

Gas Industry Standard

GIS/F6:2021

Specification for

Carbon and Manganese Steel Pipe Pups for Operating Pressures Greater Than 7 Barg



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Foreword

Gas Industry Standards (GIS) are revised, when necessary, by the issue of new editions. Users should ensure that they are in possession of the latest edition. Contractors and other users external to Gas Transporters should direct their requests for copies of a GIS to the department or group responsible for the initial issue of their contract documentation.

Comments and queries regarding the technical content of this document should be directed in the first instance to the contract department of the Gas Transporter responsible for the initial issue of their contract documentation.

This standard calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Compliance with this engineering document does not confer immunity from prosecution for breach of statutory or other legal obligations.

Mandatory and non-mandatory requirements

For the purposes of a GIS the following auxiliary verbs have the meanings indicated:

can indicates a physical possibility;

may indicates an option that is not mandatory;

shall indicates a GIS requirement;

should indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment needs to be completed to show that the alternative method delivers the same, or better, level of protection.

Disclaimer

This engineering document is provided for use by Gas Transporters and such of their contractors as are obliged by the terms of their contracts to comply with this engineering document. Where this engineering document is used by any other party, it is the responsibility of that party to ensure that the engineering document is correctly applied.

Brief history

First published as BG/PS/F6	March 1987
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1. Scope

1.1 This Gas Industry Standard specifies the requirements for the manufacture of carbon and carbon manganese steel pipe pups equal to or less than 1220 mm nominal size, and for operating pressures greater than 7 barg.

Excluded from this standard are:

- Valves: When valves complete with pipe pups are required, the overall length of the valve and pipe pup assembly shall be in accordance with GIS/V6.
- Pig Signaling Devices: The length of pipe pups associated with pig signaling devices shall be in accordance with */SP/E/56.
- Isolation Joints: The overall length of the isolation joint and pipe pup assembly shall be in accordance with */SP/E/56.
- Reducers: The total fitting length shall be in accordance with Table F.2 in */SP/B/12.

Note: All other requirements for pipe pups shall be in accordance with this standard. This includes the pipe pup lengths for reducers, bends, tees and end caps.

Typical applications of pipe pups to this standard are as follows:

- a) To enable sub-assemblies of a standard length to be produced;
- b) To protect heat sensitive parts of components during welding on site;
- c) To act as a transition piece where there is a change in wall thickness or material specification.

2. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

2.1 British and European standards

Enter standards in the format

ISO 8501-1, *Preparation of steel substrates before application of paints and related products.*

2.2 Gas Transporter Specifications

*/SP/B/12, *Specification for Steel Bends, Tees, Reducers and End Caps for Operating Pressures Greater than 7bar.*

*/SP/CM/1, *Specification for internal coating operations for steel line pipe and fittings.*

*/SP/CW/6, *Specification for the external protection of steel line pipe and fittings using resin and associated coating systems.*

*/SP/DAT/29, *Hard stamping of components and pipes.*

*/SP/E/56, *Specification for Steel Valves for Use With Natural Gas At Normal Operating Pressures Above 7 Bar And Sizes Above DN15.*

*/SP/NDT/2, *Specification for Non-Destructive testing of welded joints in steel pipelines and pipework.*

*/SP/PA/10, *Specification for new and maintenance painting at works and site for above ground pipeline and plant installations.*

*/SP/PIP/1, *Specification for Steel Line Pipe for Natural Gas Pipelines Operating At Pressures Greater Than 7 Bar.*

*/SP/Q/9, *Specification for identification system for pipes and associated fittings differing from their specified requirements.*

NOTE

Where no date is shown, the latest edition of each standard and specification shall apply.

- Gas Transporters will each have their own specifications normally in the referenced format */SP/XX/No, where * is replaced by the Gas Transporters reference e.g. T for National Grid, or SGN, WWU etc. followed by the specification initials and number reference.

2.3 Gas Industry Standards

GIS/DAT6, *Specification for carbon and carbon manganese steel pipe for operating pressures above 7 bar.*

GIS/P16, *Specification for dimensions and applications of standard weld end preparations for steel pipe, fittings and valves.*

GIS/V6, *Specification for Steel Valves for Use With Natural Gas At Normal Operating Pressures Above 7 Bar And Sizes Above DN15.*

3. Terms and Definitions

For the purposes of this document, the following definitions apply.

