

PROCESS TITLE: ELECTRICITY DISTRIBUTION SYSTEM (EnMS/SOP/01)

1. PURPOSE

To provide guidelines for energy conservation during Electricity Distribution System.

2. SCOPE

It is applicable to Operation of Electricity Distribution System in **ABC**.

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Optimize the tariff structure with utility supplier
- 5.2 Schedule your operations to maintain a high load factor
- 5.3 Shift loads to off-peak times if possible.
- 5.4 Minimize maximum demand by tripping loads through a demand controller
- 5.5 Stagger start-up times for equipment with large starting currents to minimize load peaking.
- 5.6 Use standby electric generation equipment for on-peak high load periods.
- 5.7 Correct power factor to at least 0.95 under rated load conditions.
- 5.8 Relocate transformers close to main loads.
- 5.9 Set transformer taps to optimum settings.
- 5.10 Check utility electric meter with your own meter.
- 5.11 Shut off unnecessary computers, printers and copiers at night.

PROCESS TITLE: MOTORS OPERATION (EnMS/SOP/02)

1. PURPOSE

To provide guidelines for energy conservation during Motors operation.

2. SCOPE

It is applicable to Operation of all motors in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Properly size to the load for optimum efficiency.
(High efficiency motors offer of -----higher efficiency than standard motors)
- 5.2 Use energy-efficient motors where economical.
- 5.3 Use synchronous motors to improve power factor.
- 5.4 Check for under-voltage and over-voltage conditions.
- 5.5 Balance the three-phase power supply.
(An imbalanced voltage can reduce ----- motor input power)
- 5.6 Demand efficiency restoration after motor rewinding.
(if rewinding is not done properly, the efficiency can be reduced by----)

PROCESS TITLE: FANS OPERATION (EnMS/SOP/03)

1. PURPOSE

To provide guidelines for energy conservation during Fans operation.

2. SCOPE

It is applicable to Operation of all Fans in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Avoid poor flow distribution at the fan inlet.
- 5.2 Minimize fan inlet and outlet obstructions.
- 5.3 Clean screens, filters, and fan blades regularly.
- 5.4 Use aero fail-shaped fan blades.
- 5.5 Minimize fan speed,
- 5.6 Use low-slip or flat belts.
- 5.7 Check belt tension regularly.
- 5.8 Use energy-efficient motors for continuous or near-continuous operation
- 5.9 Eliminate leaks in ductwork.
- 5.10 Minimize bends in ductwork.
- 5.11 Turn fans off when not needed.

PROCESS TITLE: PUMPS OPERATION (EnMS/SOP/04)

1. PURPOSE

To provide guidelines for energy conservation during Pumps operation.

2. SCOPE

It is applicable to Operation of all Pumps in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Operate pumping near best efficiency point.
- 5.2 Modify pumping to minimize throttling.
- 5.3 Adapt to wide load variation with variable speed drives or sequenced control of smaller units.
- 5.4 Stop running both pumps – add an auto-start for an on-line spare or add a booster pump in the problem area.
- 5.5 Repair seals and packing to minimize water waste.
- 5.6 Balance the system to minimize flows and reduce pump power requirements.

PROCESS TITLE: COMPRESSORS OPERATION (EnMS/SOP/05)

1. PURPOSE

To provide guidelines for energy conservation during Compressor operation.

2. SCOPE

It is applicable to Operation of all Compressors in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Consider variable speed drive for variable load on positive displacement compressors.
- 5.2 Use a synthetic lubricant if the compressor manufacturer permits it.
- 5.3 Be sure lubricating oil temperature is not too high (oil degradation and lowered viscosity) and not too low (condensation contamination).
- 5.4 Change the oil filter regularly.
- 5.5 Periodically inspect compressor intercoolers for proper functioning.
- 5.6 Use waste heat from a very large compressor to power an absorption chiller or preheat process or utility feeds.
- 5.7 Establish a compressor efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressor efficiency-maintenance program a part of your continuous energy management program.

PROCESS TITLE: COMPRESSOP AIR SYSTEM (EnMS/SOP/06)

1. PURPOSE

To provide guidelines for energy conservation during Compressed Air System.

