

ATLAS COPCO ENERGAS
GMBH

50999 Köln Deutschland

Atlas Copco

Bauart / Type

HL806-4-75

Serien-Nr. / Serial-No.

14-2275

Auftrags-Nr. / Supply order No.

57237318

Baujahr / Year build

2005

Volumenstrom / Capacity

15563

m³/h

Druck / Pressure

bar (a)

Leistung / Power

1700

kW

Drehzahl / Speed

1/min

Auslegungsdruck / Design pressure

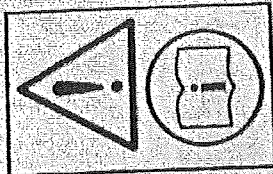
12

bar (a)

Auslegungstemp. / Design temp.

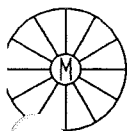
150

°C



0525

Made in Germany



ATLAS COPCO ENERGAS GMBH KÖLN GILT :

Freimaßtoleranzen nach Merknorm 010.50.0 FF.
Oberflächenangaben nach Merknorm 033.00.0 FF.

Note Hinweis	Modified from Beschreibung der Änderung (Kurztext)	Date Datum	Intr. Name	Note Hinweis	Modified from Beschreibung der Änderung (Kurztext)	Date Datum	Intr. Name
0	-	-	-				

Für Maschinen innerhalb der EG
und nach DGRL ab der Kategorie II

		ATLAS COPCO ENERGAS	
		GMBH	
		50999 Köln Deutschland	
Bauart / Type	HL806-4-75		
Serien.Nr. / Serial-No.	14-2275		
Auftrags-Nr. / Supply order No.	57237318		
Baujahr / Year build	2005		
Volumenstrom / Capacity	15563	m ³ /h	 
Druck / Pressure	7,3	bar(a)	
Leistung / Power	1700	kW	0525
Drehzahl / Speed	19644/30191	1/min	
Auslegungsdruck / Design pressure	12	bar(a)	
Auslegungstemp. / Design temp.	150	°C	
Made in Germany			

weitere Maschinen-Nr.: 14-2276

Zeichnung darf nur mit dem CAD-System geändert werden !

Tolerances, if not indicated, according to: Toleranzen, falls nicht angegeben, gemäß: ATLAS COPCO STANDARD/Klasse/Class *		Machined surface Oberflächenbearbeitung		Secrecy class Sicherheitsklasse
		1350K/		1102 K/
Name Benennung		TYPENSCHILD (DGRL ab Kat. II) Deutsch/Englisch		Material-class Materialklasse
Material Werkstoff		CRN1		56900
				CAD
 Atlas Copco Energas GmbH Köln/Cologne		Scale Maßstab 1:1.0	6970308953 1 20-05-05 0 Drawn Gezeichnet PT4 RSchmidt	Compare Entstanden aus
Transferred fr Erhalten von		Blank wt. Rohgewicht 6970308953 1 kg	Finished wt. Fertigsgewicht 1350K/760 kg	Designation/Zeichnungs-Nr.
Design chd. Ausf. gepr. .		Prod. chd. Produkt gepr.	Date Datum 20-MAY-2005	Drq Owner Zchg Eigent. ENG
			6970308953	Blatt/Sheet () 1/1

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QUALITÄTSKONTROLLEBescheinigung
Certificate

EN 10204

-2.1	[]	-3.1	[X]
-2.2	[]	-3.2	[]

Atlas Copco

Werksbescheinigung über durchgeführte Prüfungen

Certificate for inspections carried out

AC-Auftr.-Nr. 57237318 AC Supply Order No.		Kennwort: Asu Kosice Code word:	Maschinen-Nr. 14-2275 Machine No.
Menge Quantity	Benennung Designation	Teile-Nr. Part No.	
1	Turboverdichter Turbocompressor	6970301490	

Diese(s) Teil(e) wurde(n) in unserem Werk folgenden Prüfungen unterzogen:

Above part(s) was/were submitted to following tests at our factory:

- | | |
|---|--|
| ☐ Allgemeine Sichtkontrolle
Generell visual inspection | ☐ Sauberkeit Sichtkontrolle
Cleanliness visual inspection |
| ☐ Sauberkeit Wischprobe
Cleanliness white glove test | ☐ Öl- und Fettfrei
Oil- and grease free |
| ☐ Anstrich (Sichtkontrolle)
Painting (Visual inspection) | ☐ Anstrich Farbnummer _____
Painting colour code _____ |
| ☐ Maßkontrolle (Haupt- und Anschlußmaße)
Dimensional check (Main-/connection dimens.) | ☐ Prüfung nach P+I-Schema
Check according to P+I drawing |
| ☐ Elektrischer Funktionstest
Electrical function check | ☐ Mechanischer Funktionstest
Mechanical function check |
| ☒ Vollständigkeit und Versandkontrolle der Lieferung
Completeness and readiness for dispatch | ☐ Lagersichtkontrolle nach dem Probelauf
Bearing inspection after test run |
| ☐ Verpackung
Packing | ☐ Dokumentationskontrolle
Documentation review |
- ☐ Farbanstrich ist entsprechend unserer Werknorm WN 033.20.1/033.20.2/033.20.3 ausgeführt.
Painting has been carried out according to Works Standard WN 033.20.1/033.20.2/033.20.3

Bemerkung:
Remarks:Prüfergebnis: Keine Beanstandungen
Test result: No objections

Ort/Place: D-50999 Köln (Sürth)

ATLAS COPCO ENERGAS GMBH

Datum/Date:

S. Kuthke
19.07.05Prüfer
ExaminerAbnahmebeauftragter
Purchasers's InspectorWerkssachverständiger
Works SurveyorAtlas Copco
Energias GmbH
Quality Control



TEST PROCEDURE FOR TURBOCOMPRESSOR LUBE-OIL-SYSTEM **TESTBESCHREIBUNG TURBOVERDICHTER-SCHMIERÖLSYSTEM**

-CLEANING PROCEDURE / FUNCTIONAL TEST / PRESERVATION- **-REINIGUNGSPROZEDUR / FUNKTIONSTEST / KONSERVIERUNG-**

ACE ORDER NO.	572 3 7318
ACE CODE	ASU Kosice
ACE MACHINE TYPE	HL8-4-75
ACE MACHINE NO.	14- 2275
QUANTITY	1
CUSTOMER	Air Liquide AGS GmbH
CUSTOMER ORDER NO.	Z13/4500024048

Remarks: Bemerk.:					
00	23.11.04	Beckers			
REVISION	DATE	ORIG		Forwarded on	Received
				CONTRACT COORDINATOR	
				CLIENT APPROVAL	

Freigabe WET
13. Juli 2005
 Name: *[Signature]*

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1. General / Allgemeines

This document describes the test procedure for proving the correct function of the lubrication oil system that is in the scope of supply together with the Atlas Copco Turbocompressor of above mentioned order. Furthermore the test includes the cleaning procedure prior to testing and the preservation of all inner parts that get in contact with the oil during testing. The tests are carried out in Atlas Copco work shop, they are generally internal. A customer-witnessed test is as an option possible.

Das vorliegende Dokument beschreibt die Testprozeduren zum Nachweis der ordnungsgemäßen Funktion des Schmierölsystems, das im Lieferumfang des Turboverdichters o. g. Auftrages enthalten ist. Die Tests beinhalten ebenfalls die Reinigungsprozeduren vor Testbeginn, sowie die Konservierung aller mit Öl benetzten Teile des Systems. Die Tests werden im Atlas Copco Werk durchgeführt, und sind generell intern. Eine Abnahme durch Kundenvertreter ist optional möglich.

2. Mechanical preparations / Vorbereitung mechanisch

ACTIVITY TÄTIGKEIT			Date/ Datum	Done by/ Erledigt von
Setup includes job main motor Aufbau inklusive original Hauptmotor	Yes/Ja	No/Nein	8.7.05	<i>Druck</i>
	X			
Visual check of job oil filter system, filter cartridge OK Visuelle Kontrolle Auftragsölfiltereinheit, Filtereinsatz OK ?	Yes/Ja	No/Nein	8.7.05	<i>Druck</i>
	X			
Oil filling up to MIN sign (Test bed oil) Type/Typ: Öl Einfüllen bis Marke MIN (Prüffeldöl)	VG 32	VG 46	8.7.05	<i>Druck</i>
		X		
Installation of instrument air as additional seal gas (if necessary) Anschluss Prüffeldinstrumentenluft als Fremdsperrgas (falls erforderlich)			/	/
Visual check of mounting direction of non-return valves (if accessible from outside) Visuelle Kontrolle der Einbaurichtung der Rückschlagklappen (wenn von außen zugänglich)			8.7.05	<i>Druck</i>
Check of order related P & I diagram Kontrolle des auftragsbezogenen P & I Diagramms (Soll-Ist)			8.7.05	<i>Druck</i>

Cleaning of oil piping downstream of filter(s) by / Reinigung der Ölleitung nach Filter durch:

Installation of additional filter sieve (50µm) at the gearbox inlet flange Montage Zusatzsieb (50µm) am Getriebeeintrittsflansch OR / ODER	8.7.05	<i>Druck</i>
Installation of flexible pipe from gearbox inlet flange back to oil tank Montage Rücklaufschlauch von Getriebeeintrittsflansch zurück zum Öltank OR / ODER	/	/
Removal of piping, flushing and cleaning by hand Demontage der Ölleitung, Spülen und Reinigen von Hand		

3. Electrical preparations / Vorbereitung elektrisch

ACTIVITY TÄTIGKEIT	Date/ Datum	Done by/ Erledigt von
Connection of oil heater to test bed power line Anschluss Ölheizung, elektrisch an Prüffeldnetz	8.7.05	R. Jülle
Functional test of oil heater regarding warming up, short circuit, etc. Funktionsprüfung Ölheizung auf Erwärmung, Kurzschluss, etc.	8.7.05	R. Jülle
Connection of oil demistor to test bed power line Anschluss Öldemistor, elektrisch an Prüffeldnetz	8.7.05	R. Jülle
Functional test of oil demistor regarding turning direction, short circuit, etc. Funktionsprüfung Öldemistor auf Drehrichtung, Kurzschluss, etc.	8.7.05	R. Jülle
Connection of auxiliary oil pump to test bed power line Anschluss Hilfsölpumpe, elektrisch an Prüffeldnetz	8.7.05	R. Jülle
Connection of oil inlet temperature measurement: Job probe ? Anschluss Ölvorlauftemperaturmessung: Originalfühler ?	Yes/Ja No/Nein 8.7.05	Invent
Connection of oil inlet pressure measurement: Job probe ? Anschluss Ölvorlauf-Druckmessung: Originalgerät ?	Yes/Ja No/Nein 8.7.05	Invent

4. Oil system operation tests / Ölsystem Betriebstests

ACTIVITY TÄTIGKEIT	Date/ Datum	Done by/ Erledigt von
Start up of auxiliary oil pump Einschalten Hilfsölpumpe	8.7.05 10:00	Invent
Visual tightness and leakage check of oil pipes, filter(s), cooler(s) Visuelle Leckagekontrolle, Rohrleitungen, Ölkühler, Auftragsölfiltereinheit	8.7.05	Invent
Adjustment oil inlet pressure to nominal pressure approx. 2.0 barg Einstellung Ölvorlaufdruck auf Nenndruck ca. 2.0 barg	8.7.05	Invent
Flushing time, minimum 2 hours Spülvorgang, mind. 2 Stunden	Stop at 12:15 8.7.05	Invent
Stop of auxiliary oil pump, removing of additional filter sieve or flexible pipe (assembly of "filter downstream" piping respectively) Abschalten Hilfsölpumpe und Demontage Zusatzsieb oder Rücklaufschlauch (bzw. Montage der „nach-Filter“ Ölleitung)	8.7.05	Invent
Start up of auxiliary oil pump (with gearbox connected) Einschalten Hilfsölpumpe (Getriebe angeschlossen)	8.7.05	Invent

Adjustment oil inlet pressure to maximum by closing of relieve valve, recording of pressure Einstellung Ölvorlaufdruck auf Maximaldruck (Überdruck Bypass schließen) und Druck notieren	Max. pressure Maximaldruck [barg]	4,0	8.7.05	Inzel
Visual tightness and leakage check of oil pipes, filter(s), cooler(s) Visuelle Leakagekontrolle, Rohrleitungen, Ölkühler, Auftragsölfiltereinheit			8.7.05	Inzel
Recording of oil inlet temperature Ölvorlauftemperatur notieren	Oil temperature Öltemperatur [°C]	33,2	8.7.05	Inzel
Adjustment oil inlet pressure to nominal pressure approx. 2.0 barg, recording of pressure Einstellung Ölvorlaufdruck auf Nenndruck 2.0 barg und Druck notieren	Oil pressure Öldruck [barg]	2,0	8.7.05	Inzel
Switch of oil filters in case of double filter unit Umschalten der Doppelölfiltereinheit (falls vorhanden)			8.7.05	Inzel
Switch of oil coolers in case of double cooler unit Umschalten der Doppelölkühlereinheit (falls vorhanden)			/	/
Visual check of oil flow to gear box over inspection covers (oil feeding) Kontrolle Ölfluss zum Getriebe über Revisionsdeckel (Ölduschen, wenn Deckel vorhanden)			8.7.05	Inzel

5. Standstill-tests after operation / Stillstandstests nach Betrieb

ACTIVITY TÄTIGKEIT	Date/ Datum	Done by/ Erledigt von
Visual check of job oil filter system, open and cleaning of filter cartridge Visuelle Kontrolle Auftragsölfiltereinheit, Filtereinsatz herausnehmen und reinigen (wenn möglich)	11.7.05	Lenz
Check of oil filling in suction pipe of main oil pump (e.g. open flange) Kontrolle Ölfüllstand in Saugleitung Hauptölpumpe (z.B. Flansch öffnen)	11.7.05	Lenz
Remove oil out of the pipes with pressurized air Ausblasen der Rohrleitungen mit Druckluft	11.7.05	Lenz
Remove oil out of the tank Abpumpen des Öls, zurück in Prüffeldtank	11.7.05	Lenz
Disconnection of all electric components Abklemmen aller elektrischen Komponenten	11.7.05	[Signature]

6. Remarks / Bemerkungen:

7. On site activities / Baustellentätigkeiten

Since the tests are carried out without the main motor and the turbocompressor respectively running, the following additional on site activities are necessary during the commissioning:
 Da während der Tests der Hauptmotor bzw. somit auch der Turbocompressor nicht in Betrieb sind, werden im Rahmen der Erstinbetriebnahme auf der Baustelle folgende Tätigkeiten notwendig:

ACTIVITY TÄTIGKEIT	Date/ Datum	Done by/ Erledigt von
Check of pressure take-over of the main oil pump during very first start up of the compressor at the auxiliary oil pump shut down. Kontrolle der Förderdruck-Übernahme durch die Hauptölpumpe bei erstem Anfahren des Kompressors und Abschaltung der Hilfsölpumpe		ACE Service dept.
Adjustment oil inlet pressure to nominal pressure (normal approx. 2.5 barg) Einstellung Ölvorlaufdruck auf Nenndruck (normalerweise ca. 2.5 barg)		ACE Service dept.
Check of temperature control valve function (TCV), when oil temperature has reached nominal value (normal 40-48°C) after first start up Funktionskontrolle des Temperaturregelventil TCV, wenn Ölvorlauftemperatur den Nennwert (normalerweise 40-48°C) nach erstem Anfahren erreicht		ACE Service dept.
Check of oil cooler function: water flow, approach temperature, water leak-ages) Funktionskontrolle des Ölkühlers im Bezug auf: Wasserdurchfluss, Rückkühltemperatur, Wasserleckagen		ACE Service dept.



6970301469

45217950

57237310

ACC Sales Order Number L8-41197 #
 Serial Number TBI0541197
 Customer AC Energas / Air Liquide

Gearbox	03
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Atlas Copco Comptec Inc.

Atlas Copco Comptec Inc.
 46 School Road
 Voorheesville, NY 12186
 USA

Phone: (518) 765-3344

Fax: (518) 765-3357
 (518) 765-4889 (svce)
 (518) 765-4220 (mfg)
 (518) 765-4528 (eng)
 (518) 765-2048 (acct)

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Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31401

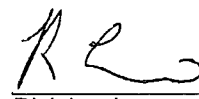
Date: 02/15/2005

Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0303 REV 4
Pattern Number: 1320701560 REV 13 Rev: 13	Cast Date: 02/10/2005 Cast Qty: 2
P.O. Number: 412871-001	Heat Treat Date(s): 3/9/2005 2.00 0.00
Physical Properties Tensile (PSI): 45,000 Yield (PSI): Elongation 2" Meth: Test Bar BHN: 228 412871-001 s/n021005-1 412871-007 s/n021005-2	Chemical Properties C: 3.215 Si: 2.079 P: 0.017 S: 0.031 Mn: 0.788

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer

Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31510

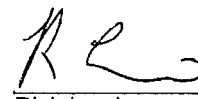
Date: 03/03/2005

Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0303 REV 4
Pattern Number: 1320701564 REV 8 Rev: 8	Cast Date: 02/25/2005 Cast Qty: 1
P.O. Number: 500469-010	Heat Treat Date(s): 03/09/05 1.00 0.00
Physical Properties Tensile (PSI): 46,400 Yield (PSI): Elongation 2" Meth: Test Bar BHN: 217 s/n022505-3	Chemical Properties C: 3.174 Si: 2.071 P: 0.012 S: 0.031 Mn: 0.780

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer

Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31592

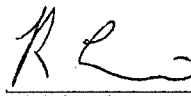
Date: 03/18/2005

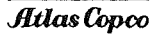
Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0260 REV 4
Pattern Number: 1320701619 REV 11 Rev: 11	Cast Date: 03/14/2005 Cast Qty: 1
P.O. Number: 500381-003	Heat Treat Date(s): 4/7/2005 1.00 0.00
Physical Properties Tensile (PSI): 62,800 Yield (PSI): 44,700 Elongation 2" Meth: 20.15 Test Bar BHN: 163 s/n031405-1	Chemical Properties C: 3.507 Si: 2.649 P: 0.021 S: 0.006 Mn: 0.319 Mg: 0.054

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer



Atlas Copco Comptec Inc.
46 School Road
Voorheesville, N.Y. 12186

LEAK TEST REPORT

S.O./Rel.: L8-41197-A

Stage: 1 PCS: 1

ITEM: 1ST ST HSG	CATL#: 1320701741	DWG#: 1320701741	REV.: 17	SERIAL #: 031405-1
ITEM: SHROUD	CATL#: 1320100047	DWG#: 1320100047	REV.: 3	SERIAL #: 032105-2
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____

Max. Allowable Working Pressure _____ PSI _____ F _____ minutes

Gas & Bubble Test at _____ PSI for _____ minutes

Hydrostatic Test at SEE BELOW PSI for 10 minutes

Part Accepted: ☒ Rejected: ☐

SPECIAL REQUIREMENTS:

Gauge Nbr.:

Pressures:

1st Stage:

M1103

65 PSII

2nd Stage:

3rd Stage:

4th Stage:

NO VISIBLE LEAKS

REMARKS:

WI-0104

We certify the above listed pressure vessel has been leak tested in accordance
with ATLAS COPCO COMPTREC INC. Q.A. procedure number WI-0104 per QSI Rev.

Test by: Jed Merwin Witness by: Dom Caruso

Date: 5/09/2005 Date: 5/09/2005

Title: HYDRO WORKER Title: HYDRO WORKER

Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31659

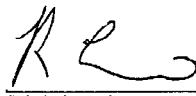
Date: 03/28/2005

Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0260 REV 4
Pattern Number: 1320701620 REV 5 Rev: 5	Cast Date: 03/21/2005 Cast Qty: 1
P.O. Number: 500381-004	Heat Treat Date(s): 04/07/05 1.00 0.00
Physical Properties Tensile (PSI): 62,300 Yield (PSI): 43,500 Elongation 2" Meth: 22.35 Test Bar BHN: 156 s/n032105-1	Chemical Properties C: 3.458 Si: 2.743 P: 0.025 S: 0.009 Mn: 0.317 Mg: 0.037

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer

Atlas Copco

Atlas Copco Comptec Inc.
46 School Road
Voorheesville, N.Y. 12186

LEAK TEST REPORT

S.O./Rel.: L8-41197-A

Stage: 2 PCS: 1

ITEM: <u>2ND ST HSG</u>	CATL#: <u>1320713049</u>	DWG#: <u>1320713049</u>	REV.: <u>6</u>	SERIAL #: <u>032105-1</u>
ITEM: <u>SHROUD</u>	CATL#: <u>1320713364</u>	DWG#: <u>1320713364</u>	REV.: <u>1</u>	SERIAL #: <u>031005-2</u>
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____

Max. Allowable Working Pressure _____ PSI _____ F _____ minutes
Gas & Bubble Test at _____ PSI for _____ minutes
Hydrostatic Test at SEE BELOW PSI for 10 minutes
Part Accepted: x Rejected: _____

SPECIAL REQUIREMENTS:

Gauge Nbr.:

Pressures:

1st Stage:

2nd Stage:

M2381

150 PSI

3rd Stage:

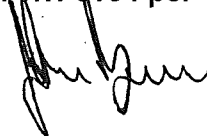
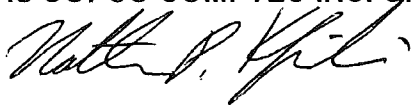
4th Stage:

NO VISIBLE LEAKS

REMARKS:

WI-0104

We certify the above listed pressure vessel has been leak tested in accordance
with ATLAS COPCO COMPTREC INC. Q.A. procedure number WI-0104 per QSI Rev.



Test by: _____ Witness by: _____
NATHAN KENDZIERSKI JOHN BAREIS

Date: 5/05/2005 Date: 5/05/2005

Title: HYDRO WORKER Title: HYDRO WORKER

Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31500

Date: 03/03/2005

Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0260 REV 4
Pattern Number: 1320701621 REV 9 Rev: 9	Cast Date: 02/28/2005 Cast Qty: 2
P.O. Number: 500469-005	Heat Treat Date(s): 03/10/05 2.00 0.00
Physical Properties Tensile (PSI): 67,800 Yield (PSI): 44,800 Elongation 2" Meth: 18.25 Test Bar BHN: 163 500469-005 s/n022805-1 500469-013 s/n022805-3	Chemical Properties C: 3.489 Si: 2.655 P: 0.029 S: 0.014 Mn: 0.320 Mg: 0.059

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer



Atlas Copco Comptec Inc.
46 School Road
Voorheesville, N.Y. 12186

LEAK TEST REPORT

S.O./Rel.: L8-41197-A

Stage: 3 PCS: 1

ITEM: 3RD ST HSG	CATL#: 1320713053	DWG#: 1320713053	REV.: 1	SERIAL #: 022805-1
ITEM: SHROUD	CATL#: 1320100234	DWG#: 1320100234	REV.: 0	SERIAL #: 031105-3
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____

Max. Allowable Working Pressure _____ PSI _____ F _____ minutes

Gas & Bubble Test at _____ PSI for _____ minutes

Hydrostatic Test at SEE BELOW PSI for 10 minutes

Part Accepted: ☒ Rejected: ☐

SPECIAL REQUIREMENTS:

Gauge Nbr.:

Pressures:

1st Stage:

2nd Stage:

3rd Stage: M604

425 PSI

4th Stage:

NO VISIBLE LEAKS

REMARKS:

WI-0104

We certify the above listed pressure vessel has been leak tested in accordance with ATLAS COPCO COMPTREC INC. Q.A. procedure number WI-0104 per QSI Rev.

Test by: NATHAN KENDZIERSKI Witness by: JOHN BAREIS

Date: 5/04/2005 Date: 5/04/2005

Title: HYDRO WORKER Title: HYDRO WORKER

Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31647

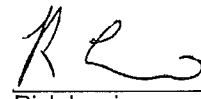
Date: 03/24/2005

Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0260 REV 4
Pattern Number: 1320100095 REV 1 Rev: 1	Cast Date: 03/21/2005 Cast Qty: 2
P.O. Number: 501256-006	Heat Treat Date(s): 04/07/05 2.00 0.00
Physical Properties Tensile (PSI): 65,600 Yield (PSI): 48,000 Elongation 2" Meth: 21.50 Test Bar BHN: 170 501256-006 s/n032105-1 501180-006 s/n032105-2	Chemical Properties C: 3.431 Si: 2.616 P: 0.019 S: 0.010 Mn: 0.313 Mg: 0.042

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer

Atlas Copco

Atlas Copco Comptec Inc.

46 School Road
Voorheesville, N.Y. 12186

LEAK TEST REPORT

S.O./Rel.: L8-41197-A

Stage: 1 **PCS:** 1

ITEM: <u>1ST ST HSG</u>	CATL#: <u>1320701741</u>	DWG#: <u>1320701741</u>	REV.: <u>17</u>	SERIAL #: <u>031405-1</u>
ITEM: <u>SHROUD</u>	CATL#: <u>1320100047</u>	DWG#: <u>1320100047</u>	REV.: <u>3</u>	SERIAL #: <u>032105-2</u>
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____

Max. Allowable Working Pressure _____ PSI _____ F _____ minutes

Gas & Bubble Test at _____ PSI for _____ minutes

Hydrostatic Test at SEE BELOW PSI for 10 minutes

Part Accepted: X Rejected: _____

SPECIAL REQUIREMENTS:

Gauge Nbr.:

Pressures:

1st Stage:

M1103

65 PSII

2nd Stage:

3rd Stage:

4th Stage:

NO VISIBLE LEAKS

REMARKS:

WI-0104

We certify the above listed pressure vessel has been leak tested in accordance
with ATLAS COPCO COMPTec INC. Q.A. procedure number WI-0104 per QSI Rev.

Test by:

JED MERWIN

Witness by:

DOM CARUSO

Date:

5/09/2005

Date:

5/09/2005

Title:

HYDRO WORKER

Title:

HYDRO WORKER

Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31568

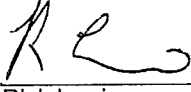
Date: 03/15/2005

Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0260 REV 4
Pattern Number: 1320701684 REV 6 Rev: 6	Cast Date: 03/10/2005 Cast Qty: 3
P.O. Number: 501172-002	Heat Treat Date(s): 03/23/05 3.00 0.00
Physical Properties Tensile (PSI): 62,500 Yield (PSI): 43,300 Elongation 2" Meth: 24.55 Test Bar BHN: 163 501172-002 s/n031005-1 501180-007 s/n031005-2 501256-007 s/n031005-3	Chemical Properties C: 3.525 Si: 2.688 P: 0.008 S: 0.008 Mn: 0.324 Mg: 0.044

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer



Atlas Copco Comptec Inc.
46 School Road
Voorheesville, N.Y. 12186

LEAK TEST REPORT

S.O./Rel.: L8-41197-A

Stage: 2 PCS: 1

ITEM: 2ND ST HSG	CATL#: 1320713049	DWG#: 1320713049	REV.: 6	SERIAL #: 032105-1
ITEM: SHROUD	CATL#: 1320713364	DWG#: 1320713364	REV.: 1	SERIAL #: 031005-2
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____

Max. Allowable Working Pressure _____ PSI _____ F _____ minutes

Gas & Bubble Test at _____ PSI for _____ minutes

Hydrostatic Test at SEE BELOW PSI for 10 minutes

Part Accepted: ☒ Rejected: _____

SPECIAL REQUIREMENTS:

Gauge Nbr.:

Pressures:

1st Stage:

2nd Stage:

M2381

150 PSI

3rd Stage:

4th Stage:

NO VISIBLE LEAKS

REMARKS:

WI-0104

We certify the above listed pressure vessel has been leak tested in accordance with ATLAS COPCO COMPTREC INC. Q.A. procedure number WI-0104 per QSI Rev.

Test by: _____ Witness by: _____
NATHAN KENDZIERSKI JOHN BAREIS

Date: 5/05/2005 Date: 5/05/2005

Title: HYDRO WORKER Title: HYDRO WORKER

Rough Casting Certification Report

Elyria Foundry
120 Filbert St.
Elyria Oh. 44036

Cert Number: 31581

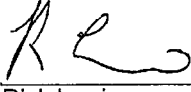
Date: 03/16/2005

Revision Date:

Customer: ATLAS COPCO COMPRESSORS INC	Metal Specification: WI-0260 REV 4
Pattern Number: 1320701686 REV 6 Rev: 6	Cast Date: 03/11/2005 Cast Qty: 3
P.O. Number: 501180-008	Heat Treat Date(s): 03/23/05 3.00 0.00
Physical Properties Tensile (PSI): 64,700 Yield (PSI): 46,100 Elongation 2" Meth: 24.05 Test Bar BHN: 163 501180-008 s/n031105-1 501172-003 s/n031105-2 501256-008 s/n031105-3	Chemical Properties C: 3.595 Si: 2.645 P: 0.025 S: 0.006 Mn: 0.317 Mg: 0.042

We hereby certify that the material has been manufactured, tested and inspected in accordance with the specification referenced herein, and had been found to meet all requirements.

Remarks:


Rick Lewis
Quality Engineer



Atlas Copco Comptec Inc.
46 School Road
Voorheesville, N.Y. 12186

LEAK TEST REPORT

S.O./Rel.: L8-41197-A

Stage: 3 PCS: 1

ITEM: 3RD ST HSG	CATL#: 1320713053	DWG#: 1320713053	REV.: 1	SERIAL #: 022805-1
ITEM: SHROUD	CATL#: 1320100234	DWG#: 1320100234	REV.: 0	SERIAL #: 031105-3
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____
ITEM: _____	CATL#: _____	DWG #: _____	REV.: _____	SERIAL #: _____

Max. Allowable Working Pressure _____ PSI _____ F _____ minutes

Gas & Bubble Test at _____ PSI for _____ minutes

Hydrostatic Test at SEE BELOW PSI for 10 minutes

Part Accepted: X Rejected: _____

SPECIAL REQUIREMENTS:

Gauge Nbr.:

Pressures:

1st Stage:

2nd Stage:

3rd Stage: M604

425 PSI

4th Stage:

NO VISIBLE LEAKS

REMARKS:

WI-0104

We certify the above listed pressure vessel has been leak tested in accordance with ATLAS COPCO COMPTREC INC. Q.A. procedure number WI-0104 per QSI Rev.

Test by: _____
NATHAN KENDZIERSKI

Witness by: _____
JOHN BAREIS

Date: 5/04/2005

Date: 5/04/2005

Title: HYDRO WORKER

Title: HYDRO WORKER

ProcessCertL (2): 8/97

PROCESS CERTIFICATION

Quantity Accepted by Final Inspection And Released For Shipment.

PCC PART NO.

12477

SO NO.

62492

METAL LOT NO.

57347

P/S NO.

684099

QTY.

1 pc.

CUSTOMER PART NO.

1320703200 / Rev.5

PURCHASE ORDER NO.

0411443

PCC Structural, Inc. hereby certifies that the material (product) described above has been completely processed per all purchase order, supplement and blueprint instructions and is acceptable to all applicable specification requirements.

SPECIAL REQUIREMENTS

1. Material: 17-4PH Per WI-0296
2. HIP: 2125°F +/- 25°F at 15+/- 0.5ksi for 4 hrs min.
3. Heat Treat per WI-0296:
 - A. Solution Anneal: 1900°F +/- 25°F for 4 hrs.
 - B. Sub Zero: -100°F for 3 hrs.
 - C. Age: 1100°F +/- 10°F for 6 hrs min.
4. Inspection and acceptance per WI-0138:
 - A. Visual
 - B. Penetrant

SERIAL NUMBERS

00072-01

ATTACHMENTS

1. Material Cert
2. Test Material (1 Tensile, 1 Charpy)
3. Weld Map (if applicable)

PCC

Structurals, Inc.

4800 S.E. HARNEY DRIVE
PORTLAND, OREGON 97206

TELEPHONE (503)777-3881

Authorized
Signature

Date

Suminda Duggan

1-21-05

Bodycote
MATERIALS TESTING PORTLAND
4949 S.E. JOHNSON CR25K BLVD
PORTLAND, OR 97222-4122
503/774-5977 • FAX 503/771-7451

for
POC
Structurals, Inc.

MATERIAL CERTIFICATE

Page 1 of 1
January 20, 2005

This document may be duplicated or copied only in its entirety.

LIMS ID 01 N12477020102105		PART NO. 12477		HIP/PT NO. 02-01-021-05		CUSTOMER ATLAS COPCO	
ALLOY TYPE 17-4		LOT NO.		METAL LOT NO. 57347		SPECIFICATION W1-0296 Rev. 10	
HEAT VENDOR CANNON-MUSKEGON		SERIAL NO.		RELEASED TO 5015L Rev. BM		Part per Heat Treat Load	

MASTER HEAT CHEMISTRY WEIGHT %							
Element	C	Mn	Si	P	S	Cr	Ni
Test	0.03	0.44	0.95	0.006	0.001	15.98	3.88
Element	N	Fe	Ch+Ta	Cu			
Test	0.028	Bal.	0.20	2.88			

Method : C, P, S-OES; Majors-XRF; GASES-IGF

Ultimate (KSI) 152.4		Yield @ .2% (KSI) 145.6		Elong. 4D % 16.7		Red. of Area % 53.0		HARDNESS (HRC) 33		Tested per ASTM E 8 and E 18	
Temp (F) ROOM		Ft. lbs (Test #1) 11		Ft. lbs (Test #2) 13		Ft. lbs (Test #3) 13		Ft. lbs (Avg) 12		Tested per ASTM E 23	

ROOM TEMP TENSILE

Charpy V-Notch

MATERIAL TO SHIP : 1 TENSILE, 1 CHARPY

SHIPPING USE ONLY P/S 684099 TEST MATERIALS ARE INCLUDED WITH THIS SHIPMENT		Material conforms to applicable specification requirements.	
00072-01		G. Turner H/E LABORATORY MANAGER DATE 1/20/05	

This certifies that materials, parts, or components of assemblies have been inspected to the specifications involved, and results of tests required are as shown. All analyses are performed by approved laboratories.

Discipline taken. Evidence for conformance information on this document must be referenced as a failure under federal statute. The negligence or characteristics are reflective only of the material(s) tested.

Atlas Copco

Impeller Acceptance Certificate

Atlas Copco Compressors Inc. hereby certifies that Compressor wheel part #
1320707592
has been tested to the following speed(s).

Operator: Joel LeRomain

Date: 4/11/2005

S.O.# L8-41197-A

Stage: 1st

H ☒

SC ☐

AV ☐

Serial No. 00072-01

Before overspeed .5 hour - ☒ MPI
☐ FPI

Indications and type: None

- ☒ Accept
☐ Reject

Inspector: Joel Leromain

Date: 04/11/2005

Speed & Time:	22,590 rpm for 5 minutes	Date:	04/11/2005
---------------	--------------------------	-------	------------

Performed By: Joel Leromain

After overspeed .5 hour - ☒ MPI
☐ FPI

Indications and type: none

- ☒ Accept
☐ Reject

Inspector: Richard Loucks

Date: 04/11/2005

E505/P20B.02

ATLAS COPCO COMPTEC
VOORHEESVILLE, NY

operator : JOEL

04.11.05 09:48 AM

rotor data

setup: 

file name :

a: 1.625 in	b: 5.444 in	c: 2.625 in
r1: 1.400 in	readout : pl1/pl2	r2: 6.500 in
m1:  polar		m2:  polar
tol1: 0.566 gin		tol2: 0.566 gin
bal. speed: 922. 0/min		

plane 1

	154.	mg
at	195	deg
in tol		

rotor: 1320707592

run 9

plane 2

	292.	mg
at	188	deg
3.3 * tol		



AT

E2

W/O L8-41197-A 0029 ATLAS COPCO ENERGAS
HL8-1ST.STG.IMPELLER SERIAL NO.00072-01
1320707592

PROCESS CERTIFICATION

PCC PART NO. 12458	SO NO. 63106	METAL LOT NO. 58016	Quantity Accepted by Final Inspection And Released For Shipment.	
CUSTOMER PART NO. 1320703206 / Rev. D		P/S NO. 687238	QTY. 1	
PURCHASE ORDER NO. 412418				

PCC Structural, Inc. hereby certifies that the material (product) described above has been completely processed per all purchase order, supplement and blueprint instructions and is acceptable to all applicable specification requirements.

SPECIAL REQUIREMENTS

1. Material: 17-4PH Per WI-0296
2. HIP: 2050°F +/- 25°F at 15+/- 0.5ksi for 4 hrs min.
3. Heat Treat per WI-0296:
 - A. Solution Anneal: 1900°F +/- 25°F for 4 hrs.
 - B. Sub Zero: -100°F for 3 hrs.
 - C. Age: 1100°F +/- 10°F for 4 hrs min.
4. Inspection and acceptance per WI-0138:
 - A. Visual
 - B. Penetrant

SERIAL NUMBERS NONWELDED 00046-02	ATTACHMENTS 1. Material Cert 2. Test Material (1 Tensile, 1 Charpy) 3. Weld Map (if applicable)
 Structurals, Inc. 4600 S.E. HARNEY DRIVE PORTLAND, OREGON 97206	Authorized Signature PAM BURGESS Date 3/1/2005

MATERIAL CERTIFICATE

This document may be duplicated or copied only in its entirety.

LINKS ID 01		PART NO.		HIP/HT NO.		CUSTOMER	
N12458020204205		12458		02-02-042-05		ATLAS COPCO	
ALLOY TYPE		LOT NO.		METAL LOT NO.		SPECIFICATION	
17-4				58016		W1-0296 Rev. 10	
HEAT VENDOR		SERIAL NO.		RELEASED TO		Part per Heat Treat Load	
CANNON-MUSKEGON				5015L Rev. B			

MASTER HEAT CHEMISTRY WEIGHT %							
Element	C	Mn	Si	P	S	Cu	Ni
Test	0.04	0.44	0.88	0.009	<0.001	16.14	3.96
Element	N					Cb+Ta	Fe Bal.
Test	0.027					0.18	2.96

Method : C, P, S-OES; Majors-XRF; GASES-IGF

ROOM TEMP TENSILE			
Ultimate (KSI)	Yield @ .2% (KSI)	Elong. 4D %	Red. of Area %
146.8	138.0	18.8	53.8
Charpy V-Notch			
Temp (F)	Ft. lbs (Test #1)	Ft. lbs (Test #2)	Ft. lbs (Test #3)
ROOM	21	21	14
HEAT TREATMENT			

HARDNESS (HRC)		Tested per	
34		ASTM E 8 and E 18	
Ft. lbs (Avg)		Tested per	
19		ASTM E 23	

HIP : 2125 +/- 25 F @ 15ksi for 4 hrs minimum
 ANNEAL : 1900 +/- 25 F for 4 hrs minimum
 SUBZERO : -100 F for 3 hrs minimum
 AGE : 1100F +/- 15F for 6 hrs. minimum
 NOTE: : Thermal treatments by PCC Structural.

MATERIAL TO SHIP : 1 TENSILE, 1 CHARPY

SHIPPING USE ONLY	Material conforms to applicable specification requirements.	
P/S 687238	S/N NONWELDED 00046-02 1 PC.	
	G. Trumbull	2/24/05
	LABORATORY MANAGER	DATE

This certifies that materials, parts, or components of assemblies have been inspected to the specifications involved, and results of tests required are as shown. All analyses are performed by approved laboratories.

Recording false, fictitious or fraudulent information on this document may be prosecuted as a felony under federal statutes. The properties or characteristics are reflective only of the material(s) tested.

Atlas Copco

Impeller Acceptance Certificate

Atlas Copco Compressors Inc. hereby certifies that Compressor wheel part #
1320707185
has been tested to the following speed(s).

Operator: Joel LeRomain

Date: 4/12/2005

S.O.# L8-41197-A

Stage: 2nd

H ☒

SC ☐

AV ☐

Serial No. 00046-02

Before overspeed .5 hour - ☒ MPI
☐ FPI

Indications and type: None

- ☒ Accept
☐ Reject

Inspector: Joel Leromain

Date: 04/12/2005

Speed & Time:	22,590 rpm for 5 minutes	Date:	04/12/2005
---------------	--------------------------	-------	------------

Performed By: Joel Leromain

After overspeed .5 hour - ☒ MPI
☐ FPI

Indications and type: None

- ☒ Accept
☐ Reject

Inspector: Joel Leromain

Date: 04/12/2005

E505/P20B.02

 ATLAS COPCO COMPTEC
 VOORHEESVILLE, NY

 operator : JOEL 04.12.05 11:22 AM

rotor data

file name :
 setup: 

a: 1.650 in	b: 4.000 in	c: 2.400 in
r1: 1.000 in	readout : pl1/pl2	r2: 5.305 in
m1:  polar		m2:  polar
tol1: 0.226 gin		tol2: 0.226 gin
bal. speed: 883. 0/min		

plane 1

	119. mg
at	308 deg
in tol	

rotor: 1320707185

run 10

plane 2

	385. mg
at	7 deg
9.0 * tol	



AT

E2

W/O L8-41197-A 0030 ATLAS COPCO ENERGAS
 HL8-2ND.STG.IMPELLER SERIAL NO.00046-02
 1320707185

PROCESS CERTIFICATION

Quantity Accepted by Final Inspection And Released For Shipment.

PCC PART NO. 12536	SO NO. 62015	METAL LOT NO. 57514	P/S NO. 681408	QTY. 2
CUSTOMER PART NO. 1320703212 / Rev. 7				
PURCHASE ORDER NO. 409946				

PCC Structural, Inc. hereby certifies that the material (product) described above has been completely processed per all purchase order, supplement and blueprint instructions and is acceptable to all applicable specification requirements.

SPECIAL REQUIREMENTS

1. Material: 17-4PH Per WI-0296
2. HIP: 2050°F +/- 25°F at 15+/- 0.5ksi for 4 hrs min.
3. Heat Treat per WI-0296:
 - A. Solution Anneal: 1900°F +/- 25°F for 4 hrs.
 - B. Sub Zero: -100°F for 3 hrs.
 - C. Age: 1100°F +/- 10°F for 4 hrs min.
4. Inspection and acceptance per WI-0138:
 - A. Visual
 - B. Penetrant

ATTACHMENTS

1. Material Cert
2. Test Material (1 Tensile, 1 Charpy)
3. Weld Map (if applicable)

SERIAL NUMBERS

00096-01, 00096-02



Structurals, Inc.
4800 S.E. HARNEY DRIVE
PORTLAND, OREGON 97206

TELEPHONE (503)777-3881

Authorized Signature

PAM BURGESS

Pam Burgess

Date 12/10/2004

MATERIAL CERTIFICATE

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PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536
PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536	PART NO. 12536

MASTER HEAT CHEMISTRY WEIGHT %

Element	$\frac{C}{\text{Test}}$	$\frac{Mn}{\text{Test}}$	$\frac{Si}{\text{Test}}$	$\frac{P}{\text{Test}}$	$\frac{S}{\text{Test}}$	$\frac{Cr}{\text{Test}}$	$\frac{Ni}{\text{Test}}$	$\frac{Cb+Ta}{\text{Test}}$	$\frac{Fe}{\text{Bal.}}$	$\frac{Cu}{\text{Test}}$
	0.04	0.40	0.97	0.009	0.001	16.35	3.98	0.23	2.95	

Method : C, P, S-OES; Majors-XRF; GASES-IGF

ROOM TEMP TENSILE

Ultimate (KSI)	142.6	142.6
Yield @ .2% (KSI)	142.6	142.6
Elong. 4D%	18.2	18.2
Red. of Area %	59.7	59.7
HARDNESS (HRC)	34	34
Tested per ASTM E 8 and E 18		

Charpy V-Notch

Temp (°F)	Ft. lbs (Test #1)	Ft. lbs (Test #2)	Ft. lbs (Test #3)	Ft. lbs (Avg)	Tested per ASTM E 23
ROOM	12	13	12	12	

MATERIAL TO SHIP: 1 TENSILE, 1 CHARPY

SHIPPING USE ONLY
P/S 681408

S/N 00096-01; 00096-02 2 PCS.

2 PCS.

"TEST MATERIALS ARE INCLUDED WITH THIS SHIPMENT"

Material conforms to applicable specification requirements.

G. Thomas MC
LABORATORY MANAGER

DATE _____

LABORATORY MANAGER
This certifies that materials, parts, or components of assemblies have been inspected to the specifications
DATE



Impeller Acceptance Certificate

Atlas Copco Compressors Inc. hereby certifies that Compressor wheel part #
1320706710
has been tested to the following speed(s).

Operator: Joel LeRomain

Date: 4/8/2005

S.O.# L8-41197-A

Stage: 3rd

H ☒

SC ☐

AV ☐

Serial No. 00096-01

Before overspeed .5 hour - ☒ MPI
☐ FPI

Indications and type: None

- ☒ Accept
☐ Reject

Inspector: Joel Leromain

Date: 04/08/2005

Speed & Time:	27,100 rpm for 5 minutes	Date:	04/14/2005
---------------	--------------------------	-------	------------

Performed By: Joel Leromain

After overspeed .5 hour - ☒ MPI
☐ FPI

Indications and type: None

- ☒ Accept
☐ Reject

Inspector: Joel Leromain

Date: 04/14/2005

E505/P20B.02

ATLAS COPCO COMPTEC
VOORHEESVILLE, NY

operator : JOEL

04.14.05 08:36 AM

rotor data

setup:  file name :

a: 6.600 in	b: 2.850 in	c: 4.125 in
r1: 3.312 in	readout : p11/p12	r2: 0.689 in
m1:  polar		m2:  polar
tol1: 0.056 gin		tol2: 0.056 gin
bal. speed: 1024. 0/min		

plane 1

	191. mg
at	105 deg
11.3 * tol	

rotor: 1320706710

run 5

plane 2

	312. mg
at	339 deg
3.8 * tol	



AT

E2

W/O L8-41197-A 0032 ATLAS COPCO ENERGAS
HL8-3RD.STG.IMPELLER SERIAL NO.00096-01
1320706710



M. C. WATTEEUW n.v.
Kampveldstraat 51
B - 8020 OOSTKAMP
Tel. +32.50.82.69.07
Fax. +32.50.82.69.74
FORMULIER

F 11.01.01N
datum uitgifte : 31/05/00
revisie : 02

Pagina

..... /

KEURINGSRAPPORT
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION

EN 10204 - 3.1B

Klant :
Customer / Client

Atlas Copco Comptec

Ordernummer :
Purchase order nr. / No. de commande

408588

Tekeningnummer :
Drawing number / No. de plan

1320702612

Editie : 3
Issue / Edition

Stuknaam :
Part name / Dénomination

HELICAL GEAR PINION

Hoeveelheid : 4
Quantity / Quantité

Identificatie :
Identification / Identification

18079, 18080, 18081, 18082

Opmerkingen :
Remarks / Remarques

Verklaard wordt, dat het geheel der hierboven genoemde afleveringen in alle opzichten in overeenstemming zijn met de gestelde eisen, de tekeningen en de betreffende kontrakten en dat de afleveringen werden geverifieerd en gekeurd overeenkomstig de kontrakteisen, behoudens hogervermelde uitzonderingen.

It is certified that the whole of supplies outlined above are in all respects conform to the specifications, the drawings and the contracts in question and that the supplies have been verified and inspected in accordance with the contract requirements, except for above mentioned exceptions.

Il est certifié que la totalité des fournitures nommées ci-dessus sont totalement conformes aux spécifications, plan et contrats qui s'y rapportent et que les fournitures ont été vérifiées et contrôlées, conformément aux exigences du contrat, hormis les exceptions mentionnées ci-dessus.

