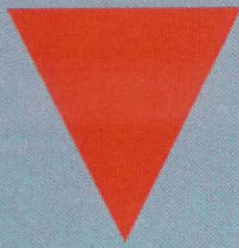


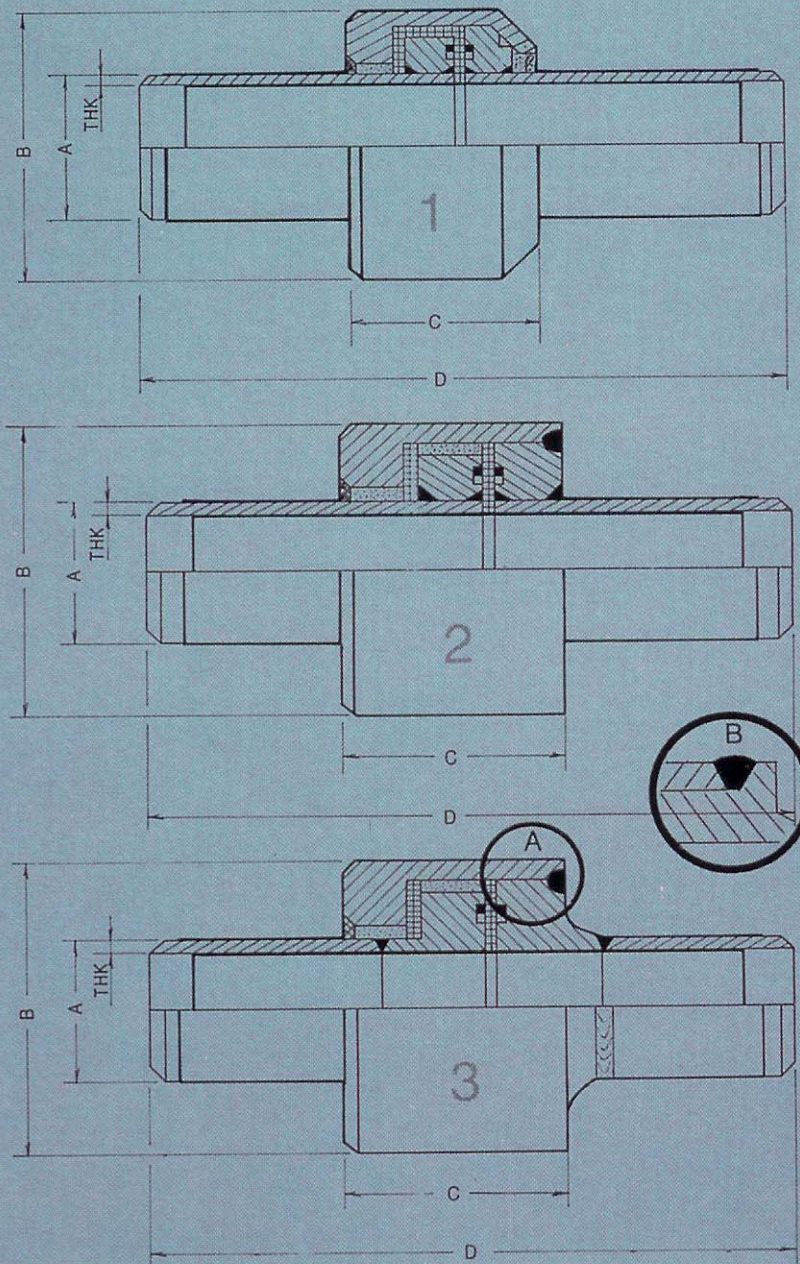
**KEROTEST**

SINCE 1909

**ZUNT  
MONOLITHIC  
INSULATING  
JOINTS**



# INSULATING JOINTS FOR SECTIONING MAIN PIPELINES FOR GAS-WATER-OIL



**SIZE RANGE:**  
from 1/2" to 100"

**RATING CLASS:**  
from ANSI 150 to  
ANSI 2500

## CHARACTERISTICS GUARANTEED FOR STANDARD JOINTS

- **MAX OPERATING PRESSURE:**  
Equal to the Nominal Pressure  
(PN/ANSI rating)
- **TEST PRESSURE:**  
1.5 times the Design Pressure
- **OPERATING TEMPERATURE:**  
-20°F to +158°F for normal  
temperatures  
-20°F to +320°F for high  
temperatures  
(high temperature on specific  
request up to 500°F)

