

SULZER

Tipo: 10x14x21M BBS-SC

No. de Orden: 100209046-0020-01

Type

Order No.

Item Cliente No.: 010-P-280 A

No. de Serie: 537284

Client's Item No.

Sulzer Serial. No.:

Cliente/Destino: KP ENGINEERING

Curva de prueba: M-11439

Client/Destination

Test Curve:

Reporte de prueba 261/16

Test Report No.

Datos de punto de operación
Data at guarantee point

Q_N 6509.00 USGPM
 H_N 387.00 ft
 P_N 453.00 BHP
 η_N 84.30 %
 A_N 0.60 SG
 n_N 1792.0 rpm
 NPSH 19.50 ft
 S_N 350.00 °F

Drive / Motor: 1-ML-80
 1st gear drive / 1. Getriebe: 02:01
 2st gear drive / 2. Getriebe:

No./Nr.: 1-ML-80
 No./Nr.: 1-ML-127
 No./Nr.:

Tacometro Tachometer Pepper & Fuchs Visolux Nr. No.: 1-ML-109128S

Medidor de potencia Power measuring ZES ZIMMER TM39 Nr. No.: 1-ML-33

Medidor de flujo Pump capacity meter Magnetico20 Nr. No.: 1-ML-120_20in

Medidor de Ps Inlet pressure meter Rosemount -14.2 - 50 PSI Suct Loop2 Nr. No.: 1-ML-109

Medidor de Pd Outlet pressure meter Rosemount 0-3000 PSI Disch Loop2 Nr. No.: 1-ML-111

Sensor Temp. de liquido Temp. sensing test liquid PT2 100 H2O Loop1 Nr. No.: PT1002

Diametros de succion y descarga p_s / p_d

13 10
in in

Presión Barométrica:
mean barometric press.

11.18 p.s.i.

No. De Pasos No. Stages 0-104224329 Dia. Maximo Impulsor Imp. Max Dia. 21.00"
 No. De Venas No. Vanes 5
 Modelo Impulsor Impeller Pattern P104224329001 Dia. Impulsor Prueba Imp. Test Dia. 19.60"

Measurement no.	Lecturas No.			1	2	3	4	5	6	7	8	9
Motor speed	Velocidad de Motor	n_M	rpm	3587.0	3586.4	3587.8	3590.6	3592.3	3590.6	3593.3	3592.6	3595.5
Pump speed	Velocidad de Bomba	n_P	rpm	1793.5	1793.2	1793.9	1795.3	1796.2	1795.3	1796.7	1796.3	1797.7
Outlet pressure	Presión de Descarga	P_d	p.s.i.	152.52	126.61	171.09	141.46	189.79	159.53	211.61	182.02	213.34
Inlet pressure	Presión de Succión	P_s	p.s.i.	22.0	-1.0	22.0	-3.5	22.7	-3.7	23.3	-3.7	23.7
Velocity head difference	Hv Dif. de velocidades	$(v_2^2 - v_1^2) / 2g$	ft	16.928	16.958	11.755	11.818	7.247	7.257	0.761	0.758	0.000
Pressure head outlet	Presión de carga de salida	H_d	ft	354.71	294.51	397.72	329.09	441.00	371.17	491.45	423.48	495.37
Pressure head inlet	Presión de carga de entrada	H_s	ft	51.28	-2.32	51.19	-8.14	52.72	-8.69	54.00	-8.53	55.11
Pump head	Carga total	H	ft	320.37	313.79	358.29	349.05	395.53	387.12	438.21	432.77	440.27
Net. Pos. Suct. Head	Carga Net. Pos. Succ.	NPSH	ft		30.10		21.69		18.84		15.77	
Pump capacity	Capacidad de la Bomba	Q	USGPM	9985.70	9994.51	8321.42	8343.43	6533.86	6538.26	2117.78	2113.38	0.00
Efficiency	Eficiencia	η	%	86.10		86.62		83.73		43.98		0.00
Electric power	Potencia Eléctrica	P_{el}	BHP	993.70		923.96		832.77		584.69		500.20
Motor efficiency	Eficiencia de motor	η_{Mot}	%	94.98		94.76		94.47		92.68		92.00
Motor power output	Potencia de salida del Motor	P_{Mot}	BHP	943.82		875.52		786.68		541.88		460.20
Pwr loss 1st gear drive	Perdidas Pot. reductor 1	P_{V1}	BHP	12.07		12.07		12.07		12.07		12.07
Pwr loss 2nd gear drive	Perdidas Pot. reductor 2	P_{V2}	BHP									
Pump input	P Entrada a la Bomba	P	BHP	931.75		863.45		774.61		529.81		448.13
Values converted to n_N and i stages				Valores corregidos $n_N = 1792.0$								
Efficiency	Eficiencia	η	%	86.10		86.62		83.73		43.98		0.00
Pump capacity	Capacidad de la Bomba	Q	USGPM	9977.28	9987.76	8312.57	8328.14	6518.76	6526.18	2112.29	2108.32	0.00
Pump head	Carga Din. Tot.	H	ft	319.83	313.37	357.52	347.77	393.70	385.69	435.94	430.71	437.46
Net. Pos. Suct. Head	Carga Net. Pos. Succ.	NPSH	ft		30.06		21.61		18.77		15.69	
Pump input at p_N	P Entrada a Bomba p_N	P	BHP	562.35		520.57		465.07		317.66		268.16

Probado por:

Tested by

REYNA

Fecha: Date

21.07.2016

Atestiguado por:

Witnessed by

Observaciones:

Remarks

Fecha:

Date

Temperatura de Soporte:

Bearing temperature:

103.90 °F

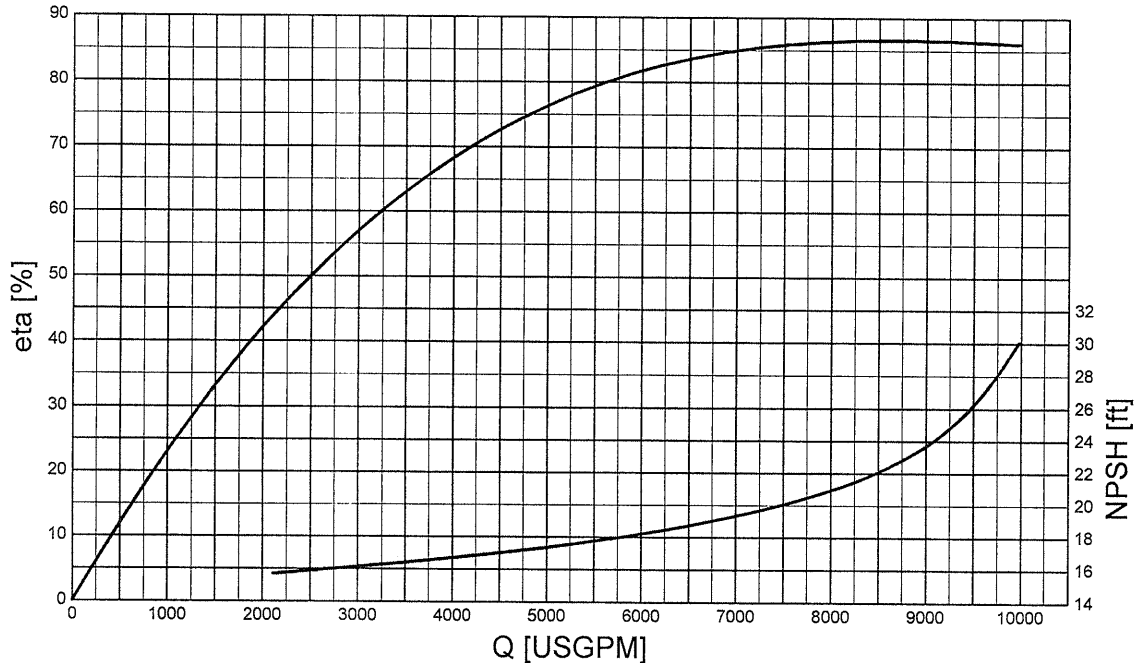
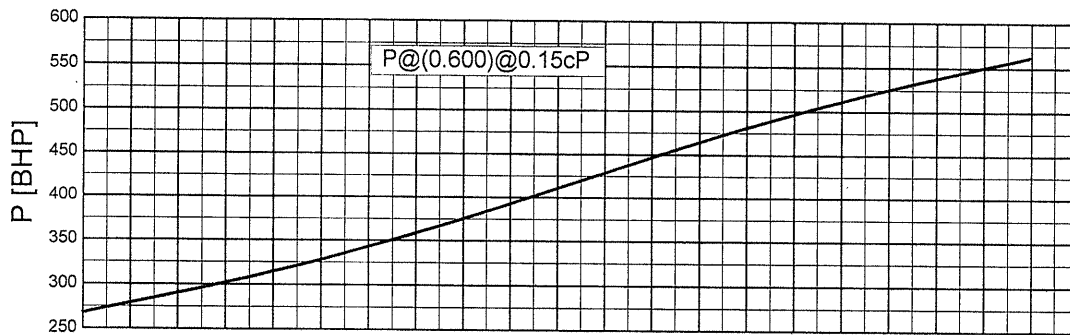
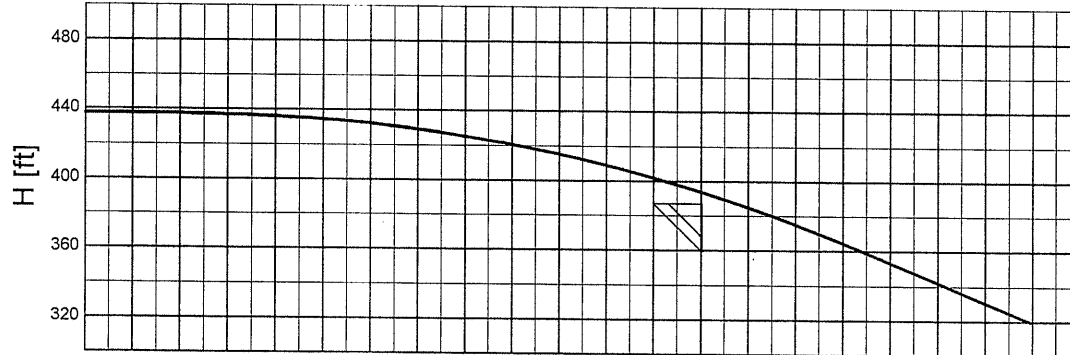
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Brg Hsg DE

