

1. Safety

- MAAP Gas Burns At Roughly 3,670 to 5,301°F*
- Workspace Must Have Good Ventilation
- Flooring & Work Surface Should Be Fire Resistant
 - Old Counter Tops
 - Sheet of Metal (Stainless Steel)
 - Natural Stone Tile
 - Something hard to catch fire or have a high melting point
- Good Lighting
- Proper Ergonomics

A. Required Safety Equipment

- Fire Extinguisher
- Didymium Safety Glasses
- Bowl Of Sand Or Water Or Both
- Leather Apron
- Closed Toed Shoes

2. Tools

A. Required Items

A. Torch System

A. Dual Fuel Head Torch

- Use Propane And Oxygen Line To Torch Head Requires Use Of Separate Refillable Propane & Oxygen Tanks (Or Oxygen Concentrator)
- Higher Temperature Flames Are Possible
- More Control Of Flame Is Possible
- Expensive To Start Up

B. Hot Head / MAAP Torch

- Uses MAAP Gas Bottles
- Special Disposal Of Gas Bottles Is Required

B. Fuel ∞

C. System To Secure Torch

D. Bead Release

E. Mandrels

F. Marvers

G. Mandrel Holder

H. Annealing/Cooling System ∞

- Kiln Annealing
 - More controlled cooling of the bead
 - More Expensive
 - Process Can Require Several Hours Of Attentiveness* (Unless You Have A Programable Digital Kiln)
- Flame Annealing
 - Uses Torch to cool the bead
 - Uses either hot crock pot with vermiculite can be cooled within two hours and will only need attention once or use of a fiber blanket (cooling time unknown)

B. Nice To Have

1. Heat Resistant Gloves
2. Glass Rests
3. Dual Head Marver
4. Torch Mounted Marver
5. Metal Pick
6. Bench Vise
7. Diamond Files For Glass
8. Pipe Cleaners
9. Metal Glass Holder
10. Glass Warming Device (Heated Crock Pot With Vermiculite)

3. Things To Know

1. Zones Of The Flame
2. Spin Class!
3. Hot Head Torch
 - Counter Clockwise To Open Gas Valve (To Light It)
 - Clockwise To Close The Gas Valve (To Cut Torch Off)
4. Glass being used is COE 104

4. Making Beads

1. Safety Check
 1. Check To Ensure The Following:
 - A. Fire Extinguisher Is Close By
 - B. Wearing Glasses & Apron
 - C. Water/Sand Bowl Close By
2. Prepare Your Workspace
 1. Dip Mandrels In Bead Release
 2. Pick Out Glass For Bead & Place Near Torch
 3. Determine Tools For Bead & Place Near Torch
 4. Make Sure Torch & Fuel Is Secured
 5. Make Sure Your Cooling System Is Setup And Heated Up As Needed
3. Final Safety Check
 1. Apron & Glasses Check
 2. Ensure Items Are Within Reach And Flame In Not In The Path Of That Reach
 3. Fire Extinguisher Is Within Reach
4. Final Preparations
 1. Light The Torch
 2. Firing The Bead Release On Mandrel
 - To Ensure Proper Release Coverage
 - To Prevent The Release From Cracking While Applying The Glass

5. Make The Bead

1. Heat Up The Glass
 - While Heating The Glass Keep It Pointed Away From You
2. Once It Has Soften Bring Mandrel To The Glass Slowly Turning The Mandrel
 - While Adding Glass To The Mandrel Ensure The Mandrel And The Glass Are At 90° Angle To Each Other
 - Let The Flame Cut The Glass, Don't Tug On It
3. Shape The Bead
 - Slowly Turn The Bead While In The Flame
 - Let Gravity Do The Work
4. Add Next Color Of Glass Or Add Designs
5. Re-Shape The Bead
6. Start The Annealing Process
 - Once You Have The Final Design And Shape Take The Bead Out Of The Flame Or Away From It
 - Keep Spinning The Bead As It Cools Once The Red Color Has Left The Bead Test The Bead
 - Test The Bead By Tapping It On The Marver
 - If It Thuds The Bead Needs To Cool By The Flame More
 - If It Rings The Bead Is Done By The Flame
7. Cut The Torch Off
8. Put Bead In The Kiln Or Vermiculite To Cool Completely*

6. Where to Buy:

Amazon: amazon.com

Hot Head Torch
Mandrels
Marvers (Graphite Paddle)

Didymium Glasses
Kilns
Diamond Files
Leather Apron

Frantz Glass: www.frantzartglass.com

Kilns
Glass (COE 104 only)
Dual Fuel Torch Heads
Marvers

Mandrels
Didymium Glasses
Bead Release

Devardi Glass: <http://www.devardiglass.com/supplies.htm>

Oak Mandrel Stand
Glass Rod Holder

Ring Mandrels
2 & 4 Hole Button Mandrels

Lowe's:

Leather Apron
MAAP Gas
Sheet Metal for work surface

Vermiculite
PVC for Glass Transport & Storage

Goodwill:

Used Crock Pots

Storage Trays

Habitat For Humanity:

Old Counter Top Surfaces