

# Roche Diagnostics

## SIQ Reporting

## SIQ calculations

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## DOCUMENT INFORMATION

### General Information

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**Document History**

Version	Reason for change	Date (mm/dd/yyyy)
1.0	First release	07/21/2003
1.1	added codes Z77 and Z78 in matrix; added sets S31, S32; modified sets S3, S4, S7 and S30; modified formula for MTFVS; described Labor and ServiceCostsPerSystem; new definition for annual measures	07/05/2004
2.0	added code Z44, deleted code W05, renamed codes W02 and W12 (updates in task & time set matrix)	01/27/2005
4.0	changed to v4.0 to be compliant with DocIT versioning	12/05/2005
	added code Z26, Z85 (check task & time set matrix and active systems definition)	
	deleted codes R03, R04, R05, R11, R12 and W06, renamed codes A06, A07 and A15 (updates in task & time set matrix)	
	removed codes A14, Z45, Z46 from set S32	
	added Case Type information to several task & time sets	
	added definitions for installed & known systems	
	defined mandatory and optional formulas, all formulas only use closed cases	
	added formulas for phone fix ratio and remote fix ratio	
5.0	Codes A16, A17, Z90 added Codes A14, Z45, Z46 renamed Set “S28 – All mandatory modifications” added Code A16 added for active system calculation, active system calculation will be Case Type independent	03/20/2007
6.0	Renamed SA codes R09, Z49 Added some SA codes to active instrument calculation list Added measure: Installed Instruments Per Month, this also affects MTTI formula	01/15/2008
7.0	Code Z79 added, belongs to Service Activity Sets S7 and S11, Z79 code also used to calculate Active Instruments Renamed Service Activity Sets S25 and S26, set S26 now only includes Call Center cases Added Service Activity Set S29 Updated RFR formula Added RFR_ASV and RUR formula	As of approval

**Distribution**

Department / Area / Function

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## 1. Purpose

This document lists all the formulas used in SIQ reporting to obtain several statistic values needed to assess instrument performance.

## 2. Definitions / Abbreviations

- AS – Active Systems
- DMS – Diagnostics Master System
- FSR – Field Service Report
- GRIPS – Global Repository of Information about Products and Services
- MTB(x) – Mean Time Between ...-quality measures  
(e.g. MTBRV - mean time between repair visits)
- MTF(x) – Mean Time For ...-quality measures  
(e.g. MTFRV - mean time for repair visits)
- MTT(x) – Mean Time To ...-quality measures  
(e.g. MTTM - mean time to maintain)
- part costs – part cost values shown in SIQ are coming directly from DMS and are transfer prices ex Mannheim in Euro.  
SIQ part cost values may differ from part costs used in local datawarehouses
- pool repair – workshop repair activities on a local pool of instruments (instruments which won't be shipped back to a customer immediately after repair)
- Service Activity Code – a code describing a service activity performed to answer a customer inquiry or a complaint (e.g. Z11 = support by phone)
- SIQ – Service and Instrument Quality
- Task Set – a set of several service activities (the amount of visits with a special service activity code, e.g. S2 or S2.Visits = all repair visits).
- Time Set – a set of several service activities (time spent for several service activities (in hours), e.g. S2.Hours = time needed for all repair visits)
- (x)FR – ... Fix Ratio - quality measures (e.g. PFR – phone fix ratio)

### 3. Task & Time Set Matrix

All the SIQ measures are based on the Service Activity Codes selected for each case and on the labour hours used for these activities. For an easier reading of the SIQ calculation formulas the Service Activity Codes are group in several task and time sets as shown in the following matrix: <sup>1</sup>

Remark: • The sets S1, S2, S3, S4, S18, S30, S31 only include field reports (only cases with Case Type “Service Report”). Set S25, S26, S29 <sup>2</sup> only includes call center cases (all cases with Case Type “Call Center”). All other sets are Case Type independent.

