VOLVO CONSTRUCTION EQUIPMENT
MATRIS REPORT

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Company name	Dealer	Report Issuer
volvo	arnold machinery	

Contact name	Technician	Primary Application
mike seifert	CE Tech	Quarries

Site	Workorder	Ground Condition

MATRIS Reading, Summary / Recommendation

Machine model	SerialNo	Operating Hours	Reading Date
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Main equipment	Type	Equipment
	Tyre size/class	Sold without tyres
	Body extensions	Not mounted
	Tail-gate	Not mounted
	Extra spillguard	Not mounted
	Wear plates	Not mounted
	Pattern	None

Machine model	SerialNo	Operating Hours	Reading Date
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Machine utilization (%)


Total logged time (h) = 4220.9
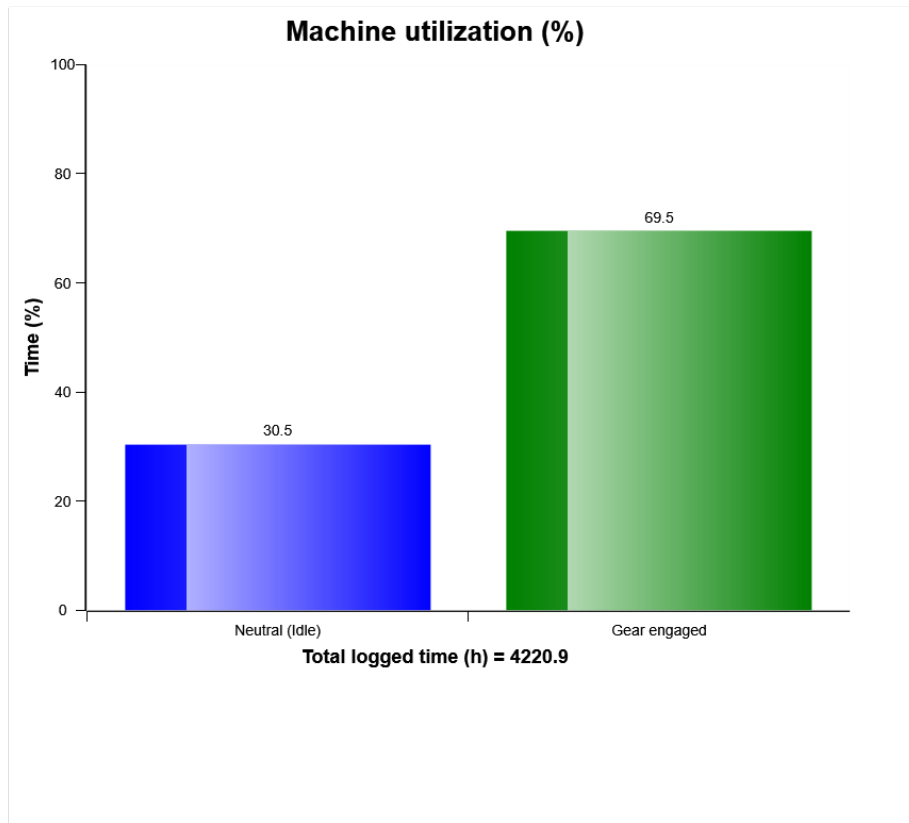
The diagram shows a simplified presentation of the machines utilization based on the relation between time in gear and time in neutral. The "Gear engaged " includes both forward and reverse gears.

This presentation of the machines utilization can only be seen as a guideline value since a full calculation of the machines utilization is more advanced. E.g. "Neutral" includes time for loading and dumping which should be seen as operating time.

High percentage of neutral time may indicate that the machine is underused due to e.g. under dimensioned loading tool or oversized hauler fleet

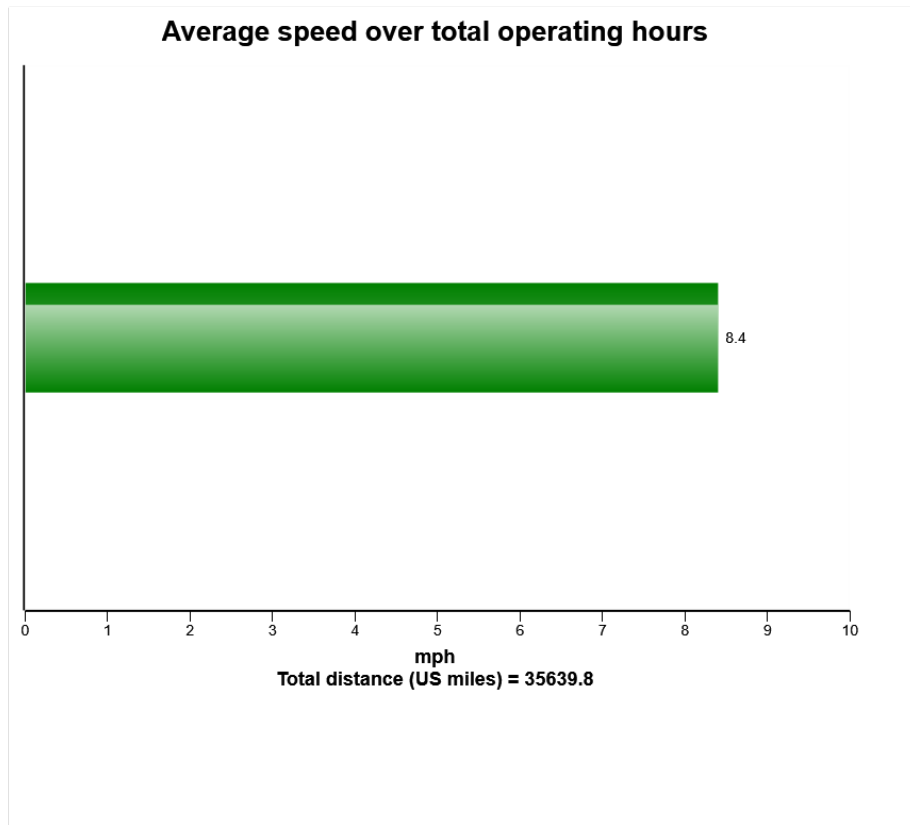| Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Machine speed, distribution
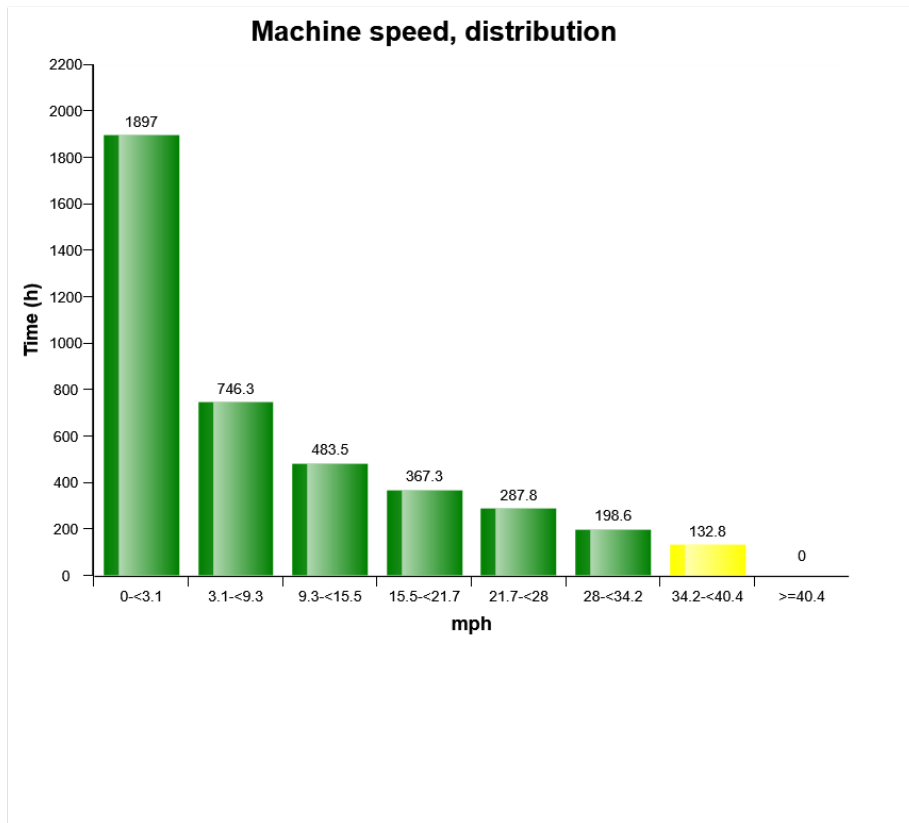
The presentation shows the time in hours in speed-intervals for the machine.

Note that the interval 0-3,1 mile/h includes machine not in motion. If the machine has been operated above 34,2 Mile/h there is a risk of engine over speed, check "Engine speed, over 2100 rpm"
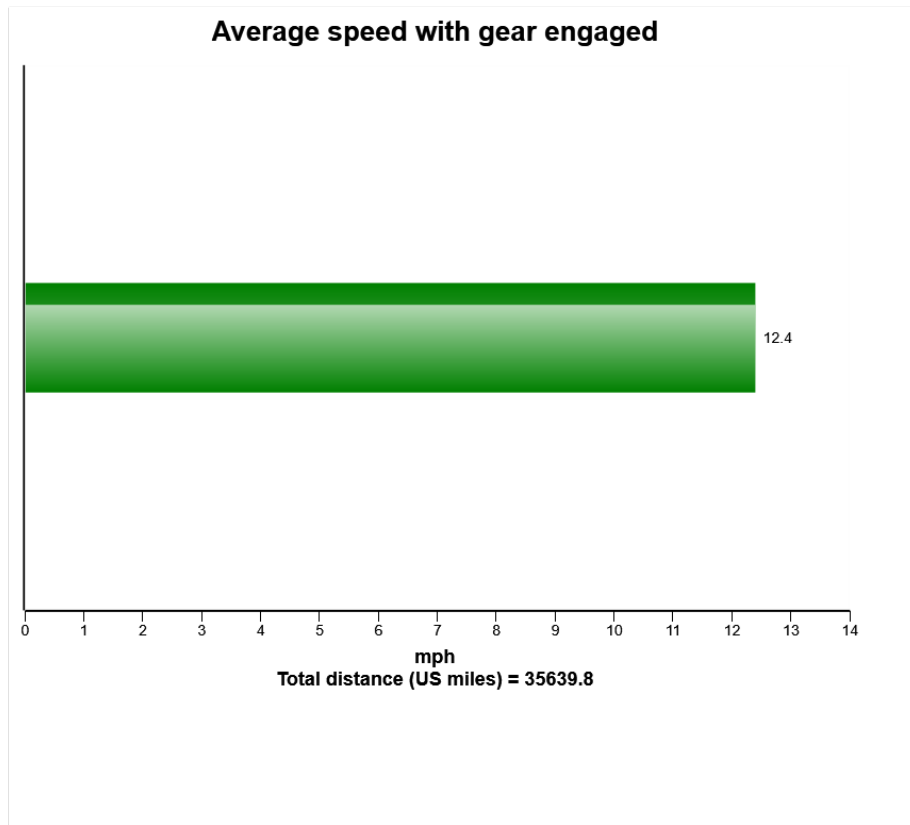
Machine model	SerialNo	Operating Hours	Reading Date
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Average speed over total operating hours

mph
Total distance (US miles) = 35639.8

The diagram shows the machines average speed based on the total operating hours

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Average speed with gear engaged

12.4

mph
Total distance (US miles) = 35639.8

(x-axis: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14)

The diagram shows the machines average speed based on the operating hours with gear engaged.

