Service Bulletin

FILING INSTRUCTIONS	
Binder: Construction Eq. Binder	Page: 1 of 10
Mach Loc Code: 30000	Document No.: NEN CE SB 003 08
Issued By: Technical Support Services	Supersedes:
	Date Issued: April 9, 2008

MODELS AFFECTED: All Current Products Using an Engine (See Attachment A)

SUBJECT: Guidelines for the Use of Biodiesel Blends

Guidelines for the Use of Biodiesel Blends
for Case Construction Equipment

1) Introduction on FAME Biodiesel.

FAME Biodiesel (Fatty Acid Methyl Ester), Biodiesel in the following, consists of a family of fuels derived from vegetable oils treated with methyl esters.

Among the Biodiesel production, there are two main Biodiesel types: **RME** (Rapeseed Methyl Ester or a blend of Rapeseed and Sunflower Methyl Ester) the preferred crop in Europe and **SME** (Soybean Methyl Ester) the preferred crop in the United States.

Biodiesel is a renewable alternative fuel source, its use and development is promoted worldwide especially in Europe and in the United States.

Biodiesel fuel can be used to run Diesel engines as pure Biodiesel or when blended with standard Diesel:

B5: indicates the blend of 5% Biodiesel and 95% Diesel.

B20: indicates the blend of 20% Biodiesel and 80% Diesel.

B100: indicates pure Biodiesel, or 100% Biodiesel.

Biodiesel has several positive features in comparison with Diesel:

Biodiesel adds lubricity to the fuel, which is beneficial in many circumstances, particularly as sulphur and aromatics are removed from the fuel.

Biodiesel has a greater Cetane number and burns cleaner.

Biodiesel produces less particulates and smoke emissions.

Biodiesel is fully biodegradable and is non toxic.

2) Diesel and Biodiesel specification.

Diesel fuel specification is covered by the following requirements and test methods:

Europe: EN590

North America: ASTM D975

Pure Biodiesel (B100) specifications are covered by the following:

Europe:

EN 14214, and DIN51606 - Automotive fuels. Fatty Acid Methyl Ester (FAME) for Diesel engines. Requirements and test methods.

United States:

ASTM D6751 - Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels.

In both cases, Europe and the United States, **the raw oil must undergo a process called transesterification** to remove the glycerides before it is converted to Biodiesel suitable for blending and being burnt in a diesel Engine. The transesterification process is a reaction of the oil with an alcohol to separate the glycerin from the fat or vegetable oil. This process leaves behind two products: Methyl Ester (the chemical name of Biodiesel) and Glycerin (a by-product usually sold to be used in soaps or other products).

Biodiesel fuels approved for use must be transesterified and must comply with the European Standard EN14214, German DIN51606 or the North America Standard ASTM D6751.

Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally **unrefined vegetable oils used as motor fuel,** are fuels that are normally made from Oil Seed Rape or similar high oil content crops. **These kinds of fuel are not transesterified, so they do not fulfill the EN14214, DIN51606, and ASTM D6751 requirements.** There is no recognized quality standard available for these types of fuel.

Therefore, the use of Cold Pressed Biodiesel, Cold Pressed Oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel are "NOT APPROVED" at any blend.

Any engine and fuel system found to have run with any blend of NON APPROVED fuel (fuel not fulfilling the specification described in the requirement EN 14214 or DIN51606 for Europe or ASTM D6751 for the United States**) will no longer be covered for Warranty**.

The effects of Biodiesel on engine performance can be summarized as follows:

Up to B5: no effect on performance

Up to B20: 1% to 3% reduction in power / torque

The customer, by using Biodiesel, must accept the reduced power. Lower performance means an increase in fuel consumption; the End User is not allowed to modify the engine / injection pump settings to recover the reduced performance.

3) Biodiesel usage conditions.

The Biodiesel usage conditions **must be stringently followed** by the End User. Incorrect application of the Biodiesel usage conditions could lead to severe damage to both the engine and the fuel injection equipment.

The main concerns related to the operation with Biodiesel are:

Filters and injector blockage caused by poor fuel quality

Wear and corrosion of internal components due to water content affecting lubricity

Deterioration of some rubber sealing compounds in the fuel system

Biodiesel oxidation that can lead to the formation of deposits which can harm the injection system of the engine

Any problem in the engine or fuel system associated with non-compliance to the following conditions for Biodiesel fuel handling and maintenance will not be covered for Warranty.

Blends up to B5

Biodiesel blends up to and including B5 are approved for use in Case engines as noted in the Case Biodiesel Approval Guidelines. For non- Case engines, follow the engine manufacture's guidelines for Biodiesel blends. The Biodiesel blend stock must meet the EN 14124, DIN 51606, or ASTM D6751 fuel specification and the fuel supplier must maintain good fuel quality.