		Field Activities	Repair Visits (S1)	All Repair Visits (S2)	Application visit (S3)	All Application Visits (S4)	Maintenance Visits (S5)	All Maintenance Visits(S6)	Recurrent Service Visits (S30)	All Recurrent Service Visits (S31)	Customer training (S8)	Software Installation (S9)	Installation Visits (S10)	All Installation Visits (S11)	Retrofit/Modify (S27)	Lab.Org. consulting visit (S12)	Method correlation visit (S13)	Product conversion visit (S14)	System calibration visits (S15)	Regulatory affairs (S16)	Marketing assist (S17)	Dispatched Site Visits (S18)	Workshop Activities	Workshop Repair (S19)	Workshop Refurbish (S20)	Workshop Retrofit (S21)	Quality control inspection (S22)	Workshop Preparation (S23)	Goods in inspection (S24)	Call Centre Activities	Phone Fixes (S25)	Remote Fixes (S26)	Remote Fixes_ASV (S29)	Sets not used in any formula	Site Visits (S7)	All Mandatory Modifications (S28)	Problem description set (S32)	
Code	Service activity																																					
A06	Customer training (on site, follow-up)										#																									#		
A07	Customer training (in house, follow-up)										#																									#		
A08	Correlation activities				#	#											#																			#		
A09	Product conversion				#	#			#	#								#																	#			
A10	System calibration				#	#			#	#									#																#			
A11	Regulatory affaires																			#																#		
A14	SW modification (mandatory)								#	#		#																								#	#	
A15	Customer Training (initial)										#																									#		
A16	SW modification (optional)								#	#		#																								#		
A17	Appl Corrective Action (mandatory)								#	#																										#	#	
R06	Send replacement instrument																																					
R07	Send reagent products																																					
R08	Send information/or documentation																																					
R09	Case dispatch to CHU																																					

<sup>1</sup> Please note that there are some sets defined even if they aren't used in any formula, they can be used when only looking at a subset of activities in ProClarity

<sup>2</sup> Please note that set S29 only includes those Tele/Remote activities where additionally the Tele/Remote Result code “T01 – used, avoided service visit” is selected

# SIQ Reporting – SIQ calculations

		Field Activities	Repair Visits (S1)	All Repair Visits (S2)	Application visit (S3)	All Application Visits (S4)	Maintenance Visits (S5)	All Maintenance Visits(S6)	Recurrent Service Visits (S30)	All Recurrent Service Visits (S31)	Customer training (S8)	Software Installation (S9)	Installation Visits (S10)	All Installation Visits (S11)	Retrofit/Modify (S27)	Lab.Org. consulting visit (S12)	Method correlation visit (S13)	Product conversion visit (S14)	System calibration visits (S15)	Regulatory affairs (S16)	Marketing assist (S17)	Dispatched Site Visits (S18)	Workshop Activities	Workshop Repair (S19)	Workshop Refurbish (S20)	Workshop Retrofit (S21)	Quality control inspection (S22)	Workshop Preparation (S23)	Goods in inspection (S24)	Call Centre Activities	Phone Fixes (S25)	Remote Fixes (S26)	Remote Fixes_ASV (S29)	Sets not used in any formula	Site Visits (S7)	All Mandatory Modifications (S28)	Problem description set (S32)	
Code	Service activity																																					
W01	WS Instrument repair																							#													#	
W02	WS Instrument pool repair																								#													
W03	WS Instrument retrofit																										#										#	
W04	WS PCB / Module repair																						#														#	
W07	WS New instrument prep																											#										
W08	WS New PCB / Module prep																											#										
W09	WS Demo instrument prep																											#										
W10	WS Instrument pre-repair inspection																											#										
W11	WS Quality assurance check																										#											
W12	WS OEM part pool repair																									#												
W13	Instrument re-certification CU Center																																					
Z00	Please Specify																																					
Z11	Support by Phone																														#						#	
Z12	Tele/RmoteDiag																														#		#				#	
Z21	ServVisit Em'cy		#	#					#	#												#														#		#
Z22	ServVisit NonEm'cy		#	#					#	#												#														#		#
Z23	ServVisit Assist			#						#																											#	
Z24	ServVisit Cont'd			#						#																											#	
Z25	ServVisit Repeat			#						#																											#	
Z26	ServVisit Intervention				#	#			#	#												#														#		#
Z29	Cancelled Call																																					
Z30	ApplVisit Em'cy				#	#			#	#												#														#		#
Z31	ApplVisit NonEm'cy				#	#			#	#												#														#		#
Z32	ApplVisit Assist					#				#																											#	
Z33	ApplVisit Cont'd					#				#																											#	
Z34	ApplVisit Repeat					#				#																											#	
Z41	PM Visit						#	#	#	#																										#		

