



UNDERWRITERS LABORATORIES INC.®
1285 WALT WHITMAN ROAD • MELVILLE, LONG ISLAND, NEW YORK 11747-5381

APP'S REPORT

an independent, not-for-profit organization testing for public safety

File SA7099
Project 89ME50600

November 2, 1989

REPORT

on

PHZS - MEANS OF ESCAPE

Under The

CLASSIFICATION PROGRAM

Modum USA Corp.
Houston, TX

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Underwriters Laboratories Inc.®

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April 24, 1995
MELVILLE OFFICE



Modem International Of Illinois, Inc.
Mr. Harold Brotens
42W194 Campton Hills Rd.
Elburn, IL 60119

Subject: Agency Notification of Authorization

Dear Mr. Brotens:

UL has received the attached Agency Authorization Notification Form from Mogens Taarop of Danacet A/S indicating that you are to function as their agent in their work with UL.

We have recorded this authorization information, and are providing you with a copy of the form to ensure all parties involved are aware of the details.

We appreciate this opportunity to be of service. Should you have any questions regarding these arrangements or wish to make some change, please contact me at the above UL office.

Yours truly,

CHARLENE BROOKS (Ext. 22699)
Agent Specialist

CB:dh
Attach.
04951620

Issued: 11-2-89

D E S C R I P T I O N

PRODUCT COVERED:

Supplementary means of egress designated "Modum Escape Ladder" fold out aluminum ladder, exterior wall mounted. Rated 30 lb per ft, with a maximum total length not exceeding 30 ft.

GENERAL:

This ladder is intended to be secured to the exterior wall of a building and used only when normal egress methods are not available. This ladder is not intended to be used as an emergency exit as required by the Life Safety Code, NFPA 101 of the National Fire Protection Association. This ladder is intended to be installed in accordance with the instructions provided with the product (see Ill. 14.1 to 14.5) on walls consisting of exterior siding, stucco, metal, masonry, brick, concrete or wood. The ladder may be connected in series with the appropriate connection means in accordance with the instructions. Angled overhang sections are permissible provided that the slope from the vertical does not exceed 30° and are mounted in accordance with the instructions.

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE USE):

Use - The ladder covered by this Report is intended for use as a supplementary means of escape from window or balcony access points.

The installation and use of the ladder covered by this Report are under the jurisdiction of building code and security authorities and subject to the following:

1. The ladder is installed only on exterior building surface as a supplementary means of escape with no Recognition as a required exit.
2. Installation requirements of the local authorities having jurisdiction are satisfied.

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3. Security requirements of the local authorities having jurisdiction are satisfied.

TESTS TO BE CONDUCTED BY MANUFACTURER:

Operation Test - To be performed on each ladder. Each release station must not exceed 5 lbs of force to pull the pin, and the ladder shall deploy without any resistive force.

MARKING:

The following markings shall appear on each unit (ladder section) at the appropriate location. All markings shall be on Recognized Component marking and labeling systems (PGDQ2) manufactured by Topslight AB, designated "P-728S" or "P-728SCP".

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1. Caution - Do Not Block - Located at eye level on the outer rail of the bottom ladder section. See Ill. 15, No. 1.
2. Manufacturer/Product Restrictions - Manufacturer, rated load, NFPA 101 disclaimer and shock hazard caution. Located at every release station facing the access point. See Ill. 15, No. 2.
3. UL Classification Mark - Classification mark and control number located at every release station facing the access point. See Ill. 15 No. 3.
4. Instructions - Operation and maintenance instructions. Located at every release station facing the access point.

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CONSTRUCTION DETAILS:

1. Tolerances for decimal dimensions \pm 0.30 mm unless otherwise indicated on the Figures or Illustrations.

2. All aluminum rung and side rail stock used in the fabrication of the unit shall be designated:

Alcan 50 SWP
Hydro 6111 ALM 65015
Profilgrp 6053-T6

3. Welding rods used in the buttress section shall be marked DE58. All welds should be visually examined for cracks, porosity, undercuts and proper seam size.

ASSEMBLED LADDER-STRAIGHT SECTION VARIATIONS

FIG. 1

General - The basic ladder construction as shown may be any length (unbroken or joined sections) not exceeding 30 feet with the appropriate mountings, release stations, and coupling links.

SECTION A - Straight section with top release station.

SECTION B - Straight section with joined release station.

SECTION C - Joined straight sections with or without joined release station.

1. Cover - See Fig. 3 Item 6 for further details.
2. Inner Rail - See Ill. 1 for dimensional details. Aluminum trough with flange which houses and supports the rungs.
3. Outer Rail - Same as inner rail.
4. Release Pin - See Fig. 3, Item 5 for further details.
5. Mounting Bracket - See Ill. 4 for dimensional details of one piece bracket and Ill. 5 for dimensional details of two piece bracket. One or two piece aluminum plate to secure inner rail to building surfaces. Fasteners are not provided with the product. For straight sections, brackets are to be located at either the first or second rung from the top of the section and at the last rung in the section with additional mounting brackets at least every fourth rung.
6. Standard Rung - See Ill. 6 for dimensional details. Square aluminum tubes with anti-slip step surface connected to rails at 30.0 cm intervals with a stainless steel bolt and lock nut 6.0 mm O.D., 50.0 mm long, or 6.0 mm O.D., 64 mm long with mounting brackets.

and Report

7. Joined Release Station - See Ill. 7 for positioning and Fig. 3, Item 4 for further details of the coupling link. This release station may be added at any point to the outer rail of straight ladder sections or at joined ladder sections. A two piece mounting bracket must be used on the rung under the release station if there is none.
8. Inner Fish Plate - See Fig. 3, Item 7 for details.
9. Outer Fish Plate - See Fig. 3, Item 8 for details.

ASSEMBLED LADDER - BUTTRESS SECTION

FIG. 2

General - The buttress ladder construction as shown may be added to straight sections only at either end with the appropriate mountings, release stations or coupling links as described in Fig. 1 and are not permitted elsewhere in the buttress section. The slope section may not have more than 3 telescoping rungs or exceed an angle of 30°.

1. Cover - Same as Fig. 1, Item 1.
2. Inner Rail - Same as Fig. 1, Item 2.
3. Outer Rail - Same as Fig. 1, Item 3.
4. Standard Rung - Same as Fig. 1, Item 6.
5. Slide Rung - See Ill. 9 for dimensional details. Square aluminum tube with anti-slip step surface to fit inside the modified standard rung making a telescoping rung. The slide rung is connected to the inner rail with a stainless steel bolt and lock out 6.0 mm O.D., 50.0 mm long.
6. Modified Standard Rung - Same as standard rung Fig. 1, Item 6 with the following modifications: The total length is 340.0 mm and the unbolted rung end is cut perpendicular for a squared end.
7. Release Pin - Same as Fig. 1, Item 4.
8. Welded Joints - Four angle joints but welded on the inner and outer surfaces with a minimum seam, size of 8.0 mm and ground flat on the inner surfaces of the rails.
9. Mounting Bracket - Same as Fig. 1, Item 5 positioned at the 1st, 4th, 7th and 9th rung.

FIG. 3 (M89-19221)

1. Adaptor Plate - See Ill. 10 for dimensional details. Aluminum plate for use on buildings with thin stud areas, fasteners are not provided for connection to the building structure. Two stainless steel bolts, 8.0 mm O.D. 30.5 mm long are provided for attachment of the mounting brackets.
2. Two Piece Mounting Bracket - Same as Fig. 1, Item 5. See Ill. 5 for dimensional details.
3. One Piece Mounting Bracket - Same as Fig. 1 Item 5. See Ill. 4 for dimensional details.
4. Coupling Link - See Ill. 8 for dimensional details and Ill. 7 for location of coupling link. Polymeric insert to be riveted to the outer rail at a jointed release station.
5. Release Pin - See Ill. 2 for dimensional details, Ill. 3 for positioning of pin on top release stations and Ill. 7 for joined release stations. Stainless steel pin with chain and polymeric sleeves, connected to rail with screw.
6. Cover - See Ill. 11 for dimensional details. Attached to the top inner rail of exposed ladder sections or an option on the outer rail of exposed bottom sections with 2 stainless steel bolts 4.8 mm O.D., 16.2 mm long.
7. Outer Fishplate - See Ill. 12 for dimensional details. Aluminum connecting plate for outer rails. Four stainless steel screws provided, 5.0 mm O.D., 16.2 mm long.
8. Inner Fishplate - See Ill. 12 for dimensional details, aluminum connecting plate for inner rails. Four stainless steel bolts provided, 5.0 mm O.D., 19.9 mm long.
9. Shims - See Ill. 13 for dimensional details. 1.5 mm and 3.0 mm aluminum plates to fit between the building surface and mounting brackets. Two types: open and closed fit, close fit not shown.

T E S T R E C O R D N O. 1SAMPLES:

Samples representative of the Modum Escape Ladder were used to determine compliance with the design and construction requirements for the Class.

Test work was performed at the manufacturing location and the Melville Office of Underwriters Laboratories Inc. The following tests were conducted:

OPERATIONAL TEST:

METHOD

A 4.5 m ladder section with a top release station and a joined section with a release station were mounted as intended for use. The units were then subjected to 100 cycles of release, extension, retraction and securement.

RESULTS

A visual examination of component parts showed no excessive wear. The ladder release mechanisms and extension operated as intended without sticking.

STATIC LOAD TEST:

METHOD

A 4.5 m straight section with top release station mounted to brick and a 4.5 m straight section with a coupled release station and joined with fishplates mounted to wood as intended for use in accordance with the manufacturers installation instructions were subjected to a uniform static load of 4 times the rated load applied for 1 minute.

RESULTS

The ladder and mountings held the applied load without failure. There was no evidence of slipping or stripping of the mounting means and no visible damage to the ladder. The unit was retracted and secured as intended after this test.

RUNG STRENGTH TEST:

METHOD

A 1000 lb static load was applied for 5 minutes to a 3-1/2 in wide block resting at the center of a telescoping rung on a 3.14 m buttress ladder section.

RESULTS

The rung withstood the applied load after deformation without ultimate failure. A permanent set of 1.6 in was recorded. The ladder could not be retracted and secured as intended after this test.

RUNG/RAIL SHEAR TEST:

METHOD

A 1000 lb static load was applied for 5 min to a 3-1/2 in wide block on the center of a telescoping rung as close to the inner rail as possible on a 3.14 m buttress ladder section.

RESULTS

The rung held the load without failure. Upon removal of the test load, there was no visual evidence of damage to the bolt, rung or inner side rail. The unit was retracted and secured as intended after this test.