3.1 Contractor

The person, firm or company with whom a Gas Transporter enters into a contract to which this standard applies, including the Contractor's personal representatives, successors and permitted assignees.

4. Conformance

4.1 Units of measurement

In this standard, for data expressed in both SI and USC units, a dot (on the line) is used as the decimal separator, and no comma or space is used as the thousands separator, in order to be consistent with other Gas Transporter specifications.

5. General

Pipe pups shall be manufactured from pipe which conforms to the requirements referred to in 6.1.1. The nominal size values used to describe pipe pups in this standard shall be related to the nominal size in the requirements referred to in 6.1.1.

Information to be supplied by the Gas Transporter to the Contractor and information to be supplied by the Contractor to the Gas Transporter to meet the requirements of this standard are listed in Section 2.

6. Manufacture

6.1 Starting pipe

6.1.1 Pipe pups shall be manufactured from pipe which conforms to the following standards or specifications:

- a) GIS/DAT6
- b) */SP/PIP/1

Where pipe to the above standards or specifications is not available, the Gas Transporter shall be satisfied that any equivalent pipe shall be to the requirements of above. The equivalent pipe shall be assessed and agreed through the deviations process.

If specified on the Data Sheet (see Annex A, Sheet 1, item 4 b)), pipe pups shall be made from free

issued pipe which has been pre-installation tested. All pre-installation tested pipe will be recognizable as such by a 150 mm wide stripe of yellow paint applied to the external surface of the pipe from end to end of each length in accordance with */SP/Q/9.

6.1.2 Where practicable, bare pipe should be used for the manufacture of pipe pups.

If it is necessary to use coated pipe, the Contractor shall be informed of the type of coating, by the Gas Transporter, on the Data Sheet (see Annex A, Sheet 1, item 4 c)).

Coatings shall be removed as follows:

- a) Coatings applied as multi-component liquids or epoxy resin powder shall be removed for a distance of 150 +5/-0 mm from each end of the pipe pup, except for pipe pups of length less than 500 mm, when the entire coating shall be removed.
- b) Other coatings shall be completely removed.

Note: Where it is specified on the Data Sheet (see Annex A, Sheet 1, item 7 a)) that the pipe pups are to be recoated with epoxy resin powders or multi-component liquids, the pipe shall be left to weather for a suitable period after the removal of coal tar enamel or polyethylene coatings. A period of weathering of three weeks will normally be sufficient to allow complete loosening of any residual coating.

Coatings shall be removed without damaging the pipe. Preferred methods for the removal of coatings are given in Table 2.

Due care and attention shall be given to the necessity for eye, ear and respiratory protection during the removal of the coating.

6.2 Dimensions of pipe pups

6.2.1 Pipe pups shall be manufactured from pipe of dimensions given in GIS/DAT6, as specified on the Data Sheet (see Annex A, Sheet 1, item 3).

6.2.2 The length of the pup shall not be less than that stated in Table 1. There shall be an allowance of 35 mm between pipe pups when cutting them from pipe, i.e. 5 mm for cutting and 15 mm for machining each weld end preparation.

Table 1 – MINIMUM PUP LENGTHS

Pipe Diameter (mm)	Minimum Pup Lengths (mm)
Less than or equal to 100	250
150 to 250 inclusive	300
300 to 450 inclusive	450
600 to 900 inclusive	500
1050 and above	600

6.3 Weld end preparations

6.3.1 The type and dimensions of the weld end preparation machined on each end of the pipe pup shall be as specified on the Data Sheet (see Annex A, Sheet 1, items 5 and 6). Weld end preparations for pipe pups shall be in accordance with GIS/P16.

6.3.2 When machining weld end preparations, care shall be taken to prevent clamps, chuck jaws, etc., causing indentations in the wall of the pipe pup.

6.3.3 The root face shall not be brought into tolerance by filing or grinding; the entire weld end preparation shall be machined. When removing the inside burr, care shall be taken to prevent the formation of an inside bevel where none is specified.

6.3.4 Where pipe pups are manufactured from welded pipe, the internal weld bead shall be ground flush with the pipe surface for a distance of not less than 25 mm from each weld end preparation, and the external seam 150mm. The ground area shall be blended into the adjacent pipe and weld bead to form a smooth contoured surface. The wall thickness shall not be reduced to less than the minimum value permitted by the specification for the starting pipe.

6.4 Tolerances

6.4.1 The tolerance on the specified length of pipe pups, measured at any point round the circumference, shall be 2 mm for pipe pups equal to or less than 100 mm nominal size and 3 mm for pipe pups greater than 100 mm nominal size.

