

ing. **POP IOAN GHEORGHE**

**GAZIFICAREA ȘI ARDEREA LIGNIȚILOR**

**TEZĂ DE DOCTORAT**

**Coordonator științific**  
Prof. dr. ing. **CORNELIU UNGUREANU**

**ANEXA Nr. 1**

**I. MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR  
CU AMESTEC DE AER SI ABUR**

**II. MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR  
CU AMESTEC DE OXIGEN SI ABUR**

**ANEXA Nr. 2**

**MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR  
CU UMIDITATEA PROPRIE BAZAT PE ANALIZA  
ELEMENTARĂ A CĂRBUNELUI**

**ANEXA Nr. 3**

**MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR  
CU UMIDITATEA PROPRIE BAZAT PE FORMULA  
CHIMICĂ A MASEI ORGANICE**

**ANEXA Nr. 4**

**DETERMINĂRI EXPERIMENTALE PRIVIND ARDEREA  
COMBUSTIBILULUI GAZOS REZULTAT ÎN URMA  
GAZIFICĂRII CĂRBUNILOR CU UMIDITATEA PROPRIE**

**ANEXA Nr. 5**

**PROGRAM CALCUL BILANȚ TERMIC STAȚIE  
COMPLEXĂ DE GAZIFICARE A CĂRBUNILOR CU  
UMIDITATEA PROPRIE**

BIBLIOTECA CENTRALĂ  
UNIVERSITATEA "POLITEHNICA"  
TIMIȘOARA

**TIMIȘOARA**  
**1988**

624.124/2  
181

ing. POP IOAN GHEORGHE

## GAZIFICAREA ȘI ARDEREA LIGNIȚILOR

### TEZĂ DE DOCTORAT

Coordonator științific  
Prof. dr. ing. CORNELIU UNGUREANU

ANEXA Nr. 1

#### I. MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR CU AMESTEC DE AER ȘI ABUR

##### CUPRINS

1. SISTEMUL DE ECUAȚII	pag. 1-3
2. LISTARE PROGRAM DE CALCUL	pag. 1-17
3. RULARE REZULTATE CALCUL LIGNIT VOIVOZI	pag. 1-12
4. RULARE REZULTATE CALCUL LIGNIT ROVINARI	pag. 13-20
5. RULARE REZULTATE CALCUL LIGNIT BOROZEL	pag. 21-28

#### II. MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR CU AMESTEC DE OXIGEN CU ABUR

##### CUPRINS

1. SISTEMUL DE ECUAȚII	pag. 1-3
2. LISTARE PROGRAM DE CALCUL	pag. 1-17
3. RULARE REZULTATE CALCUL LIGNIT VOIVOZI	pag. 1-15
4. RULARE REZULTATE CALCUL LIGNIT ROVINARI	pag. 17-30
5. RULARE REZULTATE CALCUL LIGNIT BOROZEL	pag. 31-41

TIMIȘOARA  
1998



# MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR CU AMESTEC DE AER SI ABUR

## SISTEMUL DE ECUAȚII

Relatiile bilanțului masic elementar:

a - bilanțul masic al carbonului:

$$C^{anh}B^{anh} = (r_{CO_2} + r_{CO} + r_{CH_4}) \frac{12,011}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (1)$$

b - bilanțul masic al oxigenului:

$$O^{anh}B^{anh} + L_w \frac{31,999}{2 \cdot 18,015} + 0,21L_A \frac{31,999}{22,414} = (r_{CO} + 0,5r_{CO_2} + 0,5r_{H_2O}) \frac{31,999}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (2)$$

c - bilanțul masic al hidrogenului:

$$H^{anh}B^{anh} + L_w \frac{2,0159}{18,015} = (2r_{CH_4} + r_{H_2} + r_{H_2S}) \frac{2,0159}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (3)$$

d - bilanțul masic al azotului:

$$N^{anh}B^{anh} + 0,79L_A \frac{28,013}{22,414} = r_{N_2} \frac{28,013}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (4)$$

e - bilanțul masic al sulfului:

$$S^{anh}B^{anh} = r_{H_2S} \frac{32,06}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (5)$$

în care:  $C^{anh}$ ,  $O^{anh}$ ,  $H^{anh}$ ,  $N^{anh}$ ,  $S^{anh}$ ,  $A^{anh}$  - analiza elementara a cărbunelui anhidru determinată pe baza analizei elementare a probei inițiale;

$B^{anh}$  - consumul specific de cărbune anhidru corespunzător unității de gaz de gazogen, în  $kg/m^3N$  gaz;

$L_w$  - consumul specific de abur necesar gazificării unității de gaz de gazogen, în  $kg/m^3N$  gaz;

$L_A$  - consumul specific de aer necesar gazificării unității de gaz de gazogen, în  $kg/m^3N$  gaz;

$r_{CO}$ ,  $r_{CH_4}$ ,  $r_{H_2}$ ,  $r_{CO_2}$ ,  $r_{N_2}$ ,  $r_{H_2S}$ ,  $r_{H_2O}$  - participațiile volumice ale componentelor gazului de gazogen.

Relatia participațiilor volumice ale componentelor gazului de gazogen brut

$$r_{CO} + r_{CH_4} + r_{H_2} + r_{CO_2} + r_{N_2} + r_{H_2S} + r_{H_2O} = 1 \quad (6)$$

Relațiile constantelor de echilibru:

a - constanta de echilibru pentru reacția Boudouard:

$$K_p = \frac{p_{CO_2}}{p_{CO}^2} \quad (7)$$

b - constanta de echilibru pentru reacția de hidrogenare a carbonului

$$K_p = \frac{r_{CO_2}}{p \cdot r_{CO}} \quad (8)$$

c - constanta de echilibru pentru reacția de gazificare heteroasă cu vapori de apă:

$$K_p = \frac{p_{CO} \cdot r_{H_2O}}{r_{CO_2}} \quad (9)$$

în care: p - presiunea absolută a reactanților, în bar.

Calculul constantelor de echilibru aferente reacțiilor chimice adoptate se efectuează pe baza determinării afinității chimice care depinde de variația entalpiei și entropiei standard a reactanților, conform relației:

$$\ln K_p = -\frac{1}{R \cdot T} \left( \Delta H_{298}^0 - T \Delta S_{298}^0 - \int_{298}^T \Delta C_p^0 dT - \int_{298}^T \frac{\Delta C_p^0 dT}{T} \right) \quad (10)$$

în care: R - este constanta universală a gazelor perfecte, în kJ/kmol K;

T - temperatura la care se desfășoară reacția chimică, în K;

$\Delta H_{298}^0$  - entalpia de reacție, în kJ/kmol;

$\Delta S_{298}^0$  - entropiei de reacție, în kJ/kmol K;

$\Delta C_p^0$  - variația capacității calorice moleculare corespunzător temperaturii T, în kJ/kmol K, a căror valori sunt prezentate în tabelul 1.

Nr. crt.	SUBSTANTA	$H_{298}^0$ kJ/kmol	$S_{298}^0$ kJ/kmol K	$C_p^0$ kJ/kmol K
1	C	0	1.3609	$2,673 + 2,617 \cdot 10^{-3} T - 0,1169 \cdot 10^{-6} T^2$
2	CO <sub>2</sub>	-94.051,8	51.061	$6,85 + 8,533 \cdot 10^{-3} T - 2,475 \cdot 10^{-6} T^2$
3	CO	-26.415,7	47.3	$6,25 + 2,091 \cdot 10^{-3} T - 4,59 \cdot 10^{-7} T^2$
4	H <sub>2</sub>	0	31,211	$6,88 + 0,066 \cdot 10^{-3} T + 2,79 \cdot 10^{-7} T^2$
5	CH <sub>4</sub>	-17.889	44.5	$4,75 + 12 \cdot 10^{-3} T + 30,31 \cdot 10^{-7} T^2 - 2,63 \cdot 10^{-9} T^3$
6	H <sub>2</sub> O	57.237	46.84	$6,89 + 3,283 \cdot 10^{-3} T - 3,43 \cdot 10^{-7} T^2$

Tabelul 1 Valorile entalpiei standard, a entropiei standard și variația capacității calorice molare

Ecuatia bilantului energetic al gazificării (s-au neglijat pierderile specifice gazogenului):

$$Q_{cc} + Q_{cs} + Q_{sLa} + Q_{sLw} = Q_{gc} + Q_{gs} + Q_{cens} \quad [\text{kJ/m}^3\text{N gaz}] \quad (11)$$

în care:  $Q_{cc}$  - căldura chimică a cărbunelui corespunzătoare unitatii de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cc} = B^{anh} H_{cs} \quad [\text{kJ/m}^3\text{N gaz}] \quad (12)$$

$Q_{cs}$  - căldura sensibilă a cărbunelui corespunzătoare unitatii de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cs} = B^{anh} c_c t_c \quad [\text{kJ/m}^3\text{N gaz}] \quad (13)$$

$Q_{sLa}$  - căldura sensibilă a aerului corespunzătoare unitatii de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{sLa} = L_A c_{pA} t_A \quad [\text{kJ/m}^3\text{N gaz}] \quad (14)$$

$Q_{sLw}$  - căldura sensibilă a aburului corespunzătoare unitatii de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{sLw} = L_w i_{ab} \quad [\text{kJ/m}^3\text{N gaz}] \quad (15)$$

$Q_{gc}$  - căldura chimică a gazului de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{gc} = H_{gs} \quad [\text{kJ/m}^3\text{N gaz}] \quad (16)$$

$Q_{gs}$  - căldura sensibilă a gazului de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{gs} = c_{pg} t_g \quad [\text{kJ/m}^3\text{N gaz}] \quad (17)$$

$Q_{cens}$  - căldura sensibilă a cenușii la evacuarea din gazogen corespunzătoare unitatii de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cens} = B^{anh} A^{anh} c_{cen} t_{cen} \quad [\text{kJ/m}^3\text{N gaz}] \quad (18)$$

în care:  $H_{cs}$  - puterea calorifică superioară a cărbunelui, în  $\text{kJ/kg}$ ;

$c_c$  - căldura specifică a cărbunelui la intrare, în  $\text{kJ/kg K}$ ;

$c_{pA}$  - căldura specifică a aerului necesar gazificării la intrare, în  $\text{kJ/m}^3\text{N K}$ ;

$t_c, t_A$  - temperatura cărbunelui, respectiv a aerului la intrare, în  $^{\circ}\text{C}$ ;

$i_{ab}$  - entalpia aburului la intrare, în  $\text{kJ/kg}$ ;

$H_{gs}$  - puterea calorifică superioară a gazului de gazogen, în  $\text{kJ/m}^3\text{N}$ ;

$c_{pg}$  - căldura specifică a gazului de gazogen la ieșire, în  $\text{kJ/m}^3\text{N K}$ ;

$t_g, t_{cen}$  - temperatura gazului de gazogen, respectiv a cenușii la ieșire, în  $^{\circ}\text{C}$ ;

$c_{cen}$  - căldura specifică a cenușii la ieșire, în  $\text{kJ/kg K}$ .

#### DATE INIȚIALE:

- analiza elementară a cărbunelui:  $C^I, O^I, H^I, N^I, S^I, A^I, W^I$ ;

#### VARIABLE DE CALCUL:

- parametrii de gazificare: presiunea -  $p$ , și temperatura -  $t, T$ .

#### NECUNOSCUTE:

- compoziția gazului de gazogen:

- căldura sensibilă a gazului de gazogen:  $r_{CO}, r_{CH_4}, r_{H_2}, r_{CO_2}, r_{N_2}, r_{H_2S}, r_{H_2O}$

- consumuri specifice: cărbune -  $B^{anh}$ , aer -  $L_A$ , și abur -  $L_w$

C MODELAREA MATEMATICA A GAZIFICARII CU AER SI ABUR

C DECLARARE VARIABLE

```
REAL NI,I1,J1,K1,L1,M1,N1,I2,J2,K2,L2,M2,N2,I3,J3,KP,I5
DOUBLE PRECISION COF(5), X(4), Y(4), TOL
DIMENSION KP(3), COCAR(7)
DIMENSION ABUR(2,7)
DIMENSION XR(4)
CHARACTER*9 NUME(7)
DATA (NUME(I), I=1,7)/6hCARBON, 8hHIDROGEN, 6hOXIGEN, 4hAZOT, 4hSU
xLF, 6hCENUSA, 9hUMIDITATE/
DATA (ABUR(1,J), J=1,7)/2675., 2749., 2778., 2792., 27799., 2803.
x,2804./
DATA (ABUR(2,J),J=1,7)/0.5903, 2.669, 5.139, 7.593, 10.041, 12.51
x, 15 /
```

C INTRODUCERE DATE INITIALE - VERIFICARE CORECTITUDINE DATE

```
94 WRITE (*,*) 'INTRODUCETI COMPOZITIA CARBUNELUI -ANALIZA ELEMETARA
x IN %'
SUMA=0
DO 90 I=1,7
91 WRITE (*,*) NUME(I)
READ (*,*) COCAR(I)
IF (COCAR(I).GE.0.AND.COCAR(I).LE.100) GO TO 92
WRITE (*,*) 'EROARE LA INTRODUCEREA ELEMENTULUI CHIMIC AL CARBUBE
xLUI'
GO TO 91
92 SUMA=SUMA+COCAR(I)
90 CONTINUE
IF (SUMA.GE.99.9.AND.SUMA.LE.100.1) GO TO 93
WRITE(*,*)'EROARE LA COMPOZITIA COMBUSTIBILULUI',SUMA
GO TO 94
93 CI=COCAR(1)/100
HI=COCAR(2)/100
OI=COCAR(3)/100
NI=COCAR(4)/100
SI=COCAR(5)/100
AI=COCAR(6)/100
WI=COCAR(7)/100
QSCAR=33800.*CI+125448.*HI+10827.*(SI-OI)
QICAR=QSCAR-2509.*(WI+9*HI)
WRITE (*,*) 'INTRODUCETI TEMPERATURA AERULUI IN GRAD C'
READ (*,*) TAER
WRITE (*,*) 'MODELARE MATEMATICA GAZIFICARE CU AMESTEC DE AER CU
IABUR'
WRITE (*,*) 'DATELE INITIALE DE CALCUL'
WRITE (*,*) 'COMPOZITIA CARBUNELUI ANALIZA ELEMENTARA'
WRITE (*,*) (NUME(I),COCAR(I),I=1,7)
```

C DESCHIDERE FISIER DATE INTRARE - CALCULATE

```
OPEN(33.FILE='AERRG')
```

C FISIER DATE INTRARE

```
WRITE(33.420)
420 FORMAT(72(' '),/,'*',70X,'*')
WRITE (33.421)
421 FORMAT(' ' 18X,'GAZIFICARE CARBUNE CU AER SI ABUR'19X,'*'/,'*',70X,
1'')
WRITE(33.422)
422 FORMAT(' ' 12X,'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1.12X,'*'/,'*',70X,'*'/72(''))
WRITE(33.423)
423 FORMAT(' ' 70X,'*'/,'*',20X,'ANALIZA ELEMENTARA CARBUNE /%/'20X,'*
1'/'*',70X,'*'/72('')/,'*',6(9X,'*'),10X,'*'/,'*',3X,'CI',4X,'*3X,
1'HI',4X,'*3X,'OI',4X,'*3X,'NI',4X,'*3X,'SI',4X,'*',3X,'AI',4X,
1'*,4X,'WI',4X,'*'/,'*',6(9X,'*'),10X,'*')
WRITE(33.424)(COCAR(I),I=1.7)
424 FORMAT(' ' 6(1X.F6.2,2X,'*'),2X.F6.2,2X,'*'/,'*',6(9X,'*'),10X,'*'/
172('')/,'*',70X,'*'/,'*',22X,'PUTERE CALORIFICA /KJ/KG/'23X,'*'/,'*
170X,'*'/72('')/,'*',35X,'*34X,'*')
WRITE(33.425)QSCAR,QICAR
425 FORMAT(' '12X,'SUPERIOARA'13X,'*12X,'INFERIOARA'12X,'*'/,'*',35X,
1'*,34X,'*'/,'*',12X.F10.3,13X,'*12X.F10.3,12X,'*'/,'*',35X,'*34X,
1'*/72('')/,'*',70X,'*'/,'*',23X,'TEMPERATURA AER INTRODUS'23X,'*
1'/'*,29X,'GRAD CELSIUS'29X,'*'/,'*',70X,'*')
WRITE(33.426)TAER
426 FORMAT(' ' 30X.F10.2,30X,'*'/,'*',70X,'*'/72('')/,'*',70X,'*'/
1'*,16X,'ABUR SATURAT LA PARAMETRII GAZIFICARII',16X,'*'/
1'*,70X,'*'/72(''))
```

C BLOC CALCUL - SISTEM ECUATII MODEL MATEMATIC

```
5 DO 10 J=1.7
IF (J.NE 1) GO TO 11
P=1
GO TO 8
11 P=5*(J-1)
8 DO 9 I=1.7
TABS=723 15+50*I
```

C CONSTANTE DE ECHILIBRU

```
RB=-(.41021 194-24.906374*TABS+(3.484E-3)*(TABS**2)-(0.2595E-6)*
I(TABS**3)-(58450./TABS)-2.977*TABS*(ALOG(TABS)))/(1.987*TABS)
KP(1)=EXP(RB)
RM=-(-14442 568-56.774074*TABS-(4.6255E-3)*(TABS**2)-(4.12E-7)*
I(TABS**3)+(0.219166E-9)*(TABS**4)-(58450./TABS)+11.683*TABS*
I(ALOG(TABS)))/(1.987*TABS)
KP(2)=EXP(RM)
```

$$RH = - (30911.826 - 9.972231 \cdot TABS + (1.8715E-3) \cdot (TABS^{**2}) - (2.7166E-8) \cdot (TABS^{**3}) - (58450./TABS) - 3.567 \cdot TABS \cdot (ALOG(TABS))) / ((1.987 \cdot TABS) \cdot KP(3)) = EXP(RH)$$

### C CALCUL COEFICIENTI SISTEM PRIM

$$\begin{aligned} A1 &= 22.414 \cdot CI / 12.011 \\ B1 &= 22.414 \cdot (OI / 31.999 + WI / (2 \cdot 18.015)) \\ C1 &= 0.21 / 1.293 \\ D1 &= 22.414 / (2 \cdot 18.015) \\ E1 &= 22.414 \cdot (HI / 2.0159 + WI / 18.015) \\ F1 &= 22.414 / 18.015 \\ G1 &= 22.414 \cdot NI / 28.013 \\ H1 &= 0.79 / 1.293 \\ I1 &= 22.414 \cdot SI / 32.06 \\ J1 &= P / KP(1) \\ K1 &= P \cdot KP(2) \\ L1 &= P / KP(3) \end{aligned}$$

### C CALCUL ELEMENTE BILANT TERMIC

$$\begin{aligned} VAR &= (TABS - 273.15) / 22.414 \\ HCO2 &= (44.14 + (9.04E-3) \cdot TABS - (8.53E5) / (TABS^{**2})) \cdot VAR \\ HCO &= (28.41 + (4.10E-3) \cdot TABS - (0.46E5) / (TABS^{**2})) \cdot VAR \\ HCH4 &= (17.45 + (60.46E-3) \cdot TABS + (1.117E-6) \cdot (TABS^{**2}) - (7.2E-9) \cdot (TABS^{**3})) \cdot VAR \\ HH2 &= (27.28 + (3.26E-3) \cdot TABS + (0.502E5) / (TABS^{**2})) \cdot VAR \\ HN2 &= (27.87 + (4.27E-3) \cdot TABS) \cdot VAR \\ HH2O &= ABUR(1, J) \cdot ABUR(2, J) + (30. + (10.71E-3) \cdot TABS + (0.33E5) / (TABS^{**2})) \cdot VAR \\ HH2S &= (29.37 + (15.4E-3) \cdot TABS) \cdot VAR \\ CPO2 &= (31.46 + (3.39E-3) \cdot TABS - (3.77E5) / (TABS^{**2})) / 22.414 \\ M1 &= QSCAR - 0.75 \cdot (TABS - 273.15) \cdot AI + 24.8 \\ N1 &= 1.015 \cdot TAER \\ O1 &= ABUR(1, J) \\ P1 &= HCO2 \\ R1 &= 12720. + HCO \\ S1 &= 39890. + HCH4 \\ T1 &= 12770. + HH2 \\ U1 &= HN2 \\ V1 &= HH2O \\ Z1 &= 25620. + HH2S \end{aligned}$$

### C CALCUL COEFICIENTI SISTEM SECUND

$$\begin{aligned} A2 &= C1 \\ B2 &= (B1 / A1) - 0.5 \\ C2 &= ((B1 / A1) - 1) \cdot J1 \\ D2 &= 0.5 \cdot L1 \\ E2 &= K1 \cdot B1 / A1 \\ F2 &= D1 \\ G2 &= (E1 - I1) / A1 \end{aligned}$$

$$\begin{aligned}
H2 &= J1 \cdot (E1 - I1) / A1 \\
I2 &= L1 \\
J2 &= ((E1 - I1) / A1 - 2) \cdot K1 \\
K2 &= F1 \\
L2 &= H1 \\
M2 &= 1 + (G1 + I1) / A1 \\
N2 &= M2 \cdot J1 \\
O2 &= M2 \cdot K1 \\
P2 &= N1 - U1 \cdot H1 \\
R2 &= (M1 - U1 \cdot G1 - Z1 \cdot I1) / A1 - R1 \\
S2 &= ((M1 - U1 \cdot G1 - Z1 \cdot I1) / A1 - P1) \cdot J1 \\
T2 &= V1 \cdot L1 \\
V2 &= ((M1 - U1 \cdot G1 - Z1 \cdot I1) / A1 - S1) \cdot K1 \\
U2 &= T1 \\
W2 &= O1
\end{aligned}$$

C CALCUL COEFICIENTI SISTEM TERT

$$\begin{aligned}
A3 &= M2 - B2 \cdot L2 / A2 + F2 \cdot L2 \cdot G2 / (A2 \cdot K2) \\
B3 &= N2 - C2 \cdot L2 / A2 + F2 \cdot L2 \cdot H2 / (A2 \cdot K2) \\
C3 &= I2 + D2 \cdot L2 / A2 - F2 \cdot L2 \cdot I2 / (A2 \cdot K2) \\
D3 &= 1 - F2 \cdot L2 / (A2 \cdot K2) \\
E3 &= O2 - E2 \cdot L2 / A2 + F2 \cdot L2 \cdot J2 / (A2 \cdot K2) \\
F3 &= R2 - P2 \cdot B2 / A2 - G2 \cdot (W2 - P2 \cdot F2 / A2) / K2 \\
G3 &= S2 - P2 \cdot C2 / A2 - H2 \cdot (W2 - P2 \cdot F2 / A2) / K2 \\
H3 &= P2 \cdot D2 / A2 - T2 + I2 \cdot (W2 - P2 \cdot F2 / A2) / K2 \\
I3 &= (W2 - P2 \cdot F2 / A2) / K2 - U2 \\
J3 &= V2 - P2 \cdot E2 / A2 - J2 \cdot (W2 - P2 \cdot F2 / A2) / K2
\end{aligned}$$

C CALCUL COEFICIENTI SISTEM CUADRAT

$$\begin{aligned}
A4 &= E3 \cdot G3 - B3 \cdot J3 \\
B4 &= C3 \cdot G3 - B3 \cdot H3 \\
C4 &= D3 \cdot G3 - B3 \cdot I3 \\
D4 &= A3 \cdot G3 - B3 \cdot F3
\end{aligned}$$

C CALCUL COEFICIENTI SISTEM QUINT

$$\begin{aligned}
A5 &= (A4^{**2}) \cdot G3 - H3 \cdot A4 \cdot B4 + J3 \cdot (B4^{**2}) \\
B5 &= 2 \cdot G3 \cdot A4 \cdot C4 - F3 \cdot A4 \cdot B4 - A4 \cdot D4 \cdot H3 \\
C5 &= I3 \cdot (B4^{**2}) + 2 \cdot J3 \cdot B4 \cdot D4 - H3 \cdot B4 \cdot C4 \\
D5 &= G3 \cdot (C4^{**2}) - F3 \cdot B4 \cdot C4 - F3 \cdot A4 \cdot D4 \\
E5 &= H3 \cdot G3 \cdot B4 - 2 \cdot (G3^{**2}) \cdot A4 - D4 \cdot C4 \cdot H3 \\
F5 &= J3 \cdot (D4^{**2}) + 2 \cdot I3 \cdot B4 \cdot D4 \\
G5 &= F3 \cdot G3 \cdot B4 - F3 \cdot D4 \cdot C4 - 2 \cdot (G3^{**2}) \cdot C4 \\
H5 &= H3 \cdot G3 \cdot D4 + (D4^{**2}) \cdot I3 \\
I5 &= G3^{**3} + F3 \cdot G3 \cdot D4 \\
COF(1) &= A5 \cdot 1 \cdot E7 \\
COF(2) &= (B5 + C5) \cdot 1 \cdot E7 \\
COF(3) &= (D5 + E5 + F5) \cdot 1 \cdot E7 \\
COF(4) &= (G5 + H5) \cdot 1 \cdot E7 \\
COF(5) &= I5 \cdot 1 \cdot E7
\end{aligned}$$

M=5

C LANSARE RUTINE REZOLVARE POLINOM - NEWTON

```
CALL C02AEF(COF,M,X,Y,TOL,IFAIL)
WRITE(*,*)'COEFICIENTI'
WRITE(*,*)(COF(KK),KK=1,5)
WRITE(*,*)'REZULTATE'
WRITE(*,*)(X(KJ),Y(KJ),KJ=1,4)
WRITE(*,*)'TOL,IFAIL',TOL,IFAIL
WRITE(*,*)'SOLUTII REALE CONVENABILE'
```

C BLOC SELECTIONARE SOLUTIE POLINOM

```
JSOL=0
DO 60 ISOL=1,4
IF (Y(ISOL).NE.0) GO TO 60
IF (X(ISOL).LE.0.OR.X(ISOL).GE.1.) GO TO 60
JSOL=JSOL+1
XR(JSOL)=X(ISOL)
WRITE(*,*)'NR. SOLUTIE ',JSOL,' VALOARE SOLUTIE ',XR(JSOL)
60 CONTINUE
IF (JSOL.NE.0) GO TO 61
WRITE (*,*) 'EROARE LA REZOLVARE ECUATIE NEWTON'
GO TO 9
61 write(*,*)'ALEGETI SOLUTIA DE REZOLVARE A SISTEMULUI'
WRITE (*,*) 'INTRODUCETI NUMARUL SOLUTIEI'
READ(*,*) KSOL
IF (KSOL.EQ.5) GO TO 9
```

C DETERMINARE NECUNOSCUITE SISTEM

```
33 X6=XR(KSOL)
X5=K1*(X6**2)
IF(X5.GT.0.AND.X5.LT.1) GO TO 35
WRITE (*,*) X6,X5
GO TO 37
35 X4=(G3-X6*C4-(X6**2)*A4)/(D4+X6*B4)
IF(X4.GT.0.AND.X4.LT.1) GO TO 38
WRITE (*,*) X6,X5,X4
GO TO 37
38 X8=L1*X4*X6
IF(X8.GT.0.AND.X8.LT.1) GO TO 40
WRITE (*,*) X6,X5,X4,X8
GO TO 37
40 X1=(J1*(X4**2)+X4+K1*(X6**2))/A1
IF(X1.GT.0) GO TO 42
WRITE (*,*) X6,X5,X4,X8,X1
GO TO 37
42 X3=A1*X1-X4-X5
IF(X3.GT.0.AND.X3.LT.1) GO TO 44
WRITE (*,*) X6,X5,X4,X8,X1,X3
```



```

GO TO 37
44 X9=I1*X1
IF(X9.GT 0.AND X9.LT 1) GO TO 46
WRITE (*,*) X6.X5.X4.X8.X1.X3.X9
GO TO 37
46 X7=1-X3-X4-X5-X6-X8-X9
IF(X7.GT 0.AND X7.LT 1) GO TO 48
WRITE (*,*) X6.X5.X4.X8.X1.X3.X9.X7
GO TO 37
48 X10=-((G2*X4+H2*(X4**2)-I2*X4*X6-X6+J2*(X6**2))/K2
IF(X10.GT 0) GO TO 50
WRITE (*,*) X6.X5.X4.X8.X1.X3.X9.X7.X10
GO TO 37
50 X2=-((B2*X4+C2*(X4**2)-D2*X4*X6+E2*(X6**2)+F2*X10)/A2
IF(X2.GT 0) GO TO 52
WRITE (*,*) X6.X5.X4.X8.X1.X3.X9.X7.X10.X2
37 WRITE(*,*) 'EROARE LA REZOLVAREA SISTEMULUI'
GO TO 61
52 X3=X3
X4=X4
X5=X5
X6=X6
X7=X7
X8=X8
X9=X9
XA3=X3/(1-X8)
XA4=X4/(1-X8)
XA5=X5/(1-X8)
XA6=X6/(1-X8)
XA7=X7/(1-X8)
XA9=X9/(1-X8)

```

### C DETERMINARE ELEMENTE BILANT TERMIC

```

QS=X4*12720.+X5*39890.+X6*12770.+X9*25620.
QAS=XA4*12720.+XA5*39890.+XA6*12770.+XA9*25620.
QI=X4*12720.+X5*35910.+X6*10800.+X9*25620.
QAI=XA4*12720.+XA5*35910.+XA6*10800.+XA9*25620.
BA=X1*(1-WI)
QCAR=QSCAR*X1
QSEC=24.8*X1
QSEA=1.015*TAER*X2
QSAB=ABUR(1,J)*X10
QINTR=QCAR+QSEC+QSEA+QSAB
QSGAZ=HCO2*X3+HCO*X4+HCH4*X5+HH2*X6+HN2*X7+HH2O*X8+HH2S*X9
QSCEN=0.75*(TABS-273.15)*AI*X1
QIES=QS+QSGAZ+QSCEN
QINT=QICAR*X1+QSEC+QSEA+QSAB
RAGTR=100*QI/QINT
RAGTC=(100*(QI+QSGAZ))/QINT
X3=X3*100
X4=X4*100

```

```

X5=X5*100
X6=X6*100
X7=X7*100
X8=X8*100
X9=X9*100
X81=X8/100
XA3=X3/(1-X81)
XA4=X4/(1-X81)
XA5=X5/(1-X81)
XA6=X6/(1-X81)
XA7=X7/(1-X81)
XA9=X9/(1-X81)

```

### C LISTARE CONSOLA DATE CALCULATE

```

WRITE (*,300)
300 FORMAT(72(*),/,',',70X,')
WRITE (*,301)
301 FORMAT(' ',18X,'GAZIFICARE CARBUNE CU AER SI ABUR',19X,','/','70X,
1')
WRITE(*,302)
302 FORMAT(' ',17X,'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1,18X,','/','70X,','/72(')/','70X,')
WRITE(*,303)
303 FORMAT(' ',35X,','34X,','/','7X,'TEMPERATURA DE CALCUL',7X,','
1,8X,'PRESIUNEA DE CALCUL',8X,','/','11X,'GRAD CELSIUS',12X,','
116X,'BAR',15X,','/','70X,')
TCEL=TABS-273.15
WRITE(*,304)TCEL,P
304 FORMAT(' ',14X,F7.2,14X,','14X,F7.2,14X,','/','70X,','/72(')/
1''70X,','/','70X,','/''25X,'CONSUMURI SPECIFICE',26X,','/''70X,
1''/72(')/','70X,')
WRITE(*,305)
305 FORMAT(' ',2X,'CARBUNE UMED',3X,','1X,'CARBUNE ANHIDRU',1X,','
17X,'AER',7X,','6X,'ABUR',6X,','/''4X,'KG/Nm3GAZ',4X,','4X,'KG/N
1m3GAZ',4X,','4X,'Nm3/Nm3GAZ',3X,','4X,'KG/Nm3GAZ',3X,','/''70X,
1')
WRITE(*,306)X1,BA,X2,X10
306 FORMAT(' ',3(5X,F7.4,5X,','),4X,F7.4,5X,','/''17X,','17X,','17X,
1''16X,','/72(')/''70X,','/''20 X,'COMPONENTELE GAZULUI UMED
1 /%/',21 X,','/''70X,','/72(')/''6(9X,','),10X,','/''3X,'CO
12',3X,','4X,'CO',3X,','3X,'CH4',3X,','4X,'H2',3X,','4X,'N2',3X,
1''3X,'H2O',3X,','4X,'H2S',3X,','/''6(9X,','),10X,')
WRITE(*,307) X3,X4,X5,X6,X7,X8,X9
307 FORMAT(' ',6(2X,F5.3,2X,','),2X,F5.3,3X,','/''6(9X,','),10X,','/
172('))
WRITE(*,308)
308 FORMAT(' ',70X,','/''19 X,'COMPONENTELE GAZULUI ANHIDRU /%/'
1,19 X,','/''70X,','/72(')/''6(9X,','),10X,','/''3X,'CO2',3X
1,','4X,'CO',3X,','3X,'CH4',3X,','4X,'H2',3X,','4X,'N2',3X,','3
1X,'H2S',3X,','10X,','/''6(9X,','),10X,')
WRITE(*,309)XA3,XA4,XA5,XA6,XA7,XA9

```

```

309 FORMAT(' 6(2X.F5 3 2X.'*) 10X.'**/'* 6(9X.'*),10X.'**/72('*)
1/'* 70X.'**/'*22X.'PUTERE CALORIFICA /KJ/Nm3/'22X.'**/'* 70X.'*
1'/72('*)/'* 35X.'* 34X.'**/'*13X.'GAZ UMED'.14X.'*.12X.'GAZ A
1NHIDRU'.11X.'*)
WRITE(* 310)
310 FORMAT('** 35X.'* 34X.'**/72('*)/'* 3(17X.'*)16X.'**/'*3X.'IN
1FERIOARA'4X.'* 3X.'SUPERIOARA'4X.'* 3X.'INFERIOARA'4X.'**3X.'SUP
1ERIOARA'3X.'**/'* 3(17X.'*)16X.'*)
WRITE(* 311)QI.QS.QAI.QAS
311 FORMAT('** 3(3X.F10.2.4X.'*),3X.F10.2.3X.'**/'* 3(17X.'*)16X.
1**/72('*))
WRITE(* 312)
312 FORMAT('** 70X.'**/'*18X.'BILANTUL ENERGETIC AL GAZIFICARII'19 X,
1**/'*70X.'**/'* 18X.'FLUXURI TERMICE INTRATE KJ/Nm3GAZ'19X.'**/
1**70X.'**/'*4(13X.'*), 14X.'**/'*4X.'TOTAL'4X.'**3X.'CHIMIC'4X,
1**2X.'SENSIBIL'3X.'* 2X.'SENSIBIL'3X.'**3X.'SENSIBIL'3X.'**/'*
13X.'INTRAT'4X.'* 3X.'CARBUNE'3X.'* 3X.'CARBUNE'3X.'* 5X.'AER'.
15X.'*5X.'ABUR'5X.'**/'*4(13X.'*), 14X.'*)
WRITE(* 313)QINTR.QCAR.QSEC.QSEA.QSAB
313 FORMAT('**4(3X.F8.2.2X.'*), 3X.F8.2.3X.'**/72('*)/'* 70X.'*)
WRITE(* 314)
314 FORMAT('** 19X.'FLUXURI TERMICE IESITE KJ/Nm3GAZ'19X.'**/'*70X.'**
1/72('*)/'*4(13X.'*), 14X.'**/'*4X.'TOTAL'4X.'**3X.'CHIMIC'4X,
1**2X.'SENSIBIL'3X.'* 2X.'SENSIBIL'3X.'**14X.'**/'*
14X.'IESIT'.4X.'* 5X.'GAZ'5X.'* 5X.'GAZ'5X.'* 3X.'CENUSA',
14X.'**14X.'**/'*4(13X.'*), 14X.'*)
WRITE(* 315)QIES.QS.QSGAZ.QSCEN
315 FORMAT('**4(3X.F8.2.2X.'*), 14X.'**/'*4(13X.'*), 14X.'**/72('*)/
1/'* 70X.'*)
WRITE(* 316)
316 FORMAT('**21X.'RANDAMENTUL GAZIFICARII /%/' 22X.'**/'*70X.'**/72
1('*)/'*13X.'GAZ RECE'14X.'**13X.'GAZ CALD'13X.'**/'*35X.'**34X.
1'*)
WRITE(* 317)RAGTR.RAGTC
317 FORMAT('**14X.F7.3.14X.'**14X.F7.3.13X.'**/'*70X.'**/72('*))

```

## C FISIER DATE CALCULALE

```

WRITE(33.400)
400 FORMAT(////.72('*)/.'* 70X.'*)
WRITE (33.401)
401 FORMAT('** 18X.'GAZIFICARE CARBUNE CU AER SI ABUR'19X.'**/'* 70X,
1'*)
WRITE(33.402)
402 FORMAT('** 12X.'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1.12X.'**/'* 70X.'**/72('*))
WRITE(33.403)
403 FORMAT('** 35X.'* 34X.'**/'* 7X.'TEMPERATURA DE CALCUL'.7X.'**
1.8X.'PRESIUNEA DE CALCUL'.7X.'**/'* 11X.'GRAD CELSIUS'.12X.'*',
116X.'BAR'15X.'**/'* 35X.'* 34X.'*)
TCEL=TABS-273.15
WRITE(33.404)TCEL,P

```

```

404 FORMAT('**',14X,F7 2,14X,'**',14X,F7 2,13X,'**','**',35X,'**',34X,'**',/72('**
1')/'**',70X,'**','**',70X,'**','**',25X,'CONSUMURI SPECIFICE',26X,'**','**'
170X,'**',/72('**')/'**',3(17X,'**'),16X,'**')
WRITE(33,405)
405 FORMAT('**',2X,'CARBUNE UMED',3X,'**',1X,'CARBUNE ANHIDRU',1X,'**'
17X,'AER',7X,'**',6X,'ABUR',6X,'**','**',4X,'KG/Nm3GAZ',4X,'**',4X,'KG/N
1m3GAZ',4X,'**',4X,'Nm3/Nm3GAZ',3X,'**',4X,'KG/Nm3GAZ',3X,'**','**',3(
117X,'**'),16X,'**')
WRITE(33,406)X1,BA,X2,X10
406 FORMAT('**',3(5X,F7 4,5X,'**'),4X,F7 4,5X,'**','**',17X,'**',17X,'**',17X,
1'**,16X,'**',/72('**')/'**',70X,'**','**',20 X,'COMPONENTELE GAZULUI UMED
1 /%/',21 X,'**','**',70X,'**',/72('**')/'**',6(9X,'**'),10X,'**','**',3X,'CO
12',3X,'**',4X,'CO',3X,'**',3X,'CH4',3X,'**',4X,'H2',3X,'**',4X,'N2',3X,
1'**,3X,'H2O',3X,'**',4X,'H2S',3X,'**','**',6(9X,'**'),10X,'**')
WRITE(33,407) X3,X4,X5,X6,X7,X8,X9
407 FORMAT('**',6(2X,F5 2,2X,'**'),2X,F5 2,3X,'**','**',6(9X,'**'),10X,'**',
172('**'))
WRITE(33,408)
408 FORMAT('**',70X,'**','**',19 X,'COMPONENTELE GAZULUI ANHIDRU /%/'
1,19 X,'**','**',70X,'**',/72('**')/'**',6(9X,'**'),10X,'**','**',3X,'CO2',3X
1,'**',4X,'CO',3X,'**',3X,'CH4',3X,'**',4X,'H2',3X,'**',4X,'N2',3X,'**',3
1X,'H2S',3X,'**',10X,'**','**',6(9X,'**'),10X,'**')
WRITE(33,409)XA3,XA4,XA5,XA6,XA7,XA9
409 FORMAT('**',6(2X,F5 2,2X,'**'),10X,'**','**',6(9X,'**'),10X,'**',/72('**')
1/'**',70X,'**','**',22X,'PUTERE CALORIFICA /KJ/Nm3',/22X,'**','**',70X,'**'
1'/72('**')/'**',35X,'**',34X,'**','**',13X,'GAZ UMED',14X,'**',12X,'GAZ A
1NHIDRU',11X,'**')
WRITE(33,410)
410 FORMAT('**',35X,'**',34X,'**',/72('**')/'**',3(17X,'**'),16X,'**','**',3X,'IN
1FERIOARA',4X,'**',3X,'SUPERIOARA',4X,'**',3X,'INFERIOARA',4X,'**',3X,'SUP
1ERIOARA',3X,'**','**',3(17X,'**'),16X,'**')
WRITE(33,411)QI,QS,QAI,QAS
411 FORMAT('**',3(4X,F8 2,5X,'**'),4X,F8 2,4X,'**','**',3(17X,'**'),16X,'**',/
12('**'))
WRITE(33,412)
412 FORMAT('**',70X,'**','**',18X,'BILANTUL ENERGETIC AL GAZIFICARII',19 X,
1'**','**',70X,'**','**',18X,'FLUXURI TERMICE INTRATE /KJ/Nm3GAZ',/17X,'**',/
1'**',70X,'**',/72('**')/'
1'**',4(13X,'**'),14X,'**','**',4X,'TOTAL',4X,'**',3X,'CHIMIC',4X,
1'**',2X,'SENSIBIL',3X,'**',2X,'SENSIBIL',3X,'**',3X,'SENSIBIL',3X,'**','**'
13X,'INTRAT',4X,'**',3X,'CARBUNE',3X,'**',3X,'CARBUNE',3X,'**',5X,'AER',
15X,'**',5X,'ABUR',5X,'**','**',4(13X,'**'),14X,'**')
WRITE(33,413)QINTR,QCAR,QSEC,QSEA,QSAB
413 FORMAT('**',4(3X,F8 2,2X,'**'),3X,F8 2,3X,'**',/72('**')/'**',70X,'**')
WRITE(33,414)
414 FORMAT('**',18X,'FLUXURI TERMICE IESITE /KJ/Nm3GAZ',/18X,'**','**',70X,'**'
1/72('**')/'**',4(13X,'**'),14X,'**','**',4X,'TOTAL',4X,'**',3X,'CHIMIC',4X,
1'**',2X,'SENSIBIL',3X,'**',2X,'SENSIBIL',3X,'**',14X,'**','**'
14X,'IESIT',4X,'**',5X,'GAZ',5X,'**',5X,'GAZ',5X,'**',3X,'CENUSA',
14X,'**',14X,'**','**',4(13X,'**'),14X,'**')
WRITE(33,415)QIES,QS,QSGAZ,QSCEN
415 FORMAT('**',4(3X,F8 2,2X,'**'),14X,'**','**',4(13X,'**'),14X,'**',/72('**')/'

```

```

      ** 70X **\
      WRITE(33,416)
416 FORMAT('**21X,'RANDAMENTUL GAZIFICARII I%/'.22X,'**/'**70X,'**/72
      1('**)/**35X,'**34X**/'**13X,'GAZ RECE'14X'**13X,'GAZ CALD'13X,'*
      1/'**35X,'**34X,'**')
      WRITE(33,417)RAGTR,RAGTC
417 FORMAT('**14X,F7.3,14X,'**14X,F7.3,13X,'**/'**35X,'**34X,'**/72
      1('**'))

9 CONTINUE
10 CONTINUE

      CLOSE (33)

      STOP
      END

```

SUBROUTINE C02AEF(A,N,REZ,IMZ,TOL,IFAIL)

### C RUTINE REZOLVARE POLINOM - NEWTON

#### C DECLARARE VARIABLE

```

CHARACTER*6    SRNAME
PARAMETER      (SRNAME='C02AEF')
DOUBLE PRECISION TOL
INTEGER        IFAIL, N
DOUBLE PRECISION A(N), IMZ(N), REZ(N)
DOUBLE PRECISION J, JX, R, RX, X, Y
LOGICAL        SAT
DOUBLE PRECISION A1P5, CMAX, FAC, FOUR, FUN, G, NFUN, ONE, P1,
*              P2Z1, P3Z2, P4Z1, P5, S, S1, S2, SCALE, SIG, T,
*              TOL2, TWO, XXX, ZERO
INTEGER        I, I2, II, IND, JTEMP, K
LOGICAL        CBIG, FLAG
DOUBLE PRECISION B(100), C(100)
CHARACTER*1    P01REC(1)

```

#### C FUNCTII EXTERNE

```

DOUBLE PRECISION X02AJF, X02ALF
INTEGER          P01ABF
EXTERNAL        X02AJF, X02ALF, P01ABF
EXTERNAL        C02AEZ
INTRINSIC       ABS, LOG, SQRT, DBLE, INT

```

#### C BLOC INITIALIZARE

```

COMMON          /AC02AE/X, Y, R, RX, J, JX, SAT

DATA           ONE/1.0D0/, A1P5/1.5D0/, ZERO/0.0D0/,
*             P4Z1/1.0D-5/

```

```

DATA      TWO/2.0D0/, P5/0.5D0/, P2Z1/1 0D-3/,
* P1/0.1D0/
DATA      P3Z2/2.0D-4/, FOUR/4.0D0/

```

### C EXECUTIE

```

XXX = X02AJF()
IF (TOL.LT.XXX) TOL = XXX
CMAX = SQRT(X02ALF())
FAC = ONE
FLAG = IFAIL .EQ. 2
IF (FLAG) IFAIL = 1
IND = 0
TOL2 = TOL**A1P5
IF (A(1).NE.ZERO .AND. N.GE.2 .AND. N.LE.100) GO TO 20
IND = P01ABF(IFAIL,1,SRNAME,0,P01REC)
GO TO 780
20 IF (A(N).NE.0.D0) GO TO 40
   REZ(N-1) = ZERO
   IMZ(N-1) = ZERO
   N = N - 1
   GO TO 20
40 SCALE = ZERO
   DO 60 I = 1, N
     IF (ABS(A(I)).GE.P4Z1) SCALE = SCALE + LOG(ABS(A(I)))
60 CONTINUE
   K = INT(SCALE/(DBLE(N)*LOG(TWO))+P5)
   SCALE = TWO**(-K)
   DO 80 I = 1, N
     A(I) = A(I)*SCALE
     B(I) = A(I)
80 CONTINUE

```

### C TESTARE ORDIN REDUS POLIMON

```

IF (N.GT.3) GO TO 100
GO TO (780,620,640) N
100 DO 160 I = 2, N
    II = N - I + 2
    IF (B(II).EQ.0.0D0) GO TO 200
    T = B(1)/B(II)
    IF (ABS(T).GE.ONE) GO TO 200
    DO 120 K = 2, II
        I2 = II - K + 1
        C(K-1) = B(K) - T*B(I2)
120 CONTINUE
    JTEMP = II - 1
    DO 140 K = 1, JTEMP
        B(K) = C(K)
140 CONTINUE
160 CONTINUE
    FAC = FAC*TWO

```

```

SCALE = ONE
I = N
180 I = I - 1
  IF (I.LT.1) GO TO 100
  SCALE = SCALE*TWO
  A(I) = A(I)*SCALE
  B(I) = A(I)
  GO TO 180
200 IF ( NOT FLAG) GO TO 220
  X = REZ(1)
  Y = IMZ(1) + TOL
  FLAG = FALSE
  GO TO 240
220 X = P2Z1
  Y = P1
240 CALL C02AEZ(A,N,TOL)
  FUN = R*R + J*J
260 G = RX*RX + JX*JX
  IF (G.GE.FUN*TOL2) GO TO 320
280 IND = P01ABF(IFAIL.2,SRNAME,0,P01REC)
  SCALE = ONE
  I = N
300 I = I - 1
  IF (I.LT.1) GO TO 780
  SCALE = SCALE*FAC
  A(I) = A(I)/SCALE
  GO TO 300
320 S1 = -(R*RX+J*JX)/G
  S2 = (R*JX-J*RX)/G
  SIG = P3Z2
  S = SQRT(S1*S1+S2*S2)
  IF (S.LE.ONE) GO TO 340
  S1 = S1/S
  S2 = S2/S
  SIG = SIG/S
340 X = X + S1
  Y = Y + S2
360 CALL C02AEZ(A,N,TOL)
  IF (SAT) GO TO 400
  NFUN = R*R + J*J
  IF (FUN-NFUN.GE.SIG*FUN) GO TO 380
  S1 = P5*S1
  S2 = P5*S2
  IF (ABS(S1).LE.XXX*ABS(X) .AND. ABS(S2).LE.XXX*ABS(Y)) GO TO 280
  S = P5*S
  SIG = P5*SIG
  X = X - S1
  Y = Y - S2
  GO TO 360
380 FUN = NFUN
  GO TO 260
400 FUN = ONE/TOL2

```

```

K = 0
IMZ(N-1) = Y*FAC
IF (ABS(Y).GT.P1) GO TO 460

```

### C RADACINA REALA

```

S1 = Y
Y = ZERO
CALL C02AEZ(A,N,TOL)
Y = S1
IF (.NOT. SAT) GO TO 460
REZ(N-1) = X*FAC
IMZ(N-1) = ZERO
N = N - 1
B(1) = A(1)
C(N) = -A(N+1)/X
CBIG = .FALSE.
DO 440 I = 2, N
  B(I) = A(I) + X*B(I-1)
  II = N - I + 1
  IF (CBIG) GO TO 420
  C(II) = (C(II+1)-A(II+1))/X
  IF (ABS(C(II)).LE.CMAX) GO TO 440
  CBIG = .TRUE.
420  C(II) = CMAX
440 CONTINUE
GO TO 520

```

### C RADACINA COMPLEXA

```

460 REZ(N-1) = X*FAC
REZ(N-2) = X*FAC
IMZ(N-2) = -IMZ(N-1)
N = N - 2
R = TWO*X
J = -(X*X+Y*Y)
B(1) = A(1)
B(2) = A(2) + R*B(1)
C(N) = -A(N+2)/J
C(N-1) = -(A(N+1)+R*C(N))/J
IF (N.EQ.2) GO TO 520
CBIG = .FALSE.
DO 500 I = 3, N
  B(I) = A(I) + R*B(I-1) + J*B(I-2)
  II = N - I + 1
  IF (CBIG) GO TO 480
  C(II) = -(A(II+2)-C(II+2)+R*C(II+1))/J
  IF (ABS(C(II)).LE.CMAX) GO TO 500
  CBIG = .TRUE.
480  C(II) = CMAX
500 CONTINUE

```



```

520 DO 540 I = 1, N
    NFUN = ABS(B(I)) + ABS(C(I))
    IF (NFUN LE TOL) GO TO 540
    NFUN = ABS(B(I)-C(I))/NFUN
    IF (NFUN GE FUN) GO TO 540
    FUN = NFUN
    K = I
540 CONTINUE
    IF (K EQ 1) GO TO 580
    JTEMP = K - 1
    DO 560 I = 1, JTEMP
        A(I) = B(I)
560 CONTINUE
580 A(K) = P5*(B(K)+C(K))
    IF (K EQ N) GO TO 40
    JTEMP = K + 1
    DO 600 I = JTEMP, N
        A(I) = C(I)
600 CONTINUE
    GO TO 40
620 REZ(1) = -A(2)/A(1)*FAC
    IMZ(1) = ZERO
    GO TO 760
640 R = A(2)*A(2) - FOUR*A(1)*A(3)
    IF (R GT ZERO) GO TO 660
    REZ(2) = -P5*A(2)/A(1)*FAC
    REZ(1) = REZ(2)
    IMZ(2) = P5*SQRT(-R)/A(1)*FAC
    IMZ(1) = -IMZ(2)
    GO TO 760
660 IMZ(1) = ZERO
    IMZ(2) = ZERO
    IF (A(2)) 680, 700, 720
680 REZ(1) = P5*(-A(2)+SQRT(R))/A(1)*FAC
    GO TO 740
700 REZ(1) = -P5*SQRT(R)/A(1)*FAC
    GO TO 740
720 REZ(1) = P5*(-A(2)-SQRT(R))/A(1)*FAC
740 REZ(2) = A(3)/(REZ(1)*A(1))*FAC*FAC
760 N = 1
780 IFAIL = IND
    RETURN
    END

```

SUBROUTINE C02AEZ(A,N,TOL)

C DECLARARE VARIABILE

```

DOUBLE PRECISION TOL
INTEGER          N
DOUBLE PRECISION A(N)
DOUBLE PRECISION J, JX, R, RX, X, Y

```

LOGICAL        SAT

DOUBLE PRECISION A1, A2, A3, A8, B1, B2, B3, C, P, P8, Q, T, TEN

\*                TWO, ZERO

INTEGER        K

C    FUNCTII INTRINSECI

INTRINSIC        ABS, SQRT

COMMON            /AC02AE/X, Y, R, RX, J, JX, SAT

DATA              TWO/2.0D0/, ZERO/0.0D0/, P8/0.8D0/, TEN/1.0D1/,

\*                A8/8.0D0/

C    EXECUTIE

P = -TWO\*X

Q = X\*X + Y\*Y

T = SQRT(Q)

A2 = ZERO

B2 = ZERO

B1 = A(1)

A1 = A(1)

C = ABS(A1)\*P8

N = N - 2

DO 20 K = 2, N

    A3 = A2

    A2 = A1

    A1 = A(K) - P\*A2 - Q\*A3

    C = T\*C + ABS(A1)

    B3 = B2

    B2 = B1

    B1 = A1 - P\*B2 - Q\*B3

20 CONTINUE

N = N + 2

A3 = A2

A2 = A1

A1 = A(N-1) - P\*A2 - Q\*A3

R = A(N) + X\*A1 - Q\*A2

J = A1\*Y

RX = A1 - TWO\*B2\*Y\*Y

JX = TWO\*Y\*(B1-X\*B2)

C = T\*(T\*C+ABS(A1)) + ABS(R)

SAT = (SQRT(R\*R+J\*J)) .LT. ((TEN\*C-A8\*(ABS(R)+ABS(A1))\*T)

\*    +TWO\*ABS(X\*A1))\*TOL)

RETURN

END

C    DECLARARE VARIABLE

INTEGER FUNCTION P01ABF(IFAIL, IERROR, SRNAME, NREC, REC)

INTEGER            IERROR, IFAIL, NREC

CHARACTER\*(\*)     SRNAME

CHARACTER*(*)	REC(*)
INTEGER	I, NERR
CHARACTER*72	MESS
EXTERNAL	P01ABZ, X04AAF, X04BAF
INTRINSIC	ABS, MOD

C EXECUTIE

```

IF (IERROR.NE.0) THEN
  IF (IFAIL.EQ.-1 .OR. IFAIL.EQ.0 .OR. IFAIL.EQ.-13 .OR.
  * (IFAIL.GT.0 .AND. MOD(IFAIL/10,10).NE.0)) THEN
    CALL X04AAF(0,NERR)
    DO 20 I = 1, NREC
      CALL X04BAF(NERR,REC(I))
20  CONTINUE
    IF (IFAIL.NE.-13) THEN
      WRITE (MESS,FMT=99999) SRNAME, IERROR
      CALL X04BAF(NERR,MESS)
      IF (ABS(MOD(IFAIL,10)).NE.1) THEN

        CALL X04BAF(NERR,
        * ' ** NAG hard failure - execution terminated'
        * )
        CALL P01ABZ
      ELSE

        CALL X04BAF(NERR,
        * ' ** NAG soft failure - control returned')
      END IF
    END IF
  END IF
  END IF
  END IF
  P01ABF = IERROR
  RETURN

```

C

```

99999 FORMAT (' ** ABNORMAL EXIT from NAG Library routine ',A,': IFAIL',
* ' =',I6)
END
DOUBLE PRECISION FUNCTION X02AJF()

```

C EXECUTIE

```

X02AJF = 2.0D0**(-55)
RETURN
END
DOUBLE PRECISION FUNCTION X02ALF()

```

C EXECUTIE

```

X02ALF = (2.0D0**126 - 2.0D0**70) * 2.0D0
RETURN
END

```

SUBROUTINE P01ABZ

C EXECUTIE  
STOP  
END

SUBROUTINE X04AAF(I,NERR)

C DECLARARE VARIABILE

INTEGER I, NERR  
INTEGER NERR1  
SAVE NERR1  
DATA NERR1/6/

C EXECUTIE

IF (I.EQ.0) NERR = NERR1  
IF (I.EQ.1) NERR1 = NERR  
RETURN  
END

SUBROUTINE X04BAF(NOUT,REC)

C DECLARARE VARIABILE

INTEGER NOUT  
CHARACTER\*(\*) REC  
INTEGER I  
INTRINSIC LEN

C EXECUTIE

IF (NOUT.GE.0) THEN

DO 20 I = LEN(REC), 2, -1  
IF (REC(I:I).NE.' ') GO TO 40  
20 CONTINUE

40 WRITE (NOUT,FMT=99999) REC(1:I)  
END IF  
RETURN  
99999 FORMAT (A)  
END

*027.104/pe  
1/10*

GAZIFICARE CARBUNE CU AER SI ABUR  
 MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI

ANALIZA ELEMENTARA CARBUNE /%/

CI	HI	OI	NI	SI	AI	WI
21.55	1.40	4.24	.73	1.05	45.11	21.91

PUTERE CALORIFICA /KJ/KG/

SUPERIOARA	INFERIOARA
8694.791	7728.324

TEMPERATURA AER INTRODUS  
 GRAD CELSIUS

20.00

ABUR SATURAT LA PARAMETRII GAZIFICARII

MODELARE MATEMATICA GAZIFICARE CARBUNE VOLVOZI CU AER SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500,00  
 RAP  
 1,00

CONSUMURI SPECIFICE

ARBORIE UMEDA	ARBORIE ANHIDRU	AER	ABUR
KG/TP	KG/TP	Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	KG/TP
4,111		7,770	2,057

COMBUSTIBILE GAZOASE UMED / /

CO	CH4	H2	H2O	H2S
3,24	11,37	39,97	26,69	0,36

COMBUSTIBILE GAZOASE ANHIDRU / /

CO	CH4	H2	HC	NO	H2O	H2S
4,43	15,51	54,53	0,54			

PUTERE CALORIFICA / KJ/NM3/

GAZ UMED	GAZ ANHIDRU
3161,92	3831,37

INFERIOARA SUPERIOARA INFERIOARA SUPERIOARA

3161,92	3831,37	4313,15
---------	---------	---------

RILANTUL ENERGETIC AL GAZIFICAREII

FLUXURI TERMICE INTRARE / /

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL ABUR
4522,63	3922,22	11,14	574,26

FLUXURI TERMICE IESIRE / /

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
4522,63	3161,92	1097,00	109,91

RANDAMENTUL GAZIFICAREII /

GAZ RECE	68,729	GAZ CALD	86,505
----------	--------	----------	--------



MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 TEMPERATURA DE CALCUL                      PRESIUNEA DE CALCUL  
 GRAD CELSIUS                                      BAR  
 500.00    10.00

CONSUMURI SPECIFICE

CARBUNE UMED		CARBUNE ANHIDRU		AER		ABUR		BILANTUL ENERGETIC AL GAZIFICARII				
KG/Nm3GAZ		KG/Nm3GAZ		Nm3/Nm3GAZ		KG/Nm3GAZ		FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/				
.6724	*	.4981	*	.6794	*	.2907	*	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
								INTRAT	CARBUNE	CARBUNE	AER	ABUR
								5098.55	4331.04	12.35	13.79	741.27

COMPONENTELE GAZULUI UMED /- /

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
							IESIT	GAZ	GAZ	CENUSA
							5896.55	3723.37	1261.44	113.79

COMPONENTELE GAZULUI ANHIDRU /- /

RENTABILITATIL GAZIFICARII /- /

CO	H4	H2	N2	H2S	GAZ REGE	GAZ
					22.296	22.296

GAZ ANHIDRU

GAZ ANHIDRU

GAZ ANHIDRU

GAZ ANHIDRU

GAZ ANHIDRU

GAZ ANHIDRU

GAZ ANHIDRU

GAZ ANHIDRU



MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 PRESIUNEA DE CALCUL

TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

BAR  
 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	AER Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL AEP	SENSIBIL ABUR
6.197	.4591	.8179	.1841	4488.79	3991.42	11.38	16.60	469.39

COMPONENTELE GAZULUI UMED / - /

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
11.83	3.50	3.40	7.99	43.90	25.99	.40	4488.79	2924.32	1438.68	125.79

COMPONENTELE GAZULUI ANHIDRU / - /

RANDAMENTUL GAZIFICARII / /

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S	GAZ RECE	GAZ CALD
20.03	4.73	4.60	10.79	59.31	.54	65.055	82.621

PUTERE CALORIFICA /KJ/Nm<sup>3</sup>/

GAZ UMED

GAZ ANHIDRU

INFERIOARA

SUPERIOARA

2631.55

2924.32

3555.62

3951.19

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 TEMPERATURA DE CALCUL 700.00  
 GRAD CELSIUS  
 PRESIUNEA DE CALCUL 10.00  
 BAR

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	AER Nm3/Nm3GAZ	ABUR KG/Nm3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL AER	SENSIBIL ABUR
.6147	.4554	1.0102	.0412	4096.55	3959.64	11.29	20.51	105.11

COMPONENTELE GAZULUI UMED /-/  
 FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL GERSUA
10.46	9.77	.63	6.35	52.38	20.03	.38	4096.55	2402.85	1548.11	145.59

COMPONENTELE GAZULUI ANHIDRU /-/  
 RANIDAMENTUL GAZIFICARII /-/-

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
13.06	12.43	.79	6.91	65.50	.48	61.607	575.24

GAZ UMED  
 GAZ ANHIDRU

INTERIOARA	TERMOGARA	INTERIOARA	SUPERIOARA
4	4	4	3004.79



MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 TEMPERATURA DE CALCUL 600.00  
 GRAD CELSIUS  
 PRESIUNEA DE CALCUL 20.00  
 BAR

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/NM3GAZ/

CARBONE UMED KG/NM3GAZ	CARBONE ANHIDRU KG/NM3GAZ	AER NM3/NM3GAZ	ABUR KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBONE	SENSIBIL CARBONE	SENSIBIL AER	SENSIBIL ABUR
.6351	.4705	.7945	.2087	4650.74	4090.87	11.67	16.13	53.107

COMPONENTELE GAZULUI UMED / %

FLUXURI TERMICE IESITE /KJ/NM3GAZ/

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIRE	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUCI
15.16	0.574	1.53	6.54	43.60	27.60	.41	4650.74	3068.48	1493.43	1.0000

MIKROELEMENTE ADIUVI ANHIDRU

RANDAMENTUL GAZIFICARII

C	H	N	H2S	GAZ REACT	GAZ PROD
0.0000	0.0000	0.0000	0.0000	65.61	0.0000

GAZ REACT	GAZ PROD
0.0000	0.0000

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 PRESIUNEA DE CALCUL

TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

BAR  
 20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

CARBUNII UMEDI	CARBUNE ANHIDRU	AER	ABUR	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
KG/Nm3GAZ	KG/Nm3GAZ	Nm3/Nm3GAZ	KG/Nm3GAZ	INTRAT	CARBUNE	CARBUNE	AER	ABUR
6.081	.4505	.9599	.0832	4159.93	3917.11	11.17	19.48	212.16

COMPONENTELE GAZULUI UMED / % /

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

CO2	CO	CH4	H2	N2	H2O	H2S
12.01	7.44	1.40	6.71	50.29	21.78	.38
TOTAL	IESIT	CHIMIC	SENSIBIL	SENSIBIL	CENUSA	
4159.93	4159.93	2456.53	1559.38	144.02		

COMPONENTELE GAZULUI ANHIDRU / % /

RANDAMENTUL GAZIFICARII / % /

CO2	CO	CH4	H2	N2	H2S
15.36	9.51	1.78	8.57	64.29	.49
GAZ RECE	GAZ CALD				
60.917	88.785				

PUTERE CALORIFICA /KJ/Nm3/

GAZ ANHIDRU

GAZ UMED	GAZ ANHIDRU
INFERIOARA	INFERIOARA
SUPERIOARA	SUPERIOARA
2260.88	2456.53
	2900.60
	3140.48

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 TEMPERATURA DE CALCUL PRESTUNEA DE CALCUL  
 GRAD CELSIUS BAR  
 500.00 30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/NM3GAZ/

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	AER NM3/NM3GAZ	ABUR KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL AER	SENSIBIL ABUR
.6951	.5150	.6690	.3055	5282.90	4477.42	12.77	13.58	779.13

COMPONENTELE GAZULUI UMED / /

FLUXURI TERMICE IESITE /KJ/NM3GAZ/

CO2	CO	OH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
16.82	.47	8.26	3.37	37.73	32.88	.47	5282.90	3905.47	1259.84	117.59

COMPONENTELE GAZULUI ANHIDRU / /

RANJAMENTUL GAZIFICARII /

CO2	CO	OH4	H2	N2	H2S	GAZ RECH	GAZ CALD
16.82	.47	8.26	3.37	37.73	.69	73.356	4477.42

AV. UMED / /  
 GAZ ANHIDRU / /

INTRATA	INTRATA	INTRATA	SUPERATA
16.82	8.26	37.73	32.88

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 TEMPERATURA DE CALCUL  
 PRESIUNEA DE CALCUL  
 BAR  
 600.00  
 30.00

CONSUMURI SPECIFICE		BILANTUL ENERGETIC AL GAZIFICARII	
		FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/	
CARBUNE UMED KG/Nm <sup>3</sup> GAZ		TOTAL	CHIMIC
.6445		INTRAT	CARBUNE
	AER Nm <sup>3</sup> /Nm <sup>3</sup> GAZ		ABUR
	.7842	4740.23	4150.97
			11.84
			15.92
			561.49

COMPONENTELE GAZULUI UMED / - /		FLUXURI TERMICE IESITE /KJ/Nm3GAZ/	
CO <sub>2</sub>		TOTAL	CHIMIC
15.65		IESIT	GAZ
	H <sub>2</sub>		GAZ
	5.70	4740.23	3148.25
	42.62		1461.16
	28.39		130.82
	.42		

COMPONENTELE GAZULUI ANHIDRU / - /		RANDAMENTUL GAZIFICARII / - /	
CO <sub>2</sub>		GAZ RECE	GAZ CALD
21.86		66.179	84.327
	H <sub>2</sub>		
	7.96		
	59.52		
	.58		

PUTERE CALORIFICA /KJ/Nm3/	
GAZ UMED	GAZ ANHIDRU
INFERIOARA	SUPERIOARA
3148.25	3954.39
	4396.48

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI CU AER SI ABUR  
 TEMPERATURA DE CALCUL 700.00  
 GRAD CELSIUS  
 PRESIUNEA DE CALCUL 30.00  
 BAR

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	AER Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL AER	SENSIBIL ABUR
.6092	.4513	.9349	.1054	4292.73	3923.85	11.19	18.98	208.71

COMPONENTELE GAZULUI UMED /-/-

CO <sub>2</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S	TOTAL INTRAT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENDEA
11.00	1.00	44.24	22.86	0.58	4292.73	2507.05	1910.84	111.84

COMPONENTELE ABURULI ANHIDRU

H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S	TOTAL INTRAT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENDEA
1.00	1.00	1.00	1.00	4.00	4.00	4.00	4.00

RADIAMENTUL SPECIFIC

GAZ	PER E	GAZ	PER E
CO <sub>2</sub>	1.00	H <sub>2</sub> O	1.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
4292.73	3923.85	11.19	18.98	208.71

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
4292.73	2507.05	1910.84	111.84	111.84



```

*****
*
*           GAZIFICARE CARBUNE CU AER SI ABUR
*
*   MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI
*
*****
*
*           ANALIZA ELEMENTARA CARBUNE /:/
*
*****
*
*   *           *           *           *           *           *           *           *
*   CI      *   HI      *   OI      *   NI      *   SI      *   AI      *   WI
*   31.32   *   2.82   *   13.14   *   .85   *   .98   *   10.04   *   40.85
*   *           *           *           *           *           *           *
*
*****
*
*           PUTERE CALORIFICA /KJ/KG/
*
*****
*
*           SUPERIOARA           *           INFERIOARA
*
*           12807.230           *           11145.520
*
*****
*
*           TEMPERATURA AER INTRODUS
*           GRAD CELSIUS
*
*           20.00
*
*****
*
*           ABUR SATURAT LA PARAMETRII GAZIFICARII
*
*****

```

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI CU AER SI ABUR  
 TEMPERATURA DE CALCUL PRESIUNEA DE CALCUL  
 GRAD CELSIUS BAR

500.00 1.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/NM3GAZ/

CARBUNE UMED	CARBUNE ANHIDRU	AER	ABUR	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
KG/NM3GAZ	KG/NM3GAZ	NM3/NM3GAZ	KG/NM3GAZ	INTRAT	CARBUNE	CARBUNE	AER	ABUR
.3828	.2205	.9128	.1080	3199.79	2900.26	5.62	18.53	275.98

