE STRESSES

27. The roof sheets and supporting structure shall be designed in accordance with the requirements of Appendix E.

MINIMUM THICKNESS OF METAL

28. The steel used for construction of the roof members shall have a minimum thickness of not less than 3⁄16 in. This does not apply to the webs of rolled steel joists, and channels or packings or to structures in which special provision against corrosion is made.

STABILITY OF ROOFS

29. Roof framing shall be provided with bracing in the plane of the roof surface or between trusses, where these occur, to the following requirements:—

a. Cross bracing in the plane of the roof surface shall be provided in at least two bays, i.e. between two pairs of adjacent rafters, on all roofs exceeding 48 ft diameter. Sets of braced bays shall be spaced symmetrically around the tank circumference.

b. Additional vertical ring bracing, on trussed roofs only, shall be provided in an approximately vertical plane between the trusses to the following requirements:—

(i) Roofs over 48 ft but under 80 ft diameter: one ring.

(ii) Roofs over 80 ft diameter: two rings.

TOP CURB ANGLES

30. *a. Cone roof.* For non-pressure tanks the top curb angle shall be of the following minimum sizes:—

(i) Tanks up to and including 35 ft: 2½ in. × 2½ in. × ¼ in.

(ii) Tanks over 35 ft diameter and including 60 ft: 2½ in. × 2½ in. × 5⁄16 in.

(iii) Tanks over 60 ft diameter and including 120 ft: 3 in × 3 in × 3⁄8 in.

(iv) Tanks over 120 ft: 4 in. × 4 in. × 3⁄8 in.

NOTE. For external top curb angles the outstanding leg shall be of sufficient width to accommodate the whole section of the handrail stanchion.

For pressure tanks the top curb angle shall be increased in sizes or suitably stiffened to withstand the loading due to the internal pressure of 8 in. water gauge.

b. Dome roof. The top curb angle shall be suitably designed for pressure and non-pressure conditions.

SECTION SIX : MOUNTINGS

SHELL MANHOLES

31. The shell manholes shall be in accordance with Fig. 7.

The manhole frames shall be pressed, formed or alternatively fabricated by welding.

For sheared and flame cut manhole necks all edge cracks shall be removed, and the edge shall be finished uniform and smooth with corners radiused, as shown in Fig. 7, detail ' C '.

SHELL NOZZLES

32. The shell nozzles shall be either single flange, double flange or special flange type as agreed by the purchaser, and in accordance with Fig. 8.

The details and dimensions given in Fig. 8 are for nozzles installed with their axes perpendicular to the shell plate. Nozzles may be installed at an angle other than 90 deg. to the shell plate in a horizontal plane, provided

adequate compensation is allowed for in the compensating plate.

For sheared and flame cut nozzle necks which terminate at the shell as shown for single flange nozzle in Fig. 8 all edge cracks shall be removed and, where the end of the nozzle neck remains unwelded in the completed tank, this end shall be made uniform and smooth with corners rounded to a radius of ¼ in.

WATER DRAW-OFF SUMP

33. The draw-off sump shall be in accordance with Fig. 9.

COMBINED WATER DRAW-OFF AND CLEAN-OUT SUMP

34. The tank bottom clean-out sump shall be in accordance with Fig. 10. The fillet weld to the underside of the bottom sketch plate or annular plate shall be deposited in the downhand position, the bottom plate being reversed for this purpose before finally positioning on the tank foundation.

DRAIN PAD FOR ELEVATED TANKS

35. The drain shall be in accordance with Fig. 11.

CLEAN-OUT DOORS

36. Clean-out doors shall be of mild steel welded construction in accordance with Figs. 19 A, B and C. The hinged davit shown may be omitted by agreement between purchaser and manufacturer. Stress relief is recommended and shall be carried out unless otherwise specified by the purchaser.

ROOF MANHOLES

37. The roof manholes shall have minimum inside diameter of 20 in. They shall be of metallic construction suitable for attachment by welding to the tank roof sheets and shall be positioned close to roof sheet supporting members.

The manhole covers shall be of hinged type with single or multiple bolt fixing as required by the purchaser.

ROOF NOZZLES

38. Flanged roof nozzles shall be in accordance with Fig. 12.

FLANGE DRILLING

39. The flanges for all mountings except shell and roof manholes shall be made and drilled in accordance with B.S. 1560*, Class 150, unless otherwise specified by the purchaser.

STAIRWAYS AND GANGWAYS

40. Stairways and gangways shall be of metallic construction and the minimum clear walking space shall be 24 in.

It is recommended that the angle of stairways to the horizontal plane should not exceed 45 deg.

The stairway treads shall be of open grill non-slip type. The rise shall be 8 in. with a minimum width of 8 in. measured at the mid-length of tread.

Circumferential or spiral type stairs shall be completely supported on the shell of the tank and the ends of the stringer or stringers shall terminate clear of the tank foundation as exemplified in Fig. 13.

Stairways and gangways shall be capable of supporting a superimposed load of 50 lb/sq.ft. It is recommended that, where the vertical rise is more than 20 ft, stairways should be arranged with an intermediate landing or landings.

Tank gangways which extend from one part of a tank to any part of an adjacent tank or to ground or other structure shall be so supported as to permit free relative movement of the structures joined by the runway.

HANDRAILING

41. Handrailing to tank roofs, stairways and gangways shall be of rolled steel sections as exemplified in Fig. 14.

The distance between handrail standards at the tank perimeter and on gangways or measured along the slope of stairways shall not exceed 96 in.

Handrails shall be provided on both sides of gangways and stairways, also on circular and spiral type stairways where the distance between the tank shell and the inner stringer is more than 8 in.

For tanks over 40 ft diameter, where access is required to fittings at or near to the centre of the roof, handrailing and treads shall be provided as shown in Fig. 14.

Particular care shall be taken in the jointing of handrails to ensure that the full strength of the members is developed.

LADDERS

42. Fixed steel ladders exceeding 16 ft in height shall be provided with safety cages.

EARTHING CONNECTIONS

43. All tanks shall be fitted with suitable earthing connections. A typical type of connection is shown in Fig. 15.

* B.S. 1560, ' Steel pipe flanges and flanged fittings for the petroleum industry '.

SECTION SEVEN : SHOP FABRICATION

WORKMANSHIP

44. *a. General.* The workmanship and finish shall be first class in every respect, subject to the closest inspection by the manufacturer's inspector, whether or not the purchaser waives any part of his inspection.

b. Straightening. Straightening of material shall be done by pressing before being laid out or worked on in any way, or by methods that will not injure it. Heating or hammering is not permissible unless the material is heated to a forging temperature.

PLATE EDGE PREPARATION

45. The edges of plates may be sheared, machined, chipped, or cut with a machine-operated cutting blow-pipe. Shearing shall be limited to ⅜ in. thickness of plates for butt-welded joints. When edges of plates are cut by a blow-pipe, the

resulting surface shall be uniform and smooth and free of scale and slag accumulations before welding. A fine film of rust adhering after wire brushing on cut or sheared edges that are to be welded, need not be removed. Circumferential edges of roof and bottom sketch plates or annulars may be cut with a manually-operated cutting blow-pipe.

All shell plates shall be profiled to a tolerance of ± 1/16 in. in length and − 0 in. + 1/16 in. in width. In addition, to ensure that plates are truly rectangular, the diagonals measured across the rectangle formed by scribing lines 2 in. from each edge, shall not differ by more than 1/16 in.

For roof and bottom plates normal mill tolerances are acceptable.

ROLLING AND PRESSING

46. All shell plates for tanks below 80 ft diameter shall have their ends pre-set to the proper curvature. Shell plates for tanks 80 ft diameter and over shall have their ends pre-set, when specified by the purchaser.

Except where otherwise specified by the purchaser, all shell plates shall be rolled to correct curvature.

SHOP PAINTING

47. Unless otherwise specified by the purchaser, painting shall be as follows:—

a. All roof structural members, stairways, handrailing, etc., shall be thoroughly cleaned and freed from rust and scale and painted with a primary coat of approved paint before despatch. Tank plates shall be despatched unpainted.

Where facilities are available it is recommended that the whole of the tank material including mountings should have the mill scale removed by pickling or alternatively sand or shot blasting and be painted, with an approved primer, immediately after cleaning.

b. All machined surfaces and plate edges adjacent to welded joints and bolts and nuts shall be left unpainted and coated with an approved corrosion inhibitor in a petroleum base before despatch.

ERECTION MARKS (HOME MARKET)

48. *a. Tanks erected by manufacturer.* All plates and structural members shall be marked in accordance with the manufacturer's normal practice, unless specified otherwise by the purchaser.

b. Tanks erected by others. All plates and structural members shall be marked in accordance with a marking diagram to be supplied by the manufacturer, which shall also bear such other marks as may be required to facilitate erection. Erection marks shall be painted clearly on plates and structural members in symbols at least 2 in. high where practicable, and in the case of curved plates, such marks shall be on the concave side.

ERECTION MARKS (EXPORT MARKET)

49. All plates and structural members shall be marked in accordance with a marking diagram to be supplied by the manufacturer, which shall also bear such other marks as may be required to facilitate erection oversea.

Erection marks shall be painted clearly on plates and structural members in white paint and shall be at least 2 in. high. In addition they shall be hard stamped in symbols not less than ½ in. high, which in the case of plates shall be in the corner approximately 6 in. from either edge. For curved plates such marks shall be on the concave side.

PACKAGING (HOME MARKET)

50. *a. Structural materials and tank plates.* All materials to be erected either by the manufacturers or by others shall be bundled and packaged in accordance with the usual requirements for road or rail transit and every care shall be taken to ensure that reasonable precautions have been taken to guard against damage or loss in transit.

b. Mountings and fittings. Roof and shell manholes and nozzles, bottom sumps and clean-outs, etc., may be sent loose with covers bolted on. Where flange gaskets are packed separately they shall be adequately protected against damage in transit.

c. Welding electrodes. All electrodes shall be supplied adequately protected against damage by moisture.

PACKAGING (EXPORT MARKET)

51. In complying with the following clauses due regard shall be paid to handling facilities in transit:—

a. Structural materials and tank plates. (i) Roof and shell plates of 3/16 in. thickness shall be bundled by tack welding in a similar manner to that shown in Fig. 16 to prevent damage in transit, or alternatively, roof plates may be bundled by wiring through the tack holes. The maximum weight of a single package shall be approximately 1·5 tons.

(ii) Tank shell plates, ¼ in. thick and up to 5/16 in. thick, may be sent loose, or, by agreement between purchaser and manufacturer, may be bundled in the manner shown in Fig. 16, provided that the maximum weight of a single package shall be approximately 2 tons.

(iii) All structural sections such as roof members, curb angles, handrailing and stair rods, shall be bundled and secured by tack welding or wiring. The maximum weight of a single bundle shall be approximately 1 ton.

(iv) All gusset plates and cleats, etc., shall be securely wired in bundles of a maximum weight of approximately 5 cwt.

(v) All small parts such as bolts and nuts, erection key plates, nuts, shim plates and wedges, etc., shall be bagged and packed separately and shall be enclosed in stout wooden cases, strongly battened and banded with steel strips. The maximum weight of each case shall be approximately 5 cwt.

b. Mountings and fittings. Roof and shell manholes and nozzles, bottom sumps and clean-outs, etc., may be shipped loose. Manhole and clean-out covers shall be bolted on with gaskets in position.

Flanges of nozzles, etc., shall be adequately protected to prevent damage in transit.

Roof ventilators, dip-hatches and other similar fittings shall be packed in stout wooden cases complete with gaskets, etc., and secured against damage in transit. The maximum weight of the case shall be approximately 5 cwt and the cases shall be battened and banded with tensional steel strapping.

c. Welding electrodes. Welding electrodes shall be supplied in containers which give adequate protection against damage and moisture in transit and in storage on site. The type of packing to be employed shall be agreed between purchaser and manufacturer.

d. Shipping marks. The shipping mark, weight and any other desired particulars shall be stencilled on each case, bundle or package wherever possible. Alternatively, this information shall be suitably inscribed on a metal label securely attached to the package when stencilling cannot be applied.

Where circumstances are such that confusion is likely to occur in sorting, reception, and distribution of materials, all parts shall carry, in addition to the erection or shipping marks, a further distinctive mark painted on, consisting of a colour band or surface mark. Such additional marking shall be agreed with the purchaser.

NOTE. Attention is drawn to B.S. 1133, ' Packaging Code ', which gives guidance on the construction and use of containers and packaging materials.

SECTION EIGHT : SHOP INSPECTION AND ERECTION

SHOP INSPECTION

52. The purchaser's inspector shall be permitted free entry to all parts of the manufacturer's works concerned with the contract, whenever any work under the contract is being performed. The manufacturer shall afford the purchaser's inspector, free of cost to purchaser, all reasonable facilities to satisfy him that the material is being furnished in accordance with this specification and shall furnish free of cost to purchaser any samples or specimens of materials for the purpose of testing welding operators. Inspection shall be made at the place of manufacture prior to shipment unless otherwise specified. The manufacturer shall give the purchaser ample notice as to when fabricated work will be started, so that the purchaser's inspector may be on hand when required. The usual mill test of plates shall be deemed sufficient to prove the quality of the steel furnished (except as specified in Sub-clause *a.* below). Mill test reports shall be furnished to the purchaser when required.

a. Material and workmanship which in any way fails to meet the requirements of this specification will be rejected by the purchaser's inspector, and the material involved shall not be used under the contract. Material which shows injurious defects subsequent to its acceptance from the mill or at the manufacturer's works or during erection and test of the tank, will be rejected and the manufacturer will be notified to this effect in writing and required promptly to furnish new materials and make the necessary replacements or make suitable repairs.

SHOP ERECTION

53. Sufficient portion of the roof supporting framing shall be assembled or erected as far as may be required by the purchaser to enable his inspector to check the general accuracy of the work. The purchaser in his enquiry shall notify the manufacturer of the amount of shop erection required.

Where more than one roof structure is supplied to one set of templates it shall be deemed sufficient to inspect the assembly for one tank.

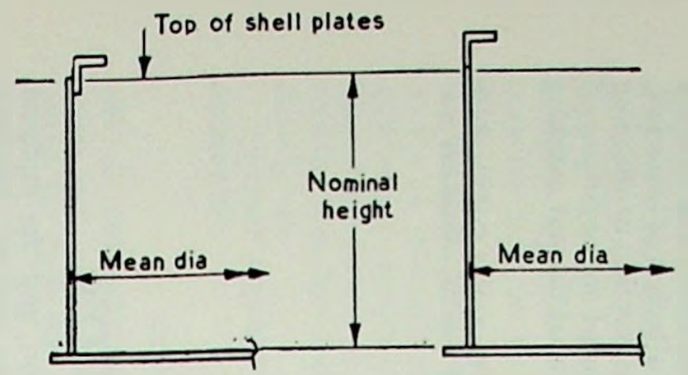


TABLE 1. STANDARD TANKS—TYPE A

NOMINAL CAPACITIES IN CUBIC FEET

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 6·00 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	392·7	883·5	1 570·8	2 454·3	3 534·3	4 810·5	6 283	10 857	14 778	19 302	30 159	43 429	59 112	67 860	77 208	87 162	97 716	120 636	145 968	188 496
2	785·4	1 767·0	3 141·6	4 908·6	7 068·6	9 621·0	12 566	21 714	29 556	38 604	60 318	86 858	118 224	135 720	154 416	174 324	195 432	241 272	291 936	376 992
3	1 178·1	2 650·5	4 712·4	7 362·9	10 602·9	14 431·5	18 849	32 571	44 334	57 906	90 477	130 287	177 336	203 580	231 624	261 486	293 148	361 908	437 904	565 488
4	1 570·8	3 534·0	6 283·2	9 817·2	14 137·2	19 242·0	25 132	43 428	59 112	77 208	120 636	173 718	236 448	271 440	308 832	348 648	390 864	482 544	583 872	753 984
5	—	4 417·5	7 854·0	12 271·5	17 671·5	24 052·5	31 415	54 285	73 890	96 510	150 795	217 145	295 560	339 300	386 040	435 810	488 580	603 180	729 840	942 480
6	—	5 301·0	9 424·8	14 725·8	21 205·8	28 863·0	37 698	65 142	88 668	115 812	180 954	260 574	354 672	407 160	463 248	522 972	586 296	723 816	875 808	1 130 976
7	—	—	—	17 180·1	24 740·1	33 673·5	43 981	75 999	103 446	135 114	211 113	304 003	413 784	475 020	540 456	610 134	684 012	844 452	1 021 776	1 319 472
8	—	—	—	—	—	—	50 264	86 856	118 224	154 416	241 272	347 432	472 896	542 880	617 664	697 296	781 728	965 088	1 167 744	1 507 968
9	—	—	—	—	—	—	56 547	97 713	133 002	173 718	271 431	390 861	532 008	610 740	694 872	784 458	879 444	1 085 724	1 313 712	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

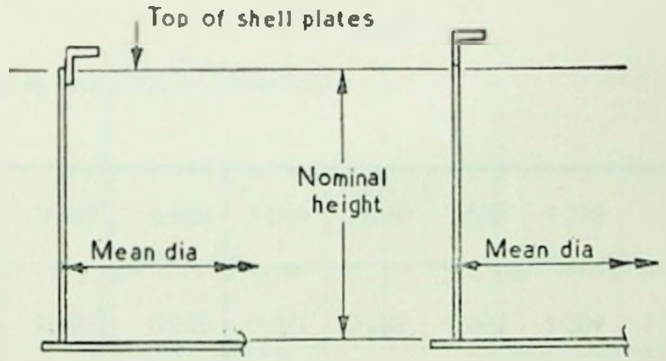


TABLE 2. STANDARD TANKS—TYPE A

NOMINAL CAPACITIES IN CUBIC METRES

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 6·00 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	11·12	25·02	44·48	69·50	100·08	136·21	177·9	307·4	418·4	546·5	854·0	1 229·7	1 674	1 921	2 186	2 468	2 767	3 416	4 133	5 337
2	22·24	50·04	88·96	139·00	200·16	272·42	355·8	614·8	836·8	1 093·0	1 708·0	2 459·4	3 348	3 842	4 372	4 936	5 534	6 832	8 266	10 674
3	33·36	75·06	133·44	208·50	300·24	408·63	533·7	922·2	1 255·2	1 639·5	2 562·0	3 689·1	5 022	5 763	6 558	7 404	8 301	10 243	12 399	16 011
4	44·48	100·08	177·92	278·00	400·32	544·84	711·6	1 229·6	1 673·6	2 186·0	3 416·0	4 918·8	6 696	7 684	8 744	9 872	11 069	13 664	16 532	21 348
5	—	125·10	222·40	347·50	500·40	681·05	889·5	1 537·0	2 092·0	2 732·5	4 270·0	6 148·5	8 370	9 605	10 930	12 340	13 835	17 080	20 665	26 685
6	—	150·12	266·88	417·00	600·48	817·26	1 067·4	1 844·4	2 510·4	3 279·0	5 124·0	7 378·2	10 044	11 526	13 116	14 808	16 602	20 496	24 798	32 022
7	—	—	—	486·50	700·56	953·47	1 245·3	2 151·8	2 928·8	3 825·5	5 978·0	8 607·9	11 718	13 447	15 302	17 276	19 369	23 912	28 931	37 359
8	—	—	—	—	—	—	1 423·2	2 459·2	3 347·2	4 372·0	6 832·0	9 837·6	13 392	15 368	17 488	19 744	22 136	27 328	33 064	42 696
9	—	—	—	—	—	—	1 601·1	2 766·6	3 765·6	4 918·5	7 686·0	11 067·3	15 066	17 289	19 674	22 212	24 903	30 744	37 197	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

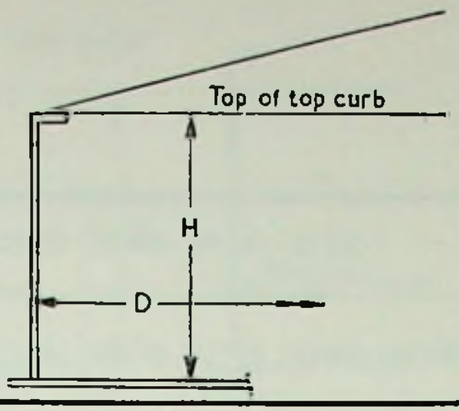


TABLE 3. STANDARD TANKS—TYPE A

MINIMUM CALCULATED SHELL PLATE THICKNESSES IN INCHES

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 6·00 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
2	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	0·256	0·282	0·320
3	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	0·277	0·297	0·317	0·337	0·356	0·396	0·436	0·495
4	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	0·268	0·321	0·375	0·402	0·429	0·455	0·482	0·536	0·589	0·670
5	—	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	0·270	0·338	0·405	0·473	0·507	0·540	0·574	0·608	0·676	0·743	0·844
6	—	3/16	3/16	3/16	3/16	3/16	3/16	1/4	0·285	0·326	0·408	0·489	0·571	0·612	0·652	0·693	0·734	0·815	0·897	1·019
7	—	—	—	3/16	3/16	3/16	1/4	0·287	0·334	0·382	0·478	0·573	0·669	0·716	0·764	0·812	0·860	0·955	1·050	1·194
8	—	—	—	—	—	—	1/4	0·328	0·383	0·438	0·547	0·657	0·766	0·821	0·876	0·931	0·985	1·095	1·204	1·369
9	—	—	—	—	—	—	0·256	0·370	0·432	0·494	0·617	0·741	0·864	0·926	0·988	1·049	1·111	1·235	1·358	—

No allowance has been made for negative mill tolerance in the above decimal thicknesses.
Plate thickness based on maximum stress in plate of 21 000 lb/sq. in.
t = plate thickness in inches = 0·0 001 456 × D × (H-1) where D = tank diameter in feet, and H = tank height in feet to the top of curb angle as shown above.

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.
II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

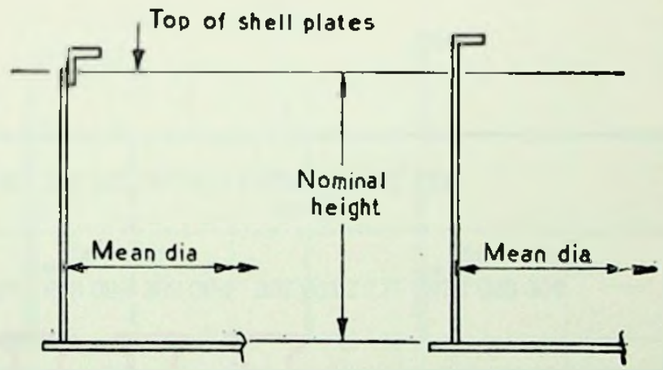


TABLE 4. STANDARD TANKS—TYPE A

NOMINAL TANK HEIGHTS IN FEET

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 6·00 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6
2	10	10	10	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	12
3	15	15	15	15	15	15	15	18	18	18	18	18	18	18	18	18	18	18	18	18
4	20	20	20	20	20	20	20	24	24	24	24	24	24	24	24	24	24	24	24	24
5	—	25	25	25	25	25	25	30	30	30	30	30	30	30	30	30	30	30	30	30
6	—	30	30	30	30	30	30	36	36	36	36	36	36	36	36	36	36	36	36	36
7	—	—	—	35	35	35	35	42	42	42	42	42	42	42	42	42	42	42	42	42
8	—	—	—	—	—	—	40	48	48	48	48	48	48	48	48	48	48	48	48	48
9	—	—	—	—	—	—	45	54	54	54	54	54	54	54	54	54	54	54	54	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

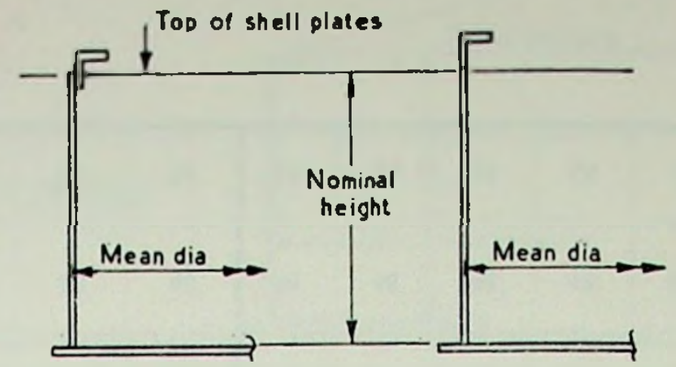


TABLE 5. STANDARD TANKS—TYPE B

NOMINAL CAPACITIES IN CUBIC FEET

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 7·25 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	392·7	883·5	1 570·8	2 454·3	3 534·3	4 810·5	6 283	10 857	14 778	19 302	30 159	43 429	59 112	67 860	77 208	87 162	97 716	120 636	145 968	188 496
2	785·4	1 767·0	3 141·6	4 908·6	7 068·6	9 621·0	12 566	21 714	29 556	38 604	60 318	86 858	118 224	135 720	154 416	174 324	195 432	241 272	291 936	376 992
3	1 178·1	2 650·5	4 712·4	7 362·9	10 602·9	14 431·5	18 849	32 571	44 334	57 906	90 477	130 287	177 336	203 580	231 624	261 486	313 505	387 040	468 314	604 762
4	1 570·8	3 534·0	6 283·2	9 817·2	14 137·2	19 242·0	25 132	43 428	59 112	77 208	120 636	173 716	248 763	285 577	324 917	366 806	431 579	532 809	644 692	832 524
5	—	4 417·5	7 854·0	12 271·5	17 671·5	24 054·5	31 415	54 285	73 890	96 510	150 795	226 193	320 190	367 575	418 210	472 127	549 652	678 577	821 070	1 060 290
6	—	5 301·0	9 424·8	14 725·8	21 205·8	28 863·0	37 698	65 142	88 668	115 812	187 237	278 670	391 617	449 572	521 562	577 448	667 726	824 346	997 448	1 288 056
7	—	—	—	17 180·1	24 740·1	33 673·5	43 981	75 999	103 446	139 135	223 679	331 147	463 044	531 570	604 796	682 769	788 799	970 114	1 173 826	1 515 822
8	—	—	—	—	—	—	50 264	86 856	121 302	162 458	260 121	383 624	534 471	613 567	698 089	788 089	903 873	1 115 883	1 350 204	—
9	—	—	—	—	—	—	56 547	99 975	139 159	185 781	296 563	436 101	605 898	695 565	791 382	893 410	1 021 946	1 261 651	—	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

III Denotes range of plates 7 ft 3 in. wide × 8π feet (25·13 feet) long.

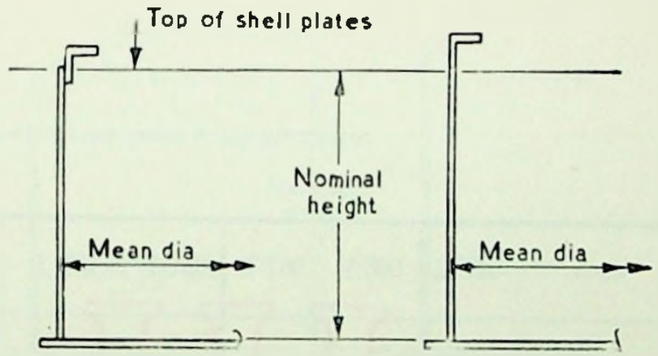


TABLE 6. STANDARD TANKS—TYPE B

NOMINAL CAPACITIES IN CUBIC METRES

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 7·25 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	11·12	25·02	44·48	69·50	100·08	136·21	177·9	307·4	418·4	546·5	854·0	1 229·7	1 674	1 921	2 186	2 468	2 767	3 416	4 133	5 337
2	22·24	50·04	88·96	139·00	200·16	272·42	355·8	614·8	836·8	1 093·0	1 708·0	2 459·4	3 348	3 842	4 372	4 936	5 534	6 832	8 266	10 674
3	33·36	75·06	133·44	208·50	300·24	408·63	533·7	922·2	1 255·2	1 639·5	2 562·0	3 689·1	5 022	5 763	6 558	7 404	8 877	10 960	13 260	17 124
4	44·48	100·08	177·92	278·00	400·32	544·84	711·6	1 229·6	1 673·6	2 186·0	3 416·0	4 918·8	7 044	8 085	9 200	10 386	12 221	15 088	18 254	23 573
5	—	125·10	222·40	347·50	500·40	681·05	889·5	1 537·0	2 092·0	2 732·5	4 270·0	6 404	9 067	10 407	11 841	13 368	15 564	19 217	23 248	30 023
6	—	150·12	266·88	417·00	600·48	817·26	1 067·4	1 844·4	2 510·4	3 279·0	5 302	7 890	11 090	12 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	23 345	28 243	36 473
7	—	—	—	486·50	700·56	953·47	1 245·3	2 151·8	2 928·8	3 939	6 334	9 376	13 112	15 0[illegible]	17 12[illegible]	[illegible]	[illegible]	[illegible]	27 473	33 237	42 923
8	—	—	—	—	—	—	1 423·2	2 459·2	3 434	4 600	7 365	10 862	15 135	17 372	19 767	22 314	25 595	31 602	38 231	—
9	—	—	—	—	—	—	1 601·1	2 830·7	3 940	5 260	8 397	12 348	17 157	19 694	22 409	25 296	28 938	35 730	—	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

III Denotes range of plates 7 ft 3 in. wide × 8π feet (25·13 feet) long.

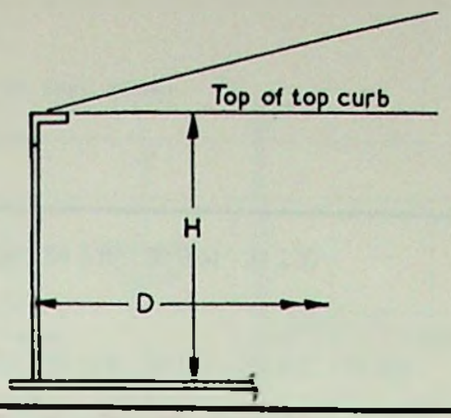


TABLE 7. STANDARD TANKS—TYPE B

MINIMUM CALCULATED SHELL PLATE THICKNESSES IN INCHES

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 7·25 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
2	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	0·256	0·282	0·320
3	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	0·277	0·297	0·317	0·337	0·383	0·425	0·468	0·531
4	3/16	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	0·268	0·321	0·395	0·424	0·452	0·480	0·535	0·594	0·653	0·743
5	—	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	0·270	0·338	0·423	0·514	0·550	0·587	0·624	0·687	0·763	0·839	0·954
6	—	3/16	3/16	3/16	3/16	3/16	3/16	1/4	0·285	0·326	0·422	0·524	0·632	0·677	0·722	0·767	0·839	0·932	1·025	1·165
7	—	—	—	3/16	3/16	3/16	1/4	0·287	0·334	0·394	0·506	0·626	0·750	0·804	0·856	0·911	0·991	1·101	1·211	1·376
8	—	—	—	—	—	—	1/4	0·328	0·393	0·461	0·591	0·727	0·868	0·930	0·992	1·054	1·143	1·270	1·397	—
9	—	—	—	—	—	—	0·256	0·379	0·453	0·529	0·676	0·828	0·987	1·057	1·128	1·198	1·295	1·439	—	—

No allowance has been made for negative mill tolerance in the above decimal thicknesses.

Plate thickness based on maximum stress in plate of 21 000 lb/sq. in.

t = plate thickness in inches = 0,0 001 456 × D × (H-1) where D = tank diameter in feet, and H = tank height in feet to the top of curb angle as shown above.

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

III Denotes range of plates 7 ft 3 in. wide × 8π feet (25·13 feet) long.

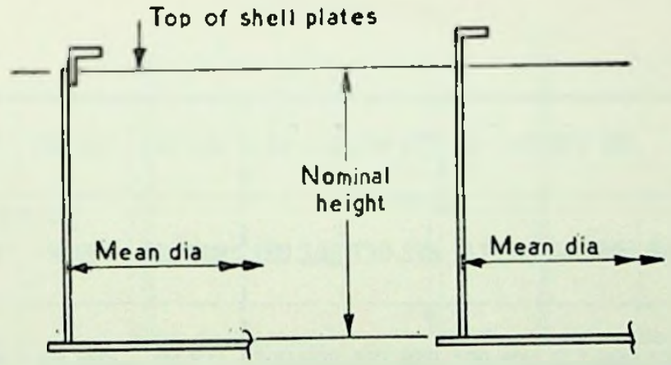


TABLE 8. STANDARD TANKS—TYPE B

NOMINAL TANK HEIGHTS IN FEET

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 7·25 FEET

Number of courses	TANK DIAMETER IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6
2	10	10	10	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	12
3	15	15	15	15	15	15	15	18	18	18	18	18	18	18	18	18	19·25	19·25	19·25	19·25
4	20	20	20	20	20	20	20	24	24	24	24	24	25·25	25·25	25·25	25·25	26·50	26·50	26·50	26·50
5	—	25	25	25	25	25	25	30	30	30	30	31·25	32·50	32·50	32·50	32·50	33·75	33·75	33·75	33·75
6	—	30	30	30	30	30	30	36	36	36	37·25	38·50	39·75	39·75	39·75	39·75	41·00	41·00	41·00	41·00
7	—	—	—	35	35	35	35	42	42	43·25	44·50	45·75	47·00	47·00	47·00	47·00	48·25	48·25	48·25	48·25
8	—	—	—	—	—	—	40	48	49·25	50·50	51·75	53·00	54·25	54·25	54·25	54·25	55·50	55·50	55·50	—
9	—	—	—	—	—	—	45	55·25	56·50	57·75	59·00	60·25	61·50	61·50	61·50	61·50	62·75	62·75	—	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.

III Denotes range of plates 7 ft 3 in. wide × 8π feet (25·13 feet) long.

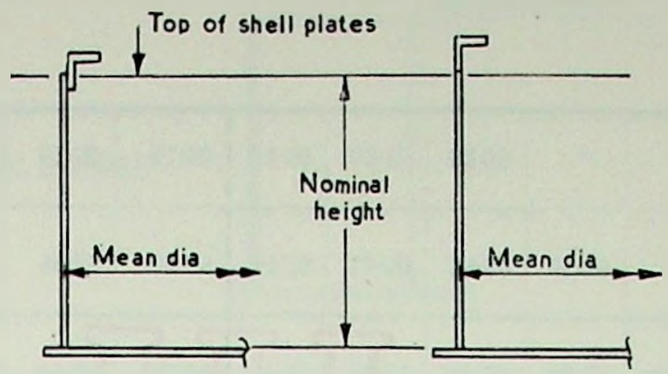
APPENDIX A

STANDARD TANKS—TYPE A

NOMINAL CAPACITIES IN U.S. BARRELS

BUTT-WELDED SHELLS

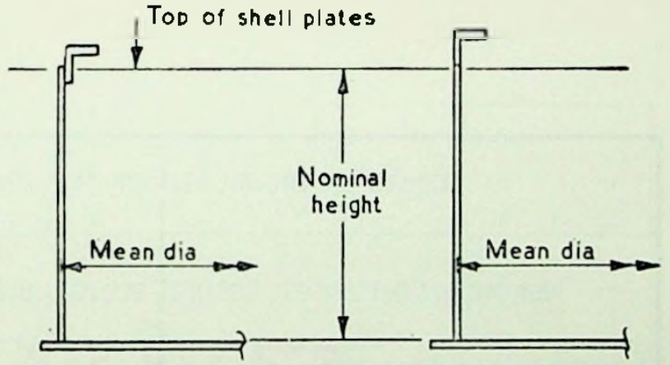
MAX. PLATE WIDTH 6·00 FEET



Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	70	157	280	437	629	857	1 119	1 934	2 632	3 438	5 371	7 735	10 528	12 086	13 751	15 524	17 404	21 486	25 998	33 572
2	140	314	560	874	1 258	1 714	2 238	3 868	5 264	6 876	10 742	15 470	21 056	24 172	27 502	31 048	34 808	42 972	51 996	67 144
3	210	471	840	I 311	1 887	2 571	3 357	5 802	7 896	10 314	16 113	23 205	II 584	II 258	41 253	46 572	52 212	64 458	77 994	100 716
4	280	628	1 120	I 748	2 516	3 428	4 476	7 736	10 528	13 752	21 484	30 940	II 112	II 344	55 004	62 096	69 616	85 944	103 992	134 288
5	—	785	1 400	2 185	3 145	4 285	5 595	9 670	13 160	17 190	26 855	38 675	52 640	60 430	68 755	77 620	87 020	107 430	129 990	167 860
6	—	942	1 680	2 622	3 774	5 142	6 714	11 604	15 792	20 628	32 226	46 410	63 168	72 516	82 506	93 144	104 424	128 916	155 988	201 432
7	—	—	—	3 059	4 403	5 999	7 833	13 538	18 424	24 066	37 597	54 145	73 696	84 602	96 257	108 668	121 828	150 402	171 986	235 004
8	—	—	—	—	—	—	8 952	15 472	21 056	27 504	42 968	61 880	84 224	96 688	110 008	124 192	139 232	171 888	207 984	268 576
9	—	—	—	—	—	—	10 071	17 406	23 688	30 942	48 339	69 615	94 752	108 774	123 759	139 716	156 636	193 374	233 982	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.



APPENDIX B

STANDARD TANKS—TYPE A

NOMINAL CAPACITIES IN THOUSANDS OF IMPERIAL GALLONS

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 6·00 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure																Type BNP Design for non-pressure only			
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	2·45	5·5	9·8	15·3	22	30	39	68	92	120	188	271	368	423	481	543	609	751	909	1 174
2	4·90	11·0	19·6	30·6	44	60	78	136	184	240	376	542	736	846	962	1 086	1 218	1 502	1 818	2 348
3	7·35	16·5	29·4	45·9	66	90	117	204	276	360	564	813	1 104	1 269	1 443	1 629	1 827	2 253	2 727	3 522
4	9·80	22·0	39·2	61·2	88	120	156	272	368	480	752	1 084	1 472	1 692	1 924	2 172	2 436	3 004	3 636	4 696
5	—	27·5	49·0	76·5	110	150	195	340	460	600	940	1 355	1 840	2 115	2 405	2 715	3 045	3 755	4 545	5 870
6	—	33·0	58·8	91·8	132	180	234	408	552	720	1 128	1 626	2 208	2 538	2 886	3 258	3 654	4 506	5 454	7 044
7	—	—	—	107·1	154	210	273	476	644	840	1 316	1 897	2 576	2 961	3 367	3 801	4 263	5 257	6 363	8 218
8	—	—	—	—	—	—	312	544	736	960	1 504	2 168	2 944	3 384	3 848	4 344	4 872	6 008	7 272	9 392
9	—	—	—	—	—	—	351	612	828	1 080	1 692	2 439	3 312	3 807	4 329	4 887	5 481	6 759	8 181	—

I Denotes range of plates 5 ft 0 in. wide × 5= feet (15·7 feet) long.

II Denotes range of plates 6 ft 0 in. wide × 8= feet (25·13 feet) long.

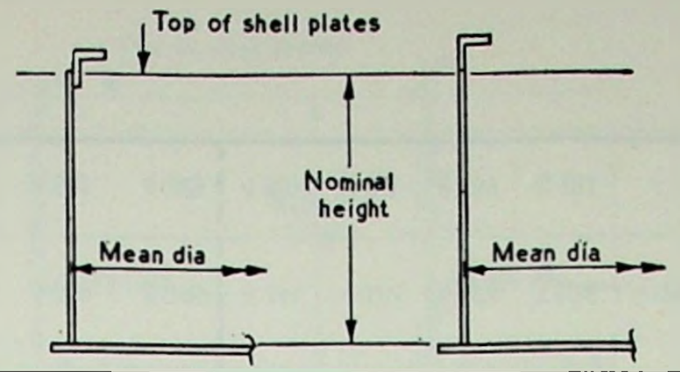
APPENDIX C

STANDARD TANKS—TYPE B

NOMINAL CAPACITIES IN U.S. BARRELS

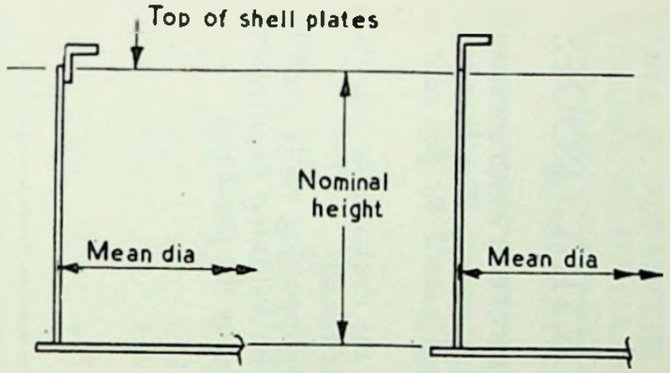
BUTT-WELDED SHELLS

MAX. PLATE WIDTH 7·25 FEET



Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure															Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	70	157	280	437	629	857	1 119	1 934	2 632	3 438	5 371	7 735	10 528	12 086	13 751	15 824	17 404	21 486	25 998	33 572
2	140	314	560	874	1 258	1 714	2 238	3 868	5 264	6 876	10 742	15 470	21 056	24 172	27 502	31 048	34 808	42 972	51 996	67 144
3	210	471	840	1 311	1 887	2 571	3 357	5 802	7 896	10 314	16 113	23 205	31 584	36 258	41 253	46 572	55 837	68 934	83 408	107 710
4	280	628	1 120	1 748	2 516	3 428	4 476	7 736	10 528	13 752	21 484	30 940	44 306	50 862	57 870	35 330	76 866	94 896	114 820	148 276
5	—	785	1 400	2 185	3 145	4 285	5 595	9 670	13 160	17 190	26 855	40 286	57 028	65 466	74 487	84 088	97 895	120 858	146 232	188 842
6	—	942	1 680	2 622	3 774	5 142	6 714	11 604	15 792	20 628	33 346	49 632	69 750	80 070	91 104	103 846	118 624	146 820	177 644	229 408
7	—	—	—	3 059	4 403	5 999	7 833	13 538	18 424	24 781	39 837	58 978	82 472	94 674	107 721	121 604	139 953	172 782	209 056	269 974
8	—	—	—	—	—	—	8 952	15 472	21 605	28 934	46 328	68 324	95 194	109 278	124 338	140 362	160 982	198 744	240 468	—
9	—	—	—	—	—	—	10 071	17 806	24 786	33 087	52 819	77 670	107 916	123 882	140 955	159 120	182 011	224 706	—	—

I Denotes range of plates 5 ft 0 in. wide × 5π feet (15·7 feet) long.
II Denotes range of plates 6 ft 0 in. wide × 8π feet (25·13 feet) long.
III Denotes range of plates 7 ft 3 in. wide × 8π feet (25·13 feet) long.



APPENDIX D

STANDARD TANKS—TYPE B

NOMINAL CAPACITIES IN THOUSANDS OF IMPERIAL GALLONS

BUTT-WELDED SHELLS

MAX. PLATE WIDTH 7·25 FEET

Number of courses	TANK DIAMETERS IN FEET																			
	Type BNP—Design for non-pressure only Type BLP—Design for pressure																Type BNP Design for non-pressure only				
	10	15	20	25	30	35	40	48	56	64	80	96	112	120	128	136	144	160	176	200
1	2·45	5·5	9·8	15·3	22	30	39	68	92	120	188	271	368	423	481	543	609	751	909	1 174
2	4·90	11·0	19·6	30·6	44	60	78	136	184	240	376	542	736	946	962	1 086	1 218	1 502	1 818	2 348
3	7·35	16·5	29·4	45·9	66	90	117	204	276	360	564	813	1 104	1 269	1 443	1 629	1 953	2 411	2 917	3 766
4	9·80	22·0	39·2	61·2	88	120	156	272	368	480	752	1 084	1 549	1 780	2 024	2 285	2 688	3 319	4 015	5 185
5	—	27·5	49·0	76·5	110	150	195	340	460	600	940	1 410	1 994	2 290	2 605	2 941	3 424	4 227	5 114	6 604
6	—	33·0	58·8	91·8	132	180	234	408	552	720	1 167	1 737	2 439	2 801	3 186	3 597	4 159	5 135	6 213	8 023
7	—	—	—	107·1	154	210	278	476	644	866	1 394	2 063	2 884	3 312	3 767	4 253	4 895	6 043	7 311	9 442
8	—	—	—	—	—	—	312	544	755	1 011	1 620	2 390	3 329	3 822	4 348	4 909	5 630	6 951	8 410	—
9	—	—	—	—	—	—	351	623	867	1 157	1 847	2 716	3 774	4 333	4 929	5 565	6 366	7 859	—	—

I Denotes range of plates 5 ft 0 in. wide × 5= (15·7 feet) long.
II Denotes range of plates 6 ft 0 in. wide × 8= feet (25·13 feet) long.
III Denotes range of plates 7 ft 3 in. wide × 8= feet (25·13 feet) long.

APPENDIX E

DESIGN AND PERMISSIBLE STRESSES FOR SELF-SUPPORTING ROOFS

The thickness of roof sheets shall be assessed in the light of the requirements of internal and external pressures.

Internal pressure. The thickness shall be determined by adopting a maximum allowable design stress, before applying the factor E of 21 000 lb/sq.in. The factor E associated with the lap joint in the roof sheet welded from one side only (see Clause 25 *c* of this standard) shall be assumed to be 80 per cent.

External pressure. The thickness shall be determined by considering the sheet to be a beam of unit width encastered at each end spanning between supports. The maximum stress due to bending shall not exceed 80 per cent of 21 000 lb/sq.in.

In no case, however, shall the thickness be less than $\frac{3}{16}$ in. (see Clause 28 of this standard).

Structural members of self-supporting roofs shall be designed in accordance with the following requirements except where otherwise specified by the purchaser.