Blends greater than B5 through B20

The use of Biodiesel blends above B5 through B20 is approved for most machines using Case Tier 2 and newer emissions compliant engines as specified in the attached listing. For non-Case engines, follow the Engine Manufacturer's Guidelines for Biodiesel Blends.

Any engine or fuel system found to have run with non-approved blends or without adherence to recommended oil and filter change intervals will no longer be covered for Warranty.

The use of Biodiesel blends above B5 through B20 will not void the Case engine warranty as long as the following conditions for Biodiesel fuel handling and maintenance are stringently followed:

Biodiesel blend stock must meet the fuel specifications listed above (EN14214, DIN 51606, or ASTM D6751).

Biodiesel meeting the fuel standards listed above must be purchased from a trusted supplier that understands the product and maintains good product quality. It is highly recommended that you use Biodiesel from BQ 9000 accredited suppliers to maintain the quality and the consistency of the fuel.

NOTE: *The BQ 9000 Quality Management Program is accredited by the National Biodiesel Board for producers and marketers of Biodiesel fuel. See the National Biodiesel Board website at www.biodiesel.org for more information.*

Biodiesel must be purchased pre-blended from the supplier. Mixing the diesel fuel and Biodiesel on-site can result in a non-homogeneous mixture that can lead to problems. Case can not honor warranty if there is a problem associated with poor fuel quality due to improper blending. It is the responsibility of the fuel supplier and / or the End User to make sure the right type of fuel and blend are delivered and used.

Care must be taken when handling the fuel to assure water does not enter the supply. Biodiesel will actually attract water vapors out of the air. Fuel tanks must be kept as full as possible to limit the amount of air and water vapors in them. Drain water from engine and machine fuel filters on a regular basis, at least once a week.

Check the engine oil dipstick daily to ensure that the level is maintained between the normal minimum and maximum. If the oil level increases above the maximum marking, verify that the increase is not due to overfill of the engine. If increase is not due to overfill, do not use the machine and contact your Case dealer.

Due to potential oxidation and stability problems with Biodiesel, the fuel must **not** be stored in on–site storage tanks for more than 3 months. If it is, it cannot be used as fuel for a diesel engine.

Likewise, potential oxidation and stability could be a problem with the fuel stored in your machine. Machines must **not** be stored for more than 3 months with Biodiesel blends in the fuel system. If long storage periods are necessary, the engine must run on pure diesel fuel for 20 hours to flush the Biodiesel fuel out of the engine fuel system prior to storage.

When changing over to Biodiesel use, it may be necessary to change fuel filters once or twice prior to the normal change interval. Biodiesel can loosen rust and particles from the inside of on-site fuel storage tanks and vehicle fuel tanks that would normally adhere to the sides of the tank and not cause any problems. These particles will then be trapped by the vehicle fuel filters and cause shortened filter life and filter blockage.

Complete cleaning of the whole on-site handling system and storage tanks may be required in some instances. Use a fuel filter and water separator and make sure the storage tanks, fuel lines and fittings are compatible with Biodiesel.

Use a biocide during the spring and summer months; this prevents problems with bacterial growth in the system.

As Biodiesel has a higher cloud point than conventional diesel, the Case minimal temperature limit for Biodiesel usage without low temperature additives is set for blends greater than B5 through B20 at -9º C (+16º F). If the temperature is below this limit, the Customer must switch from Biodiesel to a blended diesel suitable for the ambient temperature, for continued machine operation.

Refer to the attached machine listing to determine the type of engine fitted in every machine model, and the maximum Biodiesel blend approved:

Any spillage of Biodiesel must be cleaned up immediately before it can cause damage to the paintwork of the machine.

Maintenance Intervals for blends greater than B5 through B20

The use of Biodiesel blends above B5 in Case engines may require shortened oil and filter change intervals depending upon the engine and type of Biodiesel fuel used. Case engines operated with RME (Europe) can be operated with the standard service intervals defined in the operator's manual for the machine. Case engines operating on SME Biodiesel (North America) may require a shortened interval defined by the attached chart. Those machines requiring shortened intervals are noted as "**AC-H**".

MAINTENANCE INTERVALS (AC-H Machines)

Oil[1]	250 hrs
Oil Filter	250 hrs
CCV Filter (If equipped)	250 hrs

[1] Oil type ACEA E3/5 (Europe) & API CH4 (North America) or better required

For non- Case engines, follow the Engine Manufacturer's Guidelines for Biodiesel Blends.

