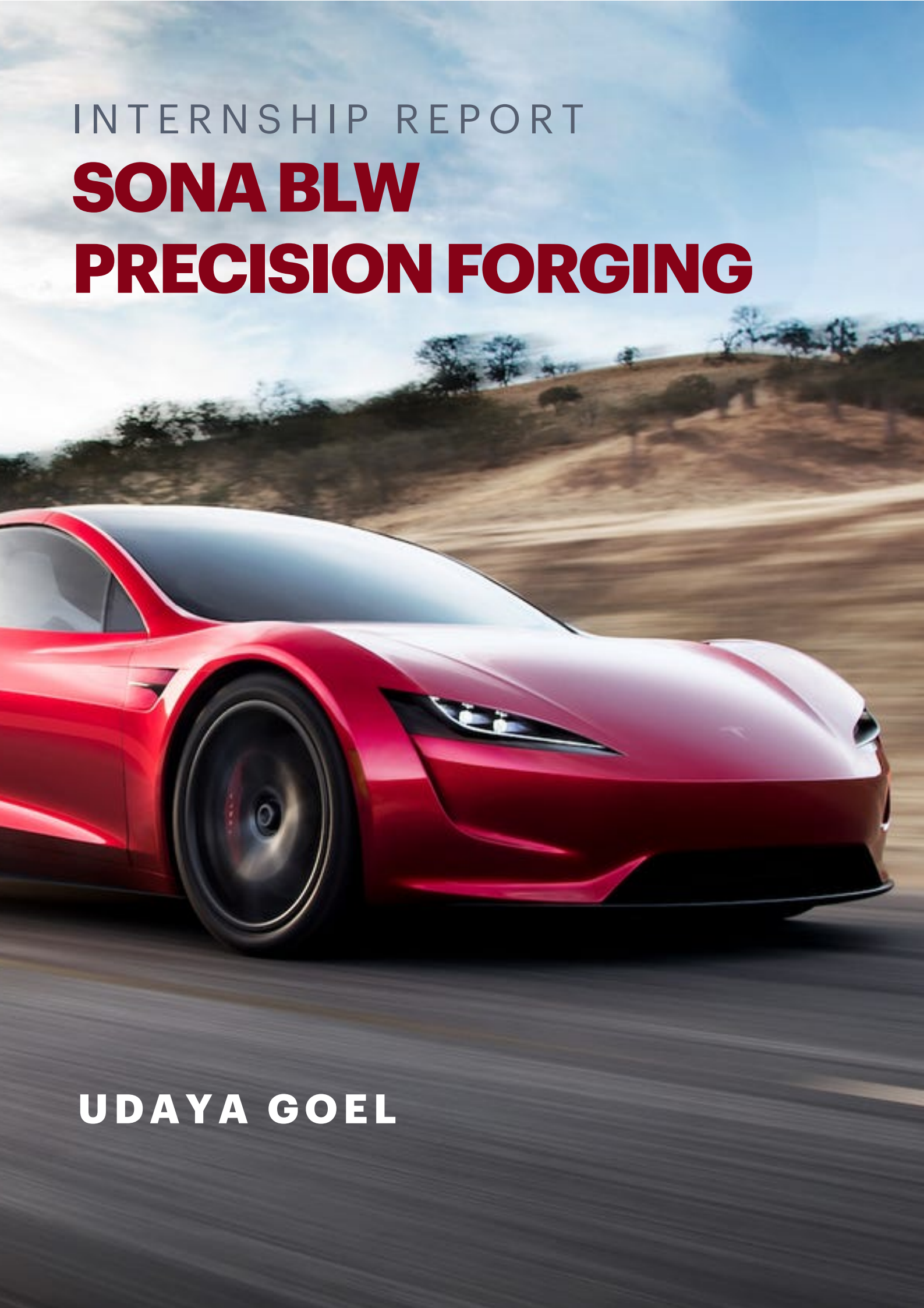
INTERNSHIP REPORT

SONA BLW PRECISION FORGING



UDAYA GOEL

SUMMARY

SONA BLW PRECISION FORGING

In the summer of 2019, I spent 3 Weeks interning at the Sona BLW Precision Forging Ltd. in Gurugram, Haryana. Sona BLW is engaged in the manufacturing of Bevel Gears & Differentials for the Automobile Industry for companies such as Maruti Suzuki, Mahindra and even Tesla. During the internship I spent most of my time in the engineering department where I engaged with the teams of production and designing to learn the basics of computer-aided design. Over my 3-week internship training I had the chance to have a detailed plant tour, learn about the designing process and understand the importance of Quality check.