## ELECTRICAL TESTS IN DRY AIR AT 77°F:

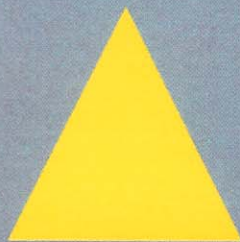
- **DIELECTRIC  
STRENGTH TEST:**  
3000 V at 50 Hz a.c. for 1 min.
- **ELECTRICAL  
RESISTANCE TEST:**  
≥5 MΩ - 1000 V d.c.

## MATERIAL USED:

- **FERROUS MATERIALS:**  
Carbon steel in its various grades
- **NON FERROUS MATERIALS:**  
Stratified epoxy resin and glass  
fiber Class G10-G11  
Sealing O-Rings suitable to meet  
working temperature and fluid  
conveyed  
Filling epoxy resin  
Epoxy resin for internal/external  
coating (3 mils DFT)

NPS	ANSI 150						ANSI 300						ANSI 600					
	SIZE	A	B	C	D	WALL	LBS.	A	B	C	D	WALL	LBS.	A	B	C	D	WALL
1/2	.840	2 3/8	1 3/4	11 13/16	.109	2	.840	2 3/8	2 3/8	11 13/16	.109	2.2	.840	2 3/8	2 3/8	11 13/16	.109	2.2
3/4	1.050	2 3/8	1 3/4	11 13/16	.113	2	1.050	2 5/8	2 3/8	11 13/16	.113	2.9	1.050	2 5/8	2 3/8	11 13/16	.113	2.9
1	1.315	2 1/2	1 7/8	11 13/16	.133	2.6	1.315	3	2 3/8	11 13/16	.133	4.4	1.315	3	2 3/8	11 13/16	.133	4.4
1 1/4	1.660	3 1/16	2	11 13/16	.140	4	1.660	3 1/4	2 3/4	11 13/16	.140	5.5	1.660	3 1/4	2 3/4	11 13/16	.140	5.5
1 1/2	1.900	3 9/16	2 1/8	11 13/16	.145	5.3	1.900	3 3/4	3 3/16	11 13/16	.145	7.7	1.900	3 3/4	3 3/16	11 13/16	.145	7.7
2	2.375	4	2 3/8	15 3/4	.154	9	2.375	4 1/4	3 5/8	15 3/4	.154	13.2	2.375	4 1/4	3 5/8	15 3/4	.154	13.2
2 1/2	2.875	4 1/2	2 7/16	15 3/4	.172	10.6	2.875	5 1/16	3 3/4	15 3/4	.172	18.7	2.875	5 1/16	3 3/4	15 3/4	.172	18.7
3	3.500	5	2 9/16	15 3/4	.188	13.9	3.500	5 1/2	4 1/8	19 11/16	.188	26.4	3.500	5 3/4	4 3/4	19 11/16	.216	33
4	4.500	6 1/16	2 3/4	15 3/4	.188	20	4.500	6 1/4	4 5/16	19 11/16	.188	30.8	4.500	7	5 3/16	19 11/16	.237	48.4
5	5.563	7 5/8	3 3/16	19 11/16	.188	31.9	5.563	7 13/16	5 1/8	19 11/16	.258	57.2	5.563	8	5 9/16	23 5/8	.258	68.2
6	6.625	9 1/16	3 3/4	19 11/16	.219	46.2	6.625	9	5 3/8	23 5/8	.218	81.4	6.625	9 7/16	5 13/16	23 5/8	.280	94.6
8	8.625	10 3/4	3 15/16	19 11/16	.250	68.2	8.625	11 3/4	5 7/16	23 5/8	.250	125.4	8.625	11 3/4	6 1/4	23 5/8	.322	145.2
10	10.750	13 1/2	5 3/16	27 9/16	.250	136.4	10.750	13 13/16	5 5/8	27 5/8	.307	187	10.750	14 1/4	7 1/16	27 9/16	.365	235.4
12	12.750	15 9/16	5 5/16	27 9/16	.281	171.6	12.750	15 3/4	5 15/16	31 1/2	.312	250.8	12.750	16 5/16	7 15/16	35 7/16	.500	332.2
14	14.000	16 15/16	5 7/16	35 7/16	.312	250.8	14.000	17 5/16	6 3/16	35 7/16	.312	316.8	14.000	17 3/4	8 3/16	39 3/8	.500	471
16	16.000	19	5 5/8	35 7/16	.312	292.6	16.000	19 5/16	6 3/8	39 3/8	.312	451	16.000	19 7/8	8 5/8	39 3/8	.500	508.2
18	18.000	21 1/16	6 1/4	39 3/8	.312	343.2	18.000	21 1/2	6 15/16	39 3/8	.375	492.8	18.000	22 3/8	9 9/16	39 3/8	.500	649
20	20.000	23 5/16	6 3/4	39 3/8	.312	451	20.000	23 13/16	7 5/8	39 3/8	.375	589.6	20.000	24 13/16	10 1/16	39 3/8	.500	814
22	22.000	25 3/8	7	39 3/8	.312	545.6	22.000	25 13/16	7 13/16	47 1/4	.375	763.4	22.000	27 1/16	10 15/16	47 1/4	.562	1,056
24	24.000	27 9/16	7 3/8	39 3/8	.375	642.4	24.000	28 3/8	8 1/16	47 1/4	.375	972.4	24.000	29 7/16	11 7/16	47 1/4	.625	1,287
26	26.000	29 1/2	7 7/8	39 3/8	.375	737	26.000	30 9/16	8 7/16	47 1/4	.500	1,148.4	26.000	32	12 1/16	51 13/16	.625	1,716
28	28.000	31 15/16	8 3/16	47 1/4	.375	836	28.000	32 11/16	8 11/16	47 1/4	.500	1,344	28.000	34 3/16	13 1/16	51 13/16	.688	1,947

