



INFRASTAKETM

DESIGN GUIDELINES

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INTRODUCTION: THE INFRASTAKE PROCESS

THE INFRASTAKE PROCESS USES RADIALLY FOCUSED INFRARED RADIATION TO QUICKLY AND EFFICIENTLY PERFORM STAKING OPERATIONS. AS WITH ANY RADIATIVE PROCESS, MANY FACTORS INFLUENCE THE ABSORPTIVITY (ABILITY TO ABSORB RADIATION) OF A MATERIAL: BASE MATERIAL, FILLERS, COLOR, TRANSPARENCY, SURFACE FINISH, AND GEOMETRY. THE FOLLOWING ARE TYPICAL SUGGESTIONS AND GUIDELINES FOR THE IMPLEMENTATION OF INFRASTAKE HEADS IN THE DESIGN PROCESS.

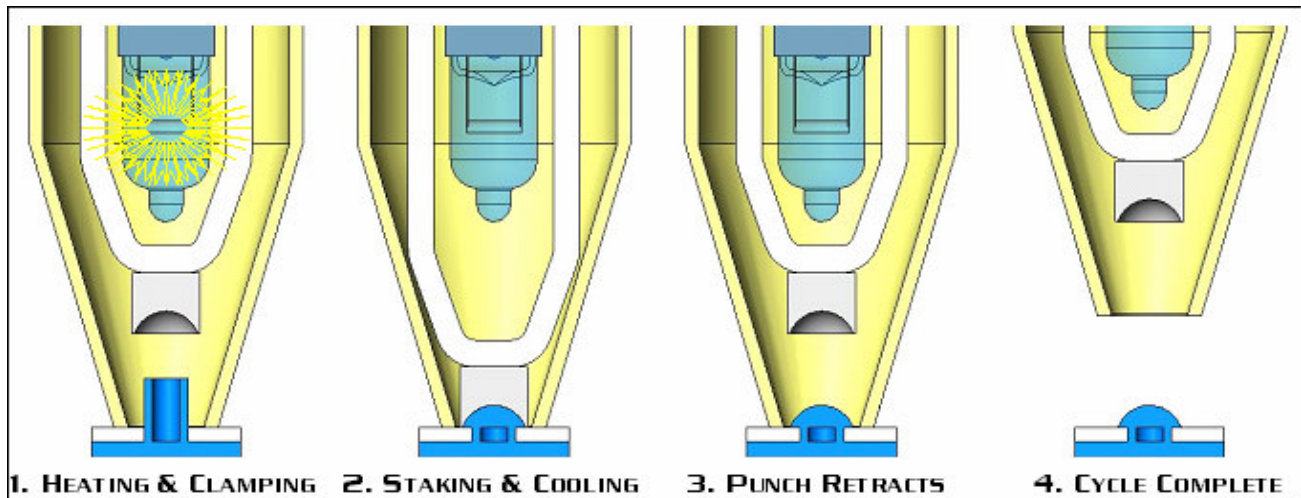


FIGURE 1. INFRASTAKE SEQUENCE OF OPERATIONS

NOTE:

DESIGNS SHOULD BE REVIEWED WITH EXTOL FOR EACH APPLICATION BEFORE KICK-OFF.

KEY CONCEPTS TO OPTIMIZE PERFORMANCE:

- MINIMIZE THE DISTANCE MOLTEN PLASTIC MUST FLOW TO FINAL STAKED PROFILE BY DECREASING THROUGH-HOLE CLEARANCE AND SHORTENING BOSSES: SEE FIG. 5, 6
- REDUCE BOSS/SIDEWALL THICKNESS TO MINIMIZE CONDUCTIVE (SLOW) HEAT TRANSFER: SEE FIG. 5, 6
- A ROUND/UNIFORM BOSS YIELDS SHORTER CYCLE TIMES THAN A NON-UNIFORM BOSS: SEE FIG. 3, 5, 6
- ALIGN CENTERLINE OF BOSS WITH INFRASTAKE HEAD CENTERLINE: SEE FIG. 1
- FOR TIGHT STAKES PROVIDE MATING SURFACE THAT IS PERPENDICULAR TO AXIS OF BOSS: SEE FIG. 1
- ALLOW CLEARANCE (FROM SIDEWALLS AND OBSTRUCTIONS) FOR INFRASTAKE HEADS DURING STAKING OPERATION; 3D CAD MODELS ARE AVAILABLE UPON REQUEST: SEE FIG. 4

