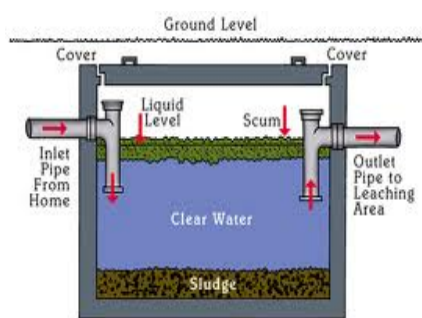




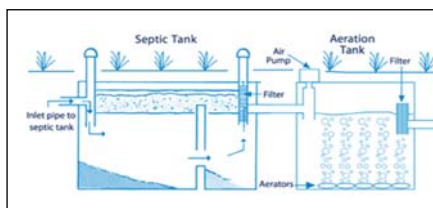
ON-SITE SEWAGE TREATMENT FACILITIES IN MALAYSIA



NATIONAL WATER SERVICES COMMISSION
MALAYSIA



Septic Tank



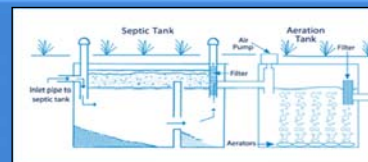
ON-SITE DOMESTIC
TREATMENT

OVERVIEW



On-site treatment systems designed to treat and dispose of effluent from single premise and/or single ownership development

On-site



Small Sewage Treatment System



Cess pit
(An old system - Obsolete)



Individual Septic Tank

Communal Septic Tank
(Obsolete system - serving multi premises)

3

SEWERAGE COVERAGE AREA IN MALAYSIA

TYPES OF SERVICES AND APPLICATION	
Type of Services	Units (PE)
OFF-SITE TREATMENT	
Decentralized (Multipoint)	8,847 (17,839,120)
Centralized (Regional)	82 (6,407,515)
ON-SITE TREATMENT	
Individual Septic Tank	1,306,662 (6,669,142)
Communal Septic Tank (CST)	4,378 (525, 240)
Small Sewage Treatment System	2400 ¹ (240,000)
Cess Pit (Pour Flush)	894,859 (4,474,293)

* Source : Malaysia Water Industry Guide 2014

Note : 1. Estimate installation of SSTs since year 2008

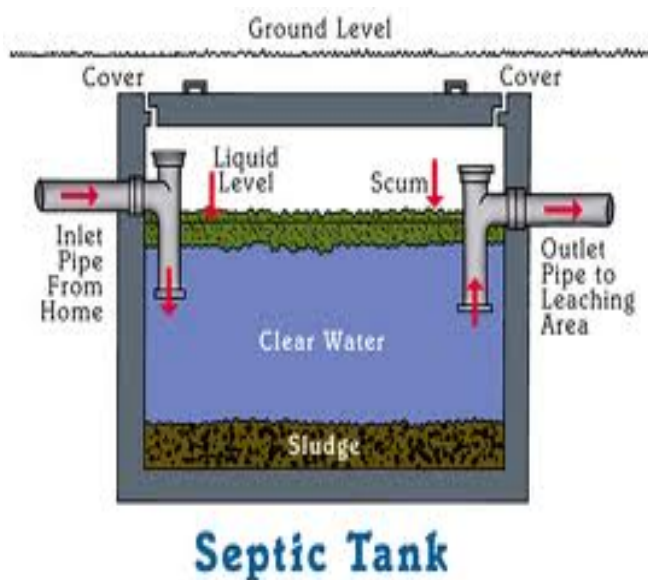


ON-SITE SYSTEM IN MALAYSIA

INDIVIDUAL SEPTIC TANK

DEFINITION of septic tank based on Water Services Industry 2006 (Act 655):

“A basic form of on-site treatment facility consisting of one or more compartments that provides treatment of sewage by means of sedimentation and anaerobic process.”



DESIGN CAPACITY

For 5 – 30 PE
(1.125 – 6.750 m³/day)

APPLICATION

- Serving a single premise, with capacity not more than 30PE
- Other treatment system shall be provided if the design PE more than 30PE.

INDIVIDUAL SEPTIC TANK

LIMITATION

Limitation in providing primary treatment

Treatment performance is inconsistent to meet the required standards

PERFORMANCE MEASUREMENT

Performance is subjected to retention which is affected by quantity of settled solids which accumulated over time

EFFLUENT QUALITY

Design for effluent discharge downstream of water intake points

Average effluent quality

- BOD : 50 mg/l
- Suspended Solid : 100 mg/l

MAINTENANCE OF THE SYSTEM

Design shall allow regular desludging

Desludging shall be at least once every 3 years.

