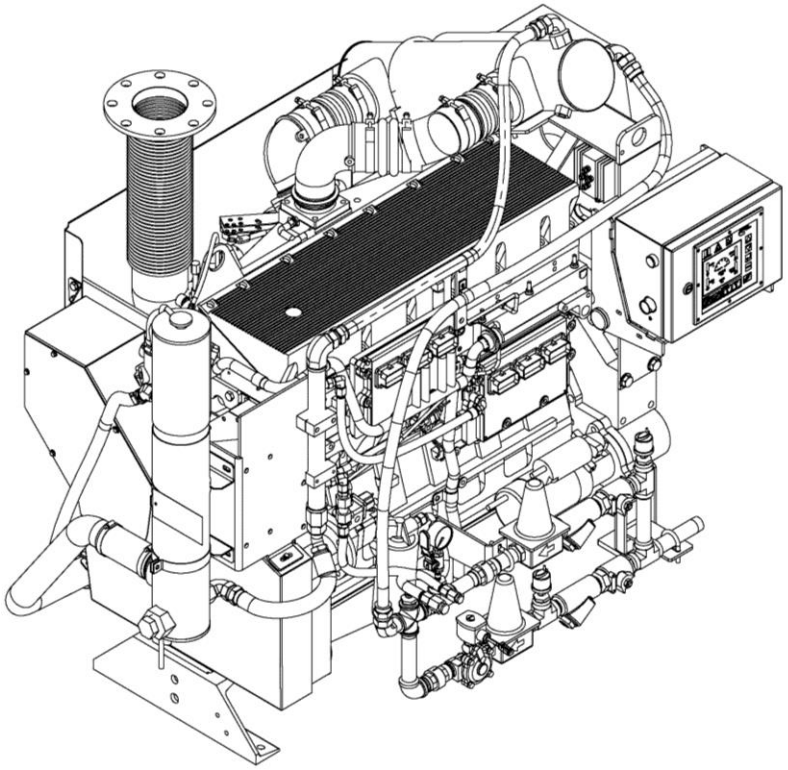
Engine Specification Sheet

Cummins Fire Power
De Pere, WI 54115
http://www.cumminsfirepower.com

Basic Engine Model
CFP11E- F20

Curve Number: **FR - 20091**
Revision Date: **June 2014**



Operating Speed (RPM)

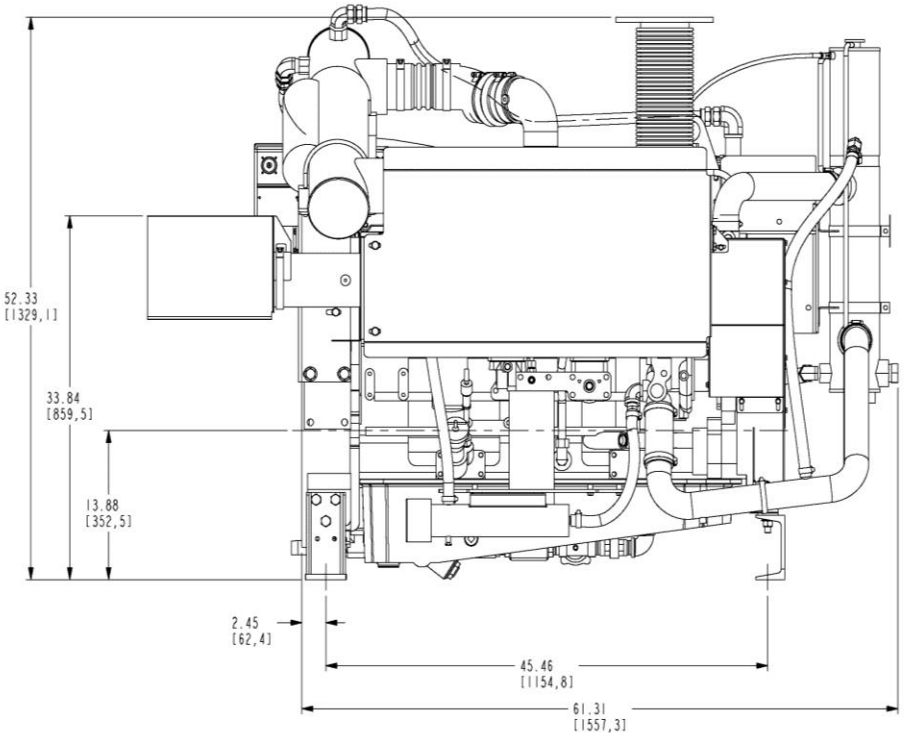
Model	1470	1760	2100
CFP11E-F20	347 (259)	401 (299)	345 (257)

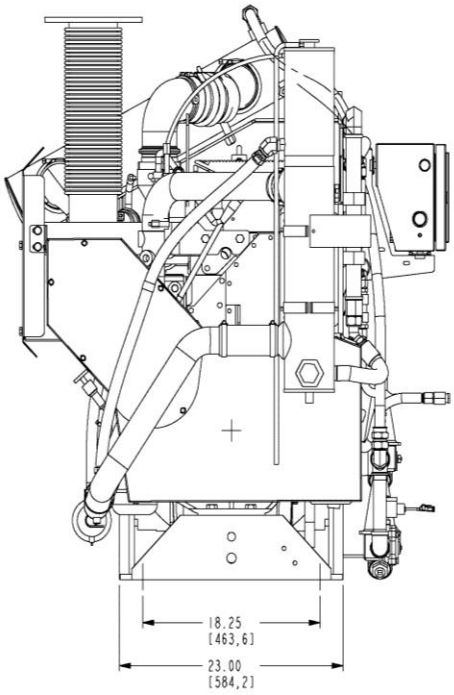
Ratings are: HP (kW)

Specifications

Aspiration	Turbocharged and Charge Air Cooled
Rotation	Counterclockwise from flywheel end
Weight - lb (kg) Est	2700 (1215)
Displacement - in^3 (litre)	660 (10.8)
Engine Type	4 Cycle; In-Line, 6 Cylinder
Engine Series	Cummins QSM11 Series
Exhaust Emissions	EPA/CARB Tier 2

