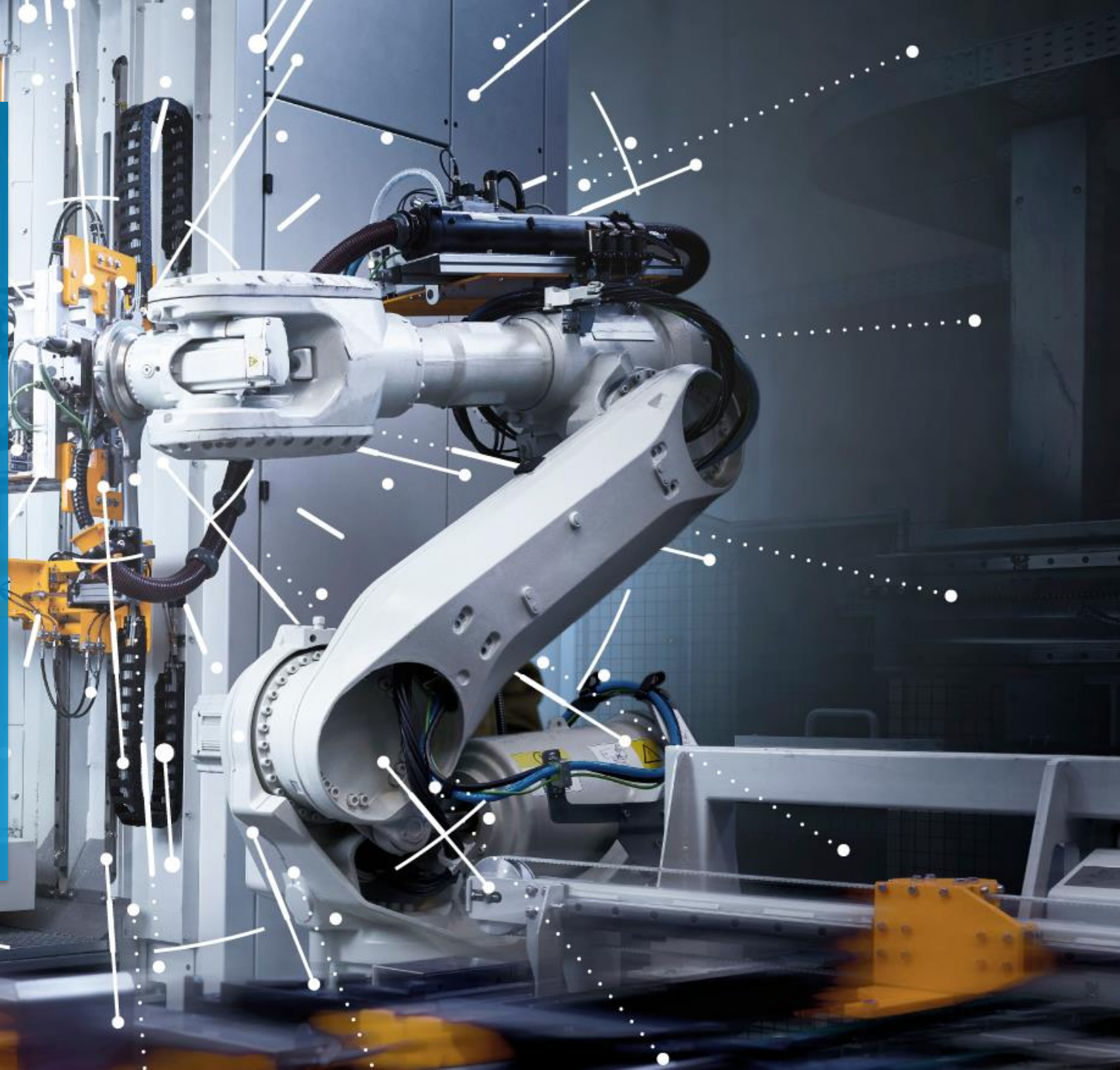


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Waters Continuous Improvement Update - 2021