RUNG TORQUE TEST:

METHOD

The same unit employed during the rung/rail shear test was subjected to a 100 ft lb torque applied to the center of the rung. The torque was applied using a test bar that would not damage the rung and alternated clockwise and counterclockwise for 10 cycles at 30 sec per application.

RESULTS

The rung withstood the torque cycling without failure. There was no visible damage to the rung, side rails or bolts. There was no visible motion between the rung and side rails. The unit was retracted and secured as intended after this test. The maximum twist angle under load was approximately 10°. There was no permanent set.

RELEASE MECHANISM TEST:

METHOD

The force required to pull out the release pin on a single section and a joined section with a release station was recorded with three consecutive releases.

RESULTS

The forces measured did not exceed the 5 lb limit.

LOW TEMPERATURE TEST:

METHOD

Two, 3-1/2 ft retracted and secured sections of a single ladder and a 3-1/2 ft joined section with a release station was subjected to 24 h at -40°C. The force required to pull the release pin and deploy the ladder was recorded.

RESULTS

The force to release the pin did not exceed the 25 lbf limit. The ladder deployed as intended.

RAIN/LOW TEMPERATURE TEST:

METHOD

The same samples used in the low temperature test were subjected to a 1 h standing rain test. Immediately following the standing rain, the samples were placed in a chamber at -40°C for 8 h. The force required to pull the release pin and deploy the ladder was recorded.

RESULTS

The force to release the pin did not exceed the 25 lbf limit. The ladder deployed as intended.

SALT FOG TEST:

METHOD

The same samples used in the low temperature test were subjected to a salt spray exposure for 240 h in accordance to ASTM B117. After the exposure, the force required to pull the release pin and deploy the ladder was recorded.

RESULTS

The force to release the pin did not exceed the 25 lbf limit. The ladder deployed as intended.

TENSILE STRENGTH TEST:

METHOD

Three ASTM E8 test bars were cut from a section of the side rail and subjected to a Tensile Strength Test at a crosshead speed of 0.2 in/min.

RESULTS

The average break strength was found to be 32,184 psi.

C.D.

C O N C L U S I O N

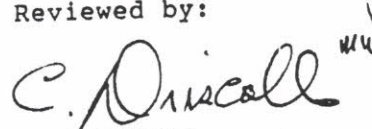
Samples of the products covered by this report have been found to comply with the requirements covering the class when limited to use as supplementary means of egress, and the products are judged to be eligible for Classification and Follow-Up Service. The manufacturer is authorized to use the Laboratories' Classification Marking on such products which comply with the Follow-Up Service Procedure and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the Laboratories' Classification Marking are considered as Classified by Underwriters Laboratories Inc.

Report by:

 MW

R. RIEGEL
Project Engineer
Casualty and Chemical Hazards Dept.

Reviewed by:

 MW

C. DRISCOLL
Engineering Group Leader
Casualty and Chemical Hazards Dept.

A P P E N D I X A

FIELD REPRESENTATIVE'S DUTIES AND INSTRUCTIONS FOR EXAMINATION OF THE PRODUCT.

I. FIELD REPRESENTATIVE'S DUTIES:

The field representative's duties include, but are not limited to:

- A. Examine the construction of production intended to bear the UL Mark or Marking to determine compliance with the description of the product and any other requirements expressed in this Procedure.
- B. Where so specified by an Appendix B, forward samples to UL for Follow-Up Tests.
- C. Where so specified by an Appendix C, perform the required tests at the manufacturing location on randomly selected samples.
- D. Where so specified by an Appendix D, witness tests performed by the manufacturer and ensure that:
 - 1. The proper number of samples are undergoing the required tests, and
 - 2. The required tests are being performed correctly, and
 - 3. The instruments being used for the tests have been calibrated at the prescribed interval and are in good working order.
- F. Report to the manufacturer and Follow-Up Services Department by means of a Variation Notice (VN) if:
 - 1. Variations in construction are found.
 - 2. Variations in markings are found.
- G. When a product does not comply with the Follow-Up Service Procedure require that the manufacturer either shall (1) remove any markings referencing UL from the product, (2) or suitably modify all products that do not comply with the Follow-Up Services Procedure, or (3) hold shipment pending further instructions from Follow-Up Services.

In the event of a disagreement between the manufacturer and the field representative as to whether a product is acceptable, the manufacturer shall hold production at the factory pending resolution of the variations. The manufacturer has the right to appeal a decision with which he disagrees and the field representative shall provide the name of the FUS engineer to whom the appeal is to be made. Should Follow-Up Services grant temporary authorization for the continued use of the UL Mark, such temporary authorization shall only be for the time needed to review and/or process the Procedure revisions, or as otherwise specified to cover a particular lot or production run.

II. INSTRUCTIONS FOR INSPECTION OF THE PRODUCT:

- A. At each inspection, samples of current production and/or stock shall be examined for compliance with the applicable descriptions and requirements contained in this Procedure.
- B. In making this determination, consideration shall also be given to the following general requirements applying to the products covered by this Procedure.
 - 1. Markings - Information required shall be permanent and legibly marked on the product, in the manner specified under the General Description.
 - 2. Personal Injury Considerations - Except as described to provide a specific function, the product shall have no sharp edges, burrs, points, or spikes inside or outside which may cause injury during use or during cleaning operations.
 - 3. Packaging - There shall be no marking on the carton or package that is, or could be considered to be, in conflict with or an extension of the use covered in the instruction manual or Procedure.

A P P E N D I X B

SAMPLES TO BE FORWARDED TO MELVILLE FOLLOW-UP

FIELD REPRESENTATIVE:

During the regular inspection, the Field Representative shall:

1. Select necessary items for forwarding to Melville (see "Samples for Melville").

SAMPLES FOR MELVILLE

Select samples as described in TABLE A marked with the appropriate identification and forward to the Follow-Up Services Department at Melville. The forwarded samples shall be subjected to the tests and requirements as described in Appendix E.

TABLE A

<u>Frequency of Test</u>	<u>Proc. Sec.</u>	<u>Mat. Desiq.</u>	<u>Test Performed</u>	<u>Sample Size</u>	<u>Sample Description</u>
1/year	1	#	Tensile Test	2 ft.	Side Rail

Select any one of the following: Alcan 50 SWP, Hydro 6111 ALM 65015, or Profilgrp 6063-T6.

A P P E N D I X C

TEST CONDUCTED BY THE FIELD REPRESENTATIVE

GENERAL:

The field representative shall perform the test at the manufacturing location as listed below and judge the results according to the basis for acceptability.

RELEASE PIN PULLOUT:

METHOD

Using an applicable force gauge, pull the release pin in a manner perpendicular to the side rail on three samples each of the top release station and joined release station of randomly selected completed units.

BASIS FOR ACCEPTABILITY

The force required to directly pull out the release pin shall not exceed 5 lb on any sample.

HARDNESS TEST:

METHOD

Using a Webster hardness tester, determine the hardness on randomly selected samples of the side rails, rungs and mounting plates.

BASIS FOR ACCEPTABILITY

The hardness of any sample test shall be at least 13.

A P P E N D I X D

TESTS TO BE WITNESSED BY THE FIELD REPRESENTATIVE

GENERAL:

Upon every visit, the following tests are to be performed by the manufacturer and witnessed by the Field Representative. Instruments are to be calibrated at least once per year.

RUNG STRENGTH TEST:

METHOD

A 1,000 lb static load shall be applied to a 3.5 in wide block resting at the center of a rung connected on a straight ladder section for one minute.

BASIS FOR ACCEPTABILITY

There shall be no cracking or failure of the rung or supporting rails. The ladder must retract and deploy as intended.

A P P E N D I X E

INSTRUCTIONS FOR FOLLOW-UP TESTS AT UL

GENERAL:

The samples forwarded by the Field Representative shall be subjected to the appropriate test as described below.

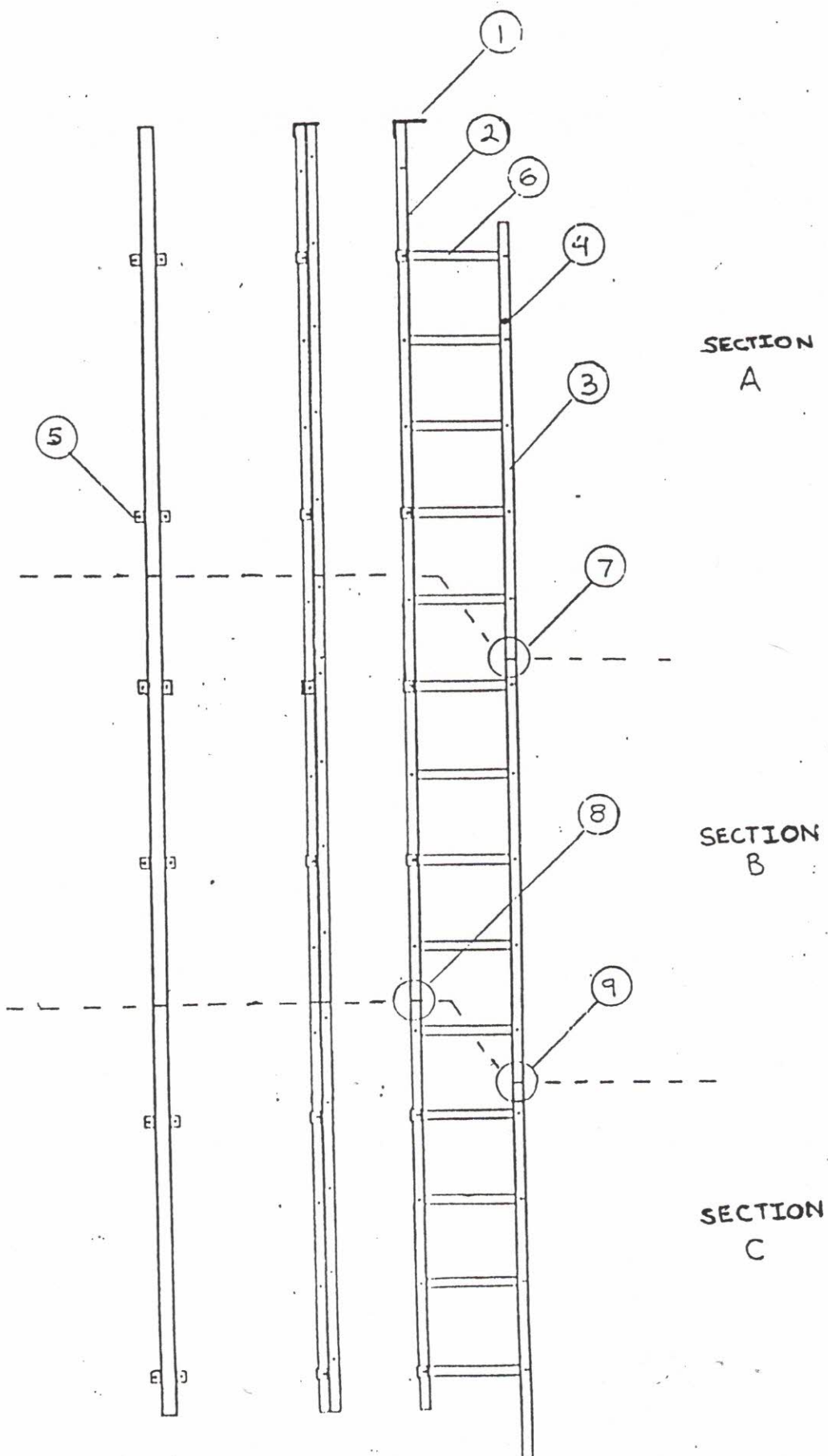
TENSILE STRENGTH TEST:

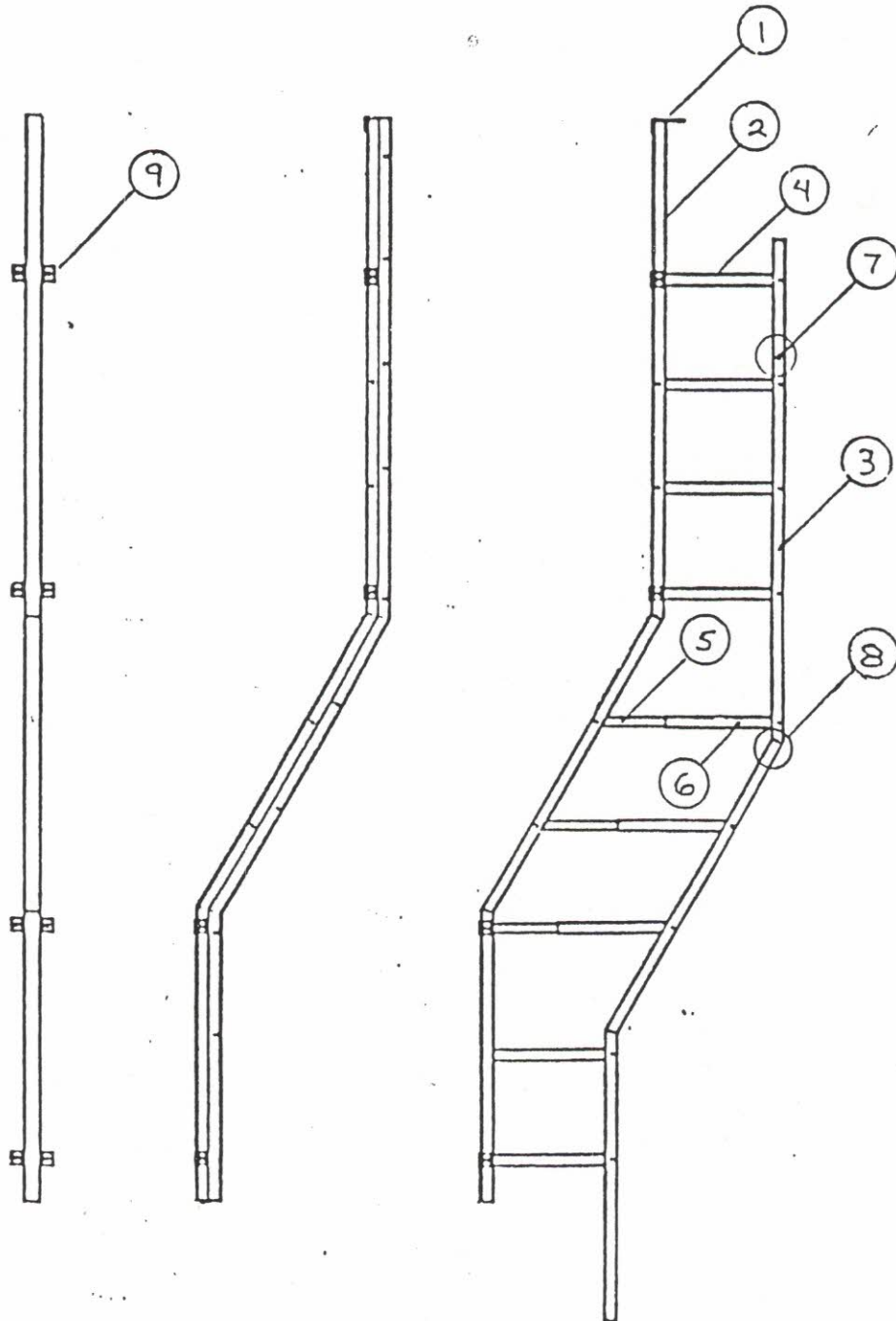
METHOD

Three ASTM E8 samples bars shall be cut from the side rail and subjected to a tensile strength test at a crosshead speed of 0.2 in/min.

