CONVI

User and Service Manual

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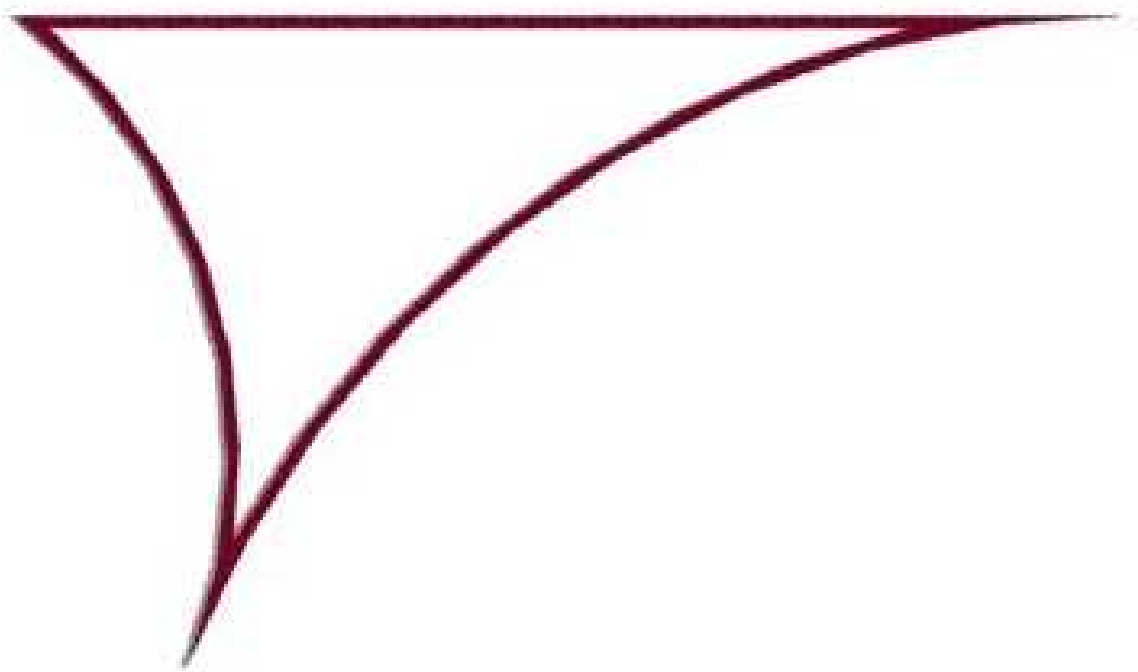
Visco Control



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Visco Control

1. Description

Visco Control 1 is a consistency control system, which controls the concrete's viscosity based on the Visco Probe's measurements. The viscosity is regulated by post-dosing water.
The concrete is produced with a water deficit of approx. 5%. When the concrete is mixed homogenously, the Visco Control system will read the Visco Probe's measured value for viscosity and calculate the amount of water that needs to be added to achieve the required viscosity for the concrete.
When the mix is ready Visco Control 1 checks that both the concrete's viscosity and yield stress are within the permitted deviations, before it allows the mixer to be emptied.
Visco Control 1 works with the mixing system's process control unit via a simple interface. Through this interface, the process control unit receives information from Visco Control 1 on how much water needs to be added to the mixture to achieve the correct viscosity. It is thus the process control unit that controls and monitors everything relating to the addition of the water.

