NORTHEAST ENERGY SYSTEMS
Power Systems Specialists

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Exhaust Components

4EA **EXHAUST SILENCER – HORIZONTAL MOUNT DESIGN.**
HARCO SUPER CRITICAL GRADE SIDE INLET / END OUTLET
SILENCER - MODEL 36132-VCS-14-SI.

SHIPPING
The Silencer will be shipped by truck and customer can be notified prior to shipment from factory
All other components are shipped loose and will be shipped UPS without notification
Customer to supply address for receipt of equipment

Boulden Energy Systems
Silencer Specifications Sheet - 01/17/12

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Customer Name : Northeast Energy Systems

Contact Name : Bob Culp

Job Reference : Nelson Gardens

Quote-Number : 1201-015 Reference Date : 01/17/12 Prepared By : Marc W. Boulden

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Engine : Jenbacher Biogas JGS320C82 Rated at 1059 K/W Operating at 1800 RPM.

Engine Exh-Flow = 8518 CFM Exh-Outlet Diam = 12.0 In Engine NA/TA = Turbo
Max Engine B/P = 23.6 In H2O Nbr Exh-Outlets = 1 Port Eng Pwr Levl = 1468 HP
Engine Exh-Temp = 954 °F Exh-Mass Flw = 13704 LB/HR

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Silencer Model : 36132-VCS-14-SI
Harco Super Critical Grade Model 36132-VCS-14-SI Side Inlet / End Outlet Silencer

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SILENCER DIMENSIONAL DATA	INLET/OUTLET DATA	OCTAVE BAND	INLET Db	Db REDUCTN	OUTLET Db
Silencer Diamtr = 36.0 In	Silencer Weight = 1650 Lbs	63 Hz	108.0 Db	23.0 Db	85.0 Db
Silencer Length = 132.0 In	Silencer Inlet = 14.0 In ASA	125 Hz	122.0 Db	29.0 Db	93.0 Db
	Silencer Outlet = 14.0 In ASA	250 Hz	118.0 Db	34.0 Db	84.0 Db
		500 Hz	114.0 Db	37.0 Db	77.0 Db
A-Weighted Exhaust Noise into Silencer at 3.3 Feet = 120.0 DbA		1000 Hz	113.0 Db	34.5 Db	78.5 Db
Broad Band Exh-Noise Insertion Loss Thru Silencer = 35.0 Dcbls		2000 Hz	114.0 Db	35.0 Db	79.0 Db
A-Weighted Exhaust Noise From Silencer at 3.3 Feet = 85.0 DbA		4000 Hz	112.0 Db	36.0 Db	76.0 Db
Estimated Back Pressure Loss Thru Exhaust Silencer = 8.9 In H2O		8000 Hz	110.0 Db	38.0 Db	72.0 Db