Equipment	Standard	Optional
Air Cleaner	Disposable, Treated for High Humidity, Indoor Service	Heavy Duty, 2 stage with replaceable elements.
Alternator	24V-DC, 70 Amps, with Belt Guard	N/A
Cooling Loop (Maximum Pressure of 350 PSI)	1" diameter for Fresh Water. With alarm sensors and FM Approval.	Cu Ni construction available for sea water application.
Exhaust Protection	Metal Guards on Manifolds and Turbo	N/A
Exhaust Flex Connection	SS Flex, NPT	SS Flex, 150# Flange
Flywheel Power Take-Off	Flywheel	●Drive Shaft System ●Stub Shaft
Fuel Connections	Fire Resistant Flexible Supply and Return Lines	N/A
Fuel Injection	Direct Injection	N/A
Fuel Filter	Primary Filter with Priming Pump	N/A
Engine Heater	120V-AC, 2250 Watts	240V-AC, 2250 Watts
Governor, Speed	Constant Speed	N/A
Heat Exchanger	Tube & Shell Type, 60 PSI with NPTF Connections	N/A
Instrument Panel	Digital, NEMA 4X, English and Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure & Two (2) Voltmeters	Optional 316SS Construction, Custom gauges with expansion module
Junction Box	Integral with Instrument Panel; For DC Wiring Interconnection to Engine Controller	N/A
Lube Oil Cooler	Engine Water Cooled, Plate Type	N/A
Lube Oil Filter	Full Flow with By-Pass Valve	N/A
Lube Oil Pump	Gear Driven	N/A
Manual Start	On Instrument Panel	N/A
Overspeed Controls	Electronic with Reset & Test on Instrument Panel	N/A
Raw Water Solenoid Operation	Automatic from Engine Controller & from Emergency Local Control	N/A
Run-Stop Control	On Instrument Panel	N/A
Run Solenoid	24V-DC	
Starters	24V-DC	
Throttle Control	Adjustable Speed Control	N/A
Water Pump	Poly-Vee Belt Drive with Guard	N/A





Engine Ratings Baselines

- Engines are rated at standard SAE conditions of 29.61 in. (7521 mm) Hg barometer and 77°F (25°C) inlet air temperature (approximates 300ft. (91.4 m) above sea level) by the testing laboratory (see SAE Standard J1349).
- A deduction of 3 percent from engine horsepower rating at standard SAE conditions shall be made for diesel engines for each 1000 ft. (305 m) altitude above 300 ft. (91.4 m).
- A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 10°F above 77°F (24°C) ambient temperature.

Certified Power

This Cummins Fire Power fire pump driver is built to comply with NFPA-20, and is UL listed and FM approved.

For additional information, click the hyperlinks below.

CFP11E-F20

Engine Performance Curve

Cummins Fire Power
De Pere, WI 54115
http://www.cumminsfirepower.com

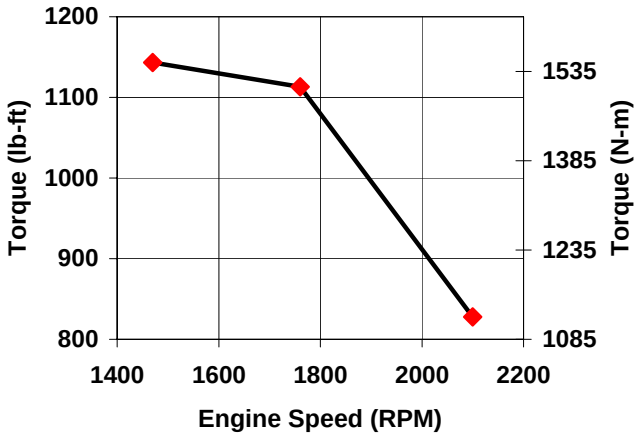
Basic Engine Model
CFP11E-F10

Curve Number: **FR - 20091**
Revision Date: **March 2010**

Engine Family:	**Construction**	CPL Code:	**2829**
Displacement - in.3 (litre):	**661 (10.8)**	Emission Certification:	**2001 EPA/CARB Tier 2**
Compression Ratio:	**16.3:1**	Aspiration:	**Turbocharged, Chrg Air Cooled**
No. of Cylinders:	**6**	Engine Configuration:	**D353014CX03**
Fuel System:	**Cummins Celect**	Minimum rating:	**320 HP @ 1400 RPM**
		Maximum rating:	**373 HP @ 1760 RPM**

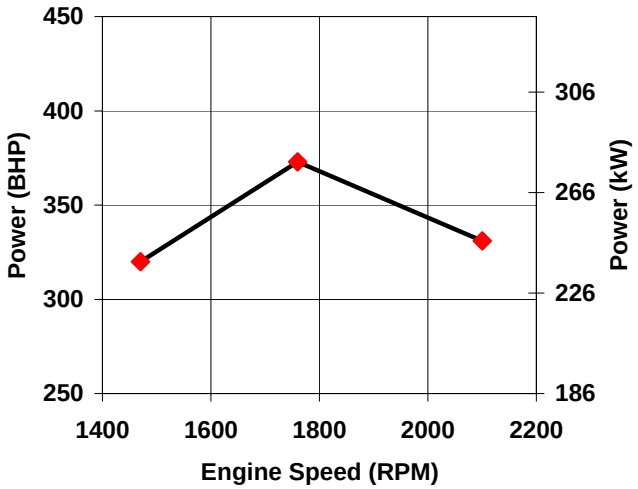
Torque Output

RPM	lb-ft	N-m
1470	1143	1550
1760	1113	1509
2100	828	1122



Horsepower Output

RPM	BHP	kW
1470	320	239
1760	373	278
2100	331	247



1. Curves shown above represent mature gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions of 29.61 in Hg (100 kPa) barometric pressure [300 ft. (91.4 m) altitude], 77 °F (25 °C) inlet air temperature, and 0.30 in. Hg (1 kPa) water vapor pressure with No. 2 diesel fuel.

2. The engine may be operated without changing the fuel setting up to 300 ft. (91.4 m) altitude and up to 77°F (25 °C) ambient temperature. For sustained operation at high altitudes, the fuel rate of the engine should be adjusted to limit performance by 3% per 1,000 ft. (305 m) above 300 ft. (91.4 m) altitude. For sustained operation at high ambient temperatures, the fuel rate of the engine should be adjusted to limit performance by 1% per 10 °F above 77 °F (2% per 11 °C above 25 °C).

3. Engine is certified at any speed between 1470 and 2100 RPM.

Jim Vanden Boogard
Director of Engineering

Certified Within 5%

Engine Datasheet

Cummins Fire Power
De Pere, WI 54115
http://www.cumminsfirepower.com

Configuration Number: **D353014CX03**
Installation Drawing: **15551**

Basic Engine Model	**CFP11E-F10, F20**
Curve Number:	**FR - 20091**
CPL Code:	**2829**
Engine Family:	**Construction**
Revision Date:	**March 2010**

General Engine Data

Type	4 Cycle; In-Line; 6 Cylinder	
Aspiration	Turbocharged, Chrg Air Cooled	
Bore & Stroke - in. (mm)	4.92 x 5.79	(125 x 147)
Displacement - $in.^3$ (litre)	660	(10.8)
Compression Ratio	16.3:1	
Valves per Cylinder - Intake	2	
- Exhaust	2	
Maximum Allowable Bending Moment @ Rear Face of Block - lb.-ft. (N-m)	1000	(1356)

