Instalaza S.A.

C90-CR-BK (M3.1)

ANTI-BUNKER WEAPON SYSTEM
SPECIFICATION FOR ACCEPTANCE
FE.3.02.05.02.1

INSTALAZA S.A.
Núñez de Balboa 103, 1º Izda.
28006 Madrid - SPAIN
TL: (34) 915618835
FX: (34) 915626350

INSTALAZA S.A.
Monreal 27
50002 Zaragoza - SPAIN
TL: (34) 976293423 & 976293422
FX: (34) 976299331

Instalaza SA

CONTENTS

1 SCOPE 1
2 APPLICABLE DOCUMENTS 1
2.1 Standards 1
2.2 Drawings 1
2.3 Quality Plan and Manufacturing Documentation 1
2.4 Other Documents 2
3 TECHNICAL REQUIREMENTS 2
3.1 General Description 2
3.2 Use 2
3.3 Maintainability 2
4 QUALITY ASSURANCE REQUIREMENTS 2
4.1 In Manufacturing 2
4.1.1 Propellant Charge 2
4.1.2 Pyrotechnic Train of the Firing Mechanism 3
4.1.3 Precursor Warhead 3
4.1.4 Fragmentation Warhead 3
4.1.5 Main Fuze 3
4.1.6 Secondary Fuze 3
4.1.7 Initial Explosive Components 3
4.1.8 Warhead / Motor Coupling 3
4.1.9 Combustion Chamber 3
4.1.10 Container-Launcher 4
4.1.11 Optical Viewfinder 4
4.1.12 Round 4
4.2 Final Inspection 4
4.2.1 Sampling 4
4.2.2 Non-Destructive Tests 5
4.2.2.1 Logistic Packs Inspection 5
4.2.2.2 Logistic Protection Bags Inspection 5
4.2.2.3 Systems Inspection 6
4.2.2.4 Firing Mechanisms Inspection 6
4.2.2.5 Optical Viewfinder Inspection 6
4.2.2.6 Dimensional Inspection of Systems 7
4.2.2.7 Weight Inspection of Systems 7
4.2.2.8 Protective Covers Inspection 8
4.2.2.9 Round Inspection (Inside the Container-Launcher) 8
4.2.3 Destructive Tests 9

4.2.3.1 General Conditions 9
4.2.3.2 Transport Vibration 9
4.2.3.3. Operational High Temperature 10
4.2.3.4. Operational Low Temperature 10
4.2.3.5 Perforation 11
4.2.3.6 Precision 12
5 PREPARATION FOR DELIVERY 13
5.1 Preservation and Packaging 13
5.2 Marking 13
5.2.1 Logistic Pack 13
5.2.2 Logistic Protective Bag 13
5.2.3 Weapon System 14
5.2.4 Firing Mechanism 14
5.2.5 Round 14
6 TERMS DEFINITION, ABBREVIATIONS AND SYMBOLS 15
6.1 Terms Definition 15
6.1.1 Quality Assurance Authority 15
6.1.2 Customer Quality Assurance Representative 15
6.1.3 Lot 15
6.1.4 Lot Size 15
6.1.5 Lots of Lower Size 15
6.2 Abbreviations and Symbols 16

TABLE OF RANDOM NUMBERS ..... ANNEX I

Instalaza S.A.

1 SCOPE

This document establishes the specifications for acceptance and test requirements for C90-CR-BK (M3.1) Systems.

These specifications and requirements will be applied to C90-CR-BK (M3.1) Systems Lots [6.1.3] when they are subjected to Final Inspection.

In the event of a conflict between the text in this document and the Contract, the Contract shall take precedence.

2 APPLICABLE DOCUMENTS

The following documents, of the issue in effect on the date of signature of the contract form a part of these specifications to the extent specified herein.

2.1 Standards

- ANSI/ASQC Z1.4-1993, Sampling Procedures and Tables for Inspection by Attributes.

2.2 Drawings

- System 13 W33 9900
- Firing Mechanism 13 W16 9300
- Round 13 W33 9100
- Precursor Warhead 13 W13 9140
- Fragmentation Warhead 13 W13 9170
- Rocket Motor and Stabilizer 13 W26 9160
- Safety and Arming Device 13 W09 9900
- Logistic Protective Bag 13 W33 9600
- Logistic Pack 13 W33 9500

2.3 Quality Plan and Manufacturing Documentation

Manufacturing Documentation, Drawings and Quality Plan will not be considered as a part of the Contract. The Manufacturer will permit to consult these documents if it is strictly necessary and a formal request is presented by the Customer.

2.4 Other Documents

- "C90-CR-BK (M3.1). Anti-Bunker Weapon System. DESCRIPTION AND USE", document reference GE.3.02.05.03.1, published by INSTALAZA S.A.
- Other technical documents being part of the Contract.

3 TECHNICAL REQUIREMENTS

3.1 General Description

A general description of the System is presented in the manual titled "C90-CR-BK (M3.1). Anti-Bunker Weapon System, DESCRIPTION AND USE". Characteristics described in the manual show nominal values.

The manual is at the disposal of the Customer Quality Assurance Representative [6.1.2].

3.2 Use

The use of the System is described in the manual titled "C90-CR-BK (M3). Anti-Bunker Weapon System. DESCRIPTION AND USE".

3.3 Maintainability

C90-CR-BK (M3.1) System is maintenance-free during the entire service life, assuming standard storage conditions.

4 QUALITY ASSURANCE PROVISIONS

4.1 In Manufacturing

The Military Quality Assurance Representative [6.1.1] will certify, based on the appropriate tests, that the elements shown below comply with the quality levels established in the Documents appearing in 2.3 for the characteristics listed:

4.1.1 Propellant Charge

- Chemical composition and physical characteristics of the propellant.
- Dimensions of propellant grains.
- Weight of Propellant Charges.

- Combustion time of Propellant Charges.
- Pressure vs. Time curves, at high and low temperatures.

4.1.2 Pyrotechnic Train of the Firing Mechanism

- Sensitivity and output of the Primer.
- Time of transmission for the Pyrotechnical Train.

4.1.3 Precursor Warhead

- Type of explosive and characteristics.
- X-Ray examination showing the explosive charge has no discontinuities.
- Penetration performance.

4.1.4 Fragmentation Warhead

- Type of explosive and characteristics.
- Fragmentation performance.

4.1.5 Main Fuze

- Jolt test.
- Drop test.
- Safety Distance test.

4.1.6 Secondary Fuze

- Jolt test.
- Drop test.
- Safety Distance test.

4.1.7 Components of the Initiation Trains

- Sensitivity and output.

4.1.8 Warhead / Motor Coupling

- All the Warhead/Motor Couplings of the Rounds have passed the pressure and tensile test.

4.1.9 Combustion Chamber

- All the Combustion Chambers have passed the pressure and tensile test.

4.1.10 Container-Launcher

- All the Container-Launchers have passed the pressure and tensile test.

4.1.11 Optical Viewfinder

- Lines and characteristics of the Reticule.

4.1.12 Round

- Markings [5.2.5].

4.2 Final Inspection

Based upon Contract conditions, a Customer Quality Assurance Representative could be designated by the Customer to be present during the Final Inspection Tests to be performed by INSTALAZA S.A.

Defective units during Final Inspection shall be replaced by INSTALAZA S.A.

INSTALAZA S.A. could present to a second Final Inspection a Lot previously rejected.

4.2.1 Sampling

Sampling shall be according to ANSI/ASQC Z1.4-1993.

Logistic Packs will be arranged so that an easy and randomly sampling can be performed.

Inspection Level S-4, Double Sampling Plan for Normal Inspection shall be applied to Logistic Protective Bags and Logistic Packs.

Inspection Level S-4, Double Sampling Plan for Normal Inspection shall be applied to Systems in non-destructive tests.

Inspection Level S-2, Double Sampling Plan for Normal Inspection shall be applied to Systems in destructive tests, except for Precision Test. A sample of eleven (11) units will be selected for Precision Test.

Samples are selected according to Random Numbers Table (Annex I) following the procedure below:

1) Select the Logistic Packs.
2) From the Logistic Packs above, select the Logistic Protective Bags.
3) Take out the Weapon Systems from the Bags.

The Lot size is checked at the same time sampling is performed.

4.2.2 Non-Destructive Tests

4.2.2.1 Logistic Packs Inspection

Procedure:

Packs shall be visually inspected externally as well as inside.

A Logistic Pack shall be considered defective if any of the following requirements is not met:

a) There will not be damaged so that it is made unusable.

b) Marking will be according to 5.2.1.

c) Number of Systems inside will correspond to the number marked outside.

d) All the cushions will be positioned correctly.

e) Technical and operational information documents specified in the Contract will be enclosed.

Criteria:

Acceptance Quality Level (AQL) = 4.0

Note: In case the Lot should be rejected but the defects could be easily corrected in a short time, the manufacturer – if authorized by the Customer Quality Assurance Representative – could correct the defective units while the Final Inspection continues.

4.2.2.2 Logistic Protective Bags Inspection

Procedure:

Protective Bags shall be visually inspected externally as well as inside.

