
SAPPMA
southern african plastic pipe manufacturers association
WEBINAR VII
August 2022
WEBINAR

# SAPPMA QUALITY WORKSHOPS / WEBINARS

SAPPMA WORKSHOP 1 - 16-11-2019

SAPPMA WORKSHOP 2 - 17-07-2019

SAPPMA WORKSHOP 3 - 19-02-2020

SAPPMA WORKSHOP 4 - 22-07-2020

SAPPMA WORKSHOP 5 - 22-10-2020

SAPPMA WEBINAR 1 - 25-02-2021

SAPPMA WEBINAR 2 - 24-03-2021

SAPPMA WEBINAR 3 - 20-04-2021

SAPPMA WEBINAR 4 - 25-05-2021


SAPPMA WEBINAR 5 - 24-06-2021

SAPPMA WEBINAR 6 - 22-07-2021

SAPPMA WEBINAR 7 - 25-08-2021

SAPPMA WEBINAR 8 - 21-10-2021 - *PETER FISCHER*

SAPPMA WEBINAR 8 - 21-10-2021 - *PROF MARANGONI*

SAPPMA WEBINAR 8 - 21-10-2021 - *MIKE SMART*

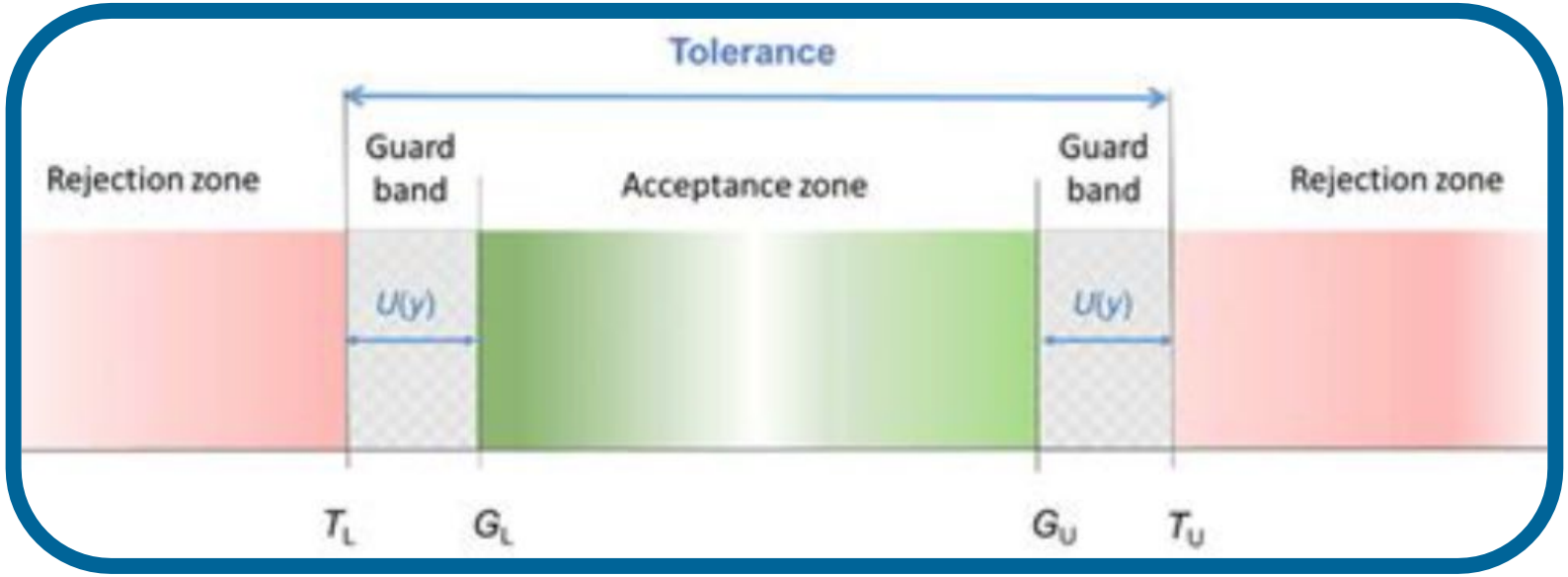
SAPPMA WEBINAR 8 - 21-10-2021 - *DARREN*

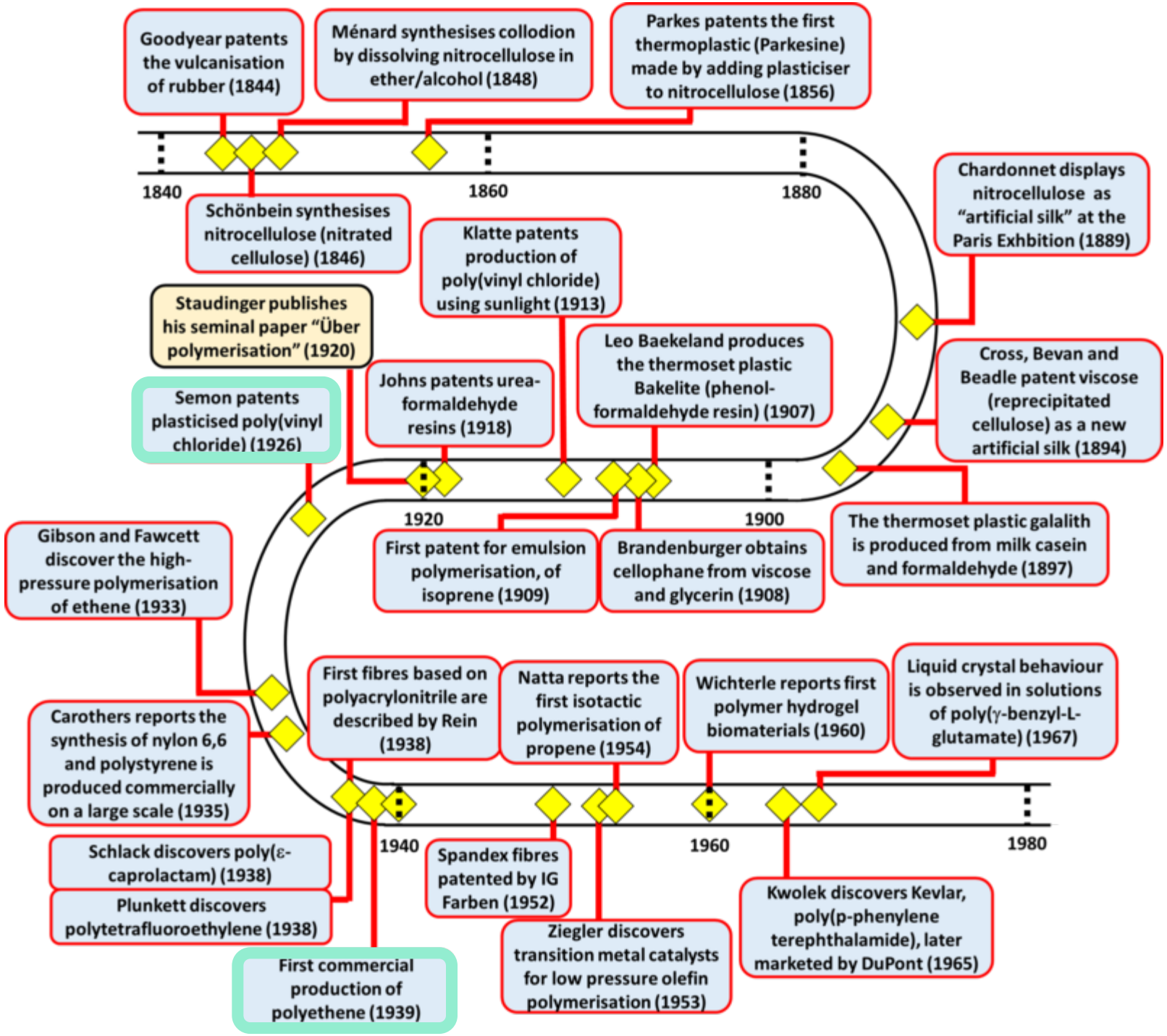
SAPPMA WEBINAR 9 - 24-11-2021

**Download from www.sappma.co.za**

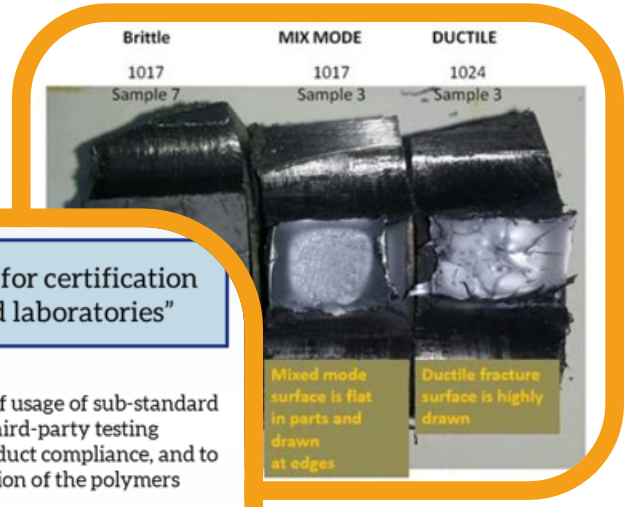
# Testing and Verification

# Calibration and Guard Banding


Goodyear patents the vulcanisation of rubber (1844)
Ménard synthesises collodion by dissolving nitrocellulose in ether/alcohol (1848)
Parkes patents the first thermoplastic (Parkesine) made by adding plasticiser to nitrocellulose (1856)
1840
1860
1880
Schönbein synthesises nitrocellulose (nitrated cellulose) (1846)
Klatte patents production of poly(vinyl chloride) using sunlight (1913)
Chardonnet displays nitrocellulose as "artificial silk" at the Paris Exhbition (1889)
Staudinger publishes his seminal paper "Über polymerisation" (1920)
Leo Baekeland produces the thermoset plastic Bakelite (phenol-formaldehyde resin) (1907)
Cross, Bevan and Beadle patent viscose (reprecipitated cellulose) as a new artificial silk (1894)
Semon patents plasticised poly(vinyl chloride) (1926)
Johns patents urea-formaldehyde resins (1918)
1920
1900
First patent for emulsion polymerisation, of isoprene (1909)
Brandenburger obtains cellophane from viscose and glycerin (1908)
The thermoset plastic galalith is produced from milk casein and formaldehyde (1897)
Gibson and Fawcett discover the high-pressure polymerisation of ethene (1933)
First fibres based on polyacrylonitrile are described by Rein (1938)
Natta reports the first isotactic polymerisation of propene (1954)
Wichterle reports first polymer hydrogel biomaterials (1960)
Liquid crystal behaviour is observed in solutions of poly(γ-benzyl-L-glutamate) (1967)
Carothers reports the synthesis of nylon 6,6 and polystyrene is produced commercially on a large scale (1935)
1940
1960
1980
Schlack discovers poly(ε-caprolactam) (1938)
Plunkett discovers polytetrafluoroethylene (1938)
Spandex fibres patented by IG Farben (1952)
Kwolek discovers Kevlar, poly(p-phenylene terephthalamide), later marketed by DuPont (1965)
Ziegler discovers transition metal catalysts for low pressure olefin polymerisation (1953)
First commercial production of polyethene (1939)

# SAPPMA Webinar VII 2022

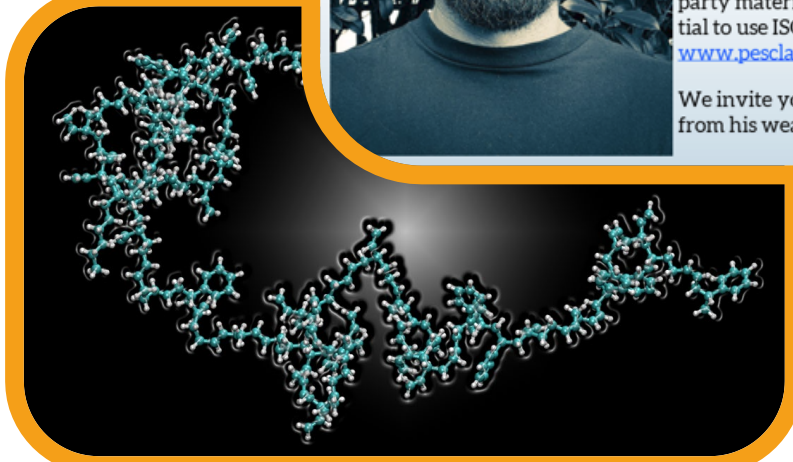



"The importance of third-party independent testing for certification and product compliance using ISO17025 accredited laboratories"

To avoid being exposed to the risk of usage of sub-standard products, utilisation of accredited third-party testing has proved essential to confirm product compliance, and to verify the quality and the composition of the polymers used.

Over a decade of laboratory expertise, François Prinsloo from Productivity Engineering Services and Consultants (P.E.S.C), Laboratory Quality Manage & Senior Polymer Technologist, will share his extensive knowledge on third party material and product validation, and why it is essential to use ISO17025 accredited testing facilities.
www.pesclab.com

We invite you to join us for a SAPPMA Webinar to learn from his wealth of understanding of the subject matter.





SAPPMA
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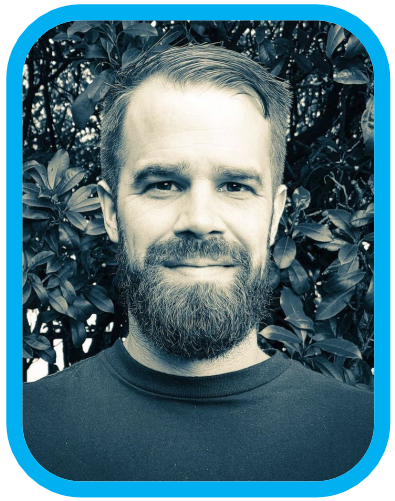
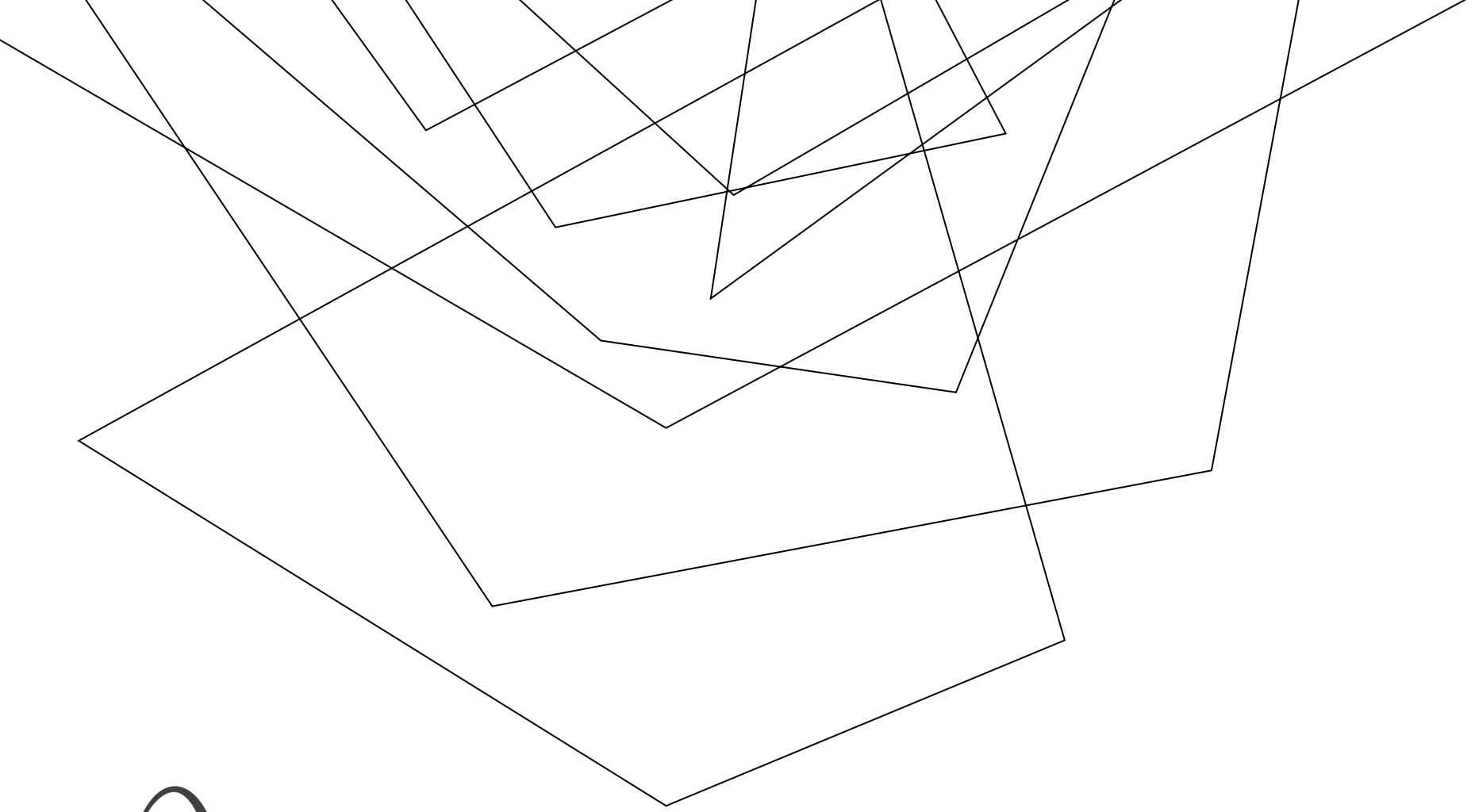
# Presenter

## SAPPMA Webinar IX

**24 August 2022**



**Francois Prinsloo**



P.E.S.C
PLASTICS & POLYMER
TESTING LABORATORY

sanas
Testing Laboratory
T0879

# SAPPMA WEBINAR

By P.E.S.C Laboratory 2022

# PURPOSE OF THIS SESSION

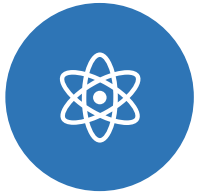
- A thorough understanding of the importance of Third Party Independent testing using ISO17025 accredited laboratories for Certification and product compliance
- Fundamental concepts of polymeric materials, test methodology, and corresponding scientific relationships

Brief overview of ISO17025, why it is important and the benefits thereof

Why using 3rd party testing laboratories are so important

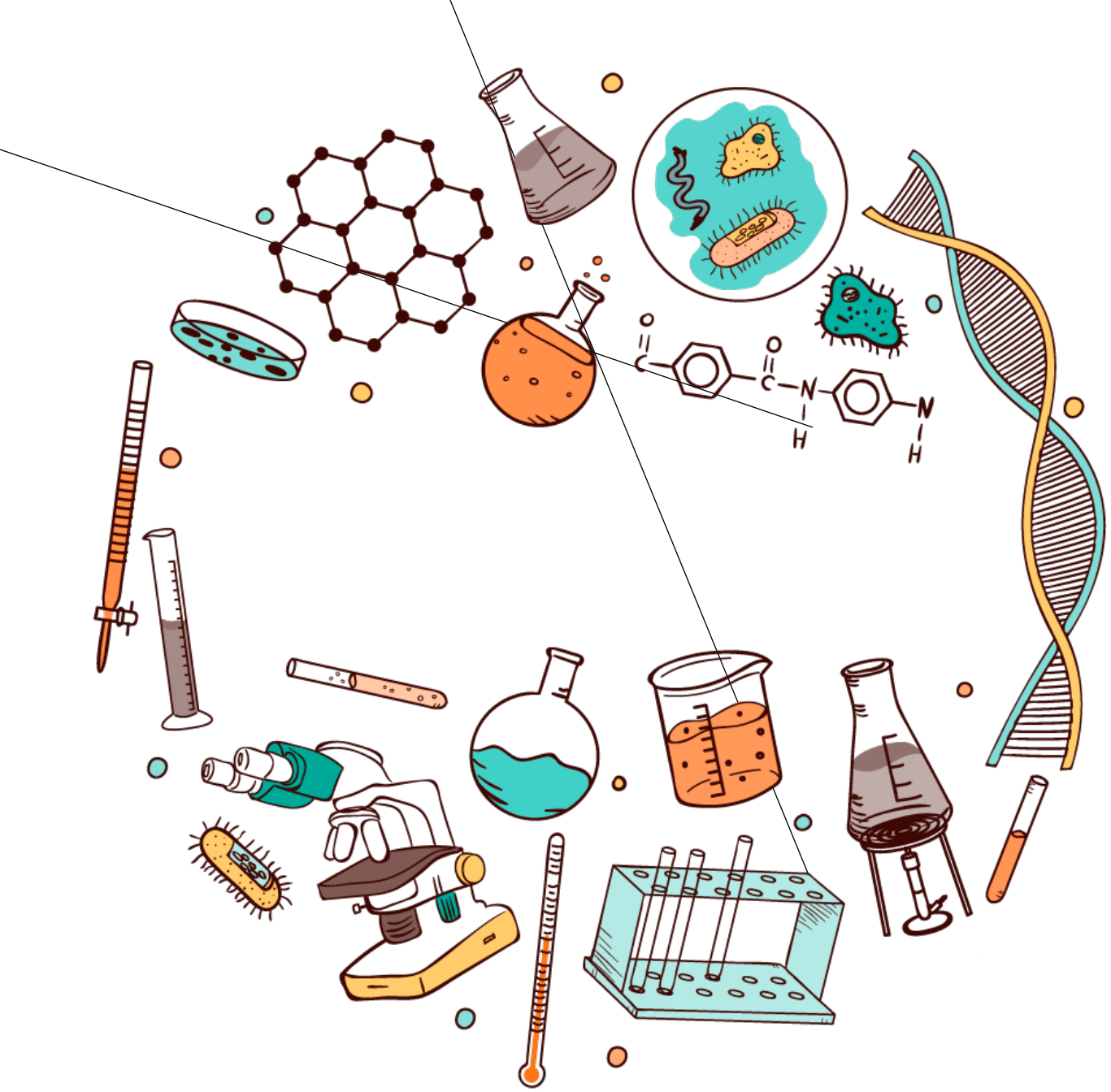
Product quality validation and compliance

Examples of non-compliant thermoplastic products



Understanding of a Laboratory's approach to the assessment of products to be tested

Equipment used and verification thereof



# OVERVIEW OF AGENDA

Introduction of P.E.S.C.

ISO17025 Accreditation

South African National Accreditation System

Third Party Testing

Validations of Plastic Piping Products

Benefits of Certified Piping

Introduction to Polymer Theory

Examples of tests

Thermoplastic pipe weld testing

ISO9080

PESC Certification Services

Other Services

Q & A

# P.E.S.C LABORATORY

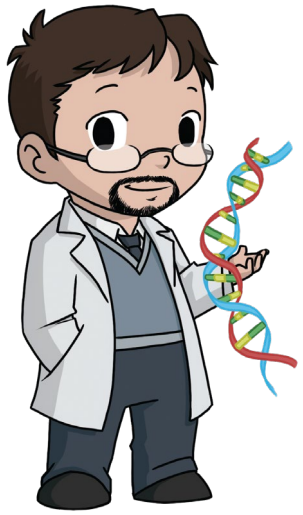
**Who we are**

Productivity Engineering Services and Consultants (P.E.S.C.) founded its laboratory in 2015.

- State-of-the-art, world-class facility
- Unique and specialized services

- Uniquely qualified staff has extensive knowledge
- Accurate results meeting national and international standards.

- Accredited to ISO17025 through SANAS, the South African National Accreditation System, in 2019.



# MEET OUR TEAM

JUSTIN MARSBERG

TECHNICAL MANAGER

FRANCOIS PRINSLOO

QUALITY MANAGER

KELLI SCHEEPERS

FINANCIAL & HR MANAGER

NELLY MOKOENA

LABORATORY SUPERVISOR

TAWANDA MPANDANYAMA

POLYMER TECHNOLOGIST

MAGADI KATUMA

POLYMER TECHNOLOGIST

# A RANGE OF TESTS WE DO

**Over 500 types of tests registered on our database**

- Ash content
- Adhesion strength
- Bending strength (flexural strength)
- Brittleness temperature determination
- Carbon black content
- Carbon black dispersion
- Chemical resistance
- Compression strength
- Density (specific gravity)
- Dichloromethane resistance
- Durability
- Environmental stress crack resistance (ESCR)
- Flammability
- Fracture toughness
- Hydrostatic pressure strength at 20°C, 60°C, 80°C, 95°C, and 110°C
- Impact testing
- Ingress of dust and water
- Thermal reversion
- Melt mass-flow rate (MFI – melt flow index)
- Material identifications via FT-IR analysis
- Oxidation induction time
- Peel strength
- Ring stiffness
- Tensile and Elongation
- Ultraviolet radiation
- Vacuum resistance
- Vicat softening temperature
- Welding strength

# PRODUCTS TESTED AT P.E.S.C LAB

We test a wide range of polymer and plastic components, such as

**Compression moulded components**

**Typical tests**

- Compression strength
- Density
- Oxidation induction time

# PRODUCTS TESTED AT P.E.S.C LAB

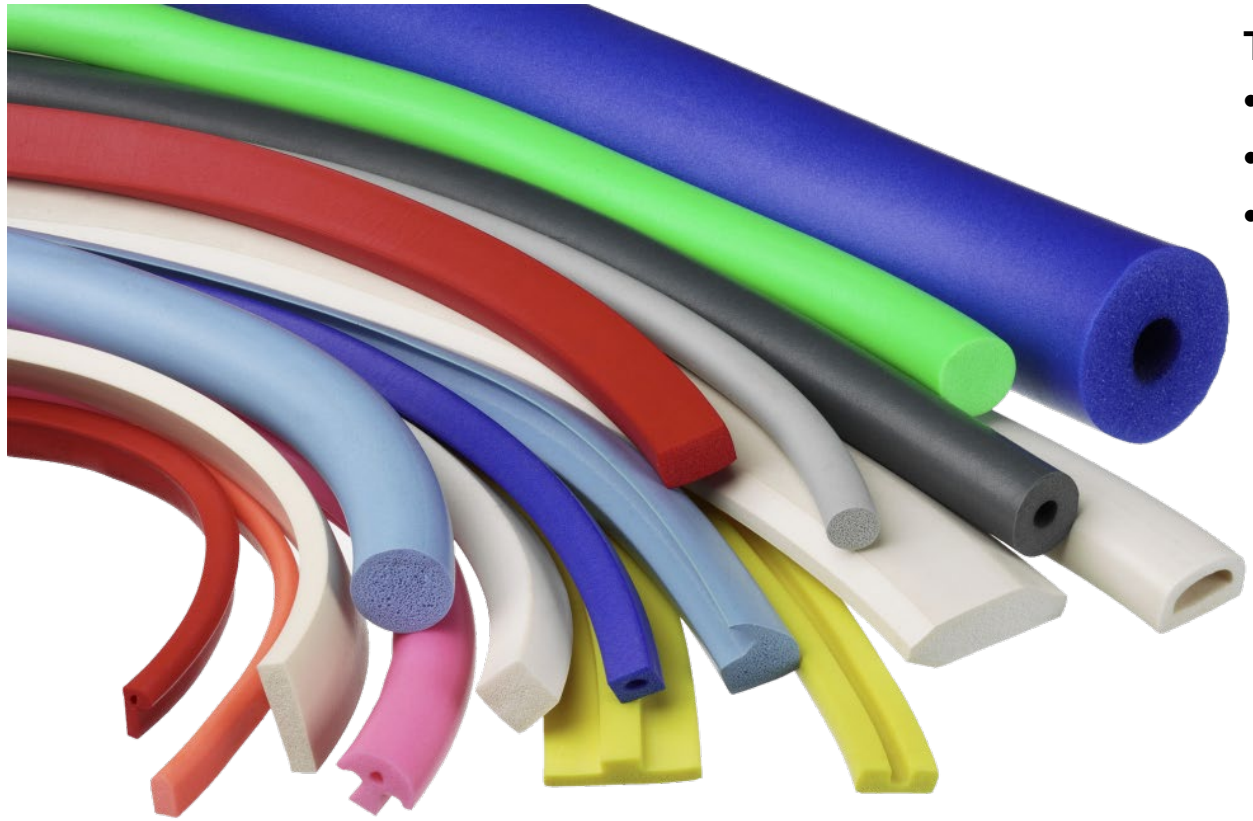
**Engineering components**

**Typical tests**

- Chemical resistance testing
- Durability
- Tensile properties

# PRODUCTS TESTED AT P.E.S.C LAB

## Extrusion profiles



**Typical tests**

- Density
- Heat resistance
- UV resistance

# PRODUCTS TESTED AT P.E.S.C LAB

**Injection moulded components**

**Typical tests**

- Compression strength
- Environmental stress crack resistance
- Flexural strength

# PRODUCTS TESTED AT P.E.S.C LAB

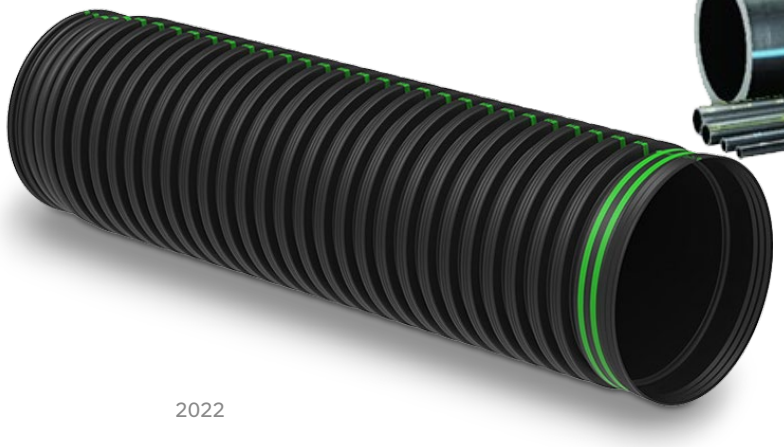
## Packaging


**Typical tests**

- Calcium carbonate content
- Load bearing capabilities
- Tear strength

# PRODUCTS TESTED AT P.E.S.C LAB

## Piping



**Typical tests**

HDPE

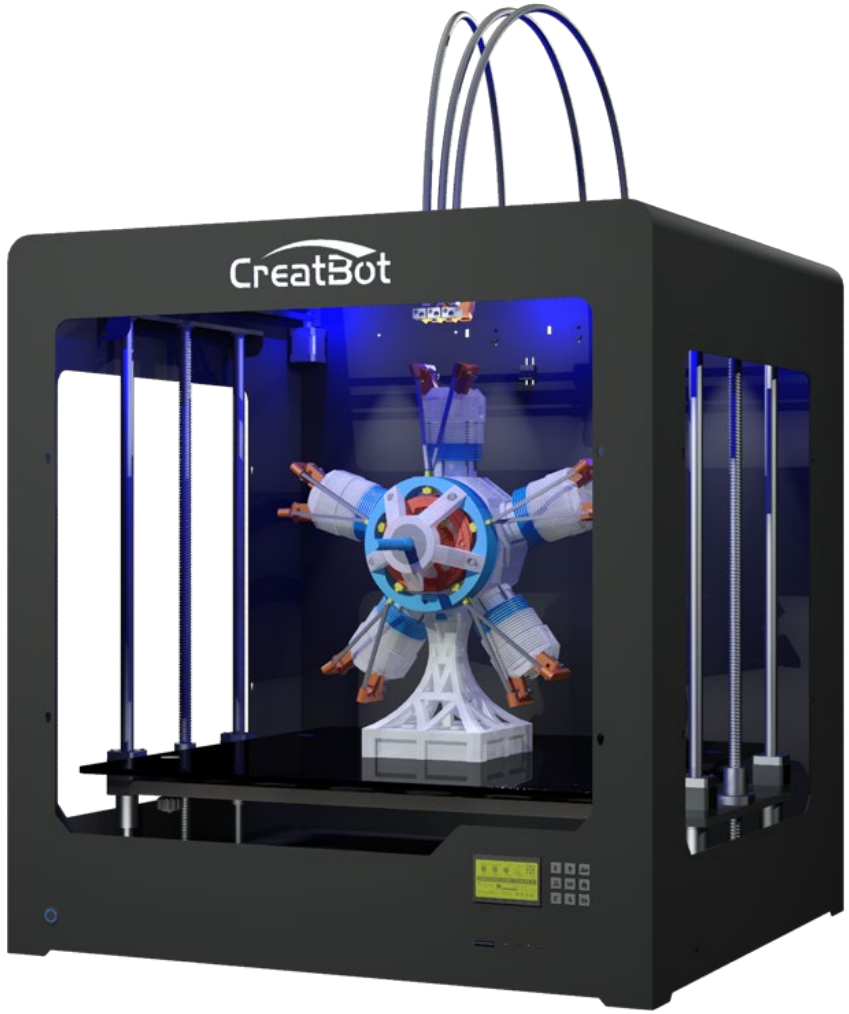
- Carbon black content & dispersion
- Hydrostatic pressure resistance
- Weld strength properties

PVC

- Thermal reversion
- Vicat softening point

# PRODUCTS TESTED AT P.E.S.C LAB

## 3D Printing




**Typical tests**

- Customised tests
- Filament properties such as
  - Heat deflection temperature
  - Vicat softening temperature

# P.E.S.C ISO 17025 ACCREDITATION


**What does it mean?**
ISO 17025 is an international recognized standard for managing laboratories which offers competent, trusted and professional testing.

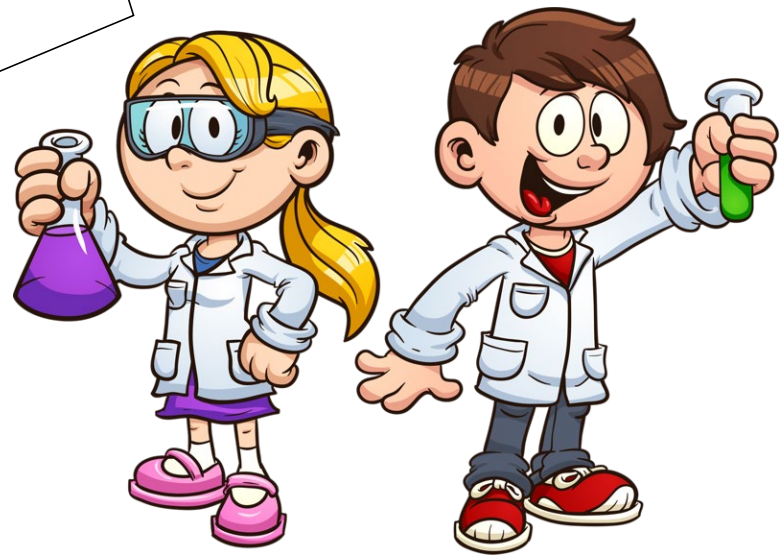
It ensures the implementation of a world class quality management system, enabling laboratories to establish policies and procedures that regulates and defines key actions as required by laboratory personnel.

The approach of an ISO 17025 management system also ensures continual improvement and systematic reduction of errors based in risk.

# P.E.S.C ISO 17025 ACCREDITATION

**Competency is key**

Personnel competency is regularly assessed to ensure that only professional, trained, skilled and authorized staff are eligible to conduct laboratory testing.



ISO 17025 laboratories must validate its policies and procedures to obtain a clear understanding of its resources and level of variation in the results provided.

This offers customers the added assurance that laboratory tests are conducted to expectations and results reported are accurate and valid

# P.E.S.C ISO 17025 ACCREDITATION

**Benefits**

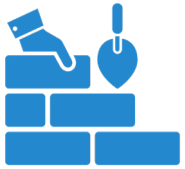
By offering customers such 3rd party test results, you


Prove quality

Gain trust


Fuel recommendations

Ensure returning customers



Stronger business foundations

Growth and returns on investment

# REGULATING ISO17025

**Independent regulation**

Being SANAS accredited, a laboratory is independently evaluated against set standard requirements, ensuring that they carry out specific activities to ensure their impartiality and competence.

By applying South African national and international standards, government, producers and consumers can have confidence in test results.

# SANAS OPERATIONS

SANAS operates in accordance with requirements, criteria, rules and regulations as per

- The Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006).
- Requirements of the international standard ISO/IEC 17011: Conformity Assessment – General Requirements for Accreditation Bodies Accrediting Conformity Assessment Bodies.
- Requirements as stipulated in the various Memorandums of Agreement with the international bodies and the national regulatory bodies.

# THIRD PARTY TESTING

**For significant and high-risk projects**

**Is the products 100% compliant?**

**Can the manufacturer quality control be trusted?**

**What is third party testing?**

Sending products to an independent, unbiased lab for testing.

Through well-planned Third-Party Testing

- You validate if it meets expectations
- You ensure that specified requirements are met
- It prevents sub standard products from entering the market
- It ensures industry standards are being met
- Customers are guaranteed most transparent methods are used to assess the quality
- Validates test results obtained at the manufacturing plant

Neutral Independent Results
In-Depth Understanding
Appropriate Focus

# THIRD PARTY TESTING

**Why is thorough testing of products so important?**

Without third-party testing, products can enter the market that don't work as advertised

This can be due to:

- Manufacturers do not have the necessary baseline calibrations in place for processes
- Usage of sub-standard cheaper materials
- Lack of technical know-how to ensure and validate quality.

# THIRD PARTY TESTING

**Inhouse testing, can it be trusted?**
It may not always be as accurate. Processes and procedures have not been qualified or validated

There could be a potential for bias with in-house testing

- Rushed job
- Pride and overconfidence
- Outdated equipment
- Not enough tests

With third-party labs,
- Unbiased testing
- Processes and procedures have been qualified and validated
- Results guaranteed to be accurate

# THIRD PARTY TESTING

**Non-accredited laboratories, are they reliable?**

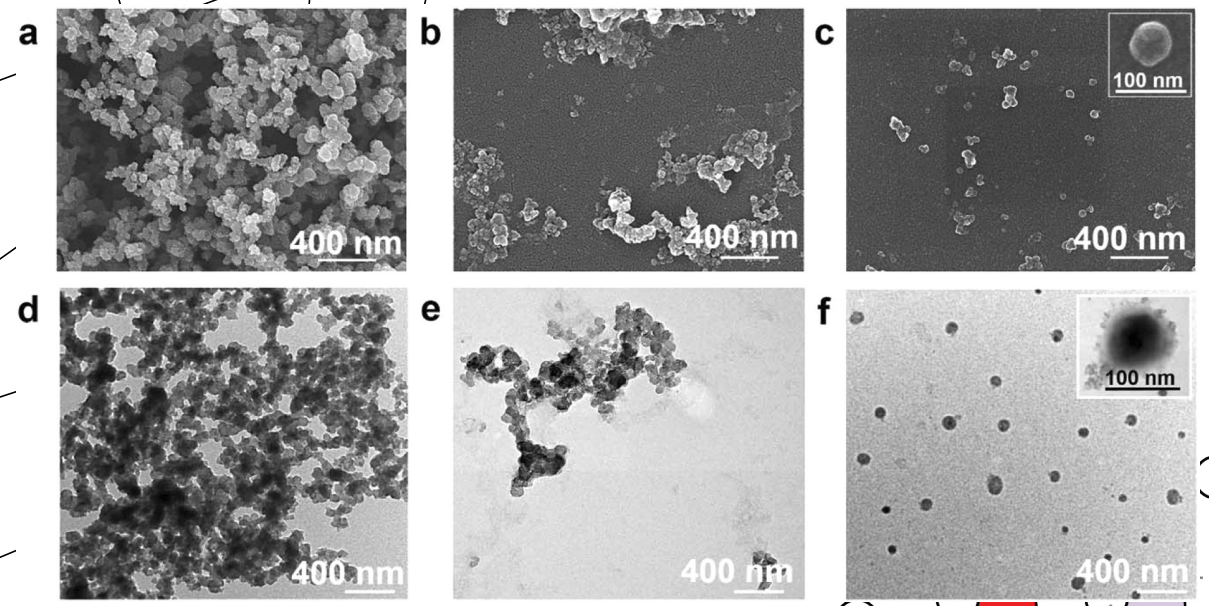
Just as in-house testing laboratories, it may not always be as accurate. Processes and procedures may not have not been qualified or validated by independent bodies.

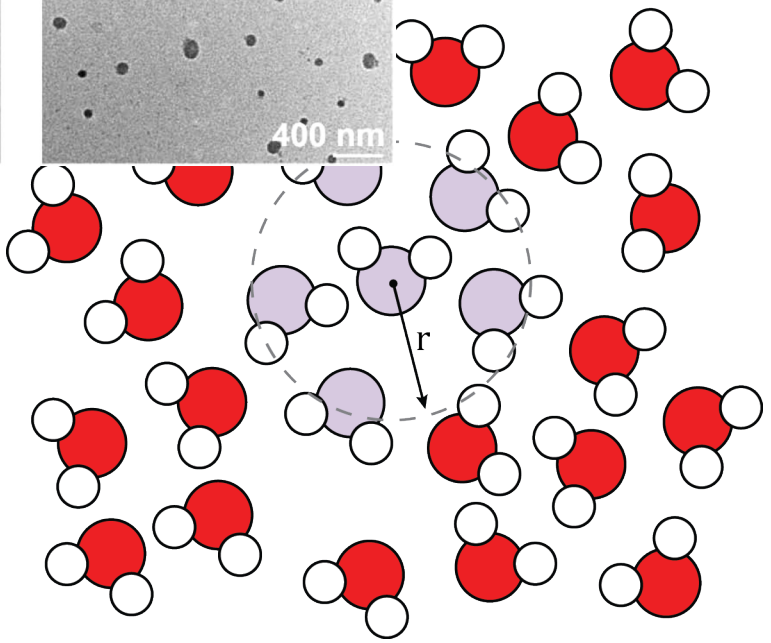
When working with unaccredited laboratories, you could have an increase in risk. This could be due to

- No calibration from accredited calibration laboratories
- No repeatability checks
- No proficiency testing or benchmarking with other laboratories
- No standard operating procedures
- No qualified staff members
- Outdated test methods

There could also be a potential for reporting of biased results to increase their market share

# VALIDATIONS OF RAW MATERIALS (COMPOUNDS) AND FINISHED GOODS




Variation in raw materials is common.

VALIDATED

Active piping ingredients (API's) may represent the most uncontrollable component in the complete product and production process validation scheme.

Key physical properties such as morphology, particle content and size distribution may not be completely defined this early in the sequence.

Material density, particle size and shape can affect material flow and blend uniformity.

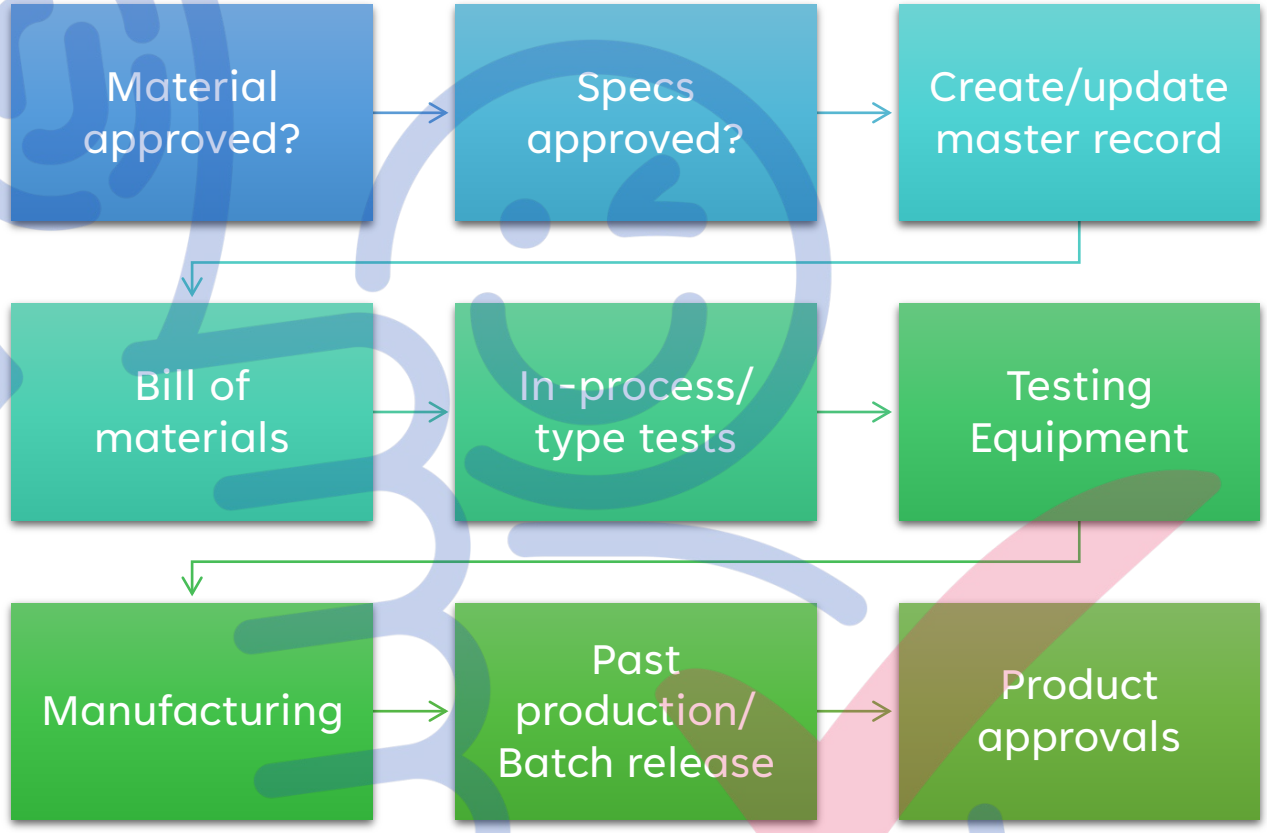
In order to achieve desired product performance, it is critical that API's be validated to specification

# VALIDATIONS OF RAW MATERIALS (COMPOUNDS) AND FINISHED GOODS

**Validation of finished goods is vital**

**After validation, its ready for shipment**

# VALIDATIONS OF RAW MATERIALS (COMPOUNDS) AND FINISHED GOODS



# CERTIFIED PIPING REQUIREMENTS


- Quality Management System
- Documented evidence of process validation
- Well-regulated production
- Trained personnel
- Traceability of active piping ingredients
- Evidence of in-process/ type tests
- Evidence of post product/ batch release tests
- Supporting documents to handle any legal product risk

# ORGANIZATIONS OFFERING PIPE CERTIFICATION IN SOUTH AFRICA

SABS APPROVED

SATAS

BSI

AENOR

ER

Empresa Registrada



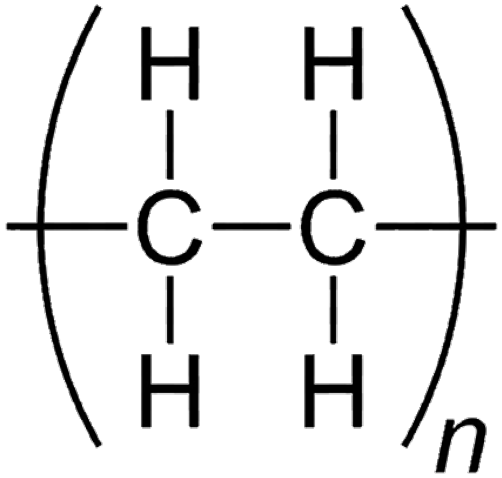
P.E.S.C PLASTICS & POLYMER TESTING LABORATORY

# INTRODUCTION TO POLYMER THEORY

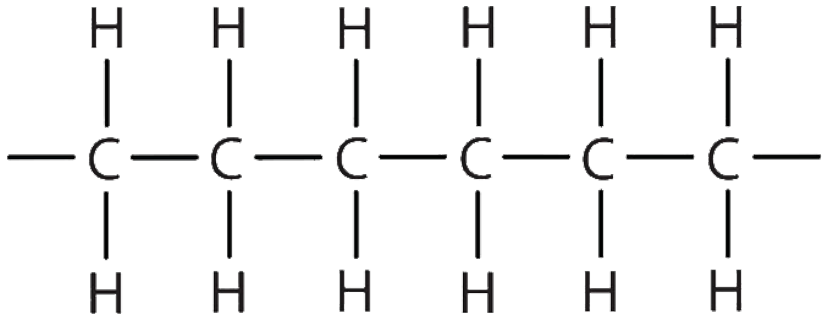
By understanding the theory we don't have to remember everything we need to look out for

MONOMERS

POLYMERS



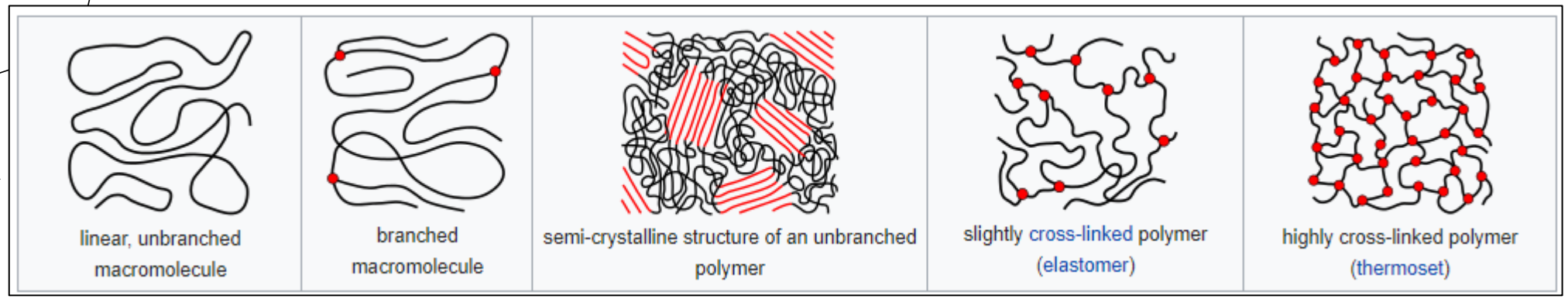




# INTRODUCTION TO POLYMER THEORY

By understanding the theory we don't have to remember everything we need to look out for

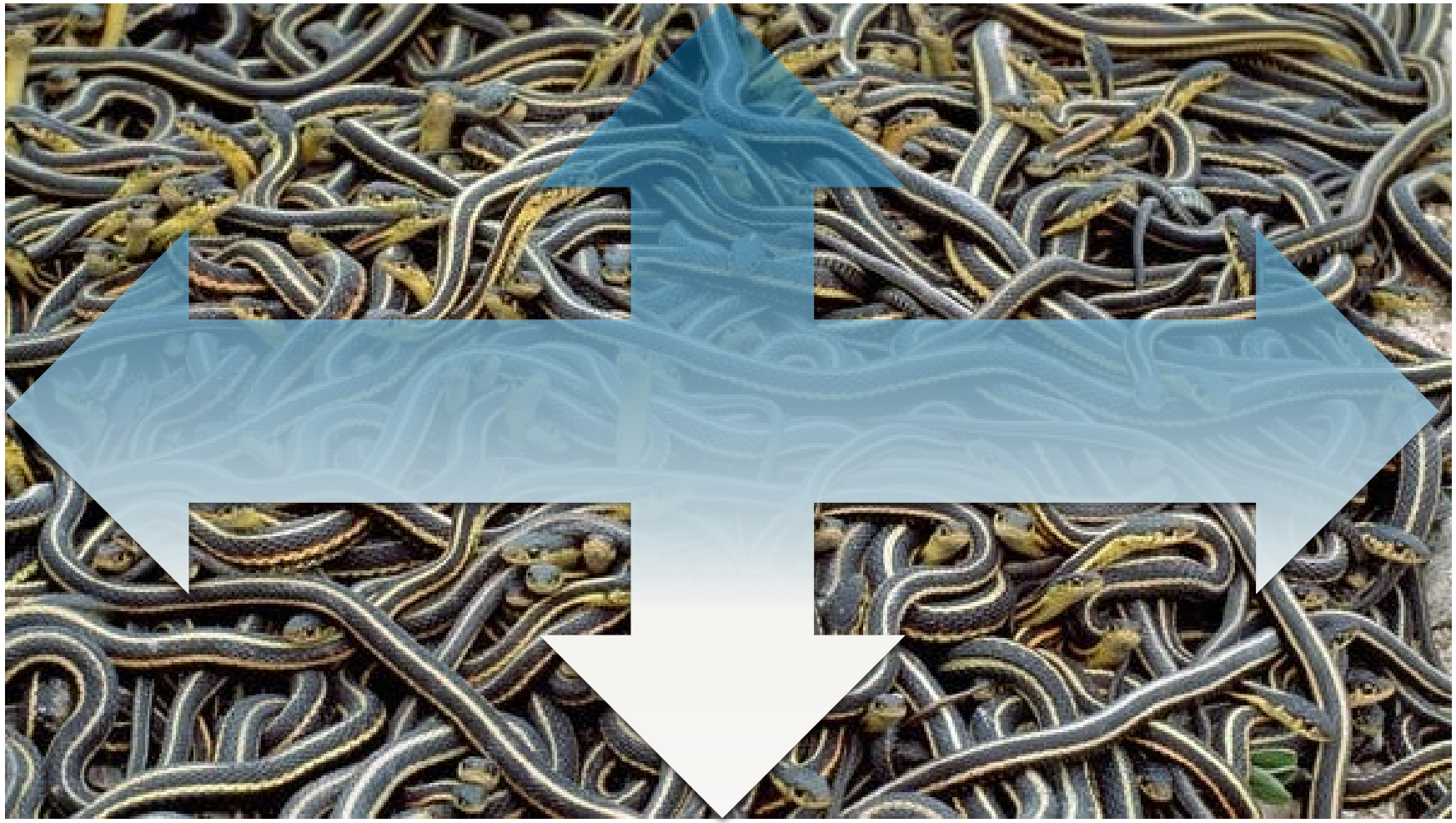
## Theoretical Representation of long Molecules




What sort of properties do polymers exhibit for the above types of branching and cross-linking?

# THE ROOM OF SNAKES

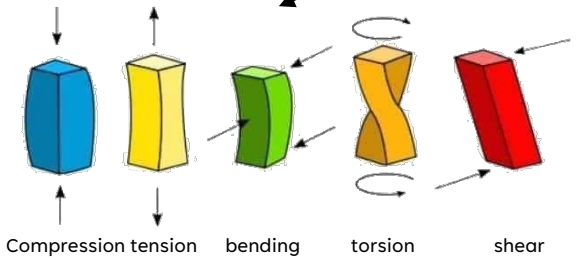
*A great analogy to visualise polymeric behaviour*

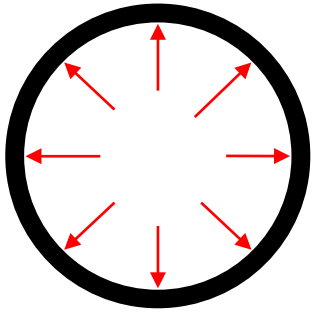


# ENVIRONMENTAL FACTORS INFLUENCING POLYMERS

*Focus on 2 main environmental factors affecting polymers*

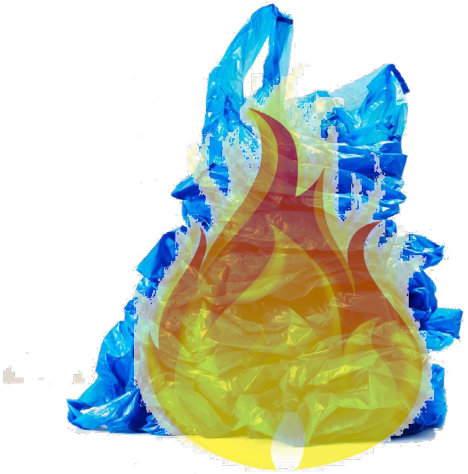
## Mechanical Forces



Hydrostatic

## Thermal Effects

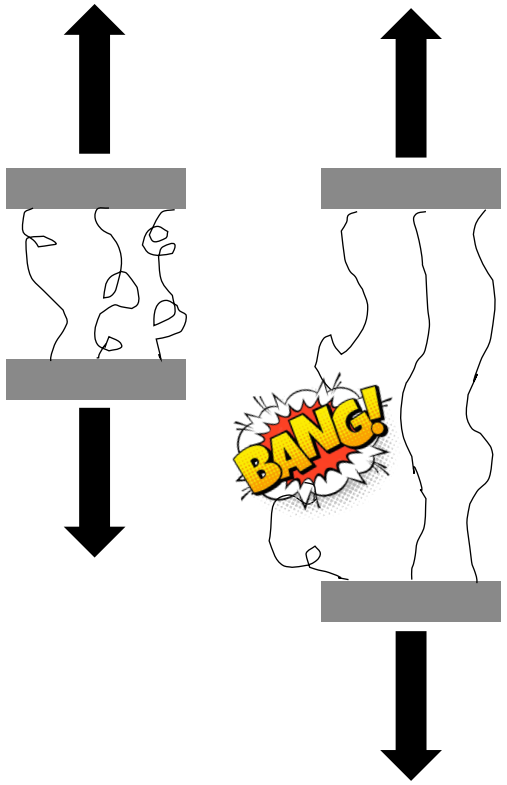


Oxidation
Degradation/thermal ageing
Reduced service life

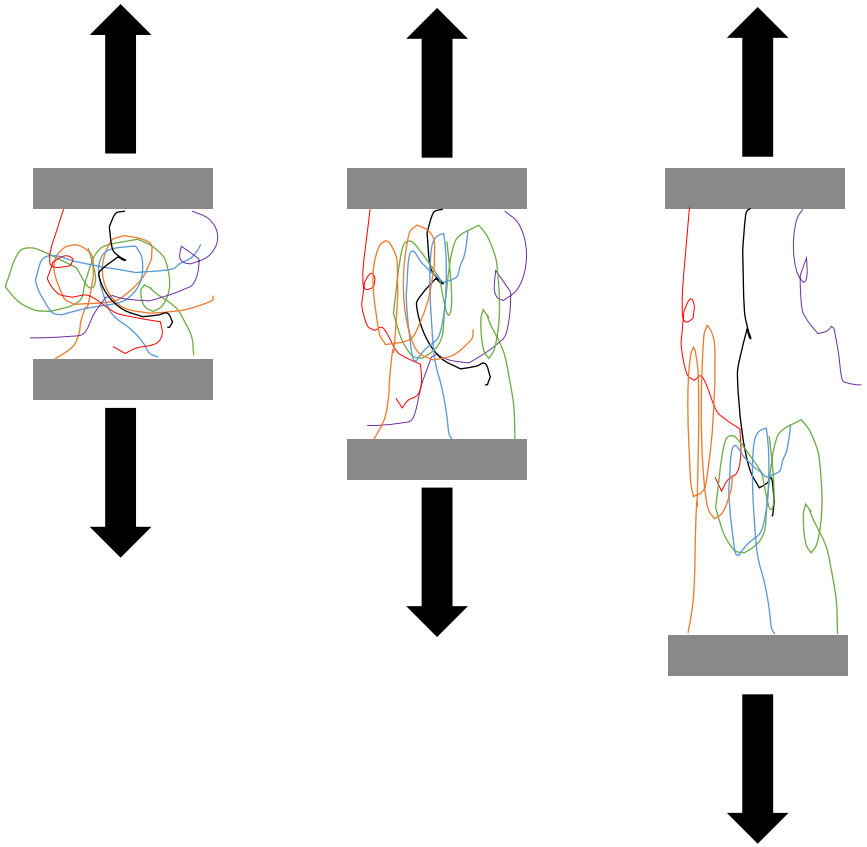
**Other factors, not covered in detail include abrasion, impact, chemical, biological and time/ageing*

# STRESS – WHY SO SERIOUS??

Mechanical Failure
*Chain Scission*




"Chemical" Failure
*Disentanglement i.e. creep*



# STRESS – WHY SO SERIOUS??

Mechanical Failure

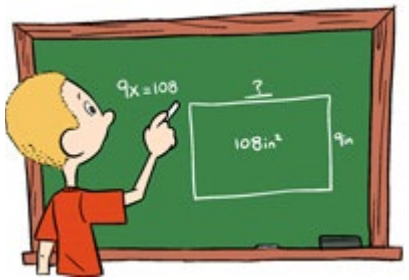
*A PRACTICAL DEMONSTRATION*


FORCE

$$\sigma = \frac{F}{A}$$

STRESS

AREA



# STRESS – WHY SO SERIOUS??

Mechanical Failure

*A PRACTICAL DEMONSTRATION*

$$\sigma = \frac{F}{A}$$

$\sigma < \sigma_{UTS}$

$\sigma > \sigma_{UTS}$


UTS = Ultimate Tensile Strength

# STRESS – WHY SO SERIOUS??

## Mechanical Failure

*A PRACTICAL DEMONSTRATION*

$$\sigma = \frac{F}{A}$$

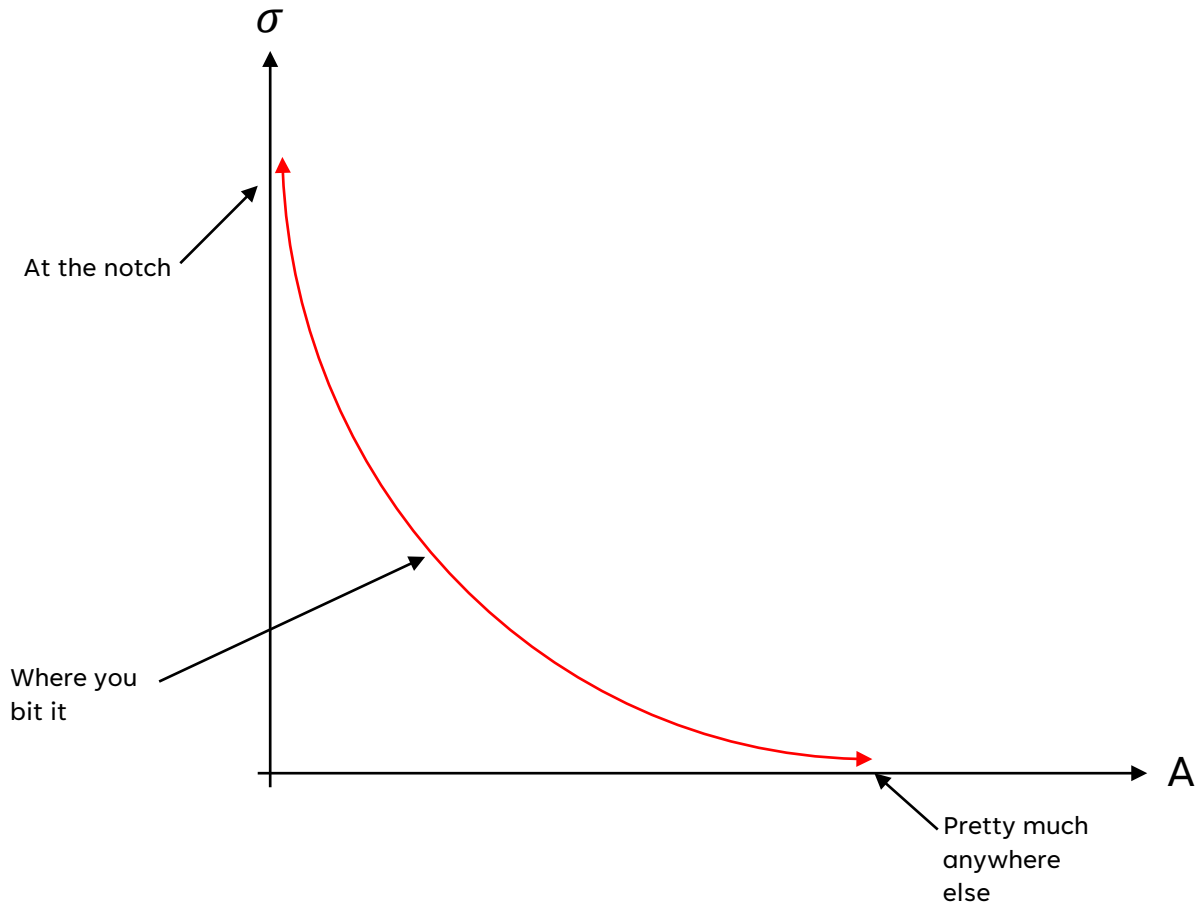
Lets try to open the bag at these locations

# STRESS – WHY SO SERIOUS??

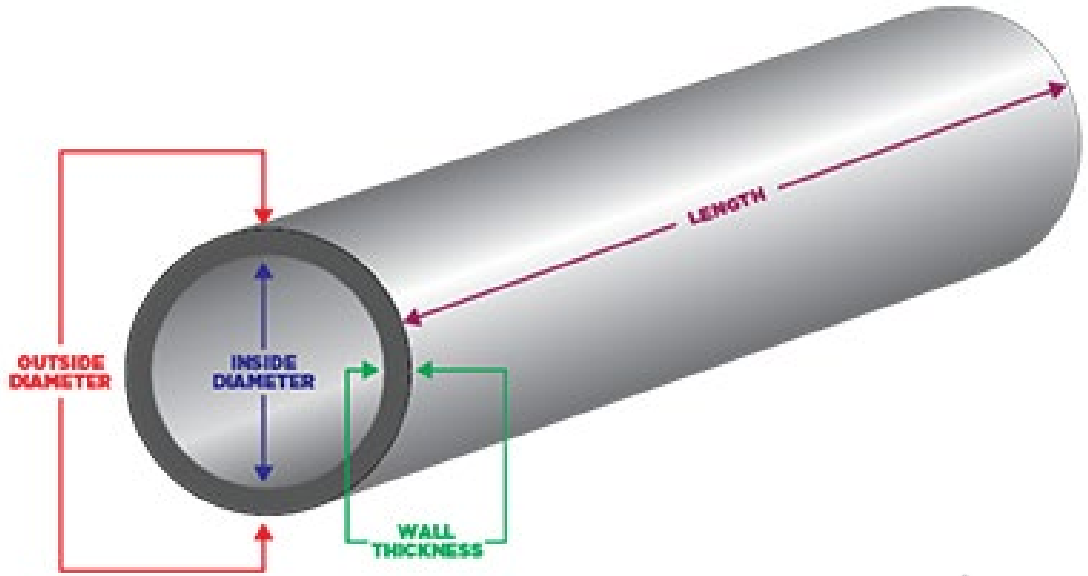
## Mechanical Failure

*A PRACTICAL DEMONSTRATION*

$$\sigma = \frac{F}{A}$$



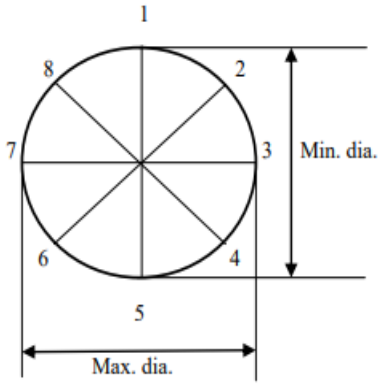
# DIMENSIONS


LENGTH
OUTSIDE DIAMETER
INSIDE DIAMETER
WALL THICKNESS

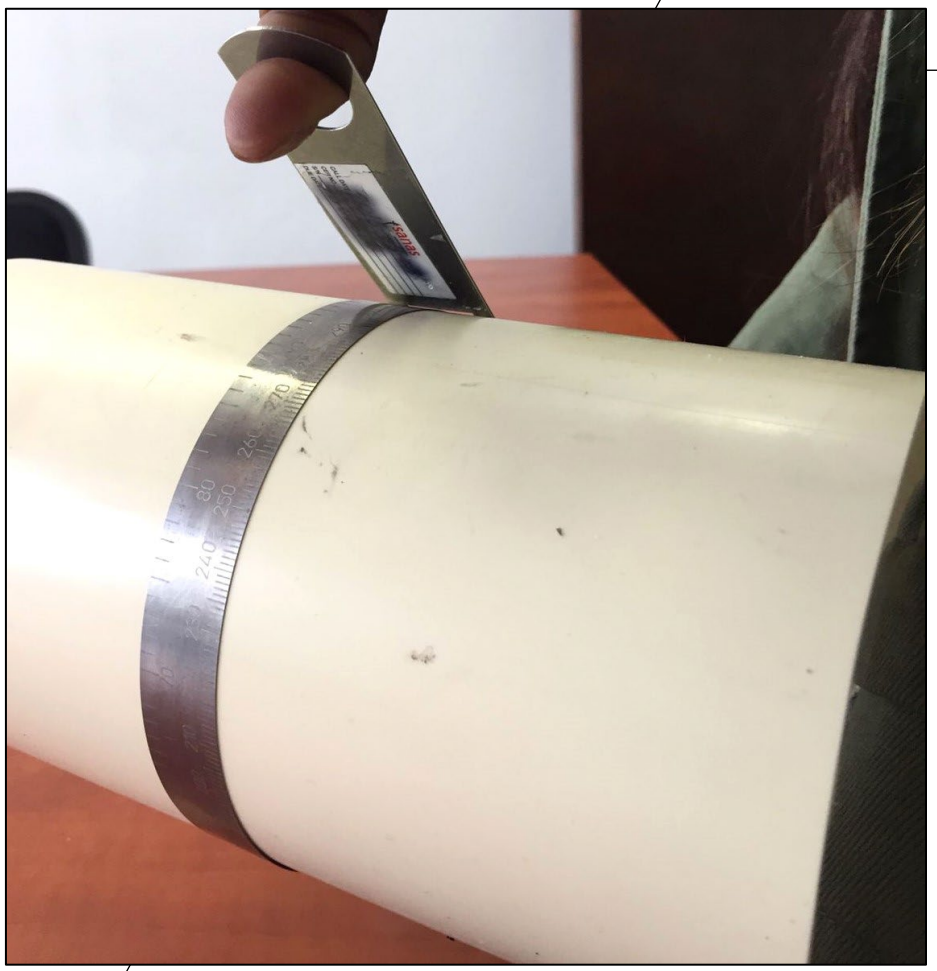

Mitutoyo


20-300
PRESTO
60-950

# OUTSIDE DIAMETER



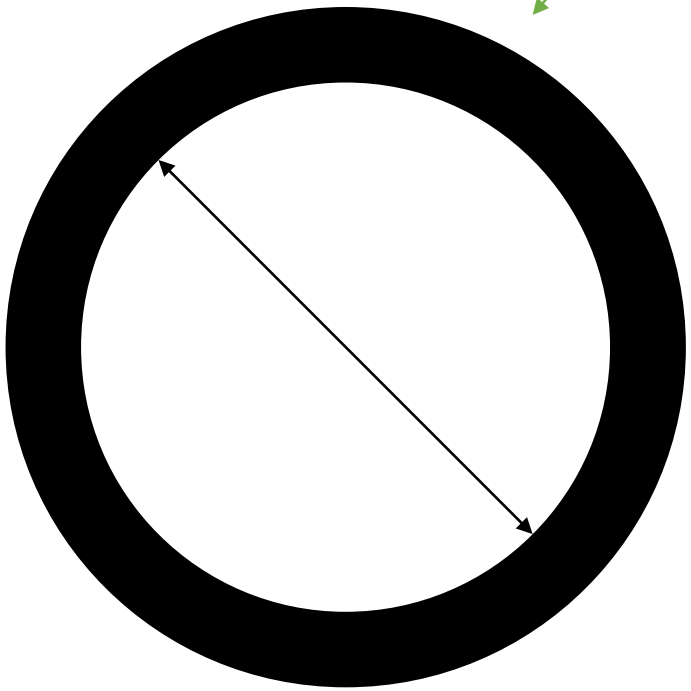


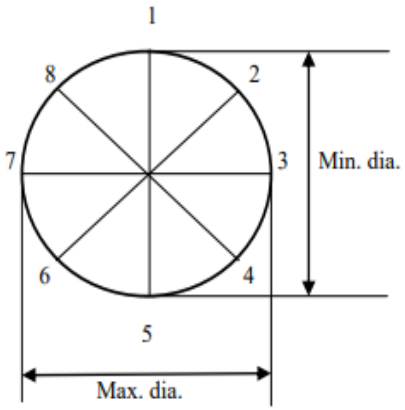


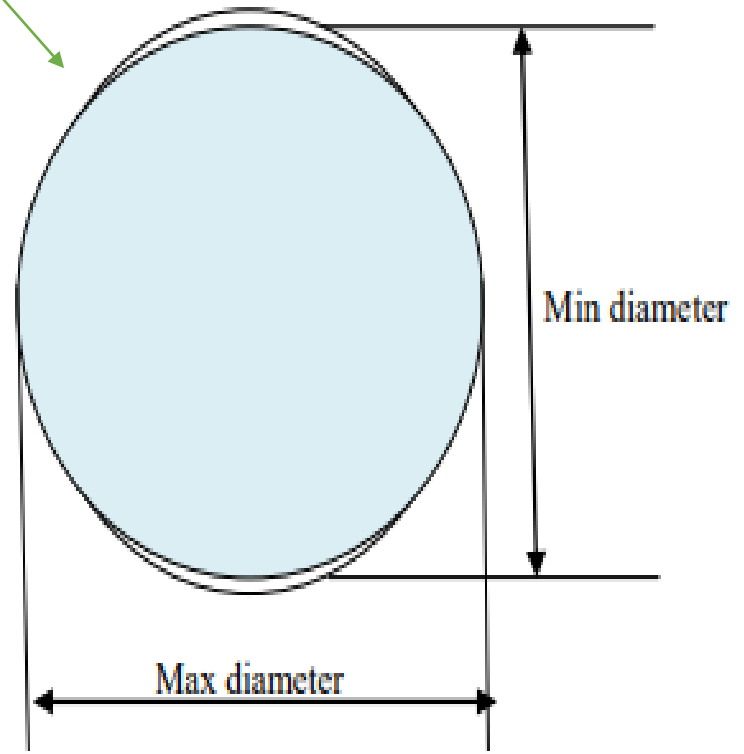
Small diameter pipes (± < 20mm)

# INSIDE DIAMETER

# OUT OF ROUNDNESS

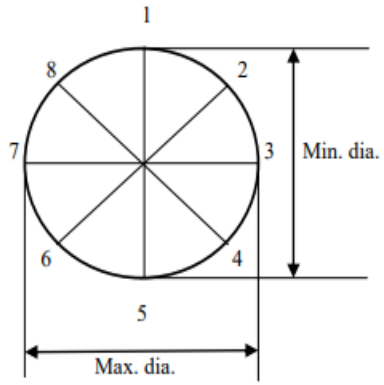




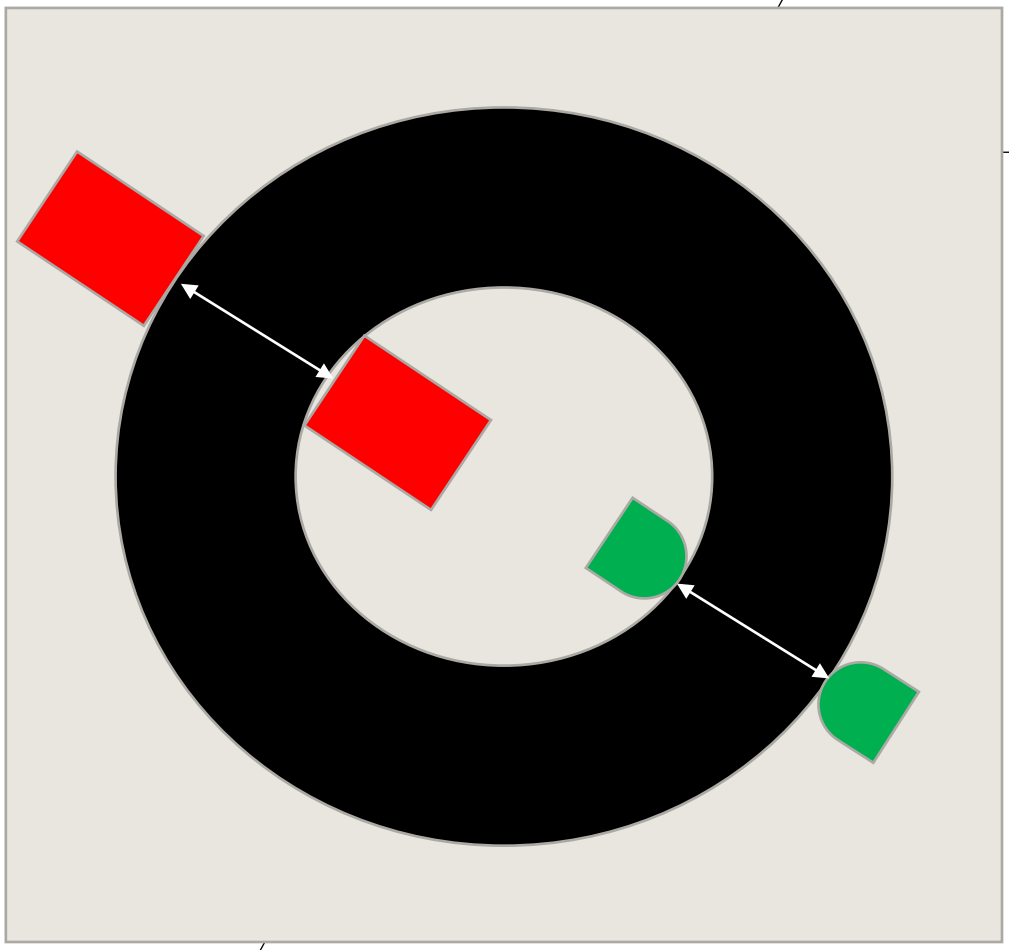



# WALL THICKNESS

Rounded tip to ensure proper thickness measurement







# WORKMANSHIP

**SANS 4427-2**

## 5.1 Appearance

When viewed without magnification, the internal and external surfaces of pipes shall be smooth, clean and free from scoring, cavities and other surface defects such as would prevent conformity of the pipe to this part of ISO 4427. The pipe ends shall be cut cleanly and square to the axis of the pipe.

**SANS 966-1**

## 5.4 Workmanship

Both the inner and the outer surfaces of pipes shall be smooth and free from grooving, blistering and other deleterious defects. A plain end of a pipe shall be clean cut and, in the case of an integral pipe-end socketed pipe, shall be chamfered (at an angle of approximately 15°) to half the wall thickness of the pipe. Both ends of a pipe shall be free from chips and rough edges, and shall be square to the axis of the pipe.

# TYPES OF DEFECTS

1. Voids
2. Roughness
3. Sink Marks
4. Flowlines
5. Fisheyes aka surface agglomerates
6. Die lines

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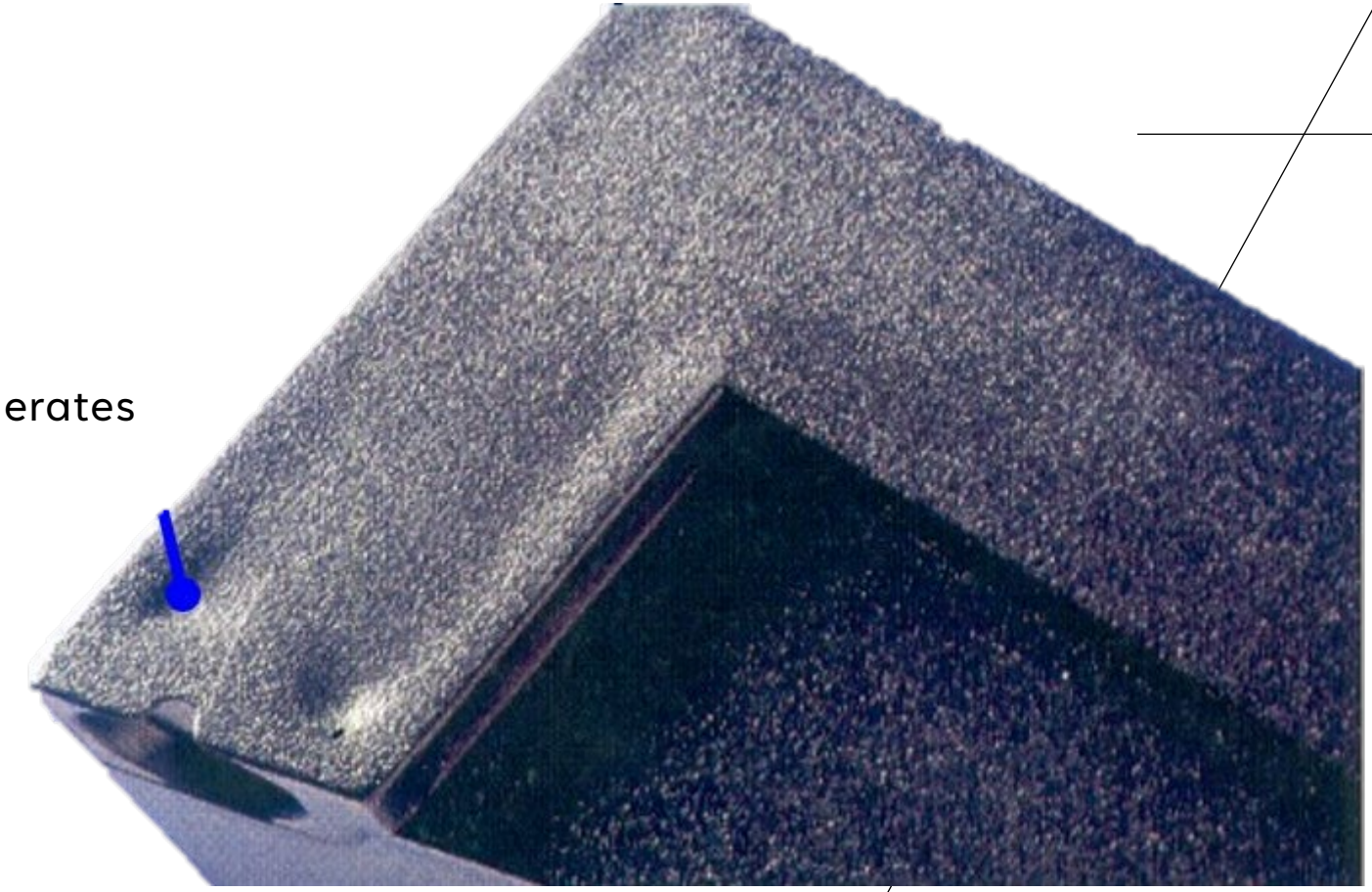

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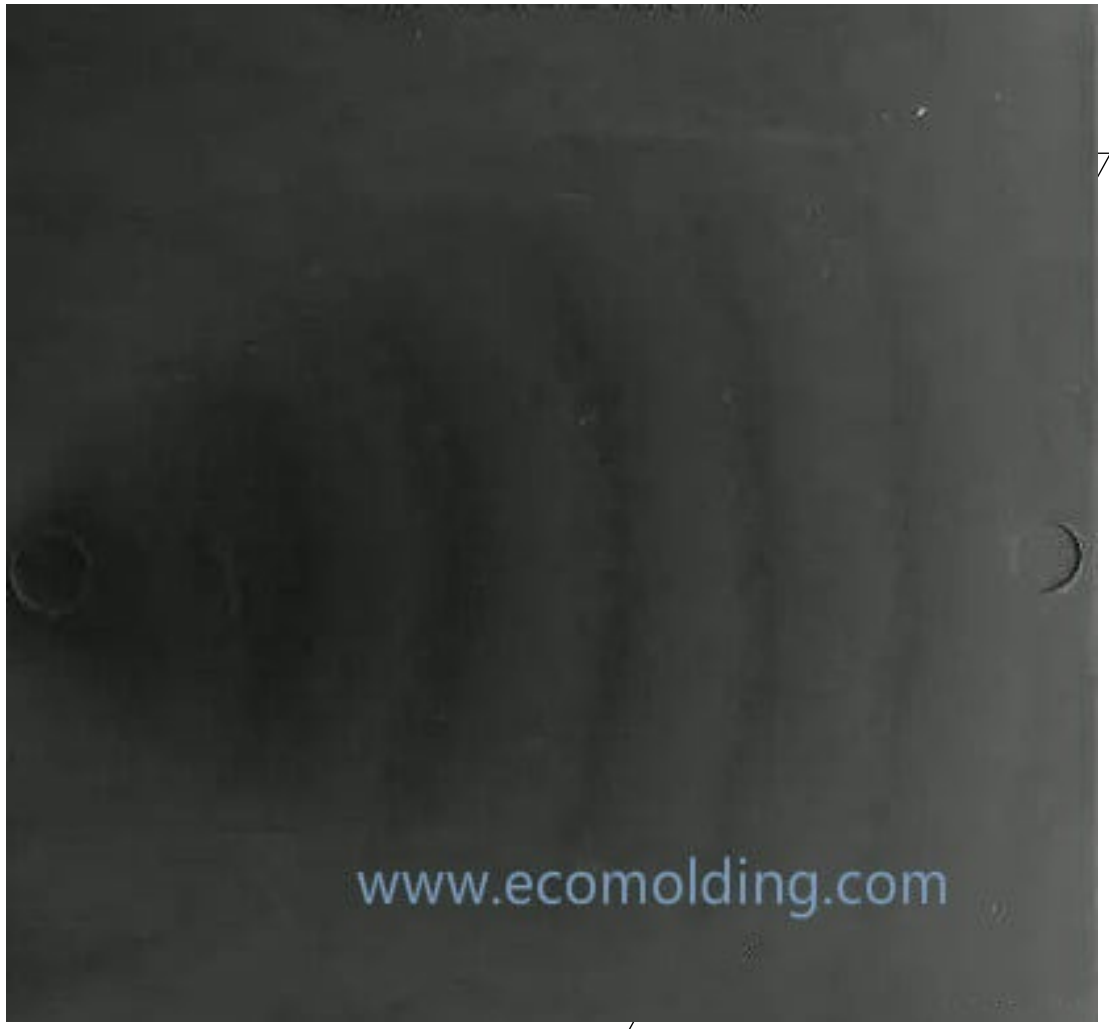

# TYPES OF DEFECTS

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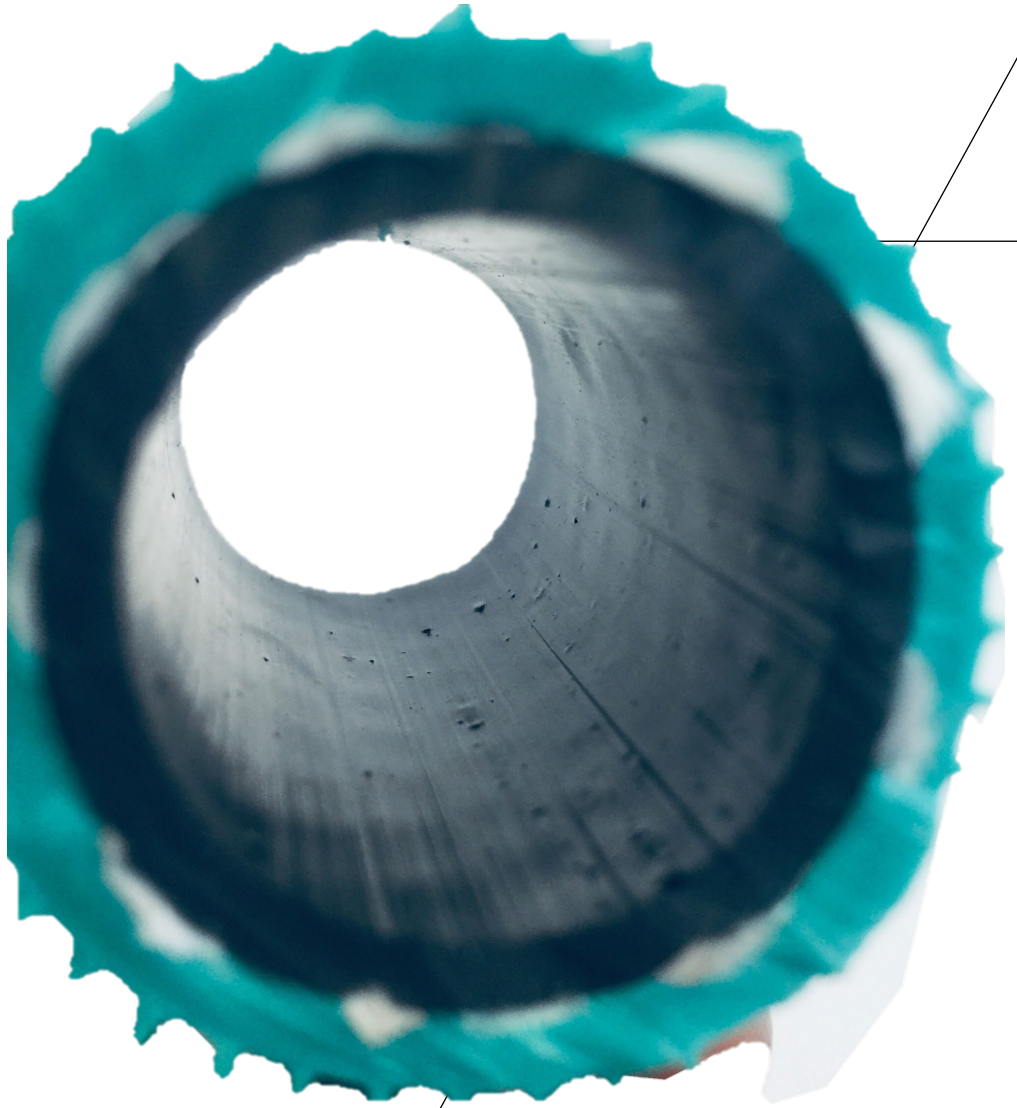

# TYPES OF DEFECTS

1. Voids
2. Roughness
3. Sink Marks
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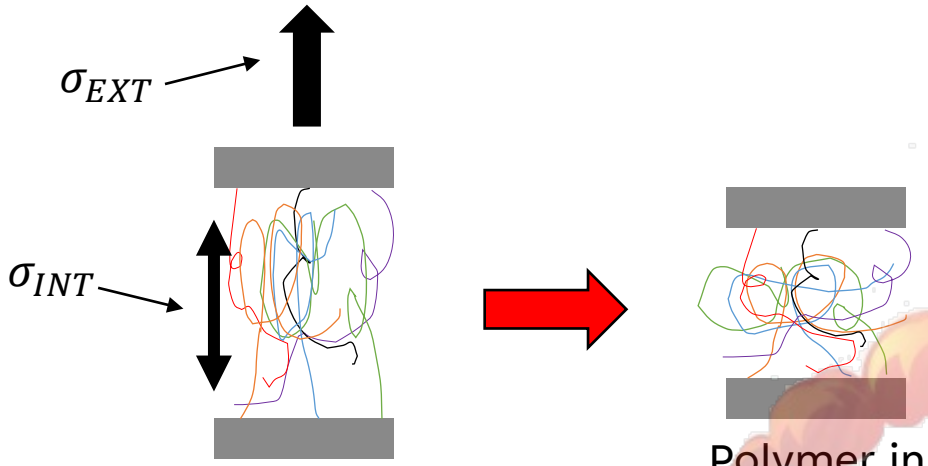
5. Fisheyes aka surface agglomerates
6. **Die lines**

# PLASTIC REVERSION

Caused by the polymer freezing in an unstable orientation due to factors such as rapid cooling, extrusion rates etc.




Polymer under internal stress

Polymer in relaxed state

$$\sigma_{TOTAL} = \sigma_{EXT} + \sigma_{INT}$$

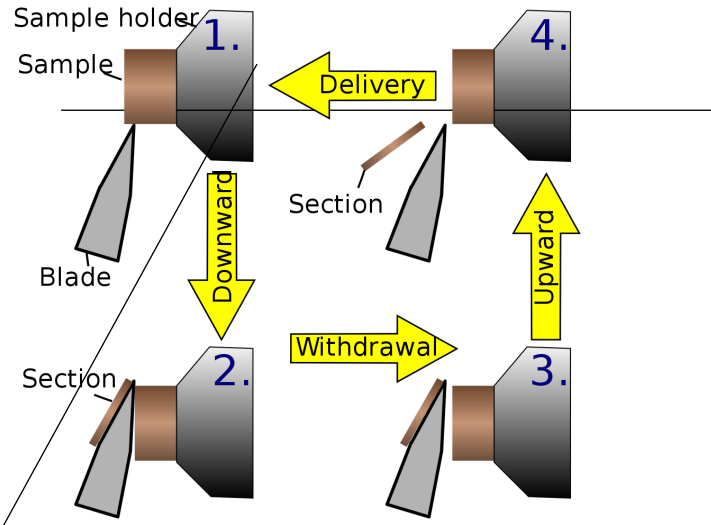
$$\sigma_{TOTAL} > \sigma_y$$

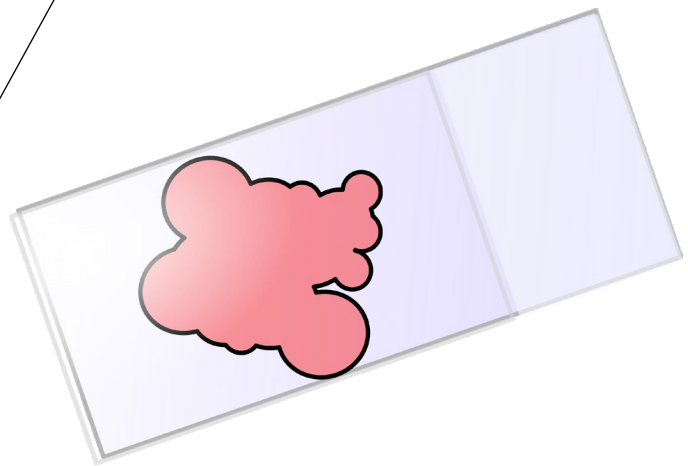
# CARBON BLACK DISPERSION TESTING

- High density polyethylene PE100 plastic piping (SANS4427)
- Testing in accordance with ISO18553:2002

**Sample preparation**

- 6 specimens must be sourced from various regions from the sample.
- Specified thickness
- Usage of a microtome
- In case of dispute a compression method is preferred using an air circulating oven between 180°C and 200°C for max 10 minutes using pressure clamps
- Between two microscope slides.

# CARBON BLACK DISPERSION TESTING

- High density polyethylene PE100 plastic piping (SANS4427)
- Testing in accordance with ISO18553:2002

**Particle Assessment Method**

- Using an optical microscope.
- Microscope slides assessed at 100x magnification
- Agglomeration count on each specimen
- Total number of agglomerates assessed as per ISO18553

| Grade | Dimensions µm | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 to 10 | 11 to 20 | 21 to 30 | 31 to 40 | 41 to 50 | 51 to 60 | 61 to 70 | 71 to 80 | 81 to 90 | 91 to 100 | 101 to 110 | 111 to 120 | 121 to 130 | 131 to 140 | >140 |
| | Maximum number of particles and agglomerates | | | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | | | | |
| 0,5 | 1 | | | | | | | | | | | | | | |
| 1 | 3 | 1 | | | | | | | | | | | | | |
| 1,5 | 6 | 3 | 1 | | | | | | | | | | | | |
| 2 | 12 | 6 | 3 | 1 | | | | | | | | | | | |
| 2,5 | | 12 | 6 | 3 | 1 | | | | | | | | | | |
| 3 | | | 12 | 6 | 3 | 1 | | | | | | | | | |
| 3,5 | | | | 12 | 6 | 3 | 1 | | | | | | | | |
| 4 | | | | | 12 | 6 | 3 | 1 | | | | | | | |
| 4,5 | | | | | | 12 | 6 | 3 | 1 | | | | | | |
| 5 | | | | | | | 12 | 6 | 3 | 1 | | | | | |
| 5,5 | | | | | | | | 12 | 6 | 3 | 1 | | | | |
| 6 | | | | | | | | | 12 | 6 | 3 | 1 | | | |
| 6,5 | | | | | | | | | | 12 | 6 | 3 | 1 | | |
| 7 | | | | | | | | | | | 12 | 6 | 3 | 1 | |

NOTE 1 7 µm corresponds to 0,7 mm under a magnification of × 100 and to 0,49 mm under a magnification of × 70. Similarly, 60 µm corresponds to 6 mm under a magnification of 100.

NOTE 2 All empty upper right cells in the table mean that no particles in the size range are acceptable for the grade in that row.

NOTE 3 All empty lower left cells mean no limit to the number of particles in the size range.

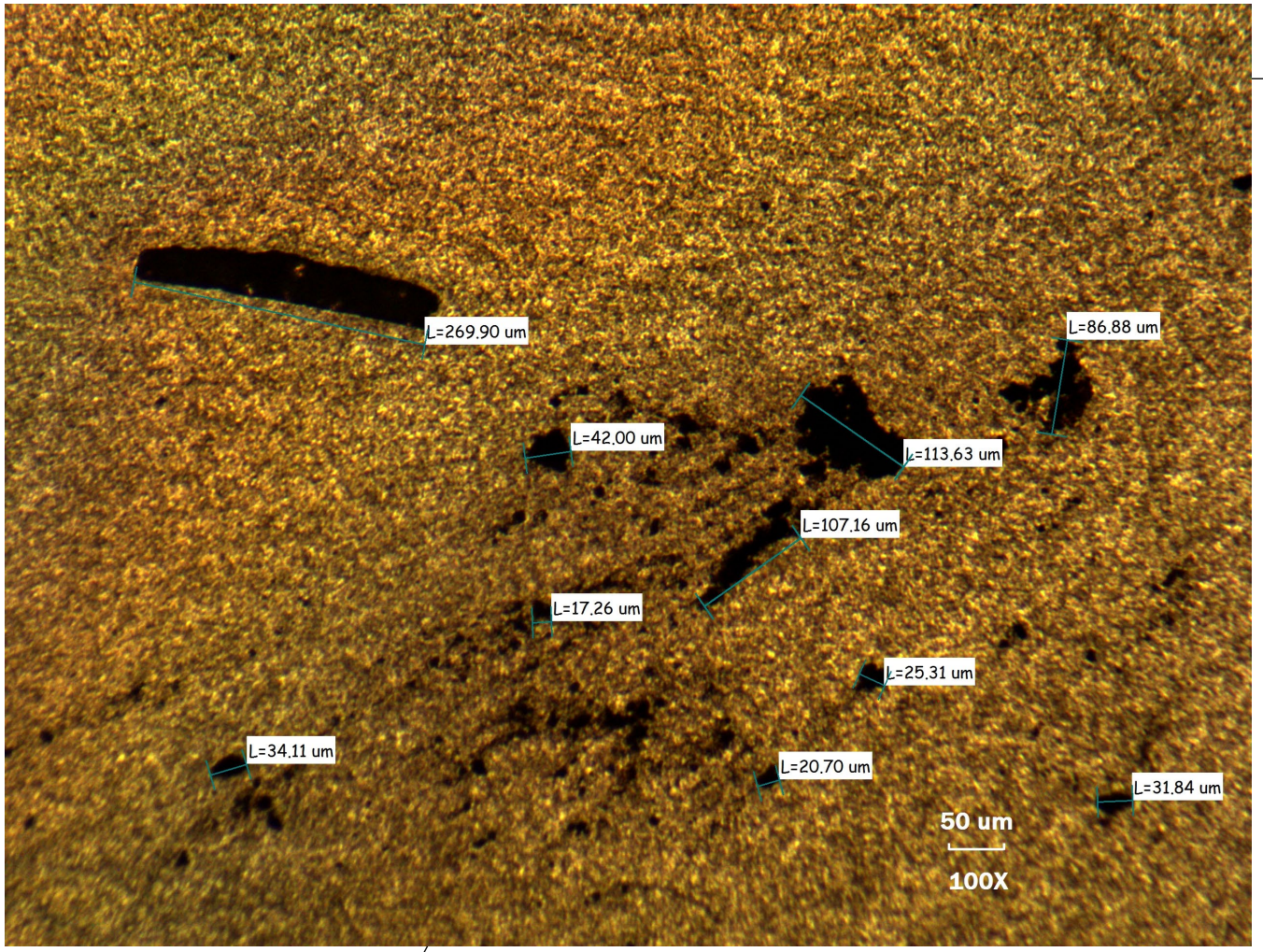
# CARBON BLACK DISPERSION TESTING

- High density polyethylene PE100 plastic piping (SANS4427)
- Testing in accordance with ISO18553:2002

For optimal performance, carbon particles must be uniformly dispersed with in the polymer matrix.

If ignored, large agglomerates could be formed and could cause the opposite of desired results:

- Brittleness
- Stress raisers
- Uneven distribution of any other additives

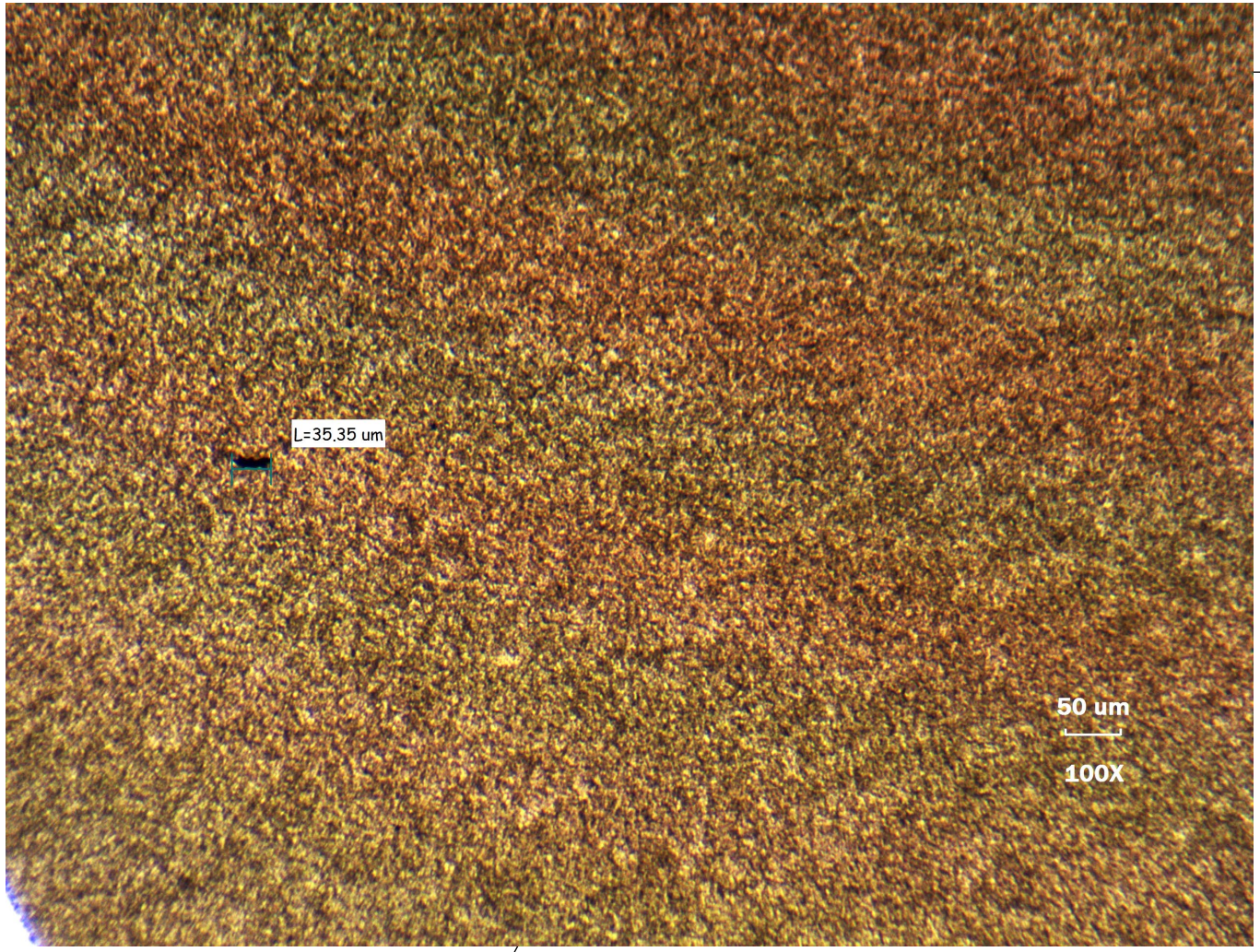


# CARBON BLACK DISPERSION TESTING

- High density polyethylene PE100 plastic piping (SANS4427)
- Testing in accordance with ISO18553:2002

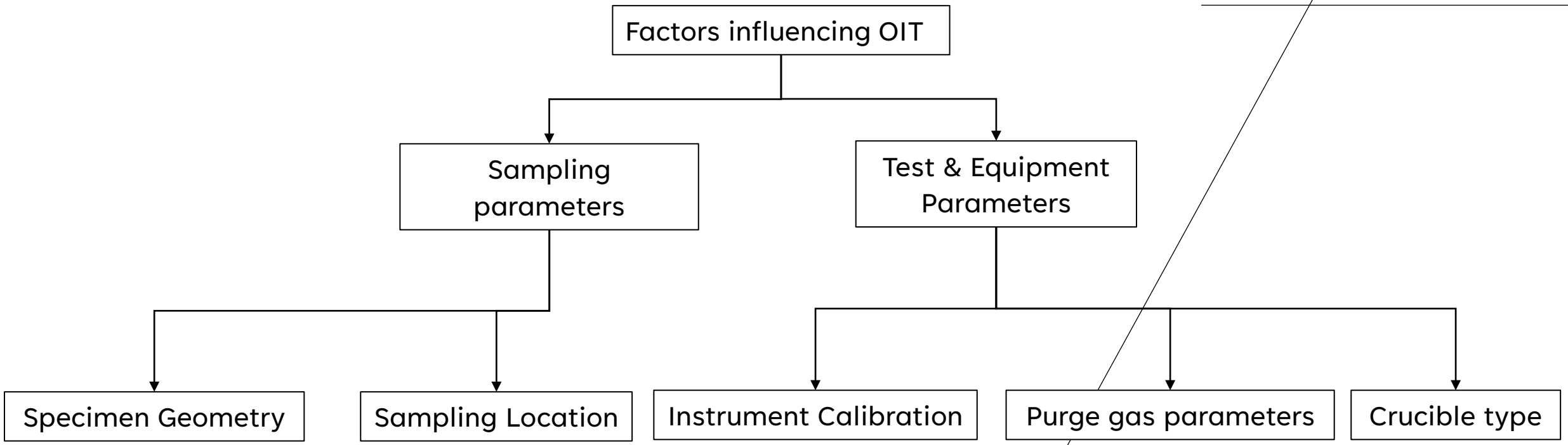
Uniform distribution of particles would

- Increase performance
- Increase UV stability
- Reduce risk



# OXIDATION INDUCTION TIME

*Assessed using methods as described in ISO 11357-6*

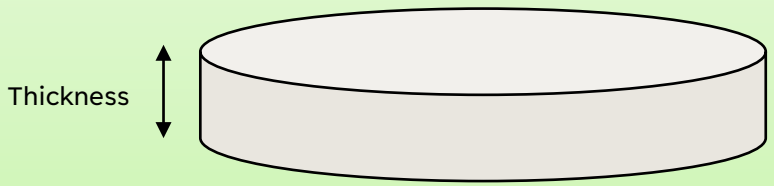


# OXIDATION INDUCTION TIME

*Sampling Parameters*

Sample geometrical features can make a difference!

ISO 11357-6 recommended




Corners leading to increased thermal stress are minimised ensuring most efficient path to isothermal specimen

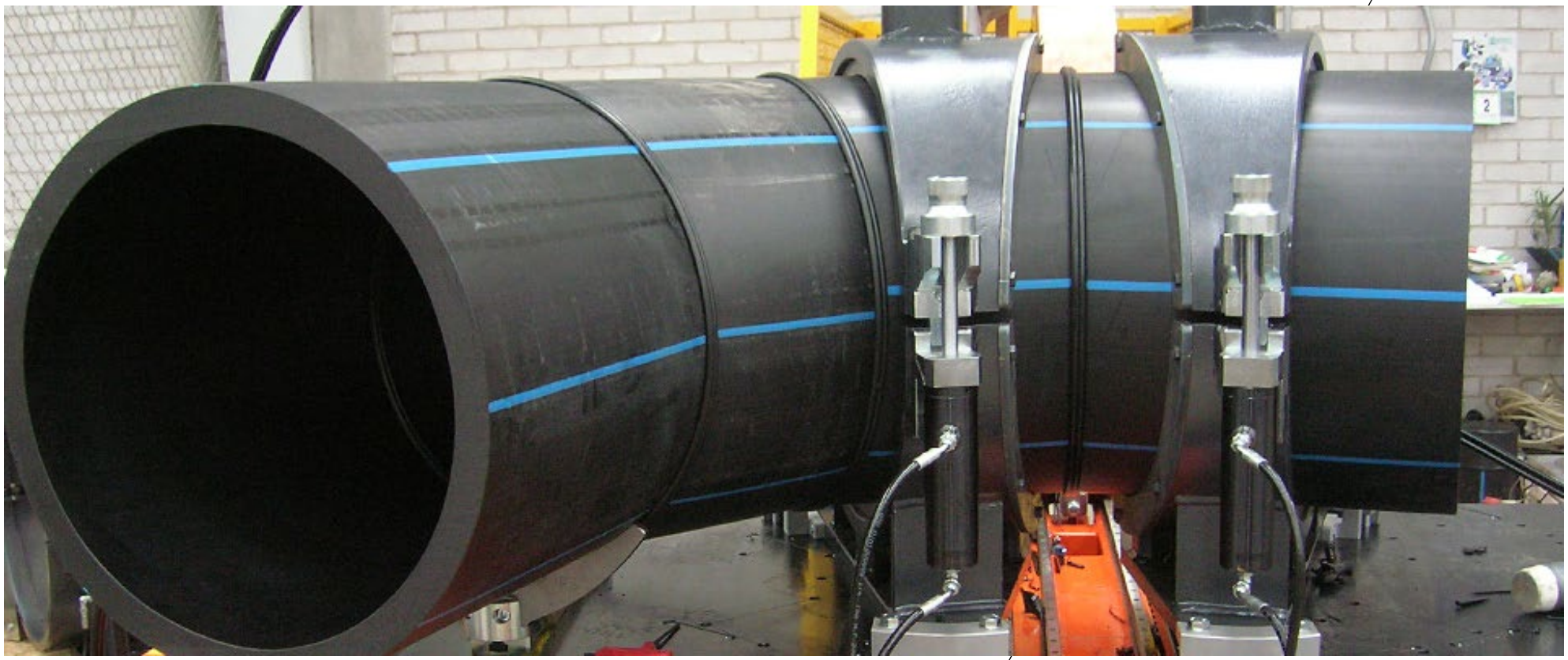
Recommended by absolutely nobody

Sharp, erratic corners and edges increase thermal stress and prolong time until thermal steady state is reached

# WELD QUALITY TESTING

2 Types of commercially practiced thermoplastic welding techniques

- Butt fusion welding



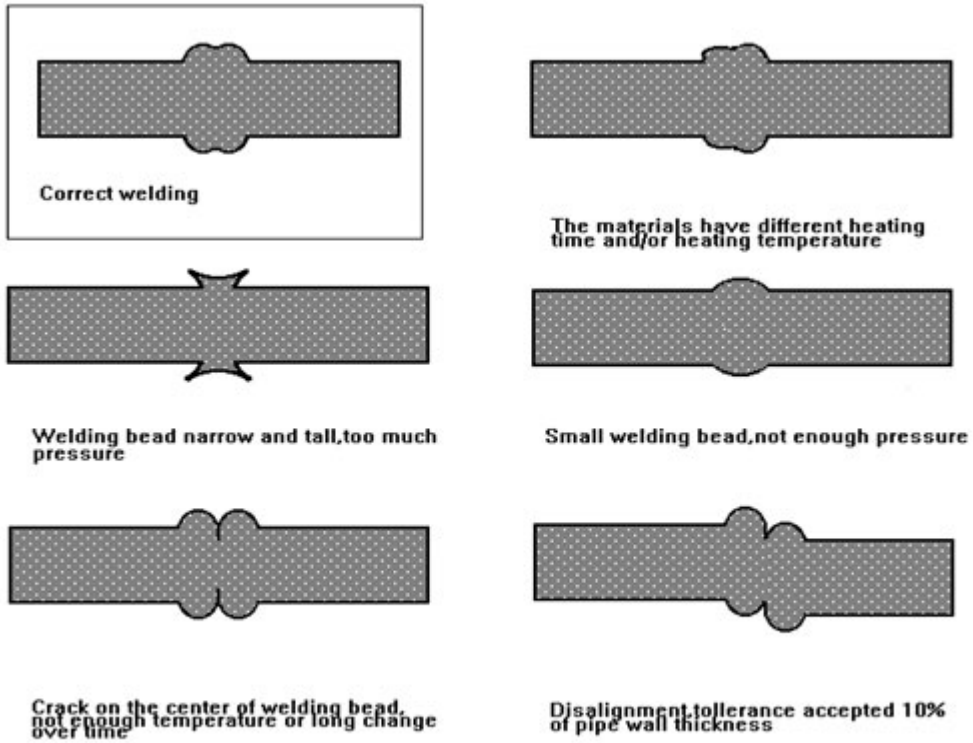
# WELD QUALITY TESTING

- Electrofusion welding


# WELD QUALITY TESTING

Testing must be performed in accordance with South African National Standard SANS6269:2005, Welding of thermoplastics — Test methods for welded joints.

This standard does not address the visual appearance of welded components, However, you could get a generic idea of what the weld should look like when butt fusion welding had been performed.



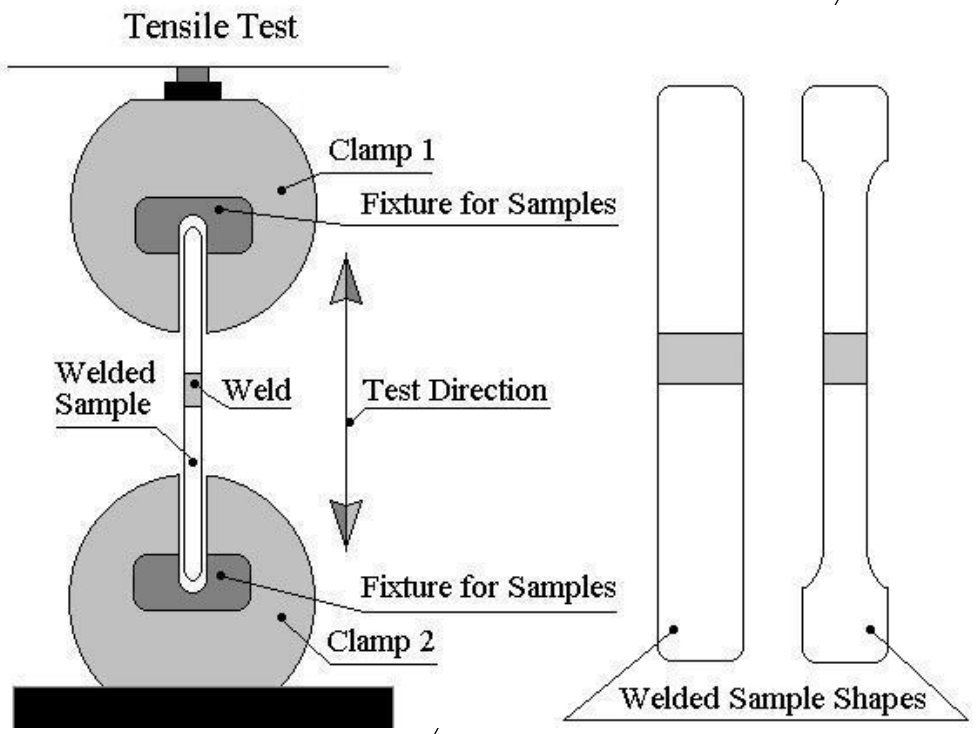

**IMPORTANT!**

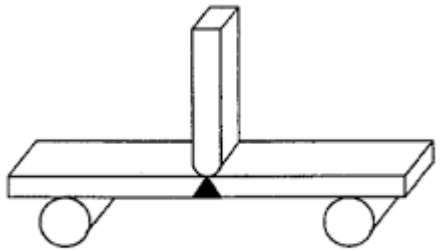
Such an assessment is only an estimation and not final validation of quality

# WELD QUALITY TESTING

**Butt Welds**

- Tensile testing for weld factor determination
- Bend testing for weld integrity verification

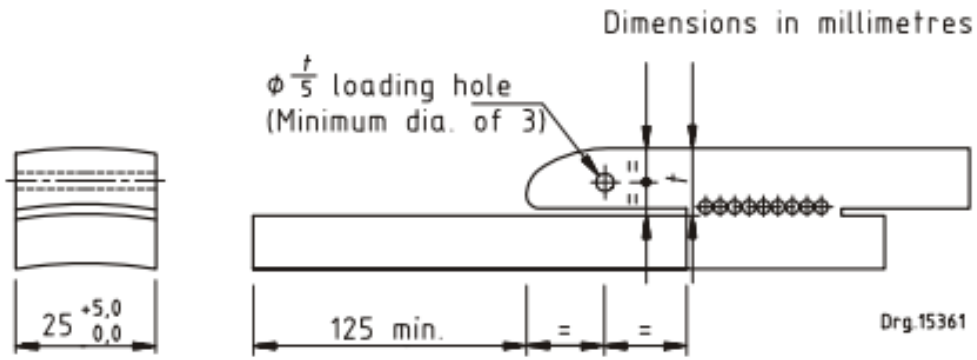


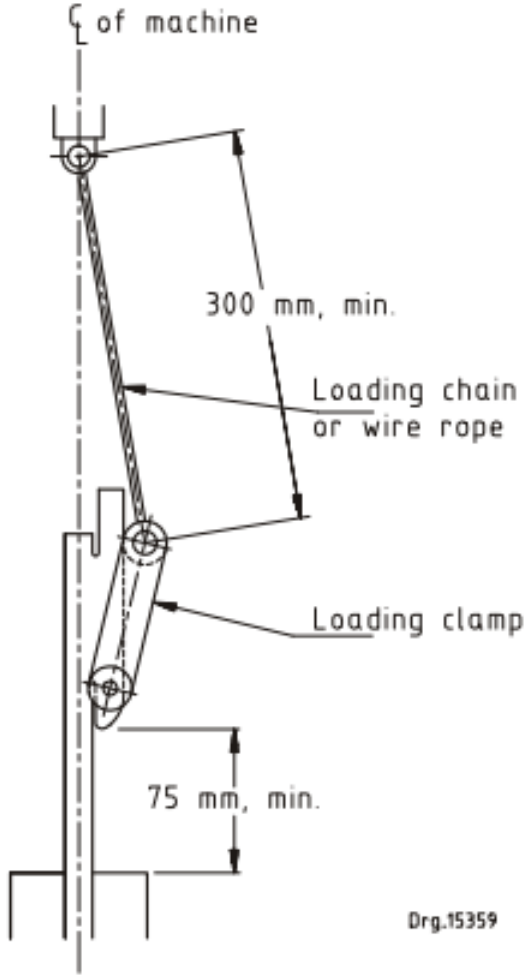



# WELD QUALITY TESTING

**Electrofusion Welds**

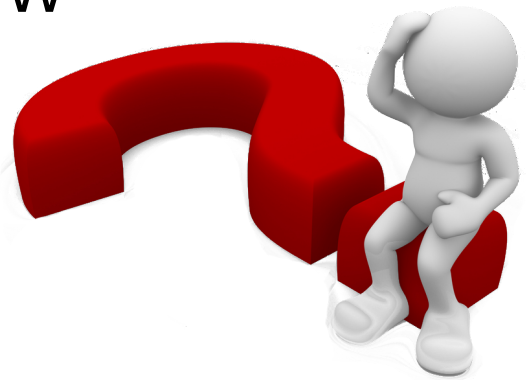
- Tensile testing for weld factor determination
- Peel testing for weld integrity verification



# ISO 9080 – AN OVERVIEW

This Statistical Extrapolation Method (SEM) is meant to be used to evaluate the long-term hydrostatic strength of a material in pipe form.

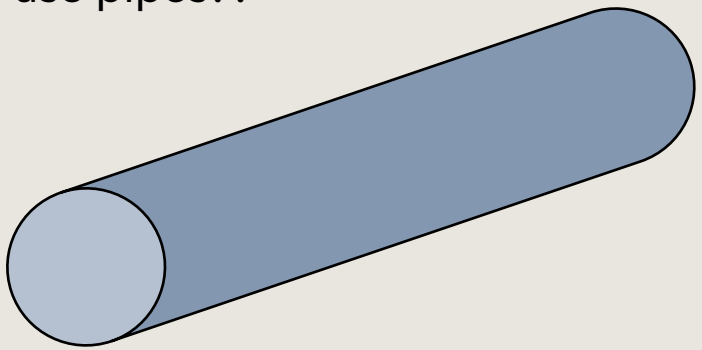



The method can provide a systematic basis for the interpolation and extrapolation of stress rupture characteristics at operating conditions different from the conventional 50 years at 20 °C

WE NEED TO KNOW WHAT THE MINIMUM REQUIRED STRENGTH (MRS) IS!!

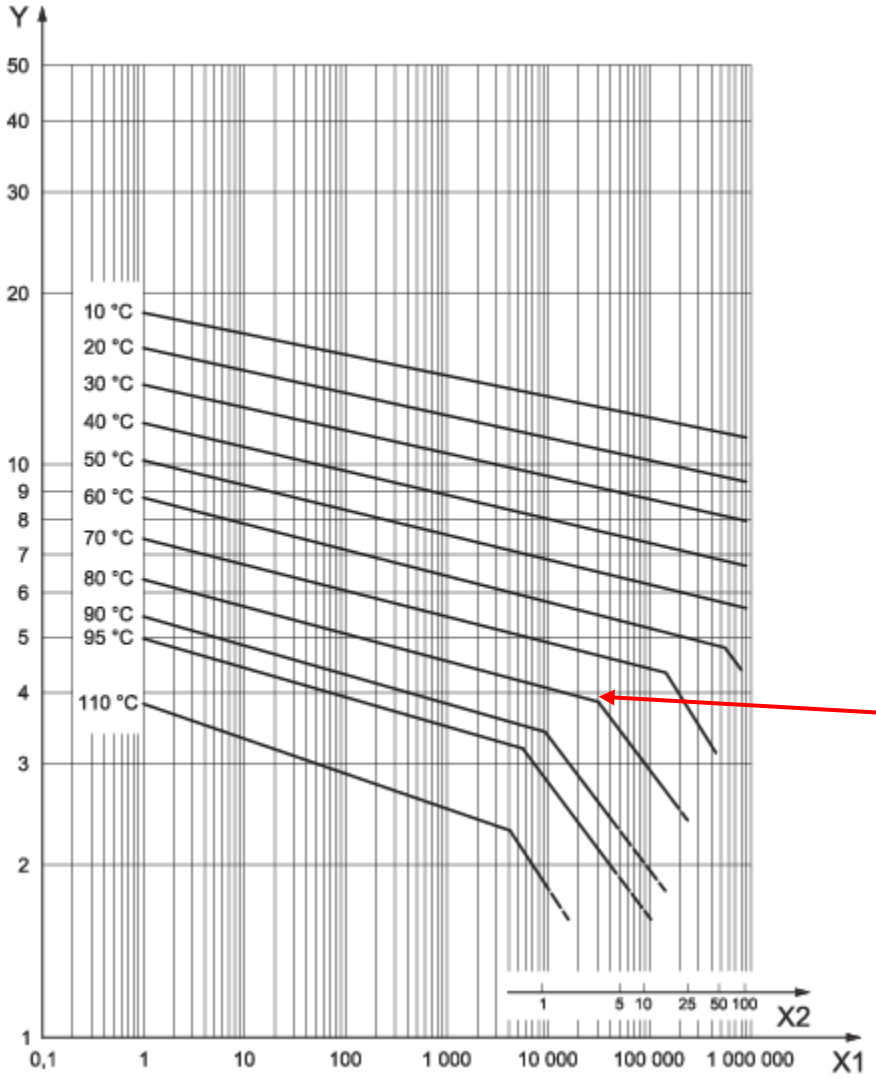
Pipeline designers and installers can use the MRS to predict required pipe class and corresponding lifespan!

ISO 9080 is a material test?! Why do we use pipes??



Minimisation of any geometrical influence

# ISO 9080 – AN OVERVIEW




SANS 15874-2 (PPR reference curve)

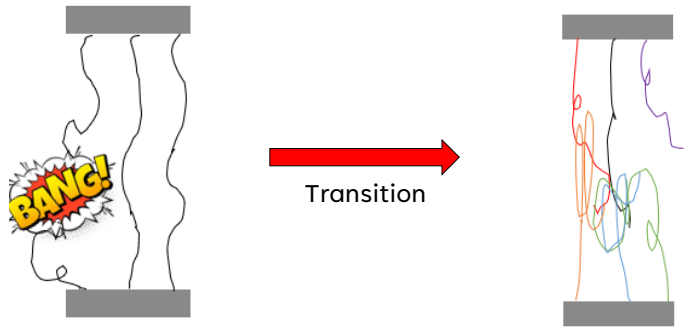
## Factors to be considered when determining the MRS:

1. Material being tested: Amorphous or semi-crystalline
2. Melting temperature
3. Service/usage temperature

## Observation requirements:

1. Minimum of 30 observations per temperature
2. Minimum of 2 temperatures
3. 4 observations > 7000 hours
4. 1 observation > 9000 hours
5. Minimum 20 observations after the KNEE

## WHAT IS THE KNEE POINT

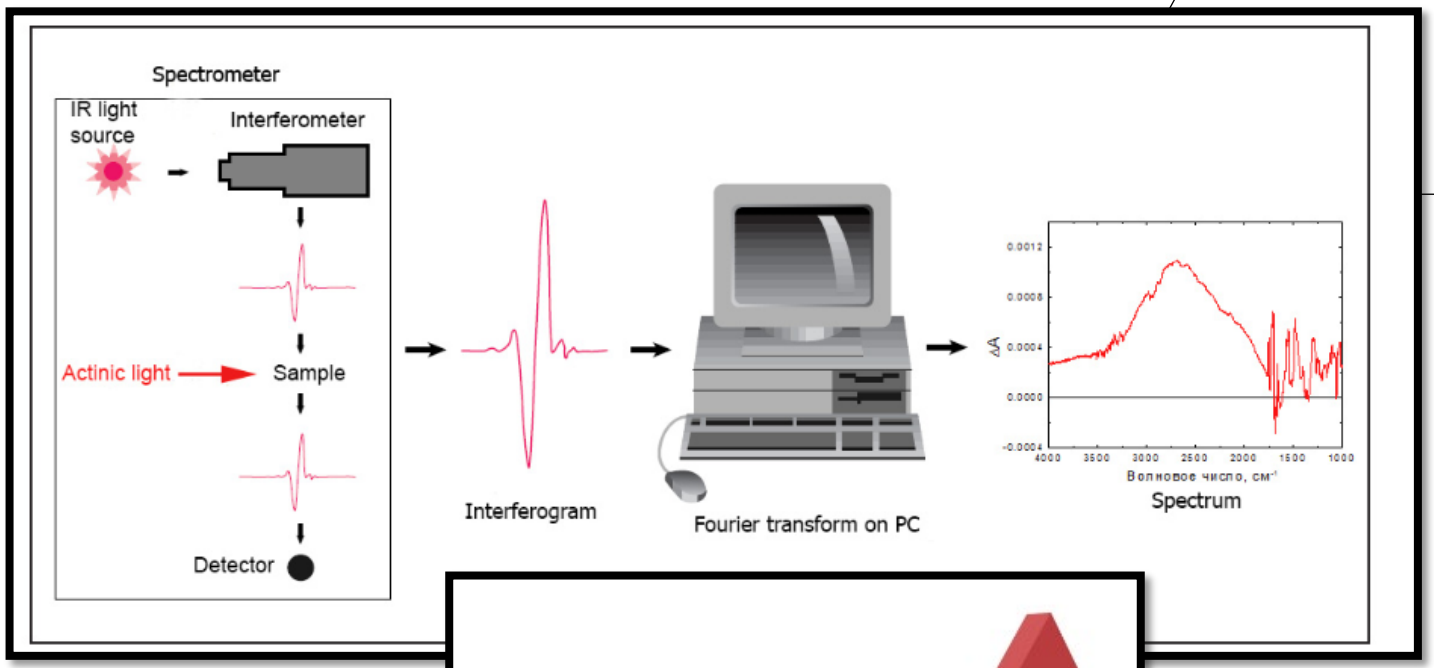



Knee points often occur at times > 10,000 hours + while using elevated temperatures

# P.E.S.C LABORATORY

*Certification Services and Tools*

1. FTIR Fingerprints
2. Technical Support Documents
3. Dashboard Live Progress Monitoring (coming soon)

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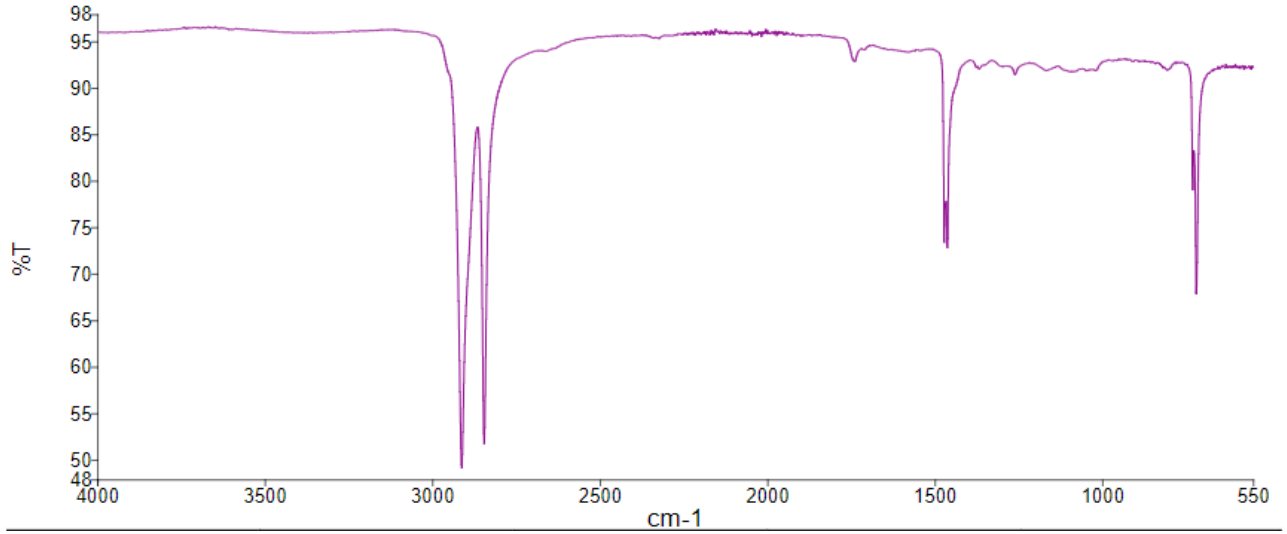
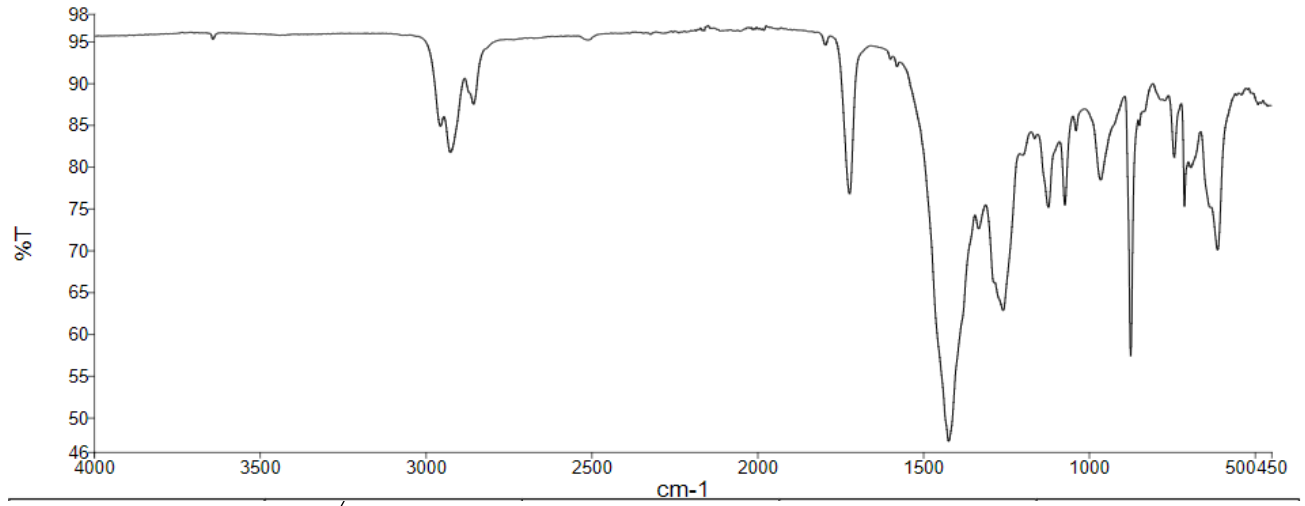



Commercial HDPE PE100




Highly Plasticised PVC

1. FTIR Fingerprints

2. **Technical Support Documents**

3. Dashboard Live Progress Monitoring (coming soon)


- Highlights possible risks
- Allows for risk minimisation
- Discusses possible root causes
- Recommends corrective actions for product improvement
- Suggests tests/checks to confirm successfully correction

# P.E.S.C LABORATORY

*Certification Services and Tools*

1. FTIR Fingerprints
2. Technical Support Documents
3. **Dashboard Live Progress Monitoring (coming soon)**

# EXTRA SERVICES

## INVESTIGATIONS

- Failure investigations
- Fingerprinting and identification of unknown polymeric materials
- Forensic investigations
- Tests required for specialized products in the absence of specifications

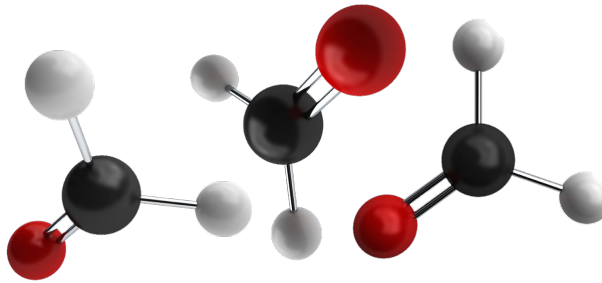
## CONSULTATIONS

- Legal – product liability assessments
- Quality Control – Unbiased selection of tests and requirements
- Technical assistance
- Training – development of training courses specific to your requirements
- Machine builds

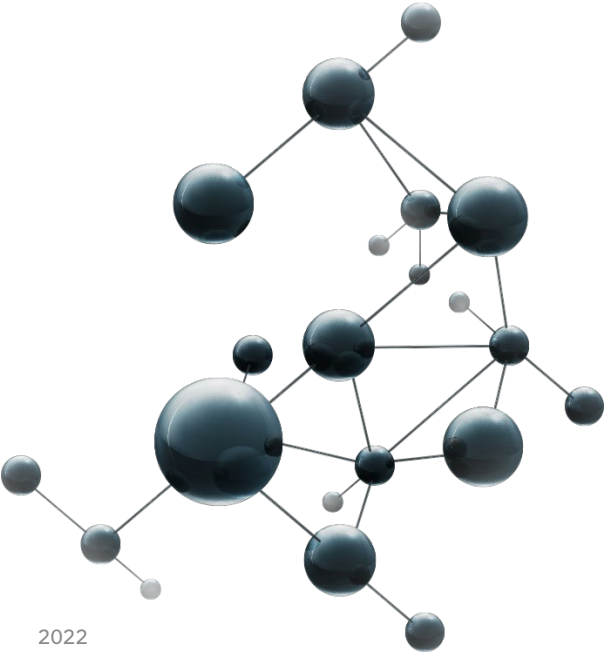
## AUDITS & INSPECTIONS

- Batch release inspections
- Development of test methods
- Expert witnessing
- Finite Element Analysis
- Site inspections
- Specialized audits

# Q & A



Presentation created by
François Prinsloo & P.E.S.C. Laboratory

P.E.S.C Laboratory

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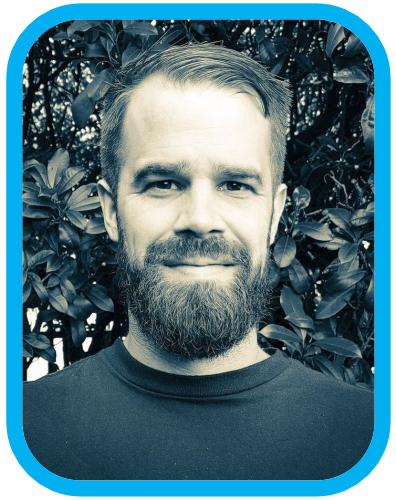
# *Questions and Answers*



Francois Prinsloo



# Equipment calibration and what then?

People always ask, "*I have uncertainty listed in my equipment's calibration report. Why do I need to estimate uncertainty? It is already done for me*."

Unfortunately, this is not the case. **You still need to estimate uncertainty**.

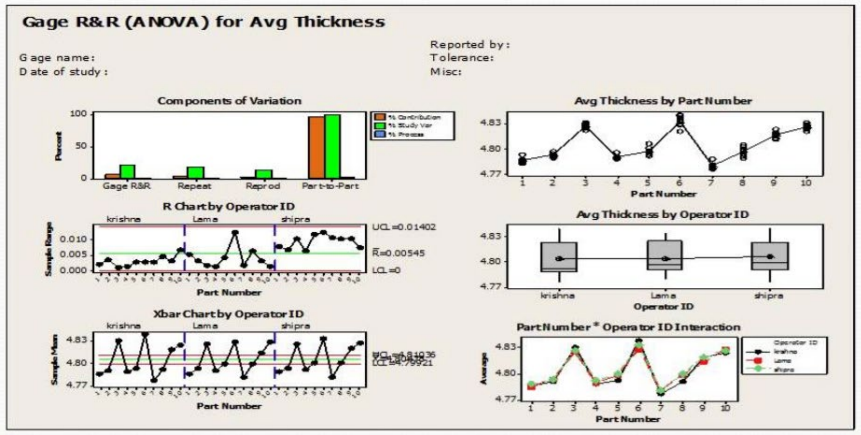
The uncertainty reported in your equipment's calibration reports is the uncertainty associated with the reported calibration result. It is not the uncertainty for your measurement results when you use the equipment.

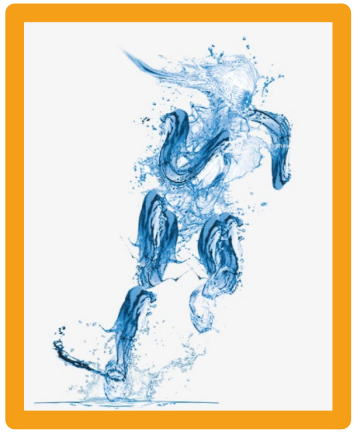
The uncertainty reported in your equipment's calibration reports is only one component of many that should be considered in your uncertainty analysis. Typically, it is referred to as the Reference Standard Uncertainty, Calibration Uncertainty, or Traceable Uncertainty.

So, please remember that you still need to estimate uncertainty and include other factors such as repeatability, reproducibility, bias, drift, resolution, and other significant factors.

Do we understand what is required for quality measurement?

## ANOVA gauge R&R



# SAPPMA Webinar VII 2022


*Participants*
*Audience*
*& Organizers*

SAPPMA
southern african plastic pipe manufacturers association

# Questions and Answers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admin@sappma.co.za

SAPPMA
southern african plastic pipe manufacturers association