Air Induction System

Max. Temperature Rise Between Ambient Air and Engine Air Inlet - ^oF (^oC)	30	(16.7)
Maximum Inlet Restriction with Dirty Filter - in. H_2O (mm H_2O)	25	(635)
Recommended Air Cleaner Element - (Standard) K&N (CFP)	RU-3220	(9608)
- (Optional) Industrial 2 stage.(FLG)	AF26124 / AF26125	

Lubrication System

Oil Pressure Range at Rated - PSI (kPa)	35	(241) Nominal
Oil Capacity of Pan (High - Low) - U.S. quarts (litre)	36-32	(45-38)
Total System Capacity - U.S. Gal. (litre)	6.9	(26.1)
Recommended Lube Oil Filter Fleetguard (Cummins)	LF9001	(3101869)

Cooling System

Raw Water Working Pressure Range at Heat Exchanger - PSI (kPa)	60	(413) MAX
Recommended Min. Water Supply Pipe Size to Heat Exchanger - in. (mm)	1.00	(25.40)
Recommended Min. Water Disch. Pipe Size From Heat Exchanger - in. (mm)	1.25	(31.75)
Coolant Water Capacity (Engine Side) - U.S. gal. (litre)	2.5	(9.5)
Standard Thermostat - Type	Modulating	
- Range - deg F (deg C)	180-200	(82-93)
Minimum Raw Water Flow		
with Water Temperatures to 90 ^oF (32 ^oC) - U.S. GPM (litre/s)	40	(2.52)
Recommended Cooling Water Filter Fleetguard (Cummins)	WF2075	(3100308)

A jacket water heater is mandatory on this engine. The recommended heater wattage is 2250 down to 40 ^oF (4 ^oC).

Exhaust System

Max. Back Pressure Imposed by Complete Exhaust System in in. H_2O (kPa)	40.8	(10.2)
Exhaust Pipe Size Normally Acceptable - in. (mm)	5.0	(127)

Noise Emissions

Top	101.4 dBa
Right Side	104.1 dBa
Left Side	104.2 dBa
Front	104.6 dBa
Exhaust	121.0 dBa

The noise emission values are estimated sound pressure levels at 3.3 ft. (1 m.).

Fuel Supply / Drain System	**1470**	**1760**	**2100**
CFP11E-F20 Nominal Fuel Consumption - Gal./hr. (L/hr)	17.1 (64.8)	20.2 (76.4)	17.4 (65.8)
CFP11E-F10 Nominal Fuel Consumption - Gal./hr. (L/hr)	15.1 (57.0)	17.8 (67.2)	16.0 (60.5)
Fuel Type	Number 2 Diesel Only		
Minimum Supply Line Size - in. (mm)	0.5	(12.70)	
Minimum Drain Line Size - in. (mm)	0.375	(9.53)	
Maximum Fuel Height above C/L Fire Pump ft (m)	20	(6)	
Recommended Fuel Filter - Primary ..... Fleetguard (Cummins)	FS1000	(3329289)	
- Secondary	None		
Maximum Restriction @ Lift Pump-Inlet - With Clean Filter - in. Hg (mm Hg)	4.0	(102)	
Maximum Restriction @ Lift Pump-Inlet - With Dirty Filter - in. Hg (mm Hg)	8.0	(203)	
Maximum Return Line Restriction - Without Check Valves - in. Hg (mm Hg)	2.5	(64)	
Minimum Fuel Tank Vent Capability - ft^3/hr (m^3/hr)	30	(0.90)	
Maximum Fuel Temperature @ Lift Pump Inlet - ^oF (^oC)	160	(71)	

Starting and Electrical System	**12V**	**24V**
Min. Recommended Batt. Capacity - Cold Soak at 0^oF (-18^oC) or Above		
Engine Only - Cold Cranking Amperes - (CCA)	1875	1250
Engine Only - Reserve Capacity - Minutes	850	430
Battery Cable Size (Maximum Cable Length Not to Exceed 5 ft. [1.5 m] AWG)	00	00
Maximum Resistance of Starting Circuit - Ohms	0.001	0.0017
Typical Cranking Speed - RPM	120	120
Alternator (Standard), Internally Regulated - Ampere	100	70
Wiring for Automatic Starting (Negative Ground)	Standard	
Reference Wiring Diagram	16260	

Performance Data

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and alternator; not included are compressor, fan, optional equipment, and driven components. Data is based on operation at SAE standard J1394 conditions of 300 ft. (91.4 m) altitude, 29.61 in. (752 mm) Hg dry barometer, and 77 ^oF (25 ^oC) intake air temperature, using No.2 diesel or a fuel corresponding to ASTM-D2.

Altitude Above Which Output Should be Limited - ft. (m)	300	(91.4)
Correction Factor per 1000 ft. (305 m) above Altitude Limit	3%	
Temperature Above Which Output Should be Limited - ^oF (^oC)	77	(25)
Correction Factor per 10 ^oF (11 ^oC) Above Temperature Limit	1%	(2%)

Exhaust Emissions (EPA Tier T2) [Reference Emissions Data Doc. 9803]	**g/kW-hr**	**g/BHP-hr**
Hydrocarbons (HC/OMHCE)	0.22	0.16
Oxides of Nitrogen (NOx)	5.39	4.02
Non-Methane Hydrocarbons + NOx (NMHC+NOx)	5.61	4.18
Carbon Monoxide (CO)	1.00	0.75
Particulate	0.14	0.10

FM Approved and UL Listed Ratings for CFP11E-F10, F20

Engine Speed - RPM	**1470**	**1760**	**2100**
CFP11E-F20 Output - BHP (kW)	**364 (271)**	**424 (316)**	**360 (268)**
Ventilation Air Required for Combustion - CFM (litre/sec)	740 (349)	875 (413)	854 (403)
Exhaust Gas Flow - CFM (litre/sec)	1890 (892)	2180 (1,029)	2009 (948)
Exhaust Gas Temperature - ^{o}F (^{o}C)	977 (525)	954 (512)	844 (451)
Engine Heat Rejection to Coolant- BTU/min. (kW)	4750 (83)	5100 (90)	9265 (163)
Engine Heat Rejection to Ambient - BTU/min. (kW)	1500 (26)	1580 (28)	1435 (25)
CFP11E-F10 Output - BHP (kW)	**320 (239)**	**373 (278)**	**331 (247)**
Ventilation Air Required for Combustion - CFM (litre/sec)	649 (306)	769 (363)	825 (389)
Exhaust Gas Flow - CFM (litre/sec)	1663 (785)	1943 (917)	1857 (877)
Exhaust Gas Temperature - ^{o}F (^{o}C)	946 (508)	917 (492)	779 (415)
Engine Heat Rejection to Coolant- BTU/min. (kW)	4649 (82)	5102 (90)	4792 (84)
Engine Heat Rejection to Ambient - BTU/min. (kW)	1400 (25)	1490 (26)	1412 (25)

All Data is Subject to Change Without Notice.