2. Interface with the process control

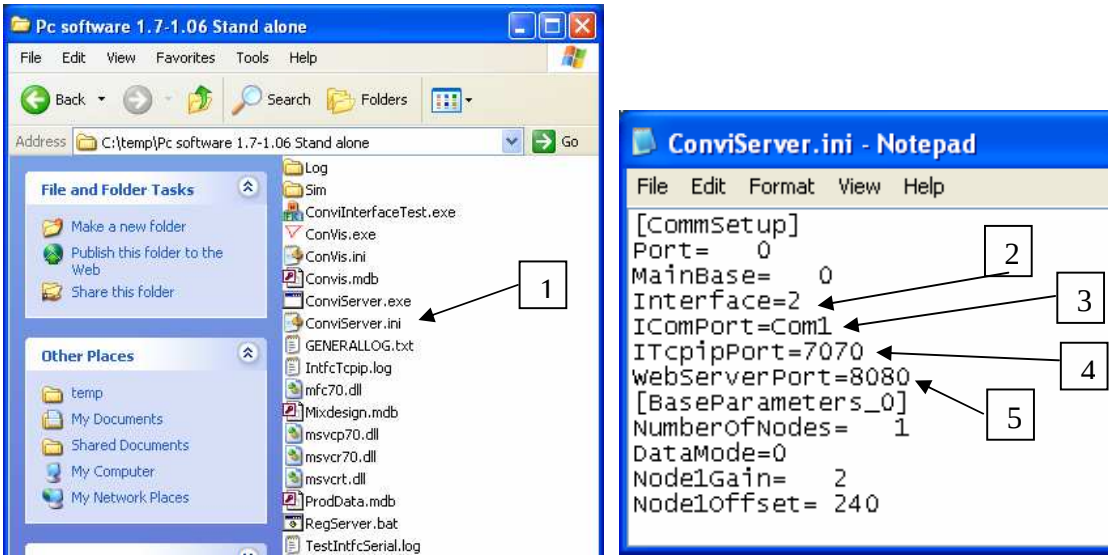
There are three different interface options:

1. Serial connection via RS232 or RS485.
2. Simple tcp/ip communication via Ethernet.
3. http communication via Ethernet.

The three options are described in more detail in appendix 1.

On delivery the system is set up to work with interface solutions 2 and 3. If you want to use solution 1, the settings need to be changed.
This change can be carried out by opening the software folder supplied by Convi, then:

1. Opening the 'ConviServer.ini' file.
2. Changing the interface from 2 to 1.
3. Changing the 'IcomPort' specifier to the com port that is actually being used.
4. Click 'file' and click 'Save'.
5. Click 'file' and 'close'.
6. Close the 'Convi' folder.

