

Railtech Deutschland

A new strong Brand for Success, Reliability and Continuity

Railtech Deutschland –
The new strong Brand for further Success, Reliability and Continuity



A well known brand for quality and reliability merge into a new one!

What are the changes, reasons and advantages for you in the future?

New Management Team:

⇒ May 2015 a new Managing Director was set in place.

Dr. Joachim Krägeloh

Age: 49

PHD in Metallurgy and Steelmaking

- 20 years experience in steel business
- Specialist for Quality, Processes and Scientific Studies



⇒ July 2015 – Technical Service reinforced:

Michael Liddell

Age: 49

Acknowledged and certified Welding Specialist

- 35 years welding experience (WIG, MAG, Arc Welding, etc.)
- 19 years experience in AT welding
- Specialist for AT-Process, Development and for specific welding problems



⇒ Since 2006 – “well known” Technical Sales:

Maciej Palka

Age: 35

Acknowledged Sales Specialist

- 15 years experience in AT welding and equipment
- Specialist for the polish market, for welding as well as for specific welding problems



Overview Changes:

- **Brand:**
 - New Logo (but still registered as Rolf Plötz - Polska)
- **Process:**
 - New Crucible Design
 - New Mould Design
- **Mould Production:**
 - New and optimized industrial production process for moulds
- **Advanced Quality Management:**
 - FMEA (internal customer/supplier relationship)
 - Process Control with 6 Sigma
 - Optimized internal/external claim management

- **Research and Development:**
 - Standard Quality testing acc. EN14730
 - Fatigue Testing
 - SEM – Microscopy
 - Know – How Transfer with Railtech Welding & Equipment
 - Engineering With RWE
 - FEM-Modelling of the casting process just implemented
 - Present in the all important European Norm and welding committees
- **Larger and optimized stock in Germany:**
 - Stock increase for short term delivery (< 5 days)
 - Customized stock management for more flexibility

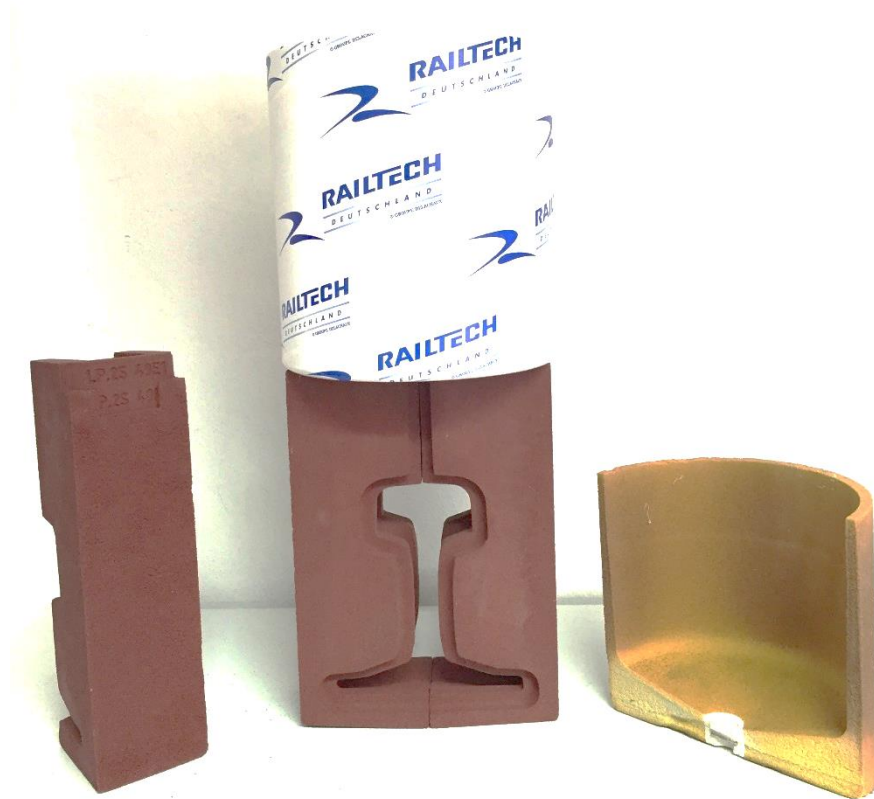
● Brand:

- We are part of the big and successful Railtech family
- We all participate of the experience and knowledge of RWE but without losing our own identity and philosophy
- Better financial security for our partners for major projects

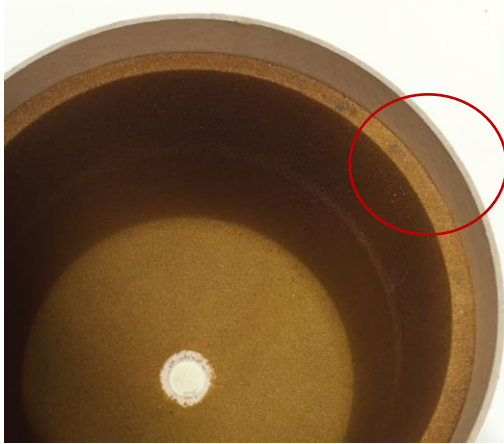
● Process:

- New Product Design – SoWoS-P:

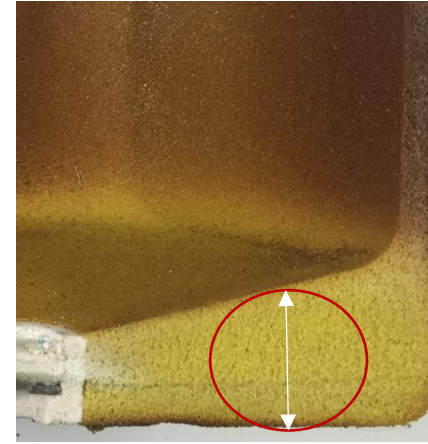
- Optimized handling and safety
- Corporate Railtech design
- Underlining our new identity
- Professional industrial design



Important features as portion-weight, chemical composite, technical labeling, welding behavior and especially the mechanic-technological properties are according to the homologation from 06.03.2009 and our recent WPQR.