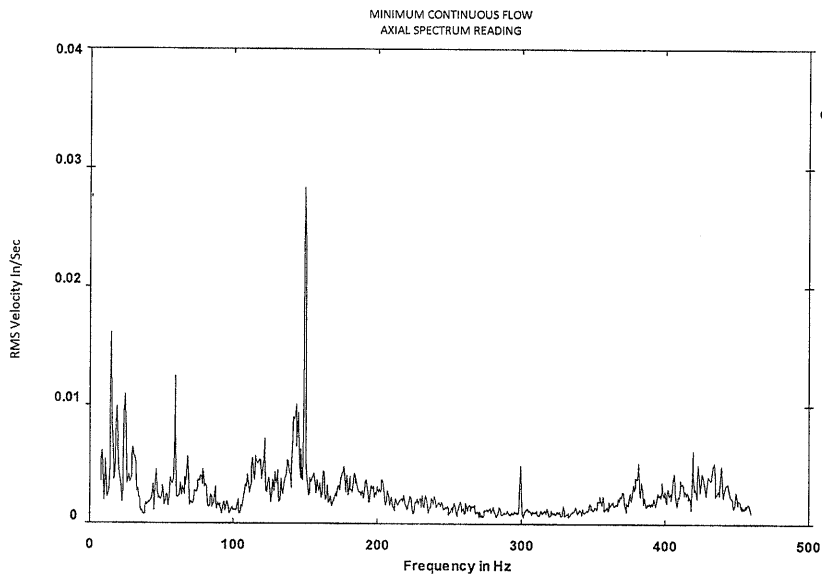
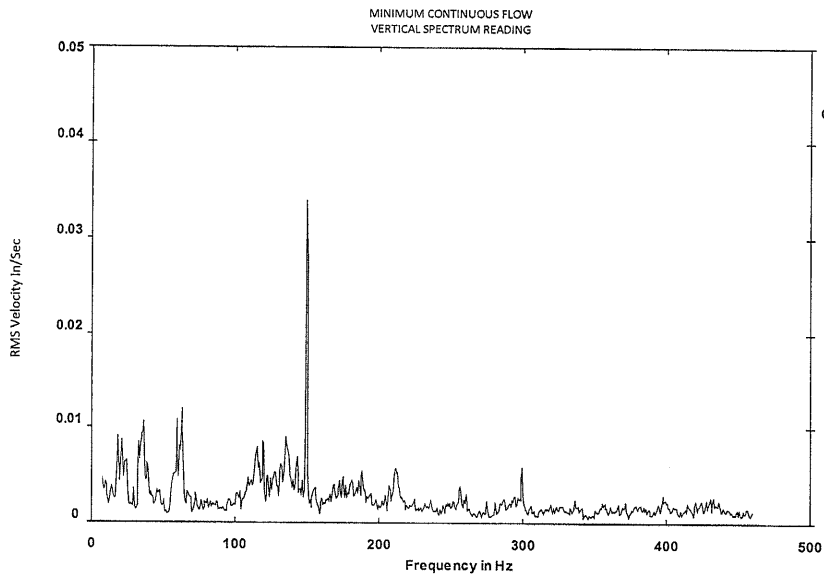
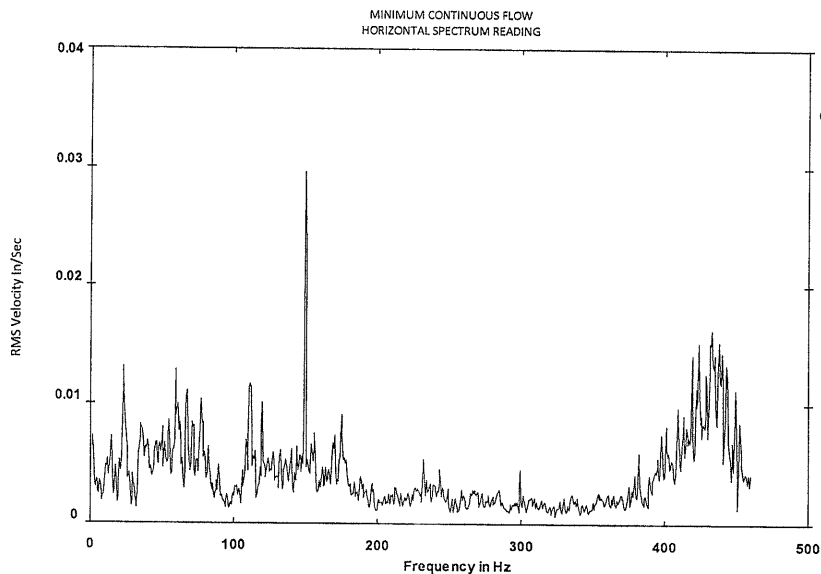
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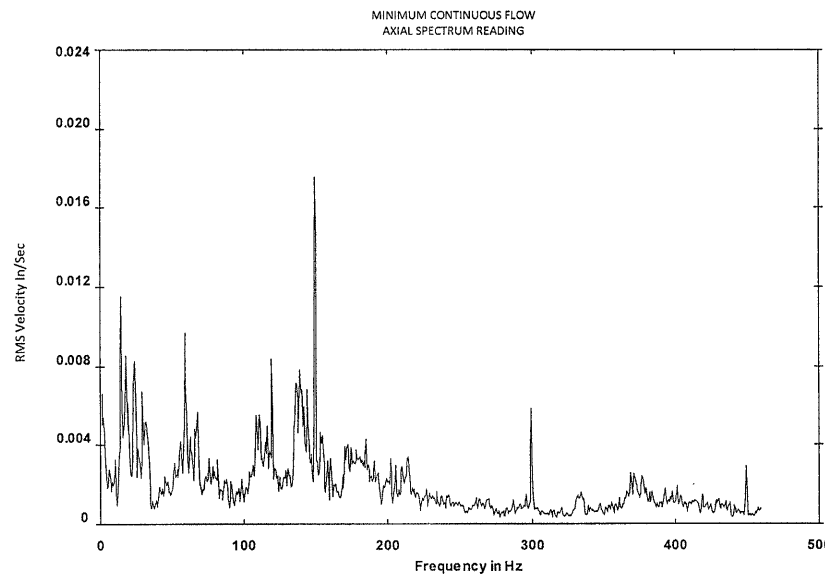
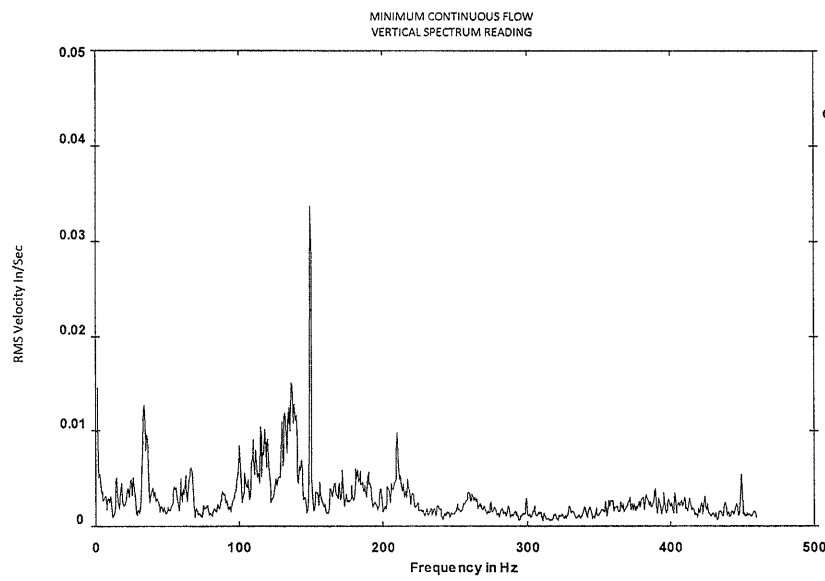
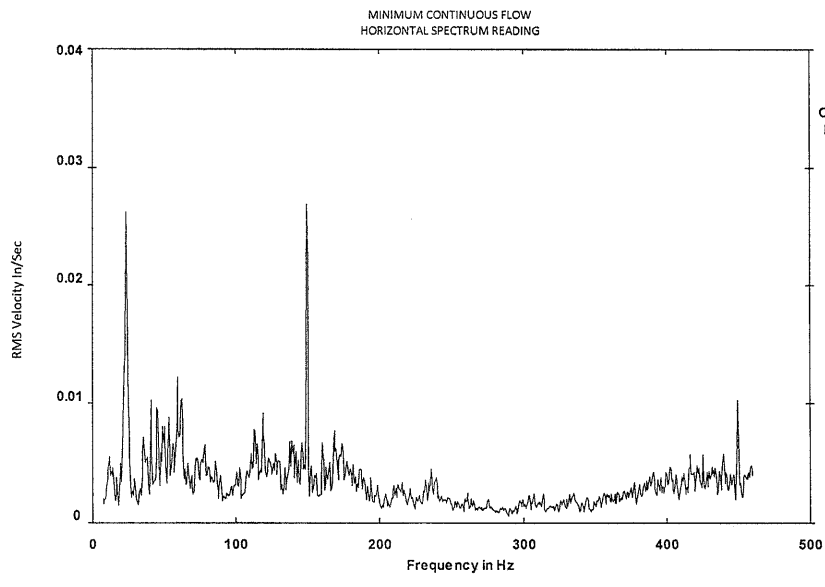
SULZER		Dibujo No. Drawing-No.		No. Orden 100209046-0020-01	
Curva de Prueba Test Curve M-11439		Impulsor Impeller	0-104224329	P204505132001	
Cliente Customer	KP ENGINEERING			Sulzer Comm.Nr.	
Orden Compra Order No.	J1422-B-009	Difusor Diffuser	0-104224221	P204505008200	
No. Identif. Ident No.	010-P-280 A	Gehäuse Casing			Tipo Type
No. Serie. Serial No.	537284	D2 Diseño. D2 design.	Ø 19.60"	Venas. Vane	Ø 19.60"
Nombre Name	REYNA	D2 min. D2 min.	Ø 16.81"	Reporte No. 261/16 Test Report No.	
Fecha Date	21.07.2016	D2 max. D2 max.	Ø 21.00"	n= 1792	1/min. = 1 Pasos Stages
				DN _s 14"	DN _d 10"



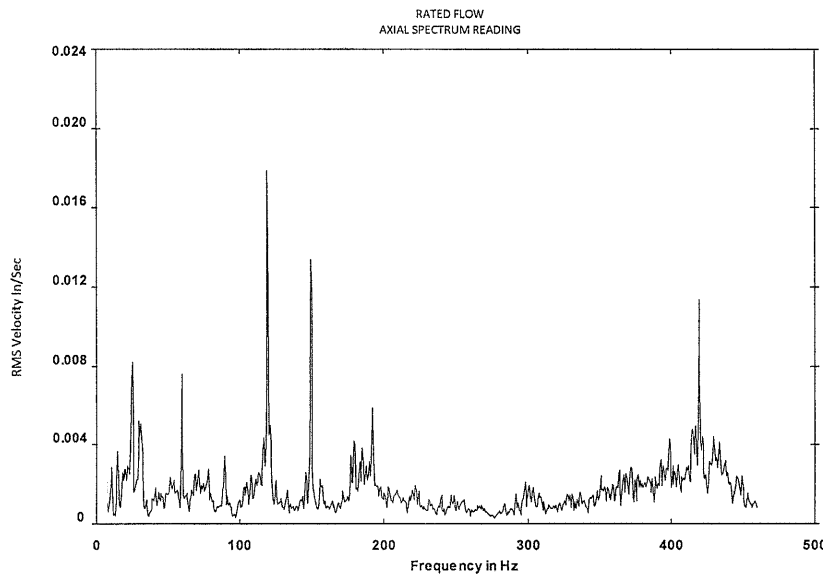
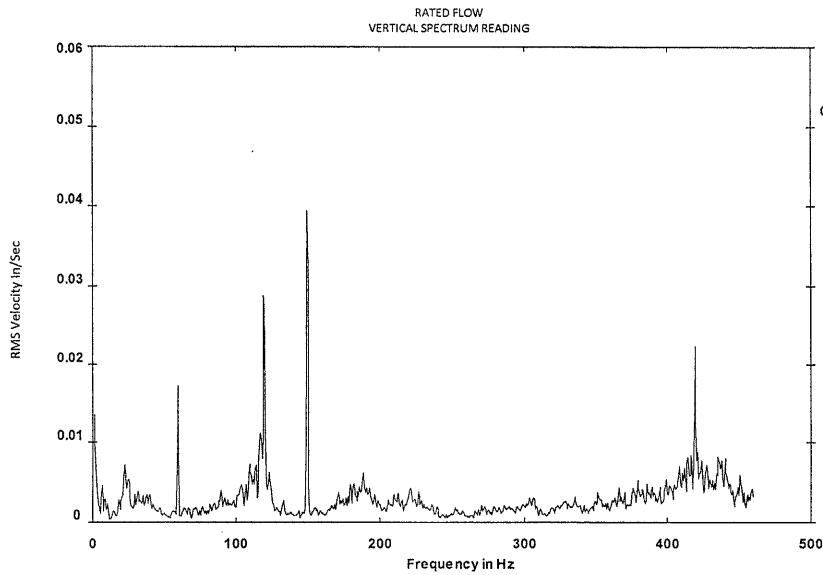
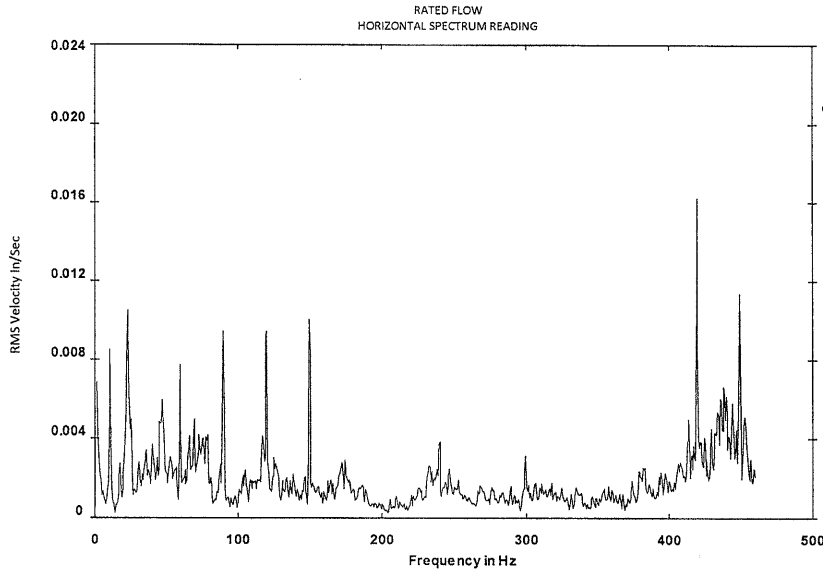
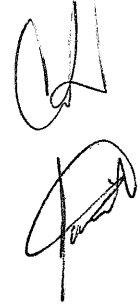
100209046-0020-01
10x14x21M BBS-SC
2112.29 USGPM
1796 RPM
DRIVEN END