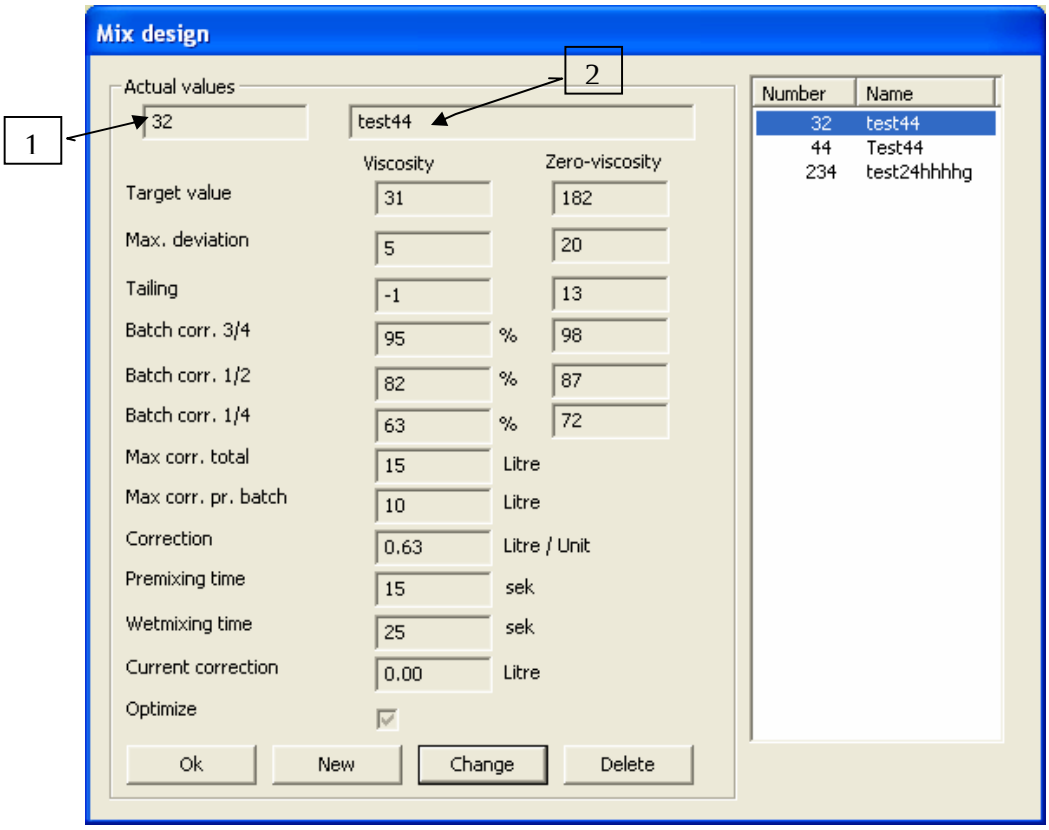


If you are using tcp/ip or http and you want to use a different port address than the default one (tcp/ip = 7070 and http = 8080), enter the relevant parts of the port address you wish to use in lines 4 and 5.

The protocols that need to be used for the third interface option are shown in appendix 2.

3. Entering mix design values in the Visco Control system

Click the ‘Mix design’ button on the Visco Probe’s user interface to bring up an image of the next page on the screen.
If you want to change a mix design, click the ‘Change’ button. If you want to create a new mix design, click the ‘New’ button. Once all details have been entered, click the ‘Save’ button and then ‘OK’.
State the mix design number and name in the field marked ‘1’ and’2’ exactly as they appear in the process control unit.



Target value for viscosity and yield stress are automatically entered for the following test mix. The value '0' is thus entered.
Max. Deviation indicates the acceptable size of the deviation for viscosity or yield stress. The given values are used as a starting point.
Tailing is the change made during the wetmixing time if no extra water is added. The values are automatically entered for the following test mix. Enter value as '0'.
Batch corr. indicates the difference in measured values for full batches and smaller batches. 100 is entered as a starting point in all six fields. The values are changed later, when the dependence on the batch size is found.
Max corr. total indicates by how much Visco Control 1 may correct the values. The given values are used as a starting point.
Max corr. pr. batch indicates how much Visco Control 1 may correct the values from one batch to the next. The given values can be used as a starting point.
Correction is the value used for water calculation. The values are automatically read for the following test mix. Enter value as '0'.
Premixing time is the time from when the last material was added to the mixer until the water calculation is carried out. The time must be long enough to ensure that the mix is almost homogenous. This is considered to be when the Visco Probe's viscosity

measurement is stable or deviates only slightly. The value is dependent on the mixer and machine and may be found by mixing a mix design and measuring the time taken.
Wetmixing time is the time between when Visco Control 1 advises how much water must be dosed until the mix is homogenous again, which is when the Visco Probe's viscosity measurement is stable. The value is dependent on the mixer and machine and may be found by mixing a mix design and measuring the time taken.
Current correction is the last correction made. The value '0' is entered here.
Optimize is a possibility to choose an automatically tendency regulation of the value 'Correction'. If 'Optimize' is marked, the value for 'Correction' will be regulated by 0.01 after each batch based on the experience from this batch. If the experience shows, that the value for 'Correction' is correct, there will be no regulation.

4. Correction for batch size

The dependency on batch size is recorded by mixing a whole batch to the required target values. The concrete level in the mixer is measured. Then around 25% of the mix is emptied manually. The mixer is started and the Visco Probe's measurements are recorded once they become stable. The mixer is stopped and the concrete level is measured. The process is repeated until the minimum batch size is reached.
By entering the measured values in a coordinate system and drawing a line between the measuring points, the values can be found for a ¾, ½ and $^1/_4$ batch.
The values are entered in 'Mix design' as a percentage of the value for a full batch.

