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BLEED CYCLE PROPELLANT PUMPING IN A GAS-CORE NUCLEAR ROCKET ENGINE SYSTEM

by Albert F. Kascak and Annie J. Easley Lewis Research Center Cleveland, Obio 44135

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heating that occurs there. Possible alternative pumping cycles are the Rankine or Brayton					
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by Albert F. Kascak and Annie J. Easley

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SUMMARY

In order to maintain a critical mass in a gas-core nuclear rocket engine, the operating pressure must be about 500 atmospheres, or higher. The question arises as to whether the propellant can be pumped to this high pressure. A bleed cycle that would use the gamma and neutron heat deposited in the moderator as a heat source and a turbine as a work source to drive the pump was considered in this study. Ideal and real staged pumps and turbines were considered. The range of engine operating pressures investigated was from 500 to 5000 atmospheres, thus making hydrogen property extrapolation necessary.

This study showed that for a required engine operating pressure of 1000 atmospheres the pump work was about 1315 watts per kilogram per second (0.8 hp/(lb/sec)); the specific impulse penalty resulting from dumping the turbine bleed flow was about 10 percent; and the required heat addition to the propellant was about 17.2 megawatts per kilogram per second (7.8 MW/(lb/sec)). For a specific impulse above 2400 seconds, there is more than enough energy deposited in the moderator by gamma and neutron heating to pump the propellant to operating conditions. This report showed that possible alternative cycles (such as a Rankine or Brayton cycle) should be considered. These cycles would probably not have as severe a specific impulse penalty as the bleed cycle considered. They would, however, be more mechanically complex.

INTRODUCTION

The gas-core nuclear rocket features a high specific impulse (2000 to 7000 sec) and a moderately high thrust $(4.45 \times 10^4 \text{ to } 4.45 \times 10^5 \text{ N})$, or 10 000 to 100 000 lbf). In order to maintain a critical mass, this rocket must operate at high pressures (at or above 500 atm; ref. 1). The question arises as to whether the propellant can be pumped to this high pressure.

There are two facets to this question: first, the physical design of the pump; and second, the mechanical energy necessary to drive the pump. The physical design of a high-pressure pump is beyond the scope of this report, but it can be conceptually envisioned as a series of stages of low-pressure pumps. Each low-pressure pump would probably be designed to pump across a maximum pressure difference. (Pressure difference is used rather than pressure ratio because seal leakage would probably be the limiting quantity rather than aerodynamic instability, for which pressure ratio would be the important variable.) An estimation of the amount of mechanical energy necessary to drive the pump, and determining possible sources of this energy, are the objectives of this report.

Roughly 7 percent of the reactor power is deposited in the moderator from thermalization of the neutrons and gamma rays. Part or all of this energy can be used to drive the pump, the rest must be either regeneratively removed or radiated to space. This energy is available at the maximum allowable moderator temperature. The problem then is how to best use this energy to pump the propellant to the required engine pressure without incurring any undue penalty on engine performance due to such things as additional system weight or complexity or a reduction in specific impulse due to dumping turbine bleed flow.

References 2 and 3 are studies of topping and bleed cycles for nuclear rocket applications. Reference 2 reports the conclusion that about 1000 atmospheres was the limit on the engine pressure to which the propellant could be pumped by using a topping cycle. The reason for this was that the overall thermodynamic efficiency of the topping cycle was low. The present study evaluates a bleed cycle, which is basically a simpler and more efficient cycle but which does involve a specific impulse penalty. At the same time, an auxiliary Carnot cycle is used to evaluate the applicability of Rankine and Brayton cycles to gas-core propellant pumping (at least in a cursory manner, to establish their degree of potential usefulness).

SYMBOLS

h	enthalpy per unit mass
Δh	enthalpy change across stage
ṁ	mass flow of propellant
р	pressure
Q	heat transferred per unit mass flow
s	entropy per unit mass
Т	temperature
2	

v	volume
W	work per unit mass flow
ΔW	work of each stage
$\eta_{ m mass}$	ratio of bleed to total propellant flow
$\eta_{ m comp}$	ratio of ideal to real work of compressor or pump
$\eta_{ ext{turb}}$	ratio of real to ideal work of turbine
Subscri	pts:
aux	auxiliary engine between heat exchanger and moderator
b	bleed flow
comp	compressor or pump
exh	exhaust condition
hex	heat exchanger
max	maximum value in cycle
mod	moderator
sat	saturation conditions
turb	turbine

ANALYSIS

The overall engine propellant bleed cycle is shown in figure 1. The hydrogen propellant is pumped from tank storage conditions (saturated conditions; 0.5 atm) to the required engine pressure. Part of the gamma and neutron heat deposited in the moderator is then transferred to the propellant in a heat exchanger, heating the propellant to the maximum allowable temperature. A relatively small part of this heated propellant is then bled off and expanded through the turbine to provide the shaft work for the pump. The bleed flow is expanded to some low pressure (say 10 atm) and then discharged to space. The primary propellant stream flows directly from the heat exchanger to the engine cavity.

The ideal performance of this system is shown in figure 2. The propellant is isentropically pumped from saturated conditions to the pump discharge pressure. The propellant is then heated at constant pressure (by the waste heat of an auxiliary moderator cooling cycle) to the maximum allowable temperature. A fraction of the propellant is then isothermally expanded through a turbine to exhaust conditions.

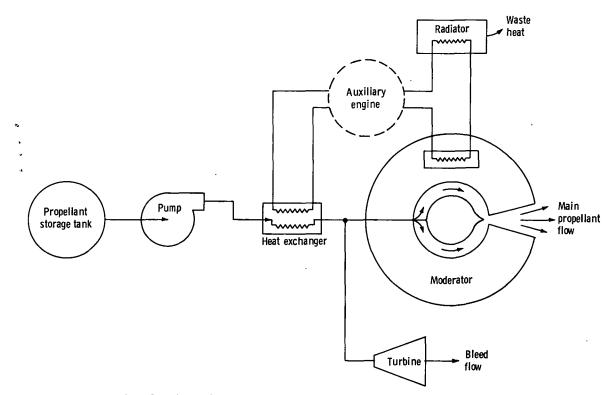


Figure 1. - Bleed cycle used to pump propellant for gas-core nuclear rocket engine system.

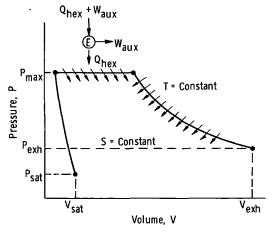


Figure 2. - Pressure-volume diagram for ideal bleed cycle.

Q.

Isothermal expansion through a turbine can be approximated by a turbine with many stages; after each stage, the fluid is reheated to the original inlet temperature. In actual practice, the ideal performance of this cycle could not be achieved. It is only presented as a limiting case to provide an idea of the maximum cycle efficiency possible, and to indicate the degree of improvement that might be available by using a series of turbine-reheater stages. An overall engine design study would be required to determine whether the increased mechanical complexity and increased system weight would override the increased efficiency afforded by turbine interstage heating.

Per unit mass flow rate, the following relations are true for this ideal cycle:

$$W_{comp} = h(P_{max}, S_{sat}) - h(P_{sat}, S_{sat})$$

$$Q_{hex} = h(T_{max}, P_{max}) - h(P_{max}, S_{sat})$$

$$W_{aux} = T_{max} [S(T_{max}, P_{max}) - S_{sat}] - Q_{hex}$$

$$Q_{turb} = T_{max} [S(T_{max}, P_{max}) - S(T_{max}, P_{exh})]$$

$$W_{turb} = h(T_{max}, P_{max}) - h(T_{max}, P_{exh}) - Q_{turb}$$
(1)

The fraction of the total propellant flow that is bled through the turbine is

$$\eta_{\rm mass} = \frac{\dot{m}_{\rm b}}{\dot{m}} = \frac{W_{\rm comp}}{W_{\rm turb}} \tag{2}$$

The amount of energy used from the moderator per unit mass flow rate is

$$Q_{\text{mod}} = \left[h(T_{\text{max}}, P_{\text{max}}) - h(P_{\text{sat}}, S_{\text{sat}})\right](1 - \eta_{\text{mass}}) + \left[h(T_{\text{max}}, P_{\text{exh}}) - h(P_{\text{sat}}, S_{\text{sat}})\right]\eta_{\text{mass}}$$
(3)

In a real cycle both the pump and turbine would be staged, and the performance of each stage would be nonisentropic. The efficiency of the pump and turbine stages is defined as

$$\eta_{\rm comp} = \frac{\Delta h(\rm isentropic)}{\Delta h(\rm real)}$$

$$\eta_{\rm turb} = \frac{\Delta h(\rm real)}{\Delta h(\rm isentropic)}$$
(4)

where

 $\Delta h(real) = W$

To obtain more power from the turbine and to approximate the isothermal expansion, the bleed propellant can be reheated to the maximum temperature after each turbine stage. The amount of energy used to heat the bleed propellant after each stage per unit flow is

$$Q_{turb} = \Delta H(isothermal) - \Delta H(real)$$
 (5)

These relations are applied as many times as there are stages.

DISCUSSION

The objective of this report was to determine whether there was enough energy available to pump the propellant of the gas-core nuclear rocket to the required operating pressure range. A "bleed cycle" was chosen because of its simplicity; it is illustrated in figures 1 to 3.

Three cases were analyzed. The first case had an ideal pump and an ideal turbine and used turbine interstage heat addition to achieve a constant temperature expansion in the turbine. The second case had a real (efficiency less than 1) pump and a real turbine, but still utilized heat addition after each turbine stage. The third case was the same as the second case except that the turbine expansion process was adiabatic.

The efficiencies of the real pump and turbine stages were assumed to be 85 percent, and each stage had a pressure difference of 100 atmospheres. For all three cases the tank storage condition was 0.5 atmospheres and the turbine exhaust pressure was assumed to be 10 atmospheres. The maximum available propellant temperature from the moderator was assumed to be either 944 or 1111 K (1700° or 2000° R). The required engine operating pressure ranged from 500 to 5000 atmospheres. The properties of the hydrogen propellant were not available in this high-pressure range. A computer code tabulation of hydrogen properties (ref. 4) was extrapolated to provide property estimates for this study. The equations given in the analysis section were programmed and used

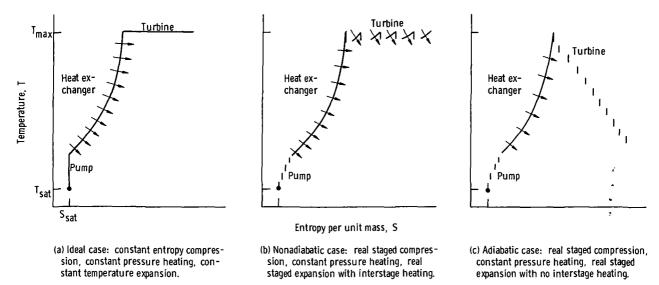


Figure 3. - Temperature-entropy diagram for three bleed cycles considered. (Only reversible portion of cycle shown on diagram.)

to obtain the results of this study. A discussion of the program is given in the appendix. The numerical results are tabulated in tables I to III for all cases calculated.

Figure 4 shows, as a function of pump exhaust pressure (operating pressure), the work required to pump propellant from storage conditions to operating pressures and the work available from an auxiliary Carnot cycle operating between the moderator and the heat exchanger. This work is per unit mass flow rate of propellant through the pump or the heat exchanger.

The required pump work ranges from about 821.5 watts per kilogram per second (0.5 hp/(lb/sec)) at 500 atmospheres to about 5750 watts per kilogram per second (3.5 hp/(lb/sec)) at 5000 atmospheres. At 1000 atmospheres, the required pump work is about 1315 watts per kilogram per second (0.8 hp/(lb/sec)) for a real pump. The work available from an auxiliary cycle is at least several times the work required by the pump. This suggests the possible use of a Rankine or Brayton cycle instead of the bleed cycle. These cycles were not considered in this study; and therefore, this source of available work has been neglected. A further evaluation might disclose worthwhile gains available by using a Rankine or Brayton cycle.

Figure 5 shows the ratio of required pump work to available turbine work per unit mass flow rate through the pump and the turbine. This ratio is also the ratio of bleed flow rate to total flow rate in the bleed cycle. This ratio varies from less than 0.1 at 500 atmospheres to less than 0.4 at 5000 atmospheres. At 1000 atmospheres, this bleed ratio - which is also the specific impulse penalty - is about 10 percent for a real pump and a real nonadiabatic turbine. Thus for a 5000-second specific impulse engine, the bleed cycle penalty would be 500 seconds.

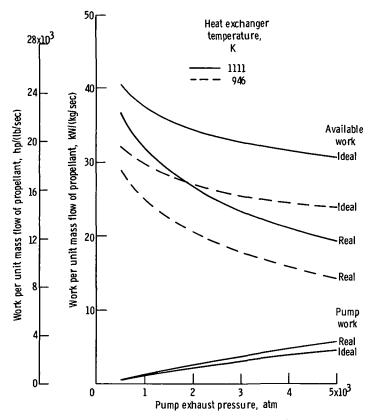


Figure 4. - Work per unit mass flow of propellant as function of pump exhaust pressure for ideal and real cases. Efficiency, 0.85.

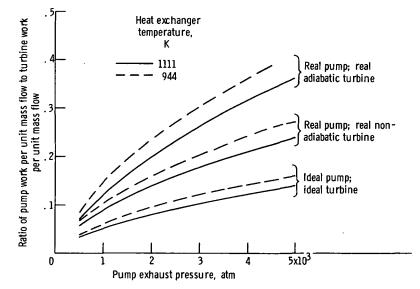


Figure 5. - Ratio of pump work per unit mass flow to turbine work per unit mass flow, as function of pump exhaust pressure, for ideal, nonadiabatic, and adiabatic turbine cases. Efficiencies, 0.85; turbine exhaust pressure, 10 atmospheres.

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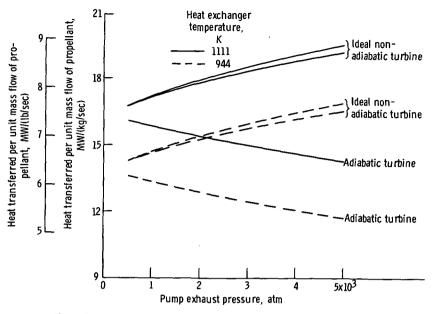


Figure 6. - Heat transferred per unit mass flow of propellant as function of pump exhaust pressure for ideal, nonadiabatic, and adiabatic turbine cases. Efficiencies, 0.85; turbine exhaust pressure, 10 atmospheres; all propellant heated to heat exchanger temperature.

Figure 6 shows the required heat transfer from the moderator to the propellant (assuming no auxiliary engine). This heat transfer is per unit mass flow rate of propellant through the heat exchanger plus the required bleed flow rate through the turbine. The required heat is less than 19.8 megawatts per kilogram per second (9 MW/(lb/sec)). At 1000 atmospheres, the required heat transfer is about 17.2 megawatts per kilogram per second (7.8 MW/(lb/sec)) for a real pump, a heat exchanger operating at 1111 K (2000[°] R), and a real nonadiabatic turbine.

Figure 7 shows the amount of energy generated in the fissioning plasma and the amount of energy deposited in the moderator (7 percent of energy generated). This heat transfer rate is per unit mass flow rate of propellant through the reactor cavity and is plotted as a function of reactor cavity specific impulse. From figure 6 the maximum heat transfer rate from the moderator to the heat exchanger was about 19.8 megawatts per kilogram per second (9 MW/(lb/sec)) per unit mass flow rate of total propellant flow. If the bleed flow is small, the flow through the cavity is approximately equal to the total flow. Therefore, figure 7 shows that, above 2400 seconds specific impulse, there is an excess of energy available to pump the propellant to operating conditions.

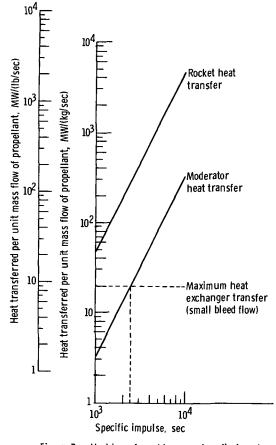


Figure 7. - Heat transferred from nuclear fissions to propellant or moderator, as function of specific impulse.

