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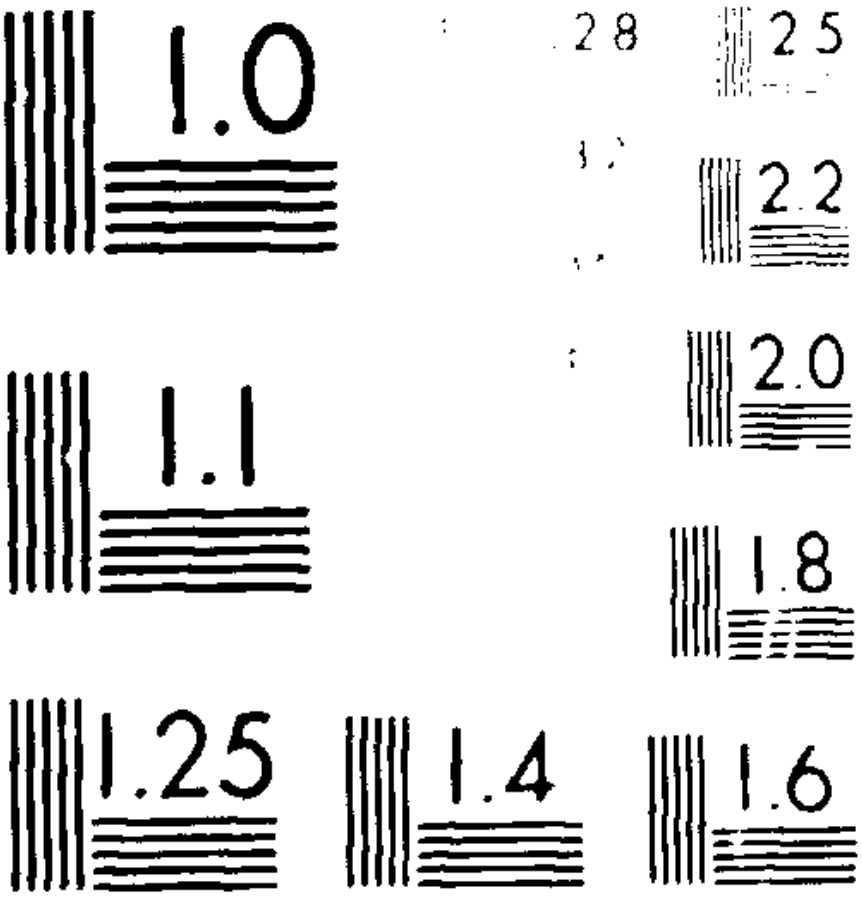
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Technical Consultations among Developing Countries on Large-Scale Biogas Technology in China

Beijing, China, 4 - 19 July 1980

COLLECTION OF SIMPLE BIOGAS DIGESTER DESIGNS *

prepared by

the Southwest Architectural Designing Institute

Sichuan, China

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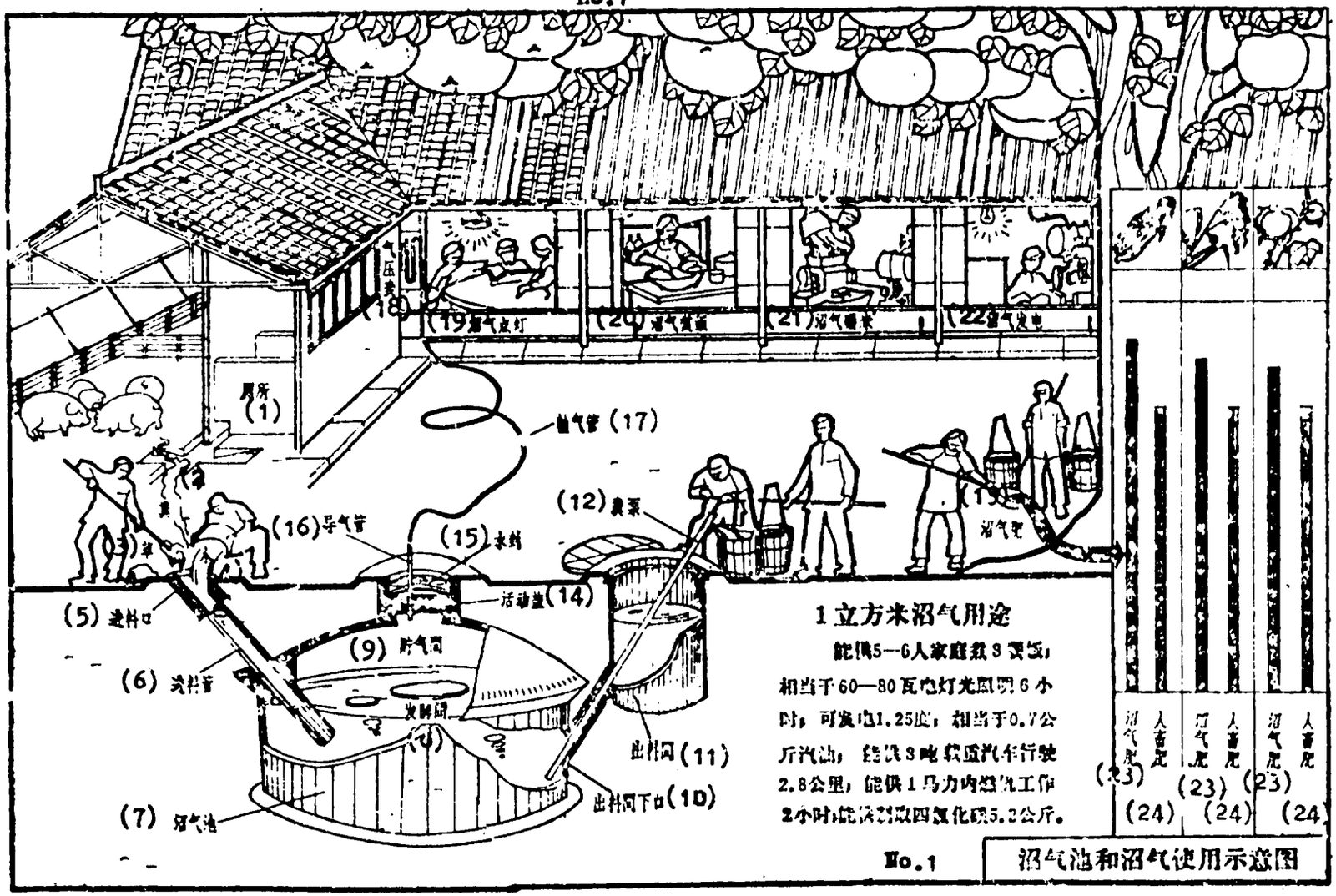
No.1



No.1 沼气池和沼气使用示意图

No. 1 Schematic view of a digester and the uses of biogas

(1) Latrine

(2) Manure

(3) Weeds

(4) Water

(5) Inlet opening

(6) Inlet pipe

(7) Digester tank

(8) Fermentation space

(9) Gas storage space

(10) Lower opening of outlet room

(11) Outlet room

(12) Manure pump

(13) Digester manure

(14) Removable cover

(15) Water seal

(16) Gas conduct

(17) Gas pipeline

(18) Gas meter

(19) Household lighting

(20) Household cooking

(21) Rice hulling

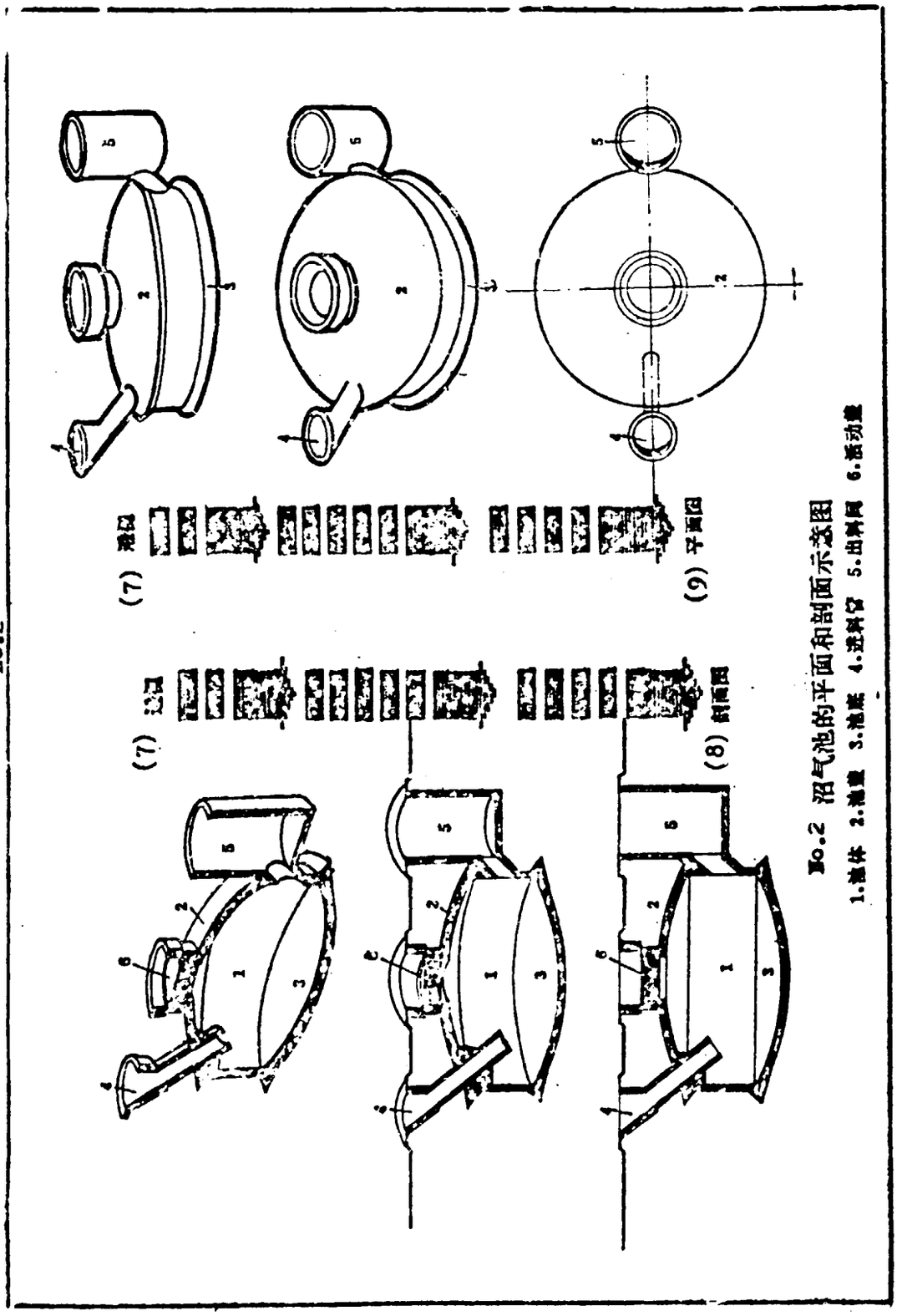
(22) Power-generating

(23) Digester manure

(24) Human excrements and animal manure

What can be done by $1m^3$ of biogas?

It can provide energy for cooking three meals a day of a family with 5-6 members; for driving a truck of 3 - tons to run 2.8km. or an engine of 1 horse power to work 2 hr., that is equivalent to 0.7kg. of gasoline; and for producing CCl4 5.2kg..



No.2 沼气池的平面和剖面示意图

1.池体 2.池盖 3.池底 4.进料管 5.出料间 6.活动盖

No. 2 Schematic view showing the plan and cutaway of a digester

(1) Tank body

(2) Tank cover

(3) Tank bottom

(4) Inlet pipe

(5) Outlet room

(6) Removable cover

(7) Perspective

(8) Cutaway

(9) Plan

一、总 说 明

几年来，我们四川省广大农村大办沼气的热潮，是在毛主席和华主席亲切关怀下出现的，现在很多县、区、公社和大队已经基本实现沼气化。广大群众在修建沼气池的实践中，创造了许多好经验。本图集就是在深入调查，总结经验的基础上，根据“三结合”、“圆、小、浅”、“活动盖”、“直管进料”、“中层出料”、“出料口加盖”等群众的建池经验，结合四川地区的情况而编制的。

（一）沼气简介

沼气是利用人畜粪便、植物茎叶和垃圾等有机物质作原料，在一定温度、湿度和密闭的条件下，经过微生物发酵而产生的一种可燃气体。人工制取沼气具有重大的政治和经济意义，它为农村煮饭、点灯、发电和开动机器提供了廉价的能源，可为国家节约大量的煤、电和油料，支援工业建设；又可提高肥效，扩大肥料来源，发展农业生产并能沉降杀灭寄生虫卵，改善环境卫生，促进人畜健康。

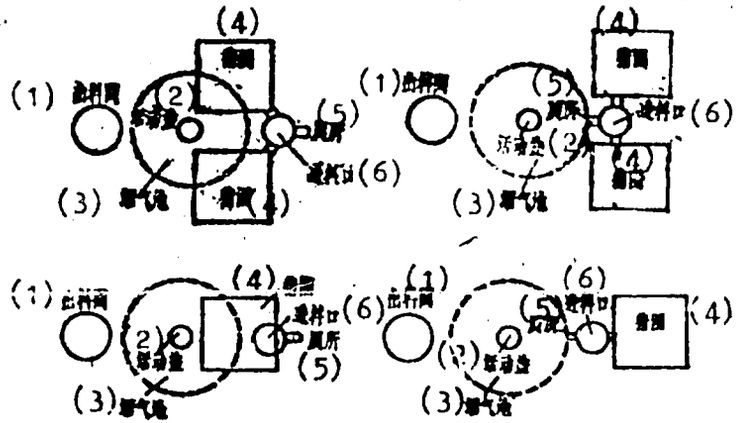
人工制取沼气，除应合理修建沼气池外，还应注意合理配料，进行科学管理。发酵原料的适宜配料比例（重量比）是：人粪便（包括水分）10%＋牲畜粪便、植物茎叶40%＋池水50%。料液的温度在10—55℃间均可发酵产气，在这个温度范围内，温度越高，产气率也随之提高。一般常温发酵温度为10—30℃。作物秸秆（秸秆）、青草、植物茎叶等应铡成1寸左右（30至40毫米）短节，经过短期堆沤发酵或不经堆沤发酵均可下池。第一次投料，应占池体容积90%。使用过程中应经常添加新料，取出旧料，保持适宜温度并勤于搅拌。