BASIS FOR ACCEPTABILITY

The break strength of the material shall be at least 29,000 psi





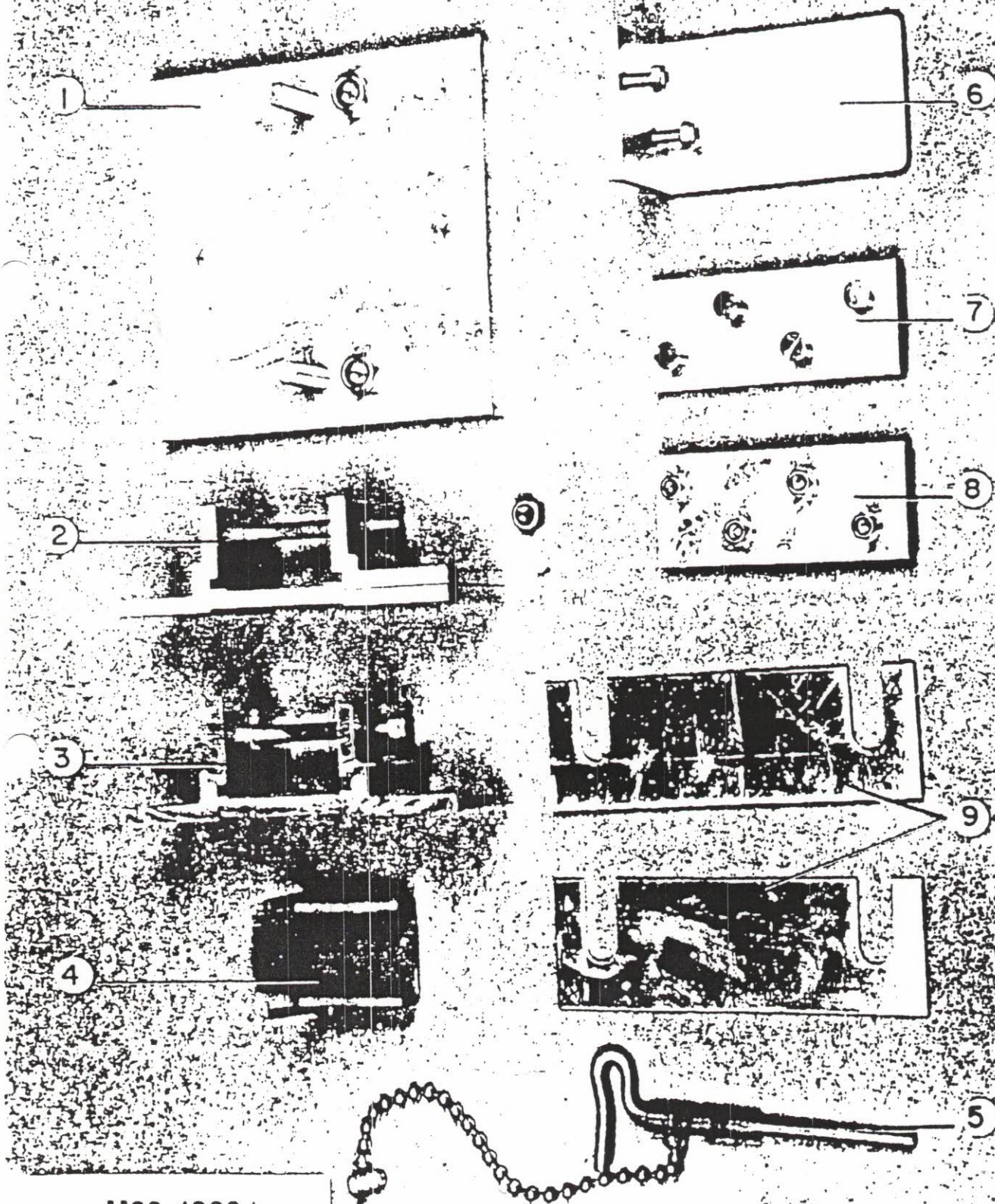
FRONT

SIDE

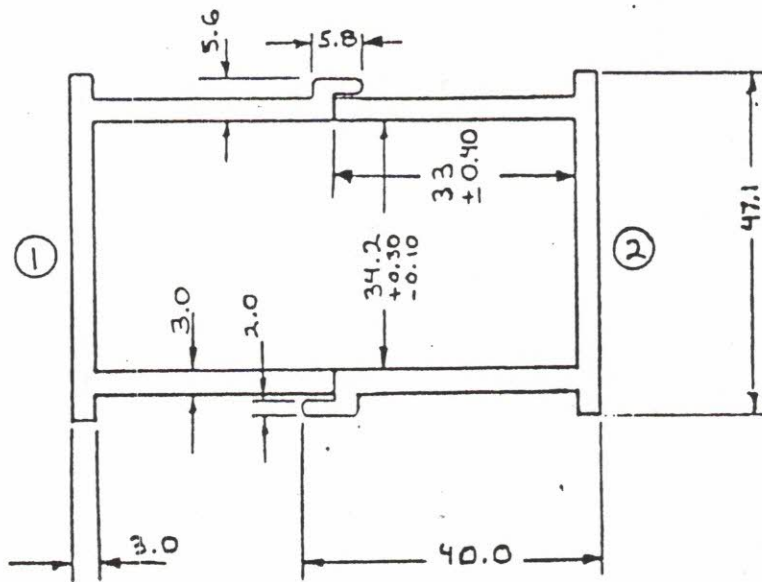
SIDE

RETRACTED

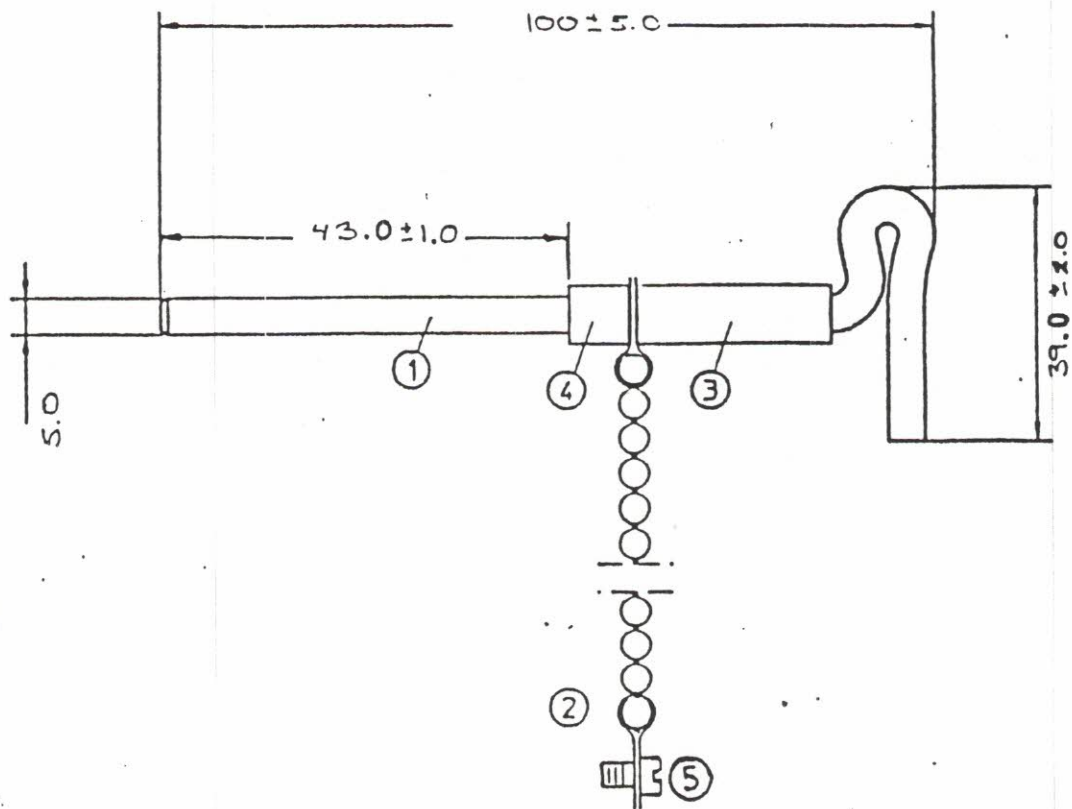
DEPLOYED



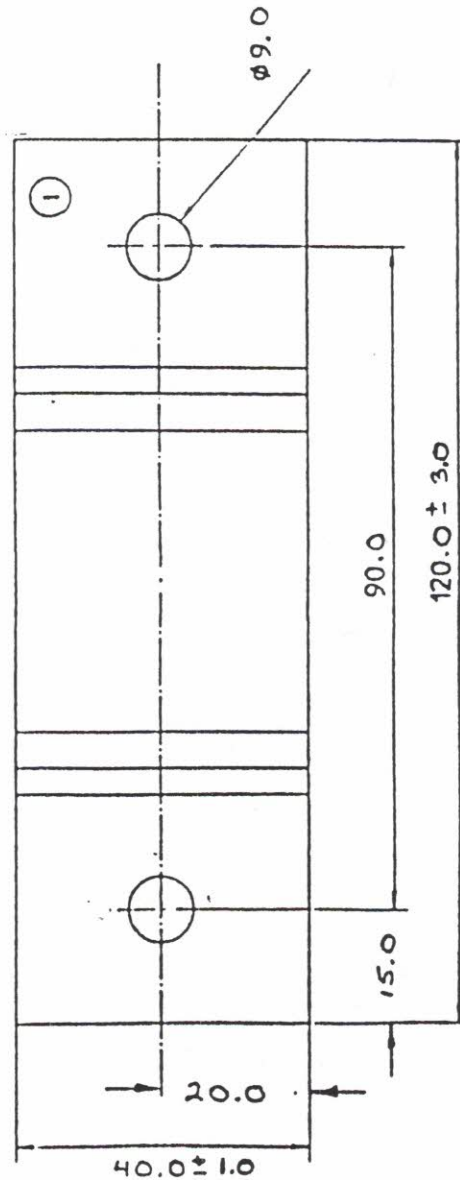
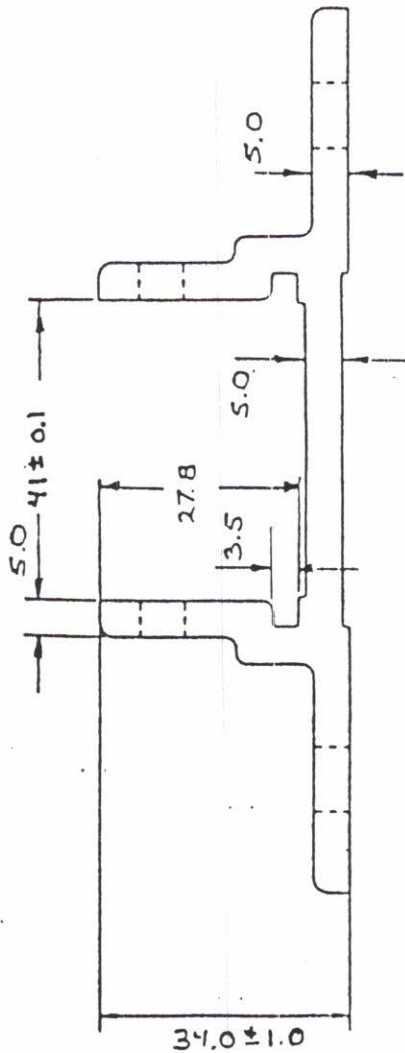
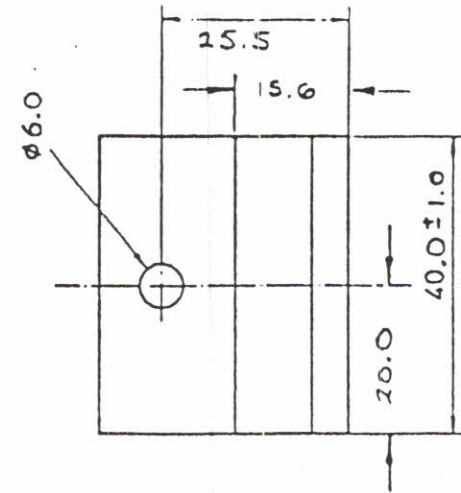
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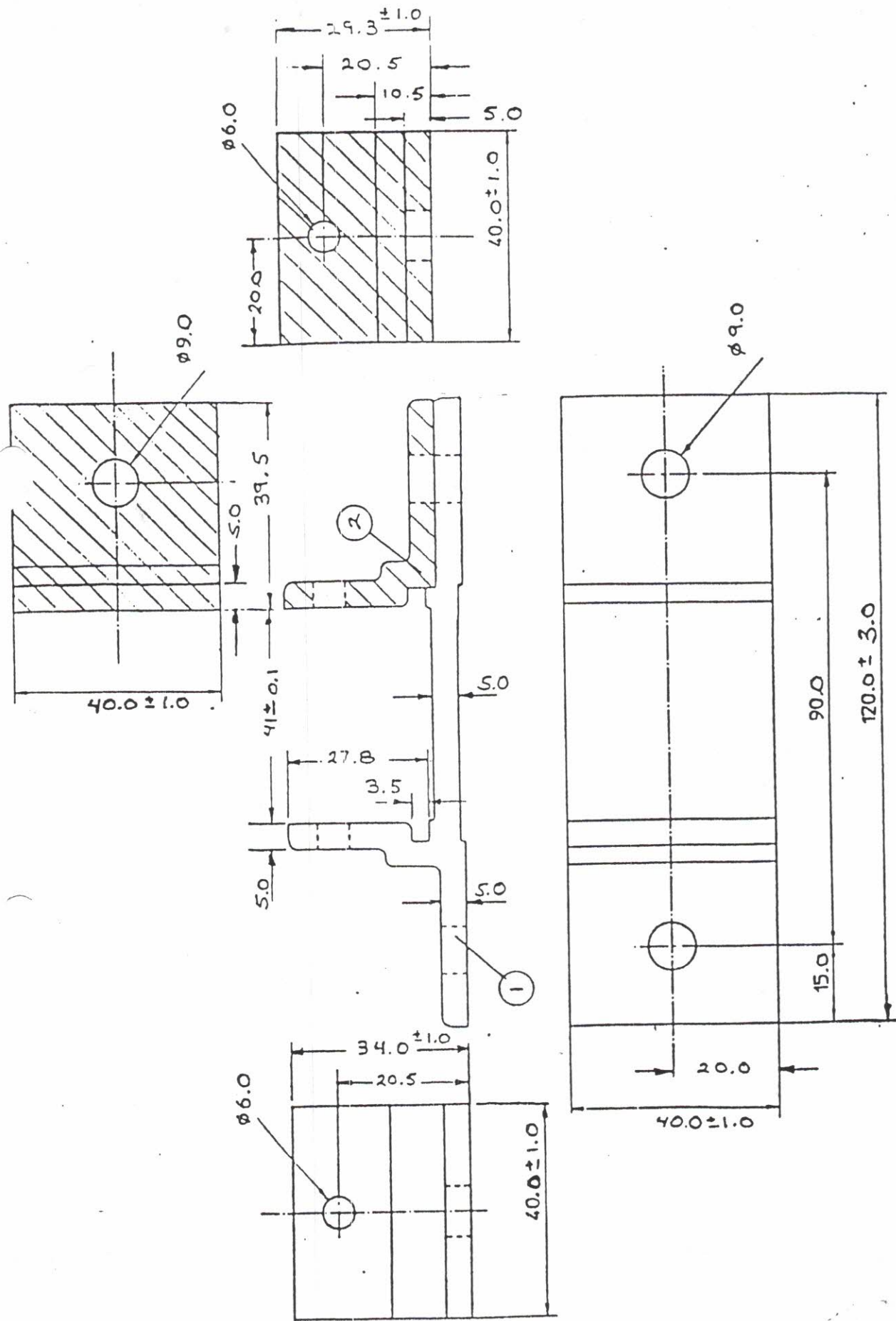
NBR.	NAME	ITEM
1	Inner Rail	1
1	Outer Rail	2