5. Assessing the max. deviation

By entering small values for maximum deviations you ensure strict control of the concrete consistency. Choosing a smaller value than the total machine's operating tolerances can mean that there are many situations in which the deviations are too great to allow Visco Control 1 to give the signal that the mixture is alright and the mixer can be emptied.
The max. deviation for viscosity can be set to a corresponding water quantity for a full batch. This is done by multiplying the numerical values by the numerical value found for correction.

6. Test mix and monitoring

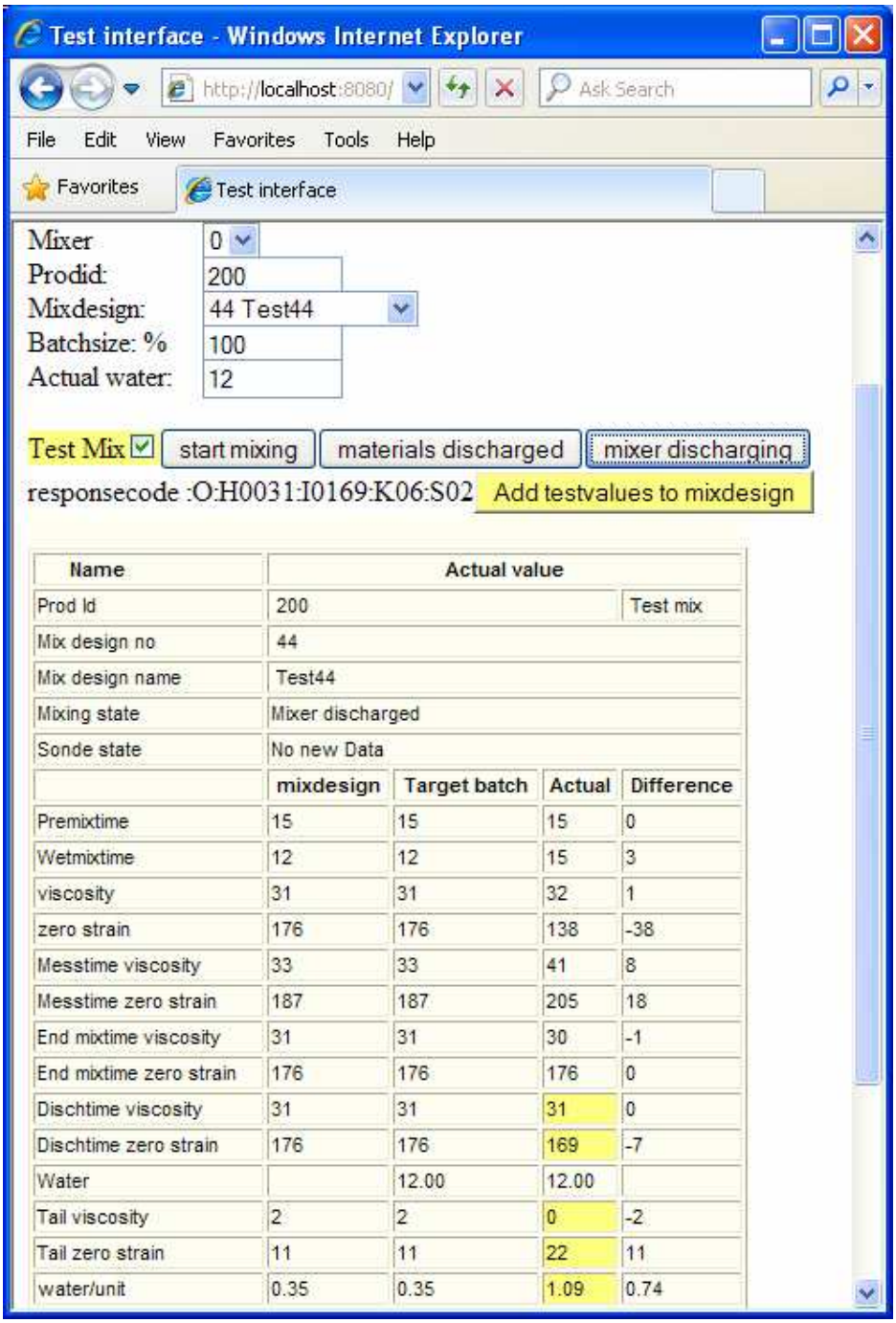
The system can always be contacted using an internet browser regardless of the choice of interface type. This can be done from the PC used to drive the system, or from any other PC that is connected to it via a network.