## SIQ Reporting – SIQ calculations

		Field Activities	Repair Visits (S1)	All Repair Visits (S2)	Application visit (S3)	All Application Visits (S4)	Maintenance Visits (S5)	All Maintenance Visits(S6)	Recurrent Service Visits (S30)	All Recurrent Service Visits (S31)	Customer training (S8)	Software Installation (S9)	Installation Visits (S10)	All Installation Visits (S11)	Retrofit/Modify (S27)	Lab.Org. consulting visit (S12)	Method correlation visit (S13)	Product conversion visit (S14)	System calibration visits (S15)	Regulatory affairs (S16)	Marketing assist (S17)	Dispatched Site Visits (S18)	Workshop Activities	Workshop Repair (S19)	Workshop Refurbish (S20)	Workshop Retrofit (S21)	Quality control inspection (S22)	Workshop Preparation (S23)	Goods in inspection (S24)	Call Centre Activities	Phone Fixes (S25)	Remote Fixes (S26)	Remote Fixes_ASV (S29)	Sets not used in any formula	Site Visits (S7)	All Mandatory Modifications (S28)	Problem description set (S32)	
Code	Service activity																																					
Z42	PM Visit Assist							#		#																										#		
Z43	PM Visit Cont'd							#		#																										#		
Z44	ApplVisit PM								#	#																										#		
Z45	HW modification (mandatory)								#	#					#																					#	#	
Z46	HW modification (optional)								#	#																										#		
Z49	Parts Delivery / Management																																					
Z51	Valid'n/Accredit'n																																			#		
Z61	Site Preparation visit																																			#		
Z62	Installation												#	#																						#		
Z63	De-Inst/Removal																																			#		
Z64	Relocate System																																			#		
Z73	Installation Assist													#																						#		
Z74	Installation Continued													#																						#		
Z75	Installation completion													#																						#		
Z76	Host / Connection & installation																																			#		#
Z77	Install applications													#																						#		
Z78	Install new host connection													#																						#		
Z79	Routine Start / Go-Live													#																						#		
Z82	Courtesy Visit																																			#		
Z83	Sales Assistance																				#															#		
Z84	Laboratory organisation consulting															#																				#		
Z85	Customer IT SW Configuration																																			#		
Z86	Peripheral Hardware visit								#	#																										#		#
Z88	Support Training																																					
Z90	Pre-Marketing/Design																				#																	
Z91	Admin./Office																																					

## 4. SIQ calculation formulas

### 4.1. Definition: Active Systems

A system (instrument) is considered active if it has generated at least one service activity within the last 18 months with one of the following service activity codes:

Code	Service activity
A10	System calibration
A14	SW modification (mandatory)
A15	Customer Training (initial)
A16	SW modification (optional)
W01	WS Instrument repair
W03	WS Instrument retrofit
Z11	Support by phone
Z12	Tele/Remote Diag
Z21	ServVisit Em'cy
Z22	ServVisit NonEm'cy
Z26	ServVisit Intervention
Z30	ApplVisit Em'cy
Z31	ApplVisit NonEm'cy
Z41	PM Visit
Z44	ApplVisit PM
Z45	HW modification (mandatory)
Z46	HW modification (optional)
Z51	Valid'n/Accredit'n
Z62	Installation
Z64	Relocate System
Z73	Installation Assist
Z74	Installation Cont'd
Z75	Installation completion
Z76	Host / Connection & installation
Z77	Install applications
Z78	Install new host connection
Z79	Routine Start / Go-Live
Z86	Peripheral Hardware visit

Remark: Receiving a de-installation report (a service report with service activity code Z63 – De-Inst/Removal) will set the respective instrument to an inactive state immediately. Any further report for this system, with one of the service activity codes from the list above, will make this instrument active again.

### 4.2. Definition: Installed Systems (Installed Base)

For Clarify PRISMA countries, the installed base includes all instruments with the status “installed good” from the local Clarify PRISMA installed part table.

For non-Clarify countries, each instrument which appeared in at least one report (field service, workshop, or call center), is included in the installed base.



#### 4.3. Definition: Known Systems

Each instrument which appeared in at least one report (field service, workshop, or call center), is included in the known system count.

For non-Clarify countries this means that installed systems and known systems are identical.

#### 4.4. Definition: Installed Instruments per Month

“Installed Instruments per Month” counts all instruments with an Install Date of the respective month in the Clarify PRISMA installed part table.

#### 4.5. MTB(x) calculations

MTB(x) calculations use active systems (the average of several “active systems / month” values) together with different task sets (Sx, the average of several “visits / month” values). MTB(x) values are reported in days.