CONCLUSIONS

This study has shown that it is energetically and thermodynamically possible to pump the propellant of a gas-core nuclear rocket to as high as 5000 atmospheres. With a bleed cycle, the specific impulse penalty was less than 40 percent for all cases considered. For a typical gas-core operating pressure of 1000 atmospheres the required pump work was 1315 watts per kilogram per second (0.8 hp/(lb/sec)); the specific im-

pulse penalty was about 10 percent; and the heat transferred from the moderator to preheat the hydrogen to the turbine inlet temperature was about 17.2 megawatts per kilogram per second (7.8 MW/(lb/sec)). For specific impulses above 2400 seconds, there is an excess of energy available in the moderator to pump the propellant to operating conditions. Future work areas that should be investigated include an assessment of a Rankine or Brayton cycle as possible alternatives to the bleed cycle studies in this report and an improvement in the accuracy of the property estimates used in the calculation.

Lewis Research Center,

National Aeronautics and Space Administration, Cleveland, Ohio, December 1, 1971,

112-28.

APPENDIX - COMPUTER SOLUTION OF THERMODYNAMIC RELATIONS FOR GAS-CORE TURBOPUMP BLEED CYCLE

The equations from the analysis section were programmed for three cases. The cases considered were the following: first, an "ideal case," which had an ideal pump and an ideal isothermal turbine; second, a "nonadiabatic case," which had a real staged pump and a real staged turbine with interstage heating; third, an "ideabatic case," which had a real staged pump and a real staged turbine with no interstage heating. Input quantities for the computing code were storage pressure, maximum pressure, maximum temperature, and exhaust pressure. In addition, for the nonadiabatic and adiabatic cases, the pressure difference and efficiency of the compressor and of turbine stages were input quantities.

The output from the code gave properties at storage tank conditions, at compressor exhaust conditions, at heat exchanger exhaust conditions, and at turbine exhaust conditions. Additional output included the ratio of compressor to turbine work per unit flow through the compressor and turbine, the compressor work per unit flow through the compressor, the available work from an auxiliary Carnot cycle per unit flow through the heat exchanger, and the heat transferred to the heat exchanger per unit flow through the heat exchanger. The results of this code are tabulated in tables I to III.

The calculation proceeded as follows: The propellant is initially in the storage tank at saturation conditions. Once the storage pressure is given, the other thermodynamic properties are found from subroutine BW (ref. 4). The propellant is then pumped through the first stage of the compressor. If the compressor is ideal, the entropy at the exhaust of the compressor stage is the same as at the inlet (a known value). The pressure difference across the stage and the inlet pressure are used to obtain the exhaust pressure. For the ideal compressor stage, knowing the inlet entropy and pressure and using subroutine BW gives the ideal exhaust thermodynamic properties. The ideal work necessary to drive the compressor stage is the difference in enthalpies across the stage. If the compressor is not ideal, the real work is the ideal work divided by the compressor stage efficiency. Since energy must be conserved, the real exhaust enthalpy is the inlet enthalpy plus the real work. The real exhaust thermodynamic properties are given from the exhaust pressure, the exhaust enthalpy, and subroutine BW. This process is repeated until the propellant is pumped to operating pressures.

After the propellant is pumped to operating pressure, it flows into the heat exchanger, where the propellant is heated at constant pressure to the maximum allowable temperature. The thermodynamic properties at the inlet of the heat exchanger are the same as those at the exhaust of the pump (which are known). The thermodynamic properties at the exhaust of the heat exchanger are found from the exhaust pressure (maximum pressure), the exhaust temperature (maximum temperature), and subroutine BW. The heat absorbed by the heat exchanger is given by the difference in enthalpies of the propellant across the heat exchanger. The work available from an auxiliary Carnot cycle between the moderator and the heat exchanger is given by the maximum temperature of the propellant in the heat exchanger multiplied by the entropy difference of the propellant across the heat exchanger, minus the heat absorbed by the propellant in the heat exchanger.

The majority of the propellant flows from the heat exchanger into the cavity of the gas-core nuclear rocket. A small fraction of the propellant, the bleed flow, flows from the heat exchanger through a turbine and is then dumped into space. The work of this turbine is used to drive the compressor.

The bleed flow passes through the first stage of the turbine. If the turbine is ideal, the entropy at the exhaust of the turbine stage is the same as at the inlet (a known value). The pressure difference across the stage and the inlet pressure determine the exhaust pressure. For the ideal turbine stage, knowing the inlet entropy and pressure and using subroutine BW gives the ideal exhaust thermodynamic properties. The ideal work of the turbine stage is given by the difference in enthalpies across the stage. If the turbine is not ideal, the real work is the ideal work times the turbine stage efficiency. Since energy must be conserved, the real exhaust enthalpy is given by the inlet enthalpy minus the real work. The real exhaust thermodynamic properties are obtained from the exhaust pressure, the exhaust enthalpy, and subroutine BW.

If the turbine is nonadiabatic, a heat exchanger is placed between each stage of the turbine. The bleed flow passes from the exhaust of the first turbine stage through a heat exchanger, where it is heated (at constant pressure) from the exhaust temperature to the maximum allowable temperature. The thermodynamic properties at the inlet of the heat exchanger are the same as those at the exhaust of the turbine stage (which are known). The thermodynamic properties at the exhaust of the heat exchanger are found from the exhaust pressure (turbine stage exhaust pressure), the exhaust temperature (maximum temperature), and subroutine BW. The heat absorbed by the heat exchanger is given by the difference in enthalpies of the bleed flow across the heat exchanger. This process is repeated until the bleed flow is expanded to the turbine exhaust pressure.

The total compressor or turbine work per unit mass flow through it is given by the sum of the work per unit mass flow for each stage. The fraction of the total propellant flow that is bled through the turbine is the ratio of total compressor work (per unit mass flow through it) to total turbine work (per unit mass flow through it). The total amount of heat transferred is the amount of heat transferred to the propellant flowing into the cavity plus the amount of heat transferred to the bleed flow.

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E-6639

TABLE I. - IDEAL TURBINE CYCLE

.

(a) SI units

STORAGE		HEAT EXCHANGER	PRESS AT EXIT
PRESSURE		Temperature	OF TURB. STAGE
(N/M++2)		(Deg. K)	{N/M*#2}
5.07E+04	5.066E+07	944.4	1.015+06

RATIO OF CUMPRESSOR Tu tjrbinë work	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))	HEAT TRANSFERRED (MEG-W/(KG/S))
0.038	6.0302+05	3.230E+07	14.300

	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/M++3)	ENTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TANK	18.1	5.072+04	7.310E+01	-2.76E+05	7.01E+03
COMPRESSOR EXIT	30.0	5.07E+07	9.200E+01	3.27E+05	7.01E+03
HEAT EXCHANGER EXIT	944.0	5.07E+07	1.180E+01	1.41E+07	5.57E+04
TURBINE EXIT	944.0	1.01E+06	2.600E-01	1.36E+07	7.18E+04

STORAGE	COMPRESSOR HEAT EXCHANGER	PRESS AT EXIT
Pressure	Pressure temperature	OF TURB. STAGE
(n/m++2)	(N/M++2) (DEG, K)	(N/M++2)
5.07E+04	1.013E+08 944.4	1.01E+06

RATIO OF COMPRES To tjrbine work	SOR	COMPRESSOR WURK (W/(KG/S))	AVAILABLE WOR (W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))
0.060		1.130E+06	2.970E+07		14.700
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(DEG. K)	(N/M++2)	(KG/M++3)	(J/KG)	(J/(KG-K))
STORAGE TANK	18 .1	5.07E+04	7.310E+01	-2.76E+05	7.016+03
COMPRESSOR EXIT	36.9	1.01E+08	1.010E+02	8.52E+05	7.01E+03
HEAT EXCHANGER EXIT	944.0	1.01E+08	2.160E+01	1.45E+07	5.296+04
TURBINE EXIT	944.0	1-01E+06	2.600E-01	1.36E+07	7.18E+04

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STORAGE PRESSURE (N/M#+2)		CUMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXI OF TURB. STA (N/M++2)
5.07E+04		1.520E+08	944.4		1.01E+06
RATID OF COMPRESS TO TURBINE WORK	SOR	COMPRESSOR WORK { W/(KG/S})	AVAILABLE WOR (W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))
0.07ä		1.620E+06	2.820E+07		5.000
	TEMPERATURE (DEG. K)	PRESSURE [N/M++2]	DENSITY (KG/M##3)	ENTHALPY {j/kg}	ENTROPY (j/(kg-k))
TORAGE TANK Ompressor exit IEAT Exchanger exit Urbine exit	18.1 42.7 944.0 944.0	5.07E+04 1.52E+08 1.52E+08 1.01E+06	7.310E+01 1.070E+02 3.000E+01 2.600E~01	-2.76E+05 1.34E+06 1.49E+07 1.36E+07	7.01E+03 7.01E+03 5.12E+04 7.18E+04

STORAGE PRESSURE	COMPRESSOR HEAT EXCHANGER PRESSURE TEMPERATURE	PRESS AT EXIT OF TURB. STAGE
(N/M++2)	(N/M++2) (DEG. K)	(N/M++2)
5.07E+04	2.026E+08 944.4	1.01E+06

RATID OF COMPRES TO TURBINE WORK	SOR	COMPRESSOR WORK (W/(KG/SI)	AVAILABLE WOR { W/(KG/S))		HEAT TRANSFERRED (PEG-W/(KG/S))	
0.094		2+080E+06	2.720E+07		5.400	
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY	
	(DEG, K)	(N/M++2)	(KG/M++3)	(J/KG)	(j/(kg-k))	
STORAGE TANK	18,1	5.07E+04	7.310E+01	-2.76E+05	7.01E+03	
Compressor Exit	47,9	2.03E+08	1.110E+02	1.80E+06	7.01E+03	
Heat Exchanger Exit	944.0	2.03E+08	3.740E+01	1.52E+07	5.00E+04	
Turbinë Exit	944.0	1.01E+06	2.600E-01	1.36E+07	7.18E+04	

TABLE I. - Continued. IDEAL TURBINE CYCLE

(a) Continued. SI units

STORAGE	COMPRESSOR HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE TEMPERATURE	OF TURB. STAGE
{N/M**2}	(N/M++2) (DEG.K)	(N/M++2)
5.07E+04	2.533E+08 944.4	1.01E+06

RATID OF CUMPRESSOR TO TURBINE WORK	COMPRESSOR WORK { W/(KG/S)}	AVAILABLE WORK (W/(KG/S})	HEAT TRANSFERRED (MEG-W/(KG/S))
0.110	2.530E+06	2.640E+07	5.700

	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/M**3)	ENTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TANK	18.1	5.07E+04	7.310E+01	-2.76E+05	7.01E+03
COMPRESSOR EXIT	52.3	2.53E+08	1.150E+02	2.25E+06	7.015+03
HEAT EXCHANGER EXIT	944.0	2.53E+08	4.390E+01	1.56E+07	4.916+04
TURBINE EXIT	944.0	1.01E+06	2.600E-01	1.36E+07	7.185+04

STORAGE	COMPRESSOR	HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE	Temperature	OF TURB. STAGE
{N/M++2}	[n/M##2]	(Deg. K)	(N/M++2)
5.07E+04	3.040E+08	944.4	1.01E+06

RATIJ OF COMPRES TO TURBINE WORK	SOR	COMPRESSUR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))
0.120		2.960E+06	2•570E+07		15.900
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(DEG. K)	(N/M=+2)	(KG/M+*3)	(J/KG)	(j/(kg-k))
STORAGE TANK	18.1	5.07E+04	7.310E+01	-2.76E+05	7.01E+03
Compressor Exit	56.0	3.04E+08	1.190E+02	2.68E+06	7.01E+03
Heat Exchanger Exit	944.0	3.04E+08	4.980E+01	1.59E+07	4.83E+04
Turbine Exit	944.0	1.01E+06	2.600E-01	1.36E+07	7.18E+04

STORAGE PRESSURE (N/M++2)		CUMPRESSOR PRESSURE {N/M**2}	HEAT EXCHANGER Tempfrature (Deg. K)		PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.07E+04		3.546E+08	944.4		1.015+06
RATID OF COMPRES To tjrbine work	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))
0.130		3.380E+06	2.520E+07		16.200
	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/M==3)	ENTHALPY (J/KG)	ENTROPY (j/(kg-k))
STORAGE TANK Compressor exit Heat exchanger exit	18.1 59.4 944.0	5.07E+04 3.55E+08 3.55E+08	7.310E+01 1.220E+02 5.520E+01	-2.76E+05 3.11E+06 1.63E+07	7.01E+03 7.01E+03 4.76E+04
TURBINE EXIT	944.0	1.016+06	2.600E-01	1.36E+07	7 . 18E+04

STORAGE Pressure (N/M++2)	COMPRESSOR HEAT EXCHANGER PRESSURE TEMPERATURE (N/M#+2) (DEG+ K)	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.07E+04	4.053E+08 944.4	1.01E+06

RATIO OF CUMPRES To tjrbine work	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))
0.140		3.790E+06	2.470E+07		16.500
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(DEG. K)	(N/M++2)	(KG/M++3)	{j/kg}	(j/(kg-k))
STORAGE TANK	18.1	5.07E+04	7.310E+01	-2.76E+05	7.01E+03
Compressor Exit	62.4	4.05E+08	1.240E+02	3.52E+06	7.01E+03
Heat Exchanger Exit	944.0	4.05E+08	6.010E+01	1.66E+07	4.70E+04
Turbine Exit	944.0	1.01E+06	2.600E-01	1.36E+07	7.18E+04

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TABLE I, - Continued, IDEAL TURBINE CYCLE

(a) Continued. SI units

STORAGE	CUMPRESSOR HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	Pressure temperature	OF TURB. STAGE
(N/M++2)	{n/m++2} (deg. k)	(N/M**2)
5.076+04	4.560E+08 944.4	1.01E+06

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RATIO OF CUMPRES Tu turbine work	SOR	COMPRESSOR WORK { W/(KG/S)}	AVAILABLE WOR (W/(KG/S))	ĸ	HEAT TRANSFERRED (MEG-W/(KG/S))
0.150		4.200±+06	. 2.430E+07		16.700
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(deg. k)	(N/M++2)	(Kg/M++3)	(J/KG)	(j/(kg-k})
STORAGE TANK	18.1	5.07E+04	7.310E+01	-2.76E+05	7.01E+03
COMPRESSOR EXIT	65.1	4.56E+08	1.270E+02	3.92E+06	7.01E+03
HEAT EXCHANGER EXIT	944.0	4.56E+08	6.460E+01	1.69E+07	4.65E+04
TURBINE EXIT	944.0	1.01E+06	2.600E-01	1.36E+07	7.18E+04

STORAGE PRESSURE (N/M**2)		CUMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXIT DF TURB. STAGE (N/M*+2)
5.07E+04		5.0662+08	944.4		1.01E+06
RATIO OF COMPRES TO TURBINE WORK	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WOR { W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))
0.160		4.590E+06	2•390E+07		16.900
	76405047405			.	
	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/M++3)	ENTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbing Exit	18.1 67.7 944.0 944.0	5.07E+04 5.07E+08 5.07E+08 1.01E+08	7.310E+01 1.290E+02 6.870E+01 2.600E-01	-2.76E+05 4.32E+06 1.73E+07 1.36E+07	7.01E+03 7.01E+03 4.61E+04 7.18E+04

STORAGE PRESSURE {N/M++2}		COMPRESSOR Pressure (n/m++2)	HEAT EXCHANGER Temperature (Deg. K)		PRESS AT EXIT OF TURE. STAGE (N/M*+2)
5.07E+04		5.066E+07	1111.0		1.01E+06
RATID OF COMPRES To turbine work	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE W (W/(KG/S		HE&T TRANSFERRED [MEG-b/(KG/S))
0.033		6.030E+05	4 . 060E+0	7	16.800
	TEMPERATURE {DEG. K}	PRESSURE (N/M++2)	DENS[TY (KG/M**3)	ENTHALPY (j/kg)	ENTŘOPY (j/(kg-k})
STORAGE TANK Compressor exit Heat exchanger exit Turbine exit	18.1 30.0 1110.0 1110.0	5.07E+04 5.07E+07 5.07E+07 1.01E+06	7.310E+01 9.200E+01 1.020E+01 2.200E-01	-2.76E+05 3.27E+05 1.66E+07 1.61E+07	7.01E+03 7.01E+03 5.82E+C4 7.43E+04

