

## Technical Description and Specification of Supply

### Item. 1 1 pcs. Axial-Converter I.D.-Fan, TLT-Type G 125 / 188

Axial-Impulse Fan with suction box and diffuser, supported on both sides, on an elevated concrete foundation, controlled by an electric-motor with variable frequency converter (Motor and FC-Drive is scope of Samyoung).

#### Design Data per Fan :

Mass flow (based on 132.000 Nm <sup>3</sup> /h, wet).....	107.8	kg/s
Volume flow at inlet conditions (humid).....	159.2	m <sup>3</sup> /s
Temperature at inlet conditions .....	180	°C
Max. temperature (mechanical design / peaks) .....	200/250	°C
Density at standard conditions (humid).....	1,154	kg/m <sup>3</sup>
Density at inlet conditions (humid).....	0,677	kg/m <sup>3</sup>
Barometric pressure (average).....	101.300	Pa
Pressure at fan inlet (absolut).....	98.685	Pa
Pressure loss according to inquiry .....	8.400	Pa
Additional losses .....	0	Pa
Total pressure increase .....	8.400	Pa
Efficiency .....	76,0	%
Power requirement at the fan shaft .....	1708	kW
Fan speed .....	2.065	r.p.m.
Max. speed for impeller (mechanical design).....	1.575	r.p.m.
Moment of inertia of rotating mass (0,25 x GD <sup>2</sup> ) .....	650	kg m <sup>2</sup>
Recommended power of the drive motor .....	790	kW
Speed of the drive motor (with frequency converter) .....	1,800	r.p.m

We guarantee the stated power requirement at fan shaft in accordance with the VDI 2044 - „Fan Regulations“, as well as DIN 24166 assuming undisturbed flow conditions at the fan inlet and outlet.

The Pressure-Calculation for the “pressure surge protected” ID-Fan will be done for a designpressure above the atmosphere 1,5 bar abs, with a short-time temperature design for 250 °C.

The performance of the gas-tightness of the whole ID-Fan-Housing will be checked in our workshop in Bad Hersfeld before assembly with 1,5 bar abs with compressed air acc. to TLT-MB 187-024-01, which is similar to DIN 3230 – BE, Page 3.

**The Main Motor and the VVVF-Drive (supplied by PTAT or Others) must be locked at max. 2.075 rpm!!!**

#### Annexes:

Characteristic Curve	KLN	-	107698
Table	TAB	-	107698
Octav Band Analysis	OAN	-	107698
Starting Torque Curve	ANM	-	107698



TURBO-LUFTTECHNIK  
4200 OBERHAUSEN

Kennlinien / Performance curves  
Regelung durch Drehzahl  
Control by variable speed

Projekt - Nr. / Project - No:

107698

Kunde / Customer:

VAI Gwangyang

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Enst. aus PV590-226 11.06.03 Storm