PLANNING ASPECT OF INDIVIDUAL SEPTIC TANK

Single Development Up To 30 Units Or 150PE In Total

- Septic tanks regarded as temporary treatment system
- Owner of system shall provide the following
 - 150mm by-pass pipe from last inspection chamber before septic tank
 - By pass pipe extended it to the drain outside the premises
 - The pipe shall be end capped for future connection

Individual Development Outside The Local Authority Areas

Owners must be compelled to adhere to rules and requirement

Product must be approved by SPAN

- Complying with determined effluent standard
- Trenches to be provided for final effluent discharge
- Raised soak away shall be provided if water table is high
- Desludging activities must be provided by registered desludging contractor

All soak away shall be located 5m downstream of wells for domestic consumption

SMALL SEWERAGE TREATMENT SYSTEM

DESIGN CAPACITY For 31 – 149 PE
(6.975 – 33.525 m³/day)

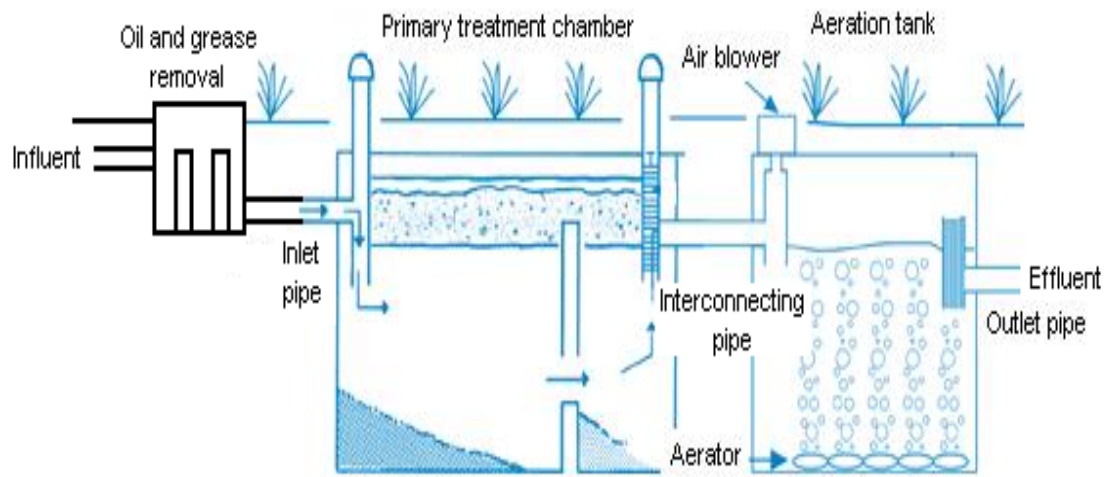


Diagram : Schematic Diagram of SSTS

SMALL SEWERAGE TREATMENT SYSTEM

TREATMENT PRINCIPLES

Limited to development with lower population size

Additional aeration process at the second tank for removal of BOD

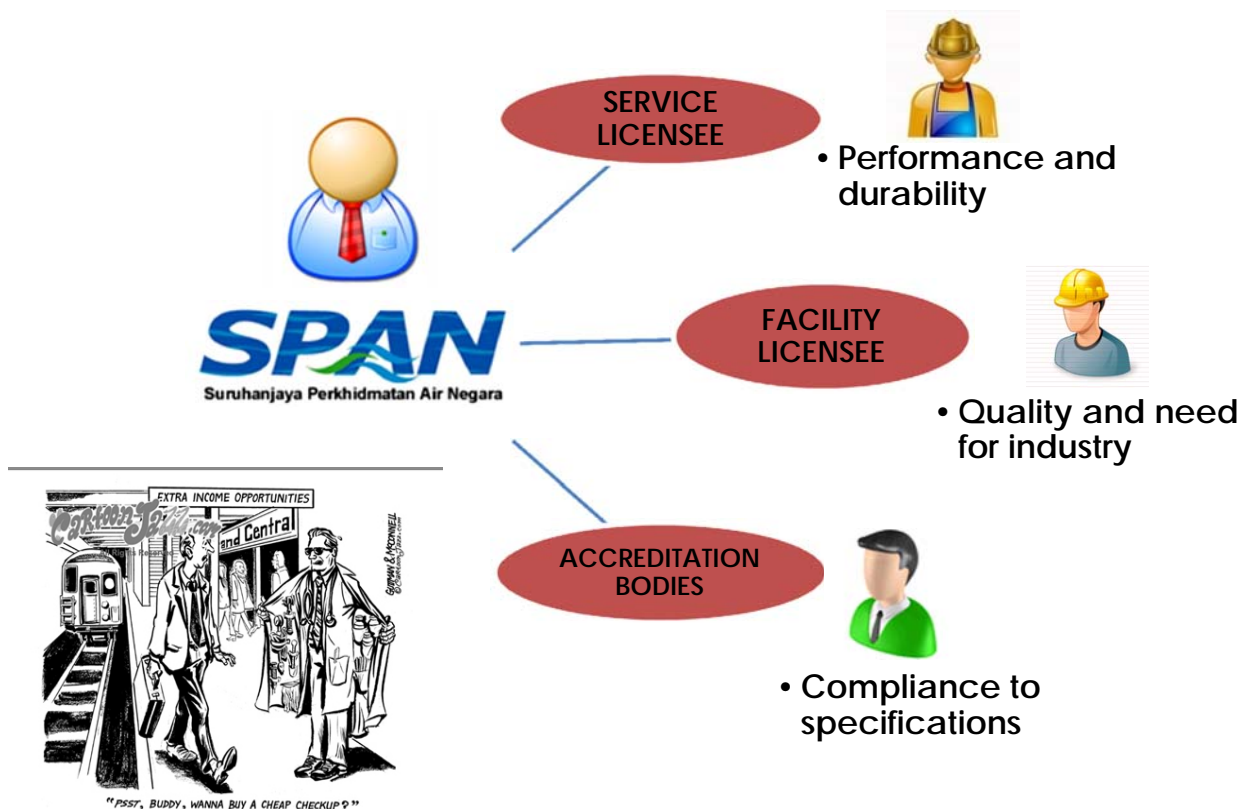
Provide only a partial treatment

Low energy consumption

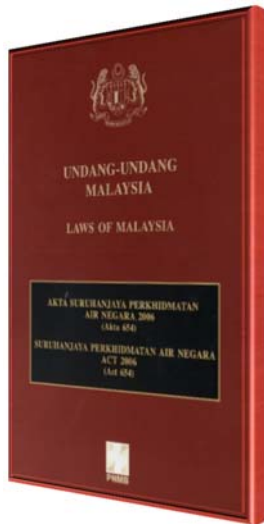
The function of key components does not require intensive energy and technical ability for operation



WHY DO WE NEED STANDARDIZATION



PROVISION OF LAW WATER SERVICES INDUSTRY ACT 2006



SECTION 45

- Plans and specifications for the construction of sewerage systems and septic tanks require the approval of the Commission

SECTION 180(a)(i)

- The Commission may make such rules to provide for the minimum standards and specifications which shall be used in the design, construction, installation, protection, operation and maintenance of any water supply system or sewerage system