STORAGE	COMPRESSOR	HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE	Temperature	CF TURE. STAGE
(N/M++2)	(N/M++2)	(DEG. K)	(N/M*+2)
5.07E+04	1.013E+08	1111.0	1.016+06

RATIO OF COMPRESSOR TO TURBINE WORK		COMPRESSOR WORK { W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HE/T TRANSFERRED (MEG-W/(KG/S))	
0.051		1.130E+06	3.750E+07		17.200	
	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/M++3)	ENTHALPY (j/kg)	ENTROPY (j/(kg-k))	
STORAGE TANK Compressdr Exit Heat Exchanger Exit Turbine Exit	18.1 36.9 1110.0 1110.0	5.07E+04 1.01E+08 1.01E+08 1.01E+08 1.01E+06	7.310E+01 1.010E+02 1.890E+01 2.200E-01	-2.76E+05 8.52E+05 1.70E+07 1.61E+07	7.01E+03 7.01E+03 5.53E+04 7.43E+04	

TABLE I. - Continued. IDEAL TURBINE CYCLE

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		(a) Co	ntinued. SI units		
STORAGE PRESSURE (N/M##2)		COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (Deg. K)		PRESS AT EXIT CF TURB. STAGE (N/M++2)
5.07E+04		1.520E+08	1111.0		/ 1.01E+06
					: :
RATIO OF COMPRESS TO TURBINE WORK	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))
0.067		1.620E+06	3•580E+07	1	17.600
	TEMPERATURE (DEG. K)	PRESSURE (N/M**2)	DENSITY (KG/M**3)	ENTHALPY (j/kg)	EN TROP Y (J/(KG-K))
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 42.7 1110.0 1110.0	5.07E+04 1.52E+08 1.52E+08 1.01E+06	7.310E+01 1.070E+02 2.650E+01 2.200E-01	-2.76E+05 1.34E+06 1.74E+07 1.61E+07	7。01E+03 7。01E+03 5。37E+04 7。43E+04
STORAGE PRESSURE (N/M++2)		COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXIT CF TURB. STAGE (N/M# 42)
5.07E+04		2.026E+08	1111.0		1.01E+06
RATID OF CUMPRESS TO TURBINE WORK	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HEAT TRANSFERRED (HEG-W/(KG/S))
0.080		2.080E+06	3.450E+07		17.900
	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/M++3)	ENTHALPY (J/KG)	Entropy (j/(kg-k))
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 47.9 1110.0 1110.0	5.07E+04 2.03E+08 2.03E+08 1.01E+06	7.310E+01 1.110E+02 3.320E+01 2.200E-01	-2.76E+05 1.80E+06 1.78E+07 1.61E+07	7.01E+03 7.01E+03 5.25E+04 7.43E+04

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STORAGE PRESSURE (N/M⇒+2)		COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXIT CF TURB. STAGE (N/M++2)	
5.07E+04		2.533E+08	1111.0		1.01E+06	
RATID OF COMPRES To tjrbine work	SOR	COMPRESSOR WORK (W/(KG/S))	• AVAILABLE WO (W/(KG/S)		HEAT TRANSFERRED (MEG-W/(KG/S))	
0.093		2.530E+06	3.360E+07		18.200	
	TEMPERATURE (DEG. K)	PRESSURE (N/M*+2)	DENSITY (Kg/M++3)	ENTHALPY (j/kg)	ENTRCFY (J/(KG-K))	
STORAGE TANK COMPRESSOR EXIT HEAT EXCHANGER EXIT TURBINE EXIT	18.1 52.3 1110.0 1110.0	5.07E+04 2.53E+08 2.53E+08 1.01E+06	7.310E+01 1.150E+02 3.930E+01 2.200E-01	-2.76E+05 2.25E+06 1.01E+07 1.61E+07	7.01E+C3 7.C1E+O3 5.15E+O4 7.43E+O4	

STORAGE	COMPRESSOR	HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE	TEMPERATURE	CF TURB. STAGE
{N/M++2}	(N/M++2)	(DEG. K)	(N/M**2)
5.07E+04	3.040E+08	1111.0	1.01E+06

RATIO OF COMPRES TO TJRBINE WORK	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HEIT TRANSFERRED {PEG-W/(KG/S))	
0.100		2.960E+06	3.280E+07		18.500	
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROFY	
	(DEG. K)	(N/M++2)	(KG/M**3)	(J/KG)	(j/(kg-k))	
STORAGE TANK	18.1	5.07E+04	7.310E+01	-2.76E+05	7.01E+C3	
Compressor Exit	56.0	3.04E+08	1.190E+02	2.68E+06	7.01E+O3	
Heat Exchanger Exit	1110.0	3.04E+08	4.490E+01	1.85E+07	5.08E+O4	
Turbinë Exit	1110.0	1.01E+06	2.200E-01	1.61E+07	7.43E+O4	

TABLE I. - Continued. IDEAL TURBINE CYCLE

(a) Concluded. SI units

		(4)				
STORAGE PRESSURE {N/M++2}		COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)		PRESS AT EXIT CF TURE. STAGE (N/M++2)	
5.07E+04		3.546E+08	1111.0		1.01E+06	
RATIO OF COMPRES To Turbine Work	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK { W/(KG/S))		HEIT TRANSFERRED (FEG-W/(KG/S))	
0.110		3.380E+06	3.220E+07		18.8CC	
	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	OENSITY (KG/M++3)	ENTHALPY (J/KG)	ENTROPY (J/(KG-K))	
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 59.4 1110.0 1110.0	5.07E+04 3.55E+08 3.55E+08 1.01E+06	7.310E+01 1.220E+02 4.990E+01 2.200E-01	-2.76E+05 3.11E+06 1.88E+07 1.61E+07	7.01E+03 7.01E+03 5.01E+04 7.43E+04	
STORAGE PRESSURE (N/M++2)		COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)		PRESS AT EXIT OF TURB. STAGE (N/M**2)	
5.07E+04		4.053E+08	1111.0		1.01E+06	
RATID OF CUMPRES TO TJRBINE WORK	SOR	COMPRESSOR WORK (W/(KG/S))	AVAILABLE WORK (W/(KG/S))		HEAT TRANSFERRED (PEG-W/(KG/S))	
0.120		3.790E+06	3.160E+07		15.100	
	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/Ņ★+3)	ENTHALPY (J/KG)	ENTROPY {j/(kg-k)}	
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 62.4 1110.0 1110.0	5.07E+04 4.05E+08 4.05E+08 1.01E+06	7.310E+01 1.240E+02 5.460E+01 2.200E-01	-2.76E+05 3.52E+06 1.92E+07 1.61E+07	7.01E+03 7.01E+03 4.96E+04 7.43E+04	

STORAGE PRESSURE (N/M**2) 5.07E+04		COMPRESSOR PRESSURE (N/M++2) 4.560E+08	HEAT EXCHANGER Temperature (Deg. K) 1111.0		PRESS AT EXIT CF TURE. STAGE (N/M**2) 1.01E+06
RATID OF COMPRESS TO TURBINE WORK C.130	SOR	COMPRESSUR WORK (W/(KG/S}) 4.200E+06	AVAILABLE W (W/(KG/S 3.110E+0		HEAT TRANSFERRED (MEG-W/(KC/S)) 19.300
STORAGE TANK COMPRESSOR EXIT HEAT EXCHANGER EXIT TURBIN ^G EXIT	TEMPERATURE {DEG. K} 18.1 65.1 1110.0 1110.0	PRESSURE (N/M**2) 5.07E+04 4.56E+08 4.56E+08 1.01E+06	DENSITY (KG/M**3) 7.310E+01 1.270E+02 5.890E+01 2.200E-01	ENTHALPY (J/KG) -2.76E+05 3.92E+06 1.95E+07 1.61E+07	ENTROPY (J/(KG-K)) 7.01E+03 7.01E+03 4.91E+04 7.43E+04
STORAGE PRESSURE (N/M=+2) 5.07E+04		COMPRESSOR PRESSURE (N/M++2) 5.066E+08	HEAT EXCHANGER Temperature (Deg. K) 1111.0		PRESS AT EXIT DF TURB. STAGE (N/M**2) 1.01E+C6
RATID OF CUMPRESS TO TURBINE WORK 0.140	SOR	CUMPRESSOR WORK (W/(KG/S)) 4.590E+06	AVAILABLE W (W/(KG/S 3.070E+0		HE/T TRANSFERRED (MEG-W/(KG/S)) 19.600

	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSITY (KG/M++3)	ENTHALPY (J/KG)	ENTROPY {J/(KG-K))
STORAGE TANK	18.1	5.07E+04	7.310E+01	-2.76E+05	7.01E+03
COMPRESSOR EXIT	67.7	5.07E+08	1.290E+02	4.32E+06	7.01E+03
HEAT EXCHANGER EXIT	1110.0	5.07E+08	6.300E+01	1.98E+07	4.86E+04
TURBINE EXIT	1110.0	1.01E+06	2.200E-01	1.61E+07	7.432+04

TABLE I. - Continued. IDEAL TURBINE CYCLE

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(b) U.S. customary units

STORAGE PRESSURE (ATM)		COMPRESSOR Pressure (ATM)	HEAT EXCHANGER Temperature (Deg. K)		PRESS AT EXIT OF TURB. STAGE (ATM)	
0.50		500.0	944.4		20.00	
RATID OF COMPRES. Tu turbinë work	SOR	COMPRESSOR WORK (HP/(Lb/S))	AVAILABLE WORF (HP/(LB/S))	ζ.	HEAT TRANSFERRED (MEG-W/(LB/S))	
0.038		367.0	19600.0		6.500	
	TEMPERATURE (DEG. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY (CAL/G).	ENTROPY (Cal/(G-k))	
STORAGE TANK Compressor exit Heat exchanger exit Turbine exit	18.1 30.0 944.0 944.0	0.50 500.00 500.00 10.00	7.310E-02 9.200E-02 1.180E-02 2.590E-04	-65.9 78.2 3360.0 3260.0	1.68 1.68 13.30 17.20	

STORAGE	COMPRESSOR HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE TEMPERATURE	OF TURB. STAGE
(ATM)	(ATM) (DEG.K)	(ATM)
0.50	1000.0 944.4	10.00

RATIO OF COMPRES Tu turbine work	SOR	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (MEG-W/(LB/S))	
0.060		686.0	18100.0		6.660	
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	TEMPERATURE (DEG. K)	PRESSURE (ATM)	_ DENSITY {G/CM++3}	ENTHALPY { CAL/G }	ENTROPY (CAL/(G-K))	
STORAGE TANK Compressor exit Heat Exchanger exit Turbin= exit	18.1 36.9 944.0 944.0	0.50 1000.00 1000.00 10.00	7.310E-02 1.000E-01 2.160E-02 2.590E-04	-65.9 204.0 3460.0 3260.0	1.68 1.68 12.60 17.20	

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PRESSURE PRESSURE TEMPERATURE CF TURB (ATM) (ATM) (DEG. K) (ATM)	JIAGE	
0.5) 1500.0 944.4 10.00		
RATIO OF CUMPRESSOR COMPRESSOR WORK AVAILABLE WORK HEAT TRANSFERRED TO TURBINE WORK (HP/(LB/S)) (HP/(LB/S)) (MEG-W/(LB/S))		
TO TURBINE WORK (HP/(LB/S)) (HP/(LB/S)) (MEG-W/(LB/S))		
0.078 982.0 17200.0 £.82C	6.82C	
TEMPERATURE PRESSURE DENSITY ENTHALPY ENTROP	۲	
(DEG. K) (ATM) (G/CM++3) (CAL/G) (CAL/G-	K))	
STORAGE TANK 18.1 0.50 7.310E-02 -65.9 1.68		
COMPRESSOR EXIT 42.7 1500.00 1.100E-01 320.0 1.68		
HEAT EXCHANGER EXIT 944.0 1500.00 3.000E-02 3550.0 12.20		
TURBINE EXIT 944.0 10.00 2.590E-04 3260.0 17.20		

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STORAGE	COMPRESSUR HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE TEMPERATURE	OF TURB. STAGE
(ATM)	(ATM) (DEG.K)	(ATM)
0.50	2000.0 944.4	10.00

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RATIO OF COMPRESSOR		COMPRESSOR WORK	AVAILABLE WORK		HEAT TRANSFERRED	
To Turbine work		(HP/(LB/S))	(HP/(LB/S))		(MEG-W/(L8/S))	
0.094		1260.0	16500.0		£.960	
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY	
	(DEG. K)	(ATM)	(G/CM++3)	(CAL/G)	(CAL/(G-K))	
STORAGE TANK	18 .1	0.50	7.310E-02	-65.9	1.68	
Compressor exit	47.9	2000.00	1.100E-01	431.0	1.68	
Heat exchanger exit	944.0	2000.00	3.740E-02	3640.0	11.90	
Turbine exit	944.0	10.00	2.590E-04	3260.0	17.20	

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TABLE I. - Continued. IDEAL TURBINE CYCLE

(b)	Continued. U.S.	customary units	
		EXCHANGER	

STORAGE	COMPRESSOR	HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE	Temperature	OF TURB. STAGE
(ATM)	(ATM)	(deg. K)	(ATM)
0.50	2500.0	944.4	10.00
RATIO OF CUMPRESSOR	CUMPRESSOR WORK	AVAILABLE WORK	HE⊅T TRANSFERRED
TO TJRBINE WURK	(HP/(Lb/S))	(HP/(LB/S))	(⊬EG-W/(LB/S))
0.110	1540.0	16000.0	7.100

	TEMPERATURE (Deg. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY (CAL/G)	ENTROPY (Cal/(g-k))
STORAGE TANK	18.1	0.50	7.310E-02	-65.9	1.68
COMPRESSOR EXIT	52.3	2500.00	1.200E-01	538.0	1.68
HEAT EXCHANGER EXIT	944.0	2500.00	4.390E-02	3720.0	11.70
TURBINE EXIT	944.0	10.00	2.590E-04	3260.0	17.20

STORAGE	COMPRESSOR	HEAT EXCHANGER	PRESS AT EXIT
Pressure	Pressure	Temperature	OF TURH. STAGE
(ATM)	(ATM)	(deg. K)	(ATM)
0.50	3000.0	944.4	16.00

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RATID OF COMPRESSOR		COMPRESSOR WORK	AVAILABLE WORK		HEAT TRANSFERRED	
TO TURBINE WORK		(HP/(LB/S))	(HP/(LB/S))		(MEG-W/(LB/S))	
0.120	•	1800.0	15600.0		7.230	
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY	
	(DEG. K)	(ATM)	{G/CM++3}	(CAL/G)	(Cal/(g-k))	
STORAGE TANK	18.1	0.50	7.310E-02	-65.9	1.68	
Compressor Exit	56.0	3000.00	1.200E-01	642.0	1.68	
Meat Exchanger Exit	944.0	3000.00	4.980E-02	3810.0	11.50	
Turbine Exit	944.0	10.00	2.590E-04	3260.0	17.20	

