





Plant 1.0 MTPA ALUMINA REFINERY STREAM-5	Client NALCO	Contract Code NAL	Document ID 6695-ELT-G00-EC-0030	Contract No. 66-6695
 thyssenkrupp	TECHNICAL SPECIFICATIONS – G.I CABLE TRAY AND ACCESSORIES			 नेशनल एल्युमिनियम कम्पनी लिमिटेड National Aluminium Company Ltd.
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INDEX SHEET

The document Cover Sheet indicates revisions made in this document along with the purpose of issue of the revised document. The details of revisions made in the enclosures of this document are listed in the table of *Contents* below and the enclosures listed therein are an integral part of this document.

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 thyssenkrupp	GI CABLE TRAYS & ACCESSORIES Part-I - General Specifications			 नेशनल एल्युमिनियम कम्पनी लिमिटेड National Aluminium Company Ltd.		
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1.0 INTRODUCTION

This specification covers the design, manufacturing, inspection and testing of **G.I cable trays & accessories**.

Scope of supply and services covered under this specification shall be as per various parts of this specification. Specific requirement is covered in Part-II, while standard and descriptive requirement is covered in Part-I.

2.0 GENERAL REQUIREMENT

2.1 CONSTRUCTION

The cable trays shall be either ladder or perforated type as indicated in Part-II. Tray arrangement shall be as per enclosed drawings. Cable trays and accessories shall be fabricated out of hot rolled mild steel (sheet steel), which shall be hot dip galvanized. The complete assembled cable tray sections shall be corrosion resistant, high strength and with extremely smooth surface.

2.2 BENDS

Required horizontal, vertical bends and tee crosses shall be fabricated as per tray specifications. They shall have the required bending radii as required for various cable sizes with a minimum radius of 300 mm.

2.3 ACCESSORIES

Cable trays shall be supplied with GI coupler plates as indicated in Part-II and associated hardware i.e. nuts, bolts and washers for joining the standard lengths of cable tray sections.

Covers, along with all necessary hardware for fixing covers on trays (e.g. nuts, bolts etc.), shall be supplied.

2.4 SURFACE PREPARATION FOR GALVANIZING / PAINTING

For treatment and preparation of surface of fabricated trays, seven-tank process shall be employed comprising of the following

2.4.1 Cleaning

All members, plates etc. shall be free from grease, paint or any other foreign matter. A chemical solvent as trichloroethylene / carbon tetrachloride or a combination of solvent cleaning and heating shall be employed. Immediately, after degreasing, the material shall be rinsed with hot / cold water.



2.4.2 Pickling

Both hydrochloric acid and sulphuric acid solutions may be used for pickling. After pickling, the material shall be rinsed in running water. After surface treatment, cable tray shall be galvanized as given below.

2.5 GALVANIZING

2.5.1 Zinc conforming to grade Zn 98 of IS:2629 shall normally be used for galvanizing.

2.5.2 As far as practicable, the fabricated cable tray and accessories shall not be sunk to the bottom of the bath during galvanizing.

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- 2.5.3 Tray and accessories shall be galvanized at the lowest possible temperature which will allow the free drainage of zinc from the work piece during withdrawal.
- 2.5.4 The thickness of the coating and zinc deposit shall be as per Part-II. The thickness shall be checked by magnetic method as per IS: 3203.
- 2.5.5 Small components handled in baskets shall be centrifuged to remove excess of zinc immediately after galvanizing while the coating is still in molten condition. Material of hardware such as nuts and bolts shall be as specified in Part-II.

3.0 LOADING & DEFLECTION CRITERIA

For tray system design, in addition to self-load, following criteria shall be applied to determine section and thickness of cable tray:

a) Support Span = 3000mm

b) Cable load for -

- | | |
|-----------------------|----------|
| i) 150mm wide tray: | 30 kg/m |
| ii) 300mm wide tray: | 50 kg/m |
| iii) 450mm wide tray: | 75 kg/m |
| iv) 600mm wide tray: | 100 kg/m |
| v) 750mm wide tray: | 120 kg/m |

Allowable mid span deflection < 15 mm

c) In addition to this, 70kg concentrated load at center span shall be considered for size 300 mm and above. With this load, cable tray shall not develop any crack or break.

4.0 FACTORY ACCEPTANCE TEST

All cable trays and the accessories shall be offered for inspection at the fabricator's works to LSTK Contractor/Owner/Consultant representative. Notice for readiness for inspection shall be given at least 15 days in advance.

Tests shall be carried out as per Part-III: Inspection Test Plan.



