

SCOPE

- I 1.1 This practice covers the design, fabrication and inspection of elevated, utility, steam assisted and air assisted (excluding air supply facilities) flare tips and associated pilots and ignition facilities.
- I 1.2 An asterisk (*) indicates that a decision by the purchaser is required, or that additional information is furnished by the Owner.

SUMMARY OF ADDITIONAL REQUIREMENTS

- I 2.1 **Table 1** lists the practices and standards which shall be used with this practice.
- I 2.2 **Table 2** lists the practices which shall be used with this practice as specified by the purchaser.

TABLE 1

PRACTICES	
IP 2-1-1	Plant Noise Design Criteria
IP 3-16-1	Flanged Joints, Gaskets, and Bolting
IP 3-18-1	Piping Fabrication Shop or Field
IP 15-11-1	Instrument Control Panels
IP 15-12-1	Instrument Wire and Cable
IP 18-7-1	Welding Procedures
IP 18-12-1	Positive Material Identification
IP 19-1-1	Paint and Protective Coatings
IP 20-1-1	Inspection of Equipment and Materials
CODES	
ASME	
B1.20.1	Pipe Threads, General Purpose (inch)
B31.3	Process Piping

TABLE 2

PRACTICES	
IP 19-3-2	Refractory Linings for Pressure Vessels and Piping
IP 20-1-2	Administrative Procedures for Obtaining Inspection

DOCUMENTATION

PROPOSAL INFORMATION

- I 3.1 Vendor shall provide the following information:
 - a. Drawing of flare tip showing arrangement, materials of construction, details of flame retainer, steam nozzles, lining, pilots, and sizes of all interconnecting flanges and piping.
 - b. List of valves, regulators, controllers and other instrument items.
 - c. Maximum flaring capacity and maximum smokeless firing capacity with specified range of flared streams.
 - d. Steam/air rates for normal and maximum smokeless flaring required at grade for each steam/air system at maximum normal and standby conditions.
 - e. Pilot gas consumption, gas pressure at grade and pilot orifice size.
 - f. Flare tip pressure drop, ground level radiant heat flux and noise level guarantee.
 - * g. If specified, automatic pilot relight procedures.
 - * h. If specified, pilot retractable thermocouple details.
 - i. Recommendations for thermal insulation of ancillary piping from grade.

POST AWARD REVIEW

- I 3.2 Vendor shall provide the following design details for review:
- Design calculations for all pressure parts.
 - Flare tip detail drawings showing all attachments.
 - Pilot drawing including orifice size, thermocouple, ignition system and strainer details.
 - Flare tip installation and removal procedures.

FINAL RECORDS

- I 3.3 Vendor shall supply following documents:
- Complete set of "as built" drawings.
 - Mill test certificates and heat number shall be provided for all pressure parts.
 - Operating and maintenance instructions for flare tip and all associated equipment.

FLARE TIP DESIGN

- R,C 4.1 Minimum acceptable materials of construction shall be per the table below.

COMPONENT	MATERIAL	COMMENTS
Tip	Incoloy 800 or Type 310 SS	See Par. 4.2
Tip mounting flange	Forged carbon steel	RFWN
Top steam/air manifold	Type 347 SS or thermally stabilized 321 SS	See Par. 4.3
Steam/air manifolds (except top manifold)	Type 304L SS	See Par. 4.3
Muffler and/or windshield	Type 304L SS	
Air induction venturi	Type 304 SS	
Internal tubes - Tubes above elbow - Tubes below elbow	Type 310 SS Type 304L SS	Min. Sch. 40
Velocity seal	Type 304L SS	If provided
Tip refractory	Medium weight	See Par. 4.4

- R,C 4.2 The top 10 ft (3 m) of the flare tip shall be Type 310 stainless steel or Incoloy 800 (fine grain in shop annealed condition -- grain size to be ASTM No. 8 or finer). All attachments to the tip shall be the same as tip material. Tip thickness shall be the larger of 1/4 in. (6 mm) or thickness required for 150 psig (1035 kPa) design pressure per ASME B31.3 at flared gas supply temperature.
- R 4.3 Separate steam connections shall be provided for each manifold. All manifolds shall be fully drainable. Steam lines between flare tip and strainers at grade shall be Type 304 SS. Steam strainers shall remove material larger than 25% of the diameter of the smallest downstream orifice or hole.
- R 4.4 Flare tips which require refractory shall be lined with a medium weight castable (Type 5) with a long term use temperature rating of 2800°F (1538°C) minimum. Minimum castable thickness shall be 1 in. (25 mm). Lining shall be installed and dried prior to shipment to site.
- R 4.5 Bolting detail design shall prevent potential loosening due to relaxation at temperature and vibration.
- R 4.6 Tip design shall permit removal and cleaning of the pilot orifice from the platform location at the tip mounting flange.
- S * 4.7 Aircraft warning lights will be specified by purchaser if required.

PILOT SYSTEM DESIGN

- R 5.1 The minimum number of pilots shall be two. Vendor to advise need for additional pilots based on flare diameter.
- R 5.2 Pilots, pilot gas/air tube, flame front generator tubes and thermocouple guide tube attached to the pilot shall be Incoloy 800 or Type 310 SS from pilot to termination point at end of tip.