SECTION ONE : PERMISSIBLE STRESSES

AXIAL STRESSES IN TENSION

1. The direct stress in pure tension on the net area of the section in tons per square inch shall not exceed F_t where :

$$F_t = 9 \text{ tons/sq.in.}$$

AXIAL STRESSES IN STRUTS

2. *a*. The permissible working stresses on the gross sectional area of struts axially loaded shall not exceed the values in Table 9 in which l/r = effective length divided by the radius of gyration.

TABLE 9. PERMISSIBLE WORKING STRESSES IN TONS/SQ. IN. OF GROSS SECTION FOR AXIAL LOADS.

*l/r	F_a tons/ sq. in.	l/r	F_a tons/ sq. in.	l/r	F_a tons/ sq. in.	l/r	F_a tons/ sq. in.
0	9·00	70	5·60	140	2·57	210	1·27
10	8·51	80	5·12	150	2·30	220	1·17
20	8·03	90	4·62	160	2·06	230	1·08
30	7·54	100	4·13	170	1·86	240	0·99
40	7·06	110	3·67	180	1·68	250	0·92
50	6·57	120	3·26	190	1·52	300	0·65
60	6·09	130	2·89	200	1·39	350	0·49

* Intermediate values may be determined by interpolation.

b. Angles as struts. For single-angle, discontinuous struts connected to gussets or to the leg of a rolled section either by bolting or riveting with not less than two bolts or rivets in line along the angle at each end, or by their equivalent in welding, the eccentricity of the connection with respect to the centroid of the strut may be ignored and the strut designed as an axially-loaded member. The permissible working stress shall not exceed the values given in Table 10 in which l is 0·8 of the length of the strut, centre to centre of fastenings at each end, and r is the minimum radius of gyration.

Angle struts with single-bolted or riveted connection shall be treated similarly but the permissible working stress shall not exceed the values given in Table 11 in which l is the length of the strut × 0·8 centre to centre of fastenings at each end, and r is the minimum radius of gyration.

For double-angle, discontinuous struts back-to-back connected to both sides of a gusset or to both sides of the leg of a rolled section, by not less than two bolts or rivets in line along each angle at each end, or by their equivalent in welding, the load may be regarded as applied axially, the permissible working stress shall not exceed the values obtained from Table 9. The value of the effective length may be taken as the length between centre to centre of fastenings multiplied by a factor of unity.

Double-angle discontinuous struts back-to-back connected to one side of a gusset or leg of a rolled section shall be designed as for single angles and the permissible working stress shall not exceed the values in Table 10 whether the angles are connected at each end by one or more rivets or bolts or by welding. The angles, whether in contact or separated, shall be connected together so as to satisfy the above requirements for double angles connected to both sides of a gusset.

TABLE 10. PERMISSIBLE WORKING STRESSES IN TONS/SQ. IN. OF GROSS SECTION FOR DISCONTINUOUS ANGLE STRUTS (DOUBLE-BOLTED, DOUBLE-RIVETED, OR WELDED AT ENDS).

*l/r	F_c2 tons/ sq. in.	l/r	F_c2 tons/ sq. in.	l/r	F_c2 tons/ sq. in.	l/r	F_c2 tons/ sq. in.
0	6·00	70	3·97	140	2·15	210	1·16
10	5·71	80	3·68	150	1·95	220	1·08
20	5·42	90	3·40	160	1·77	230	1·00
30	5·13	100	3·12	170	1·61	240	0·93
40	4·84	110	2·85	180	1·47	250	0·86
50	4·55	120	2·60	190	1·35	300	0·62
60	4·26	130	2·37	200	1·25	350	0·47

* Intermediate values by interpolation.

TABLE 11. PERMISSIBLE WORKING STRESSES IN TONS/SQ. IN. OF GROSS SECTION FOR DISCONTINUOUS ANGLE STRUTS (SINGLE-BOLTED, OR SINGLE-RIVETED AT ENDS).

*l/r	F_c tons/ sq. in.	l/r	F_c tons/ sq. in.	l/r	F_c tons/ sq. in.	l/r	F_c tons/ sq. in.
0	3·00	70	2·19	140	1·41	210	0·90
10	2·88	80	2·08	150	1·32	220	0·84
20	2·77	90	1·96	160	1·24	230	0·79
30	2·65	100	1·85	170	1·16	240	0·75
40	2·54	110	1·73	180	1·09	250	0·71
50	2·42	120	1·62	190	1·02	300	0·53
60	2·31	130	1·51	200	0·96	350	0·43

* Intermediate values by interpolation.

BENDING STRESSES

3. *a. General.* In calculating tensile stresses in bending, the moment of inertia of the net cross-section shall be used, and calculations for compressive stresses shall be based on the moment of inertia of the gross cross-section, although for convenience the net cross-section may be used.

b. In tension. For beams the bending stress in the extreme fibres in tension shall not exceed F_{bt} where:

$$F_{bt} = 10 \text{ tons/sq.in.}$$

c. In compression. The bending stress in the extreme fibres in compression shall not exceed the lesser of the values F_{bc} obtained from (i) and (ii) in the following formula:

(i) $F_{bc} = 10$ tons/sq. in., or

(ii) $F_{bc} = \dfrac{1000}{l/r} \times K_1$ tons/sq. in. where

l = the length between effective lateral restraints

r = the radius of gyration of the beam section perpendicular to the plane of bending

K_1 = a factor which shall be taken as unity except in the case of rolled steel joists, and compound sections symmetrical about both principal axes and subject to bending about the xx axis (as given in B.S. 4, ' Dimensions and properties of channels and beams for structural purposes '). For these conditions the factor may be assumed to have the values given in Table 12, depending upon the ratio of gross radii of gyration r_{xx} and r_{yy} about the principal rectangular axes.

TABLE 12. BENDING STRESS FACTORS K_1

r_{xx}/r_{yy}	K_1
5·0	1·000
4·5	1·125
4·0	1·250
3·5	1·375
3·0 or less	1·500

Intermediate values may be determined by linear interpolation.

SHEAR STRESSES

4. The shear stress, for the purpose of this standard may be taken as equal to F_s on the gross section of the beam provided that the ratio of thickness to depth of the web does not exceed one seventy-fifth, where:

$$F_s = 6{\cdot}5 \text{ tons/sq. in.}$$

BEARING STRESSES

5. The permissible bearing stress on the net area of contact shall not exceed F_p where:

$$F_p = 12 \text{ tons/sq. in.}$$

COMBINED STRESSES

6. *a. Bending and axial compression.* Members subject to both axial compression and bending stresses shall be so proportioned that the quantity:

$$\frac{f_a}{F_a} + \frac{f_{bc}}{F_{bc}}$$

does not exceed unity, where

f_a = the axial compressive stress

F_a = the permissible compressive stress in axially loaded struts (see Table 11)

f_{bc} = the sum of the compressive stresses due to bending about both rectangular axes

F_{bc} = the minimum permissible compressive stress for members subject to bending (see Clause 3 *c*. of this Appendix).

For the purpose of this clause, the allowances made in Clause 3 *c* of this Appendix, Table 12 should not be used where excessive flexibility will result.

b. Bending and axial tension. Members subject to both axial tension and bending stress shall be so proportioned that the quantity:

$$\frac{f_t}{F_t} + \frac{f_{bt}}{F_{bt}}$$

does not exceed unity, where

f_t = the axial tensile stress

F_t = the permissible axial tensile stress (see Clause 1 of this Appendix)

f_{bt} = the maximum tensile stress due to bending about both principal axes

F_{bt} = the permissible tensile stress in bending (see Clause 3 of this Appendix).

PERMISSIBLE STRESSES IN RIVETS AND BOLTS

7. The permissible stresses in rivets and bolts shall not exceed the following:

TABLE 13. PERMISSIBLE STRESSES IN RIVETS AND BOLTS

	Stress tons/ sq. in.	Remarks
In tension		
Axial stress on gross area of rivets and net area of bolts:		For gross and net area, see Clause 11 of this Appendix.
Shop-driven rivets	5	
Field-driven rivets	4	
Bolts ¾ in. and over in diameter	6	These stresses are not intended to apply to screwed tension rods.
Bolts less than ¾ in. diameter	5	
In shear		
Shear stress on gross area of rivets and bolts:		For gross area see Clause 11 of this Appendix.
In shear		
Shop-driven rivets	6	For rivets and bolts in double or quadruple shear, the area to be assumed shall be two or four times respectively the area as defined.
Field-driven rivets	5	
Turned and fitted bolts	6	
Black bolts	4	
In bearing		
Bearing stress on gross diameter of rivets and bolts:		
Shop-driven rivets	12	Where the rivets or turned and fitted bolts are in double shear the permissible bearing stress on the central thickness of metal may be increased by 25 per cent.
Field-driven rivets	10	
Turned and fitted bolts	12	
Black bolts	8	

SECTION TWO : DESIGN AND DETAILS OF CONSTRUCTION

DEFLECTION OF BEAMS

8. The calculated deflection of any beam shall not be greater than one-two hundred and fortieth part of the span.

MAIN COMPRESSION MEMBERS OF ROOF SUPPORTING STRUCTURE

9. When the design detail is such that these members can be considered as continuous through panel points they shall be designed in accordance with Clause 6 of this Appendix with the following assumptions:

a. The maximum bending moment in the panel may be three-quarters of that which would exist in a simply supported beam of span equal to the length between adjacent panel points, and carrying the same panel loads.

b. The effective length of such members shall be equal to the distance between the centres of adjacent and effective supports in the plane of the rafters and 0·7 times the distance in the plane of the truss.

c. In the case of radial rib domed roofs, the effective length for transverse stability may be taken as the distance between purlin intersections with the rib.

MAXIMUM SLENDERNESS RATIO OF STRUTS

10. The ratio of effective length to the appropriate radius of gyration shall not exceed the following values:

a. For any member carrying loads resulting from dead weights and superimposed loads, 180.

b. For any member carrying loads resulting from wind forces only, provided the deformation of such members does not adversely affect the stress in any part of the structure, 250.

c. For any member normally acting as a tie in a roof truss but subject to possible reversal of stress resulting from the action of wind or internal pressure, or during erection, 350.

SECTIONAL AREAS

11. *a. General.* The gross sectional area shall be taken as the area of the cross-section as calculated from the specified size.

The net sectional area shall be taken as the gross sectional area less deductions for rivet holes, bolt holes and open holes, or other deductions specified herein.

In taking deductions for rivet and bolt holes, the diameter shall be assumed to be 1/16 in. in excess of the normal diameter of the rivet or bolt, unless otherwise specified.

The number of holes to be deducted shall be the actual maximum number of holes at a plane right across section, provided that where holes are staggered, account shall be taken of the tendency of the member to fail along a zig-zag section passing through the holes.

b. Rivets. The nominal diameter of a rivet shall be the diameter cold before driving.

The gross area of a rivet shall be the cross-sectional area of the finished rivet after driving.

c. Bolts. The net sectional area of a bolt shall be taken as the area of the root of the thread.

d. Web. The gross sectional area of the web of a joist or channel shall be taken as the full depth of that joist or channel, multiplied by its web thickness.

ANGLES IN TENSION

12. *a. General.* The following requirements shall be deemed to make allowance for eccentricity of normal connections:—

b. Single angle connected through one leg. For a single equal-sided angle carrying direct tension, the area to be taken in computing the mean tensile stress shall be that of the connected leg minus holes plus half the area of the outstanding leg. and similarly for an unequal angle, except when the outstanding leg is greater in which case an area equal to half the gross area of the connected leg shall be added in lieu of half the area of the outstanding leg.

c. Double angles connected each side of a gusset. For double angles, carrying direct tension and placed back-to-back and connected to each side of a gusset or to each side of the leg of a rolled section, the area to be taken in computing the mean tensile stress shall be the gross area less the deduction for holes, provided the members are connected together along their length as specified in Clauses 14 *d* and 16 of this Appendix.

d. Double angles connected one side of a gusset. For double equal-sided angles carrying direct tension and connected to one side of a gusset or to one side of the leg of a rolled section and connected together as in *c.* above, the area to be taken in computing the mean tensile stress shall be that of the connected legs minus holes plus three-quarters of the area of the outstanding legs, and similarly for unequal angles, except where the outstanding legs are the greater in which case an area equal to three-quarters of the gross area of the connected legs shall be added in lieu of three-quarters of the area of the outstanding legs. Where the members are not connected together at intervals, they shall be designed as separate members in accordance with sub-clause *b* above.

The foregoing stipulations for angle members in direct tension shall also apply where lug-angles are used to form part of the connection to a gusset.

CONNECTIONS

13. *a. Use of rivets, turned and fitted bolts, black bolts and welding.* As much of the work of fabrication as is reasonably practicable shall be completed in the shops where the steelwork is fabricated.

Either rivets or turned and fitted bolts or welding shall be used where connection is such that slip under load is to be avoided.

Black bolts shall not be used to carry a force through a connection subject to impact or vibration.

b. Composite connections. In connections containing more than one type of fastening, only rivets with turned and fitted bolts may be considered as acting together to share the load. In all other such composite connections sufficient of the one type of fastening shall be provided to carry the entire load for which the connection is designed.

c. Members meeting at a joint. Members meeting at a joint should, wherever practicable, have their centroidal axes intersecting at a point so as to avoid or minimize eccentricity effects.

Wherever practicable the centre of resistance of a connection shall lie on the line of action of the load, so as to avoid an eccentricity moment on the connections.

Where eccentricity of members or of connections is present, then the members and the connections shall provide adequate resistance to the induced bending moments. This resistance shall be deemed to have been covered in respect of the members only in Clause 2 *b* and 12 of this Appendix.

d. Packing. (i) *Rivets or bolts through packings.* Rivets or bolts carrying calculated shear stress through a packing shall be increased above the number required by normal calculations by 5 per cent for each ⅛ in. thickness of packing. The additional rivets or bolts should preferably be placed in an extension of the packing.

(ii) *Packings in welded construction.* Where a packing is to be used between two parts, then the packing and the welds connecting it to each part shall be capable of transmitting the load between the parts except where the packing is too thin to carry the load or permit the provision of adequate welds, when it shall be trimmed flush with the edges of the narrower part, and the load shall be transmitted through the welds alone, the welds being increased in size by an amount equal to the thickness of the packing.

(iii) *Packings subject to direct compression only.* Where properly fitted packings are subject to direct compression only, then (i) and (ii) of this sub-clause shall not apply.

RIVETS AND RIVETING

14. *a. Pitch of rivets.* The distance between centres of rivet holes shall be not less than three times the nominal diameter of the rivet; the minimum pitch should preferably be as follows:

Rivet nominal diameter (in.)	1¼	1⅛	1	⅞	¾	⅝	½
Pitch (in.)	4½	4	3½	3	2½	2	1¾

Except that for parts in tension and compression where two rows of staggered rivets occur in one flange of a single angle, the straight-line pitch in the direction of stress shall not exceed one and a half times these distances.

b. Pitch at the ends of compression members. In the ends of compression members, the pitch of the rivets connecting component parts for a distance equal to one and a half times the width or depth, whichever is the greater, of the member, shall not exceed the following:

Rivet nominal diameter (in.)	1¼	1⅛	1	⅞	¾	⅝	½
Pitch (in.)	5½	5	4½	4	3½	3	2½

The same pitches shall apply over similar distances below and above restrained connections of beams, and below non-restrained beam connections, in each case the distance being measured from the outer surface of the flange of the beam.

c. Edge distance. The distance from the centre of any rivet to a sheared edge shall be not less than the following:

Rivet nominal diameter (in.)	1¼	1⅛	1	⅞	¾	⅝	½
Edge distance (in.)	2¼	2	1¾	1½	1¼	1⅛	1

The distance to a rolled, sawn or planed edge (except where the standard rivet sizes and cross-centres are worked to through the flange of a rolled ' I '—beam, tee or channel) shall be not less than the following:

Rivet nominal diameter (in.)	1¼	1⅛	1	⅞	¾	⅝	½
Edge distance (in.)	2	1¾	1½	1¼	1⅛	1	¾

The distance from any edge to the nearest line of rivets shall not exceed twelve times the thickness of the outside plate for work not exposed to the weather, or six times that thickness in the case of exposed work, except in the case of compression members.

d. Tacking rivets. Recommendations for tacking rivets have been made for compression members in Clauses 2 and 18 of this Appendix and these should be followed in the design and construction of struts.

In tension members composed of two flats, angles, channels or tees in contact back-to-back or separated back-to-back by a distance not exceeding the aggregate thickness of the connected parts, tacking rivets, with solid distance pieces where the parts are separated, shall be provided, for the purpose of this specification only, at a pitch in line of not exceeding 60 in.

e. Countersunk heads. For countersunk heads one-half of the depth of the counter-sinking shall be neglected in calculating the length of the rivet in bearing. For rivets in tension with countersunk heads the tensile value shall be reduced by 33⅓ per cent. No reduction need be made for shear.

f. Long rivets. The grip length of rivets shall not exceed four diameters, where possible. Greater grip lengths may be permitted provided the number of rivets is increased by 1 per cent for each additional $\frac{1}{16}$ in. of grip.

BOLTS AND BOLTING

15. *a. Pitches, edge distances and tacking bolts.* The requirements for bolts shall be the same as specified for rivets in Clause 14 *a*, *b*, *c* and *d* of this Appendix.

b. Locking of bolts. Reasonable care should be taken to see that bolts are made secure.

c. Turned and fitted bolts. Holes for turned and fitted bolts shall be accurately drilled or reamed with an aggregate clearance of not more than $\frac{1}{100}$ in. and the barrel of the bolt shall be $\frac{1}{16}$ in. greater in diameter than the screwed portion of the bolt. The holes after assembly of the parts shall be true throughout the thickness of all parts and perpendicular to the axis of the member.

INTERMITTENT WELDING OF TENSION MEMBERS

16. In tension members composed of two flats, angles, channels or tees in contact back-to-back, or separated back-to-back, intermittent welds, not subject to calculated stress, shall be provided to connect the two parts together along both pairs of edges, with solid distance-pieces where the component parts are not in contact or sufficiently close for butt welding. The pitch of the effective lengths of welds, centre-to-centre, shall for the purpose of this specification only, not exceed 60 in. in line whether they are opposite or staggered in respect of the two pairs of edges. Such tension members which do not permit access to the exposed inner surfaces for painting shall not be used for exposed work.

COMPRESSION MEMBERS

17. *a. General.* The thickness of an outstanding leg of any member in compression, unless stiffened, shall be not less than one-sixteenth of the outstand.

In riveted or welded construction the web of a member primarily in compression shall not have a width in the clear between the flanges or the legs of flange angles (or other members attaching the web to the flanges) of more than 60 times its thickness, and not more than 40 times its thickness shall be reckoned in computing the cross-sectional area of the member as resisting compressive forces only. For computing other section properties the full area of the web shall be taken.

b. Joints. Where the ends of compression members are faced for bearing over the whole area they shall be sufficiently spliced to hold the connected members accurately in place and to resist any tension caused by bending.

In riveted or bolted construction and in welded construction where splices are used, the effective length of the splice from the plane of joint shall be not less than the width of the spliced flange.

Where such members are not faced for complete bearing they shall be spliced to transmit all the forces to which the joint is subjected.

Wherever possible, splices shall be proportioned and arranged so that the gravity axis of the splice is in line with the gravity axis of the members jointed in order to avoid eccentricity.

WASHER-RIVETING OR WELDING

18. The compression members of triangulated frame works which are fashioned from two angles, channels, or tees placed back-to-back or separated shall be connected together by riveting, welding or bolting in such a manner as to conform with the following requirements:

Each end of such members shall be mutually connected by no less than two rivets or their equivalent in welding.

Further connections shall be provided at mid-point or ' third ' points depending on the overall length of the member and the size of the outstanding leg of each component.

For a leg of 2 in. outstand, a single mid-point connection is satisfactory for members up to and including 11 ft in length, but where this length is exceeded two connections shall be provided at the ' third ' points.

For a leg of outstand greater than 2 in. a single mid-point connection is satisfactory for members up to and including 12 ft 6 in., but where this length is exceeded two connections shall be provided at the ' third ' points. Where the members are separated back-to-back the rivets through these connections shall pass through solid washers or packings, and where the connected angle legs or tables of tees are 5 in. wide or over, or where webs of channels are 6 in. wide or over, not less

than two rivets shall be used in each connection, one on the line of each gauge mark.

Where these connections are made by welding, solid packings shall be used to effect the jointing unless the members are sufficiently close together to permit butt welding, and the members shall be connected by welding along both pairs of edges of the main components. Such butt-welded struts which do not permit access to the exposed adjacent parts for subsequent painting shall not be used for external work.

The rivets or welds in these connections shall be sufficient to carry the shears and moments (if any) specified for battened struts, and in no case shall the rivets be less than ⅝ in. diameter for members up to and including ⅜ in. thickness, ¾ in. diameter for members up to and including ⅝ in. thickness and ⅞ in. diameter for members over ⅝ in. thickness.

Compression members connected by such riveting or welding shall not be subjected to transverse loading perpendicular to the washer-riveted or welded surfaces.

PURLINS

19. (All members supporting roof sheets only, i.e. without supporting any other members.)

For roof slopes not exceeding 30 degrees pitch, the requirements of Clauses 3 and 8 of this Appendix as regards limiting deflection of beams and lateral instability may be waived in the design of purlins, provided that, where L is the distance in inches centre-to-centre of the steel principals or other supports, the following requirements are fulfilled:—

The leg or the depth of the purlin in the plane appropriate to the incidence of the maximum loads or maximum component of the load is not less than $L/45$, and the numerical value of the section modulus of the purlin in inch units is not less than $WL/90$, provided that the other leg or width of the purlin is not less than $L/75$. The loading W is the total distributed load in tons on the purlin arising from loading assumed in Clause 26 of this standard.

APPENDIX F

INFORMATION TO BE SUPPLIED BY THE PURCHASER

Certain clauses of this standard permit alternatives.

A. The following information shall be supplied by the purchaser in his enquiry:

1. Destination of tank.

2. State whether non-pressure, pressure or open-top (Clause 1).

a. For pressure tanks, state pressures and vacuums required (Clauses 1 and 26 *a*).

3. State diameter and height, or capacity, of tank (Tables 1 to 8).

4. State whether special stiffening is required (Clause 15).

5. State whether partial or full penetration is required for horizontal joints (Clause 17 *c* (iii)).

6. State whether special type of shell nozzle is required (Clause 32).

7. State whether manhole covers are to be of hinged or bolted type (Clause 37).

8. State whether flange drilling is to be otherwise than in accordance with B.S. 1560, Class 150 (Clause 39).

9. State details of shop painting requirements and whether pickling or sand blasting is required (Clause 47).

10. State method of despatching tank plates for export (Clause 51 *a*).

11. State whether welding electrodes are to be supplied by the tank manufacturer.

12. Specify amount of shop erection required (Clause 53).

13. List by size and number all mountings required, showing locations thereof, and sketches where these mountings are not in accordance with the standard.

14. Specify any details required which do not comply with this standard, such as tank with special roof, e.g. water seal, breather, lifter, etc. Attach drawings where necessary.

B. It is recommended that the following additional information should be supplied to the purchaser, unless it is intended that the choice of alternatives permitted in this standard shall be left to the tank manufacturer:

15. State type of tank (Clause 3).

16. State method of fixing curb angle to shell plates (Clause 18).

17. *Roof design.* State which of the following is required:

a. Open-top roof (for floating roof).

b. Fixed roof:

(i) Self-supporting.

(ii) Column-supported.

18. Specify whether cone or dome roof is required (Clause 22).

20. State angle of stairways required (Clause 40).

21. State if special erection marks are required (Clause 46).

22. Specify shipping marks required (Clause 41 *b*).

23. State whether mill test reports are required (Clause 52).

APPENDIX G

PRACTICAL CONSIDERATIONS FOR INSTALLATION OF OIL STORAGE TANKS

1. The foundations necessary for tanks at any particular location will depend mainly on site conditions, and should be of a nature to ensure good drainage, the minimum corrosion of tank bottoms, and provide adequate allowance for settlement.

Where tanks are built on sand bed, or sand bed and rubble type foundations, the foundation should be carried at least 18 in. beyond the tank shell and its top surface should be protected by a sand and bitumen carpet about 2 in. thick, in order to prevent erosion by weather conditions and also provide protection to underside of tank bottom plates (see Fig. 18).

2. All valves fitted next to tank nozzles for inlet, outlet and drain connections should be of steel construction throughout. If not of the rising stem type they should embody an indicator to show clearly whether the stem valve is open or shut.

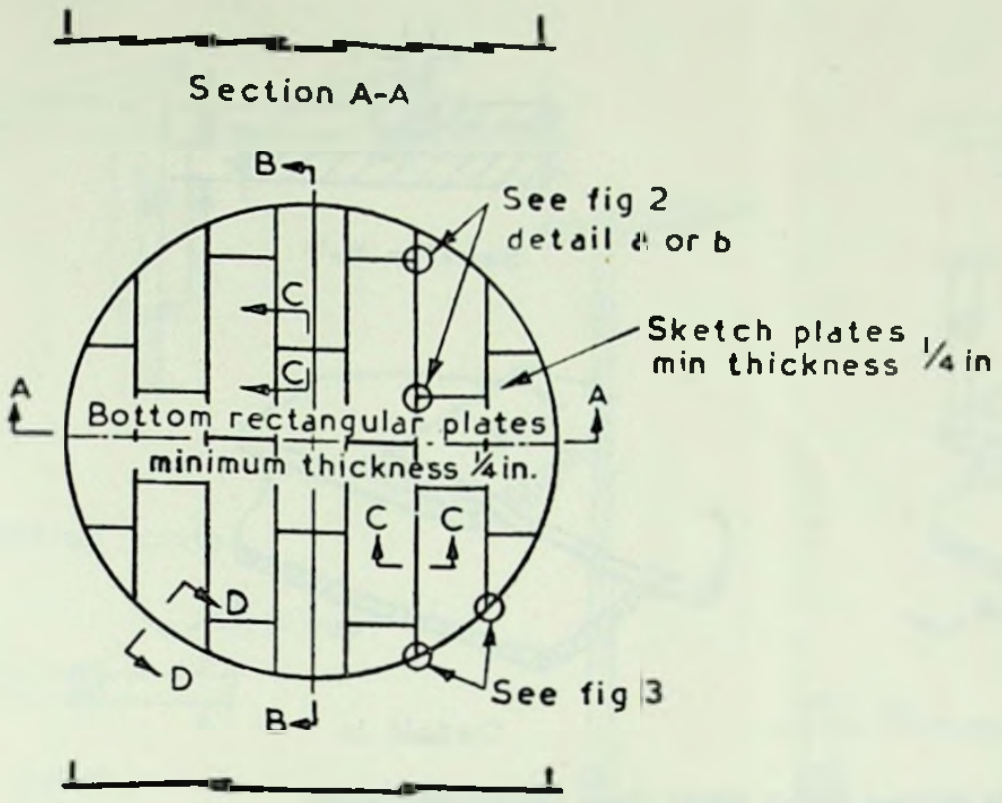
3. Adequate provision should be made for flexibility in piping connections to permit movement due to settlement.

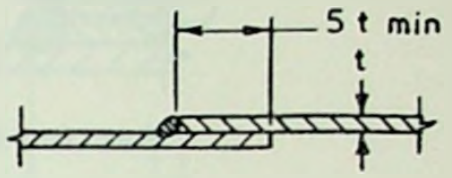
4. Tanks should be fitted with adequate vents to permit pressure or vacuum release when filling or discharging operations are in progress or for any extraordinary temperature change due to climatic conditions.

5. Roof manholes wherever possible should be located over side manholes. Tanks over 30 ft diameter should be provided with at least two roof and two side manholes. For tanks 30 ft diameter and below one roof and one side manhole is considered adequate.

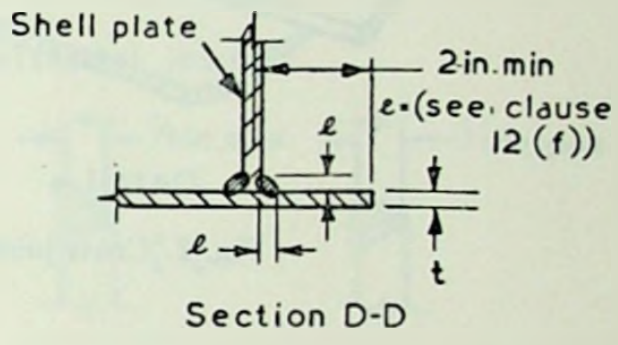
6. All tanks should be provided with either a ladder or a staircase for easy external access to the roof. In the case of groups of tanks with connecting gangways at least one staircase should be provided.

7. The above clauses represent a standard of good practice and therefore takes the form of recommendations. Compliance with it does not confer immunity from relevant legal requirements, including bye-laws.



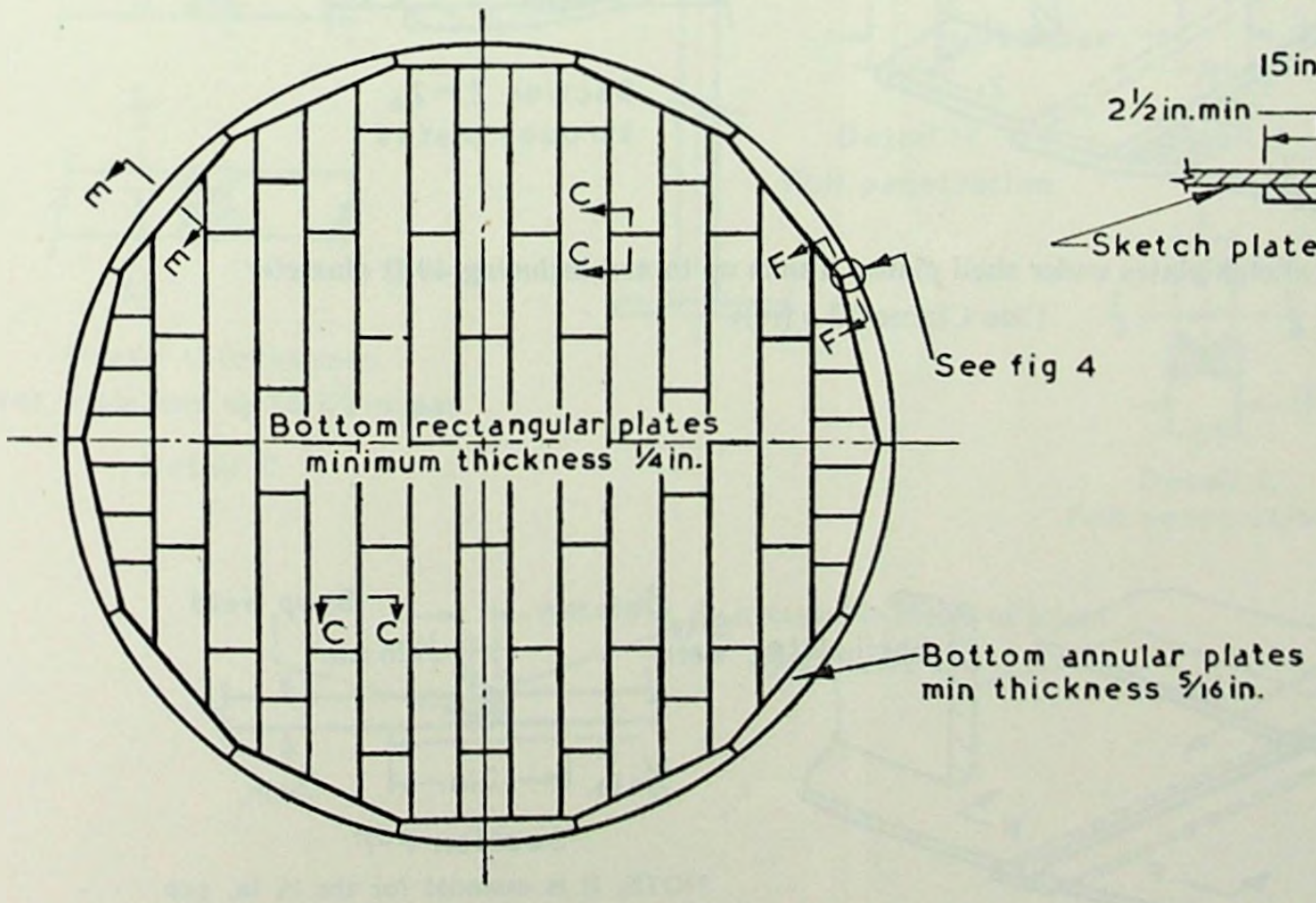


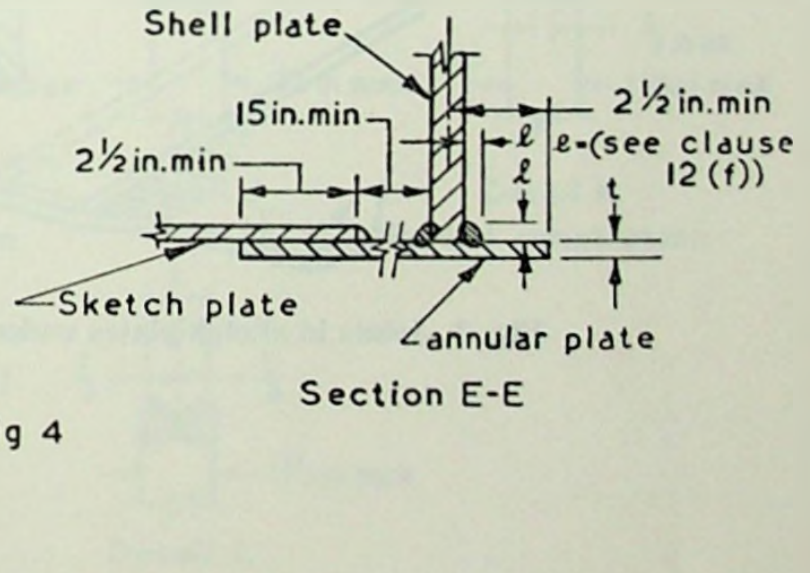
Section C-C



Section D-D

Typical layout, tanks up to and including 40 ft diameter





Section E-E

Typical layout, tanks over 40 ft diameter. Lay of plates similar to Sections A-A, and B-B above

Fig. 1

(See Clauses 11 and 12)

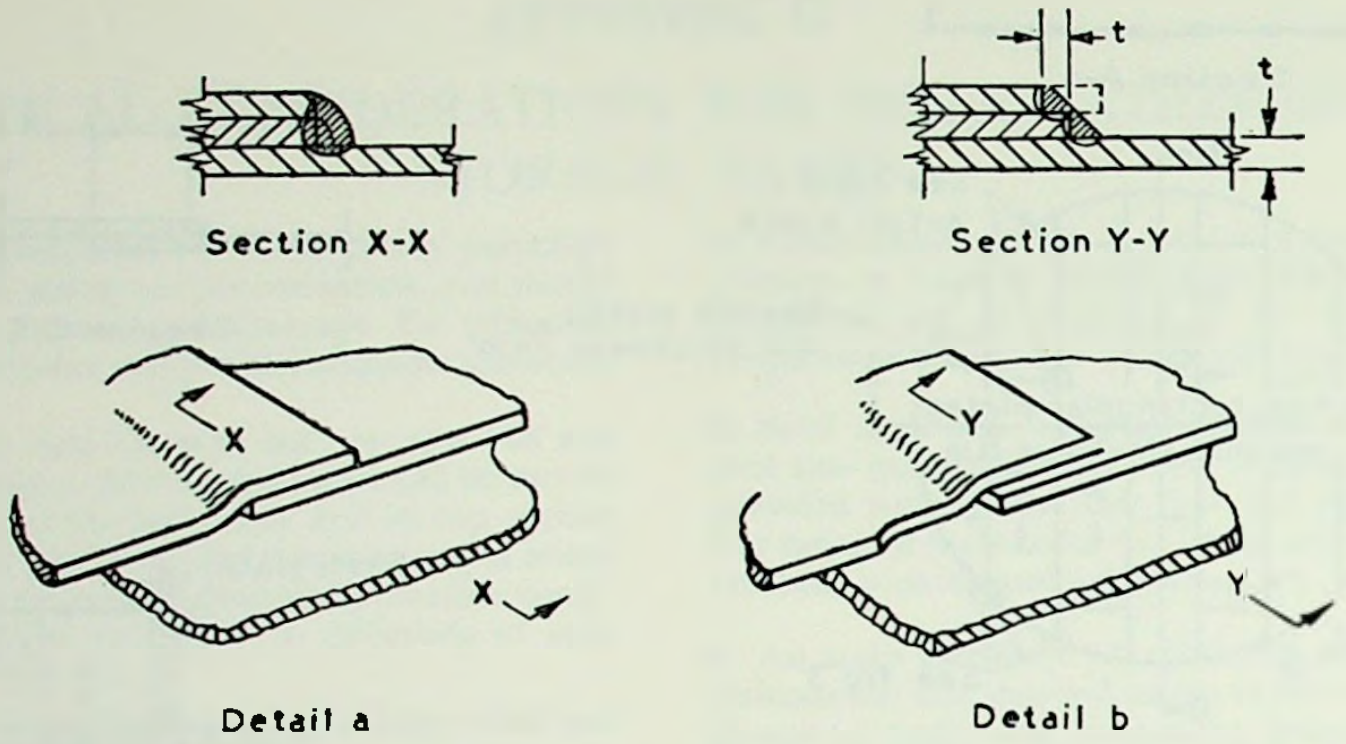


Fig. 12. Cross joints in bottom plates where three thicknesses occur
(See Clause 12 *b* (iii))

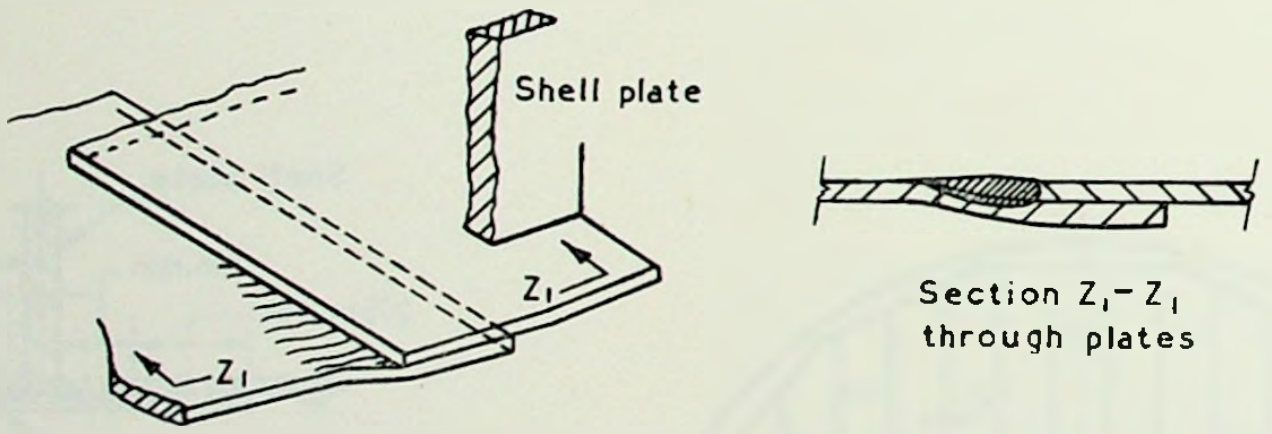
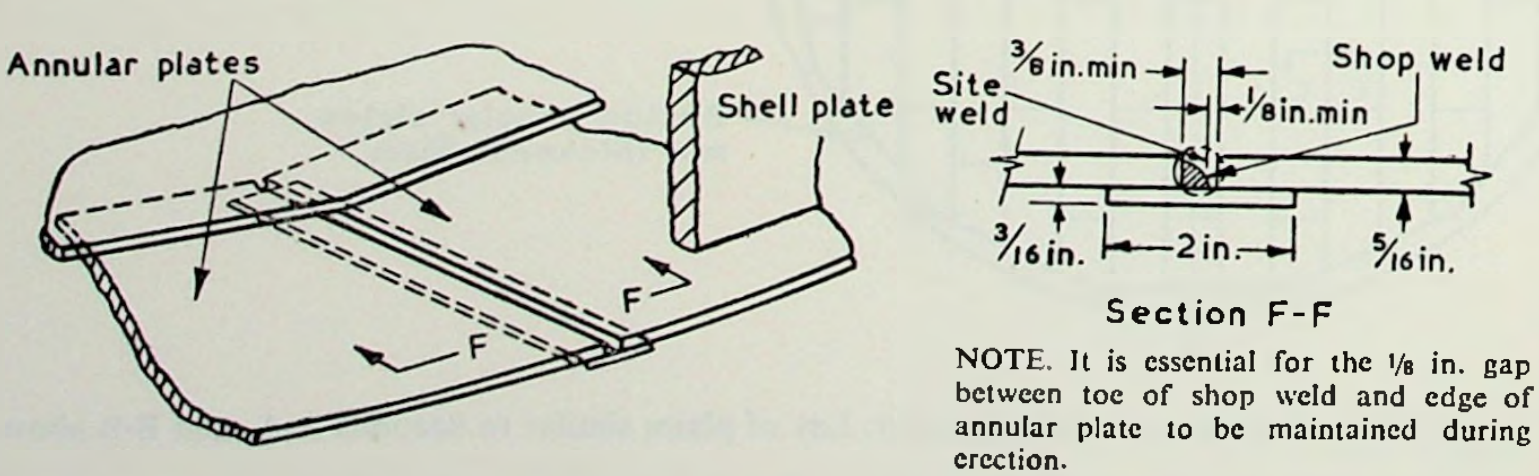
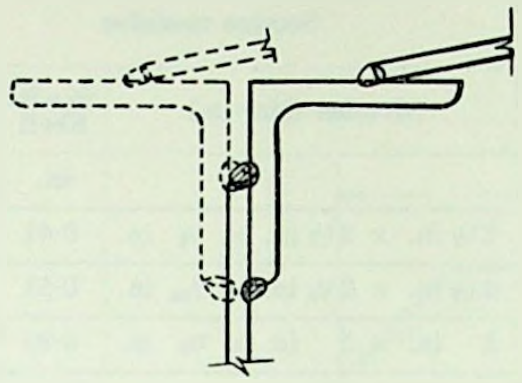


Fig. 3. Joints in sketch plates under shell plates. Tanks up to and including 40 ft diameter
(See Clause 12 *b* (iv))

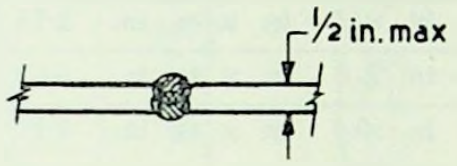


NOTE. It is essential for the 1/8 in. gap between toe of shop weld and edge of annular plate to be maintained during erection.