**NOTE:**

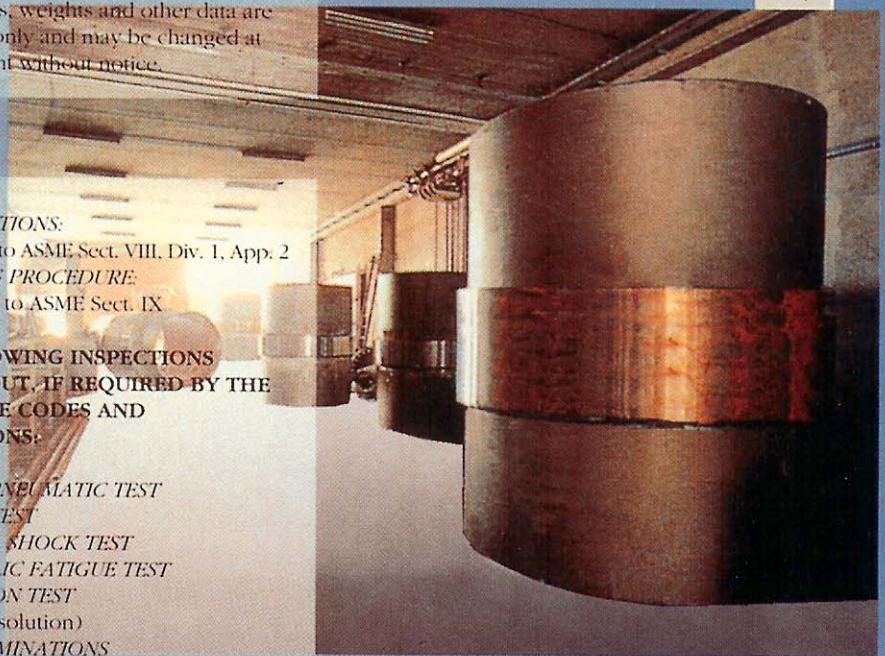


- Alternative wall thickness can be manufactured on request
- For joints over 28" ND or joints over PN 100 (ANSI 600), dimensions, weights and technical features shall be supplied on receipt of detailed enquiry/specification.
- Dimensions, weights and other data are indicative only and may be changed at any moment without notice.