02 Jul 2021



2021 Overall Continuous Improvement Update

Closed In Progress

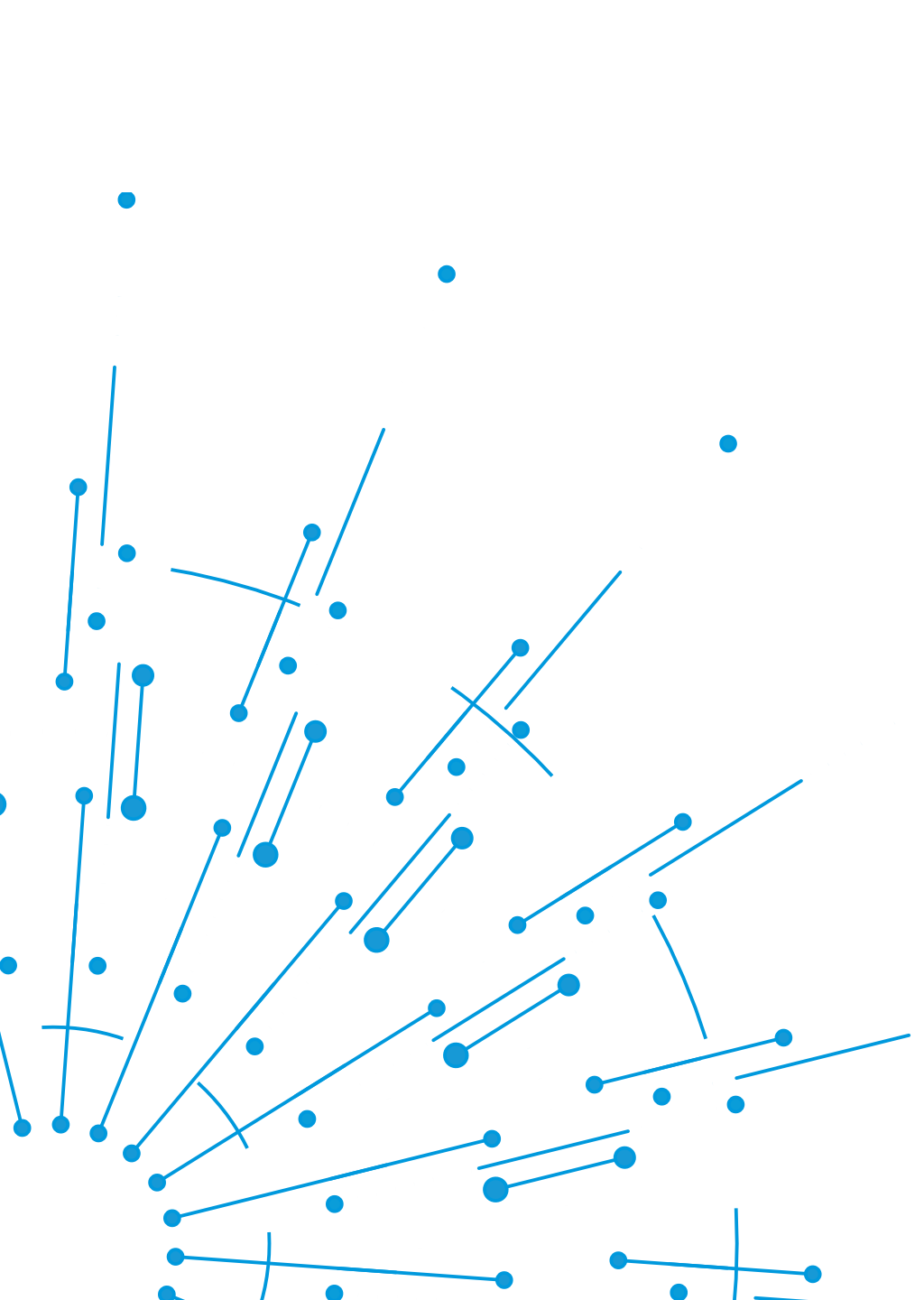
Continuous Improvement Plan – Focus Areas		Objective/Goal	Responsible	Jan-Mar	Apr-Jun	Jul- Sep	Oct - Dec
Quality	1. Yield Improvement – Soft failures	Focus top 2 failures (Soft failures)	Joel / Hua Zhen	Comm Failure	FPY for QSM+ (Test Flow Rate Accuracy 0.5ml/min)	FPY for QSM+ (Test Static Leak Decay Vent Valve to Filter/Mixer)	FPY for QSM+ (Test Seal Wash Pump Prime/Flow)
	2. Yield Improvement – Hard failures	Focus on top 2 failures (Hard failures)	KS Chua	-	-	-	-
Enhancement	1. eDHR	Increased process robustness	Aldwin	Alliance	Pumps	PDA Detectors	TUV Detectors
	2. Spares serial number traceability to PO.	Enhanced Baan - for SN scanning	Walter Chai	-	-	-	Plan
	3. CR - Sheet metal Value Engineering.	Sheet metal CR	Amy	-	-	-	-
	4. CR - PCBA Value Engineering.	PCBA CR	Amy	-	-	-	-
4M	1. Competency Check	ASP/TSP scrub, Operator compliance, PM/CAL,5S	Aldwin / Gary	186001525 186269506 186269505 186015080	186015031 186299800 186248900	186015033 186015032 186017003	186017002 WAT207000 186001515 186002487 186002998
	2. Capacity review & enhancement.	Submit Overall capacity (incl. testers capacity) update for FY22	Amy / Aldwin	Complete	-	-	-
	3. Tester's upgrade	Refurbishment of test equipment	Hua Zhen/Joel	-	Alliance FT (8x)	Alliance FT (8x)	-
NPI	1. Arc FTN remote training & Layout & MR	Successful transfer of Arc FTN	Natarajan/Gary	Layout & 6x Subassy Training Completed	Complete	-	-
	2. Arc Premier MR	Arc Premier provisional approval	Aldwin	-	Complete	-	-
	3. Arc HPLC transfer	Successful transfer of Arc HPLC	Gary	-	-	Plan	Plan

