A Recipe for Success!

10 Ingredients for a Healthy Gage Management System

June 22, 2021
Meet the Presenters

Eric Gasper
Sr. Product Development Specialist
PQ Systems

Derek Benson
Product & Application Support Manager
PQ Systems
Brand new?
Taking over existing?
Where did your Gage System come from?
Where did your Gage System come from?
Where did your Gage System come from?
Where did your Gage System come from?
Where did your Gage System come from?
Where did your Gage System come from?
Gage Management

INGREDIENT 1:

Gage Inventory Details
INGREDIENT 1:

Make sure you know the gage number, gage type, current location, and due dates of all the gages in your system. Though additional information is nice, it's generally a waste of time.
**INGREDIENT 1:**

Make sure you know the gage number, gage type, current location, and due dates of all the gages in your system. Though additional information is nice, it's generally a waste of time.
Include as many details as you're aware of related to your gages. They may not seem immediately necessary, but envision scenarios where having that information may become helpful. The more details that exist, the more power you'll have to extract useful information from your system.
Where are my gages??

27 calibrations overdue!!

I need those certificates from last year!
Where are my gages??

I need those certificates from last year!

27 calibrations overdue!?

Why did I take this job?
Questions?

- Managers
- Customers
- Auditors
Questions?
• Managers
• Customers
• Auditors

Eric Gasper 1:41 PM
I need a list of the gages we have that we bought last year. Specifically, the digital calipers we got from Mitutoyo which were sent to production Line 7 and are now on a 4 month calibration cycle.
Questions?
• Managers
• Customers
• Auditors

Eric Gasper 1:41 PM
I need a list of the gages we have that we bought last year. Specifically, the digital calipers we got from Mitutoyo which were sent to production Line 7 and are now on a 4 month calibration cycle.

Derek Benson 1:50 PM
Not sure we've done the best job documenting all those details in GAGEpack. Let me ask around and try to come up with something for you.
Questions?
• Managers
• Customers
• Auditors

Answers:

Eric Gasper 1:41 PM
I need a list of the gages we have that we bought last year. Specifically, the digital calipers we got from Mitutoyo which were sent to production Line 7 and are now on a 4 month calibration cycle.

Derek Benson 1:50 PM
Not sure we've done the best job documenting all those details in GAGEpack. Let me ask around and try to come up with something for you.
Questions?
- Managers
- Customers
- Auditors

Answers:
 Hopefully in your Gage Management System
Make a Meal
| INGREDIENT 2: | Gage Labels |
INGREDIENT 2:

"Maintain accurate and up-to-date gage labels that display the most vital details about each gage"
# Gage Management

**Recipe Name:**

**Prep Time:** 30 min  
**Cook Time:** 1 hour  
**Serves:** Everyone

**Ingredient 2:**

Maintain accurate gage labels that display the most vital details about each gage.
INGREDIENT 2:

Maintain accurate and up-to-date gage labels that display the most vital details about each gage.
Why do we need labels?

- Distinguishing between similar gages.
- Being aware of important dates.
- Organization and Traceability back to equipment history.
Keep it Relevant

- What’s Important?
Keep it Relevant

• What’s Important?
  - Gage Number
  - Description
  - Model #
  - Manufacturer
  - Storage Location
  - Last Calibration Date
  - Calibration Due Date
  - Calibration Interval
  - Current Location
  - Status
  - Last Calibration by
  - Assigned to
  - Barcode
Keep it Relevant

- What’s Important?
  - Gage Number
  - Description
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  - Storage Location
  - Last Calibration Date
  - Calibration Due Date
  - Calibration Interval
  - Current Location
  - Status
  - Last Calibration by
  - Assigned to
  - Barcode
### What’s Important?

<table>
<thead>
<tr>
<th>Gage Number</th>
<th>Description</th>
<th>Model #</th>
<th>Manufacturer</th>
<th>Storage Location</th>
<th>Last Calibration Date</th>
<th>Calibration Due Date</th>
<th>Calibration Interval</th>
<th>Current Location</th>
<th>Status</th>
<th>Last Calibration by</th>
<th>Assigned to</th>
<th>Barcode</th>
</tr>
</thead>
</table>

---

**Keep it Relevant**

![Image of a calibration tool with a label]
Which are good labels?

