**IE-352**

**Section 1, CRN: 5022/5030/5041**

**Section 2, CRN: 32997/32999/32998**

**Second Semester 1433-34 H (Spring-2013) – 4(4,1,1)
MANUFACTURING PROCESSES – 2**

**Wednesday, Mar 13, 2013 (01/05/1434H)**

**Exercise: Geometric Tolerance (Straightness of a Center Plane)**

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| **Name:**  | **Student Number:****4** | **Section:****8:00 / 10:00** |

**Straightness of a Center Plane**

Examine the dimensioned plane shown on the right (units in *mm*). Calculate the geometric tolerance for cross sections in the plane having the following sizes:

1. 0.632
2. 0.628
3. 0.621
4. 0.619

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**Given:**

1. $BS=0.625 mm$
	* $Size Tol.=\pm 0.005$
	* ⇒ $MMC=BS+0.005=0.625+0.005=0.630$
	* ⇒ $LMC=BS-0.005=0.625-0.005=0.620$
	* **⇒**$ 0.620\leq size\leq 0.630$
	* Note, this is the allowable range of sizes (or size zone) along the different cross sections of the plane

1. Feature control frame:
	* Straightness geometric tolerance (plane)
	* $GT=0.003 @ MMC$ (i.e. allowable GT at MMC is 0.003 mm)
	* ⇒ Virtual Condition: $V\_{c}=MMC+0.003=0.630+0.003=0.633$
	* ⇒ @ LMC: $GT\_{LMC}=V\_{c}-LMC=0.633-0.620=0.013$
	* **⇒**$ 0.003 \left(@MMC\right)\leq GT\leq 0.013 (@LMC)$
	* This is the allowable GT range (or GT zone) for this feature

**Required:**

1. $GT\_{0.632}=?$
2. $GT\_{0.628}=?$
3. $GT\_{0.621}=?$
4. $GT\_{0.619}=?$

**Solution:**

1. $size=0.632$
	* Check if within size limits: $0.632>0.630$ ⇒ **part is rejected** (note, remachining may be possible here)
2. $size=0.628$
	* Check size: $0.620<0.628<0.630$ ⇒ part is acceptable
	* $GT\_{0.628}=V\_{c}-size=0.633-0.628=0.005$
	* Check if within GT limits: $0.003<0.005<0.013 $(⇒ ok)

$$GT\_{0.628}=0.005$$

1. $size=0.621$
	* Check size: $0.620\leq 0.621\leq 0.630$ (⇒ ok)
	* $GT\_{0.621}=V\_{c}-size=0.633-0.621=0.012$
	* Check GT: $0.003<0.012<0.013 $(⇒ ok)

$$GT\_{0.628}=0.012$$

1. $size=0.619$
	* Check size: $0.619<0.620$ ⇒ **part is rejected** (note, remachining is not possible in this case)