ISO 8434-1 Bite Type Ferrule Fittings Introduction II

Single Bite and Double Bite Design

As introduced in the Introduction I, the ISO 8434-1 fittings consist of three components, which are body, cutting ring and nut. Here we will explain the **design** and **function** of cutting ring fittings in details.

Source：Parker Catalog 4300

Design of ISO 8434-1 Standard Ferrule Fittings

Among the common ferrule designs available on the market, aside from minor differences in external dimensions, the most significant distinction lies between **single-edge** and **double-edge** types. Most users are not well-versed in the functional and design differences between these two types, which often leads to incorrect selection for specific applications. Below is a detailed explanation comparing single-edge and double-edge ferrule designs.

Single-edge Cutting Ring

The single-edge ferrule corresponds to **Type B** under the ISO 8434-1 / DIN 2353 standard. It has a single cutting edge that engages with the tube and features a relatively simple geometry. The cutting edge bites into the tube during assembly to form a seal and mechanical grip. The rear section of the ferrule typically serves as support and alignment.

Double-edge Cutting Ring

Also known as a **progressive cutting ring**, it features two edges—usually a cutting edge and a limiting (or stop) edge. The cutting edge bites into the tube to initiate the seal, while the secondary edge follows to create a second gripping point and stabilize the deformation, preventing further advancement of the ferrule. The limiting edge significantly increases the tightening force, which can be clearly felt during assembly.

After proper assembly, a **visible annular ridge** should form on the tube in front of the first cutting edge, completely filling the space. For stainless steel tubes or soft fittings made from free-cutting steel, due to the hardness of the material, the resulting ridge may be relatively small.

Comparison between Single-Edge and Double-Edge Ferrules

Feature	Single-Edge	Double-Edge
High pressure / vibration resistance	Relatively weak	More reliable
Resistance to dynamic loads & tube pull-out	Lower	Higher
Redundant sealing	None	Yes
Manufacturing complexity & cost	Simpler, lower cost	More complex, higher cost
Installation torque tolerance	More forgiving	Requires precise torque on both edges
Sensitivity to tube preparation / alignment	Low	More sensitive

The Function of Cutting Ring

The cutting ring is the key sealing element. Its job is:

- To **cut into the outer surface of the tube** during assembly.
- To **create a mechanical grip** that resists pull-out.
- To **form a pressure-tight seal** between the fitting and the tube.

During tightening of the nut:

- The ring is **forced into the 24° tapered seat**.
- The sharp edge(s) of the ring **bite into the tube surface**, forming a secure hold.
- The tube is pushed slightly forward and may deform plastically under the ring's pressure.
- A tight, vibration-resistant connection is formed.

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