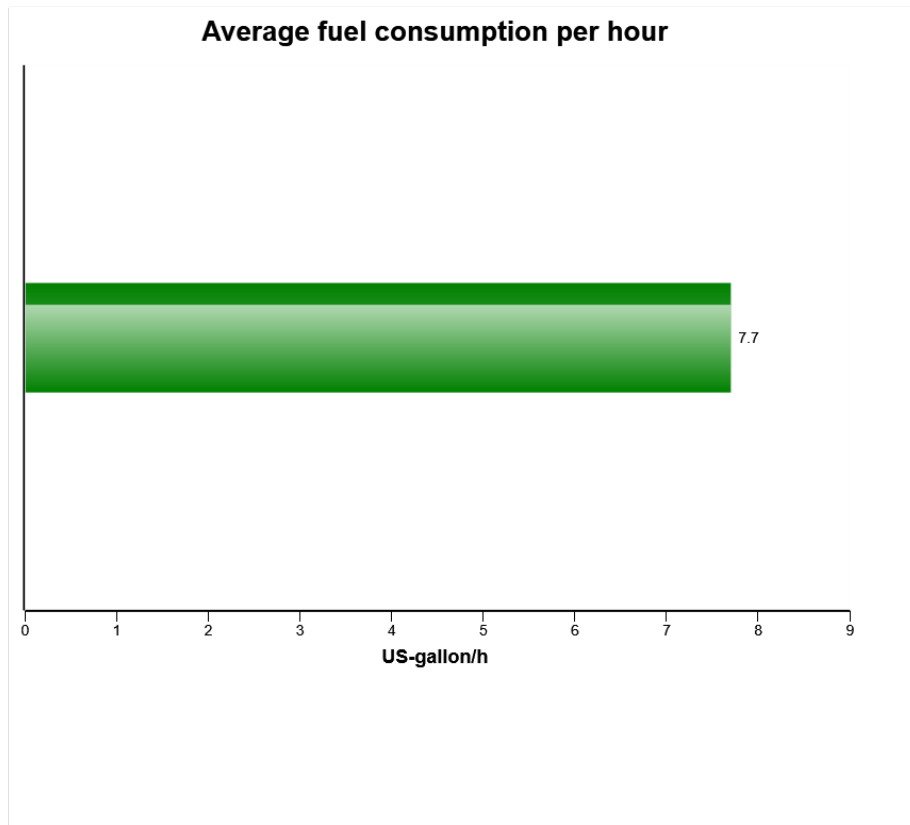| Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019
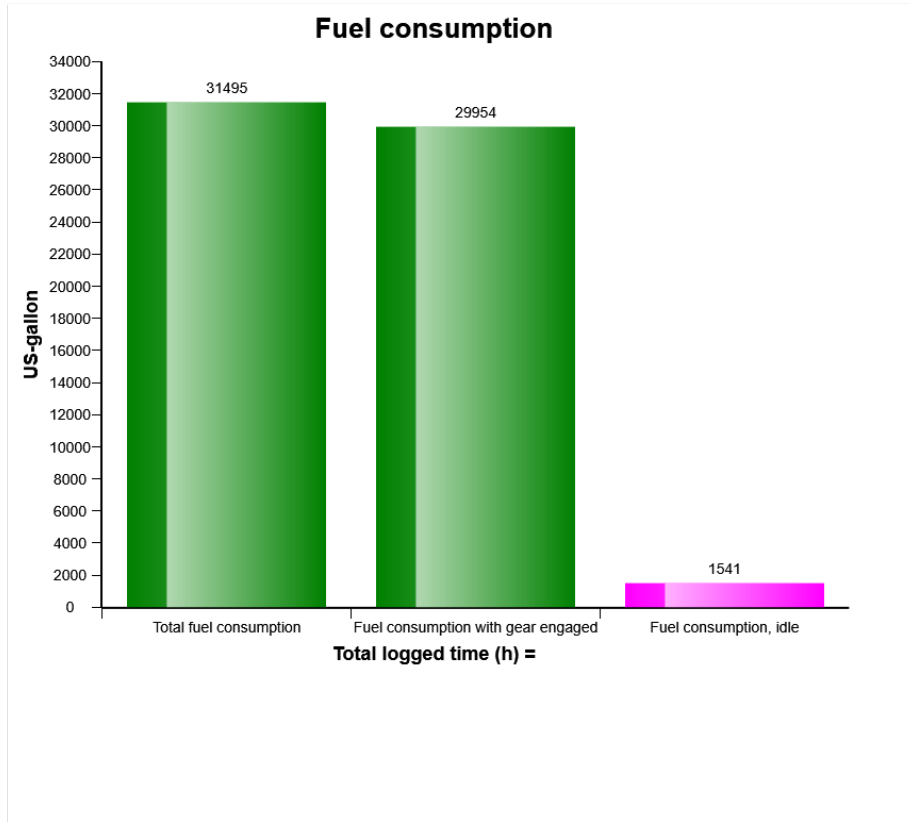
Fuel consumption

The diagram shows the total fuel consumption, fuel consumption with gear engaged and fuel consumption during idle.

High fuel consumption during idle can indicate that the machine is not fully utilized.

Average fuel consumption per hour

7.7

US-gallon/h

The diagram shows the average fuel consumption based on total operating hours

Machine model	SerialNo	Operating Hours	Reading Date
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Average fuel consumption per hour with gear engaged

10.6

US-gallon/h
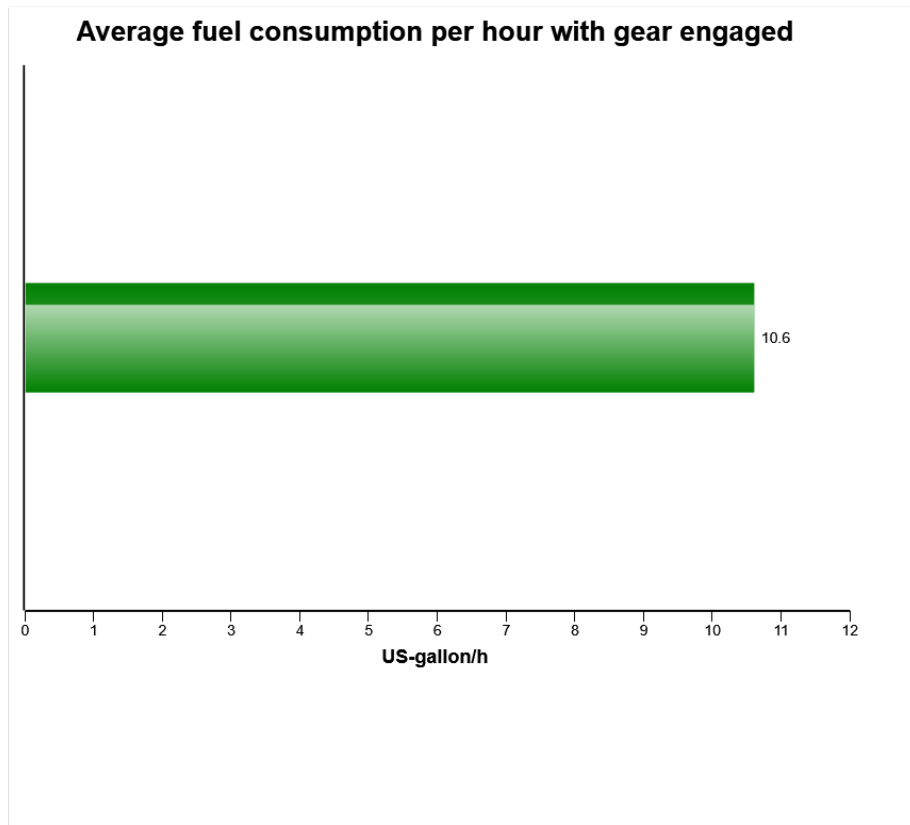
The diagram shows the average fuel consumption based on operating hours with gear engaged

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Average fuel consumption
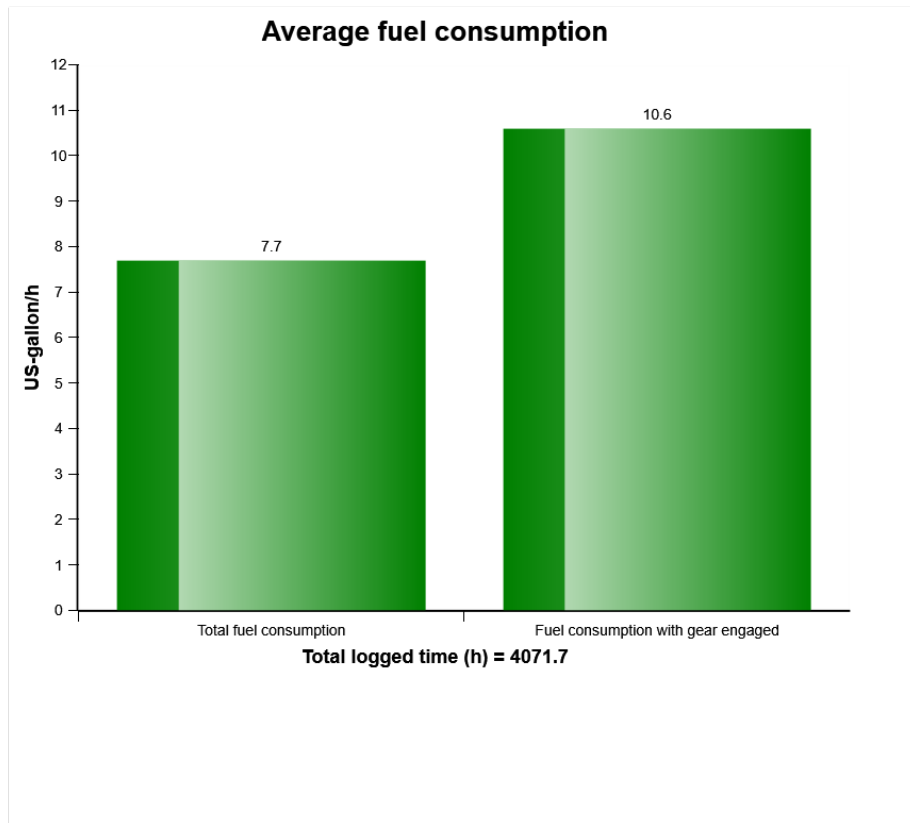
The diagram shows the total average fuel consumption versus average fuel consumption with gear engaged.

Big difference between the bars can indicate that the machine is not fully utilized, high idle lowers the total average fuel consumption.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Cycle Time (%)

Total logged time (h) = 4072
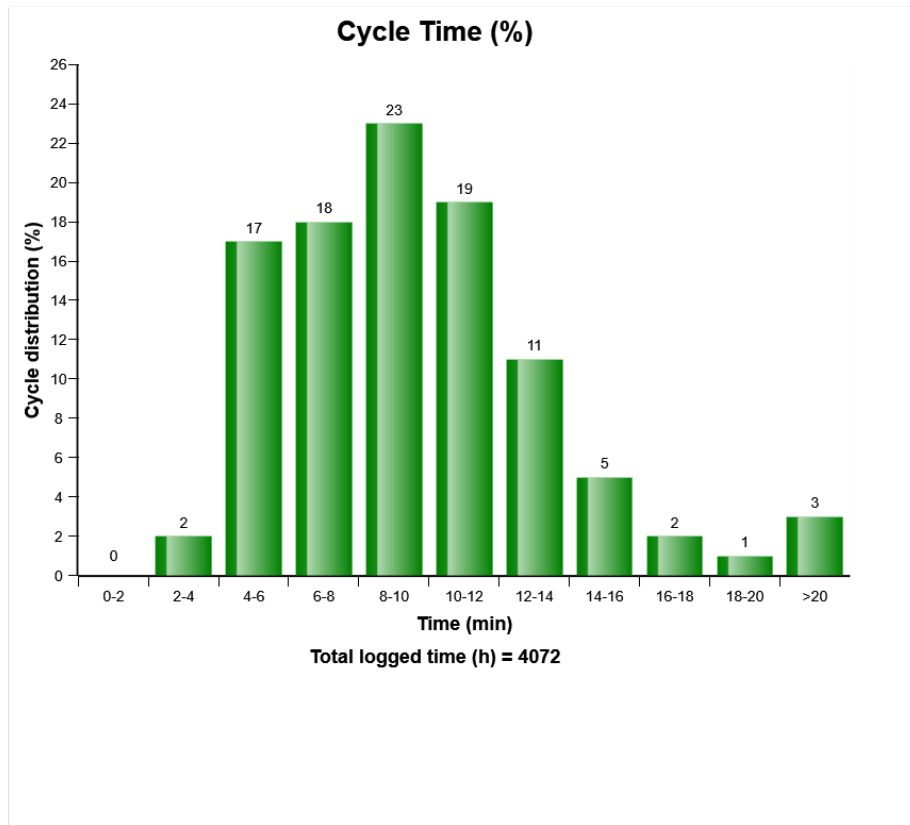
The diagram shows the distribution of the working cycle time. The time between 2 valid cycle registrations is registered. Time starts from lifting the body.

Machine model	SerialNo	Operating Hours	Reading Date
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Cycle Distance (%)

Distribution (%)

Cycle Distance (miles)	Value
0 - 1/4	6
1/4 - 1/2	17
1/2 - 3/4	13
3/4 - 1	7
1 - 1 1/2	4
1 1/2 - 2	7
2 - 2 1/2	30
2 1/2 - 3	10
>3	6

Cycle Distance (miles)

Total logged time (h) = 4071.7
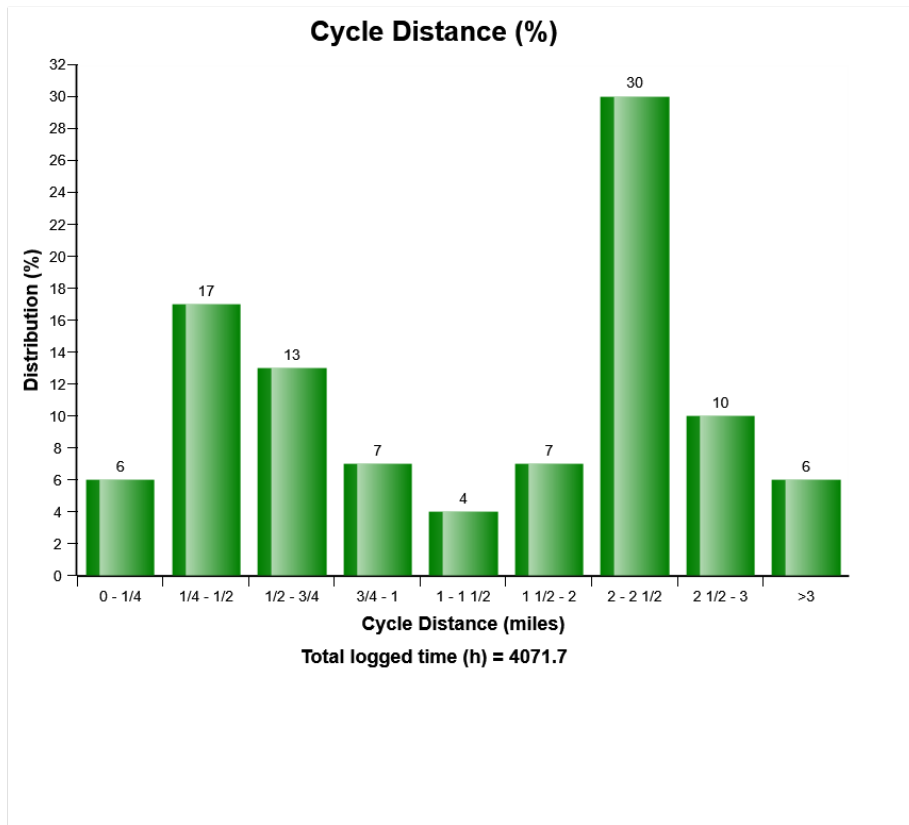
The diagram shows the distribution of the working cycle distance. The distance driven between 2 valid cycle registrations.