Gage #: C-01001
Gage type: Caliper
Assigned location: Spoiler Line
Last calib date: 5/5/2016
Next due date: 11/5/2016

Asset #: C-01001
Gage type: Caliper
Purchase date: 7/15/2001
Purchase price: 350
Gage size: 1"
Manufacturer: Fowler
Calib due date: 8/25/2009
Owner: Company
# Recipe

**From the Kitchen of PQ Systems**

**Recipe Name:** Gage Management

<table>
<thead>
<tr>
<th>Prep Time:</th>
<th>Cook Time:</th>
<th>Serves:</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 min</td>
<td>1 hour</td>
<td>Everyone</td>
</tr>
</tbody>
</table>

**Ingredient 3:**

Gage Locations
Tracking gage location has never seemed to be very useful here.
INGREDIENT 3:

Tracking gage location has never seemed to be very useful here.
INGREDIENT 3:

At any given moment, you should be able to understand where each gage resides. Track movements of your equipment to save time spent hunting lost gages.
In a given year, how much time does the average adult spend looking for lost belongings?

2.5 Days
In a given year, how much time does the average adult spend looking for lost belongings?

60 Hours
In a given year, how much time does the average adult spend looking for lost belongings?

$1500
The Impact of Lost Gages

In a given year, how much time does the average adult spend looking for lost belongings?

$30,000
The Impact of Lost Gages

• Lost gages are easy targets for auditors.
Lost gages are easy targets for auditors. A lost gage represents a risk because, if found, it could have potentially been used to measure a part on which it wasn’t specified to be used.
The Impact of Lost Gages

- Lost gages are easy targets for auditors.
- A lost gage represents a risk because, if found, it could have potentially been used to measure a part on which it wasn’t specified to be used.
- Lost gages are also an investment from which you are no longer getting value.
How do you store your gages?
How do you store your gages?
What do you do?
What do you do?
What do you do?
What do you do?
What do you do?

DOCUMENT
EVERYTHING!
| INGREDIENT 4: | Audit Records |
Ensure you have a system in place which captures the “who, what, when, and why” for changes happening with your inventory.
RECIPE
FROM THE KITCHEN OF PQ SYSTEMS

<table>
<thead>
<tr>
<th>RECIPE NAME:</th>
<th>Gage Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREP TIME:</td>
<td>30 min</td>
</tr>
<tr>
<td>COOK TIME:</td>
<td>1 hour</td>
</tr>
<tr>
<td>SERVES:</td>
<td>Everyone</td>
</tr>
</tbody>
</table>

INGREDIENT 4: Ensure you have a system in place which captures the "who, what, when, and why" for changes happening in inventory.
## Gage Management

**RECIPE NAME:**

**PREP TIME:** 30 min  
**COOK TIME:** 1 hour  
**SERVES:** Everyone

**INGREDIENT 4:**

Ensure you have a system in place which captures the “who, what, when, and why” for changes happening with your inventory.
What’s she going to ask me?

- Are you using any overdue gages?
- Can you show me the calibration history for this gage?
- Why does this record look the way it does?
- Why did you do that?
- What is the evidence to support that?
- Can you explain that to me?
- Who else performs this function?
dot the i's and cross the t's
## Audit Record

**Gage number:** C-05001  
**Type:** Edit gage  
**Edit date:** 6/24/2021 4:45:25 PM  
**Edit by:** Derek Benson  

**Reason:** Tolerances increased due to customer input.

### Calibration Steps

#### Before

<table>
<thead>
<tr>
<th>Seq</th>
<th>Name</th>
<th>IsAttr</th>
<th>Target</th>
<th>Units</th>
<th>Plus/Minus</th>
<th>Min</th>
<th>Max</th>
<th>NumDec</th>
<th>Master</th>
<th>Unc</th>
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<tbody>
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<td>MASTER-0....</td>
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<tr>
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<td>inches</td>
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<td>MASTER-0....</td>
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<td>Max-Range</td>
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<td>inches</td>
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<td>4.999</td>
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<td></td>
<td>MASTER-0....</td>
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</table>

#### After

<table>
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<tr>
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<td>0.103</td>
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<td>inches</td>
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<td>5.001</td>
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<td>MASTER-0....</td>
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</tr>
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</table>
INGREDIENT 5:

Scheduling Gage Events
### Gage Management

**INGREDIENT 5:**

Schedule all service events on all of our tools for October of each year to reduce the interruption caused by down time.
INGREDIENT 5:

Schedule all service events on all of our tools for October of each year to reduce the interruption caused by down time.
INGREDIENT 5:

Spread out the servicing events on tools at appropriate intervals throughout the year in order to reduce or eliminate downtime associated with these events.
• Don’t assume your gages are accurate.