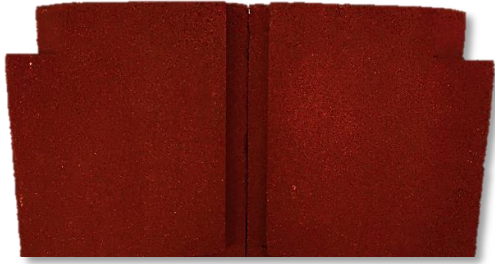
- thicker paper drum
- no gravel
- 1 kg lighter
- same stability
- tight fit against movement (save transport)



- thicker base
- higher stability against impact to gravel in track (damage prevention)



- minus 8 mm diameter
- min. 20 mm crimping
- good distance to gravel in track (damage prevention)
- Exact positioning guidance



- Newly developed automatic, integrated positioning system
- save and stable stand even in bends and slanted mold positions
- always centered
- No extra positioning system necessary
- Good visible labelling

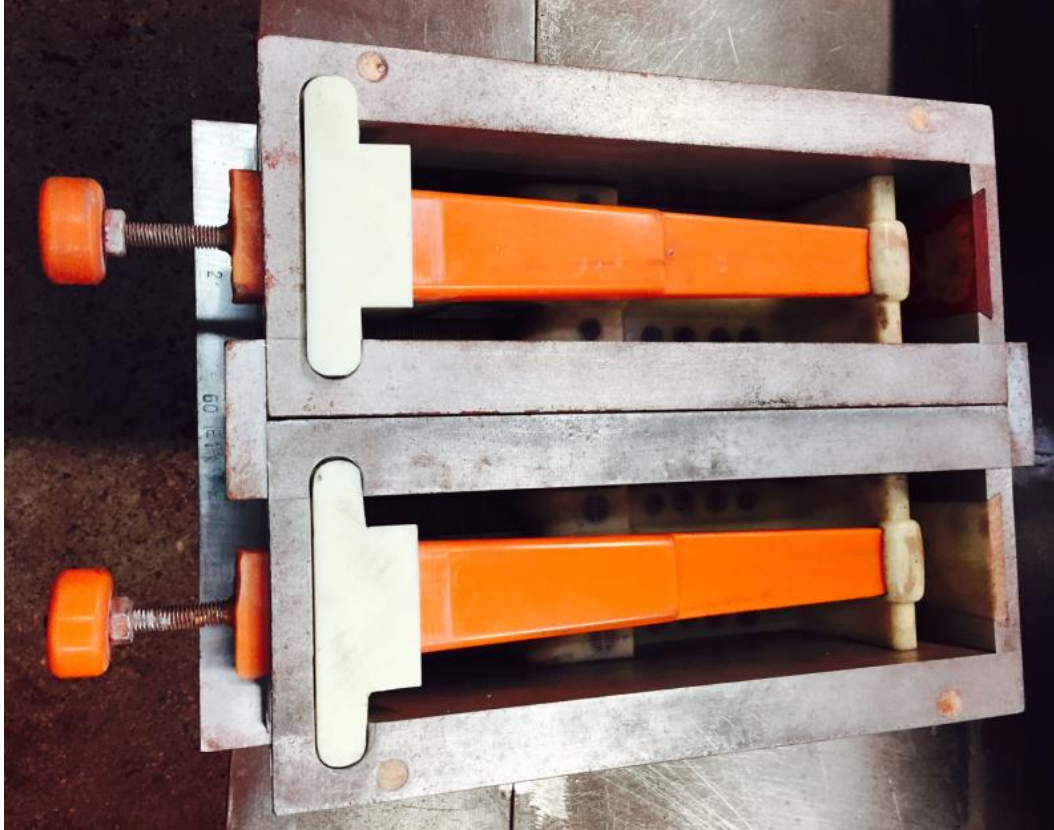


- **Mould Production – Sopron Hungary:**



New optimized setup for mould production (8 bar) for advanced quality and better productivity.





- New tools system for high pressure and higher density
- Optimized quality due to 8 bar shooting pressure
- Modern and “state of the art” process for mould manufacturing with doubling the productivity
- > Highly flexible production planning for short term delivery

● Advanced Quality Management:

- FMEA – (Failure Mode and Effect Analyse):

“Highly structured method to verify process risks and define their measures.”

Implemented for all main production processes at Railtech Deutschland Group (portion/moulds)

Process FMEA

Production: Manufacturing of AT Portions										Date:	
No.	Main Step	No.	Partial Step	Nr.	Failure	Risk Priority 1=low; 6=high	Failure Possibility 1=low; 6=high	Detection Probability 1=high; 6=low	Cause	Measures	RPN

- Process Map with single steps
- Failure analyze of each step
- Defining the risk priority of each failure
- Defining the failure possibility of each failure
- Defining the probability of detection
- Defining measures for high Risk Priority Numbers (RPN)

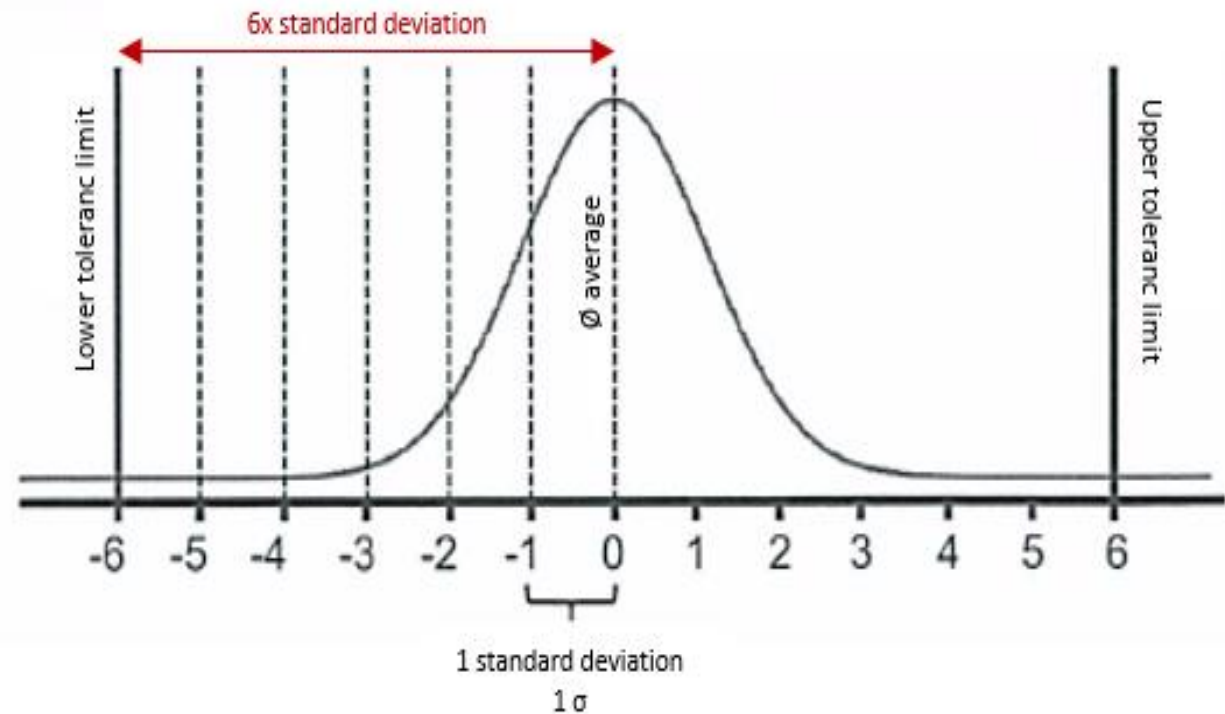
Worst Case (high value of RPN) is a failure with a high probability but hard to detect by the worker and cause a high inconvenience for the customer (RPN > 100 – 216)

- Process Control with 6 Sigma:

6 Sigma is a dedicated and powerful method for advanced quality and process optimizing.

6 Sigma was invented in 1970's by Motorola and became famous through General Electric's CEO Jack Welch who implemented this as a general quality strategy at GE.