STORAGE PRESSURE (ATM)		CUMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)		PRESS AT EXIT OF TURB. STAGE (ATM)
0.50		3500.0	944.4		10.00
RATID OF CUMPRESSOR TO TURBINE WORK		PRESSOR WORK HP/(L8/S))	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (MEG-W/(LB/S))
0.130		2060.0	15300.0		7.350
	ERATURE G, K)	PRESSURE (ATM)	DENSITY {G/CM++3}	ENTHALPY { CAL/G }	ENTROPY (CAL/(G-K))
CUMPRESSOR EXIT 5 HEAT EXCHANGER EXIT 94	8.1 9.4 4.0 4.0	0.50 3500.00 3500.00 10.00	7.310E-02 1.200E-01 5.520E-02 2.590E-04	-65.9 742.0 3890.0 3260.0	1.68 1.68 11.40 17.20
STORAGE PRESSURE (ATM)		CUMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER TEMPERATURE (DEG. K)		PRESS AT EXIT OF TURB. STAGE (ATM)
0.50		4000.0	944.4		10.00
RATID OF COMPRESSOR To Turbine work		PRESSOK WORK HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (MEG-W/(LB/S))
0.140		2310.0	15000.0		7.470
	ERATURE G. K)	PRESSURE (ATM)	DENSITY (G/CM**3)	ENTHALPY (CAL/G)	ENTROPY (Cal/(G-K))
COMPRESSOR EXIT 6 HEAT EXCHANGER EXIT 94	8.1 2.4 4.0 4.0	0.50 4000.00 4000.00 10.00	7.310E-02 1.200E-01 6.010E-02 2.590E-04	-65.9 841.0 3570.0 3260.0	1.68 1.68 11.20 17.20

TABLE I. - Continued, IDEAL TURBINE CYCLE

		(b) Continued	. U.S. customary units		
STORAGE PRESSURE (ATM)		CUMPRESSOR Pressure (ATM)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXIT OF TURB. STAGE (ATM)
0.50		4500.0	944.4		10.00
RATIO OF COMPRESS TO TURBINE WORK	SOR	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))		HEAT THANSFERRED {#EG-#/(LB/S)}
0.150		2550.0	14800.0		7.580
	TEMPERATURE (DEG. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY (CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TANK Compressor Exit	18.1 65.1	C.50 4500.00	7.310E-02 1.300E-01	-65.9 937.0	1.68 1.68 .
HEAT EXCHANGER EXIT	944.0 944.0	4500.00 10.00	6.460E-02 2.590E-04	4050.0	11.10 17.20
STORAGE PRESSURE (ATM)		CUMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXIT OF TURB. STAGE (ATM)
0.50		5000.0	944.4		10.00
RATID OF COMPRESS	500	COMPRESSUR WORK	AVAILABLE WORK		HEAT TRANSFERRED
TU TURBINE WORK	, ,	(HP/(LB/S))	(HP/(LB/S))		(MEG-W/(LB/S))
0.160		2790.0	14600.0		7.690
	TEMPERATURE (DEG. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY (CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TANK Compressor Exit	18.1 67.7	0.50 5000.00	7.310E-02 1.300E-01	-65.9 1C30.0	1.68 1.68
HEAT EXCHANGER EXIT	944.0 944.0	5000.00	6.870E-02 2.590E-04	4130.0	11.00
TORVINE EATT	774.0	10.00	2.3905-04	3260.0	17.20

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STORAGE		EAT EXCHANGER	PRESS AT EXIT
PRESSURE		Emperature	CF TURB. STAGE
(ATM)		(Deg. K)	(ATM)
C.5)	500.0	1111.0	10.00

RATIO OF COMPRESSOR	COMPRESSOR WORK	AVAILABLE WORK	HEAT TRANSFERRED
To Turbine Work	(HP/(LB/S))	(HP/(LB/S))	(MEG-W/(LE/S))
0.033	367.0	24700.0	7.630

	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(DEG. K)	(ATM)	(G/CM**3)	{CAL/G}	(CAL/(G-K))
STORAGE TANK	18 .1	0.50	7.310E-02	-65.9	1.68
Compressor exit	30.0	500.00	9.200E-02	78.2	1.68
HEAT EXCHANGER EXIT	1110.0	500.00	1.020E-02	3960.0	13.90
TURBINE EXIT	1110.0	10.00	2.210E-04	3860.0	17.80

STORAGE Pressure (ATM)	COMPRESSOR HEAT EXCHANGER PRESSURE TEMPERATURE (ATM) (DEG•K)	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	1000.0 1111.0	10.00

RATID OF COMPRESS To turbine work	SOR	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (MEG-W/(LB/S))
0.051 686.0		22800.0		7.810	
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(DEG. K)	(ATM)	(G/CM++3)	(CAL/G)	(Cal/(G-K))
STORAGE TANK	18.1	0.50	7.310E-02	-65.9	1.68
Compressor Exit	36.9	1000.00	1.000E-01	204.0	1.68
Heat Exchanger Exit	1110.0	1000.00	1.890E-02	4C60.0	13.2C
Turbine Exit	1110.0	10.00	2.210E-04	3860.0	17.80

TABLE I. - Continued. IDEAL TURBINE CYCLE

(b) Continued. U.S. customary units

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STORAGE	COMPRESSOR	HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE	Temperature	OF TURB. STAGE
(ATM)	(ATM)	(deg. K)	(ATM)
0.50	1500.0	1111.0	10.00

RATID OF COMPRESSOR To turbine work	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))	HEAT TRANSFERRED (Meg-W/(Le/s))
0.067	982.0	21800.0	7 . 97C
TEMPERATUR	E PRESSURE	DENSITY	ENTHALPY ENTROPY

	(DEG. K)	(ATM)	(G/CM++3)	(CAL/G)	(CAL/(G-K))
STORAGE TANK	18.1	0.50	7.3106-02	-65.9	1.68
COMPRESSOR EXIT	42.7	1500.00	1.100E-01	320.0	1.68
HEAT EXCHANGER EXIT	1110.0	1500.00	2.650E-02	4150.0	12.80
TURBINE EXIT	1110.0	10.00	2.210E-04	3860.0	17.80

STORAGE	COMPRESSOR	HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE	Temperature	CF TURB. STAGE
(ATM)	(ATM)	(Deg. K)	(ATM)
0.50	2000.0	1111.0	10.00

RATIO OF COMPRES TO TURBINE WORK	SOR	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))	н	EAT TRANSFERRED (MEG-W/(LE/S))	
0.080		1260.0	21000.0		E-12C	
				,		
	TEMPERATURE (DEG. K)	PRESSURE (ATM)	DENSITY {G/CM++3}	ENTHALPY (CAL/G)	ENTROPY (CAL/(G~K))	
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 47.9 1110.0 1110.0	0.50 2000.00 2000.00 10.00	7.310E-02 1.100E-01 3.320E-02 2.210E-04	-65.9 431.0 4240.0 3860.0	1.68 1.68 12.50 17.80	

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STORAGE PRESSURE (ATM)		CUMPRESSOR Pressure (ATM)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXIT CF TURB. STAGE (ATM)
0.50		2500.0	1111.0		10.00
RATIO OF CUMPRESS TO TURBINE WORK	OR	COMPRESSOR WORK (HP/(L8/S))	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (MEG-W/(LB/S))
0.093		1540.0	20400.0		8.260
	TEMPERATURE (DEG. K)	PRE SSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY (CAL/G)	ENTROPY (Cal/(g-k))
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 52.3 1110.0 1110.0	0.50 2500.00 2500.00 10.00	7.310E-02 1.200E-01 3.930E-02 2.210E-04	-65.9 538.0 4330.0 3860.0	1.68 1.68 12.30 17.80
STORAGE Pressure (ATM)		COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (DEG. K)		PRESS AT EXIT CF TURB. STAGE (ATM)
0.50		3000.0	1111.0		10.00
RATID OF COMPRESS TO TJRBINE WORK	SOR	COMPRESSOR WORK (HP/(LB/S})	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (HEG-W/(LB/S))
0.106		1800.0	20000.0		8.400
	TEMPERATURE (DEG. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY {CAL/G}	ENTROPY (Cal/(G-K))
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 56.0 1110.0 1110.0	0.50 3000.00 3000.00 10.00	7.310E-02 1.200E-01 4.490E-02 2.210E-04	-65.9 642.0 4420.0 3860.0	1.68 1.68 12.10 17.80

TABLE I. - Concluded. IDEAL TURBINE CYCLE

(b) Concluded. U.S. customary units

STORAGE	COMPRESSOR HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE TEMPERATURE	CF TURB. STAGE
(ATM)	(ATM) (DEG.K)	(ATM)
0.50	3500.0 1111.0	10.00

RATIO OF COMPRESSOR	COMPRESSOR WORK	AVAILABLE WORK	HE/T TRANSFERRED
To Turbine work	(HP/(LB/S))	(HP/(LB/S))	(MEG-W/(LE/S))
0.110	2060.0	19600.0	8.530

	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(DEG. K)	(ATM)	(G/CM++3)	{ (AL/G}	(Cal/(G-K))
STORAGE TANK	18.1	0.50	7.310E-02	-65.9	1.68
Compressor Exit	59.4	3500.00	1.200E-01	742.0	1.68
Heat Exchanger Exit	1110.0	3500.00	4.990E-02	4500.0	12.CC
Turbinë Exit	1110.0	10.00	2.210E-04	3860.0	17.80

STORAGE	COMPRESSOR HEAT EXCHANGER	PRESS AT EXIT
PRESSURE	PRESSURE TEMPERATURE	Of Turb. Stage
(ATM)	(ATM) (DEG.K)	(ATM)
0.50	4000.0 1111.0	10.00

RATIO OF COMPRES To turbine work	SOR	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (FEG-W/(LR/S))
0.120		2310.0	19200.0		8.65C
	TEMPERATURE	PRESSURE	DENSITY	ENTHALPY	ENTROPY
	(DEG. K)	(ATM)	(G/CM++3)	(CAL/G)	(CAL/(G-K))
STORAGE TANK	18.1	0.50	7.310E-02	-65.9	1.68
Compressor Exit	62.4	4000.00	1.200E-01	841.0	1.68
Heat Exchanger Exit	1110.0	4000.00	5.460E-02	4580.0	11.80
Turbine Exit	1110.0	10.00	2.210E-04	3860.0	17.8C

STORAGE PRESSURE (ATM)		COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER TEMPERATURE (DEG. K)		PRESS AT EXIT CF TURB. STAGE (ATM)
0.50		4500.0	1111.0		10.00
RATID OF COMPRES TO TURBINE WORK	SOR	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (MEG-W/(LE/S))
0.130		2550.0	18900.0		8.77C
	TEMPERATURE IDEG. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY {CAL/G}	ENTROPY (CAL/(G-K))
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 65.1 1110.0 1110.0	0.50 4500.00 4500.00 10.00	7.310E-02 1.300E-01 5.890E-02 2.210E-04	-65.9 537.0 4660.C 3860.0	1.68 1.68 11.7C 17.80
STORAGE PRESSURE (ATM)		COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (deg. K)		PRESS AT EXIT CF TURB. STAGE (ATM)
0.50		5000.0	1111.0		10.CC
RATID DF COMPRES TO TURBINE WORK	SOR	COMPRESSOR WORK (HP/(LB/S))	AVAILABLE WORK (HP/(LB/S))		HE&T TRANSFERRED (#EC-h/(LB/S))
0.140		2790.0	18700.0		8*880
	TEMPERATURE (DEG. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY (CAL/G)	ENTROP Y {CAL/(G-K))

		(ATH)	(6/04++3)	(CAL/G)	(CAL/(G-K))
STORAGE TANK	18.1	0.50	7.310E-02	-65.9	1.68
COMPRESSOR EXIT	67.7	5000.00	1.300E-01	1030.0	1.68
HEAT EXCHANGER EXIT	1110.0	5000.00	6.300E-02	4740.0	11.60
TURBINE EXIT	1110.0	10.00	2.210E-04	3860.0	17.80

TABLE II. - NONADIABATIC TURBINE CYCLE

(a) SI units

STORAGE PRESSURE (N/M##2)	PRESS. DIFF. OF CUMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE (N/M*+2)
5.07E+04	1.01E+07	0.85	5.066E+07	944.4	1.01E+07	0.85	1.01E+06
RATID OF To tjrbi	CUMPRESSOR Ne Work		RESSOR WORK W/{KG/S}}		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0.	066		7.270E+05	:	2.920E+07	14.	300
	TEMPER (deg.		PRESSURE (N/M##2)	DENSI (KG/M+4		(J/KG)	ENTROPY (J/(KG-K))
STORAGE TANK Compressor e Heat exchang	XIT 43.	3	5.07E+04 5.07E+07 5.07E+07	7.310E4 8.650E4 1.180E4	+01 4.	.76E+05 .51E+05 .41E+07	7.01E+03 1.04E+04 5.57E+04
TURBINE EXIT			1.01E+06	2.600E-		36E+07	7.18E+04
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. NF CUMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER TEMPERATURE (DEG. K)	PRESS. DIFF. OF TURB. STAGE (N/M**2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE {N/M# #2}
5.07E+04	1.01E+07	0.85	1.013E+08	944.4	1.01E+07	0.85	1.01E+06
RATIO OF To turbi	COMPRESSOR Në Work		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0.	100		1.390E+06	:	2.500E+07	14.	700
	TEMPER (DEG.		PRESSURE (N/M##2)	DENSI (KG/M++		(J/KG)	ENTROFY (j/(kg+k))
STORAGE TANK Compressor e			5.07E+04 1.01E+08	7.310E- 9.280E-		.76E+05 .11E+06	7.01E+03 1.22E+04
HEAT EXCHANG TURBINE EXIT			1.01E+08 1.01E+06	2.160E- 2.600E-	+01 1.	45E+07 36E+07	5.29E+04 7.18E+04

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STORAGE PRESSURE (N/M++2)	PRESS. DIFF. UF COMP. STAGE {N/M**2}	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. k)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M**2)
5.07E+04	1.01E+07	0.85	1.520E+08	944.4	1.01E+07	0.85	1.01E+06
RATIO OF To turbi	COMPRESSOR INE WORK		ESSOR WORK (/(Kg/S))		LABLE WORK W/(KG/S))		ANSFERRED / (KG/S))
0.	130	2	2.010E+06		2.250E+07		ccc
	TEMPER (Deg.		PRESSURE (N/M++2)	DENSI (KG/M**		NTHALPY (j/kg)	ENTROPY (j/(KG-k))
STORAGE TANK Compressor e Heat exchang Turbin: exit	XIT 80. GER EXIT 944.	.7 .0	5.07E+04 1.52E+08 1.52E+08 1.01E+06	7.310E 9.790E 3.000E 2.600E	01 1 +01 1	•76E+05 •74E+06 •49E+07 •36E+07	7.01E+03 1.35E+04 5.12E+04 7.18E+04

STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/#*+2)
5.07E+04	1.01E+07	0.85	2.026E+08	944 .4	1.01E+07	0.85	1.01E+06
RATIO OF To turbi	COMPRESSOR NE WORK		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S})		ANSFERRED /(K@/S))
0.	0.160		2.610E+06		2.060E+07		300
	TEMPER (deg.		PRESSURE (N/M##2)	DENSI (KG/M+		NTH AŁPY (J/KG)	ENTROPY {j/(kg-k})
STORAGE TANK Compressor e Heat Exchang Turbine exit	XIT 94. ER EXIT 944.	5 0	5.07E+04 2.03E+08 2.03E+08 1.01E+06	7.310E 1.020E 3.740E 2.600E	+02 2 +01 1	.76E+05 .33E+06 .52E+07 .36E+07	7.01E+03 1.45E+04 5.00E+04 7.18E+04

TABLE II. - Continued. NONADIABATIC TURBINE CYCLE

(a) Continued. SI units

STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB• STAGE	PRESS AT EXIT OF TURB. STAGE {N/M++2}
5.07E+04	1.01E+07	0.85	2•533E+08	944.4	1.01E+07	0.85	1.01E+06
	F COMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0	•180		3.19QE+06	:	1.910E+07	15.	500
	T EMPER		PRESSURE (N/M**2)	DENSI (KG/M#		(J/KG)	ENTROPY (j/(kg-k))
STORAGE TAN Compressor			5.07E+04 2.53E+08	7.310E 1.060E		.76E+05 .91E+06	7.01E+03 1.54E+04
HEAT EXCHAN Turbine ext			2.53E+08 1.01E+06	4•390E 2•600E		\$6E+07 \$6E+07	4.91E+04 7.18E+04
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. DF COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M**2)	EFFICIENCY Of TURB. STAGE	PRESS AT EXIT GF TURB. STAGE (N/M*+2)
5.07E+04	1.01E+07	0.85	3.040E+08	944.4	1.01E+07	0.85	1.01E+06
	F COMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
o	.200		3.740E+06	:	1.790E+07	15.	700
	TEMPER (Deg.		PRESSURE (N/M##2)	DENSI (KG/M+		(J/KG)	ENTROPY (J/(KG-K))
STORAGE TAN COMPRESSOR			5.07E+04 3.04E+08	7•310E 1•090E		•76E+05 •47E+06	7.01E+03 1.61E+04
HEAT EXCHAN TURBINE EXI	GER EXIT 944.	.0	3.04E+08 1.01E+06	4.980E 2.600E	+01 1	•59E+07 •36E+07	4.83E+04 7.18E+04