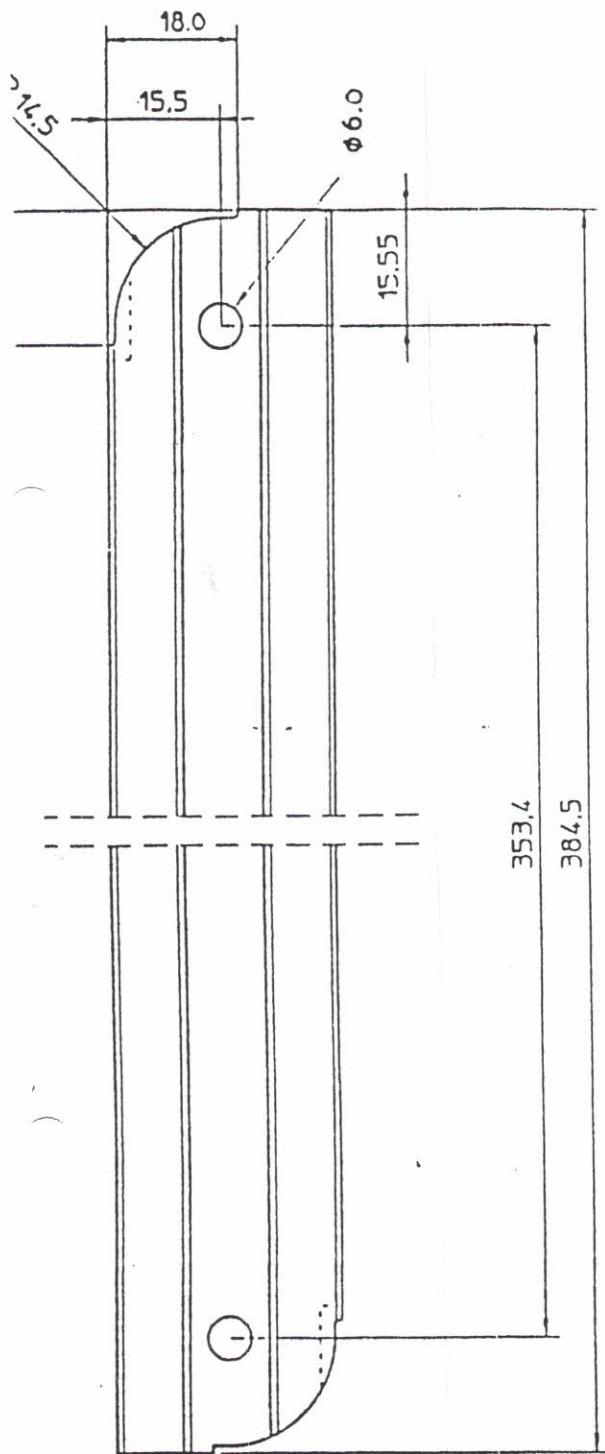
NBR.	NAME	ITEM
1	Release pin	1
1	Chain	2
1	Plastic sleeve	3
1	Plastic sleeve	4
1	Selflapping screw	5



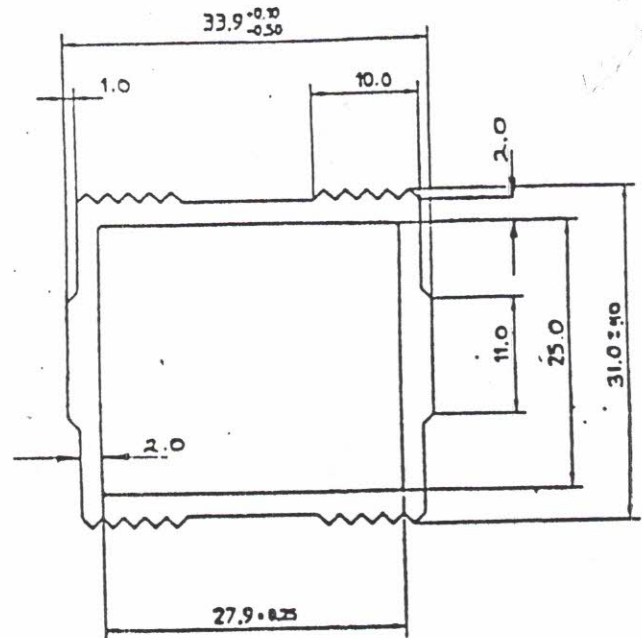
NBR.	NAME	ITEM
1	Base for two-piece bracket	1