STANDARDS & GUIDELINES



MALAYSIAN SEWERAGE INDUSTRY GUIDELINES VOL. 5 – SEPTIC TANKS

- 3rd Edition January 2009
- Published by SPAN



MALAYSIAN STANDARD ON SITE TREATMENT UNITS PART 1 : PREFABRICATED SEPTIC TANKS SPECIFICATIONS

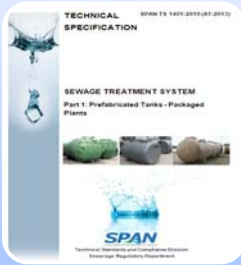
- Publish on June 2012



MALAYSIAN STANDARD ON SITE TREATMENT UNITS PART 2 : PACKAGED PREFABRICATED SMALL SEWAGE TREATMENT SYSTEM SPECIFICATIONS

- Draft approved by ISC D on November 2014

TECHNICAL SPECIFICATIONS



TECHNICAL SPECIFICATION SEWAGE TREATMENT SYSTEM

Part 1: Prefabricated Tanks - Packaged Plants

- First Edition October 2010, Revision March 2013
- Publish by SPAN

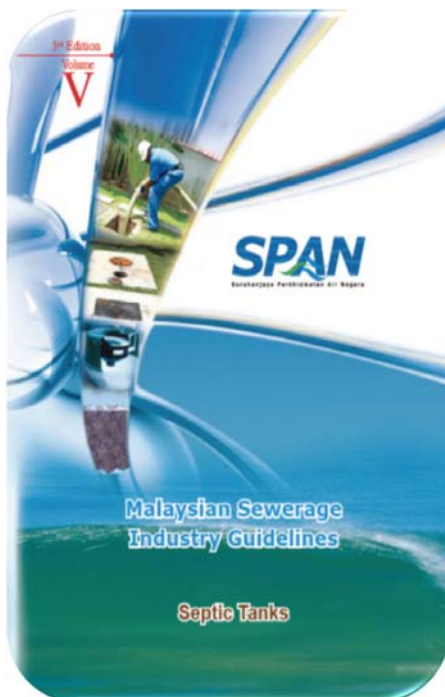


TECHNICAL SPECIFICATION SEWAGE TREATMENT SYSTEM

Part 2: Construction and Installation - Packaged Plants

- First Edition October 2010, Revision March 2013
- Publish by SPAN

MALAYSIAN SEWERAGE INDUSTRY GUIDELINES VOL. V SEPTIC TANKS



PURPOSE

- To set up the requirements of SPAN for design and construction of Individual Septic Tank

APPLICATION

- Development with population equivalent size up to 150 PE
- For single development shall not more than 30 PE

MALAYSIAN SEWERAGE INDUSTRY GUIDELINES

VOL. V

SEPTIC TANKS

EFFLUENT DISCHARGE STANDARDS

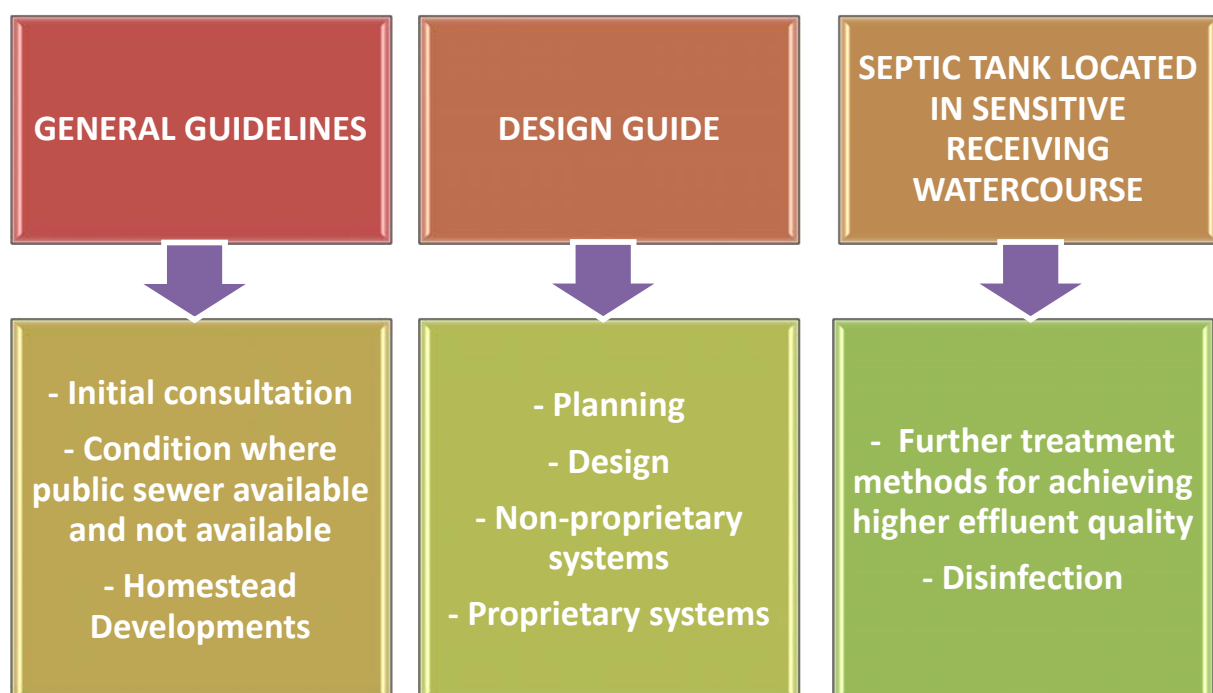
- Standards based on Environmental Quality (Sewage) Regulations 2009 under Environment Quality Act 1974
- Regulate by Department of Environment Malaysia (DOE)
- Standard A for upstream water intake point and Standard B for downstream

