



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

MATERIAL STANDARD
FOR
LOCAL CONTROL PANEL AND ACCESSORIES
NPCS-MS-IN-38
REVISION : 0

OCTOBER 1992

THIS DOCUMENT IS THE PROPERTY OF N.P.C. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED, TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF N.P.C.



CONTENTS

1	<u>GENERAL</u>
2	<u>TEST AND INSPECTION</u>
3	<u>SPARES</u>
4	<u>SYSTEM REQUIREMENTS</u>
5	<u>CONTROLLERS</u>
6	<u>RACK MOUNTED INSTRUMENTS INSIDE SYSTEM CABINET</u>
7	<u>PANEL MOUNTED INSTRUMENTS</u>
8	<u>SYSTEM SIGNAL VOLTAGE</u>
9	<u>POWER SUPPLY</u>
10	<u>CABLING</u>
11	<u>ALARM ANNUNCIATORS</u>
12	<u>OTHER ACCESSORIES</u>
13	<u>PURGING</u>
14	<u>IDENTIFICATION AND NAMEPLATE MARKING</u>
15	<u>ENVIRONMENTAL CONDITIONS</u>
16	<u>SHIPPING</u>

THIS DOCUMENT IS THE PROPERTY OF N.P.C. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED, TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN AUTHORITY OF N.P.C.



1 GENERAL

1.1 SCOPE

1.1.1 This standard covers the minimum requirements for the conventional local control panels and accessories.

1.1.2 Local control panels shall be of conventional electronic with split architecture construction (pneumatic local panels are not acceptable at all).

1.1.3 This standard covers the requirements for the selection, design, materials, nameplate marking, testing and shipping of electronic instruments comprising of :

- a) Rack instruments comprising of all control components, signal-conditioning, processing modules, alarm, power pack, etc.
- b) Panel mounted analog instruments such as control stations, recorder, indicator, etc., and system cabinet.

1.1.4 The related standards referred to therein and mentioned below shall be of the latest editions prior to the date of the purchaser's enquiry:

- ANSI B 2.1 Pipe Threads.
- ANSI B 16.5 Pipe Flanges and Flanged Fittings.
- IEC-144 Degree of Protection by Enclosure.
- ASTM American Society of Testing and Materials.
- ISO International Standard Organization.

1.1.5 In the event of any conflict between this standard, data sheets, related standards, codes, etc., vendor shall refer the matter to purchaser for clarification and only after obtaining the same should proceed with the manufacture of the items in question.

DOCUMENT IS THE PROPERTY OF NPCC. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED. TO THE OWNER. NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE USED TO ANY THIRD PARTY. REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF NPCC.



1.2 BIDS

1.2.1 Vendor's quotation shall contain a list of the various instruments and components necessary to meet the purchaser's requirements alongwith the purchaser's tag numbers and vendor's model number against each type. Also, this shall contain unit prices against each item. This shall also apply to accessories like racks/cabinets, cables, power supply, etc.

1.2.2 Vendor shall enclose technical literatures giving detailed technical information and specification for each and every type of instrument and accessory covered in the bid. Vendor shall also furnish sufficient information to decode the model number description.

1.2.3 Vendor's bid shall also include the following information as a minimum, for each and every type of instrument.

- a) All details regarding type, construction, materials, etc., of the instrument and accessories.
- b) Panel cut-out dimension in "mm" for panel mounted instruments.
- c) Allowable mounting positions, including maximum allowable angle of indication in case of inclined mounting.
- d) Suggested cabinets/rack lay-out & modules configuration.
- e) Total power consumption in "VA".

1.2.4 All the units of measurement in vendor's specification sheets shall be the same as those in purchaser's data sheets.

1.2.5 All the material specification for various parts in the Vendor's specification sheets shall be to the same standards as those in purchaser's data sheets, e.g. ASTM, BS, etc.

1.2.6 Vendor shall scrutinize the purchaser's specification and data sheets very carefully and deviations, if any, shall be summed up, itemwise, tag no. wise. Also vendor shall provide reason for these deviations.

1.2.7 Vendor's quotations, catalogues, drawings, operation and maintenance manuals, etc., shall be in the English.

THIS DOCUMENT IS THE PROPERTY OF NPC. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED. TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY. REPRODUCTION OF THIS DOCUMENT IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF NPC IS PROHIBITED.