4) Warranty on Fuel Injection Equipment

Despite Case approving the use of Biodiesel blends according to the list in Biodiesel Approval Guidelines, some Diesel Fuel Injection Equipment Manufacturers may only permit B5 as the maximum blend. Fuel Injection Equipment Service Agents may reject warranty for equipment used with Biodiesel blends greater than B5. In these cases the warranty claim must be forwarded directly to Case. Warranty claims will only be considered if approved blends have been used and the conditions for Biodiesel fuel handling and maintenance were followed.

The majority of problems found on injection systems running with Biodiesel are related to poor quality of the fuel.

5) Biodiesel usage in previous / out of production models

For machines with Case engines that precede compliance to the Tier 2 emissions regulations and for machines out of production, more generally for all earlier machines not detailed in the following list, the only approved blends are up to, and including B5. No evaluations on the use of greater Biodiesel blends were carried out in previous models and their engines. Biodiesel deteriorates old type rubber, seals etc, and conclusive tests have not been performed with older engines.

For non- Case engines, follow the engine manufacture's guidelines for Biodiesel blends.

Any engine fitted to a Case machine (with an existing warranty) not present in the attached document (a previous model or out of production model), found to have run with Biodiesel blend greater than B5, will be not be covered by Case Warranty.

6) Biodiesel usage on machines with exhaust after treatment devices

For machines fitted with exhaust after treatment devices such as diesel particulate filters (DPFs) or Selective Catalytic Reduction (SCR), consult with the device supplier to determine if the device is compatible with Biodiesel.

Attachment A

2008 Biodiesel Approval Guidelines
Case CE Equipment - North America
Revision L February 22, 2008

Approval Code:	
A =	**Approved w/ no limitations**
AC =	**Approved - must follow Case Guidelines for Biodiesel Blends above 5%**
AC-H =	**Approved - must follow Case HPCR Engine Guidelines for Biodiesel Blends**
M =	**Follow Engine Manufacturers Guidelines for Biodiesel Blends**
N/A =	**Not Approved**

Model	Rating kW (hp)	Engine	Displacement (L)	Biodiesel Approval	
				B5	B20
ARTICULATED TRUCKS					
325	185 (248)	Cummins 6CTAA-8.3	8.3L	A	AC
327	224 (300)	Iveco Cursor	10.3L	A	AC
327 B	224 (300)	Iveco Cursor	10.3L	A	AC
330	213 (286)	Cummins QSM	10.8L	A	AC
330	260 (349)	Iveco Cursor	10.3L	A	AC
330 B	260 (349)	Iveco Cursor	10.3L	A	AC
335	284 (380)	Iveco Cursor 13	12.9L	A	AC
335 B	306 (410)	Iveco Cursor 13	12.9L	A	AC
340	318 (426)	Iveco Cursor 13	12.9L	A	AC
340B	340 (456)	Iveco Cursor 13	12.9L	A	AC
COMPACT TRACK LOADERS (SSL)					
420CT Series 3	55 (74)	FPT 432T/M3	3.2L	A	AC
440CT Series 3	67 (89)	NEF 445T/M3	4.5L	A	AC
445CT	60 (80.5)	NEF 445/M2	4.5L	A	AC
445CT Series 3	61 (82)	FPT 432T/M3	3.2L	A	AC
450CT	65.7 (88)	NEF 445T/M2	4.5L	A	AC
450CT Series 3	67 (89)	NEF 445T/M3	4.5L	A	AC
COMPACTION EQUIPMENT					
DV201	20 (27)	Deutz F2L1011F	1.7L	A	M
DV202	20 (27)	Deutz F2L1011F	1.7L	A	M
DV204	27.6 (38)	Deutz F3L1011F	2.3L	A	M
SV208	75 (100)	Cummins B4.5-C99	4.5L	A	AC
SV210	75 (100)	Cummins B4.5-C99	4.5L	A	AC
SV212	101 (135)	Cummins QSB5.9-C155	5.9L	A	AC
SV212	110 (148)	Cummins QSB 4.5	4.5L	A	AC
SV216	110 (148)	Cummins QSB5.9-C155	5.9L	A	AC
SV216	110 (148)	Cummins QSB 4.5	4.5L	A	AC
CRAWLER DOZERS					
550H	50 (67)	CDC 4-390	3.9L	A	AC
550H	52 (70)	CDC 4T-390	3.9L	A	AC
550L	55 (74)	FPT 432T/M3	3.2L	A	AC
650K	55.8 (74.8)	NEF 445T/M2	4.5L	A	AC
650L	60 (81)	NEF 445TA/E3	4.5L	A	AC-H