LIMITATION

- Septic tank performance may not be on a consistent basis to meet DOE standards
- For this reason, the effluent discharge downstream shall met:
- BOD5 : 50 mg/L
- Suspended Solids : 100mg/L



CONTENTS



DESIGN EFFLUENT VALUES

Parameter (mg/l unless otherwise state)	Effluent Discharge to Rivers / Stream				Effluent Discharge to * Stagnant Water Bodies			
	Standard A		Standard B		Standard A		Standard B	
	Absolute	Design	Absolute	Design	Absolute	Design	Absolute	Design
BOD ₅	20	10	50	20	20	10	50	20
SS	50	20	100	40	50	20	100	40
COD	120	60	200	100	120	60	200	100
AMN	10	5	20	10	5	2	5	2
Nitrate Nitrogen	20	10	50	20	10	5	10	5
Total Phosphorus	N/A	N/A	N/A	N/A	5	2	10	5
O&G	5	2	10	5	5	2	10	5

MS 2441-1:2012

ON SITE SEWAGE TREATMENT UNITS – PART 1 : PREFABRICATED SEPTIC TANKS SPECIFICATION



SCOPE

- Requirement for prefabricated septic tanks and their associated fittings
- Treatment of sewage for up to 30 PE
- Installed below ground level
- Serve one premise only
- Two materials covered, FRP & PE
- Intended for use by consultants, designers, manufacturer, certifying bodies, installers, regulators and other interested parties

MAJOR SPECIFICATION REQUIREMENTS



GENERAL REQUIREMENTS

SEPTIC TANKS – GENERAL USAGE REQUIREMENTS

- Only for total development < 150PE
- Individual septic tank (IST) can only serve one premises
- Size capacity – smallest (5PE) & largest (30PE)
- Multiple IST within single lot not allowed



TYPES OF SEPTIC TANKS

- Prefabricated
- Cast In-Situ



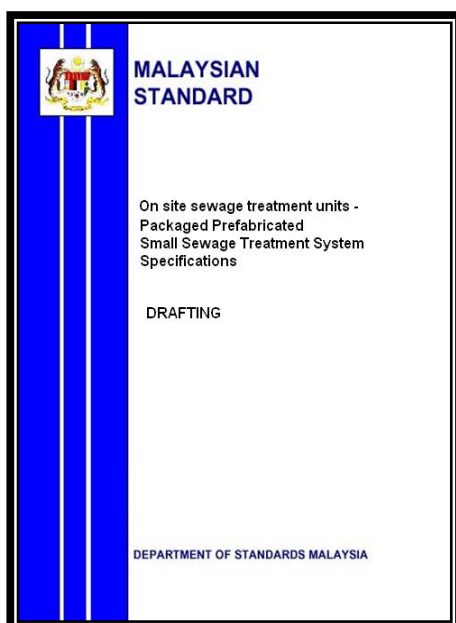
STANDARDS REFERENCE

- ✚ AS/NZS 1546 : 2008 - On-site domestic wastewater treatment units
Part 1: Septic Tanks
- ✚ EN 12566: 2007 - Small wastewater treatment systems for up to 50 PE
Part 1: Prefabricated Tank
- ✚ CAN/ CSA B66 : 2005 - Design, material and manufacturing requirements for prefabricated septic tanks and sewage holding tanks

OTHER REFERENCES

- ✚ Malaysian Sewerage Industry Guidelines, Volume 5 - Septic Tanks
- ✚ Water Services Industry Act 2006
- ✚ Water Services Industry (Desludging and Septage Discharge) Regulations 2008 [Draft]

ON SITE SEWAGE TREATMENT UNITS – PART 2 : PACKAGED PREFABRICATED SMALL SEWAGE TREATMENT PLANT SPECIFICATIONS



SCOPE

- Requirement for packaged prefabricated small sewage treatment system (SSTS) and their associated fittings
- Designed for sewage flow of 31 up to 149 PE
- Installed below ground level
- No vehicle load and not installed in high water table area
- Two materials covered, FRP & PE
- Off-site assembled
- Intended for use by consultants, designers, manufacturers, certifying bodies, installers, regulators and other interested parties

MAJOR SPECIFICATION REQUIREMENTS

Capacity	Inlet & Outlet fittings	Openings
Anchorage	Filter media	Partitions
Marking	Thickness	Treatment efficiency