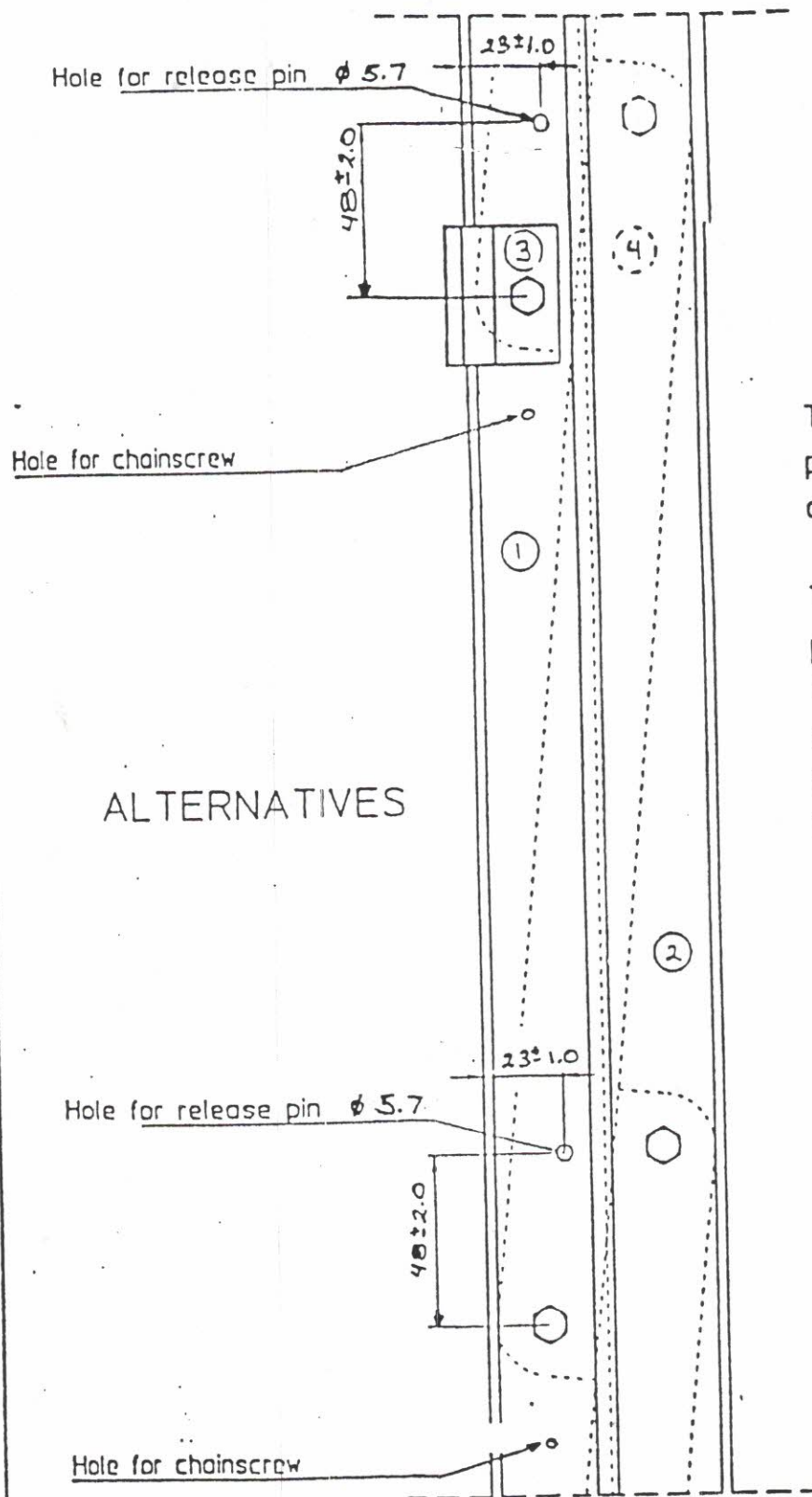


NBR.	NAME	ITEM
1	Base for two-piece bracket	1
1	Angle for two-piece bracket	2



STANDARD RUNG

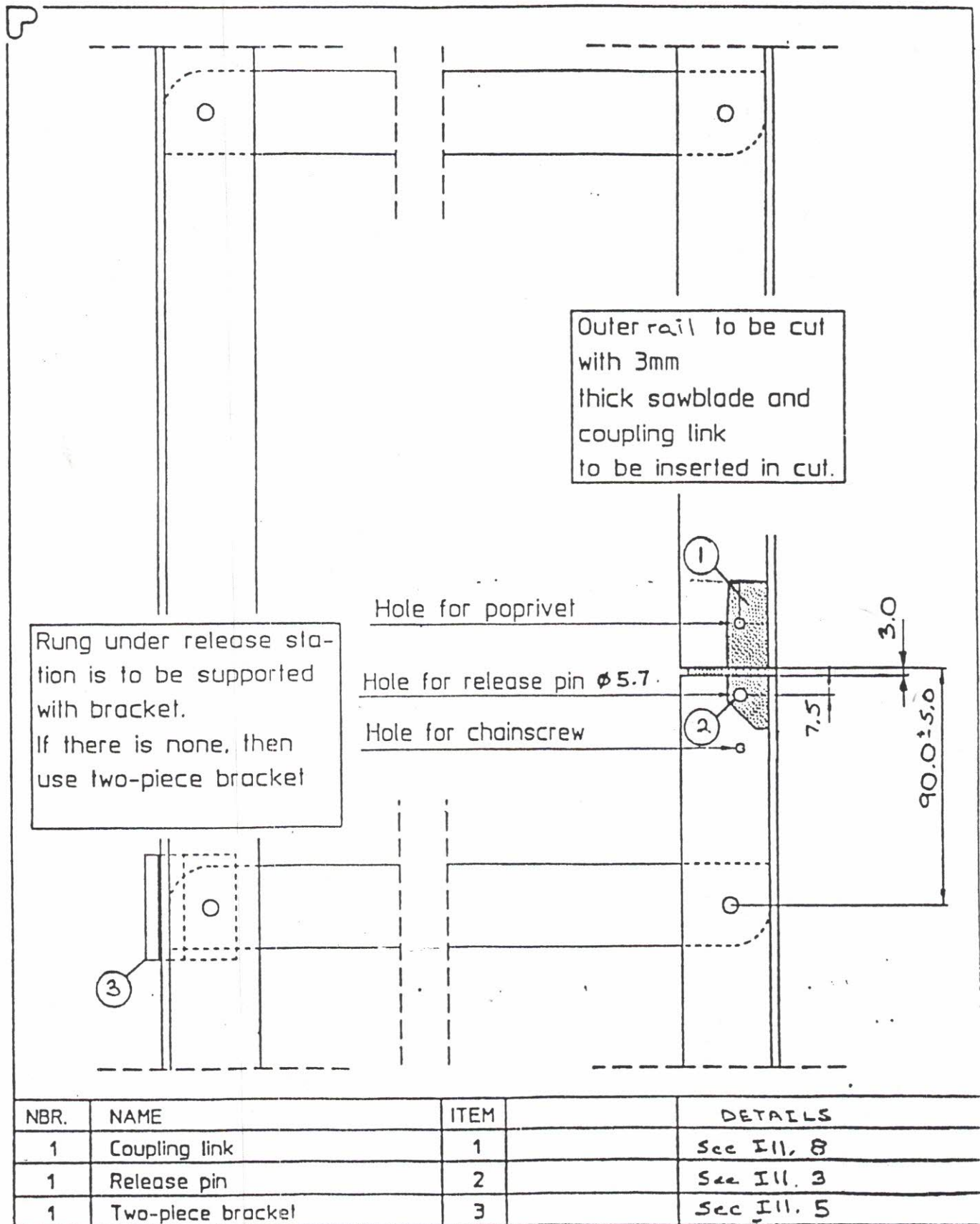


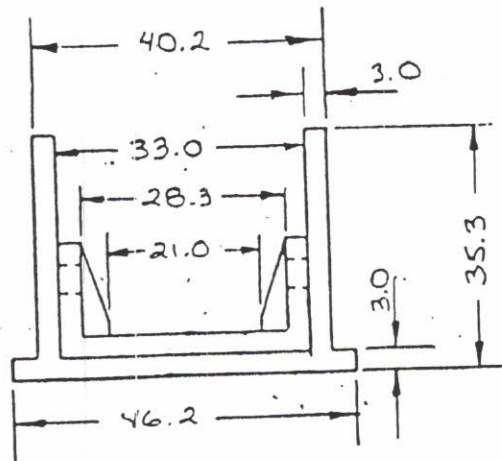
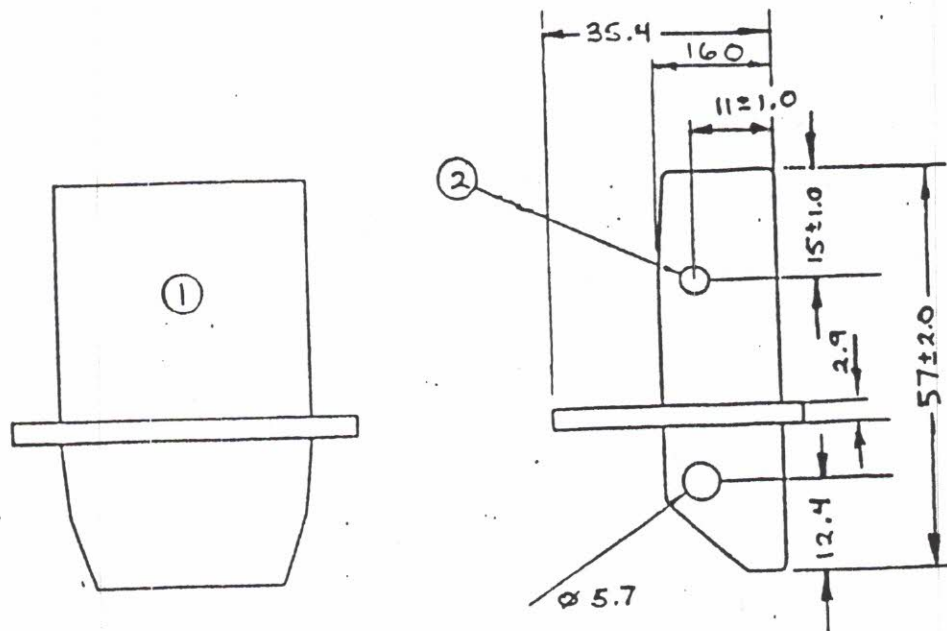


The uppermost release pin can be located at any of the upper rungs.

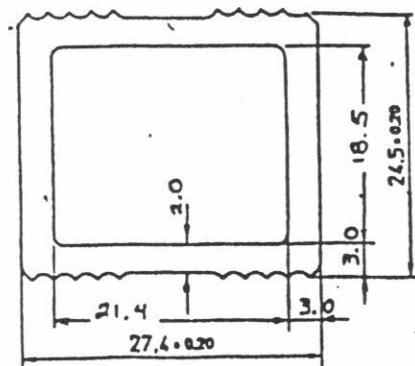
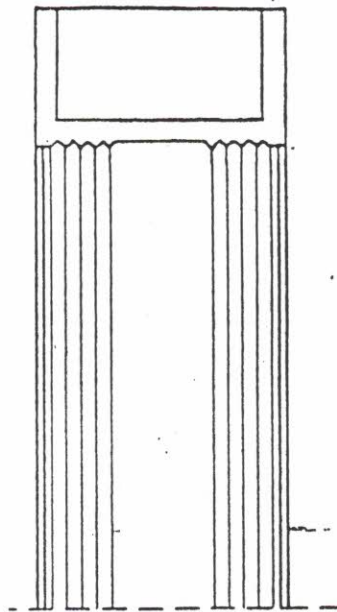
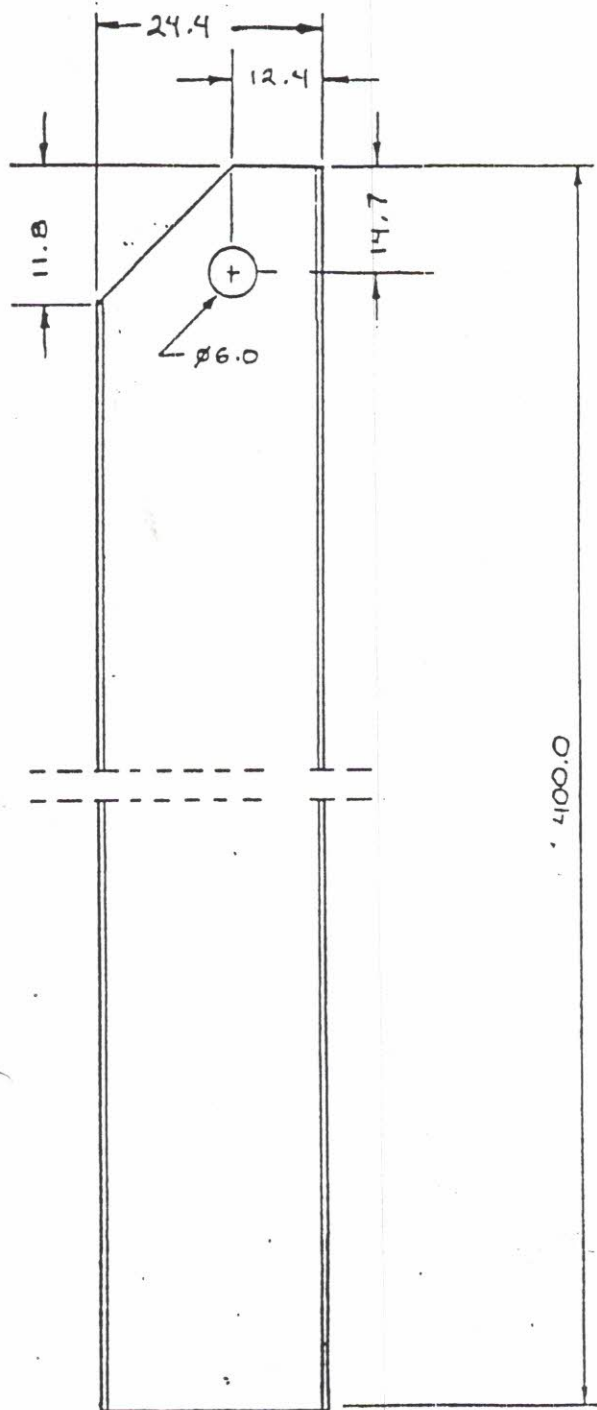
The hole for release pin is to be drilled through inner rail and rung while the slides are being kept tight together.