Director of Engineering: Jim Vanden Boogard

Cummins Fire Power, De Pere, WI 54115 U.S.A.

California ATCM Tier 2 Emission Data
EPA Tier 2 Emission Data

CFP11E-F10 Fire Pump Driver

Type: 4 Cycle; In-Line; 6 Cylinder
Aspiration: Turbocharged, Charge Air Cooled

15 PPM Diesel Fuel

		Fuel Consumption		D2 Cycle Exhaust Emissions										Exhaust			
				Grams per BHP - HR					Grams per kW - HR					Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC	NOx	NMHC+NOx	CO	PM	NMHC	NOx	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	320	15.1	57.2											946	508	1663	785
1760	373	17.8	67.4	0.185	3.603	3.787	0.597	0.072	0.248	4.831	5.079	0.800	0.096	917	492	1943	917
2100	331	16	60.6											779	415	1857	877

The emissions values above are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

300-500 PPM Diesel Fuel

		Fuel Consumption		D2 Cycle Exhaust Emissions										Exhaust			
				Grams per BHP - HR					Grams per kW - HR					Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC	NOx	NMHC+NOx	CO	PM	NMHC	NOx	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	320	15.1	57.2											946	508	1663	785
1760	373	17.8	67.4	0.224	3.907	4.131	0.597	0.082	0.300	5.240	5.540	0.800	0.110	917	492	1943	917
2100	331	16.0	60.6											779	415	1857	877

QSM11 Base Model Manufactured by Cummins Inc.
- Using fuel rating 20091 (combination of FR2912 and FR 2940)

Reference EPA Standard Engine Family: 5CEXL0661

No special options needed to meet current emission regulations for all 50 states

Test Methods:

EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A, for Constant Speed Engines (ref. ISO8178-4, D2).

Diesel Fuel Specifications:

Cetane Number: 40-48
Reference: ASTM D975 No. 2-D

Reference Conditions:

Air Inlet Temperature: 25°C (77°F)
Fuel Inlet Temperature: 40°C (104°F)
Barometric Pressure: 100 kPa (29.53 in Hg)
Humidity: 10.7 g/kg (75 grains H_2O/lb) of dry air; required for NOx correction
Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.

The data was obtained by using two fuel ratings 2912 (for the 2100 rating) and 2940 (for the 1470 and 1760 ratings). The highest exhaust emissions for either fuel rating are stated above.

Revision:

April 2008 - listed NMHC and NOx separately
April 2008 - Update EPA Engine Family to 5CEXL0661AAE
August 2008 - Correct RPM data error

Fire Power

EPA Tier 2 Emission Data
Fire Pump NSPS Compliant

CFP11E-F10 Fire Pump Driver

Type: 4 Cycle; In-Line; 6 Cylinder
Aspiration: Turbocharged, Charge Air Cooled

15 PPM Diesel Fuel													
		Fuel Consumption		D2 Cycle Exhaust Emissions						Exhaust			
				Grams per BHP - HR			Grams per kW - HR			Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC+NOx	CO	PM	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	320	15.1	57.2	3.841	0.746	0.091	5.151	1.000	0.123	946	508	1663	785
1760	373	17.8	67.4							917	492	1943	917
2100	331	16.0	60.6							779	415	1857	877

The emissions values above are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

300-500 PPM Diesel Fuel													
		Fuel Consumption		D2 Cycle Exhaust Emissions						Exhaust			
				Grams per BHP - HR			Grams per kW - HR			Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC+NOx	CO	PM	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	320	15.1	57.2	4.183	0.746	0.104	5.610	1.000	0.140	946	508	1663	785
1760	373	17.8	67.4							917	492	1943	917
2100	331	16.0	60.6							779	415	1857	877

QSM11 Base Model Manufactured by Cummins Inc.
- Using fuel rating 20091 (combination of FR2912 and FR 2940)

Reference EPA Standard Engine Family: ACEXL019.AAD

Test Methods:

EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A, for Constant Speed Engines (ref. ISO8178-4, D2).

Diesel Fuel Specifications:

Cetane Number: 40-48
Reference: ASTM D975 No. 2-D

Reference Conditions:

Air Inlet Temperature: 25°C (77°F)
Fuel Inlet Temperature: 40°C (104°F)
Barometric Pressure: 100 kPa (29.53 in Hg)
Humidity: 10.7 g/kg (75 grains H_2O/lb) of dry air; required for NOx correction
Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.

The data was obtained by using two fuel ratings 2912 (for the 2100 rating) and 2940 (for the 1470 and 1760 ratings). The highest exhaust emissions for either fuel rating are stated above.

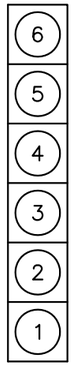
Revision:

Document Review & Approved

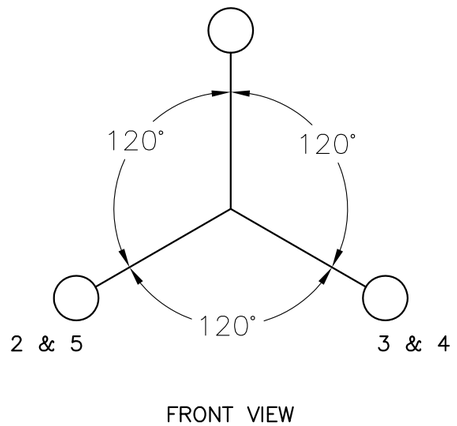
Revision Date: June 2014

ENGINE MODEL: QSM11–C (A)
ENGINE ROTATION: RIGHT HAND
TYPE: 4 CYCLE DIESEL
No. OF CYLINDERS: 6
RECIPROCATING WT/CYL: 10.3 LBS (4.67KG)
FIRING ORDER: 1–5–3–6–2–4
(B) CRANK INTERVAL BETWEEN SUCCESSIVE FIRING: 120°
(B) FLYWHEEL OPTION: FW2141
(B) VIBRATION DAMPER OPTION: DA2078