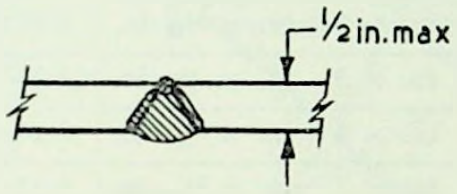
Fig. 4. Joint in annular plates under shell plates. Tanks over 40 ft diameter
(See Clause 12 *e*)



Vertical joints



Detail A



Detail B

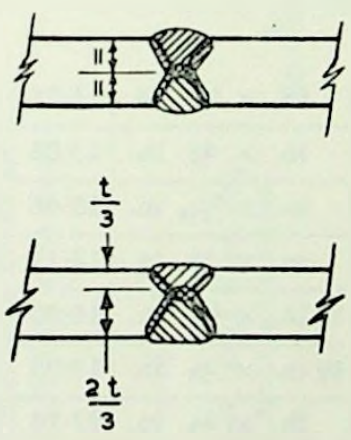
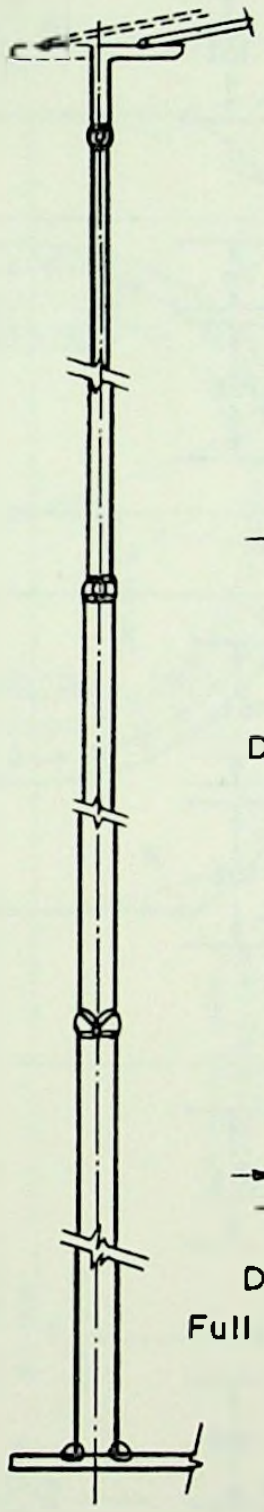
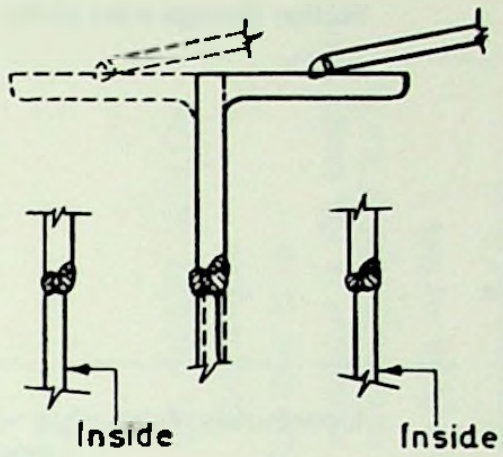


Plate thicknesses
over 5/16 in. and up to 1½ in. max

Detail C





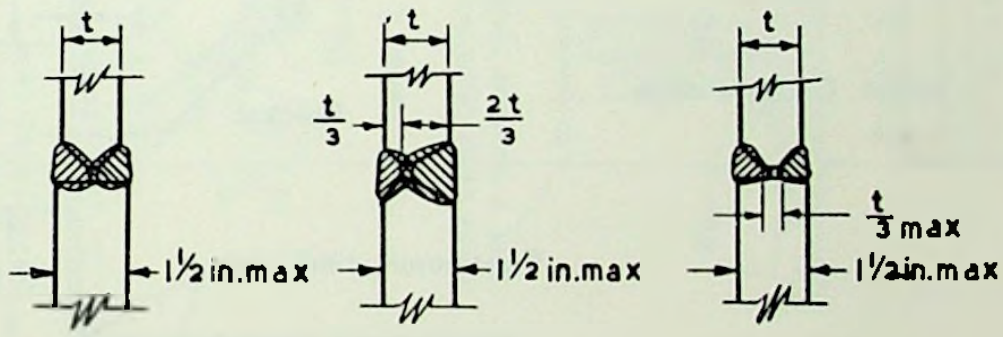
Horizontal joints

Detail E

Detail F

Detail G

Full penetration



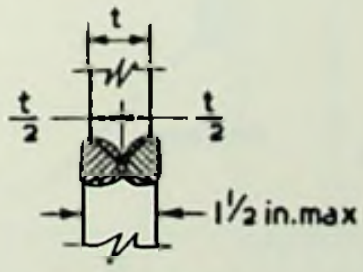
Detail H

Detail J

Detail K

Full penetration

Partial penetration



Detail L

Full penetration

Fig. 5. Acceptable forms of joints

(See Clause 17)

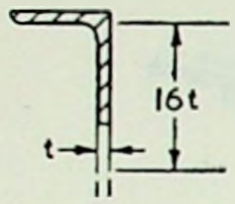
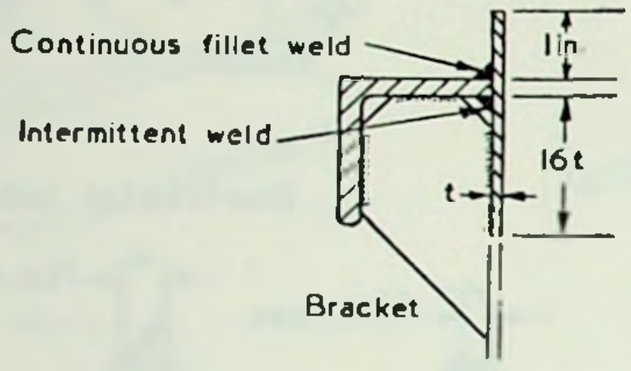
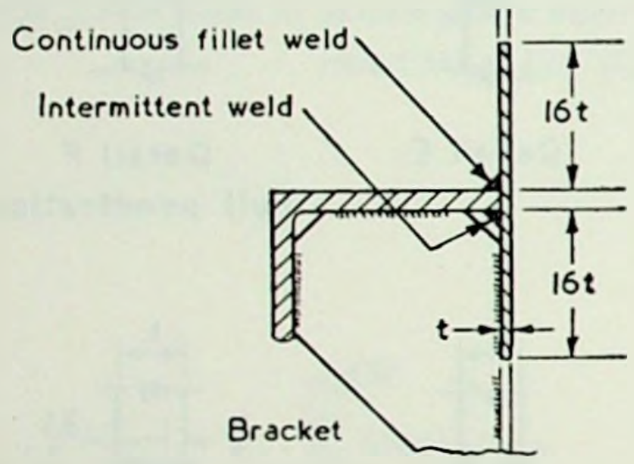
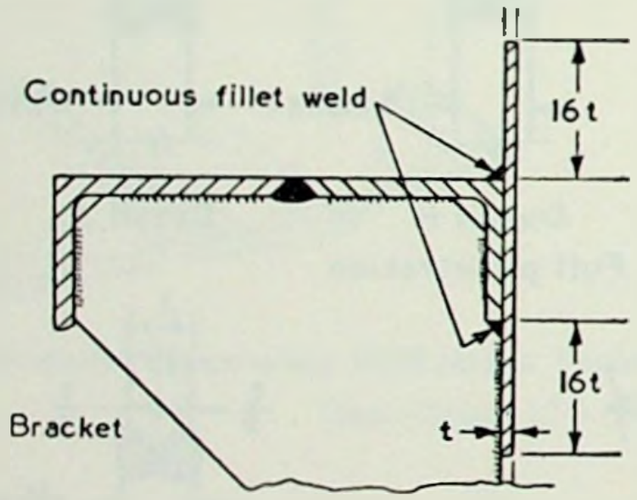
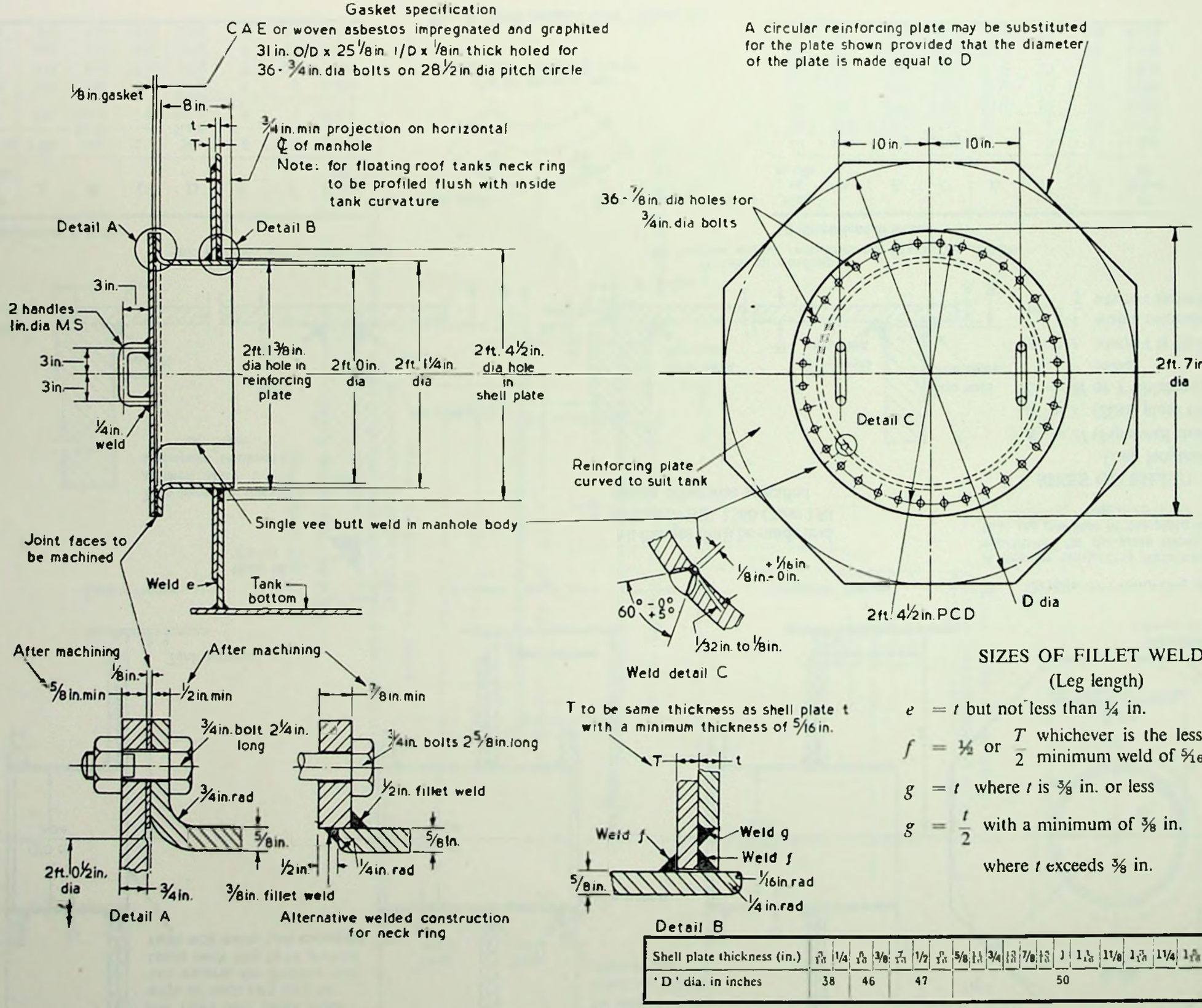
Section through wind girder	Member (size in.)	3/16 in. Shell	1/4 in. Shell
		in.	in.
Detail A top angle 	2 1/2 in. × 2 1/2 in. × 1/4 in.	0·41	0·42
	2 1/2 in. × 2 1/2 in. × 5/16 in.	0·51	0·52
	3 in. × 3 in. × 3/8 in.	0·89	0·91
Detail B curb angle 	2 1/2 in. × 2 1/2 in. × 1/4 in.	1·61	1·72
	2 1/2 in. × 2 1/2 in. × 5/16 in.	1·89	2·04
	3 in. × 3 in. × 1/4 in.	2·32	2·48
	3 in. × 3 in. × 3/8 in.	2·78	3·35
	4 in. × 4 in. × 1/4 in.	3·64	4·41
	4 in. × 4 in. × 3/8 in.	4·17	5·82
Detail C single angle 	2 1/2 in. × 2 1/2 in. × 1/4 in.	1·68	1·78
	2 1/2 in. × 2 1/2 in. × 3/16 in.	1·98	2·12
	4 in. × 3 in. × 1/4 in.	3·50	3·73
	4 in. × 3 in. × 5/16 in.	4·14	4·45
	5 in. × 3 in. × 5/16 in.	5·53	5·95
	5 in. × 3 1/2 in. × 5/16 in.	6·13	6·60
	5 in. × 3 1/2 in. × 3/8 in.	7·02	7·61
	6 in. × 4 in. × 3/8 in.	9·02	10·56
Detail D two angles 	4 in. × 3 in. × 5/16 in.	11·27	11·78
	4 in. × 3 in. × 3/8 in.	13·06	13·67
	5 in. × 3 in. × 5/16 in.	15·48	16·24
	5 in. × 3 in. × 3/8 in.	18·17	18·89
	5 in. × 3 1/2 in. × 5/16 in.	16·95	17·70
	5 in. × 3 1/2 in. × 3/8 in.	19·99	20·63
	6 in. × 4 in. × 3/8 in.	27·74	28·92
Detail E formed plate	b = 10	—	22·3
	b = 12	—	28·1
	b = 14	—	34·3
	b = 16	—	40·8
	b = 18	—	47·7
	b = 20	—	54·9
	b = 22	—	62·4
	b = 24	—	70·3
	b = 26	—	78·5
	b = 28	—	87·0
	b = 30	—	95·9
	b = 32	—	105·1
	b = 34	—	114·7
	b = 36	—	124·5
	b = 38	—	134·7
	b = 40	—	145·3

Fig. 6. Wind girders (See Clause 20 *c*)



SIZES OF FILLET WELDS
(Leg length)

e = t but not less than 1/4 in.

f = 1/2 or $\frac{T}{2}$ whichever is the lesser with a minimum weld of 5/16 in.

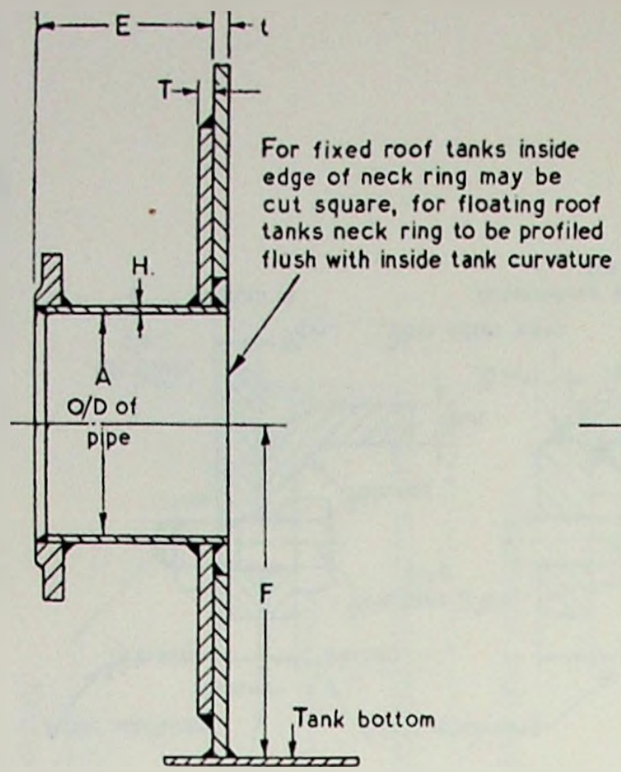
g = t where t is 3/8 in. or less

g = $\frac{t}{2}$ with a minimum of 3/8 in.

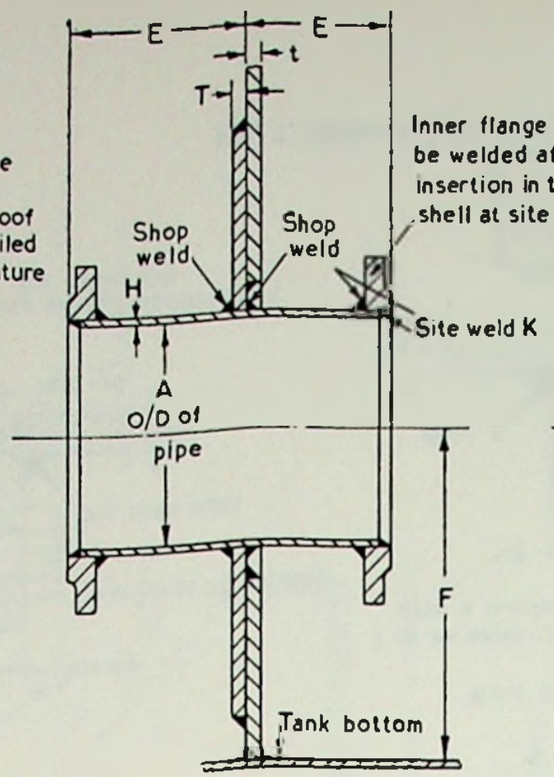
where t exceeds 3/8 in.

Shell plate thickness (in.)	5/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1	1 1/16	1 1/8	1 3/16	1 1/4	1 5/16	1 3/8	1 7/16	1 1/2
'D' dia. in inches	38		46		47			50												51		

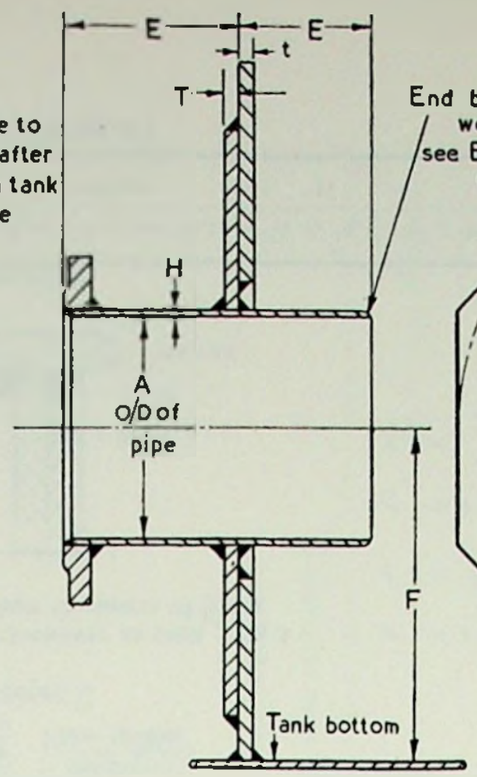
Fig. 7. Shell manholes (See Clause 31)



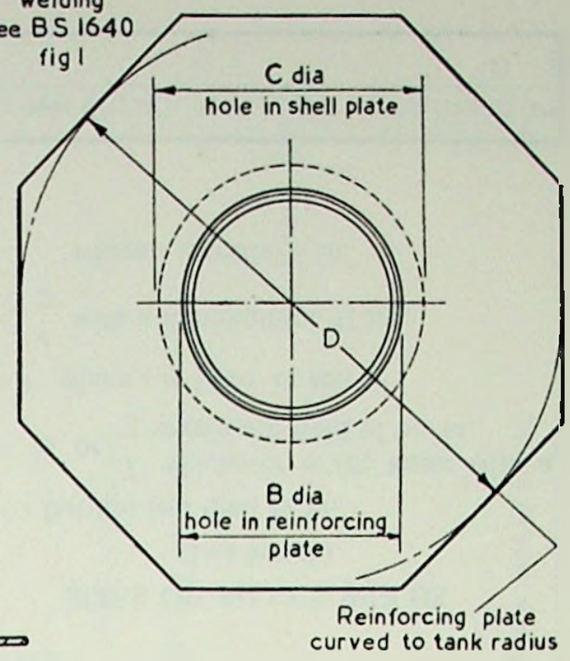
Single flange



Double flange

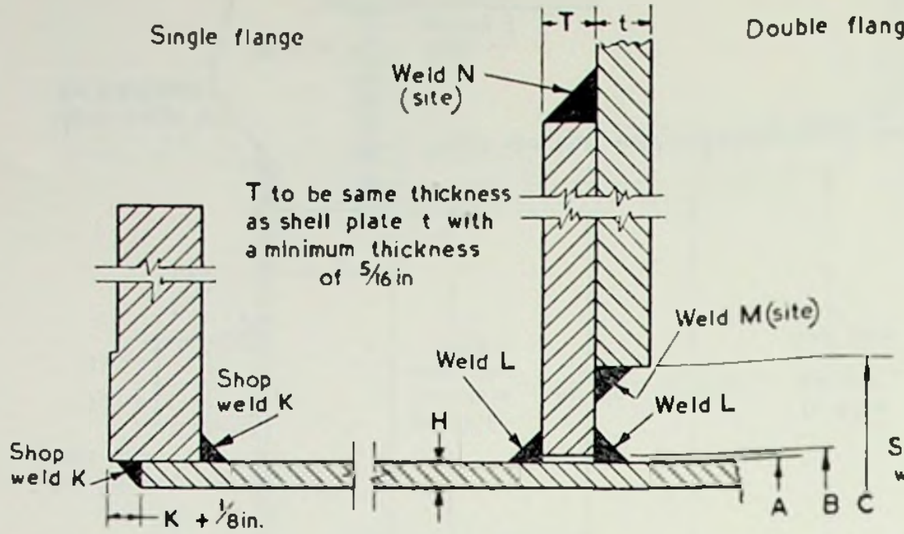


Special flange



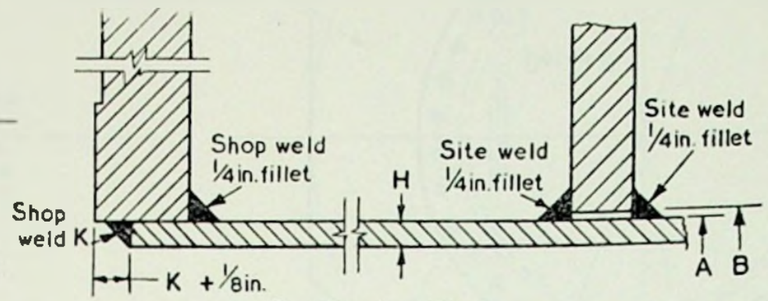
Details of reinforcing plate

A circular reinforcing plate may be substituted for the plate shown provided that the diameter of the plate is made equal to D



Details of welding for nozzles with reinforcement

All flanges shall be made and drilled to B.S. 1560 Class 150 unless otherwise specified



Details of welding for nozzles without reinforcement Sizes 1½ in. and 2 in.

SIZES OF FILLET WELDS.
(Leg lengths)

$K = H$ (Pipe wall thickness)
$N = t$ (Shell plate thickness)
$L = H$ or T whichever is the lesser
$+ = t$ where t is ⅜ in. or less
or $= \frac{t}{2}$ with a minimum of ⅜ in. where t exceeds ⅜ in.

All dimensions in inches

Size of nozzle	A	B	C	D	E	F	H Sched 80
1½	1·90	No Rein-forcg. plate	2	No Rein-forcg. plate	6	6	0·200
2	2⅜		2½		6	7	0·218
3	3½	3⅝	6¼	12½	7	9	0·300
4	4½	4⅝	7¼	14½	7	10	0·337
6	6⅝	6¾	9⅜	18¾	8	12	0·432
8	8⅝	8¾	11⅜	22¾	8	14	0·500

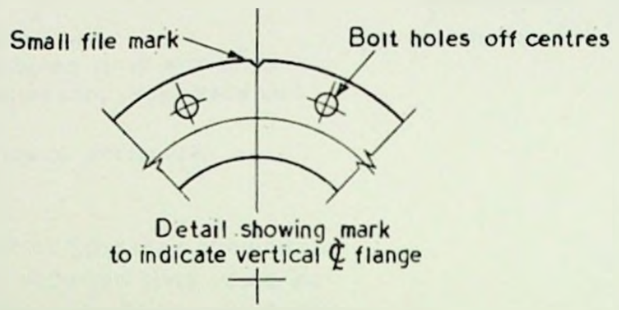
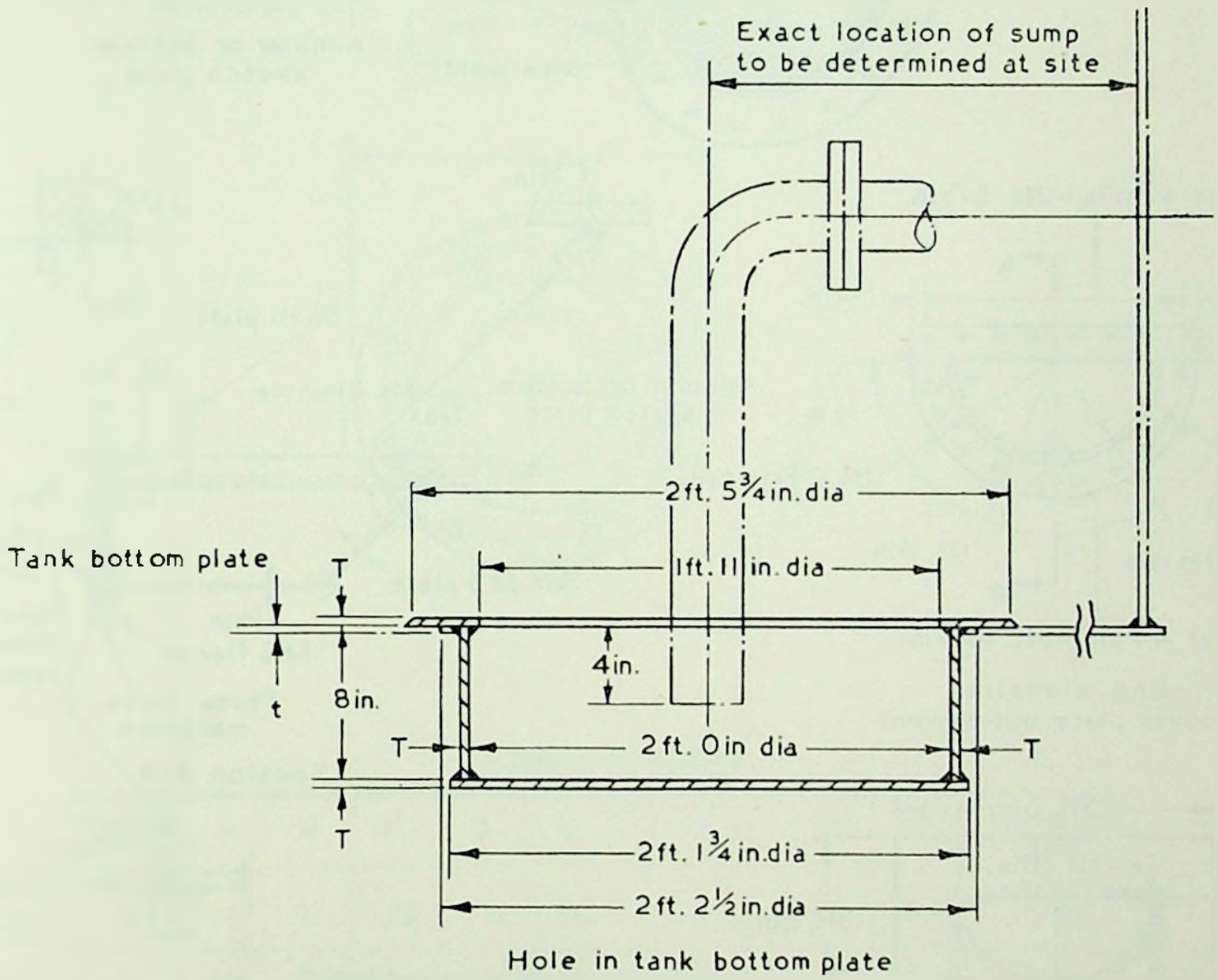


Fig. 8. Shell nozzles (See Clause 32)

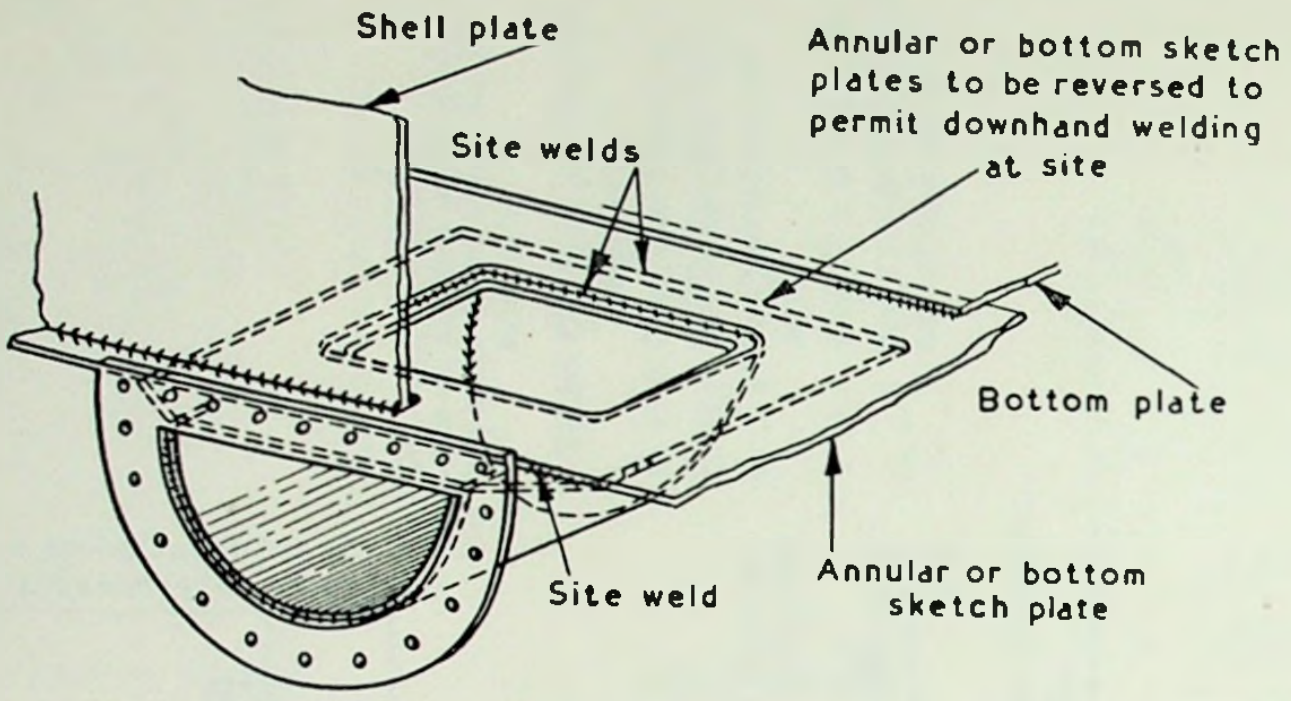
All dimensions in inches

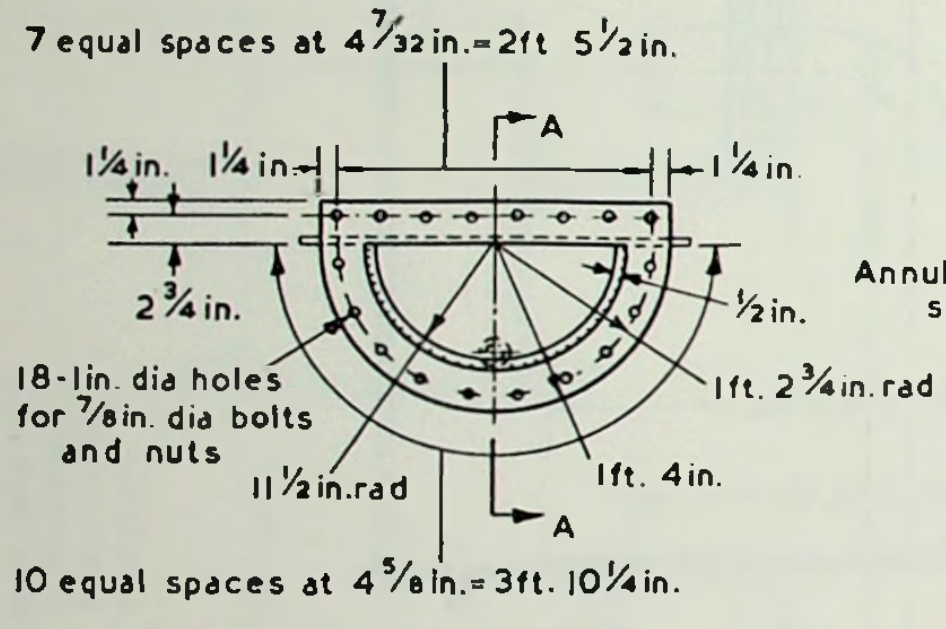
Size of nozzle	A	B	C	D	E	F	H Sched 80
10	10¾	10⅞	13½	27	9	17	0·500
12	12¾	12⅞	15½	31	9	18	0·500
14	14	14⅛	16¾	33½	10	19	0·500
16	16	16⅛	18¾	37½	10	21	0·500
18	18	18⅛	20¾	41½	10	23	0·500
20	20	20⅛	22¾	45½	11	25	0·500
24	24	24⅛	26¾	53½	12	29	0·500



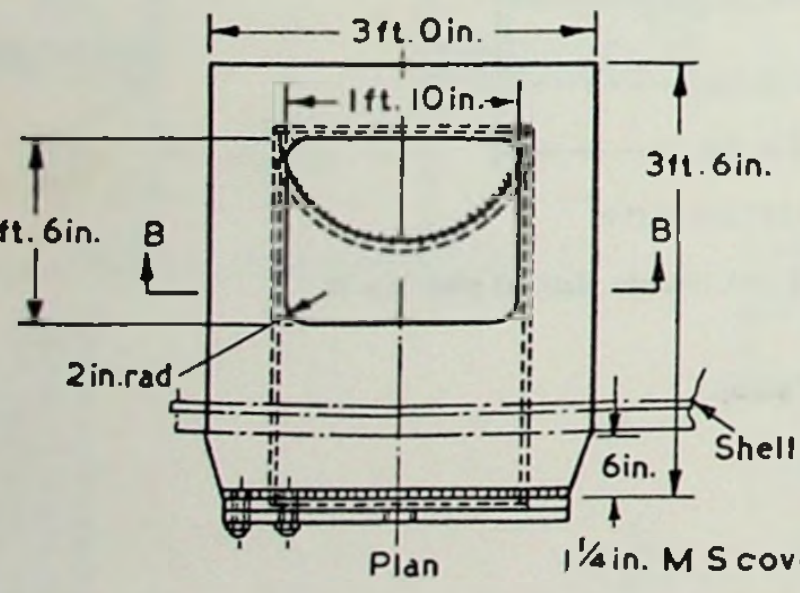
NOTE. Thickness of plate T to be equal to thickness of tank bottom plate (t) plus $\frac{1}{16}$ in.
All welds to be full fillet welds.

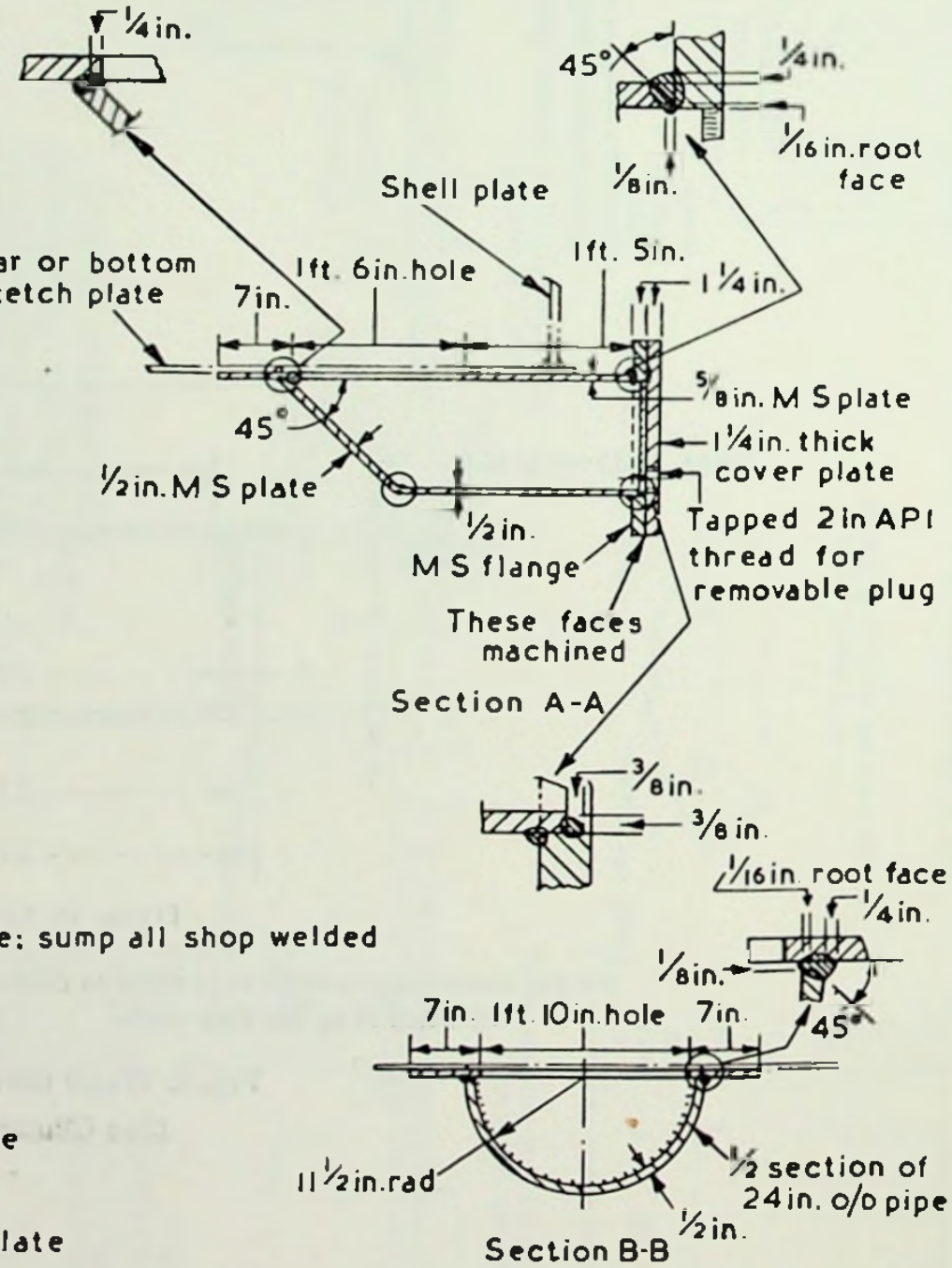
Fig. 9. Water draw-off sump
(See Clause 33)





End elevation
(cover plate not shown)





Note; sump all shop welded

Fig. 10. Combined water draw-off and clean-out sump

(See Clause 34)

Dimensions in inches

Nominal size	A	B	C	D	E	F	G	H	J	No. and dia. studs
2	2	6	4¾	⅞	2⅝	1⅝	1	⅝	3⅝	4–⅝
3	3⅝	7½	6	1	4¼	1¾	1	¾	5	4–⅝
4	4⅝	9	7½	1⅛	5¼	1¾	1	⅞	6 3/16	8–⅝
6	6¾	11	9½	1¼	7⅜	2	1¼	15/16	8½	8–¾

Fig. 11. Detail of drain pad for use on elevated tanks
(See Clause 35)

Dimensions of plate ring flanges to conform to B.S. 1560, Class 150, in all respects, except that extended hub at back of flange may be omitted. Slip-on flanges to B.S. 1560, Class 150 (forged steel) may be substituted for plate ring flanges.

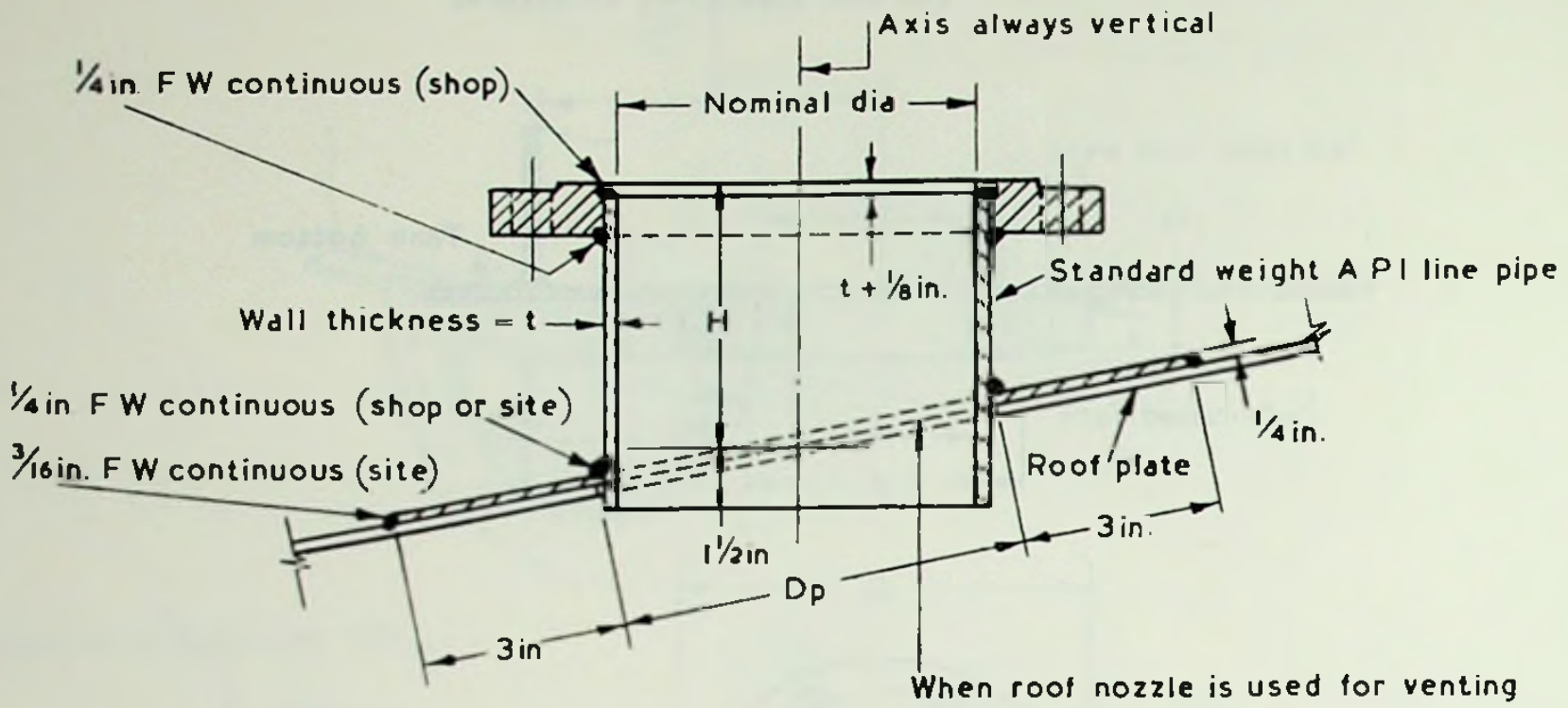
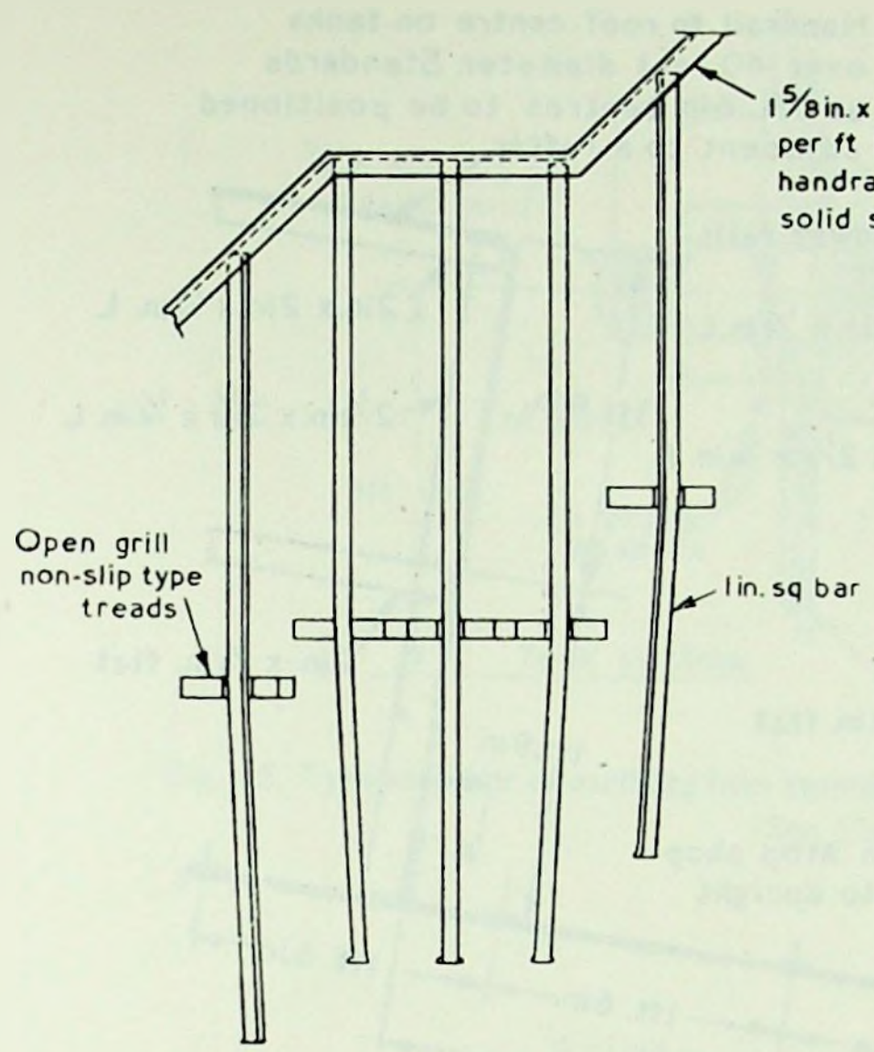


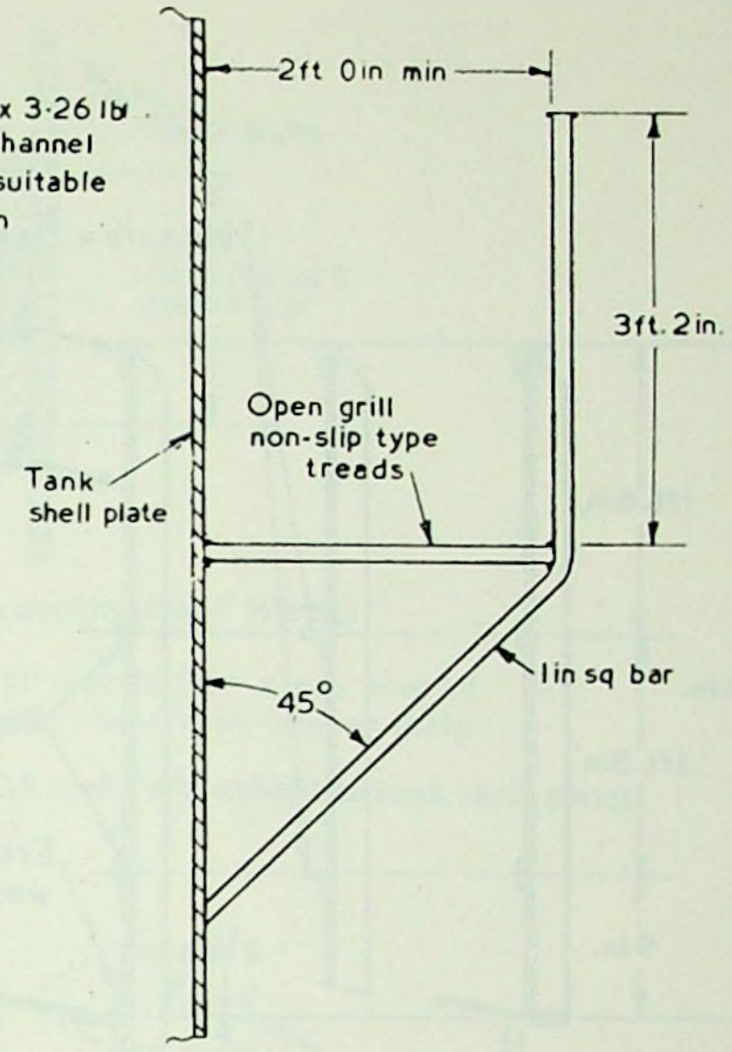
TABLE. All dimensions in inches

Nominal diameter of nozzle	Outside diameter of pipe neck	Dia. of hole in roof plate Dp	Height of nozzle H
1	1 5/16	1 7/16	6
2	2 3/8	2½	6
3	3½	3 5/8	6
4	4½	4 5/8	6
6	6 5/8	6¾	6
8	8 5/8	8 7/8	6
10	10¾	11	8
12	12¾	13	8

