

**REGULATORY GUIDELINES FOR
PLANNING, OPERATION AND IMPLIMENTATION
OF ENVIRONMENTAL CONTROL
FOR QUARRIES AND CRUSHERS IN
THE UNITED ARAB EMIRATES**

**Ministerial Order (110)
February 2010**



**MINISTRY OF ENVIRONMENT & WATER
UNITED ARAB EMIRATES**

**Foreword from the office of the Minister of Environment and Water,
United Arab Emirates**

After perusal of Federal Law No. (1) For the year 1972 on the functions of the ministries and powers of Ministers and the laws amending it under:

- *The Penal Code promulgated by Federal Law No. (3) for the year 1987 and the laws amending it,*
- *The Federal Law No. (24) for the year 1999 on the protection of the environment and development and the laws amending it,*
- *The Council of Ministers Resolution No. (37) for the year 2001 on issuing systems for the Regulations of the Federal Law No. (24) for the year 1999 of the protection of environment and development,*
- *The Council of Ministers Resolution No. (20) for the year 2008 on regulate the activities of crushers and quarries and the transfer of their products,*
- *The Article (23) of the Council of Ministers resolution No. (20) for the year 2008 on regulate the activities of crushers and quarries and the transfer of their products, which entitle us issue regulator decisions to manage and operate the activities of crushers and quarries and the transfer of their products including guidelines for the operational processes and mechanisms of pollutants monitoring,*
- *The Council of Ministers Resolution No. (21) for the year 2009 on the organizational structure of the Ministry of Environment and Water and its amendments, and*
- *The Ministerial Decree No. (492) for the year 2008 on the regulatory guidelines for planning, operation and implementation works of facilities operating in field of crushers and quarries,*

the following regulatory guidelines have been set:



1. INTRODUCTION

In accordance with the provisions made by the Council of Ministers Decision No. (20) for the year 2008 it is obligatory to assess the negative environmental impacts from the operations of quarries and crushers in the United Arab Emirates, and to control the emissions by regular inspections & monitoring.

Based on the decisions issued by the Ministry of Environment and Water, which has committed to control and minimize the negative emissions from new and existing crushers and quarries to comply with the regulatory guidelines. To ensure tighter environmental control additional guidelines have been added to the previous guidelines set forth by the Ministerial Decree No. (492) of 2008. This will ensure installation of the best available techniques especially with regard of dust, noise, health, safety, environmental factors, management and transport.

2. SCOPE OF THE REGULATORY GUIDELINES

- The implementation of these regulations will be with immediate effect for new and existing quarries. Existing quarries will comply with these revised guidelines within 90 days from the date of issue.
- These regulatory guidelines will also apply to all the existing quarries and crushers of cement plants, ceramic and terrazzo tile factories, marble factories and other related industry.
- All the quarry and crusher operators/ companies will submit a copy of their planning and schedule of implementing the guidelines within 2 months from the date of this issue to the ministry of environment & water..
- Competent authorities will ensure and follow up implementation of these regulatory guidelines with immediate effect.
- Authorities from the Ministry of Environment and Water and local competent authorities will make regular visits to the quarries and crushers to follow up with the implementation of these regulatory guidelines at site, in addition to collection of required data.
- It will be mandatory for all quarry operators to register and obtain an environmental compliance certificate (ECC) from the technical division of the ministry of environment & water. This will be necessary for Issue & renewal of licenses and permits from local and federal authorities.
- The recommended environmental standards are stated in chapters 15,16 & 17.



3. GUIDELINES FOR QUARRYING

All quarrying operations in the UAE will comply with the following guidelines for their day to day quarrying operations with respect to drilling, blasting, material handling, in-site hauling and transportation.

3.1 Drilling

3.1.1 All drilling equipment will be fitted with an efficient dust collection system. Proper disposal arrangements to be made for the fine dust collected in bags or filters.

3.1.2 All the drilling operators and supervising staff will adopt proper safety measures during drilling operations, includes wearing dust mask and ear plugs.

3.1.3 Hours of operation: Drilling operations can be carried out round the clock. In case of complaints from the local residents living within 3 km from the quarry, the hours of operation can be restricted by the local competent authorities.

3.1.4 All the drilling and ancillary equipment will be maintained in good working order to reduce fumes and noise.

3.1.5 For large drilling equipment equipped with cab for operators, the cabs should have good sealing and fitted with dust filters.

