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Darstellung der neu integrierten Stoffdaten-Funktionen im System MAPLIB in tabellarischer und graphischer Form

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Kohlenstoff	CPC	Spez. Wärme	32
	EKC	Emissionskoeffizient	35
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	RØC	Dichte	39
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	WLNAKL	Wärmeleitfähigkeit	92
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Nickel	EKNI	Emissionskoeffizient	98
$TH\emptyset_2$	CPTHØ2	Spez. Wärme	99
	EKTHØ2	Emissionskoeffizient	102
	GATHØ2	Lin., diff. Ausdehnungskoeffizient	105
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Stahl 4550	CP4550	Spez. Wärme	126
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	GA4550	Lin., diff. Ausdehnungskoeffizient	130
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Stahl 4869	CP4869	Spez. Wärme	135
	EK4869	Emissionskoeffizient	136
	GA4869	Lin., diff. Ausdehnungskoeffizient	137
	RØ4869	Dichte	140
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	EHH2ØL	Enthalpie	147
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	PRH2ØL	Prandtl-Zahl	149
	RØH2ØL	Dichte	150
	STH2ØL	Oberflächen-Spannung	151
	VØH2ØL	Spez. Volumen	152
	VPH2ØL	Sattdampfdruck	153
	VTH2ØL	Sattdampftemperatur	154
	WLH2ØL	Wärmeleitfähigkeit	155
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Wasserdampf	CPH2ØV	Spez. Wärme	157
	EHH2ØV	Enthalpie	158
	ESH2ØV	Entropie	159
	PRH2ØV	Prandtl-Zahl	160
	RØH2ØV	Dichte	161
	VØH2ØV	Spez. Volumen	162
	VPH2ØV	Sattdampfdruck	163
	VTH2ØV	Sattdampftemperatur	164
	WLH2ØV	Wärmeleitfähigkeit	165
	ZDH2ØV	Dynam. Viskosität	166

Zusammenfassung

MAPLIB (Material Properties Programm Library) ist ein Programmsystem, das für Rechenprogramme Stoffwerte bereitstellt. Es enthält für zahlreiche Materialien Eigenschaftsfunktionen, deren Namen sich nach festen Konventionen aufbauen.

Dieser Bericht schließt an den Externen Bericht 8/77-1 an, in dem der Stand von MAPLIB (Oktober 1977) dokumentiert wurde [2].

Alle Routinen sind in FORTRAN IV geschrieben.

Abstract

Presentation of the new material property data of the System MAPLIB in tabular and graphical form.

This report documents functions implemented in addition to the version of the external report 8/77-1.

1. Einleitung

Für die Verwendung in Rechenprogrammen stellt das Programmsystem MAPLIB /1/ Stoffwerte zur Verfügung.

Durch den Aufruf einer FORTRAN-Funktion, deren Namen sich aus einem charakteristischen Eigenschafts- und Stoffsymbol zusammensetzt, werden diese Werte in Abhängigkeit von bestimmten Parametern ermittelt. Diese algorithmische Darstellungsweise bringt für die maschinelle Verarbeitung (Computer) erhebliche Vorteile bezüglich Zugriffszeit und Speicherbedarf gegenüber der Speicherung in Tabellenform.

Auf Grund neuerer Literaturstellen /3/ und /4/ wurde das System MAPLIB durch neue Stoffdaten-Funktionen erweitert.

In diesem Bericht werden folgende Funktionen tabelliert:

CPAL23	CPCU	CPMGØ	EKNI	CP4550
EKAL23	EKCU	RØMGØ		EK4550
GAAL23	GACU	WLMGØ	CPTHØ2	GA4550
ROAL23	RØCU		EKTHØ2	RØ4550
WLAL23	WLCU	VPNAK	GATHØ2	WL4550
		VTNAK	RØTHØ2	
CPC	CPINC6		WLTHØ2	CP4869
EKC	EKINC6	CPNAKL		EK4869
GAC	GAINC6	EHNAKL	EKUØ	GA4869
RØC	RØINC6	PRNAKL		RØ4869
WLC	WLINC6	RØNAKL	CPZRY4	WL4869
		WLNAKL	EKZRY4	
	FHK	ZDNAKL	GAZRY4	
	VHK		RØZRY4	
			WLZRY4	

Als Erweiterung des Berichtes /2/ werden folgende Funktionen in neuen Temperatur- und Druck-Bereichen tabelliert:

VPH2Ø	CPH2ØL	CPH2ØV
VTH2Ø	EHH2ØL	EHH2ØV
	ESH2ØL	ESH2ØV
	PRH2ØL	PRH2ØV
	RØH2ØL	RØH2ØV
	STH2ØL	VØH2ØV
	VØH2ØL	VPH2ØV
	VPH2ØL	VTH2ØV
	VTH2ØL	WLH2ØV
	WLH2ØL	ZDH2ØV
	ZDH2ØL	

2. Tabelle der Materialeigenschafts-Symbole

SYMBOL	MATERIAL	
AIRV	LUFT	
AL	ALUMINIUM	
AL23	AL2O3	
B4C	BOR-4-CARBID	(B4C)
C	ELEKTROGRAFIT	
CO2V	CO2-GAS	
CU	KUPFER	
HEV	HELIUM-GAS	
H2O	WASSER, ALLGEMEIN	
H2OL	WASSER, FLUESSIG	
H2OV	WASSERDAMPF	
INC6	INCONEL 600	
K	KALIUM	
MGO	MAGNESIUM-OXID	
NA	NATRIUM	
NAK	NATRIUM-KALIUM 78	
NAKL	NATRIUM-KALIUM 78, FLUESSIG	
NAL	NATRIUM, FLUESSIG	
NALS	GESAETTIGTES FLUESSIGES NATRIUM	
NAV	NATRIUM-DAMPF	
NAVS	GESAETTIGTER NATRIUMDAMPF	
NB	NIOB	
NI	NICKEL	(BEI 99.9 % REINHEIT)
PUO	PLUTONIUM OXID	(PUO2)
THO2	THO2	
UO	URAN-OXID	
UPUO	PLUTONIUM OXID	(PUO2)
ZRY4	ZIRCALOY-4	
4550	STAHL 4550	(BEI 13.5 GRAD C)
4869	STAHL 4869	
4961	STAHL 4961	
4981	STAHL 4981	
4988	STAHL 4988	

3. Tabelle der Stoff- und der Parameter-Symbole

SYMBOL	PROPERTY	UNIT
CP	SPEZ. WAERME B. CONST. DRUCK	J/KG.K
CV	SPEZ. WAERME B. CONST. VOLUMEN	J/KG.K
EH	ENTHALPIE	J/KG
EK	EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)	1
EM	ELASTIZITAETSMODUL	N/M2
ES	ENTROPIE	J/KG.K
FH	SCHMELZWAERME	J/KG
FT	SCHMELZTEMPERATUR	K
GA	LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT	1/K
PR	PRANDTL-ZAHL	1
PV	DRUCK ALS FUNKTION VON TEMPERATUR UND VOLUMEN	N/M2
RH	REKRISTALLISATIONSWAERME	J/KG
RO	DICHTE	KG/M3
RS	SPEZIELLE GASKONSTANTE	J/KG.K
SB	BRUCHSPANNUNG	N/M2
SD	DEHNGRENZE	N/M2
ST	OBERFLAECHEN SPANNUNG	N/M
VH	VERDAMPFUNGSENTHALPIE	J/KG
VO	SPEZ. VOLUMEN	M3/KG
VP	SATTDAMPFDRUCK	N/M2
VS	VERDAMPFUNGSENTROPIE	J/KG.K
VT	SATTDAMPFTEMPERATUR	K
WL	WAERMELEITFAEHIGKEIT	W/M.K
ZD	DYNAMISCHE VISKOSITAET	N.S/M2

SYMBOL	PARAMETER	UNIT
I	DIESER PARAMETER-NAME IST VERBOTEN	-
CNPU	KONZENTRATION DES PLUTONIUMOXIDS	MOL-BRUCH
DUMMY	DUMMY PARAMETER	1
P	DRUCK	N/M2
PERCEN	DEHNUNGSKOEFFIZIENT	%
PN	DRUCK	N/M2
PNM2	DRUCK	N/M2
PORVOL	RELATIVES PORVOLUMEN	VOL-ANTEIL
STANDT	STANDZEIT	S
T	TEMPERATUR	K
TK	TEMPERATUR	K
V	SPEZIFISCHES VOLUMEN	M3/KG

4. Verzeichnis der aufbereiteten Funktionen

NAME DER FUNKTION EIGENSCHAFT/STOFF	NUMMER DER FUNKTIONS-AUSGABE
CPAIRV	1
CVAIRV	2
EHAIRV	3
ESAIRV	4
PRAIRV	5
ROAIRV	6
VOAIRV	7
WLAIRV	8
ZDAIRV	9
CPAL	10
EMAL	11
FHAL	12
FTAL	13
GAAL	14
ROAL	15
STAL	16
VHAL	17
VOAL	18
VPAL	19
WLAL	20
ZDAL	21
CPAL23	22
EKAL23	23
GAAL23	24
ROAL23	25
WLAL23	26
CPB4C	27
FTB4C	28
GAB4C	29
ROB4C	30
WLB4C	31
CPC	32
EKC	33
GAC	34
ROC	35
WLC	36
CPCO2V	37
CVCO2V	38
EHCO2V	39
ESCO2V	40
PRCO2V	41
ROCO2V	42
RSCO2V	43
VOCO2V	44
VPCO2V	45
VTCO2V	46
WLCO2V	47
ZDCO2V	48
CPCU	49
EKCU	50
GACU	51
ROCU	52
WLCU	53
CPHEV	54
CVHEV	55

NAME DER FUNKTION EIGENSCHAFT/STOFF	NUMMER DER FUNKTIONS-AUSGABE
EHHEV	56
ESHEV	57
PRHEV	58
ROHEV	59
RSHEV	60
VOHEV	61
WLHEV	62
ZDHEV	63
VPH2O	64
VTH2O	65
CPH2OL	66
EHH2OL	67
ESH2OL	68
PRH2OL	69
ROH2OL	70
STH2OL	71
VOH2OL	72
VPH2OL	73
VTH2OL	74
WLH2OL	75
ZDH2OL	76
CPH2OV	77
EHH2OV	78
ESH2OV	79
PRH2OV	80
ROH2OV	81
VOH2OV	82
VPH2OV	83
VTH2OV	84
WLH2OV	85
ZDH2OV	86
CPINC6	87
EKINC6	88
GAINC6	89
ROINC6	90
WLINC6	91
FHK	92
VHK	93
CPMGO	94
ROMGO	95
WLMGO	96
STNA	97
VHNA	98
VPNA	99
VSNA	100
VTNA	101
VPNAK	102
VTNAK	103
CPNAKL	104
EHNAKL	105
PRNAKL	106
RONAKL	107
WLNAKL	108
ZDNAKL	109
CPNAL	110

NAME DER FUNKTION EIGENSCHAFT/STOFF	NUMMER DER FUNKTIONS-AUSGABE
EHNAL	111
ESNAL	112
PRNAL	113
RONAL	114
STNAL	115
VHNAL	116
VONAL	117
VPNAL	118
VSNAL	119
VTNAL	120
WLNAL	121
ZDNAL	122
CPNALS	123
EHNALS	124
ESNALS	125
PRNALS	126
RONALS	127
STNALS	128
VHNALS	129
VONALS	130
VPNALS	131
VSNALS	132
VTNALS	133
WLNALS	134
ZDNALS	135
CPNAV	136
EHNAV	137
ESNAV	138
PRNAV	139
PVNAV	140
RONAV	141
VHNAV	142
VONAV	143
VPNAV	144
VTNAV	145
WLNAV	146
ZDNAV	147
CPNAVS	148
EHNAVS	149
ESNAVS	150
PRNAVS	151
RONAVS	152
VHNAVS	153
VONAVS	154
VPNAVS	155
VSNAVS	156
VTNAVS	157
WLNAVS	158
ZDNAVS	159
CPNB	160
FTNB	161
GANB	162
RONB	163
WLNB	164
CPNI	165

NAME DER FUNKTION EIGENSCHAFT/STOFF	NUMMER DER FUNKTIONS-AUSGABE
EKNI	166
FTNI	167
GANI	168
RONI	169
VONI	170
WLNI	171
CPPUO	172
FHPUO	173
FTPUO	174
GAPUO	175
RHPUO	176
ROPUO	177
WLPUO	178
CPTHO2	179
EKTHO2	180
GATHO2	181
ROTHO2	182
WLTHO2	183
CPUO	184
EKUO	185
EMUO	186
FHUO	187
FTUO	188
GAUO	189
RHUO	190
ROUO	191
WLUO	192
CPUPUO	193
EMUPUO	194
FHUPUO	195
FTUPUO	196
GAUPUO	197
RHUPUO	198
ROUPUO	199
WLUPUO	200
CPZRY4	201
EKZRY4	202
GAZRY4	203
ROZRY4	204
WLZRY4	205
CP4550	206
EK4550	207
GA4550	208
RO4550	209
WL4550	210
CP4869	211
EK4869	212
GA4869	213
RO4869	214
WL4869	215
CP4961	216
EM4961	217
FH4961	218
FT4961	219
GA4961	220

NAME DER FUNKTION EIGENSCHAFT/STOFF	NUMMER DER FUNKTIONS-AUSGABE
RH4961	221
RO4961	222
WL4961	223
CP4981	224
EM4981	225
FH4981	226
FT4981	227
GA4981	228
RH4981	229
RO4981	230
SB4981	231
SD4981	232
WL4981	233
CP4988	234
EM4988	235
FH4988	236
FT4988	237
GA4988	238
RH4988	239
RO4988	240
WL4988	241

5. Tabelle aller Stoffdaten-Funktionen in MAPLIB mit Angaben über Parameterliste

Die nachfolgenden Tabellen stellen den derzeitigen Inhalt an Stoffunktionen im System MAPLIB dar.

Die Zeichen in den Klammern entsprechen den Argumentenlisten der implementierten Funktionen.

Die mit "x" gekennzeichneten Tabellen-Stellen zeigen an, daß für die Stoffeigenschaften noch keine Stoffunktionen bestehen.

Argumentenzeichen nach dem Semikolon ";" bedeuten, daß für den Funktionsaufruf die Argumente nach dem Semikolon wahlweise weggelassen werden können. In den Funktionen werden dann Standardwerte an Stelle der fehlenden Argumentenwerte eingesetzt.

PROPERTY	/ MATERIAL AIRV	AL	AL23	B4C	C
CP	(TK,PN)	(TK)	(TK)	(TK)	(TK)
CV	(TK,PN)	*	*	*	*
EH	(TK,PN)	*	*	*	*
EK	*	*	(TK)	*	(DUMMY)
EM	*	(DUMMY)	*	*	*
ES	(TK,PN)	*	*	*	*
FH	*	(DUMMY)	*	*	*
FT	*	(DUMMY)	*	(DUMMY)	*
GA	*	(TK)	(TK)	(TK)	(TK)
PR	(T,P)	*	*	*	*
PV	*	*	*	*	*
RH	*	*	*	*	*
RO	(TK,PN)	(TK)	(DUMMY)	(TK)	(DUMMY)
RS	*	*	*	*	*
SB	*	*	*	*	*
SD	*	*	*	*	*
ST	*	(DUMMY)	*	*	*
VH	*	(DUMMY)	*	*	*
VO	(T,P)	(TK)	*	*	*
VP	*	(DUMMY)	*	*	*
VS	*	*	*	*	*
VT	*	*	*	*	*
WL	(TK,PN)	(DUMMY)	(TK)	(TK)	(TK)
ZD	(TK,PN)	(DUMMY)	*	*	*

PROPERTY	/ MATERIAL CO2V	CU	HEV	H2O	H2OL
CP	(TK,PN)	(TK)	(TK,PN)	*	(T;P)
CV	(TK,PN)	*	(TK,PN)	*	*
EH	(TK,PN)	*	(TK,PN)	*	(T;P)
EK	*	(DUMMY)	*	*	*
EM	*	*	*	*	*
ES	(TK,PN)	*	(TK,PN)	*	(T;P)
FH	*	*	*	*	*
FT	*	*	*	*	*
GA	*	(TK)	*	*	*
PR	(TK,PN)	*	(TK,PN)	*	(T;P)
PV	*	*	*	*	*
RH	*	*	*	*	*
RO	(TK,PN)	(DUMMY)	(T,P)	*	(T;P)
RS	(DUMMY)	*	(DUMMY)	*	*
SB	*	*	*	*	*
SD	*	*	*	*	*
ST	*	*	*	*	(T)
VH	*	*	*	*	*
VO	(TK,PN)	*	(TK,PN)	*	(T;P)
VP	(TK)	*	*	(TK)	(T)
VS	*	*	*	*	*
VT	(PN)	*	*	(PN)	(PN)
WL	(TK,PN)	(TK)	(TK,PN)	*	(T;P)
ZD	(TK,PN)	*	(TK)	*	(T;P)

PROPERTY	/ MATERIAL H2CV	INC6	K	MGO	NA
CP	(T:P)	(TK)	*	(TK)	*
CV	*	*	*	*	*
EH	(T:P)	*	*	*	*
EK	*	(DUMMY)	*	*	*
EM	*	*	*	*	*
ES	(T:P)	*	*	*	*
FH	*	*	(DUMMY)	*	*
FT	*	*	*	*	*
GA	*	(TK)	*	*	*
PR	(T:P)	*	*	*	*
PV	*	*	*	*	*
RH	*	*	*	*	*
RO	(T:P)	(DUMMY)	*	(DUMMY)	*
RS	*	*	*	*	*
SB	*	*	*	*	*
SD	*	*	*	*	*
ST	*	*	*	*	(TK)
VH	*	*	(DUMMY)	*	(TK)
VO	(T;P)	*	*	*	*
VP	(T)	*	*	*	(TK)
VS	*	*	*	*	(TK)
VT	(PN)	*	*	*	(PNM2)
WL	(TK,PN)	(TK)	*	(TK)	*
ZD	(TK,PN)	*	*	*	*

PROPERTY	/ MATERIAL NAK	NAKL	NAL	NALS	NAV
CP	*	(TK)	(TK;PNM2)	(TK)	(TK;PNM2)
CV	*	*	*	*	*
EH	*	(TK)	(TK,PNM2)	(TK)	(TK,PNM2)
EK	*	*	*	*	*
EM	*	*	*	*	*
ES	*	*	(TK,PNM2)	(TK)	(TK,PNM2)
FH	*	*	*	*	*
FT	*	*	*	*	*
GA	*	*	*	*	*
PR	*	(TK)	(TK;PNM2)	(TK)	(TK;PNM2)
PV	*	*	*	*	(TK,V)
RH	*	*	*	*	*
RO	*	(TK)	(TK)	(TK)	(TK,PNM2)
RS	*	*	*	*	*
SB	*	*	*	*	*
SD	*	*	*	*	*
ST	*	*	(TK)	(TK)	*
VH	*	*	(TK)	(TK)	(TK)
VO	*	*	(TK)	(TK)	(TK,PNM2)
VP	(TK)	*	(TK)	(TK)	(TK)
VS	*	*	(TK)	(TK)	*
VT	(PNM2)	*	(PNM2)	(PNM2)	(PNM2)
WL	*	(TK)	(TK)	(TK)	(TK)
ZO	*	(TK)	(TK)	(TK)	(TK)

PROPERTY	/ MATERIAL NAVS	NB	NI	PUO	THO2
CP	(TK)	(TK)	(TK)	(TK)	(TK)
CV	*	*	*	*	*
EH	(TK)	*	*	*	*
EK	*	*	(DUMMY)	*	(TK)
EM	*	*	*	*	*
ES	(TK)	*	*	*	*
FH	*	*	*	(DUMMY)	*
FT	*	(DUMMY)	(DUMMY)	(DUMMY)	*
GA	*	(TK)	(TK)	(TK)	(TK)
PR	(TK)	*	*	*	*
PV	*	*	*	*	*
RH	*	*	*	(DUMMY)	*
RO	(TK)	(TK)	(TK)	(TK;PORVOL)	(DUMMY)
RS	*	*	*	*	*
SB	*	*	*	*	*
SD	*	*	*	*	*
ST	*	*	*	*	*
VH	(TK)	*	*	*	*
VO	(TK)	*	(TK)	*	*
VP	(TK)	*	*	*	*
VS	(TK)	*	*	*	*
VT	(PNM2)	*	*	*	*
WL	(TK)	(TK)	(TK)	(TK,PORVOL)	(TK)
ZD	(TK)	*	*	*	*

PROPERTY / MATERIAL	UO	UPUC	ZRY4	4550	4869
CP	(TK)	(TK,T,CNPU)	(TK)	(TK)	(DUMMY)
CV	*	*	*	*	*
EH	*	*	*	*	*
EK	(TK)	*	(DUMMY)	(DUMMY)	(DUMMY)
EM	(TK;PORVOL)	(TK;PORVOL,CNPU)	*	*	*
ES	*	*	*	*	*
FH	(DUMMY)	(DUMMY)	*	*	*
FT	(DUMMY)	(CNPU)	*	*	*
GA	(TK)	(TK)	(TK)	(DUMMY)	(TK)
PR	*	*	*	*	*
PV	*	*	*	*	*
RH	(DUMMY)	(DUMMY)	*	*	*
RO	(TK;PORVOL)	(TK;PORVOL,CNPU)	(DUMMY)	(DUMMY)	(DUMMY)
RS	*	*	*	*	*
SB	*	*	*	*	*
SD	*	*	*	*	*
ST	*	*	*	*	*
VH	*	*	*	*	*
VO	*	*	*	*	*
VP	*	*	*	*	*
VS	*	*	*	*	*
VT	*	*	*	*	*
WL	(TK,PORVOL)	(TK;PORVOL,CNPU)	(TK)	(TK)	(TK)
ZD	*	*	*	*	*

PROPERTY	/ MATERIAL 4961	4981	4988
CP	(TK)	(TK)	(TK)
CV	*	*	*
EH	*	*	*
EK	*	*	*
EM	(TK)	(TK)	(TK)
ES	*	*	*
FH	(DUMMY)	(DUMMY)	(DUMMY)
FT	(DUMMY)	(DUMMY)	(DUMMY)
GA	(TK)	(TK)	(TK)
PR	*	*	*
PV	*	*	*
RH	(DUMMY)	(DUMMY)	(DUMMY)
RO	(TK)	(TK)	(TK)
RS	*	*	*
SB	*	(T,STANDT)	*
SD	*	(T,STANDT,PERCEN)	*
ST	*	*	*
VH	*	*	*
VO	*	*	*
VP	*	*	*
VS	*	*	*
VT	*	*	*
WL	(TK)	(TK)	(TK)
ZD	*	*	*

6. Literatur

/1/ Schumann,U.:
MAPLIB - ein Programmsystem zur Bereitstellung von Stoffdaten für Rechenprogramme.
KFK 1253 (September 1970)

/2/ Schuster,R., Zimmerer,W.:
Darstellung der Stoffdaten des Systems Maplib in tabellarischer und graphischer Form.
KFK-Ext. 8/77-1 (Oktober 1977)

/3/ Wagner,K., Vollmer,T.:
Zusammenstellung von Stoffwerten für Wärmeleitrechnungen an LWR-Brennstäben und deren Simulatoren.
KFK-Ext. 15/77-2 (August 1977)

/4/ Foust,O.J.:
Sodium-Nak Engineering Handbook Vol. 1; Gordon and Breach, Science Publishers, Inc.
Sodium Chemistry and Physical Properties
New York / London / Paris

7. FORTRAN-Funktionen, tybellarische und graphische Darstellung

Die FORTRAN-Funktions-Listen, Tabellen und graphischen Darstellungen sind nach dem in Kapitel 4 enthaltenen Verzeichnis aufgeführt. Es werden nur die neu implementierten Funktionen dargestellt.

Für die Handhabung dieses Berichtes sei folgender Hinweis gegeben:

1. In Kapitel 2 und 3 sind die Materialeigenschafts- und Stoff-Symbole aufgelistet, deren Kombinationen Funktionsnamen entsprechend der MAPLIB-Konvention ergeben;
   z.B. Material-Symbol AIRV (Luft)
   Stoff-Symbol CP (Spez. Wärme)
   ergibt CPAIRV

2. Das ermittelte Material-Stoff-Symbol CPAIRV (als Beispiel) ist danach mit der Tabelle auf den Seiten 10 bis 16 zu vergleichen. Es ergibt sich nach Überprüfung der Spalten (Material) und Zeilen (Stoff), daß die Funktion CPAIRV in MAPLIB integriert ist und mit dem Argument TK (Temperatur in ^{o}K) aufzurufen ist.

```
      FUNCTION CPAL23(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                              J/KG.K
C$M   AL203
CP    TK            273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN:  K.WAGNER & T.VOLLMER   (KAPITEL 4.7)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPAL23,'CPAL23',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      CPAL23= 701.7 + 26.15*SQRT(TC) - 2.060E-1*TC - 5.757E-5*TC*TC
   99 RETURN
      END
```

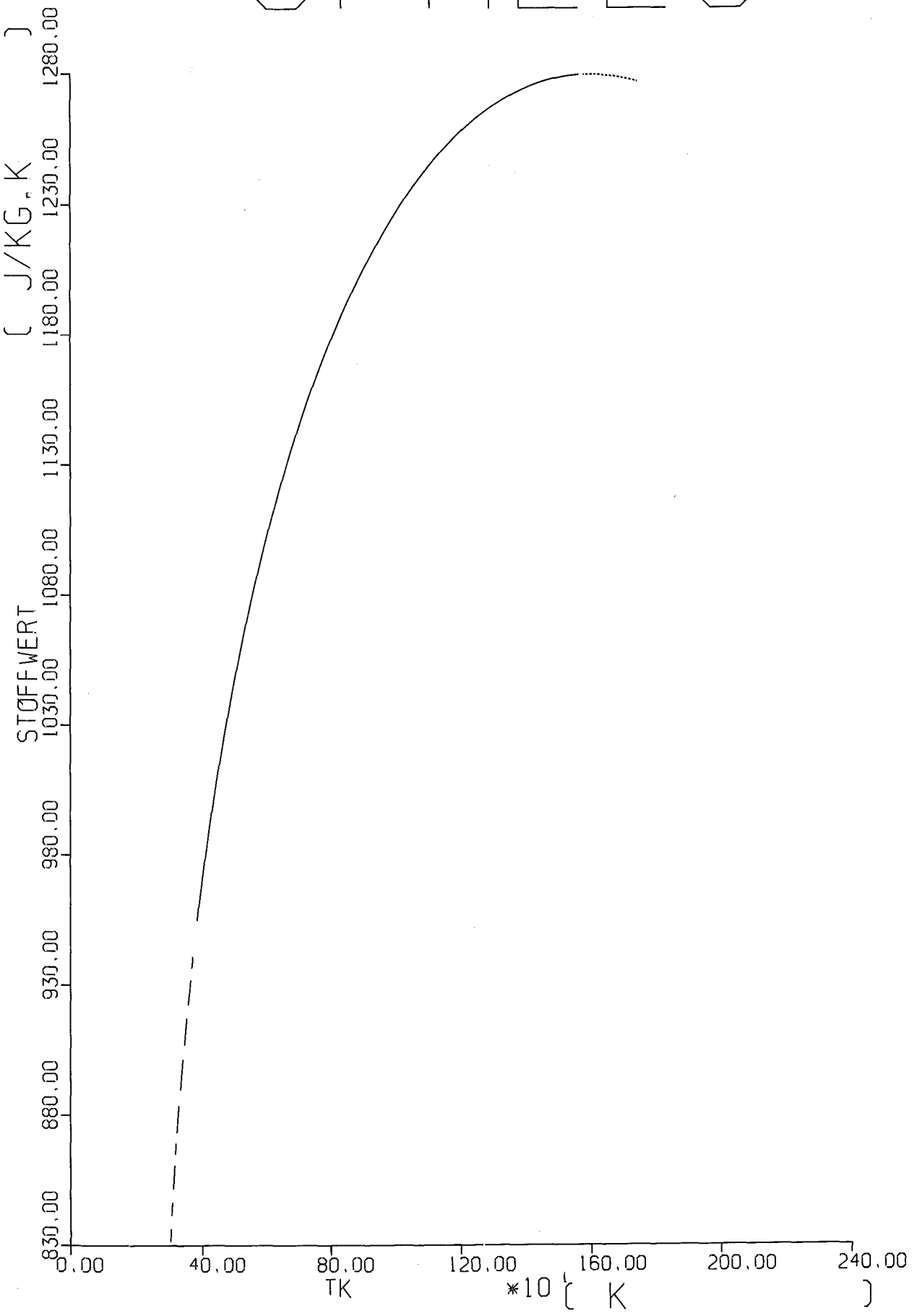
**** FUNKTION 22 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON AL23 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	831.629	*2*	852.772	*2*	870.911	*2*	886.971	*2*	901.479	*2*
350.00	914.770	*2*	927.075	*2*	938.557	*2*	949.339		959.517	
400.00	969.164		978.341		987.097		995.474		1003.51	
450.00	1011.22		1018.65		1025.81		1032.72		1039.40	
500.00	1045.87		1052.13		1058.20		1064.08		1069.80	
550.00	1075.36		1080.76		1086.02		1091.14		1096.13	
600.00	1100.98		1105.72		1110.34		1114.84		1119.24	
650.00	1123.53		1127.72		1131.82		1135.82		1139.73	
700.00	1143.55		1147.28		1150.93		1154.50		1158.00	
750.00	1161.41		1164.75		1168.02		1171.22		1174.35	
800.00	1177.42		1180.41		1183.35		1186.22		1189.03	
850.00	1191.77		1194.47		1197.10		1199.67		1202.20	
900.00	1204.66		1207.08		1209.44		1211.75		1214.01	
950.00	1216.22		1218.38		1220.50		1222.57		1224.59	
1000.00	1226.56		1228.49		1230.38		1232.22		1234.02	
1050.00	1235.78		1237.49		1239.17		1240.80		1242.40	
1100.00	1243.95		1245.47		1246.95		1248.38		1249.79	
1150.00	1251.15		1252.48		1253.77		1255.02		1256.24	
1200.00	1257.43		1258.58		1259.70		1260.78		1261.83	
1250.00	1262.84		1263.82		1264.77		1265.69		1266.58	
1300.00	1267.43		1268.25		1269.04		1269.80		1270.53	
1350.00	1271.23		1271.90		1272.54		1273.15		1273.73	
1400.00	1274.29		1274.81		1275.30		1275.77		1276.21	
1450.00	1276.62		1277.00		1277.35		1277.68		1277.98	
1500.00	1278.26		1278.50		1278.72		1278.92		1279.09	
1550.00	1279.23		1279.34		1279.44		1279.50	*2*	1279.54	*2*
1600.00	1279.55	*2*	1279.54	*2*	1279.51	*2*	1279.45	*2*	1279.36	*2*
1650.00	1279.25	*2*	1279.12	*2*	1278.96	*2*	1278.78	*2*	1278.57	*2*
1700.00	1278.34	*2*	1278.09	*2*	1277.81	*2*	1277.51	*2*	1277.19	*2*
1750.00	1276.84	*2*	1276.47	*2*	1276.08	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

CPAL23


STØFFWERT
[J/KG,K]
830.00
880.00
930.00
980.00
1030.00
1080.00
1130.00
1180.00
1230.00
1280.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 [K]

```
      FUNCTION EKAL23(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   AL203
CP    TK            273.15 <= 373.15 <= TK <= 1773.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 5.7)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(EKAL23,'EKAL23',1,373.15,1773.15,273.15,1773.15,TK,&99)
C$T
99999 IF (TK.GT.1573.15) GOTO 1
      EKAL23= 0.8 - 3.615E-4*(TK-273.15)
      RETURN
    1 EKAL23= 0.33
   99 RETURN
      END
```

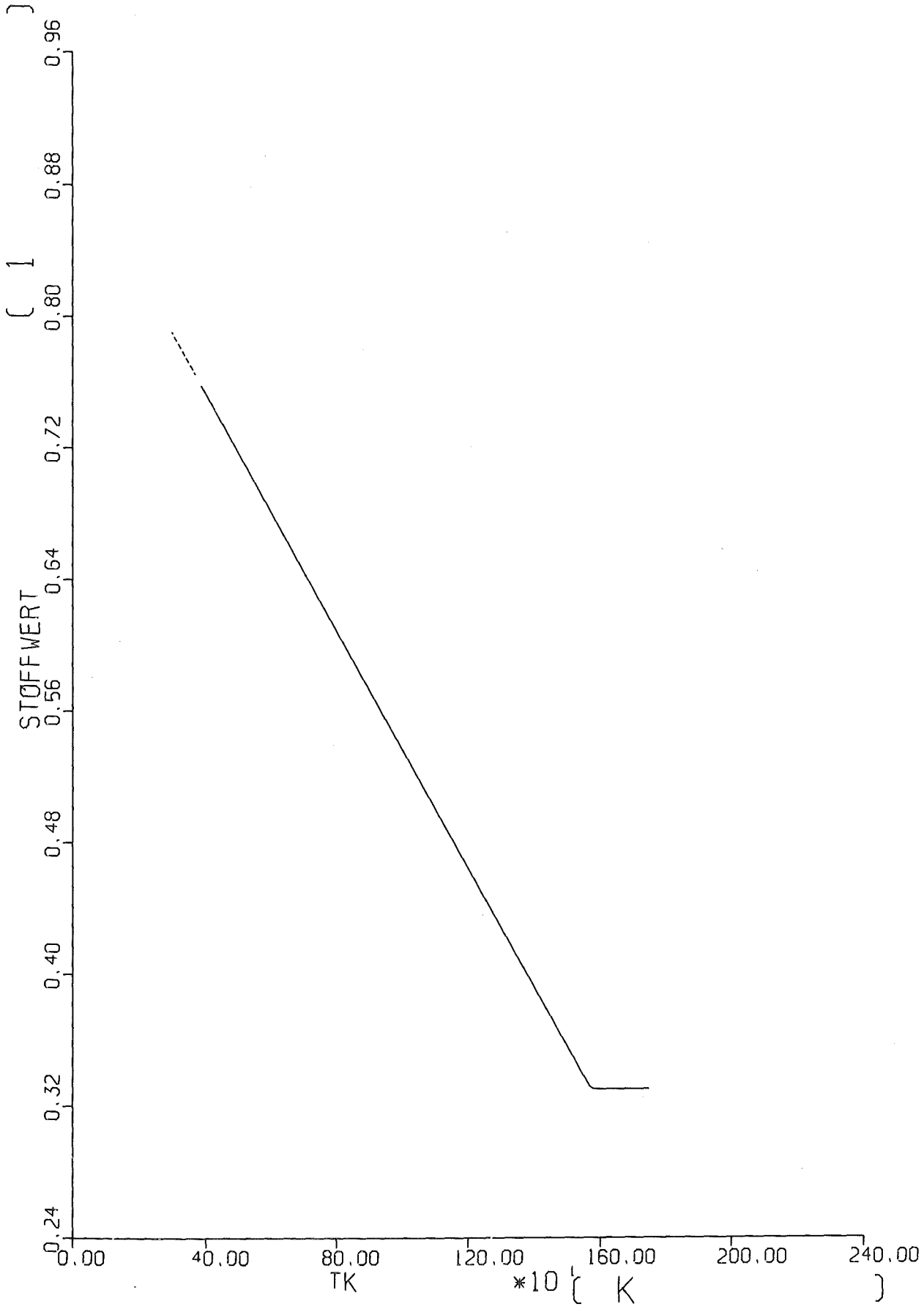
**** FUNKTION 23 ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON AL23 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: EK IN 1
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000	+
300.00	.790294 *2*	.786679 *2*	.783064 *2*	.779449 *2*	.775834 *2*	
350.00	.772219 *2*	.768604 *2*	.764989 *2*	.761374	.757759	
400.00	.754144	.750529	.746914	.743299	.739684	
450.00	.736069	.732454	.728839	.725224	.721609	
500.00	.717994	.714379	.710764	.707149	.703534	
550.00	.699919	.696304	.692689	.689074	.685459	
600.00	.681844	.678229	.674614	.670999	.667384	
650.00	.663769	.660154	.656539	.652924	.649309	
700.00	.645694	.642079	.638464	.634849	.631234	
750.00	.627619	.624004	.620389	.616774	.613159	
800.00	.609544	.605929	.602314	.598699	.595084	
850.00	.591469	.587854	.584239	.580624	.577009	
900.00	.573394	.569779	.566164	.562549	.558934	
950.00	.555319	.551704	.548089	.544474	.540859	
1000.00	.537244	.533629	.530014	.526399	.522784	
1050.00	.519169	.515554	.511939	.508324	.504709	
1100.00	.501094	.497479	.493864	.490249	.486634	
1150.00	.483019	.479404	.475789	.472174	.468559	
1200.00	.464944	.461329	.457714	.454099	.450484	
1250.00	.446869	.443254	.439639	.436024	.432409	
1300.00	.428794	.425179	.421564	.417949	.414334	
1350.00	.410719	.407104	.403489	.399874	.396259	
1400.00	.392644	.389029	.385414	.381799	.378184	
1450.00	.374569	.370954	.367339	.363724	.360109	
1500.00	.356494	.352879	.349264	.345649	.342034	
1550.00	.338419	.334804	.331189	.330000	.330000	
1600.00	.330000	.330000	.330000	.330000	.330000	
1650.00	.330000	.330000	.330000	.330000	.330000	
1700.00	.330000	.330000	.330000	.330000	.330000	
1750.00	.330000	.330000	.330000	1.00000 *3*	1.00000 *3*	
1800.00	1.00000 *3*					

EKAL23


[ ]
[1
0,96
0,88
0,80
0,72
0,64
0,56
0,48
0,40
0,32
0,24
STØFFWERT
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK
*10 [K]

```
      FUNCTION GAAL23(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT                    1/K
C$M   AL203
CP    TK            273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.7)
CB    AN HAND VORGENANNTER LITERATUR WURDE DER DIFFERENTIELLE
CB    AUSDEHNUNGSKOEFFIZIENT ERMITTELT.
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(GAAL23,'GAAL23',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 GAAL23= 6.910E-6 + 3.628E-9*(TK-273.15)
   99 RETURN
      END
```

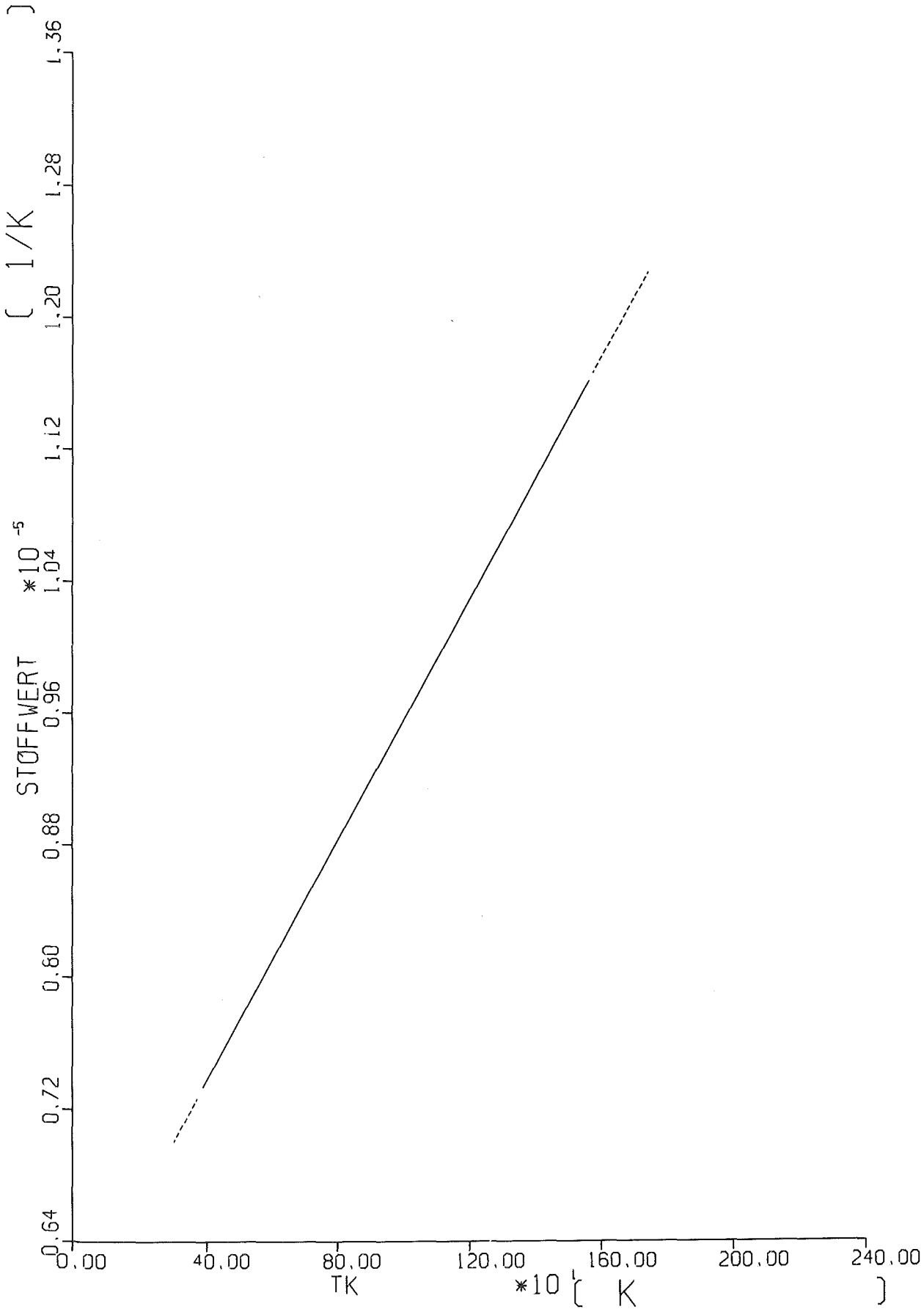
**** FUNKTION 24 ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON AL23 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: GA IN 1/K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	.700741E-05*2*	.704369E-05*2*	.707997E-05*2*	.711625E-05*2*	.715253E-05*2*
350.00	.718881E-05*2*	.722509E-05*2*	.726137E-05*2*	.729765E-05	.733393E-05
400.00	.737021E-05	.740649E-05	.744277E-05	.747905E-05	.751533E-05
450.00	.755161E-05	.758789E-05	.762417E-05	.766045E-05	.769673E-05
500.00	.773301E-05	.776929E-05	.780557E-05	.784185E-05	.787813E-05
550.00	.791441E-05	.795069E-05	.798697E-05	.802325E-05	.805953E-05
600.00	.809581E-05	.813209E-05	.816837E-05	.820465E-05	.824093E-05
650.00	.827721E-05	.831349E-05	.834977E-05	.838605E-05	.842233E-05
700.00	.845861E-05	.849489E-05	.853117E-05	.856745E-05	.860373E-05
750.00	.864001E-05	.867629E-05	.871257E-05	.874885E-05	.878513E-05
800.00	.882141E-05	.885769E-05	.889397E-05	.893025E-05	.896653E-05
850.00	.900281E-05	.903909E-05	.907537E-05	.911165E-05	.914793E-05
900.00	.918421E-05	.922049E-05	.925677E-05	.929305E-05	.932933E-05
950.00	.936561E-05	.940189E-05	.943817E-05	.947445E-05	.951073E-05
1000.00	.954701E-05	.958329E-05	.961957E-05	.965585E-05	.969213E-05
1050.00	.972841E-05	.976469E-05	.980097E-05	.983725E-05	.987353E-05
1100.00	.990981E-05	.994609E-05	.998237E-05	.100187E-04	.100549E-04
1150.00	.100912E-04	.101275E-04	.101638E-04	.102001E-04	.102363E-04
1200.00	.102726E-04	.103089E-04	.103452E-04	.103815E-04	.104177E-04
1250.00	.104540E-04	.104903E-04	.105266E-04	.105629E-04	.105991E-04
1300.00	.106354E-04	.106717E-04	.107080E-04	.107443E-04	.107805E-04
1350.00	.108168E-04	.108531E-04	.108894E-04	.109257E-04	.109619E-04
1400.00	.109982E-04	.110345E-04	.110708E-04	.111071E-04	.111433E-04
1450.00	.111796E-04	.112159E-04	.112522E-04	.112885E-04	.113247E-04
1500.00	.113610E-04	.113973E-04	.114336E-04	.114699E-04	.115061E-04
1550.00	.115424E-04	.115787E-04	.116150E-04	.116513E-04*2*	.116875E-04*2*
1600.00	.117238E-04*2*	.117601E-04*2*	.117964E-04*2*	.118327E-04*2*	.118689E-04*2*
1650.00	.119052E-04*2*	.119415E-04*2*	.119778E-04*2*	.120141E-04*2*	.120503E-04*2*
1700.00	.120866E-04*2*	.121229E-04*2*	.121592E-04*2*	.121955E-04*2*	.122317E-04*2*
1750.00	.122680E-04*2*	.123043E-04*2*	.123406E-04*2*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