使用沼气和沼气池维修，必须注意安全，要防火、防爆、防止窒息事故。下池出料或检修，应先驱尽池内残留的沼气，并先放小动物（如鸡、兔）入池试验。严禁明火入池。

（二）沼气池设计条件

1.建池原则　本图集体现了“三结合”、“圆、小、浅”、“活动盖”、“直管进料”、“中层出料”、“出料口加盖”等建池原则。

“三结合”是指在选择池基时，要靠近厕所、牲畜圈、使粪便自动流入池内，便于进料，方便管理，并有利保持池温，



No.3　　图1—1　沼气池“三结合”布置示意图

No. 3 Layouts of a triplet digester

(1) Outlet room

(2) Removable cover

(3) Digester

(4) Pigsty

(5) Latrine

(6) Inlet opening

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提高产气率，改善环境卫生（图1—1）。

“圆、小、浅”的池型，用料较省，受力合理，施工简便，便于管理，发酵液面较大，利于产气。但池上应有一定覆土厚度，利于保持池温。

“活动盖”便于清除沉渣及排出余气，维修池体时，通风采光好，当输气管路堵塞时，也起安全阀门作用。

“直管进料”，施工方便，进料顺畅，利于搅拌料液。

“中层出料”即出料间下口不直达池底，设在池壁中部，这样建池较为省工省料，利于沉降寄生虫卵。

“出料口加盖”，能防止人畜跌进池内，改善环境卫生，利于冬季保温。

2.设计池型（图1—2） 本图集按常温发酵设计，池体埋设在地面以下，由主池、进料管、出料间三部分组成。主池池型选用短圆柱体池身，正拱球壳形池盖，反拱球壳形池底（图1—1）。主池下部为料液发酵间，上部为储气间。池内气体对池体最大压力取1000公斤/平方米*，池体按无弯矩理论计算，因此池壁与池盖应相互隔离，池壁与池底连接处应作成铰接，

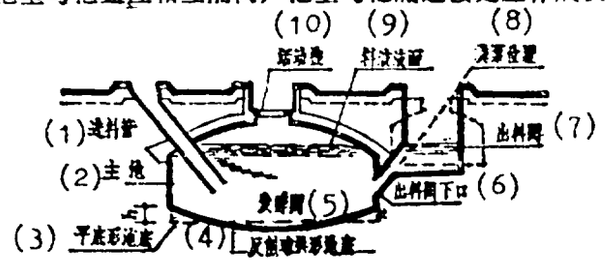


图1—2 沼气池池型

使池荷载直接传至地基，减轻池壁负荷。

反拱球壳形池底，适用于有地下水及无地下水的地质条件，当池建于地下水位以上时，也可采用平底形池底，此时只需适当增加池壁高度（h），即可满足建池容积需要。

进料管安装在池盖拱座上部，使进料直达池中，并能节约用地，当条件适宜时也可改装在池壁中部。

出料间应有一定容积，以便容纳由于池内气压增加而挤出的部分料液，其容积（同主池内料液容量达到90%时，液面以上的部分），按主池净容积的5—10%计算。出料间下口设计混合料泵使用。图页73为提料泵和搅拌器示意图供制作参考。

3.设计容积 设计容积分为6、8、10、12、50、100立方米六档，一律按主池净容积计算。用作农村家庭炊煮、照明使用的沼气池容积，可按每人1.5—2.0立方米考虑。在发酵原料充足，管理正常的情况下，每立方米容积每天产气约0.15立方米。3人以下的家庭可建6立方米，4—5人可建8立方米，6人左右可建10立方米，7—10人可建12立方米。一般5—7人的家庭，一日做三餐饭，点一盏沼气灯，平均每天耗气量约1立方米（1000公升）。

50、100立方米池型，供社队企业使用。如容积不够，可采用成组并联方式建池，施工简便，利于管理和检修。

4.材料、结构类型 本图集设计的结构类型，包括灰土、三合土、掺塑化剂（石灰、粘土）的低标号混凝土、炉渣、矿

* 在选用气压表时，水柱差应控制在1000毫米以内。

No. 4 Pattern of a digester

(1) Inlet pipe

(2) Main tank

(3) Plan bottom

(4) Domical bottom

(5) Fermentation space

(6) Lower opening of outlet room

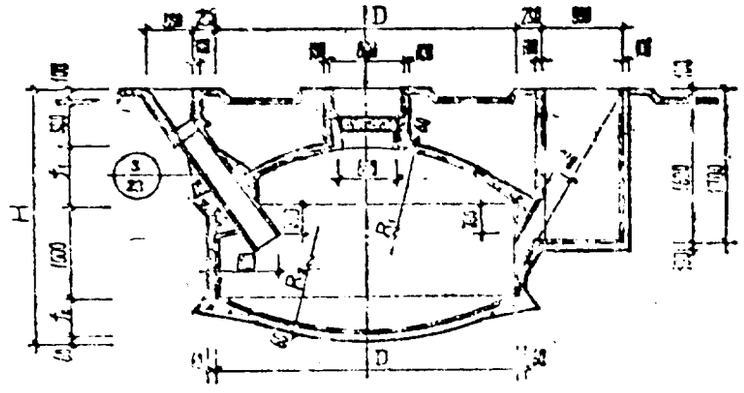
(7) Outlet room

(8) Manure pump

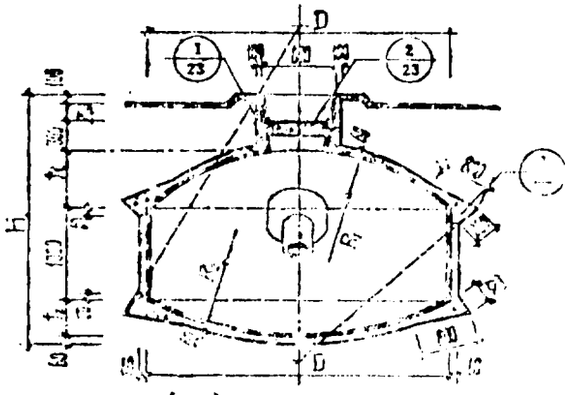
(9) Liquid level

(10) Removable cover

On p. 2



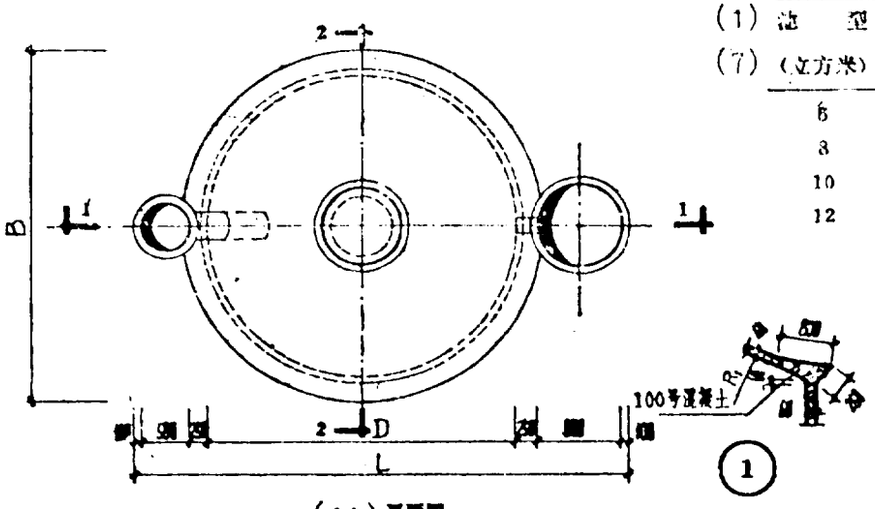
(10) 1—1 剖面图



(10) 2—2 剖面图

(1) 池型 / (7) (立方米)	(2) 用地范围 L	B	池壁高度 H	池壁内直径 D	(3) 池盖拱圆 半径 R₁ (8)	矢高 f (9)	(4) 池底拱圆 半径 R₂ (8)	矢高 f₂ (9)
6	4580	2880	2440	2400	1740	480	2560	300
8	4880	3180	2540	2700	1960	540	2860	340
10	5180	3480	2640	3000	2180	600	3180	380
12	5360	3780	2700	3200	2320	640	3400	400

注：1.池盖、池壁、池底用30号混凝土，当池盖采用100号混凝土时，见详图①。
2.进料口、出料间用灰土材料。



(11) 平面图

①

No.5 6、8、10、12立方米混凝土沼气池

No. 5 Concrete digester of 6, 8, 10, 12m^3

(1) Volume of tank

(2) Area

(3) Height of burial

(4) Inside diameter

(5) Dome of cover

(6) Dome of bottom

(7) (m^3)

(8) Radius

(9) Rise

(10) Cutaway

(11) Plan

Note: 1. No. 30 concrete is used for cover, wall and bottom; in case No. 100 concrete is used for cover, reference should be made to details (1).

2. Lime-clay material is used for inlet opening and outlet room.

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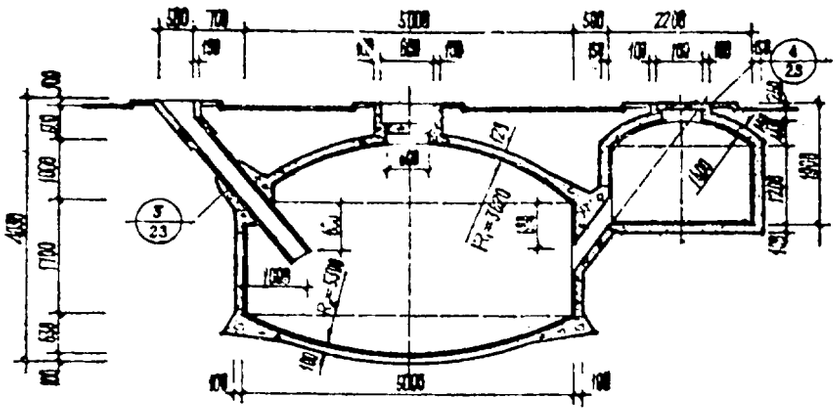
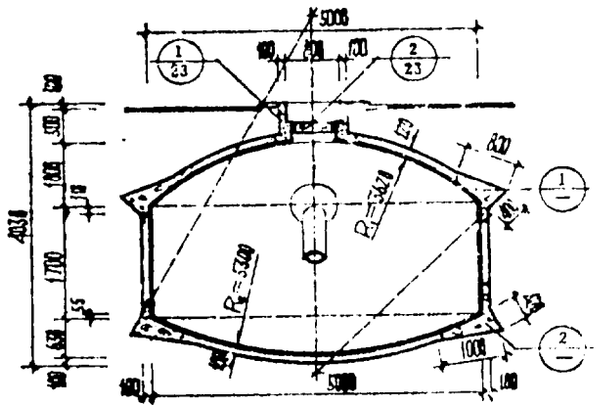
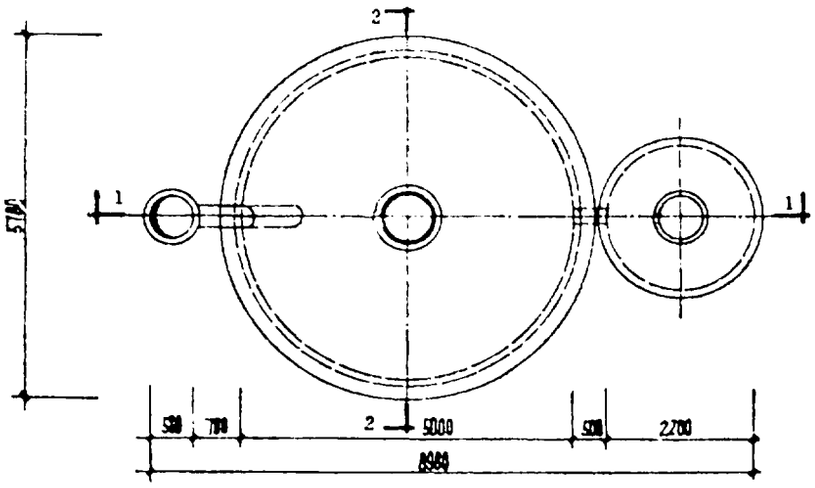


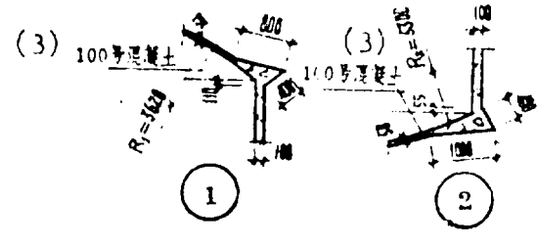
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



注：1.池盖、池壁、池底均为30号混凝土，当池盖、池底选用其他材料时，见详图①、②。
2.进料口、出料间为灰土材料。

No.6 | 50立方米混凝土沼气池

No. 6 Concrete digester of $50m^3$

(1) Cutaway

(2) Plan

(3) No. 100 concrete

Note: 1. No. 30 concrete is used for cover, wall and bottom; in case other material is used for cover and bottom, reference should be made to details (1), (2).

