

Fibras Ópticas

OpE - MIB 2007/2008

Fibras Ópticas: Estruturas e Teoria de Propagação

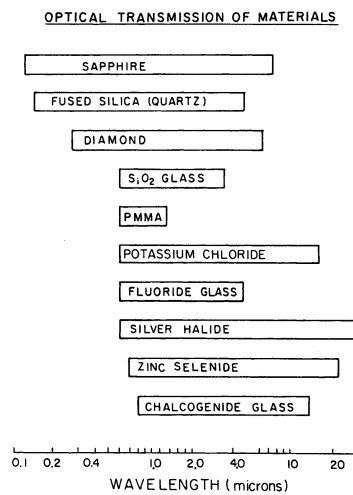
Fibras Ópticas: Materiais e Técnicas de Fabrico
Cabos de Fibra

□ **Matérias-primas para o fabrico de fibras ópticas**

Na selecção de materiais para fabricar fibras certos requisitos devem ser satisfeitos:

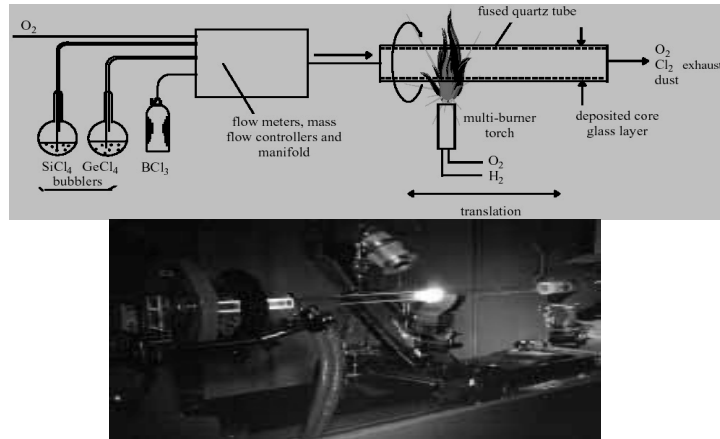
- Deve ser possível produzir fibras de espessura reduzida, flexíveis e com grandes comprimentos
- O material deve ser transparente no comprimento de onda de operação
- Devem existir materiais compatíveis com índices de refração ligeiramente diferentes para o núcleo e a bainha