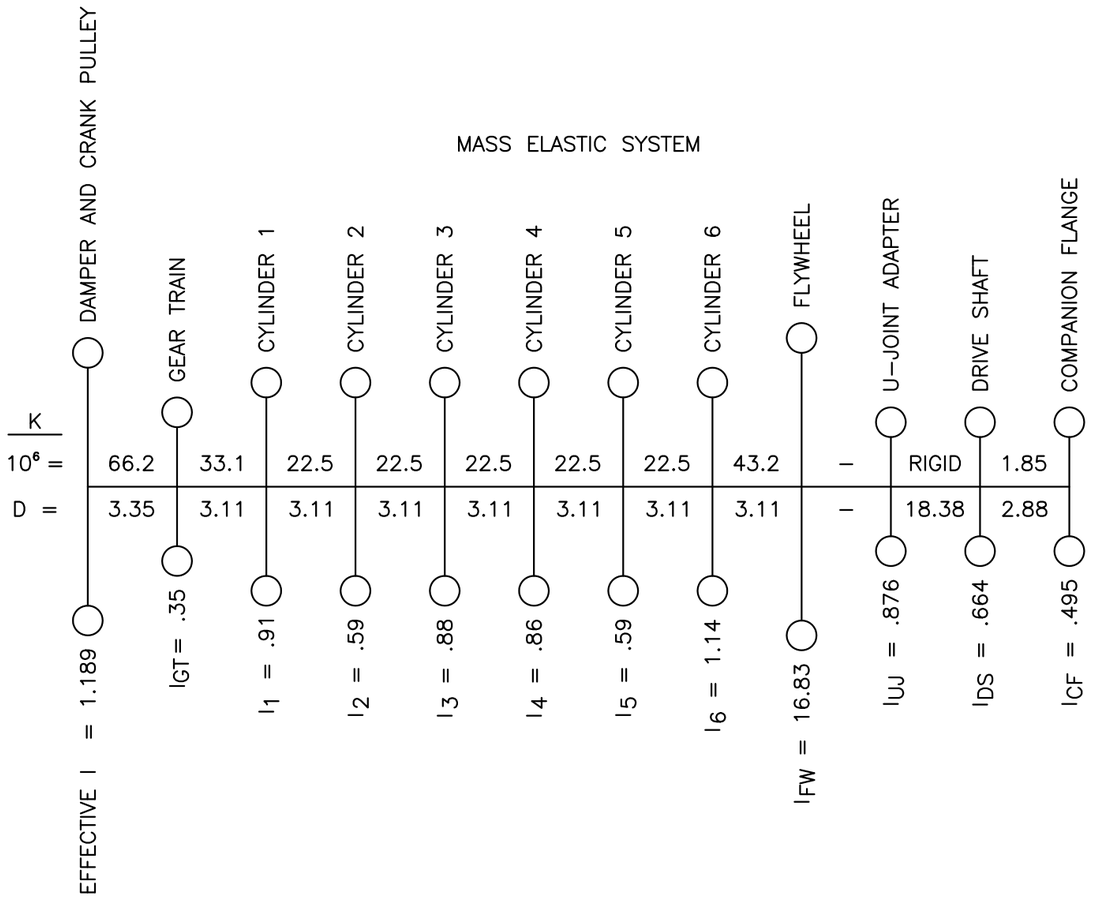
CYLINDER ARRANGEMENT



CRANKSHAFT ARRANGEMENT



MASS ELASTIC SYSTEM



I = MASS MOMENT OF INERTIA (IN–LB–SEC²)
K = STIFFNESS (IN–LB/RADIAN)
D = MINIMUM SHAFT DIAMETER (INCHES)

EFFECTIVE INERTIA = HOUSING+PULLEY+1/2 FLOATING
HOUSING INERTIA = 0.46
FLOATING INERTIA = 1.17
PULLEY INERTIA = 0.144
STRUCTURAL DAMPING = 0.06
VISCOUS DAMPING = 934

REV	ECO	DESCRIPTION OF REVISION	BY	DATE
B	2014–404	ADDED FW & DA OPTIONS	MRH	16JUN2014
A	2013–229	CHANGE ENGINE TYPE FROM G TO C	S DUBICK	23–APR–13

UNLESS OTHERWISE SPECIFIED ALL DIMENSION TOLERANCES ARE
ANGULAR DIMENSIONS ± 1°
IMPERIAL UNITS: MACHINE TOLERANCES XX = ± 0.010, XXX = ± 0.005; FORM TOLERANCES XX = ± 0.030, XXX = ± 0.015; FAB TOLERANCES XX = ± 0.060, XXX = ± 0.030
METRIC UNITS: MACHINE TOLERANCES X = ± 0.4, XX = ± 0.2; FORM TOLERANCES X = ± 0.8, XX = ± 0.4; FAB TOLERANCES X = ± 1.5, XX = ± 0.8
THIRD ANGLE PROJECTION

Cummins Fire Power
CUMMINS FIRE POWER LLC
CORPORATE OFFICE
1600 BUERKLE ROAD
WHITE BEAR LAKE, MN
WWW.CUMMINSFIREPOWER.COM

CUSTOM DESIGN AND
UPFIT CENTER
875 LAWRENCE DRIVE
DEPERE, WISCONSIN

MASS ELASTIC SYSTEM
CFP11E

DWG UNITS: INCH/LB/S
DRAWN BY: PBS
AUTO CAD
DATE: 15–MAY–09
INIT ECO:
SCALE:
EST WEIGHT:
SHEET 1OF1
DRAWING NO: 14986

Engine Materials and Construction

Cummins Fire Power
DePere, WI 54115
http://www.cumminsfirepower.com

Basic Engine Model
CFP11E-F20, F10

Curve Number: **FR - 20091**
CPL Code: **8062**

Configuration Number: **D353014CX03**
Installation Drawing: **8712**

Engine Family: **Industrial**
Revision Date: **June 2006**

Engine

Camshaft
- Type……Precision Ground
- Material……Forged Steel
- Location……In Block
- Drive……Gear

Connecting Rods
- Type……I-Beam, Fracture-split
- Material……Nickel Chrome Molybdenum

Crankshaft
- Type……Precision Ground
- Material……Forged Steel

Crankshaft Main Bearings
- Type……Precision Half Shells
- Material……Steel, Copper with Soft Metal Overlay

Crankshaft Rod Bearings
- Type……Precision Half Shells
- Material……Steel, Copper with Soft Metal Overlay

Cylinder Block
- Type……Wet Lined
- Material……Cast Iron Alloy

Cylinder Head
- Type……1 Common, 24 Valve
- Material……Cast Iron Alloy

Cylinder Liners
- Type……Centrifugal Casting, Mid Stop
- Material……Cast Iron Alloy

Pistons
- Type……Articulated
- Material……Steel Head with Aluminum Skirt

Piston Pins
- Type……Full Floating
- Material……Forged Steel

Piston Rings
- First……Chrome Coated Ductile Cast Iron
- Second……Keystone, Hardened Grey Cast Iron
- Third……Chrome Coated Composite

Valves
- Type……Poppet
- Arrangement……Overhead Valve
- Number per Cylinder…2 Intake, 2 Exhaust
- Mechanism Type……Mechanical Rocker Arm
- Lifter Type……Solid Push Tube

Air Handling

Air Cleaner
- Type……Single Element, Disposable
- Material……Cellulose

Turbocharger
- Type……Cummins Turbo Tech GTA55
- Design……Wastegated

Cooling System

Charge Air Cooler Heat Exchanger
- Type……Tube and Shell
- Material……
  - Covers……83600 Red Brass
  - Headers……36500 Muntz
  - Plumbing……316 Stainless Steel Brass, Copper & Silicone
  - Tubes……Copper

Coolant Heat Exchanger
- Type……Tube and Shell
- Material……
  - Electrode……Zinc
  - Headers……Copper
  - Shell……Copper
  - Tubes……Copper

Coolant Pump
- Type……Centrifugal
- Drive……Belt, Multi VCC

Thermostat
- Type……Modulating
- Quantity……1

Fuel System

Fuel Injection Pump
- Type……Gerotor
- Drive……Electronic, Gear Driven

Fuel Lift Pump
- Type……Roller Vane
- Drive……Electronic, Gear Driven

Lubrication System

Oil Pump
- Type……Gerotor
- Drive……Gear

Lubrication Cooler
- Type……Plate
- Material……Braised Stainless Steel

HENTZEN COATINGS, INC.