2. Lime-clay is used for inlet opening and outlet room.

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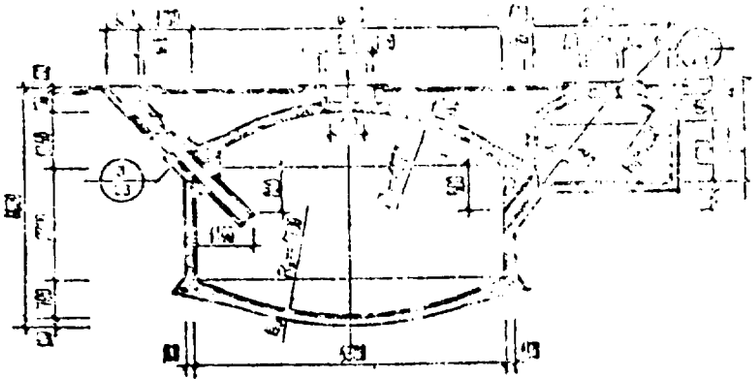
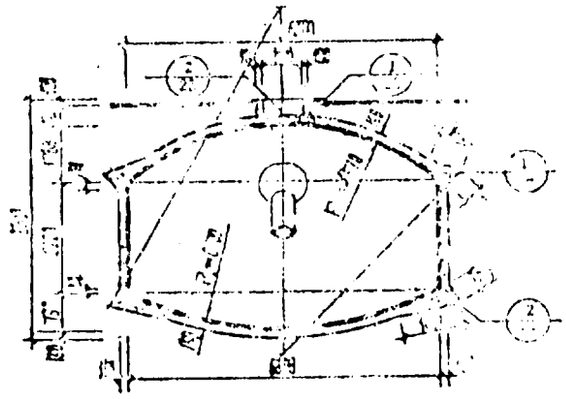
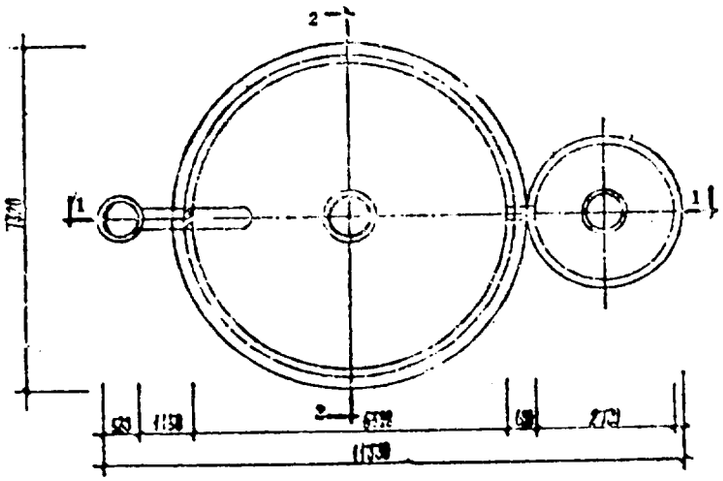


(1) 1—1 剖面图

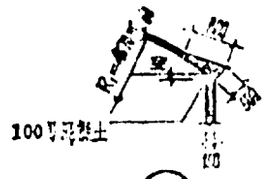


(1) 2—2 剖面图



(2) 平面图

(3)



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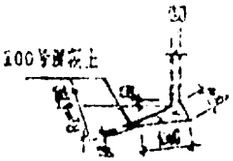
(3)



②

注：1.池盖、池壁、池底均为30号混凝土，当池盖池底改为100号混凝土时，见详图①、②。
2.进料口、出料间均为灰土材料。

No.7 100立方米混凝土沼气池

No. 7 Concrete digester of $100m^3$

(1) Cutaway

(2) Plan

(3) No. 100 concrete

Note: 1. No. 30 concrete is used for cover, wall and bottom; in case No.100 concrete is used for cover and bottom, reference should be made to details (1), (2).

2. Lime-clay is used for inlet opening and outlet room.

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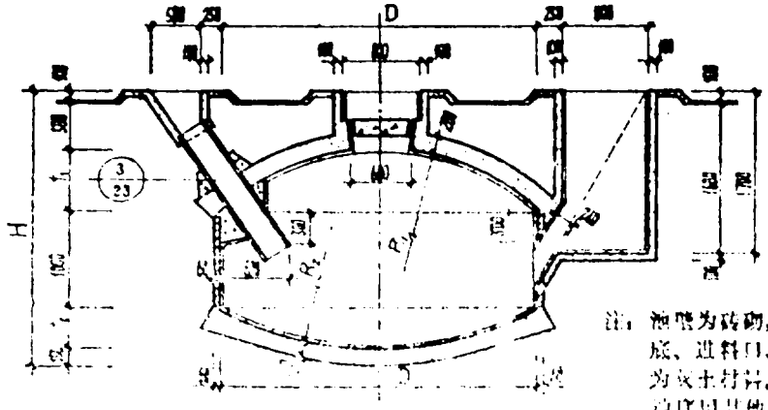
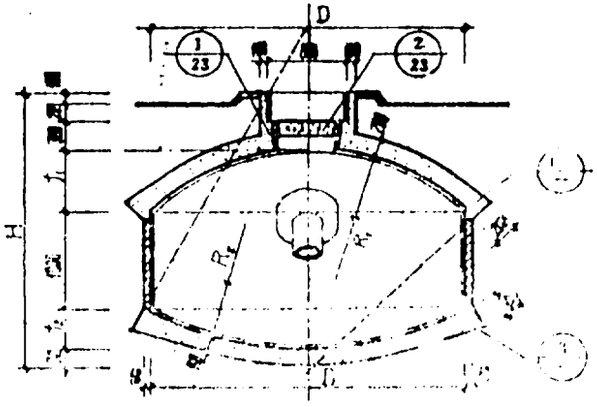
No.8

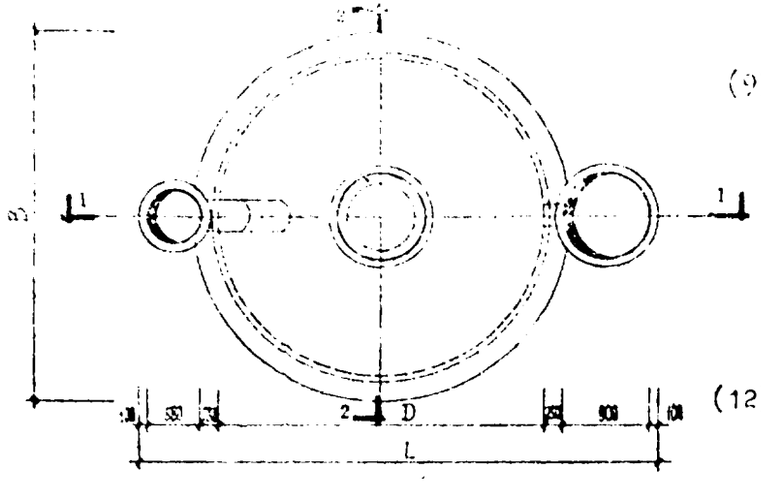


(1) 1—1 剖面图



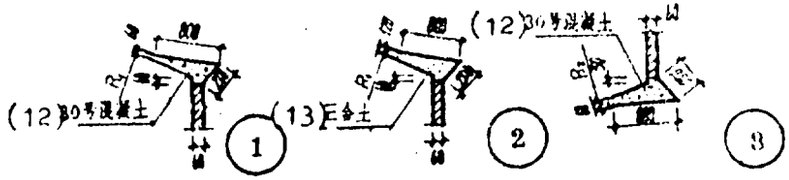
(1) 2—2 剖面图

注：池墙为砖砌，池盖、池底、进料口、出料间均为钢筋混凝土材料。当池容、池底用其他材料时，见详图①、②、③。



(2) 平面图

(3) 池型 (9) (立方米)	(4) 用地范围 L	B	(5) 容量深度 H	(6) 池体内径 D	(7) 池盖拱矢 f	(8) 池盖厚度 δ	(9) 池底拱矢 f	(10) 池底厚度 δ
6	4580	2830	2550	2400	1740	480	2550	360
8	4830	3130	2630	2700	1960	540	2860	360
10	5180	3480	2730	3000	2180	600	3180	360
12	5380	3680	2790	3200	2320	640	3380	400



No.8 6、8、10、12立方米砖壁整体盖沼气池

No. 8 Brick-walled digester with integral cover of 6, 8, 10, 12m^3

(1) Cutaway

(2) Plan

(3) Volume of tank

(4) Area

(5) Height of burial

(6) Inside diameter

(7) Dome of cover

(8) Dome of bottom

(9) (m^3)

(10) Radius

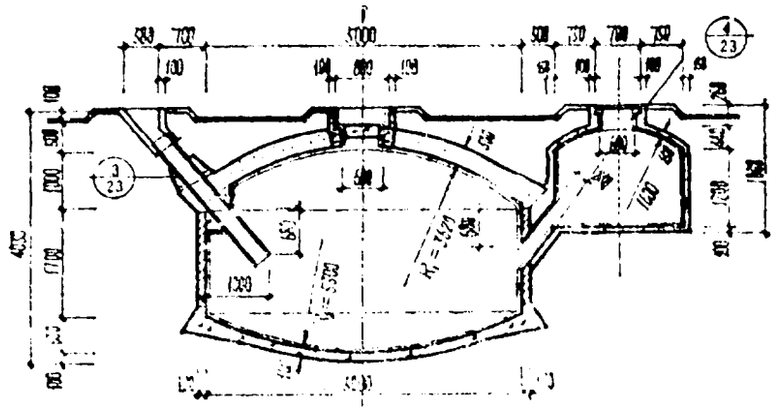
(11) Rise

(12) No.30 concrete

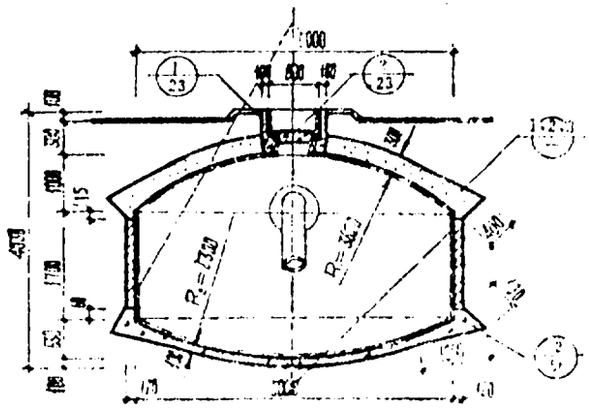
(13) Lime concrete

Note: wall is laid by bricks. Lime-clay is used for cover, bottom, inlet opening and outlet room; in case other materials are used for cover and bottom, reference should be made to details (1), (2), (3).

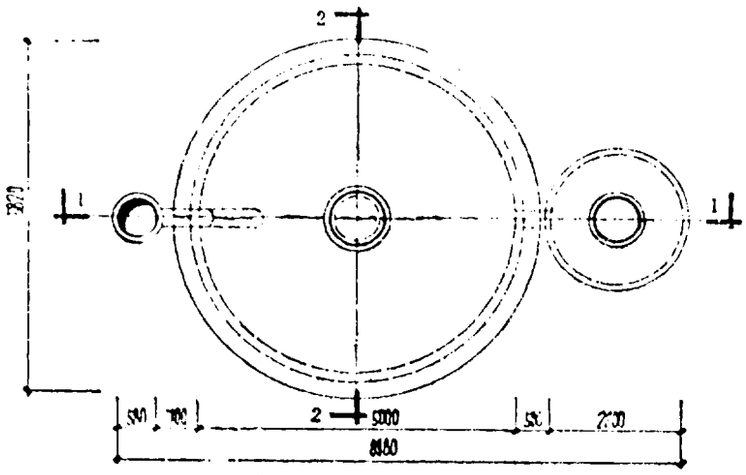
On p. 42



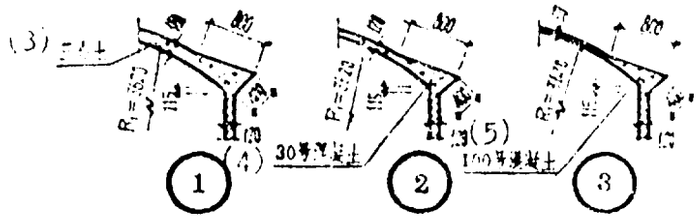
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



注：1.池盖、进料口、出料间均为灰土，当选其他材料时，见详图①、②、③。

2.池壁为普通粘土砖，用25号混合砂浆砌筑。

3.池底为30号混凝土，当用100号混凝土时，见图页56详图②。

No.9	50立方米砖壁整体盖沼气池

No. 9 Brick-walled digester with integral cover of $50m^3$

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

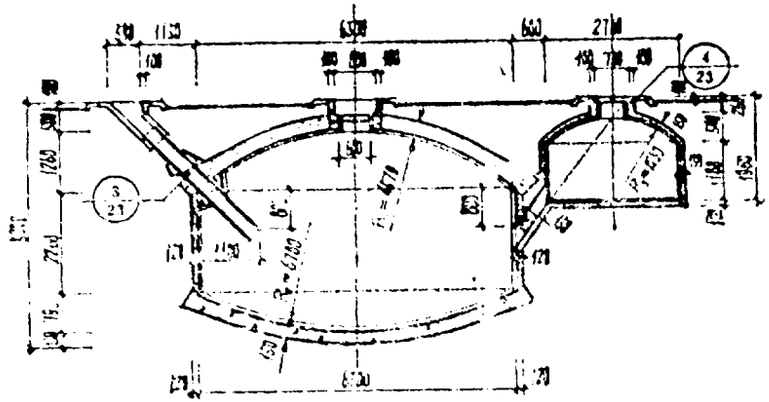
(5) No.100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used, reference should be made to details (1), (2), (3).

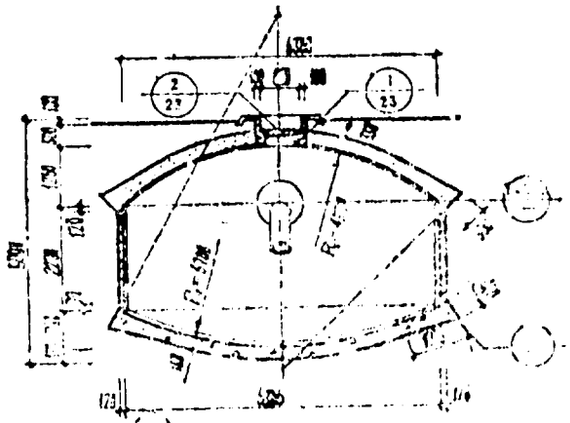
2. Wall is laid by clay bricks with composite plaster No.25.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 56 (2).

