

1.5 Duct Spacers

| Clause/Section | Sub Clause/Sub Section | Compliance Statement | Reference to Alternative Proposal |
|---|---|----------------------|-----------------------------------|
| 1/General | 1.1./Scope | | |
| | 1.2./Intended use | | |
| | 1.3./Type approval | | |
| | 1.4./Reserved rights | | |
| 2/Associated specifications | | | |
| 3/Definitions | | | |
| 4/Design requirements | 4.1./General | | |
| | 4.2./Long term performance requirements | | |
| | 4.3./Design | | |
| 5/Material properties and test requirements | 5.1.General | | |
| | 5.2./Test and report requirements | | |
| | 5.3./Raw material | | |
| | 5.4./Complete product | | |
| 6/Electrical and transmission requirements | | | |
| 7/Quality assurance | 7.1./Quality system accreditation | | |
| | 7.2./Inspection | | |
| 8/Summary of reports and testing frequency | 8.1./General | | |
| | 8.2./Type approval tests, samples and report requirements | | |
| | 8.3./Routine quality control test reports | | |
| 9/Packing and marking | 9.1./Packing | | |
| 10/Compliance statement | 10.1./Compliance | | |
| | 10.2./Non-compliance | | |
| | 10.3./Non-compliance with alternative proposal | | |

TABLE OF CONTENTS

REVISION REFERENCE SHEET

| | |
|-----|--|
| 1. | GENERAL |
| 1.1 | SCOPE |
| 1.2 | INTENDED USE |
| 1.3 | TYPE APPROVAL |
| 1.4 | RESERVED RIGHTS |
| 2. | ASSOCIATED SPECIFICATIONS |
| 3. | DEFINITIONS |
| 4. | DESIGN REQUIREMENTS |
| 4.1 | GENERAL |
| 4.2 | LONG TERM PERFORMANCE REQUIREMENTS |
| 4.3 | DESIGN |
| 5. | MATERIAL PROPERTIES AND TEST REQUIREMENTS |
| 5.1 | GENERAL |
| 5.2 | TEST AND REPORT REQUIREMENTS |
| 5.3 | RAW MATERIAL |
| 5.4 | COMPLETE PRODUCT |
| 6. | ELECTRICAL AND TRANSMISSION REQUIREMENTS |
| 7. | QUALITY ASSURANCE |
| 7.1 | QUALITY SYSTEM ACCREDITATION |
| 7.2 | INSPECTION |
| 8. | SUMMARY OF REPORTS AND TESTING FREQUENCY |
| 8.1 | GENERAL |
| 8.2 | TYPE APPROVAL TESTS, SAMPLES AND REPORT REQUIREMENTS |
| 8.3 | ROUTINE QUALITY CONTROL TEST REPORTS |

DUCT SPACERS

9. PACKING AND MARKING

9.1 PACKING

10. COMPLIANCE STATEMENT

10.1 COMPLIANCE

10.2 NON-COMPLIANCE

10.3 NON-COMPLIANCE WITH ALTERNATIVE PROPOSAL

11. APPROVED MANUFACTURERS

1. GENERAL

1.1. SCOPE

1.1.1 This specification covers the minimum standards and requirements for the construction, properties, testing and packing of PVC ducts spacers.

1.1.2 Tenderers shall provide with their bids their proposed material under this Specification, stating manufacturer, model number, technical specification, country of origin, and such other required information as noted herein. References to submissions by "supplier", "manufacturer" and the like shall mean the "Tenderers" (during tender stage) or the "Contractor" (during the contract period), the Tenderer/Contractor being required to provide same under actual submission from the respective supplier/manufacturer.

1.1.3 The purpose of the tender for OFT is for supply / install as set out in the Contract. References to "Supply-only" in this specification shall be disregarded, and shall only apply to special supply purchase orders as may be requested by MOT under the provision of Contract, if applicable.

1.1.4 Packing and marking sections of this specification are generally intended for imported materials. The Contractor shall be responsible to provide all necessary requirements to suit his approved sourcing, in order to ensure that materials are delivered to site in the specified condition.

1.2. INTENDED USE

Duct spacers in compliance with this specification shall be used in the underground outside plant of the telecommunications network of Lebanon.

Duct spacers are used to position ducts compliant with MAT 2201 and to support the ducts while maintaining adequate separation in preparation for subsequent concrete encasement or direct burial with appropriate sand embedding

1.3. TYPE APPROVAL

1.3.1 Contractors who have not previously supplied under this specification (or who have made changes to prior supplied products) shall submit a product sample for approval. An interim Type Approval may be granted on the basis of a compliance statement and other information from the

Handwritten signature and initials.

Handwritten signature and initials.

manufacturer. Approval of a sample shall not be construed as waiving any requirements of this specification.