	PRESS. DIFF. UF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (DEG. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE (N/M++2)
5.07E+04	1.01E+07	0.85	3.546E+08	944.4	1.01E+07	0.85	1.016+06
RATIO OF To Turbin	CUMPRESSOR E WURK		RESSOR WORK W/(KG/S})		(LABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0.2	20		4.280E+06	1	L•690E+07	1ć.	ecc
		·					
	TEMPER (DEG.		PRESSURE (N/M++2)	DENSI1 (KG/M**		THALPY J/KG}	ENTROPY (J/(KG-K))
STORAGE TANK Compressor ex		0	5.07E+04 3.55E+08	7.310E4 1.120E4	+02 4.	76E+05 01E+06	7.01E+03 1.68E+04
HEAT EXCHANGE Turbine Exit	R EXIT 944. 944.		3.55E+08 1.01E+06	5.520E 2.600E		63E+07 36E+07	4.76E+04 7.18E+04
	PRESS. DIFF. OF COMP. STAGE {N/M++2}	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M**2)	HEAT EXCHANGER TEMPERATURE {DEG•K}	PRESS. DIFF. OF TUR8. STAGE {N/M*+2}	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE {N/M*+2}
5.07E+04	1.01E+07	0.85	4.053E+08	944.4	1.01E+07	0.85	1.01E+06
RATID OF TO TURBIN	COMPRESSOR IE WORK		RESSOR WORK W/{KG/S}}		ILABLE WORK W/(KG/S))		ANSFERRED /(Kg/s))
0.2	40		4 . 810E+06	1	1.590E+07	16.	200
	TEMPER (DEG.		PRESSURE (N/M++2)	DENSI1 (KG/M++		NTHALPY (J/RG)	ENTROPY (J/(KG-K))
STORAGE TANK Compressor ex	18. 17 138.		5.07E+04 4.05E+08	7.310E4 1.140E4		•76E+05 •54E+06	7.01E+03 1.74E+04
HEAT EXCHANGE TURBINE EXIT		0	4.05E+08 1.01E+06	6.010E4 2.600E-	•01 1.	•66E+07 •36E+07	4.70E+04 7.18E+04

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TABLE II. - Continued, NONADIABATIC TURBINE CYCLE

(a) Continued. SI units

STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE [N/M##2]	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M**2)
5.07E+04	1.01E+07	0.85	4.560E+08	944.4	1.01E+07	C.85	1.01E+06
TO TURB	F CUMPRESSOR INE WORK	()	ESSUR WORK (/(KG/S))	(LABLE WORK W/(KG/S))	(MEG-h	ANSFERRED /(KG/S))
U	.260	5	330E+06		1.510E+07	16.	400
	TEMPER (Deg		PRESSURE (N/M++2)	DENSI (Kg/m++		NTHALPY (j/kg)	ENTROFY (j/(kg-k))
STORAGE TAN Compressor Heat Exchan Turbine exi	EXIT 147. GER EXIT 944.	.0 .0	5.07E+04 4.56E+08 4.56E+08 1.01E+06	7.310E 1.160E 6.460E 2.600E	+02 5. +01 1.	.76E+05 .05E+06 .69E+07 .36E+07	7.01E+03 1.79E+04 4.65E+04 7.18E+04
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. SIAGE	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.07E+04	1.01E+07	0.85	5.066E+08	944.4	1.01E+07	0.85	1.01E+06
	F COMPRESSOR INE WORK		ESSOR WORK (KG/S))		[LABLE WORK W/(KG/S})		ANSFERRED /(KG/S))
o	.270	5	•840E+06	:	l•440E+07	16.	600
	TEMPER (deg.		PRESSURE (N/M++2)	DENSI {KG/M+		NTHALPY IJ/KG)	ENTROPY (j/(kg-k))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 156. GER EXIT 944.	.0 .0	5.07E+04 5.07E+08 5.07E+08 1.01E+06	7.310E 1.180E 6.870E 2.600E	+02 5. +01 1.	•76E+05 •56E+06 •73E+07 •36E+07	7.01E+03 1.84E+04 4.61E+04 7.18E+04

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STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE {N/M++2}	EFFICIENCY OF COMP. STAGE	CUMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. K)	PRESS. DIFF. OF TURB. STAC (N/M++2)	EFFICIENCY GE OF TURB. STAGE	PRESS AT EXIT OF TURB STAGE (N/M++2)	
5.07E+34	1.01E+07	0.85	1.520E+08	1111.0	1.01E+07	0.85	1.01E+06	
	F CUMPRESSOR INE WORK		RESSUR WORK N/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))	
0	.110	:	2.0102+06	:	2.900E+07	17.	500	
			·					
	TEMPER (Deg.		PRESSURE (N/M##2)	DENSI IKG/M=		ENTHALPY (J/KG)	ENTROPY (J/(KG-K))	
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIF 80. GER EXIT 1110.	.7 .0	5.07E+04 1.52E+08 1.52E+08 1.01E+06	7.310E 9.790E 2.650E 2.200E	+01 +01	-2.76E+05 1.74E+06 1.74E+07 1.61E+07	7.01E+03 1.35E+04 5.37E+04 7.43E+04	
		-						
								•
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. UF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE {N/M++2}	HEAT EXCHANGER Temperature (deg. K)		EFFICIENCY GE OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE {N/M**2}	
5.07E+04	1.01E+07	0.85	2.026E+08	1111.0	1.01E+07	0.85	1.01E+06	
	F CUMPRESSOR INE WURK		RESSOR WORK (/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))	
o	•140	:	2.610E+06		2.670E+07	17.	800	
	TEMPER (Deg.	RATURE K)	PRESSURE (N/M++2)	DENSI (KG/M#		ENTHALPY (J/KG)	ENTROPY (j/(kg-k))	
STORAGE TAN Compressor Heat Exchan	EXIT 94.	5	5.07E+04 2.03E+08 2.03E+08	7.310E 1.020E 3.320E	+02	-2.76E+05 2.33E+06 1.78E+07	7.01E+03 1.45E+04 5.25E+04	
TURBINE EXI			1.01E+06	2.2005		1.782+07 1.61E+07	7.43E+04	

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TABLE II. - Continued. NONADIABATIC TURBINE CYCLE

(a) Continued. SI units

STORAGE PRESSURE (N/M=+2)	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	CUMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M**2)
5.07E+04	1.01E+07	0.85	2.533E+08	1111.0	1.01E+07	0.85	1.01E+06
	F CUMPRESSOR INE WORK		RESSOR WORK #/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0	.160		3.190E+06	:	2.500E+07	16.	100
	TEMPER (Deg.		PRESSURE (N/M++2)	DENSI (KG/M+		NTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 107. GER EXIT 1110.	0	5.07E+04 2.53E+08 2.53E+08 1.01E+06	7.310E 1.060E 3.930E 2.200E	+02 2. +01 1.	.76E+05 .91E+06 .81E+07 .61E+07	7.01E+03 1.54E+04 5.15E+04 7.43E+04
TURDINE EXI		U	1.012+08	2.2002	-01 1.	016401	1.432.404
STORAGE PRESSURE (N/M*+2)	PRESS. DIFF. OF COMP. STAGE (N/M#+2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE {N/M++2}	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M#+2)
5.07E+04	1.01E+07	0+85	3.040E+08	1111.0	1.01E+07	0.85	1.016+06
	F COMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0	.170		3.740E+06	:	2.350E+07	18.	400
	TENOS			05463			CAT DOOL
	TEMPER (DEG.		PRESSURE (N/M++2)	DENSI (KG/M=		NTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TAN Compressor			5.07E+04 3.04E+08	7.310E 1.090E		76E+05 47E+06	7.01E+03 1.61E+04
HEAT EXCHAN Turbing Exi			3.04E+08 1.01E+06	4.490E 2.200E		85E+07 61E+07	5•08E+04 7•43E+04

STORAGE PRESSURE (N/M++2)	PRESS. DIFF. UF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M*+2)
5.07E+04	1.01E+07	0.85	3.546E+08	1111.0	1.01E+07	C.85	1.01E+06
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	F COMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0	.190		4.280E+06	:	2.220E+07	18.	600
	TEMPER (DEG.		PRESSURE (N/M##2)	DENSI (KG/M++		ITHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TAN Compressor I Heat Exchan	EXIT 128. GER EXIT 1110.	0 ' 0	5.07E+04 3.55E+08 3.55E+08	7.310E 1.120E 4.990E	+02 4. +01 1.	76E+05 01E+06 88E+07	7.01E+03 1.68E+04 5.01E+04
TURBINE EXI	T 1110.	U	1.01E+06	2 .20 0E-	-01 . 1.	61E+07	7.43E+04
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. NF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (DEG. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.07E+04	1.01E+07	0.85	4.053E+08	1111.0	1.01E+07	0 . 85	1.01E+06
	F COMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))	-	ANSFERRED /(KG/S))
0.	.210		4.810E+06	2	2.110E+07	18.	800
	TEMPER (DEG.		PRESSURE (N/M##2)	DENSI , {KG/M+		ITHALPY J/KG)	ENTROPY (j/(kg-k))
STORAGE TANI Compressor I		-	5.07E+04 4.03E+08	7.310E- 1.140E-		76E+05 54E+06	7.01E+03 1.74E+04
HEAT EXCHANI Turbine exi			4.05E+08 1.01E+06	5.460E 2.200E	+01 1.	92E+07 61E+07	4.96E+04 7.43E+04

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TABLE II. - Continued. NONADIABATIC TURBINE CYCLE

(a) Concluded. SI units

STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M*+2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5+07E+04	1.01E+07	0.85	4.560E+08	1111.0	1.01E+07	0.85	1.01E+06
RATID OF To turbi	COMPRESSOR NE WORK		RESSOR WORK W/(KG/S))		(LABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0.	2 20	:	5.330E+06	ä	2.020E+07	15.	000
	TEMPER (Deg.		PRESSURE (N/M++2)	DENSI1 (KG/M=+		THALPY J/KG)	ENTROPY (J/(KG-K))
STORAGE TANK Compressor e Heat exchang	XIT 147. ER EXIT 1110.	0 0	5.07E+04 4.56E+08 4.56E+08	7.310E4 1.16CE4 5.890E4	•02 5. •01 1.	76E+05 05E+06 95E+07	7.01E+03 1.79E+04 4.91E+04
TURBINE EXIT	1110.	0	1.01E+06	2.200E-	-01 1.	.61E+07	7.43E+04
STORAGË PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M**2)	EFFICIENCY (OF COMP. STAGE	COMPRESSOR PRESSURE (N/M*+2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB, STAGE (N/M++2)
5.07E+34	1.01E+07	0.85	5.066E+08	1111.0	1.01E+07	0.85	1.01E+06
RATIO OF TO TURBI	COMPRESSOR NE WORK		RESSOR WORK (/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /{KG/S})
0.	240	:	5.840E+06	1	.930E+07	15.	200
	TEMPER (DEG.		PRESSURE (N/M##2)	DENSI {KG/M+4		ITHALPY J/KG)	ENTROPY {j/(kg-k)}
STORAGE TANK Compressor e			5.07E+04 5.07E+08	7.310E4 1.180E4		76E+05 56E+06	7.01E+03 1.84E+04
HEAT EXCHANG Turbine Exit			5.07E+08 1.01E+06	6.300E		98E+07 61E+07	4.86E+04 7.43E+04

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STORAGE PRESSURE (N/M##2)	PRESS. DIFF ()F COMP. ST {N/M++2}	AGE OF COMP.		HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. Of Turb. Stage (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT DF TURB• STAGE (N/M*+2)
5.07E+04	1.01E+07	0.85	5.066E+07	1111.0	1.01E+07	0.85	1.01E+06
	F CUMPRESSOR INE WORK		COMPRESSOR WORK (W/(KG/S))		ÍLABLE WORK W/(KG/S))		ANSFERRED /(Kg/S))
0.	.056		7.270£+05		3.690E+07	16.	800
	Te	MPERATURE	PRESSURE	DENSI	TY EI	NTHALPY	ENTROPY
	-	DEG. K)	(N/M++2)	(KG/M+	*3)	(J/KG)	(J/(KG-K))
STORAGE TAN		18.1	5.07E+04	7.310E		76E+05	7.01E+03
COMPRESSOR I HEAT EXCHAN		43.3 110.0	5.07E+07 5.07E+07	8.650E 1.020E		.51E+05 .66E+07	1.045+04 5.825+04
TURBINE EXI		110.0	1.01E+06	2.200E		61E+07	7.43E+04
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STURAGE PRESSURE (N/M++2)	PRESS. DIFF OF COMP. ST (N/M**2)	AGE OF COMP.		HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M**2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M*+2)
5.07E+04	1.01E+07	0.85	5 1.013E+08	1111.0	1.01E+07	0.85	1.01E+06
	F COMPRESSOR INE WORK		COMPRESSOR WORK (W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0	.087		1.390E+06		3.200E+07	17.	200
	TE	MPERATURE	PRESSURE	DENSI	TY EI	NTHALPY	ENTROPY
	ĩ	DEG. K)	(N/M++2)	{KG/M*		(J/KG)	(J/(KG-K))
STORAGE TAN	ĸ	18.1	5.07E+04	. 7.310E	+01 -2	.76E+05	7.01E+03
COMPRESSOR	EXIT	64.3	1.01E+08	9.2805	+01 1	.11E+06	1.22E+04
TURBINE EXCHAN		110.0	1.01E+08 1.01E+06	1.890E 2.200E		.70E+07 .61E+07	5.538+04 7.438+04
TURDING CAL	· •	110.0	1.010+00	2+200E			1.432704
						2	

TABLE II. - Continued. NONADIABATIC TURBINE CYCLE

			(b) U.S.	customary units			
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF FURB. STAGE (ATM)
0.50	100.0	0.85	500.0	944.4	100.0	0.85	10.00
TO TURB	COMPRESSOR		ESSOR WORK /(L8/S))	()	ILABLE WORK HP/(LB/S))	(MEG-W	ANSFERRED /(L8/SI)
0.	.066		442.0	:	17700.0	٤.	490
	TEMPER (Deg.		PRESSURE (ATM)	DENSI {G/CM+		NTHALPY Cal/G)	ENTROPY (Cal/(G-K))
STORAGE TAN Compressor i Heat Exchan Turbine exit	EXIT 43. GER EXIT 944.	3 0	0.50 500.00 500.00 10.00	7.310E 8.650E 1.180E 2.590E	-02 -02 3	-65.9 108.0 360.0 260.0	1.68 2.49 13.30 17.20
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSUR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	1000.0	944.4	100.0	C.85	10.00
TO TURB	F COMPRESSOR INE WORK 100		ESSOR WORK /(LB/S)) 844.0	()	ILABLE WORK HP/(LB/S)) L5200.0	(MEG-W	ANSFERRED /(LB/S)) 650
	TEMPER (DEG.		PRESSURE (ATM)	DENSI (G/CM++		NTHALPY CAL/G)	ENTROPY (Cal/(G-K))
STORAGE TAN Compressor e Heat exchand Turbine exit	EXIT 64. GER EXIT 944.	3 0	0.50 1000.00 1000.00 10.00	7.310E 9.280E 2.160E 2.590E	-02 3	-65.9 266.0 460.0 260.0	1.68 2.92 12.60 17.20

