



NATIONAL PETROCHEMICAL COMPANY STANDARDS

ENGINEERING STANDARD FOR OILY WASTE/PROCESS WASTE COLLECTION SYSTEM NPCS-ES-W-15 REVISION : 0

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1 SCOPE

This standard describes the engineering requirements for oily waste sewers and process waste sewers (clean water/utility sewers, chemical sewer, etc.) from units, offsite area and tankfarm area, etc. in an industrial complex.

2 STANDARDS AND CODES

- Institute of Petroleum Refining Safety Code, "Model Code of safe-practice part-3".
- NFPA National. Fire Protection Association.
- UOP Specification (8-17-2)
- National Standard Plumbing code. (National Association of Plumbing, Heating, Cooling Contractors).

3 TYPES OF SEWERS/COLLECTION

Liquid effluent collection system in a refinery, petrochemical, chemical plant complex may be **classified** as given below:

- a) Oily water sewer.
- b) Clean water sewer.
- c) Chemical sewer.
- d) Sanitary sewer.

However, sanitary sewer is completely separate from all other complex's effluent system. Therefore it has been taken under engineering standard NPCS-ES-GC-13.

Collection of waste through sewers shall be taken to waste water treatment plant. Final effluent shall be discharged to outside of complex.

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4 DESIGN OF SEWERS

4.1 Manning's formula shall be used for design of sewers for gravity flow.

4.1.1 Mannings Formula

$$V = \frac{1}{n} R^{2/3} S^{1/2}$$

V = Velocity of flow (m/S)

R = Hydraulic mean radius = A/P

A = Area

P = Wetted perimeter

S = Hydraulic gradient

n = Rugosity coefficient
(Depending upon the surface of the pipe or drain as given below).

Value of rugosity coefficient "n".

NO.	DESCRIPTION	VALUE OF n.
1	Welded steel pipes	0.013
2	CI pipes	0.013
3	Concrete pipes	0.015
4	Cement mortar surface	0.013
5	Concrete lined channels	0.016

$$Q = AXV$$

where:

Q = Discharge in m³/S.

A = Cross sectional area of pipe or drain in m².

V = Velocity of flow in m/s.

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