- Arc FTN MR completed
- 7x Arc Premier Instrument completed: 186019007 (3u), 186019008 (4u)

FPY Improvement Summary

Model	Target 2021	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Item	Progress
Alliance	84.25 %	89.95 %	92.36 %			NA	NA
QSM+	52.48 %	55.41 %	51.69 %			TOP 3 Failures: 1. Test Flow Rate Accuracy 0.5ml/min 2. Test Static Leak Decay Vent Valve to Filter/Mixer 3. Test Seal Wash Pump Prime/Flow	Test Flow Rate Accuracy 0.5ml/min : • Focus in Q2. • 4M Analysis completed. • Data collection on Interface Tubing using 36.0 IN-LBS
BSM	50.70 %	40.25 %	40.00 %			TOP 3 Failures: 1. Test Flow Rate Accuracy Pump B 2ml/min 2. Test Seal Wash Pump Prime/Flow 3. Test Alarms at Bootup	KIV as CIP 2021 focus on QSM+.
PDA Detectors	77.44 %	80.97 %	78.79 %			Communication Failure	TE82882-8 - Eric Turner updated the Relay Box Driver 19-Feb-2021 - Instruction is to used the old relay box and original wiring –completed - Monitoring performance of tester TE82882-11 - Re-install image completed and monitoring in-progress (Loaded on 08 Feb 2021) - Monitoring performance of tester TE82882-13 - Observed that Empower Project 2998_TEST have project lock and suspect causing loss comm 17-Feb-2021 - Not able to use Acronis Imaging Software 17 Feb 2021 - Utilized Clone image from Empower Project 11-Mar-2021 - Monitoring performance of tester - TE82882-13 now unlock empower
TUV Detectors	96.56 %	98.08 %	98.82 %			NA	NA
Pumps	99.85 %	99.10 %	97.73 %			1x Faulty ASSY, PCB 515 PUMP CONTROLLER (210000562) on Feb'21	RTV the PCBA back to Senai for FA