A Logistic Protective Bag shall be considered defective if any of the following requirements is not met:

a) Marking will be according to 5.2.2.

b) No cracks or holes that pierce the bag.

c) Sealing will be complete.

d) The cutter will be in place.

e) There will be desiccant material in good condition.

Criteria:

AQL = 4.0

4.2.2.3 Weapon Systems Inspection

Procedure:

Weapon Systems shall be visually inspected externally.

A Weapon System shall be considered defective if any of the following requirements is not met:

a) Marking will be according to 5.2.3.

b) All the external elements will be in place (i.e., Optical Viewfinder, Firing Mechanism, Protective Covers, Carrying Strap and any other optional element specified in the Contract).

c) All the elements mentioned above will be correctly fitted to the Container-Launcher.

Criteria:

AQL = 2.5

4.2.2.4 Firing Mechanisms Inspection

Procedure:

Firing Mechanisms shall be visually inspected externally.

A Firing Mechanism shall be considered defective if any of the following requirements is not met:

a) Safety Cover will be in correct place, without deformation or fracture.

b) Marking will be according to 5.2.4.

c) Sealing Tape will be correctly positioned.

d) Sealing screws of the Fuse Connector will be correctly positioned.

Criteria:

AQL = 2.5

4.2.2.5 Optical Viewfinder Inspection

Procedure:

Optical Viewfinders shall be visually inspected externally.

An Optical Viewfinder shall be considered defective if any of the following requirements is not met:

a) The Eyeflap and the Cap of the objective lens will be correctly in place.

b) The Reticule will correspond to the type of System.

c) The field of vision will be clear and free of spots, scratches, etc., that could disturb aiming.

Criteria:

AQL = 2.5

4.2.2.6 Dimensional Inspection of the Systems

Procedure:

The length of the Weapon Systems – Front End Protective Cover included – shall be checked.

Gauge used shall be certified according to official procedure of the Spanish Ministry of Defense. It will be provided by the manufacturer.

A Weapon System shall be considered defective if the following requirement is not met:

- The total length will be 984 mm ± 2%.

Criteria:

AQL = 2.5

4.2.2.7 Weight Inspection of the Systems

Procedure:

Every System from the sample is weighed with all protective covers on.

Balance used shall be certified according to official procedure of the Spanish Ministry of Defense. It will be provided by the manufacturer.

Nominal weight of the System – without optional elements – is 5350 g.

Nominal weight of the optional elements are:

- Hand grip..... 100 g
- Shoulder pad ..... 15 g

The nominal weight for a lot is established adding to the nominal weight of the System the weight of the optional elements specified in the Contract.

Lot Weight = 5350 g + Optional Elements Weight

A System will be considered defective if the following requirement is not met:

- The weight will be within the nominal weight of the Lot ±10%

Criteria:

AQL = 2.5

4.2.2.8 Protective Covers Inspection

Procedure:

Protective Covers shall be visually inspected. The Back End Protective Cover shall be inspected externally and the Front End Protective Cover shall be inspected internally after being extracted.

A Protective Cover will be considered defective if any of the following requirements is not met:

a) There will be no cracks or holes that pierce the wall of the Protective Cover.

b) The Desiccant material will be placed correctly inside the Front End Protective Cover.

c) The elements in the Front Protective Cover provided to assure watertightness will be in place.

d) The Front Protective Cover can be extracted easily.

Criteria:

AQL = 2.5

4.2.2.9 Round Inspection (Inside the Container-Launcher)

Procedure:

Every round will be externally inspected without being extracted from the Container-Launcher.

This operation will be performed with all safety precautions and without using tools.

A round will be considered defective if any of the following requirements is not met:

a) The round will be inside the Container-Launcher.

b) The round cannot be extracted when it is pulled axially.

c) The ogive tip will be clearly seen.

Criteria:

AQL= 2.5

4.2.3 Destructive Tests

4.2.3.1 General Conditions

Whenever it is possible the Destructive Tests will be performed using Systems already subjected to Non-Destructive Tests.

All the firings will be performed from a fixed rigid stand.

Systems will be remotely fired or the adequate safety rules should be used.

4.2.3.2. Transport Vibration

Procedure:

Weapon Systems – with all protective covers on – will be re-located into the Logistic Pack. The volume of the pack will be completed using empty Container-Launchers, if necessary.

The Logistic Pack will be transported for 30 minutes in a tactical wheeled vehicle traversing off road terrain.

The real transportation could be simulated by subjecting the Logistic Pack to a vibration of an amplitude of 30 mm and 120 impacts/ minute for 30 minutes.

After testing, the Systems will be fired against a 25 mm thickness plywood plate target situated at a minimum distance of 20m from the muzzle.

A System will be considered defective if any of the following requirements is not met:

a) The round will leave the Container-Launcher at firing.

b) The round will not detonate before reaching the target.

c) The Precursor Warhead will detonate on target impact.

d) The Fragmentation Warhead will detonate behind the target (assuming the Precursor Warhead has functioned correctly)

Criteria:

AQL= 6.5

4.2.3.3. Operational High Temperature

Procedure:

Systems will be conditioned at +55°C for 24 hours.

After conditioning, the Systems will be fired against a 25 mm thickness plywood target situated at a minimum distance of 20 m from the muzzle. Firings will be performed as soon as possible to assure that the temperature of the System is not lower than +50°C.

A System will be considered defective if any of the following requirements is not met:

a) The round will leave the Container-Launcher at firing.

b) The round will not detonate before reaching the target.

c) The Precursor Warhead will detonate on target impact.

d) The Fragmentation Warhead will detonate behind the target (assuming the Precursor Warhead has functioned correctly)

Criteria:

AQL= 6.5

4.2.3.4. Operational Low Temperature

Procedure:

Systems will be conditioned at –30°C for 24 hours.

After conditioning, the Systems will be fired against a 25 mm thickness plywood target situated at a minimum distance of 20 m from the muzzle. Firings will be performed as soon as possible after leaving the high-temperature chamber to assure that the temperature of the System is not higher than –25°C.

A System will be considered defective if any of the following requirements is not met:

a) The round will leave the Container-Launcher at firing.

b) The round will not detonate before reaching the target.

c) The Precursor Warhead will detonate on target impact.

d) The Fragmentation Warhead will detonate behind the target (assuming the Precursor Warhead has functioned correctly)

Criteria:

AQL= 6.5

4.2.3.5 Perforation

Two types of target shall be considered:

- Sand Bags wall

  A wall 1 x 1 x 1 m constructed with sand bags filled with pit run sand.

- Reinforced Concrete wall

  A wall 1 m x 1 m x 250 mm constructed from concrete having a compressive strength of 25 – 30 MPa and reinforced with 12 mm diameter deformed steel reinforcing bars placed both vertically and horizontally at 150 mm centres.

Targets will be situated at a minimum distance of 20 m from the muzzle.

Procedure:

Half of the Weapon Systems of the sample shall be fired against the Sand Bags target and the other half against the Reinforced Concrete target. When the number of Systems of the sample is uneven, then the Sand Bags target shall be selected to perform the uneven firing.

A Weapon System shall be considered defective if any of the following requirements is not met:

a) The round will leave the Container-Launcher at firing.

b) The round will not detonate before reaching the target.

c) The Precursor Warhead will detonate on target impact.

d) The Fragmentation Warhead will detonate behind the target (assuming the Precursor Warhead has functioned correctly)

Note: When the round is not hitting the central area of the target, the firing will not be considered and a new firing will be performed.

Criteria:

AQL = 10.0

4.2.3.6 Precision

Procedure:

A series of eleven firings shall be fired against a vertical soft target, minimum dimensions 1 x 1 m, situated at 50 m from the muzzle.

A 25 mm thickness plywood board will be positioned at a minimum distance of 10 m behind the soft target to provoke the detonation of the warheads on impact.

Firings should be performed with wind velocity lower than 3 m/s.

One out of the eleven firings can be discarded.

The origin (0,0) is considered to be in the down left hand side corner of the soft target; coordinates for each firing are measured (Xn, Yn).

Then the Centre of Impacts is established as follows:

$$CI_X = \frac{\Sigma_1^n X_n}{n} \qquad CI_Y = \frac{\Sigma_1^n Y_n}{n}$$

X and Y deviations of every impact from the Centre of Impacts are determined:

$$d_{Xn} = X_n - CI_X \qquad d_{Yn} = Y_n - CI_Y$$

Standard deviations are calculated:

$$E_X = \sqrt{\frac{\Sigma_1^n d_{Xn}^2}{n}} \qquad E_Y = \sqrt{\frac{\Sigma_1^n d_{Yn}^2}{n}}$$

50% Zones:

$$Z_X = 1{,}349 \bullet E_X \qquad Z_Y = 1{,}349 \bullet E_Y$$

The requirements are:

- $Z_X \leq 0.20$ m
- $Z_Y \leq 0.25$ m

Criteria:

The Lot shall be rejected if any of the requirements above is not met.

5. PREPARATION FOR DELIVERY

5.1 Preservation and Packaging

Every System will be protected from humidity and other external influences by a Logistic Protection Bag made of a barrier material.

Three Systems will be packed in a pine wood box (Logistic Pack) with the necessary cushioning and blocking.