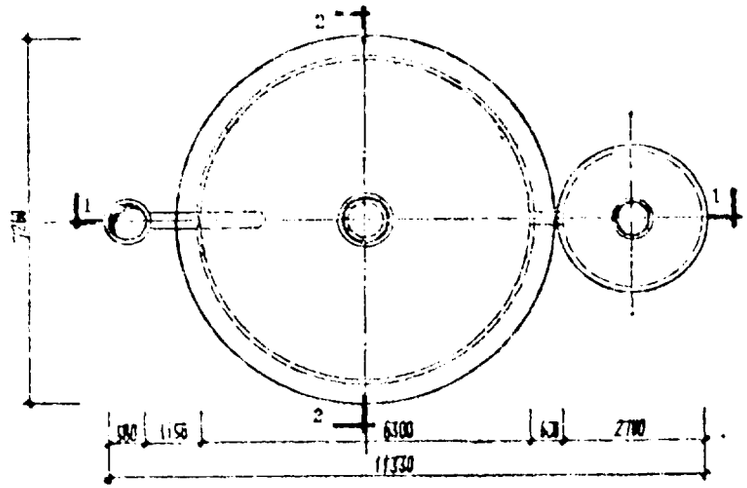
On p. 43



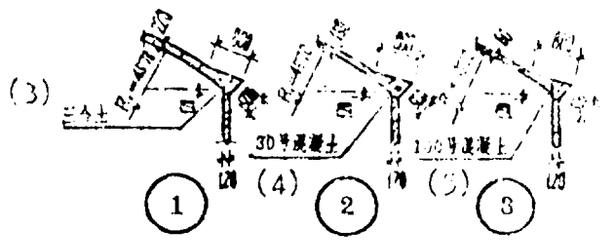
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



注：1.池盖、进料口、出料间均为灰土，当选用其他材料时，见详图①、②、⑨。
2.池墙为普通粘土砖，用25号混合砂浆砌筑。
3.池底为30号混凝土，当用100号混凝土时，见图页57详图②。

No.10 100立方米砖壁整体盖沼气池

No. 10 Brick-walled digester with integral cover of $100m^3$

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

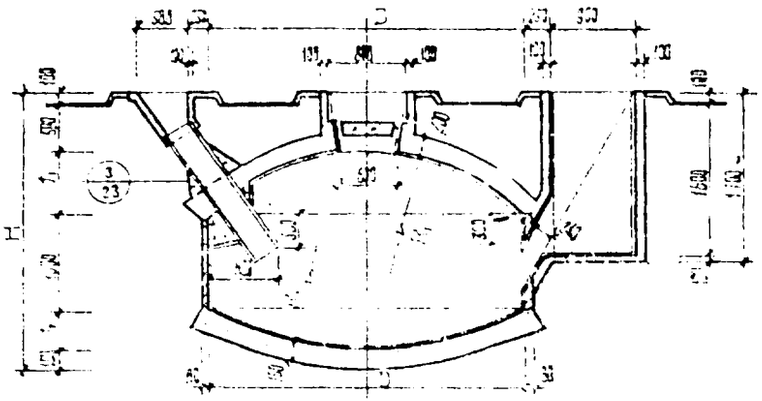
(5) No.100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used, reference should be made to details (1), (2), (3).

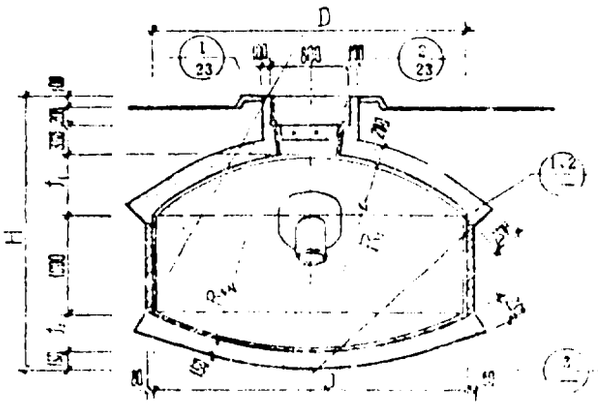
2. Wall is laid by clay bricks with composite plaster No.25.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 57 (2).

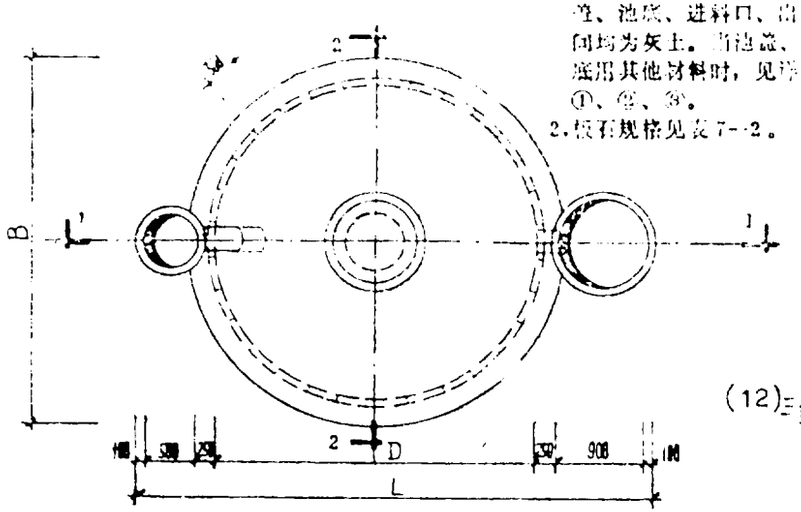
On p. 44



(1) 1—1 剖面图



(1) 2—2 剖面图



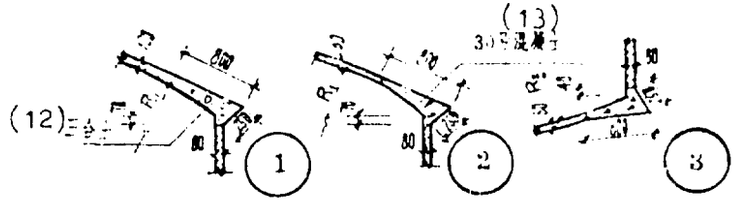
(2) 平面图

注：1.图中池壁为板石砌筑，池盖、池底、进料口、出料间均为灰土。当池盖、池底用其他材料时，见详图①、②、③。

2.板石规格见表7—2。

(3) 池 型 (立方米)	(4) 用地范围 L	B	(5) 池壁内净深度 H	(6) 池壁内净直径 D	(7) 池盖拱弧 半径	矢高	(8) 池底拱弧 半径	矢高
6	4580	2920	2530	2400	1740	480	2550	300
8	4820	3220	2630	2700	1960	510	2860	310
10	5180	3520	2730	3000	2180	600	3180	380
12	5380	3720	2790	3200	2320	640	3400	400

(9) (10) (11) (12) (13)



No.11 | 6、8、10、12立方米板石壁整体盖沼气池

No. 11 Slate-block-walled digester with integral cover of 6, 8, 10, 12m^3

(1) Cutaway

(2) Plan

(3) Volume of tank

(4) Area

(5) Height of burial

(6) Inside diameter

(7) Dome of cover

(8) Dome of bottom

(9) (m^3)

(10) Radius

(11) Rise

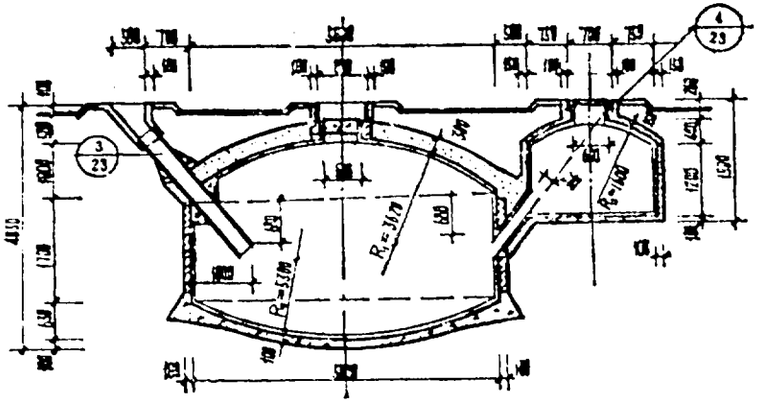
(12) Lime concrete

(13) No.30 concrete

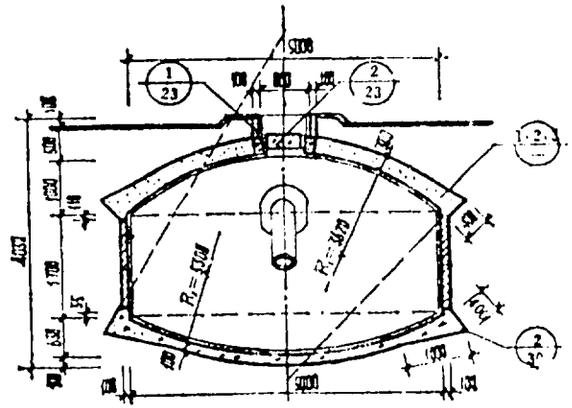
Note: 1. Wall is laid by slate blocks. Lime-caly is used for cover, bottom, inlet opening and outlet room; in case other materials are used for cover and bottom, reference should be made to details (1), (2), (3).

2. For specifications of slate blocks, see Table 7-2.

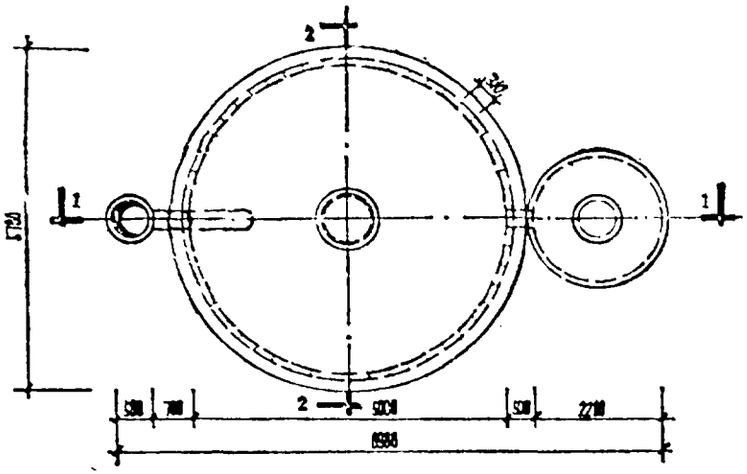
On p. 45



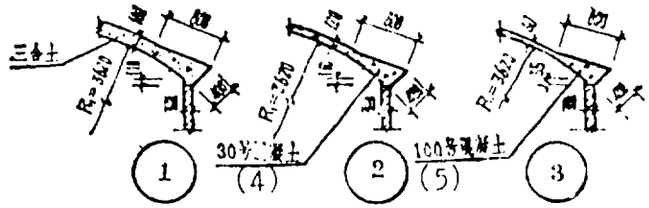
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



(3)

(4)

(5)

注：1.池盖、进料口、出料间均为灰土，当池盖选用其他材料时，见详图①、②、③。

2.池壁为板石，规格见表 7—2，用 25 号混合砂浆砌筑。

3.池底为 30 号混凝土，当用 100 号混凝土时，见图页 30 详图②。

No.12 | 50 立方米板石壁整体盖沼气池

No. 12 Slate-block-walled digester with integral cover of $50 m^3$

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

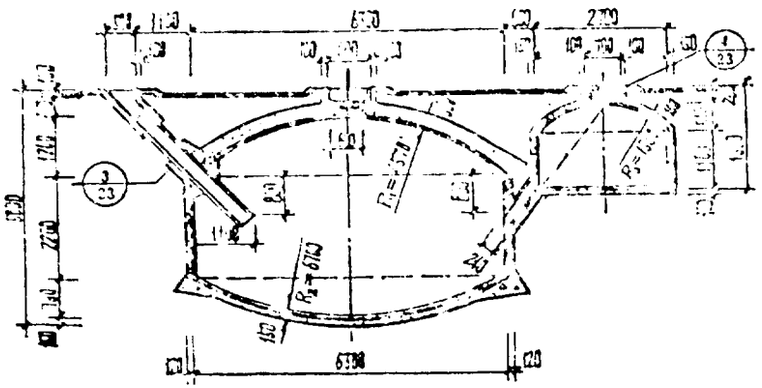
(5) No.100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used for cover, reference should be made to details (1), (2), (3).

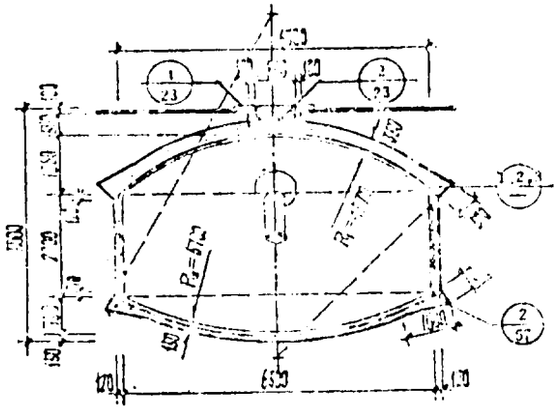
2. Wall is laid by slate blocks with composite plaster No.25. For specifications of slate blocks, see Table 7-2.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 30 (2).

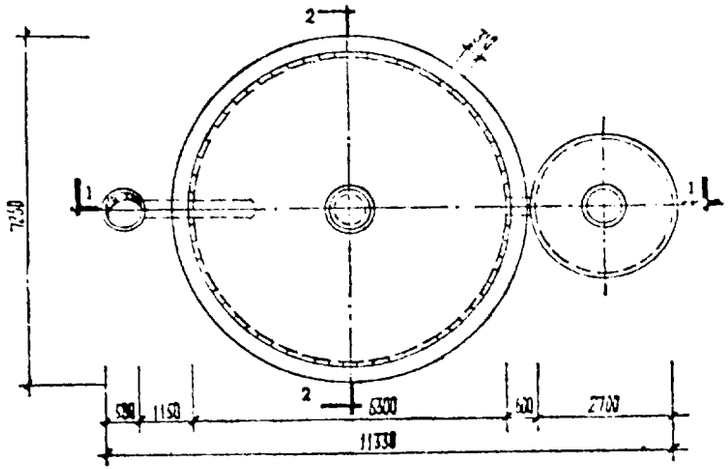
On p. 46



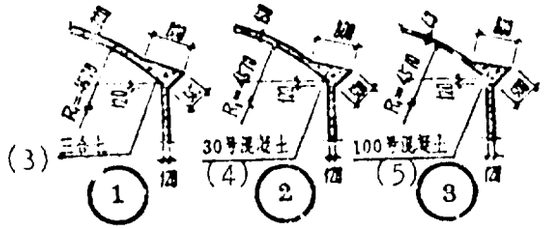
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



(3)

注：1.池盖、进料口、出料间均为灰土，当池盖选用其他材料时，见详图①、②、③。
2.池壁为普通粘土砖，用25号混合砂浆砌筑。
3.池底为30号混凝土，当用100号混凝土时，见图页57详图③。

No.13 100立方米板石壁整体盖沼气池

No. 13 Slate-block-walled digester with integral cover of $100m^3$

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

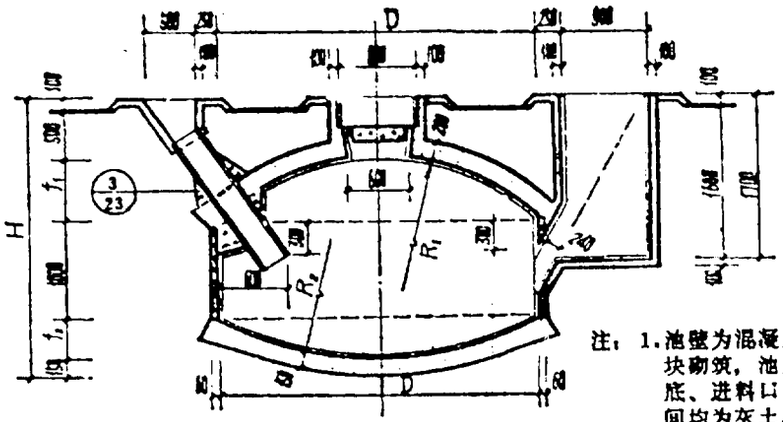
(5) No.100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used for cover, reference should be made to details (1), (2), (3).