CRITICAL INFRAStAKE-BOSS DESIGN VARIABLES:

- **THROUGH HOLE DIAMETER**
 - CLOSE CLEARANCE THROUGH-HOLES YIELD A STRONGER STAKE BY CREATING A LARGER SHOULDER OF PLASTIC OVER THE MATING PART
 - CLOSE CLEARANCE THROUGH-HOLES CONTRIBUTE TO A DECREASED CYCLE TIME BECAUSE PLASTIC DOES NOT NEED TO FLOW AS FAR TO CREATE A SHOULDER OVER THE MATING PART
- **BOSS VOLUME / GEOMETRY**
 - THE INFRAStAKE PROCESS HEATS RADIALLY FROM THE OUTSIDE-IN; ROUND BOSSES ARE PREFERRED
 - A THIN BOSS/SIDEWALL WILL MINIMIZE THE CHANCE OF BURNING THE BOSS AND WILL DECREASE THE OVERALL CYCLE TIME
 - BOSS HEIGHTS OVER 5/16" GENERALLY REQUIRE LONGER CYCLE TIMES
- **STAKE PROFILES**
 - THE STAKE PROFILE IS DEPENDENT ON THE BOSS VOLUME AND THROUGH-HOLE DIAMETER.
 - DOME PROFILES (HEMISPHERICAL) ARE MADE WITH NOMINAL DIAMETERS (1/16", 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", AND 1/2"): SEE FIG. 3
 - THE STAKE PROFILE MUST BE WIDE ENOUGH TO CREATE A SHOULDER OF PLASTIC OVER THE MATING PART AND THE CORRECT DEPTH TO ENCAPSULATE THE BOSS VOLUME
 - ROSETTE PROFILES ARE AVAILABLE FOR HOLLOW BOSSES: SEE FIG. 3
- NOTE:
 - FOR UNIQUE APPLICATIONS EXTOL CAN DEVELOP CUSTOM STAKE PROFILES
- **PUNCH BUTTON O.D.**
 - THE STAKE PROFILE IS MACHINED INTO A PUNCH BUTTON; PUNCH BUTTONS COME IN NOMINAL OUTSIDE DIAMETERS (1/8", 3/16", 1/4", 5/16", 3/8", AND 7/16"): SEE FIG. 2,3
- **APERTURE SIZE**
 - THE APERTURE SIZE IS THE OPENING AT THE TIP OF THE CONCENTRATOR ON THE INFRAStAKE HEAD. THE O.D. OF THE PUNCH MUST FIT THROUGH THE APERTURE: SEE FIG. 2
- **MATERIAL**
 - THE INFRAStAKE PROCESS IS COMPATIBLE WITH ANY THERMOPLASTIC
 - TRANSLUCENT AND LIGHT COLORED PLASTICS GENERALLY REQUIRE LONGER CYCLE TIMES
 - GLASS-FILLED MATERIALS WITH THICK CROSS-SECTIONS REQUIRE LONGER CYCLE TIMES DUE TO THEIR INSULATING PROPERTIES (LOW THERMAL CONDUCTIVITY)
 - COATINGS AND PLATINGS ON BOSSES GENERALLY INCREASE CYCLE TIMES