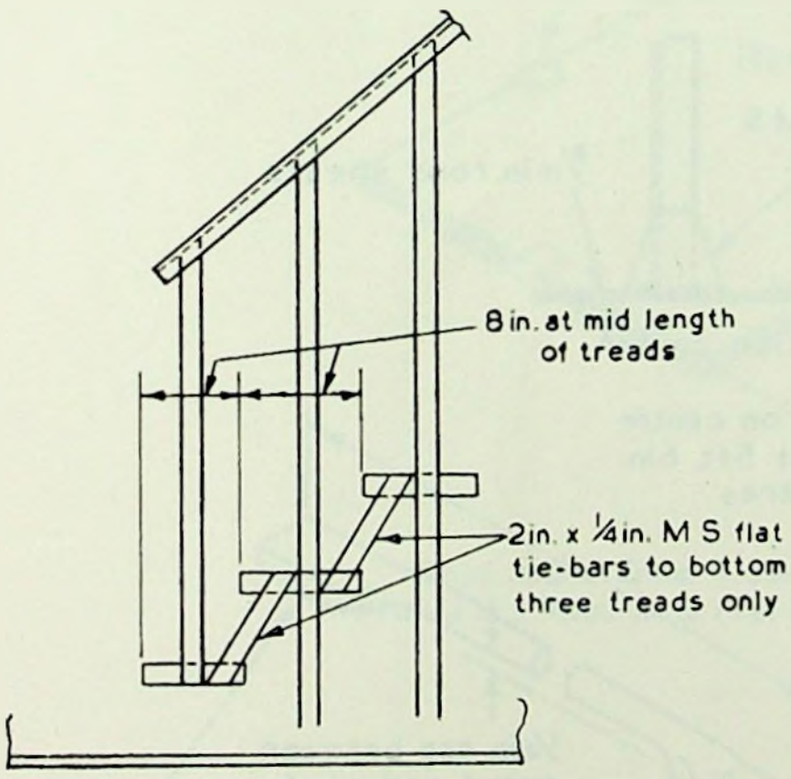
Fig. 12. Flanged roof nozzles
(See Clause 38)

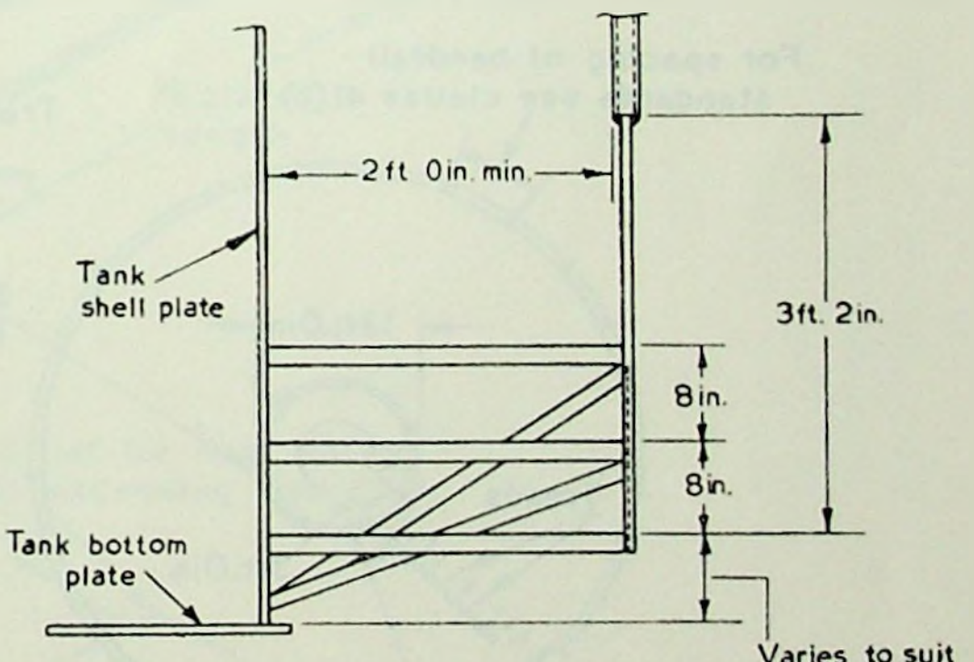


Elevation of centre landing when required

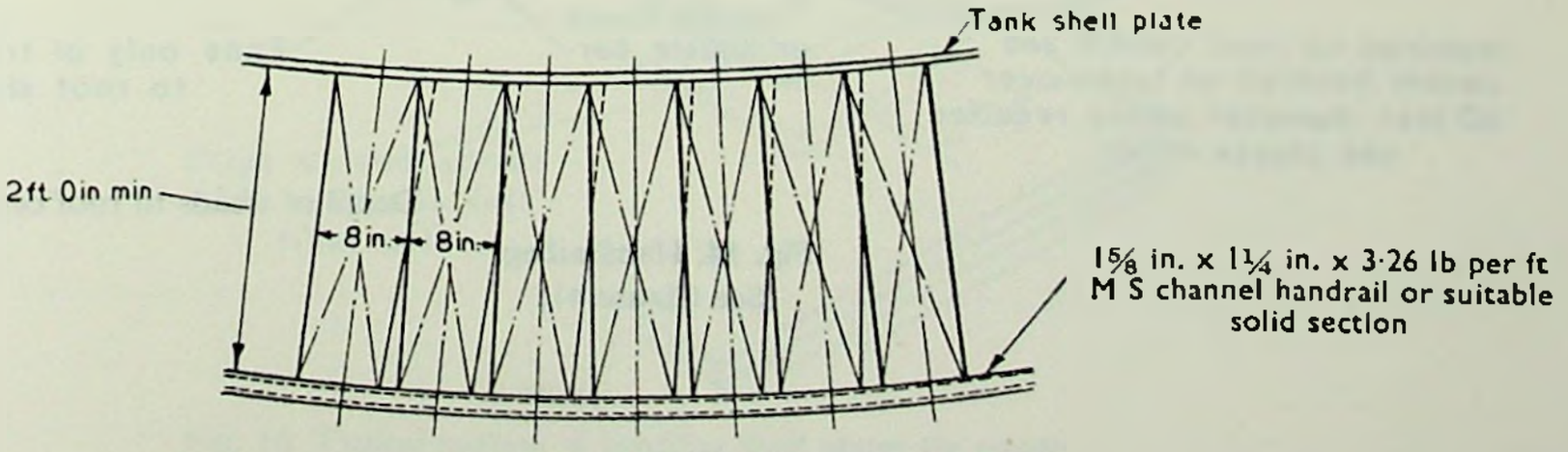


Typical cross section through stairway





Elevation of bottom staircase



Plan of staircase

Fig. 13. Details of spiral stairways (See Clause 40)

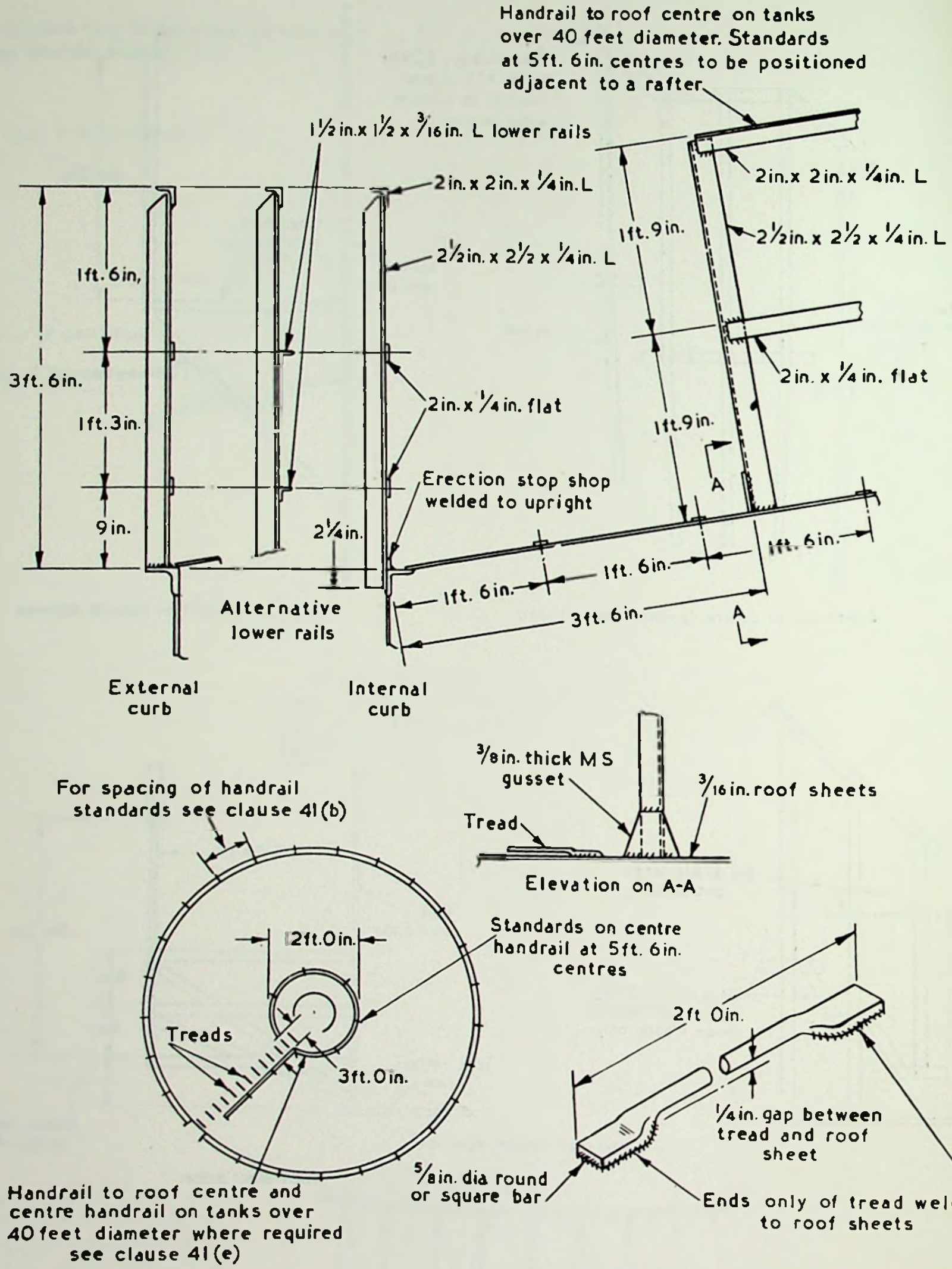


Fig. 14. Handrailing
(See Clause 41)

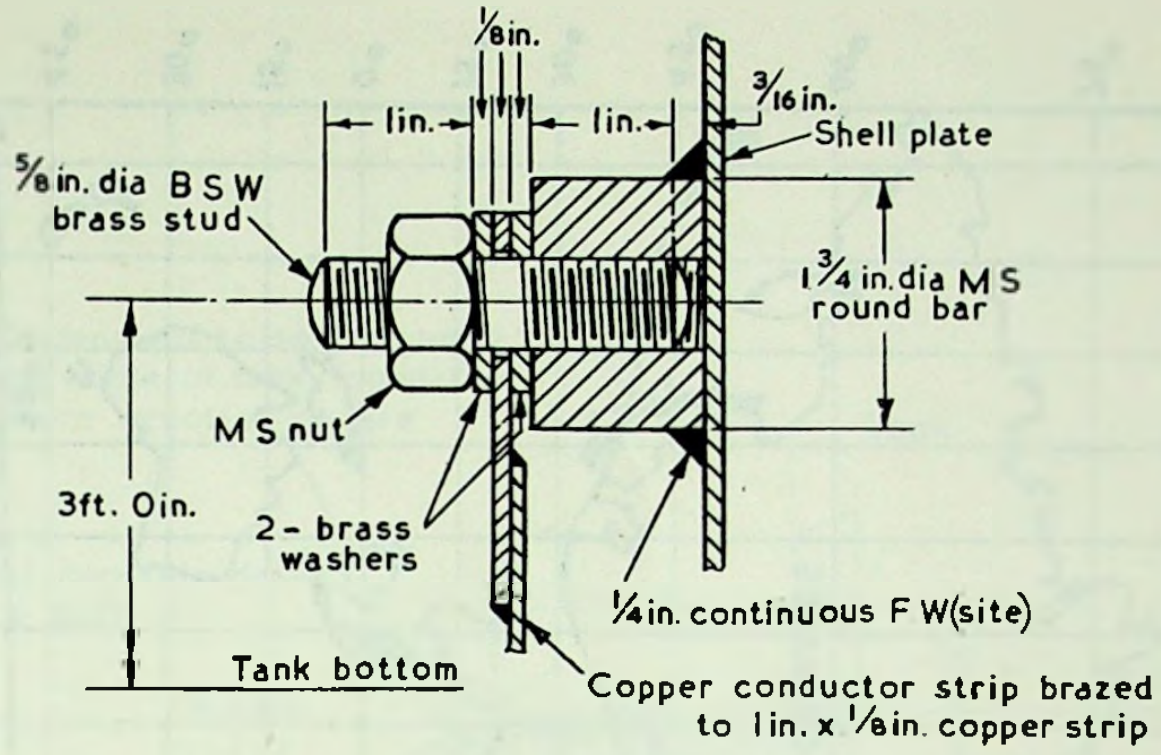


Fig. 15. Typical detail of earthing boss (supplied with tank) site welded to tank shell plates
(See Clause 43)

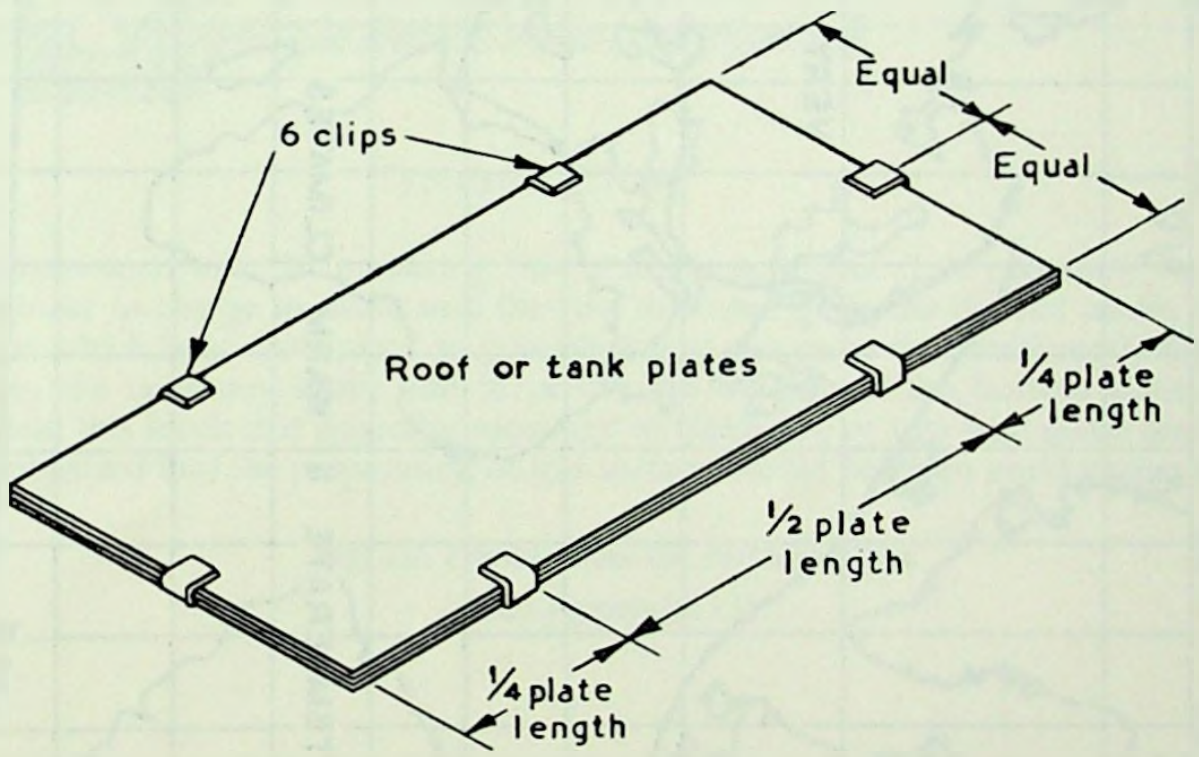


Fig. 16. Typical method of bundling shell plates for export
(See Clause 51 *a*)

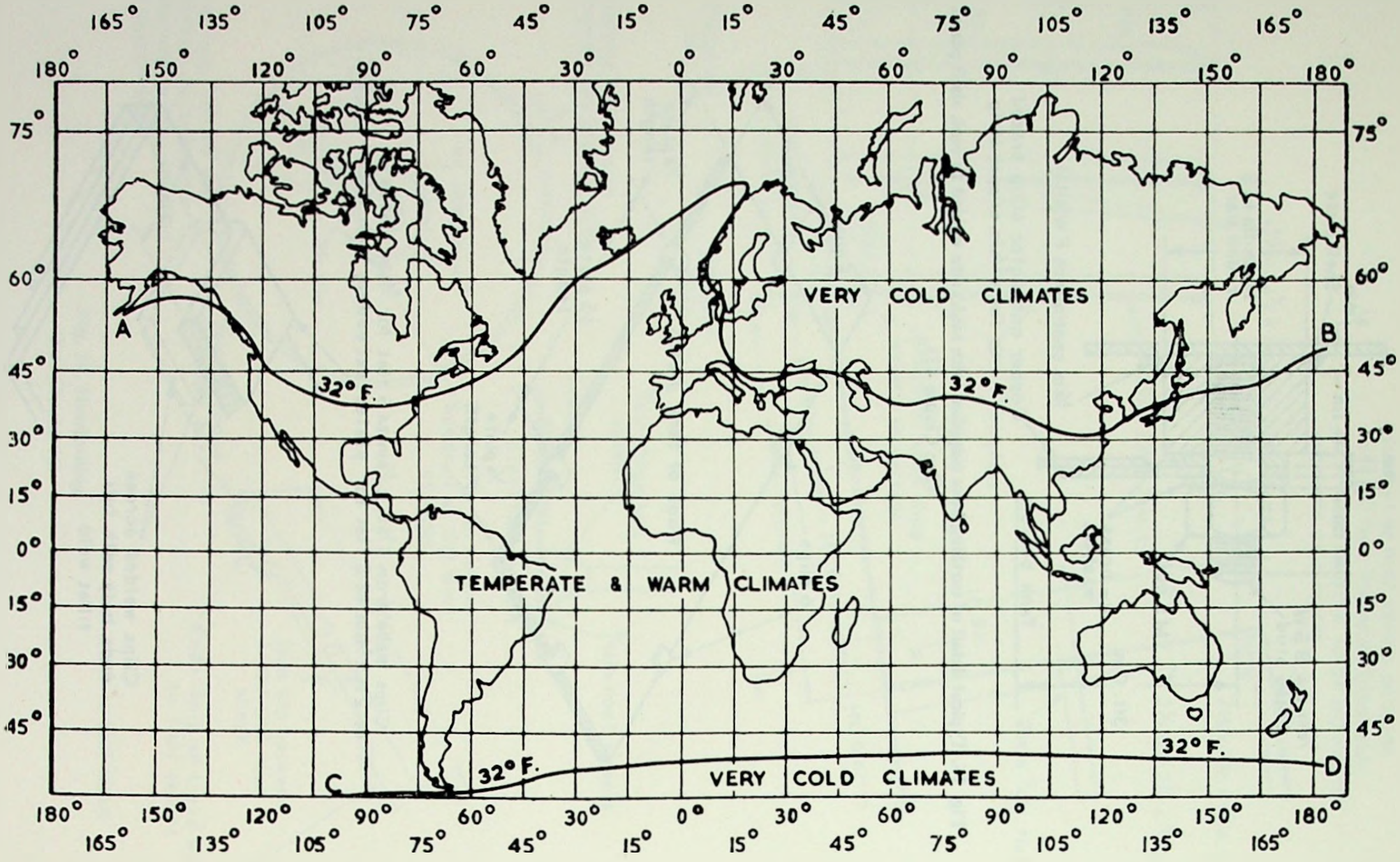
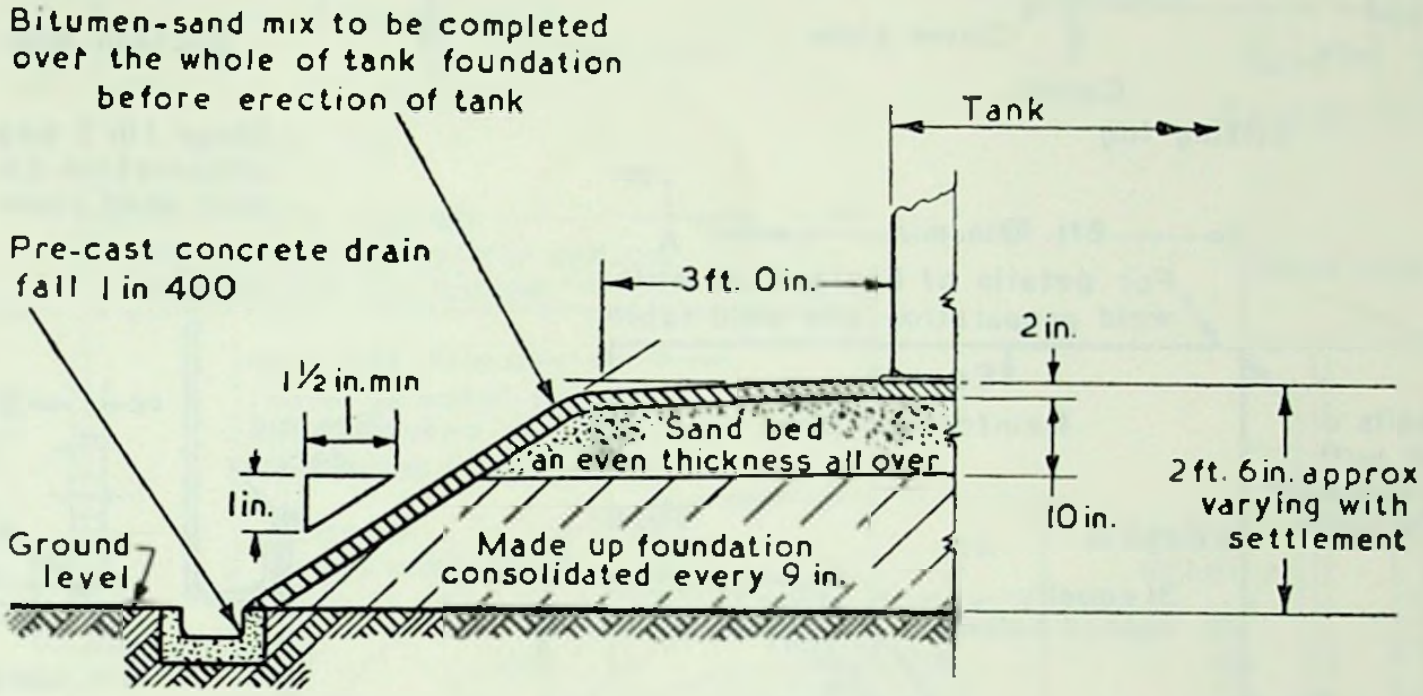


Fig. 17. Map of world showing isotherms

(See Clause 6)

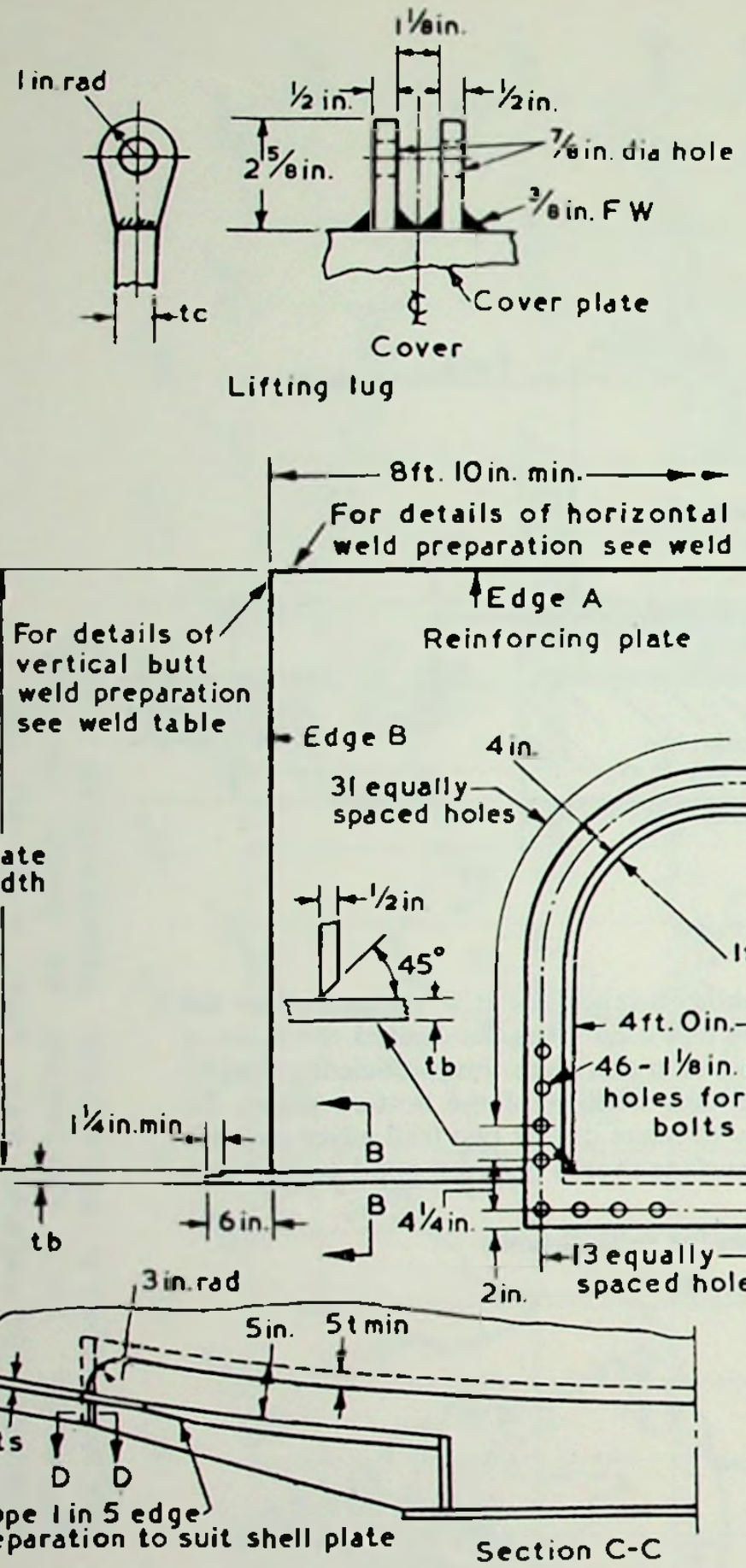


Typical section

Bitumen-sand mix. In preparing this bitumen-sand mix it is necessary for the engineer in charge to make sure that the mix used gives the desired result, i.e. a layer which is as waterproof as possible but at the same time sufficiently firm to carry the necessary traffic and to permit the welding of the bottom plates. To obtain this result it is generally necessary to make one or two trial mixes and it is emphasized that the preparation of this surface should be given good supervision.

Fig. 18. Foundations for vertical tanks

(See Appendix G)



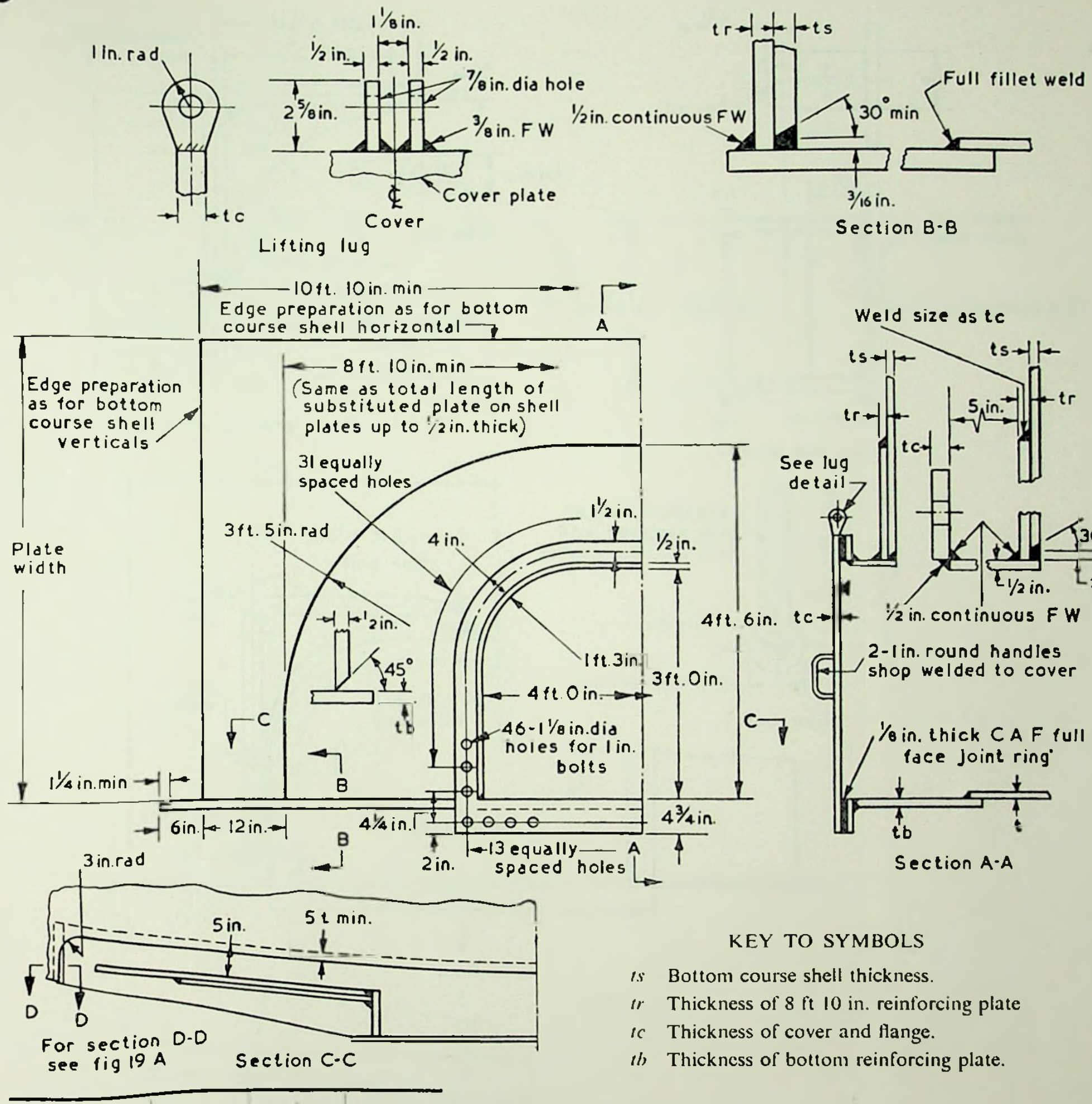
For plate widths, values of *tb*, *ts*, etc., see Table

Table

Plate	ts	tr	tc	tb
ft in.	in.	in.	in.	in.
5 0	3/16	½	1	1
*5 0	¼ to 9/32	16/16	1	1 5/16
6 0	¼ to ⅜	16/16	1	1 5/16
6 0	13/32 to ½	1 3/16	1	1 5/16

* Denotes required on tanks code BLP 407, 408 and 409.

Fig. 19A. Clean-out door
(For tanks with shell plates 3/16 in. to ½ in. thick
(See Clause 36)



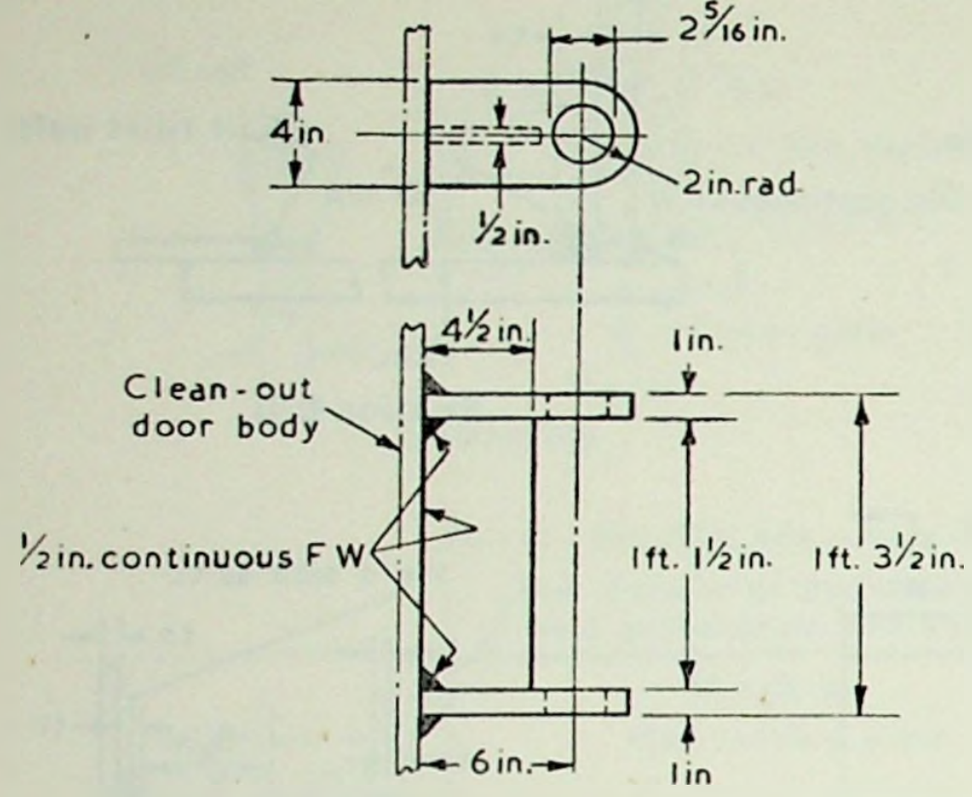
ts	tr	tc*	tb*
in.	in.	in.	in.
17/32 to ¾	15/16	1	1 5/16
25/32 to 1	1 3/16	1	1 5/16
1 1/32 to 1 7/16	1 11/16	1	1 5/16

* Tanks over 60 ft 0 in. and up to 68 ft 0 in. *tc* to be increased to 1 1/16 in., and *tb* to 1 3/16 in.

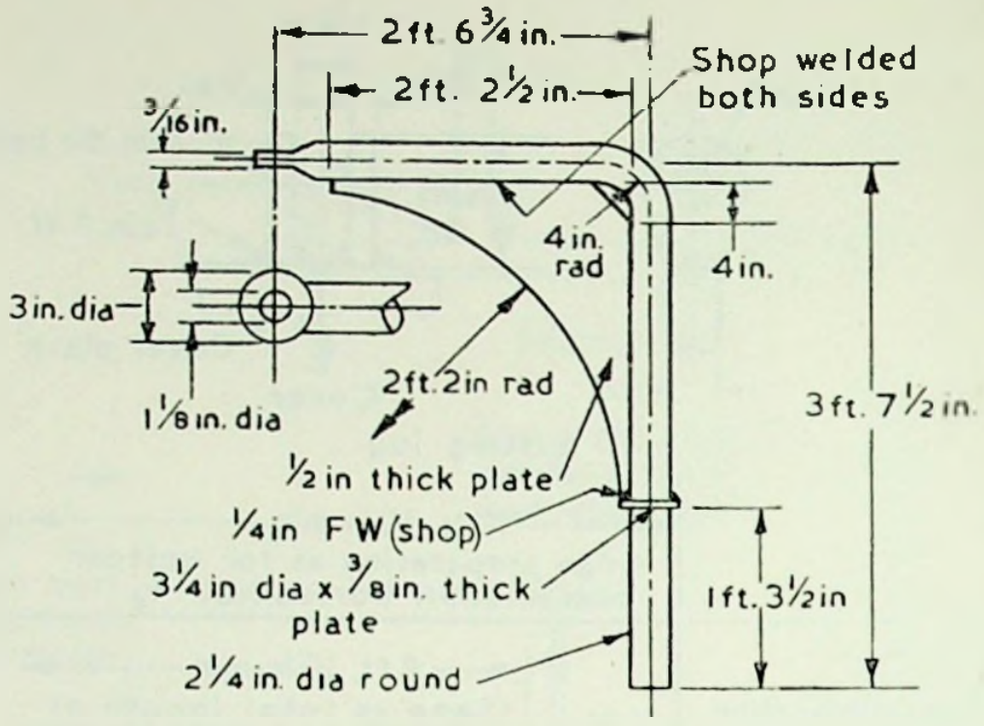
KEY TO SYMBOLS

ts Bottom course shell thickness.
tr Thickness of 8 ft 10 in. reinforcing plate
tc Thickness of cover and flange.
tb Thickness of bottom reinforcing plate.

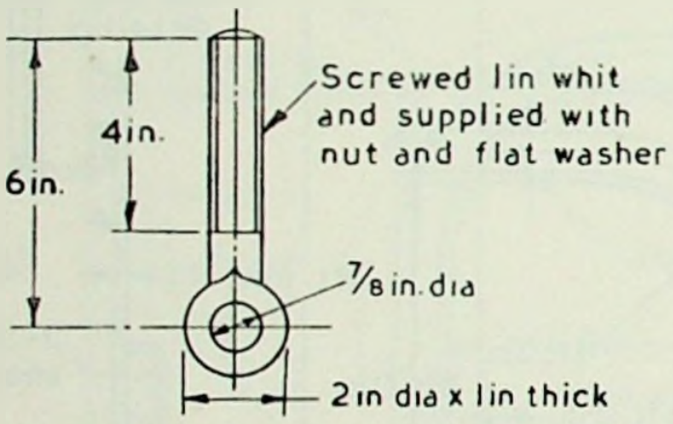
Fig. 19B. Clean-out door
(For tanks with shell plates 17/32 in. to 1 7/16 in. thick)
(See Clause 36)



Davit arm swivel



Davit arm



Eye bolt

Fig. 19C. Davit suitable for 4 ft 0 in. by 3 ft 0 in. clean-out door
(See Clause 36)

Universal Decimal Classification 621 . 642 . 3 : 665 . 5

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[UDC 621.642.3 : 665.5 : 624.953.014.25]

SPECIFICATION FOR VERTICAL MILD STEEL WELDED STORAGE TANKS WITH BUTT-WELDED SHELLS FOR THE PETROLEUM INDUSTRY

PART 2 SITE ERECTION, INSPECTION AND TESTING

BRITISH STANDARDS INSTITUTION

SPECIFICATION FOR
VERTICAL MILD STEEL
WELDED STORAGE TANKS
WITH BUTT-WELDED SHELLS
FOR THE PETROLEUM INDUSTRY

PART 2. SITE ERECTION, INSPECTION AND TESTING

B.S. 2654 : Part 2 : 1961

Price 12/6 net

BRITISH STANDARDS INSTITUTION

INCORPORATED BY ROYAL CHARTER

BRITISH STANDARDS HOUSE, 2 PARK ST., LONDON, W.1

TELEGRAMS: STANDARDS, LONDON, W.1 TELEPHONE: MAYFAIR 9000

THIS BRITISH STANDARD, having been approved by the Petroleum Equipment Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 28th December, 1961.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 4000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook, price 15s.

This standard makes reference to the following British Standards:

B.S. 639. Covered electrodes for the metal-arc welding of mild steel.

B.S. 1719. Classification of covered electrodes for the metal-arc welding of mild steel and medium-high-tensile steels of welding quality.

B.S. 2600. General recommendations for the radiographic examination of fusion welded joints in thicknesses of steel up to 2 inches.

and to the following specification of the American Petroleum Institute (obtainable through the British Standards Institution):

API Std. 12–C. Welded oil storage tanks.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this standard:
Committee reference PEE/12. Draft for comment AA(PEE) 8610.

CONTENTS

CO-OPERATING ORGANIZATIONS

The Petroleum Equipment Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government department and scientific and industrial organizations:

*British Iron and Steel Federation

*Council of British Manufacturers of Petroleum Equipment

Federation of British Rubber and Allied manufacturers

Institute of Petroleum

Ministry of Power

*Oil Companies' Materials Association

The industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Association of British Chemical Manufacturers

British Chemical Plant Manufacturers' Association

Engineering Equipment Users' Association

Institute of Welding

Tank and Industrial Plant Association.

BRITISH STANDARD SPECIFICATION FOR

VERTICAL MILD STEEL WELDED STORAGE TANKS, WITH BUTT-WELDED SHELLS, FOR THE PETROLEUM INDUSTRY

PART 2. SITE ERECTION, INSPECTION AND TESTING

FOREWORD

This British Standard, prepared under the authority of the Petroleum Equipment Industry Standards Committee, is designed to provide the petroleum industry with tanks of adequate safety, reasonable economy and a range of suitable capacities.

Part 1 of this standard deals with the design and fabrication of tanks. This part deals with site erection, inspection and testing.

Acknowledgment is made to the American Petroleum Institute for data taken from API Std. 12–C, ' Welded Oil Storage Tanks.'

SPECIFICATION

SECTION ONE : GENERAL

SCOPE

1. This British Standard applies to vertical mild steel welded storage tanks, with butt-welded shells, for the petroleum industry, the design and fabrication of which are the subject of Part 1 of this standard.

SECTION TWO : SITE ERECTION

FOUNDATIONS

2. The foundation for receiving the tank bottom shall be provided by the purchaser, unless otherwise stated in the order, and it shall be properly consolidated. All reasonable care shall be taken to prevent damage to the foundation during erection.

The perimeter of the foundation in the way of the first course shell plates shall be level within ± ⅜ in and, to ensure circularity of the tank, shall be maintained within this tolerance by the purchaser during the course of erection.

RECTIFICATION OF DAMAGE TO MATERIALS

3. Any damaged material shall be corrected by the erection contractor prior to erection to the satisfaction of the purchaser's representative.

ERECTION OF PLATES

4. *a.* The method proposed by the manufacturer or erection contractor to hold the plates in position for welding shall be submitted for approval to the purchaser's inspector, if such approval has not already been given in writing by the purchaser.

b. The first course of shell plates shall be held in position by metal clamps or other devices attached to the bottom plates whilst it is plumbed and checked for circularity and before it is tack welded or welded to the bottom.

c. At all lap joints the plates shall be held in close contact during the welding operation. The surfaces where the weld metal is to be applied shall be thoroughly cleaned before assembly.

d. The method to be used for filling in holes made for erection purposes shall be approved by the purchaser.

Lugs attached by welding to the tank, and needed only for purposes of erection, shall be removed and any noticeable projections of weld metal carefully ground or chipped from the plate. The plate shall not be gouged or torn in the process of removing lugs.

CIRCULARITY AND SHAPE

5. In the construction of the shell of the tank every care shall be taken to minimize distortion or lack of circularity due to welding or any other reason.

MISALIGNMENT

6. *a.* Plates to be joined by butt-welding shall be matched accurately and retained in position during the welding operation. Misalignment in completed vertical joints

shall not exceed 10 per cent of the plate thickness, or 1/16 in for plates 3/4 in thick and under, and 1/8 in for plates over 3/4 in thick, whichever is the larger.

b. In completed horizontal butt joints the centre lines of the plates shall not be out of alignment by more than 20 per cent of the upper plate thickness with a maximum of 1/8 in for plate thicknesses exceeding 5/16 in, except that, for plate thicknesses 5/16 in and under the maximum shall be 1/16 in.

WIRE GUYS OR CABLES

7. Tank shells shall be safeguarded from damage due to wind by provision of steel wire guys or cables until completion of the roof framing, or of the wind girder in the case of an open top tank.

SECTION THREE : SITE WELDING

WELDING PROCESSES

8. Tanks and their structural attachments shall be welded by the metal-arc or the submerged-arc process using suitable equipment. Other suitable processes approved by the purchaser may be used, but it is emphasized that some extension of the normal procedure qualification tests may be necessary to prove their suitability. The welding may be performed manually, automatically or semi-automatically and shall be executed in a manner to ensure fusion with the base metal within the limits required by the applicable clauses and figures. The welding shall be carried out according to the weld procedure established in Section Six and by welders qualified under Section Six. Alternatively, by agreement between the purchaser and the erection contractor, weld procedure and welder qualification may be carried out in accordance with API Std. 12–C, Section 7.

WELDING SEQUENCES

9. The proposed sequences in which joints are to be welded shall be the subject of agreement between purchaser and erection contractor and they shall be adhered to on site.

WEATHER CONDITIONS AND PRE-HEATING

10. Welding shall not be done when the surfaces of the parts to be welded are wet, when rain or snow is falling on such surfaces, or during periods of high winds unless the welder and work are properly shielded. Welding shall not be done when the base metal temperature is less than 0°F. When the base metal temperature is within the range 0 to 32°F, inclusive, or the thickness is in excess of 1¼ in, the surfaces on both sides of the joint shall be pre-heated to a temperature warm to the hand and to a distance of not less than four times the plate thickness, or three inches, whichever is the greater, in any direction, before welding is begun, and during the course of the welding operation this pre-heat temperature shall be maintained in the specified area.