- *CALCULATIONS:* according to ASME Sect. VIII, Div. 1, App. 2
- *WELDING PROCEDURE:* according to ASME Sect. IX

**THE FOLLOWING INSPECTIONS CARRIED OUT, IF REQUIRED BY THE APPLICABLE CODES AND REGULATIONS:**

- *HYDRO-PNEUMATIC TEST*
- *HELIUM TEST*
- *THERMAL SHOCK TEST*
- *HYDRAULIC FATIGUE TEST*
- *IMMERSION TEST* (3% NaCl solution)
- *NDE EXAMINATIONS*
- *HOLIDAY AND ADHESION TEST* on coating/lining



## FIELD INSTALLATION OF INSULATING JOINTS

- INDEX :
1. Scope
  2. Field of application
  3. References
  4. Responsibility
  5. Instructions
  6. Documentation

N° Rev	DESCRIPTION OF REVISION	ISSUED QA		CHECKED PGT		APPROVED PGT	
		Date	Signature	Date	Signature	Date	Signature
0	First Issue						
1	Electrical tests before and after installation included						
2	High voltage Protection						
3	Joint protection during PWHT						
4	Shotblasting operations	09.12.03	S.A	09.12.03	I.C.	09.12.03	I.C.

1. **SCOPE :** Handling and installation of joints on site
2. **FIELD OF APPLICATION :** Every insulating joint
3. **REFERENCES :** Zunt Quality Assurance Manual ; NACE RP0286
4. **RESPONSIBILITY:** Users

## 5. INSTRUCTIONS

### 5.1 ELECTRIC MEASUREMENT BEFORE INSTALLATION

Before the joint is installed , the Inspector or Company Representative shall measure the electrical insulation resistance of the joint in upright position with a 1000 DC volt megger in dry conditions. The result shall be at least 5 MOhm.

### 5.2 INSTALLATION

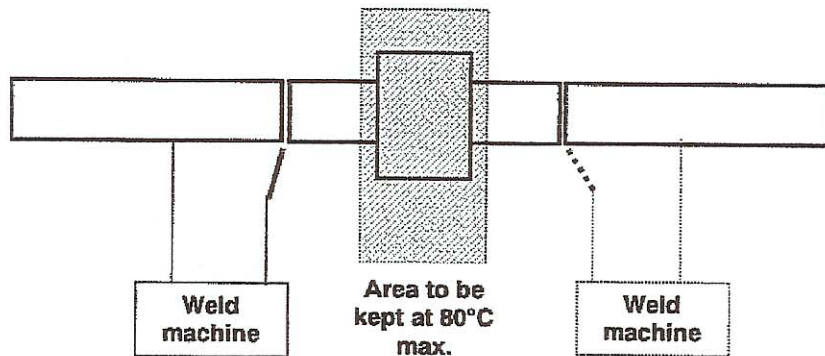
Handling and transportation of the joints in the various site areas shall be done very carefully, so as to prevent any mechanical damage or permanent deformation.

A particular care shall be taken not to damage the internal and external coating in any way.

On a distance of 25 - 30 mm, any protection or foreign material shall be removed, both internally and externally from all weld ends, which shall then be ground or repaired to recondition, if necessary, all weld bevels. The latter shall be free from oil, grease or any other contaminating material that would affect the subsequent welding.

**Hammering, hitting or heating the ends of dielectric joints shall be absolutely avoided.**

The union welding between the dielectric joint and the adjacent line pipe shall be done very accurately, making sure that the weld can shrink freely, with no obstacle and in any case that, at the end of that operation, no stresses are grieving on the joint (both longitudinally and transversally). During field welding, be sure to move the earthing electrical terminal to the same side of the weld to made (see the sketch here below). This will avoid any damage to the dielectric properties due to the welding current.



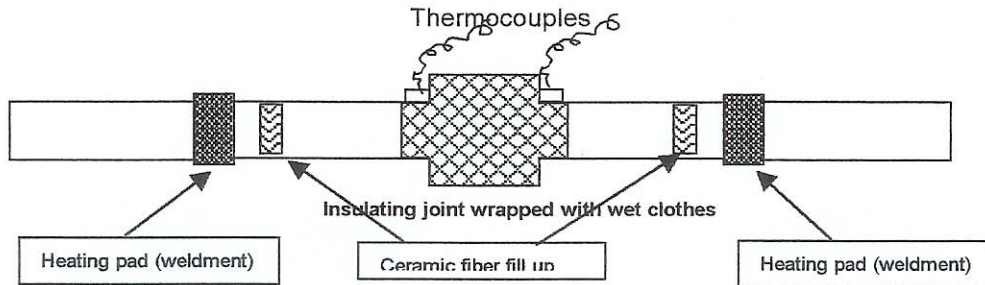
Assembly and welding operations shall be carried out by skilled personnel (qualified welders ), using approved Welding Procedure Specifications.