3.1.6 Avoid secondary jackhammer drilling. Hydraulic breakers to be adopted for reducing size of large rock boulders

3.2 Quarry Blasting

3.2.1 Set optimum blasting parameters to reduce dust emissions, ground vibrations, air overpressure, fly rock and noise. Records of all the blasting parameters to be maintained for better control and optimization. The parameters include:

- Proper spacing of blast holes depending on hole diameter
- Maintaining a safe drilling angle for the quarry face
- Calculating optimum quantity of explosives for charging
- Use of delay detonators for reducing ground vibrations
- Maintaining proper stemming depth to minimize fly rock
- Avoid using detonator cords over the ground
- Maintain proper log of all the parameters

The above parameters will be set by the blasting / explosives expert in charge of the quarry.

3.2.2 All blasting operations will be supervised and carried out by competent personnel only, as per the guidelines/rules set by the ministry of interior.



3.2.3 Blasting should not be carried out in adverse weather conditions. Avoid blasting when the wind direction is toward local residential areas.

3.2.4 Progressive warning signals by siren and red flags will be given prior to final detonation, to alert all the staff and public to keep 500 meters away from the blast area.

3.2.5 Ground vibrations and air over pressure should be monitored regularly during the blasting operations. The recommended limits are given in Chapter-17. The measurements should be taken from a distance of 800 meters from the blasting face towards the nearest residential area. If the residential area is located less than 800 meters from the blasting face, then the measurements should be taken close to the foundation of the nearest building.

3.2.6 A report showing the total explosives consumption and average powder factor (tons/kg. of explosive) along with the vibration and noise records should be submitted every six months to the technical division of the ministry of environment & water (MOEW-TD).

3.3. Material Handling

Material handling will include all the quarry operations related to cleaning of quarry face, loading of material to dumpers or trucks, use of hydraulic breakers for breaking large size rocks, grizzlies, etc.

3.3.1 Regular mechanical maintenance will be carried out on all the material handling equipment to cut down fumes and noise. Safe practices will be adopted at all times during the operations. Only licensed and trained operators will operate these equipments.

3.3.2 All the operator cabs will be properly sealed for dust and noise and fitted with dust filters.

3.3.3 All the grizzlies and rotary screens in the quarry area for grading the quarry run material should be encapsulated with an efficient dust control system (Ref Chapter 6).

3.4 Hauling in Site

3.4.1 Hauling of quarry material to the crushing plant by dump trucks can be carried out round the clock. In case of complaints from the local residents, the hours can be restricted by the local competent authorities.

3.4.2 Hauling roads should be planned with low gradients and set to follow safe speed limits with proper warning signs.

3.4.3 Hauling roads will be paved or sprayed with water to prevent fugitive dust. It is recommended to use sea water, if available to conserve on ground water.



3.4.4 Proper caution boards showing speed limits, road conditions and directions should be installed.

4. GUIDELINES FOR CRUSHERS

Crusher operations will include primary and secondary crushing, screening, material handling and transport

4.1 Primary Crushers

4.1.1 The primary feeder should be fully encapsulated with a proper structure and installed with an efficient dust control system (Ref. 4.3).

4.1.2 The crusher control rooms will be properly sealed with dust filters.

4.1.3 Proper maintenance of the primary crushing plant should be carried out to prevent excessive dust & noise emissions and other problems.

4.2 Secondary Crushers

4.2.1 All secondary crushers should be encapsulated and installed with an efficient dust control system (Ref. 4.3) to bring down the dust emissions to the recommended standards.

4.2.2 The material inlet and outlet locations of the secondary crushers will be properly sealed by using rubber curtains to prevent dust leakage.

4.2.3 The secondary crushers will be properly maintained to reduce noise levels.

4.3 Screening Plants

4.3.1 All vibratory screening plants should be covered and installed with an efficient dust control system (Ref. 4.3).

4.3.2 The material inlet and outlet chutes of the screening plants to be protected properly with rubber curtains to prevent dust leakage.

4.3.3 The screening plants should be regularly maintained to optimize the performance with minimum dust and noise emissions.

4.4 Material Handling

Material handling operations will include stackers, conveyor belts and ancillary units, stock piling, in-site loading and hauling, etc.

4.4.1 All conveyor belt and stacker systems should be properly enclosed on the sides and top and installed with an efficient dust control system (Ref. 4.3).



4.4.2 For stock piling of graded material from the screening plant, the conveyors output points should have proper flexible chutes to prevent wind whipping of fine material.

4.4.3 All stock piles of graded fine material to be sprayed with water or protected with coverings to prevent fugitive dust due to wind whipping.

4.4.4 The loading and hauling areas in and around the crushing plant should be sprayed with water form time to time

4.4.5 All the material handling equipments should be properly maintained to minimize noise and dust emissions.

5. GENERAL REQUIREMENTS

All quarry operators must submit the production and operations data to the local competent authority and to technical division of the ministry of environment and water (MOEW-TD).