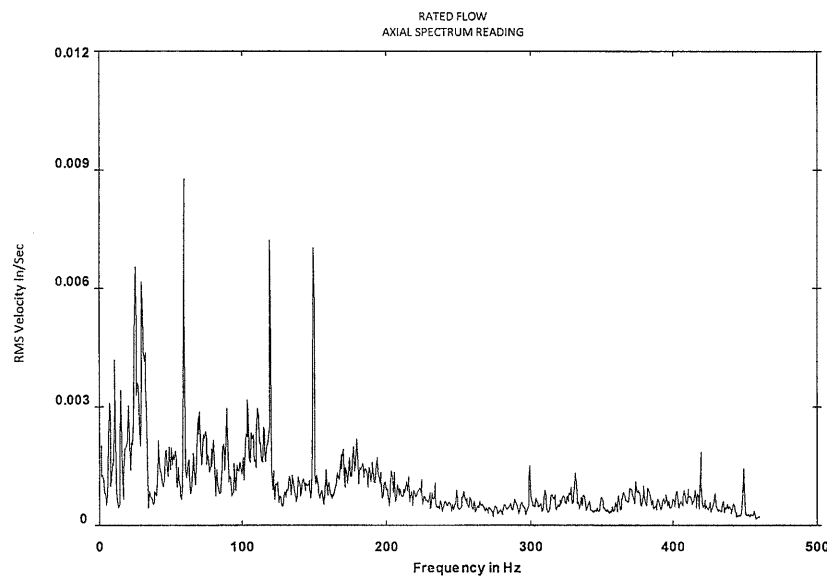
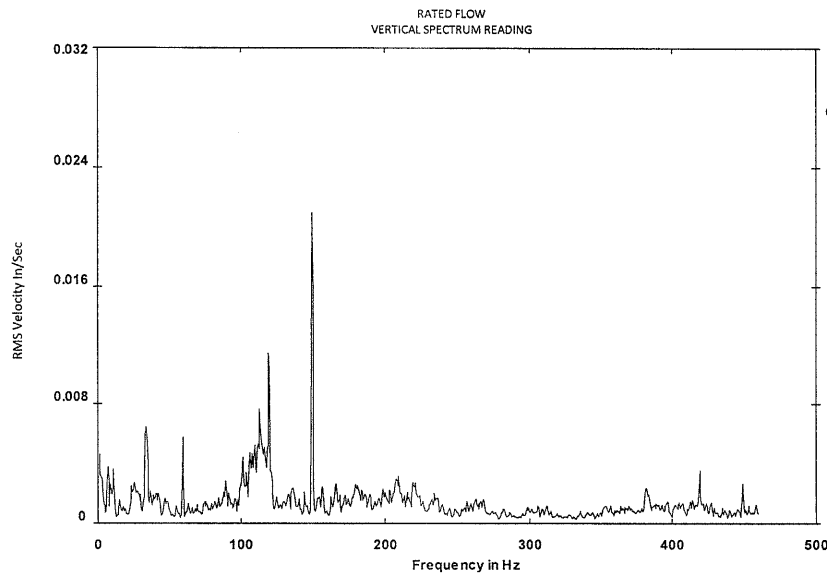
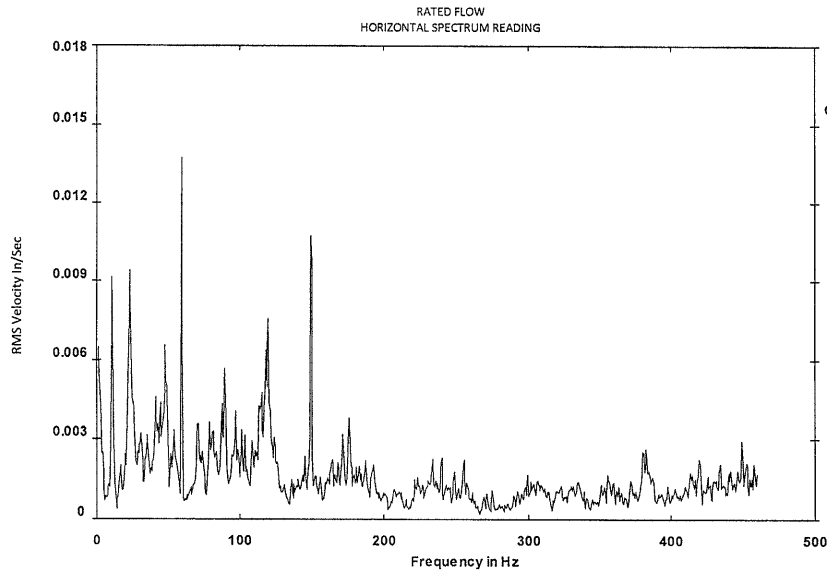
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10x14x21M BBS-SC
2112.29 USGPM
1796 RPM
NON DRIVEN END



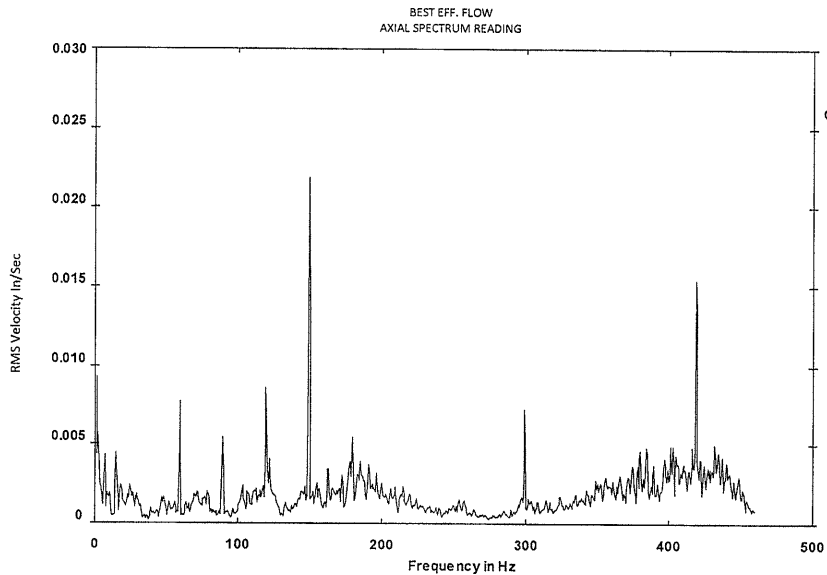
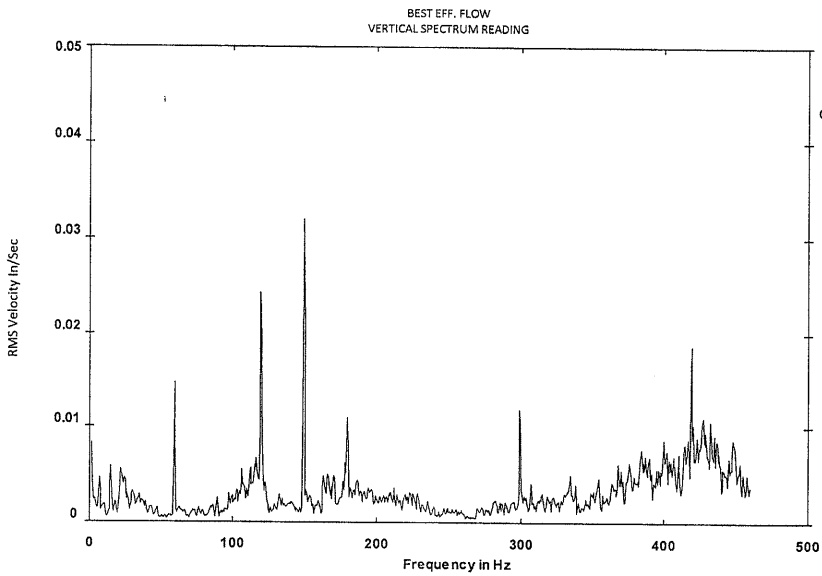
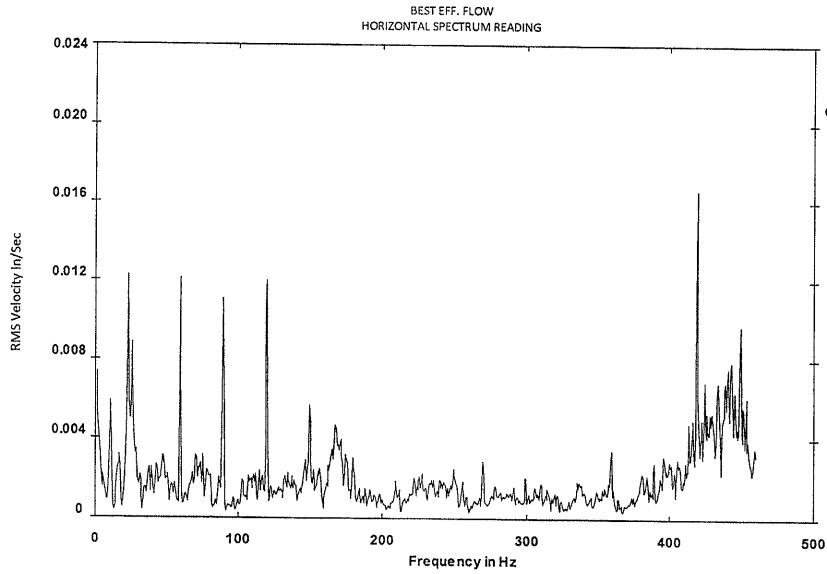
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10x14x21M BBS-SC
6518.76 USGPM
1796 RPM
DRIVEN END



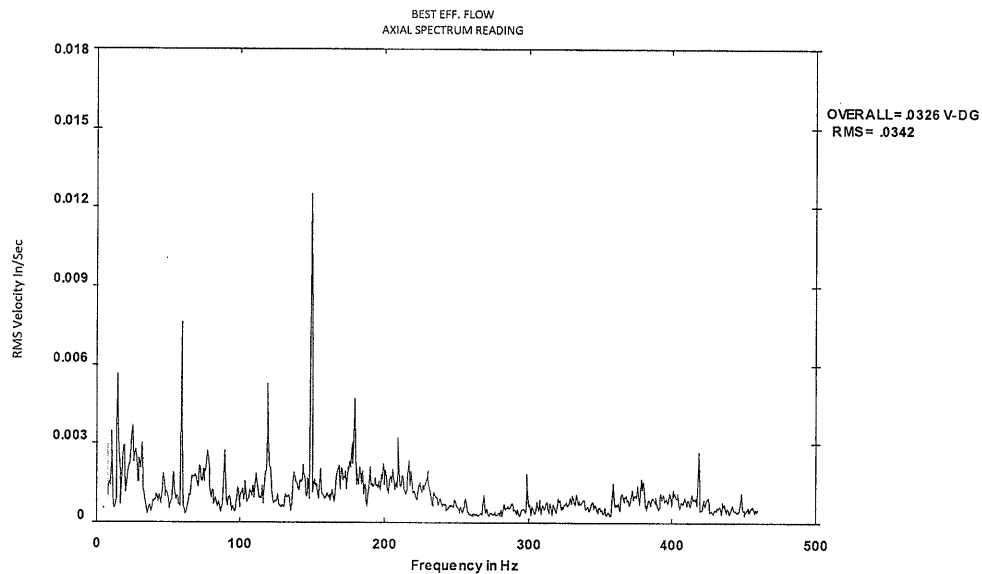
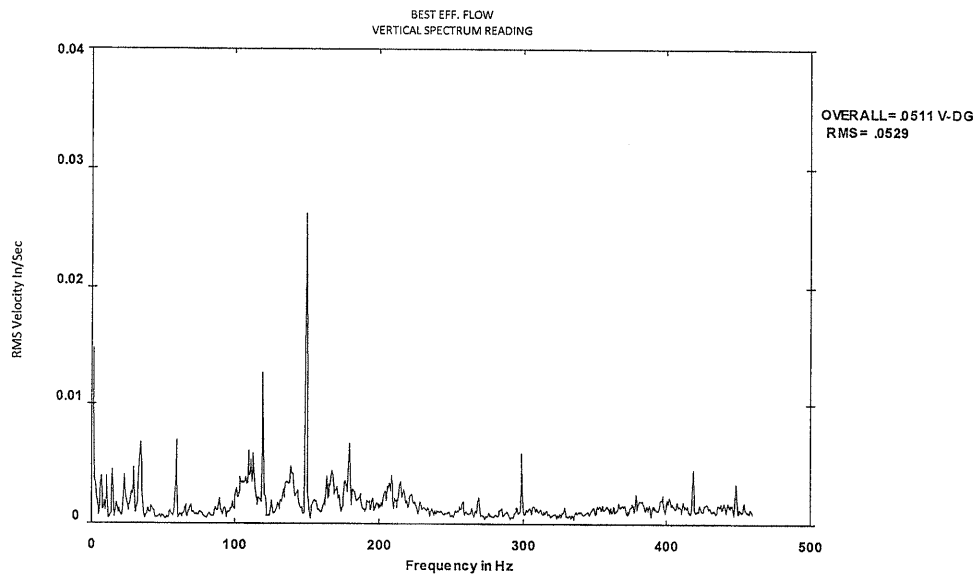
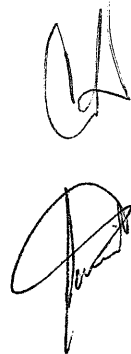
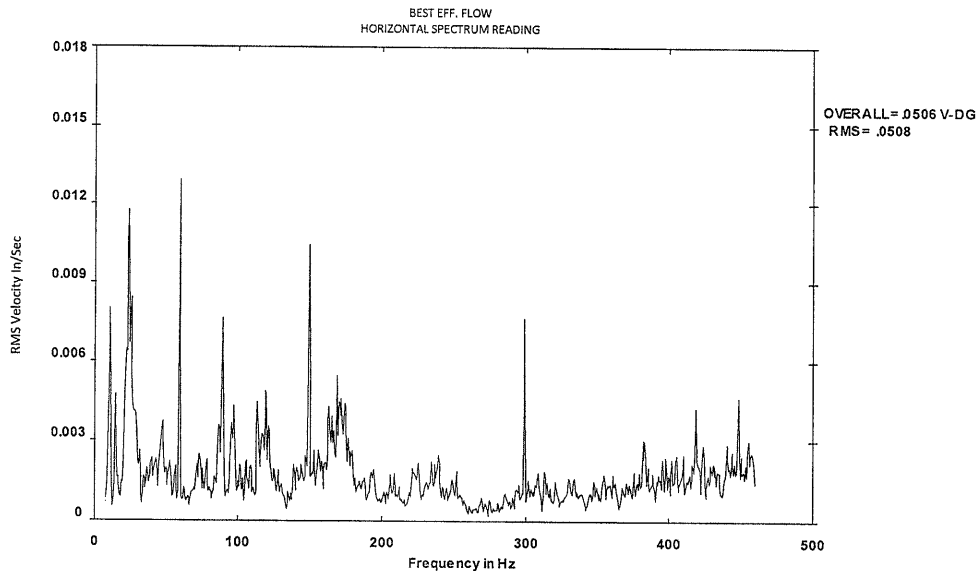
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10x14x21M BBS-SC
6518.76 USGPM
1796 RPM
NON DRIVEN END