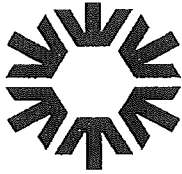
Datum :
Date / Date

20 DEC. 2004

Naam en functie :
Name and function / Nom et fonction



[Handwritten signature]



MECHANISCHE CONSTRUCTIE
WATTEEUW N. V.
Kampveldstraat 51
B-8020 Oostkamp
FORMULIER

F 09.03.10
pagina 1 / 1
datum uitgifte : 28/02/01
revisie: 01

Instructieblad - turbo controle

38 a

Klant : **A.C.Comptec** Pinion

Gecementeerd (*)

Plan samenstelling : 1320702612		Rev : 3		PO nr:	
		ID nr: 588229			
Volgnummer : 18079 - 18082					
	Pinion		pinion	Ring 1	Ring 2
	shaft		shaft	gear	gearmop
Lot serial :	B04090209				
Materiaal item nr :	1011760130c2				
Ovenlading :	A8078 8849				

Procedure voor algemene controle :

a) Uit te voeren controles :

* Dimensioneel :

☒	100 % controle op de Höfler
☒	100 % controle Ø en slag nauwkeurige boring + WK , rest steekproef , F 09.03.14
☒	100 % controle electrical runout
☒	100 % visueel (polieren)
☒	Nummeren

* Magnaflux :

☒	100 % magnaflux en demagnetiseren
-------------------------------------	-----------------------------------

b) Mee te leveren documenten : volledig pakket wordt ingescand en doorgemaild

Ingescand ☐

Samengesteld door ☐

c) Documenten hier te bewaren : (originelen)

☒	Keuringsrapport EN 10204-3.1.B , formulier 11.01.01 N
☒	Voorblad F 09.03.10
☒	Materiaal certificaat 3.1.B
☒	Hardheidscertificaat formulier
☒	Gear data certification F 09.03.17
☒	100 % grafieken evolvente , richting , steek en rondloop
☒	100 % meetrapport Höfler
☒	Steekproef controle , formulier F 09.03.13
☒	Procescontrolebladen van de machine of van onderaannemer

Opmerkingen : NCR nr:	Rebut sn :	
	Herwerking sn :	
Revisie : 4	Datum :	29/09/2003

(*) schrappen wat niet past

Stempel ter goedkeuring :

338

 Watteeuw Group Kampveldstraat 51 B 8020 Oostkamp	Datum: 15/12/2004	Klant: A.C.Comptec
	benaming: Pinion	Plan nr: 1320702612
	ID: 588229	Rev: 3

Kontrolerapport Pinion

4. Gear Data Certification

	requirements	set nr;			
		18079	18080	18081	18082
Runout	0,0005	0,00013	0,00011	0,00015	0,00043
Tooth to tooth space	0,0002	0,00004	0,00004	0,00004	0,00006
Finisch on tooth contact surface	32	O.K.	O.K.	O.K.	O.K.
Finisch on fillet area	64	O.K.	O.K.	O.K.	O.K.
Chordal tooth thickness	,1376 - ,1335	0,1371	0,1363	0,1360	0,1360

Lead and profile; See Chart

5. Magnetic Particle Inspection
--

All parts have been inspected and are conform to the specifications.

6. balance record

parts are not balanced

Edelstahlwerke Buderus AG, Buderussstraße 25, 35576 Weizlar				Abnahmeprüfzeugnis (EN 10 204 - 3.1.B)		Buderus EDELSTAHL	
				Attest-Nr./Certificate-no.		020820040855	
				Werksauftrag-Nr./our reference no.			
				Pos.-Los			
Position	UPos	Anzahl Quantity	Chargen-Nr. Heat-no.	Chargen-Kurzz. Heat code-no.	Gewicht Weight		
			499910		kg		
Erschmelzungsart Melting process		Elektrostahl electric steel		B04090209			
Kd. Wst. Bez.		18 CrNiMo 7 6		Werkstoff Nr. 6587		1011750130C2	
Mat. qual.				Steel gr. no.		6,12 m	
Versandanzeige-Nr. / Datum Shipment no.							
Materialbezeichnung: Stabstahl gewalzt Material							
Position :							
Ausführung : Gewalzt, BG-Geglüht, Gerichtet, UT-geprüft nach EN 10228-3 Finish							
Kundenbestellnummer : Purchase order-no.							
Liefervorschrift : TLV OP-Q 01-001 REV. Specification							
Abmessung : RM RD. 140 X HSTLG. MM Dimension							
Chemische Zusammensetzung % Chemical composition				Chargenanalyse Heat analysis		Schmelzen-Nr. 499910 Heat-no.	
C	Si	Mn	P	S	Cr	Ni	Mo
0,17	0,18	0,53	0,007	0,026	1,70	1,50	0,31
Sn	Ti	H ₂	Sb	Ca	O ₂	N ₂	Nb
0,009	0,002	2,2	0,0013	12 ppm	10 ppm	93 ppm	0,003
Bemerkungen/remarks: H2 in ppm							
Stirnabschreckversuch Jominy-test							
1,5	3	5	7	9	10	11	13
44	44	43	43	42	42	42	42
15	20	25	30	40	50	MM	
41	39	37	35	34	33	HRC	
MI-Reinheitsgrad gem. DIN 50602 Micro-cleanliness acc. DIN 50602							
K4 = 10							
MI-Reinheitsgrad gem. ISO 4967 Micro-cleanliness acc. ISO 4967							
A:Dünn Dick Thin Heavy		B:Dünn Dick Thin Heavy		C:Dünn Dick Thin Heavy		D:Dünn Dick Thin Heavy	
2,0	1,5	0,0	0,0	0,0	0,0	0,5	0,5
1,0	1,5	0,0	0,0	1,0	0,0	1,0	0,0
1,5	1,0	1,0	0,5	0,0	0,0	0,5	0,5
2,0	1,0	0,0	0,0	0,0	0,0	0,5	0,5
1,0	1,0	0,0	0,0	0,0	0,0	1,0	0,0
1,5	1,5	0,5	0,0	0,0	0,0	0,5	0,5
						Prüf-Nr.	
						DS = 1,5 29419	
						DS = 1,5 29418	
						DS = 1,5 29417	
						DS = 1,5 29416	
						DS = 1,5 29415	
						DS = 1,5 29414	

Edelstahlwerke Buderus AG, Buderusstraße 25, 53576 Wetzlar		Abnahmeprüfzeugnis (EN 10 204 - 3.1.B)		Buderus EDELSTAHL	
		Attest-Nr./Certificate-no:		020820040855	
		Werksauftrag-Nr./our reference no.			
		Pos-Los			
Abschreckkorngröße Austenitic grain size 6 und feiner / 6 and smaller					
Härteprüfung Hardness test					
Prüf-Nr.		HB 30			
Test-no.		26352 164 HB			
Zugversuch Tensile test		Referenzerprobung Reference test			
Prüf-Temp. Test-temp.	[°C]	+ 20			
R _{p0.2}	[N/mm ²]	822			
R _m	[N/mm ²]	1151			
A5	[%]	12,4			
Z	[%]	52			
Kerbschlagversuch Notch impact test		Referenzerprobung Reference test			
Prüf-Temp. Test-temp.	[°C]	+ 20	+ 20	+ 20	
Av-Einzelwert Notch impact energy	[J]	67	68	69	
Dynamische Schlagarbeit 59-64 kN					
Bemerkungen/remarks: ULTRASCHALLPRÜFUNG GEMÄSS DIN EN 10228-3 TYP 1 TAB.5 KL.3, RAND 1/3 D 3 MM KSR, REST 5 MM KSR VERFORMUNGSGRAD: > 6 - FACH "Wir bestätigen, dass die Angaben der oben aufgeführten Lieferung denen des Ursprungszeugnisses nach EN 10204 entsprechen." "We confirm, that the Data of above mentioned delivery are in conformity to the Root-Certificate according to EN 10204"			Edelstahlwerke Buderus AG Qualitätskontrolle/Q.C. Department Wetzlar, 02.08.2004 H. Moosberger Werksachverständiger/work inspector		
Bei Rückfragen bitte unsere Werksauftrags-Nr. angeben. If there are any questions, please refer to our reference no.					
Attest ist per EDV erstellt und ohne Unterschrift gültig gemäß EN 10204. Es wird hiermit bestätigt, daß die Lieferung den Vereinbarungen bei der Bestellung entspricht. Certificate is prepared by EDP-system and has validity without signature acc: to EN 10204. we herewith certify, that above mentioned material is in accordance with terms of order.					



03 SEP. 2004

Documentation control index card		XX.XX.XX.XX
GS 05.03.06 E		Date:
ROLLED BARS, FORGED BARS, SAWED PIECES - CASE HARDENING STEELS		Revision: draft
CLASS 2		
Used code D: Document M: Measure V: Visual Ref: Rejected Acc: Accepted	Manufacturer	☐ D ☒ V
	Steelmaking process	☐ D ☒ V • Secondary metallurgy ☐ D ☒ V • Casting process (ingot/concast)
	Delivery content	☐ D ☒ V • Steel grade ☐ D ☒ V • Dimensions ☐ D ☒ V • Quantity
	Cast N° and analysis	☐ D ☒ V
	Austenitic grain size	☐ D ☒ V
	End quench hardenability	☐ D ☒ V
	Hardness	☐ D ☒ V
	Degree of cleanliness	☐ D ☒ V
	Reduction ratio	Or guaranteed minimum reduction ☐ D ☒ V
	US-report	Or conformity statement, if applicable ☐ D ☒ V
Remarks:		Decision: Date: 03 SEP. 2004
		B04030209



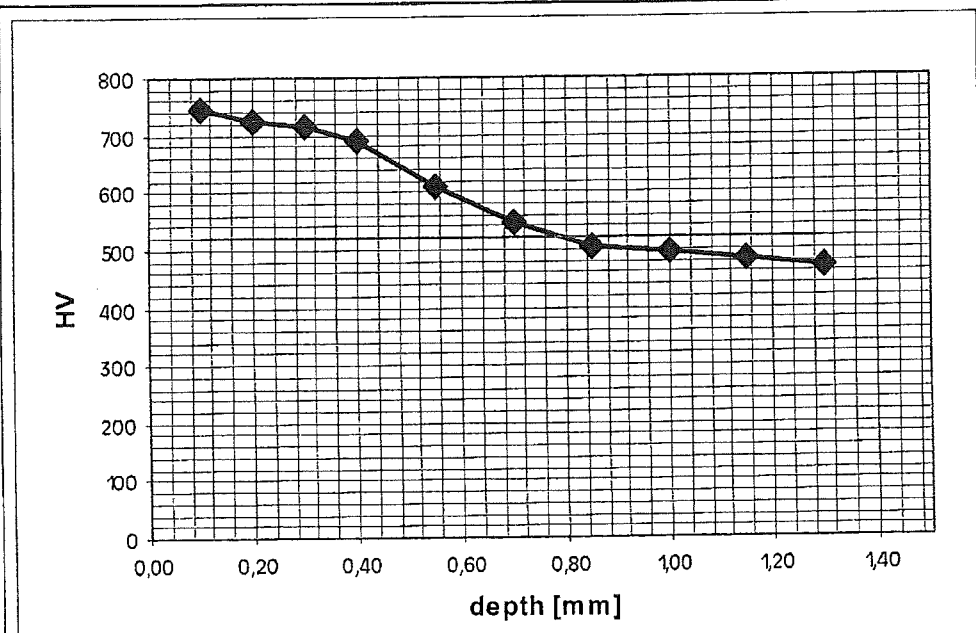
Documentcode	BF824_004
Type document	Locaal formulier
Uitgiftedatum	02.01.2004
Revisie	0
Pagina	1/1
Referentie document	P823_005N

HEAT TREATMENT PROCESS INSPECTION

MCW ☒	EURAIR ☐	BMTR_G ☐	BMTR_AS ☐	BMTR_C ☐	BMTC ☐	CARATRON ☐	AMTECH ☐
---	---------------------------------	---------------------------------	----------------------------------	---------------------------------	-------------------------------	-----------------------------------	---------------------------------

Heat treat lot A8849				proefblok d30 17 Cr Ni Mo 6		
customer	itemnr	serial nr	id nr	qty	material	Lot/Serial nr
AC COMPTEC	1320702612		588229	4	17 Cr Ni Mo 6	

Results of the analyses and checks



Metallographic structure

Residual Austenite (500:1)				Carbide precipitation (500 : 1)						
Intergranular oxidation (500:1)				Decarburization (500:1)						
Surface structure (500:1)				Core structure (500:1)						
effective case dept ISO 2639				Hardness						
effective case depth GH = 520 HV				Surface			Core			
loc zone			final	draw spec	hardness	specified	FOUND	hardnesstest	specified	FOUND
Sample			0,62	0,38 - 0,63	HRC	59 - 64	59	HRC	0 - 0	42,2

Remarks Lab :

date: 13/10/2004

issued by :

Rammelaere Johan

F423_004N, rev. 0, 20-01-03

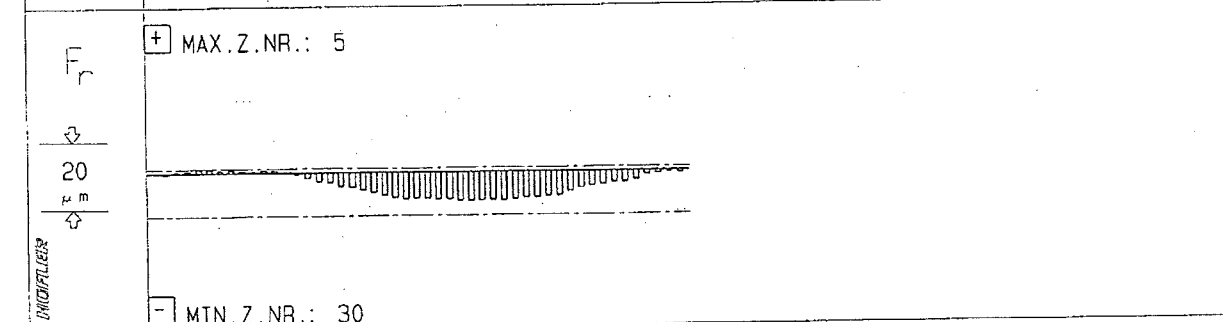
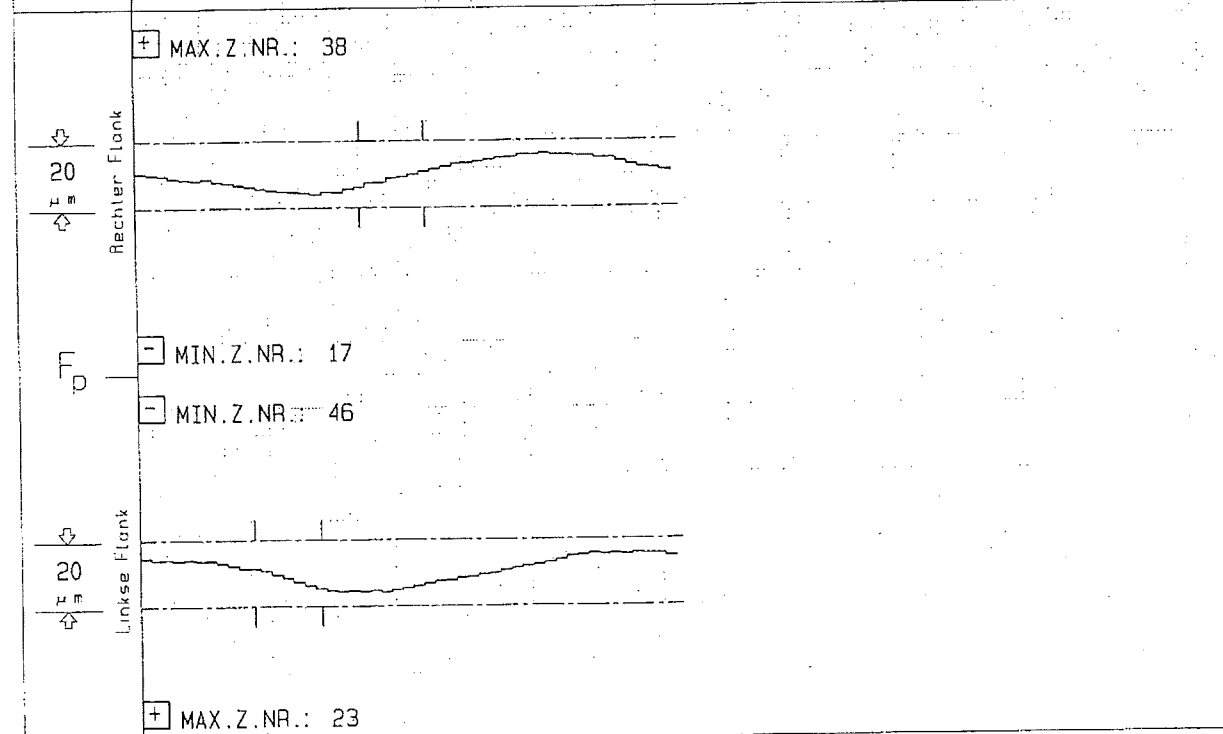
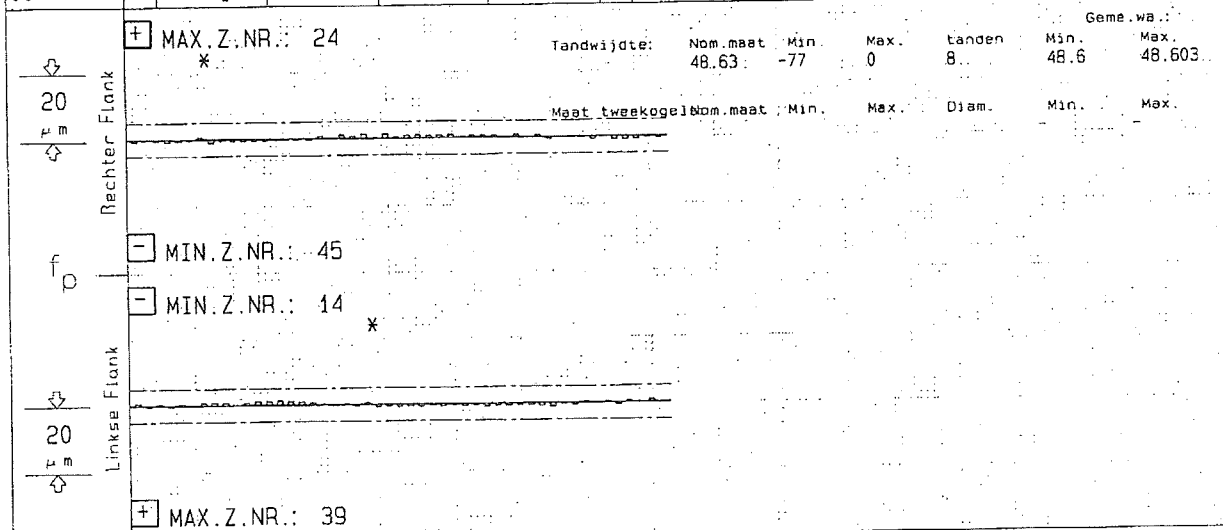
WATTEUW		Meetblad Flanklijn			
Tekeningnr.: 1320702612/T/3/S	m_n 2.116667	mm	b	67.3	mm
Benaming TURBONETIC	z 49 R/R	L_B 80/80/100 %			
BEMERKING: Mach450 Sn18082 LOPEND NR 2	α_n 25° 0' 0" I X0	d_b 98.363/98.363 mm			
WOODRUFF BOVEN MET POTJES	d 18° 57' 58" / 18° 57' 58"	vP 3 / vL 7			
	d_b 17° 7' 51" / 17° 7' 51"	TASTERSTIFT: $\emptyset$ 1 mm			
Kwaliteit	Toeg. Pr: 5 / Fl: 5 Gemet. Pr: 5 / F1: 6		Toeg. Pr: 5 / Fl: 5 Gemet. Pr: 5 / Fl: 2		
Kop 4 : 1 ↓ 2.5 mm ↑ 500 : 1 20 μm Voet	linkse Flank Tand rechter Flank				
Toeg. waarde	M Q Toeg. waarde				
F_α 0/7	4	4.5	4.5	4.5 4	0/7 5 4 4.5 4.5 4
$f_{f\alpha}$ 0/5	4	4.5	4.5	4.5 5	0/6 3 2.5 3.5 3 4
$f_{H\alpha} + -4.5$	-2.5	-1	-5	-1.5 4	+ -4.5 3.5 3 2.5 3 5
K.5/13	1	.5	2	1	5/13 4.5 5 5 5
Ketruier 617	linkse Flank Tand rechter Flank				
Toeg. waarde	M Q Toeg. waarde				
F_B 0/10	3	7.5	6.5	5.5 4	0/10 3 3 2.5 3 1
$f_{f\beta}$ 0/7	2	2.5	3.5	2.5 2	0/7 3 2 2 2.5 1
$f_{H\beta} + -7$	-2.5	-7.5	-5.5	-5 6	+ -7 -3 -2 1.5 -1 2

Datum 09.12.2004 07:38

ZP 350 V5.14 DIN

DIN 350 V5.14 DIN

DIN	f_{pt}	$f_{u\%}$	F_D	$F_{pz}/8$	f_{pt}	$f_{u\%}$	F_D	$F_{pz}/8$	F_r
Toeg.Kwal.	5	5	5	5	5	5	5	5	5
Toeg.waarde	5	6	20	12	5	6	20	12	14
Geme.waarde	1.5	1	11.5	6	1.5	1.5	12	4.5	10
Geme.Kwal.	1	1	4	3	1	1	4	3	4



ATLAS COPCO COMPTEC
VOORHEESVILLE, NY

operator : CR

05.03.05 06:59 AM

rotor data

setup:  file name :

a: 4.250 in	b: 16.87 in	c: 4.375 in
r1: 5.300 in	readout : p11/p12	r2: 6.500 in
m1:  polar		m2:  polar
tol1: 0.367 gin		tol2: 0.735 gin
bal. speed: 1090. 0/min		

plane 1

	18.5	mg
at	62	deg
in tol		

rotor: 1320102149

run 7

plane 2

	14.2	mg
at	266	deg
in tol		



AT

E2

W/O L8-41197-A 0014 ATLAS COPCO ENERGAS
HL8 1ST & 2ND STG ROTOR
PINION S/N 18082 1ST WHEEL S/N 00072-01 2ND WHEEL S/N 00046-02

ATLAS COPCO COMPTEC
VOORHEESVILLE, NY

operator : CR

05.02.05 02:24 PM

rotor data

setup:  file name :

a: 12.50 in	b: 5.500 in	c: 9.800 in
r1: 6.500 in	readout : pl1/pl2	r2: 1.375 in
m1:  polar		m2:  polar
tol1: 0.735 gin		tol2: 0.735 gin
bal. speed: 1004. 0/min		

plane 1

	10.9	mg
at	293	deg
in tol		

rotor: 1320102149

run 3

plane 2

	21.1	mg
at	325	deg
in tol		



AT

E2

W/O L8-41197-A 0014 ATLAS COPCO ENERGAS
HL8 1ST STG ROTOR
PINION S/N 18082 WHEEL S/N 00072-01

ATLAS COPCO COMPTEC
VOORHEESVILLE, NY

operator : CR

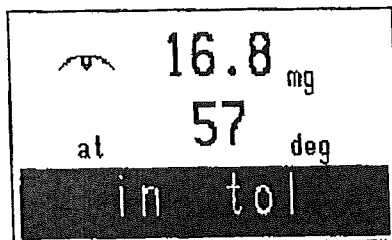
05.02.05 12:32 PM

rotor data

setup:  file name :

a: 12.50 in	b: 4.000 in	c: 8.250 in
r1: 5.300 in	readout : pl1/pl2	r2: 1.000 in
m1:  polar		m2:  polar
tol1: 0.367 gin		tol2: 0.367 gin
bal. speed: 1165. 0/min		

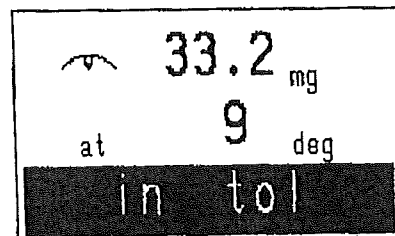
plane 1



rotor: 1320102149

run 20

plane 2



AT

E2

W/O L8-41197-A 0014 ATLAS COPCO ENERGAS
HL8 2NDSTG ROTOR
PINION S/N 18082 WHEEL S/N 00046-02

ATLAS COPCO COMPTEC
VOORHEESVILLE, NY

operator : CR

05.02.05 10:11 AM

rotor data

setup: $\frac{1}{2}$ | $\frac{1}{2}$ file name :

a: 2.625 in	b: 2.800 in	c: 2.800 in
r1: 1.800 in	readout : pl1/pl2	r2: 2.400 in
m1:  polar		m2:  polar
tol1: 0.004 gin		tol2: 0.004 gin
bal. speed: 1186. 0/mh		

plane 1

	15.0	mg
at	128	deg
in tol		

rotor: 1320705573

run 20

plane 2

	7.87	mg
at	331	deg
in tol		

DE

AT

E2

W/O L8-41197-A 0014 ATLAS COPCO ENERGAS
HL8 1ST & 2ND STG PINION S/N 18082

Atlas Copco

Plant Air Rotor Assembly

Sales Order # L8-41197-A

Compressor Model: HL8

Pinion Part # 1320705373

Pinion Serial #: 18082

Rotor Assy Part # 1320102149

Stage 1

Wheel S/N 00672-01

Stage 2

Wheel S/N 00046-02

Pinion Runout Measurements

	Stage 1	Stage 2
Mech. Runout	.00005	.00005
Elec. Runout	.00016	.00008
Total Runout	.00021	.00013

Performed By: CR

Date: 5/2/05

Witnessed By: _____

Date: _____

	Stretch Instruction #	Spacer	Nut
1 st Stage	1320707989	1320708520	1320708020
2 nd Stage	1320707988	1320708521	1320707834
3 rd Stage			
4 th Stage			

Pressure On Gauge (PSIG)

Stage	Dim.	Pre Stretch	Required	Actual
1	P1	9,857	8,973	9,000
2	P2	10,732	10,232	10,250
3	P3			
4	P4			

Tie-Bolt Stretch

Stage	Dim.	Required	Actual	Start Dim.	Final Dim.
1	B1	.022 - .024	.022	1.8695	1.8915
2	B2	.020 - .022	.021	1.604	1.625
3	B3				
4	B4				

Rotor Assembly Runouts

	Stage 1	Stage 2
Circular Runout (Wheel)	.003	.003
Circular Runout (Nut)	.005	.010
Seal Diameter	2.908	2.547

Completed By: CR



M. C. WATTEEUW n.v.
Kampveldstraat 51
B - 8020 OOSTKAMP
Tel. +32.50.82.69.07
Fax. +32.50.82.69.74
FORMULIER

F 11.01.01N
datum uitgifte : 31/05/00
revisie : 02

Pagina

..... /

KEURINGSRAPPORT
INSPECTION CERTIFICATE
CERTIFICAT DE RECEPTION

EN 10204 - 3.1B

Klant :
Customer / Client

ATLAS COPCO COMPTEC

Ordernummer :
Purchase order nr. / No. de commande

406799

Tekeningnummer :
Drawing number / No. de plan

1320702628

Editie : 7
Issue / Edition

Stuknaam :
Part name / Dénomination

Pinion

Hoeveelheid :
Quantity / Quantité

2

Identificatie :
Identification / Identification

17947 - 17948

Opmerkingen :
Remarks / Remarques

Verklaard wordt, dat het geheel der hierboven genoemde afleveringen in alle opzichten in overeenstemming zijn met de gestelde eisen, de tekeningen en de betreffende kontrakten en dat de afleveringen werden geverifieerd en gekeurd overeenkomstig de kontrakteisen, behoudens hogervermelde uitzonderingen .

It is certified that the whole of supplies outlined above are in all respects conform to the specifications, the drawings and the contracts in question and that the supplies have been verified and inspected in accordance with the contract requirements, except for above mentioned exeptions .

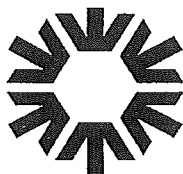
Il est certifié que la totalité des fournitures nommées ci-dessus sont totalement conformes aux spécifications, plan et contrats qui s'y rapportent et que les fournitures ont été vérifiées et contrôlées, conformément aux exigences du contrat, hormis les exeptions mentionnées ci-dessus .

Datum :
Date / Date

7.7 okt. 2004

Naam en functie :
Name and function / Nom et fonction



**MECHANISCHE CONSTRUCTIE****WATTEEUW N.V.**

Kampveldstraat 51

B-8020 Oostkamp

FORMULIER

F 09.03.10

pagina 1 / 1

datum uitgifte : 28/02/01

revisie: 01

Instructieblad - turbo controle**38 a**Klant : **A.C.Comptec** Pinion

Gecementeerd (*)

Plan samenstelling : 1320702628	Rev : 7	PO nr:
	ID nr: 574413	
Volgnummer : 17947 - 17949		
Pinion	pinion	Ring 1 x Ring 2
shaft x	shaft	gear gearmop
Lot serial :	B04061101	B03022802
Materiaal item nr :	1011760080c2	1013460100
Ovenlading :	C6445	

Procedure voor algemene controle :**a) Uit te voeren controles :***** Dimensioneel :**

☒	100 % controle op de Höfler
☒	100 % controle Ø en slag nauwkeurige boring + WK , rest steekproef , F 09.03.14
☒	100 % controle electrical runout
☒	100 % visueel (polieren)
☒	Nummeren

*** Magnaflux :**

☒	100 % magnaflux en demagnetiseren
-------------------------------------	-----------------------------------

b) Mee te leveren documenten : volledig pakket wordt ingescand en doorgemaildIngescand ☐Samengesteld door ☐**c) Documenten hier te bewaren : (originelen)**

☐	Keuringsrapport EN 10204-3.1.B , formulier 11.01.01 N
☒	Voorblad F 09.03.10
☒	Materiaal certificaat 3.1.B
☒	Hardheidscertificaat formulier
☒	Gear data certification F 09.03.17
☒	Uitbalancerrapport
☒	100 % grafieken evolvente , richting , steek en rondloop
☒	100 % meetrapport Höfler
☒	Steekproef controle , formulier F 09.03.13
☒	Procescontrolebladen van de machine of van onderaannemer

Opmerkingen : NCR nr:	Rebut sn :	17949
	Herwerking sn :	
Revisie : 4	Datum :	29/09/2003

(*) schrappen wat niet past

Stempel ter goedkeuring : 338

**ASCOMETAL**Boite postale 41
59941 Dunkerque cedex 2

B03022802

CERTIFICAT DE RECEPTION 3-1-B/EN 10204

N° CERTIFICAT 1/72510		CLIENT				CDE CLIENT DAB 100813					
CDE USINE 216/8322 /02-01		MCB RUE JL DEFRENE 107 B4340 AWANS BELGIQUE				N° COULEE B6850					
DESIGNATION DIMENSIONS ET POIDS		16 rd 100 x 4,160/ 6,150 m = 5,650 T <i>4013460 10002</i> <i>5B,97 m</i>									
NUANCE		34CRNIMO6									
COMPOSITION CHIMIQUE 10-3%											
C	Mn	Si	S	P	Ni	Cr	Mo	Al	Cu	H2	
356	692	211	20	12	1540	1620	239	30	163	ppm 1,05	
CARACTERISTIQUES MECANIQUES											
* TC PR	TRAITEMENT	* L T	LIM. EL RE N/mm2	RESIST RM	A %	Z %	* L T	RESILIENCE KV JOULES			DURETE HB
PR	Traité	L	947	1069	15,5	57,5	L + 20	89.4- 89.7- 89.9			331/ 341
IGNIFIE TC : TEMOINS COULEE PR : PRODUIT ETAT LIV. L : LONG T : TRANSVERS											
AUTRES RESULTATS											
Elaboration electrique, metal degaze sous vide Contrôle def. de surface et internes satisfaisant Inclusions: K4=.0											
 EURAIR 258 03-03-2003											
Acier exempt de radioactivité anormale - Steel free from abnormal radioactivity - Stahl frei von anormaler Radioaktivität											
NOUS CERTIFIONS QUE LES PRODUITS CI-DESSUS SONT CONFORMES AUX PRESCRIPTIONS DE LA COMMANDE				DATE 05/12/01		VISA DU CHEF DU SERVICE G. GIROUD MG / 095					

Edelstahlwerke Buderus AG, Buderusstraße 25, 35576 Wetzlar			Abnahmeprüfzeugnis (EN 10 204 - 3.1.B)		Buderus EDELSTAHL	
			Attest-Nr./Certificate-no.			091220021330
			Werksauftrag-Nr./our reference no.			
			Pos-Los			
Position	UPos	Anzahl Quantity	Chargen-Nr. Heat-no.	Chargen-Kurzz. Heat code-no.	Gewicht Weight	
			439860		kg	
Erschmelzungsart Melting process Kd Wst Bez Mat. qual. Lieferschein-Nr. / Datum Deliver no.			Elektrostahl electric steel 18 CrNiMo 7 - 6 Werkstoff Nr. 6587 Steel gr. no.			
Materialbezeichnung: Stabstahl / bar steel Material						
Position :						
Ausführung : Gewalzt, Gerichtet, BG-Geglüht, US-Geprüft hot rolled, straightened, BG- annealed, us-tested Finish						
Kundenbestellnummer : Purchase order-no.						
Liefervorschrift : ZF1 A, SEP 1921;3 D/d Specification						
Abmessung : Rund 80 x Dimension						

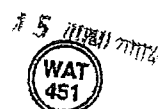
15 JUNI 2004



[Handwritten signature]

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Edelstahlwerke Buderus AG, Buderusstraße 25, 35576 Wetzlar		Abnahmeprüfzeugnis (EN 10 204 - 3.1.B)		Buderus EDELSTAHL									
		Attest-Nr./Certificate-no.		091220021330									
		Werksauftrag-Nr./our reference no.											
		Pos-Los											
Chemische Zusammensetzung % Chemical composition			Chargenanalyse Heat analysis		Schmelzen-Nr. 439860 Heat-no.								
C	Si	Mn	P	S	Cr	Ni	Mo	V	Cu				
0,17	0,15	0,54	0,007	0,031	1,68	1,49	0,32		0,10				
Sn	Al	H ₂	Ti	Ca	B	N ₂	W	Nb					
0,009	0,024		<0,002	0,0017		0,0093		<0,003					
Bemerkungen/remarks: bei ZF vorgestellt am 23.10.02													
Stirnabschreckversuch Jominy-test													
1,5	3	5	7	9	11	13	15	20	25	30	40	50	MM
44	43	43	43	42	42	42	42	39	37	35	34	33	HRC
MI-Reinheitsgrad gem. DIN 50602 Micro-cleanliness acc. DIN 50602													
K4= 0 Oxide													
MI-Reinheitsgrad gem. ISO 4967 Micro-cleanliness acc. ISO 4967													
A:Dünn Dick		B:Dünn Dick		C:Dünn Dick		D:Dünn Dick							
Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy				
1,5	1,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	54503		
1,5	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	54502		
1,5	1,5	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,0	0,0	54501		
1,5	1,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	54500		
1,5	1,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	54499		
1,5	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,0	0,0	54498		



Edelstahlwerke Buderus AG, Buderusstraße 25, 35576 Wetzlar		Abnahmeprüfzeugnis (EN 10 204 - 3.1.B)		Buderus EDELSTAHL	
		Attest-Nr./Certificate-no.		091220021330	
		Werksauftrag-Nr./our reference no.			
		Pos-Los			
Abschreckkorngröße Austenitic grain size 6 und feiner / 6 and finer					
Härteprüfung Hardness test					
Prüf-Nr. HB 30 Test-no. 54504 168 HB					
Zugversuch Referenzerprobung Tensile test Reference-test					
Prüf-Nr. / Test-no.		1			
Probenform / Test-piece-type		10 mm rd.			
Richtung / Direction		längs			
Lage / Position					
Prüf-Temp. Test-temp.	[°C]	+23			
Rp_{0,2}	[N/mm ²]	812			
Rm	[N/mm ²]	1139			
A5	[%]	12,1			
Z	[%]	51			
Kerbschlagversuch Referenzerprobung Notch impact test Reference-test					
Prüf-Nr. / Test-no.		1			
Probenform / Test-piece-type		Charpy-V			
Richtung / Direction		längs			
Lage / Position					
Prüf-Temp. Test-temp.	[°C]	+23			
Av-Einzelwert Notch impact energy	[J]	72			
Av-Einzelwert Notch impact energy	[J]	73			
Av-Einzelwert Notch impact energy	[J]	74			
Referenzzustand: 63 R, 860°C/Oel + 180°C 120 min Luft					
Bemerkungen/remarks: Verformungsgrad/forging ratio: > 6 - fach/fold Ultraschallprüfung gem. SEP 1921 3 D/d.			Edelstahlwerke Buderus AG Qualitätskontrolle/Q.C. Department Wetzlar, 09.12.2002 Fr. Mann Werkssachverständige/work inspector		
Bei Rückfragen bitte unsere Werksauftrags-Nr. angeben. If there are any questions, please refer to our reference no.					
Attest ist per EDV erstellt und ohne Unterschrift gültig gemäß EN 10204. Es wird hiermit bestätigt, daß die Lieferung den Vereinbarungen bei der Bestellung entspricht. Certificate is prepared by EDP-system and has validity without signature acc. to EN 10204. we herewith certify, that above mentioned material is in accordance with terms of order.					



Wattoonw

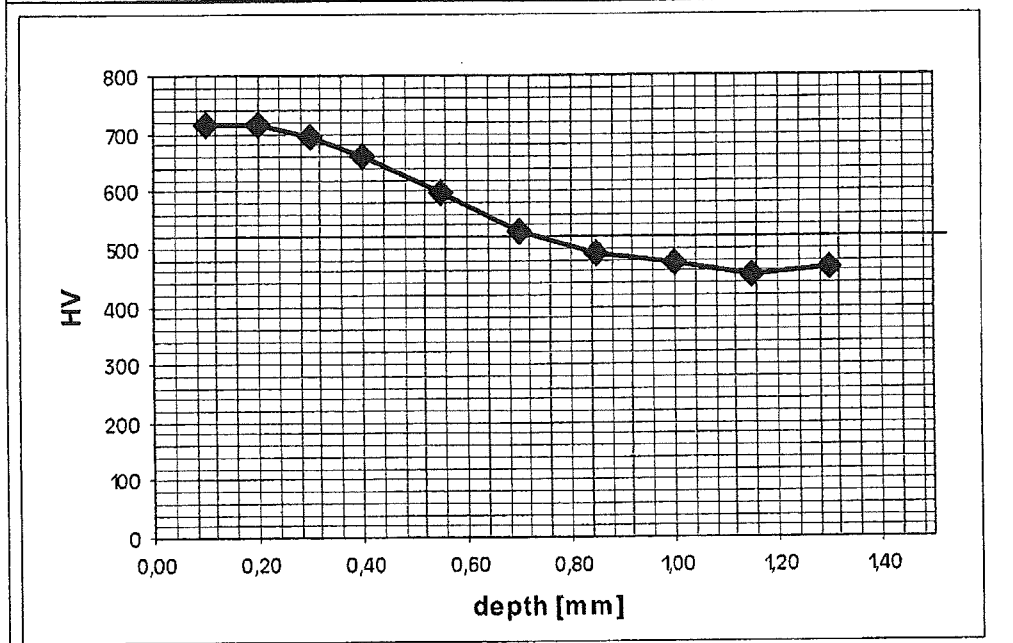


Documentcode	BF824_004
Type document	Locaal formulier
Uitgiftedatum	02.01.2004
Revisie	0
Pagina	1/1
Referentie document	P823_005N

HEAT TREATMENT PROCESS INSPECTION

MCW ☒	EURAIR ☐	BMTR_G ☐	BMTR_AS ☐	BMTR_C ☐	BMTC ☐	CARATRON ☐	AMTECH ☐
---	---------------------------------	---------------------------------	----------------------------------	---------------------------------	-------------------------------	-----------------------------------	---------------------------------

Heat treat lot		C6445				
customer	Itemnr	serial nr	Id nr	qty	material	Lot/Serial nr
AC COMPTEC	13204702628B		574448	3		

Results of the analyses and checks**Metakgraphic structure**

Residual Austenite (500:1)					Carbide precipitation (500 : 1)					
Intergranular oxidation (500:1)					Decarburization (500:1)					
Surface structure (500:1)					Core structure (500:1)					
effective case dept ISO 2639					Hardness					
effective case depth GH = 520 HV					Surface			Core		
loc zone			final	draw spec	hardness	specified	FOUND	hardnesstest	specified	FOUND
Sample			0,56	0,38 - 0,63	HRC	-	59	HRC	0 - 0	44,2

Remarks Lab :

date: 18/08/2004

issued by:

Rammelaere Johan

 Watteuw Group Kampveldstraat 51 B 8020 Oostkamp	Datum: 5/10/2004	Klant: A.C.Comptec
	benaming: Pinion	Plan nr: 1320702628
	ID: 574413	Rev: 7

Kontrolerapport Pinion

4. Gear Data Certification

	requirements	17947	17948	set nr;
Runout	0,0005	0,00017	0,00037	
Tooth to tooth space	0,0002	0,00004	0,00008	
Finisch on tooth contact surface	32	0.H.	0.H.	
Finisch on fillet area	64	0.H.	0.H.	
Chordal tooth thickness	1,379 - ,1339	0,1373	0,1363	

Lead and profile; See Chart

5. Magnetic Particle Inspection

All parts have been inspected and are conform to the specifications.

6. balance record

parts are not balanced

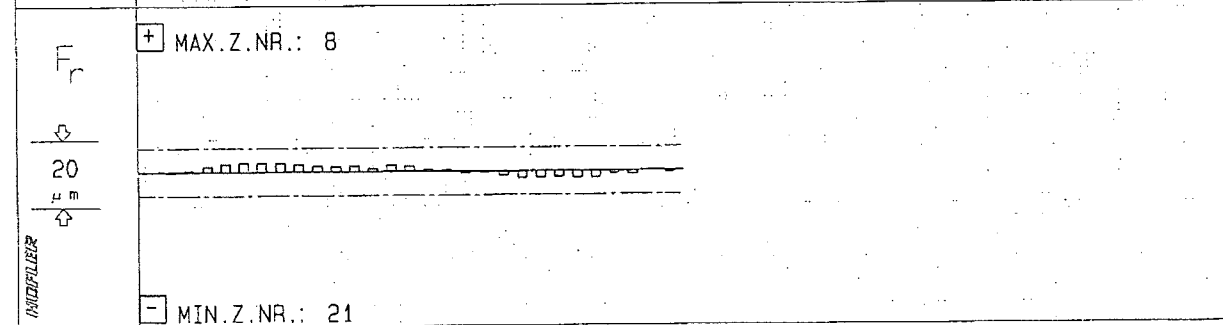
WATTEEUW		Meetblad Flanklijn							
Tekeningnr.: 1320702628/T/7/S	m _n 2.1166		mm	b 90	mm				
Benaming: ATLAS COPCO COMPTEC	z 29 R/R		L _B 80/80/100 %						
BEWERKING: Mach450-Sn17947	LOPEND NR 2	α _n 25° 0' 0" X0		d _B 58.213/58.213 mm					
WOODRUFF BOVEN		β 18° 57' 58" / 18° 57' 58"		vP 2 / vL 6					
		D _B 17° 7' 51" / 17° 7' 51"		TASTERSTIFT: Ø 1 mm					
Kwaliteit	Toeg. Pr: 5 / F1: 5 Gemet. Pr: 5 / F1: 5		Toeg. Pr: 5 / F1: 5 Gemet. Pr: 4 / F1: 5						
Kop 5 : 1 ↓ 2 mm ↑									
500 : 1 ↓ 20 μm ↑									
Voet									
Toeg waarde	M Q Toeg waarde								
F _α 0/7	4	4	3.5	4 3	0/7	3.5	4	4	4 3
f _{rα} 0/6	4.5	4.5	4	4.5 5	0/6	3	4	4	3.5 4
f _{Hα} +-4.5	3	3.5	2.5	3 5	+-4.5	2	2	1.5	2 3
K.5/13	4.5	4.5	4.5	4.5	5/13	8	8.5	9	8.5
Keurder									
BOVEN									
1 : 1 ↓ 10 mm ↑									
500 : 1 ↓ 20 μm ↑									
ONDER									
Toeg waarde	M Q Toeg waarde								
F _B 0/10	5	4.5	4.5	4.5 2	0/10	3.5	4.5	5.5	4.5 3
f _{rB} 0/7	2.5	2.5	3	2.5 1	0/7	2.5	2.5	2.5	2.5 1
f _{Hβ} +-7	6.5	4.5	5.5	5.5 5	+-7	3	4.5	6.5	4.5 5

Datum: 02.09.2004 15:57

Keurder 367

ZP 350 V5.14 DIN

UNICONTROL



ATLAS COPCO COMPTEC M857
VOORHEESVILLE, NY

operator : TH

04.19.05 05:59 PM

rotor data

file name :

setup: 

a: 12.00 in	b: 2.875 in	c: 6.625 in
r1: 3.250 in	readout : pl1/pl2	r2: 0.687 in
m1:  polar		m2:  polar
tol1: 0.056 gin		tol2: 0.056 gin
bal. speed: 1691. 0/min		

plane 1

	6.34 mg
at	208 deg
in tol	

rotor: 1320707070 3RD 8

run 6

plane 2

	7.12 mg
at	283 deg
in tol	



AT

E2

W/O L8-41197-A 0015 AC ENERGAS GMBH
WHEEL S/N 00096-01 PINION S/N 17947
3RD STG HL8 ROTOR

 ATLAS COPCO COMPTEC M857
 VOORHEESVILLE, NY

 operator : GT 04.18.05 09:11 PM

rotor data

file name :
 setup: 

a: 2.187 in	b: 4.375 in	c: 1.687 in
r1: 1.100 in	readout : pl1/pl2 bal. speed: 1526. 0/min	r2: 1.600 in
m1:  polar		m2:  polar
tol1: 0.056 gin		tol2: 0.056 gin

plane 1

	12.3	mg
at	223	deg
in tol		

rotor: 1320702628 REV 7

run 2

plane 2

	3.89	mg
at	338	deg
in tol		



AT

E2

W/O L8-41197-A 0015 AC ENERGAS GMBH
 PINION S/N 17947
 3RD STG HL8 PINION

Atlas Copco

Plant Air Rotor Assembly

Sales Order # L 8-41197-A Compressor Model: HL8
Pinion Part # 1320702628 Rev 7 Pinion Serial #: 17947
Rotor Assy Part # 1320707070 Stage 3 Wheel S/N 00096-01
Stage _____ Wheel S/N _____

Pinion Runout Measurements

	Stage 3	Outboard
Mech. Runout	<u>.00005</u>	<u>.00005</u>
Elec. Runout	<u>.00006</u>	<u>.00019</u>
Total Runout	<u>.00011</u>	<u>.00024</u>

Performed By: GT Date: 4/15/05
Witnessed By: _____ Date: _____

	Stretch Instruction #	Spacer	Nut
1 st Stage			
2 nd Stage			
3 rd Stage	<u>1320707994</u>	<u>1320708002</u>	<u>1320707836</u>
4 th Stage			

Pressure On Gauge (PSIG)

Stage	Dim.	Pre Stretch	Required	Actual
1	P1			
2	P2			
3	P3	<u>10,732</u>	<u>10,232</u>	<u>10,250</u>
4	P4			

Tie-Bolt Stretch

Stage	Dim.	Required	Actual	Start Dim.	Final Dim.
1	B1				
2	B2				
3	B3	<u>.018 - .022</u>	<u>.020</u>	<u>2.774</u>	<u>2.774</u>
4	B4				

Rotor Assembly Runouts

	Stage 3	
Circular Runout (Wheel)	<u>.0015</u>	
Circular Runout (Nut)	<u>.0009</u> <i>ACB up to 1/2</i>	
Seal Diameter	<u>1.9066</u>	