STORAGE PRESSURE (ATM)	PRESS. DIFF. DF CUMP. STAGE (ATM)	EFFICIENCY DF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	1500.0	944.4	100.0	0.85	10.00
RATIO O	F COMPRESSOR	COMP	RESSOR WORK	۵VA	LABLE WORK	HEAT TR	ANSFERRED
TO TURB	INE WORK		P/(LB/S))	()	HP/(LB/S))	(MEG-W	/(L8/\$))
0	•130		1220.0		13700.0	٤.	790
	TEMPER (Deg.		PRESSURE {ATM}	DENSI (G/CM#+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STURAGE TAN Compressor Heat Exchan Turbiné Exi	EXIT 80. GER EXIT 944.	7 0	0.50 1500.00 1500.00 10.00	7.310E- 9.790E- 3.000E- 2.590E-	-02 -02 3	-65.9 415.0 550.0 260.0	1.68 3.23 12.20 17.20
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)		EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	2000.0	944.4	100.0	0.85	10.00
	F CUMPRESSOR INE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
0	.160		1590.0	:	12500.0	٤.	920
	TEMPER (DEG.		PRESSURE (ATM)	DENSI (G/CM++	-	NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbinë Exi	EXIT 94. GER EXIT 944.	5 0	0.50 2000.00 2000.00 10.00	7.310E- 1.000E- 3.740E- 2.590E-	-01 -02 3	-65.9 557.0 640.0 260.0	1.68 3.47 11.90 17.20

TABLE II. - Continued. NONADIABATIC TURBINE CYCLE

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			(b) Continued	. U.S. customary u	nits		
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (deg. k)	PRESS. DIFF. DF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAG (ATM)
0.50	100.0	0.85	2500.0	944.4	100.0	0.85	10.CC
RATIO OF To turbin	COMPRESSOR IE WORK		ESSOR WORK /{lb/s}}		LABLE WORK IP/(LB/S))		ANSFERRED /(LB/S))
0.1	180		1940.0	1	1600.0	7.	040
	TEMPER (Deg.		PRESSURE (ATM)	DENSI1 (G/CM++		NTHALPY CAL/G)	ENTROPY {Cal/(G-k)}
STORAGE TANK Compressor E) Heat Exchange Turbine Exit		.0 .0	0.50 2500.00 2500.00 10:00	7.310E- 1.100E- 4.390E- 2.590E-	-01 d -02 31	-65.9 596.0 720.0 260.0	1.68 3.68 11.70 17.20
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF CUMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (deg. K)	PRESS. DIFF. DF TURB. STAGE (ATM)	EFFICIENCY OF TURB• STAGE	PRESS AT EXIT OF TURB. STAG (ATM)
0.50	100.0	0.85	3000.0	944.4	100.0	0.85	10.00
RATIO OF To tjrbim	Compressor Ne work		ESSOR WORK V(LB/S))		[LABLE WORK 1P/(LB/S))		ANSFERRED /(LB/S))
0.2	200		2280.0	1	10900.0	7.	140
	TEMPER (deg.		PRESSURE (ATM)	DENSI1 (G/CM++		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TANK Compressor EX			0.50 3000.00 3000.00	7.310E- 1.100E-	-01 8	-65.9 328.0 810.0	1.68 3.85 11.50

	RESS. DIFF. F COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER TEMPERATURE (DEG. K)	PRESS. DIFF. DF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)	
0.50	100.0	0.85	3500.0	944.4	100.0	C.85	10.00	
RATID OF CO TO TURBINE			RESSOR WORK P/(L8/S))		LABLE WORK 197(LB/S))		ANSFERRED /(LB/S))	
0.22	0		2600.0	. 1	10300.0	7.	240	
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM++		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))	
STORAGE TANK Compressor Exi Heat Exchanger Turbine Exit		0	0.50 3500.00 3500.00 10.00	7.310E- 1.100E- 5.520E- 2.590E-	-01 -02 3	-65.9 958.0 890.0 260.0	1.68 4.01 11.40 17.20	
	RESS. DIFF. F COMP. STAGE (ATM) 100.0	EFFICIENCY OF COMP. STAGE 0.85	COMPRESSOR PRESSURE (ATM) 4000.0	HEAT EXCHANGER TEMPERATURE (DEG. K) 944.4		EFFICIENCY OF TURB. STAGE 0.85	PRESS AT EXIT OF TURB. STAGE (ATM) 10.0C	
RATID OF CO To turbine			RESSOR WORK P/(lb/s))		ILABLE WORK 1P/(LB/S))		ANSFERRED /(LB/S))	
0.24	0		2930.0		9700.0	7.	340	
	TEMPER (Deg.		PRESSURE (ATM)	DENSII (G/CM++		NTHALPY CAL/G)	ENTROPY (Cal/(G-K})	
STORAGE TANK Compressor exi Heat exchanger Turbine exit		0 0	0.50 4000.00 4000.00 10.00	7.310E- 1.100E 6.010E- 2.590E-	-01 1 -02 3	-65.9 080.0 970.0 260.0	1.68 4.15 11.20 17.20	
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TABLE II. - Continued. NONADIABATIC TURBINE CYCLE

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(b) Continued. U.S. customary units

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	4500.0	944.4	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK P/{lb/s}}		ILABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
0	•260		3240.0		9210.0	7.,	430
	TEMPER (deg.		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 147. GER EXIT 944.	0	0.50 4500.00 4500.00 10.00	7.310E 1.200E 6.460E 2.590E	-01 11 -02 4	-65.9 210.0 C50.0 260.0	1.68 4.28 11.10 17.20
STORAGE PRESSURE {ATM}	PRESS. DIFF. Of COMP. STAGE (ATM)	EFFICIENCY DF COMP• STAGE	COMPRESSOR PRESSURE {ATM}	HEAT EXCHANGER Temperature {Deg. K}	PRESS• DIFF• OF TURB• STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	5000.0	944.4	100.0	0.85	10.CC
	F COMPRESSOR INE WORK		RESSOR WORK V(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(lb/s))
O	• 270		3550.0		8770.0	7.	510
	T EMPER (Deg.		PRESSURE (ATM)	DENSI {G/CM+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 156. GER EXIT 944.	0 0	0.50 5000.00 5000.00 10.00	7.310E- 1.200E- 6.870E- 2.590E-	-01 1: -02 4	-65.9 330.0 130.0 260.0	1.68 4.40 11.00 17.20

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (DEG. K)	PRESS. DIFF. DF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE (ATM)
0.50	100.0	0.85	500.0	1111.0	100.0	0.85	10.00
	F CUMPRESSOR INE WORK		ESSOR WORK V(LB/S))		LABLE WORK		ANSFERRED /(LB/S))
0	• 056		442.0	:	22500.0	7.	630
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM++		(THALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 43. GER EXIT 1110.	3 0	0.50 500.00 500.00 10.00	7.310E- 8.650E- 1.020E- 2.210E-	-02 1 -02 39	-65.9 108.0 560.0 260.0	1.68 2.49 13.90 17.80
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. Of Turb. Stage (ATM)	EFFICIENCY OF TUR8. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	1000.0	1111.0	100.0	C.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK V/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
0	.087		844.0	:	19500.0	7.	790
	TEMPER (deg.		PRESSURE (ATM)	DENSI {G/CM+		NTHALPY (Al/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 64. GER EXIT 1110.	3 0	0.50 1000.00 1000.00 10.00	7.310E 9.280E 1.890E 2.210E	-02 2 -02 40	-65.9 266.0 260.0 860.0	1.68 2.92 13.20 17.80

TABLE II. - Continued. NONADIABATIC TURBINE CYCLE

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(b) Continued. U.S. customary units

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE (ATM)
0.50	100.0	0.85	1500.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR INE WORK		ESSOR WORK		ILABLE WORK HP/(LB/S))		ANSFERREC /(LB/S))
0.	.110		1220.0	:	17600.0	7.	940
	T E MPEI (DEG	RATURE . K)	PRESSURE (ATM)	DENSI {g/cm+		NTHALPY CAL/G)	ENTROPY {CAL/(G-K)}
STORAGE TAN Compressor f Heat Exchan Turbine Exi	EXIT 80. Ger Exit 1110	.7 .0	0.50 1500.00 1500.00 10.00	7.310E 9.790E 2.650E 2.210E	-02 4	-65.9 415.0 150.0 660.0	1.68 3.23 12.80 17.80
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP• STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT Of Turb. Stage (ATM)
0.50	100.0	0.85	2000.0	1111.0	100.0	0.85	16.00
	F COMPRESSOR INE WORK		ESSOR WORK		ILABLE WORK HP/(LB/S))		ANSFERRED /(le/s))
0.	• 140		1590.0		16300.0	٤.	080
	TEMPE (Deg	RATURE • K)	PRESSURE (ATM)	DENS1 {G/CM+		NTHALPY Cal/g)	ENTRCPY (CAL/(G-K))
STORAGE TAN Compressor (Heat Exchand Turbine Exi	EXIT 94. GER EXIT 1110-	.5 .0	0.50 2000.00 2000.00 10.00	7.310E 1.000E 3.320E 2.210E	-01 -02 4	-65.9 557.0 240.0 860.0	1.68 3.47 12.50 17.80

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	2500.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(L0/S))
0	.160		1940.0	1	15200.0	£ .	210
	TEMPER (Deg.		PRESSURE (ATM)	DENSIT (G/CM++		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 107. GER EXIT 1110.	0	0.50 2500.00 2500.00 10.00	7.310E- 1.100E- 3.930E- 2.210E-	-01 6 -02 41	-65.9 196.0 230.0 360.0	1.68 3.68 12.30 17.80
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	3000.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(Le/S))
0	.170		2280.0	1	14300.0	٤.	320
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM+4		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbinf Exi	EXIT 118. GER EXIT 1110.	.0 .0	0.50 3000.00 3006.00 10.00	7.310E- 1.100E- 4.490E- 2.210E-	-01 -02 4	-65.9 828.0 420.0 860.0	1.68 3.85 12.10 17.80

TABLE II. - Concluded. NONADIABATIC TURBINE CYCLE

(b) Concluded. U.S. customary units

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE {ATM}	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	3500.0	1111.0	100.0	0.85	10.00
		CONP	ESSOR WORK		LABLE WORK	HFAT TR	ANSFERRED
TO TURBI			P/(L8/S))		HP/(LB/S))		/(LE/S))
0.	.190		2600.0	:	13500.0	e .	430
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM+		THALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TÀNH Compressor e Heat Exchanc Turbine Exit	EXIT 128. GER EXIT 1110.	0 0 .	0.50 3500.00 3506.00 10.00	7.310E 1.100E 4.990E 2.210E	-01 -02 41	-65.9 958.0 500.0 360.0	1.68 4.01 12.00 17.80
STORAGË PRESSURE (ATM)	PRESS. DIFF. DF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB• STAGE	PRESS AT EXIT CF TURB. STAGE (ATM)
0.50	100.0	0.85	4000.0	1111.0	100.0	C•85	10.00
	COMPRESSOR INE WORK		RESSOR WORK V(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(lb/s))
0.	.210		2930.0		12900.0	e •	540
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY Cal/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor I Heat Exchanc Turbine Exit	EXIT 138. GER EXIT 1110.	0	0.50 4000.00 4000.00 10.00	7.310E 1.100E 5.460E 2.210E	-01 10 -02 4	-65.9 280.0 580.0 860.0	1.68 4.15 11.80 17.80

STORAGE PRESSURE (ATM)	PRESS. DIFF. UF Comp. Stage (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature {deg. k}	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE (ATM)
0.50	100.0	0.85	4500.0	1111.0	100.0	0.85	10.00
	DF COMPRESSOR Dine Work		RESSOR WORK P/{lb/s}}		(LABLE WORK 1P/(LB/S))		ANSFERRED /(L0/S))
c	. 220		3240.0	1	2300.0	• ع	630
	TEMPER (deg.		PRESSURE (ATM)	DENSI (g/CM+)		NTH ALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAM Compressor Heat Exchan Turbint Exi	EXIT 147. IGER EXIT 1110.	0	0.50 4500.00 4500.00 10.00	7.310E- 1.200E- 5.890E- 2.210E-	-01 17 -02 40	-65.9 210.0 660.0 860.C	1.68 4.28 11.7C 17.8C
STORAGE PRESSURE (ATM)	PRESS. DIFF. Of Comp. Stage (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	Ç.85	5000.0	1111.0	100.0	0.85	10.00
	DF COMPRESSOR Bine Work		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S})		ANSFERRED /(LB/S))
c	.240		3550.0	1	11700.0	8.	730
	T EMPER (deg		PRESSURE (ATM)	DENSI (G/CM++		NTHALPY Cal/g)	ENTROPY (CAl/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 156. NGER EXIT 1110.	.0 .0	0.50 5000.00 5000.00 10.00	7.310E- 1.200E- 6.300E- 2.210E-	-01 1: -02 4	-65.9 330.0 740.0 860.0	1.68 4.40 11.60 17.80

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TABLE III. - ADIABATIC TURBINE CYCLE

				(a) SI units			
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M*+2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. k)	PRESS. DIFF. DF TURB. STAGE (N/M++2)	EFFICIENCY ` OF TURB. STAGE	PRESS AT EXI OF TURB. STA (N/M*+2)
5.07E+04	1.01E+07	0.85	5.066E+07	944.4	1.01E+07	0.85	1.01E+06
	IF COMPRESSOR SINE WORK		RESSOR WORK W/(Kg/S))		ILABLE WORK W/(KG/S))		ANSFEFRED /(KG/S))
0	.094		7.270E+05	:	2.920E+07	13.	600
	T EMPER (DEG.		PRESSURE (N/M++2)	DENSI { KG/M++		NTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGË TAN Compressor Heat exchan Turbinë exi	EXIT 43. IGER EXIT 944.	.3	5.07E+04 5.07E+07 5.07E+07 1.01E+06	7.310E- 8.650E- 1.180E- 6.400E-	+01 4. +01 1	.76E+05 .51E+05 .41E+07 .39E+06	7.01E+03 1.04E+04 5.57E+C4 5.88E+04
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. 9F COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXI OF TURB. STA (N/M=+2)
5.07E+04	1.01E+07	0.85	1.013E+08	944.4	1.01E+07	0.85	1.01E+06
	IF COMPRESSOR INE WORK		RESSOR WORK H/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S})
٥	•140	:	1 •390E+06		2•500E+07	12.	400
	T EMPER (DEG a		PRESSURE (N/M++2)	DENSI (KG/M++		(THALPY (J/KG)	ENTROPY (j/(kg-k))
STORAGE TAN Compressor Heat Exchan Turbine exi	EXIT 64. IGER EXIT 944.	.3 .0	5.07E+04 1.01E+08 1.01E+08	7•310E+ 9•280E+ 2•160E+	+01 1	.76E+05 .11E+06 .45E+07	7.01E+03 1.22E+04 5.29E+04

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STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M*+2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.078+04	1.01E+07	0.85	1.520E+08	944.4	1.01E+07	0.85	1.01E+06
TO TURB	F COMPRESSOR INE WORK •190	- (v	ESSDR WORK //(Kg/S)) 2.010E+06	ť	(LABLE WORK W/(KG/S)) 2.250E+07		ANSFERRED /(KC/S))
·	•••	-					•••
	TEMPER (deg.		PRESSURE (N/M++2)	DENSI (Kg/M++		NTHALPY (J/KG)	ENTRCFY (j/(kg-k))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 80. GER EXIT 944.	.7	5.07E+04 1.52E+08 1.52E+08 1.01E+06	7.310E4 9.790E4 3.000E4 8.200E4	•01 1 •	76E+05 74E+06 49E+07 15E+06	7.01E+03 1.35E+04 5.12E+04 5.51E+04
STORAGE	PRESS. DIFF.	EFFICIENCY	COMPRESSOR	HEAT EXCHANGER	PRESS. DIFF.	EFFICIENCY	PRESS AT EXIT
PRESSURE (N/M++2)		OF COMP. STAGE	PRESSURE (N/M++2)	TEMPERATURE (DEG. K)	DF TURB. STAGE (N/M=+2)	OF TURB. STAGE	OF TURB. STAGE (N/M++2)
5.07E+04	1.01E+07	0.85	2.026E+08	944.4	1.01E+07	0.85	1.01E+06
	F COMPRESSOR INE WORK		RESSOR WORK #/(Kg/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(Kg/S))
0	.230	:	2.610E+06	:	2.060E+07	12.	900
	TEMPE	RATURE	PRESSURE	DENSI	TY EI	NTHALPY	ENTROFY
	(DEG	. к)	(N/M++2)	(KG/M+		(J/KG)	(J/(KG-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 94. GER EXIT 944	.5	5.07E+04 2.03E+08 2.03E+08 1.01E+06	7.310E 1.020E 3.740E 8.800E	+02 2 +01 1	.76E+05 .33E+06 .52E+07 .88E+06	7.01E+03 1.45E+04 5.00E+04 5.42E+04