This Logistic Pack will protect the Systems from shocks and static loading during storage and transport.

5.2 Marking

5.2.1 Logistic Pack

Unless otherwise specified in the Contract, Logistic Packs shall be marked as follows,

- Weapon System identification, including model designation.
- NATO Stock Number or National Classification Number.
- Quantity of Weapon Systems contained.
- Serial Number of the Weapon Systems contained.
- Name of the manufacturer or logo.
- Lot number and fabrication year.
- Explosive Material Indication and Classification for Transport.
- Storage temperature limits.
- Operational temperature limits.
- A Red Spot showing warhead location.
- Gross Weight.
- Gross Volume.

5.2.2 Logistic Protective Bag

Logistic Protective Bags shall be marked as follows,

- System identification, including model designation.
- Serial Number of the System contained.
- Lot number and fabrication year.
- Name of the manufacturer or logo.

5.2.3 Weapon System

Weapon Systems shall be marked as follows,

- System identification, including model designation.
- Type of Ammunition according to NATO Code Colours for Identification of ammunition (i.e., "High Explosive Anti-Bunker" and yellow and black circumferential bands close to the front end, and a brown circumferential band close to the back end).
- Lot number and fabrication year.
- Serial Number.
- An arrow indicating firing direction.
- Graphic Instructions to use the Weapon System.
- Storage temperature limits.
- Operational temperature limits.

5.2.4 Firing Mechanism

Safety Covers of the Firing mechanisms shall be marked as follows,

- "SAFETY COVER"
- "LOADED WEAPON"
- "Only Remove Safety cover for Firing"

5.2.5 Round

Rounds shall be marked as follows,

- System identification including model designation.
- Type of Ammunition according to NATO Code Colours for Identification of ammunition (i.e., "High Explosive Anti-Bunker" and yellow and black discs on the Warhead, and a brown disc on the Rocket Motor).
- Lot number and fabrication year.

6 TERMS DEFINITION, ABBREVIATIONS AND SYMBOLS

6.1 Terms Definition

6.1.1 Quality Assurance Authority

Military Official Quality Representative of the Spanish Ministry of Defense who certifies that the requirements specified herein have been fulfilled.

6.1.2. Customer Quality Assurance Representative

Person or group of persons designated by the Customer in order to be present during Final Inspection.

6.1.3 Lot

A collection of units of product manufactured under homogeneous conditions, presented all together to Final Inspection under the same Contract.

6.1.4 Lot Size

The number of units of product (Weapon Systems) in a Lot.

A Lot is considered to have a "normal size" when the number of units is in between 1201 and 10000. The corresponding number of Logistic Packs will be in between 401and 3334, respectively.

In every Contract or Purchaser Order only a Lot having a size lower than the minimum size can be admitted to Final Inspection [6.1.5].

The Systems used in destructive tests specified in this document are considered part of the Lot under Contract in conditions "ready for delivery". These Systems will be paid by the Customer in a first inspection. If the lot suffers a second Final Inspection the units for the destructive tests will then be paid by the Supplier.

6.1.5 Lots of Lower Size

When the Lot presented to Final Inspection has a size lower than 1201 units, minimum number of the size defined herein as normal size of a Lot [6.1.4], then the number of units to be used for destructive tests shall be minimized. The tests shall be performed sequentially following manufacturer criteria with the approval of the Quality Assurance Authority.

Only a Lot, in every Contract or Customer Order, having a size lower than 1201 units shall be admitted to Final Inspection.

In Lots of size in between 501 and 1200 units the sequence for tests shall be: One sample will be subjected to Transport Vibration test, and then

followed by the Operational Low Temperature test. The other sample will be subjected to the Operational High Temperature test and then fired to perform the Perforation test. Precision test will not be performed. It will be replaced by a Certificate issued by the Quality Assurance Authority based upon results of precision tests performed during manufacturing.

For Lots of 500 units or lower, a Certificate from the Quality Assurance Authority based upon results of tests performed during manufacturing shall be considered as the document of acceptance.

6.2. Abbreviations and Symbols

C90-CR-BK (M3.1). ....Antibunker Weapon System C90-CR-BK, M3.1 version, manufactured by INSTALAZA S.A.

°C .....Centigrade temperature

cm .....Centimetres

g .....Grams

kg .....Kilograms

m .....Metres

mm .....Millimetres

MPa .....Megapascals

AQL .....Acceptance Quality Level

[9.1.2...] .....See paragraph... 9.1.2...

Annex I. TABLE OF RANDOM NUMBERS

Instalaza s.a.

TABLE OF RANDOM NUMBERS

TO BE USED TO EXTRACT A SAMPLE OF n UNITS OUT OF A GROUP MADE OUT OF N UNITS.

1. First of all, the N physical units shall be placed in such a way as to be able to allocate each individual unit an ordinal number. For example: if the N units are parcels, the parcels shall be positioned to assign each one an ordinal number in a natural series (1, 2, 3, ..., N).

   This natural ordinal number shall be expressed with the same number of digits as the number of digits of N. For example: if N=640, then the numbers shall be: 001, 002, 003, ..., 638, 639, 640.

   D will be called the total number of digits of N (In the above example N=640 and D=3).

2. The user shall freely decide (without reading the table) how to make groups of D digits out of the annexed table. For example: the user may decide to make groups by using the first three digits of each group of the table as normally read: 488, 398, 666, 571, 272, 372, etc... or by using the last and two first digits of the table when read in inverted column: 548, 204, 720, 109, 083, etc...

3. The user shall also decide, freely and without previous examination of the table, the place of the table where he is going to start making groups of D digits. For example: from the beginning of the table (4885) or from the middle (6406).

   The user shall then decide, also freely and without previous examination, how from the initial group he is going to read the next group of figures in the table. For example: by normal columns, by inverted columns, by rows from left to right, etc...

4. Once the above process is engaged, the user shall note the numbers finally defined. Taking the first example: 488, 398, 666, 571, 272, 372, 834, 414, etc...

   From the list obtained in this way, the user shall reject the numbers which are bigger than N. If again, we take the first example and N=640, then 666, 834, etc... shall be deleted. Also the numbers equal to a previous number of the series shall be deleted from the list.

   The user shall proceed in this way up to the point in which the number of elements of the list equals n .

5. The user shall then choose the physical units corresponding to the n numbers of the list according to the criteria of order of the first paragraph.

Instalaza s.a.

TABLE OF RANDOM NUMBERS

4885 3982 6662 5712 2721 3729 8344 4144 4377 6981 8356 0699 3101 9504 7563
0422 2984 6066 0903 4227 3738 3346 2160 6458 2777 4636 8170 7037 6385 1429
2047 6315 9645 6849 9562 2721 3729 8747 2722 1627 5216 2111 3562 4005 4916
6941 5110 1331 6066 9476 3720 4017 8518 3236 0526 2070 8054 4036 5244 9702
8320 9992 6789 7518 5959 0671 5026 0705 2910 3220 6044 5059 1653 4200 5591

0347 7997 0007 5382 5191 8305 0260 1564 5037 3825 7448 3611 9270 8182 5429
3142 0778 7096 0916 7217 4465 4732 8067 7047 6165 6005 4742 3999 1043 4795
1385 6408 4217 0152 6595 1569 1117 9188 8116 5237 2296 9786 3770 8497 3170
1102 3178 1984 3314 6293 6527 6667 4194 9838 1651 8194 8449 2573 1967 8422
6574 7785 5844 9257 3196 7842 2657 4778 5527 2492 6462 1153 2132 4301 3089

1370 8157 6939 3756 6099 9068 4498 4437 8323 6086 5705 5988 2805 8699 6601
2753 0574 4694 6641 7639 9162 8622 5427 2480 2483 1997 9216 1400 4282 9441
1868 6528 8548 0559 3437 7543 7684 3528 1047 5951 5003 1312 6310 3117 0598
9204 3994 1948 2641 1510 0335 2346 5148 5340 4804 6256 0910 0324 2025 3415
5559 736 3871 1151 5465 4377 2922 2321 3278 5128 9938 0626 6507 5297 9173

1491 3022 4777 5819 7415 4179 7973 0582 5765 6629 5574 3350 7168 9617 2800
4627 7621 8282 3298 9919 6674 7555 9609 0431 3552 3979 7797 9899 0495 9435
9984 2477 9556 8030 8343 6716 6980 1407 6421 7610 5109 8589 4907 3810 9234
0114 5898 3150 7176 4305 8257 0701 9985 3184 4017 8073 9865 8188 0838 2056
3212 1261 8847 2846 9152 0954 8006 3265 2619 5087 7032 1323 7289 3145 6728

1437 9089 9353 5108 6717 2532 6406 8183 2747 4757 8068 5680 0054 6693 7605
5709 7425 5734 2767 1508 4198 0654 5520 2434 2874 9561 0479 3513 4888 1399
0137 6415 6484 4345 1891 1645 1457 8926 0609 2112 5323 1617 4055 7997 9065
0798 3538 7929 3244 7760 8802 5590 3062 6864 5896 2209 1745 3888 9114 2728
8467 4755 3915 2814 4266 0488 5113 8485 1153 7724 5705 5127 7092 6911 9943

