PROPOSED NATIONAL EMISSION STANDARDS FOR PETROCHEMICAL PLANTS

1.0 EMISSION STANDARDS FOR HEATER/FURNACE/BOILERS/VAPORISERS

S. No.	Parameter		Maximum emission limit (mg/Nm^3)	
			Existing plants	New plants/ Expansion (commissioned after January 01, 2007
1	NOx	Gas firing	350	150
		Liquid firing	400	250
2	SOx	Liquid firing	1700	850
3	CO	Carbon mono oxide limit in case of partial oxidation in PA, MA, PTA and DMT plant	150	150
4	SPM	Liquid firing	150	100

Notes:

1. All values are corrected to 3% O_2.
2. At the time of decoking, wet scrubber shall be operated.

2.0 EMISSION STANDARDS FOR ORGANIC PARTICULATES

S. No.	Petrochemical compound	Maximum Emission limit (mg/Nm^3)		Mass flow limit (gm/hr)
		Existing plant	New plants/ Expansion (commissioned after January 01, 2007	
1	Phthalic anhydride (PA), Maleic anhydride (MA), Toluene Di- isocyanate (TDI)	50	25	100*

Note:

***** - Mass flow limit (gm/hr) is applicable for new plants and expansion plants.

3.0 EMISSION STANDARDS FOR PROCESS EMISSION (SPECIFIC ORGANIC POLLUTANTS)

S. No.	Parameter	Source	Maximum emission Limit (mg/Nm^3)
1	Chlorine	EDC / VCM plant and incinerator	10
2	HCl	EDC / VCM plant and incinerator	30
3	Ammonia	Process vent (wastewater stripper) acrylonitrile plant, caprolactum plant	75
4	H_2S	Naphtha pre-treatment plant, olefin plant	05
5	Phosgene	Generated in TDI and MDI plants	01
6	HCN	Acrylonitrile plant	10

4.0 EMISSION STANDARDS FOR VOC-HAPS FROM PROCESS VENTS

S.No.	Parameters	Maximum emission Limit		
		Existing plant (mg/Nm^3)	New plants/ Expansion	
			(mg/Nm^3)	(gm/hr)
1	(Toluene Di-isocyanate) TDI, Methylenediphenyl Di-isocyanate (MDI)	0.1	0.1	0.5
2	Benzene, Butadiene	5.0	5.0	25.0
3	EO, VCM, EDC, ACN, PO	20.0	10.0	50.0

5.0 EMISSION STANDARDS FOR VOCS (GENERAL) FROM PROCESS VENTS

S.No.	Petrochemical process / compounds	Maximum emission Limit (mg/Nm^3), dry basis
1	MA, PA, Phenol	20
2	Ethyl benzene (EB), Styrene, Toluene, Xylene, Aromatics, EG, PG	100
3	Non-methane HC (paraffin), Acetone, olefins	150

6.0 STANDARDS FOR STORAGE AND TRANSFER POINT (LOADING AND UNLOADING)

6.1 STANDARDS FOR ATMOSPHERIC STORAGE TANKS OF PETROCHEMICAL PRODUCTS

S. No.	True Vapour Pressure (TVP), kPa at 20 ^{0}C	Storage Tank Capacity (M^3)
1	> 10	4 – 75
2	10 – 76	75 – 500
3	10 – 76	> 500
4	> 76	> 75

Notes:

1. Requirement for seals in Floating Roof Tanks:

   (i) IFRT & EFRT are to be provided with secondary seal with minimum vapour recovery of 96%.

   (ii) Primary seal will be liquid or shoe mounted for EFRT and vapour mounted for IFRT. Maximum seal gap width will be 4 cm and maximum gap area will be 200 cm2/m of tank diameter.

   (iii) Secondary seal will be rim mounted. Maximum seal gap width will be 1.3 cm and maximum gap area will be 20 cm^2/m of tank diameter.

   (iv) Material of seal and construction should ensure high performance and durability.

2. Fixed Roof Tanks will have vapour control efficiency of 95% or vapour recovery/balancing efficiency of 90%.

3. Inspection and maintenance of storage tanks should be carried out under strict control. For the inspection, API RP 575 may be adopted. In-service inspection with regard seal gap should be carried out once in every six months and repair to be implemented in short time. In future, possibility of on-stream repair of both seals will be examined.

4. Tanks shall have paint with white colour shade, except for derogation of visually sensitive area.

6.2 STORAGE OF BENZENE, VCM AND ACN

For storage of benzene, VCM and ACN, following shall be followed:

1. FRT with vapour to incineration with 99.9% of removal efficiency for volatile organic compounds (VOC).

(OR)

2. EFRT with double seals, emission-reducing roof fitting and fitted with fixed roof with vapor removal efficiency of at least 99%.

(OR)

3. Internal floating roof and nitrogen blanketing in between fixed and floating roofs.

7.0 STANDARDS FOR EMISSION FROM LOADING OF VOLATILE PRODUCTS

S. No.	Item	(Standards) Maximum emission limit
1	Naphtha: (i) VOC reduction, % (or) (ii) Emission, gm/m^3	 (i) 99.5 % (or) (ii) 5 gm/m^3
2	Benzene and Butadiene: (i) VOC reduction, % (or) (ii) Emission, mg/m^3	 (i) 99.99 % (or) (ii) 20 mg/m^3
3	Toluene/Xylene: (i) VOC reduction, % (or) (ii) Emission, mg/m^3	 (i) 99.98 % (or) (ii) 150 mg/m^3

GUIDELINES

1.0 GUIDELINES FOR ATMOSPHERIC STORAGE TANK PRACTICES

(i) For true vapour pressure up to 10 kPa with tank capacity in the range of 4-75 m^3, Fixed Roof Tank (FRT) with pressure valve vent may be provided.

