General Specifications

ELVORACK system consists of a versatile range of standard components which bolt together to create an unlimited variety of structures and hanging dispositions, used for supporting mechanical or electrical elements.

The advantages of the system are among others:

- easy design and assembly.
- numerous services can be provided including cabling, piping or ducting.
- no welding or drilling work is necessary on site since all components are fully remountable and reusable.
- assembly time is limited to minimum.

The main components of the system are:

- channels (single or multiple sections).
- channels nuts.
- Fittings and brackets.

A. The channels are the basic structural member of the system. They can be fixed easily to the floors, ceilings, walls or steelwork and may be connected to each other by using the various fittings available.

ELVORACK channels are formed from 2.5mm pregalvanized steel plate but they are also available in a hot dip galvanized finish. Multiple channel sections are formed by welding together single ones. Standard lengths are 3 mts.

B. The channel nuts are the elements by which the channels are connected to form the metal framing. They have serrated grooves with hardened teeth which bite securely into the channel's inturned edges.

They can be inserted easily at any point along the channel and held in place by the spring.

C. Bolts used throughout the **ELVORACK** sytem are M6, M8, M10, M12 normal bolts and M10, M12 high tensile bolts. The standard finish is zinc plated. Bolts to be used when attaching fittings to the channels are:

- M10X30 or M12X30 when channels 50A are connected by using fittings of the range 53.

- M10X25 or M12X25 when the structure is formed by using channels 50C.

- M6X25 when attaching the cable tray or cable ladder to a bracket range 10.EHD.

D. **ELVORACK** system includes a comprehensive range of fittings, cantilever arms, brackets, pipe clamps etc.

They are also designed to reduce on site cost by avoiding drilling or welding. Fittings are made of 6 mm gauge steel bar.

The size of holes is 14mm in order to accept bolts M10 or M12.

Design of the Framework

To design a safe structure it is necessary to check all components of the structure. Therefore we have to ensure that all channels, fittings and brackets can safely with stand the load being imposed upon them.

A. Channels used as beams

The maximum safe load for a channel used as a beam can be calculated using one of the following three criteria:

1. maximum load calculated from the yield stress of the steel, using a safety factor of 1.5

2. a maximum mid-span deflection 1/180 of the span.

3. a maximum mid-span deflection 1/360 of the span. The maximum uniformly distributed loads according to the above criteria are given on page 168.

If in practise loads are neither uniformly distributed across the beam nor a point load the following approximation can be used:

We add all the loads imposed on the channel (uniformly distributed or point loads) and assume that the sum of these loads is imposed at mid-span.

So we can check the beam, using the table on page 168 with a safe approximation.

B. Channels used as upstands

It is rare that that loads are directly applied to the upper end of a channel. In most cases loads are applied to the brackets or fittings which are connected to the open end of the channel and create a combined axial force down to the upstand and a bending force which reduces the maximum admissible load. Such eccentric loads should be carefully checked in accordance with standard design practice.

C. Brackets

Loads applied to brackets could be either uniformly distributed loads or point loads. In the first case the maximum load applied to a bracket is shown on page 184. In the second case the bending moment produced by the various point loads should not exceed the admissible max. bending moment shown below based on a safety factor 1.5.

bracket Part Nr.	max. bending moment
10.EHD - 1	590 Nm or 60 Kgfm
10.EHD - 2	1670 Nm or 170 Kgfm

As known the bending moment for any point is obtained by multiplynig the size of the load by the distance from the end of the arm. If several point loads exist the bending moments produced should be added to obtain the total. If on the other hand, part of the load is uniformly distributed along a section of the bracket then this load can be considered as acting at mid-point of the section over which it is spread.

D. Brackets - Nuts

TThe maximum force to be applied on a nut without sliding across the channel, based on a safety factor 3, is shown on the nearby table:

Nuts Part Nr.	Aesistance to slip	Put out strength
52 A1 52 B1	651 Kgf 380 Kgf	870 Kgf 650 Kgf

If the figure obtained from the calculation exceeds the maximum one shown in the table, then another fitting with 2 or more bolts should be used.

E. Bolts

The moment to be applied for tightening bolts M10 and M12 is 48 Nm (4.7 Kgf) i.e. the one obtained by hand.