The address to use from the PC used to drive the system is ‘http://localhost:8080/’. If you want to connect using another PC, then change ‘localhost’ to the name of the PC used to drive the system.
The internet browser is used for the following:

1. Testing the mix to find and record target values and calculation values for the mix design.
2. Using Visco Control 1 for the process control unit without an interface.
3. Monitoring and searching for information.

7. Test mix of the current mix design

The test is carried out on a full batch.
5 to 10 % of the theoretical amount of water for the batch is reserved for the Visco Probe.
Connect using the internet browser as directed above.
Click the ‘test’ button and tick the ‘Test Mix’ box (see image).
State ’Actual water’ as approximately 75 % of the water reservation mentioned above.
Start the mix and let the mix cycle run automatically. Visco Control 1 will add the stated amount of water to the mix. Once the mix time is finished an assessment is made of whether the concrete has the correct consistency. Any necessary adjustments are then made.
When the mix is acceptable, click ‘mixer discharging’.
Assess the figures in the ‘Actual’ column and if they seem correct click the ‘Add testvalues to mixdesign’ button which should appear. The values found are added above in the mixdesign.
Remove the tick from the ‘Test Mix’ box.
Visco Control 1 is now ready to take over control of the concrete consistency for this mix design.



Name	Actual value			
Prod Id	200			Test mix
Mix design no	44			
Mix design name	Test44			
Mixing state	Mixer discharged			
Sonde state	No new Data			
	mixdesign	Target batch	Actual	Difference
Premixtime	15	15	15	0
Wetmixtime	12	12	15	3
viscosity	31	31	32	1
zero strain	176	176	138	-38
Messtime viscosity	33	33	41	8
Messtime zero strain	187	187	205	18
End mixtime viscosity	31	31	30	-1
End mixtime zero strain	176	176	176	0
Dischtime viscosity	31	31	31	0
Dischtime zero strain	176	176	169	-7
Water		12.00	12.00	
Tail viscosity	2	2	0	-2
Tail zero strain	11	11	22	11
water/unit	0.35	0.35	1.09	0.74

Any fine adjustments to the values are made in relation to the description in the Visco Probe manual. The changes are implemented by going into ‘Mixdesign’ from the Visco Probe’s interface.

8. Visco Control 1 with no interface to the process control unit

It is possible to use Visco Control 1 by manually entering the information which would otherwise be exchanged over the interface connection.
Reserving 5 to 10 % of the theoretical amount of water for the Visco Proben,
Entry is done via an internet browser and includes the following:

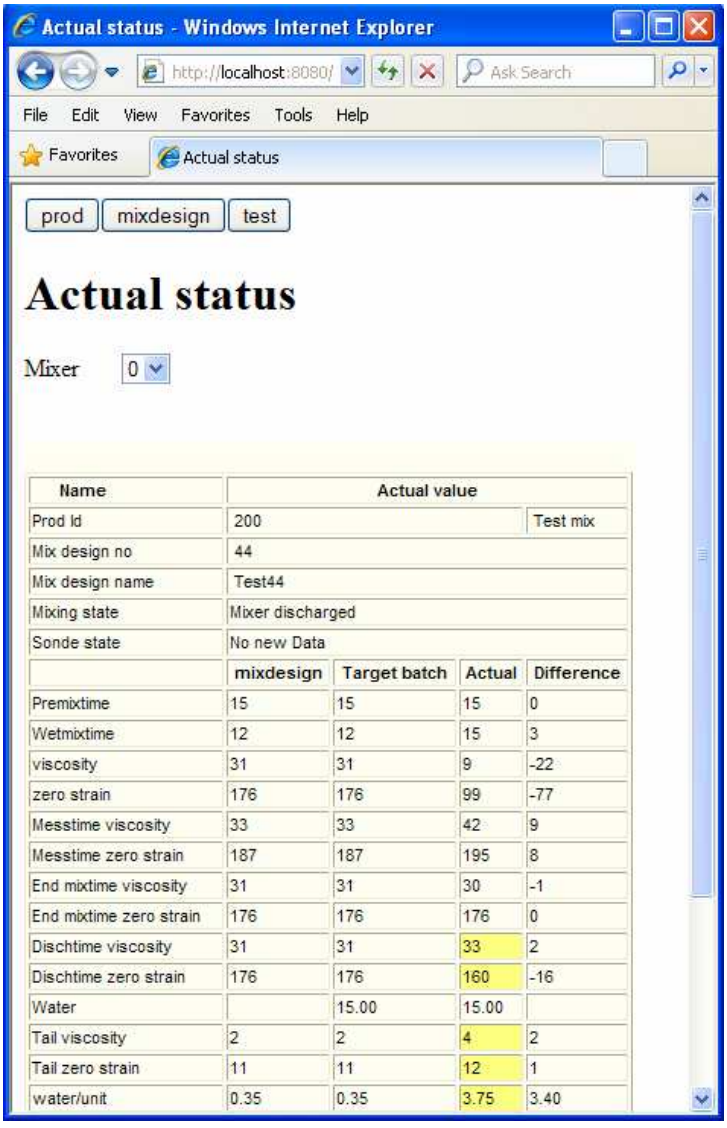
1. Select Mixer. The current base address for the Visco Probe is stated here.
2. State production ID.
3. Select the current mix design.
4. State the batch size as a percentage of the full batch.
5. Click the ‘start mixing’ button, once the material starts to run into the mixer
6. Click the ‘materials discharged’ button, once the last of the material has been emptied from the mixer. It is important that this specifier is exact.
7. When the ‘Premixtime’ has finished, indicate how much water needs to be added in the ‘Water’ line. Add the quantity of water indicated.
8. State the actual amount of water added.
9. Wait until the ‘Wetmixtime’ has finished. Check ‘Mixing state’. If the message states ‘Mixing ended, values within limits’, click the ‘mixer discharging’ button and the mixer is discharged.

If the next mix is the same, you just need to change the production ID and repeat steps 5 to 9.

If the final readings from the Visco Probe do not fall within the permitted deviations you will not get the message ‘Mixing ended, values within limits’; instead you will get the message ‘Mixing ended, values outside limits’. If this happens, follow the directions in the Visco Probe manual.

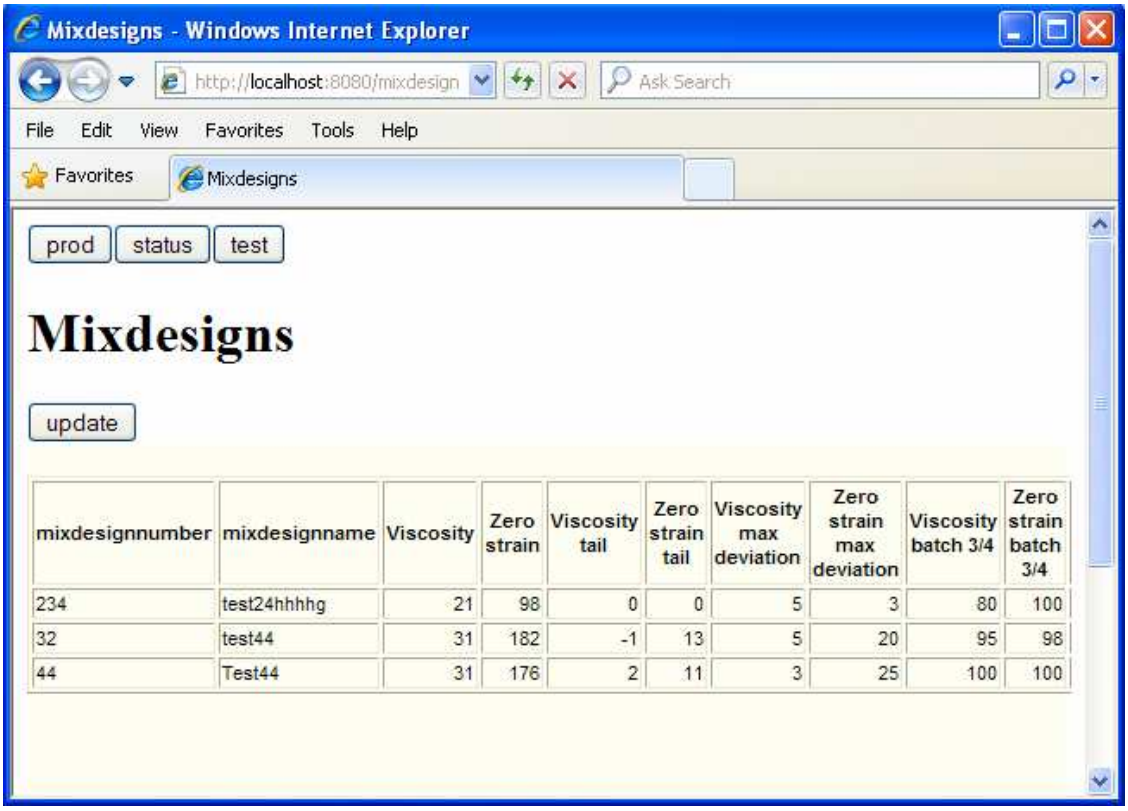
9. Status of Visco Control 1, mix designs and production log