6.4.2 The machined ends of pipe pups shall be within the squareness tolerance shown in Figure 1.

6.4.3 The ovality of pipe pups shall be within the tolerances necessary to meet the requirements of 6.4.4, 6.4.5 and 6.4.6. Alternative means of measurement may be proposed to the Gas Transporter. Proposals may be made to the Gas Transporter, to bring the pipe pups within the specified tolerances by cold forming; using segments and jacks to fit the inside bore across the minor diameter. No heat shall be used and the pipe pup shall not be struck with any tool.

6.4.4 Pipe pups equal to or less than 250 mm nominal size shall permit the passage of a gauge plate 1.5 mm smaller than the inside diameter (as determined by the outside diameter and nominal wall thickness of the starting pipe) for a distance of 100 mm from each end.

6.4.5 Pipe pups 300 mm to 450 mm inclusive nominal size shall permit the passage of a gauge plate 2.5 mm smaller than the inside diameter (as determined by the outside diameter and nominal wall thickness of the starting pipe) for a distance of 100 mm from each end.

6.4.6 Pipe pups greater than 450 mm nominal size shall permit the passage of an external ring gauge of inside diameter 6 mm larger than the outside diameter of the pipe pup for a distance of 100 mm from each end, as specified on the Data Sheet (see Annex A, Sheet 1, item 3 b)).

Note: Where coatings applied as epoxy resin powders or multi-component liquids have been removed for a distance of only 150 mm from the ends of the pipe pup (see 6.1.2 b)), allowance shall be made for the thickness of the coating when considering any obstruction to the passage of the ring gauge.

6.4.7 The inside diameter at the weld end preparation (G) shown in Figure 1 shall not deviate by greater than 1.5 mm at any point from the value specified on the Data Sheet (see Annex A, Sheet 1, items 5 c) and 6 c)).

7. Non-Destructive Testing Procedures and Acceptance Levels

7.1 General requirements

All non-destructive testing (NDT) shall be carried out after all processing, machining and grinding.

The Contractor shall submit procedures for all applicable NDT techniques before production commences.

All operators of NDT equipment hold a current certification and be able to demonstrate their ability to carry out the agreed procedures satisfactorily. BGAS, PCN (independently approved) and ASNT approval schemes are recognised, although other certifications may be considered.

The surface finish of weld end preparations and ground seam welds shall be good enough to permit the applicable NDT techniques to find the unacceptable defects specified in Annex C.

7.2 Ultrasonic testing

Ultrasonic testing of the circumference of pipe pups shall be carried out over a band not less than 50 mm wide at each end, including any weld.

7.3 Magnetic particle flaw detection

7.3.1 Welds

For pipe pups manufactured from welded pipe, the internal and external surfaces of the weld shall be examined by magnetic particle flaw detection, in accordance with */SP/NDT/2, over a distance of not less than 50 mm from each weld end preparation.

7.3.2 Weld end preparations

The weld end preparations shall be examined by magnetic particle flaw detection in accordance with */SP/NDT/2.

7.4 Unacceptable defects

Defects disclosed by NDT which exceed the limits specified in Annex B are unacceptable and shall be treated as specified in Annex B in consultation with the Gas Transporter.

8. Coating

8.1 External surfaces

Unless specified otherwise on the Data Sheet (see Annex A, Sheet 1, item 7 a)) and apart from a band 150 mm wide at each end of the pipe pup (see 8.3), all exposed external surfaces of pipe pups shall be either:

- a) Painted in accordance with */SP/PA/10, or
- b) Wire brushed to ISO 8501-1 quality finish and coated with one coat of chlorinated rubber primer, applied in accordance with */SP/PA/10 to a dry film thickness of between 45µm and 60µm, for short term protection.

Surfaces where resin powder or multi-component liquid coatings have been retained need not be painted provided that any damage to the coating is repaired in accordance with */SP/CW/6.

8.2 Internal surfaces

Unless specified otherwise on the Data Sheet (see Annex A, Sheet 1, item 7 b)) and apart from a band 50 mm wide at each end of the pipe pup, all internal surfaces of pipe pups shall, where practicable, be either:

- a) Coated in accordance with */SP/CM/1, or
- b) Wire brushed to ISO 8501-1 quality finish and coated with an approved epoxy resin paint in accordance with */SP/CM/1, for short term protection.