4053 7506 1984 4923 0419 5432 5015 1226 2601 6259 6583 8312 2147 3022 3857
2079 0794 8027 4961 8414 1826 1284 9665 9809 5739 8478 6090 1963 8126 8905
5047 0718 1926 1601 5559 6561 8608 6571 4960 6145 5489 6828 3242 8656 3121
1045 3226 4188 0649 5117 5466 9241 4728 6759 1291 7035 3090 9221 0909 0804
6786 9360 4041 5897 3017 3774 7839 5543 1263 4335 7360 3585 7657 2261 8901

4622 3217 3081 0400 8295 2151 2506 9402 7529 4007 2922 9239 7339 8758 4915
6648 3612 9179 2569 9337 0659 5670 7630 1921 7267 3232 2921 4060 6171 4406
3628 0199 7253 2589 2643 9048 7913 1543 1035 7052 3464 7846 4878 0102 0769
7597 6417 8737 1860 9187 1681 6360 8254 8280 7154 1656 2392 1423 9391 4491
6071 9030 8884 2941 7688 3902 8657 8465 0064 4036 2129 0100 9503 2862 2082

5108 9952 7348 6154 1905 2177 0548 8322 9270 7216 0448 4096 3245 7574 3211
9222 8503 0547 9818 3073 9807 1208 6117 2624 0880 7799 1453 7399 1612 9595
5163 7027 3238 6718 466 8298 5363 5798 5793 5430 8246 3030 5937 8925 8498
6410 9921 6047 0393 7912 7625 4943 4683 5279 4850 7907 9627 8317 3640 1567
6578 3909 7101 3036 8038 6139 0855 6271 4541 8020 2476 8818 6295 5178 8416

4008 5248 3589 2410 5579 6255 9270 5169 9432 8383 6958 8510 3014 1701 4510
9091 8210 9887 1776 3219 0055 8172 7412 7817 1349 5126 9206 8851 9684 7610
7806 5778 9042 8012 3464 7480 2382 8524 0477 4631 0500 9760 5167 4040 6855
9545 1482 5880 8810 1997 2287 0766 0837 3335 2868 9855 3126 7792 5448 9662
8433 1236 8790 8332 0090 6893 6168 4096 2034 4625 7598 8262 2251 0074 1277

3857 9406 5159 4915 3788 0711 1928 1493 1511 0696 0089 8745 8263 4709 9862
1254 8167 9829 6227 8790 2611 8403 0935 1537 7544 3334 5331 5547 4884 7497
9956 3990 0182 9986 6028 0802 3236 8967 3290 2880 7979 9636 6614 7449 4891
2733 1178 3405 9341 6265 6111 4723 6139 2931 0405 1960 5166 3247 6468 4568
3953 5642 9126 7413 7622 5538 3335 9811 5948 6643 1761 4110 3169 2936 1234

Instalaza S.A.

CONTENTS

1 SUBJECT 1
2 PRELIMINARY CONDITIONS 1
3 APPLICABLE DOCUMENTS 1
3.1 Standards 1
3.2 Drawings 1
3.3 Quality Plan and Manufacturing Documentation 1
4 LOTS 2
4.1 Definition 2
4.2 Lot Size (with sub-paragraphs 4.2.1 & 4.2.2) 2
5 COMPOSITION 2
6 DEFINITIONS (with sub-paragraphs 6.1 & 6.2) 3
7 IDENTIFICATION (with sub-paragraphs 7.1 & 7.2) 3
8 SAMPLING (with sub-paragraphs 7.1, 7.2, 7.3 & 7.4 Order of Precedence) 4
9 NON-FIRING TESTS 4
9.1 Visual Inspection 4
9.1.1 Of Logistic Packings 4
9.1.2 Of Inner Packings 5
9.1.3 Of Units of Ammunition 6
9.2 Dimensional Inspection of Units of Ammunition 6
9.2.1 Of Arrow Bodies 6
9.2.2 Of Propelling Cartridges 7
9.2.3 Weight Inspection of the Propelling Charge 7
10 FIRING TESTS 7
10.1 Precision Test 7
10.2 Velocity Test 8
10.3 Propelling Cartridge Percussion Test 9

TABLE OF RANDOM NUMBERS ..... ANNEX A

1 SUBJECT

This set of Specifications establishes the tests imposed upon lots of production of ***Sets of Ammunition 10x*** for ***INSTALAZA***'s ***TR90*** and ***TR90 (M3) Trainers*** for the C90 Family of Weapon Systems when presented for official acceptance, and the criteria for acceptance or rejection according to the results of the tests.

2 PRELIMINARY CONDITIONS

To apply this set of Specifications the production shall have been carried out according to the manufacturing plans for each of the parts and for the whole finished item. This fact shall be certified by the Resident Military Inspector in the factory of the manufacturer.

3 APPLICABLE DOCUMENTS

The following documents, of the issue in effect on the date of signature of the contract form a part of these specifications to the extent specified herein.

3.1 Standards

- ANSI/ASQC Z1.4-1993, Sampling Procedures and Tables for Inspection by Attributes.

3.2 Drawings

- Arrow Assembly: 40 W03 9801
- Propelling Cartridge: 40 W03 9851
- Outer Packing: 40 W03 9511

3.3 Quality Plan and Manufacturing Documentation

Although these documents form part of these Specifications, they do not form part of the Contract. The Manufacturer will permit to consult those documents if it is strictly necessary and a formal request is presented by the Customer.

4 LOTS

4.1 Definition

A Lot is considered as the group of Sets of Ammunition 10x for TR90 and TR90 (M3) Trainers presented for acceptance under the same contract of supply, manufactured according to the same industrial process and made out of parts which individually and separately fulfil this set of technical conditions.

4.2 Lot Size

4.2.1 The regular size or number of units in the Lot presented for acceptance shall be no more than 10,000 Basic Sets of Ammunition 10x.

4.2.2 The complete Lot shall be presented for acceptance in such a way as not to impede an easy sorting of the samples, enabling the picking up of the samples for testing in a not discriminatory way. The Lot may be presented for sampling in pallets in case the contract of supply or the conditions of the freight impose or recommend such a stacking.

5 COMPOSITION

The Sets of Ammunition 10x for TR90 and TR90 (M3) Trainers subject to the acceptance tests of these Specifications shall be presented for acceptance in their wooden boxes (Outer Packing) according to the applicable drawings mentioned in Paragraph 3.2.

The Outer Packing shall contain:

3	Cartoon boxes with 20 Arrow Bodies each
12	Cartoon Boxes with 50 Propelling Cartridges each
1	Plastic Bag with 600 Locking Rings
600	Stabilizers
6	Brief Operating Instructions to replace expended Stabilizers

as separate items.

6. DEFINITIONS

6.1 For the purposes of these Specifications, the Basic Set of Ammunition 10x for TR90 and TR90 (M3) Trainers is composed of:

1 Arrow Bodies
10 Stabilizers
10 Locking Rings
10 Propelling Cartridges

as separate items.

6.2 For the purposes of these Specifications, the Unit of Ammunition for TR90 and TR90 (M3) Trainers is composed of:

1 Arrow Body
1 Stabilizer
1 Locking Ring
1 Propelling Cartridge

where the three first elements shall be assembled in ready to operate conditions.

7 IDENTIFICATION

7.1 The Outer Packings (wooden boxes) of the Sets of Ammunition 10x for TR90 and TR90 (M3) Trainers shall be externally marked according to the applicable drawings, in a most clear manner, with the following data:

A) "60 Sets of Ammunition 10x for TR90 Trainer" or "60 Sets of Ammunition 10x for TR90 (M3) Trainer", as stated in the contract of supply.

B) NATO Stock Number or Classification National Number.

C) Manufacturer's logo and/or name.

D) Lot number and fabrication year.

E) Total gross weight.

F) Total gross volume.

and/or any other data/legend which may be agreed upon in the contract of supply.

7.2. The Inner Packings shall be externally marked according to the applicable drawings, in a most clear manner, with legends stating the content of each pack/bag, and/or any other data/legend which may be agreed upon in the contract of supply.

8 SAMPLING

8.1 In general, the sampling shall follow the ANSI/ASQC Z1.4-1993, in its last revision, for Normal Inspection and Single Sample.

8.2 A sample of Outer Packings, in a quantity as given by Inspection Level S-3, shall be taken from the manufactured Lot. The Random Numbers Table of Annex I shall be used.

The samples of Sets and/or Units of Ammunition 10x for TR90 and TR90 (M3) Trainers to be used in the different destructive and non-destructive tests as imposed by these Specifications, shall be taken from the sample above.

The sample of Inner Packings will be composed by all the items contained in the Outer Packings sample.

The samples of Units of Ammunition for the non-firing tests shall be according to Inspection Level S-4, for every test.

The samples for the firing tests shall be according to:

- Accuracy test ..... eleven (11) Units of Ammunition
- Velocity test ..... ten (10) Units of Ammunition
- Propelling Cartridge Percussion test ..... Inspection Level S-3

8.3 The ammunition used in the different firing tests shall be at the Customer's cost in first inspection and at the manufacturer's cost if a second inspection becomes necessary.