Completed By: TH

	M. C. WATTEEUW n.v. Kampveldstraat 51 B - 8020 OOSTKAMP Tel. +32.50.82.69.07 Fax. +32.50.82.69.74 FORMULIER	F 11.01.01N datum uitgifte : 31/05/00 revisie : 02	Pagina /																																																								
KEURINGSRAPPORT INSPECTION CERTIFICATE CERTIFICAT DE RECEPTION		EN 10204 - 3.1B																																																									
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; vertical-align: top;">Klant :</td> <td colspan="3" style="text-align: center; vertical-align: top;">Atlas Copco Compressors Inc</td> </tr> <tr> <td style="font-size: small;"><i>Customer / Client</i></td> <td colspan="3"></td> </tr> <tr> <td style="vertical-align: top;">Ordernummer :</td> <td colspan="3" style="text-align: center; vertical-align: top;">411214</td> </tr> <tr> <td style="font-size: small;"><i>Purchase order nr. / No. de commande</i></td> <td colspan="3"></td> </tr> <tr> <td style="vertical-align: top;">Tekeningnummer :</td> <td style="text-align: center; vertical-align: top;">1320702241</td> <td style="width: 10%; vertical-align: top;">Editie :</td> <td style="text-align: center; vertical-align: top;">A</td> </tr> <tr> <td style="font-size: small;"><i>Drawing number / No. de plan</i></td> <td></td> <td style="font-size: small;"><i>Issue / Edition</i></td> <td></td> </tr> <tr> <td style="vertical-align: top;">Stuknaam :</td> <td colspan="3" style="text-align: center; vertical-align: top;">Gear Assy Drive + Pump</td> </tr> <tr> <td style="font-size: small;"><i>Part name / Dénomination</i></td> <td colspan="3"></td> </tr> <tr> <td style="vertical-align: top;">Hoeveelheid :</td> <td colspan="3" style="text-align: center; vertical-align: top;">5</td> </tr> <tr> <td style="font-size: small;"><i>Quantity / Quantité</i></td> <td colspan="3"></td> </tr> <tr> <td style="vertical-align: top;">Identificatie :</td> <td colspan="3" style="text-align: center; vertical-align: top;">18061 - 1806.5</td> </tr> <tr> <td style="font-size: small;"><i>Identification / Identification</i></td> <td colspan="3"></td> </tr> <tr> <td style="vertical-align: top;">Opmerkingen :</td> <td colspan="3"></td> </tr> <tr> <td style="font-size: small;"><i>Remarks / Remarques</i></td> <td colspan="3"></td> </tr> </table>				Klant :	Atlas Copco Compressors Inc			<i>Customer / Client</i>				Ordernummer :	411214			<i>Purchase order nr. / No. de commande</i>				Tekeningnummer :	1320702241	Editie :	A	<i>Drawing number / No. de plan</i>		<i>Issue / Edition</i>		Stuknaam :	Gear Assy Drive + Pump			<i>Part name / Dénomination</i>				Hoeveelheid :	5			<i>Quantity / Quantité</i>				Identificatie :	18061 - 1806.5			<i>Identification / Identification</i>				Opmerkingen :				<i>Remarks / Remarques</i>			
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Opmerkingen :																																																											
<i>Remarks / Remarques</i>																																																											
Verklaard wordt, dat het geheel der hierboven genoemde afleveringen in alle opzichten in overeenstemming zijn met de gestelde eisen, de tekeningen en de betreffende contracten en dat de afleveringen werden geverifieerd en gekeurd overeenkomstig de kontrakteisen, behoudens hogervermelde uitzonderingen .																																																											
It is certified that the whole of supplies outlined above are in all respects conform to the specifications, the drawings and the contracts in question and that the supplies have been verified and inspected in accordance with the contract requirements, except for above mentioned exeptions .																																																											
Il est certifié que la totalité des fournitures nommées ci-dessus sont totalement conformes aux spécifications, plan et contrats qui s'y rapportent et que les fournitures ont été vérifiées et contrôlées, conformément aux exigences du contrat, hormis les exeptions mentionnées ci-dessus .																																																											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">Datum : dinsdag 8 februari 2005</td> <td style="width: 60%;">Naam en functie :</td> </tr> <tr> <td style="font-size: small;"><i>Date / Date</i></td> <td style="font-size: small;"><i>Name and function / Nom et fonction</i></td> </tr> </table> 				Datum : dinsdag 8 februari 2005	Naam en functie :	<i>Date / Date</i>	<i>Name and function / Nom et fonction</i>																																																				
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MECHANISCHE CONSTRUCTIE
WATTEEUW N.V.
Kampveldstraat 51
B-8020 Oostkamp
FORMULIER

F 09.03.10
pagina 1 / 1
datum uitgifte : 28/02/01
revisie: 01

Instructieblad - turbo controle

38 a

Klant : **A.C.Comptec** Bullgear Niet gecementeerd

Plan samenstelling : 1320701557 R1	Rev : 9	PO nr:
	ID nr: 609908	
Volgnummer : 18062 → 18065		
		gear x
Lot serial :	I04112301	
Materiaal item nr :	108176800077C2	
Ovenlading :		

Procedure voor algemene controle :

a) Uit te voeren controles :

* Dimensioneel :

☒	100 % controle Ø en slag nauwkeurige boring + WK , rest steekproef , F 09.03.14
☒	100 % visueel (polieren)
☒	Nummeren

* Magnaflux :

☒	100 % magnaflux en demagnetiseren
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b) Mee te leveren documenten : volledig pakket wordt ingescand en doorgemaild

Ingescand ☐

Samengesteld door

c) Documenten hier te bewaren : (originelen)

☒	Keuringsrapport EN 10204-3.1.B , formulier 11.01.01 N
☒	Voorblad F 09.03.10
☒	Materiaal certificaat 3.1.B
☒	Gear data certification F 09.03.17
☒	Uitbalanceerrapport
☒	100 % grafieken evolvente , richting , steek en rondloop
☒	Steekproef controle , formulier F 09.03.13
☒	Procescontrolebladen van de machine of van onderaannemer

Opmerkingen : NCR nr:	Rebut sn :
	Herwerking sn :
Revisie : 4	Datum : 29/09/2003

(*) schrappen wat niet past

Stempel ter goedkeuring :



MECHANISCHE CONSTRUCTIE
WATTEEUW N.V.
Kampveldstraat 51
B-8020 Oostkamp
FORMULIER

F 09.03.10
pagina 1 / 1
datum uitgifte : 28/02/01
revisie: 01

Instructieblad - turbo controle

38 a

Klant : **A.C.Comptec** Shaft

Niet gecementeerd

Plan samenstelling : 1320701557 R2	Rev : 9	PO nr:
	ID nr: 609909	
Volgnummer : 609909/1 → 609909/5		
shaft	x	
Lot serial :	B04111705	
Materiaal item nr :	1013460180C2	
Ovenlading :		

Procedure voor algemene controle :

a) Uit te voeren controles :

* Dimensioneel :

☒	100 % controle op de Höfler
☒	steekproef , F 09.03.14
☒	100 % visueel (polieren)
☒	Nummeren

* Magnaflux :

☒	100 % magnaflux en demagnetiseren
-------------------------------------	-----------------------------------

b) Mee te leveren documenten : volledig pakket wordt ingescand en doorgemaild

Ingescand ☐

Samengesteld door

c) Documenten hier te bewaren : (originelen)

☐	Keuringsrapport EN 10204-3.1.B , formulier 11.01.01 N
☒	Voorblad F 09.03.10
☒	Materiaal certificaat 3.1.B
☐	
☐	
☒	100 % meetrapport Höfler
☒	Steekproef controle , formulier F 09.03.13
☒	Procescontrolebladen van de machine of van onderaannemer

Opmerkingen : NCR nr:	Rebut sn :	
S/N 1 monteren met aan- gepaste bulgeart .S/N 18061	Herwerking sn :	
Revisie : 4	Datum :	29/09/2003

276

(*) schrappen wat niet past

Stempel ter goedkeuring :

**MECHANISCHE CONSTRUCTIE****WATTEEUW N.V.**

Kampveldstraat 51

B-8020 Oostkamp

FORMULIER

F 09.03.10

pagina 1 / 1

datum uitgifte : 28/02/01

revisie: 01

Instructieblad - turbo controle**38 a**Klant : **A.C.Comptec** Spur gear

Niet-gecementeerd

Plan samenstelling : 1320701637		Rev : 4		PO nr:	
		ID nr: 609910			
Volgnummer : 609910/1 - 609910/5					
	Pinion		pinion	Ring 1	Ring 2
	shaft		shaft	gear	gearmop X
Lot serial :				B03022804	
Materiaal item nr :				1013460140c2	
Ovenlading :					

Procedure voor algemene controle :a) **Uit te voeren controles :**

* Dimensioneel :

☒	100 % controle op de Höfler
☒	100 % controle Ø en slag nauwkeurige boring + WK , rest steekproef , F 09.03.14
☐	
☐	Nummeren

* Magnaflux :

☒	100 % magnaflux en demagnetiseren
-------------------------------------	-----------------------------------

b) **Mee te leveren documenten : volledig pakket wordt ingescand en doorgemaild**Ingescand ☐Samengesteld door ☐c) **Documenten hier te bewaren : (originelen)**

☐	Keuringsrapport EN 10204-3.1.B , formulier 11.01.01 N
☒	Voorblad F 09.03.10
☒	Materiaal certificaat 3.1.B
☒	Hardheidscertificaat formulier
☒	Gear data certification F 09.03.17
☐	
☒	100 % grafieken evolvente , richting , steek en rondloop
☒	100 % meetrapport Höfler
☒	Steekproef controle , formulier F 09.03.13
☒	Procescontrolebladen van de machine of van onderaannemer

Opmerkingen : NCR nr:	Rebut sn :	
	Herwerking sn :	
Revisie : 4	Datum :	29/09/2003

(*) schrappen wat niet past

Stempel ter goedkeuring :



MECHANISCHE CONSTRUCTIE
WATTEEUW N. V.
Kampveldstraat 51
B-8020 Oostkamp
FORMULIER

F 09.03.10
pagina 1 / 1
datum uitgifte : 28/02/01
revisie: 01

Instructieblad - turbo controle

38 a

Klant: **A.C.Comptec**

Samengeeld.
Bulfgear

Niet-gecementeerd

Plan samenstelling : 1320701637	Rev : 4	PO nr:
	ID nr: 595199	
Volgnummer : 595199/1 - 595199/5		
Pinion	pinion	Ring 1
shaft	shaft	gear X
Lot serial :		B03022804
Materiaal item nr :		1013460140C2
Ovenlading :		

Procedure voor algemene controle :

a) Uit te voeren controles :

* Dimensioneel :

☐	100 % controle op de Höfler
☐	100 % controle Ø en slag nauwkeurige boring + WK , rest steekproef , F 09.03.14
☐	100 % controle electrical runout
☐	100 % visueel (polieren)
☐	Nummeren

* Magnaflux :

☐	100 % magnaflux en demagnetiseren
--------------------------	-----------------------------------

b) Mee te leveren documenten : volledig pakket wordt ingescand en doorgemailed

Ingescand ☐

Samengesteld door

c) Documenten hier te bewaren : (originelen)

☐	Keuringsrapport EN 10204-3.1.B , formulier 11.01.01 N
☒	Voorblad F 09.03.10
☒	Materiaal certificaat 3.1.B
☒	Hardheidscertificaat formulier
☒	Gear data certification F 09.03.17
☒	grafieken evolvente , richting , steek en rondloop
☒	Steekproef controle , formulier F 09.03.13

Opmerkingen : NCR nr:	Rebut sn :
	Herwerking sn :
Revisie : 4	Datum : 29/09/2003

(*) schrappen wat niet past

Stempel ter goedkeuring :

Edelstahlwerke Buderus AG		Abnahmeprüfzeugnis EN 10 204-3.1.B	Herstellerzeichen Suppliers Mark Marque D'Usine  Buderus Buderus AG Wetzlar, Germany 35576 Wetzlar
STAHLLAGER WETZLAR		Attest Nr. 202891	
BUDERUSSTR. 25		Werksauftrag-Nr. 1-27577-3	
D 35576 WETZLAR		Pos-Los 1-09	

Position	UPos	Anzahl	Chargen Nr.	Gewicht [Kg]
0001	0	2	53877	35560,000

Erschmelzungsart Elektrostaht
 Kd Wst Bez 18 CRNIMO 7-6 ISO-B Werkstoff 6587
 Versandanzeige-Nr. / Datum 5000197748 26.03.2003

Materialbezeichnung : Stabstaht geschmiedet	
Position	: ARTIKEL-NR.: 75004698
Ausführung	: DIN 7527/6 - 02/76, FESTIGKEIT MIN 180,0, FESTIGKEIT MAX 210,0 HB, UNBEARBEITET, BEIDE ENDEN GESAGT, UT-GEPRÜFT, VORVERGÜTET, VERFORMUNGSGRAD MIN 4,0 VAKUUMENTGAST, 100 % TITANFREI
Kundenbestellnummer	:
Liefervorschrift	: EN 10084 + DIN 17210-ANHANG AUSGABE 10/84 ZF 1A REV.10/01
Abmessung	: RM RD. 800,0 X

Chemische Zusammensetzung % Chargenanalyse									
C	Si	MN	P	S	CR	NI	MO	V	W
0,17	0,33	0,55	0,008	0,002	1,69	1,57	0,30	—	—
CU	SN	TI	AL	H2	CA	SB	O2		
0,19	0,0100	0,0010	0,026	—	0,0010	0,0015	0,0012		

NB=0,002 N2=0,0090

Stirnabschreckversuch Charge												
1,5	3	5	7	9	10	13	15	20	25	30	40	50
44	44	44	43	43	43	43	42	40	39	35	35	34
												MM
												HRC

Dynamische Schlagkraft in [KN]
63

MI-Reinheit DIN 50602 Charge
K4 0,0

MI-Reinheit nach ASTM E 45/97 PL. Charge
A Dünn Dick B Dünn Dick C Dünn Dick D Dünn Dick
0,5 0,5 0,0 0,0 0,0 0,0 1,0 0,5
ISO 4967: TYP DS= 1,0

Abschreck Korngröße :	Charge 6-7
-----------------------	------------

Prüf Nr.	Härteprüfung
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Edelstahlwerke Buderus AG	Qualitätssicherung Wetzlar, den 13.08.2004	Hr. C. Moosberger Werkssachverständiger	Seite 1 von 2
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Bullgean



23 NOV. 2004

Edelstahlwerke Buderus AG STAHLLAGER WETZLAR BUDERUSSTR. 25 D 35576 WETZLAR	Abnahmeprüfzeugnis EN 10 204-3.1.B	Herstellerzeichen Supplier's Mark Marque D'Usine  Buderus Angewandte Metallverarbeitung Industrielle Gruppe Schäferstrasse 100 D-35576 Wetzlar
	Attest Nr. 202891	
	Werksauftrag-Nr. 1-27577-3	
	Pos-Los 1-09	

V 0624 HB 30 190

Zugversuch

Zugversuch		Blindhärteprüfung				Werte
Prüf Nr.	Proben - Form Richtung Lage	Temp: [°C]				
S 0624	Q 8 10 X 50 STIRNS./FRONT-FACE	+ 20	RP	0,2 [MPa]		1083
				RM [MPa]		1232
				A 5 [%]		10,4
				Z [%]		51,0

Kerbschlagversuch

Kerbschlagversuch		Blindhärteprüfung				Werte
Prüf Nr.	Proben - Form Richtung Lage	Temp: [°C]	Testart			
S 0624	Q ISO-V STIRNS./FRONT-FACE	+ 20	AV/Einzelwerte [J]	46	51	45

VERFORMUNGSGRAD: > 4 - FACH
DIE US-PRÜFUNG GEMÄSS QSV 1090 REV.1 ERGAB KEINE BEANSTANDUNG.

Attest ist per EDV erstellt und ohne Unterschrift gültig gemäss EN 10204.

Es wird hiermit bestätigt, daß die Lieferung den Vereinbarungen bei der Bestellung entspricht.

23 NOV. 2004



Edelstahlwerke Buderus AG	Qualitätssicherung Wetzlar, den 13.08.2004	Hr. C. Moosberger Werkssachverständiger	Seite 2 von 2 Anlagen 
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B04-111705
10134601802
Watteau 5,57 m
633089

EDELSTAHL WITTEN-KREFELD GMBH

Austrasstra.
D-58452 Witten
Telefon: (02302) 29-4
Telefax: (02302) 29-40 00
Postanschrift: D-58449 Witten
http://www.edelstahl-witten-krefeld.de

Datum/Date: 28.07.04

Seite/Page: 1/2

Zertifiziert nach:	ISO 9001 VDA 6. Teil 1 AD2000 W 0 TRD 100	Werkstofflieferant gemäß Druckgutachten 97/23 EG
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Abnahmeprüfzeugnis nach
Inspection Certificate acc.to/Certificat de réception selon
Zeugnis-Nr./Certificate No./No.de Certificat
DIN EN 10204 3.1B
805387/655269/bt

Edelstahl Witten-Krefeld GmbH, D-58449 Witten
ThyssenKrupp Materials Belgium (BE)
N.V.S.A.
Zoning Industriel Rue de Wallonie
BE-4460 Grace-Hollogne

Hersteller/Supplier's Mark/Marque d'origine	WK
Prüfung/Inspection's stamp/Visum de l'expert	QA

Warenempfänger
N.V. ThyssenKrupp Materials Belgium
Weverslaan, 16
BE-9160 Lokeren

Ihre Auftr.-Nr. vom Your order No./date /No de votre commande du 4500213796 / 07.05.04	Unser Material-Nr. Our material No./No. de notre matériel 2215852
Unser Auftr.-Nr. Our order No./No. de notre Commande 228197 / 10	Unser Abteilung/Our department/Notre département VBR4
Unser Telefon/Our telephone/Notre téléphone 02302/294990	

Produkt/Product/Produit

STAIBE AUS EDELSTAHL
THYROPOR 34 CRNMO 6 MAT. NO. 1.6582
GEWALZT, VERGÜTET,
GERÄUCHT,
GEMÄSS EN 10083-1 QT
RM = 800-950 N/MM²
TOLERANZ DIN 1013
GEMÄSS SPEC. 05.03.07 E V. 08.02

ENGINEERING STEEL BARS
THYROPOR 34 CRNMO 6 MAT. NO. 1.6582
HOT ROLLED, HARDENED AND TEMPERED,
STRAIGHTENED,
ACC. TO EN 10083-1 QT
RM = 800-950 N/MM²
TOLERANCE DIN 1013
ACC. TO SPEC. 05.03.07 E V. 08.02

BARRES EN ACIER FIN DE CONSTRUCTION
THYROPOR 34 CRNMO 6 MAT. NO. 1.6582
LAMINÉ, TREMPÉ ET REVENU,
DRESSÉ,
SELON EN 10083-1 QT
RM = 800-950 N/MM²
TOLERANCE DIN 1013
SELON SPEC. 05.03.07 E V. 08.02

BARRAS DE ACERO DE CONSTRUCCION
THYROPOR 34 CRNMO 6 MAT. NO. 1.6582
LAMINADO, BORNIFICADO,
ENDEREZADO,
SEGUN EN 10083-1 QT
RM = 800-950 N/MM²
TOLERANCIA DIN 1013
SEGUN SPEC. 05.03.07 E V. 08.02

Fertigungsnummer/Production lot-No./Lot de fabrication No. : 23140
Lieferchein-Nr./Delivery note/No. de l'avis de livraison :
Schulden-Nr./Debt No./No. de compte : 503360
Stückzahl/Plates No./Nombre des pièces :
Gewicht/Weight/Masse :
Zeichnungs-Nr./Drawing No./No. du dessin :
Formel/Shape/Profil : rund / round / rond
Durchm./Diameter/Diamètre/Idm./Diamètre/Longueur : 193.000 [mm] +2.500/-2.500 [mm]
Dicke/Thickness/Épaisseur :
Länge/Length/Longueur : 15000 + 6500 [mm] + UL

Selbstschmelz und Gewicht siehe Bescheinigung / Quantity and weight see delivery bill/invoice.
Nombre des pièces et poids voir facture.

Lieferzustand/Condition as supplied/État de livraison : 840 °C Wasser/Water/L'Eau + 620 °C Ölöl/Air/L'air

Die Prüfungsergebnisse zu Ihrer Lieferung finden Sie auf der Rückseite bzw. den nächsten Seiten.
As for the results of your delivery see invoice. / Voir l'ensemble des résultats d'examen de votre livraison aux pages suivantes.

EDELSTAHL WITTEN-KREFELD GMBH
Abnahmeprüfung/Inspection department/Département de Réception

Der Werkssachverständige
Works' Inspector/L'Agent Réceptionnaire de l'usine

ThyssenKrupp
Materials Belgium N.V./S.A.
- 3 ADUT 2004
Division Liège





EDELSTAHL WITTEN-KREFELD GMBH

Austrasse 4
D-58452 Witten
Telefon: (02302) 229-0
Telefax: (02302) 229-40 00
Postanschrift D-58449 Witten
http://www.edelstahl-witten-krefeld.de

Datum/Date: 28.07.04

Seite/Page: 2 / 2

Zertifikat-Nr. Certificate No./No. de Certificat	Unsere Auftr.-Nr. Our order No./No. de notre Commande	Ihre Auftr.-Nr. vom Your order No. date /No. de votre commande du	Fertigungsauftr.-Nr. Production lot-No./Lot de fabrication No.
505337/653269/bit	228197/110	4500213796	23140

Schmelzen-Nr. Heat No./No. de coulée	Erzeugungsart Steelmaking process/Procédé d'élaboration	Gießverfahren Casting process/Procédé de coulé
505360	S	VSG

Chemische Zusammensetzung / Chemical Composition / Composition chimique

	C	Si	Mn	P	S	Cr	Mo	Ni	Ca	Se	V	Al	
ist/Actual/Actual	0.35	0.31	0.62	0.010	0.026	1.50	0.20	1.51	0.05	0.014	< 0.01	0.027	[96]

Zugversuch / Tensile test / Essai de traction

Lieferzustand / Condition as supplied / Etat de livraison

Proben-Nr./Specimen-No./No. d'éprouvette	R _m [MPa (N/mm²)]	R _m [MPa (N/mm²)]	A5 [%]	Z [%]
47191	748	867	20.0	66
Soll/Required/Demandé	≥ 600	800 - 950	≥ 13	≥ 55

Stoßversuch / Impact test / Essai de résilience

Lieferzustand / Condition as supplied / Etat de livraison

Probenform / Type of specimen / Type d'éprouvette	Probenrichtung / Specimen direction / Sens de Préfèrence	Prüftemp. / Test temperature / Température d'essai
[CHARPY V]	Stoß / Impact / Choc	23 [°C]
Proben-Nr./Specimen-No./No. d'éprouvette	1. Prüfl./Spec./Epreuve	2. Prüfl./Spec./Epreuve
47191	89 [J]	91 [J]
Soll/Required/Demandé	≥ 60 [J]	90 [J]

Korngröße / Grain size / Grosséur de grain

Lieferzustand / Reference condition / Etat de référence

Prüfgröße / Size / Grosséur

ist / as / and smaller / et plus fin

Mikroskopischer Reinheitsgrad / Microscopic cleanliness / Degré de propreté micrographique

1) DIN 50602 entspr. Spec. 05.02.07 E gewaschen / washed / lavé / garantizado

3-Prüfung / Ultrasonic testing / Contrôle par ultrasons

ist / as / and smaller / et plus fin

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18 NOV. 2004



5 haft

 		ASCOMETAL Usine des Dunes Boite postale 41 59041 Dunkerque cedex 2 CERTIFICAT DE RECEPTION 3-1-B/EN 10204		GROUPE LUCCHINI <i>B03022704</i>								
N° CERTIFICAT 1/72813		CLIENT MCB RUE JL DEFRENE 107 B4340 AWANS BELGIQUE		CDE CLIENT DAB 100819								
CDE USINE 216/8320 /02-01				N° COULEE B6850								
DESIGNATION DIMENSIONS ET POIDS NUANCE		8 rd 140 x 6,000/ 6,100 m = 5,860 T <i>-221346 074002</i> <i>30,65 m</i> 34CRNIMO6										
COMPOSITION CHIMIQUE 10-3%												
C	Mn	Si	S	P	Ni	Cr	Mo	H2	Cu			
356	692	211	20	12	1540	1620	239	ppm 1,05	163			
CARACTERISTIQUES MECANIQUES												
* TC PR	TRAITEMENT	* L RE T	LIM.EL RE N/mm ²	RESIST RM	A %	Z %	* L T	RESILIENCE KV JOULES			DURETE HB	
PR	Traité	L	849	969	17,8	64,0	L	+ 20 95.0- 99.8-100.3			269/ 277	
SIGNIFIE TC : TEMOINS COULEE PR : PRODUIT ETAT LIV. L : LONG T : TRANSVERS												
AUTRES RESULTATS Elaboration electrique, metal degaze sous vide Controle def.de surface et internes satisfaisant Inclusions: K4=.0 <i>Signeur 609910/1 -> 609910/5</i>												
 03-03-2003												
Acier exempt de radioactivité anormale - Steel free from abnormal radioactivity - Stahl frei von anormaler Radioaktivität												
NOUS CERTIFIONS QUE LES PRODUITS CI-DESSUS SONT CONFORMES AUX PRESCRIPTIONS DE LA COMMANDE					DATE 21/11/01		VISA DU CHEF DU SERVICE G. GIROUD <i>[Signature]</i> GG					
					MG / 095							

Edelstahlwerke Buderus AG STAHLLAGER WETZLAR BUDERUSSTR. 25 D 35576 WETZLAR	Abnahmeprüfzeugnis EN 10 204-3.1.B	Herstellerzeichen Suppliers Mark Marque D'Usine 
	Attest Nr. 202891	
	Werksauftrag-Nr. 1-27577-3	Zeichen des Fertigungszeichens Fertigungs-Bezeichnung Fertigungs-Nr.
	Pos-Los 1-09	

Position	UPos	Anzahl	Chargen Nr.	Gewicht [Kg]
0001	0	2	53877	35560,000

Erschmelzungsart Elektrostaahl
 Kd Wst Bez 18 CRNIMO 7-6 ISO-B Werkstoff 6587
 Versandanzeige-Nr. / Datum 5000197748 26.03.2003

I04112301
 10817680007762
 5X

Materialbezeichnung	: Stabstaahl geschmiedet
Position	: ARTIKEL-NR.: 75004698
Ausführung	: DIN 75278 - 02/75, FESTIGKEIT MIN 180,0, FESTIGKEIT MAX 210,0 HB, UNBEARBEITET, BEIDE ENDEN GESÄGT, UT-GEPRÜFT, VORVERGÜTET, VERFORMUNGSGRAD MIN 4,0 VAKUUMENTGAST, 100 % TITANFREI
Kundenbestellnummer	: -
Liefervorschrift	: EN 10084 + DIN 17210-ANHANG AUSGABE 10/84 ZF 1A REV.10/01
Abmessung	: RM RD, 600,0 X

Chemische Zusammensetzung % Chargenanalyse									
C	Si	MN	P	S	CR	NI	MO	V	W
0,17	0,33	0,55	0,008	0,002	1,69	1,57	0,30	—	—
CU	SN	TI	AL	H2	CA	SB	O2		
0,19	0,0100	0,0010	0,026	—	0,0010	0,0015	0,0012		

NB=0,002 N2=0,0090

Stirnabschreckversuch Charge												
1,5	3	5	7	9	10	13	15	20	25	30	40	50
44	44	44	43	43	43	43	42	40	39	36	35	34
												MM
												HRC

Dynamische Schlagkraft in [KN]
63

MI-Reinheit DIN 50602 Charge
K4 0,0

MI-Reinheit nach ASTM E 45/97 PL. Charge
A Dünn Dick B Dünn Dick C Dünn Dick D Dünn Dick 0,5 0,5 0,0 0,0 0,0 0,0 1,0 0,5
ISO 4967: TYP DS= 1,0

Abschreck Korngröße :	Charge 6-7
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Prüf Nr.	Härteprüfung
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Edelstahlwerke Buderus AG	Qualitätssicherung Wetzlar, den 13.08.2004	Hr. C. Moosberger Werkssachverständiger	Seite 1 von 2
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23 NOV 2004



Edelstahlwerke Buderus AG		Abnahmeprüfzeugnis EN 10 204-3.1.B	Herstellerzeichen Supplier's Mark Marque d'Usine  Buderus Teil von der Industriegruppe Pöchlmann Group Don Ofner, Linz
STAHLLAGER WETZLAR BUDERUSSTR. 25 D 35576 WETZLAR		Attest Nr. 202891	
		Werksauftrag-Nr. 1-27577-3	
		Pos.-Los 1-09	

V 0624 HB 30 190

Zugversuch

Zugversuch		Blindhärteprüfung				Werte
Prüf Nr.	Proben - Form Richtung Lage	Temp: [°C]				
S 0624	O B 10 X 50 STIRNS./FRONT-FACE	+ 20	RP	0,2 [MPa]		1083
				RM [MPa]		1232
				A 5 [%]		10,4
				Z [%]		51,0

Kerbschlagversuch

Kerbschlagversuch		Blindhärteprüfung				Werte
Prüf Nr.	Proben - Form Richtung Lage	Temp: [°C]	Testart			
S 0624	Q ISO-V STIRNS./FRONT-FACE	+ 20	AV/Einzelwerte [J]	46	51	45

VERFORMUNGSGRAD: > 4 - FACH
DIE US-PRÜFUNG GEMÄSS QSV 1090 REV.1 ERGAB KEINE BEANSTANDUNG.

Attest ist per EDV erstellt und ohne Unterschrift gültig gemäss EN 10204.

Es wird hiermit bestätigt, daß die Lieferung den Vereinbarungen bei der Bestellung entspricht.

23 NOV. 2004



Edelstahlwerke Buderus AG	Qualitätssicherung Wetzlar, den 13.08.2004	Hr. C. Moosberger Werkssachverständiger	Seite 2 von 2 Anlagen 
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 		ASCOMETAL CERTIFICAT DE RECEPTION 3-1-B/EN 10204		Usine des Dunes Boite postale 41 59341 Dunkerque cedex 2		GROUPE LUCCHINI Bc 3c 2204						
N° CERTIFICAT 1/72813		CLIENT MCB RUE JL DEFRENE 107 B4340 AWANS BELGIQUE				CDE CLIENT DAB 100819						
CDE USINE 216/8320 /02-01						N° COULEE B6850						
DESIGNATION DIMENSIONS ET POIDS NUANCE		8 rd 140 x 6,000/ 6,100 m = 5,860 T 34CRNIMO6										
COMPOSITION CHIMIQUE 10-3%												
C	Mn	Si	S	P	Ni	Cr	Mo	H2	Cu			
356	692	211	20	12	1540	1620	239	ppm 1,05	163			
CARACTERISTIQUES MECANIQUES												
* TC PR	TRAITEMENT	* L T	LIM. EL RE N/mm ²	RESIST RM	A %	Z %	* L T	RESILIENCE KV JOULES	DURETE HB			
PR	Traité	L	849	969	17,8	64,0	L + 20	95.0~ 99.8-100.3	269/ 277			
SIGNIFIE TC : TEMOINS COULEE PR : PRODUIT ETAT LIV. L : LONG T : TRANSVERS												
AUTRES RESULTATS Elaboration electrique, metal degaze sous vide Controle def.de surface et internes satisfaisant Inclusions: K4=.0 1320704827 Ca 510059/4 - 550 045/2												
Acier exempt de radioactivité anormale - Steel free from abnormal radioactivity - Stahl frei von anormaler Radioaktivität												
NOUS CERTIFIONS QUE LES PRODUITS CI-DESSUS SONT CONFORMES AUX PRESCRIPTIONS DE LA COMMANDE					DATE 21/11/01		VISA DU CHEF DU SERVICE G. GIROUD MG / 295					

Matteeuw Group		Datum: 17/01/2005		Klant: A.C.Complec	
Kampveldstraat 51		benaming: gear		Plan nr: 1320701557	
B 8020 Oostkamp		ID: 609908		Rev: 9	



Kontrolerapport gear

4. Gear Data Certification

	requirements	set nr,				
		18062	18063	18064	18065	
Runout	0,0008	0,00049	0,000392	0,000294	0,000294	
Tooth to tooth space	0,0002	0,000058	0,000058	0,000058	0,000058	
Finisch on tooth contact surface	32	O.K.	O.K.	O.K.	O.K.	
Finisch on fillet area	63	O.K.	O.K.	O.K.	O.K.	
Chordal tooth thickness	,1069 -,1035	0,1064	0,1065	0,1058	0,1044	

Lead and profile; See Chart

5. Magnetic Particle Inspection

All parts have been inspected and are conform to the specifications.

6. balance record

All parts are balanced

Kontrollerapport pinion

S/N.....609910/1 - 609910/5.....

5. MAGNETIC PARTICLE INSPECTION

Parts have been inspected on a simpling base to MIL-STD 105 E and comply to the specification

6, BALANCE RECORD

parts are not balanced

Watteeuw Group	Datum: 6/12/2004	Klant: A.C. Comptec
Kampveldstraat 51	benaming: Gear	Plan nr: 1320701637
B 8020 Oostkamp	ID: 595199	Rev: 4

Kontrolerapport pinion

S/N.....595199/1 - 595199/5

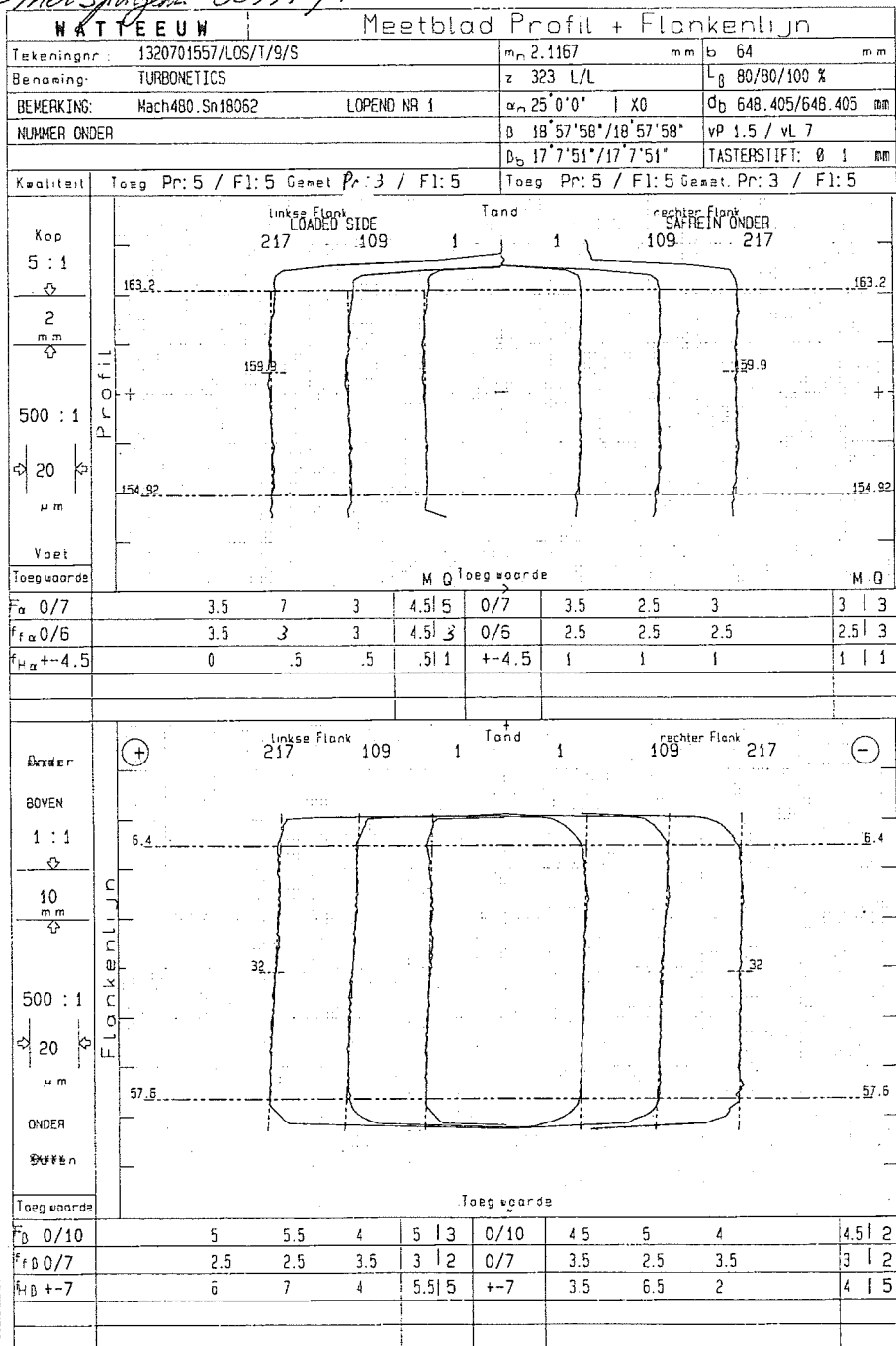
5. MAGNETIC PARTICLE INSPECTION

Parts have been inspected on a simpling base to MIL-STD 105 E
and comply to the specification

6. BALANCE RECORD

parts are not balanced

met spijzen 609910/1



Datum 13.01.2005 22:14

Keurder 446.

ZP 1000 V5.14 DIN

INCHTELLER

Operator: 133

PLC: DATA SENSITIVITY

PLC: DATA SENSITIVITY

PLC: DATA SENSITIVITY

Operator: 133

21.01.05 13:03

Operator: 133

File name: 1328782241

rotor data

setup: 21.01.05

a: 75.00 mm	b: 51.00 mm	c: 77.00 mm
r1: 254.0 mm	readout : p11/p12	r2: 254.0 mm
m1:  polar		m2:  polar
tol1: 345.0 gmm	bal. speed: 412 C/min	tol2: 345.0 gmm

plane 1

 153. mg	rotor: 18882
at 112 deg	
In tol	

plane 2

 555. mg	
at 256 deg	
In tol	

run 1

PT

PT

PT

PT

PLC. MATTHEW A. O.

Removal of heat 21

D-8020 On time

operator : 035

21.01.00 13:08

water date

setup : 1

1020702241

ax 78.00 mm

bx 31.00 mm

cx 17.00 mm

dx 354.0 mm

dx, diam

dx 254.0 mm

ax -polar

ax -polar

bx 354.0 mm

bx 354.0 mm

machine : 1

set speed : 450. rpm

readout

motor: 18062

11.01.00 13:08

run : 1

set speed : 450. rpm

pl 11

111. mg

pl 11

111. mg

111. mg

111. mg

111. mg

111. mg

corrective in 101. mg

101. mg

101. mg

Final Inspection of Centrifugal Compressors

Customer: AC Energas / Air Liquide Unit: HL8-4-75 Sales Order: L8-41197

No. Description

Verified By/ Date

Pre Test

1. Orientation of Flow Direction Sensitive Items Verified
2. Loctite has been Applied to the IGV Control Rod End Bolt
3. Piping, Tubing & Conduit are Properly Secured
4. Bolting is Installed Properly on Required Flanges 6.
5. Unit Checked for Replacement of Plastic Plugs w/ Metal Ones

AP 6/2/05
AP 6/2/05
AP 6/2/05
AP 6/2/05
AP 6/2/05

Post Test

6. Post Test Bearing and Seal Inspection if Required
7. Shop Test Punchlist Findings Resolved
8. Unit assembly checklist is completed
9. Painting Accomplished as Required
10. Tagging is Completed, & is Verified as Correct

AP 6/2/05
AP 6/2/05
AP 6/2/05
AP 6/2/05
AP 6/2/05

Administrative

12. Dim Check is Completed and Dispositioned
13. All NCR's against this job have been Cleared
14. Requirements of Quality Plan Performed

AP 6/2/05
AP 6/2/05
AP 6/2/05

Atlas Copco Comptec

15. Control Drawing in Electrical Box & Electrical Boxes Secured
16. Certification of Compressor Package, Signed & Attached
17. Record Serial Numbers

AT 6/2/05
AT 6/2/05
AT 6/2/05

	Shell
1 st Stg Cooler	N/A
2 nd Stg Cooler	
3 rd Stg Cooler	
Aftercooler	
Oil Cooler	

Bundle
N/A

Shipping Preparation

18. Preservation Techniques Applied as Required (Includes Gearing)
19. Coupling Blocked & Wrapped for Shipment
20. Protective Covers Installed on External Openings
21. Insulation has been installed if required.
22. Necessary Hardware for Ship Loose Items Included/ Packaged

AT 6/2/05
AT 6/2/05
AT 6/2/05
N/A
AT 6/2/05

Comments: _____

Unit Released for Shipment Q.C.: AT 6/2/05 Date: 6/2/05
Customer Release if Required: _____ Date: _____



Certificate of Test

This certifies that the centrifugal compressor identified as serial number TBI0541197 was mechanically and performance tested on 25-May-05 for a minimum of two hours and has been found acceptable according to the terms of the order. The testing was executed using atmospheric air. The compressor was driven through an intermediate gear using a shop test motor. Compressor input speed was 3010 RPM.

Jude Fusco

Digitally signed by Jude Fusco
DN: CN = Jude Fusco, C = US
Date: 2005.06.02 09:58:18 -04'00'

Quality Assurance
Atlas Copco Comptec Inc



Roger Nyquist

Digitally signed by
Roger Nyquist
DN: cn=Roger Nyquist,
o=Atlas Copco, c=US
Date: 2005.06.01
13:21:05 -04'00'

Signature valid

Senior Aero Engineer
Atlas Copco Comptec Inc.

Atlas Copco Comptec Inc.

Atlas Copco Comptec Inc.
46 School Road
Voorheesville, NY 12186 USA
FCD-0095; Rev. 3; Certificate of Test

Phone: (518) 765-3344

Compressor Test Sign-off Sheet

Model: HL8-4-75

Unit Number: L8-41197

Customer: ACE/Air Liquide

Test Location: ACC Test Cell T13

The referenced unit has successfully completed test as defined by the Test Spec. and meets contract requirements, mechanical and aero.

By:  **Jeff Sheely**
Signature valid
Atlas Copco – Project Engineer

Digitally signed by Jeff
Sheely
DN: cn=Jeff Sheely, c=US
Date: 2005.06.03
08:16:43 -04'00'

By: _____
Customer – if witnessed

Comments: _____

Accepted and issued by:  **Jeffrey W. Smith**
Signature valid
Test Engineer

Digitally signed by Jeffrey
W. Smith
DN: cn=Jeffrey W. Smith,
o=Atlas Copco Compress
Inc., ou=Test, c=US
Date: 2005.05.27 09:42:20
-04'00'

Date

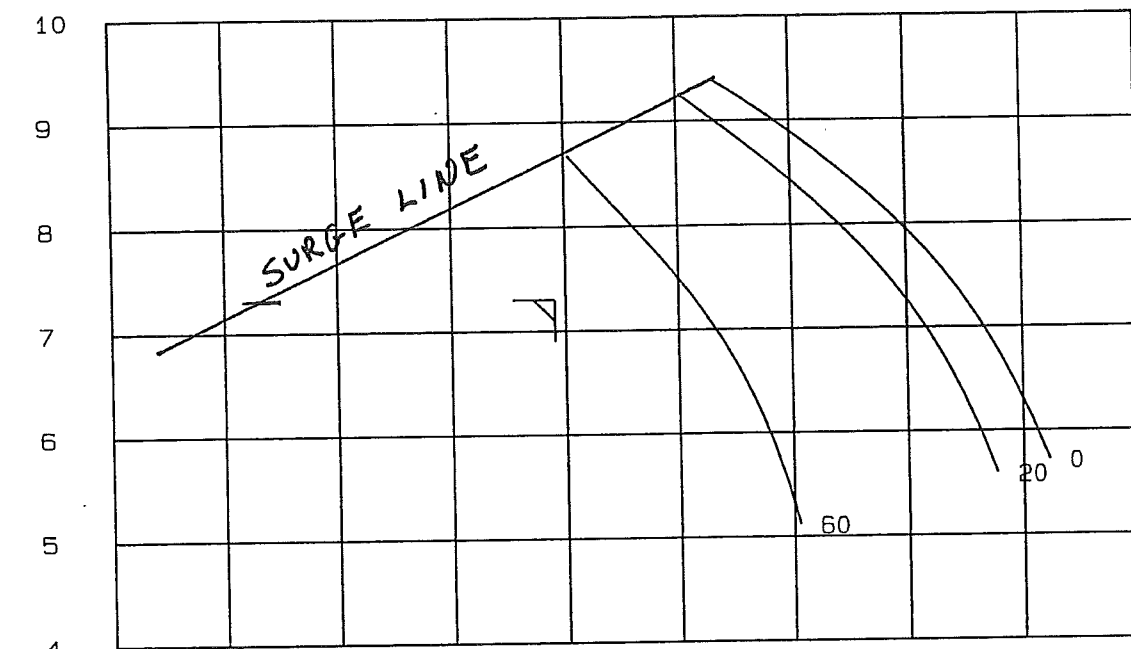
ATLAS COPCO ACT COMPRESSOR PERFORMANCE MAP

ORDER # : L8-41197
 CUSTOMER: ACE/AIR LIQUIDE
 MODEL: HL8-4-75
 TEST DATE: 5-25-05

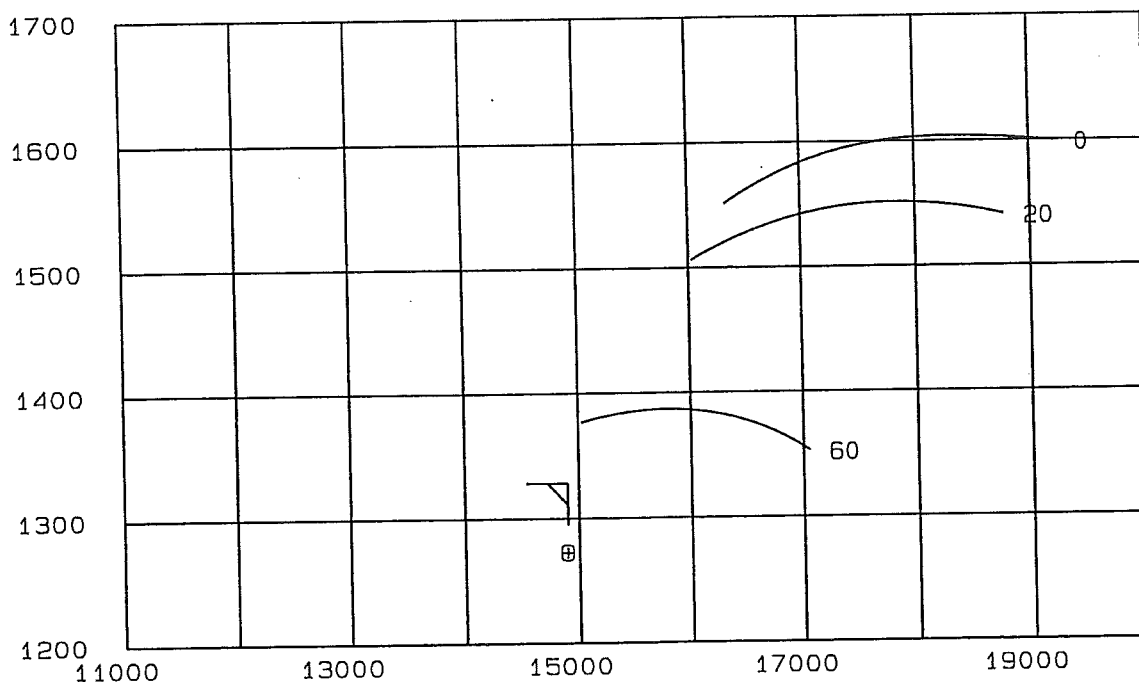
REF. PRES. : 15.16 psia
 MEDIUM : NITROGEN
 MOLEWEIGHT : 28.01 kg/kMol
 ISEN. EXP. : 1.4
 REL. HUM. : 0%

T1 IN : 71.6 deg F
 T2 IN : 70 deg F
 T3 IN : 69.8 deg F

DISCHARGE PRESSURE BAR (a)



KILOWATTS



DELIVERED FLOW NM³/HR

G = Tested Power at GP

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

INPUT DATA

NUMBER OF STAGES = 3 NUMBER OF IGV ANGLES = 3
 BAROMETRIC PRESSURE = 14.70 REFERENCE PRESSURE = 15.16
 AFTERCOOLER DP = 1.52 MECHANICAL POWER LOSS = 67.0
 STAGE 1 INLET TEMP = 71.6 STAGE 1 GAS CONSTANT: 55.15
 STAGE 2 INLET TEMP = 70.0 STAGE 2 GAS CONSTANT: 55.15
 STAGE 3 INLET TEMP = 69.8 STAGE 3 GAS CONSTANT: 55.15
 STAGE 1 - 2 DP, FLOW = 0.96 @ 9912.0
 STAGE 2 - 3 DP, FLOW = 0.88 @ 9912.0

SEAL LEAKAGE + CONDENSATE KNOCKOUT

MASS FLOW RATIO m2/m1 = 1.000
 MASS FLOW RATIO m3/m1 = 0.999

INTERSTAGE MASS INJECTION OR REMOVAL

MASS FLOW RATIO m2/m1 = 1.000
 MASS FLOW RATIO m3/m2 = 1.000

DISCHARGE TO INLET FLOW RATIO = .998

IGV ANGLE = 0				IGV ANGLE = 20				IGV ANGLE = 60			
Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1
10088	2.733	930.7	.8355	9831	2.697	885.6	.8424	9249	2.526	781.6	.8305
10588	2.682	962.0	.8299	10186	2.653	904.7	.8382	9838	2.382	793.0	.8087
11048	2.605	978.3	.8230	10664	2.581	927.7	.8282	10453	2.212	801.4	.7689
11584	2.521	1000.8	.8107	11061	2.507	940.8	.8174				
11795	2.485	1008.9	.8040	11490	2.431	957.1	.8034				

STAGE 2				STAGE 3			
Q	PR	HP	EF	Q	PR	HP	EF
3727	1.97	220.4	.8355	1926	1.74	93.9	.8185
3761	1.97	221.2	.8433	1942	1.75	95.0	.8195
3793	1.97	220.7	.8509	1961	1.75	95.7	.8215
3947	1.93	230.8	.8165	2088	1.73	99.3	.8292
4090	1.93	231.3	.8435	2171	1.73	102.4	.8278
4278	1.88	235.7	.8315	2323	1.68	105.9	.8152
4279	1.88	238.5	.8222	2326	1.68	105.6	.8169
4410	1.86	239.0	.8301	2426	1.66	108.0	.8062
4597	1.82	245.7	.8074	2612	1.60	111.4	.7798
4791	1.78	248.4	.8012	2774	1.53	113.8	.7254
4946	1.73	249.9	.7788	2952	1.34	114.2	.5202
4962	1.74	252.5	.7773	2958	1.34	115.0	.5194
4969	1.73	252.3	.7758	2975	1.33	114.7	.5040

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

ACCURACY OF POLYNOMIAL CURVE FIT

IGV ANGLE = 0				IGV ANGLE = 20				IGV ANGLE = 60			
Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF
10088	0.01	0.02	0.00	9831	-0.02	-0.03	0.00	9249	0.00	0.00	0.00
10588	-0.07	-0.08	-0.00	10186	0.05	0.08	-0.01	9838	0.00	0.00	0.00
11048	0.11	0.12	0.00	10664	-0.07	-0.11	0.01	10453	0.00	0.00	0.00
11584	-0.11	-0.13	-0.00	11061	0.05	0.08	-0.01				
11795	0.06	0.06	0.00	11490	-0.01	-0.02	0.00				

STAGE 2				STAGE 3			
Q	ēPR	ēHP	ēEF	Q	ēPR	ēHP	ēEF
3727	0.30	-0.23	0.74	1926	0.46	0.42	0.83
3761	-0.22	0.02	-0.34	1942	0.08	-0.17	0.42
3793	-0.34	0.82	-1.37	1961	-0.15	-0.25	-0.10
3947	0.62	-1.22	2.27	2088	-0.54	0.20	-1.77
4090	-0.54	0.45	-1.35	2171	-0.73	-0.48	-1.38
4278	0.14	0.66	-0.41	2323	0.32	-0.04	0.80
4279	0.11	-0.51	0.71	2326	0.39	0.30	0.60
4410	-0.11	0.54	-0.73	2426	0.64	0.13	1.66
4597	0.17	-0.59	0.90	2612	0.20	0.07	0.68
4791	-0.22	-0.08	-0.33	2774	-1.20	-0.28	-3.16
4946	0.35	0.61	0.06	2952	0.70	0.39	1.87
4962	-0.17	-0.28	-0.05	2958	0.12	-0.29	0.56
4969	-0.07	-0.15	0.01	2975	-0.23	0.02	-0.62

ALL ē VALUES ARE GIVEN AS PERCENT DIFFERENCE OF CALCULATED TO INPUT VALUE.