• Never use a gage that’s behind on calibration.
  • Implement systems that prevent it from happening, where possible.

• Calibrate routinely per gage manufacturer recommendations.

**BONUS**

• VERIFY gage is holding accurate throughout calibration interval.
Examine your Workload

• Be aware of peaks and valleys in your calibration scheduling so you can prepare.

• Work on calibration schedule to limit the peaks and valleys.

• Calibrate early, if possible, to flatten the curve.
Gages need to be checked at regular intervals to ensure they are accurate. But what is the right interval? How often should the technicians calibrate the gage?

Too often – waste of time and money!

Not often enough – possibly using a bad gage to check your parts!
A Stability study can be done to determine if your measurement system is stable (in control).

Checking to see if a gage is consistent and predictable between calibration cycles.
Stability Study

Results

PASS
Stability Study

Results
Notifications
**RECIPE NAME:** Gage Management

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**INGREDIENT 6:**

Set a reminder for yourself to review the inventory every so often for upcoming service events.
INGREDIENT 6:

Set a reminder for yourself to review the inventory every so often for upcoming service events.

improve it!
### Recipe Name:
**Gage Management**

| Prep Time: | 30 min | Cook Time: | 1 hour | Serves: | Everyone |

**Ingredient 6:**

Leverage technology to notify you of upcoming work to be completed on your gages so you don’t find yourself using overdue gages.
Strings too loose? *Won’t play*

Strings too tight? *Will snap*

Strings tuned just right can play beautiful music!
Strings too loose? *Won’t play*

Stings too tight?  *Will snap*

Strings tuned just right can play beautiful music!
RECIPE
FROM THE KITCHEN OF PQ SYSTEMS

RECIPE NAME: Gage Management

PREP TIME: 30 min  COOK TIME: 1 hour  SERVES: Everyone

INGREDIENT 7: MSA
INGREDIENT 7:

Remember to perform Measurement Systems Analysis on your gages to confirm they are measuring accurately.
<table>
<thead>
<tr>
<th>INGREDIENT 7:</th>
</tr>
</thead>
</table>

Remember to perform Measurement Systems Analysis on your gages to confirm they are measuring accurately.

improve it!
INGREDIENT 7:

Remember to perform Measurement Systems Analysis to build trust and consistency in your measurement processes.
What are MSA Studies?

Everybody has a “junk drawer” in their kitchen, right?

Measuring cups are used every day!

It is like a calibration – checking to see if your gage is measuring correctly against a known reference value.
What are MSA Studies?

The “Specialty” Pampered Chef gadgets.
What are MSA Studies?

The “Specialty” Pampered Chef gadgets.

Variable R&R Study

Attribute R&R Study

Uncertainty Study

Linearity Study

Stability Study
Calibration vs MSA

Checking for Accuracy – Within Tolerances
Calibration vs MSA

An analysis of my ENTIRE measurement system
An analysis of my ENTIRE measurement system

- Material
- Method
- Machine
- Manpower
- Milieu
**RECIPE NAME:** Gage Management

| PREP TIME:   | 30 min | COOK TIME:   | 1 hour | SERVES:     | Everyone |

**INGREDIENT 8:**

*Understanding Gage Usage*
As long as you get all the calibrations done on-time, there’s no need to document each time a gage is used to measure specific parts.
As long as your calibrations are done on-time, there's no need to document each time a gage is used to measure specific parts.
INGREDIENT 8:

Making a logical connection between the gages and the things they are measuring is, at some point, going to pay off big time!
Build a Bridge!

Gage Management

Quality Data
Build a Bridge!

Gage Management

Quality Data
The parts you sent me are the wrong size!

What do you do?
What do you do?
Build a Bridge!

• Document “Part-Usage” in your gage management system.
  Allows you to extract all suspect parts following calibration failure.