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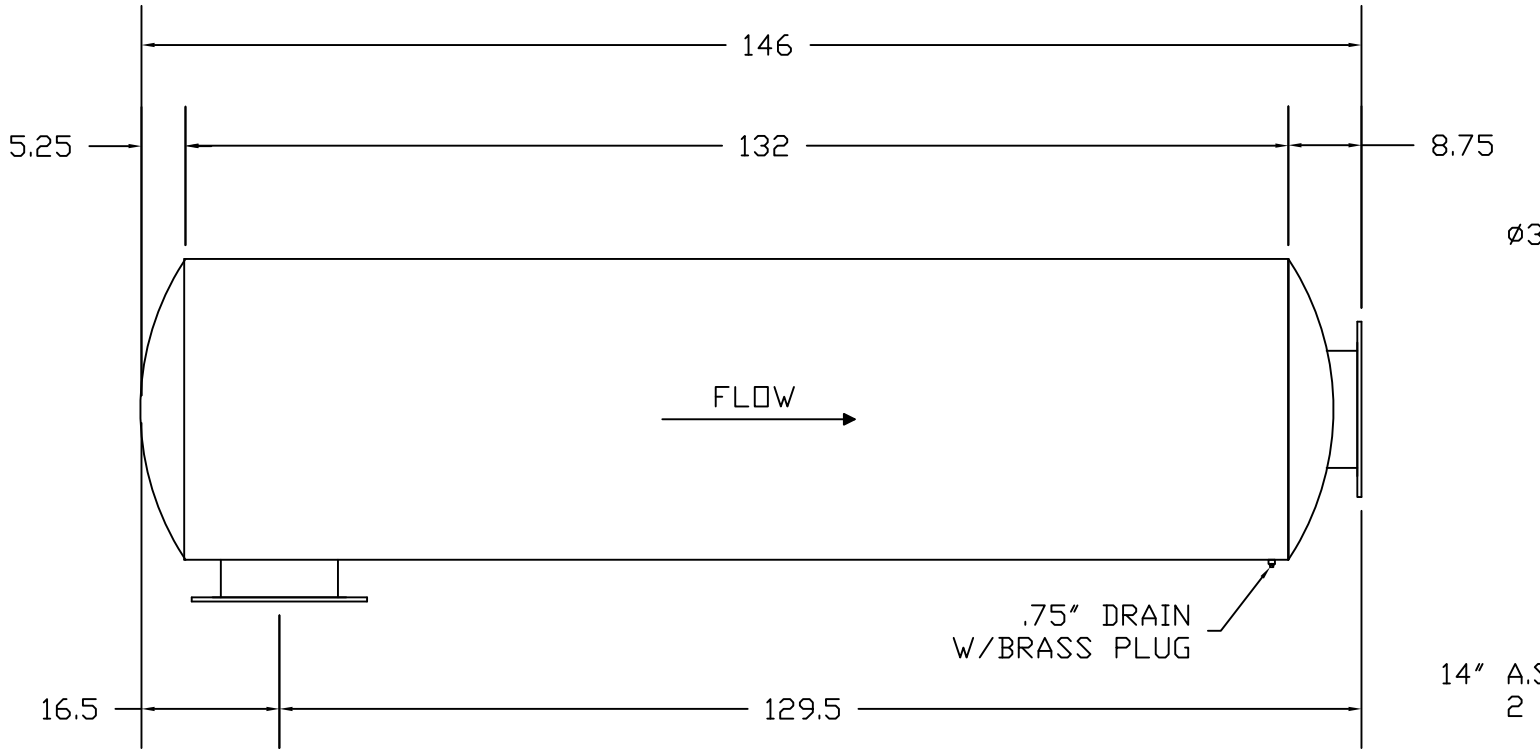
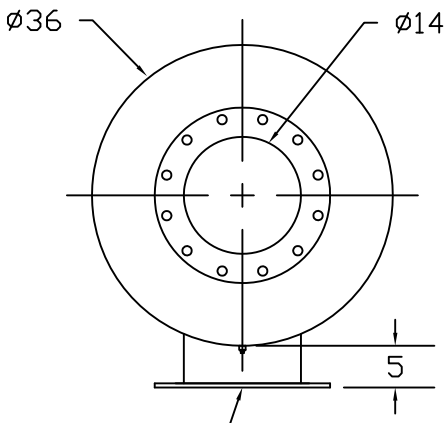
FLEX/PIPE DATA	PIPE RUN ONE DATA	PIPE RUN TWO DATA	* ALLOWABLE ADDITIONAL EXH-PIPE *		
Flex Diam = 12.0 In	Pipe Diam = 14.0 In	Pipe Diam = 14.0 In	PIPE-DIAM	MAX-LGTH	B/P / 10 FT
Flex Lgth = 18.0 In	Pipe Lgth = 0.0 Feet	Pipe Lgth = 0.0 Feet	10.0 In	129 Ft	1.13 In H2O
Nbr 90/45 = 0/0 Elbws	Nbr 90/45 = 0/0 Elbws	Nbr 90/45 = 0/0 Elbws	12.0 In	321 Ft	0.45 In H2O
Pipe Lgth = 0.0 Feet	Pipe B/P = 0.0 In H2O	Pipe B/P = 0.0 In H2O	14.0 In	694 Ft	0.21 In H2O
Flex B/P = 0.1 In H2O	Exhst-Vel = 7968 F.P.M	Exhst-Vel = 7968 F.P.M	16.0 In	1353 Ft	0.11 In H2O
Exhst-Vel = 10845 F.P.M			18.0 In	2438 Ft	0.06 In H2O
	Estimated Exhst System Back Pressure = 9.0 In H2O				