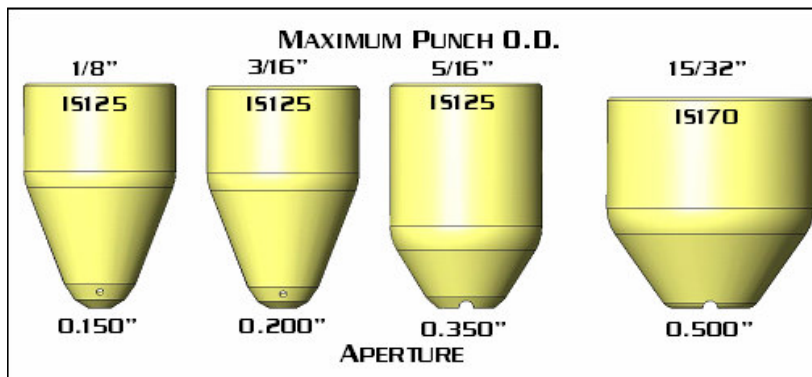


FIGURE 2. CONCENTRATORS

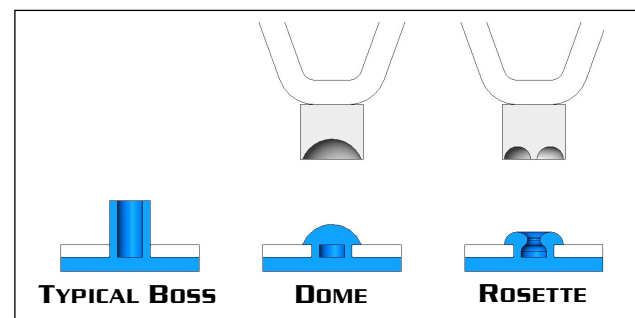


FIGURE 3. STAKE PROFILES

TYPICAL INFRASTAKE HEAD: EXPLODED VIEW

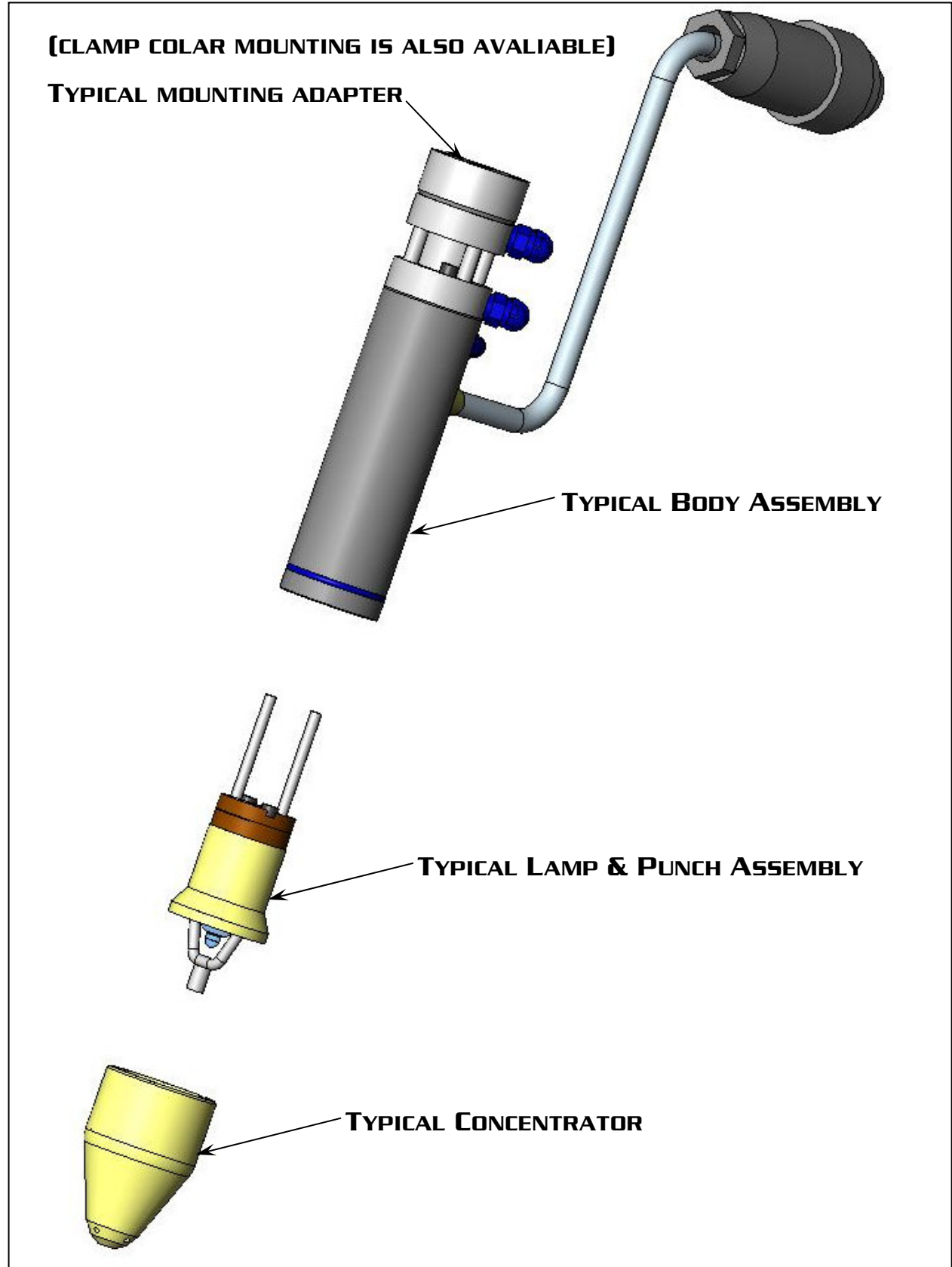


FIGURE 4. INFRASTAKE HEAD: EXPLODED VIEW

GENERAL BOSS DESIGN GUIDELINES:

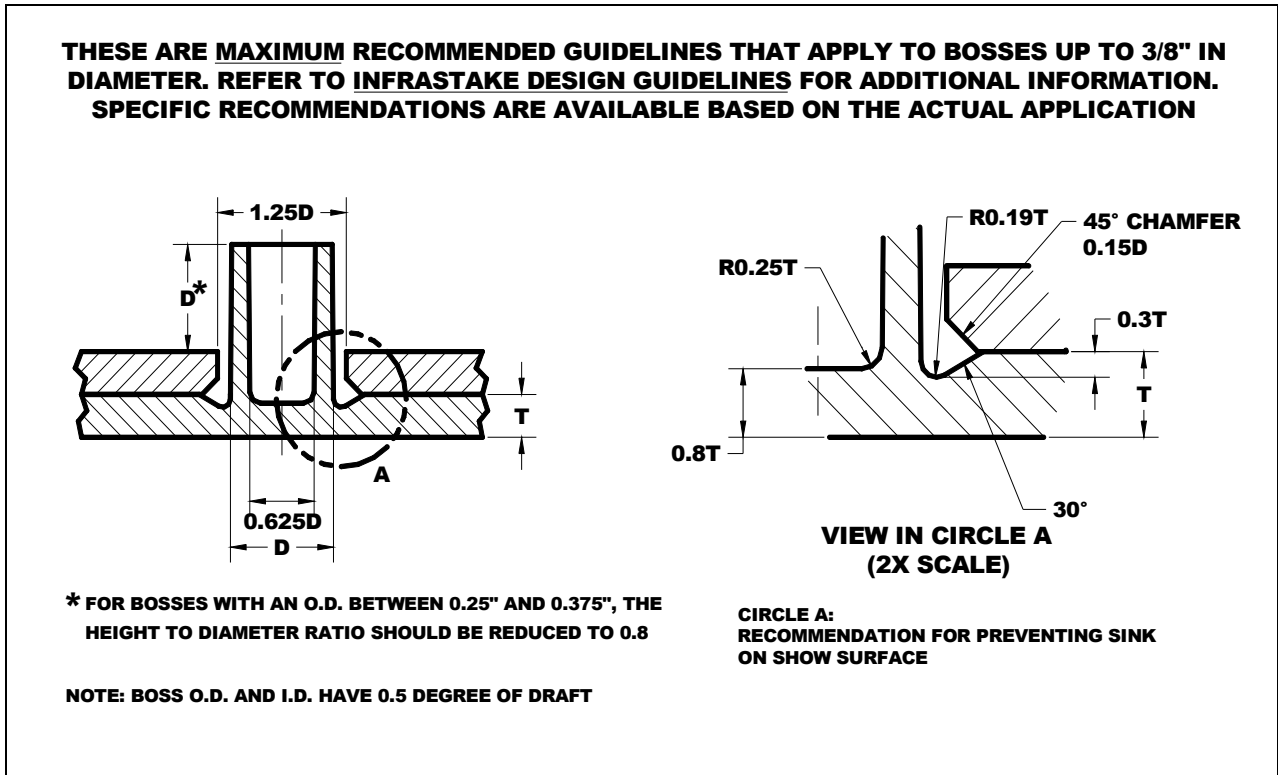


FIGURE 5. HOLLOW ROUND BOSS DESIGN