- All formulas only use closed cases.
- M indicates a formula where implementation in local data warehouses is mandatory
- O indicates a formula where implementation is optional (based on local requirements)

Mean Time Between ...		mandatory / optional
• ... Repair Visits (MTBRV):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of repair visits (S1)}} * 30$	M
• ... Application Visits (MTBAV):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of application visits (S3)}} * 30$	M
• ... Maintenance Visits (MTBMV):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of maintenance visits (S5)}} * 30$	M
• ... Site Visits (MTBSV):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of recurrent service visits (S30)}} * 30$	M
• ... Workshop Repairs (MTBWR):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of workshop repairs (S19)}} * 30$	M
• ... Customer Training (MTBCT):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of customer trainings (S8)}} * 30$	O
• ... Software Installation (MTBSI):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of software installations (S9)}} * 30$	O
• ... Retrofit / Modify (MTBRM):	$\frac{\text{avg.no.of active systems}}{\text{avg.no.of retrofit / modify visits (S27)}} * 30$	M

#### 4.6. MTF(x) / MTT(x) calculations

MTF(x) / MTT(x) calculations use task and time sets for calculations and are reported in hours.

- All formulas only use closed cases.
- M indicates a formula where implementation in local data warehouses is mandatory
- O indicates a formula where implementation is optional (based on local requirements)

Mean Time For/To ...		mandatory / optional:
• ... Repair Visits (MTFRV):	$\frac{\text{time for all repair visits (S2.Hours)}}{\text{no.of repair visits (S1.Visits)}}$	M
• ... Application Visits (MTFAV):	$\frac{\text{time for all application visits (S4.Hours)}}{\text{no.of application visits (S3.Visits)}}$	M
• ... Maintain (MTTM):	$\frac{\text{time for all maintenance visits (S6.Hours)}}{\text{no.of maintenance visits (S5.Visits)}}$	M
• ... Site Visits (MTFSV):	$\frac{\text{time for all recurrent service visits (S31.Hours)}}{\text{no.of recurrent service visits (S30.Visits)}}$	M
• ... Install (MTTI):	$\frac{\text{time for all installation visits (S11.Hours)}}{\text{Installed Instruments Per Month}}$	M
• ... Customer Training (MTFCT):	$\frac{\text{time for customer trainings (S8.Hours)}}{\text{no.of customer training (S8.Visits)}}$	O
• ... Lab Consulting (MTFLC):	$\frac{\text{time for lab.org.consult.visits (S12.Hours)}}{\text{no.of lab.org.consulting visits (S12.Visits)}}$	O
• ... Method Correlation (MTFMC):	$\frac{\text{time for method corr.visits (S13.Hours)}}{\text{no.of method correlation visits (S13.Visits)}}$	O
• ... Product Conversion (MTFPC):	$\frac{\text{time for product conv.visits (S14.Hours)}}{\text{no.of product conversion visits (S14.Visits)}}$	O
• ... System Calibration (MTFSC):	$\frac{\text{time for system calib.visits (S15.Hours)}}{\text{no.of system calibration visits (S15.Visits)}}$	O
• ... Regulatory Affaires (MTFRA):	$\frac{\text{time for regulatory affaires (S16.Hours)}}{\text{no.of regulatory affaires (S16.Visits)}}$	O
• ... Marketing Activities (MTFMA):	$\frac{\text{time for marketing assists (S17.Hours)}}{\text{no.of marketing assists (S17.Visits)}}$	O
• ... Software Update(MTTSU):	$\frac{\text{time for all sw installation visits (S9.Hours)}}{\text{no.of sw installation visits (S9.Visits)}}$	O