TABLE III. - Continued. ADIABATIC TURBINE CYCLE

(a) Continued. SI units

STORAGE PRESSURE (N/M##2)	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	CUMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. K)	PRESS. DIFF. OF TURB. STAGE {N/M*+2}	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE (N/M++2)
5.07E+04	1.01E+07	0.85	2.533E+08	944.4	1.01E+07	0.85	1.01E+06
TO TURB	F COMPRESSOR INE WORK • 270	ť	RESSOR WORK W/(KG/S)) 3.190±+06	ť	ILABLE WORK W/(KG/S)) L.910E+07		ANSFERRED /(Kg/S)) 7CC
	T EMPER (Deg.		PRESSURE (N/M++2)	DENSI {Kg/m=		NTHALPY (j/kg)	ENTROPY (j/(kg-k))
STORAGE TAN Compressor Heat Exchan Turbinë Exi	EXIT 107. GEREXIT 944.	.0	5.07E+04 2.53E+08 2.53E+08 1.01E+06	7.310E 1.060E 4.390E 9.300E	+02 2 +01 1	•76E+05 •91E+06 •56E+07 •64E+06	7.01E+03 1.54E+04 4.91E+C4 5.33E+04
STORAGE PRESSURE {N/M++2}	PRESS. DIFF. UF COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M==2)	EFFICIENCY OF TURB. SIAGE	PRESS AT EXIT Of Turb. Stage {N/M**2}
5.07E+04	1.01E+07	0.85	3.040E+08	944.4	1.01E+07	0.85	1.01E+06
TO TURB	F COMPRESSOR INE WORK • 300	t	RESSOR WORK W/(KG/S)) 3.740E+06	ť	ILABLE WORK W/(KG/S)) L.790E+07		ANSFERRED /(KG/S)) 5CC
	TEMPER (Deg.		PRESSURE (N/M++2)	DENSI (Kg/m+		NTHALPY (j/kg)	ENTROPY (j/(kg-k))
STORAGE TAN Compressor I Heat Exchance Turbing Exit	EXIT 118. GER EXIT 944.	0	5.07E+04 3.04E+08 3.04E+08 1.01E+06	7.310E 1.090E 4.980E 9.600E	+02 3. +01 1.	•76E+05 •47E+06 •59E+07 •53E+08	7.C1E+03 1.61E+04 4.83E+04 5.25E+04

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STORAGE PRESSURE (N/M=+2)	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE {N/M++2}	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M**2)	EFFICIENCY OF TURB. SIAGE	PRESS AT EXIT CF TURB. STAGE (N/M##2)
5.07E+04	1.01E+07	0.85	3.546E+08	944.4	1.01E+07	0.85	1.01E+06
TO TURE	DF COMPRESSOR Bine Work D.330	()	RESSOR WORK W/(KG/S)) 4.280E+06	(ILABLE WORK W/(KG/S)) 1.690E+07	(MEG-W	ANSFERREC /(Kg/s)) 30C
STORAGE TAM	TEMPEF (DEG.	. K)	PRESSURE (N/M*+2) 5.07E+04	DENSI (KG/M+ 7.310E	•3)	NTHALPY (J/KG) •76E+05	ENTROPY (j/(kg-k)) 7.01E+03
COMPRESSOR HEAT EXCHAN TURBINE EXI	EXIT 128 NGER EXIT 944	.0	3.55E+08 3.55E+08 1.01E+06	1.12CE 5.520E 9.900E	+02 4 +01 1	•01E+06 •63E+07 •41E+06	1.68E+04 4.76E+04 5.24E+04
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STORAGE Pressure (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT DF TURB. STAGE (N/M++2)
5.07E+04	1.01E+07	0.85	4.053E+08	944.4	1.01E+07	0.85	1.01E+06
	DF CUMPRESSOR BINE WORK		RESSOR WORK W/(KG/S})		ILABLE WORK W/{KG/S}}		ANSFERRED //(KG/S))
C	.360		4.810E+06		1.590E+07	12.	100
	TEMPEI (deg		PRESSURE (N/M++2)	DENSI {KG/M+		NTH AL PY (j/kg)	ENTROPY (j/(kg-k))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 138 NGER EXIT 944	.0 .0	5.07E+04 4.05E+08 4.05E+08 1.01E+06	7.310E 1.140E 6.010E 1.020E	+02 4 +01 1	•76E+05 •54E+06 •66E+07 •27E+06	7.01E+03 1.74E+04 4.7CE+04 5.18E+04

TABLE III. - Continued. ADIABATIC TURBINE CYCLE

(a) Continued. SI units

STORAGE Pressure (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (deg. k)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M**2)
5.07E+04	1.01E+07	0.85	4.560E+08	944.4	1.01E+07	C.85	1.01E+06
	F COMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		[LABLE WORK W/(KG/S))		ANSFERRED /(K@/S))
0.	.390		5.330E+06		1.510E+07	11.	900
	TEMPER (Deg.		PRESSURE (N/M##2)	DENSI (KG/M+		NTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TAN	EXIT 147.	ō	5.07E+04 4.56E+08	7.310E 1.160E	+02 54	.76E+05 .05E+06	7.01E+03 1.79E+04
HEAT EXCHANG Turbine exi			4.56E+08 1.01E+06	6.460E 1.040E		69E+07 22E+06	4.65E+04 5.16E+04
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STORAGE Pressure (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M**2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M==2)	HEAT EXCHANGER TEMPERATURE (DEG. K)	PRESS. DIFF. OF TURB. STAGE (N/M**2)	EFFICIENCY OF TURB. SIAGE	PRESS AT EXIT OF TURB. STAGE (N/M*#2)
5.07E+)4	1.01E+07	0.85	5.066E+08	944.4	1.01E+07	C.85	1.01E+06
	F COMPRESSOR INE WORK		RESSOR WORK W/(Kg/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0.	.410		5.840E+06	:	1.440E+07	11.	700
	TEMPER (deg.		PRESSURE (N/M++2)	DENSI (KG/M+		NTHALPY (J/KG)	ENTROPY (J/(KG-K))
STORAGE TAN		-	5.07E+04 5.07E+08	7.310E 1.180E		.76E+05 .56E+06	7.01E+03 1.84E+04
HEAT EXCHANG	GER EXIT 944.	0	5.07E+08 1.01E+06	6.870E- 1.060E-	+01 1.	73E+07 14E+06	4.61E+04 5.13E+C4

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STORAGE PRESSURE (N/M++2)	PRESS. DIFF. Of COMP. STAGE (N/M++2)	EFFICIENCY OF CUMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M**2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAG (N/M=+2)
5.07E+04	1.01E+07	0.85	5.066E+07	1111.0	1.01E+07	0.85	1.01E+06
RATIO OF To turbi	- COMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		[LABLE WORK W/(KG/S))		ANSFERRED /{KG/S}}
0.	.071	-	•270E+05	1	3.690E+07	16.	100
	TEMPER (deg.		PRESSURE (N/M++2)	DENSI (KG/M+		NTHALPY (J/KG)	ENTROPY (j/(kg-k))
STORAGE TANK Compressor e Heat exchang Turbing exit	EXIT 43. GER EXIT 1110.	3	5.07E+04 5.07E+07 5.07E+07 1.01E+06	7.310E 8.650E 1.020E 5.400E	+01 4. +01 1.	.76E+05 .51E+05 .66E+07 .41E+06	7.01E+03 1.04E+04 5.82E+04 6.12E+04
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAG (N/M##2)
5.07E+04	1.01E+07	0.85	1.013E+08	1111.0	1.01E+07	0.85	01E+06
RATID OF TO TURBI	CUMPRESSOR INE WORK		RESSOR WORK		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S))
0.	120	1	L•390E+06	:	3.200E+07	15.	900
	TEMPER (Deg.		PRESSURE (N/M++2)	DENSI (KG/M+4		NTHALPY (J/KG)	ENTROPY {j/(kg-k)}
	(18.	1'	5.07E+04	7.310E		76E+05	7.01E+03

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TABLE III. - Continued. ADIABATIC TURBINE CYCLE

			(a) Cont	inued. SI units			
	ESS. DIFF. COMP. STAGE {N/M=+2}	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT DF TURB. STAGE (N/M*#2)
5.07E+04	1.01E+07	0.85	1.520E+08	1111.0	1.01E+07	0.85	1.01E+06
RATID OF CU To turbine (ESSOR WORK /(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED / (KG/S) }
0.160		2	•010E+06	:	2.900E+07	15.	600
	TEMPER (DEG.		PRESSURE	DENS [] { KG / M*+		STHALPY (J/KG)	ENTROPY {j/(kg-k))
STORAGE TANK Compressor exit Heat exchanger e Turbine exit	18. 80. EXIT 1110. 350.	7 0	5.07E+04 1.52E+08 1.52E+08 1.01E+06	7.310E 9.790E 2.650E 7.000E	+01 1. +01 1.	.76E+05 .74E+06 .74E+07 .94E+06	7.01E+03 1.35E+04 5.37E+04 5.75E+04
	ESS. DIFF. COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT Of Turb. Stagi (N/M*#2)
5.07E+04	1.01E+07	0.85	2.026E+08	1111.0	1.01E+07	0.85	1.01E+06
RATIO OF CU To turbine (ESSOR WORK /(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED / (KG/S))
0.200		2	•610E+06	i	2.670E+07	15.	400
	TEMPER (DEG.		PRESSURE (N/M=+2)	DENSI {KG/M+4		(THALPY (J/KG)	ENTROPY (j/(kg-k))
STORAGE TANK Compressor exit Heat exchanger (Turbine exit	18. 94. EXIT 1110. 328.	5 0	5.07E+04 2.03E+08 2.03E+08 1.01E+06	7•310E- 1•020E- 3•320E- 7•400E-	+02 2. +01 1.	.76E+05 .33E+06 .78E+07 .62E+06	7.01E+03 1.45E+04 5.25E+04 5.66E+04

STORAGE PRESS. D PRESSURE OF COMP. (N/M++2) (N/M+	STAGE OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE {N/M*+2}	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M*+2)
5+07E+34 1+01E	+07 0.85	2.533E+08	1111.0	1.01E+07	0.85	1.01E+06
RATID OF COMPRESS		PRESSOR WORK		ILABLE WORK W/(Kg/S))		ANSFERRED / (KG/S))
TO TURBINE WORK	,	W/(KG/S)) 3.190E+06		*/(KG/3/) 2.500E+07	15.	
0.230		3.1901.00			154	200
	TEMPERATURE (DEG. K)	PRESSURE (N/M++2)	DENSI" (KG/M+)		NTHALPY (J/KG)	ENTROPY (j/(kg-k))
STORAGE TANK Compressor Exit Heat Exchanger Exit	18.1 107.0 1110.0	5.07E+04 2.53E+08 2.53E+08	7.310E 1.060E 3.930E	+02 2. +01 1.	•76E+05 •91E+06 •81E+07	7.01E+03 1.54E+04 5.15E+04
TURBINE EXIT	312.0	1.01E+06	7.800E·	-01 4	•39E+06	5.59E+04
STORAGE PRESS. D PRESSURE OF COMP. (N/M++2) (N/M+	STAGE OF COMP. STAGE	COMPRESSOR PRESSURE {N/M*+2}	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M*+2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.07E+04 1.01E	+07 0.85	3.040E+08	1111.0	1.01E+07	0.85	1.01E+06
RATIO OF COMPRESS To tjrbine work		PRESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /{kg/s})
0.260		3.740E+06	:	2.350E+07	15.	000
	TEMPERATURE (deg. k)	PRESSURE {N/M++2}	DENSI (Kg/m+		NTHALPY (j/kg)	ENTROPY (j/(kg-k))
STORAGE TANK Compressor exit	18.1 118.0	5.07E+04 3.04E+08	7.310E 1.090E		•76E+05 •47E+06	7.01E+03 1.61E+04
HEAT EXCHANGER EXIT Turbine exit	1110.0 300.0	3.04E+08 1.01E+06	4.490E 8.100E		•85E+07 •21E+06	5.08E+04 5.53E+04

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TABLE III. - Continued. ADIABATIC TURBINE CYCLE

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(a) Concluded. SI units

STORAGE PRESSURE {N/M++2}	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (N/M##2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.07E+04	1.016+07	0.85	3.546E+08	1111.0	1.01E+07	0.85	1.01E+06
	F CUMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		LABLE WORK W/(KG/S))		ANSFERRED /(Kg/S))
0	• 29ü		4.280E+06	;	2.220E+07	14.	800
	TEMPER (Deg.		PRESSURE (N/M++2)	DENSI (KG/M*		NTHALPY (J/KG)	ENTROPY {J/(KG-K)}
STORAGE TAN Compressor Heat Exchan Turbint Exi	EXIT 128. GER EXIT 1110,	0	5.07E+04 3.55E+08 3.55E+08 1.01E+06	7.310E 1.120E 4.990E 8.400E	+02 4. +01 1.	.76E+05 .01E+06 .88E+07 .06E+06	7.01E+03 1.68E+04 5.01E+04 5.48E+04
STORAGE PRESSURE {N/M++2}	PRESS. DIFF. OF COMP. STAGE (N/M++2)	EFFICIENCY OF COMP. STAGE	COMPRESSUR PRESSURE (N/M++2)	HEAT EXCHANGER TEMPERATURE (DEG. K)	PRESS. DIFF. Of Turb. Stage (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M++2)
5.07E+04	1.01E+07	0.85	4.053E+08	1111.0	1.01E+07	0.85	1.01E+06
	F COMPRESSOR Ine work		RESSOR WORK W/(KG/S))		LABLE WORK W/(KG/S))		AN SFE PR ED / (KG/S))
0	. 320		4.810E+06	:	2.110E+07	14.	600
	TEMPER (deg.		PRESSURE {N/M++2}	DENSI (KG/M++		ITHALPY J/KG]	ENTROPY (J/(KG-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 138. GER EXIT 1110.	ō o	5.07E+04 4.05E+08 4.05E+08 1.01E+06	7.310E4 1.140E4 5.460E4 8.600E4	+02 4. +01 1.	76E+05 54E+06 92E+07 94E+06	7.01E+03 1.74E+04 4.96E+04 5.44E+04

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STORAGE PRESSURE (N/M++2)	PRESS. DIFF. DF CDMP. STAG (N/M++2)	EFFICIENCY E OF COMP. STAGE	COMPRESSOR PRESSURE {N/M#+2}	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (N/M++2)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (N/M**2)
5.07E+04	1.01E+07	0.85	4.560E+08	1111.0	1.01E+07	0.85	1.01E+06
RATID OF To Turbi	- CUMPRESSOR INE WORK		RESSOR WORK W/(KG/S))		ILABLE WORK W/(KG/S))		ANSFERRED /(KG/S)]
0.	340		5.330E+06	:	2.020E+07	_ 4 •	500
		ERATURE G. K)	PRESSURE (N/M++2)	DENSI (KG/M+4		ITHALPY J/KG)	ENTROPY (j/(KG-K))
STORAGE TANK Compressor e		8.1	5.07E+04 4.56E+08	7.310E4 1.160E4		76E+05 05E+06	7.01E+03 1.79E+04
HEAT EXCHANC	GER EXIT 111	0.0	4.56E+08 1.01E+06	5.890E- 9.000E-	+01 1.	,95E+07 ,79E+06	1.79E+04 4.91E+04 5.38E+04
STORAGE PRESSURE (N/M++2)	PRESS. DIFF. OF COMP. STAC (N/M++2)	EFFICIENCY E OF COMP. STAGE	COMPRESSOR PRESSURE (N/M++2)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. Of Turb. Stage (N/M++2)	EFFICIENCY OF TURB• STAGE	PRESS AT EXIT OF TURB, STAGE ` (N/M*+2)

