Content

1. Standard
2. Solvent prepare
3. Sample preparation
4. Sample dissolve
5. Viscometer test IV
6. Take report
7. Wash tubes

1. Standard

IUPAC	Test method	Solvent	Concentration	Temperature
PET/PBT/PCT/PEN	ASTM D4603	Phenol/Tetrachloroethane	0.5%	30℃
PET/PBT	ISO 1628-5 DIN 53728	Phenol/Dichlorobenzene	0.5%	25℃
PET/PBT/PEN	IS0 1628-5	Trichlorophenole	0.5%	25℃
PET	GB/T 17931 GB/T 14190	Phenol/Tetrachloroethane	0.5%	25℃

IVS400 can meets ASTM/ISO/DIN/GB standards for PET IV measruing

Take ASTMD 4603 as example

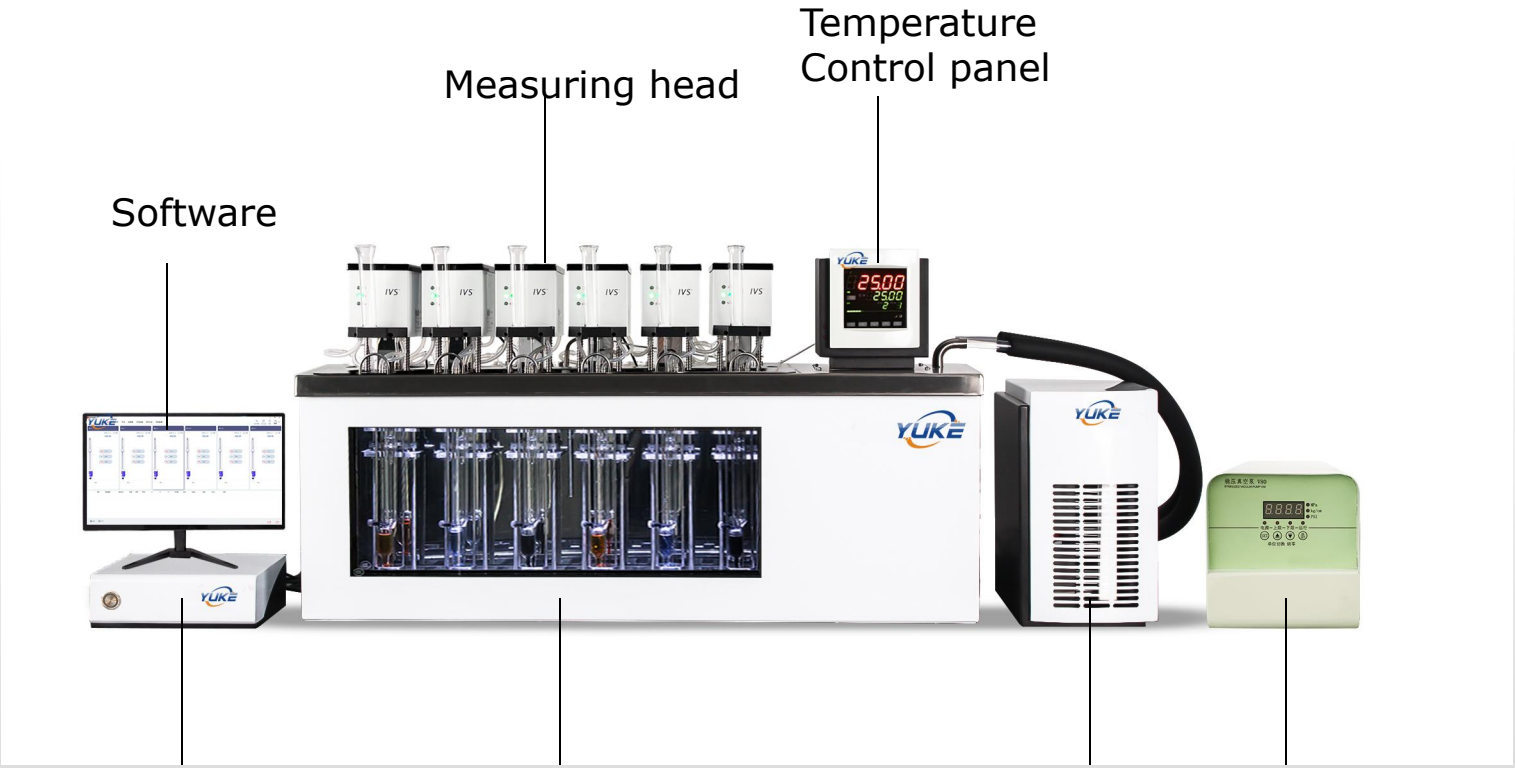
Solvent: Phenol/Tetrachloroethane

Capillary tubes: 0.88 mm

Test temperature: 30 ℃

This test method is for the determination of the inherent viscosity of poly(ethylene terephthalate) (PET) soluble at 0.50 % concentration in a 60/40 phenol/1,1,2,2-tetrachloroethane solution by means of a glass capillary viscometer.


IVS
IVS
IVS
IVS
IVS
IVS
25.00
25.00
YUKE

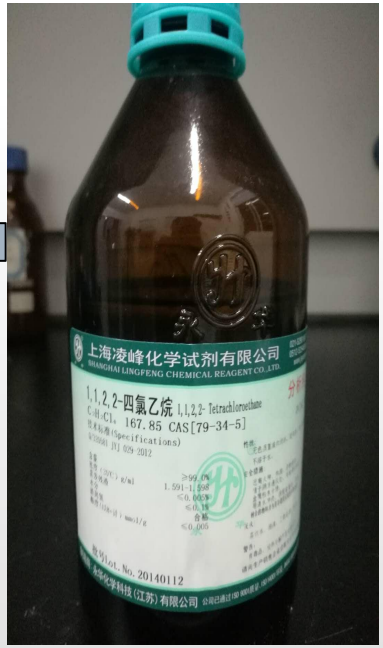

Temperature
Control panel
Measuring head
Software
Control box
Water bath
Cooling system
Vacuum pump

2. Solvent preparation

Take the weight of 60/40 phenol/1,1,2,2-tetrachloroethane

60

40



2. Solvent preparation

After solvent prepared, then place the solvent in the constant water bath and stirring for 24 hours before use.

To make sure the mix process is completely.

3. Sample preparation

3.1 PET sample

Grinding or cutting the sample will be more conducive to dissolution

3. Sample preparation

3.2. Use the 0.1 mg balance to prepare 0.125 g ±0.005g samples

3. Sample preparation

3. 3 put samples into dissolve bottles

3. Sample preparation

3.4 Use the pipette to transfer 25ml a 60/40 phenol/1,1,2,2-tetrachloroethane solution into the bottles.

DP25 pipette can transfer the chemicals automated at precision 1/10000

- ✓ Safe
- ✓ Simple
- ✓ Precision
- ✓ Stable

4. Sample dissolve

4.1 Place the mixed sample + solvent on the dissolver

Set temperature at 90~110 ℃

Rpm at 400

- ✓ Automated
- ✓ Clean
- ✓ Concentration constant
- ✓ Efficient for multi sample dissolving
- ✓ Safe
- ✓ Can handle 13 samples dissolving at the same time