6 Sigma based on the vision of “zero failure” – strategy. That means that every process has to achieve the acceptance criteria of the customer (plus/minus process tolerance) within +/- 6 times the standard deviation.



For an uncontrolled process which is less than 6 σ (6 times the standard deviation) the likelihood for failure is:

Sigma Level [σ]	Probability for good parts [%]	Probability for defective parts [%]	Loss [ppm]
1	30.9	69.1	691462
2	69.1	30.9	308538
3	93.3	6.7	66807
4	99.38	0.62	6210
5	99.977	0.023	233
6	99,9997	0.00034	3.4



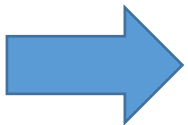
Structure:

Problem > **1.** *D = Define* > **2.** *M = Measure* > **3.** *A = Analyze* > **4.** *I = Improve* > **5.** *C = Control* > **Solution**

One of the most important quality feature > chemical analyze of the weld

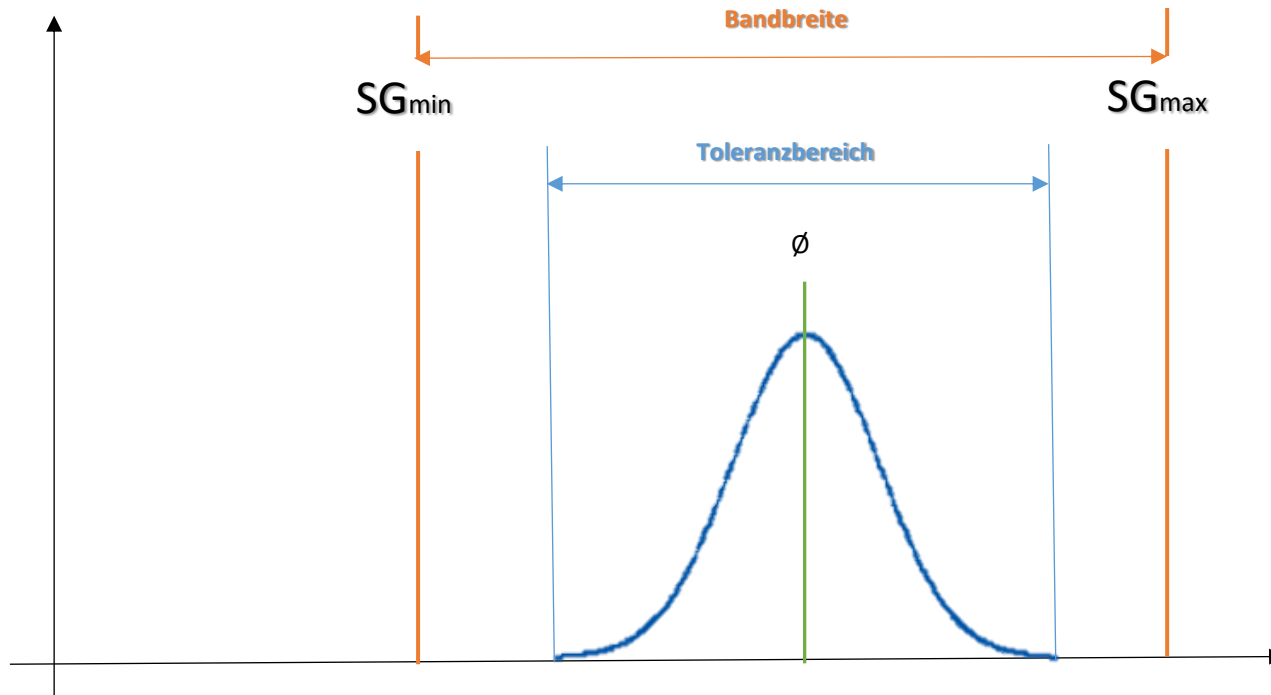
Too much deviation of the analyze means:

- Instable mechanic-technological properties (hardness, ductility, etc.)
- Risk of deviation to rail analyze
- Increase risk of segregations in the molten phase
- Increase risk of fatigue



Investigation of the process capability of our chemical analyze

1st step Define:



Requirements for analyze acc. EN 14730-1

Tabelle 7 — Chemische Komponenten

Element	Erlaubter Bereich %		Toleranzbereich	Schienen-Stahlsorte EN 13674-1
	Minimum	Maximum		
Kohlenstoff	0,30	0,55	± 0,12	R200
	0,35	0,70	± 0,12	R220
	0,40	0,75	± 0,12	R260, R260Mn
	0,50	0,85	± 0,12	R320Cr, R350HT, R350LHT
Silizium	0,00	1,20	± 0,25	alle
Mangan	0,40	1,00	± 0,20	R200
	0,45	1,20	± 0,20	R220
	0,50	1,40	± 0,20	R260, R320Cr, R350HT, R350LHT
	0,50	1,60	± 0,20	R260Mn
Phosphor	0,00	0,035	—	alle
Schwefel	0,00	0,030	—	alle
Chrom	0,00	0,20	—	R200, R220, R260, R260Mn
	0,00	0,80	± 0,20	R320Cr, R350HT, R350LHT
Molybdän	0,00	0,10	—	alle
Nickel	0,00	0,10	—	alle
Aluminium	0,02	0,60	± 0,20	alle
Kupfer	0,00	0,20	—	alle
Zinn	0,00	0,02	—	alle
Antimon	0,00	0,02	—	alle
Titan	0,00	0,05	—	alle
Niob	0,00	0,01	—	alle
Vanadium	0,00	0,25	—	R200, R220, R260, R260Mn
	0,00	0,45	—	R320Cr
	0,00	0,65	—	R350HT, R350LHT

2nd step Measure:

1st: Analyze of short term behavior > 25 welds in a row with the same lot of:

Iron oxide, Aluminum, Manganese, Cast Iron

Goal: A better understanding for the main process stability of the recipe

2nd: Analyze of long term behavior > 100 welds of the previous years analyzed with shifting lots of:

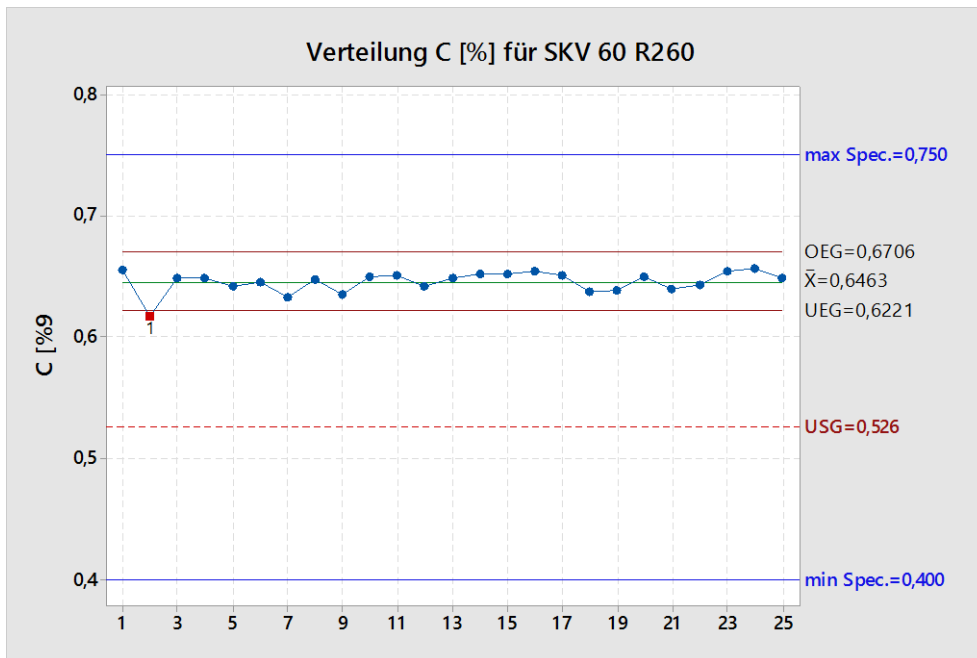
Iron oxide, Aluminum, Manganese, Cast Iron