□ For Q12001 Yield as of May'21



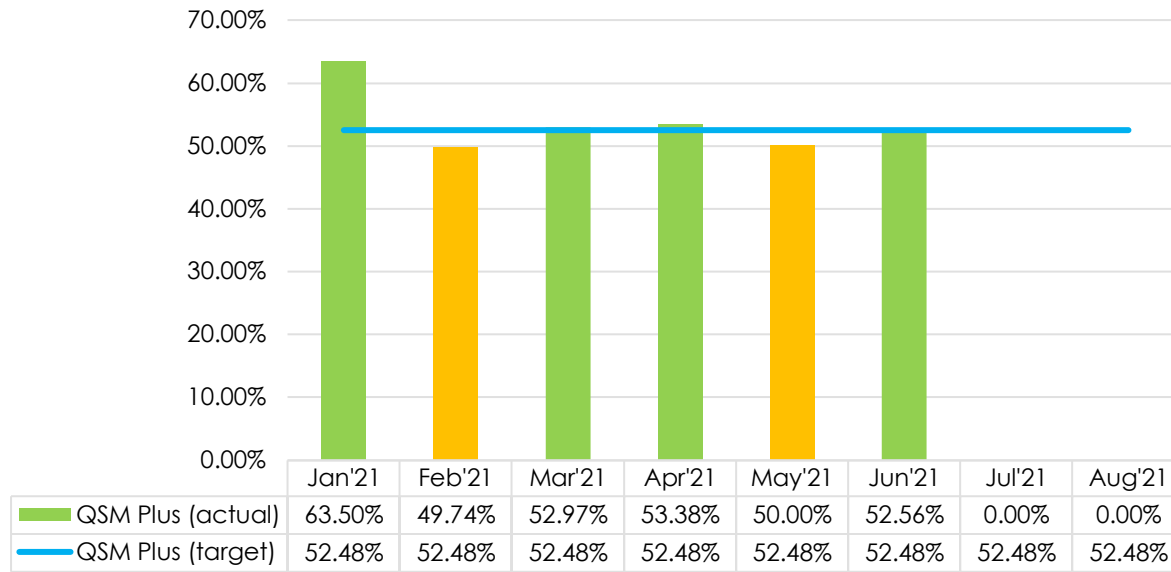
QSM Plus –

Yield Improvement

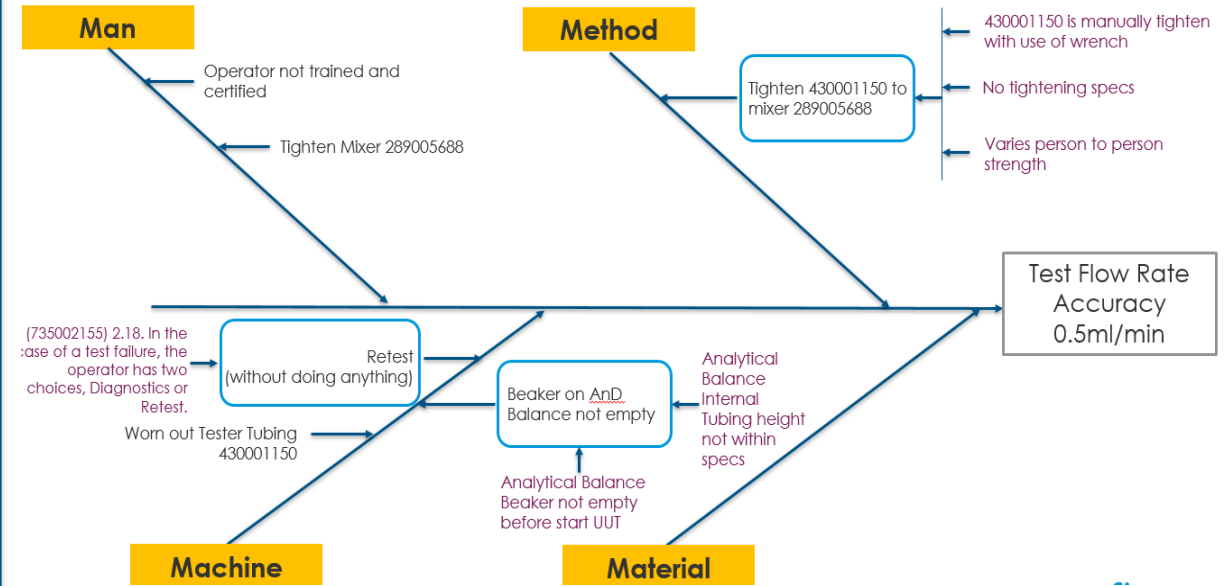
QSM+ – Yield Improvement

In-progress

QSM Plus Yield %



QSM+ – 4M : Test Flow Rate Accuracy 0.5ml/min



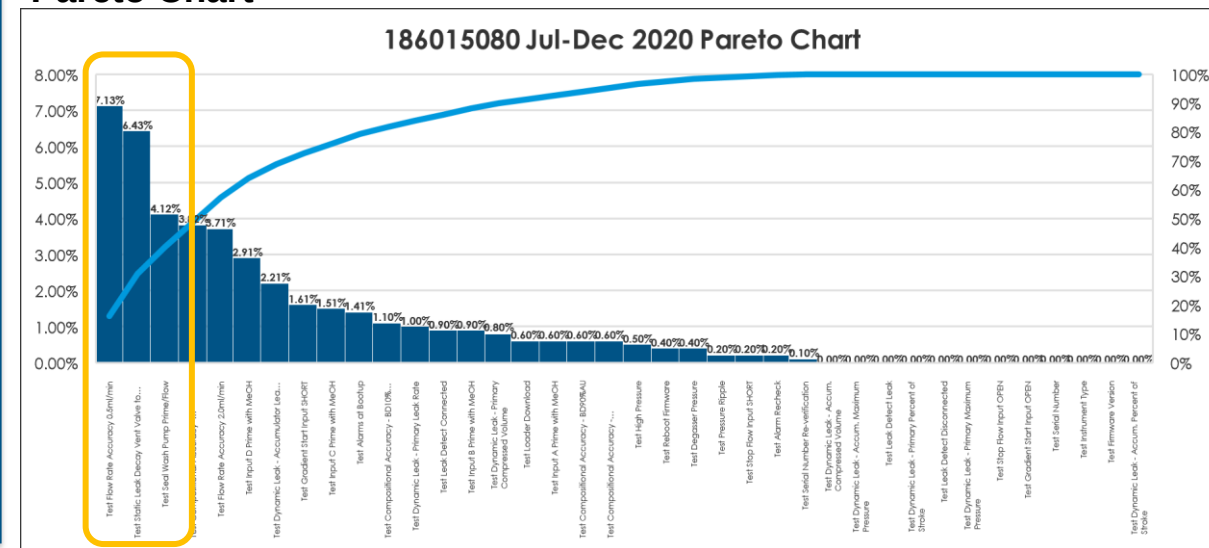
Target Sheet

Target Sheet		Jan'21	Feb'21	Mar'21	Apr'21	May'21	Jun'21	Jul'21	Aug'21
Test Flow Rate Accuracy 0.5ml/min	Target%	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
	Actual %	13.14	5.13	3.78	3.62	3.74	3.85		

Target Sheet		Jan'21	Feb'21	Mar'21	Apr'21	May'21	Jun'21	Jul'21	Aug'21
Test Static Leak Decay Vent Valve to Filter/Mixer	Target%	6.43	6.43	6.43	6.43	6.43	6.43	6.43	6.43
	Actual %	3.65	8.21	8.65	6.52	6.54	4.49		

Target Sheet		Jan'21	Feb'21	Mar'21	Apr'21	May'21	Jun'21	Jul'21	Aug'21
Test Seal Wash Pump Prime/Flow	Target%	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
	Actual %	4.38	6.15	5.95	2.90	4.67	7.69		

Pareto Chart



QSM+ – Yield Improvement

No	Failure	% Fail Jul'20- Dec'20	% Improve 2021	Actions & Results	
				Flex	PIC / Date