COMPONENTELE GAZULUI UMED /./

FLUXURI TERMICE IESITE /KJ/NM3GAZ/

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
							IESIT	GAZ	GAZ	CENOSA
15.28	.40	1.66	8.06	18.43	23.93	.23	3199.79	2056.42	1128.96	14.41

COMPONENTELE GAZULUI ANHIDRU /./

KANTAMENTUL GAZIFICARII /./

H4	H2	N2	H2S	GAZ RECE	GAZ CALD
				64.864	54.841

INTRAREA DE AER SI ABUR

GAZ ANHIDRU

INTRAREA DE AER SI ABUR

GAZ RECE



MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI CU AER SI ABUR  
 TEMPERATURA DE CALCUL PRESTIUNEA DE CALCUL  
 GRAD CELSIUS BAR

600.00 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/NM<sup>3</sup>GAZ/

CARBUNE UMED KG/NM <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/NM <sup>3</sup> GAZ	AER Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/NM <sup>3</sup> GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL AER	SENSIBIL ABUR
.3857	.2281	.9853	.0695	3124.75	2921.95	5.00	20.00	1.80

COMPOZITIALE GAZIUMI UMEDI / / FLUXURI TERMICE IESITE /KJ/NM<sup>3</sup>GAZ/

CO <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENOSA
14.33	0.00	0.15	11.91	23.07	0	36.49	18.90	1	17.59

RAZII ENERGETICE ANHIDRU

RAZII ENERGETICE UMEDI

CO <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENOSA
14.33	0.00	0.15	11.91	23.07	0	18.90	1	17.59

600.00 10.00

16

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI CU AER SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

\*\*\*\*\*  
 CONSUMURI SPECIFICE  
 \*\*\*\*\*

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	AER Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
.4091	.2420	.8510	.1732

\*\*\*\*\*

\*\*\*\*\*  
 COMPONENTELE GAZULUI UMED /-/  
 \*\*\*\*\*

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
15.99	.56	4.69	3.07	46.43	29.01	.25

\*\*\*\*\*

\*\*\*\*\*  
 COMPONENTELE GAZULUI ANHIDRU /-/  
 \*\*\*\*\*

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S
22.53	.79	6.60	4.32	65.41	.35

\*\*\*\*\*

\*\*\*\*\*  
 PUTERE CALORIFICA /KJ/Nm<sup>3</sup>/  
 \*\*\*\*\*

GAZ UMED	GAZ ANHIDRU
2149.64	3376.25

\*\*\*\*\*

\*\*\*\*\*  
 BILANTUL ENERGETIC AL GAZIFICARII  
 \*\*\*\*\*  
 FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/  
 \*\*\*\*\*

TOTAL INTRAT	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
3564.02	3099.20	6.00	17.28	441.54

\*\*\*\*\*

\*\*\*\*\*  
 FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/  
 \*\*\*\*\*

TOTAL IESIT	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
3564.02	2396.68	1151.93	15.40	

\*\*\*\*\*

\*\*\*\*\*  
 RANDAMENTUL GAZIFICARII /-/  
 \*\*\*\*\*

GAZ RECE	GAZ CALD
67.986	83.417

\*\*\*\*\*

MODELARE MATEMATICA GAZIFICARE CARBUNE KOVINARI CU AER SI ABUR  
 TEMPERATURA DE CALCUL                      PRESIUNEA DE CALCUL  
 GRAD CELSIUS                                      BAR  
 600.00    20.00

CONSUMURI SPECIFICE

CARBONE UMEID KG/Nm <sup>3</sup> GAZ	CARBONE ANHIDRU KG/Nm <sup>3</sup> GAZ	AER Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL AER	SENSIBIL ABUR
.3891	.2301	.9604	.0926	3708.87	2947.51	5.71	19.50	230.10

COMPONENTELE GAZULUI UMEID / / /

CO <sub>2</sub>	CO	H <sub>2</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S	TOTAL TESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
14.86	2.97	2.34	4.66	50.96	24.49	.23	1900.10	1291.18	17.58	

COMPONENTELE GAZULUI ANHIDRU / / /

CO <sub>2</sub>	CO	H <sub>2</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S	TOTAL TESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
13.87	3.00	2.34	4.66	50.96	24.49	.23	1900.10	1291.18	17.58	

PRELUCRAREA ABURULUI

GAZ UMEID                      GAZ ANHIDRU

INTRATA                      INTRATA                      INTRATA

1715.00                      1715.00                      1715.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

RANJAMENTUL GAZIFICARII / /

GAZ RECE                      GAZ CALD  
60.688                      81.175



MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI CU AER SI ABUR  
 TEMPERATURA DE CALCUL                      PRESIUNEA DE CALCUL  
 GRAD CELSIUS                                      BAR  
 600.00    30.00

CONSUMURI SPECIFICE

CARBUNE UMED	CARBUNE ANHIDRU	AER	ABUR	BIANTUL ENERGETIC AL GAZIFICARII	FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/
KG/Nm3GAZ	KG/Nm3GAZ	Nm3/Nm3GAZ	KG/Nm3GAZ		
.3918	.2318	.9497	.1033	TOTAL	CHIMIC
				INTRAT	CARBUNE
					SENSIBIL
					CARBUNE
					AER
					ABUR
				3256.79	2968.39
					5.75
					19.28
					203.98

COMPONENTELE GAZULUI UMED / /

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
							IESIT	GAZ	GAZ	CHIMICA
15.09	2.03	2.74	4.13	50.57	25.20	.23	3256.79	1940.64	1298.44	17.70

COMPONENTELE GAZULUI ANHIDRU / /

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
							IESIT	GAZ	GAZ	CHIMICA

BIANTUL ENERGETIC AL GAZIFICARII

BIANTUL ENERGETIC AL GAZIFICARII	FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/	FLUXURI TERMICE IESITE /KJ/Nm3GAZ/



```

*****
*
*           GAZIFICARE CARBUNE CU AER SI ABUR
*
*           MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL
*
*****
*
*           ANALIZA ELEMENTARA CARBUNE /*/
*
*****
*           *           *           *           *           *           *           *
*          CI          *   HI          *   OI          *   NI          *   SI          *   AI          *   WI
*          30.85      *   4.94      *  14.77      *    .48      *    1.61      *  14.72      *  32.63
*          *           *           *           *           *           *           *
*****
*
*           PUTERE CALORIFICA /KJ/KG/
*
*****
*
*           SUPERIOARA          *           INFERIOARA
*
*           15199.600          *           13265.410
*
*****
*
*           TEMPERATURA AER INTRODUS
*           GRAD CELSIUS
*
*           20.00
*
*****
*
*           ABUR SATURAT LA PARAMETRII GAZIFICARII
*
*****

```









MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEI CU AER SI ABUR  
 TEMPERATURA DE CALCUL      PRESIUNEA DE CALCUL  
 GRAD CELSIUS                      BAR  
 600.00                                      20.00

CONSUMURI SPECIFICE

CARBUNE UMED	CARBUNE ANHIDRU	AER	ABUR	KG/NM3GAZ	KG/NM3GAZ	KG/NM3GAZ
.3847	.2592	.9001	.0856			

COMPONENTELE GAZULUI UMED /./

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
13.48	2.40	4.09	0.30	49.73	23.61	.39	4182.14	2841.29	1315.37	25.43

COMPONENTELE GAZULUI ANHIDRU /./

CO2	CO	CH4	H2	N2	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
13.48	2.40	4.09	0.30	49.73	23.61	4182.14	2841.29	1315.37	25.43

REACTANTII SPECIFICI

INERTE	ABUR	INERTE	ABUR	INERTE	ABUR	INERTE	ABUR
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/NM3GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	ABUR	SENSIBIL
4182.14	3939.07	6.43	18.27	218.37	

FLUXURI TERMICE IESITE /KJ/NM3GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL
4182.14	2841.29	1315.37	25.43

RANDAMENTUL GAZIFICARII /./

GAZ RECE	GAZ CALD
69.397	90.135



MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL CU AER SI ABUR  
 TEMPERATURA DE CALCUL 600.00  
 GRAD CELSIUS 30.00  
 PRESIUNEA DE CALCUL 30.00  
 BAR

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	AER Nm3/Nm3GAZ	ABUR KG/Nm3GAZ	BILANTUL ENERGETIC AL GAZIFICARII	FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/	SENIBIL. AER	SENIBIL. ABUR
.3859	.2627	.8922	.0945	TOTAL INTRAT	4258.44	6.51	18.11
				TOTAL CHIMIC CARBUNE	3992.90		240.91

COMPONENTELE GAZULUI UMED / /

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENIBIL. GAZ	SENIBIL. GAZ	SENIBIL. CENOSA
13.68	1.98	4.65	5.49	49.45	24.36	.46	4258.44	3992.90	1322.91	25.8	

COMPONENTELE GAZULUI ANHIDRU / /

CO2	CO	CH4	H2	N2	H2S	TOTAL	CHIMIC	SENIBIL. GAZ	SENIBIL. GAZ	SENIBIL. CENOSA
18.08	2.00	4.15	2.00	60.57	.52	4258.44	3992.90	1322.91	25.8	

PROFIT CALORIFIC A FI (M3)

AV UMED AV ANHIDRU

INTELUSANA

REACTANTA



# MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR CU AMESTEC DE OXIGEN SI ABUR

## SISTEMUL DE ECUAȚII

Relatiile bilantului masic elementar:

a - bilanțul masic al carbonului:

$$C^{anh}B^{anh} = \left( r_{CO_2} + r_{CO} + r_{CH_4} \right) \frac{12,011}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (1)$$

b - bilanțul masic al oxigenului:

$$O^{anh}B^{anh} + L_w \frac{31,999}{2 \cdot 18,015} + L_o = \left( r_{CO_2} + 0,5r_{CO} + 0,5r_{H_2O} \right) \frac{31,999}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (2)$$

c - bilanțul masic al hidrogenului:

$$H^{anh}B^{anh} + L_w \frac{2,0159}{18,015} = \left( 2r_{CH_4} + r_{H_2} + r_{H_2S} \right) \frac{2,0159}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (3)$$

d - bilanțul masic al azotului:

$$N^{anh}B^{anh} = r_{N_2} \frac{28,013}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (4)$$

e - bilanțul masic al sulfului:

$$S^{anh}B^{anh} = r_{H_2S} \frac{32,06}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (5)$$

în care:  $C^{anh}$ ,  $O^{anh}$ ,  $H^{anh}$ ,  $N^{anh}$ ,  $S^{anh}$ ,  $A^{anh}$  - analiza elementara a cărbunelui anhidru determinată pe baza analizei elementare a probei inițiale;

$B^{anh}$  - consumul specific de cărbune anhidru corespunzător unității de gaz de gazogen, în  $kg/m^3N$  gaz;

$L_w$  - consumul specific de abur necesar gazificării unității de gaz de gazogen, în  $kg/m^3N$  gaz;

$L_o$  - consumul specific de oxigen necesar gazificării unității de gaz de gazogen, în  $kg/m^3N$  gaz;

$r_{CO}$ ,  $r_{CH_4}$ ,  $r_{H_2}$ ,  $r_{CO_2}$ ,  $r_{N_2}$ ,  $r_{H_2S}$ ,  $r_{H_2O}$  - participațiile volumice ale componentelor gazului de gazogen.

Relația participațiilor volumice ale componentelor gazului de gazogen brut:

$$r_{CO} + r_{CH_4} + r_{H_2} + r_{CO_2} + r_{N_2} + r_{H_2S} + r_{H_2O} = 1 \quad (6)$$

Relațiile constantelor de echilibru:

a - constanta de echilibru pentru reacția Boudouard:

$$K_p = \frac{p_{CO_2}}{p_{CO}^2} \quad (7)$$

b - constanta de echilibru pentru reacția de hidrogenare a carbonului:

$$K_p = \frac{p_{H_2O}}{p \cdot p_{H_2}} \quad (8)$$

c - constanta de echilibru pentru reacția de gazificare heterogenă cu vapor de apă:

$$K_p = \frac{p_{CO} p_{H_2O}}{p_{H_2O}} \quad (9)$$

în care p - presiunea absolută a reactanților, în bar.

Calculul constantelor de echilibru aferente reacțiilor chimice adoptate se efectuează pe baza determinării afinității chimice care depinde de variația entalpiei și entropiei standard a reactanților, conform relației:

$$\ln K_p = -\frac{1}{R \cdot T} \left( \Delta H_{298}^0 - T \Delta S_{298}^0 + \int_{298}^T \Delta C_p^0 dT - \int_{298}^T \frac{\Delta C_p^0 dT}{T} \right) \quad (10)$$

în care R - este constanta universală a gazelor perfecte, în kJ/kmol K;

T - temperatura la care se desfășoară reacția chimică, în K;

$\Delta H_{298}^0$  - entalpia de reacție, în kJ/kmol;

$\Delta S_{298}^0$  - entropiei de reacție, în kJ/kmol K;

$\Delta C_p^0$  - variația capacității calorice moleculare corespunzător temperaturii T, în kJ/kmol K, a căror valori sunt prezentate în tabelul 1.

Nr crt.	SUBSTANTA	$H_{298}^0$ kJ/kmol	$S_{298}^0$ kJ/kmol K	$C_p^0$ kJ/kmol K
1	C	0	1,3609	$2,673 + 2,617 \cdot 10^{-3} T - 0,1169 \cdot 10^6 T^{-2}$
2	CO <sub>2</sub>	-94.051,8	51.061	$6,85 + 8,533 \cdot 10^{-3} T - 2,475 \cdot 10^{-6} T^2$
3	CO	-26.415,7	47,3	$6,25 + 2,091 \cdot 10^{-3} T - 4,59 \cdot 10^{-7} T^2$
4	H <sub>2</sub>	0	31,211	$6,88 + 0,066 \cdot 10^{-3} T + 2,79 \cdot 10^{-7} T^2$
5	CH <sub>4</sub>	-17.889	44,5	$4,75 + 12 \cdot 10^{-3} T + 30,31 \cdot 10^{-7} T^2 - 2,63 \cdot 10^{-9} T^3$
6	H <sub>2</sub> O	57.237	46,84	$6,89 + 3,283 \cdot 10^{-3} T - 3,43 \cdot 10^{-7} T^2$

Tabelul 1 Valorile entalpiei standard, a entropiei standard și variația capacității calorice molare

Ecuatia bilanțului energetic al gazificării (s-au neglijat pierderile specifice gazogenului):

$$Q_{cc} + Q_{cs} + Q_{sLO} + Q_{sLw} = Q_{gc} + Q_{gs} + Q_{cens} \quad [\text{kJ/m}^3\text{N gaz}] \quad (11)$$

în care:  $Q_{cc}$  - căldura chimică a cărbunelui corespunzătoare unitatii de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cc} = B^{anh} H_{cs} \quad [\text{kJ/m}^3\text{N gaz}] \quad (12)$$

$Q_{cs}$  - căldura sensibilă a cărbunelui corespunzătoare unitații de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cs} = B^{anh} c_c t_c \quad [\text{kJ/m}^3\text{N gaz}] \quad (13)$$

$Q_{sLO}$  - căldura sensibilă a oxigenului corespunzătoare unitații de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{sLa} = L_o c_{pO} t_o \quad [\text{kJ/m}^3\text{N gaz}] \quad (14)$$

$Q_{sLw}$  - căldura sensibilă a aburului corespunzătoare unitații de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{sLw} = L_w i_{ab} \quad [\text{kJ/m}^3\text{N gaz}] \quad (15)$$

$Q_{gc}$  - căldura chimică a gazului de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{gc} = H_{gs} \quad [\text{kJ/m}^3\text{N gaz}] \quad (16)$$

$Q_{gs}$  - căldura sensibilă a gazului de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{gs} = c_{pg} t_g \quad [\text{kJ/m}^3\text{N gaz}] \quad (17)$$

$Q_{cens}$  - căldura sensibilă a cenușii la evacuarea din gazogen corespunzătoare unitații de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cens} = B^{anh} A^{anh} c_{cen} t_{cen} \quad [\text{kJ/m}^3\text{N gaz}] \quad (18)$$

în care:  $H_{cs}$  - puterea calorifică superioară a cărbunelui, în  $\text{kJ/kg}$ ;

$c_c$  - căldura specifică a cărbunelui la intrare, în  $\text{kJ/kg K}$ ;

$c_{pO}$  - căldura specifică a oxigenului necesar gazificării la intrare, în  $\text{kJ/m}^3\text{N K}$ ;

$t_c, t_o$  - temperatura cărbunelui, respectiv a oxigenului la intrare, în  $^{\circ}\text{C}$ ;

$i_{ab}$  - entalpia aburului la intrare, în  $\text{kJ/kg}$ ;

$H_{gs}$  - puterea calorifică superioară a gazului de gazogen, în  $\text{kJ/m}^3\text{N}$ ;

$c_{pg}$  - căldura specifică a gazului de gazogen la ieșire, în  $\text{kJ/m}^3\text{N K}$ ;

$t_g, t_{cen}$  - temperatura gazului de gazogen, respectiv a cenușii la ieșire, în  $^{\circ}\text{C}$ ;

$c_{cen}$  - căldura specifică a cenușii la ieșire, în  $\text{kJ/kg K}$ .

#### DATE INIȚIALE:

- analiza elementară a cărbunelui:  $C^I, O^I, H^I, N^I, S^I, A^I, W^I$ ;

#### VARIABLE DE CALCUL:

- parametrii de gazificare: presiunea -  $p$ , și temperatura -  $t, T$ ;

#### NECUNOSCUTE:

- compoziția gazului de gazogen:

- căldura sensibilă a gazului de gazogen:  $r_{CO}, r_{CH_4}, r_{H_2}, r_{CO_2}, r_{N_2}, r_{H_2S}, r_{H_2O}$

- consumuri specifice: cărbune -  $B^{anh}$ , oxigen -  $L_o$  și abur -  $L_w$

C MODELAREA MATEMATICA A GAZIFICARII CU OXIGEN SI ABUR

C DECLARARE VARIABLE

```
REAL NI,I1,J1,K1,L1,M1,N1,I2,J2,K2,L2,M2,N2,I3,J3,I5,KP
Double precision COF(5), X(4), Y(4), tol
dimension KP(3), COCAR(7)
DIMENSION ABUR(2,7)
DIMENSION XR(4)
character*9 NUME(7)
DATA (NUME(I), I=1,7)/6hCARBON, 8hHIDROGEN, 6hOXIGEN, 4hAZOT, 4hSU
xLF, 6hCENUSA, 9hUMIDITATE/
DATA (ABUR(1,J), J=1,7)/2675., 2749., 2778., 2792., 2799., 2803.
x,2804./
DATA (ABUR(2,J),J=1,7)/0.5903, 2.669, 5.139, 7.593, 10.041, 12.51
x, 15. /
```

C INTRODUCERE DATE INITIALE - VERIFICARE CORECTITUDINE DATE

```
94 WRITE (*,*) 'INTRODUCETI COMPOZITIA CARBUNELUI-ANALIZA ELEMETARA
x IN %'
SUMA=0
DO 90 I=1,7
91 WRITE (*,*) NUME(I)
READ (*,*) COCAR(I)
IF (COCAR(I).GE.0.AND.COCAR(I).LE.100) GO TO 92
WRITE (*,*) 'EROARE LA INTRODUCEREA ELEMENTULUI CHIMIC AL CARBUBE
xLUI'
GO TO 91
92 SUMA=SUMA+COCAR(I)
90 CONTINUE
IF (SUMA.GE.99.9.AND.SUMA.LE.100.1) GO TO 93
WRITE(*,*)'EROARE LA COMPOZITIA COMBUSTIBILULUI',SUMA
GO TO 94
93 CI=COCAR(1)/100
HI=COCAR(2)/100
OI=COCAR(3)/100
NI=COCAR(4)/100
SI=COCAR(5)/100
AI=COCAR(6)/100
WI=COCAR(7)/100
QSCAR=33800.*CI+125448.*HI+10827.*(SI-OI)
QICAR=QSCAR-2509.*(WI+9*HI)
WRITE (*,*) 'INTRODUCETI TEMPERATURA OXIGENULUI IN GRAD C'
READ (*,*) TO2
WRITE (*,*) 'MODELARE MATEMATICA GAZIFICARE CU AMESTEC DE AER CU
IABUR'
WRITE (*,*) 'DATELE INITIALE DE CALCUL'
WRITE (*,*) 'COMPOZITIA CARBUNELUI ANALIZA ELEMENTARA'
WRITE (*,*) (NUME(I),COCAR(I),I=1,7)
```

## C DESCHIDERE FISIER DATE INTRARE - CALCULATE

```
OPEN(33 FILE='OXIRRG')
```

## C FISIER DATE INTRARE

```
WRITE(33 420)
420 FORMAT(72(' '),/,' 70X,')
WRITE(33 421)
421 FORMAT(' 17X 'GAZIFICARE CARBUNE CU OXIGEN SI ABUR'17X,/'',7
10X,')
WRITE(33 422)
422 FORMAT(' 12X 'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1 12X ' 70X ' /72(''))
WRITE(33 423)
423 FORMAT(' 70X,/' 20X, 'ANALIZA ELEMENTARA CARBUNE /%/'20X, '
1/' 70X, /72(')/' 6(9X, ),10X, /' 3X, 'Cl',4X, ' 3X,
1 Hl',4X, ' 3X, 'Ol',4X, ' 3X, 'Nl',4X, ' 3X, 'Sl',4X, ' 3X, 'Al',4X,
1' 4X, 'Wl',4X, /' 6(9X, ),10X, ')
WRITE(33 424)(COCAR(I),I=1,7)
424 FORMAT(' 6(1X,F6.2,2X,')2X,F6.2,2X,/'',6(9X, ),10X, /
172(')/' 70X, /' 22X, 'PUTERE CALORIFICA /KJ/KG/'23X, /'
170X, /72(')/' 35X, ' 34X, ')
WRITE(33 425)QSCAR,QICAR
425 FORMAT(' 12X, 'SUPERIOARA'13X, ' 12X, 'INFERIOARA'12X, /' 35X,
1' 34X, /' 12X, F10.3,13X, ' 12X, F10.3,12X, /' 35X, ' 34X,
1' /72(')/' 70X, /' 22X, 'TEMPERATURA OXIGEN INTRODUS'21X, '
1/' 29X, 'GRAD CELSIUS'29X, /' 70X, ')
WRITE(33 426)TO2
426 FORMAT(' 30X, F10.2,30X, /' 70X, /72(')/' 70X, /'
1' 16X, 'ABUR SATURAT LA PARAMETRII GAZIFICARII',16X, /'
1' 70X, /72('))
```

## C BLOC CALCUL - SISTEM ECUATII MODEL MATEMATIC

```
5 DO 10 J=1,7
IF (J NE 1) GO TO 11
P=1
GO TO 8
11 P=5*(J-1)
8 DO 9 I=1,7
TABS=723.15+50*I
```

## C CONSTANTE DE ECHILIBRU

```
RB=- (41021.194-24.906374*TABS+(3.484E-3)*(TABS**2)-(0.2595E-6)*
I(TABS**3)-(58450./TABS)-2.977*TABS*(ALOG(TABS)))/(1.987*TABS)
KP(1)=EXP(RB)
RM=- (-14442.568-56.774074*TABS-(4.6255E-3)*(TABS**2)-(4.12E-7)*
I(TABS**3)+(0.219166E-9)*(TABS**4)-(58450./TABS)+11.683*TABS*
I(ALOG(TABS)))/(1.987*TABS)
KP(2)=EXP(RM)
```

$$RH = - (30911.826 - 9.972231 \cdot TABS + (1.8715E-3) \cdot (TABS^{**2}) - (2.7166E-8) \cdot (TABS^{**3}) - (58450./TABS) - 3.567 \cdot TABS \cdot (ALOG(TABS))) / (1.987 \cdot TABS)$$

$$KP(3) = EXP(RH)$$

### C CALCUL COEFICIENTI SISTEM PRIM

$$A1 = 22.414 \cdot CI / 12.011$$

$$B1 = 22.414 \cdot (OI / 31.999 + WI / (2 \cdot 18.015))$$

$$C1 = 22.414 / 31.999$$

$$D1 = 22.414 / (2 \cdot 18.015)$$

$$E1 = 22.414 \cdot (HI / 2.0159 + WI / 18.015)$$

$$F1 = 22.414 / 18.015$$

$$G1 = 22.414 \cdot NI / 28.013$$

$$H1 = 0.$$

$$I1 = 22.414 \cdot SI / 32.06$$

$$J1 = P / KP(1)$$

$$K1 = P \cdot KP(2)$$

$$L1 = P / KP(3)$$

### C CALCUL ELEMENTE BILANT TERMIC

$$VAR = (TABS - 273.15) / 22.414$$

$$HCO2 = (44.14 + (9.04E-3) \cdot TABS - (8.53E5) / (TABS^{**2})) \cdot VAR$$

$$HCO = (28.41 + (4.10E-3) \cdot TABS - (0.46E5) / (TABS^{**2})) \cdot VAR$$

$$HCH4 = (17.45 + (60.46E-3) \cdot TABS + (1.117E-6) \cdot (TABS^{**2}) - (7.2E-9) \cdot (TABS^{**3})) \cdot VAR$$

$$HH2 = (27.28 + (3.26E-3) \cdot TABS + (0.502E5) / (TABS^{**2})) \cdot VAR$$

$$HN2 = (27.87 + (4.27E-3) \cdot TABS) \cdot VAR$$

$$HH2O = ABUR(1, J) \cdot ABUR(2, J) + (30. + (10.71E-3) \cdot TABS + (0.33E5) / (TABS^{**2})) \cdot VAR$$

$$HH2S = (29.37 + (15.4E-3) \cdot TABS) \cdot VAR$$

$$CPO2 = (31.46 + (3.39E-3) \cdot TABS - (3.77E5) / (TABS^{**2})) / 22.414$$

$$M1 = QSCAR - 0.75 \cdot (TABS - 273.15) \cdot AI + 24.8$$

$$N1 = CPO2 \cdot TO2$$

$$O1 = ABUR(1, J)$$

$$P1 = HCO2$$

$$R1 = 12720. + HCO$$

$$S1 = 39890. + HCH4$$

$$T1 = 12770. + HH2$$

$$U1 = HN2$$

$$V1 = HH2O$$

$$Z1 = 25620. + HH2S$$

### C CALCUL COEFICIENTI SISTEM SECUND

$$A2 = C1$$

$$B2 = (B1 / A1) - 0.5$$

$$C2 = ((B1 / A1) - 1) \cdot J1$$

$$D2 = 0.5 \cdot L1$$

$$E2 = K1 \cdot B1 / A1$$

$$F2 = D1$$

$$G2 = (E1 - I1) / A1$$

$$\begin{aligned}
H2 &= J1 \cdot (E1 - I1) / A1 \\
I2 &= L1 \\
J2 &= ((E1 - I1) / A1 - 2) \cdot K1 \\
K2 &= F1 \\
L2 &= H1 \\
M2 &= 1 + (G1 + I1) / A1 \\
N2 &= M2 \cdot J1 \\
O2 &= M2 \cdot K1 \\
P2 &= N1 - U1 \cdot H1 \\
R2 &= (M1 - U1 \cdot G1 - Z1 \cdot I1) / A1 - R1 \\
S2 &= ((M1 - U1 \cdot G1 - Z1 \cdot I1) / A1 - P1) \cdot J1 \\
T2 &= V1 \cdot L1 \\
V2 &= ((M1 - U1 \cdot G1 - Z1 \cdot I1) / A1 - S1) \cdot K1 \\
U2 &= T1 \\
W2 &= O1
\end{aligned}$$

C CALCUL COEFICIENTI SISTEM TERT

$$\begin{aligned}
A3 &= M2 - B2 \cdot L2 / A2 + F2 \cdot L2 \cdot G2 / (A2 \cdot K2) \\
B3 &= N2 - C2 \cdot L2 / A2 + F2 \cdot L2 \cdot H2 / (A2 \cdot K2) \\
C3 &= I2 + D2 \cdot L2 / A2 - F2 \cdot L2 \cdot I2 / (A2 \cdot K2) \\
D3 &= 1 - F2 \cdot L2 / (A2 \cdot K2) \\
E3 &= O2 - E2 \cdot L2 / A2 + F2 \cdot L2 \cdot J2 / (A2 \cdot K2) \\
F3 &= R2 - P2 \cdot B2 / A2 - G2 \cdot (W2 - P2 \cdot F2 / A2) / K2 \\
G3 &= S2 - P2 \cdot C2 / A2 - H2 \cdot (W2 - P2 \cdot F2 / A2) / K2 \\
H3 &= P2 \cdot D2 / A2 - T2 + I2 \cdot (W2 - P2 \cdot F2 / A2) / K2 \\
I3 &= (W2 - P2 \cdot F2 / A2) / K2 - U2 \\
J3 &= V2 - P2 \cdot E2 / A2 - J2 \cdot (W2 - P2 \cdot F2 / A2) / K2
\end{aligned}$$

C CALCUL COEFICIENTI SISTEM CUADRAT

$$\begin{aligned}
A4 &= E3 \cdot G3 - B3 \cdot J3 \\
B4 &= C3 \cdot G3 - B3 \cdot H3 \\
C4 &= D3 \cdot G3 - B3 \cdot I3 \\
D4 &= A3 \cdot G3 - B3 \cdot F3
\end{aligned}$$

C CALCUL COEFICIENTI SISTEM QUINT

$$\begin{aligned}
A5 &= (A4^2) \cdot G3 - H3 \cdot A4 \cdot B4 + J3 \cdot (B4^2) \\
B5 &= 2 \cdot G3 \cdot A4 \cdot C4 - F3 \cdot A4 \cdot B4 - A4 \cdot D4 \cdot H3 \\
C5 &= I3 \cdot (B4^2) + 2 \cdot J3 \cdot B4 \cdot D4 - H3 \cdot B4 \cdot C4 \\
D5 &= G3 \cdot (C4^2) - F3 \cdot B4 \cdot C4 - F3 \cdot A4 \cdot D4 \\
E5 &= H3 \cdot G3 \cdot B4 - 2 \cdot (G3^2) \cdot A4 - D4 \cdot C4 \cdot H3 \\
F5 &= J3 \cdot (D4^2) + 2 \cdot I3 \cdot B4 \cdot D4 \\
G5 &= F3 \cdot G3 \cdot B4 - F3 \cdot D4 \cdot C4 - 2 \cdot (G3^2) \cdot C4 \\
H5 &= H3 \cdot G3 \cdot D4 + (D4^2) \cdot I3 \\
I5 &= G3^3 + F3 \cdot G3 \cdot D4 \\
COF(1) &= A5 \cdot 1 \cdot E7 \\
COF(2) &= (B5 + C5) \cdot 1 \cdot E7 \\
COF(3) &= (D5 + E5 + F5) \cdot 1 \cdot E7 \\
COF(4) &= (G5 + H5) \cdot 1 \cdot E7 \\
COF(5) &= I5 \cdot 1 \cdot E7
\end{aligned}$$

M=5

C LANSARE RUTINE REZOLVARE POLINOM - NEWTON

```
CALL C02AEF(COF,M,X,Y,TOL,IFAIL)
WRITE(*,*)'COEFICIENTI'
WRITE(*,*)(COF(KK),KK=1,5)
WRITE(*,*)'REZULTATE'
WRITE(*,*)(X(KJ),Y(KJ),KJ=1,4)
WRITE(*,*)'TOL,IFAIL',TOL,IFAIL
WRITE(*,*)'SOLUTII REALE CONVENABILE'
```

C BLOC SELECTIONARE SOLUTIE POLINOM

```
JSOL=0
DO 60 ISOL=1,4
IF (Y(ISOL).NE.0) GO TO 60
IF (X(ISOL).LE.0.OR.X(ISOL).GE.1.) GO TO 60
JSOL=JSOL+1
XR(JSOL)=X(ISOL)
WRITE(*,*)'NR. SOLUTIE ',JSOL,' VALOARE SOLUTIE ',XR(JSOL)
60 CONTINUE
IF (JSOL.NE.0) GO TO 61
WRITE (*,*) 'EROARE LA REZOLVARE ECUATIE NEWTON'
GO TO 9
61 write(*,*)'ALEGETI SOLUTIA DE REZOLVARE A SISTEMULUI'
WRITE (*,*) 'INTRODUCETI NUMARUL SOLUTIEI'
READ(*,*) KSOL
IF (KSOL.EQ.5) GO TO 9
```

C DETERMINARE NECUNOSCUITE SISTEM

```
33 X6=XR(KSOL)
X5=K1*(X6**2)
IF(X5.GT.0.AND.X5.LT.1) GO TO 35
WRITE (*,*) X6,X5
GO TO 37
35 X4=(G3-X6*C4-(X6**2)*A4)/(D4+X6*B4)
IF(X4.GT.0.AND.X4.LT.1) GO TO 38
WRITE (*,*) X6,X5,X4
GO TO 37
38 X8=L1*X4*X6
IF(X8.GT.0.AND.X8.LT.1) GO TO 40
WRITE (*,*) X6,X5,X4,X8
GO TO 37
40 X1=(J1*(X4**2)+X4+K1*(X6**2))/A1
IF(X1.GT.0) GO TO 42
WRITE (*,*) X6,X5,X4,X8,X1
GO TO 37
42 X3=A1*X1-X4-X5
IF(X3.GT.0.AND.X3.LT.1) GO TO 44
WRITE (*,*) X6,X5,X4,X8,X1,X3
```



```

GO TO 37
44 X9=11*X1
IF(X9 GT 0 AND X9 LT 1) GO TO 46
WRITE (' ') X6 X5 X4 X8 X1 X3 X9
GO TO 37
46 X7=1-X3-X4-X5-X6-X8-X9
IF(X7 GT 0 AND X7 LT 1) GO TO 48
WRITE (' ') X6 X5 X4 X8 X1 X3 X9 X7
GO TO 37
48 X10=-((G2*X4+H2*(X4**2)-I2*X4*X6-X6+J2*(X6**2))/K2
IF(X10 GT 0) GO TO 50
WRITE (' ') X6 X5 X4 X8 X1 X3 X9 X7 X10
GO TO 37
50 X2=-((B2*X4+C2*(X4**2)-D2*X4*X6+E2*(X6**2)+F2*X10)/A2
IF(X2 GT 0) GO TO 52
WRITE (' ') X6 X5 X4 X8 X1 X3 X9 X7 X10 X2
37 WRITE (' ') 'EROARE LA REZOLVAREA SISTEMULUI'
GO TO 61
52 XA3=X3/(1-X8)
XA4=X4/(1-X8)
XA5=X5/(1-X8)
XA6=X6/(1-X8)
XA7=X7/(1-X8)
XA9=X9/(1-X8)

```

### C DETERMINARE ELEMENTE BILANT TERMIC

```

QS=X4*12720 +X5*39890 +X6*12770 +X9*25620.
QAS=XA4*12720 +XA5*39890 +XA6*12770 +XA9*25620.
QI=X4*12720 +X5*35910 +X6*10800 +X9*25620.
QAI=XA4*12720 +XA5*35910 +XA6*10800 +XA9*25620.
BA=X1*(1-WI)
QCAR=QSCAR*X1
QSEC=24 8*X1
TO2=TO2+273.15
CPOI2=(31.46+(3.39E-3)*TO2-(3.77E5)/(TO2**2))/22.414
QSO2=CPOI2*(TO2-273.15)*X2
QSAB=ABUR(1,J)*X10
QINTR=QCAR+QSEC+QSO2+QSAB
QSGAZ=HCO2*X3+HCO*X4+HCH4*X5+HH2*X6+HN2*X7+HH2O*X8+HH2S*X9
QSCEN=0.75*(TABS-273.15)*AI*X1
QIES=QS+QSGAZ+QSCEN
QINT=QICAR*X1+QSEC+QSO2+QSAB
RAGTR=100*QI/QIES
RAGTC=(100*(QI+QSGAZ))/QIES
X3=X3*100
X4=X4*100
X5=X5*100
X6=X6*100
X7=X7*100
X8=X8*100
X9=X9*100

```



```

310 FORMAT(' 35X.' 34X.' /72(') / 3(17X.' 16X.' / 3X.' IN
:FERIOARA'4X.' 3X.' SUPERIOARA'4X.' 3X.' INFERIOARA'4X.' 3X.' SUP
1ERIOARA'3X.' / 3(17X.' 16X.')
WRITE(* 311)QI.QS.QAI.QAS
311 FORMAT(' 3(3X.F10.2.4X.' 3X.F10.2.3X.' / 3(17X.' 16X.'
1' /72('))
WRITE(* 312)
312 FORMAT(' 70X.' / 18X.' BILANTUL ENERGETIC AL GAZIFICARII'19 X.
1' / 70X.' / 18X.' FLUXURI TERMICE INTRATE KJ/Nm3GAZ'19X.' /
1' 70X.' / 4(13X.' 14X.' / 4X.' TOTAL'4X.' 3X.' CHIMIC'4X.
1' 2X.' SENSIBIL'3X.' 2X.' SENSIBIL'3X.' 3X.' SENSIBIL'3X.' /
13X.' INTRAT'4X.' 3X.' CARBUNE'3X.' 3X.' CARBUNE'3X.' 4X.' OXIGEN
1' 3X.' 5X.' ABUR'5X.' / 4(13X.' 14X.')
WRITE(* 313)QINTR.QCAR.QSEC.QSO2.QSAB
313 FORMAT(' 4(3X.F8.2.2X.' 3X.F8.2.3X.' /72(') / 70X.')
WRITE(* 314)
314 FORMAT(' 19X.' FLUXURI TERMICE IESITE KJ/Nm3GAZ'19X.' / 70X.'
1/72(') / 4(13X.' 14X.' / 4X.' TOTAL'4X.' 3X.' CHIMIC'4X.
1' 2X.' SENSIBIL'3X.' 2X.' SENSIBIL'3X.' 14X.' /
14X.' IESIT' 4X.' 5X.' GAZ'5X.' 5X.' GAZ'5X.' 3X.' CENUSA'
14X.' 14X.' / 4(13X.' 14X.')
WRITE(* 315)QIES.QS.QSGAZ.QSCEN
315 FORMAT(' 4(3X.F8.2.2X.' 14X.' / 4(13X.' 14X.' /72(') /
1' 70X.')
WRITE(* 316)
316 FORMAT(' 21X.' RANDAMENTUL GAZIFICARII % / 22X.' / 70X.' /72
1(') / 13X.' GAZ RECE'14X.' 13X.' GAZ CALD'13X.' / 35X.' 34X.
1')
WRITE(* 317)RAGTR.RAGTC
317 FORMAT(' 14X.F7.3.14X.' 14X.F7.3.13X.' / 70X.' /72('))

```

## C FISIER DATE CALCULALE

```

WRITE (33.401)
401 FORMAT(2X'GAZIFICARE CARBUNE CU OXIGEN SI ABUR'10X,'MODELARE
MATEM
1ATICA GAZIFICARE CARBUNE VOIVOZI')
WRITE(33.403)
403 FORMAT(2X.'TEMPERATURA DE CALCUL'.22X.
1'PRESIUNEA DE CALCUL'/2X.'GRAD CELSIUS'.31X.'BAR')
TCEL=TABS-273.15
WRITE(33.404)TCEL,P
404 FORMAT(1X.F7.2.34X.F7.2/72(') / 70X.' / 25X.'CONSUMURI SPECI
1FICE' 26X.' /
170X.' /72(') / 3(17X.' 16X.')
WRITE(33.405)
405 FORMAT(' 2X.' CARBUNE UMED' 3X.' 1X.' CARBUNE ANHIDRU' 1X.'
16X.' OXIGEN' 5X.' 6X.' ABUR' 6X.' / 4X.' KG/Nm3GAZ' 4X.' 4X.' K
1G/Nm3GAZ' 4X.' 4X.' Nm3/Nm3GAZ' 3X.' 4X.' KG/Nm3GAZ' 3X.' /
13(17X.' 16X.')
WRITE(33.406)X1.BA.X2.X10
406 FORMAT(' 3(5X.F7.4.5X.' 4X.F7.4.5X.' / 17X.' 17X.' 17X.

```

```

1* 16X,'*/72('*)/'*,70X,'**'20 X,'COMPONENTELE GAZULUI UMED
1 /%/',21 X,'**',70X,'*/72('*)/'*,6(9X,'*),10X,'**'3X,'CO
12',3X,'*4X,'CO',3X,'*',3X,'CH4',3X,'*',4X,'H2',3X,'*',4X,'N2',3X,
1* 3X,'H2O'3X,'*4X,'H2S',3X,'**',6(9X,'*),10X,'*')
WRITE(33,407) X3,X4,X5,X6,X7,X8,X9
407 FORMAT('* 6(2X,F5.2,2X,'*),2X,F5.2,3X,'**',6(9X,'*),10X,'**/
172('*))
WRITE(33,408)
408 FORMAT('* 70X,'**'19 X,'COMPONENTELE GAZULUI ANHIDRU /%/'
1,19 X,'**',70X,'*/72('*)/'*,6(9X,'*),10X,'**'3X,'CO2',3X
1,'*4X,'CO',3X,'*',3X,'CH4',3X,'*',4X,'H2',3X,'*',4X,'N2',3X,'* 3
1X,'H2S',3X,'*10X,'**',6(9X,'*),10X,'*')
WRITE(33,409)XA3,XA4,XA5,XA6,XA7,XA9
409 FORMAT('* 6(2X,F5.2,2X,'*),10X,'**',6(9X,'*),10X,'**/72('*')
1/'*,70X,'**'22X,'PUTERE CALORIFICA /KJ/Nm3/22X,'**',70X,'*
1/72('*)/'*,35X,'*',34X,'**'13X,'GAZ UMED',14X,'*',12X,'GAZ A
1NHIDRU',11X,'*')
WRITE(33,410)
410 FORMAT('* 35X,'*',34X,'**/72('*)/'*,3(17X,'*)16X,'**'3X,'IN
1FERIOARA'4X,'*',3X,'SUPERIOARA'4X,'*',3X,'INFERIOARA'4X,'*3X,'SUP
1ERIOARA'3X,'*')
WRITE(33,411)QI,QS,QAI,QAS
411 FORMAT('* 3(4X,F8.2,5X,'*),4X,F8.2,4X,'**',3(17X,'*)16X,'**/
12('*))
WRITE(33,412)
412 FORMAT('///72('*)/'*,70X,'**'18X,'BILANTUL ENERGETIC AL GAZIF
1ICARII'19 X,
1**'70X,'**'18X,'FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/'17X,'**/
1**70X,'**/72('*)/
1**4(13X,'*),14X,'**'4X,'TOTAL'4X,'*3X,'CHIMIC'4X,
1**2X,'SENSIBIL'3X,'*',2X,'SENSIBIL'3X,'*3X,'SENSIBIL'3X,'**'
13X,'INTRAT'4X,'*',3X,'CARBUNE'3X,'*',3X,'CARBUNE'3X,'*',4X,'OXIGEN
',3X,'*5X,'ABUR'5X,'**'4(13X,'*),14X,'*')
WRITE(33,413)QINTR,QCAR,QSEC,QSO2,QSAB
413 FORMAT('* 4(3X,F8.2,2X,'*),3X,F8.2,3X,'**/72('*)/'*,70X,'*')
WRITE(33,414)
414 FORMAT('* 18X'FLUXURI TERMICE IESITE /KJ/Nm3GAZ/'18X,'**'70X'
1/72('*)/'**4(13X,'*),14X,'**'4X,'TOTAL'4X,'*3X,'CHIMIC'4X,
1**2X,'SENSIBIL'3X,'*',2X,'SENSIBIL'3X,'*14X,'**'
14X,'IESIT',4X,'*',5X,'GAZ'5X,'*',5X,'GAZ'5X,'*',3X,'CENUSA',
14X,'*14X,'**'4(13X,'*),14X,'*')
WRITE(33,415)QIES,QS,QSGAZ,QSCEN
415 FORMAT('* 4(3X,F8.2,2X,'*),14X,'**'4(13X,'*),14X,'**/72('*)/
1*',70X,'*')
WRITE(33,416)
416 FORMAT('* 21X,'RANDAMENTUL GAZIFICARII /%/',22X,'**'70X,'**/72
1('*)/'**35X,'**34X'13X,'GAZ RECE'14X'13X,'GAZ CALD'13X,'*
1/'**35X,'**34X,'*')
WRITE(33,417)RAGTR,RAGTC
417 FORMAT('* 14X,F7.3,14X,'*14X,F7.3,13X,'**'35X,'*',34X,'**/72
1('*))
9 CONTINUE

```

10 CONTINUE

CLOSE(33)

stop  
end

SUBROUTINE C02AEF(A,N,REZ,IMZ,TOL,IFAIL)

C RUTINE REZOLVARE POLINOM

C DECLARARE VARIABLE

CHARACTER\*6 SRNAME  
PARAMETER (SRNAME='C02AEF')  
DOUBLE PRECISION TOL  
INTEGER IFAIL, N  
DOUBLE PRECISION A(N), IMZ(N), REZ(N)  
DOUBLE PRECISION J, JX, R, RX, X, Y  
LOGICAL SAT  
DOUBLE PRECISION A1P5, CMAX, FAC, FOUR, FUN, G, NFUN, ONE, P1,  
\* P2Z1, P3Z2, P4Z1, P5, S, S1, S2, SCALE, SIG, T,  
\* TOL2, TWO, XXX, ZERO  
INTEGER I, I2, II, IND, JTEMP, K  
LOGICAL CBIG, FLAG  
DOUBLE PRECISION B(100), C(100)  
CHARACTER\*1 P01REC(1)

C FUNCTII EXTERNE

DOUBLE PRECISION X02AJF, X02ALF  
INTEGER P01ABF  
EXTERNAL X02AJF, X02ALF, P01ABF  
EXTERNAL C02AEZ  
INTRINSIC ABS, LOG, SQRT, DBLE, INT

C BLOC INITIALIZARE

COMMON /AC02AE/X, Y, R, RX, J, JX, SAT  
DATA ONE/1.0D0/, A1P5/1.5D0/, ZERO/0.0D0/,  
\* P4Z1/1.0D-5/  
DATA TWO/2.0D0/, P5/0.5D0/, P2Z1/1.0D-3/,  
\* P1/0.1D0/  
DATA P3Z2/2.0D-4/, FOUR/4.0D0/

C EXECUTIE

XXX = X02AJF()  
IF (TOL LT XXX) TOL = XXX  
CMAX = SQRT(X02ALF())  
FAC = ONE

```

FLAG = IFAIL .EQ. 2
IF (FLAG) IFAIL = 1
IND = 0
TOL2 = TOL**A1P5
IF (A(1).NE.ZERO .AND. N.GE.2 .AND. N.LE.100) GO TO 20
IND = P01ABF(IFAIL,1,SRNAME,0,P01REC)
GO TO 780
20 IF (A(N).NE.0.D0) GO TO 40
  REZ(N-1) = ZERO
  IMZ(N-1) = ZERO
  N = N - 1
  GO TO 20
40 SCALE = ZERO
  DO 60 I = 1, N
    IF (ABS(A(I)).GE.P4Z1) SCALE = SCALE + LOG(ABS(A(I)))
60 CONTINUE
  K = INT(SCALE/(DBLE(N)*LOG(TWO))+P5)
  SCALE = TWO**(-K)
  DO 80 I = 1, N
    A(I) = A(I)*SCALE
    B(I) = A(I)
80 CONTINUE

```

#### C TESTARE ORDIN REDUS POLIMON

```

IF (N.GT.3) GO TO 100
GO TO (780,620,640) N
100 DO 160 I = 2, N
  II = N - I + 2
  IF (B(II).EQ.0.0D0) GO TO 200
  T = B(1)/B(II)
  IF (ABS(T).GE.ONE) GO TO 200
  DO 120 K = 2, II
    I2 = II - K + 1
    C(K-1) = B(K) - T*B(I2)
120 CONTINUE
  JTEMP = II - 1
  DO 140 K = 1, JTEMP
    B(K) = C(K)
140 CONTINUE
160 CONTINUE
  FAC = FAC*TWO
  SCALE = ONE
  I = N
180 I = I - 1
  IF (I.LT.1) GO TO 100
  SCALE = SCALE*TWO
  A(I) = A(I)*SCALE
  B(I) = A(I)
  GO TO 180
200 IF (.NOT. FLAG) GO TO 220
  X = REZ(1)

```

```

Y = IMZ(1) + TOL
FLAG = FALSE.
GO TO 240
220 X = P2Z1
Y = P1
240 CALL C02AEZ(A,N,TOL)
FUN = R*R + J*J
260 G = RX*RX + JX*JX
IF (G GE FUN*TOL2) GO TO 320
280 IND = P01ABF(IFAIL.2,SRNAME.0,P01REC)
SCALE = ONE
I = N
300 I = I - 1
IF (I LT 1) GO TO 780
SCALE = SCALE*FAC
A(I) = A(I)/SCALE
GO TO 300
320 S1 = -(R*RX+J*JX)/G
S2 = (R*JX-J*RX)/G
SIG = P3Z2
S = SQRT(S1*S1+S2*S2)
IF (S LE ONE) GO TO 340
S1 = S1/S
S2 = S2/S
SIG = SIG/S
340 X = X + S1
Y = Y + S2
360 CALL C02AEZ(A,N,TOL)
IF (SAT) GO TO 400
NFUN = R*R + J*J
IF (FUN-NFUN.GE.SIG*FUN) GO TO 380
S1 = P5*S1
S2 = P5*S2
IF (ABS(S1).LE.XXX*ABS(X) .AND. ABS(S2).LE.XXX*ABS(Y)) GO TO 280
S = P5*S
SIG = P5*SIG
X = X - S1
Y = Y - S2
GO TO 360
380 FUN = NFUN
GO TO 260
400 FUN = ONE/TOL2
K = 0
IMZ(N-1) = Y*FAC
IF (ABS(Y) GT P1) GO TO 460

```

### C RADACINA REALA

```

S1 = Y
Y = ZERO
CALL C02AEZ(A,N,TOL)
Y = S1

```

```

IF (.NOT. SAT) GO TO 460
REZ(N-1) = X*FAC
IMZ(N-1) = ZERO
N = N - 1
B(1) = A(1)
C(N) = -A(N+1)/X
CBIG = .FALSE.
DO 440 I = 2, N
  B(I) = A(I) + X*B(I-1)
  II = N - I + 1
  IF (CBIG) GO TO 420
  C(II) = (C(II+1)-A(II+1))/X
  IF (ABS(C(II)).LE.CMAX) GO TO 440
  CBIG = .TRUE.
420  C(II) = CMAX
440 CONTINUE
GO TO 520

```

### C RADACINA COMPLEXA

```

460 REZ(N-1) = X*FAC
REZ(N-2) = X*FAC
IMZ(N-2) = -IMZ(N-1)
N = N - 2
R = TWO*X
J = -(X*X+Y*Y)
B(1) = A(1)
B(2) = A(2) + R*B(1)
C(N) = -A(N+2)/J
C(N-1) = -(A(N+1)+R*C(N))/J
IF (N.EQ.2) GO TO 520
CBIG = .FALSE.
DO 500 I = 3, N
  B(I) = A(I) + R*B(I-1) + J*B(I-2)
  II = N - I + 1
  IF (CBIG) GO TO 480
  C(II) = -(A(II+2)-C(II+2)+R*C(II+1))/J
  IF (ABS(C(II)).LE.CMAX) GO TO 500
  CBIG = .TRUE.
480  C(II) = CMAX
500 CONTINUE

520 DO 540 I = 1, N
  NFUN = ABS(B(I)) + ABS(C(I))
  IF (NFUN.LE.TOL) GO TO 540
  NFUN = ABS(B(I)-C(I))/NFUN
  IF (NFUN.GE.FUN) GO TO 540
  FUN = NFUN
  K = I
540 CONTINUE
IF (K.EQ.1) GO TO 580
JTEMP = K - 1

```



```

DO 560 I = 1 JTEMP
  A(I) = B(I)
560 CONTINUE
580 A(K) = P5*(B(K)+C(K))
  IF (K EQ N) GO TO 40
  JTEMP = K + 1
  DO 600 I = JTEMP, N
    A(I) = C(I)
600 CONTINUE
  GO TO 40
620 REZ(1) = -A(2)/A(1)*FAC
  IMZ(1) = ZERO
  GO TO 760
640 R = A(2)*A(2) - FOUR*A(1)*A(3)
  IF (R GT ZERO) GO TO 660
  REZ(2) = -P5*A(2)/A(1)*FAC
  REZ(1) = REZ(2)
  IMZ(2) = P5*SQRT(-R)/A(1)*FAC
  IMZ(1) = -IMZ(2)
  GO TO 760
660 IMZ(1) = ZERO
  IMZ(2) = ZERO
  IF (A(2)) 680, 700, 720
680 REZ(1) = P5*(-A(2)+SQRT(R))/A(1)*FAC
  GO TO 740
700 REZ(1) = -P5*SQRT(R)/A(1)*FAC
  GO TO 740
720 REZ(1) = P5*(-A(2)-SQRT(R))/A(1)*FAC
740 REZ(2) = A(3)/(REZ(1)*A(1))*FAC*FAC
760 N = 1
780 IFAIL = IND
  RETURN
  END

```

SUBROUTINE C02AEZ(A,N,TOL)

C DECLARARE VARIABILE

```

DOUBLE PRECISION TOL
INTEGER          N
DOUBLE PRECISION A(N)
DOUBLE PRECISION J, JX, R, RX, X, Y
LOGICAL          SAT
DOUBLE PRECISION A1, A2, A3, A8, B1, B2, B3, C, P, P8, Q, T, TEN,
*              TWO, ZERO
INTEGER          K
INTRINSIC        ABS, SQRT
COMMON           /AC02AE/X, Y, R, RX, J, JX, SAT
DATA             TWO/2.0D0/, ZERO/0.0D0/, P8/0.8D0/, TEN/1.0D1/,
*              A8/8.0D0/

```

C EXECUTIE

```

P = -TWO*X
Q = X*X + Y*Y
T = SQRT(Q)
A2 = ZERO
B2 = ZERO
B1 = A(1)
A1 = A(1)
C = ABS(A1)*P8
N = N - 2
DO 20 K = 2, N
  A3 = A2
  A2 = A1
  A1 = A(K) - P*A2 - Q*A3
  C = T*C + ABS(A1)
  B3 = B2
  B2 = B1
  B1 = A1 - P*B2 - Q*B3
20 CONTINUE
N = N + 2
A3 = A2
A2 = A1
A1 = A(N-1) - P*A2 - Q*A3
R = A(N) + X*A1 - Q*A2
J = A1*Y
RX = A1 - TWO*B2*Y*Y
JX = TWO*Y*(B1-X*B2)
C = T*(T*C+ABS(A1)) + ABS(R)
SAT = (SQRT(R*R+J*J)) .LT. ((TEN*C-A8*(ABS(R)+ABS(A1)*T)
*   +TWO*ABS(X*A1))*TOL)
RETURN
END
INTEGER FUNCTION P01ABF(IFAIL,IERROR,SRNAME,NREC,REC)

```

### C DECLARARE VARIABILE

```

INTEGER          IERROR, IFAIL, NREC
CHARACTER*(*)    SRNAME
CHARACTER*(*)    REC(*)
INTEGER          I, NERR
CHARACTER*72     MESS
EXTERNAL         P01ABZ, X04AAF, X04BAF
INTRINSIC        ABS, MOD

```

### C EXECUTIE

```

IF (IERROR.NE.0) THEN
  IF (IFAIL.EQ.-1 .OR. IFAIL.EQ.0 .OR. IFAIL.EQ.-13 .OR.
*   (IFAIL.GT.0 .AND. MOD(IFAIL/10,10).NE.0)) THEN
    CALL X04AAF(0,NERR)
    DO 20 I = 1, NREC
      CALL X04BAF(NERR,REC(I))

```

```

20 CONTINUE
   IF (IFAIL.NE.-13) THEN
     WRITE (MESS,FMT=99999) SRNAME, IERROR
     CALL X04BAF(NERR,MESS)
     IF (ABS(MOD(IFAIL,10)).NE.1) THEN

       CALL X04BAF(NERR,
        *      ' ** NAG hard failure - execution terminated'
        *      )
       CALL P01ABZ
     ELSE

       CALL X04BAF(NERR,
        *      ' ** NAG soft failure - control returned')
     END IF
   END IF
END IF
END IF
END IF
P01ABF = IERROR
RETURN

C
99999 FORMAT (' ** ABNORMAL EXIT from NAG Library routine ',A,', IFAIL',
 *      '= ',I6)
END
DOUBLE PRECISION FUNCTION X02AJF()

C EXECUTIE

X02AJF = 2.0D0**(-55)
RETURN
END
DOUBLE PRECISION FUNCTION X02ALF()
X02ALF = (2.0D0**126 - 2.0D0**70) * 2.0D0
RETURN
END

SUBROUTINE P01ABZ

C EXECUTIE
STOP
END
SUBROUTINE X04AAF(I,NERR)

C DECLARARE VARIABILE

INTEGER      I, NERR
INTEGER      NERR1
SAVE         NERR1
DATA        NERR1/6/

C EXECUTIE
IF (I.EQ.0) NERR = NERR1

```

```
IF (I.EQ.1) NERR1 = NERR  
RETURN  
END
```

```
SUBROUTINE X04BAF(NOUT,REC)
```

```
C  DECLARARE VARIABILE
```

```
INTEGER      NOUT  
CHARACTER*(*) REC  
INTEGER      I  
INTRINSIC    LEN  
IF (NOUT.GE.0) THEN  
  DO 20 I = LEN(REC), 2, -1  
    IF (REC(I:I).NE.' ') GO TO 40  
20  CONTINUE
```

```
40  WRITE (NOUT,FMT=99999) REC(1:I)  
    END IF  
    RETURN
```

```
C  
99999 FORMAT (A)  
END
```

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI

ANALIZA ELEMENTARA CARBUNE /%/

CI	HI	OI	NI	SI	AI	WI
21.55	1.40	4.24	.73	1.05	45.11	25.92

PUTERE CALORIFICA /KJ/KG/

SUPERIOARA

INFERIOARA

8694.791

7728.324

TEMPERATURA OXIGEN INTRODUS  
 GRAD CELSIUS

20.00

ABUR SATURAT LA PARAMETRII GAZIFICARII

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

CARBUNE UMEI KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	OXIGEN Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
1.1052	.8188	.2895	.4422

COMPONENTELE GAZULUI UMEI / - /

CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
3.35	2.75	12.73	.58	41.16	.73

COMPONENTELE GAZULUI ANHIDRU / - /

CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
3.35	2.75	12.73	.58	41.16	.73

ENTALPIA ALGORITMICA / KJ/Nm<sup>3</sup>

GAZ UMEI	GAZ ANHIDRU
64.101	90.330

BILANTUL ENERGETIC AL GAZIFICARII

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
8329.41	7119.02	20.31	7.25	1182.83

FLUXURI TERMICE IESITE / KJ/Nm<sup>3</sup>GAZ/

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
8285.94	5969.15	2173.29	143.50

RANDAMENTUL GAZIFICARII / - /

GAZ RECE	GAZ CALD
64.101	90.330



GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOTI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

CARBUNE UMED	CARBUNE ANHIDRU	OXIGEN	ABUR
KG/Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ	Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ
1.6472	1.2202	.5225	.0706

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
INTRAT	CARBUNE	CARBUNE	OXIGEN	ABUR
11274.55	10609.72	30.26	445.82	188.76

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL
IESIT	GAZ	GAZ	CENUSA
11186.19	6466.40	4419.06	360.10

RANDAMENTUL GAZIFICARII / %

GAZ RECE	GAZ CALD
54.686	54.187

COMPOZITIA ALIMENTARA /KG/Nm<sup>3</sup>

C	H	N	H <sub>2</sub> O	H <sub>2</sub> S
14.04	20.81	.54	16.62	.65
37.48	.81			

GAZ UMED

C	H	N	H <sub>2</sub> O	H <sub>2</sub> S
49.76	14.14	6.58	1.03	1.30

GAZ ANHIDRU

C	H	N	H <sub>2</sub> O	H <sub>2</sub> S
14.04	20.81	.54	16.62	.65



GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	OXIGEN Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
1.1571	.8572	.2501	.5166

COMPONENTELE GAZULUI UMED / %

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
30.08	1.14	14.48	8.02	.66	44.78	.83

COMPONENTELE GAZULUI ANHIDRU / %

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S
54.47	2.06	26.23	14.53	1.20	1.51

POTERE CALORIFICA / KJ/Nm<sup>3</sup>

GAZ UMED	GAZ ANHIDRU
INFERIOARA 6426.18	INFERIOARA 11637.10
SUPERIOARA 7160.71	SUPERIOARA 12967.26

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE / KJ/Nm<sup>3</sup>GAZ/

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
9183.27	7452.92	21.26	327.13	1381.95

FLUXURI TERMICE IESITE / KJ/Nm<sup>3</sup>GAZ/

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
9146.73	7160.71	1826.81	195.74

RANDAMENTUL GAZIFICARII /

GAZ RECE	GAZ CALD
70.257	80.229

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBUNE ANHIDRU \* OXIGEN \* ABUR  
 KG/Nm<sup>3</sup>GAZ \* KG/Nm<sup>3</sup>GAZ \* Nm<sup>3</sup>/Nm<sup>3</sup>GAZ \* KG/Nm<sup>3</sup>GAZ  
 1.3000 \* .9697 \* .3639 \* .3159

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL  
 INTRAT \* CARBUNE \* CARBUNE \* OXIGEN \* ABUR  
 9949.57 \* 8431.12 \* 24.05 \* 649.50 \* 844.91

COMPONENTELE GAZULUI UMED / /

CO<sub>2</sub> \* CO \* CH<sub>4</sub> \* H<sub>2</sub> \* N<sub>2</sub> \* H<sub>2</sub>O \* H<sub>2</sub>S  
 11.84 \* 5.11 \* 17.52 \* .60 \* 39.62 \* .76

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL  
 TESTIT \* GAZ \* GAZ \* CENUSA \*  
 9881.76 \* 6248.84 \* 3390.74 \* 310.00 \*

COMPONENTELE GAZULUI ANHIDRU / /

O<sub>2</sub> \* CO<sub>2</sub> \* CO \* H<sub>2</sub> \* N<sub>2</sub> \* H<sub>2</sub>S  
 8.154 \* 24.03 \* 1.00 \* 1.25 \*

GAZ RECE \* \* \* \* \*  
 57.666 \* \* \* \* \*  
 GAZ CALD \* \* \* \* \*

RANDAMENTUL GAZIFICARII / /

PUTERE CALORIFICA /KJ/Nm<sup>3</sup>

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 800.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	OXIGEN Nm3/Nm3GAZ	ABUR KG/Nm3GAZ
1.5526	1.1502	.4621	.1430

COMPONENTELE GAZULUI UMED / % /

CO2	CH4	H2	N2	H2O	H2S
14.16	1.86	16.64	.64	38.20	.80

COMPONENTELE GAZULUI ANHIDRU / % /

CO2	CH4	H2	N2	H2S
22.91	3.01	26.93	1.03	1.29

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED	GAZ ANHIDRU
6192.90	10671.41
6594.68	10021.26
	SUPERIOARA
	INFERIOARA

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
INTRAT	CARBUNE	CARBUNE	OXIGEN	ABUR
11467.08	10000.43	28.52	1055.60	382.53

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
IESIT	GAZ	GAZ	CENUSA	
11378.04	6594.68	4452.17	420.23	

RANDAMENTUL GAZIFICARII / % /

GAZ RECE	GAZ CALD
54.429	83.558

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

CARBUNE UMED KG/Nm3GAZ	1.1670	OXIGEN Nm3/Nm3GAZ	.2278	ABUR KG/Nm3GAZ	.5380	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
						9616.47	7516.67	21.44	639.18	1439.18

COMPONENTELE GAZULUI UMED /- /

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

H2O	CH4	H2	NO	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
16.81	16.38	6.09	.68	45.38	.86	9580.77	7633.71	1785.36	197.41

COMPONENTELE ABURUL ANHIDRU /- /

RANDAMENTUL GAZIFICARII /- /

CH4	H2	H2	H2S	GAZ RECE	GAZ CALD
1.18	11.15	1.25	1.57	71.671	80.256

GAZ UMED

GAZ ANHIDRU

INFERIOARA 1.900.000  
 SUPERIOARA 13.075.000

AZIFICARE CARBUNE CU OXIGEN SI ABUR MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 TEMPERATURA DE CALCUL PRESIUNEA DE CALCUL  
 GRAD CELSIUS BAR  
 600.00 20.00

CONSUMURI SPECIFICE

CARBUNE UMED	* CARBUNE ANHIDRU	* OXIGEN	* ABUR
KG/Nm3GAZ	KG/Nm3GAZ	Nm3/Nm3GAZ	KG/Nm3GAZ
1.1984	.8877	.2587	.4813

COMPONENTELE GAZULUI UMED / - /

CO2	CH4	H2	N2	H2O	H2S
28.03	12.53	11.09	.64	43.42	.80

COMPONENTELE GAZULUI ANHIDRU / - /

CO2	CO	CH4	H2	N2	H2S
49.53	6.16	22.15	19.61	1.13	1.42

FUTERE CALORIFICA /KJ/Nm3/

INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
6347.57	7064.89	11218.47	12486.23

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
9894.59	7718.71	22.02	866.47	1287.40

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
9842.87	7064.39	2586.45	243.26	

RAMDAMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
64.489	80.76e

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	OXIGEN Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
1.2623	.9351	.3046	.3868

COMPONENTELE GAZULUI UMED / /

CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
10.20	1.97	15.77	.61	40.90	.77

COMPONENTELE GAZULUI ANHIDRU / /

CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S
10.20	1.97	15.77	.61	.77

POTENTIAL CALORIFIC (KJ/Nm<sup>3</sup>)

GAZ UMED : GAZ ANHIDRU

SUPERLATIA : SUPERLATIA : INERTIA : SUPERLATIA :  
 11340.47

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRAJE /KJ/Nm<sup>3</sup>GAZ/

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
10381.35	8130.88	23.19	1192.56	1034.71

FLUXURI TERMICE TESTE /KJ/Nm<sup>3</sup>GAZ/

TOTAL TEST	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
10313.63	6696.70	3384.69	298.96

RANDAMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
58.844	81.671

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 800.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE		BILANTUL ENERGETIC AL GAZIFICARII	
CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	OXIGEN Nm3/Nm3GAZ	ABUR KG/Nm3GAZ
1.4174	1.0500	.3738	.2465
FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/			
TOTAL INTRAT		CHIMIC	SENSIBIL
11498.91	9129.50	CARBUNE	OXIGEN
	26.04		659.39
FLUXURI TERMICE IESITE /KJ/Nm3GAZ/			
TOTAL IESIT		CHIMIC	SENSIBIL
11412.31	6784.89	GAZ	CENUSA
	4330.39		383.63
RANDAMENTUL GAZIFICARII / /			
GAZ RECE		GAZ CALD	
55.047			52.097
COMPONENTELE GAZULUI UMED / % /			
CO2	CH4	H2	N2
16.57	3.92	17.60	.61
		38.70	.77
COMPONENTELE GAZULUI ANHIDRU / % /			
CO2	CO	CH4	H2
27.03	35.60	28.72	1.00
		1.26	
FUTERE CALORIFICA /KJ/Nm3/			
GAZ UMED		GAZ ANHIDRU	
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
6282.12	6784.89	10247.87	11068.03

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CRISTINS  
 500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	OXIGEN Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
1.1692	.8662	.2044	.5554

COMPONENTELE GAZULUI UMED / /

CO <sub>2</sub>	O <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
0.00	0.00	17.71	5.20	.69	45.65	.87

COMPONENTELE GAZULUI ANHIDRU / /

CO <sub>2</sub>	O <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S
0.00	0.00	0.00	0.00	0.00	0.00

PURTEA CALORIFICA /KJ/Nm<sup>3</sup>/

GAZ UMED	GAZ ANHIDRU
71.952	90.362

DIFFER. APA	DIFFER. GAZA	INTEHIVARA	SUPERHARA
0.00	0.00	0.00	0.00

BILANTUL ENERGETIC AL GAZIFICARII

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
10084.06	7531.22	21.48	1045.61	1485.75

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
10047.06	8036.54	1849.72	197.79

RANDAMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
71.952	90.362





MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 FRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/NM <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/NM <sup>3</sup> GAZ	OXIGEN NM <sup>3</sup> /NM <sup>3</sup> GAZ	ABUR KG/NM <sup>3</sup> GAZ
1.2456	.9228	.2671	.4267