Udaya Goel

SONA BLW
MORE TORQUE PER GRAM

NO: SBPL/HR/Training Certificate/2019

Date: - July 05, 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Udaya Goel** (Roll No. 006) of The Doon School has under gone **Internship training** in our organization from 15.06.2019 to 05.07.2019.

During the tenure with us, we found him sincere and hard working. His main interests were seen in the fields of Mechanical Design. Throughout his internship he was observed to be a very keen learner and we hope he has benefited a lot by this industrial exposure.

We wish him all the best for his future endeavors.

For Sona *BLW Precision Forgings Ltd.*

Sona BLW Precision Forgings Ltd. Gurgaon

Amin Rao
DGM – Human Resource

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INTERNSHIP OVERVIEW

I. Plant Tour

A. Dojo (Japanese name for Martial Art Training Centre) (Theoretical Overview of all Processes)

1. Safety (Helmet, Shoe, Glasses, Ear Plugs, Gangways, Gloves, etc.)
2. Forging (Billet Heated and Presses in a dye into the shape of a gear)
3. Machining (A gear is refined for better performance)
4. Heat Treatment (By heat durability and life of the product is increased)
5. Assembly (Differential is assembled for the customers)

B. Manufacturing Plant Tour

1. Forging

a. Steel Rods Cut

i. Weight

ii. Blade (Better and smoother finish)

b. The billet is put in an Induction Heater (800 – 1000.C)

c. Using weight, the red-hot billet is forged
    i. Automatic (Single Stroke)
    ii. Manual (Single and Double Stroke)
d. The forged gear is not cooled by external methods to avoid cracks

2. Machining

a. As the edges of the gears are not as smooth and have extra material that is removed and smoothened
b. Grooves are cut in the center of the Gear
c. And the back surface is smoothened

3. Heat Treatment

a. Pre-Heated so the furnace does not cool down
b. Heated in a furnace
c. Cool-down automatically to improve hardness and durability
d. Machining happens again and doubles quality check

4. Assembly

a. Differential
    i. Washer + Bevel Gear
    ii. Washer + Pinion
    iii. Shaft
    iv. Play and Movement Check
    v. Pin Lock
b. Some Part sent as it is to the customer for their approval
c. Note (Differential)
    i. Produces more Torque
    ii. Transfers Power during turning for a smoother drive
    iii. Power consumption is less as it is transferred

5. Dye & Tool Shop

a. Dye

i. Cutting

(a) Milling (Better More Accurate) (Steel & Graphite)

(b) EMC (Steel)

