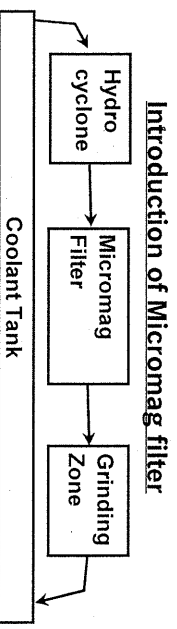
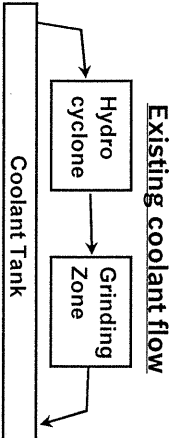


BanP / TEF1		Interim	Final	Date
Routing Copies		Methods Development and automation ✓		Machine- Tyroth
1 BanP/TEF		Project Description		22.11.10
2 BanP/MFE		Product / Component	Operation	Machine
3 BanP/MFE-E21		A type Element / Plunger	FMG	Studer RHU 400
4 BanP/MFE-M2				3274
5 BanP/M3530				
6 BanP/MW9711				
7 BanP/TEF3				
8 BanP/TEF31				
9 BanP/MW9700				
Project No : F002 4RI 035		Referred by : MFE-E21		Activity Method Improvement

- Task:**
  - To improve / achieve consistent surface finish on element plunger OD after FMG - Rz 0.7µ
  - To develop an eco friendly filtration mechanism for grinding coolant filtration

- Activity:**
  - Is-condition of process and coolant filtration studied and need for additional filtration found.
  - Selected new type magnetic filtration unit from Micro mag filters.
  - Trials conducted on Studer RHU 400 machine for Element Plunger finish match grinding with In-line type Micro Mag filter 5"
  - Filter mounted on RHU 400 along with existing Hydrocyclone filtration.
  - Component Quality monitored before and after Magnetic filtration.
  - Coolant contamination level could not be checked because of fine grit wheel and the grinding disposal is in semi-solid state



**3 Results:**

Quality	Specification	Before	After
Surface finish	Rz 0.7µ	1.08µ to 1.4µ	0.49µ to 0.66µ

**Filter details:**

Filter number	MM/5
Product number	70 lpm
Flow rate	1 kg
Muck holding	12 bar

3.1 Quality on the component was improved because of the coolant purity.

#### 4 Conclusion:

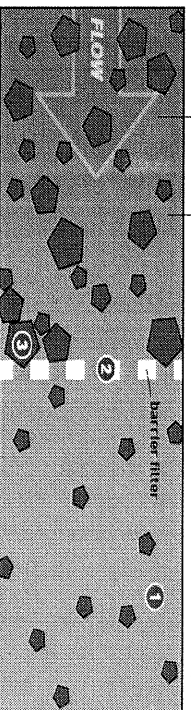
- Filtration is effective wrt to ferrous particles in coolant and this reduces the coolant contamination.
- Cleaning and disposal of muck is easier.
- Can be used in place of magnetic separator for all grinding applications & also in pressure line of through coolant application.
- Since it is a Magnetic filter, Non ferrous particles pass through. To be fixed before or after paper band/pre filter.

#### 5 Features of this filtration unit

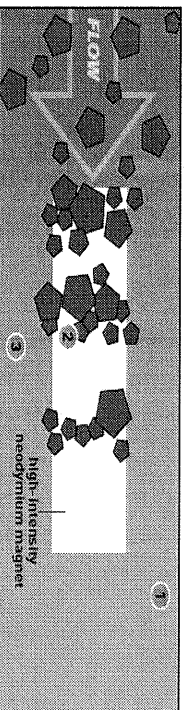
- Longer coolant life, due to better filtration properties.
- No consumables, Manual cleaning of the unit is all required, No running cost.
- Minimal coolant wastage as the unit is fixed upright and no restriction of flow, no back pressure.
- Almost dry grinding dust can be collected out, hence it can be easily disposed, Environmental friendly unit.
- Fine filtration can be achieved.

#### Filters in action

**Barrier filtration**  
contamination particles | fluid



**Magnetic filtration**



- Particles smaller than media rating remain in the fluid reducing its efficiency and increasing wear on machinery and cutting tools
- Once full, the contaminated media is disposed of along with fluid held in the filter medium
- The filter becomes clogged causing blinding and back pressure
- All particles are removed
- Once full, the contamination is removed from the magnet and can be recycled with little loss of fluid and can be recycled
- Patented magnet configuration means that even when the filter is full, flow channels remain open so there is no blinding or pressure build up

Devaraju GR  
TEF 11  
Ph : 9689


Cleared by : *[Signature]*

N. Srinivas

Srinivas N  
TEF 1  
Ph : 9408

*Micromag Filter trials*


6002 02 0000

<b>Bosch Limited</b>		<b>Results of Standards Room Measurement</b>		 <b>BOSCH</b>	
To : <i>TEF 1</i>					
W/o. No.	Date : <i>12.10.10</i>	Components/ Product No.	Spec.	Item No.	Dept. : W7760
Sl. No.	Characteristic	Obtained Values			
1	<i>Plunger OD R2</i>	0.70	0.64	0.66	
Remarks :					
Checked by : <i>W</i> Date : <i>12/10</i>					

(All values are in  $\mu\text{m}$ )