** OCTAVE BAND ADJUSTMENT **	**** CALCULATION OF A-WEIGHTED ENGINE EXHAUST NOISE WITH SILENCER ****
63 Hz : 85.0 - 27.5 = 57.5	80.0 »
125 Hz : 93.0 - 17.0 = 76.0	78.5 |=> 80.0 + 2.0 = 82.0 »
250 Hz : 84.0 - 9.0 = 75.0	77.0 » |
500 Hz : 77.0 - 3.5 = 73.5	76.0 |=> 77.0 + 2.5 = 79.5 |=> 82.0 + 2.0 = 84.0 »
1000 Hz : 78.5 - 0.0 = 78.5	75.0 » |=> 84.0 + 1.0 = 85.0 DbA @ 3.3 Ft
2000 Hz : 79.0 + 1.0 = 80.0	73.5 |=> 75.0 + 2.0 = 77.0 |=> 77.0 + 1.0 = 78.0 »
4000 Hz : 76.0 + 1.0 = 77.0	70.5 » |
8000 Hz : 72.0 - 1.5 = 70.5	57.5 |=> 70.5 + 0.0 = 70.5 »

REV	DATE	REVISION	BY



OUTLET VIEW



14" A.S.A. FLG
2 PLACES
21" O.D.
18.75" B.C.
WITH 12-1.125ø HOLES THRU
EQUALLY SPACED

NOTES:

1 MATERIAL: CARBON STEEL

2 PAINTED WITH HIGH TEMP
PAINT AND PRIMER

ENGINE:	CFM:	FPM:	KW:	WT: 1872 Lbs	PRESSURE DROP H20

UNLESS OTHERWISE SPECIFIED-
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES ARE:
.XXX± .010 ANGLES± 1/2°
.XX± .030 SURFACE FINISH
.X± .062
FRACTIONS ± MAX.

HAPCO ENGINE PRODUCTS
HARCO MANUFACTURING CO.
1000 INDUSTRIAL PARKWAY,
NEWBERG, OR, 97132-7071, USA
(503)537-0600 FAX(503)537-0601

APPROVALS	DATE
DRAWN MJB	01/04/06
CHECKED	
APPROVED	

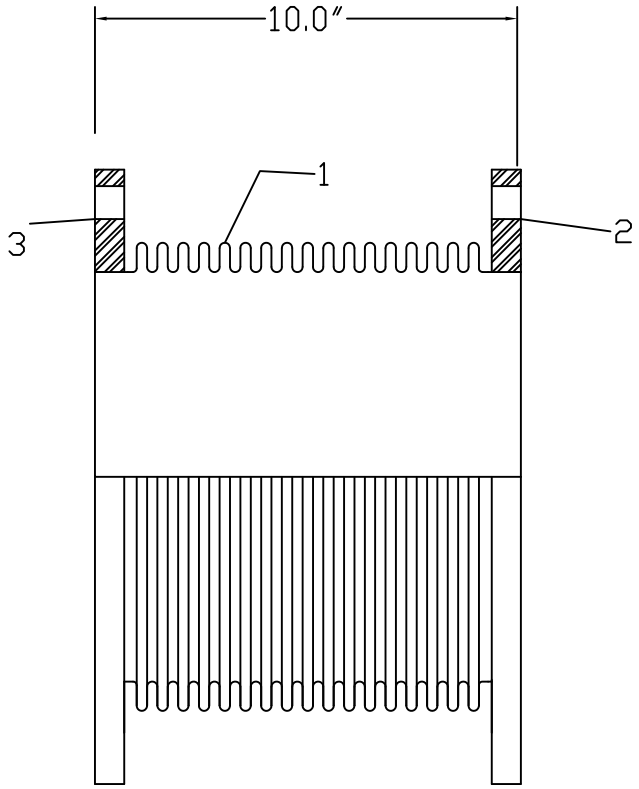
TITLE
SUPER CRITICAL GRADE
36132-VCS-14-SI