GAAL23


STOFFWERT *10 -5 [1/K]
0,64
0,72
0,80
0,88
0,96
1,04
1,12
1,20
1,28
1,36
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10 [K]

```
      FUNCTION ROAL23(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   AL203
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 2.7)
      ROAL23= 3800.
99999 RETURN
      END
```

```
****  FUNKTION   25  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON AL23 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   .

DIMENSIONEN: RO IN  KG/M3
DUMMY   ( 1          ).

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  3800.00
```

```
      FUNCTION WLAL23(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                        W/M.K
C$M   AL203                        (BEI 95% D. THEOR. DICHTE)
CP    TK           273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                  K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.7)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLAL23,'WLAL23',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      IF (TC.GT.400.) GOTO 1
      WLAL23= 33.71 - 8.0365E-2*TC +7.026E-5*TC*TC
      RETURN
    1 WLAL23= 5.82 - 3.741E3/TC + 4.874E6/(TC*TC) - 9.056E8/(TC*TC*TC)
   99 RETURN
      END
```

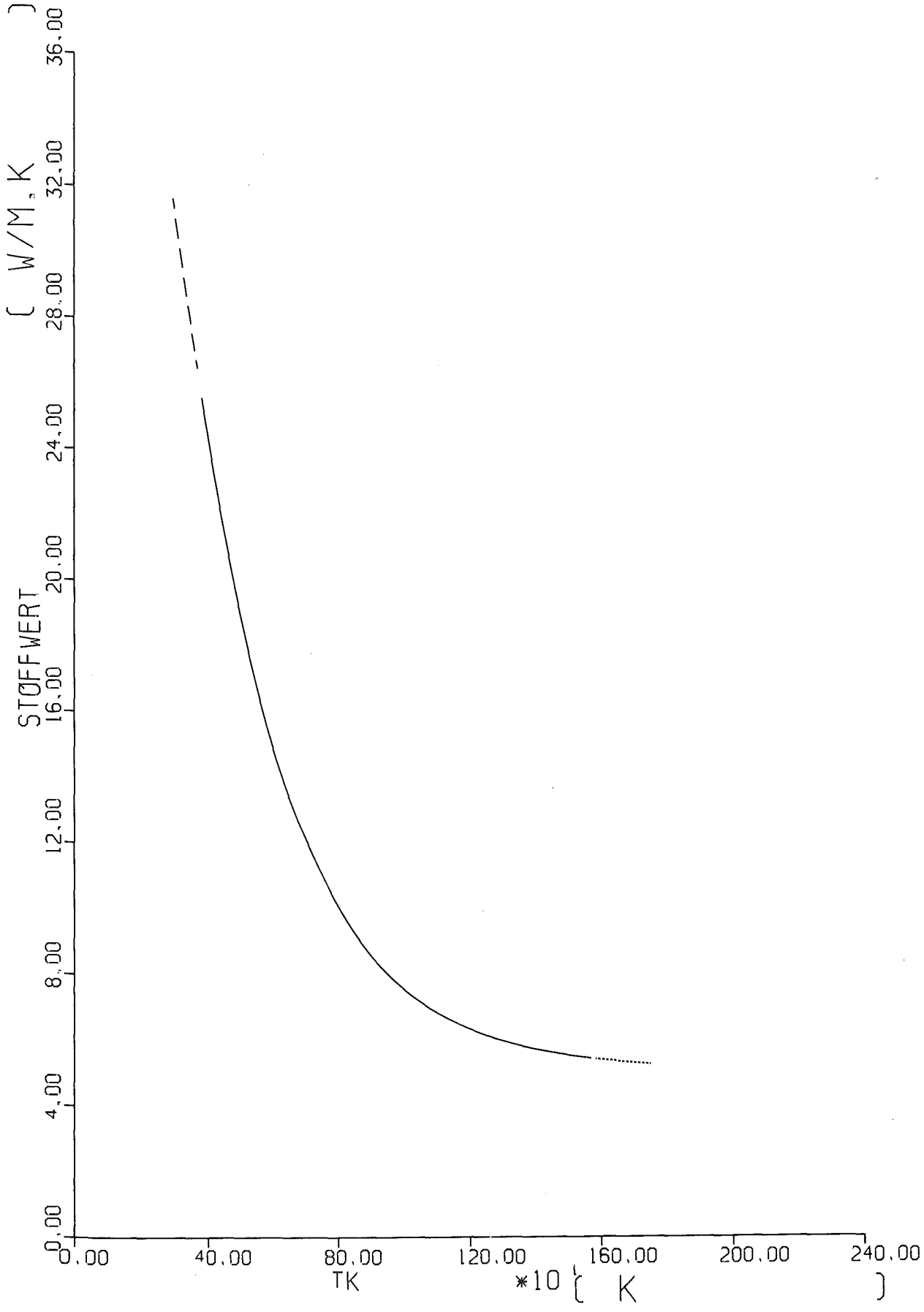
**** FUNKTION 26 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON AL23 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	31.6028	*2*	30.8439	*2*	30.0991	*2*	29.3683	*2*	28.6516	*2*
350.00	27.9489	*2*	27.2602	*2*	26.5857	*2*	25.9251		25.2787	
400.00	24.6462		24.0278		23.4235		22.8333		22.2570	
450.00	21.6949		21.1468		20.6127		20.0927		19.5867	
500.00	19.0948		18.6170		18.1532		17.7034		17.2677	
550.00	16.8461		16.4385		16.0450		15.6655		15.3000	
600.00	14.9486		14.6113		14.2880		13.9788		13.6836	
650.00	13.4025		13.1354		12.8824		12.6231		12.3926	
700.00	12.1622		11.9337		11.7081		11.4864		11.2695	
750.00	11.0577		10.8515		10.6511		10.4567		10.2684	
800.00	10.0861		9.90998		9.73981		9.57557		9.41709	
850.00	9.26426		9.11693		8.97494		8.83813		8.70633	
900.00	8.57937		8.45709		8.33931		8.22588		8.11663	
950.00	8.01141		7.91005		7.81243		7.71837		7.62776	
1000.00	7.54044		7.45630		7.37521		7.29705		7.22169	
1050.00	7.14904		7.07898		7.01141		6.94623		6.88335	
1100.00	6.82268		6.76413		6.70762		6.65306		6.60040	
1150.00	6.54954		6.50042		6.45298		6.40714		6.36286	
1200.00	6.32007		6.27871		6.23873		6.20008		6.16271	
1250.00	6.12657		6.09162		6.05782		6.02512		5.99347	
1300.00	5.96286		5.93323		5.90455		5.87680		5.84993	
1350.00	5.82391		5.79872		5.77432		5.75070		5.72781	
1400.00	5.70565		5.68418		5.66337		5.64321		5.62368	
1450.00	5.60475		5.58641		5.56863		5.55140		5.53470	
1500.00	5.51851		5.50281		5.48759		5.47283		5.45853	
1550.00	5.44465		5.43120		5.41816		5.40551	*2*	5.39324	*2*
1600.00	5.38134	*2*	5.36981	*2*	5.35862	*2*	5.34776	*2*	5.33724	*2*
1650.00	5.32703	*2*	5.31713	*2*	5.30753	*2*	5.29821	*2*	5.28918	*2*
1700.00	5.28042	*2*	5.27192	*2*	5.26368	*2*	5.25569	*2*	5.24794	*2*
1750.00	5.24043	*2*	5.23314	*2*	5.22608	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

WLAL23


STOFFWERT
(W/M, K)
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
36.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

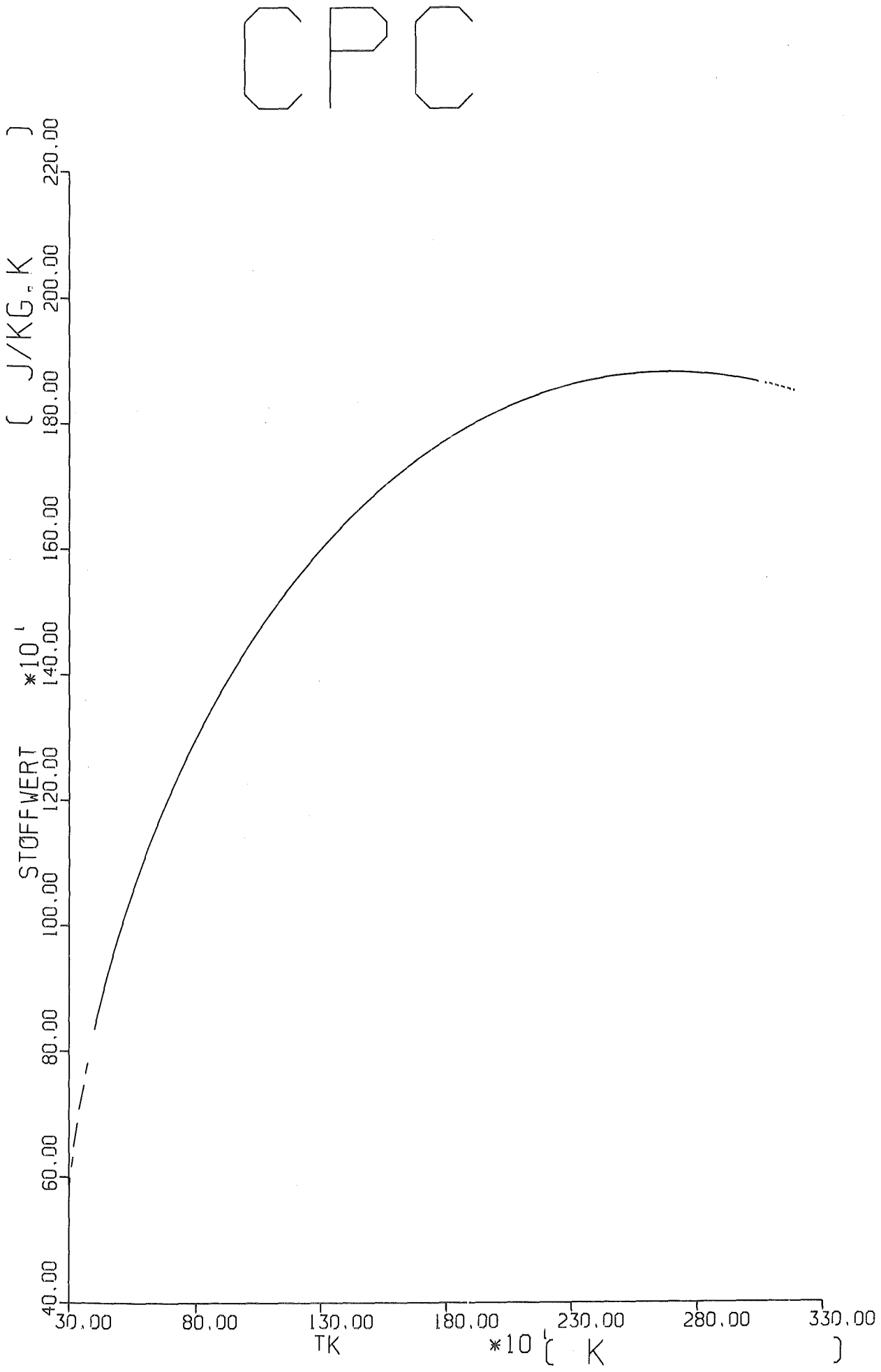
```
      FUNCTION CPC    (/TK     /)
C
CN    ***  M A P L I B  ***    FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                                  J/KG.K
C$M   ELEKTROGRAFIT
CP    TK            273.15 <= 373.15 <= TK <= 3073.15 <= 3273.15
CP    TEMPERATUR                                                    K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.11)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPC    ,'CPC    ',1,373.15,3073.15,273.15,3273.15,TK,&99)
C$T
99999 TC= TK-273.15
      CPC    = 364.4 + 42.57*SQRT(TC) - 4.529E-2*TC - 7.996E-5*TC*TC
   99 RETURN
      END
```

**** FUNKTION 32 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON C ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0		+ 20.000		+ 40.000		+ 60.000		+ 80.000	+
300.00	583.711	*2*	653.482	*2*	709.075	*2*	756.587	*2*	798.686	
400.00	836.824		871.895		904.496		935.048		963.864	
500.00	991.181		1017.18		1042.02		1065.82		1088.68	
600.00	1110.68		1131.89		1152.38		1172.20		1191.40	
700.00	1210.01		1228.08		1245.63		1262.69		1279.30	
800.00	1295.46		1311.21		1326.57		1341.54		1356.15	
900.00	1370.41		1384.34		1397.94		1411.24		1424.23	
1000.00	1436.93		1449.35		1461.50		1473.38		1485.01	
1100.00	1496.39		1507.52		1518.42		1529.08		1539.52	
1200.00	1549.74		1559.75		1569.54		1579.14		1588.52	
1300.00	1597.72		1606.72		1615.52		1624.15		1632.59	
1400.00	1640.85		1648.93		1656.84		1664.58		1672.15	
1500.00	1679.56		1686.80		1693.88		1700.81		1707.57	
1600.00	1714.19		1720.65		1726.96		1733.12		1739.14	
1700.00	1745.01		1750.74		1756.33		1761.78		1767.09	
1800.00	1772.26		1777.30		1782.20		1786.97		1791.61	
1900.00	1796.12		1800.50		1804.76		1808.88		1812.89	
2000.00	1816.76		1820.52		1824.15		1827.66		1831.05	
2100.00	1834.32		1837.47		1840.50		1843.42		1846.22	
2200.00	1848.91		1851.48		1853.94		1856.29		1858.52	
2300.00	1860.64		1862.66		1864.56		1866.35		1868.03	
2400.00	1869.61		1871.08		1872.44		1873.70		1874.85	
2500.00	1875.89		1876.83		1877.67		1878.40		1879.03	
2600.00	1879.56		1879.99		1880.31		1880.54		1880.66	
2700.00	1880.68		1880.61		1880.43		1880.16		1879.79	
2800.00	1879.32		1878.75		1878.08		1877.32		1876.46	
2900.00	1875.51		1874.46		1873.32		1872.08		1870.74	
3000.00	1869.32		1867.79		1866.18		1864.47		1862.67	*2*
3100.00	1860.77	*2*	1858.79	*2*	1856.71	*2*	1854.54	*2*	1852.28	*2*
3200.00	1849.92	*2*	1847.48	*2*	1844.94	*2*	1842.32	*2*	1.00000	*3*
3300.00	1.00000	*3*								


CPC
(J/KG. K)
STOFFWERT *10 '
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.00
220.00
30.00
80.00
130.00
180.00
230.00
280.00
330.00
TK *10 '(K)

```
      FUNCTION EKC    (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   ELEKTROGRAFIT
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER    (KAPITEL 5.11)
      EKC    = 0.80
99999 RETURN
      END
```

```
****  FUNKTION   33  ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON C     ALS FUNKTION DER
   0 ARGUMENTE DUMMY    .

DIMENSIONEN: EK IN  1
DUMMY    ( 1          ).

DUMMY    =          +  .0          +
                   +---------------
          0.0      |  .800000
```

```
      FUNCTION GAC    (/TK     /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT                  1/K
C$M   ELEKTROGRAFIT              (BEI 20. GRAD C)
CP    TK           273.15 <= 373.15 <= TK <= 3073.15 <= 3273.15
CP    TEMPERATUR                                               K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.11)
CB    AN HAND VORGENANNTER LITERATUR WURDE DER DIFFERENTIELLE
CB    AUSDEHNUNGSKOEFFIZIENT ERMITTELT.
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(GAC    ,'GAC    ',1,373.15,3073.15,273.15,3273.15,TK,&99)
C$T
99999 GAC    = 3.846E-6 + 1.2846E-9*(TK-273.15)
   99 RETURN
      END
```

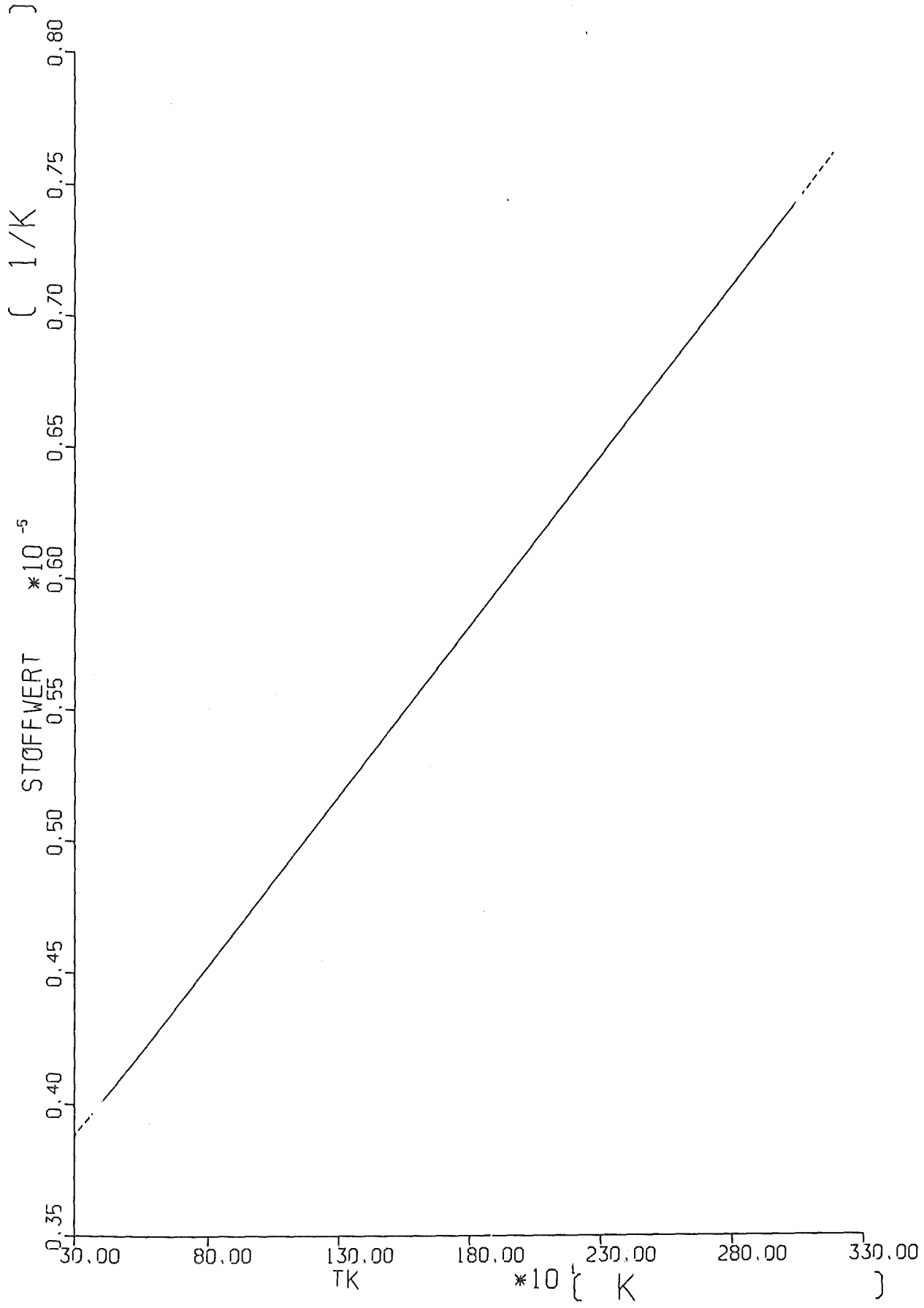
**** FUNKTION 34 ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON C ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: GA IN 1/K
TK (K),

TK =	+ .0	+ 20.000	+ 40.000	+ 60.000	+ 80.000
300.00	.388049E-05*2*	.390618E-05*2*	.393188E-05*2*	.395757E-05*2*	.398326E-05
400.00	.400895E-05	.403464E-05	.406034E-05	.408603E-05	.411172E-05
500.00	.413741E-05	.416310E-05	.418880E-05	.421449E-05	.424018E-05
600.00	.426587E-05	.429156E-05	.431726E-05	.434295E-05	.436864E-05
700.00	.439433E-05	.442002E-05	.444572E-05	.447141E-05	.449710E-05
800.00	.452279E-05	.454848E-05	.457418E-05	.459987E-05	.462556E-05
900.00	.465125E-05	.467694E-05	.470264E-05	.472833E-05	.475402E-05
1000.00	.477971E-05	.480540E-05	.483110E-05	.485679E-05	.488248E-05
1100.00	.490817E-05	.493386E-05	.495956E-05	.498525E-05	.501094E-05
1200.00	.503663E-05	.506232E-05	.508802E-05	.511371E-05	.513940E-05
1300.00	.516509E-05	.519078E-05	.521648E-05	.524217E-05	.526786E-05
1400.00	.529355E-05	.531924E-05	.534494E-05	.537063E-05	.539632E-05
1500.00	.542201E-05	.544770E-05	.547340E-05	.549909E-05	.552478E-05
1600.00	.555047E-05	.557616E-05	.560186E-05	.562755E-05	.565324E-05
1700.00	.567893E-05	.570462E-05	.573032E-05	.575601E-05	.578170E-05
1800.00	.580739E-05	.583308E-05	.585878E-05	.588447E-05	.591016E-05
1900.00	.593585E-05	.596154E-05	.598724E-05	.601293E-05	.603862E-05
2000.00	.606431E-05	.609000E-05	.611570E-05	.614139E-05	.616708E-05
2100.00	.619277E-05	.621846E-05	.624415E-05	.626985E-05	.629554E-05
2200.00	.632123E-05	.634692E-05	.637262E-05	.639831E-05	.642400E-05
2300.00	.644969E-05	.647538E-05	.650108E-05	.652677E-05	.655246E-05
2400.00	.657815E-05	.660384E-05	.662954E-05	.665523E-05	.668092E-05
2500.00	.670661E-05	.673230E-05	.675800E-05	.678369E-05	.680938E-05
2600.00	.683507E-05	.686076E-05	.688646E-05	.691215E-05	.693784E-05
2700.00	.696353E-05	.698922E-05	.701492E-05	.704061E-05	.706630E-05
2800.00	.709199E-05	.711768E-05	.714338E-05	.716907E-05	.719476E-05
2900.00	.722045E-05	.724614E-05	.727184E-05	.729753E-05	.732322E-05
3000.00	.734891E-05	.737460E-05	.740030E-05	.742599E-05	.745168E-05*2*
3100.00	.747737E-05*2*	.750306E-05*2*	.752876E-05*2*	.755445E-05*2*	.758014E-05*2*
3200.00	.760583E-05*2*	.763152E-05*2*	.765722E-05*2*	.768291E-05*2*	1.00000 *3*
3300.00	1.00000 *3*				

GAC


STOFFWERT *10 -5 (1/K)
0,35
0,40
0,45
0,50
0,55
0,60
0,65
0,70
0,75
0,80
30,00
80,00
130,00
180,00
230,00
280,00
330,00
TK *10 (K)

```
      FUNCTION ROC    (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   ELEKTROGRAFIT
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 2.11)
      ROC   = 1680.
99999 RETURN
      END
```

```
****  FUNKTION   35  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON C     ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: RO IN  KG/M3
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  1680.00
```

```
      FUNCTION WLC    (/TK     /)
C
CN    ***  M A P L I B  ***    FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                        W/M.K
C$M   ELEKTROGRAFIT
CP    TK            273.15 <= 373.15 <= TK <= 3073.15 <= 3273.15
CP    TEMPERATUR                                                  K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.11)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLC    ,'WLC    ',1,373.15,3073.15,273.15,3273.15,TK,&99)
C$T
99999 TC= TK-273.15
      WLC    = 104.98 - 7.550E-2*TC + 2.542E-5*TC*TC - 3.204E-9*TC*TC*TC
   99 RETURN
      END
```

**** FUNKTION 36 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON C ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0	+ 20.000	+ 40.000	+ 60.000	+ 80.000	+
300.00	102.971 *2*	101.498 *2*	100.045 *2*	98.6124 *2*	97.1991	
400.00	95.8053	94.4308	93.0756	91.7394	90.4221	
500.00	89.1235	87.8436	86.5821	85.3388	84.1137	
600.00	82.9066	81.7173	80.5456	79.3915	78.2547	
700.00	77.1352	76.0327	74.9471	73.8782	72.8259	
800.00	71.7901	70.7706	69.7672	68.7797	67.8081	
900.00	66.8522	65.9117	64.9867	64.0768	63.1820	
1000.00	62.3021	61.4370	60.5864	59.7503	58.9284	
1100.00	58.1207	57.3270	56.5471	55.7809	55.0282	
1200.00	54.2888	53.5627	52.8496	52.1494	51.4620	
1300.00	50.7871	50.1247	49.4746	48.8366	48.2106	
1400.00	47.5964	46.9939	46.4029	45.8232	45.2548	
1500.00	44.6975	44.1510	43.6153	43.0901	42.5755	
1600.00	42.0711	41.5768	41.0925	40.6181	40.1533	
1700.00	39.6980	39.2521	38.8154	38.3878	37.9690	
1800.00	37.5591	37.1577	36.7647	36.3801	36.0035	
1900.00	35.6350	35.2743	34.9212	34.5757	34.2375	
2000.00	33.9066	33.5827	33.2657	32.9554	32.6518	
2100.00	32.3546	32.0636	31.7789	31.5001	31.2271	
2200.00	30.9598	30.6980	30.4416	30.1904	29.9442	
2300.00	29.7030	29.4665	29.2346	29.0071	28.7840	
2400.00	28.5649	28.3499	28.1387	27.9311	27.7271	
2500.00	27.5264	27.3290	27.1346	26.9431	26.7544	
2600.00	26.5682	26.3845	26.2031	26.0238	25.8466	
2700.00	25.6711	25.4973	25.3250	25.1540	24.9844	
2800.00	24.8157	24.6481	24.4812	24.3147	24.1489	
2900.00	23.9831	23.8177	23.6521	23.4865	23.3204	
3000.00	23.1540	22.9868	22.8190	22.6500	22.4801 *2*	
3100.00	22.3090 *2*	22.1364 *2*	21.9623 *2*	21.7863 *2*	21.6087 *2*	
3200.00	21.4289 *2*	21.2470 *2*	21.0627 *2*	20.8761 *2*	1.00000 *3*	
3300.00	1.00000 *3*					

**** FUNKTION 36 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON C ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0		+ 20.000		+ 40.000		+ 60.000		+ 80.000	
300.00	102.971	*2*	101.498	*2*	100.045	*2*	98.6124	*2*	97.1991	
400.00	95.8053		94.4308		93.0756		91.7394		90.4221	
500.00	89.1235		87.8436		86.5821		85.3388		84.1137	
600.00	82.9066		81.7173		80.5456		79.3915		78.2547	
700.00	77.1352		76.0327		74.9471		73.8782		72.8259	
800.00	71.7901		70.7706		69.7672		68.7797		67.8081	
900.00	66.8522		65.9117		64.9867		64.0768		63.1820	
1000.00	62.3021		61.4370		60.5864		59.7503		58.9284	
1100.00	58.1207		57.3270		56.5471		55.7809		55.0282	
1200.00	54.2888		53.5627		52.8496		52.1494		51.4620	
1300.00	50.7871		50.1247		49.4746		48.8366		48.2106	
1400.00	47.5964		46.9939		46.4029		45.8232		45.2548	
1500.00	44.6975		44.1510		43.6153		43.0901		42.5755	
1600.00	42.0711		41.5768		41.0925		40.6181		40.1533	
1700.00	39.6980		39.2521		38.8154		38.3878		37.9690	
1800.00	37.5591		37.1577		36.7647		36.3801		36.0035	
1900.00	35.6350		35.2743		34.9212		34.5757		34.2375	
2000.00	33.9066		33.5827		33.2657		32.9554		32.6518	
2100.00	32.3546		32.0636		31.7789		31.5001		31.2271	
2200.00	30.9598		30.6980		30.4416		30.1904		29.9442	
2300.00	29.7030		29.4665		29.2346		29.0071		28.7840	
2400.00	28.5649		28.3499		28.1387		27.9311		27.7271	
2500.00	27.5264		27.3290		27.1346		26.9431		26.7544	
2600.00	26.5682		26.3845		26.2031		26.0238		25.8466	
2700.00	25.6711		25.4973		25.3250		25.1540		24.9844	
2800.00	24.8157		24.6481		24.4812		24.3147		24.1489	
2900.00	23.9831		23.8177		23.6521		23.4865		23.3204	
3000.00	23.1540		22.9868		22.8190		22.6500		22.4801	*2*
3100.00	22.3090	*2*	22.1364	*2*	21.9623	*2*	21.7863	*2*	21.6087	*2*
3200.00	21.4289	*2*	21.2470	*2*	21.0627	*2*	20.8761	*2*	1.00000	*3*
3300.00	1.00000	*3*								

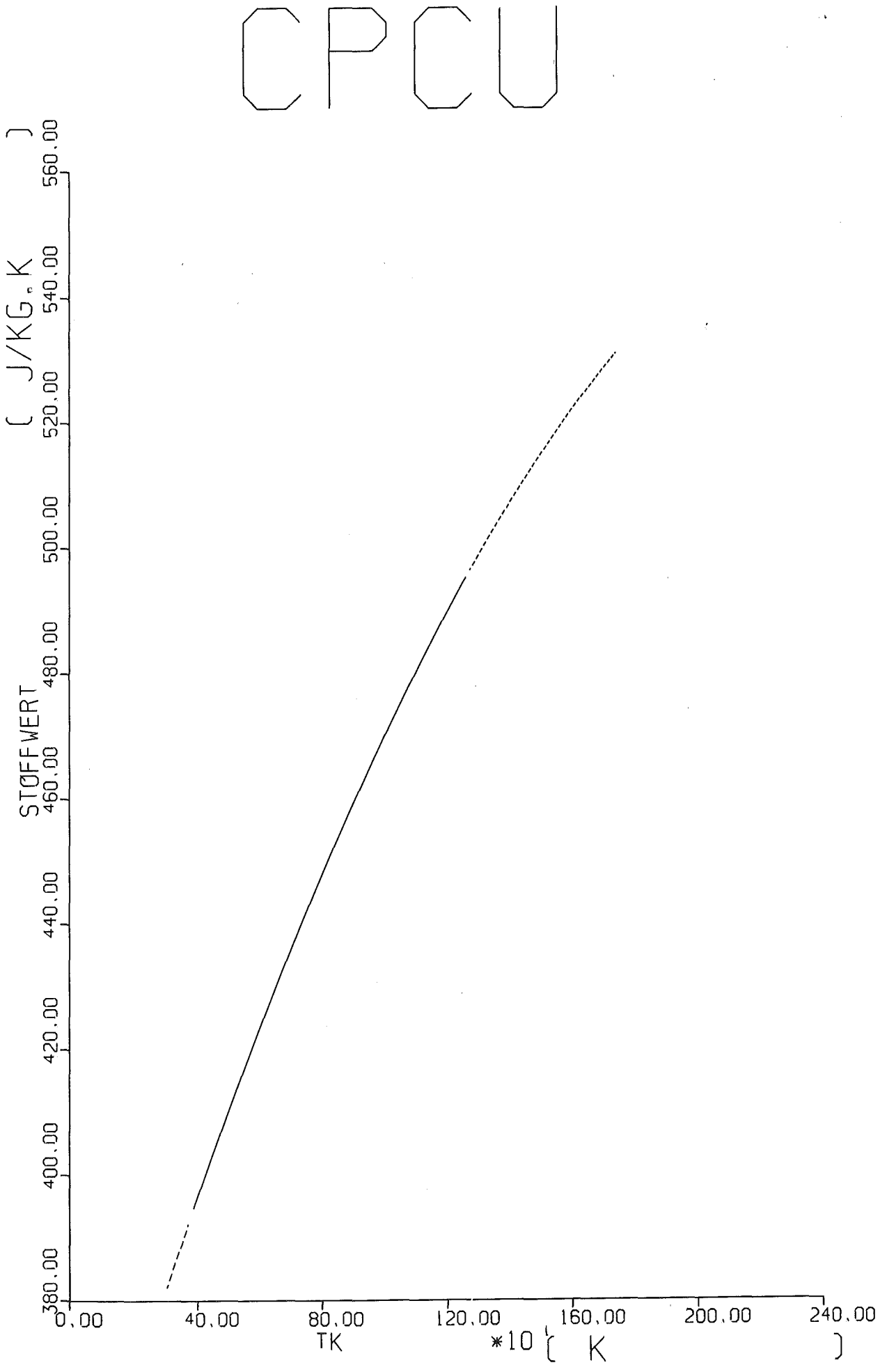
```
      FUNCTION CPCU  (/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                              J/KG.K
C$M   KUPFER
CP    TK           273.15 <= 373.15 <= TK <= 1273.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.12)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPCU  ,'CPCU  ',1,373.15,1273.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      CPCU  = 378.2 + 0.1473*TC - 2.968E-5*TC*TC
   99 RETURN
      END
```

**** FUNKTION 49 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON CU ALS FUNKTION DER
1 ARGUMENTE TK .

DIMENSIONEN: CP IN J/KG.K
TK (K).

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	382.133	*2*	383.587	*2*	385.036	*2*	386.478	*2*	387.914	*2*
350.00	389.344	*2*	390.769	*2*	392.187	*2*	393.600		395.007	
400.00	396.407		397.802		399.191		400.574		401.950	
450.00	403.321		404.687		406.046		407.399		408.746	
500.00	410.087		411.423		412.752		414.076		415.393	
550.00	416.705		418.010		419.310		420.604		421.892	
600.00	423.174		424.450		425.720		426.984		428.242	
650.00	429.495		430.741		431.981		433.216		434.444	
700.00	435.667		436.884		438.094		439.299		440.498	
750.00	441.691		442.878		444.059		445.234		446.403	
800.00	447.566		448.724		449.875		451.021		452.160	
850.00	453.294		454.421		455.543		456.659		457.768	
900.00	458.872		459.970		461.062		462.148		463.228	
950.00	464.303		465.371		466.433		467.490		468.540	
1000.00	469.584		470.623		471.656		472.682		473.703	
1050.00	474.718		475.727		476.730		477.727		478.718	
1100.00	479.703		480.682		481.656		482.623		483.584	
1150.00	484.540		485.489		486.433		487.371		488.302	
1200.00	489.228		490.148		491.062		491.970		492.872	
1250.00	493.768		494.658		495.542		496.421	*2*	497.293	*2*
1300.00	498.159	*2*	499.020	*2*	499.875	*2*	500.723	*2*	501.566	*2*
1350.00	502.403	*2*	503.234	*2*	504.058	*2*	504.877	*2*	505.690	*2*
1400.00	506.497	*2*	507.299	*2*	508.094	*2*	508.883	*2*	509.666	*2*
1450.00	510.444	*2*	511.215	*2*	511.981	*2*	512.740	*2*	513.494	*2*
1500.00	514.241	*2*	514.983	*2*	515.719	*2*	516.449	*2*	517.173	*2*
1550.00	517.891	*2*	518.603	*2*	519.309	*2*	520.010	*2*	520.704	*2*
1600.00	521.392	*2*	522.075	*2*	522.751	*2*	523.422	*2*	524.086	*2*
1650.00	524.745	*2*	525.398	*2*	526.044	*2*	526.685	*2*	527.320	*2*
1700.00	527.949	*2*	528.572	*2*	529.189	*2*	529.801	*2*	530.406	*2*
1750.00	531.005	*2*	531.599	*2*	532.186	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								


CPCU
STØFFWERT
(J/KG.K)
560.00
540.00
520.00
500.00
480.00
460.00
440.00
420.00
400.00
380.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION EKCU  (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   KUPFER
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 5.12)
      EKCU  = 0.30
99999 RETURN
      END
```

```
****  FUNKTION   50  ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON CU   ALS FUNKTION DER
   0 ARGUMENTE DUMMY   .

DIMENSIONEN: EK IN  1
DUMMY   ( 1          ).