8.4 Order of precedence of the Tests

The order of precedence of test shall be such as to minimize the final quantity of units and their required ammunition to be employed in the whole process of acceptance tests.

9 NON-FIRING TESTS

9.1 Visual Inspection

9.1.1 Of Outer Packings

The Outer Packings integrating the sample shall be inspected both internally and externally.

An Outer Packing shall have to be considered as defective if it does not meet one or more than one of the following requirements:

A) All legends and/or markings shall be according to what is specified in Paragraph 7.1 of these Specifications.

B) The seal(s) is(are) missing.

C) The technical/operational documentation as specified in the contract of supply or as specified in Paragraph 5 shall be placed inside each Outer Packing.

D) The boards have no damage that make the packing useless.

E) The type and quantity of elements in the Outer Packing under inspection shall be according to what is specified in the Paragraph 5 above.

F) The Outer Packing wooden handles are correctly placed.

Acceptance Quality Level (AQL) = 6.5

Remarks: If defects that can be corrected easily in short time are found, the Acceptance Authority could continue with the Final Inspection –although the Lot can be refusable– while the manufacturer proceeds to correct the defective units.

9.1.2 Of Inner Packings

The Inner Packings integrating the sample shall be inspected both internally and externally.

An Outer Packing shall have to be considered as defective if it does not meet one or more than one of the following requirements:

A) No Inner Packing is missing, according to what is specified in Paragraph 5 of these Specifications.

B) The legend/marks of every Inner Packing are according to what is specified in Paragraph 7.2 of these Specifications.

C) The contents of every Inner Packing is according to what is specified in Paragraph 5 of these Specifications.

Acceptance Criteria:

	Aceptation	Rejection
First Sample:	1 failure	4 failures
First + Second Samples:	4 failures	5 failures

9.1.3 Of Units of Ammunition

Any element shall be considered as defective if it does not meet any of the following requirements:

A) Arrow Bodies:

A1) The Locking Ring Slot is missing.

A2) The Arrow Tip may be manually unfastened.

A3) The Body is not painted according to the manufacturing drawings.

B) Stabilizer:

B1) One/More fin(s) is broken or missing.

B2) The Stabilizer cannot be introduced in the Arrow Body.

C) Locking Ring:

C1) The Locking Ring cannot be introduced into the Locking Ring Slot of the Arrow Body.

C2) The Locking Ring cannot return to its normal static position after flexion for introduction in the Locking Ring Slot of the Arrow Body.

D) Propelling Cartridge:

D1) The Primer is missing.

D2) The Powder leaks out by the front end.

AQL = 6.5

9.2 Dimensional Inspection of Units of Ammunition

9.2.1 Of Arrow Bodies

The measure of the internal diameter along all the length of the Arrow Body of the sample shall be checked by means of a calibre of 12.82 mm diameter and 235 mm length.

Any Arrow Body which does not meet the above criteria shall be considered as defective.

This dimensional inspection shall be performed using inspection equipment provided by the manufacturer, assuming this equipment has been certified in accordance with the official procedure established by the Spanish Ministry of Defence.

AQL = 2.5

9.2.2 Of Propelling Cartridges

The Propelling Cartridges integrating the sample shall be checked by insertion in a gage simulating the TR90 Trainer Chamber.

A Propelling Cartridge not fitting the gage shall be considered defective.

This dimensional inspection shall be performed using inspection equipment provided by the manufacturer, assuming this equipment has been certified in accordance with the official procedure established by the Spanish Ministry of Defence.

AQL = 2.5

9.2.3 Weight Inspection of the Propelling Charge

The Propelling Cartridges constituting the sample shall be emptied of their Propelling Charge. The Charge shall be weighted with equipment as provided by the manufacturer if, and only if, this equipment to be used has been certified according to the official procedure established by the Spanish Ministry of Defence.

The weight shall be between W ± 0.05 g, where W is the nominal weight of the Propelling Charge as previously defined by the manufacturer for this specific powder.

AQL = 2.5

10 FIRING TESTS

10.1 Precision Test

10.1.1 Method

Eleven (11) rounds will be fired using a TR90 Test Barrel provided by the Manufacturer. The Test Barrel shall be mounted in a rigid support.

The target for precision test shall be 4 m x 4 m cloth, placed at 150 m from the muzzle. The aiming point is shown on the target by a cross.

Firings shall be carried out at standard ambient temperature and with no wind.

The exact location of each impact on the target is required. Each location should be expressed in terms of a horizontal (x_i) and vertical (y_i) distance from a fixed reference point at the lower left corner of the target. The coordinates

of the aiming point relative to the established reference shall also be measured.

Out of the eleven firings, one can be dropped.

10.1.2 Calculations

The coordinates $\bar{x}$ and $\bar{y}$ of the Mean Point of Impacts (MPI) and the Distance D from the MPI to the aiming point will be determined as follows:

$$\bar{x} = \frac{\Sigma_1^n x_i}{n} \; ; \; \bar{y} = \frac{\Sigma_1^n y_i}{n}$$

$$D = [(x_0 - \bar{x})^2 + (y_0 - \bar{y})^2]^{1/2}$$

The 50% zones will be determined::

$$Z_x = 1.349 \bullet E_x \; ; \; Z_y = 1.349 \bullet E_y$$

being:

$$E_x = \left[\frac{\Sigma_1^n (\bar{x} - x_i)^2}{n} \right]^{1/2} \; ; \; E_y = \left[\frac{\Sigma_1^n (\bar{y} - y_i)^2}{n} \right]^{1/2}$$

10.1.3 Acceptance Criteria

The obtained values shall met:

A) $D < 75$ cm

B) $Z_x < 60$ cm

C) $Z_y < 75$ cm

The Lot shall be rejected if any of the above criteria is not met, except if the defect is due to a Propelling Cartridge failing to fire, in which case the test may be repeated with the same Arrow and a new Propelling Cartridge.

10.2 Velocity Test

10.2.1 Method

The Units of Ammunition of the sample (10 units) are fired from a TR90 Testing Barrel provided by the manufacturer.

Firings shall be performed at standard ambient temperature and with no wind.

This test may be simultaneously performed with the Precision Test.

The velocity of the Arrow shall be measured at the muzzle of the TR90 Testing Barrel by measuring means as provided by the manufacturer.

10.2.2 Acceptance Criteria

The average velocity (Vav) shall be between 151.5 and 168.5 m/s.

Only one individual value will be accepted not to be within Vav ± 8 m/s.

Any Individual Ammunition failing to operate within the above referred velocities shall be considered as defective, except if the defect is due to a Propelling Cartridge failing to fire, in which case the test may be repeated with the same Arrow and a new Propelling Cartridge.

10.3 Propelling Cartridge Percussion Test

The firing of all the sample of Propelling Cartridges, without Arrows to be propelled, shall take place from the TR90 Testing Barrel provided by the manufacturer and placed in a rigid stand.

Firings shall be performed at standard ambient temperature and with no wind.

Any Propelling Cartridge failing to take fire is to be considered as defective if, and only if, the failure cannot be allocated to the TR90 Testing Gun (and this fact can be ascertained by inspecting the denting in the primer of the concerned Propelling Cartridge and comparing it to the dentings of previous or subsequent firings).

AQL = 2.5

Annex I. TABLE OF RANDOM NUMBERS

Instalaza s.a.

TABLE OF RANDOM NUMBERS

TO BE USED TO EXTRACT A SAMPLE OF n UNITS OUT OF A GROUP MADE OUT OF N UNITS.

1. First of all, the N physical units shall be placed in such a way as to be able to allocate each individual unit an ordinal number. For example: if the N units are parcels, the parcels shall be positioned to assign each one an ordinal number in a natural series (1, 2, 3, ..., N).

   This natural ordinal number shall be expressed with the same number of digits as the number of digits of N. For example: if N=640, then the numbers shall be: 001, 002, 003, ..., 638, 639, 640.

   D will be called the total number of digits of N (In the above example N=640 and D=3).

2. The user shall freely decide (without reading the table) how to make groups of D digits out of the annexed table. For example: the user may decide to make groups by using the first three digits of each group of the table as normally read: 488, 398, 666, 571, 272, 372, etc... or by using the last and two first digits of the table when read in inverted column: 548, 204, 720, 109, 083, etc...

3. The user shall also decide, freely and without previous examination of the table, the place of the table where he is going to start making groups of D digits. For example: from the beginning of the table (4885) or from the middle (6406).

   The user shall then decide, also freely and without previous examination, how from the initial group he is going to read the next group of figures in the table. For example: by normal columns, by inverted columns, by rows from left to right, etc...

4. Once the above process is engaged, the user shall note the numbers finally defined. Taking the first example: 488, 398, 666, 571, 272, 372, 834, 414, etc...

   From the list obtained in this way, the user shall reject the numbers which are bigger than N. If again, we take the first example and N=640, then 666, 834, etc... shall be deleted. Also the numbers equal to a previous number of the series shall be deleted from the list.

   The user shall proceed in this way up to the point in which the number of elements of the list equals n .

5. The user shall then choose the physical units corresponding to the n numbers of the list according to the criteria of order of the first paragraph.

Instalaza s.a.