- Materiais usados para o fabrico de fibras ópticas



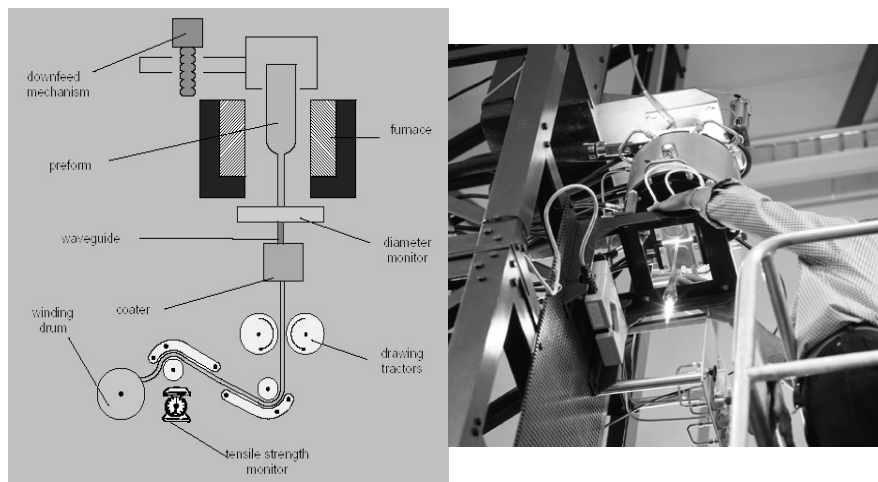
□ Preforma

- Fabricação da preforma



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- Estiramento da preforma

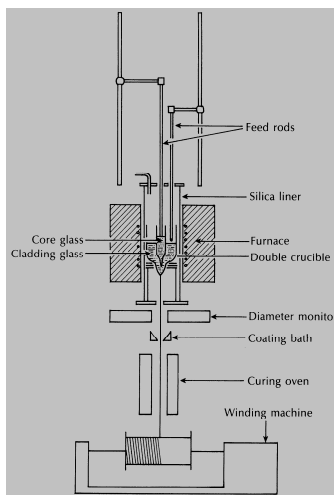


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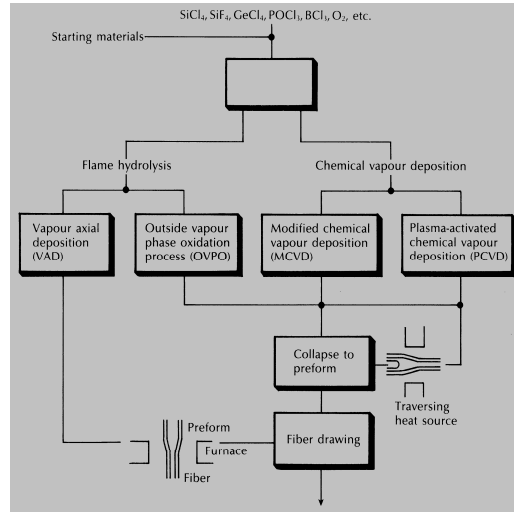
□ Técnicas de fabrico

- Técnica "direct-melting"
- Técnica "vapour-phase deposition"

- Método "double-crucible"



- Métodos "vapour-phase deposition"



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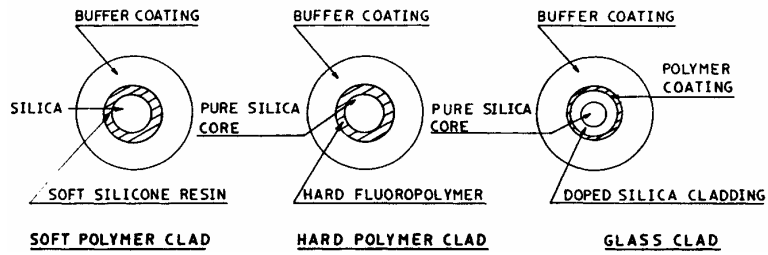
□ Cabos de fibras ópticas

As funções do cabo de fibras ópticas são:

- Protecção da fibra
- Estabilidade das características de transmissão das fibras
- Resistência mecânica
- Identificação e junção das fibras no interior do cabo

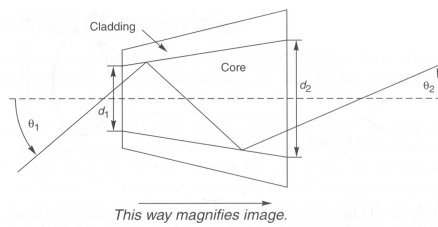
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- Protecções para fibras do tipo "fused silica":



□ Extremos e pontas das fibras modificadas

- "Tapers"

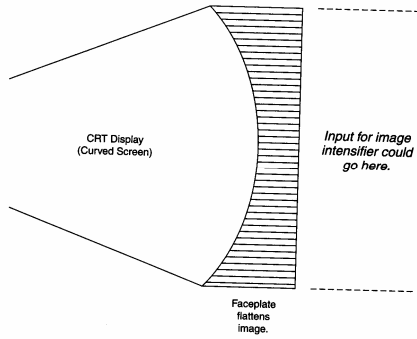


$$d_1 \cdot \text{sen} \theta_1 = d_2 \cdot \text{sen} \theta_2$$



□ Extremos e pontas das fibras modificadas

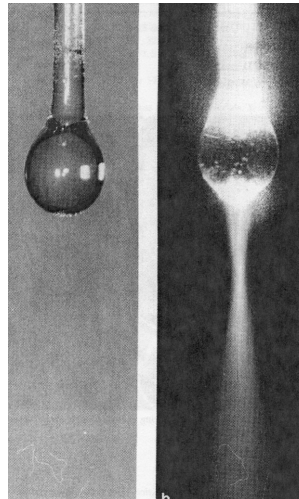
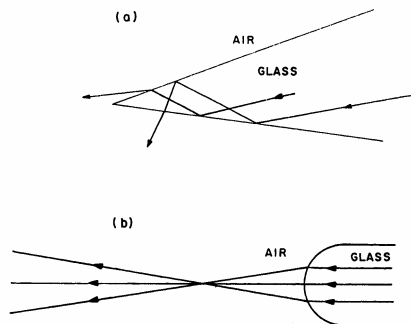
- "Faceplates"