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  .300000
```

```
      FUNCTION GACU  (/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT                    1/K
C$M   KUPFER
CP    TK           273.15 <= 373.15 <= TK <= 1273.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.12)
CB    AN HAND VORGENANNTER LITERATUR WURDE DER DIFFERENTIELLE
CB    AUSDEHNUNGSKOEFFIZIENT ERMITTELT.
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(GACU  ,'GACU  ',1,373.15,1273.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      GACU  = 1.6727E-5 + 5.056E-9*TC + 2.4111E-12*TC*TC
   99 RETURN
      END
```

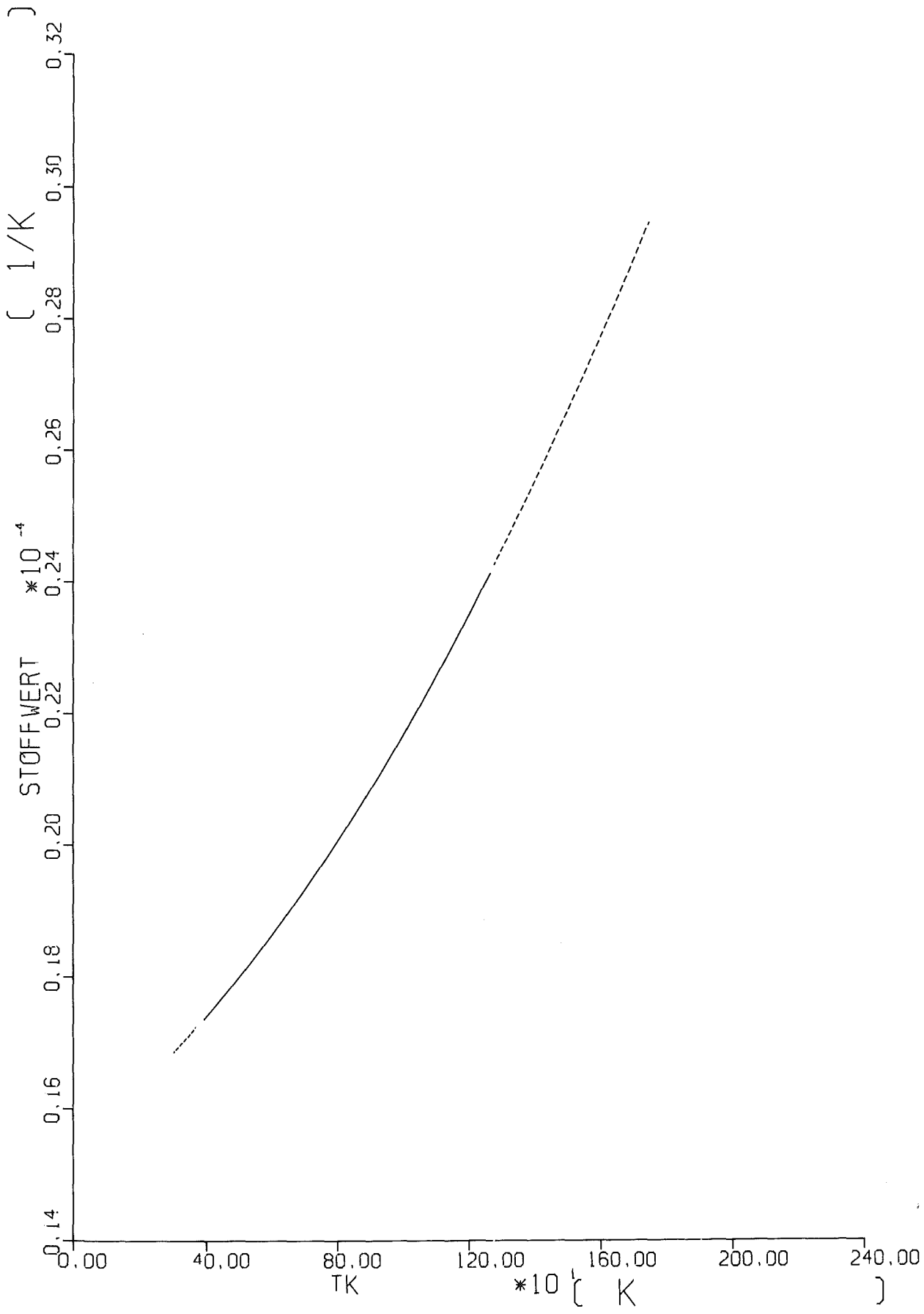
**** FUNKTION 51 ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON CU ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: GA IN 1/K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	.168645E-04*2*	.169166E-04*2*	.169691E-04*2*	.170222E-04*2*	.170758E-04*2*
350.00	.171298E-04*2*	.171843E-04*2*	.172393E-04*2*	.172947E-04	.173507E-04
400.00	.174071E-04	.174641E-04	.175215E-04	.175793E-04	.176377E-04
450.00	.176966E-04	.177559E-04	.178157E-04	.178760E-04	.179368E-04
500.00	.179980E-04	.180598E-04	.181220E-04	.181847E-04	.182479E-04
550.00	.183115E-04	.183757E-04	.184403E-04	.185054E-04	.185711E-04
600.00	.186371E-04	.187037E-04	.187707E-04	.188383E-04	.189063E-04
650.00	.189748E-04	.190437E-04	.191132E-04	.191831E-04	.192535E-04
700.00	.193244E-04	.193958E-04	.194677E-04	.195400E-04	.196129E-04
750.00	.196862E-04	.197600E-04	.198343E-04	.199090E-04	.199843E-04
800.00	.200600E-04	.201362E-04	.202129E-04	.202901E-04	.203677E-04
850.00	.204459E-04	.205245E-04	.206036E-04	.206831E-04	.207632E-04
900.00	.208438E-04	.209248E-04	.210063E-04	.210883E-04	.211708E-04
950.00	.212537E-04	.213372E-04	.214211E-04	.215055E-04	.215904E-04
1000.00	.216757E-04	.217616E-04	.218479E-04	.219348E-04	.220221E-04
1050.00	.221098E-04	.221981E-04	.222868E-04	.223761E-04	.224658E-04
1100.00	.225560E-04	.226466E-04	.227378E-04	.228294E-04	.229216E-04
1150.00	.230142E-04	.231072E-04	.232008E-04	.232949E-04	.233894E-04
1200.00	.234844E-04	.235799E-04	.236759E-04	.237723E-04	.238693E-04
1250.00	.239667E-04	.240646E-04	.241630E-04	.242619E-04*2*	.243612E-04*2*
1300.00	.244611E-04*2*	.245614E-04*2*	.246622E-04*2*	.247634E-04*2*	.248652E-04*2*
1350.00	.249675E-04*2*	.250702E-04*2*	.251734E-04*2*	.252771E-04*2*	.253813E-04*2*
1400.00	.254859E-04*2*	.255911E-04*2*	.256967E-04*2*	.258028E-04*2*	.259094E-04*2*
1450.00	.260165E-04*2*	.261240E-04*2*	.262320E-04*2*	.263406E-04*2*	.264496E-04*2*
1500.00	.265590E-04*2*	.266690E-04*2*	.267794E-04*2*	.268904E-04*2*	.270018E-04*2*
1550.00	.271137E-04*2*	.272261E-04*2*	.273389E-04*2*	.274522E-04*2*	.275661E-04*2*
1600.00	.276804E-04*2*	.277951E-04*2*	.279104E-04*2*	.280262E-04*2*	.281424E-04*2*
1650.00	.282591E-04*2*	.283763E-04*2*	.284940E-04*2*	.286121E-04*2*	.287308E-04*2*
1700.00	.288499E-04*2*	.289695E-04*2*	.290896E-04*2*	.292102E-04*2*	.293312E-04*2*
1750.00	.294528E-04*2*	.295748E-04*2*	.296973E-04*2*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

GACU


STOFFWERT *10 -4 [1/K]
0,14
0,16
0,18
0,20
0,22
0,24
0,26
0,28
0,30
0,32
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10 [K]

```
      FUNCTION ROCU  (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   KUPFER                    (BEI 20. GRAD C)
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 2.12)
      ROCU  = 8930.
99999 RETURN
      END
```

```
****  FUNKTION    52  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON CU   ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: RO IN  KG/M3
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  8930.00
```

```
      FUNCTION WLCU  (/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                    W/M.K
C$M   KUPFER                    (BEI 99.999% REINHEIT)
CP    TK          273.15 <= 373.15 <= TK <= 1373.15 <= 1773.15
CP    TEMPERATUR                                              K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.12)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLCU  ,'WLCU  ',1,373.15,1373.15,273.15,1773.15,TK,699)
C$T
99999 TC= TK-273.15
      WLCU  = 399.1 - 4.484E-2*TC - 1.779E-5*TC*TC
   99 RETURN
      END
```

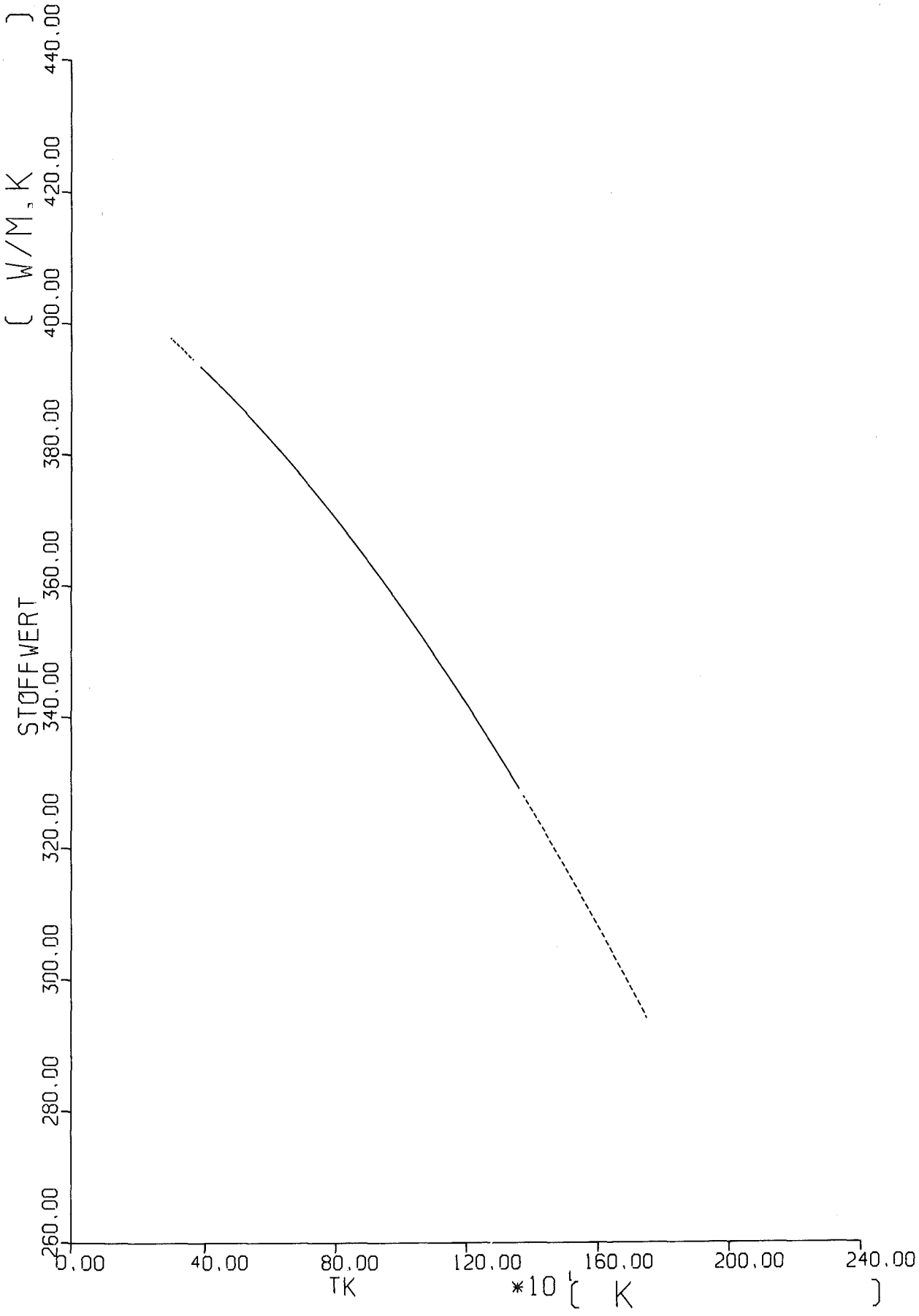
**** FUNKTION 53 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON CU ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000	+
300.00	397.883 *2*	397.424 *2*	396.960 *2*	396.493 *2*	396.023 *2*	
350.00	395.549 *2*	395.071 *2*	394.590 *2*	394.106	393.617	
400.00	393.126	392.630	392.131	391.629	391.123	
450.00	390.614	390.101	389.584	389.064	388.540	
500.00	388.012	387.482	386.947	386.409	385.868	
550.00	385.323	384.774	384.221	383.666	383.106	
600.00	382.543	381.977	381.407	380.833	380.256	
650.00	379.676	379.091	378.503	377.912	377.317	
700.00	376.719	376.117	375.511	374.902	374.289	
750.00	373.673	373.053	372.429	371.802	371.172	
800.00	370.538	369.900	369.259	368.615	367.966	
850.00	367.314	366.659	366.000	365.337	364.671	
900.00	364.001	363.328	362.652	361.971	361.287	
950.00	360.600	359.909	359.214	358.516	357.815	
1000.00	357.109	356.400	355.688	354.972	354.253	
1050.00	353.530	352.803	352.073	351.339	350.602	
1100.00	349.861	349.117	348.369	347.617	346.863	
1150.00	346.104	345.342	344.576	343.807	343.034	
1200.00	342.257	341.477	340.694	339.907	339.116	
1250.00	338.322	337.524	336.723	335.918	335.110	
1300.00	334.298	333.482	332.663	331.841	331.014	
1350.00	330.185	329.351	328.514	327.674 *2*	326.830 *2*	
1400.00	325.982 *2*	325.131 *2*	324.277 *2*	323.418 *2*	322.556 *2*	
1450.00	321.691 *2*	320.822 *2*	319.950 *2*	319.074 *2*	318.194 *2*	
1500.00	317.311 *2*	316.425 *2*	315.534 *2*	314.640 *2*	313.743 *2*	
1550.00	312.842 *2*	311.938 *2*	311.030 *2*	310.118 *2*	309.203 *2*	
1600.00	308.284 *2*	307.362 *2*	306.436 *2*	305.507 *2*	304.574 *2*	
1650.00	303.637 *2*	302.697 *2*	301.754 *2*	300.806 *2*	299.855 *2*	
1700.00	298.901 *2*	297.943 *2*	296.982 *2*	296.017 *2*	295.049 *2*	
1750.00	294.076 *2*	293.101 *2*	292.122 *2*	1.00000 *3*	1.00000 *3*	
1800.00	1.00000 *3*					

WLCU


STØFFWERT
(W/M, K)
260.00
280.00
300.00
320.00
340.00
360.00
380.00
400.00
420.00
440.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION CPINC6(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                              J/KG.K
C$M   INCONEL 600
CP    TK           273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.13)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPINC6,'CPINC6',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      IF (TC.GT.560.) GOTO 1
      CPINC6= 435. + 2.937E-1*TC - 1.589E-4*TC*TC
      RETURN
    1 IF (TC.GT.740.) GOTO 2
      CPINC6= 365.3 + 3.333E-1*TC
      RETURN
    2 CPINC6= 567.1 + 6.071E-2*TC
   99 RETURN
      END
```

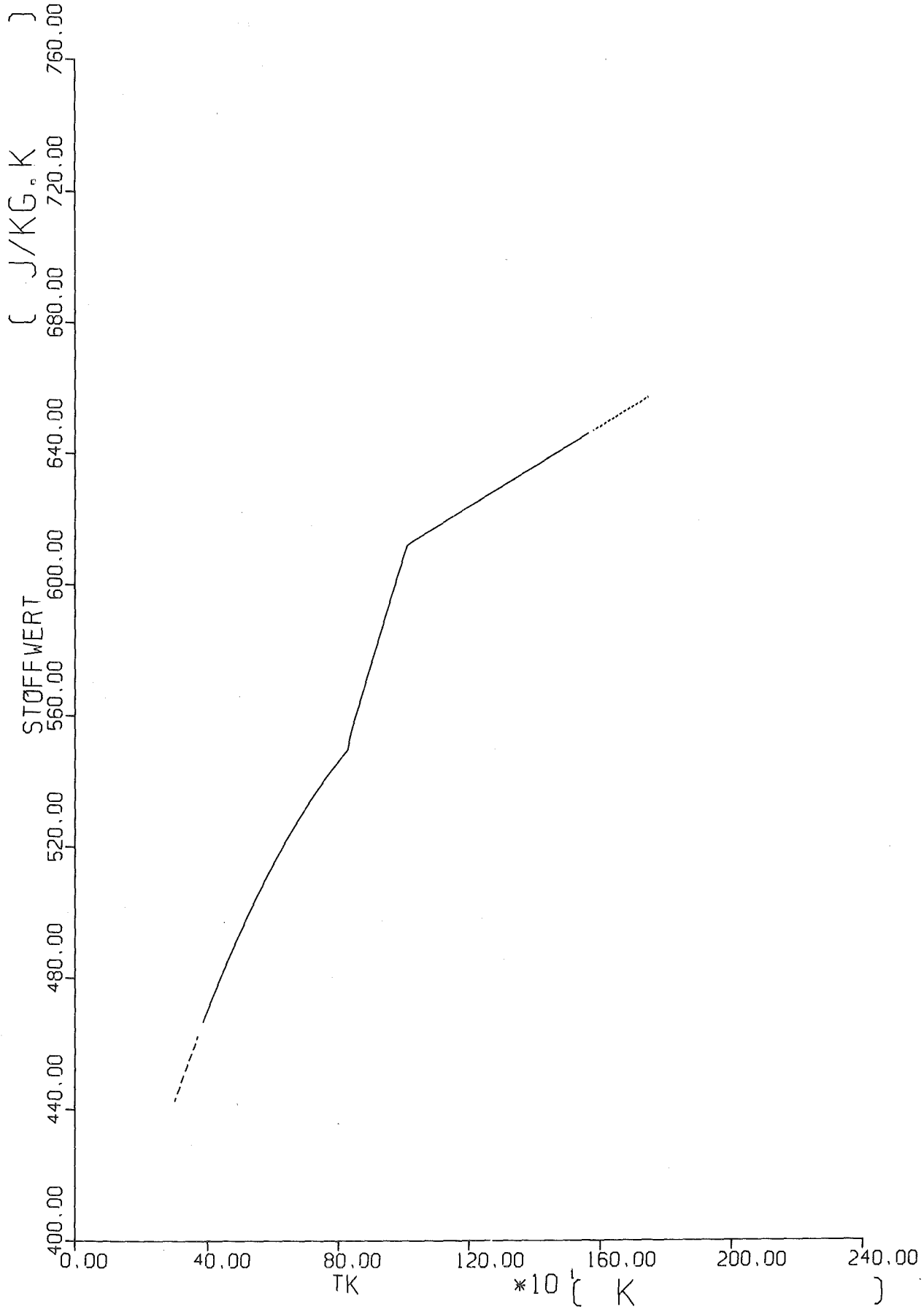
**** FUNKTION 87 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON INC6 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	442.771 *2*	445.607 *2*	448.411 *2*	451.183 *2*	453.924 *2*
350.00	456.632 *2*	459.309 *2*	461.954 *2*	464.568	467.149
400.00	469.699	472.217	474.703	477.157	479.580
450.00	481.971	484.330	486.657	488.953	491.217
500.00	493.448	495.649	497.817	499.954	502.059
550.00	504.132	506.173	508.182	510.160	512.106
600.00	514.020	515.903	517.753	519.572	521.359
650.00	523.114	524.838	526.530	528.189	529.818
700.00	531.414	532.979	534.511	536.012	537.482
750.00	538.919	540.325	541.699	543.041	544.351
800.00	545.630	546.876	548.091	549.274	554.231
850.00	557.564	560.897	564.230	567.563	570.896
900.00	574.229	577.562	580.895	584.228	587.561
950.00	590.894	594.227	597.560	600.893	604.226
1000.00	607.559	610.892	612.441	613.048	613.656
1050.00	614.262	614.870	615.477	616.084	616.691
1100.00	617.298	617.905	618.512	619.119	619.727
1150.00	620.333	620.941	621.548	622.155	622.762
1200.00	623.369	623.976	624.583	625.190	625.797
1250.00	626.405	627.012	627.619	628.226	628.833
1300.00	629.440	630.047	630.654	631.261	631.868
1350.00	632.476	633.083	633.690	634.297	634.904
1400.00	635.511	636.118	636.725	637.332	637.939
1450.00	638.547	639.154	639.761	640.368	640.975
1500.00	641.582	642.189	642.796	643.403	644.010
1550.00	644.617	645.225	645.832	646.439 *2*	647.046 *2*
1600.00	647.653 *2*	648.260 *2*	648.867 *2*	649.474 *2*	650.082 *2*
1650.00	650.688 *2*	651.296 *2*	651.903 *2*	652.510 *2*	653.117 *2*
1700.00	653.724 *2*	654.331 *2*	654.938 *2*	655.545 *2*	656.152 *2*
1750.00	656.760 *2*	657.367 *2*	657.974 *2*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

CPINC6


STOFFWERT
[J/KG.K]
400.00
440.00
480.00
520.00
560.00
600.00
640.00
680.00
720.00
760.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 [K]

```
      FUNCTION EKINC6(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   INCONEL 600
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2: AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN:  K.WAGNER & T.VOLLMER   (KAPITEL 5.13)
      EKINC6= 0.70
99999 RETURN
      END
```

```
****  FUNKTION   88  ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON INC6 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: EK IN  1
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
        0.0       |  .700000
```

```
      FUNCTION GAINC6(/TK    /)
C
CN    *** M A P L I B ***  FUNCTION
C
C$P   LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT                    1/K
C$M   INCONEL 600
CP    TK          273.15 <= 373.15 <= TK <= 1273.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.13)
CB    AN HAND VORGENANNTER LITERATUR WURDE DER DIFFERENTIELLE
CB    AUSDEHNUNGSKOEFFIZIENT ERMITTELT.
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(GAINC6,'GAINC6',1,373.15,1273.15,273.15,1773.15,TK,&99)
C$T
99999 GAINC6= 1.345E-5 + 6.676E-9*(TK-273.15)
   99 RETURN
      END
```

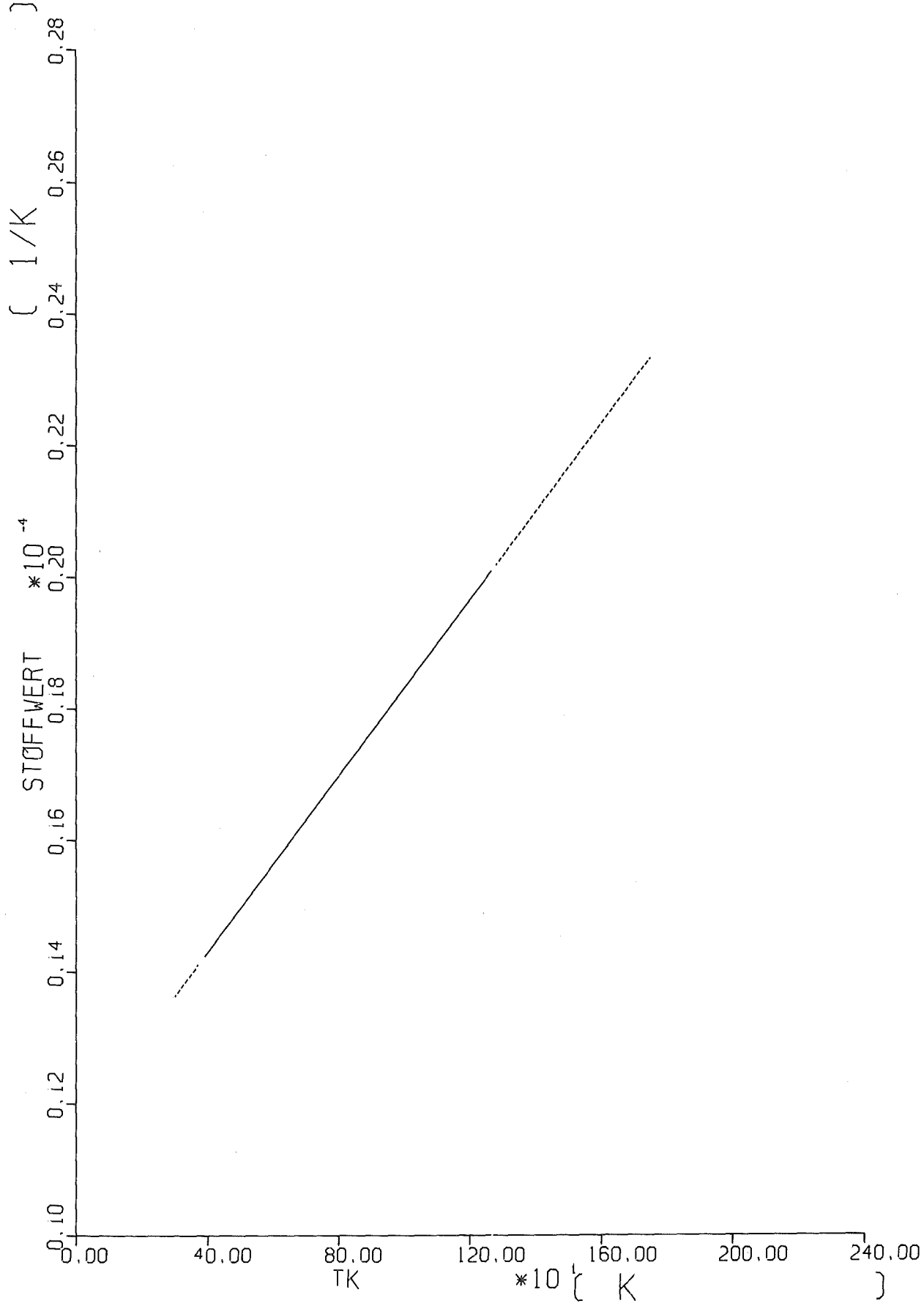
**** FUNKTION 89 ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON INC6 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: GA IN 1/K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	.136293E-04*2*	.136960E-04*2*	.137628E-04*2*	.138295E-04*2*	.138963E-04*2*
350.00	.139631E-04*2*	.140298E-04*2*	.140966E-04*2*	.141633E-04	.142301E-04
400.00	.142969E-04	.143636E-04	.144304E-04	.144971E-04	.145639E-04
450.00	.146307E-04	.146974E-04	.147642E-04	.148309E-04	.148977E-04
500.00	.149645E-04	.150312E-04	.150980E-04	.151647E-04	.152315E-04
550.00	.152982E-04	.153650E-04	.154318E-04	.154985E-04	.155653E-04
600.00	.156320E-04	.156988E-04	.157656E-04	.158323E-04	.158991E-04
650.00	.159658E-04	.160326E-04	.160994E-04	.161661E-04	.162329E-04
700.00	.162996E-04	.163664E-04	.164332E-04	.164999E-04	.165667E-04
750.00	.166335E-04	.167002E-04	.167670E-04	.168337E-04	.169005E-04
800.00	.169672E-04	.170340E-04	.171008E-04	.171675E-04	.172343E-04
850.00	.173010E-04	.173678E-04	.174346E-04	.175013E-04	.175681E-04
900.00	.176348E-04	.177016E-04	.177684E-04	.178351E-04	.179019E-04
950.00	.179686E-04	.180354E-04	.181022E-04	.181689E-04	.182357E-04
1000.00	.183024E-04	.183692E-04	.184360E-04	.185027E-04	.185695E-04
1050.00	.186362E-04	.187030E-04	.187698E-04	.188365E-04	.189033E-04
1100.00	.189700E-04	.190368E-04	.191036E-04	.191703E-04	.192371E-04
1150.00	.193038E-04	.193706E-04	.194374E-04	.195041E-04	.195709E-04
1200.00	.196376E-04	.197044E-04	.197712E-04	.198379E-04	.199047E-04
1250.00	.199714E-04	.200382E-04	.201050E-04	.201717E-04*2*	.202385E-04*2*
1300.00	.203052E-04*2*	.203720E-04*2*	.204388E-04*2*	.205055E-04*2*	.205723E-04*2*
1350.00	.206390E-04*2*	.207058E-04*2*	.207726E-04*2*	.208393E-04*2*	.209061E-04*2*
1400.00	.209728E-04*2*	.210396E-04*2*	.211064E-04*2*	.211731E-04*2*	.212399E-04*2*
1450.00	.213066E-04*2*	.213734E-04*2*	.214402E-04*2*	.215069E-04*2*	.215737E-04*2*
1500.00	.216404E-04*2*	.217072E-04*2*	.217740E-04*2*	.218407E-04*2*	.219075E-04*2*
1550.00	.219743E-04*2*	.220410E-04*2*	.221078E-04*2*	.221745E-04*2*	.222413E-04*2*
1600.00	.223080E-04*2*	.223748E-04*2*	.224416E-04*2*	.225083E-04*2*	.225751E-04*2*
1650.00	.226418E-04*2*	.227086E-04*2*	.227754E-04*2*	.228421E-04*2*	.229089E-04*2*
1700.00	.229756E-04*2*	.230424E-04*2*	.231092E-04*2*	.231759E-04*2*	.232427E-04*2*
1750.00	.233094E-04*2*	.233762E-04*2*	.234430E-04*2*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

GAINC6


STOFFWERT *10 -4 (1/K)
0,10
0,12
0,14
0,16
0,18
0,20
0,22
0,24
0,26
0,28
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10 (K)

```
      FUNCTION ROINC6(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   INCONEL 600
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 2.13)
      ROINC6= 8430.
99999 RETURN
      END
```

```
****  FUNKTION   90  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON INC6 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: RO IN  KG/M3
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  8430.00
```

```
      FUNCTION WLINC6(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                        W/M.K
C$M   INCONEL 600
CP    TK           273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                  K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.13)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLINC6,'WLINC6',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      WLINC6= 17.5 + 1.4876E-2*TC + 6.1227E-6*TC*TC
   99 RETURN
      END
```

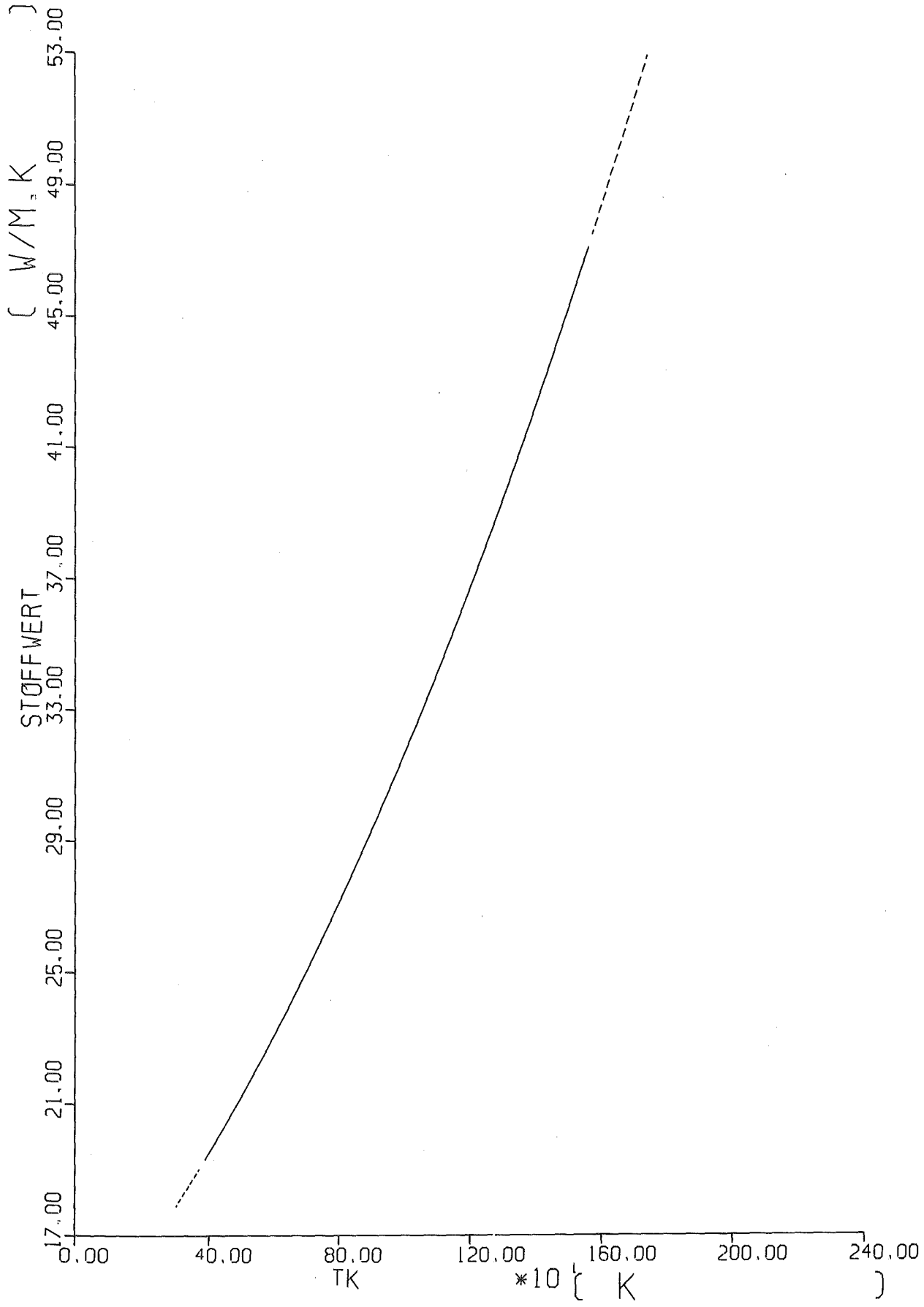
**** FUNKTION 91 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON INC6 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	17.9038	*2*	18.0565	*2*	18.2104	*2*	18.3655	*2*	18.5218	*2*
350.00	18.6794	*2*	18.8382	*2*	18.9982	*2*	19.1594		19.3218	
400.00	19.4855		19.6504		19.8166		19.9839		20.1525	
450.00	20.3223		20.4933		20.6656		20.8391		21.0138	
500.00	21.1897		21.3668		21.5452		21.7248		21.9056	
550.00	22.0877		22.2710		22.4555		22.6412		22.8281	
600.00	23.0163		23.2057		23.3963		23.5882		23.7812	
650.00	23.9755		24.1711		24.3678		24.5658		24.7650	
700.00	24.9654		25.1670		25.3699		25.5740		25.7793	
750.00	25.9858		26.1936		26.4026		26.6128		26.8242	
800.00	27.0369		27.2508		27.4659		27.6822		27.8998	
850.00	28.1186		28.3386		28.5598		28.7823		29.0060	
900.00	29.2309		29.4570		29.6844		29.9129		30.1427	
950.00	30.3738		30.6060		30.8395		31.0742		31.3101	
1000.00	31.5473		31.7857		32.0253		32.2661		32.5081	
1050.00	32.7514		32.9959		33.2417		33.4886		33.7368	
1100.00	33.9862		34.2368		34.4886		34.7417		34.9960	
1150.00	35.2515		35.5083		35.7663		36.0255		36.2859	
1200.00	36.5475		36.8104		37.0745		37.3398		37.6063	
1250.00	37.8741		38.1431		38.4133		38.6848		38.9574	
1300.00	39.2313		39.5064		39.7828		40.0603		40.3391	
1350.00	40.6191		40.9004		41.1828		41.4665		41.7514	
1400.00	42.0376		42.3249		42.6135		42.9033		43.1943	
1450.00	43.4866		43.7801		44.0748		44.3707		44.6679	
1500.00	44.9662		45.2659		45.5667		45.8687		46.1720	
1550.00	46.4765		46.7823		47.0892		47.3974	*2*	47.7068	*2*
1600.00	48.0174	*2*	48.3293	*2*	48.6423	*2*	48.9566	*2*	49.2722	*2*
1650.00	49.5889	*2*	49.9069	*2*	50.2261	*2*	50.5465	*2*	50.8681	*2*
1700.00	51.1910	*2*	51.5151	*2*	51.8404	*2*	52.1670	*2*	52.4948	*2*
1750.00	52.8237	*2*	53.1540	*2*	53.4854	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

WLINC6


(W/M. K)
53.00
49.00
45.00
41.00
37.00
33.00
29.00
25.00
21.00
17.00
STØFFWERT
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION FHK    (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SCHMELZWAERME                                          J/KG
C$M   KALIUM
CP    DUMMY
CP    DUMMY PARAMETER                                        1
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      FHK  = 5.945256E4
99999 RETURN
      END
```

```
****  FUNKTION   92  ****

TABELLE DER WERTE DER EIGENSCHAFT FH VON K    ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: FH IN  J/KG
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                +----------------
         0.0    |  59452.6
```

```
      FUNCTION VHK    (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   VERDAMPFUNGSENTHALPIE                                        J/KG
C$M   KALIUM
CP    DUMMY
CP    DUMMY PARAMETER                                              1
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
C
      VHK   = 1.984543E6
99999 RETURN
      END
```

```
****  FUNKTION   93  ****

TABELLE DER WERTE DER EIGENSCHAFT VH VON K    ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: VH IN  J/KG
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  .198454E+07
```

```
      FUNCTION CPMGO (/TK     /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                              J/KG.K
C$M   MAGNESIUM-OXID
CP    TK            273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.6)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPMGO ,'CPMGO ',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      CPMGO= 787.0 + 30.75*SQRT(TC) - 5.562E-1*TC + 9.4823E-5*TC*TC
   99 RETURN
      END
```

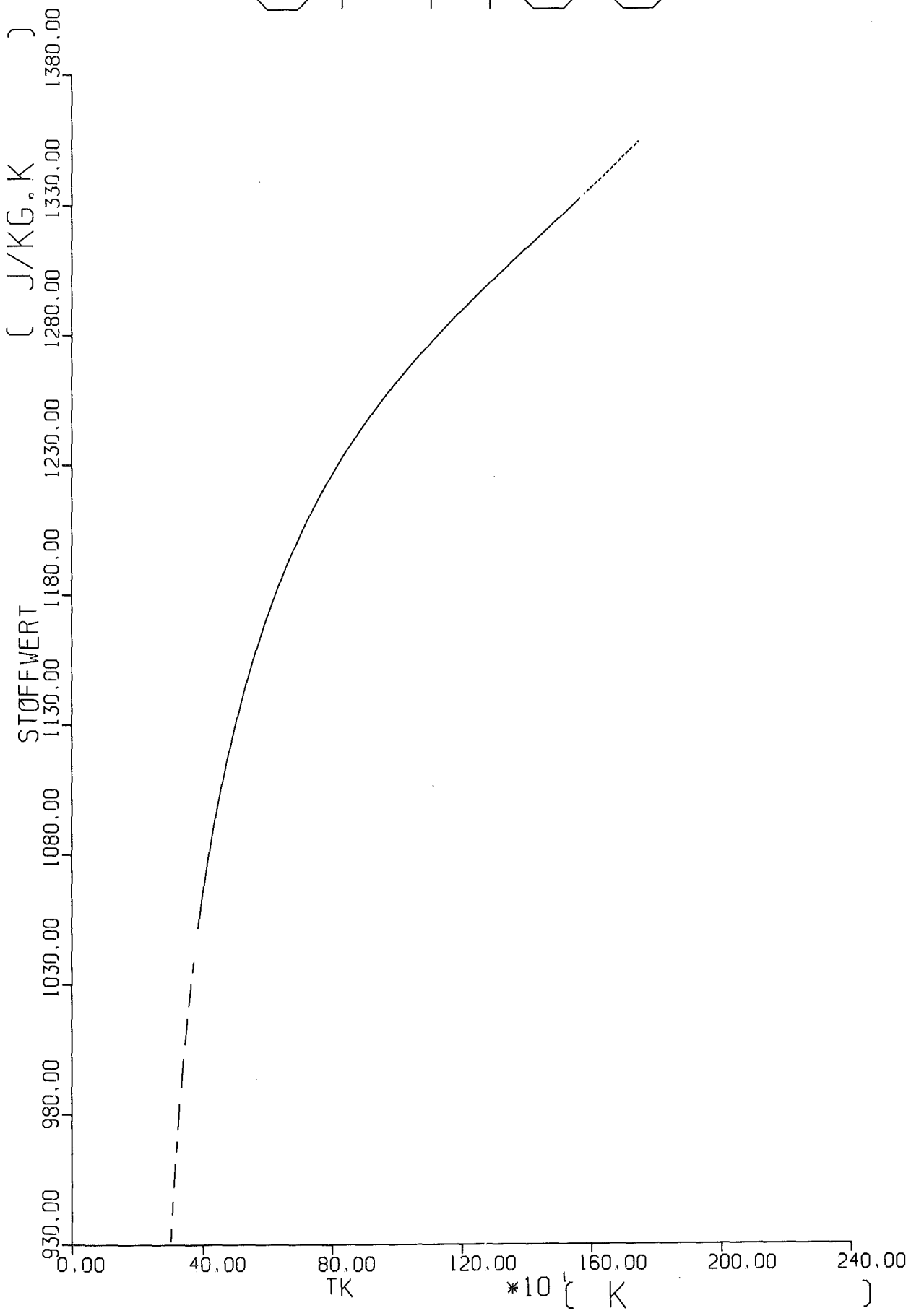
**** FUNKTION 94 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON MGO ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	931.472	*2*	953.298	*2*	971.625	*2*	987.538	*2*	1001.66	*2*
350.00	1014.38	*2*	1025.98	*2*	1036.64	*2*	1046.51		1055.70	
400.00	1064.30		1072.38		1080.00		1087.20		1094.04	
450.00	1100.53		1106.72		1112.62		1118.26		1123.67	
500.00	1128.85		1133.82		1138.61		1143.21		1147.65	
550.00	1151.93		1156.06		1160.05		1163.91		1167.65	
600.00	1171.26		1174.77		1178.17		1181.48		1184.68	
650.00	1187.80		1190.83		1193.78		1196.65		1199.44	
700.00	1202.17		1204.82		1207.41		1209.94		1212.41	
750.00	1214.82		1217.18		1219.48		1221.73		1223.94	
800.00	1226.10		1228.21		1230.28		1232.31		1234.30	
850.00	1236.25		1238.17		1240.05		1241.90		1243.71	
900.00	1245.49		1247.25		1248.97		1250.67		1252.34	
950.00	1253.98		1255.60		1257.19		1258.77		1260.32	
1000.00	1261.85		1263.36		1264.85		1266.32		1267.77	
1050.00	1269.21		1270.63		1272.03		1273.42		1274.79	
1100.00	1276.15		1277.50		1278.83		1280.15		1281.46	
1150.00	1282.76		1284.05		1285.33		1286.59		1287.85	
1200.00	1289.10		1290.34		1291.58		1292.81		1294.03	
1250.00	1295.24		1296.45		1297.65		1298.84		1300.03	
1300.00	1301.22		1302.40		1303.58		1304.75		1305.92	
1350.00	1307.09		1308.25		1309.41		1310.57		1311.73	
1400.00	1312.89		1314.04		1315.19		1316.35		1317.50	
1450.00	1318.65		1319.80		1320.95		1322.11		1323.26	
1500.00	1324.41		1325.57		1326.72		1327.88		1329.04	
1550.00	1330.20		1331.36		1332.53		1333.70	*2*	1334.87	*2*
1600.00	1336.04	*2*	1337.22	*2*	1338.40	*2*	1339.58	*2*	1340.77	*2*
1650.00	1341.96	*2*	1343.16	*2*	1344.35	*2*	1345.56	*2*	1346.76	*2*
1700.00	1347.98	*2*	1349.19	*2*	1350.41	*2*	1351.64	*2*	1352.87	*2*
1750.00	1354.11	*2*	1355.35	*2*	1356.60	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

CPMGO


STØFFWERT
[J/KG.K]
930.00
980.00
1030.00
1080.00
1130.00
1180.00
1230.00
1280.00
1330.00
1380.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 [K]

```
      FUNCTION ROMGO (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   MAGNESIUM-OXID
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN:  K.WAGNER & T.VOLLMER   (KAPITEL 2.6)
      ROMGO= 3220.
99999 RETURN
      END
```

```
****  FUNKTION    95  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON MGO  ALS FUNKTION DER
   0 ARGUMENTE DUMMY    .

DIMENSIONEN: RO IN  KG/M3
DUMMY    ( 1           ).