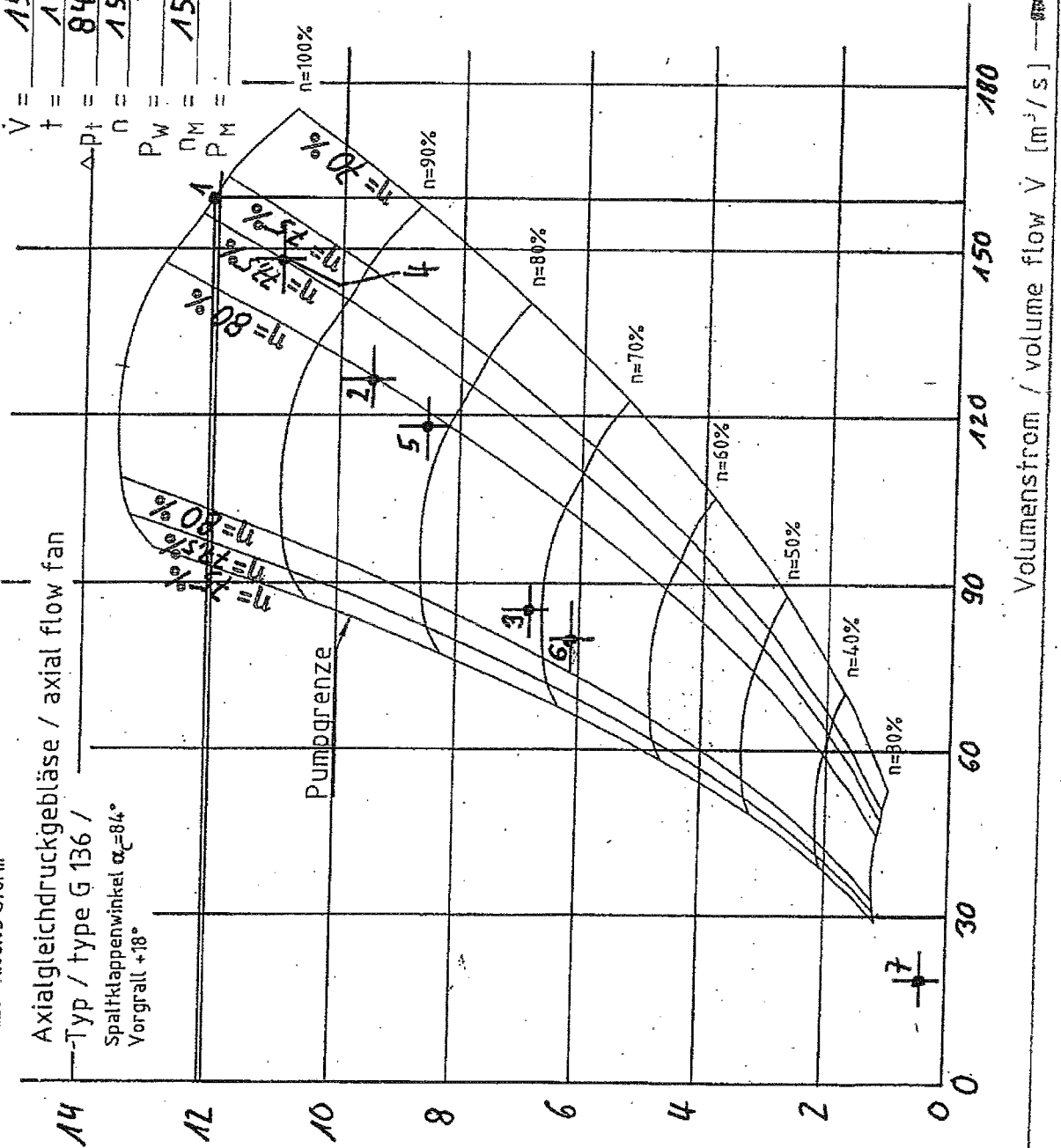
Axialgleichdruckgebläse / axial flow fan

Typ / type G 136 /

Spaltklappenwinkel  $\alpha_c = 84^\circ$

Vorgrall  $+18^\circ$

$V = 159.2$  m<sup>3</sup>/s  
 $t = 180$  °C  
 $\Delta p_t = 8400$  Pa  
 $n = 1575$  1/min  
 $P_w = 1575$  kW  
 $n_M = 1575$  1/min  
 $P_M =$  kW



X10<sup>3</sup>

Totaldruckerhöhung / total pressure increase  $\Delta p_t$  [Pa]  
spez. Förderarbeit / specific delivery work  $\gamma$  [J/kg]

Date: 12.03.08

Name: [Signature]

Verwendungszweck:

Application: Converter Waste Gas Fan

TLT - Nr. / TLT - No:

KLN - 21619

Volumenstrom / volume flow  $V$  [m<sup>3</sup>/s]