ii. Laser Marking of Dye Number

iii. Double Quality Check and then sent to Forge Shop

6. Tesla Line

a. Fully Automated

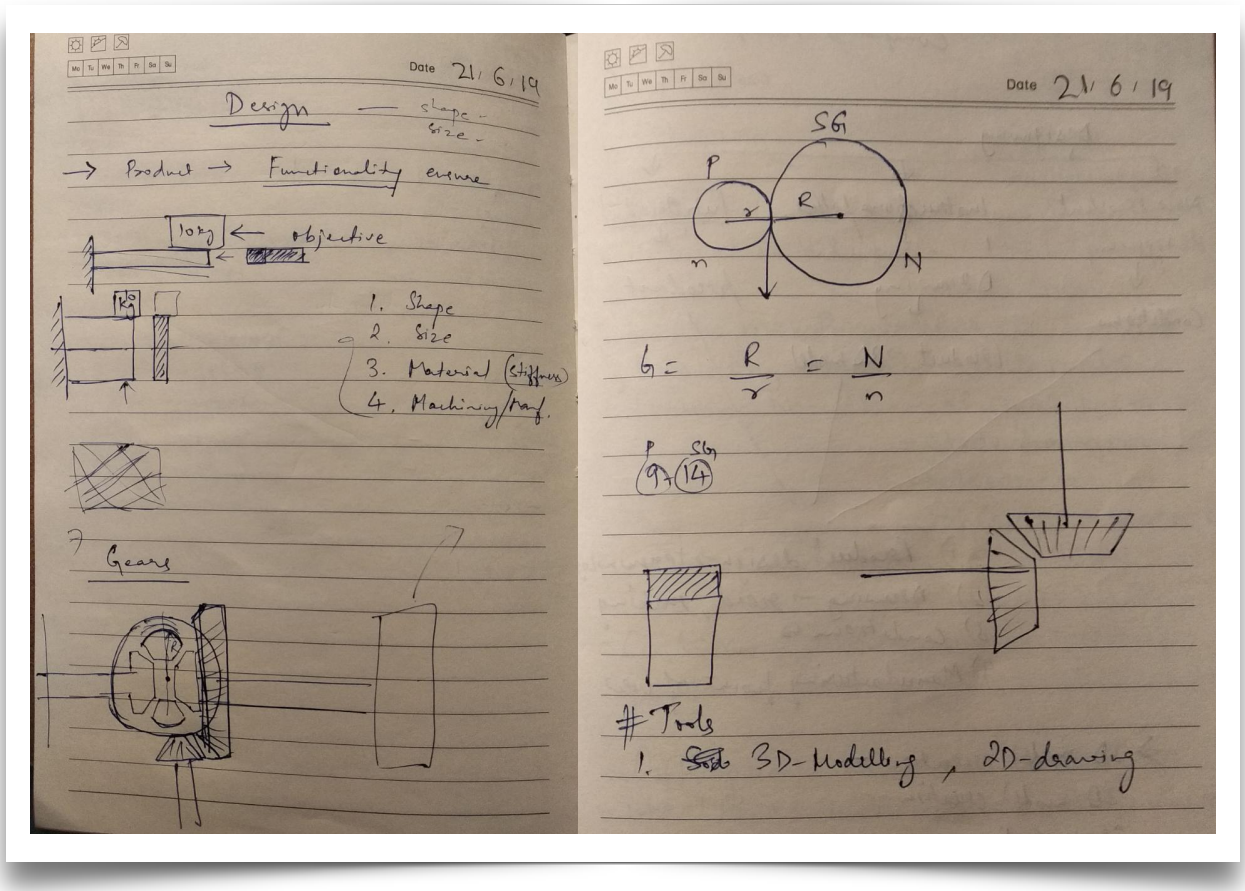
b. The quality check involved testing for biological interference

c. Dirt control was given very high importance

II.Design

A. Product – Ensure Functionality

1. Shape
2. Size
3. Material (Stiffness)
4. Manufacturing Feasibility
5. Gear Ratios are set, and new designs must be based on them
6. Tools
    a. 2D Design
    b. 3D Design



B. Types of Designing

1. New-Product Design – Conditions
2. Instruction Following – Drawing – Product – 3D Modelling
3. Upgrading existing Product

C. What You Must Know While Designing

1. Product Design Terminology
2. Drawing – Reading & Making
3. Conditions
4. Manufacturing Point of View

D. What You Do While Designing on Solid Edge ST10

1. 3D Model Creation
2. 2D Model Creation
3. Cross – Sections

E. Comprehension of a Drawing

1. Quality Check Requirements
2. Intersections and different views
3. Manufacturing Sheet and instruction sheet
4. Buckling Test – Most Designs made have a long shaft or pole or legs, Buckling is a test which uses weight on one end of the pole and test with how much weight will the start bending and when will it break.