**Welding and post weld heat treatment shall be carried out in such a manner that the heat generated does not damage the insulating materials, the interpass temperature shall be maintained within limits allowing the temperature of the insulating joint central body not to exceed 80°C.**

There is no preferential direction as regards the fluid conveyed. When insulating joints are installed in vertical position, the closure weld "F" of the insulating joint (visible weld on joint central body) shall be preferably installed upwards.

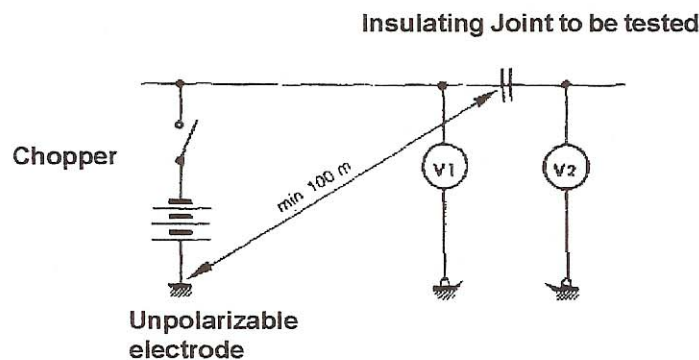
## PWHT PERFORMANCE

**When PWHT has to be carried out after installation, care shall be taken to protect the joint body parts from overheating. The internal bore of the joint shall be filled with ceramic-fiber blanket or refractory material immediately after the area to be heat treated, in order to prevent internal heat convection towards the joint body parts. Suitable cooling methods shall be employed (wet clothes wrapping, compressed air, etc.) and the joint body parts temperature shall be monitored for the whole duration of the PWHT in order not to overcome the 80°C temperature.**



### 5.3 TESTING AFTER INSTALLATION - Alternative 1

The sketch n°1 shows the scheme of the circuit to be made .



### SKETCH N°1

The integrity of the joint can be tested by the tension variation method.

The tension variation shall be high enough to allow a good evaluation of the joint (about 1.35V).

A chopper shall be installed in the circuit of the closest impressed current station .

If the tension difference  $\Delta V$  is not high enough , a temporary impressed current station with a chopper shall be installed close to the joint to be tested.

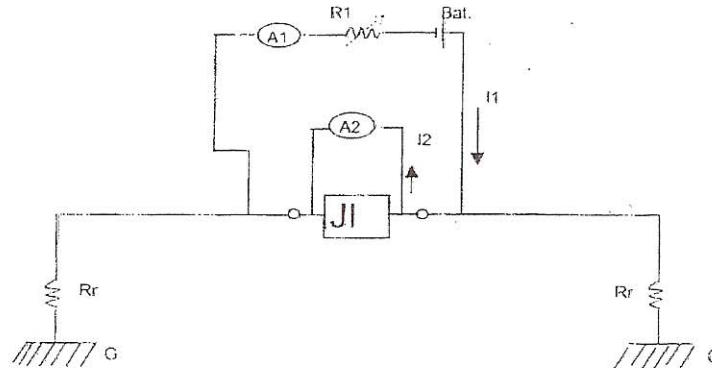
After having applied the tension  $\Delta V$ , tensions V1 and V2 shall be measured by means of two voltmeters:

- The joint is in good conditions if ,when  $\Delta V$  is applied, either V2 does not change or it changes in the opposite way than V1.
- The joint is faulty if V2 is either equal or almost equal to V1.

PRECAUTIONS: In order to perform a reliable test, it is important to observe the following precautions:

- 1) Any connecting cable employed to short-circuit the joint during weld operations in site shall be removed.
- 2) Any metallic support short-circuiting the insulating joint shall be removed or suitably isolated.
- 3) The inside internal surfaces of the pipeline in correspondance of the joint shall be dry and free from any conductive material.

## TESTING AFTER INSTALLATION – Alternative 2



The following method of checking insulating joints consists in measuring the current  $I_2$  by means of an amperometer  $A_2$ .