TABLE OF RANDOM NUMBERS

4885 3982 6662 5712 2721 3729 8344 4144 4377 6981 8356 0699 3101 9504 7563
0422 2984 6066 0903 4227 3738 3346 2160 6458 2777 4636 8170 7037 6385 1429
2047 6315 9645 6849 9562 2721 3729 8747 2722 1627 5216 2111 3562 4005 4916
6941 5110 1331 6066 9476 3720 4017 8518 3236 0526 2070 8054 4036 5244 9702
8320 9992 6789 7518 5959 0671 5026 0705 2910 3220 6044 5059 1653 4200 5591

0347 7997 0007 5382 5191 8305 0260 1564 5037 3825 7448 3611 9270 8182 5429
3142 0778 7096 0916 7217 4465 4732 8067 7047 6165 6005 4742 3999 1043 4795
1385 6408 4217 0152 6595 1569 1117 9188 8116 5237 2296 9786 3770 8497 3170
1102 3178 1984 3314 6293 6527 6667 4194 9838 1651 8194 8449 2573 1967 8422
6574 7785 5844 9257 3196 7842 2657 4778 5527 2492 6462 1153 2132 4301 3089

1370 8157 6939 3756 6099 9068 4498 4437 8323 6086 5705 5988 2805 8699 6601
2753 0574 4694 6641 7639 9162 8622 5427 2480 2483 1997 9216 1400 4282 9441
1868 6528 8548 0559 3437 7543 7684 3528 1047 5951 5003 1312 6310 3117 0598
9204 3994 1948 2641 1510 0335 2346 5148 5340 4804 6256 0910 0324 2025 3415
5559 736 3871 1151 5465 4377 2922 2321 3278 5128 9938 0626 6507 5297 9173

1491 3022 4777 5819 7415 4179 7973 0582 5765 6629 5574 3350 7168 9617 2800
4627 7621 8282 3298 9919 6674 7555 9609 0431 3552 3979 7797 9899 0495 9435
9984 2477 9556 8030 8343 6716 6980 1407 6421 7610 5109 8589 4907 3810 9234
0114 5898 3150 7176 4305 8257 0701 9985 3184 4017 8073 9865 8188 0838 2056
3212 1261 8847 2846 9152 0954 8006 3265 2619 5087 7032 1323 7289 3145 6728

1437 9089 9353 5108 6717 2532 6406 8183 2747 4757 8068 5680 0054 6693 7605
5709 7425 5734 2767 1508 4198 0654 5520 2434 2874 9561 0479 3513 4888 1399
0137 6415 6484 4345 1891 1645 1457 8926 0609 2112 5323 1617 4055 7997 9065
0798 3538 7929 3244 7760 8802 5590 3062 6864 5896 2209 1745 3888 9114 2728
8467 4755 3915 2814 4266 0488 5113 8485 1153 7724 5705 5127 7092 6911 9943

4053 7506 1984 4923 0419 5432 5015 1226 2601 6259 6583 8312 2147 3022 3857
2079 0794 8027 4961 8414 1826 1284 9665 9809 5739 8478 6090 1963 8126 8905
5047 0718 1926 1601 5559 6561 8608 6571 4960 6145 5489 6828 3242 8656 3121
1045 3226 4188 0649 5117 5466 9241 4728 6759 1291 7035 3090 9221 0909 0804
6786 9360 4041 5897 3017 3774 7839 5543 1263 4335 7360 3585 7657 2261 8901

4622 3217 3081 0400 8295 2151 2506 9402 7529 4007 2922 9239 7339 8758 4915
6648 3612 9179 2569 9337 0659 5670 7630 1921 7267 3232 2921 4060 6171 4406
3628 0199 7253 2589 2643 9048 7913 1543 1035 7052 3464 7846 4878 0102 0769
7597 6417 8737 1860 9187 1681 6360 8254 8280 7154 1656 2392 1423 9391 4491
6071 9030 8884 2941 7688 3902 8657 8465 0064 4036 2129 0100 9503 2862 2082

5108 9952 7348 6154 1905 2177 0548 8322 9270 7216 0448 4096 3245 7574 3211
9222 8503 0547 9818 3073 9807 1208 6117 2624 0880 7799 1453 7399 1612 9595
5163 7027 3238 6718 466 8298 5363 5798 5793 5430 8246 3030 5937 8925 8498
6410 9921 6047 0393 7912 7625 4943 4683 5279 4850 7907 9627 8317 3640 1567
6578 3909 7101 3036 8038 6139 0855 6271 4541 8020 2476 8818 6295 5178 8416

4008 5248 3589 2410 5579 6255 9270 5169 9432 8383 6958 8510 3014 1701 4510
9091 8210 9887 1776 3219 0055 8172 7412 7817 1349 5126 9206 8851 9684 7610
7806 5778 9042 8012 3464 7480 2382 8524 0477 4631 0500 9760 5167 4040 6855
9545 1482 5880 8810 1997 2287 0766 0837 3335 2868 9855 3126 7792 5448 9662
8433 1236 8790 8332 0090 6893 6168 4096 2034 4625 7598 8262 2251 0074 1277

3857 9406 5159 4915 3788 0711 1928 1493 1511 0696 0089 8745 8263 4709 9862
1254 8167 9829 6227 8790 2611 8403 0935 1537 7544 3334 5331 5547 4884 7497
9956 3990 0182 9986 6028 0802 3236 8967 3290 2880 7979 9636 6614 7449 4891
2733 1178 3405 9341 6265 6111 4723 6139 2931 0405 1960 5166 3247 6468 4568
3953 5642 9126 7413 7622 5538 3335 9811 5948 6643 1761 4110 3169 2936 1234

TR90 (M3) TRAINER

FOR C90 (M3) WEAPON SYSTEMS

SPECIFICATION FOR ACCEPTANCE

FE.3.03.03.01.2

INSTALAZA S.A.
Núñez de Balboa 103, 1º Izda.
28006 Madrid - SPAIN
TL: (34) 915618835 & 915626350
FX: (34) 915626350

INSTALAZA S.A.
Monreal 27
50002 Zaragoza - SPAIN
TL: (34) 976293423 & 976293422
FX: (34) 976299331

Instalaza SA

CONTENTS

1. Subject 1
2. Preliminary Conditions 1
3. Applicable Documents 1
   3.1. Standards 1
   3.2. Drawings 1
   3.3. Quality Plan and Manufacturing Documentation 1
4. Lots 2
   4.1. Definition 2
   4.2. Lot Size (with sub-paragraphs 4.2.1 & 4.2.2) 2
5. Composition 3
6. Identification (with sub-paragraphs 6.1, 6.2, 6.3 & 6.4) 4
7. Sampling (with sub-paragraphs 7.1, 7.2, 7.3 & 7.4 Order of Precedence) 5
8. Non-Firing Tests 6
   8.1. Visual Inspection 6
      8.1.1. of Logistic Packings 6
      8.1.2. of ***TR90 (M3) Trainer*** System 6
   8.2. Dimensional Inspection 7
9. Firing Tests 8
   9.1. Accuracy Test 8
      9.1.1. Method 8
      9.1.2. Calculation 8
      9.1.3. Acceptance Criteria 8
   9.2. Percussion Test 9
      9.2.1. Method 9
      9.2.2. Acceptance Criteria 9
   9.3. Over Pressure Test 9
      9.3.1. Method 9
      9.3.2. Acceptance Criteria 9

Annex A. Table of Random Numbers 10

1. SUBJECT

This set of Specifications establishes the tests imposed upon lots of production for ***INSTALAZA***'s ***TR90 (M3) TRAINERS*** for the C90 (M3) Family of Weapon Systems when introduced for official acceptance, and the criteria for acceptance or rejection according to the results of the tests.

2. PRELIMINARY CONDITIONS

To apply this set of Specifications the production shall have been carried out according to the manufacturing plans for each of the parts and for the whole finished item. This fact shall be certified by the Resident Military Inspector in the factory of the Manufacturer.

3. APPLICABLE DOCUMENTS

The following documents, of the issue in effect on the date of signature of the contract form a part of these specifications to the extent specified herein.

3.1. STANDARDS

- ANSI/ASQC Z1.4-1993, Sampling Procedures and Tables for Inspection by Attributes.

3.2. DRAWINGS

- ***TR90 (M3) Trainer***: 40 W07 9100
- Container-Launcher (Assy.): 40 W07 9200
- Firing Mechanism (Assy.): 40 W07 9300
- Optical Viewfinder (Assy.): 40 W07 9400
- Extractor: 40 W03 9601
- Breech (Assy.): 40 W03 9701
- Logistic Packing: 40 W07 9500

3.3. QUALITY PLAN AND MANUFACTURING DOCUMENTATION

Although these documents form part of these Specifications, they do not form part of the Contract. The Manufacturer will permit to consult those documents if it is strictly necessary and a formal request is presented by the Customer.

4. LOTS

4.1. DEFINITION

A Lot is considered as the group of units of ***TR90 (M3) Trainers*** presented for simultaneous acceptance under the same contract of supply, manufactured according to the same industrial process and made out of parts which individually and separately fulfil this set of technical conditions.