1.4. RESERVED RIGHTS

1.4.1

The MOT guarantees that any of the requirements, standards, regulations and conditions of this specification are not covered or protected by copyright or patent of a third party.

The MOT reserves the right to make changes to the specification without notice.

2. ASSOCIATED SPECIFICATIONS

The following unattached and/or national standards shall be applied, and deemed to be an integral part of this specification:

MAT 2201 PVC Duct

ISO 9002 Quality systems - Model for quality assurance in production and installation

ASTM D638 Standard test method for tensile properties of plastics.

3. DEFINITIONS

Refer to the general definitions of the Contract.

4. DESIGN REQUIREMENTS

4.1. GENERAL

4.1.1. This section describes the design of the duct spacers.

4.1.2. The design of the duct spacer shall allow for ease of system installation and the spacers shall be interchangeable.

4.1.3. The duct spacers shall be delivered as single cradle and double cradle models as shown in Appendix 1

4.1.4. The duct spacers shall preferably be delivered in basic sizes that can be joined together to support any number of ducts

Star 1158 4 AF

1987.10.13

Star 1158 4 AF

1987.10.13

4.2. LONG TERM PERFORMANCE REQUIREMENTS

4.2.1. The duct spacers supplied in compliance with this specification shall be capable of withstanding the local service conditions of Lebanon for a period of twenty years without detriment to the operation and maintenance characteristics.

4.2.2. Duct spacers shall be designed, manufactured and packaged so that the physical, on and operation and maintenance characteristics shall not degrade when exposed to the environmental conditions of Lebanon during storage, transport, installation and operation and also when exposed to the expected environmental conditions during storage and transportation outside of Lebanon.

The environmental conditions of Lebanon may include ambient air temperature variations from -15°C to $+37^{\circ}\text{C}$. In addition direct solar radiation is known to increase the temperature of some outside plant to $+52^{\circ}\text{C}$.

4.3. DESIGN

4.3.1. The cradles of the duct spacers shall be at least 30 mm wide and have a diameter of 100 mm to accommodate PVC-ducts specified in MAT 2201, as shown in Appendix 1.

4.3.2. The duct spacers shall be suitable for multiple rows and multiple column placement. They must be interconnectable, or at least have seating surfaces which can be easily matched to adjacent spacers.

4.3.3. The duct spacers shall provide a uniform separation of the ducts within the formation in the trench (both vertically and horizontally).

4.3.4. The duct spacers shall be of a heavy duty design and construction such that they will be able to withstand a static, equally distributed load of 150 kg, once installed, without being crushed or cracked.

4.3.5. The duct spacers shall be designed to limit slip between themselves or the ducts in the formation while the formation is being assembled, or while the concrete encasement is being poured.

4.3.6. The duct spacers shall be easily assembled.

5. MATERIAL PROPERTIES AND TEST REQUIREMENTS

5.1. GENERAL

5.1.1. This section specifies the duct spacers material, physical, chemical, environmental and mechanical requirements and the tests to be applied for the determination of these requirements.

5.1.2. The requirements of this section refer to completed duct spacers, or material removed from completed duct spacers unless identified otherwise.

5.1.3. All materials used in the duct spacers shall be non-toxic and dermatologically safe.

5.2. TEST AND REPORT REQUIREMENTS

5.2.1. In order to assure the quality of purchased duct spacers, tenderers are required to supply Type Approval and routine Quality Control test results and reports.

5.2.2. TYPE APPROVAL TESTING

5.2.2.1. Type Approval test results, samples and reports are required for acceptance of new designs and materials and following-modifications to existing designs and materials. These test results are intended to assure the Ministry that products have been designed to provide fault free service for the required life of the duct spacers.

5.2.2.2. Type Approval shall not be granted until a Type Approval sample has been evaluated by the MOT. In the event that appropriate samples are not available from the manufacturer an interim Type Approval may be granted on the basis of a compliance statement and other information from the manufacturer. However a sample must be approved by the MOT for Type Approval prior to delivery.

5.2.2.3. Further to the contract requirements in respect of material approvals by the Engineer, Contractors are advised not to proceed with manufacture until written Type Approval or interim Type Approval has been given by the Engineer for all Type Approval requirements of this specification.

5.2.2.4. Tenderer are required to ensure that supplied duct spacers complies fully with the Type Approval requirements. Although the MOT may designate tests as Type Approval the tenderer may find it necessary to perform some of the tests on a regular Quality Control basis.

5.2.2.5. Type Approval tests and measurements are identified by (TA)

5.2.2.6. Type Approval Samples

Type Approval samples shall include, unless agreed otherwise:

1 complete duct spacer of each type.

5.2.3. ROUTINE QUALITY CONTROL

Routine Quality Control tests are the tests used on a regular basis, to assure the MOT that manufactured items conform to specification and the manufacturing process is under control. Routine Quality Control tests are identified by (QC). Testing frequencies are detailed in Section 8.