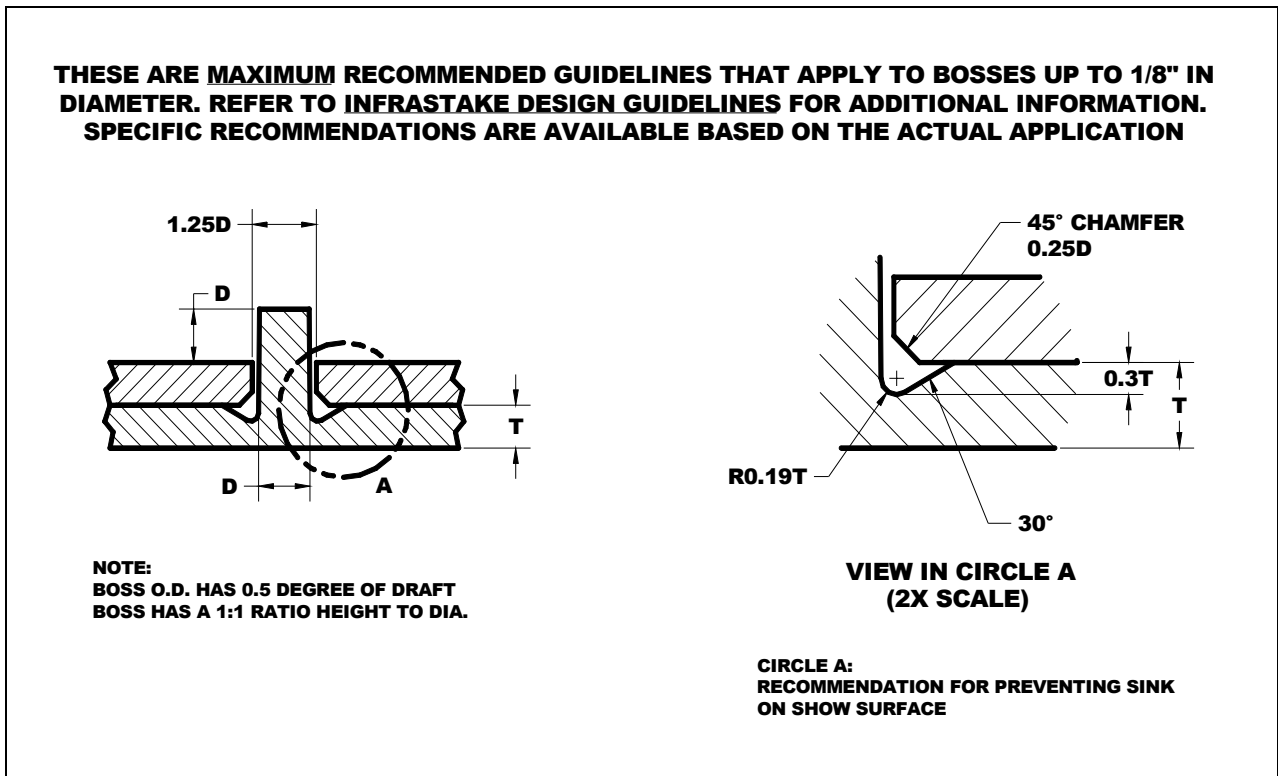


FIGURE 6. SOLID ROUND BOSS DESIGN