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 0

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
10088	3769	1936	15.2	2.734	40.5	1.967	78.7	1.751
10182	3817	1968	15.2	2.726	40.3	1.960	78.1	1.744
10276	3867	2003	15.2	2.717	40.2	1.952	77.4	1.738
10371	3919	2039	15.2	2.707	40.0	1.943	76.8	1.732
10465	3973	2077	15.2	2.696	39.8	1.935	76.0	1.726
10559	4030	2118	15.2	2.684	39.6	1.926	75.3	1.720
10653	4089	2160	15.2	2.671	39.4	1.916	74.4	1.714
10747	4149	2205	15.2	2.657	39.1	1.906	73.6	1.708
10841	4211	2251	15.2	2.642	38.9	1.895	72.7	1.701
10936	4275	2300	15.2	2.627	38.7	1.884	71.8	1.693
11030	4341	2351	15.2	2.611	38.4	1.872	70.8	1.683
11124	4408	2405	15.2	2.595	38.1	1.860	69.8	1.672
11218	4476	2461	15.2	2.580	37.9	1.846	68.8	1.657
11312	4545	2519	15.2	2.564	37.6	1.832	67.8	1.639
11406	4615	2580	15.2	2.548	37.4	1.818	66.7	1.616
11501	4686	2643	15.2	2.532	37.1	1.802	65.7	1.587
11595	4756	2710	15.2	2.517	36.8	1.786	64.6	1.551
11689	4827	2778	15.2	2.502	36.6	1.769	63.5	1.505
11783	4898	2849	15.2	2.488	36.4	1.751	62.4	1.448
11877	4968	2923	15.2	2.474	36.1	1.732	61.3	1.379

PERFORMANCE SUMMARY

FLOW DEL. NM ³ /HR	DIS P. BAR(a)	DIS P. BAR(e)	SHAFT KW
16330	9.39	8.38	1551.1
16483	9.29	8.27	1560.0
16635	9.18	8.16	1568.0
16788	9.06	8.05	1575.0
16940	8.94	7.93	1581.2
17092	8.82	7.81	1586.5
17245	8.69	7.68	1591.0
17397	8.56	7.55	1594.7
17550	8.42	7.41	1597.7
17702	8.27	7.26	1600.1
17855	8.11	7.10	1601.8
18007	7.94	6.93	1603.0
18159	7.76	6.74	1603.7
18312	7.56	6.54	1603.9
18464	7.33	6.32	1603.7
18617	7.08	6.07	1603.3
18769	6.80	5.79	1602.5
18922	6.49	5.47	1601.6
19074	6.13	5.11	1600.5
19226	5.72	4.71	1599.4

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9900	3758	1928	15.2	2.689	39.8	1.969	77.5	1.752
9989	3808	1962	15.2	2.679	39.6	1.961	76.8	1.746
10078	3860	1998	15.2	2.668	39.5	1.953	76.1	1.739
10167	3914	2035	15.2	2.657	39.3	1.944	75.4	1.733
10256	3969	2074	15.2	2.644	39.1	1.936	74.7	1.727
10345	4026	2114	15.2	2.631	38.8	1.926	73.9	1.721
10435	4085	2157	15.2	2.617	38.6	1.917	73.0	1.715
10524	4145	2201	15.2	2.602	38.4	1.907	72.2	1.708
10613	4207	2247	15.2	2.588	38.1	1.896	71.3	1.702
10702	4270	2296	15.2	2.572	37.9	1.885	70.4	1.694
10791	4335	2346	15.2	2.557	37.6	1.873	69.4	1.685
10880	4401	2399	15.2	2.541	37.4	1.861	68.5	1.673
10970	4469	2454	15.2	2.525	37.1	1.848	67.5	1.659
11059	4538	2512	15.2	2.508	36.8	1.834	66.5	1.642
11148	4607	2572	15.2	2.492	36.6	1.819	65.4	1.619
11237	4678	2635	15.2	2.476	36.3	1.804	64.4	1.591
11326	4750	2702	15.2	2.460	36.0	1.788	63.3	1.555
11415	4822	2772	15.2	2.444	35.8	1.770	62.2	1.510
11505	4894	2845	15.2	2.429	35.5	1.752	61.0	1.453
11594	4967	2922	15.2	2.413	35.3	1.732	59.9	1.380

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR(a)	BAR(e)	KW
16025	9.26	8.25	1506.1
16169	9.14	8.13	1513.2
16314	9.02	8.01	1519.7
16458	8.90	7.89	1525.6
16602	8.78	7.77	1530.8
16747	8.66	7.64	1535.4
16891	8.53	7.52	1539.4
17035	8.40	7.38	1542.9
17180	8.26	7.24	1545.7
17324	8.11	7.10	1547.9
17468	7.96	6.95	1549.6
17613	7.79	6.78	1550.7
17757	7.61	6.60	1551.2
17901	7.42	6.40	1551.3
18046	7.20	6.19	1550.8
18190	6.96	5.94	1549.8
18334	6.68	5.67	1548.4
18479	6.37	5.35	1546.4
18623	6.01	4.99	1543.9
18767	5.60	4.58	1540.9

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 60

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9286	3760	1928	15.2	2.517	37.3	1.968	72.7	1.752
9352	3812	1963	15.2	2.502	37.1	1.960	71.9	1.745
9417	3864	1999	15.2	2.487	36.8	1.952	71.1	1.739
9483	3918	2036	15.2	2.471	36.6	1.944	70.3	1.732
9549	3973	2074	15.2	2.455	36.3	1.935	69.5	1.727
9615	4028	2114	15.2	2.439	36.1	1.926	68.6	1.721
9681	4086	2155	15.2	2.423	35.8	1.917	67.8	1.715
9747	4144	2198	15.2	2.406	35.5	1.907	66.9	1.709
9812	4204	2243	15.2	2.389	35.3	1.897	66.0	1.702
9878	4265	2289	15.2	2.372	35.0	1.886	65.1	1.695
9944	4327	2337	15.2	2.354	34.7	1.875	64.2	1.686
10010	4392	2388	15.2	2.337	34.5	1.863	63.3	1.676
10076	4457	2441	15.2	2.319	34.2	1.850	62.3	1.663
10141	4524	2497	15.2	2.301	33.9	1.837	61.3	1.647
10207	4593	2556	15.2	2.283	33.6	1.822	60.3	1.626
10273	4664	2619	15.2	2.264	33.3	1.807	59.2	1.599
10339	4736	2685	15.2	2.245	33.0	1.791	58.1	1.565
10405	4811	2756	15.2	2.226	32.7	1.773	57.0	1.521
10471	4887	2832	15.2	2.207	32.4	1.754	55.8	1.463
10536	4965	2914	15.2	2.187	32.1	1.733	54.6	1.388

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR (a)	BAR (e)	KW
15031	8.68	7.66	1376.9
15138	8.55	7.53	1379.5
15245	8.42	7.41	1381.7
15351	8.29	7.28	1383.5
15458	8.17	7.15	1385.0
15564	8.04	7.03	1386.0
15671	7.91	6.90	1386.7
15777	7.78	6.77	1387.0
15884	7.65	6.63	1386.9
15990	7.51	6.49	1386.3
16097	7.36	6.35	1385.3
16203	7.21	6.19	1383.9
16310	7.04	6.02	1382.0
16417	6.85	5.84	1379.6
16523	6.65	5.64	1376.7
16630	6.42	5.41	1373.2
16736	6.17	5.15	1369.2
16843	5.87	4.86	1364.5
16949	5.52	4.51	1359.1
17056	5.12	4.10	1352.9

□

***** Power Evaluation (Inlet Guide Vanes) *****

Model : HL8-4-75

Order No : L8-41197

Test Date : 5-25-05

Guaranteed Conditions: POINT # 1

(QG)	Flow	14900.00	DEL. NM ³ /HR	
(DPG)	Disc Press		7.30	BAR(a)
(HPG)	Coupling Power	1328.00	KW	
(HPM)	Mechanical loss	49.96	KW	
(APD)	Aftercooler dp	0.11	BAR	

Igv Angle 1 (deg)		60	
Flow 1	16096.89	DEL. NM ³ /HR	
Disc P 1	7.36	BAR(a)	
Power 1	1385.32	KW	
Flow 2	16203.43	DEL. NM ³ /HR	
Disc P 2	7.21	BAR(a)	
Power 2	1383.88	KW	

Igv Angle 2 (deg)		20	
Flow 1	17901.38	DEL. NM ³ /HR	
Disc P 1	7.42	BAR(a)	
Power 1	1551.29	KW	
Flow 2	18045.72	DEL. NM ³ /HR	
Disc P 2	7.20	BAR(a)	
Power 2	1550.81	KW	

Calc Values at Des P:

IGV 1 Flow	16138.64	DEL. NM ³ /HR	
IGV 1 Power	1384.76	KW	
IGV 2 Flow	17979.09	DEL. NM ³ /HR	
IGV 2 Power	1551.03	KW	
Des Pt IGV angle (deg)		86.92	
Des Pt Power	1272.85	KW	

(Calc/Guar) Power(%)	-4.15
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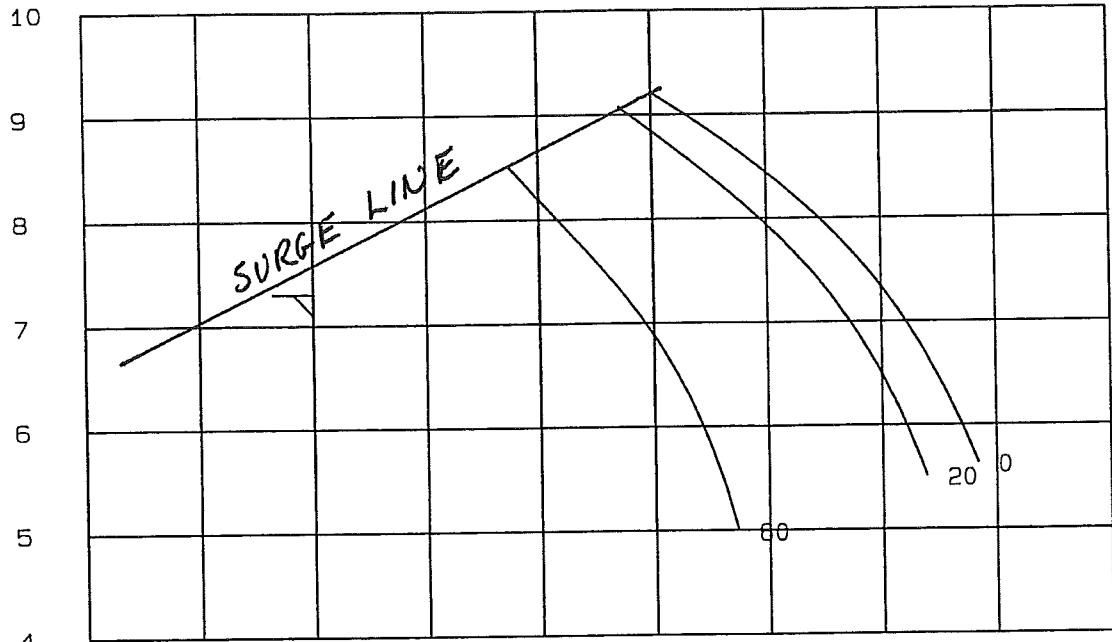
ATLAS COPCO ACT COMPRESSOR PERFORMANCE MAP

ORDER # : L8-41197
 CUSTOMER: ACE/AIR LIQUIDE
 MODEL: CASE A MIN
 TEST DATE: 5-25-05

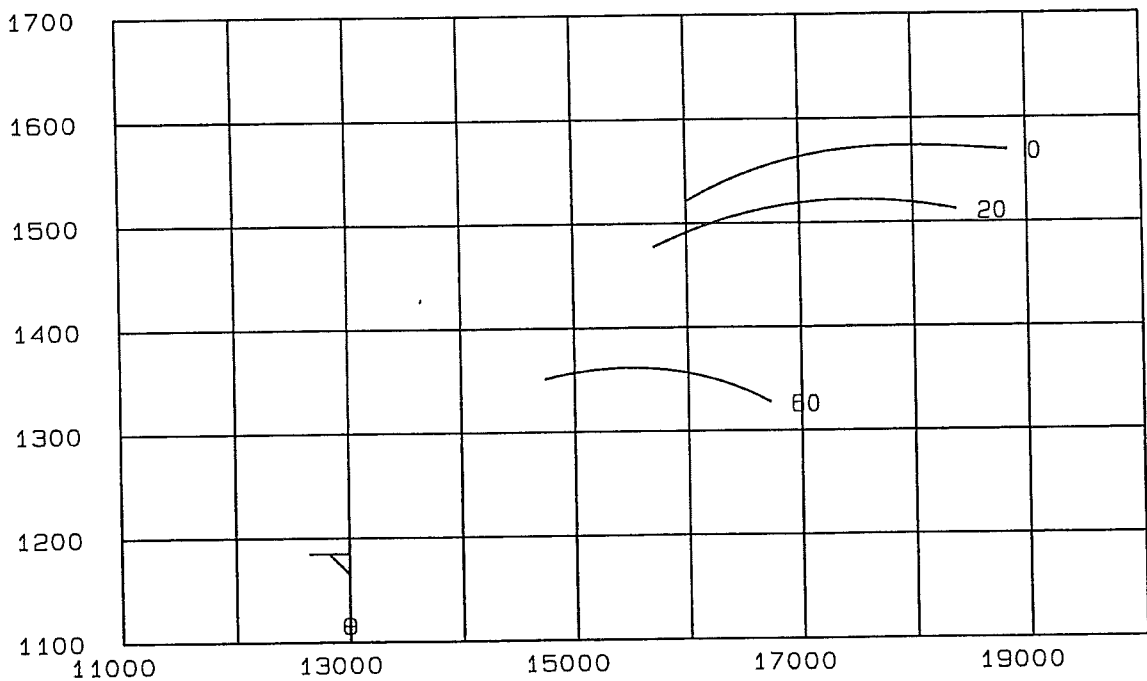
REF. PRES. : 14.87 psia
 MEDIUM : NITROGEN
 MOLEWEIGHT : 28.01 kg/kMol
 ISEN. EXP. : 1.4
 REL. HUM. : 0%

T1 IN : 71.6 deg F
 T2 IN : 70 deg F
 T3 IN : 69.8 deg F

DISCHARGE PRESSURE BAR (a)



KILOWATTS



DELIVERED FLOW NM³/HR

0 = Tested Power at GP

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

INPUT DATA

NUMBER OF STAGES	= 3	NUMBER OF IGV ANGLES	= 3
BAROMETRIC PRESSURE	= 14.70	REFERENCE PRESSURE	= 14.87
AFTERCOOLER DP	= 1.52	MECHANICAL POWER LOSS	= 67.0
STAGE 1 INLET TEMP	= 71.6	STAGE 1 GAS CONSTANT:	55.15
STAGE 2 INLET TEMP	= 70.0	STAGE 2 GAS CONSTANT:	55.15
STAGE 3 INLET TEMP	= 69.8	STAGE 3 GAS CONSTANT:	55.15
STAGE 1 - 2 DP, FLOW	= 0.96 @ 9912.0		
STAGE 2 - 3 DP, FLOW	= 0.88 @ 9912.0		

SEAL LEAKAGE + CONDENSATE KNOCKOUT

INTERSTAGE MASS INJECTION OR REMOVAL

MASS FLOW RATIO m2/m1 = 1.000
MASS FLOW RATIO m3/m1 = 0.999

MASS FLOW RATIO m2/m1 = 1.000
MASS FLOW RATIO m3/m2 = 1.000

DISCHARGE TO INLET FLOW RATIO = .998

IGV ANGLE = 0				IGV ANGLE = 20				IGV ANGLE = 60			
Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1
10088	2.733	912.9	.8355	9831	2.697	868.6	.8424	9249	2.526	766.7	.8305
10588	2.682	943.6	.8299	10186	2.653	887.3	.8382	9838	2.382	777.8	.8087
11048	2.605	959.6	.8230	10664	2.581	910.0	.8282	10453	2.212	786.1	.7689
11584	2.521	981.7	.8107	11061	2.507	922.8	.8174				
11795	2.485	989.6	.8040	11490	2.431	938.8	.8034				

STAGE 2				STAGE 3			
Q	PR	HP	EF	Q	PR	HP	EF
3727	1.97	216.2	.8355	1926	1.74	92.1	.8185
3761	1.97	217.0	.8433	1942	1.75	93.1	.8195
3793	1.97	216.4	.8509	1961	1.75	93.8	.8215
3947	1.93	226.4	.8165	2088	1.73	97.4	.8292
4090	1.93	226.9	.8435	2171	1.73	100.5	.8278
4278	1.88	231.2	.8315	2323	1.68	103.9	.8152
4279	1.88	233.9	.8222	2326	1.68	103.6	.8169
4410	1.86	234.4	.8301	2426	1.66	106.0	.8062
4597	1.82	241.0	.8074	2612	1.60	109.2	.7798
4791	1.78	243.7	.8012	2774	1.53	111.6	.7254
4946	1.73	245.1	.7788	2952	1.34	112.0	.5202
4962	1.74	247.7	.7773	2958	1.34	112.8	.5194
4969	1.73	247.5	.7758	2975	1.33	112.5	.5040

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

ACCURACY OF POLYNOMIAL CURVE FIT

IGV ANGLE = 0				IGV ANGLE = 20				IGV ANGLE = 60			
Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF
10088	0.01	0.02	0.00	9831	-0.02	-0.03	0.00	9249	0.00	0.00	0.00
10588	-0.07	-0.08	-0.00	10186	0.05	0.08	-0.01	9838	0.00	0.00	0.00
11048	0.11	0.12	0.00	10664	-0.07	-0.12	0.01	10453	0.00	0.00	0.00
11584	-0.11	-0.13	-0.00	11061	0.05	0.08	-0.01				
11795	0.06	0.07	0.00	11490	-0.01	-0.02	0.00				

STAGE 2				STAGE 3			
Q	ēPR	ēHP	ēEF	Q	ēPR	ēHP	ēEF
3727	0.30	-0.24	0.74	1926	0.46	0.35	0.83
3761	-0.22	0.00	-0.34	1942	0.08	-0.14	0.42
3793	-0.34	0.85	-1.37	1961	-0.15	-0.22	-0.10
3947	0.62	-1.23	2.27	2088	-0.54	0.22	-1.77
4090	-0.54	0.44	-1.35	2171	-0.73	-0.50	-1.38
4278	0.14	0.65	-0.41	2323	0.32	-0.03	0.80
4279	0.11	-0.49	0.71	2326	0.39	0.31	0.60
4410	-0.11	0.55	-0.73	2426	0.64	0.08	1.66
4597	0.17	-0.58	0.90	2612	0.20	0.11	0.68
4791	-0.22	-0.10	-0.33	2774	-1.20	-0.30	-3.16
4946	0.35	0.63	0.06	2952	0.70	0.40	1.87
4962	-0.17	-0.29	-0.05	2958	0.12	-0.29	0.56
4969	-0.07	-0.15	0.01	2975	-0.23	0.02	-0.62

ALL ē VALUES ARE GIVEN AS PERCENT DIFFERENCE OF CALCULATED TO INPUT VALUE.

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 0

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
10088	3771	1938	14.9	2.734	39.7	1.967	77.1	1.750
10182	3818	1970	14.9	2.726	39.5	1.959	76.5	1.744
10275	3868	2004	14.9	2.718	39.4	1.952	75.9	1.738
10369	3920	2040	14.9	2.708	39.2	1.943	75.2	1.732
10462	3974	2078	14.9	2.696	39.0	1.935	74.5	1.726
10556	4030	2119	14.9	2.684	38.8	1.926	73.8	1.720
10649	4088	2161	14.9	2.671	38.6	1.916	73.0	1.714
10743	4149	2205	14.9	2.657	38.4	1.906	72.1	1.708
10836	4211	2251	14.9	2.643	38.2	1.895	71.3	1.701
10930	4274	2300	14.9	2.628	37.9	1.884	70.4	1.693
11024	4339	2351	14.9	2.612	37.7	1.872	69.4	1.684
11117	4406	2404	14.9	2.597	37.4	1.860	68.5	1.672
11211	4473	2459	14.9	2.581	37.2	1.847	67.5	1.658
11304	4542	2517	14.9	2.565	36.9	1.833	66.5	1.640
11398	4612	2578	14.9	2.549	36.6	1.818	65.5	1.617
11491	4682	2641	14.9	2.534	36.4	1.803	64.4	1.589
11585	4752	2707	14.9	2.518	36.1	1.787	63.4	1.553
11678	4823	2775	14.9	2.504	35.9	1.770	62.3	1.508
11772	4893	2846	14.9	2.489	35.7	1.752	61.2	1.452
11865	4963	2919	14.9	2.476	35.4	1.734	60.2	1.383

PERFORMANCE SUMMARY

FLOW DEL. NM ³ /HR	DIS P. BAR(a)	DIS P. BAR(e)	SHAFT KW
16018	9.20	8.18	1522.0
16166	9.10	8.08	1530.7
16315	8.99	7.98	1538.6
16463	8.88	7.87	1545.5
16612	8.76	7.75	1551.5
16760	8.64	7.63	1556.8
16909	8.52	7.51	1561.2
17058	8.39	7.38	1564.8
17206	8.25	7.24	1567.8
17355	8.11	7.09	1570.1
17503	7.95	6.94	1571.8
17652	7.79	6.77	1572.9
17800	7.61	6.60	1573.5
17949	7.41	6.40	1573.7
18097	7.19	6.18	1573.5
18246	6.95	5.94	1573.0
18394	6.68	5.66	1572.3
18543	6.37	5.36	1571.3
18691	6.03	5.01	1570.3
18840	5.63	4.62	1569.2

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9895	3757	1928	14.9	2.690	39.0	1.969	76.0	1.753
9983	3807	1962	14.9	2.680	38.9	1.961	75.3	1.746
10072	3859	1997	14.9	2.669	38.7	1.953	74.7	1.739
10161	3912	2034	14.9	2.657	38.5	1.945	74.0	1.733
10250	3967	2073	14.9	2.645	38.3	1.936	73.2	1.727
10339	4024	2113	14.9	2.632	38.1	1.927	72.4	1.721
10428	4082	2155	14.9	2.618	37.9	1.917	71.6	1.715
10516	4142	2200	14.9	2.604	37.6	1.907	70.8	1.709
10605	4204	2246	14.9	2.589	37.4	1.897	69.9	1.702
10694	4267	2294	14.9	2.574	37.2	1.886	69.0	1.694
10783	4332	2344	14.9	2.558	36.9	1.874	68.1	1.685
10872	4398	2396	14.9	2.542	36.7	1.862	67.2	1.674
10960	4465	2451	14.9	2.526	36.4	1.849	66.2	1.660
11049	4533	2509	14.9	2.510	36.1	1.835	65.2	1.643
11138	4603	2569	14.9	2.494	35.9	1.820	64.2	1.621
11227	4673	2632	14.9	2.478	35.6	1.805	63.2	1.593
11316	4744	2698	14.9	2.462	35.4	1.789	62.1	1.558
11405	4816	2767	14.9	2.446	35.1	1.771	61.0	1.513
11493	4889	2840	14.9	2.430	34.9	1.753	59.9	1.457
11582	4962	2916	14.9	2.415	34.6	1.734	58.8	1.386

PERFORMANCE SUMMARY

FLOW DEL. NM^3/HR	DIS P. BAR (a)	DIS P. BAR (e)	SHAFT KW
15711	9.08	8.06	1477.4
15852	8.96	7.95	1484.4
15993	8.85	7.83	1490.9
16134	8.73	7.72	1496.7
16275	8.61	7.60	1501.9
16416	8.49	7.48	1506.5
16557	8.36	7.35	1510.5
16698	8.23	7.22	1513.9
16839	8.10	7.09	1516.7
16980	7.96	6.94	1518.9
17121	7.81	6.79	1520.5
17262	7.65	6.63	1521.6
17403	7.47	6.46	1522.2
17544	7.28	6.27	1522.2
17685	7.07	6.05	1521.7
17826	6.83	5.82	1520.7
17967	6.56	5.55	1519.3
18108	6.26	5.25	1517.3
18249	5.91	4.90	1515.0
18390	5.51	4.50	1512.1

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 60

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9281	3758	1927	14.9	2.518	36.6	1.969	71.3	1.753
9347	3810	1962	14.9	2.503	36.4	1.961	70.5	1.746
9413	3863	1998	14.9	2.488	36.1	1.952	69.7	1.739
9479	3916	2036	14.9	2.472	35.9	1.944	68.9	1.733
9545	3971	2074	14.9	2.456	35.6	1.935	68.1	1.727
9611	4027	2114	14.9	2.440	35.4	1.926	67.3	1.721
9678	4085	2155	14.9	2.423	35.1	1.917	66.5	1.715
9744	4144	2198	14.9	2.407	34.9	1.907	65.6	1.709
9810	4203	2243	14.9	2.390	34.6	1.897	64.8	1.702
9876	4265	2289	14.9	2.373	34.3	1.886	63.9	1.695
9942	4328	2338	14.9	2.355	34.1	1.875	63.0	1.686
10008	4392	2389	14.9	2.337	33.8	1.863	62.0	1.676
10074	4458	2442	14.9	2.319	33.5	1.850	61.1	1.662
10140	4525	2499	14.9	2.301	33.2	1.837	60.1	1.646
10206	4595	2558	14.9	2.283	32.9	1.822	59.1	1.625
10272	4666	2621	14.9	2.264	32.6	1.807	58.0	1.598
10338	4738	2688	14.9	2.245	32.3	1.790	56.9	1.563
10404	4813	2759	14.9	2.226	32.0	1.772	55.8	1.518
10470	4890	2836	14.9	2.207	31.7	1.753	54.7	1.460
10536	4969	2918	14.9	2.187	31.4	1.732	53.4	1.383

PERFORMANCE SUMMARY

FLOW DEL. NM ³ /HR	DIS P. BAR (a)	DIS P. BAR (e)	SHAFT KW
14737	8.51	7.50	1351.0
14841	8.38	7.37	1353.6
14946	8.26	7.24	1355.9
15051	8.13	7.12	1357.7
15156	8.01	6.99	1359.2
15261	7.88	6.87	1360.3
15366	7.76	6.74	1361.0
15471	7.63	6.61	1361.3
15576	7.49	6.48	1361.1
15681	7.36	6.34	1360.6
15785	7.21	6.20	1359.6
15890	7.06	6.05	1358.1
15995	6.89	5.88	1356.2
16100	6.71	5.70	1353.8
16205	6.51	5.50	1350.9
16310	6.29	5.27	1347.5
16415	6.03	5.02	1343.4
16520	5.74	4.73	1338.8
16625	5.40	4.38	1333.5
16730	4.99	3.98	1327.4

□

***** Power Evaluation (Inlet Guide Vanes) *****

Model : CASE A MIN

Order No : L8-41197

Test Date : 5-25-05

Guaranteed Conditions:

POINT # 1

(QG)	Flow	13000.00	DEL. NM ³ /HR	
(DPG)	Disc Press		7.30	BAR(a)
(HPG)	Coupling Power		1185.00	KW
(HPM)	Mechanical loss		49.96	KW
(APD)	Aftercooler dp		0.11	BAR

Igv Angle 1 (deg)		60
Flow 1	15680.60	DEL. NM ³ /HR
Disc P 1	7.36	BAR(a)
Power 1	1360.58	KW
Flow 2	15785.49	DEL. NM ³ /HR
Disc P 2	7.21	BAR(a)
Power 2	1359.58	KW

Igv Angle 2 (deg)		20
Flow 1	17402.96	DEL. NM ³ /HR
Disc P 1	7.47	BAR(a)
Power 1	1522.15	KW
Flow 2	17543.99	DEL. NM ³ /HR
Disc P 2	7.28	BAR(a)
Power 2	1522.18	KW

Calc Values at Des P:

IGV 1 Flow	15722.52	DEL. NM ³ /HR
IGV 1 Power	1360.18	KW
IGV 2 Flow	17529.59	DEL. NM ³ /HR
IGV 2 Power	1522.18	KW
Des Pt IGV angle (deg)		120.26
Des Pt Power	1116.12	KW

(Calc/Guar) Power(%)		-5.81
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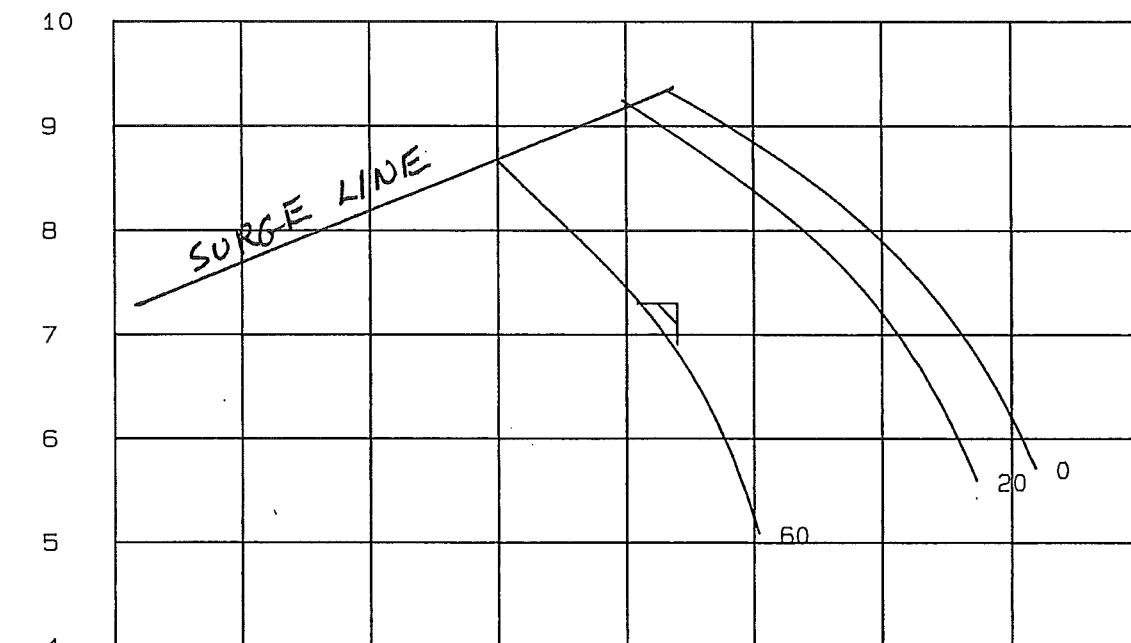
ATLAS COPCO ACT COMPRESSOR PERFORMANCE MAP

ORDER # : L8-41197
 CUSTOMER: ACE/AIR LIQUIDE
 MODEL: CASE A MAX
 TEST DATE: 5-25-05

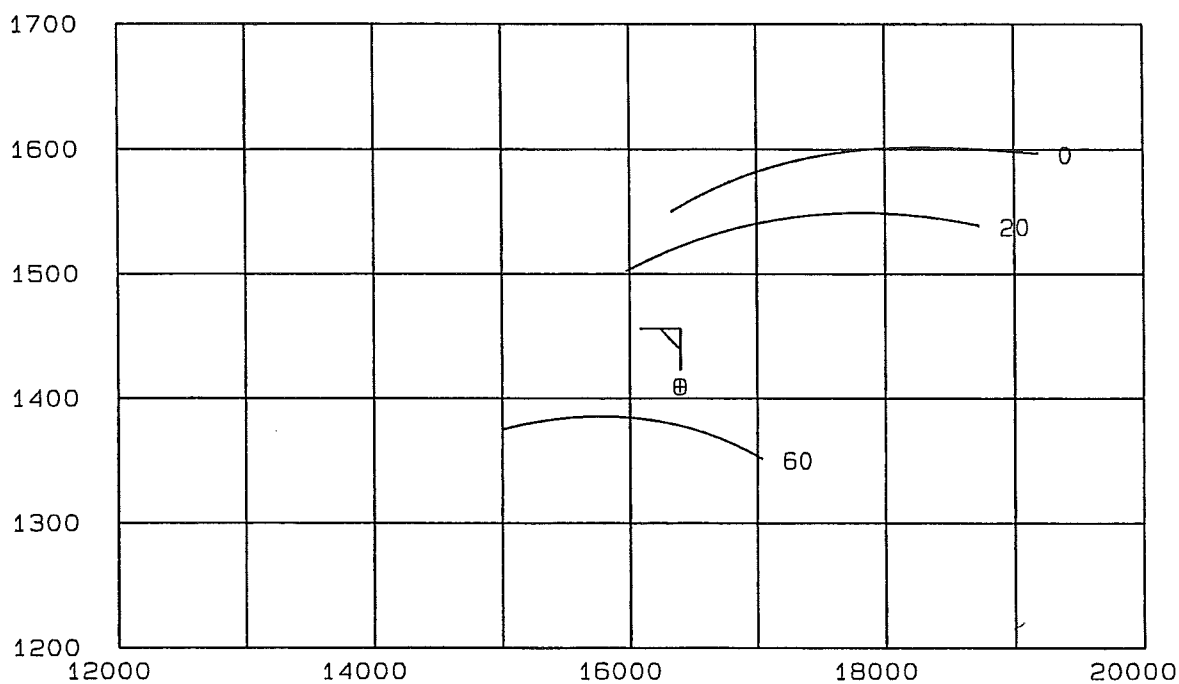
REF. PRES. : 15.16 psia
 MEDIUM : NITROGEN
 MOLEWEIGHT : 28.01 kg/kMol
 ISEN. EXP. : 1.4
 REL. HUM. : 0%

T1 IN : 71.6 deg F
 T2 IN : 71.6 deg F
 T3 IN : 71.4 deg F

DISCHARGE PRESSURE BAR (a)



KILOWATTS



DELIVERED FLOW NM³/HR

θ = Tested Power at GP

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

INPUT DATA

NUMBER OF STAGES	= 3	NUMBER OF IGV ANGLES	= 3
BAROMETRIC PRESSURE	= 14.70	REFERENCE PRESSURE	= 15.16
AFTERCOOLER DP	= 1.52	MECHANICAL POWER LOSS	= 67.0
STAGE 1 INLET TEMP	= 71.6	STAGE 1 GAS CONSTANT:	55.15
STAGE 2 INLET TEMP	= 71.6	STAGE 2 GAS CONSTANT:	55.15
STAGE 3 INLET TEMP	= 71.4	STAGE 3 GAS CONSTANT:	55.15
STAGE 1 - 2 DP, FLOW	= 0.96 @ 9912.0		
STAGE 2 - 3 DP, FLOW	= 0.88 @ 9912.0		

SEAL LEAKAGE + CONDENSATE KNOCKOUT

INTERSTAGE MASS INJECTION OR REMOVAL

MASS FLOW RATIO m2/m1 = 1.000
MASS FLOW RATIO m3/m1 = 0.999

MASS FLOW RATIO m2/m1 = 1.000
MASS FLOW RATIO m3/m2 = 1.000

DISCHARGE TO INLET FLOW RATIO = .998

IGV ANGLE = 0				IGV ANGLE = 20				IGV ANGLE = 60			
Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1
10088	2.733	930.7	.8355	9831	2.697	885.6	.8424	9249	2.526	781.6	.8305
10588	2.682	962.0	.8299	10186	2.653	904.7	.8382	9838	2.382	793.0	.8087
11048	2.605	978.3	.8230	10664	2.581	927.7	.8282	10453	2.212	801.4	.7689
11584	2.521	1000.8	.8107	11061	2.507	940.8	.8174				
11795	2.485	1008.9	.8040	11490	2.431	957.1	.8034				

STAGE 2				STAGE 3			
Q	PR	HP	EF	Q	PR	HP	EF
3727	1.96	219.7	.8355	1926	1.74	93.7	.8185
3761	1.97	220.5	.8433	1942	1.75	94.7	.8195
3793	1.97	220.0	.8509	1961	1.75	95.4	.8215
3947	1.92	230.1	.8165	2088	1.73	99.0	.8292
4090	1.92	230.6	.8435	2171	1.72	102.1	.8278
4278	1.88	235.0	.8315	2323	1.68	105.6	.8152
4279	1.88	237.8	.8222	2326	1.68	105.3	.8169
4410	1.86	238.2	.8301	2426	1.65	107.7	.8062
4597	1.82	244.9	.8074	2612	1.60	111.0	.7798
4791	1.78	247.7	.8012	2774	1.52	113.4	.7254
4946	1.73	249.2	.7788	2952	1.34	113.8	.5202
4962	1.73	251.8	.7773	2958	1.34	114.6	.5194
4969	1.73	251.6	.7758	2975	1.32	114.3	.5040

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

ACCURACY OF POLYNOMIAL CURVE FIT

IGV ANGLE = 0				IGV ANGLE = 20				IGV ANGLE = 60			
Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF
10088	0.01	0.02	0.00	9831	-0.02	-0.03	0.00	9249	0.00	0.00	0.00
10588	-0.07	-0.08	-0.00	10186	0.05	0.08	-0.01	9838	0.00	0.00	0.00
11048	0.11	0.12	0.00	10664	-0.07	-0.11	0.01	10453	0.00	0.00	0.00
11584	-0.11	-0.13	-0.00	11061	0.05	0.08	-0.01				
11795	0.06	0.06	0.00	11490	-0.01	-0.02	0.00				

STAGE 2				STAGE 3			
Q	ēPR	ēHP	ēEF	Q	ēPR	ēHP	ēEF
3727	0.30	-0.23	0.74	1926	0.46	0.34	0.83
3761	-0.22	0.02	-0.34	1942	0.08	-0.14	0.42
3793	-0.34	0.82	-1.37	1961	-0.15	-0.22	-0.10
3947	0.61	-1.22	2.27	2088	-0.54	0.22	-1.77
4090	-0.55	0.45	-1.35	2171	-0.73	-0.47	-1.38
4278	0.14	0.65	-0.41	2323	0.32	-0.05	0.80
4279	0.11	-0.52	0.71	2326	0.39	0.29	0.60
4410	-0.11	0.57	-0.73	2426	0.64	0.10	1.66
4597	0.16	-0.57	0.90	2612	0.20	0.10	0.68
4791	-0.22	-0.10	-0.33	2774	-1.19	-0.28	-3.16
4946	0.35	0.61	0.06	2952	0.70	0.39	1.87
4962	-0.17	-0.28	-0.05	2958	0.11	-0.29	0.56
4969	-0.07	-0.14	0.01	2975	-0.23	0.01	-0.62

ALL ē VALUES ARE GIVEN AS PERCENT DIFFERENCE OF CALCULATED TO INPUT VALUE.

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 0

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
10088	3781	1947	15.2	2.734	40.5	1.962	78.4	1.746
10181	3828	1979	15.2	2.726	40.3	1.954	77.9	1.740
10274	3877	2013	15.2	2.718	40.2	1.947	77.2	1.734
10367	3929	2050	15.2	2.708	40.0	1.938	76.6	1.728
10460	3982	2088	15.2	2.697	39.8	1.930	75.9	1.722
10553	4038	2128	15.2	2.685	39.6	1.921	75.1	1.716
10646	4096	2170	15.2	2.672	39.4	1.911	74.3	1.710
10739	4156	2214	15.2	2.658	39.2	1.901	73.4	1.704
10831	4218	2260	15.2	2.644	38.9	1.891	72.6	1.697
10924	4281	2308	15.2	2.629	38.7	1.880	71.7	1.689
11017	4345	2359	15.2	2.613	38.4	1.868	70.7	1.680
11110	4411	2412	15.2	2.598	38.2	1.856	69.7	1.668
11203	4479	2467	15.2	2.582	37.9	1.843	68.8	1.653
11296	4547	2525	15.2	2.566	37.7	1.829	67.7	1.635
11389	4616	2585	15.2	2.551	37.4	1.815	66.7	1.612
11482	4686	2648	15.2	2.535	37.1	1.799	65.7	1.583
11575	4756	2713	15.2	2.520	36.9	1.783	64.6	1.547
11668	4826	2781	15.2	2.505	36.7	1.766	63.5	1.501
11761	4896	2852	15.2	2.491	36.4	1.749	62.4	1.445
11854	4965	2925	15.2	2.478	36.2	1.730	61.4	1.376

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR (a)	BAR (e)	KW
16330	9.34	8.32	1550.0
16481	9.23	8.22	1558.8
16631	9.13	8.11	1566.6
16781	9.02	8.00	1573.5
16932	8.90	7.89	1579.6
17082	8.78	7.77	1584.8
17233	8.66	7.64	1589.2
17383	8.52	7.51	1592.8
17534	8.39	7.37	1595.7
17684	8.24	7.23	1598.0
17834	8.08	7.07	1599.7
17985	7.92	6.90	1600.8
18135	7.73	6.72	1601.4
18286	7.53	6.52	1601.6
18436	7.31	6.30	1601.4
18587	7.06	6.05	1600.8
18737	6.78	5.77	1600.0
18887	6.47	5.46	1599.1
19038	6.12	5.10	1597.9
19188	5.72	4.70	1596.8

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9865	3751	1926	15.2	2.693	39.9	1.966	77.5	1.750
9955	3801	1960	15.2	2.683	39.7	1.959	76.9	1.743
10045	3852	1996	15.2	2.672	39.5	1.951	76.2	1.737
10134	3906	2033	15.2	2.661	39.3	1.942	75.5	1.730
10224	3961	2072	15.2	2.649	39.1	1.933	74.7	1.724
10314	4018	2112	15.2	2.635	38.9	1.924	73.9	1.719
10404	4076	2155	15.2	2.622	38.7	1.915	73.1	1.713
10493	4137	2199	15.2	2.607	38.5	1.905	72.3	1.706
10583	4199	2245	15.2	2.593	38.2	1.894	71.4	1.700
10673	4262	2293	15.2	2.577	38.0	1.883	70.5	1.692
10763	4327	2344	15.2	2.562	37.7	1.871	69.5	1.683
10853	4394	2397	15.2	2.546	37.4	1.859	68.6	1.671
10942	4462	2452	15.2	2.529	37.2	1.846	67.6	1.658
11032	4531	2510	15.2	2.513	36.9	1.832	66.5	1.640
11122	4601	2570	15.2	2.497	36.6	1.818	65.5	1.618
11212	4672	2634	15.2	2.481	36.4	1.802	64.4	1.590
11301	4744	2701	15.2	2.464	36.1	1.786	63.4	1.554
11391	4817	2771	15.2	2.448	35.9	1.769	62.2	1.509
11481	4890	2844	15.2	2.433	35.6	1.750	61.1	1.451
11571	4964	2922	15.2	2.417	35.3	1.731	60.0	1.379

PERFORMANCE SUMMARY

FLOW DEL. NM ³ /HR	DIS P. BAR (a)	DIS P. BAR (e)	SHAFT KW
15969	9.25	8.24	1502.1
16115	9.14	8.12	1509.5
16260	9.02	8.00	1516.2
16405	8.90	7.89	1522.3
16550	8.78	7.76	1527.8
16696	8.65	7.64	1532.5
16841	8.53	7.51	1536.7
16986	8.39	7.38	1540.2
17132	8.26	7.24	1543.2
17277	8.11	7.10	1545.5
17422	7.96	6.95	1547.2
17568	7.80	6.78	1548.4
17713	7.62	6.60	1549.0
17858	7.42	6.41	1549.1
18004	7.20	6.19	1548.7
18149	6.96	5.95	1547.7
18294	6.68	5.67	1546.2
18440	6.37	5.36	1544.3
18585	6.01	5.00	1541.8
18730	5.60	4.58	1538.9

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 60

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9263	3754	1927	15.2	2.523	37.4	1.966	72.8	1.750
9329	3806	1962	15.2	2.507	37.2	1.958	72.0	1.743
9396	3858	1998	15.2	2.492	36.9	1.950	71.2	1.736
9462	3912	2036	15.2	2.476	36.7	1.941	70.4	1.730
9529	3967	2074	15.2	2.460	36.4	1.932	69.5	1.724
9595	4024	2114	15.2	2.444	36.2	1.923	68.7	1.718
9662	4081	2156	15.2	2.427	35.9	1.914	67.8	1.712
9728	4140	2199	15.2	2.411	35.6	1.904	67.0	1.706
9795	4200	2244	15.2	2.394	35.4	1.894	66.1	1.700
9861	4262	2290	15.2	2.376	35.1	1.883	65.2	1.692
9928	4325	2339	15.2	2.359	34.8	1.872	64.3	1.684
9994	4389	2390	15.2	2.341	34.5	1.860	63.3	1.673
10060	4455	2444	15.2	2.323	34.2	1.847	62.3	1.660
10127	4523	2500	15.2	2.305	33.9	1.834	61.3	1.643
10193	4592	2560	15.2	2.286	33.6	1.820	60.3	1.622
10260	4664	2623	15.2	2.268	33.4	1.804	59.2	1.595
10326	4737	2690	15.2	2.249	33.1	1.788	58.1	1.561
10393	4812	2761	15.2	2.229	32.7	1.770	57.0	1.515
10459	4889	2838	15.2	2.210	32.4	1.751	55.8	1.457
10526	4968	2921	15.2	2.190	32.1	1.730	54.6	1.380

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR(a)	BAR(e)	KW
14994	8.67	7.66	1375.0
15102	8.54	7.53	1377.6
15209	8.41	7.40	1379.9
15317	8.29	7.27	1381.8
15425	8.16	7.15	1383.4
15532	8.03	7.02	1384.5
15640	7.91	6.89	1385.2
15747	7.77	6.76	1385.5
15855	7.64	6.63	1385.4
15963	7.50	6.49	1384.9
16070	7.35	6.34	1383.9
16178	7.20	6.18	1382.5
16285	7.03	6.01	1380.5
16393	6.84	5.83	1378.1
16501	6.64	5.63	1375.2
16608	6.41	5.40	1371.7
16716	6.15	5.14	1367.6
16824	5.85	4.83	1362.9
16931	5.50	4.48	1357.5
17039	5.09	4.07	1351.3

□

***** Power Evaluation (Inlet Guide Vanes) *****

Model : CASE A MAX

Order No : L8-41197

Test Date : 5-25-05

Guaranteed Conditions:

POINT # 1

(QG) Flow	16400.00	DEL. NM ³ /HR	
(DPG) Disc Press		7.30	BAR(a)
(HPG) Coupling Power		1456.00	KW
(HPM) Mechanical loss		49.96	KW
(APD) Aftercooler dp		0.11	BAR

Igv Angle 1 (deg)		20	
Flow 1	17858.34	DEL. NM ³ /HR	
Disc P 1	7.42	BAR(a)	
Power 1	1549.10	KW	
Flow 2	18003.66	DEL. NM ³ /HR	
Disc P 2	7.20	BAR(a)	
Power 2	1548.65	KW	

Igv Angle 2 (deg)		60	
Flow 1	16070.26	DEL. NM ³ /HR	
Disc P 1	7.35	BAR(a)	
Power 1	1383.90	KW	
Flow 2	16177.88	DEL. NM ³ /HR	
Disc P 2	7.20	BAR(a)	
Power 2	1382.46	KW	

Calc Values at Des P:

IGV 1 Flow	17938.66	DEL. NM ³ /HR	
IGV 1 Power	1548.85	KW	
IGV 2 Flow	16106.96	DEL. NM ³ /HR	
IGV 2 Power	1383.41	KW	
Des Pt IGV angle (deg)			53.60
Des Pt Power	1409.88	KW	

(Calc/Guar) Power(%)		-3.17
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ATLAS COPCO COMPTEC INC. TEST DATA REDUCTION PROGRAM

IGV=0 DATA AQUI MAY 26,2005 10:45 AM REV 2.1NT
 MODEL SC- 0 # 0-41197 TEST DATE: MAY 25, 5
 SUPERVISING ENGINEER : JWS

RAW TEST DATA:C:\AERO\41197AA1.A00

1	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
2	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.04
3	INLET P	PSI	2.29	2.47	2.66	2.85	2.94
4	DISC. P	PSI	18.96	17.86	16.53	14.99	14.29
7	FLOW T	F	96.81	99.47	101.19	101.62	101.61
8	INLET T	F	99.34	98.88	99.69	100.03	99.87
9	DISC. T	F	319.81	315.88	312.07	307.01	304.48
11	VAPOR P	PSI	0.11	0.11	0.11	0.11	0.11
15	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
17	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
23	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.03
25	FLOW DP	PSI	0.81	0.89	0.95	1.02	1.04
31	INLET P	PSI	2.30	2.48	2.67	2.85	2.94
33	INLET P	PSI	2.29	2.47	2.64	2.85	2.94
39	DISC. P	PSI	19.04	17.94	16.63	15.09	14.40
41	DISC. P	PSI	18.87	17.77	16.43	14.89	14.19
52	FLOW T	F	96.91	99.62	101.31	101.60	101.77
53	FLOW T	F	96.71	99.32	101.06	101.64	101.46
56	INLET T	F	99.50	99.08	99.90	100.26	100.11
57	INLET T	F	99.18	98.68	99.49	99.81	99.62
60	DISC. T	F	319.80	315.71	311.88	306.81	304.27
61	DISC. T	F	319.83	316.06	312.27	307.21	304.69
65	SPEED	RPM	3008.00	3007.00	3013.00	3011.00	3009.00
69	R.H.	%	11.70	12.00	11.60	11.50	12.10
74	BAROMETR	PSI	14.47	14.47	14.46	14.46	14.46
81	RH T	F	99.60	98.70	99.20	99.40	99.20
82	RH P	PSI	12.17	11.99	11.81	11.61	11.52

NOTE : BE SURE BAROMETRIC PRESSURE GIVEN IS FOR THE LOCAL ELEVATION,
 PRESSURE GIVEN BY THE WEATHER SERVICE IS CORRECTED TO SEA LEVEL,
 AND SO MUST BE RECORRECTED BACK TO THE LOCAL PRESSURE.