A[1]: Isuzu approves B5 biodiesel fuel compliant with EU EN14214
AC-H: Requires 250 hours oil and oil filter maintenance interval

Model	Rating kW (hp)	Engine	Displacement (L)	Biodiesel Approval	
				B5	B20
CRAWLER DOZERS (cont.)					
750K	60 (81)	NEF 445T/M2	4.5L	A	AC
750L	67 (90)	NEF 445TA/E3	4.5L	A	AC-H
850K	72 (96)	NEF 667T/M2	6.7L	A	AC
850L	74 (99)	NEF 667TA/E3	6.7L	A	AC-H
1150H	89 (119)	CDC 6T-590	5.9L	A	AC
1150K	97 (130)	NEF 667TA/E3	6.7L	A	AC-H
1650K	104 (140)	Cummins 6BTA-5.9	5.9L	A	AC
1650K	116 (156)	NEF 667TA/E3	6.7L	A	AC-H
1850K	134 (180)	Cummins 6CTAA-8.3	8.3L	A	AC
1850 XLF	145 (195)	NEF 667TA/E3	6.7L	A	AC-H
1850K	157 (211)	NEF 667TA/E3	6.7L	A	AC-H
EXCAVATORS					
Compact					
CX 14	8.86 (11.9)	Yanmar 3TNE68	0.78L	A	N/A
CX 27B	15.9 (21.3)	Yanmar 3TNV82-A-SYB	1.33L	A	N/A
CX 31B	21.2 (28.4)	Yanmar 3TNV88-PYB	1.64L	A	N/A
CX 36B	21.2 (28.4)	Yanmar 3TNV88-PYB	1.64L	A	N/A
CX 50B	30.4 (40.8)	Yanmar 4TNV88-XYB	2.2L	A	N/A
Tracked					
CX 75 SR	39.1 (52)	Isuzu CC 4JG1	3.1L	A [1]	N/A
CX 80	39.1 (52)	Isuzu CC 4JG1	3.1L	A [1]	N/A
CX 135 SR	65.6 (88)	Isuzu BB 4BG1T	4.3L	A [1]	N/A
CX 130	79 (106)	CDC 4TA-390	3.9L	A	AC
CX 160	79 (106)	CDC 4TA-390	3.9L	A	AC
CX 160B	89 (120)	Isuzu AJ-4JJ1X	3.0L	A [1]	N/A
CX 210	102.9 (138)	CDC 6TAA-5904	5.9L	A	AC
CX 210B	117 (157)	Isuzu 4HK1X	5.2L	A [1]	N/A
CX 225 SR	104 (141)	Isuzu 6BG1T	6.5L	A [1]	N/A
CX 240	121.5 (163)	CDC 6TAA-5904	5.9L	A	AC
CX 240B	132 (177)	Isuzu 4HK1X	5.2L	A [1]	N/A
CX 290	142 (190)	CDC 6TAA-5904	5.9L	A	AC
CX 290B	154 (207)	Isuzu 6HK1YSS	7.8L	A [1]	N/A
CX 330	193 (259)	Isuzu AH 6HKIX	7.8L	A [1]	N/A
CX 330	202 (271)	Isuzu AH 6HKIX	7.8L	A [1]	N/A
CX 460	235 (316)	Isuzu AA-6SD1XQB	9.8L	A [1]	N/A
CX 700	317 (425)	Isuzu AH6WG1X	15.7L	A [1]	N/A
CX 700	317 (425)	Isuzu AH6WG1X	15.7L	A [1]	N/A
CX 800	362 (486)	Isuzu 6WG1TC	15.7L	A [1]	N/A
CX800	369 (495)	Isuzu 6WG1X	15.7L	A [1]	N/A
FORK LIFTS					
585G	54 (73)	CDC 4-390	3.9L	A	AC
586G	54 (73)	CDC 4-390	3.9L	A	AC
586G Series 3	63 (85)	NEF 445T/M3	4.5L	A	AC
588G	54 (73)	CDC 4-390	3.9L	A	AC
588G Series 3	63 (85)	NEF 445T/M3	4.5L	A	AC

A[1]: Isuzu approves B5 biodiesel fuel compliant with EU EN14214
AC-H: Requires 250 hours oil and oil filter maintenance interval