VOLVO

Machine model	SerialNo	Operating Hours	Reading Date
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Vehicle Tilt (h)

Downhill ▮ Uphill ▮
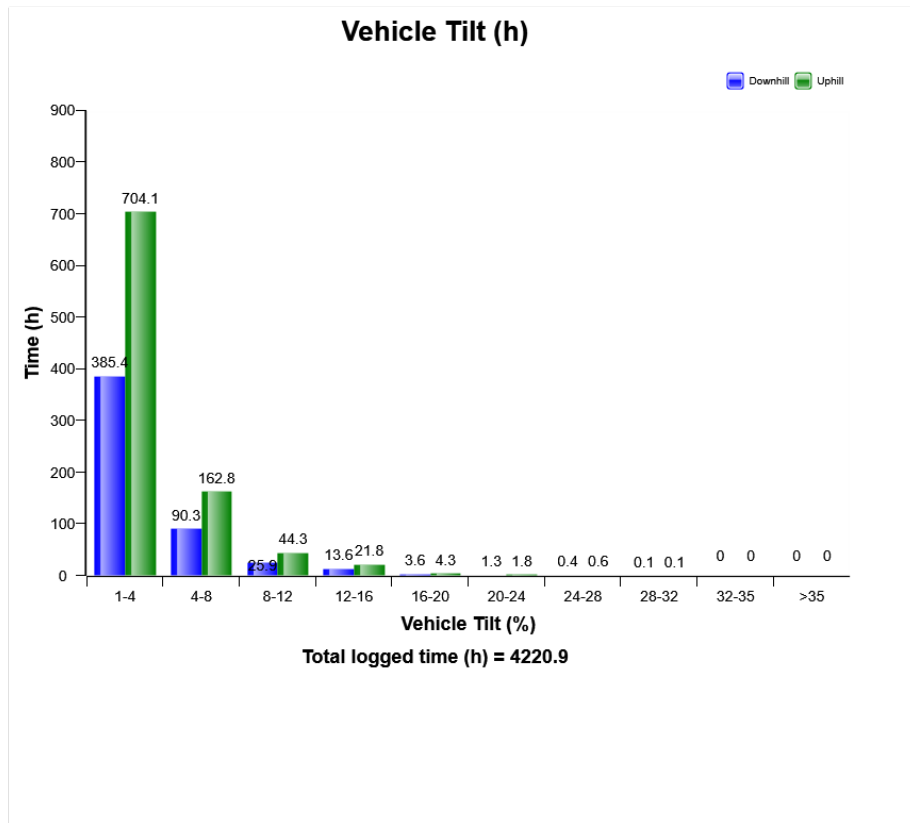
The diagram shows the distribution of the longitudinal tilt in percent (not degrees), the criteria to get registrations is that the vehicle speed exceeds 1km/h (0,62mph) and that the engine is on.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Accumulated performance
Total logged time (h) =

Total logged time (h) =
Fuel consumption (US-gallons)
Production (ton,US)
Ton/h
Ton/gal
Fuel efficiency (US Gal/ton)
Number of cycles
Cycles overloaded (%)
Load utilisation / cycle (%)

The table shows the accumulated values for respectively area stated in the table.

Values are saved over the life of the machine only when the engine is running.

4101.4
31504
749408
182.7
23.8
0.04
19700
4
84

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Fuel efficiency (US-ton/gal)

23.8

Total logged time (h) = 4101.4
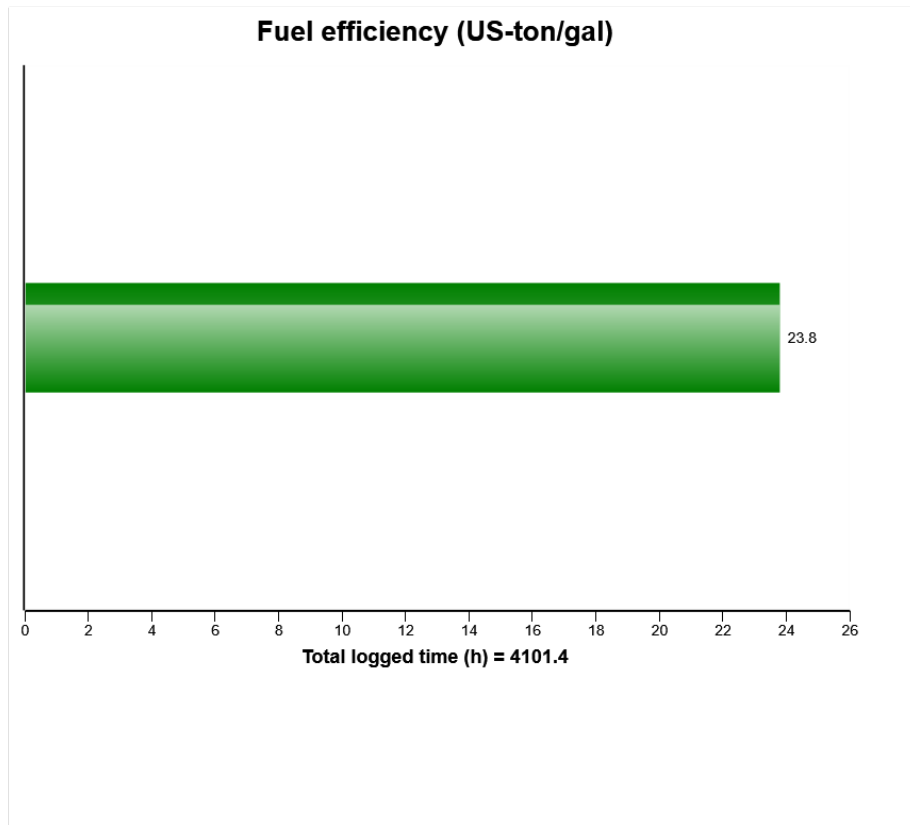
The presentation display the average produced tonne per fuel unit over the machines lifetime

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Average load

Ton, US
Total logged time (h) = 4101.4

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Average number of cycles per hour

4.8

Total logged time (h) = 4101.4
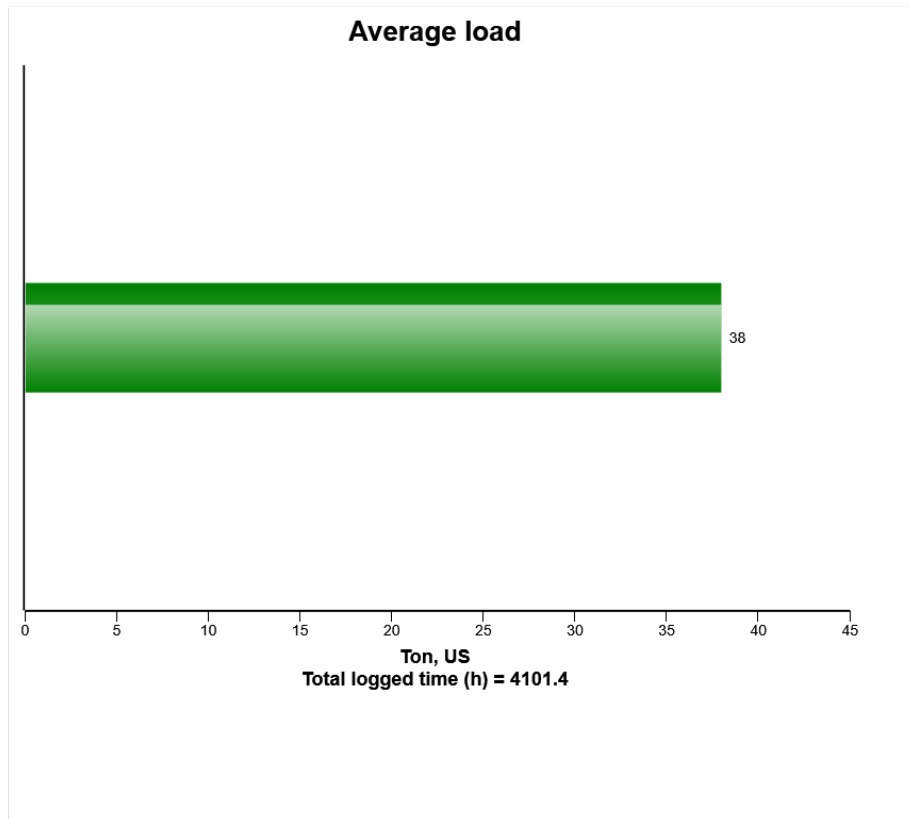
The presentation shows the average number of cycles per hour over the machines lifetime.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Engine coolant temperature, distribution (%)

Y-axis: Time (%)
X-axis: Temperature (°F)

- <167: 5
- 167-208.4: 95
- 208.4-217.4: 0
- >217.4: 0

Total time (h) = 4191

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

Machine model	SerialNo	Operating Hours	Reading Date
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Green bar = Normal working temperature. The Major part of the registrations shall be in this region.

Yellow bar =   High working temperature. It is normal to have some registrations in this region.

Red bar = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Engine coolant temperature, distribution (h)

Total time (h) = 4190.6

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

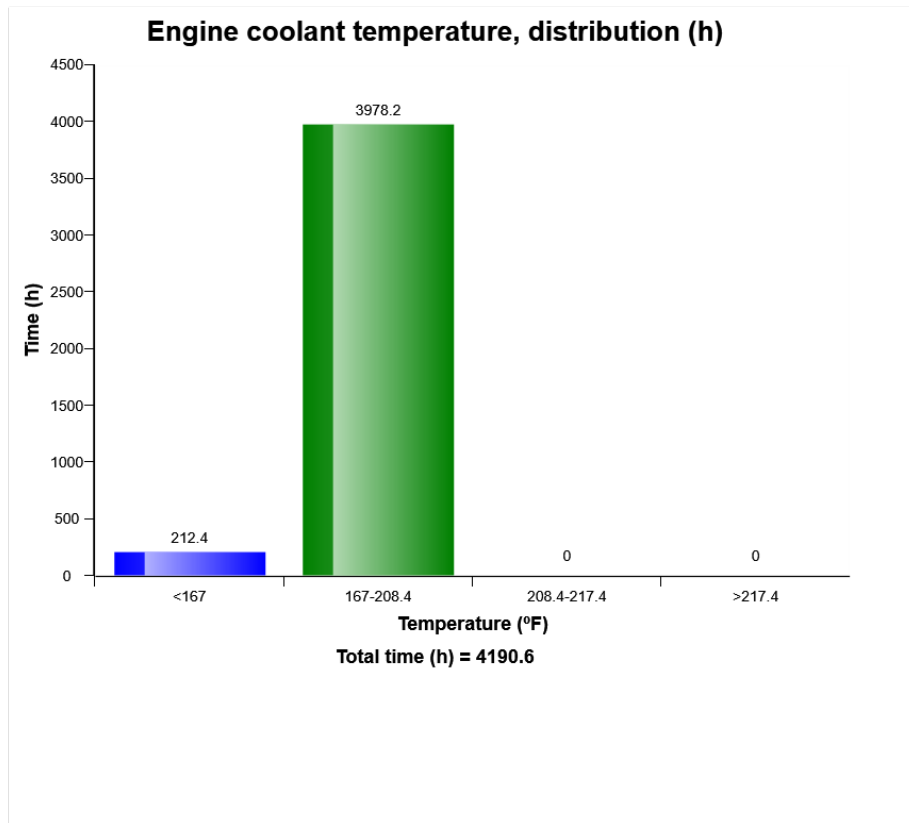Green bar = Normal working temperature. The Major part of the registrations shall be in this region.

Yellow bar = High working temperature. It is normal to have some registrations in this region.

Red bar = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Engine speed, distribution (%)

Time (%)

9.4 — 1000-1200
15.6 — 1200-1400
16.3 — 1400-1600
10.8 — 1600-1800
1.5 — 1800-2000
1.5 — 2000-2200
0 — >2200

Engine speed (rpm)

Engine run time 4220.9

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Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Engine speed, distribution (h)

Time (h)

398   660.2   686.1   456.3   61.3   64.3   0

1000-1200   1200-1400   1400-1600   1600-1800   1800-2000   2000-2200   >2200

Engine speed (rpm)

Engine run time 4220.9

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'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Start at different engine coolant temperatures (%)

Total number of occurences = 1845

Definition:

The graph shows the distribution of engine coolant temperature, at the starting moment.

Explanation:

Y-axis: Number of engine starts

X-axis: Engine coolant temperature.

A great proportion of engine wear is due to cold starts. Try to avoid extremely cold starts. Try using an electric coolant heater.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Under the graph the total number of engine starts is displayed.

Also see " *Number of starts / hour*" to get a complete picture of engine starting.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Start at different engine coolant temperatures

Total number of starts: 1845

Definition:

The graph shows the distribution of engine coolant temperature, at the starting moment.