ECHO KEY FILE:C:\AERO\41197A.KYA

15.160	71.60	2980.0	1.4000	55.150	1	2		
67.00	16.2500	0.9950	6.59184	0.0000110	0.0			
3	3	3	3	6	6	3	81	82
0	0	0	2	0	0	0	0	
1	0	0	0	10.69	0.00	14.31	0.00	
15.0000	11.9380	0.6000	0.0000	1.0000	0.0000	0.0000110	0.0000187	

IGV=0 DATA AQUI

MAY 26, 2005 10:45 AM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

VARIATION FROM AVERAGE

1	FLOW P	PSI	0.00	0.00	0.00	0.00	0.00
2	FLOW DP	PSI	0.00	0.01	0.00	0.00	0.01
3	INLET P	PSI	0.01	0.00	0.01	0.00	0.00
4	DISC. P	PSI	0.09	0.09	0.10	0.10	0.11
7	FLOW T	F	0.10	0.15	0.13	0.02	0.16
8	INLET T	F	0.16	0.20	0.21	0.23	0.25
9	DISC. T	F	0.01	0.18	0.19	0.20	0.21

INSTRUMENT TEMPERATURE ASSUMED TO BE 68 DEGREES

REF, INLET, INSTR., FLOW DEVICE, OR DRY BULB TEMP SHOULD BE USED FOR R.H. LINE

ABSOLUTE PRESSURES AND TEMPERATURES

1	FLOW P	PSI	13.82	13.78	13.72	13.68	13.66
2	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.04
3	INLET P	PSI	12.17	12.00	11.81	11.61	11.52
4	DISC. P	PSI	33.42	32.33	30.99	29.45	28.76
7	FLOW T	R	556.48	559.14	560.86	561.29	561.29
8	INLET T	R	559.01	558.55	559.37	559.71	559.54
9	DISC. T	R	779.49	775.56	771.75	766.68	764.15
72	GAS CONS		53.5328	53.5352	53.5346	53.5373	53.5474
73	HT RATIO		1.3957	1.3958	1.3958	1.3959	1.3960
74	BAROMETR	PSI	14.4660	14.4670	14.4640	14.4630	14.4620

PRIMARY FLOW DEVICE

CALCULATION FOR AN ORIFICE $D+1/2D$

PIPE DIA = 14.3120 DEVICE DIA = 10.6870 B = 0.7467 F = 1.0000

	FLOW	REYNOLDS	FLOW	VELOCITY	DYNAMIC			STAG	STATIC
	COEFF	NUMBER	#/SEC	FT/SEC	TEMP	PRESS	%	PRESS	FLOW
1	0.6099	1149392.	10.042	139.29	1.60	0.12	0.58	12.30	10256.4
2	0.6098	1186542.	10.401	146.26	1.76	0.13	0.66	12.13	10769.1
3	0.6098	1218254.	10.701	153.03	1.93	0.14	0.76	11.95	11267.7
4	0.6097	1255395.	11.033	160.48	2.12	0.16	0.88	11.77	11816.2
5	0.6097	1267606.	11.141	163.35	2.20	0.16	0.94	11.68	12027.5

DISCHARGE VELOCITY				INLET			
VELOCITY	TEMP	PRESS	%	STAG	STATIC	STAG	
				PRESS	FLOW	FLOW	
1	111.86	1.03	0.16	0.73	33.58	5216.9	5199.6
2	119.17	1.17	0.17	0.84	32.50	5557.8	5536.7
3	127.23	1.33	0.19	0.98	31.18	5933.6	5907.9
4	137.09	1.55	0.21	1.17	29.66	6393.7	6361.2
5	141.32	1.64	0.22	1.26	28.98	6590.8	6555.2

RATIOS OF DISCHARGE TO INLET

PRESSURE		TEMPERATURE		FLOW	
STATIC	STAG	STATIC	STAG	STATIC	STAG
1	2.7456	2.7308	1.3966	1.3944	0.5087
2	2.6949	2.6794	1.3908	1.3885	0.5161
3	2.6245	2.6087	1.3821	1.3797	0.5266
4	2.5360	2.5203	1.3722	1.3698	0.5411
5	2.4967	2.4812	1.3681	1.3657	0.5480

IGV=0 DATA AQUI

MAY 26, 2005 10:45 AM REV 2.1NT

MODEL SC- 0

#

0-41197

TEST DATE:

MAY 25, 5

	ITROPIC WORK	I.W. COEFF	PTROPIC COEFF	PTROPIC WORK	P.W. COEFF	POWER TORQUE	POWER KWATTS	MOTOR EFF
1	34781.	0.5661	1.4946	35664.	0.5805	0.0	0.0	0.0000
2	34001.	0.5538	1.4993	34883.	0.5682	0.0	0.0	0.0000
3	32996.	0.5353	1.5053	33872.	0.5495	0.0	0.0	0.0000
4	31670.	0.5145	1.5161	32553.	0.5288	0.0	0.0	0.0000
5	31058.	0.5052	1.5220	31947.	0.5197	0.0	0.0	0.0000

	MACH NUMBER	REYNOLDS NUMBER	TEMP EFF	GAS HORSEPOWER AERO	TORQUE	EFFICIENCY (FROM AERO)		
						SHAFT	ITROPIC	PTROPIC
1	1.2128	550506.	0.8355	760.1	0.0	0.7663	0.8355	0.8567
2	1.2128	543546.	0.8299	774.8	0.0	0.7624	0.8299	0.8514
3	1.2144	535426.	0.8230	780.1	0.0	0.7562	0.8230	0.8449
4	1.2131	526298.	0.8107	783.7	0.0	0.7453	0.8107	0.8333
5	1.2124	522021.	0.8040	782.4	0.0	0.7392	0.8040	0.8271

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 15.16	GAS CONSTANT	= 55.15	WHEEL DIA	= 16.250
TEMPERATURE	= 71.60	HEAT RATIO	= 1.400	TIP WIDTH	= 0.995
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000110	MECH HP	= 67.0
MACHINE MACH	= 1.2124	REYNOLDS #	= 782245.	WHEEL SPEED	= 19644.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8567	0.5805	10088.1	35002.7	2.7333	1.3984	930.7	997.7
2	0.8514	0.5682	10588.1	34259.8	2.6816	1.3924	962.0	1029.0
3	0.8449	0.5495	11048.1	33134.0	2.6055	1.3824	978.3	1045.3
4	0.8333	0.5288	11583.8	31885.9	2.5214	1.3732	1000.8	1067.8
5	0.8271	0.5197	11794.7	31334.2	2.4846	1.3694	1008.9	1075.9

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 14.87	GAS CONSTANT	= 55.15	WHEEL DIA	= 16.250
TEMPERATURE	= 71.60	HEAT RATIO	= 1.400	TIP WIDTH	= 0.995
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000110	MECH HP	= 67.0
MACHINE MACH	= 1.2124	REYNOLDS #	= 767282.	WHEEL SPEED	= 19644.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8567	0.5805	10088.1	35002.7	2.7333	1.3984	912.9	979.9
2	0.8514	0.5682	10588.1	34259.8	2.6816	1.3924	943.6	1010.6
3	0.8449	0.5495	11048.1	33134.0	2.6055	1.3824	959.6	1026.6
4	0.8333	0.5288	11583.8	31885.9	2.5214	1.3732	981.7	1048.7
5	0.8271	0.5197	11794.7	31334.2	2.4846	1.3694	989.6	1056.6

IGV=0 DATA AQUI

MODEL SC- 0

#

0-41197

TEST DATE:

MAY 26, 2005 10:45 AM REV 2.1NT

MAY 25, 5

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 15.16 GAS CONSTANT = 55.15 WHEEL DIA = 16.250
TEMPERATURE = 71.60 HEAT RATIO = 1.400 TIP WIDTH = 0.995
MOTOR SPEED = 2980. VISCOSITY = 0.0000110 MECH HP = 67.0
MACHINE MACH = 1.2124 REYNOLDS # = 782245. WHEEL SPEED = 19644.
NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8567	0.5805	10088.1	35002.7	2.7333	1.3984	930.7	997.7
2	0.8514	0.5682	10588.1	34259.8	2.6816	1.3924	962.0	1029.0
3	0.8449	0.5495	11048.1	33134.0	2.6055	1.3824	978.3	1045.3
4	0.8333	0.5288	11583.8	31885.9	2.5214	1.3732	1000.8	1067.8
5	0.8271	0.5197	11794.7	31334.2	2.4846	1.3694	1008.9	1075.9

ATLAS COPCO COMPTEC INC. TEST DATA REDUCTION PROGRAM

IGV=0 DATA AQU1

MAY 26,2005 10:45 AM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

SUPERVISING ENGINEER : JWS

RAW TEST DATA:C:\AERO\41197AA1.B00

1	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
2	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.04
3	INLET P	PSI	18.10	16.89	15.43	13.78	13.03
4	DISC. P	PSI	49.61	45.75	41.09	35.85	33.15
7	FLOW T	R	96.81	99.47	101.19	101.62	101.61
8	INLET T	R	98.96	100.47	101.36	99.02	98.50
9	DISC. T	R	238.00	235.56	231.31	223.21	219.96
11	VAPOR P	PSI	0.11	0.11	0.11	0.11	0.11
15	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
17	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
23	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.03
25	FLOW DP	PSI	0.81	0.89	0.95	1.02	1.04
31	INLET P	PSI	18.14	16.94	15.48	13.82	13.09
33	INLET P	PSI	18.07	16.85	15.38	13.74	12.96
39	DISC. P	PSI	49.66	45.78	41.16	35.91	33.23
41	DISC. P	PSI	49.56	45.73	41.02	35.79	33.08
52	FLOW T	F	96.91	99.62	101.31	101.60	101.77
53	FLOW T	F	96.71	99.32	101.06	101.64	101.46
56	INLET T	F	99.29	100.90	101.80	99.56	99.14
57	INLET T	F	98.63	100.04	100.92	98.48	97.85
60	DISC. T	F	237.96	235.61	231.32	223.14	220.01
61	DISC. T	F	238.03	235.50	231.31	223.29	219.92
65	SPEED	RPM	3008.00	3007.00	3013.00	3011.00	3009.00
69	R.H.	%	11.70	12.00	11.60	11.50	12.10
74	BAROMETR	PSI	14.47	14.47	14.46	14.46	14.46
81	RH T	F	99.60	98.70	99.20	99.40	99.20
82	RH P	PSI	12.17	11.99	11.81	11.61	11.52

NOTE : BE SURE BAROMETRIC PRESSURE GIVEN IS FOR THE LOCAL ELEVATION,
PRESSURE GIVEN BY THE WEATHER SERVICE IS CORRECTED TO SEA LEVEL,
AND SO MUST BE RECORRECTED BACK TO THE LOCAL PRESSURE.

ECHO KEY FILE:C:\AERO\41197A.KYB

15.160	70.00	2980.0	1.4000	55.150	1	2		
67.00	12.8200	0.7410	6.59184	0.0000110	0.0			
3	3	3	3	6	6	3	81	82
0	0	2	2	0	0	0	0	
1	0	0	0	10.69	0.00	14.31	0.00	
11.9380	10.0200	0.6000	0.0000	1.0000	0.0000	0.0000110	0.0000187	

IGV=0 DATA AQU

MAY 26, 2005 10:45 AM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

VARIATION FROM AVERAGE

1	FLOW P	PSI	0.00	0.00	0.00	0.00	0.00
2	FLOW DP	PSI	0.00	0.01	0.00	0.00	0.01
3	INLET P	PSI	0.04	0.05	0.05	0.04	0.06
4	DISC. P	PSI	0.05	0.02	0.07	0.06	0.07
7	FLOW T	R	0.10	0.15	0.13	0.02	0.16
8	INLET T	R	0.33	0.43	0.44	0.54	0.65
9	DISC. T	R	0.03	0.06	0.00	0.08	0.05

INSTRUMENT TEMPERATURE ASSUMED TO BE 68 DEGREES

REF, INLET, INSTR., FLOW DEVICE, OR DRY BULB TEMP SHOULD BE USED FOR R.H. LINE

ABSOLUTE PRESSURES AND TEMPERATURES

1	FLOW P	PSI	13.82	13.78	13.72	13.68	13.66
2	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.04
3	INLET P	PSI	32.57	31.36	29.89	28.24	27.49
4	DISC. P	PSI	64.08	60.22	55.55	50.31	47.62
7	FLOW T	R	556.48	559.14	560.86	561.29	561.29
8	INLET T	R	558.63	560.14	561.03	558.69	558.17
9	DISC. T	R	697.67	695.23	690.99	682.89	679.64
72	GAS CONS		53.5328	53.5352	53.5346	53.5373	53.5474
73	HT RATIO		1.3974	1.3974	1.3975	1.3976	1.3976
74	BAROMETR	PSI	14.4660	14.4670	14.4640	14.4630	14.4620

PRIMARY FLOW DEVICE

CALCULATION FOR AN ORIFICE D+1/2D

PIPE DIA = 14.3120 DEVICE DIA = 10.6870 B = 0.7467 F = 1.0000

	FLOW COEFF	REYNOLDS NUMBER	FLOW #/SEC	VELOCITY FT/SEC	DYNAMIC			STAG PRESS	STATIC FLOW
					TEMP	PRESS	%		
1	0.6099	1149422.	10.042	82.30	0.56	0.11	0.37	32.68	3838.2
2	0.6098	1186575.	10.401	88.75	0.65	0.13	0.45	31.49	4139.0
3	0.6098	1218291.	10.701	95.93	0.76	0.14	0.56	30.04	4473.9
4	0.6097	1255437.	11.034	104.22	0.90	0.16	0.73	28.40	4860.8
5	0.6097	1267649.	11.141	108.04	0.96	0.17	0.84	27.65	5038.9

DISCHARGE VELOCITY				INLET				
VELOCITY	TEMP	PRESS	%	STAG PRESS	STATIC FLOW	STAG FLOW	STAG FLOW	
1	74.18	0.45	0.15	0.47	64.22	2437.4	2433.4	3828.6
2	81.46	0.55	0.17	0.58	60.39	2676.4	2671.1	4127.0
3	90.28	0.67	0.19	0.74	55.74	2966.2	2959.0	4458.7
4	101.54	0.85	0.22	1.00	50.54	3336.4	3325.9	4841.2
5	107.83	0.96	0.24	1.17	47.85	3542.8	3530.3	5017.1

RATIOS OF DISCHARGE TO INLET

PRESSURE		TEMPERATURE		FLOW		
STATIC	STAG	STATIC	STAG	STATIC	STAG	
1	1.9674	1.9650	1.2493	1.2489	0.6350	0.6356
2	1.9202	1.9177	1.2416	1.2412	0.6466	0.6472
3	1.8584	1.8559	1.2321	1.2316	0.6630	0.6636
4	1.7814	1.7792	1.2227	1.2223	0.6864	0.6870
5	1.7323	1.7304	1.2180	1.2176	0.7031	0.7037

IGV=0 DATA AQU

MAY 26, 2005 10:45 AM REV 2.1NT

MODEL SC- 0

#

0-41197

TEST DATE:

MAY 25, 5

	ITROPIC WORK	I.W. COEFF	PTROPIC COEFF	PTROPIC WORK	P.W. COEFF	POWER TORQUE	POWER KWATTS	MOTOR EFF
1	22270.	0.5824	1.4904	22621.	0.5916	0.0	0.0	0.0000
2	21449.	0.5613	1.4966	21794.	0.5704	0.0	0.0	0.0000
3	20306.	0.5293	1.5081	20649.	0.5382	0.0	0.0	0.0000
4	18726.	0.4887	1.5347	19084.	0.4981	0.0	0.0	0.0000
5	17737.	0.4636	1.5602	18115.	0.4734	0.0	0.0	0.0000

	MACH NUMBER	REYNOLDS NUMBER	TEMP EFF	GAS HORSEPOWER AERO	TORQUE	EFFICIENCY (FROM AERO)		
						SHAFT	ITROPIC	PTROPIC
1	0.9566	860676.	0.8509	477.9	0.0	0.7441	0.8509	0.8642
2	0.9549	825152.	0.8435	480.9	0.0	0.7383	0.8435	0.8570
3	0.9561	786532.	0.8301	475.9	0.0	0.7252	0.8301	0.8441
4	0.9573	748528.	0.8012	468.9	0.0	0.6987	0.8012	0.8166
5	0.9571	729297.	0.7758	463.1	0.0	0.6757	0.7758	0.7923

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 15.16	GAS CONSTANT	= 55.15	WHEEL DIA	= 12.820
TEMPERATURE	= 70.00	HEAT RATIO	= 1.400	TIP WIDTH	= 0.741
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000110	MECH HP	= 67.0
MACHINE MACH	= 0.9579	REYNOLDS #	= 460981.	WHEEL SPEED	= 19644.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8642	0.5916	3792.9	22201.4	1.9700	1.2513	220.7	287.7
2	0.8570	0.5704	4089.9	21404.7	1.9263	1.2443	231.3	298.3
3	0.8441	0.5382	4409.9	20198.9	1.8614	1.2340	239.0	306.0
4	0.8166	0.4981	4791.4	18693.4	1.7815	1.2239	248.4	315.4
5	0.7923	0.4734	4968.7	17767.1	1.7331	1.2193	252.3	319.3

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 14.87	GAS CONSTANT	= 55.15	WHEEL DIA	= 12.820
TEMPERATURE	= 70.00	HEAT RATIO	= 1.400	TIP WIDTH	= 0.741
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000110	MECH HP	= 67.0
MACHINE MACH	= 0.9579	REYNOLDS #	= 452162.	WHEEL SPEED	= 19644.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8642	0.5916	3792.9	22201.4	1.9700	1.2513	216.4	283.4
2	0.8570	0.5704	4089.9	21404.7	1.9263	1.2443	226.9	293.9
3	0.8441	0.5382	4409.9	20198.9	1.8614	1.2340	234.4	301.4
4	0.8166	0.4981	4791.4	18693.4	1.7815	1.2239	243.7	310.7
5	0.7923	0.4734	4968.7	17767.1	1.7331	1.2193	247.5	314.5

IGV=0 DATA AQUI

MODEL SC- 0 # 0-41197

MAY 26,2005 10:45 AM REV 2.1NT

TEST DATE: MAY 25, 5

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 15.16 GAS CONSTANT = 55.15 WHEEL DIA = 12.820
TEMPERATURE = 71.60 HEAT RATIO = 1.400 TIP WIDTH = 0.741
MOTOR SPEED = 2980. VISCOSITY =0.0000110 MECH HP = 67.0
MACHINE MACH = 0.9565 REYNOLDS # = 459592. WHEEL SPEED = 19644.
NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8642	0.5916	3792.9	22201.4	1.9664	1.2505	220.0	287.0
2	0.8570	0.5704	4089.9	21404.7	1.9229	1.2436	230.6	297.6
3	0.8441	0.5382	4409.9	20198.9	1.8582	1.2333	238.2	305.2
4	0.8166	0.4981	4791.4	18693.4	1.7787	1.2232	247.7	314.7
5	0.7923	0.4734	4968.7	17767.1	1.7305	1.2187	251.6	318.6

ATLAS COPCO COMPTEC INC. TEST DATA REDUCTION PROGRAM

IGV=0 DATA AQUI MAY 26,2005 10:45 AM REV 2.1NT
 MODEL SC- 0 # 0-41197 TEST DATE: MAY 25, 5
 SUPERVISING ENGINEER : JWS

RAW TEST DATA:C:\AERO\41197AA1.C00

1	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
2	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.04
3	INLET P	PSI	48.71	44.75	39.93	34.48	31.59
4	DISC. P	PSI	95.25	86.79	74.83	59.33	45.44
7	FLOW T	R	96.81	99.47	101.19	101.62	101.61
8	INLET T	R	99.59	100.75	100.86	99.86	99.24
9	DISC. T	R	216.22	213.46	207.70	198.13	191.47
11	VAPOR P	PSI	0.11	0.11	0.11	0.11	0.11
15	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
17	FLOW P	PSI	0.65	0.69	0.74	0.78	0.80
23	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.03
25	FLOW DP	PSI	0.81	0.89	0.95	1.02	1.04
31	INLET P	PSI	48.78	44.85	40.02	34.57	31.66
33	INLET P	PSI	48.63	44.65	39.84	34.40	31.52
39	DISC. P	PSI	95.15	86.73	74.83	59.27	45.35
41	DISC. P	PSI	95.34	86.85	74.83	59.39	45.53
52	FLOW T	F	96.91	99.62	101.31	101.60	101.77
53	FLOW T	F	96.71	99.32	101.06	101.64	101.46
56	INLET T	F	99.59	100.74	100.87	99.87	99.25
57	INLET T	F	99.58	100.75	100.85	99.85	99.23
60	DISC. T	F	216.54	213.77	208.12	198.76	192.66
61	DISC. T	F	215.90	213.15	207.29	197.49	190.29
65	SPEED	RPM	3008.00	3007.00	3013.00	3011.00	3009.00
69	R.H.	%	11.70	12.00	11.60	11.50	12.10
74	BAROMETR	PSI	14.47	14.47	14.46	14.46	14.46
81	RH T	F	99.60	98.70	99.20	99.40	99.20
82	RH P	PSI	12.17	11.99	11.81	11.61	11.52

NOTE : BE SURE BAROMETRIC PRESSURE GIVEN IS FOR THE LOCAL ELEVATION,
 PRESSURE GIVEN BY THE WEATHER SERVICE IS CORRECTED TO SEA LEVEL,
 AND SO MUST BE RECORRECTED BACK TO THE LOCAL PRESSURE.

ECHO KEY FILE:C:\AERO\41197A.KYC

15.160	69.80	2980.0	1.4000	55.150	1	2		
67.00	7.1000	0.6220	11.13793	0.0000	110	0.0		
3	3	3	3	6	6	3	81	82
0	0	2	2	0	0	0	0	
1	0	0	0	10.69	0.00	14.31	0.00	
10.0200	6.0650	0.6000	0.0000	1.0000	0.0000	0.0000	110	0.0000187

IGV=0 DATA AQU

MODEL SC- 0 # 0-41197

MAY 26,2005 10:45 AM REV 2.1NT

TEST DATE: MAY 25, 5

VARIATION FROM AVERAGE

1	FLOW P	PSI	0.00	0.00	0.00	0.00	0.00
2	FLOW DP	PSI	0.00	0.01	0.00	0.00	0.01
3	INLET P	PSI	0.07	0.10	0.09	0.09	0.07
4	DISC. P	PSI	0.09	0.06	0.00	0.06	0.09
7	FLOW T	R	0.10	0.15	0.13	0.02	0.16
8	INLET T	R	0.01	0.01	0.01	0.01	0.01
9	DISC. T	R	0.32	0.31	0.42	0.63	1.19

INSTRUMENT TEMPERATURE ASSUMED TO BE 68 DEGREES

REF, INLET, INSTR., FLOW DEVICE, OR DRY BULB TEMP SHOULD BE USED FOR R.H. LINE

ABSOLUTE PRESSURES AND TEMPERATURES

1	FLOW P	PSI	13.82	13.78	13.72	13.68	13.66
2	FLOW DP	PSI	0.81	0.88	0.94	1.01	1.04
3	INLET P	PSI	63.17	59.22	54.39	48.95	46.05
4	DISC. P	PSI	109.71	101.26	89.29	73.79	59.90
7	FLOW T	R	556.48	559.14	560.86	561.29	561.29
8	INLET T	R	559.26	560.42	560.53	559.53	558.91
9	DISC. T	R	675.89	673.13	667.38	657.80	651.15
72	GAS CONS		53.5328	53.5352	53.5346	53.5373	53.5474
73	HT RATIO		1.3977	1.3978	1.3979	1.3980	1.3981
74	BAROMETR	PSI	14.4660	14.4670	14.4640	14.4630	14.4620

PRIMARY FLOW DEVICE

CALCULATION FOR AN ORIFICE D+1/2D

PIPE DIA = 14.3120 DEVICE DIA = 10.6870 B = 0.7467 F = 1.0000

	FLOW	REYNOLDS	FLOW	VELOCITY	DYNAMIC			STAG	STATIC
	COEFF	NUMBER	#/SEC	FT/SEC	TEMP	PRESS	%	PRESS	FLOW
1	0.6099	1149429.	10.042	60.32	0.30	0.12	0.26	63.29	1982.0
2	0.6098	1186583.	10.401	66.78	0.37	0.14	0.33	59.35	2194.2
3	0.6098	1218300.	10.702	74.81	0.46	0.16	0.45	54.55	2457.9
4	0.6097	1255447.	11.034	85.54	0.60	0.19	0.75	49.13	2810.6
5	0.6097	1267661.	11.141	91.70	0.70	0.20	1.48	46.26	3012.9

DISCHARGE VELOCITY				INLET		
VELOCITY	TEMP	PRESS	%	STAG PRESS	STATIC FLOW	STAG FLOW
1	114.46	1.08	0.62	1.31	110.33	1377.8
2	127.87	1.35	0.72	1.68	101.97	1539.2
3	147.81	1.81	0.85	2.39	90.14	1779.3
4	181.52	2.72	1.08	4.19	74.87	2185.1
5	223.05	4.11	1.34	8.92	61.24	2684.9

RATIOS OF DISCHARGE TO INLET

PRESSURE		TEMPERATURE		FLOW	
STATIC	STAG	STATIC	STAG	STATIC	STAG
1	1.7367	1.7432	1.2073	1.2086	0.6951
2	1.7099	1.7180	1.1995	1.2011	0.7015
3	1.6416	1.6525	1.1884	1.1906	0.7239
4	1.5075	1.5237	1.1720	1.1756	0.7775
5	1.3007	1.3239	1.1591	1.1650	0.8911

IGV=0 DATA AQU

MAY 26,2005 10:45 AM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

	ITROPIC WORK	I.W. COEFF	PTROPIC COEFF	PTROPIC WORK	P.W. COEFF	POWER TORQUE	POWER KWATTS	MOTOR EFF
1	18025.	0.5383	1.5171	18318.	0.5471	0.0	0.0	0.0000
2	17554.	0.5246	1.5120	17820.	0.5326	0.0	0.0	0.0000
3	16202.	0.4823	1.5322	16467.	0.4902	0.0	0.0	0.0000
4	13404.	0.3995	1.6238	13694.	0.4082	0.0	0.0	0.0000
5	8743.	0.2609	2.1946	9073.	0.2708	0.0	0.0	0.0000

	MACH NUMBER	REYNOLDS NUMBER	TEMP EFF	GAS AERO	HORSEPOWER TORQUE	EFFICIENCY (FROM AERO)		
						SHAFT	ITROPIC	PTROPIC
1	0.8945	1306694.	0.8215	400.6	0.0	0.7014	0.8215	0.8348
2	0.8933	1220685.	0.8278	401.0	0.0	0.7070	0.8278	0.8404
3	0.8949	1123758.	0.8062	391.0	0.0	0.6855	0.8062	0.8194
4	0.8951	1014481.	0.7254	370.7	0.0	0.6119	0.7254	0.7411
5	0.8949	956026.	0.5040	351.4	0.0	0.4216	0.5040	0.5231

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 15.16	GAS CONSTANT	= 55.15	WHEEL DIA	= 7.100
TEMPERATURE	= 69.80	HEAT RATIO	= 1.400	TIP WIDTH	= 0.622
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000110	MECH HP	= 67.0
MACHINE MACH	= 0.8966	REYNOLDS #	= 362232.	WHEEL SPEED	= 33191.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8348	0.5471	1960.9	17978.3	1.7484	1.2107	95.7	162.7
2	0.8404	0.5326	2170.9	17501.1	1.7254	1.2038	102.4	169.4
3	0.8194	0.4902	2425.9	16107.8	1.6562	1.1924	108.0	175.0
4	0.7411	0.4082	2774.1	13413.7	1.5264	1.1771	113.8	180.8
5	0.5231	0.2708	2974.6	8899.3	1.3257	1.1665	114.7	181.7

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 14.87	GAS CONSTANT	= 55.15	WHEEL DIA	= 7.100
TEMPERATURE	= 69.80	HEAT RATIO	= 1.400	TIP WIDTH	= 0.622
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000110	MECH HP	= 67.0
MACHINE MACH	= 0.8966	REYNOLDS #	= 355303.	WHEEL SPEED	= 33191.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8348	0.5471	1960.9	17978.3	1.7484	1.2107	93.8	160.8
2	0.8404	0.5326	2170.9	17501.1	1.7254	1.2038	100.5	167.5
3	0.8194	0.4902	2425.9	16107.8	1.6562	1.1924	106.0	173.0
4	0.7411	0.4082	2774.1	13413.7	1.5264	1.1771	111.6	178.6
5	0.5231	0.2708	2974.6	8899.3	1.3257	1.1665	112.5	179.5

IGV=0 DATA AQUA

MODEL SC- 0

#

0-41197

TEST DATE:

MAY 26, 2005 10:45 AM REV 2.1NT

MAY 25, 5

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 15.16 GAS CONSTANT = 55.15 WHEEL DIA = 7.100
TEMPERATURE = 71.40 HEAT RATIO = 1.400 TIP WIDTH = 0.622
MOTOR SPEED = 2980. VISCOSITY = 0.0000110 MECH HP = 67.0
MACHINE MACH = 0.8952 REYNOLDS # = 361141. WHEEL SPEED = 33191.
NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8348	0.5471	1960.9	17978.3	1.7457	1.2101	95.4	162.4
2	0.8404	0.5326	2170.9	17501.1	1.7229	1.2032	102.1	169.1
3	0.8194	0.4902	2425.9	16107.8	1.6539	1.1918	107.7	174.7
4	0.7411	0.4082	2774.1	13413.7	1.5246	1.1766	113.4	180.4
5	0.5231	0.2708	2974.6	8899.3	1.3246	1.1660	114.3	181.3

MECHANICAL DATA SHEET

10. Title *ACE/AIR Liquids*

11. Date 8-25-05

12. Model HL 806-04

13. S/N C8-41197

[illegible]

DATA TAKEN BY:

REVIEWED BY

RTD/MECHANICAL DATA SHEET

Atlas Copco

10. Title ACE/AIR Leijerle
12. Model HL806-84

11. Date 05-25-05
13. S/N LG-41197

TEST POINT	1	2	3	4	5	6	7	8	9
IGV ANGLE	20	0	0	0	0	20	20	20	20
TIME	2:40	2:53	3:07	3:21	3:39	3:53	4:06	4:20	4:34
RTD 1 °F °C	169	170	171	171	171	169	169	170	170
RTD 2 °F °C	192	193	193	193	193	191	191	192	192
RTD 3 °F °C	138	138	139	139	139	138	138	139	138
RTD 4 °F °C	139	139	140	140	139	139	139	139	139
RTD 5 °F °C	173	172	170	165	163	173	171	169	166
RTD 6 °F °C	168	167	166	163	161	168	167	165	163
RTD 7 °F °C	179	179	179	179	179	178	179	178	178
RTD 8 °F °C	173	173	173	173	173	173	173	173	173
RTD 9 °F °C									
RTD 10 °F °C									
RTD 11 °F °C									
RTD 12 °F °C									
RTD 13 °F °C									
RTD 14 °F °C									
RTD 15 °F °C	165	166	166	166	166	165	165	166	165
RTD 16 °F °C	181	181	181	179	179	180	180	180	179
RTD 17 °F °C	139	139	139	139	138	139	139	139	139
RTD 18 °F °C	138	138	138	138	137	137	138	138	137
RTD 19 °F °C	138	138	138	139	139	138	138	138	138
RTD 20 °F °C	137	138	138	138	138	137	138	138	138
RTD 21 °F °C	182	182	182	181	181	182	182	182	181
RTD 22 °F °C	204	204	204	204	203	203	204	204	203
RTD 23 °F °C									
RTD 24 °F °C									

DATA TAKEN BY: [Signature]

REVIEWED BY: [Signature]

MECHANICAL DATA SHEET

10. Title ACE/Air Liquide

11. Date 8-25-05

12. Model 14800-04

13. S/N 28-41/97

[illegible]

DATA TAKEN BY:

REVIEWED BY

RTD/MECHANICAL DATA SHEET

Atlas Copco

10. Title ACE/Air Liquefier

11. Date 5-25-05

12. Model AL806-04

13. S/N 4841197

TEST POINT	10	11	12	13					
IGV ANGLE	20	60	60	60					
TIME	4:49	5:02	5:17	5:31					
RTD 1 °F °C	170	167	168	167					
RTD 2 °F °C	192	188	189	189					
RTD 3 °F °C	138	138	138	138					
RTD 4 °F °C	139	139	139	139					
RTD 5 °F °C	162	171	167	161					
RTD 6 °F °C	160	167	164	159					
RTD 7 °F °C	177	175	175	174					
RTD 8 °F °C	172	171	170	170					
RTD 9 °F °C									
RTD 10 °F °C									
RTD 11 °F °C									
RTD 12 °F °C									
RTD 13 °F °C									
RTD 14 °F °C									
RTD 15 °F °C	165	164	164	164					
RTD 16 °F °C	178	179	178	177					
RTD 17 °F °C	138	138	139	138					
RTD 18 °F °C	137	137	137	136					
RTD 19 °F °C	138	137	138	138					
RTD 20 °F °C	138	137	137	138					
RTD 21 °F °C	181	180	181	180					
RTD 22 °F °C	202	203	203	202					
RTD 23 °F °C									
RTD 24 °F °C									

DATA TAKEN BY: Ben Bryant

REVIEWED BY: J. S. [Signature]

ATLAS COPCO ACT COMPRESSOR PERFORMANCE MAP

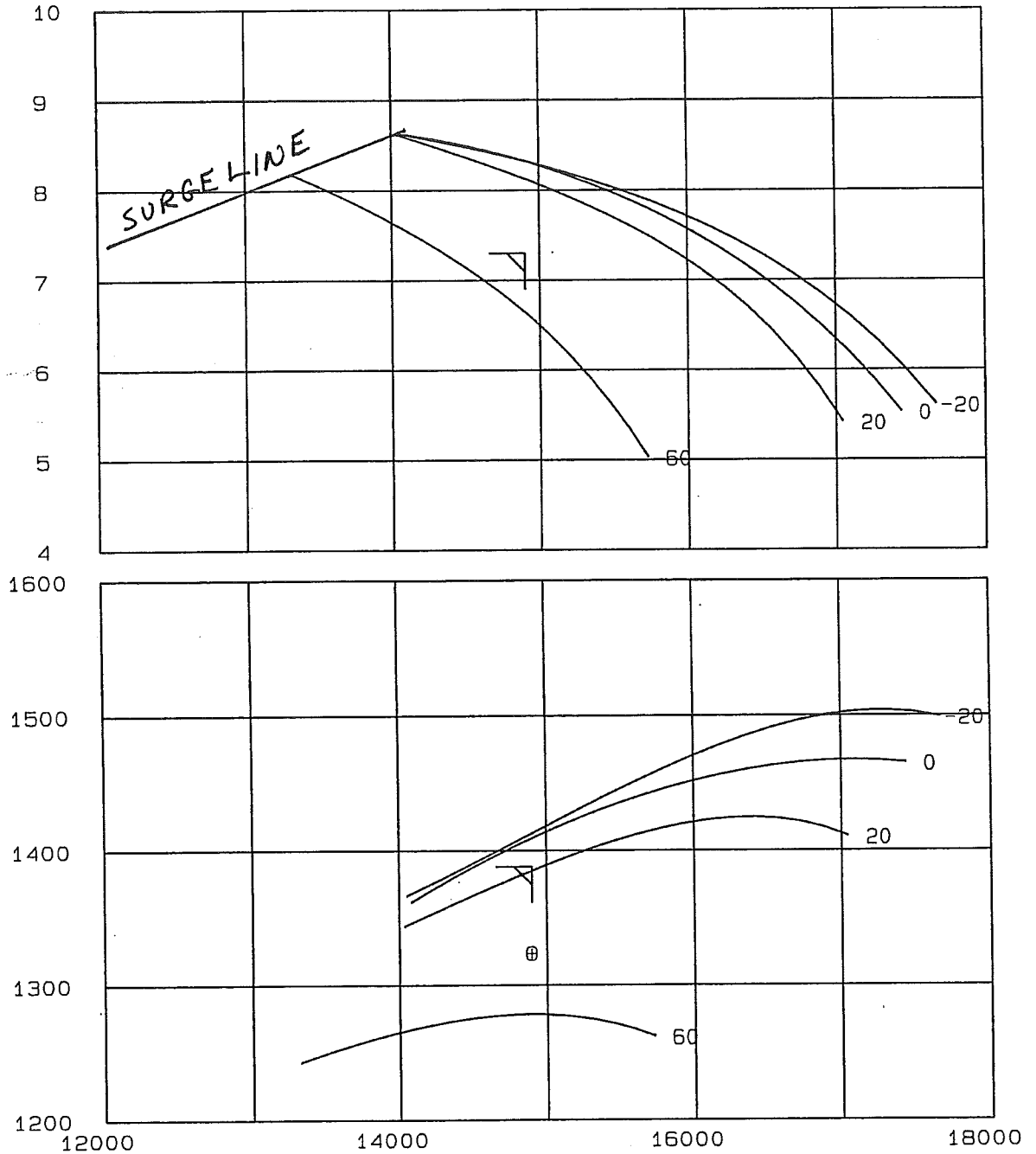
ORDER # : L8-41197
 CUSTOMER: ACE/AIR LIQUIDE
 MODEL: HL8-4-75
 TEST DATE: 5-25-05

REF. PRES. : 15.16 psia
 MEDIUM : NITROGEN
 MOLEWEIGHT : 28.01 kg/kMol
 ISEN. EXP. : 1.4
 REL. HUM. : 0%

T1 IN : 96.8 deg F
 T2 IN : 108 deg F
 T3 IN : 108 deg F

DISCHARGE PRESSURE BAR (a)

KILOWATTS



DELIVERED FLOW NM³/HR

Θ = Tested Power at GP

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

INPUT DATA

NUMBER OF STAGES = 3 NUMBER OF IGV ANGLES = 4
BAROMETRIC PRESSURE = 14.70 REFERENCE PRESSURE = 15.16
AFTERCOOLER DP = 1.52 MECHANICAL POWER LOSS = 67.0
STAGE 1 INLET TEMP = 96.8 STAGE 1 GAS CONSTANT: 55.15
STAGE 2 INLET TEMP = 108.0 STAGE 2 GAS CONSTANT: 55.15
STAGE 3 INLET TEMP = 108.0 STAGE 3 GAS CONSTANT: 55.15
STAGE 1 - 2 DP, FLOW = 0.96 @ 9912.0
STAGE 2 - 3 DP, FLOW = 0.88 @ 9912.0

SEAL LEAKAGE + CONDENSATE KNOCKOUT

INTERSTAGE MASS INJECTION OR REMOVAL

MASS FLOW RATIO m2/m1 = 1.000 MASS FLOW RATIO m2/m1 = 1.000
MASS FLOW RATIO m3/m1 = 0.999 MASS FLOW RATIO m3/m2 = 1.000

DISCHARGE TO INLET FLOW RATIO = .998

IGV ANGLE = -20				IGV ANGLE = 0				IGV ANGLE = 20			
Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1
9081	2.667	835.8	.8138	9112	2.668	827.8	.8251	9053	2.667	804.1	.8434
9495	2.659	852.8	.8312	9619	2.648	858.0	.8327	9506	2.626	828.9	.8436
9989	2.631	893.9	.8239	10058	2.622	885.2	.8345	9853	2.584	845.1	.8412
10646	2.585	934.7	.8223	10584	2.552	906.2	.8300	10481	2.508	875.0	.8333
11345	2.505	969.6	.8129	11240	2.466	936.8	.8171	10975	2.414	885.9	.8213

IGV ANGLE = 60

Q1	PR1	HP1	EF1
8613	2.53	717.2	.8434
9197	2.42	736.3	.8320
10086	2.23	757.2	.7962

STAGE 2				STAGE 3			
Q	PR	HP	EF	Q	PR	HP	EF
3530	1.92	194.4	.8578	1871	1.69	84.8	.8243
3536	1.91	194.7	.8553	1873	1.69	84.8	.8241
3539	1.91	194.2	.8558	1874	1.69	85.1	.8218
3551	1.91	195.6	.8572	1877	1.69	85.3	.8222
3735	1.89	200.3	.8602	2000	1.68	88.7	.8385
3767	1.89	202.9	.8546	2023	1.68	89.9	.8301
3786	1.89	203.8	.8552	2037	1.68	90.3	.8323
3967	1.85	208.3	.8493	2173	1.65	93.6	.8304
3995	1.85	209.4	.8496	2199	1.65	94.3	.8301
4009	1.85	209.9	.8488	2212	1.65	94.7	.8316
4029	1.85	211.2	.8483	2215	1.65	95.2	.8304
4354	1.80	219.6	.8377	2479	1.59	100.6	.8068
4397	1.78	219.4	.8309	2524	1.57	101.0	.7974
4428	1.78	221.5	.8319	2541	1.57	101.8	.7964
4787	1.71	227.4	.8028	2885	1.37	104.7	.6061
4808	1.71	228.7	.8031	2892	1.38	105.2	.6205
4830	1.70	228.1	.7980	2925	1.34	104.8	.5621
4846	1.70	229.2	.7993	2928	1.36	105.4	.5866

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

ACCURACY OF POLYNOMIAL CURVE FIT

IGV ANGLE = -20				IGV ANGLE = 0				IGV ANGLE = 20			
Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF
9081	0.03	-0.13	0.17	9112	-0.04	-0.05	-0.00	9053	0.03	0.03	0.01
9495	-0.09	0.40	-0.51	9619	0.17	0.19	0.02	9506	-0.12	-0.13	-0.03
9989	0.10	-0.42	0.56	10058	-0.23	-0.25	-0.03	9853	0.14	0.14	0.03
10646	-0.05	0.19	-0.27	10584	0.12	0.13	0.01	10481	-0.06	-0.06	-0.02
11345	0.01	-0.04	0.06	11240	-0.02	-0.02	-0.00	10975	0.02	0.02	0.00

IGV ANGLE = 60			
Q1	ēPR	ēHP	ēEF
8613	0.00	0.00	0.00
9197	0.00	0.00	0.00
10086	0.00	0.00	0.00

STAGE 2				STAGE 3			
Q	ēPR	ēHP	ēEF	Q	ēPR	ēHP	ēEF
3530	-0.07	-0.02	-0.10	1871	0.03	0.14	0.02
3536	0.08	-0.07	0.19	1873	0.10	0.22	0.05
3539	0.21	0.25	0.13	1874	0.11	-0.09	0.33
3551	-0.16	-0.24	-0.04	1877	0.01	-0.24	0.29
3735	0.01	0.56	-0.53	2000	-0.36	0.31	-1.21
3767	-0.09	-0.21	0.07	2023	-0.10	-0.28	-0.11
3786	-0.23	-0.35	-0.03	2037	-0.21	-0.25	-0.31
3967	0.24	0.22	0.20	2173	0.25	0.23	0.33
3995	0.10	0.09	0.07	2199	0.23	0.20	0.38
4009	0.10	0.06	0.12	2212	0.11	0.13	0.19
4029	-0.10	-0.29	0.11	2215	-0.05	-0.33	0.33
4354	-0.25	-0.16	-0.31	2479	-0.01	-0.09	0.13
4397	0.31	0.39	0.21	2524	0.13	0.27	0.00
4428	-0.20	-0.24	-0.13	2541	-0.29	-0.25	-0.43
4787	0.17	0.22	0.11	2885	0.51	0.25	1.13
4808	-0.18	-0.21	-0.16	2892	-0.66	-0.20	-2.14
4830	0.20	0.20	0.22	2925	0.88	0.27	3.03
4846	-0.15	-0.18	-0.13	2928	-0.67	-0.29	-1.79

ALL ē VALUES ARE GIVEN AS PERCENT DIFFERENCE OF CALCULATED TO INPUT VALUE.