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□ Extremos e pontas das fibras modificadas

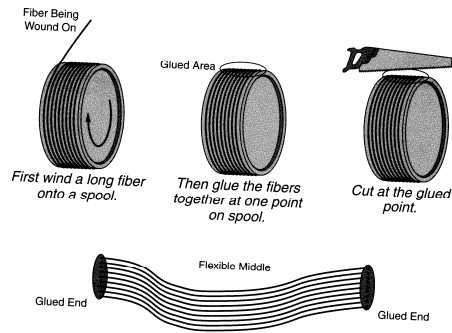
- "Tips"



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□ “Bundles” de fibras ópticas

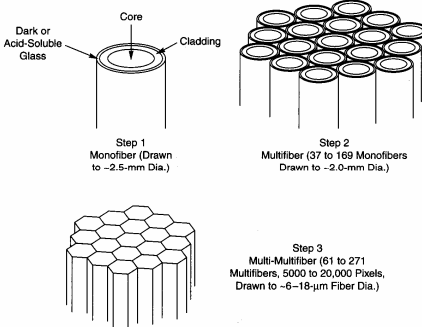
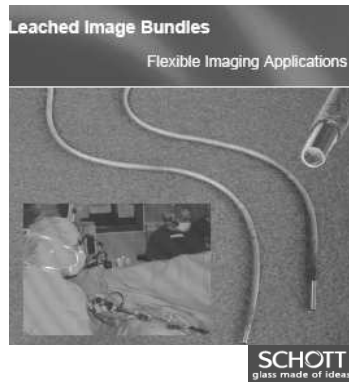
- Fabricação:
 - “Wound Fiber Bundles”



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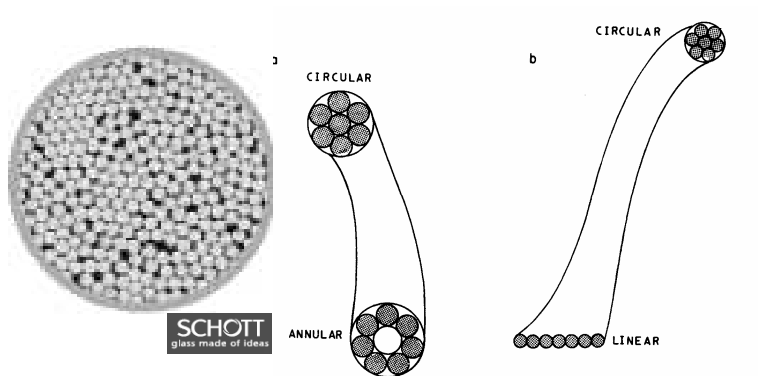
□ “Bundles” de fibras ópticas

- Fabricação:
 - “Leached Fiber Bundles”



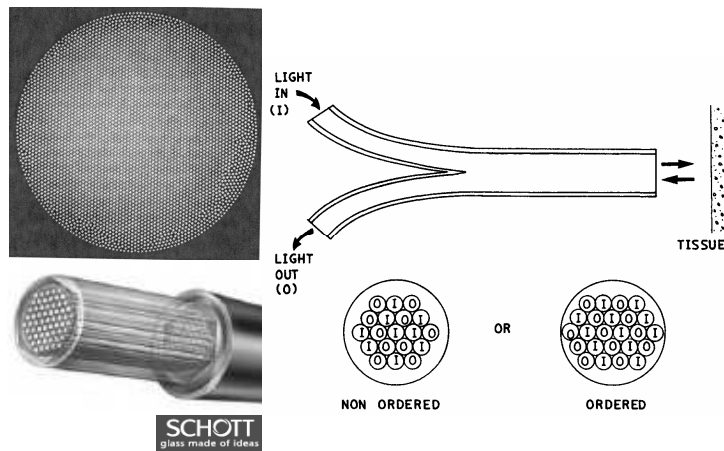
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- “Bundles” de fibras ópticas
 - “Nonordered Fiberoptic Bundles”



