Unless otherwise stated, the CMS mirror transmission + loss has been calculated using the measurement of finesse for ATF + CMS mirror cavity. The transmission + loss of ATF mirror is estimated from the measurement of finesse of cavity made from two ATF mirrors. The expected finesse is calculated by assuming a cavity with the same T + L for both mirrors.

The data in the red row is most probably bad due to an impurity on ATF mirror.

Test Results for mirrors from Hannover

Test results for **CMS curved mirror 0181 with a 5 cm cavity** at different mode positions on the mirror:

Mode Position (microns)	Transmission + Loss (ppm)	Expected Finesse
A (0,0)	16.4	191000
B (-110,938)	8.6	366000
C (-138,-579)	18.1	173000
D (883,-82)	14.9	211000
E (828,800)	8.5	365000

Test results for **CMS curved mirror 0154 with a 5 cm cavity** at different mode positions on the mirror:

Mode Position (microns)	Transmission + Loss (ppm)	Expected Finesse
A (0,0)	57.6	55000
B (-110,938)	8.5	372000
C (-50,-855)	18	174000
D (883,-100)	15.5	136000
E (-993,-25)	23	202000

Test results for **CMS curved mirror 0177 with a 5 cm cavity** at different mode positions on the mirror:

Mode Position (microns)	Transmission + Loss (ppm)	Expected Finesse
A (0,0)	122	25000
B (0,800)	10	329000
C (0,-1100)	17	245000
D (938,0)	17.8	239000
E (-745,0)	14	269000

Test results for **CMS plane mirror 02703 with a 5 cm cavity** at different mode positions on the mirror:

Mode Position (mm)	Transmission + Loss (ppm)	Expected Finesse
A (0,0)	22	137000
B (-1.25,0)	21	150000
C (1.25,0)	21	148000
D (0,1.25)	19	165000
E (0,-1.25)	21	149000

Test results for **CMS plane mirror 3200 with a 5 cm cavity** at different mode positions on the mirror:

Mode Position (mm)	Transmission + Loss (ppm)	Expected Finesse
A (0,0)	20	153000
B (-1.25,0)	19	165000
C (1.25,0)	21	150000
D (0,1.25)	20	156000
E (0,-1.25)	20	157000

Test results for **CMS plane mirror 3200 with a 45 cm cavity** at different mode positions on the mirror:

Mode Position (mm)	Transmission + Loss (ppm)	Expected Finesse
A (0,0)	24.7	127000
B (-1.25,0)	38.6	81000
C (1.25,0)	27.2	115000
D (0,1.25)	24.7	126000
E (0,-1.25)	30.9	101000

Measured results of CMS Plane 3200 and CMS curved mirror 0154 with a 5 cm cavity at different mode positions on the **Plane mirror**:

Mode Position (mm)	Transmission + Loss (ppm)	Finesse
A (0,0)	23	136000
B (-1.25,0)	21	149000
C (1.25,0)	21	149000

Measured results of CMS Plane 3200 and CMS curved mirror 0177 with a 5 cm cavity at different mode positions **on one or both mirrors**:

Mode Position (mm)	Transmission + Loss (ppm)	Finesse
A (0,0) on both mirrors	26.6	118000
B (-1.25,0) on plane and (0,0) on curved mirror	21.5	146000
C (0,1) on both mirrors	20.4	154000

Measured results of CMS Plane 3200 and CMS curved mirror 0154 with a 45 cm cavity at different mode positions **on both mirrors**:

Mode Position (mm)	Transmission + Loss (ppm)	Finesse
A (0,0) on both mirrors	35	89000
B (-1.275,0) on both mirror	21.9	143000
C (-1.275, 1.275) on both mirrors	26.6	118000
D (-1.275,- 1.275) on both mirrors	23.6	133000

Measured results of CMS Plane 3200 and CMS curved mirror 0177 with a 45 cm cavity at different mode positions **on both mirrors**:

Mode Position (mm)	Transmission + Loss (ppm)	Finesse
A (0,0) on both mirrors	40	78000
B (0,0.9) on both mirrors	29	108000
C (0.7,0) on both mirrors	36	87000

Repeat Measurement of **Combined 5 cm CMS Plane 3200 and CMS curved mirror 0154 cavity** at different mode positions on the **Plane mirror**:

Mode Position (mm)	Transmission + Loss (ppm)	Finesse
A (0,0)	21.5	146000
B (-1.25,0)	22	143000
C (1.25,0)	22.1	142000
D (0,1.25)	21.7	145000
E (0,-1.25)	21.2	148000

Repeat Measurement of **Combined 5 cm CMS Plane 3200 and CMS curved mirror 0154 cavity** at different mode positions on the **both mirrors**:

Mode Position (mm)	Transmission + Loss (ppm)	Finesse
A (0,0)	21.7	145000
B (-1,0) on both mirrors	46	68000
C (1,0) on both mirrors	24.7	127000
D (0,1) on both mirrors	21.3	147000
E (0,-1) on both mirrors	22.1	142000

Average 1-R observed in the first set of measurements (13 points) on the three **curved mirrors** (after removing the bad data due to a particle on the ATF plane mirror) was **14.6 ppm** which would give a finesse of **215000**. For the **plane mirrors**, the average 1-R value (from 10 points) was **20 ppm** which would give a finesse of **150000**. As a **combined system** therefore, we would expect the finesse to be above **150000**. However, the finesse values obtained in later measurements were smaller which is probably due to contamination or coating defects coming into the larger mode diameter. Also in later measurements with a 5 cm cavity gave a few points where the finesse was really bad which was not the case in the first round of measurements.