4. Sample dissolve

4.2 sample dissolving finished

Take out bottles and cooling down at room temperature

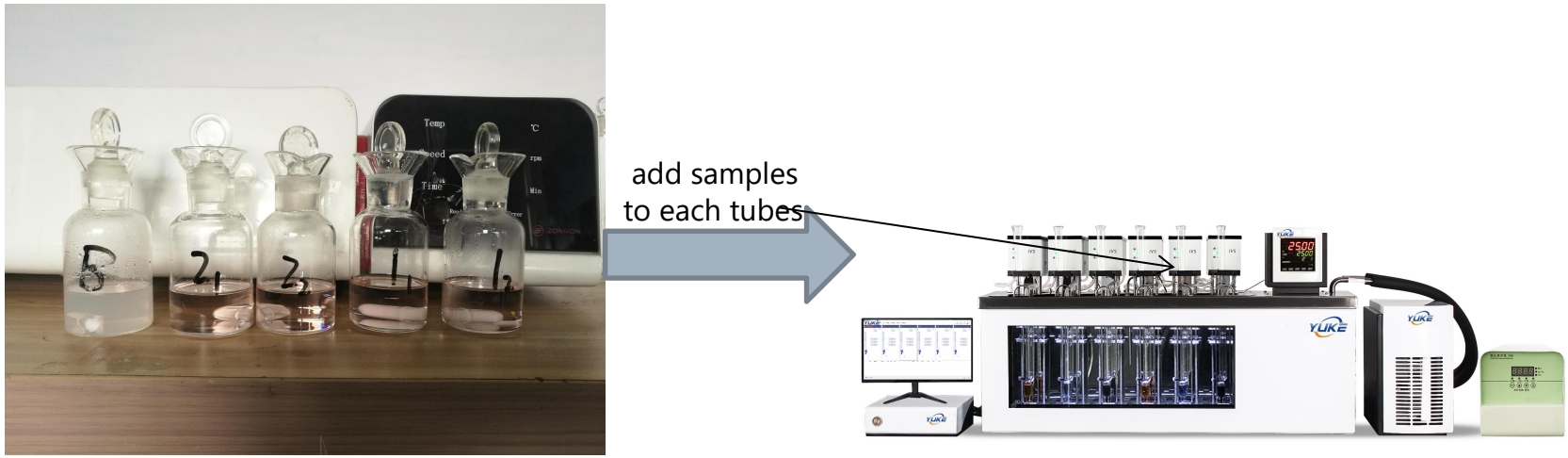
Normally, sample bottles will be ,

1. Solvent ----Mark as “B”
2. PET standard chips----Mark as “s” (if needed)
3. Sample 1, do parallel samples, mark as “1-1””1-2”
4. Sample 2, do parallel samples, mark as “2-1””2-2”

….etc

5. Viscometer test IV

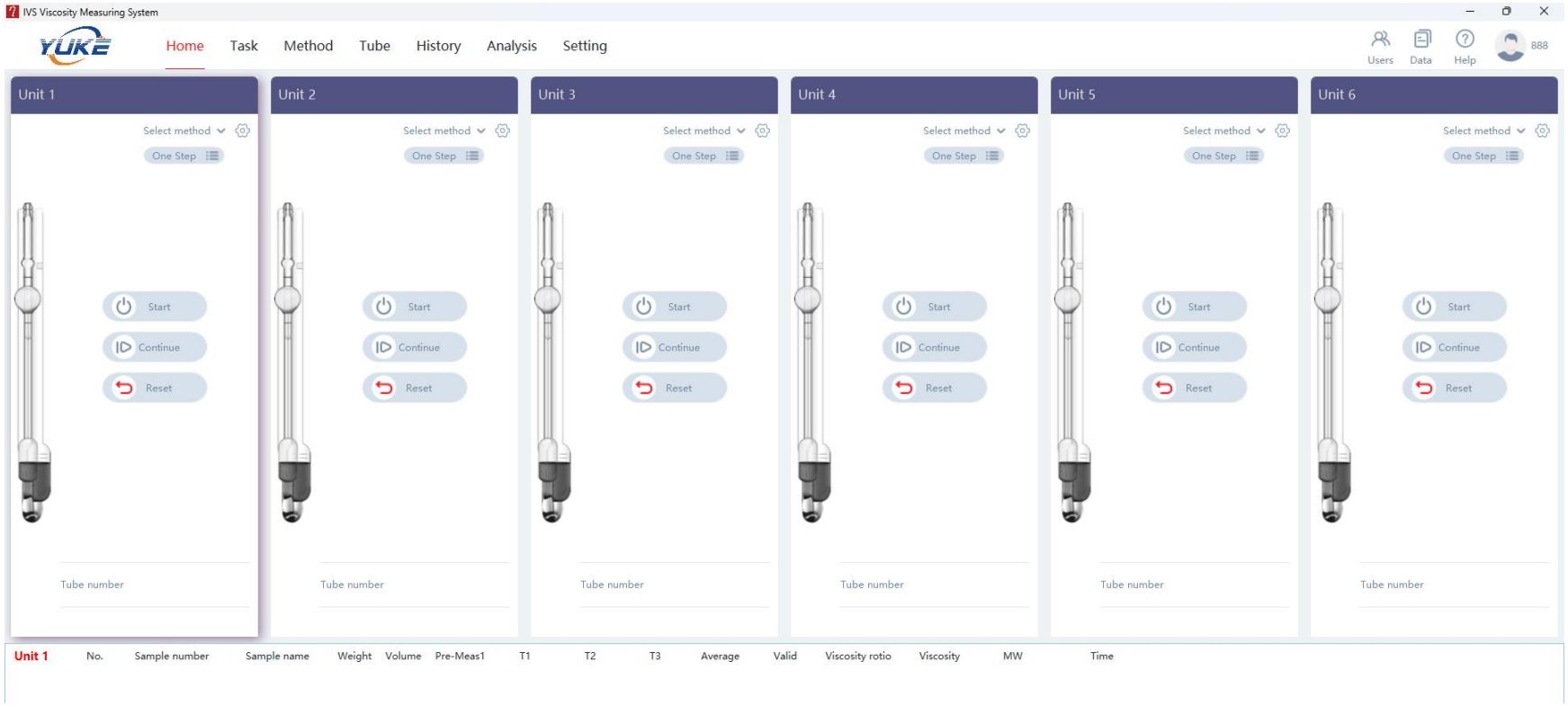
5.1. Pour the dissolved sample to the viscometer tubes via Sand core funnel



