



## System of grooved end pipe connection

CHRYSsafidis S.A. supplies RECOMB grooved fittings

### QUALITY

RECOMB fittings are UL and FM approved and RECOMB is certified according to ISO 9001:2000 and PEC 97/23EC Module A

### A SYSTEM FOR CONNECTING STEEL PIPES WITH GROOVED ENDS

Recent times have seen the widespread use of a system for the connection of steel pipes with grooved ends. The system includes fittings and accessories with significant technical and economic advantages.

The grooved end system can tolerate high pressure, vacuum, and external buffeting, while reducing the need for external supports, expansion joints, etc.

The system is used in fire-fighting, hydration, heating, cooling, gas, and pneumatic transfer applications.

### ASSEMBLY

The heart of the system is the coupling, which is made up of a two-part body, a rubber gasket and the tightening bolts.



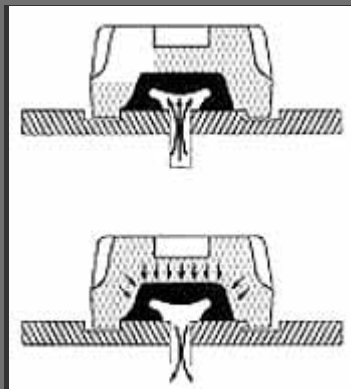
#### A. Flexible or Rigid Body

The body of the grooved couplings permits the self-centering of the pipe. The body encloses and retains the gasket, ensuring the system is watertight. The ends of the coupling rest in the pipes' grooves, preventing separation due to internal pressure.

Both flexible and rigid couplings are available. Flexible couplings create a predefined gap between the coupling and the pipe grooves, which permits both angular and longitudinal movement. Conversely, rigid couplings secure the pipes and prevent any separation or movement. In both cases, the pipes have to have grooves. Grooving can be done either by forming (rolling) or by cutting away parts of the pipe.

The couplings are fully painted and, as such, are suited for regular use, such as that involving atmospheric corrosion. For highly corrosive conditions, hot dip galvanized and stainless steel couplings are used.

The two parts of the coupling are connected by two oval headed bolts. Their head is positioned in the body in such a manner as to prevent the rotation of the bolt during the tightening of the nut. Tightening the nut only requires one wrench.



#### B. Gasket

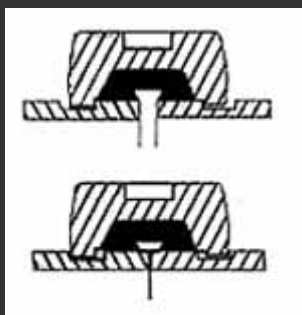
The C-shaped gasket securely waterproofs the system, under both internal pressure and internal vacuum. The diameter of the gasket and its internal structure create a very tight fit with the pipe, ensuring that the connection is watertight and airtight. Pressure from inside the pipes enters the hollow of the gasket and compresses the lips of the gasket on the pipe, making it even more watertight. In pipes with vacuum, the gasket compresses as a result of external pressure, and this also ensures that the system is watertight. The gasket is constructed of various elastomers, such as EPDM, BUNA-N, FLUOROELASTOMER and silicone. The variety of materials used in the gasket makes the Grinnell / RECOMB system suitable for use with many types of fluids, such as water, acids, bases, salts, petroleum, vegetable oils, gas, hydraulic fluids, lubricants, etc.

## TECHNICAL CHARACTERISTICS

The basic characteristics of the system are as follows:

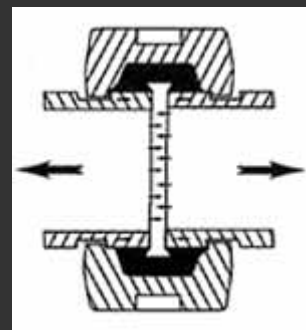
### •Rigid or Flexible

Both rigid and flexible couplings are available. Flexible couplings counteract expansion resulting from temperature changes, reducing the need for expansion joints.



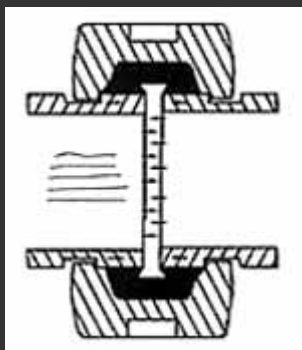
### •Self-stabilizing fittings

The couplings enter the peripheral grooves of the pipe and ensure the strength of the connection.