2. Wall is laid by slate blocks with composite plaster No.25.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 57 (2).

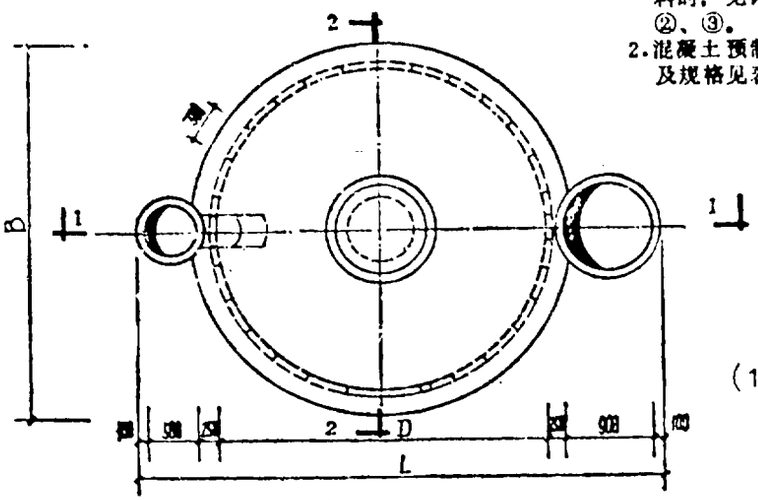
On p. 47



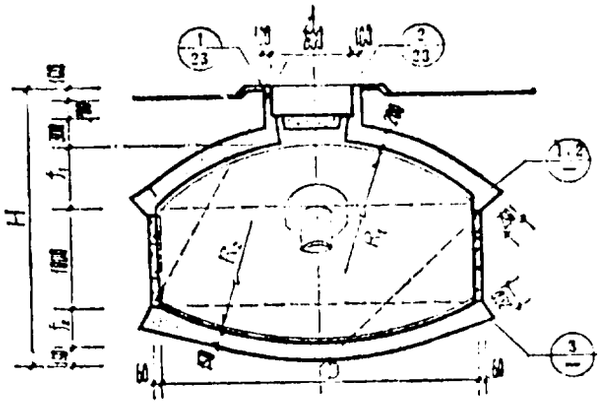
(1) 1—1 剖面图

注：1.池壁为混凝土预制块砌筑，池盖、池底、进料口、出料间均为灰土。当池盖、池底用其他材料时，见详图①、②、③。

2.混凝土预制块用料及规格见表7—1。



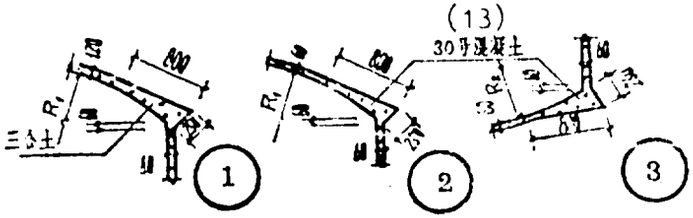
(2) 平面图



(1) 2—2 剖面图

(3) 池型（立方米）	(4) 用地范围 L	B	(5) 埋置深度 H	(6) 池壁内直径 D	(7) 池盖拱弧 半径 R_1	矢高 f_1	(8) 池底拱弧 半径 R_2	矢高 f_2
6	4580	2880	2530	2400	1740	480	2550	300
8	4880	3180	2630	2700	1960	540	2880	340
10	5180	3480	2730	3000	2180	600	3180	380
12	5380	3680	2790	3200	2320	640	3400	400

(13)



(12) 三合土

No.14 6、8、10、12立方米混凝土预制块池壁整体盖沼气池

No. 14 Concrete-block-walled digester with integral cover of 6, 8, 10, 12m^3

(1) Cutaway

(2) Plan

(3) Volume of tank

(4) Area

(5) Height of burial

(6) Inside diameter

(7) Dome of cover

(8) Dome of bottom

(9) (m^3)

(10) Radius

(11) Rise

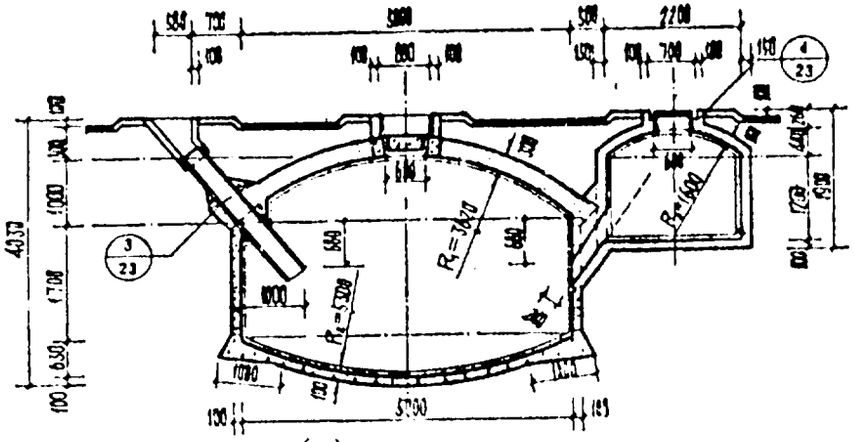
(12) Lime concrete

(13) No.30 concrete

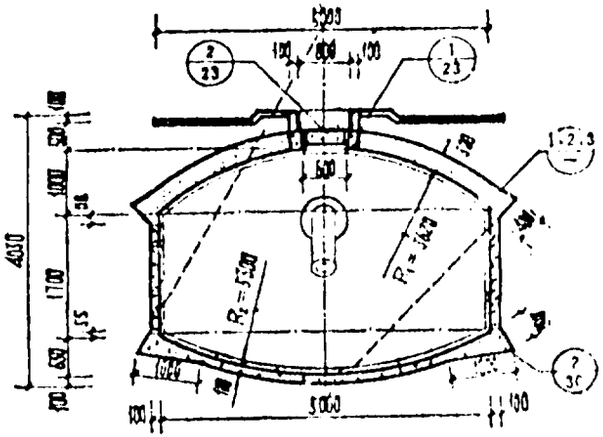
Note: 1. Wall is laid by concrete blocks. Lime-clay is used for cover, bottom, inlet opening and outlet room; in case other materials are used for cover and bottom, reference should be made to details (1), (2), (3).

2. For specifications and formulations of concrete blocks, see Table 7-1.

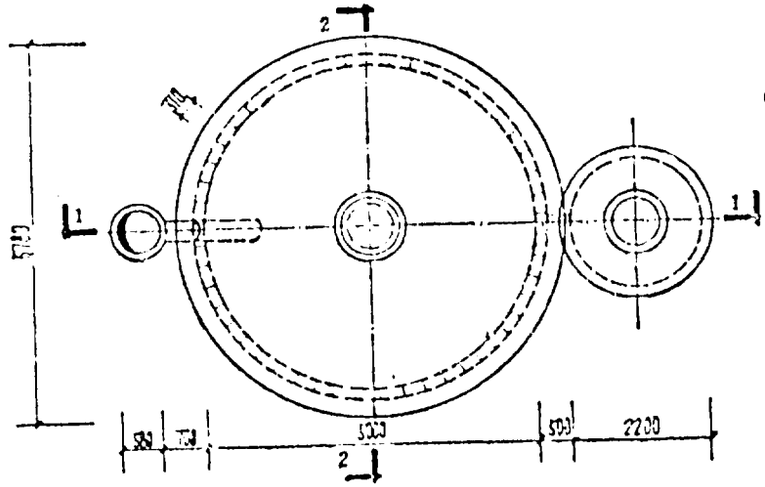
On p. 48



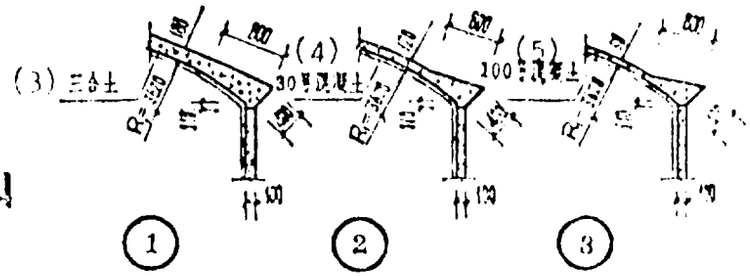
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



注：1.池盖、进料口、出料间均为灰土，当池盖选用其他材料时，见详图①、②、③。

2.池壁为30号混凝土预制块，规格见表7—1，用25号混合砂浆砌筑。

3.池底为30号混凝土，当用100号混凝土时，见图页30详图②。

No.15 | 50立方米混凝土预制块池壁整体盖沼气池

No. 15 Concrete-block-walled digester with integral cover of 50m^3

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

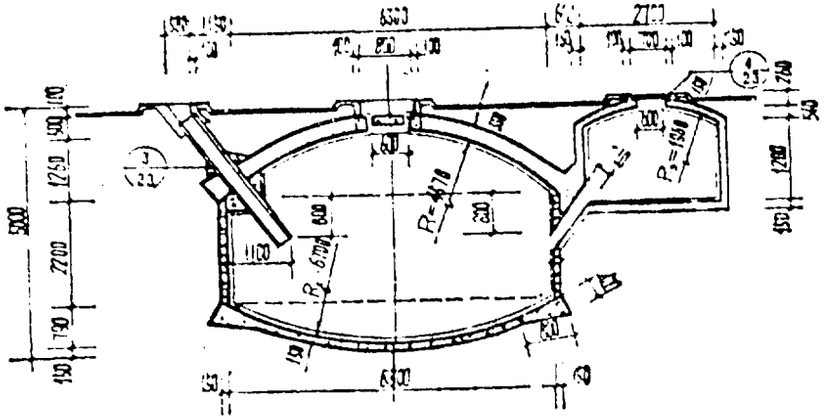
(5) No. 100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used for cover, reference should be made to details (1), (2), (3).

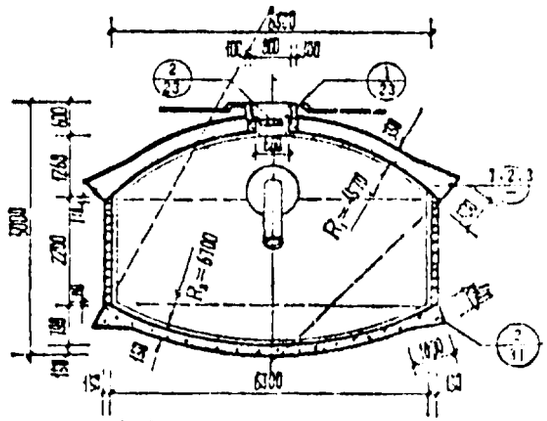
2. Wall is laid by No.30 concrete blocks with composite plaster No.25. For specifications of concrete blocks, see Table 7-1.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 30 (2).

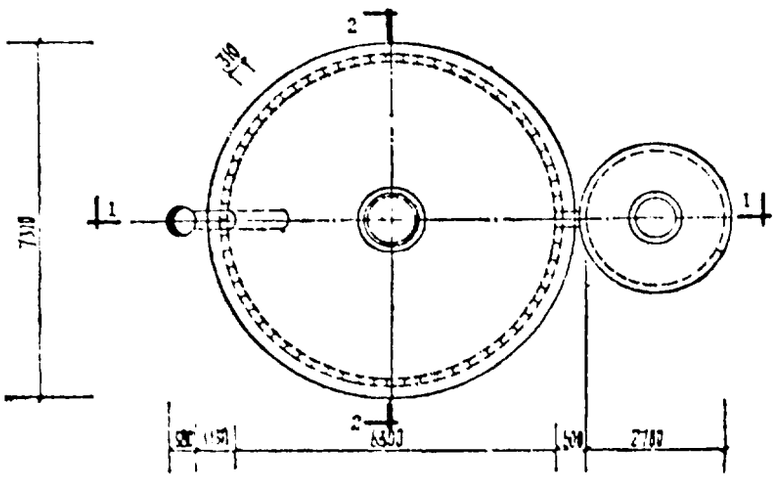
On p. 49



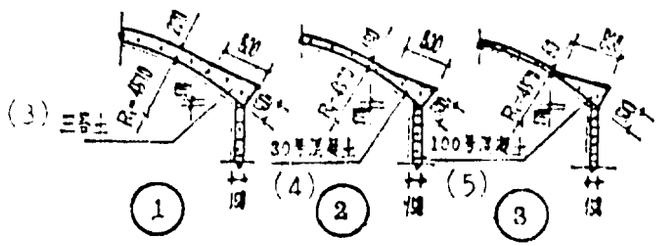
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



(3) 三合土

(4) 30号混凝土

(5) 100号混凝土

注：1.池盖、进料口、出料间均为灰土，当池盖选用其他材料时，见注图①、②、③。

2.池壁为30号混凝土预制块，规格见表7—1，用25号混合砂浆砌筑。

3.池底为30号混凝土，当用100混凝土时，见图页31详图②。

No. 16 Concrete-block-walled digester with integral cover of $100m^3$

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

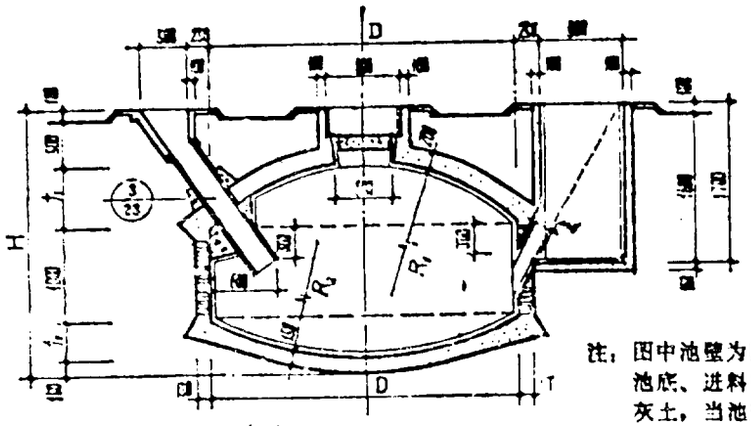
(5) No.100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used, reference should be made to details (1), (2), (3).