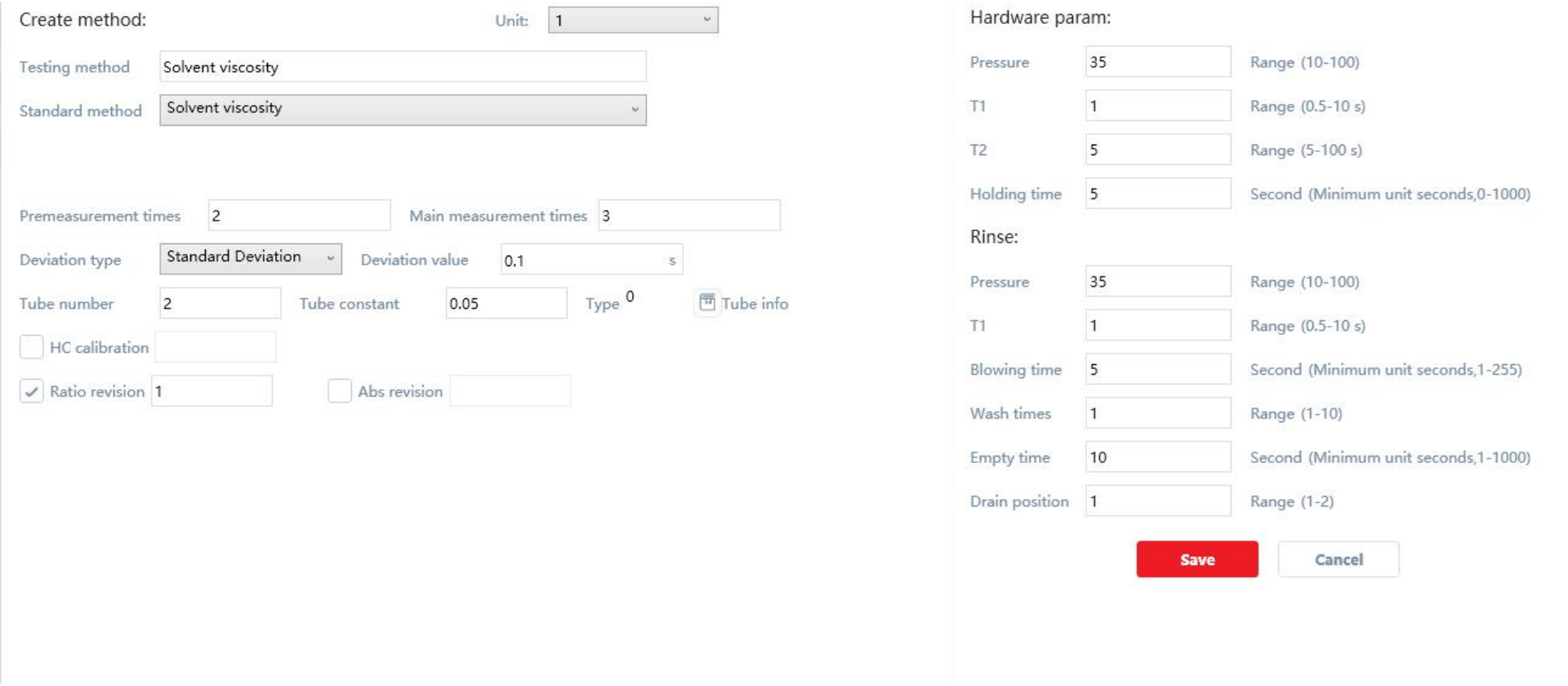
- Start viscometer
- Cool the water bath to 30 ℃±0.01℃
- Pour the samples to capillary tubes
- Hold for 10 minutes to makes sample reaches same temperature as water bath