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = -20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9090	3547	1872	15.2	2.667	39.6	1.912	75.0	1.689
9214	3601	1907	15.2	2.665	39.6	1.906	74.6	1.686
9337	3656	1943	15.2	2.662	39.5	1.899	74.2	1.683
9460	3711	1981	15.2	2.658	39.4	1.892	73.8	1.680
9584	3769	2020	15.2	2.653	39.3	1.885	73.3	1.676
9707	3827	2061	15.2	2.648	39.2	1.877	72.8	1.672
9831	3887	2104	15.2	2.642	39.1	1.868	72.2	1.667
9954	3949	2148	15.2	2.635	39.0	1.859	71.6	1.661
10078	4012	2194	15.2	2.628	38.9	1.850	71.0	1.655
10201	4076	2243	15.2	2.620	38.7	1.840	70.3	1.646
10324	4143	2294	15.2	2.611	38.5	1.829	69.5	1.637
10448	4211	2347	15.2	2.601	38.4	1.818	68.8	1.625
10571	4282	2403	15.2	2.591	38.2	1.806	68.0	1.611
10695	4354	2463	15.2	2.579	38.0	1.793	67.1	1.593
10818	4429	2526	15.2	2.567	37.8	1.780	66.2	1.572
10942	4506	2593	15.2	2.554	37.6	1.765	65.2	1.546
11065	4586	2664	15.2	2.540	37.3	1.749	64.2	1.514
11188	4668	2739	15.2	2.526	37.1	1.733	63.1	1.475
11312	4753	2820	15.2	2.510	36.8	1.715	62.0	1.426
11435	4842	2907	15.2	2.493	36.5	1.696	60.8	1.365

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR(a)	BAR(e)	KW
14048	8.63	7.62	1366.2
14239	8.57	7.56	1376.0
14430	8.51	7.49	1386.3
14621	8.44	7.43	1396.7
14811	8.36	7.35	1407.4
15002	8.28	7.27	1418.1
15193	8.19	7.18	1428.8
15384	8.10	7.08	1439.3
15574	7.99	6.98	1449.4
15765	7.87	6.86	1459.2
15956	7.74	6.73	1468.4
16147	7.60	6.59	1476.8
16337	7.44	6.43	1484.4
16528	7.27	6.25	1491.0
16719	7.07	6.05	1496.5
16910	6.85	5.83	1500.5
17101	6.60	5.58	1503.1
17291	6.31	5.30	1503.8
17482	5.99	4.97	1502.6
17673	5.61	4.60	1499.1

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 0

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9112	3556	1878	15.2	2.667	39.6	1.911	75.0	1.688
9226	3603	1909	15.2	2.667	39.6	1.905	74.7	1.686
9341	3653	1942	15.2	2.665	39.5	1.899	74.3	1.683
9455	3705	1977	15.2	2.661	39.5	1.893	73.9	1.680
9569	3760	2014	15.2	2.655	39.4	1.886	73.4	1.677
9684	3817	2054	15.2	2.648	39.2	1.878	72.8	1.673
9798	3877	2096	15.2	2.640	39.1	1.870	72.2	1.668
9913	3939	2141	15.2	2.630	38.9	1.861	71.5	1.662
10027	4003	2188	15.2	2.620	38.7	1.851	70.8	1.655
10141	4070	2238	15.2	2.608	38.5	1.841	70.0	1.647
10256	4139	2290	15.2	2.595	38.3	1.830	69.2	1.637
10370	4210	2346	15.2	2.582	38.1	1.818	68.3	1.625
10484	4283	2404	15.2	2.568	37.9	1.806	67.4	1.610
10599	4358	2466	15.2	2.553	37.6	1.792	66.4	1.592
10713	4435	2531	15.2	2.538	37.4	1.778	65.4	1.570
10827	4514	2599	15.2	2.522	37.1	1.763	64.4	1.543
10942	4594	2671	15.2	2.506	36.8	1.748	63.3	1.511
11056	4676	2746	15.2	2.491	36.6	1.731	62.2	1.471
11171	4759	2825	15.2	2.475	36.3	1.714	61.1	1.422
11285	4843	2908	15.2	2.459	36.0	1.696	60.0	1.364

PERFORMANCE SUMMARY

FLOW DEL. NM^3/HR	DIS P. BAR (a)	DIS P. BAR (e)	SHAFT KW
14082	8.62	7.61	1361.6
14259	8.58	7.56	1372.9
14436	8.52	7.51	1383.6
14612	8.45	7.44	1393.7
14789	8.38	7.37	1403.2
14966	8.29	7.28	1412.1
15143	8.20	7.19	1420.4
15319	8.09	7.08	1428.1
15496	7.98	6.96	1435.1
15673	7.85	6.83	1441.6
15850	7.70	6.69	1447.3
16026	7.55	6.53	1452.4
16203	7.38	6.36	1456.8
16380	7.19	6.17	1460.4
16557	6.98	5.96	1463.3
16733	6.74	5.73	1465.4
16910	6.49	5.47	1466.7
17087	6.20	5.19	1467.1
17264	5.88	4.87	1466.6
17440	5.53	4.52	1465.1

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9080	3546	1871	15.2	2.665	39.6	1.912	75.0	1.689
9183	3602	1908	15.2	2.655	39.4	1.905	74.4	1.686
9286	3658	1945	15.2	2.645	39.3	1.899	73.7	1.683
9388	3715	1983	15.2	2.635	39.1	1.892	73.1	1.679
9491	3772	2022	15.2	2.625	38.9	1.884	72.5	1.676
9593	3830	2063	15.2	2.614	38.7	1.876	71.9	1.672
9696	3889	2104	15.2	2.604	38.6	1.868	71.2	1.667
9799	3948	2147	15.2	2.593	38.4	1.859	70.5	1.661
9901	4010	2192	15.2	2.582	38.2	1.850	69.8	1.655
10004	4072	2239	15.2	2.570	38.0	1.841	69.0	1.647
10106	4136	2288	15.2	2.558	37.8	1.830	68.2	1.638
10209	4203	2340	15.2	2.545	37.6	1.820	67.4	1.627
10311	4271	2394	15.2	2.531	37.3	1.808	66.5	1.613
10414	4342	2452	15.2	2.516	37.1	1.795	65.6	1.597
10517	4416	2514	15.2	2.501	36.8	1.782	64.6	1.577
10619	4493	2580	15.2	2.484	36.6	1.767	63.6	1.551
10722	4574	2651	15.2	2.465	36.3	1.752	62.5	1.520
10824	4658	2729	15.2	2.446	35.9	1.735	61.3	1.480
10927	4747	2813	15.2	2.425	35.6	1.716	60.0	1.430
11029	4841	2905	15.2	2.402	35.2	1.696	58.7	1.366

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR(a)	BAR(e)	KW
14033	8.62	7.61	1343.6
14192	8.54	7.52	1351.4
14350	8.45	7.44	1359.2
14509	8.36	7.35	1366.8
14668	8.27	7.26	1374.2
14826	8.18	7.16	1381.5
14985	8.08	7.06	1388.4
15143	7.97	6.96	1395.0
15302	7.86	6.84	1401.2
15460	7.73	6.72	1406.8
15619	7.60	6.59	1411.9
15777	7.46	6.44	1416.3
15936	7.30	6.28	1419.9
16094	7.12	6.11	1422.6
16253	6.92	5.91	1424.2
16411	6.70	5.68	1424.6
16570	6.44	5.43	1423.7
16728	6.15	5.14	1421.2
16887	5.81	4.80	1416.9
17046	5.42	4.41	1410.5

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 60

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
8621	3549	1872	15.2	2.526	37.6	1.912	71.2	1.689
8703	3604	1908	15.2	2.512	37.3	1.905	70.5	1.686
8785	3660	1945	15.2	2.498	37.1	1.898	69.8	1.683
8867	3717	1984	15.2	2.484	36.9	1.891	69.1	1.679
8949	3776	2024	15.2	2.469	36.7	1.884	68.3	1.676
9031	3836	2065	15.2	2.454	36.4	1.875	67.6	1.671
9112	3897	2109	15.2	2.439	36.2	1.867	66.8	1.666
9194	3959	2153	15.2	2.423	35.9	1.858	66.0	1.660
9276	4023	2200	15.2	2.407	35.7	1.848	65.1	1.654
9358	4088	2249	15.2	2.391	35.4	1.838	64.3	1.645
9440	4155	2300	15.2	2.375	35.1	1.827	63.4	1.635
9522	4223	2354	15.2	2.358	34.9	1.816	62.5	1.623
9604	4294	2410	15.2	2.341	34.6	1.804	61.6	1.609
9685	4365	2469	15.2	2.324	34.3	1.791	60.6	1.592
9767	4439	2530	15.2	2.306	34.0	1.778	59.6	1.571
9849	4514	2596	15.2	2.288	33.7	1.763	58.6	1.545
9931	4592	2665	15.2	2.270	33.4	1.748	57.6	1.514
10013	4672	2737	15.2	2.251	33.1	1.732	56.5	1.476
10095	4753	2815	15.2	2.232	32.8	1.715	55.4	1.429
10177	4837	2897	15.2	2.213	32.5	1.697	54.3	1.372

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR(a)	BAR(e)	KW
13324	8.18	7.16	1242.7
13450	8.09	7.07	1247.5
13577	7.99	6.98	1252.1
13703	7.89	6.88	1256.3
13830	7.79	6.77	1260.3
13956	7.68	6.67	1263.9
14083	7.57	6.55	1267.2
14209	7.45	6.43	1270.1
14336	7.32	6.31	1272.7
14462	7.19	6.17	1274.8
14589	7.04	6.03	1276.4
14715	6.89	5.88	1277.6
14842	6.73	5.71	1278.2
14968	6.55	5.53	1278.2
15095	6.35	5.34	1277.6
15221	6.14	5.13	1276.2
15348	5.90	4.89	1274.1
15474	5.64	4.63	1271.1
15601	5.35	4.34	1267.1
15727	5.03	4.02	1262.0

□

***** Power Evaluation (Inlet Guide Vanes) *****

Model : HL8-4-75

Order No : L8-41197

Test Date : 5-25-05

Guaranteed Conditions:

POINT # 1

(QG)	Flow	14900.00	DEL. NM^3/HR	
(DPG)	Disc Press		7.30	BAR(a)
(HPG)	Coupling Power	1388.00	KW	
(HPM)	Mechanical loss	49.96	KW	
(APD)	Aftercooler dp	0.11	BAR	

Igv Angle 1 (deg)		20	
Flow 1	15777.28	DEL. NM^3/HR	
Disc P 1	7.46	BAR(a)	
Power 1	1416.29	KW	
Flow 2	15935.81	DEL. NM^3/HR	
Disc P 2	7.30	BAR(a)	
Power 2	1419.88	KW	

Igv Angle 2 (deg)		60	
Flow 1	14335.87	DEL. NM^3/HR	
Disc P 1	7.32	BAR(a)	
Power 1	1272.66	KW	
Flow 2	14462.38	DEL. NM^3/HR	
Disc P 2	7.19	BAR(a)	
Power 2	1274.77	KW	

Calc Values at Des P:

IGV 1 Flow	15932.23	DEL. NM^3/HR	
IGV 1 Power	1419.80	KW	
IGV 2 Flow	14355.34	DEL. NM^3/HR	
IGV 2 Power	1272.99	KW	
Des Pt IGV angle (deg)		46.18	
Des Pt Power	1323.70	KW	

(Calc/Guar) Power(%)	-4.63
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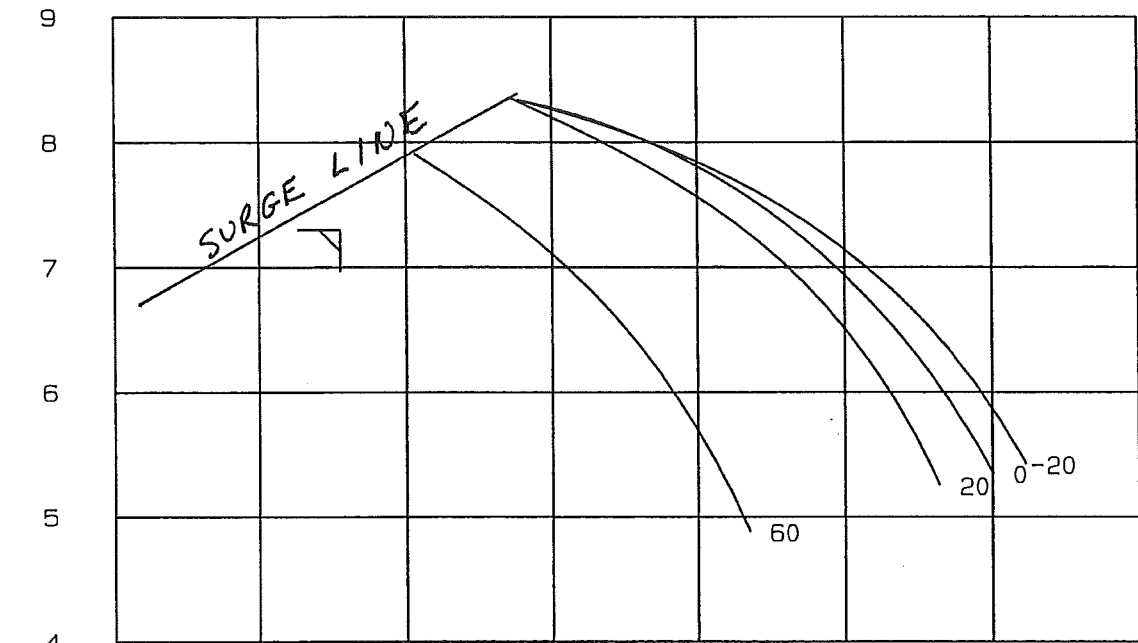
ATLAS COPCO ACT COMPRESSOR PERFORMANCE MAP

ORDER # : L8-41197
 CUSTOMER: ACE/AIR LIQUIDE
 MODEL: CASE B MIN
 TEST DATE: 5-25-05

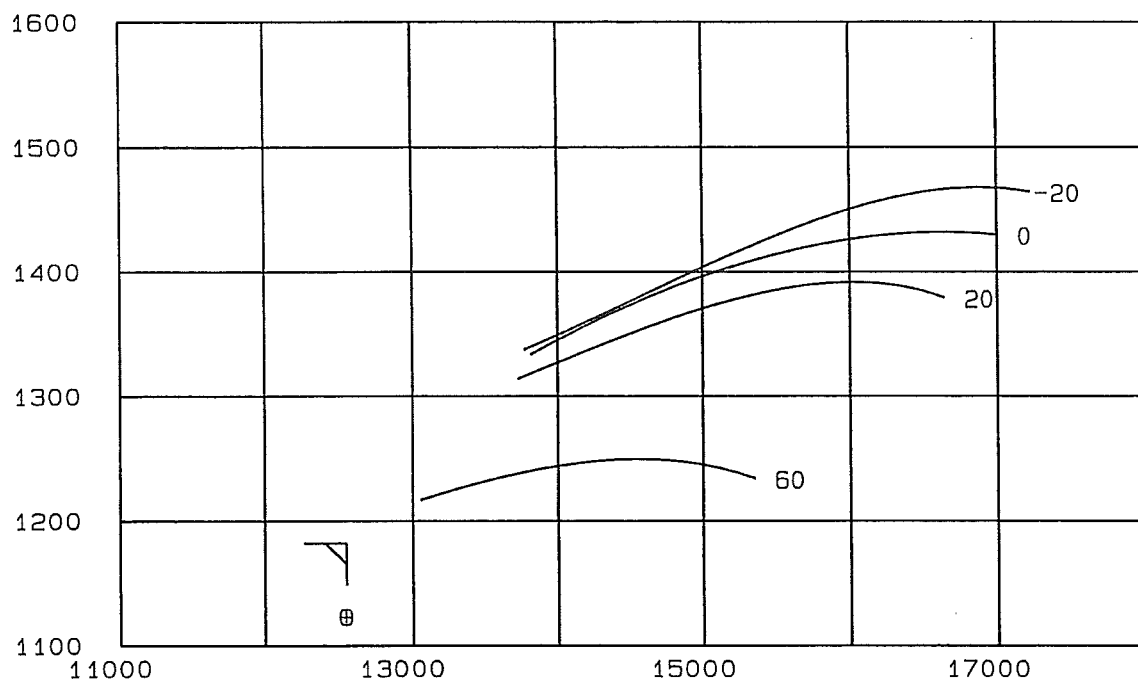
REF. PRES. : 14.87 psia
 MEDIUM : NITROGEN
 MOLEWEIGHT : 28.01 kg/kMol
 ISEN. EXP. : 1.4
 REL. HUM. : 0%

T1 IN : 96.8 deg F
 T2 IN : 113.7 deg F
 T3 IN : 113.7 deg F

DISCHARGE PRESSURE BAR (a)



KILOWATTS



DELIVERED FLOW NM³/HR

Θ = Tested Power at GP

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

INPUT DATA

NUMBER OF STAGES = 3 NUMBER OF IGV ANGLES = 4
 BAROMETRIC PRESSURE = 14.70 REFERENCE PRESSURE = 14.87
 AFTERCOOLER DP = 1.52 MECHANICAL POWER LOSS = 67.0
 STAGE 1 INLET TEMP = 96.8 STAGE 1 GAS CONSTANT: 55.15
 STAGE 2 INLET TEMP = 113.7 STAGE 2 GAS CONSTANT: 55.15
 STAGE 3 INLET TEMP = 113.7 STAGE 3 GAS CONSTANT: 55.15
 STAGE 1 - 2 DP, FLOW = 0.96 @ 9912.0
 STAGE 2 - 3 DP, FLOW = 0.88 @ 9912.0

SEAL LEAKAGE + CONDENSATE KNOCKOUT INTERSTAGE MASS INJECTION OR REMOVAL

MASS FLOW RATIO m2/m1 = 1.000 MASS FLOW RATIO m2/m1 = 1.000
 MASS FLOW RATIO m3/m1 = 0.999 MASS FLOW RATIO m3/m2 = 1.000

DISCHARGE TO INLET FLOW RATIO = .998

IGV ANGLE = -20				IGV ANGLE = 0				IGV ANGLE = 20			
Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1
9081	2.667	819.8	.8138	9112	2.668	812.0	.8251	9053	2.667	788.8	.8434
9495	2.659	836.5	.8312	9619	2.648	841.6	.8327	9506	2.626	813.0	.8436
9989	2.631	876.8	.8239	10058	2.622	868.3	.8345	9853	2.584	828.9	.8412
10646	2.585	916.8	.8223	10584	2.552	888.8	.8300	10481	2.508	858.3	.8333
11345	2.505	951.1	.8129	11240	2.466	918.8	.8171	10975	2.414	869.0	.8213

IGV ANGLE = 60			
Q1	PR1	HP1	EF1
8613	2.53	703.5	.8434
9197	2.42	722.2	.8320
10086	2.23	742.7	.7962

STAGE 2				STAGE 3			
Q	PR	HP	EF	Q	PR	HP	EF
3530	1.90	188.8	.8578	1871	1.68	82.4	.8243
3536	1.90	189.0	.8553	1873	1.68	82.4	.8241
3539	1.90	188.6	.8558	1874	1.68	82.6	.8218
3551	1.90	190.0	.8572	1877	1.68	82.8	.8222
3735	1.88	194.5	.8602	2000	1.68	86.1	.8385
3767	1.88	197.0	.8546	2023	1.67	87.3	.8301
3786	1.88	197.9	.8552	2037	1.67	87.7	.8323
3967	1.84	202.2	.8493	2173	1.65	90.9	.8304
3995	1.84	203.3	.8496	2199	1.64	91.6	.8301
4009	1.84	203.8	.8488	2212	1.64	92.0	.8316
4029	1.84	205.1	.8483	2215	1.64	92.5	.8304
4354	1.79	213.3	.8377	2479	1.58	97.7	.8068
4397	1.77	213.1	.8309	2524	1.56	98.0	.7974
4428	1.77	215.1	.8319	2541	1.56	98.9	.7964
4787	1.70	220.8	.8028	2885	1.37	101.7	.6061
4808	1.70	222.1	.8031	2892	1.38	102.2	.6205
4830	1.69	221.5	.7980	2925	1.34	101.7	.5621
4846	1.69	222.5	.7993	2928	1.35	102.4	.5866

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

ACCURACY OF POLYNOMIAL CURVE FIT

IGV ANGLE = -20				IGV ANGLE = 0				IGV ANGLE = 20			
Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF
9081	0.03	-0.13	0.17	9112	-0.04	-0.05	-0.00	9053	0.03	0.03	0.01
9495	-0.09	0.40	-0.51	9619	0.17	0.20	0.02	9506	-0.12	-0.13	-0.03
9989	0.10	-0.42	0.56	10058	-0.23	-0.26	-0.03	9853	0.14	0.14	0.03
10646	-0.05	0.19	-0.27	10584	0.12	0.13	0.01	10481	-0.06	-0.06	-0.02
11345	0.01	-0.04	0.06	11240	-0.02	-0.02	-0.00	10975	0.02	0.02	0.00

IGV ANGLE = 60			
Q1	ēPR	ēHP	ēEF
8613	0.00	0.00	0.00
9197	0.00	0.00	0.00
10086	0.00	0.00	0.00

STAGE 2				STAGE 3			
Q	ēPR	ēHP	ēEF	Q	ēPR	ēHP	ēEF
3530	-0.07	-0.03	-0.10	1871	0.03	0.08	0.02
3536	0.08	-0.02	0.19	1873	0.10	0.16	0.05
3539	0.21	0.25	0.13	1874	0.11	-0.04	0.33
3551	-0.16	-0.27	-0.04	1877	0.01	-0.20	0.29
3735	0.01	0.55	-0.53	2000	-0.36	0.37	-1.21
3767	-0.09	-0.21	0.07	2023	-0.10	-0.26	-0.11
3786	-0.22	-0.36	-0.03	2037	-0.21	-0.24	-0.31
3967	0.24	0.24	0.20	2173	0.25	0.24	0.33
3995	0.10	0.10	0.07	2199	0.23	0.19	0.38
4009	0.09	0.06	0.12	2212	0.12	0.11	0.19
4029	-0.10	-0.30	0.11	2215	-0.05	-0.37	0.33
4354	-0.25	-0.18	-0.31	2479	-0.01	-0.09	0.13
4397	0.31	0.38	0.21	2524	0.13	0.36	0.00
4428	-0.20	-0.23	-0.13	2541	-0.29	-0.30	-0.43
4787	0.16	0.22	0.11	2885	0.50	0.23	1.13
4808	-0.18	-0.22	-0.16	2892	-0.66	-0.24	-2.14
4830	0.21	0.19	0.22	2925	0.88	0.35	3.03
4846	-0.15	-0.16	-0.13	2928	-0.66	-0.33	-1.79

ALL ē VALUES ARE GIVEN AS PERCENT DIFFERENCE OF CALCULATED TO INPUT VALUE.

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = -20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9081	3580	1905	14.9	2.667	38.9	1.897	73.0	1.678
9201	3633	1940	14.9	2.665	38.8	1.891	72.6	1.675
9322	3687	1976	14.9	2.662	38.7	1.884	72.2	1.672
9442	3742	2013	14.9	2.658	38.7	1.877	71.8	1.669
9562	3798	2052	14.9	2.654	38.6	1.870	71.3	1.665
9683	3855	2093	14.9	2.649	38.5	1.862	70.8	1.660
9803	3914	2135	14.9	2.643	38.4	1.854	70.3	1.655
9923	3974	2179	14.9	2.637	38.3	1.845	69.7	1.649
10044	4036	2225	14.9	2.630	38.1	1.836	69.1	1.642
10164	4099	2273	14.9	2.622	38.0	1.826	68.4	1.633
10284	4164	2323	14.9	2.614	37.8	1.816	67.8	1.623
10405	4231	2376	14.9	2.605	37.7	1.805	67.0	1.611
10525	4300	2432	14.9	2.595	37.5	1.793	66.3	1.596
10645	4371	2490	14.9	2.584	37.3	1.781	65.4	1.578
10766	4443	2552	14.9	2.572	37.1	1.768	64.6	1.556
10886	4518	2617	14.9	2.560	36.9	1.754	63.7	1.529
11006	4596	2687	14.9	2.547	36.7	1.739	62.7	1.497
11127	4676	2761	14.9	2.533	36.5	1.723	61.7	1.457
11247	4758	2839	14.9	2.518	36.2	1.706	60.6	1.408
11367	4844	2924	14.9	2.503	36.0	1.687	59.5	1.348

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR (a)	BAR (e)	KW
13766	8.34	7.32	1337.3
13948	8.28	7.27	1346.5
14131	8.22	7.21	1356.1
14313	8.15	7.14	1366.0
14495	8.08	7.07	1376.0
14678	8.00	6.99	1386.0
14860	7.92	6.90	1396.1
15043	7.82	6.81	1405.9
15225	7.72	6.70	1415.5
15407	7.60	6.59	1424.7
15590	7.48	6.46	1433.4
15772	7.34	6.33	1441.4
15955	7.19	6.17	1448.7
16137	7.01	6.00	1455.1
16320	6.82	5.81	1460.3
16502	6.61	5.59	1464.4
16684	6.37	5.35	1467.0
16867	6.09	5.08	1468.0
17049	5.78	4.77	1467.2
17232	5.43	4.41	1464.4

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 0

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9112	3593	1913	14.9	2.667	38.9	1.896	72.9	1.677
9223	3639	1944	14.9	2.667	38.8	1.890	72.6	1.675
9334	3688	1977	14.9	2.665	38.8	1.884	72.3	1.672
9444	3739	2011	14.9	2.661	38.7	1.878	71.9	1.669
9555	3792	2049	14.9	2.656	38.6	1.871	71.4	1.665
9666	3848	2088	14.9	2.649	38.5	1.863	70.9	1.661
9777	3906	2129	14.9	2.641	38.3	1.855	70.3	1.656
9888	3967	2173	14.9	2.632	38.2	1.846	69.6	1.650
9998	4029	2220	14.9	2.622	38.0	1.837	68.9	1.643
10109	4094	2269	14.9	2.611	37.8	1.827	68.2	1.634
10220	4161	2320	14.9	2.599	37.6	1.816	67.4	1.624
10331	4230	2375	14.9	2.586	37.4	1.805	66.6	1.611
10442	4301	2432	14.9	2.573	37.2	1.793	65.7	1.596
10553	4374	2492	14.9	2.559	37.0	1.780	64.8	1.577
10663	4448	2556	14.9	2.544	36.7	1.767	63.9	1.555
10774	4525	2622	14.9	2.530	36.5	1.752	62.9	1.527
10885	4603	2692	14.9	2.514	36.2	1.737	61.9	1.494
10996	4682	2766	14.9	2.499	36.0	1.721	60.8	1.454
11107	4763	2843	14.9	2.483	35.7	1.705	59.8	1.406
11218	4845	2924	14.9	2.468	35.5	1.687	58.7	1.348

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR (a)	BAR (e)	KW
13813	8.33	7.31	1333.5
13981	8.28	7.27	1344.1
14149	8.23	7.21	1354.2
14317	8.16	7.15	1363.7
14485	8.09	7.08	1372.6
14653	8.01	7.00	1381.0
14821	7.92	6.91	1388.8
14989	7.82	6.80	1396.0
15157	7.70	6.69	1402.6
15325	7.58	6.57	1408.6
15493	7.44	6.43	1414.0
15661	7.29	6.28	1418.7
15829	7.13	6.11	1422.8
15997	6.94	5.93	1426.1
16165	6.74	5.73	1428.8
16333	6.52	5.50	1430.7
16501	6.27	5.26	1431.8
16669	6.00	4.98	1432.0
16837	5.69	4.68	1431.4
17005	5.35	4.34	1429.9

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9053	3568	1897	14.9	2.668	38.9	1.898	73.1	1.679
9154	3624	1934	14.9	2.658	38.7	1.892	72.5	1.676
9256	3680	1971	14.9	2.648	38.5	1.885	71.9	1.673
9357	3736	2009	14.9	2.638	38.4	1.878	71.3	1.669
9458	3793	2049	14.9	2.628	38.2	1.871	70.7	1.665
9559	3850	2089	14.9	2.618	38.0	1.863	70.0	1.661
9660	3909	2131	14.9	2.608	37.9	1.855	69.4	1.656
9761	3968	2174	14.9	2.597	37.7	1.846	68.7	1.650
9862	4028	2219	14.9	2.586	37.5	1.837	68.0	1.643
9963	4090	2265	14.9	2.575	37.3	1.828	67.3	1.635
10065	4153	2314	14.9	2.563	37.1	1.818	66.6	1.625
10166	4219	2365	14.9	2.551	36.9	1.807	65.8	1.614
10267	4286	2419	14.9	2.537	36.7	1.796	65.0	1.599
10368	4355	2477	14.9	2.523	36.5	1.784	64.1	1.582
10469	4428	2537	14.9	2.508	36.2	1.770	63.2	1.561
10570	4503	2603	14.9	2.492	36.0	1.756	62.2	1.536
10671	4582	2673	14.9	2.474	35.7	1.741	61.1	1.504
10772	4664	2748	14.9	2.456	35.4	1.725	60.0	1.464
10873	4751	2830	14.9	2.436	35.1	1.707	58.8	1.414
10975	4842	2920	14.9	2.414	34.7	1.688	57.5	1.351

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR (a)	BAR (e)	KW
13724	8.35	7.34	1313.9
13877	8.27	7.25	1321.3
14030	8.18	7.17	1328.6
14184	8.10	7.08	1335.9
14337	8.01	6.99	1342.9
14490	7.91	6.90	1349.8
14644	7.82	6.80	1356.5
14797	7.71	6.70	1362.8
14950	7.60	6.59	1368.7
15103	7.48	6.47	1374.2
15257	7.35	6.34	1379.1
15410	7.21	6.20	1383.3
15563	7.06	6.04	1386.9
15717	6.89	5.87	1389.6
15870	6.69	5.68	1391.3
16023	6.48	5.46	1391.8
16176	6.23	5.22	1391.1
16330	5.95	4.94	1389.0
16483	5.63	4.62	1385.1
16636	5.25	4.24	1379.3

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 60

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
8613	3580	1903	14.9	2.527	36.9	1.897	69.3	1.678
8692	3634	1939	14.9	2.514	36.6	1.891	68.6	1.675
8772	3689	1976	14.9	2.500	36.4	1.884	67.9	1.672
8852	3745	2015	14.9	2.486	36.2	1.877	67.3	1.669
8931	3803	2054	14.9	2.472	36.0	1.869	66.5	1.665
9011	3861	2095	14.9	2.458	35.8	1.861	65.8	1.660
9091	3921	2138	14.9	2.443	35.5	1.853	65.1	1.655
9170	3982	2183	14.9	2.428	35.3	1.844	64.3	1.649
9250	4044	2229	14.9	2.413	35.0	1.835	63.5	1.641
9330	4108	2277	14.9	2.397	34.8	1.825	62.7	1.633
9409	4173	2327	14.9	2.381	34.5	1.814	61.9	1.622
9489	4240	2380	14.9	2.365	34.3	1.803	61.0	1.610
9569	4308	2435	14.9	2.348	34.0	1.792	60.1	1.595
9648	4378	2493	14.9	2.332	33.8	1.779	59.2	1.577
9728	4450	2553	14.9	2.315	33.5	1.766	58.3	1.556
9808	4523	2617	14.9	2.297	33.2	1.753	57.4	1.530
9887	4598	2684	14.9	2.279	32.9	1.738	56.4	1.498
9967	4676	2755	14.9	2.261	32.7	1.723	55.4	1.460
10046	4755	2830	14.9	2.243	32.4	1.706	54.3	1.414
10126	4836	2910	14.9	2.225	32.1	1.689	53.3	1.358

PERFORMANCE SUMMARY

FLOW DEL. NM^3/HR	DIS P. BAR(a)	DIS P. BAR(e)	SHAFT KW
13056	7.91	6.89	1216.6
13177	7.82	6.81	1221.0
13297	7.73	6.71	1225.3
13418	7.63	6.62	1229.2
13539	7.53	6.52	1232.9
13660	7.43	6.42	1236.3
13780	7.32	6.31	1239.3
13901	7.21	6.19	1242.1
14022	7.08	6.07	1244.4
14143	6.95	5.94	1246.3
14263	6.82	5.80	1247.8
14384	6.67	5.66	1248.9
14505	6.51	5.50	1249.4
14626	6.34	5.32	1249.4
14746	6.15	5.14	1248.7
14867	5.94	4.93	1247.4
14988	5.72	4.71	1245.3
15109	5.47	4.46	1242.5
15229	5.19	4.18	1238.7
15350	4.88	3.87	1234.0

□

***** Power Evaluation (Inlet Guide Vanes) *****

Model : CASE B MIN

Order No : L8-41197

Test Date : 5-25-05

Guaranteed Conditions: POINT # 1

(QG)	Flow	12550.00	DEL. NM ³ /HR	
(DPG)	Disc Press		7.30	BAR(a)
(HPG)	Coupling Power		1182.00	KW
(HPM)	Mechanical loss		49.96	KW
(APD)	Aftercooler dp		0.11	BAR

Igv Angle 1 (deg)		60	
Flow 1	13780.39	DEL. NM ³ /HR	
Disc P 1	7.32	BAR(a)	
Power 1	1239.35	KW	
Flow 2	13901.14	DEL. NM ³ /HR	
Disc P 2	7.21	BAR(a)	
Power 2	1242.06	KW	

Igv Angle 2 (deg)		20	
Flow 1	15256.69	DEL. NM ³ /HR	
Disc P 1	7.35	BAR(a)	
Power 1	1379.08	KW	
Flow 2	15409.98	DEL. NM ³ /HR	
Disc P 2	7.21	BAR(a)	
Power 2	1383.35	KW	

Calc Values at Des P:

IGV 1 Flow	13801.72	DEL. NM ³ /HR	
IGV 1 Power	1239.83	KW	
IGV 2 Flow	15316.12	DEL. NM ³ /HR	
IGV 2 Power	1380.74	KW	
Des Pt IGV angle (deg)		93.06	
Des Pt Power	1123.36	KW	

(Calc/Guar) Power(%)	-4.96
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ATLAS COPCO ACT COMPRESSOR PERFORMANCE MAP

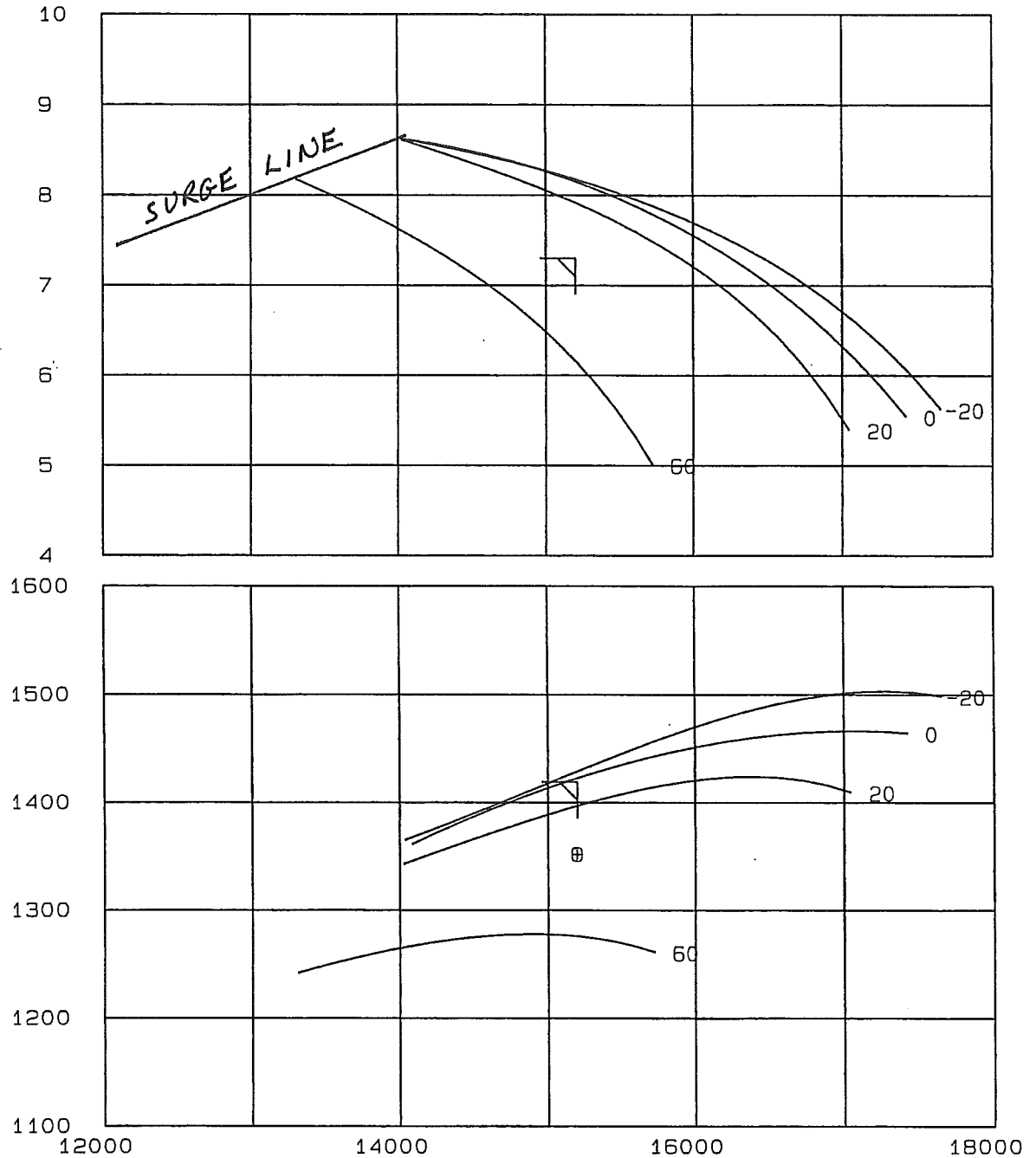
ORDER # : L8-41197
 CUSTOMER: ACE/AIR LIQUIDE
 MODEL: CASE B MAX
 TEST DATE: 5-25-05

REF. PRES. : 15.16 psia
 MEDIUM : NITROGEN
 MOLEWEIGHT : 28.01 kg/kMol
 ISEN. EXP. : 1.4
 REL. HUM. : 0%

T1 IN : 96.8 deg F
 T2 IN : 108.5 deg F
 T3 IN : 108.5 deg F

DISCHARGE PRESSURE BAR (a)

KILOWATTS



DELIVERED FLOW NM³/HR

⊗ = Tested Power at 6P

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

INPUT DATA

NUMBER OF STAGES = 3 NUMBER OF IGV ANGLES = 4
 BAROMETRIC PRESSURE = 14.70 REFERENCE PRESSURE = 15.16
 AFTERCOOLER DP = 1.52 MECHANICAL POWER LOSS = 67.0
 STAGE 1 INLET TEMP = 96.8 STAGE 1 GAS CONSTANT: 55.15
 STAGE 2 INLET TEMP = 108.5 STAGE 2 GAS CONSTANT: 55.15
 STAGE 3 INLET TEMP = 108.5 STAGE 3 GAS CONSTANT: 55.15
 STAGE 1 - 2 DP, FLOW = 0.96 @ 9912.0
 STAGE 2 - 3 DP, FLOW = 0.88 @ 9912.0

SEAL LEAKAGE + CONDENSATE KNOCKOUT INTERSTAGE MASS INJECTION OR REMOVAL

MASS FLOW RATIO m2/m1 = 1.000 MASS FLOW RATIO m2/m1 = 1.000
 MASS FLOW RATIO m3/m1 = 0.999 MASS FLOW RATIO m3/m2 = 1.000

DISCHARGE TO INLET FLOW RATIO = .998

IGV ANGLE = -20				IGV ANGLE = 0				IGV ANGLE = 20			
Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1	Q1	PR1	HP1	EF1
9081	2.667	835.8	.8138	9112	2.668	827.8	.8251	9053	2.667	804.1	.8434
9495	2.659	852.8	.8312	9619	2.648	858.0	.8327	9506	2.626	828.9	.8436
9989	2.631	893.9	.8239	10058	2.622	885.2	.8345	9853	2.584	845.1	.8412
10646	2.585	934.7	.8223	10584	2.552	906.2	.8300	10481	2.508	875.0	.8333
11345	2.505	969.6	.8129	11240	2.466	936.8	.8171	10975	2.414	885.9	.8213

IGV ANGLE = 60

Q1	PR1	HP1	EF1
8613	2.53	717.2	.8434
9197	2.42	736.3	.8320
10086	2.23	757.2	.7962

STAGE 2				STAGE 3			
Q	PR	HP	EF	Q	PR	HP	EF
3530	1.91	194.2	.8578	1871	1.69	84.7	.8243
3536	1.91	194.5	.8553	1873	1.69	84.7	.8241
3539	1.91	194.1	.8558	1874	1.69	85.0	.8218
3551	1.91	195.4	.8572	1877	1.69	85.2	.8222
3735	1.89	200.2	.8602	2000	1.68	88.6	.8385
3767	1.89	202.7	.8546	2023	1.68	89.8	.8301
3786	1.89	203.6	.8552	2037	1.68	90.2	.8323
3967	1.85	208.1	.8493	2173	1.65	93.5	.8304
3995	1.85	209.2	.8496	2199	1.65	94.3	.8301
4009	1.85	209.7	.8488	2212	1.65	94.6	.8316
4029	1.85	211.0	.8483	2215	1.65	95.2	.8304
4354	1.80	219.4	.8377	2479	1.59	100.5	.8068
4397	1.78	219.3	.8309	2524	1.57	100.9	.7974
4428	1.78	221.3	.8319	2541	1.57	101.7	.7964
4787	1.70	227.2	.8028	2885	1.37	104.6	.6061
4808	1.71	228.5	.8031	2892	1.38	105.1	.6205
4830	1.69	227.9	.7980	2925	1.34	104.7	.5621
4846	1.70	228.9	.7993	2928	1.36	105.3	.5866

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

ACCURACY OF POLYNOMIAL CURVE FIT

IGV ANGLE = -20				IGV ANGLE = 0				IGV ANGLE = 20			
Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF	Q1	ēPR	ēHP	ēEF
9081	0.03	-0.13	0.17	9112	-0.04	-0.05	-0.00	9053	0.03	0.03	0.01
9495	-0.09	0.40	-0.51	9619	0.17	0.19	0.02	9506	-0.12	-0.13	-0.03
9989	0.10	-0.42	0.56	10058	-0.23	-0.25	-0.03	9853	0.14	0.14	0.03
10646	-0.05	0.19	-0.27	10584	0.12	0.13	0.01	10481	-0.06	-0.06	-0.02
11345	0.01	-0.04	0.06	11240	-0.02	-0.02	-0.00	10975	0.02	0.02	0.00

IGV ANGLE = 60			
Q1	ēPR	ēHP	ēEF
8613	0.00	0.00	0.00
9197	0.00	0.00	0.00
10086	0.00	0.00	0.00

STAGE 2				STAGE 3			
Q	ēPR	ēHP	ēEF	Q	ēPR	ēHP	ēEF
3530	-0.07	-0.01	-0.10	1871	0.03	0.13	0.02
3536	0.08	-0.05	0.19	1873	0.10	0.21	0.05
3539	0.21	0.22	0.13	1874	0.11	-0.10	0.33
3551	-0.16	-0.23	-0.04	1877	0.01	-0.25	0.29
3735	0.01	0.52	-0.53	2000	-0.36	0.34	-1.21
3767	-0.08	-0.20	0.07	2023	-0.10	-0.25	-0.11
3786	-0.23	-0.35	-0.03	2037	-0.21	-0.22	-0.31
3967	0.24	0.22	0.20	2173	0.25	0.27	0.33
3995	0.11	0.10	0.07	2199	0.24	0.13	0.38
4009	0.09	0.06	0.12	2212	0.11	0.17	0.19
4029	-0.10	-0.28	0.11	2215	-0.05	-0.40	0.33
4354	-0.25	-0.15	-0.31	2479	-0.01	-0.07	0.13
4397	0.31	0.36	0.21	2524	0.13	0.28	0.00
4428	-0.19	-0.23	-0.13	2541	-0.29	-0.25	-0.43
4787	0.17	0.21	0.11	2885	0.50	0.25	1.13
4808	-0.18	-0.22	-0.16	2892	-0.67	-0.21	-2.14
4830	0.21	0.19	0.22	2925	0.88	0.27	3.03
4846	-0.15	-0.15	-0.13	2928	-0.66	-0.29	-1.79

ALL ē VALUES ARE GIVEN AS PERCENT DIFFERENCE OF CALCULATED TO INPUT VALUE.

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = -20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9081	3546	1872	15.2	2.667	39.6	1.911	75.0	1.688
9204	3600	1907	15.2	2.665	39.6	1.905	74.6	1.685
9328	3655	1944	15.2	2.662	39.5	1.898	74.2	1.682
9451	3710	1981	15.2	2.658	39.4	1.891	73.8	1.679
9574	3767	2021	15.2	2.654	39.3	1.884	73.3	1.675
9698	3826	2061	15.2	2.648	39.2	1.876	72.8	1.671
9821	3886	2104	15.2	2.643	39.1	1.868	72.2	1.666
9944	3947	2148	15.2	2.636	39.0	1.859	71.6	1.661
10068	4010	2194	15.2	2.629	38.9	1.849	71.0	1.654
10191	4074	2242	15.2	2.620	38.7	1.839	70.3	1.646
10314	4141	2293	15.2	2.612	38.6	1.829	69.6	1.636
10437	4209	2346	15.2	2.602	38.4	1.818	68.8	1.625
10561	4279	2403	15.2	2.591	38.2	1.806	68.0	1.610
10684	4352	2462	15.2	2.580	38.0	1.793	67.1	1.593
10807	4426	2525	15.2	2.568	37.8	1.779	66.2	1.572
10931	4503	2591	15.2	2.555	37.6	1.765	65.2	1.546
11054	4582	2662	15.2	2.541	37.3	1.749	64.2	1.514
11177	4665	2737	15.2	2.527	37.1	1.733	63.1	1.475
11301	4750	2818	15.2	2.511	36.8	1.715	62.0	1.427
11424	4838	2904	15.2	2.495	36.6	1.696	60.8	1.366

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR(a)	BAR(e)	KW
14034	8.62	7.61	1365.1
14225	8.56	7.55	1374.9
14415	8.50	7.49	1385.1
14606	8.43	7.42	1395.6
14797	8.36	7.34	1406.3
14987	8.28	7.26	1417.0
15178	8.19	7.18	1427.6
15368	8.09	7.08	1438.1
15559	7.99	6.97	1448.3
15749	7.87	6.86	1458.1
15940	7.74	6.73	1467.3
16131	7.60	6.59	1475.8
16321	7.44	6.43	1483.4
16512	7.27	6.25	1490.1
16702	7.07	6.06	1495.5
16893	6.85	5.84	1499.7
17084	6.60	5.59	1502.3
17274	6.32	5.30	1503.1
17465	5.99	4.98	1502.0
17655	5.62	4.61	1498.6

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 0

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9112	3559	1881	15.2	2.667	39.6	1.910	74.9	1.687
9226	3606	1911	15.2	2.667	39.6	1.904	74.6	1.685
9339	3656	1944	15.2	2.665	39.5	1.898	74.3	1.682
9453	3708	1979	15.2	2.661	39.5	1.892	73.8	1.679
9567	3762	2017	15.2	2.655	39.4	1.884	73.4	1.676
9681	3819	2056	15.2	2.648	39.2	1.877	72.8	1.672
9795	3878	2098	15.2	2.640	39.1	1.869	72.2	1.667
9908	3940	2143	15.2	2.631	38.9	1.860	71.5	1.661
10022	4004	2190	15.2	2.620	38.7	1.850	70.8	1.655
10136	4071	2239	15.2	2.608	38.5	1.840	70.0	1.646
10250	4139	2292	15.2	2.596	38.3	1.829	69.2	1.636
10363	4210	2347	15.2	2.583	38.1	1.817	68.3	1.624
10477	4282	2405	15.2	2.569	37.9	1.805	67.4	1.610
10591	4357	2466	15.2	2.554	37.6	1.792	66.4	1.592
10705	4434	2531	15.2	2.539	37.4	1.778	65.4	1.570
10819	4512	2598	15.2	2.523	37.1	1.763	64.4	1.543
10932	4592	2670	15.2	2.508	36.9	1.747	63.3	1.511
11046	4673	2744	15.2	2.492	36.6	1.731	62.2	1.471
11160	4756	2823	15.2	2.476	36.3	1.714	61.1	1.423
11274	4839	2905	15.2	2.460	36.1	1.696	60.0	1.366

PERFORMANCE SUMMARY

FLOW	DIS P.	DIS P.	SHAFT
DEL. NM^3/HR	BAR(a)	BAR(e)	KW
14082	8.61	7.60	1361.2
14258	8.56	7.55	1372.5
14434	8.51	7.50	1383.2
14610	8.44	7.43	1393.2
14785	8.37	7.36	1402.7
14961	8.28	7.27	1411.6
15137	8.19	7.18	1419.9
15313	8.08	7.07	1427.5
15489	7.97	6.95	1434.5
15665	7.84	6.83	1440.9
15840	7.70	6.69	1446.7
16016	7.54	6.53	1451.7
16192	7.37	6.36	1456.1
16368	7.18	6.17	1459.7
16544	6.98	5.96	1462.6
16720	6.75	5.73	1464.7
16895	6.49	5.48	1466.0
17071	6.21	5.19	1466.4
17247	5.89	4.88	1465.9
17423	5.54	4.53	1464.5

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 20

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
9076	3547	1873	15.2	2.665	39.6	1.911	74.9	1.688
9179	3603	1909	15.2	2.655	39.4	1.904	74.3	1.685
9282	3659	1947	15.2	2.645	39.3	1.898	73.7	1.682
9384	3716	1985	15.2	2.635	39.1	1.890	73.1	1.679
9487	3773	2024	15.2	2.625	38.9	1.883	72.5	1.675
9590	3831	2065	15.2	2.615	38.7	1.875	71.8	1.671
9693	3890	2107	15.2	2.604	38.6	1.867	71.2	1.666
9796	3950	2150	15.2	2.594	38.4	1.858	70.5	1.660
9898	4011	2195	15.2	2.582	38.2	1.849	69.7	1.654
10001	4074	2242	15.2	2.571	38.0	1.839	69.0	1.646
10104	4139	2291	15.2	2.558	37.8	1.829	68.2	1.637
10207	4205	2343	15.2	2.545	37.6	1.818	67.4	1.625
10310	4274	2397	15.2	2.531	37.3	1.807	66.5	1.612
10413	4345	2455	15.2	2.517	37.1	1.794	65.6	1.595
10515	4419	2518	15.2	2.501	36.8	1.781	64.6	1.575
10618	4496	2584	15.2	2.484	36.6	1.766	63.5	1.549
10721	4577	2656	15.2	2.465	36.3	1.750	62.4	1.517
10824	4662	2733	15.2	2.446	35.9	1.733	61.2	1.477
10927	4751	2818	15.2	2.425	35.6	1.715	60.0	1.427
11029	4846	2910	15.2	2.402	35.2	1.694	58.6	1.362

PERFORMANCE SUMMARY

FLOW DEL. NM^3/HR	DIS P. BAR (a)	DIS P. BAR (e)	SHAFT KW
14026	8.62	7.60	1342.9
14185	8.53	7.52	1350.7
14344	8.44	7.43	1358.5
14503	8.36	7.34	1366.2
14662	8.26	7.25	1373.7
14821	8.17	7.15	1380.9
14980	8.07	7.05	1387.9
15139	7.96	6.95	1394.5
15298	7.85	6.83	1400.7
15457	7.72	6.71	1406.4
15615	7.59	6.58	1411.5
15774	7.45	6.43	1415.8
15933	7.28	6.27	1419.4
16092	7.11	6.09	1422.1
16251	6.91	5.89	1423.7
16410	6.68	5.67	1424.1
16569	6.43	5.41	1423.1
16728	6.13	5.12	1420.6
16887	5.79	4.78	1416.2
17046	5.40	4.38	1409.6

□

CUSTOMER: ACE/AIR LIQUIDE

TEST DATE: 5-25-05

STAGE MATCHING CALCULATIONS

INLET GUIDE VANE ANGLE = 60

Q1	Q2	Q3	PI1	PR1	PI2	PR2	PI3	PR3
ICFM	ICFM	ICFM						
8613	3546	1871	15.2	2.527	37.6	1.911	71.2	1.688
8695	3602	1907	15.2	2.514	37.4	1.905	70.5	1.685
8777	3658	1945	15.2	2.499	37.1	1.898	69.8	1.682
8860	3716	1984	15.2	2.485	36.9	1.890	69.1	1.679
8942	3774	2024	15.2	2.470	36.7	1.883	68.3	1.675
9024	3834	2065	15.2	2.455	36.4	1.875	67.6	1.671
9107	3896	2109	15.2	2.440	36.2	1.866	66.8	1.666
9189	3958	2154	15.2	2.424	35.9	1.857	66.0	1.660
9271	4023	2201	15.2	2.408	35.7	1.847	65.1	1.653
9353	4088	2250	15.2	2.392	35.4	1.837	64.3	1.644
9436	4155	2302	15.2	2.376	35.1	1.826	63.4	1.634
9518	4224	2355	15.2	2.359	34.9	1.815	62.5	1.622
9600	4295	2412	15.2	2.342	34.6	1.803	61.6	1.608
9683	4367	2471	15.2	2.324	34.3	1.790	60.6	1.590
9765	4441	2533	15.2	2.306	34.0	1.777	59.6	1.569
9847	4517	2599	15.2	2.288	33.7	1.762	58.6	1.543
9930	4595	2668	15.2	2.270	33.5	1.747	57.5	1.511
10012	4675	2742	15.2	2.251	33.2	1.731	56.5	1.473
10094	4757	2819	15.2	2.232	32.8	1.713	55.4	1.426
10177	4842	2902	15.2	2.213	32.5	1.695	54.2	1.368

PERFORMANCE SUMMARY

FLOW DEL. NM^3/HR	DIS P. BAR (a)	DIS P. BAR (e)	SHAFT KW
13311	8.18	7.16	1241.9
13438	8.08	7.07	1246.7
13565	7.99	6.98	1251.3
13692	7.89	6.88	1255.6
13819	7.79	6.77	1259.7
13947	7.68	6.66	1263.3
14074	7.56	6.55	1266.7
14201	7.44	6.43	1269.7
14328	7.32	6.30	1272.2
14455	7.18	6.17	1274.4
14583	7.04	6.03	1276.0
14710	6.88	5.87	1277.2
14837	6.72	5.71	1277.8
14964	6.54	5.53	1277.8
15091	6.34	5.33	1277.1
15219	6.13	5.11	1275.7
15346	5.89	4.88	1273.5
15473	5.63	4.62	1270.5
15600	5.34	4.32	1266.4
15727	5.01	3.99	1261.2

□

***** Power Evaluation (Inlet Guide Vanes) *****

Model : CASE B MAX

Order No : L8-41197

Test Date : 5-25-05

Guaranteed Conditions: POINT # 1

(QG) Flow	15200.00	DEL. NM ³ /HR	
(DPG) Disc Press		7.30	BAR(a)
(HPG) Coupling Power		1419.00	KW
(HPM) Mechanical loss		49.96	KW
(APD) Aftercooler dp		0.11	BAR

Igv Angle 1 (deg)		20	
Flow 1	15774.33	DEL. NM ³ /HR	
Disc P 1	7.45	BAR(a)	
Power 1	1415.84	KW	
Flow 2	15933.23	DEL. NM ³ /HR	
Disc P 2	7.28	BAR(a)	
Power 2	1419.42	KW	

Igv Angle 2 (deg)		60	
Flow 1	14328.16	DEL. NM ³ /HR	
Disc P 1	7.32	BAR(a)	
Power 1	1272.22	KW	
Flow 2	14455.37	DEL. NM ³ /HR	
Disc P 2	7.18	BAR(a)	
Power 2	1274.36	KW	

Calc Values at Des P:

IGV 1 Flow	15918.28	DEL. NM ³ /HR	
IGV 1 Power	1419.09	KW	
IGV 2 Flow	14344.13	DEL. NM ³ /HR	
IGV 2 Power	1272.49	KW	
Des Pt IGV angle (deg)		38.25	
Des Pt Power	1352.20	KW	

(Calc/Guar) Power(%)	-4.71
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ATLAS COPCO COMPTEC INC. TEST DATA REDUCTION PROGRAM

IGV=0 DATA AQUI
 MODEL SC- 0 # 0-41197 TEST DATE: MAY 25, 2005 2:32 PM REV 2.1NT
 SUPERVISING ENGINEER : JWS

RAW TEST DATA:C:\AERO\41197BA1.A00

1	FLOW P	PSI	0.53	0.57	0.60	0.67	0.70
2	FLOW DP	PSI	0.67	0.73	0.79	0.85	0.94
3	INLET P	PSI	1.88	2.04	2.20	2.44	2.62
4	DISC. P	PSI	19.29	18.62	17.86	16.44	15.06
7	FLOW T	F	129.97	130.00	127.70	126.21	125.03
8	INLET T	F	125.59	125.96	124.56	123.36	122.12
9	DISC. T	F	353.10	349.57	344.49	337.44	331.11
11	VAPOR P	PSI	0.14	0.13	0.13	0.12	0.12
15	FLOW P	PSI	0.53	0.57	0.60	0.66	0.70
17	FLOW P	PSI	0.53	0.57	0.60	0.67	0.71
23	FLOW DP	PSI	0.67	0.73	0.78	0.85	0.94
25	FLOW DP	PSI	0.67	0.74	0.79	0.84	0.94
31	INLET P	PSI	1.88	2.04	2.21	2.45	2.62
33	INLET P	PSI	1.88	2.04	2.20	2.44	2.62
39	DISC. P	PSI	19.39	18.70	17.94	16.53	15.16
41	DISC. P	PSI	19.19	18.53	17.77	16.36	14.97
52	FLOW T	F	129.98	130.04	127.70	126.25	125.08
53	FLOW T	F	129.96	129.97	127.71	126.17	124.99
56	INLET T	F	125.76	126.16	124.76	123.62	122.39
57	INLET T	F	125.42	125.76	124.36	123.09	121.85
60	DISC. T	F	353.17	349.55	344.48	337.30	330.94
61	DISC. T	F	353.03	349.59	344.49	337.59	331.28
65	SPEED	RPM	3013.00	3014.00	3009.00	3009.00	3013.00
69	R.H.	%	7.20	6.80	6.90	6.70	6.90
74	BAROMETR	PSI	14.45	14.45	14.45	14.45	14.45
81	RH T	F	124.50	125.00	123.90	122.70	121.50
82	RH P	PSI	12.56	12.41	12.25	12.01	11.83

NOTE : BE SURE BAROMETRIC PRESSURE GIVEN IS FOR THE LOCAL ELEVATION,
 PRESSURE GIVEN BY THE WEATHER SERVICE IS CORRECTED TO SEA LEVEL,
 AND SO MUST BE RECORRECTED BACK TO THE LOCAL PRESSURE.

ECHO KEY FILE:C:\AERO\41197B.KYA

15.160	96.80	2980.0	1.4000	55.150	1	2		
67.00	16.2500	0.9950	6.59184	0.0000120	0.0			
3	3	3	3	6	6	3	81	82
0	0	0	2	0	0	0	0	
1	0	0	0	10.69	0.00	14.31	0.00	
15.0000	11.9380	0.6000	0.0000	1.0000	0.0000	0.0000110	0.0000187	

IGV=0 DATA AQUI

MAY 25,2005 2:32 PM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

VARIATION FROM AVERAGE

1	FLOW P	PSI	0.00	0.00	0.00	0.00	0.00
2	FLOW DP	PSI	0.00	0.00	0.01	0.00	0.00
3	INLET P	PSI	0.00	0.00	0.01	0.00	0.00
4	DISC. P	PSI	0.10	0.09	0.09	0.09	0.10
7	FLOW T	F	0.01	0.03	0.00	0.04	0.05
8	INLET T	F	0.17	0.20	0.20	0.27	0.27
9	DISC. T	F	0.07	0.02	0.00	0.14	0.17

INSTRUMENT TEMPERATURE ASSUMED TO BE 68 DEGREES

REF, INLET, INSTR., FLOW DEVICE, OR DRY BULB TEMP SHOULD BE USED FOR R.H. LINE

ABSOLUTE PRESSURES AND TEMPERATURES

1	FLOW P	PSI	13.92	13.88	13.85	13.79	13.75
2	FLOW DP	PSI	0.67	0.73	0.79	0.85	0.94
3	INLET P	PSI	12.57	12.41	12.25	12.01	11.83
4	DISC. P	PSI	33.74	33.06	32.31	30.90	29.52
7	FLOW T	R	589.64	589.68	587.38	585.88	584.71
8	INLET T	R	585.26	585.63	584.23	583.03	581.79
9	DISC. T	R	812.77	809.24	804.16	797.12	790.78
72	GAS CONS		53.5728	53.5659	53.5654	53.5564	53.5588
73	HT RATIO		1.3945	1.3946	1.3947	1.3949	1.3951
74	BAROMETR	PSI	14.4490	14.4490	14.4510	14.4530	14.4520

PRIMARY FLOW DEVICE

CALCULATION FOR AN ORIFICE D+1/2D

PIPE DIA = 14.3120 DEVICE DIA = 10.6870 B = 0.7467 F = 1.0000

	FLOW COEFF	REYNOLDS NUMBER	FLOW #/SEC	VELOCITY FT/SEC	DYNAMIC TEMP	PRESS	%	STAG PRESS	STATIC FLOW
1	0.6103	982163.	8.932	125.82	1.30	0.10	0.47	12.67	9264.6
2	0.6102	1024203.	9.315	132.95	1.45	0.11	0.53	12.51	9789.4
3	0.6101	1061818.	9.630	138.88	1.58	0.12	0.59	12.36	10226.0
4	0.6100	1101292.	9.971	146.24	1.76	0.13	0.68	12.14	10768.1
5	0.6099	1159232.	10.481	155.68	1.99	0.14	0.82	11.97	11462.9

	DISCHARGE VELOCITY				INLET		
	VELOCITY	TEMP	PRESS	%	STAG PRESS	STATIC FLOW	STAG FLOW
1	102.88	0.87	0.13	0.60	33.86	4798.2	4785.2
2	108.97	0.97	0.14	0.68	33.21	5082.0	5066.5
3	114.55	1.08	0.15	0.76	32.46	5342.5	5324.4
4	122.89	1.24	0.17	0.90	31.07	5731.5	5709.1
5	134.11	1.48	0.20	1.10	29.71	6254.5	6225.1

RATIOS OF DISCHARGE TO INLET

	PRESSURE		TEMPERATURE		FLOW	
	STATIC	STAG	STATIC	STAG	STATIC	STAG
1	2.6845	2.6737	1.3903	1.3887	0.5179	0.5194
2	2.6652	2.6533	1.3836	1.3818	0.5191	0.5208
3	2.6383	2.6256	1.3783	1.3764	0.5224	0.5242
4	2.5724	2.5592	1.3692	1.3672	0.5323	0.5342
5	2.4950	2.4814	1.3613	1.3592	0.5456	0.5478

IGV=0 DATA AQUI

MAY 25,2005 2:32 PM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

	ITROPIC WORK	I.W. COEFF	PTROPIC COEFF	PTROPIC WORK	P.W. COEFF	POWER TORQUE	POWER KWATTS	MOTOR EFF
1	35551.	0.5768	1.5013	36501.	0.5922	0.0	0.0	0.0000
2	35253.	0.5715	1.4957	36140.	0.5859	0.0	0.0	0.0000
3	34737.	0.5651	1.4947	35592.	0.5790	0.0	0.0	0.0000
4	33616.	0.5468	1.4989	34449.	0.5604	0.0	0.0	0.0000
5	32297.	0.5240	1.5099	33145.	0.5377	0.0	0.0	0.0000

	MACH NUMBER	REYNOLDS NUMBER	TEMP EFF	GAS HORSEPOWER AERO TORQUE	EFFICIENCY (FROM AERO)		
					SHAFT	ITROPIC	PTROPIC
1	1.1874	525159.	0.8251	699.7	0.0	0.7512	0.8251
2	1.1874	518584.	0.8327	717.0	0.0	0.7597	0.8327
3	1.1868	513573.	0.8345	728.9	0.0	0.7627	0.8345
4	1.1880	506064.	0.8300	734.2	0.0	0.7591	0.8300
5	1.1908	501617.	0.8171	753.2	0.0	0.7487	0.8171

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 15.16	GAS CONSTANT	= 55.15	WHEEL DIA	= 16.250
TEMPERATURE	= 96.80	HEAT RATIO	= 1.400	TIP WIDTH	= 0.995
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000120	MECH HP	= 67.0
MACHINE MACH	= 1.1846	REYNOLDS #	= 684586.	WHEEL SPEED	= 19644.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8471	0.5922	9111.9	35705.7	2.6684	1.3924	827.8	894.8
2	0.8537	0.5859	9618.5	35329.2	2.6479	1.3853	858.0	925.0
3	0.8550	0.5790	10058.4	34909.1	2.6224	1.3801	885.2	952.2
4	0.8506	0.5604	10583.5	33788.0	2.5518	1.3698	906.2	973.2
5	0.8386	0.5377	11240.0	32422.9	2.4655	1.3600	936.8	1003.8

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 14.87	GAS CONSTANT	= 55.15	WHEEL DIA	= 16.250
TEMPERATURE	= 96.80	HEAT RATIO	= 1.400	TIP WIDTH	= 0.995
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000120	MECH HP	= 67.0
MACHINE MACH	= 1.1846	REYNOLDS #	= 671490.	WHEEL SPEED	= 19644.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8471	0.5922	9111.9	35705.7	2.6684	1.3924	812.0	879.0
2	0.8537	0.5859	9618.5	35329.2	2.6479	1.3853	841.6	908.6
3	0.8550	0.5790	10058.4	34909.1	2.6224	1.3801	868.3	935.3
4	0.8506	0.5604	10583.5	33788.0	2.5518	1.3698	888.8	955.8
5	0.8386	0.5377	11240.0	32422.9	2.4655	1.3600	918.8	985.8

IGV=0 DATA AQUA

MODEL SC- 0

#

0-41197

TEST DATE:

MAY 25,2005 2:32 PM REV 2.1NT

MAY 25, 5

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 15.16 GAS CONSTANT = 55.15 WHEEL DIA = 16.250
TEMPERATURE = 96.80 HEAT RATIO = 1.400 TIP WIDTH = 0.995
MOTOR SPEED = 2980. VISCOSITY =0.0000120 MECH HP = 67.0
MACHINE MACH = 1.1846 REYNOLDS # = 684586. WHEEL SPEED = 19644.
NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8471	0.5922	9111.9	35705.7	2.6684	1.3924	827.8	894.8
2	0.8537	0.5859	9618.5	35329.2	2.6479	1.3853	858.0	925.0
3	0.8550	0.5790	10058.4	34909.1	2.6224	1.3801	885.2	952.2
4	0.8506	0.5604	10583.5	33788.0	2.5518	1.3698	906.2	973.2
5	0.8386	0.5377	11240.0	32422.9	2.4655	1.3600	936.8	1003.8

ATLAS COPCO COMPTEC INC. TEST DATA REDUCTION PROGRAM

IGV=0 DATA AQUI

MAY 25,2005 2:32 PM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE:

MAY 25, 5

SUPERVISING ENGINEER : JWS

RAW TEST DATA:C:\AERO\41197BA1.B00

1	FLOW P	PSI	0.53	0.57	0.60	0.67	0.70
2	FLOW DP	PSI	0.67	0.73	0.79	0.85	0.94
3	INLET P	PSI	18.58	17.80	16.98	15.41	13.92
4	DISC. P	PSI	48.93	46.59	43.69	38.65	33.77
7	FLOW T	R	129.97	130.00	127.70	126.21	125.03
8	INLET T	R	136.86	136.16	137.41	138.78	137.78
9	DISC. T	R	277.96	274.21	271.39	266.39	259.05
11	VAPOR P	PSI	0.14	0.13	0.13	0.12	0.12
15	FLOW P	PSI	0.53	0.57	0.60	0.66	0.70
17	FLOW P	PSI	0.53	0.57	0.60	0.67	0.71
23	FLOW DP	PSI	0.67	0.73	0.78	0.85	0.94
25	FLOW DP	PSI	0.67	0.74	0.79	0.84	0.94
31	INLET P	PSI	18.63	17.87	17.02	15.45	13.96
33	INLET P	PSI	18.53	17.73	16.94	15.36	13.87
39	DISC. P	PSI	48.95	46.63	43.75	38.70	33.81
41	DISC. P	PSI	48.90	46.56	43.63	38.60	33.72
52	FLOW T	F	129.98	130.04	127.70	126.25	125.08
53	FLOW T	F	129.96	129.97	127.71	126.17	124.99
56	INLET T	F	137.25	136.54	137.83	139.17	138.17
57	INLET T	F	136.47	135.77	136.99	138.39	137.40
60	DISC. T	F	277.84	274.20	271.49	266.47	259.08
61	DISC. T	F	278.09	274.22	271.29	266.32	259.03
65	SPEED	RPM	3013.00	3014.00	3009.00	3009.00	3013.00
69	R.H.	%	7.20	6.80	6.90	6.70	6.90
74	BAROMETR	PSI	14.45	14.45	14.45	14.45	14.45
81	RH T	F	124.50	125.00	123.90	122.70	121.50
82	RH P	PSI	12.56	12.41	12.25	12.01	11.83

NOTE : BE SURE BAROMETRIC PRESSURE GIVEN IS FOR THE LOCAL ELEVATION,
PRESSURE GIVEN BY THE WEATHER SERVICE IS CORRECTED TO SEA LEVEL,
AND SO MUST BE RECORRECTED BACK TO THE LOCAL PRESSURE.

ECHO KEY FILE:C:\AERO\41197B.KYB

15.160	108.00	2980.0	1.4000	55.150	1	2		
67.00	12.8200	0.7410	6.59184	0.0000120	0.0			
3	3	3	3	6	6	3	81	82
0	0	2	2	0	0	0	0	
1	0	0	0	10.69	0.00	14.31	0.00	
11.9380	10.0200	0.6000	0.0000	1.0000	0.0000	0.0000110	0.0000187	

IGV=0 DATA AQUI

MODEL SC- 0 # 0-41197

MAY 25,2005 2:32 PM REV 2.1NT

TEST DATE: MAY 25, 5

VARIATION FROM AVERAGE

1	FLOW P	PSI	0.00	0.00	0.00	0.00	0.00
2	FLOW DP	PSI	0.00	0.00	0.01	0.00	0.00
3	INLET P	PSI	0.05	0.07	0.04	0.05	0.05
4	DISC. P	PSI	0.02	0.04	0.06	0.05	0.05
7	FLOW T	R	0.01	0.03	0.00	0.04	0.05
8	INLET T	R	0.39	0.38	0.42	0.39	0.38
9	DISC. T	R	0.13	0.01	0.10	0.08	0.03

INSTRUMENT TEMPERATURE ASSUMED TO BE 68 DEGREES

REF, INLET, INSTR., FLOW DEVICE, OR DRY BULB TEMP SHOULD BE USED FOR R.H. LINE

ABSOLUTE PRESSURES AND TEMPERATURES

1	FLOW P	PSI	13.92	13.88	13.85	13.79	13.75
2	FLOW DP	PSI	0.67	0.73	0.79	0.85	0.94
3	INLET P	PSI	33.03	32.25	31.43	29.86	28.37
4	DISC. P	PSI	63.37	61.04	58.14	53.10	48.22
7	FLOW T	R	589.64	589.68	587.38	585.88	584.71
8	INLET T	R	596.53	595.83	597.08	598.45	597.46
9	DISC. T	R	737.64	733.88	731.06	726.07	718.73
72	GAS CONS		53.5728	53.5659	53.5654	53.5564	53.5588
73	HT RATIO		1.3960	1.3961	1.3962	1.3963	1.3965
74	BAROMETR	PSI	14.4490	14.4490	14.4510	14.4530	14.4520

PRIMARY FLOW DEVICE

CALCULATION FOR AN ORIFICE D+1/2D

PIPE DIA = 14.3120 DEVICE DIA = 10.6870 B = 0.7467 F = 1.0000

	FLOW	REYNOLDS	FLOW	VELOCITY	DYNAMIC			STAG	STATIC
	COEFF	NUMBER	#/SEC	FT/SEC	TEMP	PRESS	%	PRESS	FLOW
1	0.6103	982183.	8.932	77.15	0.49	0.10	0.32	33.12	3598.1
2	0.6102	1024226.	9.315	82.29	0.56	0.11	0.37	32.35	3837.7
3	0.6101	1061842.	9.631	87.46	0.63	0.12	0.44	31.55	4078.9
4	0.6100	1101318.	9.971	95.50	0.75	0.13	0.57	29.99	4454.0
5	0.6099	1159262.	10.481	105.46	0.92	0.15	0.78	28.52	4918.4

DISCHARGE VELOCITY							INLET	
VELOCITY	TEMP	PRESS	%	STAG	STATIC	STAG	STAG	
				PRESS	FLOW	FLOW	FLOW	
1	70.59	0.41	0.12	0.41	63.50	2319.4	3590.7	
2	76.02	0.48	0.14	0.48	61.18	2497.8	3828.7	
3	82.20	0.56	0.16	0.58	58.30	2700.7	4068.1	
4	92.51	0.71	0.18	0.78	53.28	3039.4	4440.0	
5	105.97	0.93	0.22	1.10	48.44	3481.9	4899.4	

RATIOS OF DISCHARGE TO INLET

PRESSURE		TEMPERATURE		FLOW	
STATIC	STAG	STATIC	STAG	STATIC	STAG
1	1.9188	1.9170	1.2369	0.6446	0.6450
2	1.8930	1.8911	1.2321	0.6508	0.6513
3	1.8498	1.8479	1.2248	0.6621	0.6626
4	1.7784	1.7767	1.2136	0.6824	0.6829
5	1.6997	1.6982	1.2033	0.7079	0.7084

IGV=0 DATA AQUI

MAY 25,2005 2:32 PM REV 2.1NT

MODEL SC- 0 # 0-41197 TEST DATE: MAY 25, 5

	ITROPIC WORK	I.W. COEFF	PTROPIC COEFF	PTROPIC WORK	P.W. COEFF	POWER TORQUE	POWER KWATTS	MOTOR EFF
1	22841.	0.5954	1.4842	23170.	0.6039	0.0	0.0	0.0000
2	22289.	0.5806	1.4861	22609.	0.5889	0.0	0.0	0.0000
3	21453.	0.5607	1.4919	21767.	0.5689	0.0	0.0	0.0000
4	20008.	0.5229	1.5068	20322.	0.5311	0.0	0.0	0.0000
5	18286.	0.4766	1.5360	18613.	0.4852	0.0	0.0	0.0000

	MACH NUMBER	REYNOLDS NUMBER	TEMP EFF	GAS HORSEPOWER AERO	TORQUE	EFFICIENCY (FROM AERO) SHAFT	ITROPIC	PTROPIC
1	0.9273	781184.	0.8572	432.8	0.0	0.7395	0.8572	0.8695
2	0.9282	764907.	0.8552	441.4	0.0	0.7397	0.8552	0.8675
3	0.9257	741974.	0.8483	442.8	0.0	0.7344	0.8483	0.8607
4	0.9246	702711.	0.8309	436.5	0.0	0.7180	0.8309	0.8439
5	0.9266	671052.	0.7993	436.0	0.0	0.6903	0.7993	0.8136

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 15.16 GAS CONSTANT = 55.15 WHEEL DIA = 12.820
 TEMPERATURE = 108.00 HEAT RATIO = 1.400 TIP WIDTH = 0.741
 MOTOR SPEED = 2980. VISCOSITY =0.0000120 MECH HP = 67.0
 MACHINE MACH = 0.9253 REYNOLDS # = 394279. WHEEL SPEED = 19644.
 NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8695	0.6039	3551.4	22665.3	1.9145	1.2379	195.6	262.6
2	0.8675	0.5889	3785.5	22102.2	1.8866	1.2325	203.8	270.8
3	0.8607	0.5689	4028.8	21349.9	1.8492	1.2264	211.2	278.2
4	0.8439	0.5311	4397.2	19931.9	1.7799	1.2155	219.4	286.4
5	0.8136	0.4852	4845.8	18207.6	1.6976	1.2042	229.2	296.2

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 14.87 GAS CONSTANT = 55.15 WHEEL DIA = 12.820
 TEMPERATURE = 113.70 HEAT RATIO = 1.400 TIP WIDTH = 0.741
 MOTOR SPEED = 2980. VISCOSITY =0.0000120 MECH HP = 67.0
 MACHINE MACH = 0.9207 REYNOLDS # = 382892. WHEEL SPEED = 19644.
 NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8695	0.6039	3551.4	22665.3	1.9034	1.2355	190.0	257.0
2	0.8675	0.5889	3785.5	22102.2	1.8758	1.2302	197.9	264.9
3	0.8607	0.5689	4028.8	21349.9	1.8390	1.2241	205.1	272.1
4	0.8439	0.5311	4397.2	19931.9	1.7706	1.2134	213.1	280.1
5	0.8136	0.4852	4845.8	18207.6	1.6895	1.2022	222.5	289.5

IGV=0 DATA AQUI

MODEL SC- 0 # 0-41197

MAY 25,2005 2:32 PM REV 2.1NT
TEST DATE: MAY 25, 5

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 15.16 GAS CONSTANT = 55.15 WHEEL DIA = 12.820
TEMPERATURE = 108.50 HEAT RATIO = 1.400 TIP WIDTH = 0.741
MOTOR SPEED = 2980. VISCOSITY =0.0000120 MECH HP = 67.0
MACHINE MACH = 0.9249 REYNOLDS # = 393932. WHEEL SPEED = 19644.
NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8695	0.6039	3551.4	22665.3	1.9135	1.2377	195.4	262.4
2	0.8675	0.5889	3785.5	22102.2	1.8856	1.2323	203.6	270.6
3	0.8607	0.5689	4028.8	21349.9	1.8483	1.2262	211.0	278.0
4	0.8439	0.5311	4397.2	19931.9	1.7791	1.2154	219.3	286.3
5	0.8136	0.4852	4845.8	18207.6	1.6969	1.2041	228.9	295.9

ATLAS COPCO COMPTEC INC. TEST DATA REDUCTION PROGRAM

IGV=0 DATA AQUI MAY 25,2005 2:32 PM REV 2.1NT
 MODEL SC- 0 # 0-41197 TEST DATE: MAY 25, 5
 SUPERVISING ENGINEER : JWS

RAW TEST DATA:C:\AERO\41197BA1.C00

1	FLOW P	PSI	0.53	0.57	0.60	0.67	0.70
2	FLOW DP	PSI	0.67	0.73	0.79	0.85	0.94
3	INLET P	PSI	48.21	45.76	42.76	37.51	32.45
4	DISC. P	PSI	91.00	86.18	79.56	66.53	48.31
7	FLOW T	R	129.97	130.00	127.70	126.21	125.03
8	INLET T	R	137.50	138.22	136.89	137.27	136.38
9	DISC. T	R	254.02	251.99	246.91	239.65	228.77
11	VAPOR P	PSI	0.14	0.13	0.13	0.12	0.12
15	FLOW P	PSI	0.53	0.57	0.60	0.66	0.70
17	FLOW P	PSI	0.53	0.57	0.60	0.67	0.71
23	FLOW DP	PSI	0.67	0.73	0.78	0.85	0.94
25	FLOW DP	PSI	0.67	0.74	0.79	0.84	0.94
31	INLET P	PSI	48.29	45.87	42.85	37.65	32.59
33	INLET P	PSI	48.12	45.65	42.68	37.38	32.30
39	DISC. P	PSI	90.88	86.12	79.47	66.53	48.28
41	DISC. P	PSI	91.13	86.24	79.65	66.53	48.34
52	FLOW T	F	129.98	130.04	127.70	126.25	125.08
53	FLOW T	F	129.96	129.97	127.71	126.17	124.99
56	INLET T	F	137.49	138.23	136.90	137.28	136.38
57	INLET T	F	137.50	138.21	136.88	137.26	136.37
60	DISC. T	F	254.35	252.30	247.13	240.12	229.76
61	DISC. T	F	253.70	251.67	246.70	239.18	227.78
65	SPEED	RPM	3013.00	3014.00	3009.00	3009.00	3013.00
69	R.H.	%	7.20	6.80	6.90	6.70	6.90
74	BAROMETR	PSI	14.45	14.45	14.45	14.45	14.45
81	RH T	F	124.50	125.00	123.90	122.70	121.50
82	RH P	PSI	12.56	12.41	12.25	12.01	11.83

NOTE : BE SURE BAROMETRIC PRESSURE GIVEN IS FOR THE LOCAL ELEVATION,
 PRESSURE GIVEN BY THE WEATHER SERVICE IS CORRECTED TO SEA LEVEL,
 AND SO MUST BE RECORRECTED BACK TO THE LOCAL PRESSURE.

ECHO KEY FILE:C:\AERO\41197B.KYC

15.160	108.00	2980.0	1.4000	55.150	1	2		
67.00	7.1000	0.622011	1.13793	0.0000120	0.0			
3	3	3	3	6	6	3	81	82
0	0	2	2	0	0	0	0	
1	0	0	0	10.69	0.00	14.31	0.00	
10.0200	6.0650	0.6000	0.0000	1.0000	0.0000	0.0000110	0.0000187	

IGV=0 DATA AQUI

MAY 25,2005 2:32 PM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

VARIATION FROM AVERAGE

1	FLOW P	PSI	0.00	0.00	0.00	0.00	0.00
2	FLOW DP	PSI	0.00	0.00	0.01	0.00	0.00
3	INLET P	PSI	0.09	0.11	0.09	0.13	0.15
4	DISC. P	PSI	0.12	0.06	0.09	0.00	0.03
7	FLOW T	R	0.01	0.03	0.00	0.04	0.05
8	INLET T	R	0.00	0.01	0.01	0.01	0.00
9	DISC. T	R	0.33	0.32	0.22	0.47	0.99

INSTRUMENT TEMPERATURE ASSUMED TO BE 68 DEGREES

REF, INLET, INSTR., FLOW DEVICE, OR DRY BULB TEMP SHOULD BE USED FOR R.H. LINE

ABSOLUTE PRESSURES AND TEMPERATURES

1	FLOW P	PSI	13.92	13.88	13.85	13.79	13.75
2	FLOW DP	PSI	0.67	0.73	0.79	0.85	0.94
3	INLET P	PSI	62.65	60.21	57.21	51.97	46.90
4	DISC. P	PSI	105.45	100.63	94.01	80.98	62.76
7	FLOW T	R	589.64	589.68	587.38	585.88	584.71
8	INLET T	R	597.17	597.89	596.56	596.94	596.05
9	DISC. T	R	713.70	711.66	706.59	699.32	688.44
72	GAS CONS		53.5728	53.5659	53.5654	53.5564	53.5588
73	HT RATIO		1.3965	1.3966	1.3967	1.3968	1.3970
74	BAROMETR	PSI	14.4490	14.4490	14.4510	14.4530	14.4520

PRIMARY FLOW DEVICE

CALCULATION FOR AN ORIFICE $D+1/2D$

PIPE DIA = 14.3120

DEVICE DIA = 10.6870

B = 0.7467

F = 1.0000

	FLOW COEFF	REYNOLDS NUMBER	FLOW #/SEC	VELOCITY FT/SEC	DYNAMIC TEMP	DYNAMIC PRESS	%	STAG PRESS	STATIC FLOW
1	0.6103	982189.	8.932	57.81	0.28	0.10	0.24	62.76	1899.5
2	0.6102	1024232.	9.315	62.80	0.32	0.12	0.29	60.33	2063.2
3	0.6101	1061850.	9.631	68.17	0.38	0.13	0.35	57.34	2239.8
4	0.6100	1101327.	9.971	77.73	0.50	0.15	0.53	52.12	2553.8
5	0.6099	1159274.	10.481	90.37	0.67	0.19	1.19	47.09	2969.3

DISCHARGE VELOCITY				INLET			
VELOCITY	TEMP	PRESS	%	STAG PRESS	STATIC FLOW	STAG FLOW	STAG FLOW
1	111.94	1.03	0.54	1.24	105.99	1347.5	1342.6
2	121.93	1.22	0.61	1.49	101.24	1467.7	1461.4
3	133.93	1.48	0.69	1.86	94.70	1612.2	1603.7
4	159.14	2.09	0.85	2.87	81.83	1915.7	1901.4
5	211.99	3.71	1.19	7.08	63.96	2551.8	2517.7

RATIOS OF DISCHARGE TO INLET

PRESSURE		TEMPERATURE		FLOW		
STATIC	STAG	STATIC	STAG	STATIC	STAG	
1	1.6831	1.6889	1.1940	1.1951	0.7094	0.7076
2	1.6713	1.6782	1.1889	1.1903	0.7114	0.7093
3	1.6432	1.6516	1.1827	1.1844	0.7198	0.7172
4	1.5584	1.5702	1.1690	1.1715	0.7501	0.7461
5	1.3382	1.3583	1.1501	1.1550	0.8594	0.8503

IGV=0 DATA AQU

MAY 25,2005 2:32 PM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

	ITROPIC WORK	I.W. COEFF	PTROPIC COEFF	PTROPIC WORK	P.W. COEFF	POWER TORQUE	POWER KWATTS	MOTOR EFF
1	18078.	0.5381	1.5155	18354.	0.5463	0.0	0.0	0.0000
2	17861.	0.5313	1.5071	18112.	0.5388	0.0	0.0	0.0000
3	17231.	0.5143	1.5091	17469.	0.5214	0.0	0.0	0.0000
4	15390.	0.4593	1.5404	15629.	0.4665	0.0	0.0	0.0000
5	10214.	0.3041	1.8889	10516.	0.3130	0.0	0.0	0.0000

	MACH NUMBER	REYNOLDS NUMBER	TEMP EFF	GAS AERO	HORSEPOWER TORQUE	EFFICIENCY (FROM AERO)		
						SHAFT	ITROPIC	PTROPIC
1	0.8671	1160450.	0.8222	357.1	0.0	0.6893	0.8222	0.8347
2	0.8669	1113767.	0.8323	363.5	0.0	0.6996	0.8323	0.8440
3	0.8664	1060898.	0.8304	363.4	0.0	0.6984	0.8304	0.8419
4	0.8662	963363.	0.7974	349.9	0.0	0.6666	0.7974	0.8098
5	0.8679	873684.	0.5866	331.8	0.0	0.4858	0.5866	0.6039

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 15.16	GAS CONSTANT	= 55.15	WHEEL DIA	= 7.100
TEMPERATURE	= 108.00	HEAT RATIO	= 1.400	TIP WIDTH	= 0.622
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000120	MECH HP	= 67.0
MACHINE MACH	= 0.8659	REYNOLDS #	= 309702.	WHEEL SPEED	= 33191.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8347	0.5463	1876.5	17954.1	1.6881	1.1963	85.3	152.3
2	0.8440	0.5388	2037.2	17705.9	1.6778	1.1915	90.3	157.3
3	0.8419	0.5214	2214.6	17134.4	1.6520	1.1857	95.2	162.2
4	0.8098	0.4665	2523.9	15329.2	1.5709	1.1728	101.0	168.0
5	0.6039	0.3130	2928.4	10286.8	1.3572	1.1554	105.4	172.4

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE	= 14.87	GAS CONSTANT	= 55.15	WHEEL DIA	= 7.100
TEMPERATURE	= 113.70	HEAT RATIO	= 1.400	TIP WIDTH	= 0.622
MOTOR SPEED	= 2980.	VISCOSITY	= 0.0000120	MECH HP	= 67.0
MACHINE MACH	= 0.8616	REYNOLDS #	= 300758.	WHEEL SPEED	= 33191.

NO REYNOLDS NUMBER CORRECTION

	PTROPIC EFF	WORK COEFF	VOLUME FLOW	PTROPIC WORK	PRESS RATIO	TEMP RATIO	GAS POWER	SHAFT POWER
1	0.8347	0.5463	1876.5	17954.1	1.6801	1.1943	82.8	149.8
2	0.8440	0.5388	2037.2	17705.9	1.6699	1.1896	87.7	154.7
3	0.8419	0.5214	2214.6	17134.4	1.6445	1.1839	92.5	159.5
4	0.8098	0.4665	2523.9	15329.2	1.5644	1.1710	98.0	165.0
5	0.6039	0.3130	2928.4	10286.8	1.3534	1.1539	102.4	169.4

IGV=0 DATA AQUI

MAY 25, 2005 2:32 PM REV 2.1NT

MODEL SC- 0 # 0-41197

TEST DATE: MAY 25, 5

TEST RESULTS CONVERTED TO DESIGN INLET CONDITIONS

PRESSURE = 15.16 GAS CONSTANT = 55.15 WHEEL DIA = 7.100
TEMPERATURE = 108.50 HEAT RATIO = 1.400 TIP WIDTH = 0.622
MOTOR SPEED = 2980. VISCOSITY = 0.0000120 MECH HP = 67.0
MACHINE MACH = 0.8655 REYNOLDS # = 309430. WHEEL SPEED = 33191.
NO REYNOLDS NUMBER CORRECTION

	PTROPIC	WORK	VOLUME	PTROPIC	PRESS	TEMP	GAS	SHAFT
	EFF	COEFF	FLOW	WORK	RATIO	RATIO	POWER	POWER
1	0.8347	0.5463	1876.5	17954.1	1.6874	1.1961	85.2	152.2
2	0.8440	0.5388	2037.2	17705.9	1.6771	1.1913	90.2	157.2
3	0.8419	0.5214	2214.6	17134.4	1.6514	1.1856	95.2	162.2
4	0.8098	0.4665	2523.9	15329.2	1.5703	1.1726	100.9	167.9
5	0.6039	0.3130	2928.4	10286.8	1.3568	1.1553	105.3	172.3



MECHANICAL DATA SHEET

10. Title ACE/AIR Liquids 11. Date 5-25-05
12. Model HL806-04 13. S/N L841197

12. Model AL806-04

13. S/N 6841197

[illegible]

DATA TAKEN BY:

REVIEWED BY

RTD/MECHANICAL DATA SHEET

Atlas Copco

10. Title ACE/AIR Liquide
12. Model HL806-04

11. Date 5-25-05
13. S/N LG-41197

TEST POINT	1	2	3	4	5	6	7	8	9
IGV ANGLE	-20	-20	-20	-20	-20	0	0	0	0
TIME	10:02	10:18	10:35	10:50	11:05	11:22	11:40	11:55	12:10
RTD 1 °F °C	170	169	171	171	171	169	169	170	170
RTD 2 °F °C	193	192	192	193	193	191	191	192	193
RTD 3 °F °C	137	138	139	139	139	138	139	139	139
RTD 4 °F °C	139	139	140	140	140	140	140	140	140
RTD 5 °F °C	169	170	167	165	161	169	168	167	163
RTD 6 °F °C	165	166	164	162	159	165	165	163	161
RTD 7 °F °C	175	175	177	177	177	176	176	177	176
RTD 8 °F °C	172	172	173	174	174	172	173	173	173
RTD 9 °F °C	X								
RTD 10 °F °C									
RTD 11 °F °C									
RTD 12 °F °C									
RTD 13 °F °C									
RTD 14 °F °C									
RTD 15 °F °C	163	163	165	165	165	164	165	165	165
RTD 16 °F °C	177	177	177	177	176	177	178	177	177
RTD 17 °F °C	139	139	139	139	138	139	139	139	139
RTD 18 °F °C	138	138	138	138	137	138	138	138	138
RTD 19 °F °C	136	137	137	138	139	138	138	138	139
RTD 20 °F °C	136	136	138	138	138	137	137	138	138
RTD 21 °F °C	180	181	181	181	180	180	181	181	180
RTD 22 °F °C	204	204	204	204	204	203	203	204	203
RTD 23 °F °C	X								
RTD 24 °F °C									

DATA TAKEN BY: Emm

REVIEWED BY: J. L. D.