DUMMY    =           +  .0          +
                    +---------------
          0.0       |  3220.00
```

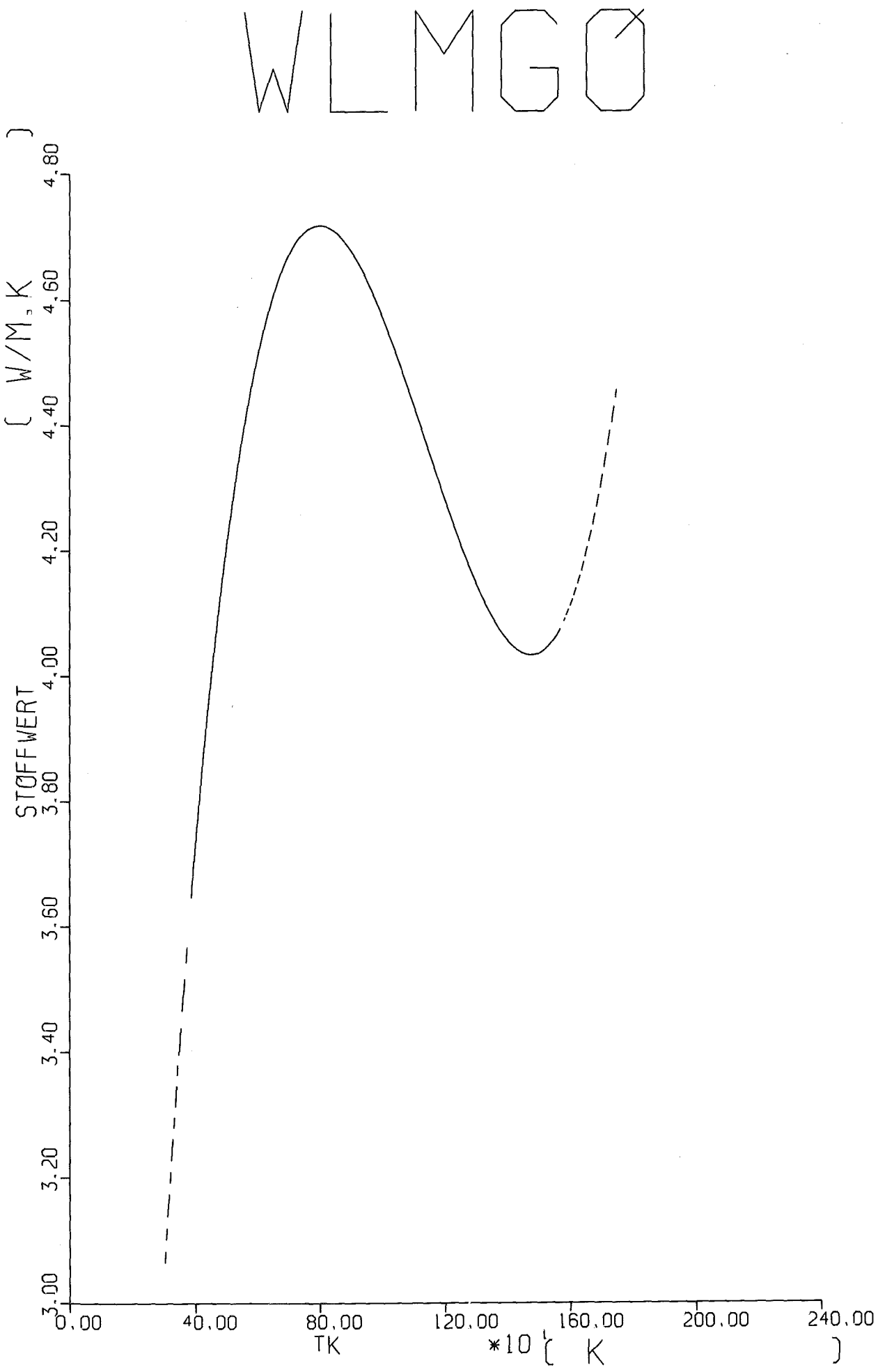
```
      FUNCTION WLMGO (/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                        W/M.K
C$M   MAGNESIUM-OXID            (BEI 90% D. THEOR. DICHTE)
CP    TK          273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                  K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.6)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLMGO ,'WLMGO ',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      WLMGO= 2.850 + 8.330E-3*TC - 1.139E-5*TC*TC + 4.392E-9*TC*TC*TC
   99 RETURN
      END
```

**** FUNKTION 96 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON MGO ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	3.06553 *2*	3.14171 *2*	3.21571 *2*	3.28756 *2*	3.35727 *2*
350.00	3.42488 *2*	3.49042 *2*	3.55391 *2*	3.61538	3.67485
400.00	3.73235	3.78790	3.84154	3.89329	3.94317
450.00	3.99122	4.03745	4.08190	4.12459	4.16554
500.00	4.20479	4.24236	4.27827	4.31256	4.34525
550.00	4.37636	4.40592	4.43396	4.46051	4.48558
600.00	4.50921	4.53143	4.55225	4.57172	4.58984
650.00	4.60665	4.62218	4.63645	4.64949	4.66132
700.00	4.67197	4.68147	4.68984	4.69711	4.70331
750.00	4.70846	4.71258	4.71571	4.71788	4.71910
800.00	4.71941	4.71882	4.71737	4.71509	4.71200
850.00	4.70812	4.70348	4.69811	4.69204	4.68528
900.00	4.67788	4.66985	4.66121	4.65201	4.64226
950.00	4.63199	4.62122	4.60999	4.59831	4.58622
1000.00	4.57374	4.56089	4.54772	4.53423	4.52046
1050.00	4.50642	4.49216	4.47770	4.46306	4.44826
1100.00	4.43334	4.41832	4.40322	4.38809	4.37293
1150.00	4.35778	4.34266	4.32759	4.31262	4.29776
1200.00	4.28303	4.26847	4.25410	4.23994	4.22603
1250.00	4.21239	4.19905	4.18603	4.17336	4.16106
1300.00	4.14916	4.13769	4.12668	4.11615	4.10613
1350.00	4.09663	4.08770	4.07936	4.07162	4.06453
1400.00	4.05809	4.05235	4.04733	4.04306	4.03955
1450.00	4.03684	4.03496	4.03393	4.03378	4.03451
1500.00	4.03617	4.03880	4.04242	4.04703	4.05267
1550.00	4.05939	4.06718	4.07609	4.08613 *2*	4.09735 *2*
1600.00	4.10975 *2*	4.12338 *2*	4.13826 *2*	4.15440 *2*	4.17182 *2*
1650.00	4.19060 *2*	4.21070 *2*	4.23219 *2*	4.25509 *2*	4.27941 *2*
1700.00	4.30519 *2*	4.33245 *2*	4.36121 *2*	4.39151 *2*	4.42337 *2*
1750.00	4.45683 *2*	4.49189 *2*	4.52859 *2*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				


WLMGO
STØFFWERT
(W/M, K)
4,80
4,60
4,40
4,20
4,00
3,80
3,60
3,40
3,20
3,00
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK
*10 (K)

```
      FUNCTION VPNAK (/TK     /)
C
CN    ***  M A P L I B  ***    FUNCTION
C
C$P   SATTDAMPFDRUCK                                              N/M2
C$M   NATRIUM-KALIUM 78
CP    TK          323.15 <= 722. <= TK <= 1478. <= 1673.15
CP    TEMPERATUR                                                  K
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(VPNAK ,'VPNAK ',1,722.,1478.,323.15,1673.15,TK,&99)
C$T
99999 VPNAK= 1.013250E5 * 10.**(4.114 - 4367./TK)
   99 RETURN
      END
```

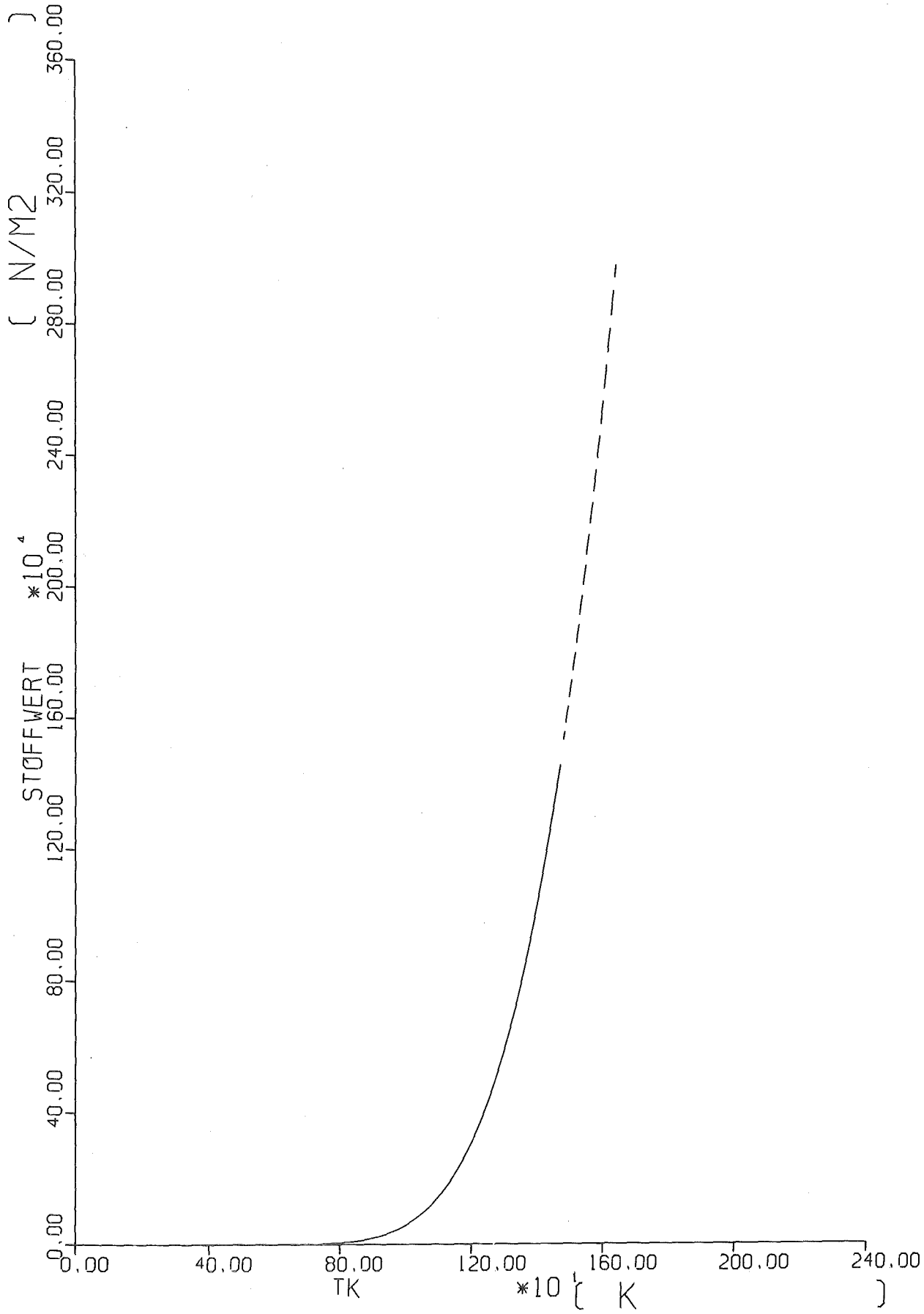
**** FUNKTION 102 ****

TABELLE DER WERTE DER EIGENSCHAFT VP VON NAK ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: VP IN N/M2
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	.769817E-04*2*	.188628E-03*2*
350.00	.439116E-03*2*	.975366E-03*2*	.207502E-02*2*	.424242E-02*2*	.836159E-02*2*
400.00	.159301E-01*2*	.294103E-01*2*	.527351E-01*2*	.920248E-01*2*	.156574 *2*
450.00	.260180 *2*	.422903 *2*	.673332 *2*	1.05148 *2*	1.61240 *2*
500.00	2.43063 *2*	3.60556 *2*	5.26795 *2*	7.58745 *2*	10.7816 *2*
550.00	15.1258 *2*	20.9654 *2*	28.7286 *2*	38.9411 *2*	52.2424 *2*
600.00	69.4041 *2*	91.3486 *2*	119.171 *2*	154.160 *2*	197.825 *2*
650.00	251.916 *2*	318.458 *2*	399.767 *2*	498.493 *2*	617.635 *2*
700.00	760.582 *2*	931.138 *2*	1133.55 *2*	1372.54	1653.36
750.00	1981.76	2364.10	2807.30	3318.94	3907.24
800.00	4581.07	5350.07	6224.55	7215.59	8335.05
850.00	9595.56	11010.6	12594.4	14362.1	16329.6
900.00	18513.8	20932.3	23603.6	26547.2	29783.3
950.00	33333.1	37218.5	41462.5	46088.7	51121.8
1000.00	56587.1	62510.8	68919.9	75842.3	83306.6
1050.00	91341.8	99978.3	109247.	119179.	129806.
1100.00	141162.	153279.	166192.	179935.	194543.
1150.00	210052.	226497.	243915.	262343.	281818.
1200.00	302378.	324060.	346904.	370945.	396226.
1250.00	422782.	450654.	479882.	510503.	542557.
1300.00	576085.	611123.	647715.	685897.	725707.
1350.00	767188.	810378.	855315.	902036.	950583.
1400.00	.100099E+07	.105331E+07	.110755E+07	.116378E+07	.122202E+07
1450.00	.128231E+07	.134469E+07	.140919E+07	.147585E+07*2*	.154470E+07*2*
1500.00	.161578E+07*2*	.168913E+07*2*	.176478E+07*2*	.184276E+07*2*	.192310E+07*2*
1550.00	.200585E+07*2*	.209102E+07*2*	.217865E+07*2*	.226878E+07*2*	.236144E+07*2*
1600.00	.245664E+07*2*	.255444E+07*2*	.265484E+07*2*	.275788E+07*2*	.286360E+07*2*
1650.00	.297201E+07*2*	.308315E+07*2*	.319703E+07*2*	1.00000 *3*	1.00000 *3*
1700.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1750.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

VPNAK


STØFFWERT *10⁴ [N/M2]
0,00
40,00
80,00
120,00
160,00
200,00
240,00
280,00
320,00
360,00
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10¹ [K]

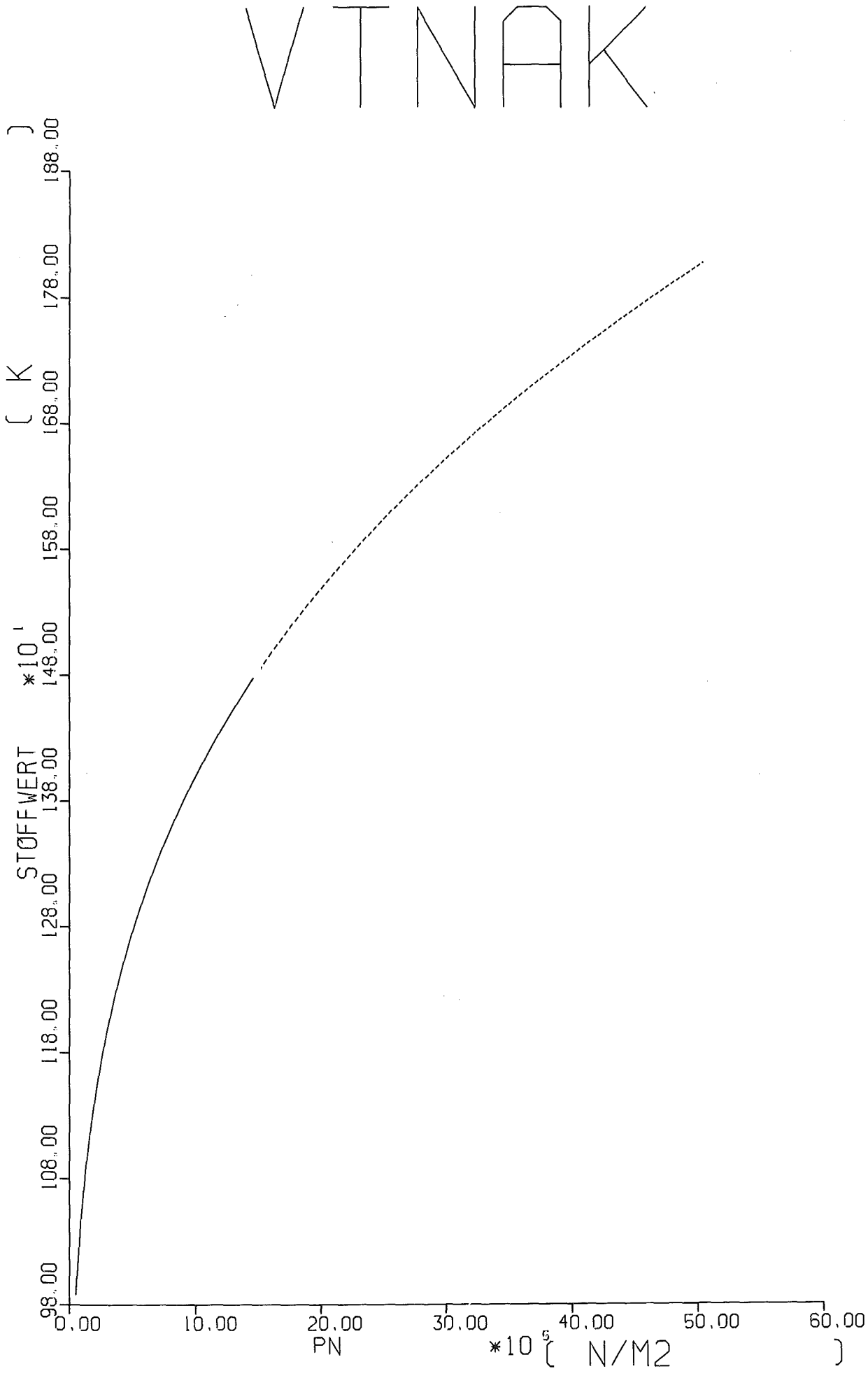
```
      FUNCTION VTNAK (/PNM2  /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SATTDAMPFTEMPERATUR                                          K
C$M   NATRIUM-KALIUM 78
CP    PNM2        10. <= 1.E3 <= PNM2 <= 1.5E6 <= 1.E7
CP    DRUCK                                                        N/M2
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(VTNAK ,'VTNAK ',2,1.E3,1.5E6,10.,1.E7,PNM2,&99)
C$T
99999 VTNAK= 4367./(4.114-ALOG10(PNM2/1.013250E5))
   99 RETURN
      END
```

**** FUNKTION 103 ****

TABELLE DER WERTE DER EIGENSCHAFT VT VON NAK ALS FUNKTION DER
I ARGUMENTE PN ,

DIMENSIONEN: VT IN K
PN (N/M2),

PN =	+ .0	+ 50000.	+ .10000E+06	+ .15000E+06	+ .20000E+06	+
50000.00	987.842	1060.02	1107.36	1143.59	1173.36	
300000.00	1198.87	1221.32	1241.45	1259.77	1276.62	
550000.00	1292.26	1306.87	1320.61	1333.59	1345.91	
800000.00	1357.63	1368.84	1379.57	1389.88	1399.81	
1050000.00	1409.38	1418.63	1427.58	1436.26	1444.68	
1300000.00	1452.87	1460.84	1468.60	1476.16	1483.54	
1550000.00	1490.76 *2*	1497.81 *2*	1504.70 *2*	1511.45 *2*	1518.07 *2*	
1800000.00	1524.55 *2*	1530.91 *2*	1537.15 *2*	1543.28 *2*	1549.30 *2*	
2050000.00	1555.22 *2*	1561.04 *2*	1566.76 *2*	1572.39 *2*	1577.94 *2*	
2300000.00	1583.40 *2*	1588.78 *2*	1594.08 *2*	1599.31 *2*	1604.47 *2*	
2550000.00	1609.55 *2*	1614.57 *2*	1619.52 *2*	1624.41 *2*	1629.24 *2*	
2800000.00	1634.01 *2*	1638.73 *2*	1643.39 *2*	1647.99 *2*	1652.54 *2*	
3050000.00	1657.04 *2*	1661.49 *2*	1665.90 *2*	1670.26 *2*	1674.57 *2*	
3300000.00	1678.84 *2*	1683.06 *2*	1687.25 *2*	1691.39 *2*	1695.49 *2*	
3550000.00	1699.56 *2*	1703.59 *2*	1707.58 *2*	1711.53 *2*	1715.45 *2*	
3800000.00	1719.34 *2*	1723.19 *2*	1727.01 *2*	1730.79 *2*	1734.55 *2*	
4050000.00	1738.27 *2*	1741.97 *2*	1745.63 *2*	1749.27 *2*	1752.88 *2*	
4300000.00	1756.46 *2*	1760.02 *2*	1763.54 *2*	1767.04 *2*	1770.52 *2*	
4550000.00	1773.97 *2*	1777.40 *2*	1780.80 *2*	1784.18 *2*	1787.54 *2*	
4800000.00	1790.87 *2*	1794.18 *2*	1797.47 *2*	1800.74 *2*	1803.99 *2*	
5050000.00	1807.21 *2*					


VTNAK
STØFFWERT *10 ¹ [K]
93.00
108.00
118.00
128.00
138.00
148.00
158.00
168.00
178.00
188.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
PN *10 ⁵ [N/M2]

```
      FUNCTION CPNAKL(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                              J/KG.K
C$M   NATRIUM-KALIUM 78, FLUESSIG
CP    TK          323.15 <= 323.15 <= TK <= 1073.15 <= 1673.15
CP    TEMPERATUR                                                K
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPNAKL,'CPNAKL',1,323.15,1073.15,323.15,1673.15,TK,&99)
C$T
99999 TC= TK-273.15
      CPNAKL= (0.2320 - 8.82E-5*TC + 8.2E-8*TC*TC)*4186.8
   99 RETURN
      END
```

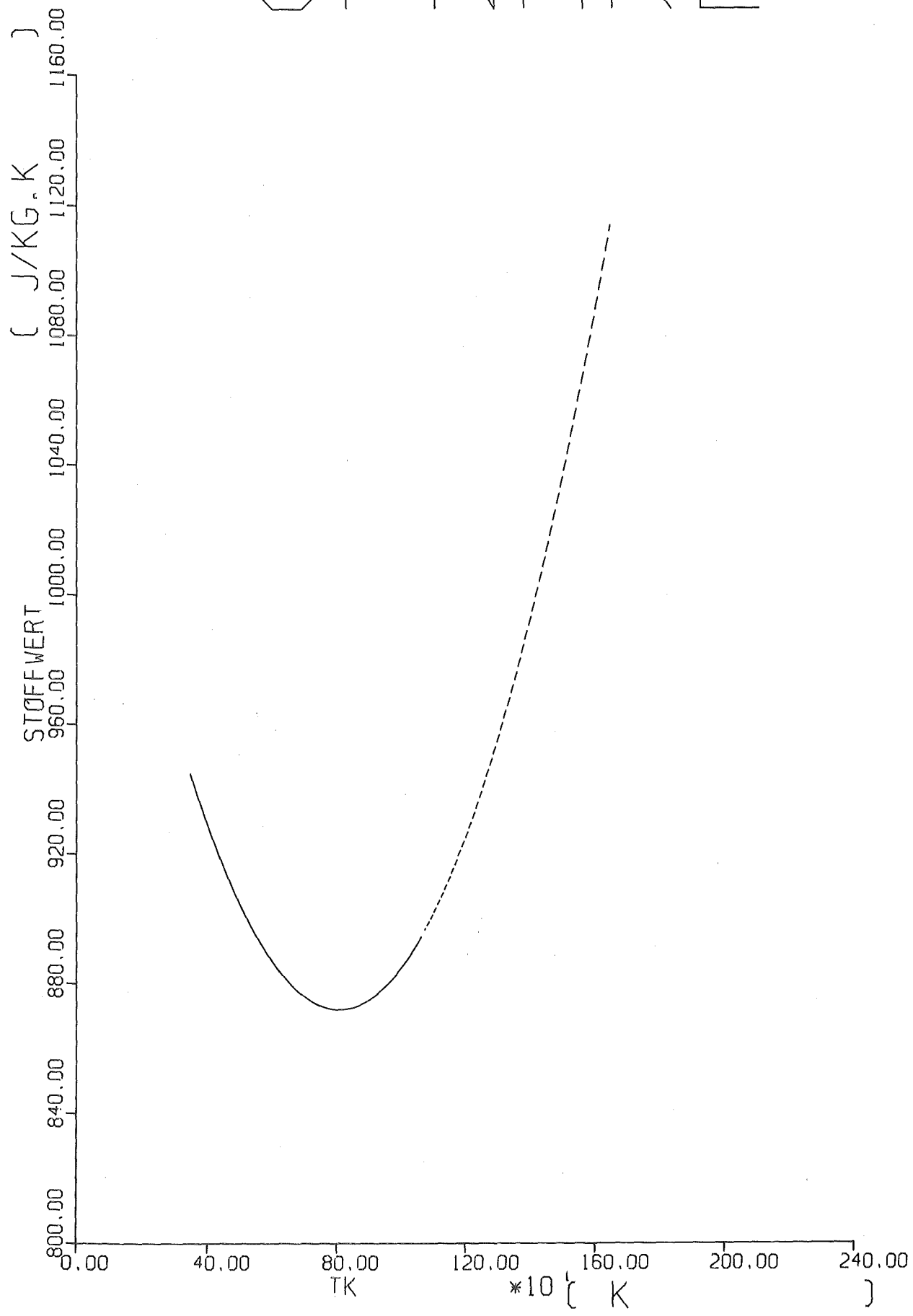
**** FUNKTION 104 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON NAKL ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	951.454	948.186
350.00	944.986	941.855	938.793	935.800	932.875
400.00	930.019	927.232	924.513	921.863	919.281
450.00	916.769	914.324	911.949	909.642	907.404
500.00	905.235	903.134	901.102	899.138	897.243
550.00	895.417	893.660	891.971	890.351	888.799
600.00	887.316	885.902	884.557	883.280	882.072
650.00	880.932	879.862	878.859	877.926	877.061
700.00	876.265	875.537	874.878	874.288	873.767
750.00	873.314	872.929	872.614	872.367	872.189
800.00	872.080	872.038	872.066	872.163	872.328
850.00	872.561	872.864	873.235	873.675	874.183
900.00	874.760	875.406	876.121	876.904	877.755
950.00	878.676	879.665	880.722	881.849	883.044
1000.00	884.308	885.640	887.042	888.511	890.050
1050.00	891.656	893.332	895.077	896.890 *2*	898.771 *2*
1100.00	900.722 *2*	902.740 *2*	904.828 *2*	906.984 *2*	909.210 *2*
1150.00	911.503 *2*	913.866 *2*	916.297 *2*	918.796 *2*	921.365 *2*
1200.00	924.002 *2*	926.707 *2*	929.482 *2*	932.324 *2*	935.236 *2*
1250.00	938.217 *2*	941.266 *2*	944.383 *2*	947.570 *2*	950.824 *2*
1300.00	954.148 *2*	957.540 *2*	961.001 *2*	964.531 *2*	968.129 *2*
1350.00	971.796 *2*	975.532 *2*	979.336 *2*	983.209 *2*	987.151 *2*
1400.00	991.161 *2*	995.240 *2*	999.387 *2*	1003.60 *2*	1007.89 *2*
1450.00	1012.24 *2*	1016.66 *2*	1021.16 *2*	1025.71 *2*	1030.34 *2*
1500.00	1035.04 *2*	1039.81 *2*	1044.64 *2*	1049.54 *2*	1054.51 *2*
1550.00	1059.55 *2*	1064.66 *2*	1069.84 *2*	1075.09 *2*	1080.40 *2*
1600.00	1085.79 *2*	1091.24 *2*	1096.76 *2*	1102.35 *2*	1108.01 *2*
1650.00	1113.73 *2*	1119.53 *2*	1125.39 *2*	1.00000 *3*	1.00000 *3*
1700.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1750.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

CPNAKL


STOFFWERT
(J/KG.K)
1160.00
1120.00
1080.00
1040.00
1000.00
960.00
920.00
880.00
840.00
800.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

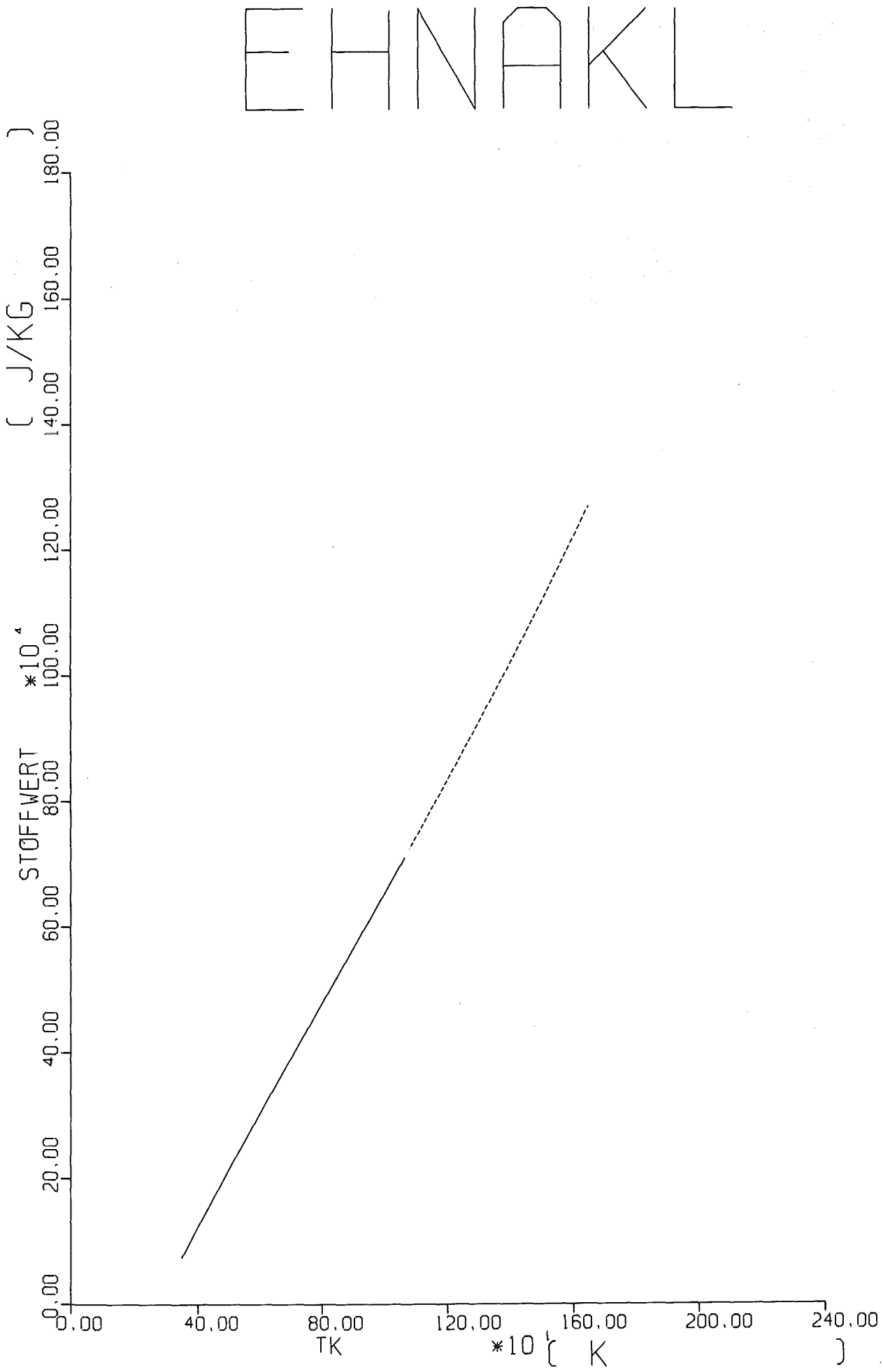
```
      FUNCTION EHNAKL(/TK    /)
C
CN    *** M A P L I B ***   FUNCTION
C
C$P   ENTHALPIE                                                  J/KG
C$M   NATRIUM-KALIUM 78, FLUESSIG
CP    TK          323.15 <= 323.15 <= TK <= 1073.15. <= 1673.15
CP    TEMPERATUR                                                  K
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(EHNAKL,'EHNAKL',1,323.15,1073.15,323.15,1673.15,TK,899)
C$T
99999 TC= TK-273.15
      EHNAKL= (0.93860*TC - 1.09621E-4*TC*TC + 7.0555E-8*TC*TC*TC
     1 + 0.05636*TC*EXP(-0.004055*TC))*1.E3
   99 RETURN
      END
```

**** FUNKTION 105 ****

TABELLE DER WERTE DER EIGENSCHAFT EH VON NAKL ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: EH IN J/KG
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	55562.5	65149.7
350.00	74687.6	84178.7	93624.9	103029.	112392.
400.00	121716.	131003.	140256.	149475.	158662.
450.00	167819.	176947.	186048.	195123.	204173.
500.00	213200.	222204.	231188.	240152.	249097.
550.00	258024.	266935.	275829.	284709.	293575.
600.00	302428.	311269.	320099.	328918.	337727.
650.00	346527.	355318.	364103.	372880.	381651.
700.00	390417.	399177.	407933.	416686.	425435.
750.00	434182.	442927.	451670.	460413.	469155.
800.00	477897.	486641.	495385.	504132.	512880.
850.00	521632.	530386.	539145.	547907.	556674.
900.00	565446.	574224.	583008.	591798.	600596.
950.00	609401.	618213.	627034.	635864.	644702.
1000.00	653550.	662408.	671277.	680156.	689047.
1050.00	697949.	706864.	715790.	724730. *2*	733683. *2*
1100.00	742650. *2*	751631. *2*	760627. *2*	769638. *2*	778664. *2*
1150.00	787706. *2*	796764. *2*	805838. *2*	814930. *2*	824039. *2*
1200.00	833166. *2*	842311. *2*	851475. *2*	860658. *2*	869860. *2*
1250.00	879083. *2*	888325. *2*	897588. *2*	906872. *2*	916178. *2*
1300.00	925506. *2*	934856. *2*	944229. *2*	953625. *2*	963044. *2*
1350.00	972488. *2*	981956. *2*	991448. *2*	.100097E+07*2*	.101051E+07*2*
1400.00	.102008E+07*2*	.102967E+07*2*	.103930E+07*2*	.104895E+07*2*	.105862E+07*2*
1450.00	.106833E+07*2*	.107806E+07*2*	.108782E+07*2*	.109762E+07*2*	.110744E+07*2*
1500.00	.111729E+07*2*	.112717E+07*2*	.113708E+07*2*	.114703E+07*2*	.115700E+07*2*
1550.00	.116701E+07*2*	.117705E+07*2*	.118713E+07*2*	.119723E+07*2*	.120737E+07*2*
1600.00	.121755E+07*2*	.122776E+07*2*	.123800E+07*2*	.124828E+07*2*	.125860E+07*2*
1650.00	.126895E+07*2*	.127934E+07*2*	.128976E+07*2*	1.00000 *3*	1.00000 *3*
1700.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1750.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				


EHNAKL
STØFFWERT *10⁴ (J/KG)
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK *10¹ (K)

```
      FUNCTION PRNAKL(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   PRANDTL-ZAHL                                                  1
C$M   NATRIUM-KALIUM 78, FLUESSIG
CP    TK          323.15 <= 423.15 <= TK <= 953.15 <= 1673.15
CP    TEMPERATUR                                                    K
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(PRNAKL,'PRNAKL',1,423.15,953.15,323.15,1673.15,TK,&99)
C$T
99999 PRNAKL= ZDNAKL(TK) * CPNAKL(TK) / WLNAKL(TK)
   99 RETURN
      END
```

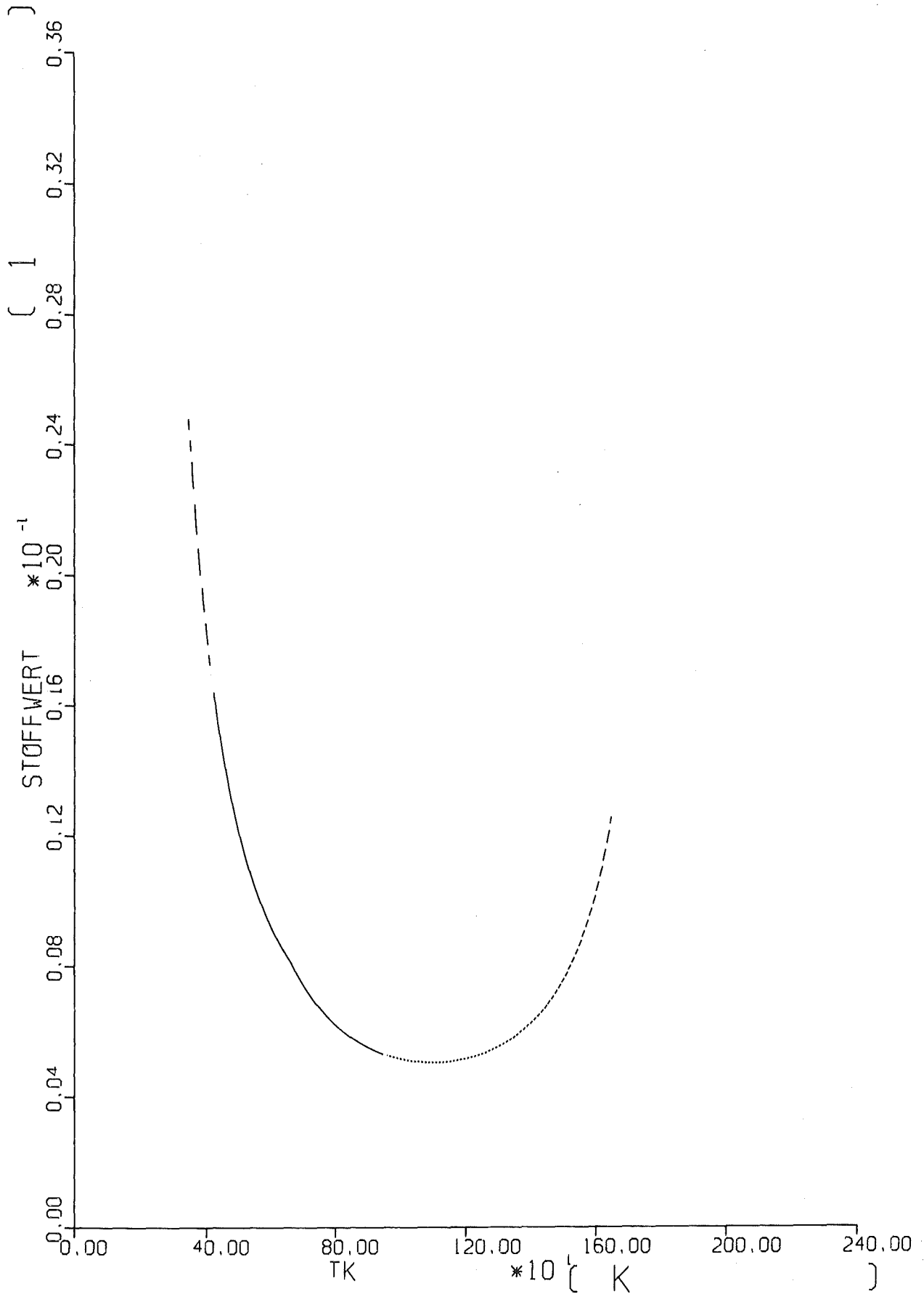
**** FUNKTION 106 ****

TABELLE DER WERTE DER EIGENSCHAFT PR VON NAKL ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: PR IN 1
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	.284478E-01*2*	.265132E-01*2*
350.00	.248000E-01*2*	.232754E-01*2*	.219124E-01*2*	.206886E-01*2*	.195854E-01*2*
400.00	.185873E-01*2*	.176811E-01*2*	.168558E-01*2*	.161019E-01	.154112E-01
450.00	.147768E-01	.141927E-01	.136537E-01	.131552E-01	.126932E-01
500.00	.122642E-01	.118653E-01	.114936E-01	.111467E-01	.108226E-01
550.00	.105192E-01	.102350E-01	.996840E-02	.971800E-02	.948260E-02
600.00	.926108E-02	.905244E-02	.885577E-02	.867026E-02	.849514E-02
650.00	.832973E-02	.817344E-02	.802565E-02	.778419E-02	.760882E-02
700.00	.744341E-02	.728731E-02	.713991E-02	.700066E-02	.686908E-02
750.00	.674468E-02	.662706E-02	.651582E-02	.641060E-02	.631109E-02
800.00	.621698E-02	.612797E-02	.604384E-02	.596432E-02	.588921E-02
850.00	.581829E-02	.575140E-02	.568833E-02	.562895E-02	.557309E-02
900.00	.552064E-02	.547145E-02	.542540E-02	.538239E-02	.534233E-02
950.00	.530512E-02	.527067E-02*2*	.523892E-02*2*	.520978E-02*2*	.518321E-02*2*
1000.00	.515914E-02*2*	.513751E-02*2*	.511828E-02*2*	.510141E-02*2*	.508687E-02*2*
1050.00	.507463E-02*2*	.506466E-02*2*	.505693E-02*2*	.505143E-02*2*	.504816E-02*2*
1100.00	.504711E-02*2*	.504826E-02*2*	.505164E-02*2*	.505723E-02*2*	.506506E-02*2*
1150.00	.507515E-02*2*	.508750E-02*2*	.510216E-02*2*	.511914E-02*2*	.513851E-02*2*
1200.00	.516028E-02*2*	.518451E-02*2*	.521126E-02*2*	.524059E-02*2*	.527257E-02*2*
1250.00	.530727E-02*2*	.534479E-02*2*	.538520E-02*2*	.542862E-02*2*	.547516E-02*2*
1300.00	.552493E-02*2*	.557807E-02*2*	.563473E-02*2*	.569506E-02*2*	.575925E-02*2*
1350.00	.582748E-02*2*	.589997E-02*2*	.597693E-02*2*	.605862E-02*2*	.614531E-02*2*
1400.00	.623731E-02*2*	.633496E-02*2*	.643861E-02*2*	.654865E-02*2*	.666556E-02*2*
1450.00	.678979E-02*2*	.692192E-02*2*	.706255E-02*2*	.721233E-02*2*	.737205E-02*2*
1500.00	.754255E-02*2*	.772478E-02*2*	.791979E-02*2*	.812883E-02*2*	.835327E-02*2*
1550.00	.859468E-02*2*	.885486E-02*2*	.913589E-02*2*	.944019E-02*2*	.977055E-02*2*
1600.00	.101302E-01*2*	.105230E-01*2*	.109536E-01*2*	.114273E-01*2*	.119507E-01*2*
1650.00	.125319E-01*2*	.131805E-01*2*	.139087E-01*2*	1.00000 *3*	1.00000 *3*
1700.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1750.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

PRNAKL


STOFFWERT *10 -1 (1)
0.00
0.04
0.08
0.12
0.16
0.20
0.24
0.28
0.32
0.36
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK *10 1 (K)

```
      FUNCTION RONAKL(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   NATRIUM-KALIUM 78, FLUESSIG
CP    TK          323.15 <= 323.15 <= TK <= 1473.15 <= 1673.15
CP    TEMPERATUR                                                K
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.:  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(RONAKL,'RONAKL',1,323.15,1473.15,323.15,1673.15,TK,&99)
C$T
99999 TC= TK-273.15
      RONAKL= 855.60 + 270.20*(100.-TC)/1100.
   99 RETURN
      END
```

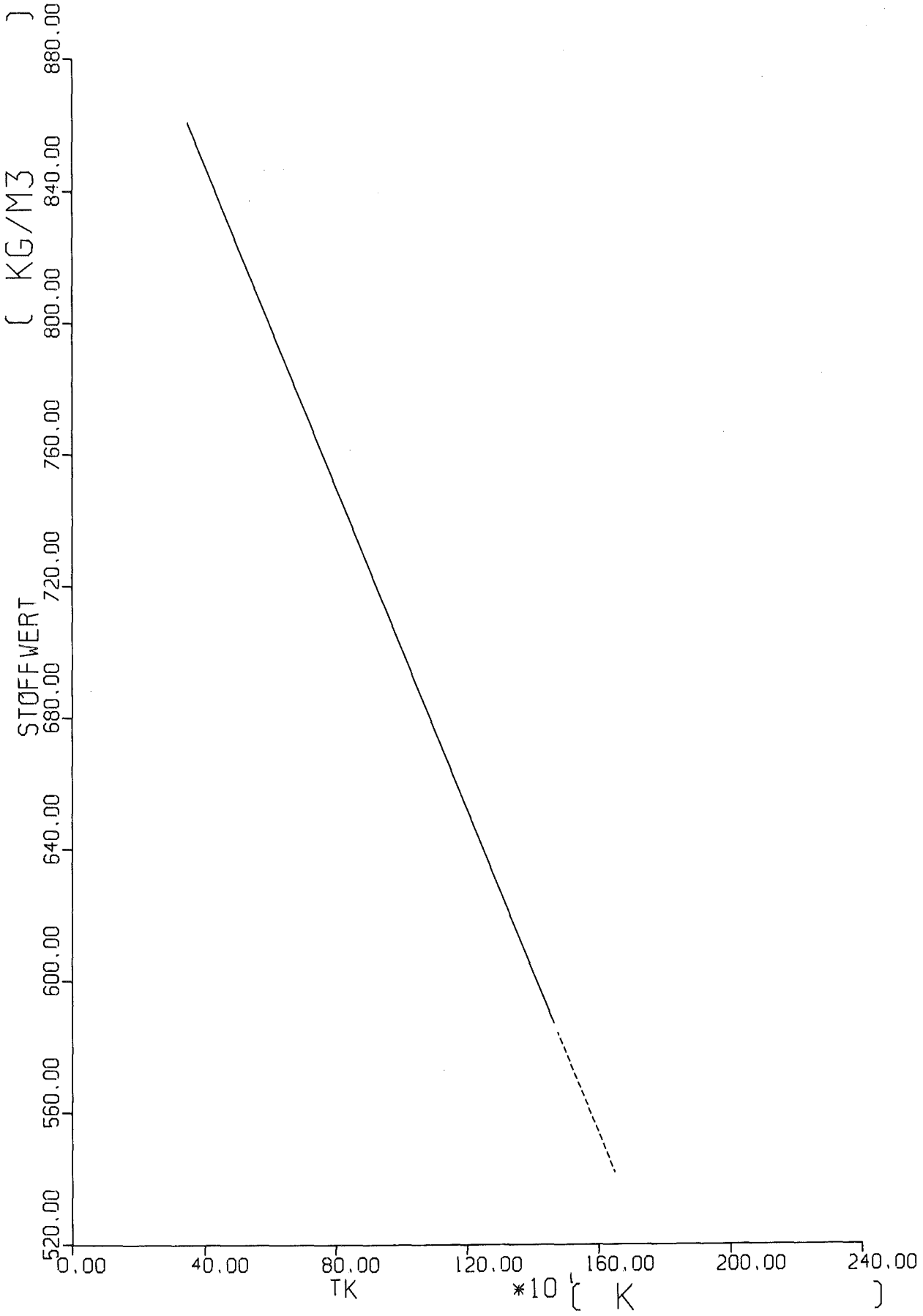
**** FUNKTION 107 ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON NAKL ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: RO IN KG/M3
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	866.199		863.743	
350.00	861.286		858.830		856.374		853.917		851.461	
400.00	849.005		846.548		844.092		841.635		839.179	
450.00	836.723		834.266		831.810		829.354		826.897	
500.00	824.441		821.985		819.528		817.072		814.615	
550.00	812.159		809.703		807.246		804.790		802.334	
600.00	799.877		797.421		794.965		792.508		790.052	
650.00	787.595		785.139		782.683		780.227		777.770	
700.00	775.314		772.857		770.401		767.945		765.488	
750.00	763.032		760.575		758.119		755.663		753.207	
800.00	750.750		748.294		745.837		743.381		740.925	
850.00	738.468		736.012		733.556		731.099		728.643	
900.00	726.187		723.730		721.274		718.817		716.361	
950.00	713.905		711.448		708.992		706.536		704.079	
1000.00	701.623		699.167		696.710		694.254		691.797	
1050.00	689.341		686.885		684.428		681.972		679.516	
1100.00	677.059		674.603		672.146		669.690		667.234	
1150.00	664.777		662.321		659.865		657.408		654.952	
1200.00	652.496		650.039		647.583		645.126		642.670	
1250.00	640.214		637.757		635.301		632.845		630.388	
1300.00	627.932		625.476		623.019		620.563		618.106	
1350.00	615.650		613.194		610.738		608.281		605.825	
1400.00	603.368		600.912		598.456		596.000		593.543	
1450.00	591.087		588.630		586.174		583.718	*2*	581.261	*2*
1500.00	578.805	*2*	576.349	*2*	573.892	*2*	571.436	*2*	568.979	*2*
1550.00	566.523	*2*	564.067	*2*	561.610	*2*	559.154	*2*	556.698	*2*
1600.00	554.241	*2*	551.785	*2*	549.329	*2*	546.872	*2*	544.416	*2*
1650.00	541.959	*2*	539.503	*2*	537.047	*2*	1.00000	*3*	1.00000	*3*
1700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1750.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

RONAKL


STOFFWERT
(KG/M3)
880.00
840.00
800.00
760.00
720.00
680.00
640.00
600.00
560.00
520.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION WLNAKL(/TK     /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                        W/M.K
C$M   NATRIUM-KALIUM 78, FLUESSIG
CP    TK          323.15 <= 423.15 <= TK <= 953.15. <= 1673.15
CP    TEMPERATUR                                                  K
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLNAKL,'WLNAKL',1,423.15,953.15,323.15,1673.15,TK,&99)
C$T
99999 TC= TK-273.15
      WLNAKL= (0.214 + 2.07E-4*TC -2.2E-7*TC*TC)*100.
   99 RETURN
      END
```

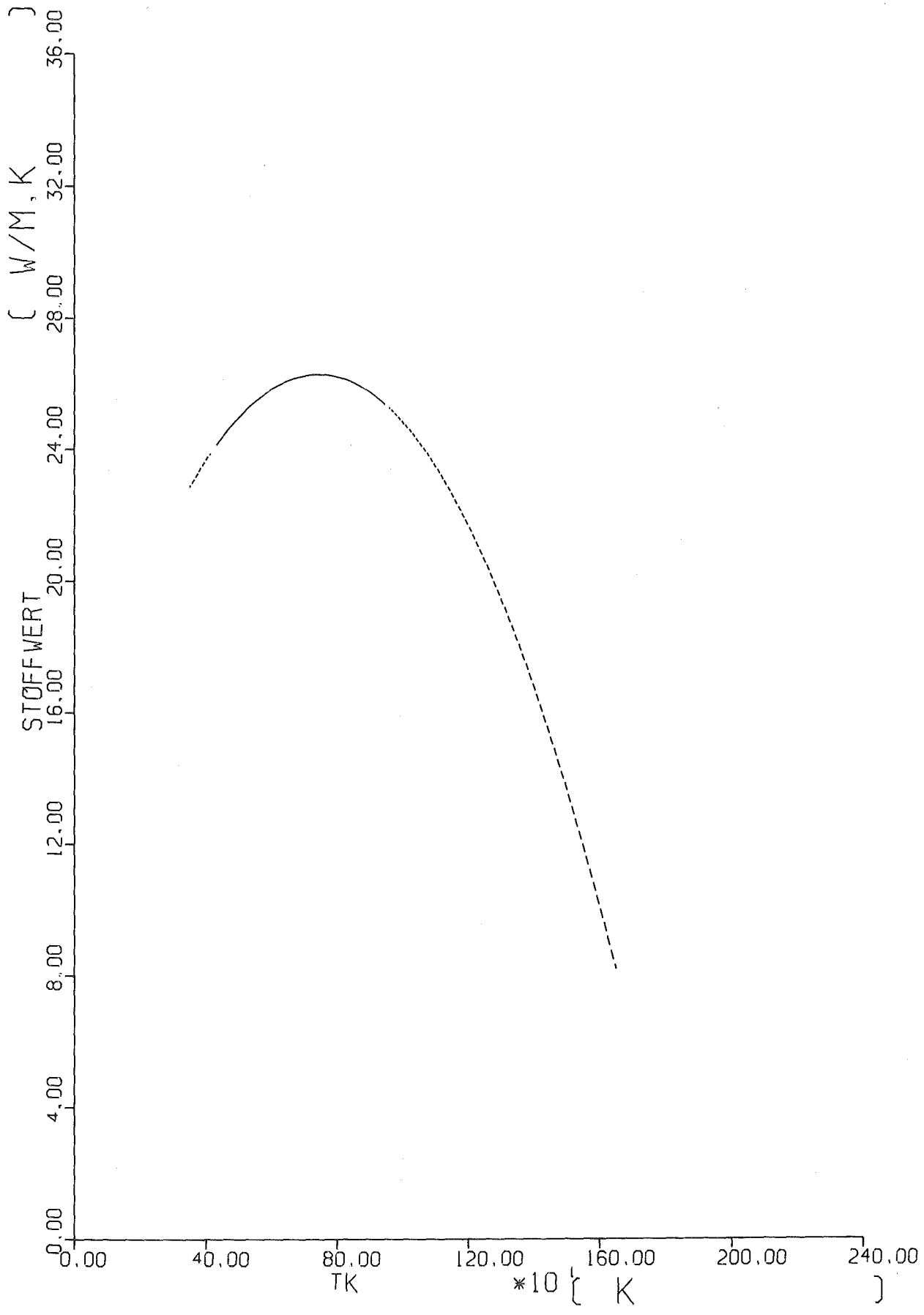
**** FUNKTION 108 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON NAKL ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	22.5057	*2*	22.6855	*2*
350.00	22.8609	*2*	23.0318	*2*	23.1984	*2*	23.3606	*2*	23.5184	*2*
400.00	23.6718	*2*	23.8208	*2*	23.9654	*2*	24.1055		24.2413	
450.00	24.3727		24.4997		24.6223		24.7405		24.8543	
500.00	24.9636		25.0686		25.1692		25.2654		25.3572	
550.00	25.4446		25.5276		25.6061		25.6803		25.7501	
600.00	25.8155		25.8765		25.9331		25.9853		26.0330	
650.00	26.0764		26.1154		26.1500		26.1802		26.2060	
700.00	26.2274		26.2444		26.2569		26.2651		26.2689	
750.00	26.2683		26.2633		26.2539		26.2401		26.2218	
800.00	26.1992		26.1722		26.1408		26.1050		26.0648	
850.00	26.0202		25.9711		25.9177		25.8599		25.7977	
900.00	25.7311		25.6601		25.5847		25.5048		25.4206	
950.00	25.3320		25.2390	*2*	25.1416	*2*	25.0398	*2*	24.9336	*2*
1000.00	24.8229	*2*	24.7079	*2*	24.5885	*2*	24.4647	*2*	24.3365	*2*
1050.00	24.2039	*2*	24.0669	*2*	23.9254	*2*	23.7796	*2*	23.6294	*2*
1100.00	23.4748	*2*	23.3158	*2*	23.1524	*2*	22.9846	*2*	22.8123	*2*
1150.00	22.6357	*2*	22.4547	*2*	22.2693	*2*	22.0795	*2*	21.8853	*2*
1200.00	21.6867	*2*	21.4837	*2*	21.2762	*2*	21.0644	*2*	20.8482	*2*
1250.00	20.6276	*2*	20.4026	*2*	20.1732	*2*	19.9394	*2*	19.7011	*2*
1300.00	19.4585	*2*	19.2115	*2*	18.9601	*2*	18.7043	*2*	18.4441	*2*
1350.00	18.1795	*2*	17.9104	*2*	17.6370	*2*	17.3592	*2*	17.0770	*2*
1400.00	16.7904	*2*	16.4994	*2*	16.2040	*2*	15.9042	*2*	15.5999	*2*
1450.00	15.2913	*2*	14.9783	*2*	14.6609	*2*	14.3391	*2*	14.0129	*2*
1500.00	13.6823	*2*	13.3473	*2*	13.0078	*2*	12.6640	*2*	12.3158	*2*
1550.00	11.9632	*2*	11.6062	*2*	11.2448	*2*	10.8789	*2*	10.5087	*2*
1600.00	10.1341	*2*	9.75510	*2*	9.37171	*2*	8.98390	*2*	8.59168	*2*
1650.00	8.19507	*2*	7.79405	*2*	7.38863	*2*	1.00000	*3*	1.00000	*3*
1700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1750.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

WLNAKL


STOFFWERT
(W/M,K)
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
36.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION ZDNAKL(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DYNAMISCHE VISKOSITAET                                    N.S/M2
C$M   NATRIUM-KALIUM 78, FLUESSIG
CP    TK          323.15 <= 323.15 <= TK <= 1473.15 <= 1673.15
CP    TEMPERATUR                                                K
CD    15.01.1978
CA    W. ZIMMERER
CL    SODIUM - NAK ENGINEERING HANDBOOK:  VOLUME 1; SODIUM CHEMISTRY AND
CL    PHYSICAL PROPERTIES BY  O.J. FOUST;  GORDON AND BREACH, SCIENCE
CL    PUBLISHERS INC.;  NEW YORK/LONDON/PARIS 1972
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(ZDNAKL,'ZDNAKL',1,323.15,1473.15,323.15,1673.15,TK,&99)
C$T
99999 C1= 0.116
      C2= 688.
      IF (TK.LT.673.15) GOTO 1
      C1= 0.082
      C2= 979.
    1 RO= RONAKL(TK)*1.E-3
      ZDNAKL= (C1*RO**0.333333 *EXP(C2*RO/TK))*1.E-3
   99 RETURN
      END
```

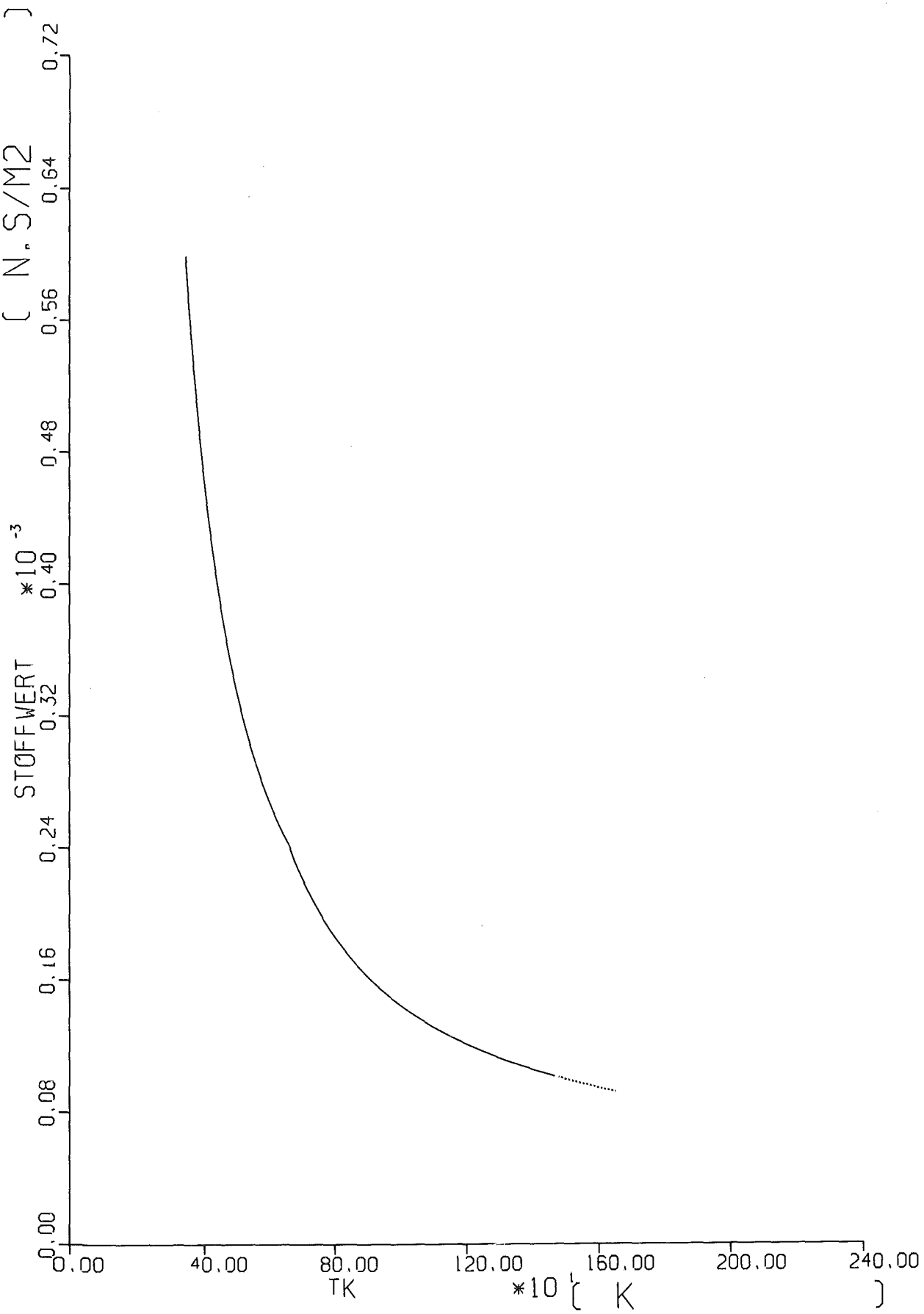
**** FUNKTION 109 ****

TABELLE DER WERTE DER EIGENSCHAFT ZD VON NAKL ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: ZD IN N.S/M2
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	.672904E-03	.634331E-03
350.00	.599955E-03	.569171E-03	.541476E-03	.516455E-03	.493762E-03
400.00	.473103E-03	.454232E-03	.436939E-03	.421043E-03	.406391E-03
450.00	.392848E-03	.380300E-03	.368645E-03	.357795E-03	.347673E-03
500.00	.338211E-03	.329349E-03	.321033E-03	.313218E-03	.305858E-03
550.00	.298919E-03	.292365E-03	.286167E-03	.280296E-03	.274728E-03
600.00	.269441E-03	.264415E-03	.259630E-03	.255071E-03	.250722E-03
650.00	.246568E-03	.242598E-03	.238799E-03	.232128E-03	.227346E-03
700.00	.222788E-03	.218438E-03	.214284E-03	.210312E-03	.206512E-03
750.00	.202872E-03	.199384E-03	.196038E-03	.192825E-03	.189739E-03
800.00	.186772E-03	.183917E-03	.181168E-03	.178520E-03	.175967E-03
850.00	.173504E-03	.171127E-03	.168831E-03	.166612E-03	.164466E-03
900.00	.162390E-03	.160380E-03	.158434E-03	.156548E-03	.154719E-03
950.00	.152945E-03	.151224E-03	.149553E-03	.147930E-03	.146353E-03
1000.00	.144819E-03	.143328E-03	.141877E-03	.140465E-03	.139090E-03
1050.00	.137750E-03	.136445E-03	.135172E-03	.133931E-03	.132720E-03
1100.00	.131539E-03	.130385E-03	.129259E-03	.128159E-03	.127084E-03
1150.00	.126033E-03	.125006E-03	.124001E-03	.123018E-03	.122056E-03
1200.00	.121114E-03	.120191E-03	.119288E-03	.118403E-03	.117536E-03
1250.00	.116686E-03	.115852E-03	.115035E-03	.114233E-03	.113446E-03
1300.00	.112673E-03	.111915E-03	.111171E-03	.110439E-03	.109721E-03
1350.00	.109015E-03	.108322E-03	.107640E-03	.106969E-03	.106310E-03
1400.00	.105661E-03	.105023E-03	.104395E-03	.103777E-03	.103169E-03
1450.00	.102569E-03	.101979E-03	.101398E-03	.100826E-03*2*	.100262E-03*2*
1500.00	.997056E-04*2*	.991576E-04*2*	.986172E-04*2*	.980844E-04*2*	.975590E-04*2*
1550.00	.970406E-04*2*	.965292E-04*2*	.960246E-04*2*	.955266E-04*2*	.950351E-04*2*
1600.00	.945498E-04*2*	.940706E-04*2*	.935975E-04*2*	.931302E-04*2*	.926683E-04*2*
1650.00	.922122E-04*2*	.917615E-04*2*	.913161E-04*2*	1.00000 *3*	1.00000 *3*
1700.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1750.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

ZDNAKL


STOFFWERT *10 -3
(N. S/M2)
0,00
0,08
0,16
0,24
0,32
0,40
0,48
0,56
0,64
0,72
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10 (K)

```
      FUNCTION EKNI  (/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   NICKEL                      (BEI 99.9 % REINHEIT)
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN:  K.WAGNER & T.VOLLMER   (KAPITEL 5.14)
      EKNI  = 0.20
99999 RETURN
      END
```

```
****  FUNKTION  166  ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON NI   ALS FUNKTION DER
   0 ARGUMENTE DUMMY    .

DIMENSIONEN: EK IN  1
DUMMY   ( 1          ).

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  .200000
```

```
      FUNCTION CPTHO2(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                              J/KG.K
C$M   THO2
CP    TK          273.15 <= 373.15 <= TK <= 1773.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.8)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPTHO2,'CPTHO2',1,373.15,1773.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      CPTHO2= 214.4 + 4.025*SQRT(TC) - 4.785E-2*TC + 1.178E-5*TC*TC
   99 RETURN
      END
```

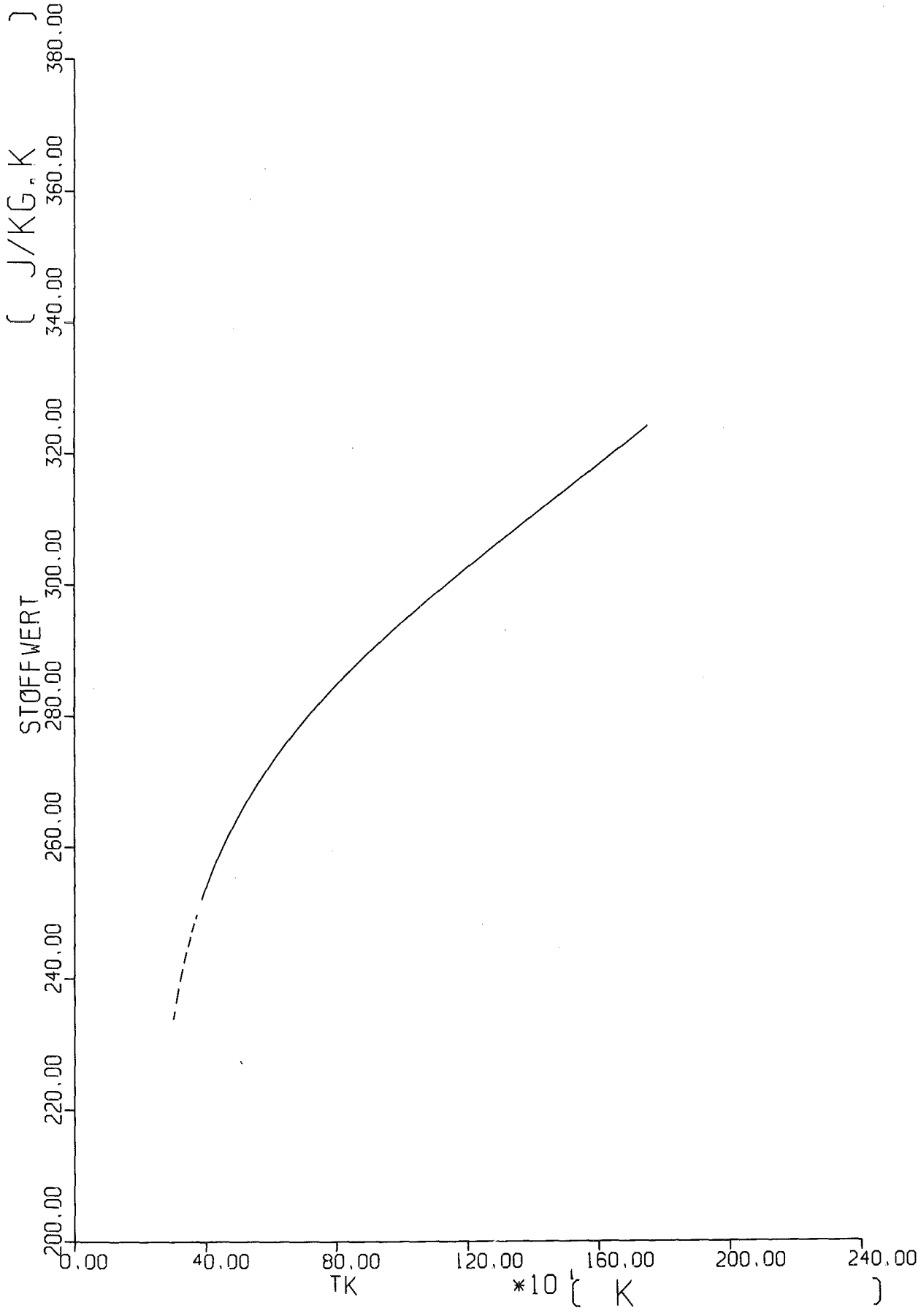
**** FUNKTION 179 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON THO2 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000	+
300.00	233.980 *2*	237.086 *2*	239.734 *2*	242.066 *2*	244.163 *2*	
350.00	246.077 *2*	247.843 *2*	249.487 *2*	251.027	252.479	
400.00	253.852	255.158	256.403	257.593	258.735	
450.00	259.832	260.889	261.909	262.895	263.849	
500.00	264.774	265.671	266.544	267.394	268.220	
550.00	269.027	269.813	270.582	271.333	272.067	
600.00	272.786	273.490	274.181	274.859	275.523	
650.00	276.176	276.817	277.448	278.068	278.678	
700.00	279.279	279.871	280.454	281.029	281.595	
750.00	282.155	282.706	283.251	283.789	284.321	
800.00	284.846	285.366	285.879	286.388	286.891	
850.00	287.388	287.882	288.370	288.853	289.333	
900.00	289.807	290.279	290.745	291.209	291.668	
950.00	292.125	292.578	293.027	293.474	293.917	
1000.00	294.358	294.796	295.231	295.664	296.094	
1050.00	296.521	296.947	297.370	297.791	298.210	
1100.00	298.627	299.042	299.456	299.868	300.278	
1150.00	300.687	301.094	301.499	301.903	302.306	
1200.00	302.707	303.108	303.507	303.905	304.302	
1250.00	304.698	305.093	305.487	305.881	306.273	
1300.00	306.665	307.056	307.447	307.836	308.226	
1350.00	308.615	309.003	309.390	309.778	310.165	
1400.00	310.552	310.938	311.324	311.710	312.095	
1450.00	312.481	312.866	313.251	313.637	314.022	
1500.00	314.407	314.792	315.177	315.562	315.948	
1550.00	316.333	316.719	317.105	317.490	317.877	
1600.00	318.263	318.650	319.037	319.425	319.812	
1650.00	320.200	320.589	320.978	321.367	321.757	
1700.00	322.147	322.537	322.929	323.320	323.712	
1750.00	324.105	324.499	324.893	1.00000 *3*	1.00000 *3*	
1800.00	1.00000 *3*					

CPTH02


STOFFWERT
(J/KG.K)
200.00
220.00
240.00
260.00
280.00
300.00
320.00
340.00
360.00
380.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION EKTHO2(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   THO2
CP    TK            273.15 <= 373.15 <= TK <= 3273.15 <= 3273.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 5.8)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(EKTHO2,'EKTHO2',1,373.15,3273.15,273.15,3273.15,TK,&99
C$T
99999 IF (TK.GT.823.15) GOTO 1
      EKTHO2= 0.30
      RETURN
    1 IF (TK.GT.2613.15) GOTO 2
      EKTHO2= 0.162 + 2.514E-4*(TK-273.15)
      RETURN
    2 EKTHO2= 0.75
   99 RETURN
      END
```

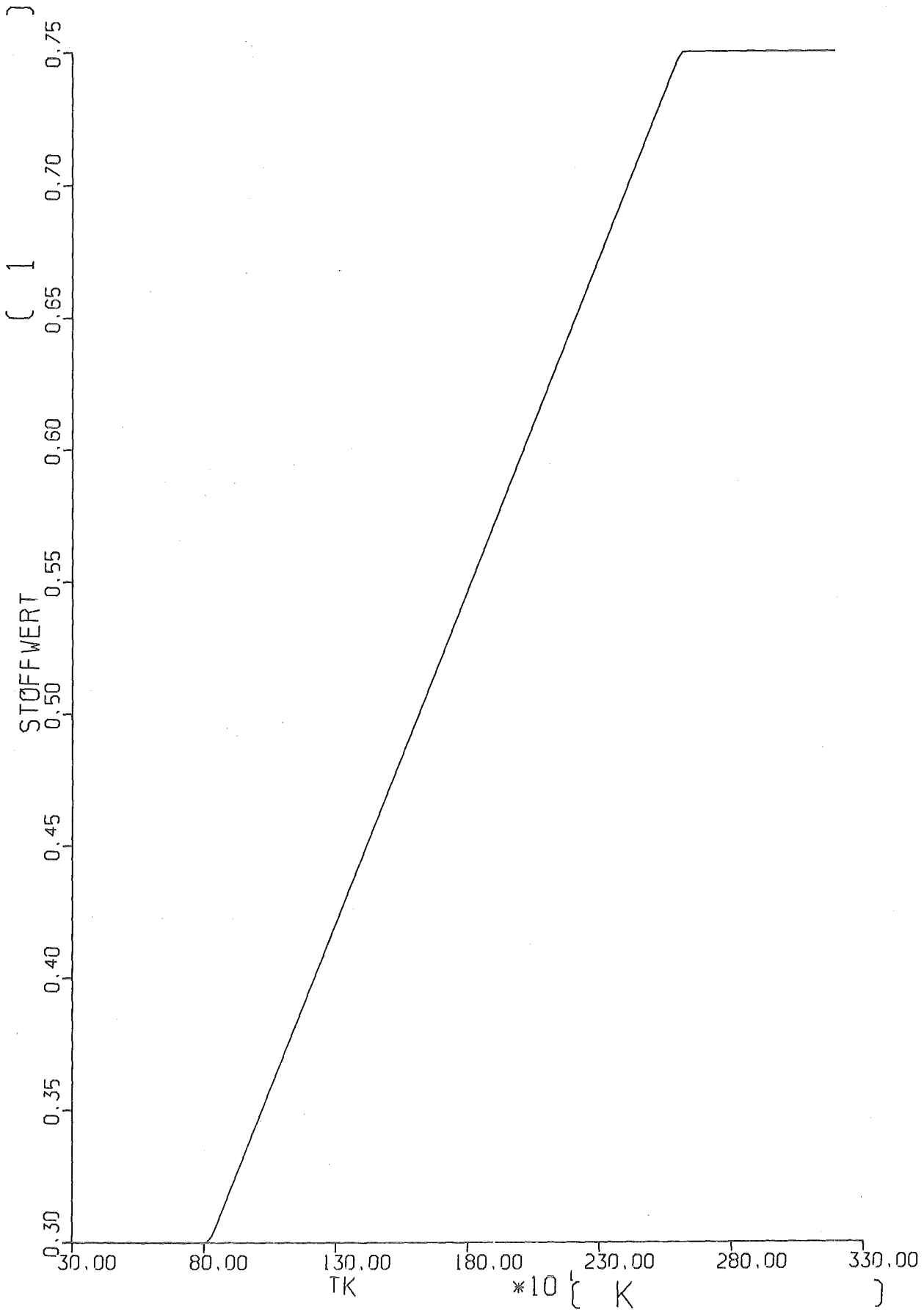
**** FUNKTION 180 ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON THO2 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: EK IN 1
TK (K),

TK =	+ .0	+ 20.000	+ 40.000	+ 60.000	+ 80.000	+
300.00	.300000 *2*	.300000 *2*	.300000 *2*	.300000 *2*	.300000	
400.00	.300000	.300000	.300000	.300000	.300000	
500.00	.300000	.300000	.300000	.300000	.300000	
600.00	.300000	.300000	.300000	.300000	.300000	
700.00	.300000	.300000	.300000	.300000	.300000	
800.00	.300000	.300000	.304506	.309534	.314562	
900.00	.319590	.324618	.329646	.334674	.339702	
1000.00	.344730	.349758	.354786	.359814	.364842	
1100.00	.369870	.374898	.379926	.384954	.389982	
1200.00	.395010	.400038	.405066	.410094	.415122	
1300.00	.420150	.425178	.430206	.435234	.440262	
1400.00	.445290	.450318	.455346	.460374	.465402	
1500.00	.470430	.475458	.480486	.485514	.490542	
1600.00	.495570	.500598	.505626	.510654	.515682	
1700.00	.520710	.525738	.530766	.535794	.540822	
1800.00	.545850	.550878	.555906	.560934	.565962	
1900.00	.570990	.576018	.581046	.586074	.591102	
2000.00	.596130	.601158	.606186	.611214	.616242	
2100.00	.621270	.626298	.631326	.636354	.641382	
2200.00	.646410	.651438	.656466	.661494	.666522	
2300.00	.671550	.676578	.681606	.686634	.691662	
2400.00	.696690	.701718	.706746	.711774	.716802	
2500.00	.721830	.726858	.731886	.736914	.741942	
2600.00	.746970	.750000	.750000	.750000	.750000	
2700.00	.750000	.750000	.750000	.750000	.750000	
2800.00	.750000	.750000	.750000	.750000	.750000	
2900.00	.750000	.750000	.750000	.750000	.750000	
3000.00	.750000	.750000	.750000	.750000	.750000	
3100.00	.750000	.750000	.750000	.750000	.750000	
3200.00	.750000	.750000	.750000	.750000	1.00000 *3*	
3300.00	1.00000 *3*					

EKTH02


STØFFWERT
(1)
0,30
0,35
0,40
0,45
0,50
0,55
0,60
0,65
0,70
0,75
30,00
80,00
130,00
180,00
230,00
280,00
330,00
TK
*10 (K)

```
      FUNCTION GATHO2(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT                    1/K
C$M   THO2                        (BEI 10. GRAD C)
CP    TK          273.15 <= 373.15 <= TK <= 1773.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.8)
CB    AN HAND VORGENANNTER LITERATUR WURDE DER DIFFERENTIELLE
CB    AUSDEHNUNGSKOEFFIZIENT ERMITTELT.
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(GATHO2,'GATHO2',1,373.15,1773.15,273.15,1773.15,TK,&99)
C$T
99999 GATHO2= 7.900E-6 + 2.658E-9*(TK-273.15)
   99 RETURN
      END
```

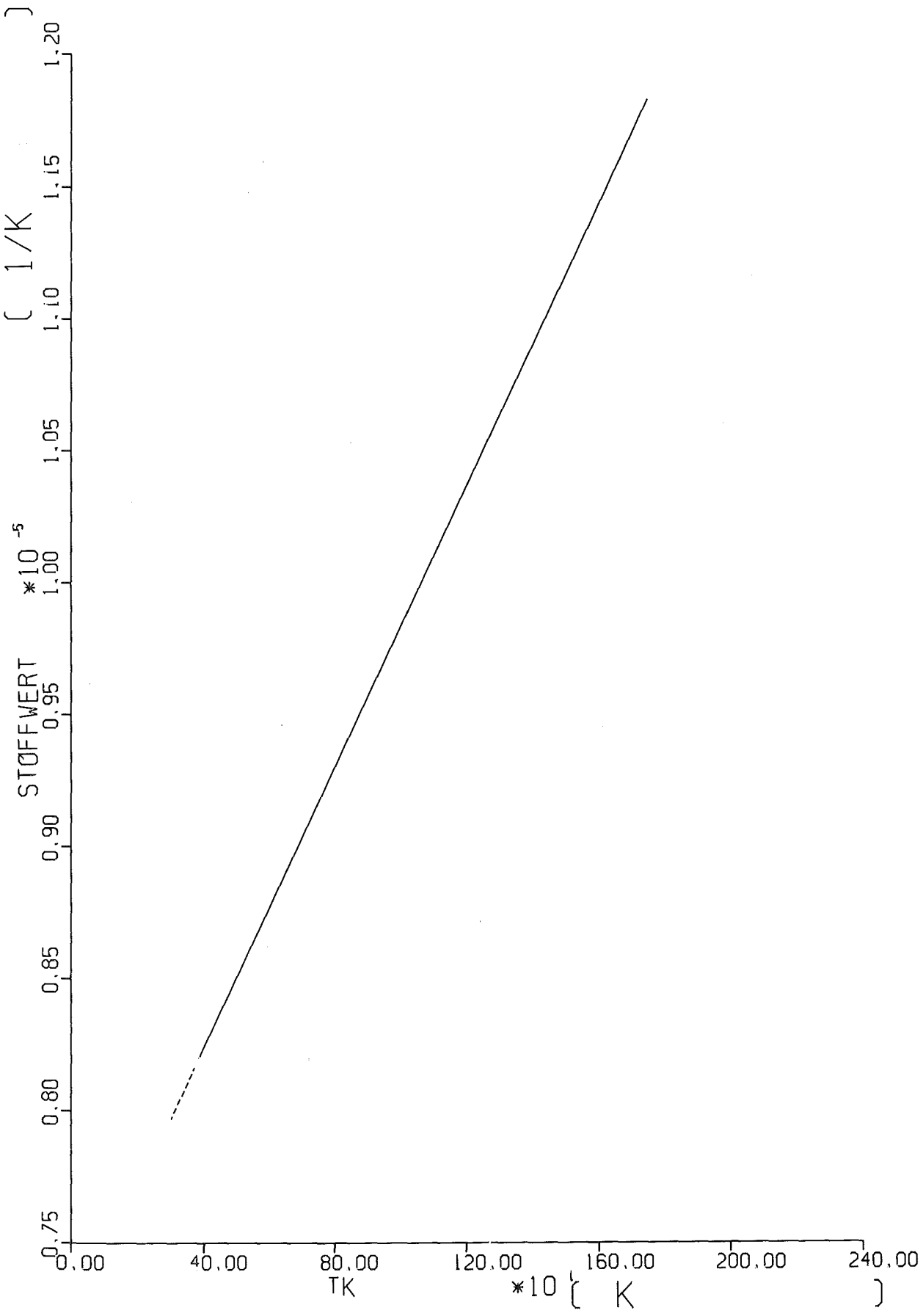
**** FUNKTION 181 ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON THO2 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: GA IN 1/K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	.797137E-05*2*	.799795E-05*2*	.802453E-05*2*	.805111E-05*2*	.807769E-05*2*
350.00	.810427E-05*2*	.813085E-05*2*	.815743E-05*2*	.818401E-05	.821059E-05
400.00	.823717E-05	.826375E-05	.829033E-05	.831691E-05	.834349E-05
450.00	.837007E-05	.839665E-05	.842323E-05	.844981E-05	.847639E-05
500.00	.850297E-05	.852955E-05	.855613E-05	.858271E-05	.860929E-05
550.00	.863587E-05	.866245E-05	.868903E-05	.871561E-05	.874219E-05
600.00	.876877E-05	.879535E-05	.882193E-05	.884851E-05	.887509E-05
650.00	.890167E-05	.892825E-05	.895483E-05	.898141E-05	.900799E-05
700.00	.903457E-05	.906115E-05	.908773E-05	.911431E-05	.914089E-05
750.00	.916747E-05	.919405E-05	.922063E-05	.924721E-05	.927379E-05
800.00	.930037E-05	.932695E-05	.935353E-05	.938011E-05	.940669E-05
850.00	.943327E-05	.945985E-05	.948643E-05	.951301E-05	.953959E-05
900.00	.956617E-05	.959275E-05	.961933E-05	.964591E-05	.967249E-05
950.00	.969907E-05	.972565E-05	.975223E-05	.977881E-05	.980539E-05
1000.00	.983197E-05	.985855E-05	.988513E-05	.991171E-05	.993829E-05
1050.00	.996487E-05	.999145E-05	.100180E-04	.100446E-04	.100712E-04
1100.00	.100978E-04	.101243E-04	.101509E-04	.101775E-04	.102041E-04
1150.00	.102307E-04	.102572E-04	.102838E-04	.103104E-04	.103370E-04
1200.00	.103636E-04	.103901E-04	.104167E-04	.104433E-04	.104699E-04
1250.00	.104965E-04	.105230E-04	.105496E-04	.105762E-04	.106028E-04
1300.00	.106294E-04	.106559E-04	.106825E-04	.107091E-04	.107357E-04
1350.00	.107623E-04	.107888E-04	.108154E-04	.108420E-04	.108686E-04
1400.00	.108952E-04	.109217E-04	.109483E-04	.109749E-04	.110015E-04
1450.00	.110281E-04	.110546E-04	.110812E-04	.111078E-04	.111344E-04
1500.00	.111610E-04	.111875E-04	.112141E-04	.112407E-04	.112673E-04
1550.00	.112939E-04	.113204E-04	.113470E-04	.113736E-04	.114002E-04
1600.00	.114268E-04	.114533E-04	.114799E-04	.115065E-04	.115331E-04
1650.00	.115597E-04	.115862E-04	.116128E-04	.116394E-04	.116660E-04
1700.00	.116926E-04	.117191E-04	.117457E-04	.117723E-04	.117989E-04
1750.00	.118255E-04	.118520E-04	.118786E-04	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

GATH02


STØFFWERT *10 -5 [1/K]
0,75
0,80
0,85
0,90
0,95
1,00
1,05
1,10
1,15
1,20
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10 [K]

```
      FUNCTION ROTHO2(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                   KG/M3
C$M   THO2
CP    DUMMY
CP    DUMMY PARAMETER                                          1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977: ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN:  K.WAGNER & T.VOLLMER   (KAPITEL 2.8)
      ROTHO2= 9340.
99999 RETURN
      END
```

```
****  FUNKTION  182  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON THO2 ALS FUNKTION DER
   0 ARGUMENTE DUMMY    ,

DIMENSIONEN: RO IN  KG/M3
DUMMY    ( 1          ),

DUMMY    =          +  .0          +
                   +---------------
          0.0      |  9340.00
```

```
      FUNCTION WLTHO2(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                    W/M.K
C$M   THO2                        (BEI 98% D.THEOR.DICHTE U.99.5% REINHEIT)
CP    TK          273.15 <= 373.15 <= TK <= 1773.15 <= 1773.15
CP    TEMPERATUR                                              K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.8)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLTHO2,'WLTHO2',1,373.15,1773.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      IF (TC.GT.400.) GOTO 1
      WLTHO2= 13.36 - 3.423E-2*TC + 3.73E-5*TC*TC
      RETURN
    1 WLTHO2= 2.146 - 9.390E2/TC + 2.043E6/(TC*TC) - 4.470E8/(TC*TC*TC)
   99 RETURN
      END
```