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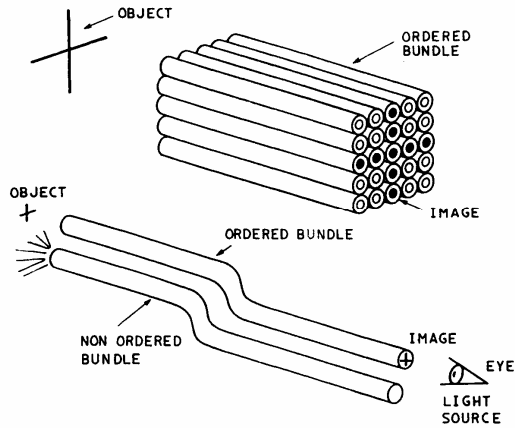
- “Bundles” de fibras ópticas
 - “Ordered Fiberoptic Bundles”



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□ “Bundles” de fibras ópticas

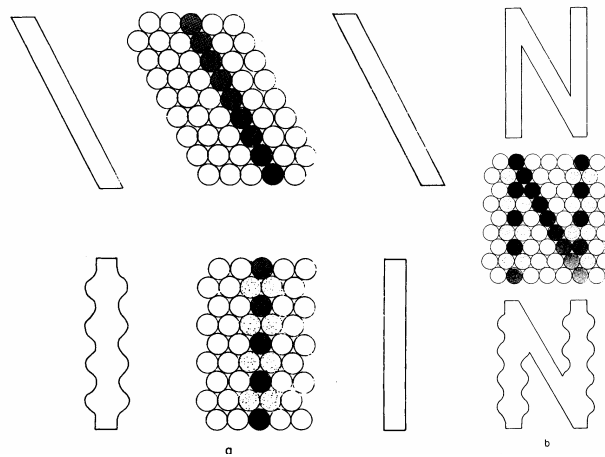
- “Ordered Fiberoptic Bundles”: transmissão de imagens



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□ “Bundles” de fibras ópticas

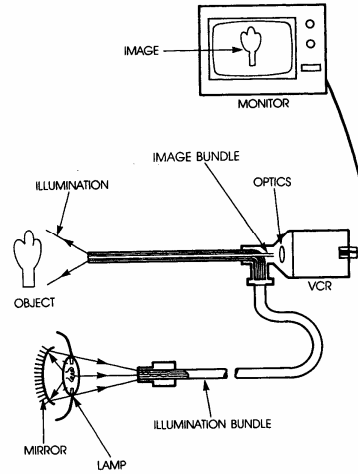
- “Ordered Fiberoptic Bundles”: transmissão de imagens



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FibOpt 81

□ “Bundles” de fibras ópticas

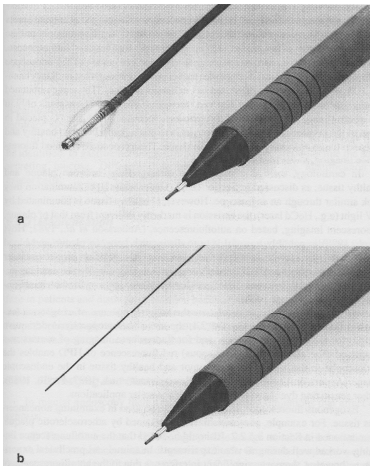
- “Fiberscopes”



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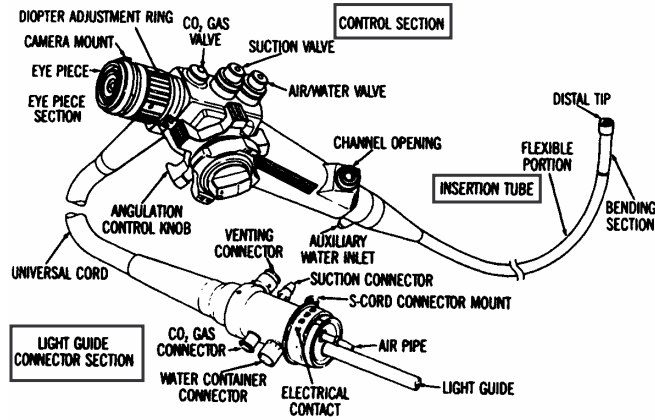
□ “Bundles” de fibras ópticas