1	Overall Failure	43.98 (Overall Failure Rate = 47.52)	40.44	<u>Tester ID:</u> • TE82943-11, TE82943-12, TE82943-13, TE82943-14, TE82943-15, TE82943-16, TE82943-17, TE8943-18	
	Test Flow Rate Accuracy 0.5ml/min	7.13	5.70 (20 %)	• Monitoring in progress • Q1 focus • Setup 1x unit of QSM+ and simulated the failures • Tightening tubing (430001150) – loosen by ¼ and tighten by ½ turn with manual wrench (able to fail and pass unit) • Retest • Empty beaker • Brief production on Mark fitting with marker and tighten ¾ turn. • Evaluation using 36.0 IN-LBS to tighten interface tubing (430001150) 120 Data points collected for manual tighten vs using 36.0 IN-LBS	Aldwin, Joel / 16 Feb 21 Aldwin, Joel / 19 Mar 21 Aldwin / 23 Mar 21 Aldwin/ 25 Mar 21 (1 ~ 2 weeks)

Done

QSM+ – Yield Improvement

Test Flow Rate Accuracy 0.5ml/min - Monitoring

Month	Total Unit Tested	QSM Plus (failure%)
		2020 (Jul-Dec) Ref rate 7.13 % Target% = 5.70 %
Jan -2021	137	13.14 %
Feb -2021	195	5.13 %
Mar -2021	185	3.78 %
Apr -2021	138	3.62 %
May -2021	214	3.74 %
Jun -2021	156*	3.85 %

Note: * is tentative and not final

flex.

Thank You