ELECTRODES

11. Welding electrodes shall be in accordance with B.S. 639* Parts 1 and 2.

Electrodes shall be stored in their original packets or cartons in a dry place adequately protected from weather effects. Similar precautions shall be taken in the storage of flux for submerged-arc welding.

If the electrodes become defective by dampness but are not otherwise damaged they may be used only after being dried out in a manner approved by the electrode manufacturer. Any electrodes which have areas of the flux covering broken away or damaged shall be discarded.

Low-hydrogen electrodes shall be stored and dried out in accordance with the manufacturer's recommendations.

*B.S. 639, 'Covered electrodes for the metal-arc welding of mild steel'.

TACK WELDS

12. Tack welds used in the assembly of the vertical joints of tank shells and those used for assembling the tank shell to the bottom shall be removed and shall not remain in the finished joint. Tack welds in the bottom, roof and circumferential joints of the tank shell, and other joints, need not be removed provided they are sound and the subsequent weld beads are thoroughly fused into the tack welds.

CLEANING OF WELDS

13. Each layer of weld metal of multi-layer welding shall be cleaned of slag and other deposits before the next layer is applied. Slag shall also be removed from finished welds before inspection.

BACK GOUGING AND CHIPPING

14. The reverse side of full penetration butt welds shall be cleaned thoroughly prior to the application of the first bead to this side in a manner that will leave the exposed surface suitable for proper interfusion with the deposited weld metal. This may be done by chipping, grinding or gouging, or, where the back of the initial bead is smooth and free from crevices which might entrap slag, by other methods which may, upon field inspection, be acceptable to the purchaser.

WELD REINFORCEMENT

15. The weld metal of both sides of all butt joints shall be built up so that the finished face in the area of fusion extends above the surface of the adjoining plates, or the thinner plate joined, preferably not more than 1/16 in.

UNDERCUTTING

16. The edges of all welds shall merge smoothly with the surface of the plate without a sharp angle. There shall be no undercutting of the base metal, except that, on horizontal butt joints and fillet welds, undercutting shall not exceed 1/32 inch in depth.

PEENING

17. Peening of welds shall not be carried out except by agreement between the purchaser and the erection contractor. In no case shall the final layer of the weld be peened.

SECTION FOUR : WELD SUPERVISION AND INSPECTION

WELD SUPERVISION

18. It shall be the responsibility of the erection contractor to ensure that all welding is carried out in accordance with the requirements of this British Standard and he shall provide all the supervision necessary to fulfil this requirement.

EXAMINATION OF BUTT WELDS

19. The method used for the examination of butt welds shall be the subject of agreement between the purchaser and the erection contractor and shall be stated in the enquiry or order. The preferred method is by radiography as described in Section Seven.

INSPECTION OF FILLET WELDS

20. Inspection of fillet welds shall be made by visual examination. Where this indicates unsatisfactory welding, assessment of the weld for compliance with this specification shall be based on the examination of a section or sections removed by gouging or chipping with a mechanical round nosed chipping tool.

SECTION FIVE : TANK TESTING

GENERAL

21. No connections shall be made between a tank and any product line until the tank and its appropriate mountings have been satisfactorily tested in accordance with the following clauses in this section.

BOTTOM TESTING

22. After the bottom, and at least the bottom course of shell plates have been welded, air shall be pumped beneath the bottom at a pressure sufficient to lift the bottom plates off the foundation. The pressure, which shall be 4 in water gauge minimum, shall be held by the construction of a temporary dam of clay or other suitable material around the tank periphery. Soapsuds or other suitable material shall be applied to the joints for the detection of leaks. (Fuel oil may be used instead of air subject to agreement with the purchaser.) Alternatively, the bottom seams may be tested by the vacuum box method, or by any other method agreed between the purchaser and the erection contractor.

The bottom shall be made free from leaks to the satisfaction of the purchaser.

SHELL TESTING

23. The tank shall be tested by filling with water to the level of the top of the tank shell, including the top curb angle. The rate of filling shall be agreed by the purchaser. Continuous inspection shall be maintained for the whole of the filling period and any uneven settlement of the tank on its foundation shall be reported immediately.

All leaks found shall be repaired with the water level at least one foot below the point being repaired.

Where local conditions are such that the above test is impossible the tank shall be tested by painting or spraying all the joints on the inside with a highly penetrating oil, or by any other method agreed between the purchaser and the erection contractor.

ROOF TESTING

24. When the tank shell is tested with water the roof joints shall be tested by applying an internal air pressure equal to 3 in water gauge for non-pressure tanks and 2 in water gauge above the design pressure of the tank for pressure tanks. Soapsuds or other suitable material shall be used for the detection of leaks. Where no water is available for testing the shell, the roof may be tested by using the vacuum box method or by the use of highly penetrating oil or by any other method agreed between the purchaser and the erection contractor.

REPAIRS

25. All defects found in welds shall be brought to the attention of the purchaser's inspector, and his approval shall be obtained to the method of repair. All completed repairs shall be subject to the approval of the purchaser's inspector.

All defects in excess of the minimum requirements in Clause 42 shall be removed by chipping, grinding or gouging from one or both sides of the joint, as required, and re-welded. Only sufficient cutting-out of the joints shall be done as is necessary to correct the defects.

Isolated pinhole leaks in roof joints may be caulked mechanically.

No welding shall be done on any tank unless all lines connecting thereto have been completely blanked off. No repairs shall be attempted on tanks while filled with oil, nor on tanks which have contained oil until the tank has been emptied, cleaned and gas-freed in a safe manner. No repairs shall be attempted by the erection contractor on a tank which has contained oil except in a manner approved in writing by the purchaser and in the presence of the purchaser's inspector.

PAINTING

26. Where shop painting has been carried out it is recommended that, soon after final testing, the priming coat shall be made good where damaged and extended to all bare surfaces to be subsequently painted.

SECTION SIX : WELDING PROCEDURE AND WELDER QUALIFICATION

GENERAL

27. *a.* The welding processes to be used for the construction of the tank shall be used in the procedure and welder qualification tests.

b. All welding procedures shall be proved in accordance with the requirements specified in Clauses 31 and 32, and all welders qualified in accordance with Clause 34. In no case shall welders weld on tanks until they have qualified.

c. If special welding processes are to be used, the welding procedure tests shall include any supplementary tests needed to prove their suitability (see Clause 8).

MATERIALS

28. The parent plate and electrodes shall comply with the requirements of Part 1, Section Two, of this standard.

Qualification in such material shall qualify the procedure for any other grade of plate permitted under the above section.

PLATE EDGE PREPARATION

29. *a.* The length of the weld and the dimensions of the parent test plate shall be such as to provide sufficient plate for the test specimens.

b. The plate edges shall be prepared as detailed in Clause 45 in Part 1 of this standard.

A. WELDING PROCEDURE

PROCEDURE TEST PLATES

30. *a.* The test plates shall be welded as specified in Section Three and shall be used to approve procedure. The details of the approved procedure shall be recorded by the erection contractor as the welding procedure specification to be followed, and this record shall include results of the qualification tests that have been conducted to approve them.

b. One butt-welded test plate shall be welded in the horizontal/vertical position.

One butt-welded test plate shall be welded in the vertical position.

All welds shall have full penetration.

The welding positions shall be as illustrated in Fig. 1.

c. The thickness of the material used for the test plates shall not be less than the maximum thickness used in the construction; alternatively, it need not exceed one inch.

Where the maximum thickness of the test plate exceeds 1¼ inches, material may be removed for the bend test specimens as described in Clause 32*b*.

Tensile test specimens shall be prepared from the full plate thickness, but where the thickness of the material exceeds 1 inch, they may be reduced to a thickness of 1 inch.

EXAMINATION OF TEST PLATES

31. Each butt-welded test plate shall be prepared and radiographed in accordance with Section Seven.

The radiograph shall show clearly the test plate for its full length. For the purpose of interpretation a length of 1½ inches from each end shall be ignored.

The radiograph shall conform to the acceptance standards specified in Clause 42.

WELD SPECIMENS

32. After radiographic acceptance, the following specimens from each test plate shall be prepared to the dimensions shown in Figs. 2 and 3.

2 Tensile specimens.
2 Normal bend specimens.
2 Reverse bend specimens.

The sequence of removal of test specimens shall be as shown in Fig. 4.

The specimen shall be tested as follows:

a. Tensile specimens. Before testing, the least width and corresponding thickness of the reduced section shall be measured in inches. The specimen shall be ruptured under tensile load and the maximum load in tons shall be determined. The cross-sectional area shall be obtained as follows:

Cross-sectional area = width × thickness.

The tensile strength in tons per square inch shall be obtained by dividing the maximum load by the cross-sectional area.

The tensile strength of the joint shall be not less than the minimum specified for the plate.

b. Bend specimens. Four bend test specimens of rectangular section shall be cut from the test plate, two bent with the outer surface of the weld in tension, and two with the inner surface in tension.

The specimens shall be cut transversely to the weld and have a width equal to 1·5 times the thickness, the mid portion of the specimens coinciding with the centre line of the weld. The edges may be rounded off to a radius not exceeding 10 per cent of the thickness of the specimen. In test plate thicknesses not exceeding 1¼ in, the thickness of the specimens shall be equal to the thickness of the test plate. Where the plate thickness exceeds 1¼ in, the specimens may be reduced in thickness to 1¼ in. These shall be prepared by machining discard metal from the surfaces of the specimens which will be in compression when the test is applied (see Figs. 3*a* and 3*b*).

For each specimen, the weld reinforcement shall be removed by buffing or machining so that the outer and inner surfaces of the weld are flush with the surface of the plate. Each specimen shall be bent cold without fracture through an angle of 180 degrees over a former of 4*t* diameter where *t* = thickness of specimen. The form of the specimen after bending shall be as shown in Fig. 3*c*.

REQUALIFICATION OF PROCEDURE

33. Requalification shall be required if any of the following changes are made in procedure:

a. A change in welding electrode from one B.S. 1719* classification number to another, or a change of electrode where both types are to B.S. 1719, Class 9.

b. An increase in the diameter of the electrode above that called for in the welding procedure specification.

c. A change of more than 15 per cent above or below the specified amperage for each size of electrode used.

d. For a specified welding groove a change of more than plus or minus twenty-five per cent in the number of passes. If the cross-sectional area of the groove is increased, it is also permissible to increase the number of passes in proportion to the increased area.

e. A decrease in the pre-heating temperature.

f. A change in the type of welding groove; for example a change from a V to a U groove.

*B.S. 1719, ' Classification of covered electrodes for the metal-arc welding of mild steel and medium-high-tensile steels of welding quality.'

g. A change in the shape of any one type of welding groove involving:

(i) A decrease in the included angle of the welding groove, or a decrease in the width of a groove.

(ii) A decrease in the root gap of a welding groove.

(iii) An increase in the root face of a groove.

h. In the case of vertical welds, a change from the progression specified for any pass from upward to downward or vice-versa.

j. For submerged-arc welding, a change in the composition of the electrode filler wire.

k. For submerged-arc welding, a change in the brand or make of the flux. (Requalification is not required for a change in flux particle size.)

l. For submerged-arc welding, a change from multiple pass per side to single pass per side.

m. For submerged-arc welding, a change from single arc to multiple arc, or vice versa.

B. QUALIFICATION OF WELDERS

QUALIFICATION OF WELDERS

34. *a*. Each welder shall qualify before welding on the tank. A welder who has successfully welded the procedure test plate shall be considered to have qualified.

b. Each welder shall weld a test plate, of thickness as specified in Clause 30*c*, in a similar position and conditions to the work he will be doing on the tank. A welder who qualifies in the horizontal/vertical or vertical position. shall be considered to be qualified to weld in the downhand position. A welder who is qualified to make butt welds shall be considered qualified to make fillet welds.

c. *Examination of test plates*. Each butt-welded test plate shall be radiographed in a similar manner to that required for the welding procedure in Clause 31.

d. *Retests*. In the event of the failure of a test plate to meet the required standard, specified in Clause 31, a retest shall be permitted.

The retest shall conform in all respects to the conditions of the original test with the exception that two test plates shall be welded. The results from these tests shall meet the specified requirements for the purposes of qualification.

e. *Re-qualification of welders*. A manual welder shall be required to requalify for the changes listed in the two Sub-clauses 33*a* and 33*h* and welders operating automatic and semi-automatic machines shall be required to requalify for the changes listed in Sub-clauses 33*j* to *m* inclusive.

PERIOD OF EFFECTIVENESS

35. The period of qualification shall be for as long as a welder is employed on that type of work for which he was qualified, provided:

a. he has not changed his employer,

b. there is no reason to consider that the quality of his production welding has fallen below the requirements of the welding procedure listed in Clause 31,

c. that his absence from such work does not exceed three months and that he is in the employ of the erection contractor during this period.

RECORDS

36. *a*. The erection contractor shall maintain records of each welder qualified by him. Such records shall clearly state the date of qualification, together with details of each test.

b. Copies of all such records shall be available for examination on site by the purchaser's inspector.

c. A welder who has qualified shall not be prevented from undertaking production work pending examination of these records, or certified copies of these records provided the requirements of Clause 36*b* have been complied with.

SECTION SEVEN : PROCEDURES FOR INSPECTING BUTT JOINTS BY RADIOGRAPHIC METHODS

APPLICATION

37. *a*. The following procedure shall apply to inspection of butt joints in shell plating and to radial butt joints in annular bottom plates when this is required by the purchaser.

b. Radiographic examination is not required for the examination of welds in roofs, nor of welds joining tank bottoms to the first course of shell plates, nor of the welds connecting the top curb angle to the shells or roofs, nor of welds connecting manholes or other fittings to the tanks, nor of tank bottoms excepting the butt welds in the annular plates.

PREPARATION FOR EXAMINATION

38. Surface irregularities which may be confused with or mask any objectionable defect shall be removed by grinding.

EXTENT OF RADIOGRAPHY

39. The number and location of spot radiographs shall comply with the following minimum requirements:

a. *Vertical joint*. One radiograph shall be taken from the first 10 ft of completed vertical joint of each type and thickness welded by each welder, thereafter without regard to the number of welders working thereon, one additional radiograph shall be taken from each additional 100 ft (approximately) and any remaining fractions thereof on vertical joints of the same type and thickness. At least 25 per cent of the selected spots on vertical seams shall be at junctions of the vertical and circumferential joint with a minimum of two such intersections per tank.

b. *Horizontal joint*. One radiograph shall be taken from the first 10 ft of completed horizontal joint of each type and

thickness (based on the thickness of the thicker plate) at the joint without regard to the number of welders working thereon. Thereafter one additional radiograph shall be taken for each additional 200 ft (approximately) and any remaining major fraction thereof on horizontal joint of the same type and thickness. For this purpose plates shall be considered of the same thickness when the difference in the specified or design thickness does not exceed 0·03 in.

c. Butt welds in annular bottom plates. One radiograph shall be taken at the outer ends of 25 per cent of the butt welds in annular bottom plates with a minimum of four joints per tank.

d. Additional radiography. When a section of weld is shown by a radiograph not to comply with this specification, or the limits of the defective welding are not defined by such radiograph, two adjacent spots shall be examined by radiography. If the weld at either of these sections fails to comply with the requirements of Clause 42, additional nearby spots shall be examined until the limits of such welding are determined, or, at the option of the manufacturer, all the welding performed by the welder on that joint shall be replaced, in which case the inspector shall have the option of requiring that one radiograph be taken at any selected location on any other joint on which the same welder has welded. If any such additional spot fail to comply with the requirements of Clause 42, the limits of such welding shall be determined as specified for the initial section.

e. General. When two or more tanks are erected in the same location for the same purchaser either concurrently or continuously the number of radiographs taken may be based on the aggregate footage of welds for the same type and thickness in such a group of tanks rather than on the footage in each individual tank.

RADIOGRAPHIC PROCEDURE

40. *a. General.* It is recommended that the techniques employed should be generally in accordance with B.S. 2600*, Sections One, Two and Four. X-radiography is preferred to gamma-radiography because of the inherent low contrast of the latter; if, because of local conditions or special circumstances, gamma-radiography is used the isotope shall be Iridium 192.

b. Intensifying screens. Lead screens are preferred for X-radiography and are mandatory for gamma-radiography. Where salt screens are used for X-radiography they shall be of the high resolution type, used in conjunction with the appropriate type of film.

c. Radiographic film. The film shall show clearly a minimum of 12 in of weld length; it shall be centred on the weld and shall be sufficiently wide to permit adequate space for the location of identification markers and penetrameter. The range of density in the area under examination shall be 1·3 to 2·3 for screen-type film and 1·7 to 3·0 for non-screen film; the recommended minimum exposure time shall be 8mA minutes. Care shall be taken to ensure that films are carefully handled and stored; they should not be subjected to mechanical or chemical damage and it is specially important to guard against inadvertant exposure to actinic light, radiation or excessive heat. The film shall be of the screen type when salt screens are used, of the medium-speed type for X-ray exposures with lead screens, and of the fine-grain high-contrast type for gamma ray exposures with lead screens; there shall be no spurious image which will interfere with its interpretation.

d. Standard technique. The exposing, film processing and handling techniques shall be demonstrated to the purchaser and shall be subject to approval. A standard test radiograph shall be prepared and shall be made available for inspection.

e. Penetrameters. As a guide to the degree of definition and contrast achieved and to determine whether the minimum radiographic standard is being attained a penetrameter or image quality indicator shall be used.

(i) The penetrameter shall be placed on the side of the plate nearest the source of radiation.

(ii) One penetrameter shall be used for each exposure, it shall be placed at the end of the area to be examined. Step and hole types shall be placed parallel and adjacent to the weld seam with the small hole at the top for vertical welds and the right for horizontal welds. Wire type penetrameters (e.g. DIN) may be placed across the weld.

(iii) A shim shall be placed under penetrameters which do not rest on the weld so that the total thickness under the penetrameter is equal to the mean total thickness of the weld.

(iv) The material of the penetrameter shall be substantially the same as that of the weld under examination.

(v) The type of penetrameter to be used shall be agreed between purchaser and erection contractor, it shall be designed so as to be capable of indicating a penetrameter sensitivity of 2 per cent of the mean total thickness of the weld being examined. DIN and BWRA penetrameters are examples of suitable types.

(vi) The penetrameters used must be readily identifiable by means of symbols used within its construction, the image of these identification symbols shall be clearly visible on the radiograph.

f. Film location. The film during exposure shall be as close to the adjacent weld surface as is practicable.

g. Identification markers. Identification markers, the images of which will appear on the film, shall be placed adjacent to the weld at each spot examined and their locations accurately marked near the weld on the outside surface of the structure, so that a defect appearing on the radiograph may be accurately located.

h. Reference marker. There shall also be a suitable reference marker on each film.

SUBMISSION OF RADIOGRAPHS

41. All radiographs shall be submitted to the purchaser's inspector.

*B.S. 2600, 'General recommendations for the radiographic examination of fusion welded joints in thicknesses of steel up to 2 inches'.

RADIOGRAPHIC STANDARDS

42. Sections of welds that are shown by radiography to have any of the following imperfections shall be judged not to comply with this specification.

a. Any crack or lack of fusion.

b. Incomplete penetration. In the case of partial penetration horizontal joints, this clause shall apply within the limits of penetration required by Part 1, Clause 17*c*(iii).

c. Any individual elongated inclusion having a length greater than two thirds the thickness of the thinner plate of the joint, except that, regardless of the plate thickness, no such inclusion shall be longer than ¾ in and no such inclusion shorter than ¼ in shall constitute non-compliance with this specification.

d. Any group of inclusions in line, where the sum of the longest dimensions of all such imperfections is greater than T (where T is the thickness of the thinner plate joined) in a length $6T$, except when each of the individual spaces between imperfections is greater than three times the length of the longer of the adjacent imperfections. When the length of the radiograph is less than $6T$, the permissible sum of the lengths of all inclusions shall be proportionally less than T, provided the limits of the deficient welding are clearly defined.

e. Porosity in excess of the standard shown in Figs. 5 to 8.

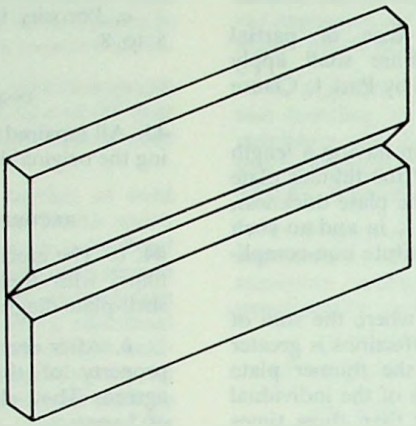
INSPECTION OF REPAIRED WELDS

43. All repaired welds in joints shall be checked by repeating the original inspection procedure.

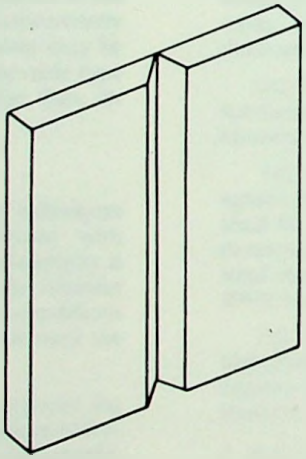
RECORD OF RADIOGRAPHIC EXAMINATION

44. *a.* The erection contractor shall make a record of all films, with their identification marks, on a developed shell-plate diagram, or other agreed method.

b. After completion of the tank, the films shall be the property of the erection contractor unless otherwise agreed. They shall be retained for a minimum period of 5 years.

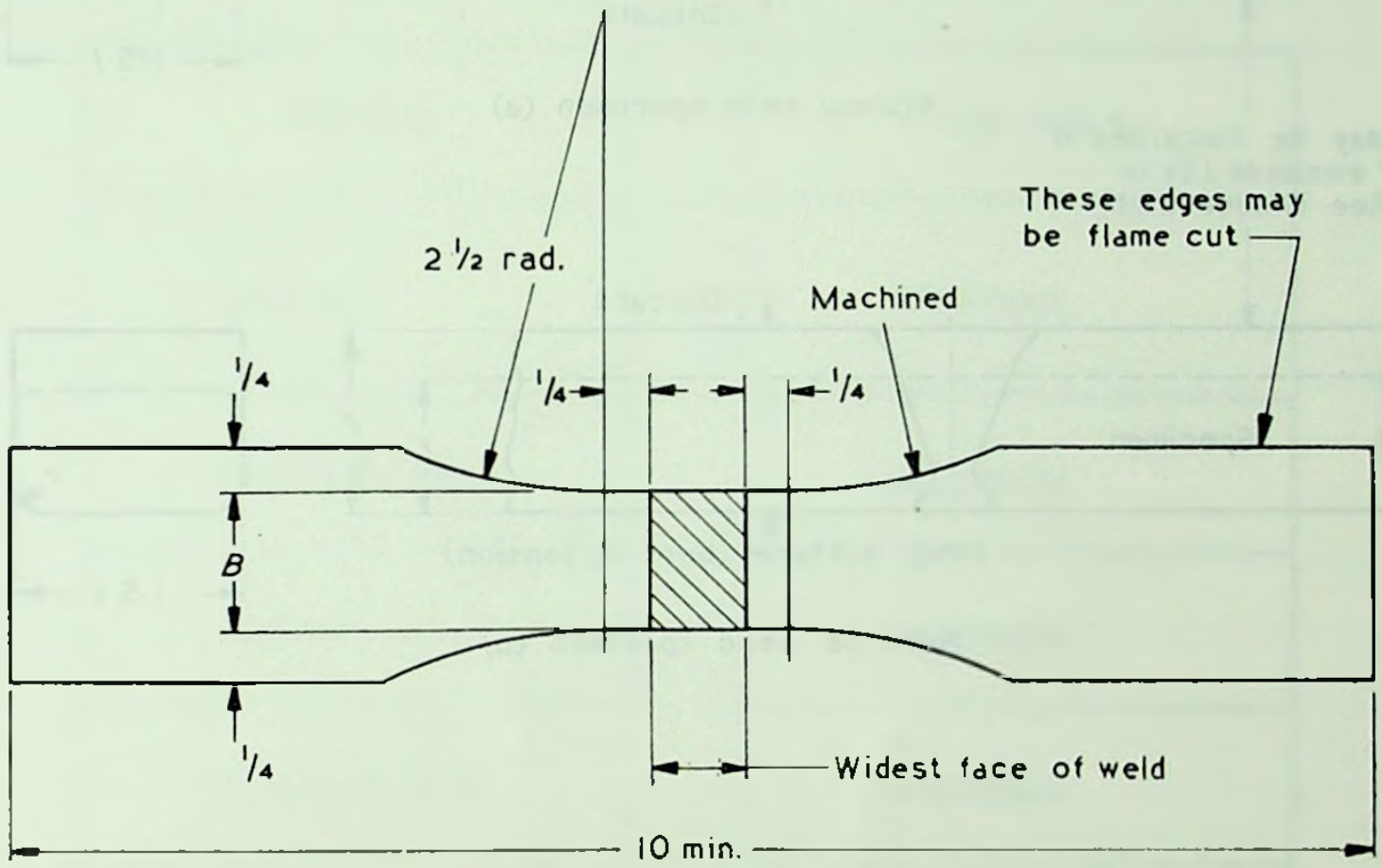


Horizontal/vertical position (*a*)



Vertical position (*b*)

Fig. 1. Welding position of test plates



Dimensions are in inches

B = Not less than thickness of plate with a minimum width of 1¼ in.

An equivalent form of test piece to the above may be accepted.

The weld reinforcement to be machined flush with plates on both sides.

The tensile strength of the joint not to be less than the minimum specified for the plate.

Fig. 2. Tensile test specimen

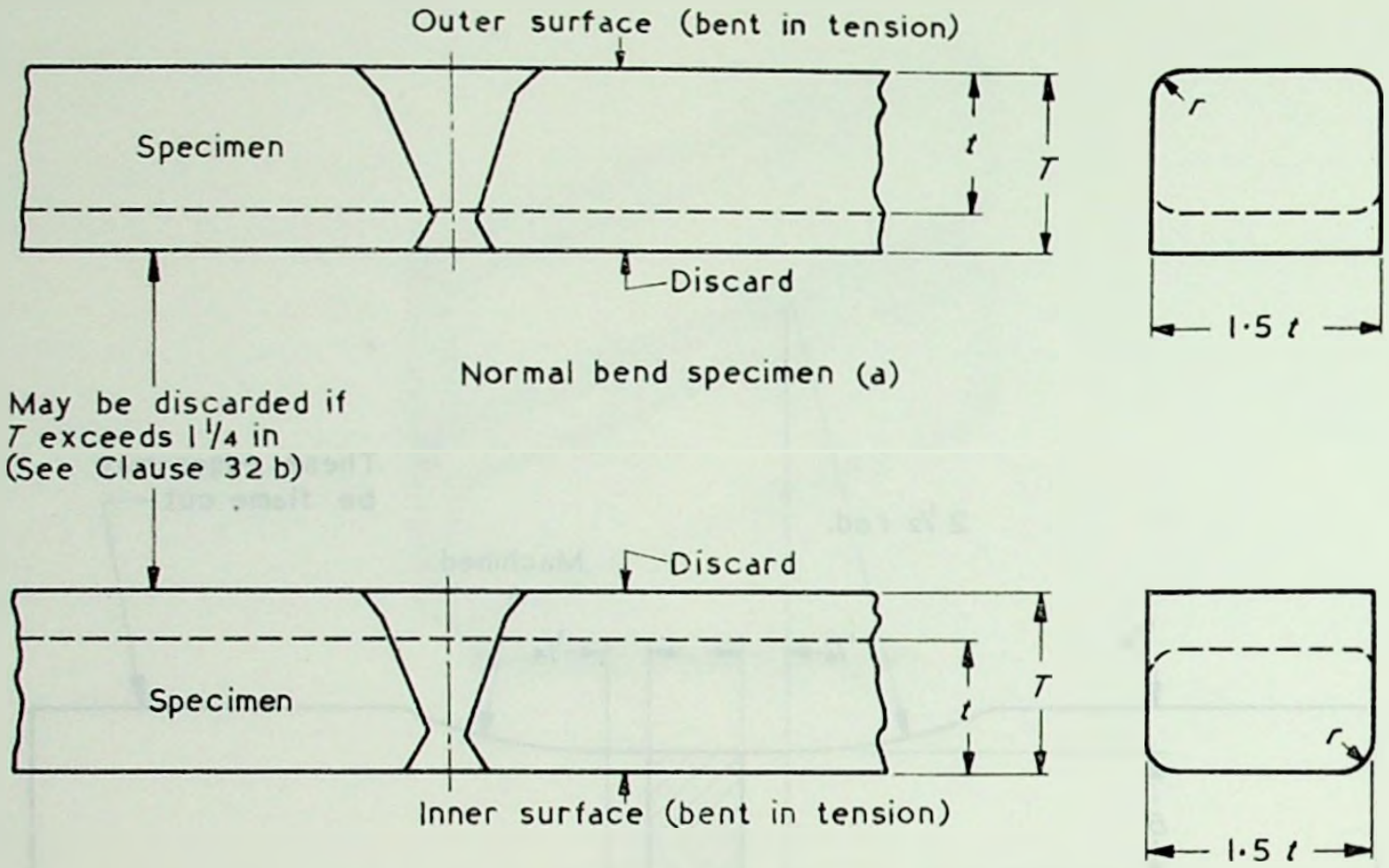


Fig. 3. Bend specimens

DISCARD		THIS PIECE
TENSILE		SPECIMEN
REVERSE BEND		SPECIMEN
NORMAL BEND		SPECIMEN
REVERSE BEND		SPECIMEN
NORMAL BEND		SPECIMEN
TENSILE		SPECIMEN
DISCARD		THIS PIECE

Fig. 4. Sequence of removal of test specimens

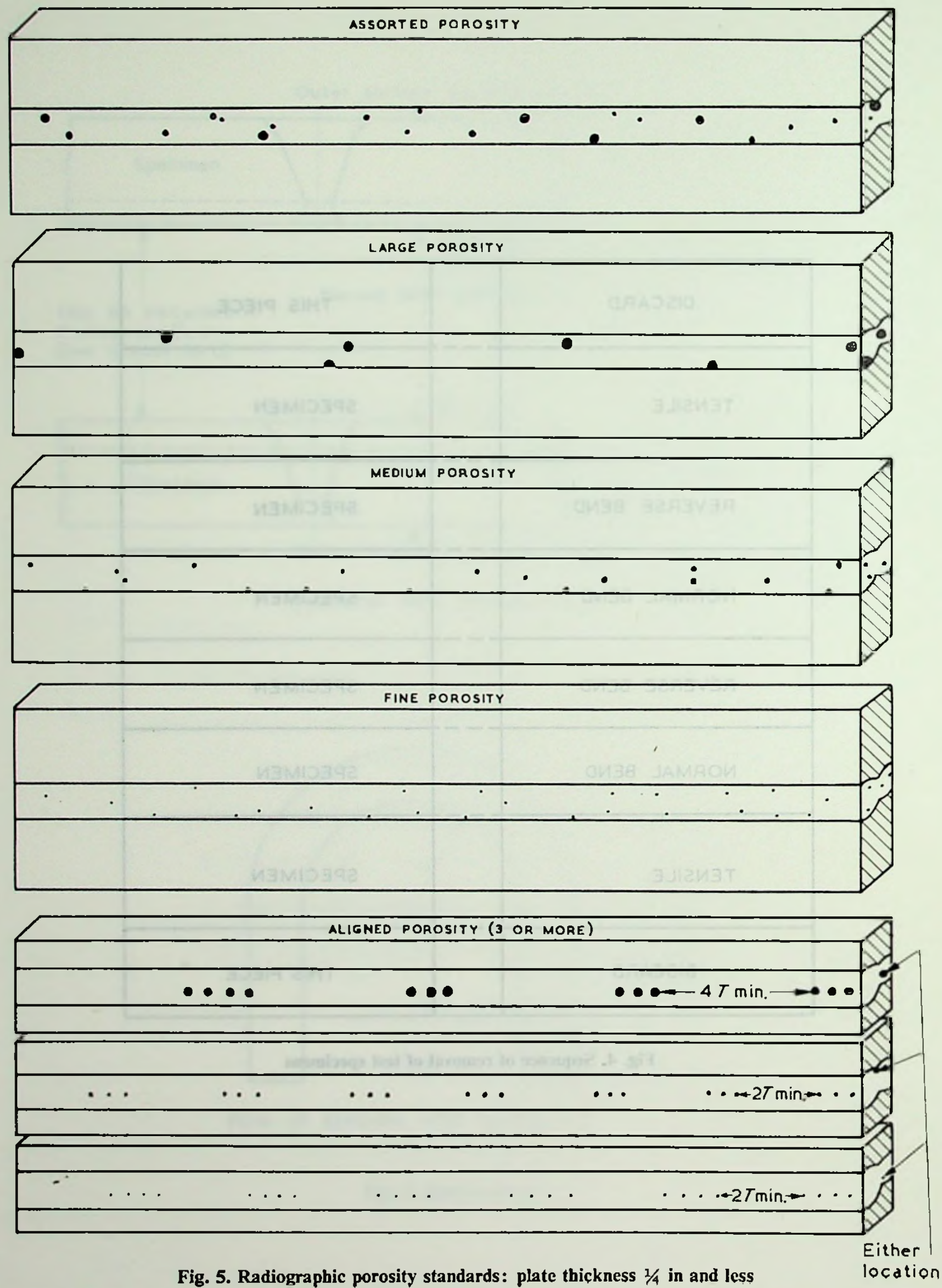


Fig. 5. Radiographic porosity standards: plate thickness ¼ in and less

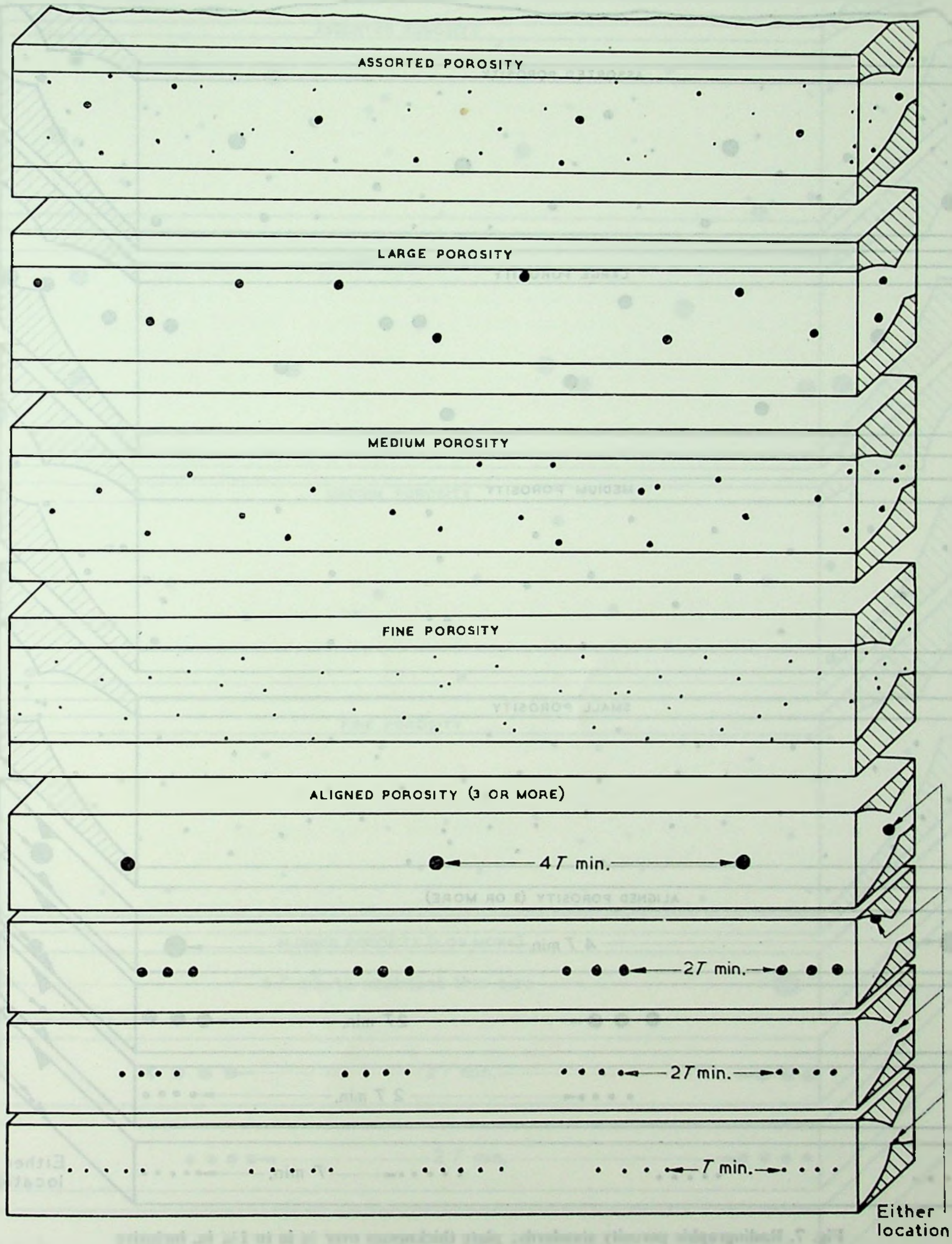


Fig. 6. Radiographic porosity standards: plate thickness over ¼ in to ½ in, inclusive

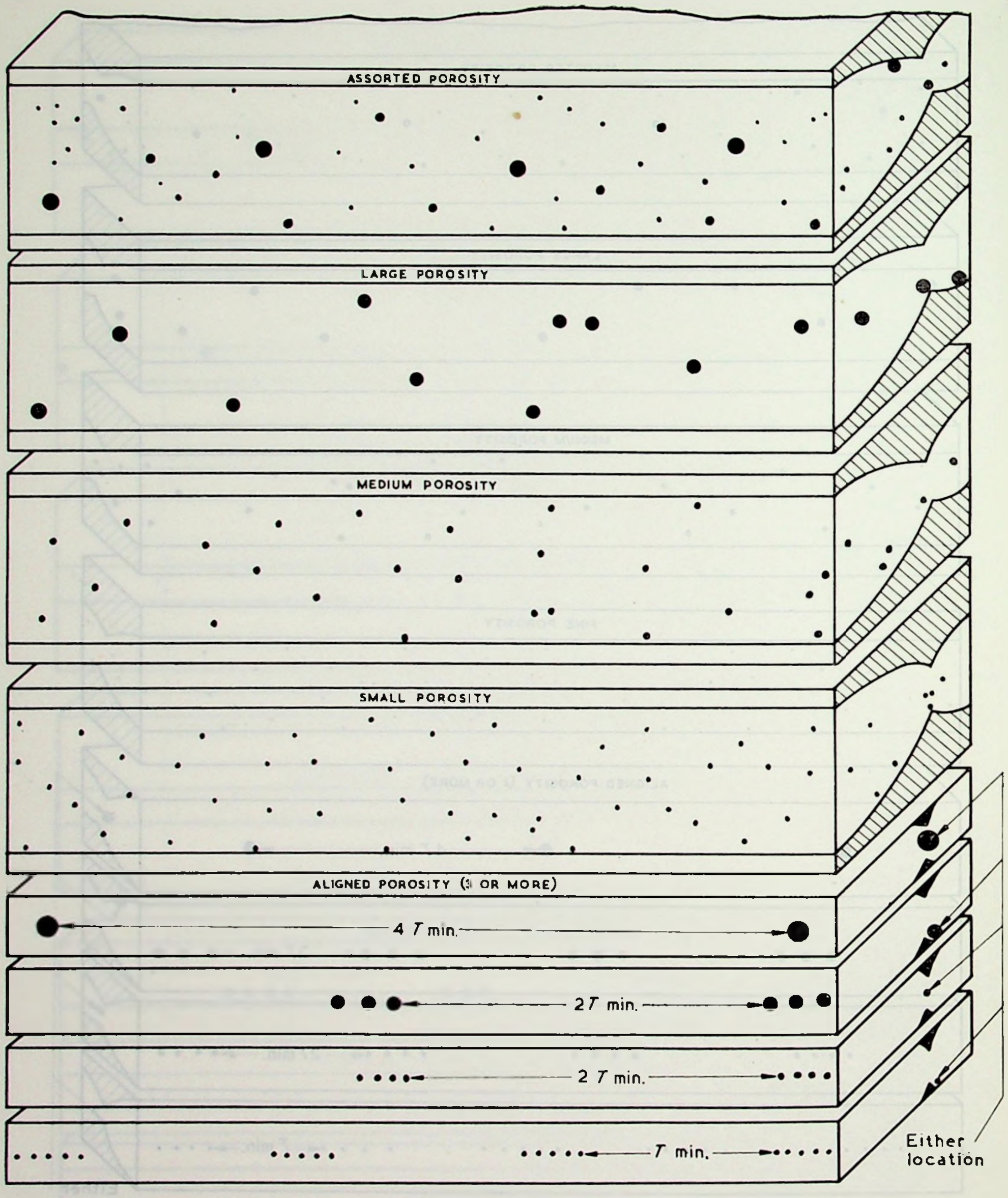


Fig. 7. Radiographic porosity standards: plate thicknesses over ½ in to 1¼ in, inclusive

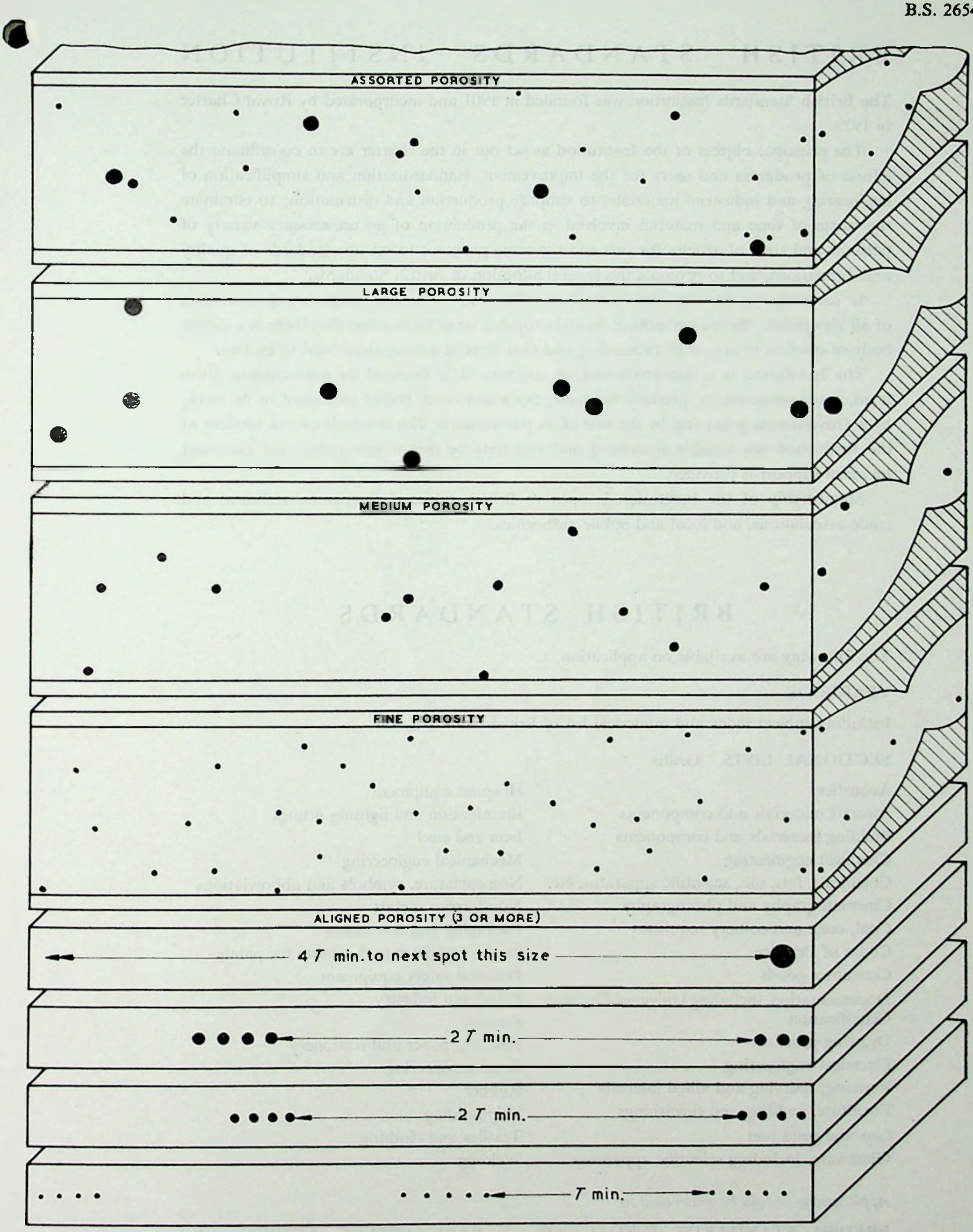


Fig. 8. Radiographic porosity standards : plate thicknesses over 1¼ in to 1½ in, inclusive

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COLONIAL SECRETARY'S OFFICE
23 OCT 1962
FALKLAND ISLANDS

MEMORANDUM

equested
ny refer-
is memo-
he above
and date
e quoted.

23rd October

To: The Honourable,

Superintendent of Works, P.W.D.

The Colonial Secreta.

Stanley.

Stanley, Falkland Islands.

SUBJECT :- Soundings at Jetties in Stanley.