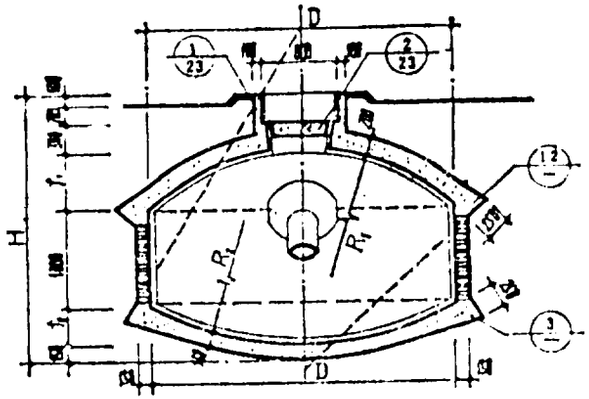
2. Wall is laid by No.30 concrete blocks with composite plaster No.25. For specifications of concrete blocks, see table 7-1.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 31 (2).

On p. 50

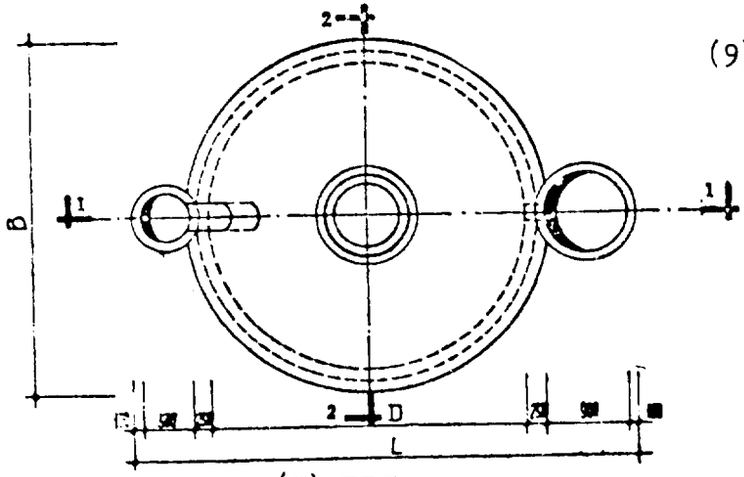


(1) 1—1 剖面图



(1) 2—2 剖面图

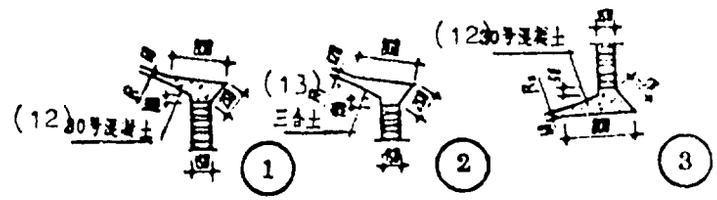
注：图中池壁为卵石砌筑，池盖、池底、进料口和出料间均为灰土，当池盖、池底选用其他材料时，见详图①、②、③。



(2) 平面图

(9)

(3) 池型（立方米）	(4) 用地范围 L	B	(5) 埋置深度 H	(6) 池壁内直径 D	(7) 池盖拱弧 半径 R_1	矢高 f_1	(8) 池底拱弧 半径 R_2	矢高 f_2
6	4580	3060	2530	2400	1740	480	2550	300
8	4880	3360	2830	2700	1960	540	2860	340
10	5180	3660	2730	3000	2180	600	3180	380
12	5380	3860	2790	3200	2320	640	3400	400



No.17 6、8、10、12立方米卵石池壁整体盖沼气池

No. 17 Cobble-stone-walled digester with integral cover of 6, 8, 10, 12m^3

(1) Cutaway

(2) Plan

(3) Volume of tank

(4) Area

(5) Height of burial

(6) Inside diameter

(7) Dome of cover

(8) Dome of bottom

(9) (m^3)

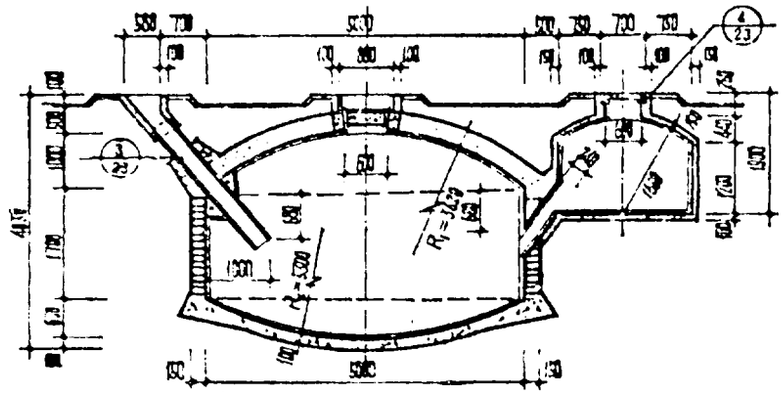
(10) Radius

(11) Rise

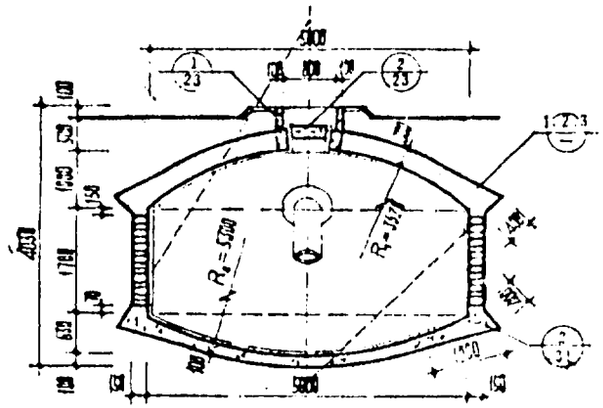
(12) No.30 concrete

(13) Lime concrete

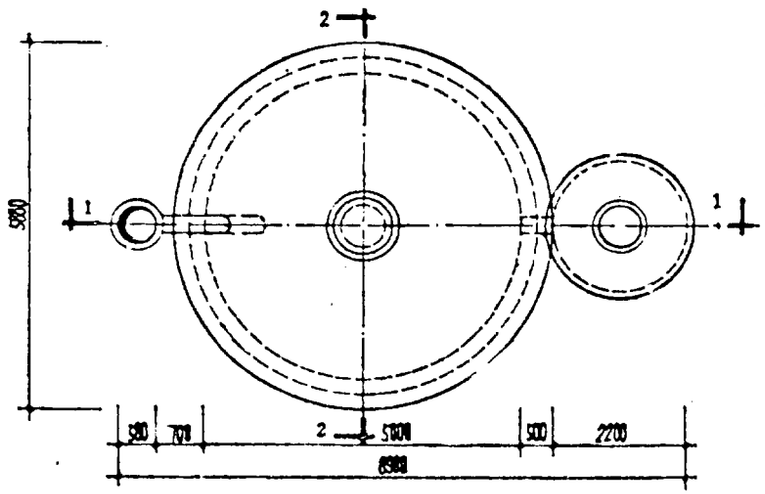
Note: Wall is laid by cobble stones. Lime-clay is used for cover, bottom, inlet opening and outlet room; in case other materials are used for cover and bottom, reference should be made to details (1), (2), (3).



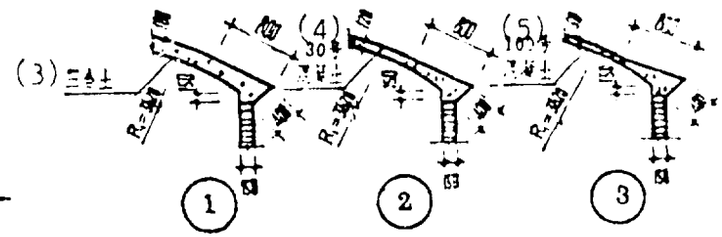
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



注：1.池盖、进料口、出料间均为灰土，当池盖选用其他材料时，见详图①、②、③。

2.池壁为卵石、粘土浆砌筑。

3.池底为30号混凝土，当用100号混凝土时，见图页31详图2。

No.18 | 50立方米卵石池墙整体盖沼气池

No. 18 Cobble-stone-walled digester with integral cover of $50m^3$

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

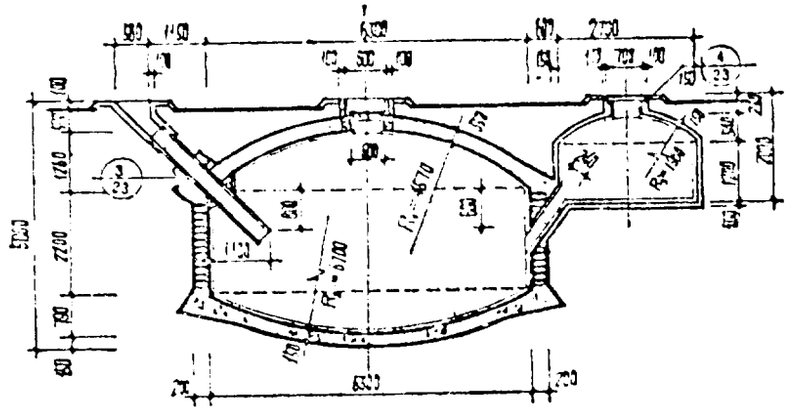
(5) No.100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used for cover, reference should be made to details (1), (2), (3).

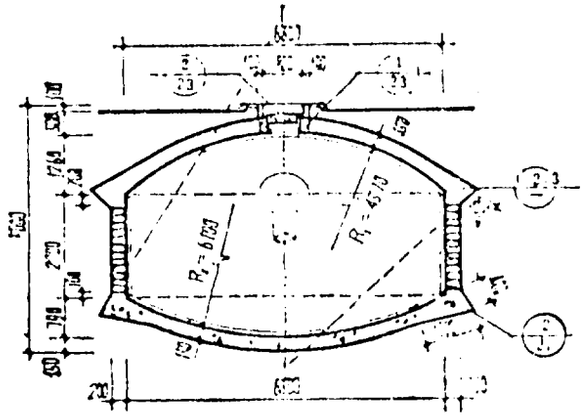
2. Wall is laid by cobble stones with clay mortar.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 31 (2).

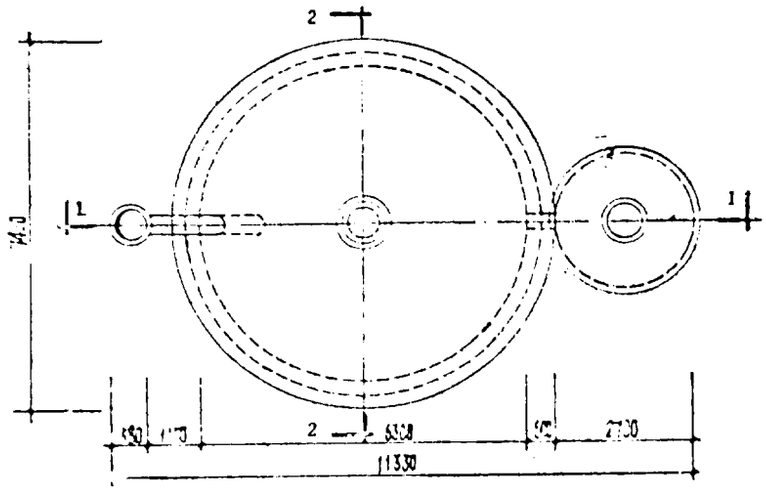
On p. 52



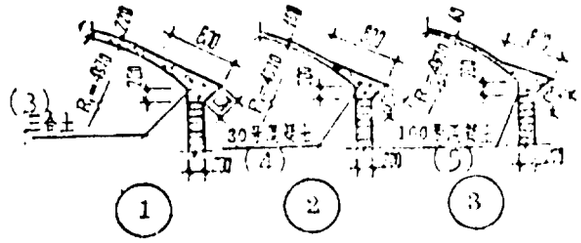
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



注：1.池盖、进料口、出料间均为矩土，当池盖选用其他材料时，见详图①、②、③。
2.池壁为卵石、粘土浆砌筑。
3.池底为30号混凝土，当用100号混凝土时，见图页27详图②。

No.19 100立方米卵石池壁整体盖沼气池

No. 19 Cobble-stone-walled digester with integral cover of $100m^3$

(1) Cutaway

(2) Plan

(3) Lime concrete

(4) No.30 concrete

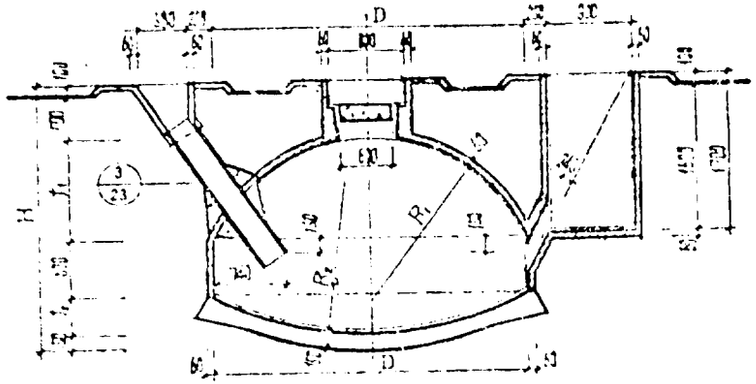
(5) No.100 concrete

Note: 1. Lime-clay is used for cover, inlet opening and outlet room; in case other materials are used for cover, reference should be made to details (1), (2), (3).

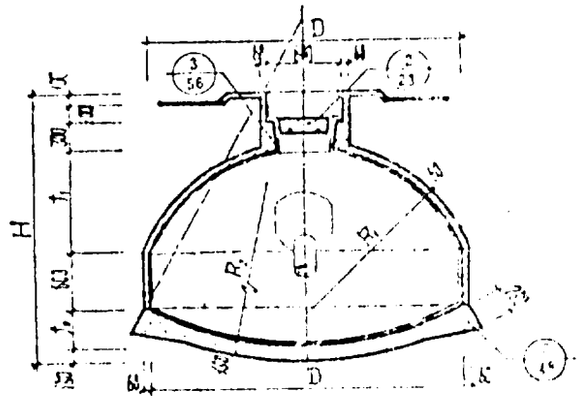
2. Wall is laid by cobble stones with clay mortar.

3. No.30 concrete is applied for bottom; in case No.100 concrete is applied, reference should be made to details on page 27 (2) .