2. SCOPE

It is applicable to Operation of Compressed Air System in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Install a control system to coordinate multiple air compressors.
- 5.2 Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple air compressors.
- 5.3 Avoid over sizing – match the connected load.
- 5.4 Load up modulation-controlled air compressors. (They use almost as much power at partial load as at full load.)
- 5.5 Reduce air compressor discharge pressure to the lowest acceptable setting.
(Reduction of 1 kg/cm² air pressure (-----) would result in 9% input power saving. This will also reduce compressed air leakage rates by ----)
- 5.6 Use a control system to minimize heatless desiccant dryer purging.
- 5.7 Minimize purges, leaks, excessive pressure drops, and condensation accumulation.
(Compressed air leak from 1 mm hole size at ---- pressure would mean power loss equivalent to ---)
- 5.8 Use drain controls instead of continuous air bleeds through the drains.
- 5.9 Replace standard v-belts with high-efficiency flat belts as the old v-belt wear out.
- 5.10 Use a small air compressor when major production load is off.
- 5.11 Take air compressor intake air from the coolest (but not air conditioned) location.
(Every -- reduction in intake air temperature would result in ---reduction in compressor power consumption).
- 5.12 Monitor pressure drops across suction and discharge filters and clean or replace filters promptly upon alarm.

- 5.13 Use a properly sized compressed air storage receive. Minimize disposal costs by using lubricant that is fully demulsible and effective oil water separator.
- 5.14 Use nozzles or venture-type devices rather than blowing with open compressed air lines.
- 5.15 Check for leaking drain valves on compressed air filter/regulator sets. Certain rubber-type valve may leak continuously after they age and crack.
- 5.16 In dusty environments, control packaging lines with high-intensity photocell units instead of standard units with continuous air purging of lenses and reflectors.
- 5.17 Establish a compressed air efficiency-maintenance program. Start with an energy audit and follow-up, then make a compressed air efficiency-maintenance program a part of your continuous energy management program.

PROCESS TITLE: LIGHTING (EnMS/SOP/07)

1. PURPOSE

To provide guidelines for energy conservation during Lighting.

2. SCOPE

It is applicable to Operation of Lighting in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Reduce excessive illumination levels to standard levels using switching, delamping, etc. (Know the electrical effects before doing delamping.)
- 5.2 Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.
- 5.3 Install efficient alternatives to incandescent lighting, mercury vapor lighting, etc. Efficacy (lu-means/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high pressure sodium, metal ABCL halide, fluorescent, mercury vapor, incandescent.
- 5.4 Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- 5.5 Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts
- 5.6 Consider day lighting, skylights, etc.
- 5.7 Consider painting the walls a lighter color and using less lighting fixtures or lower wattages.
- 5.8 Use task lighting and reduce background illumination.
- 5.9 Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.
- 5.10 Change exit signs from incandescent to LED.

PROCESS TITLE: DG SET OPERATION (EnMS/SOP/08)

1. PURPOSE

To provide guidelines for energy conservation during DG Set operation.

2. SCOPE

It is applicable to Operation of DG Sets in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

5.1 Optimize loading

5.2 Use waste heat to generate steam/hot water / power and absorption chiller or preheat process or utility feeds.

5.3 Use jacket and head cooling water for process needs

5.4 Clean air filters regularly

5.5 Insulate exhaust pipes to reduce DG set room temperatures

5.6 Use cheaper heavy fuel oil for capacities more than 1MW

PROCESS TITLE: BUILDINGS (EnMS/SOP/09)

1. PURPOSE

To provide guidelines for energy conservation during Buildings.

2. SCOPE

It is applicable to Operation of Buildings in **ABC**

3. RESPONSIBILITY

Section in-charge
Equipment / Process Operators

4. RECORDS

Equipment Operation log book

5. GUIDELINES

- 5.1 Seal exterior cracks/openings/gaps with caulk, gasketing, weather stripping, etc.
- 5.2 Consider new thermal doors, thermal windows, roofing insulation, etc.
- 5.3 Install windbreaks near exterior doors.
- 5.4 Replace shingle-pane glass with insulating glass.
- 5.5 Consider covering some window and skylight areas with insulated wall panels inside the building.
- 5.6 If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- 5.7 Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- 5.8 Use landscaping to advantage.

BUILDINGS

- 5.9 Add vestibules or revolving doors to primary exterior personnel doors.
- 5.10 Consider automatic doors or curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- 5.11 Use intermediate doors in stairways and vertical passages to minimize building stack effect.
- 5.12 Use dock seals at shipping and receiving doors.
- 5.13 Bring cleaning personnel in during the working day or as soon after possible to minimize lighting and HVAC cost.