Explanation:

Y-axis: Number of engine starts

X-axis: Engine coolant temperature.

A great proportion of engine wear is due to cold starts. Try to avoid extremely cold starts. Try using an electric coolant heater.

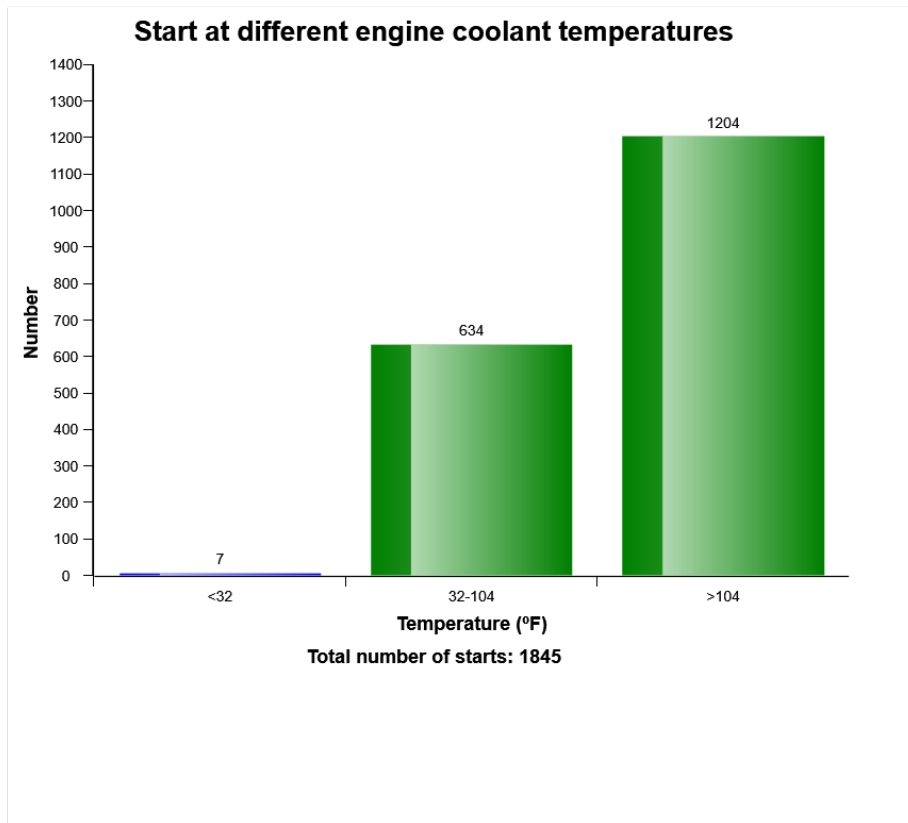| Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Under the graph the total number of engine starts is displayed.

Also see " *Number of starts / hour*" to get a complete picture of engine starting.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Average number of starts per hour

0.4

| 0 | 0.05 | 0.1 | 0.15 | 0.2 | 0.25 | 0.3 | 0.35 | 0.4 | 0.45 |

Total number of starts: 1845

Definition:

The graph describes the average number of engine starts per engine running hour.

Explanation:

X-axis: Number of average starts per hour.

The actual time used for calculation, is time with engine on

If the fuel consumption is high one reason may be that the engine is not turned off often enough, perhaps machine is left idling for long periods. Check " Machine utilization".

The value can vary a lot depending on in which application the machine is used.

To see at which different temperatures engine is started see" Start at different engine temperatures."

Machine model	SerialNo	Operating Hours	Reading Date
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Green bar = Number of average starts per hour

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

High engine coolant temperature
Total number of occurences = 0

	Op hours	Year	Month	Day	Hour	Minute	Duration (sec)
A	0	2000	0	0	0	0	0
B	0	2000	0	0	0	0	0
C	0	2000	0	0	0	0	0
D	0	2000	0	0	0	0	0
E	0	2000	0	0	0	0	0
F	0	2000	0	0	0	0	0
G	0	2000	0	0	0	0	0
H	0	2000	0	0	0	0	0
I	0	2000	0	0	0	0	0
J	0	2000	0	0	0	0	0

Definition　:

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month, day, hour and minute to show when an event has occurred.

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Only one event per minute is registered.

Over the table the total number of events is displayed.

Duration　:

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Extreme (°F)
32
32
32
32
32
32
32
32
32
32

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Criteria :

The criteria to get an registration, is that the alarm signal for high engine coolant temperature is active and that the diesel engine is running.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

High engine oil temperature
Total number of occurences = 0

	Op hours	Year	Month	Day	Hour	Minute	Duration (sec)
A	0	2000	0	0	0	0	0
B	0	2000	0	0	0	0	0
C	0	2000	0	0	0	0	0
D	0	2000	0	0	0	0	0
E	0	2000	0	0	0	0	0
F	0	2000	0	0	0	0	0
G	0	2000	0	0	0	0	0
H	0	2000	0	0	0	0	0
I	0	2000	0	0	0	0	0
J	0	2000	0	0	0	0	0

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Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Extreme (°F)
32
32
32
32
32
32
32
32
32
32

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Criteria :

The criteria to get an registration, is that the alarm signal for high engine oil temperature is active and that the diesel engine is running.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Regeneration aborted
Total number of occurences = 9

Op hours	Year	Month	Day	Hour	Minute	Reason
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
174	2017	7	21	10	29	1
338	2017	8	22	14	5	1
523	2017	9	27	15	1	1
641	2017	10	18	19	18	1
722	2017	10	30	15	13	2
988	2017	12	16	12	41	1
989	2017	12	16	14	13	1
1227	2018	1	25	6	58	1
1227	2018	1	25	6	38	1

An error has occurred while processing HtmlTextBox 'ExplanationTxb':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
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Regeneration duration
Total number of occurences = 28

Op hours	Year	Month	Day	Hour	Minute	Duration (min)
721	2017	10	30	14	30	43
821	2017	11	21	10	23	46
908	2017	12	6	7	55	47
988	2017	12	16	13	47	26
988	2017	12	16	12	14	27
989	2017	12	18	6	45	34
1084	2018	1	9	11	41	44
1158	2018	1	17	11	24	51
1226	2018	1	24	16	35	43
1227	2018	1	25	6	27	11
1227	2018	1	25	6	49	9
1228	2018	1	25	7	16	28
1737	2018	4	20	7	14	30
1737	2018	4	19	18	13	33
2242	2018	6	25	7	18	46
2242	2018	6	23	18	34	5
2725	2006	8	22	8	35	53
2852	2006	9	11	13	52	57
3357	2007	1	1	3	46	49
3865	2019	4	26	1	22	57

An error has occurred while processing HtmlTextBox 'ExplanationTxb':
The 'span' start tag on line 1 position 43 does not match the end tag of 'BR'. Line 1, position 153.

Machine model	SerialNo	Operating Hours	Reading Date
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Water level warning in water separator
Total number of occurences = 7

Op hours	Year	Month	Day	Hour	Minute	Duration (min)
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
0	2000	0	0	0	0	0
2860	2006	9	12	14	48	0
2864	2006	9	13	7	12	11
2869	2006	9	13	12	18	14
2873	2006	9	17	7	4	0
2931	2006	9	23	14	14	3
2968	2006	9	26	17	55	2
3010	2006	10	16	16	14	0

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Machine model	SerialNo	Operating Hours	Reading Date
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High voltage
Total number of occurences = 26

Op hours	Year	Month	Day	Hour	Minute	Duration (sec)	Extreme value
3725	2007	3	3	19	40	89	31.8
3725	2007	3	14	1	15	120	31.6
3725	2007	3	14	1	19	94	31.6
3597	2007	1	28	22	7	5	31.4
3543	2007	1	22	21	2	6	31.5
3461	2007	1	13	2	42	141	31.8
3446	2007	1	11	21	53	150	31.4
2992	2006	9	30	11	0	0	0.0
2101	2018	6	6	18	37	136	31.5
1760	2018	4	23	11	27	3	30.4
1459	2018	3	13	17	43	55	31.5
1089	2018	1	10	6	29	0	30.3
979	2017	12	15	15	0	3	29.7
961	2017	12	14	6	32	0	29.1
959	2017	12	13	16	4	3	30.6
318	2017	8	12	14	31	114	31.3
315	2017	8	11	17	28	154	30.8
286	2017	8	4	17	29	161	30.7
278	2017	8	3	17	19	128	31.5
264	2017	8	1	17	20	161	32.1

Definition   :

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Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

an event has occurred.

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Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

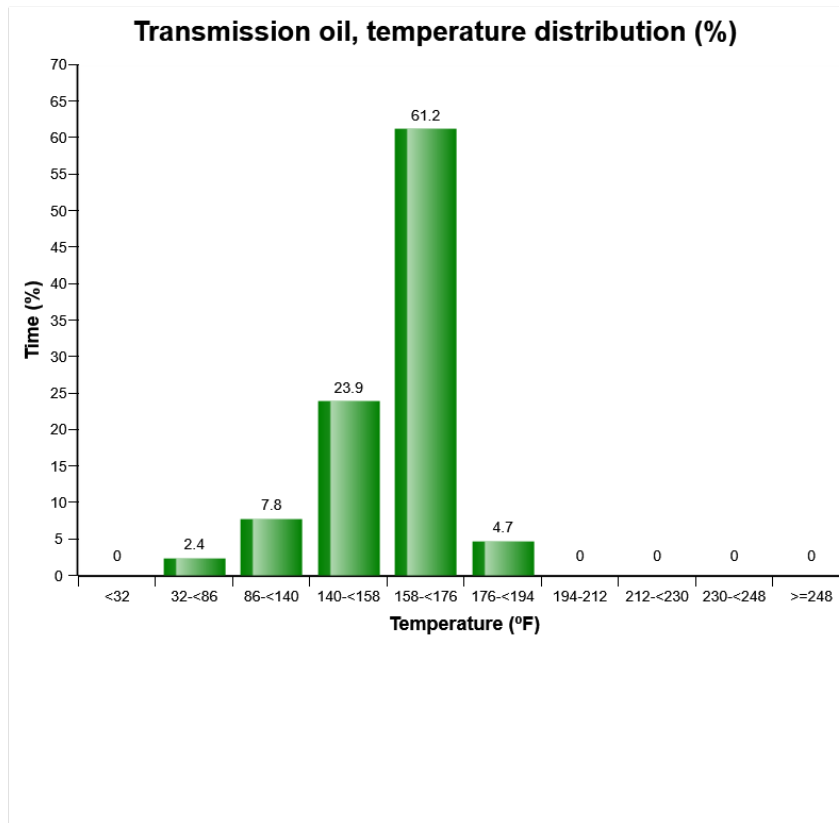The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, Alarm high system voltage , is active.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Low voltage
Total number of occurences = 2

Op hours	Year	Month	Day	Hour	Minute	Duration (sec)	Extreme value
318	2017	8	12	14	31	0	23.3
264	2017	8	1	17	20	1	13.4
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0
0	2000	0	0	0	0	0	0.0

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month , day , hour and minute to show when

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, Alarm low system voltage , is active.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Transmission oil, temperature distribution (%)

Time (%) vs Temperature (ºF)

Temperature (ºF)	Time (%)
<32	0
32-<86	2.4
86-<140	7.8
140-<158	23.9
158-<176	61.2
176-<194	4.7
194-212	0
212-<230	0
230-<248	0
>=248	0

The diagram shows the transmission oil temperature in various temperature ranges. The time is displayed in the following ten temperature ranges:

<32ºF Temperatures below 32ºF

32-<86ºF Temperatures from 32ºF until 86ºF

86-<140ºF Temperatures from 86ºF until 140ºF

140-<158ºF Temperatures from 140ºF until 158ºF

158-<176ºF Temperatures from 158ºF until 176ºF

176-<194ºF Temperatures from 176ºF until 194ºF

194-<212ºF Temperatures from 194ºF until 212ºF

212-<230ºF Temperatures from 212ºF until 230ºF

230-<248ºF Temperatures from 230ºF until 248ºF
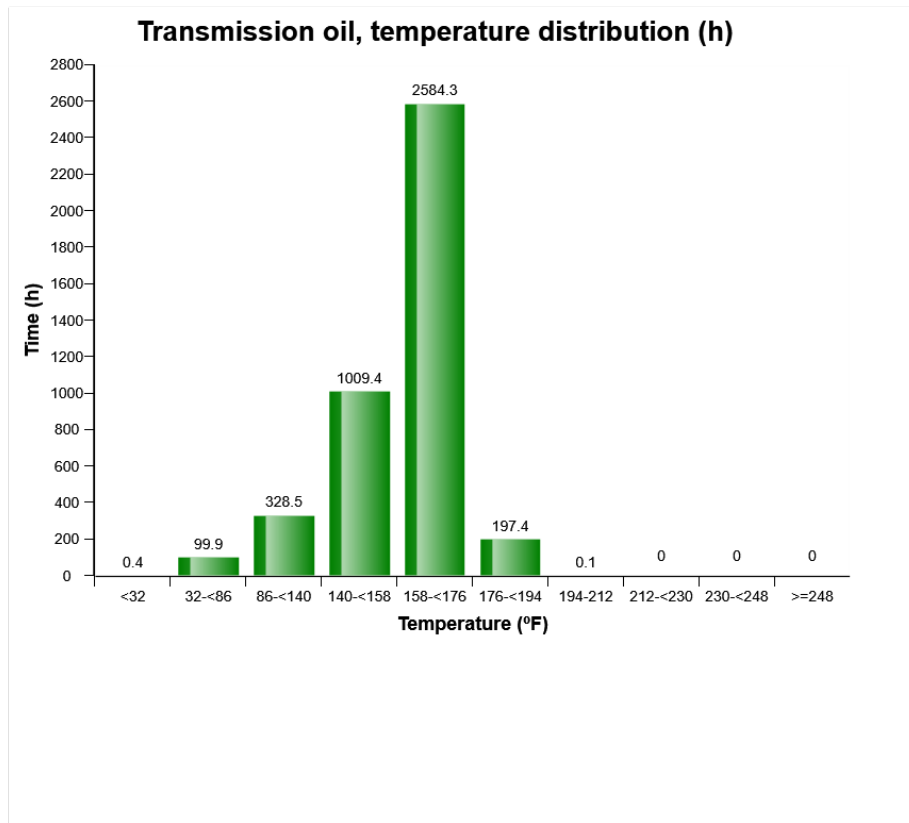
>248ºF Temperatures over 248ºF
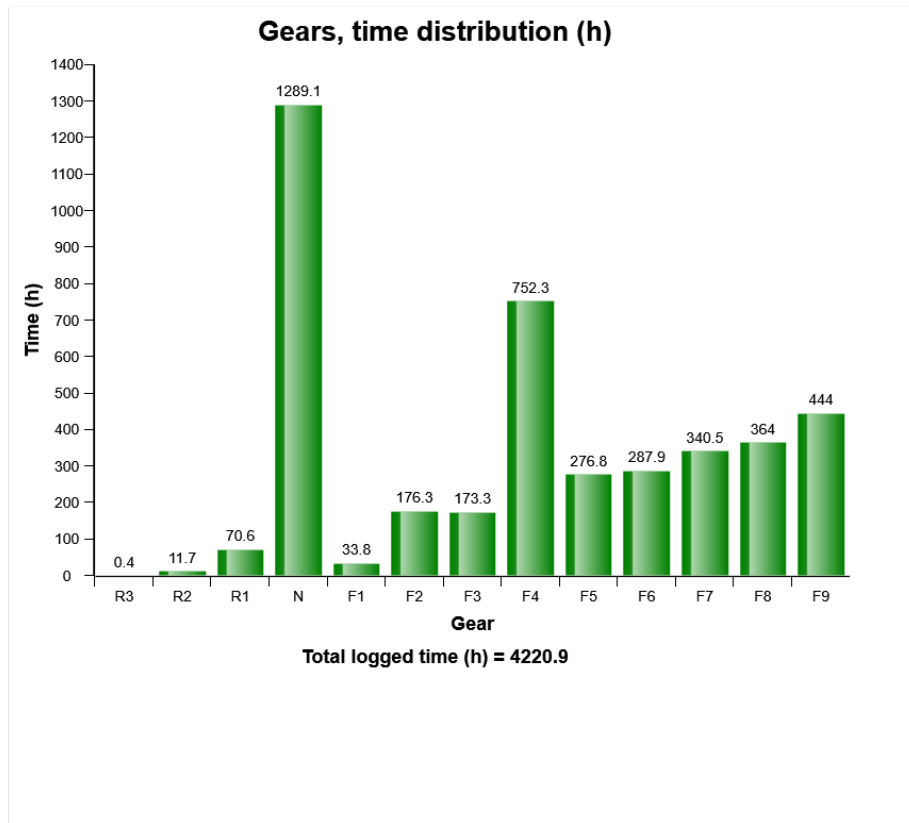
The bar that describes temperatures from 230ºF until 248ºF is yellow and means that the oil has began to be overheated. Driver has been given orange central warning

The bar that describes >248ºF is red and means that the oil has been overheated. Driver has been given red central warning.

Oil temperatures exceeding 230ºF must be avoided since the properties of the oil are degraded

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Transmission oil, temperature distribution (h)

The diagram shows the transmission oil temperature in various temperature ranges. The time is displayed in the following ten temperature ranges:

<32ºF Temperatures below 32ºF

32-<86ºF Temperatures from 32ºF until 86ºF

86-<140ºF Temperatures from 86ºF until 140ºF

140-<158ºF Temperatures from 140ºF until 158ºF

158-<176ºF Temperatures from 158ºF until 176ºF

176-<194ºF Temperatures from 176ºF until 194ºF

194-<212ºF Temperatures from 194ºF until 212ºF

212-<230ºF Temperatures from 212ºF until 230ºF

230-<248ºF Temperatures from 230ºF until 248ºF

>248ºF Temperatures over 248ºF

The bar that describes temperatures from 230ºF until 248ºF is yellow and means that the oil has began to be overheated. Driver has been given orange central warning

The bar that describes >248ºF is red and means that the oil has been overheated. Driver has been given red central warning.

Oil temperatures exceeding 230ºF must be avoided since the properties of the oil are degraded

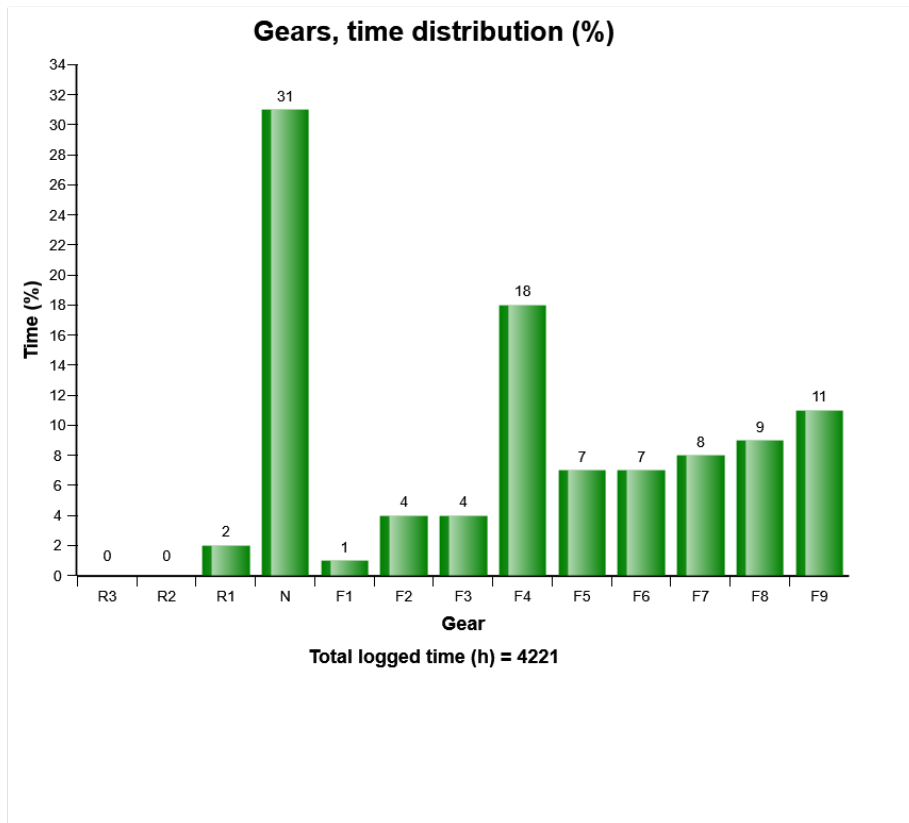| Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Gears, time distribution (h)

The diagram shows the time for each gear. Each bar represents a gear.

How the time is distributed between the gears depends on the operating conditions.

Gears, time distribution (%)

Time (%) — Gear

Gear	Value
R3	0
R2	0
R1	2
N	31
F1	1
F2	4
F3	4
F4	18
F5	7
F6	7
F7	8
F8	9
F9	11

Total logged time (h) = 4221

The diagram shows the time for each gear. Each bar represents a gear.

How the time is distributed between the gears depends on the operating conditions.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Longitudinal difflock engaged (h)

703.6
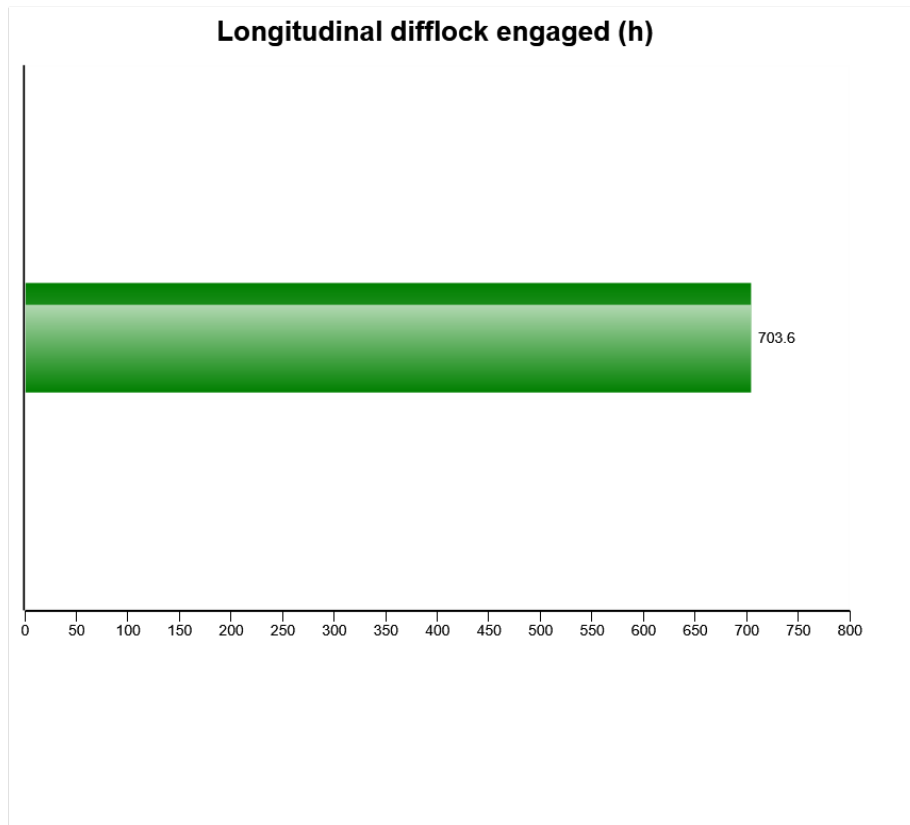
The diagram shows how long time in hours the longitudinal difflock has been engaged. The presentation only shows time when the machine is moving as this is when the wear on the difflock occurs. The difflock should always be disengage when not needed to avoid unnecessary wear.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Longitudinal difflock use related to machine in motion (%)
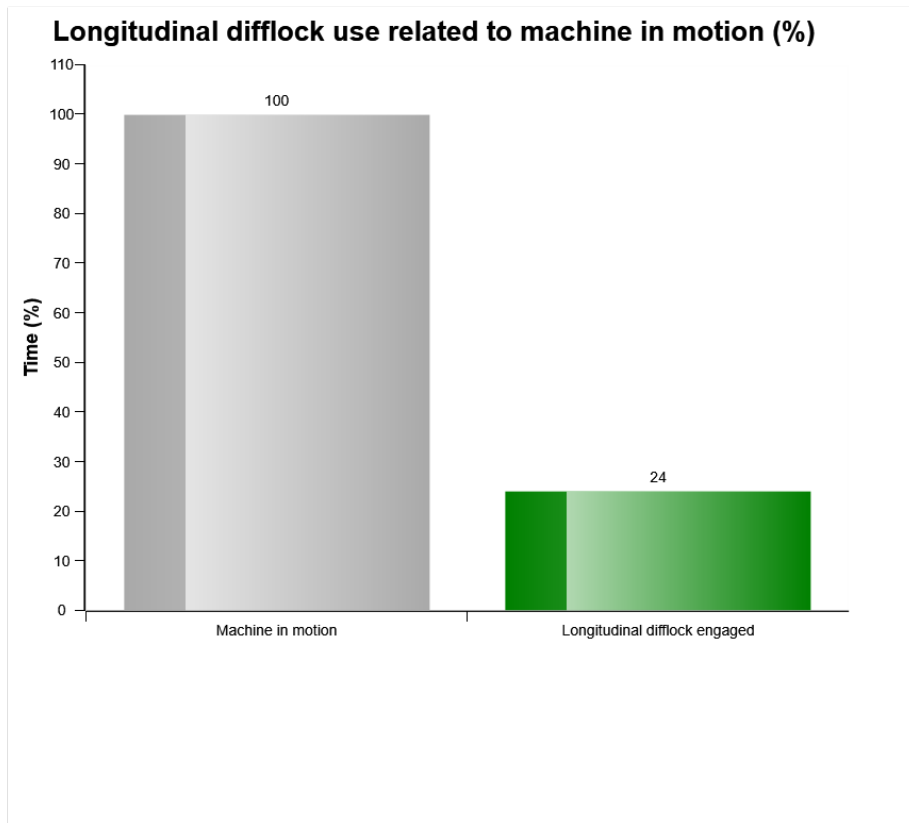
The diagram shows the percentage of engaged longitudinal difflock in relation to machine in motion.

The longitudinal difflock should always be disengaged when not needed to reduce wear.

The normal use of the longitudinal difflock in relation to the time that the machine has been operated depends on the operating conditions. Generally, the more offroad applications the machine operates in, the higher the longitudinal difflock use shall be in relation to the time that the machine has been operated. Also operating in uphill conditions on slippery surface can require longitudinal difflock.