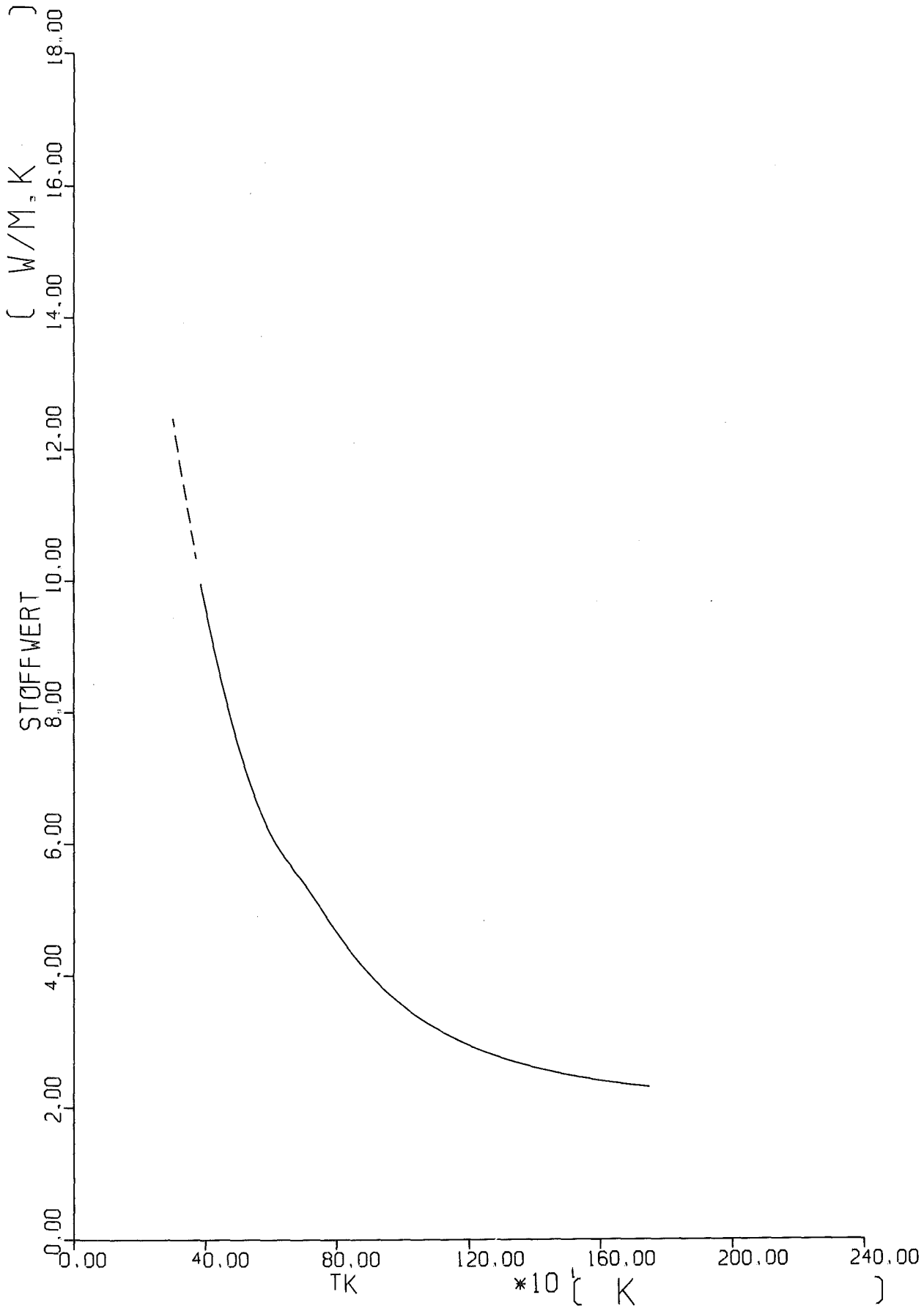
**** FUNKTION 183 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON THO2 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	12.4678	*2*	12.1493	*2*	11.8382	*2*	11.5346	*2*	11.2384	*2*
350.00	10.9497	*2*	10.6685	*2*	10.3947	*2*	10.1284		9.86951	
400.00	9.61811		9.37417		9.13769		8.90867		8.68711	
450.00	8.47301		8.26637		8.06719		7.87547		7.69121	
500.00	7.51441		7.34507		7.18319		7.02877		6.88181	
550.00	6.74231		6.61027		6.48569		6.36857		6.25892	
600.00	6.15671		6.06197		5.97470		5.89487		5.82252	
650.00	5.75762		5.70018		5.65020		5.54292		5.47954	
700.00	5.41152		5.34014		5.26643		5.19124		5.11526	
750.00	5.03904		4.96303		4.88759		4.81302		4.73954	
800.00	4.66733		4.59653		4.52724		4.45954		4.39349	
850.00	4.32910		4.26641		4.20542		4.14612		4.08850	
900.00	4.03254		3.97822		3.92549		3.87434		3.82473	
950.00	3.77661		3.72995		3.68471		3.64085		3.59833	
1000.00	3.55711		3.51715		3.47840		3.44084		3.40442	
1050.00	3.36910		3.33486		3.30164		3.26943		3.23818	
1100.00	3.20787		3.17846		3.14992		3.12223		3.09535	
1150.00	3.06925		3.04392		3.01932		2.99543		2.97223	
1200.00	2.94969		2.92779		2.90651		2.88583		2.86573	
1250.00	2.84619		2.82719		2.80871		2.79074		2.77327	
1300.00	2.75626		2.73972		2.72362		2.70795		2.69270	
1350.00	2.67785		2.66339		2.64931		2.63560		2.62224	
1400.00	2.60923		2.59655		2.58420		2.57215		2.56042	
1450.00	2.54897		2.53782		2.52694		2.51633		2.50598	
1500.00	2.49589		2.48604		2.47643		2.46706		2.45791	
1550.00	2.44898		2.44026		2.43175		2.42344		2.41532	
1600.00	2.40740		2.39966		2.39210		2.38471		2.37749	
1650.00	2.37044		2.36355		2.35682		2.35024		2.34381	
1700.00	2.33752		2.33137		2.32536		2.31948		2.31373	
1750.00	2.30810		2.30260		2.29722		1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

WLTH02


STOFFWERT
(W/M, K)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

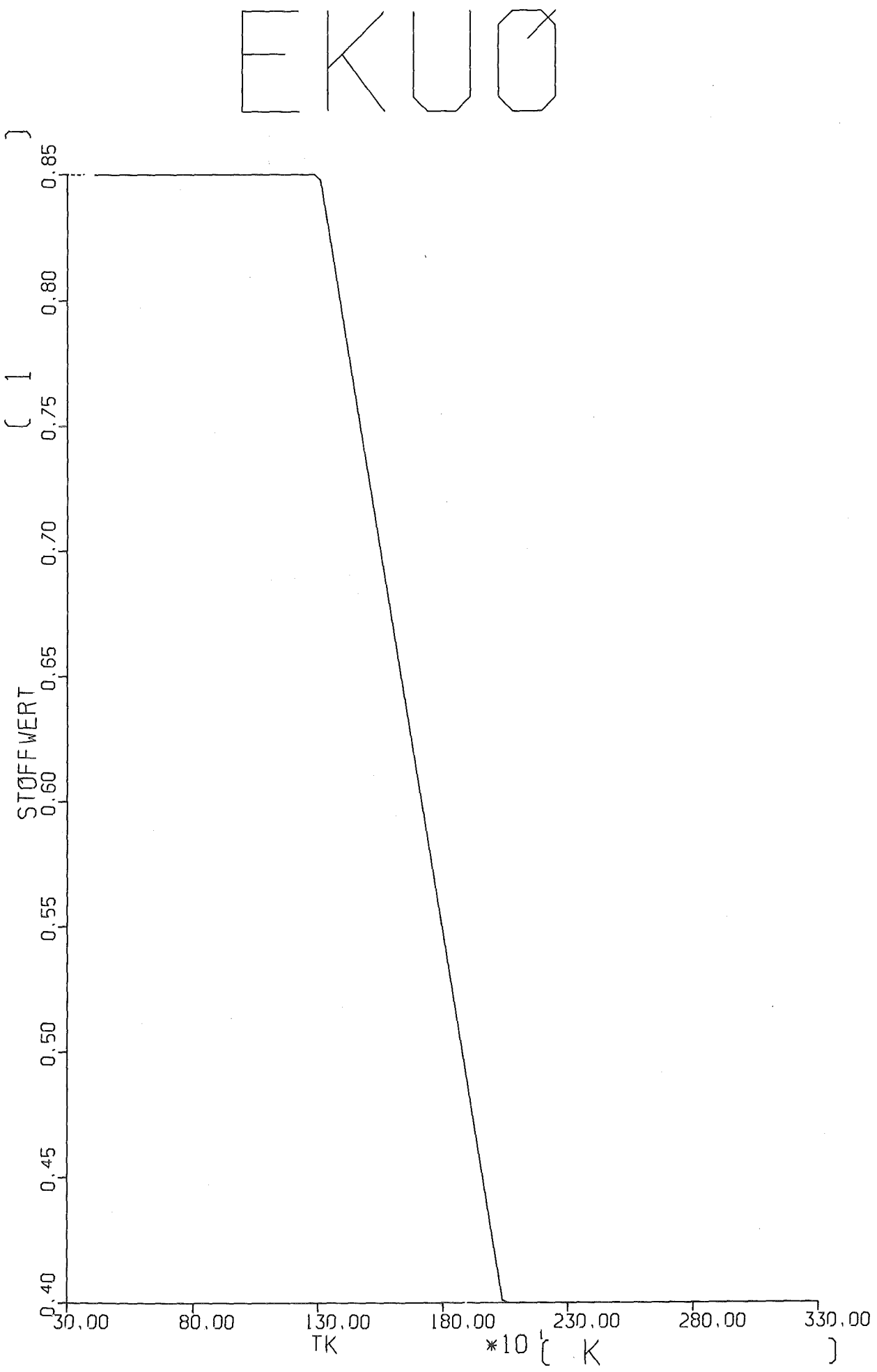
```
      FUNCTION EKUO  (/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   URAN-OXID
CP    TK            273.15 <= 373.15 <= TK <= 3273.15 <= 3273.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 5.1)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(EKUO  ,'EKUC  ',1,373.15,3273.15,273.15,3273.15,TK,&99)
C$T
99999 TC= TK-273.15
      IF (TC.GT.1040.) GOTO 1
      EKUO= 0.85
      RETURN
    1 IF (TC.GT.1770.) GOTO 2
      EKUO= 1.49 - 6.164E-4*TC
      RETURN
    2 EKUO= 0.4
   99 RETURN
      END
```

**** FUNKTION 185 ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON UO ALS FUNKTION DER
1 ARGUMENTE TK .

DIMENSIONEN: EK IN 1
TK (K).

TK =	+ .0	+ 20.000	+ 40.000	+ 60.000	+ 80.000	+
300.00	.850000 *2*	.850000 *2*	.850000 *2*	.850000 *2*	.850000	
400.00	.850000	.850000	.850000	.850000	.850000	
500.00	.850000	.850000	.850000	.850000	.850000	
600.00	.850000	.850000	.850000	.850000	.850000	
700.00	.850000	.850000	.850000	.850000	.850000	
800.00	.850000	.850000	.850000	.850000	.850000	
900.00	.850000	.850000	.850000	.850000	.850000	
1000.00	.850000	.850000	.850000	.850000	.850000	
1100.00	.850000	.850000	.850000	.850000	.850000	
1200.00	.850000	.850000	.850000	.850000	.850000	
1300.00	.850000	.844721	.832393	.820065	.807737	
1400.00	.795409	.783081	.770753	.758425	.746097	
1500.00	.733769	.721441	.709113	.696785	.684457	
1600.00	.672129	.659801	.647473	.635145	.622817	
1700.00	.610489	.598161	.585833	.573505	.561177	
1800.00	.548849	.536521	.524193	.511865	.499537	
1900.00	.487209	.474882	.462554	.450226	.437898	
2000.00	.425570	.413241	.400914	.400000	.400000	
2100.00	.400000	.400000	.400000	.400000	.400000	
2200.00	.400000	.400000	.400000	.400000	.400000	
2300.00	.400000	.400000	.400000	.400000	.400000	
2400.00	.400000	.400000	.400000	.400000	.400000	
2500.00	.400000	.400000	.400000	.400000	.400000	
2600.00	.400000	.400000	.400000	.400000	.400000	
2700.00	.400000	.400000	.400000	.400000	.400000	
2800.00	.400000	.400000	.400000	.400000	.400000	
2900.00	.400000	.400000	.400000	.400000	.400000	
3000.00	.400000	.400000	.400000	.400000	.400000	
3100.00	.400000	.400000	.400000	.400000	.400000	
3200.00	.400000	.400000	.400000	.400000	1.00000 *3*	
3300.00	1.00000 *3*					


EKUØ
STØFFWERT
[ ]
0,85
0,80
0,75
0,70
0,65
0,60
0,55
0,50
0,45
0,40
30,00
80,00
130,00
180,00
230,00
280,00
330,00
TK
*10 [K]

```
      FUNCTION CPZRY4(/TK     /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                                  J/KG.K
C$M   ZIRCALOY-4
CP    TK            273.15 <= 373.15 <= TK <= 1773.15 <= 1773.15
CP    TEMPERATUR                                                    K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.2)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CPZRY4,'CPZRY4',1,373.15,1773.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      IF (TC.GT.800.) GOTO 1
      CPZRY4= 286. + 9.286E-2*TC
      RETURN
    1 IF (TC.GT.907.) GOTO 2
      CPZRY4= -3341. + 4.626*TC
      RETURN
    2 IF (TC.GT.985.) GOTO 3
      CPZRY4= 6611. - 6.346*TC
      RETURN
    3 CPZRY4= 360.
   99 RETURN
      END
```

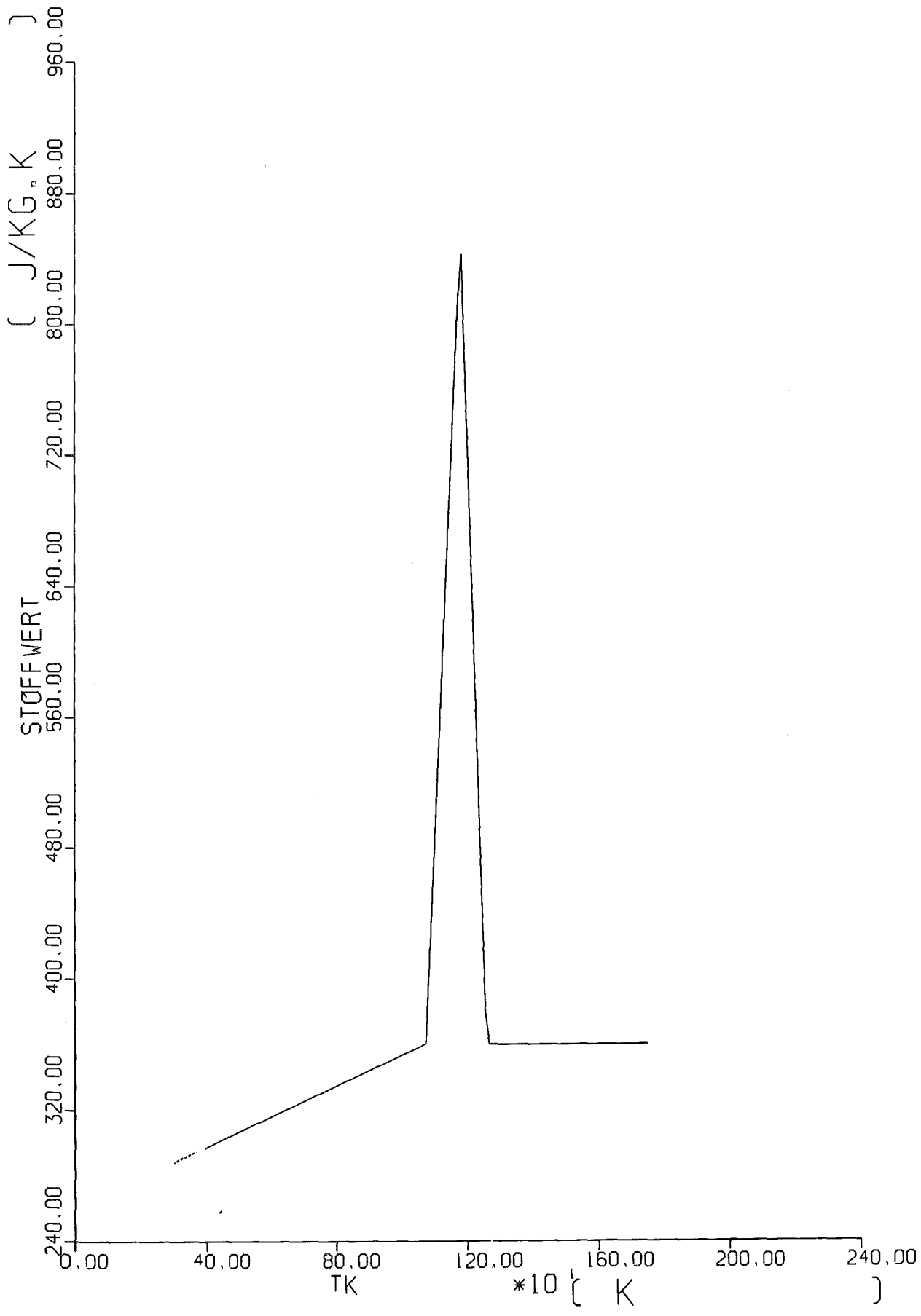
**** FUNKTION 201 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON ZRY4 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	+
300.00	288.493	*2*	289.422	*2*	290.350	*2*	291.279	*2*	292.208	*2*
350.00	293.136	*2*	294.065	*2*	294.993	*2*	295.922		296.851	
400.00	297.779		298.708		299.636		300.565		301.494	
450.00	302.422		303.351		304.279		305.208		306.136	
500.00	307.065		307.994		308.922		309.851		310.780	
550.00	311.708		312.637		313.565		314.494		315.423	
600.00	316.351		317.280		318.208		319.137		320.066	
650.00	320.994		321.923		322.851		323.780		324.708	
700.00	325.637		326.566		327.494		328.423		329.352	
750.00	330.280		331.209		332.137		333.066		333.995	
800.00	334.923		335.852		336.780		337.709		338.637	
850.00	339.566		340.495		341.423		342.352		343.281	
900.00	344.209		345.138		346.066		346.995		347.924	
950.00	348.852		349.781		350.709		351.638		352.567	
1000.00	353.495		354.424		355.352		356.281		357.209	
1050.00	358.138		359.067		359.995		391.489		437.749	
1100.00	484.009		530.269		576.529		622.789		669.049	
1150.00	715.309		761.566		807.828		854.086		792.672	
1200.00	729.211		665.750		602.293		538.832		475.371	
1250.00	411.910		360.000		360.000		360.000		360.000	
1300.00	360.000		360.000		360.000		360.000		360.000	
1350.00	360.000		360.000		360.000		360.000		360.000	
1400.00	360.000		360.000		360.000		360.000		360.000	
1450.00	360.000		360.000		360.000		360.000		360.000	
1500.00	360.000		360.000		360.000		360.000		360.000	
1550.00	360.000		360.000		360.000		360.000		360.000	
1600.00	360.000		360.000		360.000		360.000		360.000	
1650.00	360.000		360.000		360.000		360.000		360.000	
1700.00	360.000		360.000		360.000		360.000		360.000	
1750.00	360.000		360.000		360.000		1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

CPZRY4


(J/KG.K)
960.00
880.00
800.00
720.00
640.00
560.00
480.00
400.00
320.00
240.00
STOFFWERT
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION EKZRY4(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   ZIRCALOY-4
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 5.2)
      EKZRY4= 0.75
99999 RETURN
      END
```

```
****  FUNKTION  202  ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON ZRY4 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: EK IN  1
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  .750000
```

```
      FUNCTION GAZRY4(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   LINEARER, INTEGR. AUSDEHNUNGSKOEFFIZIENT                1
C$M   ZIRCALOY-4
CP    TK            273.15 <= 373.15 <= TK <= 1773.15 <= 1773.15
CP    TEMPERATUR                                              K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.2)
CB    WEGEN DES BESONDEREN MATERIALVERHALTENS WURDE ABWEICHEND VON DER
CB    MAPLIB-KONVENTION IN DIESER FUNCTION DIE INTEGRALE FORM ZUR
CB    ERMITTLUNG VON  ALPHA(T)*DT = DL/LO  ANGEWANDT.
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(GAZRY4,'GAZRY4',1,373.15,1773.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      IF (TC.GT.825.) GOTO 1
      GAZRY4= 8.2076E-4 + TK*(-7.856E-6 + TK*(1.9236E-8 -
     1   TK*6.1409E-12))
      RETURN
    1 IF (TC.GT.890.) GOTO 2
      GAZRY4= 7.3E-3
      RETURN
    2 IF (TC.GT.955.) GOTO 3
      GAZRY4= 2.7E-2 - 2.214E-5*TC
      RETURN
    3 IF (TC.GT.990.) GOTO 4
      GAZRY4= 5.75E-3
      RETURN
    4 GAZRY4= -6.514E-3 + TK*9.7006E-6
   99 RETURN
      END
```

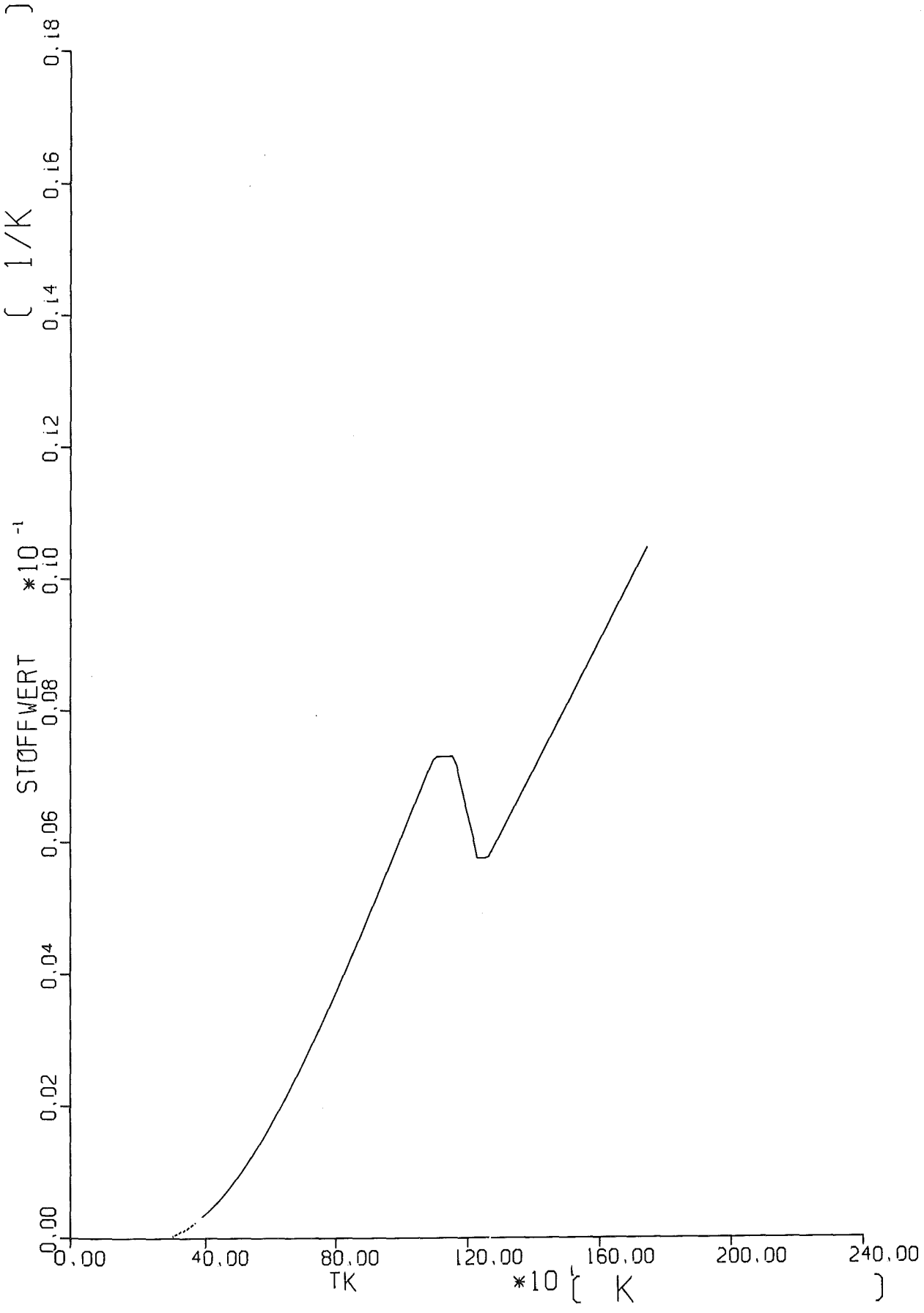
**** FUNKTION 203 ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON ZRY4 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: GA IN 1/K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	.293958E-04*2*	.510360E-04*2*	.753812E-04*2*	.102395E-03*2*	.132040E-03*2*
350.00	.164279E-03*2*	.199076E-03*2*	.236393E-03*2*	.276195E-03	.318444E-03
400.00	.363103E-03	.410135E-03	.459503E-03	.511172E-03	.565103E-03
450.00	.621260E-03	.679606E-03	.740105E-03	.802720E-03	.867412E-03
500.00	.934148E-03	.100289E-02	.107359E-02	.114623E-02	.122077E-02
550.00	.129716E-02	.137537E-02	.145536E-02	.153711E-02	.162056E-02
600.00	.170569E-02	.179245E-02	.188081E-02	.197074E-02	.206219E-02
650.00	.215513E-02	.224952E-02	.234533E-02	.244251E-02	.254104E-02
700.00	.264087E-02	.274197E-02	.284430E-02	.294783E-02	.305251E-02
750.00	.315832E-02	.326521E-02	.337314E-02	.348209E-02	.359201E-02
800.00	.370286E-02	.381462E-02	.392723E-02	.404067E-02	.415491E-02
850.00	.426989E-02	.438559E-02	.450197E-02	.461899E-02	.473661E-02
900.00	.485481E-02	.497353E-02	.509275E-02	.521242E-02	.533251E-02
950.00	.545299E-02	.557382E-02	.569496E-02	.581637E-02	.593802E-02
1000.00	.605986E-02	.618187E-02	.630400E-02	.642622E-02	.654850E-02
1050.00	.667079E-02	.679306E-02	.691527E-02	.703739E-02	.715937E-02
1100.00	.730000E-02	.730000E-02	.730000E-02	.730000E-02	.730000E-02
1150.00	.730000E-02	.730000E-02	.714374E-02	.692234E-02	.670094E-02
1200.00	.647954E-02	.625814E-02	.603674E-02	.575000E-02	.575000E-02
1250.00	.575000E-02	.575000E-02	.580576E-02	.590276E-02	.599977E-02
1300.00	.609678E-02	.619378E-02	.629079E-02	.638779E-02	.648480E-02
1350.00	.658181E-02	.667881E-02	.677582E-02	.687283E-02	.696983E-02
1400.00	.706683E-02	.716384E-02	.726085E-02	.735785E-02	.745486E-02
1450.00	.755187E-02	.764887E-02	.774588E-02	.784288E-02	.793989E-02
1500.00	.803690E-02	.813390E-02	.823091E-02	.832791E-02	.842492E-02
1550.00	.852193E-02	.861893E-02	.871594E-02	.881295E-02	.890995E-02
1600.00	.900695E-02	.910396E-02	.920097E-02	.929797E-02	.939498E-02
1650.00	.949199E-02	.958899E-02	.968600E-02	.978300E-02	.988001E-02
1700.00	.997702E-02	.100740E-01	.101710E-01	.102680E-01	.103650E-01
1750.00	.104620E-01	.105591E-01	.106561E-01	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

GAZRY4


STØFFWERT *10 -1
(1/K)
0,00
0,02
0,04
0,06
0,08
0,10
0,12
0,14
0,16
0,18
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10 (K)

```
      FUNCTION ROZRY4(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   ZIRCALOY-4                (BEI 25. GRAD C)
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 2.2)
      ROZRY4= 6570.
99999 RETURN
      END
```

```
****  FUNKTION  204  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON ZRY4 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   .

DIMENSIONEN: RO IN  KG/M3
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  6570.00
```

```
      FUNCTION WLZRY4(/TK     /)
C
CN    ***  M A P L I B  ***    FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                        W/M.K
C$M   ZIRCALOY-4
CP    TK           273.15 <= 373.15 <= TK <= 1773.15 <= 1773.15
CP    TEMPERATUR                                                   K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN:  K.WAGNER & T.VOLLMER   (KAPITEL 3.2)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WLZRY4,'WLZRY4',1,373.15,1773.15,273.15,1773.15,TK,&99)
C$T
99999 WLZRY4= 7.848 + 2.2E-2*TK - 1.676E-5*TK*TK + 8.712E-9*TK*TK*TK
   99 RETURN
      END
```

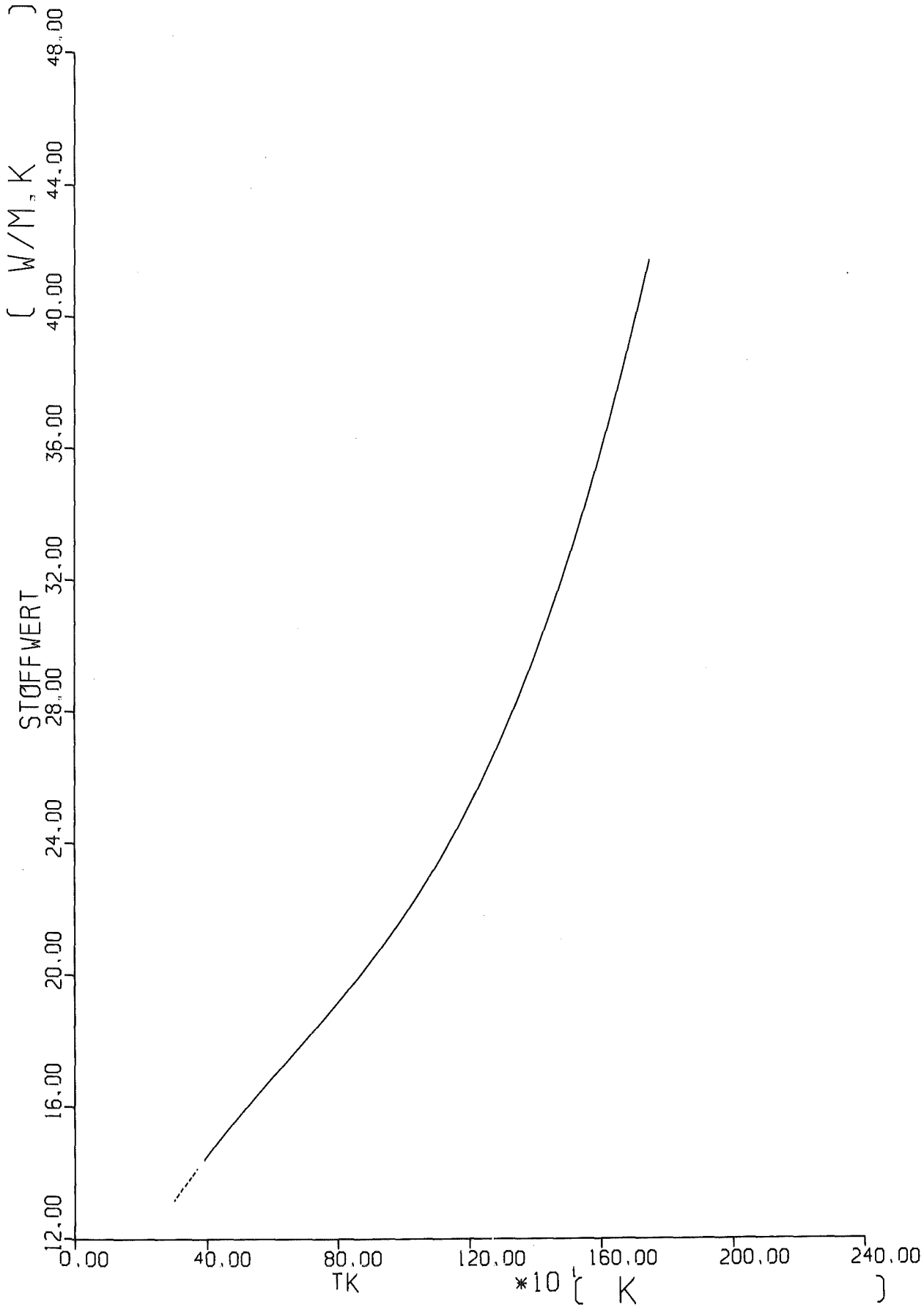
**** FUNKTION 205 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON ZRY4 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000	+
300.00	13.1748 *2*	13.3169 *2*	13.4573 *2*	13.5959 *2*	13.7330 *2*	
350.00	13.8684 *2*	14.0024 *2*	14.1348 *2*	14.2659	14.3956	
400.00	14.524C	14.6511	14.7770	14.9017	15.0254	
450.00	15.1480	15.2696	15.3902	15.5100	15.6289	
500.00	15.7470	15.8644	15.9811	16.0971	16.2126	
550.00	16.3275	16.4420	16.5561	16.6697	16.7831	
600.00	16.8962	17.0090	17.1217	17.2344	17.3469	
650.00	17.4594	17.5720	17.6847	17.7975	17.9105	
700.00	18.0238	18.1374	18.2513	18.3657	18.4805	
750.00	18.5958	18.7118	18.8283	18.9455	19.0634	
800.00	19.1821	19.3017	19.4221	19.5434	19.6658	
850.00	19.7891	19.9136	20.0392	20.1660	20.2941	
900.00	20.4234	20.5541	20.6862	20.8198	20.9549	
950.00	21.0915	21.2298	21.3697	21.5114	21.6548	
1000.00	21.8000	21.9471	22.0961	22.2471	22.4002	
1050.00	22.5553	22.7126	22.8720	23.0338	23.1977	
1100.00	23.3641	23.5328	23.7040	23.8777	24.0539	
1150.00	24.2327	24.4143	24.5985	24.7855	24.9753	
1200.00	25.1679	25.3635	25.5621	25.7637	25.9683	
1250.00	26.1761	26.3871	26.6013	26.8188	27.0396	
1300.00	27.2639	27.4915	27.7227	27.9574	28.1957	
1350.00	28.4377	28.6833	28.9328	29.1860	29.4431	
1400.00	29.7041	29.9691	30.2381	30.5112	30.7884	
1450.00	31.0697	31.3553	31.6452	31.9394	32.2380	
1500.00	32.5410	32.8485	33.1606	33.4772	33.7985	
1550.00	34.1245	34.4552	34.7908	35.1312	35.4765	
1600.00	35.8268	36.1820	36.5424	36.9078	37.2784	
1650.00	37.6543	38.0354	38.4219	38.8137	39.2109	
1700.00	39.6137	40.0219	40.4358	40.8553	41.2805	
1750.00	41.7114	42.1481	42.5906	1.00000 *3*	1.00000 *3*	
1800.00	1.00000 *3*					

WLZRY4


STOFFWERT
(W/M, K)
48.00
44.00
40.00
36.00
32.00
28.00
24.00
20.00
16.00
12.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION CP4550(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                              J/KG.K
C$M   STAHL 4550
CP    TK           273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.4)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(CP4550,'CP4550',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      IF (TC.GT.500.) GOTO 1
      CP4550= 431.1 + 3.991*SQRT(TC) + 1.917E-1*TC - 1.556E-4*TC*TC
      RETURN
    1 CP4550= 695.2 - 5.113E-1*TC + 5.565E-4*TC*TC
   99 RETURN
      END
```

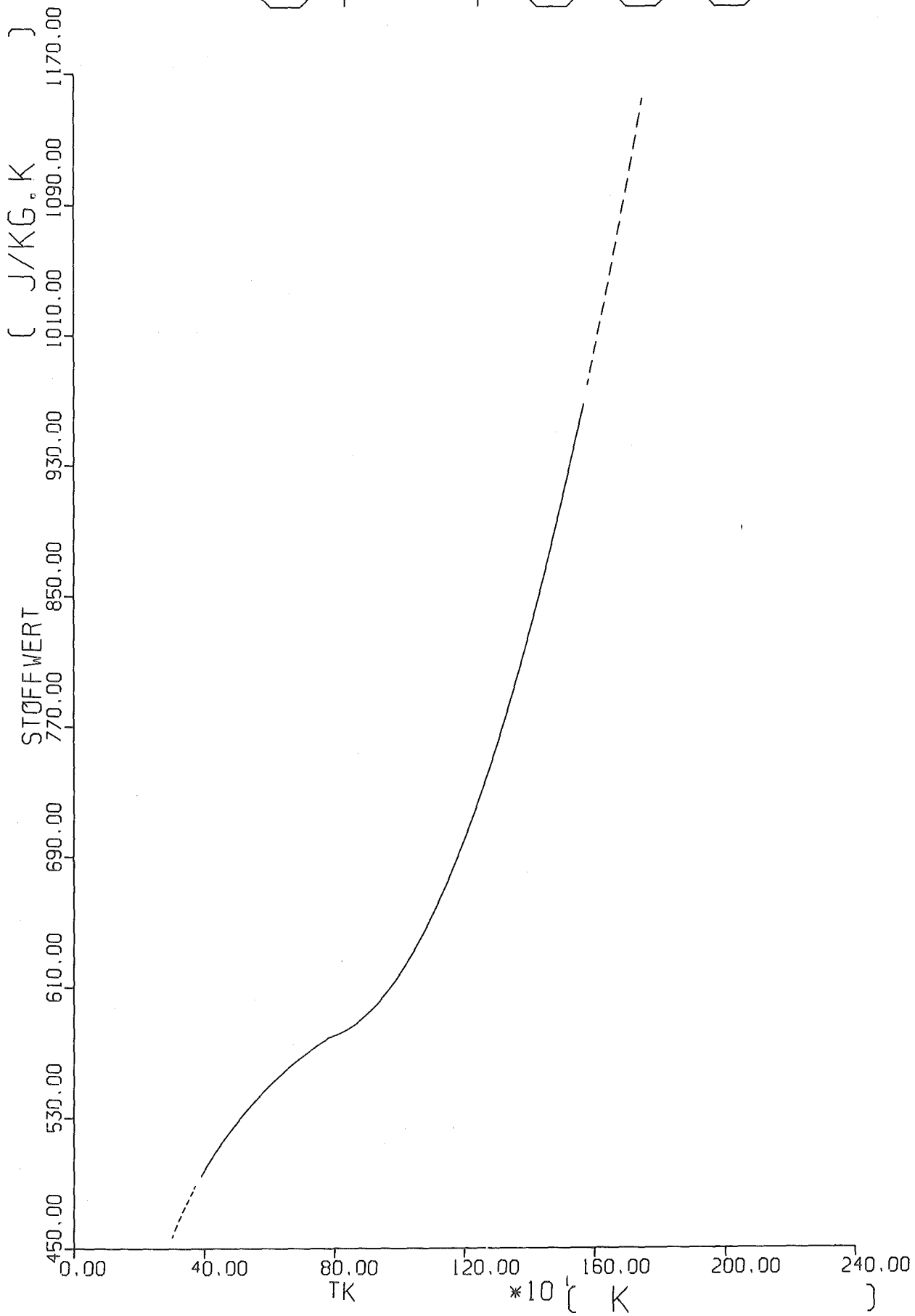
**** FUNKTION 206 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON 4550 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: CP IN J/KG.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	456.815	*2*	462.180	*2*	467.057	*2*	471.587	*2*	475.851	*2*
350.00	479.899	*2*	483.769	*2*	487.483	*2*	491.061		494.517	
400.00	497.863		501.108		504.259		507.323		510.305	
450.00	513.210		516.041		518.802		521.495		524.124	
500.00	526.690		529.196		531.644		534.035		536.370	
550.00	538.651		540.880		543.057		545.183		547.260	
600.00	549.287		551.267		553.199		555.085		556.925	
650.00	558.720		560.470		562.175		563.837		565.456	
700.00	567.032		568.565		570.057		571.506		572.915	
750.00	574.282		575.608		576.894		579.011		579.594	
800.00	580.290		581.096		582.014		583.043		584.184	
850.00	585.435		586.798		588.272		589.858		591.555	
900.00	593.363		595.283		597.313		599.455		601.709	
950.00	604.074		606.550		609.137		611.835		614.645	
1000.00	617.566		620.599		623.743		626.998		630.364	
1050.00	633.842		637.431		641.131		644.943		648.866	
1100.00	652.900		657.045		661.302		665.670		670.150	
1150.00	674.740		679.442		684.256		689.180		694.216	
1200.00	699.363		704.622		709.992		715.473		721.065	
1250.00	726.769		732.584		738.510		744.548		750.697	
1300.00	756.957		763.328		769.811		776.405		783.110	
1350.00	789.927		796.855		803.895		811.045		818.307	
1400.00	825.680		833.165		840.760		848.468		856.286	
1450.00	864.216		872.257		880.409		888.673		897.047	
1500.00	905.533		914.131		922.840		931.660		940.591	
1550.00	949.634		958.788		968.053		977.430	*2*	986.918	*2*
1600.00	996.517	*2*	1006.23	*2*	1016.05	*2*	1025.98	*2*	1036.03	*2*
1650.00	1046.18	*2*	1056.45	*2*	1066.83	*2*	1077.32	*2*	1087.92	*2*
1700.00	1098.63	*2*	1109.45	*2*	1120.39	*2*	1131.43	*2*	1142.59	*2*
1750.00	1153.86	*2*	1165.24	*2*	1176.73	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