TLT-Turbo GmbH		Table to the Convert.Waste Gas Fan Type 136 / 188				Com.-No. 107698 Cust. VAI Gwangyang	
Dpt IVO	12.03.2008	Control by Speed				TAB-No. 21619	
Name : Unger						Sheet 1 of 2	
Impeller diameter	1884 mm	Cross sec. suc. box	IN	4.40	m <sup>2</sup>		
Recomm. motor power	2050 kW	Cross sec. housing	IN		m <sup>2</sup>		
Motor speed	1575 1/min	Cross sec. housing	OUT		m <sup>2</sup>		
Barometric pressure	1013 mbar	Cross sec. diffusor	OUT	4.41	m <sup>2</sup>		
Load							
Point		1	2	3	4	5	6
Mass flow kg/s		107.8	86.6	59.4	107.8	86.6	59.4
Volume flow Sm <sup>3</sup> /h		336391	271108	184707	336434	271108	184707
Volume flow Am <sup>3</sup> /s		159.2	127.1	85.8	148.6	118.6	80.1
Temperature ss deg C		180	180	180	150	150	150
pl inquiry Pa		8400	6600	4800	8200	6400	4600
Total press. Pa		8400	6600	4800	8200	6400	4600
pa absolute Pa		98685	99625	100555	98745	99665	100565
Density (std) kg/m <sup>3</sup>		1.154	1.150	1.157	1.154	1.150	1.157
Density (act) kg/m <sup>3</sup>		0.677	0.681	0.692	0.726	0.730	0.741
Compress-fact. -		0.971	0.977	0.983	0.972	0.978	0.984
Density (aver) kg/m <sup>3</sup>		0.698	0.697	0.704	0.747	0.747	0.753
Spec. energy J/kg		12041	9464	6821	10977	8572	6108
Efficiency %		76.0	80.0	80.0	77.5	80.0	80.0
Power at shaft kW		1708	1025	506	1528	928	453
Speed rpm		1575	1355	1135	1495	1292	1070
Temperature ds deg C		194	190	188	163	159	157
Platz-Nr. 839							

TLT-Turbo GmbH		Table to the Convert.Waste Gas Fan Type 136 / 188				Com.-No. 107698 Cust. VAI Gwangyang	
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Name : Unger						Sheet 2 of 2	
Impeller diameter	1884 mm	Cross sec. suc. box	IN	4.40	m <sup>2</sup>		
Recomm. motor power	2050 kW	Cross sec. housing	IN		m <sup>2</sup>		
Motor speed	1575 1/min	Cross sec. housing	OUT		m <sup>2</sup>		
Barometric pressure	1013 mbar	Cross sec. diffusor	OUT	4.41	m <sup>2</sup>		
Load							
Point	7	8	9	10	11	12	
Mass flow kg/s	21.3						
Volume flow Sm <sup>3</sup> /h	60000						
Volume flow Am <sup>3</sup> /s	19.1						
Temperature ss deg C	40						
pl inquiry Pa	500						
Total press. Pa	500						
pa absolute Pa	101125						
Density (std) kg/m <sup>3</sup>	1.280						
Density (act) kg/m <sup>3</sup>	1.114						
Compress-fact. -	0.998						
Density (aver) kg/m <sup>3</sup>	1.116						
Spec. energy J/kg	448						
Efficiency %	10.0						
Power at shaft kW	96						
Speed rpm	160						
Temperature ds deg C	44						
Platz-Nr. 839							