- 1.2.8 Vendor shall quote for two years' operational spares for each type of instrument and accessory which will be covered in the bid.
- 1.2.9 Vendor shall also quote for any special tools and test equipment needed for maintenance and servicing on these instruments.
- 1.2.10 Vendor's quotation shall also accompany control loop diagrams covering the various instruments and components involved in each loop.
- 1.3 DRAWINGS & DATA
- 1.3.i Detailed drawings, data, catalogues and manuals required from vendor, are indicated by purchaser in "Vendor Data Requirement" sheet. The required number of reproducibles and prints shall be despatched to the address mentioned, adhering to the time limits indicated.
- 1.3.2 After placement of purchase order, vendor shall submit certified drawings and specification sheets for each instrument and its accessory which shall include the following:
- a) De-tailed dimensional drawings.
 - b) Detailed wiring drawing.
 - c) Power consumption in "VA".
 - d) Loop diagrams.
 - e) Weight of the instruments racks/cabinets in Kg.
 - f) Rack lay-outs and modules configuration.

2 TEST AND INSPECTION

Purchaser or their representative shall be allowed to inspect and test, rack and display instruments or parts of it at any reasonable time. He shall also be permitted to witness and participate in all shop tests. For this purpose, purchaser shall be notified well in advance.

THIS DOCUMENT IS THE PROPERTY OF N.P.C. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED. TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF N.P.C.



3 SPARES

3.1 Vendor shall quote two years' operational and commissioning spares as recommended by them furnishing list, quantity, part number and unit price.

3.2 Operational spares shall include:

- Spare instrument, if recommended.
- Spare cards.
- Spare components for cards.
- Spare accessories.

3.3 Commissioning spares shall be supplied with main items furnishing list and part number and the price of which shall be included in main item price. Where indicated on purchasers lay-out drawing, space on the panel face and at the rear shall be reserved for future equipment. Spare cut-outs, where specified, shall be fitted with removable masking plate.

4 SYSTEM REQUIREMENTS

4.1 GENERAL

4.1.1 Equipment shall be designed as split stations such that all functional electronic control system components can be physically mounted in racks and enclosures separated from conventional control panel and connected via standard plug-in-cables.

4.1.2 Unless otherwise specifically mentioned, control and transmission signal shall be in the range of 4-20 mA DC (RTD'S and Thermocouples are exceptions to this).

4.1.3 The system shall employ solid state electronics assembled from high quality ICS, transistors and precision components; Carbon resistors and electrolytic capacitors shall be avoided. Inplace, wire wound resistors and Tantalum capacitors are preferred.

4.1.4 The input/output circuitry shall be designed to reject common mode & normal mode noise as well as radio frequency interferences.

THIS DOCUMENT IS THE PROPERTY OF NPCC. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED. TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF NPCC.



THIS DOCUMENT IS THE PROPERTY OF N.P.C. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED. TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF N.P.C.

- 4.1.5 All the local control panel instruments shall be resisted to radio frequency interference generated by Walki Takies of 5 W nominal output power as close as 1 m from equipment.
- 4.2 PANEL DESIGN
- 4.2.1 panels shall be console desk type, selfsupporting, free standing with rear doors. Screwed cover shall be used below the angle desk portion for accessibility of desk mounted items. Refer panel front arrangement drawing for details.
- 4.2.2 Panels shall be welded construction with 50 X 50 X 6mm angle and 4 mm thick cold rolled Steel sheets. The panel door bottom and sides shall be made of 3 mm cold rolled Steel sheets; adequate louvers shall be provided for cooling of panel instruments.
- 4.2.3 The panel shall be supported on 100 x 50 x 6 channel supports. The base frame shall be suitably drilled for bolting to the floor.
- 4.2.4 Dimension of local control panel shall be preferably as follows:
- no. of sections : As per what will be on data sheet.
- Size of each section : 2200 mm high (Including base channel) .
1200 mm wide.
900 mm deep.
- 4.2.5 Access doors shall be fabricated from Steel plate mounted on lift off hinges and fitted with locks and handle. The doors shall seal into a suitable elastomer gasket.
- 4.2.6 The edge of all panels and cabinets shall be straight and smooth. Corners shall be welded and ground smooth.
- 4.2.7 Sufficient numbers of panel stiffeners shall be provided at suitable locations so that control panel is kept straight and true.
- 4.2.8 The surface of the panel exposed to view shall be flat and level to 1.5 mm in 100.
- 4.2.9 Manufacturer shall ensure that all back of panel equipment is installed with due regard to access for commissioning, adjustments servicing requirements and cover removal.



