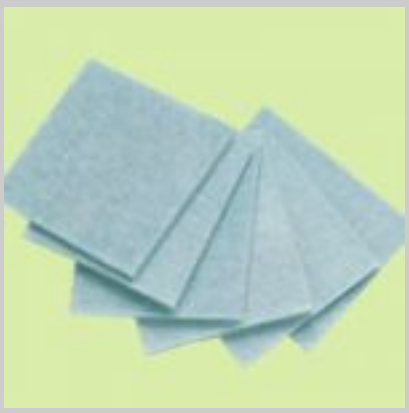
Wires - Gas Brazing & Welding

Details

Wire Feed Rollers

Details



Wire Feed Pads

Details

Wire Feed Pads

Details

Dissimilar Metals

Joining Nickel-Clad Steels

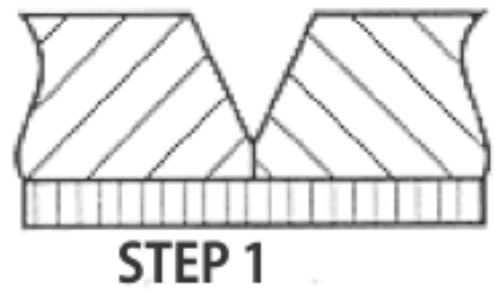
When it comes to joining steels with a corrosion resistant nickel alloy, care must be taken to ensure that the weld joint retains the nickel alloy continuously over its surface. To achieve this, the joint must be carefully designed and the welding executed with care.

Butt joints offer the best approach and should be used when possible. The joint should be designed in a way to avoid dilution of the nickel cladding with the steel weld metal. Figure 1 shows a typical design sequence. The weld made on the steel side should not penetrate the cladding. A root face with a tight fitup will help prevent penetration into the cladding. If the nickel cladding is diluted with steel, cracking can occur.

Once the steel side has been joined, the clad side should be back gouged to sound metal and welded with a filler metal that is recommended for the particular nickel alloy of the cladding. At least two layers (three or more depending on the thickness) should be deposited on the clad side to counteract dilution with the steel and assure the retention of corrosion resistance.

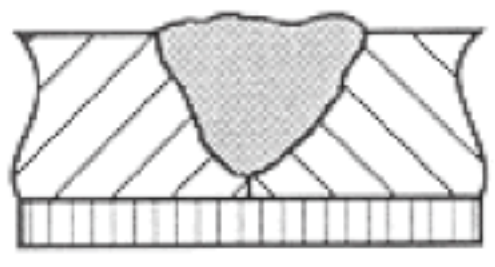
An alternative approach is the strip-back method (Fig.2). With this technique, the cladding is removed a

Fig. 1



STEP 1

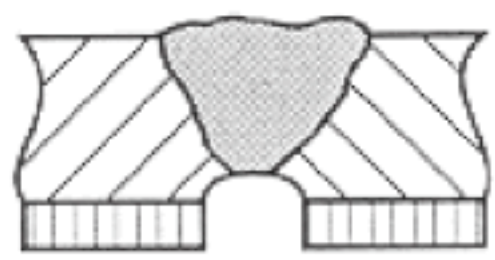
Step 1: Zero root opening in steel with minimum 1/16 in. (1.6mm) root face



STEP 2

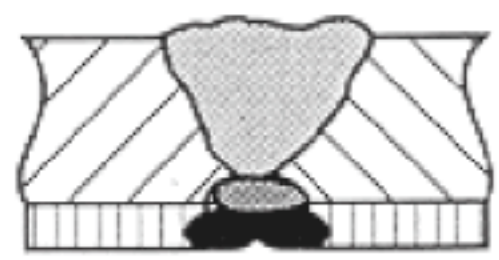
1/16 in. (1.6mm)

Step 2: Weld with carbon steel filler metal. Do not weld into nickel alloy.



STEP 3

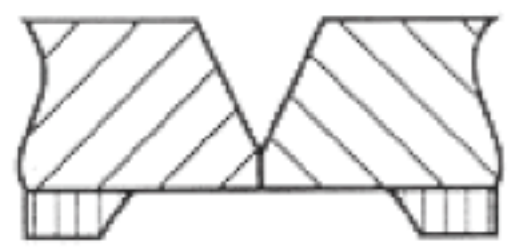
Step 3: Back gouge clad side to sound metal. Gouge to a depth to allow minimum of two layers nickel filler deposit. Gouge to allow three or more layers in a very corrosive environment.