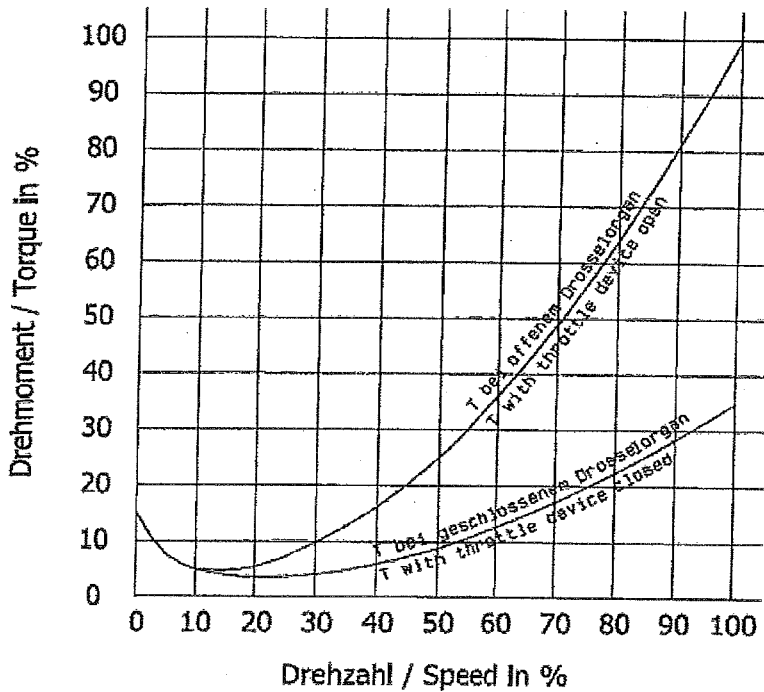
# ANLAUF-KURVE

ID Fan

# STARTUP-CURVE

Type: G136/188

T = 10356 (0° C) 17184 Nm



$$T = \frac{9550 \times P_W}{N_G}$$

T: Drehmoment bezogen auf die Gebläse-Auslegung und NG.

T: Torque referring to fan design with NG.

GEBLÄSE-AUSLEGUNG: FAN DESIGN:				EMPFOHLENE MOTORDATEN: RECOMMENDED MOTORDATA:	
V =	159,2	( ) 159,2	m <sup>3</sup> / s	PM =	2050 kW
PT =	8400	( ) 13938	PA	NM =	1575 1 / min
T =	180	( ) 0	°C		
NG =	1575	( ) 1575	1 / min		
P <sub>w</sub> =	1708	( ) 2834	kW		
<b>Massenträgheitsmoment</b> Mass moment of inertia					
I =	650	( )	kgm <sup>2</sup>		
<b>(0,25 x GD<sup>2</sup>)</b>					