8.3 Pipe pup-ends

The weld end preparations and pipe pup external and internal surfaces shall be protected for a distance of 150 mm externally and 50mm internally from each end with a rust preventative coating which can be readily removed on site, e.g. by stripping, wire brushing or using a solvent.

9. Marking

9.1 The pipe pups shall be suitably and individually identified using approved methods of marking.

9.2 The method to be used to identify all pipe pups shall be as follows:

- a) Marked on the outside surface of the pipe pup in white paint which is compatible with the coating applied in accordance with 8.1, with the following information:
 - 1). */SP/F/6.
 - 2). Gas Transporter order and item number for the pup (see Annex A, Sheet 1, item 1).
 - 3). Gas Transporter order/item number of component to which the pipe pup will be

welded (where specified on the Data Sheet (see Annex A, Sheet 1, item 2)).

- 4). The type of weld end preparation used on each end of the pipe pup.
- 5). Starting pipe manufacturer's pipe identification and year.
- 6). Pipe pup manufacturer's reference number and year.

For items which cannot be individually identified as specified above, an approved individual tagging identification method shall be used.

- b) Pipe pups, equal to or greater than 200 mm nominal size, shall be stamped with unique identification in accordance with */SP/DAT/29.
- c) Marked in accordance with */SP/Q/9 where the starting pipe was pre-installation tested (see 6.1.1).

The Contractor shall be responsible for recording on Sheet 2 of the Data Sheet (see Annex A), the information specified in 9.2 a) 5), 9.2 a) 6) and 9.2 b).

10. Handling, Transportation and Storage

10.1 Starting pipe and pipe pups shall be handled, transported and stored in such a manner as to prevent mechanical or coating damage.

10.2 Care shall be taken to ensure that wire ropes, chains and other forms of handling equipment do not come into metallic contact with the starting pipe or pipe pups.

10.3 It is recommended that broad band non-metallic slings be used to load, unload and support pipes or pipe pups when in transit. Pipes and pipe pups shall also be adequately supported to prevent damage during transit.

10.4 Storage shall be so arranged to avoid accumulation of water inside pipes or pipe pups and to allow free circulation of air.

11. Certificates

Certificates shall be submitted to the Gas Transporter before dispatch of the pipe pups from the Contractor. The certificates shall include:

- a) Certificates of analysis and mechanical tests received with the starting pipe;
- b) A statement of compliance with the dimensional requirements of 6.2, 6.3 and 6.4;
- c) A statement of compliance with the NDT requirements of clause 7.

12. Variants

The Contractor shall only propose variants to this standard where the text indicates that variants would be considered by the Gas Transporter.

Table 2 - PREFERRED METHODS FOR THE REMOVAL OF PIPE COATINGS

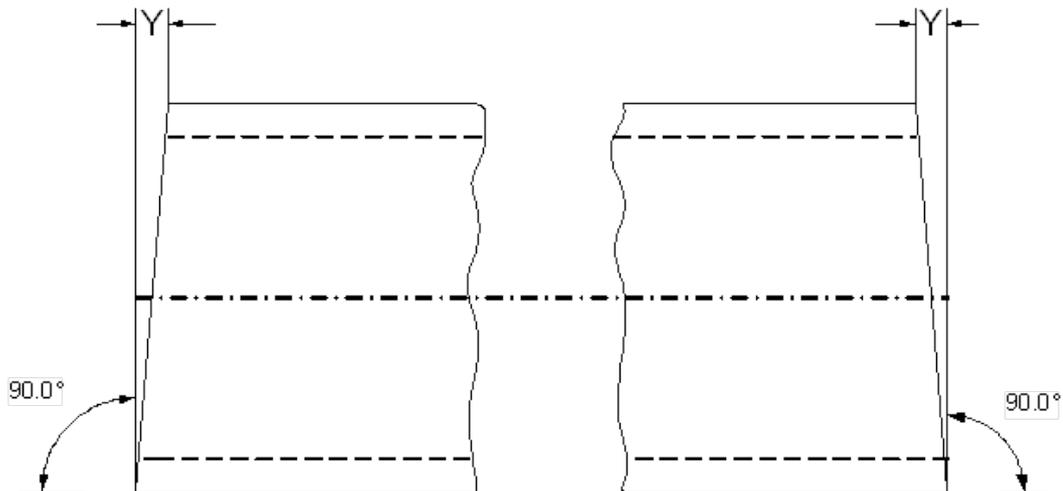
Type of coating	Preferred method of removal indicated by ✓ (see Note 1)		
	Heating (see Note 2) and /or scraping followed by blast cleaning	Prolonged blast cleaning	Power wire brushing
Resin powder	✓	✓	✓
Multi-component	(see Note 3)	✓	-
Polyethylene	✓	-	-