Soundings taken progressively from Government Jetty due North compare favourably with those on Admiralty Chart 27th May, 1938 and the one taken from Public Jetty.

Government Jetty.	13' 0".	Public Jetty.	10' 0".
	15' 0".		
	17' 0".		
	19' 0".		
	19' 6".		
	19' 9".		
	21' 4".		
	21' 0".		

Low tide 20th October 1962 19.00 hours.

It appears that we have the same if not more depth whem silt is cleared from Government Jetty than the Public Jetty.

If there is no objection from the Captains, Government Jetty could be strengthened to accommodate any of the larger vessels.

R Pinton.
Supt. of Works.

Shown to HE.

1. Tanks to be erected on site above Power Station. Preparation of site is the most urgent thing & it can not proceed SPW, SDE to be informed.

2. Arrangements for bringing oil to these Tanks and from them to the ships are not yet decided on. ~~They~~ This part of the question is less urgent. We must obviously consider the opinions of the Captains of the Boats.

3. As regards 2 the considerations are as follows (and see it more)

(a) Unloading into tanks & loading into ships will have to be done from either the Public or Government jetty.

(b) advantage of Public jetty: We know that they do alongside anyhow. When they are here they will be with oil at the same time as they were other cargo. Captain White says it would be ~~more~~ easier in that way. There can be no question of the Captains

objecting to it.

(c) Advantages of Government Settlers.

(i) On a large amount of lifting saved.

(ii) no difficulty about buying building

(more lifting will be necessary from all the ways from the jetty to the tracks as the present lifting is too small but there is no question of building up roads or pavements.)

(d) It appears that there is no insuperable objection to using the Government jetty. The depths of water appear to be on the whole better than those at the Public jetty. But it will have to be strengthened & better mooring facilities provided. H.R tells me that it is his factor & not the weather factor that frightens away the Captains of Bisitor. Perhaps we need not regard the necessity for spending money on improving the jetty as another argument against using it as the conversion of a good jetty would be an addition to the assets of the Colony. All of the above bears (d) is however liable to require modification after we have consulted the Captains.

4. We should now get a letter to Groom telling them that we have decided on this site and what the proposed facilities is.

Immediate action as at 1 & 4.

23/10/62

S-E.

198

SPW & SPE info of decision on site

Draft submitted to Crown

A copy of previous letter to Crown was sent to S/S 149. Shall we ask Crown to inform Admiralty that this Camden site will now be required? And should we also inform S/S 2. 168 - 171 should also be studied by SPE & SPW

S 26/10/62.

(The mark we sent was the ordinary town mark there was no space copy for the file)

DECODE.

TELEGRAM.

From Colonial Secretary, Stanley.

To Crown Agents, London.

Despatched : 27th October, *19*62. *Time :* 1100

Received : *19* *Time :*

No. 383. For Hawtrey from Governor. Oil tanks.

Reasons for siting tanks on town side or harbour near power station are more cogent than I thought in London and it has now been decided that this is best site. There is therefore no further need to negotiate with Admiralty over Camber site but I am grateful for their co-operation. If Admiralty are interested in increasing their stocks of dieso in Colony space would be available for them in new tanks.

Colonial Secretary

G.T.C. : EPA/LH

BW 29 11 62

See 287.

Folios 200–205 transferred to 1905/B.

1905

206

No.

It is requested that in any reference to this memorandum the above number and date should be quoted.

MEMORANDUM

COLONIAL SECRETARY'S OFFICE -9NOV 1962 FALKLAND ISLANDS

8th November 1962.

The Supt. Power & Electrical Dept.

Stanley, Falkland Islands.

The Hon. The Colonial Secretary,
Secretariat,
STANLEY.

SUBJECT :- Tank Construction.

I have the honour to refer to our conversation of this morning regarding keeping in touch with Mr Thorsen and submit the following telegram to him for your approval.

ADMIN SOUTH GEORGIA.

Following for Mr Thorsen Albion Star. Tank site now selected and base being prepared 230/400 volt 50 cycle AC supply available Stop Makers Motherwells instructed most urgent to send one set of plans to you we expect delivery January AES of tanks Stop Can you advise approximate date when you would wish to depart South Georgia for Stanley Stop Mrs Thorsen informed Gutteridge that Mr Hamer will not be coming grateful you confirm and name successor Stop Please let me know of any information you require. Stop Tank Diameter 48 Ft Height ~~30~~ 36. Ft.

248 P/L

Secretary.

Extracted to 1905/C

I contacted B.A.S. Secretary with regard to the sailing of B.A.S. vessels, and was informed that Biscoe is unable to bring the personel up from South Georgia. Also that Shackleton would not be able to until the end of the season, April, this is of course late. No doubt however this itinary can and will be altered as it is in B.A.S. interests as well as our own that no delays occur.

Telegram approved 13/11/62

Supt. Power & Electrical Dept.

Issue tel pl

See 341

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

207

Wt P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			13.11.62

To

etat Adminoff South Georgia SGA/c

No. 248. Following for Mr. Thorsen Albion Star stop Tank site now selected and base being prepared 230/400 volt 50 cycle AC supply available stop Makers Motherwells instructed most urgent to send one set of plans to you we expect delivery January AES of tanks stop Can you advise approximate date when you would wish to depart South Georgia for Stanley stop Mrs. Thorsen informed Gutteridge that Mr. Hamer will not be coming grateful you confirm and name successor stop Please let me know of any information you require

Tank diameter 48 feet height 30 feet

Time Copy in 1903/c Secretary Reply at 216

208

could we see it & mail it to us when it is
known whether aboard ship

[illegible] 14/4/02.

1/C5.

208 A

Dark bright is 36ft and 30ft as stated
in telegram. Pray Mr Thorsen be informed please.
I regret error.

[illegible] 21/11/02.

208b.

209-215 sent to S.C.
(Letter from Crown Agents)

HE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

'BVF'

201

CROWN AGENTS

FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS

EC367/25

TELEGRAMS { INLAND: "CROWN, SOWEST, LONDON." OVERSEA: "CROWN, LONDON S W 1"
TELEPHONE: ABBEY 7730
TELEX No. 24209

4, MILLBANK.
LONDON, S.W.1.

26 October, 1962.

Dear Sir.

145 in Vol I

Oil Storage Tanks and Pipeline
Your letter 1905 of 18th August, 1962.

168 herein

Further to our letter of 10th October, we are now able to reply to the points raised by you as follows:

Tanks A firm order has been placed for the tanks as quoted.

Electrodes These have been ordered with the tanks.

Erection Your instructions are noted.

Relative Merits of Proposals 1 to 4 In our opinion the choice lies only between Proposals 1 and 4 with No.1 having practically all points in its favour, in that the Camber site is in an existing tank farm with all essential facilities. Capital costs are therefore lower than elsewhere and there is a complete absence of fire risk to Stanley. Only in the matter of convenience does Proposal No.4 have the advantage over No.1 as double lighterage of the oil is eliminated. From enquiries made by us, it appears, moreover, that any additional fire risk to the Town by locating the tanks at the site near the Power Station would be negligible.

As regards the other proposals, No.2 has the drawback of double lighterage but is considerably more expensive, in capital and maintenance costs, that No.1 (Camber Site). Similarly Proposal No.3 has no advantage over No.4 and would again result in higher capital and running costs.

The final decision as between Proposals Nos. land 4 should, we suggest, be based solely on their relative convenience, that is the advantage of siting the tanks in the tank farm should be weighed against their being sited where double lighterage would not be required.

Use of Camber site. As we have already reported, the Admiralty has been approached on the question of the free use of the Camber Site and is prepared to consider this. At the meeting held on October 1st at which H.E. the Governor was present, it was agreed that a final decision must await H.E.'s return to the Falkland Islands when, if after consideration it was still desired to use the Camber site, your Government would put forward firm proposals including the concessions you would offer the Admiralty in return for free use of the site. For your information we enclose copies of :

211-213

(a) Some notes we made of the meeting of October 1st

(b) A letter to us from the Chief Surveyor of Lands, Admiralty.

/ IN the

The Colonial Secretary,
Stanley,
Falkland Islands.

LMcC/DO

In the event of the Camber site being selected, it will be necessary to construct the tanks and piping to Admiralty requirements. You have already been supplied with a copy of the notes by Mr.Pollock (referred to in (a) above) on points to be considered when the tanks are constructed but a second copy is enclosed for ease of reference. We would comment on the points raised by Mr.Pollock as follows:

(i) We have discussed the question of a dipstick instead of a flowmeter with the tank manufacturers and they suggest that a standard gauge tape would best serve the purpose. Our Buying Department will be writing to you shortly about this.

(ii) Our letter of October 10th mentioned the foundations on which the tanks are to be erected. It is recommended that you use the B.S.2654 foundation on whichever site is finally selected.

(iii) As delivery of the tanks would be delayed by a change in design of the sump at this stage we have ordered them unchanged. Our Buying Department will, in their letter, suggest how the purpose of Mr.Pollock's recommendations can be met.

(iv)(v) & (vi) Will you please note Mr.Pollock's comments. It is evident that, with regard to (v), Mr.Pollock is under a misapprehension. The retaining wall shown in the drawing is to support the proposed concrete floor, which, on the recommendation at Mr.Pollock's point (ii) is not to be provided. A ring bund is in fact shown on the Admiralty drawing (vide para.1 of our note of the meeting) but whichever site is chosen, a bund would be needed to meet Mr.Pollock's point.

Cost of Materials. In your letter you ask for a provisional estimate of the material costs for the various proposals for siting the tanks. For the reasons stated earlier, we have confined these to Proposals 1 and 4 only and the landed costs of materials for these are given below:

Proposal No.1

1000 ft of 6" piping complete with fittings
100 ft flexible hose in standard lengths complete with couplers and tightening keys.
Valves, Fittings and expansion joints

say £1000

Note: This quantity of piping will be increased if the site within the Admiralty tank farm is used.

Proposal No.2

3000 feet of 6" piping)
100 feet flexible hose) as above.
Valves, Fittings and expansion joints
Pump complete with suction hose

say £2500

Lee 199

Will you please notify this office as soon as a firm decision is made as to the siting of the tanks.

Yours faithfully,

for the Crown Agents.

NAVY WORKS DEPARTMENT,
ADMIRALTY,
LILLIE ROAD,
LONDON, S.W.6.

Telephone: Fulham 1244 Extn.

2M

N.W.5030/3773/79a.

14th October, 1962.

Dear Sirs,

Proposed Oil Storage Tanks and Pipelines,
Stanley, Falkland Islands

I have to refer to your letter dated 20th September, 1962, reference EC.367/25 addressed to the Secretary of the Admiralty about a proposal by the Government of the Falkland Islands to erect two oil storage tanks at Stanley.

2. At a meeting held on 1st October at which the Governor Sir Edwin Arrowsmith, your representative Mr. Hawtrey and Admiralty representatives were present, it was arranged that after the return of the Governor to the Islands, he would consider the various sites which had been suggested to meet the requirement and if it was still desired to utilise the Admiralty site, he would put forward firm proposals which would include concessions which the Falkland Islands Government are prepared to make regarding the availability to the Admiralty for use in H.M. ships in an emergency, of diesel fuel stored in the the tanks.

3. The Governor's further proposals are therefore awaited.

Yours faithfully,

J. M. Aust

for CHIEF SURVEYOR OF LANDS.

The Crown Agents for Overseas
Governments and Administrations,
4 Millbank,
London, S.W.1.

31

212

Note on Meeting at Admiralty Building, West Brompton on 1st October, 1962 attended by Sir Edwin Arrowsmith, Governor of Falkland Islands and myself.

In the Chair - Mr. A. Fairley, Senior Surveyor of Lands, Admiralty.
About 6 other representatives of Admiralty were present.

The proposal is to transfer oil from tanker with R.N. lighter which would pump the oil into the tankage. The Navy have two tanks at Camber, on a site some distance west of the jetty, and at this site there is space left for two additional tanks within the protective bund. They offered this space to the Governor as an alternative to the site NE of the root of the mole as shown on Drawing enclosed with Colonial Secretary's letter. The Navy receive oil once a year.

The Governor said that their requirements amount to about 800 tons/year. They would have two tanks, one for the Colony's use (Power Station) and one for the John Biscoe, though both tanks would contain the same oil and they would probably draw for both uses from one tank, keeping the other as a year's reserve. Additionally there could be 500 to 600 tons reserve at the Power Station tankage at Stanley.

The Navy showed themselves agreeable to come to terms though when the Governor talked of free storage they reminded him that any agreement would have to be approved by Treasury who would expect to see a 'quid pro quo' in the form of concessions by Government. Fairley said that these should be equated to the value of what the Navy would be giving Colony, e.g. use of jetty say 1/10 of economic rent plus amortisation, plus say 1/10 maintenance cost which might be put at £200 - £300 per year, cost of water supplied if any, share of cost of caretaker etc.

Governor said that the Colony had hitherto relied on drawing supplies in South Georgia but Salvesen and Albion Star have both notified that Colony should not rely on supply from there in future. Direct supply to Falkland would save transport mileage.

(a) First thing was to decide whether tanks should be sited at Camber. (Navy agree to Colony using any site at Camber). Governor hopes to get (a) agreed by Legco in November.

(b) Next, as Colony would use Admiralty facilities free of charge, the former would concede to the Admiralty the right to draw on Colony oil in emergency.

Once this was agreed with a formal document, Colony hope to erect tanks in March or April with Norwegian labour.

Governor and Admiralty decided that as correspondence via C.O. would be too slow, they would correspond via Crown Agents.

Other Departments being asked whether they had any observations, Mr. Pollock, Oil adviser to Admiralty said he had prepared some notes regarding construction of tanks which he gave me for typing.

Answering a question by Mr. Fairley, H.E. said delivery to fuelling point at Camber would include lighter charge. As for subsequent lightering across to Stanley, the Falkland Islands Company were due to submit proposals. Present cost of oil delivered Falklands is abouy £15 per ton.

J.H.P. Hawkey

Note by Mr. Pollock, Oil Adviser to Admiralty.

Referring to Falkland Islands Savingram No. 124 and accompanying drawings, there are some technical points on which I would comment, these being

(i) It is stated that a flowmeter is necessary to measure the volume of oil received and discharged. An accurate flowmeter would be a convenience but it is by no means necessary in this instance as tanks of 1500 tons capacity can be dipped with sufficient accuracy for this purpose provided that the tanks are properly calibrated on erection.

(ii) The tank layout drawing appears to show a 6" concrete slab foundation enclosed by a 12" x 24" retaining wall apparently touching the tank shell plates. It is recommended that a standard foundation with a bitumen-sand carpet be used instead, as this provides best protection against corrosion of the bottom plates. This type of foundation is recommended in B.S.2654: Part 1:1956 and illustrated in Fig.18. It is suggested that Colonial Office should forward a copy of this publication to Falklands for guidance.

(iii) The same publication shows, in Fig.10, a combined water draw-off and clean-out sump and it is recommended that this be fitted to facilitate tank cleaning and drainage, and that a 4" sluice valve be fitted to its cover plate instead of the standard plug in order to facilitate emptying the tank below loss of swing arm suction for tank cleaning purposes; a 4" valved branch on the 6" main between the tanks would enable a portable pump and flexible hoses to be used for transferring bottoms to the other tank.

(iv) The tank drain should not discharge direct to sea, where it could cause oil pollution but to the tank area drain leading to an oil-water separator preferably located immediately outside the tank bund and discharging to sea; a valve fitted to the drain pipe passing through the bund would be fitted to close the outlet in case of oil flooding due to tank damage.

(v) A retaining wall 12" x 24" is shown surrounding the tanks. Its volumetric capacity, including that of the tanks up to the 2 ft. level, is of the order of 256 tons, which is inadequate. The minimum requirement in U.K. would be the capacity of one tank + 10%, i.e. 1650 tons, equal to 64,500 cubic feet. The enclosed area, with a 5 ft high bund, therefore would be 200 ft. x 65 ft. equivalent. The bund itself may be of earth construction (as for Tanks Nos. land 2) or a concrete wall. Details of a suitable API oil/water separator can be provided on request.

(vi) The area within the bunds and around the tanks need not be surfaced or paved but a concrete drain channel surrounding each tank mound should continue to a small sump at the inlet of the drain through the bund, the purpose of which is to intercept sand, gravel etc. which otherwise would choke the drain pipe or foul the separator.

KIV 208.

214

LO9 et seq for information of SPE re SPLA

16/9/62

H.C.S.

215

Noted, thank you.

SPE 20/11/62.

215A

H.C.S.

To see + return pl

23.11.62.

215B.

H.C.S.

Noted thank you.

L Pitcher. SP2.

24/11/62.

Can go in main file now.

216

DECODE.

TELEGRAM.

No. 127.

From Administrative Officer, South Georgia.

To Colonial Secretary, Stanley.

Despatched : 17th November, *19* 62. *Time :* 1400

Received : *19* *Time :*

207 No. 293. Your telegram No. 248. Following from Thorsen Albion Star.

"Intend using two welding transformers 400 volts 50 cycles AC from Grytviken please arrange power supply connections accordingly. Grateful know whether adequate lighting for night work available Stanley otherwise will have to be supplied by Albion Star. Also require small shed on site for transformers welding equipment welding electrodes tools etc. Re our departure from South Georgia following telegram received from Southampton Office

"Your departure Stanley depends Ringdals arrival South Georgia to relieve you please request Colonial Secretary advise us direct expected vessels movements between South Georgia Stanley February March enable us arrange arrival Ringdal".

Fully qualified welder Odd Amundsen replacing Hamer. Have started prepare jack equipment but unable complete preparing until plans arrive from Motherwells".

Administrative Officer

Copy in 1905/c

P/L : LH
Copy to: S/P.E.

KIV 214.

211
action on 208 A.
Then 2

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

~~219~~ 217

Wt P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			21.11.62

To

etat ADMINOFF SOUTH GEORGIA SGA/c

No. 253. Following for Thorsen tank height is 36 feet not 30 feet as stated in telegram

Secretary

Time ECG/TB

Copy for SPED

~~220~~ 218

Dw

To see from 209 pl.

23.11.62

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

~~223~~ 219

Wt. P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			22.11.62.

To

etat ALBION SOUTHAMPTON ENGLAND A/c HO

~~223~~ 4w Yours 21st Early to be definite but possibility trip to South Georgia
1905/C soon after Darwin arrives Stanley March 29.

GOVERNOR

Kiv change 1/
Passage free

Repeat 225

Time PA/ER
P/L

Copied to O.C. RPS

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

~~224~~ 220

SENT

W1 P2809 5/61

[redacted]umber	Office of Origin	Words	Handed in at	Date
	Psy			23.11.62

To

etat CROWN LONDON HOA/c

145 in 1905 No. 412. Mylet 1905 of 18th August last paragraph drawings not yet received here or by Works Master South Georgia stop When are they being sent stop If not sent in Harvester could be sent direct by Kista Dan or air mailed here to catch her

Secretary

Time RHDM/LH

Reply at ~~232~~ 224

209-215 sent to SW to see
(letter from Gowers)

23 11 62

~~226~~
221

DECODE.

TELEGRAM SENT.

From **SECRETARY OF STATE** *to* **GOVERNOR**

Despatched : 27.11.62. *Time :* 1230 *Received :* 28.11.62. *Time :* 1020.

142 in 1905

No. 97. Your telegram No. 97. Colony Estimates 1962/63. Issue of Special Warrant to incur £15,000 under head Special Expenditure new item Oil Storage Tanks approved.

Secer.

KW Bell 25

~~227~~/222

HCT

P/L : IM. Copy to Treasury.

~~220~~ 223

Thank you.

noted. thank you.

29. 11. 62.

Folios 229 - 231 transferred to 1905/B.

~~232~~
224

DECODE.

TELEGRAM.

No. 33.

From Crown Agents, London.

To Colonial Secretary, Stanley.

Despatched : 28th November, *19*62. *Time* : 1700

Received : 29th November, *19*62. *Time* : 1030

~~219~~ 220 Your telegram No. 412 of 13th November. Tank drawings sent to Works Master 20th September. Three further sets being sent with tanks on A.E.S.

Crown

~~235~~ 225

P/L : LH

Inform AO of departure and ask if they have yet arrived.

(Intld.) DM

29.11.62.

Folios 234-5 recib. de SPUS y SPED la misma (en temp. file)

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

~~2357~~ 226

EC2/Falkland Is. 9084/1

TELEGRAMS { INLAND: "CROWN, SOWEST, LONDON"
OVERSEA: "CROWN, LONDON"

TELEPHONE: ABBEY 7730

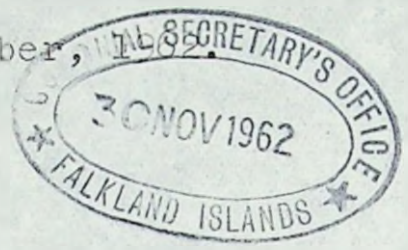
TELEX NO. 24209

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS

4, MILLBANK,
LONDON, S.W.1.

BOF.

7th November, 1962.



Sir,

Oil Fuel Storage Tanks

168 We have to refer to our letter of the 10th October, 1962, under reference EC367/25 with which were sent to you some notes on oil storage tanks prepared by Mr. Pollock, Oil Advisor to the Admiralty.

In these notes (1) it was suggested that the tanks could be dipped with sufficient accuracy provided they were properly calibrated on erection. A quotation has been obtained for two Carbon Steel Tapes fitted with 22 ounce detachable brass weight 7 in. long for use in heavy oils and the cost of these is £13 for two.

In (3) the Admiralty Oil Advisor recommended the British Standard combined water draw-off and clean-out sump but production of the tanks is too far advanced to enable this modification to be included although the drain sump being supplied serves the same purpose with the exception that suitable valves for suction draw-off should also be included. The makers recommend two no. 4 in. diameter lubricated plug valves complete with the necessary bolts and nuts at a cost of £9. It will be appreciated if you will advise us as soon as possible whether these two items of additional equipment should be ordered.

235

Enclosed please find a copy of a self-explanatory letter of even date addressed to Albion Star(Southampton)Ltd.

will s/s. Sept. Docks 209

Referring to the last paragraph of our letter of the 26th October, 1962 under reference EC367/25 a check on the estimated freight costs for supply of the piping etc. has indicated that the standard rates used in calculation were too low and that in the event of piping being ordered an allowance of plus 12½ per cent should be made on the two cost figures shown.

Yours faithfully,

for the Crown Agents.

The Colonial Secretary,
Stanley,
FALKLAND ISLANDS,
South Atlantic.

RJF/JERB

Distribution: File
EC367/25

EC2/Falkland Is. 9084/1

7th November, 1962.

Gentlemen,

Oil Fuel Storage Tanks

We have to advise you that a copy of your letter AP/WC of the 22nd October, 1962 was passed to us by Mr. R. C. Pettitt of the Colonial Office and the contents of the telegram were sent to the tank makers, Messrs. Motherwell Bridge & Engineering Co. Ltd., on the 24th October.

The order for these tanks was placed with the firm on the 22nd August, 1962 and in consequence all plates have been ordered and production is now well advanced. The makers are therefore unable to accede to the request to make the height of each plate tier a maximum of 5 ft. 11 in. as the plates are cut 6 ft. wide. Similarly they are unable to supply plates having 5 in. extra length on each plate tier. The plate edges are all finished for square butts so that welding from the inside would be satisfactory, but the firm state that they have no knowledge of the jack method of erection and are unable to comment thereon.

A copy of this letter is being sent to the Colonial Secretary Falkland Islands but it is suggested that in an emergency you should contact Messrs. Motherwell Bridge & Engineering Co. Ltd., quoting the reference given at the head of this letter together with their reference number A2050.

Yours faithfully,

for the Crown Agents.

Albion Star(Southampton) Ltd.,
10-12 Briton Street,
SOUTHAMPTON.

RJF/JENB

KW 233

~~234~~ 228

S.P.E.D.,
S/25.

To note from f. 234 pt.

for C.S.
4.12.62.

229 ~~235~~

HOS

Have we a copy of letter AP/MC of 22nd October please. Appeal L @ 235. If not may I see original file. It would appear that somehow Albion Star have been in contact with CAs ~~about~~ the subject of which we should know of.

230 ~~236~~ 5/12/62.

Noted. Thank you
L Dalton. S.P.N.
6/12/62.

~~237~~ 231

S.P.E.D.,

Main files are now with you pt.

for C.S.
6.12.62.

7/12/62.

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

232

Wt P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			1.12.62

To

etat ADMINOFF SOUTH GEORGIA SG/Ac

224

No. 263. Following from Crown begins Tank drawings sent to works master 20th September stop Three further sets being sent with tanks on AES ends Please telegraph if received

Reply at 237.

Secretary

Time DRM/TB

~~231~~
233

DECODE.
26/58

TELEGRAM.

From Administrative Officer, South Georgia.

To Secretary, Stanley.

Despatched : 3rd December, *19* 62. *Time :* 1250

Received : 3rd December, *19* 62. *Time :*

~~230~~ 232

No. 300. Your telegram No. 263.

Confirm one set of tank drawings received by Thorsen Grytviken.

Administrative Officer

P/L : TB

~~234~~ 234

234 to SPW + S PCD to Lord - noted at 235A

JR 3/12/62.

K.V - 209 - 215B.

235 ~~240~~

~~HCS.~~ Sue thank you.

7/12/62

K.V — 209 - 215B,
— 234 - 235C

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

~~242~~ 236

Wt. P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			111.12.62

To

etat CROWN LONDON HOA/c

No. 435. Reference Q/EC2/Falklands 9084 please confirm that tanks are being shipped in December AES

Secretary

Time RHDM/LH

Reply at ~~245~~ 240.

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

~~273~~ 237

Wt. P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			11.1.2. 62

To

etat CROWN LONDON HOA/c

226

~~234~~ No. 433. Yourlet EC2/Falkland Islands 9084/1 of 7th November please order two items

Secretary

Time DRM/LH

~~247~~ 1905/II (file GA)

~~247~~ - 238

Discussed with S/PED.

There are two points.

EC2/Falklands 9084/1 ?209

1. We have to answer 239. We have delayed this too long. The order at 4/12 to note is incurred

As regards the flowmeter S/PED think we will need one but it seems to me very horrible that we have for it will be to small existing tanks when then be large storage tanks. In any case we will need (when Steel tapes so that we can know how much is in the tanks at any time (this would be calculated from the flowmeter and a mistake might not be detected for ages.) So we can leave the flowmeter for the present

S/PED is satisfied with the proposal to refit the valves.

Write "Please order the two items"

2. Albion Steam have addressed the Colonial Official (see 235) who may be going to send have the letter to us a copy of their letter AP/TC of 22/10/02 but S/PED think it best not to interfere at this stage

N.F.A on both.

237 — who send their bill (

5/12/02.

~~238~~ 239
~~242~~
~~240~~

DECODE.

TELEGRAM.

No. 57.

From Crown Agents, London.

To Colonial Secretary, Stanley.

Despatched : 13th December, *19* 62. *Time :* 1630

Received : 14th December, *19* 62. *Time :* 1030

~~242~~ 236 Your telegram No. 435 December 11th. Expect ship tanks A.E.S. sailing 20th December.

Crown

P/L : LH
(Intld.) DM

Copies to: S/W
S/P.E.

~~KW 242241~~

240

L09 is marked as requiring a reply. I think this is because the last sentence asks us to tell them when a decision is reached. But we have already done this in 199. No further reply seems to be needed here?

DR 13/12/62

BA 20-12-62
5.1.63 KMV

1905

PRELIMINARY SHIPPING ADVICE

241

The Crown Agents have to report that the following shipment is expected :—

Reference:

S/ SC2 Falkland Is. 9004/1.

SUPPLIER:

The Motherwell Bridge & Eng. Co. Ltd.,
P.O. Box No. 4,
MOTHERWELL.

26th November, 62.

Indent No. COL. SEC. LTR.

Special A/C

Dept.

Consigned to C.A.G.

Marked

REQN. 9004

C ↑ A

* Nos.

Gross Weight

Ind.

COL. SEC.
STANLEY.

1905 dd.
Col. Sec. Ltr. 22.1.62.

M.V./S.S. "A.E.S." in the B. Shed, West India Dock, London, E14.

6th/10th December.

The latest date above is for loading. The sailing date is normally some days later and in some instances may be up to 14 days after the loading date, according to the destination and the loading programme of the shipping company concerned.

The particulars given in the schedule below were those furnished by the above mentioned contractor, when forwarding instructions were issued, and are not necessarily accurate.

VALUE £	*Nos.	Description of Packages	CONTENTS	WEIGHT Tons	Cwt.	Qr.	Lb.	MEASUREMENTS Length	Breadth	Depth
9112	1/75		As per Specification Attached.							

The Bill of Lading and Invoice will be despatched as soon as possible.
It should be understood, however, that the shipment is not yet confirmed.

75

Note to Contractor :—

S1 C.A.L.

1905

PRELIMINARY SHIPPING ADVICE

The Crown Agents have to report that the following shipment is expected :—

Referer[redacted]

S/ Falkland Is. 9084/1.

SUPPLIER:
The Motherwell Bridge & Eng. Co. Ltd.,
P.O. Box No. 4,
Motherwell.

28th November, 2.

Indent No. Col. Sec. Ltr.

Special A/C

Dept.

Consigned to O.A.G.

Marked

REQN. 9084. COL. SEC.
C ↑ A STANLEY.
* Nos. 1905 dd.
Gross Weight 22.1.62.
Ind. Col. Sec. Ltr.

M.V./S.S. "A.E.S." in the E. Shed, West, Victoria Dock, London, E.14.

6-10 Dec.

The latest date above is for loading. The sailing date is normally some days later and in some instances may be up to 14 days after the loading date, according to the destination and the loading programme of the shipping company concerned.

The particulars given in the schedule below were those furnished by the above mentioned contractor, when forwarding instructions were issued, and are not necessarily accurate.

VALUE £	*Nos.	Description of Packages	CONTENTS	WEIGHT Tons	Cwt.	Qr.	Lb.	MEASUREMENTS Length	Breadth	Depth
1264	90/91 100/5.	As per Specifications attached.								

72.

The Bill of Lading and Invoice will be despatched as soon as possible. It should be understood, however, that the shipment is not yet confirmed.

Note to Contractor :—

mail from 248

BU 9.1.63 to KIV mail

243

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

Wt. P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			3.1.63

To

etat ADMINOFF SOUTH GEORGIA SGA/c

No. 1. Grateful you telegraph approximate shipping dimensions of equipment to be brought to Stanley in connection with erection of oil storage tanks

Secretary

Reply at 245. Bu 8.1.63

Time HLB/LH

FS?.123/78/03.

244

Saving

From the Secretary of State for the Colonies.

To the Officer Administering the Government of FALKLAND ISLANDS

Date 13 December, 1962.

No. 106 **Saving**

149 in vol I

Your savingram No. 124 of 18th August.

Storage of Oil

245/

I enclose as reminder an extract from a letter received from the Director of Stores, the Admiralty.

SECRETARY.

Pl. let me have this back on file

EXTRACT FROM

a letter from Director of Stores,
Admiralty, Lillie Road, London, S.W.6.
dated 17th October, 1962.

x x x

With reference to your letter FST.123/78/03 dated 11th September, 1962, you will probably have heard that the Falkland Islands scheme was discussed at a meeting between Admiralty representatives and the Governor and Chief Civil Engineer to the Crown Agents, on 1st October, 1962.

2. Our view, as put to the Governor, was that we should have no objection in recommending the siting of the tanks in the oil Fuel Depot, but that so far as the financial arrangements were concerned, it would be normal Treasury practice to make a charge for the land and facilities required for the operation of the tankage. We agreed that it would be easier for us to consider a waiving of such charges if the Governor could make a formal offer of the benefits which could be offered the Admiralty in return: these were either an arrangement whereby we could draw on the Government-owned oil in emergency or if, as the Governor suggested, the Colony might not be able to afford sufficient oil to fill the storage immediately, the use of surplus capacity in the tanks for Admiralty to fill without payment of rental charges.

3. In view of the time factor, we hope for an early offer by the Governor so that we can seek the requisite approvals.

x x x

245

Mail from 244.

KIV - Bn. on 243.

243 I have phoned O.I.C BAS and asked him to explain the position to Captain Turnbull. We phoned 246 get a reply to 243 before Friday when Shackleton sails but in any case I have asked that Captain Turnbull should be asked to find out at S.S exactly what he is expected to bring. Please note to inform O.I.C BAS of a reply comes even if he fate is not available.

247.

As regards 244 which has to be resubmitted we have informed Brown by 199 but this does not seem to have penetrated to S of S. Resubmit with Vol I

[illegible] 31/63.

HCJ Vol I attached.

[illegible]
9.1.63

245

DECODE.

TELEGRAM.

No. 97.

From Administrative Officer, South Georgia.

To Colonial Secretary, Stanley.

Despatched : 8th January, *19* 63. *Time :* 1750

Received : 9th January, *19* 63. *Time :* 1045

243 No. 7. Reference your telegram No. 1. Approximate dimensions equipment required erection oil storage tanks. Thorsen estimates approximately 400 cubic feet and this includes 14 beams 15 feet long and 1 beam 21 feet long. Nearly all equipment can be carried as deck cargo with exception of actual welding equipment.

Administrative Officer

KIV 247

'Phoned Mrs. Clements 11.50 a.m.

P/L : MM
(Intld.) DM

(Intld.) HLB
9.1.63.

249.

G.E. 244 submitted. We informed Brown by 199. That we were sitting Re tanks this side but we have not told S of S

[illegible]
11/1/63.

Recalled
15.2.63.

THE FOLLOWING REFERENCE SHOULD BE QUOTED IN COMMUNICATIONS

W/EC2 Falkland Islands

COLONIAL SECRETARY'S OFFICE
JAN 1963
FALKLAND ISLANDS

9084

Copies of letter dated 4/12/62 for your information

With the Compliments

of

The Crown Agents

The Colonial Secretary
Stanley
Falkland Islands

THE CROWN AGENTS for Oversea

250

THE FOLLOWING REFERENCE
SHOULD BE QUOTED IN
COMMUNICATIONS

W/ECC2 Falkland Islands 9084

COLONIAL SECRETARY'S OFFICE
JAN 1963
FALKLAND ISLANDS

Copies of letter dated 4/12/62 for your information

With the Compliments

of

The Crown Agents

The Colonial Secretary
Stanley
Falkland Islands

THE CROWN AGENTS for Oversea
Governments and Administrations,
4, MILLBANK,
LONDON, S.W.1.

O.53 CAL

AOP 25/
Vide Telegram No 4330 11/12/62

c.c. Crown Agents:
Contracts.

DO/A2050.

4th December, 1962.

Mr. Thor Thorsen,
Works Master,
Albion Star Whaling Co.,
Grytviken,
South Georgia.

Dear Sirs,

Crown Agents - Ref. W/EC2 Falkland Islands - 9084/1

We have been advised by the Crown Agents that the drawings forwarded to you appear to have gone astray and we are enclosing one airmail copy from each of the undernoted drawings and foundation details for your reference.

Three sets of these drawings are also enclosed in one of the cases which has now been shipped and we trust you will find them satisfactory for erection purposes.

Drawing Nos.

26469	26470	26471	26472.	26473	26474
26475	26476	26477	26478	26659	26494
S/25524	NP5	S/A2050/62/1			
AP5/2	AP5/9	AP6/1	AP9/1	AP23/1A	AP27/1
AP28/2	AP32/1	S/A6037/62/1			
KE/1	KE/2	KE/3	KE/4	KE/5	KE/7
KE/8	KE/9	KE/10			

Yours faithfully,

D. S. MOFFAT.

DSM/JK.

A.O.P.

Vide Telegram No.433 of 11/12/62

252

c.c. Crown Agents:-
Contracts.

DO/A2050.

4th December, 1962.

Mr. Thor Thorsen,
Works Master,
Albion Star Whaling Co.,
Grytviken,
South Georgia.

Dear Sirs,

Crown Agents - Ref: W/FC2 Falkland Islands - 9084/1

We have been advised by the Crown Agents that the drawings forwarded to you appear to have gone astray and we are enclosing one airmail copy from each of the undernoted drawings and foundation details for your reference.

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S/25524	NP5	S/A2050/62/1			
AP5/2	AP5/9	AP6/1	AP9/1	AP23/1A	AP27/1
AP28/2	AP32/1	S/A6037/62/1			
KE/1	KE/2	KE/3	KE/4	KE/5	KE/7
KE/8	KE/9	KE/10			

Yours faithfully,

D. S. MOFFAT.

DSM/JK.

253

SP.E

To see from 1 pl.

254

D Pen
24.1.63

H.C.S.

Seen thank, please pass to Supt. P.W.D.
for information.

28/1/63.

SPW

255

To see from 1 pl

D Rumford
28.1.63

256

H.C.S. Noted thank you.

L Pinton SPW.
28/1/63.

BV 2 cheques for Fisheries Station
re Mitchell 27/2/63

Bell 13.3.63

257

THE CROWN AGENTS. JOB No. A.2050.

2 TANKS 48'0" dia. x 36'0" high - F.R.

CONTRACT No. EC2 Falkland Is. 9084/1.

SPECIFICATION OF MATERIAL shipped by

THE MOTHERWELL BRIDGE & ENGINEERING COMPANY, LTD., MOTHERWELL

at LONDON per F.V. "AES" for A/c of

THE CROWN AGENTS and consigned to

STANLEY.

Marks Numbers 1 to 65 & 68 to 88, Tank 1.
do., do. 2.
66 & 67.

Regn. 9084
C/A No.
Gross Weight.
COL. SEC. STANLEY
Ind. No.
Col.Sec.LTR. 1905 dd. 22.1.62.

Shipping Nos.	Nos.	Description	External Dimensions						Nett Weight				Gross			
			Feet	Ins.	Feet	Ins.	Feet	Ins.	Tons	Cwts.	Qrs.	Lbs.	Tons	Cwts.	Qrs.	Lbs.
		Material in 1 Tank - 2 Rqd.														
		Bottom Plates.														
1	1	Pc. Common Plate.	25	1 19/32	6	-	-	1/4		13	2	26		13	2	26
2-3	2	Pcs. Half Plate.	12	6 5/8	6	-	-	1/4		13	2	24		13	2	24
4-5	2	Pcs. Sketch Plate, mk. B1.	17	1 1/4	6	-	-	1/4		18	2	22		18	2	22
6-7	2	Pcs. do. B2.	11	8	6	-	-	1/4		12	3	-		12	3	-
8-11	4	Pcs. do. B3.	15	11	6	-	-	1/4	1	13	-	17	1	13	-	17
12-15	4	Pcs. do. B4.	16	10	6	-	-	1/4	1	13	-	7	1	13	-	7
16-19	4	Pcs. do. B5.	5	-	5	-	-	1/4		4	2	6		4	2	6
20-23	4	Pcs. do. B6.	8	3	6	-	-	1/4		14	1	26		14	1	26
24-27	4	Pcs. do. B7.	9	8	6	-	-	1/4		19	2	9		19	2	9
28-29	2	Pcs. do. B8.	9	6	6	-	-	1/4		10	1	15		10	1	15
		Shell Plates.														
30-38	9	Bdls. ea. of 4 Shell Pls., mk. 1.	24	-1/2	6	-1/2	3	8 1/4	24	14	1	17	24	16	-	1
		Curb Angle.														
39	1	Bdl. of 6 Curb Ls., curved.	24	1	4	1	-	6 1/4		11	1	23		11	1	25
		Roof Plates.														
40	1	Bdl. of 10 Roof Plates, mk. 8/Common & 2/4.	15	9	5	-1/2	-	2 3/8	2	13	2	17	2	13	3	9
41	1	Bdl. of 10 Roof Plates, mk. 1/2, 1/3, 5/1, 1/5 & 2/6,	15	9	5	-1/2	-	1 5/8	1	12	-	7	1	12	-	27
42	1	Bdl. of 16 Roof Plates, mk. 4/8, 4/9, 4/10 & 4/11.	6	11 1/2	5	-1/2	-	2 3/4	1	2	1	26	1	2	2	18
		Carry forward,							39	8	-	18	39	10	1	8

Shipping Nos.	Nos.	Description	External Dimensions						Nett Weight				Gross			
			Feet	Ins.	Feet	Ins.	Feet	Ins.	Tons	Cwts.	Qrs.	Lbs.	Tons	Cwts.	Qrs.	Lbs.
		Brought forward, =							39	8	-	18	39	10	1	8
43	1	Bdl. of 10 Roof Plates, mk. 3/7, 1/7A, 4/12 & 2/13.	9	4½	5	-½	-	2⅜	1	7	-	4	1	7	-	24
44	1	Pc. Crown Plate.	6	-	6	-	-	¼		2	2	8		2	2	8
		6 Roof Trusses.														
45	1	Bdl. of 6 Rafter Ls., mk. 1-5	21	9 3/32	-	6¾	-	6¼		10	2	10		10	2	12
46	1	Bdl. of 12 Btm. Tie Ls., mk. 6/6-T2 & 6/1-6.	17	5½	-	7⅜	-	7⅜		6	1	3		6	1	5
47	1	Bdl. of 12 Vert. Ls., mk. 6/2-6 & 6/3-7.	4	9	-	6⅜	-	6⅜		1	1	18		1	1	20
48	1	Bdl. of 12 Diagl. Ls., mk. 6/2-7 & 6/4-7.	8	-	-	6⅜	-	6⅜		2	1	25		2	1	27
49	1	Bdl. of 12 Vert. & Diagl. Ls., mk. 6/4-8 & 6/5-8.	7	9	-	6⅜	-	6⅜		2	1	11		2	1	13
		6 Sets of Purlins.														
50	1	Bdl. of 6 Purlin Channs., mk.1.	6	10	-	7	-	4 9/16		2	2	11		2	2	13
51	1	Bdl. of 6 do. mk.2.	12	10	-	7	-	4 9/16		4	3	14		4	3	16
52	1	Bdl. of 6 do. mk.3.	18	10	-,	7	-	4 9/16		7	-	17		7	-	19
		6 Sets Vert. Bracing.														
53	1	Bdl. of 12 Vert. Ls.	10	-	-	6⅜	-	6⅜		3	1	19		3	1	21
		6 Sets Rafters.														
54	1	Bdl. of 6 Rafter Channs., mk.R1.	21	6	-	7	-	4 9/16		8	-	19		8	-	21
55	1	Bdl. of 12 Rafter Channs., mr. R2, R_{2X}.	15	6	1	1¾	-	4 9/16		11	3	3		11	3	5
		2 Sets Rafter Bracing.														
56	1	Bdl. of 12 Bracing Ls., 4/RB1-RB4, 4/RB2-RB4 & 4/RB3-RB4.	13	6	-	6⅞	-	6⅜		4	1	8		4	1	10
57	1	Bdl. of 6 Gusset Plates, mk. 2/RB1, 2/RB2 & 2/RB3.	4	-½	-	10½	-	1¾		1	1	13		1	2	5
		Centre Drum, Tie Plates etc.														
58	1	Pc. Centre Drum welded complete.	4	-¼,	4	-¼	1	-⅜		2	3	1		2	3	1
59	1	Pc. Top Tie Plate, T1.	5	4⅜	5	4⅜	-	⅜		2	-	5		2	-	5
60	1	Pc. Bottom Tie Plate, T2.	2	9	2	9	-	⅜			3	7			3	7
		Carry forward,							44	10	-	18	44	12	3	16

Shipping Nos.	Nos.	Description	External Dimensions						Nett Weight				Gross			
			Feet	Ins.	Feet	Ins.	Feet	Ins.	Tons	Cwts.	Qrs.	Lbs.	Tons	Cwts.	Qrs.	Lbs.
		Brought forward,							44	10	-	18	44	12	3	16
61	1	Bdl. of 4 Strut Ls.	7	3	-	3 3/8	-	3 3/8			3	9			3	11
62	1	Bdl. of 1 1/4" dia. Handrail Rounds.								2	2	12		2	2	14
63	1	Bdl. of 2 Cheq.Plate Flooring Panels.	4	10 1/2	2	6 1/2	-	8 3/4		2	1	18		2	2	10
64	1	Bdl. of 2 Handrail Flats, 1 Bracing L. & 3 Handrail Stds., mk.S3.	7	3	-	2 3/4	-	2 3/4			3	7			3	9
65	1	Bdl. of 54 Handrail Stds mk. 51/S1 & 3/S2.	4	3 5/8	-	9 7/8	-	9 1/4		6	3	18		6	3	20
		Fittings.														
68	1	Pc. 24" dia. Shell Manhole with a cover tack bolted on in reverse position.	2	8 3/4	2	8 3/4	-	6 1/2		1	3	13		1	3	13
69	1	Pc. Reinf. Plate.	4	6	4	6	-	1/4		1	1	26		1	1	26
70	1	Pc. 24" dia. Roof Manhole with cover tack bolted in reverse position.	2	6	2	6	-	11		1	-	11		1	-	11
71	1	Pc. Reinf. Plate.	3	10	3	10	-	1/4			3	-			3	-
72	1	Bdl. of 2 Reinf. Plates.	2	3 1/4	2	3 1/4	-	3/4			3	19			3	21
73	1	Pc. Swing Pipe with a flange welded one end.	22	- 7/16	-	11	-	11		3	3	17		3	3	17
74	1	Pc. Swing Pipe with a bend & baffle plate welded on.	20	6	1	2 5/16	1	-		3	3	5		3	3	5
		Roof Handrailing.														
75-76	2	Bdls.ea.of 12 Handrail Stds., mk. S1.	3	5 3/8	-	6 7/8	-	6 7/8		2	3	26		3	-	2
77	1	Bdl. of 10 Handrail Stds. mk. 13/H1 & 2/HS2.	3	5 3/8	-	6 1/8	-	6 1/8		1	-	27		1	1	1
78	1	Bdl. of 15 Handrail Rds. mk. 13/H1 & 2/HS2.	17	2 1/2	-	5 1/4	-	5 1/4		7	-	11		7	-,	13
79	1	Bdl. of 28 Handrail Flats mk. 22/H2 & 2/HS3.	17	2	-	4 1/4	-	3 3/8		5	1	8		5	1	10
		Carry forward,							46	14	-	21	46	17	1	3

Shipping Nos.	Nos.	Description	External Dimensions Feet	Ins.	Feet	Ins.	Feet	Ins.	Nett Weight Tons	Cwts.	Qrs.	Lbs.	Gross Tons	Cwts.	Qrs.	Lbs.
		Brought Forward,							46	14	-	21	46	17	1	3
80	1	Case ctg:-	2	4	1	10	1	10		5	-	9		5	3	5
		1 Klingerit Pack. 6⅞"	c/d.	x	4½"		i/d.	x								
					1/16"											
		1 do. 28⅜"	c/d.	x	2"		i/d.	x	⅛"							
		1 do. 2'5⅝"	c/d.	x	2"		i/d.	x								
						5/16"										
		2 s.s. Spindles ¾" dia.	x	3⅜"												
		4 s.s. Pins 3/16" dia.	x	1¼"												
		4 s.s. Washers 2" c/d.	x	13/16"		i/d.	x	⅛"								
		2 Oil-less Brass Bushes to suit ¾" dia. spindle.														
		2 C.I. Pulleys 6½" dia. with tread to suit ⅜" dia. rope.														
		1 Pc. Soft Asbestos Pack. 3/8" sq. x 5'0"														
		1 Klingerit Pack. 1'11" x 10" c/sides x 1'7" x 6" i/sides x ⅛" thk.														
		1 - ¼" dia. Galvd. Oil Proof Chain with shackle & split pin each end, 53'0" ins														
		94 lin.ft. ⅜" dia. x 6/24 Strand Construction specially flexible ungalvd. best plough steel wire rope, complete with thimble, shackle & pin one end only.														
		2 Klingerit Packs. 8⅝" c/d.	x	6½"	i/d.	x	⅛"									
		1 Brass Nameplate complete with 4 studs.														
		57 Bolts & Nuts ½" dia.	x	1¼"	Snap R.H.											
		40 " ¾" dia.	x	1¾"	Nick Chk. R.H.											
		16 " ½" dia	x	1¼"	HRH.											
		3 " "	x	1½"	"											
		132 " ⅝" dia.	x	1"	"											
		596 " "	x	1¼"	"											
		59 " "	x	1½"	"											
		20 " "	x	1¾"	"											
		48 " "	x	2"	"											
		14 " ¾" dia.	x	1"	"											
		115 " "	x	1¼"	"											
		57 " "	x	1½"	"											
		18 " "	x	3"	"											
		112 Std. Taper Washers for ½" dia. bolts.														
81	1	Case ctg:-	1	9	1	-	1	7		1	2			2	4	
		1 Thermometer with engraved glass stem & range 0° to 120° F.														
		1 Hydrometer Type M50, Range 0.800 to 0.850.														
		1 do. " 0.850 to 0.900.														
		2 Hydrometer Jars 2" dia. x 10"														
		1 Dipping Bottle & Tag.														
82	1	Case ctg:-	3	4	2	4	1	10		15	-	10		15	3	26
		12 End Cleats 3½" x 3"	x	¼"	x	10"										
					mk.	AB.										
		6 Truss Support Assemblies welded complete.			mk.	A.										
		51 Treads 2'6" x 10½" x	5/16"	c/d.,	belt.											
		2 Stiff. Plates 2'6" x	1'2"	to 8"	x	⅜"										
		2 do.	do.													
		2 do.	do.													
		1 Stiff. Plate 2'6" x	1'2"	to 8"	x	⅜"										
		Carry forward,							47	14	2	14	47	19	2	10

CONTINUED 5.

