

1. Corrugated steel pipes

1.1 What is MultiPlate?

MultiPlate describes flexible, embedded, corrugated steel pipes. On job site, the pipes are assembled from corrugated steel plates, which are curved according to the pipe shape by means of bolted joints.

1.2 What MultiPlate structures are used for?

Mostly, MultiPlate structures are used for culverts and bridges above and below of bridges and roads of all classes up to highways and service roads for heavy traffic. Corrugated steel pipes are also used in industry (discharge pipe for gravel, silos, etc.) and agriculture (liquid manure tanks).

1.3 Are MultiPlate structures and LinerPlate structures statically designed?

The two types of construction belong to the category flexible, embedded, corrugated steel pipes. The stability computation is made in accordance with the Klöppel/Glock method with separate computation for permanent traffic loads and /or bridge classes. Safety factors for the ultimate state are calculated.

1.4 Which type of bolted joint is used?

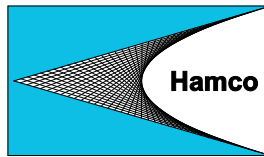
The joint of the separate steel plates is made with a shear-joint, the ultimate strength of which was ascertained in test carried out by a recognized institute.

1.5 What are the advantages of MultiPlate structures?

- low design cost
- low expenditure for construction
- short time of construction
- lower cost with complicated soil conditions
- low long-term maintenance cost

1.6 What is the relationship of manure tanks (agriculture) and other silos (industry) and the MultiPlate construction?

Manure tanks are circular tanks, which are placed on a steel concrete plate and are made of MultiPlate steel plates with the Duplex-system. Other MultiPlate silos are used in the industry for the storage of gravel, sand, broken stones, etc..



1.7 Is the span width of MultiPlate structures limited?

Yes, however, with this type of construction long-span structures are realizable. For example, we built a landscape bridge crossing the highway Arnheim-Appeldoorn (Netherlands), which is still today world-wide one of the largest structures with a span width of 17,00 m ever made of MP 200 x 55. Beside this spectacular building exist a lot of Hamco corrugated steel structures with spans higher than 10,00 m

1.8 What is LinerPlate?

LinerPlate is a construction method of prefabricated steel parts. LinerPlate is distinguished into 2-flange and 4-flange LinerPlate. A characteristic feature is easy and simply handling.

1.9 Which solution is available for the repair and reconstruction of vaults?

For this purpose, MultiPlate as well as LinerPlate structures are proved useful with its profile shapes, which are the best adapted to the vault. The remaining space between structure and vault is filled with mortar or insulation material. The assembly of such types of structures is carried out with running traffic.

1.10 What is Hel-Cor?

Hel-Cor is the name of corrugated spirally welded steel pipes, which are galvanized and if required plastic coating additionally.

2. Corrosion protection

2.1 What is the corrosion protection source of corrugated steel pipes?

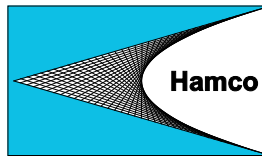
This task is assumed by zinc which is metallurgical connected to the steel plates. The zinc coating is carried out according to DIN EN ISO 1461. Depending on the requirement higher zinc thicknesses are possible.

2.2 What does the Duplex-system stand for?

To ensure a long service life MultiPlate and LinerPlate steel structures are provided with a corrosion protection of high quality, i.e. a Duplex-system are composed of hot-dip galvanizing and epoxy coating.

2.3 Which service life is realistic for MultiPlate structures?

MultiPlate structures with a corrosion protection of the Duplex-system can be compared to a service life of solid structures.



2.4 What experience is available about the corrosion protection of MultiPlate structures?

The company can take on decades of experiences in the field of application of zinc or in duplex system produced corrugated steel pipes. A close and continuous cooperation with raw material suppliers and monitoring of production processes and products provide a high quality standard. Hamco's own investigations on galvanized structures aged 30 to 40 years when measuring the coating thickness showed no objections to the corrosion protection.

3. Installation and assembly

3.1 Which height cover must be kept?

1/6 (even in some cases 1/8) of the span of profile, but not less than 0,50m.

3.2 Which measures are to be taken with the poor soil conditions?

For soil conditions requiring support there are following solutions:

- exchange of the soil
- use of geogrids or textile fabrics (reinforced soil)

3.3 How long does the assembly of MultiPlate structure take?

In most cases the assembly time is one day up to few days.

4. Design features

4.1 What is the design of the ends of the structures?

Dominating in the slope are bevel ends with collars of regular and irregular rocks or paving. Facing of the bevelled corrugation can be an effective design detail.

4.2 Which solution can be found if none of the standard profiles is practicable?

Hamco is able to design - without any additional costs for the customers - special profiles for special purposes (crossing of railway lines, low construction heights, etc.) with variation of the radii of curvature and angle of aperture of the steel plates.

4.3 What is done in case of extrem skewes?

Keeping the skew of the pipe axis the structure ends are changed to more or less 90° and the slope is matched accordingly.