Notes

1 Any method that risks damaging the pipe is unacceptable

2 The metal temperature shall be not higher than 300°C

3 The use of heat is prohibited since multi-component liquids may release toxic particles or fumes



Nominal Size	Maximum tolerance Y
Equal to or less than 100	1.0
150 to 200 inclusive	1.5
250 to 600 inclusive	2.0
750 to 1200 inclusive	2.5

Note- All dimensions in mm

Figure 1 – Permitted Squareness Tolerance for pipe Pups

Annex - A Sample Data Sheet for Pipe Pups to */SP/F/6

SHEET 1 – To be Completed by the Gas Transporter / Designer															
1	Order Number _____	Date _____													
2	Order number of component to which pipe pup will be welded (If appropriate) _____														
3	Pipe Pup details (see 6.2)														
	a) Nominal Size	_____	mm												
	b) Outside diameter	_____	mm												
	c) Nominal wall thickness (T)	_____	mm												
	d) Material Grade	_____													
	e) Length (see Figure 1)	_____	mm												
4	Starting pipe details (see 6.1.1 and 6.1.2)														
	a) Will starting pipe be issued by the Gas Transporter?	_____	Yes*	No*											
	b) Is pre-installation tested pipe to be used?	_____	Yes*	No*											
	c) Type of Coating	_____													
5	Weld end preparation on one end of pup (information to be supplied by component manufacturer where appropriate – see item 2)														
	a) Weld end preparation type from GIS/P16 Table 5	_____													
	b) Coating removal distance (see 6.1.2a and 6.1.2b)	_____	mm												
	c) Other requirements	_____													
6	Weld end preparation on end opposite to that in item 5														
	a) Weld end preparation type from GIS/P16 Table 5	_____													
	b) Coating removal distance (see 6.1.2a and 6.1.2b)	_____	mm												
	c) Other requirements	_____													
7	Coating to be applied to pups														
	a) External surface (see 8.1)	_____													
	b) Internal surface (see 8.2)	_____													
	c) Pup ends (see 8.2)	_____													
8	Special requirements _____														
FIRST	Date	by	Rev	Date	by	Rev	Date	by	Rev	Date	by	Rev	Date	by	
ISSUE															
Signed _____											Date _____				
Identification Number _____							Project Plan _____								
*Delete as applicable							Data Sheet no: _____				Sheet 1 of 2				

Annex A (Concluded)

SHEET 2 – To be Completed by the Contractor															
9	Starting pipe manufacturer's pipe identification and year _____														
10	Pup manufacturer's reference number and year _____														
11	Unique identification number (see clause 9 b) _____														
FIRST	Date	by	Rev	Date	by	Rev	Date	by	Rev	Date	b	y	Rev	Date	by
ISSUE															
Signed (Contractor)												Date			
Identification Number						Project Plan									
*Delete as applicable						Data Sheet no:			Sheet 2 of 2						

Annex - B Defect Acceptable Levels for the Finished Product

Defect acceptable levels for the finished product are given in Tables B.1, B.2 and B.3.

Table B.1 - Defects at weld end preparations

Defect Type	Permitted maximum
Individual or isolated laminations	Maximum length along the weld end preparation - 6 mm for 100 mm nominal size and below 13 mm for above 100 mm nominal size.
In line or separated laminations	Separation between laminations along the weld end preparation shall be not less than the length of the longer lamination. Sum of lamination lengths shall be not greater than 0.1 x total weld end preparation length.

Table B.2 - Surface defects on welds or body

Defect Type	Permitted maximum
Dents	Not allowed
Scores, pitting, corrosion, finish workmanship	Not to affect the intended service duty within the standard.
Surface laps, gouges	Not permitted. May be ground smooth provided that the wall thickness is not reduced to less than the specified minimum for the starting pipe. Complete removal of the defects shall be confirmed using magnetic particle flaw detection, in accordance with */SP/NDT/2.

Table B.3- Defects in Welds

Defect Type	Permitted maximum
Porosity	No significant porosity is permitted for a distance of 50 mm from each weld end preparation.
Slag inclusions	Not permitted for a distance of 50 mm from each weld end preparation.