6002 02 0000

*Trial Order*

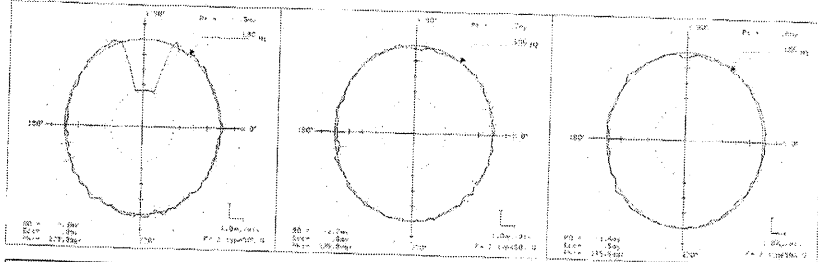
<b>Bosch Limited</b>		<b>Results of Standards Room Measurement</b>		 <b>BOSCH</b>	
To : <i>TEF 1</i>					
W/o. No.	Date : <i>13.10.10</i>	Components/ Product No.	Spec.	Item No.	Dept. : W7760
Sl. No.	Characteristic	Obtained Values			
1	<i>plunger OD R2</i>	0.70	0.49	0.56	
Remarks :					
Checked by : <i>W</i> Date : <i>13/10</i>					

(All values are in  $\mu\text{m}$ )

BEFORE

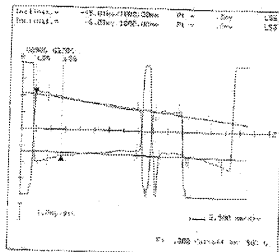
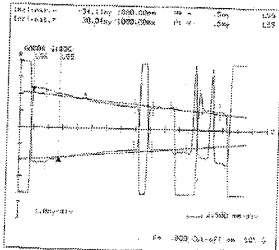
<b>Mahr</b> MEAS. RECORD MPU 8	BOSCH BANGALORE Ph: 2189 MINI Stands ROOM : PLANT-2 ; QMM-4 FORM MEASUREMENTS FROM MPU8		25 July 2010 09:31:03 W7760 TO :3530
	PART : F/660	DRAWING NO. : ELEMENT PLUNGER"	TASK NO. : %22
COMMENT : ROUNDNESS & STRAIGHTNESS ON SHAFT (FMG)			

POS M1 = 2mm FROM TOP FACE  
POS M2 = 18mm FROM TOP FACE  
POS M3 = 30mm FROM TOP FACE



RS	MP	Feature	Nom.size mm	Low.tol. my	Upp.tol. my	Act.size mm	Deviation my	TE
3	M1	ROUND	0.0000	0.00	.50	.0005	.51	U
3	M2	ROUND	0.0000	0.00	.50	.0005	.50	U
3	M3	ROUND	0.0000	0.00	.50	.0006	.64	U

STRAIGHTNESS EVALUATION  
FROM TOP FACE BETWEEN 1.5 & 31.5mm  
IS CONSIDERED

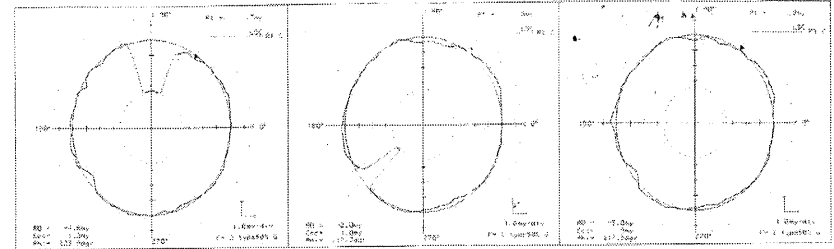


RS	MP	Feature	Nom.size mm	Low.tol. my	Upp.tol. my	Act.size mm	Deviation my	TE
3	0 DEG	STRAI	0.0000	0.00	1.00	.0005	.55	
3	180 "	STRAI	0.0000	0.00	1.00	.0005	.52	
3	90 "	STRAI	0.0000	0.00	1.00	.0003	.32	
3	270 "	STRAI	0.0000	0.00	1.00	.0008	.79	

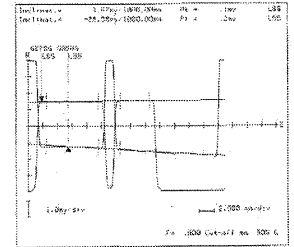
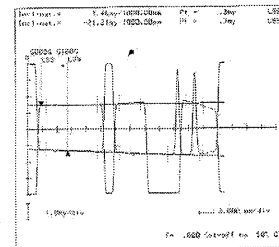
SHAFT Rz: 1) 1.08 .Um  
-----do----- 2) 1.14 .Um  
-----do----- 3) 1.42 .Um

BEFORE AFTER

<b>Mahr</b> MEAS. RECORD MPU 8	BOSCH BANGALORE Ph: 2189 MINI Stands ROOM : PLANT-2 ; QMM-4 FORM MEASUREMENTS FROM MPU 8		18 Oct 2010 09:31:03 W7760 TO :3530
	PART : F/625	DRAWING NO. : ELEMENT PLUNGER "PF" TYPE %14	TASK NO. : %14
COMMENT : ROUNDNESS&STRAIGHTNESS ON THE SHAFT (FMG)			



RS	MP	Feature	Nom.size mm	Low.tol. my	Upp.tol. my	Act.size mm	Deviation my	TE
2	R1HLX	ROUND	0.0000	0.00	.50	.0007	.75	U
2	R2MID	ROUND	0.0000	0.00	.50	.0008	.75	U
2	R3VAN	ROUND	0.0000	0.00	.50	.0008	.81	U



RS	MP	Feature	Nom.size mm	Low.tol. my	Upp.tol. my	Act.size mm	Deviation my	TE
2	0 DEG	STRAI	0.0000	0.00	1.00	.0003	.33	
2	180 "	STRAI	0.0000	0.00	1.00	.0003	.32	
2	90 "	STRAI	0.0000	0.00	1.00	.0001	.08	
2	270 "	STRAI	0.0000	0.00	1.00	.0002	.16	

RZ ON SHAFT = 0.65 um