GENERAL REQUIREMENTS

SSTS – GENERAL USAGE REQUIREMENTS

- Only for development 31PE - 149PE
- Prefabricated only



STANDARDS REFERENCE

- ✚ MS 1225-2:2006, Polyethylene (PE) tanks for cold water storage - Part 1: Capacity more up to 600 gal (first revision)
- ✚ AS/NZS 1546.3: 2008, On-site domestic wastewater treatment units - Part 3: Aerated wastewater treatment systems
- ✚ BS EN 12566-3+A1: 2009, Small wastewater treatment systems for up to 50 PT - Part 3: Packaged and/or site assembled domestic wastewater treatment plants
- ✚ CAN/ CSA B66: 2005, Design, material and manufacturing requirements for prefabricated septic tanks and sewage holding tanks

OTHER REFERENCES

- ✚ Malaysian Sewerage Industry Guidelines, Volume 5 - Septic Tanks
- ✚ Water Services Industry Act 2006
- ✚ Water Services Industry (Desludging and Septage Discharge) Regulations 2008 [Draft]

JUSTIFICATIONS



To elevate and maintain the quality of on-site treatment system produced by the manufacturers at desirable level to perform as required

To ensure necessary certification is obtained thus manufacturers are more responsible and accountable.



BENEFITS

By specifying the requirements and test specification, it will;

Enable Septic Tanks and SSTs to be manufactured/ constructed in compliance to manufacturing requirements and performance criteria established in the standard



End users will have the opportunity in having good quality and certified products



TECHNICAL SPECIFICATION SEWAGE TREATMENT SYSTEM

Part 1: Prefabricated Tanks - Packaged Plants &
Part 2: Construction and Installation - Packaged Plants



SCOPE

- Requirements for packaged sewage treatment plant consisting prefabricated tanks made of FRP or PE
- Serve between 150 and 5000 population equivalents

TECHNICAL SPECIFICATION SEWAGE TREATMENT SYSTEM

Part 1: Prefabricated Tanks - Packaged Plants

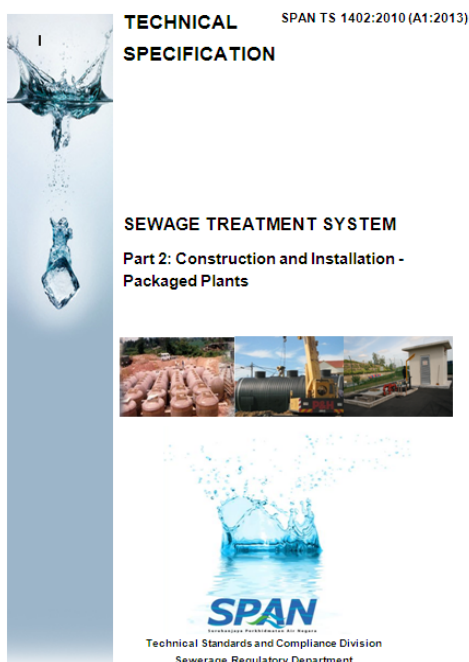


SPECIFICATION

- Performance requirements and associated test methods for the prefabricated tanks and their accessories that are installed buried in the ground with no vehicles loads are applied above it
- Marking requirements and evaluation of conformity for the prefabricated tanks