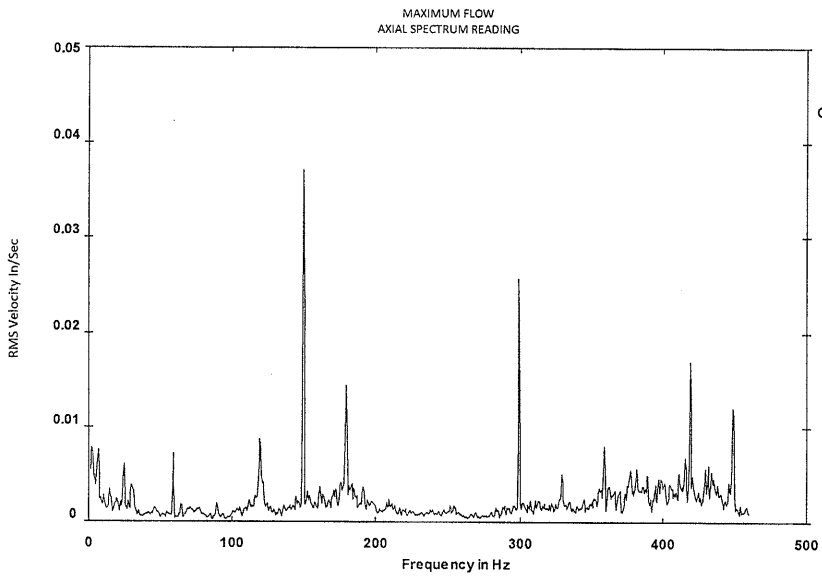
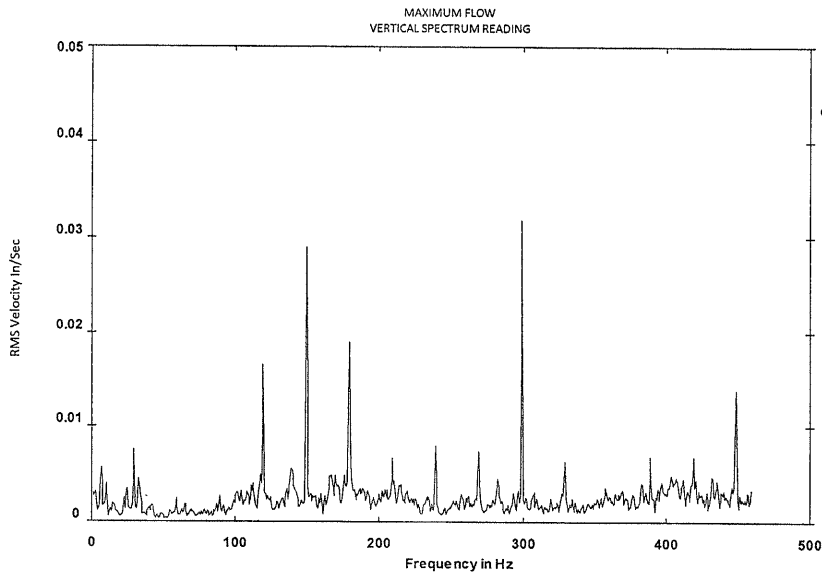
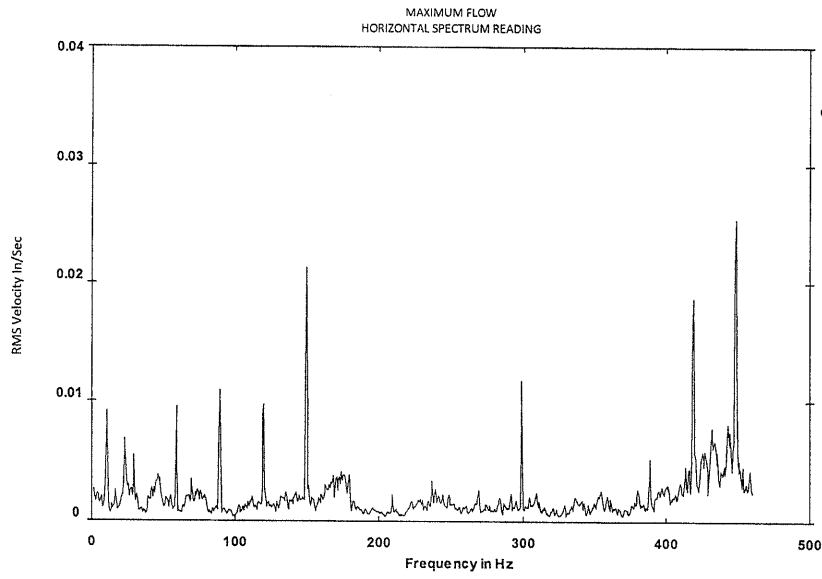
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10x14x21M BBS-SC
8312.57 USGPM
1793 RPM
DRIVEN END



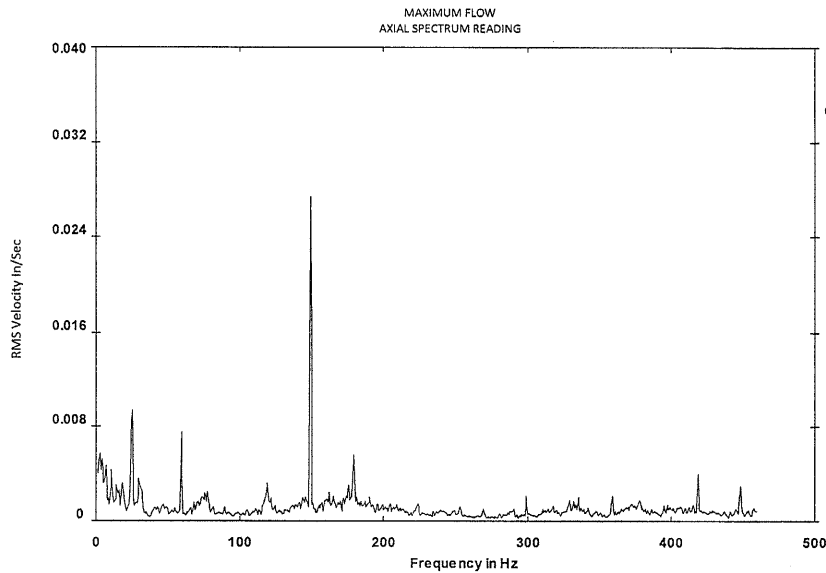
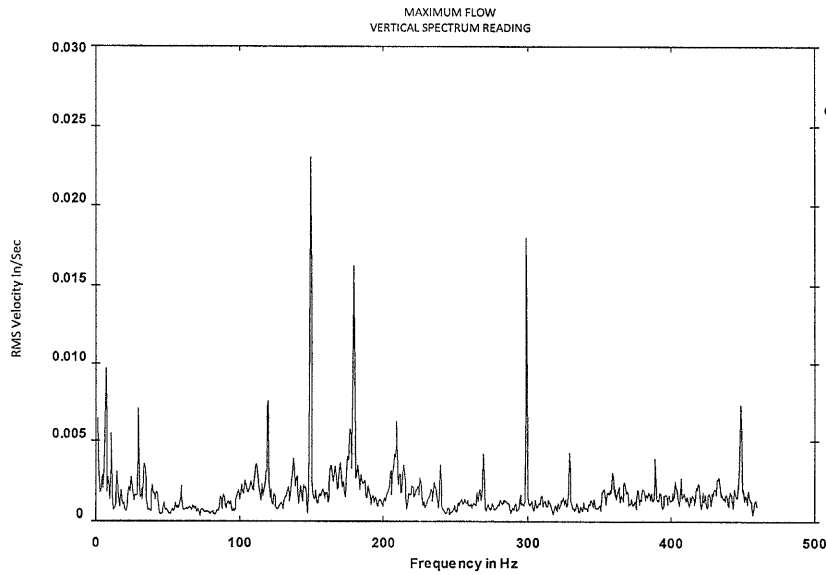
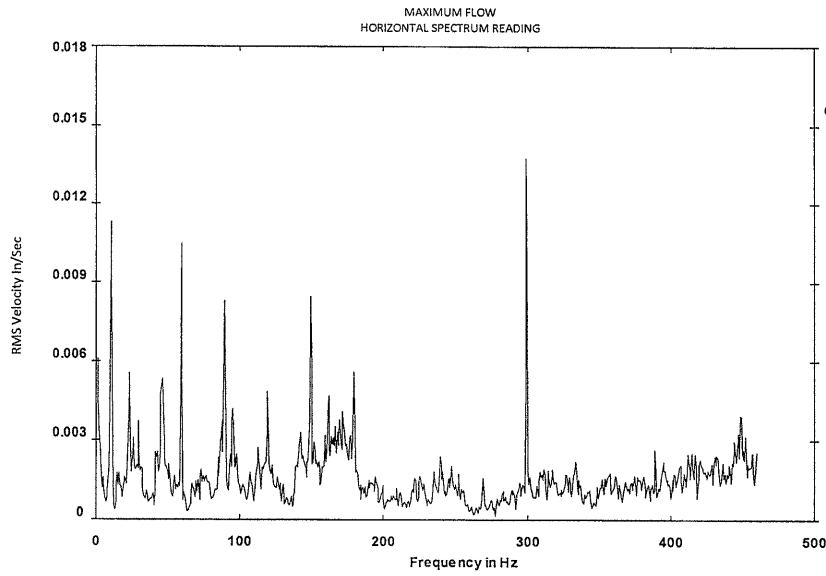
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10x14x21M BBS-SC
8312.57 USGPM
1793 RPM
NON DRIVEN END



100209046-0020-01
10x14x21M BBS-SC
9977.28 USGPM
1793 RPM
DRIVEN END



100209046-0020-01
10x14x21M BBS-SC
9977.28 USGPM
1793 RPM
NON DRIVEN END



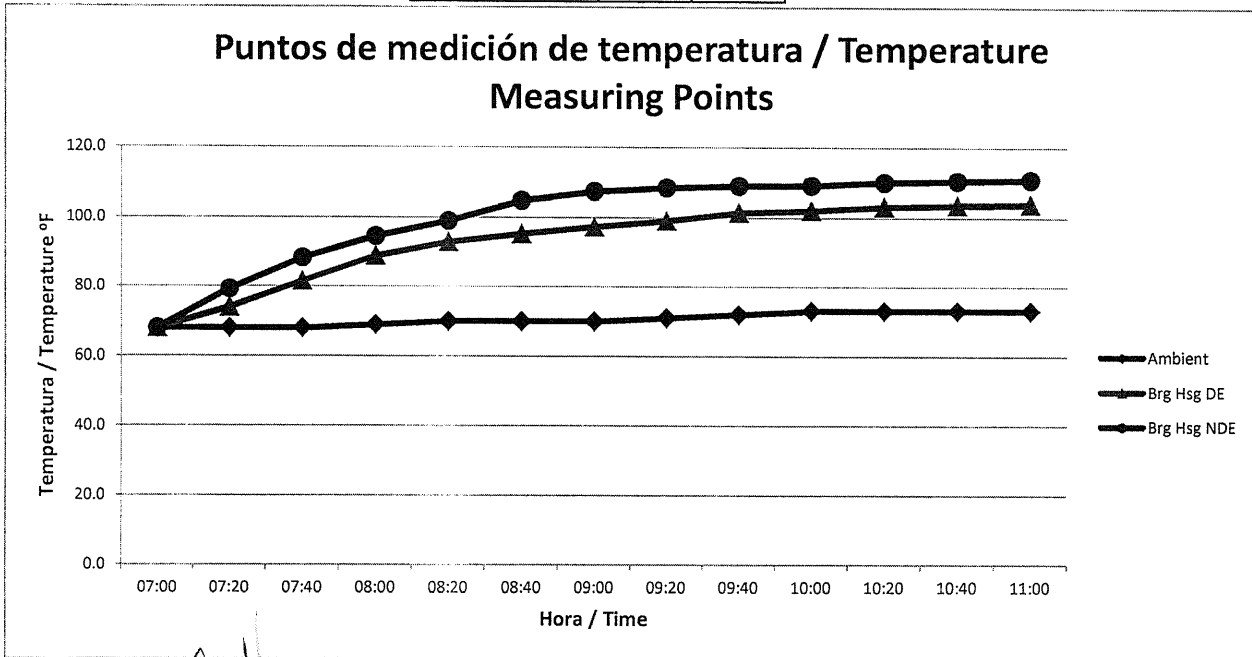
SULZER

Tipo: 10x14x21M BBS-SC
Item Cliente No:
Client's Item No: 010-P-280 A
Cliente/Destino: KP ENGINEERING

No. de Orden: 100209046-0020-01
Order No:
No. de Serie: 537284
Sulzer Serial. No.:
Curva No: M-11439
Curve No:

Reporte Prueba No.: 261/16
Test Report No.:

Puntos de medición de temperatura Temperature Measuring Points			
Hora: Time:	Ambiente	Soporte Extremo Accionado	Soporte Extremo no Accionado
	Ambient	Bearing Housing Driven End	Bearing Housing Non Driven End
	°F	°F	°F
07:00	68.0	68.0	68.0
07:20	68.0	74.0	79.2
07:40	68.0	81.5	88.3
08:00	69.0	88.9	94.6
08:20	70.0	92.9	99.0
08:40	70.0	95.3	104.8
09:00	70.0	97.3	107.4
09:20	71.0	99.1	108.5
09:40	72.0	101.5	109.0
10:00	73.0	102.1	109.2
10:20	73.0	103.2	110.1
10:40	73.0	103.6	110.5
11:00	73.0	103.9	110.9



Probado por: REYNA
Tested by: REYNA
Fecha: 21.07.2016
Date: 21.07.2016

Testificado por: [Signature]
Witnessed by: [Signature]
Fecha: [Signature]
Date: [Signature]

F-BP-003

SULZER

Tipo: 10x14x21M BBS-SC

No. de Orden: 100209046-0020-02

Type

Order No.