No material shall be despatched until clearance for despatch has been obtained in writing from the LSTK Contractor/Owner/Consultant.



5.0 PACKING

The cable tray shall be suitably protected by proper and adequate packing for shipment and weather conditions involved. Cable trays may be dispatched in dismantled conditions with standard length of each cable tray section as decided by LSTK Contractor. Vendor shall clearly indicate method of packing in the offer.

6.0 PERFORMANCE GUARANTEE

Vendor/LSTK Contractor shall guarantee the material supplied by him for a period as indicated elsewhere in the tender. In case of any failure in the bought out items, the same shall be replaced with new one within the period of guarantee. Moreover the Owner/LSTK Contractor reserves the right to use rejected / failed material till it is replaced.

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GENERAL	001		Make	:	As per Vendor List- Electrical			
	002		Quantity	:	*			
	003		Acceptable quantity variation after order	:	*			
			placement	:	*			
	004							
CODES	005		IS 1079 : Hot rolled carbon steel & strip					
	006		IS 816 : Code of practise for use of metal arc welding for general.					
	007		IS 2629 : Recommended practice for hot dip galvanizing of iron & steel.					
	008		IS 2633 : Method of testing, uniformity of coating on zinc coated articles.					
	009	01	Indian Electricity Act & CEA Regulations					
	010							
	011							
TRAY & ACCESSORIES	012		Type	:	Ladder			
		01	a) Material	:	hot-dip galvanised mild steel (sheet steel)			
			b) Width	:	300 / 600 / 750 / 900 mm			
			c) Standard length	:	3000 mm			
			d) Thickness	:	2.5 / 3 mm (without galvanising)			
			e) Height	:	75 / 100 mm			
			f) Rung spacing	:	300 mm			
			g) Rung dimensions (w x h x t)	:	35 mm x 15 mm x 2.5 mm			
			h) Support Span	:	3000 mm			
			i) Loading Capacity	:	As per Part-I, Cl. 3.0			
	013		Type	:	Perforated			
		01	a) Material	:	hot-dip galvanised mild steel (sheet steel)			
			b) Width	:	50 / 100 / 150 mm			
			c) Standard length	:	3000 mm			
			d) Thickness	:	2.5 mm (without galvanising)			
			e) Height	:	50 mm			
			f) Support Span	:	3000 mm			
			g) Loading Capacity	:	As per Part-I, Cl. 3.0			
COVER	014	01	Material of construction	:	hot-dip galvanised mild steel (sheet steel)			
	016		Width :	:	As required			
	017		Thickness	:	1.6 mm (without galvanising)			
	018		Standard length	:	3000 mm			
	019		Fixing of Cover	:	At every 1 meter			
	020		Covers shall be provided with necessary fixing hardware.					
HARDWARE	021		Nuts, Bolts, Washers	:	Stainless Steel (SS 3304)			
	022							

 नालको NALCO नेपाल एलुमिनियम कम्पनी लिमिटेड National Aluminium Company Ltd.		GI CABLE TRAYS & ACCESSORIES PART- III INSPECTION TEST PLAN			Code	NAL		
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		Scope of Inspection						
		Tests	Reference Documents	Sample size	Vendor	Owner / Consultant / LSTK Contractor	Remark	
001		Dimensional Checking & Visual inspection (covering all items such as straight runs, accessories, coupler plates, covers, hardware)	GA drawings	# 10% of total quantity (min. 10 pieces) of every type and size of cable tray and accessory	P	W		
002		Deflection load test and point load test	PO Specification	## 1 sample of each size (separately for straight run and bend)	P	W	Test to be conducted with worst case support locations	
003		Thickness of Galavnizing coating by Elecometer	-	5 samples of per lot	P	W		
004		Mass of Galvanizing coating by stripping test	IS:6745 / IS:4759	1 sample of per lot	P	W		
005		Determination of uniformity of galvanized coating by Preece Test	IS:2633	1 sample of per lot	P	W		
007		Complete Bill of Material Check	PO Specification, Approved drawings	100%	P	W		
008		Review of Type Test Certificates, internal test reports/ logs, material test certificates	PO Specification	100%	P	W		
009								
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012								
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014								
015		Note:						
016		1) W = Witness, R = Review, P = Perform.						
017								
018								
019		# 100% quantity shall be ready for Inspection for sampling to be carried out. Samples shall be randomly selected by the Inspector						
020		from total 100% qty offered for Inspection. Even if there is a single rejection of item in the sampled lot of that particular type of item						
021		then 100% inspection of that particular type and size shall be carried out by Inspector						
022								
023		## Samples will be randomly selected by the Inspector.						
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025								
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027								
028								