TECHNICAL BULLETIN

15937RAF
60 Red High Solids Air Dry Enamel

PRODUCT DESCRIPTION

This product has been formulated to comply with Cummins' Engineering Standard #21055 and exhibits fast dry, good exterior durability, and is 3.50 VOC compliant.

HANDLING & STORAGE

The containers should be stored away from direct sunlight and heat. Freezing is not harmful if reheated gently to room temperature prior to use.

PHYSICAL CHARACTERISTICS

Weight per Gallon:	8.43 lbs. ± .2 lbs.
Weight Solids:	58.83% ± 1.0%
Volume Solids:	49.71% ± 1.0%
VOC:	Less than 3.50
Viscosity:	17 ± 2" @ #3 Zahn
Theoretical Coverage - sq. ft./gl. @ 1.0 mil dry film thickness:	797.3
Cure Schedule - Air Dry @ 77°F & 50% Relative Humidity:	
Dust Free:	15 – 30 minutes
Dry to Touch:	45 – 60 minutes
Dry to Handle:	Overnight
Dry Hard:	2 - 3 weeks
Gloss:	90° @ 1.5 mils

ENVIRONMENTAL REPORT

Volatile Content (Wt.%):	41.17%
Organic Volatile Content (Wt.%):	41.17%
Water Content (Wt.%):	0.00
Water Content (Vol.%):	0.00
VOC Minus Water:	3.50 maximum

DIRECTIONS FOR USE

Thoroughly agitate the paint before using. This is a 3.50 VOC compliant coating that requires no reduction. When testing this product for film properties, use Bonderite 1000 P60 type panels. Cure times may vary depending on environmental conditions and film thickness.

PRECAUTIONS & SAFETY

- Do not apply at temperatures below 50°F.
- Read all container labels.
- Read Material Safety Data Sheet.

CLEAN-UP

Clean equipment immediately after use with Aromatic or Ketone Solvents.

February 24, 2003

6937 WEST MILL ROAD • MILWAUKEE, WI 53218-1225 • TELEPHONE 414-353-4200 • FAX 414-353-0286 • EMAIL coatings@hentzen.com

M A T E R I A L S A F E T Y D A T A S H E E T

Product Code: 15937RAF
Product Name: 60 RED HIGH SOLIDS ENAMEL

Hentzen Coatings, Inc., 6937 W. Mill Road, Milwaukee, WI 53218-1225

Chemtrec 24-hour Emergency Phone: 800-424-9300

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

(See top of page)

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product contains one or more reported carcinogens or suspected carcinogens which are noted below and in Section 11.
This product contains a component or components that are Federally classified as a hazardous air pollutant.

Component/Exposure Limits	CAS#	% by Wt.
METHYL AMYL KETONE	110-43-0	20.18
ACGIH TLV/TWA - 50 PPM, 233 MG/M3 OSHA PEL - 100 PPM, 465 MG/M3 OTHER LIMITS: NIOSH REL/TWA : 100 PPM, 465 MG/M3		
XYLENE(PURE)	1330-20-7	7.82
ACGIH TLV/TWA - 100 PPM, 434 MG/M3; STEL: 150 PPM OSHA PEL - 100 PPM(TWA), 435 MG/M3(TWA) OTHER LIMITS: NIOSH REL: 100 PPM(TWA), 435 MG/M3(TWA)		
METHYL PROPYL KETONE	107-87-9	5.97
ACGIH TLV/TWA - NOT ESTABLISHED OSHA PEL - 200 PPM, 700MG/M3 OTHER LIMITS: NIOSH REL/TWA: 150PPM,530MG/M3 ACGIH STEL/CEIL: 150PPM, 529MG/M3		
METHYL ISOAMYL KETONE	110-12-3	2.65
ACGIH TLV/TWA - 50 PPM, 234 MG/M3 OSHA PEL - 100 PPM, 475 MG/M3 OTHER LIMITS: NIOSH REL/TWA : 50 PPM, 240 MG/M3		
IRON (III) OXIDE	1309-37-1	0-10%
ACGIH TLV/TWA - 5 MG/M3 (Fume) OSHA PEL - 10 MG/M3 (Fume)		
ETHYLBENZENE	100-41-4	1.733
ACGIH TLV/TWA - 100 PPM,434 MG/M3 STEL: 125PPM OSHA PEL - 100 PPM, 435 MG/M3 OTHER INFORMATION: Listed by IARC as Group 2B, possibly carcinogenic to humans. See Section 11. OTHER LIMITS: NIOSH REL: 100 PPM(TWA), 435 MG/M3(TWA)		
TOLUENE	108-88-3	1.49
ACGIH TLV/TWA - 20 PPM, 75MG/M3 OSHA PEL: 200PPM, STEL: 300PPM, 500PPM(CEIL)*		

* For a 10 minute interval during an 8-hour shift.
OTHER LIMITS:
NIOSH REL: 100PPM(TWA), 375MG/M3(TWA)
NIOSH STEL/CEIL: 150PPM, 560MG/M3

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Harmful if inhaled. May cause the following effects:
Nose, throat and respitory tract irritation. Allergic respitory reaction.
May cause lung damage. Eye and skin irritation. Allergic skin reaction.

FLAMMABLE LIQUID

Keep away from heat, sparks, and flame.
Vapors may cause flash fire.
Toxic gases/fumes are given off during burning or thermal decomposition.

EYE CONTACT:
Severe irritant. Prolonged contact may result in chemical burns to the eyes. Blindness may occur.

SKIN CONTACT:
Severe irritant. Contact with skin causes severe irritation and pain. Prolonged contact may result in chemical burns. Product may be absorbed through the skin in harmful amounts.

PRIMARY ROUTES OF ENTRY:
Skin absorption.
Dermal and inhalation.

INGESTION:
If swallowed, consult a physician immediately.

INHALATION:
Anesthetic. Can cause irritation of the respiratory tract or acute nervous system depression characterized by the following progressive steps if severe overexposure is continued: headache, dizziness, staggering gait, confusion or unconsciousness.

CHRONIC INFORMATION:
See Section 11.

CARCINOGENICITY:

See Section 11.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE:
Asthma and other respiratory ailments; chemical sensitization.