5. Viscometer test IV

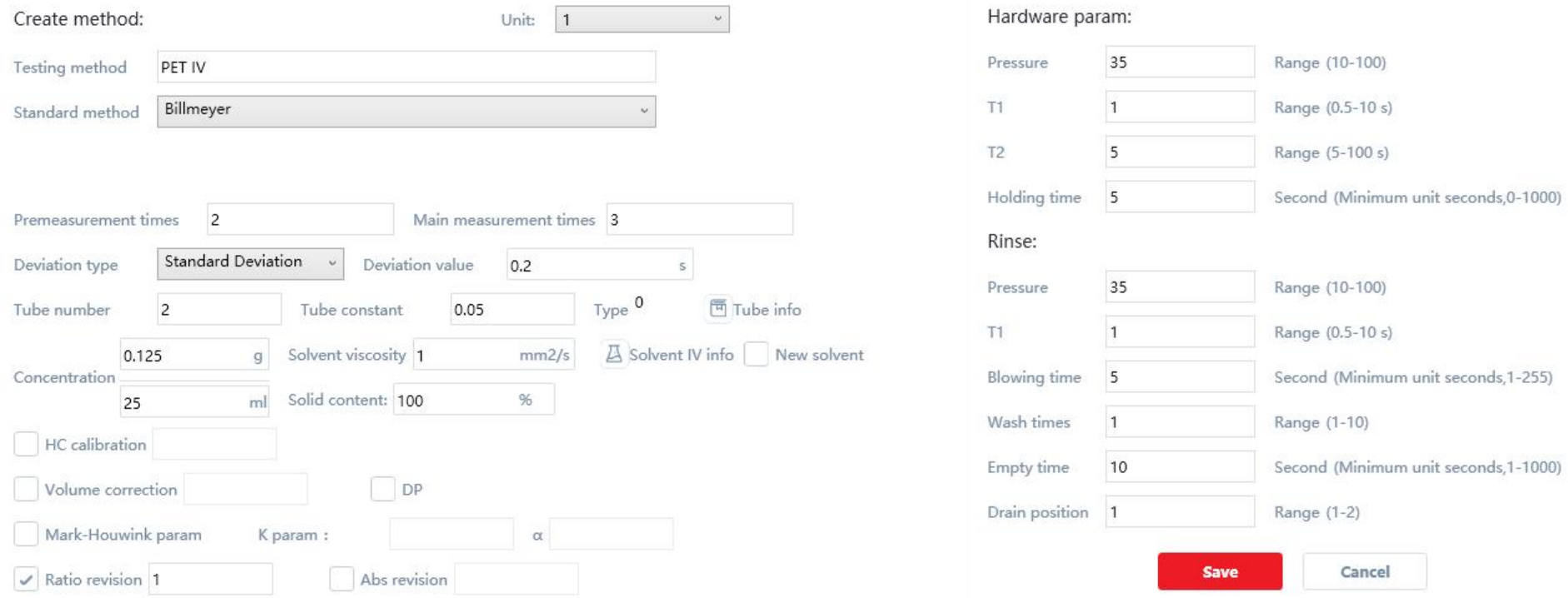
5.2. set params on the software



5. 1 solvent viscosity param setting



5. 2 PET IV param setting



6. Take report

Steps:

I. Solvent viscosity test first (if need)

II. Standard PET viscosity (if need)

III. Sample viscosity

6. Take report

Steps:

I. Solvent viscosity test first (if need)

II. Standard PET viscosity (if need)

III. Sample viscosity

6. Take report

Steps:

I. Solvent viscosity test first (if need)

Solvent viscosity: 1.06 mm2/s

IVS Viscosity Test Report

Sample number:	20210701		
Sample name:	Solvent viscosity		
Tube number:	25		
Tube type:	0		
TubeTube constant:	0.01		
Standard method:	Solvent viscosity	Time (s):	
Average:	105.8 s	105.785	
Deviation type:	Absolute deviation	105.811	
Deviation value:	0.1 s	105.791	
Actual deviation:	0.02599335 s		
Solvent viscosity:	**1.06 mm2/s**		
Tester:	888	Test date:	2021-08-19 13:19

6. Take report

Steps:

II. Standard PET viscosity (if need)

Intrinsic viscosity: 0.6338 dl/g

VN: 0.7108 dl/g

IVS Viscosity Test Report

Sample number:	20210701--	
Sample name:	PET IV	
Tube number:	2	
Tube type:	0	
TubeTube constant:	0.01	
Concentration:	0.0050 g/mL	
Solvent viscosity:	1.05796 mm2/s	
Standard method:	Billmeyer	Time (s):
Average:	143.4 s	143.421
Deviation type:	Stander deviation	143.393