4.2. LOT SIZE

4.2.1. The regular size or number of units in the Lot presented for acceptance shall be no more than 50 ***TR90 (M3) Trainers***.

4.2.2. The complete Lot shall be presented for acceptance in such a way as not to impede an easy sorting of the samples, enabling the picking up of the samples for testing in a not discriminatory way. The Lot may be presented for sampling in pallets in case the contract of supply or the conditions of the freight impose or recommend such a stacking.

5. COMPOSITION

The ***TR90 (M3) Trainers*** subject to the acceptance tests of these Specifications shall be presented for acceptance in wooden boxes (Logistic Packing) according to the applicable drawings mentioned in paragraph 3.2.

The Logistic Packing shall contain all elements in final delivery configuration, namely:

1 x ***TR90 (M3) Trainer*** (complete in operational configuration).

1 x Set of Spares of the following composition:

- 1 x Window (Ref.: 252)
- 1 x Forward window clip (Ref.: 253)
- 1 x Rear window clip (Ref.: 272)
- 1 x Arming spring (Ref.: 313)
- 1 x Firing Pin Spring (Ref.: 347)
- 1 x Firing Pin (Ref.: 350)
- 1 x Pin Hammer (Ref.: 351)
- 1 x Trigger (Ref.: 359)
- 1 x Locker (Ref.: 701)

1 x Cleaning Rod.

1 x ***TR90 (M3) Trainer*** Manual for Description and Use.

3 x Brief instruction manuals for arrow stabilizer replacement.

2 x Brief instruction manuals for ***TR90 (M3) Trainer*** operation.

1 x Tip bended Pliers for Stabilizer Locking Ring Operation.

1 x Storing Bag.

6. IDENTIFICATION

6.1. The Logistic Packings of the ***TR90 (M3) Trainers*** shall be externally marked according to the applicable drawings, in a most clear manner, with the following data:

A) "***TR90 (M3) TRAINER*** for C90 (M3) Weapon Systems".

B) Reference number of the particular trainer.

C) NATO Stock Number or Classification National Number.

D) Manufacturer's name and/or logo.

E) Total gross Weight, and,

F) Total Gross Volume.

and/or any other data/legend which may be agreed upon in the contract of supply.

6.2. The Firing Mechanism Cap (Safety Cover) shall be externally marked according to the applicable drawings, in a most clear manner, with the following legend:

A) "SAFETY COVER".

B) "LOADED WEAPON".

C) "ONLY REMOVE SAFETY COVER FOR FIRING".

6.3. The Container-Launcher shall be marked according to the applicable drawings with the following data:

A) A black arrow near the muzzle showing the direction of firing.

B) Graphic instructions for firing the ***TR90 (M3) Trainer***.

6.4. The breech shall have been engraved with the following data according to the applicable drawings:

TR-NN-AA

where:

* TR stands for "***tr***ainer".
* NN indicates the serial number with two digits.
* AA is an alphabetic, numeric or alpha-numeric identification of one or two symbols.

7. SAMPLING

7.1. In general, the sampling shall follow the ANSI/ASQC Z1.4-1993, in its last revision, for Normal Inspection and Single Sample.

7.2. A sample of Logistic Packings, in a quantity as given by Inspection Level II, shall be taken from the manufactured Lot. The Random Numbers Table of Annex I shall be used.

The samples of ***TR90 (M3) Trainers*** (systems) to be used in the non-firing and the firing tests as imposed by these Specifications, shall be taken from the sample above.

The samples for the non-firing tests shall be according to Inspection Level II, for every test.

The samples for the firing tests shall be according to Inspection Level S-1, for every test.

7.3. The ***TR90 (M3) Trainer***'s ammunition used in the different firing tests established in these Specifications shall be at the Customer cost.

7.4. ORDER OF PRECEDENCE OF THE TESTS. The order of precedence of tests shall be such as to minimize the final quantity of units and their required ammunition to be employed in the whole process of acceptance tests.

8. NON-FIRING TESTS

8.1. VISUAL INSPECTION

8.1.1. OF LOGISTIC PACKINGS

The Logistic Packings integrating the sample shall be inspected both internally and externally.

A Logistic Packing shall have to be considered as defective if it does not meet one or more of the following requirements:

A) All legends and/or markings shall be according to what is specified in Paragraph 6.1 of these Specifications.

B) The technical/operational documentation as specified in the contract of supply or as specified in Paragraph 5 shall be placed inside each Logistic Packing.

C) The type and quantity of spares and tools in the Logistic Packing under inspection shall be according to what is specified in Paragraph 5.

D) The Logistic Packing latches and handles are well and firmly placed, and work properly.

E) The metallic elements are not damaged or rusted.

F) The boards have no damage that make the packing useless.

G) No seal is missing.

H) The stackers are complete and well placed inside the Logistic Packing.

I) The ***TR90 (M3) Trainer*** System is placed inside the Storing Bag.

Acceptance Quality Level (AQL) = 6.5

Remarks: If defects that can be corrected easily in short time are found, the Acceptance Authority could continue with the Final Inspection –although the Lot can be refusable– while the manufacturer proceeds to correct the defective units.

8.1.2. OF ***TR90 (M3) TRAINER*** SYSTEM

A particular ***TR90 (M3) Trainer*** System shall be considered as defective if it does not meet one or more of the following requirements:

A) All legends and/or markings shall be according to what is specified in Paragraphs 6.2, 6.3 and 6.4.

B) All exterior components (Optical Aiming Sight, Firing Mechanism Safety Cover, the two Protecting Caps, Carrying Strap, etc.) are correctly assembled to the Container-Launcher.

C) The Protecting Cap and the Eyeguard of the Optical Viewfinder are in place and correctly attached.

D) Reticule markings are according to Drawings, without dots or scratches which may mislead the gunner.

F) The ***TR90 (M3) Trainer*** System is complete and apparently in full working condition.

G) The metallic elements are not damaged or rusted.

H) Inside elements of the ***TR90 (M3) Trainer*** according to Drawings.

I) No foreign bodies inside.

AQL = 6.5

8.2. DIMENSIONAL INSPECTION

Total length of the ***TR90 (M3) Trainers*** of the sample shall be between 894 and 912mm, Protecting Caps included.

The exterior calibre of the propelling barrel shall be between 12.75 and 12.82mm.

The depth of the breech shall be between 34 and 36mm.

The internal diameter of the breech shall be checked with the calibres specified in the Drawing reference 7131-13-1 of the Spanish Ministry of Defence.

Any ***TR90 (M3) Trainer*** which does not meet the above criteria shall be considered as a defective.

This dimensional inspection shall be carried out using measuring equipment as provided by the Manufacturer if, and only if, the equipment has been certified according to the official procedure established by the Spanish Ministry of Defence.

AQL = 6.5

9. FIRING TESTS

The ***TR90 (M3) Trainer***'s ammunition used in the different firing tests established in this Specifications shall be at the Customer cost.

9.1. ACCURACY TEST

9.1.1. METHOD

Eleven (11) firings will be carried out with every ***TR90 (M3) Trainer*** against a cloth target, dimensions 4m x 4m, placed at 150m from the muzzle.

The Optical Viewfinder of the System will be used as aiming unit every time.

Firings will be carried out at standard ambient temperature and with wind velocity lower than 3m/s.

Out of the eleven firings, one can be dropped.

Underneath and left hand sides of the target will be used as coordinates axis.

Mean Point of Impacts (MPI) will be determined and the dispersion of the rounds about the MPI will be measured.

9.1.2. CALCULATION

The consistency in each of the two directions is calculated using standard statistical procedures:

$$E_x = \left[\frac{\Sigma\,(\bar{x} - x_i)^2}{n}\right]^{1/2} ; E_y = \left[\frac{\Sigma\,(\bar{y} - y_i)^2}{n}\right]^{1/2}$$

50% zones will be:

$$Z_x = 1.349 \bullet E_x ; Z_y = 1.349 \bullet E_y$$

9.1.3. ACCEPTANCE CRITERIA

The 50 percent zones of the impacts should be less than 60cm in the horizontal axis and less than 75cm in the vertical axis.

The distance between the MPI and the Aiming Point of the cloth target shall be less than 75cm.

9.2. PERCUSSION TEST

9.2.1. METHOD

The units constituting the sample shall fire 100 propelling cartridges with their propelling charge previously removed.

Firings shall be performed at standard ambient temperature.

9.2.2. ACCEPTANCE CRITERIA

It will be considered a failure when:

- On firing the ***TR90 (M3) Trainer***, the Cartridge does not function (if the non-operation is exclusively due to the ***TR90 (M3) Trainer*** and not to a defective cartridge's primer, which can be ascertained by inspecting the denting in the primer and comparing it to other primers which have correctly operated)
- The Firing Mechanism fails the sequential operation arm/disarm/arm.
- The S/F Cam fails to secure the operation of the Firing Mechanism when the Trigger is operated in the S position.

No more than two failures in a ***TR90 (M3) Trainer*** will be admitted.

9.3. OVERPRESSURE TEST

7.1.4.1. METHOD

The units constituting the sample shall fire three (3) rounds with propelling cartridges in which the propelling charge shall have been incremented with an additional 10% of the nominal load.