4. FIRST AID MEASURES

EYE CONTACT:
Flush immediately with large amounts of running water for at least 15 minutes while lifting eyelids. Take to a physician for medical treatment.

SKIN CONTACT:
Wash affected areas with soap and water. Remove contaminated clothing and wash before reuse. Consult a physician if irritation develops or persists.

INGESTION:
If swallowed, CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.

INHALATION:
Remove from exposure. Restore breathing. Keep warm and quiet. Notify a physician.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION PROPERTIES:

FLASH POINT (deg.F):
45
METHOD:
Tag Closed Cup

FLAMMABLE LIMITS % :
Lower limit: 1.05
Upper limit: 8.7
AUTOIGNITION TEMPERATURE:
N/A

EXTINGUISHING MEDIA:
Carbon Dioxide, Dry Chemical or Foam.

FIREFIGHTING PROCEDURES AND EQUIPTMENT:
Keep containers tightly closed. Isolate from heat,

electrical equipment, sparks and open flames.
Closed container may explode when exposed to extreme heat.
Do not apply to hot surfaces. Never use welding or cutting torch on or near product container (even empty) because product (even residue) can ignite explosively.
Full protective equipment including self-contained breathing apparatus should be worn.
Water spray may be ineffective. Water may be used to cool closed containers to prevent pressure build-up or possible autoignition or explosion when exposed to extreme heat. If water is used, fog nozzles are preferable.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED :
Evacuate all non-essential personnel and remove all sources of ignition (flames, hot surfaces, electrical, static and frictional sparks). Ventilate area. Equip clean-up crew with appropriate protective equipment. Avoid breathing vapors. Avoid skin contact. Prevent entry into drains, sewers and waterways. Notify appropriate authorities if necessary. Contain and remove with inert absorbent and nonsparking tools.

7. HANDLING AND STORAGE

HANDLING:
Use only with adequate ventilation. Avoid prolonged breathing of vapors. Wear an appropriate, properly fitted respirator (NIOSH/MSHA approved) during and after application unless air monitoring demonstrates that vapor/mist levels are below applicable exposure limits. Follow respirator manufacturer's directions for use.
Use grounding and bonding connection when transferring material to prevent static discharge, fire or explosion. Avoid free fall of liquid in excess of a few inches. Use sparkproof tools and explosion proof equipment.

STORAGE:
Do not store above 120 F or below 32 F. Store large quantities in buildings designed to comply with OSHA's 29 CFR 1910.106. Keep away from heat, sparks and open flame. Keep containers closed when not in use. Keep closures tight and upright to prevent leakage.
Emptied containers may retain hazardous residue. Follow all hazard precautions in this data sheet until container is thoroughly cleaned or destroyed. To avoid spontaneous

combustion during temporary storage, soak soiled rags and waste immediately after use in a water-filled, closed container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Provide general dilution or local exhaust ventilation in volume and pattern to keep the air contaminant concentration below current applicable OSHA safety and health requirements in the mixing, application and curing areas; and to remove decomposition products during welding and flame cutting on surfaces coated with this product.

RESPIRATORY PROTECTION:
When spray applied and when used in limited ventilation areas, wear a NIOSH/MSHA approved organic vapor/particulate respirator designed to remove a combination of particulate, gas and vapor. When used in confined areas or poorly ventilated areas, use a NIOSH/MSHA approved air line type respirator or hood. During sanding or grinding operations, use a NIOSH approved particulate respirator to remove solid airborne particles of sanding dust. Use NIOSH approved respirators when flame cutting, welding or hazing material coated with this product. Observe OSHA regulations for respirator use (29 CFR 1910.134). Air monitoring of the workplace may be required to determine appropriate respirator selection.

EYE PROTECTION:
Use safety eyewear with splash guards or side shields. A full face shield may be appropriate. Contact lenses should not be worn.

SKIN PROTECTION:
It is good industrial hygiene practice to minimize skin contact. Chemical resistant gloves are required for prolonged or repeated contact. An apron may be appropriate to protect against skin contact. Prevent prolonged skin contact with contaminated clothing. Wash contaminated clothing before reuse.

OTHER PROTECTIVE EQUIPMENT AND GUIDLINES:
Safety showers and eye wash stations should be available. Educate and train employees in the safe use of this product.

Product Code: 15937RAF
Product Name: 60 RED HIGH SOLIDS ENAMEL

Hentzen Coatings, Inc., 6937 W. Mill Road, Milwaukee, WI 53218-1225

Chemtrec 24-hour Emergency Phone: 800-424-9300

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:
Liquid.
APPEARANCE:
Opaque.
ODOR:
Solvent odor.
VOC (LB/GL):
3.46 lb/gl
VOC (grams/liter):
415 g/l
WEIGHT PER GALLON:
8.4358 lb/gl
SPECIFIC GRAVITY:
1.0131
%EXEMPT SOLVENT by WEIGHT:
0
%EXEMPT SOLVENT by VOLUME:
0
BOILING POINT (deg. F):
213
WATER SOLUBILITY:
Negligible.
FREEZING POINT (deg. F):
N/A

10. STABILITY AND REACTIVITY

STABILITY:
Stable under normal conditions.

HAZARDOUS POLYMERZATION:
Will not occur.

HAZARDOUS DECOMPOSITION PRODUCTS:
May produce hazardous fumes when heated to decomposition as in welding. Fumes may contain the following:
Carbon Monoxide, Carbon Dioxide and other toxic vapors depending upon the temperature reached.

INCOMPATIBILITIES (MATERIALS TO AVOID):
Strong oxidizers.

11. TOXICOLOGICAL INFORMATION

ACUTE EFFECTS:

Toluene:

LD50 Oral Rat = 5000mg/kg
LC50 Inhalation Rat = 8000 ppm for 4 hours
LD50 Dermal Rabbit = 14000mg/kg

Xylene (Mixed Isomers):

LD50 Oral Rat = 4300mg/kg
LC50 Inhalation Rat = 6700 ppm for 4 hours
LD50 Dermal Rabbit = >2000mg/kg

Ethyl Benzene:

Oral Rat LD50 = 3.5 g/kg
Dermal Rabbit LD50 = 17 g/kg

Has not been tested as a whole for acute effects.

CHRONIC EFFECTS:
Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage, liver and kidney damage. Long term overexposure effects are not currently known.
There are reports that long-term repeated exposure to Xylene may result in some loss of hearing.
There are reports that long-term repeated exposure to Toluene may result in some loss of hearing.

Has not been tested as a whole for chronic effects.

CARCINOGENICITY:
Contains Ethylbenzene which IARC has listed as Group 2B, possibly carcinogenic to humans, based upon laboratory animal studies.

Has not been tested as a whole for carcinogenicity effects.

MUTAGENICITY:

Has not been tested as a whole for mutagenicity effects.

REPRODUCTIVE EFFECTS:

Has not been tested as a whole for reproductive effects.

DEVELOPMENTAL EFFECTS:

Has not been tested as a whole for developmental effects.

12. ECOLOGICAL INFORMATION

ECOLOGICAL EFFECTS:
Has not been tested as a whole for ecological effects.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS:
Recycle, fuel blend or incinerate.
Dispose of in accordance with applicable laws and regulations. It is the responsibility of the owner of the waste to dispose of it properly. Laboratory analysis is recommended to profile the waste for proper disposal determination.

U.S E.P.A WASTE NUMBER AND DESCRIPTION:
D001 Waste Paint

HAZARDOUS WASTE CHARACTERISTICS:
Ignitable.

14. TRANSPORT INFORMATION

UN NUMBER:
UN 1263

DOT PROPER SHIPPING NAME:
Paint

DOT HAZARD CLASS:
3

DOT LABEL:
Flammable Liquid

DOT PACKAGING GROUP:
PG II

U.S POSTAL SERVICE:
Will not handle.

15. REGULATORY INFORMATION

(Not meant to be all inclusive - selected regulations represented)

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

CAS#100-41-4 Ethyl Benzene
CAS#1330-20-7 Xylene
CAS#108-88-3 Toluene

TSCA STATUS:
All ingredients are listed on the TSCA inventory.

STATE REGULATIONS:
Toluene is listed by the State of California as a substance known to cause reproductive toxicity. The California Safe Drinking Water and Toxic Enforcement Act requires clear and reasonable warning be given before exposing any person to toluene. Toluene may also contain traces of benzene which the State of California has found to cause cancer. This product may contain chemicals that fall under individual state Right-to-Know regulatory requirements. See Section 2 for material listings. For details on regulatory requirements, contact the appropriate agency in your state.

16. OTHER INFORMATION

Date of issue: 11/28/2007

Last Revision Date: 11/23/05

HMIS Information
HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 1
PERSONAL PROTECTIVE EQUIPMENT: X

DISCLAIMER:
This MSDS is provided as an informational resource only. The information is received from a combination of sources, including raw material suppliers and is believed to be reliable and accurate. It does not intend to be all inclusive and shall only be used as a guide. Changing reporting requirements and other uncontrolled variables make it impossible to guarantee the accuracy of the information contained in this document. It is the responsibility of the user to verify its information as well as determine the proper personal protection based on conditions of use. The buyer assumes all responsibility for the use and handling of this product in accordance with the Federal, State and Local laws and regulations. Hentzen Coatings, Inc. makes no representation or warranty regarding the accuracy of this information nor that the information or data will not change.

MATERIAL SAFETY DATA SHEET

B54AF407
09 00

Section 1 -- PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B54AF407

HMIS CODES

Health	2*
Flammability	3
Reactivity	1

PRODUCT NAME

MERCURY AIR-O-JET* Enamel, Gray Flash Primer

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

EMERGENCY TELEPHONE NO.

(216) 566-2917

DATE OF PREPARATION

07-JAN-07

INFORMATION TELEPHONE NO.

(216) 566-2902

Section 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

% by WT	CAS No.	INGREDIENT			UNITS	VAPOR PRESSURE
22	64742-89-8	V. M. & P. Naphtha				
			ACGIH TLV	300	ppm	12 mm
			OSHA PEL	300	ppm	
			OSHA PEL	400	ppm STEL	
1	25013-15-4	Vinyl Toluene				
			ACGIH TLV	50	ppm	1.1 mm
			ACGIH TLV	100	ppm STEL	
			OSHA PEL	100	ppm	
1	100-41-4	Ethylbenzene				
			ACGIH TLV	100	ppm	7.1 mm
			ACGIH TLV	125	ppm STEL	
			OSHA PEL	100	ppm	
			OSHA PEL	125	ppm STEL	
6	1330-20-7	Xylene				
			ACGIH TLV	100	ppm	5.9 mm
			ACGIH TLV	150	ppm STEL	
			OSHA PEL	100	ppm	
			OSHA PEL	150	ppm STEL	
22	14807-96-6	Talc				
			ACGIH TLV	2	mg/m3 as Resp. Dust	
			OSHA PEL	2	mg/m3 as Resp. Dust	
6	7727-43-7	Barium Sulfate				
			ACGIH TLV	10	mg/m3 as Dust	
			OSHA PEL	10	mg/m3 Total Dust	
			OSHA PEL	5	mg/m3 Respirable Fraction	
10	13463-67-7	Titanium Dioxide				
			ACGIH TLV	10	mg/m3 as Dust	
			OSHA PEL	10	mg/m3 Total Dust	
			OSHA PEL	5	mg/m3 Respirable Fraction	
5	1314-13-2	Zinc Oxide				
			ACGIH TLV	10	mg/m3 as Dust	
			OSHA PEL	10	mg/m3 Total Dust	
			OSHA PEL	5	mg/m3 Respirable Fraction	

Continued on page 2

Section 3 -- HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.

EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

Section 4 -- FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

Section 5 -- FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL
50 F PMCC	0.9	11.0

FLAMMABILITY CLASSIFICATION

RED LABEL -- Flammable, Flash below 100 F (38 C)

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Continued on page 3

Section 6 -- ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

Section 7 -- HANDLING AND STORAGE

STORAGE CATEGORY

DOL Storage Class IB

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 8 -- EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

Continued on page 4

Section 9 -- PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	11.03 lb/gal	1321 g/l
SPECIFIC GRAVITY	1.33	
BOILING POINT	240 - 338 F	115 - 170 C
MELTING POINT	Not Available	
VOLATILE VOLUME	52 %	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

3.44 lb/gal	413 g/l	Less Water and Federally Exempt Solvents
3.44 lb/gal	413 g/l	Emitted VOC

Section 10 -- STABILITY AND REACTIVITY

STABILITY -- Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

Section 11 -- TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver, urinary and reproductive systems.

Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

TOXICOLOGY DATA

Continued on page 5

CAS No.	Ingredient Name				
64742-89-8	V. M. & P. Naphtha				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
25013-15-4	Vinyl Toluene				
		LC50	RAT	4HR	Not Available
		LD50	RAT		2255 mg/kg
100-41-4	Ethylbenzene				
		LC50	RAT	4HR	Not Available
		LD50	RAT		3500 mg/kg
1330-20-7	Xylene				
		LC50	RAT	4HR	5000 ppm
		LD50	RAT		4300 mg/kg
14807-96-6	Talc				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
7727-43-7	Barium Sulfate				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
13463-67-7	Titanium Dioxide				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
1314-13-2	Zinc Oxide				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

Section 12 -- ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

Section 13 -- DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

Section 14 -- TRANSPORT INFORMATION

No data available.

Section 15 -- REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

Continued on page 6

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
100-41-4	Ethylbenzene	1	
1330-20-7	Xylene	6	
	Zinc Compound	7	4.8

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

Section 16 -- OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.