SCALE 1:26	CAD NO. #214A-1	SHEET
PLOTTED	DWG. NO.	A

ITEM	QTY	DESCRIPTION

CUSTOMER APPROVED DWG:

ALL DIMENSIONS IN INCHES



REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

GENERAL NOTES:

A. DESIGN:
- INTERNAL PRESSURE = 5 PSIG
- TEMPERATURE = 1050°F
- AXIAL COMPRESSION = 3.0" OR
- LATERAL OFFSET = 0.375"
- NON-CONCURRRENT

B. ALL WELDING SHALL BE IN ACCORDANCE WITH: ASME SECTION IX.

C. BELLOWS MADE IN ACCORDANCE WITH: EXPANSION JOINTS MANUFACTURERS ASSOCIATION INC 5TH EDITION

ITEM	QTY	DESCRIPTION	MATERIAL
3	1	FLANGE, 14"-125/150# X 1/2" THK.	A 36
2	1	FLANGE, 14"-125/150# X 1/2" THK.	A 36
1	1	BELLOWS, 14" I.D. X 1 PLY	A 240 T321

BILL OF MATERIAL

DME INCORPORATED
14001 MARQUARDT AVE, SANTA FE SPRINGS , CA 90670
TEL: (562) 921 - 0464 FAX: (562) 802 - 7489

AGENT: BOULDEN ENERGY
JOB#
EXHAUST SERVICE

EXPANSION JOINT

DESIGN: DJM	CATALOG	SIZE	DWG NO.	REV
APPROVED BY: DJM	12-22-00	SCALE NONE	DATE 12-22-00	SHEET
DWG: P.K.	12-22-00			

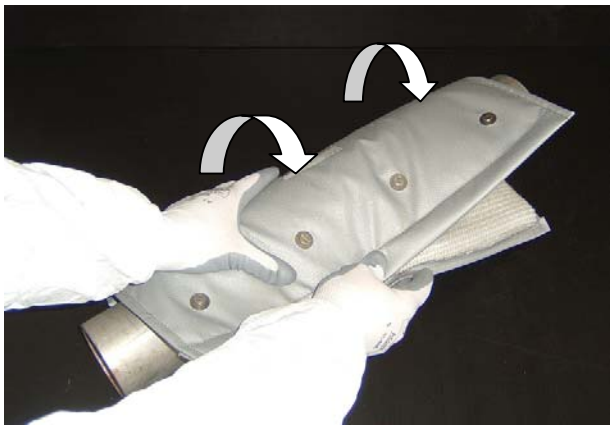
Firwin Corp., 1685 Flint Road, North York, ON M3J 2W8 Canada
Tel: 416.745.9389 • Fax: 416.745.0782 • www.firwin.com

GENERAL INSULATION BLANKET INSTALLATION INSTRUCTIONS

TO INSTALL FIRWIN INSULATION BLANKETS YOU WILL NEED:

- **STAINLESS STEEL WIRE (SUPPLIED)**
- **GLOVES**
- **PLIERS AND OR SIDE CUTTERS**

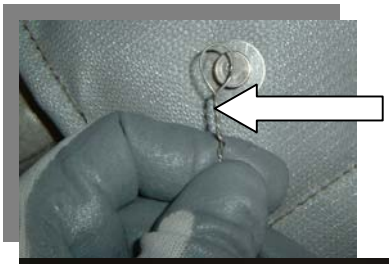
MAKE SURE YOU KNOW WHERE EACH BLANKET GOES BEFORE INSTALLING.