CP4550


STØFFWERT
(J/KG.K)
450.00
530.00
610.00
690.00
770.00
850.00
930.00
1010.00
1090.00
1170.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION EK4550(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   STAHL 4550
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 5.4)
      EK4550= C.69
99999 RETURN
      END
```

```
****  FUNKTION  207  ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON 4550 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: EK IN  1
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  .690000
```

```
      FUNCTION GA4550(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT                  1/K
C$M   STAHL 4550                (BEI 13.5 GRAD C)
CP    DUMMY
CP    DUMMY PARAMETER                                         1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.4)
CB    AN HAND VORGENANNTER LITERATUR WURDE DER DIFFERENTIELLE
CB    AUSDEHNUNGSKOEFFIZIENT ERMITTELT.
      GA4550= 1.85E-5
99999 RETURN
      END
```

```
****  FUNKTION  208  ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON 4550 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: GA IN  1/K
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                +----------------
         0.0    |  .185000E-04
```

```
      FUNCTION RO4550(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                    KG/M3
C$M   STAHL 4550                (BEI 25. GRAD C)
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 2.4)
      RO4550= 7800.
99999 RETURN
      END
```

```
****  FUNKTION  209  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON 4550 ALS FUNKTION DER
   0 ARGUMENTE DUMMY    ,

DIMENSIONEN: RO IN  KG/M3
DUMMY    ( 1           ),

DUMMY    =          +  .0          +
                   +---------------
          0.0      |  7800.00
```

```
      FUNCTION WL4550(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                        W/M.K
C$M   STAHL 4550
CP    TK           273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                                   K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.4)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WL4550,'WL4550',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 TC= TK-273.15
      WL4550= 14.9 + 1.459E-2*TC - 1.813E-6*TC*TC
   99 RETURN
      END
```

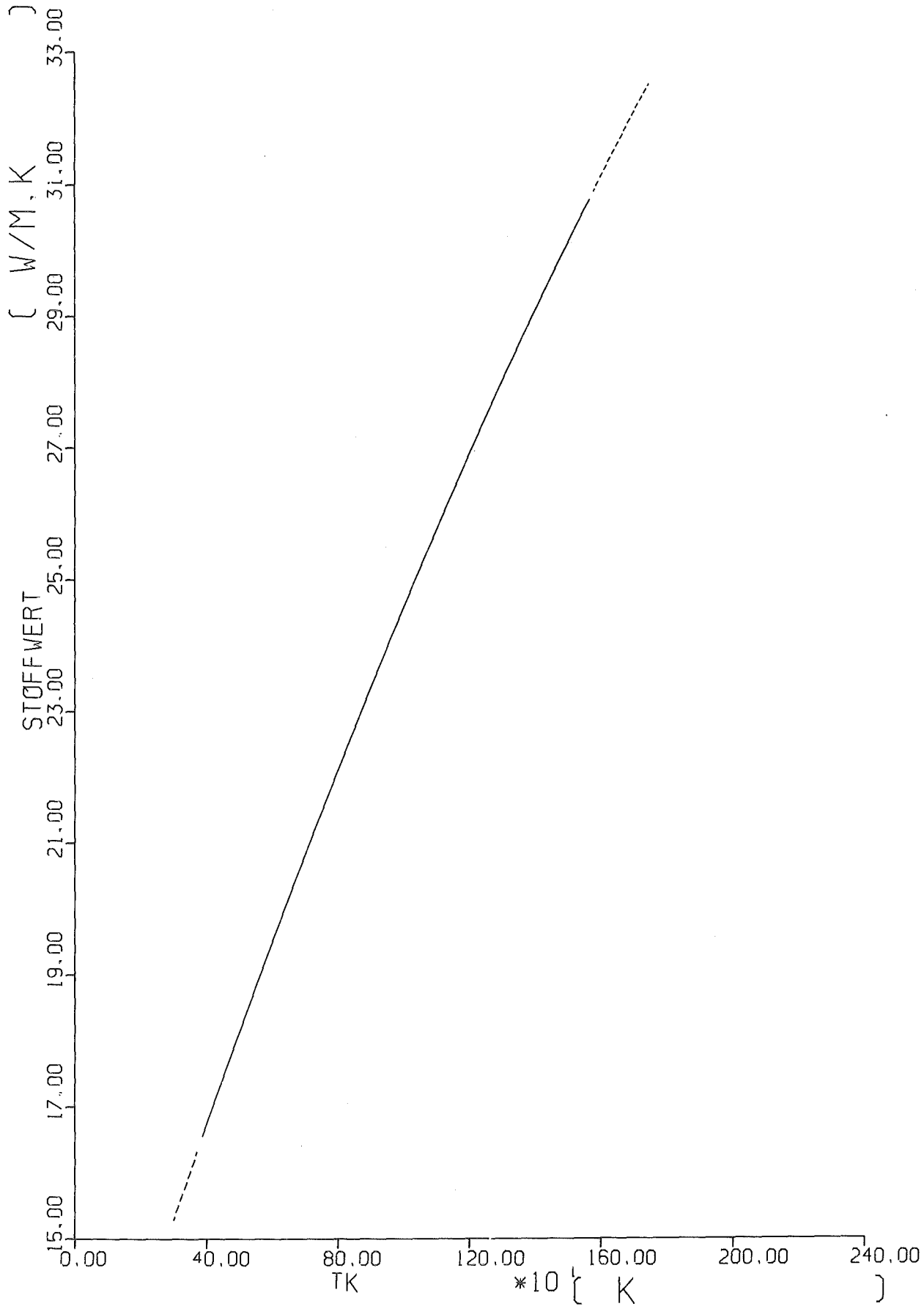
**** FUNKTION 210 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON 4550 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	15.2904	*2*	15.4352	*2*	15.5796	*2*	15.7236	*2*	15.8672	*2*
350.00	16.0105	*2*	16.1534	*2*	16.2960	*2*	16.4382		16.5801	
400.00	16.7216		16.8627		17.0034		17.1438		17.2839	
450.00	17.4235		17.5628		17.7018		17.8404		17.9786	
500.00	18.1164		18.2539		18.3911		18.5278		18.6642	
550.00	18.8003		18.9359		19.0713		19.2062		19.3408	
600.00	19.4750		19.6089		19.7424		19.8755		20.0083	
650.00	20.1408		20.2728		20.4045		20.5358		20.6668	
700.00	20.7974		20.9276		21.0575		21.1870		21.3162	
750.00	21.4450		21.5734		21.7015		21.8292		21.9565	
800.00	22.0835		22.2101		22.3364		22.4622		22.5878	
850.00	22.7130		22.8377		22.9622		23.0863		23.2100	
900.00	23.3333		23.4563		23.5789		23.7012		23.8231	
950.00	23.9446		24.0658		24.1866		24.3071		24.4272	
1000.00	24.5469		24.6663		24.7853		24.9039		25.0222	
1050.00	25.1401		25.2576		25.3748		25.4917		25.6081	
1100.00	25.7242		25.8400		25.9553		26.0703		26.1850	
1150.00	26.2993		26.4132		26.5267		26.6400		26.7528	
1200.00	26.8653		26.9774		27.0891		27.2005		27.3115	
1250.00	27.4222		27.5325		27.6424		27.7520		27.8612	
1300.00	27.9701		28.0786		28.1867		28.2944		28.4018	
1350.00	28.5089		28.6155		28.7218		28.8278		28.9334	
1400.00	29.0386		29.1434		29.2479		29.3521		29.4559	
1450.00	29.5592		29.6623		29.7650		29.8673		29.9693	
1500.00	30.0709		30.1721		30.2730		30.3735		30.4736	
1550.00	30.5734		30.6728		30.7719		30.8706	*2*	30.9689	*2*
1600.00	31.0669	*2*	31.1645	*2*	31.2617	*2*	31.3586	*2*	31.4551	*2*
1650.00	31.5513	*2*	31.6471	*2*	31.7425	*2*	31.8376	*2*	31.9323	*2*
1700.00	32.0266	*2*	32.1206	*2*	32.2142	*2*	32.3075	*2*	32.4004	*2*
1750.00	32.4929	*2*	32.5851	*2*	32.6769	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

WL4550


(W/M.K)
STOFFWERT
15.00
17.00
19.00
21.00
23.00
25.00
27.00
29.00
31.00
33.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

```
      FUNCTION CP4869(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   SPEZ. WAERME B. CONST. DRUCK                                  J/KG.K
C$M   STAHL 4869
CP    DUMMY
CP    DUMMY PARAMETER                                               1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 4.10)
      CP4869= 500.
99999 RETURN
      END
```

```
****  FUNKTION  211  ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON 4869 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: CP IN  J/KG.K
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  500.000
```

```
      FUNCTION EK4869(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   EMISSIONSKOEFFIZIENT (WAERMESTRAHLUNG)                    1
C$M   STAHL 4869
CP    DUMMY
CP    DUMMY PARAMETER                                           1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 5.10)
      EK4869= 0.85
99999 RETURN
      END
```

```
****  FUNKTION  212  ****

TABELLE DER WERTE DER EIGENSCHAFT EK VON 4869 ALS FUNKTION DER
   0 ARGUMENTE DUMMY   ,

DIMENSIONEN: EK IN  1
DUMMY   ( 1          ),

DUMMY   =          +  .0          +
                  +---------------
         0.0      |  .850000
```

```
      FUNCTION GA4869(/TK     /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   LINEARER, DIFF. AUSDEHNUNGSKOEFFIZIENT                    1/K
C$M   STAHL 4869                  (BEI 25. GRAD C)
CP    TK           273.15 <= 373.15 <= TK <= 1273.15 <= 1773.15
CP    TEMPERATUR                                                K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 6.8)
CB    AN HAND VORGENANNTER LITERATUR WURDE DER DIFFERENTIELLE
CB    AUSDEHNUNGSKOEFFIZIENT ERMITTELT.
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(GA4869,'GA4869',1,373.15,1273.15,273.15,1773.15,TK,&99)
C$T
99999 GA4869= 1.316E-5 + 9.578E-9*(TK-273.15)
   99 RETURN
      END
```

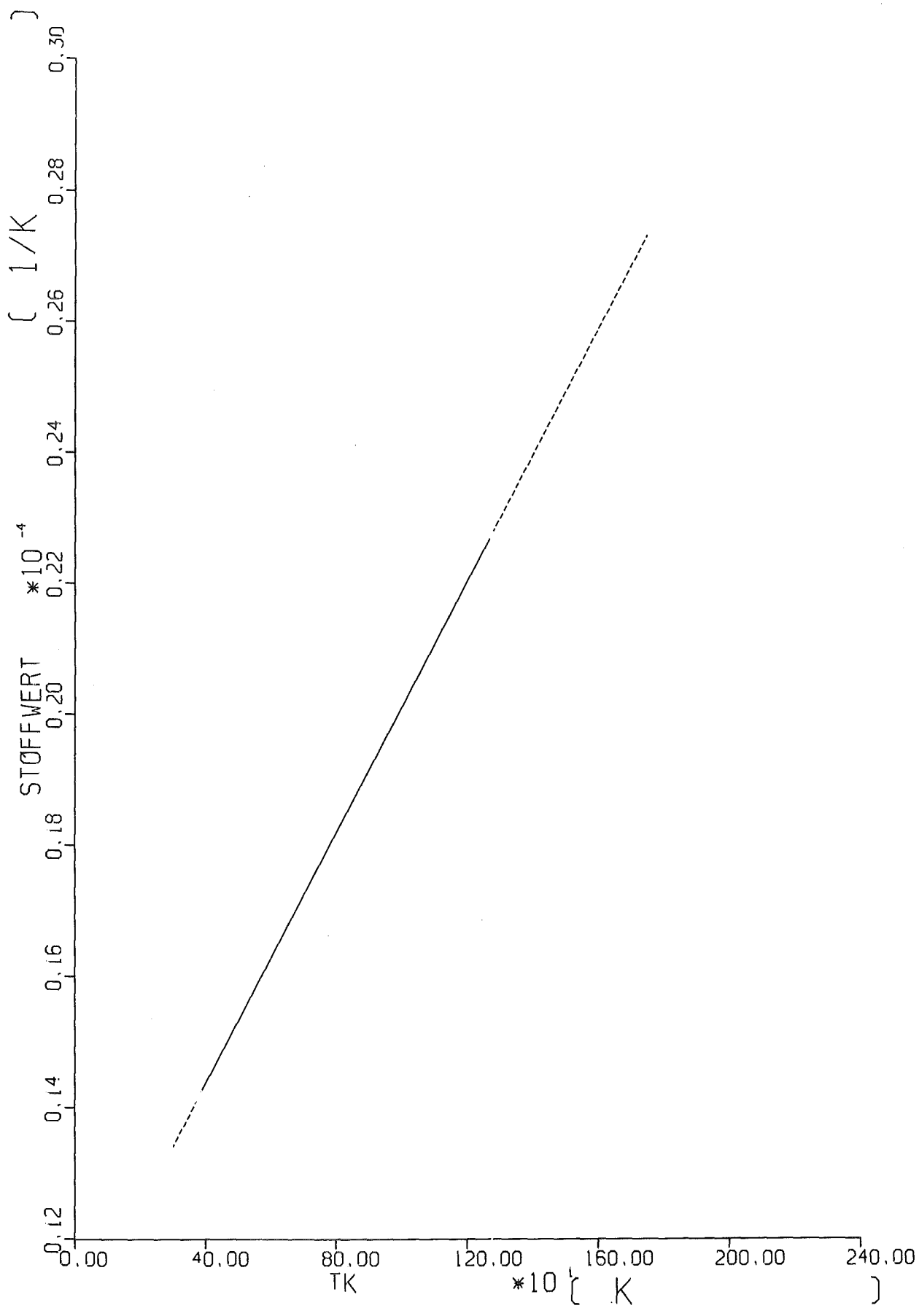
**** FUNKTION 213 ****

TABELLE DER WERTE DER EIGENSCHAFT GA VON 4869 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: GA IN 1/K
TK (K),

TK =	+ .0	+ 10.000	+ 20.000	+ 30.000	+ 40.000
300.00	.134172E-04*2*	.135129E-04*2*	.136087E-04*2*	.137045E-04*2*	.138003E-04*2*
350.00	.138961E-04*2*	.139918E-04*2*	.140876E-04*2*	.141834E-04	.142792E-04
400.00	.143750E-04	.144707E-04	.145665E-04	.146623E-04	.147581E-04
450.00	.148539E-04	.149496E-04	.150454E-04	.151412E-04	.152370E-04
500.00	.153328E-04	.154285E-04	.155243E-04	.156201E-04	.157159E-04
550.00	.158117E-04	.159074E-04	.160032E-04	.160990E-04	.161948E-04
600.00	.162906E-04	.163863E-04	.164821E-04	.165779E-04	.166737E-04
650.00	.167695E-04	.168652E-04	.169610E-04	.170568E-04	.171526E-04
700.00	.172484E-04	.173441E-04	.174399E-04	.175357E-04	.176315E-04
750.00	.177273E-04	.178230E-04	.179188E-04	.180146E-04	.181104E-04
800.00	.182062E-04	.183019E-04	.183977E-04	.184935E-04	.185893E-04
850.00	.186851E-04	.187808E-04	.188766E-04	.189724E-04	.190682E-04
900.00	.191640E-04	.192597E-04	.193555E-04	.194513E-04	.195471E-04
950.00	.196429E-04	.197386E-04	.198344E-04	.199302E-04	.200260E-04
1000.00	.201218E-04	.202175E-04	.203133E-04	.204091E-04	.205049E-04
1050.00	.206007E-04	.206964E-04	.207922E-04	.208880E-04	.209838E-04
1100.00	.210796E-04	.211753E-04	.212711E-04	.213669E-04	.214627E-04
1150.00	.215585E-04	.216542E-04	.217500E-04	.218458E-04	.219416E-04
1200.00	.220374E-04	.221331E-04	.222289E-04	.223247E-04	.224205E-04
1250.00	.225163E-04	.226120E-04	.227078E-04	.228036E-04*2*	.228994E-04*2*
1300.00	.229952E-04*2*	.230909E-04*2*	.231867E-04*2*	.232825E-04*2*	.233783E-04*2*
1350.00	.234741E-04*2*	.235698E-04*2*	.236656E-04*2*	.237614E-04*2*	.238572E-04*2*
1400.00	.239530E-04*2*	.240487E-04*2*	.241445E-04*2*	.242403E-04*2*	.243361E-04*2*
1450.00	.244319E-04*2*	.245276E-04*2*	.246234E-04*2*	.247192E-04*2*	.248150E-04*2*
1500.00	.249108E-04*2*	.250065E-04*2*	.251023E-04*2*	.251981E-04*2*	.252939E-04*2*
1550.00	.253897E-04*2*	.254854E-04*2*	.255812E-04*2*	.256770E-04*2*	.257728E-04*2*
1600.00	.258686E-04*2*	.259643E-04*2*	.260601E-04*2*	.261559E-04*2*	.262517E-04*2*
1650.00	.263475E-04*2*	.264432E-04*2*	.265390E-04*2*	.266348E-04*2*	.267306E-04*2*
1700.00	.268264E-04*2*	.269221E-04*2*	.270179E-04*2*	.271137E-04*2*	.272095E-04*2*
1750.00	.273053E-04*2*	.274010E-04*2*	.274968E-04*2*	1.00000 *3*	1.00000 *3*
1800.00	1.00000 *3*				

GA4869


STOFFWERT *10 -4 [1/K]
0,12
0,14
0,16
0,18
0,20
0,22
0,24
0,26
0,28
0,30
0,00
40,00
80,00
120,00
160,00
200,00
240,00
TK *10 [K]

```
      FUNCTION RO4869(/DUMMY /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   DICHTE                                                 KG/M3
C$M   STAHL 4869
CP    DUMMY
CP    DUMMY PARAMETER                                        1
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN:  K.WAGNER & T.VOLLMER   (KAPITEL 2.10)
      RO4869= 8300.
99999 RETURN
      END
```

```
****  FUNKTION  214  ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON 4869 ALS FUNKTION DER
   0 ARGUMENTE DUMMY    ,