COMPONENTELE GAZULUI UMED / /

CO	CH4	H2	N2	H2O	H2S
24.00	9.56	14.52	.63	41.62	.78

COMPONENTELE GAZULUI ANHIDRU / /

CO	CH4	H2	N2	H2S
11.15	14.12	24.88	1.04	1.33

POTRIF ALCHIMICA /KJ/NM<sup>3</sup>/

GAZ UMED	GAZ ANHIDRU
10898.65	54.132

SUPERFATA  
 SUPERFATA  
 SUPERFATA  
 SUPERFATA

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/NM<sup>3</sup>GAZ/

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
10898.65	8023.27	22.88	1711.00	1141.49

FLUXURI TERMICE IESITE /KJ/NM<sup>3</sup>GAZ/

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
10828.23	7082.14	3521.50	995.00

RANDAMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
54.132	81.654

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 800.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE		BILANTUL ENERGETIC AL GAZIFICAPII	
CARBUNE UMED	CARBUNE ANHIDRU	OXIGEN	ABUR
KG/Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ	Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ
1.3586	1.0065	.3212	.3057
FLUXURI TERMICE INTRATE /KJ/Nm <sup>3</sup> GAZ/			
TOTAL		CHIMIC	SENSIBIL
INTRAT		CARBUNE	OXIGEN
11869.05	8751.18	24.96	2275.11
FLUXURI TERMICE IESITE /KJ/Nm <sup>3</sup> GAZ/			
TOTAL		CHIMIC	SENSIBIL
IESIT		GAZ	CENUSA
11779.80	7038.85	4462.47	367.73
RANDOMAMENTUL GAZIFICARII / /			
GAZ RECE		GAZ CALD	
54.938			82.820
PUTERE CALORIFICA /KJ/Nm <sup>3</sup> /			
GAZ UMED		GAZ ANHIDRU	
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
6471.55	7038.85	10652.59	11586.40

```

*****
*
*           GAZIFICARE CARBUNE CU OXIGEN SI ABUR
*
*           MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI
*
*****
*
*           ANALIZA ELEMENTARA CARBUNE /% /
*
*****
*
*           *           *           *           *           *           *           *           *
*          CI          *          HI          *          OI          *          NI          *          SI          *          AI          *          WI          *
*           *           *           *           *           *           *           *           *
*         31.32      *          2.82      *         13.14      *           .85      *           .98      *         10.04      *         40.85      *
*           *           *           *           *           *           *           *           *
*****
*
*           PUTERE CALORIFICA /KJ/KG/
*
*****
*
*           SUPERIOARA          *           INFERIOARA
*
*           12807.230          *           11145.520
*
*****
*
*           TEMPERATURA OXIGEN INTRODUS
*           GRAD CELSIUS
*
*           20.00
*
*****
*
*           ABUR SATURAT LA PARAMETRII GAZIFICARII
*
*****

```



GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE				BILANTUL ENERGETIC AL GAZIFICARII			
CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	OXIGEN Nm3/Nm3GAZ	ABUR KG/Nm3GAZ	FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/	FLUXURI TERMICE IESITE /KJ/Nm3GAZ/	TOTAL INTRAT	TOTAL IESIT
.9753	.5769	.5239	.1364	7388.25	14.31	7988.13	7925.07
COMPONENTELE GAZULUI UMED / /				COMPONENTELE GAZULUI ANHIDRU / /			
CO2	CH4	H2	N2	H2O	H2S	CHIMIC GAZ	CHIMIC GAZ
26.15	1.90	17.23	.48	40.32	.49	4790.98	3153.09
COMPONENTELE GAZULUI UMED / /				COMPONENTELE GAZULUI ANHIDRU / /			
CO2	CH4	H2	N2	H2O	H2S	CHIMIC GAZ	CHIMIC GAZ
43.62	3.18	28.87	.81	.81		55.216	55.003
PUTERE CALCULATA /KJ/Nm3/				RANDAMENTUL GAZIFICARII / /			
GAZ UMED	GAZ ANHIDRU	INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA	GAZ RECE	GAZ CALD
4375.95	4790.98	7332.13	8027.54	7332.13	8027.54	55.216	55.003



GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	OXIGEN Nm3/Nm3GAZ	ABUR KG/Nm3GAZ
.8778	.5192	.4117	.3098

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/	FLUXURI TERMICE IESITE /KJ/Nm3GAZ/
TOTAL INTRAT	TOTAL IESIT
8029.47	7975.46
CHIMIC CARBUNE	CHIMIC GAZ
6649.45	5289.41
SENSIBIL CARBUNE	SENSIBIL GAZ
12.88	2700.40
OXIGEN	ABUR
538.48	828.67

COMPONENTELE GAZULUI UMED / % /

CO2	CO	CH4	H2	N2	H2O	H2S
30.80	4.97	7.59	11.74	.50	43.89	.51

COMPONENTELE AZULUI ANHIDRU / % /

CO2	CO	CH4	H2	N2	H2S
54.89	8.85	13.53	20.93	.90	.91

RANDAMENTUL GAZIFICARII / %

GAZ RECE	GAZ CALD
59.633	83.492

FUTERE CALORIFICA /KJ/Nm3/

GAZ UMED	GAZ ANHIDRU
4755.99	8476.05
5289.41	9426.70

INFERIOARA

INFERIOARA	SUPERIOARA
4755.99	5289.41
8476.05	9426.70



GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	OXIGEN Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
.9816	.5806	.4909	.1690

COMPONENTELE GAZULUI UMED / % /

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
24.94	14.18	3.67	14.39	.50	41.82	.50

COMPONENTELE GAZULUI ANHIDRU / % /

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S
42.87	24.37	6.37	24.74	.86	.86

POTERE CALORIFICA /KJ/Nm<sup>3</sup>/

GAZ UMED	GAZ ANHIDRU
5235.03	8998.04

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	OXIGEN	SENSIBIL ABUR
8779.33	7436.40	14.40	876.33	452.20

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
8709.48	5235.03	3492.55	51.74

RANDAMENTUL GAZIFICARII / % /

GAZ RECE	GAZ CALD
55.173	85.274

INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
4807.29	5235.03	8259.40	8998.04

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	.8346	CARBUNE ANHIDRU KG/Nm3GAZ	.4937	OXIGEN Nm3/Nm3GAZ	.3344	ABUR KG/Nm3GAZ	.4159
*****							
TOTAL	8211.19	CHIMIC	6322.55	SENSIBIL	12.24	OXIGEN	763.78
INTRAT		CARBUNE		CARBUNE		ABUR	1112.61

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

TOTAL	8171.10	CHIMIC	6175.26	SENSIBIL	2004.50
IESIT		GAZ		GAZ	31.42

COMPONENTELE GAZULUI UMED /-/-

CO2	33.06	CH4	13.15	H2	5.36	N2	.55	H2O	46.51	H2S	.55
-----	-------	-----	-------	----	------	----	-----	-----	-------	-----	-----

COMPONENTELE GAZULUI ANHIDRU /-/-

CO2	61.80	CH4	24.58	H2	10.01	N2	1.02	H2O	1.03	H2S	
-----	-------	-----	-------	----	-------	----	------	-----	------	-----	--

RANDAMENTUL GAZIFICARII / /

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED	67.880	GAZ ANHIDRU	62.410
INFERIOARA	5546.56	SUPERIOARA	11544.38
	6175.26		10369.04



GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 700.00  
 GRAD CELSIUS  
 MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	.9288	CARBUNE ANHIDRU KG/Nm3GAZ	.5494	OXIGEN Nm3/Nm3GAZ	.4191	ABUR KG/Nm3GAZ	.2520
BILANTUL ENERGETIC AL GAZIFICARII							
FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/							
TOTAL INTRAT	9127.96	CHIMIC	7036.24	SENSIBIL	13.63	SENSIBIL	1403.93
		CARBUNE		CARBUNE		OXIGEN	
						ABUR	674.16

COMPONENTELE GAZULUI UMED / % /

CO2	26.18	CH4	6.07	H2	13.45	N2	.50	H2O	42.72	H2S	.50
FLUXURI TERMICE IESITE /KJ/Nm3GAZ/											
TOTAL IESIT	9058.63	CHIMIC	5612.68	SENSIBIL	3466.32	SENSIBIL	43.96				
		GAZ		GAZ		CENUSA					

COMPONENTELE GAZULUI ANHIDRU / % /

CO2	45.72	CH4	10.60	H2	23.49	N2	.87	H2S	.88
RANDAMENTUL GAZIFICARII / %									
GAZ RECE									
56.365									
GAZ CALD									
84.631									

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED									
GAZ ANHIDRU									
INFERIOARA									
5105.94	SUPERIOARA	5612.68	INFERIOARA	8914.75	SUPERIOARA	9799.49			

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR

800.00 20.00

CONSUMURI SPECIFICE BILANTUL ENERGETIC AL GAZIFICARII

CONSUMURI SPECIFICE				BILANTUL ENERGETIC AL GAZIFICARII			
				FLUXURI TERMICE INTRATE /KJ/Nm <sup>3</sup> GAZ/			
CARBUNF. UMED	CARBONE ANHIDRU	OXIGEN	ABUR	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
KG/Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ	Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ	INTRAT	CARBUNE	CARBUNE	OXIGEN
1.0704	.6331	.5082	.0854	10343.05	8108.74	15.70	1990.15
							228.46

COMPONENTELE GAZULUI UMED /-/  
 FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

COMPONENTELE GAZULUI UMED /-/ FLUXURI TERMICE IESITE /KJ/Nm <sup>3</sup> GAZ/			
CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>
18.64	22.46	2.61	13.94
			.51
			41.32
			.51
			10253.68
			5810.10
			4468.47
			44.48

COMPONENTELE GAZULUI ANHIDRU /-/  
 RANDAMENTUL GAZIFICARII /

COMPONENTELE GAZULUI ANHIDRU /-/ RANDAMENTUL GAZIFICARII /			
CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>
31.73	38.27	4.45	23.76
			.87
			.87
			52.971
			96.550

PUTERE CALORIFICA /KJ/Nm<sup>3</sup>/

PUTERE CALORIFICA /KJ/Nm <sup>3</sup> /			
	GAZ UMED	GAZ ANHIDRU	
INFERIARA	5400.44	5810.10	9901.04
SUPERIARA	4256.67	9256.67	9256.67

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE		BILANTUL ENERGETIC AL GAZIFICARII	
		FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/	
CARBUNE UMED KG/Nm3GAZ		TOTAL INTRAT	SENSIBIL CARBUNE
.8292		8815.61	
CARBUNE ANHIDRU KG/Nm3GAZ		CHIMIC CARBUNE	SENSIBIL OXIGEN
.4904		6281.21	
OXIGEN Nm3/Nm3GAZ			
.2977		12.16	1340.84
ABUR KG/Nm3GAZ			
.4416			
COMPONENTELE GAZULUI UMED / % /		FLUXURI TERMICE IESITE /KJ/Nm3GAZ/	
CO2		TOTAL IESIT	CHIMIC GAZ
32.12		8773.53	6680.63
H2			2103.76
H2O			
46.75			
N2			
.55			
H2S			
.56			
COMPONENTELE GAZULUI ANHIDRU / % /		RANDAMENTUL GAZIFICARII / %	
CO		GAZ RECE	GAZ CALD
1.27		68.439	82.417
CH4			
27.57			
H2			
8.75			
N2			
1.04			
H2S			
1.05			
PUTERE CALORIFICA /KJ/Nm3/			
GAZ UMED			
GAZ ANHIDRU			
INFERIOARA			
6004.48			
SUPERIOARA			
6680.63			
INFERIOARA			
11276.07			
SUPERIOARA			
12545.83			

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	OXIGEN Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
.8572	.5071	.3241	.3908

COMPONENTELE GAZULUI UMED / %

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
30.32	2.93	11.76	8.70	.52	45.24	.53

COMPONENTELE GAZULUI ANHIDRU / %

CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S
91.48	6.33	11.48	15.89	.96	.96

Pondere calorifică /KJ/Nm<sup>3</sup>

GAZ UMED GAZ ANHIDRU

GAZ UMED	GAZ ANHIDRU
10456.06	10456.06
11523.70	11523.70

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
9209.88	6494.06	12.58	1657.97	1045.27

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
9152.66	6310.49	2860.66	38.73

RANDAMENTUL GAZIFICARII / %

GAZ RECE	GAZ CALD
61.961	83.216

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 700.00  
 GRAD CELSIUS

MODELARE MATEMATICA GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

\*\*\*\*\*

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	OXIGEN Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	ABUR KG/Nm <sup>3</sup> GAZ
.9019	.5335	.3639	.3048

\*\*\*\*\*

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm<sup>3</sup>GAZ/

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
9752.95	6832.32	13.23	2092.03	811.36

\*\*\*\*\*

\*\*\*\*\*

COMPONENTELE GAZULUI UMED /% /

CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
26.23	7.96	12.78	.50	43.25	.50

\*\*\*\*\*

FLUXURI TERMICE IESITE /KJ/Nm<sup>3</sup>GAZ/

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
9679.88	6052.28	3653.13	47.54

\*\*\*\*\*

\*\*\*\*\*

COMPONENTELE GAZULUI ANHIDRU /% /

CO <sub>2</sub>	CH <sub>4</sub>	H <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub> S
46.22	14.02	22.53	.88	.89

\*\*\*\*\*

RANDAMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
56.650	84.390

\*\*\*\*\*

\*\*\*\*\*

PUTERE CALORIFICA /KJ/Nm<sup>3</sup>/

GAZ UMED	GAZ ANHIDRU
5483.70	9662.80
	10664.71

\*\*\*\*\*



GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 800.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	OXIGEN Nm3/Nm3GAZ	ABUR KG/Nm3GAZ
1.0027	.5931	.4292	.1668

COMPONENTELE GAZULUI UMED / % /

CO2	CO	CH4	H2	N2	H2O	H2S
19.46	19.15	4.19	14.74	.50	41.45	.50

COMPONENTELE GAZULUI ANHIDRU / /

CO2	CO	CH4	H2	N2	H2S
11.24	12.21	7.16	25.18	.95	.86

POTERE CALORIFICA /KJ/Nm3/

GAZ UMED	GAZ ANHIDRU

INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
6119.96	6119.96	6221.05	10450.27

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

TOTAL	CHIMIC	SENSIBIL	OXIGEN	SENSIBIL	ABUR
10806.19	7595.76	14.71	2749.46	446.26	

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

TOTAL	CHIMIC	SENSIBIL	SENSIBIL
10713.67	6119.86	4625.92	60.40

RANDAMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
52.853	86.931

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL

ANALIZA ELEMENTARA CARBUNE / /

CI	HI	OI	NI	SI	AI	WI
30.85	4.94	14.77	.48	1.61	14.72	32.63

PUTERE CALORIFICA /KJ/KG/

SUPERIOARA

INFERIOARA

15199.600

13265.410

TEMPERATURA OXIGEN INTRODUS  
 GRAD CELSIUS

20.00

ABUR SATURAT LA PARAMETRII GAZIFICARII

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE /KJ/NM3GAZ/

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	OXIGEN NM3/NM3GAZ	ABUR KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL OXIGEN	SENSIBIL ABUR
.7591	.5114	.3679	.2633	8499.71	7773.54	12.68	9.21	704.28

COMPONENTELE GAZULUI UMED /- /

FLUXURI TERMICE IESITE /KJ/NM3GAZ/

CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA	
3.40	8.54	18.91	.27	39.59	.79	8459.63	6453.92	2003.89	41.90

COMPONENTELE GAZULUI ANHIDRU /- /

RANDAMENTUL GAZIFICARII / /

CO	CH4	H2	NO	H2S	GAZ RECE	GAZ CALD	
41.10	4.60	14.13	31.30	.45	1.31	67.872	81.560

POTERE CALORIFICA /KJ/NM3/

GAZ UMED	GAZ ANHIDRU	GAZ UMED	GAZ ANHIDRU	INFERIARA	SUPERIARA
10600.00	10600.00	9500.00	10600.00	9500.00	10600.00

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ \* CARBUNE ANHIDRU \* OXIGEN \* ABUR  
 KG/Nm3GAZ \* KG/Nm3GAZ \* Nm3/Nm3GAZ \* KG/Nm3GAZ  
 .8513 \* .5735 \* .4551 \* .0971

COMPONENTELE GAZULUI UMED / %

CO2 \* CH4 \* H2 \* N2 \* H2O \* H2S  
 23.05 \* 3.31 \* 23.99 \* .26 \* 35.32 \* .78

COMPONENTELE GAZULUI ANHIDRU / %

CO2 \* CH4 \* H2 \* N2 \* H2S \*  
 35.63 \* 5.12 \* 37.09 \* .41 \* 1.20 \*

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED \* GAZ ANHIDRU \*  
 INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA  
 5668.91 \* 6273.20 \* 8764.96 \* 9699.28

MODELARE MATEMATICA GAZIFICARE CARBUNE BOKOZEI.  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

TOTAL INTRAT \* CHIMIC \* CARBUNE \* SENSIBIL \* CARBUNE \* SENSIBIL \* OXIGEN \* SENSIBIL \* ABUR  
 9183.28 \* 8717.53 \* 14.22 \* 191.69 \* 259.83

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

TOTAL IESIT \* CHIMIC \* GAZ \* SENSIBIL \* GAZ \* SENSIBIL \* CENUSA \*  
 9126.20 \* 6273.20 \* 2853.69 \* 50.39 \*

RANDAMENTUL GAZIFICARII / %

GAZ RECE \* GAZ CALD  
 62.117 \* 83.386

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS

500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROFEL  
 PRESIUNEA DE CALCUL

10.00

CONSUMURI SPECIFICE

CONSUMURI SPECIFICE	ABUR	BILANTUL ENERGETIC AL GAZIFICARII	FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/	FLUXURI TERMICE IESITE /KJ/Nm3GAZ/				
CARBUNE UMED	CARBUNE ANHIDRU	OXIGEN	ABUR	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	SENSIBIL
KG/Nm3GAZ	KG/Nm3GAZ	Nm3/Nm3GAZ	KG/Nm3GAZ	INTRAT	CARBUNE	CARBUNE	OXIGEN	ABUR
.8031	.5410	.3373	.3254	9395.29	8223.69	13.42	287.83	870.35

COMPONENTELE GAZULUI UMED / /

COMPONENTELE GAZULUI UMED / /	COMPONENTELE GAZULUI ANHIDRU / /	RANDAMENTUL GAZIFICARII / /							
CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL
1.15	15.77	8.50	.31	43.43	.92	IESIT	GAZ	GAZ	CENUSA
						9363.43	7758.28	1592.68	44.33

COMPONENTELE GAZULUI ANHIDRU / /

COMPONENTELE GAZULUI ANHIDRU / /	RANDAMENTUL GAZIFICARII / /						
CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
2.04	27.88	15.03	.55	1.62		74.364	81.374

PUTERE CALORIFICA /KJ/Nm3/

PUTERE CALORIFICA /KJ/Nm3/	GAZ UMED	GAZ ANHIDRU	
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
6963.05	7758.28	12308.201	13713.89

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	OXIGEN Nm3/Nm3GAZ	ABUR KG/Nm3GAZ
.8935	.6019	.4519	.1086

COMPONENTELE GAZULUI UMED /% /

CO2	CO	CH4	H2	N2	H2O	H2S
22.26	14.05	5.89	19.12	.28	37.57	.83

COMPONENTELE GAZULUI ANHIDRU /% /

CO2	CO	CH4	H2	N2	H2S
35.66	22.50	9.44	30.62	.45	1.32

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED	GAZ ANHIDRU
6178.78	83.825

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

TOTAL INTRAT	CHIMIC	SENSIBIL	CARBUNE	OXIGEN	SENSIBIL	ABUR
10045.73	9149.24	14.93	591.17	290.39		

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

TOTAL IESIT	CHIMIC	SENSIBIL	GAZ	CENUSA
9981.99	6789.87	3186.81	69.05	

RANDAMENTUL GAZIFICARII /

GAZ RECE	GAZ CALD
61.899	83.825

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUI.  
 GRAD CELSIUS  
 500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BORZEI,  
 PRESIUNEA DE CALCUI,  
 BAR  
 20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

CONSUMURI SPECIFICE	ABUR	FLUXURI TERMICE INTRATE /KJ/NM <sup>3</sup> GAZ/	SENSTIBIL	SENSTIBIL
CARBUNE UMED	ABUR	TOTAL	CHIMIC	SENSTIBIL
KG/NM <sup>3</sup> GAZ	KG/NM <sup>3</sup> GAZ	INTRAT	CARBUNE	OXIGEN
.8117	.3441	9812.17	8312.08	13.56
				566.13
				920.39

COMPONENTELE GAZULUI UMED / /

FLUXURI TERMICE IESITE /KJ/NM<sup>3</sup>GAZ/

COMPONENTELE GAZULUI UMED / /	H2O	H2S	TOTAL	CHIMIC	SENSTIBIL	SENSTIBIL
CO	H2	N2	IESIT	GAZ	GAZ	CFNUSA
.82	17.77	6.44	9781.98	8257.82	1509.55	44.81

COMPONENTELE GAZULUI ANHIDRU / /

RANDAMENTUL GAZIFICARII / /

COMPONENTELE GAZULUI ANHIDRU / /	H2	H2S	GAZ RECE	GAZ CALD
CO	CH4	H2		
1.46	31.77	11.52	75.890	81.322

PUTERE CALORIFICA /KJ/NM<sup>3</sup>/

PUTERE CALORIFICA /KJ/NM <sup>3</sup> /	GAZ UMET	GAZ ANHIDRU	INFERIOARA	SUPERIOARA
			13270.09	14761.48

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ \* CARBUNE ANHIDRU \* OXIGEN \* ABUR  
 KG/Nm3GAZ \* KG/Nm3GAZ \* Nm3/Nm3GAZ \* KG/Nm3GAZ  
 .8723 \* .5876 \* .4042 \* .1763

COMPONENTELE GAZULUI UMED / % /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S  
 23.76 \* 10.48 \* 8.73 \* 16.80 \* .29 \* 39.12 \* .84

COMPONENTELE GAZULUI ANHIDRU / % /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S  
 39.02 \* 17.21 \* 14.33 \* 27.59 \* .47 \* 1.38

FUTERE CALORIFICA / KJ/Nm3 /

GAZ UMED \* GAZ ANHIDRU  
 INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA  
 6495.88 \* 7174.10 \* 10669.17 \* 11783.12

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEI,  
 PRESIUNEA DE CALCUL

BAR  
 20.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE / KJ/Nm3GAZ /

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL  
 INTRAT \* CARBUNE \* CARBUNE \* OXIGEN \* ABUR  
 10341.54 \* 8931.92 \* 14.57 \* 923.34 \* 471.71

FLUXURI TERMICE IESITE / KJ/Nm3GAZ /

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 10279.54 \* 7174.10 \* 3100.03 \* 67.11

KANDAMENTUL GAZIFICARII / /

GAZ RECE \* GAZ CALD  
 63.192 \* 83.350





GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOKOZEI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	OXIGEN Nm3/Nm3GAZ	ABUR KG/Nm3GAZ
.8336	.5616	.3252	.3058

COMPONENTELE GAZULUI UMED / % /

CO2	CO	CH4	H2	N2	H2O	H2S
27.71	2.90	15.41	10.29	.31	42.48	.90

COMPONENTELE GAZULUI ANHIDRU / % /

CO2	CO	CH4	H2	N2	H2S
48.18	5.04	26.79	17.89	.53	1.56

FUTERE CALORIFICA /KJ/Nm3/

INFERIOARA 7243.51	SUPERIOARA 8059.45	INFERIOARA 12594.01	SUPERIOARA 14012.65

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/Nm3GAZ/

TOTAL INTRAT	CHIMIC	CARBUNE	SENSIBIL	OXIGEN	ABUR
10456.62	8535.60	13.93	1089.17		817.92

FLUXURI TERMICE IESITE /KJ/Nm3GAZ/

TOTAL IESIT	CHIMIC	SENSIBIL	GAZ	CENUSA
10409.78	8059.45	2341.95	55.21	

RANDAMENTUL GAZIFICARII /

GAZ RECE	GAZ CALD
69.584	82.081

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE /KJ/NM3GAZ/

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	OXIGEN NM3/NM3GAZ	ABUR KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	OXIGEN	SENSIBIL ABUR
.8614	.5904	.3623	.2207	10844.62	8821.12	14.39	1418.82	590.29

COMPONENTELE GAZULUI UMED /%/  
 FLUXURI TERMICE IESITE /KJ/NM3GAZ/

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
22.96	8.70	10.82	15.46	.29	39.92	.85	10781.39	7616.67	3161.37	66.57

COMPONENTELE GAZULUI ANHIDRU /%/  
 RANDEMENTUL GAZIFICARII /%/  
 GAZ RECE

CO2	CO	CH4	H2	N2	H2S	PUTERE CALORIFICA /KJ/NM3/	GAZ CALD
39.87	14.48	10.03	25.74	.48	1.41	63.825	83.148

INFERIOARA GHI	SUPERIOARA GHI	INFERIOARA GHI	SUPERIOARA GHI
1153.24	12677.32	1153.24	12677.32

GAZIFICARE CARBUNE CU OXIGEN SI ABUR  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 800.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE			
CARBUNE UMED	CARBUNE ANHIDRU	OXIGEN	ABUR
KG/Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ	Nm <sup>3</sup> /Nm <sup>3</sup> GAZ	KG/Nm <sup>3</sup> GAZ
9.325	6.282	.4210	.0852
COMPONENTELE GAZULUI UMED / % /			
CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>
17.51	18.99	6.33	18.93
			.29
			37.12
			.84
COMPONENTELE GAZULUI ANHIDRU / % /			
CO <sub>2</sub>	CO	CH <sub>4</sub>	H <sub>2</sub>
27.85	30.19	10.07	30.11
			.45
			1.33
PUTERE CALORIFICA /KJ/Nm <sup>3</sup> /			
GAZ UMED			
GAZ ANHIDRU			
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
6947.02	7571.90	11047.90	12041.65
BILANTUL ENERGETIC AL GAZIFICARII			
FLUXURI TERMICE INTRATE /KJ/Nm <sup>3</sup> GAZ/			
TOTAL	CHIMIC	SENSIBIL	SENSIBIL
11688.80	CARBUNE	CARBUNE	OXIGEN
			ABUR
	9549.00	15.58	1896.21
FLUXURI TERMICE IESITE /KJ/Nm <sup>3</sup> GAZ/			
TOTAL	CHIMIC	SENSIBIL	SENSIBIL
11608.11	GAZ	GAZ	CENUSA
	7571.90	4034.54	82.36
RANDAMENTUL GAZIFICARII / % /			
GAZ RECE			
			GAZ CALD
	59.846		84.602

ing. POP IOAN GHEORGHE

## GAZIFICAREA ȘI ARDEREA LIGNIȚILOR

### TEZĂ DE DOCTORAT

Coordonator științific  
Prof. dr. ing. CORNELIU UNGUREANU

ANEXA Nr. 2

#### MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR CU UMIDITATEA PROPRIE

#### MODEL MATEMATIC SIMPLIFICAT BAZAT PE ANALIZA ELEMENTARĂ A CĂRBUNELUI

#### CUPRINS

1. SISTEMUL DE ECUAȚII	pag. 1-3
2. LISTARE PROGRAM DE CALCUL	pag. 1-17
3. RULARE REZULTATE CALCUL LIGNIT VOIVOZI	pag. 1-16
4. RULARE REZULTATE CALCUL LIGNIT ROVINARI	pag. 17-34
5. RULARE REZULTATE CALCUL LIGNIT BOROZEL	pag. 35-48

**TIMIȘOARA**  
**1998**

# MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR CU UMIDITATEA PROPRIE

## SISTEMUL DE ECUAȚII

Relatiile bilantului masic elementar

a - bilanțul masic al carbonului:

$$C'B' = (r_{CO_2} + r_{CO} + r_{CH_4}) \frac{12,011}{22,414} \quad [kg/m^3 N \text{ gaz}] \quad (1)$$

b - bilanțul masic al oxigenului:

$$O'B' + (W'B' + W^{exc}) \frac{31,999}{2 \cdot 18,015} = (r_{CO_2} + 0,5r_{CO} + 0,5r_{H_2O}) \frac{31,999}{22,414} \quad [kg/m^3 N \text{ gaz}] \quad (2)$$

c - bilanțul masic al hidrogenului:

$$H'B' + (W'B' + W^{exc}) \frac{2,0159}{18,015} = (2r_{CH_4} + r_{H_2} + r_{H_2O} + r_{H_2S}) \frac{2,0159}{22,414} \quad [kg/m^3 N \text{ gaz}] \quad (3)$$

d - bilanțul masic al azotului:

$$N'B' = r_{N_2} \frac{28,013}{22,414} \quad [kg/m^3 N \text{ gaz}] \quad (4)$$

e - bilanțul masic al sulfului:

$$S'B' = r_{H_2S} \frac{32,06}{22,414} \quad [kg/m^3 N \text{ gaz}] \quad (5)$$

în care:  $C^i, O^i, H^i, N^i, S^i, A^i$  - analiza elementara a probei inițiale;

B - consumul specific de cărbune corespunzător unității de gaz de gazogen, în  $kg/m^3 N \text{ gaz}$ ;

$W_{exc}$  - excesul de apă necesar gazificării unității de gaz de gazogen, în  $kg/m^3 N \text{ gaz}$ ;

$r_{CO}, r_{CH_4}, r_{H_2}, r_{CO_2}, r_{N_2}, r_{H_2S}, r_{H_2O}$  - participațiile volumice ale componentelor gazului de gazogen.

Relatia participațiilor volumice ale componentelor gazului de gazogen brut:

$$r_{CO} + r_{CH_4} + r_{H_2} + r_{CO_2} + r_{N_2} + r_{H_2S} + r_{H_2O} = 1 \quad (6)$$

Relatiile constantelor de echilibru

a - constanta de echilibru pentru reacția Boudouard:

$$K_p = \frac{p_{CO}^2}{p_{CO_2}} \quad (7)$$

b - constanta de echilibru pentru reacția de hidrogenare a carbonului:

$$K_p = \frac{r_{H_2}}{p \cdot r_C} \quad (8)$$

c - constanta de echilibru pentru reacția de gazificare heterogenă cu vapori de apă

$$K_p = \frac{p_{CO} r_{H_2}}{r_{H_2O}} \quad (9)$$

în care p - presiunea absolută a reactanților, în bar.

Calculul constantelor de echilibru aferente reacțiilor chimice adoptate se efectuează pe baza determinării afinității chimice care depinde de variația entalpiei și entropiei standard a reactanților, conform relației:

$$\ln K_p = - \frac{1}{R \cdot T} \left( \Delta H_{298}^0 - T \Delta S_{298}^0 + \int_{298}^T \Delta C_p^0 dT - \int_{298}^T \frac{\Delta C_p^0 dT}{T} \right) \quad (10)$$

în care R - este constanta universală a gazelor perfecte, în kJ/kmol K;

T - temperatura la care se desfășoară reacția chimică, în K;

$\Delta H_{298}^0$  - entalpia de reacție, în kJ/kmol,

$\Delta S_{298}^0$  - entropiei de reacție, în kJ/kmol K;

$\Delta C_p^0$  - variația capacității calorice moleculare corespunzător temperaturii T,

în kJ/kmol K, a căror valori sunt prezentate în tabelul 1.

Nr crt	SUBSTANTA	$H_{298}^0$ kJ/kmol	$S_{298}^0$ kJ/kmol K	$C_p^0$ kJ/kmol K
1	C	0	1.3609	$2.673 + 2.617 \cdot 10^{-3} T - 0.1169 \cdot 10^{-6} T^2$
2	CO <sub>2</sub>	-94.051,8	51.061	$6.85 + 8,533 \cdot 10^{-3} T - 2.475 \cdot 10^{-6} T^2$
3	CO	-26.415,7	47,3	$6.25 + 2.091 \cdot 10^{-3} T - 4,59 \cdot 10^{-7} T^2$
4	H <sub>2</sub>	0	31.211	$6.88 + 0.066 \cdot 10^{-3} T + 2.79 \cdot 10^{-7} T^2$
5	CH <sub>4</sub>	-17.889	44,5	$4.75 + 12 \cdot 10^{-3} T + 30,31 \cdot 10^{-7} T^2 - 2,63 \cdot 10^{-9} T^3$
6	H <sub>2</sub> O	57.237	46.84	$6.89 + 3.283 \cdot 10^{-3} T - 3.43 \cdot 10^{-7} T^2$

Tabelul 1 Valorile entalpiei standard, a entropiei standard și variația capacității calorice molare

Ecuatia bilanțului energetic al gazificării (s-au neglijat pierderile specifice gazogenului):

$$Q_{cc} + Q_{cs} + Q_{sw} + Q_{ext} = Q_{gc} + Q_{gs} + Q_{cens} \quad [\text{kJ/m}^3 \text{N gaz}] \quad (11)$$

în care:  $Q_{cc}$  - căldura chimică a cărbunelui corespunzătoare unității de gaz de gazogen, în  $\text{kJ/m}^3 \text{N gaz}$ , pe baza relației:

$$Q_{cc} = B' H_{cs} \quad [\text{kJ/m}^3 \text{N gaz}] \quad (12)$$

$Q_{cs}$  - căldura sensibilă a cărbunelui corespunzătoare unității de gaz de gazogen, în  $\text{kJ/m}^3 \text{N gaz}$ , pe baza relației:

$$Q_{cs} = B' c_c t_c \quad [\text{kJ/m}^3 \text{N gaz}] \quad (13)$$

$Q_{sw}$  - căldura sensibilă a excesului de apă necesar gazificării unității de gaz de gazogen, în  $\text{kJ/m}^3 \text{N gaz}$ , pe baza relației:

$$Q_{sw} = W_{exc} c_{pW} t_w \quad [\text{kJ/m}^3 \text{N gaz}] \quad (14)$$

$Q_{ext}$  - fluxul termic furnizat din exterior necesar gazificării unității de gaz de gazogen, în  $\text{kJ/m}^3 \text{N}$ , rezultând din ecuația de bilanț termic;

$Q_{gc}$  - căldura chimică a gazului de gazogen, în  $\text{kJ/m}^3 \text{N gaz}$ , pe baza relației:

$$Q_{gc} = H_{gs} \quad [\text{kJ/m}^3 \text{N gaz}] \quad (15)$$

$Q_{gs}$  - căldura sensibilă a gazului de gazogen, în  $\text{kJ/m}^3 \text{N gaz}$ , pe baza relației:

$$Q_{gs} = c_{pg} t_g \quad [\text{kJ/m}^3 \text{N gaz}] \quad (16)$$

$Q_{cens}$  - căldura sensibilă a cenușii la evacuarea din gazogen corespunzătoare unității de gaz de gazogen, în  $\text{kJ/m}^3 \text{N gaz}$ , pe baza relației:

$$Q_{cens} = B' A' c_{cen} t_{cen} \quad [\text{kJ/m}^3 \text{N gaz}] \quad (17)$$

în care:  $H_{cs}$  - puterea calorifică superioară a cărbunelui, în  $\text{kJ/kg}$ ;

$c_c$  - căldura specifică a cărbunelui la intrare, în  $\text{kJ/kg K}$ ;

$c_{pW}$  - căldura specifică a excesului de apă necesar gazificării la intrare, în  $\text{kJ/m}^3 \text{N K}$ ;

$t_c, t_w$  - temperatura cărbunelui, respectiv a excesului de apă la intrare, în  $^{\circ}\text{C}$ ;

$H_{gs}$  - puterea calorifică superioară a gazului de gazogen, în  $\text{kJ/m}^3 \text{N}$ ;

$c_{pg}$  - căldura specifică a gazului de gazogen la ieșire, în  $\text{kJ/m}^3 \text{N K}$ ;

$t_g, t_{cen}$  - temperatura gazului de gazogen, respectiv a cenușii la ieșire, în  $^{\circ}\text{C}$ ;

$c_{cen}$  - căldura specifică a cenușii la ieșire, în  $\text{kJ/kg K}$ .

#### DATE INIȚIALE:

- analiza elementară a cărbunelui:  $C', O', H', N', S', A', W'$ ;

#### VARIABLE DE CALCUL:

- parametrii de gazificare: presiunea -  $p$ , și temperatura -  $t, T$ ;

#### NECUNOSCUTE:

- compoziția gazului de gazogen:  $r_{CO}, r_{CH_4}, r_{H_2}, r_{CO_2}, r_{N_2}, r_{H_2S}, r_{H_2O}$

- consumuri specifice: cărbune -  $B'$ , exces umiditate -  $W_{exc}$

- fluxul termic furnizat din exterior -  $Q_{ext}$



C MODELAREA MATEMATICA A GAZIFICARII CU UMIDITATE PROPRIE

C DECLARARE VARIABLE

```
REAL NI,NA,I1,J1,K1,L1,M1,KP
Double precision COF(5), X(4), Y(4), tol
dimension KP(3), COCAR(7)
DIMENSION ABUR(2,7)
DIMENSION XR(4)
character*9 NUME(7)
DATA (NUME(I), I=1,7)/6hCARBON, 8hHIDROGEN, 6hOXIGEN, 4hAZOT, 4hSU
xLF, 6hCENUSA, 9hUMIDITATE/
DATA (ABUR(1,J), J=1,7)/2675., 2749., 2778., 2792., 2799., 2803.
x,2804./
DATA (ABUR(2,J),J=1,7)/0.5903, 2.669, 5.139, 7.593, 10.041, 12.51
x, 15 /
```

C INTRODUCERE DATE INITIALE - VERIFICARE CORECTITUDINE DATE

```
94 WRITE (*,*) 'INTRODUCETI COMPOZITIA CARBUNELUI -ANALIZA ELEMETARA
x IN %'
SUMA=0
DO 90 I=1,7
91 WRITE (*,*) NUME(I)
READ (*,*) COCAR(I)
IF (COCAR(I).GE.0.AND.COCAR(I).LE.100) GO TO 92
WRITE (*,*) 'EROARE LA INTRODUCEREA ELEMENTULUI CHIMIC AL CARBUBE
xLUI'
GO TO 91
92 SUMA=SUMA+COCAR(I)
90 CONTINUE
IF (SUMA.GE.99.9.AND.SUMA.LE.100.1) GO TO 93
WRITE(*,*)'EROARE LA COMPOZITIA COMBUSTIBILULUI',SUMA
GO TO 94
93 CI=COCAR(1)/100
HI=COCAR(2)/100
OI=COCAR(3)/100
NI=COCAR(4)/100
SI=COCAR(5)/100
AI=COCAR(6)/100
WI=COCAR(7)/100
WRITE (*,*) 'INTRODUCETI CALDURA SPECIFICA A CARBUNELUI IN KJ/KG
1 K'
READ (*,*) CCAR
WRITE (*,*) 'INTRODUCETI RANDAMENTUL FURNIZARII FLUXULUI TERMIC'
READ (*,*) RAND
WRITE (*,*) 'MODELARE MATEMATICA GAZIFICARE CU UMIDITATE PROPRIE'
WRITE (*,*) 'DATELE INITIALE DE CALCUL'
WRITE (*,*) 'COMPOZITIA CARBUNELUI ANALIZA ELEMENTARA'
WRITE (*,*) (NUME(I),COCAR(I),I=1,7)
QSCAR=33800.*CI+125448.*H1+10827.*(SI-OI)
QICAR=QSCAR-2509.*(WI+9*HI)
```

C DESCHIDERE FISIER DATE INTRARE - CALCULATE

OPEN (33.FILE='UMIDRG')

C FISIER DATE INTRARE

```
WRITE(33.420)
420 FORMAT(72(' '),/,',',70X,',')
WRITE (33.421)
421 FORMAT('' 15X 'GAZIFICARE CARBUNE CU UMIDITATE PROPRIE'16X,',',/''
1' 70X,',')
WRITE(33.422)
422 FORMAT('' 12X 'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1 12X,',',/'' 70X,',',/72(''))
WRITE(33.423)
423 FORMAT('' 70X,',',/'' 20X 'ANALIZA ELEMENTARA CARBUNE /%/'20X,',''
1'/'' 70X,',',/72('')/'' 6(9X,',') .10X,',',/'' 3X 'CI' 4X,',', 3X,
1'HI' 4X,',', 3X 'OI' 4X,',', 3X 'NI' 4X,',', 3X 'SI' 4X,',', 3X 'AI' 4X,
1'', 4X 'WI' 4X,',',/'' 6(9X,',') .10X,',')
WRITE(33.424)(COCAR(I),I=1,7)
424 FORMAT('' 6(1X,F6.2,2X,',') .2X,F6.2,2X,',',/'' 6(9X,',') .10X,',',/
172('')/'' 70X,',',/'' 22X 'PUTERE CALORIFICA /KJ/KG/'23X,',',/''
170X,',',/72('')/'' 35X,',', 34X,',')
WRITE(33.425)QSCAR.QICAR
425 FORMAT('' 12X 'SUPERIOARA'13X,',', 12X 'INFERIOARA'12X,',',/'' 35X,
1'', 34X,',',/'' 12X.F10.3,13X,',', 12X.F10.3,12X,',',/'' 35X,',', 34X,
1'',/72('')/'' 70X,',',/'' 22X 'CALDURA SPECIFICA CARBUNE'23X,',''
1'/'' 30X,',',/KJ/KG K/'31X,',',/'' 70X,',')
WRITE(33.426) CCAR
426 FORMAT('' .30X.F10.2,30X,',',/'' 70X,',',/72('')/'' 70X,',',/
1'' 11X 'RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN',12X,',',/
1'' 33X,',',/%',', 34X,',',/'' 70X,',')
WRITE(33.427)RAND
427 FORMAT('' 32X,F6.2,32X,',',/'' 70X,',',/72(''))
```

C BLOC CALACUL - SISTEM ECUATII MODEL MATEMATIC

```
9 VAL=1/(1-WI)
CA=CI*VAL
HA=HI*VAL
OA=OI*VAL
NA=NI*VAL
SA=SI*VAL
AA=AI*VAL
12 DO 250 J=1.7
IF (J NE 1) GO TO 230
P=1
GO TO 231
230 P=5*(J-1)
231 DO 15 I=1.7
TABS=623 15+50*I
```

### C CONSTATE DE ECHILIBRU

$$RB = -(41021.194 - 24.906374 \cdot TABS + (3.484E-3) \cdot (TABS^{**2}) - (0.2595E-6) \cdot (TABS^{**3}) - (58450./TABS) - 2.977 \cdot TABS \cdot (ALOG(TABS))) / (1.987 \cdot TABS)$$

$$KP(1) = EXP(RB)$$

$$RM = -(-14442.568 - 56.774074 \cdot TABS - (4.6255E-3) \cdot (TABS^{**2}) - (4.12E-7) \cdot (TABS^{**3}) + (0.219166E-9) \cdot (TABS^{**4}) - (58450./TABS) + 11.683 \cdot TABS \cdot (ALOG(TABS))) / (1.987 \cdot TABS)$$

$$KP(2) = EXP(RM)$$

$$RH = -(30911.826 - 9.972231 \cdot TABS + (1.8715E-3) \cdot (TABS^{**2}) - (2.7166E-8) \cdot (TABS^{**3}) - (58450./TABS) - 3.567 \cdot TABS \cdot (ALOG(TABS))) / (1.987 \cdot TABS)$$

$$KP(3) = EXP(RH)$$

### C CALCUL COEFICIENTI SISTEM PRIM

$$A1 = 22.414 \cdot CA / 12.011$$

$$B1 = 22.414 \cdot OI / 31.999$$

$$C1 = 22.414 / (2 \cdot 18.015)$$

$$D1 = 0.5$$

$$E1 = 0.5$$

$$F1 = 22.414 \cdot HA / 2.0159$$

$$G1 = 22.414 / 18.015$$

$$H1 = 2.$$

$$I1 = 22.414 \cdot NA / 28.013$$

$$J1 = 22.414 \cdot SA \cdot 0.6 / 32.06$$

$$K1 = P / KP(1)$$

$$L1 = P \cdot KP(2)$$

$$M1 = P / KP(3)$$

### C CALCUL COEFICIENTI SISTEM SECUND

$$A2 = (F1 - J1) \cdot K1 / A1 - K1 \cdot G1 \cdot (B1 / A1 - 1.) / C1$$

$$B2 = (F1 - J1) / A1 - G1 \cdot (B1 / A1 - D1) / C1$$

$$C2 = E1 \cdot M1 \cdot G1 / C1 - M1$$

$$D2 = (F1 - J1) \cdot L1 / A1 - H1 \cdot L1 - B1 \cdot L1 \cdot G1 / (A1 \cdot C1)$$

$$E2 = K1 + (I1 + J1) \cdot K1 / A1$$

$$F2 = 1. + (I1 + J1) / A1$$

$$G2 = M1$$

$$H2 = L1 + (I1 + J1) \cdot L1 / A1$$

### C CALCUL COEFICIENTI SISTEM TERT

$$A3 = A2 \cdot H2 - E2 \cdot D2$$

$$B3 = A2 + E2$$

$$C3 = E2 \cdot B2 - A2 \cdot F2$$

$$D3 = E2 \cdot C2 - A2 \cdot G2$$

### C CALCUL COEFICIENTI SISTEM CUADRAT

$$A4 = a2 \cdot (A3^{**2}) + A3 \cdot C2 \cdot D3 + D2 \cdot (D3^{**2})$$

$$B4 = 2 \cdot A3 \cdot B3 \cdot A2 + A3 \cdot B2 \cdot D3 + A3 \cdot C2 \cdot C3 + C2 \cdot B3 \cdot D3 + 2 \cdot C3 \cdot D2 \cdot D3 - (D3^{**2})$$

$$C4 = A2 \cdot (B3^{**2}) - 2 \cdot A3 \cdot (A2^{**2}) + A3 \cdot B2 \cdot C3 + B2 \cdot B3 \cdot D3 + C2 \cdot C3 \cdot B3 - A2 \cdot C2 \cdot D3 + D2 \cdot$$

```

1/(C3**2)-2*C3*D3
D4=B2*B3*C3-2*B3*(A2**2)-A2*B2*D3-C2*A2*C3-(C3**2)
E4=(A2**3)-A2*B2*C3

```

```

COF(1)=A4*1.E7
COF(2)=B4*1.E7
COF(3)=C4*1.E7
COF(4)=D4*1.E7
COF(5)=E4*1.E7
M=5

```

### C LANSARE RUTINE REZOLVARE POLINOM - NEWTON

```

CALL C02AEF(COF,M,X,Y,TOL,IFAIL)
WRITE(*,*)'COEFICIENTI'
WRITE(*,*)(COF(KK),KK=1,5)
WRITE(*,*)'REZULTATE'
WRITE(*,*)(X(KJ),Y(KJ),KJ=1,4)
WRITE(*,*)'TOL,IFAIL',TOL,IFAIL

```

### C BLOC SELECTIONARE SOLUTIE POLINOM

```

WRITE(*,*) 'SOLUTII REALE CONVENABILE'
JSOL=0
DO 160 ISOL=1,4
IF (Y(ISOL) NE.0) GO TO 160
IF (X(ISOL) LE.0 OR X(ISOL) GE.1.) GO TO 160
JSOL=JSOL+1
XR(JSOL)=X(ISOL)
WRITE(*,*)'NR. SOLUTIE ',JSOL,' VALOARE SOLUTIE ',XR(JSOL)
160 CONTINUE
IF (JSOL.NE.0) GO TO 61
WRITE (*,*) 'EROARE LA REZOLVARE ECUATIE NEWTON'
GO TO 250
61 write(*,*)'ALEGETI SOLUTIA DE REZOLVARE A SISTEMULUI'
WRITE (*,*) 'INTRODUCETI NUMARUL SOLUTIEI'
read(*,*) KSOL
IF (KSOL.EQ.5) GO TO 9

```

### C DETERMINARE NECUNOSCUTE SISTEM

```

X6=XR(KSOL)
X4=((X6**2)*A3+X6*B3-A2)/(C3+X6*D3)
IF(X4 GT 0 AND X4.LT.1) GO TO 47
WRITE (*,*) X6,X4
GO TO 49
47 X2=(E1*M1*X4*X6-(X4**2)*(B1*K1/A1-K1)-X4*(B1/A1-D1)-B1*L1*(X6**2)/
1A1)/C1
IF(X2.GT.0) GO TO 51
WRITE (*,*) X6,X4,X2
GO TO 49
51 X7=I1*(K1*(X4**2)+X4+L1*(X6**2))/A1

```

```

IF(X7.GT.0.AND.X7.LT.1) GO TO 52
WRITE (*,*) X6.X4.X2.X7
GO TO 49
52 X3=K1*(X4**2)
IF(X3.GT.0.AND.X3.LT.1) GO TO 54
WRITE (*,*) X6.X4.X2.X7.X3
GO TO 49
54 X5=L1*(X6**2)
IF(X5.GT.0.AND.X5.LT.1) GO TO 56
WRITE (*,*) X6.X4.X2.X7.X3.X5
GO TO 49
56 X8=M1*X4*X6
IF(X8.GT.0.AND.X8.LT.1) GO TO 58
WRITE (*,*) X6.X4.X2.X7.X3.X5.X8
GO TO 49
58 X9=J1*X7/I1
IF(X9.GT.0.AND.X9.LT.1) GO TO 60
WRITE (*,*) X6.X4.X2.X7.X3.X5.X8.X9
GO TO 49
60 X1=X7/I1
IF(X1.GT.0) GO TO 62
WRITE (*,*) X6.X4.X2.X7.X3.X5.X8.X9.X1
49 WRITE(*,*) 'EROARE LA REZOLVAREA SISTEMULUI'
GO TO 15
62 XA3=X3/(1-X8)
XA4=X4/(1-X8)
XA5=X5/(1-X8)
XA6=X6/(1-X8)
XA7=X7/(1-X8)
XA9=X9/(1-X8)
WRITE(*,*) 'SOLUTII SISTEM ECUATII'
WRITE(*,*) 'COMPOZITIE GAZ'
WRITE(*,*) 'CO2 ' ' CO ' ' CH4 ' ' H2 ' ' H2O ' ' H2S'
WRITE(*,*)X3,X4,X5,X6,X7,X8,X9
WRITE(*,*)'CONSUM SPECIFIC CARBUNE ',X1
WRITE(*,*)' UMIDITATE',X2

```

### C DETERMINARE ELEMENTE BILANT TERMIC

```

QS=X4*12720.+X5*39890.+X6*12770.+X9*25620.
QAS=XA4*12720.+XA5*39890.+XA6*12770.+XA9*25620.
QI=X4*12720.+X5*35910.+X6*10800.+X9*23650.
QAI=XA4*12720.+XA5*35910.+XA6*10800.+XA9*23650.
BI=X1*VAL
WEXC=X2-WI*BI
WCAR=WI*BI
QCAR=QSCAR*BI
QSEC=BI*20*CCAR
IF(WEXC.GT.0) GO TO 102
QSEW=0
GO TO 103
102 QSEW=WEXC*20*4.1855

```

```

103 VAR=(TABS-273.15)/22.414
HCO2=(44.14+(9.04E-3)*TABS-(8.53E5)/(TABS**2))*VAR
HCO=(28.41+(4.10E-3)*TABS-(0.46E5)/(TABS**2))*VAR
HCH4=(17.45+(60.46E-3)*TABS+(1.117E-6)*(TABS**2)-(7.2E-9)*
|(TABS**3))*VAR
HH2=(27.28+(3.26E-3)*TABS+(0.502E5)/(TABS**2))*VAR
HN2=(27.87+(4.27E-3)*TABS)*VAR
HH2O=ABUR(1,J)*ABUR(2,J)+(30.+(10.71E-3)*TABS+(0.33E5)/
|(TABS**2))*VAR
HH2S=(29.37+(15.4E-3)*TABS)*VAR
HGAZ=HCO2*X3+HCO*X4+HCH4*X5+HH2*X6+HN2*X7+HH2O*X8+HH2S*X9
QSAI=0.75*AI*(TABS-273.15)*X1
QIES=QS+HGAZ+QSAI
QEXT=QIES-(QCAR+QSEC+QSEW)
DGAZ=QEXT/(RAND*QI/100)
DGAR=QEXT/(RAND*(QI+HGAZ)/100)
RAGAR=QI/QIES
RAGAC=(QI+HGAZ)/QIES
X3=X3*100
X4=X4*100
X5=X5*100
X6=X6*100
X7=X7*100
X8=X8*100
X9=X9*100
X81=X8/100
XA3=X3/(1-X81)
XA4=X4/(1-X81)
XA5=X5/(1-X81)
XA6=X6/(1-X81)
XA7=X7/(1-X81)
XA9=X9/(1-X81)
RAGAR=RAGAR*100.
RAGAC=RAGAC*100.

```

### C LISTARE CONSOLA DATE CALCULATE

```

WRITE (*,300)
300 FORMAT(72('*') /, ' ', 70X, '*')
WRITE (*,301)
301 FORMAT(' ' 15X, 'GAZIFICARE CARBUNE CU UMIDITATE PROPRIE' 16X, '*')
1, 70X, '*')
WRITE (*,302)
302 FORMAT(' ' 17X, 'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1 18X, '*')
70X, '*')
72('*') /, ' ', 70X, '*')
WRITE (*,303)
303 FORMAT(' ' 35X, '*')
34X, '*')
7X, 'TEMPERATURA DE CALCUL' 7X, '*')
1, 8X, 'PRESIUNEA DE CALCUL' 8X, '*')
11X, 'GRAD CELSIUS' 12X, '*')
116X, 'BAR' 15X, '*')
70X, '*')
TCEL=TABS-273.15
WRITE (*,304) TCEL, P
304 FORMAT(' ' 14X, F7.2, 14X, '*')
14X, F7.2, 14X, '*')
70X, '*')
72('*') /

```

```

1**70X,'**/'**25X,'CONSUMURI SPECIFICE'.26X,'**/'**70X.
1**/72(**)/**',22X,'**',22x**22x,'**24x,'**')
WRITE(*,305)
305 FORMAT(**,5X,'CARBUNE UMED',5X,'**',3X,'CARBUNE ANHIDRU',4X,'**'
14X,'EXCES UMIDITATE',5X,'**/'**',6X,'KG/Nm3GAZ',7X,'**',6X,'KG/N
1m3GAZ',7X,'**',7X,'KG/Nm3GAZ',8X,'**',/'**',22X,'**22x,'**24x**')
WRITE(*,306)BI,X1,X2
306 FORMAT(**,2(7X,F8.4,7X,'**'),8X,F8.4,8X,'**/'**',22X,'**22X,'**24X,
1**/72(**)/**',70X,'**/'**20 X,'COMPONENTELE GAZULUI UMED
1 /%/',21 X,'**/'**',70X,'**/72(**)/**',6(9X,'**'),10X,'**/'**3X,'CO
12',3X,'**4X,'CO',3X,'**',3X,'CH4',3X,'**',4X,'H2',3X,'**',4X,'N2',3X,
1**',3X,'H2O'3X,'**4X,'H2S',3X,'**/'**',6(9X,'**'),10X,'**')
WRITE(*,307) X3,X4,X5,X6,X7,X8,X9
307 FORMAT(**,6(2X,F5.2,2X,'**'),2X,F5.2,3X,'**/'**',6(9X,'**'),10X,'**/'
172(**))
WRITE(*,308)
308 FORMAT(**,70X,'**/'**19 X,'COMPONENTELE GAZULUI ANHIDRU /%/'
1,19 X,'**/'**',70X,'**/72(**)/**',6(9X,'**'),10X,'**/'**3X,'CO2',3X
1,'**4X,'CO',3X,'**',3X,'CH4',3X,'**',4X,'H2',3X,'**',4X,'N2',3X,'**',3
1X,'H2S',3X,'**10X,'**/'**',6(9X,'**'),10X,'**')
WRITE(*,309)XA3,XA4,XA5,XA6,XA7,XA9
309 FORMAT(**,6(2X,F5.2,2X,'**'),10X,'**/'**',6(9X,'**'),10X,'**/72(**)
1/'**',70X,'**/'**22X,'PUTERE CALORIFICA /KJ/Nm3/'22X,'**/'**',70X,'**
1/72(**)/**',35X,'**',34X,'**/'**13X,'GAZ UMED',14X,'**',12X,'GAZ A
1NHIDRU',11X,'**')
WRITE(*,310)
310 FORMAT(**,35X,'**',34X,'**/72(**)/**',3(17X,'**')16X,'**/'**3X,'IN
1FERIOARA'4X,'**',3X,'SUPERIOARA'4X,'**',3X,'INFERIOARA'4X,'**'3X,'SUP
1ERIOARA'3X,'**/'**',3(17X,'**')16X,'**')
WRITE(*,311)QI,QS,QAI,QAS
311 FORMAT(**,3(3X,F10.2,4X,**'),3X,F10.2,3X,'**/'**',3(17X,'**')16X,
1**/72(**))
WRITE(*,312)
312 FORMAT(///72(**)/**',70X,'**/'**18X,'BILANTUL ENERGETIC AL GAZIFI
1CARI'19 X,
1**/'**70X,'**/'**',18X,'FLUXURI TERMICE INTRATE KJ/Nm3GAZ'19X,'**/'
1**70X,'**/72(**)/**'4(13X,'**'),14X,'**/'**4X,'TOTAL'4X,'**'3X,'CH
2IMIC'4X,
1**2X,'SENSIBIL'3X,'**',2X,'SENSIBIL'3X,'**'6X,'FLUX'6X,'**/'**
13X,'INTRAT'4X,'**',3X,'CARBUNE'3X,'**',3X,'CARBUNE'3X,'**',2X,'UMIDIT
1ATE',2X,'**'3X,'EXTERIOR',3X,'**/'**4(13X,'**'),14X,'**')
WRITE(*,313)QIES,QCAR,QSEC,QSEW,QEXT
313 FORMAT(**4(3X,F8.2,2X,'**'),3X,F8.2,3X,'**/72(**)/**',70X,'**')
WRITE(*,314)
314 FORMAT(**,19X,'FLUXURI TERMICE IESITE KJ/Nm3GAZ'19X,'**/'**70X'**
1/72(**)/**'4(13X,'**'),14X,'**/'**4X,'TOTAL'4X,'**'3X,'CHIMIC'4X,
1**2X,'SENSIBIL'3X,'**',2X,'SENSIBIL'3X,'**'14X,'**/'**
14X,'IESIT',4X,'**',5X,'GAZ'5X,'**',5X,'GAZ'5X,'**',3X,'CENUSA',
14X,'**'14X,'**/'**4(13X,'**'),14X,'**')
WRITE(*,315)QIES,QS,HGAZ,QSAI
315 FORMAT(**4(3X,F8.2,2X,'**'),14X,'**/'**4(13X,'**'),14X,'**/72(**)/
1**',70X,'**')

```



```

WRITE(* 316)
316 FORMAT('**21X.'RANDAMENTUL GAZIFICARII /%/'.22X.'**/'**70X.'**/72
1('**)/**13X.'GAZ RECE'14X.'**13X.'GAZ CALD'13X.'**/'**35X.'**34X.
1**)
WRITE(* 317)RAGAR RAGAC
317 FORMAT('**14X.F7.3.14X.'**14X.F7.3.13X.'**/'**70X.'**/72('**))
WRITE(* 318)
318 FORMAT('** 70X.'**/'**22X.'GAZ CONSUMAT FLUX EXTERIOR'.22X.'**/
1**70X.'**/72('**)/** 35X.'** 34X.'**/'**13X.'GAZ CALD'14X.'**
113X.'GAZ RECE'13X.'**/'**12X.'Nm3/Nm3 GAZ'12X.'**12X.'Nm3/Nm3 GAZ'
1 11X.'**/'** 35X.'**34X.'**')
WRITE(* 319) DGAR.DGAZ
319 FORMAT('**14X.F6.4.15X.'**14X.F6.4.14X.'**/'** 35X.'** 34X.'**/
172('**))

```

### C FISIER DATE CALCULATE

```

WRITE (33.400)
400 FORMAT(72('**)/** 70X.'**')
WRITE (33.401)
401 FORMAT('** 15X.'GAZIFICARE CARBUNE CU UMIDITATE PROPRIE'16X.'**/'**
1 70X.'**')
WRITE(33.402)
402 FORMAT('** 17X.'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1 18X.'**/'** 70X.'**/72('**)/** 70X.'**')
WRITE(33.403)
403 FORMAT('** 35X.'** 34X.'**/'** 7X.'TEMPERATURA DE CALCUL'.7X.'**
1.8X.'PRESIUNEA DE CALCUL'.8X.'**/'** 11X.'GRAD CELSIUS'.12X.'**
116X.'BAR'15X.'**/'** 70X.'**')
TCEL=TABS-273 15
WRITE(33.404)TCEL.P
404 FORMAT('** 14X.F7.2.14X.'**14X.F7.2.14X.'**/'** 70X.'**/72('**)/
1**70X.'**/'**25X.'CONSUMURI SPECIFICE'.26X.'**/'**70X.
1**/72('**)/** 22X.'** 22x**22x.'**24x.'**')
WRITE(33.405)
405 FORMAT('** 5X.'CARBUNE UMED'.5X.'** 3X.'CARBUNE ANHIDRU'.4X.'**
14X.'EXCES UMIDITATE'.5X.'**/'** 6X.'KG/Nm3GAZ'.7X.'**6X.'KG/N
1m3GAZ'.7X.'** 7X.'KG/Nm3GAZ'.8X.'**/'** 22X.'**22x.'**24x'**)
WRITE(33.406)BI.X1.X2
406 FORMAT('** 2(7X.F8.4.7X.'**).8X.F8.4.8X.'**/'** 22X.'**22X.'**24X.
1**/72('**)/** 70X.'**/'**20 X.'COMPONENTELE GAZULUI UMED
1 /%/'.21 X.'**/'** 70X.'**/72('**)/** 6(9X.'**).10X.'**/'**3X.'CO
12'.3X.'* 4X.'CO' 3X.'** 3X.'CH4' 3X.'** 4X.'H2' 3X.'** 4X.'N2' 3X.
1** 3X.'H2O'3X.'**4X.'H2S' 3X.'**/'** 6(9X.'**).10X.'**')
WRITE(33.407) X3.X4.X5.X6.X7.X8.X9
407 FORMAT('** 6(2X.F5.2.2X.'**).2X.F5.2.3X.'**/'** 6(9X.'**).10X.'**/
172('**))
WRITE(33.408)
408 FORMAT('** 70X.'**/'**19 X.'COMPONENTELE GAZULUI ANHIDRU /%/'.
1 19 X.'**/'** 70X.'**/72('**)/** 6(9X.'**).10X.'**/'**3X.'CO2'.3X
1 **4X.'CO' 3X.'** 3X.'CH4' 3X.'** 4X.'H2' 3X.'** 4X.'N2' 3X.'** 3
1X.'H2S' 3X.'**10X.'**/'** 6(9X.'**).10X.'**')

```



```

WRITE(33,409)XA3.XA4.XA5.XA6.XA7.XA9
409 FORMAT('*,6(2X,F5.2,2X,*),10X,*/**6(9X,*),10X,*/72(*)
1/**,70X,*/**22X,'PUTERE CALORIFICA /KJ/Nm3/'22X,*/**70X,*
1/72(*)/**,35X,*34X,*/**13X,'GAZ UMED',14X,*12X,'GAZ A
1NHIDRU',11X,*)
WRITE(33,410)
410 FORMAT('*,35X,*34X,*/72(*)/**,3(17X,*)16X,*/**3X,'IN
1FERIOARA'4X,*3X,'SUPERIOARA'4X,*3X,'INFERIOARA'4X,*3X,'SUP
1ERIOARA'3X,*/**3(17X,*)16X,*)
WRITE(33,411)QI,QS,QAI,QAS
411 FORMAT('*,3(3X,F10.2,4X**),3X,F10.2,3X,*/**3(17X,*)16X,
1**/72(**))
WRITE(33,412)
412 FORMAT(///72(*)/**,70X,*/**18X,'BILANTUL ENERGETIC AL GAZIFI
1CARI'19 X,
1**/70X,*/**18X,'FLUXURI TERMICE INTRATE KJ/Nm3GAZ'19X,*/
1**70X,*/72(*)/**4(13X,*),14X,*/**4X,'TOTAL'4X,*3X,'CH
2IMIC'4X,
1**2X,'SENSIBIL'3X,*2X,'SENSIBIL'3X,*6X,'FLUX'6X,*/**
13X,'INTRAT'4X,*3X,'CARBUNE'3X,*3X,'CARBUNE'3X,*2X,'UMIDIT
1ATE',2X,*3X,'EXTERIOR',3X,*/**4(13X,*),14X,*)
WRITE(33,413)QIES,QCAR,QSEC,QSEW,QEXT
413 FORMAT('**4(3X,F8.2,2X,*),3X,F8.2,3X,*/72(*)/**,70X,*)
WRITE(33,414)
414 FORMAT('*,19X,'FLUXURI TERMICE IESITE KJ/Nm3GAZ'19X,*/**70X**
1/72(*)/**4(13X,*),14X,*/**4X,'TOTAL'4X,*3X,'CHIMIC'4X,
1**2X,'SENSIBIL'3X,*2X,'SENSIBIL'3X,*14X,*/**
14X,'IESIT',4X,*5X,'GAZ'5X,*5X,'GAZ'5X,*3X,'CENUSA',
14X,*14X,*/**4(13X,*),14X,*)
WRITE(33,415)QIES,QS,HGAZ,QSAI
415 FORMAT('**4(3X,F8.2,2X,*),14X,*/**4(13X,*),14X,*/72(*)/
1**,70X,*)
WRITE(33,416)
416 FORMAT('**21X,'RANDAMENTUL GAZIFICARII /%/',22X,*/**70X,*/72
1(*)/**13X,'GAZ RECE'14X,*13X,'GAZ CALD'13X,*/**35X,*34X,
1**)
WRITE(33,417)RAGAR,RAGAC
417 FORMAT('**14X,F7.3,14X,*14X,F7.3,13X,*/**70X,*/72(*)
WRITE(33,418)
418 FORMAT('*,70X,*/**22X,'GAZ CONSUMAT FLUX EXTERIOR',22X,*/
1**,70X,*/72(*)/**,35X,*34X,*/**13X,'GAZ CALD'14X,*
113X,'GAZ RECE'13X,*/**12X,'Nm3/Nm3 GAZ'12X,*12X,'Nm3/Nm3 GAZ'
1,11X,*/**35X,*34X,*)
WRITE(33,419) DGAR,DGAZ
419 FORMAT('**14X,F6.4,15X,*14X,F6.4,14X,*/**35X,*34X,*/
172(*)

```

15 CONTINUE  
250 CONTINUE

CLOSE (33)  
stop

end

C **RUTINE REZOLVARE POLINOM**

SUBROUTINE C02AEF(A,N,REZ,IMZ,TOL,IFAIL)

C DECLARARE VARIABILE

CHARACTER\*6 SRNAME  
PARAMETER (SRNAME='C02AEF')  
DOUBLE PRECISION TOL  
INTEGER IFAIL, N  
DOUBLE PRECISION A(N), IMZ(N), REZ(N)  
DOUBLE PRECISION J, JX, R, RX, X, Y  
LOGICAL SAT  
DOUBLE PRECISION A1P5, CMAX, FAC, FOUR, FUN, G, NFUN, ONE, P1,  
\* P2Z1, P3Z2, P4Z1, P5, S, S1, S2, SCALE, SIG, T,  
\* TOL2, TWO, XXX, ZERO  
INTEGER I, I2, II, IND, JTEMP, K  
LOGICAL CBIG, FLAG  
DOUBLE PRECISION B(100), C(100)  
CHARACTER\*1 P01REC(1)

C FUNCTII EXTERNE

DOUBLE PRECISION X02AJF, X02ALF  
INTEGER P01ABF  
EXTERNAL X02AJF, X02ALF, P01ABF  
EXTERNAL C02AEZ  
INTRINSIC ABS, LOG, SQRT, DBLE, INT

C BLOC INITIALIZARE

COMMON /AC02AE/X, Y, R, RX, J, JX, SAT  
DATA ONE/1.0D0/, A1P5/1.5D0/, ZERO/0.0D0/,  
\* P4Z1/1.0D-5/  
DATA TWO/2.0D0/, P5/0.5D0/, P2Z1/1.0D-3/,  
\* P1/0.1D0/  
DATA P3Z2/2.0D-4/, FOUR/4.0D0/

C EXECUTIE

XXX = X02AJF()  
IF (TOL.LT.XXX) TOL = XXX  
CMAX = SQRT(X02ALF())  
FAC = ONE  
FLAG = IFAIL.EQ.2  
IF (FLAG) IFAIL = 1  
IND = 0  
TOL2 = TOL\*\*A1P5  
IF (A(1).NE.ZERO.AND.N.GE.2.AND.N.LE.100) GO TO 20  
IND = P01ABF(IFAIL,1,SRNAME,0,P01REC)

```

GO TO 780
20 IF (A(N).NE.0.D0) GO TO 40
  REZ(N-1) = ZERO
  IMZ(N-1) = ZERO
  N = N - 1
  GO TO 20
40 SCALE = ZERO
  DO 60 I = 1, N
    IF (ABS(A(I)).GE.P4Z1) SCALE = SCALE + LOG(ABS(A(I)))
60 CONTINUE
  K = INT(SCALE/(DBLE(N)*LOG(TWO))+P5)
  SCALE = TWO**(-K)
  DO 80 I = 1, N
    A(I) = A(I)*SCALE
    B(I) = A(I)
80 CONTINUE