Deviation value:	0.2 s	143.373
Actual deviation:	0.0241128 s	
Limiting viscosity:	**0.6338 dL/g**	
Viscosity ratio:	**1.36**	
Viscosity:	**0.7108 dL/g**	
DP:		
Molecular mass:		

6. Take report

Steps:

III. Sample viscosity

Intrinsic viscosity: 0.9376 dl/g

VN: 1.070 dl/g

IVS Viscosity Test Report

Sample number:	20210701-sample	
Sample name:	PET IV	
Tube number:	2	
Tube type:	0	
TubeTube constant:	0.01	
Concentration:	0.0050 g/mL	
Solvent viscosity:	1.05796 mm2/s	
Standard method:	Billmeyer	Time (s):
Average:	164.31 s	164.313
Deviation type:	Stander deviation	164.281
Deviation value:	0.2 s	164.328
Actual deviation:	0.02400541 s	
Limiting viscosity:	**0.9376 dL/g**	
Viscosity ratio:	**1.55**	
Viscosity:	**1.1070 dL/g**	
DP:		
Molecular mass:		

7. Wash tubes

Unit 1 will starts by following steps

I. Manual add sample

II. Automated test

III. Automated calculate result

IV. Automated wash

No.	Sample number	Sample name	Weight	Volume	Pre-Meas1	T1	T2	T3	Average	Valid	Viscosity ratio	Viscosity	MW
01	20210701	Solvent viscosity	0	0		105.785	105.811	105.791	105.80	TRUE	--	1.06 mm2/s	--
02	20210701--	PET IV	0.125	25		143.421	143.393	143.373	143.40	TRUE	1.36	0.6338 dL/g	--
03	20210701-sample	PET IV	0.1249	25		164.313	164.281	164.328	164.31	TRUE	1.55	0.9376 dL/g	--
04		Wash	0	0									

7. Wash tubes

Wash param set as picture shows: