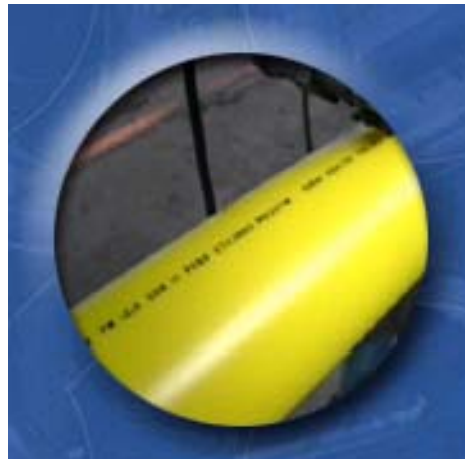




# POLYETHYLENE MALAYSIA

**TITLE :**

**Development of Malaysian Standard on Polyethylene (PE) Piping Systems For Gaseous Fuel Supply (MS 1086 : 2007)**



# The Content



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## Part 1: Introduction/Overview

- Background of Gas Pipes in Malaysia

## Part 2: The Evolution of MS1086

- What is triggering the development of the standard?
- When was the standard technical committee formed?
- Why was MS1086:1987 revised?
- What are the benefits of standard development to the industry?

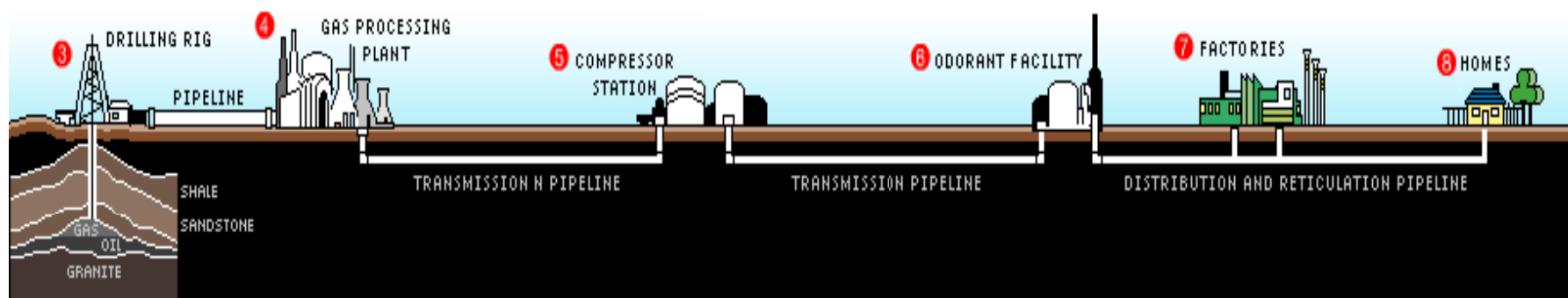
## Part 3: The structure of MS1086

- The synopsis of each part
- Major modification of the standard with the most impact

# Part I : Background of Gas Pipe Industry in Malaysia



- Has been in use for about 50 years
- **1950s** - the first PE pipe was introduced to the gas distribution sector in US and Canada as the alternative material to metal pipe.
- **1980s** - PE pipe was used for water & gas pipe systems in Malaysia
- Within 20 years of its introduction in this country, the PE pipe material has been changed from PE 63 to PE 80.



# Polyethylene (PE) Piping System for Gas Application

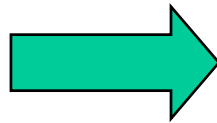


- The innovation of better PE had enhanced its usage from 1970 onwards
- Today, 90% of pipes installed for gas distribution are plastic and 99% are PE pipes
- PE piping is the only approved plastic material under the NFPA 58 LPG code
- PE pipe was found to be much safer and cost effective compared to conventional materials.

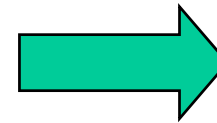
# About PE



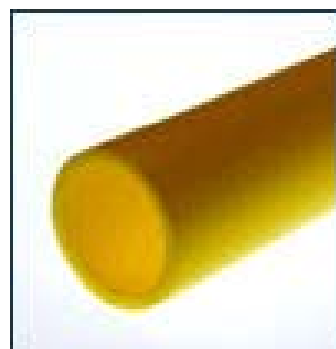
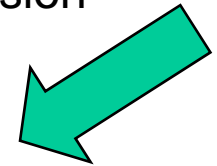
Gas Cracking



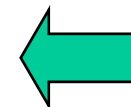
Polymerization



Powder Extrusion

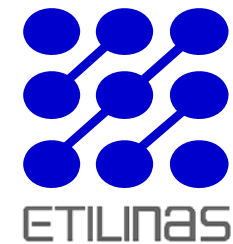


Pipe & Fitting Extrusion



Compounding Extrusion

General flow of the PE resin application process



# PE Piping System Characteristics

<b>Pipe Sizes</b>	<b>Outside Diameter (OD) 16 ~ 630 mm</b>
<b>Temperature</b>	<b>- 40 Cels to 80 Cels</b>
<b>Pressure</b>	<b>Maximum Pressure up to 5 Bar</b>
<b>Installation &amp; Joining</b>	<ul style="list-style-type: none"><li>• <b>Common method for jointing – heat fusion, electrofusion &amp; mechanical fitting</b></li><li>• <b>Provide leak-free jointing system</b></li><li>• <b>Installation method – trench laid, sliplined &amp; directional drilled</b></li></ul>
<b>Maintenance</b>	<p><b>PE pipe requires little on going maintenance because it is:</b></p> <ul style="list-style-type: none"><li>• <b>Resistant to most ordinary chemicals</b></li><li>• <b>Resistant to bacterial growth &amp; fungal attack</b></li><li>• <b>Immune to physical aging attack</b></li></ul>

