03

PRODUCT FAMILY 03 · DN50 – DN3000

SS bellows & expansion joints

A metal bellows expansion joint is a pressure-containing element incorporating one or more thin-wall corrugated bellows sections fabricated from stainless steel or special alloy. Installed in a pipeline, it absorbs thermal expansion and contraction, vibration, misalignment, and structural settlement — relieving connected equipment and pipe supports of potentially damaging forces and moments.

Unlike corrugated hoses, bellows and expansion joints are **engineered-to-order products** — each one calculated to the specific DN, pressure, temperature, and movement requirement of the installation, per EJMA and EN 14917:2021, with documented fatigue life, squirm stability analysis, and spring rate supplied with every order.

SIZE RANGE	DESIGN STANDARD	CONVOLUTION
DN50–DN3000	EJMA / EN 14917	SINGLE / MULTI-PLY

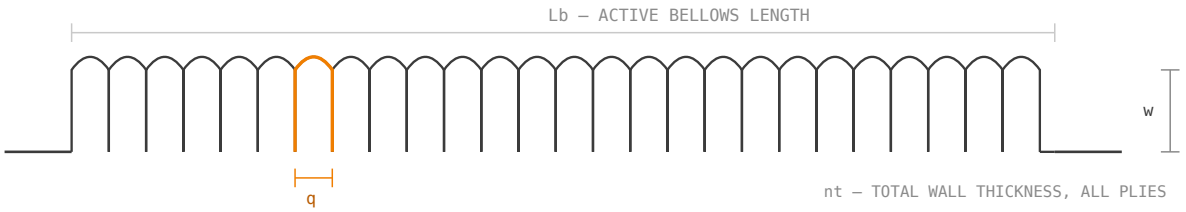


FIG. 03 — BELLOWS CONVOLUTION PROFILE

W HEIGHT · Q PITCH · LB ACTIVE LENGTH · NT TOTAL WALL THICKNESS

— CORE TECHNICAL SPECIFICATIONS —

Nominal diameter range	DN50 to DN3000
End fitting materials	Carbon steel, SS 304 / 316, precision-cast, forged alloy fittings
Connection types	Plain weld ends (ISO bevel) · EN 1092-1 flanges · ASME B16.5 flanges · RTJ
Design pressure	Full vacuum to 50 barg standard — higher pressures with engineering review
Temperature range	-196 °C to +900 °C (material-dependent)
Convolution construction	Single-ply or multi-ply laminated — superior fatigue and pressure performance
Design standards	EJMA (11th Ed.) · EN 14917:2021

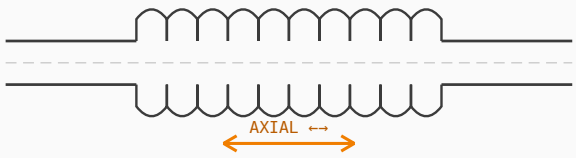
14 / BELLOWS ASSEMBLY CONFIGURATIONS

Assembly configurations.

SELECT BY DIRECTION + MAGNITUDE
OF MOVEMENT TO BE ABSORBED

Single bellows — axial

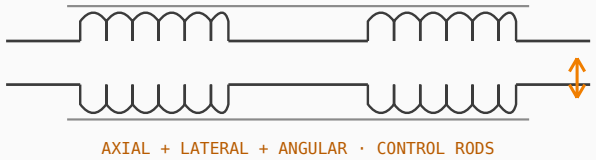
CFG. A



MOVEMENT	Axial compression / extension
THRUST	Not contained — anchors carry thrust
USE	Single-axis thermal expansion, anchored piping

Universal — dual bellows, lateral

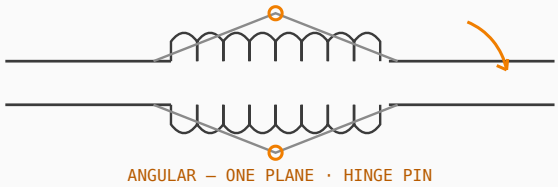
CFG. B



MOVEMENT	Axial + lateral + angular
THRUST	Not contained — anchors required (tied variant: rods carry thrust)
USE	General purpose complex pipe movements

Hinged — single plane angular

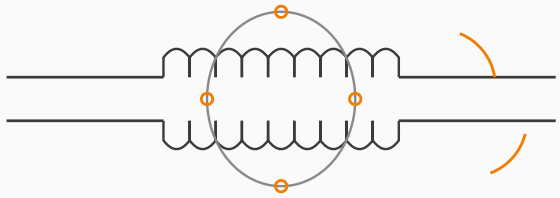
CFG. C



MOVEMENT	Angular in one plane only
THRUST	Contained — via hinge apparatus
USE	In pairs / triples for large lateral offset

Gimbal — multi-plane angular

CFG. D

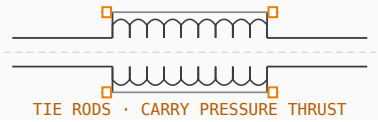


MOVEMENT	Angular in any plane
THRUST	Contained — via dual gimbal ring
USE	Omni-directional rotation at pipe bends

— RESTRAINED & PRESSURE-BALANCED —

Restrained — tie rods

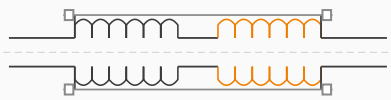
CFG. E



Lateral · rods carry full thrust

Pressure-balanced (inline)

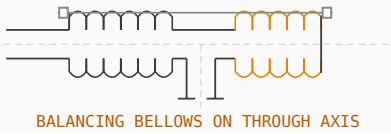
CFG. F



Axial + lateral · no main anchors

Pressure-balanced (elbow)

CFG. G



Axial + lateral at direction change

INTERNAL LINER (FLOW SLEEVE)

Fitted inside the bellows for high-velocity, turbulent or abrasive media — prevents impingement on the corrugated surface, extends fatigue life, smooths flow. Specify when gas or steam exceeds 1.2 m/s per 25 mm of bore up to DN150 (7.6 m/s above), liquid exceeds 0.6 m/s per 25 mm (3 m/s above), media is abrasive / particulate / slurry, flow is turbulent at direction changes, or for high-temperature steam and gas injection. Bellows only — corrugated-hose velocity limits are on p.09.