The fire shall be performed at standard ambient temperature, with the ***TR90 (M3) Trainer*** System placed in a rigid stand and with Trigger operation by telecontrol at a safe distance.

7.1.4.2. ACCEPTANCE CRITERIA

Any ***TR90 (M3) Trainer*** System is considered defective when the Breech fails to operate correctly in 10 operations performed after every one of the overpressure firings.

Instalaza S.A.

ANNEX A. TABLE OF RANDOM NUMBERS

Instalaza s.a.

TABLE OF RANDOM NUMBERS

TO BE USED TO EXTRACT A SAMPLE OF n UNITS OUT OF A GROUP MADE OUT OF N UNITS.

1. First of all, the N physical units shall be placed in such a way as to be able to allocate each individual unit an ordinal number. For example: if the N units are parcels, the parcels shall be positioned to assign each one an ordinal number in a natural series (1, 2, 3, ..., N).

   This natural ordinal number shall be expressed with the same number of digits as the number of digits of N. For example: if N=640, then the numbers shall be: 001, 002, 003, ..., 638, 639, 640.

   D will be called the total number of digits of N (In the above example N=640 and D=3).

2. The user shall freely decide (without reading the table) how to make groups of D digits out of the annexed table. For example: the user may decide to make groups by using the first three digits of each group of the table as normally read: 488, 398, 666, 571, 272, 372, etc... or by using the last and two first digits of the table when read in inverted column: 548, 204, 720, 109, 083, etc...

3. The user shall also decide, freely and without previous examination of the table, the place of the table where he is going to start making groups of D digits. For example: from the beginning of the table (4885) or from the middle (6406).

   The user shall then decide, also freely and without previous examination, how from the initial group he is going to read the next group of figures in the table. For example: by normal columns, by inverted columns, by rows from left to right, etc...

4. Once the above process is engaged, the user shall note the numbers finally defined. Taking the first example: 488, 398, 666, 571, 272, 372, 834, 414, etc...

   From the list obtained in this way, the user shall reject the numbers which are bigger than N. If again, we take the first example and N=640, then 666, 834, etc... shall be deleted. Also the numbers equal to a previous number of the series shall be deleted from the list.

   The user shall proceed in this way up to the point in which the number of elements of the list equals n .

5. The user shall then choose the physical units corresponding to the n numbers of the list according to the criteria of order of the first paragraph.

Instalaza S.A.

TABLE OF RANDOM NUMBERS

4885 3982 6662 5712 2721 3729 8344 4144 4377 6981 8356 0699 3101 9504 7563
0422 2984 6066 0903 4227 3738 3346 2160 6458 2777 4636 8170 7037 6385 1429
2047 6315 9645 6849 9562 2721 3729 8747 2722 1627 5216 2111 3562 4005 4916
6941 5110 1331 6066 9476 3720 4017 8518 3236 0526 2070 8054 4036 5244 9702
8320 9992 6789 7518 5959 0671 5026 0705 2910 3220 6044 5059 1653 4200 5591

0347 7997 0007 5382 5191 8305 0260 1564 5037 3825 7448 3611 9270 8182 5429
3142 0778 7096 0916 7217 4465 4732 8067 7047 6165 6005 4742 3999 1043 4795
1385 6408 4217 0152 6595 1569 1117 9188 8116 5237 2296 9786 3770 8497 3170
1102 3178 1984 3314 6293 6527 6667 4194 9838 1651 8194 8449 2573 1967 8422
6574 7785 5844 9257 3196 7842 2657 4778 5527 2492 6462 1153 2132 4301 3089

1370 8157 6939 3756 6099 9068 4498 4437 8323 6086 5705 5988 2805 8699 6601
2753 0574 4694 6641 7639 9162 8622 5427 2480 2483 1997 9216 1400 4282 9441
1868 6528 8548 0559 3437 7543 7684 3528 1047 5951 5003 1312 6310 3117 0598
9204 3994 1948 2641 1510 0335 2346 5148 5340 4804 6256 0910 0324 2025 3415
5559 736 3871 1151 5465 4377 2922 2321 3278 5128 9938 0626 6507 5297 9173

1491 3022 4777 5819 7415 4179 7973 0582 5765 6629 5574 3350 7168 9617 2800
4627 7621 8282 3298 9919 6674 7555 9609 0431 3552 3979 7797 9899 0495 9435
9984 2477 9556 8030 8343 6716 6980 1407 6421 7610 5109 8589 4907 3810 9234
0114 5898 3150 7176 4305 8257 0701 9985 3184 4017 8073 9865 8188 0838 2056
3212 1261 8847 2846 9152 0954 8006 3265 2619 5087 7032 1323 7289 3145 6728

1437 9089 9353 5108 6717 2532 6406 8183 2747 4757 8068 5680 0054 6693 7605
5709 7425 5734 2767 1508 4198 0654 5520 2434 2874 9561 0479 3513 4888 1399
0137 6415 6484 4345 1891 1645 1457 8926 0609 2112 5323 1617 4055 7997 9065
0798 3538 7929 3244 7760 8802 5590 3062 6864 5896 2209 1745 3888 9114 2728
8467 4755 3915 2814 4266 0488 5113 8485 1153 7724 5705 5127 7092 6911 9943

4053 7506 1984 4923 0419 5432 5015 1226 2601 6259 6583 8312 2147 3022 3857
2079 0794 8027 4961 8414 1826 1284 9665 9809 5739 8478 6090 1963 8126 8905
5047 0718 1926 1601 5559 6561 8608 6571 4960 6145 5489 6828 3242 8656 3121
1045 3226 4188 0649 5117 5466 9241 4728 6759 1291 7035 3090 9221 0909 0804
6786 9360 4041 5897 3017 3774 7839 5543 1263 4335 7360 3585 7657 2261 8901

4622 3217 3081 0400 8295 2151 2506 9402 7529 4007 2922 9239 7339 8758 4915
6648 3612 9179 2569 9337 0659 5670 7630 1921 7267 3232 2921 4060 6171 4406
3628 0199 7253 2589 2643 9048 7913 1543 1035 7052 3464 7846 4878 0102 0769
7597 6417 8737 1860 9187 1681 6360 8254 8280 7154 1656 2392 1423 9391 4491
6071 9030 8884 2941 7688 3902 8657 8465 0064 4036 2129 0100 9503 2862 2082

5108 9952 7348 6154 1905 2177 0548 8322 9270 7216 0448 4096 3245 7574 3211
9222 8503 0547 9818 3073 9807 1208 6117 2624 0880 7799 1453 7399 1612 9595
5163 7027 3238 6718 466 8298 5363 5798 5793 5430 8246 3030 5937 8925 8498
6410 9921 6047 0393 7912 7625 4943 4683 5279 4850 7907 9627 8317 3640 1567
6578 3909 7101 3036 8038 6139 0855 6271 4541 8020 2476 8818 6295 5178 8416

4008 5248 3589 2410 5579 6255 9270 5169 9432 8383 6958 8510 3014 1701 4510
9091 8210 9887 1776 3219 0055 8172 7412 7817 1349 5126 9206 8851 9684 7610
7806 5778 9042 8012 3464 7480 2382 8524 0477 4631 0500 9760 5167 4040 6855
9545 1482 5880 8810 1997 2287 0766 0837 3335 2868 9855 3126 7792 5448 9662
8433 1236 8790 8332 0090 6893 6168 4096 2034 4625 7598 8262 2251 0074 1277

3857 9406 5159 4915 3788 0711 1928 1493 1511 0696 0089 8745 8263 4709 9862
1254 8167 9829 6227 8790 2611 8403 0935 1537 7544 3334 5331 5547 4884 7497
9956 3990 0182 9986 6028 0802 3236 8967 3290 2880 7979 9636 6614 7449 4891
2733 1178 3405 9341 6265 6111 4723 6139 2931 0405 1960 5166 3247 6468 4568
3953 5642 9126 7413 7622 5538 3335 9811 5948 6643 1761 4110 3169 2936 1234

LX02

Tele: 3019787

GOVERNMENT OF INDIA
MINISTRY OF DEFENCE
DEPTT OF DEF PRODN & SUPPLIES(DGQA)
DTE OF QUALITY ASSURANCE(ARMTS)
DHQ PO NEW DELHI-110011

No. A/93050/DL/DGQA/Arm-4 19 Dec 2001

To

The Controller
CQA(A) Kirkee Pune-411003

DISPOSABLE ROCKET LAUNCHER EX M/S INSTALZA SPAIN

1. Contract No. 10(8)/2001/D(GS IV) dated 26 Nov 2001 is forwarded in original. You are requested to keep a copy of the same and return the original to this HQ at the earliest.

Encl :- 1) Contract as above
2) General Description Anti Bunker Wpn System C-90-CR-BK (M3.1)
3) Set of Ammunition 10X Trainers for TR90 and TR 90 (M3). Specification for acceptance FE 3.03.01.02.2
4) C-90-CR-BK (M3.1) Specification for acceptance FE 3.02.05.02 1

(DV Singhal)
PScO
DDQA(A)
for DIRECTOR OF QUALITY ASSURANCE(ARMTS)