Also check " Longitudinal difflock engaged (h)"

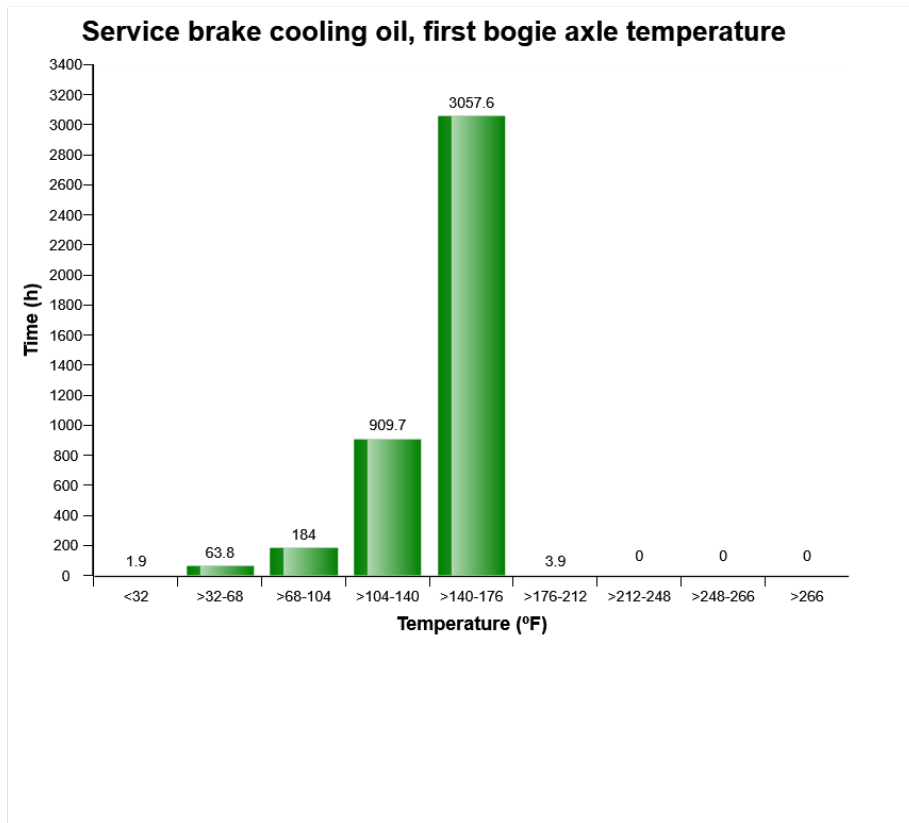**Service brake cooling oil, front axle temperature**
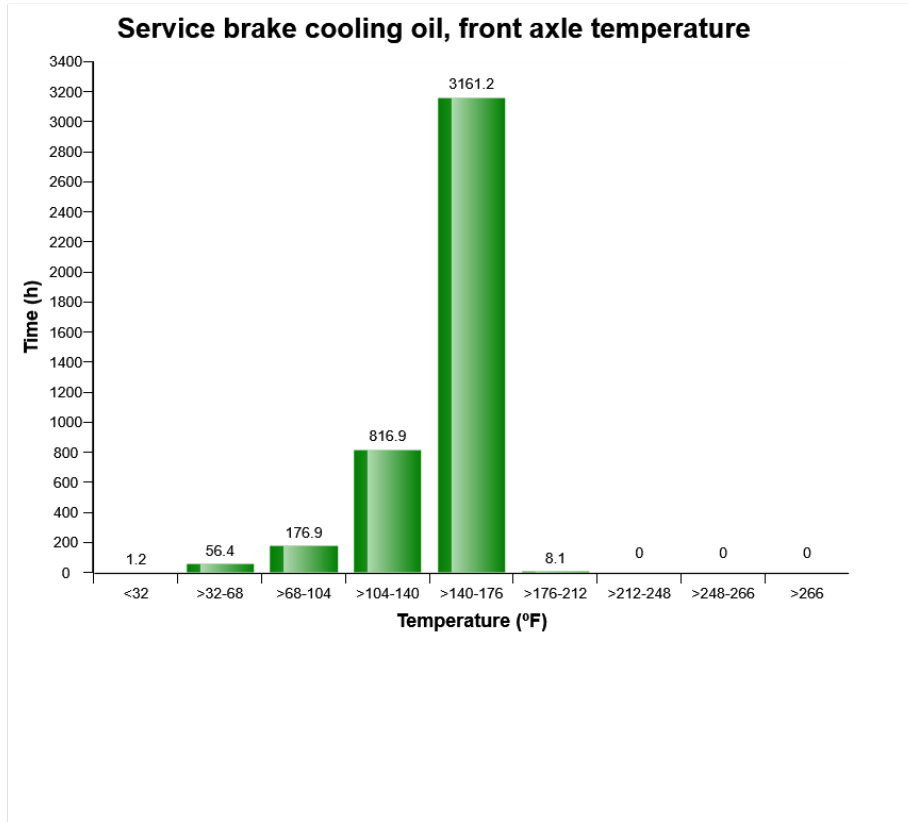
The diagram shows the front axle brake cooling oil temperature. The temperatures are divided into ranges, yellow bar (>248-266ºF) and red bar (>266ºF) shows abnormal temperatures. The temperature is registered in the line from the front axle to the oil cooler, that is, the warmest oil in the circuit.

The temperature shown by yellow and red bars degrade the properties of the cooling oil, and may be the result of incorrect and hard operation of the machine. Check the brake pressure distribution in the diagram "Service brake pressure, distribution (%)". If the brake cooling oil temperature is high despite normal distribution of service brake pressure, there is probably a malfunction in the brake cooling circuit

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

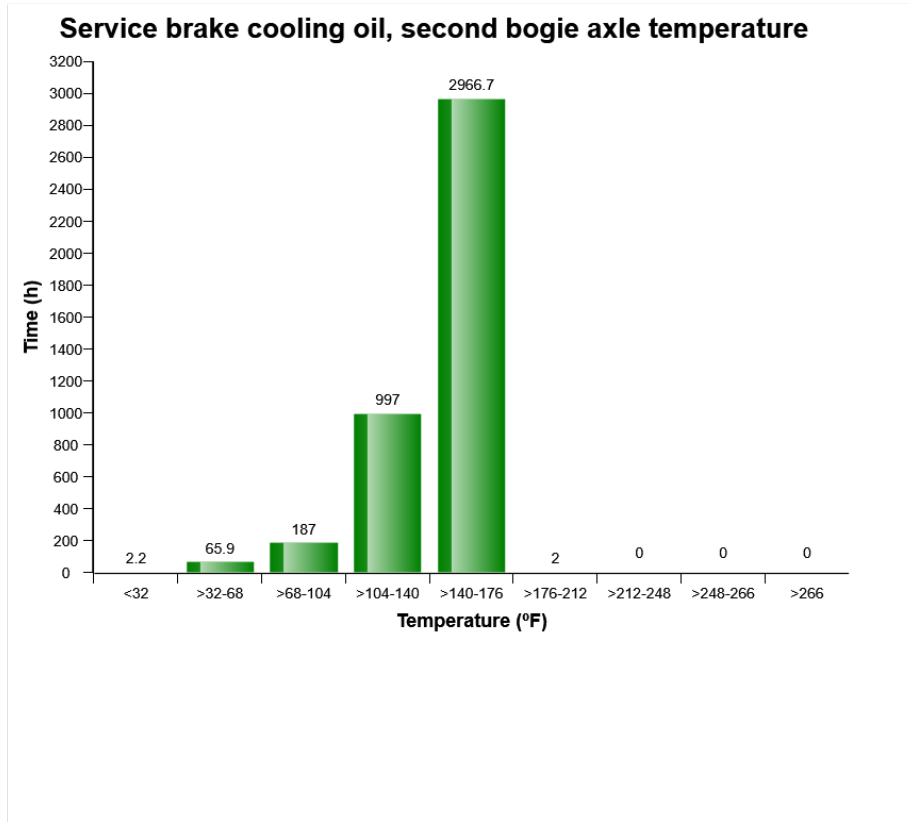**Service brake cooling oil, first bogie axle temperature**

The diagram shows the first bogie axle brake cooling oil temperature. The temperatures are divided into ranges, yellow bar (>248-266ºF) and red bar (>266ºF) shows abnormal temperatures. The temperature is registered in the line from the first bogie axle to the oil cooler, that is, the warmest oil in the circuit.

The temperature shown by yellow and red bars degrade the properties of the cooling oil, and may be the result of incorrect and hard operation of the machine. Check the brake pressure distribution in the diagram "Service brake pressure, distribution (%)". If the brake cooling oil temperature is high despite normal distribution of service brake pressure, there is probably a malfunction in the brake cooling circuit.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

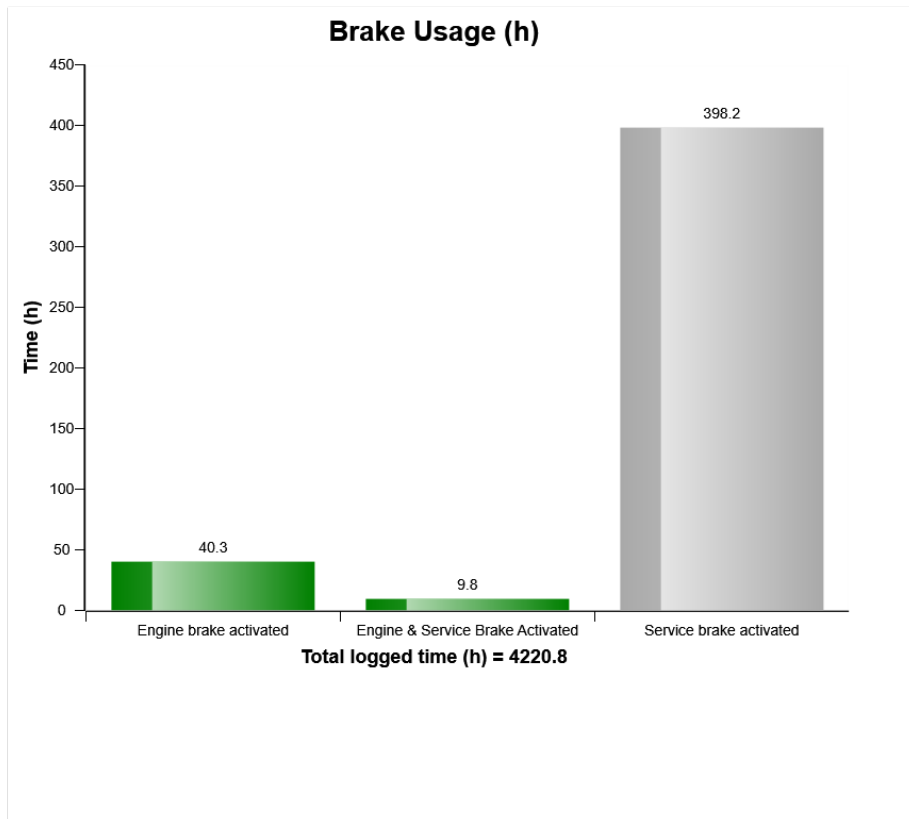**Service brake cooling oil, second bogie axle temperature**

The diagram shows the front axle brake cooling oil temperature. The temperatures are divided into ranges, yellow bar (>248-266ºF) and red bar (>266ºF) shows abnormal temperatures. The temperature is registered in the line from the second bogie axle to the oil cooler, that is, the warmest oil in the circuit.

The temperature shown by yellow and red bars degrade the properties of the cooling oil, and may be the result of incorrect and hard operation of the machine. Check the brake pressure distribution in the diagram "Service brake pressure, distribution (%)". If the brake cooling oil temperature is high despite normal distribution of service brake pressure, there is probably a malfunction in the brake cooling circuit.
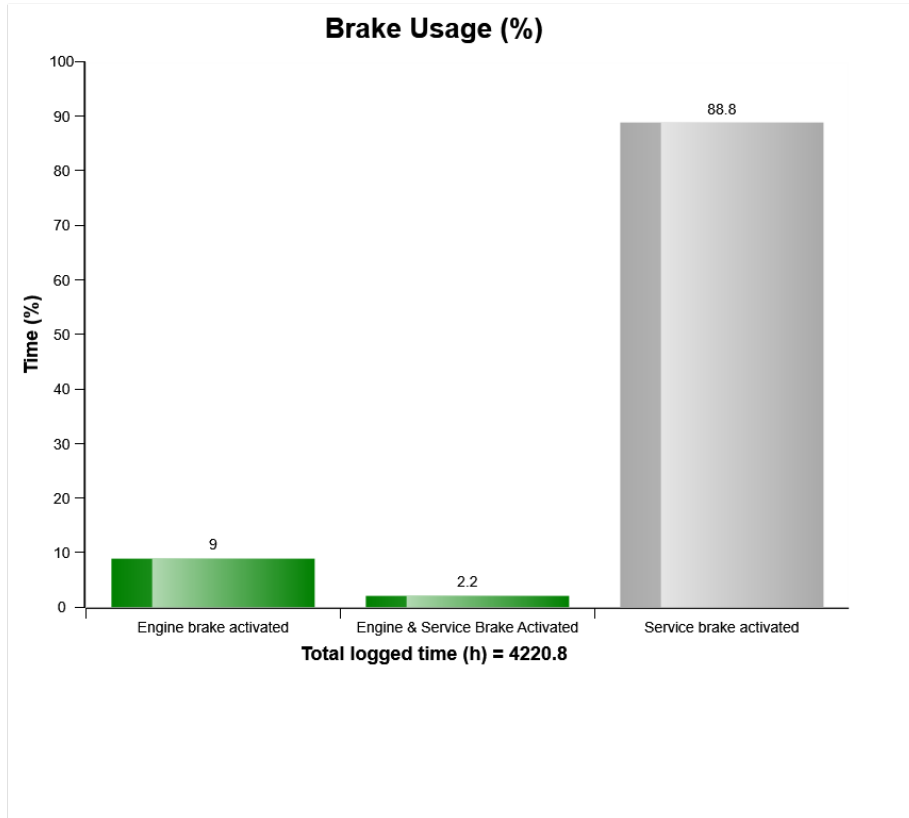
Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Brake Usage (h)

Time (h)

450 —
400 —   398.2
350 —
300 —
250 —
200 —
150 —
100 —
50 —   40.3
0 —   9.8

Engine brake activated   Engine & Service Brake Activated   Service brake activated

Total logged time (h) = 4220.8

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Brake Usage (%)

Time (%)

- Engine brake activated: 9
- Engine & Service Brake Activated: 2.2
- Service brake activated: 88.8

Total logged time (h) = 4220.8

An error has occurred while processing HtmlTextBox 'htmlTextBox1':
'WordSection1' is an unexpected token. The expected token is '"' or '''. Line 1, position 18.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Low Brake Servo Pressure
Total number of occurences = 13

	Op hours	Year	Month	Day	Hour	Minute	Duration (sec)
D	266	2017	8	2	7	0	0
E	310	2017	8	10	8	5	0
F	317	2017	8	12	7	45	0
G	894	2017	12	4	9	26	0
H	1024	2018	1	2	6	9	10
I	1358	2018	2	16	7	14	0
J	1531	2018	3	21	6	33	2
A	1856	2018	5	2	7	10	3
B	3506	2007	1	16	19	14	1
C	4218	2019	9	25	6	54	2

Definition　:

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month, day, hour and minute to show when an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration：

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value：

The extreme value column displays the most extreme value during the event.