Item Cliente No.: 010-P-280 B

No. de Serie: 537285

Client's Item No.

Sulzer Serial. No.:

Cliente/Destino: KP ENGINEERING

Curva de prueba: M-11440

Client/Destination

Test Curve:

Reporte de prueba 262/16
Test Report No.Datos de punto de operación
Data at guarantee pointDrive / Motor: 1-ML-80
1st gear drive / 1. Getriebe: 02:01
2st gear drive / 2. Getriebe:No./Nr.: 1-ML-80
No./Nr.: 1-ML-127
No./Nr.:

Q_N 6509.00 USGPM
 H_N 387.00 ft
 P_N 453.00 BHP
 η_N 84.30 %
 A_N 0.60 SG
 n_N 1792 rpm
 $NPSH$ 19.50 ft
 θ_N 350.00 °F

Tacometro Tachometer

Pepper & Fuchs Visolux

Nr. No.: 1-ML-109128S

Medidor de potencia Power measuring

ZES ZIMMER TM39

Nr. No.: 1-ML-33

Medidor de flujo Pump capacity meter

Magnetico20

Nr. No.: 1-ML-120_20in

Medidor de Ps Inlet pressure meter

Rosemount -14.2 - 50 PSI Suct Loop2

Nr. No.: 1-ML-109

Medidor de Pd Outlet pressure meter

Rosemount 0-3000 PSI Disch Loop2

Nr. No.: 1-ML-111

Sensor Temp. de liquido Temp.sensing test liquid

PT2 100 H2O Loop1

Nr. No.: FT1002

Presión Barométrica:
mean barometric press.

11.18 p.s.i.

No. De Pasos
No. De Venas
Modelo ImpulsorNo. Stages
No. Vanes
Impeller Pattern0-104224329
5
P104224329001Dia.Maximo Impulsor
Dia.Impulsor PruebaImp. Max Dia.
Imp. Test Dia.21.00"
19.60"

Measurement no.	Lecturas No.			1	2	3	4	5	6	7	8	9
Motor speed	Velocidad de Motor	n_M	rpm	3585.8	3587.4	3587.7	3590.7	3589.1	3589.9	3589.7	3594.0	3595.0
Pump speed	Velocidad de Bomba	n_P	rpm	1792.9	1793.7	1793.9	1795.3	1794.6	1795.0	1794.8	1797.0	1797.5
Outlet pressure	Presión de Descarga	P_d	p.s.i.	157.42	133.03	176.95	147.61	196.21	167.97	219.50	191.74	222.15
Inlet pressure	Presión de Succión	P_s	p.s.i.	20.5	-1.5	21.1	-3.7	21.0	-4.0	22.0	-3.9	22.8
Velocity head difference	Hv Dif. de velocidades	$(v_s^2 - v_d^2)/2g$	ft	16.883	16.958	11.880	11.880	7.257	7.257	0.774	0.758	0.000
Pressure head outlet	Presión de carga de salida	H_d	ft	365.79	309.10	410.90	342.94	455.29	390.21	508.97	445.44	514.99
Pressure head inlet	Presión de carga de entrada	H_s	ft	47.54	-3.47	49.04	-8.54	48.62	-9.34	51.05	-9.00	52.82
Pump head	Carga total	H	ft	335.13	329.53	373.74	363.36	413.93	406.81	458.70	455.19	462.17
Net. Pos. Suct. Head	Carga Net. Pos. Succ.	NPSH	ft		29.31		21.76		18.67		15.78	
Pump capacity	Capacidad de la Bomba	Q	USGPM	9972.49	9994.51	8365.45	8365.45	6538.26	6538.26	2135.39	2113.38	0.00
Efficiency	Eficiencia	η	%	85.91		86.53		85.16		45.26		0.00
Electric power	Potencia Electrica	P_{el}	BHP	1039.76		968.95		857.58		599.57		519.65
Motor efficiency	Eficiencia de motor	η_{Mot}	%	95.06		94.90		94.54		92.80		92.16
Motor power output	Potencia de salida del Motor	P_{Mot}	BHP	988.44		919.54		810.80		556.39		478.89
Pwr loss 1st gear drive	Perdidas Pot. reductor 1	P_{V1}	BHP	12.07		12.07		12.07		12.07		12.07
Pwr loss 2nd gear drive	Perdidas Pot. reductor 2	P_{V2}	BHP									
Pump input	P Entrada a la Bomba	P	BHP	976.37		907.47		798.73		544.32		466.82
Values converted to n_N and i stages				Valores corregidos $n_N = 1792.0$								
Efficiency	Eficiencia	η	%	85.91		86.53		85.16		45.26		0.00
Pump capacity	Capacidad de la Bomba	Q	USGPM	9764.69	9781.75	8186.60	8179.90	6395.99	6394.60	2088.60	2064.80	0.00
Pump head	Carga Din. Tot.	H	ft	321.31	315.64	357.93	347.42	396.11	389.13	438.82	434.42	440.84
Net. Pos. Suct. Head	Carga Net. Pos. Succ.	NPSH	ft		29.26		21.68		18.61		15.69	
Pump input at ρ_N	P Entrada a Bomba ρ_N	P	BHP	554.13		513.84		451.43		307.29		262.32

Probado por:

Tested by

REYNA

Fecha: Date

18.07.2016

Atestiguado por:

Witnessed by

Observaciones:

Remarks

TRIM DIAMETER AFTER TEST TO: 19.60"

Fecha:

Date

Temperatura de Soporte:

Bearing temperature:

105.10 °F

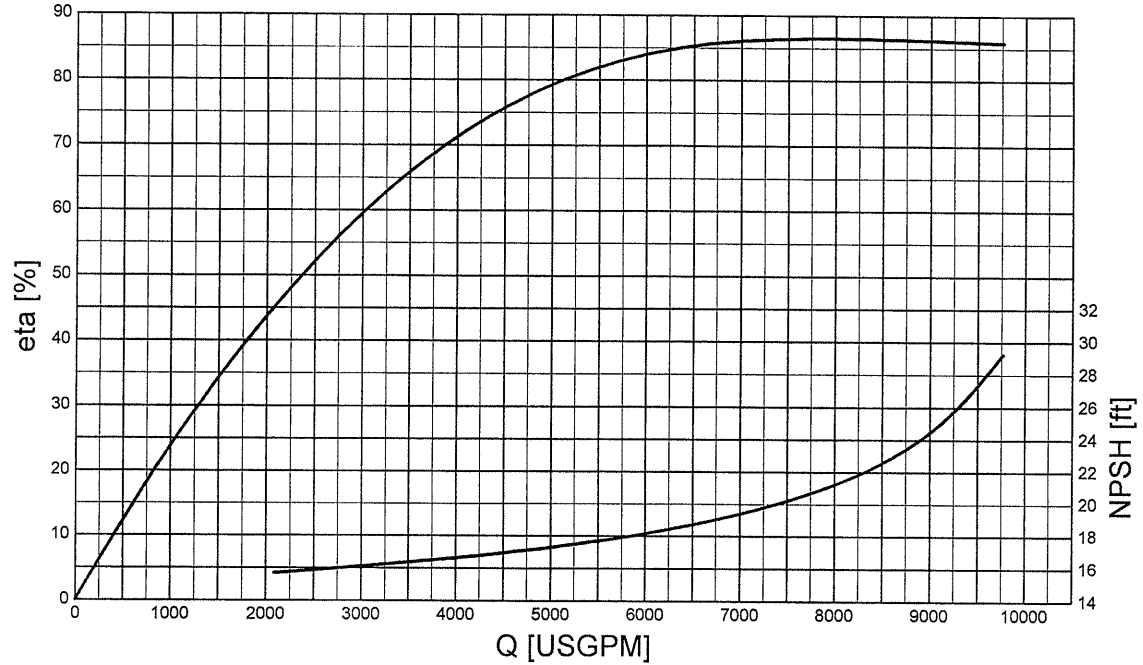
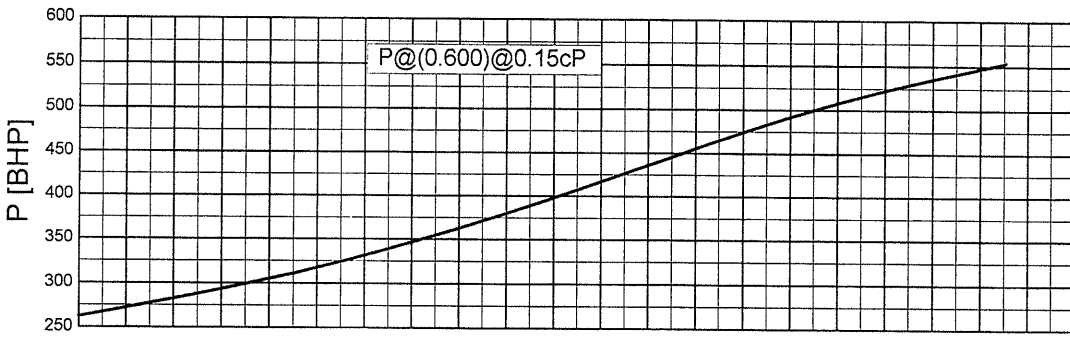
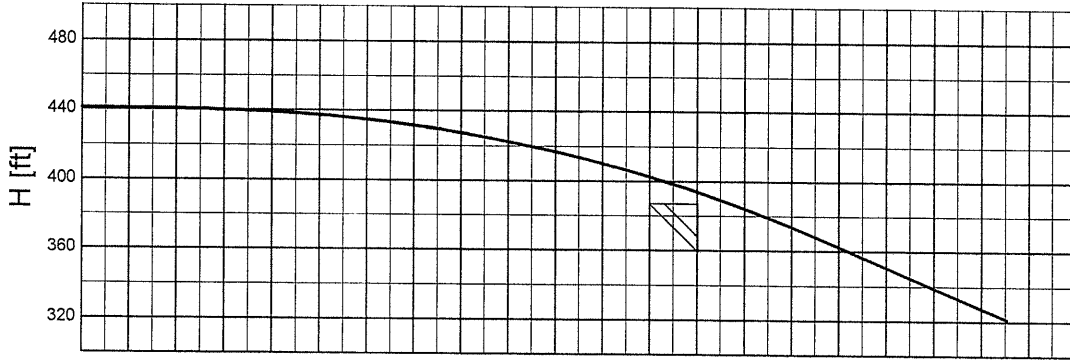
114.20 °F

Brg Hsg DE

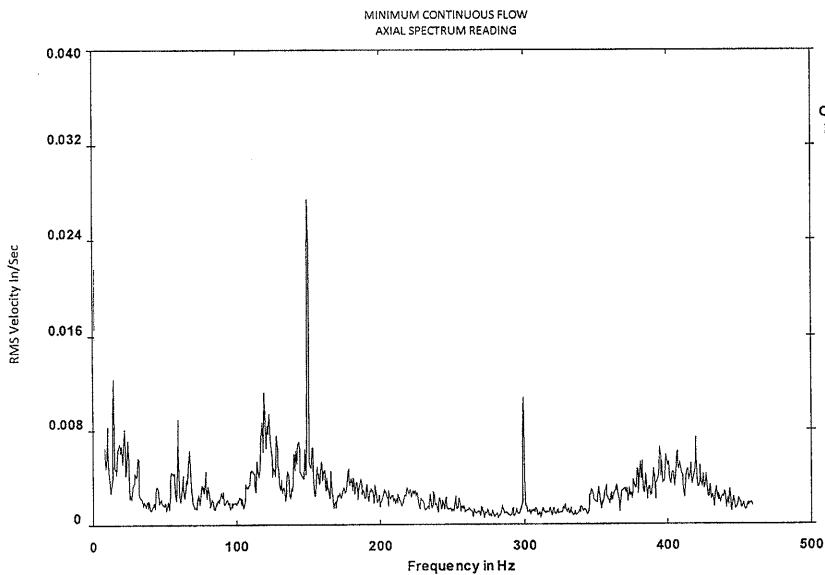
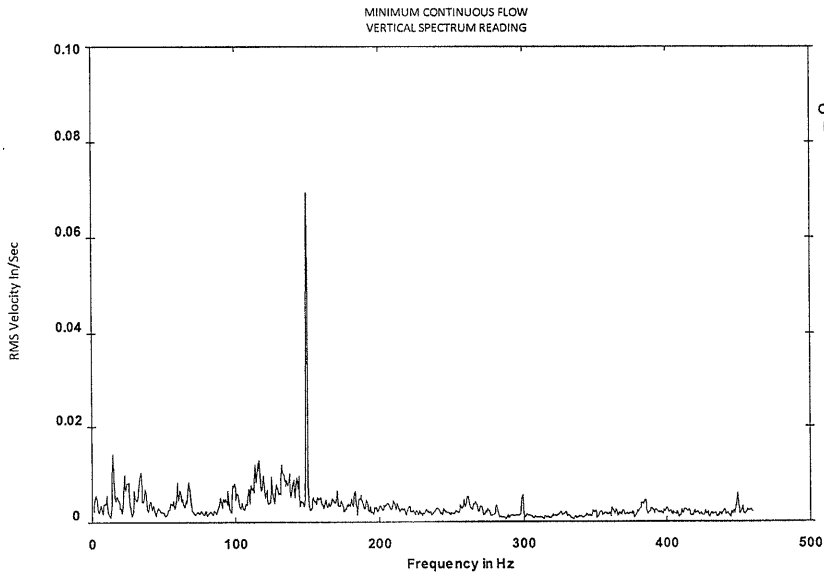
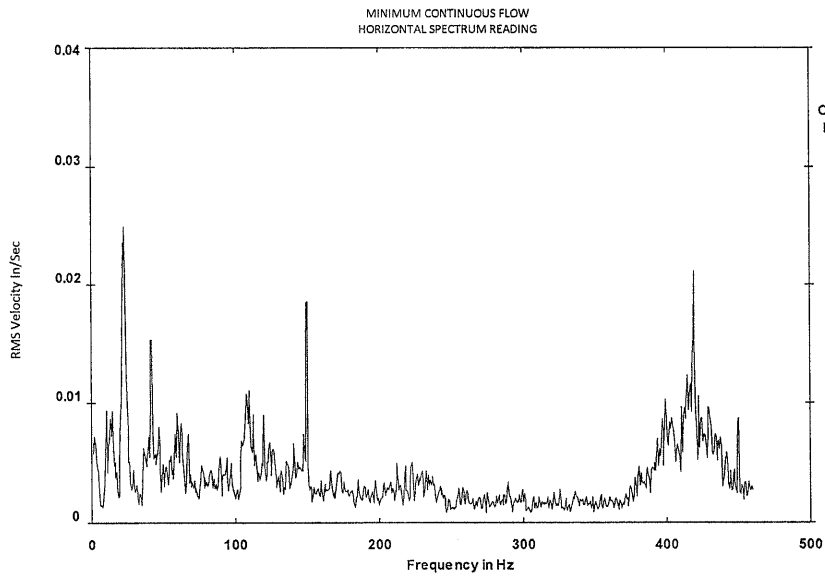
Brg Hsg NDE