- “Fiberscopes: Thin and Ultrathin”



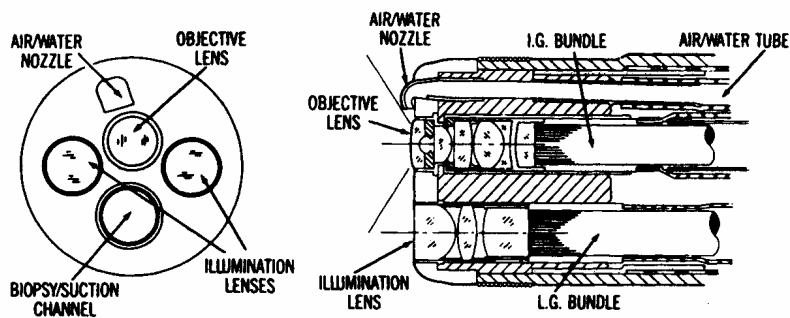
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FibOpt 83

- Endoscopia
 - O endoscópio



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FibOpt 84

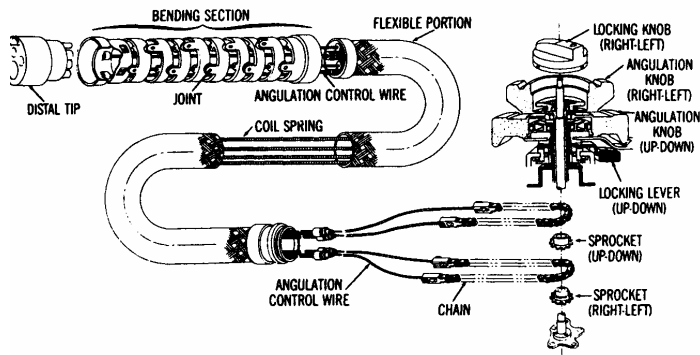
- Endoscópio
 - O extremo distal



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FibOpt 85

□ Endoscópio

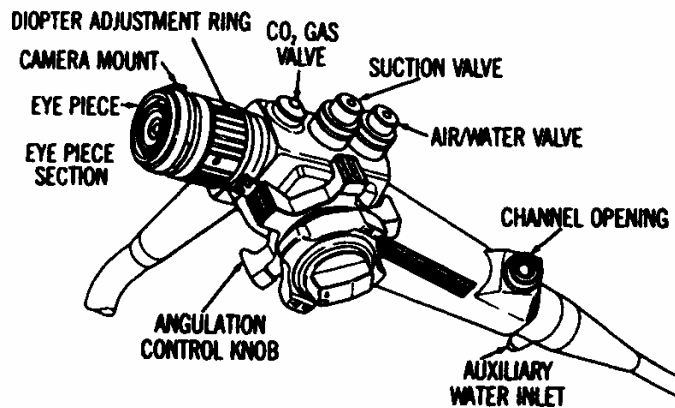
- O tubo flexível: mecanismo angular



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□ Endoscópio

- O extremo proximal



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FibOpt 87

□ Endoscópio

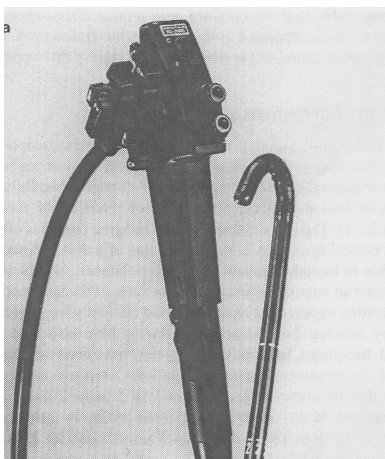
- Parâmetros característicos



Link: http://www.olympus-europa.com/endoscopy/OLY_146_07_Endoscope_overv_2007.pdf

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FibOpt 90

□ Vídeoadoscópio



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FibOpt 91