Goal: Comparison with short term analyze and finding the real process drifts

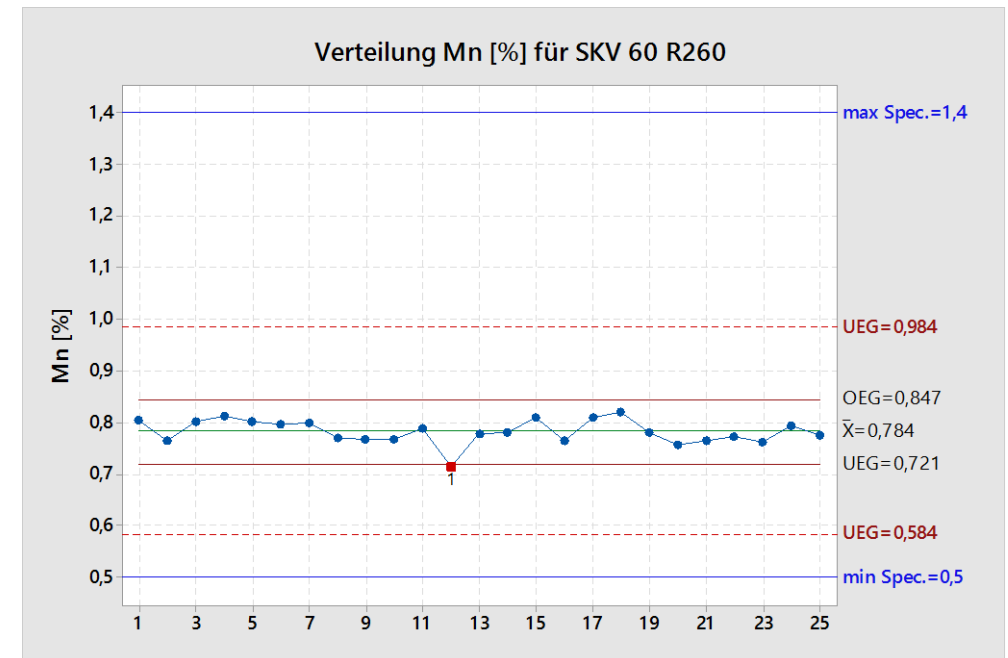
3rd: Defining control parameters for daily quality control

Results for 3 main elements (Carbon, Manganese, Aluminum):

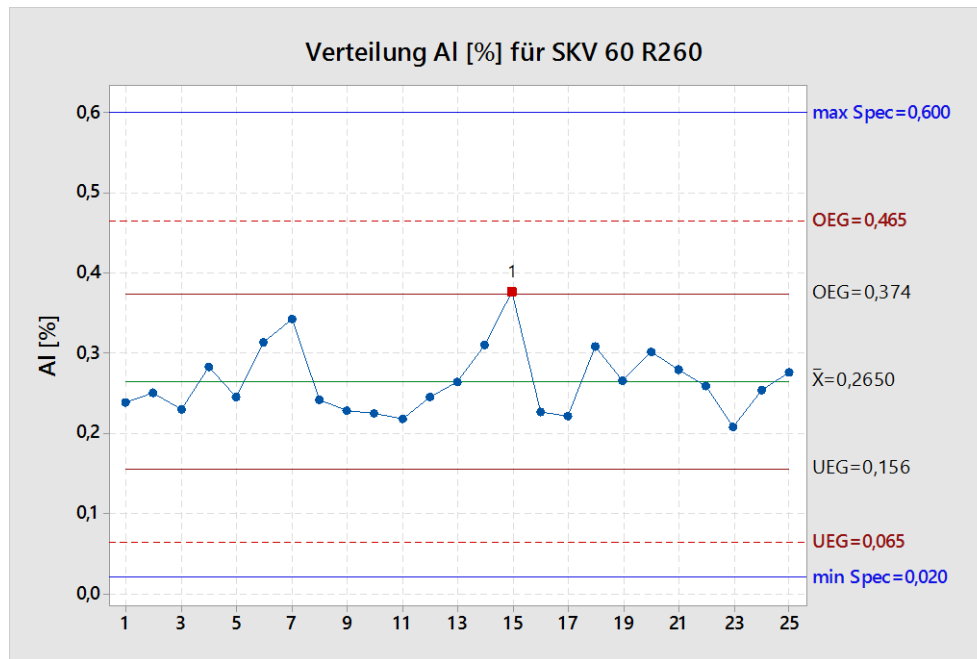
Carbon [%]:



Manganese [%]:

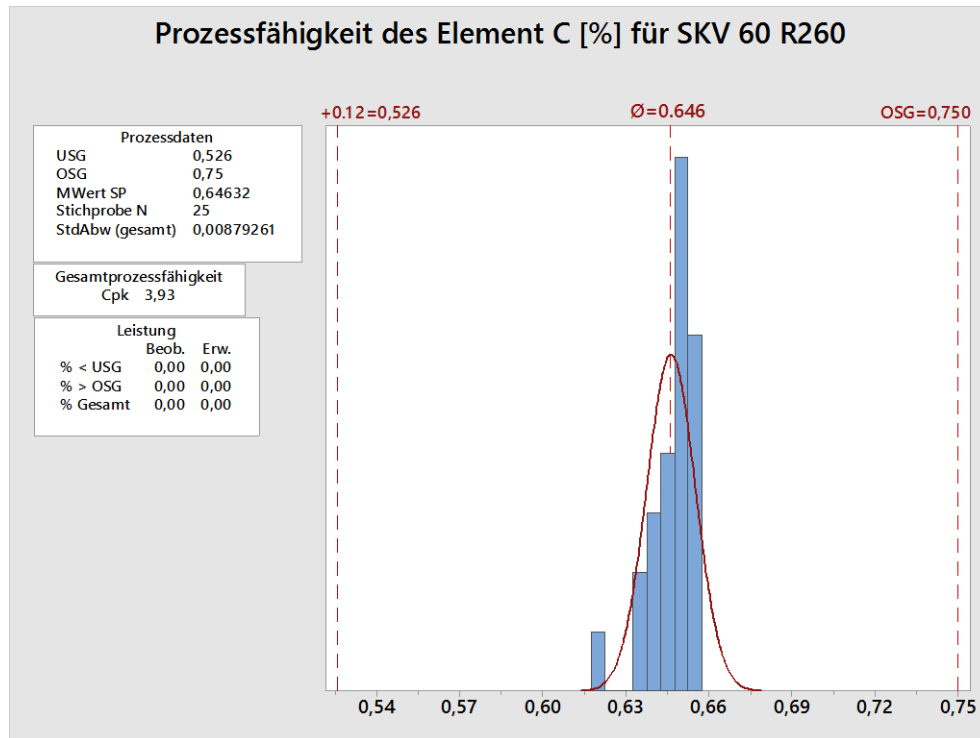


Aluminum [%]:

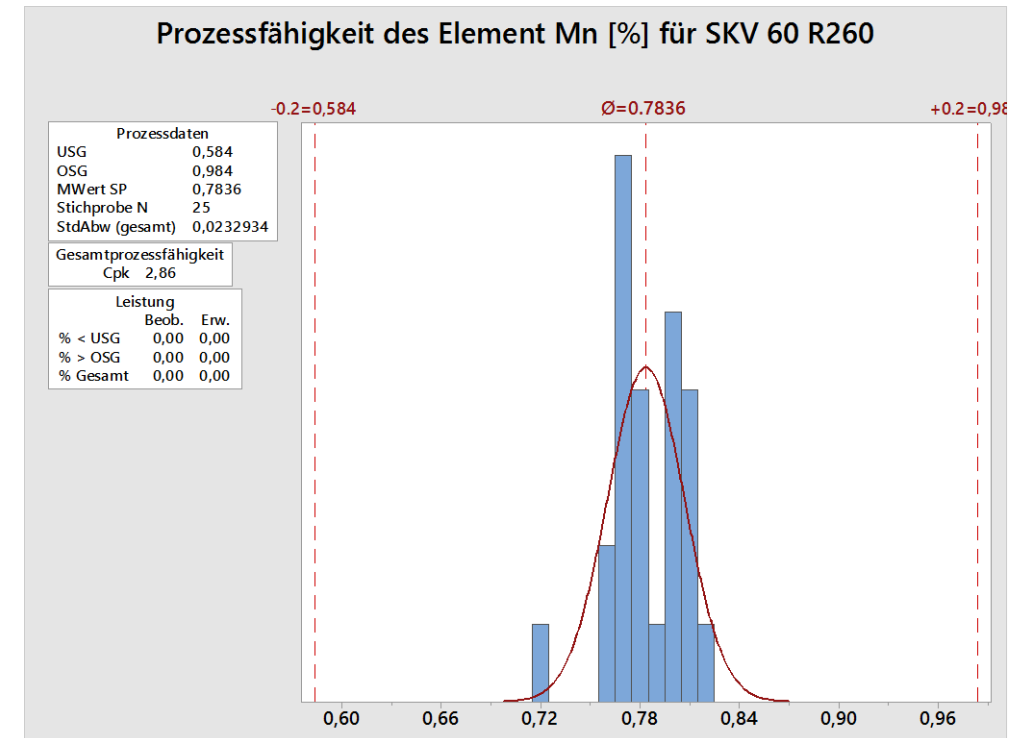


3rd step Analyze:

Carbon [%]:

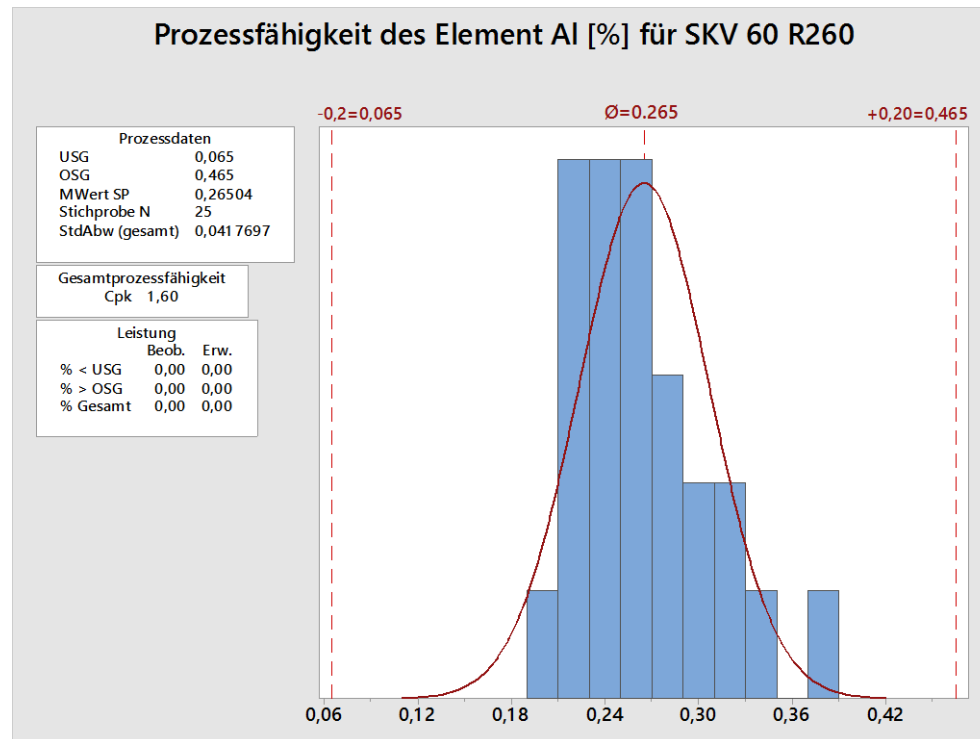


Manganese [%]:



Highly capable process; easily adjustable > 6 Sigma achievable

Aluminum [%]:



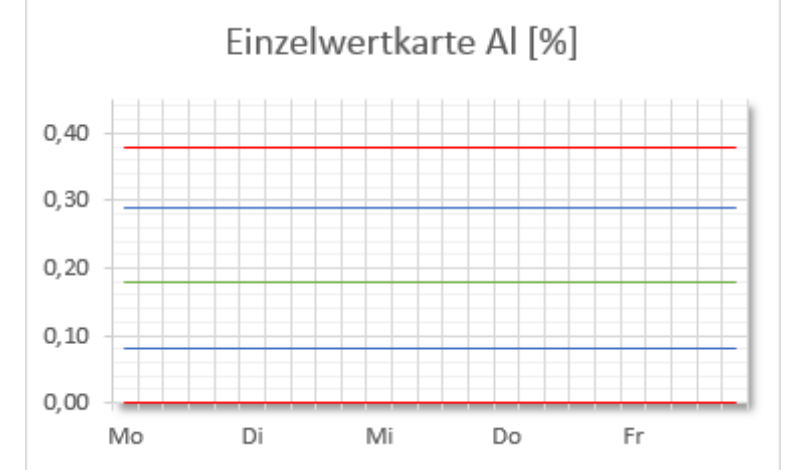
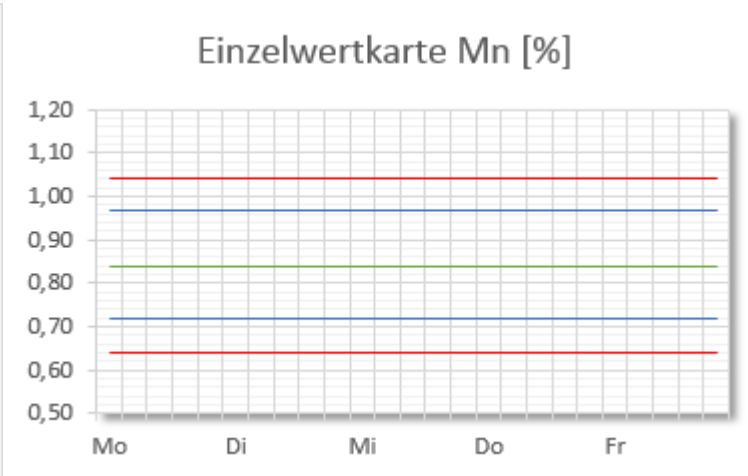
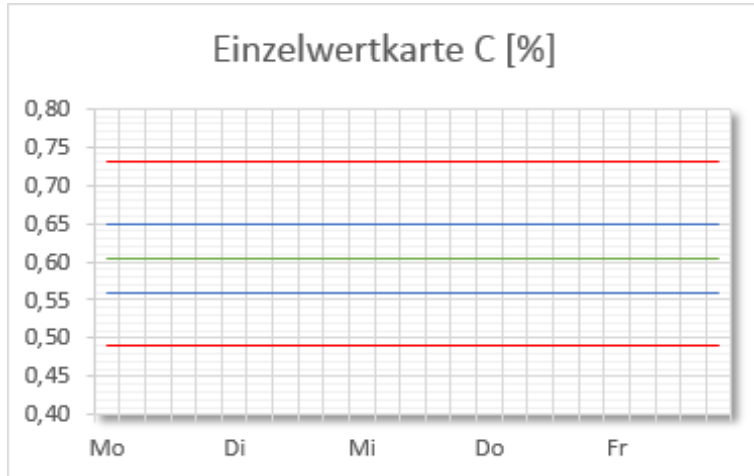
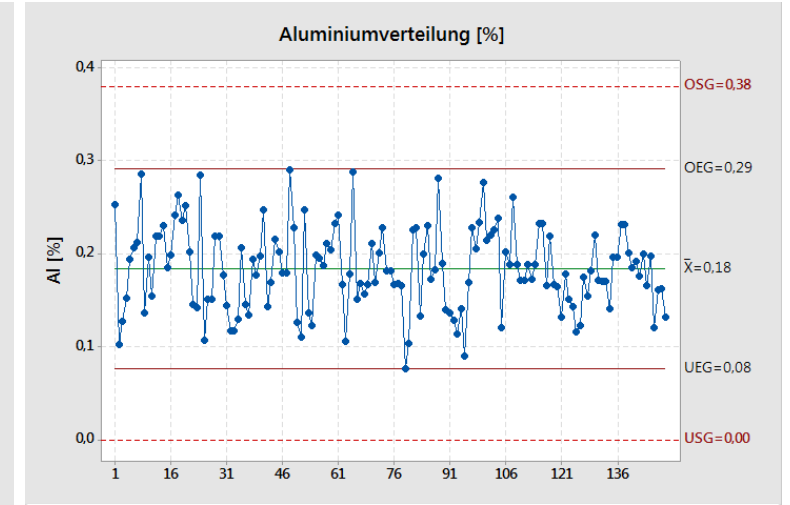
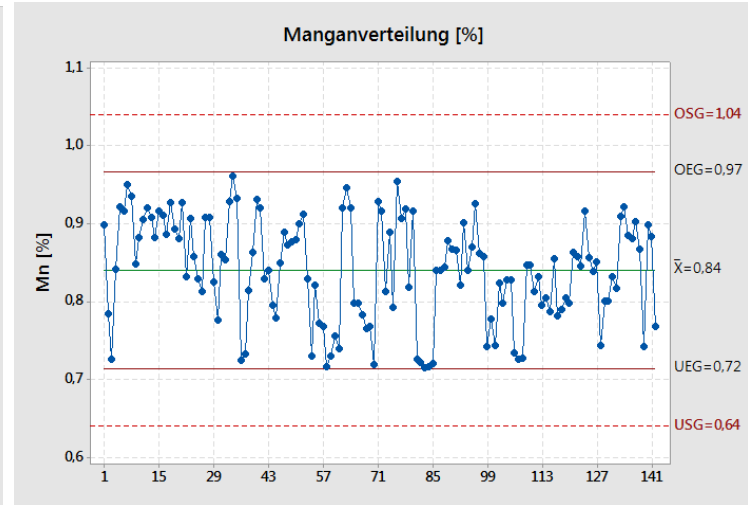
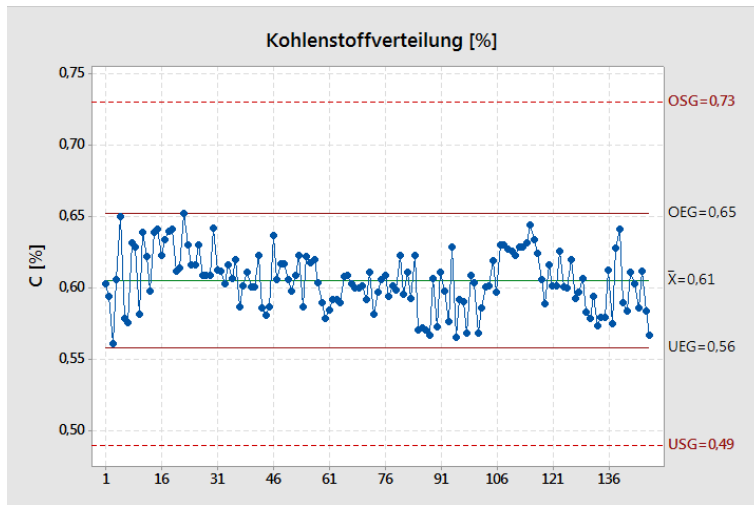
Due to a capable behavior of all elements with regard to the EN 14730 the **4th step Improvement** was not necessary...