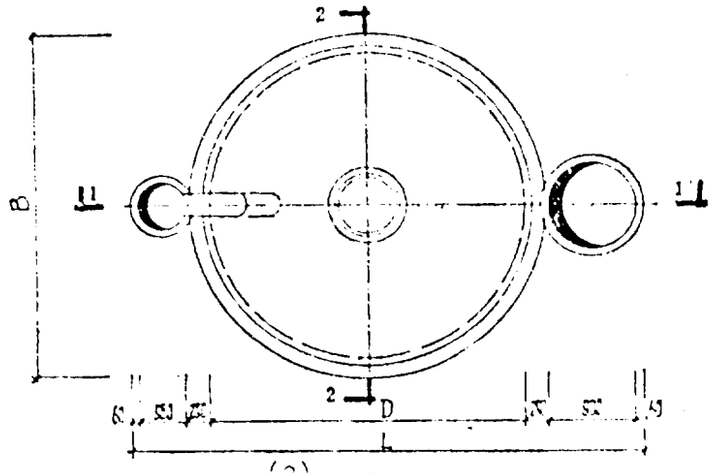
On p. 53



(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图

(3) 池型 (立方米)	(4) 用地范围 L	B	(5) 埋置深度 H	池壁内直径 D	(6) 池盖拱顶半径 R_1	池盖拱顶 矢高 f_1	(7) 池底拱顶 半径 R_2	池底拱顶 矢高 f_2
6	4,700	3,080	2,550	2,600	1,410	870	2,700	330
8	4,900	3,280	2,630	2,800	1,510	930	2,980	360
10	5,200	3,580	2,760	3,100	1,680	1,030	3,300	390
12	5,400	3,780	2,870	3,300	1,790	1,100	3,510	410

注：除池底用灰土材料外，均用钢筋。当池底用 30 号混凝土时，见本图页 48 详图 ③。

No.20

6、8、10、12 立方米沼气池

No. 20 Brick digester of 6, 8, 10, 12m^3

(1) Cutaway

(2) Plan

(3) Volume of tank

(4) Area

(5) Height of burial

(6) Inside diameter

(7) Dome of cover

(8) Dome of bottom

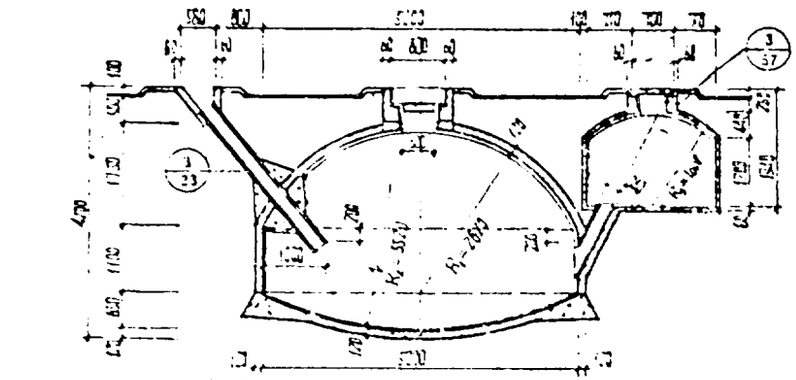
(9) (m^3)

(10) Radius

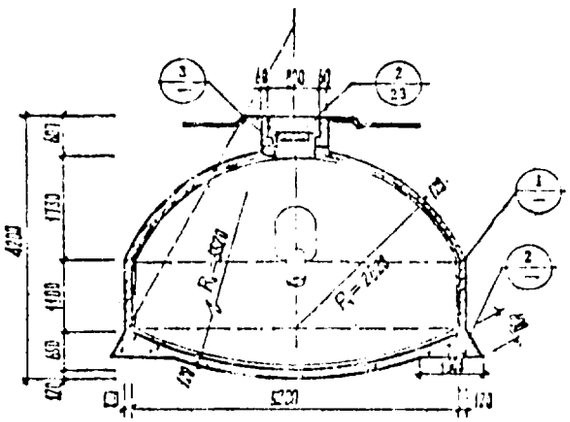
(11) Rise

Note: All parts are laid by bricks except the bottom which is applied by lime-clay; in case No.30 concrete is applied for bottom, reference should be made to details on page 48 (3).

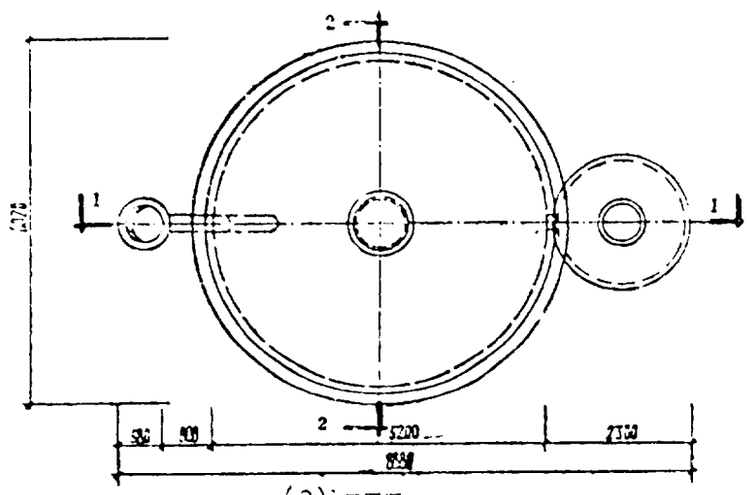
On p. 55



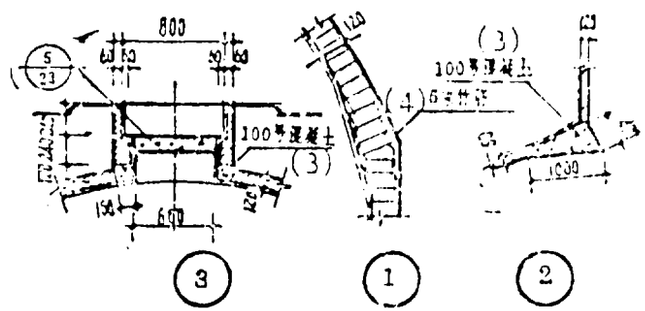
(1) 1—1 剖面图



(1) 2—2 剖面图



(2) 平面图



注：1.除池底为30号混凝土外，其他均为砖砌，当池底为100号混凝土时，见详图②。

2.竹筋每束截面不小于1平方厘米。

No.21 | 50立方米砖沼气池

No. 21 Brick digester of $50m^3$

(1) Cutaway

(2) Plan

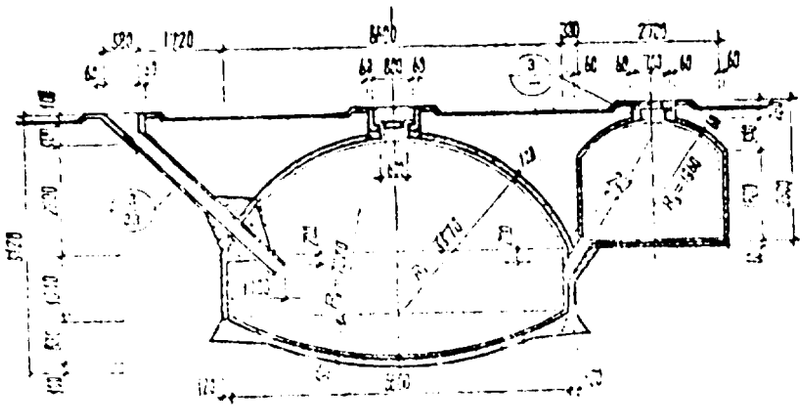
(3) No.100 concrete

(4) 5 Bamboo reinforcements

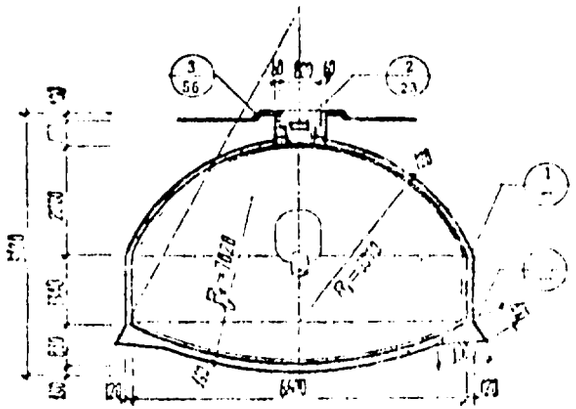
Note: 1. All parts are laid by bricks except bottom which is applied by No.30 concrete; in case No.100 concrete is applied for bottom, reference should be made to details (2).

2. The cross section of each bamboo reinforcement should not be less than $1cm^2$.

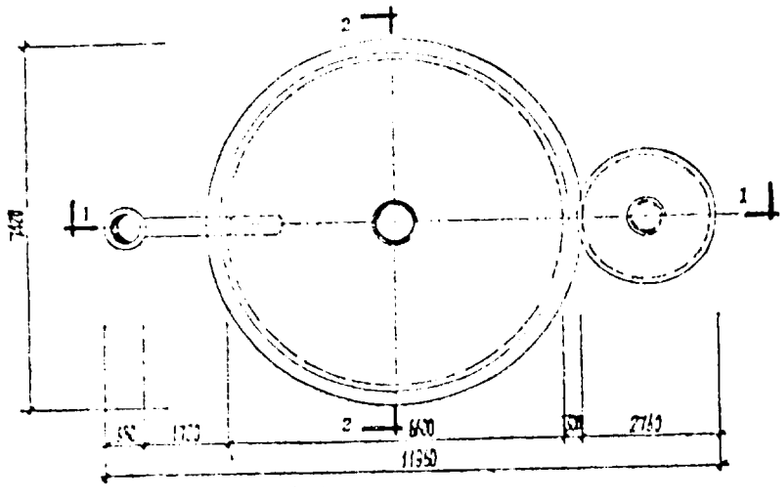
On p. 56



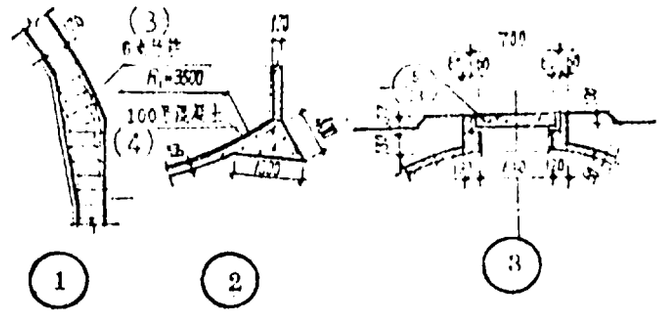
(1) 1－1 剖面图



(1) 2－2 剖面图



(2) 平面图



注：1. 除池底为 30 号混凝土外，其他均为砖砌，当池底为 100 号混凝土时，见详图 2。
2. 每束竹筋截面不小于 1 平方厘米。

No. 22 Brick digester of $100m^3$

(1) Cutaway

(2) Plan

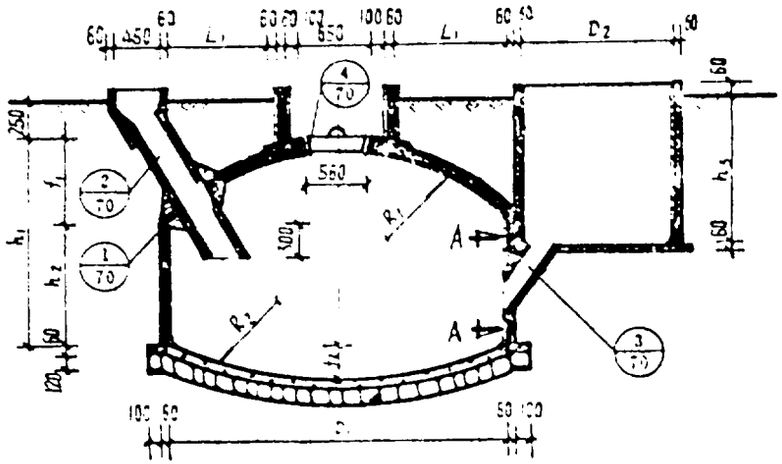
(3) 6 Bamboo reinforcements

(4) No.100 concrete

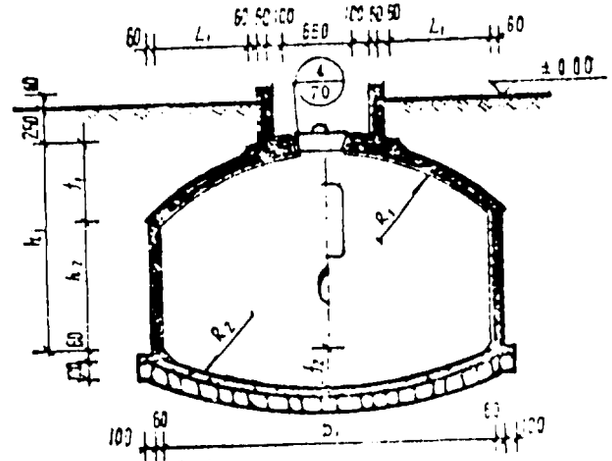
Note: 1. All parts are laid by bricks except bottom which is applied by No.30 concrete; in case No.100 concrete is applied for bottom, reference should be made to detail (2).

2. The cross section of each bamboo reinforcement should not be less than $1cm^2$.

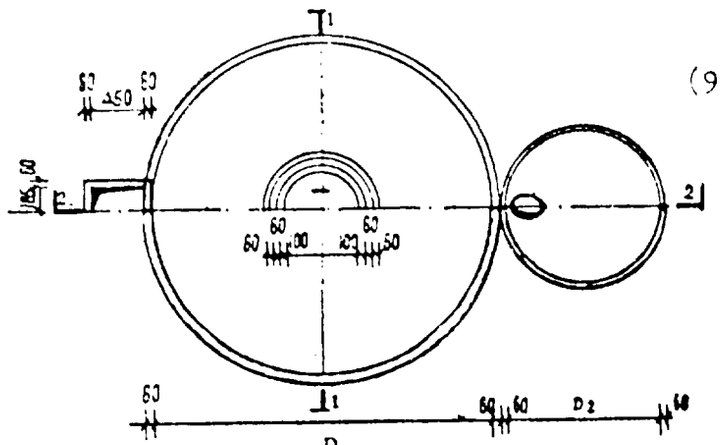
On p. 57



(1) 2—2 剖面图



(1) 1—1 剖面图



(2) 平面图

(9)

(3) 池壁	(4) 直径		(5) 高度			(6)	(7)	(8)		
(立方米)	D_1	D_2	h_1	h_2	h_3	f	f_1	L_1	K	W
6	2,550	1,100	1,110	900	940	510	260	730	1,850	3,26
8	2,550	1,100	1,710	1,200	1,140	510	260	730	1,850	3,9
10	2,950	1,450	1,650	1,000	940	590	300	930	2,110	3,74
12	2,950	1,250	1,850	1,200	1,140	590	300	930	2,110	3,7

注：1. 节点 1—A 详图见图页 70。
2. 上池池壁及出料间池壁用 25 号混凝土砌块加 25 号砂浆灌缝，用 25 号砂浆抹面 15 毫米厚。
3. 拱盖用 25 号混凝土砌块加 25 号砂浆砌筑，外壁和内壁分别用 25 号砂浆抹面 10 毫米厚和 15 毫米厚。
4. 池底用 15 号砂浆灌入卵石缝中，再用 25 号混凝土浇筑 10 毫米厚。
5. 出料间池底在夯实的素土上浇筑 25 号混凝土 60 毫米厚。

No.23 | 6、8、10、12 立方米混凝土砌块沼气池

No. 23 Concrete block digester of 6, 8, 10, 12m^3

(1) Cutaway

(2) Plan

(3) Volume of tank

(4) Diameter

(5) Height

(6) Rise

(7) Distance

(8) Curvature radius

(9) (m^3)

Note: 1. For location of section A - A, cross reference should be made to schematic views on page 69.