Model	Rating kW (hp)	Engine	Displacement (L)	Biodiesel Approval	
				B5	B20
LOADER BACKHOES					
580M	57 (76)	NEF 445/M2	4.5L	A	AC
580M Turbo	60 (80)	NEF 445T/M2	4.5L	A	AC
580M Turbo Series 3	63 (85)	NEF 445T/M3	4.5L	A	AC
580SM	67 (90)	NEF 445T/M2	4.5L	A	AC
580SM Series 3	72 (97)	NEF 445TA/E3	4.5L	A	AC-H
580SM+	67 (90)	NEF 445T/M2	4.5L	A	AC
580SM+ Series 3	72 (97)	NEF 445TA/E3	4.5L	A	AC-H
590SM	73 (98)	NEF 445T/M2	4.5L	A	AC
590SM Series 3	82 (110)	NEF 445TA/E3	4.5L	A	AC-H
590SM+ Series 3	82 (110)	NEF 445TA/E3	4.5L	A	AC-H
LOADER TOOL CARRIERS					
570 MXT	54 (73)	CDC 4-390	3.9L	A	AC
570 MXT Turbo	60 (80)	CDC 4T-390	3.9L	A	AC
570 MXT Series 3	63 (85)	NEF 445T/M3	4.5L	A	AC
MOTOR GRADERS					
845	104 (140)	Cummins 6BTAA-5.9	5.9L	A	AC
845 DHP	104 (140)	Cummins QSB-6.7	6.7L	A	AC
865	116 (155)	Cummins 6CTAA-8.3	8.3L	A	AC
865 DHP	125 (168) 141 (190)	Cummins QSB-5.9	5.9L	A	AC
865 VHP	134 (180)	Cummins QSB-6.7	6.7L	A	AC
885	153 (205)	Cummins 6CTAA-8.3	8.3L	A	AC
885	153 (205)	Cummins QSB-6.7	6.7L	A	AC
SKID STEER LOADERS					
410	38 (51)	ISM N844L	2.2L	A	N/A
410 Series 3	44 (59)	ISM N844LT	2.2L	A	N/A
420	44 (58)	ISM N844LT	2.2L	A	N/A
420 Series 3	55 (74)	FPT 432T/M3	3.2L	A	AC
430	60 (80)	NEF445/M2	4.5L	A	AC
430 Series 3	61 (82)	FPT 432T/M3	3.2L	A	AC
435	58 (78)	NEF 334T/M2	3.4L	A	AC
435 Series 3	61 (82)	FPT 432T/M3	3.2L	A	AC
440	66 (89)	NEF 445T/M2	4.5L	A	AC
440 Series 3	67 (90)	NEF 445T/M3	4.5L	A	AC
445	60 (80)	NEF 445/M2	4.5L	A	AC
445 Series 3	61 (82)	FPT 432T/M3	3.2L	A	AC
450	66 (89)	NEF 445T/M2	4.5L	A	AC
450 Series 3	67 (90)	NEF 445T/M3	4.5L	A	AC
465	66 (89)	NEF 445T/M2	4.5L	A	AC
465 Series 3	67 (90)	NEF 445T/M3	4.5L	A	AC

A[1]: Isuzu approves B5 biodiesel fuel compliant with EU EN14214
AC-H: Requires 250 hours oil and oil filter maintenance interval

Model	Rating kW (hp)	Engine	Displacement (L)	Biodiesel Approval	
				B5	B20
WHEEL LOADERS					
21D	38 (51)	Deutz F4M2011	3.1L	A	M
21E	40 (54)	FPT 432T/M3	3.2L	A	AC
121D	44 (59)	Deutz F4M2011	3.1L	A	M
121E	48 (64)	FPT 432T/M3	3.2L	A	AC
221D	44 (59)	Deutz F4M2011	3.1L	A	M
221E	55 (74)	FPT 432T/M3	3.2L	A	AC
321D	53.5 (72)	Deutz BF4M2011	3.1L	A	M
321E	61 (82)	FPT 432T/M3	3.2L	A	AC
521D	82 (110)	NEF 445TA/M2	4.5L	A	AC
521E	93 (125)	NEF 445TA/E3	4.5L	A	AC-H
621D	101 (136)	NEF 667TA/M2	6.7L	A	AC
621E	126 (169)	NEF 667TA/E3	6.7L	A	AC-H
721D	127 (170)	NEF 667TA/E2	6.7L	A	AC-H
721E	145 (195)	NEF 667TA/E3	6.7L	A	AC-H
821C	148 (198)	CDC 6TAA-830	8.3L	A	AC
821E	169 (227)	NEF 667TA/E3	6.7L	A	AC-H
921C	185 (248)	Cummins QSM	10.8L	A	AC
921C	216 (290)	Cummins QSM	10.8L	A	AC
921E	239 (321)	Cummins QSM	10.8L	A	AC

A[1]: Isuzu approves B5 biodiesel fuel compliant with EU EN14214
AC-H: Requires 250 hours oil and oil filter maintenance interval