STEP 4

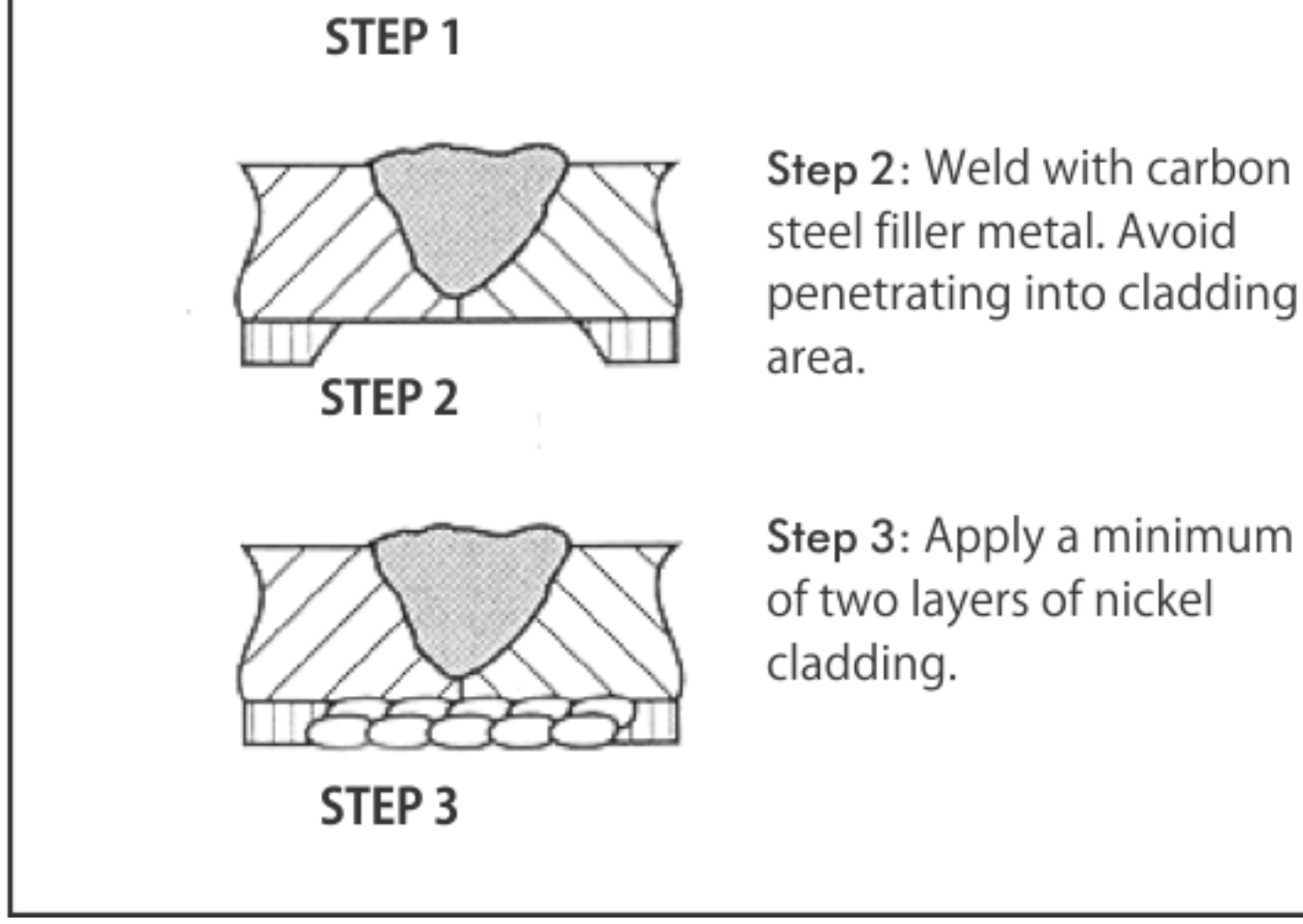
Step 4: Fill the groove with nickel alloy filler metal.