5.3. RAW MATERIAL

5.3.1. The duct spacers shall be made of virgin unplasticized, polyvinylchloride (PVC), or a suitable alternative.

5.3.2. TENSILE STRENGTH (TA)

The PVC shall have a minimum tensile strength of 50 MOT, tested in accordance with ASTM D 638

5.3.3. All materials shall be new and shall not contain fillers, plasticizers, or additives which may react harmfully with PVC ducts produced in accordance with MAT 2201.

5.3.4. No constituent material shall be used which will adversely affect the tensile mechanical strength of the PVC. All constituents shall be uniformly and fully dispersed.

5.4. COMPLETED PRODUCT

6. ELECTRICAL AND TRANSMISSION REQUIREMENTS

Not required in this specification.

7. QUALITY ASSURANCE

7.1. QUALITY SYSTEM ACCREDITATION

7.1.1. Manufacturers of duct spacers conforming to this specification may be required to show evidence that the product has been manufactured according to a Quality System conforming to ISO 9002 or a national equivalent which has been approved by MOT.

7.1.2. Manufacturers may be required to supply a copy of the Quality Manual at the time of tender, which shall be utilised for the manufacture and delivery of duct spacers complying to this specification.

7.1.3. The MOT may require the manufacturer to be accredited to the above standards either by MOT personnel or assessors acting on behalf of the MOT.

7.2. INSPECTION

7.2.1. The MOT or its authorised representatives(s) may inspect the Tenderer's facilities for the purpose of Quality Assurance surveillance, at any time during the term of the contract.

7.2.2. If requested by MOT the tenderer shall supply evidence of the quality of raw materials and components used in the manufacturing process.

7.2.3. All duct spacers manufactured to this specification may be inspected and tested by MOT to check compliance.

7.2.4. The inspector reserves the right to request proof of compliance with the specification, either by witnessing actual performance of this specification's prescribed tests and/or the provisioning of documented test results at the discretion of the inspector.

7.2.5. In the case of a dispute, testing shall be performed by an independent authority at the expense of the tenderer.

8. SUMMARY OF REPORTS AND TESTING FREQUENCY

8.1. GENERAL

8.1.1. The two categories of test reports required, i.e. Type Approval and Quality Control, are detailed in clause 5.2.

8.1.2. REPORT FORMAT

8.1.2.1. All reports submitted shall include the following details:

Manufacturers name
Project number

Quality Control reports shall also include

Date of delivery

Identification of duct spacers included in the report

8.1.2.2. The report shall detail all results in the same order and shall refer to the relevant clause of Section 8.

8.2. TYPE APPROVAL TESTS, SAMPLES AND REPORT REQUIREMENT

8.2.1. Type Approval test results and samples shall be submitted as follows:

1. At the time of tender for each type and size of duct spacers which has not been given Type Approval, or

2. Prior to delivery of any duct spacers which do not have Type Approval?

8.2.2. COMPLIANCE STATEMENT

8.2.2.1. Tenderers shall supply a clause by clause compliance statement, with the complete specification.

8.2.3. Tensile strength, clause 5.3.2.

8.2.4. Water absorption, clause 5.4.1

8.3. ROUTINE QUALITY CONTROL TEST REPORTS

Unless stated otherwise, no QC reports shall be required.

9. PACKING AND MARKING

9.1. PACKING

9.1.1. Duct spacers shall be packed in boxes sufficient for protection from ultraviolet radiation for 1 year. The boxes shall be suitable to protect the spacers from damage during shipping by land or sea, and during storage.

9.1.2. The maximum packed weight of each box shall be 25 kg.

9.1.3. Each box shall be marked as below with the following information in Arabic and English:

Ministry of Telecommunications Lebanon

Duct spacers

Quantity per box

Manufacturer's Name or trademark

Month and year of manufacture

10. COMPLIANCE STATEMENT

The Contractor must indicate his compliance or non-compliance with all clauses of this specification in a side by side format. There are three statements to describe compliance or non-compliance with each clause, as detailed in clauses 10.1, 10.2 and 10.3.

10.1. COMPLIANCE

The Contractor agrees to the stated requirements without any reservation.

10.2. NON-COMPLIANCE

The Contractor does not meet the respective item or clause. The reason for the non-compliance shall be stated

10.3. NON-COMPLIANCE WITH ALTERNATIVE PROPOSAL

The Contractor does not meet the provisions of the clause but offers an equivalent alternative which shall be fully documented with supporting evidence.

II. APPROVED MANUFACTURERS

The MOT requires that items supplied under this specification be restricted to the following sources:

REFER TO APPROVED LIST ELSEWHERE

A. [unclear] H. [unclear]