DIMENSIONEN: RO IN  KG/M3
DUMMY    ( 1           ),

DUMMY    =          +   .0           +
                   +----------------
        0.0        |  8300.00
```

```
      FUNCTION WL4869(/TK    /)
C
CN    ***  M A P L I B  ***   FUNCTION
C
C$P   WAERMELEITFAEHIGKEIT                                    W/M.K
C$M   STAHL 4869              (BEI 98% D.THEOR.DICHTE U.99.5% REINHEIT)
CP    TK          273.15 <= 373.15 <= TK <= 1573.15 <= 1773.15
CP    TEMPERATUR                                              K
CD    01.03.1978
CA    W.ZIMMERER
CL    KFK-EXT.15/77-2; AUGUST 1977; ZUSAMMENSTELLUNG VON STOFFWERTEN
CL    FUER WAERMELEITRECHNUNGEN AN LWR-BRENNSTAEBEN UND DEREN SIMULATO-
CL    REN;  K.WAGNER & T.VOLLMER   (KAPITEL 3.10)
      COMMON/$TEST$/ NOTEST
      LOGICAL*1 NOTEST
C$F
      IF(NOTEST) GOTO 99999
      CALL RANGE(WL4869,'WL4869',1,373.15,1573.15,273.15,1773.15,TK,&99)
C$T
99999 WL4869= 11.91 + 1.7057E-2*(TK-273.15)
   99 RETURN
      END
```

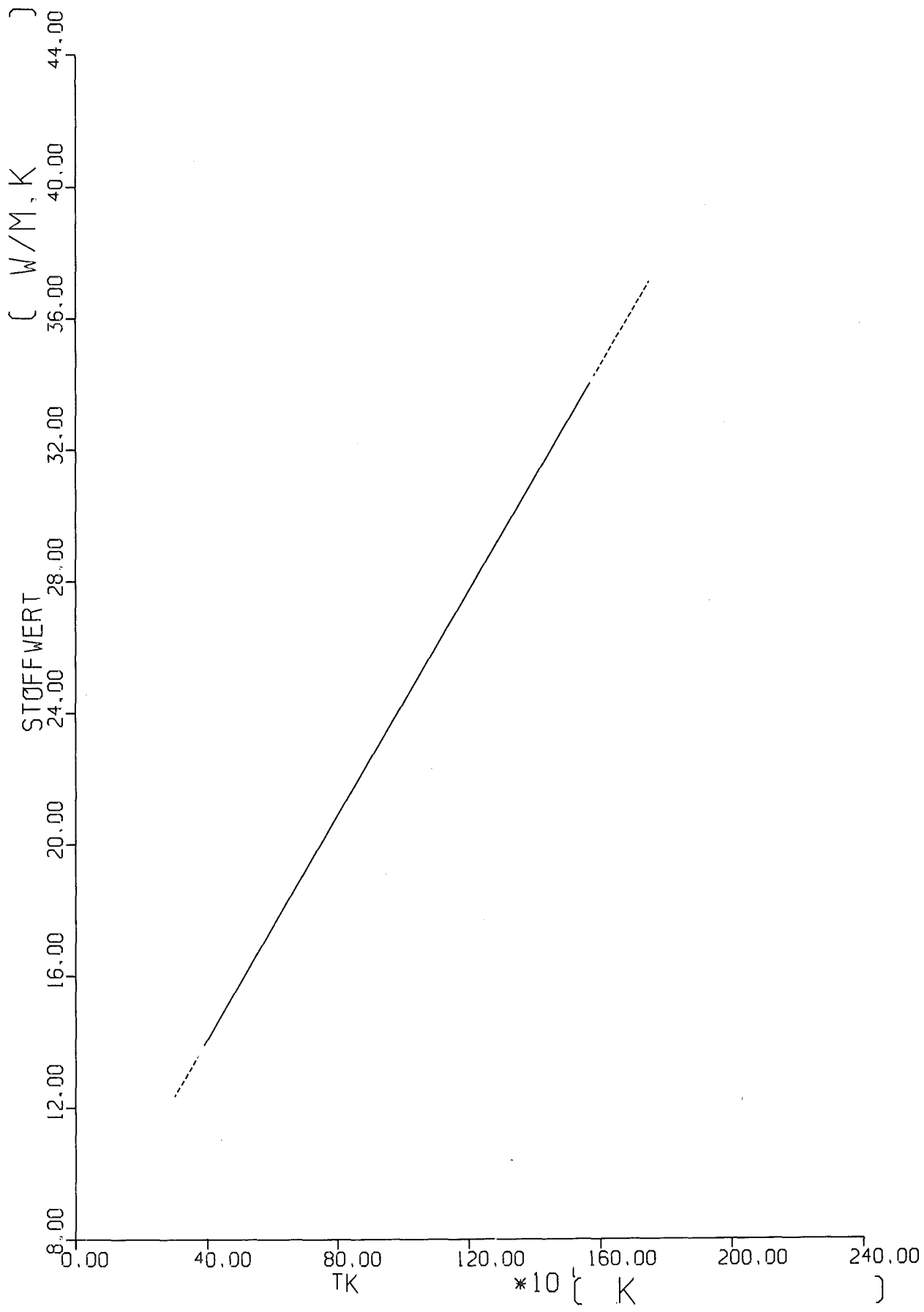
**** FUNKTION 215 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON 4869 ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: WL IN W/M.K
TK (K),

TK =	+ .0		+ 10.000		+ 20.000		+ 30.000		+ 40.000	
300.00	12.3680	*2*	12.5386	*2*	12.7091	*2*	12.8797	*2*	13.0503	*2*
350.00	13.2208	*2*	13.3914	*2*	13.5620	*2*	13.7325		13.9031	
400.00	14.0737		14.2443		14.4148		14.5854		14.7560	
450.00	14.9265		15.0971		15.2677		15.4382		15.6088	
500.00	15.7794		15.9500		16.1205		16.2911		16.4617	
550.00	16.6322		16.8028		16.9734		17.1439		17.3145	
600.00	17.4851		17.6556		17.8262		17.9968		18.1674	
650.00	18.3379		18.5085		18.6791		18.8496		19.0202	
700.00	19.1908		19.3613		19.5319		19.7025		19.8731	
750.00	20.0436		20.2142		20.3848		20.5553		20.7259	
800.00	20.8965		21.0670		21.2376		21.4082		21.5788	
850.00	21.7493		21.9199		22.0905		22.2610		22.4316	
900.00	22.6022		22.7728		22.9433		23.1139		23.2845	
950.00	23.4550		23.6256		23.7962		23.9667		24.1373	
1000.00	24.3079		24.4784		24.6490		24.8196		24.9902	
1050.00	25.1607		25.3313		25.5019		25.6724		25.8430	
1100.00	26.0136		26.1841		26.3547		26.5253		26.6959	
1150.00	26.8664		27.0370		27.2076		27.3781		27.5487	
1200.00	27.7193		27.8898		28.0604		28.2310		28.4016	
1250.00	28.5721		28.7427		28.9133		29.0838		29.2544	
1300.00	29.4250		29.5955		29.7661		29.9367		30.1072	
1350.00	30.2778		30.4484		30.6190		30.7895		30.9601	
1400.00	31.1307		31.3012		31.4718		31.6424		31.8129	
1450.00	31.9835		32.1541		32.3247		32.4952		32.6658	
1500.00	32.8364		33.0069		33.1775		33.3481		33.5186	
1550.00	33.6892		33.8598		34.0303		34.2009	*2*	34.3715	*2*
1600.00	34.5421	*2*	34.7126	*2*	34.8832	*2*	35.0538	*2*	35.2243	*2*
1650.00	35.3949	*2*	35.5655	*2*	35.7361	*2*	35.9066	*2*	36.0772	*2*
1700.00	36.2478	*2*	36.4183	*2*	36.5889	*2*	36.7595	*2*	36.9300	*2*
1750.00	37.1006	*2*	37.2712	*2*	37.4418	*2*	1.00000	*3*	1.00000	*3*
1800.00	1.00000	*3*								

WL4869


(W/M, K)
STOFFWERT
8.00
12.00
16.00
20.00
24.00
28.00
32.00
36.00
40.00
44.00
0.00
40.00
80.00
120.00
160.00
200.00
240.00
TK
*10 (K)

**** FUNKTION 64 ****

TABELLE DER WERTE DER EIGENSCHAFT VP VON H2O ALS FUNKTION DER
1 ARGUMENTE TK ,

DIMENSIONEN: VP IN N/M2
TK (K),

TK =	+ .0	+ 2.0000	+ 4.0000	+ 6.0000	+ 8.0000
250.00	95.3772 *2*	113.673 *2*	135.063 *2*	159.999 *2*	188.983 *2*
260.00	222.583 *2*	261.426 *2*	306.215 *2*	357.723 *2*	416.813 *2*
270.00	484.433 *2*	561.631 *2*	649.555	749.470	862.754
280.00	990.921	1135.61	1298.62	1481.89	1687.53
290.00	1917.83	2175.24	2462.43	2782.25	3137.79
300.00	3532.33	3969.43	4452.84	4986.63	5575.08
310.00	6222.80	6934.64	7715.80	8571.75	9508.33
320.00	10531.7	11648.3	12865.0	14189.1	15628.2
330.00	17190.2	18883.6	20717.1	22700.0	24842.0
340.00	27153.2	29644.0	32325.7	35209.5	38307.6
350.00	41632.2	45196.6	49013.9	53098.3	57464.1
360.00	62126.5	67100.8	72403.4	78050.6	84059.8
370.00	90448.5	97235.2	104439.	112078.	120174.
380.00	128746.	137817.	147406.	157538.	168234.
390.00	179519.	191415.	203949.	217144.	231028.
400.00	245626.	260965.	277074.	293979.	311710.
410.00	330297.	349770.	370157.	391492.	413806.
420.00	437130.	461499.	486945.	513502.	541205.
430.00	570089.	600191.	631545.	664190.	698163.
440.00	733501.	770243.	808430.	848098.	889291.
450.00	932048.	976410.	.102242E+07	.107012E+07	.111955E+07
460.00	.117076E+07	.122379E+07	.127868E+07	.133549E+07	.139425E+07
470.00	.145501E+07	.151782E+07	.158272E+07	.164977E+07	.171901E+07
480.00	.179049E+07	.186426E+07	.194037E+07	.201887E+07	.209981E+07
490.00	.218324E+07	.226922E+07	.235779E+07	.244901E+07	.254293E+07
500.00	.263961E+07	.273910E+07	.284146E+07	.294673E+07	.305498E+07
510.00	.316627E+07	.328064E+07	.339816E+07	.351889E+07	.364288E+07
520.00	.377020E+07	.390089E+07	.403503E+07	.417267E+07	.431388E+07
530.00	.445871E+07	.460724E+07	.475951E+07	.491560E+07	.507557E+07
540.00	.523948E+07	.540741E+07	.557940E+07	.575555E+07	.593590E+07
550.00	.612053E+07	.630951E+07	.650291E+07	.670080E+07	.690325E+07
560.00	.711033E+07	.732213E+07	.753870E+07	.776013E+07	.798650E+07
570.00	.821789E+07	.845437E+07	.869603E+07	.894294E+07	.919521E+07
580.00	.945290E+07	.971612E+07	.998495E+07	.102595E+08	.105398E+08
590.00	.108260E+08	.111183E+08	.114166E+08	.117212E+08	.120321E+08
600.00	.123494E+08	.126733E+08	.130038E+08	.133412E+08	.136855E+08
610.00	.140369E+08	.143956E+08	.147616E+08	.151352E+08	.155165E+08
620.00	.159057E+08	.163030E+08	.167085E+08	.171225E+08	.175451E+08
630.00	.179767E+08	.184174E+08	.188675E+08	.193272E+08	.197969E+08
640.00	.202768E+08	.207672E+08	.212684E+08	.217808E+08	.223046E+08*2*
650.00	.228404E+08*2*	.233885E+08*2*	.239493E+08*2*	.245233E+08*2*	.251109E+08*2*
660.00	.257123E+08*2*	.263285E+08*2*	.269598E+08*2*	.276068E+08*2*	.282699E+08*2*

**** FUNKTION 65 ****

TABELLE DER WERTE DER EIGENSCHAFT VT VON H2O ALS FUNKTION DER
1 ARGUMENTE PN ,

DIMENSIONEN: VT IN K
PN (N/M2),

PN =	+ .0	+ .10000E+06	+ .20000E+06	+ .30000E+06	+ .40000E+06 +
100000.00	372.776	393.375	406.691	416.781	425.006
600000.00	432.002	438.121	443.579	448.521	453.045
1100000.00	457.225	461.116	464.760	468.191	471.435
1600000.00	474.515	477.448	480.250	482.933	485.509
2100000.00	487.987	490.376	492.682	494.912	497.071
2600000.00	499.165	501.198	503.174	505.096	506.968
3100000.00	508.793	510.573	512.311	514.009	515.670
3600000.00	517.294	518.885	520.443	521.970	523.467
4100000.00	524.936	526.378	527.794	529.185	530.552
4600000.00	531.896	533.218	534.519	535.799	537.059
5100000.00	538.301	539.524	540.729	541.917	543.088
5600000.00	544.243	545.382	546.507	547.616	548.711
6100000.00	549.793	550.861	551.916	552.958	553.988
6600000.00	555.006	556.012	557.006	557.990	558.962
7100000.00	559.925	560.876	561.818	562.749	563.671
7600000.00	564.584	565.488	566.382	567.268	568.145
8100000.00	569.014	569.874	570.727	571.572	572.408
8600000.00	573.238	574.060	574.874	575.681	576.482
9100000.00	577.275	578.062	578.843	579.617	580.384
9600000.00	581.145	581.900	582.649	583.368	584.106
10100000.0	584.839	585.565	586.286	587.002	587.713
10600000.0	588.418	589.119	589.814	590.505	591.189
11100000.0	591.870	592.546	593.218	593.884	594.546
11600000.0	595.204	595.857	596.505	597.150	597.790
12100000.0	598.426	599.058	599.686	600.309	600.929
12600000.0	601.545	602.157	602.766	603.370	603.971
13100000.0	604.568	605.161	605.752	606.338	606.920
13600000.0	607.500	608.076	608.648	609.218	609.784
14100000.0	610.346	610.906	611.462	612.016	612.565
14600000.0	613.112	613.656	614.198	614.735	615.270
15100000.0	615.802	616.331	616.858	617.381	617.902
15600000.0	618.420	618.935	619.448	619.957	620.465
16100000.0	620.969	621.471	621.970	622.468	622.961
16600000.0	623.453	623.942	624.430	624.914	625.396
17100000.0	625.875	626.353	626.828	627.301	627.771
17600000.0	628.239	628.705	629.168	629.630	630.089
18100000.0	630.546	631.001	631.454	631.905	632.353
18600000.0	632.800	633.244	633.686	634.127	634.565
19100000.0	635.001	635.436	635.868	636.299	636.727
19600000.0	637.154	637.579	638.001	638.422	638.841
20100000.0	639.259				

**** FUNKTION 66 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON H2OL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: CP IN J/KG.K
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	4179.12		4176.25		4173.37		4170.50		4167.62	
340.00	4187.69		4185.56		4183.31		4181.12		4178.94	
380.00	1.00000	*3*	4221.44		4219.12		4216.81		4214.56	
420.00	1.00000	*3*	4298.44		4295.37		4292.37		4289.31	
460.00	1.00000	*3*	1.00000	*3*	4428.87		4424.06		4419.44	
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	4653.19		4644.56	
540.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	4164.87		4162.06		4159.31		4156.56		4153.87	
340.00	4176.81		4174.69		4172.50		4170.37		4168.31	
380.00	4212.31		4210.06		4207.87		4205.62		4203.44	
420.00	4286.37		4283.37		4280.44		4277.56		4274.69	
460.00	4414.75		4410.12		4405.62		4401.12		4396.75	
500.00	4636.00		4627.69		4619.37		4611.37		4603.44	
540.00	1.00000	*3*	5050.00		5031.00		5012.00		4994.00	
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 67 ****

TABELLE DER WERTE DER EIGENSCHAFT EH VON H2OL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: EH IN J/KG
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	112588.		113508.		114427.		115346.		116264.	
340.00	279834.		280657.		281480.		282302.		283125.	
380.00	1.00000	*3*	448705.		449440.		450175.		450911.	
420.00	1.00000	*3*	618979.		619609.		620240.		620871.	
460.00	1.00000	*3*	1.00000	*3*	793927.		794406.		794887.	
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	975615.		975839.	
540.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	117181.		118097.		119013.		119928.		120843.	
340.00	283947.		284770.		285592.		286414.		287237.	
380.00	451647.		452383.		453120.		453857.		454595.	
420.00	621505.		622139.		622774.		623411.		624049.	
460.00	795371.		795858.		796348.		796840.		797334.	
500.00	976069.		976306.		976549.		976799.		977055.	
540.00	1.00000	*3*	.116902E+07		.116875E+07		.116851E+07		.116823E+07	
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 68 ****

TABELLE DER WERTE DER EIGENSCHAFT ES VON H2OL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: ES IN J/KG.K
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	392.833		392.556		392.277		391.998		391.718	
340.00	916.147		915.564		914.983		914.403		913.824	
380.00	1.00000	*3*	1382.81		1381.98		1381.16		1380.34	
420.00	1.00000	*3*	1808.78		1807.70		1806.61		1805.53	
460.00	1.00000	*3*	1.00000	*3*	2204.06		2202.63		2201.21	
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	2580.23		2578.28	
540.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	391.437		391.156		390.874		390.591		390.308	
340.00	913.247		912.670		912.095		911.521		910.948	
380.00	1379.52		1378.71		1377.89		1377.08		1376.28	
420.00	1804.46		1803.39		1802.32		1801.26		1800.20	
460.00	2199.79		2198.39		2196.99		2195.60		2194.22	
500.00	2576.34		2574.41		2572.51		2570.61		2568.74	
540.00	1.00000	*3*	2944.98		2942.11		2939.27		2936.47	
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 69 ****

TABELLE DER WERTE DER EIGENSCHAFT PR VON H2CL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: PR IN 1
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	5.82146		5.80889		5.79642		5.78404		5.77175	
340.00	2.63519		2.63161		2.62798		2.62442		2.62089	
380.00	1.00000	*3*	1.57920		1.57797		1.57674		1.57554	
420.00	1.00000	*3*	1.12880		1.12828		1.12778		1.12726	
460.00	1.00000	*3*	1.00000	*3*	.913262		.912718		.912212	
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	.820014		.818732	
540.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	5.75974		5.74773		5.73590		5.72416		5.71259	
340.00	2.61743		2.61400		2.61056		2.60719		2.60388	
380.00	1.57436		1.57318		1.57203		1.57087		1.56973	
420.00	1.12678		1.12628		1.12578		1.12532		1.12486	
460.00	.911694		.911188		.910708		.910228		.909774	
500.00	.817470		.816261		.815061		.813924		.812807	
540.00	1.00000	*3*	.818676		.815095		.811553		.808211	
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 70 ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON H2OL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: RO IN KG/M3
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	996.666		997.112		997.558		998.002		998.445	
340.00	979.481		979.928		980.373		980.817		981.259	
380.00	1.00000	*3*	953.557		954.048		954.538		955.026	
420.00	1.00000	*3*	920.067		920.642		921.214		921.784	
460.00	1.00000	*3*	1.00000	*3*	880.174		880.883		881.588	
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	831.937		832.864	
540.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	998.887		999.328		999.769		1000.21		1000.65	
340.00	981.700		982.140		982.579		983.016		983.452	
380.00	955.511		955.996		956.478		956.958		957.438	
420.00	922.351		922.915		923.477		924.036		924.593	
460.00	882.289		882.986		883.678		884.366		885.050	
500.00	833.823		834.752		835.673		836.586		837.491	
540.00	1.00000	*3*	774.172		775.569		776.944		778.299	
580.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
620.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
660.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
700.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
740.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
780.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
820.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
860.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
900.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
940.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 71 ****

TABELLE DER WERTE DER EIGENSCHAFT ST VON H2OL ALS FUNKTION DER
1 ARGUMENTE T ,

DIMENSIONEN: ST IN N/M
T (K),

T =	+ .0	+ 2.0000	+ 4.0000	+ 6.0000	+ 8.0000
250.00	.783138E-01*2*	.781087E-01*2*	.778975E-01*2*	.776806E-01*2*	.774581E-01*2*
260.00	.772301E-01*2*	.769968E-01*2*	.767583E-01*2*	.765147E-01*2*	.762663E-01*2*
270.00	.760131E-01*2*	.757552E-01*2*	.754929E-01	.752262E-01	.749553E-01
280.00	.746801E-01	.744011E-01	.741186E-01	.738311E-01	.735406E-01
290.00	.732465E-01	.729489E-01	.726478E-01	.723435E-01	.720359E-01
300.00	.717253E-01	.714116E-01	.710949E-01	.707754E-01	.704530E-01
310.00	.701280E-01	.698003E-01	.694699E-01	.691372E-01	.688019E-01
320.00	.684642E-01	.681243E-01	.677820E-01	.674375E-01	.670909E-01
330.00	.667422E-01	.663914E-01	.660387E-01	.656839E-01	.653271E-01
340.00	.649686E-01	.646082E-01	.642459E-01	.638819E-01	.635162E-01
350.00	.631487E-01	.627797E-01	.624089E-01	.620365E-01	.616626E-01
360.00	.612871E-01	.609100E-01	.605314E-01	.601513E-01	.597697E-01
370.00	.593866E-01	.590021E-01	.586162E-01	.582288E-01	.578400E-01
380.00	.574499E-01	.570583E-01	.566653E-01	.562710E-01	.558753E-01
390.00	.554783E-01	.550800E-01	.546802E-01	.542792E-01	.538768E-01
400.00	.534732E-01	.530681E-01	.526618E-01	.522541E-01	.518451E-01
410.00	.514348E-01	.510232E-01	.506102E-01	.501960E-01	.497805E-01
420.00	.493636E-01	.489454E-01	.485259E-01	.481051E-01	.476829E-01
430.00	.472595E-01	.468347E-01	.464087E-01	.459813E-01	.455526E-01
440.00	.451226E-01	.446912E-01	.442586E-01	.438247E-01	.433894E-01
450.00	.429528E-01	.425150E-01	.420758E-01	.416354E-01	.411937E-01
460.00	.407507E-01	.403064E-01	.398609E-01	.394141E-01	.389661E-01
470.00	.385168E-01	.380663E-01	.376145E-01	.371616E-01	.367075E-01
480.00	.362523E-01	.357958E-01	.353383E-01	.348796E-01	.344198E-01
490.00	.339590E-01	.334971E-01	.330342E-01	.325702E-01	.321054E-01
500.00	.316395E-01	.311728E-01	.307052E-01	.302368E-01	.297675E-01
510.00	.292975E-01	.288267E-01	.283553E-01	.278832E-01	.274105E-01
520.00	.269373E-01	.264636E-01	.259895E-01	.255149E-01	.250400E-01
530.00	.245649E-01	.240895E-01	.236140E-01	.231385E-01	.226629E-01
540.00	.221873E-01	.217119E-01	.212367E-01	.207617E-01	.202872E-01
550.00	.198131E-01	.193395E-01*2*	.188665E-01*2*	.183943E-01*2*	.179229E-01*2*
560.00	.174524E-01*2*	.169829E-01*2*	.165145E-01*2*	.160474E-01*2*	.155816E-01*2*
570.00	.151172E-01*2*	.146545E-01*2*	.141934E-01*2*	.137341E-01*2*	.132767E-01*2*
580.00	.128214E-01*2*	.123683E-01*2*	.119176E-01*2*	.114693E-01*2*	.110237E-01*2*
590.00	.105808E-01*2*	.101408E-01*2*	.970395E-02*2*	.927031E-02*2*	.884007E-02*2*
600.00	.841340E-02*2*	.799047E-02*2*	.757145E-02*2*	.715653E-02*2*	.674588E-02*2*
610.00	.633971E-02*2*	.593819E-02*2*	.554154E-02*2*	.514995E-02*2*	.476363E-02*2*
620.00	.438280E-02*2*	.400769E-02*2*	.363853E-02*2*	.327556E-02*2*	.291903E-02*2*
630.00	.256921E-02*2*	.222643E-02*2*	.189101E-02*2*	.156337E-02*2*	.124408E-02*2*
640.00	.933983E-03*2*	.634675E-03*2*	.350141E-03*2*	.962594E-04*2*	.136285E-03*2*
650.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
660.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

**** FUNKTION 72 ****

TABELLE DER WERTE DER EIGENSCHAFT VC VON H2CL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: VO IN M3/KG
T (K),PN (N/M2),

T /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	.100334E-02	.100290E-02	.100245E-02	.100200E-02	.100156E-02
340.00	.102095E-02	.102048E-02	.102002E-02	.101956E-02	.101910E-02
380.00	1.00000 *3*	.104870E-02	.104816E-02	.104763E-02	.104709E-02
420.00	1.00000 *3*	.108688E-02	.108626E-02	.108552E-02	.108485E-02
460.00	1.00000 *3*	1.00000 *3*	.113614E-02	.113522E-02	.113432E-02
500.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	.120201E-02	.120065E-02
540.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
580.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
620.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
660.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
700.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
740.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
780.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
820.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
860.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
900.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
940.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

T /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	.100111E-02	.100067E-02	.100023E-02	.999792E-03	.999354E-03
340.00	.101864E-02	.101818E-02	.101773E-02	.101728E-02	.101683E-02
380.00	.104656E-02	.104603E-02	.104550E-02	.104498E-02	.104445E-02
420.00	.108419E-02	.108352E-02	.108286E-02	.108221E-02	.108156E-02
460.00	.113341E-02	.113252E-02	.113163E-02	.113075E-02	.112988E-02
500.00	.119930E-02	.119796E-02	.119664E-02	.119533E-02	.119404E-02
540.00	1.00000 *3*	.129170E-02	.128938E-02	.128709E-02	.128485E-02
580.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
620.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
660.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
700.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
740.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
780.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
820.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
860.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
900.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
940.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

**** FUNKTION 73 ****

TABELLE DER WERTE DER EIGENSCHAFT VP VON H2OL ALS FUNKTION DER
1 ARGUMENTE T ,

DIMENSIONEN: VP IN N/M2
T (K),

T =	+ .0	+ 2.0000	+ 4.0000	+ 6.0000	+ 8.0000
200.00	.330784 *2*	.440170 *2*	.582190 *2*	.765516 *2*	1.00083 *2*
210.00	1.30126 *2*	1.68277 *2*	2.16479 *2*	2.77077 *2*	3.52890 *2*
220.00	4.47294 *2*	5.64313 *2*	7.08717 *2*	8.86154 *2*	11.0326 *2*
230.00	13.6782 *2*	16.8893 *2*	20.7717 *2*	25.4480 *2*	31.0602 *2*
240.00	37.7712 *2*	45.7686 *2*	55.2663 *2*	66.5091 *2*	79.7746 *2*
250.00	95.3772 *2*	113.673 *2*	135.063 *2*	159.999 *2*	188.983 *2*
260.00	222.583 *2*	261.426 *2*	306.215 *2*	357.723 *2*	416.813 *2*
270.00	484.433 *2*	561.631 *2*	649.555	749.470	862.754
280.00	990.921	1135.61	1298.62	1481.89	1687.53
290.00	1917.83	2175.24	2462.43	2782.25	3137.79
300.00	3532.33	3969.43	4452.84	4986.63	5575.08
310.00	6222.80	6934.64	7715.80	8571.75	9508.33
320.00	10531.7	11648.3	12865.0	14189.1	15628.2
330.00	17190.2	18883.6	20717.1	22700.0	24842.0
340.00	27153.2	29644.0	32325.7	35209.5	38307.6
350.00	41632.2	45196.6	49013.9	53098.3	57464.1
360.00	62126.5	67100.8	72403.4	78050.6	84059.8
370.00	90448.5	97235.2	104439.	112078.	120174.
380.00	128746.	137817.	147406.	157538.	168234.
390.00	179519.	191415.	203949.	217144.	231028.
400.00	245626.	260965.	277074.	293979.	311710.
410.00	330297.	349770.	370157.	391492.	413806.
420.00	437130.	461499.	486945.	513502.	541205.
430.00	570089.	600191.	631545.	664190.	698163.
440.00	733501.	770243.	808430.	848098.	889291.
450.00	932048.	976410.	.102242E+07	.107012E+07	.111955E+07
460.00	.117076E+07	.122379E+07	.127868E+07	.133549E+07	.139425E+07
470.00	.145501E+07	.151782E+07	.158272E+07	.164977E+07	.171901E+07
480.00	.179049E+07	.186426E+07	.194037E+07	.201887E+07	.209981E+07
490.00	.218324E+07	.226922E+07	.235779E+07	.244901E+07	.254293E+07
500.00	.263961E+07	.273910E+07	.284146E+07	.294673E+07	.305498E+07
510.00	.316627E+07	.328064E+07	.339816E+07	.351889E+07	.364288E+07
520.00	.377020E+07	.390089E+07	.403503E+07	.417267E+07	.431388E+07
530.00	.445871E+07	.460724E+07	.475951E+07	.491560E+07	.507557E+07
540.00	.523948E+07	.540741E+07	.557940E+07	.575555E+07	.593590E+07
550.00	.612053E+07	.630951E+07	.650291E+07	.670080E+07	.690325E+07
560.00	.711033E+07	.732213E+07	.753870E+07	.776013E+07	.798650E+07
570.00	.821789E+07	.845437E+07	.869603E+07	.894294E+07	.919521E+07
580.00	.945290E+07	.971612E+07	.998495E+07	.102595E+08	.105398E+08
590.00	.108260E+08	.111183E+08	.114166E+08	.117212E+08	.120321E+08
600.00	.123494E+08	.126733E+08	.130038E+08	.133412E+08	.136855E+08
610.00	.140369E+08	.143956E+08	.147616E+08	.151352E+08	.155165E+08
620.00	.159057E+08	.163030E+08	.167085E+08	.171225E+08	.175451E+08
630.00	.179767E+08	.184174E+08	.188675E+08	.193272E+08	.197969E+08
640.00	.202768E+08	.207672E+08	.212684E+08	.217808E+08	.223046E+08*2*
650.00	.228404E+08*2*	.233885E+08*2*	.239493E+08*2*	.245233E+08*2*	.251109E+08*2*
660.00	.257123E+08*2*	.263285E+08*2*	.269598E+08*2*	.276068E+08*2*	.282699E+08*2*

**** FUNKTION 74 ****

TABELLE DER WERTE DER EIGENSCHAFT VT VON H2OL ALS FUNKTION DER
1 ARGUMENTE PN ,

DIMENSIONEN: VT IN K
PN (N/M2),

PN =	+ .0	+ .10000E+06	+ .20000E+06	+ .30000E+06	+ .40000E+06 +
100000.00	372.776	393.375	406.691	416.781	425.006
600000.00	432.002	438.121	443.579	448.521	453.045
1100000.00	457.225	461.116	464.760	468.191	471.435
1600000.00	474.515	477.448	480.250	482.933	485.509
2100000.00	487.987	490.376	492.682	494.912	497.071
2600000.00	499.165	501.198	503.174	505.096	506.968
3100000.00	508.793	510.573	512.311	514.009	515.670
3600000.00	517.294	518.885	520.443	521.970	523.467
4100000.00	524.936	526.378	527.794	529.185	530.552
4600000.00	531.896	533.218	534.519	535.799	537.059
5100000.00	538.301	539.524	540.729	541.917	543.088
5600000.00	544.243	545.382	546.507	547.616	548.711
6100000.00	549.793	550.861	551.916	552.958	553.988
6600000.00	555.006	556.012	557.006	557.990	558.962
7100000.00	559.925	560.876	561.818	562.749	563.671
7600000.00	564.584	565.488	566.382	567.268	568.145
8100000.00	569.014	569.874	570.727	571.572	572.408
8600000.00	573.238	574.060	574.874	575.681	576.482
9100000.00	577.275	578.062	578.843	579.617	580.384
9600000.00	581.145	581.900	582.649	583.368	584.106
10100000.0	584.839	585.565	586.286	587.002	587.713
10600000.0	588.418	589.119	589.814	590.505	591.189
11100000.0	591.870	592.546	593.218	593.884	594.546
11600000.0	595.204	595.857	596.505	597.150	597.790
12100000.0	598.426	599.058	599.686	600.309	600.929
12600000.0	601.545	602.157	602.766	603.370	603.971
13100000.0	604.568	605.161	605.752	606.338	606.920
13600000.0	607.500	608.076	608.648	609.218	609.784
14100000.0	610.346	610.906	611.462	612.016	612.565
14600000.0	613.112	613.656	614.198	614.735	615.270
15100000.0	615.802	616.331	616.858	617.381	617.902
15600000.0	618.420	618.935	619.448	619.957	620.465
16100000.0	620.969	621.471	621.970	622.468	622.961
16600000.0	623.453	623.942	624.430	624.914	625.396
17100000.0	625.875	626.353	626.828	627.301	627.771
17600000.0	628.239	628.705	629.168	629.630	630.089
18100000.0	630.546	631.001	631.454	631.905	632.353
18600000.0	632.800	633.244	633.686	634.127	634.565
19100000.0	635.001	635.436	635.868	636.299	636.727
19600000.0	637.154	637.579	638.001	638.422	638.841
20100000.0	639.259				

**** FUNKTION 75 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON H2OL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: WL IN W/M.K
T (K),PN (N/M2),

T /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	.613819	.614692	.615558	.616418	.617272
340.00	.659751	.660557	.661358	.662153	.662943
380.00	1.00000 *3*	.683964	.684670	.685373	.686074
420.00	1.00000 *3*	.687546	.688220	.688893	.689566
460.00	1.00000 *3*	1.00000 *3*	.673705	.674504	.675301
500.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	.642398	.643574
540.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
580.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
620.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
660.00	.529943E-01	.537274E-01	.546322E-01	.556672E-01	.568265E-01
700.00	.576736E-01	.583747E-01	.591972E-01	.601082E-01	.611005E-01
740.00	.624795E-01	.631731E-01	.639547E-01	.647990E-01	.656992E-01
780.00	.674065E-01	.681088E-01	.688762E-01	.696893E-01	.705426E-01
820.00	.724500E-01	.731721E-01	.739433E-01	.747486E-01	.755834E-01
860.00	.776059E-01	.783557E-01	.791432E-01	.799565E-01	.807919E-01
900.00	.828709E-01	.836543E-01	.844668E-01	.852991E-01	.861486E-01
940.00	.882421E-01	.890633E-01	.899073E-01	.907669E-01	.916397E-01
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

T /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	.618119	.618960	.619795	.620623	.621445
340.00	.663727	.664505	.665277	.666043	.666804
380.00	.686771	.687465	.688157	.688845	.689530
420.00	.690238	.690910	.691581	.692252	.692922
460.00	.676096	.676890	.677682	.678473	.679263
500.00	.644743	.645903	.647055	.648198	.649334
540.00	1.00000 *3*	.595602	.597494	.599363	.601208
580.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
620.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
660.00	.581163E-01	.595513E-01	.611533E-01	.629515E-01	.649821E-01
700.00	.621744E-01	.633351E-01	.645918E-01	.659568E-01	.674453E-01
740.00	.666541E-01	.676657E-01	.687383E-01	.698782E-01	.710936E-01
780.00	.714342E-01	.723649E-01	.733371E-01	.743545E-01	.754220E-01
820.00	.764461E-01	.773370E-01	.782573E-01	.792096E-01	.801971E-01
860.00	.816483E-01	.825254E-01	.834243E-01	.843467E-01	.852945E-01
900.00	.870139E-01	.878950E-01	.887925E-01	.897076E-01	.906419E-01
940.00	.925249E-01	.934222E-01	.943321E-01	.952556E-01	.961937E-01
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

**** FUNKTION 76 ****

TABELLE DER WERTE DER EIGENSCHAFT ZD VON H2CL ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: ZD IN N.S/M2
T (K),PN (N/M2),

T /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	.855041E-03	.854996E-03	.854951E-03	.854906E-03	.854861E-03
340.00	.415163E-03	.415316E-03	.415470E-03	.415623E-03	.415776E-03
380.00	1.00000 *3*	.255865E-03	.256069E-03	.256273E-03	.256477E-03
420.00	1.00000 *3*	.180554E-03	.180777E-03	.181000E-03	.181223E-03
460.00	1.00000 *3*	1.00000 *3*	.138922E-03	.139155E-03	.139388E-03
500.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	.113207E-03	.113448E-03
540.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
580.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
620.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
660.00	.237964E-04	.239152E-04	.240392E-04	.241689E-04	.243049E-04
700.00	.254237E-04	.255353E-04	.256510E-04	.257710E-04	.258957E-04
740.00	.270511E-04	.271564E-04	.272649E-04	.273768E-04	.274923E-04
780.00	.286786E-04	.287782E-04	.288805E-04	.289855E-04	.290934E-04
820.00	.303061E-04	.304007E-04	.304974E-04	.305964E-04	.306978E-04
860.00	.319337E-04	.320237E-04	.321155E-04	.322093E-04	.323049E-04
900.00	.335613E-04	.336472E-04	.337346E-04	.338237E-04	.339143E-04
940.00	.351889E-04	.352711E-04	.353545E-04	.354394E-04	.355256E-04
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

T /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	.854817E-03	.854773E-03	.854728E-03	.854683E-03	.854638E-03
340.00	.415929E-03	.416083E-03	.416236E-03	.416389E-03	.416543E-03
380.00	.256682E-03	.256886E-03	.257090E-03	.257294E-03	.257499E-03
420.00	.181446E-03	.181669E-03	.181892E-03	.182115E-03	.182338E-03
460.00	.139621E-03	.139854E-03	.140087E-03	.140320E-03	.140553E-03
500.00	.113688E-03	.113929E-03	.114169E-03	.114409E-03	.114650E-03
540.00	1.00000 *3*	.965555E-04	.968028E-04	.970500E-04	.972973E-04
580.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
620.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
660.00	.244477E-04	.245982E-04	.247573E-04	.249259E-04	.251052E-04
700.00	.260253E-04	.261603E-04	.263012E-04	.264484E-04	.266025E-04
740.00	.276116E-04	.277350E-04	.278626E-04	.279946E-04	.281315E-04
780.00	.292043E-04	.293182E-04	.294355E-04	.295561E-04	.296803E-04
820.00	.308015E-04	.309078E-04	.310166E-04	.311280E-04	.312422E-04
860.00	.324026E-04	.325022E-04	.326040E-04	.327078E-04	.328139E-04
900.00	.340066E-04	.341006E-04	.341963E-04	.342937E-04	.343930E-04
940.00	.356132E-04	.357022E-04	.357926E-04	.358845E-04	.359779E-04
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

**** FUNKTION 77 ****

TABELLE DER WERTE DER EIGENSCHAFT CP VON H2OV ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: CP IN J/KG.K
T (K),PN (N/M2),

T /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*
300.00	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*
340.00	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*	.000329E-78*3*
380.00	2017.00	2017.00 *3*	2017.00 *3*	2017.00 *3*	2017.00 *3*
420.00	1987.00	1987.00 *3*	1987.00 *3*	1987.00 *3*	1987.00 *3*
460.00	1979.00	2613.00	2613.00 *3*	2613.00 *3*	2613.00 *3*
500.00	1983.00	2353.00	2889.00	2889.00 *3*	2889.00 *3*
540.00	1995.00	2218.00	2522.00	2914.00	3425.00
580.00	2013.00	2154.00	2333.00	2556.00	2826.00
620.00	2035.00	2129.00	2240.00	2374.00	2532.00
660.00	2059.00	2124.00	2199.00	2286.00	2383.00
700.00	2084.00	2133.00	2187.00	2247.00	2312.00
740.00	2111.00	2150.00	2191.00	2235.00	2282.00
780.00	2138.00	2170.00	2203.00	2237.00	2274.00
820.00	2165.00	2192.00	2220.00	2249.00	2279.00
860.00	2192.00	2216.00	2240.00	2265.00	2290.00
900.00	2219.00	2241.00	2262.00	2283.00	2305.00
940.00	2246.00	2265.00	2284.00	2303.00	2322.00
980.00	2273.00	2290.00	2306.00	2323.00	2341.00
1020.00	2299.00	2314.00	2329.00	2345.00	2359.00
1060.00	2325.00	2338.00	2351.00	2365.00	2379.00
1100.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*

T /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*
300.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*
340.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*
380.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*
420.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*
460.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*
500.00	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*	2379.00 *3*
540.00	4124.00	4124.00 *3*	4124.00 *3*	4124.00 *3*	4124.00 *3*
580.00	3152.00	3557.00	4080.00	4790.00	5817.00
620.00	2714.00	2922.00	3163.00	3444.00	3780.00
660.00	2494.00	2619.00	2756.00	2908.00	3076.00
700.00	2385.00	2464.00	2551.00	2645.00	2747.00
740.00	2332.00	2387.00	2445.00	2509.00	2576.00
780.00	2311.00	2352.00	2394.00	2440.00	2487.00
820.00	2308.00	2340.00	2373.00	2408.00	2443.00
860.00	2316.00	2342.00	2368.00	2395.00	2424.00
900.00	2327.00	2349.00	2372.00	2395.00	2419.00
940.00	2341.00	2362.00	2381.00	2401.00	2421.00
980.00	2358.00	2375.00	2393.00	2410.00	2428.00
1020.00	2375.00	2391.00	2406.00	2421.00	2437.00
1060.00	2393.00	2406.00	2420.00	2434.00	2448.00
1100.00	2448.00 *3*	2448.00 *3*	2448.00 *3*	2448.00 *3*	2448.00 *3*

**** FUNKTION 78 ****

TABELLE DER WERTE DER EIGENSCHAFT EH VON H2CV ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: EH IN J/KG
T (K),PN (N/M2),

T /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	.269003E+07	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	.277006E+07	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	.284934E+07	.278699E+07	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	.292854E+07	.288586E+07	.283391E+07	1.00000 *3*	1.00000 *3*
540.00	.300809E+07	.297703E+07	.294150E+07	.290082E+07	.285432E+07
580.00	.308826E+07	.306433E+07	.303825E+07	.300960E+07	.297816E+07
620.00	.316922E+07	.314989E+07	.312953E+07	.310789E+07	.308480E+07
660.00	.325109E+07	.323490E+07	.321822E+07	.320090E+07	.318284E+07
700.00	.333394E+07	.332003E+07	.330589E+07	.329143E+07	.327660E+07
740.00	.341782E+07	.340567E+07	.339341E+07	.338099E+07	.336838E+07
780.00	.350277E+07	.349204E+07	.348125E+07	.347039E+07	.345944E+07
820.00	.358879E+07	.357926E+07	.356970E+07	.356010E+07	.355045E+07
860.00	.367591E+07	.366741E+07	.365889E+07	.365035E+07	.364179E+07
900.00	.376412E+07	.375652E+07	.374892E+07	.374130E+07	.373368E+07
940.00	.385342E+07	.384662E+07	.383982E+07	.383302E+07	.382621E+07
980.00	.394379E+07	.393771E+07	.393163E+07	.392555E+07	.391947E+07
1020.00	.403522E+07	.402978E+07	.402434E+07	.401891E+07	.401347E+07
1060.00	.412767E+07	.412281E+07	.411795E+07	.411309E+07	.410824E+07
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

T /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
540.00	.280047E+07	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
580.00	.294369E+07	.290573E+07	.286346E+07	.281548E+07	.275951E+07
620.00	.306019E+07	.303395E+07	.300599E+07	.297610E+07	.294399E+07
660.00	.316397E+07	.314423E+07	.312366E+07	.310203E+07	.307949E+07
700.00	.326133E+07	.324561E+07	.322938E+07	.321264E+07	.319537E+07
740.00	.335555E+07	.334247E+07	.332912E+07	.331548E+07	.330155E+07
780.00	.344837E+07	.343716E+07	.342582E+07	.341432E+07	.340265E+07
820.00	.354074E+07	.353097E+07	.352112E+07	.351118E+07	.350115E+07
860.00	.363320E+07	.362458E+07	.361591E+07	.360720E+07	.359844E+07
900.00	.372603E+07	.371837E+07	.371069E+07	.370299E+07	.369526E+07
940.00	.381940E+07	.381257E+07	.380574E+07	.379889E+07	.379203E+07
980.00	.391338E+07	.390729E+07	.390120E+07	.389510E+07	.388899E+07
1020.00	.400804E+07	.400260E+07	.399717E+07	.399173E+07	.398629E+07
1060.00	.410338E+07	.409853E+07	.409368E+07	.408883E+07	.408398E+07
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

**** FUNKTION 79 ****

TABELLE DER WERTE DER EIGENSCHAFT ES VON H2OV ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: ES IN J/KG.K
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
340.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
380.00	7398.60		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
420.00	7598.87		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
460.00	7779.17		6565.68		1.00000	*3*	1.00000	*3*	1.00000	*3*
500.00	7944.26		6771.93		6390.99		1.00000	*3*	1.00000	*3*
540.00	8097.31		6947.42		6598.17		6358.91		6160.53	
580.00	8240.53		7103.41		6771.10		6553.41		6382.03	
620.00	8375.51		7246.07		6923.32		6717.34		6559.94	
660.00	8503.46		7378.95		7061.96		6862.75		6713.22	
700.00	8625.33		7504.17		7190.93		6995.94		6851.16	
740.00	8741.86		7623.14		7312.50		7120.36		6978.68	
780.00	8853.64		7736.80		7428.12		7238.02		7098.52	
820.00	8961.20		7845.84		7538.69		7350.17		7212.30	
860.00	9064.92		7950.80		7644.89		7457.64		7321.07	
900.00	9165.18		8052.08		7747.21		7561.00		7425.49	
940.00	9262.25		8150.03		7846.03		7660.71		7526.09	
980.00	9356.39		8244.92		7941.67		7757.11		7623.24	
1020.00	9447.83		8337.00		8034.39		7850.47		7717.26	
1060.00	9536.73		8426.46		8124.41		7941.04		7808.39	
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
340.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
380.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
420.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
460.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
540.00	5977.91		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	6234.17		6098.89		5969.30		5839.73		5704.23	
620.00	6428.57		6312.92		6207.27		6108.03		6012.55	
660.00	6590.86		6485.38		6391.23		6305.04		6224.57	
700.00	6734.12		6634.55		6546.90		6467.82		6395.12	
740.00	6865.02		6769.14		6685.49		6610.73		6542.67	
780.00	6987.18		6893.77		6812.77		6740.82		6675.75	
820.00	7102.67		7011.05		6931.92		6861.93		6798.92	
860.00	7212.76		7122.51		7044.79		6976.26		6914.76	
900.00	7318.27		7229.12		7152.52		7085.13		7024.80	
940.00	7419.77		7331.52		7255.84		7189.39		7130.01	
980.00	7517.68		7430.20		7355.29		7289.62		7231.03	
1020.00	7612.34		7525.52		7451.27		7386.26		7328.33	
1060.00	7704.03		7617.77		7544.08		7479.64		7422.28	
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 80 ****

TABELLE DER WERTE DER EIGENSCHAFT PR VON H2OV ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: PR IN 1
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
340.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
380.00	.983532		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
420.00	.978830		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
460.00	.968452		1.15772		1.00000	*3*	1.00000	*3*	1.00000	*3*
500.00	.957118		1.07165		1.20560		1.00000	*3*	1.00000	*3*
540.00	.946769		1.01600		1.09891		1.19170		1.29312	
580.00	.938101		.981974		1.03216		1.09045		1.15490	
620.00	.930915		.960800		.992677		1.02965		1.07139	
660.00	.924565		.945438		.967602		.992509		1.01922	
700.00	.918669		.933055		.947659		.963387		.979874	
740.00	.913977		.924225		.934057		.944261		.954919	
780.00	.909628		.916896		.923739		.930422		.937849	
820.00	.905627		.910706		.915624		.920570		.925603	
860.00	.901975		.905670		.908970		.912421		.915664	
900.00	.898656		.901367		.903405		.905278		.907415	
940.00	.895652		.896991		.898145		.899191		.900159	
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
340.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
380.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
420.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
460.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
540.00	1.40393		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	1.22430		1.30017		1.38485		1.48159		1.74627	
620.00	1.11665		1.16456		1.21566		1.26955		1.37315	
660.00	1.04915		1.08180		1.11574		1.15143		1.18839	
700.00	.998327		1.01775		1.03874		1.06063		1.08350	
740.00	.966037		.978389		.991063		1.00516		1.01932	
780.00	.944799		.952899		.960884		.969905		.978690	
820.00	.929935		.935182		.940517		.946303		.951715	
860.00	.919117		.922385		.925464		.928730		.932544	
900.00	.909434		.911341		.913518		.915569		.917861	
940.00	.901059		.902661		.903427		.904500		.905491	
980.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1020.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1060.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 81 ****

TABELLE DER WERTE DER EIGENSCHAFT RO VON H2OV ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: RO IN KG/M3
T (K),PN (N/M2),

T /PN	100000.		.110000E+07		.210000E+07		.310000E+07		.410000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
340.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
380.00	.578387		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
420.00	.520482		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
460.00	.473813		5.58955		1.00000	*3*	1.00000	*3*	1.00000	*3*
500.00	.435150		5.01144		10.1291		1.00000	*3*	1.00000	*3*
540.00	.402480		4.57291		9.06048		13.9655		19.4321	
580.00	.374452		4.21924		8.26868		12.5641		17.1584	
620.00	.350117		3.92330		7.63761		11.5115		15.5680	
660.00	.328776		3.66979		7.11259		10.6659		14.3406	
700.00	.309902		3.44912		6.66395		9.95880		13.3389	
740.00	.293087		3.25474		6.27372		9.35234		12.4933	
780.00	.278010		3.08193		5.92994		8.82328		11.7634	
820.00	.264412		2.92713		5.62409		8.35600		11.1236	
860.00	.252086		2.78756		5.34985		7.93934		10.5565	
900.00	.240860		2.66101		5.10229		7.56491		10.0491	
940.00	.230594		2.54570		4.87755		7.22623		9.59186	
980.00	.221168		2.44016		4.67247		6.91814		9.17719	
1020.00	.212485		2.34318		4.48451		6.63647		8.79907	
1060.00	.204458		2.25373		4.31153		6.37782		8.45260	
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

T /PN	.510000E+07		.610000E+07		.710000E+07		.810000E+07		.910000E+07	
260.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
300.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
340.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
380.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
420.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
460.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
500.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
540.00	25.6938		1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*
580.00	22.1203		27.5437		33.5685		40.4201		48.4892	
620.00	19.8346		24.3441		29.1368		34.2637		39.7928	
660.00	18.1490		22.1058		26.2273		30.5322		35.0424	
700.00	16.8105		20.3803		24.0561		27.8465		31.7606	
740.00	15.6997		18.9749		22.3229		25.7477		29.2538	
780.00	14.7519		17.7905		20.8813		24.0263		27.2278	
820.00	13.9278		16.7696		19.6498		22.5697		25.5304	
860.00	13.2017		15.8754		18.5783		21.3109		24.0738	
900.00	12.5551		15.0831		17.6335		20.2065		22.8024	
940.00	11.9745		14.3744		16.7916		19.2263		21.6785	
980.00	11.4497		13.7357		16.0352		18.3483		20.6750	
1020.00	10.9723		13.1562		15.3507		17.5559		19.7717	
1060.00	10.5358		12.6275		14.7276		16.8360		18.9529	
1100.00	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*	1.00000	*3*

**** FUNKTION 82 ****

TABELLE DER WERTE DER EIGENSCHAFT VO VON H2OV ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: VO IN M3/KG
T (K),PN (N/M2),

T /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	1.72895	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	1.92130	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	2.11054	.178905	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	2.29806	.199544	.987253E-01	1.00000 *3*	1.00000 *3*
540.00	2.48460	.218679	.110369	.716051E-01	.514614E-01
580.00	2.67057	.237010	.120938	.795921E-01	.582803E-01
620.00	2.85619	.254888	.130931	.868694E-01	.642343E-01
660.00	3.04158	.272495	.140596	.937564E-01	.697323E-01
700.00	3.22682	.289929	.150061	.100414	.749685E-01
740.00	3.41195	.307244	.159395	.106925	.800428E-01
780.00	3.59700	.324472	.168636	.113337	.850095E-01
820.00	3.78198	.341632	.177806	.119674	.898987E-01
860.00	3.96690	.358737	.186921	.125955	.947288E-01
900.00	4.15178	.375797	.195990	.132189	.995115E-01
940.00	4.33663	.392819	.205021	.138385	.104255
980.00	4.52144	.409809	.214019	.144548	.108966
1020.00	4.70622	.426770	.222990	.150682	.113648
1060.00	4.89098	.443708	.231936	.156793	.118307
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

T /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
540.00	.389198E-01	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
580.00	.452072E-01	.363059E-01	.297898E-01	.247402E-01	.206232E-01
620.00	.504170E-01	.410777E-01	.343209E-01	.291854E-01	.251301E-01
660.00	.550993E-01	.452370E-01	.381282E-01	.327523E-01	.285369E-01
700.00	.594867E-01	.490670E-01	.415694E-01	.359112E-01	.314855E-01
740.00	.636955E-01	.527010E-01	.447970E-01	.388384E-01	.341835E-01
780.00	.677879E-01	.562096E-01	.478897E-01	.416210E-01	.367272E-01
820.00	.717986E-01	.596318E-01	.508910E-01	.443071E-01	.391689E-01
860.00	.757481E-01	.629904E-01	.538261E-01	.469242E-01	.415389E-01
900.00	.796491E-01	.662993E-01	.567103E-01	.494890E-01	.438550E-01
940.00	.835105E-01	.695680E-01	.595535E-01	.520122E-01	.461286E-01
980.00	.873386E-01	.728031E-01	.623629E-01	.545010E-01	.483675E-01
1020.00	.911385E-01	.760099E-01	.651436E-01	.569610E-01	.505773E-01
1060.00	.949142E-01	.791923E-01	.678999E-01	.593964E-01	.527625E-01
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

**** FUNKTION 83 ****

TABELLE DER WERTE DER EIGENSCHAFT VP VON H2OV ALS FUNKTION DER
1 ARGUMENTE T ,

DIMENSIONEN: VP IN N/M2
T (K),

T =	+ .0	+ 2.0000	+ 4.0000	+ 6.0000	+ 8.0000
200.00	.330784 *2*	.440170 *2*	.582190 *2*	.765516 *2*	1.00083 *2*
210.00	1.30126 *2*	1.68277 *2*	2.16479 *2*	2.77077 *2*	3.52890 *2*
220.00	4.47294 *2*	5.64313 *2*	7.08717 *2*	8.86154 *2*	11.0326 *2*
230.00	13.6782 *2*	16.8893 *2*	20.7717 *2*	25.4480 *2*	31.0602 *2*
240.00	37.7712 *2*	45.7686 *2*	55.2663 *2*	66.5091 *2*	79.7746 *2*
250.00	95.3772 *2*	113.673 *2*	135.063 *2*	159.999 *2*	188.983 *2*
260.00	222.583 *2*	261.426 *2*	306.215 *2*	357.723 *2*	416.813 *2*
270.00	484.433 *2*	561.631 *2*	649.555	749.470	862.754
280.00	990.921	1135.61	1298.62	1481.89	1687.53
290.00	1917.83	2175.24	2462.43	2782.25	3137.79
300.00	3532.33	3969.43	4452.84	4986.63	5575.08
310.00	6222.80	6934.64	7715.80	8571.75	9508.33
320.00	10531.7	11648.3	12865.0	14189.1	15628.2
330.00	17190.2	18883.6	20717.1	22700.0	24842.0
340.00	27153.2	29644.0	32325.7	35209.5	38307.6
350.00	41632.2	45196.6	49013.9	53098.3	57464.1
360.00	62126.5	67100.8	72403.4	78050.6	84059.8
370.00	90448.5	97235.2	104439.	112078.	120174.
380.00	128746.	137817.	147406.	157538.	168234.
390.00	179519.	191415.	203949.	217144.	231028.
400.00	245626.	260565.	277074.	293979.	311710.
410.00	330297.	349770.	370157.	391492.	413806.
420.00	437130.	461499.	486945.	513502.	541205.
430.00	570089.	600191.	631545.	664190.	698163.
440.00	733501.	770243.	808430.	848098.	889291.
450.00	932048.	976410.	.102242E+07	.107012E+07	.111955E+07
460.00	.117076E+07	.122379E+07	.127868E+07	.133549E+07	.139425E+07
470.00	.145501E+07	.151782E+07	.158272E+07	.164977E+07	.171901E+07
480.00	.179049E+07	.186426E+07	.194037E+07	.201887E+07	.209981E+07
490.00	.218324E+07	.226922E+07	.235779E+07	.244901E+07	.254293E+07
500.00	.263961E+07	.273910E+07	.284146E+07	.294673E+07	.305498E+07
510.00	.316627E+07	.328064E+07	.339816E+07	.351889E+07	.364288E+07
520.00	.377020E+07	.390089E+07	.403503E+07	.417267E+07	.431388E+07
530.00	.445871E+07	.460724E+07	.475951E+07	.491560E+07	.507557E+07
540.00	.523948E+07	.540741E+07	.557940E+07	.575555E+07	.593590E+07
550.00	.612053E+07	.630951E+07	.650291E+07	.670080E+07	.690325E+07
560.00	.711033E+07	.732213E+07	.753870E+07	.776013E+07	.798650E+07
570.00	.821789E+07	.845437E+07	.869603E+07	.894294E+07	.919521E+07
580.00	.945290E+07	.971612E+07	.998495E+07	.102595E+08	.105398E+08
590.00	.108260E+08	.111183E+08	.114166E+08	.117212E+08	.120321E+08
600.00	.123494E+08	.126733E+08	.130038E+08	.133412E+08	.136855E+08
610.00	.140369E+08	.143956E+08	.147616E+08	.151352E+08	.155165E+08
620.00	.159057E+08	.163030E+08	.167085E+08	.171225E+08	.175451E+08
630.00	.179767E+08	.184174E+08	.188675E+08	.193272E+08	.197969E+08
640.00	.202768E+08	.207672E+08	.212684E+08	.217808E+08	.223046E+08*2*
650.00	.228404E+08*2*	.233895E+08*2*	.239493E+08*2*	.245233E+08*2*	.251109E+08*2*
660.00	.257123E+08*2*	.263285E+08*2*	.269598E+08*2*	.276068E+08*2*	.282699E+08*2*

**** FUNKTION 84 ****

TABELLE DER WERTE DER EIGENSCHAFT VT VON H2CV ALS FUNKTION DER
1 ARGUMENTE PN ,

DIMENSIONEN: VT IN K
PN (N/M2),

PN =	+ .0	+ .10000E+06	+ .20000E+06	+ .30000E+06	+ .40000E+06	+
100000.00	372.776	393.375	406.691	416.781	425.006	
600000.00	432.002	438.121	443.579	448.521	453.045	
1100000.00	457.225	461.116	464.760	468.191	471.435	
1600000.00	474.515	477.448	480.250	482.933	485.509	
2100000.00	487.987	490.376	492.682	494.912	497.071	
2600000.00	499.165	501.198	503.174	505.096	506.968	
3100000.00	508.793	510.573	512.311	514.009	515.670	
3600000.00	517.294	518.885	520.443	521.970	523.467	
4100000.00	524.936	526.378	527.794	529.185	530.552	
4600000.00	531.896	533.218	534.519	535.799	537.059	
5100000.00	538.301	539.524	540.729	541.917	543.088	
5600000.00	544.243	545.382	546.507	547.616	548.711	
6100000.00	549.793	550.861	551.916	552.958	553.988	
6600000.00	555.006	556.012	557.006	557.990	558.962	
7100000.00	559.925	560.876	561.818	562.749	563.671	
7600000.00	564.584	565.488	566.382	567.268	568.145	
8100000.00	569.014	569.874	570.727	571.572	572.408	
8600000.00	573.238	574.060	574.874	575.681	576.482	
9100000.00	577.275	578.062	578.843	579.617	580.384	
9600000.00	581.145	581.900	582.649	583.368	584.106	
10100000.0	584.839	585.565	586.286	587.002	587.713	
10600000.0	588.418	589.119	589.814	590.505	591.189	
11100000.0	591.870	592.546	593.218	593.884	594.546	
11600000.0	595.204	595.857	596.505	597.150	597.790	
12100000.0	598.426	599.058	599.686	600.309	600.929	
12600000.0	601.545	602.157	602.766	603.370	603.971	
13100000.0	604.568	605.161	605.752	606.338	606.920	
13600000.0	607.500	608.076	608.648	609.218	609.784	
14100000.0	610.346	610.906	611.462	612.016	612.565	
14600000.0	613.112	613.656	614.198	614.735	615.270	
15100000.0	615.802	616.331	616.858	617.381	617.902	
15600000.0	618.420	618.935	619.448	619.957	620.465	
16100000.0	620.969	621.471	621.970	622.468	622.961	
16600000.0	623.453	623.942	624.430	624.914	625.396	
17100000.0	625.875	626.353	626.828	627.301	627.771	
17600000.0	628.239	628.705	629.168	629.630	630.089	
18100000.0	630.546	631.001	631.454	631.905	632.353	
18600000.0	632.800	633.244	633.686	634.127	634.565	
19100000.0	635.001	635.436	635.868	636.299	636.727	
19600000.0	637.154	637.579	638.001	638.422	638.841	
20100000.0	639.259					

**** FUNKTION 85 ****

TABELLE DER WERTE DER EIGENSCHAFT WL VON H2OV ALS FUNKTION DER
2 ARGUMENTE T ,PN ,

DIMENSIONEN: WL IN W/M.K
T (K),PN (N/M2),

T /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	.252610E-01	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	.283489E-01	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	.318964E-01	.343573E-01	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	.357397E-01	.373536E-01	.401299E-01	1.00000 *3*	1.00000 *3*
540.00	.398030E-01	.409787E-01	.427875E-01	.452485E-01	.486015E-01
580.00	.440470E-01	.449828E-01	.463042E-01	.479653E-01	.500122E-01
620.00	.484489E-01	.492521E-01	.503069E-01	.515634E-01	.530258E-01
660.00	.529943E-01	.537274E-01	.546322E-01	.556672E-01	.568265E-01
700.00	.576736E-01	.583747E-01	.591972E-01	.601082E-01	.611005E-01
740.00	.624795E-01	.631731E-01	.639547E-01	.647990E-01	.656992E-01
780.00	.674065E-01	.681088E-01	.688762E-01	.696893E-01	.705426E-01
820.00	.724500E-01	.731721E-01	.739433E-01	.747486E-01	.755834E-01
860.00	.776059E-01	.783557E-01	.791432E-01	.799565E-01	.807919E-01
900.00	.828709E-01	.836543E-01	.844668E-01	.852991E-01	.861486E-01
940.00	.882421E-01	.890633E-01	.899073E-01	.907669E-01	.916397E-01
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

T /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
540.00	.533800E-01	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
580.00	.525493E-01	.557567E-01	.599400E-01	.656382E-01	.738846E-01
620.00	.547203E-01	.566923E-01	.590087E-01	.617629E-01	.650824E-01
660.00	.581163E-01	.595513E-01	.611533E-01	.629515E-01	.649821E-01
700.00	.621744E-01	.633351E-01	.645918E-01	.659568E-01	.674453E-01
740.00	.666541E-01	.676657E-01	.687383E-01	.698782E-01	.710936E-01
780.00	.714342E-01	.723649E-01	.733371E-01	.743545E-01	.754220E-01
820.00	.764461E-01	.773370E-01	.782573E-01	.792096E-01	.801971E-01
860.00	.816483E-01	.825254E-01	.834243E-01	.843467E-01	.852945E-01
900.00	.870139E-01	.878950E-01	.887925E-01	.897076E-01	.906419E-01
940.00	.925249E-01	.934222E-01	.943321E-01	.952556E-01	.961937E-01
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

**** FUNKTION 86 ****

TABELLE DER WERTE DER EIGENSCHAFT ZD VON H2OV ALS FUNKTION DER
2 ARGUMENTE TK ,PN ,

DIMENSIONEN: ZD IN N.S/M2
TK (K),PN (N/M2),

TK /PN	100000.	.110000E+07	.210000E+07	.310000E+07	.410000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	.123178E-04	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	.139652E-04	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	.156090E-04	.152224E-04	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	.172502E-04	.170124E-04	.167465E-04	1.00000 *3*	1.00000 *3*
540.00	.188894E-04	.187711E-04	.186438E-04	.185047E-04	.183497E-04
580.00	.205268E-04	.205069E-04	.204858E-04	.204631E-04	.204384E-04
620.00	.221630E-04	.222271E-04	.222940E-04	.223640E-04	.224373E-04
660.00	.237964E-04	.239152E-04	.240392E-04	.241689E-04	.243049E-04
700.00	.254237E-04	.255353E-04	.256510E-04	.257710E-04	.258957E-04
740.00	.270511E-04	.271564E-04	.272649E-04	.273768E-04	.274923E-04
780.00	.286786E-04	.287782E-04	.288805E-04	.289855E-04	.290934E-04
820.00	.303061E-04	.304007E-04	.304974E-04	.305964E-04	.306978E-04
860.00	.319337E-04	.320237E-04	.321155E-04	.322093E-04	.323049E-04
900.00	.335613E-04	.336472E-04	.337346E-04	.338237E-04	.339143E-04
940.00	.351889E-04	.352711E-04	.353545E-04	.354394E-04	.355256E-04
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*

TK /PN	.510000E+07	.610000E+07	.710000E+07	.810000E+07	.910000E+07
260.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
300.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
340.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
380.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
420.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
460.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
500.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
540.00	.181721E-04	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
580.00	.204112E-04	.203805E-04	.203450E-04	.203024E-04	.221802E-04
620.00	.225141E-04	.225947E-04	.226793E-04	.227675E-04	.236424E-04
660.00	.244477E-04	.245982E-04	.247573E-04	.249259E-04	.251052E-04
700.00	.260253E-04	.261603E-04	.263012E-04	.264484E-04	.266025E-04
740.00	.276116E-04	.277350E-04	.278626E-04	.279946E-04	.281315E-04
780.00	.292043E-04	.293182E-04	.294355E-04	.295561E-04	.296803E-04
820.00	.308015E-04	.309078E-04	.310166E-04	.311280E-04	.312422E-04
860.00	.324026E-04	.325022E-04	.326040E-04	.327078E-04	.328139E-04
900.00	.340066E-04	.341006E-04	.341963E-04	.342937E-04	.343930E-04
940.00	.356132E-04	.357022E-04	.357926E-04	.358845E-04	.359779E-04
980.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1020.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1060.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*
1100.00	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*	1.00000 *3*