

7036 Issue 01

15 September 2007

**QUALIFICATION OF ALLIED FOR  
THE SUPPLY OF FORGED BENDS,  
TEES AND SMALL FITTINGS TO  
NATIONAL GRID SPECIFICATION  
T/SP/B/12**

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## Report Issue Record

Report Title: Qualification of Allied for the supply of forged bends, Tees and Small Fittings, to National Grid Specification T/SP/B/12	
Report Number: 7036	Project SAP Code: 1/11203

Issue	Description of Amendment	Originator/Author	Checker	Approver	Date
01	First issue for client comments	ML	PB	MK	15 Sep 07

Previous issues of this document shall be destroyed or marked **SUPERSEDED**

## Report Approval

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## Executive Summary

Allied International S.R.L has been qualified, through a series of inspection visits, for the supply of forged bends, tees and all small diameter fittings to National Grid specification T/SP/B/12, for all National Grid projects within this range of fittings.

Qualification to butt weld fittings specification T/SP/B/12 has been completed, concurrently with production for the 1200 mm (48") Felindre to Brecon section of the South Wales Reinforcement pipeline system, on behalf of Nacap Land and Marine Joint Venture (NLMJV), as agreed by National Grid (NG) under its qualification management procedure NSBP 401 in accordance with its technical qualification procedure T/SP/MPQ/2.

All critical stages of production have been monitored. Drawings, manufacturing procedures and certification have been reviewed. Completed test and production fittings, produced by all forging processes, have been dimensionally checked and subjected to non destructive examination (NDE) and mechanical tests.

## Conclusions

1. Allied has fulfilled the qualification requirements for the supply of all sizes of forged bends and tees, and for small forged reducers and end caps up to 450 mm nominal size, produced at its own manufacturing plants.
2. Manufacturing processes were generally well controlled. No adverse observations on basic forming and heat treatment operations were noted, except in dimensional control of half shell pressing, which required correction during production. Welding was consistently well executed.
3. Mechanical properties of the finished test and production fittings were entirely satisfactory and significantly exceeded specification requirements for the material grades.
4. Dimensional conformance of tees, reducers and closed die and mandrel pulled bends was entirely satisfactory and well within specification tolerances.
5. Most of the half shell bends initially had body ovality that exceeded the 1% limit for NG forged bends, which is tighter than that in other standards and for other customers. This was rectified by carefully controlled and supervised hot jacking. The causes were identified and steps taken, using proven methods, to avoid recurrence on future production. All corrected bends were within or close to 1% ovality.
6. All materials and processes were fully documented, and manufacturing procedures were satisfactory.
7. Allied has the capability to manufacture the full range of butt weld fittings covered by T/SP/B12.
8. Limited additional testing would be required in order to extend approval to the full range of butt weld fittings to T/SP/B12 to include large end caps and large fabricated and forged reducers.

## Recommendations

1. Approve Allied SRL to supply the following range of forged butt weld fittings to T/SP/B/12 for all National Grid projects.

### Product range:

- All sizes of tee 1200 mm down to 50 mm, equal and reducing.
- All sizes configurations of bend, 1200 mm down to 50 mm, except line bends of combined large diameter (1200 mm) large radius (3D) and large angle (> 45°)
- All types of small (up to 450 mm) normalised fittings (bends, tees, reducers and end caps) made from seamless pipe

### Manufacturing locations:

- Fittings that are manufactured by the Allied S.R.L. group at its Tectubi Podenzano, Tectubi San Giovanni (Cuma) and Raccordi Nibbiano plants.

### Starting materials

- Fittings that are made from the same starting material specifications and suppliers as used for qualification i.e. Trametel plate for large ( $\geq 450$  mm) quench and tempered fittings and Dalmine pipe for small seamless normalised fittings

### Manufacturing processes:

- Fittings that are made by the same forging processes as qualified for each product and size range viz:
    - Closed die and extrusion pulled tees
    - Closed die, half shell and mandrel pulled bends
    - Die forged reducers
  - Fittings that are supplied in the same heat treatment condition as qualified for each product, size and grade range viz:
    - Quench and tempered (Q&T) for larger fittings of grade L415 (X60) and above
    - Normalised for smaller fittings of grade L360 (X52) and below.
2. Extend qualification to large fabricated reducers and to variants in starting material, fitting geometry, forging or heat treatment process for a particular product and size range, by means of witnessed production inspection plus tests on integral extensions of, or coupons attached to, the fitting, that undergo the same heat cycle as the fitting.
  3. Extend qualification to the full range of fittings in T/SP/B/12 by qualifying additional test fittings comprising a large (1200 mm) end cap and a large (1200 x 600 mm) forged reducer.
  4. Monitor production of half shell bends on the next orders to ensure that body ovality is controlled to within 1%.