You can see the current status for Visco Control 1 using the internet browser if you click the ‘status’ button.
You will then see the image below where you can follow the ongoing production.
The ‘mixdesign’ column shows all the values that are indicated in the mix design. The ‘Target batch’ column shows the values corrected for batch size. The ‘Actual’ and ‘Difference’ columns show the actual measurements and the difference to the target batch respectively.



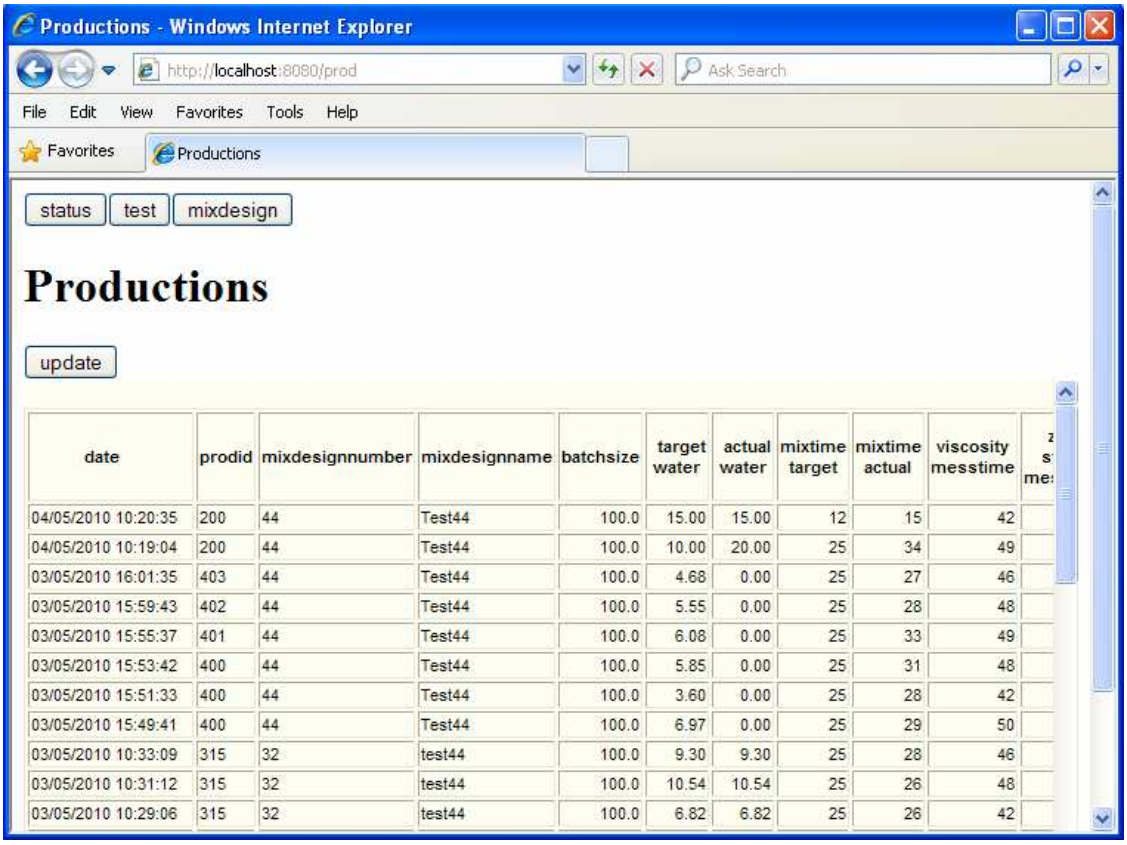
Name	Actual value			
Prod Id	200			Test mix
Mix design no	44			
Mix design name	Test44			
Mixing state	Mixer discharged			
Sonde state	No new Data			
	mixdesign	Target batch	Actual	Difference
Premixtime	15	15	15	0
Wetmixtime	12	12	15	3
viscosity	31	31	9	-22
zero strain	176	176	99	-77
Messtime viscosity	33	33	42	9
Messtime zero strain	187	187	195	8
End mixtime viscosity	31	31	30	-1
End mixtime zero strain	176	176	176	0
Dischtime viscosity	31	31	33	2
Dischtime zero strain	176	176	160	-16
Water		15.00	15.00	
Tail viscosity	2	2	4	2
Tail zero strain	11	11	12	1
water/unit	0.35	0.35	3.75	3.40