5.1 Monthly production data showing separately, all the types of materials (armor rock, graded rocks of different sizes, aggregates, sand, road base, etc.).

5.2 Detailed maps and drawings of the quarry and crusher areas showing:

- Locations of the existing and abandoned quarry faces
- Location of crushing plants
- 3D contour maps
- Location for ancillary or additional developments
- Material storage yards
- In site roads and dwellings
- Residential areas around the site

The above maps will be updated and submitted every two years to the local competent authorities and to the technical division of the ministry of environment and water.

6. ENVIRONMENT CONTROL & MONITORING

- All the quarries and crushers will install at least one stationery air quality monitor for PM10 and TSP measurements. The data will be provided to the local competent authority and to the technical division of ministry of environment & water every 3 months. The authorities will also inspect the monitoring equipment from time to time.
- Competent authorities from the Ministry of Environment & water and local inspectors will visit the quarry and crusher sites to assess and monitor the emissions on a regular basis.



- The Ministry of Environment and Water will have the right to enforce alternative monitoring systems if necessary.
- All quarries and crushers will plant sufficient trees in the area to improve the landscape and ecology.
- Noise barriers or bunds (minimum 15 feet height) to be constructed along residential areas falling less than 2 km. from the quarry and crusher site.
- Dust Control System: best available techniques (BAT) should be adopted to control dust emissions efficiently. High pressure (>10 bar) water with compressed air dust suppression system and /or a high capacity dry dust collection system with bag filters have been proved very effective in controlling quarry dust emissions.. Combination of both the systems is very effective in case of the feed material with high percentage of clay and soil. The water suppression system will have sufficient heavy duty nozzles to cover the dust areas. Foaming agents can be used for further reduction in dust. High pressure water with compressed air suppression systems also saves on water consumption and more effective at higher pressures. Also the cost of installation of water with compressed air systems is by far less than the dry dust collection systems. High pressure (> 40 bar) fogging systems are also very effective in suppressing quarry dust emissions.

7. WASTE MANAGEMENT

- Proper care should be taken to dispose all waste products from quarrying and crushing operations. The natural waste products can be utilized for quarry restoration work at a later stage.
- Quarry areas should be protected from illegal dumping of waste by third parties.
- Waste oil and other residues from machinery maintenance should be stored in proper containers or cemented pits to avoid seepage to ground water and surrounding soil.
- Only authorized waste disposal contractors should be hired for collection and disposal of waste, including waste oils, batteries, tires, scrap etc.
- A proper waste management record to be maintained.

8. ENVIRONMENTAL COMPLIANCE CERTIFICATION (ECC)

All quarry operators should obtain an environmental compliance certification (ECC) from the technical division of the ministry of environment & water (MOEW-TD). This will be mandatory for renewal of all licenses and permits issued by the local and federal competent authorities. MOEW-TD will carry out necessary inspections at the quarry site before issuing the ECC. Further details can be obtained from MOEW website. The ECC should be renewed annually.



9. HSE MANAGEMENT SYSTEM

- A well planned HSE (Health, Safety & Environment) management system is a valuable tool for managerial and supervisory staff in quarries and crushers, to meet current and future environmental requirements and challenges. All quarries should adopt a proper HSE management system by hiring a professional HSE consultant.
- A separate health & safety regulatory guidelines for the quarrying industry will be issued by the ministry of environment & water.

10. EQUIPMENT SELECTION (Recommended)

- It is recommended to deploy large capacity quarry equipment (drilling rigs, dozers, shovels, dumper, etc.) This will help to minimize the operating hours, dust, fume, noise emissions, etc.
- Also adopting to larger production capacities with the best available techniques will minimize emissions and energy consumption.

11. TRANSPORT OF QUARRY AND CRUSHER PRODUCTS

The quarry operator will inform the truck operators of the following guidelines with respect to transportation of material:

- All trucks transporting quarry and crusher products should be well maintained and should be in good running condition.
- All trucks carrying crusher products to customer sites should properly cover the material to prevent wind whipping. Also it is recommended to spray water on top of the material in the truck. The quarry operator will arrange to provide this facility.
- The material loaded into the trucks should be below the body level
- Armor rocks loaded into flat bed trailers should be properly checked for loose joints and cracks to prevent falling of the rock on to the roads.