III. Quality Checks

A. Straightness

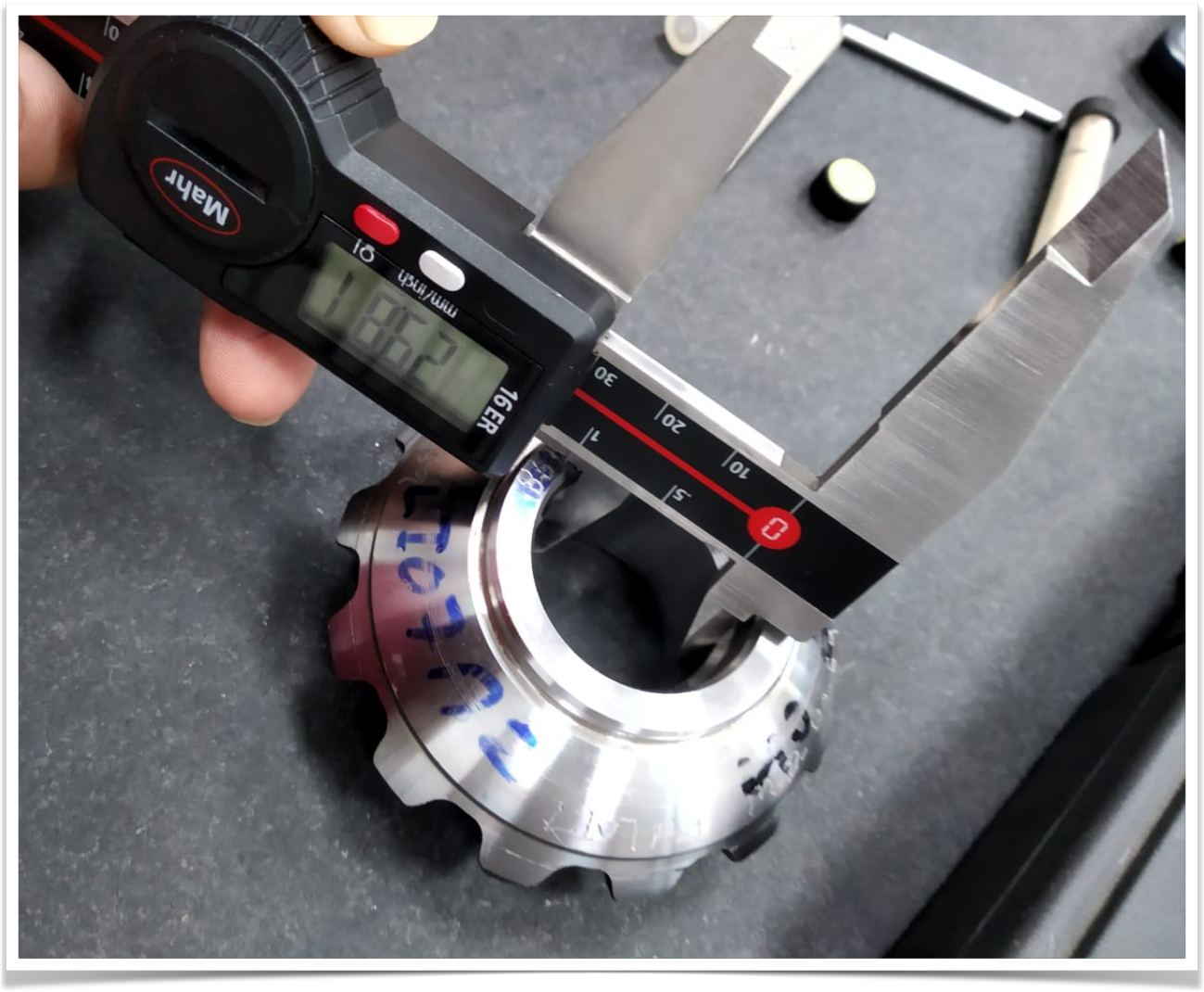
1. Puppy Gauge
2. Table – Calibrated every year – Graphite – 0-micron error