RATED POINT

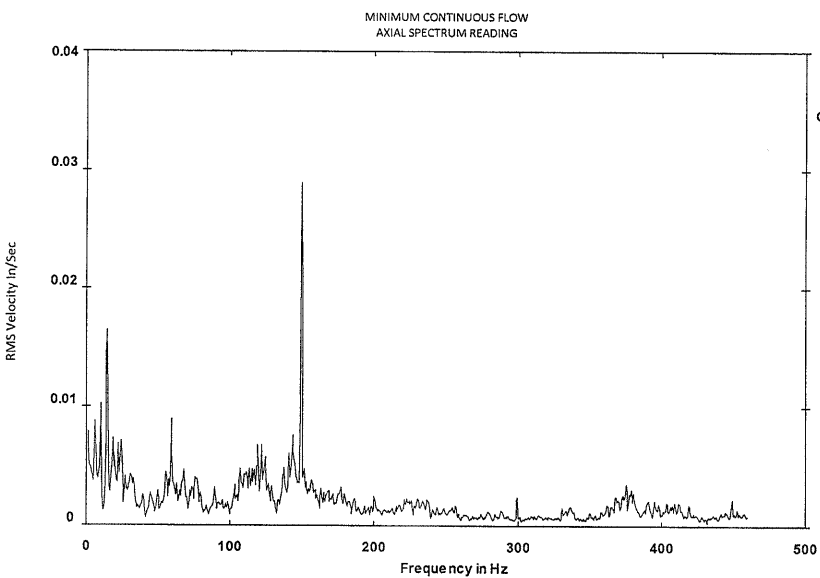
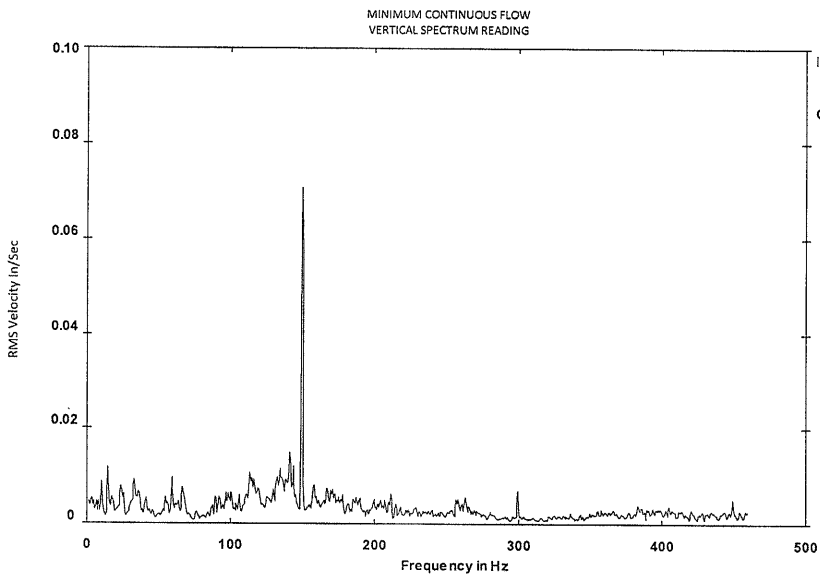
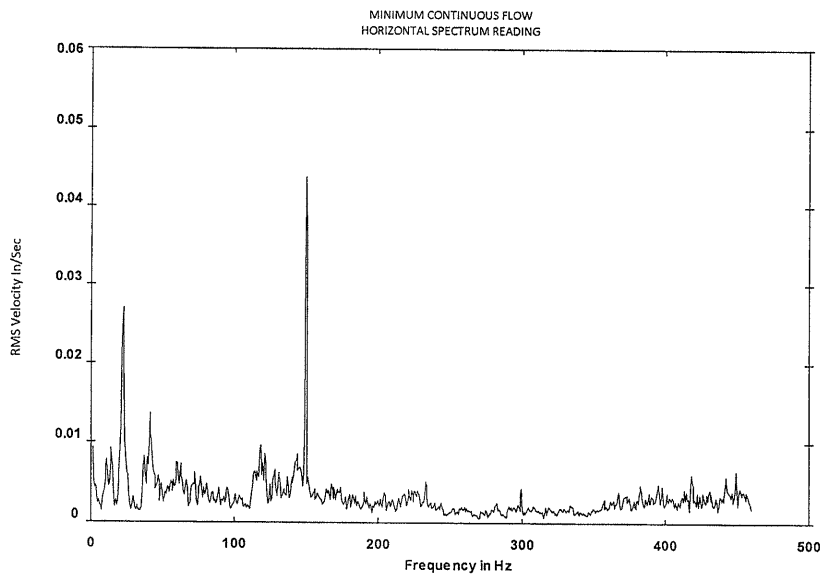
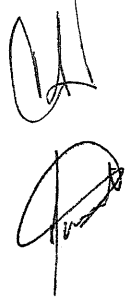
SULZER		Dibujo No. Drawing-No.		No. Orden 100209046-0020-02	
Curva de Prueba Test Curve M-11440		Impulsor Impeller	0-104224329	P204505132001	Sulzer Comm.Nr.
Cliete Customer	KP ENGINEERING	Difusor Diffuser	0-104224221	P204505008200	Tipo Type 10x14x21M BBS-SC
Orden Compra Order No.	J1422-B-009	Gehäuse Casing			
No. Identif. Ident No.	010-P-280 B	D2 Diseño. D2 design.	Ø 19.60"	Venas. Vane	Ø 19.60"
No. Serie. Serial No.	537285	D2 min. D2 min.	Ø 16.81"		
Nombre Name	REYNA	D2 max. D2 max.	Ø 21.00"		
Fecha Date	18.07.2016	Reporte No. Test Report No.	262/16		
		n=	1792	1/min.	i= 1 Pasos Stages
		DN _s	14"		DN _d 10"



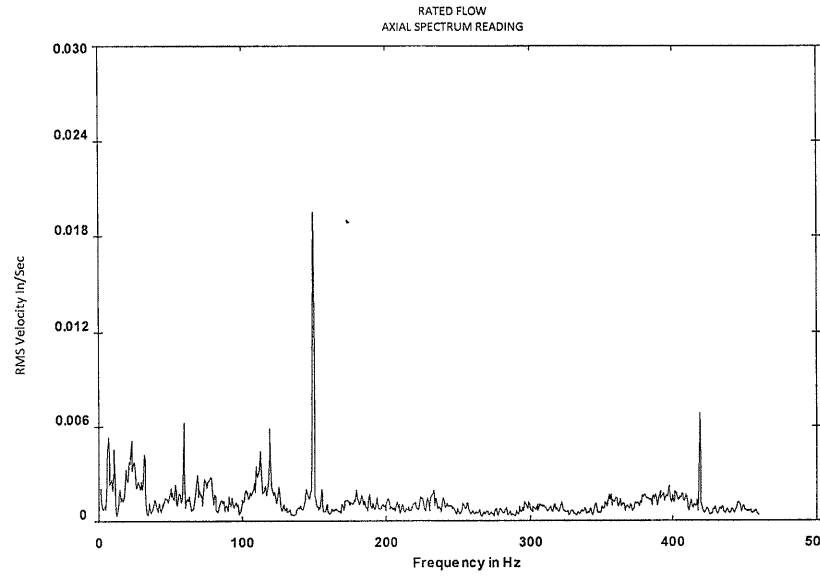
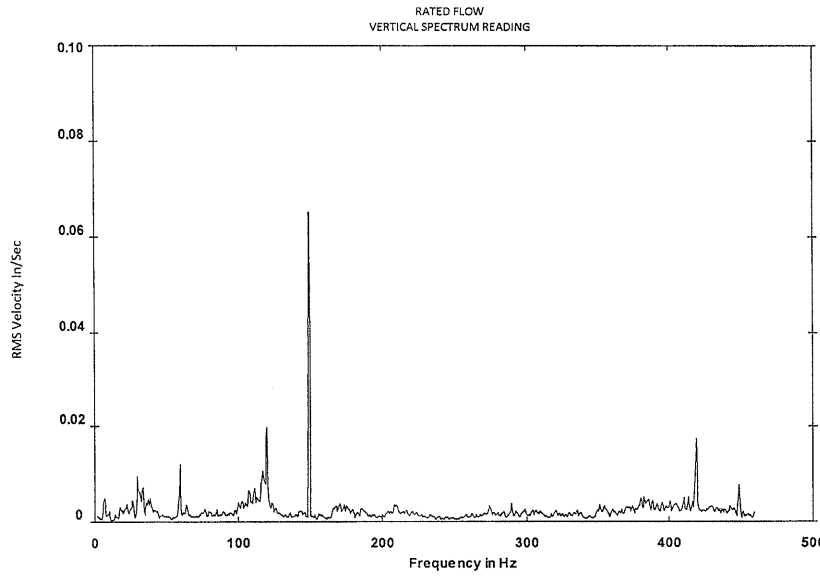
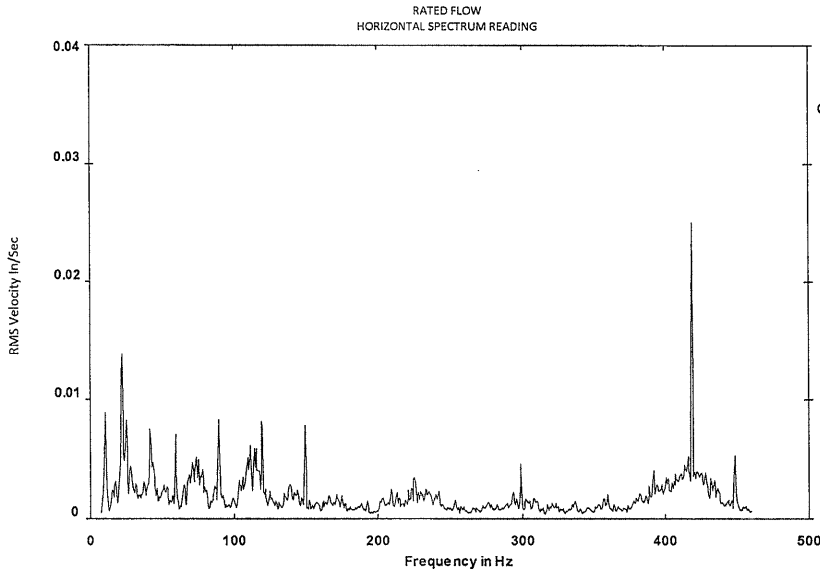
100209046-0020-02
10x14x21M BBS-SC
2088.60 USGPM
1794 RPM
DRIVEN END