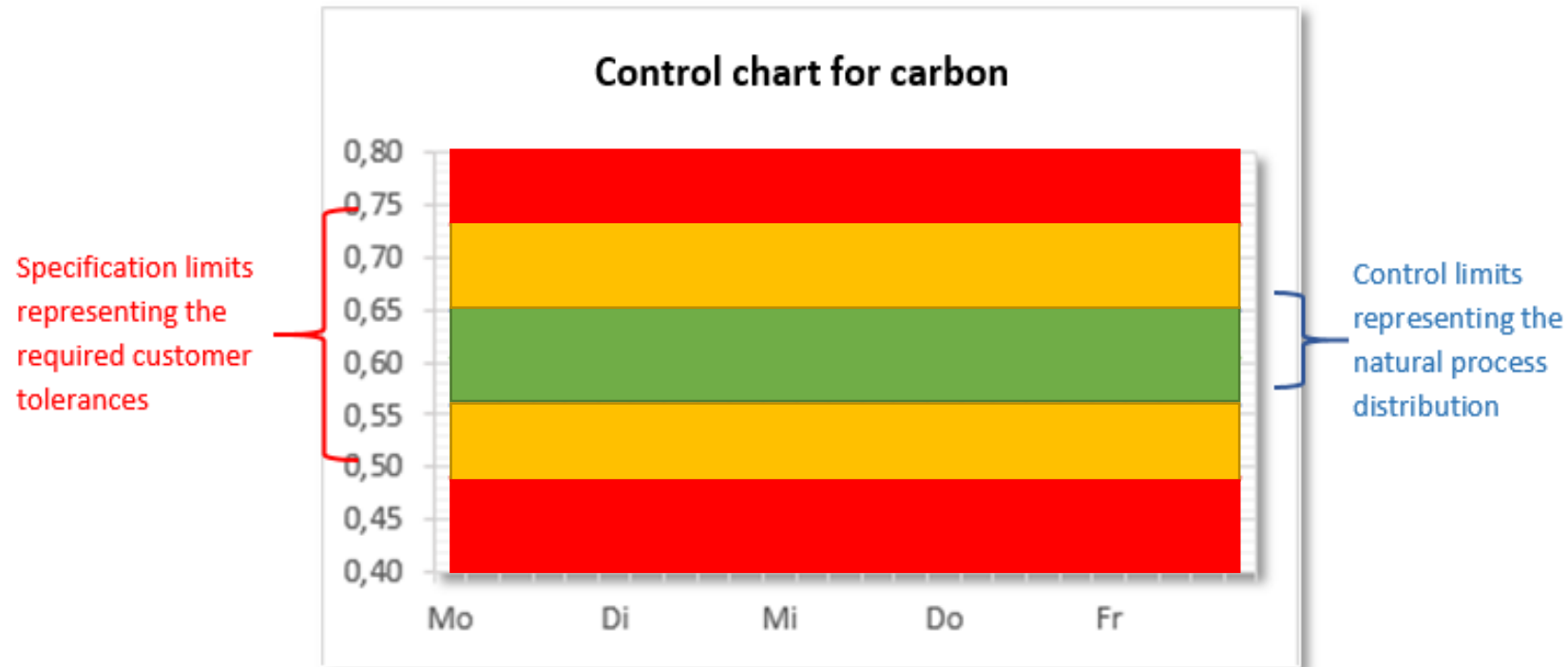
Capable process; adjustable > 4 Sigma achievable

Analyse der Elementeverteilung für SKV 49,54,60 R260

5th step Control:

Results of long term behavior and derived control chart





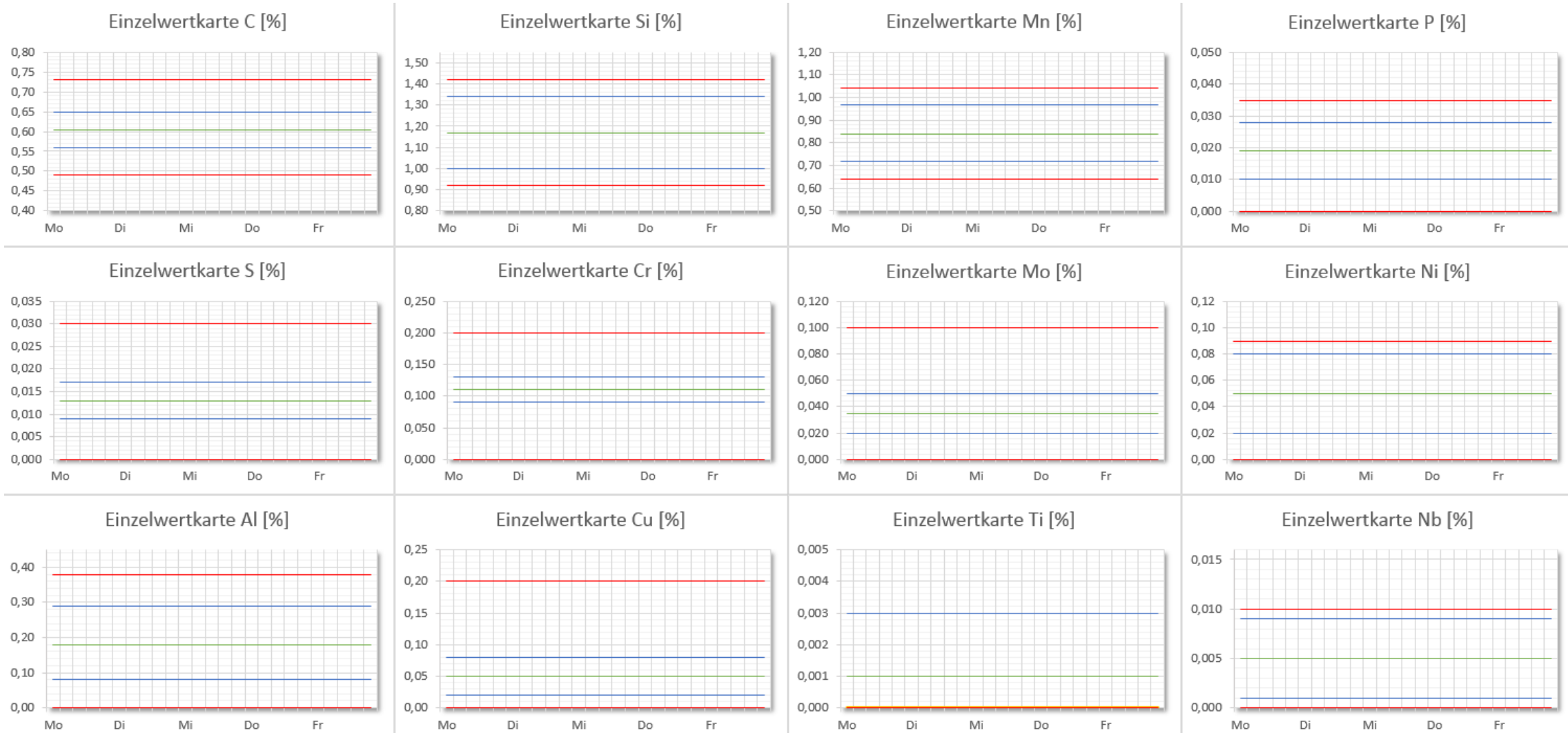
Internal Quality Levels:

S1 = range between control limits > No reaction

S2 = range between control limits and specification limits > analyzing and adjustment of process

S3 = range beyond specification limits > full stop of production and analyzing

Daily control of the production lots with help of the control charts:



- Optimized internal/external claim management

For all external customer deviations as well as for internal claims (internal customer/supplier relationship) a well known state of the art process is used > 8D- Reporting.

8D- Reporting was formally invented by the automotive industry and takes care that the problem is analyzed in a structured manner and solved sustainable for the future.