MECHANICAL DATA SHEET

10. Title AIR/Liquide

11. Date 2-25-05

12. Model HL806-04

13. S/N 28-41197

[illegible]

DATA TAKEN BY:

REVIEWED BY

RTD/MECHANICAL DATA SHEET

Arlas Copco

10. Title ACE/AIR Lignette
12. Model HL806-04

11. Date 5-25-05
13. S/N 68-41197

TEST POINT	10	11	12	13	14	15	16	17	18
IGV ANGLE	0	20	20	20	20	20	60	60	60
TIME	12:26	12:42	12:57	1:10	1:24	1:37	1:50	2:03	2:17
RTD 1 °F °C	171	168	169	169	170	170	167	168	167
RTD 2 °F °C	193	190	191	191	192	191	188	188	188
RTD 3 °F °C	139	138	138	138	139	138	137	138	138
RTD 4 °F °C	140	139	140	140	140	140	139	139	139
RTD 5 °F °C	160	168	168	166	163	159	167	165	159
RTD 6 °F °C	158	164	164	163	160	157	163	162	157
RTD 7 °F °C	176	175	176	176	176	175	173	173	172
RTD 8 °F °C	173	172	172	172	172	172	170	170	170
RTD 9 °F °C									
RTD 10 °F °C									
RTD 11 °F °C									
RTD 12 °F °C									
RTD 13 °F °C									
RTD 14 °F °C									
RTD 15 °F °C	165	164	164	165	165	164	163	164	163
RTD 16 °F °C	176	177	177	177	177	176	176	176	175
RTD 17 °F °C	138	139	139	139	139	138	138	139	138
RTD 18 °F °C	137	139	138	138	138	137	138	138	137
RTD 19 °F °C	139	138	138	138	138	139	137	138	138
RTD 20 °F °C	138	137	137	138	138	138	137	137	138
RTD 21 °F °C	180	181	181	181	181	180	180	180	179
RTD 22 °F °C	202	202	203	203	203	202	202	202	201
RTD 23 °F °C									
RTD 24 °F °C									

DATA TAKEN BY: _____

REVIEWED BY:

Detailed Test Data

Name	ACEAIR LIQUIDE		
Title			
Model #	HL806-04	Order #	41197
Calibration	STD_TC	Config.	41197
Customer	41197	Date	05/27/05

	Test #	1	2	3	4	5	6
Time		07:07:03	07:06:59	07:06:55	07:06:50	07:06:46	07:08:09
0 ZB-0	DEGF	66.194	65.592	65.134	64.772	64.580	72.884
1 TF-1	DEGF	124.769	127.944	131.139	130.269	141.297	101.766
2 TF-1	DEGF	124.801	127.835	131.159	130.135	141.586	101.464
3 T00-1	DEGF	122.135	124.212	126.010	124.103	126.297	100.110
4 T00-1	DEGF	121.590	123.706	125.486	123.616	125.607	99.624
5 T08-1	DEGF	335.907	343.402	349.275	354.870	351.135	304.274
6 T08-1	DEGF	336.250	343.631	349.275	354.707	350.863	304.687
7 T00-2	DEGF	137.012	138.508	139.037	137.587	139.384	99.137
9 T00-2	DEGF	136.128	137.650	138.104	136.740	138.690	97.846
10 T08-2	DEGF	258.502	267.172	272.633	278.048	276.560	220.011
11 T08-2	DEGF	258.531	266.986	272.391	278.037	276.465	219.918
13 T00-3	DEGF	136.564	138.835	138.949	136.905	137.378	99.249
14 T00-3	DEGF	136.519	138.829	138.955	136.905	137.391	99.229
15 T08-3	DEGF	230.723	243.177	248.928	253.711	251.381	192.659
16 T08-3	DEGF	229.052	242.267	248.466	253.030	250.886	190.292
17 TOIL-0	DEGF	148.405	148.143	147.850	146.844	145.944	147.450
57 PBAR-0	PSIA	14.449	14.449	14.449	14.446	14.444	14.462
58 RH-1	%	7.263	7.046	6.949	7.504	7.494	12.051
59 TRH-1	DEGF	121.156	123.153	124.784	122.844	123.744	99.219
196 RPM-0	RPM	3013.470	3009.970	3008.900	3015.640	3014.430	3008.560
200 DPF-1	PSID	0.950	0.859	0.779	0.667	0.730	1.030
201 DPF-1	PSID	0.959	0.864	0.779	0.671	0.730	1.040
202 PF-1	PSID	-0.737	-0.669	-0.605	-0.510	-0.571	-0.796
203 PF-1	PSID	-0.745	-0.674	-0.610	-0.515	-0.571	-0.803
208 P0-1	PSIG	-2.681	-2.432	-2.183	-1.897	-2.029	-2.944
209 P0-1	PSIG	-2.681	-2.424	-2.183	-1.897	-2.029	-2.944
210 PRH-1	PSIG	-2.681	-2.424	-2.197	-1.897	-2.021	-2.944
212 PIGV-1	PSIG	-0.007	-0.007	-0.007	-0.007	0.000	-0.037
224 P8-1	PSIG	15.503	16.968	18.042	19.458	18.848	14.404
225 P8-1	PSIG	15.308	16.773	17.871	19.263	18.701	14.185
226 P0-2	PSIG	14.282	15.894	17.114	18.677	18.018	13.086
227 P0-2	PSIG	14.160	15.796	17.041	18.628	17.969	12.964
229 P8-2	PSIG	34.522	39.966	43.823	48.877	46.826	33.081
230 P0-3	PSIG	33.398	38.989	42.993	48.291	46.094	31.665
231 P0-3	PSIG	33.154	38.843	42.896	48.120	45.996	31.519
240 P8-3	PSIG	50.720	69.641	79.590	91.187	86.975	45.349
241 P8-3	PSIG	50.842	69.580	79.590	91.126	87.219	45.532
300 IGV-0	DEG	-20.000	-20.000	-20.000	-20.000	-20.000	0.000

Detailed Test Data

Name	ACEVAIR LIQUIDE		
Title			
Model #	HL806-04	Order #	41197
Calibration	STD_TC	Config.	41197
Customer	41197	Date	05/27/05

	Test #	7	8	9	10	11	12
Time		07:08:06	07:08:02	07:07:58	07:07:55	07:07:23	07:07:19
0 ZB-0	DEGF	72.593	72.050	71.507	71.038	68.187	67.743
1 TF-1	DEGF	101.595	101.313	99.624	96.909	125.076	126.252
2 TF-1	DEGF	101.641	101.063	99.321	96.711	124.987	126.169
3 T00-1	DEGF	100.255	99.900	99.084	99.499	122.386	123.623
4 T00-1	DEGF	99.814	99.485	98.676	99.176	121.853	123.091
5 T08-1	DEGF	306.810	311.879	315.709	319.796	330.944	337.303
6 T08-1	DEGF	307.207	312.270	316.055	319.830	331.283	337.587
7 T00-2	DEGF	99.564	101.798	100.899	99.288	138.173	139.170
9 T00-2	DEGF	98.485	100.925	100.038	98.630	137.397	138.388
10 T08-2	DEGF	223.137	231.318	235.608	237.965	259.079	266.474
11 T08-2	DEGF	223.294	231.313	235.504	238.029	259.034	266.316
13 T00-3	DEGF	99.867	100.866	100.734	99.591	136.380	137.277
14 T00-3	DEGF	99.847	100.853	100.748	99.578	136.368	137.258
15 T08-3	DEGF	198.757	208.124	213.770	216.538	229.764	240.118
16 T08-3	DEGF	197.492	207.288	213.148	215.894	227.779	239.183
17 TOIL-0	DEGF	147.475	148.299	147.694	146.331	148.804	148.480
57 PBAR-0	PSIA	14.463	14.464	14.467	14.465	14.451	14.453
58 RH-1	%	11.523	11.621	11.973	11.729	6.922	6.734
59 TRH-1	DEGF	99.387	99.219	98.656	99.641	121.465	122.703
196 RPM-0	RPM	3010.710	3012.800	3007.200	3007.860	3012.650	3008.540
200 DPF-1	PSID	1.008	0.942	0.876	0.813	0.940	0.850
201 DPF-1	PSID	1.016	0.947	0.889	0.813	0.945	0.845
202 PF-1	PSID	-0.776	-0.737	-0.686	-0.645	-0.698	-0.664
203 PF-1	PSID	-0.784	-0.745	-0.691	-0.652	-0.706	-0.669
208 P0-1	PSIG	-2.849	-2.666	-2.476	-2.300	-2.622	-2.446
209 P0-1	PSIG	-2.849	-2.644	-2.468	-2.285	-2.622	-2.439
210 PRH-1	PSIG	-2.849	-2.651	-2.476	-2.292	-2.622	-2.446
212 PIGV-1	PSIG	-0.022	-0.022	-0.022	-0.015	-0.022	-0.015
224 P8-1	PSIG	15.088	16.626	17.944	19.043	15.161	16.528
225 P8-1	PSIG	14.893	16.431	17.773	18.872	14.966	16.357
226 P0-2	PSIG	13.818	15.479	16.943	18.140	13.965	15.454
227 P0-2	PSIG	13.745	15.381	16.846	18.066	13.867	15.356
229 P8-2	PSIG	35.791	41.016	45.728	49.561	33.716	38.599
230 P0-3	PSIG	34.570	40.015	44.849	48.779	32.593	37.647
231 P0-3	PSIG	34.399	39.844	44.653	48.633	32.300	37.378
240 P8-3	PSIG	59.265	74.829	86.731	95.154	48.279	66.528
241 P8-3	PSIG	59.387	74.829	86.853	95.337	48.340	66.528
300 IGV-0	DEG	0.000	0.000	0.000	0.000	0.000	0.000

Detailed Test Data

Name	ACEAIR LIQUIDE		
Title			
Model #	HL806-04	Order #	41197
Calibration	STD_TC	Config.	41197
Customer	41197	Date	05/27/05

	Test #	13	14	15	16	17	18
Time		07:07:14	07:07:10	07:07:07	07:08:35	07:08:32	07:08:27
0 ZB-0	DEGF	67.375	67.157	66.686	71.208	71.629	72.294
1 TF-1	DEGF	127.702	130.040	129.982	101.201	100.531	101.995
2 TF-1	DEGF	127.708	129.970	129.957	100.978	100.472	101.897
3 T00-1	DEGF	124.756	126.163	125.760	99.387	98.978	100.202
4 T00-1	DEGF	124.359	125.760	125.421	98.926	98.570	99.821
5 T08-1	DEGF	344.480	349.552	353.169	297.938	302.028	308.225
6 T08-1	DEGF	344.491	349.590	353.027	298.425	302.486	308.523
7 T00-2	DEGF	137.827	136.538	137.252	100.314	99.564	100.433
9 T00-2	DEGF	136.993	135.767	136.469	99.584	98.300	99.057
10 T08-2	DEGF	271.488	274.197	277.835	222.084	227.391	233.713
11 T08-2	DEGF	271.291	274.225	278.092	220.908	226.093	232.675
13 T00-3	DEGF	136.899	138.230	137.492	99.466	102.264	99.551
14 T00-3	DEGF	136.880	138.211	137.498	99.531	102.330	99.584
15 T08-3	DEGF	247.131	252.297	254.353	193.495	204.763	209.001
16 T08-3	DEGF	246.703	251.672	253.695	191.219	203.799	208.501
17 TOIL-0	DEGF	148.861	148.742	148.018	147.013	147.144	147.388
57 PBAR-0	PSIA	14.451	14.449	14.449	14.460	14.460	14.461
58 RH-1	%	6.889	6.778	7.152	12.158	12.246	11.914
59 TRH-1	DEGF	123.884	124.981	124.532	99.528	99.219	100.175
196 RPM-0	RPM	3009.120	3013.860	3012.970	3007.030	3009.330	3010.840
200 DPF-1	PSID	0.781	0.732	0.667	0.994	0.940	0.896
201 DPF-1	PSID	0.791	0.737	0.674	0.999	0.942	0.891
202 PF-1	PSID	-0.598	-0.574	-0.525	-0.769	-0.732	-0.698
203 PF-1	PSID	-0.601	-0.571	-0.527	-0.774	-0.740	-0.703
208 P0-1	PSIG	-2.212	-2.043	-1.882	-2.827	-2.681	-2.512
209 P0-1	PSIG	-2.197	-2.043	-1.882	-2.827	-2.681	-2.505
210 PRH-1	PSIG	-2.197	-2.043	-1.890	-2.834	-2.681	-2.512
212 PIGV-1	PSIG	-0.015	-0.015	-0.007	-0.022	-0.022	-0.029
224 P8-1	PSIG	17.944	18.701	19.385	14.038	15.332	16.626
225 P8-1	PSIG	17.773	18.530	19.190	13.843	15.137	16.455
226 P0-2	PSIG	17.017	17.871	18.628	12.744	14.136	15.552
227 P0-2	PSIG	16.943	17.725	18.530	12.671	14.038	15.479
229 P8-2	PSIG	43.628	46.558	48.901	32.520	37.329	41.821
230 P0-3	PSIG	42.847	45.874	48.291	31.250	36.279	40.942
231 P0-3	PSIG	42.676	45.654	48.120	31.055	36.084	40.723
240 P8-3	PSIG	79.468	86.121	90.881	45.410	65.430	77.942
241 P8-3	PSIG	79.651	86.243	91.126	45.593	65.552	77.881
300 IGV-0	DEG	0.000	0.000	0.000	20.000	20.000	20.000

Detailed Test Data

Name	ACEAIR LIQUIDE		
Title			
Model #	HL806-04	Order #	41197
Calibration	STD_TC	Config.	41197
Customer	41197	Date	05/27/05

	Test #	19	20	21	22	23	24
Time		07:08:23	07:08:12	07:08:12	07:07:39	07:07:36	07:07:33
0 ZB-0	DEGF	72.810	72.884	72.884	70.018	69.726	69.399
1 TF-1	DEGF	103.293	102.979	102.979	127.166	125.933	126.693
2 TF-1	DEGF	102.907	102.828	102.828	127.153	125.747	126.342
3 T00-1	DEGF	101.181	101.359	101.359	123.789	122.905	123.636
4 T00-1	DEGF	100.846	100.971	100.971	123.258	122.418	123.123
5 T08-1	DEGF	313.721	317.087	317.087	326.040	331.146	337.554
6 T08-1	DEGF	313.924	317.164	317.164	326.439	331.518	337.696
7 T00-2	DEGF	100.498	98.715	98.715	138.098	138.709	137.599
9 T00-2	DEGF	97.641	96.751	96.751	137.467	138.022	136.633
10 T08-2	DEGF	239.355	239.521	239.521	259.108	266.265	270.888
11 T08-2	DEGF	238.890	239.412	239.412	258.961	266.130	270.769
13 T00-3	DEGF	100.274	99.670	99.670	136.841	138.079	137.827
14 T00-3	DEGF	100.294	99.663	99.663	136.829	138.066	137.814
15 T08-3	DEGF	214.531	216.970	216.970	229.897	241.075	247.542
16 T08-3	DEGF	213.975	216.234	216.234	227.895	240.072	247.006
17 TOIL-0	DEGF	147.781	146.907	146.907	148.318	148.948	148.087
57 PBAR-0	PSIA	14.464	14.462	14.462	14.464	14.459	14.458
58 RH-1	%	11.914	11.875	11.875	5.973	6.762	6.461
59 TRH-1	DEGF	100.822	101.075	101.075	122.984	121.888	122.816
196 RPM-0	RPM	3011.820	3012.920	3012.920	3014.370	3008.180	3006.860
200 DPF-1	PSID	0.828	0.779	0.779	0.901	0.840	0.754
201 DPF-1	PSID	0.830	0.784	0.784	0.913	0.845	0.762
202 PF-1	PSID	-0.645	-0.618	-0.618	-0.706	-0.662	-0.596
203 PF-1	PSID	-0.649	-0.623	-0.623	-0.715	-0.667	-0.601
208 P0-1	PSIG	-2.344	-2.234	-2.234	-2.556	-2.366	-2.168
209 P0-1	PSIG	-2.344	-2.227	-2.227	-2.556	-2.366	-2.168
210 PRH-1	PSIG	-2.344	-2.234	-2.234	-2.556	-2.366	-2.168
212 PIGV-1	PSIG	-0.029	-0.037	-0.037	-0.022	-0.022	-0.022
224 P8-1	PSIG	17.896	18.750	18.750	14.673	16.211	17.603
225 P8-1	PSIG	17.725	18.555	18.555	14.478	16.016	17.407
226 P0-2	PSIG	16.943	17.847	17.847	13.501	15.161	16.675
227 P0-2	PSIG	16.870	17.749	17.749	13.355	15.064	16.577
229 P8-2	PSIG	45.947	49.072	49.072	32.837	38.159	42.969
230 P0-3	PSIG	45.142	48.364	48.364	31.690	37.231	42.114
231 P0-3	PSIG	44.995	48.193	48.193	31.470	37.036	41.943
240 P8-3	PSIG	87.952	94.421	94.421	46.204	65.857	78.064
241 P8-3	PSIG	88.196	94.482	94.482	46.387	65.918	78.186
300 IGV-0	DEG	20.000	20.000	20.000	20.000	20.000	20.000

Detailed Test Data

Name	ACEAIR LIQUIDE		
Title			
Model #	HL806-04	Order #	41197
Calibration	STD_TC	Config.	41197
Customer	41197	Date	05/27/05

	Test #	25	26	27	28	29	30
Time		07:07:29	07:07:26	07:08:47	07:08:44	07:08:38	07:07:51
0 ZB-0	DEGF	69.038	68.602	70.542	70.868	71.045	70.603
1 TF-1	DEGF	130.682	129.492	101.115	101.825	103.379	125.415
2 TF-1	DEGF	130.707	129.269	100.886	101.490	102.959	125.140
3 T00-1	DEGF	126.316	125.025	99.137	99.979	100.938	122.693
4 T00-1	DEGF	125.869	124.603	98.774	99.630	100.695	122.231
5 T08-1	DEGF	344.632	347.457	283.039	293.230	303.165	311.077
6 T08-1	DEGF	344.616	347.343	283.217	293.446	303.353	311.313
7 T00-2	DEGF	136.241	137.031	100.544	101.496	100.419	137.069
9 T00-2	DEGF	135.552	136.134	99.966	100.564	99.012	136.317
10 T08-2	DEGF	273.911	277.623	222.043	233.672	240.892	258.848
11 T08-2	DEGF	274.018	277.835	221.007	232.726	240.141	258.593
13 T00-3	DEGF	137.018	139.308	100.064	100.531	101.240	137.296
14 T00-3	DEGF	137.006	139.295	100.091	100.577	101.280	137.277
15 T08-3	DEGF	251.268	255.766	194.044	209.790	218.594	231.440
16 T08-3	DEGF	250.687	255.080	191.835	209.196	218.039	229.729
17 TOIL-0	DEGF	148.568	147.825	146.406	147.007	146.169	148.012
57 PBAR-0	PSIA	14.458	14.456	14.455	14.458	14.459	14.465
58 RH-1	%	6.463	6.836	12.402	12.490	12.441	6.450
59 TRH-1	DEGF	125.178	123.744	99.078	100.091	100.906	122.084
196 RPM-0	RPM	3013.130	3013.090	3013.520	3013.730	3010.760	3014.920
200 DPF-1	PSID	0.718	0.662	0.864	0.789	0.710	0.793
201 DPF-1	PSID	0.725	0.669	0.869	0.786	0.715	0.798
202 PF-1	PSID	-0.557	-0.527	-0.669	-0.623	-0.562	-0.618
203 PF-1	PSID	-0.562	-0.520	-0.674	-0.627	-0.562	-0.613
208 P0-1	PSIG	-2.000	-1.860	-2.446	-2.219	-1.985	-2.234
209 P0-1	PSIG	-2.000	-1.860	-2.446	-2.212	-1.978	-2.227
210 PRH-1	PSIG	-2.007	-1.868	-2.454	-2.212	-1.985	-2.234
212 PIGV-1	PSIG	-0.022	-0.022	-0.022	-0.015	-0.015	-0.015
224 P8-1	PSIG	18.530	19.458	12.354	14.966	17.212	13.232
225 P8-1	PSIG	18.359	19.312	12.158	14.746	17.041	13.037
226 P0-2	PSIG	17.725	18.701	11.157	13.940	16.357	12.109
227 P0-2	PSIG	17.627	18.628	11.060	13.867	16.284	12.012
229 P8-2	PSIG	46.338	49.121	29.761	38.794	46.143	30.835
230 P0-3	PSIG	45.654	48.364	28.516	37.842	45.483	29.785
231 P0-3	PSIG	45.508	48.267	28.345	37.671	45.313	29.517
240 P8-3	PSIG	85.876	91.065	41.870	72.632	89.294	45.288
241 P8-3	PSIG	85.999	90.881	41.992	72.754	89.539	45.410
300 IGV-0	DEG	20.000	20.000	60.000	60.000	60.000	60.000

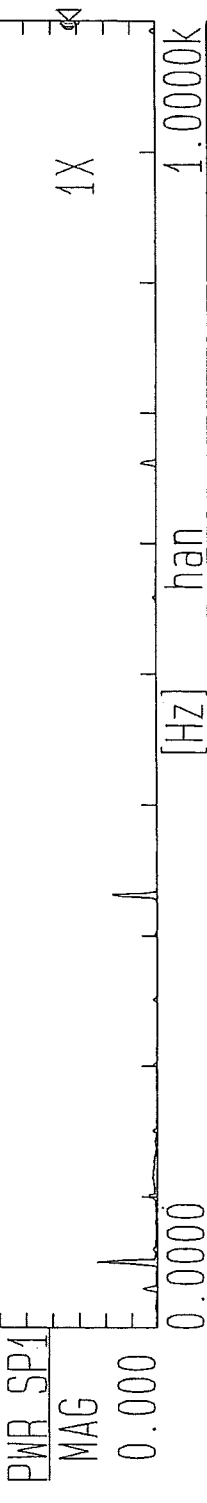
Detailed Test Data

Name	ACEVAIR LIQUIDE		
Title			
Model #	HL806-04	Order #	41197
Calibration	STD_TC	Config.	41197
Customer	41197	Date	05/27/05

	Test #	31	32				
Time		07:07:48	07:07:44				
0 ZB-0	DEGF	70.392	70.222				
1 TF-1	DEGF	128.753	131.718				
2 TF-1	DEGF	128.422	131.768				
3 T00-1	DEGF	125.070	126.514				
4 T00-1	DEGF	124.590	126.074				
5 T08-1	DEGF	325.772	335.454				
6 T08-1	DEGF	325.942	335.437				
7 T00-2	DEGF	136.905	136.475				
9 T00-2	DEGF	136.203	135.723				
10 T08-2	DEGF	271.404	277.405				
11 T08-2	DEGF	271.146	277.522				
13 T00-3	DEGF	136.519	139.711				
14 T00-3	DEGF	136.526	139.717				
15 T08-3	DEGF	247.434	256.656				
16 T08-3	DEGF	246.937	255.987				
17 TOIL-0	DEGF	148.137	147.294				
57 PBAR-0	PSIA	14.463	14.460				
58 RH-1	%	6.255	6.128				
59 TRH-1	DEGF	124.109	125.150				
196 RPM-0	RPM	3013.710	3014.920				
200 DPF-1	PSID	0.676	0.608				
201 DPF-1	PSID	0.686	0.620				
202 PF-1	PSID	-0.532	-0.481				
203 PF-1	PSID	-0.549	-0.486				
208 P0-1	PSIG	-1.934	-1.699				
209 P0-1	PSIG	-1.926	-1.692				
210 PRH-1	PSIG	-1.934	-1.692				
212 PIGV-1	PSIG	-0.022	-0.022				
224 P8-1	PSIG	16.211	18.066				
225 P8-1	PSIG	16.016	17.896				
226 P0-2	PSIG	15.356	17.334				
227 P0-2	PSIG	15.259	17.236				
229 P8-2	PSIG	40.796	46.411				
230 P0-3	PSIG	40.064	45.947				
231 P0-3	PSIG	39.868	45.776				
240 P8-3	PSIG	75.256	86.731				
241 P8-3	PSIG	75.256	87.036				
300 IGV-0	DEG	60.000	60.000				

ACE/AIR LIQUIDE HL806-04 L8-41197

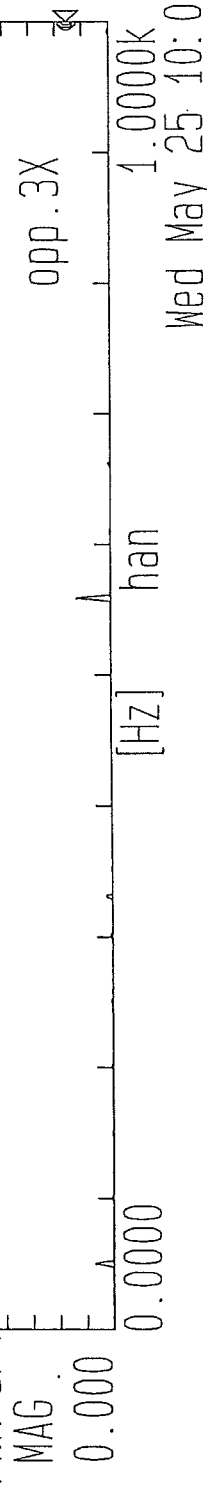
1.0kHz. CH1: AC/56.2mVr CH2: AC/56.2mVr CH3: AC/56.2mVr CH4: AC/56.2mVr
 795.271m OVERALL X: Y: 327.942mMILS



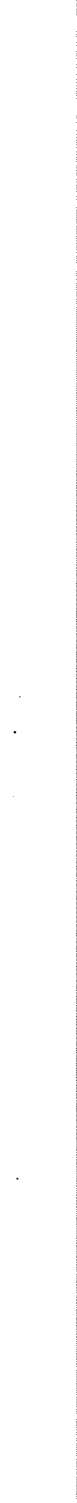
795.271m OVERALL X: Y: 377.367mMILS
 PWR SP2
 MAG 0.000 2X



795.271m OVERALL X: Y: 268.680mMILS
 PWR SP3
 MAG 0.000 3X



795.271m OVERALL X: Y: 156.460mMILS
 PWR SP4
 MAG 0.000 opp. 3X



CH 1
 AVERAGE
 SP. PK
 15
 100

LENGTH
 2048

MEM No.
 1

REC ADS
 0

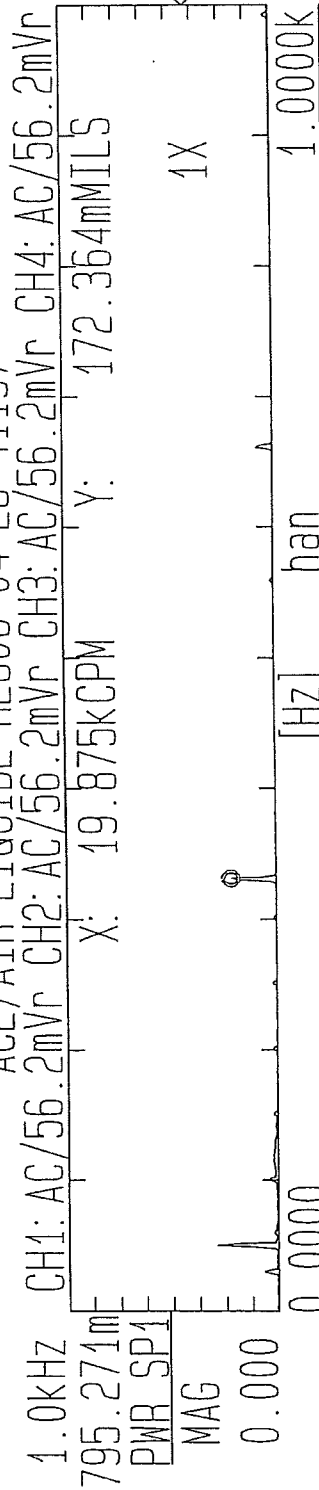
REC GAP
 2

1.0000k [Hz] han

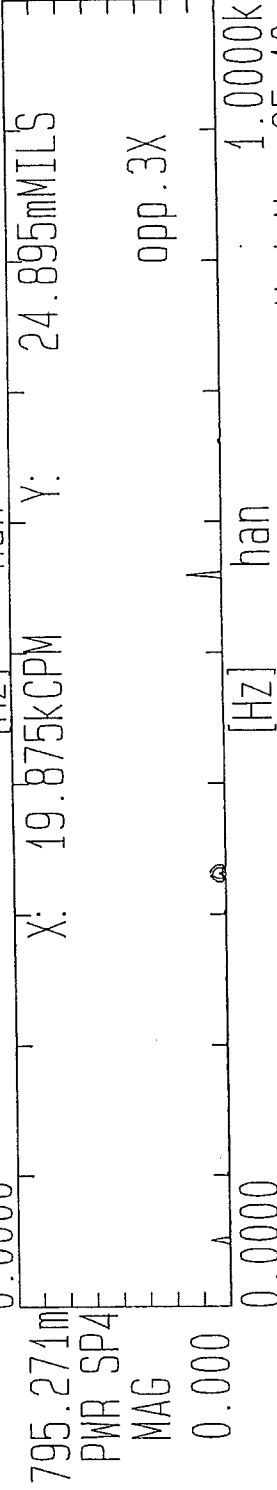
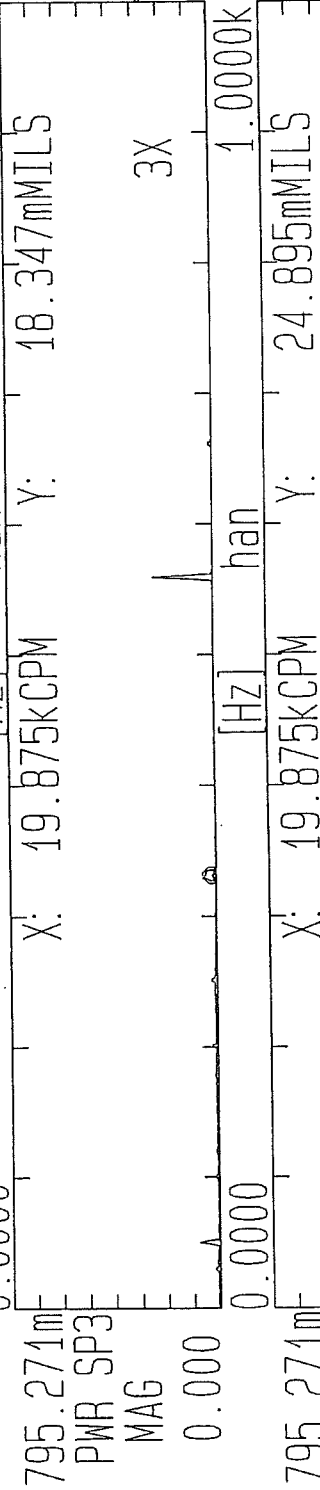
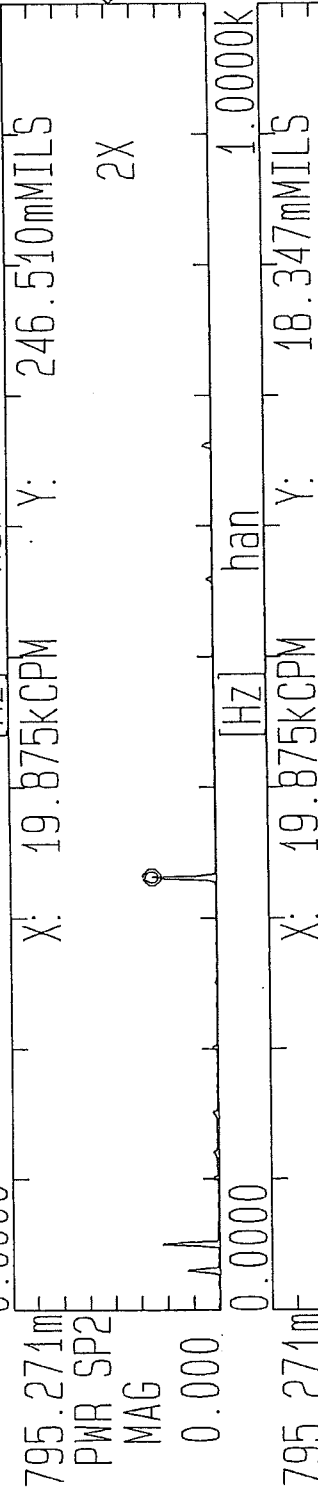
Wed May 25 10:08:34 2005

ACE/AIR LIQUIDE HL806-04 L8-41197

CH 1
AVERAGE
SP. PK
15
100



LENGTH 2048
MEM No. 1
REC ADS 0
REC GAP 2



ACE/AIR LIQUIDE HL806-04 L8-41197

CH 1
AVERAGE
SP. PK
15
100

CH1: AC/56.2mVr CH2: AC/56.2mVr CH3: AC/56.2mVr CH4: AC/56.2mVr
X: 33.525kCPM Y: 13.777mMILS

1.0kHz
795.271m
PWR SP1
MAG
0.000

[Hz] han 1.0000k
X: 33.525kCPM Y: 23.205mMILS

795.271m
PWR SP2
MAG
0.000

LENGTH 2048
MEM NO. 1
REC ADS 0
REC GAP 2

[Hz] han 1.0000k
X: 33.525kCPM Y: 233.946mMILS

795.271m
PWR SP3
MAG
0.000

[Hz] han 1.0000k
X: 33.525kCPM Y: 127.642mMILS

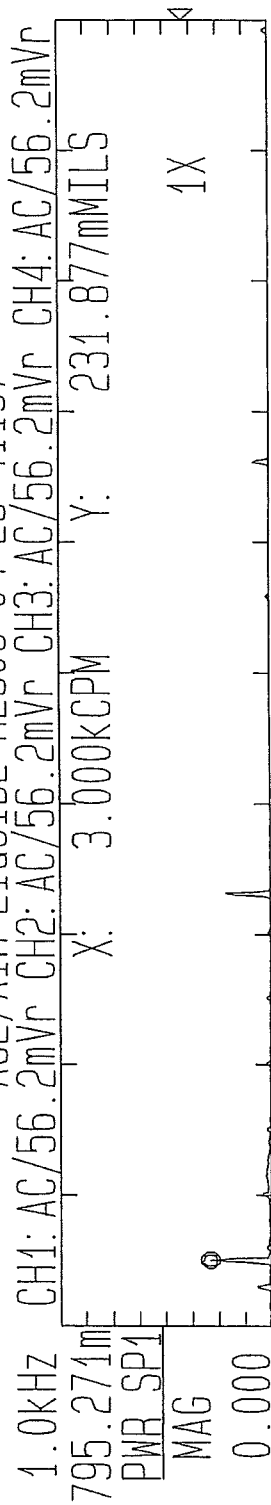
795.271m
PWR SP4
MAG
0.000

[Hz] han 1.0000k
opp.3X

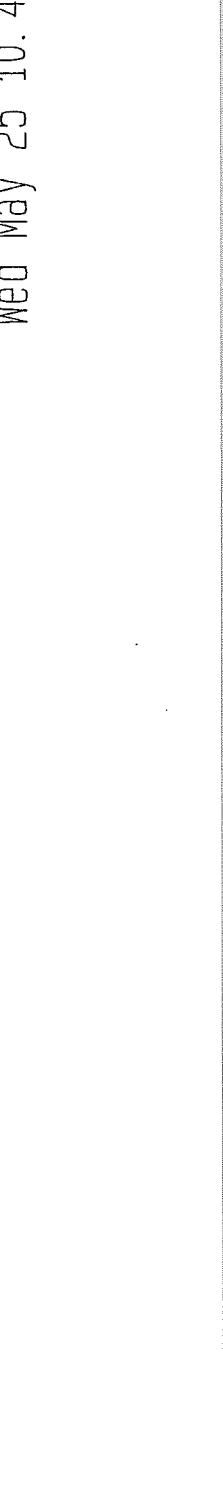
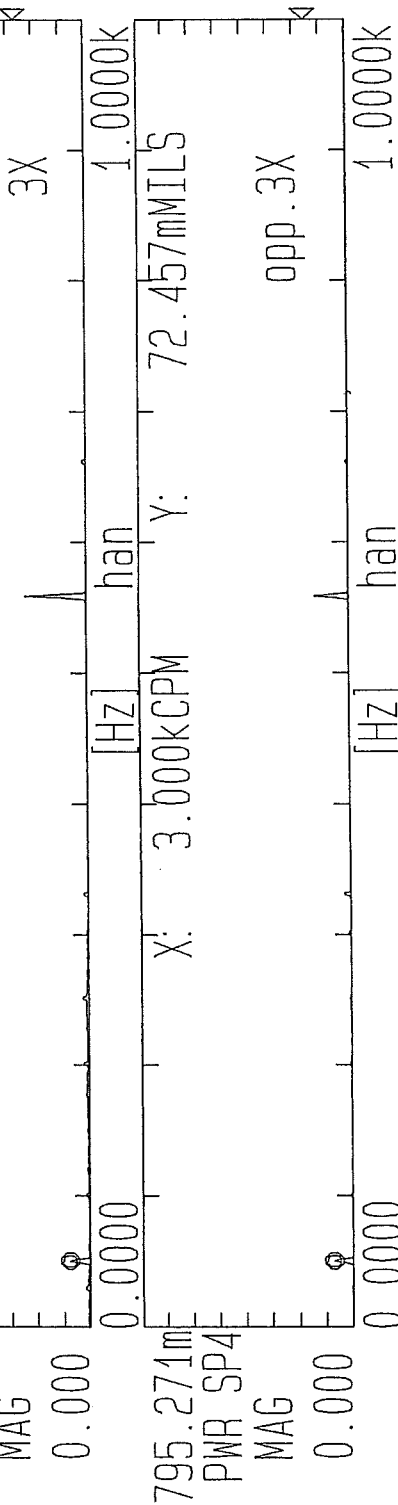
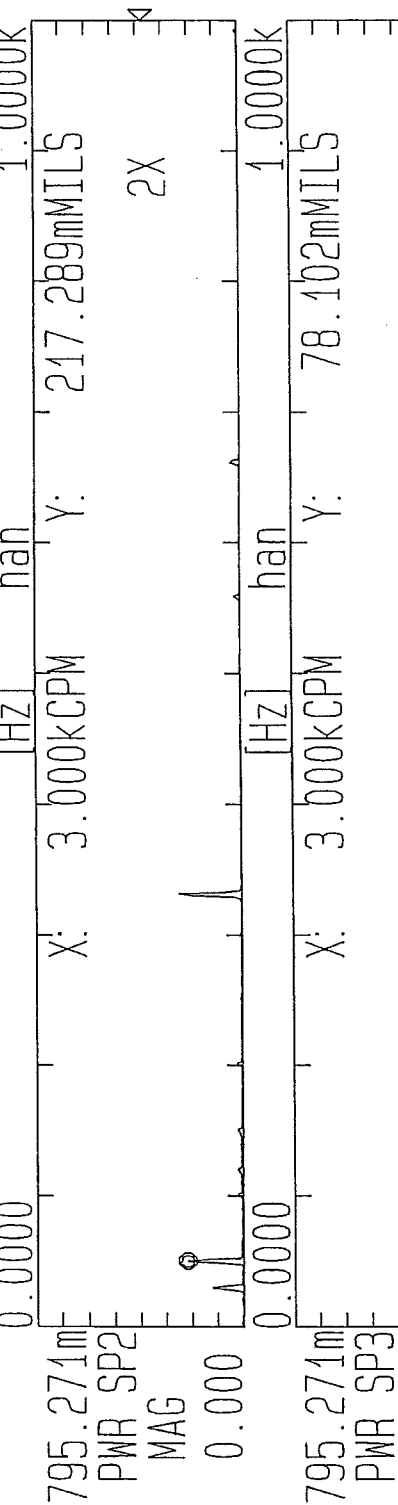
Wed May 25 10:26:14 2005

ACE/AIR LIQUIDE HL806-04 L8-41197

CH 1
AVERAGE
SP. PK
15
100

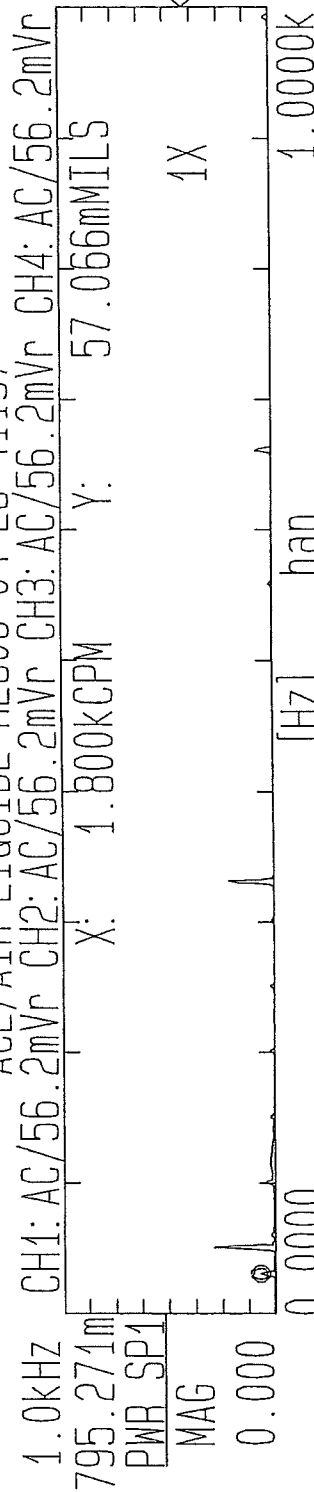


LENGTH
2048
MEM No.
1
REC ADS
0
REC GAP
2

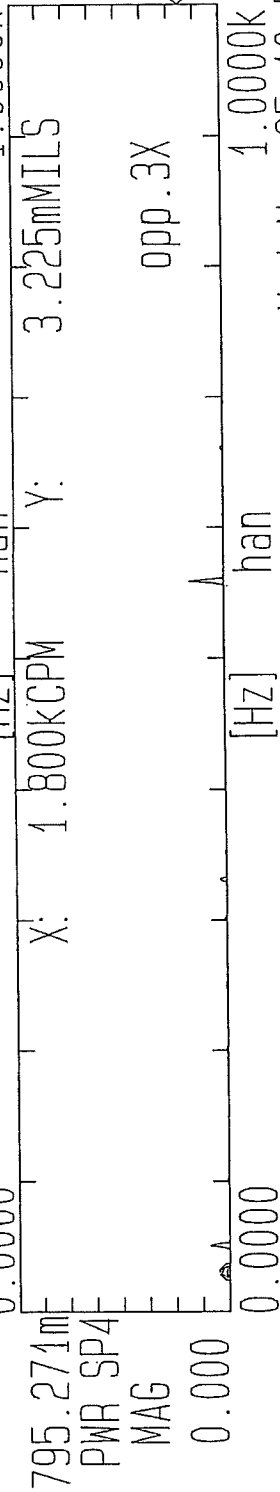
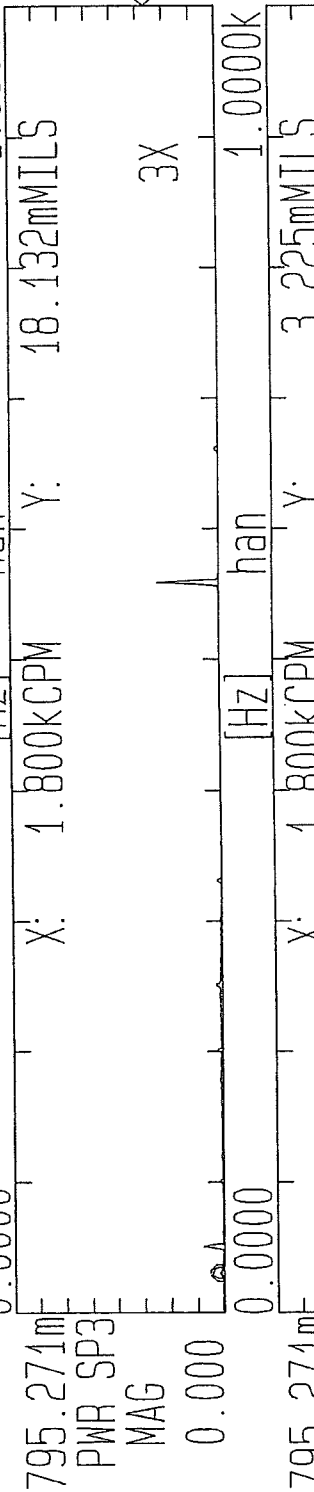
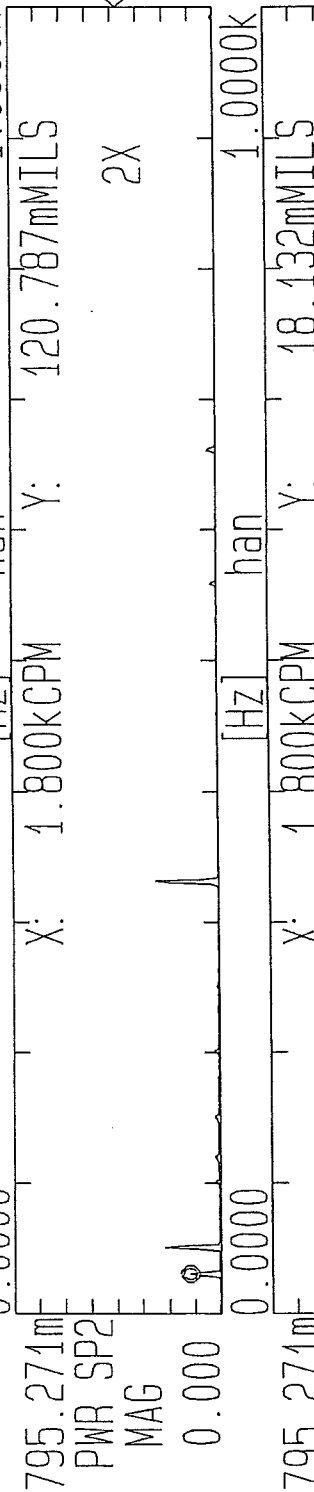


ACE/AIR LIQUIDE HL806-04 L8-41197

CH 1
AVERAGE
SP. PK
15
100

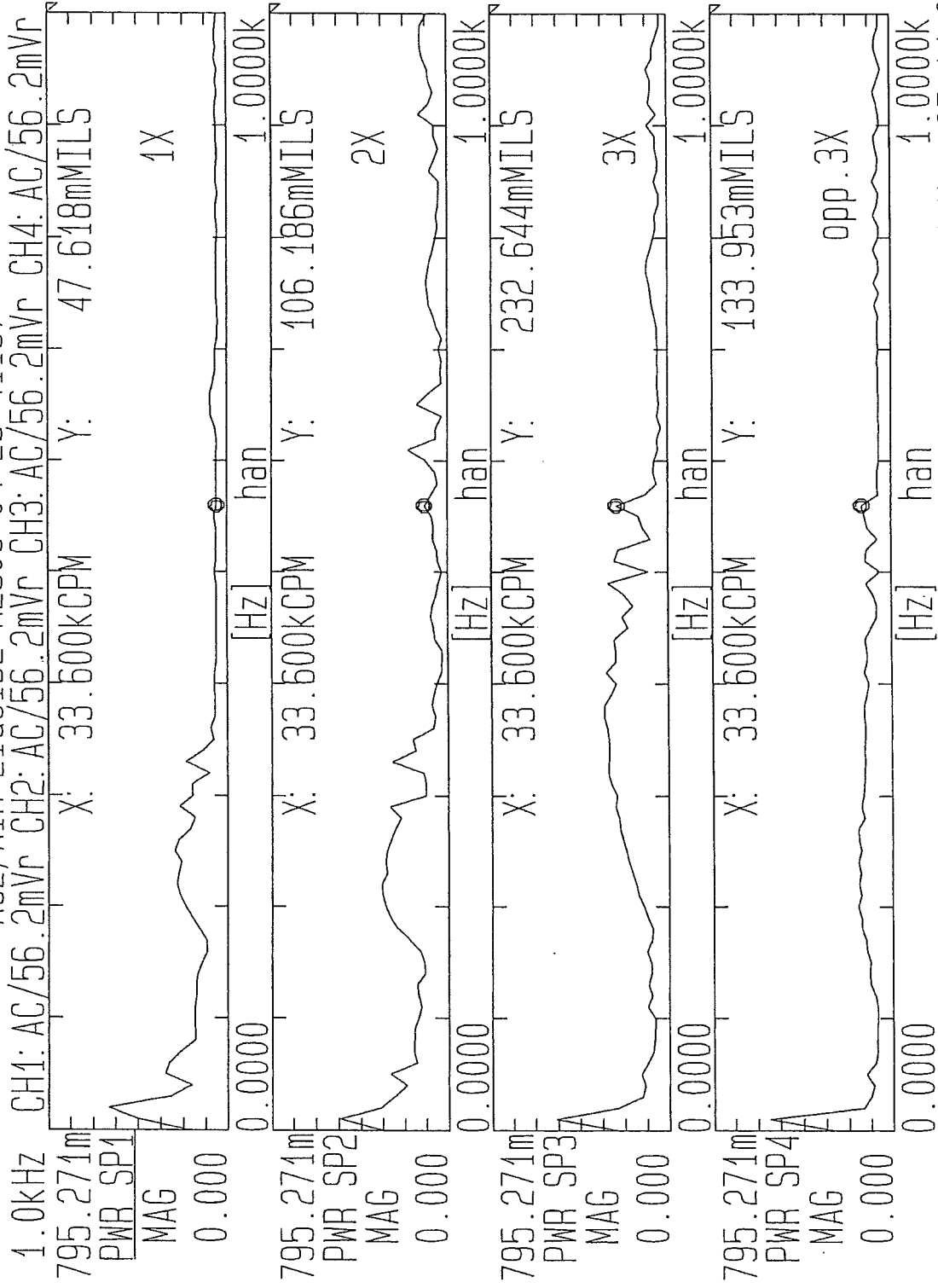


LENGTH 2048
MEM No. 1
REC ADS 0
REC GAP 2



Wed May 25 10:58:07 2005

ACE/AIR LIQUIDE HL806-04 L8-41197



CH 1
 AVERAGE
 SP. PK
 382
 100
 LENGTH
 256
 MEM No.
 1
 REC ADS
 0
 REC GAP
 2

Atlas Copco

Declaration by the Manufacturer

As defined by EC Machinery Directive 98/37/EC, Annex II B

Herewith, we, ATLAS COPCO COMPTEC INC., 46 School Road, Voorheesville NY 12186, declare in our sole responsibility that the product ("the partial machine")

Machine description: Multi-Stage Centrifugal Compressor

Machine type: HL806-4 50 HZ

Serial No. TBI0441197

is intended to be

- ☐ incorporated into machinery ("complete machine")
☒ assembled with other machinery to constitute machinery ("complete machine")

as defined by the above mentioned EC machinery directive.

Declaration:

In the development and production of the above described partial machine, all direct feasible state-of-the-art measures have been considered to meet the substantive contents of the basic safety and health requirements pertinent to this partial machine as defined in EC machinery directive 98/37/EC with the following supplements: 93/68/EEC. Pertinent documentation will be made available to the competent national authority in charge of the execution of the EC machinery directive on sufficiently justified request within a reasonable period time.

Note:

The manufacturer of the ready-for-use machinery ("complete machine")

- ☐ into which this partial machine is to be incorporated
☒ with which this partial machine is to be assembled to constitute machinery

is obliged to take any and all further required action in the framework of safety techniques still to be carried out, including warning labels to make sure that the ready-for-use complete machine conforms to the dispositions of the EC machinery directive. The partial machine must not be put into service until the complete machine

- ☐ into which this partial machine is to be incorporated
☒ with which this partial machine is to be assembled

has been declared to be in conformity with the provisions of the directive in the specified revision

Applied harmonized standards:

EN "compressor safety"
(currently in draft form)

N / A

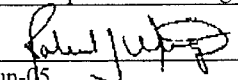
EN 292 Part 1 and 2

Applied national technical standards and specifications:

N / A

Names: Robert J. Wright

Position: Core Operations Manager

Signature: 

Date: 2-Jun-05

Atlas Copco

Herstellererklärung

im Sinne der EC-Maschinen-Richtlinie 98/37/EWG, Anhang II B

Wir, die ATLAS COPCO COMPTEC INC., 46 School Road, Voorheesville NY 12186 USA, erklären hiermit in alleiniger Verantwortung, dass das Produkt ("die Teilmaschine")
Machinenbezeichnung: Multi-Stage Centrifugal Compressor

Machinentype: HL806-4 50 HZ Maschinen-Nr: TBI0441197

- ☐ zum Einbau in eine Maschine ("Gesamtmaschine")
☒ zum Zusammenbau mit anderen Maschinen zu einer Maschine ("Gesamtmaschine")

im Sinne der EG-Maschinen-Richtlinie bestimmt ist.

Erklärung:

In die Entwicklung und den Bau der vorbeschriebenen Teilmaschine sind die nach dem Stand der Technik möglichen unmittelbaren Massnahmen zur Erfüllung des auf diese Teilmaschine zutreffenden materiellen Inhalts der grundlegenden Sicherheits- und Gesundheitsanforderungen gemäss der EG-Maschinen-Richtlinie 98/37/EWG mit den Ergänzungen 93/68/EWG eingeschlossen. Eine entsprechende Dokumentation wird bei ausreichend begründetem Verlangen der für die Durchführung der EG-Maschinen-Richtlinie zuständigen nationalen Behörden in angemessener Zeit verfügbar gemacht.

Hinweis:

Der Hersteller der verwendungsfertigen Maschine ("Gesamtmaschine")

- ☐ in die diese Teilmaschine eingebaut
☒ mit der diese Teilmaschine zusammengebaut

werden soll, muss im Rahmen der mittelbaren und hinweisenden Sicherheitstechnik die notwendigen weiteren Massnahmen ergreifen, damit die verwendungsfertige Gesamtmaschine den Bestimmungen der EG-Maschinen-Richtlinie entspricht. Die Inbetriebnahme ist solange untersagt, bis festgestellt wurde, dass die Gesamtmaschine.

- ☐ in die diese Teilmaschine eingebaut
☒ mit der diese Teilmaschine zusammengebaut

werden soll, den Bestimmungen der EG-Maschinen-Richtlinie in der o.g. Fassung entspricht

Angewendete harmonisierte Normen:

EN "Kompressoren-Sicherheit"
(z.Zt.Entwurf)

N / A

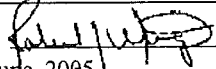
EN 292 T1 and T2

Angewendete nationale technische Normen und Spezifikationen:

N / A

Name: Robert J. Wright

Position: Core Operations Manager

Unterschrift: 

Datum: 2 June, 2005