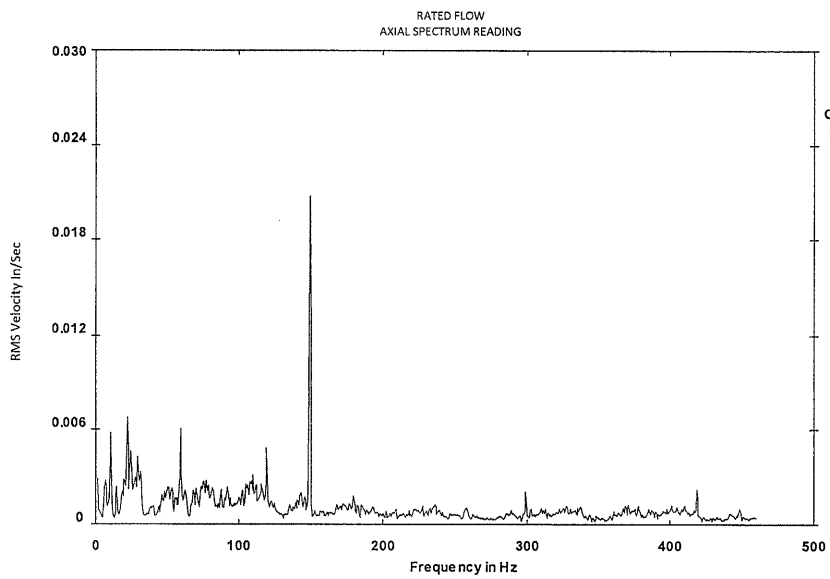
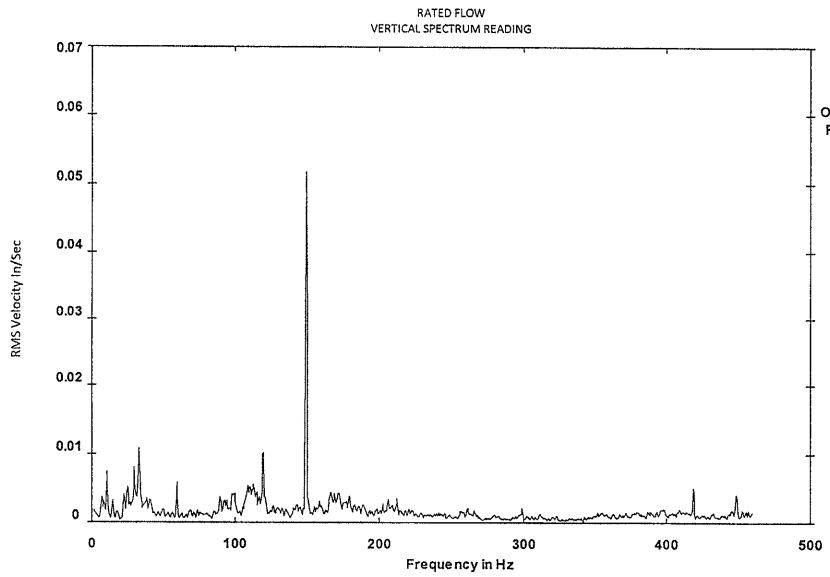
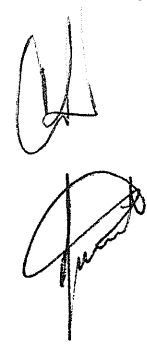
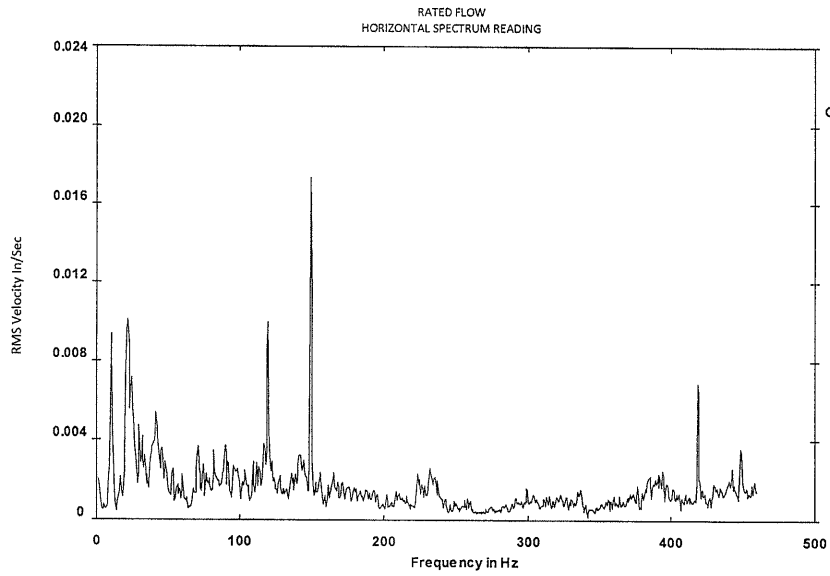
100209046-0020-02
10x14x21M BBS-SC
2088.60 USGPM
1794 RPM
NON DRIVEN END



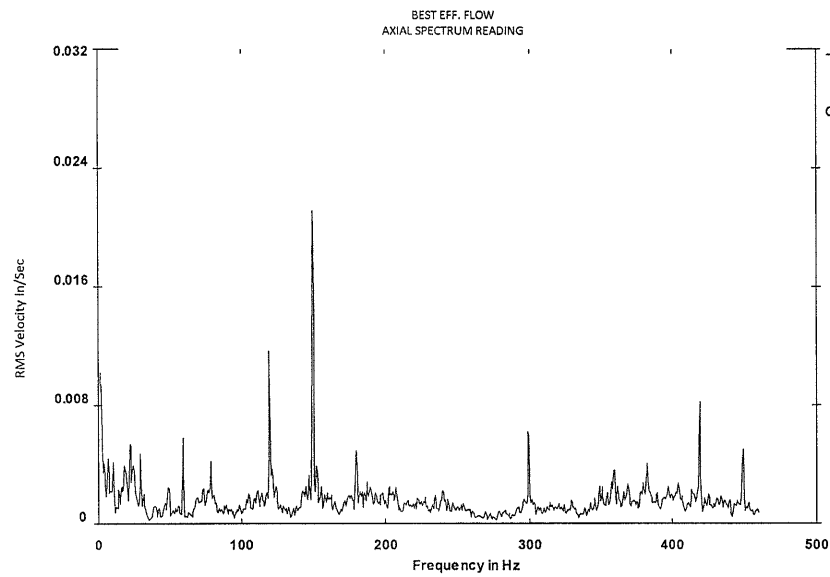
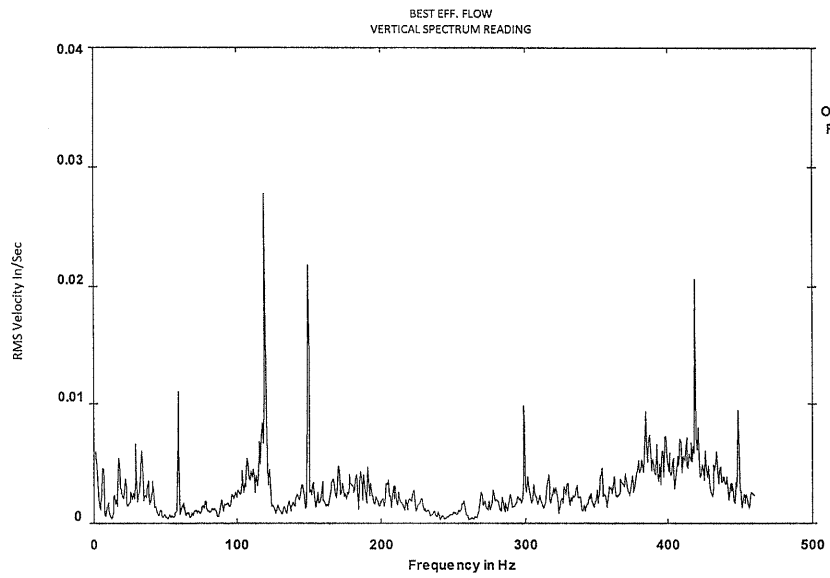
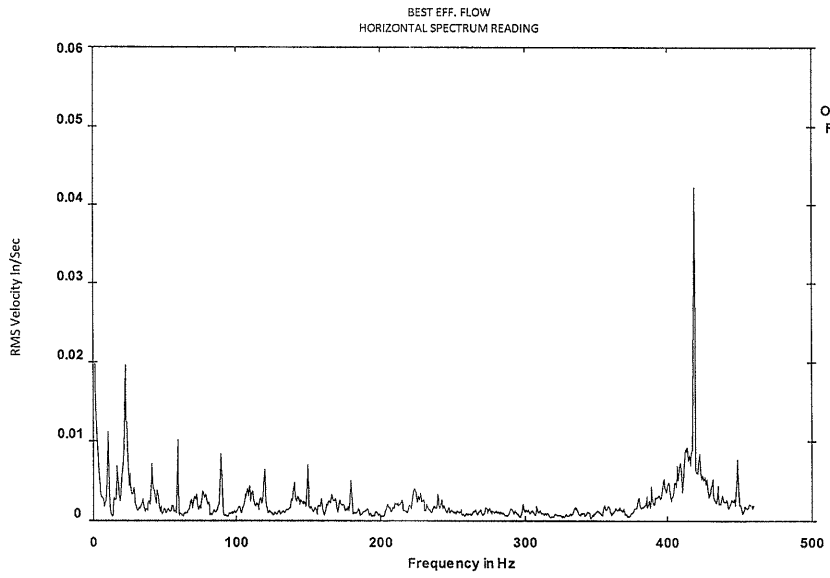
100209046-0020-02
10x14x21M BBS-SC
6395.99 USGPM
1794 RPM
DRIVEN END



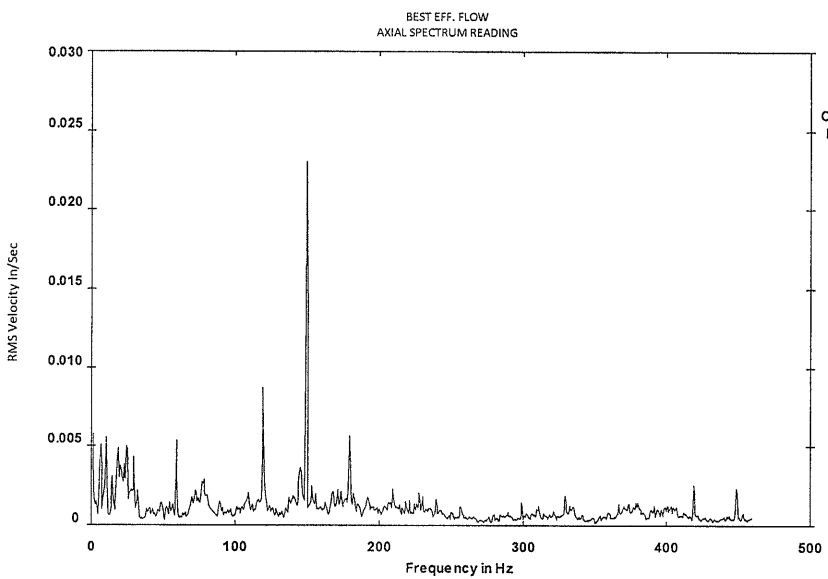
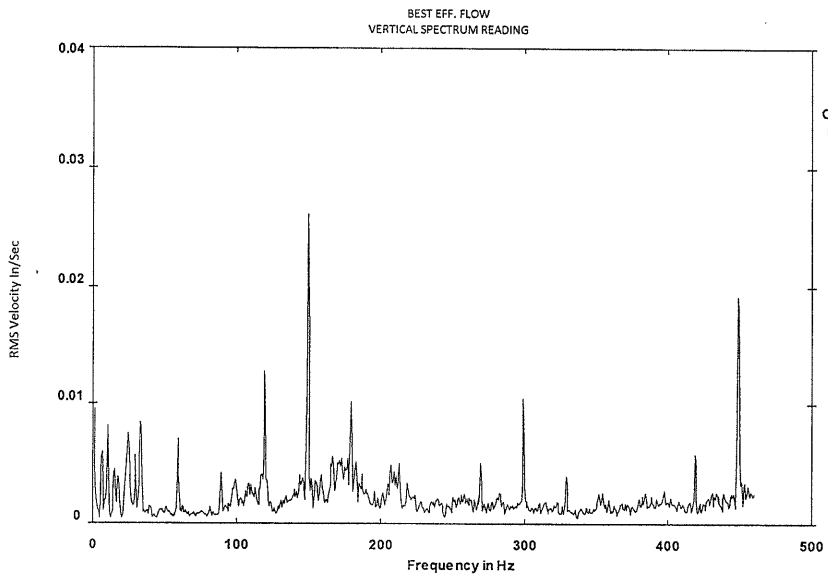
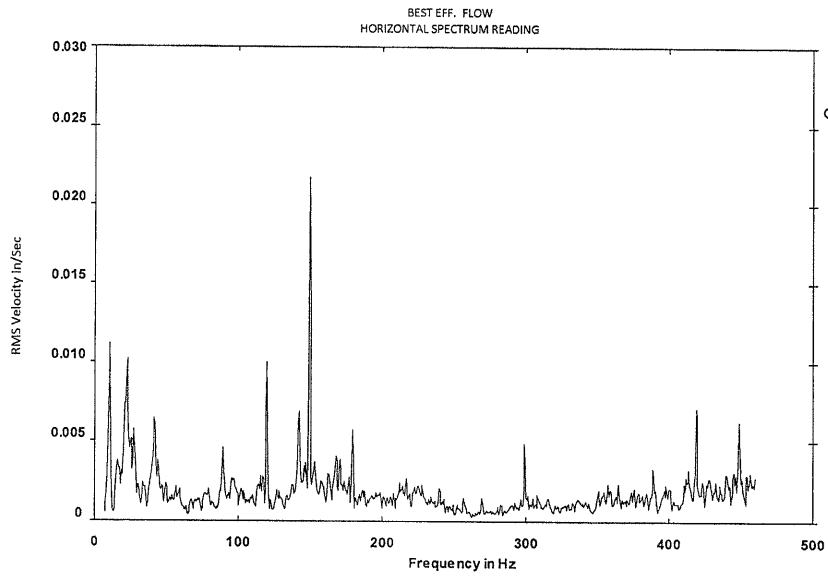
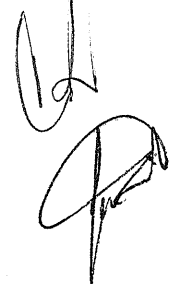
100209046-0020-02
10x14x21M BBS-SC
6395.99 USGPM
1794 RPM
NON DRIVEN END