## Part II – Evolution of MS1086

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- **Developed through the supervision of the Technical Committee on Plastics Pipes and Fittings**
- **Executed by the Working Group on PE Pipes and Fittings**
- **Representing the whole industry players : producers, users, consumers and others with relevant interests**
- **Aligned to the European Standard EN 1555:2002 series as a primary basis**
- **The 1<sup>st</sup> version was MS1086:1987.**
- **The 2<sup>nd</sup> revised version was MS1086: 2005 which replaced version 1987.**
- **The update is in line with the development of the EN1555 standard.**

# Working Group Members



## Regulatory Body

- Suruhanjaya Tenaga Malaysia

## End-Users

- Gas Malaysia Sdn Bhd

## Secretariat & Certification Body

- SIRIM Berhad
- SIRIM QAS International Sdn Bhd

## Pipe Producers

- KWH Pipe Malaysia Sdn Bhd
- Musa Rahman Plastic Industries Sdn Bhd
- Polyflow Sdn Bhd

- UAC Pipes Sdn Bhd

- Polyolefins Pipe Sdn Bhd

## Fitting Producers

- AWT Fusion Sdn Bhd
- George Fisher (M) Sdn Bhd
- Megapadu Sdn Bhd

## PE Resin Producers

- Polyethylene Malaysia Sdn Bhd

# Part III - The Structure of MS1068: 2007



**TITLE : PE Piping Systems for gaseous fuels supply. Consists of the following parts :**

<b>PART</b>	<b>TITLE</b>	<b>SYNOPSIS</b>
<b>1</b>	<b>General</b>	<b>Specifies the general requirements of PE raw material to make components (pipe, fitting &amp; valve) for gaseous fuel supply piping system</b>
<b>2</b>	<b>Pipes</b>	<b>Specifies the characteristic pipes made from PE for gaseous fuel piping system. It includes test method &amp; parameters</b>
<b>3</b>	<b>Fittings</b>	<b>Specifies the characteristics of fusion and mechanical fittings made from PE and other materials for gaseous fuel piping system. Applicable to electrofusion socket / saddle fittings and spigot end fittings</b>
<b>4</b>	<b>Valves</b>	<b>Specifies the characteristics of valves made from PE and other materials for gaseous fuel piping system. Applicable to bi-directional valves with spigot end or electrofusion socket.</b>
<b>5</b>	<b>Fitness for the purpose of the system</b>	<b>Specifies the definitions of electrofusion, method to prepare test piece joint, installation recommendations and test to be carried out for assessing the fitness of the system</b>
<b>6</b>	<b>Guidance for the assessment of conformity</b>	<b>Specifies the requirements for material, components and joints given in Part 1. Also requirements for manufacturers' quality system and 3rd party certification</b>

# Modification & Justification

Clause	Modifications	Justification
1.Scope	. . . a maximum operating pressure (MOP) up to 4 bar (PE 80) and 5 bar (PE 100)	To comply with local end users normal application of MOP in the actual pipe line
3.1.2.2 Compound	. . . Reprocessable material not allowed	Allowing recycle material to be used may lead to manipulation by certain parties to include unsuitable waste material without proper control
4.2.1 Additives	. . . The compound shall be produced by resin manufacturer . Addition of <u>mtbx</u> & additives not allowed by pipe manufacturer	As of now, the local pipe converter is still not equipped with suitable extruder and know-how to do own compounding. Allowing to do own compounding may lead to manipulation

# Modification & Justification



Clause	Modifications	Justification
4.2.2 Color	Notify different color as yellow for PE 80 class and orange for PE100 class	To comply with standard color code designated by local end-users. Black gas pipe is never coded in Malaysia
4.2.3.1 (Table 1)	No requirement on Carbon Black Content and Carbon Black Dispersion test	No requirement for Black gas pipe in Malaysia
4.2.3.1	Requirement to test Pigment Dispersion test for orange color compound	To support addition of orange color compound for PE 100 gas pipe

## Modification and Justification

Clause	Modifications	Justification
4.2.3.2 (Table 2)	No requirement for Rapid Crack Growth (RCG) test	<p><u>RCG</u> test is a simulation of pipe under extreme conditions of low temperature and severe impact which could cause a crack to propagate at high speed along a pipe at high pressure containing gas or air. Test sample is cooled at -70 C, notched and impacted.</p> <p>Malaysia as a tropical country does not experience extreme temperature condition and <u>RCG</u> is not required</p>
Others	Testing and conditioning temperature for all types of tests have been increased from $23 \pm 0$ C to $27 \pm 0$ C	To adopt standard temperature of tropical countries as specified in ISO 291.

End of Presentation

Thank You