A 12 V battery is connected in parallel with the Joint with an amperometer  $A_1$  and a variable resistance  $R_1$  as per above sketch.

The joint is not damaged if the measurement obtained from  $A_1$  is the same of  $A_2$ .

If the joint is not damaged any current variation  $I_1$  generated by the variation of resistance  $R_1$  will change the  $I_2$  current approximately in the same proportions.

The joint is damaged if the  $I_2$  current is near zero or the variation is too small for any variation of  $I_1$ .

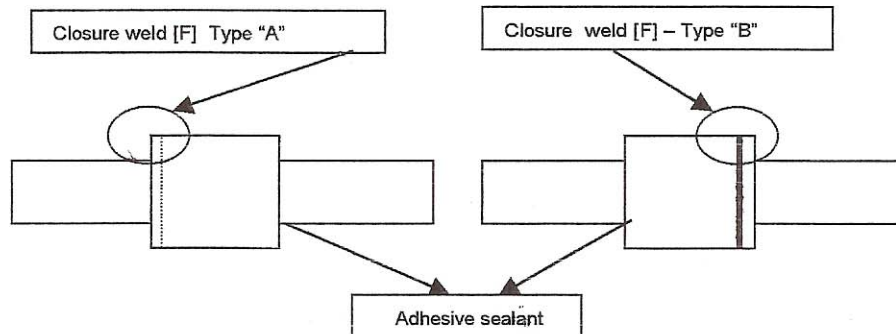
If any discrepancies on electrical test value will arise and test were carried out in a reliable way, the only reason of this fault is that the installation was not carried out following our previously described recommendations. As a heat damaged installed joint can't be repaired, it must be replaced with a new monoblock insulating joint.

## 5.4 HIGH VOLTAGE PROTECTION

Insulating joints dielectric properties may be damaged by lightning and high voltage surges generated by fault conditions, switching surges, induced AC from adjacent high voltage cables. Therefore it is advisable, according to the particular application in which the joint is employed, to protect the joint with devices like capacitors, polarisation cells, spark gaps, or any equivalent solid-state product. Lightning arrestors and other protective devices shall be located to prevent the collection of dirt and moisture that could lead to an external flashover at a relatively low surge voltage.

## 5.5 SHOTBLASTING OPERATIONS

In case it is necessary to carry out shotblasting operations on installed joints, care must be taken to avoid removal of the adhesive sealant on the epoxy filler area. The area of application of the adhesive sealant is easily identifiable because it is the side that is opposite to the side where the joint body closure weld is present.



6. **DOCUMENTATION:** Results of any electrical test shall be written in a report by the appointed personnel dated and signed.

Via Grinetta, 22 - 24068 Seriate (BG) Italy  
 Phone : ..39/035-30.39.82 - Fax ..39/035-30.39.69  
[commercial@zunt.com](mailto:commercial@zunt.com)- [technical@zunt.com](mailto:technical@zunt.com)  
 Website: [www.zunt.com](http://www.zunt.com)