B. Flatness

1. Puppy Gauge (1 – 10mm)/(0 – 1mm)

C. Cylindricity

1. Digital Vernier Caliper is used at different points of the surface and the reading should be the same



D. Runout

1. Simple
2. Total
3. Checked using an expanding Mendel

E. Line and Surface Profile

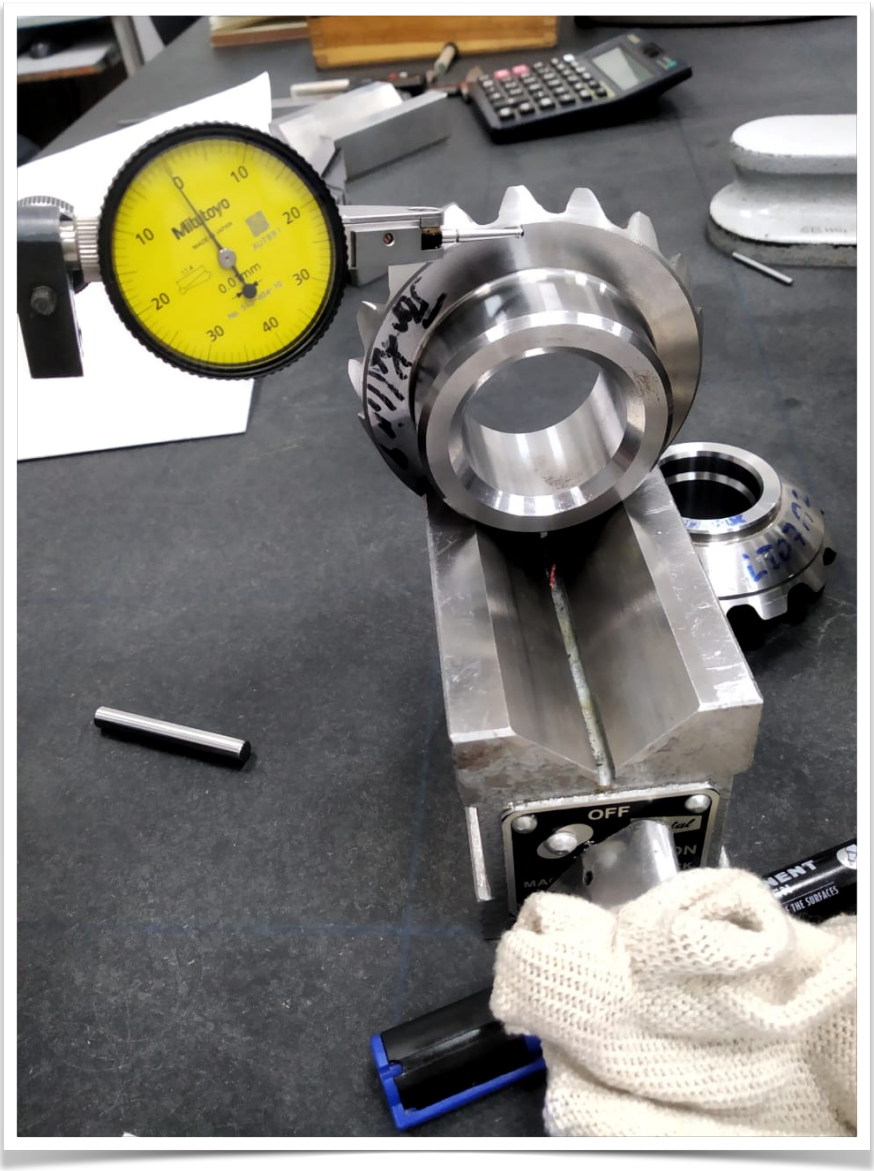
1. CMM-Coordinate Measuring Machine
2. Different Probes used for different parts