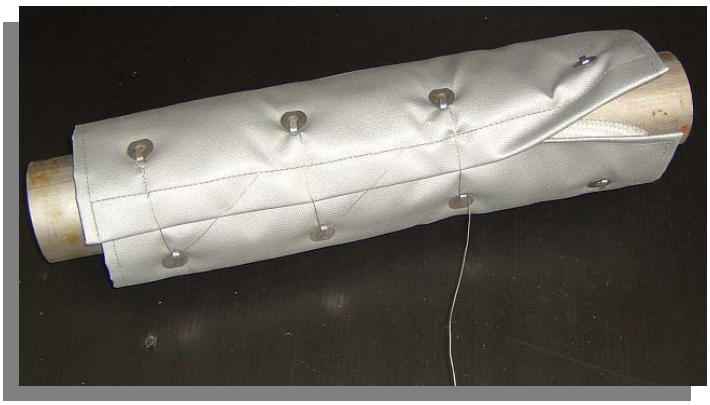


WRAP THE BLANKET AROUND THE PIPE (PART). FORM AND COMPRESS THE BLANKET WHILE WORKING TO CLOSE THE SEAM.

FORM A LOOP IN THE WIRE AND HOOK IT AROUND THE FIRST RIVET/HOOK. LACE THE WIRE ACROSS THE BLANKET TO CLOSE THE SEAM.

ON LONGER BLANKET SECTIONS, TEMPORARY TIES OR STARTING THE BLANKET IN THE MIDDLE WILL HELP.





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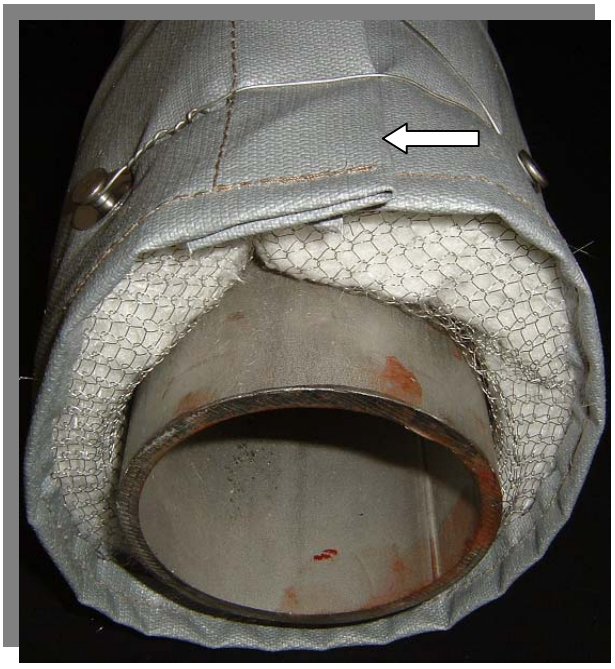

BE SURE TO OVERLAP THE SEAM WITH THE FLAP. THE INSULATION SHOULD MEET AND FORM A COMPLETE LAYER AROUND THE PART.

THE OUTER MATERIAL SHOULD NOT COME IN DIRECT CONTACT WITH THE HOT SURFACE.

DO NOT ALLOW OIL OR FUEL TO LEAK INTO THE BLANKET.

BE SURE TO INSPECT THE BLANKETS ON A REGULAR BASIS.

FIRWIN INSULATION BLANKETS ARE AVAILABLE FOR MANY DIFFERENT APPLICATIONS:

- **MANIFOLDS**
- **TURBOS**
- **ELBOWS**
- **FLANGES**
- **SILENCERS**
- **FLEX JOINTS**

OPTIONAL INSTALLATION WITH "WIRE TWIST PLIERS"

Firwin Corp., 1685 Flint Road, North York, ON M3J 2W8 Canada
Tel: 416.745.9389 • Fax: 416.745.0782 • www.firwin.com

INSULATION BLANKETS ARE A "WEAR" ITEM. JUST LIKE THE BRAKE PADS ON YOUR CAR, THEY WILL WEAR OUT OVER TIME.