- 4.2.10 The panels shall be provided with concealed or removable type of lifting lugs as required to handle the load and located in such a manner as to ensure proper distribution of weight in order to prevent excessive tilting when lifted.
- 4.2.11 All panel cut outs and holes may be cut or drilled by any standard method, but must not be flame cut.
- 4.2.12 Suitable number of anti-vibration pads shall be provided for protecting panels from vibration
- 4.2.13 Each panel section shall be provided with fluorescent tubes and power to tubes shall be 220 V AC, connected through door switch. Vendor shall provide 220 V AC, 5 A receptacle in each panel section for maintenance work.
- 4.2.14 A separate grounding bus shall be provided at the bottom of each section for earthing of all electrical instruments.
- 4.2.15 The panel shall be provided with instrument earthing bus.
- 4.2.16 All the panels shall be supplied with all the cutouts made, mounted with all the mounting bins, supports & mounting accessories, terminal block strips, lights, receptacle, power distribution box, lamps, push button, switches, horn, etc., completely wired upto terminal point. Dummy instrument/casing shall be used for wiring, mounting, etc., for instruments supplied by vendor. Purchasers certified drawings shall be used for wiring, etc., of instruments not in vendor's scope of supply but to be mounted in the panel.
- 4.2.17 Alarm annunciator logic unit and power supply shall be mounted inside panel.
- 4.2.18 Painting
- The panel finish will include sand blasting, grinding, chemical cleaning, surface finishing by suitable filler and two coats of high grade lacquer with wet sanding between coats. One coat of Zinc Chromate primer (free of Lead) mils (5) shall be applied to all metal surface after which two coats of finish enamel paint, 2 mils of each, shall be applied by spray painting followed by staving procedure. Two coats of paint in panel colour and final coat will be given after assembly for non-glossy high-satin finish. Panel face final colour shall be opaline green to BS 381C. Panel rear surface, frame work and bulk head plates will have a finish colour of pale cream to BS 381C. Both front and back of panel shall be finish painted with paints of reputed manufacturer.

THIS DOCUMENT IS THE PROPERTY OF NPC. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED, TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR ANY MANNER WITHOUT THE PRIOR WRITTEN CONSENT OF NPC.



THIS DOCUMENT IS THE PROPERTY OF N.P.C. IT IS CONFIDENTIAL AND ALL RIGHTS RESERVED. TO THE OWNER NEITHER THE WHOLE NOR ANY PART OF THIS DOCUMENT MAY BE DISCLOSED TO ANY THIRD PARTY, REPRODUCED, STORED IN ANY RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE PRIOR WRITTEN CONSENT OF N.P.C.

- 4.2.19 Wirings
- 4.2.19.1 Wiring and components shall be so arranged, that any device may be removed and/or serviced without unduly disturbing the other wirings.
- 4.2.19.2 The internal wiring of panel shall be of PVC insulated 1.5 mm² Copper conductor of 600 V grade.
- 4.2.19.3 All wirings shall be **properly** clamped **inside** the panel. Miniature box type of PVC perforated cable trays shall be used for housing the lay-out of cables inside the panel. All wires shall be bunched by means of strapping systems.
- 4.2.19.4 All wires shall. be numbered at both ends by means of ferrules inside the panel ,
- 4.2.19.5 Suitable and sufficient number of cable glands shall be provided for cable entry at bottom plate. Each cable gland **cabling** shall be identified by a metallic/plastic tag.
- 4.2.19.6 Flexible wires with additional length shall be used between terminal block and items mounted on **desk**.
- 4.2.19.7 The panel section shall have terminal blocks consisting of requisit no. of terminal strips plus 20% spare strips, for all incoming and outgoing cabling. The terminal strips shall be covered type, suitable for 4 mm² cable conductor.
- 4.2.19.8 Klippon type vibrationproof terminal blocks shall be used and shall be spring tight.
- 4.2.19.9 Signal and power cables shall be laid-out separately in separate boxes of cable trays.
- 4.2.19.10 All live terminals shall be properly shielded.
- 4.2.19.11 End of all wires shall be shielded by PVC sleeves.
- 4.3 CABINETS AND BOXES IN AIR CONDITIONED ROOM
- 4.3.1 Cabinets/boxes shall be closed cubicle type, free standing gasketed, lockable (with handle and key), double opening front or front/back hinged **doors**. The system cabinet shall have two removable sides and front and back doors. The height of cabinets/boxes (except system **cabinet**) shall be the same.