```

### C TESTARE ORDIN REDUS POLIMON

```

IF (N.GT.3) GO TO 100
GO TO (780,620,640) N
100 DO 160 I = 2, N
  II = N - I + 2
  IF (B(II).EQ.0.D0) GO TO 200
  T = B(1)/B(II)
  IF (ABS(T).GE.ONE) GO TO 200
  DO 120 K = 2, II
    I2 = II - K + 1
    C(K-1) = B(K) - T*B(I2)
120 CONTINUE
  JTEMP = II - 1
  DO 140 K = 1, JTEMP
    B(K) = C(K)
140 CONTINUE
160 CONTINUE
  FAC = FAC*TWO
  SCALE = ONE
  I = N
180 I = I - 1
  IF (I.LT.1) GO TO 100
  SCALE = SCALE*TWO
  A(I) = A(I)*SCALE
  B(I) = A(I)
  GO TO 180
200 IF (.NOT. FLAG) GO TO 220
  X = REZ(1)
  Y = IMZ(1) + TOL
  FLAG = .FALSE.
  GO TO 240
220 X = P2Z1
  Y = P1
240 CALL C02AEZ(A,N,TOL)

```

```

FUN = R*R + J*J
260 G = RX*RX + JX*JX
  IF (G GE FUN*TOL2) GO TO 320
280 IND = P01ABF(IFAIL.2.SRNAME.0.P01REC)
  SCALE = ONE
  I = N
300 I = I - 1
  IF (I LT 1) GO TO 780
  SCALE = SCALE*FAC
  A(I) = A(I)/SCALE
  GO TO 300
320 S1 = -(R*RX+J*JX)/G
  S2 = (R*JX-J*RX)/G
  SIG = P3Z2
  S = SQRT(S1*S1+S2*S2)
  IF (S LE ONE) GO TO 340
  S1 = S1/S
  S2 = S2/S
  SIG = SIG/S
340 X = X + S1
  Y = Y + S2
360 CALL C02AEZ(A.N.TOL)
  IF (SAT) GO TO 400
  NFUN = R*R + J*J
  IF (FUN-NFUN.GE.SIG*FUN) GO TO 380
  S1 = P5*S1
  S2 = P5*S2
  IF (ABS(S1).LE.XXX*ABS(X) .AND. ABS(S2).LE.XXX*ABS(Y)) GO TO 280
  S = P5*S
  SIG = P5*SIG
  X = X - S1
  Y = Y - S2
  GO TO 360
380 FUN = NFUN
  GO TO 260
400 FUN = ONE/TOL2
  K = 0
  IMZ(N-1) = Y*FAC
  IF (ABS(Y).GT.P1) GO TO 460

```

### C RADACINA REALA

```

S1 = Y
Y = ZERO
CALL C02AEZ(A.N.TOL)
Y = S1
IF ( NOT SAT) GO TO 460
REZ(N-1) = X*FAC
IMZ(N-1) = ZERO
N = N - 1
B(1) = A(1)
C(N) = -A(N+1)/X

```

```

CBIG = .FALSE.
DO 440 I = 2, N
  B(I) = A(I) + X*B(I-1)
  II = N - I + 1
  IF (CBIG) GO TO 420
  C(II) = (C(II+1)-A(II+1))/X
  IF (ABS(C(II)).LE.CMAX) GO TO 440
  CBIG = .TRUE.
420  C(II) = CMAX
440 CONTINUE
  GO TO 520

```

### C RADACINA COMPLEXA

```

460 REZ(N-1) = X*FAC
  REZ(N-2) = X*FAC
  IMZ(N-2) = -IMZ(N-1)
  N = N - 2
  R = TWO*X
  J = -(X*X+Y*Y)
  B(1) = A(1)
  B(2) = A(2) + R*B(1)
  C(N) = -A(N+2)/J
  C(N-1) = -(A(N+1)+R*C(N))/J
  IF (N.EQ.2) GO TO 520
  CBIG = .FALSE.
  DO 500 I = 3, N
    B(I) = A(I) + R*B(I-1) + J*B(I-2)
    II = N - I + 1
    IF (CBIG) GO TO 480
    C(II) = -(A(II+2)-C(II+2)+R*C(II+1))/J
    IF (ABS(C(II)).LE.CMAX) GO TO 500
    CBIG = .TRUE.
480  C(II) = CMAX
500 CONTINUE

520 DO 540 I = 1, N
  NFUN = ABS(B(I)) + ABS(C(I))
  IF (NFUN.LE.TOL) GO TO 540
  NFUN = ABS(B(I)-C(I))/NFUN
  IF (NFUN.GE.FUN) GO TO 540
  FUN = NFUN
  K = I
540 CONTINUE
  IF (K.EQ.1) GO TO 580
  JTEMP = K - 1
  DO 560 I = 1, JTEMP
    A(I) = B(I)
560 CONTINUE
580 A(K) = P5*(B(K)+C(K))
  IF (K.EQ.N) GO TO 40
  JTEMP = K + 1

```

```

DO 600 I = JTEMP, N
  A(I) = C(I)
600 CONTINUE
  GO TO 40
620 REZ(1) = -A(2)/A(1)*FAC
  IMZ(1) = ZERO
  GO TO 760
640 R = A(2)*A(2) - FOUR*A(1)*A(3)
  IF (R GT ZERO) GO TO 660
  REZ(2) = -P5*A(2)/A(1)*FAC
  REZ(1) = REZ(2)
  IMZ(2) = P5*SQRT(-R)/A(1)*FAC
  IMZ(1) = -IMZ(2)
  GO TO 760
660 IMZ(1) = ZERO
  IMZ(2) = ZERO
  IF (A(2)) 680, 700, 720
680 REZ(1) = P5*(-A(2)+SQRT(R))/A(1)*FAC
  GO TO 740
700 REZ(1) = -P5*SQRT(R)/A(1)*FAC
  GO TO 740
720 REZ(1) = P5*(-A(2)-SQRT(R))/A(1)*FAC
740 REZ(2) = A(3)/(REZ(1)*A(1))*FAC*FAC
760 N = 1
780 IFAIL = IND
  RETURN
  END

```

SUBROUTINE C02AEZ(A,N,TOL)

```

C  DECLARARE VARIABILE
DOUBLE PRECISION TOL
INTEGER          N
DOUBLE PRECISION A(N)
DOUBLE PRECISION J, JX, R, RX, X, Y
LOGICAL          SAT
DOUBLE PRECISION A1, A2, A3, A8, B1, B2, B3, C, P, P8, Q, T, TEN,
*                TWO, ZERO
INTEGER          K
INTRINSIC        ABS, SQRT
COMMON           /AC02AE/X, Y, R, RX, J, JX, SAT

```

```

DATA            TWO/2.0D0/, ZERO/0.0D0/, P8/0.8D0/, TEN/1.0D1/,
*              A8/8.0D0/

```

C EXECUTIE

```

P = -TWO*X
Q = X*X + Y*Y
T = SQRT(Q)
A2 = ZERO
B2 = ZERO

```

```

B1 = A(1)
A1 = A(1)
C = ABS(A1)*P8
N = N - 2
DO 20 K = 2, N
  A3 = A2
  A2 = A1
  A1 = A(K) - P*A2 - Q*A3
  C = T*C + ABS(A1)
  B3 = B2
  B2 = B1
  B1 = A1 - P*B2 - Q*B3
20 CONTINUE
N = N + 2
A3 = A2
A2 = A1
A1 = A(N-1) - P*A2 - Q*A3
R = A(N) + X*A1 - Q*A2
J = A1*Y
RX = A1 - TWO*B2*Y*Y
JX = TWO*Y*(B1-X*B2)
C = T*(T*C+ABS(A1)) + ABS(R)
SAT = (SQRT(R*R+J*J)) .LT. ((TEN*C-A8*(ABS(R)+ABS(A1))*T)
*   +TWO*ABS(X*A1))*TOL)
RETURN
END
INTEGER FUNCTION P01ABF(IFAIL,IERROR,SRNAME,NREC,REC)

```

### C DECLARARE VARIABILE

```

INTEGER          IERROR, IFAIL, NREC
CHARACTER*(*)    SRNAME
CHARACTER*(*)    REC(*)
INTEGER          I, NERR
CHARACTER*72     MESS
EXTERNAL         P01ABZ, X04AAF, X04BAF
INTRINSIC        ABS, MOD

```

### C EXECUTIE

```

IF (IERROR.NE.0) THEN
IF (IFAIL.EQ.-1 .OR. IFAIL.EQ.0 .OR. IFAIL.EQ.-13 .OR.
*   (IFAIL.GT.0 .AND. MOD(IFAIL/10,10).NE.0)) THEN
CALL X04AAF(0,NERR)
DO 20 I = 1, NREC
CALL X04BAF(NERR,REC(I))
20 CONTINUE
IF (IFAIL.NE.-13) THEN
WRITE (MESS,FMT=99999) SRNAME, IERROR
CALL X04BAF(NERR,MESS)
IF (ABS(MOD(IFAIL,10)).NE.1) THEN

```

```

      CALL X04BAF(NERR,
      *      * ** NAG hard failure - execution terminated'
      *
      CALL P01ABZ
      ELSE

      CALL X04BAF(NERR,
      *      * ** NAG soft failure - control returned')
      END IF
      END IF
      END IF
      END IF
      P01ABF = IERROR
      RETURN
99999 FORMAT (' ** ABNORMAL EXIT from NAG Library routine 'A.': IFAIL',
      *      * = 16)
      END
      DOUBLE PRECISION FUNCTION X02AJF()

C EXECUTIE

      X02AJF = 2.0D0**(-55)
      RETURN
      END
      DOUBLE PRECISION FUNCTION X02ALF()

C EXECUTIE

      X02ALF = (2.0D0**126 - 2.0D0**70) * 2.0D0
      RETURN
      END

      SUBROUTINE P01ABZ

C EXECUTIE

      STOP
      END
      SUBROUTINE X04AAF(I,NERR)

C DECLARARE VARIABILE

      INTEGER      I, NERR
      INTEGER      NERR1
      SAVE         NERR1
      DATA        NERR1/6/

C EXECUTIE

      IF (I.EQ.0) NERR = NERR1
      IF (I.EQ.1) NERR1 = NERR
      RETURN

```



END

SUBROUTINE X04BAF(NOUT,REC)

C DECLARARE VARIABILE

INTEGER NOUT

CHARACTER\*(\*) REC

INTEGER I

INTRINSIC LEN

IF (NOUT.GE.0) THEN

DO 20 I = LEN(REC), 2, -1

IF (REC(I:I).NE.' ') GO TO 40

20 CONTINUE

40 WRITE (NOUT,FMT=99999) REC(1:I)

END IF

RETURN

C

99999 FORMAT (A)

END

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVODEI

ANALIZA ELEMENTARA CARBUNE / /

CI	HI	OI	NI	SI	AI	WI
21.55	1.40	4.24	.7	1.05	48.11	23.91

PUTERE CALORIFICA /KJ/KG/

SUPERIOARA

8694.791

INFERIOARA

7728.324

CALDURA SPECIFICA CARBUNE  
/KJ/KG K/

.85

RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN

/ /

80.01

METODE KALORIMETRI BERBASIS KEKAMPURAN  
 ANALISIS KANDUNGAN AIR TERKAMPUR  
 KALORIFERIK  
 100%

METODE KALORIMETRI BERBASIS KEKAMPURAN  
 ANALISIS KANDUNGAN AIR TERKAMPUR  
 KALORIFERIK  
 100%

KANDUNGAN		KANDUNGAN		KANDUNGAN	
NO	UNIT	NO	UNIT	NO	UNIT
1	kg	1	kg	1	kg
2	kg	2	kg	2	kg
3	kg	3	kg	3	kg
4	kg	4	kg	4	kg
5	kg	5	kg	5	kg
6	kg	6	kg	6	kg
7	kg	7	kg	7	kg
8	kg	8	kg	8	kg
9	kg	9	kg	9	kg
10	kg	10	kg	10	kg
11	kg	11	kg	11	kg
12	kg	12	kg	12	kg
13	kg	13	kg	13	kg
14	kg	14	kg	14	kg
15	kg	15	kg	15	kg
16	kg	16	kg	16	kg
17	kg	17	kg	17	kg
18	kg	18	kg	18	kg
19	kg	19	kg	19	kg
20	kg	20	kg	20	kg
21	kg	21	kg	21	kg
22	kg	22	kg	22	kg
23	kg	23	kg	23	kg
24	kg	24	kg	24	kg
25	kg	25	kg	25	kg
26	kg	26	kg	26	kg
27	kg	27	kg	27	kg
28	kg	28	kg	28	kg
29	kg	29	kg	29	kg
30	kg	30	kg	30	kg
31	kg	31	kg	31	kg
32	kg	32	kg	32	kg
33	kg	33	kg	33	kg
34	kg	34	kg	34	kg
35	kg	35	kg	35	kg
36	kg	36	kg	36	kg
37	kg	37	kg	37	kg
38	kg	38	kg	38	kg
39	kg	39	kg	39	kg
40	kg	40	kg	40	kg
41	kg	41	kg	41	kg
42	kg	42	kg	42	kg
43	kg	43	kg	43	kg
44	kg	44	kg	44	kg
45	kg	45	kg	45	kg
46	kg	46	kg	46	kg
47	kg	47	kg	47	kg
48	kg	48	kg	48	kg
49	kg	49	kg	49	kg
50	kg	50	kg	50	kg
51	kg	51	kg	51	kg
52	kg	52	kg	52	kg
53	kg	53	kg	53	kg
54	kg	54	kg	54	kg
55	kg	55	kg	55	kg
56	kg	56	kg	56	kg
57	kg	57	kg	57	kg
58	kg	58	kg	58	kg
59	kg	59	kg	59	kg
60	kg	60	kg	60	kg
61	kg	61	kg	61	kg
62	kg	62	kg	62	kg
63	kg	63	kg	63	kg
64	kg	64	kg	64	kg
65	kg	65	kg	65	kg
66	kg	66	kg	66	kg
67	kg	67	kg	67	kg
68	kg	68	kg	68	kg
69	kg	69	kg	69	kg
70	kg	70	kg	70	kg
71	kg	71	kg	71	kg
72	kg	72	kg	72	kg
73	kg	73	kg	73	kg
74	kg	74	kg	74	kg
75	kg	75	kg	75	kg
76	kg	76	kg	76	kg
77	kg	77	kg	77	kg
78	kg	78	kg	78	kg
79	kg	79	kg	79	kg
80	kg	80	kg	80	kg
81	kg	81	kg	81	kg
82	kg	82	kg	82	kg
83	kg	83	kg	83	kg
84	kg	84	kg	84	kg
85	kg	85	kg	85	kg
86	kg	86	kg	86	kg
87	kg	87	kg	87	kg
88	kg	88	kg	88	kg
89	kg	89	kg	89	kg
90	kg	90	kg	90	kg
91	kg	91	kg	91	kg
92	kg	92	kg	92	kg
93	kg	93	kg	93	kg
94	kg	94	kg	94	kg
95	kg	95	kg	95	kg
96	kg	96	kg	96	kg
97	kg	97	kg	97	kg
98	kg	98	kg	98	kg
99	kg	99	kg	99	kg
100	kg	100	kg	100	kg



CALCULAREA CARBUNII CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODURILE MATEMATICE GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONDITII SPECIFICE

CARBUNE UMED KG/Nm <sup>3</sup> GAZ	CARBUNE ANHIDRU KG/Nm <sup>3</sup> GAZ	EXCES UMIDITATE KG/Nm <sup>3</sup> GAZ
10011	10849	2697

401 REZULTATE GAZOZII UMED / /

H <sub>2</sub> O	N <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> S
10011	10849	21.16	0.41

201 REZULTATE GAZOZII ANHIDRU / /

H <sub>2</sub> O	N <sub>2</sub>	H <sub>2</sub> S
10011	10849	0.41

RANJAMENTUL GAZIFICARII

GAZ RECE	GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
79.373			

GAZIFICAREA UMED / /

GAZ CALD KG/Nm <sup>3</sup> GAZ	GAZ RECE	GAZ UMED KG/Nm <sup>3</sup> GAZ
10011	10849	2697

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm <sup>3</sup> GAZ	FLUXURI TERMICE IESITE KJ/Nm <sup>3</sup> GAZ
11179.00	31000.00

FLUXURI TERMICE IESITE KJ/Nm<sup>3</sup>GAZ

TOTAL TESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
11179.00	9990.00	1049.30	139.70

GAZIFICARE CARRUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUII  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE, CAPRUF MONTAZI  
 PRESIUNEA DE CALCUII  
 BAK  
 1.00

CONSUMURI SPECIFICE

CARBURIFUMI FG/Um3GAZ	CARBUNE ANHIDRU FG/Um3GAZ	EXCES UMIDITATE FG/Um3GAZ
1.000	.470	.1371

COMPONENTELE GAZULUI UMED /

CH4	H2	H2O	H2S
2.20	49.63	8.74	.44

BI-HEXELUL GAZULUI ANHIDRU /

CH4	H2	H2S
3.57	51.28	.49

POZEE CALORIFIECA /EL/Um3/

GAS UMED	GAZ ANHIDRU
----------	-------------

DIFFUZARA	DIFFUZAREA	SUPERFARA
100000	114000	100000

BILANTUL ENERGETIC AL GAZULUI API

FLUXURI TERMICE INTRATE EL/Um3GAZ

TOTAL INTRAT	CHIMIC	SENSIBIL	SEMIPIL	FLUX
12762.72	8777.93	17.17	11.48	3956.15

FLUXURI TERMICE IESITE EL/Um3GAZ

TOTAL IESIT	CHIMIC	SENSIBIL	SEMIPIL
12762.72	11486.41	1000.70	1175.61

RANDAMENTUL GAZULUI API /

GAZ RECE	GAZ CALD
81.254	100.000

GAZ CONSUMAT ELVE FETEPICB

GAZ CALD	GAZ RECE
Nm3/Um3 GAZ	Nm3/Um3 GAZ
.4312	1.0000



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOLVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

PARAMETRI SPECIFICI

CARBUNE USCAT  
 KG/Nm<sup>3</sup>GAZ  
 1.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm<sup>3</sup>GAZ

COMPOZITIA GAZULUI UMED / %

CO<sub>2</sub> : 0.00  
 CO : 0.00  
 H<sub>2</sub> : 18.87  
 H<sub>2</sub>O : 35.92  
 N<sub>2</sub> : 0.63  
 H<sub>2</sub>S : 0.47

FLUXURI TERMICE IESITE KJ/Nm<sup>3</sup>GAZ

TOTAL INTRAT : 11919.29  
 CHIMIC CARBUNE : 9322.15  
 SENSIBIL CARBUNE : 18.23  
 UMIDITATE : 29.07  
 TOTAL IESIT : 11919.29  
 CHIMIC GAZ : 10543.94  
 SENSIBIL GAZ : 1014.22  
 UMIDITATE : 161.13

COMPOZITIA GAZULUI ANHIDRU / %

CO<sub>2</sub> : 0.00  
 CO : 0.00  
 H<sub>2</sub> : 31.00  
 H<sub>2</sub>S : 0.74

RANDAMENTUL GAZIFICARII / %

GAZ RECE : 78.965  
 GAZ CALD : 60.110

POTERE CALORIFICA /KJ/Nm<sup>3</sup>

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED : 14657.31

GAZ CALD : 3001  
 GAZ RECE : 2400

GAZ ANHIDRU : 16413.17

GAZ RECE



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELAIE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

CARBUNE UMED  
 KG/Nm3GAZ  
 1.0597

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .7850

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .2579

TOTAL  
 INTRAT  
 12509.67

CHIMIC  
 CARBUNE  
 9213.83

SENSIBIL  
 CARBUNE  
 18.01

SENSIBIL  
 UMIDITATE  
 21.59

FLUX  
 EXTERIOR  
 3256.24

COMPONENTELE GAZULUI UMED /- /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2  
 16.34  
 CO  
 13.29  
 CH4  
 12.99  
 H2  
 41.34  
 N2  
 .62  
 H2O  
 24.96  
 H2S  
 .47

TOTAL  
 IESIT  
 12509.67

CHIMIC  
 GAZ  
 10994.40

SENSIBIL  
 GAZ  
 1329.36

SENSIBIL  
 CENUSA  
 185.91

RANDAMENTUL GAZIFICARII /- /

GAZ RECE  
 78.745

GAZ CALD  
 1403/Nm3 GAZ  
 3641

GAZ CONSUMAT FLUX EXTERIOR P

GAZ UMED  
 1.0597

GAZ CALD  
 1403/Nm3 GAZ  
 3641

GAZ CALD  
 Nm3/Nm3 GAZ  
 413

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

CONSUMURI SPECIFICE

CARBUNE UMEDI  
 KG/Nm3GAZ 1.0995

CARBUNE ANHIDRU  
 KG/Nm3GAZ .8145

EXCES UMIDITATE  
 KG/Nm3GAZ .4120

COMPONENTELE GAZULUI UMED / /

CO2 19.78

CO .09

CH4 24.35

H2 2.76

N2 .64

H2O 51.90

H2S .48

COMPONENTELE GAZULUI ANHIDRU / /

CO2 41.13

CO .18

CH4 50.61

H2 5.73

N2 1.34

H2O 1.01

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMEDI

GAZ ANHIDRU

INFERIOARA 9105.87

SUPERIOARA 10197.64

INFERIOARA 19056.21

SUPERIOARA 21203.39

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIWOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT 11125.67

CHIMIC CARBUNE 9560.00

SE SIBIL CARBUNE 18.69

SENSIBIL UMIDITATE 34.49

FLUX EXTERIOR 1512.50

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT 11125.67

CHIMIC GAZ 10198.64

SE SIBIL GAZ 816.80

SENSIBIL CENUSA 110.23

RANDAMENTUL GAZIFICARII / /

GAZ RECE 82.385

GAZ CALD 99.726

GAZ CONSUM T FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ .1894

GAZ RECE Nm3/Nm3 GAZ .2063

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAU CELSIVS  
 500.00

MODELAJE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRELUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
1.1306	.8376	.3805	11816.72	9830.73	19.22	31.85	1931.93

COMPONENTELE GAZULUI UMED / /

CO2	CO	CH4	H2	H2	H2O	H2S	TOTAL TESTIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
21.03	.00	3.76	7.33	.66	46.04	.50	11816.72	10629.42	1045.62	141.69

CANTITATELE CALCULAT ANHIDRU

CO2	CO	CH4	H2	H2	H2O	H2S	GAZ RECE	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE	GAZ CALD Nm3/Nm3 GAZ
38.97	1.00	14.04	13.03	1.11	.92	.00	80.943	80.943	80.943	80.943

Energie pe kilocalorie

ANTRACIT	COAL ANHIDRU	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE
1965.5	1965.5	1965.5	1965.5

INFERIORA

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUI,  
 GRAD CELSIUS  
 600.00

CONSUMURI SPECIFICE

CARBUNE UMEDI  
 KG/Nm3GAZ 1.1187

CARBUNE ANHIDRU  
 KG/Nm3GAZ .8287

EXCES UMIDITATE  
 KG/Nm3GAZ .3438

COMPONENTELE GAZULUI UMED / % /

CO2 20.89

CO 3.15

CH4 20.96

H2 15.01

N2 .65

H2O 38.86

H2S .49

COMPONENTELE GAZULUI ANHIDRU / /

CO2 34.16

CO 5.15

CH4 34.27

H2 24.54

N2 1.07

H2S .81

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMEDI

GAZ ANHIDRU

INFERIOARA 9662.50

SUPERIOARA 10501.85

INFERIOARA 15803.97

SUPERIOARA 17667.49

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUI,  
 BAR  
 20.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT 12220.90

CHIMIC CARBUNE 9726.76

SENSIBIL CARBUNE 19.02

UMIDITATE 28.78

EXTERIOR 2446.34

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT 12220.90

CHIMIC GAZ 10801.85

SENSIBIL GAZ 1250.82

CENUSA 168.23

RANDAMENTUL GAZIFICARII /

GAZ RECE 79.065

GAZ CALD 89.300

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ .2802

GAZ RECE Nm3/Nm3 GAZ .3165

GAZIFICARE CARBONE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBONE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBONE UMED  
 KG/Nm3GAZ  
 1.1040

CARBONE ANHIDRU  
 KG/Nm3GAZ  
 .8178

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .2820

COMPOZITIELE GAZULUI UMED / /

CO2  
 18.06

H2  
 1.43

N2  
 4.94

H2O  
 .64

H2S  
 29.54

CH4  
 .49

REACTIILE ADULSI ANHIDRU / /

GAZ RECE  
 78.392

GAZ CALD  
 11129.16

GAZ RECE  
 1399.74

GAZ CALD  
 193.68

GAZIFICAREA

GAZ ANHIDRU

GAZ RECE  
 78.392

GAZ CALD  
 11129.16

GAZ RECE  
 1399.74

GAZ CALD  
 193.68

BIANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL  
 INTRAT

CHIMIC  
 CARBONE

SENSIBIL  
 CARBONE

SENSIBIL  
 UMIDITATE

FLUX  
 EXTERIOR

9598.78

18.77

23.60

3081.44

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL  
 IESIT

CHIMIC  
 GAZ

SENSIBIL  
 GAZ

SENSIBIL  
 CENUSA

11129.16

1399.74

193.68

RANDEMENTUL GAZIFICARII / /

GAZ RECE

GAZ CALD

GAZIFICAREA FLUX EXTERIOR

GAZ CALD

GAZ RECE

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL,  
 GRAD CELSIUS  
 400.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 1.1052

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .8187

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .4121

COMPONENTELE GAZULUI UMED / /

CO2  
 19.77

CH4  
 24.60

H2  
 2.26

N2  
 .65

H2O  
 52.16

H2S  
 .49

COMPONENTELE GAZULUI ANHIDRU / /

CO2  
 41.33

CH4  
 51.43

H2  
 4.73

N2  
 1.35

H2S  
 1.02

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED  
 INFERIOARA  
 9203.57

GAZ ANHIDRU  
 INFERIOARA  
 19237.96

SUPERIOARA  
 10236.92

SUPERIOARA  
 21397.93

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL  
 INTRAT  
 11166.24

CHIMIC  
 CARBUNE  
 9609.63

SENSIBIL  
 CARBUNE  
 18.79

SENSIBIL  
 UMIDITATE  
 34.49

FLUX  
 EXTERIOR  
 1503.33

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL  
 IESIT  
 11166.24

CHIMIC  
 GAZ  
 10236.92

SENSIBIL  
 GAZ  
 818.52

SENSIBIL  
 CENUSA  
 110.90

RANDAMENTUL GAZIFICARII / /

GAZ RECE  
 82.423

GAZ CALD  
 99.753

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD  
 Nm3/Nm3 GAZ  
 -1875

GAZ RECE  
 Nm3/Nm3 GAZ  
 .0042

GAZIFICAREA CARBONEI CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRADUL DE CALCUL

500.00

MODELAREA HATERMATEI A GAZIFICAREI CARBONEI VOLVOZI  
 PRESIUNEA DE CALCUL  
 BAR

30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICAREII  
 FLUXURI TERMICE INTRARE KI/NI<sup>3</sup>GAZ

CARBONE UMED KG/NI <sup>3</sup> GAZ	CARBONE ANHIDRU KG/NI <sup>3</sup> GAZ	EXCES UMIDITATE KG/NI <sup>3</sup> GAZ	TOTAL INTRAT	CHEMIC CARBONE	SENSIBIL CARBONE	SENSIBIL UMIDITATE	FLUX EXTERIOR
1.1949	2431	1811	11917.42	9947.56	19746	41.90	1011.97

REZERVATA CARBONII UMED 7.7

FLUXURI TERMICE IESIRE KI/NI<sup>3</sup>GAZ

CO <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub>	H <sub>2</sub> O	H <sub>2</sub> A	TOTAL IESIRE	CHEMIC GAZ	SENSIBIL GAZ	SENSIBIL TERMICA
1.1949	2431	2431	4071	250	11917.42	10211.79	199715	144.4

Se detaliaza in anexa alaturata

PARAMETRII CALCULAREI

VALORILE

14

ALTE PARAMETRII

VALORILE

14





GAZIFICARE CARBUNE CU UMDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMEZ  
 KG/NM3GAZ  
 1.1307

CARBONE ANHIDRU  
 KG/NM3GAZ  
 .8376

EXCES UMDITATE  
 KG/NM3GAZ  
 .2931

RANDAMENTUL GAZULUI UMEZ / /

CO2  
 18.89

CO  
 8.25

H2  
 1.49

N2  
 .66

H2O  
 31.88

H2S  
 .50

RANDAMENTUL GAZULUI ANHIDRU / /

CO2  
 27.74

CO  
 .00

H2  
 .00

N2  
 .00

H2O  
 .73

H2S  
 .00

GAZ CALD

GAZ CALD  
 Nm3/NM3 GAZ  
 .3252

GAZ RECE  
 Nm3/NM3 GAZ  
 .78258

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

TOTAL  
 INTRAT  
 12868.84

CHIMIC  
 CARBUNE  
 9830.91

SENSIBIL  
 CARBUNE  
 19.22

SENSIBIL  
 UMDITATE  
 24.54

FLUX  
 EXTERIOR  
 2994.17

FLUXURI TERMICE IESITE KJ/NM3GAZ

TOTAL  
 IESIT  
 12868.84

CHIMIC  
 GAZ  
 11233.68

SENSIBIL  
 GAZ  
 1436.79

SENSIBIL  
 CENUSA  
 198.37

RANDAMENTUL GAZIFICARII / /

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD  
 Nm3/NM3 GAZ  
 .3252

GAZ RECE  
 Nm3/NM3 GAZ  
 .78258

```

*****
*
*           GAZIFICARE CARBUNE CU UMIDITATE PROPRIE
*
*           MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI
*
*****
*
*           ANALIZA ELEMENTARA CARBUNE / /
*
*****
*
*           CI           HI           OI           NI           SI           AI           WI
*
*           31.32      *  2.82      *  13.14      *    .65      *    .98      *  10.04      *  40.65
*
*****
*
*           PUTERE CALORIFICA /KJ/KG/
*
*****
*
*           SUPERIOARA           INFERIOARA
*
*           12807.230           11145.520
*
*****
*
*           CALDURA SPECIFICA CARBUNE
*           /KJ/KG K/
*
*           .92
*
*****
*
*           RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN
*           / /
*
*           80.00
*
*****

```

GAZIFICARE CARBUNE CU UMDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS

400.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .6927 \* .4097 \* .3509

COMPONENTELE GAZULUI UMED /./

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 19.32 \* .39 \* 20.77 \* 11.38 \* .47 \* 47.38 \* .28

COMPONENTELE GAZULUI ANHIDRU /./

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 36.71 \* .75 \* 19.17 \* 21.63 \* .90 \* .54

POTREBA CALORIFICA /KJ/Nm3/

GAZ UMED \* GAZ ANHIDRU \*  
 .2280 \* .2280

INERȚIA \* INERȚIA \* INERȚIA \* SUPLETA \*  
 8505.03 \* 9800.00 \* 10700.00 \* 18740.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

BILANTUL ENERGETIC AL G ZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMDITATE \* EXTERIOR  
 10663.05 \* 8871.07 \* 12.74 \* 29.38 \* 1749.86

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 10663.05 \* 9862.06 \* 788.66 \* 12.34

PANDAMENTUL GAZIFICARII /./

GAZ RECE \* GAZ CALD \*  
 82.580 \* 69.976

GAZ CONSUMAT FIUX EXTERIOR

GAZ CALD \* GAZ RECE \*  
 1063/Nm3 GAZ \* 1063/Nm3 GAZ

.2280

.2280

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ .6468

CARBUNE ANHIDRU  
 KG/Nm3GAZ .3826

EXCES UMIDITATE  
 KG/Nm3GAZ .3089

COMPONENTELE GAZULUI UMED /% /

CO2 19.94

CO 2.95

CH4 14.91

H2 25.98

N2 .44

H2O 35.51

H2S .27

COMPONENTELE GAZULUI ANHIDRU /% /

CO2 30.92

CO 4.58

CH4 23.13

H2 40.28

N2 .68

H2S .41

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED

GAZ ANHIDRU

INFERIOARA 8599.00

SUPERIOARA 9709.47

INFERIOARA 13334.81

SUPERIOARA 15056.87

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL

BAR  
 1.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT 10675.71

CHIMIC CARBUNE 8283.75

SENSIBIL CARBUNE 11.90

UMIDITATE 25.85

EXTERIOR 2354.21

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT 10675.71

CHIMIC GAZ 9709.47

SENSIBIL GAZ 951.84

CENUSA 14.40

RANDAMENTUL GAZIFICARII /% /

GAZ RECE 80.547

GAZ CALD 89.463

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ .3081

GAZ RECE Nm3/Nm3 GAZ .3422

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	EXCES UMIDITATE KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
.6212	.3710	.2200	11198.77	8033.23	11.54	18.42	3135.58

COMPONENTELE GAZULUI UMED /% /

FLUXURI TERMICE IESITE KJ/NM3GAZ

CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
16.25	12.41	8.00	41.47	.43	21.18	11198.77	10133.65	1048.36	16.76

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIFICARII /% /

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
20.61	15.75	16.16	52.62	.54	.33	80.303	89.665

ENTALPIA ALCHIMICA /KJ/NM3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
8992.98	3013.00	.3903	.4358

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .6800

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .4022

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .0863

COMPONENTELE GAZULUI UMED /% /

CO2  
 7.63

CO  
 28.71

CH4  
 3.41

H2  
 50.78

N2  
 .46

H2O  
 8.74

H2S  
 .28

COMPONENTELE GAZULUI ANHIDRU /% /

CO2  
 8.36

CO  
 31.45

CH4  
 3.74

H2  
 55.64

N2  
 .51

H2S  
 .31

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED

GAZ ANHIDRU

INFERIOARA  
 10426.19

SUPERIOARA  
 11567.73

INFERIOARA  
 11424.51

SUPERIOARA  
 12675.36

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL  
 INTRAT  
 12686.53

CHIMIC  
 CARBUNE  
 8708.96

SENSIBIL  
 CARBUNE  
 12.51

UMIDITATE  
 7.22

EXTERIOR  
 3957.83

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL  
 IESIT  
 12686.53

CHIMIC  
 GAZ  
 11567.73

SENSIBIL  
 GAZ  
 1097.59

CENUSA  
 21.20

RANDAMENTUL GAZIFICARII /% /

GAZ RECE  
 82.183

GAZ CALD  
 90.835

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD  
 Nm3/Nm3 GAZ  
 .4293

GAZ RECE  
 Nm3/Nm3 GAZ  
 .4745

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ
.7513	.4444	.3477

COMPONENTELE GAZULUI UMED /- /

CO2	CO	CH4	H2	N2	H2O	H2S
19.08	.12	24.71	3.93	.51	51.35	.31

COMPONENTELE GAZULUI ANHIDRU /- /

CO2	CO	CH4	H2	N2	H2S
39.21	.25	50.78	8.07	1.05	.63

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED GAZ ANHIDRU

INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
9185.58	10452.41	19290.17	21482.82

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
11280.52	9621.48	13.82	29.11	1616.11

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
11280.52	10452.41	814.72	13.38

RANDAMENTUL GAZIFICARII /- /

GAZ RECE	GAZ CALD
83.202	90.424

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
.1980	.2100



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

CONSUMURI SPECIFICE	
CARBUNE UMED KG/Nm3GAZ	7586
CARBUNE ANHIDRU KG/Nm3GAZ	4487
EXCES UMIDITATE KG/Nm3GAZ	3147

COMPONENTELE GAZULUI UMED / % /

CO2	20.22	CO	0.94	CH4	23.18	H2	10.24	N2	0.52	H2O	44.59	H2S	0.31
-----	-------	----	------	-----	-------	----	-------	----	------	-----	-------	-----	------

COMPONENTELE GAZULUI NHIDRU / % /

CO2	36.49	CO	1.70	CH4	41.83	H2	18.48	N2	0.93	H2S	0.56
-----	-------	----	------	-----	-------	----	-------	----	------	-----	------

PUTERE CALORIFICA /KJ/Nm3/

INFERIOARA	9622.84	SUPERIOARA	10753.24	I FERIOARA	17366.82	SUPERIOARA	19406.91
------------	---------	------------	----------	------------	----------	------------	----------

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

BILANTUL ENERGETIC L GAZIFICARII	
FLUXURI TERMICE INT ATE KJ/Nm3GAZ	11803.97
CHIMIC	9716.15
CARBUNE	13.96
SENSIBIL	26.34
UMIDITATE	2047.52
EXTERIOR	

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL	11803.97	CHIMIC	9716.15	SENSIBIL	26.34
IESIT		GAZ	1033.84	CENUSA	16.90

RANDAMENTUL GAZIFICARII / % /

GAZ RECE	81.522	GAZ CALD	90.280
----------	--------	----------	--------

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ	2402	GAZ RECE Nm3/Nm3 GAZ	2660
-------------------------	------	-------------------------	------



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

BIANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE  
 KG/NM3GAZ \* KG/NM3GAZ \* KG/NM3GAZ  
 .7360 \* .4353 \* .2742

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 12050.13 \* 9426.23 \* 13.54 \* 22.95 \* 2587.41

COMPONENTELE GAZULUI UMED /%/

FLUXURI TERMICE IESITE KJ/NM3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S  
 19.64 \* 4.32 \* 19.06 \* 20.24 \* .50 \* 35.94 \* .30

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 12050.13 \* 10814.09 \* 1216.37 \* 19.67 \*

COMPONENTELE GAZULUI ANHIDRU /%/

RANDAMENTUL GAZIFICARII /%/

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S  
 30.66 \* 6.74 \* 29.75 \* 41.59 \* .78 \* .47

GAZ CALD \* GAZ RECE \* GAZ CALD  
 80.089 \* \* 90.183

ENTALPIA / KJ/NM3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* GAZ ANHIDRU

GAZ CALD \* GAZ RECE  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

.2976 \* .3351

9650.84 \* 10000.00 \* 15065.45 \* 10881.37

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ .7233

CARBUNE ANHIDRU  
 KG/Nm3GAZ .4278

EXCES UMIDITATE  
 KG/Nm3GAZ .1995

COMPONENTELE GAZULUI UMED /%/

CO2 15.72

CO 13.03

CH4 13.51

H2 31.96

N2 .49

H2O 24.98

H2S .30

COMPONENTELE GAZULUI ANHIDRU /%/

CO2 20.96

CO 17.37

CH4 18.01

H2 42.60

N2 .66

H2S .40

PUTERE CALORIFICA /KJ/Nm3/

INFERIOARA 10033.24

SUPERIOARA 11206.61

INFERIOARA 13373.32

SUPERIOARA 1497.31

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

BILANTUL ENERGETIC L GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT 12560.08

CHIMIC CARBUNE 9263.41

SENSIBIL CARBUNE 13.31

SENSIBIL UMIDITATE 16.70

FLUX EXTERIOR 3266.66

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT 12560.08

CHIMIC GAZ 11206.61

SENSIBIL GAZ 1330.92

SENSIBIL CENUSA 22.55

RANDAMENTUL GAZIFICARII /%/

GAZ RECE 79.882

GAZ CALD 90.478

GAZ CONSUMAT FL X EXTERIOR

GAZ CALD Nm3/Nm3 GAZ .3593

GAZ RECE Nm3/Nm3 GAZ .4070

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/NM3GAZ \* KG/NM3GAZ \* KG/NM3GAZ \*  
 .7603 \* .4497 \* .3470

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX \*  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR \*  
 11377.45 \* 9737.87 \* 13.99 \* 29.05 \* 1596.53

COMPONENTELE GAZULUI UMED /t/

FLUXURI TERMICE IESITE KJ/NM3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 19.04 \* .09 \* 25.31 \* 2.81 \* .52 \* 51.92 \* .31

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 11377.45 \* 10545.25 \* 818.65 \* 13.55

COMPONENTELE GAZULUI ANHIDRU /./

KANDAMENTUL GAZIFICARII /./

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 39.61 \* .18 \* 52.64 \* 5.94 \* 1.08 \* .65

GAZ RECE \* \* \* \*  
 83.292 \* \* \* \*  
 GAZ CALD \* \* \* \*  
 90.487 \* \* \* \*

PUTERE CALORIFICA /KJ/NM3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* \* \* \*  
 GAZ ANHIDRU \* \* \* \*

GAZ CALD \* \* \* \*  
 NM3/NM3 GAZ \* \* \* \*  
 GAZ RECE \* \* \* \*  
 NM3/NM3 GAZ \* \* \* \*

INTERIOARA \* SUPRACATA \* INTERIOARA \* SUBTERIOARA \*  
 9430.49 \* 10945.05 \* 19710.15 \* 21933.06

GAZ CALD \* \* \* \*  
 NM3/NM3 GAZ \* \* \* \*  
 .1938 \* \* \* \*  
 GAZ RECE \* \* \* \*  
 NM3/NM3 GAZ \* \* \* \*

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .7804

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .4616

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .3142

COMPONENTELE GAZULUI UMED /%/

CO2 \* \* CH4 \* H2 \* N2 \* H2O \* H2S

20.26 \* \* 24.68 \* 7.47 \* .53 \* 46.06 \* .32

COMPONENTELE GAZULUI ANHIDRU /%/

CO2 \* \* CH4 \* H2 \* N2 \* H2S

37.57 \* 1.23 \* 45.77 \* 13.85 \* .98 \* .59

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED \* \* \* \* \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

9831.79 \* 10967.77 \* 18228.26 \* 20334.38

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

BILANTUL ENERGETIC L GAZIFICARII

FLUXURI TERMICE INT ATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX

INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR

12033.45 \* 9994.88 \* 14.36 \* 26.30 \* 1997.91

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX

IESIT \* GAZ \* GAZ \* CENUSA \* EXTERIOR

12033.45 \* 10967.77 \* 1048.31 \* 17.38 \* 1997.91

RANDAMENTUL GAZIFICARII /%

GAZ RECE \* \* \* \* \* GAZ CALD

81.704 \* \* \* \* \* 90.415

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* \* \* \* \* GAZ RECE

Nm3/Nm3 GAZ \* \* \* \* \* Nm3/Nm3 GAZ

.2295 \* \* \* \* \* .2540

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
TEMPERATURA DE CALCUL  
GRAD CELSIUS

600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
PRESIUNEA DE CALCUL  
BAR

20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ  
.7697 \* .4553 \* .2793

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
12380.16 \* 9857.81 \* 14.16 \* 23.38 \* 2484.81

COMPONENTELE GAZULI UMED /% /

FLUXURI TERMICE IETITE KJ/Nm3GAZ

CO \* CH4 \* H2 \* N2 \* H2O \* H2S  
20.14 \* 3.09 \* 21.76 \* 15.29 \* .52 \* 38.88 \* .32

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
IESIT \* GAZ \* GAZ \* CENUSA \*  
12380.16 \* 11105.75 \* 1253.83 \* 20.57 \*

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIFICARII /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S  
32.95 \* 5.06 \* 33.60 \* 15.92 \* .86 \* .52

GAZ RECE \* \* \* \* \* GAZ CALD \* \* \* \* \*  
80.228 \* \* \* \* \* 90.356

INERTE ADJUNCTIVA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* \* \* \* \* GAZ ANHIDRU \* \* \* \* \*

GAZ CALD \* \* \* \* \* GAZ RECE \* \* \* \* \*  
Nm3/Nm3 GAZ \* \* \* \* \* Nm3/Nm3 GAZ

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

.2777 \* \* \* \* \* .3127

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .7561

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .4473

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .2200

COMPONENTELE GAZULUI UMED /% /

CO2 \* \* CO \* \* CH4 \* \* H2 \* \* N2 \* \* H2O \* \* H2S \* \*  
 17.39 \* 9.69 \* 17.11 \* 25.43 \* .51 \* 29.55 \* .31

COMPONENTELE GAZULUI ANHIDRU /% /

CO2 \* \* CO \* \* CH4 \* \* H2 \* \* N2 \* \* H2S \* \*  
 24.69 \* 13.76 \* 24.29 \* 36.09 \* .73 \* .44

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED \* \* \* \* \* GAZ ANHIDRU \* \* \* \* \*  
 INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA \*  
 10196.21 \* 11384.15 \* 14473.64 \* 16159.94

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* \* CHIMIC \* \* SENSIBIL \* \* SENSIBIL \* \* FLUX  
 INTRAT \* \* CARBUNE \* \* CARBUNE \* \* UMIDITATE \* \* EXTERIOR  
 12810.30 \* 9684.14 \* 13.91 \* 18.41 \* 3093.84

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* \* CHIMIC \* \* SENSIBIL \* \* SENSIBIL \* \*  
 IESIT \* \* GAZ \* \* GAZ \* \* CENUSA \* \*  
 12810.30 \* 11384.15 \* 1402.58 \* 23.58

RANDAMENTUL GAZIFICARII /% /

GAZ RECE \* \* \* \* \* GAZ CALD \* \* \* \* \*  
 79.594 \* \* \* \* \* 90.543

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* \* \* \* \* GAZ RECE \* \* \* \* \*  
 Nm3/Nm3 GAZ \* \* \* \* \* Nm3/Nm3 GAZ \* \* \* \* \*  
 .3334 \* \* \* \* \* .3793

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODELARE MATEMATICA GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
.7645	.4522	.3467	11421.50	9790.66	14.07	29.02	1587.75

COMPONENTELE GAZULUI UMED /./

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
19.03	.07	25.58	2.31	.52	52.18	.31	11421.50	10587.45	820.42	13.62

COMPONENTELE GAZULUI ANHIDRU /./

RANDAMENTUL GAZIFICARII /./

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
39.80	.15	54.49	4.82	1.09	.06	83.332	90.515

HEATING VALUE DATA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD	GAZ RECE	GAZ CALD	PERTE % GAZ
19177.33	20180.33	19908.64	21139.63	1920	2085



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .7907

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .4677

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .3138

COMPONENTELE GAZULUI UMED /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S

20.28 \* .54 \* 25.39 \* 6.19 \* .54 \* 46.74 \* .33

COMPONENTELE GAZULUI ANHIDRU /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S

38.08 \* 1.02 \* 47.66 \* 11.62 \* 1.01 \* .61

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMEI \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

9931.10 \* 11069.83 \* 18645.17 \* 20783.10

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL \* FLUX

INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR

12142.47 \* 10126.43 \* 14.55 \* 26.27 \* 1975.22

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL

IESIT \* GAZ \* GAZ \* CENUSA

12142.47 \* 11069.83 \* 1055.03 \* 17.61

RANDAMENTUL GAZIFICARII /- /

GAZ RECE \* GAZ CALD

81.788 \* 90.477

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* GAZ RECE

Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ

.2247 \* .2486



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	EXCES UMIDITATE KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
.7870	.4655	.2812	12553.42	10078.93	14.48	23.54	2436.47

COMPONENTELE GAZULUI UMED /% /

FLUXURI TERMICE IESITE KJ/NM3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
20.37	2.54	23.09	12.86	.54	40.28	.32	12553.42	11260.26	1272.13	21.03

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIFICARII /% /

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
44.10	4.25	38.67	21.54	.90	.54	80.308	90.441

POTIERE CALORIFICA /KJ/NM3 /

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
100.000	11.60.36	16851.94	18856.09
		.2683	.3021

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .7758

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .4589

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .2290

COMPONENTELE GAZULUI UMED /% /

CO2 \* \* \* \* \*  
 18.19 \* 8.09 \* 19.06 \* 21.91 \* 31.90 \* .32

CH4 \* \* \* \* \*  
 H2 \* \* \* \* \*  
 N2 \* \* \* \* \*  
 H2O \* \* \* \* \*  
 H2S \* \* \* \* \*

COMPONENTELE GAZULUI ANHIDRU /% /

CO2 \* \* \* \* \*  
 26.71 \* 11.88 \* 27.99 \* 32.18 \* .77 \* .47

CH4 \* \* \* \* \*  
 H2 \* \* \* \* \*  
 N2 \* \* \* \* \*  
 H2S \* \* \* \* \*  
 H2S \* \* \* \* \*

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED \* \* \* \* \*  
 10315.57 \* 11512.08 \* 15147.40 \* 16904.36

GAZ ANHIDRU \* \* \* \* \*  
 INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

MODELARE MATEMATICA GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* \* \* \* \*  
 12976.62 \* 9935.57 \* 14.27 \* 19.17 \* 3007.60

CHIMIC \* \* \* \* \*  
 CARBUNE \* \* \* \* \*  
 UMIDITATE \* \* \* \* \*  
 EXTERIOR \* \* \* \* \*

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* \* \* \* \*  
 12976.62 \* 11512.08 \* 1440.35 \* 24.19 \* \*

CHIMIC \* \* \* \* \*  
 GAZ \* \* \* \* \*  
 SENSIBIL \* \* \* \* \*  
 CENUSA \* \* \* \* \*

RANDAMENTUL GAZIFICARII /% /

GAZ RECE \* \* \* \* \*  
 79.494 \* \* \* \* \*  
 90.593

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ \* \* \* \* \*  
 3198 \* \* \* \* \*  
 3644

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL

ANALIZA ELEMENTARA CARBUNE / /

CI	HI	OI	NI	SI	AI	WI
30.85	4.94	14.77	.48	1.61	14.72	32.63

PUTERE CALORIFICA /KJ/KG/

SUPERIOARA

INFERIOARA

15199.600

13265.410

CALDURA SPECIFICA CARBUNE /KJ/KG K/

.92

RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN

/?/

80.00



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ .5943

CARBUNE ANHIDRU  
 KG/Nm3GAZ .4004

EXCES UMIDITATE  
 KG/Nm3GAZ .2178

COMPONENTELE GAZULUI UMED /%/

CO2 13.67

CO 14.37

CH4 9.16

H2 44.37

N2 .23

H2O 20.79

H2S .40

COMPONENTELE GAZULUI ANHIDRU /t/

CO2 17.20

CO 14.37

CH4 11.50

H2 56.01

N2 .29

H2S .51

POTERE CALORIFICA /KJ/Nm3/

GAZ UMED

GAZ ANHIDRU

INFERIOARA 9024.02

SUPERIOARA 10239.52

INFERIOARA 12149.51

SUPERIOARA 13723.11

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT 11941.01

CHIMIC CARBUNE 9033.81

SENSIBIL CARBUNE 10.94

UMIDITATE 18.23

FLUX EXTERIOR 2878.02

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT 11941.01

CHIMIC GAZ 10870.52

SENSIBIL GAZ 1043.96

CENUSA 26.52

RANDAMENTUL GAZIFICARII /%/

GAZ RECE 80.596

GAZ CALD 89.339

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ .3372

GAZ RECE Nm3/Nm3 GAZ .5738

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	TOTAL	INTRAT	CHIMIC	CARBUNE	SENSIBIL	CARBUNE	UMIDITATE	FLUX EXTERIOR
.6224	.4193	.1003	13127.84	9460.88	11.45	8.40	3647.11			

COMPONENTELE GAZULUI UMED /% /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	CENUSA
6.12	25.71	4.01	55.03	.24	8.48	.42	13127.84	12002.70	1092.73	32.41	

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIFICARII /% /

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
6.68	28.09	4.38	60.12	.26	.46	81.895	90.218

PUTERE CALORIFICA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
10750.99	12002.70	11747.34	13115.05
		3849	4240

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ .7764

CARBUNE ANHIDRU  
 KG/Nm3GAZ .5231

EXCES UMIDITATE  
 KG/Nm3GAZ .3135

COMPONENTELE GAZULUI UMED /t/

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S

15.51 \* .11 \* 29.08 \* 4.26 \* .30 \* 50.22 \* .52

COMPONENTELE GAZULUI ANHIDRU /t/

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S

31.15 \* .22 \* 58.42 \* 8.56 \* .60 \* 1.05

POTERE CALORIFICA /KJ/Nm3/

GAZ UMED \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \* INTERIOARA \* SUPERIOARA

11041.03 \* 12292.67 \* 22175.65 \* 24694.01

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR

13137.58 \* 11801.09 \* 14.29 \* 26.24 \* 1295.96

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* SENSIBIL \* FLUX  
 IESIT \* GAZ \* GAZ \* CENUSA \* EXTERIOR

13137.58 \* 12292.67 \* 821.81 \* 23.10 \* 1295.96

RANDAMENTUL GAZIFICARII /% /

GAZ RECE \* GAZ CALD

84.042 \* 90.297

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* GAZ RECE

Nm3/Nm3 GAZ Nm3/Nm3 GAZ

.1366 \* .1467







GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ .7339

CARBUNE ANHIDRU  
 KG/Nm3GAZ .4945

EXCES UMIDITATE  
 KG/Nm3GAZ .2535

COMPONENTELE GAZULUI UMED /%/

CO2 \* \* \* \* \* CH4 \* \* \* \* \* H2 \* \* \* \* \* N2 \* \* \* \* \* H2O \* \* \* \* \* H2S \* \* \* \* \*

16.24 \* \* \* \* \* 22.09 \* \* \* \* \* 21.79 \* \* \* \* \* .28 \* \* \* \* \* 35.18 \* \* \* \* \* .50

COMPONENTELE GAZULUI ANHIDRU /t/

CO2 \* \* \* \* \* CH4 \* \* \* \* \* H2 \* \* \* \* \* N2 \* \* \* \* \* H2S \* \* \* \* \*

25.05 \* \* \* \* \* 34.09 \* \* \* \* \* 33.62 \* \* \* \* \* .43 \* \* \* \* \* .76

POTERE CALORIFICA /KJ/Nm3/

GAZ UMED \* \* \* \* \* GAZ ANHIDRU \* \* \* \* \*

INFERIOARA \* \* \* \* \* SUPERIOARA \* \* \* \* \* INFERIOARA \* \* \* \* \* SUPERIOARA \* \* \* \* \*

10903.63 \* \* \* \* \* 12222.01 \* \* \* \* \* 16821.38 \* \* \* \* \* 18855.29

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* \* \* \* \* CHIMIC \* \* \* \* \* SENSIBIL \* \* \* \* \* SENSIBIL \* \* \* \* \* FLUX  
 INTRAT \* \* \* \* \* CARBUNE \* \* \* \* \* CARBUNE \* \* \* \* \* UMIDITATE \* \* \* \* \* EXTERIOR

13479.58 \* \* \* \* \* 11155.49 \* \* \* \* \* 13.50 \* \* \* \* \* 21.22 \* \* \* \* \* 2289.36

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* \* \* \* \* CHIMIC \* \* \* \* \* SENSIBIL \* \* \* \* \* SENSIBIL \* \* \* \* \*

IESIT \* \* \* \* \* GAZ \* \* \* \* \* GAZ \* \* \* \* \* CENUSA \* \* \* \* \*

13479.58 \* \* \* \* \* 12222.01 \* \* \* \* \* 1224.82 \* \* \* \* \* 32.75 \* \* \* \* \*

RANDAMENTUL GAZIFICARII /t/

GAZ RECE \* \* \* \* \* GAZ CALD \* \* \* \* \*

80.890 \* \* \* \* \* 89.976

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* \* \* \* \* GAZ RECE \* \* \* \* \*

Nm3/Nm3 GAZ \* \* \* \* \* Nm3/Nm3 GAZ \* \* \* \* \*

.2359 \* \* \* \* \* .2625

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BORZEI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

CONSUMURI SPECIFICE	EXCES UMIDITATE	FLUXURI TERMICE INTRATE KJ/Nm3GAZ	FLUXURI TERMICE IESITE KJ/Nm3GAZ
CARBUNE UMED		TOTAL	TOTAL
KG/Nm3GAZ	KG/Nm3GAZ	CHIMIC	CHIMIC
.7019	.4729	CARBUNE	CARBUNE
	.1905		
		TOTAL	TOTAL
		13664.94	10668.92
			12.92
			15.94
			2967.16

COMPONENTELE GAZULUI UMED /% /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

COMPONENTELE GAZULUI UMED /% /	FLUXURI TERMICE IESITE KJ/Nm3GAZ
CO	TOTAL
12.89	13664.94
CH4	CHIMIC
15.71	12291.18
H2	SENSIBIL GAZ
34.46	1337.21
N2	SENSIBIL CENUSA
.27	36.54
H2O	
24.39	
H2S	
.47	

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIF CARII /% /

COMPONENTELE GAZULUI ANHIDRU /% /	RANDAMENTUL GAZIF CARII /% /
CO2	GAZ RECE
17.05	80.334
CO	GAZ CALD
15.61	90.120
CH4	
20.78	
H2	
45.58	
N2	
.36	
H2S	
.63	

PUTERE CALORIFICA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

PUTERE CALORIFICA /KJ/Nm3/	GAZ CONSUMAT FLUX EXTERIOR
GAZ UMED	GAZ CALD
	Nm3/Nm3 GAZ
	.3012
GAZ ANHIDRU	GAZ RECE
	Nm3/Nm3 GAZ
	.3379
INFERIOARA	
SUPERIOARA	
10977.61	
12291.18	
14517.87	
16255.07	

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE												
CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	COMPONENTELE GAZULUI UMED /% /				FLOXURI TERMICE INTRATE KJ/Nm3GAZ					
			CH4	H2	N2	H2O	H2S	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
.7878	.5307	.3115						13286.37	11974.34	14.50	26.08	1271.45
COMPONENTELE GAZULUI ANHIDRU /% /												
CO2	CO	CH4	H2	N2	H2O	H2S	RANDOMENTUL GAZIFICARII /% /					
15.44	.08	29.83	3.05	.30	50.76	.53	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA		
							13286.37	12436.63	826.30	23.44		
PUTERE CALORIFICA /KJ/Nm3/												
GAZ UMED			GAZ ANHIDRU				GAZ CONSUMAT FIUX EXTERIOR					
							GAZ RECE			GAZ CALD		
							84.136			90.355		
INFERIOARA			SUPERIOARA				INFERIOARA					
							GAZ CALD Nm3/Nm3 GAZ			GAZ RECE Nm3/Nm3 GAZ		
11178.66			12436.63		22702.67	25257.48	.1324					

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS

500.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR

20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE  
 Kg/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ  
 .7997 \* .5388 \* .2819

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 13868.01 \* 12155.59 \* 14.72 \* 23.60 \* 1674.11

COMPONENTELE GAZULUI UMED /% /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S  
 16.53 \* .60 \* 28.91 \* 8.09 \* .31 \* 45.03 \* .54

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 13868.01 \* 12778.79 \* 1059.47 \* 29.74 \*

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIFICARII /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S  
 30.07 \* 1.09 \* 52.58 \* 14.71 \* .56 \* .98

GAZ RECE \* \* \* \*  
 82.624 \* \* \* \*  
 GAZ CALD \* \* \* \*  
 90.264 \* \* \* \*

PUTERE CALORIFICA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* \* \* \*  
 INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA  
 11459.32 \* 12778.79 \* 20842.91 \* 23244.88

GAZ CALD \* \* \* \*  
 Nm3/Nm3 GAZ \* \* \* \*  
 .1672 \* \* \* \*  
 GAZ RECE \* \* \* \*  
 Nm3/Nm3 GAZ \* \* \* \*  
 .1826 \* \* \* \*

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .7758

CARBUNE ANHIDRU  
 KG/Nm3GAZ

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .2538

COMPONENTELE GAZULUI UMED /%/

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S

16.54 \* 2.80 \* 25.33 \* 16.50 \* .30 \* 38.02 \* .52

COMPONENTELE GAZULUI ANHIDRU /%/

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S

26.68 \* 4.52 \* 40.86 \* 26.61 \* .48 \* .85

PUIERE CALORIFICA /KJ/Nm3/

GAZ UMED \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

11356.71 \* 12700.04 \* 18322.02 \* 20489.25

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT \* 14000.81

CHIMIC CARBUNE \* 11792.54

SENSIBIL CARBUNE \* 14.28

UMIDITATE \* 21.25

FLUX EXTERIOR \* 2172.75

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT \* 14000.81

CHIMIC GAZ \* 12700.04

SENSIBIL GAZ \* 1266.14

CENUSA \* 34.62

RANDAMENTUL GAZIFICARII /%/

GAZ RECE \* 81.115

GAZ CALD \* 90.158

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD m3/Nm3 GAZ \* .2152

GAZ RECE Nm3/Nm3 GAZ \* .2391

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE  
 BILANTUL ENERGETI AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	EXCES UMIDITATE KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	UMIDITATE	FLUX EXTERIOR
.7930	.5342	.3106	13354.06	12053.05	14.59	26.00	1260.42

COMPONENTELE GAZULUI UMED /%/  
 FLUXURI TERMICE IESITE KJ/NM3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
15.41	.06	30.18	2.51	.30	51.00	.54	13354.06	12502.13	828.34	23.59

COMPONENTELE GAZULUI ANHIDRU /%/  
 RANDAMENTUL GAZIFICARII /%/  
 GAZ RECE  
 GAZ CALD

CO2	CO	CH4	H2	N2	H2S	TOTAL RECE	GAZ RECE	GAZ CALD
31.46	.13	61.59	5.11	.62	1.09	84.179	84.179	90.381

PUTERE CALORIFICA /KJ/NM3/  
 GAZ CONSUMAT FLUX EXTERIOR

GAZ (UMED)	GAZ ANHIDRU	GAZ CALD NM3/NM3 GAZ	GAZ RECE NM3/NM3 GAZ
11241.26	12902.13	1305	1402



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .7973

CARBUNE ANHIDRU  
 KG/Nm3GAZ

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .2532

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL  
 INTRAT \*  
 14272.24

CHIMIC \*  
 CARBUNE \*  
 12119.22

SENSIBIL \*  
 CARBUNE \*  
 14.67

UMIDITATE \*  
 21.20

FLUX EXTERIOR  
 2117.15

COMPONENTELE GAZULUI UMED /t/

CO2 \*  
 16.67

CO \*  
 2.30

CH4 \*  
 26.94

H2 \*  
 13.89

N2 \*  
 .31

H2O \*  
 39.36

H2S \*  
 .54

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL  
 IESIT \*  
 14272.24

CHIMIC \*  
 GAZ \*  
 12950.21

SENSIBIL \*  
 GAZ \*  
 1286.45

CENUSA \*  
 35.58

COMPONENTELE GAZULUI ANHIDRU /t/

CO2 \*  
 27.49

CO \*  
 3.78

CH4 \*  
 44.43

H2 \*  
 22.91

N2 \*  
 .50

H2S \*  
 .89

RANDAMENTUL GAZIFICARII / %

GAZ RECE  
 81.233

GAZ CALD  
 90.246

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED

INFERIOARA \*  
 11593.72

SUPERIOARA \*  
 12950.21

INFERIOARA \*  
 19119.22

SUPERIOARA \*  
 21356.20

GAZ ANHIDRU

INFERIOARA \*  
 .2055

SUPERIOARA \*  
 .2093

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD  
 Nm3/Nm3 GAZ

GAZ RECE  
 Nm3/Nm3 GAZ

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS

700.00

MODELARE MATEMATICA GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR

30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	TOTAL	INTRAT	CHIMIC	CARBUNE	SENSIBIL	CARBUNE	UMIDITATE	FLUX EXTERIOR
.7711	.5195	.2098	14445.50	11720.53	14.19	17.56	2693.22			

COMPONENTELE GAZULUI UMED /% /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	CENUSA
14.86	7.31	22.22	23.66	.30	31.13	14445.50	12950.27	1455.08	40.15	

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIFICARII /% /

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
21.57	10.62	32.27	34.36	.43	.76	80.228	90.301

PUTERE CALORIFICA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
11584.39	12950.27	16827.53	18803.50



# GAZIFICAREA ȘI ARDEREA LIGNIȚILOR

## TEZĂ DE DOCTORAT

**Coordonator științific**  
Prof. dr. ing. **CORNELIU UNGUREANU**

ANEXA Nr. 3

### MODELUL MATEMATIC AL GAZIFICĂRII CĂRBUNILOR CU UMIDITATEA PROPRIE

### MODEL MATEMATIC COMPLEX BAZAT PE FORMULA CHIMICĂ A MASEI ORGANICE

#### CUPRINS

1. SISTEMUL DE ECUAȚII	pag. 1-3
2. LISTARE PROGRAM DE CALCUL	pag. 1-22
3. RULARE REZULTATE CALCUL LIGNIT VOIVOZI	pag. 1-14
4. RULARE REZULTATE CALCUL LIGNIT ROVINARI	pag. 15-32
5. RULARE REZULTATE CALCUL LIGNIT BOROZEL	pag. 33-49

**TIMIȘOARA**  
**1998**

# MODELUL MATEMATIC COMPLEX AL GAZIFICĂRII CĂRBUNILOR CU UMIDITATEA PROPRIE

## SISTEMUL DE ECUAȚII

Relatiile bilanțului masic elementar:

a - bilanțul masic al carbonului:

$$C'B' = (r_{CO_2} + r_{CO} + r_{CH_4}) \frac{12,011}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (1)$$

b - bilanțul masic al oxigenului:

$$O'B' + (W'B' + W^{exc}) \frac{31,999}{2 \cdot 18,015} = (r_{CO_2} + 0,5r_{CO} + 0,5r_{H_2O}) \frac{31,999}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (2)$$

c - bilanțul masic al hidrogenului:

$$H'B' + (W'B' + W^{exc}) \frac{2,0159}{18,015} = (2r_{CH_4} + r_{H_2} + r_{H_2O} + r_{H_2S}) \frac{2,0159}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (3)$$

d - bilanțul masic al azotului:

$$N'B' = r_{N_2} \frac{28,013}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (4)$$

e - bilanțul masic al sulfului:

$$S'B' = r_{H_2S} \frac{32,06}{22,414} \quad [kg/m^3N \text{ gaz}] \quad (5)$$

în care: C<sup>i</sup>, O<sup>i</sup>, H<sup>i</sup>, N<sup>i</sup>, S<sup>i</sup>, A<sup>i</sup> - analiza elementară a probei inițiale;

B - consumul specific de cărbune corespunzător unității de gaz de gazogen, în kg/m<sup>3</sup>N gaz;

W<sub>exc</sub> - excesul de apă necesar gazificării unității de gaz de gazogen, în kg/m<sup>3</sup>N gaz;

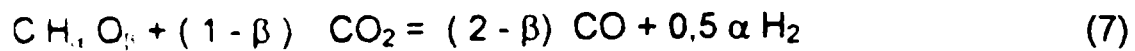
r<sub>CO</sub>, r<sub>CH<sub>4</sub></sub>, r<sub>H<sub>2</sub></sub>, r<sub>CO<sub>2</sub></sub>, r<sub>N<sub>2</sub></sub>, r<sub>H<sub>2</sub>S</sub>, r<sub>H<sub>2</sub>O</sub> - participațiile volumice ale componentelor gazului de gazogen.

Relatia participatiilor volumice ale componentelor gazului de gazogen brut:

$$r_{CO} + r_{CH_4} + r_{H_2} + r_{CO_2} + r_{N_2} + r_{H_2S} + r_{H_2O} = 1$$

Relatiile constantelor de echilibru:

a - constanta de echilibru pentru reacția Boudouard:



$$K_r = p^{1-0,5\alpha} \frac{r_{CO}^{2-\beta} r_{H_2}^{0,5\alpha}}{r_{CO_2}^{1-\beta}} \quad (8)$$



$$K_r = \frac{r_{CO_2} r_{H_2}}{r_{CO} r_{H_2O}} \quad (10)$$



$$K_p = \frac{r_{CH_4} r_{CO_2}}{p^2 r_{CO}^2 r_{H_2}^2} \quad (12)$$

Calculul constantelor de echilibru aferente reacțiilor chimice adoptate se efectuează pe baza determinării afinității chimice care depinde de variația entalpiei și entropiei standard a reactanților, conform relației:

$$\ln K_p = -\frac{1}{R \cdot T} \left( \Delta H_{298}^0 - T \Delta S_{298}^0 + \int_{298}^T \Delta C_p^0 dT - \int_{298}^T \frac{\Delta C_p^0 dT}{T} \right) \quad (13)$$

în care: R - este constanta universală a gazelor perfecte, în kJ/kmol K;  
 T - temperatura la care se desfășoară reacția chimică, în K;  
 $\Delta H_{298}^0$  - entalpia de reacție, în kJ/kmol;  
 $\Delta S_{298}^0$  - entropiei de reacție, în kJ/kmol K;  
 $\Delta C_p^0$  - variația capacității calorice moleculare corespunzător temperaturii T, în kJ/kmol K, a căror valori sunt prezentate în tabelul 1.