TECHNICAL SPECIFICATION SEWAGE TREATMENT SYSTEM

Part 2: Construction and Installation - Packaged Plants



SPECIFICATION

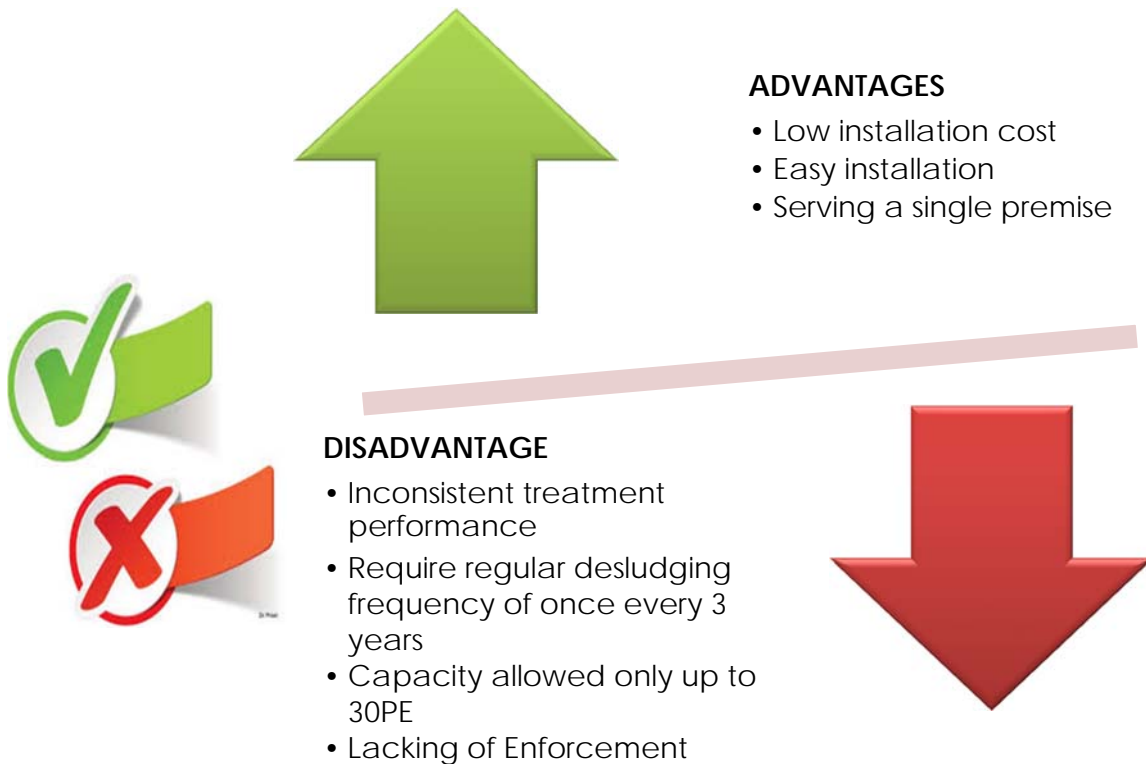
- Operational requirements and performance criteria that deal with features such as functional design and material as means of compliance with overall requirements of the packaged plant
- Focus is on operational systems of the plant comprising piping, aeration, pumping, control and other ancillaries
- Specification also includes treatment efficiency testing to ascertain if the plant achieve the effective and reliable operational performance under normal operating conditions throughout its serviceable life span

BENEFITS OF TECHNICAL SPECIFICATIONS



ISSUES, CHALLENGES
& WAY FORWARD

ADVANTAGE & DISADVANTAGE OF ON-SITE TREATMENT SYSTEM



SEWAGE CHARACTERISTICS AND EFFLUENT QUALITY

COMPONENT	PE RANGE	CAPACITY RANGE (m ³ /day)	PARAMETER/CONCENTRATION (mg/l)						
			BOD	COD	SS	TN	NH ₃ -N	Oil & Grease	P*
(IDEAL) INFLUENT	All	All	250	500	300	50	30	50	
EFFLUENT			BOD	COD	SS	NO ₃ -N	NH ₃ -N	Oil & Grease	P*
INDIVIDUAL SEPTIC TANK	5 - 30	1.12 – 6.75	50	200	100	N/A	N/A	N/A	N/A
SMALL SEWAGE TREATMENT SYSTEM	31 - 149	6.97 – 33.52	35	160	75	N/A	N/A	7.5	10

CHALLENGES IN DETERMINING THE DESIGN INFLUENT PARAMETERS

The influent parameter in Malaysia mostly diluted due to infiltration and illegal discharges from rain gutter

Note :

1 Only applicable for effluent discharge to stagnant water bodies such as lakes and ponds

2 The proposed effluent parameters for SSTS



WAY FOWARD



To
standardize
on-site
treatment
system

To elevate and
control the
quality of
prefabricated
components of
the system
produced by
manufacturers

To ensure the
system would
be able to
provide
treatment
efficiency as
intended



To specify level
of operation and
maintenance
required as
defined for the
system

To ensure
construction and
installation is at
desirable level to
perform as
required

To ensure
necessary
certification is
obtained thus
manufacturers
are more
responsible and
accountable



End users will
have the
opportunity in
having good
quality and
certified
products



SPAN
Suruhanjaya Perkhidmatan Air Negara

THANK YOU



SEWERAGE REGULATORY DEPARTMENT
NATIONAL WATER SERVICES COMMISSION
MALAYSIA