F. Parallelism

1. Puppy Gauge
2. Checked with respect to the other surface

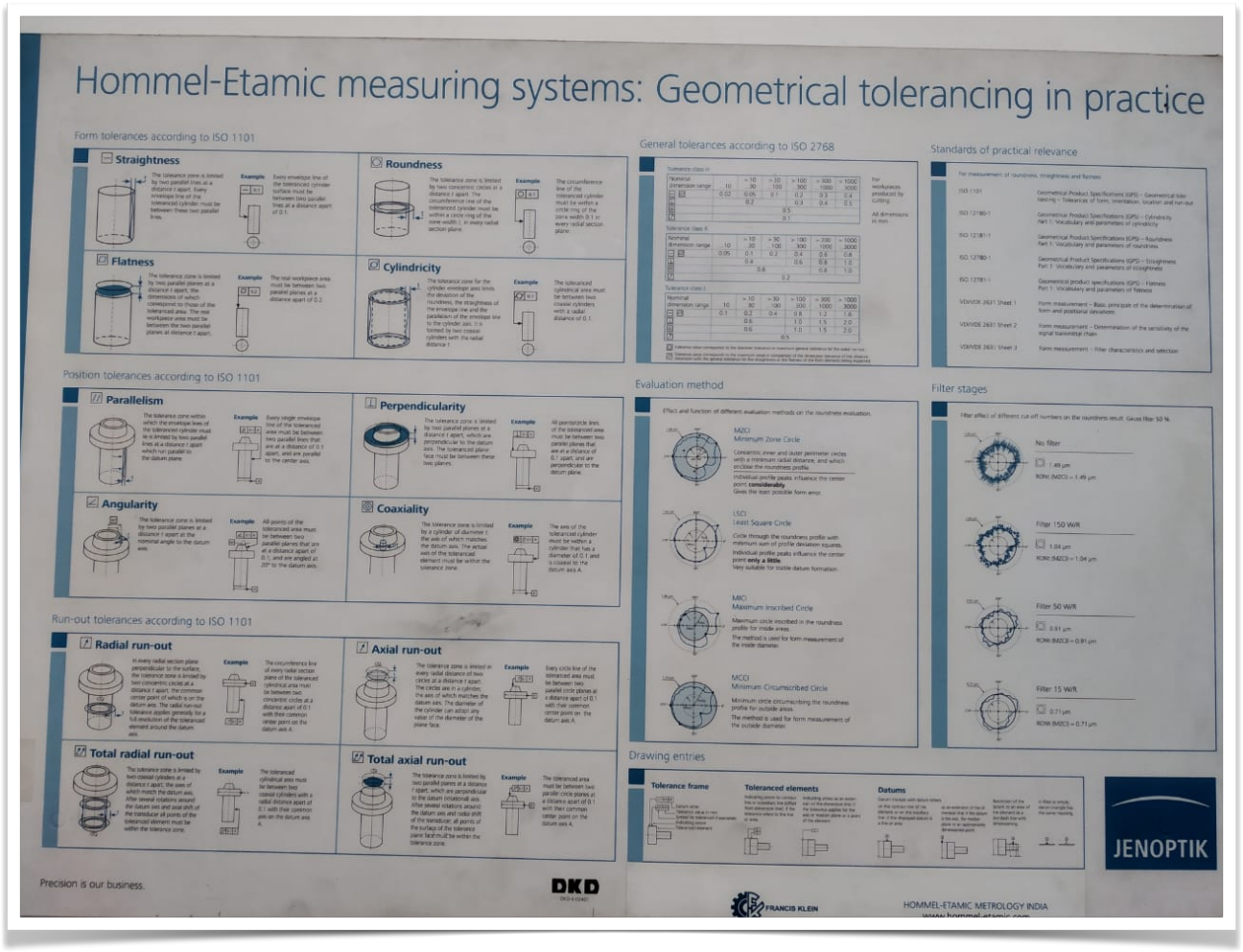
G. Perpendicularity

1. Mounted on the V-Block
2. Puppy Gauge at 900



H. Angularity

1. Mounted at an Angle and rotated with a puppy gauge


Hommel-Etamic measuring systems: Geometrical tolerancing in practice
Form tolerances according to ISO 1101
Straightness
Roundness
Flatness
Cylindricity
General tolerances according to ISO 2768
Standards of practical relevance
Position tolerances according to ISO 1101
Parallelism
Perpendicularity
Angularity
Coaxiality
Evaluation method
MZCI
Minimum Zone Circle
LSCI
Least Square Circle
MICI
Maximum Inscribed Circle
MCCI
Minimum Circumscribed Circle
Filter stages
No filter
Filter 150 W/R
Filter 50 W/R
Filter 15 W/R
Run-out tolerances according to ISO 1101
Radial run-out
Axial run-out
Total radial run-out
Total axial run-out
Drawing entries
Tolerance frame
Toleranced elements
Datums
Precision is our business.
DKD
FRANCIS KLEIN
HOMMEL-ETAMIC METROLOGY INDIA
JENOPTIK

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2020

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