Nr. crt.	SUBSTANTA	$H_{298}^0$ kJ/kmol	$S_{298}^0$ kJ/kmol K	$C_p^0$ kJ/kmol K
1.	C	0	1,3609	$2,673 + 2,617 \cdot 10^{-3} T - 0,1169 \cdot 10^{-6} T^2$
2.	CO <sub>2</sub>	-94.051,8	51,061	$6,85 + 8,533 \cdot 10^{-3} T - 2,475 \cdot 10^{-6} T^2$
3.	CO	-26.415,7	47,3	$6,25 + 2,091 \cdot 10^{-3} T - 4,59 \cdot 10^{-7} T^2$
4.	H <sub>2</sub>	0	31,211	$6,88 + 0,066 \cdot 10^{-3} T + 2,79 \cdot 10^{-7} T^2$
5.	CH <sub>4</sub>	-17.889	44,5	$4,75 + 12 \cdot 10^{-3} T + 30,31 \cdot 10^{-7} T^2 - 2,63 \cdot 10^{-9} T^3$
6.	H <sub>2</sub> O	57.237	46,84	$6,89 + 3,283 \cdot 10^{-3} T - 3,43 \cdot 10^{-7} T^2$

Tabelul 1 Valorile entalpiei standard, a entropiei standard și variația capacității calorice molare

Ecuatia bilanțului energetic al gazificării (s-au neglijat pierderile specifice gazogenului):

$$Q_{cc} + Q_{cs} + Q_{sw} + Q_{ext} = Q_{gc} + Q_{gs} + Q_{cens} \quad [\text{kJ/m}^3\text{N gaz}] \quad (14)$$

în care:  $Q_{cc}$  - căldura chimică a cărbunelui corespunzătoare unității de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cc} = B^i H_{cs} \quad [\text{kJ/m}^3\text{N gaz}] \quad (15)$$

$Q_{cs}$  - căldura sensibilă a cărbunelui corespunzătoare unității de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cs} = B^i c_c t_c \quad [\text{kJ/m}^3\text{N gaz}] \quad (16)$$

$Q_{sw}$  - căldura sensibilă a excesului de apă necesar gazificării unității de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{sw} = W_{exc} c_{pw} t_w \quad [\text{kJ/m}^3\text{N gaz}] \quad (17)$$

$Q_{ext}$  - fluxul termic furnizat din exterior necesar gazificării unității de gaz de gazogen, în  $\text{kJ/m}^3\text{N}$ , rezultând din ecuația de bilanț termic;

$Q_{gc}$  - căldura chimică a gazului de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{gc} = H_{gs} \quad [\text{kJ/m}^3\text{N gaz}] \quad (18)$$

$Q_{gs}$  - căldura sensibilă a gazului de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{gs} = c_{pg} t_g \quad [\text{kJ/m}^3\text{N gaz}] \quad (19)$$

$Q_{cens}$  - căldura sensibilă a cenușii la evacuarea din gazogen corespunzătoare unității de gaz de gazogen, în  $\text{kJ/m}^3\text{N gaz}$ , pe baza relației:

$$Q_{cens} = B^i A^i c_{cen} t_{cen} \quad [\text{kJ/m}^3\text{N gaz}] \quad (20)$$

în care:  $H_{cs}$  - puterea calorică superioară a cărbunelui, în  $\text{kJ/kg}$ ;

$c_c$  - căldura specifică a cărbunelui la intrare, în  $\text{kJ/kg K}$ ;

$c_{pw}$  - căldura specifică a excesului de apă necesar gazificării la intrare, în  $\text{kJ/m}^3\text{N K}$ ;

$t_c, t_w$  - temperatura cărbunelui, respectiv a excesului de apă la intrare, în  $^\circ\text{C}$ ;

$H_{gs}$  - puterea calorică superioară a gazului de gazogen, în  $\text{kJ/m}^3\text{N}$ ;

$c_{pg}$  - căldura specifică a gazului de gazogen la ieșire, în  $\text{kJ/m}^3\text{N K}$ ;

$t_g, t_{cen}$  - temperatura gazului de gazogen, respectiv a cenușii la ieșire, în  $^\circ\text{C}$ ;

$c_{cen}$  - căldura specifică a cenușii la ieșire, în  $\text{kJ/kg K}$ .

#### DATE ÎNȚIALE:

- analiza elementară a cărbunelui:  $C^i, O^i, H^i, N^i, S^i, A^i, W^i$ ;

#### VARIABLE DE CALCUL:

- parametrii de gazificare: presiunea -  $p$ , și temperatura -  $t, T$ ;

#### NECUNOSCUTE:

- compoziția gazului de gazogen:  $r_{CO}, r_{CH_4}, r_{H_2}, r_{CO_2}, r_{N_2}, r_{H_2S}, r_{H_2O}$

- consumuri specifice: cărbune -  $B^i$ , exces umiditate -  $W_{exc}$

- fluxul termic furnizat din exterior -  $Q_{ext}$

C MODELAREA MATEMATICA A GAZIFICARII CU UMIDITATE PROPRIE

C DECLARARE VARIABLE

```
REAL II1,J1,K1,ICP,IST,KP,L1,MM1,N1
INTEGER CC,PP,TT
DOUBLE PRECISION COF(5), X(4), Y(4), TOL
DIMENSION KP(3), AEL(7), AELA(6)
DIMENSION CSC(4,3),CEN(2), CARCE(2)
DIMENSION ALFA(2), BETA(2)
DIMENSION CGAZ(2,7,7,7)
DIMENSION DEB(2,7,7,2)
DIMENSION CSPG(8,3), HS(6,2), DCP(3),DHS(2)
DIMENSION CTG(2), STG(2),TC(2)
DIMENSION GAMA(2,3), ACG(5), CDT(2,3,3)
DIMENSION CSIS(2,3,3), FDX(2),FDY(2),VVF(2)
REAL JAC, NUMX,NUMY
DIMENSION XR(4)
CHARACTER*9 DEL(7)
CHARACTER*9 DCEN(2)
CHARACTER*9 DDEB(2)
CHARACTER*3 GAZ(7)
DATA (DEL(I), I=1,7)/6hCARBON, 8hHIDROGEN, 6hOXIGEN, 4hAZOT, 4hSU
xLF, 6hCENUSA, 9hUMIDITATE/
DATA (DCEN(I), I=1,2)/6hCENUSA, 9hANTRENATE/
DATA (DDEB(I), I=1,2)/7hCARBUNE, 9hUMIDITATE/
DATA (GAZ(I),I=1,7)/2HH2,2HCO,3HCO2,3HCH4,3HH2O,2HN2,3HH2S/
DATA ((CSC(J,I),I=1,3),J=1,4)/0.92,0.02,0.02,0.96,0.115,0.015,1.09
1,0.135,0.015,1.3,0.17,0.04/
DATA((CSPG(I,J),J=1,3),I=1,8)/27.28,3.26,0.502,28.41,4.10,-0.46,44
X.14,9.04,-8.53,17.45,60.46,1.117,30.0,10.71,0.33,27.87,4.27,0.0,29
X.37,15.4,0.0,17.15,4.27,-8.79/
DATA ((HS(I,J),J=1,2),I=1,6)/0.0,130.6,-110.5,197.4,-393.51,213.6,
X-74.85,186.19,-241.84,188.74,0.0,5.74/
```

C INTRODUCERE DATE INITIALE - VERIFICARE CORECTITUDINE DATE

```
94 WRITE (*,*) 'INTRODUCETI COMPOZITIA CARBUNELUI -ANALIZA ELEMETARA
x IN %'
SUMA=0
DO 90 I=1,7
91 WRITE (*,*) DEL(I)
READ (*,*) AEL(I)
IF (AEL(I).GE.0.AND.AEL(I).LE.100) GO TO 92
WRITE (*,*) 'EROARE LA INTRODUCEREA ELEMENTULUI CHIMIC AL CARBUNE
xLUI'
GO TO 91
92 SUMA=SUMA+AEL(I)
90 CONTINUE
IF (SUMA.GE.99.9.AND.SUMA.LE.100.1) GO TO 93
WRITE(*,*)'EROARE LA COMPOZITIA COMBUSTIBILULUI',SUMA
GO TO 94
```

```

93 VAL1=1/(100-AEL(7))
DO 500 I=1,6
AELA(I)=AEL(I)*VAL1
500 CONTINUE
506 DO 501 I=1,2
503 WRITE(*,*) 'FRACTIUNEA DIN ',DEL(6),' EVACUATA IN ',DCEN(I),' IN %
X'
READ(*,*) CEN(I)
IF (CEN(I) GE 0.0.AND CEN(I).LE.100.) GO TO 501
WRITE(*,*) 'ATENTIE LA FRACTIUNEA DIN MASA MINERALA EVACUATA IN ',
XDCEN(I),' ESTE DE ',CEN(I),' %'
GO TO 503
501 CONTINUE
SUMA =CEN(1)+CEN(2)
IF (SUMA.GE.99.99.OR SUMA.LE.100.1) GO TO 504
WRITE(*,*) 'ATENTIE LA MODUL DE EVACUARE AL CENUSII'
DO 505 I=1,2
WRITE(*,*) 'FRACTIUNEA DIN ',DEL(6),' EVACUATA IN ',DCEN(I),' ESTE
X',CEN(I),' %'
505 CONTINUE
WRITE(*,*) 'SUMA TOTALA ESTE ',SUMA,' %'
GO TO 506
504 DO 507 I=1,2
CEN(I)=CEN(I)/100
507 CONTINUE
DO 508 I=1,2
510 WRITE(*,*) 'CONTINUTUL DE CARBON DIN ',DCEN(I),' IN % ?'
READ(*,*) CARCE(I)
IF (CARCE(I).GE.0.OR.CARCE(I).LT.50) GO TO 508
WRITE(*,*) 'ATENTIE LA CONTINUTUL DE CARBON DIN ', DCEN(I),' ESTE
X DE ',CARCE(I),' %'
GO TO 510
508 CONTINUE
DO 511 I=1,2
CARCE(I)=CARCE(I)/100
511 CONTINUE
513 WRITE(*,*) 'TEMPERATURA CARBUNELUI LA INTRARE IN GRAD C ?'
READ(*,*) TCAR
IF (TCAR.GT.0.OR.TCAR.LT.200) GO TO 512
WRITE(*,*) 'ATENTIE LA TEMPERATURA CARBUNELUI LA INTRARE ',TCAR,
X'grad C'
GO TO 513
512 WRITE(*,*) 'ADOPTATI CALITATEA CARBUNELUI'
WRITE(*,*) ' - ANTRACIT, HUILA SARACA IN VOLATILE =1'
WRITE(*,*) ' - HUILA BOGATA IN VOLATILE =2'
WRITE(*,*) ' - LIGNIT =3'
WRITE(*,*) ' - TURBA =4'
WRITE(*,*) 'CALITATEA CARBUNELUI 1/2/3/4 ?'
READ(*,*) CC
IF (CC.GE.1.OR.CC.LE.4) GO TO 514
WRITE(*,*) 'VERIFICATI CALITATEA CARBUNELUI',CC
GO TO 512

```

```

514 CCA=CSC(CC,1)+CSC(CC,2)*TCAR/100+CSC(CC,3)*((TCAR/100)**2)
    CSPC=4.1855*AEL(7)/100+CCA*(1-AEL(7)/100)
516 WRITE (*,*) 'INTRODUCETI RANDAMENTUL FURNIZARII FLUXULUI TERMIC IN
X %'
    READ (*,*) RAND
    IF (RAND.GT.60.OR.RAND.LT.100) GO TO 515
    WRITE (*,*) 'ATENTIE LA RANDAMENTUL TERMIC ',RAND,' %'
    GO TO 516
515 RAND=RAND/100
    PCS=(33800.*AEL(1)+125448.*AEL(2)+10827.*(AEL(4)-AEL(3)))/100
    PCI=PCS-2509.*(AEL(7)+9*AEL(2))/100
    WRITE (*,*) 'MODELARE MATEMATICA GAZIFICARE CU UMIDITATE PROPRIE'
    WRITE (*,*) 'DATELE INITIALE DE CALCUL'
    WRITE (*,*) 'COMPOZITIA CARBUNELUI ANALIZA ELEMENTARA'
    WRITE (*,*) (DEL(I),AEL(I),I=1,7)
    ALFA(1)=0
    BETA(1)=0
    ALFA(2)=12.011*AEL(2)/AEL(1)
    BETA(2)=12.011*AEL(3)**2/(31.999*AEL(1))

```

C DESCHIDERE FISIER DATE INTRARE - CALCULATE

```
OPEN (33,FILE='UMCORG')
```

C FISIER DATE INTRARE

```

    WRITE(33,420)
420 FORMAT(72('*'),/,',*',70X, '*')
    WRITE (33,421)
421 FORMAT('*',15X,'GAZIFICARE CARBUNE CU UMIDITATE PROPRIE'16X, '*/'*
1',70X, '*')
    WRITE(33,422)
422 FORMAT('*',12X,'MODELARE MATEMATICA GAZIFICARE CARBUNE VOIVOZI'
1,12X, '*/'**',70X, '*/'72('*'))
    WRITE(33,423)
423 FORMAT('*',70X, '*/'**',20X,'ANALIZA ELEMENTARA CARBUNE /%/'20X, '*
1/'**',70X, '*/'72('*')/'**',6(9X, '*'),10X, '*/'**'3X, 'CI',4X, '*'3X,
1'HI',4X, '*'3X, 'OI',4X, '*'3X, 'NI',4X, '*'3X, 'SI',4X, '*',3X, 'AI',4X,
1**',4X, 'WI'4X, '*/'**',6(9X, '*'),10X, '*')
    WRITE(33,424)(AEL(I),I=1,7)
424 FORMAT('*',6(1X,F6.2,2X, '*'),2X,F6.2,2X, '*/'**',6(9X, '*'),10X, '*/'
172('*')/'**'70X, '*/'**'22X, 'PUTERE CALORIFICA /KJ/KG/'23X, '*/'**
170X, '*/'72('*')/'**'35X, '*'34X, '*')
    WRITE(33,425) PCS, PCI
425 FORMAT('*'12X, 'SUPERIOARA'13X, '*'12X, 'INFERIOARA'12X, '*/'**'35X,
1**'34X, '*/'**'12X, F10.3,13X, '*'12X, F10.3,12X, '*/'**'35X, '*'34X,
1**/'72('*')/'**'70X, '*/'**'22X, 'CALDURA SPECIFICA CARBUNE'23X, '*
1/'**',30X, '/KJ/KG K/'31X, '*/'**'70X, '*')
    WRITE(33,426) CSPC, ALFA(2),BETA(2)
426 FORMAT('*',30X,F10.2,30X, '*/'**'70X, '*/'72('*')/'**'70X, '*/'
1**'27X'FORMULA CHIMICA'28X, '*/'**'70X**/'72('*')/'**'35X, '*'34X, '*
1/'**'10X, 'COEFICIENT ALFA'10X, '*'10X, 'COEFICIENT BETA'9X, '*/'**'35X

```

```

1**34X**/*14X F7 4 14X,**,14X,F7.4,13X,**/*35X,**34X**/
172(**)/*70X.**/
1**11X,RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN',12X,**/
1**33X,/*%/,34X,**/*70x,**)
WRITE(33,427)RAND
427 FORMAT(**32X F6 2.32X,**/*70X,**/72(**))

```

**C BLOC CALCUL - SISTEM ECUATII MODEL MATEMATIC**

C COEFICIENTI INDEPENDENTI DE PARAMETRII DE OPERARE

C COEFICIENTI PRIMARI

```

VAL11=22 414
VAL13=CEN(1)*CARCE(1)+CEN(2)*CARCE(2)
A1=VAL11*(AELA(1)-AELA(6)*VAL13)/12.011
B1=VAL11*AELA(3)/31.999
C1=VAL11/(2*18.015)
D1=0 5
F1=0.5
G1=VAL11*AELA(2)/2.0159
H1=VAL11/18.015
II1=2.
J1=VAL11*AELA(5)/28.013
K1=VAL11*0.6*AELA(4)/32.06

```

C COEFICIENTI SECUNDARI

```

VAL21=(G1-K1)/A1
VAL22=H1*B1/(A1*C1)
A2=VAL21+H1/C1-VAL22
B2=VAL21+H1*D1/C1-VAL22
C2=VAL21-II1-VAL22
D2=1+(J1+K1)/A1

```

C COEFICIENTI TERTIARI

```

B3=B2
E3=D2

```

C CICLU PRESIUNE

```

DO 250 PP=1,7
IF (PP NE.1) GO TO 230
P=1
GO TO 231
230 P=5*(PP-1)

```

C CICLU TEMPERATURA

```

231 DO 15 TT=1,7
TABS=623.15+50*TT

```



C CICLU VARIANTA CALCUL - MODEL SIMPLIFICAT SAU COMPLEX

DO 900 MDL=1,2

C CONSTANTE DE ECHILIBRU

C CONSTANTA DE ECHILIBRU REACTIE BOUDOUARD

DO 521 I=1,2

DHS(I)=2\*HS(2,I)-(HS(6,I)+HS(3,I))

521 CONTINUE

DO 522 I=1,3

DCP(I)=2\*CSPG(2,I)-(CSPG(8,I)+CSPG(3,I))

522 CONTINUE

TC(1)=TABS

TC(2)=298.15

DO 523 I=1,2

CTG(I)=DCP(1)\*TC(I)+DCP(2)\*(TC(I)\*\*2)/(2.E3)-DCP(3)\*(1.E5)/TC(I)

STG(I)=DCP(1)\*ALOG(TC(I))+DCP(2)\*TC(I)\*(1.E-3)-DCP(3)\*(1.E5)/(2\*(T  
XC(I)\*\*2))

523 CONTINUE

ICP=CTG(1)-CTG(2)

IST=STG(1)-STG(2)

VKP1=-(DHS(1)\*(1.E3)-TABS\*DHS(2)+ICP-TABS\*IST)

VKP2=VKP1/(TABS\*8.314)

VKP3=EXP(VKP2)

KP(1)=VKP3

C CONSTANTA DE ECHILIBRU REACTIE CO+H2O=CO2+H2

DO 524 I=1,2

DHS(I)=HS(3,I)+HS(1,I)-(HS(2,I)+HS(5,I))

524 CONTINUE

DO 525 I=1,3

DCP(I)=CSPG(3,I)+CSPG(1,I)-(CSPG(2,I)+CSPG(5,I))

525 CONTINUE

DO 526 I=1,2

CTG(I)=DCP(1)\*TC(I)+DCP(2)\*(TC(I)\*\*2)/(2.E3)-DCP(3)\*(1.E5)/TC(I)

STG(I)=DCP(1)\*ALOG(TC(I))+DCP(2)\*TC(I)\*(1.E-3)-DCP(3)\*(1.E5)/(2\*(T  
XC(I)\*\*2))

526 CONTINUE

ICP=CTG(1)-CTG(2)

IST=STG(1)-STG(2)

ICP=ICP-291.85712

IST=IST-7.60188

VKP1=-(DHS(1)\*(1.E3)-TABS\*DHS(2)+ICP-TABS\*IST)

VKP2=VKP1/(TABS\*8.314)

VKP3=EXP(VKP2)

KP(2)=VKP3

C CONSTANTA DE ECHILIBRU  $2(\text{CO}+\text{H}_2\text{O})=\text{CO}_2+\text{CH}_4$

DO 527 I=1,2

$\text{DHS}(I)=\text{HS}(4,I)+\text{HS}(3,I)-2*(\text{HS}(2,I)+\text{HS}(1,I))$

527 CONTINUE

DO 528 I=1,3

$\text{DCP}(I)=\text{CSPG}(4,I)+\text{CSPG}(3,I)-2*(\text{CSPG}(2,I)+\text{CSPG}(1,I))$

528 CONTINUE

$\text{DCP}(3)=\text{DCP}(3)-\text{CSPG}(4,3)$

DO 530 I=1,2

$\text{CTG}(I)=\text{DCP}(1)*\text{TC}(I)+\text{DCP}(2)*(\text{TC}(I)**2)/(2.E3)-\text{DCP}(3)*(1.E5)/\text{TC}(I)$

$\text{STG}(I)=\text{DCP}(1)*\text{ALOG}(\text{TC}(I))+\text{DCP}(2)*\text{TC}(I)*(1.E-3)-\text{DCP}(3)*(1.E5)/(2*(\text{TC}(I)**2))$

530 CONTINUE

DO 529 I=1,2

$\text{CTG}(I)=\text{CTG}(I)+1.117*(\text{TC}(I)**3)/(3.E6)-7.2*(\text{TC}(I)**4)/(4.E9)$

$\text{STG}(I)=\text{STG}(I)+1.117*(\text{TC}(I)**2)/(2.E6)-7.2*(\text{TC}(I)**3)/(3.E9)$

529 CONTINUE

$\text{ICP}=\text{CTG}(1)-\text{CTG}(2)$

$\text{IST}=\text{STG}(1)-\text{STG}(2)$

$\text{VKP1}=-(\text{DHS}(1)*(1.E3)-\text{TABS}*\text{DHS}(2))+\text{ICP}-\text{TABS}*\text{IST}$

$\text{VKP2}=\text{VKP1}/(\text{TABS}*8.314)$

$\text{VKP3}=\text{EXP}(\text{VKP2})$

$\text{KP}(3)=\text{VKP3}$

WRITE(\*,\*)'CONSTANTE DE ECHILIBRU'

WRITE(\*,\*)'BOUDOUARD', KP(1)

WRITE(\*,\*)'CO+H2O', KP(2)

WRITE(\*,\*)'CO+H2O', KP(3)

C COEFICIENTI DEPENDENTI DE PARAMETRII DE OPERARE

C CALCUL COEFICIENTI SISTEM PRIM

$\text{L1}=(\text{P}**(1+\text{ALFA}(\text{MDL})/2))/\text{KP}(1)$

$\text{MM1}=1/\text{KP}(2)$

$\text{N1}=1/((\text{P}**2)*\text{KP}(3))$

C CALCUL COEFICIENTI SISTEM SECUND

$\text{E2}=\text{L1}$

$\text{F2}=\text{MM1}$

$\text{G2}=\text{N1}$

C CALCUL COEFICIENTI SISTEM TERT

$\text{VAL31}=1/(1-\text{BETA}(\text{MDL}))$

$\text{VAL32}=\text{E2}**\text{VAL31}$

$\text{A3}=\text{A2}*\text{VAL32}$

$\text{C3}=\text{C2}/(\text{G2}*\text{VAL32})$

$\text{D3}=\text{D2}*\text{VAL32}$

F3=D2/(G2\*VAL32)  
G3=F2\*VAL32

IF (MDL.EQ.2) GO TO 1050

C MODEL GAZIFICARE SIMPLIFICAT

C CALCUL COEFICIENTI SISTEM CUADRAT

VAL41=A3\*F3-C3\*D3

VAL42=A3+D3

VAL43=A3\*E3-B3\*D3

A4=A3\*(VAL41\*\*2)+((A3\*G3)\*\*2)\*C3

B4=A3\*VAL41\*(2\*VAL42-B3\*G3)-((A3\*G3)\*\*2)+2\*A3\*C3\*G3\*VAL43

VAL45=A3\*((VAL42\*\*2)-2\*A3\*VAL41)

VAL46=B3\*(VAL41\*VAL43+A3\*G3\*VAL42)

VAL47= VAL43\*(C3\*VAL43-2\*A3\*G3)

C4=VAL45-VAL46+VAL47

D4=(A3\*\*2)\*B3\*G3-2\*(A3\*\*2)\*VAL42-B3\*VAL42\*VAL43-(VAL43\*\*2)

E4=(A3\*\*3)+A3\*B3\*VAL43

COF(1)=A4/(1.E5)

COF(2)=B4/(1.E5)

COF(3)=C4/(1.E5)

COF(4)=D4/(1.E5)

COF(5)=E4/(1.E5)

MR=5

WRITE(\*,\*) 'TEMPERATURA PRESIUNE'

TEMPRR=TABS-273.15

WRITE(\*,\*)TEMPRR,P

DO 600 I=1,5

WRITE (\*,\*)'COEFICIENTI SISTEM', I,COF(I)

600 CONTINUE

READ(\*,\*) IJKL

IF(IJKL.EQ.5) GO TO 15

C LANSARE RUTINE REZOLVARE POLINOM

CALL C02AEF(COF,MR,X,Y,TOL,IFAIL)

WRITE(\*,\*)'COEFICIENTI'

WRITE(\*,\*)(COF(KK),KK=1,5)

WRITE(\*,\*)'REZULTATE'

WRITE(\*,\*)(X(KJ),Y(KJ),KJ=1,4)

WRITE(\*,\*)'TOL,IFAIL',TOL,IFAIL

C BLOC SELECTIONARE SOLUTIE POLINOM

WRITE(\*,\*) 'SOLUTII REALE CONVENABILE'

JSOL=0

DO 160 ISOL=1,4

IF (Y(ISOL).NE.0) GO TO 160

IF (X(ISOL).LE.0.OR.X(ISOL).GE.1.) GO TO 160

```

JSOL=JSOL+1
XR(JSOL)=X(ISOL)
WRITE(*,*)'NR SOLUTIE ',JSOL,' VALOARE SOLUTIE ',XR(JSOL)
160 CONTINUE
IF (JSOL.NE.0) GO TO 61
WRITE (*,*) 'EROARE LA REZOLVARE ECUATIE NEWTON'
GO TO 250
61 write(*,*)'ALEGETI SOLUTIA DE REZOLVARE A SISTEMULUI'
WRITE (*,*) 'INTRODUCETI NUMARUL SOLUTIEI'
read(*,*) KSOL
IF (KSOL.EQ.5) GO TO 15

```

### C DETERMINARE NECUNOSCUTE SISTEM

```

CGAZ(MDL,PP,TT,1)=XR(KSOL)
VAL51=A3-(XR(KSOL)**2)*VAL41-XR(KSOL)*VAL42
VAL52=VAL43+A3*G3*XR(KSOL)
VER=VAL51/VAL52
IF(VER.GT.0.AND.VER.LT.1) GO TO 47
WRITE (*,*) CGAZ(MDL,PP,TT,1),VER
GO TO 49
47 CGAZ(MDL,PP,TT,2)=VER
GO TO 800

```

### C MODEL COMPLEX GAZIFICARE

#### C DEZVOLTARE IN SERIE TAYLOR

```

1050 WRITE(*,*) 'REZOLVA SISTEMUL COMPLEX'
READ (*,*) MAR
GAMA (1,1)=ALFA(MDL)*VAL31/2
GAMA(2,1)=(2-BETA(MDL))*VAL31
GAMA(1,2)=2-GAMA(1,1)
GAMA(2,2)=-BETA(MDL)*VAL31
GAMA(1,3)=1+GAMA(1,1)
GAMA(2,3)=VAL31
ACG(1)=A3
ACG(2)=C3
ACG(3)=D3
ACG(4)=F3
ACG(5)=G3
DO 801 I=1,2
XO=CGAZ(1,PP,TT,I)
DO 802 J=1,3
K=J-1
VGA=GAMA(I,J)
CDT(I,J,0)=(1-VGA)*(1-VGA/2)*(XO**VGA)
CDT(I,J,1)=VGA*(2-VGA)*(XO**(VGA-1))
CDT(I,J,2)=VGA*(VGA-1)*(XO**(VGA-2))/2
802 CONTINUE
801 CONTINUE
DO 803 K=0,2

```

```

DO 804 J=0,2
CSIS(1,J,K)=0
DO 805 M=1,2
CSIS(1,J,K)=CSIS(1,J,K)+ACG(M)*CDT(1,M,J)*CDT(1,M,K)
805 CONTINUE
804 CONTINUE
803 CONTINUE
CSIS(1,1,0)=CSIS(1,1,0)-1
CSIS(1,0,1)=CSIS(1,1,1)+B3
DO 806 K=0,2
DO 807 J=0,2
CSIS(2,J,K)=0
DO 808 M=1,3
M1=M+2
CSIS(2,J,K)=CSIS(2,J,K)+ACG(M1)*CDT(1,M,J)*CDT(2,M,K)
808 CONTINUE
807 CONTINUE
806 CONTINUE
CSIS(2,0,0)=CSIS(2,0,0)-1
CSIS(2,0,1)=CSIS(2,0,1)+E3
CSIS(2,1,0)=CSIS(2,1,0)+1

```

### C REZOLVARE SISTEM NELINIAR

```

XTR=CGAZ(1,PP,TT,1)
YTR=CGAZ(1,PP,TT,2)
ERS=.00001
DO 810 M=1,1000

CALL FSIS(CSIS,XTR,YTR,VVF)

DO 815 I=1,2
FDX(I)=0
DO 820 K=0,2
DO 825 J=0,2
FDX(I)=FDX(I)+J*CSIS(I,J,K)*(XTR**(J-1))*(YTR**K)
825 CONTINUE
820 CONTINUE
815 CONTINUE

DO 830 I=1,2
FDY(I)=0
DO 835 J=0,2
DO 840 K=0,2
FDY(I)=FDY(I)+K*CSIS(I,J,K)*(XTR**J)*(YTR**(K-1))
840 CONTINUE
835 CONTINUE
830 CONTINUE
JAC=FDX(1)*FDY(2)-FDX(2)*FDY(1)
IF(JAC.EQ.0) GO TO 845
GO TO 847
845 JAC=.001

```

```

847 NUMX=VVF(2)*FDY(1)-VVF(1)*FDY(2)
   NUMY=VVF(1)*FDX(2)-VVF(2)*FDX(1)
   XTR=XTR+NUMX/JAC
   YTR=YTR+NUMY/JAC

   CALL VRADS(CSIS,XTR,YTR,VVF,ERS,VS)

   IF(VS EQ.1) GO TO 850
810 CONTINUE
   WRITE (*,*) 'SISTEM NEREZOLVAT DUPA 1000 ITERATII'
   GO TO 900
850 IF(XTR.GE.0.AND.XTR.LT.1) GO TO 855
   WRITE(*,*) 'SOLUTIA SISTEMULUI NU ESTE CORECTA XTR', XTR
   GO TO 900
855 IF(YTR.GE.0.AND.YTR.LT.1) GO TO 860
   WRITE(*,*) 'SOLUTIA SISTEMUYLUI NU ESTE CORECTA YTR', YTR
   GO TO 900
860 CGAZ(MDL,PP,TT,1)=XTR
   CGAZ(MDL,PP,TT,2)=YTR
   VER=YTR
   WRITE(*,*) 'SOLUTIA SISTEMULUI ESTE CORECTA, XTR, YTR', XTR, YTR

800 VAL53=(2-BETA(MDL))*VAL31
   VAL54=ALFA(MDL)*VAL31/2
   VER=VAL32*(VER**VAL53)*(CGAZ(MDL,PP,TT,1)**VAL54)
   IF(VER.GT.0.AND.VER.LT.1) GO TO 51
   WRITE (*,*) CGAZ(MDL,PP,TT,1),CGAZ(MDL,PP,TT,2),VER
   GO TO 49
51 CGAZ(MDL,PP,TT,3)=VER
   VAL55=(CGAZ(MDL,PP,TT,1)*CGAZ(MDL,PP,TT,2))**2
   VER=VAL55/(G2*VER)

   IF(VER.GT.0.AND.VER.LT.1) GO TO 52
   WRITE (*,*) CGAZ(MDL,PP,TT,1),CGAZ(MDL,PP,TT,2),CGAZ(MDL,PP,TT,3)
   X,VER
   GO TO 49
52 CGAZ(MDL,PP,TT,4)=VER
   VAL56=D2*(CGAZ(MDL,PP,TT,2)+CGAZ(MDL,PP,TT,3)+VER)
   VER=1-VAL56-CGAZ(MDL,PP,TT,1)
   IF(VER.GT.0.AND.VER.LT.1) GO TO 54
   WRITE (*,*) CGAZ(MDL,PP,TT,1),CGAZ(MDL,PP,TT,2),CGAZ(MDL,PP,TT,3)
   X,CGAZ(MDL,PP,TT,4),VER
   GO TO 49
54 CGAZ(MDL,PP,TT,5)=VER
   VAL57=CGAZ(MDL,PP,TT,2)+CGAZ(MDL,PP,TT,3)+CGAZ(MDL,PP,TT,4)
   DVER=VAL57/A1
   IF(DVER.GT.0) GO TO 56
   WRITE (*,*)CGAZ(MDL,PP,TT,1),CGAZ(MDL,PP,TT,2),CGAZ(MDL,PP,TT,3)
   X,CGAZ(MDL,PP,TT,4),CGAZ(MDL,PP,TT,5),DVER
   GO TO 49
56 DEB(MDL,PP,TT,1)=DVER

```

```

VAL58=B1/(A1*C1)
VAL59=F1*VER/C1-(VAL58-1/C1)*CGAZ(MDL,PP,TT,3)
VAL60=(VAL58-D1/C1)*CGAZ(MDL,PP,TT,2)+VAL58*CGAZ(MDL,PP,TT,4)
DVER=VAL59-VAL60
IF(DVER.GT.0) GO TO 58
WRITE (*,*) CGAZ(MDL,PP,TT,1),CGAZ(MDL,PP,TT,2),CGAZ(MDL,PP,TT,3)
X,CGAZ(MDL,PP,TT,4),CGAZ(MDL,PP,TT,5),DEB(MDL,PP,TT,1),DVER
GO TO 49
58 DEB(MDL,PP,TT,2)=DVER
VER=J1*DEB(MDL,PP,TT,1)
IF(VER.GT.0.AND.VER.LT.1) GO TO 60
WRITE (*,*)CGAZ(MDL,PP,TT,1),CGAZ(MDL,PP,TT,2),CGAZ(MDL,PP,TT,3)
X,CGAZ(MDL,PP,TT,4),CGAZ(MDL,PP,TT,5),DEB(MDL,PP,TT,1),DEB(MDL,PP,TT,2),VER
GO TO 49
60 CGAZ(MDL,PP,TT,6)=VER
VER=K1*DEB(MDL,PP,TT,1)
IF(VER.GT.0.AND.VER.LT.1) GO TO 72
WRITE (*,*) CGAZ(MDL,PP,TT,1),CGAZ(MDL,PP,TT,2),CGAZ(MDL,PP,TT,3)
X,CGAZ(MDL,PP,TT,4),CGAZ(MDL,PP,TT,5),DEB(MDL,PP,TT,1),DEB(MDL,PP,TT,2),CGAZ(MDL,PP,TT,6),VER
72 CGAZ(MDL,PP,TT,7)=VER
GO TO 62
49 WRITE(*,*) 'EROARE LA REZOLVAREA SISTEMULUI'
GO TO 61
62 WRITE(*,*) 'SOLUTII SISTEM ECUATII'
WRITE(*,*) 'COMPOZITIE GAZ'
DO 700 I=1,7
WRITE(*,*) CGAZ(MDL,PP,TT,I)
700 CONTINUE
DO 610 I=1,2
WRITE(*,*)'CONSUM SPECIFIC CARBUNE '
WRITE(*,*) DEB(MDL,PP,TT,I)
610 CONTINUE

```

### C DETERMINARE ELEMENTE BILANT TERMIC

```

QS=X4*12720.+X5*39890.+X6*12770.+X9*25620.
QAS=XA4*12720.+XA5*39890.+XA6*12770.+XA9*25620.
QI=X4*12720.+X5*35910.+X6*10800.+X9*23650.
QAI=XA4*12720.+XA5*35910.+XA6*10800.+XA9*23650.
BI=X1*VAL
WEXC=X2-WI*BI
WCAR=WI*BI
QCAR=QSCAR*BI
QSEC=BI*20*CCAR
IF(WEXC.GT.0) GO TO 102
QSEW=0
GO TO 103
102 QSEW=WEXC*20*4.1855
103 VAR=(TABS-273.15)/22.414
HCO2=(44.14+(9.04E-3)*TABS-(8.53E5)/(TABS**2))*VAR

```

```

HCO=(28.41+(4.10E-3)*TABS-(0.46E5)/(TABS**2))*VAR
HCH4=(17.45+(60.46E-3)*TABS+(1.117E-6)*(TABS**2)-(7.2E-9)*
I(TABS**3))*VAR
HH2=(27.28+(3.26E-3)*TABS+(0.502E5)/(TABS**2))*VAR
HN2=(27.87+(4.27E-3)*TABS)*VAR
HH2O=ABUR(1.J)*ABUR(2.J)+(30.+(10.71E-3)*TABS+(0.33E5)/
I(TABS**2))*VAR
HH2S=(29.37+(15.4E-3)*TABS)*VAR
HGAZ=HCO2*X3+HCO*X4+HCH4*X5+HH2*X6+HN2*X7+HH2O*X8+HH2S*X9
QSAI=0.75*AI*(TABS-273.15)*X1
QIES=QS+HGAZ+QSAI
QEXT=QIES-(QCAR+QSEC+QSEW)
DGAZ=QEXT/(RAND*QI/100)
DGAR=QEXT/(RAND*(QI+HGAZ)/100)
RAGAR=QI/QIES
RAGAC=(QI+HGAZ)/QIES
X3=X3*100
X4=X4*100
X5=X5*100
X6=X6*100
X7=X7*100
X8=X8*100
X9=X9*100
X81=X8/100
XA3=X3/(1-X81)
XA4=X4/(1-X81)
XA5=X5/(1-X81)
XA6=X6/(1-X81)
XA7=X7/(1-X81)
XA9=X9/(1-X81)
RAGAR=RAGAR*100.
RAGAC=RAGAC*100.

```

### C LISTARE CONSOLA DATE CALCULATE

```

WRITE (33,400)
400 format(72(' '),/,' ',70X,' ')
WRITE (33,401)
401 FORMAT(2X,'GAZIFICARE CARBUNE CU UMIDITATE PROPRIE'10X,'MODEL MATE
1MATIC COMPLEX GAZIFICARE CARBUNE BOROZEL')
WRITE(33,403)
403 FORMAT(2X,'TEMPERATURA DE CALCUL',22X,
1'PRESIUNEA DE CALCUL'/2X,'GRAD CELSIUS',31X,'BAR')
TCEL=TABS-273.15
WRITE(33,404)TCEL,P
404 FORMAT(2X,F7.2,34X,F7.2
1/72(' ')/
1''70X,'''/''25X,'CONSUMURI SPECIFICE',26X,'''/''70X,
1''/72(' ')/''',22X,'',22x''24x,'')
WRITE(33,405)
405 FORMAT(' ',5X,'CARBUNE UMED',5X,'',3X,'CARBUNE ANHIDRU',4X,'',
14X,'EXCES UMIDITATE'.5X,'''/''',6X,'KG/Nm3GAZ'.7X,'''6X,'KG/Nm3GAZ

```



```

1',7X,'*',7X,'KG/Nm3GAZ',8X,'*',/22X,'**22x','**24x'**)
WRITE(33,406)BI,X1,WEXC
406 FORMAT('**',2(7X,F8.4,7X,'**'),8X,F8.4,8X,'**/22X,'**22X,'**24X,
1**/72('**)/**',70X,'**/20 X,'COMPONENTELE GAZULUI UMED /%/',21
1X,'**/70X,'**/72('**)/**',6(9X,'**'),10X,'**/3X,'CO2',3X,'**
14X,'CO',3X,'**',3X,'CH4',3X,'**',4X,'H2',3X,'**',4X,'N2',3X,'**',3X,'H
12O',3X,'**',4X,'H2S',3X,'**/6(9X,'**'),10X,'**')
WRITE(33,407) X3,X4,X5,X6,X7,X8,X9
407 FORMAT('**',6(2X,F5.2,2X,'**'),2X,F5.2,3X,'**/6(9X,'**'),10X,'**/
172('**'))
WRITE(33,408)
408 FORMAT('**',70X,'**/19 X,'COMPONENTELE GAZULUI ANHIDRU /%/'
1,19 X,'**/70X,'**/72('**)/**',6(9X,'**'),10X,'**/3X,'CO2',3X
1,'**',4X,'CO',3X,'**',3X,'CH4',3X,'**',4X,'H2',3X,'**',4X,'N2',3X,'**',3
1X,'H2S',3X,'**',10X,'**/6(9X,'**'),10X,'**')
WRITE(33,409)XA3,XA4,XA5,XA6,XA7,XA9
409 FORMAT('**',6(2X,F5.2,2X,'**'),10X,'**/6(9X,'**'),10X,'**/72('**')
1/**',70X,'**/22X,'PUTERE CALORIFICA /KJ/Nm3/22X,'**/70X,'**
1/72('**)/**',35X,'**',34X,'**/13X,'GAZ UMED',14X,'**',12X,'GAZ A
1NHIDRU',11X,'**')
WRITE(33,410)
410 FORMAT('**',35X,'**',34X,'**/72('**)/**',3(17X,'**')16X,'**/3X,'IN
1FERIOARA',4X,'**',3X,'SUPERIOARA',4X,'**',3X,'INFERIOARA',4X,'**',3X,'SUP
1ERIOARA',3X,'**/3(17X,'**')16X,'**')
WRITE(33,411)QI,QS,QAI,QAS
411 FORMAT('**',3(3X,F10.2,4X,'**'),3X,F10.2,3X,'**/3(17X,'**')16X,
1**/72('**'))
WRITE(33,412)
412 FORMAT('**/72('**)/**',70X,'**/18X,'BILANTUL ENERGETIC AL GAZIFI
1CARI',19 X,
1**/70X,'**/18X,'FLUXURI TERMICE INTRATE KJ/Nm3GAZ',19X,'**/
1**70X,'**/72('**)/**',4(13X,'**'),14X,'**/4X,'TOTAL',4X,'**',3X,'CH
2IMIC',4X,
1**2X,'SENSIBIL',3X,'**',2X,'SENSIBIL',3X,'**',5X,'FLUX',5X,'**/
13X,'INTRAT',4X,'**',3X,'CARBUNE',3X,'**',3X,'CARBUNE',3X,'**',2X,'UMIDIT
1ATE',2X,'**',3X,'EXTERIOR',3X,'**/4(13X,'**'),14X,'**')
WRITE(33,413)QIES,QCAR,QSEC,QSEW,QEXT
413 FORMAT('**',4(3X,F8.2,2X,'**'),3X,F8.2,3X,'**/72('**)/**',70X,'**')
WRITE(33,414)
414 FORMAT('**',19X,'FLUXURI TERMICE IESITE KJ/Nm3GAZ',19X,'**/70X,'**'
1/72('**)/**',4(13X,'**'),14X,'**/4X,'TOTAL',4X,'**',3X,'CHIMIC',4X,
1**2X,'SENSIBIL',3X,'**',2X,'SENSIBIL',3X,'**',14X,'**/
14X,'IESIT',4X,'**',5X,'GAZ',5X,'**',5X,'GAZ',5X,'**',3X,'CENUSA',
14X,'**',14X,'**/4(13X,'**'),14X,'**')
WRITE(33,415)QIES,QS,HGAZ,QSAI
415 FORMAT('**',4(3X,F8.2,2X,'**'),14X,'**/4(13X,'**'),14X,'**/72('**)/
1**',70X,'**')
WRITE(33,416)
416 FORMAT('**',21X,'RANDAMENTUL GAZIFICARII /%/',22X,'**/70X,'**/72
1('**)/**',13X,'GAZ RECE',14X,'**',13X,'GAZ CALD',13X,'**/35X,'**',34X,
1**')
WRITE(33,417)RAGAR,RAGAC

```

```

417 FORMAT('14X,F7.3,14X,'14X,F7.3,13X,'/'70X,'/72('))
WRITE(33,418)
418 FORMAT('170X,'/'22X,'GAZ CONSUMAT FLUX EXTERIOR',22X,'/
170X,'/72(')/',35X,'',34X,'/'13X,'GAZ CALD'14X,'
113X 'GAZ RECE'13X,'/'12X,'Nm3/Nm3 GAZ'12X,'12X,'Nm3/Nm3 GAZ'
1,11X '/'',35X,'',34X,'')
WRITE(33,419) DGAR,DGAZ
419 FORMAT('14X,F6.4,15X,'14X,F6.4,14X,'/'',35X,'',34X,'/
172('))

```

900 CONTINUE

15 CONTINUE

250 CONTINUE

CLOSE (33)

STOP

END

### C RUTINA VERIFICARE SOLUTII SISTEM NELIANR COMPLEX

```

SUBROUTINE VRADS(CSIS,XTR,YTR,VVF,ERS,VS)
DIMENSION VAF(2),CSIS(2,3,3),VVF(2)
CALL FSIS(CSIS,XTR,YTR,VVF)
DO 10 I=1,2
VAF(I)=ABS(VVF(I))
IF(VAF(I).GT.ERS) GO TO 20
10 CONTINUE
WRITE(*,*) 'SISTEMUL SE VERIFICA'
VS=1
GO TO 25
20 VS=2
25 RETURN
END

```

### C RUTINA VALOARE FUNCTII SISTEM NELINIAR COMPLEX

```

SUBROUTINE FSIS(CSIS,XTR,YTR,VVF)
DIMENSION VVF(2),CSIS(2,3,3)
DO 10 I=1,2
VVF(I)=0
DO 20 J=0,2
DO 30 K=0,2
VVF(I)=VVF(I)+CSIS(I,J,K)*(XTR**J)*(YTR**K)
30 CONTINUE
20 CONTINUE
10 CONTINUE
RETURN
END

```

## C RUTINE REZOLVARE POLINOM

SUBROUTINE C02AEF(A,N,REZ,IMZ,TOL,IFAIL)

## C DECLARARE VARIABILE

```
CHARACTER*6    SRNAME
PARAMETER      (SRNAME='C02AEF')
DOUBLE PRECISION TOL
INTEGER        IFAIL, N
DOUBLE PRECISION A(N), IMZ(N), REZ(N)
DOUBLE PRECISION J, JX, R, RX, X, Y
LOGICAL        SAT
DOUBLE PRECISION A1P5, CMAX, FAC, FOUR, FUN, G, NFUN, ONE, P1,
*              P2Z1, P3Z2, P4Z1, P5, S, S1, S2, SCALE, SIG, T,
*              TOL2, TWO, XXX, ZERO
INTEGER        I, I2, II, IND, JTEMP, K
LOGICAL        CBIG, FLAG
DOUBLE PRECISION B(100), C(100)
CHARACTER*1    P01REC(1)
```

## C FUNCTII EXTERNE

```
DOUBLE PRECISION X02AJF, X02ALF
INTEGER          P01ABF
EXTERNAL        X02AJF, X02ALF, P01ABF
EXTERNAL        C02AEZ
INTRINSIC       ABS, LOG, SQRT, DBLE, INT
```

## C BLOC INITIALIZARE

```
COMMON          /AC02AE/X, Y, R, RX, J, JX, SAT
DATA            ONE/1.0D0/, A1P5/1.5D0/, ZERO/0.0D0/,
*              P4Z1/1.0D-5/
DATA            TWO/2.0D0/, P5/0.5D0/, P2Z1/1.0D-3/,
*              P1/0.1D0/
DATA            P3Z2/2.0D-4/, FOUR/4.0D0/
```

## C EXECUTIE

```
XXX = X02AJF()
IF (TOL.LT.XXX) TOL = XXX
CMAX = SQRT(X02ALF())
FAC = ONE
FLAG = IFAIL .EQ. 2
IF (FLAG) IFAIL = 1
IND = 0
TOL2 = TOL**A1P5
IF (A(1).NE.ZERO .AND. N.GE.2 .AND. N.LE.100) GO TO 20
write(*,*) 'unu'
read (*,*) nmh
IND = P01ABF(IFAIL,1,SRNAME,0,P01REC)
```

```

GO TO 780
write(* *) 'doi'
read (* *) nmh
20 IF (A(N).NE.0.D0) GO TO 40
REZ(N-1) = ZERO
IMZ(N-1) = ZERO
N = N - 1
GO TO 20
40 SCALE = ZERO
write(* *) 'trei'
read (* *) nmh
DO 60 I = 1, N
    IF (ABS(A(I)).GE.P4Z1) SCALE = SCALE + LOG(ABS(A(I)))
60 CONTINUE
K = INT(SCALE/(DBLE(N)*LOG(TWO))+P5)
SCALE = TWO**(-K)
DO 80 I = 1, N
    A(I) = A(I)*SCALE
    B(I) = A(I)
80 CONTINUE

```

### C TESTARE ORDIN REDUS POLIMON

```

IF (N.GT.3) GO TO 100
GO TO (780,620,640) N
100 DO 160 I = 2, N
    II = N - I + 2
    IF (B(II).EQ.0.0D0) GO TO 200
    T = B(1)/B(II)
    IF (ABS(T).GE.ONE) GO TO 200
    DO 120 K = 2, II
        I2 = II - K + 1
        C(K-1) = B(K) - T*B(I2)
120 CONTINUE
    JTEMP = II - 1
    DO 140 K = 1, JTEMP
        B(K) = C(K)
140 CONTINUE
160 CONTINUE
FAC = FAC*TWO
SCALE = ONE
I = N
180 I = I - 1
IF (I.LT.1) GO TO 100
SCALE = SCALE*TWO
A(I) = A(I)*SCALE
B(I) = A(I)
GO TO 180
200 IF (.NOT.FLAG) GO TO 220
X = REZ(1)
Y = IMZ(1) + TOL
FLAG = .FALSE.

```

```

GO TO 240
220 X = P2Z1
    Y = P1
240 CALL C02AEZ(A,N,TOL)
    FUN = R*R + J*J
260 G = RX*RX + JX*JX
    IF (G.GE.FUN*TOL2) GO TO 320
280 IND = P01ABF(IFAIL,2,SRNAME,0,P01REC)
    SCALE = ONE
    I = N
300 I = I - 1
    IF (I.LT.1) GO TO 780
    SCALE = SCALE*FAC
    A(I) = A(I)/SCALE
    GO TO 300
320 S1 = -(R*RX+J*JX)/G
    S2 = (R*JX-J*RX)/G
    SIG = P3Z2
    S = SQRT(S1*S1+S2*S2)
    IF (S.LE.ONE) GO TO 340
    S1 = S1/S
    S2 = S2/S
    SIG = SIG/S
340 X = X + S1
    Y = Y + S2
360 CALL C02AEZ(A,N,TOL)
    IF (SAT) GO TO 400
    NFUN = R*R + J*J
    IF (FUN-NFUN.GE.SIG*FUN) GO TO 380
    S1 = P5*S1
    S2 = P5*S2
    IF (ABS(S1).LE.XXX*ABS(X) .AND. ABS(S2).LE.XXX*ABS(Y)) GO TO 280
    S = P5*S
    SIG = P5*SIG
    X = X - S1
    Y = Y - S2
    GO TO 360
380 FUN = NFUN
    GO TO 260
400 FUN = ONE/TOL2
    K = 0
    IMZ(N-1) = Y*FAC
    IF (ABS(Y).GT.P1) GO TO 460

```

### C RADACINA REALA

```

S1 = Y
Y = ZERO
CALL C02AEZ(A,N,TOL)
Y = S1
IF ( .NOT. SAT) GO TO 460
REZ(N-1) = X*FAC

```

```

IMZ(N-1) = ZERO
N = N - 1
B(1) = A(1)
C(N) = -A(N+1)/X
CBIG = .FALSE.
DO 440 I = 2, N
  B(I) = A(I) + X*B(I-1)
  II = N - I + 1
  IF (CBIG) GO TO 420
  C(II) = (C(II+1)-A(II+1))/X
  IF (ABS(C(II)).LE.CMAX) GO TO 440
  CBIG = .TRUE.
420  C(II) = CMAX
440 CONTINUE
GO TO 520

```

### C RADACINA COMPLEXA

```

460 REZ(N-1) = X*FAC
REZ(N-2) = X*FAC
IMZ(N-2) = -IMZ(N-1)
N = N - 2
R = TWO*X
J = -(X*X+Y*Y)
B(1) = A(1)
B(2) = A(2) + R*B(1)
C(N) = -A(N+2)/J
C(N-1) = -(A(N+1)+R*C(N))/J
IF (N.EQ.2) GO TO 520
CBIG = .FALSE.
DO 500 I = 3, N
  B(I) = A(I) + R*B(I-1) + J*B(I-2)
  II = N - I + 1
  IF (CBIG) GO TO 480
  C(II) = -(A(II+2)-C(II+2)+R*C(II+1))/J
  IF (ABS(C(II)).LE.CMAX) GO TO 500
  CBIG = .TRUE.
480  C(II) = CMAX
500 CONTINUE

520 DO 540 I = 1, N
  NFUN = ABS(B(I)) + ABS(C(I))
  IF (NFUN.LE.TOL) GO TO 540
  NFUN = ABS(B(I)-C(I))/NFUN
  IF (NFUN.GE.FUN) GO TO 540
  FUN = NFUN
  K = I
540 CONTINUE
IF (K.EQ.1) GO TO 580
JTEMP = K - 1
DO 560 I = 1, JTEMP
  A(I) = B(I)

```

```

560 CONTINUE
580 A(K) = P5*(B(K)+C(K))
  IF (K.EQ.N) GO TO 40
  JTEMP = K + 1
  DO 600 I = JTEMP, N
    A(I) = C(I)
600 CONTINUE
  GO TO 40
620 REZ(1) = -A(2)/A(1)*FAC
  IMZ(1) = ZERO
  GO TO 760
640 R = A(2)*A(2) - FOUR*A(1)*A(3)
  IF (R.GT.ZERO) GO TO 660
  REZ(2) = -P5*A(2)/A(1)*FAC
  REZ(1) = REZ(2)
  IMZ(2) = P5*SQRT(-R)/A(1)*FAC
  IMZ(1) = -IMZ(2)
  GO TO 760
660 IMZ(1) = ZERO
  IMZ(2) = ZERO
  IF (A(2)) 680, 700, 720
680 REZ(1) = P5*(-A(2)+SQRT(R))/A(1)*FAC
  GO TO 740
700 REZ(1) = -P5*SQRT(R)/A(1)*FAC
  GO TO 740
720 REZ(1) = P5*(-A(2)-SQRT(R))/A(1)*FAC
740 REZ(2) = A(3)/(REZ(1)*A(1))*FAC*FAC
760 N = 1
780 IFAIL = IND
  RETURN
  END

```

SUBROUTINE C02AEZ(A,N,TOL)

### C DECLARARE VARIABILE

```

DOUBLE PRECISION TOL
INTEGER N
DOUBLE PRECISION A(N)
DOUBLE PRECISION J, JX, R, RX, X, Y
LOGICAL SAT
DOUBLE PRECISION A1, A2, A3, A8, B1, B2, B3, C, P, P8, Q, T, TEN,
* TWO, ZERO
INTEGER K
INTRINSIC ABS, SQRT
COMMON /AC02AE/X, Y, R, RX, J, JX, SAT
DATA TWO/2.0D0/, ZERO/0.0D0/, P8/0.8D0/, TEN/1.0D1/,
* A8/8.0D0/

```

### C EXECUTIE

P = -TWO\*X

```

Q = X*X + Y*Y
T = SQRT(Q)
A2 = ZERO
B2 = ZERO
B1 = A(1)
A1 = A(1)
C = ABS(A1)*P8
N = N - 2
DO 20 K = 2, N
  A3 = A2
  A2 = A1
  A1 = A(K) - P*A2 - Q*A3
  C = T*C + ABS(A1)
  B3 = B2
  B2 = B1
  B1 = A1 - P*B2 - Q*B3
20 CONTINUE
N = N + 2
A3 = A2
A2 = A1
A1 = A(N-1) - P*A2 - Q*A3
R = A(N) + X*A1 - Q*A2
J = A1*Y
RX = A1 - TWO*B2*Y*Y
JX = TWO*Y*(B1-X*B2)
C = T*(T*C+ABS(A1)) + ABS(R)
SAT = (SQRT(R*R+J*J)) .LT. ((TEN*C-A8*(ABS(R)+ABS(A1))*T)
*   +TWO*ABS(X*A1))*TOL)
RETURN
END
INTEGER FUNCTION P01ABF(IFAIL,IERROR,SRNAME,NREC,REC)

```

### C DECLARARE VARIABILE

INTEGER	IERROR, IFAIL, NREC
CHARACTER*(*)	SRNAME
CHARACTER*(*)	REC(*)
INTEGER	I, NERR
CHARACTER*72	MESS
EXTERNAL	P01ABZ, X04AAF, X04BAF
INTRINSIC	ABS, MOD

### C EXECUTIE

```

IF (IERROR.NE.0) THEN
  IF (IFAIL.EQ.-1 .OR. IFAIL.EQ.0 .OR. IFAIL.EQ.-13 .OR.
*   (IFAIL.GT.0 .AND. MOD(IFAIL/10,10).NE.0)) THEN
    CALL X04AAF(0,NERR)
    DO 20 I = 1, NREC
      CALL X04BAF(NERR,REC(I))

```



```

20 CONTINUE
C IFAIL = -13
IF (IFAIL.NE.-13) THEN
  WRITE (MESS,FMT=99999) SRNAME, IERROR
  CALL X04BAF(NERR,MESS)

  IF (ABS(MOD(IFAIL,10)).NE.1) THEN

    CALL X04BAF(NERR,
*           '** NAG hard failure - execution terminated'
*           )
    CALL P01ABZ
  ELSE

    CALL X04BAF(NERR,
*           '** NAG soft failure - control returned')

    END IF
  END IF
END IF
P01ABF = IERROR
RETURN
C
99999 FORMAT (' ** ABNORMAL EXIT from NAG Library routine ',A,': IFAIL',
* ' =',I6)
END
DOUBLE PRECISION FUNCTION X02AJF()

C EXECUTIE

X02AJF = 2.0D0**(-55)
RETURN
END
DOUBLE PRECISION FUNCTION X02ALF()
X02ALF = (2.0D0**126 - 2.0D0**70) * 2.0D0
RETURN
END

SUBROUTINE P01ABZ

STOP
END
SUBROUTINE X04AAF(I,NERR)

C DECLARARE VARIABILE

INTEGER      I, NERR
INTEGER      NERR1
SAVE         NERR1
DATA         NERR1/6/
IF (I.EQ.0) NERR = NERR1
IF (I.EQ.1) NERR1 = NERR

```

```
RETURN  
END
```

```
SUBROUTINE X04BAF(NOUT,REC)
```

```
C  DECLARARE VARIABILE
```

```
INTEGER      NOUT  
CHARACTER(*) REC  
INTEGER      I  
INTRINSIC    LEN
```

```
IF (NOUT GE.0) THEN  
  DO 20 I = LEN(REC), 2, -1  
    IF (REC(I:I).NE.' ') GO TO 40  
20  CONTINUE  
40  WRITE (NOUT,FMT=99999) REC(1:I)  
    END IF  
    RETURN
```

```
C  
99999 FORMAT (A)  
END
```

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI

ANALIZA ELEMENTARA CARBUNE / /

CI	HI	OI	NI	SI	AI	WI
21.55	1.40	4.24	.73	1.05	45.11	20.91

FORMULA CHIMICA

ALFA	BETA
.78030	.14770

PUTERE CALORIFICA /KJ/KG/

SUPERIOARA	INFERIOARA
8694.791	7726.324

CALDURA SPECIFICA CARBUNE  
/KJ/KG K/

.85

RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN  
/ /

80.00

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE  
 BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	EXCES UMIDITATE KG/NM3GAZ	TOTAL	INTRAT	CHIMIC	CARBUNE	SENSIBIL	CARBUNE	UMIDITATE	FLUX EXTERIOR
.7230	.5191	.3976	12082.27	10567.75	12.29	33.28	1468.95			

COMPONENTELE GAZULUI UMED %/  
 FLUXURI TERMICE IESITE KJ/NM3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
16.15	.36	21.96	12.23	.46	46.53	.30	12082.27	11243.87	791.68	46.72	

COMPONENTELE GAZULUI ANHIDRU %/  
 RANDAMENTUL GAZIFICARII %/

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
30.21	.67	44.93	22.87	.87	.57	83.124	89.676

INTEFER CALORIFICIA /KJ/NM3/  
 GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD Nm3/NM3 GAZ	GAZ RECE Nm3/NM3 GAZ
		.1595	.1721

INTEFERI JARNA  
 INTERIOARA  
 SUPERIOARA  
 18/82.97  
 21058.14



GAZIFICARE CARBUNE CU UMDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBONE ANHIDRU \* EXCES UMDITATE \*  
 KG/NM3GAZ \* KG/NM3GAZ \* KG/NM3GAZ \*  
 .7940 \* .5701 \* 3655

COMPONENTELE GAZULUI UMED / / /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 16.79 \* .86 \* 26.61 \* 11.01 \* .51 \* 43.69 \* .33

COMPONENTELE GAZULUI ANHIDRU / / /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 29.8 \* 1.50 \* 41.61 \* 15.06 \* .90 \* 1.59

CELELE APLICATE PE MAS

SATIMEL \* GAZ ABILITAT

INFERIARA \* SUPERIARA \* TOTALA \*  
 1000 \* 1000 \* 1000

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX \*  
 INTRAT \* CARBUNE \* CARBUNE \* UMDITATE \* EXTERIOR \*  
 13399.52 \* 11605.71 \* 13.50 \* 30.60 \* 149.71

FLUXURI TERMICE IESITE KJ/NM3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* GAZ \*  
 13399.52 \* 12294.40 \* 1047.02 \* 43.14

RANIMENTUL GAZIFICARII

GAZ RECE \* GAZ CALD \*  
 82.115 \* 60.291

GAZ PRIMAR PEZ EXTERIOR

GAZ CALD \* GAZ RECE \*  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ

1.109



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS

400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR

20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	FLUX EXTERIOR
.8085	.5805	.3936	13145.19	11817.89	13.74	32.95	1280.61

COMPONENTELE GAZULUI UMED / % /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL	CHIMIC	SENSIBIL	SENSIBIL	CENUSA
15.65	.08	29.54	3.04	.52	50.84	.34	13145.19	12267.51	825.44	52.25	

COMPONENTELE GAZULUI ANHIDRU / % /

RANDAMENTUL GAZIFICARII / /

CO2	CO	H4	H2	N2	H2S	GAZ RECE	GAZ CALD
31.84	.14	60.1	6.14	1.05	.69	83.874	90.154

FLUXURI SPECIFICE KJ/Nm3G

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD	GAZ RECE
11.05.39	11.05.39	1271	1300



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE		BILANTUL ENERGETIC AL GAZIFICARII					
CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	FLUXURI TERMICE INTRATE KJ/Nm3GAZ				
.8214	.5897	.3650					
COMPONENTELE GAZULUI UMED / % /							
CO2	CO	CH4	H2	N2	H2O	H2S	
16.74	.61	28.63	8.05	.53	45.10	.34	
COMPONENTELE GAZULUI ANHIDRU / % /							
CO2	CO	CH4	H2	N2	H2S		
30.50	1.10	52.16	14.66	.96	.63		
PUTERE CALORIFICA / KJ/Nm3/							
GAZ UMED	GAZ ANHIDRU						
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA				
11310.56	12615.58	20601.35	22978.35				
RANDAMENTUL GAZIFICARII / %							
GAZ RECE	GAZ CALD						
82.318	90.019						
GAZ CONSUMAT FLUX EXTERIOR							
GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ						
.1608	.1758						
TOTAL INTRAT	TOTAL IESIT	CHIMIC GAZ	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA	SENSIBIL UMIDITATE	SENSIBIL FLUX EXTERIOR
13740.16	13740.16	12005.51	12615.58	13.96	1058.23	30.55	1690.13
FLUXURI TERMICE IESITE KJ/Nm3GAZ							

GAZIFICARE CARBUNE CU UMDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS

600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR

20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMDITATE KG/Nm3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMDITATE	FLUX EXTERIOR
.1977	.5727	.3341	13895.80	11659.31	13.56	27.97	2194.97

COMPONENTELE GAZULUI UMED /- /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
	2.82	25.10	16.42	.51	38.08	.33	13895.80	12553.78	1264.70	77.32

COMPONENTELE GAZULUI ANHIDRU /- /

RANDAMENTUL GAZIFICARII /- /

CO2	H1	H2	N2	H2S	GAZ REGE	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
				.54			80.777		80.777

GAZIFICARE CU UMDITATE PROPRIE

GAZ CONSUMAT FLUX EXTERIOR

GAZIFICARE	GAZIFICARE	GAZIFICARE	GAZIFICARE	GAZIFICARE	GAZIFICARE	GAZIFICARE	GAZIFICARE	GAZIFICARE	GAZIFICARE

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE		EXCES UMIDITATE KG/Nm3GAZ	
CARBUNE UMED Kg: Nm3GAZ	.7676	CARBUNE ANHIDRU KG/Nm3GAZ	.5511
			.2810
COMPONENTELE GAZULUI UMED / % /			
CO2	14.40	CO	8.82
		CH4	19.75
		H2	27.32
		N2	.49
		H2O	28.89
		H2S	.32
COMPONENTELE GAZULUI ANHIDRU / % /			
CO2	20.26	CO	12.41
		CH4	27.77
		H2	38.42
		N2	.69
		H2S	.45
PUTERE CALORIFICA /KJ/Nm3/			
GAZ UMED		GAZ ANHIDRU	
INFERIOARA	11240.04	SUPERIOARA	15807.65
		INFERIOARA	17678.79
		SUPERIOARA	
BILANTUL ENERGETIC AL GAZIFICARII			
FLUXURI TERMICE INTRATE KJ/Nm3GAZ		FLUXURI TERMICE IESITE KJ/Nm3GAZ	
TOTAL INTRAT	14070.01	TOTAL IESIT	14070.01
CHIMIC CARBUNE	11219.75	CHIMIC GAZ	12570.52
SENSIBIL CARBUNE	13.05	SENSIBIL GAZ	1412.69
UMIDITATE	23.52	SENSIBIL CENUSA	86.80
EXTERIOR	2813.69		
RANDAMENTUL GAZIFICARII / % /			
GAZ RECE		GAZ CALD	
	79.887		89.927
GAZ CONSUMAT FLUX EXTERIOR			
GAZ CALD Nm3/Nm3 GAZ		GAZ RECE Nm3/Nm3 GAZ	
	.2616		.2945

GAZIFICARE CARBUNE CU UMDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .8138 \* .5843 \* .3932

COMPONENTELE GAZULUI UMED /+/  
 COMPONENTELE GAZULUI ANHIDRU /+/  
 RANDAMENTUL GAZIFICARII / /

CO2	CO	CH4	H2	N2	H2O	H2S
15.62	.06	29.87	2.49	.52	51.09	.34

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	FLUX
13211.09	12331.05	827.45	52.59	1269.66

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL	CHIMIC	SENSIBIL	SENSIBIL	FLUX
13211.09	11894.67	13.83	32.92	1269.66

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2	CO	CH4	H2	N2	H2S
31.94	.13	61.08	5.10	1.06	.70

GAZ RECE	GAZ CALD
83.916	90.179

INFERIOARA /KJ/Rm3/  
 GAZ UMED \* GAZ ANHIDRU

GAZ CONSUMAT FLUX EXTERIOR

INFERIOARA	INFERIOARA	SUPERIOARA
11000.00	20004.97	25209.98

GAZ CALD	GAZ RECE
1254	1347



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ
.8195	.5884	.3358

COMPONENTELE GAZULUI UMED / / /

CO2	CO	CH4	H2	N2	H2O	H2S
16.88	2.31	26.69	13.83	.52	39.42	.34

COMPONENTELE GAZULUI ANHIDRU / / /

CO2	CO	CH4	H2	N2	H2S
17.62	2.01	24.69	13.83	.52	.57

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

GAZ UMED	GAZ ANHIDRU	INTRATA	GAZ RECE
14160.40	11978.38	13.93	28.11
14160.40	11978.38	13.93	28.11

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ	FLUX EXTERIOR
14160.40	2139.98

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
14160.40	12796.11	1384.86	79.44

RANDEMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
80.891	80.925

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
1.1976	1.1966

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE VOIVOZI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ
.7935	.5697	.2892

COMPONENTELE GAZULUI UMED / % /

CO2	CO	CH4	H2	N2	H2O	H2S
15.04	7.36	22.02	23.56	.51	31.18	.33

COMPONENTELE GAZULUI ANHIDRU / % /

CO2	CO	CH4	H2	N2	H2S
21.85	10.69	32.00	34.25	.74	.48

PUTERE CALORIF CA / KJ/Nm3 /

INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
11467.98	12915.18	16663.77	18621.33

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT	CHIMIC	SENSIBIL	SENSIBIL	UMIDITATE	FLUX EXTERIOR
14358.24	11598.21	13.49	24.21	2722.33	

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT	CHIMIC	SENSIBIL	SENSIBIL	CENUSA
14358.24	12815.18	1453.33	89.73	

