CHAPTER 6

DIP METHODS FOR THE IDENTIFICATION OF INCLUSIONS USING D-FILTER

6.1 Introduction

Clarity is one of the 4 C's of the diamond. Clarity characteristics are an inherent part of a diamond's life, and can arise from events which occurred during its formation deep in the earth, the mining procedures used to collect it, the cutting of rough into its final shape and the wearing of the stone. A flawless diamond shows no inclusions or blemishes of any sort when observed by a skilled grader under 10X magnification. The twelve little facts about the diamonds, commonly called 'The Dirty Dozen' [33] are listed below.

1. The average person in the United States pays twice what they should for an engagement ring.
2. 1 out of every 3 diamonds sold in the United States is laser-drilled.
3. 1 out of every 20 diamonds sold in the United States is fracture-filled.
4. 1 out of every 3 diamonds sold in the United States has been treated to some degree, including doublets, coating, and irradiation.
5. 75% of all round diamonds are cut poorly to salvage weight, resulting in diamonds that lose 2/3 of their potential sparkle.
6. 88% of all fancy diamonds (pear, marquise, emerald cut, etc.) are poorly cut to salvage weight, resulting in diamonds that lose 2/3 of their potential sparkle.
7. The average diamond sold in the United States has been over graded in quality by two grades to enhance its salability.
8. 2 out of every 3 diamonds have fluorescence (a diamond's reaction to ultraviolet light) that causes the diamond to look oily and milky in sunlight.
9. 3 out of every 5 diamonds are weighed incorrectly to increase the profit margin of the jeweler.
10. The average diamond sold in the United States is tinted yellow and will probably never appreciate in value.
11. The average diamond sold in the United States has cracks, breaks, or carbon that can be seen with the person's own eyes.
12. If a good diamond is defined in general terms as a diamond that is big, white, clean, sparkly, and will appreciate in value over time; less than 25 out of every 1,000 diamonds sold in the United States would classify as good. The facts stated above suite Indian diamonds also.

Inscription Deception, Perception and Reality

One of the latest crazes is to have the diamond laser inscribed which means the placement of serial numbers by a laser on the girdle of diamonds for identification purposes. A sample laser inscription is shown in figure 6.1.

Figure 6.1 Sample Laser Inscription: "Marry Me".

Perception: By placing a serial number on the girdle of a diamond that matches a certificate, an independent appraiser can verify if the diamond matches the certificate. Also if the diamond is ever stolen and recovered the serial number can be put into a database so the diamond can be returned to its owner. The inscription is permanent like a tattoo and cannot be removed or altered without a major weight loss or potential damage to the diamond. The laser inscription is microscopic and hence totally invisible to the naked eye. It can only be seen with jewelers' 10X magnifying loupe. Laser inscription does not change the color grade or clarity grade of a diamond.

Reality: The only way to be 100% sure a diamond matches a certificate is to check its measurements and match up its plotting of inclusions and blemishes. Anybody can take an extra certificate and laser inscribe its number on a diamond that doesn’t match it. Now it maybe true if someone stole the diamond having a serial number that matches the certificate might bring it back to, but it is unlikely. All sophisticated jewel thieves have the girdles repolished to remove the laser inscription so the diamond
cannot be traced. This dispels the notion that an inscription is permanent and cannot be removed.

A review of literature shows that, in order to establish a stone as flawless, the (Gemological Institute of America) GIA Gem Trade Laboratory graders examine it with both a microscope and a loupe. But, it is the common practice of the jewelers to use only the 10X magnifying loupe to examine the diamond for its inclusions. The diamond customers are mostly laymen with only an interest and desire to have diamond jewels in their possession, and hence are not trained or experienced to use the 10X loupe. Hence, an attempt was made to introduce a systematic method to examine the diamond for its inclusions. Only those diamonds that have been confirmed to be original diamonds and recommended for purchase by the application of methods described in the Chapters 3, 4 and 5, are examined for inclusions. This Chapter introduces two methods namely method I and method II for examining the diamond for its inclusions, and brings out the advantage of method II over method I. For simplicity and easy understanding, a diamond with inclusions has been taken as a specimen for studying the inclusions. The images of diamonds are acquired as explained in Chapter 2.

6.2 D-Filter as a Sharpness Filter

The first step in the process of examining the diamond for its inclusions is to apply a sharpness filter, so as to enhance the edges in the diamond image. Trial and error method has been used in finding out a filter that will be suitable for the current work (examination of inclusions in the diamond), by making the edges of the diamond image enhanced to a sufficient extent by highlighting the inclusions, and can be used for further processing. The filters used in the trial, and the images resulting from the application of these filters are given in table 6.1.

The actual image of an original diamond is given below (figure 6.2).
beautiful to the eyes of the purchaser, and sometimes even a diamond appraised by
some local appraiser, or by GIA or GII to have ideal cut proportions may not be
selected or chosen for purchase by the purchaser or customer due to his personal
likings and taste for the item. Therefore, this Chapter is a consequence of an attempt
to examine the diamond for inclusions. But, if the customer has a deep sense of liking
for a gemstone with inclusions, then it is sufficient that the gemstone is identified to
be original diamond using the method described in Chapter 3, and further confirmed
using the methods described in Chapters 4 and 5.