Fig. 2



Step 1: Remove cladding minimum of 3/8 in. (10mm) from each side of joint.

minimum of 3/8 in. on either side of the joint. The steel side is then conventionally joined, and the exposed area on the clad side is covered with the nickel alloy using a standard cladding technique.



Joint Accessibility and Design with Cladding

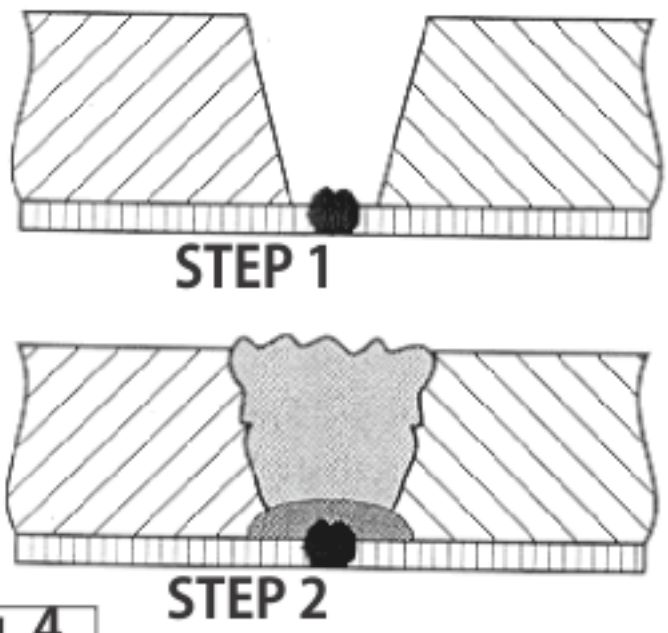
With certain types of structures, the joint is accessible from one side. In the case where only the steel side is accessible, the cladding at the root of the joint is first welded with a nickel alloy. The rest of the joint is then welded with a recommended nickel alloy (Fig.3).

If the steel is thicker than 5/16 in., a buffer layer of carbon-free iron could be deposited and then the remainder of the joint welded with an appropriate steel consumable to economise on the use of nickel filler metal.

If only the clad side is accessible (Fig.4), the joint should be partially filled with a steel weld metal. The remainder of the joint would then be filled with a minimum of two layers of the nickel alloy cladding.

Figure 5 presents designs for other than a butt joint.

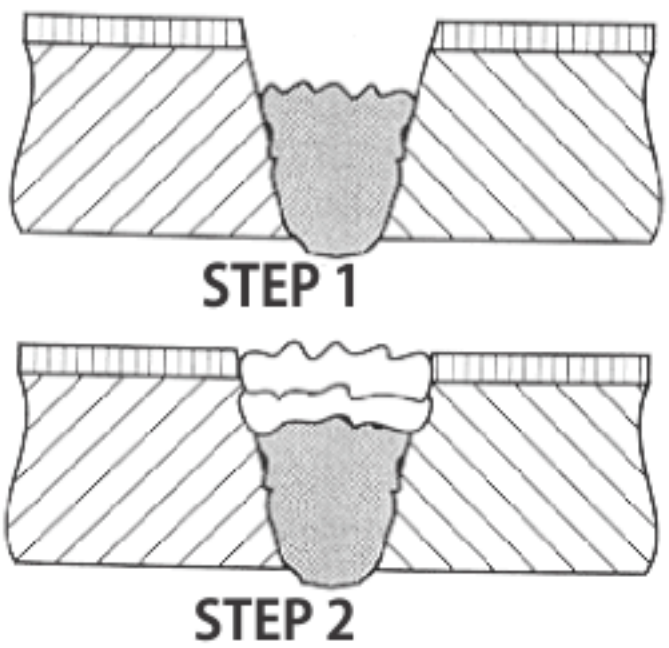
Fig. 3 **ACCESS FROM STEEL SIDE**



Step 1: Prepare joint to lea
cladding protuding.

Step 2: Deposit a layer of
cladding alloy. Complete
the joint with an appropria
nickel-based weld metal. If
the steel is thick, a buffer l
layer of ingot iron weld me
may allow completion of th
joint with a carbon steel fill
metal.