Shipping Nos.	Nos.	Description	External Dimensions						Nett Weight				Gross			
			Feet	Ins.	Feet	Ins.	Feet	Ins.	Tons	Cwts.	Qrs.	Lbs.	Tons	Cwts.	Qrs.	Lbs.
		Brought forward,							47	14	2	14	47	19	2	10
83	1	Case ctg:-	2	4	1	10	1	10		10	2	7		11	1	3
		6 Gusset Plates 9" x 5/8" x 1'7½", mk. 2.														
		6 do. " x 1'2½", mk. 3.														
		6 do. 12" x ⅝" x 1'1", mk. 4.														
		6 do. 9" x ⅝" x 2'3", mk. 6.														
		6 do. " x 1'4", mk. 7.														
		6 do. " x 9⅝", mk. 8.														
		18 Packer Plates 3" x ⅝" x 5"														
		6 Cover Plates " x 1'4", mk. 6.														
		36 Purlin Cleats 6" x ⅝" x 1'1"														
		6 Gusset Plates 7" x ⅝" x 1'9", mk. P3A.														
		12 " 6" x ⅝" x 9", mk. P3B,														
		6 Angle Cleats 2" x 2" x ¼" x 10"														
		18 Rafter Cleats 6" x 3½" x 3/8" x 4½", mk. A, AX.														
		12 Bracing Cleats 3" x 3" x 5/16" x 5", mk. RB4.														
84	1	Case ctg:-	2	4	1	10	1	10		2	1	-		2	3	24
		6 Gusset Plates each with a flange welded on, mk. 5.														
		1 Centre Tie Assembly welded complete, mk. T3.														
		1 Roof Hatch for Top Sleeve complete with cover plate.														
		2 Sheave Support Plates 8½" x ¼" x 10"														
		2 do. 5¼" to 2½" x ⅜" x 7¾"														
		1 Rope Tube complete with end plate, spring washers, pin type fitting & cap.														
		2 Distance Pieces ½" n.b. x 1¼" long.														
		30 Treads ⅝" dia. x 2'0", bent.														
		1 Sheave Support Plate 3" x ¼" x 6"														
85	1	Case ctg:-	3	10	2	4	2	4		6	2	11		7	2	19
		6 Gusset Plates each with a flange & seating cleat welded on, mk. 1.														
		1 Parcel ctg. Erection Drawings.														
		1 - 4" dia. Drain Stool complete with flange & reinf. plate.														
		1 Flange 9" o/d. x 4½" i/d. x 15/16"														
		2 - 12" dia. S/F. Shell Nozzles each with a flange one end.														
		1 - 6" n/b. S/F. Nozzle with a flange one end.														
		1 Reinf. Plate 1'3¾" x 15¾" x ¼" thk.														
		1 - 6" dia. Roof Nozzle with a flange one end.														
		1 Reinf. Plate 15" o/d. x 6¾" i/d. x ¼														
		1 Chain Lug 6" x 3" x ⅜" x 6"														
		1 - 6" dia. D/F. Stool with a flange one end.														
		1 Flange (internal) 11" o/d. x 6⅝" i/d x 1" thk.														
		1 Reinf. Plate 15¾" x ¼" x 1'3¾"														
		Carry forward,							48	14	-	4	49	1	2	-

Total Eqt. for 2 Tanks.

CONTINUED 6.

Shipping Nos.	Nos.	Description	External Dimensions						Nett Weight				Gross			
			Feet	Ins.	Feet	Ins.	Feet	Ins.	Tons	Cwts.	Qrs.	Lbs.	Tons	Cwts.	Qrs.	Lbs.
		Brought forward.							48	14	-	4	49	1	2	-
86	1	Case ctg:-	1	6	1	6	1	3			1	22			3	6
		1 - 6" Combined Vent & Dip complete with studs & nuts.														
87	1	Case ctg:-	2	7	1	6	1	3			2	4			3	16
		1 - 6" S. & J. Swing Joint (Double elbow type) complete with supports.														
88	1	Case ctg:-	3	3	1	7	1	5		1	-	8		1	3	4
		1 S. & J. Std. Winch complete with height indicator device.														
		Weight of Material in 1 Tank.							48	16	-	10	49	4	3	26
		Weight of Material in 2 Tanks.							97	12	-	20	98	9	3	24
		Total Material in 2 Tanks.														
		Fittings.														
66	1	Pc. 4" dia. Drain Bend assembly welded complete.	5	8¼	1	5½	-	9			3	-			3	-
67	1	Pc. Draw-off Sump.	2	4⅝	2	4⅝	-	8 11/16		1	-	3		1	-	3
		Weight of Material in 2 Tanks.								1	3	3		1	3	3
									97	13	3	23	98	11	2	27
									218843 lbs.				220835 lbs.			
		TOTAL WEIGHT OF SHIPMENT.							99265 Kls.				100169 Kls.			

SUMMARY.

Pieces,	80.
Bundles.	76.
Cases,	18.
Total,	174.

263

THE CROWN AGENTS. JOB No. A.6037.

2 TANKS 48'0" dia. x 36'0" high - F.R.

CONTRACT No. EC2 FALKLAND IS. 9084/1.

SPECIFICATION OF MATERIAL shipped by

THE MOTHERWELL BRIDGE & ENGINEERING COMPANY, LTD., MOTHERWELL

at LONDON per m.v. "AES" for A/c of

THE CROWN AGENTS. and consigned to

Stanley

Marks **Numbers** 90 to 103.

REQN. 9084
C A No.
Gross Wt.

COL. SEC. STANLEY

Ind. No.
Col. Sec. LTR. 1905 dd. 22.1.62.

Shipping Nos.	Nos.	Description	External Dimensions						Nett Weight				Gross			
			Feet	Ins.	Feet	Ins.	Feet	Ins.	Tons	Cwts.	Qrs.	Lbs.	Tons	Cwts.	Qrs.	Lbs.
		Erection Equipment.														
90-91	2	Bdls.ea.of 12 Fitting Channels.	4	-	1	7¾	-	6⅝		10	3	4		10	3	8
92-93	2	Bdls.ea.of 12 Joint Aligners.	3	-	2	8	1	2		6	2	26		6	3	2
94-95	2	Cases ea.ctg:-	3	4	2	4	1	10	1	15	3	22	1	17	2	26
		141 Key Plates welded complete.														
96	1	Case ctg:-	3	4	2	4	1	10	1	2	2	24	1	3	2	
		114 Key Plates welded complete. 150 Key Pins 1¼" to ⅜" dia. x 1'0" 500 Shims 2" x ⅛" x 3½"														
97	1	Case ctg:-	2	4	1	10	1	10		16	1	10		17	-	6
		1430 Fitting Wedges 1¾" to ¼" x ⅜" x 1'0"														
98	1	Case ctg:-	2	4	1	10	1	10		9	-	27		9	3	23
		200 U.Bars ⅝" sq. x 5" long, bent. 730 Fitting Wedges 1¾" to ¼" x ⅜" x 1'0" long.														
99	1	Case ctg:-	2	4	1	10	1	10		10	-	25		10	3	21
		900 Blank Nuts 1⅞" sq. x 1" thk. 130 Shims 2" x ⅛" x 3½"														
100	1	Case ctg:-	2	4	1	10	1	10		5	-	5		5	3	1
		36 Key Angles welded complete. 280 Blank Nuts 1⅞" sq. x 1" thk. 450 Shims 2" x ⅛" x 3½"														
		Carry forward,							5	17	-	3	6	2	2	15

CONTINUED 2.

Shipping Nos.	Nos.	Description	External Dimensions						Nett Weight				Gross			
			Feet	Ins.	Feet	Ins.	Feet	Ins.	Tons	Cwts.	Qrs.	Lbs.	Tons	Cwts.	Qrs.	Lbs.
		Brought forward,							5	17	-	3	6	2	2	15
101-103	3	Cases ea.ctg:-	2	4	1	10	1	10	1	18	3	22	2	1	-	10
		640 Key Pins 1¼" to ⅜" dia. x 1'0"														
									7	15	3	25	8	3	2	25
										17469 lbs.				18337 lbs.		
		TOTAL WEIGHT OF SHIPMENT,								7923 Kls.				8317 Kls.		

SUMMARY.

Bundles, 4.

Cases, 10.

Total, 14.

ACKNOWLEDGMENT OF ORDER PLACED WITH:—

265

W/EC2 / FALKLAND ISLANDS 9084/2

ADVICE OF ORDER PLACED

Indent No. or Authority Col.Sec's.Ltr. Ref.1905 dd. 22.1.62.

A/c.

Dept.

The Motherwell Bridge & Engg.Co. Ltd.,
P.O.Box No.4,
MOTHERWELL.

Order Dated:—

To:—
THE CROWN AGENTS
for Oversea Governments and Administrations,
4, MILLBANK, LONDON, S.W.1.

GENTLEMEN,

We accept this order placed for and on behalf of the Government of Falkland Islands and agree to supply, on the terms stipulated, Plug Valves, etc. specified below, in accordance with the Crown Agents' General Conditions of Contract dated June, 1957, and, where applicable, Special Conditions of Contract dated June, 1957.

Signature C.J.Shotter Address

Dated this 4th day of January 19 62

This order is subject to inspection by Chief Inspecting Engineer before despatch.

REQN. NO.	FIRM	DEPT.	DATE DUE	ACTION DUE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
9084/2	Motherwell Bridge & Engg.Co.Ltd.														

ITEM No.	QUANTITY	DETAILED DESCRIPTION OF ARTICLES ORDERED	ESTIMATED COST	RATE	AMOUNT
4	2 Nos.	4in. Class 150 Standard type lubricated plug valves Fig.No. MV23 flanged and complete with bolts and nuts	£94 - -		94 - -
5	2 "	Chesterman Carbon Steel Dipping Tapes length 50 feet complete with 7in. long 22 oz. mass weight. Figure 784/1	13 - -		13 - -
		As offered in your quotation DB/MM/9600A(RA) of 5.11.62.			
		NOTE TO FIRM: Firm Delivery date as soon as possible.			

JF/SM/MaM

DELIVERY DATE: (Not period)

Cost of articles specified on continuation sheet (if any) 107 - -

If economy can be effected by so doing, firm should quote for despatch by Parcel Post, sub-divided if necessary. Firms may offer delivery at ports other than Liverpool or London if by so doing they can deliver f.o.b. more cheaply. For delivery f.o.b. London price must include port rates.

DISCOUNTS AND TRADE ALLOWANCES
Packing and delivery f.o.b. or postage to
NET AMOUNT PAYABLE (including all charges) on receipt of Bills of Lading £ / P.O. Cert. of Posting £

POSTAL ADDRESS

Reqn. 9084

The Colonial Secretary,
Stanley,
Falkland Islands.

C † A

Ind. No. Col.Sec.Ltr. 1905 of 22.1.62

SHIPPING MARK

Reqn. 9084

C † A

No.

Gross Weight

Ind. No. Col.Sec.Ltr. of 22.1.62.

COL. SEC.
STANLEY

FOR USE IN CROWN AGENTS' OFFICE

Checked by *Delivery Due* *Entered & Copies Distributed* 16 JAN 1962

S S.10 X C.E. *To Progress*

S to Note:—
D.C. does not apply.
DB/MM/A.2050(RA)

Inspector to Note:—

A.O.P. Address
The Colonial Secretary,
Stanley,
Falkland Islands.

W.G. 419 (164947) 10,000 10/62 JC&SLtd

266

In the case of goods not of United Kingdom manufacture the items concerned should be indicated on the invoice and the country of origin stated.

INVOICE.

(Supplementary Copy)

G X E S 2

THE CROWN AGENTS

Dr. to Messrs. Motherwell Bridge & Engr. Co., Ltd.,
of (full address) P.O. Box No. 4, MOTHERWELL.

Crown Agents' Reference W/EC2Falkland Is. 9084/1
Indent No. Col.Sec.Ltr. 1905 dated 22.1.62

Special Account (if any)
Department

Shipped by SS/MV "ARS" ex London.

Date of Invoice 13th December, 1962.
Contractor's Reference No. A2050 & A6037

If goods have been despatched by post:—
Date of Posting
Post Office of Despatch
G.P.O. Serial No.

To be filled in by Contractor.

Item Nos.	Quantity	Description of Article in wording of Tender	Weight T.	c.	q.	lb.	Rate	£	s.	d.
3	2	M.S. Storage Tanks 48'0" dia. x 36'0" high with Fixed Cone Roofs.						9,112	-	-
		Extra for supply of Erection Equipment						1,264	-	-
		Extra for Increase in Wages effective from 9th July, 1962.						87	8	3
		Extra for Delivery F.O.B. London in lieu of Glasgow.						702	-	-
			107	10	-	-		£11,165	8	3

NETT.

Invoice No. 6773.

PACKING PARTICULARS

Package Numbers	Number and Description of Pkgs.	Gross Weight Each Pkge. c. q. lb.	Net Weight Each Pkge. c. q. lb.	Measurements Each pkge.	Shipping Mark
					Reqn. 9084 COL. SEC. STANLEY C ↑ A No. Gross Wt. Ind No. Col. Sec. Ltr. 1905 dd. 22.1.62.

Package Number	*If more than one package,* Contents of each package stating item nos. and quantity of item in each package.

bu. 27.2.63

bu 12.3.63

ADVICE OF AMENDMENT ORDER PLACED.

266A

W/EC2 / FALKLAND IS. 9084/2

THE CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS,
4, MILLBANK, LONDON, S.W.1.

All letters to be addressed to the Crown Agents, the above reference being quoted.

Telegrams { Inland: Crown, Sowest, London. Oversea: Crown, London.
Telephone: ABBey 7730.
Telex No. 24209.

- 6 FEB 1963

Authority: Col.Sec's ltr. Ref.1905 dd. 22/1/62.
~~Indent No.~~
Special A/c (if any)
Dept.

The Crown Agents transmit below a copy of a letter regarding a contract of which details have already been forwarded under the reference shown.

The Colonial Secretary,
Stanley,
Falkland Islands.

Your ref:- GOB/A2050/CON/NS.

Dear Sirs,

We refer to your letter dated the 29th January, 1963 concerning the above order, and note that the Plug Valves and Dipping Tapes will be available for despatch by the end of the first week of February, 1963.

Yours faithfully,

(Sd.) (Mrs.) H. A. Laurence

for the Crown Agents.

The Motherwell Bridge and
Engineering Co.,Ltd.,
P.O. Box No. 4,
Motherwell,
Scotland.

/FE

267

DECODE.

No. 65.

TELEGRAM.

From Administrative Officer, South Georgia.

To Colonial Secretary, Stanley.

Despatched : 7th March, *19* 63. *Time :* 1840

Received : 8th March, *19* 63. *Time :* 0950

No. 59. Oil storage tank erection. Thorsen requests confirmation the sufficient acetylene and oxygen available for entire work. If not he could bring supply with him please reply soonest.

Administrative Officer

268 Reply 270

P/L : LH

Re advise

8. 3. 63

Hon Col Sec.

269

Ref 267. The amount of acetylene and oxygen for entire work is not known.

Stocks at present are 5 cylinders of acetylene and nil of oxygen. 5 cylinders of oxygen are expected on next Darwin at the end of March.

Supt. of Works,
9.3.63.

So w/.
ack 11/3/63.

GOVERNMENT TELEGRAPH SERVICE

270

FALKLAND ISLANDS

SENT

Wt P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Psy			11.3.63

To

etat ADMINOFF ZBH

SGA/c

267 No. 68. Yourtel 59 At present we hold five cylinders acetylene and no oxygen stop Five cylinders oxygen expected by Darwin 29th March

Secretary

See 271

Bu 12 3 63 (256)

Time HLB/LH

271

DECODE.

No. 122.

TELEGRAM.

From Administrative Officer, South Georgia.

To Colonial Secretary, Stanley.

Despatched : 13th March, *19* 63. *Time :* 1250

Received : 14th March, *19* 63. *Time :* 1030

270

No. 73. Your telegram No. 68. Thorsen will bring additional supply gas as he considers you may not have sufficient.

Administrative.

BJ 21.3.63 Token arrive

PL:TB
Copy to SPW

(Intld) DM

281
272

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

EC.367/25

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS
4, MILLBANK,
LONDON, S.W.1.

TELEGRAMS { INLAND "CROWN, SOWEST, LONDON"
OVERSEA: "CROWN, LONDON S W 1"
TELEPHONE: ABBEY 7730
TELEX NO. 24209

17th January, 1963.

Dear Sir,

Oil Fuel Storage Tanks

199 With reference to your telegram no. 383 of the 27th October, 1962, we duly notified the Admiralty in the terms of the second half of your telegram and have now heard from them that they thank you for your kind offer of storage space in the tanks. It is not necessary for them to take advantage of this offer at present but it will be borne in mind should it become necessary for the Admiralty stocks to be increased in the future.

Yours faithfully,

for the Crown Agents.

Seen
on.
BJ 10.4.63

The Colonial Secretary,
Stanley,
FALKLAND ISLANDS,
South Atlantic.

~~282~~ 273
6 2- 281
K.J Bu 2-280
for information
6 10/4/63
274 ~~283~~
10.4.63
on.

ALMcC/JW

F105/II

No. 411/81

It is requested that, in any reference to this memorandum the above number and date should be quoted.

MEMORANDUM.

275

8th May, 1963

O.I.C., B.A.S.

Hon. Colonial Secretary,

Secretariat,

Stanley.

Stanley, Falkland Islands

COLONIAL SECRETARY'S OFFICE 8 MAY 1963 FALKLAND ISLANDS

SUBJECT :-

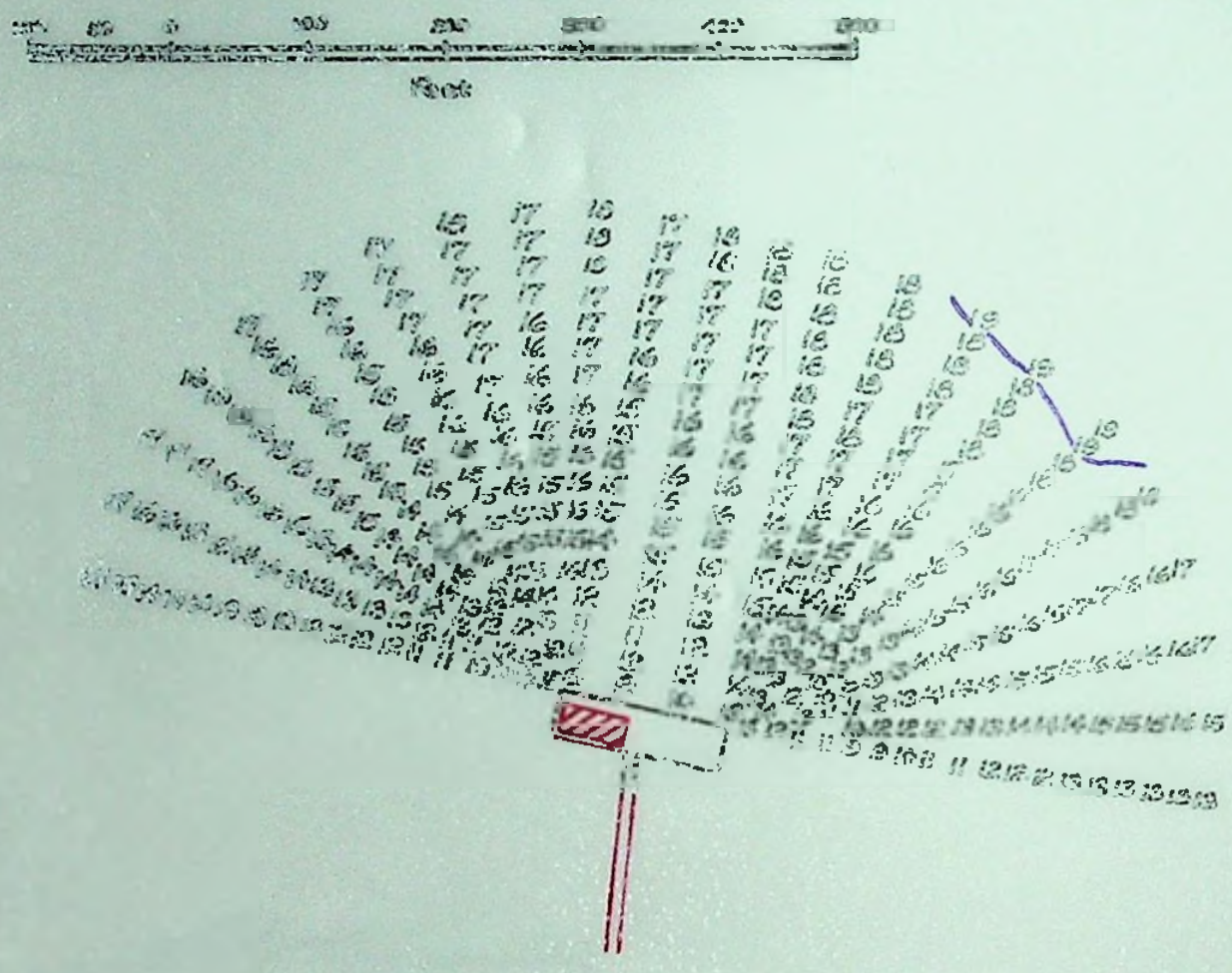
I attach for your information a copy of a minute to H.E. You may wish to include it in your file on the Fuel Tanks.

~~275~~ 276 I also attach two copies of the soundings off the Government Jetty carried out by the Royal Naval Hydrographic Team. I understand the Harbour would like one and suggest the pink copy be given to them.

I will keep you informed of any arrangements for refuelling of BAS ships that I consider would affect the initial filling of the tanks.

E. Ewbank

276



Port Stanley

GOVERNMENT JETTY

Tracing showing soundings obtained at the request of
the Governor of the Falkland Islands
R.R.S. JOHN BISCOE
29th and 30th April, 1963
Soundings in Feet
Reduced to 22·20 feet below a benchmark on the
north west corner of the P.W.D. carpenters shop
Natural Scale 1/192

J. B. Lucas

Lieut.-Cmdr., R.N.

~~266~~
277

Y.B.

Captain Johnstone's views on the points discussed are:-

A. On the ability of ships to approach and refuel from the Government Jetty:-

The Shackleton could approach the jetty during a certain period of all tides, even with full cargo.

The Biscoe could NOT approach the jetty during any period of any tide when she is fully laden. She could approach during certain tides when lightly laden (such as at the end of season cruises).

Darwin should be able to approach at all times as she is approximately two feet shallower in draught than the Biscoe.

The MEAN draughts of the ships are:-

Shackleton ? ' ' 3" Biscoe 16 feet 6 inches Darwin 13 feet 6½ inches.

The implication of the above seem to be that:- If it is decided to cease bunkering in Montevideo and the Biscoe requires fuel on arrival Stanley the Admiralty fuel barge will have to be hired. This would involve charges to cover the bunkering plus the repayment into the barge from the tanks of the oil taken for bunkering.

1). The charges involved are at 6/6d per ton of fuel oil handled. The Biscoe would require a minimum amount of 150 tons therefore 150 x 6/6d x 2 equals £97. 10. 0d. It is, however, understood that the Biscoe has a steaming range of some 15,000 miles and it is assumed that if the above barge charges were considered excessive some consideration could be given to the Biscoe not bunkering at all in Stanley, but receiving fuel required from the Shackleton during that ship's second or onward voyages. The obvious disadvantage of such an arrangement is that the seaborne scientific programme would be curtailed during possibly two voyages.

2). If it is found that the cost of fuel oil in Montevideo allows bunkering to continue in that Port then there should be no necessity for Biscoe to take fuel from the barge at the beginning of the season, but replenish from Shackleton as has happened this season.

The cost of fuel received via the Admiralty Tanker will fluctuate around the £15 per ton mark, but as the price of fuel per ton from Montevideo is not yet known, no comparison can be made.

B. <u>On the possible use of a floating fuel supply line.</u>

Captain Johnstone considers that a ship could adequately anchor off the shallow water and with stern lines to the jetty hold the vessel steady, receive fuel through a flexible hose. It is thought that an elaborate floating fuel line system need not be necessary and use could be made of either the stern lines or floating drums as supports. It is emphasized that the hose should be of continuous length as opposed to joinable sections and that the exit should have an efficient stoppering device. These precautions should go a long way to prevent or limit oil polution of the harbour.

Lt.Com. Dixon has agreed to carry out the soundings asked for and will embark upon this project this afternoon.

1905/II

27 May, 63. 278

To: The Superintendent,

From: The Colonial Secretary, Public Works Department,

STANLEY.

I am directed to enclose a tracing showing soundings taken at the Government Jetty.

COLONIAL SECRETARY

DRM/TB.

~~270~~
279

1905/II

30th May, 63.

To: Harbour Master,

From: The Colonial Secretary, STANLEY.

~~265~~ 276 I am directed to enclose a tracing showing soundings taken at the Government Jetty.

(Sgd) H.L. Bound.

for COLONIAL SECRETARY

Par

1905/II

220

3rd March, 64.

To: Superintendent of Works,
Supt. Power & Electrical,
STANLEY.

From: The Colonial Secretary,

6" Oil Pipes

Please let me have your joint Crown Agents draft not later than the 17th of March, 1964.

(Sgd) W.H. Thompson.
COLONIAL SECRETARY

I think this is in?
DEPh

BU 17364

WHT/FH

Hold for letter with C!

0014/V.

Oil Storage

If we are told that we cannot have an Admiralty tanker next year we must start searching for alternative diesel supply.

We must not be out-manoeuvred by the FIC when it comes to getting first refusal on the 500 tons stored in the barge. As soon as we receive an answer from London, and we must chase this up fairly soon, we should make a bid.

I have asked BAS to let me have all the information they possess on storage in collapsible containers. This may prove to be over expensive but should the cost be within our means it is worth investigating such storage for up to 50 tons of fuel per 'Darwin' voyage ex Montevideo.

Without doubt we must send someone to Punta on the July 'Darwin' to talk oil deliveries with the Consul. If we can find some way of getting bulk deliveries in quantities ranging from 1,500 to 2,000 tons we should do so.

Although it will not affect next year's situation we must also look at any replacement for 'Philomel' in the oil carrying content. It might be possible to build a new 'Philomel' capable of carrying bulk diesel fuel. The present 'Philomel' has made trips to Punta and any new ship should have the same range.

20.3.64.
WHT/IM.

1905

20th March, 64.

Gentlemen,

I am directed to refer to previous correspondence regarding oil tanks and an oil pipeline contained in my letter, ref. 1905 and dated the 18th of August, 1962. Your reply was under reference E.C. 367/25 of the 26th of October, 1962.

2. The tanks have now been erected at the site marked 'C' on the Stanley map enclosed with my original letter. Proposal No. 4 was adopted.

3. It has been decided that a 6 inch diameter pipeline must now be laid from the Government jetty shown on the Stanley map, to the new oil tanks. This new pipe will replace an existing 3 inch pipe now considered inadequate. Provision as shown on the enclosed drawings will be made to tee off to a 3 inch pipe at a point marked lampost pin, but no provision other than a suitable swept tee at that point need be made at present.

4. I am to ask that you will order all necessary pipework, flanges, couplings, joints, bends and other fitments to enable the pipe to be laid as shown on the enclosed drawings which give the plan and profile of the route to be taken. Measurements of actual distances between named stations or pins are accurate to within one foot. Elevations are accurate to within 0.01 feet and angles are accurate to within one minute of one degree. It will be noted that the pipe route changes direction in both the horizontal and vertical plane at each station or pin. The maximum and minimum ambient temperatures are 80 d.f. and 15 d.f. respectively. Provision will no doubt be made for the necessary expansion joints. It would be an advantage if all straight pipe couplings could be of the 'Johnson' type, i.e. non threaded. Angle connections will be flanged.

5. It is essential that the pipe is laid ready to receive oil early in 1965 and you are accordingly asked to proceed by placing firm orders for all of the materials that you consider are necessary. A provisional figure of £2,500 has been allowed as the F.O.B. cost of materials. I would be pleased if you will telegraph should you consider the cost will be greater than this amount by any large margin.

6. It is not contemplated at present to instal pumping facilities at the jetty as a pump of sufficient capacity is installed in the dumb lighter which will discharge the oil. It would be interesting to learn however what you consider the pumping pressures will be to obtain a discharge from lighter to tanks through the 6 inch pipe over the route shown at a rate of 125 tons per hour. Average specific gravity of the oil may be taken at 0.85. The static delivery head may be taken at 150 feet.

7. Mr. E.C. Cutteridge, the Superintendent of the Electricity Department, will be in England at the beginning of June of this year. He has been instructed to make himself available to answer any questions which may arise.

Yours faithfully,

COLONIAL SECRETARY

Crown Agents for Oversea Governments and Administrations,
4, Millbank,
LONDON, S.W.1.

ECG/IM.

CROWN AGENTS
REFERENCE No. C2 / FALK. IS. 4/29062
TELEGRAM
LETTER No. 1905 of 20/3/64 ITEM Nos:- On letter
DEPT. COLONIAL SECRETARY

PIPELINE ETC
249 283
2,500

(FOR USE IN C.A.'s OFFICE)

From:-

THE CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS
4 MILLBANK,
LONDON, S.W.1.

COLONIAL SECRETARY'S OFFICE
- 1 MAY 1964
FALKLAND ISLANDS

The Crown Agents acknowledge receipt of your above authority for the supply of stores. This has been registered under the reference shown at the top of this letter for action in respect of the items indicated.

This reference should be quoted on all further correspondence on the subject.

The relevant reference for any other items required under this authority is being advised to you separately.

IMPORTANT

A confirming indent, if one is sent, must be endorsed in bold type:- "In comfirmation of order by ~~telegram~~/letter dated 20/3/64.".
If a confirming indent without such a reference has already been despatched, please complete the counterpart of this form and forward it to the Crown Agents by return.

Extract from "Notes on the Preparation of Indents" (para. 36):-

The Crown Agents may have to disclaim liability arising from any duplication of supplies resulting from failure to include adequate cross references.

To:-

The Colonial Secretary,
Port Stanley,
Falkland Islands.

CD.32

284

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

C2C/FALK IS. 4/29082

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS

4. MILLBANK,
LONDON. S.W.1.

TELEGRAMS { INLAND: "CROWN, SOWEST, LONDON.
OVERSEA: "CROWN, LONDON S W 1"

TELEPHONE: ABBEY 7730

TELEX NO. 24209

285

20th April, 1964.

Dear Sir,

282

We refer to your letter No. 1905 dated 20th March which asked us to obtain the material for the 6" Diameter Pipeline, details of which are shown on the drawings attached to your letter.

We are not certain whether your requirement includes the two Valves shown adjacent to the tanks.

Would you please advise whether these should be placed on order and if possible give a specification of the valves you require.

Yours faithfully,

for the Crown Agents

Reply at 288

286

The Colonial Secretary,
Colonial Secretary's Office,
Stanley,
Falkland Islands.

287

GVM/JMB

1905/II

288

7th May, 64

Dear Sirs,

284 I refer to your letter of enquiry dated the 20th April, 1964 under reference C20/Falk. Is. 4/29082 and advise you that two gate valves should be ordered for fitting between the tanks and the pipeline.

2. Tank flange details are:

Flange outside dia.	11 inches
Number of bolt holes.	8 equally spaced
Size of holes	$\frac{7}{8}$ ins. for $\frac{3}{4}$ ins. bolt
Pitch circle dia. of holes	$9\frac{1}{2}$ ins.

3. One valve should also be ordered for the jetty end of the pipeline, specification of which will depend upon type of pipe coupling on order.

Yours faithfully,

(Sgd.) H. L. Bound

for COLONIAL SECRETARY.

Crown Agents for Oversea Governments and Administrations,
4, Millbank,
LONDON, S.W.1.

EG/TB.

copy - SP/E

DU. 22.5.64 [illegible] 10.7.64

ADVICE OF ORDER PLACED

THE CROWN AGEN.

for Overseas Governments and Administrations,

C26 / PAEL.IS 4/29082/2
All letters to be addressed to the Crown Agents the above reference being quoted

COLONIAL SECRETARY'S OFFICE 24 JUL 1964 FALKLAND ISLANDS

4, MILLBANK, LONDON, S.W.1.

Telegrams
Inland "Crown, Sowest, London"
Overseas "Crown, London-S.W.1."
Telephone Abbey 7730
Telex No. 24209

Indent No. or Authority
1905
dd.20.3.64.
A/c.

Messrs. Alley & Macl[illegible] Ltd.,
Valve Manufacturers,
WORCESTER.

Dept. Col. Secretary

- 1 JUN 1964

DEAR SIR(S),

The Crown Agents, acting for and on behalf of the Government of Falkland Islands as their duly authorised Agents, have placed an order with the above firm for the Cast Carbon steel Alley Wedge gate valves specified below, as offered in the firms quotation dated 22nd April. reference DST/VR/51 valves.

Delivery is due on 3/4 months

The goods will be inspected by CHIEF INSPECTING ENGINEER

REQN. NO.	FIRM	DEPT.	FOR RECORD PURPOSES IN CROWN AGENTS' OFFICE
4/29082/2	Alley & Mac	Col.Sec.	

ITEM NO.	QUANTITY	DETAILED DESCRIPTION OF ARTICLES ORDERED	RATE	AMOUNT £	s.	d.
	3 No.	6" Class 150 Cast Carbon steel "Alley" Wedge gate valves with outside screw and yoke, rising spindle and 11½-13% chrome stainless steel trim. Valves to conform to B.S.S.1414. Flange to have 1/16" high raised face and to be drilled to B.S.1560/1953. Class 150. Each flange to be complete with nuts, bolts and joint rings. @ £47.17s.0d.each F.O.B. Plus cost of jointing material Delivery: 3/4 months. Generally as your quotation DST/VR/51 dated 22nd April.				
208		Principal NOTES TO A[illegible].: C.S.letter 1905/II dated 7th May refers.				
SL/KB/28						

POSTAL ADDRESS

Reqn. 4/29082

The Colonial Secretary,
Port Stanley,
Falkland Islands.

C + A

Ind. No. XXXX
Col.Sec.ltr.
1905 dd.20.3.64

SHIPPING MARK

Reqn. 4/29082

OIL PIPE PROJECT
STANLEY

No.

Gross Weight

Ind. No. XXXX
Col.Sec.ltr.
1905 dd.20.3.64

MAJOR ADDRESS

The Colonial Secretary,
Port Stanley,
Falkland Islands.

W/G 43 (2712) 1/64 JC&SLtd.

ADVICE OF ORDER PLACED

290

PAR.IS.4/29082/1
To be addressed to the Crown Agents the above reference being quoted

THE CROWN AGENTS
for Overseas Governments and Administrations,
4, MILLBANK, LONDON, S.W.1.

COLONIAL SECRETARY'S OFFICE 24 JUL 1964 FALKLAND ISLANDS

Telegrams
{Inland "Crown, Sowest, London"
{Overseas "Crown, London-S.W.1."
Telephone Abbey 7730
Telex No. 24209

Indent No. or Authority
1905
dd.20.3.64.
A/c.
Dept. Col.Secretary

Messrs. Stewarts & Lloyds Ltd.,
Tube Division,
41, Oswald Street,
P.O.Box 5,
Glasgow, C.1.

- 1 JUN 1964

DEAR SIR(S),

The Crown Agents, acting for and on behalf of the Government of the Falkland Islands.
as their duly authorised Agents, have placed an order with the above firm for the
6" dia. Oil Pipe Line
specified below, as offered in the firms quotation dated 12.5.64. reference S/97219/64
Delivery is due on 4/5 months
The goods will be inspected by CHIEF INSPECTING ENGINEER

REQN. NO.	FIRM	DEPT.	FOR RECORD PURPOSES IN CROWN AGENTS' OFFICE
4/29082/1	Stewarts & Lloyds	Col.Sec.	

ITEM NO.	QUANTITY	DETAILED DESCRIPTION OF ARTICLES ORDERED	RATE	AMOUNT £	s.	d.
		6" dia. Oil Pipe Line				
		Supply approx. 2764 ft. M.S. pipes and all necessary specials, 6⅝" O.D. x 0.176" thick to lay the pipeline, details of which are shown on the drawings sent you with our enquiry dated 16th April, 1964.				
		Straight pipes to be in random lengths of 20/25 ft. and in exact Lengths where required. Terminal ends, bends, branches and ends of straights connecting to bends to be flanged; all other ends suitable for Viking Johnson Couplings.				
		Supply is to include all necessary bolts, nuts and joint rings for flanges and Viking Johnson Couplings for plain ends.				
		All flanges to be 1/16" high raised faced to B.S.1560/1953 Class 150. One flange to be provided for use at terminal end of 3" branch at "Lamppost pin".				
		Pipes and fittings to be self colour internally and protected externally with Security Tar Enamel wrapping.				
		Generally as your specification S/97219/64 dated 8th May, except flanges to be as shown above.		2025.	-	-
				F.O.B.		

For the time being of

SU/RS/28

POSTAL ADDRESS

Reqn. 4/29082

The Colonial Secretary,
Port Stanley
Falkland Islands.

C ↑ A

Ind. No. XXX Col.Sec.ltr. 1905 dd.20.3.64.

SHIPPING MARK

Reqn. 4/29082

C ↑ A

No.

OIL PIPE PROJECT
STANLEY

Gross Weight

Ind. No. XXX Col.Sec.ltr. 1905 dd.20.3.64.

A.O.P. ADDRESS

The Colonial Secretary,
Port Stanley,
Falkland Islands.

W/G 43 (2712) 1/64 JC&SLtd.

291

Ag SPED

To see 289 & 290 & to w/d

Copies from b.c. pl.

JA.

29.7.64.

292

HCS

Noted thank you, copies w/d.

RGB.

29/7/64

289

Mail from

Bu 28/8/64

293

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

C2L/Falk. Is. 4/29082

Telegrams: "Crown, London-S.W.1"
Telephone: Abbey 7730
Telex No. 24209

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS
4, MILLBANK,
LONDON, S.W.1.

3rd June, 1964.

Dear Sir,

282 We refer to your letter reference ECG/IM dated 20th March.

In paragraph 6 you requested some information on the pumping pressure necessary to obtain a discharge from the lighter to tank through the 6 inch pipe when delivering at the rate of 125 tons per hour.

Messrs. Stewarts & Lloyds have calculated that for diesel fuel of specific gravity 0.85, and basing the calculations on a viscosity at 15°F of Redwood 65 and at 80°F of Redwood 36.5, the pressure loss in the line would be 40 lbs./sq.inch and 30 lbs./sq.inch at temperatures of 15°F and 80°F respectively.

With a static delivery head of 150 ft. (56 p.s.i. for sp.gr. of 0.85) the maximum delivery head on the pump would be 56 + 40 = 96 p.s.i.

We checked this using a minimum temperature in the pipeline of 34°F and a viscosity of 20 centipoise. This gave a maximum head loss in the pipe of 47 p.s.i. which with the static delivery head of 56 p.s.i. gives a total delivery head of 103 p.s.i. - which checks reasonably well with Stewarts & Lloyds' figure.

We suggest that you use the higher figure.

Yours faithfully,

for the Crown Agents.

294

Ag SPE

To note above pl

291

The Colonial Secretary,
Colonial Secretary's Office,
Stanley,
Falkland Islands.

HCS.

Noted thankyou
a/g. 5/8/64

15
BU 15.10.64
(ECG)

CAL/EB

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

296

CROWN AGENTS

FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS

C2C/FALK IS. 4/29082

4, MILLBANK,
LONDON, S.W.1.

Telegrams: "Crown, London-S.W.1"
Telephone: Abbey 7730
Telex No. 24209

COLONIAL SECRETARY'S OFFICE
28 AUG 1964
FALKLAND ISLANDS

7th August, 1964

Dear Sir,

6" diameter Oil Pipe Line

282

We refer to your letter 1905, dated the 20th March in which you asked us to order the necessary pipes and fittings to construct the pipeline, details of which were shown in the drawing attached to your letter.

D/C.

2 We now attach a copy of each of drawings Nos. B1/610 and T6289 which were received from Stewarts & Lloyds Limited.

3 Please note that the firm are unable to agree with the length of the pipes as shown on your plant drawing. In some cases the difference they calculated is small but in others quite large. When working out the length of the pipes required between bends and tees, they based calculated distances between pins which are shown on drawing No. B1/610, sheet 1.

4 They have accordingly allowed 1 to 3 ft. extra tubing in each stretch and one of the flanged plain ended pipes will be rounded up at the plain end for a distance of 6 ft. back, so that it can be cut at site to the exact length required to ~~match~~ make up the stretch.

5 It may not be necessary to supply Viking Johnson Couplings without centre register for the insertion of the closing lengths, but meantime they have covered for one coupling in each stretch to be applied for this purpose.

6 Should the foregoing arrangements be unsuitable, would you please advise your exact requirements to enable the firm to alter their drawings accordingly. Please also let us know if the lengths shown against items 3 and 6 will be suitable as these had to be scaled from the plan lengths.

7 Pending receipt of your approval of the drawings and the suggestions given above, items 3-6-30 are being held in abeyance.

Yours faithfully,

for The Crown Agents.

Reply at 299

The Colonial Secretary,
Port Stanley,
Falkland Islands.

0102A CAL 64 GVM/MV

297

Shs

Para 6 of 296.
Wd. you Agl. advise

3.9.64

298

H.C.S.

Please inform Crown Agents:-

With reference to your letter C2C/FALK. IS. 4/29082, I apologise for misleading information in pin distances.

Actual tank pin outside boundary should read, as centre of inlet in tank. Item No 3 is 53 ft 2 inches and Item No 6. 81 ft 10 inches. Item No 30. is 160 ft which is for extension beyond survey station on jetty.

The extra lengths given for other distances are as you suggested in your letter, to be cut and jointed on site.

P Paton.
Supt. of Works.
4th September, 1964.