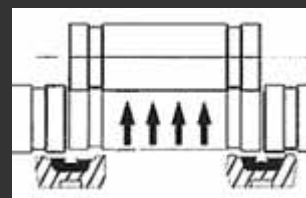
### •Noise and vibration

The elastomers used in the construction of the grooved couplings help reduce noise and absorb vibration.



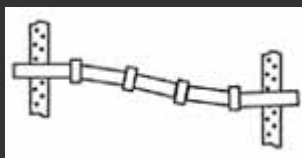
### •Ease of disassembly

The grooved couplings are easily disassembled for maintenance purposes. In systems carrying abrasive fluids, the couplings permit the rotation of the pipes to distribute evenly the effects of the corrosion.



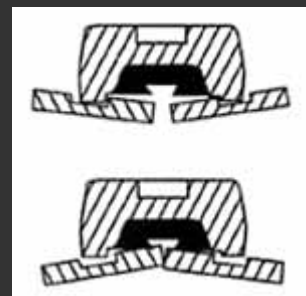
### •Flexibility

The flexibility of grooved couplings helps compensate for any changes in the course of a pipe. This permits positioning of the pipes for inclined drainage and on irregular grounds.



### •Angular Flexibility

The flexibility of grooved couplings also compensates for abrupt changes in a pipes' course resulting from landslides or seismic activity. This reduces wear and tear on the actual pipes themselves.



## ADVANTAGES

The grooved system has significant benefits over other methods of connecting pipes, such as those involving welding or flanges.


FEATURE	FLANGES	WELDING	GROOVED
Ability to change the course of pipe			■
Compensation for expansion and contraction of the pipes			■
Reusability of pipes	■		■
Reliability of pipe connection	■		■
Compensation for anomalies in pipe ends	■		■
No welding needed			■
No weakness at point of connection	■	■	■
No risk of physical injury during installation	■		■
Easy and quick installation			■
System is completely re-usable	■		■
Low total cost of installation			■
Can be installed by non-specialized personnel			■
Flexibility of pipe connections			■
Absorption of vibration			■

**The key advantages of the grooved system are:**


1. The reduction of the total cost of installation for about 30% to 40% of the cost of using flanged connections.
2. The installation time required when using the system can be as much as 70% less than that required when using other systems.

**Comparison of the cost of assembling 4" pipes**


**ASSEMBLING WITH FLANGES**

	COST OVERVIEW							
	2 Flanges PN 16	8 bolts M16x65 and nuts	Gasket	2 Welds		Welding material	Assembly	Total cost euro
			Time	Cost (18,0 euro/h)				
	2x4,7 euro = 9,4 euro	8x0,2 euro = 1,6 euro	1x0,7 euro = 0,7 euro	2x20 min = 40 min	40 min x 18,0 = 12,0 euro	1,5 euro	10 min 3,0 euro	<b>28,2</b>



















**ASSEMBLING WITH WELDING**

	COST OVERVIEW			
	Execution of welding at site of connection		Welding materials	Total cost euro
	Required time (with preparation)	Cost (18,0 euro/h)		
	25 min	25 min x 18,0 = 7,5 euro	1 euro	<b>8,5</b>

**ASSEMBLING WITH GROOVED FITTINGS**

	COST OVERVIEW			
		Cost of unskilled labor (9,0 euro/h)		Total cost euro
	1 coupling	Time needed to make 2 grooves 2x2 min = 4 min	Time needed for assembly 5 min	
	5,05 euro			<b>6,4</b>

## Range of fittings

	<b>Flexible couplings</b> 1"-24"		<b>Rigid couplings</b> 1"-12"		<b>Concentric reducers</b> 1,25"x1"-12"x10"
	<b>Eccentric reducers</b> 1,25"x1"-12"x10"		<b>Butterfly valves</b> with grooved ends PN20 2"-8"		<b>Caps</b> 1"-24"
	<b>Reducing couplings</b> 2"x1,5"-8"x6"		<b>Grooved flanges</b> 2"-12"		<b>Elbow 90°</b> 1"-24"
	<b>Elbows 45°, 22.5°, 11.25°</b> 1"-24"		<b>Tees</b> 1"-24"		<b>Crosses</b> 1"-12"
	<b>Reducing Tees</b> 1,25"x1,25"x1"-24"x24"x20"		<b>Grooved caps with BSP thread</b> 2"-10"		<b>Flanged Couplings</b> 2"-12"
	<b>Clamp-T Branch coupling with grooved outlet</b> for pipes 3"-8"		<b>Clamp-T Branch coupling with threaded outlet</b> for pipes 3"-8"		<b>Grooved &amp; Threaded nipples</b> 1"-3"

