

# Quality - Right First Time

## Right First Time



### What is “Right First Time”?

Process for an End-to-end Diagnostic of the Quality of Operations of a Value Stream or “Right First Time” (RFT) aims at optimizing production Quality and Costs by producing the Right Products for the Right Customer at the Right Time, reducing Customer complaints due to poor product quality and minimizing production incidents which disturb the production Flow. This means that we see quality by design by controlling each production step.

We must ensure that all employees strive to optimize the Quality of Operations.

"It is always cheaper to do the job right the first time" - Phil Crosby

## 1. Principles, Definitions & Prerequisites

### 1.1. Principles

Not doing the things right the first time generates extra cost:

- Producing Scrap
- Reprocess or Rework
- Downgrade (delivering sub-quality products to customers)

Not identifying incidents also has a further Cost as it can lead to a propagation of the defects.

A periodic review of the Quality of Operations allows us to identify main deviations to RFT, and is an opportunity to identify improvement Projects.

### 1.2. Definitions

- Production Elimination (Scrap): getting rid of non-conforming products
- Reprocessing: adjusting the process step (e.g. longer reaction time, adjustments to pH, composition, etc.)
- Reworking: having to repeat one or several steps of the process due to quality issues
- Mixing step (or blending): making a good product lot with two bad ones
- Downgrade: storage as a lower graded and waiting for a customer order

### 1.3 RFT as a metric

RFT at a specific production process step is the percentage of batches (or of samples in case of a continuous process) which are within the specifications (internal and/or external) which apply to that sampling point, over a period of time relevant to the situation (e.g., one year).

RFT of a Value Stream is an aggregation of the RFT of each individual production step:

	Step 1	Step 2	Step 3	Step 4					
RFT	=	RFT 1	*	RFT 2	*	RFT 3	*	RFT 4	
100%		100%		100%		100%		100%	GREAT
96,1%		99,0%		99,0%		99,0%		99,0%	GOOD ?
81,5%		95,0%		95,0%		95,0%		95,0%	
65,6%		90,0%		90,0%		90,0%		90,0%	

## 2. How to Prepare an Assessment & Best Practices

The Manufacturing Excellence Team can support on-site assessments, however, they need to be thoroughly prepared by local management in order to define expectations for the diagnostic. A checklist of questions is then prepared for the site to identify key processes and usual pitfalls.

The process to assess and optimize Site RFT Performance can be summarized as follows:



The assessment will identify whether the process is "in-spec" (internal and/or customer specifications) and whether it is under statistical control (within the upper and lower control limits on the process control chart). Depending on the findings of the study, several outcomes / improvement suggestions can be made:

Is the Process under Statistical Control?

YES	3	1
	<ul style="list-style-type: none"> <li>- Present to Business team</li> <li>- Propose a 6S Project to reduce Variability (2 specs) or to only shift the mean (1 spec)</li> </ul>	<ul style="list-style-type: none"> <li>- Get rid of the test</li> <li>- or Check only first Lot of each campaign</li> <li>- Implement Process SPC</li> </ul>
NO	4	2
	Process not capable. Many points out of spec <b>Urgent to fix</b>	<ul style="list-style-type: none"> <li>- Not urgent to address. Verify impact</li> <li>- Spec range large enough to encompass variation</li> <li>- Possibility to get rid of the test ?</li> </ul>
	NO	YES
		Is the Process CAPABLE regarding Customer Specs ?

Once the worst RFT points have been identified, the site should deep dive into these processes and deploy usually Lean Six Sigma processes to tackle these problems through workshops (VSM, DMAIC, fishbone, 5 Why's, etc.). The outcomes should be prioritized by impact and ease of implementation and transformed into improvement projects.

### 3. KPIs for Process Capability

Capability could be calculated considering Short Term or Long Term variation.

Lagging KPIs: Cpk (for short term variation) and Ppk (for long term variation)

Definitions:

- Short Term Variability( short term): Variability of a subgroup of data (batch, shift, family of products etc)

Cpk: min between Cp<sub>u</sub> and Cp<sub>l</sub>

$$Cp_u = \frac{USL - Average}{3 * \sigma \text{ short term}}$$

$$Cp_l = \frac{Average - LSL}{3 * \sigma \text{ short term}}$$

- Long Term Variability ( long term): Long term variation is the combination of short term variation, process shifts, and long term process drifts. It is what customers see.

Ppk: min between Pp<sub>u</sub> and Pp<sub>l</sub>

$$Pp_u = \frac{USL - Average}{3 * \sigma \text{ long term}}$$

$$Pp_l = \frac{Average - LSL}{3 * \sigma \text{ long term}}$$

Leading KPIs are looking at the performance of key process parameters vs. control limits. These parameters and the intervals within each should remain in order to ensure a satisfactory Ppk are defined through a problem-solving initiative to improve Ppk. Their monitoring and reacting in case of deviation are the basis of Statistical Process Control (SPC).

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