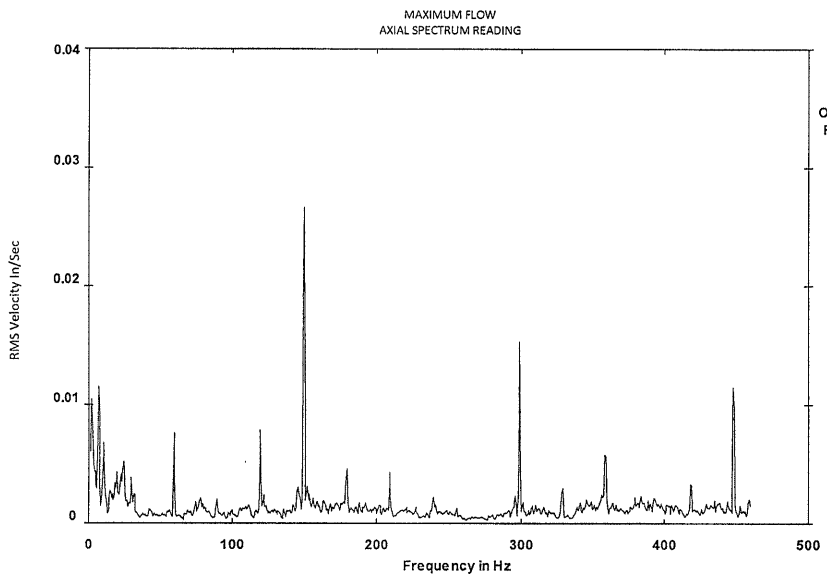
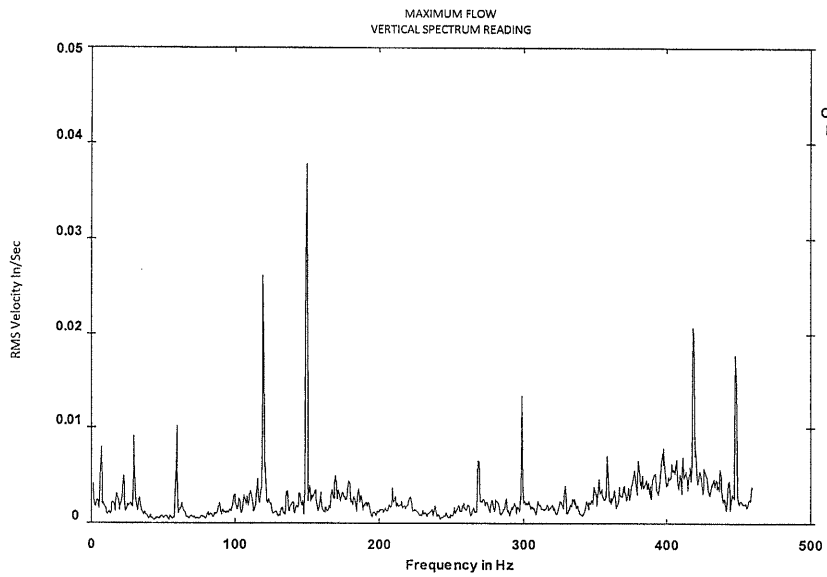
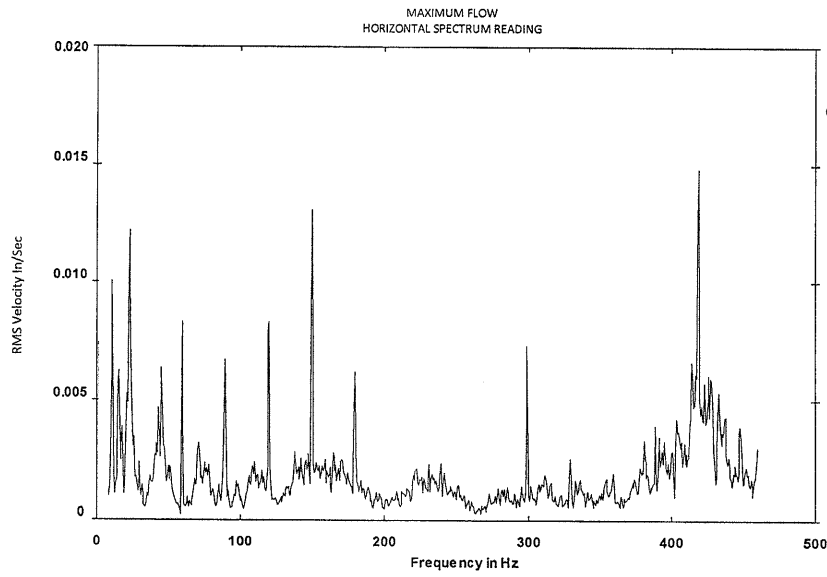
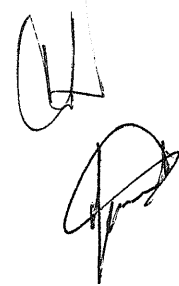
100209046-0020-02
10x14x21M BBS-SC
8186.60 USGPM
1793 RPM
DRIVEN END



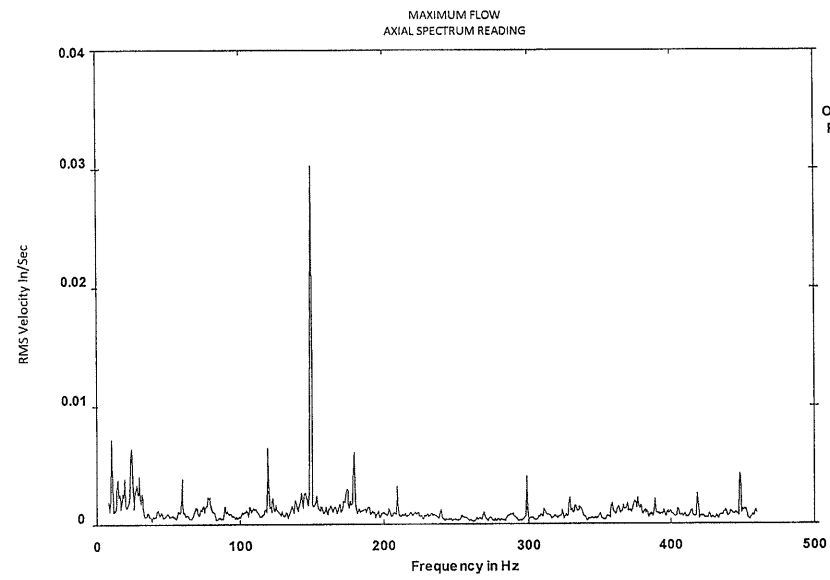
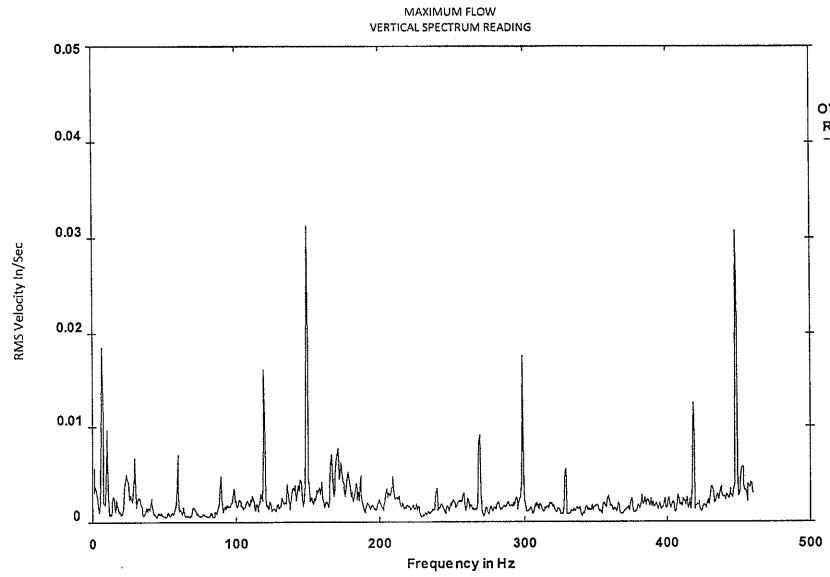
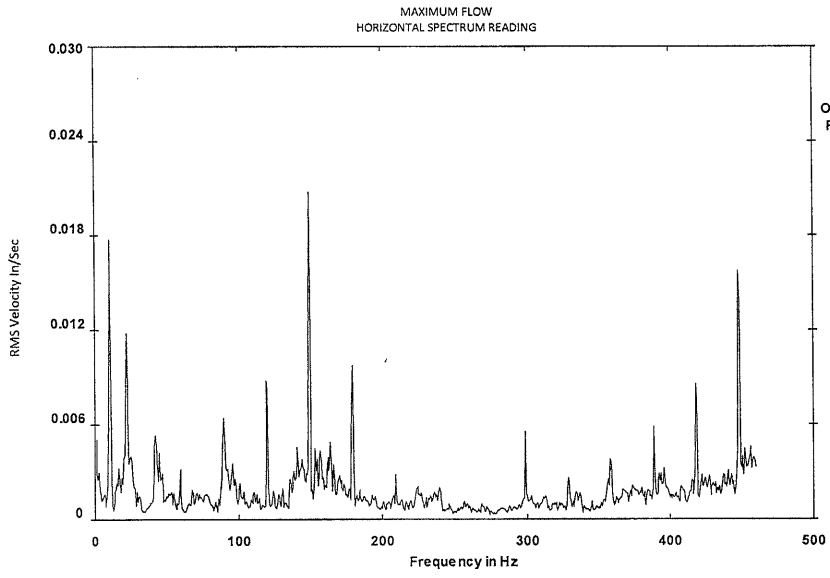
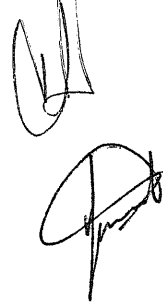
100209046-0020-02
10x14x21M BBS-SC
8186.60 USGPM
1793 RPM
NON DRIVEN END



100209046-0020-02
10x14x21M BBS-SC
9764.69 USGPM
1792 RPM
DRIVEN END



100209046-0020-02
10x14x21M BBS-SC
9764.69 USGPM
1792 RPM
NON DRIVEN END



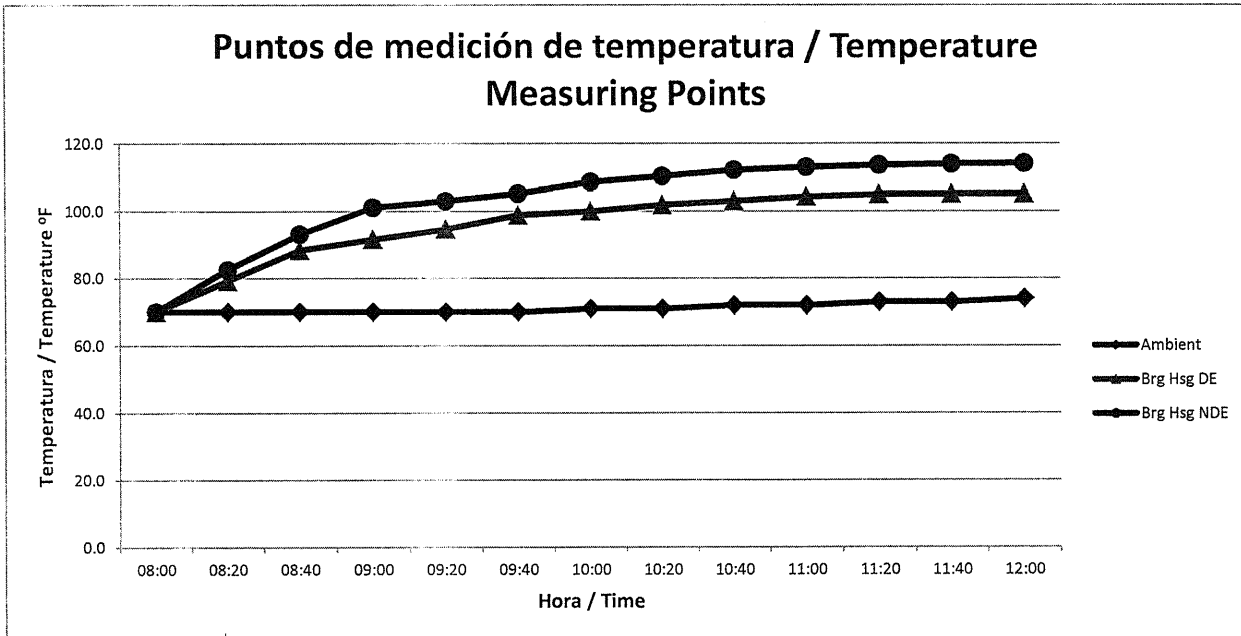
SULZER

Tipo: 10x14x21M BBS-SC
Item Cliente No:
Client's Item No: 010-P-280 B
Cliente/Destino: KP ENGINEERING

No. de Orden: 100209046-0020-02
Order No:
No. de Serie: 537285
Sulzer Serial. No.:
Curva No: M-11440
Curve No:

Reporte Prueba No.: 262/16
Test Report No.:

Puntos de medición de temperatura			
Temperature Measuring Points			
Hora: Time:	Ambiente	Soporte Extremo Accionado	Soporte Extremo no Accionado
	Ambient	Bearing Housing Driven End	Bearing Housing Non Driven End
	°F	°F	°F
08:00	70.0	70.0	70.0
08:20	70.0	79.2	82.5
08:40	70.0	88.4	93.2
09:00	70.0	91.7	101.2
09:20	70.0	94.7	103.1
09:40	70.0	98.9	105.3
10:00	71.0	100.0	108.7
10:20	71.0	101.9	110.4
10:40	72.0	103.1	112.2
11:00	72.0	104.3	113.1
11:20	73.0	105.0	113.7
11:40	73.0	105.1	114.0
12:00	74.0	105.1	114.2



Probado por: REYNA
Tested by:
Fecha: 18.07.2016
Date:

Testificado por: [Signature]
Witnessed by:
Fecha: [Signature]
Date:

F-BP-003