RANDAMENTUL GAZIFICARII / - /

GAZ RECE	GAZ CALD
79.870	89.992

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
.2479	.2793

```

*****
*
*           GAZIFICARE CARBUNE CU UMIDITATE PROPRIE
*
*   MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI
*
*****
*
*           ANALIZA ELEMENTARA CARBUNE / /
*
*****
*
*   CI      HI      OI      NI      SI      AI      WI
*
*   31.32   2.62   13.14   .65   .98   10.04   40.65
*
*****
*
*           FORMULA CHIMICA
*
*****
*
*           ALFA           BETA
*
*           1.08145       .31495
*
*****
*
*           PUTERE CALORIFICA /KJ/KG/
*
*****
*
*           SUPERIOARA           INFERIOARA
*
*           12807.230           11145.520
*
*****
*
*           CALDURA SPECIFICA CARBUNE
*           /KJ/KG K/
*
*           .92
*
*****
*
*           RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN
*           / /
*
*           80.00
*
*****

```



SALEFIICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBONE UMED \* CARBONE ANHIDRU \* EXCES UMIDITATE \*  
 KG/NM3GAZ \* KG/NM3GAZ \* KG/NM3GAZ \*  
 .5429 \* .4115 \* .4312

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBONE \* CARBONE \* UMIDITATE \* EXTERIOR  
 11848.54 \* 10427.37 \* 9.99 \* 36.10 \* 1375.08

COMPONENTELE GAZULUI UMED / / /

FLUXURI TERMICE IESITE KJ/NM3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 19.62 \* .35 \* 23.55 \* 12.12 \* .35 \* 46.78 \* .23

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 11848.54 \* 11044.63 \* 791.57 \* 12.35 \*

COMPONENTELE GAZULUI ANHIDRU / / /

RANDEMENTUL GAZIFICARII / / /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 11.02 \* .02 \* 11.04 \* 20.77 \* .05 \* .43

GAZ RECE \* \* \* \* \* GAZ CALD \*  
 83.253 \* \* \* \* \* 89.934

PREFERINTELE FLUX / KJ/NM3 /

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED

(GAZ ANHIDRU)

GAZ CALD \* \* \* \* \* GAZ RECE \*  
 Nm3/Nm3 GAZ \* \* \* \* \* Nm3/Nm3 GAZ

N.L.P. AKA

REPERIUNEA

INTELEIUNEA

SUPERIUNEA

20752.09

18544.08

20752.09

20752.09

.1613 \* \* \* \* \* .1743



GAZIFICARE CARBUNE CU UMDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .4648 \* .3523 \* .3048

COMPONENTELE GAZULUI UMED / \*\*

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 14.15 \* 11.58 \* 8.96 \* 43.89 \* .30 \* 20.92 \* .19

COMPONENTELE GAZULUI ANHIDRU / \*\*

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 17.90 \* 14.65 \* 11.33 \* 55.50 \* .38 \* .25

POTRETA CALORIFICA (KJ/Nm3)

GAZ UMED \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \*  
 2478.27 \* 11985.74 \* 13535.07

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMDITATE \* EXTERIOR  
 11763.89 \* 8927.83 \* 8.55 \* 25.52 \* 2801.98

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 11763.89 \* 10703.47 \* 1044.56 \* 15.86

RANDAAMENTUL GAZIFICARII / \*\*

GAZ RECE \* GAZ CALD  
 80.571 \* 89.450

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* GAZ RECE  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ  
 .3328 \* .3695



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ
.5971	.4526	.4319

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
12716.94	11467.42	10.99	36.16	1202.38

COMPONENTELE GAZULUI UMED / / /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S
16.21	.11	28.25	4.20	38	50.60	-.25

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL GENUSA
12716.94	11882.91	820.45	13.58

COMPONENTELE GAZULUI ANHIDRU / / /

RANDAMENTUL GAZIFICARII / /

CO2	CO	CH4	H2	N2	H2S
32.81	.22	57.18	8.40	.17	.51

GAZ RECE	GAZ CALD
83.912	90.303

POTENB. CALORIFICA KJ/Nm3 /

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU
10621.060	21601.71

GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
.1308	.1408

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE										
CARBUNE UMED	CARBUNE ANHIDRU	EXCES UMIDITATE								
KG/Nm3GAZ	KG/Nm3GAZ	KG/Nm3GAZ								
.5961	.4519	.4024								
COMPONENTELE GAZULUI UMED /%										
CO2	CO	CH4	H2	N2	H2O	H2S				
17.29	.87	26.33	10.92	.38	43.95	.25				
COMPONENTELE GAZULUI ANHIDRU /%										
CO2	CO	CH4	H2	N2	H2S					
30.86	1.55	46.99	19.48	.68	.45					
PUTERE CALORIFICA /KJ/Nm3/										
GAZ UMED					GAZ ANHIDRU					
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA							
10805.10	12073.14	19279.20	21541.73							
BILANTUL ENERGETIC AL GAZIFICARII										
FLUXURI TERMICE INTRATE KJ/Nm3GAZ					FLUXURI TERMICE IESITE KJ/Nm3GAZ					
TOTAL INTRAT	CHIMIC	CARBUNE	CARBONE	UMIDITATE	EXTERIOR					
13131.43	11449.43	10.97	33.69	1637.35						
RANDAMENTUL GAZIFICARII /										
GAZ RECE					GAZ CALD					
82.284					90.214					
GAZ CONSUMAT FLUX EXTERIOR										
GAZ CALD Nm3/Nm3 GAZ					GAZ RECE Nm3/Nm3 GAZ					
.1728					.1894					

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINAKI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .5686 \* .4310 \* .3636 \*

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 13155.56 \* 10920.22 \* 10.46 \* 30.44 \* 2194.44

COMPONENTELE GAZULUI UMED /%/

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 16.89 \* 4.00 \* 21.55 \* 21.52 \* .36 \* 35.44 \* .24 \*

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* GAZ \*  
 13155.56 \* 11912.99 \* 1223.17 \* 19.39 \*

COMPONENTELE GAZULUI ANHIDRU /%/

RANDAMENTUL GAZIFICARII /%

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 26.1 \* 6.20 \* 44.57 \* 44.43 \* .56 \* .37 \*

GAZ RECE \* GAZ CALD \*  
 80.778 \* 90.676 \*

ENERGIE SPECIFICATA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* GAZ ANHIDRU \*

GAZ CALD \* GAZ RECE \*  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ \*

ENERGIA \* INFERIOARA \* SUPERIOARA \*

.2315 \* .2581 \*

10776.87 \* 11912.99 \* 1459.87 \* 18452.01 \*



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ
.5466	.4143	.2940

COMPONENTELE GAZULUI UMED / % /

CO2	CO	CH4	H2	N2	H2O	H2S
13.43	12.05	15.33	34.04	.35	24.58	.23

COMPONENTELE GAZULUI ANHIDRU / % /

CO2	CO	CH4	H2	N2	H2S
17.81	15.97	20.32	45.13	.46	.30

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED		GAZ ANHIDRU	
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
10766.77	12051.88	14275.83	15979.77

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
13409.46	10498.73	10.06	24.61	2876.07

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
13409.46	12051.88	1335.83	21.75

RANDAMENTUL GAZIFICARII / % /

GAZ RECE	GAZ CALD
80.292	90.254

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
.2971	.3339



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
.6055	.4590	.4318	12853.80	11629.80	11.14	36.15	1176.71

COMPONENTELE GAZULUI UMED / /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL GEMUSA	
16.15	.08	23.97	3.01	.39	51.15	.25	12653.80	12015.19	824.84	14.77

COMPONENTELE GAZULUI ANHIDRU / /

KANDAMENTUL GAZIFICARII /

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
33.06	.16	59.31	6.15	.79	.52	84.006	99.403

RETEREF CARBORITIC / / / / /

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
INFERIOARA	SUPERIOARA	10797.92	1266
INFERIOARA	SUPERIOARA	12009.12	1302
INFERIOARA	SUPERIOARA	22105.74	1302
INFERIOARA	SUPERIOARA	24597.65	1302

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE		EXCES UMIDITATE	
CARBUNE UMED	CARBONE ANHIDRU	KG/Nm3GAZ	KG/Nm3GAZ
.6162	.4671	.4034	
COMPONENTELE GAZULUI UMED / % /			
CO2	CO	CH4	H2
17.26	.61	28.12	7.98
			.39
			45.38
			.26
COMPONENTELE GAZULUI ANHIDRU / % /			
CO2	CO	CH4	H2
31.60	1.12	51.47	14.60
			.72
			.47
PUTERE CALORIFICA / KJ/Nm3 /			
GZ UMED			
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
11097.54	12378.82	20316.61	22662.28
GZ ANHIDRU			
GZ CALD			
Nm3/Nm3 GAZ			
.1619			
GZ RECE			
Nm3/Nm3 GAZ			
82.487			
GZ CALD			
Nm3/Nm3 GAZ			
90.346			
GZ CONSUMAT FLUX EXTERIOR			
.1773			
RANDAMENTUL GAZIFICARII / % /			
GZ RECE			
GZ CALD			
1057.33			
17.51			
11.34			
33.77			
1574.10			
FLUXURI TERMICE IESITE KJ/Nm3GAZ			
CHIMIC			
CARBUNE			
UMIDITATE			
EXTERIOR			
FLUXURI TERMICE INTRATE KJ/Nm3GAZ			
BILANTUL ENERGETIC AL GAZIFICARII			
TOTAL			
INTRAT			
13453.66			
11834.46			
11.34			
33.77			
1574.10			

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .5998 \* .4546 \* .3707

COMPONENTELE GAZULUI UMED /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 17.24 \* 2.86 \* 24.63 \* 16.28 \* .38 \* 38.31 \* .25

COMPONENTELE GAZULUI ANHIDRU /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 27.94 \* 4.63 \* 40.00 \* 26.39 \* .62 \* .41

INTEBE CARBONICA /KJ/Nm3/

GAZ UMED \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

11042.46 \* 10350.25 \* 17899.78 \* 20 19.71

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 13634.49 \* 11519.94 \* 11.04 \* 31.03 \* 2072.48

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 13634.49 \* 12350.25 \* 1263.78 \* 20.46

RANDAMENTUL GAZIFICARII /% /

GAZ RECE \* GAZ CALD  
 80.989 \* 90.258

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* GAZ RECE  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ  
 .2105 \* .2346

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 PRESIUNEA DE CALCUL

BAR  
 20.00

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL

GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE										
CARBUNE UMED	CARBUNE ANHIDRU	EXCES UMIDITATE								
KG/Nm3GAZ	KG/Nm3GAZ	KG/Nm3GAZ								
.5789	.4388	.3152								
COMPONENTELE GAZULUI UMED /% /										
CO2	CO	CH4	H2	N2	H2O	H2S				
14.84	8.95	19.42	27.09	.37	29.08	.24				
COMPONENTELE GAZULUI ANHIDRU /% /										
CO2	CO	CH4	H2	N2	H2S					
20.92	12.62	27.39	38.20	.52	.34					
PUTERE CALORIFICA /KJ/Nm3/										
GAZ UMED										
GAZ ANHIDRU										
INFERIOARA										
11096.74	SUPERIOARA	INFERIOARA	SUPERIOARA							
	12408.25	15647.44	1746.79							
BILANTUL ENERGETIC AL GAZIFICARII										
FLUXURI TERMICE INTRATE KJ/Nm3GAZ										
TOTAL INTRAT	CHIMIC	SENSIBIL	CARBUNE	UMIDITATE	FLUX					
13843.18	11118.43	10.65	26.38	2687.71						
FLUXURI TERMICE IESITE KJ/Nm3GAZ										
TOTAL IESIT	CHIMIC	SENSIBIL	GAZ	CENUSA						
13843.18	12408.25	1411.89	23.04							
RANDAMENTUL GAZIFICARII /% /										
GAZ RECE										
80.160										
GAZ CALD										
90.360										
GAZ CONSUMAT FLUX EXTERIOR										
GAZ CALD										
Nm3/Nm3 GAZ										
.2686										
GAZ RECE										
Nm3/Nm3 GAZ										
.3028										

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE KOVINAKI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBONE UMED \* CARBONE ANHIDRU \* EXCES UMIDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .6094 \* .4619 \* .4318 \*

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX \*  
 INTRAT \* CARBONE \* CARBONE \* UMIDITATE \* EXTERIOR \*  
 12916.04 \* 11703.53 \* 11.21 \* 36.14 \* 1165.16 \*

COMPONENTELE GAZULUI UMED /: /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 .07 \* 29.30 \* 2.47 \* .39 \* 51.40 \* .26 \*

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENOSA \*  
 12916.04 \* 12075.37 \* 826.82 \* 13.86 \*

COMPONENTELE GAZULUI ANHIDRU /: /

RANDAMENTUL GAZIFICARII /: /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 33.18 \* .13 \* 11.28 \* 5.08 \* .80 \* .53 \*

GAZ RECE \* \* \* \*  
 84.048 \* \* \* \*  
 90.450 \*

PUTERE CALORIFICA /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* \* \* \*  
 \* \* \* \*  
 \* \* \* \*

GAZ CALD \* \* \* \*  
 Nm3/Nm3 GAZ \* \* \* \*  
 \* \* \* \*

INFERIOARA \* \* \* \*  
 \* \* \* \*  
 \* \* \* \*

10855.71 \* 1204.31 \* 2337.00 \* 2484.61 \*

.1247 \* \* \* \*  
 \* \* \* \*

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 TEMPERATURA DE CALCUL PRESIUNEA DE CALCUL  
 GRAD CELSIUS BAR 30.00

CONSUMURI SPECIFICE		EXCES UMIDITATE	
CARBUNE UMED	CARBUNE ANHIDRU	KG/Nm3GAZ	KG/Nm3GAZ
.6257	.4743	.4037	
COMPONENTELE GAZULUI UMED / % /			
CO2	CO	CH4	H2
17.25	.50	28.95	6.61
			.40
			46.03
			.26
COMPONENTELE GAZULUI ANHIDRU / % /			
CO2	CO	CH4	H2
31.96	.93	53.64	12.24
			.74
			.49
PUTERE CALORIFICA / KJ/Nm3 /			
GAZ UMED		GAZ ANHIDRU	
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
11236.60	12524.29	20818.75	23204.52
BILANTUL ENERGETIC AL GAZIFICARII			
FLUXURI TERMICE INTRATE KJ/Nm3GAZ		FLUXURI TERMICE IESITE KJ/Nm3GAZ	
TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE
13606.85	12016.60	11.51	33.79
FLUXURI TERMICE IESITE KJ/Nm3GAZ			
TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
13606.85	12524.29	1064.78	17.78
RANDOMENTUL GAZIFICARII / % /			
GAZ RECE		GAZ CALD	
82.580			90.406
GAZ CONSUMAT FLUX EXTERIOR			
GAZ CALD Nm3/Nm3 GAZ		GAZ RECE Nm3/Nm3 GAZ	
.1570			.1719

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE KOVINARI  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDI ATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .6158 \* .4668 \* .3736 \*

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 13884.03 \* 11827.26 \* 11.33 \* 31.27 \* 2014.16

COMPONENTELE GAZULUI UMED /% /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 17.39 \* 2.34 \* 26.23 \* 13.71 \* .39 \* 39.67 \* .26 \*

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 13884.03 \* 12579.32 \* 1283.70 \* 21.00 \*

COMPONENTELE GAZULUI ANHIDRU /% /

RANDAMENTUL GAZIFICARII /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 28.62 \* 4.89 \* 44.48 \* 22.72 \* .65 \* .43 \*

GAZ RECE \* \* \* \* \* GAZ CALD \*  
 81.101 \* \* \* \* \* 90.347

PERDRE CALORIFIE A /KJ/Nm3/

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* \* \* \* \* GAZ ANHIDRU \* \* \* \* \*

GAZ CALD \* \* \* \* \* GAZ RECE \*  
 Nm3/Nm3 GAZ \* \* \* \* \* Nm3/Nm3 GAZ

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA \*  
 11760.19 \* 15799.92 \* 15665.04 \* 20851.82 \*

.2007 \* \* \* \* \* .2236 \*



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE ROVINARI  
 TEMPERATURA DE CALCUL PRESIUNEA DE CALCUL  
 GRAD CELSIUS BAR 30.00

CONSUMURI SPECIFICE									
CARBUNE UMED	CARBONE ANHIDRU	EXCES UMIDITATE							
KG/Nm3GAZ	KG/Nm3GAZ	KG/Nm3GAZ							
.5978	.4531	.3249							
*****									
COMPONENTELE GAZULUI UMED / % /									
CO2	CO	CH4	H2	N2	H2O	H2S			
15.50	7.47	21.66	23.36	.38	31.39	.25			
*****									
COMPONENTELE GAZULUI ANHIDRU / % /									
CO2	CO	CH4	H2	N2	H2S				
22.59	10.89	31.56	34.04	.56	.37				
*****									
PUTERE CALORIFICA /KJ/Nm3/									
GAZ UMED					GAZ ANHIDRU				
INFERIOARA					INFERIOARA				
SUPERIOARA					SUPERIOARA				
11308.69	12635.67				16481.45				18415.40
*****									
BILANTUL ENERGETIC AL GAZIFICARII									
FLUXURI TERMICE INTRATE KJ/Nm3GAZ					FLUXURI TERMICE IESITE KJ/Nm3GAZ				
TOTAL INTRAT					TOTAL IESIT				
14111.66					14111.66				
CHIMIC					CHIMIC				
CARBUNE					GAZ				
11.00					1452.20				
UMIDITATE					SENSIBIL				
27.20					23.79				
2591.77					23.79				
*****									
RANDAMENTUL GAZIFICARII /									
GAZ RECE					GAZ CALD				
90.137					90.428				
*****									
GAZ CONSUMAT FLUX EXTERIOR									
GAZ CALD Nm3/Nm3 GAZ					GAZ RECE Nm3/Nm3 GAZ				
.2539					.2965				
*****									



```

*****
*
*           GAZIFICARE CARBUNE CU UMIDITATE PROPRIE
*
*   MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOROZEL
*
*****
*
*           ANALIZA ELEMENTARA CARBUNE / /
*
*****
*
*   CI      HI      OI      NI      SI      AI      WI
*
*   30.85   4.94   14.77   .48   1.81   14.72   32.63
*
*****
*
*           FORMULA CHIMICA
*
*****
*
*           ALFA                      BETA
*
*           1.92332                    .35942
*
*****
*
*           PUTERE CALORIFICA /KJ/KG/
*
*****
*
*           SUPERIOARA                INFERIOARA
*
*           15199.600                  13265.410
*
*****
*
*           CALDURA SPECIFICA CARBUNE
*           /KJ/KG K/
*
*           .92
*
*****
*
*           RANDAMENT TRANSFER TERMIC FLUX EXTERIOR-GAZOGEN
*           / /
*
*           80.00
*
*****

```

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOKOZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

CARBUNE UMED KG/NM3GAZ	CARBUNE ANHIDRU KG/NM3GAZ	EXCES UMIDITATE KG/NM3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
.5785	.4402	.3570	13449.72	12208.85	10.64	29.89	1200.35

COMPONENTELE GAZULUI UMED /- /

FLUXURI TERMICE IESITE KJ/NM3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL GEMUSA
13.53	.33	27.17	13.02	.23	45.34	.39	13449.72	12640.57	795.95	13.21

COMPONENTELE GAZULUI ANHIDRU /- /

RANDAMENTUL GAZIFICARII

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
24.75	.60	49.70	24.22	.42	.71	83.981	602.940

POTENTIAL CALORIFIC LA 17/100C

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD NM3/NM3 GAZ	GAZ RECE NM3/NM3 GAZ
11.9521	2060.52	1.1241	11.24

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .5080

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .3866

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .3310

COMPONENTELE GAZULUI UMED / %

CO2  
 14.64

CO  
 2.53

CH4  
 18.85

H2  
 29.21

N2  
 .20

H2O  
 34.22

H2S  
 .34

COMPONENTELE GAZULUI ANHIDRU / %

CO2  
 22.26

CO  
 3.85

CH4  
 28.56

H2  
 44.4

N2  
 .31

H2O  
 .52

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED

GAZ ANHIDRU

INFERIOARA  
 10327.38

SUPERIOARA  
 11659.87

INFERIOARA  
 15700.19

SUPERIOARA  
 1725.90

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL  
 INTRAT  
 12627.32

CHIMIC  
 CARBUNE  
 10721.90

SENSIBIL  
 CARBUNE  
 9.35

UMIDITATE  
 27.71

FLUX  
 EXTERIOR  
 1868.36

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL  
 IESIT  
 12627.32

CHIMIC  
 GAZ  
 11659.87

SENSIBIL  
 GAZ  
 952.95

CENUSA  
 14.50

RANDAMENTUL GAZIFICARII /

GAZ RECE  
 81.786

GAZ CALD  
 89.333

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD  
 Nm3/Nm3 GAZ  
 .2070

GAZ RECE  
 Nm3/Nm3 GAZ  
 .2261

GAZIFICAREA CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOKAZZEI  
 PRESIUNEA DE CALCUL  
 BAR  
 1.00

CONSUMURI SPECIFICE

BIANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .4610 \* .3508 \* .2610

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 12425.07 \* 9729.49 \* 8.48 \* 21.85 \* 2665.25

COMPONENTELE GAZULUI UMED /./

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 11.99 \* 10.66 \* 10.03 \* 46.44 \* .18 \* 20.38 \* 31

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 12425.07 \* 11368.11 \* 1041.17 \* 19.79 \*

COMPONENTELE GAZULUI ANHIDRU /./

RANDAMENTUL GAZIFICARII /

CO2 \* CO \* H4 \* H2 \* N2 \* H2O \*  
 15.06 \* 14.39 \* 14.50 \* 55.37 \* .23 \* .39

GAZ RECE \* GAZ CALD \*  
 80.808 \* 80.808

PUZERI CALORICI A CARBUNII

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* GAZ ANHIDRU \*  
 3004 \* 3004

GAZ CALD \* GAZ RECE \*  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ

TRIEKTARNA \* SUPERIORA \*  
 1427.15 \* 1427.15



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BORZEI  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .6488 \* .4938 \* 3442

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX \*  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR \*  
 14732.14 \* 13693.08 \* 11.94 \* 28.81 \* 998.31

COMPONENTELE GAZULUI UMED /- /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 12.86 \* .10 \* 33.05 \* 4.54 \* .26 \* 48.75 \* .44

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 14732.14 \* 13688.48 \* 828.85 \* 14.81

COMPONENTELE GAZULUI ANHIDRU /- /

RANDAMENTUL GAZIFICARII / /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 25.09 \* .10 \* 4.49 \* 0.26 \* .51 \* .05

GAZ RECE \* GAZ CALD \*  
 84.679 \* 90.105

ENERGII APLICATE FIE/Nm3

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* GAZ ANHIDRU \*  
 INTRATA \* SUPRATA \* INTRAT APA \* SUPRATA \*  
 1246.008 \* 1386.43 \* 2443.008 \* 2010.00

GAZ CALD \* GAZ RECE \*  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ \*  
 10938 \* 1

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNF. BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .6368

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .4846

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .3207

COMPONENTELE GAZULUI UMED / % /

CO2  
 13.93

CO  
 .78

CH4  
 30.45

H2  
 11.74

N2  
 .25

H2O  
 42.42

H2S  
 .43

COMPONENTELE GAZULUI ANHIDRU / % /

CO2  
 24.19

CO  
 1.36

CH4  
 52.88

H2  
 20.39

N2  
 .44

H2S  
 .74

PUTERE CALORIFICA /KJ/Nm3/

INFERIOARA  
 12402.80

SUPERIOARA  
 13854.38

INFERIOARA  
 21539.80

SUPERIOARA  
 24060.74

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL  
 INTRAT  
 14924.59

CHIMIC  
 CARBUNE  
 13440.20

SENSIBIL  
 CARBUNE  
 11.72

UMIDITATE  
 26.85

EXTERIOR  
 1445.82

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL  
 IESIT  
 14924.59

CHIMIC  
 GAZ  
 13854.38

SENSIBIL  
 GAZ  
 1052.03

CENUSA  
 18.17

RANDAMENTUL GAZIFICARII / % /

GAZ RECE  
 83.103

GAZ CALD  
 90.152

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD  
 Nm3/Nm3 GAZ  
 .1343

GAZ RECE  
 Nm3/Nm3 GAZ  
 .1457

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOKOZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .5934 \* .4516 \* .2935

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 14578.92 \* 12522.85 \* 10.92 \* 24.57 \* 2020.58

COMPONENTELE GAZULUI UMED / /

FLUXURI TERMICE IESTITE KJ/Nm3GAZ

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S  
 13.83 \* 3.62 \* 24.63 \* 23.01 \* .24 \* 34.28 \* .40

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESTIT \* GAZ \* GAZ \* CENUSA \*  
 14578.92 \* 13325.91 \* 1230.69 \* 10.33 \*

COMPONENTELE GAZULUI ANHIDRU / /

HANDAMENTUL GAZIFICARII / /

CO \* CO2 \* H4 \* H2 \* N2 \* H2S  
 21.04 \* 1.91 \* 37.46 \* 39.01 \* .36 \* .61

GAZ RECE \* GAZ CALD  
 81.518 \* 89.974

PERDUTE DE CALORIE KJ/Nm3 /

GAZ CARBONAT FLUX EXTERIOR

GAZ UMED \* GAZ ANHIDRU

GAZ CALD \* GAZ RECE  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ

INFERIOARA \* INTERIOARA \* SUPERIOARA  
 11.411 \* 133.000 \* 3085.500 \* 2027.11

.1926 \* .2125



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 10.00

CONSUMURI SPECIFICE		EXCES UMIDITATE KG/Nm3GAZ	
CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ		
.5549	.4223	.2369	
COMPONENTELE GAZULUI UMED / % /			
CO2	CH4	H2	N2
11.00	17.45	36.32	.22
			23.73
			.37
COMPONENTELE GAZULUI ANHIDRU / % /			
CO2	CO	CH4	H2
14.42	14.29	22.89	47.62
			.29
			.49
PUTERE CALORIFICA / KJ/Nm3/			
GAZ UMED		GAZ ANHIDRU	
INFERIOARA	SUPERIOARA	INFERIOARA	SUPERIOARA
11664.96	13082.49	15295.22	17153.91
BILANTUL ENERGETI AL GAZIFICARII			
FLUXURI TERMICE I TRATE KJ/Nm3GAZ		FLUXURI TERMICE IESITE KJ/Nm3GAZ	
TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBONE	SENSIBIL UMIDITATE
14447.55	11710.85	1.21	19.83
FLUXURI TERMICE IESITE KJ/Nm3GAZ			
TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
14447.55	13082.49	1342.89	22.17
RANDAMENTUL GAZIFICARII / % /			
GAZ RECE		GAZ CALD	
80.740			90.035
GAZ CONSUMAT t LUX EXTERIOR			
GAZ CALD Nm3/Nm3 GAZ		GAZ RECE Nm3/Nm3 GAZ	
.2601			.2900

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE HOKOZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMIDITATE KG/Nm3GAZ
.6600	.5022	.3419

COMPONENTELE GAZULUI UMED /% /

CO2	CO	CH4	H2	N2	H2O	H2S
12.76	.07	33.97	3.26	.26	49.24	.44

COMPONENTELE GAZULUI ANHIDRU /% /

CO2	CO	CH4	H2	N2	H2S
25.14	.14	66.91	6.41	.52	.87

POTERE CALORIFICA /KJ/Nm3 /

GAZ UMED	GAZ ANHIDRU
----------	-------------

IMPERIOLARA	CHERBOLARA	IMBOLTOARA	SUPERIORARA
-------------	------------	------------	-------------

12662.94	11087.63	24945.78	27752.49
----------	----------	----------	----------

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMIDITATE	FLUX EXTERIOR
14936.66	13927.96	12.14	28.62	967.93

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
14936.66	14087.68	833.91	15.07

RANDAMENTUL GAZIFICARII / /

GAZ RECE	GAZ CALD
84.778	90.861

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
----------------------	----------------------

.0896	.0955
-------	-------

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .6627

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .5043

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .3167

COMPONENTELE GAZULUI UMED / % /

CO2 \* \* \* \* \*  
 13.79 \* \* \* \* \*  
 CO \* \* \* \* \*  
 58.01 \* \* \* \* \*  
 CH4 \* \* \* \* \*  
 32.66 \* \* \* \* \*  
 H2 \* \* \* \* \*  
 8.60 \* \* \* \* \*  
 N2 \* \* \* \* \*  
 .27 \* \* \* \* \*  
 H2O \* \* \* \* \*  
 43.70 \* \* \* \* \*  
 H2S \* \* \* \* \*  
 .44 \* \* \* \* \*

COMPONENTELE GAZULUI ANHIDRU / % /

CO2 \* \* \* \* \*  
 24.49 \* \* \* \* \*  
 CO \* \* \* \* \*  
 58.01 \* \* \* \* \*  
 CH4 \* \* \* \* \*  
 15.27 \* \* \* \* \*  
 H2 \* \* \* \* \*  
 .47 \* \* \* \* \*  
 N2 \* \* \* \* \*  
 .27 \* \* \* \* \*  
 H2O \* \* \* \* \*  
 43.70 \* \* \* \* \*  
 H2S \* \* \* \* \*  
 .44 \* \* \* \* \*

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED  
 INFERIOARA \* \* \* \* \*  
 12829.91 \* \* \* \* \*  
 SUPERIOARA \* \* \* \* \*  
 14307.69 \* \* \* \* \*  
 INFERIOARA \* \* \* \* \*  
 22789.69 \* \* \* \* \*  
 SUPERIOARA \* \* \* \* \*  
 25414.65 \* \* \* \* \*

GAZ ANHIDRU

GAZ CALD  
 Nm3/Nm3 GAZ  
 .1235

GAZ RECE  
 Nm3/Nm3 GAZ  
 83.329

GAZ CALD  
 Nm3/Nm3 GAZ  
 90.279

GAZ CONSUMAT FLUX EXTERIOR

GAZ RECE  
 Nm3/Nm3 GAZ  
 .1339

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT \* \* \* \* \*  
 15396.78 \* \* \* \* \*  
 CHIMIC \* \* \* \* \*  
 13985.18 \* \* \* \* \*  
 CARBUNE \* \* \* \* \*  
 12.19 \* \* \* \* \*  
 UMIDITATE \* \* \* \* \*  
 26.51 \* \* \* \* \*  
 FLUX EXTERIOR \* \* \* \* \*  
 1372.90 \* \* \* \* \*

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT \* \* \* \* \*  
 15396.78 \* \* \* \* \*  
 CHIMIC \* \* \* \* \*  
 14307.69 \* \* \* \* \*  
 GAZ \* \* \* \* \*  
 1070.18 \* \* \* \* \*  
 SENSIBIL \* \* \* \* \*  
 18.91 \* \* \* \* \*

RANDAMENTUL GAZIFICARII / % /

GAZ RECE \* \* \* \* \*  
 83.329 \* \* \* \* \*  
 GAZ CALD \* \* \* \* \*  
 90.279 \* \* \* \* \*

GAZ CONSUMAT FLUX EXTERIOR

GAZ RECE  
 Nm3/Nm3 GAZ  
 .1339

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOKOZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/Nm3GAZ \* KG/Nm3GAZ \* KG/Nm3GAZ \*  
 .6332 \* .4819 \* .2930

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ  
 TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR  
 15285.16 \* 13362.79 \* 11.65 \* 24.53 \* 1886.19

COMPONENTELE GAZULUI UMED /- /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S  
 13.95 \* 2.57 \* 28.38 \* 17.46 \* .25 \* 36.96 \* .42

FLUXURI TERMICE IESITE KJ/Nm3GAZ  
 TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 15285.16 \* 13985.94 \* 1277.54 \* 21.68 \*

COMPONENTELE GAZULUI ANHIDRU /- /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S  
 22.13 \* 4.08 \* 45.00 \* 27.70 \* .40 \* .67 \*

RANDAMENTUL GAZIFICARII / /  
 GAZ CALD \* GAZ RECE \* GAZ CALD \*  
 81.806 \* \* \* 90.164 \*

CONTINE CALORIELE / KJ/Nm3 /

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED \* \* GAZ ANHIDRU \* \*  
 INFERIOARA \* INFERIOARA \* SUPERIOARA \*  
 15593.11 \* 15593.94 \* 19834.92 \* 22185.50

GAZ CALD \* \* GAZ RECE \* \*  
 Nm3/Nm3 GAZ \* \* Nm3/Nm3 GAZ \* \*  
 .1711 \* \* .1886 \*

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ .5971

CARBUNE ANHIDRU  
 KG/Nm3GAZ .4544

EXCES UMIDITATE  
 KG/Nm3GAZ .2491

COMPONENTELE GAZULUI UMED / % /

CO2 \* CH4 \* H2 \* N2 \* H2O \* H2S

12.05 \* 22.22 \* 28.98 \* .24 \* 28.04 \* .40

COMPONENTELE GAZULUI ANHIDRU / % /

CO2 \* CH4 \* H2 \* N2 \* H2S

16.75 \* 30.88 \* 40.27 \* .33 \* .56

PUTERE CALORIFICA / KJ/Nm3/

GAZ UMED \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

12231.16 \* 13694.43 \* 16996.56 \* 19029.93

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 20.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX

INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR

15142.79 \* 12601.68 \* 10.99 \* 20.85 \* 2509.27

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX

IESIT \* GAZ \* GAZ \* CENUSA \* EXTERIOR

15142.79 \* 13694.43 \* 1424.51 \* 23.86 \* 2509.27

RANDAMENTUL GAZIFICARII /

GAZ RECE \* GAZ CALD

80.772 \* 90.179

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* GAZ RECE

Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ

.2297 \* .2564

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 400.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOKUZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

CARBUNE UMED \* CARBUNE ANHIDRU \* EXCES UMIDITATE \*  
 KG/NM3GAZ \* KG/NM3GAZ \* KG/NM3GAZ \*  
 .6650 \* .5061 \* .3409

COMPONENTELE GAZULUI UMED / / /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S \*  
 12.72 \* .06 \* 34.38 \* 2.67 \* .27 \* 49.45 \* .45

COMPONENTELE GAZULUI ANHIDRU / /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S \*  
 25.16 \* .12 \* 68.00 \* 5.29 \* .53 \* .88

ENERGIE CALORIFICA / KJ/NM3 /

GAZ UMED \* CAL. ANHIDRU \*  
 14178.50 \* 836.20

INERȚIA \* SUPRACĂLĂ \* INERȚIA \* SUPRACĂLĂ \*  
 14178.50 \* 836.20 \* 28051.00 \* 28051.00

BILANTUL ENERGETIC AL GAZIFICĂRII  
 FLUXURI TERMICE INTRATE KJ/NM3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* UMIDITATE \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* EXTERIOR \*  
 15029.88 \* 14034.89 \* 12.24 \* 28.54 \* 954.23

FLUXURI TERMICE IESITE KJ/NM3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* GAZ \* GAZ \*  
 IESIT \* GAZ \* GAZ \*  
 15029.88 \* 14178.50 \* 836.20 \* 15.18 \* 15.18

RANDAMENTUL GAZIFICĂRII / /

GAZ RECE \* GAZ CALD \*  
 84.822 \* 90.585

GAZ CONSUMAT FLOX EXTERIOR

GAZ CALD \* GAZ RECE \*  
 NM3/NM3GAZ \* NM3/NM3GAZ \*  
 .0878 \* .0950

GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 500.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ  
 .6750

CARBUNE ANHIDRU  
 KG/Nm3GAZ  
 .5136

EXCES UMIDITATE  
 KG/Nm3GAZ  
 .3147

COMPONENTELE GAZULUI UMED /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2O \* H2S

13.72 \* .45 \* 33.70 \* 7.13 \* .27 \* 44.29 \* .45

COMPONENTELE GAZULUI ANHIDRU /% /

CO2 \* CO \* CH4 \* H2 \* N2 \* H2S

24.63 \* .80 \* 60.48 \* 12.80 \* .48 \* .81

PUTERE CALORIFICA /KJ/Nm3/

GAZ UMED \* GAZ ANHIDRU

INFERIOARA \* SUPERIOARA \* INFERIOARA \* SUPERIOARA

13033.86 \* 14524.29 \* 23393.97 \* 26069.08

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \* FLUX  
 INTRAT \* CARBUNE \* CARBUNE \* UMIDITATE \* EXTERIOR

15622.24 \* 14244.36 \* 12.42 \* 26.34 \* 1339.12

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL \* CHIMIC \* SENSIBIL \* SENSIBIL \*  
 IESIT \* GAZ \* GAZ \* CENUSA \*  
 15622.24 \* 14524.29 \* 1078.69 \* 19.26 \*

RANDAMENTUL GAZIFICARII / /

GAZ RECE \* GAZ CALD  
 83.431 \* 90.336

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD \* GAZ RECE  
 Nm3/Nm3 GAZ \* Nm3/Nm3 GAZ  
 .1186 \* .1284



GAZIFICARE CARBUNE CU UMDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 600.00

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOKOZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

CONSUMURI SPECIFICE

BILANTUL ENERGETIC AL GAZIFICARII  
 FLUXURI TERMICE INTRATE KJ/Nm3GAZ

CARBUNE UMED KG/Nm3GAZ	CARBUNE ANHIDRU KG/Nm3GAZ	EXCES UMDITATE KG/Nm3GAZ	TOTAL INTRAT	CHIMIC CARBUNE	SENSIBIL CARBUNE	SENSIBIL UMDITATE	FLUX EXTERIOR
.6537	.4975	.2919	15653.63	13795.81	12.03	24.44	1821.39

COMPONENTELE GAZULUI UMED / / /

FLUXURI TERMICE IESITE KJ/Nm3GAZ

CO2	CO	CH4	H2	N2	H2O	H2S	TOTAL IESIT	CHIMIC GAZ	SENSIBIL GAZ	SENSIBIL CENUSA
13.99	2.10	30.26	14.72	.26	38.22	.44	15653.63	14331.53	1299.72	22.39

COMPONENTELE GAZULUI ANHIDRU / / /

KANDAMENTUL GAZIFICARII / /

CO2	CO	CH4	H2	N2	H2S	GAZ RECE	GAZ CALD
22.65	3.40	48.98	4.84	.42	.71	81.952	997.255

GAZ UMED

GAZ CONSUMAT FLUX EXTERIOR

GAZ UMED	GAZ ANHIDRU	GAZ CALD Nm3/Nm3 GAZ	GAZ RECE Nm3/Nm3 GAZ
		1611	1779

INERENTIA

INERENTIA

INERENTIA

SUPERIORA

INERENTIA

INERENTIA

INERENTIA

INERENTIA



GAZIFICARE CARBUNE CU UMIDITATE PROPRIE  
 TEMPERATURA DE CALCUL  
 GRAD CELSIUS  
 700.00

CONSUMURI SPECIFICE

CARBUNE UMED  
 KG/Nm3GAZ .6217

CARBUNE ANHIDRU  
 KG/Nm3GAZ .4731

EXCES UMIDITATE  
 KG/Nm3GAZ .2537

COMPONENTELE GAZULUI UMED /%/

CO2 12.52

CO 17.95

CH4 24.85

H2 25.02

N2 .25

H2O 30.22

H2S .42

COMPONENTELE GAZULUI ANHIDRU /%/

CO2 17.95

CO 9.63

CH4 35.61

H2 35.86

N2 .36

H2S .60

PUTERE CALORIFICA /KJ/Nm3/

INFERIOARA 12578.55

SUPERIOARA 14068.68

INFERIOARA 18026.95

SUPERIOARA 20162.53

GAZ UMED

INFERIOARA 12578.55

SUPERIOARA 14068.68

INFERIOARA 18026.95

SUPERIOARA 20162.53

MODEL MATEMATIC COMPLEX GAZIFICARE CARBUNE BOROZEL  
 PRESIUNEA DE CALCUL  
 BAR  
 30.00

BILANTUL ENERGETIC AL GAZIFICARII

FLUXURI TERMICE INTRATE KJ/Nm3GAZ

TOTAL INTRAT 15561.69

CHIMIC CARBUNE 13121.35

SENSIBIL CARBUNE 11.44

SENSIBIL UMIDITATE 21.24

SENSIBIL FLUX EXTERIOR 2407.65

FLUXURI TERMICE IESITE KJ/Nm3GAZ

TOTAL IESIT 15561.69

CHIMIC GAZ 14068.68

SENSIBIL GAZ 1468.17

SENSIBIL CENUSA 24.84

RANDAMENTUL GAZIFICARII /

GAZ RECE 80.830

GAZ CALD 90.265

GAZ CONSUMAT FLUX EXTERIOR

GAZ CALD Nm3/Nm3 GAZ .2143

GAZ RECE Nm3/Nm3 GAZ .3393

ing. **POP IOAN GHEORGHE**

**GAZIFICAREA ȘI ARDEREA LIGNIȚILOR**

**TEZĂ DE DOCTORAT**

**Coordonator științific**

Prof. dr. ing. **CORNELIU UNGUREANU**

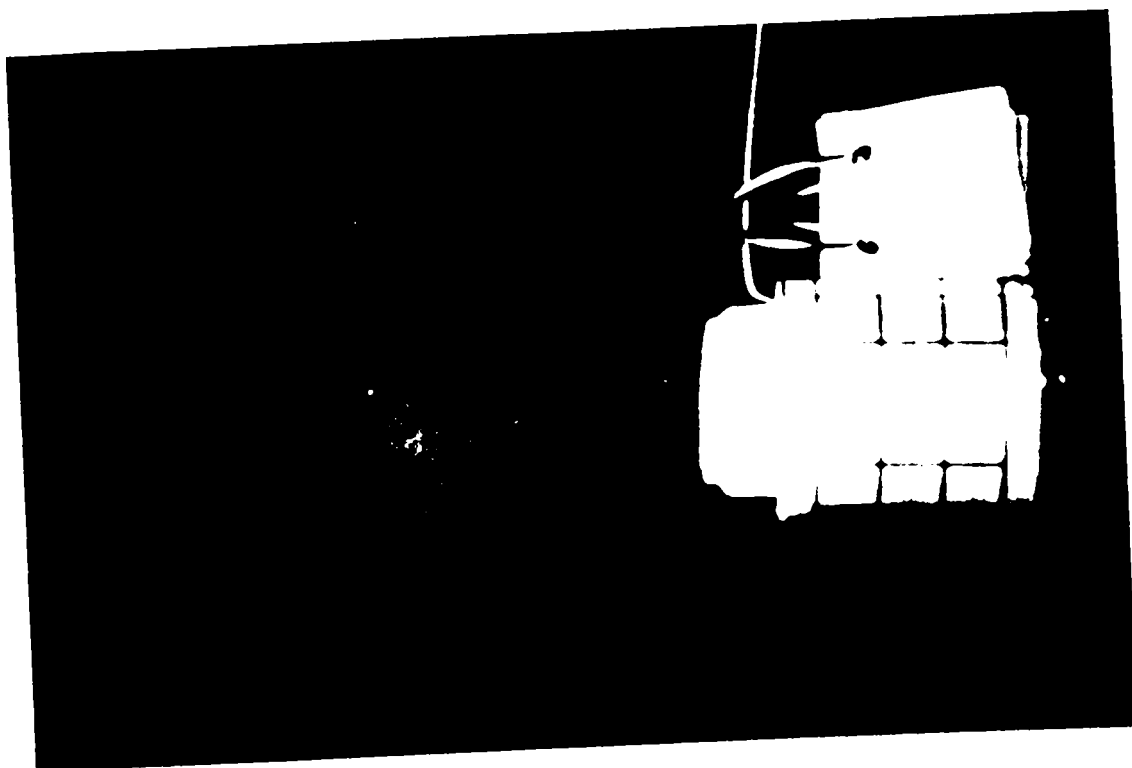
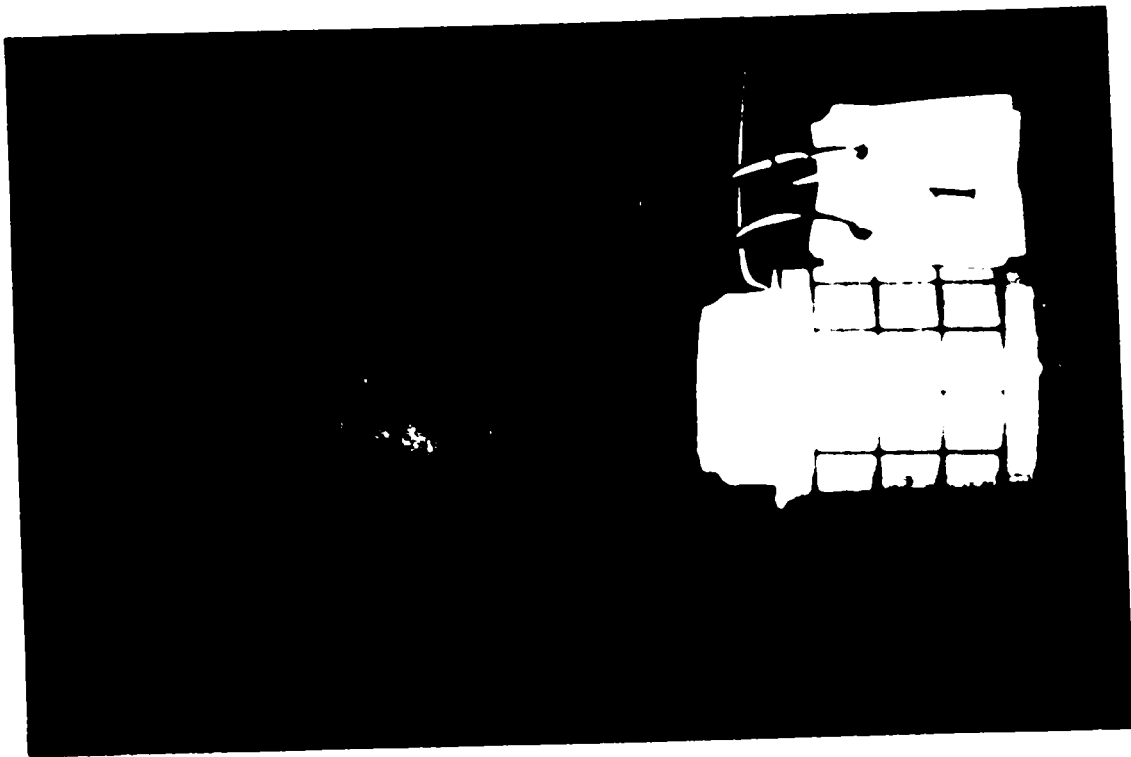
**ANEXA Nr. 4**

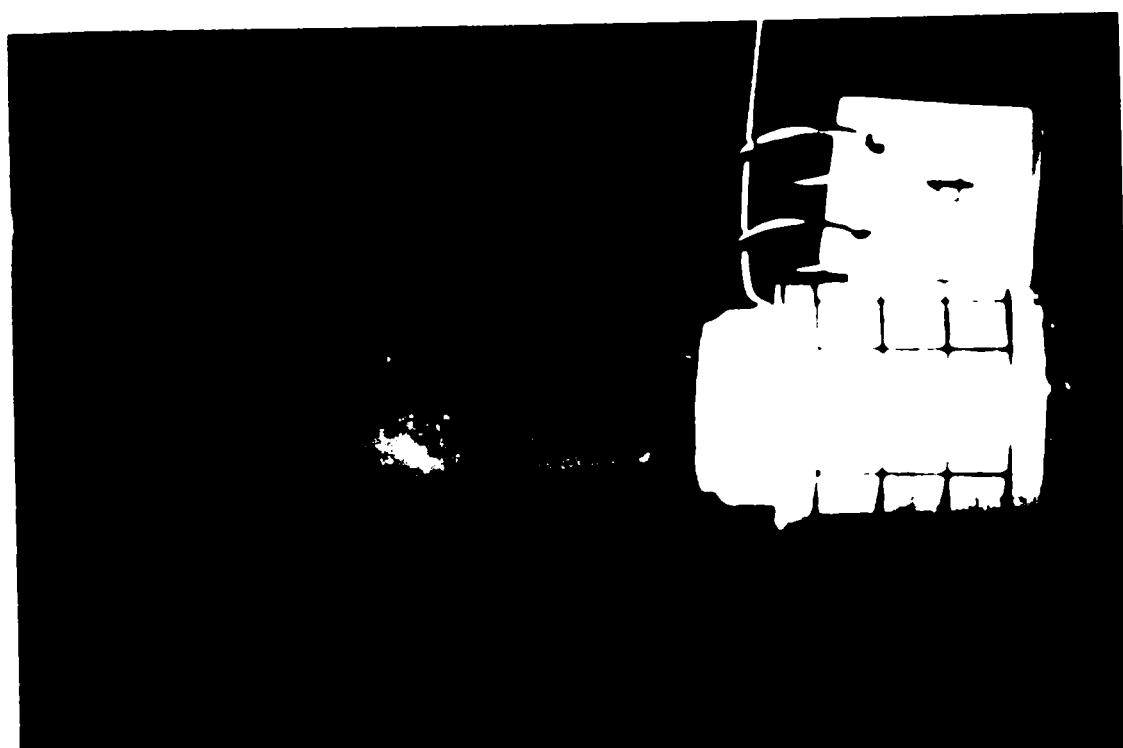
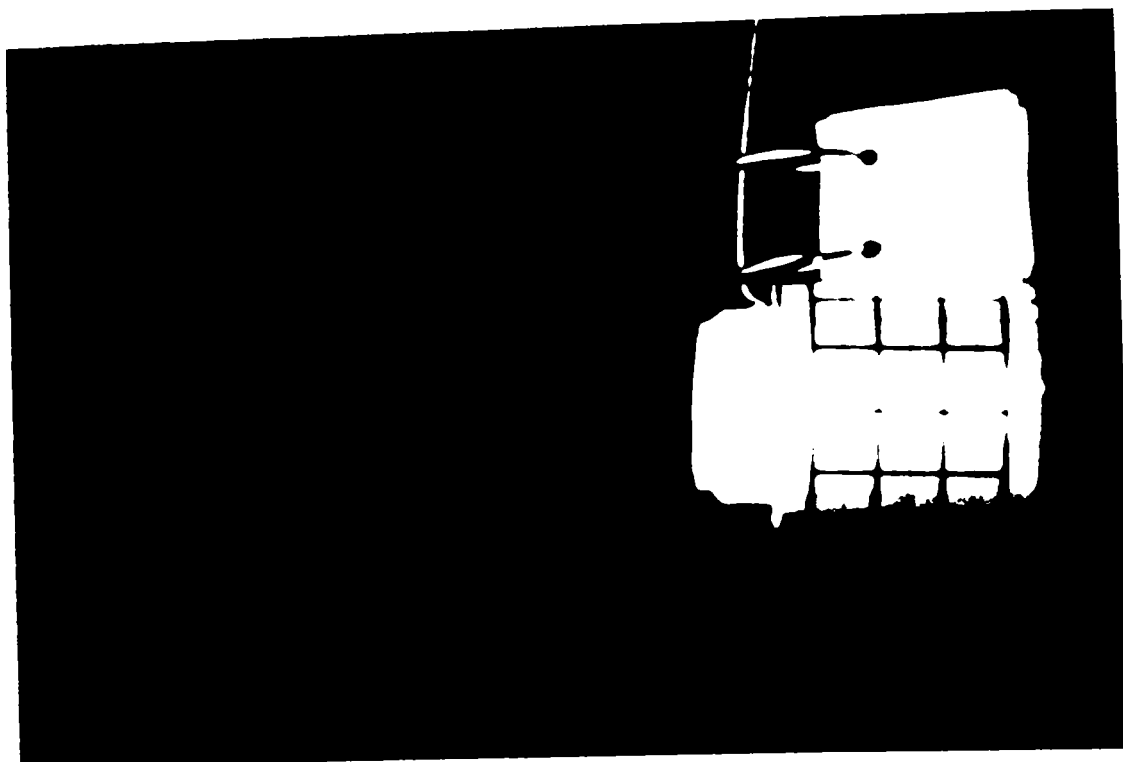
**DETERMINĂRI EXPERIMENTALE PRIVIND ARDEREA  
COMBUSTIBILULUI GAZOS REZULTAT ÎN URMA  
GAZIFICĂRII CĂRBUNILOR CU UMIDITATEA PROPRIE**

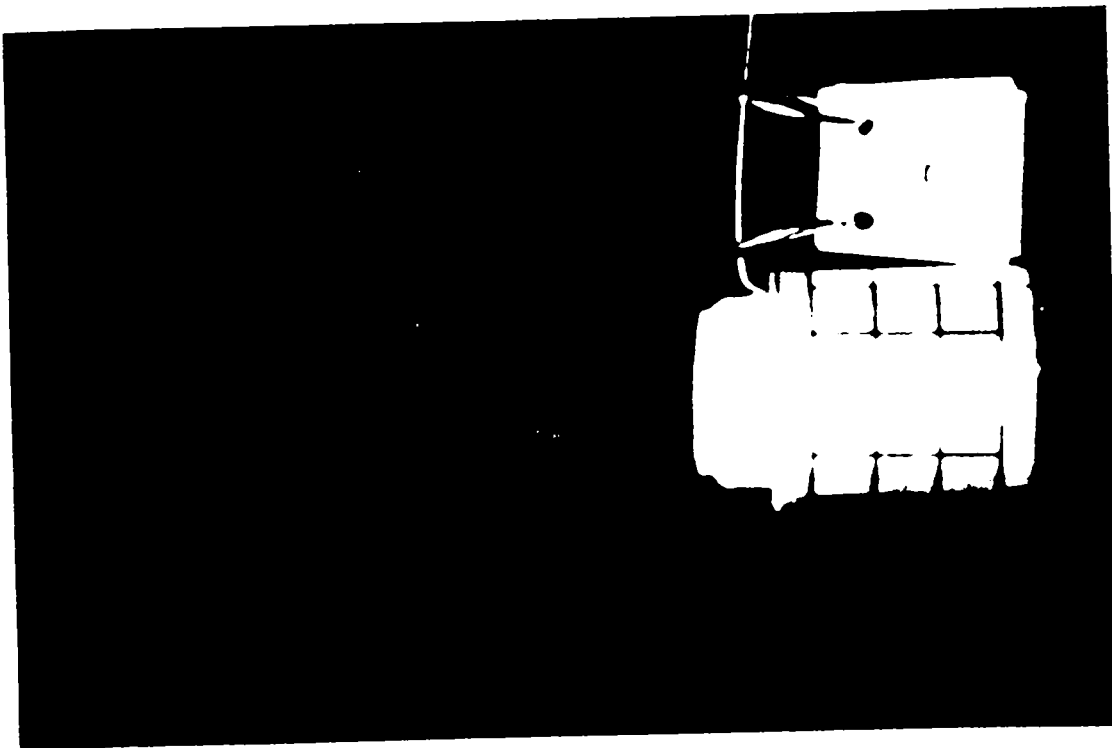
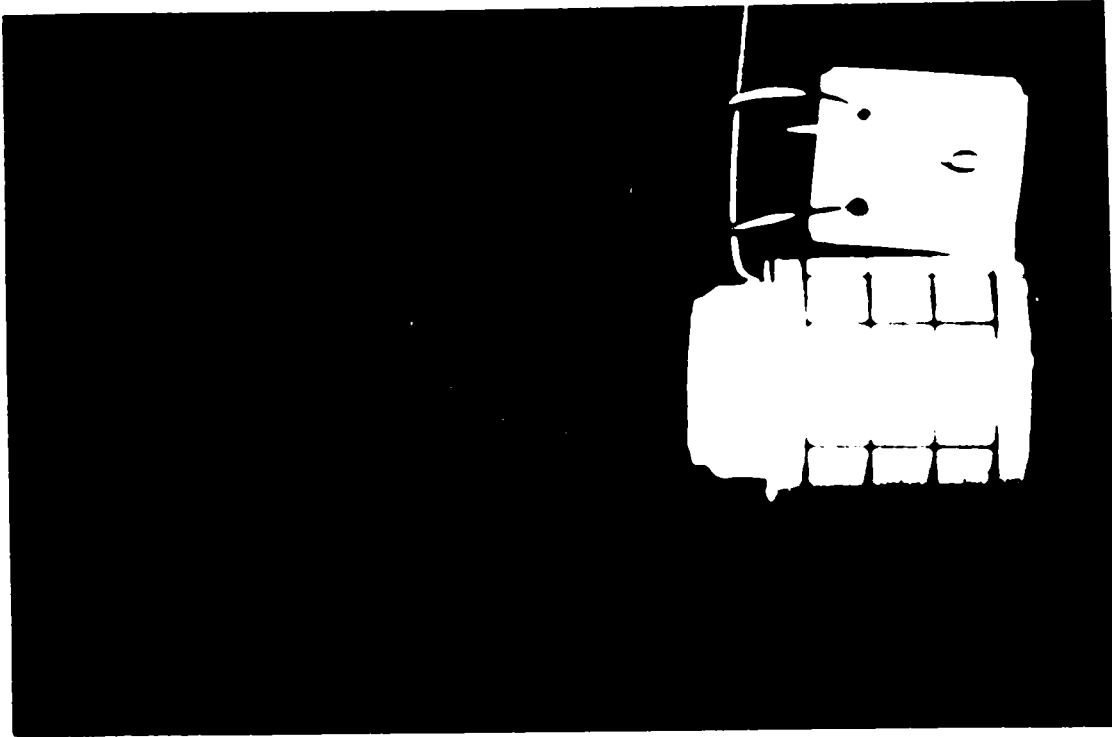
**CUPRINS**

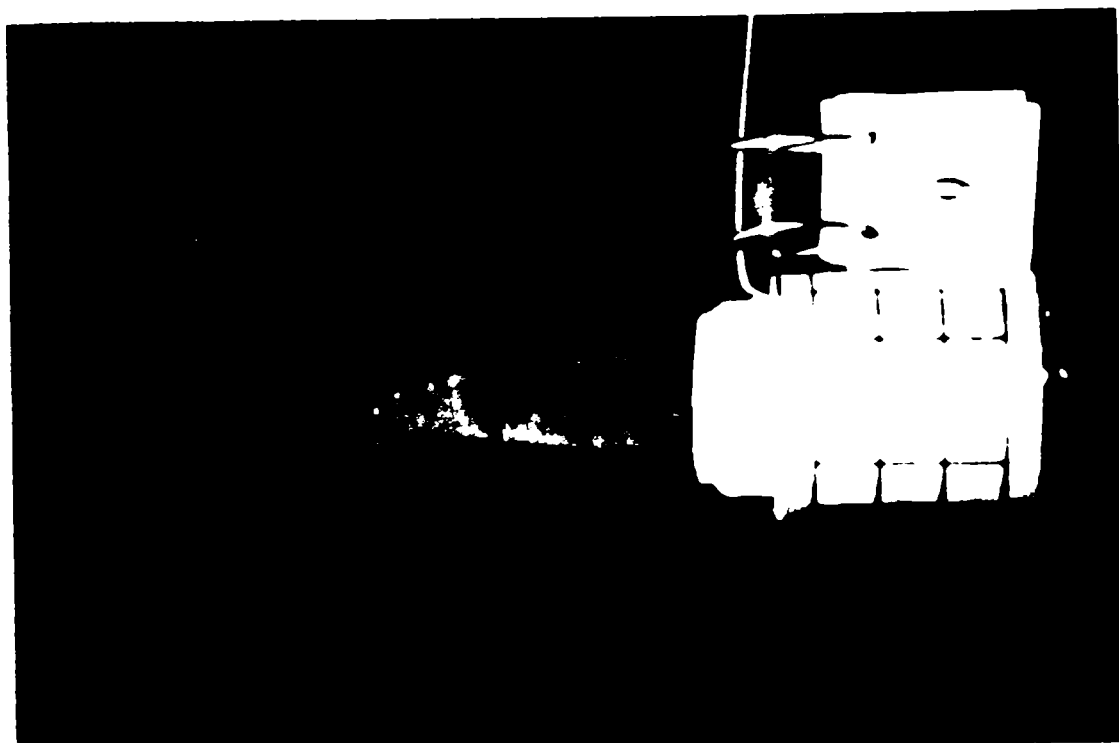
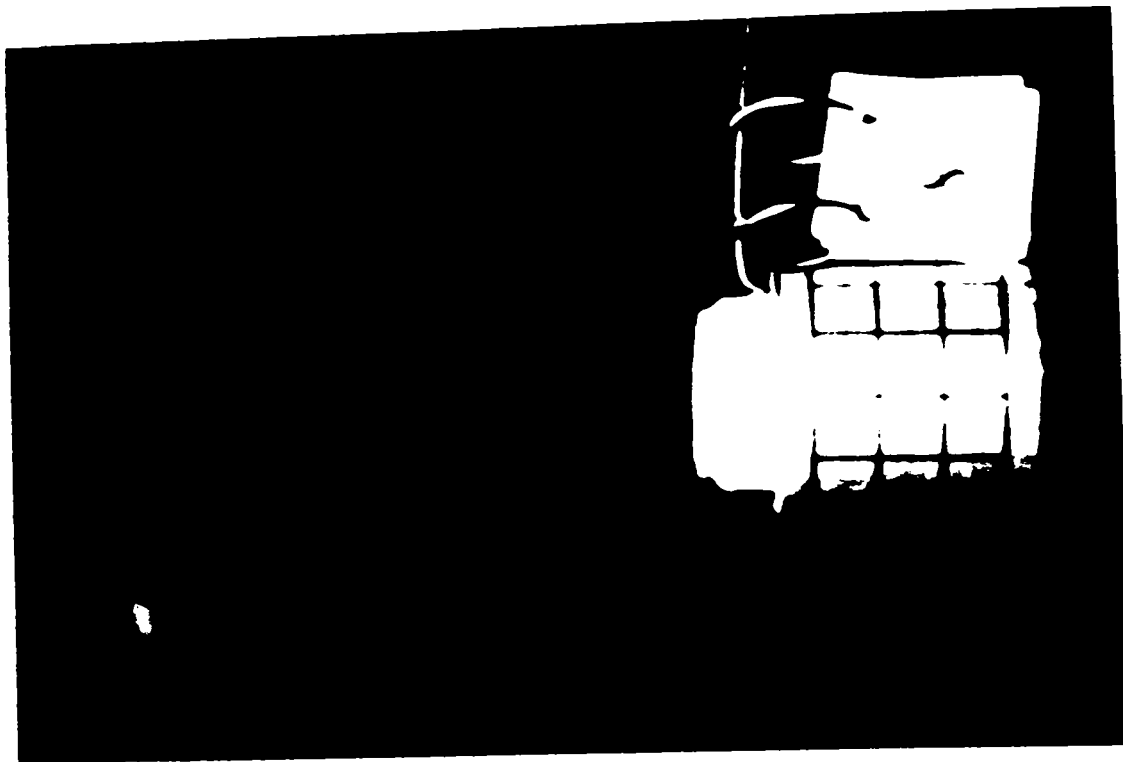
**FOTOGRAFIILE FRONTULUI FLĂCĂRII CORESPUNZĂTOARE  
GAMEI DE REGLAJE A DEBITULUI AERULUI PRIMAR  
CUPRINS ÎN DOMENIUL LIMITELOR DE INFLAMABILITATE**

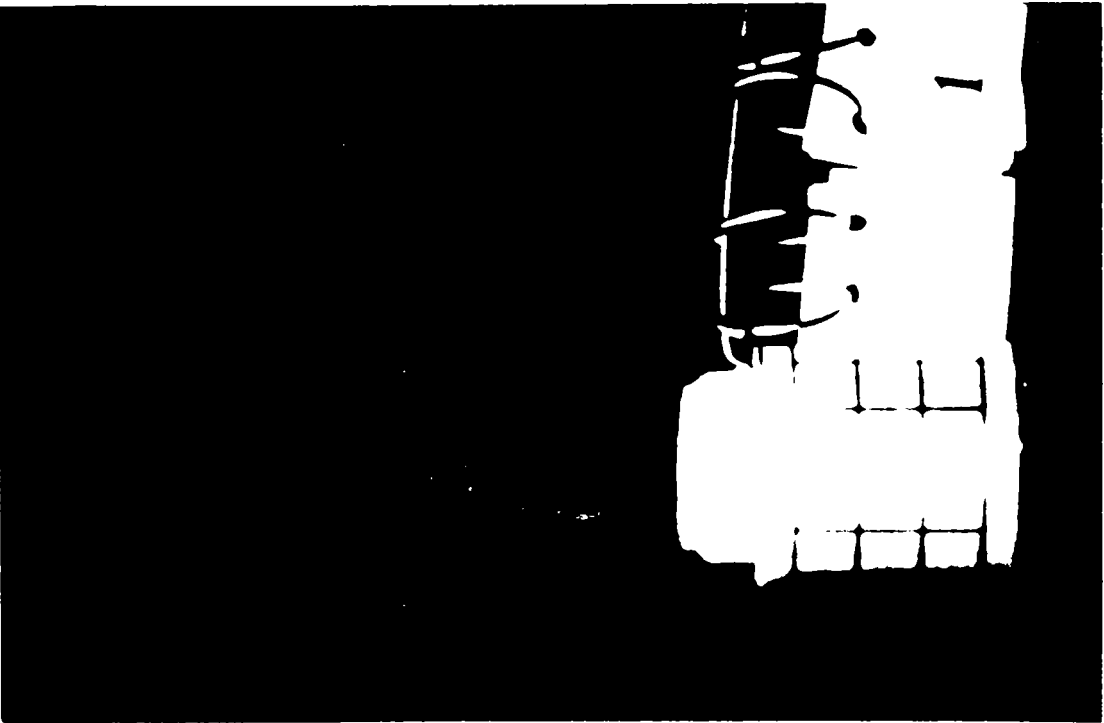
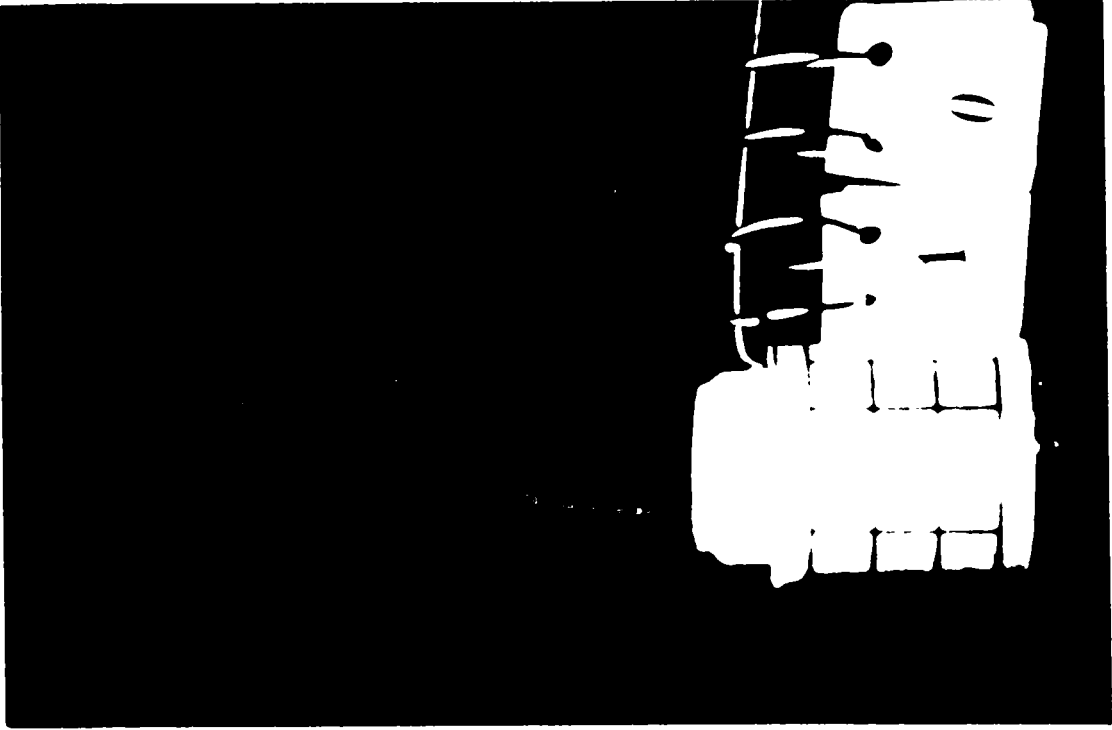
**TIMIȘOARA  
1988**