Extreme (psi)
1866
552
645
1729
1872
1667
1940
1643
2027
1921

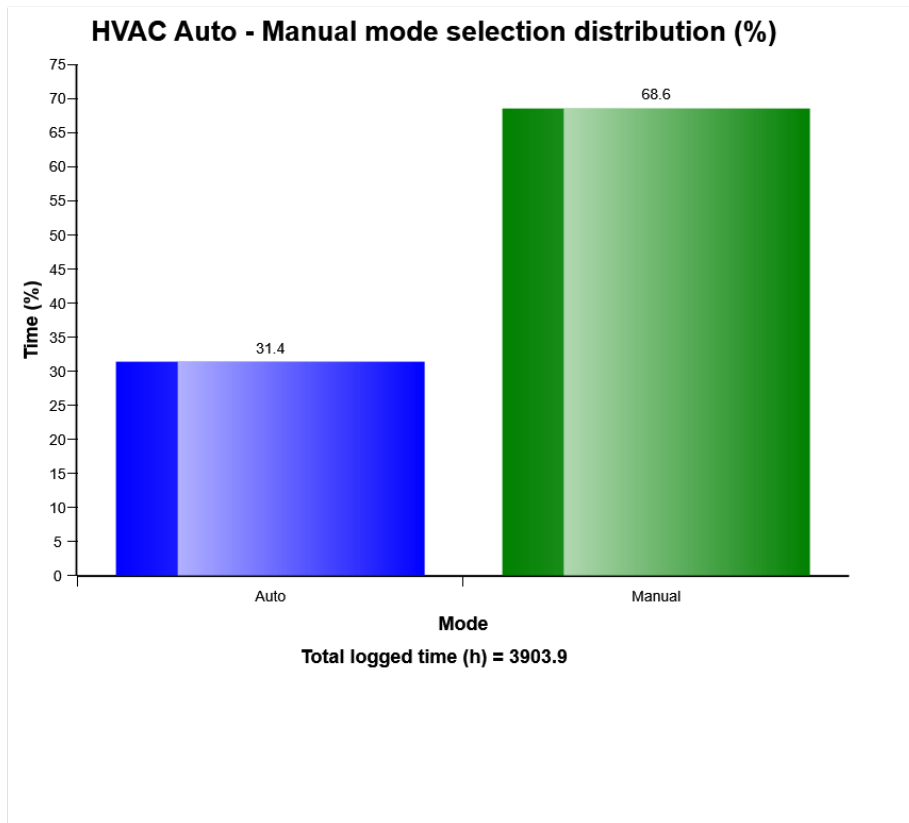| Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Criteria :

In order for an occurrence of low brake servo pressure to be recorded in a data point and the count to increment by 1, the low brake servo pressure state must be alarm. Gear not in Neutral and engine must be on.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

HVAC Auto - Manual mode selection distribution (%)

Total logged time (h) = 3903.9

Definition:

The diagram describes auto-manual mode sele ction distribution of HVAC system in machine while it Works. The share of each mode compared to Total time of HVAC operation is displayed.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

HVAC air temperature setting in auto control mode distribution (h)
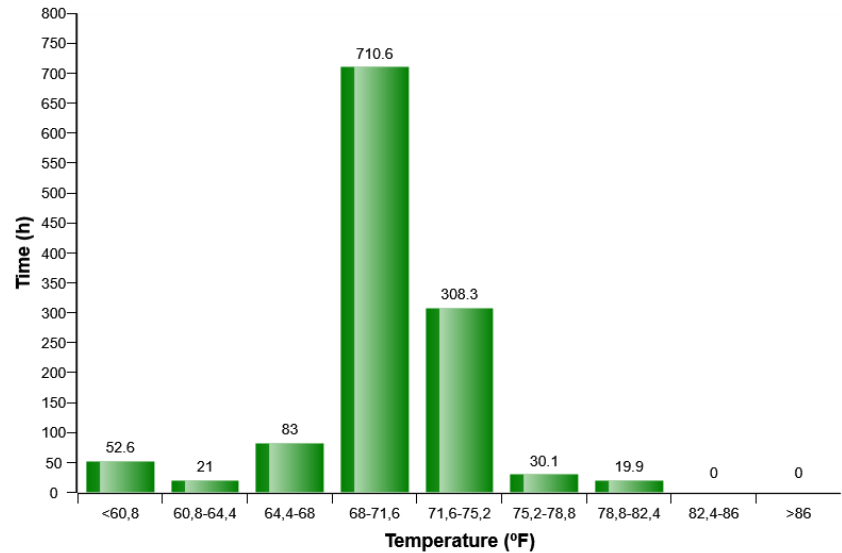
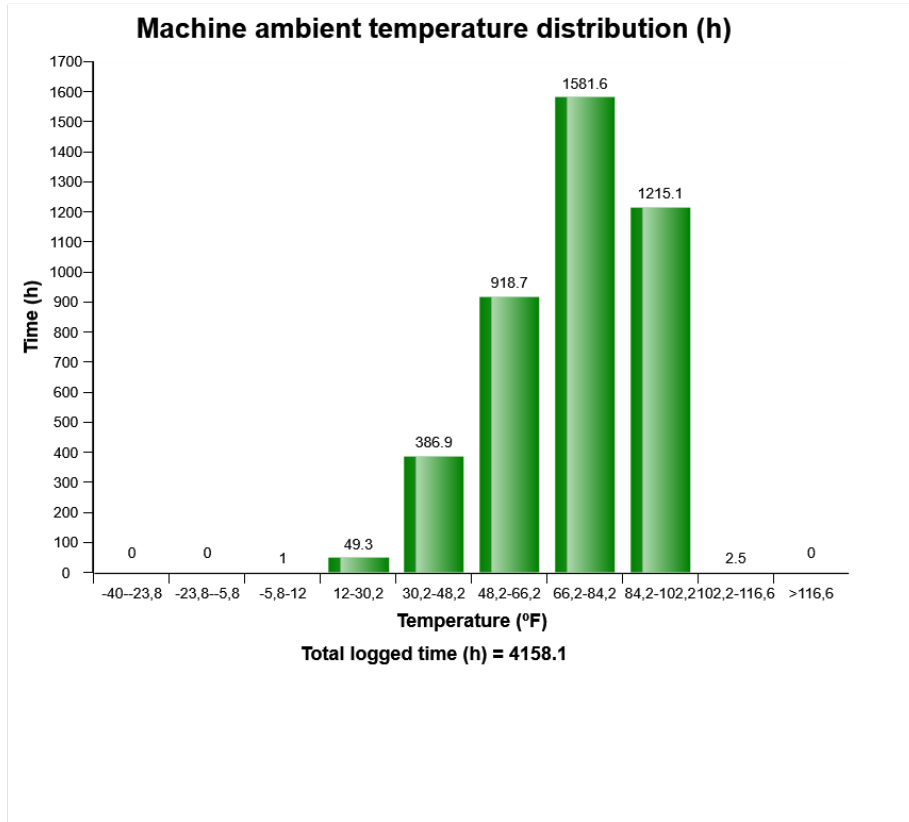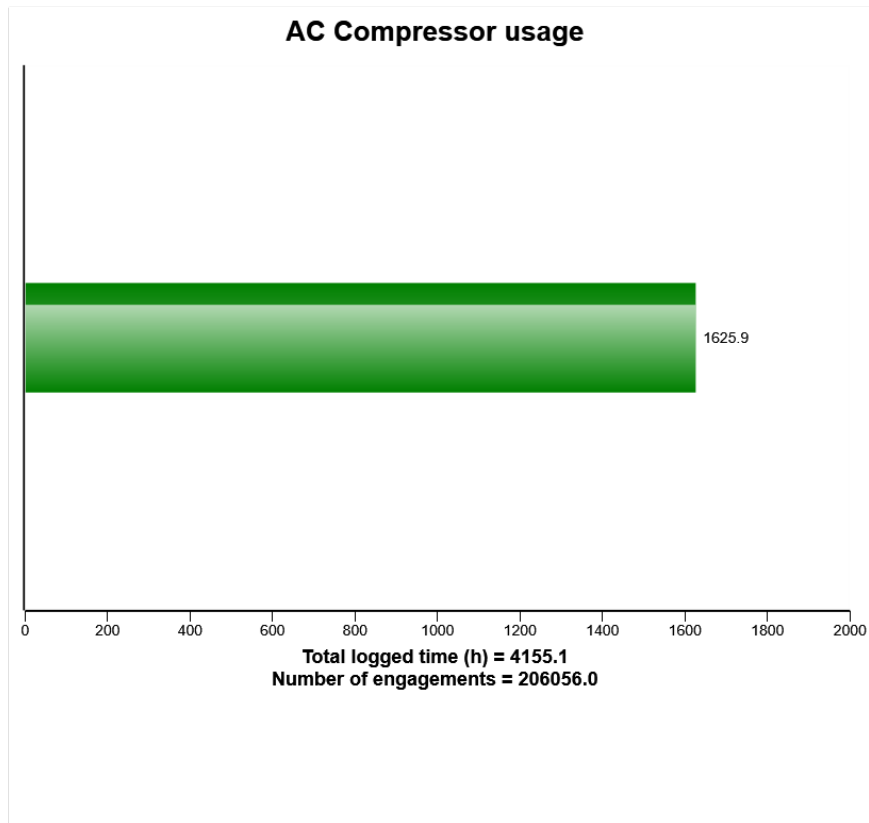## Definition:

The diagram describes air temperature setting distribution for HVAC auto control mode established by operator in Cabin

Machine ambient temperature distribution (h)

Total logged time (h) = 4158.1

Values shown: -40--23,8: 0; -23,8--5,8: 0; -5,8-12: 1; 12-30,2: 49.3; 30,2-48,2: 386.9; 48,2-66,2: 918.7; 66,2-84,2: 1581.6; 84,2-102,2: 1215.1; 102,2-116,6: 2.5; >116,6: 0

Time (h) — Temperature (°F)

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

AC Compressor usage

1625.9

Total logged time (h) = 4155.1
Number of engagements = 206056.0

Definition:

 The graph shows the total time of AC compressor engagement.

Explanation:

Green bar: Total time in hours, AC compressor has been engaged.

Under the graph the total engine running time (in hours) is displayed.

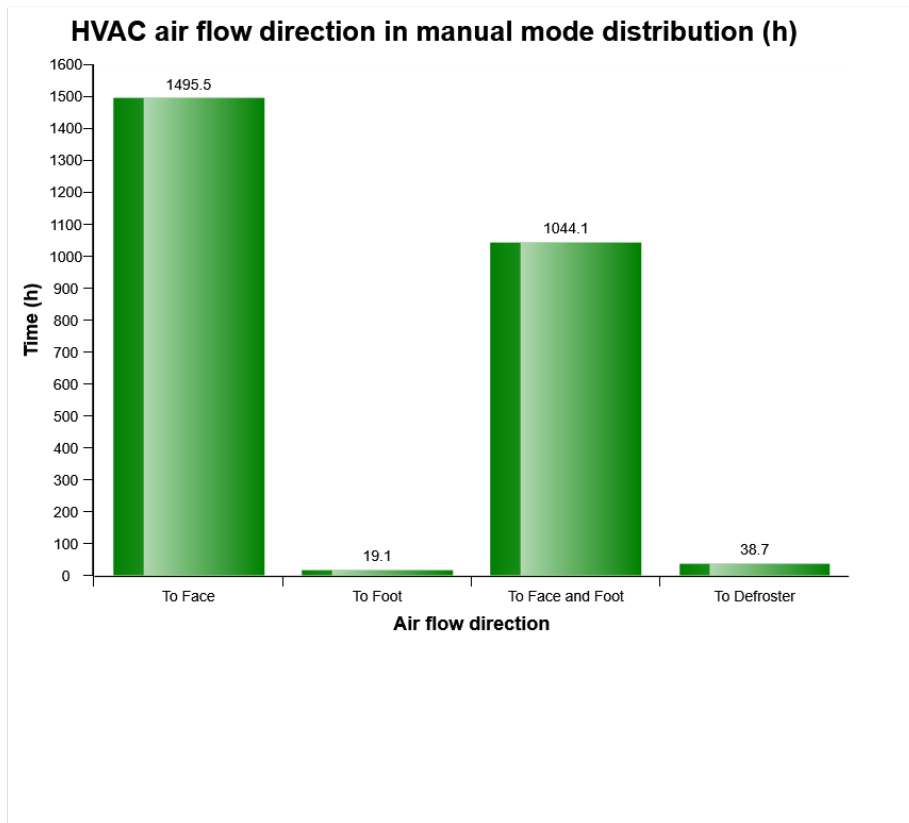Total number of AC compressor activations is also displayed.