• Document “Gage-Usage” in your quality data collection system.
  Allows you to extract all involved gages following returned product.
## Parts associated with gages

**PQ Systems**

**Date:** 11/8/2020

### All Gages

**Gage number: DX-34585**

<table>
<thead>
<tr>
<th>Part name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 2</td>
<td>Brake cylinder - Pontiac</td>
</tr>
<tr>
<td>Part 3</td>
<td>Brake cylinder - Chrysler</td>
</tr>
<tr>
<td>Part 5</td>
<td>Brake hose fitting - Pontiac</td>
</tr>
</tbody>
</table>

---- Parts: 3

**Gage number: M-01002**

<table>
<thead>
<tr>
<th>Part name</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Part 4</td>
<td>Brake hose fitting - Ford</td>
</tr>
</tbody>
</table>

---- Parts: 1

**Gage number: MASTER-06001**

<table>
<thead>
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<th>Part name</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Part 2</td>
<td>Brake cylinder - Pontiac</td>
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</tbody>
</table>

---- Parts: 1

**Gage number: MASTER-06002**

<table>
<thead>
<tr>
<th>Part name</th>
<th>Description</th>
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<tbody>
<tr>
<td>Part 2</td>
<td>Brake cylinder - Pontiac</td>
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</table>

---- Parts: 1
# Gages associated with parts

## PQ Systems

### All Parts

<table>
<thead>
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<th>Name: Part 1</th>
<th>Gage number</th>
<th>Gage type</th>
<th>Current location</th>
<th>Last calib date</th>
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<td>Gage Room</td>
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<tr>
<td>DX-34585</td>
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<td>MASTER-06001</td>
<td>Master Blocks</td>
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<td>DX-34585</td>
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INGREDIENT 9:

Record Retention
The record retention requirement for our industry is 5 years. Purge the gage management system annually to remove things greater than 5 years old.
INGREDIENT 9:

The record retention requirement for our industry is 5 years. Purge the gage management system annually to remove things greater than 5 years old.
**INGREDIENT 9:**

Though the record retention requirement for our industry is 5 years, there's really no need to purge aging records from your gage management system unless space becomes an issue.
What’s Required of Me?
What’s Required of Me?

5 Years
What’s Required of Me?

10 Years
What’s Required of Me?

2 Years
What’s Required of Me?

6 Years
Reality...
What if the doctor only sees the past 5 year’s worth of your medical history before deciding how to treat you?
What if…
Gage Management

INGREDIENT 10:

Your Team & Culture
Employee buy-in is critical for the success of any quality process. Engage your teammates and make sure everyone understands why their roles in gage management matter.
Employee buy-in and make sure their roles in gage management are critical for the success of any quality process. Engage your teammates and make sure everyone understands why their roles in gage management matter.
Employee buy-in is critical for the success of any quality process. Engage your teammates and make sure everyone understands why their roles in gage management matter.
Creating a Real Team

Bring it on!
Creating a Real Team

EMPOWER YOUR EMPLOYEES
If you wish to motivate others, you must captivate them.
If you wish to motivate others, you must inspire them.
The Golden Circle

Simon Sinek
The Golden Circle
Simon Sinek

- Purpose
- Process
- Outcome

WHY
HOW
WHAT
The Golden Circle
Simon Sinek

start with why
How about Gage Management?

**Outcome**
We know where all our gages are located, we know their history and we know they’re accurate!

**Purpose**
We believe in delighting our customers with 100% acceptable products – exactly as we’ve promised.

**Process**
We’ve done all the things in this presentation to implement a sound, easy-to-use gage management system.
Recipe

Apple Pie

Ingredients:
- 5 cups peeled and cored apples
- 1/4 cup sugar
- 1/4 cup all-purpose flour
- 1/4 tsp salt
- 1/4 tsp ground cinnamon
- 1/2 tsp ground nutmeg
- 1/2 cup unsalted butter, melted

Instructions:
1. Preheat oven to 375°F.
2. Place apples in a 9-inch pie dish.
3. In a small bowl, mix together sugar, flour, salt, cinnamon, and nutmeg.
4. In a separate bowl, stir together melted butter and flour mixture.
5. Drop by spoonfuls over apples.
6. Bake for 45-50 minutes until crust is golden brown.
7. Serve warm with whipped cream.