299

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

Wt. P2809 5/61

Number	Office of Origin	Words	Handed in at	Date
	Stanley			7.9.64

To

etat CROWN LONDON SW1 HOA/c

296 No. 247. Yourlet C2C/Falk Is.4/29082 7th August oil pipe line stop Actual tank pin outside boundary should read as centre of inlet in tank stop Item 3 53 feet 2 inches item 6 81 feet 10 inches item 30 160 feet which is for extension beyond survey station on jetty stop Extra lengths given for other distances allow for cutting and jointing on site

Secretary

Copy to S/Works

Repeat at 300.

HLB/LH

BM 15.10.64 (SPE)

300

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

C2C/FALK.IS. 4/29082/1.

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS

4, MILLBANK,
LONDON, S.W.1.

Telegrams: "Crown, London-S.W.1"
Telephone: Abbey 7730
Telex No. 24209

30th September, 1964.

Dear Sir,

299

We have to acknowledge receipt of your telegram No. 247 dated the 7th September which gives replies to a letter sent you on the 7th August. We regret that we are not altogether clear concerning the remark "Actual Tank Pin outside boundary should read as centre of inlet in Tank".

The remaining information in your telegram was passed to Messrs. Stewarts & Lloyds and now attached is their amended Drawing No. B1/610, Issue 2, giving amended lengths of pipe. The firm were told that in no circumstances should the actual lengths of piping supplied be less than that necessary to accommodate the actual pin distances shown on the plan drawing sent with your original enquiry.

Yours faithfully.

for the Crown Agents

301

S.P.S.

Para 1. Can you elucidate pl?

16.10.64

The Colonial Secretary,
Port Stanley,
Falkland Islands.

302

A.C.S.

Amended Drawing No. B1/610 as wanted.

Ignore remark in first paragraph.

L Preston,
Supt. of Works.
19th October, 1964.

Sfw 303

I understand you are now happy about this.

Is the drawing referred to in para 2 of 300 now with you?

28.10.64

304

A.C.S.

YES.

L Preston. S.P.W.
29/10/64.

S.I.E

305

The file in the story is contained in this file.

306

16.12.64

ACS.

Seen thank you. all appears in order. I hope it may be OK A.E.S. ~~Pamphlet~~ Possibly there may be some indication there Dennis?

PA

16-12-64

307

PRELIMINARY SHIPPING ADVICE

The **CROWN AGENTS** *have to report that the following shipment is expected :—*

Reference

S/20/FALK. IS. 4/29062/2.

SUPPLIER :

COLONIAL SECRETARY'S OFFICE
17 DEC 1964
FALKLAND ISLANDS

2nd December., 4.

Indent No. 1905.

Special A/c.

Dept. Col. Secretary.

Consigned to Officer Admin. the Govt..

Marked

REQN. 4/29062.

C ↑ A

OIL PIPE.
PROJECT.
STANLEY.

*Nos.

Gross Weight.

Ind. COL.SEC.LET. 1905.dd. 20/3/64.

M.V./S.S.

To the order of Messrs. , Southampton Between the 9th/11th December.,
J.F. OBree &Co., Royal Mail House, Terminus Terrace,
Southampton.

The latest date above is for loading. The sailing date is normally some days later and in some instances may be up to 14 days after the loading date, according to the destination and loading programme of the shipping company concerned.

The particulars given in the schedule below were those furnished by the above mentioned contractor, when forwarding instructions were issued and are not necessarily accurate.

VALUE £	*Nos.	Description of Packages	CONTENTS	WEIGHT				MEASUREMENTS			
				Tons	Cwt.	Qrs.	Lb.	Length	Breadth	Depth	
					TOTAL			EACH:			
144.	9433/6.	3 Loose. & 1 Case	GATE VALVES	-	7	1	18	2/13	1/3	-/11(?)	
								1/5	1/2½	1/5 (?)	
											12/4
18/11.											

The bill of lading and invoice will be despatched as soon as possible. It must be understood, however, that shipment has not yet been confirmed.

Note to Contractor :—

Your Ref. 64/898

S.3.

308

THE FOLLOWING REFERENCE AND THE DATE OF THIS LETTER SHOULD BE QUOTED IN COMMUNICATIONS.

C2C Falk.Is 4/29082/1

Telegrams: "Crown, London-S.W.1"
Telephone: Abbey 7730
Telex No. 24209

CROWN AGENTS
FOR OVERSEA GOVERNMENTS AND ADMINISTRATIONS
4, MILLBANK,
LONDON, S.W.1.

21st December 1964

Dear Sir,

6" Diameter Oil Pipe Line

We refer to the 6" diameter steel oil pipe line which was ordered against instructions contained in your letter 282 1905 dated the 20th March.

In this connection Stewarts and Lloyds have now informed us that the steel bends will be manufactured to their usual tolerance which will be ± 1° of the angle stated on your drawings. As we consider this can be easily adjusted on the Viking Johnson Couplings we have accepted the firm's tolerances and we trust this action meets with your approval.

Yours faithfully,

for The Crown Agents

309

The Colonial Secretary,
Port Stanley,
FALKLAND ISLANDS

SW

To See 308 pl.
JA.
8/1/65

GVM/RR

Col. Sec. 310

309. Noted.

308. Acceptable.

Would desire any data relating to Viking Couplings, to be sent with same (Pamphlets or).

D Beardmore

Ag. Supt. of Works.
11th January, 1965.

1905/II

311

16th January, 65.

Dear Sirs,

6" Diameter Oil Pipe Line

308

I refer to your letter C2C Falk. Is. 4/29082/1 of the 21st December, 1964, and note that the suppliers have advised that the steel bends will be manufactured to their usual tolerance.

If there are any special instructions relating to the Viking Johnson couplings would you please arrange for them to be sent direct to the Superintendent of Public Works, Stanley.

Yours faithfully,

(Sgd.) H.L. Bound

for COLONIAL SECRETARY

Crown Agents for Oversea Governments and Administrations,
4, Millbank,
LONDON, S.W.1.

Copy to SPW

HLB/IM.

312

1905

28th January, 65.

To: The Acting Superintendent,

From: The Colonial Secretary,

Public Works Department,

STANLEY.

New Oil Pipe Line

Have the pipes arrived yet and if so what action is being taken to get them installed before the arrival of the oil tanker in March?

W H. THOMPSON

COLONIAL SECRETARY

Reply at - 316

HT/IM.

1905

313

28th January, 65

To: The Acting Superintendent,

Public Works Department,

STANLEY

From: The Colonial Secretary,

Painting of Fuel Oil Tanks at Power Station

The S.P.E. has already been in touch with you about this. Please make sure that these tanks are painted before the winter comes.

Quite obviously you will have to put this out to contract and a public notice should go out as soon as possible.

W H. THOMPSON

COLONIAL SECRETARY

WHT/IM.

PROGRESS REPORT

THESE GOODS ARE READY AND THE CROWN AGENTS WILL FURNISH DETAILS OF SHIPMENT AS SOON AS POSSIBLE

Contractor of (full address) ALLEN & MCMILLAN LIMITED WORCESTER, England.

Crown Agents' Reference C2C/Pub. Ia. 1/29032/2.
Indent No. 1957 dated 20/3/64.

Special Account (if any)
Department Col. Secretary.

Shipped by SS/MV "A.J.C". Cape Southerly. CONTRACT.

Date of Invoice 7th. December, 1964.
Contractor's Reference No. 64/838

If goods have been despatched by post:—
Date of Posting
Post Office of Despatch
G.P.O. Serial No.

To be filled in by Contractor.

Item Nos.	Quantity	Description of Article in wording of Tender	Weight T.	c.	q.	lb.	Rate	£	s.	d.
4.	3.	6" dia. Class 150 Cast Carbon Steel Wedge Gate Valves, with 11½/13% chrome stainless steel trim, as B.S.-3/14. Flanges having 1/16" high raised face and drilled B.S.1560/1958, complete with bolts and jointe. ABOVE VALVE SHIPPED LOOSE WITH FLANGES PROTECTED.					£47/17/- each	£ 143	11	-
	3.	Nordstools.					Ex. est.			
	3.	Grease Nipples.								
	48.	¾" x 3" H.H.B. Bolts & Nuts.								
	6.	6" I.R. Joints.								

PACKING PARTICULARS

Package Numbers	Number and Description of Pkges.	Gross Weight Each Pkge. c.	q.	lb.	Net Weight Each Pkge. c.	q.	lb.	Measurements Each pkge.			Shipping Mark
9433/5		6	1	26	3	2	20.	35" x	15" x	11"	Regn. A/29032. ON THE PROJECT STANLEY. C↑A No. Gr. Wt. IMP. Col. Sec.Mar. 1965 29/3/64.
9436.	CASE	0	3	20	0	2	2	17" x	24½" x	17"	

Package Number	*If more than one package,* Contents of each package stating item nos. and quantity of item in each package.
9433/5	CASE VALVES.
9436.	CASE(GATE FITTINGS.

N.B.—This is simply a Progress Report and should not be regarded as an Invoice.

S59.

No.

It is requested that, in any reference to this memorandum the above number and date should be quoted.

COLONIAL SECRETARY'S OFFICE
29 1965
FALKLAND ISLANDS

MEMORANDUM

315

29th January, 1965.

From: Ag. Supt. of Works, P.W.D.

Stanley, Falkland Islands.

To: The Colonial Secretary,

STANLEY.

SUBJECT :- Painting of Oil Storage Tanks.

Would you please put out a request for tenders for painting of the above, by measurements 3,000 sq yards to be covered by:

(1) Wire Brushing.

(2) 1st Coat Plumbate.

(3) 2nd Coat Aluminium.

I would suggest, it would require knowledgeable supervision to get the best satisfaction, have further ideas on that subject.

D Beardmore
Ag. Supt. of Works.

No. _____

It is requested that, in any reference to this memorandum the above number and date should be quoted.

COLONIAL SECRETARY'S OFFICE
29 JAN 1965
FALKLAND ISLANDS

MEMORANDUM

29th January, 1965.

From: Ag. Supt. of Works, P.W.D.

To: The Colonial Secretary,

STANLEY.

Stanley, Falkland Islands.

SUBJECT :- New Oil Pipe-Line

The pipes have not yet arrived, only three valves.

D Beardmore
Ag. Supt. of Works.

S/L 315-Pt. Prepare notice inviting tenders. This shd. be done fairly soon
K+V 3/5
5.2.65

ACS

317

Draft of

7.2.65

319

PUBLIC NOTICE.

Colonial Secretary's Office,
Stanley, Falkland Islands.

8th February, 1965.

Tenders are invited for the painting of the two large oil tanks at the Power Station measuring 3,000 square yards which are required to be wire brushed, covered with a first coat of plumbate and finished with a coat of aluminium.

Details of the work involved may be obtained on application to the Acting Superintendent of Works.

Tenders endorsed "Oil Tanks" should reach the Acting Superintendent of Works by the 18th February.

Ref: 1905/II

HLB/TB.

C.S

32 Mr Beardmore's reply is at 316.

8.2.65

9.2.65

Ref.....

Power & Electrical Department,

Stanley,

Falkland Islands.

22nd February 1965

1,500 ton Oil Storage Tanks data.

Tank diameter 16 yds. Height 12yds.

Area of top = pi x r^2 = $\frac{22 \times 64}{7}$ = 201 sq.yds.

Area of sides = pi x dia. x h. = $\frac{22 \times 16 \times 12}{7}$ = 603 sq.yds.

Total area of one tank is 603 + 201 = 804 sq.yds.
Total area of both tanks is therefor 1,608 sq.yds.

For information. F.I.C. contract painting for outside ironwork 2s.3d. per sq.yd. (F.I.C. Warehouses are at present being painted at this rate)

This would amount to approximately £180 per coat of paint for the pair of tanks, a little extra to be allowed for rigging.

The existing 300 ton tanks, total combined area 530 sq.yds. were scaped, painted, (spot painted first over deeply pitted parts) then painted one coat red lead and two coats aluminium. Total contract figure £155. The Contractor, Mr Jack Barnes, did not go down on the Contract. Year, I Believe 1959 or near abouts.

321

Col Sec,

Reference 320.

The neat sum, is only approximtte too, there is extra yardage of at least 100 sq yds in staircases and handrails, which I said nothing about.

The small tanks painted in 1959 at 2/3d per sq yard would, with the rise in pay now, be double that, also no allowance had to be made for height money which comes in on $\frac{1}{3}$ of the wall surface area.

That Mr. Barnes did not go down on that contract is obvious, they are so small the majority could be painted off the ground,

The operation of covering the two tanks three times, wire - paint - & paint would be on F.I.C. price, which I suggested myself to Mr. Cahill, 6/9d a sq yard without height money coming in at all, so it would be 6/9d x approx 1700 sq yds = £573. 15. -d. and I do not think we shall get a good job with either of the two estimates.

(1) Too expensive.

(2) At the price £348 cannot see an 100% job being done.

D Beardmore
Ag. Supt. of Works.
23rd February, 1965.

✓ after
per SI

BU 2.365

for replies to tenderers

322

17th February, 1965.
84, David Street

Dear Sir,

I Wish to apply for the contract of painting, and also Brushing of oil tanks. At the price of thirteen Shillings and Six pence per yard.

I Am,
Sir,
yours obedient Servant
J. W. Nash.

Reply at 326

323

Stanley, 18th., February 1965

The
Acting Superintendent of Public Works
Stanley

Dear Sir,

With reference to the call for tenders to carry out the wire brushing and painting of the two large oil tanks at the power house I hereby offer to carry out the aforementioned work for the sum of £ 348-0-0.

Should this tender be accepted the work would be commenced immediatly and carried out to its completion without interruption except those which weather conditions might impose.

Yours faithfully

Reynold E. Reid

52 Davis Street
Stanley

Reply at 326

Record

324

A Tender Board consisting of C.S., A C S. C.T. and A.T. considered the tenders at 322 and 323 + declined to ~~accept~~ either offer.

The work is to be undertaken by PWD Painters (unestablished) + will be carried out under the Supervision of the Established Painter. Hourly men to be paid appropriate rates with overtime.

1.3.65.

325

S/c Mr. A

Pl. Send letters of regret to Marsh + Reid

1.3.65

In the case of goods not of United Kingdom manufacture the items concerned should be indicated on the invoice and the country of origin stated.

INVOICE. A.M. 2455

(Supplementary Copy)

G	X	E	S
			4

327

THE CROWN AGENTS

Dr. to Messrs. ALLEY & MACLELLAN LIMITED
of (full address) WORCESTER, England.

Crown Agents' Reference C2C/Falk. Is. 4/29062/2.
Indent No. 1906 dated 20/3/64.

Special Account (if any)
Department Col. Secretary.

Shipped by SS/MV "A.L.S". from Southampton.
COMPLETE.

Date of Invoice 7th. December, 1964.
Contractor's Reference No. 64/878

If goods have been despatched by post:—
Date of Posting
Post Office of Despatch
G.P.O. Serial No.

To be filled in by Contractor.

Item Nos.	Quantity	Description of Article in wording of Tender	Weight T.	c.	q.	lb.	Rate	£	s.	d.
	A. 3.	6" dia. Class 150 Cast Carbon Steel Wedge Gate Valves, with 11½/13% chrome stainless steel trim, as BS.1414. Flanges having 1/16" high raised face and drilled BS.1560/1958, complete with bolts and joints.					£47/17/- Ea. net	£ 143	11	-
		ABOVE VALVES SHIPPED LOOSE WITH FLANGES PROTECTED.								
	3.	Handwheels.								
	3.	Grease Nipples.								
	48.	¾" x 3" H.H.M. Bolts & Nuts.								
	6.	6" I.R. Joints.								

F.O.B. SOUTHAMPTON.

PACKING PARTICULARS

Package Numbers	Number and Description of Pkges.	Gross Weight Each Pkge. c.	q.	lb.	Net Weight Each Pkge. c.	q.	lb.	Measurements Each pkge.	SHIPPING MARK
9433/5		6	1	26	3	1	20.	35" x 15" x 11"	Reqn. 4/29062. OIL FIRE PROJECT STANLEY. C↑A No. Gr. Wt. IBD. Col. Sec.Ltr. 1906 dated 20/3/64.
9436.	CASE	0	3	20	0	2	2	17" x 14½" x 17"	

Package Number	*If more than one package,* Contents of each package stating item nos. and quantity of item in each package.
9433/5	GATE VALVES.
9436.	CASE(GATE FITTINGS.

S59.

1905/II

326

1st March, 65.

Dear Sir,

I refer to your tender for work in connection with the painting of the two large oil tanks at the Power Station and have to inform you with regret that your tender was unsuccessful.

Yours faithfully,

(Sgd) H. L. Bound.

Secretary
Tender Board

322

Mr. J. W. Marsh,
STANLEY.

323

Mr. R. E. Reid,
STANLEY.

FA

1a

PRELIMINARY SHIPPING ADVICE

328

The **Crown Agents** *have to report that the following shipment is expected :—*

Reference:
S/ C2C/FALK.IS. 4/29082/1.

SUPPLIER:
Messrs Stewarts and Lloyds Ltd.
41, Oswald Street, P.O. Box 5.
Glasgow, C.1.

452.

5th May, 5. GXM.15234.

Indent No.	1905	REQN. 29082.	
Special A/C		C↑A	OIL PIPE PROJECT. STANLEY.
Dept.	COL. SECRETARY	*Nos.	
Consigned to	THE OFFICER ADMINISTERING THE GOVERNMENT	Gross Weight	
		Ind. 1905.	

Marked

M.V./S.S., A.E.S. From 16 THE JETTY LONDON Dock, London,
Between the 12th/14th May, 1965.

The latest date is for loading. The sailing date is normally some days later and in some instances may be up to 14 days after the loading date, according to the destination and the loading programme of the shipping company concerned.

The particulars given in the schedule below were those furnished by the above mentioned contractor, when forwarding instructions were issued, and are not necessarily accurate.

VALUE £	*Nos.	Description of Packages	CONTENTS	Gross Weight Tons.	Cwts.	Qrs.	Lb.	MEASUREMENTS Length	Breadth	Depth	CUBE
2079	N/N	86 Loose	Steel Tubes Plain End.	13	6	-	-	2046/ 5/16"	-/6	-/6	
		32 Loose	Steel Tubes Flanged 1 End.	5	9	-	15	658/4	-/11	-/11	
		13 Loose	Steel Tubes Bends.	-	16	3	14	6/-	-/11	-/11	ea.
		1 case	292 Bolts.	G 0 N 1	2	1 3	4 10	2/8½	1/9	-/11	
19/21											

The Bill of Lading and Invoice will be despatched as soon as possible.
It should be understood, however, that shipment is not yet confirmed.

Note to Contractor

Stowage Order will follow for 1 Case
& 2 Drums to be numbered 2, 3, and 4.

329

PRELIMINARY SHIPPING ADVICE
(DANGEROUS GOODS)

The **Crown Agents** *have to report that the following shipment is expected :—*

Reference :

S/ FALK.19[illegible]/29052/1.

5.

SUPPLIER :

Messrs. Stewarts and Lloyds Ltd.,
41, Oswald Street,
P.O.Box 5,
GLASGOW.C.1.

2½

GXM 15254.

Indent No. 1905.

Special A/C

Dept. Col.Sec.

Consigned to OFFICER ADMINISTERING THE GOVERNMENT.

Marked

REQN. 29052

C ↑ A

*Nos.

Gross Weight

Ind. 1905.

OIL PIPE PROJECT
STANLEY.

M.V./S.S. A.E.S. From 16 THE JETTY LONDON Dock, London,

On 12th May, 1965.

The latest date is for loading. The sailing date is normally some days later and in some instances may be up to 14 days after the loading date, according to the destination and the loading programme of the shipping company concerned.

The particulars given in the schedule below were those furnished by the above mentioned contractor, when forwarding instructions were issued, and are not necessarily accurate.

VALUE £	*Nos.	Description of Packages	CONTENTS	Gross Weight Tons.	Cwts.	Qrs.	Lb.	MEASUREMENTS Length	Breadth	Depth	CUBE
25	2/4	1 Case & 2 Drums	Primer.	-	1	-	25	1/10	1/10	1/10	
			Enamel.	-	5	-	-	2/10	2/-	2/-	(2)
					TOTAL						
				-	11	-	25				

~~£0/0/0.~~

The Bill of Lading and Invoice will be despatched as soon as possible.
It should be understood, however, that shipment is not yet confirmed.

Note to Contractor :—

S.4 CAL

In the case of goods not of United Kingdom manufacture the items concerned should be indicated on the invoice and the country of origin stated.

INVOICE.

(Supplementary Copy)

G X E S 330

4 2½ 6

THE CROWN AGENTS

Dr. to Messrs. STEWARTS AND LLOYDS LTD. 2 COLMORE CIRCUS
of (full address) RINGWAY, B'HAM.

Crown Agents' Reference C2C/TALK.IS.4/29082/1 OF 1.JUN.64
Indent No. 1905

Date of Invoice 9TH MAY. 1965.
Contractor's Reference No. 37G/5/5073

Special Account (if any)
Department Col. Secretary

Shipped by SS/MV 'A.C.S.' / LONDON.

If goods have been despatched by post:—
Date of Posting
Post Office of Despatch
G.P.O. Serial No.

To be filled in by Contractor.

Item Nos.	Quantity	Description of Article in wording of Tender	Weight T.	c.	q.	lb.	Rate	£	s.	d.
		HOT FINISHED SEAMLESS STEEL TUBES B.S.S. 3601/62-27. GENERALLY ENDS FLANGED. SELF COLOUR INTERNALLY. SECURITY TAR ENAMEL WRAPPED AND WHITEWASHED EXTERNALLY.								
		6.5/8" O.D. x 7 SG THK.					SUB.	£2079	10	-
		118 LENS. T.18.15.0.15. 14 ENDS.	C.	16.	3.	14.				
	1 CASE	CONTG: 40" x 31" 36"					CASH 1%	20	15	11
X		60 COUPLINGS. GR. C.9.3.24. NET. C.8.2.7.						£2058	14	1
	1 CASE	CONTG: 40" 31" 30"								
		42 COUPLINGS. GR. C.7.1.4 NET. C.6.0.7.					NETT FOB LONDON.			
		2 FASTNUT SPANNERS.					TERMS: NETT CASH IN 14			
	1 PACKING CASE	CONTG: 2'8½" 1'9" 11½"					DAYS FROM DATE OF			
		292 - BOLTS. GR. C.2.1.4. NET. C.1.3.10.					B/L.			
	1 PACKING CASE	CONTG: 1'10" x 1'10" x 1'10"								
		1 ROLL OUTER WRAP. 2 ROLLS INNER WRAP.								
		1 GAL CAN SYNTHETIC PRIMER. 4-BOLTS. 33 KLINGER JOINT RINGS. GR. C.1.0.25. NET. C.0.3.24.								
		2 - 5 CWT. DRUMS ENAMEL. GR. C.10.2.0. NET. C.10.0.0. 34" 24" 24"								
		MARK: REQN. 4/29082. C A COL. SEC. LTD. 1905 DD 20.3.64								
		OIL PIPE PROJECT STANLEY RED BAND.								

PACKING PARTICULARS

Package Numbers	Number and Description of Pkges.	Gross Weight Each Pkge. c.	q.	lb.	Net Weight Each Pkge. c.	q.	lb.	Measurements Each pkge.	Shipping Mark
									Reqn. C ↑ A

Package Number	*If more than one package,* Contents of each package stating item nos. and quantity of item in each package.

Pa.

331

No.

It is requested that, in any reference to this memorandum the above number and date should be quoted.

MEMORANDUM

18th October, 19 65

From: Acting Superintendent of Works.

Stanley, Falkland Islands.

To: The Colonial Secretary,

Stanley.

SUBJECT :- Telegram to Crown Agents.

I have the honour to request that the following telegram be sent to the Crown Agents in connection with the material for the Ne Oil Pipe Line:-

Invoice 9th May O.C pipe project 1905

"~~[illegible]~~ REF C2C/FALK IS 4/29082/1 STOP VIKING JOHNSON COUPLINGS NOT ~~YET~~ RECEIVED STOP GRATEFUL ~~YOU~~ ENDEAVOUR SHIP ~~PER~~ BISCOE AS VERY URGENTLY REQUIRED STOP PLEASE TELEGRAPH WHETHER SUCCESSFUL OR NOT."

Issue to day

A Beardmore
Ag. Supt. of Works.

332

GOVERNMENT TELEGRAPH SERVICE

FALKLAND ISLANDS

SENT

P1677 P4416 8/64

Number	Office of Origin	Words	Handed in at	Date
	Stanley			18.10.65

To

etat CROWN LONDON, S.W.1 HOA/c

No. 239. Invoice 9th May oil pipe project 1905 ref C2C/Falk Is 4/29082/1 stop Viking Johnson couplings not received stop Grateful endeavour ship Biscoe as very urgently required stop Please telegraph whether successful or not

Secretary

Reply at 333

LS

Copy to Ag S/W

DECODE.

333

TELEGRAM.

No. 58 *From* Crown London

To Secretary, Stanley

Despatched: 21st October, *19* 65 *Time:* 1618

Received: 22nd October, *19* 65 *Time:* 0900

332 Your telegram No. 239. Unable ship viking couplings Biscoe will despatch next AES sailing.

Crown

334

SW

To note pC

22.10.65

P/L : FA

(Intld) HLB

Noted 335

NJB. 22/10/65

TELEGRAMS
TUBEMAKERS GLASGOW TELEX

A.2018

1905

ADVICE NOTE

STEWARTS AND LLOYDS, LIMITED

P.O. BOX 5

41, OSWALD STREET, GLASGOW C.1.

Telephone: CENTRAL 7011
Telex 77327

336

WORKS ORDER NO.	SALES OFFICE REF.	SALES AREA	DATE OF DESPATCH	DESPATCH NO.
[illegible]	[illegible] 15251/61.	NORTH.	9. 5. 65.	3705/5073

CUSTOMER'S ORDER No.	DATE OF ORDER	PART SENT	FINAL PART	COMPLETE
C80/AMES.4/29082/1 of	1 Jun 1964.			C.

INVOICE ADDRESS

The Crown Agents for Oversea
Governments & Administrations,
4 Millbank,
LONDON. S.W. 1.

CONSIGNMENT ADDRESS

S.S. " A.E.S."
At. 16, The Jetty, LONDON Dock.

C/O The Crown Agents for Oversea
Governments and Administrations,
4 Mill Bank, LONDON S.W.1.

DESPATCH METHOD	CARRIAGE	MARK
RAIL/BOAT	F.O.B. U.K.PORT.	Regn. 4/29082 C A No STANLEY

Each tube clearly marked with a band of Pillar Box Red OIL PIPE PROJECT Paint 1" wide accurately marked on it circumferentially at such a distance from each end that when the coupling is assembled 1/4" only of the line will be showing.

CODE	DESCRIPTION	WEIGHT T C Q LBS	FOOTAGE SENT
15/6	HOT FINISHED SEAMLESS STEEL TUBES TO BSS. 3601/62 - 27. 6.5/8" o.d. x 7 wg thk. 1 Stretch x 57-ft 6" long, when joined together in 2 lengths. Extreme ends of stretch flanged Intermediate joint plain and rounded for Johnson Couplings. One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (1)		2
	1 Stretch x 30-ft 0" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting THIS END SPECIALLY MARKED. ITEM (3)		2
	1 Stretch x 40-ft 4" long, when joined together in 2 lengths. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (5)		2

Contd.....

TO MEET THE REQUIREMENTS OF BRITISH RAILWAYS, ROAD HAULIERS AND THE POST OFFICE, NO CLAIM FOR NON-DELIVERY, DAMAGE OR DEFICIENCY CAN BE ENTERTAINED UNLESS WE AND THE CARRIERS ARE NOTIFIED IN WRITING WITHIN THE TIME LIMITS SHOWN BELOW. AN OPPORTUNITY FOR VERIFYING THE CLAIM MUST BE GIVEN.

NON-DELIVERY

TO BE REPORTED WITHIN 21 DAYS FROM DATE OF DESPATCH FOR GOODS SENT BY RAIL; WITHIN 10 DAYS FOR GOODS SENT BY ROAD AND WITHIN 7 DAYS FOR GOODS SENT BY POST.

DAMAGE OR DEFICIENCY

TO BE REPORTED WITHIN 3 DAYS OF RECEIPT.

C528

CONTINUATION

A.2015

WORKS ORDER NO.	SALES OFFICE REF.	DATE OF DESPATCH	DESPATCH NO.
[illegible]4/1842	[illegible]. 15254/64	9. 5. 65.	3705/5073
CUSTOMER'S NAME AND ORDER NO.		**DATE OF ORDER**	**CONTINUATION SHEET NO.**
C2C/FALK.IS.4/29082/1 of		1 June 1964.	1

	DESCRIPTION	WEIGHT T C Q LBS	FOOTAGE SENT
1	Stretch x 78-ft 6" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (6)		4
1	Stretch x 246-ft 0" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (8)		11
1	Stretch x 370-ft 6" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (10)		16
1	Stretch x 156-ft 6" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged, intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (12)		7

Contd.....

CONTINUATION

A.2015

WORKS ORDER NO.	SALES OFFICE REF.	DATE OF DESPATCH	DESPATCH NO.
N.4/1842	GXW.15254/64.	9. 5. 65.	3705/5073
CUSTOMER'S NAME AND ORDER NO.		DATE OF ORDER	CONTINUATION SHEET NO.
C2C/FALK.IS.4/29082/1 of		1 Jun 64	2

DESCRIPTION	WEIGHT T C Q LBS	FOOTAGE SENT
1 Stretch x 437-ft 0" long, when joined together in Random Lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (14)		18
1 Stretch x 66-ft 0" long, when joined together in Random Lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (16)		3
1 Stretch x 75-ft 0" long when joined together in Random Lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (18)		3
1 Stretch x 472-ft 0" when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (20)		20

Contd.....

A.2015

WORKS ORDER NO.	SALES OFFICE REF.	DATE OF DESPATCH	DESPATCH NO.
N.4/1842	GXN.15254/64.	9. 5. 65.	3705/5073
CUSTOMER'S NAME AND ORDER NO.		**DATE OF ORDER**	**CONTINUATION SHEET NO.**
C2C/FALK.IS.4/29082/1 of		1 Jun 64	3

DESCRIPTION	WEIGHT T C Q LBS	FOOTAGE SENT
1 - Stretch x 156-ft 6" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (22)		7
1 - Stretch x 164-ft 6" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (24)		7
1 - Stretch x 79-ft 6" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (26)		4
1 - Stretch x 116-ft 6" long, when joined together in Random lengths of 20/25-ft. Extreme ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded up 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (28)		5

Contd.....

CONTINUATION

A.2015

WORKS ORDER NO.	SALES OFFICE REF.	DATE OF DESPATCH	DESPATCH NO.
N.4/1842	GXW.15254/64.	9.5.65.	3205/6073
CUSTOMER'S NAME AND ORDER NO.		DATE OF ORDER	CONTINUATION SHEET NO.
C2C/FALK.IS.4/29082/1 of		1 Jun 64.	4.

DESCRIPTION	WEIGHT T C Q LBS	FOOTAGE SENT
1 Stretch x 158-ft 0" long, when joined together in Random lengths of 20/25-ft. Entrene ends of stretch flanged. Intermediate joints plain and rounded for Johnson Couplings. One flange/ plain end pipe to be rounded to 6-ft 0" at plain end for cutting. THIS END SPECIALLY MARKED. Item (30)		7
1 90° Bend. Tube length 6-ft 2½" Item (2)		1
1 85° 45' Bend. Tube length 6-ft 5". Item (7)		1
1 11° 50' Bend. Tube length 5-ft 10". Item (9)		1
1 ,° 53' Bend. Tube length 5-ft 10". Item (11)		1
1 25° 40' Bend. Tube length 5-ft 10". Item (13)		1
1 40° 37' Bend. Tube length 5-ft 10". Item (15)		1
1 25° 12' Bend. Tube length 5-ft 10". Item (23)		1
1 46° 21' Bend. Tube length 5-ft 10". Item (25)		1
1 47° 56' Bend. Tube length 5-ft 10". Item (27)		1
1 3° 45' Bend. Tube length 5-ft 10". Item (29)		1
1 103° 35' Bend. Tube length 6-ft 10.1/2". (Item 17)		1

Contd.....

CONTINUATION

A.2015

WORKS ORDER NO.	SALES OFFICE REF.	DATE OF DESPATCH	DESPATCH NO.
N.5/1842	GXW.15254/64.	9. 5. 65.	3705/5073
CUSTOMER'S NAME AND ORDER NO.		**DATE OF ORDER**	**CONTINUATION SHEET NO.**
G20/BALK.IS.4/29082/1 of		1 Jun 64.	5.

DESCRIPTION	WEIGHT T C Q LBS	FOOTAGE SENT
1 - 90° 46' Bend. Tube length 6-ft 2.1/2". Item (19)		1
1 x 1-ft 11". With 1 - 6.5/8" o.d. x 7 wg. thk. branch welded on where shown. Item (4).		1
1 - 10° 59' Bend. Tube length 5-ft 10". With 1 - 3.1/2" o.d. x 8 wg. thk. angle branch welded on where shown. Item (21)		1
1 - Blank Flange 7.1/2" dia. x 7/8" thk. at edge, with facing strip 5" dia. x 1/16" high, turned on edge and drilled with 4 - 3/4" holes at 6" crs. Item (31) Fitted to Item (21)		1
102 Johnson Couplings, each consisting of centre sleeve, end flanges, wedge rings and bolts and nuts. To suit 6.5/8" o.d. x 7 wg. thk. Tubes. (Item 32)		102
All the foregoing self colour internally and protected externally with our Security Tar Enamel Wrapping and Whitewashed. Inspected.		

Contd.....

CONTINUATION

A.2015

WORKS ORDER NO.	SALES OFFICE REF.	DATE OF DESPATCH	DESPATCH NO.
No.4/1842	CXW.15254/64.	9. 5. 65.	3705/5073
CUSTOMER'S NAME AND ORDER NO.		DATE OF ORDER	CONTINUATION SHEET NO.
C20/FLAK.IS.4/29082/1 of		1 Jun 64	6.

DESCRIPTION	WEIGHT T C Q LBS	FOOTAGE SENT					
102 Johnson Couplings packed in Cases as follows :-							
1 Case - containing 44 - 6⅝" Couplings	9. 3. 24.	60	8. 2. 7	40"	31"	36"	
1 Case - " 42 - " "	7. 1. 4.	42	6. 0. 7	40"	31"	30"	
2 - Fastnut Spanners		2					
32 lengths - Flanged 1 end only	5. 9. 0.15	658'4"					
86 " - Plain Ends.	13. 6. 0. 0	2046'0.5/16"					
13 Bends (app. 6-ft long) + 1 Branch piece - with 11" dia. flanges fitted to both ends.	0.16. 3.14	13					
National Material.							
1 Packing Case containing:- 292 - ¾" dia x 3" long Bolts	0. 2. 1. 4.	292	0.	1. 3.10	2'8½"	1'9"	11¾"
1 Packing Case containing:-					1'10"	1'10"	1'10
1 Roll x 800-ft x 9" wide Outer Wrap.		1					
2 Rolls x 400-ft x 6" wide Inner Wrap.		2					
* 1 1-gal. Can Synthetic Primer.		1					
4 ⅝" dia x 2¾" long bolts.		4					
32 8⅝" x 6⅝" x 1/16" thk. Klinger Joint Rings	0. 1. 0.25	32	0.	0. 3.24.			
1 5½" x 3½" x 1/16" thk. Klinger Joint Rings.		1					
SHPG NO. 2.							
2 - 5-Gal drums Enamel.	0.10. 2. 0	2	0.	10. 0. 0	34"	24"	24"
SHPG NOS. 3/4							
Flanged ends and Bends fitted with Wooden Discs - secured with 248 - 1½" dia. x 2½" long service bolts.		248					
* FLASH POINT 74 °F.							
Wagon Nos. B.730578 E.301654 B.733092 B.730582							

EX NEWPORT WORKS 8137.

INTERNAL INSTRUCTIONS

337

Sw.

To see 336. pl

338.

bol dec.

336 seen thank you

MrsW

17/12/65

1905

339

23rd December, 65.

To: The Superintendent,
Power & Electrical Department

From: Colonial Secretary,

STANLEY.

Protective Fence around the Oil Tanks.

Has this fence been completed? If not what is required to complete it? It might be preferable for you to walk over the ground with myself or the A.C.S.

(Sgd.) W. H. Thompson
COLONIAL SECRETARY.

Memo for file

TB.

No. _____

It is requested that, in any reference to this memorandum the above number and date should be quoted.

MEMORANDUM.

~~359~~ 340

29th December 1965.

From:- Supt.Power & Electrical Dept.

Stanley, Falkland Islands.

To:- The Colonial Secretary,

Secretariat,

STANLEY.

SUBJECT :- Protective Fence around the Oil Tanks.

This fence was completed around the original two, three hundred ton oil tanks but has not been extended to encompass the later two fifteen hundred ton tanks. Although the fence was intended to be anti-personal, it cannot be regarded as such, my own path to the tanks runs through it. Perhaps yourself or the A.C.S. as mentioned, should visit to decide some policy on the degree of protection.

6/6 19/1/66

Supt.Power & Electrical Dept.

BW to CS 15.3.66

341

Minute on file.

5. Apl. 66.

Item 340

I walked around the old tanks with SPE. The fence can be a demarcation line, and consequentially a warning, but it cannot be made anti-personel proof without considerable and unjustified expense.

Agreed to price a fence to include the new oil tanks + to fill at budget time.

£1 s/+.

342

C.J. I believe you have the estimate for this?

343

C/E Yes we are now pulling forward at this stage 7.4.66 £9 s. 7/

342

BRITISH ANTARCTIC SURVEY

WITH COMPLIMENTS

Received in mail

E. Clark

9.5.66

STANLEY
FALKLAND ISLANDS

344

BRITISH ANTARCTIC SURVEY

FORMERLY FALKLAND ISLANDS DEPENDENCIES SURVEY

DIRECTOR: SIR VIVIAN FUCHS

30, GILLINGHAM STREET, S.W.1

TELEPHONE: VICTORIA 3687-8-9

TELEGRAMS: POLASURVEY, LONDON-SW1

AS/132 15th April 1966

Dear Mr. Thompson,

I refer to our conversation concerning the oil storage tanks in Stanley. The papers that we have here deal only with financial transactions. A tank has not been officially allocated to the Survey.

Would you please be good enough to have a document drawn up specifying which belongs to us.

Yours sincerely,

Derek Gipps

D.R. Gipps
EQUIPMENT OFFICER

The Hon. Colonial Secretary,
Stanley,
Falkland Islands,
SOUTH ATLANTIC

Reply at 3rd

1905

345

18th May, 66.

To: The Superintendent,

From: The Colonial Secretary, Power and Electrical Department,

STANLEY.

Ownership of Oil Storage Tanks

You are aware of the history of the oil tanks and of the fact that ownership and responsibility for the maintenance has never been clearly laid down.

A letter has now been received from B.A.S. London stating that no record of ownership exists in London and asking us to draw up a document to settle the matter.

Please go over the ground with Mr. Clapp and produce a simple paper showing what is what in accordance with fact and original finances.

His Excellency the Governor will wish to see the result which should be produced to the Acting Colonial Secretary by the 20th June.

(SGD.) W.H. THOMPSON

COLONIAL SECRETARY

Reply at 347

Copy to His Excellency the Governor for information and C/c BAS.

TM.

~~K(1) 24~~

Bas 20/2/66

346

No. _____

It is requested that, in any reference to this memorandum the above number and date should be quoted.

MEMORANDUM

Ltr 28/5

18th May, 19 66

From: Superintendent of Works,
Public Works Department,
Stanley.

To: The Colonial Secretary.

Stanley, Falkland Islands.

SUBJECT :- **Painting of Oil Storage Tanks.**

As requested I have the honour to submit the cost of the painting of the 2 Oil Storage Tanks at the Power Station. The painting of these tanks extended over 2 years, 1 tank received 2 coats and 1 tank one coat in 1964/65 leaving 1 tank to have one coat in 1965/66.

1964/65	Wages.	£221. 14. 6d.	
	Materials.	112. 8. 9d.	£334. 3. 3d.
1965/66	Wages.	80. 13. 5d.	
	Materials.	23. 1. 4d.	103. 14. 9d.
		Total cost:	£437. 18. -d.

(materials do not include Sandblasting - which was not done.
W.

for Supt. of Works.

Rec 20/6/66.

347

No.

It is requested that, in any reference to this memorandum the above number and date should be quoted.

MEMORANDUM

7th June 1966

Supt. Power & Electrical Dept.

Stanley, Falkland Islands.

The Colonial Secretary,

Secretariat,

STANLEY.

SUBJECT :- Ownership of Oil Storage Tanks.

345

I refer to your Memorandum 1905 dated the 18th May and report as follows.

The Colonial Government and the British Antarctic Survey agreed in 1963 to establish jointly better oil storage facilities in Stanley. There was, to the best of my knowledge, no formal written agreement. Both Parties were to bear 50% of the cost of purchasing and building two 1,500 capacity oil storage tanks and a six inch pipeline.

It was estimated at the time that the total cost would be £30,000. B.A.S. on the 30th of June 1963 placed £15,000 on deposit with the F.I.G. as their contribution. To date £28,698 12s Od has been spent, leaving a balance of B.A.S. funds at £650 14 Od on hand. Outstanding materials and work to be done is the purchase of a tee piece for the pipe line costing £50 and the laying of the pipeline. The Supt. PWD. has informed me that the combined B.A.S. and F.I.G. funds amounting jointly to £1,301 8s Od will be sufficient to cover all charges to completion.

As previously mentioned there has been no formal agreement as to ownership of the tanks or the pipeline. Indeed to do so would present practical difficulties owing to the varying quantities held. e.g. Both B.A.S. and F.I.G. stocks may at times exceed their seperate capacities and for ease of handling stocks are held in either tank. The pipeline which forms no small part of the installation, obviously cannot be sub-divided.

In view of the practical difficulties involved in formulating a seperate ownership agreement I suggest for consideration that the oil installation consisting of the two 1,500 ton capacity tanks and the six inch pipeline, but excluding the two 300 ton capacity tanks, should be jointly owned. Maintenance costs on both tanks and pipeline be jointly shared.

F.I.G. policy is to insure the contents or their stocks against fire risk. B.A.S. policy is to carry their own insurance. This need present no problem provided it is noted in any agreement drawn up and proper store records of quantities are kept.

CS for discussion please
ES
15/11/66

Copy to Secretary BAS.

Supt. Power & Electrical Department.

ECG.

348

1905/II

6th December, 66.

To: The Superintendent of Works,

From: Colonial Secretary,

STANLEY.

6" Oil Pipe Line

I know you have a very large burden of work but it appears that a tanker may arrive in the middle of 1967 which will be of such dimensions that the demurrage charges will be unbearably high. Can you give me an estimated completion date?

(W.H.THOMPSON)
COLONIAL SECRETARY

Reply 350

TB

Ref: 1905.

3494

19th December, 1966.

S/o

Oil Tanks

344 Please refer to your AS/132 of the 19th April, 1966.

I now confirm that of the two installed 1500 ton capacity oil tanks the one to the West belongs to the British Antarctic Survey and the one to the East to the Falkland Islands Government. For this purpose an oil tank is inclusive the main outlet valve, but exclusive of any pipelines.

Provided you will agree to this simple form of hand over I cannot see that any special document is necessary.

(W. H. THOMPSON)
COLONIAL SECRETARY

Copies to: Oi/c, BAS
C.T.
S.P.E.
S.O.

W.M. Sipps, Esq.,
Equipment Officer,
British Antarctic Survey,
30 Gillingham Street,
LONDON, S.W.1.

fc

WM.

350

No. PWD 068

It is requested that, in any reference to this memorandum the above number and date should be quoted.

COLONIAL SECRETARY'S OFFICE
12 JAN 1967
FALKLAND ISLANDS

MEMORANDUM

12th January, 1968.

From: Superintendent of Works, P.W.D.

Stanley, Falkland Islands.

To: The Colonial Secretary,

STANLEY.

SUBJECT :- 64 Oil Pipe Line.

348

Re your Memo 1905/II dated 6th December, 1966.

My estimated time for completion is mid April.

Supt. of Works.

351

BRITISH ANTARCTIC SURVEY

FORMERLY FALKLAND ISLANDS DEPENDENCIES SURVEY

DIRECTOR: SIR VIVIAN FUCHS

30, GILLINGHAM STREET, S.W.1

TELEPHONE: VICTORIA 3687-8-9

TELEGRAMS: POLASURVEY, LONDON-SW1

AS/132

20th January 1967

Dear Mr Thompson.

Oil Tanks

349

Thank you for your letter 1905 dated 19th December 1966 which settles the question of ownership. I agree that no special document is necessary.

Yours sincerely,

D.R. Gipps

D.R. Gipps
EQUIPMENT OFFICER

The Hon. The Colonial Secretary,
Port Stanley,
FALKLAND ISLANDS

352

H.E. The Governor
C.T.
S.P.E.
S.P.W.
Oi/C B.A.S.
S.O.

10/3/67

Ownership of Oil Tanks

For your information, and further to a letter of mine to the Equipment Officer, British Antarctic Survey, London dated 19th December 1966 (which was not copied to everyone) it has now been agreed that of the two 1500 ton capacity oil tanks in Stanley the tank to the west (inclusive main outlet valve, exclusive of pipe-line) is the property of B.A.S.

349

The record of this is contained on file 1905/II at folios 349 and 351.

The Superintendent Public Works will now amend his list of properties accordingly. He will also check, and confirm to me, that the British Antarctic Survey tank is in no way part or parcel of any Falkland Islands Government insurance responsibilities.

C.S.

8/3

ER