(ii) For true vapour pressure of 10-76 kPa with tank capacity in the range of 75-500 m^3, Internal Floating Roof Tank (IFRT) or External Floating Roof Tank (EFRT) or Fixed Roof Tank with vapour control or vapour balancing system may be provided.

(iii) For true vapour pressure more than 10-76 kPa with tank capacity more than 500 m3, Internal Floating Roof Tank or External Floating Roof Tank or Fixed Roof Tank with vapour control system may be provided.

(iv) For true vapour pressure more than 76 kPa with tank capacity more than 75 m^3, Fixed Roof Tank with vapour control system may be provided.

2.0 LDAR AND MONITORING PROTOCOL

Leak detection and repair (LDAR) programme include (i) Block valves; (ii) Control valves; (iii) Pump seals; (iv) Compressor seals; (v) Pressure relief valves; (vi) Flanges – Heat Exchangers; (vii) Flanges – Piping; (viii) Connectors – Piping; (ix) Open ended lines; and (x) Sampling connections. Equipment and line sizes more than 2.54 cm are to be covered.

LDAR programme would be applicable to components (given at 2 above) for following products/compounds: (i) hydrocarbon gases; (ii) Light liquid with vapour pressure @ 20°C > 1.0 kPa; and (iii) Heavy liquid with vapour pressure @ 20°C between 0.3 to 1.0 kPa.

LDAR programme would not be applicable for (i) heavy liquids with vapour pressure < 0.3 kPa, it will be desirable to check for liquid dripping as indication of leak (ii) Equipment and line sizes less than 2.54 cm, less than 300 h service and in vacuum service. (iii) Equipments and piping during start up and shut down.(iv)Pumps (Canned, diaphragm, magnetic), Valves (Diaphragm, bellow) and close loop Sampling points and (v) Non-access able points to the extent of 5% of total plant.

A leak is defined as the detection of VOC concentration more than the values (in ppm) specified below at the emission source using a hydrocarbon analyser according to measurement protocol (US EPA – 40 CFR part 60 Appendix-A, method 21 for determination of VOC leaks may be referred):

S. No.	Component	HAP (General) in ppm		Volatile HAP* in ppm	
		w.e.f. 1.1.07	w.e.f. 1.1.10	w.e.f. 1.1.07	w.e.f. 1.1.10
1	Pump / Compressor	10000	5000	3000	2000
2	Valves / Flanges	10000	3000	2000	1000
3	Other components	10000	3000	2000	1000

Note : * - Benzene, butadiene, VCM, EDC, ACN, EO, PO

In addition, any component observed to be leaking by sight, sound or smell, regardless of concentration (liquid dripping, visible vapour leak) or presence of bubbles using soap solution should be considered as leak.

Following frequency of monitoring of leaks and schedule for repair of leaks shall be followed:

S. No.	Component	Frequency of monitoring	Repair schedule
1	Valves/ Flanges	Quarterly (semi-annual after two consecutive periods with < 2% leaks and annual after 5 periods with < 2% leaks)	Repair will be started within 5 working days and shall be completed within 15 working days after detection of leak for general hydrocarbons. In case of benzene, the leak shall be attended immediately for repair.
2	Pump seals	Quarterly	
3	Compressor seals	Quarterly	
4	Pressure relief devices	Quarterly	
5	Pressure relief devices (after venting)	Within 24 hours	
6	Heat Exchangers	Quarterly	
7	Process drains	Annually	
8	Components that are difficult to monitor	Annually	
9	Pump seals with visible liquid dripping	Weekly	Immediately
10	Any component with visible leaks	Weekly	Immediately
11	Any component after repair/ replacement	Within a week	-

Following types of monitoring methods may be judiciously employed for detection of leaks: (i) Photo ionisation detector (PID) or flame ionisation detector (FID) Instrumental method of measurement of leaks; (ii) Audio, visual and olfactory (AVO) leak detection; and (iii) Soap bubble method.

Data on time of measurement & concentration value for leak detection; time of repair of leak; and time of measurement & concentration value after repair of leak should be documented for all the components.

Pressure relief and blow down systems should discharge to a vapour collection and recovery system or to flare.

Open-ended lines should be closed by a blind flange or plugged.

Totally closed-loop should be used in all routine samples.

Low emission packing should be used for valves.

High integrity sealing materials should be used for flanges.

3.0 General Notes:

1. Emission monitoring shall be carried out as per the Emission Regulations – Part III, published by Central Pollution Control Board.

2. Following methods may be used for measurement of pollutant concentrations in the emissions:

S. No.	Parameter	Method of measurement
1	Sulphur Dioxide (SO_2)	USEPA CFR – 40 Part 60 Appendix A Method 6
2	Oxides of Nitrogen (NO_x)	USEPA CFR – 40 Part 60 Appendix A Method 7
3	Particulate Matter (PM)	USEPA CFR – 40 Part 60 Appendix A Method 5
4	Carbon Monoxide (CO)	USEPA CFR – 40 Part 60 Appendix A Method IOA / Combustion analyzer with electro chemical detect or / NDIR detector