## COMPANY PROFILE

<b>COMPANY NAME</b>	ZUNT ITALIANA SRL	
<b>REGISTERED OFFICE OFFICES &amp; FACTORY</b>	Largo Industrie, 30/33 - 24020 Torre Boldone (BG) - Italy <b>Via Grinetta 22 - 24068 Seriate (BG) - Italy</b> Phone : ..39/035-30.39.82 - Fax : ..39/035-30.39.69 e-mail: <a href="mailto:commercial@zunt.com">commercial@zunt.com</a> and <a href="mailto:technical@zunt.com">technical@zunt.com</a>	
<b>YEAR OF FOUNDATION</b>	1975	
<b>COMPANY'S CAPITAL</b>	Euros 98,127. <sup>00</sup>	
<b>REFERENCE BANKERS</b>	<b>Banca Popolare di Bergamo:</b> Pza Pontida branch, Bergamo <b>Banca Nazionale del Lavoro</b> – Bergamo Branch <b>Credito Bergamasco</b> - P.za Pontida branch, Bergamo <b>Intesa BCI</b> - Bergamo branch <b>Intesa BCI-Cariplo</b> - Torre Boldone branch <b>Unicredito Italiano</b> - Via Corridoni - Bergamo branch	
<b>MAIN PRODUCTS</b>	<b>MONOLITHIC INSULATING SERVICE JOINTS</b> for gas and water with maximum working pressure of 10 Bar - NPS from 1/2" to 3"- Series productions. <b>MONOLITHIC INSULATING JOINTS FOR PIPELINES</b> working pressure from ANSI rating 150 to 2500 and upto API 10000- NPS from 1/2" to maximum pipeline OD. <b>PRE-ASSEMBLED INSULATING FLANGES</b> manufactured in compliance with the client's design and specifications or according to our patent for high pressure joints. <b>INSULATING KITS FOR FLANGES</b> <b>STEEL/POLYETHYLENE TRANSITION FITTINGS</b> for water and gas pipelines 10/16 bar pressure.	
<b>TECHNICAL AND COMMERCIAL STAFF</b>	Managing Director Commercial Manager Export Dept. Sales Manager Q.A. Manager Quality Control Dept. Technical Manager Technical Dept Production Manager	Giulio CALDARA Graziella SCOTTI Cinzia COLUSSO Elio GUALINI Sergio ALFONSI Luigi DONINI Igor CALDARA, Eng. Angelo BELOTTI Giovanni ROVETTA
<b>EMPLOYEES:</b>	30 people	
<b>PRODUCTION CAPACITY</b>	approx. 30,000 service and pipeline joints per month	



**AREAS  
AND PLANTS**

covered area: offices 600 m<sup>2</sup> /plants 7,900 m<sup>2</sup>  
open area of 40,000 m<sup>2</sup> - supply mains 280 kW

**MAIN EQUIPMENT**

Semi-automatic and automatic belt units for cold-cutting of pipes; hot cutting units with oxy-methane flame; tool-machines for horizontal and vertical turning; bevelling and milling machines; electrical, hand-operated and semi-automatic welding units: GTAW, GMAW, SMAW and SAW equipment; dry blast cleaning unit ; hydraulic vertical press; air compressors; automatic and continuous cycle painting plants with dipping tanks; surface conditioning plant and kiln drying chambers with automatic cycle; hand-operated spray painting plant; FBE plant, Water jet machine, no.. 3 bridge cranes, no.. 4 fork lifts, other complementary facilities

**CHECKING &  
TESTING**

All service joints are checked by means of an automatic computerised control unit with micro-processors for the verification of air leakage and electrical properties of the joints.

Hydrostatic testing equipment, hydraulic fatigue and air leakage tests, vacuum test, equipment for bending and torsional tests, thermal shock tests, etc. Electrical equipment for the control of the electrical resistance, dielectric strength; electric resistance after electrolytic immersion (NaCl 3%); verification of the adhesion, continuity and thickness of paint.

Scintillation spectrometer Nuova OPTICA ESA-4 for the Chemical analysis of ferrous material elements (C-Mn-Si-S-P-G-Ni-V-Mo, etc.). Other complementary instruments and fittings needed for testing joints in conformity with domestic and international Standards.

Non Destructive Examinations (UT-MT/PT) are carried out by Zunt personnel. For Radiographic examinations ZUNT take advantage of the services of skilled firms.

**STANDARDS**

Ferrous materials: ASTM, API, UNI, ANSI, DIN, BS, ASME, MSS, NACE

For dielectric non ferrous materials: ASTM, CEI.

For resinous materials, paints & sand-blasting: ASTM, SPPC,ISO,SIS, BS.

For welds & related materials:AWS,ASME IX, ASME II Part C, BS 4515

NDE examinations and inspections: ASME V, ANSI B 31.3, ANSI B31.4, ANSI B 31.8, ASME VIII, API 1104.

**TESTING &  
INSPECTION  
AGENCIES**

Bureau Veritas, Lloyd Register, Det Norske Veritas, American Bureau of Shipping, RINA, Cipex, Socotec, EIL, Crown Agents, MMI ,TUV, Germanischer Lloyd, SGS , etc.