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5.07E+04	1.01E+07	0.85	5.066E+08	1111.0	1.01E+07	0.8	1.01E+06	
RATIO OF COM To Turbine W			ESSOR WORK /(Kg/s))	۸V	AILABLE WORK (W/(KG/S))		HEAT TRANSFERRED (MEG-W/(KG/S))	
0.360		5	•840E+06		1.930E+07		14.300	
	TEMPERATURE	:	PRESSURE	DENS		ENTHALPY	ENTROPY	
	(DEG. K)		(N/M++2)	(KG/M		(J/KG)	(J/(KG-K))	•
STORAGE TANK Compressor exit Heat exchanger e Turbine exit	18.1 156.0 XIT 1110.0 270.0		5.07E+04 5.07E+08 5.07E+08 1.01E+06	7.310 1.180 6.300 9.000	E+02 E+01	-2.76E+05 5.56E+06 1.98E+07 3.75E+06	7.01E+03 1.84E+04 4.86E+04 5.37E+04	

TABLE III. - Continued. ADIABATIC TURBINE CYCLE

(b) U.S. customary units

STORAGE PRESSURE (ATM)	PRESS. DIFF. Of Comp. Stage (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE {ATM}	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE {ATM}
0.50	100.0	0.85	500.0	944.4	100.0	0.85	10.00
	F COMPRESSOR Ine Work		RESSOR WORK P/(LB/S})		LABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
0	•084		442.0	:		t.	170
	TEMPER (DEG.		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 43. GER EXIT 944.	3 0	0.50 500.00 500.00 10.00	7.310E 8.650E 1.180E 6.410E	-02 1 -02 3	-65.9 108.0 360.0 290.0	1.68 . 2.49 13.30 14.10
STORAGË PRESSURE (ATM)	PRESS. DIFF. DF COMP. STAGE (ATM)	EFFICIENCY OF CUMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. DF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT Of TURB. STAGE (ATM)
0.50	100.0	0.85	1000.0	944.4	100.0	0.85	10.00
	F COMPRESSOR Ine work		RESSOR WORK V(LB/S))		[LABLE WORK HP/(LB/S))		ANSFERRED ((LB/S))
0	•140		844.0	:	15200.0	٤.	060
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM+		THALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 64. GER EXIT 944.	3 0	0.50 1000.00 1000.00 10.00	7.310E- 9.280E- 2.160E- 7.600E-	-02 2 -02 34	-65.9 266.0 660.0 280.0	1.68 2.92 12.60 13.50

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STORAGE PRESSURI (ATM)	PRESS. DIFF. OF COMP. STAG (ATM)	EFFICIENCY E OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	1500.0	944.4	100.0	0.85	10.00
	D OF COMPRESSOR TURBINE WORK		RESSOR WORK P/(LB/S))		LABLE WORK IP/(LB/S))		ANSFERRED /(LB/S))
	0.190		1220.0	I	3700.0	5.	950
		ERATURE G. K)	PRÉSSURE (ATM)	DENSII (G/CM++		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE Compress Heat Exi Turbine	SOR EXIT B CHANGER EXIT 94	8.1 0.7 4.0 7.0	0.50 1500.00 1500.00 10.00	7.310E- 9.790E- 3.000E- 8.230E-	-02 4 -02 3	-65.9 415.0 550.0 992.0	1.68 3.23 12.20 13.20
STORAGE PRESSUR (ATM)	PRESS. DIFF. E OF COMP. STAG (ATM)	EFFICIENCY E OF COMP• STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	2000.0	944.4	100.0	0.85	10.00
	ID OF COMPRESSOR TURBINE WORK		RESSOR WORK P/(LB/S))		[LABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
	0.230		1590.0	:	12500.0	5.	850

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	TEMPERATURE (DEG. K)	PRESSURE (ATM)	DENSITY (G/CM++3)	ENTHALPY (CAL/G)	ENTROPY (CAL/(G-K))	
STORAGE TANK Compressor Exit Heat Exchanger Exit Turbine Exit	18.1 94.5 944.0 278.0	0.50 2000.00 2000.00 10.00	7.310E-02 1.000E-01 3.740E-02 8.770E-04	-65.9 557.0 3640.0 928.0	1.68 3.47 11.90 12.90	
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TABLE III. - Continued. ADIABATIC TURBINE CYCLE

(b) Continued. U.S. customary units

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperäture (deg. K)	PRESS. DIFF. Of Turb. Stage (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	2500.0	944.4	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK P/(LB/S))		(LABLE WORK 1P/(LB/S))		ANSFERRED /(LB/S))
0	. 270		1940.0	1	1600.0	5.	750
	TEMPER (DEG.		PRESSURE (ATM)	DENSI1 (G/CM++		ITHALPY (AL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan	EXIT 107. GER EXIT 944.	0	0.50 2500.00 2500.00	7.310E- 1.100E- 4.390E-	-01 é -02 37	-65.9 96.0 120.0	1.68 3.68 11.70
TURBINE EXI	T 263.	0	10.00	9.300E-	-04 8	270.0	12.70
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. Of turb. stage (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	3000.0	944.4	100.0	0.85	10.00
	F COMPRESSOR Ine work		RESSOR WORK P/(LB/S))		LABLE WORK IP/(LB/S))		ANSFERRED /(LB/S))
0.	. 300		2280.0	1	.0900.0	5.0	560
	TEMPER (Deg.		PRESSURE (ATM)	DENSI1 {G/CM++		THALPY AL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor (Heat exchan	EXIT 118.	0	0.50 3000.00 3000.00	7.310E- 1.100E- 4.980E-	-01 8	65.9 28.0 10.0	1.68 3.85 11.50
TURBINE EXI			10.00	9.550E-		45.0	12.60

STORAGE PRESSURE (ATM)	PRESS. DIFF. UF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature {Deg. K}	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	3500.0	944.4	100.0	0.85	10.00
	DF CUMPRESSOR Bine Work		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S])		ANSFERRED /{lb/s}}
c	.330		2600.0	1	10300.0	5.	570
	T EMPER (Deg .		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 128. IGER EXIT 944.	0	0.50 3500.00 3500.00 10.00	7.310E 1.100E 5.520E 9.860E	-01 9 -02 36	-65.9 958.0 990.0 915.0	1.68 4.01 11.40 12.50
STORAGE PRESSURE (ATM)	PRESS. DIFF. Of Comp. Stage (Atm)	EFFICIENCY OF COMP• STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. Of Turb. Stage (ATM)	EFFICIENCY OF TURB• STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	4000.0	944.4	100.0	0.85	10.00
	DF COMPRESSOR BINE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
c	0.360		2930.0		9700.0	5.	480
	T EMPER (DEG .		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 138. NGER EXIT 944.	.0 .0	0.50 4000.00 4000.00 10.00	7.310E- 1.100E- 6.010E- 1.020E-	-01 10 -02 39	-65.9 C80.0 970.0 781.0	1.68 4.15 11.20 12.40

TABLE III. - Continued. ADIABATIC TURBINE CYCLE

(b) Continued. U.S. customary units

STORAGE Pressure (Atm)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY DF COMP• STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (deg. k)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB• STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	4500.0	944.4	100.0	0.85	10.00
RATID OF TO TJRBI	COMPRESSOR Ne Work		RESSOR WORK P/(LB/S))		LABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
0.	390		3240.0		9210.0	5.	390
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM++		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TANK Compressor e	XIT 147.	0	0.50 4500.00	7.310E- 1.200E-	-01 12	-65.9 210.0	1.68 4.28
HEAT EXCHANG TURBINE EXIT			4500.00 10.00	6.460E- 1.040E-		050.0 170.0	11.10 12.30
STORAGE PRESSURE (ATM)	PRESS. DIFF. Of COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	5000.0	944.4	100.0	0.85	10.CC
RATIO OF To Turbi	COMPRESSOR Ne work		RESSUR WORK P/(LB/S))		LABLE WORK P/(LB/S))		ANSFERRED /(LB/S))
0.	410		3550.0		8770.0	5.	310
	TEMPER (DEG.		PRESSURE (ATM)	DENSI (G/CM++		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TANK Compressor e Heat exchang Turbine exit	XIT 156. ER EXIT 944.	0 0	0.50 5000.00 5000.00 10.00	7.310E- 1.200E- 6.870E- 1.060E-	-01 13 -02 41	-65.9 330.0 130.0 751.0	1.68 4.40 11.00 12.30

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STORAGE PRESSURE [ATM]	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR Pressure (ATM)	HEAT EXCHANGER Temperature (deg. k)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY Of Turb, Stage	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	500.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR TNE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(LB/S))
0.	.071		442.0	:	22500.0	7.	310
	TEMPER {deg.		PRESSURE (ATM)	DENSI {G/CM+		(THALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TANK Compressor e Heat exchanc Turbine exit	EXIT 43. GER EXIT 1110.	3 0	0.50 500.00 500.00 10.00	7.310E 8.650E 1.020E 5.420E	-02 1 -02 3 9	65.9 (08.0 (60.0 (30.0	1.68 2.49 13.90 14.60
STORAGE PRESSURE {ATM}	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER TEMPERATURE (DEG•K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT Of TURB. STAGE (ATM)
0.50	100.0	0.85	1000.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK 1P/(LB/S))		ANSFERRED /(L8/S))
0.	.120		844.0		19500.0	7.	200
	TEMPER (DEG.		PRESSURE (ATM)	DENSI {g/cm+		NTHALPY (Al/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor (Heat Exchand Turbine Exit	EXIT 64. GER EXIT 1110.	3 0	0.50 1000.00 1000.00 10.00	7.310E 9.280E 1.890E 6.370E	-02 2 -02 40	-65.9 266.0 260.0 300.0	1.68 2.92 13.20 14.10

TABLE III, - Continued, ADIABATIC TURBINE CYCLE

(b) Continued. U.S. customary units

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (deg. k)	PRESS. DIFF. DF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	1500.0	1111.0	100.0	0.85	10.0C
	DF COMPRESSOR DINE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(Le/s))
o	.160		1220.0	:	17600.0	7.	090
	T EMPER		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor			0.50 1500.00	7•310E 9•790E		-65.9 415.0	1.68 3.23
HEAT EXCHAN	GER EXIT 1110.	0	1500.00 10.00	2.650E- 6.980E-	-02 43	150.0 180.0	12.80 13.8C
STORAGE PRESSURE (ATM)	PRESS. DIFF. Of Comp. Stage (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	2000.0	1111.0	100.0	0.85	10.00
	DF COMPRESSOR		RESSOR WORK P/{lb/s})		ILABLE WORK HP/(LB/S))		ANSFERRED /(L@/S))
c	. 200		1590.0		16300.0	٦.	000
	T EMPEI { DEG		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY Cal/g)	ENTROPY (CAL/(G-K))
STORAGE TAN Compressor			0.50 2000.00	7.310E 1.000E		-65.9 557.0	1.68 3.47
HEAT EXCHAN	GER EXIT 1110.	.0	2000.00	3•320E 7•450E	-02 4	240.0 100.0	12.50 13.50
	5100				- •		

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	2500.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK P/(LB/S))		ILABLE WORK HP/(LB/S))		ANSFERRED /(lb/s))
0.	230		1940.0	. 1	15200.0	٤.	900
			· .				
	TEMPER (DEG	RATURE . K)	PRESSURE (ATM)	DENS 11 { G/CM++		NTHALPY (Al/G)	ENTROPY (CAL/(G-K))
STORAGE TANK			0.50 2500.00	7.310E- 1.100E-		-65.9 696.0	1.68 3.68
HEAT EXCHANC	GER EXIT 1110.	.0	2500.00 10.00	3.930E- 7.820E-	-02 43	330.0 550.0	12.3C 13.40
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	3000.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR Ine Work		RESSOR WORK P/(lb/s))		ILABLE WORK HP/(LB/S))		ANSFERRED /(lb/s))
0.	.260		2280.0	1	14300.0	٤.	81C
			`				
	TEMPEI (DEG	K)	PRESSURE (ATM)	DENSI (G/CM++		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN			0.50 3000.00	7.310E- 1.100E-		-65.9 828.0	1.68 3.85
HEAT EXCHANC	GER EXIT 1110.	.0	3000.00	4.490E- 8.130E-	-02 4	420.0 C10.0	12.10 13.20
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TABLE III. - Concluded. ADIABATIC TURBINE CYCLE

(b) Concluded. U.S. customary units

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	3500.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK V/(LB/S))		LABLE WORK P/(LB/S))		ANSFERRED /(L U/S))
0	•290		2600.0	:	13500.0	ć.	720
	TEMPER (Deg.		PRESSURE (ATM)	DENSI {G/CM++		NTH AL PY CAL/G)	ENTROPY (CAL/(G-K))
STORAGE TAN COMPRESSOR HEAT EXCHAN TURBINE EXI	EXIT 128. GER EXIT 1110.	0 0	0.50 3500.00 3500.00 10.00	7.310E- 1.100E- 4.990E- 8.400E-	-01 9 -02 45	-65.9 958.0 500.0 771.0	1.68 4.01 12.00 13.10
STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. Of Turb. Stage (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)
0.50	100.0	0.85	4000.0	1111.0	100.0	0.85	10.00
	F COMPRESSOR INE WORK		RESSOR WORK V(LB/S))		LABLE WORK		ANSFERRED /(lb/s))
0	• 320		2930.0	:	12900.0	€.	640
	TEMPER (deg.		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY CAL/G)	ENTROFY (CAL/(G-K))
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 138. GER EXIT 1110.	0	0.50 4000.00 4000.00 10.00	7.310E- 1.100E- 5.460E- 8.640E-	-01 10 -02 45	-65.9 280.0 580.0 542.0	1.68 4.15 11.80 13.00

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STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER Temperature (Deg. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT CF TURB. STAGE (ATM)	
0.50	100.0	0.85	4500.0	1111.0	100.0	0.85	10.00	
RATID OF COMPRESSOR To Turbine work			COMPRESSOR WORK (HP/(LB/S))		AVAILABLE WORK (HP/(LB/S))		HEAT TRANSFERRED (FEG-W/(LB/S))	
0.340			3240.0		12300.0		6.560	
	TEMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM++		NTH ALPY (Al/G)	ENTROPY (CAL/(G-K))	
STORAGE TANK Compressor ex Heat exchange Turbine exit	XIT 147. ER EXIT 1110.	0 0	0.50 4500.00 4500.00 10.00	7.310E- 1.200E- 5.890E- 8.950E-	-01 12 -02 40	-65.9 210.0 660.0 907.0	1.68 4.28 11.70 12.90	

STORAGE PRESSURE (ATM)	PRESS. DIFF. OF COMP. STAGE (ATM)	EFFICIENCY OF COMP. STAGE	COMPRESSOR PRESSURE (ATM)	HEAT EXCHANGER TEMPERATURE (DEG. K)	PRESS. DIFF. OF TURB. STAGE (ATM)	EFFICIENCY OF TURB. STAGE	PRESS AT EXIT OF TURB. STAGE (ATM)	
0.50	100.0	0.85	5000.0	1111.0	100.0	0.85	10.00	
RATID OF COMPRESSOR To Turbine work			ESSOR WORK V(LB/S))	AVAILABLE WORK (HP/(LB/S))		HE/T TRANSFERRED (#EG~&/(LE/S))		
o	0.360		3550.0	1	11700.0		6.470	
	T EMPER (Deg.		PRESSURE (ATM)	DENSI (G/CM+		NTHALPY CAL/G)	ENTROPY (CAL/(G-K))	
STORAGE TAN Compressor Heat Exchan Turbine Exi	EXIT 156. IGER EXIT 1110.	.0 .0	0.50 5000.00 5000.00 10.00	7.310E- 1.200E- 6.300E- 9.050E-	-01 13 -02 4	-65.9 330.0 740.0 396.0	1.68 4.40 11.60 12.8C	

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