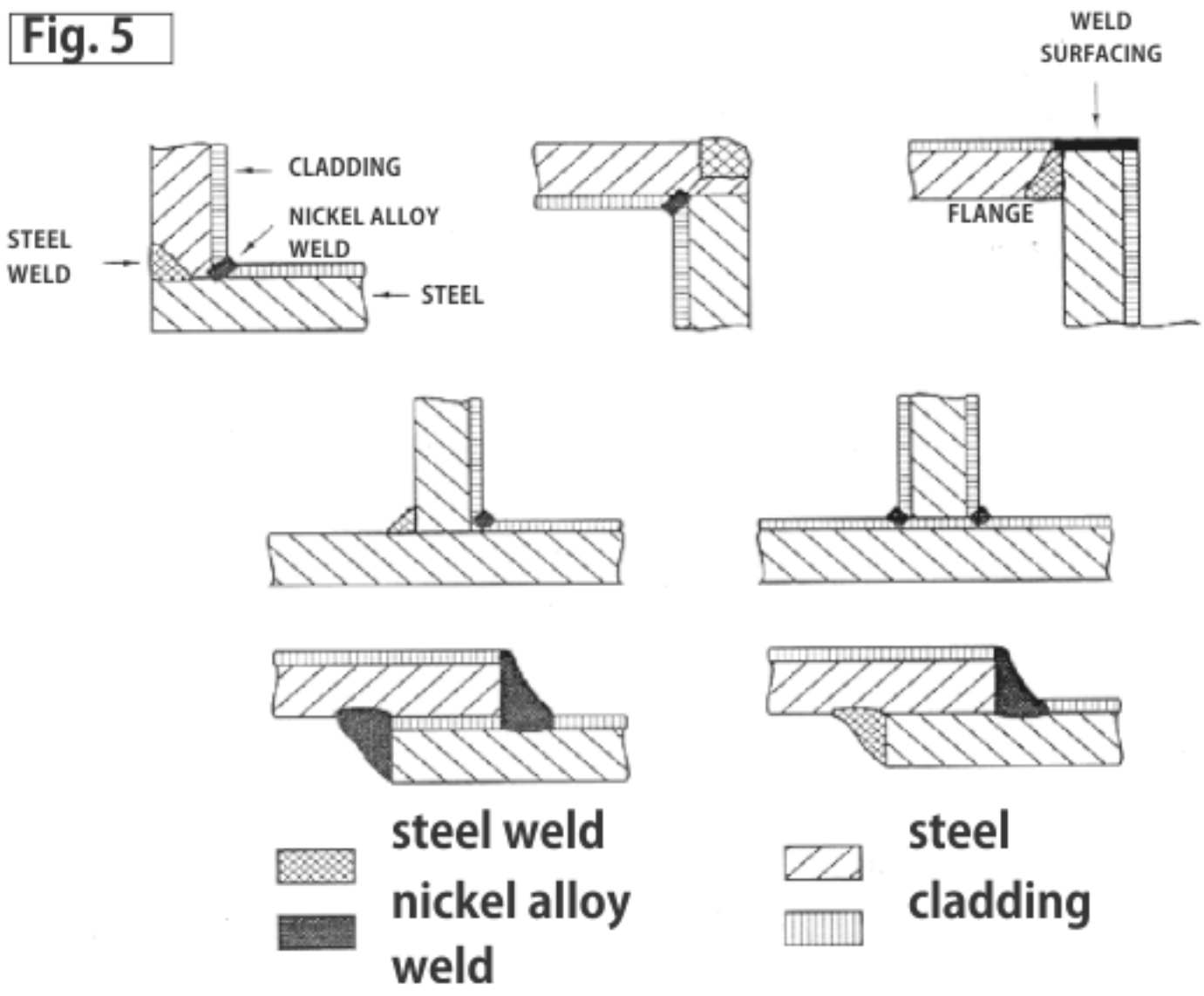
Fig. 4 **ACCESS FROM CLAD SIDE**



Step 1: Partly fill joint with
steel weld metal.

Step 2: Deposit a minimum
of two layers of nickel alloy
cladding to finish the joint.

Fig. 5



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