Mean Time For/To ...		mandatory / optional:
• ... Workshop Repair (MTFWR):	$\frac{\text{time for workshop repairs (S19.Hours)}}{\text{no.of workshop repairs (S19.Visits)}}$	M
• ... Workshop Refurbish (MTFRF):	$\frac{\text{time for workshop refurbish (S20.Hours)}}{\text{no.of workshop refurbish (S20.Visits)}}$	O
• ... Workshop Retrofit (MTFRT):	$\frac{\text{time for workshop retrofit (S21.Hours)}}{\text{no.of workshop retrofit (S21.Visits)}}$	O
• ... Quality Control (MTFQC):	$\frac{\text{time for QC inspections (S22.Hours)}}{\text{no.of QC inspections (S22.Visits)}}$	O
• ... Preparation (MTFP):	$\frac{\text{time for workshop preparations (S23.Hours)}}{\text{no.of workshop preparations (S23.Visits)}}$	O
• ... Goods in Inspection (MTFGI):	$\frac{\text{time for goods in inspection (S24.Hours)}}{\text{no.of goods in inspection (S24.Visits)}}$	O
• ... Remote Connection (MTFRC):	$\frac{\text{time for remote connections (S26.Hours)}}{\text{no.of remote connections (S26.Visits)}}$	O
• ... Retrofit/Modify (MTFRM):	$\frac{\text{time for retrofit / modify (S27.Hours)}}{\text{no.of retrofit / modify visits (S27.Visits)}}$	M

#### 4.7. (x)FR calculations

(x)FR calculations use task sets for calculations and are reported in percentages.

- All formulas only use closed cases.
- Implementation in local data warehouses is optional for all formulas

• Phone Fix Ratio (PFR):	$\frac{\text{Phone fixes (S25)}}{\text{dispatched site visits (S18) + Phone fixes (S25)}}$
• Remote Fix Ratio (RFR):	$\frac{\text{Remote Fixes (S26)}}{\text{dispatched site visits (S18) + Phone fixes (S25)}}$
• Remote Fix Ratio_ASV (RFR_ASV):	$\frac{\text{Remote Fixes _ ASV (S29)}}{\text{dispatched site visits (S18) + Phone fixes (S25)}}$
• Remote Usage Ratio (RUR): <sup>3</sup>	$\frac{\text{Tele / Remote Diag (SAcode Z12)}}{\text{dispatched site visits (S18) + Phone fixes (S25)}}$

<sup>3</sup> Please note that this formula uses SA code Z12 regardless which Case Type code is selected in the respective case  
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#### 4.8. Measurement Per Instrument Calculations

The following ...-per system values will be calculated within the SIQ datawarehouse:

- All formulas only use closed cases.
- Implementation in local data warehouses is optional for all formulas (as local datawarehouses are using local costs and currencies instead of global costs)

- $$\text{Labour Hours Per System} = \frac{\text{sum of labour hours (in an user defined set)}}{\text{avg.no.of active systems}}$$

- $$\text{Part Costs Per System} = \frac{\text{sum of part costs (in an user defined set)}}{\text{avg.no.of active systems}}$$

- $$\text{Travel Hours Per System} = \frac{\text{sum of travel hours (in an user defined set)}}{\text{avg.no.of active systems}}$$

- $$\text{Labour Costs Per System} = \frac{\text{sum of labour costs (in an user defined set)}}{\text{avg.no.of active systems}}$$

Remark: labour costs = labour hours \* 100,- €  
(100,- € is taken as a global hourly rate used for SIQ calculations)

- $$\text{Service Costs Per System} = \frac{\text{sum of service costs (in an user defined set)}}{\text{avg.no.of active systems}}$$

Remark: service costs = labour costs + part costs

Remark: For these calculations, the base of the related data needs to be defined, e.g. it is to be fixed if a certain calculation is done for all instruments, a group of instruments (instrument family), or for a certain instrument type (line). Additionally, these values may be calculated for all service activities or only a subset (e.g. only site visits or maintenance visits), and for all available reports or only within a specified timeframe.

Examples:

- labour hours for all ClinChem instruments during repair visits in 2002
- part costs for all instrument families during maintenance visits for each quarter in 2001 and 2002

#### 4.9. Annual Measurement Per Instrument Calculations

Additionally, the following annual measurement per system values will be generated within the SIQ datawarehouse:

- annual labour hours per system
  - annual part costs per system
  - annual travel time per system
  - annual labour costs per system
  - annual service costs per system
- 
- All formulas only use closed cases.
  - Implementation in local data warehouses is optional for all formulas (as local datawarehouses are using local costs and currencies instead of global costs)

Annual measurement per system values shall be calculated as follows:

*annual meas. per system = sum of respective meas. per system values (from the last 12 months)*

- Remarks:
- Data from the last 12 months include the current month and the 11 months before
  - If this value is requested for a year or a quarter, the SIQ reporting system will calculate a value for the last month in this year or quarter (e.g. the annual labour hours per system for 2003 will be the same as of December 2003, the annual part costs per system for Q3 2003 will be the same as September 2003.)