NBR.	NAME	ITEM
1	Inner Rail	1
2	Outer Rail	2
2	Mounting Bracket	3
2	Rung	4

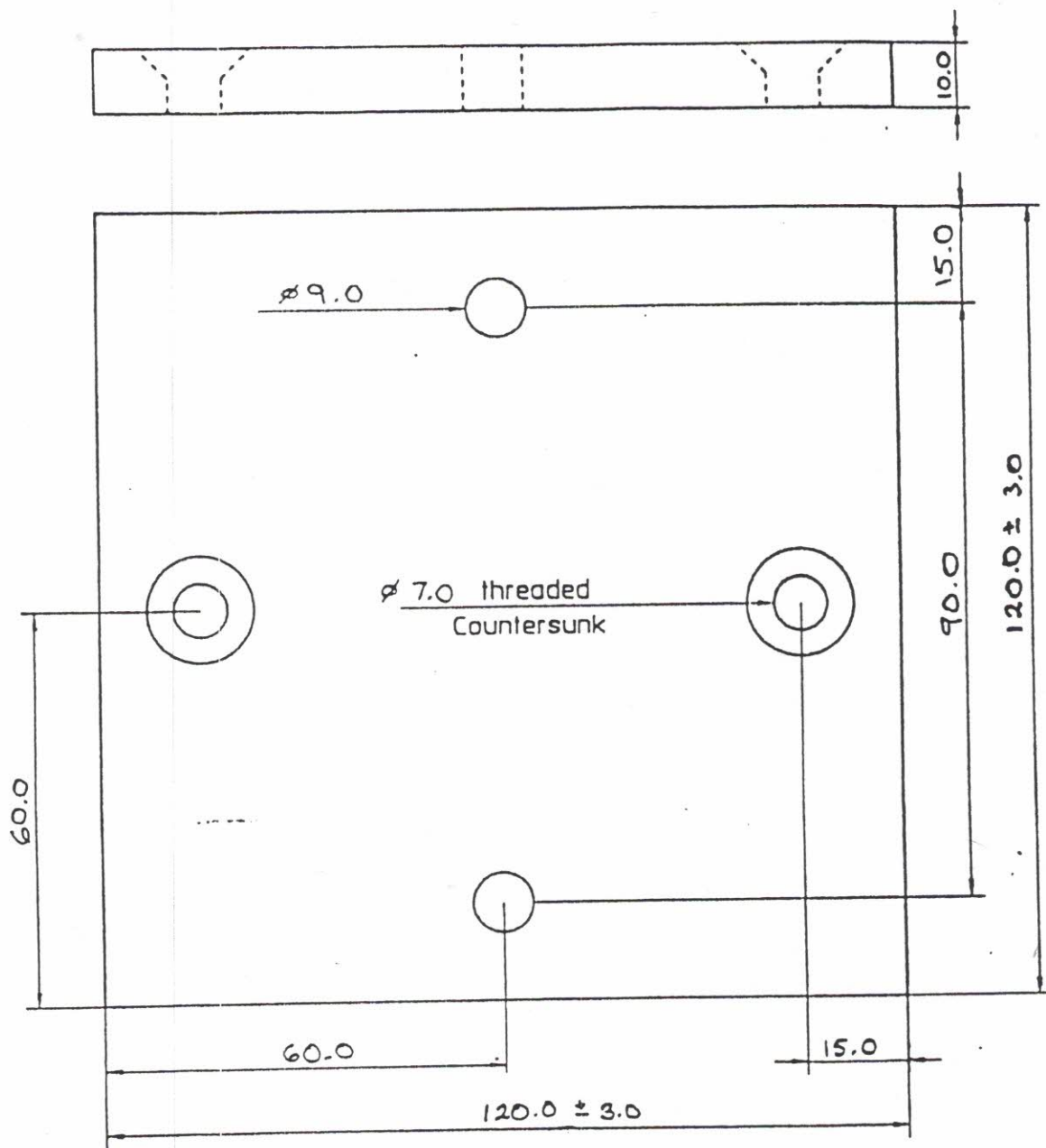




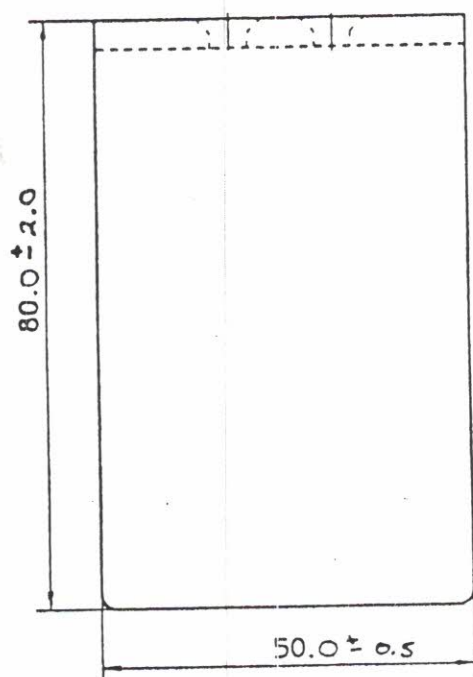
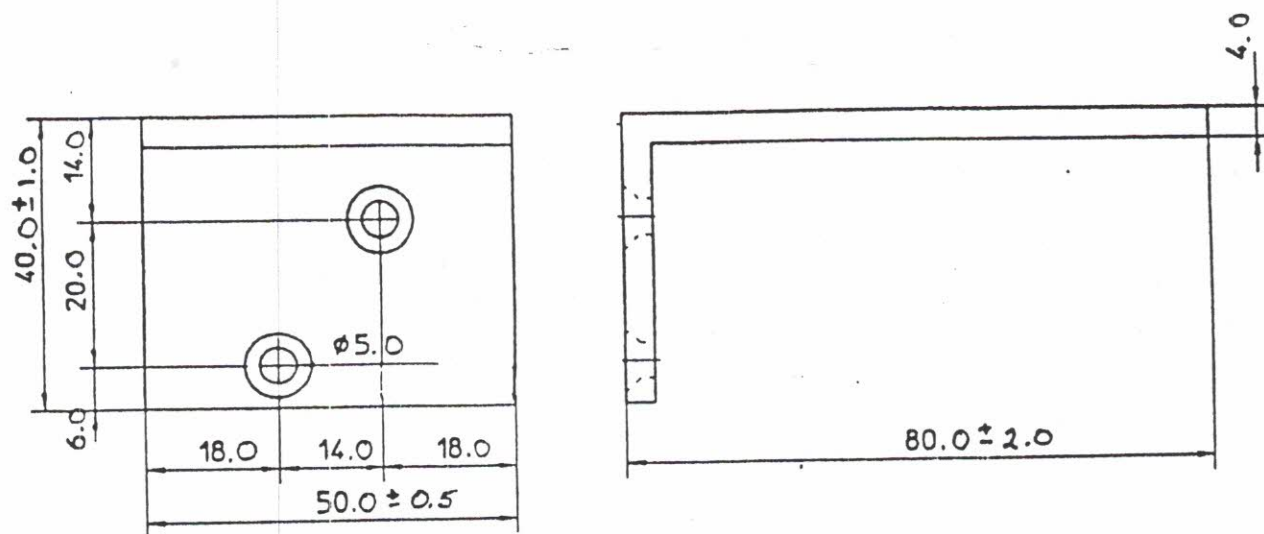
NBR.	NAME	ITEM
1	Coupling link	1
2	Poprivet	2



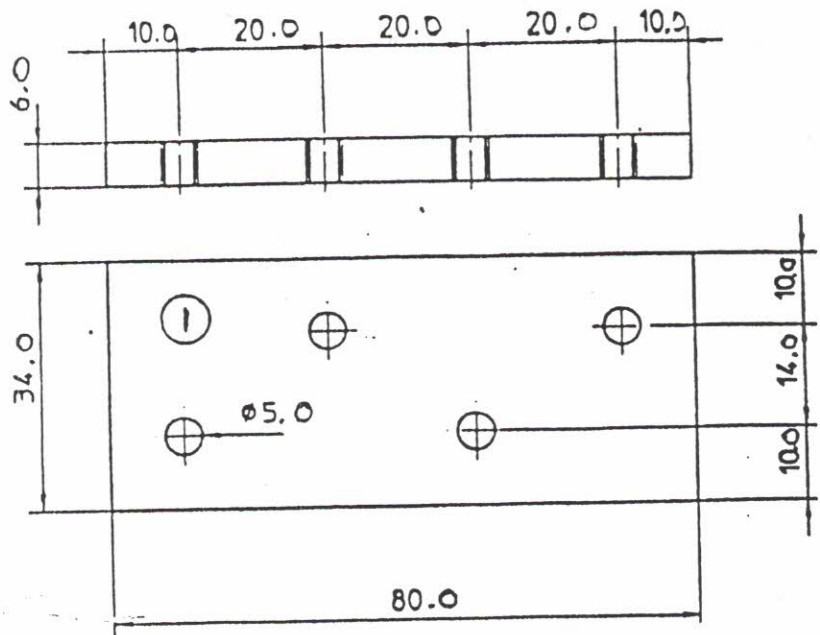
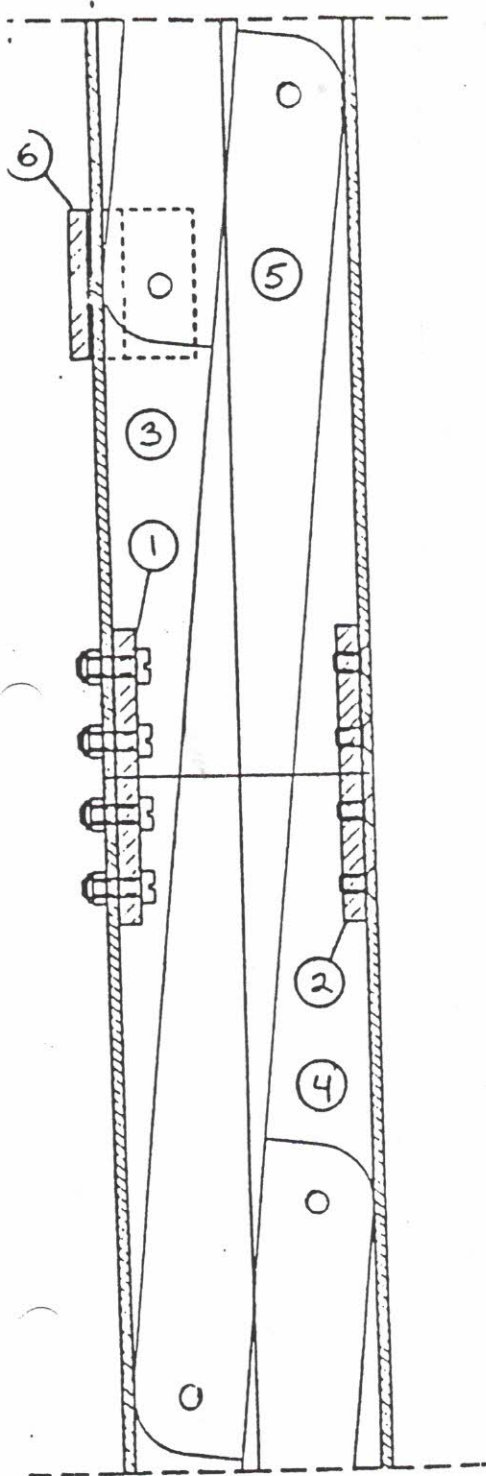
SLIDE RUNG