1st Do: Define Team and goal

2nd Do: Describe Problem

- Who
- How
- Why
- Where
- When

3rd Do: Immediate Corrective Actions for the customer

8D – Report	
Auftragsnummer/Order-No.:	Name:
Änderungsstand/Revision-No.:	Datum/Date:



1. Team	
a) Teammitglieder/ Members	
b) Teamziel/Goal:	

2. Problem - Beschreibung / Problem Description	
a) Artikelnr. / Article No:	
b) Kunde/ Customer:	
c) Beschreibung/ Description:	<p>Wer? Wer ist davon betroffen? Wer hat es (nicht-) entdeckt? Who is affected? Who didn't detected the failure?</p> <p>Wie/Was? Was für eine Art von Problem ist es? What kind of problem is it?</p> <p>Warum? Warum ist es ein Problem? Why this is a problem?</p> <p>Wo? Wo wurde es (nicht-) entdeckt? Wo wurde es verursacht? Where it wasn't detected? Where was it induced?</p> <p>Wann? Wann wurde es entdeckt? Seit wann besteht das Problem? When does it was detected? Since when the problem occurs?</p>
d) Zusammenfassung/ Summary:	

3. Sofortmaßnahme / Corrective Action	
a) Beschreibung/ Description:	

4th Do: Root Cause Analyze

- a) Description Root Cause
- b) Ishikawa (Fishbone – Diagram)
- c) 5 Why - Analyzation


5th Do: Defining preventive actions

6th Do: Validation of measures

7th Do: Scanning comparable processes for prevention

8th Do: Finalizing Analyze

8D – Report	
Auftragsnummer/Order-No.:	Name:
Änderungsstand/Revision-No.:	Datum/Date:

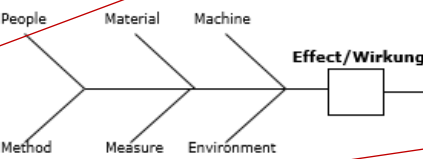


4. Fehlerursache / Root Cause

a) Beschreibung/Description:

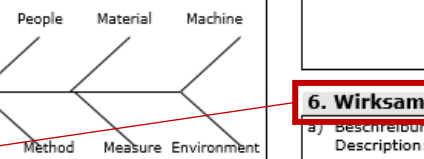
b) Ursachen-Wirkung Diagramm / Cause & Effect Chart

How does it happen? / Wie ist es passiert?



(Max. 3 Causes on each side/Max. 3 Verursacher auf jeder Seite)

Why it was not detected? / Warum wurde es nicht entdeckt?



c) 5 – Way Analysis


1. Warum ist das passiert? Why does it happen?
2. Warum ist das passiert? Why does it happen?
3. Warum ist das passiert? Why does it happen?
4. Warum ist das passiert? Why does it happen?
5. Warum ist das passiert? Why does it happen?

8. Gratuliere dem Team / Congratulate Your Team

a) Abschlussdatum / Date of closure:

b) Ersteller / Created by:

8D – Report	
Auftragsnummer/Order-No.:	Name:
Änderungsstand/Revision-No.:	Datum/Date:



5. Abstellmaßnahme / Preventive Action

a) Beschreibung/Description:

b) Zu Fehlerursache:

6. Wirksamkeit der Maßnahmen überprüfen / Validation

a) Beschreibung/Description:

7. Fehlerwiederholung verhindern / Prevention

a) Wo fließen die Erkenntnisse ein / Lessons learned:

b) Ähnliche Prozesse bei denen der Fehler auftreten könnte / Similar Processes possibly affected:

● Research and Development:

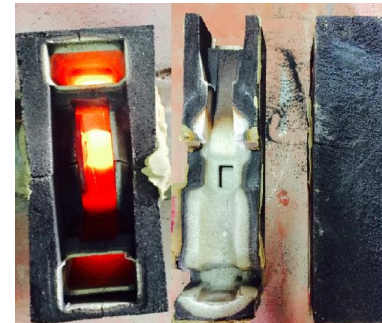
- Standard Quality testing acc. EN14730:

All vital tests required by the EN 14730 can be done in our laboratory in-house as:

- spectroscopy for all major elements
- hardness test (HV and HB)
- bending test
- macro-and microscopy (500 x) incl. metallographic analyze
- UT testing
- penetration testing
- magnetic particle testing
- crack testing for moulds

- Fatigue Testing acc. to EN 14730:

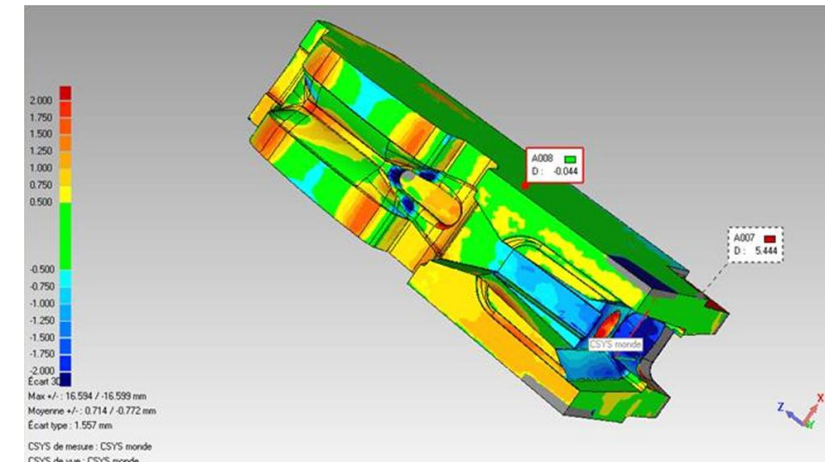
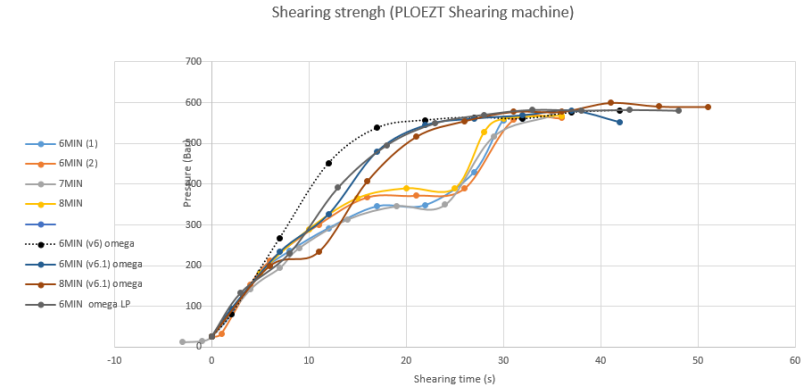
With our completely refurbished fatigue machine we can perform long time fatigue tests up to 5 Mio. cycles acc. the EN 14730 (“Past the Post” – process).



- SEM – Microscopy



- Know – How Transfer with RWE experts worldwide
- Engineering With RWE engineers
- FEM-Modelling of the casting process just implemented
- Present in the all important European Norm and welding committees



● Larger and optimized stock in Germany:

Capacity increase for now > 20.000 kits and tooling

- Stock increase for short term delivery (< 5 days)
- Customized stock management for more flexibility
- FIFO (first in, first out) process implemented



Thank you very much for your attention !!

Questions?