It is a manual picking repository system suitable for storing medium to heavy loads. This repository system is for manual picking of products, following “man-to-goods” principle. i.e. goods which are easily handled & lifted by man are stored in these systems.

**Introduction**

All basic structural components of the system such as frame (Assembly of upright, bracing and base plate), beam & decking panel are to be designed to a code of practices as recommended by European Norms (EN/FEM/SEMA).

**Design**

Systems are to be designed as per following codes.

**System Codes:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | ANSI-MH-16.1-2008 | Specification for the design testing & utilization of  industrial steel repository system (American) | | BS EN 15512:2009 | Steel static repository system – Adjustable PRS –  Principles for structural design (European) | |  |  | | SEMA | Code of practice for the Design of APRS (British) | |  |
| **Structural Design Codes:** |  |
|  |  |
| |  |  | | --- | --- | | IS 801 - 1975 | Code of Practice for use of Cold-formed Light Gauge steel structural members  in General Building Construction | | IS 800 – 2007 | General Construction in Steel - Code of Practice | |  |  | | BS 5950 – Part V | Structural use of steelwork in building - Part 5 -  Code of Practice for design of cold-formed thin gauge sections (British) | | EN 1993-1- Part 3 | Design of steel structures. General rules. Supplementary rules for cold-formed  members and sheeting (European) | | AISI -1996 | Cold Formed Steel Design Manual –  American Iron and Steel Institute (American) | |  |

**Tolerances:**

|  |  |
| --- | --- |
| BS EN 15620 - 2008 | Steel static repository systems - APR –  Tolerances, Deformations and clearances (European) |
| SEMA | Guideline No 2 - Guide to Erection Tolerances for Static system (British)  **Raw material** |

Load bearing members of the system are to be made out of high strength HR steel having properties equivalent to grades specified by IS 5986:2002 / IS 2062:2006

The different types of material to be used for load bearing members such as uprights and beams are:

|  |  |  |
| --- | --- | --- |
| **Steel type** | **Minimum guaranteed**  **yield strength** | **Equivalent international standard** |
| IS: 5986 - Fe 510 / Equivalent  (or)  IS:2062 - E 350 / Equivalent | 355 MPa | JIS 3101: SS 490  EN 10025 : S 355 JR  DIN 17100 : St 52 |
| IS: 5986 - Fe 410 / Equivalent  (or)  IS:2062 - E 250 / Equivalent | 255 MPa | JIS 3101: SS 400  EN 10025 : S 235 JR  DIN 17100 : St 42 |
| IS:3601 – 2006 / Equivalent  IS:4923 – 1997 / Equivalent | 210 Mpa |  |
| IS :513 – 2008 / Equivalent | 210 Mpa | JIS 3141 |
|  | 355 MPa | ASTM A 653 M  SS GRADE 50 |
|  | 255 MPa | ASTM A 653 M  SS GRADE 37 |
| IS 277’D’ | 210 Mpa |  |

In addition to high strength, the raw material is to be used for structural load bearing members, posses adequate ductility, to ensure toughness. The material also has the necessary impact strength for cold room applications up to -30 deg C.

**Fasteners**

All fasteners used are to be of grade 8.8.These are with galvanized finish to suit industrial atmosphere.

For long life and protection from corrosion, All Powder coated components are to be given a thorough anti-rust treatment. The dry film thickness (DFT) after powder coating should be on an average 35 microns.

**Surface finish**

All powder coated components are to be subjected to an elaborate 4 step, six zone anti corrosion treatment, viz. De-greasing as per IS 6005:1970, rinsing, phospating as per IS 3618:1966 and RO water rinsing.

Furthermore, the testing of paint for various physical and chemical properties is to be done as per IS ASTM Standards.

**Uprights**

Upright is to be roll formed construction made in single piece without welding. Upright should have slots at 50 mm.

Uprights are to be multi bend profiles, designed to offer maximum load bearing capacity with optimum surface utilization ensuring high standards of stability and safety. Uprights are to be bolted with base plates to transfer the load to ground.

The manufacturing process of punching and forming is to be in one flow and a synchronized operation, thereby providing dimensional accuracy and contour uniformity consistently.

Uprights are to be Lead free epoxy polyester powder coated.

**Base plate**

It is to be a formed construction bolted to upright. They are to be anchored to ground using M8x75 torque type mechanical anchor bolts. Floor level variation should be adjusted with shims.

Base plates are to be Lead free epoxy polyester powder coated.

**Bracing**

Diagonal and horizontal bracings are to be lipped channel sections. These are to be connected to uprights to make frames. These bracing channels are to be also made through roll forming technology.

Bracing should be galvanized.

**Beam**

Beams are to be of horizontal members connecting two frames, that support the decking panels. Beam locks by locking pins or locking clips are to be there to ensure that beams are engaged with uprights precisely and prevent any accidental beam dislodgement due to handling. Beam should be made through Hemming technology.

Beam is to be Lead free Epoxy polyester Powder coated.

6 Bend decking panels are to be formed section having 6 bends. Both ends of the panel have notches facilitating the seating of panel on the beam.

**6 Bend decking panel - LS**

Panels can be powder coated or galvanized.

**Panel connectors**

It is to be the plastic connector used in 6-Bend Panel decking to inter-connect two panels without gap. This panel connector is to be designed with a feature of inserted-self locking type. Once it is installed, it is difficult to remove without breaking.