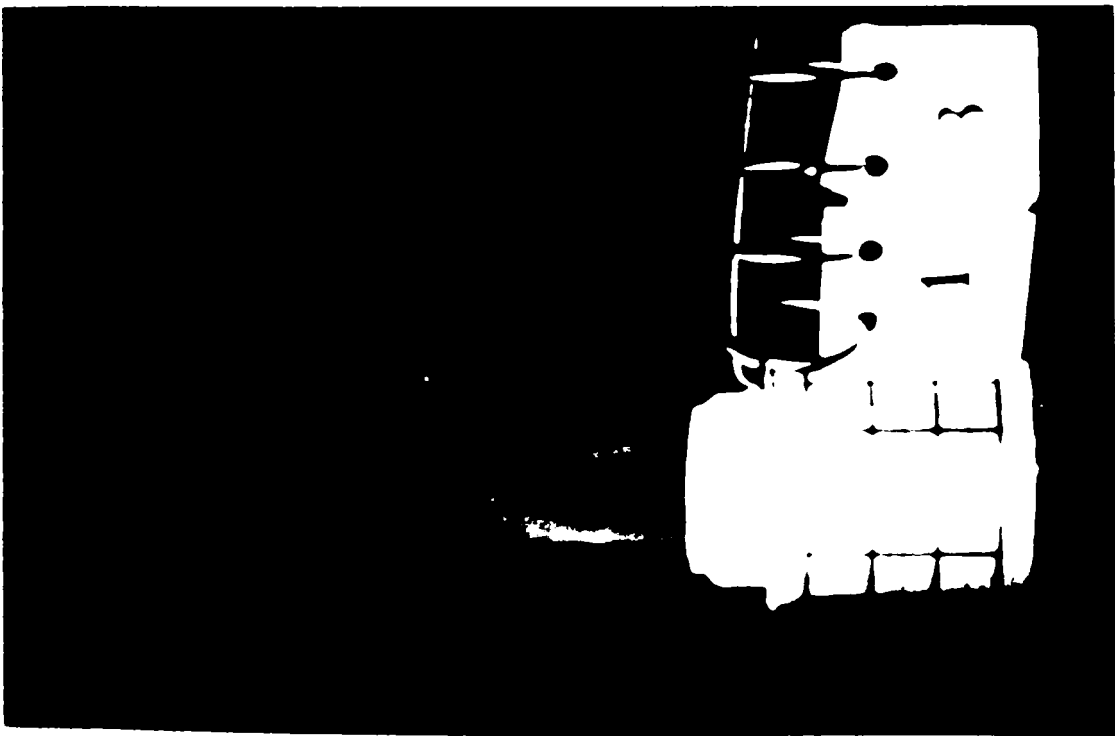
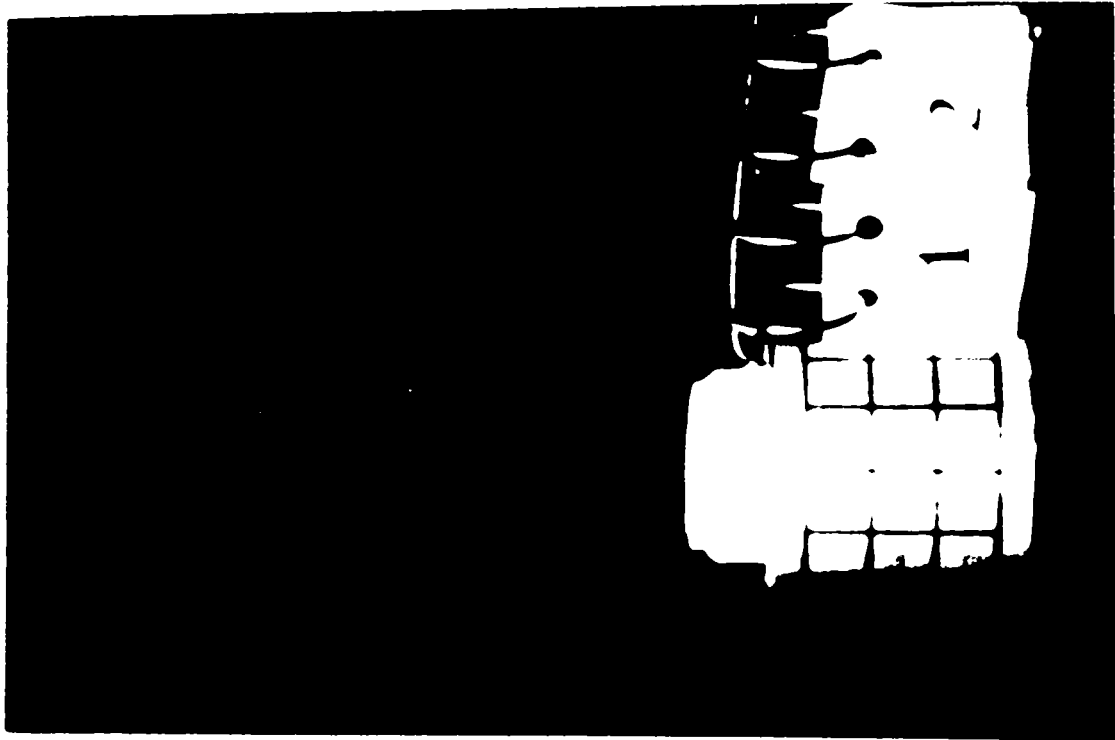




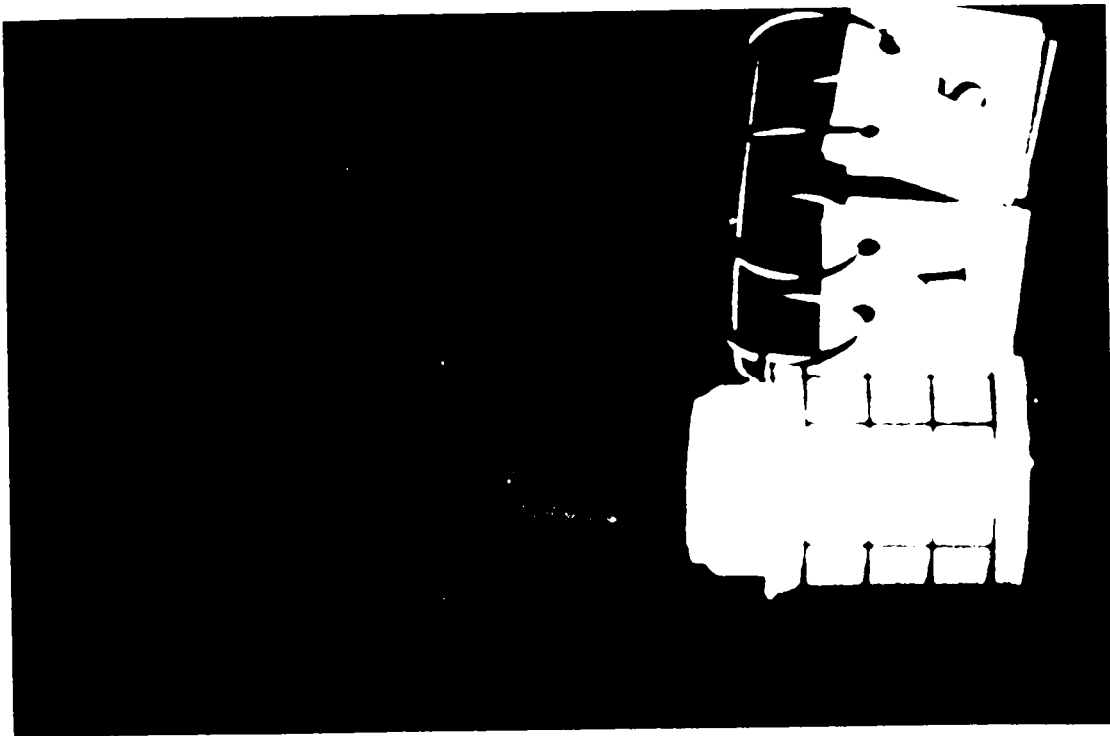
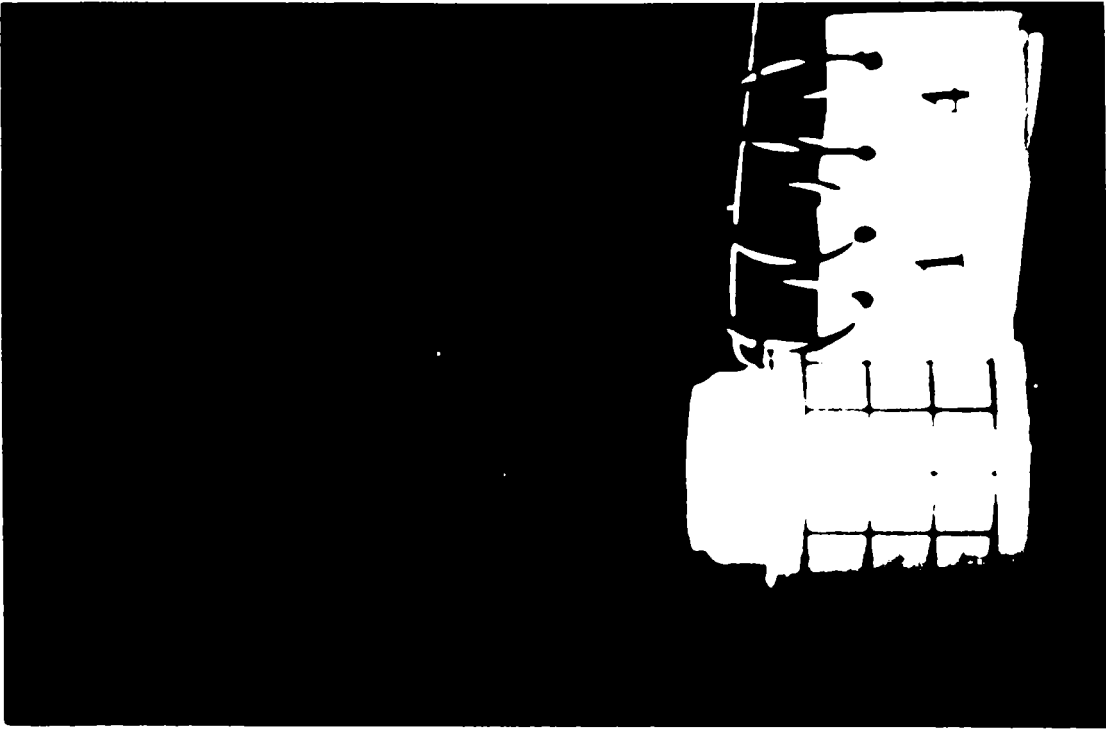


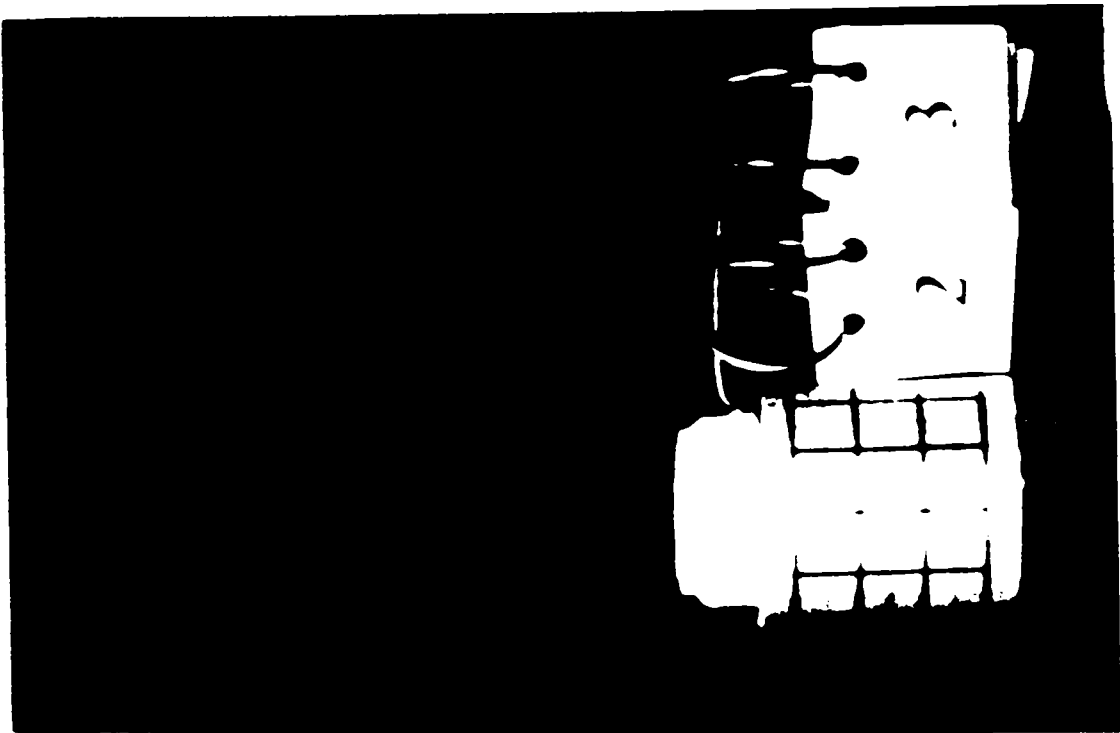
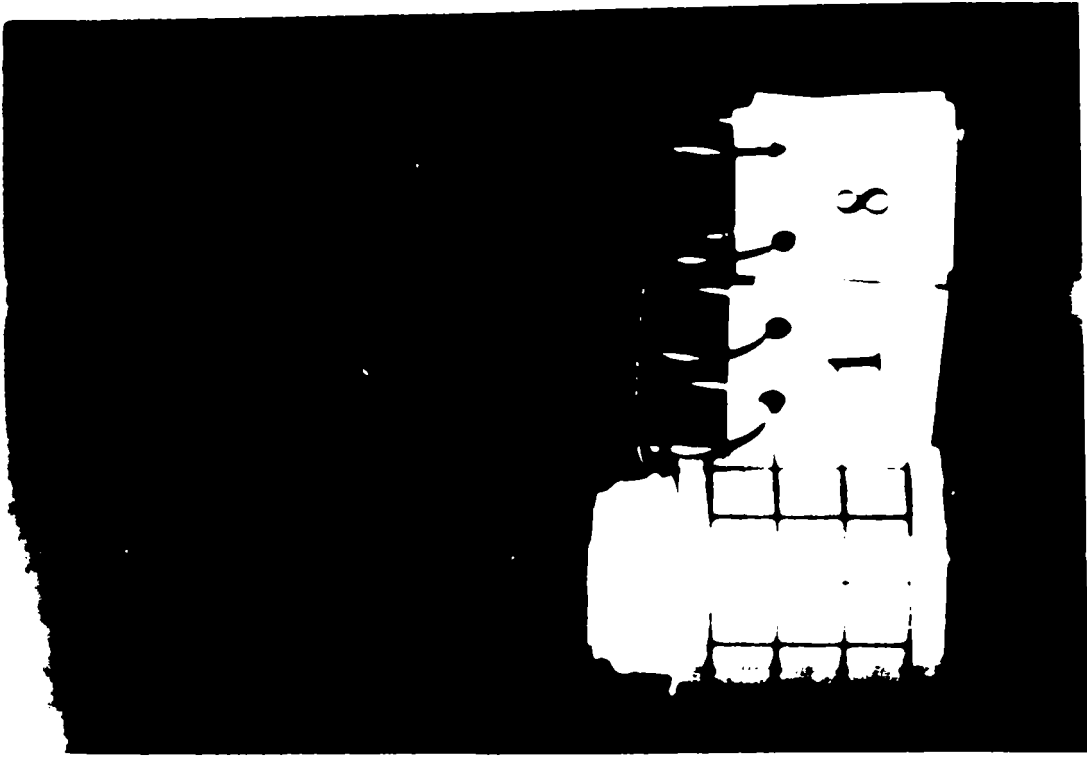


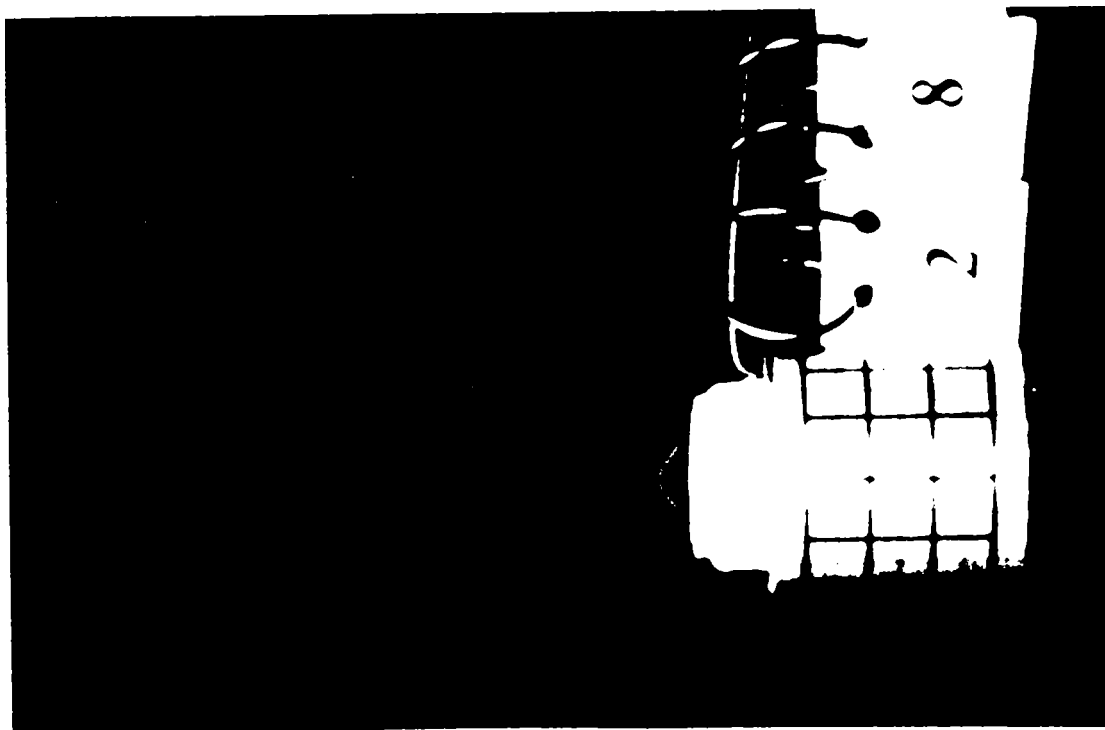
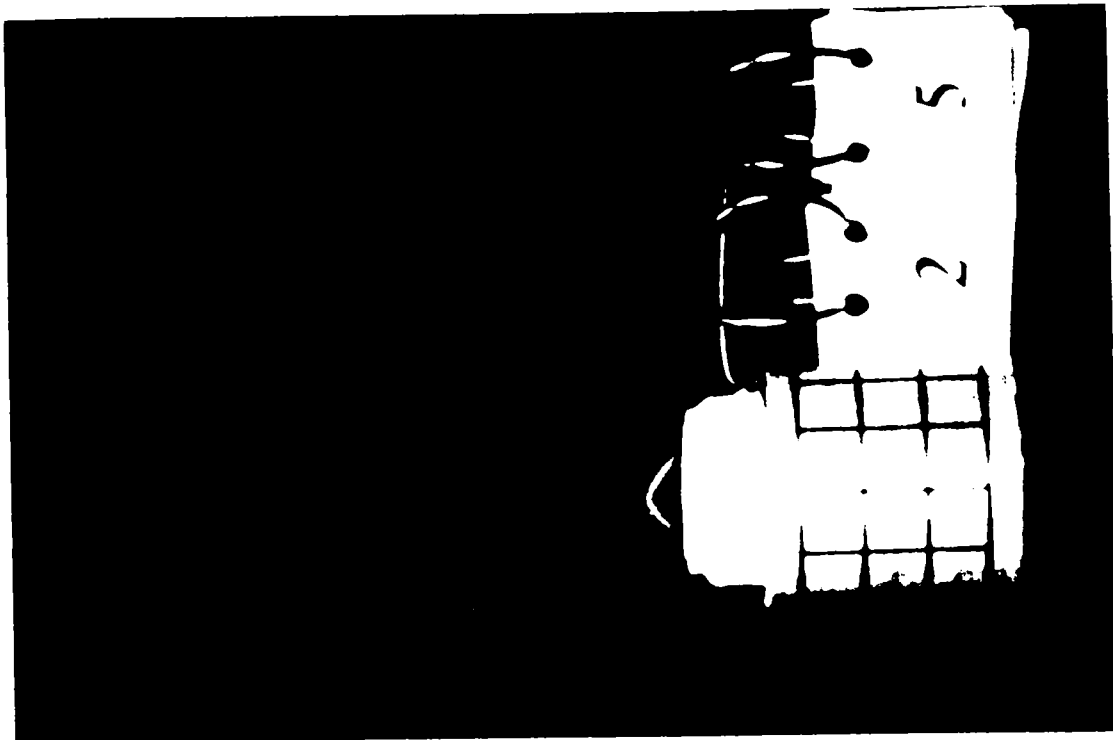


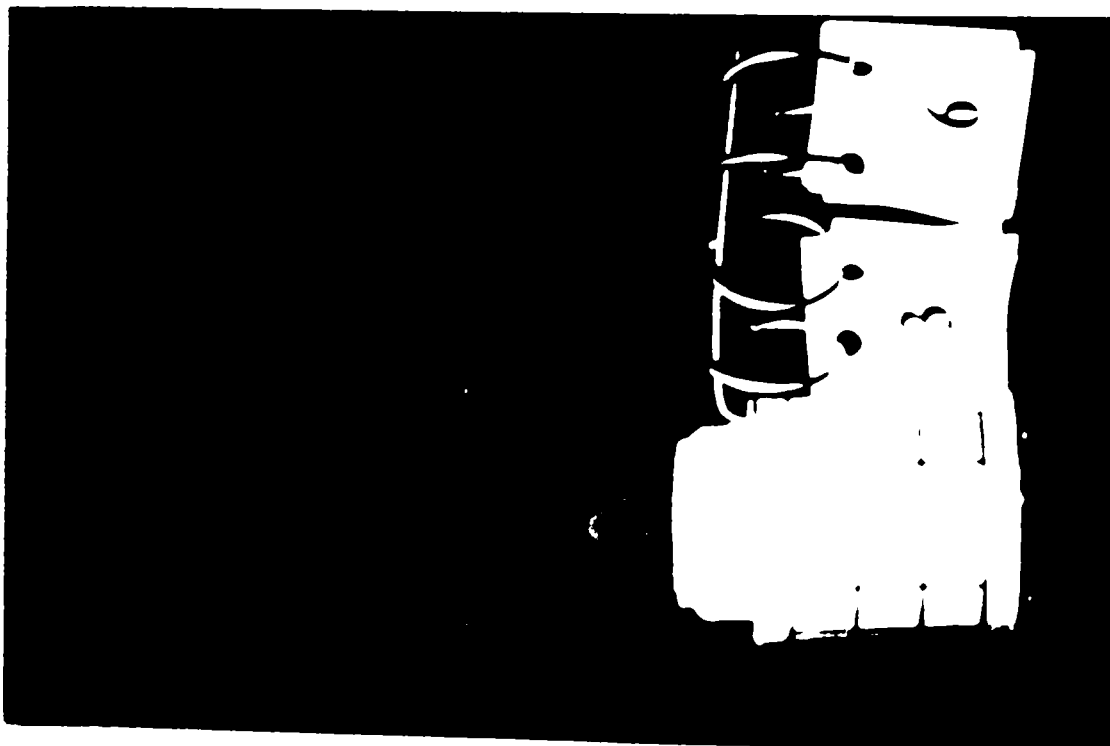
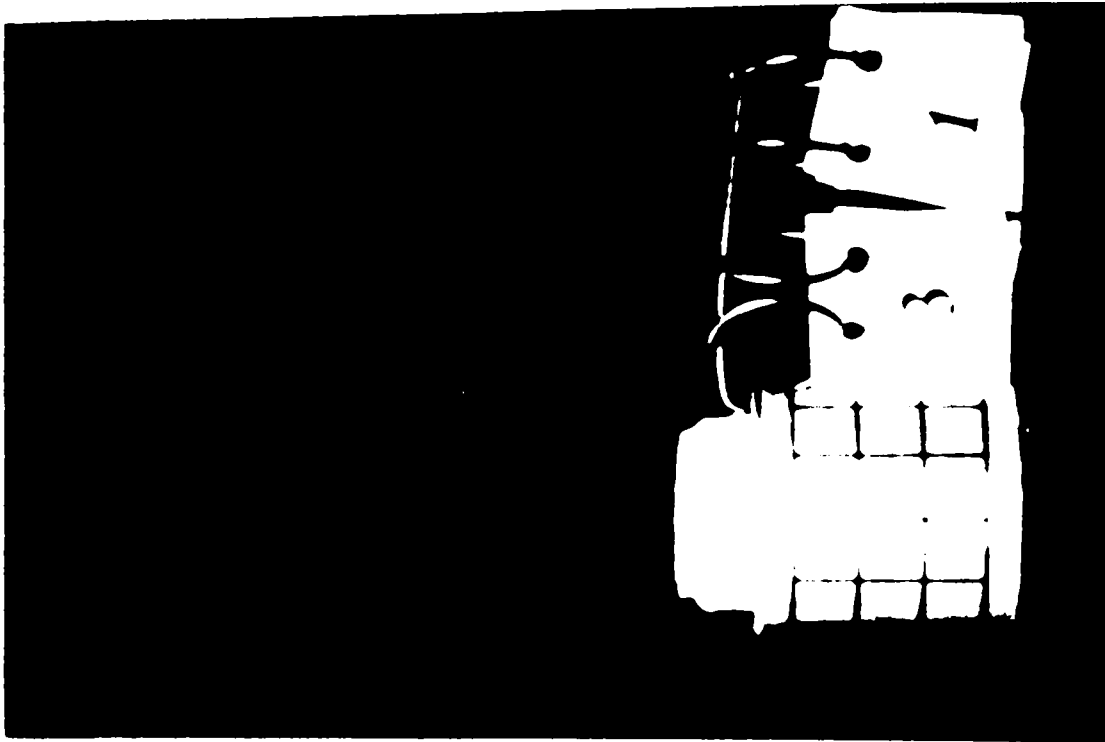


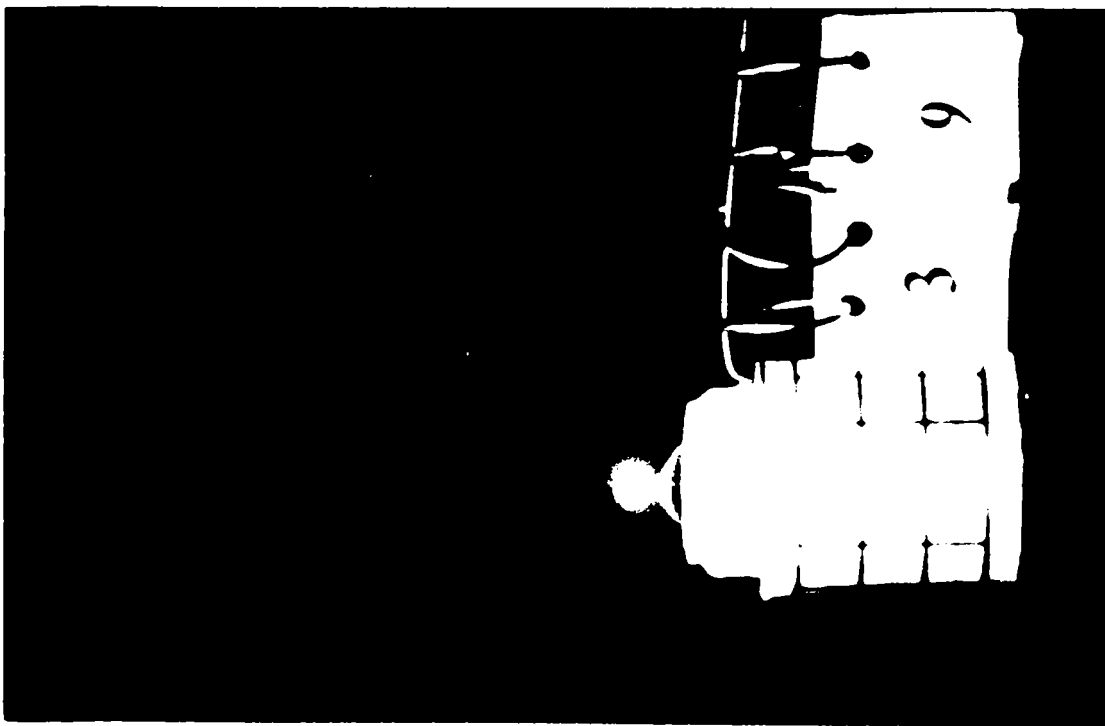
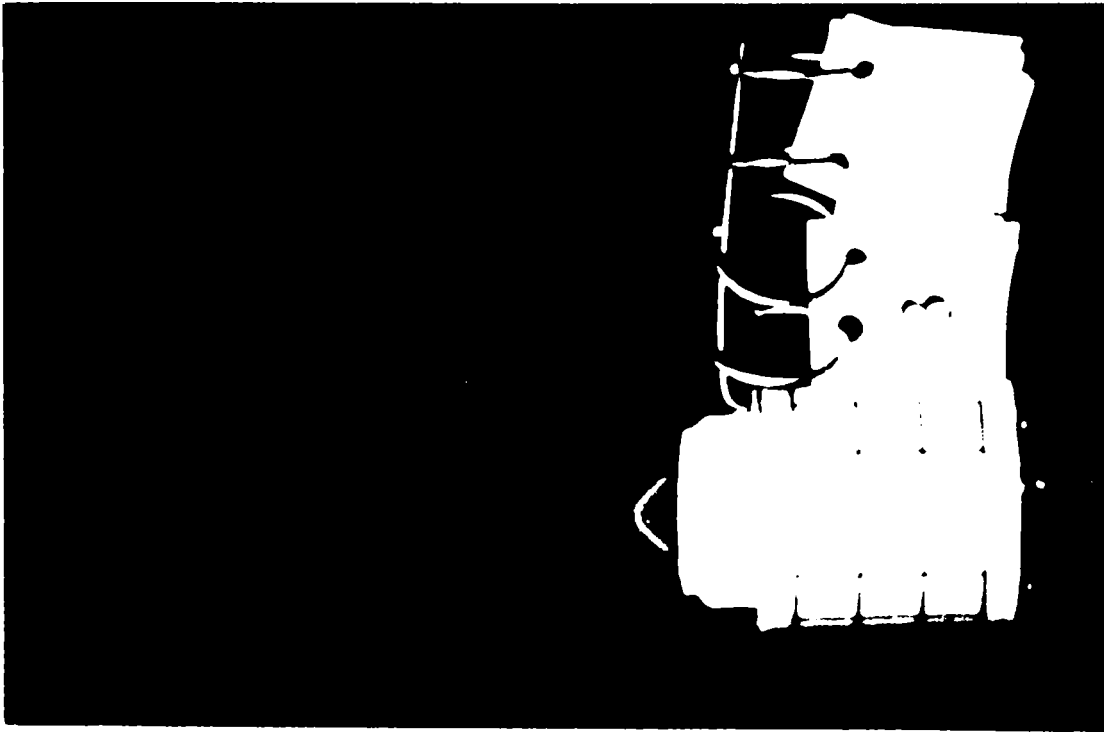


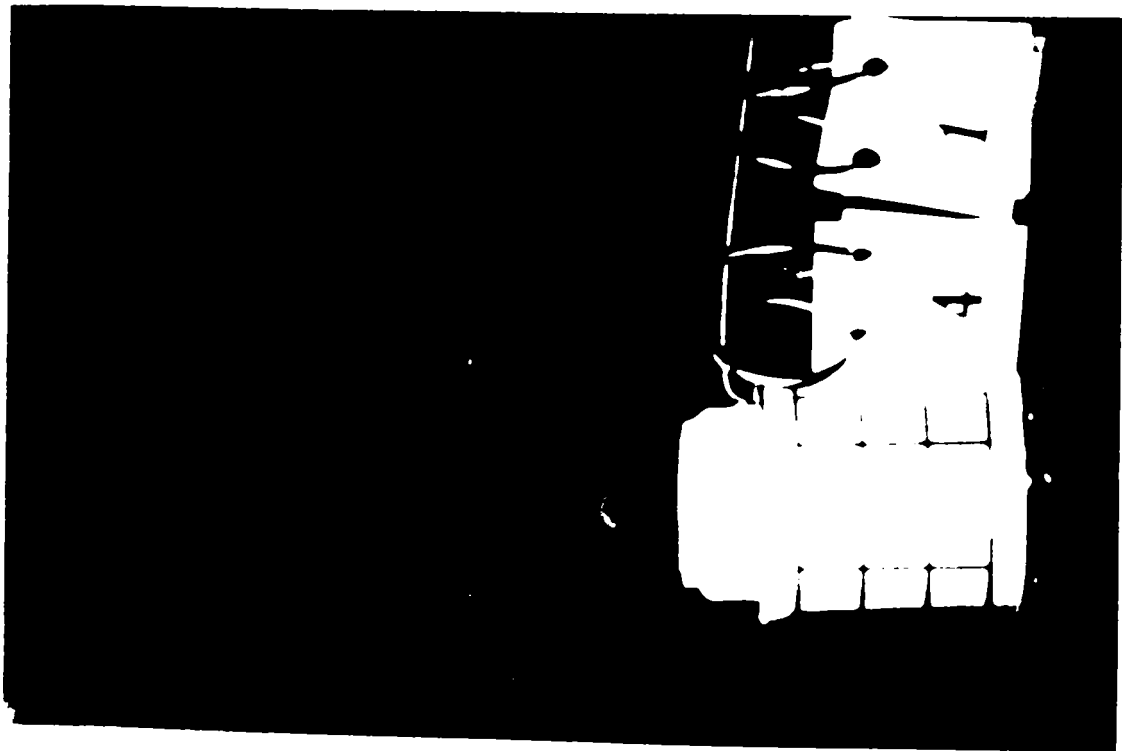


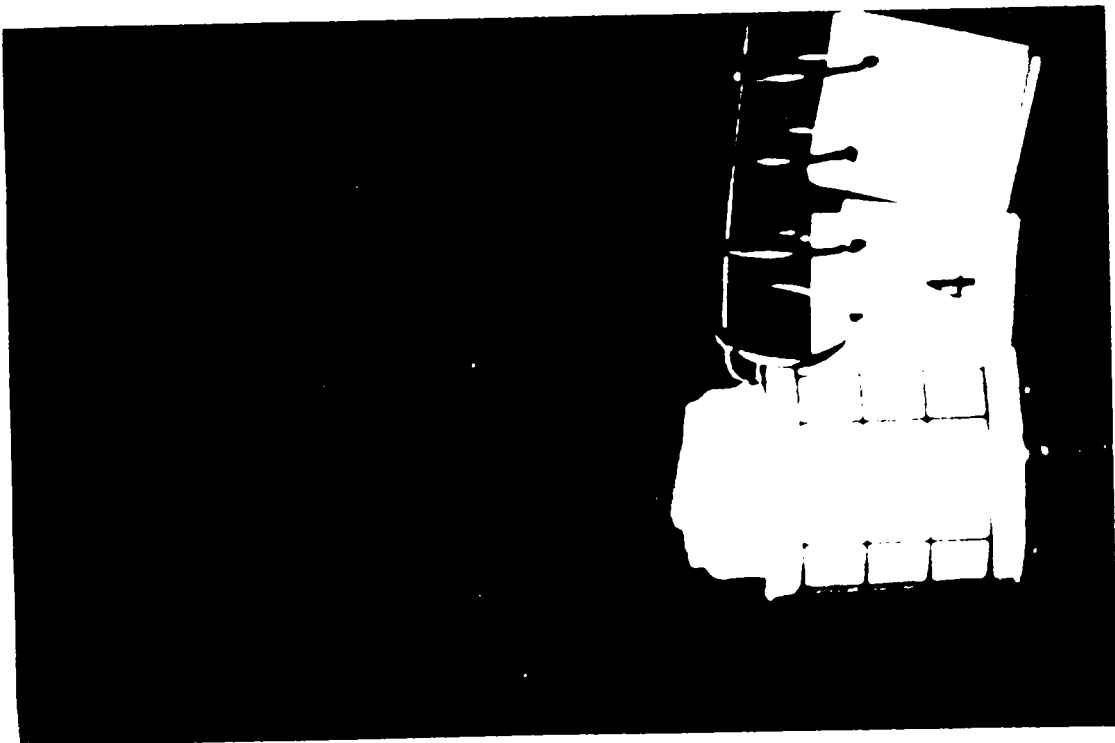
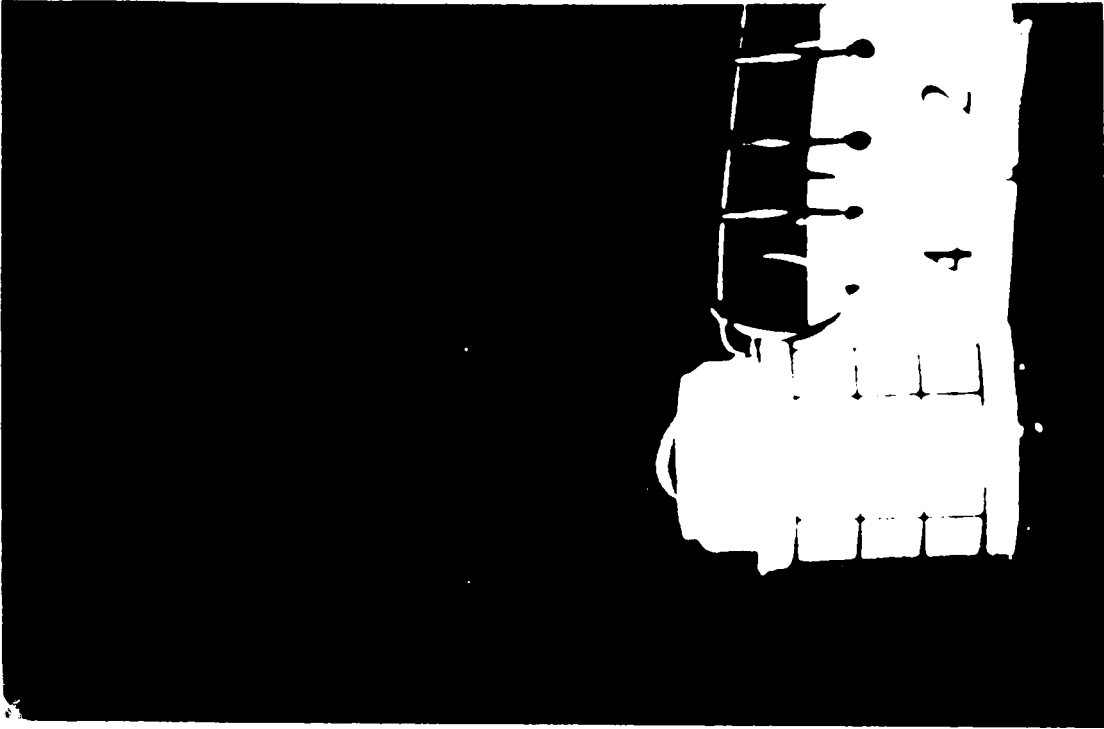


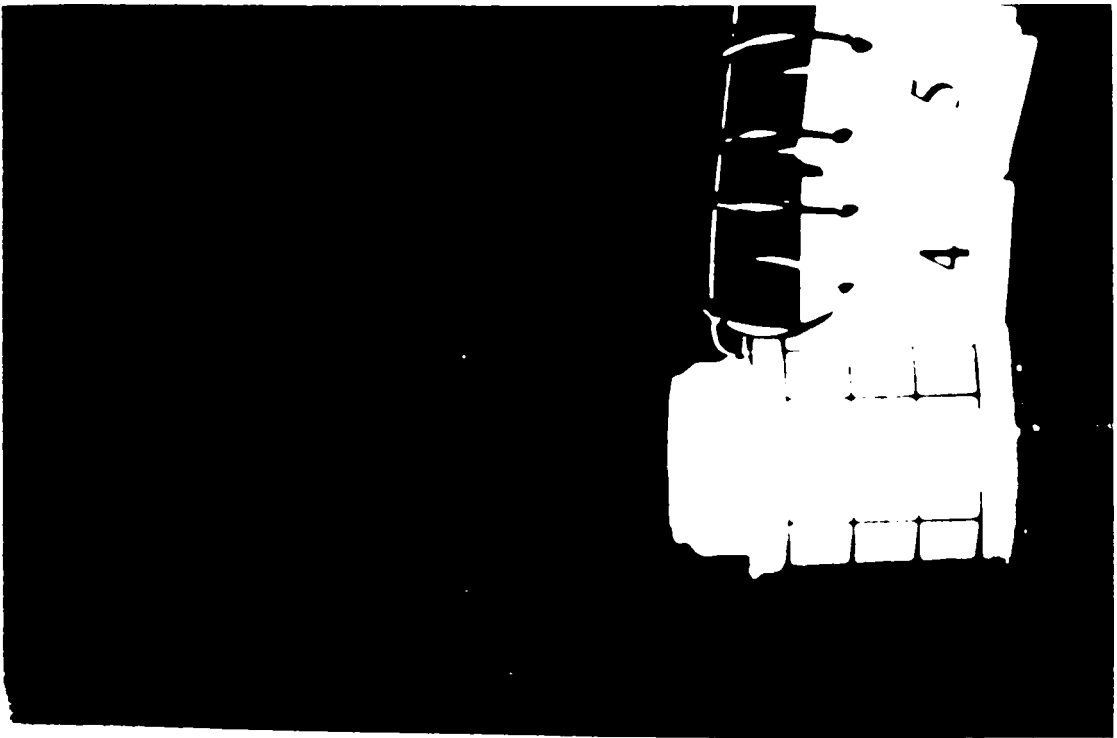
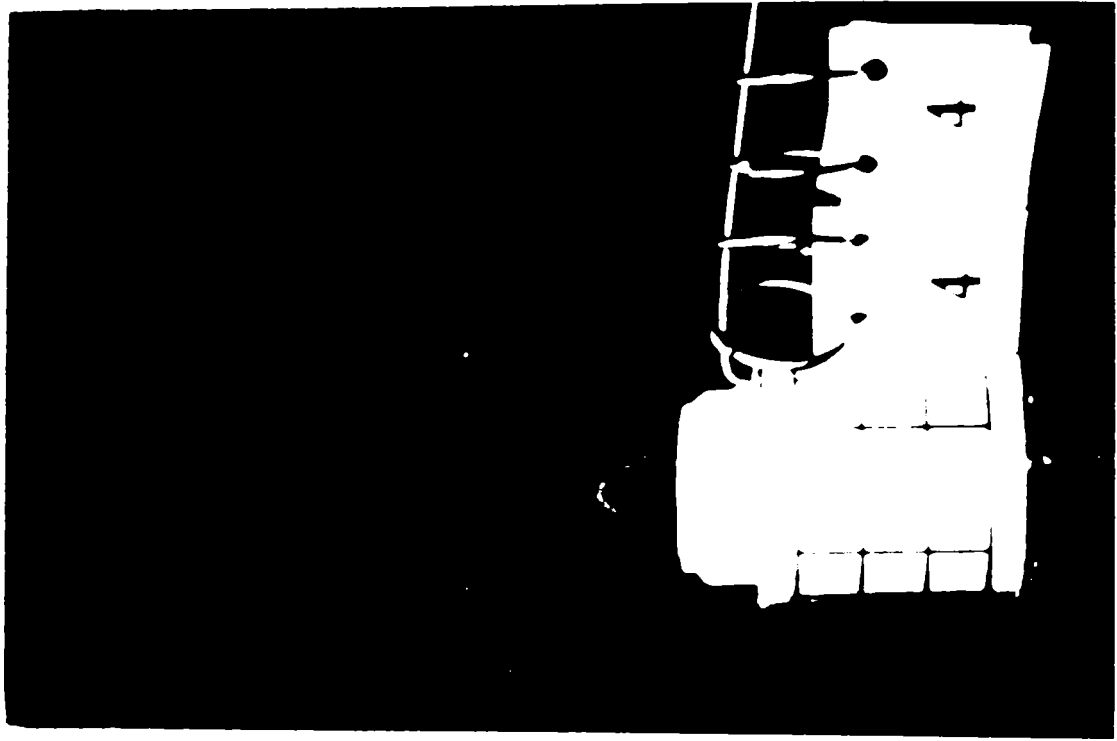




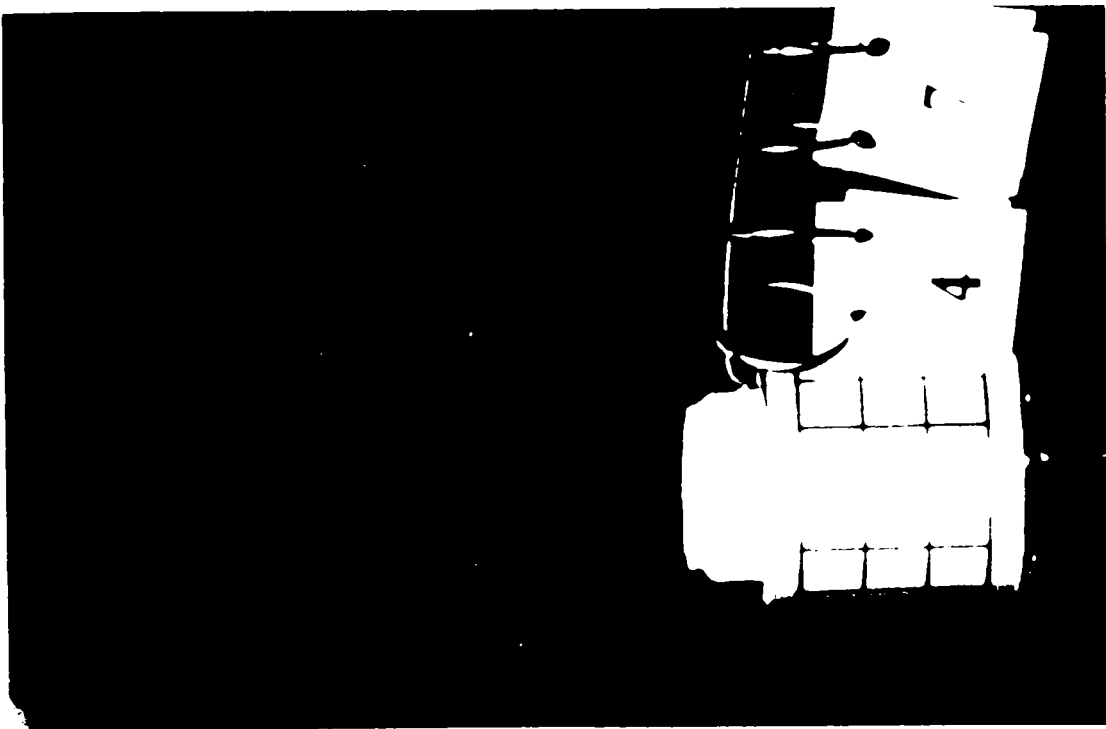
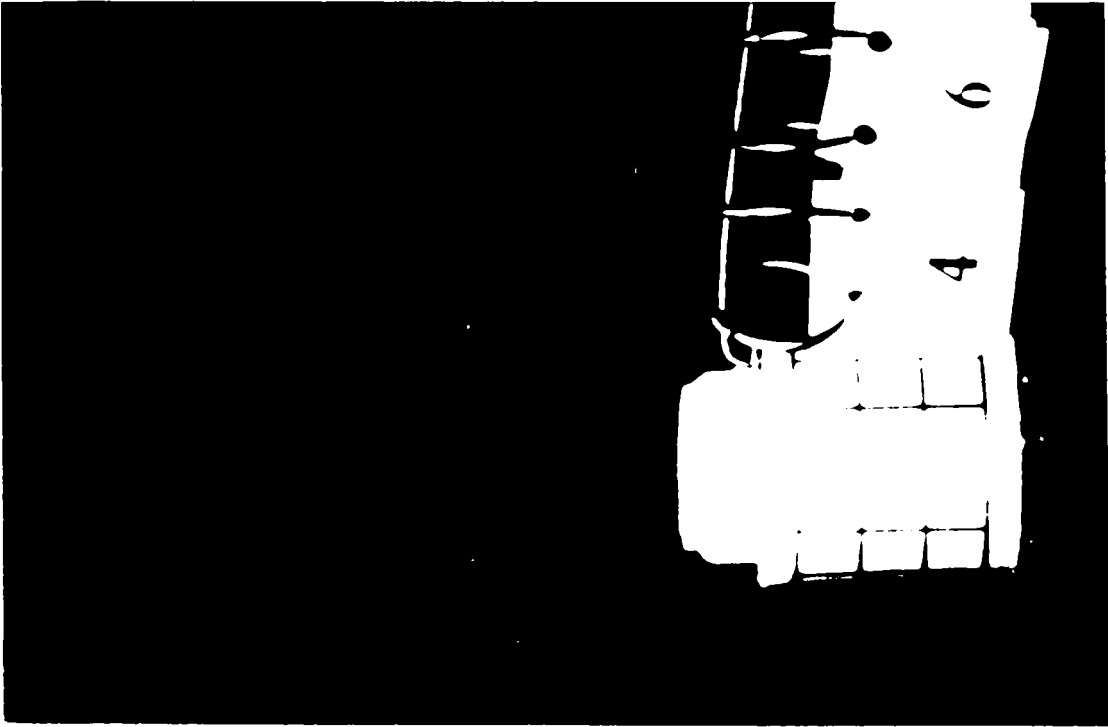


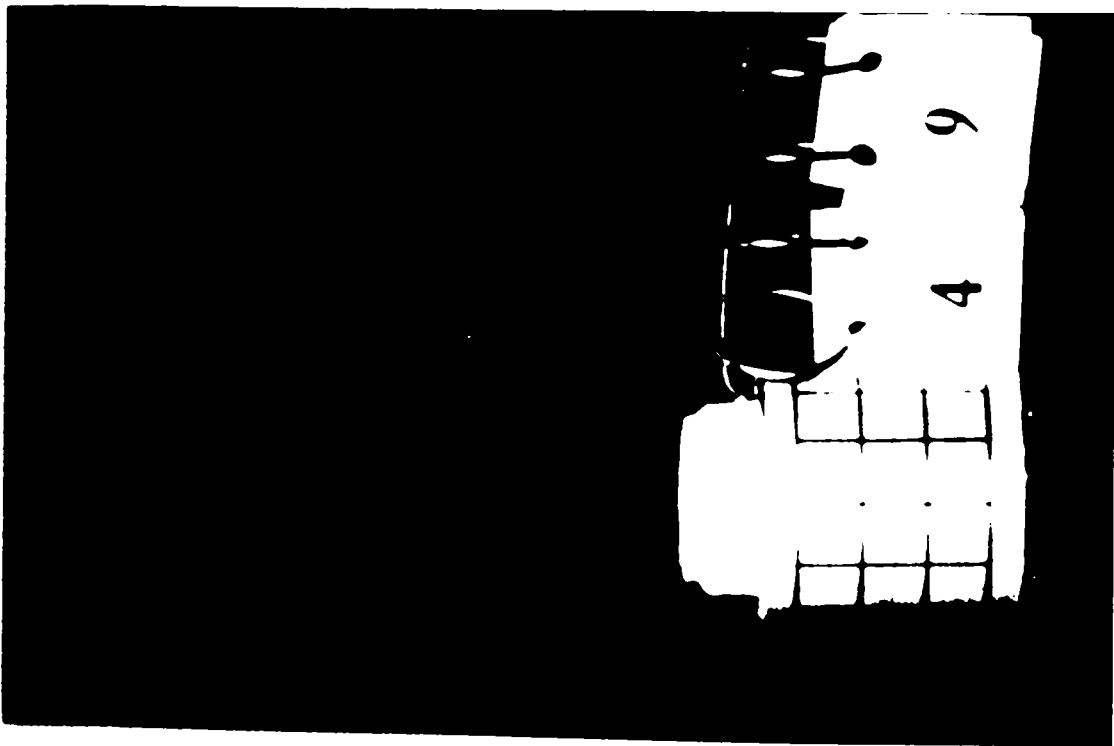
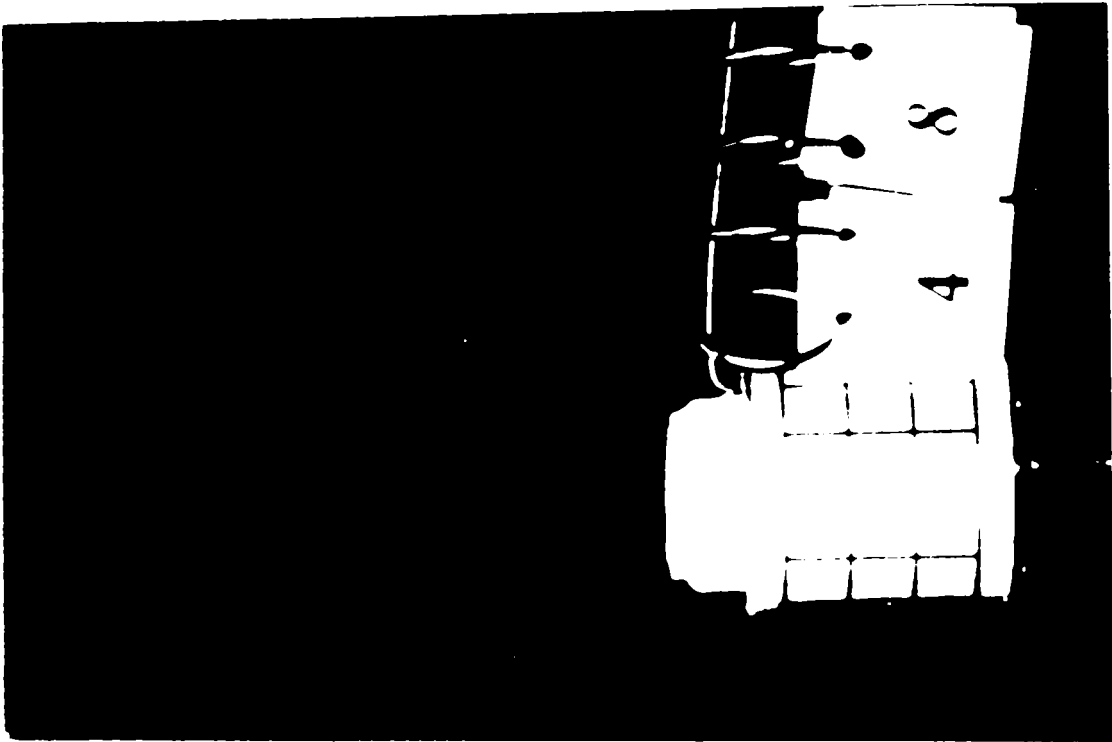


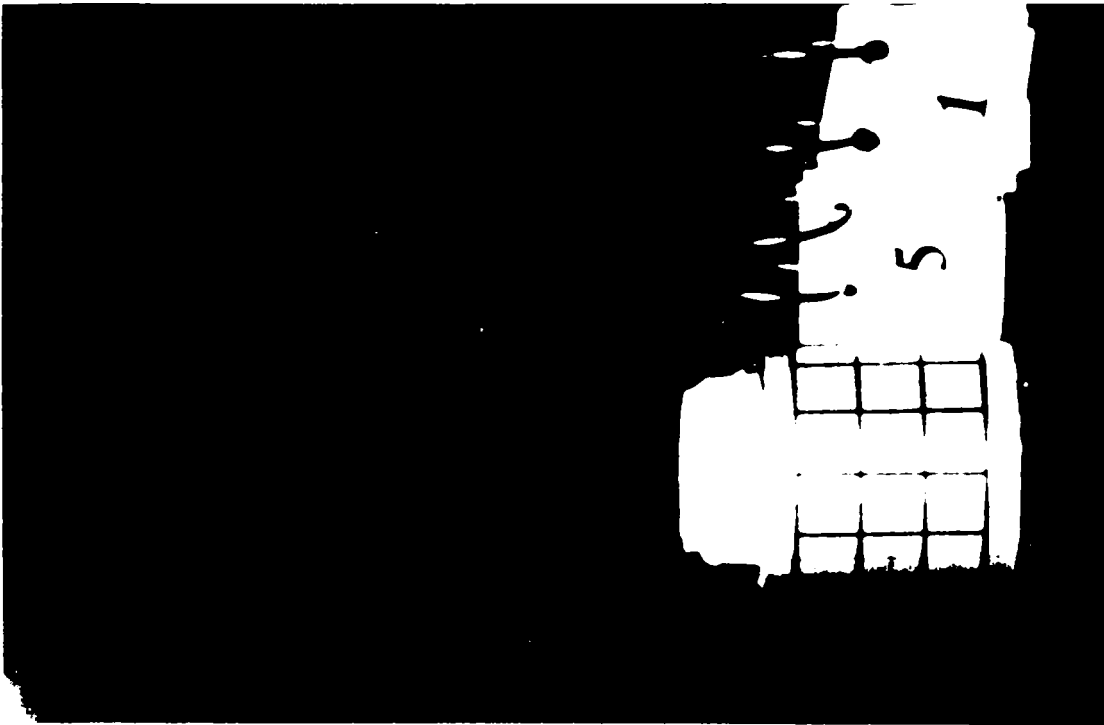
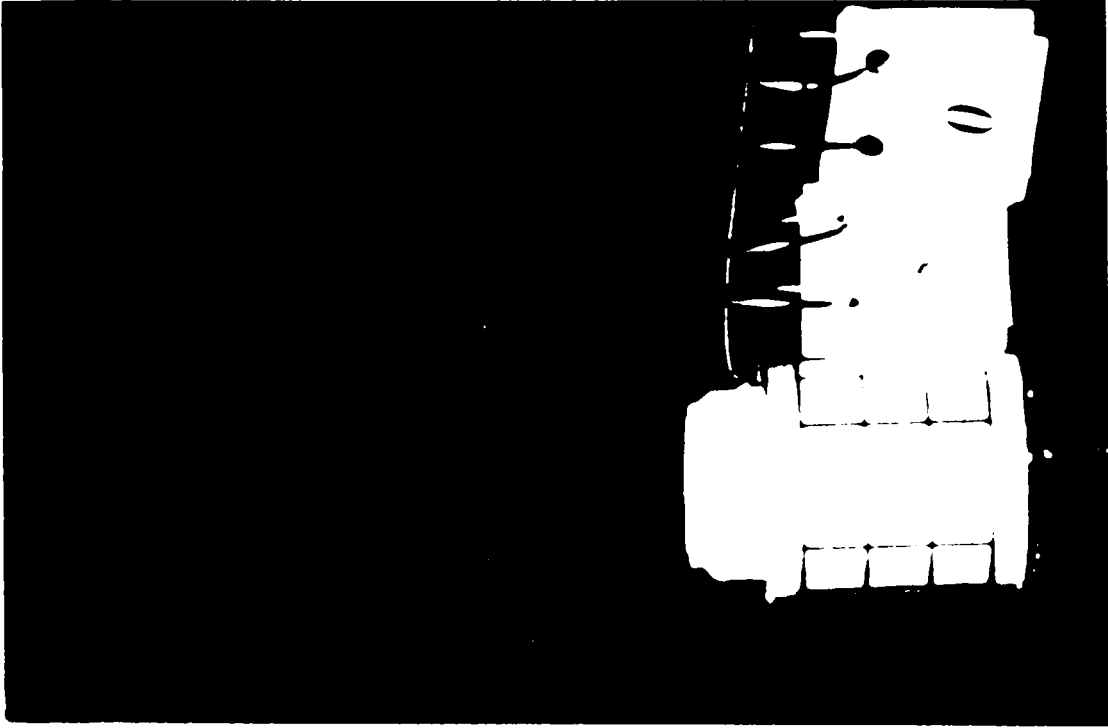


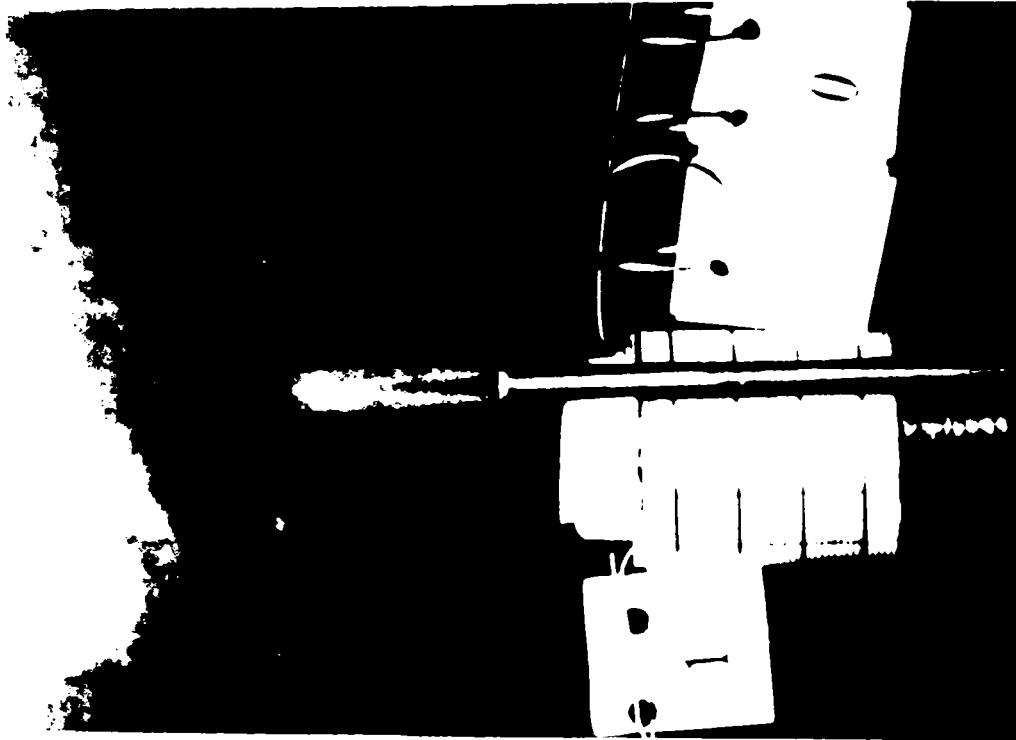


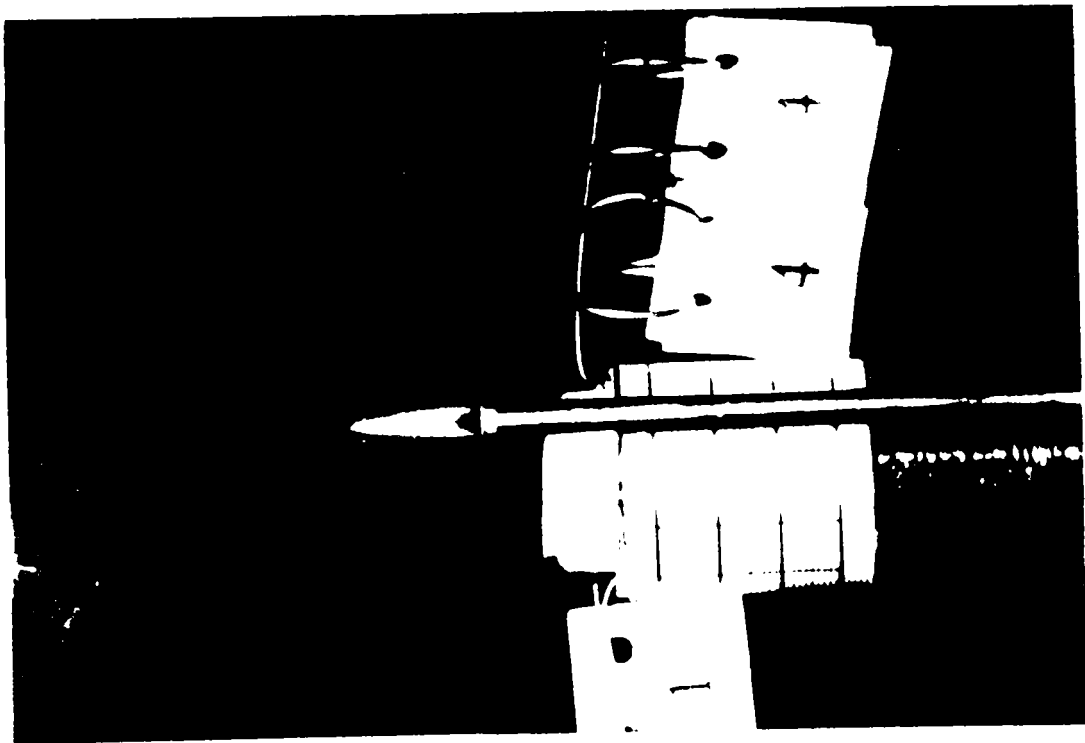
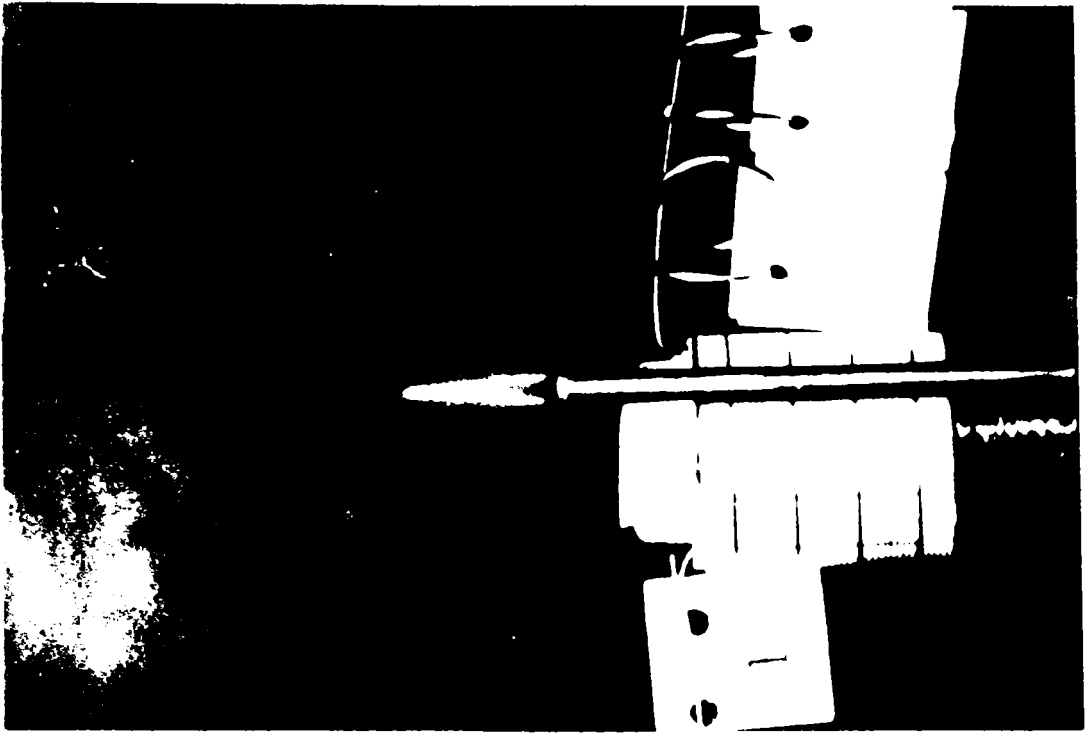












ing. **POP IOAN GHEORGHE**

**GAZIFICAREA ȘI ARDEREA LIGNIȚILOR**

**TEZĂ DE DOCTORAT**

**Coordonator științific**  
Prof. dr. ing. **CORNELIU UNGUREANU**

**ANEXA Nr. 5**

**PROGRAM CALCUL BILANȚ TERMIC STAȚIE  
COMPLEXĂ DE GAZIFICARE A CĂRBUNILOR CU  
UMIDITATEA PROPRIE**

**CUPRINS**

- |                                      |             |
|--------------------------------------|-------------|
| 1. LISTARE PROGRAM CALCUL            | pag. 1 - 25 |
| 2. RULARE - REZULTATE PROGRAM CALCUL | pag. 1 - 10 |