Click the ‘mixdesign’ button to bring up a view of all mix designs entered in Visco Control 1 with all accompanying values. The view appears as shown below. The image does not show all columns.



mixdesignnumber	mixdesignname	Viscosity	Zero strain	Viscosity tail	Zero strain tail	Viscosity max deviation	Zero strain max deviation	Viscosity batch 3/4	Zero strain batch 3/4
234	test24hhhhg	21	98	0	0	5	3	80	100
32	test44	31	182	-1	13	5	20	95	98
44	Test44	31	176	2	11	3	25	100	100

Click the ‘prod’ button to open the production log, which is where all data from Visco Control 1 is saved. The image appears as shown below. The image does not show all columns.



date	prodid	mixdesignnumber	mixdesignname	batchsize	target water	actual water	mixtime target	mixtime actual	viscosity messtime
04/05/2010 10:20:35	200	44	Test44	100.0	15.00	15.00	12	15	42
04/05/2010 10:19:04	200	44	Test44	100.0	10.00	20.00	25	34	49
03/05/2010 16:01:35	403	44	Test44	100.0	4.68	0.00	25	27	46
03/05/2010 15:59:43	402	44	Test44	100.0	5.55	0.00	25	28	48
03/05/2010 15:55:37	401	44	Test44	100.0	6.08	0.00	25	33	49
03/05/2010 15:53:42	400	44	Test44	100.0	5.85	0.00	25	31	48
03/05/2010 15:51:33	400	44	Test44	100.0	3.60	0.00	25	28	42
03/05/2010 15:49:41	400	44	Test44	100.0	6.97	0.00	25	29	50
03/05/2010 10:33:09	315	32	test44	100.0	9.30	9.30	25	28	46
03/05/2010 10:31:12	315	32	test44	100.0	10.54	10.54	25	26	48
03/05/2010 10:29:06	315	32	test44	100.0	6.82	6.82	25	26	42

Click the ‘update’ button to update the image to the latest new version of the production log.
To prevent the size of the log file from inhibiting the performance of your PC the contents should be deleted at regular intervals. If you want to keep any of the data in the production log, make a copy before you delete any data.