12. QUARRY AND CRUSHER MANAGEMENT

- All the quarry and crusher operations will be carried out with a properly set management chart, indicating the individual responsibilities.
- During the quarry and crusher operations, a competent engineer or manager should be present at the site or contactable at all times. The engineer or manager will have the authority to provide all the information regarding quarry and crusher operations to the competent authorities from local and federal authorities.



13. QUARRY REHABILITATION / RESTORATION

Quarry and crusher operators must perform progressive rehabilitation as they extract their sites. This will be done sequentially within a reasonable time after extraction of quarry resources is complete. As one area of their pit or quarry is being extracted, rehabilitation must be completed in the areas where the quarry reserves have been stopped or exhausted. Progressive rehabilitation is beneficial in many ways as it:

- Reduces the open areas within a pit or quarry
- Reduces soil erosion potential
- Reduces double-handling of soil / waste materials

The responsibility of quarry rehabilitation may fall upon the owner of the lease area or the quarry operator. The local competent authority will make the decision on this issue.

14. SAFETY AND EMERGENCY

- All the quarries and crushers should follow the safety standards set by the ministry of interior and local authorities.
- A water tanker with high pressure pump should always be made available at site to combat any fire hazards due to accidents.
- All staff at site should be trained to follow safety standards.



15. RECOMMENDED AIR QUALITY STANDARDS FOR UAE

The recommended ambient air quality standards for Particulate matter (TSP), Respiratory dust (PM10) and ambient gas emissions are tabulated below:

Pollutant	Averaging Period	Standards in $\mu\text{g}/\text{M}^3$	Standards In ppb
TSP (Total Suspended Particles)	24 hour Annual	230 90	- -
PM10 (Respirable dust)	24 hour	150	-
SO ₂ (Sulphur Dioxide)	1 Hour 24 Hour Annual	350 150 60	133 57 23
CO (Carbon Monoxide)	1 hour 8 hour	30000 10000	25000 8700
NO ₂ (Nitrogen Oxide)	1 hour 24 hour	400 150	220 83
O ₃ (Ozone)	1 hour 8 hour	200 120	102 60
Lead	Annual	1.0	-

Notes

$\mu\text{g}/\text{M}^3$ = microgram per cubic meter, 1 μg = 0.001 milligram, μm = micro meter= 0.001 millimeter

ppb = parts per billion

TSP- Total suspended particles,

PM10- Respirable dust < 10 μm



16. PERMISSIBLE NOISE LEVELS

Exposure Hrs	Noise Level dB
8 Hr	90 dB
4 Hr	95 dB
1 Hr	105 dB
30 Min	115 dB

17. GROUND VIBRATION & AIR OVER PRESSURE

The recommended values with respect to ground vibration & air overpressure from quarry blasting operations are shown in table-1. The limits have been set for regular blasting operations with respect to the sensitivity of the area. The type of facilities that are present in the area determines the sensitivity of the area towards blasting operations.

TABLE-1 Recommended Limits for blasting vibration in PPV & AOP in decibels (dB)

ZONE Sensitivity	Example	PPV in mm/sec Regular Blasting Operations (< 25 Hz)	Air Over Pressure dB(Lin)
HIGH	Hospitals, Educational institutions, Historical buildings, laboratories, Electronic industries, etc.	3	115
MEDIUM	Houses, Residential & office buildings, old industrial areas, etc.	5	120
LOW	Industrial areas with strong structures, agricultural lands, pipelines, etc.	10	130

Notes:

1. PPV – Peak particle velocity: The PPV value in any of the 3 directions –V, L & T should not exceed the above values. 90% of the blasts in a period of 6 months should fall within these limits. 50% lenience to the above values (1.5x) can be considered for 10% of the blasts during the same period.
2. At frequency greater than 25Hz, the above PPV values can exceed by 1.5 times.
3. Each area will be observed before categorizing to Zone sensitivity, based on the type of buildings, structures and facilities in the area.
4. In case the blasting operations that are carried out only for a short time (not regularly) or one time only, then the above limits can exceed by 1.5x to 2x of the



above set limits. Proper advance warnings should be given to the facilities in the area, regarding the date and time of blasting.

18. All the companies engaged in manufacture, sale or processing of quarry and crusher products should follow these regulatory guidelines.

19. PENALTIES

Penalties provided for in: Federal Law No. (24) for the year 1999 on the protection of environment and development, and the Council of Ministers Resolution No. (20) for the year 2008 on regulate the activities of crushers and quarries and the transfer of their products, are applied.

20. On all concerned implementing this resolution each with his own jurisdiction, and shall take effect from the date of issuance, and shall be published in the Official Gazette.

Signed and Sealed

**HE Dr. Rashid Ahmed Bin Fahad
Minister of Environment & Water
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