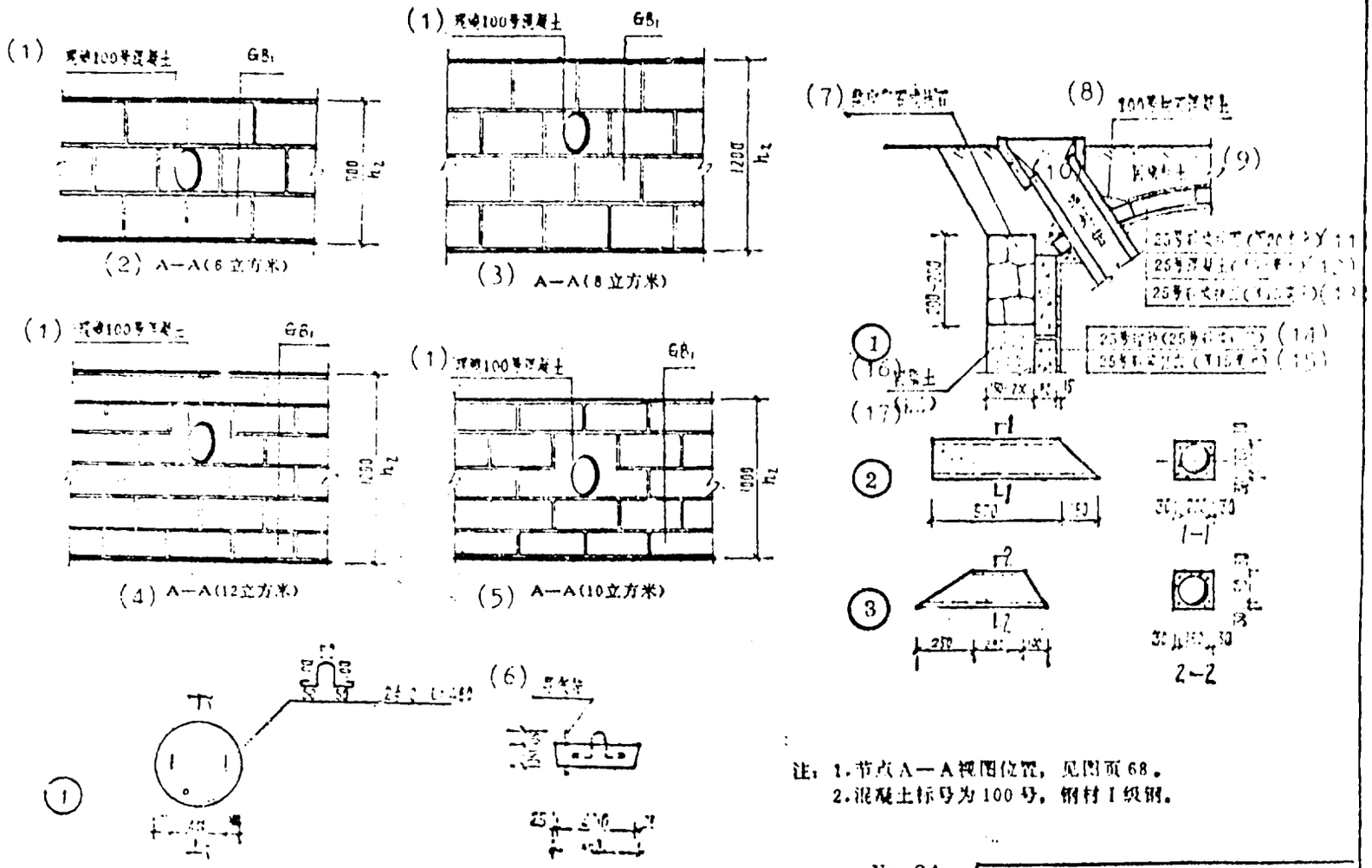
2. Walls of main tank and outlet room are laid by No.25 concrete blocks with No.25 mortar, the latter is also used for surface plastering to a thickness of 15mm.

3. Dome cover is laid by No.25 concrete blocks with No.25 mortar, and the outer and inner surfaces should be pastered by No.25 mortar to a thickness of 10mm and 15mm respectively.

4. Bottom is laid by cobble stones with No.15 mortar, and then No.25 concrete is cast to a thickness of 40mm.

5. Bottom of outlet room is cast, on the compacted natural soil, by No.25 concrete to a thickness of 60mm.

On p. 68



注：1.节点A—A视图位置，见图页68。
2.混凝土标号为100号，钢材I级钢。

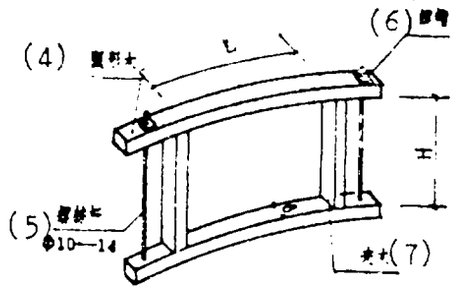
No.24 混凝土砌块沼气池节点大样

No. 24 Detail drawing showing various parts of concrete block digester

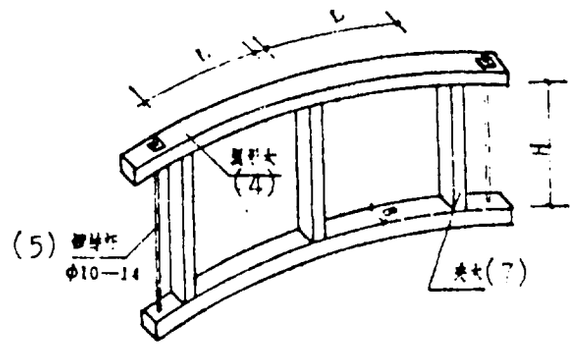
(1) Cast No.100 concrete directly
(2) A -A ($6m^3$)
(3) A - A ($8m^3$)
(4) A - A ($12m^3$)
(5) A - A ($10m^3$)
(6) Gas conduct
(7) Laid by cobble stones or slate blocks with mortar
(8) No.100 fine stone concrete
(9) Backfilled earth
(10) Inlet pipe
(11) Surface plastered by No.25 mortar (20mm thick)
(12) Cast with No.25 concrete (50mm thick)
(13) Surface plastered by No.25 mortar (15mm thick)
(14) Laid by No.25 concrete blocks (with No.25 mortar)
(15) Surface plastered by No.25 mortar (15mm thick)
(16) Backfilled earth
(17) Compacted

Note: 1. For location of section A - A, cross reference should be made to schematic views on page 68.
2. No.100 concrete and grade I steel are used.

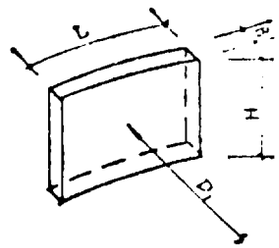
On p. 69



(1)池墙砌块模板（一）



(2) 池墙砌块模板（二）



(3)池墙砌块外形

(9) 池型（立方米）	(10) 砌块位置 (11) 池墙用 L×H×B	用量（块）(13)	(11) 池墙用 L×H×B	用量（块）(13)	(12) 出料间 L×H×B	用量（块）(13)	说明 (14)
6	390×300×60	60			330×200×60	50	yk₁ 60块 yk₂ 50块
8	390×300×60	30			330×200×60	60	yk₁ 80块 yk₂ 60块
10			390×200×60	115	330×200×60	50	yk₁115块 yk₂ 50块
12			390×200×60	138	330×200×60	60	yk₁138块 yk₂ 60块

注：1.本图模板及砌块外形尺寸（弧长×高×宽＝L×H×B），根据池墙直径D₁放样，校核无误后再进行下料制作。

2.模板用硬质木材制作，钢材采用Ⅰ级钢。

No.25 池墙砌块模板

No. 25 Wooden formwork for wall block

(1) Wooden formwork for wall block (A)

(2) Wooden formwork for wall block (B)

(3) Appearance of block

(4) Arc-shaped board

(5) Screw pole

(6) Nut

(7) Wood clip

(8) Volume of tank

(9) (m^3)

(10) Block to be used

(11) For wall of tank

(2) For wall of outlet room

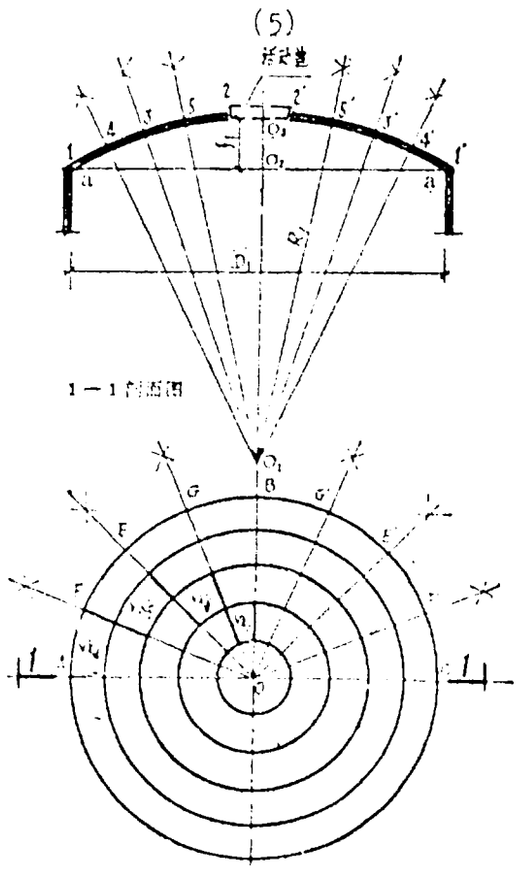
(13) Amount

(14) Remark

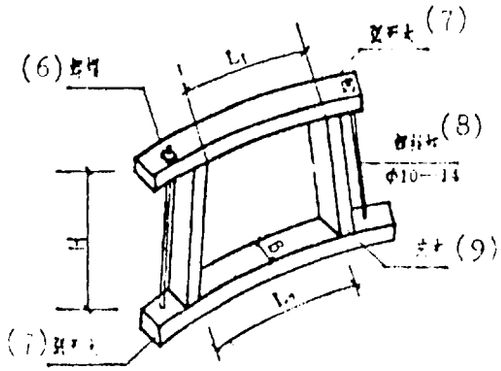
Note: 1. The formwork and its dimensions (arch length x height x width = L x H x B) should be made precisely according to the diameter D_1.

2. Hard wood and grade I steel should be used for the formwork.

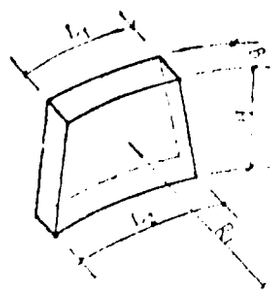
On p. 70



(4) 池盖异形砌块的放样



(2) 池盖异形砌块模板



(3) 池盖异形砌块外形

注：1.池盖异形砌块放样，先在平地上作直线a—a，O_1-O_1 垂直于O_1，按图中所示池盖矢高，量出O_1O，作f_1垂直O_1，使O_1O等于池盖半径R_1，再以O为圆心，OO_1为半径画弧交水平线于aa'即得池盖内包线，再以O_1为圆心，将O_1O加上池盖厚度为半径画弧得池盖外包线，画出池盖截面。再后4等分圆弧$\overset{\frown}{12}$，$\overset{\frown}{1'2'}$分别得3、4、5、3'、4'、5'各点，1'和5—5'为直径在另一平地上画出，再4等分圆弧$\overset{\frown}{AB}$得FEG，4等分圆弧$\overset{\frown}{BC}$得E'F'G'连接OA、OE、OF、OG、OE'、OF'、OC并延长之，即得池盖砌制砌块外弯。

2.池盖砌块砌筑时注意错缝。

3.图中D_1、f_1、R_1的尺寸见图页69。

4.砌块模板及外形尺寸，根据实际放样确定。

No.26 池盖异形砌块模板

No. 26 Wooden formwork for block of special shape used on cover

(1) 1 - 1 cutaway

(2) Wooden formwork for block of special shape

(3) Appearance of block of special shape

(4) Lay out of block of special shape

(5) Removable cover

(6) Nut

(7) Arc-shaped board

(8) Screw pole

(9) Wood clip

Note: 1. The lay out of block of special shape is: draw line a - a, crossing $O_1 - O_3$ at point O_2 on the ground. Take the rise of the cover as $O_2\ O_3$ (equal to f_1) as shown in the figure. Let $O_3\ O_1$ be the equal of R_1 (the radius of cover). Draw a circle with O_1 as the centre and $O_1\ O_3$ as the radius, crossing the horizontal aa', thus comes the inside circle of the cover. Then take O_1 as the centre of the circle, take $O_1 - O_3$ together with the thickness of the cover as the radius, and draw the outside circle of the cover. Mark out the position of the removable cover, then divide the curve $\overset{\frown}{12}$, and $\overset{\frown}{1'2'}$ into four equal parts at points 3, 4, 5, 3', 4' and 5'. Take 1 - 1' and 5 - 5' as the diameters and draw circles on the ground. Divide the curve $\overset{\frown}{AB}$ into four equal parts at

points F, E, G, and the curve $\overset{\frown}{BC}$ at E', F', G'. Extend the lines OA, OE, OB, OG', OE', OF', and OC. There comes the shape of the concrete blocks of the cover.

2. Be sure to interlacing between layers while laying the blocks.
3. The dimensions of D_1, f_1 and R_1 are shown on page 69.
4. The formwork and its dimensions should be determined according to the actual lay out.

On p. 71