**TIMIȘOARA**  
**1988**

10 REM "BILANTUL TERMIC AL STATIEI COMPLEXE DE GAZIFICARE"

20 DIM DEL\$(7), GAZUM\$(7), GAZAN\$(6)

30 DIM AEL(7), AEL1(7), CGAZUMD(7), CGUI(7)

100 REM "ELEMENTE BILANT TERMIC GAZOGEN"

1000 REM "INTRODUCERE - VERIFICARE DATE BILANT GAZOGEN"

1010 DATA "CARBON", "HIDROGEN", "OXIGEN", "AZOT", "SULF", "UMIDITATE", "MASA MINERALA"

1020 FOR I = 1 TO 7

1030 READ DEL\$(I)

1040 NEXT I

1240 PRINT "INTRODUCEREA DATELOR INITIALE BILANT GAZOGEN"

1250 INPUT "DENUMIRE CARBUNE ?"; DENS

1260 PRINT "ANALIZA ELEMETARA A CARBUNELUI, PROBA INITIALA"

1270 FOR I = 1 TO 7

1280 PRINT "CONTINUTUL DE"; DEL\$(I); "IN ?"

1290 INPUT AEL(I)

1300 IF AEL(I) < 0 OR AEL(I) > 100 GOTO 1310 ELSE 1340

1310 PRINT " ATENTIE - CONTINUTUL DE"; DEL\$(I); "IN %"; AEL(I); "ESTE INCORECT"

1320 PRINT "INTRODUCETI VALOAREA CORECTA A CONTINUTULUI DE"; DEL\$(I)

1330 GOTO 1280

1340 NEXT I

1350 SUMA = 0

1360 FOR I = 1 TO 7

1370 SUMA = SUMA + AEL(I)

1380 NEXT I

1390 IF SUMA < 99.9 OR SUMA > 100.1 GOTO 1400 ELSE 1460

1400 PRINT "EROARE LA INTRODUCEREA COMPOZITIEI CARBUNELUI"

1410 FOR I = 1 TO 7

1420 PRINT "CONTINUTUL DE"; DEL\$(I); "IN %"; AEL(I)

1430 NEXT I

1440 PRINT "SUMA TOTALA A COMPONENTELOR CARBUNELUI IN %"; SUMA

1450 GOTO 1260

1460 PRINT "INTRODUCETI TEMPERATURA CARBUNELUI LA INTRARE IN GAZOGEN IN GRAD C ?"

1461 INPUT TCAR

1462 IF TCAR < 0 OR TCAR > 100 GOTO 1463 ELSE 1465

1463 PRINT "ATENTIE - TEMPERATURA CARBUNELUI LA INTRARE "; TCAR; " GRAD C"

1464 GOTO 1460

1465 DIM DENC\$(2), ACEN(2), CCEN(2), ACEN1(2), CCEN1(2)

1466 DATA "CENUSA", "ANTRENATE"

1467 FOR I = 1 TO 2

1468 READ DENC\$(I)

1469 NEXT I

1470 PRINT "INTRODUCETI CARACTERISTICILE CENUSII"

1471 FOR I = 1 TO 2

1472 PRINT "CONTINUTUL DE MASAMINERALA EVACUATA SUB FORMA DE "; DENC\$(I); " IN

1473 INPUT ACEN(I)

1474 IF ACEN(I) < 0 OR ACEN(I) > 100 GOTO 1475 ELSE 1477

1475 PRINT "ATENTIE - CONTINUTUL DE MASA MINERALA EVACUATA SUB FORMA DE "; DENC\$(I); " IN %"

1476 GOTO 1472

1477 NEXT I

1478 FOR I = 1 TO 2

1479 PRINT "INTRODUCETI CONTINUTUL DE CARBON AL "; DENC\$(I); " IN ?"

1480 INPUT CCEN(I)

1481 IF CCEN(I) < 0 OR CCEN(I) > 100 GOTO 1482 ELSE 1484

1482 PRINT "ATENTIE - CONTINUTUL DE CARBON AL "; DENC\$(I); " ESTE "; CCEN(I); "

1483 GOTO 1479

1484 NEXT I

1485 FOR I = 1 TO 2

```

1486 CCEN1(I) = CCEN(I) / 100
1487 ACEN1(I) = ACEN(I) / 100
1488 NEXT I
1489 PRINT "INTRODUCETI NECESARUL DE EXCES DE UMIDITATE A CARBUNELUI IN KG/KG
CARBUNE'"
1490 INPUT WEXC
1491 IF WEXC < 0 OR WEXC > 2 GOTO 1492 ELSE 1494
1492 PRINT "ATENTIE - EXCESUL DE UMIDITATE AL CARBUNELUI "; WEXC; " KG/KG CARBUNE"
1493 GOTO 1489
1494 PRINT "INTRODUCETI TEMPERATURA APEI IN EXCES IN GRAD C"
1495 INPUT TWEXC
1496 IF TWEXC < 0 OR TWEXC > 100 GOTO 1497 ELSE 1499
1497 PRINT "ATENTIE - TEMPERATURA APEI IN EXCES "; TWEXC; " GRAD C"
1498 GOTO 1494
1499 FOR I = 1 TO 7
1500 AEL1(I) = AEL1(I) / 100
1501 NEXT I
1505 PCSCAR = AEL1(1) * 33900 + 120120 * (AEL1(2) - AEL1(3) / 8) + 10470 * AEL1(5)
1506 PCICAR = PCSCAR - 2510 * (AEL1(6) - 9 * AEL1(3) / 8)
1509 PRINT "ANALIZA ELEMENTARA GAZ DE GAZOGEN UMED"
1510 DATA "CO2", "CO", "CH4", "H2", "N2", "H2S", "H2O"
1520 FOR I = 1 TO 7
1530 READ GAZUMDS(I)
1540 NEXT I
1550 FOR I = 1 TO 7
1560 PRINT "CONTINUTUL DE"; GAZUMDS(I); "IN * ?'"
1570 INPUT CGAZUMD(I)
1580 IF CGAZUMD(I) < 0 OR CGAZUMD(I) > 100 GOTO 1590 ELSE 1620
1590 PRINT "ATENTIE - CONTINUTUL DE"; GAZUMDS(I); "IN *"; CGAZUMD(I); "ESTE INCORECT"
1600 PRINT "INTRODUCETI VALOAREA CORECTA A CONTINUTULUI DE"; CGAZUMD(I)
1610 GOTO 1560
1620 NEXT I
1630 SUMA = 0
1640 FOR I = 1 TO 7
1650 SUMA = SUMA + CGAZUMD(I)
1660 NEXT I
1670 IF SUMA < 99.9 OR SUMA > 100.1 GOTO 1680 ELSE 1740
1680 PRINT "EROARE LA INTRODUCEREA COMPOZITIEI GAZULUI DE GAZOGEN"
1690 FOR I = 1 TO 7
1700 PRINT "CONTINUTUL DE "; GAZUMDS(I); "IN %"; CGAZUMD(I)
1710 NEXT I
1720 PRINT "SUMA TOTALA A COMPONENTELOR GAZULUI DE GAZOGEN IN %"; SUMA
1730 GOTO 1550
1740 FOR I = 1 TO 7
1750 CGU1(I) = CGAZUMD(I) / 100
1760 NEXT I
1800 PRINT "INTRODUCETI DEBITUL TOTAL SPECIFIC DE GAZ UMED IN M^3N/KG CARBUNE ?"
1810 INPUT DTGU
1820 IF DTGU < 0 OR DTGU > 10 GOTO 1830 ELSE 1841
1830 PRINT "ATENTIE - DEBITUL TOTAL SPECIFIC DE GAZ UMED "; DTGU; " M^3N/KG CARBUNE"
1840 GOTO 1800
1841 PRINT "INTRODUCETI CANTITATEA DE GUDROANE DIN UNITATEA DE GAZ IN KG/M^3N GAZ"
1842 INPUT GUD
1843 IF GUD < 0 OR GUD > .1 GOTO 1844 ELSE 1850
1844 PRINT "ATENTIE - CANTITATEA DE GUDROANE "; GUD; " KG/M^3N GAZ"
1845 PRINT "SE RECOMANDA CANTITATEA DE GUDROANE DE 0,01-0,05 KG/M^3N GAZ"
1846 GOTO 1841
1850 PRINT "INTRODUCETI PARAMETRII DE OPERARE AI GAZIFICARII"
1860 PRINT "INTRODUCETI TEMPERATURA DE GAZIFICARE IN GRAD C"
1870 INPUT TGAZ
1880 IF TGAZ < 400 OR TGAZ > 1000 GOTO 1890 ELSE 1905
1890 PRINT "ATENTIE - TEMPERATURA DE GAZIFICARE "; TGAZ; " GRAD C"
1900 GOTO 1860

```



```

1905 TGAZK = TGAZ + 273.15
1910 PRINT "INTRODUCETI PRESIUNEA DE GAZIFICARE IN BAR"
1920 INPUT PGAZ
1930 IF PGAZ < 1 OR PGAZ > 50 GOTO 1940 ELSE 1960
1940 PRINT "ATENTIE - PRESIUNEA DE GAZIFICARE "; PGAZ; " IN BAR"
1950 GOTO 1910

```

```

1960 REM LISTARE CONSOLA DATE INTRARE

```

```

PRINT "*****"
PRINT "*"
PRINT "          INTRODUCERE DATE INITIALE"
PRINT "*"
PRINT USING "*"          DENUMIRE CARBUNE \          \
"*"; DEN$
PRINT "*"
PRINT "          ANALIZA ELEMENTARA PROBA ANHIDRA / /"
PRINT "*"
PRINT USING "*"          \          \          \          \          \          \
"*"; DEL$(1); DEL$(2); DEL$(3); DEL$(4)
PRINT USING "*"          ##.##          ##.##          ##.##          ##.##
"*"; AEL(1); AEL(2); AEL(3); AEL(4)
PRINT "*"
PRINT USING "*"          \          \          \          \          \
"*"; DEL$(5); DEL$(6); DEL$(7)
PRINT USING "*"          ##.##          ##.##          ##.##
"*"; AEL(5); AEL(6); AEL(7)
PRINT "*"
PRINT "          PUTERE CALORIFICA /kJ/Nm3/"
PRINT "*"
PRINT "          SUPERIOARA          INFERIOARA"
PRINT USING "*"          #####.###          #####.###
"*"; PCSCAR; PCICAR
PRINT "*"
PRINT "*****"
PRINT "          PARAMETRII DE OPERARE GAZOGEN"
PRINT "*"
PRINT "          TEMPERATURA          PRESIUNEA"
PRINT "          /grad C/          /bar/"
PRINT USING "*"          #####          ##
"*"; TGAZ; PGAZ
PRINT "*"
PRINT "*****"
PRINT "          COMPOZITIE GAZ DE GAZOGEN / /"
PRINT "*"
PRINT "          CO2          CO          CH4          H2"
PRINT USING "*"          ##.##          ##.##          ##.##          ##.##
"*"; CGAZUMD(1); CGAZUMD(2); CGAZUMD(3); CGAZUMD(4);
PRINT "*"
PRINT "          N2          H2S          H2O"
PRINT USING "*"          ##.##          ##.##          ##.##
"*"; CGAZUMD(5); CGAZUMD(6); CGAZUMD(7);
PRINT "*"
PRINT "*****"

```

```

REM DESCHIDERE FISIER DATE INTRARE - MARIMI CALCULATE

```

```

OPEN "bilarez.txt" FOR OUTPUT AS #1

```

```

PRINT #1, "*****"
PRINT #1, "*"

```



```

2080 INPUT GQPP5
2090 IF GQPP5 < 1 OR GQPP5 > 8 GOTO 2100 ELSE 2130
2100 PRINT "ATENTIE - PIERDEREA PROCENTUALA PRIN SCHIMB TERMIC GLOBAL CU MEDIUL
AMBIANT "; GQPP5; " %"
2110 PRINT "SE RECOMANDA O PIERDERE PROCENTUALA DE 3-5 %"
2120 GOTO 2070
2130 GQPR5 = GQPP5 / 100

2500 REM "BILANTUL TERMIC AL GAZOGENULUI"

2510 REM "FLUXURI TERMICE INTRATE IN GAZOGEN"

2520 REM "RANDAMNETUL GAZOGENULUI"

2525 PCIGUD = 33660
2530 GQPR3 = GUD * DTGU * PCIGUD
2540 GQPR4 = AEL1(7) * (ACEN1(1) * CCEN1(1) + ACEN1(2) * CCEN1(2)) * 33900 / (PCICAR
* 1.5)
2541 CACEN = ACEN1(1) * AEL1(7)
2542 CAANT = ACEN1(2) * AEL1(7)
2545 CSCEN = .822 + .02175 * TGAZ / 100 - .000625 * (TGAZ / 100) ^ 2
2550 GQPR6 = AEL1(7) * CSCEN * TGAZ / (PCICAR * 1.5)
2552 GQPRR4 = GQPR4 * PCICAR
2560 ETAG = 1 - (GQPR4 + GQPR5 + GQPR6)
2570 CSCAR = 1.13 * (1 - AEL1(6)) + 4.1855 * AEL1(6)
2580 QICS = CSCAR * TCAR
2590 QIWS = 4.1855 * WEXC * TWEXC
2690 PRINT "ETAG,GQPR3,GQPR4,GQPR5,GQPR6,PCICAR"
2692 PRINT ETAG; GQPR3; GQPR4; GQPR5; GQPR6; PCICAR

2700 REM "CARACTERISTICI TERMODINAMICE GAZ"

2710 PCIGUM = CGU1(2) * 12720 + CGU1(3) * 35910 + CGU1(4) * 10800 + CGU1(6) * 23400
2711 PCSGUM = CGU1(2) * 12720 + CGU1(3) * 39800 + CGU1(4) * 12770 + CGU1(6) * 25620
2712 PRINT "PUTERE CALORIFICA GAZ UMED"; PCIGUM
2800 DIM COEFCG(7, 3), CSCGG1(7)
2810 DATA 1.969,0.403,-0.0381,1.267,0.183,-
0.0021,0.779,2.697,0.1313,1.217,0.145,0.0022,1.243,0.191,0,1.31,0.687,0,1.336,0.478,
.0015
2820 FOR I = 1 TO 7
2830 FOR J = 1 TO 3
2840 READ COEFCG(I, J)
2850 NEXT J
2860 NEXT I
2920 FOR I = 1 TO 7
2930 CSCGG1(I) = COEFCG(I, 1) + COEFCG(I, 2) * TGAZK / 1000 + COEFCG(I, 3) * 1000
TGAZK) ^ 2
2940 NEXT I
2950 CSGG1 = 0
2960 FOR I = 1 TO 7
2970 CSGG1 = CSGG1 + CSCGG1(I) * CGU1(I)
2980 NEXT I
2985 PRINT "CALDURA SPECIFICA GAZ UMED"; CSGG1

2990 REM "FLUXURI TERMICE IESITE"

3000 QEGC = DTGU * PCIGUM
3010 QEGS = DTGU * CSGG1 * TGAZ

3020 REM "FLUX NECESAR GAZIFICARII DIN EXTERIOR"

3030 FLGEX = ((QEGC + QEGS + GQPR3) / ETAG) - (PCICAR + QICS + QIWS)
3040 PRINT "FLUX"; FLGEX

```

```

3050 QTIBGZ = PCICAR - QICS - QIWS + FLGEX
3053 GQPRR5 = GQPR5 * QTIBGZ
3054 GQPRR6 = GQPR6 * QTIBGZ
3056 GQPP4 = GQPR4 * 100
3058 GQPP6 = GQPR6 * 100
3060 QTUBGZ = QEGC + QEGS + GQPR3
3070 QTPBGZ = GQPRR4 + GQPRR5 + GQPRR6
3080 QTEBGE = QTUBGZ - QTPBGZ
3090 ETAGF = QTUBGZ * 100 / QTIBGZ

3500 REM "BILANT TERMIC FOCAR"

3510 PRINT " INTRODUCERE DATE INITIALE BILANT TERMIC FOCAR"
3520 PRINT "INTRODUCETI COEFICIENTUL EXCESULUI DE ARDERE"
3530 INPUT ALFA
3540 IF ALFA < 1 OR ALFA > 2 GOTO 3550 ELSE 3570
3550 PRINT "ATENTIE - COEFICIENTUL EXCESULUI DE AER "; ALFA
3560 GOTO 3520
3570 PRINT "INTRODUCETI TEMPERATURA GAZULUI DE GAZOGEN LA INTRARE IN FOCAR IN GRAD C"
3580 INPUT TGGIF
3590 IF TGGIF < 10 OR TGGIF > 50 GOTO 3600 ELSE 3620
3600 PRINT "ATENTIE - TEMPERATURA GAZULUI DE GAZOGEN LA INTRARE IN FOCAR "; TGGIF; "
GRAD C"
3610 GOTO 3570
3620 TGGIFK = TGGIF + 273.15
3630 PRINT "INTRODUCETI PIERDEREA PRIN ARDERE INCOMPLETA DIN PUNCT DE VEDERE CHIMIC
IN °"
3640 INPUT FQPP3
3650 IF FQPP3 < 0 OR FQPP3 > 3 GOTO 3660 ELSE 3680
3660 PRINT "ATENTIE - PIERDEREA PRIN ARDERE INCOMPLETA DIN PUNCT DE VEDERE CHIMIC ";
FQPP3; " IN °"
3670 GOTO 3640
3680 PRINT "INTRODUCETI PIERDEREA PRIN SCHIMB TERMIC GLOBAL CU MEDIUL AMBIANT IN °"
3690 INPUT FQPP5
3700 IF FQPP5 < 0 OR FQPP5 > 10 GOTO 3710 ELSE 3730
3710 PRINT "ATENTIE - PIERDEREA PRIN SCHIMB TERMIC GLOBAL CU MEDIUL AMBIANT "; FQPP5;
" °"
3720 GOTO 3680
3730 FQPR3 = FQPP3 / 100
3740 FQPR5 = FQPP5 / 100
3750 ETAF = 1 - (FQPR3 + FQPR5)
3755 PRINT "RANDAMENT FOCAR"; ETAF

3900 REM "FLUXURI TERMICE INTRATE"

3910 DIM CGA1(6), VGA(5), COEFCGA(5, 3), CSCGA1(5), CSCGA2(5)
3920 FOR I = 1 TO 6
3930 CGA1(I) = CGU1(I) / (1 - CGU1(I))
3935 NEXT I
3940 PCIGAH = PCIGUM / (1 - CGU1(7))
3945 PRINT "CO2,CO,CH4,H2,N2,H2S,PUTERE CALORIFICA GAZ ANHIDRU"
3946 PRINT CGA1(1); CGA1(2); CGA1(3); CGA1(4); CGA1(5); CGA1(6); PCIGAH
3950 FOR I = 1 TO 6
3960 CSCGG2(I) = COEFCG(I, 1) + COEFCG(I, 2) * TGGIFK / 1000 + COEFCG(I, 3) * (1000
TGGIFK) ^ 2
3970 NEXT I
3980 CSGG2 = 0
3990 FOR I = 1 TO 6
4000 CSGG2 = CSGG2 + CSCGG2(I) * CGA1(I)
4010 NEXT I
4015 PRINT "CALDURA SPECIFICA GAZ ANHIDRU INTRARE FOCAR"; CSGG2

4020 REM "BILANTUL MATERIAL AL ARDERII"

```

```

4110 OMIN = .5 * CGA1(2) + 2 * CGA1(3) + .5 * CGA1(4) - 1.5 * CGA1(6)
4120 L = ALFA * OMIN / .21
4130 VGA(1) = CGA1(1) + CGA1(2) + CGA1(3)
4140 VGA(2) = 2 * CGA1(3) + CGA1(4) + CGA1(6)
4150 VGA(3) = CGA1(6)
4160 VGA(4) = (ALFA - 1) * OMIN
4170 VGA(5) = CGA1(5) + .79 * L
4171 PRINT "OMIN, L, CO1, H2O, SO2, O2, N2"
4172 PRINT OMIN; L; VGA(1); VGA(2); VGA(3); VGA(4); VGA(5)
4173 VGAF1 = VGA(1) + VGA(2) + VGA(3) + VGA(4) + VGA(5)
4174 PRINT VGAF1
4175 PRINT "INTRODUCETI CONTINUARE"
4176 INPUT CONTI12
4180 VGAF = 0
4190 FOR I = 1 TO 5
4200 VGAF = VGAF + VGA(I)
4210 NEXT I
4215 PRINT "INTRODUCETI TEMPERATURA AERULUI DE DILUTIE LA IESIREA DIN RECUPERATOR IN
GRAD C"
4216 INPUT TLDE
4217 VAL1 = TGAEG - TLDE
4218 IF VAL1 < 30 OR VAL1 > 150 GOTO 4219 ELSE 4225
4219 PRINT "ATENTIE - TEMPERATURA AERULUI DE DILUTIE LA IESIRE DIN RECUPERATOR ";
TLDE; " GRAD C"
4220 PRINT "RECOMANDARE: 50-100 GRAD C < TEMPERATURA GAZELOR DE ARDERE LA IESIRE DIN
GAZOGEN = "; TGAEG; " GRAD C"
4221 GOTO 4215
4225 TLDEK = TLDE + 273.15
4226 CLD1 = 1.277 + .1826 * TLDEK / 1000

4230 REM "COEFICIENTI ECUATIE BILANT FOCAR - MARIMI INTRARE"

4240 PFI1 = (PCIGAH + CSGG2 * TGGIF) * ETAF
4245 PFI2 = L * ETAF
4250 PFI3 = ETAF * CLD1 * TLDE
4252 PRINT "ETAFOCAR"; ETAF
4300 DATA 1.969, 0.403, -0.0381, 1.336, 0.476, 0.0015, 1.896, 0.56, 0.0252, 1.404, 0.151, -
0.0168, 1.243, 0.191, 0
4310 FOR I = 1 TO 5
4320 FOR J = 1 TO 3
4330 READ COEFCGA(I, J)
4340 NEXT J
4350 NEXT I
4360 FOR I = 1 TO 5
4370 CSCGA1(I) = COEFCGA(I, 1) + COEFCGA(I, 2) * TGAIGK / 1000 + COEFCGA(I, 3) *
(1000 / TGAIGK) ^ 2
4380 NEXT I
4385 CSGA1 = 0
4390 FOR I = 1 TO 5
4400 CSGA1 = CSGA1 + CSCGA1(I) * VGA(I)
4410 NEXT I
4415 PRINT "CALDURA SPECIFICA GAZE ARSE IESIRE FOCAR VG*CP"; CSGA1
4420 CLD2 = 1.277 + .1826 * TGAIGK / 1000

4430 REM "COEFICIENTI ECUATIE BILANT FOCAR - MARIMI IESITE"

4440 PFE1 = CSGA1 * TGAIG
4450 PFE2 = CLD2 * TGAIG

4460 REM "COEFICIENTI FINALI ECUATIE BILANT FOCAR"

4470 PFR1 = PFI1 - PFE1
4480 PFR2 = PFI2

```

4490 PFR3 = PFI3 - PFED

4800 REM "BILANT GAZE DE ARDERE GAZOGEN"

4810 FOR I = 1 TO 5

4820 CSCGA2(I) = COEFCGA(I, 1) + COEFCGA(I, 2) \* TGAEGK / 1000 + COEFCGA(I, 3) \* (1000 / TGAEGK) - C

4830 NEXT I

4840 CSGA2 = 0

4850 FOR I = 1 TO 5

4860 CSGA1 = CSGA2 + CSCGA2(I) \* VGA(I)

4870 NEXT I

4875 PRINT "CALDURA SPECIFICA GAZE ARDERE IESIRE GAZOGEN"; CSGA2

4880 CLD3 = 1.277 + .1826 \* TGAEGK / 1000

4890 REM "COEFICIENTI FINALI BILANT GAZE DE ARDERE GAZOGEN"

4900 PGR1 = CSGA1 \* TGAIG - CSGA2 \* TGAEG

4910 PGR2 = CLD2 \* TGAIG - CLD3 \* TGAEG

4920 PGR3 = -FLGEX

5000 REM "BILANT RECUPERATOR AER COMBUSTIE"

5005 DIM CSCGG3(7)

5010 PRINT "INTRODUCETI TEMPERATURA GAZULUI DE GAZOGEN LA IESIRE DIN RECUPERATOR IN GRAD C"

5020 INPUT TGGER

5030 IF TGGER < 50 OR TGGER > 150 GOTO 5040 ELSE 5061

5040 PRINT "ATENTIE - TEMPERATURA GAZULUI DE GAZOGEN LA IESIRE DIN RECUPERATOR "; TGGER; " GRAD C"

5050 PRINT "SE RECOMANDA 80-120 GRAD C"

5060 GOTO 5010

5061 TGGERK = TGGER + 273.15

5062 PRINT "INTRODUCETI TEMPERATURA AERULUI DE COMBUSTIE LA INTRARE IN RECUPERATOR IN GRAD C"

5063 INPUT TLAI

5064 IF TLAI < 10 OR TLAI > 60 GOTO 5065 ELSE 5067

5065 PRINT "ATENTIE - TEMPERATURA AERULUI DE COMBUSTIE LA INTRARE IN RECUPERATOR "; TLAI; " GRAD C"

5066 GOTO 5062

5067 TLAIK = TLAI + 273.15

5070 PRINT "INTRODUCETI PIERDEREA RECUPERATURULUI PRIN SCHIMB GLOBAL CU MEDIUL AMBIANT IN %"

5080 INPUT RLQPP5

5090 IF RLQPP5 < 0 OR RLQPP5 > 10 GOTO 5100 ELSE 5120

5100 PRINT "ATENTIE - PIERDEREA PRIN SCHIMB GLOBAL CU MEDIUL AMBIANT "; RLQPP5; " %"

5110 GOTO 5070

5120 RLQPR5 = RLQPP5 / 100

5130 ETARLA = 1 - RLQPR5

5140 FOR I = 1 TO 7

5150 CSCGG3(I) = COEFCG(I, 1) + COEFCG(I, 2) \* TGGERK / 1000 + COEFCG(I, 3) \* (TGGERK / 1000) ^ 2

5160 NEXT I

5170 CSGG3 = 0

5180 FOR I = 1 TO 7

5190 CSGG3 = CSGG3 + CSCGG3(I) \* CSU1(I)

5200 NEXT I

5210 CLA1 = 1.277 + .1826 \* TLAIK / 1000

5220 REM "COEFICIENTI FINALI BILANT RECUPERATOR GAZ DE GAZOGEN - AER COMBUSTIE"

5230 PLAR1 = -CLA1 \* TLAI

5240 PLAR2 = 1

```

5250 PLAR3 = -ETARLA * DTGU * (CSGG1 * TGAZ - CSGG3 * TGGER)

5500 REM "REZOLVARE SISTEM ECUATII"

5510 TS1 = PFR3 * PGR1 / PGR2
5520 TS2 = PFR2 * PLAR1 / PLAR2
5530 TS3 = PFR2 * PLAR3 / PLAR2
5540 TS4 = PFR3 * PGR3 / PGR2
5550 DAGA = (TS3 + TS4) / (PFR1 - TS1 - TS2)
5552 DGATG = DAGA * VGAF
5560 PRINT "REZULTAT SISTEM - DEBIT GAZ DE GAZOGEN ANHIDRU ARS "; DAGA; " M3N/HR
CAR"
5570 DLD = -(PGR1 * DAGA + PGR3) / PGR2
5580 ELAER = -(DAGA * PLAR1 + PLAR3 / (DAGA * PLAR2)
5590 AE2 = .1826 / 1000
5600 BE2 = 1.3269
5610 CE2 = -ELAER
5620 DELE2 = BE2 ^ 2 - 4 * AE2 * CE2
5630 TLAER = (-BE2 + (DELE2 ^ .5)) / (2 * AE2)
5640 TLAER2 = (-BE2 - (DELE2 ^ .5)) / (2 * AE2)
5641 DELF = DAGA * L
5642 FICGG = DAGA * PCIGAH
5643 FISGG = DAGA * CSGG2 * TGGIF
5644 FISLD = DLD * CLD1 * TLDE
5645 FISLC = L * DAGA * ELAER
5646 FTIN = FICGG + FISGG + FISLD + FISLC
5647 DGAFG = DAGA * VGAF
5650 PRINT "SOLUTII SISTEM ECUATII, DAGA, DLD, TLAER, TLAER2"
5660 PRINT DAGA; DLD; TLAER; TLAER2
5661 FESGA = DAGA * PFE1 + DLD * PFE2
5662 FEPCI = FTIN * FQPR3
5663 FEPMA = FTIN * FQPR3
5664 FETF = FESGA + FEPCI + FEPMA
5665 FETA = 100 * FESGA / FTIN
5670 PRINT "INTRODUCETI VALOARE"
5680 INPUT NRGFG
5690 RCQISG = DTGU * CSGG1 * TGAZ
5700 RCQISL = DELF * CLA1 * TLAI
5710 RCQTI = RCQISG + RCQISL
5720 RCQESG = DTGU * CSGG3 * TGGER
5730 RCQESL = DELF * ELAER
5735 RCQTE = RCQESG + RCQESL
5740 RCFU = RCQESL - RCQISL
5750 VRLQPP5 = RLQPR5 * RCFU
5760 ETARC = 100 * RCFU / (RCQISG - RCQESG)

6000 REM "BILANT TERMIC RECUPERATOR AER DILUTIE"

6010 PRINT "INTRODUCETI TEMPERATURA AERULUI DE DILUTIE LA INTRAREA IN RECUPERATOR IN
GRAD C"
6020 INPUT TLDI
6022 IF TLDI < 10 OR TLDI > 50 GOTO 6023 ELSE 6030
6023 PRINT "ATENTIE - TEMPERATURA AERULUI DE DILUTIE LA INTRARE IN RECUPERATOR EST ";
TLDI; " GRAD C"
6024 GOTO 6010
6030 TLDIK = TLDI + 273.15
6040 PRINT "INTRODUCETI PIERDEREA PRIN SCHIMB CU MEDIUL AMBIANT AL RECUPERATORULUI
AERULUI DE DILUTIE IN "
6050 INPUT RDQPP5
6060 IF RDQPP5 < 0 OR RDQPP5 > 10 GOTO 6070 ELSE 6090
6070 PRINT "ATENTIOE - PIERDEREA PRIN SCHIMB CU MEDIUL AMBIANT AL RECUPERATORULUI
AERULUI DE DILUTIE "; RDQPP5; " "
6080 GOTO 6040

```







```

PRINT "*"
PRINT USING "*"
*"; DEL$(5); DEL$(6); DEL$(7
PRINT USING "*"          ##.##          ##.##          ##.##
*"; AEL(5); AEL(6); AEL(7
PRINT "*"
PRINT "          PUTERE CALORIFICA /kJ/kg"
PRINT "*"
PRINT "          SUPERIOARA          INFERIOARA"
PRINT USING "*"          #####.###          #####.###
*"; PCSCAR; PCICAR
PRINT "*"
PRINT "          TEMPERATURA INTRARE          CALDURA SPECIFICA"
PRINT "          /grad C/          /kJ/kg K/"
PRINT USING "*"          ##.##          ##.#####
*"; TCAR; CSCAR
PRINT "*"
PRINT "          EXCES UMIDITATE"
PRINT "          CANTITATE SPECIFICA          TEMPERATURA"
PRINT "          /kg/kg CARBUNE/          /grad C/"
PRINT USING "*"          ##.####          ##.##
*"; WEXC; TWEXC
PRINT "*"
PRINT "          GAZE DE ARDERE"
PRINT "          TEMPERATURA INTRARE          TEMPERATURA IESIRE"
PRINT "          /grad C/          /grad C/"
PRINT USING "*"          #####.###          #####.###
*"; TGAIG; TGAEG
PRINT "          DEBIT STARE NORMALA /Nm3/kg CARBUNE/"
PRINT USING "*"          ##.#####
*"; DGATG
PRINT "*"
PRINT "*****"
PRINT "*****"
PRINT "          FLUXURI TERMICE INTRATE"
PRINT "          CHIMIC CARBUNE          SENSIBIL CARBUNE"
PRINT "          /kJ/kg CARBUNE/          /kJ/kg CARBUNE/"
PRINT USING "*"          #####.###          ##.###
*"; PCICAR; QICS
PRINT "          SENSIBIL EXCES UMIDITATE          FLUX EXTERIOR"
PRINT "          /kJ/kg CARBUNE/          /kJ/kg CARBUNE/"
PRINT USING "*"          ##.###          #####.###
*"; QIWS; FLGEX
PRINT "*"
PRINT "          FLUX TOTAL INTRAT"
PRINT "          /kJ/kg CARBUNE/"
PRINT USING "*"          #####.###
*"; QTIBGZ
PRINT "*"
PRINT "*****"
PRINT "*****"
PRINT "          BILANT TERMIC GAZOGEN CU UMIDITATE PROPRIE"
PRINT "          PARAMETRII MAXIMI IESITE"
PRINT "          GAZ DE GAZOGEN

```

```

PRINT **
PRINT **          COMPOZITIE
PRINT **
PRINT USING "**
**; GAZUMDS(1); GAZUMDS(2); GAZUMDS(3); GAZUMDS(4)
PRINT USING "**          **.**#          **.**#          **.**#          **.**#
**; CGAZUMD(1); CGAZUMD(2); CGAZUMD(3); CGAZUMD(4)
PRINT **
PRINT USING "**
**; GAZUMDS(5); GAZUMDS(6); GAZUMDS(7)
PRINT USING "**          **.**#          **.**#          **.**#
**; CGAZUMD(5); CGAZUMD(6); CGAZUMD(7)
PRINT **
PRINT **          PUTERE CALORIFICA /kJ/Nm3/
PRINT **
PRINT **          SUPERIOARA          INFERIOARA
PRINT USING "**          #####.**#          #####.**#
**; PCSGUM; PCIGUM
PRINT **
PRINT **          TEMPERATURA IESIRE          DEBIT SPECIFIC
PRINT **          /grad C/          /Nm3/kg CARBUNE/
PRINT USING "**          **.*##          **.*#####
**; TGAZ; DTGU
PRINT **
PRINT **          GUDROANE
PRINT **          CANTITATE SPECIFICA          PUTERE CALORIFICA
PRINT **          /kg/Nm3 GAZ/          /kJ/kg GUDRON/
PRINT USING "**          **.*###          #####.**#
**; GUD; PCIGUD
PRINT **
PRINT **          FRACTIUNE CENUSA          FRACTIUNE ANTRENATE
PRINT **          /kg/kg CARBUNE          /kg/kg CARBUNE/
PRINT USING "**          **.*###          **.*###
**; CACEN; CAANT
PRINT **          CARBON CENUSA          CARBON ANTRENATE
PRINT **          / /          / /
PRINT USING "**          **.*##          **.*##
**; CCEN(1); CCEN(2)
PRINT **
PRINT "*****"
PRINT "*****"
PRINT **
PRINT **          FLUXURI TERMICE IESITE
PRINT **
PRINT **          FLUXURI TERMICE UTILE
PRINT **
PRINT **          CHIMIC GAZ          SENSIBIL GAZ          CHIMIC GUDROANE
PRINT **          /kJ/kg CARBUNE/          /kJ/kg CARBUNE/          /kJ/kg CARBUNE
PRINT USING "**          #####.**#          #####.**#          #####.#####
**; QEGC; QEGS; GQPR3
PRINT **
PRINT **          FLUX UTIL TOTAL
PRINT **          /kJ/kg CARBUNE/
PRINT USING "**          #####.**#
**; QTUBGZ
PRINT **
PRINT "*****"
PRINT **
PRINT **          PIERDERI SPECIFICE
PRINT **
PRINT **          SENSIBIL CENUSA          CHIMIC CENUSA          MEDIU AMBIANT
PRINT **          /kJ/kg CARBUNE/          /kJ/kg CARBUNE/          /kJ/kg CARBUNE/

```

```

PRINT USING "*"      ###.##          ###.##          ###.##
*"; GQPRR6; GQPRR4; GQPRR5
PRINT "*"           /% /           /% /           /% /
PRINT USING "*"      ##.###          ##.###          ##.###
*"; GQPP6; GQPP4; GQPP5
PRINT "*"
PRINT "              FLUX TOTAL PIERDUT
PRINT "              /kJ/kg CARBUNE/
PRINT USING "*"      #####.###
*"; QTPBGC
PRINT "*"
PRINT "              FLUX TOTAL IESIT
PRINT "              /kJ/kg CARBUNE/
PRINT USING "*"      #####.###
*"; QTEBGZ
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "              RANDAMENT GAZOGEN
PRINT "              /% /
PRINT USING "*"      ##.###
*"; ETAGP
PRINT "*****"

PRINT "*****"
PRINT "*"
PRINT "              BILANT TERMIC FOCAR CICLON
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "              PARAMETRII MARIMI INTRATE
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "              GAZ DE GAZOGEN - COMBUSTIBIL
PRINT "*"
PRINT "              TEMPERATURA INTRARE          DEBIT
PRINT "              /grad C/                    /Nm3/kg CARBUNE/
PRINT USING "*"      ###.##                    ###.#####
*"; TGGIF; DAGA
PRINT "*"
PRINT "              AER COMBUSTIE
PRINT "              TEMPERATURA          DEBIT
PRINT "              /grad C/              /Nm3/kg CARBUNE/
PRINT USING "*"      #####.#####          ###.##
*"; TLAER; DELF
PRINT "*"
PRINT "              AER DILUTIE
PRINT "              TEMPERATURA          DEBIT
PRINT "              /grad C/              /Nm3/kg CARBUNE/
PRINT USING "*"      #####.###          #####.###
*"; TLDE; DLD
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "              FLUXURI TERMICE INTRATE
PRINT "*"
PRINT "              CHIMIC GAZ          SENSIBIL GAZ
PRINT "              /kJ/kg CARBUNE/    /kJ/kg CARBUNE
PRINT USING "*"      #####.###          ##.###
*"; FICGG; FISGG
PRINT "              SENSIBIL AER COMBUSTIE          SENSIBIL AER DILUTIE
PRINT "              /kJ/kg CARBUNE/              /kJ/kg CARBUNE

```

```

PRINT USING "*"          #####.###          #####.###
*"; F1SLD; F1SLD
PRINT "*"
PRINT "*"          FLUX TOTAL INTRAT          +
PRINT "*"          /kJ/kg CARBUNE/          +
PRINT USING "*"          #####.###
*"; F2IN
PRINT "*"
PRINT "*****"
PRINT "*****"
PRINT "*"
PRINT "*"          BILANT TERMIC FOCAR CICLON          +
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "*"          PARAMETRII MARIMI IESITE          +
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "*"          GAZE DE ARDERE          +
PRINT "*"
PRINT "*"          TEMPERATURA IESIRE          DEBIT SPECIFIC          +
PRINT "*"          /grad C/          /Nm3/kg CARBUNE/          +
PRINT USING "*"          #####.##          ###.#####
*"; TGAIG; DGAFG
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "*"          FLUXURI TERMICE IESITE          +
PRINT "*"
PRINT "*"          FLUXURI TERMICE UTILE          +
PRINT "*"
PRINT "*"          SENSIBIL GAZE DE ARDERE          +
PRINT "*"          /kJ/kg CARBUNE/          +
PRINT USING "*"          #####.###
*"; FESGA
PRINT "*"
PRINT "*"          PIERDERI SPECIFICE          +
PRINT "*"
PRINT "*"          ARDERE INCOMPLETA          MEDIU AMBIANT          +
PRINT "*"          /kJ/kg CARBUNE/          /kJ/kg CARBUNE/          +
PRINT USING "*"          #####.##          ###.##
*"; FEPIC; FEPMA
PRINT "*"          / /          / */          +
PRINT USING "*"          ##.###          ##.###
*"; FQPP3; FQPP5
PRINT "*"
PRINT "*"          FLUX TOTAL IESIT          +
PRINT "*"          /kJ/kg CARBUNE/          +
PRINT USING "*"          #####.###
*"; FETF
PRINT "*"
PRINT "*****"
PRINT "*"
PRINT "*"          RANDAMENT FOCAR CICLON          +
PRINT "*"          / /          +
PRINT USING "*"          ##.###
*"; FETA
PRINT "*"
PRINT "*****"

PRINT "*****"
PRINT "*"

```

```

PRINT "*"                                BILANT TERMIC RECUPERATOR AER COMBUSTIE "+"
PRINT "*"                                "+"
PRINT "*****"                          "+"
PRINT "*"                                "+"
PRINT "*"                                PARAMETRII MARIMI INTRATE "+"
PRINT "*"                                "+"
PRINT "*****"                          "+"
PRINT "*"                                "+"
PRINT "*"                                GAZ DE GAZOGEN "+"
PRINT "*"                                "+"
PRINT "*"                                TEMPERATURA INTRARE DEBIT "+"
PRINT "*"                                /grad C/ /Nm3/kg CARBUNE/ "+"
PRINT USING "*"                          ###.## ###.#### "+"
*"; TGAZ; DTGU
PRINT "*"                                "+"
PRINT "*"                                AER COMBUSTIE "+"
PRINT "*"                                TEMPERATURA DEBIT "+"
PRINT "*"                                /grad C/ /Nm3/kg CARBUNE/ "+"
PRINT USING "*"                          ####.### ###.#### "+"
*"; TLAI; DELF
PRINT "*"                                "+"
PRINT "*****"                          "+"
PRINT "*"                                "+"
PRINT "*"                                FLUXURI TERMICE INTRATE "+"
PRINT "*"                                "+"
PRINT "*"                                SENSIBIL GAZ GAZOGEN SENSIBIL AER "+"
PRINT "*"                                /kJ/kg CARBUNE/ /kJ/kg CARBUNE/ "+"
PRINT USING "*"                          #####.### ###.### "+"
*"; RCQISG; RCQISL
PRINT "*"                                "+"
PRINT "*"                                FLUX TOTAL INTRAT "+"
PRINT "*"                                /kJ/kg CARBUNE/ "+"
PRINT USING "*"                          #####.### "+"
*"; RCQTI
PRINT "*"                                "+"
PRINT "*****"                          "+"
PRINT "*****"                          "+"
PRINT "*"                                "+"
PRINT "*"                                BILANT TERMIC RECUPERATOR AER COMBUSTIE "+"
PRINT "*"                                "+"
PRINT "*****"                          "+"
PRINT "*"                                "+"
PRINT "*"                                PARAMETRII MARIMI IESITE "+"
PRINT "*"                                "+"
PRINT "*****"                          "+"
PRINT "*"                                "+"
PRINT "*"                                GAZ DE GAZOGEN "+"
PRINT "*"                                "+"
PRINT "*"                                TEMPERATURA IESIRE DEBIT SPECIFIC "+"
PRINT "*"                                /grad C/ /Nm3/kg CARBUNE/ "+"
PRINT USING "*"                          #####.## ###.#### "+"
*"; TGGER; DTGU
PRINT "*"                                "+"
PRINT "*"                                AER DE COMBUSTIE "+"
PRINT "*"                                "+"
PRINT "*"                                TEMPERATURA IESIRE DEBIT SPECIFIC "+"
PRINT "*"                                /grad C/ /Nm3/kg CARBUNE "+"
PRINT USING "*"                          #####.### ##.### "+"
*"; TLAER; DELF
PRINT "*"                                "+"
PRINT "*****"                          "+"
PRINT "*"                                "+"
PRINT "*"                                FLUXURI TERMICE IESITE "+"

```

```

PRINT ""
PRINT ""          SENSIBIL AER COMBUSTIE          SENSIBIL GAZ
PRINT ""          /kJ/kg CARBUNE/                /kJ/kg CARBUNE/
PRINT USING ""          #####.###                #####.###
*"; RQESL; RQESG
PRINT ""
PRINT ""          FLUX TOTAL IESIT
PRINT ""          /kJ/kg CARBUNE/
PRINT USING ""          #####.###
*"; RQTE
PRINT ""
PRINT ""          FLUXURI TERMICE UTILE PREINCALZIRE AER COMBUSTIE
PRINT ""          /kJ/kg CARBUNE/
PRINT USING ""          #####.###
*"; RCFI
PRINT ""
PRINT ""          PIERDERI SPECIFICE - MEDIU AMBIANT
PRINT ""
PRINT ""          /kJ/kg CARBUNE/                / /
PRINT USING ""          ###.##                ##.##
*"; VRLQPP5; RLQPP5
PRINT ""
PRINT "*****"
PRINT ""
PRINT ""          RANDAMENT RECUPERATOR AER COMBUSTIE
PRINT ""          />/
PRINT USING ""          ##.###
*"; ETARC
PRINT ""
PRINT "*****"

PRINT "*****"
PRINT ""
PRINT ""          BILANT TERMIC RECUPERATOR AER DILUTIE
PRINT ""
PRINT "*****"
PRINT ""
PRINT ""          PARAMETRII MARIMI INTRATE
PRINT ""
PRINT "*****"
PRINT ""
PRINT ""          GAZE DE ARDERE
PRINT ""
PRINT ""          TEMPERATURA INTRARE          DEBIT
PRINT ""          /grad C/                /Nm3/kg CARBUNE/
PRINT USING ""          ###.##                ###.#####
*"; TGAEG; DGATG
PRINT ""
PRINT ""          AER DILUTIE
PRINT ""          TEMPERATURA          DEBIT
PRINT ""          /grad C/                /Nm3/kg CARBUNE/
PRINT USING ""          ####.####                ###.####
*"; TLMG; DLE
PRINT ""
PRINT "*****"
PRINT ""
PRINT ""          FLUXURI TERMICE INTRATE
PRINT ""
PRINT ""          SENSIBIL GAZE ARDERE          SENSIBIL AER
PRINT ""          /kJ/kg CARBUNE/                /kJ/kg CARBUNE/
PRINT USING ""          #####.###                ###.###
*"; TEB3; TEB4
PRINT ""

```

```

PRINT "+                FLUX TOTAL INTRAT                +"
PRINT "+                /kJ/kg CARBUNE/                    +"
PRINT USING "+                #####.###                    +"
*"; TEB7
PRINT "+
PRINT "*****
PRINT "*****
PRINT "+
PRINT "+                BILANT TERMIC RECUPERATOR AER DILUTIE                +"
PRINT "+
PRINT "*****
PRINT "+
PRINT "+                PARAMETRII MARIMI IESITE                +"
PRINT "+
PRINT "*****
PRINT "+
PRINT "+                GAZE DE ARDERE                +"
PRINT "+
PRINT "+                TEMPERATURA IESIRE                DEBIT SPECIFIC                +"
PRINT "+                /grad C/                    /Nm3/kg CARBUNE/                +"
PRINT USING "+                #####.##                    ###.#####                +"
*"; TGACF; DGATG
PRINT "+
PRINT "+                AER DE DILUTIE                +"
PRINT "+
PRINT "+                TEMPERATURA IESIRE                DEBIT SPECIFIC                +"
PRINT "+                /grad C/                    /Nm3/kg CARBUNE/                +"
PRINT USING "+                #####.###                    ##.###                +"
*"; TLDE; DLD
PRINT "+
PRINT "*****
PRINT "+
PRINT "+                FLUXURI TERMICE IESITE                +"
PRINT "+
PRINT "+                SENSIBIL AER DILUTIE                SENSIBIL GAZE ARDERE                +"
PRINT "+                /kJ/kg CARBUNE/                    /kJ/kg CARBUNE/                +"
PRINT USING "+                #####.###                    #####.###                +"
*"; TEB3; TEB6
PRINT "+
PRINT "+                FLUX TOTAL IESIT                +"
PRINT "+                /kJ/kg CARBUNE/                    +"
PRINT USING "+                #####.###                    +"
*"; TEB11
PRINT "+
PRINT "+                FLUXURI TERMICE UTILE PREINCALZIRE AER DILUTIE                +"
PRINT "+                /kJ/kg CARBUNE/                    +"
PRINT USING "+                #####.###                    +"
*"; TEB9
PRINT "+
PRINT "+                PIERDERI SPECIFICE - MEDIU AMBIANT                +"
PRINT "+
PRINT "+                /kJ/kg CARBUNE/                    / /                +"
PRINT USING "+                ##.##                    ##.##                +"
*"; TEB10; RDQPP5
PRINT "+
PRINT "*****
PRINT "+
PRINT "+                RANDAMENT RECUPERATOR AER DILUTIE                +"
PRINT "+                / /                +"
PRINT USING "+                ##.###                    +"
*"; RDETA
PRINT "+
PRINT "*****

```

```

PRINT "*****"
PRINT "
PRINT "          RANDAMENT GLOBAL STATIE GAZIFICARE
PRINT "
PRINT USING "          ##.###
*"; ETASGAC
PRINT "
PRINT "*****"

PRINT #1, "*****"
PRINT #1, "
PRINT #1, "          BILANT TERMIC GAZOGEN CU UMIDITATE PROPRIE
PRINT #1, "
PRINT #1, "*****"
PRINT #1, "
PRINT #1, "          PARAMETRII MARIMI INTRATE
PRINT #1, "
PRINT #1, "*****"
PRINT #1, "
PRINT #1, USING "          CARBUNE \          \
*"; DENS
PRINT #1, "
PRINT #1, "          ANALIZA ELEMENTARA PROBA ANHIDRA /%/
PRINT #1, "
PRINT #1, USING "          \          \          \          \          \          \          \
*"; DELS(1); DELS(2); DELS(3); DELS(4)
PRINT #1, USING "          ##.##          ##.##          ##.##          ##.##
*"; AEL(1); AEL(2); AEL(3); AEL(4)
PRINT #1, "
PRINT #1, USING "          \          \          \
*"; DELS(5); DELS(6); DELS(7)
PRINT #1, USING "          ##.##          ##.##          ##.##
*"; AEL(5); AEL(6); AEL(7)
PRINT #1, "
PRINT #1, "          PUTERE CALORIFICA /kJ/kg/
PRINT #1, "
PRINT #1, "          SUPERIOARA          INFERIOARA
PRINT #1, USING "          #####.###          #####.###
*"; PCSCAR; PCICAR
PRINT #1, "
PRINT #1, "          TEMPERATURA INTRARE          CALDURA SPECIFICA
PRINT #1, "          /grad C/          /kJ/kg K/
PRINT #1, USING "          ##.##          ##.#####
*"; TCAR; CSCAR
PRINT #1, "
PRINT #1, "          EXCES UMIDITATE
PRINT #1, "          CANTITATE SPECIFICA          TEMPERATURA
PRINT #1, "          /kg/kg CARBUNE/          /grad C/
PRINT #1, USING "          ##.####          ###.##
*"; WEXC; TWEXC
PRINT #1, "
PRINT #1, "          GAZE DE ARDERE
PRINT #1, "          TEMPERATURA INTRARE          TEMPERATURA IESIRE
PRINT #1, "          /grad C/          /grad C/
PRINT #1, USING "          #####.###          #####.###
*"; TGAIG; TGAEG
PRINT #1, "
PRINT #1, "          DEBIT STARE NORMALA /Nm3/kg CARBUNE/
PRINT #1, USING "          ##.#####
*"; DGATG
PRINT #1, "
PRINT #1, "*****"
PRINT #1, "*****"
PRINT #1, "

```







```

PRINT #1, "*"          TEMPERATURA INTRARE          DEBIT          "+"
PRINT #1, "*"          /grad C/                    /Nm3/kg CARBUNE "+"
PRINT #1, USING "*"   ###.##                      ###.####
*"; TGGIF; DAGA
PRINT #1, "*"
PRINT #1, "*"          AER COMBUSTIE
PRINT #1, "*"          TEMPERATURA          DEBIT          "+"
PRINT #1, "*"          /grad C/                    /Nm3/kg CARBUNE "+"
PRINT #1, USING "*"   ####.####                      ###.##
*"; TLAER; DELF
PRINT #1, "*"
PRINT #1, "*"          AER DILUTIE
PRINT #1, "*"          TEMPERATURA          DEBIT          "+"
PRINT #1, "*"          /grad C/                    /Nm3/kg CARBUNE "+"
PRINT #1, USING "*"   ####.###                      ###.###
*"; TLDE; DLD
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "*"          FLUXURI TERMICE INTRATE
PRINT #1, "*"
PRINT #1, "*"          CHIMIC GAZ          SENSIBIL GAZ    "+"
PRINT #1, "*"          /kJ/kg CARBUNE/        /kJ/kg CARBUNE/ "+"
PRINT #1, USING "*"   #####.###                      ###.###
*"; FICGG; FISGG
PRINT #1, "*"          SENSIBIL AER COMBUSTIE        SENSIBIL AER DILUTIE "+"
PRINT #1, "*"          /kJ/kg CARBUNE/        /kJ/kg CARBUNE/    "+"
PRINT #1, USING "*"   #####.###                      #####.###
*"; FISLC; FISLE
PRINT #1, "*"
PRINT #1, "*"          FLUX TOTAL INTRAT
PRINT #1, "*"          /kJ/kg CARBUNE/
PRINT #1, USING "*"   #####.###
*"; FTIN
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "*"          BILANT TERMIC FOCAR CICLON
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "*"          PARAMETRII MARIMI IESITE
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "*"          GAZE DE ARDERE
PRINT #1, "*"
PRINT #1, "*"          TEMPERATURA IESIRE        DEBIT SPECIFIC  "+"
PRINT #1, "*"          /grad C/                    /Nm3/kg CARBUNE/ "+"
PRINT #1, USING "*"   ####.##                      ###.####
*'; TGAIG; DGAFG
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "*"          FLUXURI TERMICE IESITE
PRINT #1, "*"
PRINT #1, "*"          FLUXURI TERMICE UTILE
PRINT #1, "*"
PRINT #1, "*"          SENSIBIL GAZE DE ARDERE
PRINT #1, "*"          /kJ/kg CARBUNE/
PRINT #1, USING "*"   #####.###
*'; FESGA

```



```

PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "*"
PRINT #1, "          BILANT TERMIC RECUPERATOR AER COMBUSTIE"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "          PARAMETRII MARIMI IESITE"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "          GAZ DE GAZOGEN"
PRINT #1, "*"
PRINT #1, "          TEMPERATURA IESIRE          DEBIT SPECIFIC"
PRINT #1, "          /grad C/                    /Nm3/kg CARBUNE/"
PRINT #1, USING "*"
PRINT #1, "          #####.###                    ##.#####"
*"; TGGER; DTGU
PRINT #1, "*"
PRINT #1, "          AER DE COMBUSTIE"
PRINT #1, "*"
PRINT #1, "          TEMPERATURA IESIRE          DEBIT SPECIFIC"
PRINT #1, "          /grad C/                    /Nm3/kg CARBUNE/"
PRINT #1, USING "*"
PRINT #1, "          #####.###                    ##.###"
*"; TLAER; DELF
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "          FLUXURI TERMICE IESITE"
PRINT #1, "*"
PRINT #1, "          SENSIBIL AER COMBUSTIE          SENSIBIL GAZ"
PRINT #1, "          /kJ/kg CARBUNE/                /kJ/kg CARBUNE/"
PRINT #1, USING "*"
PRINT #1, "          #####.###                    #####.###"
*"; RCQESL; RCQESG
PRINT #1, "*"
PRINT #1, "          FLUX TOTAL IESIT"
PRINT #1, "          /kJ/kg CARBUNE/"
PRINT #1, USING "*"
PRINT #1, "          #####.###"
*"; RCQTE
PRINT #1, "*"
PRINT #1, "          FLUXURI TERMICE UTILE PREINCALZIRE AER COMBUSTIE"
PRINT #1, "          /kJ/kg CARBUNE/"
PRINT #1, USING "*"
PRINT #1, "          #####.###"
*"; RCFU
PRINT #1, "*"
PRINT #1, "          PIERDERI SPECIFICE - MEDIU AMBIANT"
PRINT #1, "          /kJ/kg CARBUNE/                / */"
PRINT #1, USING "*"
PRINT #1, "          ###.##                    ##.###"
*"; VRLQPP5; RLQPP5
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "          RANDAMENT RECUPERATOR AER COMBUSTIE"
PRINT #1, "          / */"
PRINT #1, USING "*"
PRINT #1, "          ##.###"
*"; ETARC
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*****"
PRINT #1, "          BILANT TERMIC RECUPERATOR AER DILUTIE"
PRINT #1, "*****"

```

```

PRINT #1, "*"
PRINT #1, "          PARAMETRII MARIMI INTRATE
PRINT #1, "*"
PRINT #1, "-----"
PRINT #1, "*"
PRINT #1, "          GAZE DE ARDERE
PRINT #1, "
PRINT #1, "          TEMPERATURA INTRARE          DEBIT
PRINT #1, "          /grad C/                    /Nm3/kg CARBUNE/
PRINT #1, USING "          ###.##          ###.####
*"; TGAEG; DGATE
PRINT #1, "*"
PRINT #1, "          AER DILUTIE
PRINT #1, "          TEMPERATURA          DEBIT
PRINT #1, "          /grad C/                    /Nm3/kg CARBUNE/
PRINT #1, USING "          ####.####          ###.####
*"; TLDI; DLDI
PRINT #1, "*"
PRINT #1, "-----"
PRINT #1, "          FLUXURI TERMICE INTRATE
PRINT #1, "
PRINT #1, "          SENSIBIL GAZE ARDERE          SENSIBIL AER
PRINT #1, "          /kJ/kg CARBUNE/                /kJ/kg CARBUNE/
PRINT #1, USING "          #####.###          ###.###
*"; TEB3; TEB4
PRINT #1, "*"
PRINT #1, "          FLUX TOTAL INTRAT
PRINT #1, "          /kJ/kg CARBUNE/
PRINT #1, USING "          #####.###
*"; TEB7
PRINT #1, "*"
PRINT #1, "-----"
PRINT #1, "          BILANT TERMIC RECUPERATOR AER DILUTIE
PRINT #1, "
PRINT #1, "-----"
PRINT #1, "          PARAMETRII MARIMI IESITE
PRINT #1, "
PRINT #1, "-----"
PRINT #1, "          GAZE DE ARDERE
PRINT #1, "
PRINT #1, "          TEMPERATURA IESIRE          DEBIT SPECIFIC
PRINT #1, "          /grad C/                    /Nm3/kg CARBUNE/
PRINT #1, USING "          ####.##          ###.####
*"; TGACF; DGATG
PRINT #1, "*"
PRINT #1, "          AER DE DILUTIE
PRINT #1, "
PRINT #1, "          TEMPERATURA IESIRE          DEBIT SPECIFIC
PRINT #1, "          /grad C/                    /Nm3/kg CARBUNE/
PRINT #1, USING "          ####.###          ##.###
*"; TLIE; DLDI
PRINT #1, "*"
PRINT #1, "-----"
PRINT #1, "          FLUXURI TERMICE IESITE
PRINT #1, "
PRINT #1, "          SENSIBIL AER DILUTIE          SENSIBIL GAZE ARDERE
PRINT #1, "          /kJ/kg CARBUNE/                /kJ/kg CARBUNE/

```

```

PRINT #1, USING "*"          #####.###          #####.###
*"; TEB3; TEB6
PRINT #1, "~"
PRINT #1, "*"
PRINT #1, "*"
PRINT #1, "FLUX TOTAL IESIT"
PRINT #1, "*/kJ/kg CARBUNE/"
PRINT #1, USING "*"          #####.###
*"; TEB11
PRINT #1, "*"
PRINT #1, "*"
PRINT #1, "FLUXURI TERMICE UTILE PREINCALZIRE AER DILUTIE"
PRINT #1, "*/kJ/kg CARBUNE/"
PRINT #1, USING "*"          #####.###
*"; TEB9
PRINT #1, "*"
PRINT #1, "*"
PRINT #1, "PIERDERI SPECIFICE - MEDIU AMBIANT"
PRINT #1, "*"
PRINT #1, "*/kJ/kg CARBUNE/"
PRINT #1, "*/"
PRINT #1, USING "*"          ###.##          ##.##
*"; TEB10; RDQPP5
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "RANDAMENT RECUPERATOR AER DILUTIE"
PRINT #1, "*/"
PRINT #1, USING "*"          ##.###
*"; RDETA
PRINT #1, "*"
PRINT #1, "*****"
PRINT #1, "*****"
PRINT #1, "*"
PRINT #1, "RANDAMENT GLOBAL STATIE GAZIFICARE"
PRINT #1, "*/"
PRINT #1, USING "*"          ##.###
*"; ETASGAZ
PRINT #1, "*"
PRINT #1, "*****"

```

6375 CLOSE #1

6380 STOP

```

*****
*
*          INTRODUCERE DATE INITIALE
*
*          DENUMIRE CARBUNE VOIVODI
*
*          ANALIZA ELEMENTARA PROBA ANHIDRA /%/
*
*          CARBON          HIDROGEN          OXIGEN          AZOT
*          21.55          1.40          4.24          .75
*
*          SULF          UMIDITATE          MASA MINERALA
*          1.05          25.92          45.11
*
*          PUTERE CALORIFICA /kJ/Nm3/
*
*          SUPERIOARA          INFERIOARA
*          8460.429          7929.563
*
*****
*
*          PARAMETRII DE OPERARE GAZOGEN
*
*          TEMPERATURA          PRESIUNEA
*          /grad C/          /bar/
*          550          1
*
*****
*
*          COMPOZITIE GAZ DE GAZOGEN /%/
*
*          CO2          CO          CH4          H2
*          20.97          3.10          14.15          25.30
*
*          N2          H2S          H2O
*          0.55          0.40          35.50
*
*****

```



BILANT TERMIC GAZOGEN CU UMIDITATE PROPRIE

PARAMETRII MARIMI INTRATE

CARBUNE VOIVOZI

ANALIZA ELEMENTARA PROBA ANHIDRA /%/

CARBON	HIDROGEN	OXIGEN	AZOT
21.55	1.40	4.24	0.73
SULF	UMIDITATE	MASA MINERALA	
1.05	25.92	45.11	

PUTERE CALORIFICA /kJ/kg/

SUPERIOARA  
8460.429

INFERIOARA  
7929.563

TEMPERATURA INTRARE  
/grad C/  
20.00

CALDURA SPECIFICA  
/kJ/kg K/  
1.92199

EXCES UMIDITATE  
CANTITATE SPECIFICA  
/kg/kg CARBUNE/  
0.2610

TEMPERATURA  
/grad C/  
20.00

GAZE DE ARDERE  
TEMPERATURA INTRARE  
/grad C/  
800.000

TEMPERATURA IESIRE  
/grad C/  
400.000

DEBIT STARE NORMALA /Nm<sup>3</sup>/kg CARBUNE/  
1.254931

FLUXURI TERMICE INTRATE

CHIMIC CARBUNE  
/kJ/kg CARBUNE/  
7929.563

SENSIBIL CARBUNE  
/kJ/kg CARBUNE/  
38.440

SENSIBIL EXCES UMIDITATE  
/kJ/kg CARBUNE/  
23.523

FLUX EXTERIOR  
/kJ/kg CARBUNE/  
3356.479

FLUX TOTAL INTRAT  
/kJ/kg CARBUNE/  
11348.005

BILANT TERMIC GAZOGEN CU UMILITATE PROPRIE

PARAMETRII MARIMI IESITE

GAZ DE GAZOGEN

COMPOZITIE

CO2	CO	CH4	H2
20.97	3.10	14.18	25.30
N2	H2S	H2O	
0.55	0.40	35.50	

PUTERE CALORIFICA /kJ/Nm3/

SUPERIOARA

9371.250

INFERIOARA

8312.356

TEMPERATURA IESIRE

/grad C/

550.00

DEBIT SPECIFIC

/Nm3/kg CARBUNE/

1.05400

GUDROANE

CANTITATE SPECIFICA

/kg/Nm3 GAZ/

0.0100

PUTERE CALORIFICA

/kJ/kg GUDRON/

33660.000

FRACTIUNE CENUSA

/kg/kg CARBUNE

0.383

FRACTIUNE ANTRENATE

/kg/kg CARBUNE/

0.068

CARBON CENUSA

/%/

5.00

CARBON ANTRENATE

/%/

2.00

FLUXURI TERMICE IESITE

FLUXURI TERMICE UTILE

CHIMIC GAZ

/kJ/kg CARBUNE/

8761.226

SENSIBIL GAZ

/kJ/kg CARBUNE/

1122.788

CHIMIC GUDROANE

/kJ/kg CARBUNE

354.7764

FLUX UTIL TOTAL

/kJ/kg CARBUNE

10238.790

PIERDERI SPECIFICE

SENSIBIL CENUSA	CHIMIC CENUSA	MEDIU AMBIANT
/kJ/kg CARBUNE	/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
218.41	463.87	226.96
1.925	5.850	2.000

FLUX TOTAL PIERDUT  
/kJ/kg CARBUNE/  
919.242

FLUX TOTAL IESIT  
/kJ/kg CARBUNE/  
11148.032

RANDAMENT GAZOGEN  
/ % /  
90.225

BILANT TERMIC FOCAR CICLON

PARAMETRII MARIMI INTRATE

GAZ DE GAZOGEN - COMBUSTIBIL

TEMPERATURA INTRARE	DEBIT
/grad C/	/Nm3/kg CARBUNE/
50.00	0.29751

AER COMBUSTIE	
TEMPERATURA	DEBIT
/grad C/	/Nm3/kg CARBUNE/
623.8181	1.02

AER DILUTIE	
TEMPERATURA	DEBIT
/grad C/	/Nm3/kg CARBUNE/
300.000	3.984

FLUXURI TERMICE INTRATE

CHIMIC GAZ	SENSIBIL GAZ
/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
3834.160	26.636
SENSIBIL AER COMBUSTIE	SENSIBIL AER DILUTIE
/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
920.230	1651.284

FLUX TOTAL INTRAT
/kJ/kg CARBUNE/
6432.310

BILANT TERMIC FOCAR CICLON

PARAMETRII MARIMI IESITE

GAZE DE ARDERE

TEMPERATURA IESIRE	DEBIT SPECIFIC
/grad C/	/Nm3/kg CARBUNE/
800.00	1.25493

FLUXURI TERMICE IESITE

FLUXURI TERMICE UTILE

SENSIBIL GAZE DE ARDERE  
/kJ/kg CARBUNE/  
6361.555

PIERDERI SPECIFICE

ARDERE INCOMPLETA	MEDIU AMBIANT
/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
6.43	6.43
/%	/%
0.100	1.000

FLUX TOTAL IESIT  
/kJ/kg CARBUNE/  
6374.419

RANDAMENT FOCAR CICLON  
/%/

96.900

BILANT TERMIC RECUPERATOR AER COMBUSTIE

PARAMETRII MARIMI INTRATE

GAZ DE GAZOGEN

TEMPERATURA INTRARE	DEBIT
/grad C/	/Nm3/kg CARBUNE/
550.00	1.05400

AER COMBUSTIE

TEMPERATURA	DEBIT
/grad C/	/Nm3/kg CARBUNE/
20.0000	1.0238

FLUXURI TERMICE INTRATE

SENSIBIL GAZ GAZOGEN	SENSIBIL AER
/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
1122.788	27.245

FLUX TOTAL INTRAT

/kJ/kg CARBUNE/
1150.033

BILANT TERMIC RECUPERATOR AER COMBUSTIE

PARAMETRII MARIMI IESITE

GAS LE GAZOGEN

TEMPERATURA IESIRE	DEBIT SPECIFIC
/grad C	/Nm <sup>3</sup> /kg CARBUNE/
120.00	1.05400

AER DE COMBUSTIE

TEMPERATURA IESIRE	DEBIT SPECIFIC
/grad C/	/Nm <sup>3</sup> /kg CARBUNE/
623.818	1.024

FLUXURI TERMICE IESITE

SENSIBIL AER COMBUSTIE	SENSIBIL GAZ
/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
920.230	205.890

FLUX TOTAL IESIT  
/kJ/kg CARBUNE/  
1126.120

FLUXURI TERMICE UTILE PREINCALZIRE AER COMBUSTIE  
/kJ/kg CARBUNE/  
892.985

PIERDERI SPECIFICE - MEDIU AMBIANT

/kJ/kg CARBUNE/	/%/
4.46	0.50

RANDAMENT RECUPERATOR AER COMBUSTIE

/%/  
97.392

BILANT TERMIC RECUPERATOR AER DILUTIE

PARAMETRII MARIMI INTRATE

GAZE DE ARDERE

TEMPERATURA INTRARE	DEBIT
/grad C/	/Nm3/kg CARBUNE/
400.00	1.25493

AER DILUTIE

TEMPERATURA	DEBIT
/grad C/	/Nm3/kg CARBUNE/
20.0000	3.9838

FLUXURI TERMICE INTRATE

SENSIBIL GAZE ARDERE	SENSIBIL AER
/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
3121.468	106.005

FLUX TOTAL INTRAT

/kJ/kg CARBUNE/  
3227.472



BILANT TERMIC RECUPERATOR AER DILUTIE

PARAMETRII MARIMI IESITE

GAZE DE ARDERE

TEMPERATURA IESIRE	DEBIT SPECIFIC
/grad C	/Nm3/kg CARBUNE/
178.96	1.25493

AER DE DILUTIE

TEMPERATURA IESIRE	DEBIT SPECIFIC
/grad C/	/Nm3/kg CARBUNE/
300.000	3.984

FLUXURI TERMICE IESITE

SENSIBIL AER DILUTIE	SENSIBIL GAZE ARDERE
/kJ/kg CARBUNE/	/kJ/kg CARBUNE/
1681.284	1560.051

FLUX TOTAL IESIT  
kJ/kg CARBUNE/  
3211.33

FLUXURI TERMICE UTILE PREINCALZIRE AER DILUTIE  
/kJ/kg CARBUNE/  
1545.279

PIERDERI SPECIFICE - MEDIU AMBIANT

/kJ/kg CARBUNE/	/%/
18.14	0.50

RANDAMENT RECUPERATOR AER DILUTIE

/%/  
98.966

RANDAMENT GLOBAL STATIE GAZIFICARE

/%/  
62.135