**DESIGN &  
CALCULATIONS**

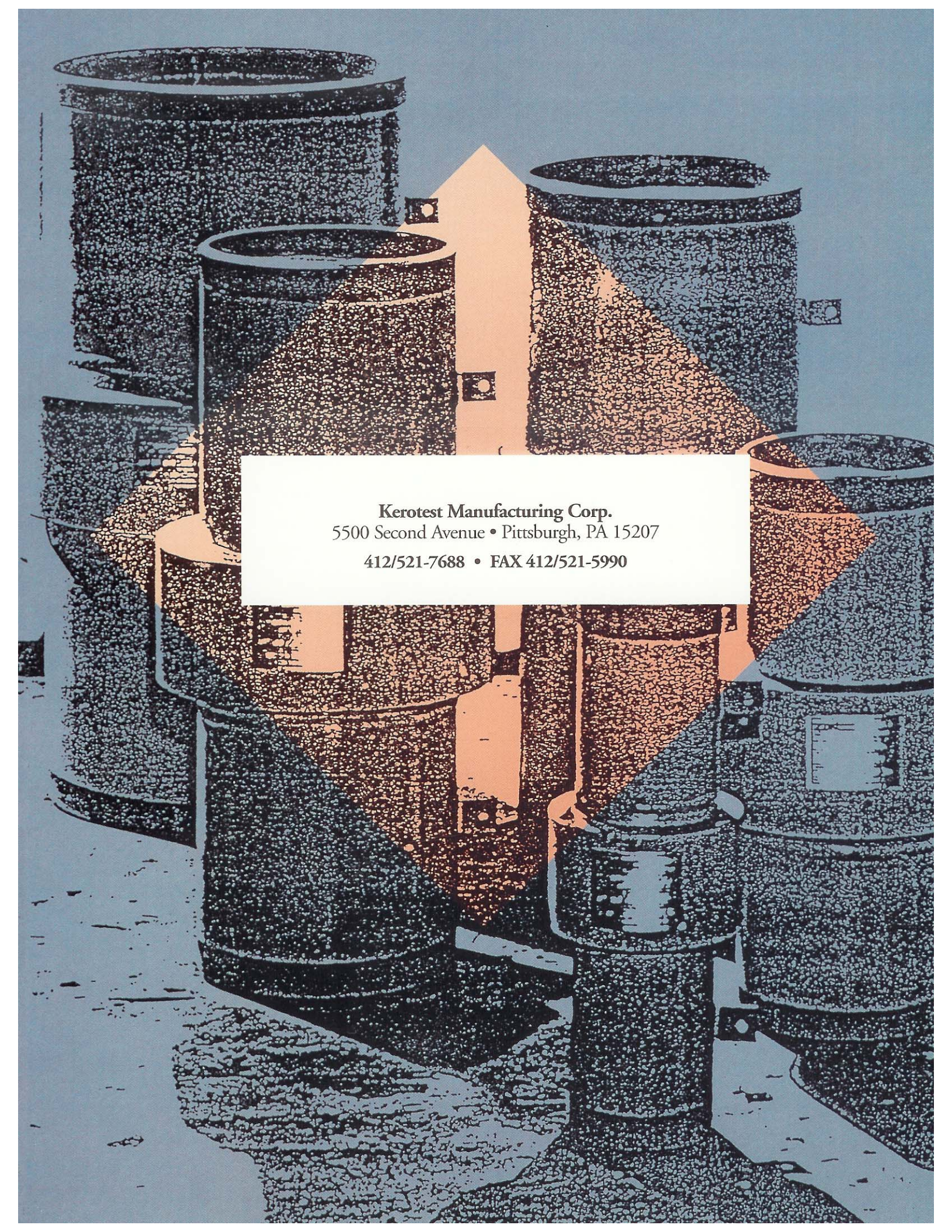
Our Company operate a computerised calculation programme for the verification of the mechanical properties of the joints, in compliance with ASME VIII Div. 1, App .2 and applicable Codes (ANSI B 31.3, 31.4, 31.8), or according to the Client's specification requirements.

A FINITE ELEMENTS method verification programme (ASME NQA-1 certified programme) is operational and available in our Design Dept..

**QUALITY  
ASSURANCE  
TO ISO 9001  
SINCE 1993**

A Quality Assurance Programme in compliance with ISO 9001 - BS 5750 part 1 is in place in our premises, duly assessed and certified by Bureau Veritas Quality International.

Our Company are also approved Vendors of Messrs BRITISH GAS, SNAM as well as of many national and international main organizations



**Kerotest Manufacturing Corp.**  
5500 Second Avenue • Pittsburgh, PA 15207  
412/521-7688 • FAX 412/521-5990