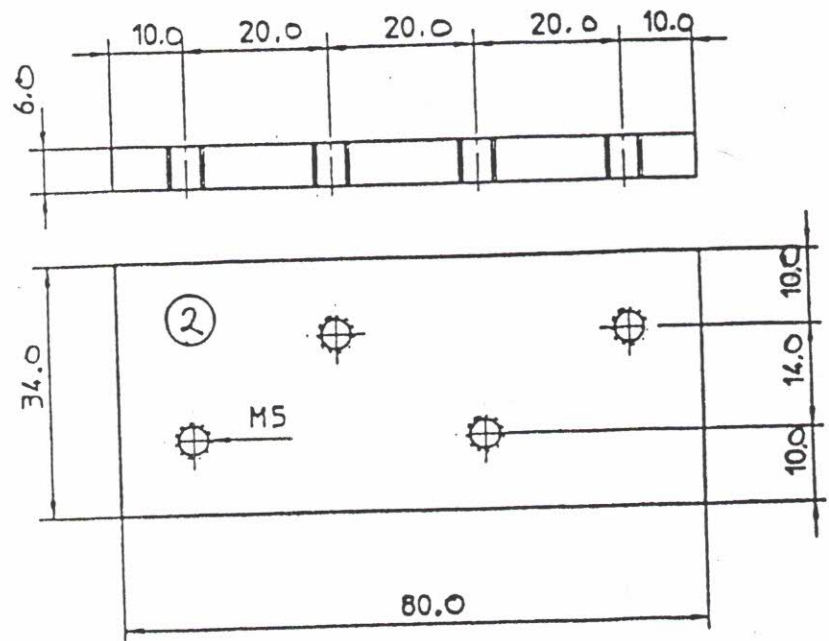
ADAPTOR PLATE



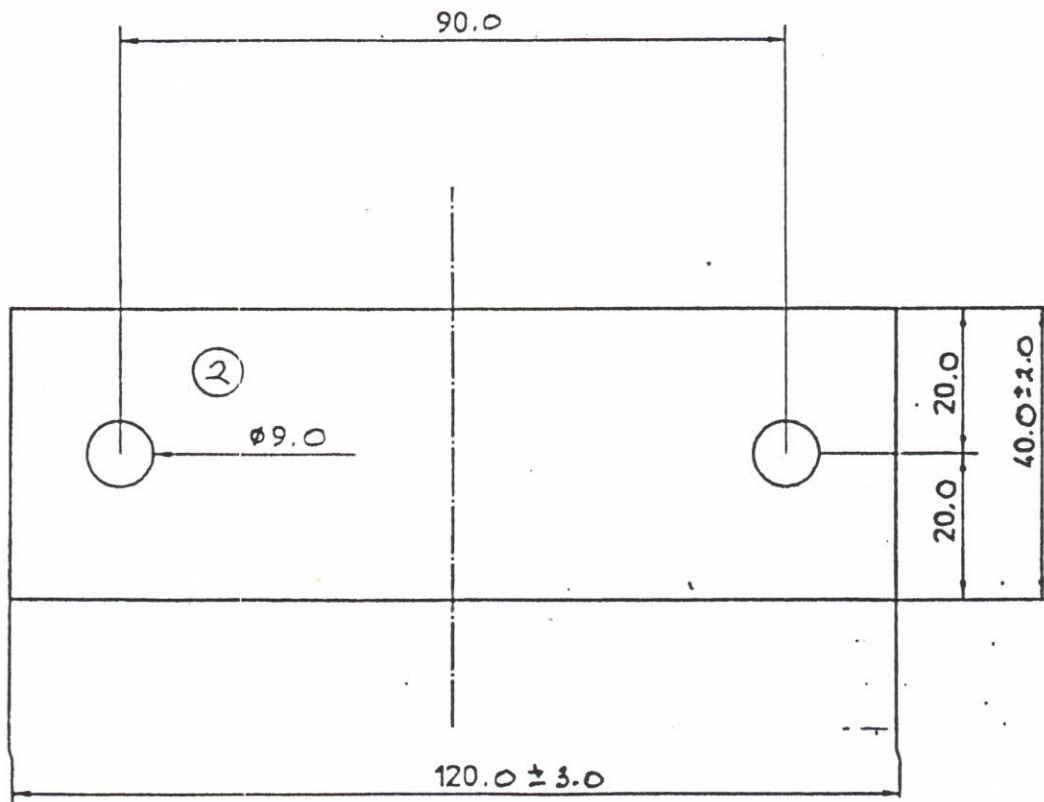
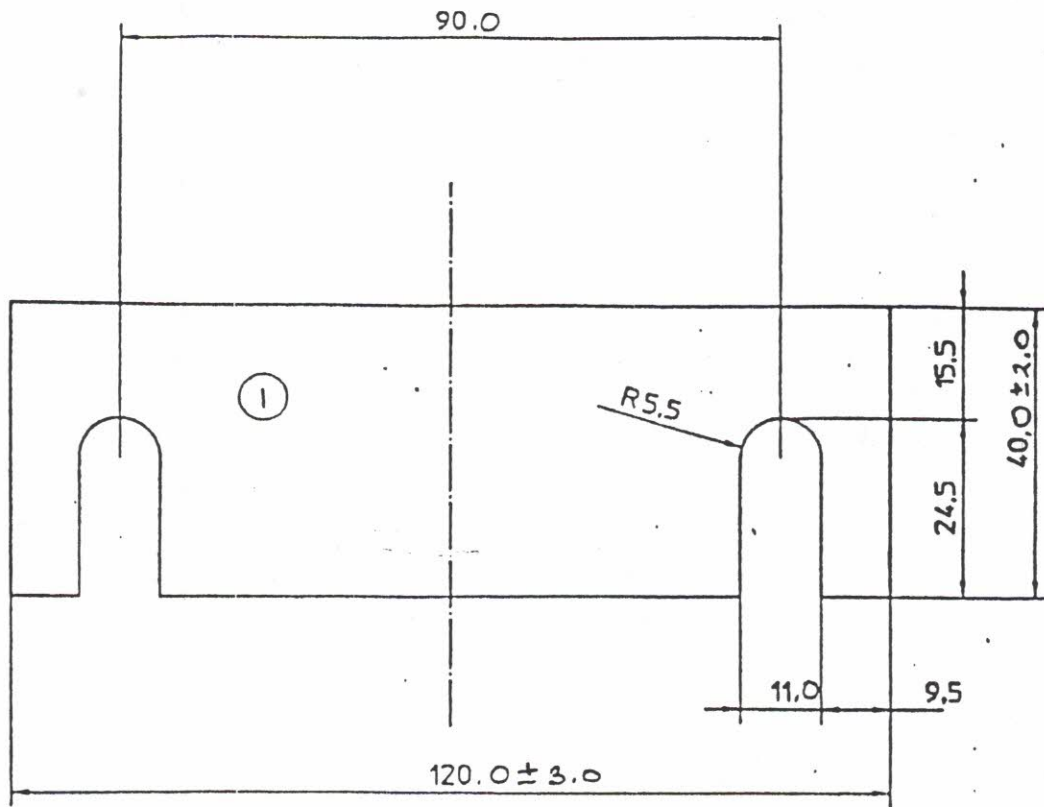
COVER



NOTE: All dimensional tolerances except for drilled holes ± 2.0 mm

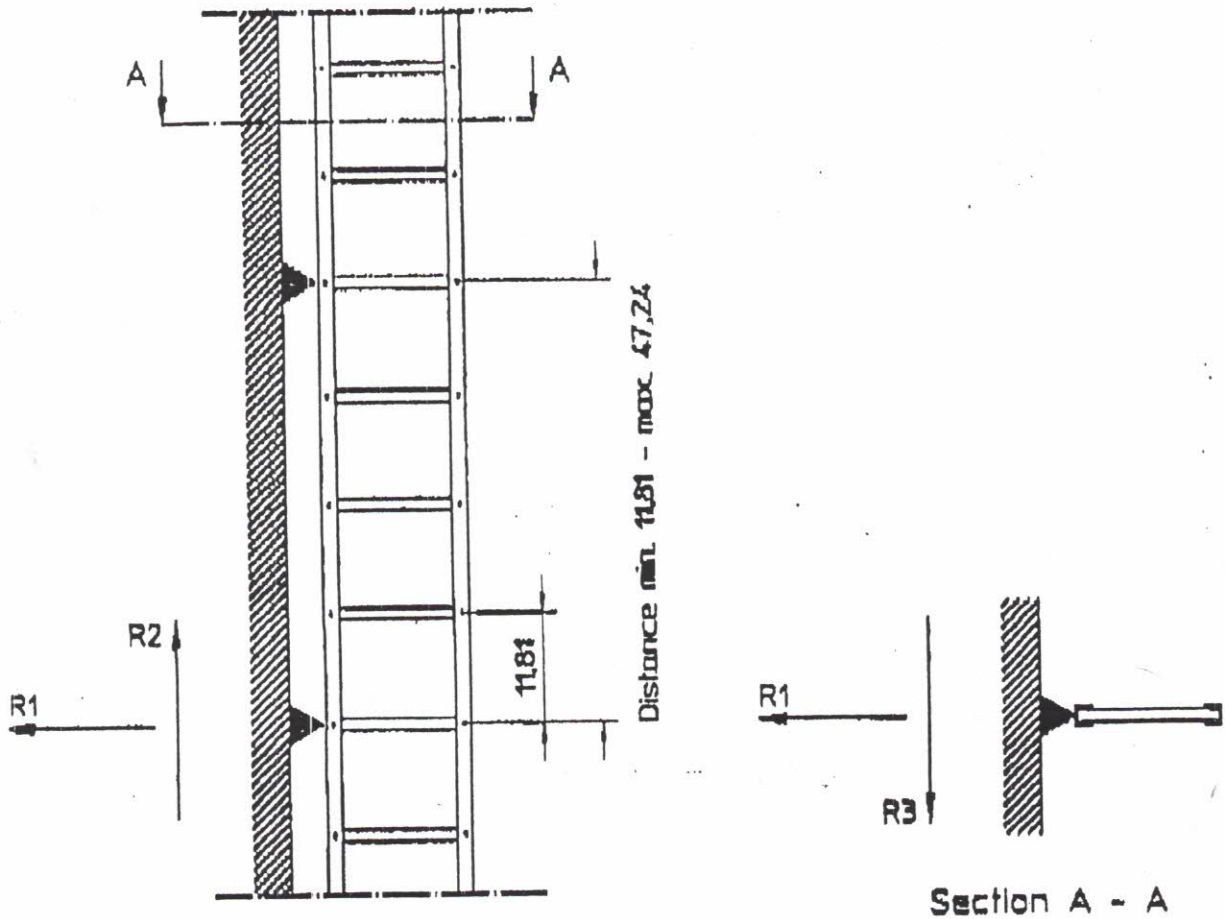


NAME	ITEM
INNER FISH PLATE	1
OUTER FISH PLATE	2
INNER RAIL	3
OUTER RAIL	4
STANDARD RUNG	5
MOUNTING BRACKET	6



NBR.	NAME	ITEM
1	Open fit shim	1
1	Closed fit Shim	2

SA7099 VOL. 1 SEC. 1 AND REPORT ILL. 14 (pg. 5 of 5) ISS: 11-2-89



REAKTIONS	±	NEWTON	kp	lb
R1	±	1500	153	337
R2		2400	245	540
R3	±	1300	133	293

NBI Fastenings to buildings must in each individual case be approved by the local building administration.

①

CAUTION
DO NOT BLOCK

This is an escape way
Keep clear a distance
of 3 feet.

②

MODUM ESCAPE LADDER Rated load 30lb.pr.fl.
MODUM INTERNATIONAL A/B Total ladder length not to exceed 30 ft.
This ladder does not meet the requirements of NFPA 101 for use as a primary means of egress
CAUTION: Shock hazard - Metal ladders should not be installed where contact can be made with electrical circuits

③

CLASSIFIED BY UNDERWRITERS LABORATORIES INC.
AS TO LOAD CARRYING CAPACITY ONLY
37E8



④

INSTRUCTION FOR USE:
1. Twist the release pin twice and pull it out.
2. Fold out the ladder

MAINTENANCE:

To ensure proper function the ladder must be released and folded out at least twice per year.