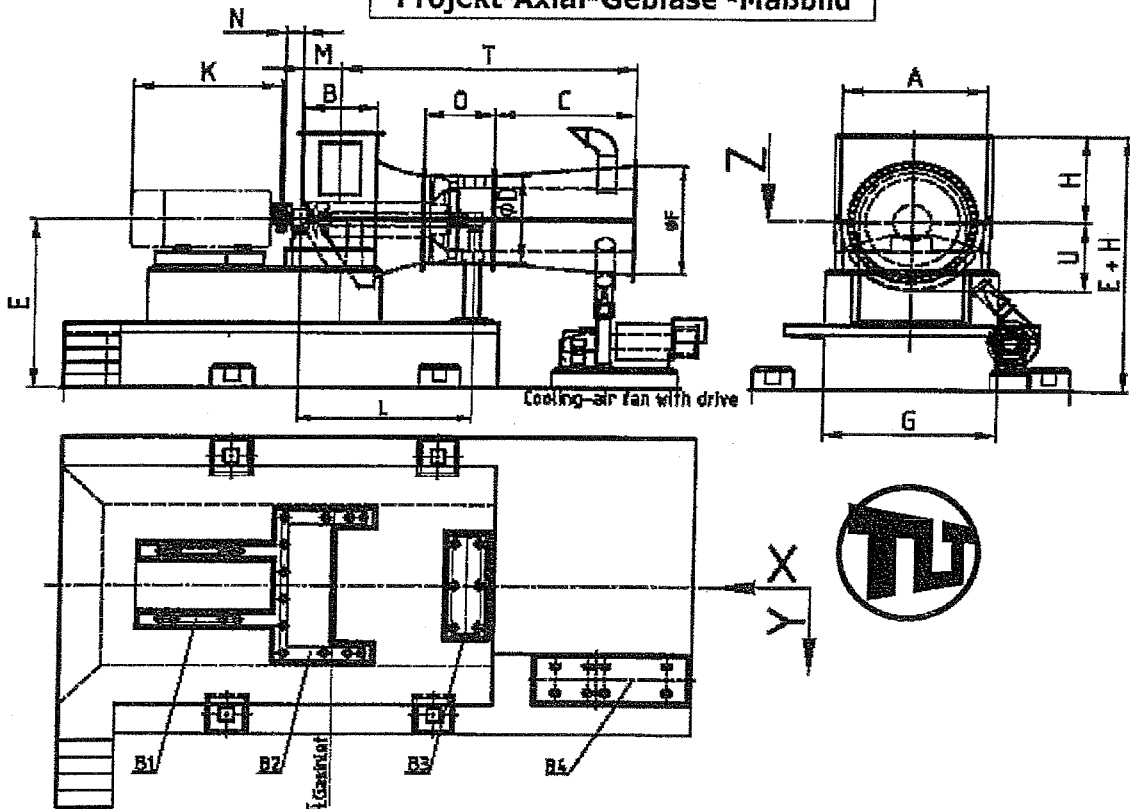
Alle Klammerwerte gelten für das Anfahren mit kaltem Fördermedium.  
All values in brackets refer to the start-up with cold gas.

Die entgültige Motorauslegung muß der Motorhersteller unter Berücksichtigung des genannten Massenträgheitsmoment und der Art des Anlaufes vornehmen. Bei Übersetzungen zwischen NM und NG ist I entsprechend umzurechnen.

The final motor design has to be carried out by the motor manufacturer considering the stated mass moment of inertia and kind of starting. In case of a transmission between NM and NG the mass moment of inertia has to be converted respectively.

Anfrage-Nr.:	107698	Datum	12 03 08	TLT-Turbo GmbH
Zeichnungs-	PMB-21621	Abteilung:	IO	Havensteinstraße 46
Gegenstand	Axial-Fan	Name:	Unger	D-46045 Oberhausen
Firma:	VAI Gwangyang			

# Projekt-Axial-Gebläse - Maßbild



Maße (mm)	
D =	1884
A =	2920
B =	1507
C =	2826
E =	3391
F =	2355
G =	3485
H =	1884
K =	3542
L =	3454
M =	754
N =	452
O =	1377
T =	5861
U =	1460

Gebläsedaten	
Type:	G136/188
Medium:	Gas
V =	159,2 m <sup>3</sup> /s
t =	180 °C
q =	0,677 kg/m <sup>3</sup>
delta Pst =	8400 Pa
delta Pt =	8400 Pa
Y =	12041 J/kg
nW =	1575 1/min
PW =	1708 kw
nM =	1575 1/min
PM =	2050 kw

Gewichte (kg)	
Rotor:	3510
Saugkasten:	2510
Vorleitapparat:	1750
Gehäuse:	1000
Nachleitapparat:	1250
Diffusor:	3010
Unterbau:	1250
Isolierung:	5010
Kühlluftgebläse:	300
Motor:	6270

Max. Last aus ruhenden Lasten, Betriebslasten und Störfällen Alle Werte in kN (10 kn = 1000 kg = 1 t)					
Fundament- bereich	Gebläse in Betrieb				
	X	Y	Z	Wz	Wy
B1					
B2					
B3					
B4					

Anfrage-Nr.:	107698	Datum	12. 3. 2008
Zeichnungs-Nr.:	PMB-21623	Abteilung:	IO
Gegenstand:	Axial-Fan	Name:	Unger
Firma:	VAI Gwangyang		

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