

36

**Pennsylvania Technical Advisory Committee
On Diesel Powered Equipment**

Stanley R. Geary
(724) 625-2936 (Home)
(717) 233-7900 (Office)
Email: srgeary@comcast.net

Ron Bowersox
(724) 726-8987 (Home)
(724) 479-8692 (Office)
Email: umwarbowersox@yahoo.com

January 11 March 24, 2006

Joseph Scaffoni, Director
Bureau of Deep Mine Safety
Fayette County Health Center
100 New Salem Road, Room 167
Uniontown, Pa. 15401

RECEIVED

MAR 30 2006

BUREAU OF MINE SAFETY

RE: Rohmac, Inc. Isuzu C240. 52 hp Diesel Power Package

Dear Mr. Scaffoni:

Article II-A of the Pennsylvania Bituminous Coal Mine Act of 1961 provides for the use of diesel-powered equipment in underground bituminous coal mines. Section 224-A of the act created a Technical Advisory Committee ("TAC") for the purpose of advising the Department regarding implementation of Article II-A.

Background

On September 21, 2005, Rohmac Inc. submitted a request to the Bureau of Deep Mine Safety (BDMS) for approval of an Isuzu C240, 52 hp Diesel Power Package pursuant to Article II-A of the act. On October 3, 2005, the Director of BDMS requested the TAC to evaluate the diesel power package and to advise the Department regarding the TAC's recommendation as to whether the diesel power package meets the requirements of Section 203-A (3) of the act for approval of an exhaust emissions control and conditioning system for multiple diesel engine applications.

The Diesel Power Package includes the following items:

- Isuzu C240, 52 hp (naturally aspirated) diesel engine (MSHA Approval No. B086)
- Emissions Control System - Rohmac Paper Filter Water Cooler (PFWC) which includes:
 - CleanAir Systems Inc. Oxidation Catalyst
 - Rohmac wet bed exhaust cooler
 - ENK Particulate filter (MSHA efficiency rating 95%)

Copies:
AG orig mmc
JAS
WJB
ALM

Investigation

On November 22, 2005, we traveled to the Rohmac facilities to perform emissions testing of the engine and after-treatment system, as well as exhaust gas temperature monitoring and stall test procedure. Following are the results of that testing.

Emission testing of the engine and after-treatment system was performed by the BDMS on November 21, 2005, and by the TAC on November 22, 2005. The results were similar and as such we have included a copy of the BDMS's test results with this recommendation (Attachment 1). The results of the emission tests showed the engine was performing within MSHA's approval specifications.

We also monitored the exhaust gas temperature during the emissions test. This monitoring produced a high exhaust gas temperature reading of 144° F, which is well below the 302° F allowed by Section 203-A (b)(4) of Article II A. It is our belief that the Rohmac PFWC will maintain the exhaust gas temperature well below the required 302° F.

The after-treatment system is fitted with an ENK disposable filter. The filter is rated by MSHA at a 95% capture rate, which meets the requirements of Section 203-A (b)(1) of Article II-A. The engine and filter extrapolations show that the Diesel Power Package will emit .042 mg/m³ of diesel particulate matter, which is well below the .12 mg/m³ requirement of Section 203-A (a)(1) of Article II-A.

The Diesel Powered Package can sustain the emissions test as described in Sections 217-A and 218-A of Article II-A and as such will not require an alternate emissions test.

In a letter dated December 14, 2005, from Rohmac, Inc. to the Department, Rohmac, Inc. advised the Department that the high exhaust temperature warning indicator will be set at 185 degrees Fahrenheit and the engine will automatically shut down if the exhaust gas temperature reaches 212 degrees Fahrenheit. Also, at the request of the TAC, Rohmac, Inc. will equip equipped the exhaust emissions control and conditioning system with a spark arrestor system and a flame arrestor system. In addition, Rohmac, Inc. installed a low water level switch in the exhaust coolant water tank that will shut down the engine when the water level reaches approximately 3^{1/2} inches.

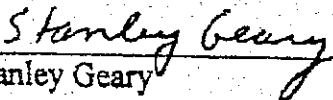
On March 24, 2006, the TAC visited the Cumberland Mine Number 1 Portal shop area to inspect the Diesel Power Package again. The primary purpose of this visit was to observe operation of the low water level switch in the exhaust coolant water tank and to inspect the spark arrestor and flame arrestor system. A demonstration of the operation of the low water switch established that it is effective to shut down the diesel engine if the water level in the exhaust coolant water tank reaches a level of approximately 3^{1/2} inches. The Enardo 803IL with a stainless steel arrestor element and the manner in which it has been installed meets the requirements of the act for a flame arrestor and spark arrestor system.

On its March 24, 2006 visit the TAC also observed demonstrations of operation of the engine shut off switches for low compressor oil pressure and for high compressor air temperature.

In addition to the testing that was conducted, our investigation and our observations on November 22, 2005 and March 24, 2006, confirmed that the Diesel Power Package is capable of meeting all the requirements of Section 203-A of Article II-A of the Pennsylvania Bituminous Coal Mine Act.

Recommendation

Our recommendation is based upon the data supplied by Rohmac, Inc., the Bureau's November 21, 2005 test results, as well as the data acquired and observations made during our investigation. The TAC has determined that the Isuzu C240 (52hp) naturally aspirated diesel engine and Rohmac PFWC meets all requirements of Section 203-A of Article II-A of the Pennsylvania Bituminous Coal Mine Act. As such, we are recommending approval of the above described Diesel Power Package. This recommendation is provided with the understanding that the General Specification Sheet (Attachment 2) be strictly adhered to. Also, because the Diesel power Package may be utilized with various types of equipment, other safeguards may be required when the power package is installed on each particular piece of equipment.


Stanley Geary


Ron Bowersox

January 17, 2006

General Specification Sheet Continued

Emissions Control System Exhaust Cooler

Manufacturer	Rohmac, Inc
Manufacturer Address	1947 Wilson Corona St. Oakland Md.
Model No.	PFWC
Type	Exhaust Water Cooler

Oxidation Catalyst

Manufacturer	CleanAir Systems Inc
Manufacturer Address	4379 Center Place Santa Fe, NM. 87507
Model No.	CPD 0466 BCCN40MM
Type	Platinum coated DOC

Particulate Filter

Manufacturer	ENK Industrial & Battery CO. INC.
Manufacturer Address	4420 Veterans Memorial Dr. Fairfield, Al. 35064 Ed Molish-(205- 786-4566
Model No.	ENK Part. No. 25-19175-7197
Type	Disposable

March 24, 2006

General Specification Sheet

Engine

Manufacturer	Isuzu
Manufacturer Address	Plymouth, Michigan
Model Number	C240
Rated Horsepower / RPM	52 hp. @ 3000 rpm
Max Torque / RPM	101 ft. lbs. @ 2000 rpm
Clean Intake Restriction (H₂O)	10" wg
Max Intake Air Restriction (H₂O)	25" wg
Max. Allowed Backpressure (H₂O)	41" wg
Low Idle (RPM)	700 rpm
High Idle (RPM)	3260 rpm
Particulate Index (PI)	2500 CFM
MSHA Gaseous Ventilation Rate (CFM)	3000CFM
Raw DPM	3.51 g/hr
MSHA 7E Approval Number	B086
Est. Ambient Level w/ after-treatment (Mg/m³)	0.042 mg/m ³
Type of Aspiration	NA
Fuel delivery System	Mechanical
Est. Untreated CO (ppm)	110 ppm
Exhaust Gas Temp (As Per Department and TAC Request)	Warning (185° F) Shut Down (212 ° F)