-

HVAC air flow direction in manual mode distribution (h)

Definition:

The diagram describes air flow direction distribution for HVAC manual control mode established by operator in Cabin.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

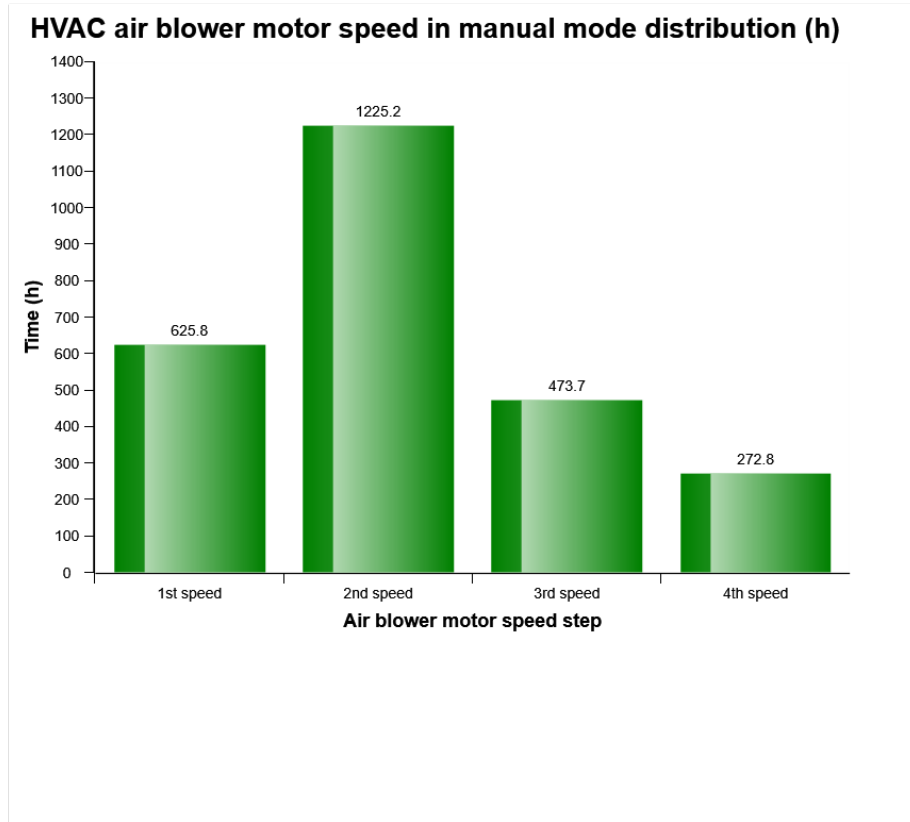**HVAC air blower motor speed in manual mode distribution (h)**

Definition:

The diagram describes air blower motor speed distribution for HVAC manual control mode established by operator in Cabin.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

AC High Pressure
Total number of occurences = 848

Op hours	Year	Month	Day	Hours	Minute	Duration (sec)	Extreme (° F)
4195	2019	7	21	1	19	97	97
4195	2019	7	21	1	47	109	97
4195	2019	7	21	1	41	76	97
4195	2019	7	21	1	32	118	97
4195	2019	7	21	1	12	70	97
4195	2019	7	21	1	27	54	97
4196	2019	7	21	2	17	55	99
4196	2019	7	21	2	10	77	97
4196	2019	7	21	2	1	64	97
4201	2019	7	23	0	56	53	91
4201	2019	7	23	1	26	70	93
4202	2019	7	23	1	56	60	93
4202	2019	7	23	2	23	72	95
4202	2019	7	23	2	5	87	95
4202	2019	7	23	1	47	60	93
4203	2019	7	23	2	41	52	91
4204	2019	7	23	3	58	7	91
4205	2019	7	23	5	2	11	91
4205	2019	7	23	4	30	24	93
4206	2019	7	23	5	43	40	91

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month , day , hour and minute to show when

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, High AC Pressure signal is active. Ambient temp is viewed.

AC Boiling Protection
Number of engagements = 0

Op hours	Year	Month	Day	Hour	Minute	Duration (sec)	Extreme (° F)
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32
0	2000	0	0	0	0	0	32

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month , day , hour and minute to show when

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.

Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, Boiling protection signal is active. Ambient temp is viewed.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

AC System Cut Out Pressure
Total number of occurences = 24

Op hours	Year	Month	Day	Hour	Minute	Duration (sec)	Extreme (° F)
2990	2006	9	27	7	14	-48670	70
2995	2006	9	27	12	17	23027	90
3001	2006	9	28	7	18	-46018	68
3007	2006	9	28	12	58	19392	90
3012	2006	9	30	11	37	710	79
3013	2006	9	30	15	10	153	84
3013	2006	10	1	14	17	53	73
3013	2006	10	1	14	56	39	72
3013	2006	10	1	15	51	56	72
3013	2006	10	1	16	0	291	70
3013	2006	10	3	7	8	4088	50
3014	2006	10	5	9	39	-56617	61
3014	2006	10	5	9	32	116	61
3017	2006	10	5	12	28	1946	70
3017	2006	10	5	13	3	4517	32
3018	2006	10	8	9	53	-64410	45
3018	2006	10	5	14	21	28	79
3019	2006	10	14	14	42	352	59
3019	2006	10	8	15	0	211	46
3019	2006	10	15	7	8	9790	50

Definition   :

This type of table shows the latest occasions when a specific event has occurred. When a specified criteria is fulfilled a registration is made. Each table row corresponds to one occasion. Operating hours is displayed in the first column, followed by year, month , day , hour and minute to show when

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

an event has occurred.

The rows are not ordered chronological (The latest event may be in the middle).

Only one event per minute is registered.

Over the table the total number of events is displayed

Duration :

The duration of each event is shown after the timestamp of the event.

The duration is counted as long as the criteria is fulfilled.
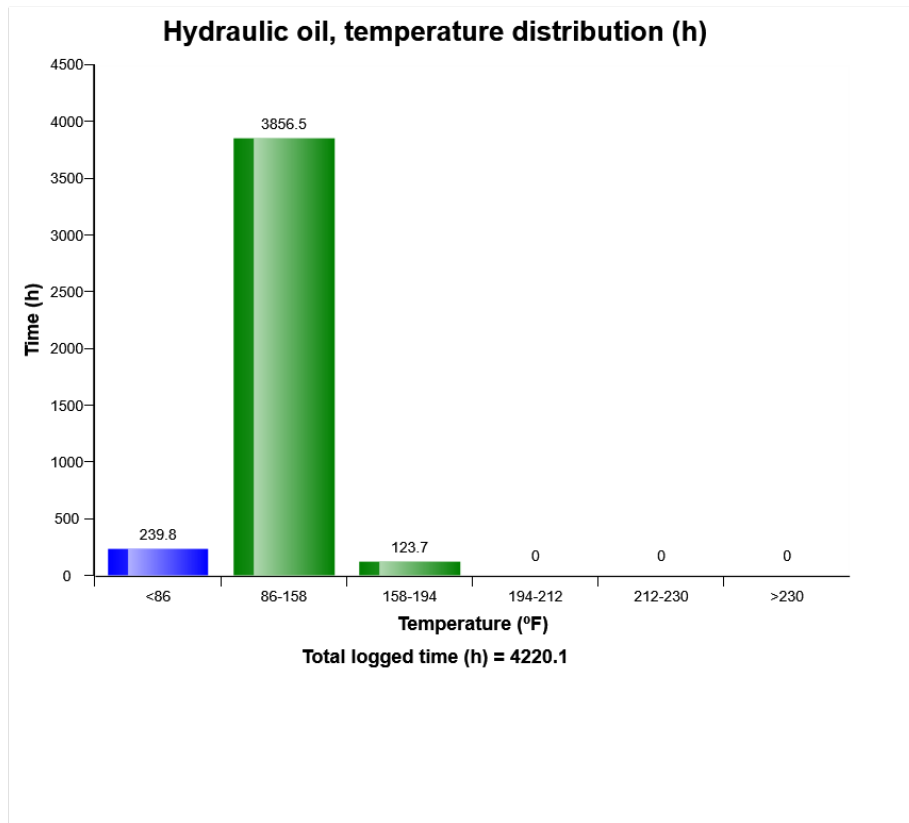
Extreme value :

The extreme value column displays the most extreme value during the event.

Criteria :

Logging is performed when, AC cut out pressure signal is active. Ambient temp is viewed.

Hydraulic oil, temperature distribution (h)

Time (h) (Y-axis)

- 4500
- 4000 — 3856.5
- 3500
- 3000
- 2500
- 2000
- 1500
- 1000
- 500 — 239.8 / 123.7 / 0 / 0 / 0
- 0

Temperature classes: <86, 86-158, 158-194, 194-212, 212-230, >230

Temperature (^{0}F)

Total logged time (h) = 4220.1

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar   = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Green bar = Normal working temperature. The Major part of the registrations shall be in this region.
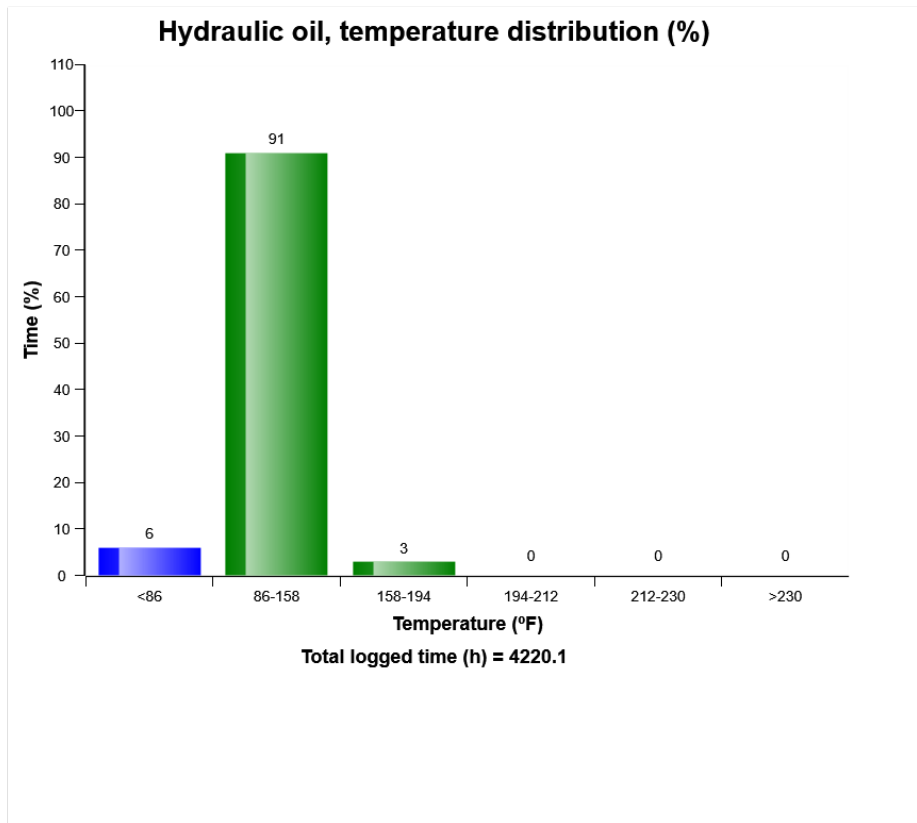
Yellow bar = High working temperature. It is normal to have some registrations in this region.

Red bar = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.

Machine model	SerialNo	Operating Hours	Reading Date
A45G	342062	4220.6	26/11/2019

Hydraulic oil, temperature distribution (%)

Time (%) vs Temperature (°F)

- <86: 6
- 86-158: 91
- 158-194: 3
- 194-212: 0
- 212-230: 0
- >230: 0

Total logged time (h) = 4220.1

Definition:

The graph shows the time distribution of the temperature, while engine running.

Explanation:

Y-axis: Time

X-axis: Temperature distribution in classes.

Blue bar = Warm-up phase.

During the engine warm-up phase, this temperature region is passed.

It is normal to have registrations in this region.

Green bar = Normal working temperature. The Major part of the registrations shall be in this region.

Yellow bar = High working temperature. It is normal to have some registrations in this region.

Red bar = Alarm.

Registrations in this region is not normal, running in this region may cause severe damage.